

**ALMANACCO  
ASTRONOMICO  
ASTRONOMICAL  
ALMANAC  
2012**



**Pier Paolo Ricci**

**Questo Almanacco è il frutto di centinaia di ore di lavoro, la sua realizzazione ha richiesto infatti un anno intero.**

**Se il volume ti è piaciuto è gradita una donazione come contributo allo sviluppo di volumi futuri.  
Buona lettura.**

**Ricci Pier Paolo**

**IBAN IT17 D083 0534 4800 0000 0050 030**

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**This Almanac is the result of hundreds hours of job, its creation has required in fact one whole year.**

**If you like the volume it is pleasant a donation as contribution to the development of future volumes. Good reading.**

**Ricci Pier Paolo**

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# INTRODUZIONE - PREFACE

Anche questo anno l'Almanacco si presenta bilingue, con l'intento di permettere la consultazione ad un pubblico internazionale. Vista infatti la sua diffusione esclusivamente tramite il web si è reso necessario fondere le due versioni italiana ed inglese in una unica.

La struttura delle tabelle è rimasta la stessa, così come i contenuti, seppur con qualche ampliamento e migliorata grafica.

I grandi eventi sono dettagliati adesso per tutte le maggiori città del mondo, ma pur sempre particolareggiati per l'Italia. Oltre 530 pagine per non perdere nessun evento, con dati ordinati in comode tabelle per ogni tipologia di fenomeno.

L'imponente mole di dati contenuta in questo Almanacco è rivolta a soddisfare tutte le necessità di chi osserva la volta celeste, tanto del professionista quanto dell'astrofilo. Vi sono inclusi sia i fenomeni che si renderanno visibili a occhio nudo, sia quelli notevoli per la spettacolarità e la rarità.

Oltre alle classiche effemeridi di Sole, pianeti e Luna, sono state prese in considerazione congiunzioni di ogni tipo, tra pianeti, con la Luna, con le comete, le posizioni dei satelliti di Giove e Saturno, i fenomeni mutui tra gli stessi, le eclissi solari e lunari, i raggruppamenti planetari e stellari, i prospetti di visibilità degli oggetti, le occultazioni lunari e asteroidali e tanto altro, il tutto corredato da grafici esplicativi e decine di pagine di informazioni varie.

È stato posto il massimo rigore nei calcoli e, salvo ove diversamente indicato, tutti i tempi sono espressi in Tempo Universale (TU): per avere i tempi segnati dai nostri orologi occorre ricordarsi pertanto di aggiungere un'ora in inverno e due ore in estate, quando è in vigore l'Ora Estiva. Generalmente gli eventi topocentrici sono espressi in TU, mentre quelli geocentrici in TDT. La differenza TDT-UT nel 2012 sarà di 67 secondi.

Talvolta sono stati inclusi anche eventi che iniziano o finiscono sotto l'orizzonte ma che si rendono visibili nel corso dei crepuscoli.

Le tabelle sono state create mediante l'utilizzo di software da me sviluppati o reperibili in Internet e tutti i dati sono aggiornatissimi. Per ulteriori aggiornamenti consultate il sito [www.pierpaoloricci.it](http://www.pierpaoloricci.it) o contattatemi alla mia email [almanacco.ricci@libero.it](mailto:almanacco.ricci@libero.it).

This year the Almanac is bilingual, with the intention of promoting a dialog within the international community. In fact, because its distribution is exclusively through the web, it was necessary to meld the two versions, Italian and English, into one document.

The format of the charts has remained the same as well as the contents, with some broadening and graphic improvements. The great events are detailed for the major cities of the world. About 530 pages covers events in great detail, with orderly data in easy to read charts for a wide variety of phenomenon.

Exhaustive data contained in this Almanac is designed to satisfy the needs of anyone that observes the sky whether professional or amateur. Included are phenomena that will be visible to the naked eye and those notable for their spectacularity and rarity. Besides the classical ephemerides of Sun, planets and Moon, there is data about conjunctions of every type, between planets, with the Moon, with the comets, the positions of the satellites of Jupiter and Saturn, the interactions between the them, solar and lunar eclipses, planetary and stellar groupings, the prospects of visibility of the objects, the lunar and asteroidal occultations and so much more, all with many explanatory graphics.

Calculations are maximally precise and, except where otherwise suitable, all times are Universal Time. Generally the topocentric events are in U.T., while geocentric events are in TDT. The difference TDT-UT in 2012 is 67 seconds.

Some events have been included that begin or end below the horizon but are visible during morning or evening twilight.

The charts have been created with software developed by me or available on the Internet and all the data is current.

For further updates check the site [www.pierpaoloricci.it](http://www.pierpaoloricci.it) or [www.pierpaoloricci.it/index\\_eng.htm](http://www.pierpaoloricci.it/index_eng.htm) or contact me by email [almanacco.ricci@libero.it](mailto:almanacco.ricci@libero.it).

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Pierpaolo Ricci, sono laureato in ingegneria presso il Politecnico di Milano, sono appassionato di meccanica celeste ed ho scritto numerosi software per il calcolo di fenomeni astronomici di ogni tipo. Sono iscritto all'Associazione Astronomica di Rovereto (TN) e gestisco attivamente il mio sito di astronomia: [www.pierpaoloricci.it](http://www.pierpaoloricci.it)

In copertina : immagine di fantasia.

My name is Pierpaolo Ricci. I was born in the '70s in Milan. I currently live in Rovereto (TN), an historic city in Trentino in northern Italy, located in the Vallagarina valley of the Adige River. I graduated with a mechanical engineering degree from Polytechnic University of Milan and am now working in the metalmeccanic industry. I have been passionate about astronomy all my life. I have devoted much of my free time to the study of celestial mechanics and writing numerous software programs for calculating astronomical phenomena of every type. In the 1990s I edited a scientific page in a monthly local magazine, writing articles about astronomy and astronautics. Currently I collaborate with a local Astronomic Association and I manage my astronomical site at [http://www.pierpaoloricci.it/index\\_eng](http://www.pierpaoloricci.it/index_eng)

On the cover : photo of imagination.





# CALENDARIO - CALENDAR

	Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
1	D	m	G	D	M	V	D	m	S	L	G	S
2	L	G	V	L	m	S	L	G	D	M	V	D
3	M	V	S	M	G	D	M	V	L	m	S	L
4	m	S	D	m	V	L	m	S	M	G	D	M
5	G	D	L	G	S	M	G	D	m	V	L	m
6	V	L	M	V	D	m	V	L	G	S	M	G
7	S	M	m	S	L	G	S	M	V	D	m	V
8	D	m	G	D	M	V	D	m	S	L	G	S
9	L	G	V	L	m	S	L	G	D	M	V	D
10	M	V	S	M	G	D	M	V	L	m	S	L
11	m	S	D	m	V	L	m	S	M	G	D	M
12	G	D	L	G	S	M	G	D	m	V	L	m
13	V	L	M	V	D	m	V	L	G	S	M	G
14	S	M	m	S	L	G	S	M	V	D	m	V
15	D	m	G	D	M	V	D	m	S	L	G	S
16	L	G	V	L	m	S	L	G	D	M	V	D
17	M	V	S	M	G	D	M	V	L	m	S	L
18	m	S	D	m	V	L	m	S	M	G	D	M
19	G	D	L	G	S	M	G	D	m	V	L	m
20	V	L	M	V	D	m	V	L	G	S	M	G
21	S	M	m	S	L	G	S	M	V	D	m	V
22	D	m	G	D	M	V	D	m	S	L	G	S
23	L	G	V	L	m	S	L	G	D	M	V	D
24	M	V	S	M	G	D	M	V	L	m	S	L
25	m	S	D	m	V	L	m	S	M	G	D	M
26	G	D	L	G	S	M	G	D	m	V	L	m
27	V	L	M	V	D	m	V	L	G	S	M	G
28	S	M	m	S	L	G	S	M	V	D	m	V
29	D	m	G	D	M	V	D	m	S	L	G	S
30	L		V	L	m	S	L	G	D	M	V	D
31	M		S		G		M	V		m		L

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	S	W	T	S	T	F	S	W	S	M	T	S
2	M	T	F	M	W	S	M	T	S	T	F	S
3	T	F	S	T	T	S	T	F	M	W	S	M
4	W	S	S	W	F	M	W	S	T	T	S	T
5	T	S	M	T	S	T	T	S	W	F	M	W
6	F	M	T	F	S	W	F	M	T	S	T	T
7	S	T	W	S	M	T	S	T	F	S	W	F
8	S	W	T	S	T	F	S	W	S	M	T	S
9	M	T	F	M	W	S	M	T	S	T	F	S
10	T	F	S	T	T	S	T	F	M	W	S	M
11	W	S	S	W	F	M	W	S	T	T	S	T
12	T	S	M	T	S	T	T	S	W	F	M	W
13	F	M	T	F	S	W	F	M	T	S	T	T
14	S	T	W	S	M	T	S	T	F	S	W	F
15	S	W	T	S	T	F	S	W	S	M	T	S
16	M	T	F	M	W	S	M	T	S	T	F	S
17	T	F	S	T	T	S	T	F	M	W	S	M
18	W	S	S	W	F	M	W	S	T	T	S	T
19	T	S	M	T	S	T	T	S	W	F	M	W
20	F	M	T	F	S	W	F	M	T	S	T	T
21	S	T	W	S	M	T	S	T	F	S	W	F
22	S	W	T	S	T	F	S	W	S	M	T	S
23	M	T	F	M	W	S	M	T	S	T	F	S
24	T	F	S	T	T	S	T	F	M	W	S	M
25	W	S	S	W	F	M	W	S	T	T	S	T
26	T	S	M	T	S	T	T	S	W	F	M	W
27	F	M	T	F	S	W	F	M	T	S	T	T
28	S	T	W	S	M	T	S	T	F	S	W	F
29	S	W	T	S	T	F	S	W	S	M	T	S
30	M		F	M	W	S	M	T	S	T	F	S
31	T		S		T		T	F		W		M

# PASQUA - EASTER

07/04/1901	20/04/1924	06/04/1947	29/03/1970	11/04/1993	27/03/2016	10/04/2039	26/03/2062	15/04/2085
30/03/1902	12/04/1925	28/03/1948	11/04/1971	03/04/1994	16/04/2017	01/04/2040	15/04/2063	31/03/2086
12/04/1903	04/04/1926	17/04/1949	02/04/1972	16/04/1995	01/04/2018	21/04/2041	06/04/2064	20/04/2087
03/04/1904	17/04/1927	09/04/1950	22/04/1973	07/04/1996	21/04/2019	06/04/2042	29/03/2065	11/04/2088
23/04/1905	08/04/1928	25/03/1951	14/04/1974	30/03/1997	12/04/2020	29/03/2043	11/04/2066	03/04/2089
15/04/1906	31/03/1929	13/04/1952	30/03/1975	12/04/1998	04/04/2021	17/04/2044	03/04/2067	16/04/2090
31/03/1907	20/04/1930	05/04/1953	18/04/1976	04/04/1999	17/04/2022	09/04/2045	22/04/2068	08/04/2091
19/04/1908	05/04/1931	18/04/1954	10/04/1977	23/04/2000	09/04/2023	25/03/2046	14/04/2069	30/03/2092
11/04/1909	27/03/1932	10/04/1955	26/03/1978	15/04/2001	31/03/2024	14/04/2047	30/03/2070	12/04/2093
27/03/1910	16/04/1933	01/04/1956	15/04/1979	31/03/2002	20/04/2025	05/04/2048	19/04/2071	04/04/2094
16/04/1911	01/04/1934	21/04/1957	06/04/1980	20/04/2003	05/04/2026	18/04/2049	10/04/2072	24/04/2095
07/04/1912	21/04/1935	06/04/1958	19/04/1981	11/04/2004	28/03/2027	10/04/2050	26/03/2073	15/04/2096
23/03/1913	12/04/1936	29/03/1959	11/04/1982	27/03/2005	16/04/2028	02/04/2051	15/04/2074	31/03/2097
12/04/1914	28/03/1937	17/04/1960	03/04/1983	16/04/2006	01/04/2029	21/04/2052	07/04/2075	20/04/2098
04/04/1915	17/04/1938	02/04/1961	22/04/1984	08/04/2007	21/04/2030	06/04/2053	19/04/2076	12/04/2099
23/04/1916	09/04/1939	22/04/1962	07/04/1985	23/03/2008	13/04/2031	29/03/2054	11/04/2077	28/03/2100
08/04/1917	24/03/1940	14/04/1963	30/03/1986	12/04/2009	28/03/2032	18/04/2055	03/04/2078	
31/03/1918	13/04/1941	29/03/1964	19/04/1987	04/04/2010	17/04/2033	02/04/2056	23/04/2079	
20/04/1919	05/04/1942	18/04/1965	03/04/1988	24/04/2011	09/04/2034	22/04/2057	07/04/2080	
04/04/1920	25/04/1943	10/04/1966	26/03/1989	08/04/2012	25/03/2035	14/04/2058	30/03/2081	
27/03/1921	09/04/1944	26/03/1967	15/04/1990	31/03/2013	13/04/2036	30/03/2059	19/04/2082	
16/04/1922	01/04/1945	14/04/1968	31/03/1991	20/04/2014	05/04/2037	04/04/2060	18/04/2083	
01/04/1923	21/04/1946	06/04/1969	19/04/1992	05/04/2015	25/04/2038	10/04/2061	26/03/2084	

# CALENDARIO PERPETUO - PERPETUAL CALENDAR

## SECOLO / CENTURY

0	100	200	300	400	500	600
700	800	900	1000	1100	1200	1300
1400	1500			1500	1600	
1700		1800		1900	2000	
2100		2200		2300	2400	
2500		2600		2700	2800	

## LETTERA DOMENICALE / SUNDAY CODE

## ANNI / YEARS

DC	ED	FE	GF	AG	BA	CB	00		
B	C	D	E	F	G	A	01	29	57 85
A	B	C	D	E	F	G	02	30	58 86
G	A	B	C	D	E	F	03	31	59 87
FE	GF	AG	BA	CB	DC	ED	04	32	60 88
D	E	F	G	A	B	C	05	33	61 89
C	D	E	F	G	A	B	06	34	62 90
B	C	D	E	F	G	A	07	35	63 91
AG	BA	CB	DC	ED	FE	GF	08	36	64 92
F	G	A	B	C	D	E	09	37	65 93
E	F	G	A	B	C	D	10	38	66 94
D	E	F	G	A	B	C	11	39	67 95
CB	DC	ED	FE	GF	AG	BA	12	40	68 96
A	B	C	D	E	F	G	13	41	69 97
G	A	B	C	D	E	F	14	42	70 98
F	G	A	B	C	D	E	15	43	71 99
ED	FE	GF	AG	BA	CB	DC	16	44	72
C	D	E	F	G	A	B	17	45	73
B	C	D	E	F	G	A	18	46	74
A	B	C	D	E	F	G	19	47	75
GF	AG	BA	CB	DC	ED	FE	20	48	76
E	F	G	A	B	C	D	21	49	77
D	E	F	G	A	B	C	22	50	78
C	D	E	F	G	A	B	23	51	79
BA	CB	DC	ED	FE	GF	AG	24	52	80
G	A	B	C	D	E	F	25	53	81
F	G	A	B	C	D	E	26	54	82
E	F	G	A	B	C	D	27	55	83
DC	ED	FE	GF	AG	BA	CB	28	56	84

## MESE

## MONTHS

gennaio, ottobre	A B C D E F G	January, October	A B C D E F G
febbraio, marzo, novembre	D E F G A B C	February, March, November	D E F G A B C
aprile, luglio	G A B C D E F	April, July	G A B C D E F
maggio	B C D E F G A	May	B C D E F G A
giugno	E F G A B C D	June	E F G A B C D
agosto	C D E F G A B	August	C D E F G A B
settembre, dicembre	F G A B C D E	September, December	F G A B C D E

## DATA

## DAYS

1	8	15	22	29	D S V G m M L	1	8	15	22	29	S S F T W T M
2	9	16	23	30	L D S V G m M	2	9	16	23	30	M S S F T W T
3	10	17	24	31	M L D S V G m	3	10	17	24	31	T M S S F T W
4	11	18	25		m M L D S V G	4	11	18	25		W T M S S F T
5	12	19	26		G m M L D S V	5	12	19	26		T W T M S S F
6	13	20	27		V G m M L D S	6	13	20	27		F T W T M S S
7	14	21	28		S V G m M L D	7	14	21	28		S F T W T M S

Utilizzo: stabilita la data (per esempio 15-04-2012), trovare la lettera domenicale (per gli anni bisestili sono due, la prima da usarsi per i mesi di gennaio e febbraio, e la seconda per gli altri mesi) che è posta nel punto di incrocio fra la colonna del secolo che interessa (nel nostro caso 2000) e la riga in cui si trovano le ultime due cifre dell'anno che consideriamo (nel nostro caso 12): quindi G.

Per le date tra il 1500 e il 4-10-1582 si utilizza la seconda colonna, dove sta il 1500 del calendario giuliano, e per quelle dal 15-10-1582 al 1599 si utilizza la quinta colonna, dove sta il 1500 del calendario gregoriano.

Ricordo che i giorni che vanno dal 5 ottobre al 14 ottobre 1582 non sono mai esistiti.

Si cerca poi, nel settore dei mesi, in quale colonna la lettera appare sulla stessa linea orizzontale del mese considerato (aprile): nel nostro caso, nella prima colonna. Infine, nella stessa colonna verticale (cioè la prima), nel settore dei giorni, si individua il giorno della settimana che appare all'incrocio con la riga in cui sta il giorno del mese considerato (il 15): ed abbiamo che è D, domenica. Si tenga presente che M (maiuscolo) sta per martedì ed m (minuscolo) sta per mercoledì.

How to use: set a date (for example 15-April-2012), find the Sunday code (in the leap years they are two, the first for January and February, and the second for the others months) in the cross of the column of the century (in this example 2000) and the row of the last two figures of the year (in this case 12): G.

In the dates since 1500 to 4-10-1582 we use the second column, for the julian calendar, since 15-10-1582 al 1599 we use the fourth column, for the Gregorian Calendar.

The days from 5 october to 14 october 1582 don't exist.

We look then, in the sector of the months, in what column the letter appears on the same horizontal line of the considered month (April): in our case, in the first column. Finally, in the same vertical column (the first), in the sector of the days, we individualize the day of the week that appears to the intersection with the line in which it is the day (15) of the considered month: and we have that it is S, Sunday.

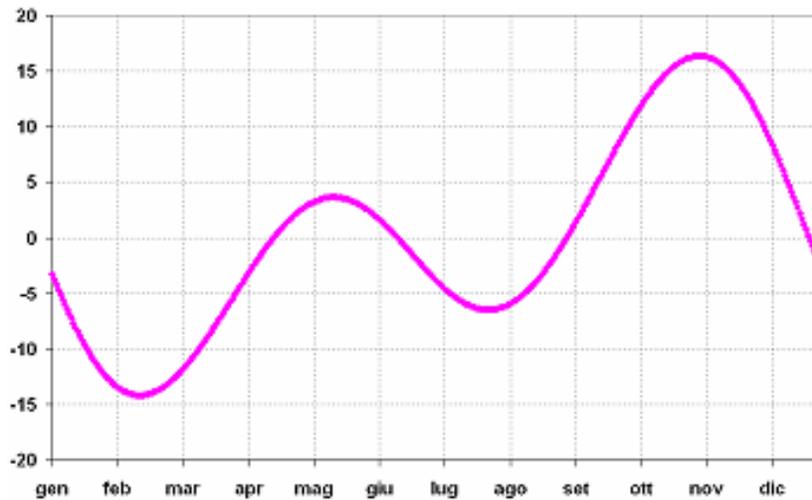
# EQUAZIONE DEL TEMPO - EQUATION OF TIME

L'equazione del tempo è la differenza tra il tempo solare vero e il tempo solare medio. E' espressa in minuti e secondi.

Tale differenza dipende dal fatto che il tempo solare medio è basato sul movimento di un Sole ipotetico (il Sole medio) che nel corso dell'anno si muove con moto uniforme lungo l'equatore celeste, mentre il moto annuo del Sole vero lungo l'eclittica non è uniforme.

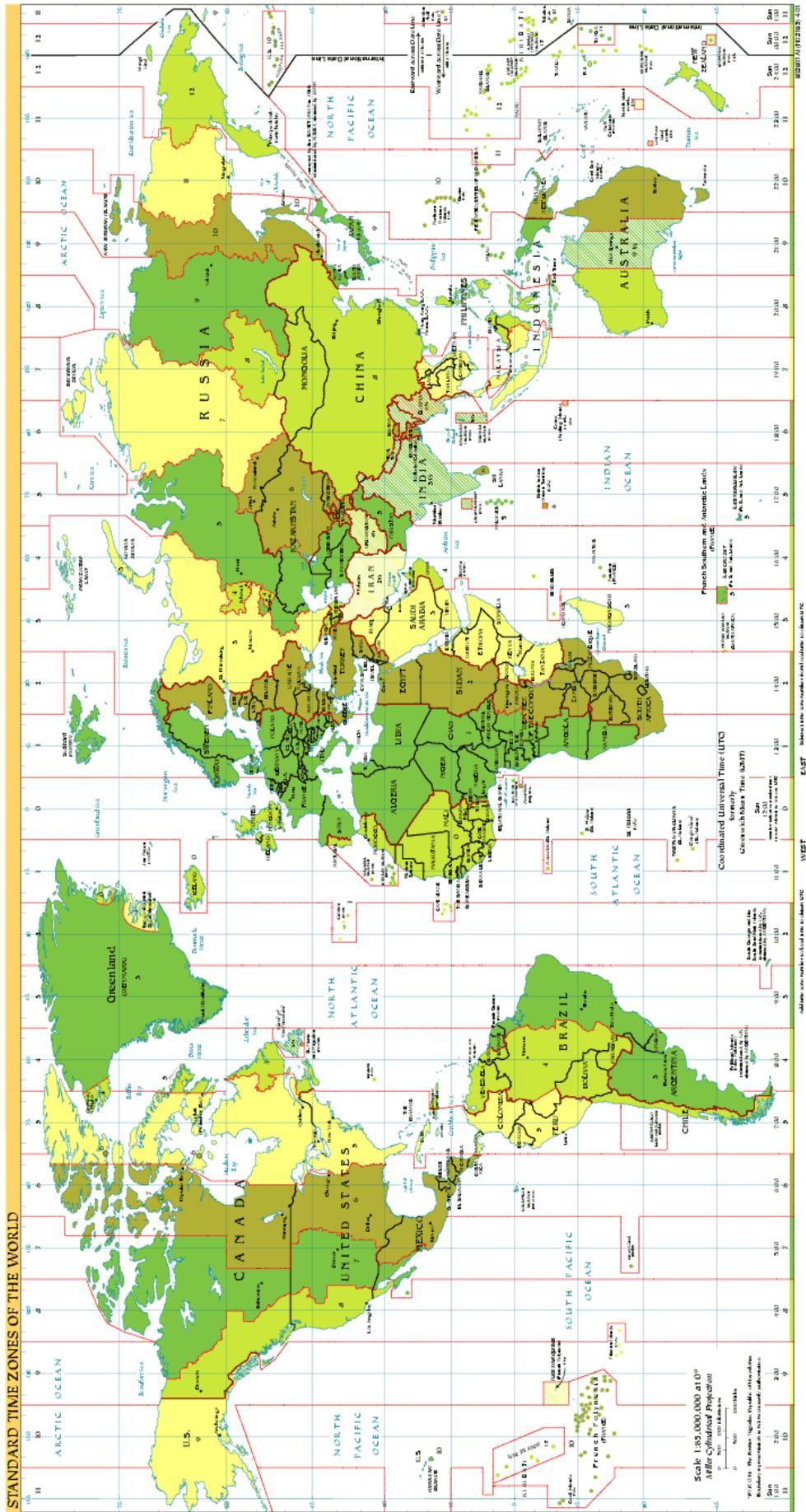
The equation of the time is the difference between the true solar time and the medium solar time. It is showed in minutes and seconds. Such difference depends on the fact that the medium solar time is based on the movement of a hypothetical Sun (the medium Sun) that moves with uniform motion along the celestial equator during the year, while the annual motion of the true Sun along the ecliptica is not uniform.

	Gen/Jan	Feb	Mar	Apr	Mag/Maj	Giu/Jun	Lug/Jul	Ago/Aug	Set/Sep	Ott/Oct	Nov	Dic/Dec
1	-3m 26s	-13m 32s	-12m 25s	-3m 59s	2m 52s	2m 14s	-3m 47s	-6m 21s	-0m 6s	10m 15s	16m 25s	11m 7s
2	-3m 54s	-13m 40s	-12m 13s	-3m 41s	2m 59s	2m 5s	-3m 59s	-6m 17s	0m 13s	10m 34s	16m 26s	10m 44s
3	-4m 21s	-13m 47s	-12m 0s	-3m 23s	3m 6s	1m 55s	-4m 10s	-6m 12s	0m 33s	10m 53s	16m 27s	10m 21s
4	-4m 49s	-13m 53s	-11m 47s	-3m 5s	3m 12s	1m 45s	-4m 21s	-6m 7s	0m 52s	11m 12s	16m 27s	9m 57s
5	-5m 16s	-13m 58s	-11m 34s	-2m 48s	3m 17s	1m 35s	-4m 31s	-6m 1s	1m 12s	11m 30s	16m 26s	9m 33s
6	-5m 42s	-14m 3s	-11m 20s	-2m 31s	3m 22s	1m 24s	-4m 41s	-5m 55s	1m 32s	11m 48s	16m 24s	9m 8s
7	-6m 8s	-14m 6s	-11m 6s	-2m 14s	3m 27s	1m 13s	-4m 51s	-5m 48s	1m 53s	12m 5s	16m 21s	8m 42s
8	-6m 34s	-14m 9s	-10m 52s	-1m 57s	3m 30s	1m 2s	-5m 1s	-5m 41s	2m 13s	12m 22s	16m 17s	8m 16s
9	-6m 59s	-14m 11s	-10m 37s	-1m 40s	3m 34s	0m 51s	-5m 10s	-5m 33s	2m 34s	12m 39s	16m 13s	7m 49s
10	-7m 24s	-14m 13s	-10m 22s	-1m 24s	3m 36s	0m 39s	-5m 19s	-5m 24s	2m 55s	12m 55s	16m 7s	7m 22s
11	-7m 48s	-14m 13s	-10m 6s	-1m 8s	3m 38s	0m 27s	-5m 27s	-5m 15s	3m 16s	13m 11s	16m 1s	6m 55s
12	-8m 11s	-14m 13s	-9m 50s	-0m 52s	3m 40s	0m 14s	-5m 35s	-5m 5s	3m 37s	13m 26s	15m 54s	6m 27s
13	-8m 34s	-14m 12s	-9m 34s	-0m 37s	3m 40s	0m 2s	-5m 43s	-4m 55s	3m 58s	13m 41s	15m 46s	5m 59s
14	-8m 57s	-14m 11s	-9m 18s	-0m 22s	3m 41s	-0m 11s	-5m 50s	-4m 44s	4m 19s	13m 55s	15m 37s	5m 30s
15	-9m 18s	-14m 8s	-9m 1s	-0m 7s	3m 40s	-0m 24s	-5m 56s	-4m 33s	4m 40s	14m 9s	15m 28s	5m 2s
16	-9m 39s	-14m 5s	-8m 44s	0m 7s	3m 39s	-0m 37s	-6m 2s	-4m 21s	5m 2s	14m 22s	15m 17s	4m 33s
17	-10m 0s	-14m 1s	-8m 27s	0m 21s	3m 38s	-0m 50s	-6m 8s	-4m 8s	5m 23s	14m 35s	15m 6s	4m 3s
18	-10m 19s	-13m 57s	-8m 10s	0m 35s	3m 36s	-1m 3s	-6m 13s	-3m 55s	5m 45s	14m 47s	14m 54s	3m 34s
19	-10m 38s	-13m 52s	-7m 53s	0m 48s	3m 33s	-1m 16s	-6m 17s	-3m 42s	6m 6s	14m 58s	14m 41s	3m 4s
20	-10m 56s	-13m 46s	-7m 35s	1m 1s	3m 30s	-1m 29s	-6m 21s	-3m 28s	6m 27s	15m 9s	14m 28s	2m 35s
21	-11m 14s	-13m 39s	-7m 17s	1m 13s	3m 26s	-1m 42s	-6m 24s	-3m 13s	6m 49s	15m 19s	14m 13s	2m 5s
22	-11m 30s	-13m 32s	-6m 59s	1m 25s	3m 22s	-1m 55s	-6m 27s	-2m 59s	7m 10s	15m 29s	13m 58s	1m 35s
23	-11m 46s	-13m 24s	-6m 42s	1m 37s	3m 18s	-2m 8s	-6m 29s	-2m 43s	7m 31s	15m 38s	13m 42s	1m 6s
24	-12m 1s	-13m 16s	-6m 24s	1m 48s	3m 12s	-2m 21s	-6m 31s	-2m 27s	7m 52s	15m 46s	13m 25s	0m 36s
25	-12m 16s	-13m 7s	-6m 5s	1m 59s	3m 7s	-2m 34s	-6m 31s	-2m 11s	8m 13s	15m 53s	13m 8s	0m 6s
26	-12m 29s	-12m 57s	-5m 47s	2m 9s	3m 0s	-2m 47s	-6m 32s	-1m 54s	8m 34s	16m 0s	12m 49s	-0m 24s
27	-12m 42s	-12m 47s	-5m 29s	2m 18s	2m 54s	-2m 59s	-6m 31s	-1m 37s	8m 55s	16m 6s	12m 30s	-0m 53s
28	-12m 54s	-12m 36s	-5m 11s	2m 28s	2m 47s	-3m 12s	-6m 31s	-1m 19s	9m 15s	16m 12s	12m 10s	-1m 23s
29	-13m 4s	-12m 28s	-4m 53s	2m 36s	2m 39s	-3m 24s	-6m 29s	-1m 2s	9m 35s	16m 16s	11m 50s	-1m 52s
30	-13m 15s		-4m 35s	2m 45s	2m 31s	-3m 36s	-6m 27s	-0m 43s	9m 55s	16m 20s	11m 29s	-2m 21s
31	-13m 24s		-4m 17s		2m 23s		-6m 24s	-0m 25s		16m 23s		-2m 50s



Esempio : il 15 aprile il Sole passa in meridiano alle 12.00.24 circa, ossia mezzo minuto in ritardo rispetto al mezzogiorno del nostro orologio.

Example: on July 3 the Sun passes in meridian at 12.00.24 o'clock, half minute late in comparison to the midday of our clock



# FUSI ORARI - TIME ZONES

UTC-12 : Isola Baker, Isola Howland

UTC-11 (BEST - Bering Standard Time) : Isole Midway ,Niue ,Samoa ,Samoa Americane

UTC-10 (HST - Hawaii-Aleutian Standard Time) : Atollo Johnston , Polinesia Francese (Tahiti, Arcipelago Tuamotu, Isole Tubuai) ,Stati Uniti (Hawaii) ,Stati Uniti (Isole Aleutine dell'Alaska)\*

UTC-9:30 : Polinesia Francese (Isole Marchesi)

UTC-9 (AKST - Alaska Standard Time) : Polinesia Francese (Isole Gambier) ,Stati Uniti (Alaska\*)

UTC-8 (PST - Pacific Standard Time) : Canada (Columbia Britannica\*, Yukon\*), Messico (Bassa California\*), Stati Uniti (California\*, Idaho (settentrionale)\*, Nevada\*, Oregon \*, Stato di Washington\*)

UTC-7 (MST - Mountain Standard Time) : Canada (Alberta\*,Territori del Nord-Ovest\*,Nunavut\*), Messico,Stati Uniti (Arizona, Colorado\*, Idaho (meridionale)\*, Montana\*, Nebraska (occidentale)\*, Nuovo Messico\*, Dakota del Nord\*, Oregon\*, Dakota del Sud\*, Utah\*, Wyoming\*)

UTC-6 (CST - Central Standard Time) : Belize , Canada (Manitoba\*, Nunavut (Isola Southampton), Nunavut (centrale)\*, Ontario (occidentale)\*, Saskatchewan) , Cile (Isola di Pasqua), Costa Rica , Ecuador (Isole Galapagos), El Salvador, Guatemala, Honduras, Messico\* (Città del Messico e tutti gli stati non menzionati), Nicaragua, Stati Uniti (Alabama\*, Arkansas\*, Illinois\*, Indiana\*, Iowa\*, Kansas\*, Kentucky (occidentale)\*, Louisiana\*, Minnesota\*, Mississippi\*, Missouri\*, Nebraska (orientale)\*, Dakota del Nord\*, Oklahoma\*, Dakota del Sud (orientale)\*, Tennessee centrale e occidentale)\*, Texas\*, Wisconsin\*)

UTC-5 (EST - Eastern Standard Time) : Brasile (Acre) ,Canada (Nunavut (orientale)\*, Ontario\*, Quebec\*), Colombia , Cuba\*, Ecuador, Giamaica, Haiti, Isole Cayman, Isole Turks e Caicos\* , Panamá, Perù, Stati Uniti (Connecticut\*, Delaware\*, Distretto di Columbia\*, Florida\*, Georgia\*, Indiana (gran parte dello stato), Kentucky (orientale e centrale)\*, Maine\*, Maryland\*, Massachusetts\*, Michigan\*, New Hampshire\*, New Jersey\*, New York\*, Carolina del Nord\*, Ohio\*, Pennsylvania\*, Rhode Island\*, Carolina del Sud\*, Tennessee (orientale)\*, Vermont\*, Virginia\*, Virginia Occidentale\*)

UTC-4 (AST - Atlantic Standard Time) : Anguilla , Antigua e Barbuda, Antille Olandesi, Aruba, Barbados, Bolivia, Brasile (Amazonas, Mato Grosso\*, Mato Grosso do Sul\*, Para (occidentale), Rondonia, Roraima), Canada (Labrador\*, New Brunswick\*, Nuova Scozia\*, Isola del Principe Edoardo\*) , Cile\*, Dominica, Grenada, Guadalupa , Guyana, Isole Falkland\*, Isole Vergini, Martinica, Montserrat, Paraguay\*, Porto Rico, Repubblica Dominicana, Saint Kitts e Nevis, Saint Vincent e le Grenadine, Santa Lucia, Trinidad e Tobago, Venezuela

UTC-3:30 (NST - Newfoundland Standard Time) : Canada (Terranova\*)

UTC-3 : Argentina ,Bahamas\* ,Brasile (Alagoas, Amapa, Bahia\*, Ceara, Distrito Federal\*, Espirito Santo\*, Goias\*, Maranhao, Minas Gerais\*, Para (orientale), Paraiba, Parana\*, Pernambuco, Piaui, Rio de Janeiro\*, Rio Grande do Norte, Rio Grande do Sul\*, Santa Catarina\*, Sao Paulo\*, Sergipe, Tocantins\*) ,Groenlandia, Guiana Francese\* ,Saint Pierre e Miquelon\* ,Suriname ,Uruguay

UTC-2 : Bermuda\* , Brasile (Fernando de Noronha)

UTC-1 : Capo Verde , Portogallo (Azzorre\*)

UTC (WET - West European Time) : Burkina Faso , Costa d'Avorio , Gambia ,Ghana ,Guinea ,Guinea-Bissau , Irlanda\* , Islanda ,Isole Faroe\* ,Liberia ,Mali ,Mauritania ,Marocco ,Portogallo\* ,Regno Unito\* , Sant'Elena ,São Tomé e Príncipe ,Senegal ,Sierra Leone ,Spagna\* (Canarie) ,Togo

UTC+1 (CET - Central European Time) : Albania\* ,Andorra\* ,Angola ,Austria\* ,Belgio\* ,Benin ,Bosnia-Erzegovina\* ,Camerun ,Ciad ,Croazia\* ,Danimarca\* ,Francia\* ,Gabon ,Germania\* ,Gibilterra\* ,Guinea Equatoriale ,Italia\* ,Isole Svalbard e Jan Mayen\*,Liechtenstein\* ,Lussemburgo\* ,Macedonia\* , Malta\* Principato di Monaco\* ,Montenegro\* ,Namibia\* ,Niger ,Nigeria ,Norvegia\* ,Paesi Bassi\* , Polonia\* , Repubblica Ceca\* ,Repubblica Centrafricana ,Repubblica del Congo ,Repubblica Democratica del Congo (Kinshasa, Bandundu, Bas-Congo, Équateur) ,San Marino\* ,Serbia\* ,Slovacchia\* ,Slovenia\* ,Spagna\* ,Svezia\* ,Svizzera\* ,Tunisia\* ,Ungheria\*

UTC+2 (EET - East European Time) : Bielorussia\* ,Botswana ,Bulgaria\* ,Burundi ,Cipro\* ,Cisgiordania\* , Egitto\* ,Estonia\* ,Finlandia\* ,Giordania ,Grecia\* ,Israele\* ,Lettonia\* ,Lesotho ,Libano\* ,Libia ,Lituania\* Malawi ,Moldavia\* ,Mozambico ,Repubblica Democratica del Congo (Kasai-Occidental, Kasai-Oriental, Alto Zaire, Katanga) ,Romania\* ,Russia (Zona 1\*, compresa Kaliningrad) ,Ruanda ,Striscia di Gaza\* ,Sudafrica , Swaziland ,Siria\* ,Turchia\* ,Ucraina\* ,Zambia ,Zimbabwe

UTC+3 (MSK - Moscow Time) : Arabia Saudita , Bahrain , Comore ,Eritrea ,Etiopia ,Gibuti ,Iraq\* ,Kenya , Kuwait ,Madagascar ,Mayotte ,Qatar ,Russia (Zona 2\*, include Mosca e San Pietroburgo; questo fuso orario si applica anche alle ferrovie di tutta la Russia) ,Somalia ,Sudan ,Tanzania ,Uganda ,Yemen

UTC+3:30 : Iran

UTC+4 : Emirati Arabi Uniti , Georgia , Mauritius , Oman ,Reunion ,Russia (Zona 3\*) ,Seychelles

UTC+4:30 : Afghanistan

UTC+5 : Armenia , Azerbaigian\* ,Kazakistan (Occidentale)\* ,Maldive ,Pakistan ,Russia (Zona 4\*, comprende Ekaterinburg e Perm) ,Tagikistan ,Turkmenistan ,Uzbekistan

UTC+5:30 (IST - Indian Standard Time) : India ,Sri Lanka

UTC+5:45 : Nepal

UTC+6 : Bangladesh ,Bhutan ,Kazakistan (orientale) ,Kirghizistan ,Russia (Zona 5\*, comprende Novosibirsk e Omsk) ,Sri Lanka

UTC+6:30 : Isole Cocos , Myanmar

UTC+7 : Cambogia ,Indonesia (occidentale) ,Isola Christmas (Australia) ,Laos ,Russia (Zona 6\*) , Thailandia ,Vietnam

UTC+8 (AWST - Australian Western Standard Time) : Australia (Australia Occidentale) ,Brunei ,Cina (continentale),Filippine ,Hong Kong ,Indonesia (centrale),Macao ,Malesia ,Mongolia ,Russia (Zona 7\*),Singapore, Taiwan

Si noti che l'intera Cina ha lo stesso orario, il che rende questo fuso orario eccezionalmente ampio. All'estremità occidentale della Cina il Sole raggiunge lo zenit alle 15:00, all'estremità orientale alle 11:00.

UTC+8:45 : Caiguna, Eucla (Australia Occidentale)

UTC+9 : Corea del Nord ,Corea del Sud (KST - tempo standard della Corea) ,Giappone (JST - Tempo standard del Giappone) ,Indonesia (orientale) ,Palau ,Russia (Zona 8\*, comprende Yakutsk) ,Timor Est

UTC+9:30 (ACST - Australian Central Standard Time) : Australia (Broken Hill (Nuovo Galles del Sud); Territori del Nord; Australia Meridionale\*)

UTC+10 (AEST - Australian Eastern Standard Time) : Australia (Australian Capital Territory\*, Nuovo Galles del Sud\* (eccetto Broken Hill), Queensland, Victoria\*, Tasmania\*) ,Guam ,Isole Cook ,Isole Marianne Settentrionali, Papua Nuova Guinea ,Russia (Zona 9\*, comprende Vladivostok) ,Stati Federati di Micronesia

UTC+10:30 : Australia (Isola Lord Howe\*) (DST solo 0:30)

UTC+11 : Isole Salomone ,Nuova Caledonia ,Russia (Zona 10\*) ,Stati Federati di Micronesia (Kosrae e Pohnpei), Vanuatu

UTC+11:30 : Isole Norfolk

UTC+12 : Figi\* ,Isola Wake ,Isole Marshall ,Kiribati (Isole Gilbert) ,Nauru ,Nuova Zelanda (Aotearoa)\* , Russia (Zona 11\*) ,Tuvalu ,Wallis e Futuna

UTC+12:45 : Nuova Zelanda (Aotearoa) (Isole Chatham\*)

UTC+13 : Kiribati (Isole Phoenix) , Tonga

UTC+14 : Kiribati (Isole della Linea o Sporadi equatoriali)

Gli stati che riportano l'asterisco \* adottano l'ora legale in estate

\* daylight saving time in the summer

## ORA LEGALE - DAYLIGHT SAVING

Anno	Inizio		Fine	
2012	Dalle ore 2 del	25 marzo	Alle ore 3 del	28 ottobre
2013	"	31 marzo	"	27 ottobre

U.S. Daylight Saving Time

Year	Start	End
2012	2 a.m. March 11	2 a.m. Nov. 4
2013	2 a.m. March 10	2 a.m. Nov. 3





# CALENDARIO GENERALE EVENTI GENERAL CALENDAR OF EVENTS

Gennaio			
d	h	d	h
1	6	17	20
2	20	19	12
2	23	20	2
4	22	21	12
6	6	22	12
6	21	23	7
9	7	24	23
12	9	25	8
13	12	27	21
13	15	30	11
16	6	30	17
16	9	31	4

Febbraio			
d	h	d	h
2	15	16	8
3	6	17	20
7	8	19	20
7	21	21	18
8	12	21	22
8	17	23	0
10	2	24	8
11	19	25	19
12	12	27	3
14	6	27	14
14	17	29	23
15	18		

Marzo			
d	h	d	h
1	1	16	3
1	15	18	13
3	20	20	3
5	5	20	5
5	15	21	19
5	17	22	11
7	3	22	14
8	9	22	18
10	9	24	18
10	19	25	22
11	3	26	5
11	22	26	19
13	23	27	6
14	6	28	6
14	13	28	23
15	1	30	19

Aprile			
d	h	d	h
3	6	16	10
3	13	18	19
6	19	19	3
7	5	21	7
7	10	22	13
7	16	22	17
10	7	22	19
10	14	24	13
10	21	25	3
12	9	25	5
13	10	29	9
15	12	30	23
15	18		

## Maggio

d	h		d	h		
4	16	Spica 1.3N della Luna	19	16	Luna all'apogeo	
6	3	Luna piena	20	4	Mercurio 2.0S della Luna	
6	3	Luna al perigeo	20	12	Giove 1.7S della Luna	
7	17	Antares 5.0S della Luna	20	23	Luna nuova Eclisse	
8	6	Minima declinaz. lunare (-21.8)	21	19	Aldebaran 5.0S della Luna	
9	17	Plutone 1.0N della Luna	Occn	22	5	Mercurio 0.4N di Giove
12	21	Luna all'ultimo quarto	22	11	Massima declinaz. lunare (21.8)	
13	13	Giove in congiunzione	22	21	Venere 4.6N della Luna	
13	17	Nettuno 5.8S della Luna	27	11	Mercurio in congiunzione sup.	
15	16	Venere stazionario	28	6	Regolo 5.7N della Luna	
16	9	Saturno 4.8N di Spica	28	20	Luna al primo quarto	
16	12	Urano 5.1S della Luna				

## Giugno

d	h		d	h		
1	2	Spica 1.3N della Luna	18	0	Venere 2.0S della Luna	
1	20	Mercurio 0.2N di Venere	18	1	Aldebaran 5.0S della Luna	
3	12	Luna al perigeo	18	18	Massima declinaz. lunare (21.7)	
4	4	Antares 5.0S della Luna	19	15	Luna nuova	
4	11	Luna piena Eclisse	20	23	Solstizio	
4	17	Minima declinaz. lunare (-21.7)	21	2	Mercurio 5.1S di Polluce	
5	4	Nettuno stazionario	21	16	Mercurio 5.5N della Luna	
6	1	Venere in congiunzione inf.	24	11	Regolo 5.6N della Luna	
6	2	Plutone 1.0N della Luna	Occn	26	9	Saturno stazionario
10	1	Nettuno 5.9S della Luna	26	10	Marte 5.3N della Luna	
11	10	Luna all'ultimo quarto	27	3	Luna al primo quarto	
12	20	Urano 5.1S della Luna	27	4	Venere stazionario	
16	2	Luna all'apogeo	28	8	Saturno 6.0N della Luna	
16	10	Venere 3.3N di Aldebaran	28	10	Spica 1.3N della Luna	
17	7	Giove 1.1S della Luna	Occn	29	15	Plutone in opposizione

## Luglio

d	h		d	h		
1	1	Mercurio alla max elong. E(26)	15	14	Venere 3.8S della Luna	
1	14	Antares 5.1S della Luna	16	1	Massima declinaz. lunare (21.6)	
1	17	Luna al perigeo	19	4	Luna nuova	
2	4	Minima declinaz. lunare (-21.7)	20	7	Mercurio 0.5N della Luna	
3	12	Plutone 1.0N della Luna	Occn	21	17	Regolo 5.5N della Luna
3	18	Luna piena	24	19	Marte 4.0N della Luna	
5	2	Terra al perielio	25	15	Saturno 5.7N della Luna	
7	9	Nettuno 5.7S della Luna	25	16	Spica 1.1N della Luna	
9	7	Venere 0.9N di Aldebaran	26	8	Luna al primo quarto	
10	4	Urano 5.0S della Luna	28	20	Mercurio in congiunzione inf.	
11	1	Luna all'ultimo quarto	28	21	Antares 5.2S della Luna	
13	16	Urano stazionario	29	8	Luna al perigeo	
13	17	Luna all'apogeo	29	12	Minima declinaz. lunare (-21.5)	
14	5	Mercurio stazionario	30	5	Giove 4.7N di Aldebaran	
15	2	Giove 0.5S della Luna	Occn	30	20	Plutone 0.9N della Luna
15	8	Aldebaran 4.9S della Luna				

## Agosto

d	h		d	h		
2	3	Luna piena	16	13	Mercurio alla max elong. O(19)	
3	18	Nettuno 5.6S della Luna	17	15	Luna nuova	
3	19	Saturno 4.5N di Spica	18	0	Regolo 5.5N della Luna	
6	12	Urano 4.8S della Luna	21	21	Spica 1.0N della Luna	
7	15	Mercurio stazionario	21	23	Saturno 5.3N della Luna	
9	18	Luna all'ultimo quarto	22	6	Marte 2.2N della Luna	
10	10	Luna all'apogeo	23	19	Luna al perigeo	
11	16	Aldebaran 4.7S della Luna	24	12	Nettuno in opposizione	
11	20	Giove 0.1N della Luna	Occn	24	13	Luna al primo quarto
12	9	Massima declinaz. lunare (21.5)	25	3	Antares 5.4S della Luna	
13	19	Venere 0.5S della Luna	Occn	25	18	Minima declinaz. lunare (-21.4)
14	3	Marte 1.8N di Spica	27	2	Plutone 0.7N della Luna	
15	10	Marte 2.7S di Saturno	31	1	Nettuno 5.6S della Luna	
15	11	Venere alla max elong. O(46)	31	14	Luna nuova	
16	3	Mercurio 3.4N della Luna				

## Settembre

d	h		d	h		
1	2	Mercurio 1.2N di Regolo	18	4	Spica 0.8N della Luna	
2	20	Urano 4.7S della Luna	18	11	Saturno 4.8N della Luna	
7	5	Luna all'apogeo	19	3	Luna al perigeo	
8	0	Aldebaran 4.5S della Luna	19	20	Marte 0.2N della Luna	
8	11	Giove 0.6N della Luna	Occn	21	9	Antares 5.6S della Luna
8	13	Luna all'ultimo quarto	21	23	Minima declinaz. lunare (-21.2)	
8	17	Massima declinaz. lunare (21.3)	22	14	Equinozio	
10	13	Mercurio in congiunzione sup.	22	19	Luna al primo quarto	
12	15	Venere 3.6N della Luna	23	7	Plutone 0.4N della Luna	
14	9	Regolo 5.5N della Luna	27	7	Nettuno 5.7S della Luna	
16	2	Luna nuova	29	7	Urano in opposizione	
16	11	Mercurio 5.5N della Luna	30	1	Urano 4.7S della Luna	
17	20	Plutone stazionario	30	3	Luna nuova	

Ottobre			
d	h		d h
1	12	Mercurio 1.6N di Spica	17 1 Luna al perigeo
3	7	Venere 0.1S di Regolo	17 2 Mercurio 1.2S della Luna Occn
4	13	Giove stazionario	18 13 Marte 1.9S della Luna
4	23	Luna all'apogeo	18 16 Antares 5.7S della Luna
5	8	Aldebaran 4.3S della Luna	19 6 Minima declinaz. lunare (-21.1)
5	10	Mercurio 3.2S di Saturno	20 13 Plutone 0.2N della Luna Occn
5	21	Giove 0.9N della Luna Occn	21 0 Marte 3.6N di Antares
6	1	Massima declinaz. lunare (21.1)	22 3 Luna al primo quarto
8	7	Luna all'ultimo quarto	24 11 Nettuno 5.8S della Luna
11	19	Regolo 5.6N della Luna	25 8 Saturno in congiunzione
12	14	Venere 5.9N della Luna	26 15 Mercurio alla max elong. E(24)
15	11	Luna nuova	27 6 Urano 4.8S della Luna
15	14	Spica 0.7N della Luna Occn	29 19 Luna nuova
16	2	Saturno 4.5N della Luna	

Novembre			
d	h		d h
1	14	Aldebaran 4.3S della Luna	16 9 Marte 3.9S della Luna
1	15	Luna all'apogeo	16 23 Plutone 0.0N della Luna Occn
2	1	Giove 0.8N della Luna Occn	17 4 Venere 3.8N di Spica
2	8	Massima declinaz. lunare (21.0)	17 16 Mercurio in congiunzione inf.
7	0	Luna all'ultimo quarto	20 14 Luna al primo quarto
7	0	Mercurio stazionario	20 17 Nettuno 5.9S della Luna
8	4	Regolo 5.7N della Luna	23 10 Urano 4.8S della Luna
11	10	Nettuno stazionario	26 23 Mercurio stazionario
11	14	Venere 5.0N della Luna	27 1 Venere 0.5S di Saturno
12	1	Spica 0.7N della Luna Occn	27 20 Marte 4.5S di Plutone
12	18	Saturno 4.1N della Luna	28 14 Luna piena Eclisse
13	22	Luna nuova Eclisse	28 19 Luna all'apogeo
14	10	Mercurio 0.9S della Luna Occn	28 21 Aldebaran 4.2S della Luna
14	10	Luna al perigeo	29 1 Giove 0.6N della Luna Occn
15	2	Antares 5.8S della Luna	29 15 Massima declinaz. lunare (21.0)
15	16	Minima declinaz. lunare (-21.0)	

Dicembre			
d	h		d h
3	1	Giove in opposizione	14 11 Plutone 0.1S della Luna Occn
5	6	Mercurio alla max elong. W(21)	15 8 Marte 5.4S della Luna
5	11	Regolo 5.7N della Luna	18 2 Nettuno 5.8S della Luna
6	15	Luna all'ultimo quarto	18 5 Mercurio 5.4N di Antares
9	11	Spica 0.6N della Luna Occn	20 5 Luna al primo quarto
10	10	Saturno 3.8N della Luna	20 16 Urano 4.7S della Luna
11	13	Venere 1.5N della Luna	21 11 Solstizio
12	0	Mercurio 1.1N della Luna Occn	24 3 Venere 5.6N di Antares
12	14	Antares 5.9S della Luna	25 21 Luna all'apogeo
12	22	Giove 4.7N di Aldebaran	26 0 Giove 0.5N della Luna Occn
12	23	Luna al perigeo	26 3 Aldebaran 4.1S della Luna
13	4	Minima declinaz. lunare (-20.9)	26 22 Massima declinaz. lunare (20.9)
13	8	Luna nuova	28 10 Luna nuova
13	20	Urano stazionario	30 13 Plutone in congiunzione

© (8)

I valori di questa tabella sono approssimativi, per precisioni maggiori consultare i capitoli successivi

Diary of Astronomical Phenomena 2012

January

d	h		d	h	
1	6	FIRST QUARTER	17	20	Moon at perigee
2	20	Moon at apogee	19	12	Antares 4.3S of Moon
2	23	Jupiter 4.8S of Moon	20	2	Moon furthest South (-22.4)
4	22	Earth at perihelion	21	12	Pluto 1.7N of Moon
6	6	Aldebaran 5.8S of Moon	22	12	Mercury 4.7S of Moon
6	21	Moon furthest North (22.5)	23	7	NEW MOON
9	7	FULL MOON	24	23	Mars stationary
12	9	Regulus 5.5N of Moon	25	8	Neptune 5.5S of Moon
13	12	Mercury 4.6S of Pluto	27	21	Uranus 5.5S of Moon
13	15	Venus 1.1S of Neptune	30	11	Jupiter 4.4S of Moon
16	6	Spica 1.8N of Moon	30	17	Moon at apogee
16	9	LAST QUARTER	31	4	FIRST QUARTER

February

d	h		d	h	
2	15	Aldebaran 5.7S of Moon	16	8	Moon furthest South (-22.3)
3	6	Moon furthest North (22.4)	17	20	Pluto 1.5N of Moon
7	8	Mercury superior conjunction	19	20	Neptune at conjunction
7	21	FULL MOON	21	18	Neptune 5.5S of Moon
8	12	Saturn stationary	21	22	NEW MOON
8	17	Regulus 5.4N of Moon	23	0	Mercury 5.6S of Moon
10	2	Venus 0.3N of Uranus	24	8	Uranus 5.3S of Moon
11	19	Moon at perigee	25	19	Venus 3.1S of Moon
12	12	Spica 1.7N of Moon	27	3	Jupiter 3.8S of Moon
14	6	Mercury 1.2S of Neptune	27	14	Moon at apogee
14	17	LAST QUARTER	29	23	Aldebaran 5.5S of Moon
15	18	Antares 4.5S of Moon			

March

d	h		d	h	
1	1	FIRST QUARTER	16	3	Pluto 1.3N of Moon
1	15	Moon furthest North (22.2)	18	13	Mercury 4.2N of Uranus
3	20	Mars at opposition	20	3	Neptune 5.6S of Moon
5	5	Mercury greatest elong E(18)	20	5	Equinox
5	15	Mercury 2.5N of Uranus	21	19	Mercury inferior conjunction
5	17	Mars nearest to Earth	22	11	Mercury 1.5S of Moon
7	3	Regulus 5.4N of Moon	22	14	NEW MOON
8	9	FULL MOON	22	18	Uranus 5.2S of Moon
10	9	Moon at perigee	24	18	Uranus at conjunction
10	19	Spica 1.5N of Moon	25	22	Jupiter 3.1S of Moon
11	3	Saturn 6.0N of Moon	26	5	Moon at apogee
11	22	Mercury stationary	26	19	Venus 1.8N of Moon
13	23	Antares 4.7S of Moon	27	6	Venus greatest elong E(46)
14	6	Venus 3.0N of Jupiter	28	6	Aldebaran 5.2S of Moon
14	13	Moon furthest South (-22.1)	28	23	Moon furthest North (22.0)
15	1	LAST QUARTER	30	19	FIRST QUARTER

April

d	h		d	h	
3	6	Mercury stationary	16	10	Neptune 5.7S of Moon
3	13	Regulus 5.5N of Moon	18	19	Mercury greatest elong W(27)
6	19	FULL MOON	19	3	Uranus 5.1S of Moon
7	5	Spica 1.4N of Moon	21	7	NEW MOON
7	10	Saturn 6.0N of Moon	22	13	Moon at apogee
7	16	Moon at perigee	22	17	Jupiter 2.4S of Moon
10	7	Antares 4.8S of Moon	22	19	Mercury 2.0S of Uranus
10	14	Pluto stationary	24	13	Aldebaran 5.1S of Moon
10	21	Moon furthest South (-21.9)	25	3	Venus 5.6N of Moon
12	9	Pluto 1.1N of Moon Occn	25	5	Moon furthest North (21.8)
13	10	LAST QUARTER	29	9	FIRST QUARTER
15	12	Mars stationary	30	23	Regulus 5.7N of Moon
15	18	Saturn at opposition			

May

d	h		d	h	
4	16	Spica 1.3N of Moon	19	16	Moon at apogee
6	3	FULL MOON	20	4	Mercury 2.0S of Moon
6	3	Moon at perigee	20	12	Jupiter 1.7S of Moon
7	17	Antares 5.0S of Moon	20	23	NEW MOON Eclipse
8	6	Moon furthest South (-21.8)	21	19	Aldebaran 5.0S of Moon
9	17	Pluto 1.0N of Moon Occn	22	5	Mercury 0.4N of Jupiter
12	21	LAST QUARTER	22	11	Moon furthest North (21.8)
13	13	Jupiter at conjunction	22	21	Venus 4.6N of Moon
13	17	Neptune 5.8S of Moon	27	11	Mercury superior conjunction
15	16	Venus stationary	28	6	Regulus 5.7N of Moon
16	9	Saturn 4.8N of Spica	28	20	FIRST QUARTER
16	12	Uranus 5.1S of Moon			

June

d	h		d	h	
1	2	Spica 1.3N of Moon	18	0	Venus 2.0S of Moon
1	20	Mercury 0.2N of Venus	18	1	Aldebaran 5.0S of Moon
3	12	Moon at perigee	18	18	Moon furthest North (21.7)
4	4	Antares 5.0S of Moon	19	15	NEW MOON
4	11	FULL MOON	20	23	Solstice
4	17	Moon furthest South (-21.7)	21	2	Mercury 5.1S of Pollux
5	4	Neptune stationary	21	16	Mercury 5.5N of Moon
6	1	Venus inferior conjunction	24	11	Regulus 5.6N of Moon
6	2	Pluto 1.0N of Moon Occn	26	9	Saturn stationary
10	1	Neptune 5.9S of Moon	26	10	Mars 5.3N of Moon
11	10	LAST QUARTER	27	3	FIRST QUARTER
12	20	Uranus 5.1S of Moon	27	4	Venus stationary
16	2	Moon at apogee	28	8	Saturn 6.0N of Moon
16	10	Venus 3.3N of Aldebaran	28	10	Spica 1.3N of Moon
17	7	Jupiter 1.1S of Moon Occn	29	15	Pluto at opposition

July

d	h		d	h	
1	1	Mercury greatest elong E(26)	15	14	Venus 3.8S of Moon
1	14	Antares 5.1S of Moon	16	1	Moon furthest North (21.6)
1	17	Moon at perigee	19	4	NEW MOON
2	4	Moon furthest South (-21.7)	20	7	Mercury 0.5N of Moon Occn
3	12	Pluto 1.0N of Moon Occn	21	17	Regulus 5.5N of Moon
3	18	FULL MOON	24	19	Mars 4.0N of Moon
5	2	Earth at aphelion	25	15	Saturn 5.7N of Moon
7	9	Neptune 5.7S of Moon	25	16	Spica 1.1N of Moon Occn
9	7	Venus 0.9N of Aldebaran	26	8	FIRST QUARTER
10	4	Uranus 5.0S of Moon	28	20	Mercury inferior conjunction
11	1	LAST QUARTER	28	21	Antares 5.2S of Moon
13	16	Uranus stationary	29	8	Moon at perigee
13	17	Moon at apogee	29	12	Moon furthest South (-21.5)
14	5	Mercury stationary	30	5	Jupiter 4.7N of Aldebaran
15	2	Jupiter 0.5S of Moon Occn	30	20	Pluto 0.9N of Moon Occn
15	8	Aldebaran 4.9S of Moon			

August

d	h		d	h	
2	3	FULL MOON	16	13	Mercury greatest elong W(19)
3	18	Neptune 5.6S of Moon	17	15	NEW MOON
3	19	Saturn 4.5N of Spica	18	0	Regulus 5.5N of Moon
6	12	Uranus 4.8S of Moon	21	21	Spica 1.0N of Moon Occn
7	15	Mercury stationary	21	23	Saturn 5.3N of Moon
9	18	LAST QUARTER	22	6	Mars 2.2N of Moon
10	10	Moon at apogee	23	19	Moon at perigee
11	16	Aldebaran 4.7S of Moon	24	12	Neptune at opposition
11	20	Jupiter 0.1N of Moon Occn	24	13	FIRST QUARTER
12	9	Moon furthest North (21.5)	25	3	Antares 5.4S of Moon
13	19	Venus 0.5S of Moon Occn	25	18	Moon furthest South (-21.4)
14	3	Mars 1.8N of Spica	27	2	Pluto 0.7N of Moon Occn
15	10	Mars 2.7S of Saturn	31	1	Neptune 5.6S of Moon
15	11	Venus greatest elong W(46)	31	14	FULL MOON
16	3	Mercury 3.4N of Moon			

September

d	h		d	h	
1	2	Mercury 1.2N of Regulus	18	4	Spica 0.8N of Moon Occn
2	20	Uranus 4.7S of Moon	18	11	Saturn 4.8N of Moon
7	5	Moon at apogee	19	3	Moon at perigee
8	0	Aldebaran 4.5S of Moon	19	20	Mars 0.2N of Moon Occn
8	11	Jupiter 0.6N of Moon Occn	21	9	Antares 5.6S of Moon
8	13	LAST QUARTER	21	23	Moon furthest South (-21.2)
8	17	Moon furthest North (21.3)	22	14	Equinox
10	13	Mercury superior conjunction	22	19	FIRST QUARTER
12	15	Venus 3.6N of Moon	23	7	Pluto 0.4N of Moon Occn
14	9	Regulus 5.5N of Moon	27	7	Neptune 5.7S of Moon
16	2	NEW MOON	29	7	Uranus at opposition
16	11	Mercury 5.5N of Moon	30	1	Uranus 4.7S of Moon
17	20	Pluto stationary	30	3	FULL MOON

October

d	h		d	h	
1	12	Mercury 1.6N of Spica	17	1	Moon at perigee
3	7	Venus 0.1S of Regulus	17	2	Mercury 1.2S of Moon Occn
4	13	Jupiter stationary	18	13	Mars 1.9S of Moon
4	23	Moon at apogee	18	16	Antares 5.7S of Moon
5	8	Aldebaran 4.3S of Moon	19	6	Moon furthest South (-21.1)
5	10	Mercury 3.2S of Saturn	20	13	Pluto 0.2N of Moon Occn
5	21	Jupiter 0.9N of Moon Occn	21	0	Mars 3.6N of Antares
6	1	Moon furthest North (21.1)	22	3	FIRST QUARTER
8	7	LAST QUARTER	24	11	Neptune 5.8S of Moon
11	19	Regulus 5.6N of Moon	25	8	Saturn at conjunction
12	14	Venus 5.9N of Moon	26	15	Mercury greatest elong E(24)
15	11	NEW MOON	27	6	Uranus 4.8S of Moon

15 14 Spica 0.7N of Moon            Occn    29 19 FULL MOON  
 16 2 Saturn 4.5N of Moon

November

d	h			d	h		
1	14	Aldebaran 4.3S of Moon		16	9	Mars 3.9S of Moon	
1	15	Moon at apogee		16	23	Pluto 0.0N of Moon	Occn
2	1	Jupiter 0.8N of Moon	Occn	17	4	Venus 3.8N of Spica	
2	8	Moon furthest North (21.0)		17	16	Mercury inferior conjunction	
7	0	LAST QUARTER		20	14	FIRST QUARTER	
7	0	Mercury stationary		20	17	Neptune 5.9S of Moon	
8	4	Regulus 5.7N of Moon		23	10	Uranus 4.8S of Moon	
11	10	Neptune stationary		26	23	Mercury stationary	
11	14	Venus 5.0N of Moon		27	1	Venus 0.5S of Saturn	
12	1	Spica 0.7N of Moon	Occn	27	20	Mars 4.5S of Pluto	
12	18	Saturn 4.1N of Moon		28	14	FULL MOON	Eclipse
13	22	NEW MOON	Eclipse	28	19	Moon at apogee	
14	10	Mercury 0.9S of Moon	Occn	28	21	Aldebaran 4.2S of Moon	
14	10	Moon at perigee		29	1	Jupiter 0.6N of Moon	Occn
15	2	Antares 5.8S of Moon		29	15	Moon furthest North (21.0)	
15	16	Moon furthest South (-21.0)					

December

d	h			d	h		
3	1	Jupiter at opposition		14	11	Pluto 0.1S of Moon	Occn
5	6	Mercury greatest elong W(21)		15	8	Mars 5.4S of Moon	
5	11	Regulus 5.7N of Moon		18	2	Neptune 5.8S of Moon	
6	15	LAST QUARTER		18	5	Mercury 5.4N of Antares	
9	11	Spica 0.6N of Moon	Occn	20	5	FIRST QUARTER	
10	10	Saturn 3.8N of Moon		20	16	Uranus 4.7S of Moon	
11	13	Venus 1.5N of Moon		21	11	Solstice	
12	0	Mercury 1.1N of Moon	Occn	24	3	Venus 5.6N of Antares	
12	14	Antares 5.9S of Moon		25	21	Moon at apogee	
12	22	Jupiter 4.7N of Aldebaran		26	0	Jupiter 0.5N of Moon	Occn
12	23	Moon at perigee		26	3	Aldebaran 4.1S of Moon	
13	4	Moon furthest South (-20.9)		26	22	Moon furthest North (20.9)	
13	8	NEW MOON		28	10	FULL MOON	
13	20	Uranus stationary		30	13	Pluto at conjunction	

The values of this charts are approximate, for greater precisions to consult the following chapters









Date = date in the format dd/mm/yyyy (00 UT)  
 A.R. e DEC. = geocentric and topocentric apparent coordinates for Rome (42°N, 12°E)  
 Distance = distance in A.U.  
 Light = distance in minutes  
 Parall. = parallax in "  
 Diam. = diameter in "

© (12)

## TRANSITI DEL MERIDIANO CENTRALE TRANSITS OF THE SOLAR CENTRAL MERIDIAN

09/01/2012	22:30:43	25/05/2012	09:55:22	08/10/2012	13:28:49
06/02/2012	06:42:09	21/06/2012	14:44:10	04/11/2012	20:34:42
04/03/2012	14:45:53	18/07/2012	19:32:59	02/12/2012	04:01:30
31/03/2012	22:09:53	15/08/2012	00:50:44	29/12/2012	11:49:32
28/04/2012	04:32:15	11/09/2012	06:50:31		

## SOLSTIZI ED EQUINOZI - SOLSTICES AND EQUINOXES

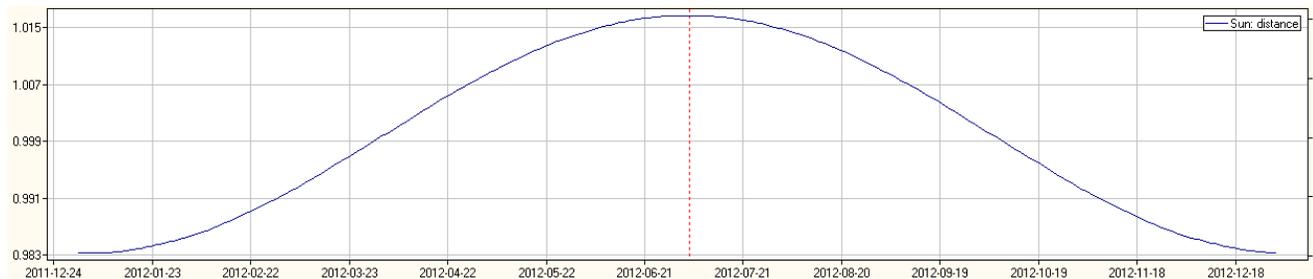
Equinozio di primavera- Spring equinox	20/03	05:14:30
Solstizio d'estate- Summer solstice	20/06	23:08:53
Equinozio d'autunno- Autumn equinox	22/09	14:49:03
Solstizio d'inverno- Winter solstice	21/12	11:11:42

## PERIGEO ED APOGEO - PERIGEE AND APOGEE

Perigeo - Perigee	05/01	00:01:14	0.98328 U.A.
Apogeo - Apogee	05/07	02:51:26	1.01668 U.A.



Diametro del Sole in " nel corso dell'anno - Diameter of the Sun in " during the year



Distanza del Sole in U.A. nel corso dell'anno - Distance of the Sun in A.U. during the year

© (4)      © (5)



Date year mt dd	Po o	Bo o	LoCarring. o Rotat.	Date year mt dd	Po o	Bo o	LoCarring. o Rotat.	Date year mt dd	Po o	Bo o	LoCarring. o Rotat.
2012 10 30	24.75	4.55	77.41 2129	2012 11 20	19.82	2.22	160.54 2130	2012 12 11	11.82	-0.43	243.79 2131
2012 10 31	24.60	4.45	64.22 2129	2012 11 21	19.50	2.09	147.36 2130	2012 12 12	11.38	-0.56	230.61 2131
2012 11 1	24.43	4.35	51.03 2129	2012 11 22	19.17	1.97	134.18 2130	2012 12 13	10.93	-0.69	217.44 2131
2012 11 2	24.26	4.25	37.85 2129	2012 11 23	18.84	1.85	121.00 2130	2012 12 14	10.49	-0.82	204.26 2131
2012 11 3	24.08	4.15	24.66 2129	2012 11 24	18.50	1.73	107.82 2130	2012 12 15	10.03	-0.94	191.09 2131
2012 11 4	23.89	4.04	11.48 2129	2012 11 25	18.16	1.60	94.64 2130	2012 12 16	9.58	-1.07	177.91 2131
2012 11 5	23.69	3.94	358.29 2130	2012 11 26	17.81	1.48	81.46 2130	2012 12 17	9.12	-1.20	164.74 2131
2012 11 6	23.49	3.83	345.11 2130	2012 11 27	17.45	1.35	68.28 2130	2012 12 18	8.66	-1.33	151.56 2131
2012 11 7	23.27	3.72	331.92 2130	2012 11 28	17.08	1.23	55.10 2130	2012 12 19	8.19	-1.45	138.39 2131
2012 11 8	23.05	3.61	318.74 2130	2012 11 29	16.71	1.10	41.92 2130	2012 12 20	7.72	-1.58	125.22 2131
2012 11 9	22.83	3.50	305.55 2130	2012 11 30	16.34	0.97	28.74 2130	2012 12 21	7.25	-1.70	112.04 2131
2012 11 10	22.59	3.39	292.37 2130	2012 12 1	15.95	0.85	15.56 2130	2012 12 22	6.78	-1.83	98.87 2131
2012 11 11	22.35	3.28	279.18 2130	2012 12 2	15.56	0.72	2.38 2130	2012 12 23	6.31	-1.95	85.70 2131
2012 11 12	22.10	3.16	266.00 2130	2012 12 3	15.17	0.59	349.20 2131	2012 12 24	5.83	-2.08	72.52 2131
2012 11 13	21.84	3.05	252.82 2130	2012 12 4	14.77	0.46	336.02 2131	2012 12 25	5.35	-2.20	59.35 2131
2012 11 14	21.57	2.93	239.64 2130	2012 12 5	14.36	0.34	322.85 2131	2012 12 26	4.87	-2.32	46.18 2131
2012 11 15	21.30	2.81	226.45 2130	2012 12 6	13.95	0.21	309.67 2131	2012 12 27	4.39	-2.44	33.01 2131
2012 11 16	21.02	2.70	213.27 2130	2012 12 7	13.53	0.08	296.49 2131	2012 12 28	3.91	-2.56	19.83 2131
2012 11 17	20.73	2.58	200.09 2130	2012 12 8	13.11	-0.05	283.31 2131	2012 12 29	3.43	-2.68	6.66 2131
2012 11 18	20.43	2.46	186.91 2130	2012 12 9	12.69	-0.18	270.14 2131	2012 12 30	2.94	-2.80	353.49 2132
2012 11 19	20.13	2.34	173.73 2130	2012 12 10	12.25	-0.31	256.96 2131	2012 12 31	2.46	-2.92	340.32 2132

Moto del meridiano centrale - Motion of the central meridian

Day	0h	3h	6h	9h	12h	15h	18h	21h	24h
0	0.0	1.7	3.3	5.0	6.6	8.3	9.9	11.6	13.2
1	13.2	14.9	16.5	18.2	19.8	21.5	23.1	24.8	26.4
2	26.4	28.1	29.7	31.4	33.0	34.7	36.3	38.0	39.6

Date = data nel formato anno/mese/giorno

Day = giorni

Po = angolo di posizione del polo nord del Sole, in °

Bo = latitudine della Terra, riferita all'equatore del Sole, in °

Lo = longitudine del meridiano centrale del Sole, in °

Po = position angle of the north pole of the Sun, in °

Bo = latitude of the Earth, referred to the solar equator, in °

Lo = longitude of the central meridian of the Sun, in °

# LEVATA E TRAMONTO DEL SOLE - SUNRISE AND SUNSET

for Greenwich Meridian      for Rome :      Longitude E 12 00.0  
 Latitude N 42 00.0  
 Time Zone      UT +1

Date	Ephemeris Transit			Rise (Azm)	Trans (Alt)	Set (Azm)
	TDT JD	TDT Time				
		h	m	h	m	h
2012-01- 1	2455928.002299	12	03	7 40	12 16	16 51
2012-01- 2	2455929.002626	12	03	7 40	12 16	16 52
2012-01- 3	2455930.002949	12	04	7 40	12 16	16 52
2012-01- 4	2455931.003267	12	04	7 40	12 17	16 53
2012-01- 5	2455932.003581	12	05	7 40	12 17	16 54
2012-01- 6	2455933.003889	12	05	7 40	12 18	16 55
2012-01- 7	2455934.004192	12	06	7 40	12 18	16 56
2012-01- 8	2455935.004490	12	06	7 40	12 18	16 57
2012-01- 9	2455936.004781	12	06	7 40	12 19	16 58
2012-01-10	2455937.005066	12	07	7 39	12 19	16 59
2012-01-11	2455938.005345	12	07	7 39	12 20	17 00
2012-01-12	2455939.005618	12	08	7 39	12 20	17 01
2012-01-13	2455940.005883	12	08	7 39	12 20	17 03
2012-01-14	2455941.006141	12	08	7 38	12 21	17 04
2012-01-15	2455942.006393	12	09	7 38	12 21	17 05
2012-01-16	2455943.006636	12	09	7 37	12 22	17 06
2012-01-17	2455944.006872	12	09	7 37	12 22	17 07
2012-01-18	2455945.007100	12	10	7 36	12 22	17 08
2012-01-19	2455946.007321	12	10	7 36	12 23	17 10
2012-01-20	2455947.007533	12	10	7 35	12 23	17 11
2012-01-21	2455948.007736	12	11	7 35	12 23	17 12
2012-01-22	2455949.007931	12	11	7 34	12 23	17 13
2012-01-23	2455950.008117	12	11	7 33	12 24	17 14
2012-01-24	2455951.008294	12	11	7 33	12 24	17 16
2012-01-25	2455952.008461	12	12	7 32	12 24	17 17
2012-01-26	2455953.008620	12	12	7 31	12 24	17 18
2012-01-27	2455954.008769	12	12	7 30	12 25	17 20
2012-01-28	2455955.008909	12	12	7 29	12 25	17 21
2012-01-29	2455956.009039	12	13	7 28	12 25	17 22
2012-01-30	2455957.009159	12	13	7 27	12 25	17 23
2012-01-31	2455958.009270	12	13	7 27	12 25	17 25
2012-02- 1	2455959.009371	12	13	7 26	12 25	17 26
2012-02- 2	2455960.009463	12	13	7 25	12 26	17 27
2012-02- 3	2455961.009544	12	13	7 23	12 26	17 29
2012-02- 4	2455962.009617	12	13	7 22	12 26	17 30
2012-02- 5	2455963.009679	12	13	7 21	12 26	17 31
2012-02- 6	2455964.009733	12	14	7 20	12 26	17 32
2012-02- 7	2455965.009776	12	14	7 19	12 26	17 34
2012-02- 8	2455966.009811	12	14	7 18	12 26	17 35
2012-02- 9	2455967.009837	12	14	7 17	12 26	17 36
2012-02-10	2455968.009853	12	14	7 15	12 26	17 38
2012-02-11	2455969.009861	12	14	7 14	12 26	17 39
2012-02-12	2455970.009859	12	14	7 13	12 26	17 40
2012-02-13	2455971.009850	12	14	7 12	12 26	17 41
2012-02-14	2455972.009832	12	14	7 10	12 26	17 43
2012-02-15	2455973.009805	12	14	7 09	12 26	17 44
2012-02-16	2455974.009771	12	14	7 08	12 26	17 45
2012-02-17	2455975.009728	12	14	7 06	12 26	17 46
2012-02-18	2455976.009677	12	13	7 05	12 26	17 48
2012-02-19	2455977.009619	12	13	7 03	12 26	17 49
2012-02-20	2455978.009553	12	13	7 02	12 26	17 50
2012-02-21	2455979.009479	12	13	7 00	12 26	17 51
2012-02-22	2455980.009398	12	13	6 59	12 26	17 53
2012-02-23	2455981.009309	12	13	6 58	12 25	17 54
2012-02-24	2455982.009214	12	13	6 56	12 25	17 55
2012-02-25	2455983.009111	12	13	6 54	12 25	17 56
2012-02-26	2455984.009001	12	12	6 53	12 25	17 58
2012-02-27	2455985.008885	12	12	6 51	12 25	17 59
2012-02-28	2455986.008762	12	12	6 50	12 25	18 00
2012-02-29	2455987.008633	12	12	6 48	12 24	18 01
2012-03- 1	2455988.008498	12	12	6 47	12 24	18 02
2012-03- 2	2455989.008357	12	12	6 45	12 24	18 04
2012-03- 3	2455990.008210	12	11	6 43	12 24	18 05
2012-03- 4	2455991.008058	12	11	6 42	12 24	18 06
2012-03- 5	2455992.007900	12	11	6 40	12 23	18 07
2012-03- 6	2455993.007738	12	11	6 39	12 23	18 08
2012-03- 7	2455994.007570	12	10	6 37	12 23	18 10
2012-03- 8	2455995.007399	12	10	6 35	12 23	18 11
2012-03- 9	2455996.007223	12	10	6 34	12 22	18 12
2012-03-10	2455997.007043	12	10	6 32	12 22	18 13
2012-03-11	2455998.006859	12	09	6 30	12 22	18 14
2012-03-12	2455999.006673	12	09	6 29	12 22	18 15
2012-03-13	2456000.006483	12	09	6 27	12 21	18 17
2012-03-14	2456001.006291	12	09	6 25	12 21	18 18

Ephemeris Transit							
Date	TDJ JD	TDJ Time	Rise (Azm)	Trans (Alt)	Set (Azm)		
		h m s	h m °	h m °	h m °		
2012-03-15	2456002.006095	12 08 46.6	6 23 ( 92)	12 21 (46)	18 19 (268)		
2012-03-16	2456003.005898	12 08 29.6	6 22 ( 91)	12 21 (47)	18 20 (269)		
2012-03-17	2456004.005698	12 08 12.3	6 20 ( 91)	12 20 (47)	18 21 (269)		
2012-03-18	2456005.005497	12 07 55.0	6 18 ( 90)	12 20 (47)	18 22 (270)		
2012-03-19	2456006.005294	12 07 37.4	6 17 ( 90)	12 20 (48)	18 23 (270)		
2012-03-20	2456007.005090	12 07 19.7	6 15 ( 89)	12 19 (48)	18 24 (271)		
2012-03-21	2456008.004884	12 07 02.0	6 13 ( 89)	12 19 (48)	18 26 (272)		
2012-03-22	2456009.004677	12 06 44.1	6 12 ( 88)	12 19 (49)	18 27 (272)		
2012-03-23	2456010.004469	12 06 26.2	6 10 ( 88)	12 18 (49)	18 28 (273)		
2012-03-24	2456011.004261	12 06 08.1	6 08 ( 87)	12 18 (50)	18 29 (273)		
2012-03-25	2456012.004052	12 05 50.1	6 06 ( 87)	12 18 (50)	18 30 (274)		
2012-03-26	2456013.003843	12 05 32.0	6 05 ( 86)	12 18 (50)	18 31 (274)		
2012-03-27	2456014.003634	12 05 14.0	6 03 ( 86)	12 17 (51)	18 32 (275)		
2012-03-28	2456015.003425	12 04 55.9	6 01 ( 85)	12 17 (51)	18 33 (275)		
2012-03-29	2456016.003216	12 04 37.9	5 59 ( 84)	12 17 (52)	18 35 (276)		
2012-03-30	2456017.003008	12 04 19.9	5 58 ( 84)	12 16 (52)	18 36 (276)		
2012-03-31	2456018.002800	12 04 01.9	5 56 ( 83)	12 16 (52)	18 37 (277)		
2012-04- 1	2456019.002594	12 03 44.1	5 54 ( 83)	12 16 (53)	18 38 (277)		
2012-04- 2	2456020.002389	12 03 26.4	5 53 ( 82)	12 15 (53)	18 39 (278)		
2012-04- 3	2456021.002185	12 03 08.8	5 51 ( 82)	12 15 (54)	18 40 (278)		
2012-04- 4	2456022.001983	12 02 51.3	5 49 ( 81)	12 15 (54)	18 41 (279)		
2012-04- 5	2456023.001783	12 02 34.0	5 48 ( 81)	12 15 (54)	18 42 (279)		
2012-04- 6	2456024.001585	12 02 16.9	5 46 ( 80)	12 14 (55)	18 43 (280)		
2012-04- 7	2456025.001389	12 02 00.0	5 44 ( 80)	12 14 (55)	18 45 (280)		
2012-04- 8	2456026.001196	12 01 43.3	5 43 ( 79)	12 14 (55)	18 46 (281)		
2012-04- 9	2456027.001006	12 01 26.9	5 41 ( 79)	12 13 (56)	18 47 (281)		
2012-04-10	2456028.000819	12 01 10.8	5 39 ( 78)	12 13 (56)	18 48 (282)		
2012-04-11	2456029.000636	12 00 55.0	5 38 ( 78)	12 13 (57)	18 49 (282)		
2012-04-12	2456030.000457	12 00 39.5	5 36 ( 77)	12 13 (57)	18 50 (283)		
2012-04-13	2456031.000281	12 00 24.3	5 34 ( 77)	12 12 (57)	18 51 (283)		
2012-04-14	2456032.000109	12 00 09.5	5 33 ( 76)	12 12 (58)	18 52 (284)		
2012-04-15	2456032.999942	11 59 55.0	5 31 ( 76)	12 12 (58)	18 53 (284)		
2012-04-16	2456033.999779	11 59 40.9	5 30 ( 75)	12 12 (58)	18 54 (285)		
2012-04-17	2456034.999621	11 59 27.2	5 28 ( 75)	12 11 (59)	18 56 (285)		
2012-04-18	2456035.999467	11 59 14.0	5 27 ( 74)	12 11 (59)	18 57 (286)		
2012-04-19	2456036.999318	11 59 01.1	5 25 ( 74)	12 11 (59)	18 58 (286)		
2012-04-20	2456037.999174	11 58 48.6	5 23 ( 73)	12 11 (60)	18 59 (287)		
2012-04-21	2456038.999035	11 58 36.6	5 22 ( 73)	12 11 (60)	19 00 (287)		
2012-04-22	2456039.998901	11 58 25.1	5 20 ( 73)	12 10 (60)	19 01 (288)		
2012-04-23	2456040.998773	11 58 14.0	5 19 ( 72)	12 10 (61)	19 02 (288)		
2012-04-24	2456041.998649	11 58 03.3	5 17 ( 72)	12 10 (61)	19 03 (289)		
2012-04-25	2456042.998532	11 57 53.2	5 16 ( 71)	12 10 (61)	19 04 (289)		
2012-04-26	2456043.998419	11 57 43.4	5 15 ( 71)	12 10 (62)	19 06 (290)		
2012-04-27	2456044.998313	11 57 34.2	5 13 ( 70)	12 10 (62)	19 07 (290)		
2012-04-28	2456045.998212	11 57 25.5	5 12 ( 70)	12 09 (62)	19 08 (290)		
2012-04-29	2456046.998117	11 57 17.3	5 10 ( 69)	12 09 (63)	19 09 (291)		
2012-04-30	2456047.998028	11 57 09.6	5 09 ( 69)	12 09 (63)	19 10 (291)		
2012-05- 1	2456048.997944	11 57 02.4	5 08 ( 69)	12 09 (63)	19 11 (292)		
2012-05- 2	2456049.997867	11 56 55.7	5 06 ( 68)	12 09 (64)	19 12 (292)		
2012-05- 3	2456050.997796	11 56 49.6	5 05 ( 68)	12 09 (64)	19 13 (293)		
2012-05- 4	2456051.997731	11 56 44.0	5 04 ( 67)	12 09 (64)	19 14 (293)		
2012-05- 5	2456052.997672	11 56 38.9	5 03 ( 67)	12 09 (64)	19 15 (293)		
2012-05- 6	2456053.997620	11 56 34.4	5 01 ( 67)	12 09 (65)	19 17 (294)		
2012-05- 7	2456054.997575	11 56 30.5	5 00 ( 66)	12 09 (65)	19 18 (294)		
2012-05- 8	2456055.997536	11 56 27.1	4 59 ( 66)	12 08 (65)	19 19 (294)		
2012-05- 9	2456056.997504	11 56 24.3	4 58 ( 65)	12 08 (66)	19 20 (295)		
2012-05-10	2456057.997478	11 56 22.1	4 57 ( 65)	12 08 (66)	19 21 (295)		
2012-05-11	2456058.997460	11 56 20.5	4 56 ( 65)	12 08 (66)	19 22 (296)		
2012-05-12	2456059.997448	11 56 19.5	4 54 ( 64)	12 08 (66)	19 23 (296)		
2012-05-13	2456060.997444	11 56 19.1	4 53 ( 64)	12 08 (67)	19 24 (296)		
2012-05-14	2456061.997446	11 56 19.3	4 52 ( 64)	12 08 (67)	19 25 (297)		
2012-05-15	2456062.997454	11 56 20.1	4 51 ( 63)	12 08 (67)	19 26 (297)		
2012-05-16	2456063.997470	11 56 21.4	4 50 ( 63)	12 08 (67)	19 27 (297)		
2012-05-17	2456064.997492	11 56 23.3	4 49 ( 63)	12 08 (67)	19 28 (298)		
2012-05-18	2456065.997521	11 56 25.8	4 48 ( 62)	12 08 (68)	19 29 (298)		
2012-05-19	2456066.997556	11 56 28.8	4 48 ( 62)	12 08 (68)	19 30 (298)		
2012-05-20	2456067.997597	11 56 32.4	4 47 ( 62)	12 09 (68)	19 31 (299)		
2012-05-21	2456068.997645	11 56 36.5	4 46 ( 61)	12 09 (68)	19 32 (299)		
2012-05-22	2456069.997699	11 56 41.2	4 45 ( 61)	12 09 (69)	19 33 (299)		
2012-05-23	2456070.997759	11 56 46.3	4 44 ( 61)	12 09 (69)	19 34 (299)		
2012-05-24	2456071.997824	11 56 52.0	4 44 ( 61)	12 09 (69)	19 35 (300)		
2012-05-25	2456072.997895	11 56 58.2	4 43 ( 60)	12 09 (69)	19 36 (300)		
2012-05-26	2456073.997972	11 57 04.8	4 42 ( 60)	12 09 (69)	19 36 (300)		
2012-05-27	2456074.998054	11 57 11.9	4 42 ( 60)	12 09 (69)	19 37 (300)		
2012-05-28	2456075.998141	11 57 19.4	4 41 ( 60)	12 09 (70)	19 38 (301)		
2012-05-29	2456076.998233	11 57 27.3	4 40 ( 59)	12 09 (70)	19 39 (301)		
2012-05-30	2456077.998329	11 57 35.7	4 40 ( 59)	12 10 (70)	19 40 (301)		
2012-05-31	2456078.998431	11 57 44.4	4 39 ( 59)	12 10 (70)	19 41 (301)		
2012-06- 1	2456079.998536	11 57 53.6	4 39 ( 59)	12 10 (70)	19 41 (301)		
2012-06- 2	2456080.998646	11 58 03.1	4 38 ( 59)	12 10 (70)	19 42 (302)		
2012-06- 3	2456081.998761	11 58 12.9	4 38 ( 58)	12 10 (70)	19 43 (302)		
2012-06- 4	2456082.998879	11 58 23.1	4 38 ( 58)	12 10 (71)	19 43 (302)		

Ephemeris Transit							
Date	TDJ JD	TDJ Time	Rise (Azm)	Trans (Alt)	Set (Azm)		
		h m s	h m °	h m °	h m °		
2012-06- 5	2456083.999001	11 58 33.7	4 37 ( 58)	12 11 (71)	19 44 (302)		
2012-06- 6	2456084.999126	11 58 44.5	4 37 ( 58)	12 11 (71)	19 45 (302)		
2012-06- 7	2456085.999255	11 58 55.7	4 37 ( 58)	12 11 (71)	19 45 (302)		
2012-06- 8	2456086.999388	11 59 07.1	4 37 ( 58)	12 11 (71)	19 46 (302)		
2012-06- 9	2456087.999524	11 59 18.8	4 36 ( 57)	12 11 (71)	19 47 (303)		
2012-06-10	2456088.999662	11 59 30.8	4 36 ( 57)	12 12 (71)	19 47 (303)		
2012-06-11	2456089.999803	11 59 43.0	4 36 ( 57)	12 12 (71)	19 48 (303)		
2012-06-12	2456090.999947	11 59 55.4	4 36 ( 57)	12 12 (71)	19 48 (303)		
2012-06-13	2456092.000093	12 00 08.0	4 36 ( 57)	12 12 (71)	19 49 (303)		
2012-06-14	2456093.000240	12 00 20.7	4 36 ( 57)	12 12 (71)	19 49 (303)		
2012-06-15	2456094.000389	12 00 33.6	4 36 ( 57)	12 13 (71)	19 49 (303)		
2012-06-16	2456095.000540	12 00 46.6	4 36 ( 57)	12 13 (71)	19 50 (303)		
2012-06-17	2456096.000691	12 00 59.7	4 36 ( 57)	12 13 (71)	19 50 (303)		
2012-06-18	2456097.000843	12 01 12.8	4 36 ( 57)	12 13 (71)	19 50 (303)		
2012-06-19	2456098.000996	12 01 26.0	4 36 ( 57)	12 13 (71)	19 51 (303)		
2012-06-20	2456099.001148	12 01 39.2	4 36 ( 57)	12 14 (71)	19 51 (303)		
2012-06-21	2456100.001300	12 01 52.3	4 37 ( 57)	12 14 (71)	19 51 (303)		
2012-06-22	2456101.001452	12 02 05.4	4 37 ( 57)	12 14 (71)	19 51 (303)		
2012-06-23	2456102.001602	12 02 18.4	4 37 ( 57)	12 14 (71)	19 51 (303)		
2012-06-24	2456103.001752	12 02 31.4	4 37 ( 57)	12 15 (71)	19 52 (303)		
2012-06-25	2456104.001900	12 02 44.1	4 38 ( 57)	12 15 (71)	19 52 (303)		
2012-06-26	2456105.002046	12 02 56.7	4 38 ( 57)	12 15 (71)	19 52 (303)		
2012-06-27	2456106.002190	12 03 09.2	4 39 ( 57)	12 15 (71)	19 52 (303)		
2012-06-28	2456107.002331	12 03 21.4	4 39 ( 57)	12 15 (71)	19 52 (303)		
2012-06-29	2456108.002470	12 03 33.4	4 39 ( 57)	12 16 (71)	19 52 (303)		
2012-06-30	2456109.002606	12 03 45.1	4 40 ( 57)	12 16 (71)	19 51 (303)		
2012-07- 1	2456110.002739	12 03 56.6	4 40 ( 57)	12 16 (71)	19 51 (303)		
2012-07- 2	2456111.002868	12 04 07.8	4 41 ( 57)	12 16 (71)	19 51 (303)		
2012-07- 3	2456112.002994	12 04 18.7	4 41 ( 58)	12 16 (71)	19 51 (302)		
2012-07- 4	2456113.003117	12 04 29.3	4 42 ( 58)	12 16 (71)	19 51 (302)		
2012-07- 5	2456114.003236	12 04 39.6	4 43 ( 58)	12 17 (71)	19 50 (302)		
2012-07- 6	2456115.003350	12 04 49.5	4 43 ( 58)	12 17 (71)	19 50 (302)		
2012-07- 7	2456116.003461	12 04 59.0	4 44 ( 58)	12 17 (71)	19 50 (302)		
2012-07- 8	2456117.003567	12 05 08.2	4 45 ( 58)	12 17 (70)	19 49 (302)		
2012-07- 9	2456118.003668	12 05 17.0	4 45 ( 58)	12 17 (70)	19 49 (301)		
2012-07-10	2456119.003765	12 05 25.3	4 46 ( 59)	12 17 (70)	19 48 (301)		
2012-07-11	2456120.003857	12 05 33.3	4 47 ( 59)	12 18 (70)	19 48 (301)		
2012-07-12	2456121.003944	12 05 40.8	4 48 ( 59)	12 18 (70)	19 47 (301)		
2012-07-13	2456122.004026	12 05 47.8	4 48 ( 59)	12 18 (70)	19 47 (301)		
2012-07-14	2456123.004102	12 05 54.4	4 49 ( 59)	12 18 (70)	19 46 (300)		
2012-07-15	2456124.004173	12 06 00.5	4 50 ( 60)	12 18 (69)	19 46 (300)		
2012-07-16	2456125.004238	12 06 06.1	4 51 ( 60)	12 18 (69)	19 45 (300)		
2012-07-17	2456126.004297	12 06 11.2	4 52 ( 60)	12 18 (69)	19 44 (300)		
2012-07-18	2456127.004349	12 06 15.8	4 52 ( 60)	12 18 (69)	19 44 (299)		
2012-07-19	2456128.004396	12 06 19.8	4 53 ( 61)	12 18 (69)	19 43 (299)		
2012-07-20	2456129.004436	12 06 23.2	4 54 ( 61)	12 18 (69)	19 42 (299)		
2012-07-21	2456130.004469	12 06 26.1	4 55 ( 61)	12 18 (68)	19 41 (299)		
2012-07-22	2456131.004496	12 06 28.4	4 56 ( 61)	12 18 (68)	19 40 (298)		
2012-07-23	2456132.004516	12 06 30.2	4 57 ( 62)	12 19 (68)	19 39 (298)		
2012-07-24	2456133.004529	12 06 31.3	4 58 ( 62)	12 19 (68)	19 39 (298)		
2012-07-25	2456134.004534	12 06 31.8	4 59 ( 62)	12 19 (68)	19 38 (297)		
2012-07-26	2456135.004533	12 06 31.6	5 00 ( 63)	12 19 (67)	19 37 (297)		
2012-07-27	2456136.004524	12 06 30.9	5 01 ( 63)	12 19 (67)	19 36 (297)		
2012-07-28	2456137.004509	12 06 29.5	5 02 ( 63)	12 18 (67)	19 35 (296)		
2012-07-29	2456138.004486	12 06 27.6	5 03 ( 64)	12 18 (67)	19 34 (296)		
2012-07-30	2456139.004455	12 06 24.9	5 04 ( 64)	12 18 (66)	19 33 (296)		
2012-07-31	2456140.004418	12 06 21.7	5 05 ( 64)	12 18 (66)	19 31 (295)		
2012-08- 1	2456141.004374	12 06 17.9	5 06 ( 65)	12 18 (66)	19 30 (295)		
2012-08- 2	2456142.004322	12 06 13.4	5 07 ( 65)	12 18 (66)	19 29 (295)		
2012-08- 3	2456143.004264	12 06 08.4	5 08 ( 65)	12 18 (65)	19 28 (294)		
2012-08- 4	2456144.004198	12 06 02.7	5 09 ( 66)	12 18 (65)	19 27 (294)		
2012-08- 5	2456145.004126	12 05 56.5	5 10 ( 66)	12 18 (65)	19 25 (294)		
2012-08- 6	2456146.004047	12 05 49.7	5 11 ( 67)	12 18 (65)	19 24 (293)		
2012-08- 7	2456147.003961	12 05 42.2	5 12 ( 67)	12 18 (64)	19 23 (293)		
2012-08- 8	2456148.003869	12 05 34.3	5 13 ( 67)	12 18 (64)	19 22 (292)		
2012-08- 9	2456149.003770	12 05 25.7	5 14 ( 68)	12 17 (64)	19 20 (292)		
2012-08-10	2456150.003665	12 05 16.6	5 15 ( 68)	12 17 (63)	19 19 (292)		
2012-08-11	2456151.003553	12 05 06.9	5 16 ( 69)	12 17 (63)	19 18 (291)		
2012-08-12	2456152.003435	12 04 56.8	5 17 ( 69)	12 17 (63)	19 16 (291)		
2012-08-13	2456153.003310	12 04 46.0	5 18 ( 69)	12 17 (62)	19 15 (290)		
2012-08-14	2456154.003180	12 04 34.8	5 19 ( 70)	12 17 (62)	19 13 (290)		
2012-08-15	2456155.003043	12 04 23.0	5 20 ( 70)	12 16 (62)	19 12 (289)		
2012-08-16	2456156.002901	12 04 10.7	5 21 ( 71)	12 16 (62)	19 10 (289)		
2012-08-17	2456157.002753	12 03 57.8	5 22 ( 71)	12 16 (61)	19 09 (289)		
2012-08-18	2456158.002599	12 03 44.5	5 23 ( 72)	12 16 (61)	19 08 (288)		
2012-08-19	2456159.002439	12 03 30.7	5 24 ( 72)	12 16 (61)	19 06 (288)		
2012-08-20	2456160.002273	12 03 16.4	5 25 ( 73)	12 15 (60)	19 04 (287)		
2012-08-21	2456161.002102	12 03 01.6	5 26 ( 73)	12 15 (60)	19 03 (287)		
2012-08-22	2456162.001926	12 02 46.4	5 27 ( 73)	12 15 (60)	19 01 (286)		
2012-08-23	2456163.001744	12 02 30.7	5 28 ( 74)	12 15 (59)	19 00 (286)		
2012-08-24	2456164.001557	12 02 14.5	5 30 ( 74)	12 14 (59)	18 58 (285)		
2012-08-25	2456165.001365	12 01 57.9	5 31 ( 75)	12 14 (59)	18 57 (285)		

Ephemeris Transit							
Date	TDT JD	TDT Time	Rise (Azm)	Trans (Alt)	Set (Azm)		
		h m s	h m °	h m °	h m °	h m °	h m °
2012-08-26	2456166.001168	12 01 40.9	5 32 ( 75)	12 14 (58)	18 55 (284)		
2012-08-27	2456167.000967	12 01 23.5	5 33 ( 76)	12 13 (58)	18 53 (284)		
2012-08-28	2456168.000761	12 01 05.7	5 34 ( 76)	12 13 (57)	18 52 (283)		
2012-08-29	2456169.000551	12 00 47.6	5 35 ( 77)	12 13 (57)	18 50 (283)		
2012-08-30	2456170.000337	12 00 29.1	5 36 ( 77)	12 12 (57)	18 49 (282)		
2012-08-31	2456171.000119	12 00 10.3	5 37 ( 78)	12 12 (56)	18 47 (282)		
2012-09- 1	2456171.999897	11 59 51.1	5 38 ( 78)	12 12 (56)	18 45 (281)		
2012-09- 2	2456172.999673	11 59 31.7	5 39 ( 79)	12 12 (56)	18 43 (281)		
2012-09- 3	2456173.999445	11 59 12.0	5 40 ( 79)	12 11 (55)	18 42 (280)		
2012-09- 4	2456174.999214	11 58 52.1	5 41 ( 80)	12 11 (55)	18 40 (280)		
2012-09- 5	2456175.998981	11 58 32.0	5 42 ( 80)	12 11 (55)	18 38 (279)		
2012-09- 6	2456176.998746	11 58 11.6	5 43 ( 81)	12 10 (54)	18 37 (279)		
2012-09- 7	2456177.998508	11 57 51.1	5 44 ( 81)	12 10 (54)	18 35 (278)		
2012-09- 8	2456178.998269	11 57 30.4	5 45 ( 82)	12 10 (53)	18 33 (278)		
2012-09- 9	2456179.998028	11 57 09.6	5 46 ( 82)	12 09 (53)	18 32 (277)		
2012-09-10	2456180.997785	11 56 48.7	5 47 ( 83)	12 09 (53)	18 30 (277)		
2012-09-11	2456181.997542	11 56 27.6	5 48 ( 83)	12 08 (52)	18 28 (276)		
2012-09-12	2456182.997297	11 56 06.5	5 49 ( 84)	12 08 (52)	18 26 (276)		
2012-09-13	2456183.997051	11 55 45.2	5 50 ( 84)	12 08 (52)	18 25 (275)		
2012-09-14	2456184.996805	11 55 24.0	5 51 ( 85)	12 07 (51)	18 23 (275)		
2012-09-15	2456185.996559	11 55 02.7	5 52 ( 85)	12 07 (51)	18 21 (274)		
2012-09-16	2456186.996312	11 54 41.4	5 53 ( 86)	12 07 (50)	18 19 (274)		
2012-09-17	2456187.996065	11 54 20.0	5 54 ( 86)	12 06 (50)	18 18 (273)		
2012-09-18	2456188.995818	11 53 58.7	5 55 ( 87)	12 06 (50)	18 16 (273)		
2012-09-19	2456189.995572	11 53 37.4	5 56 ( 87)	12 06 (49)	18 14 (272)		
2012-09-20	2456190.995326	11 53 16.2	5 58 ( 88)	12 05 (49)	18 12 (272)		
2012-09-21	2456191.995081	11 52 55.0	5 59 ( 89)	12 05 (48)	18 11 (271)		
2012-09-22	2456192.994836	11 52 33.8	6 00 ( 89)	12 05 (48)	18 09 (271)		
2012-09-23	2456193.994593	11 52 12.8	6 01 ( 90)	12 04 (48)	18 07 (270)		
2012-09-24	2456194.994351	11 51 51.9	6 02 ( 90)	12 04 (47)	18 05 (270)		
2012-09-25	2456195.994111	11 51 31.2	6 03 ( 91)	12 04 (47)	18 04 (269)		
2012-09-26	2456196.993873	11 51 10.6	6 04 ( 91)	12 03 (47)	18 02 (269)		
2012-09-27	2456197.993636	11 50 50.2	6 05 ( 92)	12 03 (46)	18 00 (268)		
2012-09-28	2456198.993403	11 50 30.0	6 06 ( 92)	12 03 (46)	17 58 (268)		
2012-09-29	2456199.993172	11 50 10.0	6 07 ( 93)	12 02 (45)	17 57 (267)		
2012-09-30	2456200.992944	11 49 50.3	6 08 ( 93)	12 02 (45)	17 55 (267)		
2012-10- 1	2456201.992719	11 49 30.9	6 09 ( 94)	12 02 (45)	17 53 (266)		
2012-10- 2	2456202.992498	11 49 11.8	6 10 ( 94)	12 01 (44)	17 51 (265)		
2012-10- 3	2456203.992280	11 48 53.0	6 11 ( 95)	12 01 (44)	17 50 (265)		
2012-10- 4	2456204.992067	11 48 34.6	6 12 ( 95)	12 01 (43)	17 48 (264)		
2012-10- 5	2456205.991858	11 48 16.5	6 14 ( 96)	12 00 (43)	17 46 (264)		
2012-10- 6	2456206.991653	11 47 58.8	6 15 ( 96)	12 00 (43)	17 45 (263)		
2012-10- 7	2456207.991454	11 47 41.6	6 16 ( 97)	12 00 (42)	17 43 (263)		
2012-10- 8	2456208.991259	11 47 24.8	6 17 ( 97)	11 59 (42)	17 41 (262)		
2012-10- 9	2456209.991070	11 47 08.4	6 18 ( 98)	11 59 (41)	17 40 (262)		
2012-10-10	2456210.990886	11 46 52.5	6 19 ( 98)	11 59 (41)	17 38 (261)		
2012-10-11	2456211.990708	11 46 37.2	6 20 ( 99)	11 59 (41)	17 36 (261)		
2012-10-12	2456212.990536	11 46 22.3	6 21 ( 99)	11 58 (40)	17 35 (260)		
2012-10-13	2456213.990370	11 46 08.0	6 22 (100)	11 58 (40)	17 33 (260)		
2012-10-14	2456214.990210	11 45 54.2	6 24 (100)	11 58 (40)	17 32 (259)		
2012-10-15	2456215.990057	11 45 40.9	6 25 (101)	11 58 (39)	17 30 (259)		
2012-10-16	2456216.989911	11 45 28.3	6 26 (101)	11 57 (39)	17 28 (258)		
2012-10-17	2456217.989771	11 45 16.2	6 27 (102)	11 57 (39)	17 27 (258)		
2012-10-18	2456218.989638	11 45 04.7	6 28 (102)	11 57 (38)	17 25 (257)		
2012-10-19	2456219.989512	11 44 53.8	6 29 (103)	11 57 (38)	17 24 (257)		
2012-10-20	2456220.989393	11 44 43.6	6 31 (103)	11 57 (37)	17 22 (256)		
2012-10-21	2456221.989282	11 44 34.0	6 32 (104)	11 57 (37)	17 21 (256)		
2012-10-22	2456222.989178	11 44 25.0	6 33 (104)	11 56 (37)	17 19 (255)		
2012-10-23	2456223.989082	11 44 16.7	6 34 (105)	11 56 (36)	17 18 (255)		
2012-10-24	2456224.988994	11 44 09.1	6 35 (105)	11 56 (36)	17 16 (254)		
2012-10-25	2456225.988914	11 44 02.1	6 36 (106)	11 56 (36)	17 15 (254)		
2012-10-26	2456226.988842	11 43 55.9	6 38 (106)	11 56 (35)	17 14 (254)		
2012-10-27	2456227.988778	11 43 50.4	6 39 (107)	11 56 (35)	17 12 (253)		
2012-10-28	2456228.988723	11 43 45.7	6 40 (107)	11 56 (35)	17 11 (253)		
2012-10-29	2456229.988677	11 43 41.7	6 41 (108)	11 56 (34)	17 10 (252)		
2012-10-30	2456230.988640	11 43 38.5	6 42 (108)	11 56 (34)	17 08 (252)		
2012-10-31	2456231.988611	11 43 36.0	6 44 (109)	11 56 (34)	17 07 (251)		
2012-11- 1	2456232.988592	11 43 34.4	6 45 (109)	11 56 (33)	17 06 (251)		
2012-11- 2	2456233.988583	11 43 33.6	6 46 (109)	11 56 (33)	17 04 (250)		
2012-11- 3	2456234.988583	11 43 33.6	6 47 (110)	11 56 (33)	17 03 (250)		
2012-11- 4	2456235.988593	11 43 34.4	6 49 (110)	11 56 (32)	17 02 (250)		
2012-11- 5	2456236.988612	11 43 36.1	6 50 (111)	11 56 (32)	17 01 (249)		
2012-11- 6	2456237.988642	11 43 38.6	6 51 (111)	11 56 (32)	17 00 (249)		
2012-11- 7	2456238.988681	11 43 42.0	6 52 (112)	11 56 (32)	16 59 (248)		
2012-11- 8	2456239.988730	11 43 46.3	6 54 (112)	11 56 (31)	16 57 (248)		
2012-11- 9	2456240.988789	11 43 51.4	6 55 (112)	11 56 (31)	16 56 (248)		
2012-11-10	2456241.988858	11 43 57.4	6 56 (113)	11 56 (31)	16 55 (247)		
2012-11-11	2456242.988938	11 44 04.2	6 57 (113)	11 56 (30)	16 54 (247)		
2012-11-12	2456243.989027	11 44 11.9	6 59 (113)	11 56 (30)	16 53 (246)		
2012-11-13	2456244.989126	11 44 20.5	7 00 (114)	11 56 (30)	16 52 (246)		
2012-11-14	2456245.989235	11 44 29.9	7 01 (114)	11 56 (30)	16 52 (246)		
2012-11-15	2456246.989354	11 44 40.2	7 02 (115)	11 57 (29)	16 51 (245)		

Date	Ephemeris Transit		Rise (Azm)	Trans (Alt)	Set (Azm)
	TDT JD	TDT Time			
2012-11-16	2456247.989482	11 44 51.3	7 03 (115)	11 57 (29)	16 50 (245)
2012-11-17	2456248.989620	11 45 03.2	7 05 (115)	11 57 (29)	16 49 (245)
2012-11-18	2456249.989768	11 45 15.9	7 06 (116)	11 57 (29)	16 48 (244)
2012-11-19	2456250.989924	11 45 29.5	7 07 (116)	11 57 (28)	16 48 (244)
2012-11-20	2456251.990090	11 45 43.8	7 08 (116)	11 58 (28)	16 47 (244)
2012-11-21	2456252.990265	11 45 58.9	7 09 (117)	11 58 (28)	16 46 (243)
2012-11-22	2456253.990449	11 46 14.8	7 11 (117)	11 58 (28)	16 46 (243)
2012-11-23	2456254.990642	11 46 31.5	7 12 (117)	11 59 (28)	16 45 (243)
2012-11-24	2456255.990844	11 46 48.9	7 13 (117)	11 59 (27)	16 44 (242)
2012-11-25	2456256.991054	11 47 07.0	7 14 (118)	11 59 (27)	16 44 (242)
2012-11-26	2456257.991273	11 47 25.9	7 15 (118)	11 59 (27)	16 43 (242)
2012-11-27	2456258.991500	11 47 45.6	7 16 (118)	12 00 (27)	16 43 (242)
2012-11-28	2456259.991735	11 48 05.9	7 17 (119)	12 00 (27)	16 42 (241)
2012-11-29	2456260.991978	11 48 26.9	7 19 (119)	12 00 (26)	16 42 (241)
2012-11-30	2456261.992229	11 48 48.6	7 20 (119)	12 01 (26)	16 42 (241)
2012-12- 1	2456262.992488	11 49 11.0	7 21 (119)	12 01 (26)	16 41 (241)
2012-12- 2	2456263.992754	11 49 34.0	7 22 (119)	12 02 (26)	16 41 (240)
2012-12- 3	2456264.993028	11 49 57.6	7 23 (120)	12 02 (26)	16 41 (240)
2012-12- 4	2456265.993308	11 50 21.8	7 24 (120)	12 02 (26)	16 41 (240)
2012-12- 5	2456266.993595	11 50 46.6	7 25 (120)	12 03 (26)	16 41 (240)
2012-12- 6	2456267.993889	11 51 12.0	7 26 (120)	12 03 (25)	16 41 (240)
2012-12- 7	2456268.994188	11 51 37.9	7 27 (120)	12 04 (25)	16 40 (240)
2012-12- 8	2456269.994494	11 52 04.3	7 28 (120)	12 04 (25)	16 40 (239)
2012-12- 9	2456270.994805	11 52 31.1	7 28 (121)	12 05 (25)	16 40 (239)
2012-12-10	2456271.995121	11 52 58.5	7 29 (121)	12 05 (25)	16 41 (239)
2012-12-11	2456272.995442	11 53 26.2	7 30 (121)	12 05 (25)	16 41 (239)
2012-12-12	2456273.995767	11 53 54.3	7 31 (121)	12 06 (25)	16 41 (239)
2012-12-13	2456274.996096	11 54 22.7	7 32 (121)	12 06 (25)	16 41 (239)
2012-12-14	2456275.996429	11 54 51.5	7 32 (121)	12 07 (25)	16 41 (239)
2012-12-15	2456276.996765	11 55 20.5	7 33 (121)	12 07 (25)	16 41 (239)
2012-12-16	2456277.997103	11 55 49.7	7 34 (121)	12 08 (25)	16 42 (239)
2012-12-17	2456278.997444	11 56 19.1	7 34 (121)	12 08 (25)	16 42 (239)
2012-12-18	2456279.997786	11 56 48.7	7 35 (121)	12 09 (25)	16 42 (239)
2012-12-19	2456280.998129	11 57 18.4	7 36 (121)	12 09 (25)	16 43 (239)
2012-12-20	2456281.998474	11 57 48.2	7 36 (121)	12 10 (25)	16 43 (239)
2012-12-21	2456282.998819	11 58 18.0	7 37 (121)	12 10 (25)	16 44 (239)
2012-12-22	2456283.999164	11 58 47.8	7 37 (121)	12 11 (25)	16 44 (239)
2012-12-23	2456284.999509	11 59 17.6	7 38 (121)	12 11 (25)	16 45 (239)
2012-12-24	2456285.999854	11 59 47.4	7 38 (121)	12 12 (25)	16 45 (239)
2012-12-25	2456287.000197	12 00 17.1	7 39 (121)	12 12 (25)	16 46 (239)
2012-12-26	2456288.000540	12 00 46.6	7 39 (121)	12 13 (25)	16 47 (239)
2012-12-27	2456289.000880	12 01 16.0	7 39 (121)	12 13 (25)	16 47 (239)
2012-12-28	2456290.001219	12 01 45.3	7 39 (121)	12 14 (25)	16 48 (239)
2012-12-29	2456291.001555	12 02 14.3	7 40 (121)	12 14 (25)	16 49 (239)
2012-12-30	2456292.001888	12 02 43.2	7 40 (121)	12 15 (25)	16 50 (239)
2012-12-31	2456293.002219	12 03 11.7	7 40 (121)	12 15 (25)	16 51 (239)

for Greenwich Meridian = per il meridiano di Greenwich

for Rome : per Roma

Longitude = longitudine

Latitude = latitudine

Time Zone = fuso orario

UT = tempo universale

Ephemeris Transit = transito

Date = data nel formato anno/mese/giorno

JD = giorno giuliano

Time = ora

Rise, trans, set = orari di levata, altezza in gradi durante il transito a sud e tramonto.

Azm = azimut in ° calcolato da nord

Per località differenti da quella calcolata (42°N, 12°E) fare riferimento alla tabella correttiva posta in fondo all'almanacco.

Tempi in T.U.+1, aggiungere un'ora quando si adotta l'ora legale

Date = date in the format yyyy/mm/dd

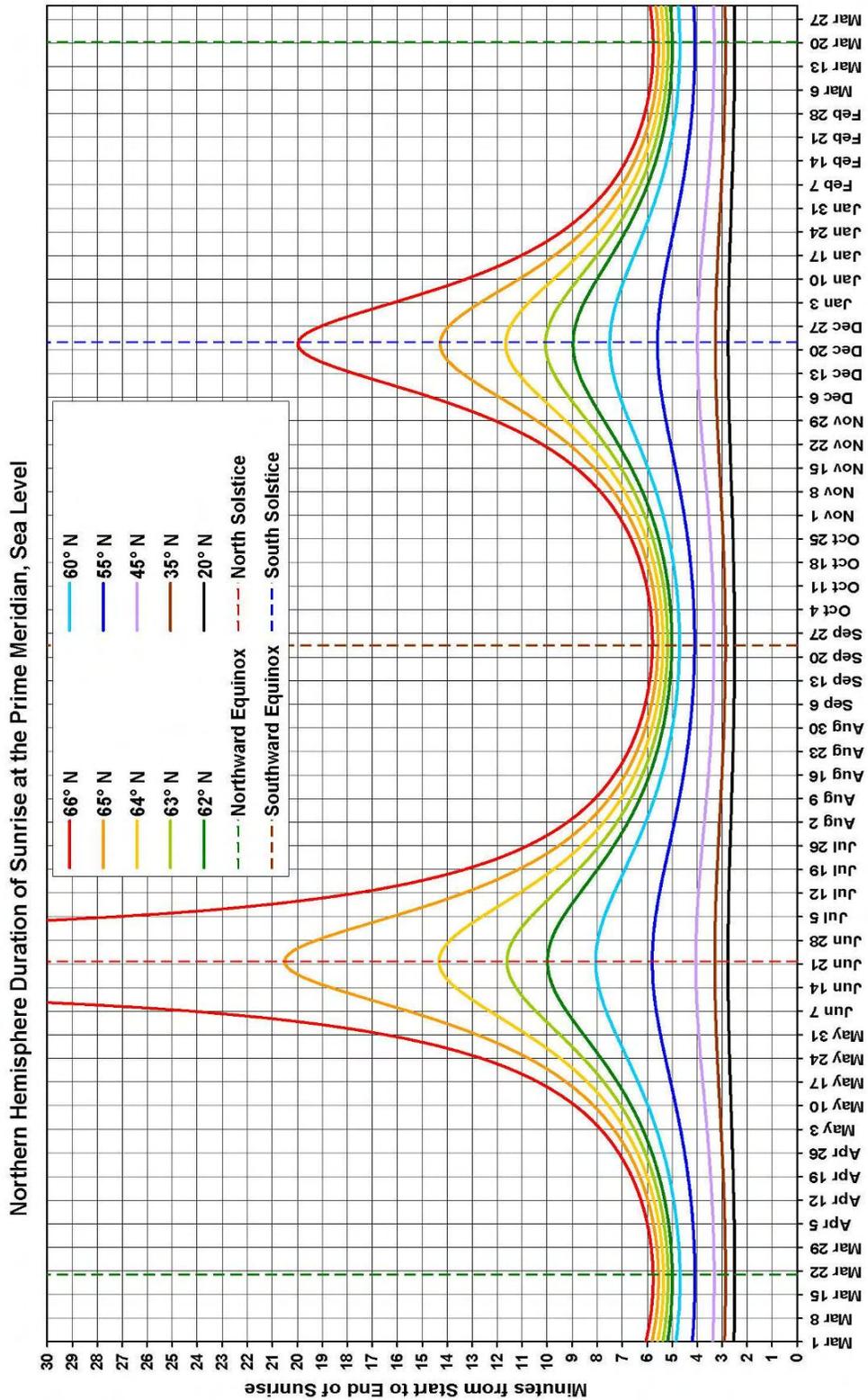
Rise, transits, set = times of rising, transit and setting, altitude in ° during the south transit.

Azm = azimuth in ° from north

For different places (42°N, 12°E) to refer to the corrective table in the last pages of the almanac.

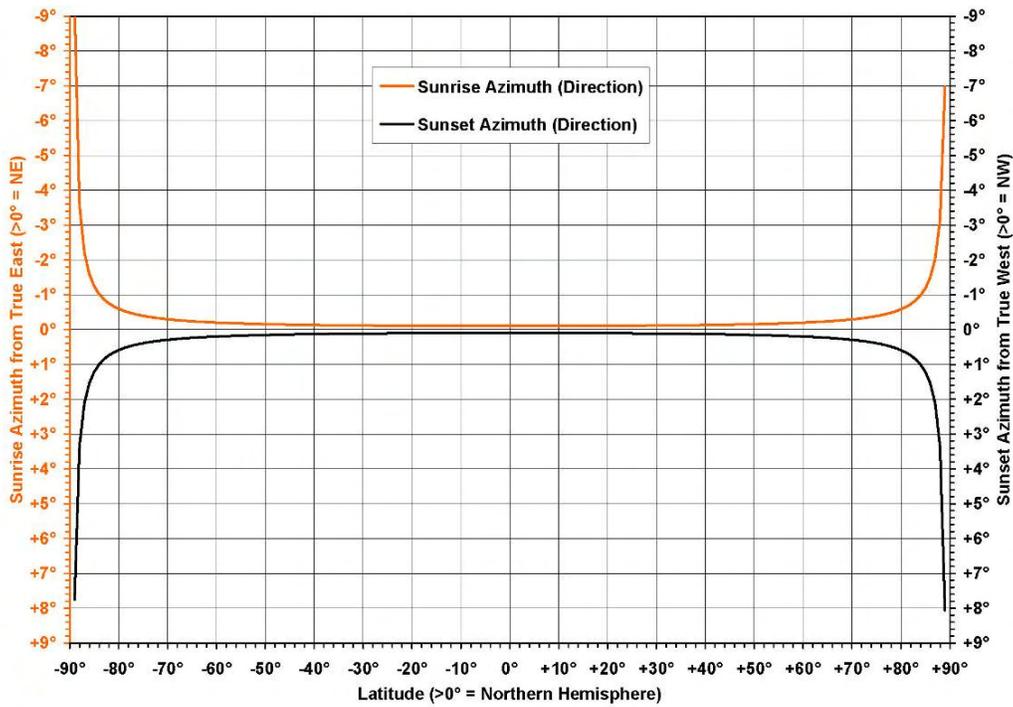
Times in local time, to add an hour when it is in use daylight saving time

# DURATA DELLA LEVATA E DEL TRAMONTO DURATION OF THE SUNRISE AND OF THE SUNSET



Il grafico mostra quanti minuti impiega il Sole per sorgere o tramontare alle varie latitudini

The graph shows how many minutes needs the Sun to rise or to set at the various latitudes

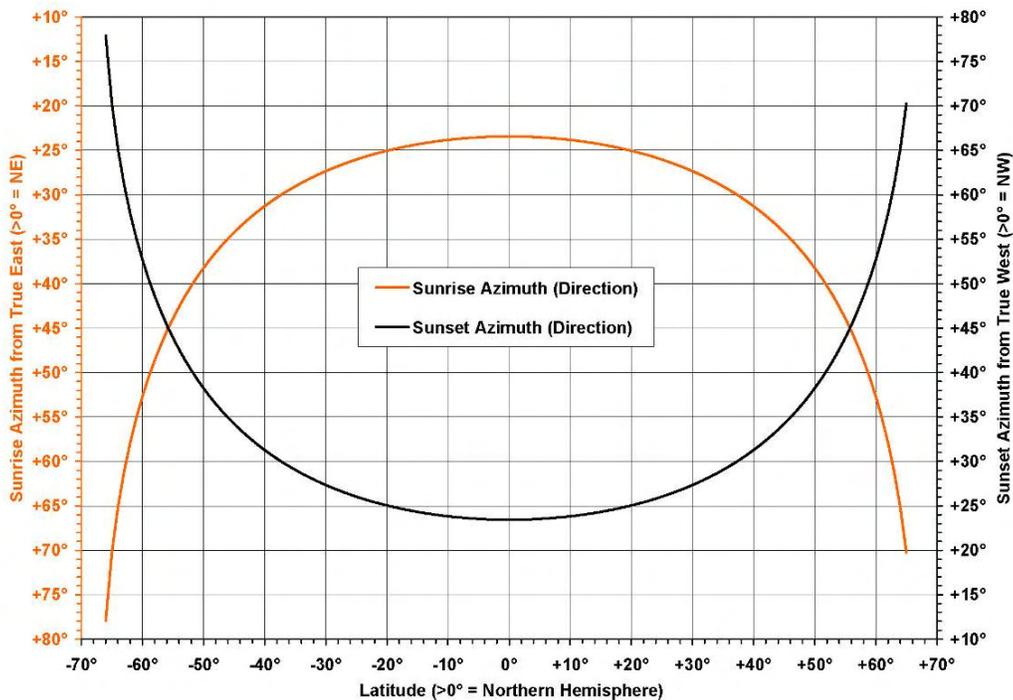


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.syn4b4.org/seasons/>

Posizione dell'azimut del Sole all'alba ed al tramonto, all'equinozio di primavera, alle varie latitudini, rispetto all'est ed all'ovest veri

Position of the azimuth of the Sun at the rising and setting, at the spring equinox, at the various latitudes, in comparison to the true east and to the true west

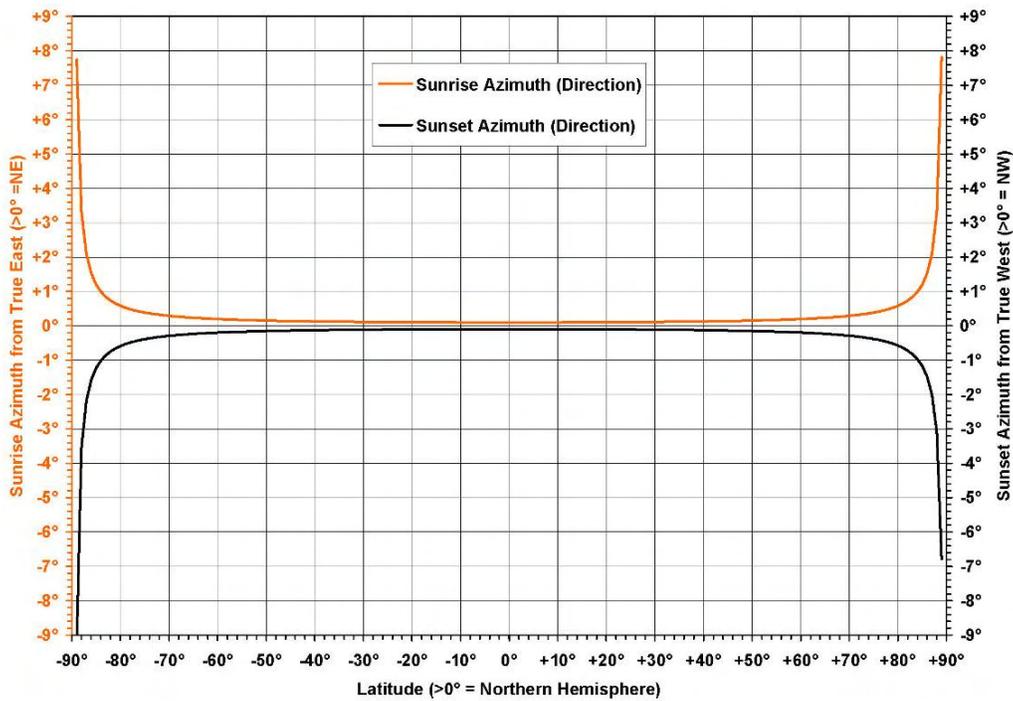


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.syn4b4.org/seasons/>

Posizione dell'azimut del Sole all'alba ed al tramonto, al solstizio d'estate, alle varie latitudini, rispetto all'est ed all'ovest veri

Position of the azimuth of the Sun at the rising and setting, at the summer solstice, at the various latitudes, in comparison to the true east and to the true west

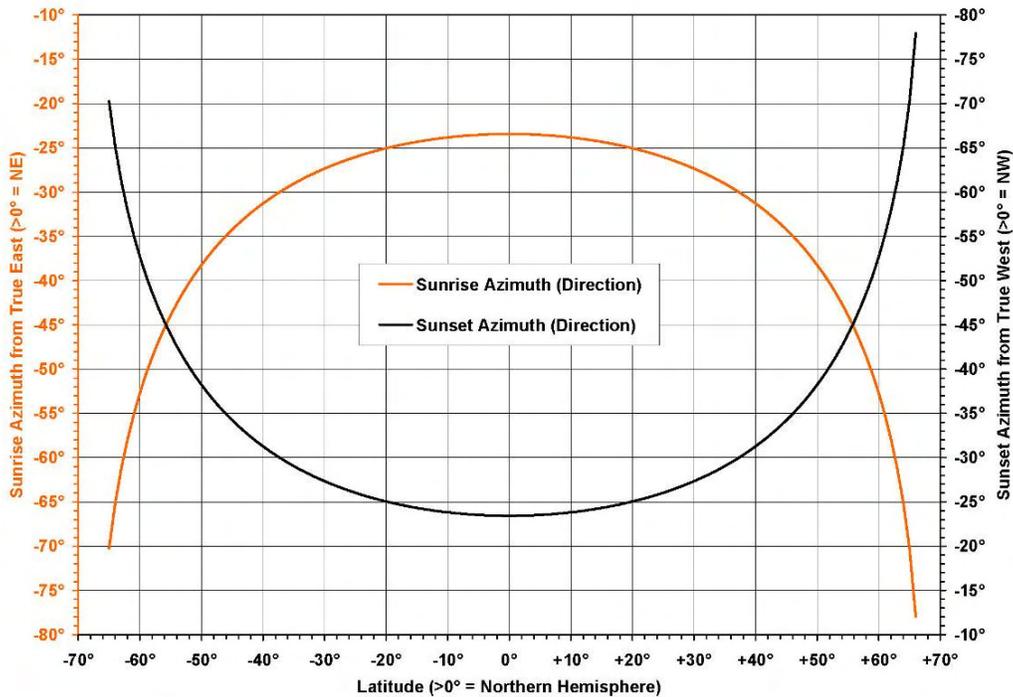


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

Posizione dell'azimut del Sole all'alba ed al tramonto, all'equinozio d'autunno, alle varie latitudini, rispetto all'est ed all'ovest veri

Position of the azimuth of the Sun at the rising and setting, at the autumn equinox, at the various latitudes, in comparison to the true east and to the true west

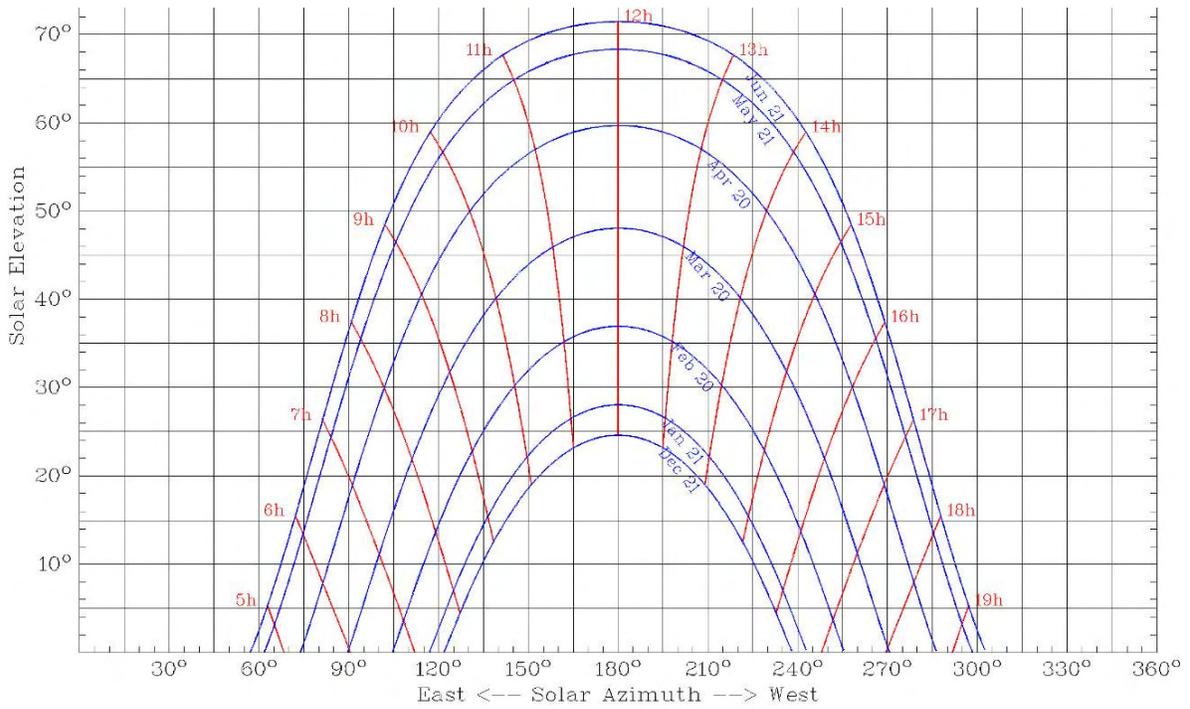


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

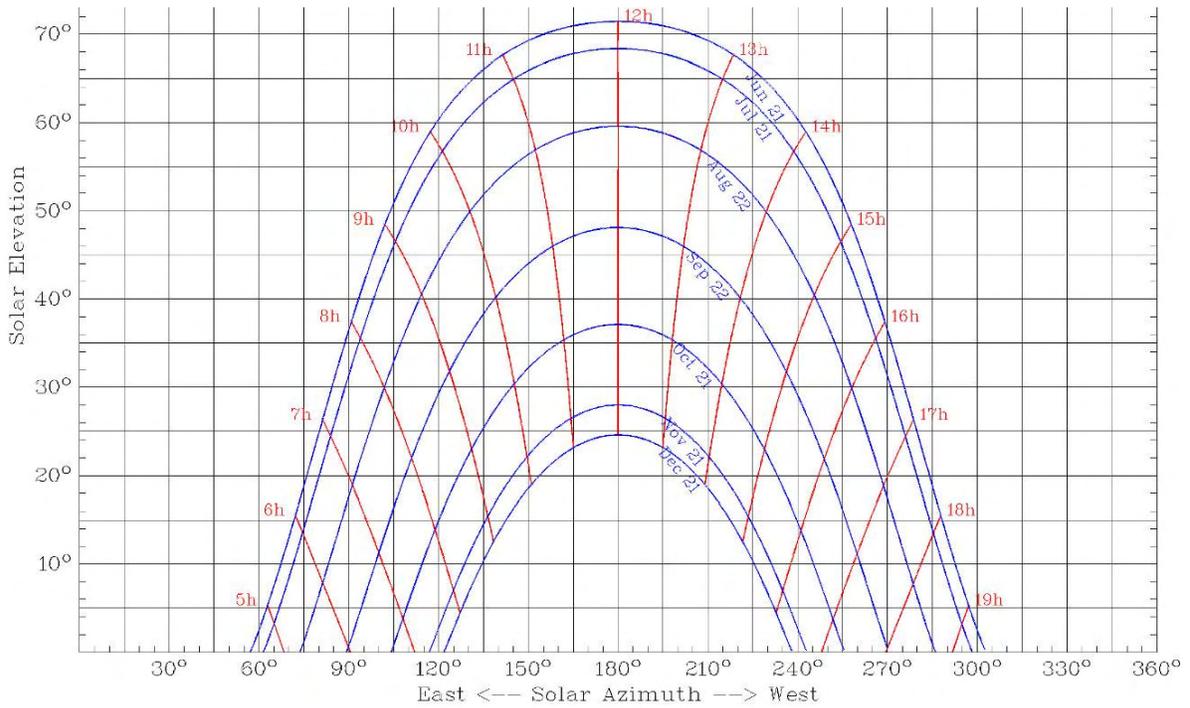
Posizione dell'azimut del Sole all'alba ed al tramonto, al solstizio d'inverno, alle varie latitudini, rispetto all'est ed all'ovest veri

Position of the azimuth of the Sun at the rising and setting, at the winter solstice, at the various latitudes, in comparison to the true east and to the true west



Altezza sull'orizzonte ed azimut del Sole per ogni mese ed ora, periodo gennaio-giugno  
Calcolato per Roma

Altitude and azimuth of the Sun above the horizon for each month and hour, January-June  
For Rome



Altezza sull'orizzonte ed azimut del Sole per ogni mese ed ora, periodo luglio-dicembre  
Calcolato per Roma

Altitude and azimuth of the Sun above the horizon for each month and hour, July-December  
For Rome

# CREPUSCOLI - TWILIGHTS

Longitude:E 12 00.0      Latitude:N 42 00.0 (Rome)      Time Zone: UT+1

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2012-01- 1	7 09	17 22	6 33	17 57	6 00	18 31
2012-01- 2	7 09	17 23	6 33	17 58	6 00	18 32
2012-01- 3	7 09	17 24	6 34	17 59	6 00	18 33
2012-01- 4	7 09	17 25	6 34	18 00	6 00	18 34
2012-01- 5	7 09	17 26	6 34	18 01	6 00	18 35
2012-01- 6	7 09	17 27	6 34	18 02	6 00	18 35
2012-01- 7	7 09	17 28	6 34	18 02	6 00	18 36
2012-01- 8	7 09	17 29	6 34	18 03	6 00	18 37
2012-01- 9	7 08	17 30	6 34	18 04	6 00	18 38
2012-01-10	7 08	17 31	6 34	18 05	6 00	18 39
2012-01-11	7 08	17 32	6 33	18 06	6 00	18 40
2012-01-12	7 08	17 33	6 33	18 07	6 00	18 41
2012-01-13	7 08	17 34	6 33	18 08	5 59	18 42
2012-01-14	7 07	17 35	6 33	18 09	5 59	18 43
2012-01-15	7 07	17 36	6 32	18 10	5 59	18 44
2012-01-16	7 07	17 37	6 32	18 11	5 59	18 45
2012-01-17	7 06	17 38	6 32	18 12	5 58	18 46
2012-01-18	7 06	17 39	6 31	18 13	5 58	18 47
2012-01-19	7 05	17 40	6 31	18 14	5 58	18 48
2012-01-20	7 05	17 41	6 31	18 16	5 57	18 49
2012-01-21	7 04	17 42	6 30	18 17	5 57	18 50
2012-01-22	7 04	17 44	6 30	18 18	5 56	18 51
2012-01-23	7 03	17 45	6 29	18 19	5 56	18 52
2012-01-24	7 02	17 46	6 28	18 20	5 55	18 53
2012-01-25	7 02	17 47	6 28	18 21	5 55	18 54
2012-01-26	7 01	17 48	6 27	18 22	5 54	18 55
2012-01-27	7 00	17 50	6 26	18 23	5 53	18 56
2012-01-28	6 59	17 51	6 26	18 24	5 53	18 57
2012-01-29	6 59	17 52	6 25	18 26	5 52	18 59
2012-01-30	6 58	17 53	6 24	18 27	5 51	19 00
2012-01-31	6 57	17 54	6 23	18 28	5 50	19 01
2012-02- 1	6 56	17 56	6 22	18 29	5 50	19 02
2012-02- 2	6 55	17 57	6 22	18 30	5 49	19 03
2012-02- 3	6 54	17 58	6 21	18 31	5 48	19 04
2012-02- 4	6 53	17 59	6 20	18 33	5 47	19 05
2012-02- 5	6 52	18 00	6 19	18 34	5 46	19 06
2012-02- 6	6 51	18 02	6 18	18 35	5 45	19 07
2012-02- 7	6 50	18 03	6 17	18 36	5 44	19 09
2012-02- 8	6 49	18 04	6 16	18 37	5 43	19 10
2012-02- 9	6 48	18 05	6 15	18 38	5 42	19 11
2012-02-10	6 46	18 07	6 13	18 40	5 41	19 12
2012-02-11	6 45	18 08	6 12	18 41	5 40	19 13
2012-02-12	6 44	18 09	6 11	18 42	5 39	19 14
2012-02-13	6 43	18 10	6 10	18 43	5 38	19 15
2012-02-14	6 42	18 11	6 09	18 44	5 36	19 17
2012-02-15	6 40	18 13	6 08	18 45	5 35	19 18
2012-02-16	6 39	18 14	6 06	18 47	5 34	19 19
2012-02-17	6 38	18 15	6 05	18 48	5 33	19 20
2012-02-18	6 36	18 16	6 04	18 49	5 31	19 21
2012-02-19	6 35	18 17	6 02	18 50	5 30	19 22
2012-02-20	6 34	18 19	6 01	18 51	5 29	19 24
2012-02-21	6 32	18 20	6 00	18 52	5 27	19 25
2012-02-22	6 31	18 21	5 58	18 54	5 26	19 26
2012-02-23	6 29	18 22	5 57	18 55	5 25	19 27
2012-02-24	6 28	18 23	5 55	18 56	5 23	19 28
2012-02-25	6 26	18 25	5 54	18 57	5 22	19 29
2012-02-26	6 25	18 26	5 52	18 58	5 20	19 31
2012-02-27	6 23	18 27	5 51	18 59	5 19	19 32
2012-02-28	6 22	18 28	5 49	19 01	5 17	19 33
2012-02-29	6 20	18 29	5 48	19 02	5 16	19 34
2012-03- 1	6 19	18 30	5 46	19 03	5 14	19 35
2012-03- 2	6 17	18 32	5 45	19 04	5 12	19 36
2012-03- 3	6 16	18 33	5 43	19 05	5 11	19 38
2012-03- 4	6 14	18 34	5 42	19 06	5 09	19 39
2012-03- 5	6 12	18 35	5 40	19 07	5 08	19 40
2012-03- 6	6 11	18 36	5 38	19 09	5 06	19 41
2012-03- 7	6 09	18 37	5 37	19 10	5 04	19 42
2012-03- 8	6 07	18 39	5 35	19 11	5 03	19 44
2012-03- 9	6 06	18 40	5 33	19 12	5 01	19 45
2012-03-10	6 04	18 41	5 32	19 13	4 59	19 46
2012-03-11	6 02	18 42	5 30	19 14	4 57	19 47
2012-03-12	6 01	18 43	5 28	19 16	4 56	19 48
2012-03-13	5 59	18 44	5 27	19 17	4 54	19 50
2012-03-14	5 57	18 45	5 25	19 18	4 52	19 51
2012-03-15	5 56	18 47	5 23	19 19	4 50	19 52
2012-03-16	5 54	18 48	5 22	19 20	4 49	19 53
2012-03-17	5 52	18 49	5 20	19 21	4 47	19 55
2012-03-18	5 51	18 50	5 18	19 23	4 45	19 56
2012-03-19	5 49	18 51	5 16	19 24	4 43	19 57
2012-03-20	5 47	18 52	5 15	19 25	4 41	19 58
2012-03-21	5 45	18 54	5 13	19 26	4 39	20 00
2012-03-22	5 44	18 55	5 11	19 27	4 38	20 01
2012-03-23	5 42	18 56	5 09	19 29	4 36	20 02
2012-03-24	5 40	18 57	5 07	19 30	4 34	20 04
2012-03-25	5 38	18 58	5 06	19 31	4 32	20 05
2012-03-26	5 37	18 59	5 04	19 32	4 30	20 06
2012-03-27	5 35	19 00	5 02	19 33	4 28	20 08

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2012-03-28	5 33	19 02	5 00	19 35	4 26	20 09
2012-03-29	5 31	19 03	4 58	19 36	4 24	20 10
2012-03-30	5 30	19 04	4 56	19 37	4 22	20 12
2012-03-31	5 28	19 05	4 55	19 38	4 20	20 13
2012-04- 1	5 26	19 06	4 53	19 40	4 18	20 14
2012-04- 2	5 24	19 07	4 51	19 41	4 16	20 16
2012-04- 3	5 23	19 08	4 49	19 42	4 14	20 17
2012-04- 4	5 21	19 10	4 47	19 43	4 12	20 18
2012-04- 5	5 19	19 11	4 46	19 45	4 10	20 20
2012-04- 6	5 18	19 12	4 44	19 46	4 08	20 21
2012-04- 7	5 16	19 13	4 42	19 47	4 06	20 23
2012-04- 8	5 14	19 14	4 40	19 48	4 04	20 24
2012-04- 9	5 12	19 15	4 38	19 50	4 02	20 26
2012-04-10	5 11	19 17	4 36	19 51	4 00	20 27
2012-04-11	5 09	19 18	4 35	19 52	3 59	20 29
2012-04-12	5 07	19 19	4 33	19 54	3 57	20 30
2012-04-13	5 06	19 20	4 31	19 55	3 55	20 32
2012-04-14	5 04	19 21	4 29	19 56	3 53	20 33
2012-04-15	5 02	19 22	4 27	19 57	3 51	20 35
2012-04-16	5 01	19 24	4 26	19 59	3 49	20 36
2012-04-17	4 59	19 25	4 24	20 00	3 47	20 38
2012-04-18	4 57	19 26	4 22	20 01	3 45	20 39
2012-04-19	4 56	19 27	4 20	20 03	3 43	20 41
2012-04-20	4 54	19 28	4 19	20 04	3 41	20 42
2012-04-21	4 52	19 30	4 17	20 05	3 39	20 44
2012-04-22	4 51	19 31	4 15	20 07	3 37	20 45
2012-04-23	4 49	19 32	4 13	20 08	3 35	20 47
2012-04-24	4 48	19 33	4 12	20 10	3 33	20 49
2012-04-25	4 46	19 34	4 10	20 11	3 31	20 50
2012-04-26	4 45	19 36	4 08	20 12	3 29	20 52
2012-04-27	4 43	19 37	4 07	20 14	3 27	20 53
2012-04-28	4 42	19 38	4 05	20 15	3 25	20 55
2012-04-29	4 40	19 39	4 03	20 16	3 23	20 57
2012-04-30	4 39	19 40	4 02	20 18	3 21	20 58
2012-05- 1	4 37	19 42	4 00	20 19	3 19	21 00
2012-05- 2	4 36	19 43	3 58	20 21	3 17	21 02
2012-05- 3	4 34	19 44	3 57	20 22	3 16	21 03
2012-05- 4	4 33	19 45	3 55	20 23	3 14	21 05
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2012-05- 6	4 30	19 48	3 52	20 26	3 10	21 08
2012-05- 7	4 29	19 49	3 51	20 27	3 08	21 10
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2012-05-11	4 24	19 53	3 45	20 33	3 01	21 17
2012-05-12	4 23	19 55	3 44	20 34	3 00	21 18
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2012-05-14	4 20	19 57	3 41	20 37	2 56	21 22
2012-05-15	4 19	19 58	3 40	20 38	2 55	21 23
2012-05-16	4 18	19 59	3 38	20 39	2 53	21 25
2012-05-17	4 17	20 00	3 37	20 41	2 51	21 27
2012-05-18	4 16	20 01	3 36	20 42	2 50	21 28
2012-05-19	4 15	20 02	3 35	20 43	2 48	21 30
2012-05-20	4 14	20 04	3 33	20 45	2 47	21 32
2012-05-21	4 13	20 05	3 32	20 46	2 45	21 33
2012-05-22	4 12	20 06	3 31	20 47	2 44	21 35
2012-05-23	4 12	20 07	3 30	20 48	2 43	21 36
2012-05-24	4 11	20 08	3 29	20 49	2 41	21 38
2012-05-25	4 10	20 09	3 28	20 51	2 40	21 39
2012-05-26	4 09	20 10	3 27	20 52	2 39	21 41
2012-05-27	4 08	20 11	3 26	20 53	2 37	21 42
2012-05-28	4 08	20 12	3 25	20 54	2 36	21 44
2012-05-29	4 07	20 12	3 25	20 55	2 35	21 45
2012-05-30	4 06	20 13	3 24	20 56	2 34	21 46
2012-05-31	4 06	20 14	3 23	20 57	2 33	21 48
2012-06- 1	4 05	20 15	3 22	20 58	2 32	21 49
2012-06- 2	4 05	20 16	3 22	20 59	2 31	21 50
2012-06- 3	4 04	20 17	3 21	21 00	2 30	21 51
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2012-06-11	4 02	20 22	3 18	21 06	2 25	21 59
2012-06-12	4 02	20 22	3 17	21 07	2 24	22 00
2012-06-13	4 01	20 23	3 17	21 07	2 24	22 01
2012-06-14	4 01	20 23	3 17	21 08	2 24	22 01
2012-06-15	4 01	20 24	3 17	21 08	2 24	22 02
2012-06-16	4 01	20 24	3 17	21 09	2 23	22 02
2012-06-17	4 01	20 25	3 17	21 09	2 23	22 03
2012-06-18	4 02	20 25	3 17	21 09	2 23	22 03
2012-06-19	4 02	20 25	3 17	21 10	2 23	22 04
2012-06-20	4 02	20 25	3 17	21 10	2 24	22 04
2012-06-21	4 02	20 26	3 18	21 10	2 24	22 04
2012-06-22	4 02	20 26	3 18	21 10	2 24	22 04
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2012-06-26	4 04	20 26	3 19	21 10	2 26	22 04
2012-06-27	4 04	20 26	3 20	21 10	2 26	22 04
2012-06-28	4 05	20 26	3 20	21 10	2 27	22 03
2012-06-29	4 05	20 26	3 21	21 10	2 28	22 03

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2012-06-30	4 06	20 26	3 21	21 10	2 28	22 03
2012-07- 1	4 06	20 26	3 22	21 10	2 29	22 02
2012-07- 2	4 07	20 25	3 23	21 09	2 30	22 02
2012-07- 3	4 07	20 25	3 23	21 09	2 31	22 01
2012-07- 4	4 08	20 25	3 24	21 08	2 32	22 01
2012-07- 5	4 09	20 24	3 25	21 08	2 33	22 00
2012-07- 6	4 09	20 24	3 26	21 07	2 34	21 59
2012-07- 7	4 10	20 24	3 27	21 07	2 35	21 58
2012-07- 8	4 11	20 23	3 27	21 06	2 36	21 57
2012-07- 9	4 11	20 23	3 28	21 06	2 37	21 57
2012-07-10	4 12	20 22	3 29	21 05	2 38	21 56
2012-07-11	4 13	20 22	3 30	21 04	2 40	21 55
2012-07-12	4 14	20 21	3 31	21 03	2 41	21 53
2012-07-13	4 15	20 20	3 32	21 03	2 42	21 52
2012-07-14	4 16	20 20	3 33	21 02	2 44	21 51
2012-07-15	4 17	20 19	3 34	21 01	2 45	21 50
2012-07-16	4 18	20 18	3 35	21 00	2 46	21 49
2012-07-17	4 18	20 17	3 37	20 59	2 48	21 47
2012-07-18	4 19	20 17	3 38	20 58	2 49	21 46
2012-07-19	4 20	20 16	3 39	20 57	2 51	21 45
2012-07-20	4 21	20 15	3 40	20 56	2 52	21 43
2012-07-21	4 22	20 14	3 41	20 55	2 54	21 42
2012-07-22	4 23	20 13	3 42	20 54	2 55	21 40
2012-07-23	4 24	20 12	3 44	20 53	2 57	21 39
2012-07-24	4 25	20 11	3 45	20 51	2 58	21 37
2012-07-25	4 27	20 10	3 46	20 50	3 00	21 36
2012-07-26	4 28	20 09	3 47	20 49	3 02	21 34
2012-07-27	4 29	20 08	3 49	20 48	3 03	21 33
2012-07-28	4 30	20 07	3 50	20 46	3 05	21 31
2012-07-29	4 31	20 05	3 51	20 45	3 06	21 29
2012-07-30	4 32	20 04	3 52	20 44	3 08	21 28
2012-07-31	4 33	20 03	3 54	20 42	3 10	21 26
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2012-08- 2	4 35	20 00	3 56	20 39	3 13	21 22
2012-08- 3	4 36	19 59	3 58	20 38	3 14	21 21
2012-08- 4	4 37	19 58	3 59	20 36	3 16	21 19
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2012-08- 6	4 40	19 55	4 02	20 33	3 19	21 15
2012-08- 7	4 41	19 54	4 03	20 32	3 21	21 13
2012-08- 8	4 42	19 52	4 04	20 30	3 23	21 11
2012-08- 9	4 43	19 51	4 05	20 28	3 24	21 09
2012-08-10	4 44	19 49	4 07	20 27	3 26	21 08
2012-08-11	4 45	19 48	4 08	20 25	3 27	21 06
2012-08-12	4 47	19 47	4 09	20 24	3 29	21 04
2012-08-13	4 48	19 45	4 11	20 22	3 30	21 02
2012-08-14	4 49	19 43	4 12	20 20	3 32	21 00
2012-08-15	4 50	19 42	4 13	20 18	3 34	20 58
2012-08-16	4 51	19 40	4 15	20 17	3 35	20 56
2012-08-17	4 52	19 39	4 16	20 15	3 37	20 54
2012-08-18	4 53	19 37	4 17	20 13	3 38	20 52
2012-08-19	4 55	19 36	4 18	20 12	3 40	20 50
2012-08-20	4 56	19 34	4 20	20 10	3 41	20 48
2012-08-21	4 57	19 32	4 21	20 08	3 43	20 46
2012-08-22	4 58	19 31	4 22	20 06	3 44	20 44
2012-08-23	4 59	19 29	4 24	20 04	3 46	20 42
2012-08-24	5 00	19 27	4 25	20 03	3 47	20 40
2012-08-25	5 01	19 26	4 26	20 01	3 49	20 38
2012-08-26	5 02	19 24	4 27	19 59	3 50	20 36
2012-08-27	5 04	19 22	4 29	19 57	3 52	20 34
2012-08-28	5 05	19 21	4 30	19 55	3 53	20 32
2012-08-29	5 06	19 19	4 31	19 54	3 55	20 30
2012-08-30	5 07	19 17	4 32	19 52	3 56	20 28
2012-08-31	5 08	19 16	4 34	19 50	3 57	20 26
2012-09- 1	5 09	19 14	4 35	19 48	3 59	20 24
2012-09- 2	5 10	19 12	4 36	19 46	4 00	20 22
2012-09- 3	5 11	19 10	4 37	19 44	4 01	20 20
2012-09- 4	5 12	19 09	4 38	19 42	4 03	20 18
2012-09- 5	5 13	19 07	4 40	19 41	4 04	20 16
2012-09- 6	5 15	19 05	4 41	19 39	4 06	20 14
2012-09- 7	5 16	19 03	4 42	19 37	4 07	20 12
2012-09- 8	5 17	19 02	4 43	19 35	4 08	20 10
2012-09- 9	5 18	19 00	4 44	19 33	4 09	20 08
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2012-09-13	5 22	18 53	4 49	19 26	4 15	20 00
2012-09-14	5 23	18 51	4 50	19 24	4 16	19 58
2012-09-15	5 24	18 49	4 51	19 22	4 17	19 56
2012-09-16	5 25	18 47	4 52	19 20	4 18	19 54
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2012-09-22	5 32	18 37	4 59	19 09	4 26	19 42
2012-09-23	5 33	18 35	5 00	19 07	4 27	19 41
2012-09-24	5 34	18 33	5 01	19 06	4 28	19 39
2012-09-25	5 35	18 31	5 02	19 04	4 29	19 37
2012-09-26	5 36	18 30	5 03	19 02	4 30	19 35
2012-09-27	5 37	18 28	5 05	19 00	4 32	19 33
2012-09-28	5 38	18 26	5 06	18 59	4 33	19 31
2012-09-29	5 39	18 24	5 07	18 57	4 34	19 30
2012-09-30	5 40	18 23	5 08	18 55	4 35	19 28
2012-10- 1	5 41	18 21	5 09	18 53	4 36	19 26

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2012-10- 2	5 42	18 19	5 10	18 52	4 37	19 24
2012-10- 3	5 43	18 18	5 11	18 50	4 38	19 22
2012-10- 4	5 45	18 16	5 12	18 48	4 40	19 21
2012-10- 5	5 46	18 14	5 13	18 47	4 41	19 19
2012-10- 6	5 47	18 13	5 14	18 45	4 42	19 17
2012-10- 7	5 48	18 11	5 15	18 43	4 43	19 16
2012-10- 8	5 49	18 09	5 17	18 42	4 44	19 14
2012-10- 9	5 50	18 08	5 18	18 40	4 45	19 12
2012-10-10	5 51	18 06	5 19	18 38	4 46	19 11
2012-10-11	5 52	18 04	5 20	18 37	4 47	19 09
2012-10-12	5 53	18 03	5 21	18 35	4 49	19 07
2012-10-13	5 54	18 01	5 22	18 34	4 50	19 06
2012-10-14	5 55	18 00	5 23	18 32	4 51	19 04
2012-10-15	5 57	17 58	5 24	18 30	4 52	19 03
2012-10-16	5 58	17 57	5 25	18 29	4 53	19 01
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2012-10-19	6 01	17 52	5 29	18 25	4 56	18 57
2012-10-20	6 02	17 51	5 30	18 23	4 57	18 55
2012-10-21	6 03	17 49	5 31	18 22	4 58	18 54
2012-10-22	6 04	17 48	5 32	18 20	5 00	18 53
2012-10-23	6 06	17 46	5 33	18 19	5 01	18 51
2012-10-24	6 07	17 45	5 34	18 18	5 02	18 50
2012-10-25	6 08	17 44	5 35	18 16	5 03	18 49
2012-10-26	6 09	17 42	5 36	18 15	5 04	18 47
2012-10-27	6 10	17 41	5 37	18 14	5 05	18 46
2012-10-28	6 11	17 40	5 38	18 12	5 06	18 45
2012-10-29	6 12	17 38	5 40	18 11	5 07	18 44
2012-10-30	6 14	17 37	5 41	18 10	5 08	18 42
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2012-11- 3	6 18	17 32	5 45	18 05	5 13	18 38
2012-11- 4	6 19	17 31	5 46	18 04	5 14	18 37
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2012-11- 9	6 25	17 26	5 52	17 59	5 19	18 32
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2012-11-11	6 28	17 24	5 54	17 58	5 21	18 31
2012-11-12	6 29	17 23	5 55	17 57	5 22	18 30
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2012-11-15	6 32	17 21	5 58	17 55	5 25	18 28
2012-11-16	6 33	17 20	5 59	17 54	5 26	18 27
2012-11-17	6 34	17 19	6 01	17 53	5 27	18 26
2012-11-18	6 36	17 19	6 02	17 53	5 28	18 26
2012-11-19	6 37	17 18	6 03	17 52	5 29	18 25
2012-11-20	6 38	17 17	6 04	17 51	5 30	18 25
2012-11-21	6 39	17 17	6 05	17 51	5 32	18 24
2012-11-22	6 40	17 16	6 06	17 50	5 33	18 24
2012-11-23	6 41	17 16	6 07	17 50	5 34	18 23
2012-11-24	6 42	17 15	6 08	17 49	5 35	18 23
2012-11-25	6 43	17 15	6 09	17 49	5 35	18 22
2012-11-26	6 44	17 14	6 10	17 49	5 36	18 22
2012-11-27	6 45	17 14	6 11	17 48	5 37	18 22
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2012-11-29	6 48	17 13	6 13	17 48	5 39	18 21
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2012-12-15	7 01	17 13	6 26	17 48	5 52	18 22
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2012-12-17	7 03	17 14	6 28	17 49	5 53	18 23
2012-12-18	7 03	17 14	6 28	17 49	5 54	18 23
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2012-12-24	7 06	17 17	6 31	17 52	5 57	18 26
2012-12-25	7 07	17 18	6 32	17 53	5 58	18 27
2012-12-26	7 07	17 18	6 32	17 54	5 58	18 28
2012-12-27	7 07	17 19	6 32	17 54	5 58	18 28
2012-12-28	7 08	17 20	6 33	17 55	5 59	18 29
2012-12-29	7 08	17 21	6 33	17 56	5 59	18 30
2012-12-30	7 08	17 21	6 33	17 56	5 59	18 30
2012-12-31	7 08	17 22	6 33	17 57	5 59	18 31

Longitude = longitudine  
 Latitude = latitudine  
 Time Zone = fuso orario  
 Date = data nel formato anno/mese/giorno  
 Civil = civile  
 Nautical = nautico  
 Astronomical = astronomico  
 Morning = mattino  
 Evening = sera  
 Data nel formato aaaa/mm/gg

Tempi in T.U.+1, aggiungere un'ora quando si adotta l'ora legale

Times in local time, to add an hour when it is in use daylight saving time

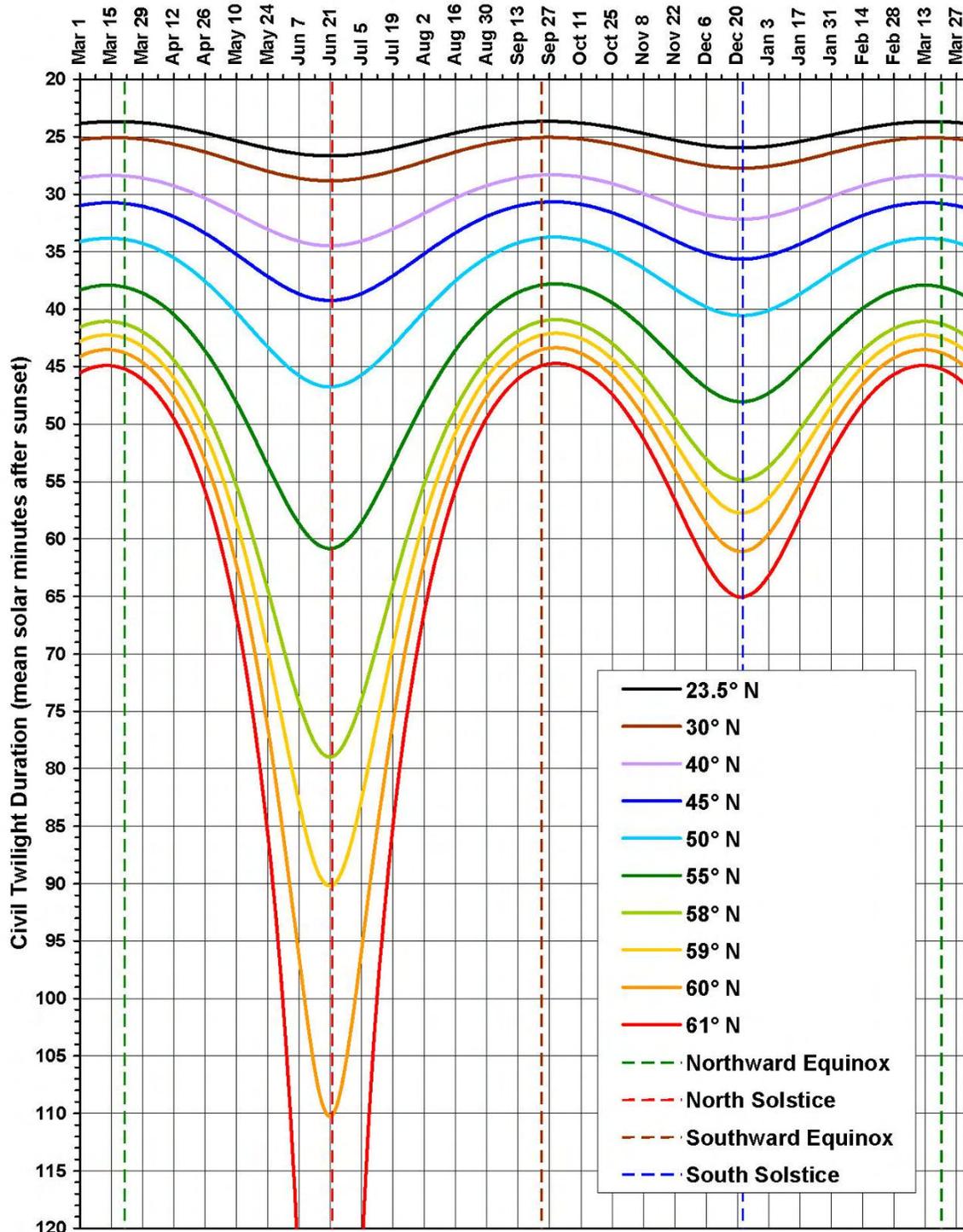
© (1)

## DURATA DEL GIORNO - DURATION OF THE DAY

### 42°N - 12°E

G	Gen.	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
D	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
01	09:11	10:00	11:16	12:44	14:03	15:02	15:11	14:25	13:07	11:44	10:21	09:21
02	09:11	10:03	11:19	12:46	14:06	15:04	15:10	14:22	13:05	11:41	10:18	09:19
03	09:12	10:05	11:21	12:49	14:08	15:05	15:09	14:20	13:02	11:38	10:16	09:18
04	09:13	10:07	11:24	12:52	14:11	15:06	15:09	14:18	12:59	11:36	10:13	09:17
05	09:14	10:10	11:27	12:55	14:13	15:07	15:08	14:16	12:56	11:33	10:11	09:16
06	09:15	10:12	11:30	12:57	14:15	15:08	15:07	14:13	12:54	11:30	10:09	09:15
07	09:16	10:15	11:33	13:00	14:17	15:09	15:06	14:11	12:51	11:27	10:06	09:14
08	09:17	10:17	11:35	13:03	14:20	15:09	15:05	14:09	12:48	11:25	10:04	09:13
09	09:19	10:20	11:38	13:06	14:22	15:10	15:04	14:06	12:45	11:22	10:02	09:12
10	09:20	10:22	11:41	13:09	14:24	15:11	15:02	14:04	12:43	11:19	09:59	09:11
11	09:21	10:25	11:44	13:11	14:26	15:12	15:01	14:02	12:40	11:16	09:57	09:11
12	09:23	10:27	11:47	13:14	14:28	15:12	15:00	13:59	12:37	11:14	09:55	09:10
13	09:24	10:30	11:50	13:17	14:30	15:13	14:59	13:57	12:34	11:11	09:53	09:09
14	09:25	10:32	11:52	13:19	14:33	15:13	14:57	13:54	12:32	11:08	09:51	09:09
15	09:27	10:35	11:55	13:22	14:35	15:14	14:56	13:52	12:29	11:05	09:49	09:08
16	09:29	10:38	11:58	13:25	14:37	15:14	14:54	13:49	12:26	11:03	09:46	09:08
17	09:30	10:40	12:01	13:28	14:39	15:14	14:53	13:47	12:23	11:00	09:44	09:08
18	09:32	10:43	12:04	13:30	14:40	15:14	14:51	13:44	12:20	10:57	09:42	09:07
19	09:34	10:46	12:07	13:33	14:42	15:14	14:49	13:42	12:18	10:54	09:41	09:07
20	09:36	10:48	12:10	13:35	14:44	15:15	14:48	13:39	12:15	10:52	09:39	09:07
21	09:37	10:51	12:12	13:38	14:46	15:15	14:46	13:37	12:12	10:49	09:37	09:07
22	09:39	10:54	12:15	13:41	14:48	15:14	14:44	13:34	12:09	10:46	09:35	09:07
23	09:41	10:56	12:18	13:43	14:49	15:14	14:43	13:31	12:06	10:44	09:33	09:07
24	09:43	10:59	12:21	13:46	14:51	15:14	14:41	13:29	12:04	10:41	09:31	09:07
25	09:45	11:02	12:24	13:48	14:53	15:14	14:39	13:26	12:01	10:39	09:30	09:08
26	09:47	11:05	12:27	13:51	14:54	15:14	14:37	13:23	11:58	10:36	09:28	09:08
27	09:49	11:07	12:29	13:53	14:56	15:13	14:35	13:21	11:55	10:33	09:27	09:08
28	09:52	11:10	12:32	13:56	14:57	15:13	14:33	13:18	11:52	10:31	09:25	09:09
29	09:54	11:13	12:35	13:58	14:59	15:12	14:31	13:15	11:50	10:28	09:24	09:09
30	09:56		12:38	14:01	15:00	15:12	14:29	13:13	11:47	10:26	09:22	09:10
31	09:58		12:41		15:01		14:27	13:10		10:23		09:11

# DURATA DEI CREPUSCOLI DURATION OF THE TWILIGHTS

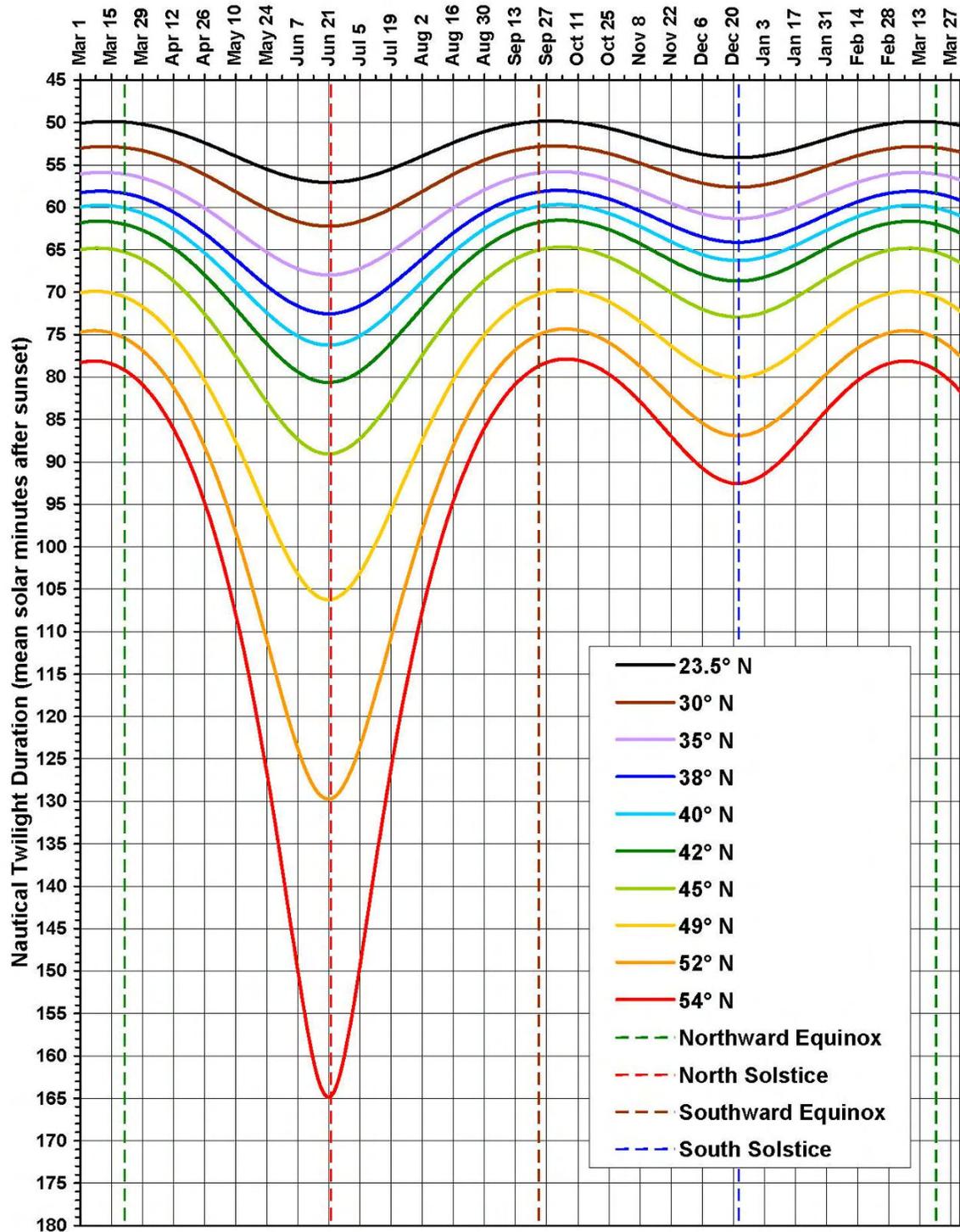


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/twilight/>

Durata in minuti del crepuscolo civile alle varie latitudini, emisfero nord.  
(I grafici dei crepuscoli per alba e tramonto, o per l'emisfero sud, sono simmetrici o capovolti)

Duration of the civil twilight for every latitude, north hemisphere.  
(The graphics for dawn and sunset, or for south hemisphere, are simmetrical or upside-down)

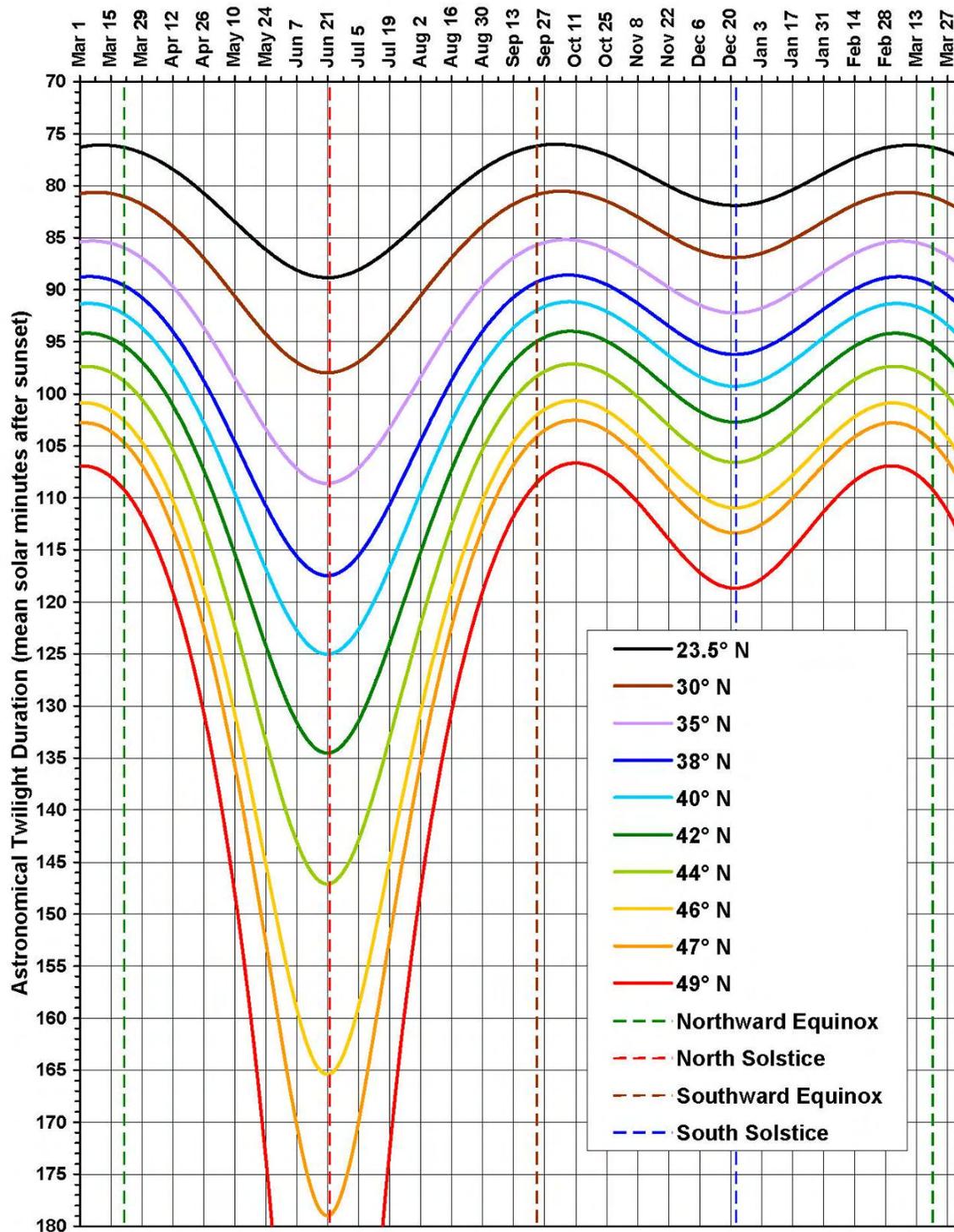


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/twilight/>

Durata in minuti del crepuscolo nautico alle varie latitudini, emisfero nord.  
 (I grafici dei crepuscoli per alba e tramonto, o per l'emisfero sud, sono simmetrici o capovolti)

Duration of the nautical twilight for every latitude, north hemisphere.  
 (The graphics for dawn and sunset, of for south hemisphere, are simmetrical or upside-down)

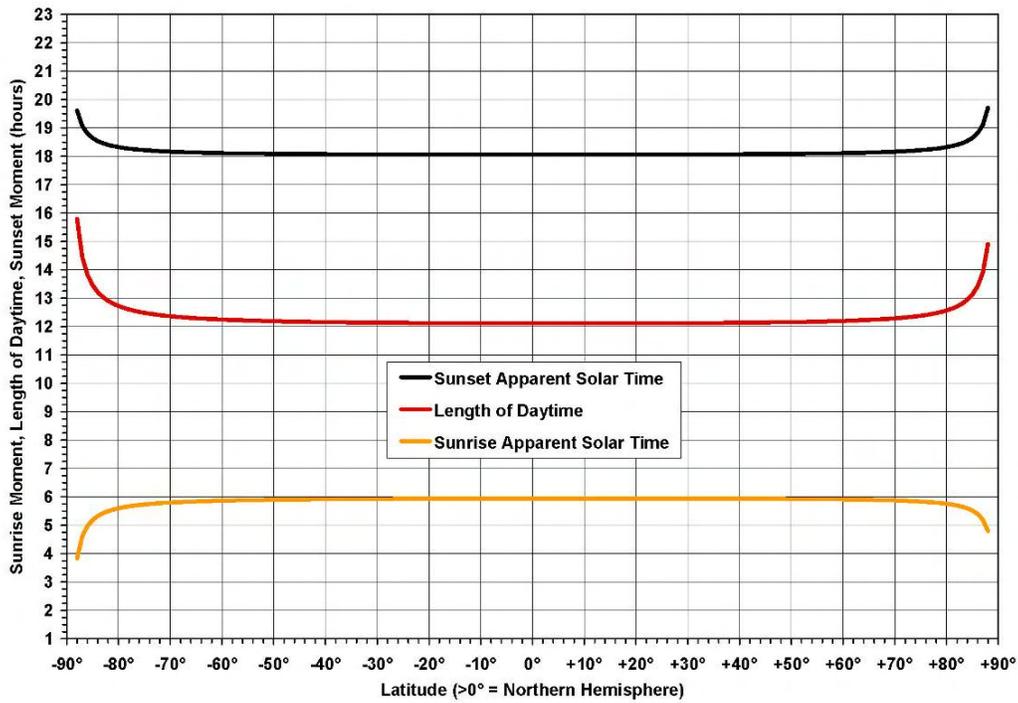


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

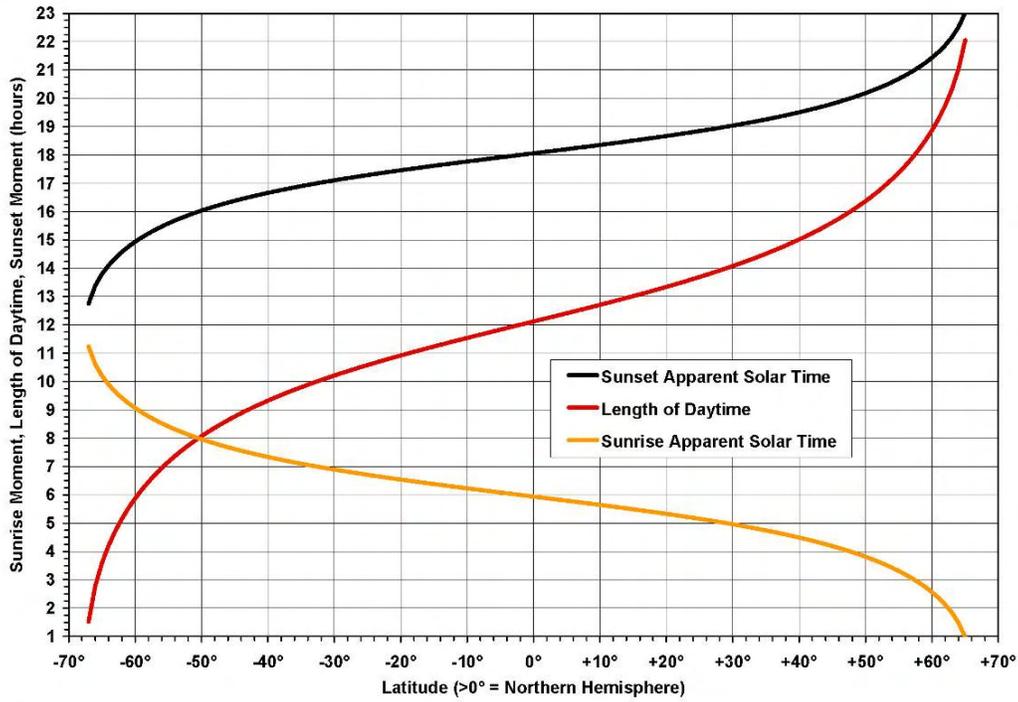
<http://www.sym454.org/twilight/>

Durata in minuti del crepuscolo astronomico alle varie latitudini, emisfero nord.  
 (I grafici dei crepuscoli per alba e tramonto, o per l'emisfero sud, sono simmetrici o capovolti)

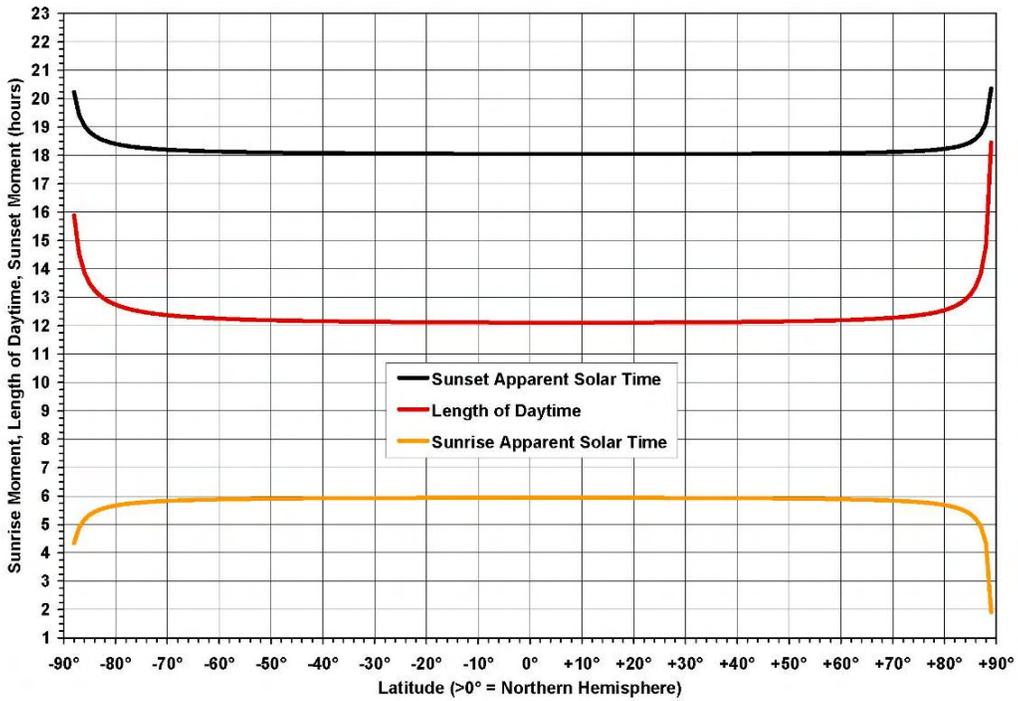
Duration of the astronomical twilight for every latitude, north hemisphere.  
 (The graphics for dawn and sunset, of for south hemisphere, are simmetrical or upside-down)



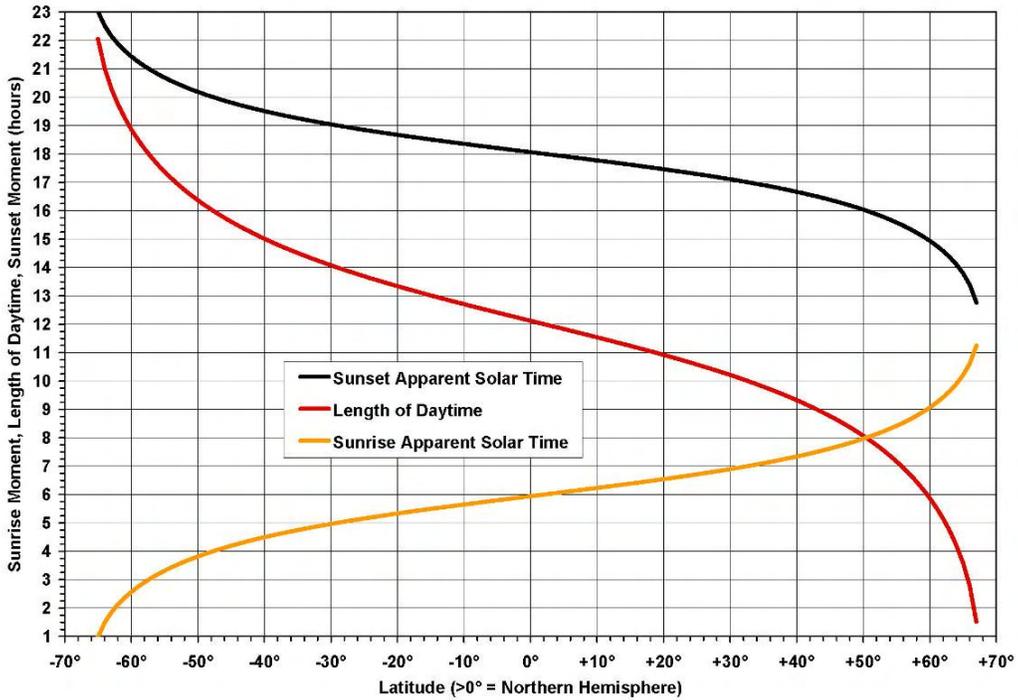
Equinozio di primavera: ora di levata e tramonto del Sole e durata del giorno alle varie latitudini  
 Spring equinox: times of rising and setting of the Sun and duration of the day at various latitudes



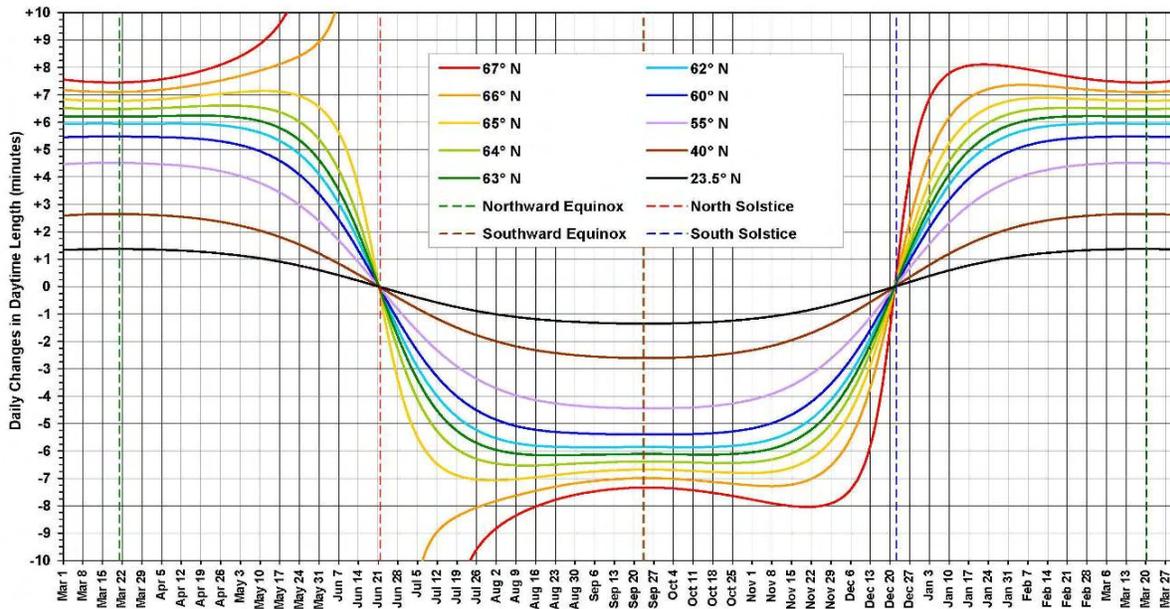
Solstizio d'estate: ora di levata e tramonto del Sole e durata del giorno alle varie latitudini  
 Summer solstice: times of rising and setting of the Sun and duration of the day at various latitudes



Equinozio d'autunno: ora di levata e tramonto del Sole e durata del giorno alle varie latitudini  
 Autumn equinox: times of rising and setting of the Sun and duration of the day at various latitudes



Solstizio d'inverno: ora di levata e tramonto del Sole e durata del giorno alle varie latitudini  
 Winter solstice: times of rising and setting of the Sun and duration of the day at various latitudes

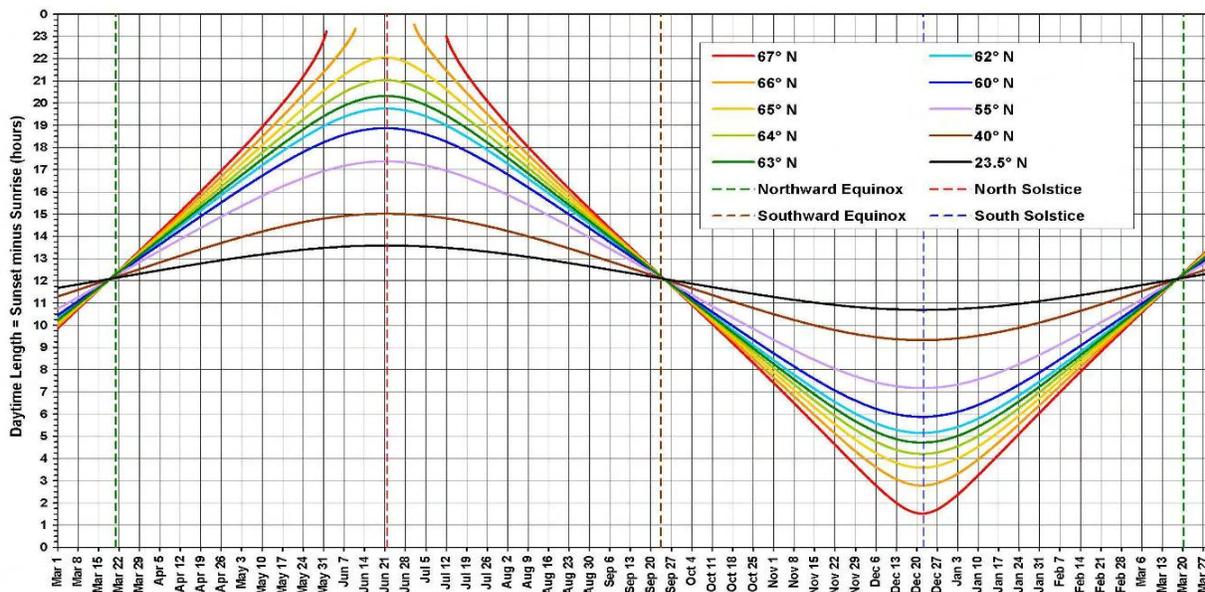


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

Variazione incrementale della durata del giorno nel corso dell'anno alle varie latitudini

Incremental variation of the duration of the day during the year for various latitudes



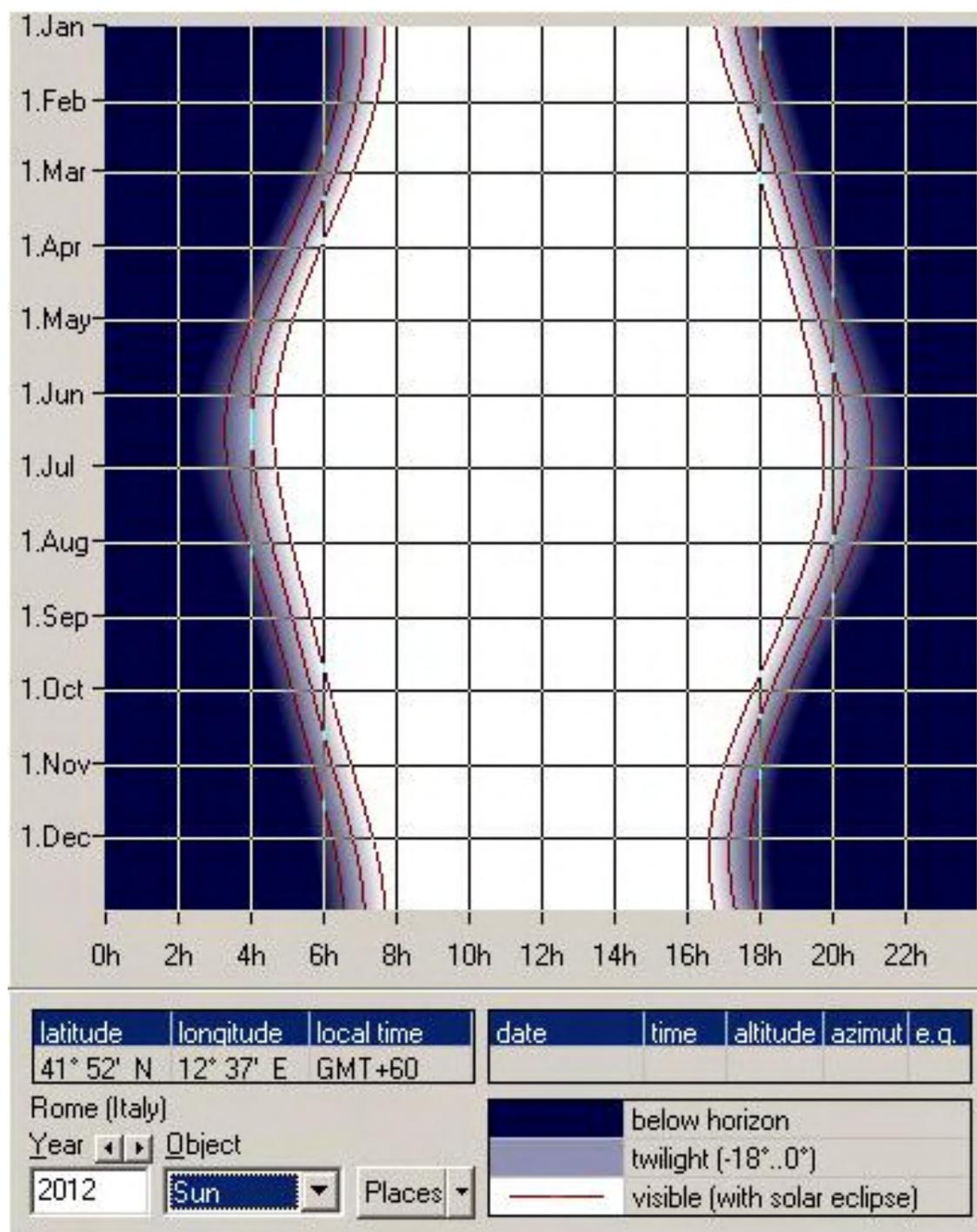
Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

Durata del giorno nel corso dell'anno alle varie latitudini (emisfero nord)

Duration of the day during the year for various latitudes (north hemisphere)

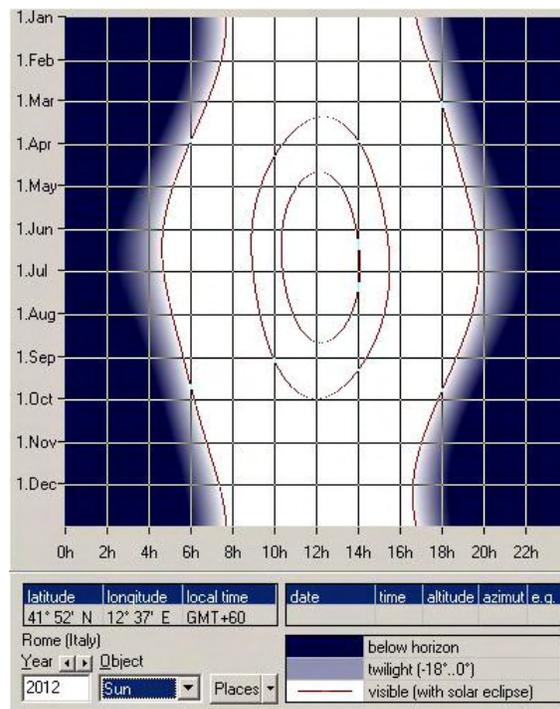
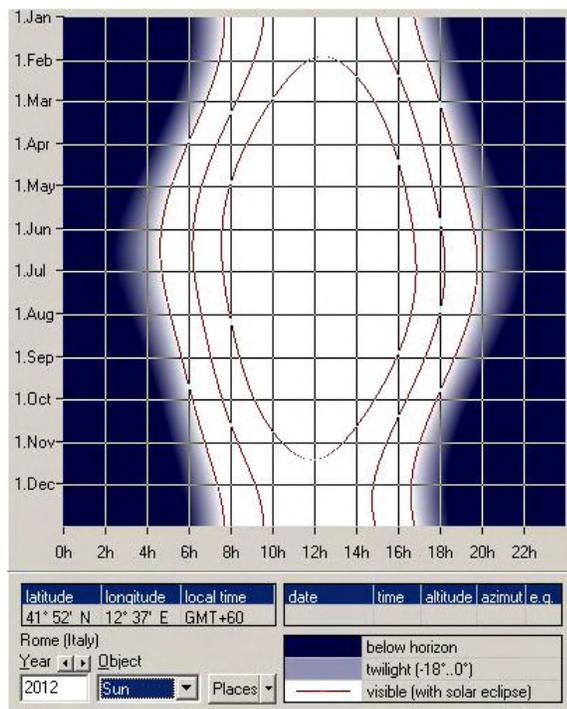
# VISIBILITA' DEL SOLE - VISIBILITY OF THE SUN



Visibilità del Sole nel corso dell'anno  
Visibility of the Sun during the year

Le 2 righe rosse più interne indicano gli istanti in cui il Sole è sull'orizzonte  
 Le 2 righe rosse intermedie indicano gli istanti in cui il Sole è a -6° dall'orizzonte, inizia o finisce il crepuscolo civile  
 Le 2 righe rosse più esterne indicano gli istanti in cui il Sole è a -12° dall'orizzonte, inizia o finisce il crepuscolo nautico

Inner red lines : sunset or sunrise  
 Medium red lines : Sun at -6°, civil twilights  
 Exterior red lines: Sun at -12°, nautical twilights



Altezza del Sole sull'orizzonte nel corso dell'anno  
 Altitude of the Sun above the horizon during the year

Figura di sinistra:

la linea rossa continua interna indica gli istanti del giorno in cui il Sole supera i 30° sull'orizzonte  
 le 2 linee rosse intermedie indicano gli istanti del giorno in cui il Sole supera i 15° sull'orizzonte

Figura di destra:

la linea rossa continua interna indica gli istanti del giorno in cui il Sole supera i 60° sull'orizzonte  
 la linea rossa continua intermedia indica gli istanti del giorno in cui il Sole supera i 45°  
 sull'orizzonte

Esempio : il 1° luglio il Sole sorge alle 4.45 circa, alle 6.15 circa si trova a 15° sull'orizzonte, alle 7.30 circa a 30°, alle 9 a 45°, dalle 10.30 alle 14 circa sarà ad oltre 60°, ecc.

Left:

inner red line, the Sun is over 30°  
 medium red line, the Sun is over 15°

Right:

inner red line, the Sun is over 60°  
 medium red line, the Sun is over 45°

© (3)







Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang'	Rise	Transit	Set
02/11/2012	16h 00m 17.43s	-23° 32' 14.3"	0.3872025	0.8952581	7.45	22.9	7.5	0.1	0.476	92.7	8.51	13.22	17.53
03/11/2012	16h 02m 37.32s	-23° 35' 44.9"	0.3814809	0.8749515	7.28	22.5	7.7	0.1	0.445	96.3	8.50	13.21	17.51
04/11/2012	16h 04m 32.15s	-23° 36' 55.5"	0.3757022	0.8546559	7.11	21.9	7.9	0.2	0.413	100.0	8.47	13.18	17.49
05/11/2012	16h 05m 59.19s	-23° 35' 36.2"	0.3698961	0.8344882	6.94	21.2	8.1	0.3	0.379	104.0	8.45	13.16	17.47
06/11/2012	16h 06m 55.63s	-23° 31' 36.1"	0.3640950	0.8145876	6.78	20.4	8.3	0.4	0.343	108.3	8.41	13.12	17.44
07/11/2012	16h 07m 18.70s	-23° 24' 43.4"	0.3583349	0.7951169	6.61	19.5	8.5	0.5	0.306	112.9	8.37	13.08	17.40
08/11/2012	16h 07m 05.77s	-23° 14' 46.0"	0.3526548	0.7762652	6.46	18.4	8.7	0.7	0.267	117.7	8.32	13.04	17.37
09/11/2012	16h 06m 14.57s	-23° 01' 32.0"	0.3470969	0.7582487	6.31	17.1	8.9	0.9	0.229	122.9	8.26	12.59	17.33
10/11/2012	16h 04m 43.41s	-22° 44' 50.3"	0.3417065	0.7413105	6.17	15.7	9.1	1.2	0.190	128.3	8.19	12.53	17.28
11/11/2012	16h 02m 31.49s	-22° 24' 32.4"	0.3365315	0.7257183	6.04	14.1	9.3	1.5	0.152	134.1	8.11	12.47	17.23
12/11/2012	15h 59m 39.18s	-22° 00' 34.2"	0.3316222	0.7117598	5.92	12.4	9.4	1.9	0.115	140.3	8.02	12.40	17.18
13/11/2012	15h 56m 08.38s	-21° 32' 57.8"	0.3270302	0.6997346	5.82	10.4	9.6	2.4	0.082	146.7	7.52	12.32	17.12
14/11/2012	15h 52m 02.70s	-21° 01' 54.5"	0.3228079	0.6899422	5.74	8.4	9.7	3	0.053	153.5	7.42	12.24	17.06
15/11/2012	15h 47m 27.71s	-20° 27' 46.9"	0.3190070	0.6826671	5.68	6.2	9.8	3.6	0.029	160.5	7.31	12.15	17.00
16/11/2012	15h 42m 30.78s	-19° 51' 10.0"	0.3156773	0.6781610	5.64	3.9	9.9	4.4	0.011	167.7	7.19	12.06	16.54
17/11/2012	15h 37m 20.89s	-19° 12' 52.2"	0.3128650	0.6766240	5.63	1.6	9.9	5.2	0.002	175.0	7.07	11.57	16.47
18/11/2012	15h 32m 08.08s	-18° 33' 52.7"	0.3106113	0.6781871	5.64	1.0	9.9	5.4	0.001	176.8	6.56	11.48	16.41
19/11/2012	15h 27m 02.77s	-17° 55' 18.4"	0.3089506	0.6829002	5.68	3.3	9.8	4.5	0.008	169.5	6.44	11.39	16.35
20/11/2012	15h 22m 15.03s	-17° 18' 18.3"	0.3079089	0.6907250	5.74	5.6	9.7	3.7	0.025	161.9	6.33	11.30	16.29
21/11/2012	15h 17m 53.82s	-16° 43' 57.9"	0.3075033	0.7015369	5.83	7.7	9.6	3	0.049	154.4	6.23	11.22	16.23
22/11/2012	15h 14m 06.51s	-16° 13' 14.1"	0.3077402	0.7151338	5.95	9.8	9.4	2.3	0.080	147.0	6.13	11.15	16.17
23/11/2012	15h 10m 58.52s	-15° 46' 50.7"	0.3086158	0.7312515	6.08	11.6	9.2	1.8	0.118	139.9	6.05	11.08	16.12
24/11/2012	15h 08m 33.26s	-15° 25' 17.3"	0.3101159	0.7495817	6.23	13.3	9.0	1.3	0.159	132.9	5.57	11.02	16.08
25/11/2012	15h 06m 52.30s	-15° 08' 48.7"	0.3122167	0.7697914	6.40	14.8	8.7	0.9	0.204	126.3	5.51	10.57	16.03
26/11/2012	15h 05m 55.60s	-14° 57' 26.6"	0.3148858	0.7915404	6.58	16.1	8.5	0.6	0.251	119.9	5.45	10.52	16.00
27/11/2012	15h 05m 41.88s	-14° 51' 01.6"	0.3180837	0.8144966	6.77	17.2	8.3	0.4	0.298	113.8	5.41	10.48	15.56
28/11/2012	15h 06m 08.96s	-14° 49' 16.6"	0.3217653	0.8383470	6.97	18.1	8.0	0.2	0.345	108.0	5.38	10.45	15.53
29/11/2012	15h 07m 14.08s	-14° 51' 48.8"	0.3258818	0.8628055	7.17	18.8	7.8	0	0.391	102.6	5.35	10.43	15.50
30/11/2012	15h 08m 54.18s	-14° 58' 12.4"	0.3303815	0.8876171	7.38	19.4	7.6	-0.1	0.436	97.4	5.33	10.41	15.48
01/12/2012	15h 11m 06.08s	-15° 08' 00.1"	0.3352125	0.9125595	7.59	19.9	7.4	-0.2	0.478	92.5	5.32	10.39	15.45
02/12/2012	15h 13m 46.67s	-15° 20' 44.9"	0.3403225	0.9374430	7.80	20.2	7.2	-0.3	0.518	88.0	5.32	10.38	15.43
03/12/2012	15h 16m 52.95s	-15° 36' 00.6"	0.3456610	0.9621085	8.00	20.4	7.0	-0.4	0.555	83.7	5.32	10.37	15.42
04/12/2012	15h 20m 22.16s	-15° 53' 22.6"	0.3511793	0.9864251	8.20	20.5	6.8	-0.4	0.590	79.6	5.33	10.37	15.40
05/12/2012	15h 24m 11.77s	-16° 12' 28.4"	0.3568315	1.0102870	8.40	20.6	6.7	-0.5	0.623	75.8	5.34	10.37	15.39
06/12/2012	15h 28m 19.51s	-16° 32' 57.3"	0.3625744	1.0336103	8.59	20.5	6.5	-0.5	0.653	72.2	5.36	10.37	15.38
07/12/2012	15h 32m 43.33s	-16° 54' 31.1"	0.3683683	1.0563300	8.78	20.4	6.4	-0.5	0.681	68.8	5.38	10.38	15.37
08/12/2012	15h 37m 21.44s	-17° 16' 53.1"	0.3741764	1.0783969	8.97	20.2	6.2	-0.5	0.706	65.7	5.40	10.39	15.36
09/12/2012	15h 42m 12.27s	-17° 39' 48.8"	0.3799653	1.0997753	9.15	20.0	6.1	-0.5	0.730	62.7	5.43	10.40	15.36
10/12/2012	15h 47m 14.44s	-18° 03' 05.4"	0.3857046	1.1204403	9.32	19.8	6.0	-0.5	0.751	59.8	5.45	10.41	15.35
11/12/2012	15h 52m 26.73s	-18° 26' 31.4"	0.3913669	1.1403760	9.48	19.5	5.9	-0.5	0.771	57.2	5.48	10.42	15.35
12/12/2012	15h 57m 48.11s	-18° 49' 56.8"	0.3969276	1.1595740	9.64	19.2	5.8	-0.5	0.789	54.6	5.51	10.44	15.35
13/12/2012	16h 03m 17.66s	-19° 13' 12.9"	0.4023645	1.1780313	9.80	18.9	5.7	-0.5	0.806	52.2	5.55	10.45	15.35
14/12/2012	16h 08m 54.58s	-19° 36' 11.8"	0.4076579	1.1957500	9.94	18.5	5.6	-0.5	0.822	50.0	5.58	10.47	15.35
15/12/2012	16h 14m 38.18s	-19° 58' 46.9"	0.4127902	1.2127352	10.08	18.1	5.5	-0.5	0.836	47.8	6.01	10.49	15.35
16/12/2012	16h 20m 27.87s	-20° 20' 51.9"	0.4177457	1.2289953	10.22	17.7	5.5	-0.5	0.849	45.8	6.05	10.51	15.36
17/12/2012	16h 26m 23.12s	-20° 42' 21.5"	0.4225105	1.2445402	10.35	17.3	5.4	-0.5	0.861	43.8	6.08	10.53	15.36
18/12/2012	16h 32m 23.48s	-21° 03' 11.1"	0.4270722	1.2593814	10.47	16.9	5.3	-0.5	0.872	41.9	6.12	10.55	15.37
19/12/2012	16h 38m 28.56s	-21° 23' 16.2"	0.4314201	1.2735313	10.59	16.4	5.3	-0.5	0.882	40.1	6.16	10.57	15.38
20/12/2012	16h 44m 38.01s	-21° 42' 33.3"	0.4355444	1.2870027	10.70	16.0	5.2	-0.5	0.892	38.4	6.19	10.59	15.39
21/12/2012	16h 50m 51.54s	-22° 00' 58.8"	0.4394366	1.2998086	10.81	15.5	5.2	-0.5	0.900	36.8	6.23	11.01	15.40
22/12/2012	16h 57m 08.87s	-22° 18' 29.6"	0.4430894	1.3119619	10.91	15.1	5.1	-0.5	0.909	35.2	6.26	11.04	15.41
23/12/2012	17h 03m 29.77s	-22° 35' 03.0"	0.4464961	1.3234753	11.01	14.6	5.1	-0.5	0.916	33.7	6.30	11.06	15.42
24/12/2012	17h 09m 54.02s	-22° 50' 36.5"	0.4496510	1.3343612	11.10	14.1	5.0	-0.5	0.923	32.2	6.34	11.09	15.43
25/12/2012	17h 16m 21.42s	-23° 05' 07.7"	0.4525490	1.3446312	11.18	13.6	5.0	-0.5	0.930	30.8	6.37	11.11	15.45
26/12/2012	17h 22m 51.81s	-23° 18' 34.5"	0.4551859	1.3542965	11.26	13.1	5.0	-0.5	0.936	29.4	6.41	11.14	15.46
27/12/2012	17h 29m 25.02s	-23° 30' 54.8"	0.4575579	1.3633676	11.34	12.6	4.9	-0.5	0.941	28.1	6.44	11.17	15.48
28/12/2012	17h 36m 00.90s	-23° 42' 06.8"	0.4596617	1.3718540	11.41	12.1	4.9	-0.6	0.946	26.8	6.48	11.19	15.50
29/12/2012	17h 42m 39.30s	-23° 52' 08.8"	0.4614946	1.3797647	11.47	11.6	4.9	-0.6	0.951	25.5	6.51	11.22	15.52
30/12/2012	17h 49m 20.10s	-24° 00' 59.1"	0.4630543	1.3871076	11.54	11.1	4.8	-0.6	0.956	24.2	6.55	11.25	15.54
31/12/2012	17h 56m 03.18s	-24° 08' 36.2"	0.4643389	1.3938897	11.59	10.6	4.8	-0.6	0.960	23.0	6.58	11.27	15.57

A.R., Dec. = coordinate apparenti  
Distance = distanza dalla Terra in U.A.  
El. = elongazione dal Sole in °  
Mag. = magnitudine

R. = distanza dal Sole in U.A.  
Light = distanza in minuti-luce  
Diam. = diametro in "

Tempi di levata e tramonto in T.U.+1, calcolati per Roma (42°N, 12°E), aggiungere un'ora quando si adotta l'ora legale

A.R., Dec. = apparent coordinates  
Distance = distance from the Earth in A.U.  
El. = elongation from the Sun in °  
Mag. = magnitude

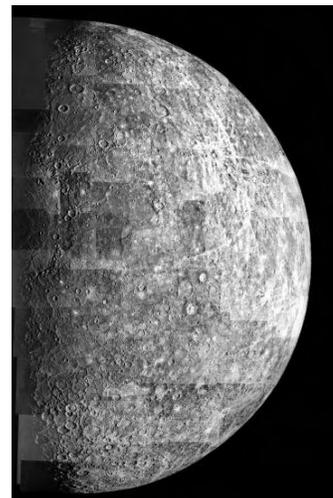
R. = distance from the Sun in A.U.  
Light = distance in minutes  
Diam. = diameter in "

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

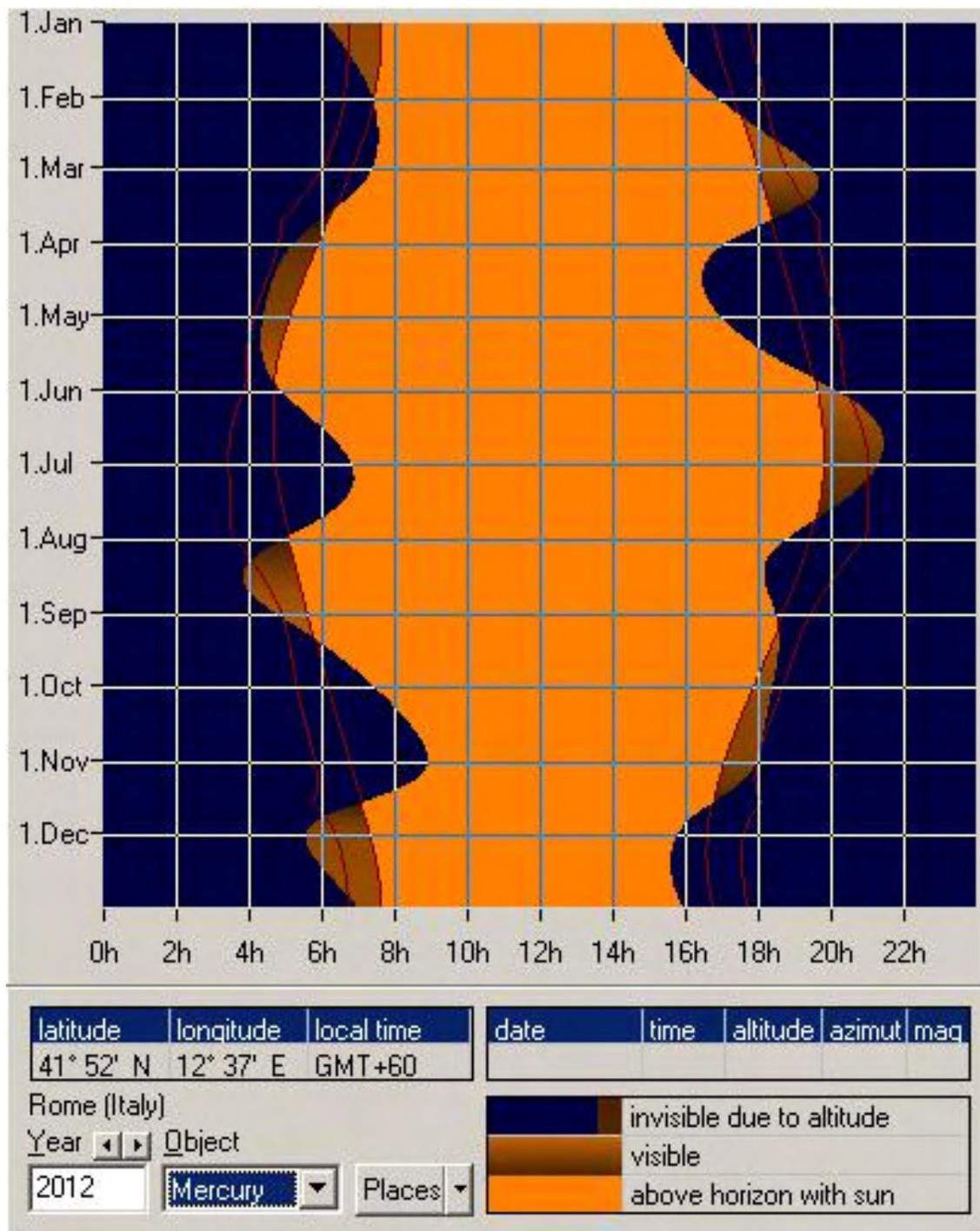
# FENOMENI DI MERCURIO - PHENOMENA OF MERCURY

Perielio - Perihelion	02/03/2012	05:22:28	0,30750 AU
Perielio - Perihelion	29/05/2012	04:37:36	0,30749 AU
Perielio - Perihelion	25/08/2012	03:53:14	0,30750 AU
Perielio - Perihelion	21/11/2012	03:09:39	0,30750 AU
Afelio - Aphelion	18/01/2012	05:44:42	0,46670 AU
Afelio - Aphelion	15/04/2012	05:00:12	0,46670 AU
Afelio - Aphelion	12/07/2012	04:15:22	0,46670 AU
Afelio - Aphelion	08/10/2012	03:31:34	0,46670 AU
Perigeo - Perigee	25/03/2012	04:53:03	0,59998 AU
Perigeo - Perigee	25/07/2012	13:34:11	0,58467 AU
Perigeo - Perigee	16/11/2012	23:32:16	0,67666 AU
Apogeo - Apogee	30/01/2012	16:06:53	1,41470 AU
Apogeo - Apogee	26/05/2012	17:27:22	1,32199 AU
Apogeo - Apogee	17/09/2012	14:58:07	1,39559 AU
Magnit. Max - Brightness maximum	09/02/2012	07:24:09	-1,5 mag
Magnit. Max - Brightness maximum	27/05/2012	11:36:34	-2,3 mag
Magnit. Max - Brightness maximum	09/09/2012	15:05:34	-1,7 mag
Magnit. Max - Brightness maximum	11/12/2012	03:04:27	-0,5 mag
Magnit. Min - Brightness minimum	04/01/2012	10:52:32	-0,4 mag
Magnit. Min - Brightness minimum	22/03/2012	00:33:51	5,1 mag
Magnit. Min - Brightness minimum	28/07/2012	17:33:47	4,8 mag
Magnit. Min - Brightness minimum	17/11/2012	16:49:43	5,5 mag
Max el. Est - Greatest elong.east	05/03/2012	09:24:34	18,2 °
Max el. Est - Greatest elong.east	01/07/2012	01:57:05	25,7 °
Max el. Est - Greatest elong.east	26/10/2012	21:48:00	24,1 °
Max el. Ovest - Greatest elong. west	18/04/2012	17:33:13	27,5 °
Max el. Ovest - Greatest elong. west	16/08/2012	12:04:06	18,7 °
Max el. Ovest - Greatest elong. west	04/12/2012	23:10:55	20,6 °
Cong. Infer. - Inferior conjunction	21/03/2012	19:20:37	
Cong. Infer. - Inferior conjunction	28/07/2012	19:57:20	
Cong. Infer. - Inferior conjunction	17/11/2012	15:46:43	
Cong. Super. - Superior conjunction	07/02/2012	09:02:34	
Cong. Super. - Superior conjunction	27/05/2012	11:19:25	
Cong. Super. - Superior conjunction	10/09/2012	12:43:53	
Moto retrogr. - Retrograde motion	11/03/2012	20:49:25	
Moto retrogr. - Retrograde motion	14/07/2012	05:23:17	
Moto retrogr. - Retrograde motion	07/11/2012	03:22:57	
Moto diretto - Prograde motion	03/04/2012	05:56:25	
Moto diretto - Prograde motion	07/08/2012	17:11:30	
Moto diretto - Prograde motion	26/11/2012	20:01:42	
Max ang. Fase - Maximum phase angle	21/03/2012	23:44:33	171,6 °
Max ang. Fase - Maximum phase angle	28/07/2012	18:35:02	168,2 °
Max ang. Fase - Maximum phase angle	17/11/2012	13:28:11	178,2 °
Min ang. Fase - Minimum phase angle	07/02/2012	07:43:32	4,9 °
Min ang. Fase - Minimum phase angle	27/05/2012	08:07:02	1,9 °
Min ang. Fase - Minimum phase angle	10/09/2012	16:14:52	4,4 °

© (5)



# VISIBILITA' DI MERCURIO - VISIBILITY OF MERCURY



Visibilità di Mercurio nel corso dell'anno - Visibility of Mercury during the year

Le righe rosse più esterne indicano in quali periodi dell'anno il pianeta è sufficientemente distante dal Sole per poter essere osservato agevolmente. Le date esatte sono riportate nelle tabelle seguenti.

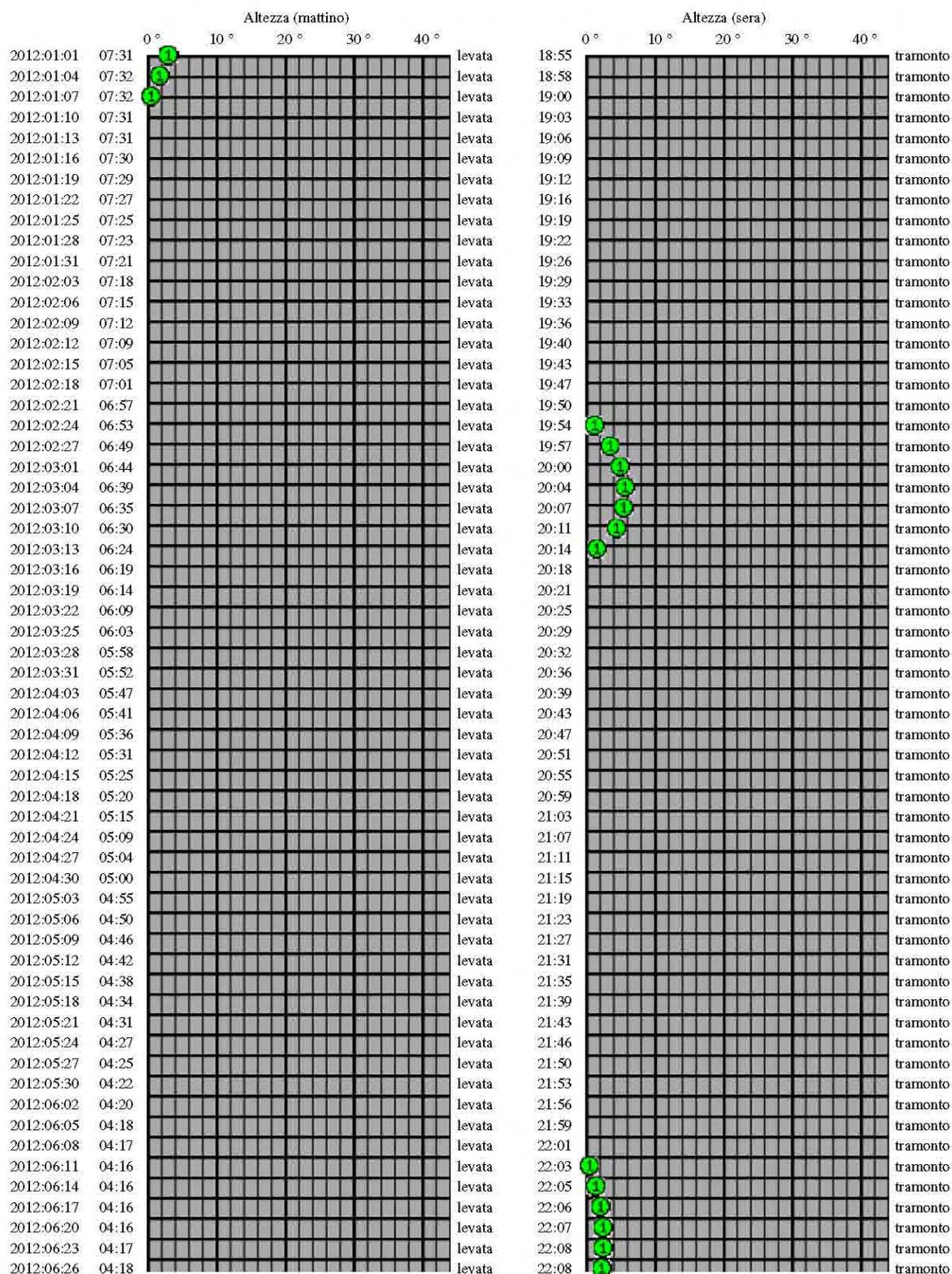
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

# Altezza ai crepuscoli

## di Mercurio

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

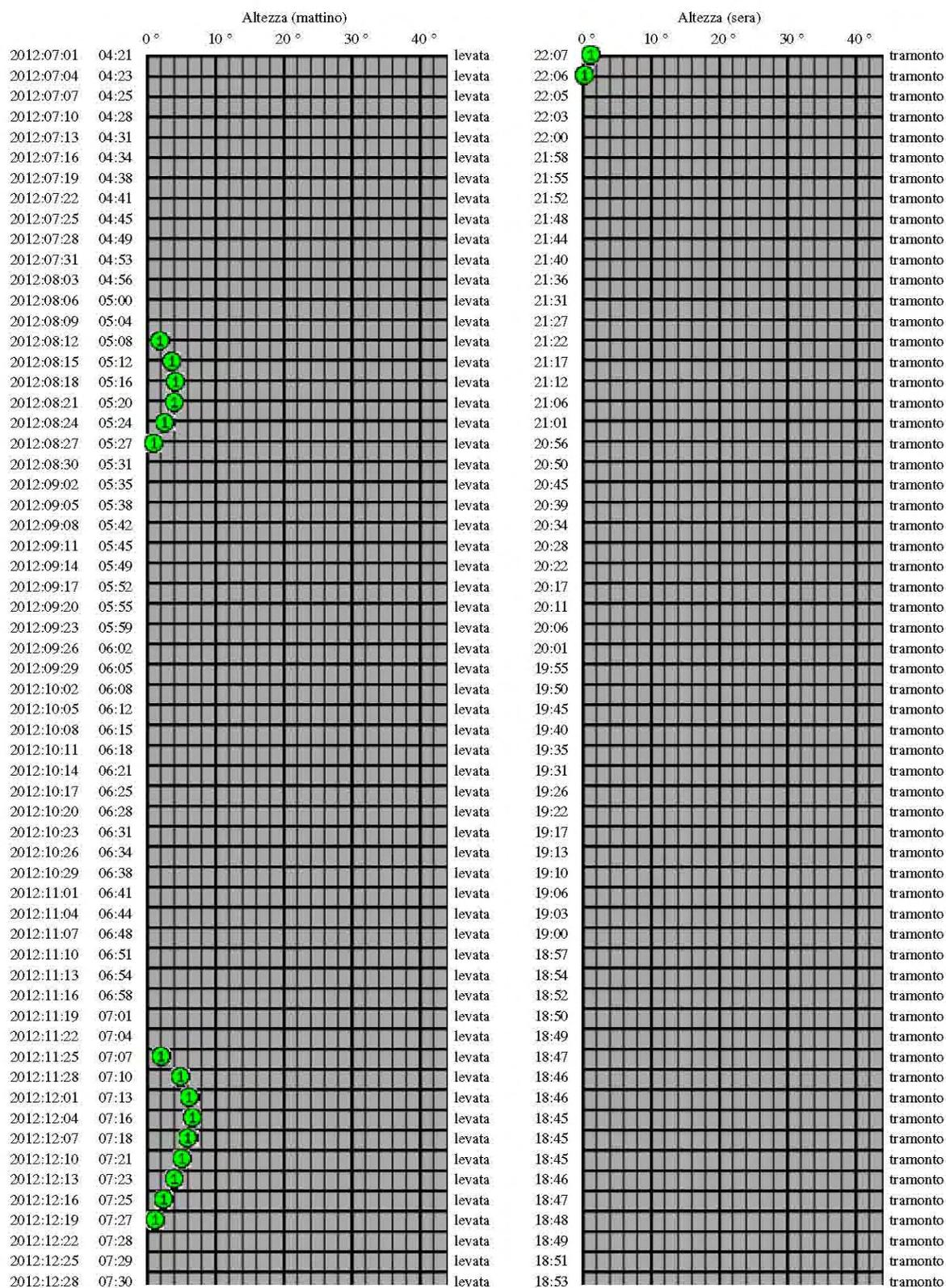


# Altezza ai crepuscoli

## di Mercurio

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 12° sotto l'orizzonte

Altitude in the twilights. The Sun is 12° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	07:31	3.0	123.7	20.1	18:55	-27.1	263.5	19.9
2012:01:04	07:32	1.7	123.2	19.0	18:58	-26.8	262.4	18.8
2012:01:07	07:32	0.3	122.5	17.8	19:00	-26.4	261.3	17.6
2012:01:10	07:31	-1.1	121.5	16.5	19:03	-25.7	260.3	16.3
2012:01:13	07:31	-2.6	120.3	15.1	19:06	-24.9	259.5	14.9
2012:01:16	07:30	-4.0	118.8	13.7	19:09	-24.0	258.7	13.4
2012:01:19	07:29	-5.4	117.1	12.2	19:12	-22.9	258.2	11.9
2012:01:22	07:27	-6.8	115.3	10.6	19:16	-21.7	257.7	10.3
2012:01:25	07:25	-8.2	113.1	8.9	19:19	-20.3	257.4	8.6
2012:01:28	07:23	-9.6	110.8	7.2	19:22	-18.7	257.3	6.9
2012:01:31	07:21	-10.9	108.2	5.4	19:26	-17.0	257.3	5.1
2012:02:03	07:18	-12.1	105.4	3.6	19:29	-15.2	257.5	3.3
2012:02:06	07:15	-13.3	102.4	2.2	19:33	-13.2	257.8	2.1
2012:02:09	07:12	-14.5	99.1	2.5	19:36	-11.0	258.3	2.7
2012:02:12	07:09	-15.6	95.6	4.2	19:40	-8.7	258.9	4.6
2012:02:15	07:05	-16.5	91.8	6.4	19:43	-6.3	259.7	6.8
2012:02:18	07:01	-17.3	87.9	8.8	19:47	-3.8	260.6	9.2
2012:02:21	06:57	-18.0	83.9	11.2	19:50	-1.3	261.7	11.7
2012:02:24	06:53	-18.4	79.8	13.6	19:54	1.1	262.9	14.0
2012:02:27	06:49	-18.6	76.0	15.7	19:57	3.3	264.4	16.0
2012:03:01	06:44	-18.4	72.6	17.3	20:00	4.9	266.2	17.5
2012:03:04	06:39	-17.9	69.9	18.1	20:04	5.8	268.3	18.2
2012:03:07	06:35	-17.1	68.2	18.0	20:07	5.6	270.7	17.9
2012:03:10	06:30	-15.9	67.7	16.7	20:11	4.2	273.4	16.3
2012:03:13	06:24	-14.4	68.5	14.1	20:14	1.5	276.3	13.5
2012:03:16	06:19	-12.6	70.5	10.4	20:18	-2.3	279.4	9.6
2012:03:19	06:14	-10.7	73.6	6.0	20:21	-7.2	282.7	5.1
2012:03:22	06:09	-8.8	77.2	3.3	20:25	-12.5	286.0	3.6
2012:03:25	06:03	-7.1	81.0	6.9	20:29	-17.9	289.2	7.9
2012:03:28	05:58	-5.6	84.5	11.7	20:32	-22.9	292.4	12.7
2012:03:31	05:52	-4.5	87.3	16.2	20:36	-27.2	295.3	17.0
2012:04:03	05:47	-3.7	89.4	19.9	20:39	-30.6	298.1	20.5
2012:04:06	05:41	-3.2	90.7	22.8	20:43	-33.3	300.7	23.3
2012:04:09	05:36	-3.0	91.3	24.9	20:47	-35.2	303.2	25.2
2012:04:12	05:31	-2.9	91.2	26.3	20:51	-36.4	305.4	26.6
2012:04:15	05:25	-3.0	90.5	27.2	20:55	-37.0	307.5	27.3
2012:04:18	05:20	-3.2	89.4	27.5	20:59	-37.1	309.4	27.5
2012:04:21	05:15	-3.5	87.8	27.4	21:03	-36.8	311.1	27.3
2012:04:24	05:09	-3.9	85.8	26.8	21:07	-36.1	312.6	26.7
2012:04:27	05:04	-4.3	83.5	25.9	21:11	-35.1	314.0	25.7
2012:04:30	05:00	-4.8	80.9	24.7	21:15	-33.7	315.1	24.4
2012:05:03	04:55	-5.3	78.0	23.2	21:19	-32.1	316.1	22.8
2012:05:06	04:50	-5.8	74.9	21.3	21:23	-30.2	316.8	20.9
2012:05:09	04:46	-6.4	71.5	19.2	21:27	-28.0	317.3	18.7
2012:05:12	04:42	-7.0	67.8	16.7	21:31	-25.6	317.5	16.1
2012:05:15	04:38	-7.7	63.9	14.0	21:35	-23.0	317.4	13.3
2012:05:18	04:34	-8.5	59.8	11.0	21:39	-20.2	317.0	10.2
2012:05:21	04:31	-9.4	55.5	7.6	21:43	-17.3	316.3	6.8
2012:05:24	04:27	-10.4	51.0	4.1	21:46	-14.2	315.2	3.2
2012:05:27	04:25	-11.4	46.5	0.6	21:50	-11.2	313.9	0.7
2012:05:30	04:22	-12.6	42.0	3.4	21:53	-8.3	312.3	4.3
2012:06:02	04:20	-13.8	37.8	7.0	21:56	-5.7	310.5	7.9
2012:06:05	04:18	-15.1	33.8	10.5	21:59	-3.3	308.6	11.3
2012:06:08	04:17	-16.4	30.2	13.7	22:01	-1.4	306.6	14.4
2012:06:11	04:16	-17.8	27.1	16.5	22:03	0.2	304.7	17.2
2012:06:14	04:16	-19.1	24.5	19.0	22:05	1.4	302.8	19.6
2012:06:17	04:16	-20.5	22.5	21.1	22:06	2.1	300.9	21.6
2012:06:20	04:16	-21.9	21.0	22.8	22:07	2.5	299.2	23.2
2012:06:23	04:17	-23.2	20.1	24.2	22:08	2.6	297.6	24.4
2012:06:26	04:18	-24.5	19.7	25.1	22:08	2.3	296.2	25.3
2012:06:29	04:20	-25.7	20.0	25.6	22:07	1.7	295.1	25.7

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	04:21	-26.5	20.6	25.7	22:07	1.1	294.5	25.7
2012:07:04	04:23	-27.4	22.0	25.5	22:06	0.0	293.8	25.4
2012:07:07	04:25	-28.0	24.1	24.7	22:05	-1.4	293.5	24.5
2012:07:10	04:28	-28.3	27.0	23.4	22:03	-3.0	293.7	23.0
2012:07:13	04:31	-28.1	30.5	21.4	22:00	-5.0	294.5	20.8
2012:07:16	04:34	-27.2	34.7	18.8	21:58	-7.2	295.8	18.1
2012:07:19	04:38	-25.5	39.3	15.6	21:55	-9.6	297.8	14.7
2012:07:22	04:41	-23.1	44.3	11.8	21:52	-12.1	300.4	10.8
2012:07:25	04:45	-19.8	49.2	7.9	21:48	-14.5	303.7	7.0
2012:07:28	04:49	-15.9	53.9	5.1	21:44	-16.6	307.2	5.0
2012:07:31	04:53	-11.7	58.1	6.1	21:40	-18.4	310.9	6.8
2012:08:03	04:56	-7.5	61.7	9.5	21:36	-19.6	314.2	10.3
2012:08:06	05:00	-3.7	64.5	13.0	21:31	-20.2	316.9	13.7
2012:08:09	05:04	-0.5	66.6	15.8	21:27	-20.4	318.7	16.3
2012:08:12	05:08	2.0	68.1	17.7	21:22	-20.1	319.5	18.0
2012:08:15	05:12	3.5	69.0	18.6	21:17	-19.5	319.1	18.7
2012:08:18	05:16	4.1	69.5	18.6	21:12	-18.6	317.6	18.4
2012:08:21	05:20	3.8	69.6	17.6	21:06	-17.6	315.2	17.3
2012:08:24	05:24	2.7	69.6	15.9	21:01	-16.5	312.0	15.5
2012:08:27	05:27	0.9	69.5	13.7	20:56	-15.4	308.2	13.1
2012:08:30	05:31	-1.3	69.4	11.0	20:50	-14.3	304.0	10.5
2012:09:02	05:35	-3.9	69.6	8.2	20:45	-13.1	299.7	7.6
2012:09:05	05:38	-6.6	69.9	5.4	20:39	-12.1	295.2	4.8
2012:09:08	05:42	-9.3	70.4	2.8	20:34	-11.1	290.9	2.4
2012:09:11	05:45	-11.9	71.1	1.7	20:28	-10.2	286.6	1.9
2012:09:14	05:49	-14.4	71.9	3.5	20:22	-9.4	282.4	4.0
2012:09:17	05:52	-16.8	72.9	5.8	20:17	-8.7	278.5	6.2
2012:09:20	05:55	-19.1	74.0	8.0	20:11	-8.0	274.6	8.5
2012:09:23	05:59	-21.3	75.2	10.1	20:06	-7.3	270.9	10.5
2012:09:26	06:02	-23.3	76.5	12.1	20:01	-6.7	267.4	12.5
2012:09:29	06:05	-25.2	77.8	14.0	19:55	-6.1	264.0	14.3
2012:10:02	06:08	-26.9	79.1	15.7	19:50	-5.6	260.8	16.0
2012:10:05	06:12	-28.5	80.5	17.3	19:45	-5.1	257.7	17.6
2012:10:08	06:15	-30.0	81.8	18.8	19:40	-4.6	254.8	19.0
2012:10:11	06:18	-31.3	83.2	20.1	19:35	-4.1	252.0	20.3
2012:10:14	06:21	-32.5	84.5	21.3	19:31	-3.6	249.4	21.5
2012:10:17	06:25	-33.6	85.8	22.3	19:26	-3.2	247.0	22.5
2012:10:20	06:28	-34.4	87.0	23.2	19:22	-2.8	244.8	23.3
2012:10:23	06:31	-35.0	88.2	23.8	19:17	-2.5	243.0	23.9
2012:10:26	06:34	-35.2	89.4	24.1	19:13	-2.2	241.4	24.1
2012:10:29	06:38	-35.1	90.7	23.9	19:10	-2.1	240.4	23.9
2012:11:01	06:41	-34.3	92.0	23.2	19:06	-2.2	239.9	23.1
2012:11:04	06:44	-32.9	93.5	21.8	19:03	-2.7	240.2	21.4
2012:11:07	06:48	-30.4	95.3	19.3	19:00	-3.6	241.6	18.7
2012:11:10	06:51	-26.6	97.5	15.4	18:57	-5.2	244.3	14.6
2012:11:13	06:54	-21.4	100.1	10.0	18:54	-7.6	248.3	9.0
2012:11:16	06:58	-15.0	103.2	3.4	18:52	-10.7	253.4	2.2
2012:11:19	07:01	-8.3	106.5	3.8	18:50	-14.0	258.9	4.9
2012:11:22	07:04	-2.3	109.7	10.2	18:49	-17.0	263.6	11.1
2012:11:25	07:07	2.2	112.6	15.1	18:47	-19.4	267.0	15.7
2012:11:28	07:10	4.9	115.0	18.2	18:46	-21.2	268.8	18.6
2012:12:01	07:13	6.3	116.9	19.9	18:46	-22.4	269.2	20.1
2012:12:04	07:16	6.5	118.3	20.5	18:45	-23.2	268.8	20.5
2012:12:07	07:18	6.1	119.3	20.4	18:45	-23.6	267.7	20.3
2012:12:10	07:21	5.2	120.0	19.7	18:45	-23.8	266.2	19.6
2012:12:13	07:23	4.0	120.5	18.8	18:46	-23.8	264.6	18.6
2012:12:16	07:25	2.6	120.7	17.6	18:47	-23.6	262.9	17.4
2012:12:19	07:27	1.1	120.6	16.3	18:48	-23.3	261.2	16.1
2012:12:22	07:28	-0.4	120.3	14.9	18:49	-22.8	259.6	14.7
2012:12:25	07:29	-1.9	119.9	13.5	18:51	-22.2	258.1	13.3
2012:12:28	07:30	-3.5	119.2	12.0	18:53	-21.5	256.7	11.8
2012:12:31	07:31	-5.0	118.3	10.5	18:55	-20.6	255.4	10.3

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

# Altezza ai crepuscoli

## di Mercurio

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

		Altezza (mattino)					Altezza (sera)												
		0 °	10 °	20 °	30 °	40 °						0 °	10 °	20 °	30 °	40 °			
2012-01-01	06:57						levata	19:29											tramonto
2012-01-04	06:58						levata	19:32											tramonto
2012-01-07	06:58						levata	19:34											tramonto
2012-01-10	06:58						levata	19:37											tramonto
2012-01-13	06:57						levata	19:40											tramonto
2012-01-16	06:57						levata	19:43											tramonto
2012-01-19	06:55						levata	19:46											tramonto
2012-01-22	06:54						levata	19:49											tramonto
2012-01-25	06:52						levata	19:52											tramonto
2012-01-28	06:50						levata	19:55											tramonto
2012-01-31	06:48						levata	19:58											tramonto
2012-02-03	06:46						levata	20:02											tramonto
2012-02-06	06:43						levata	20:05											tramonto
2012-02-09	06:40						levata	20:09											tramonto
2012-02-12	06:36						levata	20:12											tramonto
2012-02-15	06:33						levata	20:15											tramonto
2012-02-18	06:29						levata	20:19											tramonto
2012-02-21	06:25						levata	20:22											tramonto
2012-02-24	06:21						levata	20:26											tramonto
2012-02-27	06:16						levata	20:29											tramonto
2012-03-01	06:12						levata	20:33											tramonto
2012-03-04	06:07						levata	20:36											tramonto
2012-03-07	06:02						levata	20:40											tramonto
2012-03-10	05:57						levata	20:43											tramonto
2012-03-13	05:52						levata	20:47											tramonto
2012-03-16	05:46						levata	20:51											tramonto
2012-03-19	05:41						levata	20:55											tramonto
2012-03-22	05:35						levata	20:58											tramonto
2012-03-25	05:30						levata	21:02											tramonto
2012-03-28	05:24						levata	21:06											tramonto
2012-03-31	05:18						levata	21:10											tramonto
2012-04-03	05:12						levata	21:14											tramonto
2012-04-06	05:06						levata	21:18											tramonto
2012-04-09	05:00						levata	21:23											tramonto
2012-04-12	04:54						levata	21:27											tramonto
2012-04-15	04:48						levata	21:32											tramonto
2012-04-18	04:42						levata	21:36											tramonto
2012-04-21	04:37						levata	21:41											tramonto
2012-04-24	04:31						levata	21:46											tramonto
2012-04-27	04:25						levata	21:50											tramonto
2012-04-30	04:19						levata	21:55											tramonto
2012-05-03	04:14						levata	22:00											tramonto
2012-05-06	04:08						levata	22:05											tramonto
2012-05-09	04:03						levata	22:10											tramonto
2012-05-12	03:58						levata	22:15											tramonto
2012-05-15	03:53						levata	22:20											tramonto
2012-05-18	03:48						levata	22:25											tramonto
2012-05-21	03:44						levata	22:30											tramonto
2012-05-24	03:40						levata	22:34											tramonto
2012-05-27	03:36						levata	22:39											tramonto
2012-05-30	03:32						levata	22:43											tramonto
2012-06-02	03:29						levata	22:47											tramonto
2012-06-05	03:27						levata	22:50											tramonto
2012-06-08	03:25						levata	22:53											tramonto
2012-06-11	03:24						levata	22:56											tramonto
2012-06-14	03:23						levata	22:58											tramonto
2012-06-17	03:22						levata	23:00											tramonto
2012-06-20	03:23						levata	23:01											tramonto
2012-06-23	03:23						levata	23:01											tramonto
2012-06-26	03:25						levata	23:01											tramonto

# Altezza ai crepuscoli

## di Mercurio

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

		Altezza (mattino)					Altezza (sera)												
		0 °	10 °	20 °	30 °	40 °						0 °	10 °	20 °	30 °	40 °			
2012-07-01	03:28						levata	23:00										tramonto	
2012-07-04	03:31						levata	22:58										tramonto	
2012-07-07	03:34						levata	22:56										tramonto	
2012-07-10	03:38						levata	22:53										tramonto	
2012-07-13	03:42						levata	22:50										tramonto	
2012-07-16	03:46						levata	22:46										tramonto	
2012-07-19	03:50						levata	22:43										tramonto	
2012-07-22	03:55						levata	22:38										tramonto	
2012-07-25	03:59						levata	22:34										tramonto	
2012-07-28	04:04						levata	22:29										tramonto	
2012-07-31	04:09						levata	22:24										tramonto	
2012-08-03	04:14						levata	22:19										tramonto	
2012-08-06	04:18						levata	22:13										tramonto	
2012-08-09	04:23						levata	22:08										tramonto	
2012-08-12	04:28						levata	22:02										tramonto	
2012-08-15	04:33						levata	21:56										tramonto	
2012-08-18	04:37						levata	21:50										tramonto	
2012-08-21	04:42						levata	21:44										tramonto	
2012-08-24	04:46						levata	21:38										tramonto	
2012-08-27	04:51						levata	21:32										tramonto	
2012-08-30	04:55						levata	21:26										tramonto	
2012-09-02	04:59						levata	21:20										tramonto	
2012-09-05	05:03						levata	21:14										tramonto	
2012-09-08	05:07						levata	21:08										tramonto	
2012-09-11	05:11						levata	21:02										tramonto	
2012-09-14	05:15						levata	20:56										tramonto	
2012-09-17	05:18						levata	20:51										tramonto	
2012-09-20	05:22						levata	20:45										tramonto	
2012-09-23	05:25						levata	20:39										tramonto	
2012-09-26	05:29						levata	20:34										tramonto	
2012-09-29	05:32						levata	20:28										tramonto	
2012-10-02	05:36						levata	20:23										tramonto	
2012-10-05	05:39						levata	20:18										tramonto	
2012-10-08	05:42						levata	20:12										tramonto	
2012-10-11	05:46						levata	20:08										tramonto	
2012-10-14	05:49						levata	20:03										tramonto	
2012-10-17	05:52						levata	19:58										tramonto	
2012-10-20	05:56						levata	19:54										tramonto	
2012-10-23	05:59						levata	19:50										tramonto	
2012-10-26	06:02						levata	19:46										tramonto	
2012-10-29	06:05						levata	19:42										tramonto	
2012-11-01	06:09						levata	19:39										tramonto	
2012-11-04	06:12						levata	19:35										tramonto	
2012-11-07	06:15						levata	19:32										tramonto	
2012-11-10	06:18						levata	19:30										tramonto	
2012-11-13	06:21						levata	19:27										tramonto	
2012-11-16	06:25						levata	19:25										tramonto	
2012-11-19	06:28						levata	19:23										tramonto	
2012-11-22	06:31						levata	19:22										tramonto	
2012-11-25	06:34						levata	19:21										tramonto	
2012-11-28	06:36						levata	19:20										tramonto	
2012-12-01	06:39	1					levata	19:19										tramonto	
2012-12-04	06:42	1					levata	19:19										tramonto	
2012-12-07	06:44	1					levata	19:19										tramonto	
2012-12-10	06:47						levata	19:19										tramonto	
2012-12-13	06:49						levata	19:20										tramonto	
2012-12-16	06:51						levata	19:21										tramonto	
2012-12-19	06:53						levata	19:22										tramonto	
2012-12-22	06:54						levata	19:23										tramonto	
2012-12-25	06:55						levata	19:25										tramonto	
2012-12-28	06:56						levata	19:27										tramonto	

Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	06:57	-2.4	118.0	20.1	19:29	-33.4	268.9	19.9
2012:01:04	06:58	-3.7	117.6	19.0	19:32	-33.1	267.7	18.8
2012:01:07	06:58	-5.1	117.0	17.8	19:34	-32.6	266.5	17.6
2012:01:10	06:58	-6.6	116.1	16.5	19:37	-31.9	265.5	16.3
2012:01:13	06:57	-8.1	114.9	15.1	19:40	-31.1	264.6	14.9
2012:01:16	06:57	-9.6	113.6	13.7	19:43	-30.1	263.8	13.4
2012:01:19	06:55	-11.1	112.0	12.2	19:46	-29.0	263.2	11.9
2012:01:22	06:54	-12.5	110.1	10.6	19:49	-27.7	262.8	10.3
2012:01:25	06:52	-14.0	108.1	8.9	19:52	-26.3	262.5	8.6
2012:01:28	06:50	-15.4	105.8	7.2	19:55	-24.7	262.4	6.9
2012:01:31	06:48	-16.7	103.2	5.4	19:58	-23.0	262.4	5.1
2012:02:03	06:46	-18.1	100.4	3.6	20:02	-21.1	262.6	3.3
2012:02:06	06:43	-19.3	97.3	2.3	20:05	-19.1	263.0	2.1
2012:02:09	06:40	-20.5	93.9	2.4	20:09	-17.0	263.5	2.7
2012:02:12	06:36	-21.6	90.3	4.2	20:12	-14.6	264.1	4.6
2012:02:15	06:33	-22.5	86.4	6.4	20:15	-12.2	264.9	6.8
2012:02:18	06:29	-23.3	82.4	8.8	20:19	-9.7	265.9	9.2
2012:02:21	06:25	-23.9	78.1	11.2	20:22	-7.2	267.0	11.7
2012:02:24	06:21	-24.3	73.9	13.6	20:26	-4.8	268.3	14.0
2012:02:27	06:16	-24.3	69.9	15.6	20:29	-2.7	269.8	16.0
2012:03:01	06:12	-24.1	66.4	17.2	20:33	-1.1	271.6	17.5
2012:03:04	06:07	-23.5	63.6	18.1	20:36	-0.3	273.7	18.2
2012:03:07	06:02	-22.5	61.8	18.0	20:40	-0.4	276.1	17.9
2012:03:10	05:57	-21.3	61.3	16.7	20:43	-1.8	278.8	16.3
2012:03:13	05:52	-19.9	62.2	14.2	20:47	-4.5	281.8	13.5
2012:03:16	05:46	-18.3	64.3	10.5	20:51	-8.4	285.1	9.6
2012:03:19	05:41	-16.6	67.5	6.0	20:55	-13.2	288.6	5.1
2012:03:22	05:35	-14.8	71.2	3.3	20:58	-18.5	292.2	3.6
2012:03:25	05:30	-13.3	75.1	6.8	21:02	-23.8	295.8	7.9
2012:03:28	05:24	-11.9	78.6	11.7	21:06	-28.6	299.4	12.7
2012:03:31	05:18	-10.9	81.5	16.2	21:10	-32.8	302.9	17.0
2012:04:03	05:12	-10.2	83.5	19.9	21:14	-36.1	306.2	20.6
2012:04:06	05:06	-9.8	84.8	22.7	21:18	-38.7	309.4	23.3
2012:04:09	05:00	-9.6	85.3	24.9	21:23	-40.4	312.3	25.3
2012:04:12	04:54	-9.7	85.1	26.3	21:27	-41.5	315.0	26.6
2012:04:15	04:48	-9.9	84.3	27.2	21:32	-42.0	317.5	27.3
2012:04:18	04:42	-10.2	83.1	27.5	21:36	-42.1	319.7	27.5
2012:04:21	04:37	-10.6	81.3	27.4	21:41	-41.7	321.6	27.3
2012:04:24	04:31	-11.1	79.2	26.8	21:46	-40.9	323.4	26.7
2012:04:27	04:25	-11.6	76.7	25.9	21:50	-39.8	324.9	25.7
2012:04:30	04:19	-12.1	73.9	24.7	21:55	-38.5	326.1	24.4
2012:05:03	04:14	-12.6	70.8	23.2	22:00	-36.8	327.1	22.8
2012:05:06	04:08	-13.2	67.4	21.4	22:05	-34.9	327.8	20.9
2012:05:09	04:03	-13.8	63.8	19.2	22:10	-32.8	328.2	18.6
2012:05:12	03:58	-14.4	59.8	16.8	22:15	-30.5	328.3	16.1
2012:05:15	03:53	-14.9	55.6	14.0	22:20	-28.1	328.1	13.3
2012:05:18	03:48	-15.5	51.1	11.0	22:25	-25.4	327.5	10.2
2012:05:21	03:44	-16.2	46.4	7.7	22:30	-22.7	326.6	6.8
2012:05:24	03:40	-16.8	41.6	4.2	22:34	-19.9	325.3	3.2
2012:05:27	03:36	-17.5	36.6	0.7	22:39	-17.2	323.8	0.8
2012:05:30	03:32	-18.2	31.7	3.4	22:43	-14.6	322.0	4.3
2012:06:02	03:29	-18.9	27.0	7.0	22:47	-12.3	320.0	7.9
2012:06:05	03:27	-19.6	22.6	10.5	22:50	-10.3	318.0	11.3
2012:06:08	03:25	-20.4	18.6	13.6	22:53	-8.6	315.9	14.4
2012:06:11	03:24	-21.3	15.1	16.5	22:56	-7.4	313.9	17.2
2012:06:14	03:23	-22.2	12.1	19.0	22:58	-6.5	311.9	19.6
2012:06:17	03:22	-23.3	9.7	21.1	23:00	-6.0	310.0	21.6
2012:06:20	03:23	-24.4	7.9	22.8	23:01	-5.8	308.3	23.2
2012:06:23	03:23	-25.5	6.7	24.2	23:01	-5.9	306.7	24.5
2012:06:26	03:25	-26.7	6.2	25.1	23:01	-6.2	305.3	25.3
2012:06:29	03:27	-28.0	6.3	25.6	23:00	-6.9	304.1	25.7

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	03:28	-28.8	6.8	25.7	23:00	-7.4	303.5	25.7
2012:07:04	03:31	-29.9	8.2	25.5	22:58	-8.5	302.8	25.3
2012:07:07	03:34	-30.9	10.4	24.7	22:56	-9.8	302.5	24.4
2012:07:10	03:38	-31.5	13.4	23.4	22:53	-11.3	302.7	22.9
2012:07:13	03:42	-31.8	17.3	21.4	22:50	-13.1	303.5	20.8
2012:07:16	03:46	-31.5	22.0	18.8	22:46	-15.0	304.8	18.0
2012:07:19	03:50	-30.4	27.4	15.6	22:43	-17.1	306.9	14.6
2012:07:22	03:55	-28.5	33.1	11.8	22:38	-19.2	309.7	10.8
2012:07:25	03:59	-25.8	39.0	7.9	22:34	-21.2	313.0	7.0
2012:07:28	04:04	-22.3	44.5	5.1	22:29	-22.8	316.8	5.0
2012:07:31	04:09	-18.3	49.4	6.1	22:24	-24.1	320.5	6.9
2012:08:03	04:14	-14.3	53.6	9.5	22:19	-24.8	323.9	10.4
2012:08:06	04:18	-10.5	57.0	12.9	22:13	-25.0	326.5	13.7
2012:08:09	04:23	-7.3	59.5	15.7	22:08	-24.9	328.2	16.3
2012:08:12	04:28	-4.8	61.3	17.7	22:02	-24.5	328.7	18.0
2012:08:15	04:33	-3.2	62.4	18.6	21:56	-23.8	328.0	18.7
2012:08:18	04:37	-2.5	63.1	18.6	21:50	-23.1	326.2	18.4
2012:08:21	04:42	-2.7	63.3	17.6	21:44	-22.3	323.5	17.3
2012:08:24	04:46	-3.7	63.3	16.0	21:38	-21.4	319.9	15.5
2012:08:27	04:51	-5.3	63.2	13.7	21:32	-20.5	315.8	13.1
2012:08:30	04:55	-7.5	63.2	11.1	21:26	-19.6	311.3	10.4
2012:09:02	04:59	-9.9	63.3	8.2	21:20	-18.7	306.6	7.6
2012:09:05	05:03	-12.5	63.6	5.4	21:14	-17.9	301.9	4.8
2012:09:08	05:07	-15.2	64.0	2.8	21:08	-17.0	297.3	2.3
2012:09:11	05:11	-17.8	64.7	1.7	21:02	-16.3	292.8	1.9
2012:09:14	05:15	-20.3	65.5	3.5	20:56	-15.5	288.5	4.0
2012:09:17	05:18	-22.7	66.5	5.8	20:51	-14.8	284.3	6.3
2012:09:20	05:22	-25.0	67.6	8.0	20:45	-14.1	280.3	8.5
2012:09:23	05:25	-27.1	68.8	10.1	20:39	-13.5	276.5	10.6
2012:09:26	05:29	-29.1	70.1	12.1	20:34	-12.8	272.9	12.5
2012:09:29	05:32	-31.0	71.4	14.0	20:28	-12.2	269.4	14.3
2012:10:02	05:36	-32.8	72.8	15.7	20:23	-11.6	266.1	16.0
2012:10:05	05:39	-34.4	74.2	17.3	20:18	-11.0	263.0	17.6
2012:10:08	05:42	-35.9	75.7	18.8	20:12	-10.5	260.0	19.0
2012:10:11	05:46	-37.3	77.1	20.1	20:08	-9.9	257.2	20.3
2012:10:14	05:49	-38.5	78.5	21.3	20:03	-9.3	254.6	21.5
2012:10:17	05:52	-39.5	79.8	22.3	19:58	-8.8	252.2	22.5
2012:10:20	05:56	-40.3	81.1	23.2	19:54	-8.3	250.0	23.3
2012:10:23	05:59	-40.9	82.5	23.8	19:50	-7.9	248.1	23.9
2012:10:26	06:02	-41.2	83.8	24.1	19:46	-7.6	246.6	24.1
2012:10:29	06:05	-41.1	85.1	23.9	19:42	-7.5	245.5	23.9
2012:11:01	06:09	-40.4	86.5	23.3	19:39	-7.6	245.1	23.0
2012:11:04	06:12	-38.9	88.1	21.8	19:35	-8.1	245.4	21.4
2012:11:07	06:15	-36.5	90.0	19.3	19:32	-9.1	246.8	18.7
2012:11:10	06:18	-32.7	92.3	15.4	19:30	-10.9	249.4	14.6
2012:11:13	06:21	-27.5	95.0	10.1	19:27	-13.4	253.5	9.0
2012:11:16	06:25	-21.1	98.0	3.5	19:25	-16.6	258.6	2.2
2012:11:19	06:28	-14.3	101.2	3.7	19:23	-20.1	264.2	4.9
2012:11:22	06:31	-8.2	104.3	10.1	19:22	-23.2	269.1	11.1
2012:11:25	06:34	-3.7	107.0	15.0	19:21	-25.6	272.6	15.7
2012:11:28	06:36	-0.8	109.3	18.2	19:20	-27.4	274.5	18.6
2012:12:01	06:39	0.5	111.1	19.9	19:19	-28.7	275.0	20.1
2012:12:04	06:42	0.9	112.5	20.5	19:19	-29.5	274.5	20.5
2012:12:07	06:44	0.4	113.5	20.4	19:19	-29.9	273.3	20.3
2012:12:10	06:47	-0.4	114.3	19.7	19:19	-30.1	271.8	19.6
2012:12:13	06:49	-1.6	114.8	18.8	19:20	-30.1	270.1	18.6
2012:12:16	06:51	-3.0	115.0	17.6	19:21	-29.9	268.3	17.4
2012:12:19	06:53	-4.4	115.0	16.3	19:22	-29.6	266.5	16.1
2012:12:22	06:54	-6.0	114.8	15.0	19:23	-29.1	264.8	14.7
2012:12:25	06:55	-7.5	114.4	13.5	19:25	-28.4	263.3	13.3
2012:12:28	06:56	-9.1	113.8	12.0	19:27	-27.7	261.8	11.8
2012:12:31	06:57	-10.7	113.0	10.5	19:29	-26.8	260.5	10.3

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

heliacal dates for Mercury  
 location : Rome (Italy)  
 latitude : 41° 52' 12'' N  
 longitude: 12° 37' 12'' E  
 variable arcus visionis:  
 arcvis [°] = 10.5 + 1.4 \* magnitude  
 critical altitude: 0.00°

date eliache per Mercurio  
 posizione : Roma  
 latitudine : 41° 52' 12'' N  
 longitudine: 12° 37' 12'' E

visibilità minima [°] = 10.5 + 1.4 \* magnitudine  
 altezza critica : 0.00°

	date	obj r/s	sun r/s	d r/s	age	mag
morning visibility ends	2012-01-13	06:43	07:36	-0:52h	-25d 03h	-0.3
evening visibility begins	2012-02-21	18:45	17:49	0:55h	14d 09h	-1.1
evening visibility ends	2012-03-15	19:13	18:16	0:57h	-6d 01h	1.7
morning visibility ends	2012-04-19	04:32	05:22	-0:50h	-38d 08h	0.6
evening visibility begins	2012-06-07	20:49	19:42	1:07h	11d 09h	-1.0
evening visibility ends	2012-07-07	20:58	19:47	1:11h	-21d 00h	1.1
morning visibility begins	2012-08-11	03:56	05:13	-1:17h	13d 07h	0.9
morning visibility ends	2012-08-31	04:41	05:34	-0:53h	-10d 09h	-1.3
morning visibility begins	2012-11-24	05:57	07:10	-1:12h	6d 13h	0.9
morning visibility ends	2012-12-26	06:41	07:36	-0:54h	-23d 03h	-0.4

Date : data nel formato mese/giorno

Obj r/s : ora del tramonto o della levata del pianeta

Sun r/s: ora del tramonto o della levata del Sole

D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due oggetti

Age : giorni trascorsi dalla congiunzione col Sole

Mag : magnitudine

Morning visibility begins = inizio visibilità mattutina

Morning visibility ends = fine visibilità mattutina

Evening visibility begins = inizio visibilità serale

Evening visibility ends = fine visibilità serale

Obj r/s : rising and setting of the planet

Sun r/s : sunrise and sunset

D r/s : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	date	obj r/s	sun r/s	sun alt	sun lon	obj lon	obj lat	mag	d az	d lon
ML	01-13	06:43	07:36	-9° 43'	292° 26'	277° 19'	-0° 38'	-0.3	12° 04'	-15° 07'
EF	02-21	18:45	17:49	-11° 07'	332° 30'	344° 07'	-0° 53'	-1.1	-4° 46'	11° 37'
EL	03-15	19:13	18:16	-11° 31'	355° 34'	6° 00'	3° 31'	1.7	-0° 04'	10° 26'
ML	04-19	04:32	05:22	-9° 34'	29° 29'	2° 06'	-2° 25'	0.6	26° 05'	-27° 23'
EF	06-07	20:49	19:42	-10° 39'	77° 27'	90° 42'	1° 54'	-1.0	-8° 45'	13° 16'
EL	07-07	20:58	19:47	-11° 22'	106° 05'	130° 30'	-1° 19'	1.1	-22° 03'	24° 25'
MF	08-11	03:56	05:13	-13° 30'	138° 51'	121° 54'	-2° 31'	0.9	11° 14'	-16° 57'
ML	08-31	04:41	05:34	-10° 19'	158° 09'	148° 10'	1° 37'	-1.3	2° 29'	-9° 59'
MF	11-24	05:57	07:10	-13° 20'	242° 19'	228° 53'	2° 10'	0.9	4° 30'	-13° 27'
ML	12-26	06:41	07:36	-9° 54'	274° 52'	261° 50'	-0° 11'	-0.4	9° 04'	-13° 01'

MF : prima visibilità mattutina

ML : ultima visibilità mattutina

EF : prima visibilità serale

EL : ultima visibilità serale

Date : data nel formato mese/giorno

Sun alt : altezza del Sole nell'istante di visibilità del pianeta

Sun lon : longitudine celeste del Sole

Obj lon : longitudine celeste del pianeta

Obj lat : latitudine celeste del pianeta

Mag : magnitudine

D az : differenza in azimuth tra i centri del Sole e del pianeta nell'istante della sua visibilità

D lon : differenza in longitudine tra i centri del Sole e del pianeta nell'istante della sua visibilità

Date : date in the format month/day

Sun alt : altitude of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

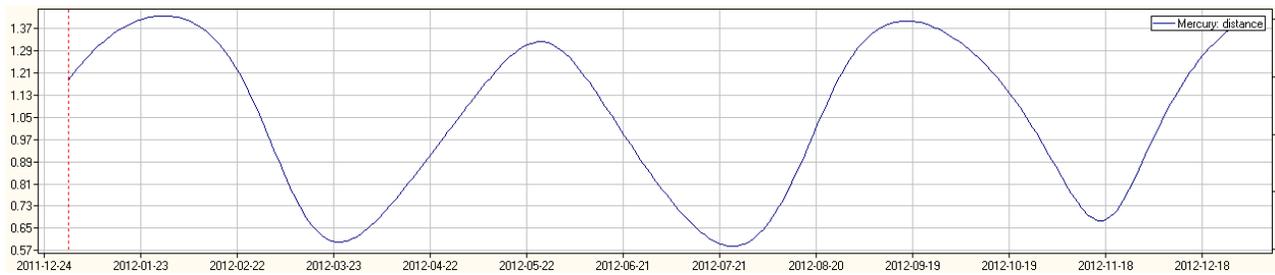
Obj lat : celestial latitude of the planet

Mag : magnitude

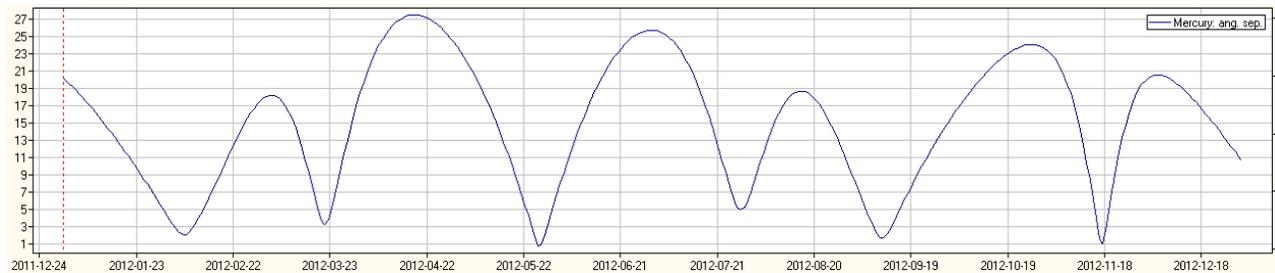
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

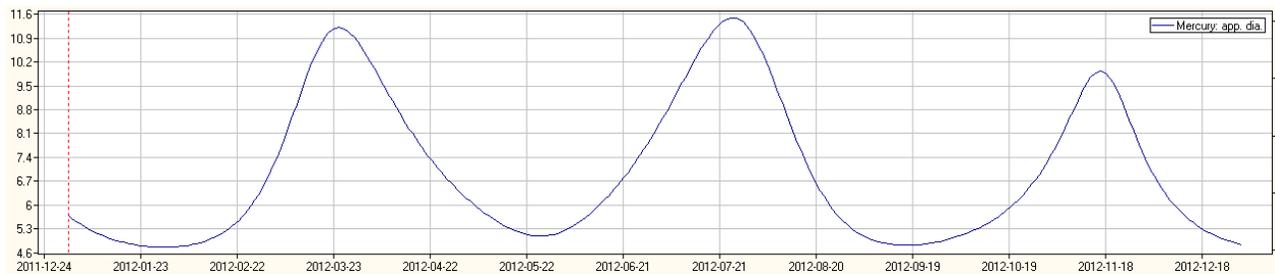
© (3)



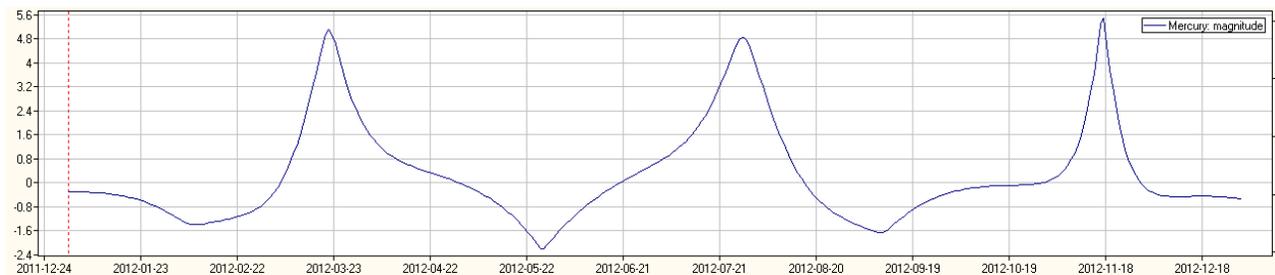
Distanza di Mercurio in U.A. nel corso dell'anno - Distance of Mercury in A.U. during the year



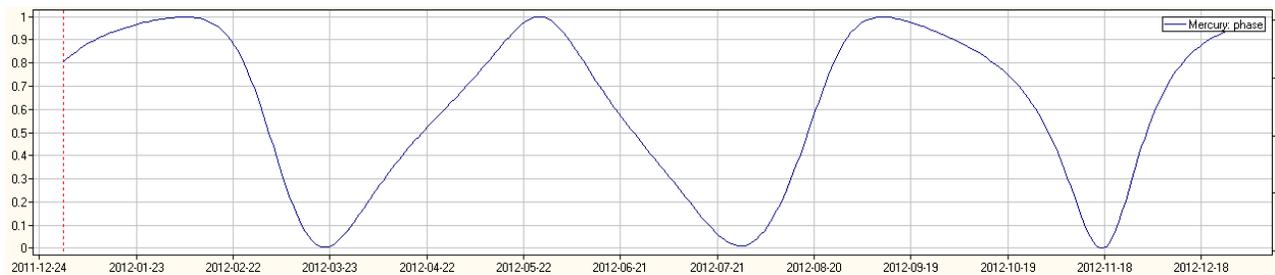
Elongazione di Mercurio in ° nel corso dell'anno - Elongation of Mercury in ° during the year



Diametro di Mercurio in " nel corso dell'anno - Diameter of Mercury in " during the year



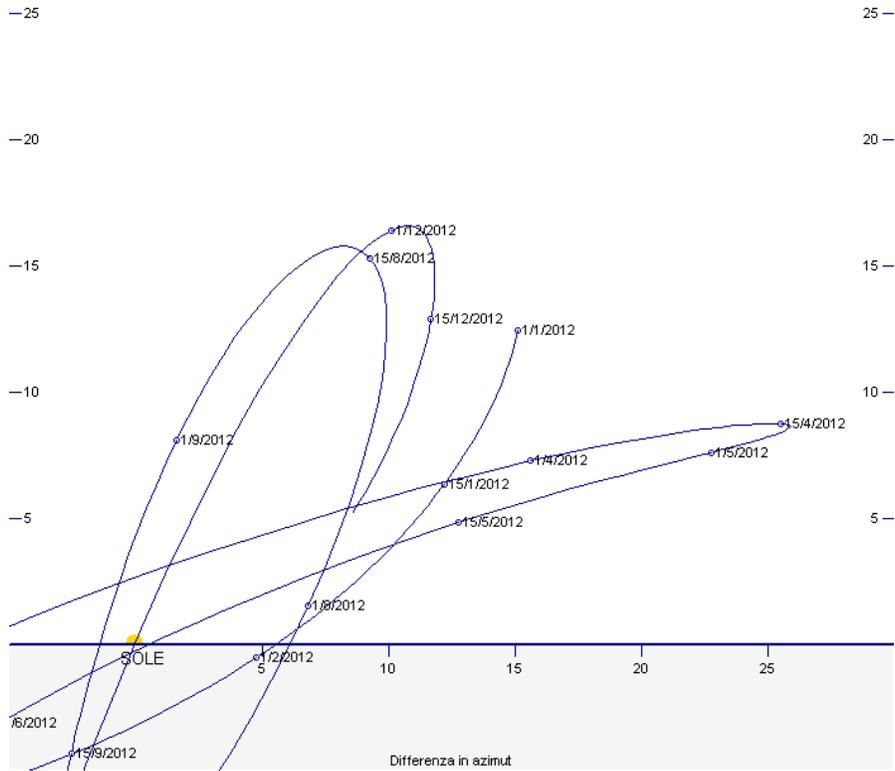
Magnitudine di Mercurio nel corso dell'anno - Magnitude of Mercury during the year



Fase di Mercurio nel corso dell'anno - Phase of Mercury during the year

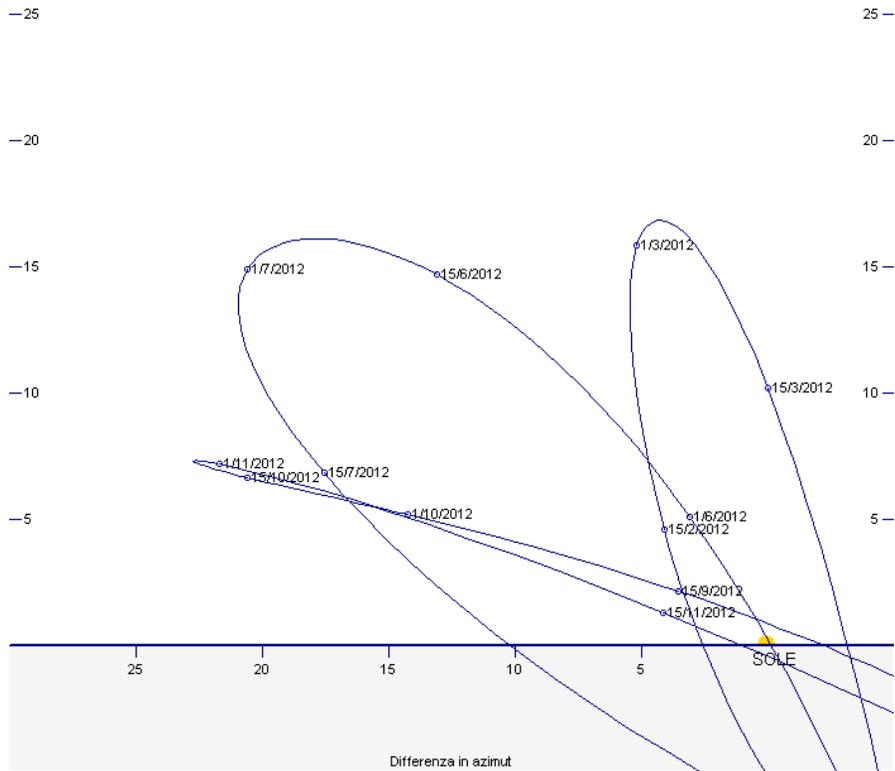
Posizione di Mercurio al mattino rispetto al sorgere del Sole

Luogo : Roma  
 Latitudine: 42° 00' 00" N  
 Longitudine: 12° 00' 00" E



Posizione di Mercurio alla sera rispetto al tramonto del Sole

Luogo : Roma  
 Latitudine: 42° 00' 00" N  
 Longitudine: 12° 00' 00" E



Posizione relativa di Mercurio rispetto al Sole al suo momento del sorgere e del tramonto  
 Relative position of Mercury respect to the sunrising and sunseting © (4)





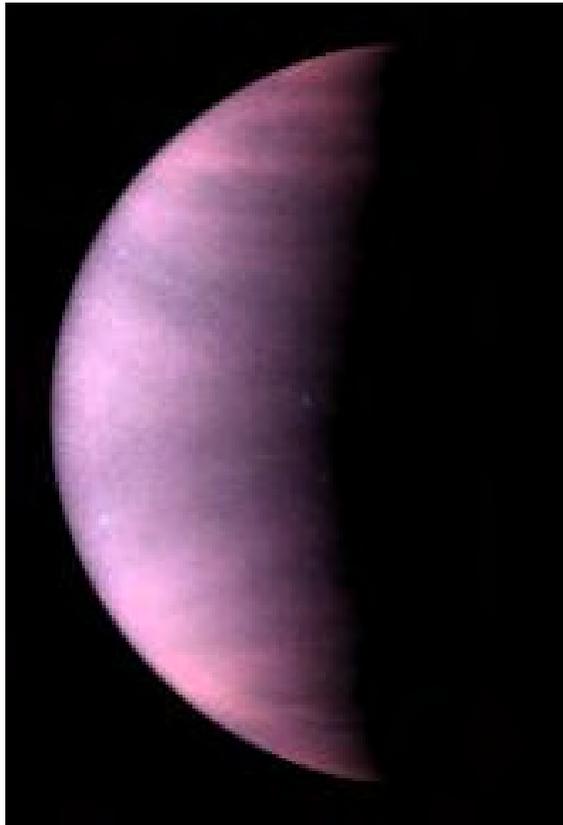




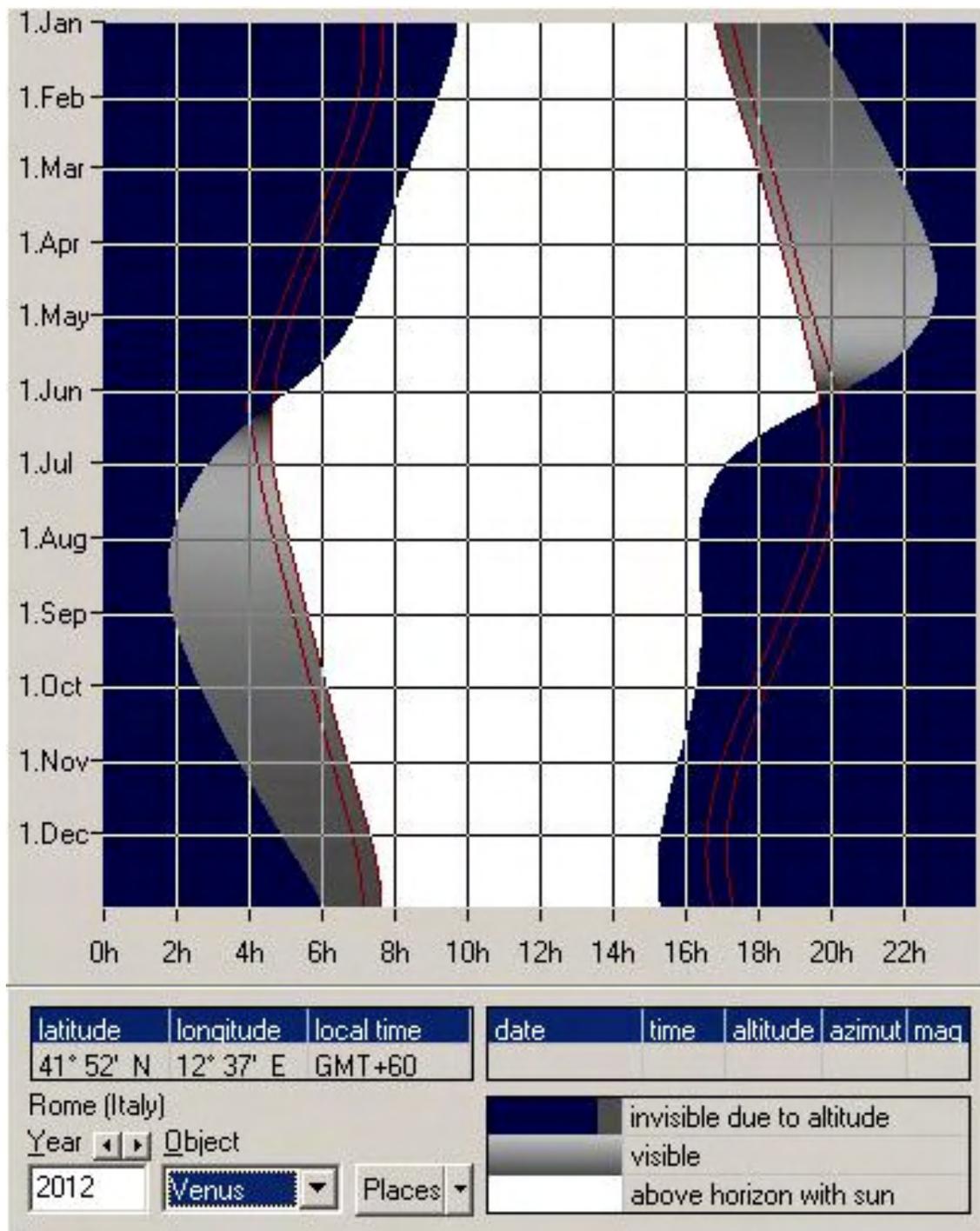
## FENOMENI DI VENERE - PHENOMENA OF VENUS

Perielio - Perihelion	21/03/2012	00:58:48	0,71845 AU
Perielio - Perihelion	31/10/2012	20:45:15	0,71842 AU
Afelio - Aphelion	11/07/2012	12:55:11	0,72823 AU
Perigeo - Perigee	05/06/2012	23:47:02	0,28870 AU
Apogeo - Apogee	Questo anno non avviene - No phenomenon		
Magnit. Max - Brightness maximum	30/04/2012	21:19:03	-4,5 mag
Magnit. Max - Brightness maximum	10/07/2012	20:59:36	-4,5 mag
Magnit. Min - Brightness minimum	05/06/2012	22:40:36	-3,7 mag
Max el. est - Greatest elong.east	27/03/2012	07:43:38	46,0 °
Max el. ovest - Greatest elong. west	15/08/2012	09:07:07	45,8 °
Cong. Infer. - Inferior conjunction	06/06/2012	01:09:04	
Cong. Super. - Superior conjunction	Questo anno non avviene - No phenomenon		
Moto retrogr. - Retrograde motion	15/05/2012	17:21:50	
Moto diretto - Prograde motion	27/06/2012	04:21:03	
Max ang. Fase - Maximum phase angle	05/06/2012	22:25:41	179,0 °
Min ang. Fase - Minimum phase angle	Questo anno non avviene - No phenomenon		

© (5)



# VISIBILITA' DI VENERE - VISIBILITY OF VENUS



Visibilità di Venere nel corso dell'anno - Visibility of Venus during the year

Le righe rosse più esterne indicano in quali periodi dell'anno il pianeta è sufficientemente distante dal Sole per poter essere osservato agevolmente. Le date esatte sono riportate nelle tabelle seguenti.

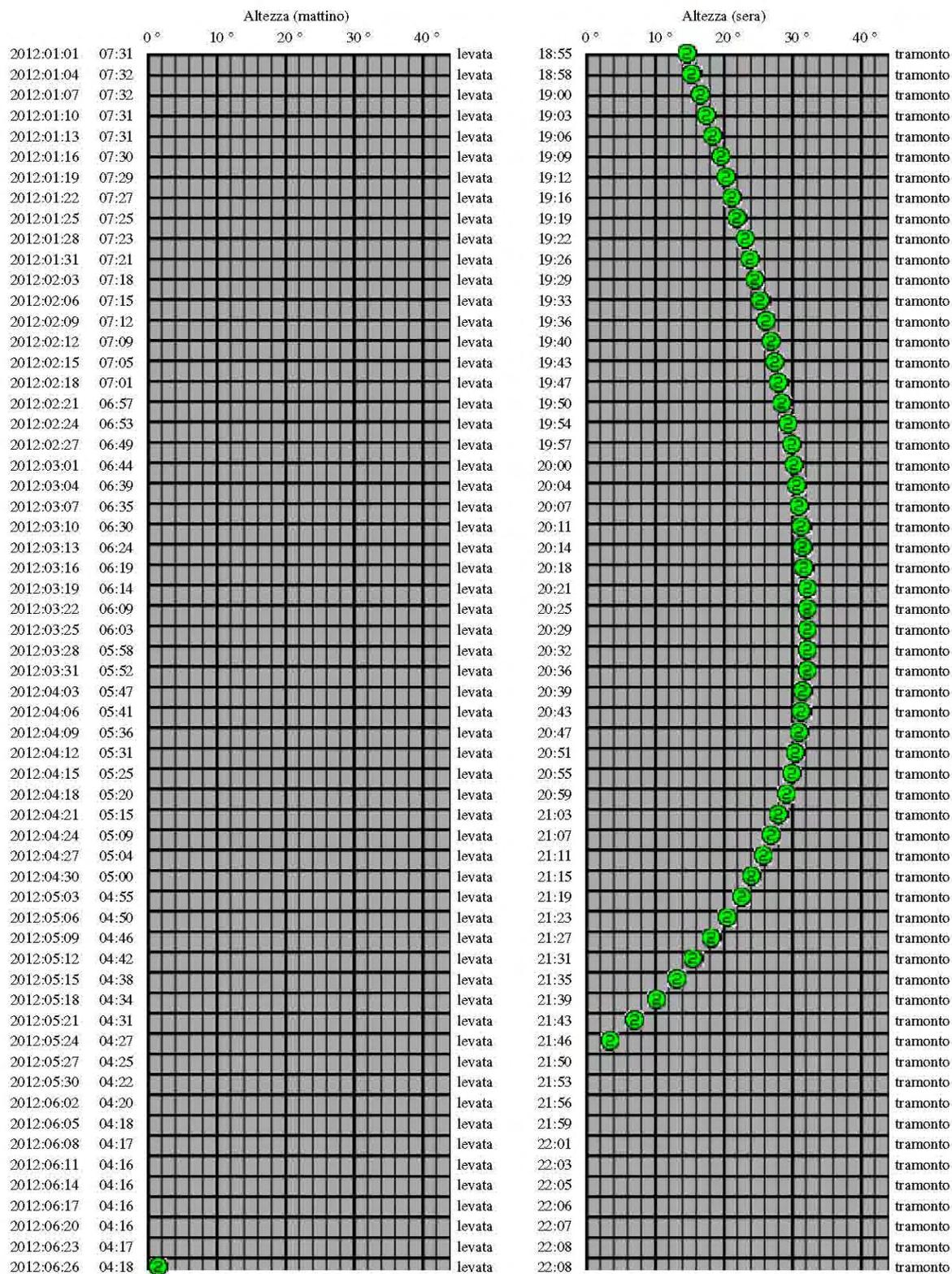
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

# Altezza ai crepuscoli

## di Venere

nel momento in cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

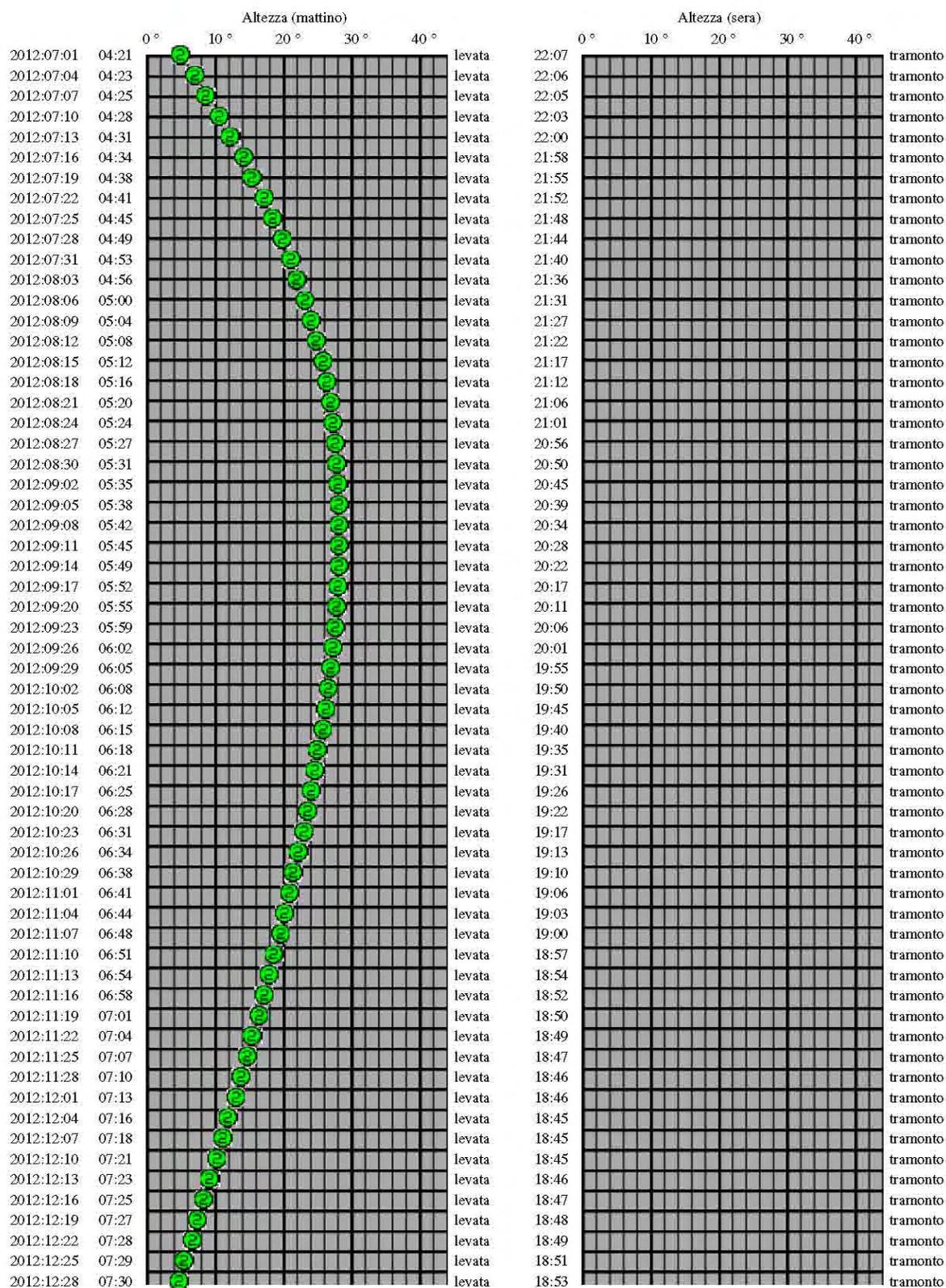


# Altezza ai crepuscoli

## di Venere

nel momento in cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 12° sotto l'orizzonte

Altitude in the twilights. The Sun is 12° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	07:31	-35.5	83.1	34.0	18:55	14.6	228.2	34.1
2012:01:04	07:32	-35.2	81.6	34.6	18:58	15.6	228.8	34.7
2012:01:07	07:32	-34.9	80.0	35.2	19:00	16.6	229.5	35.3
2012:01:10	07:31	-34.6	78.3	35.8	19:03	17.5	230.4	35.9
2012:01:13	07:31	-34.2	76.6	36.4	19:06	18.5	231.4	36.5
2012:01:16	07:30	-33.8	74.8	37.0	19:09	19.5	232.5	37.1
2012:01:19	07:29	-33.4	72.9	37.5	19:12	20.4	233.7	37.6
2012:01:22	07:27	-32.9	71.1	38.1	19:16	21.3	235.0	38.2
2012:01:25	07:25	-32.4	69.1	38.7	19:19	22.2	236.4	38.8
2012:01:28	07:23	-31.9	67.1	39.2	19:22	23.0	237.8	39.3
2012:01:31	07:21	-31.4	65.2	39.8	19:26	23.9	239.4	39.8
2012:02:03	07:18	-30.9	63.1	40.3	19:29	24.7	241.0	40.4
2012:02:06	07:15	-30.4	61.1	40.8	19:33	25.5	242.6	40.9
2012:02:09	07:12	-29.8	59.0	41.3	19:36	26.2	244.3	41.4
2012:02:12	07:09	-29.3	56.9	41.8	19:40	26.9	246.1	41.9
2012:02:15	07:05	-28.7	54.8	42.2	19:43	27.6	247.9	42.3
2012:02:18	07:01	-28.1	52.8	42.7	19:47	28.2	249.7	42.8
2012:02:21	06:57	-27.6	50.7	43.1	19:50	28.8	251.5	43.2
2012:02:24	06:53	-27.0	48.6	43.5	19:54	29.3	253.3	43.6
2012:02:27	06:49	-26.5	46.5	43.9	19:57	29.8	255.1	44.0
2012:03:01	06:44	-25.9	44.4	44.3	20:00	30.3	256.9	44.4
2012:03:04	06:39	-25.4	42.4	44.6	20:04	30.7	258.7	44.7
2012:03:07	06:35	-24.8	40.4	44.9	20:07	31.1	260.4	45.0
2012:03:10	06:30	-24.3	38.4	45.2	20:11	31.4	262.2	45.3
2012:03:13	06:24	-23.8	36.4	45.5	20:14	31.7	263.9	45.5
2012:03:16	06:19	-23.3	34.5	45.7	20:18	31.9	265.5	45.7
2012:03:19	06:14	-22.8	32.6	45.8	20:21	32.1	267.2	45.9
2012:03:22	06:09	-22.3	30.7	46.0	20:25	32.2	268.7	46.0
2012:03:25	06:03	-21.9	29.0	46.0	20:29	32.2	270.3	46.0
2012:03:28	05:58	-21.5	27.3	46.0	20:32	32.1	271.8	46.0
2012:03:31	05:52	-21.1	25.6	46.0	20:36	32.0	273.2	46.0
2012:04:03	05:47	-20.7	24.1	45.9	20:39	31.8	274.6	45.8
2012:04:06	05:41	-20.3	22.6	45.7	20:43	31.5	276.0	45.6
2012:04:09	05:36	-20.0	21.3	45.4	20:47	31.1	277.3	45.3
2012:04:12	05:31	-19.7	20.0	45.0	20:51	30.5	278.6	44.9
2012:04:15	05:25	-19.5	18.9	44.5	20:55	29.8	279.9	44.4
2012:04:18	05:20	-19.2	18.0	43.9	20:59	29.0	281.2	43.7
2012:04:21	05:15	-19.0	17.2	43.1	21:03	28.1	282.5	42.9
2012:04:24	05:09	-18.8	16.6	42.2	21:07	26.9	283.8	42.0
2012:04:27	05:04	-18.7	16.3	41.1	21:11	25.6	285.1	40.9
2012:04:30	05:00	-18.6	16.2	39.9	21:15	24.1	286.5	39.5
2012:05:03	04:55	-18.4	16.3	38.4	21:19	22.4	288.0	38.0
2012:05:06	04:50	-18.3	16.8	36.6	21:23	20.5	289.5	36.2
2012:05:09	04:46	-18.2	17.6	34.6	21:27	18.3	291.2	34.1
2012:05:12	04:42	-18.1	18.8	32.2	21:31	15.8	293.1	31.6
2012:05:15	04:38	-17.9	20.4	29.6	21:35	13.1	295.1	28.9
2012:05:18	04:34	-17.6	22.4	26.6	21:39	10.1	297.3	25.8
2012:05:21	04:31	-17.2	24.8	23.2	21:43	6.8	299.8	22.3
2012:05:24	04:27	-16.7	27.7	19.4	21:46	3.4	302.5	18.5
2012:05:27	04:25	-15.9	31.0	15.3	21:50	-0.3	305.4	14.3
2012:05:30	04:22	-15.0	34.6	10.9	21:53	-4.1	308.6	9.8
2012:06:02	04:20	-13.8	38.5	6.3	21:56	-7.9	312.1	5.2
2012:06:05	04:18	-12.4	42.5	1.6	21:59	-11.6	315.8	0.4
2012:06:08	04:17	-10.7	46.6	3.2	22:01	-15.1	319.7	4.4
2012:06:11	04:16	-8.9	50.6	8.0	22:03	-18.3	323.7	9.1
2012:06:14	04:16	-6.9	54.4	12.5	22:05	-21.1	327.7	13.6
2012:06:17	04:16	-4.9	58.0	16.8	22:06	-23.6	331.6	17.8
2012:06:20	04:16	-2.8	61.3	20.7	22:07	-25.6	335.4	21.7
2012:06:23	04:17	-0.6	64.3	24.4	22:08	-27.1	338.9	25.2
2012:06:26	04:18	1.5	67.0	27.6	22:08	-28.3	342.1	28.3
2012:06:29	04:20	3.6	69.4	30.5	22:07	-29.2	344.9	31.1

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	04:21	4.9	70.8	32.2	22:07	-29.6	346.6	32.8
2012:07:04	04:23	6.9	72.7	34.5	22:06	-30.0	348.7	35.0
2012:07:07	04:25	8.8	74.5	36.5	22:05	-30.2	350.5	37.0
2012:07:10	04:28	10.6	76.0	38.3	22:03	-30.2	351.9	38.6
2012:07:13	04:31	12.3	77.3	39.7	22:00	-30.2	352.9	40.1
2012:07:16	04:34	14.0	78.5	41.0	21:58	-30.0	353.6	41.3
2012:07:19	04:38	15.6	79.5	42.1	21:55	-29.8	354.0	42.3
2012:07:22	04:41	17.1	80.5	43.0	21:52	-29.6	354.1	43.2
2012:07:25	04:45	18.5	81.3	43.7	21:48	-29.3	354.0	43.9
2012:07:28	04:49	19.8	82.1	44.3	21:44	-29.0	353.6	44.5
2012:07:31	04:53	21.0	82.7	44.8	21:40	-28.7	353.0	44.9
2012:08:03	04:56	22.1	83.4	45.2	21:36	-28.3	352.2	45.3
2012:08:06	05:00	23.2	83.9	45.5	21:31	-28.0	351.2	45.5
2012:08:09	05:04	24.1	84.5	45.7	21:27	-27.7	350.1	45.7
2012:08:12	05:08	24.9	85.0	45.8	21:22	-27.4	348.9	45.8
2012:08:15	05:12	25.7	85.5	45.8	21:17	-27.2	347.5	45.8
2012:08:18	05:16	26.3	86.0	45.8	21:12	-26.9	346.0	45.8
2012:08:21	05:20	26.8	86.5	45.7	21:06	-26.7	344.4	45.7
2012:08:24	05:24	27.3	87.0	45.6	21:01	-26.4	342.8	45.5
2012:08:27	05:27	27.7	87.6	45.4	20:56	-26.2	341.0	45.3
2012:08:30	05:31	27.9	88.2	45.2	20:50	-26.0	339.2	45.1
2012:09:02	05:35	28.1	88.8	44.9	20:45	-25.8	337.3	44.8
2012:09:05	05:38	28.3	89.4	44.6	20:39	-25.6	335.4	44.5
2012:09:08	05:42	28.3	90.1	44.3	20:34	-25.5	333.4	44.2
2012:09:11	05:45	28.3	90.9	43.9	20:28	-25.4	331.4	43.8
2012:09:14	05:49	28.2	91.7	43.5	20:22	-25.2	329.3	43.4
2012:09:17	05:52	28.1	92.5	43.1	20:17	-25.2	327.2	43.0
2012:09:20	05:55	27.9	93.4	42.6	20:11	-25.1	325.1	42.5
2012:09:23	05:59	27.6	94.4	42.2	20:06	-25.0	323.0	42.1
2012:09:26	06:02	27.3	95.4	41.7	20:01	-25.0	320.8	41.6
2012:09:29	06:05	27.0	96.5	41.2	19:55	-24.9	318.6	41.1
2012:10:02	06:08	26.6	97.6	40.7	19:50	-24.9	316.4	40.6
2012:10:05	06:12	26.2	98.7	40.1	19:45	-24.9	314.2	40.0
2012:10:08	06:15	25.7	99.9	39.6	19:40	-25.0	312.0	39.5
2012:10:11	06:18	25.2	101.2	39.0	19:35	-25.0	309.8	38.9
2012:10:14	06:21	24.7	102.4	38.4	19:31	-25.1	307.6	38.3
2012:10:17	06:25	24.1	103.8	37.9	19:26	-25.1	305.5	37.8
2012:10:20	06:28	23.5	105.1	37.3	19:22	-25.2	303.3	37.2
2012:10:23	06:31	22.9	106.4	36.7	19:17	-25.4	301.1	36.5
2012:10:26	06:34	22.3	107.8	36.0	19:13	-25.5	299.0	35.9
2012:10:29	06:38	21.6	109.1	35.4	19:10	-25.6	296.9	35.3
2012:11:01	06:41	20.9	110.5	34.8	19:06	-25.8	294.8	34.7
2012:11:04	06:44	20.2	111.8	34.1	19:03	-25.9	292.7	34.0
2012:11:07	06:48	19.5	113.1	33.5	19:00	-26.1	290.7	33.4
2012:11:10	06:51	18.7	114.4	32.8	18:57	-26.3	288.7	32.7
2012:11:13	06:54	17.9	115.7	32.2	18:54	-26.5	286.7	32.1
2012:11:16	06:58	17.1	116.9	31.5	18:52	-26.7	284.8	31.4
2012:11:19	07:01	16.3	118.1	30.8	18:50	-26.8	283.0	30.7
2012:11:22	07:04	15.5	119.2	30.2	18:49	-27.0	281.2	30.0
2012:11:25	07:07	14.6	120.2	29.5	18:47	-27.2	279.4	29.4
2012:11:28	07:10	13.8	121.1	28.8	18:46	-27.4	277.7	28.7
2012:12:01	07:13	12.9	122.0	28.1	18:46	-27.6	276.1	28.0
2012:12:04	07:16	12.0	122.8	27.4	18:45	-27.7	274.5	27.3
2012:12:07	07:18	11.1	123.4	26.7	18:45	-27.9	273.0	26.6
2012:12:10	07:21	10.2	124.0	26.0	18:45	-28.0	271.6	25.9
2012:12:13	07:23	9.2	124.5	25.3	18:46	-28.1	270.3	25.2
2012:12:16	07:25	8.3	124.8	24.7	18:47	-28.2	269.0	24.5
2012:12:19	07:27	7.4	125.0	24.0	18:48	-28.2	267.9	23.8
2012:12:22	07:28	6.5	125.1	23.3	18:49	-28.2	266.8	23.1
2012:12:25	07:29	5.5	125.1	22.6	18:51	-28.2	265.9	22.4
2012:12:28	07:30	4.6	124.9	21.9	18:53	-28.1	265.0	21.7
2012:12:31	07:31	3.7	124.6	21.2	18:55	-28.0	264.2	21.0

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

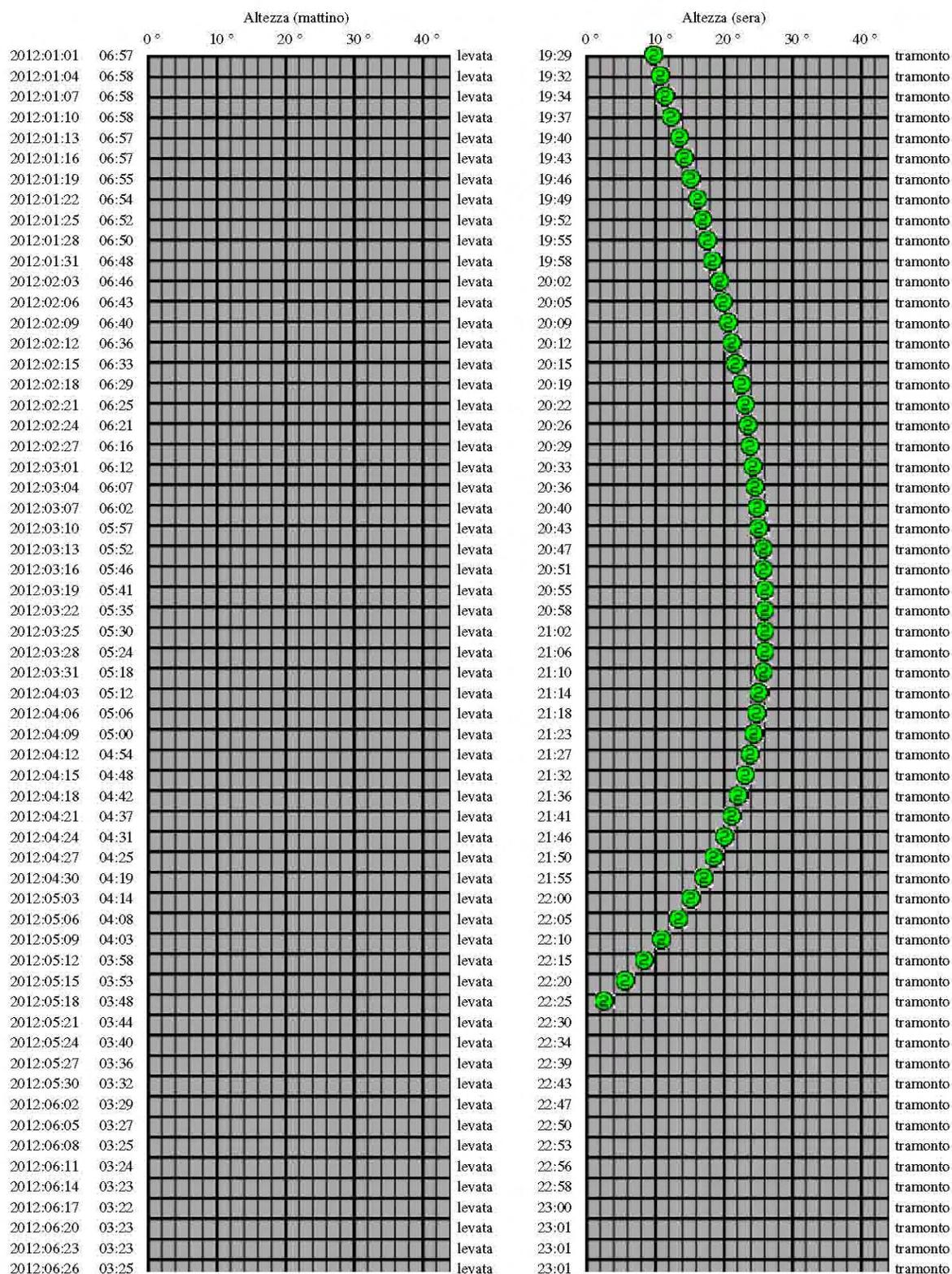
Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

# Altezza ai crepuscoli

## di Venere

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

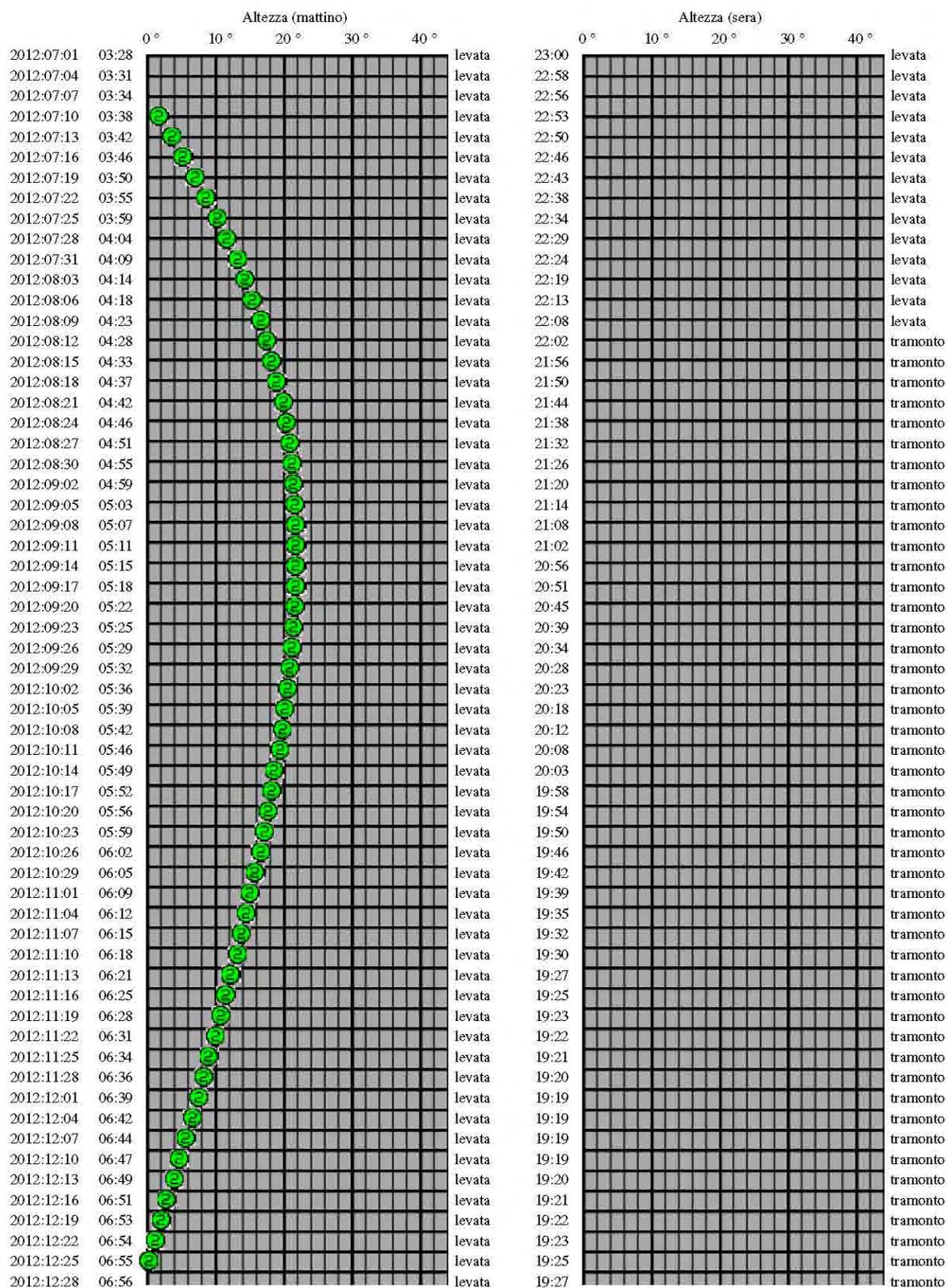


# Altezza ai crepuscoli

## di Venere

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	06:57	-41.7	76.6	34.0	19:29	9.7	234.7	34.1
2012:01:04	06:58	-41.4	75.0	34.6	19:32	10.6	235.4	34.7
2012:01:07	06:58	-41.0	73.3	35.2	19:34	11.6	236.1	35.3
2012:01:10	06:58	-40.6	71.5	35.8	19:37	12.5	237.0	35.9
2012:01:13	06:57	-40.2	69.6	36.4	19:40	13.4	238.0	36.5
2012:01:16	06:57	-39.7	67.7	37.0	19:43	14.3	239.1	37.1
2012:01:19	06:55	-39.2	65.8	37.5	19:46	15.2	240.3	37.6
2012:01:22	06:54	-38.6	63.8	38.1	19:49	16.1	241.6	38.2
2012:01:25	06:52	-38.0	61.8	38.7	19:52	16.9	243.0	38.8
2012:01:28	06:50	-37.4	59.8	39.2	19:55	17.7	244.4	39.3
2012:01:31	06:48	-36.8	57.7	39.8	19:58	18.5	245.9	39.8
2012:02:03	06:46	-36.1	55.6	40.3	20:02	19.2	247.5	40.4
2012:02:06	06:43	-35.5	53.5	40.8	20:05	19.9	249.1	40.9
2012:02:09	06:40	-34.8	51.4	41.3	20:09	20.6	250.8	41.4
2012:02:12	06:36	-34.1	49.3	41.8	20:12	21.3	252.5	41.9
2012:02:15	06:33	-33.4	47.2	42.2	20:15	21.9	254.2	42.3
2012:02:18	06:29	-32.7	45.1	42.7	20:19	22.5	255.9	42.8
2012:02:21	06:25	-32.0	42.9	43.1	20:22	23.0	257.6	43.2
2012:02:24	06:21	-31.2	40.8	43.5	20:26	23.5	259.4	43.6
2012:02:27	06:16	-30.5	38.7	43.9	20:29	24.0	261.1	44.0
2012:03:01	06:12	-29.8	36.6	44.3	20:33	24.4	262.8	44.4
2012:03:04	06:07	-29.1	34.6	44.6	20:36	24.8	264.6	44.7
2012:03:07	06:02	-28.4	32.5	44.9	20:40	25.1	266.2	45.0
2012:03:10	05:57	-27.7	30.5	45.2	20:43	25.4	267.9	45.3
2012:03:13	05:52	-27.1	28.5	45.5	20:47	25.6	269.5	45.5
2012:03:16	05:46	-26.4	26.5	45.7	20:51	25.8	271.1	45.7
2012:03:19	05:41	-25.8	24.6	45.8	20:55	25.9	272.7	45.9
2012:03:22	05:35	-25.1	22.7	46.0	20:58	26.0	274.2	46.0
2012:03:25	05:30	-24.5	20.9	46.0	21:02	25.9	275.7	46.0
2012:03:28	05:24	-24.0	19.1	46.0	21:06	25.8	277.2	46.0
2012:03:31	05:18	-23.4	17.4	46.0	21:10	25.7	278.6	46.0
2012:04:03	05:12	-22.9	15.8	45.9	21:14	25.4	280.0	45.8
2012:04:06	05:06	-22.4	14.3	45.7	21:18	25.0	281.3	45.6
2012:04:09	05:00	-22.0	12.8	45.4	21:23	24.5	282.7	45.3
2012:04:12	04:54	-21.6	11.5	45.0	21:27	23.9	284.0	44.9
2012:04:15	04:48	-21.2	10.3	44.5	21:32	23.2	285.3	44.4
2012:04:18	04:42	-20.9	9.3	43.9	21:36	22.3	286.6	43.7
2012:04:21	04:37	-20.6	8.3	43.1	21:41	21.2	288.0	42.9
2012:04:24	04:31	-20.4	7.6	42.2	21:46	20.0	289.4	42.0
2012:04:27	04:25	-20.2	7.1	41.1	21:50	18.6	290.8	40.9
2012:04:30	04:19	-20.1	6.8	39.9	21:55	17.0	292.3	39.5
2012:05:03	04:14	-20.0	6.8	38.4	22:00	15.2	293.9	38.0
2012:05:06	04:08	-20.0	7.1	36.6	22:05	13.2	295.7	36.1
2012:05:09	04:03	-20.0	7.7	34.6	22:10	11.0	297.6	34.0
2012:05:12	03:58	-20.0	8.7	32.3	22:15	8.5	299.7	31.6
2012:05:15	03:53	-20.1	10.0	29.6	22:20	5.7	302.0	28.9
2012:05:18	03:48	-20.1	11.9	26.6	22:25	2.7	304.5	25.8
2012:05:21	03:44	-20.1	14.2	23.2	22:30	-0.5	307.4	22.3
2012:05:24	03:40	-20.0	16.9	19.5	22:34	-3.8	310.5	18.4
2012:05:27	03:36	-19.9	20.1	15.4	22:39	-7.3	314.0	14.3
2012:05:30	03:32	-19.5	23.7	11.0	22:43	-10.9	317.8	9.8
2012:06:02	03:29	-19.0	27.6	6.4	22:47	-14.3	322.0	5.1
2012:06:05	03:27	-18.2	31.8	1.6	22:50	-17.6	326.4	0.4
2012:06:08	03:25	-17.2	36.0	3.2	22:53	-20.6	331.0	4.5
2012:06:11	03:24	-15.9	40.2	7.9	22:56	-23.3	335.8	9.2
2012:06:14	03:23	-14.5	44.3	12.5	22:58	-25.5	340.4	13.7
2012:06:17	03:22	-12.8	48.1	16.7	23:00	-27.3	345.0	17.9
2012:06:20	03:23	-11.1	51.6	20.7	23:01	-28.6	349.2	21.7
2012:06:23	03:23	-9.2	54.9	24.3	23:01	-29.6	353.1	25.2
2012:06:26	03:25	-7.3	57.8	27.6	23:01	-30.2	356.5	28.4
2012:06:29	03:27	-5.4	60.4	30.4	23:00	-30.5	359.4	31.2

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	03:28	-4.1	62.0	32.2	23:00	-30.6	1.0	32.8
2012:07:04	03:31	-2.1	64.2	34.5	22:58	-30.7	3.1	35.0
2012:07:07	03:34	-0.2	66.1	36.5	22:56	-30.6	4.7	37.0
2012:07:10	03:38	1.7	67.8	38.2	22:53	-30.4	5.9	38.7
2012:07:13	03:42	3.5	69.4	39.7	22:50	-30.2	6.6	40.1
2012:07:16	03:46	5.3	70.8	41.0	22:46	-30.0	7.0	41.3
2012:07:19	03:50	7.0	72.0	42.1	22:43	-29.7	7.1	42.3
2012:07:22	03:55	8.6	73.1	43.0	22:38	-29.5	6.9	43.2
2012:07:25	03:59	10.2	74.1	43.7	22:34	-29.2	6.4	43.9
2012:07:28	04:04	11.6	75.0	44.3	22:29	-29.0	5.7	44.5
2012:07:31	04:09	13.0	75.9	44.8	22:24	-28.8	4.8	44.9
2012:08:03	04:14	14.3	76.7	45.2	22:19	-28.6	3.7	45.3
2012:08:06	04:18	15.5	77.4	45.5	22:13	-28.5	2.4	45.5
2012:08:09	04:23	16.5	78.1	45.7	22:08	-28.3	1.0	45.7
2012:08:12	04:28	17.5	78.7	45.8	22:02	-28.2	359.5	45.8
2012:08:15	04:33	18.4	79.3	45.8	21:56	-28.1	357.9	45.8
2012:08:18	04:37	19.1	79.9	45.8	21:50	-28.0	356.2	45.8
2012:08:21	04:42	19.8	80.5	45.7	21:44	-28.0	354.4	45.7
2012:08:24	04:46	20.4	81.1	45.6	21:38	-27.9	352.5	45.5
2012:08:27	04:51	20.9	81.7	45.4	21:32	-27.9	350.5	45.3
2012:08:30	04:55	21.2	82.4	45.2	21:26	-27.9	348.5	45.1
2012:09:02	04:59	21.5	83.0	44.9	21:20	-27.9	346.5	44.8
2012:09:05	05:03	21.7	83.7	44.6	21:14	-27.9	344.4	44.5
2012:09:08	05:07	21.9	84.5	44.3	21:08	-27.9	342.2	44.2
2012:09:11	05:11	21.9	85.2	43.9	21:02	-28.0	340.1	43.8
2012:09:14	05:15	21.9	86.0	43.5	20:56	-28.1	337.8	43.4
2012:09:17	05:18	21.8	86.9	43.1	20:51	-28.2	335.6	43.0
2012:09:20	05:22	21.7	87.8	42.6	20:45	-28.3	333.4	42.5
2012:09:23	05:25	21.5	88.8	42.2	20:39	-28.4	331.1	42.1
2012:09:26	05:29	21.2	89.8	41.7	20:34	-28.5	328.8	41.6
2012:09:29	05:32	20.9	90.8	41.2	20:28	-28.7	326.5	41.1
2012:10:02	05:36	20.6	91.9	40.7	20:23	-28.8	324.2	40.6
2012:10:05	05:39	20.2	93.0	40.1	20:18	-29.0	321.9	40.0
2012:10:08	05:42	19.7	94.2	39.6	20:12	-29.2	319.6	39.5
2012:10:11	05:46	19.3	95.4	39.0	20:08	-29.4	317.4	38.9
2012:10:14	05:49	18.8	96.7	38.5	20:03	-29.6	315.1	38.3
2012:10:17	05:52	18.2	97.9	37.9	19:58	-29.8	312.8	37.7
2012:10:20	05:56	17.7	99.2	37.3	19:54	-30.0	310.5	37.1
2012:10:23	05:59	17.1	100.5	36.7	19:50	-30.3	308.3	36.5
2012:10:26	06:02	16.5	101.8	36.0	19:46	-30.6	306.1	35.9
2012:10:29	06:05	15.8	103.1	35.4	19:42	-30.8	303.9	35.3
2012:11:01	06:09	15.2	104.5	34.8	19:39	-31.1	301.7	34.7
2012:11:04	06:12	14.5	105.8	34.1	19:35	-31.4	299.6	34.0
2012:11:07	06:15	13.8	107.1	33.5	19:32	-31.6	297.5	33.4
2012:11:10	06:18	13.0	108.3	32.8	19:30	-31.9	295.4	32.7
2012:11:13	06:21	12.3	109.6	32.2	19:27	-32.2	293.4	32.0
2012:11:16	06:25	11.5	110.8	31.5	19:25	-32.5	291.4	31.4
2012:11:19	06:28	10.7	111.9	30.8	19:23	-32.8	289.5	30.7
2012:11:22	06:31	9.9	113.0	30.2	19:22	-33.0	287.6	30.0
2012:11:25	06:34	9.1	114.0	29.5	19:21	-33.3	285.7	29.4
2012:11:28	06:36	8.3	115.0	28.8	19:20	-33.5	284.0	28.7
2012:12:01	06:39	7.4	115.9	28.1	19:19	-33.7	282.3	28.0
2012:12:04	06:42	6.5	116.6	27.4	19:19	-33.9	280.6	27.3
2012:12:07	06:44	5.7	117.3	26.7	19:19	-34.1	279.0	26.6
2012:12:10	06:47	4.8	117.9	26.0	19:19	-34.3	277.6	25.9
2012:12:13	06:49	3.9	118.4	25.4	19:20	-34.4	276.1	25.2
2012:12:16	06:51	2.9	118.8	24.7	19:21	-34.5	274.8	24.5
2012:12:19	06:53	2.0	119.1	24.0	19:22	-34.5	273.6	23.8
2012:12:22	06:54	1.1	119.2	23.3	19:23	-34.5	272.5	23.1
2012:12:25	06:55	0.2	119.2	22.6	19:25	-34.5	271.4	22.4
2012:12:28	06:56	-0.7	119.1	21.9	19:27	-34.4	270.5	21.7
2012:12:31	06:57	-1.6	118.9	21.2	19:29	-34.3	269.7	21.0

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

heliacal dates for Venus  
 location : Rome (Italy)  
 latitude : 41° 52' 12'' N  
 longitude: 12° 37' 12'' E  
 variable arcus visionis:  
 arcvis [°] = 10.5 + 1.4 \* magnitude  
 critical altitude: 0.00°

date eliache per Venere  
 posizione : Roma  
 latitudine : 41° 52' 12'' N  
 longitudine: 12° 37' 12'' E

visibilità minima [°] = 10.5 + 1.4 \* magnitudine  
 altezza critica : 0.00°

	date	obj r/s	sun r/s	d r/s	age	mag
evening visibility ends	2012-06-01	20:13	19:38	0:34h	-4d 06h	-3.0
morning visibility begins	2012-06-13	04:00	04:33	-0:32h	7d 02h	-3.3

Date : data nel formato mese/giorno  
 Obj r/s : ora del tramonto o della levata del pianeta  
 Sun r/s: ora del tramonto o della levata del Sole  
 D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due oggetti  
 Age : giorni trascorsi dalla congiunzione col Sole  
 Mag : magnitudine  
 Morning visibility begins = inizio visibilità mattutina  
 Morning visibility ends = fine visibilità mattutina  
 Evening visibility begins = inizio visibilità serale  
 Evening visibility ends = fine visibilità serale

Obj r/s : rising and setting of the planet  
 Sun r/s : sunrise and sunset  
 D r/s : difference in hours and minutes between the instants of the rising or the setting of the two objects  
 Age : days from the conjunction with the Sun  
 Mag : magnitude

	date	obj r/s	sun r/s	sun alt	sun lon	obj lon	obj lat	mag	d az	d lon
EL	06-01	20:13	19:38	-6° 10'	71° 41'	78° 22'	1° 09'	-3.0	-3° 40'	6° 41'
MF	06-13	04:00	04:33	-5° 49'	82° 31'	71° 32'	-1° 28'	-3.3	9° 44'	-10° 59'

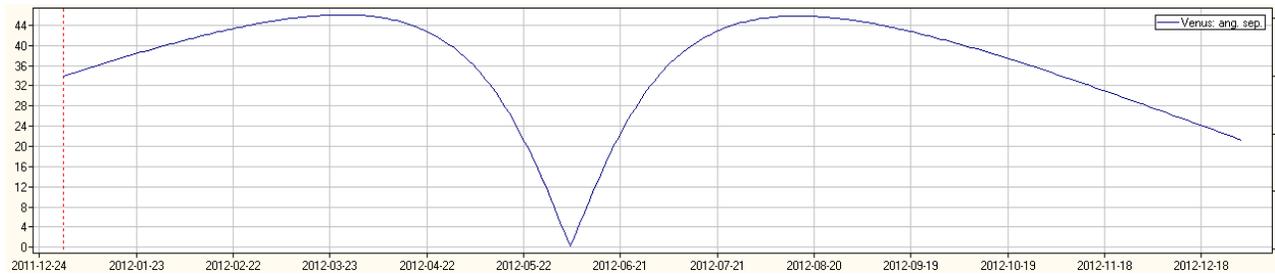
MF : prima visibilità mattutina  
 ML : ultima visibilità mattutina  
 EF : prima visibilità serale  
 EL : ultima visibilità serale  
 Date : data nel formato mese/giorno  
 Sun alt : altezza del Sole nell'istante di visibilità del pianeta  
 Sun lon : longitudine celeste del Sole  
 Obj lon : longitudine celeste del pianeta  
 Obj lat : latitudine celeste del pianeta  
 Mag : magnitudine  
 D az : differenza in azimut tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 D lon : differenza in longitudine tra i centri del Sole e del pianeta nell'istante della sua visibilità

Date : date in the format month/day  
 Sun alt : altitude of the Sun in the instant of visibility of the planet  
 Sun lon : celestial longitude of the Sun  
 Obj lon : celestial longitude of the planet  
 Obj lat : celestial latitude of the planet  
 Mag : magnitude  
 D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility  
 D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

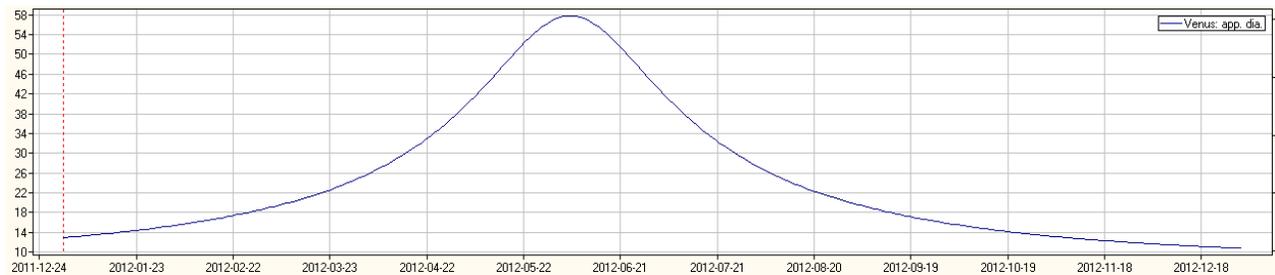
© (3)



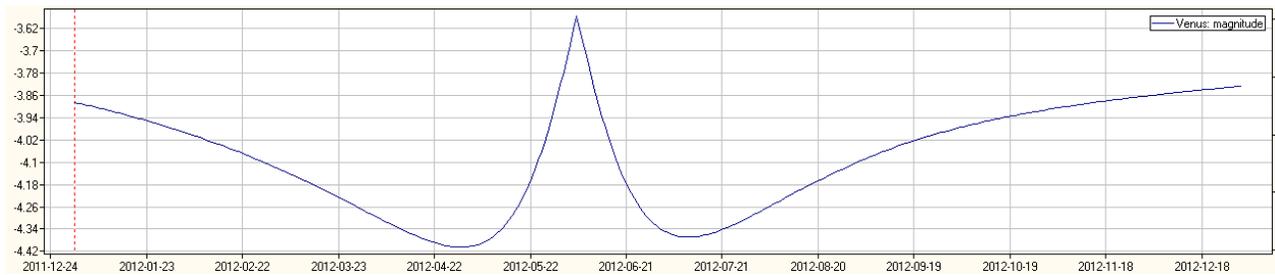
Distanza di Venere in U.A. nel corso dell'anno - Distance of Venus in A.U. during the year



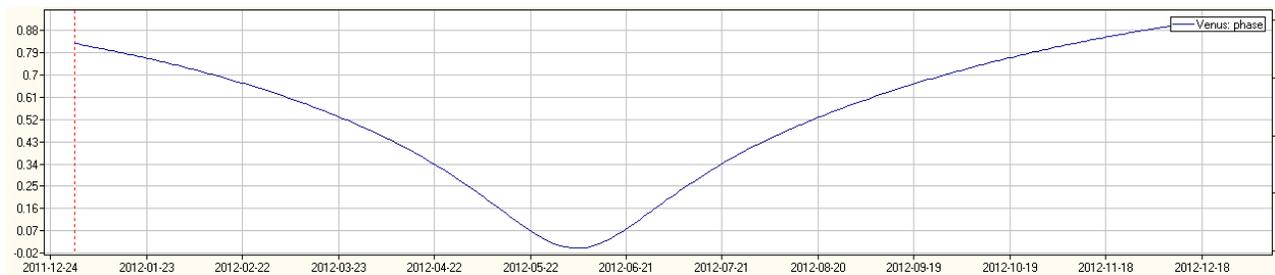
Elongazione di Venere in ° nel corso dell'anno - Elongation of Venus in ° during the year



Diametro di Venere in " nel corso dell'anno - Diameter of Venus in " during the year

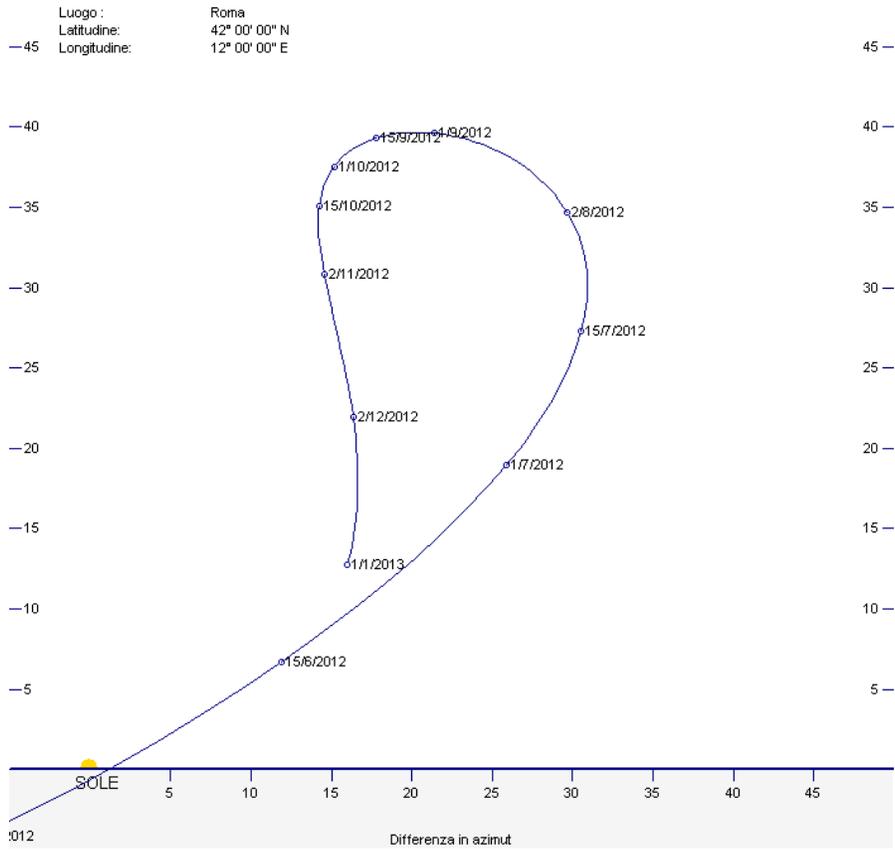


Magnitudine di Venere nel corso dell'anno - Magnitude of Venus during the year

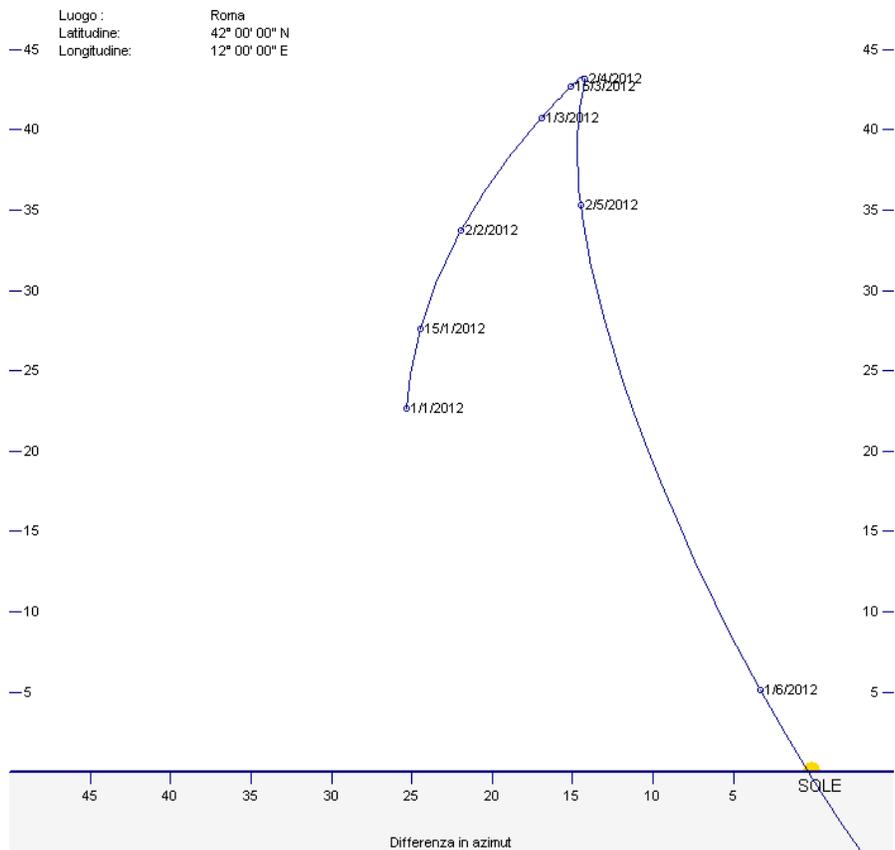


Fase di Venere nel corso dell'anno - Phase of Venus during the year

Posizione di Venere al mattino rispetto al sorgere del Sole



Posizione di Venere alla sera rispetto al tramonto del Sole



Posizione relativa di Venere rispetto al Sole al suo momento del sorgere e del tramonto

Relative position of Venus respect to the sunrising and sunsetting

© (4)









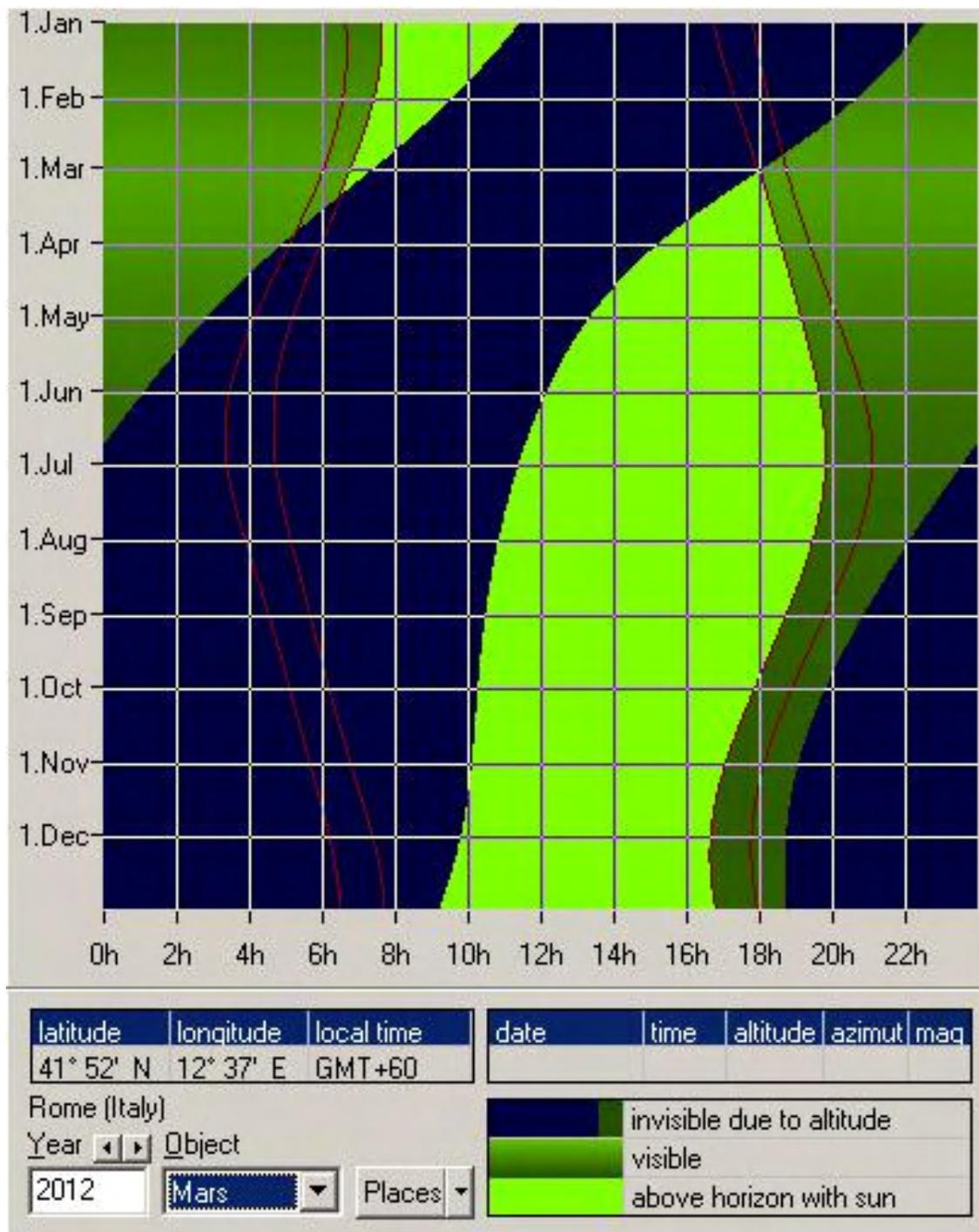
## FENOMENI DI MARTE - PHENOMENA OF MARS

Perielio - Perihelion	Questo anno non avviene - No phenomenon		
Afelio - Aphelion	15/02/2012	20:59:36	1,66598 AU
Perigeo - Perigee	05/03/2012	16:59:57	0,67368 AU
Apogeo - Apogee	Questo anno non avviene - No phenomenon		
Magnit. Max - Brightness maximum	04/03/2012	04:25:09	-1,2 mag
Magnit. Min - Brightness minimum	17/10/2012	17:02:21	1,2 mag
Opposizione - Opposition	03/03/2012	20:10:24	
Congiunzione - Conjunction	Questo anno non avviene - No phenomenon		
Moto retrogr. - Retrograde motion	25/01/2012	00:36:18	
Moto diretto - Prograde motion	15/04/2012	12:22:50	
Max ang. Fase - Maximum phase angle	18/06/2012	10:12:05	39,4 °
Min ang. Fase - Minimum phase angle	03/03/2012	21:07:48	2,5 °
Estr. lat. Terra- Extremum lat. Earth	28/06/2012	17:38:16	26,16 °
Lat. Terra zero - Lat. Earth zero	10/11/2012	18:06:23	
Estr. lat. Sole - Extremum lat. Sun	30/03/2012	04:12:35	25,19 °
Lat. Sole zero - Latitude Sun zero	29/09/2012	15:59:18	

© (5)



# VISIBILITA' DI MARTE - VISIBILITY OF MARS



Visibilità di Marte nel corso dell'anno - Visibility of Mars during the year

Le righe rosse più esterne indicano in quali periodi dell'anno il pianeta è sufficientemente distante dal Sole per poter essere osservato agevolmente. Le date esatte sono riportate nelle tabelle seguenti.

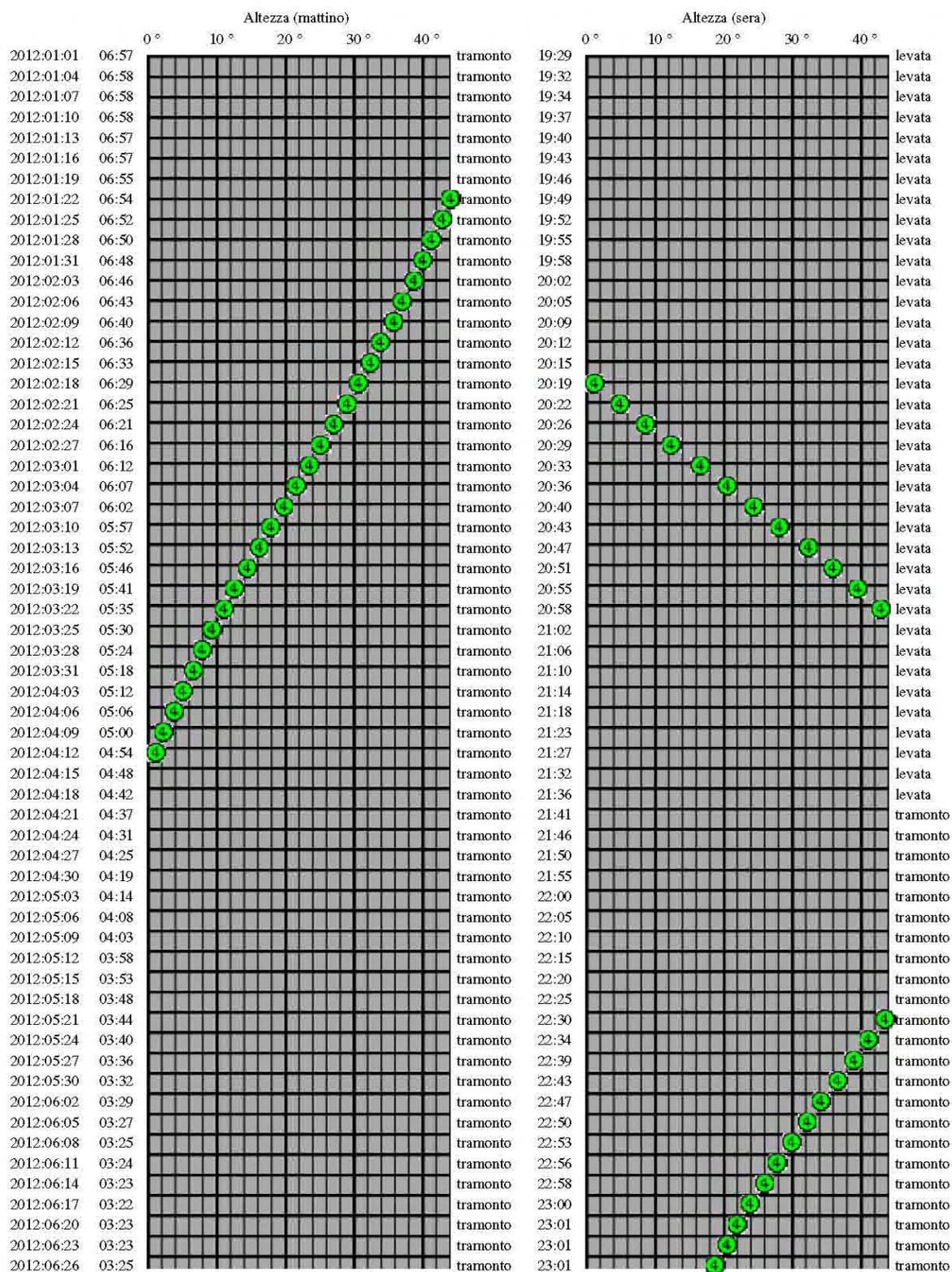
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

# Altezza ai crepuscoli

## di Marte

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

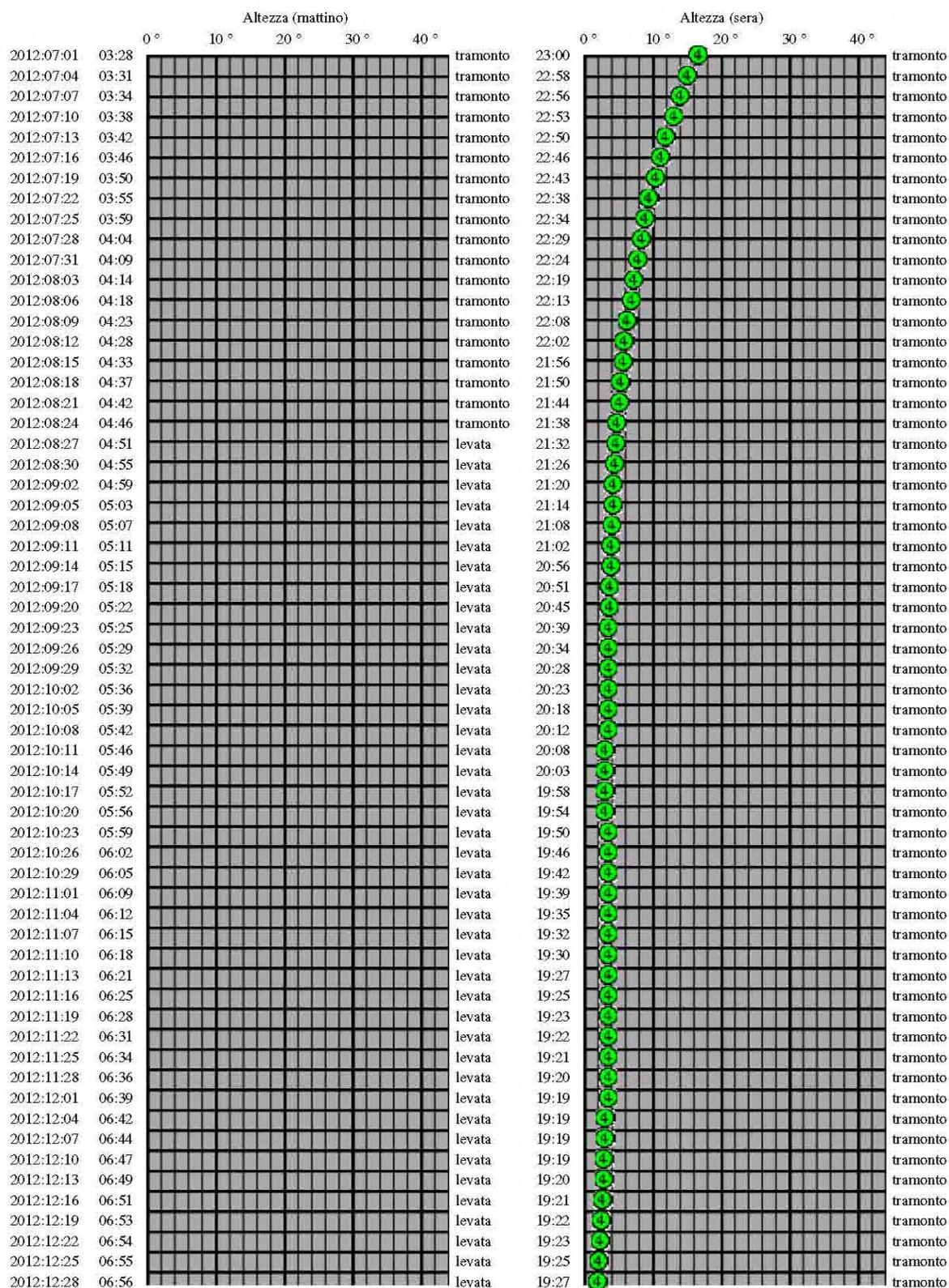


# Altezza ai crepuscoli

## di Marte

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	52.3	204.8	110.0	18:29	-37.1	29.6	110.4
2012:01:04	05:58	51.3	208.3	112.3	18:32	-36.1	33.0	112.8
2012:01:07	05:58	50.3	211.8	114.8	18:34	-35.0	36.4	115.2
2012:01:10	05:58	49.2	215.0	117.3	18:37	-33.6	39.8	117.8
2012:01:13	05:57	48.0	218.2	120.0	18:40	-32.1	43.2	120.4
2012:01:16	05:57	46.8	221.3	122.7	18:43	-30.4	46.5	123.2
2012:01:19	05:55	45.6	224.4	125.5	18:46	-28.4	49.8	126.0
2012:01:22	05:54	44.3	227.3	128.4	18:49	-26.3	53.1	128.9
2012:01:25	05:52	43.0	230.2	131.4	18:52	-24.0	56.3	132.0
2012:01:28	05:50	41.6	233.0	134.6	18:55	-21.4	59.4	135.1
2012:01:31	05:48	40.2	235.8	137.8	18:59	-18.7	62.5	138.4
2012:02:03	05:46	38.7	238.6	141.2	19:02	-15.8	65.5	141.8
2012:02:06	05:43	37.2	241.3	144.6	19:05	-12.8	68.4	145.3
2012:02:09	05:40	35.6	244.0	148.2	19:09	-9.5	71.3	148.9
2012:02:12	05:36	34.0	246.7	151.9	19:12	-6.1	74.2	152.6
2012:02:15	05:33	32.3	249.4	155.6	19:15	-2.6	77.0	156.4
2012:02:18	05:29	30.6	252.0	159.5	19:19	1.0	79.8	160.2
2012:02:21	05:25	28.9	254.6	163.4	19:22	4.8	82.7	164.1
2012:02:24	05:21	27.1	257.1	167.3	19:26	8.7	85.5	168.0
2012:02:27	05:16	25.3	259.6	171.1	19:29	12.6	88.4	171.8
2012:03:01	05:12	23.5	262.1	174.4	19:33	16.5	91.3	174.9
2012:03:04	05:07	21.6	264.4	175.8	19:36	20.5	94.4	175.6
2012:03:07	05:02	19.8	266.7	173.8	19:40	24.5	97.5	173.1
2012:03:10	04:57	18.0	268.9	170.3	19:44	28.4	100.8	169.5
2012:03:13	04:52	16.2	271.1	166.5	19:47	32.2	104.3	165.7
2012:03:16	04:46	14.4	273.1	162.6	19:51	36.0	108.0	161.8
2012:03:19	04:41	12.7	275.0	158.7	19:55	39.6	111.9	157.9
2012:03:22	04:35	11.0	276.8	154.9	19:58	43.0	116.2	154.1
2012:03:25	04:29	9.4	278.4	151.1	20:02	46.2	120.8	150.3
2012:03:28	04:24	7.9	280.0	147.5	20:06	49.2	125.9	146.7
2012:03:31	04:18	6.4	281.5	144.0	20:10	51.9	131.4	143.2
2012:04:03	04:12	5.0	282.8	140.6	20:14	54.4	137.5	139.8
2012:04:06	04:06	3.7	284.0	137.3	20:19	56.4	144.1	136.5
2012:04:09	04:00	2.4	285.2	134.1	20:23	58.1	151.1	133.4
2012:04:12	03:54	1.2	286.2	131.0	20:27	59.4	158.7	130.3
2012:04:15	03:48	-0.0	287.1	128.1	20:32	60.2	166.5	127.4
2012:04:18	03:42	-1.1	288.0	125.3	20:36	60.5	174.4	124.6
2012:04:21	03:36	-2.2	288.8	122.5	20:41	60.4	182.3	121.9
2012:04:24	03:31	-3.2	289.5	119.9	20:46	59.9	189.9	119.3
2012:04:27	03:25	-4.2	290.1	117.4	20:50	58.9	197.0	116.8
2012:04:30	03:19	-5.2	290.6	115.0	20:55	57.7	203.6	114.4
2012:05:03	03:13	-6.2	291.1	112.6	21:00	56.2	209.6	112.1
2012:05:06	03:08	-7.1	291.6	110.4	21:05	54.4	215.0	109.8
2012:05:09	03:03	-8.0	292.0	108.2	21:10	52.5	219.9	107.7
2012:05:12	02:58	-9.0	292.4	106.1	21:15	50.4	224.3	105.6
2012:05:15	02:53	-9.9	292.8	104.1	21:20	48.2	228.3	103.6
2012:05:18	02:48	-10.9	293.2	102.1	21:25	46.0	231.8	101.6
2012:05:21	02:44	-11.9	293.6	100.3	21:30	43.7	235.0	99.8
2012:05:24	02:39	-12.9	294.0	98.4	21:34	41.3	237.9	97.9
2012:05:27	02:36	-13.9	294.4	96.6	21:39	39.0	240.5	96.2
2012:05:30	02:32	-15.0	294.8	94.9	21:43	36.7	242.8	94.5
2012:06:02	02:29	-16.2	295.3	93.2	21:47	34.4	244.9	92.8
2012:06:05	02:27	-17.4	295.8	91.6	21:50	32.1	246.8	91.2
2012:06:08	02:25	-18.7	296.4	90.0	21:53	29.9	248.5	89.6
2012:06:11	02:24	-20.1	297.1	88.5	21:56	27.8	250.0	88.1
2012:06:14	02:23	-21.5	297.9	87.0	21:58	25.8	251.3	86.6
2012:06:17	02:22	-23.1	298.8	85.5	22:00	23.9	252.4	85.1
2012:06:20	02:23	-24.7	299.8	84.1	22:01	22.1	253.4	83.7
2012:06:23	02:23	-26.3	300.9	82.7	22:01	20.4	254.2	82.3
2012:06:26	02:25	-28.1	302.1	81.3	22:01	18.8	254.9	80.9
2012:06:29	02:27	-29.9	303.5	80.0	22:00	17.4	255.4	79.6

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	02:28	-31.1	304.5	79.1	22:00	16.5	255.7	78.7
2012:07:04	02:31	-33.0	306.1	77.8	21:58	15.2	256.0	77.4
2012:07:07	02:34	-34.9	307.8	76.5	21:56	14.0	256.2	76.2
2012:07:10	02:38	-36.9	309.7	75.3	21:53	12.9	256.2	75.0
2012:07:13	02:42	-38.9	311.8	74.1	21:50	11.9	256.2	73.7
2012:07:16	02:46	-40.8	314.0	72.9	21:46	11.1	256.0	72.6
2012:07:19	02:50	-42.7	316.3	71.7	21:43	10.2	255.8	71.4
2012:07:22	02:55	-44.6	318.9	70.5	21:38	9.5	255.5	70.2
2012:07:25	02:59	-46.5	321.6	69.4	21:34	8.8	255.2	69.1
2012:07:28	03:04	-48.3	324.4	68.3	21:29	8.2	254.7	68.0
2012:07:31	03:09	-50.0	327.4	67.2	21:24	7.7	254.3	66.9
2012:08:03	03:14	-51.6	330.6	66.1	21:19	7.2	253.7	65.8
2012:08:06	03:19	-53.2	334.0	65.0	21:13	6.7	253.1	64.8
2012:08:09	03:23	-54.6	337.6	64.0	21:08	6.3	252.5	63.7
2012:08:12	03:28	-55.9	341.3	63.0	21:02	6.0	251.9	62.7
2012:08:15	03:33	-57.2	345.2	61.9	20:56	5.6	251.2	61.7
2012:08:18	03:37	-58.3	349.2	60.9	20:50	5.3	250.5	60.7
2012:08:21	03:42	-59.2	353.4	59.9	20:44	5.0	249.7	59.7
2012:08:24	03:46	-60.1	357.7	58.9	20:38	4.8	249.0	58.7
2012:08:27	03:51	-60.8	2.0	58.0	20:32	4.6	248.2	57.8
2012:08:30	03:55	-61.4	6.4	57.0	20:26	4.4	247.4	56.8
2012:09:02	03:59	-61.8	10.9	56.1	20:20	4.2	246.6	55.9
2012:09:05	04:03	-62.1	15.3	55.1	20:14	4.0	245.8	54.9
2012:09:08	04:07	-62.3	19.7	54.2	20:08	3.9	245.0	54.0
2012:09:11	04:11	-62.4	24.0	53.3	20:02	3.8	244.2	53.1
2012:09:14	04:15	-62.4	28.2	52.4	19:56	3.6	243.4	52.2
2012:09:17	04:18	-62.3	32.2	51.5	19:50	3.6	242.6	51.3
2012:09:20	04:22	-62.1	36.1	50.6	19:45	3.5	241.9	50.4
2012:09:23	04:25	-61.8	39.9	49.7	19:39	3.4	241.1	49.5
2012:09:26	04:29	-61.4	43.4	48.9	19:33	3.3	240.3	48.7
2012:09:29	04:32	-61.0	46.8	48.0	19:28	3.3	239.6	47.8
2012:10:02	04:36	-60.5	50.0	47.1	19:23	3.3	238.8	47.0
2012:10:05	04:39	-59.9	53.0	46.3	19:17	3.2	238.1	46.1
2012:10:08	04:43	-59.3	55.9	45.4	19:12	3.2	237.4	45.3
2012:10:11	04:46	-58.7	58.6	44.6	19:07	3.2	236.8	44.5
2012:10:14	04:49	-58.0	61.1	43.8	19:03	3.2	236.2	43.6
2012:10:17	04:52	-57.3	63.4	43.0	18:58	3.2	235.6	42.8
2012:10:20	04:56	-56.6	65.6	42.2	18:54	3.2	235.0	42.0
2012:10:23	04:59	-55.8	67.6	41.3	18:50	3.2	234.5	41.2
2012:10:26	05:02	-55.0	69.5	40.5	18:46	3.2	234.1	40.4
2012:10:29	05:05	-54.2	71.3	39.8	18:42	3.3	233.6	39.6
2012:11:01	05:09	-53.4	72.9	39.0	18:39	3.3	233.3	38.8
2012:11:04	05:12	-52.6	74.5	38.2	18:35	3.3	233.0	38.0
2012:11:07	05:15	-51.7	75.9	37.4	18:32	3.3	232.7	37.3
2012:11:10	05:18	-50.9	77.2	36.6	18:30	3.3	232.5	36.5
2012:11:13	05:21	-50.0	78.4	35.9	18:27	3.3	232.4	35.7
2012:11:16	05:25	-49.1	79.5	35.1	18:25	3.3	232.3	35.0
2012:11:19	05:28	-48.2	80.5	34.3	18:23	3.3	232.3	34.2
2012:11:22	05:31	-47.3	81.4	33.6	18:22	3.3	232.4	33.4
2012:11:25	05:34	-46.3	82.2	32.8	18:21	3.3	232.6	32.7
2012:11:28	05:36	-45.4	83.0	32.1	18:20	3.3	232.8	32.0
2012:12:01	05:39	-44.5	83.7	31.3	18:19	3.2	233.1	31.2
2012:12:04	05:42	-43.5	84.3	30.6	18:19	3.2	233.5	30.5
2012:12:07	05:44	-42.6	84.8	29.9	18:19	3.1	234.0	29.7
2012:12:10	05:47	-41.7	85.2	29.1	18:19	3.0	234.5	29.0
2012:12:13	05:49	-40.8	85.6	28.4	18:20	2.8	235.2	28.3
2012:12:16	05:51	-39.8	85.9	27.7	18:21	2.7	235.9	27.6
2012:12:19	05:53	-38.9	86.1	27.0	18:22	2.5	236.7	26.9
2012:12:22	05:54	-38.0	86.3	26.3	18:23	2.3	237.6	26.1
2012:12:25	05:55	-37.1	86.3	25.6	18:25	2.1	238.5	25.4
2012:12:28	05:56	-36.3	86.4	24.9	18:27	1.9	239.6	24.7
2012:12:31	05:57	-35.4	86.3	24.2	18:29	1.6	240.6	24.0

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

heliacal dates for Mars	date eliache per Marte
location : Rome (Italy)	posizione : Roma
latitude : 41° 52' 12'' N	latitudine : 41° 52' 12'' N
longitude: 12° 37' 12'' E	longitudine: 12° 37' 12'' E
variable arcus visionis:	
arcvis [°] = 10.5 + 1.4 * magnitude	visibilità minima [°] = 10.5 + 1.4 * magnitudine
critical altitude: 0.00°	altezza critica : 0.00°

date	obj r/s	sun r/s	d r/s	age	mag
------	---------	---------	-------	-----	-----

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Date : data nel formato mese/giorno  
 Obj r/s : ora del tramonto o della levata del pianeta  
 Sun r/s: ora del tramonto o della levata del Sole  
 D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due oggetti  
 Age : giorni trascorsi dalla congiunzione col Sole  
 Mag : magnitudine  
 Morning visibility begins = inizio visibilità mattutina  
 Morning visibility ends = fine visibilità mattutina  
 Evening visibility begins = inizio visibilità serale  
 Evening visibility ends = fine visibilità serale  
 Last visibility : ultimo giorno di visibilità  
 First visibility : primo giorno di visibilità

Obj r/s : rising and setting of the planet  
 Sun r/s : sunrise and sunset  
 D r/s : difference in hours and minutes between the instants of the rising or the setting of the two objects  
 Age : days from the conjunction with the Sun  
 Mag : magnitude

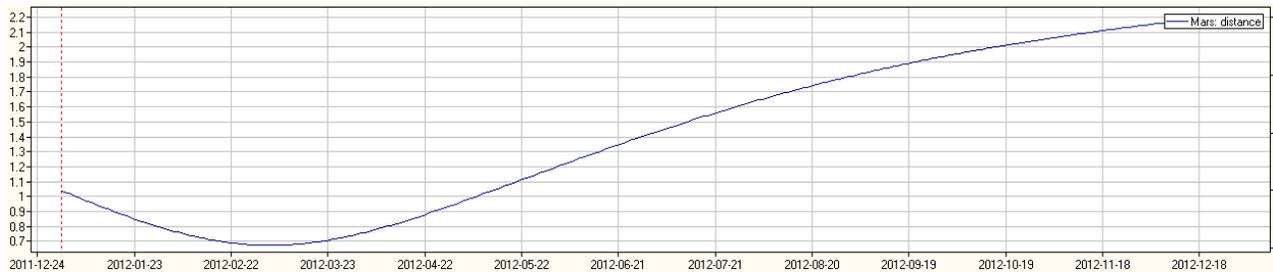
date	obj r/s	sun r/s	sun alt	sun lon	obj lon	obj lat	mag	d az	d lon
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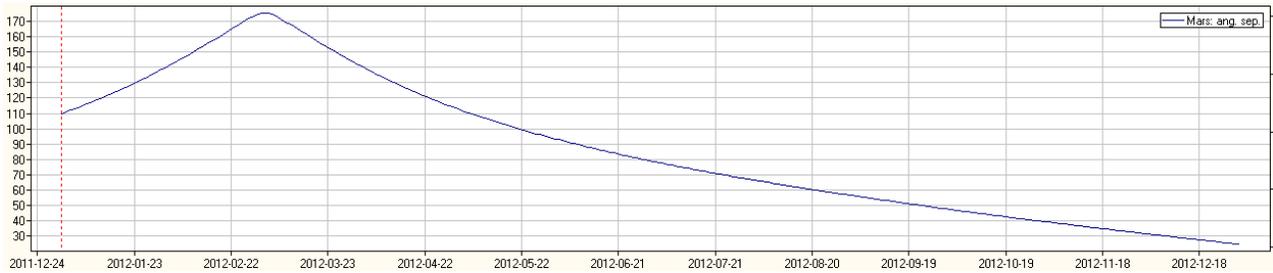
Date : data nel formato mese/giorno  
 Sun alt : altezza del Sole nell'istante di visibilità del pianeta  
 Sun lon : longitudine celeste del Sole  
 Obj lon : longitudine celeste del pianeta  
 Obj lat : latitudine celeste del pianeta  
 Mag : magnitudine  
 D az : differenza in azimut tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 D lon : differenza in longitudine tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 L = ultimo giorno di visibilità  
 F = primo giorno di visibilità

Date : date in the format month/day  
 Sun alt : altitude of the Sun in the instant of visibility of the planet  
 Sun lon : celestial longitude of the Sun  
 Obj lon : celestial longitude of the planet  
 Obj lat : celestial latitude of the planet  
 Mag : magnitude  
 D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility  
 D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

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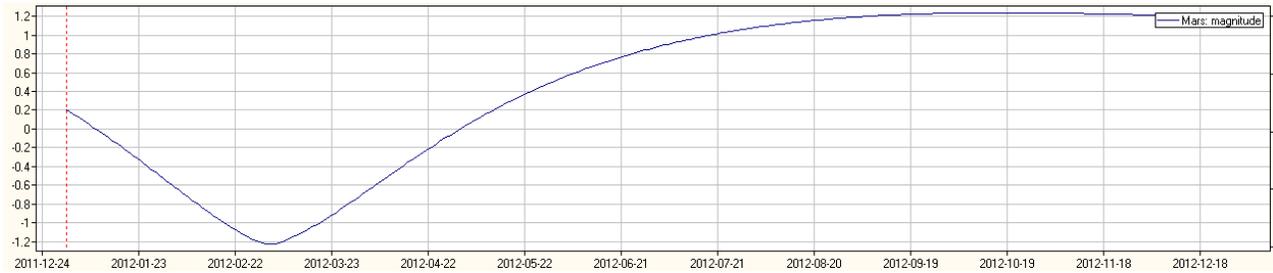
Distanza di Marte in U.A. nel corso dell'anno - Distance of Mars in A.U. during the year



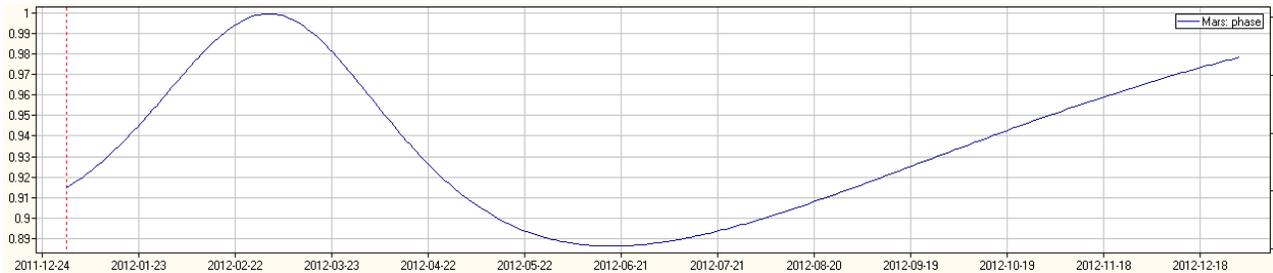
Elongazione di Marte in ° nel corso dell'anno - Elongation of Mars in ° during the year



Diametro di Marte in " nel corso dell'anno - Diameter of Mars in " during the year



Magnitudine di Marte nel corso dell'anno - Magnitude of Mars during the year



Fase di Marte nel corso dell'anno - Phase of Mars during the year



# MERIDIANO CENTRALE DI MARTE

## CENTRAL MERIDIAN OF MARS

Data	Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	°	°	°	°	°	°	°	°	°	°	°	°
1	56.3	110.6	192.5	243.3	305.0	359.3	65.9	124.4	183.7	253.0	313.1	24.7
2	46.5	100.7	182.5	233.4	295.1	349.4	56.1	114.6	174.0	243.3	303.5	15.2
3	36.7	90.8	172.6	223.4	285.2	339.6	46.4	104.9	164.3	233.6	293.8	5.6
4	26.8	80.9	162.6	213.4	275.3	329.8	36.6	95.2	154.6	223.9	284.2	356.1
5	17.0	71.0	152.6	203.4	265.4	320.0	26.9	85.5	144.9	214.3	274.5	346.5
6	7.2	61.1	142.7	193.5	255.5	310.2	17.1	75.8	135.2	204.6	264.9	337.0
7	357.3	51.2	132.7	183.5	245.6	300.4	7.4	66.1	125.5	194.9	255.3	327.4
8	347.5	41.3	122.7	173.6	235.7	290.6	357.7	56.4	115.8	185.2	245.6	317.9
9	337.6	31.3	112.8	163.6	225.8	280.8	347.9	46.7	106.1	175.5	236.0	308.4
10	327.8	21.4	102.8	153.6	215.9	271.0	338.2	37.0	96.5	165.9	226.4	298.9
11	318.0	11.5	92.8	143.7	206.1	261.2	328.5	27.3	86.8	156.2	216.7	289.4
12	308.1	1.6	82.8	133.7	196.2	251.4	318.7	17.6	77.1	146.5	207.1	279.9
13	298.3	351.6	72.9	123.8	186.3	241.6	309.0	7.9	67.4	136.8	197.5	270.4
14	288.4	341.7	62.9	113.8	176.4	231.9	299.3	358.2	57.7	127.1	187.8	260.9
15	278.6	331.8	52.9	103.9	166.6	222.1	289.5	348.5	48.0	117.5	178.2	251.4
16	268.7	321.8	42.9	93.9	156.7	212.3	279.8	338.8	38.3	107.8	168.6	241.9
17	258.8	311.9	33.0	84.0	146.9	202.5	270.1	329.1	28.6	98.1	159.0	232.4
18	249.0	302.0	23.0	74.0	137.0	192.7	260.4	319.4	18.9	88.4	149.4	222.9
19	239.1	292.0	13.0	64.1	127.1	183.0	250.6	309.7	9.2	78.8	139.8	213.5
20	229.2	282.1	3.0	54.2	117.3	173.2	240.9	300.0	359.6	69.1	130.2	204.0
21	219.4	272.1	353.0	44.2	107.4	163.4	231.2	290.3	349.9	59.4	120.5	194.6
22	209.5	262.2	343.1	34.3	97.6	153.7	221.5	280.6	340.2	49.8	110.9	185.1
23	199.6	252.2	333.1	24.4	87.7	143.9	211.8	270.9	330.5	40.1	101.4	175.7
24	189.7	242.3	323.1	14.4	77.9	134.1	202.1	261.2	320.8	30.4	91.8	166.3
25	179.9	232.3	313.1	4.5	68.1	124.4	192.3	251.5	311.1	20.8	82.2	156.9
26	170.0	222.4	303.2	354.6	58.2	114.6	182.6	241.8	301.4	11.1	72.6	147.4
27	160.1	212.4	293.2	344.7	48.4	104.9	172.9	232.2	291.7	1.4	63.0	138.0
28	150.2	202.5	283.2	334.7	38.6	95.1	163.2	222.5	282.0	351.8	53.4	128.6
29	140.3		273.2	324.8	28.7	85.4	153.5	212.8	272.4	342.1	43.9	119.3
30	130.4		263.3	314.9	18.9	75.6	143.8	203.1	262.7	332.5	34.3	109.9
31	120.5		253.3		9.1		134.1	193.4		322.8		100.5

### Moto del meridiano centrale - Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8
10	2.4	17.1	31.7	46.3	60.9	75.5	90.2	104.8	119.4	134.0	148.6	163.3
20	4.9	19.5	34.1	48.7	63.4	78.0	92.6	107.2	121.8	136.5	151.1	165.7
30	7.3	21.9	36.6	51.2	65.8	80.4	95.0	109.7	124.3	138.9	153.5	168.1
40	9.7	24.4	39.0	53.6	68.2	82.8	97.5	112.1	126.7	141.3	156.0	170.6
50	12.2	26.8	41.4	56.0	70.7	85.3	99.9	114.5	129.1	143.8	158.4	173.0
60	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8	175.4

Longitudine del meridiano che transita alle ore 0 T.U. del giorno indicato e moto medio in gradi

Longitude of the central meridian at 0 U.T. of the day and medium motion in °









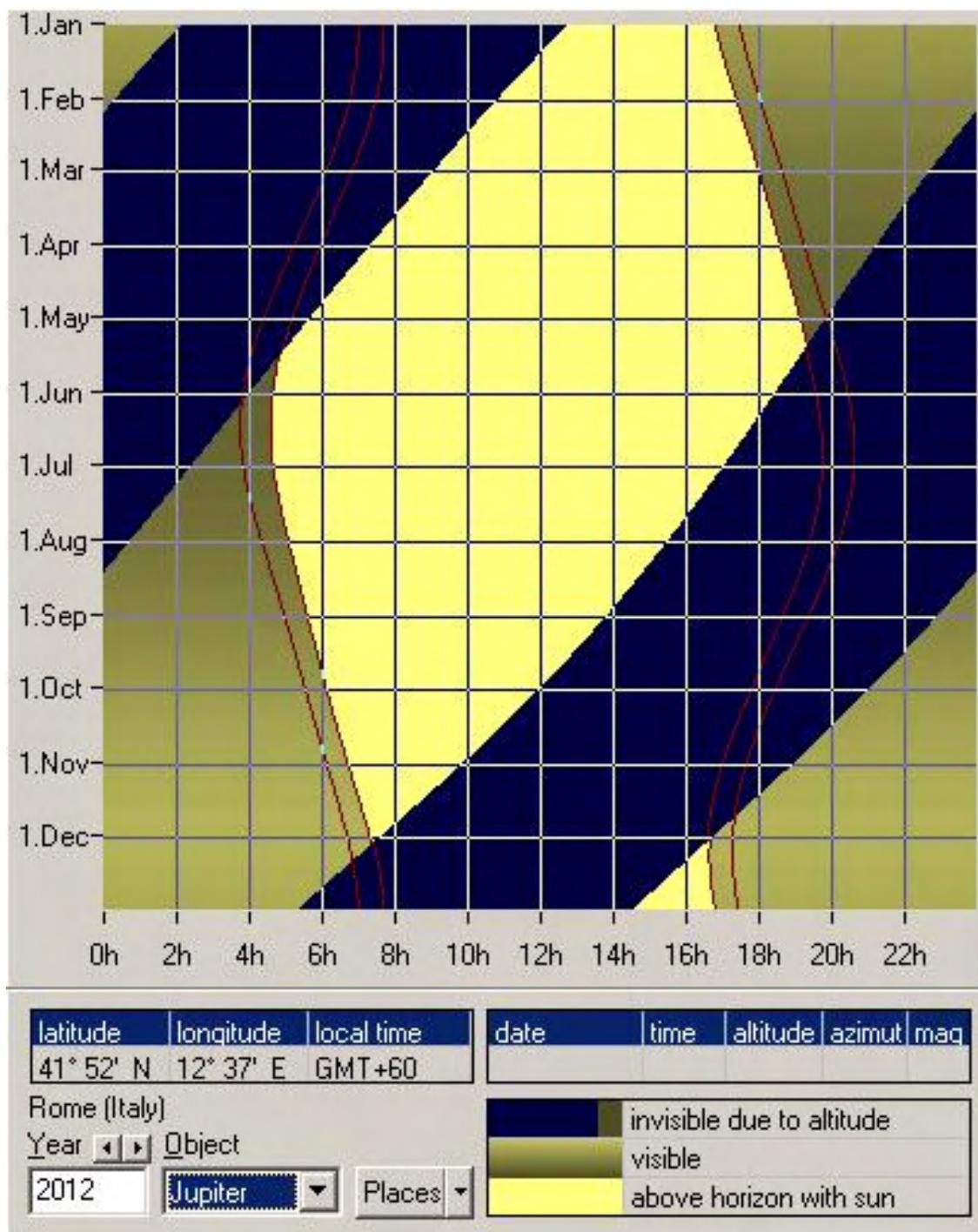
# FENOMENI DI GIOVE - PHENOMENA OF JUPITER

Perielio - Perihelion	Questo anno non avviene - No phenomenon		
Afelio - Aphelion	Questo anno non avviene - No phenomenon		
Perigeo - Perigee	01/12/2012	14:53:49	4,06854 AU
Apogeo - Apogee	15/05/2012	20:34:44	6,01015 AU
Magnit. Max - Brightness maximum	02/12/2012	16:44:35	-2,8 mag
Magnit. Min - Brightness minimum	07/05/2012	03:24:19	-2,0 mag
Opposizione - Opposition	03/12/2012	01:45:16	
Congiunzione - Conjunction	13/05/2012	13:22:48	
Moto retrogr. - Retrograde motion	04/10/2012	13:49:42	
Moto diretto - Prograde motion	Questo anno non avviene - No phenomenon		
Max ang. Fase - Maximum phase angle	22/01/2012	12:31:25	11,4 °
Max ang. Fase - Maximum phase angle	06/09/2012	04:33:22	11,6 °
Min ang. Fase - Minimum phase angle	13/05/2012	15:48:02	0,2 °
Min ang. Fase - Minimum phase angle	03/12/2012	01:13:09	0,2 °
Estr. lat. Terra- Extremum lat. Earth	04/11/2012	23:48:47	3,04 °

© (5)



# VISIBILITA' DI GIOVE - VISIBILITY OF JUPITER



Visibilità di Giove nel corso dell'anno - Visibility of Jupiter during the year

Le righe rosse più esterne indicano in quali periodi dell'anno il pianeta è sufficientemente distante dal Sole per poter essere osservato agevolmente. Le date esatte sono riportate nelle tabelle seguenti.

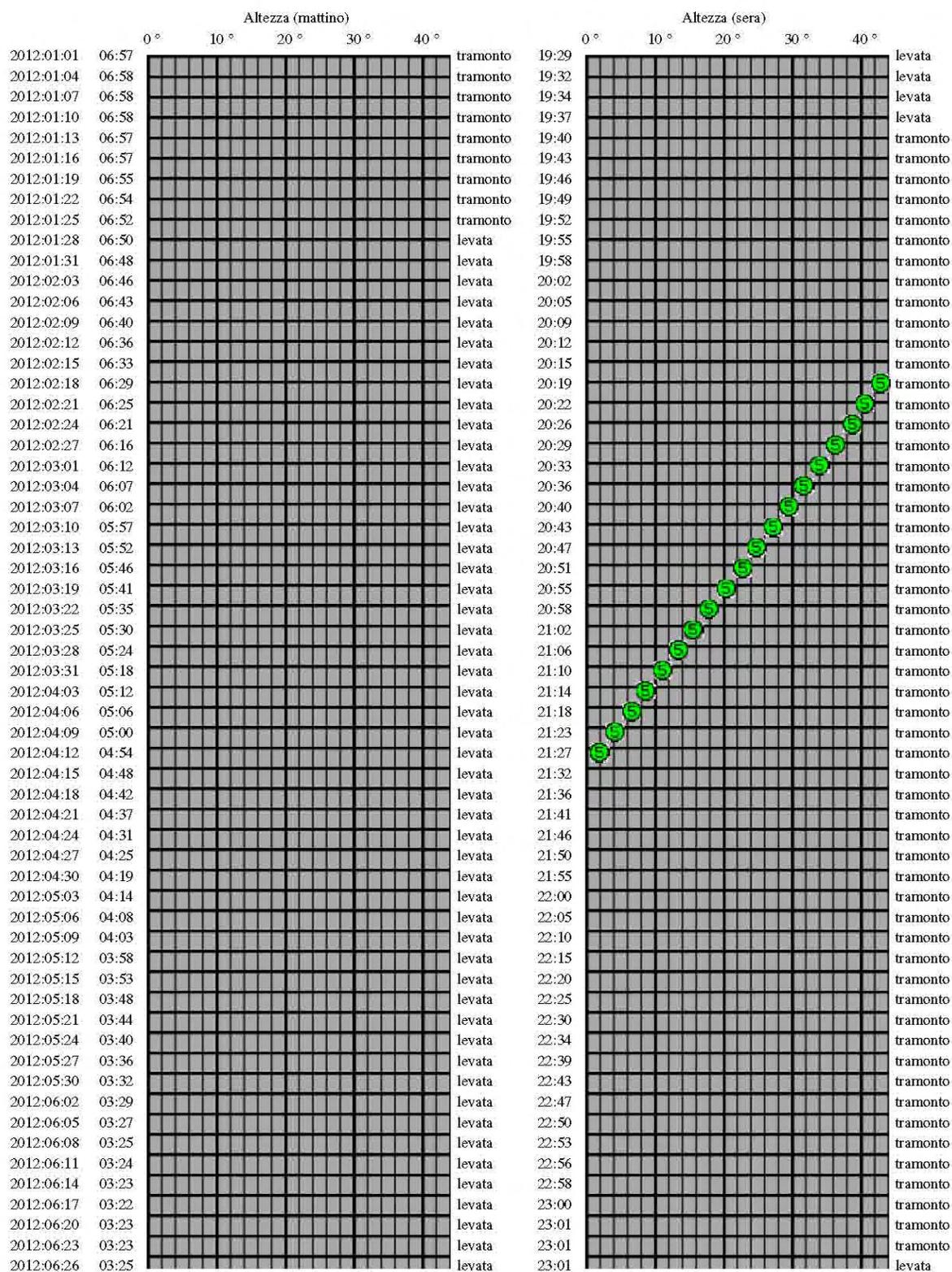
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

# Altezza ai crepuscoli

di Giove

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

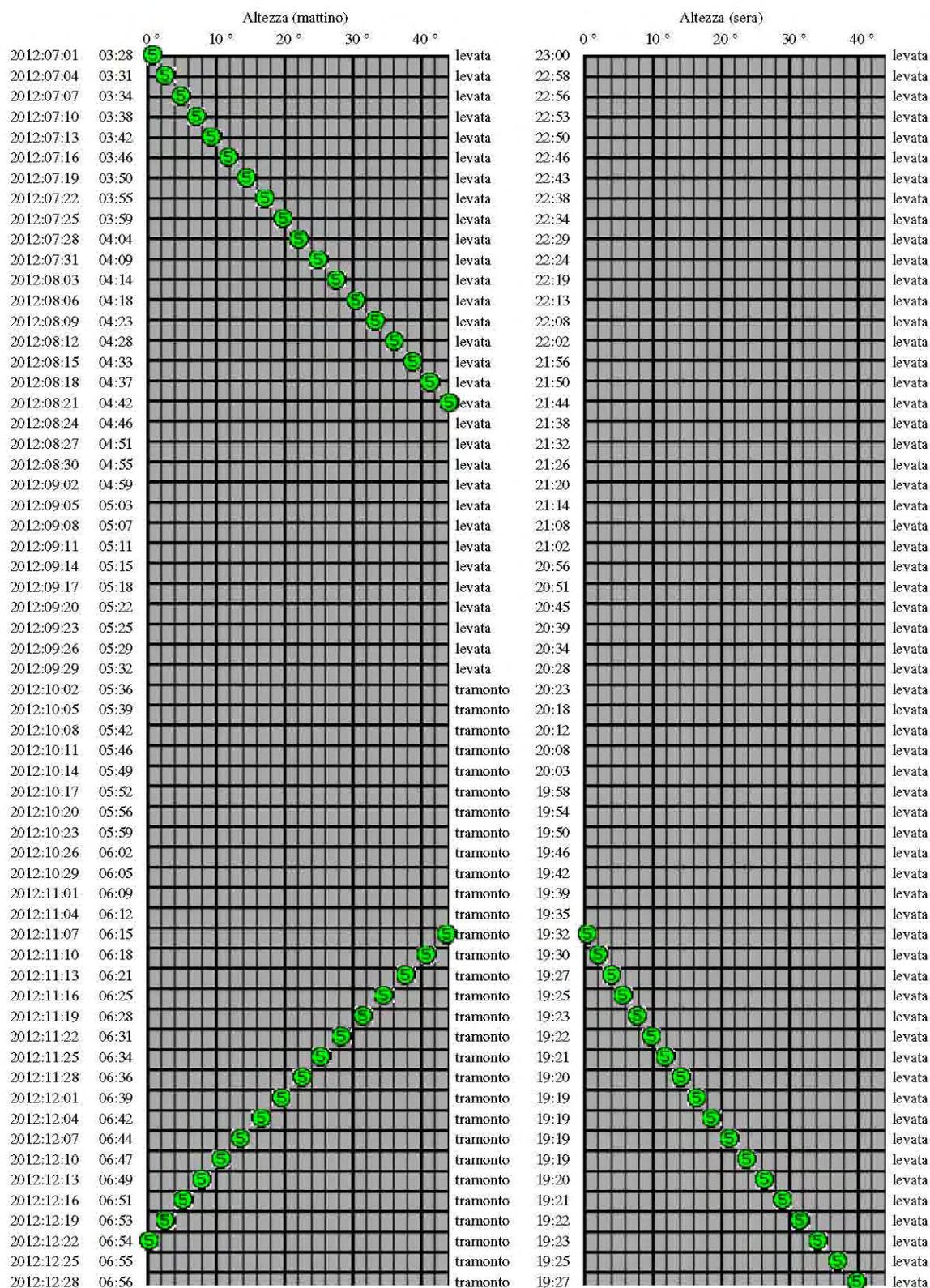


# Altezza ai crepuscoli

di Giove

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	-34.0	334.0	110.3	18:29	56.5	156.0	109.7
2012:01:04	05:58	-34.9	337.4	107.3	18:32	57.5	162.1	106.8
2012:01:07	05:58	-35.6	340.8	104.3	18:34	58.2	168.4	103.8
2012:01:10	05:58	-36.1	344.1	101.4	18:37	58.7	174.9	100.9
2012:01:13	05:57	-36.6	347.4	98.5	18:40	58.8	181.5	98.0
2012:01:16	05:57	-36.8	350.5	95.7	18:43	58.7	188.1	95.2
2012:01:19	05:55	-37.0	353.5	92.9	18:46	58.3	194.7	92.4
2012:01:22	05:54	-37.1	356.5	90.1	18:49	57.6	201.0	89.6
2012:01:25	05:52	-37.0	359.3	87.3	18:52	56.6	207.0	86.8
2012:01:28	05:50	-36.9	1.9	84.6	18:55	55.4	212.8	84.1
2012:01:31	05:48	-36.7	4.5	81.8	18:59	54.1	218.2	81.3
2012:02:03	05:46	-36.4	6.9	79.2	19:02	52.5	223.2	78.7
2012:02:06	05:43	-36.1	9.1	76.5	19:05	50.8	227.9	76.0
2012:02:09	05:40	-35.7	11.3	73.9	19:09	49.0	232.2	73.4
2012:02:12	05:36	-35.2	13.3	71.3	19:12	47.0	236.3	70.8
2012:02:15	05:33	-34.8	15.1	68.7	19:15	45.0	240.1	68.2
2012:02:18	05:29	-34.3	16.9	66.1	19:19	42.9	243.6	65.6
2012:02:21	05:25	-33.8	18.6	63.6	19:22	40.8	247.0	63.1
2012:02:24	05:21	-33.3	20.1	61.1	19:26	38.6	250.1	60.6
2012:02:27	05:16	-32.8	21.6	58.6	19:29	36.4	253.1	58.1
2012:03:01	05:12	-32.2	22.9	56.1	19:33	34.1	256.0	55.6
2012:03:04	05:07	-31.7	24.2	53.6	19:36	31.8	258.7	53.1
2012:03:07	05:02	-31.1	25.4	51.2	19:40	29.5	261.3	50.7
2012:03:10	04:57	-30.6	26.5	48.8	19:44	27.2	263.9	48.3
2012:03:13	04:52	-30.0	27.5	46.4	19:47	24.9	266.3	45.9
2012:03:16	04:46	-29.5	28.5	44.0	19:51	22.6	268.7	43.5
2012:03:19	04:41	-28.9	29.5	41.6	19:55	20.3	271.1	41.1
2012:03:22	04:35	-28.4	30.3	39.3	19:58	18.0	273.4	38.8
2012:03:25	04:29	-27.9	31.2	36.9	20:02	15.6	275.7	36.4
2012:03:28	04:24	-27.3	31.9	34.6	20:06	13.3	278.0	34.1
2012:03:31	04:18	-26.8	32.7	32.3	20:10	11.0	280.3	31.8
2012:04:03	04:12	-26.3	33.4	30.0	20:14	8.7	282.6	29.5
2012:04:06	04:06	-25.8	34.1	27.7	20:19	6.4	284.9	27.2
2012:04:09	04:00	-25.3	34.8	25.5	20:23	4.2	287.3	25.0
2012:04:12	03:54	-24.7	35.4	23.2	20:27	1.9	289.6	22.7
2012:04:15	03:48	-24.2	36.1	21.0	20:32	-0.3	292.0	20.4
2012:04:18	03:42	-23.7	36.7	18.7	20:36	-2.5	294.5	18.2
2012:04:21	03:36	-23.2	37.3	16.5	20:41	-4.6	297.0	16.0
2012:04:24	03:31	-22.6	37.9	14.3	20:46	-6.7	299.5	13.8
2012:04:27	03:25	-22.1	38.6	12.1	20:50	-8.8	302.1	11.5
2012:04:30	03:19	-21.5	39.2	9.9	20:55	-10.8	304.8	9.3
2012:05:03	03:13	-21.0	39.9	7.7	21:00	-12.8	307.6	7.1
2012:05:06	03:08	-20.4	40.5	5.5	21:05	-14.6	310.4	5.0
2012:05:09	03:03	-19.8	41.2	3.4	21:10	-16.4	313.4	2.8
2012:05:12	02:58	-19.2	41.9	1.3	21:15	-18.1	316.4	1.0
2012:05:15	02:53	-18.5	42.7	1.4	21:20	-19.7	319.4	1.8
2012:05:18	02:48	-17.8	43.5	3.4	21:25	-21.1	322.6	3.9
2012:05:21	02:44	-17.1	44.3	5.5	21:30	-22.5	325.8	6.1
2012:05:24	02:39	-16.3	45.2	7.7	21:34	-23.7	329.0	8.2
2012:05:27	02:36	-15.5	46.2	9.8	21:39	-24.7	332.3	10.4
2012:05:30	02:32	-14.6	47.2	12.0	21:43	-25.6	335.6	12.6
2012:06:02	02:29	-13.6	48.3	14.2	21:47	-26.4	338.8	14.8
2012:06:05	02:27	-12.6	49.5	16.4	21:50	-27.0	342.1	16.9
2012:06:08	02:25	-11.5	50.7	18.5	21:53	-27.5	345.2	19.1
2012:06:11	02:24	-10.3	52.1	20.7	21:56	-27.9	348.3	21.3
2012:06:14	02:23	-8.9	53.5	22.9	21:58	-28.1	351.3	23.5
2012:06:17	02:22	-7.5	55.0	25.1	22:00	-28.2	354.1	25.7
2012:06:20	02:23	-6.0	56.6	27.3	22:01	-28.2	356.8	27.9
2012:06:23	02:23	-4.3	58.2	29.5	22:01	-28.2	359.4	30.1
2012:06:26	02:25	-2.6	59.9	31.7	22:01	-28.0	1.7	32.3
2012:06:29	02:27	-0.7	61.7	33.9	22:00	-27.8	4.0	34.5

Date = data nel formato aaaa/mm/gg

Times = ore

Morning twilights = crepuscolo mattutino

Evening twilight = crepuscolo serale

Alt = altezza del pianeta sull'orizzonte, in °

Az = azimut del pianeta, in °

Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °

Az = azimuth of the planet, in °

Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	02:28	0.6	63.0	35.4	22:00	-27.7	5.4	36.0
2012:07:04	02:31	2.7	64.8	37.6	21:58	-27.4	7.3	38.2
2012:07:07	02:34	4.9	66.8	39.8	21:56	-27.1	9.2	40.4
2012:07:10	02:38	7.2	68.7	42.1	21:53	-26.8	10.9	42.7
2012:07:13	02:42	9.5	70.7	44.3	21:50	-26.4	12.4	44.9
2012:07:16	02:46	12.0	72.7	46.6	21:46	-26.1	13.9	47.2
2012:07:19	02:50	14.5	74.8	48.9	21:43	-25.8	15.3	49.5
2012:07:22	02:55	17.1	76.9	51.2	21:38	-25.4	16.6	51.8
2012:07:25	02:59	19.7	79.0	53.5	21:34	-25.1	17.8	54.1
2012:07:28	03:04	22.4	81.1	55.8	21:29	-24.7	18.9	56.4
2012:07:31	03:09	25.1	83.3	58.2	21:24	-24.3	20.1	58.8
2012:08:03	03:14	27.8	85.5	60.5	21:19	-24.0	21.1	61.1
2012:08:06	03:19	30.5	87.8	62.9	21:13	-23.6	22.1	63.5
2012:08:09	03:23	33.3	90.2	65.3	21:08	-23.3	23.1	65.9
2012:08:12	03:28	36.1	92.6	67.7	21:02	-22.9	24.1	68.3
2012:08:15	03:33	38.8	95.1	70.2	20:56	-22.5	25.1	70.8
2012:08:18	03:37	41.5	97.8	72.7	20:50	-22.1	26.1	73.3
2012:08:21	03:42	44.3	100.5	75.1	20:44	-21.8	27.0	75.7
2012:08:24	03:46	47.0	103.5	77.7	20:38	-21.4	28.0	78.3
2012:08:27	03:51	49.6	106.7	80.2	20:32	-20.9	29.0	80.8
2012:08:30	03:55	52.2	110.2	82.8	20:26	-20.5	29.9	83.4
2012:09:02	03:59	54.8	114.0	85.4	20:20	-20.1	30.9	86.0
2012:09:05	04:03	57.2	118.1	88.0	20:14	-19.6	31.9	88.6
2012:09:08	04:07	59.6	122.8	90.6	20:08	-19.1	33.0	91.2
2012:09:11	04:11	61.8	128.1	93.3	20:02	-18.6	34.0	93.9
2012:09:14	04:15	63.9	134.0	96.0	19:56	-18.0	35.1	96.6
2012:09:17	04:18	65.8	140.7	98.8	19:50	-17.4	36.2	99.4
2012:09:20	04:22	67.4	148.4	101.5	19:45	-16.8	37.4	102.1
2012:09:23	04:25	68.7	157.0	104.4	19:39	-16.2	38.6	105.0
2012:09:26	04:29	69.6	166.4	107.2	19:33	-15.5	39.8	107.8
2012:09:29	04:32	70.0	176.4	110.1	19:28	-14.7	41.0	110.7
2012:10:02	04:36	69.9	186.6	113.0	19:23	-14.0	42.3	113.6
2012:10:05	04:39	69.4	196.6	115.9	19:17	-13.1	43.6	116.5
2012:10:08	04:43	68.3	206.0	118.9	19:12	-12.2	45.0	119.5
2012:10:11	04:46	66.9	214.5	121.9	19:07	-11.3	46.4	122.5
2012:10:14	04:49	65.1	222.2	125.0	19:03	-10.3	47.8	125.6
2012:10:17	04:52	63.0	228.9	128.1	18:58	-9.2	49.3	128.7
2012:10:20	04:56	60.7	234.9	131.2	18:54	-8.1	50.8	131.8
2012:10:23	04:59	58.2	240.2	134.4	18:50	-6.9	52.3	135.0
2012:10:26	05:02	55.5	244.9	137.5	18:46	-5.6	53.9	138.2
2012:10:29	05:05	52.8	249.2	140.8	18:42	-4.2	55.5	141.4
2012:11:01	05:09	49.9	253.1	144.0	18:39	-2.8	57.2	144.6
2012:11:04	05:12	47.0	256.6	147.3	18:35	-1.2	58.9	147.9
2012:11:07	05:15	44.0	260.0	150.6	18:32	0.4	60.6	151.2
2012:11:10	05:18	40.9	263.1	154.0	18:30	2.1	62.3	154.6
2012:11:13	05:21	37.9	266.0	157.3	18:27	3.8	64.1	157.9
2012:11:16	05:25	34.8	268.8	160.7	18:25	5.7	66.0	161.3
2012:11:19	05:28	31.7	271.5	164.1	18:23	7.7	67.8	164.7
2012:11:22	05:31	28.6	274.2	167.5	18:22	9.7	69.8	168.1
2012:11:25	05:34	25.5	276.7	170.9	18:21	11.9	71.7	171.5
2012:11:28	05:36	22.4	279.2	174.3	18:20	14.1	73.7	174.9
2012:12:01	05:39	19.4	281.7	177.7	18:19	16.4	75.7	178.3
2012:12:04	05:42	16.4	284.2	178.5	18:19	18.7	77.8	177.9
2012:12:07	05:44	13.5	286.6	175.2	18:19	21.2	79.9	174.6
2012:12:10	05:47	10.7	289.0	171.8	18:19	23.7	82.1	171.2
2012:12:13	05:49	7.9	291.4	168.3	18:20	26.3	84.4	167.7
2012:12:16	05:51	5.2	293.9	164.9	18:21	28.9	86.7	164.3
2012:12:19	05:53	2.6	296.3	161.5	18:22	31.6	89.1	160.9
2012:12:22	05:54	0.1	298.7	158.0	18:23	34.4	91.7	157.5
2012:12:25	05:55	-2.3	301.1	154.7	18:25	37.1	94.3	154.1
2012:12:28	05:56	-4.5	303.6	151.3	18:27	39.9	97.1	150.7
2012:12:31	05:57	-6.7	306.0	147.9	18:29	42.7	100.1	147.3

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

heliacal dates for Jupiter  
 location : Rome (Italy)  
 latitude : 41° 52' 12'' N  
 longitude: 12° 37' 12'' E  
 variable arcus visionis:  
 arcvis [°] = 10.5 + 1.4 \* magnitude  
 critical altitude: 0.00°

date eliache per Giove  
 posizione : Roma  
 latitudine : 41° 52' 12'' N  
 longitudine: 12° 37' 12'' E  
 visibilità minima [°] = 10.5 + 1.4 \* magnitudine  
 altezza critica : 0.00°

	date	obj r/s	sun r/s	d r/s	age	mag
last visibility	2012-05-01	19:48	19:08	0:40h	-11d 18h	-1.5
first visibility	2012-06-08	03:35	04:34	-0:59h	25d 14h	-1.6

Date : data nel formato mese/giorno  
 Obj r/s : ora del tramonto o della levata del pianeta  
 Sun r/s: ora del tramonto o della levata del Sole  
 D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due oggetti  
 Age : giorni trascorsi dalla congiunzione col Sole  
 Mag : magnitudine  
 Morning visibility begins : inizio visibilità mattutina  
 Morning visibility ends : fine visibilità mattutina  
 Evening visibility begins : inizio visibilità serale  
 Evening visibility ends : fine visibilità serale  
 Last visibility : ultimo giorno di visibilità  
 Firs visibilità : primo giorno di visibilità

Obj r/s : rising and setting of the planet  
 Sun r/s : sunrise and sunset  
 D r/s : difference in hours and minutes between the instants of the rising or the setting of the two objects  
 Age : days from the conjunction with the Sun  
 Mag : magnitude

	date	obj r/s	sun r/s	sun alt	sun lon	obj lon	obj lat	mag	d az	d lon
L	05-01	19:48	19:08	-7° 38'	41° 47'	50° 23'	-0° 49'	-1.5	-4° 56'	8° 36'
F	06-08	03:35	04:34	-9° 35'	77° 43'	59° 10'	-0° 47'	-1.6	16° 14'	-18° 33'

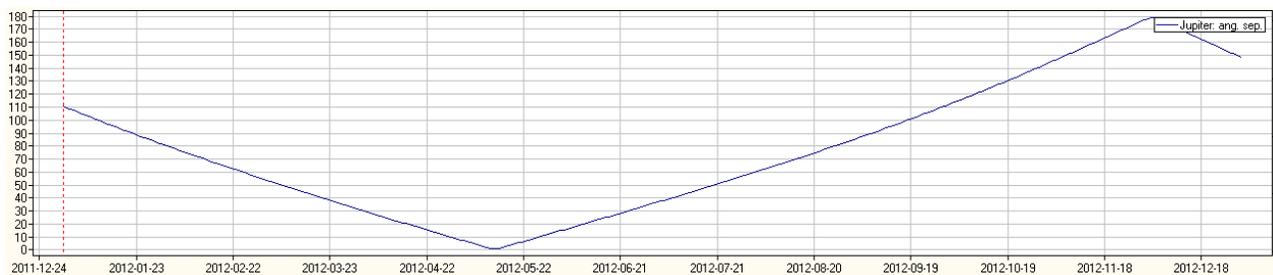
Date : data nel formato mese/giorno  
 Sun alt : altezza del Sole nell'istante di visibilità del pianeta  
 Sun lon : longitudine celeste del Sole  
 Obj lon : longitudine celeste del pianeta  
 Obj lat : latitudine celeste del pianeta  
 Mag : magnitudine  
 D az : differenza in azimut tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 D lon : differenza in longitudine tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 L = ultimo giorno di visibilità  
 F = primo giorno di visibilità

Date : date in the format month/day  
 Sun alt : altitude of the Sun in the instant of visibility of the planet  
 Sun lon : celestial longitude of the Sun  
 Obj lon : celestial longitude of the planet  
 Obj lat : celestial latitude of the planet  
 Mag : magnitude  
 D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility  
 D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

© (3)



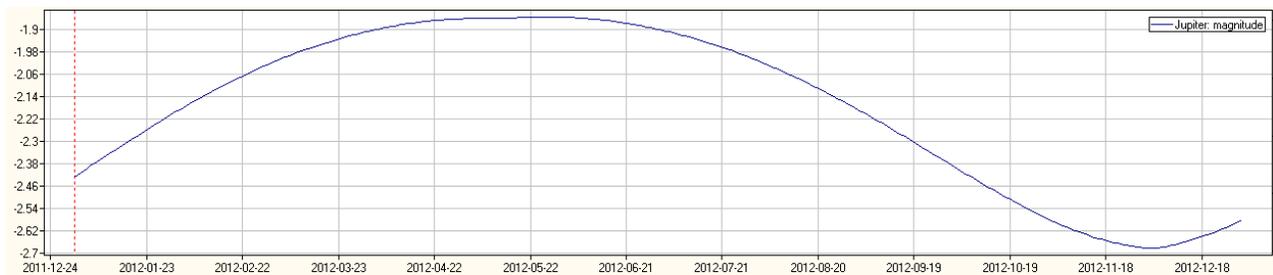
Distanza di Giove in U.A. nel corso dell'anno - Distance of Jupiter in A.U. during the year



Elongazione di Giove in ° nel corso dell'anno - Elongation of Jupiter in ° during the year



Diametro di Giove in " nel corso dell'anno - Diameter of Jupiter in " during the year



Magnitudine di Giove nel corso dell'anno - Magnitude of Jupiter during the year









	I:x	I:y	I:z	II:x	II:y	II:z	III:x	III:y	III:z	IV:x	IV:y	IV:z
25/11/2012	0,0971	0,3157	5,8990	-6,8062	0,4258	6,5573	5,5612	0,7363	13,9091	-23,3811	-0,6185	-12,6422
26/11/2012	2,3685	-0,2907	-5,4148	-5,3106	-0,4233	-7,8065	-7,1642	0,7243	13,1669	-17,1385	-0,9897	-20,2666
27/11/2012	-4,2668	0,2178	4,0517	8,6311	-0,2586	-3,4966	-14,7230	0,1885	2,8933	-8,4936	-1,2228	-25,0679
28/11/2012	5,5931	-0,1069	-1,9711	1,4838	0,5301	9,2515	-11,6250	-0,4846	-9,4731	1,3496	-1,2840	-26,3610
29/11/2012	-5,8687	-0,0208	-0,4173	-9,4886	0,0476	-0,2109	-0,0660	-0,8057	-14,9545	10,9980	-1,1635	-23,9386
30/11/2012	5,2606	0,1442	2,7263	1,9107	-0,5468	-9,1629	11,5385	-0,5392	-9,5400	19,0707	-0,8775	-18,1160
01/12/2012	-3,6572	-0,2456	-4,6156	8,4512	0,1742	3,9116	14,7063	0,1193	2,8326	24,3942	-0,4666	-9,7011
02/12/2012	1,5841	0,3029	5,6881	-5,6436	0,4761	7,5713	7,1764	0,6888	13,1487	26,1912	0,0102	0,1108
03/12/2012	0,9243	-0,3114	-5,8316	-6,5176	-0,3571	-6,8460	-5,5476	0,7583	13,9253	24,1993	0,4837	9,9040
04/12/2012	-3,1014	0,2673	5,0024	7,9362	-0,3340	-4,8753	-14,2712	0,2795	4,6197	18,7140	0,8856	18,2631
05/12/2012	4,9174	-0,1776	-3,3094	2,9801	0,4959	8,8755	-12,6685	-0,4022	-8,0297	10,5389	1,1585	23,9805
06/12/2012	-5,7815	0,0592	1,0842	-9,3952	0,1370	1,3267	-1,8484	-0,7918	-14,8423	0,8565	1,2643	26,2458
07/12/2012	5,7802	0,0686	1,3192	0,3763	-0,5457	-9,3606	10,3205	-0,6039	-10,8424	-8,9476	1,1896	24,7568
08/12/2012	-4,7070	-0,1868	-3,5375	8,9800	0,0849	2,4602	14,9409	0,0233	1,0642	-17,4954	0,9464	19,7539
09/12/2012	2,9707	0,2704	5,1088	-4,3310	0,5125	8,3828	8,6869	0,6310	12,2010	-23,5974	0,5700	11,9683
10/12/2012	-0,5811	-0,3116	-5,8713	-7,5519	-0,2813	-5,7006	-3,8569	0,7801	14,4833	-26,4138	0,1136	2,5057
11/12/2012	-1,7315	0,2987	5,6284	7,0207	-0,3992	-6,1229	-13,6197	0,3650	6,2767	-25,5569	-0,3589	-7,3056
12/12/2012	3,9233	-0,2362	-4,4367	4,3977	0,4478	8,2576	-13,5336	-0,3145	-6,4744	-21,1428	-0,7816	-16,1032
13/12/2012	-5,3147	0,1346	2,5181	-9,0517	0,2217	2,8326	-3,6093	-0,7657	-14,5213	-13,7771	-1,0954	-22,6626
14/12/2012	5,9286	-0,0109	-0,1769	-1,1745	-0,5289	-9,3041	8,9487	-0,6589	-11,9991	-4,4766	-1,2557	-26,0629
15/12/2012	-5,4505	-0,1161	-2,2245	9,2626	-0,0062	0,9352	14,9641	-0,0729	-0,7340	5,4531	-1,2391	-25,8086
16/12/2012	4,1698	0,2202	4,1954	-2,8973	0,5340	8,9719	10,0865	0,5635	11,0689	14,6029	-1,0471	-21,9106
17/12/2012	-2,0532	-0,2911	-5,5280	-8,3879	-0,1980	-4,3957	-2,0974	0,7896	14,8364	21,6560	-0,7067	-14,8983
18/12/2012	-0,2422	0,3100	5,8876	5,9050	-0,4522	-7,2074	-12,7691	0,4444	7,8543	25,5891	-0,2663	-5,7521
19/12/2012	2,6699	-0,2788	-5,2804	5,7021	0,3870	7,4092	-14,2109	-0,2225	-4,8158	25,8266	0,2105	4,2204
20/12/2012	-4,4944	0,2005	3,7923	-8,4625	0,2996	4,2724	-5,3331	-0,7279	-13,9884	22,3348	0,6547	13,5821
21/12/2012	5,6921	-0,0892	-1,6692	-2,7048	-0,4969	-8,9911	7,4332	-0,7033	-12,9904	15,6288	1,0026	20,9787
22/12/2012	-5,8362	-0,0382	-0,7575	9,2875	-0,0965	-0,6265	14,7670	-0,1673	-2,5350	6,6825	1,2051	25,3511
23/12/2012	5,1033	0,1559	3,0013	-1,3742	0,5401	9,3200	11,3487	0,4877	9,7674	-3,2157	1,2347	26,0872
24/12/2012	-3,3976	-0,2515	-4,8176	-9,0022	-0,1096	-2,9585	-0,2939	0,7869	14,9782	-12,6623	1,0888	23,1062
25/12/2012	1,2731	0,3006	5,7583	4,6117	-0,4916	-8,0992	-11,7268	0,5165	9,3353	-20,3332	0,7895	16,8608
26/12/2012	1,2326	-0,3025	-5,7818	6,8581	0,3154	6,3458	-14,6912	-0,1273	-3,0657	-25,1703	0,3799	8,2504
27/12/2012	-3,3679	0,2523	4,8215	-7,6362	0,3685	5,6089	-7,0054	-0,6788	-13,2417	-26,5116	-0,0826	-1,5088
28/12/2012	5,0786	-0,1610	-3,0621	-4,1762	-0,4506	-8,4226	5,7798	-0,7367	-13,8049	-24,1733	-0,5334	-11,0594
29/12/2012	-5,8321	0,0417	0,7711	9,0468	-0,1835	-2,1871	14,3427	-0,2592	-4,3285	-18,4775	-0,9099	-19,0761
30/12/2012	5,7056	0,0816	1,5984	0,2031	0,5305	9,4113	12,4595	0,4042	8,2976	-10,2056	-1,1595	-24,4467
31/12/2012	-4,5232	-0,1951	-3,7784	-9,3726	-0,0185	-1,4219	1,5409	0,7718	14,8978	-0,5057	-1,2468	-26,4145

Distanze in raggi di Giove dei satelliti : Io (I), Europa (II), Ganimede (III), Callisto (IV), alle ore 0 in T.U.

Distance in Jupiter's radii : Io (I), Europa (II), Ganimede (III), Callisto (IV), at 00.00 U.T.

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Date = data  
Time = orario  
Phe = fenomeno  
Pha = fase  
H = altitudine di Giove sull'orizzonte  
H S = altitudine del Sole sull'orizzonte

Date in the format dd/mm/yyyy  
Phe = phenomenon  
Pha = phase  
H = altitude of Jupiter above the horizon  
H S = altitude of the Sun above the horizon

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# FENOMENI MULTIPLI DEI SATELLITI DI GIOVE MULTIPLA PHENOMENA OF THE SATELLITES OF JUPITER

## DOPPI TRANSITI DI SATELLITI - DOUBLE TRANSITS OF THE SATELLITES

YYYY	MM	DD	hh	mm	ss	YYYY	MM	DD	hh	mm	ss	IEGC	YYYY	MM	DD	hh	mm	ss	YYYY	MM	DD	hh	mm	ss	IEGC
2012	1	11	6	25	2	2012	1	11	6	47	36	0110	2012	7	24	23	53	13	2012	7	25	1	30	13	1100
2012	1	18	8	58	30	2012	1	18	10	46	10	0110	2012	7	28	12	52	19	2012	7	28	14	53	54	1100
2012	1	25	12	39	31	2012	1	25	14	3	50	0110	2012	7	30	7	27	44	2012	7	30	9	21	28	1010
2012	3	23	0	31	14	2012	3	23	1	8	42	1010	2012	8	1	1	53	41	2012	8	1	4	0	51	1100
2012	3	30	3	26	0	2012	3	30	4	44	10	1010	2012	8	4	15	16	49	2012	8	4	16	59	37	1100
2012	7	14	8	55	8	2012	7	14	9	19	23	1100	2012	8	8	4	38	41	2012	8	8	5	58	9	1100
2012	7	17	21	54	37	2012	7	17	22	42	58	1100	2012	8	11	18	1	7	2012	8	11	18	56	35	1100
2012	7	21	10	54	0	2012	7	21	12	7	10	1100	2012	8	15	7	22	15	2012	8	15	7	54	45	1100
													2012	8	18	20	43	50	2012	8	18	20	52	47	1100

Esempio di lettura : l'11 gennaio dalle 6.25 alle 6.47 Europa e Ganimede saranno contemporaneamente in transito

Example : on 11 January from 6.25 to 6.47 Europa and Ganymede will be simultaneously in transit

## TRIPLI TRANSITI DI SATELLITI - TRIPLE TRANSITS OF THE SATELLITES

YYYY MM DD hh mm ss    YYYY MM DD hh mm ss    IEGC  
-----

## DOPPI TRANSITI DI OMBRE - DOUBLE TRANSITS OF SHADOWS

YYYY	MM	DD	hh	mm	ss	YYYY	MM	DD	hh	mm	ss	IEGC	YYYY	MM	DD	hh	mm	ss	YYYY	MM	DD	hh	mm	ss	IEGC
2012	1	4	6	27	57	2012	1	4	7	58	27	0110	2012	8	8	2	34	45	2012	8	8	4	28	50	1100
2012	1	11	10	12	24	2012	1	11	11	28	22	0110	2012	8	11	15	31	32	2012	8	11	17	40	57	1100
2012	3	15	23	27	16	2012	3	16	0	19	57	1010	2012	8	13	10	47	38	2012	8	13	12	9	20	1010
2012	3	23	2	36	22	2012	3	23	3	32	37	1010	2012	8	15	4	42	58	2012	8	15	6	37	42	1100
2012	7	21	9	50	44	2012	7	21	9	56	19	1100	2012	8	18	18	1	56	2012	8	18	19	34	29	1100
2012	7	24	22	47	33	2012	7	24	23	14	30	1100	2012	8	22	7	20	0	2012	8	22	8	31	13	1100
2012	7	28	11	44	24	2012	7	28	12	33	33	1100	2012	8	25	20	38	56	2012	8	25	21	28	0	1100
2012	8	1	0	41	11	2012	8	1	1	51	41	1100	2012	8	29	9	57	1	2012	8	29	10	24	44	1100
2012	8	4	13	38	0	2012	8	4	15	10	43	1100	2012	9	1	23	15	56	2012	9	1	23	21	31	1100
2012	8	6	8	6	22	2012	8	6	8	38	31	1010	2012	12	27	16	33	58	2012	12	27	16	49	24	1010

## DOPPI-TRIPLI TRANSITI DI OMBRE E SATELLITI - DOUBLE-TRIPLE TRANSITS OF SHADOWS AND SATELLITES

YYYY MM DD hh mm ss    YYYY MM DD hh mm ss    IEGC    IEGC  
-----

Nell'ordine: tipo di fenomeno, anno/mese/giorno/ora/minuti/secondi di inizio e di fine  
Io, Europa, Ganimede, Callisto (1 = il satellite è coinvolto, 0 = non lo è)

Data nel formato aaaa/mm/gg - Tempi in T.D.T.

Io, Europa, Ganimede, Callisto (1 = the satellite is involved, 0 = it isn't)

Times in T.D.T.

**DOPIE ECLISSI - DOUBLE ECLIPSES**

YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	IEGC	YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	IEGC
2012 1 2 12 24 58	2012 1 2 14 10 44	1100	2012 1 27 9 1 50	2012 1 27 9 18 12	1100
2012 1 6 1 22 41	2012 1 6 3 32 2	1100	2012 5 30 4 43 35	2012 5 30 6 20 18	1010
2012 1 7 19 59 36	2012 1 7 21 49 49	1010	2012 6 6 8 33 53	2012 6 6 8 48 17	1010
2012 1 9 14 23 23	2012 1 9 16 29 42	1100	2012 8 2 18 11 25	2012 8 2 18 27 45	0110
2012 1 13 3 43 27	2012 1 13 5 27 24	1100	2012 8 9 20 45 26	2012 8 9 22 27 58	0110
2012 1 16 17 2 38	2012 1 16 18 25 4	1100	2012 8 17 0 35 33	2012 8 17 1 41 27	0110
2012 1 20 6 22 40	2012 1 20 7 22 47	1100	2012 10 20 13 17 49	2012 10 20 14 34 4	1010
2012 1 23 19 41 49	2012 1 23 20 20 28	1100	2012 10 27 16 33 49	2012 10 27 17 22 50	1010

Esempio di lettura : il 30 maggio dalle 4.43 alle 5.30 Io e Ganimede saranno contemporaneamente eclissati

Example : on 30 May from 4.43 to 5.30 Io and Ganimede will be simultaneously eclipsed

**DOPIE OCCULTAZIONI - DOUBLE OCCULTATIONS**

YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	IEGC	YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	IEGC
2012 1 2 11 8 50	2012 1 2 11 36 34	1100	2012 1 30 19 34 0	2012 1 30 20 56 59	1100
2012 1 6 0 5 3	2012 1 6 0 53 40	1100	2012 2 3 8 55 27	2012 2 3 9 55 25	1100
2012 1 9 13 1 32	2012 1 9 14 10 28	1100	2012 2 6 22 16 26	2012 2 6 22 54 3	1100
2012 1 13 1 58 21	2012 1 13 3 28 46	1100	2012 2 10 11 38 46	2012 2 10 11 52 54	1100
2012 1 14 20 26 50	2012 1 14 20 36 43	1010	2012 5 23 2 58 27	2012 5 23 3 6 11	1010
2012 1 16 14 55 25	2012 1 16 16 46 47	1100	2012 5 30 5 36 50	2012 5 30 7 11 19	1010
2012 1 20 3 52 48	2012 1 20 6 3 11	1100	2012 7 26 17 50 31	2012 7 26 19 3 17	0110
2012 1 21 22 25 37	2012 1 22 0 31 58	1010	2012 8 2 21 26 26	2012 8 2 22 54 41	0110
2012 1 23 16 53 32	2012 1 23 19 0 50	1100	2012 10 6 10 42 12	2012 10 6 11 20 14	1010
2012 1 27 6 13 56	2012 1 27 7 58 48	1100	2012 10 13 13 9 47	2012 10 13 14 41 6	1010

**TRIPLE OCCULTAZIONI - TRIPLE OCCULTATIONS**

YYYY MM DD hh mm ss    YYYY MM DD hh mm ss    IEGC  
 -----

**2 TRANSITI DI SATELLITI + 2 TRANSITI DI OMBRE - 2 TRANSITS OF SATELLITES + 2 TRANSITS OF SHADOWS**

YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	IEGC	IEGC
2012 8 1 1 51 41	2012 8 1 1 53 41	1100	1100

Nell'ordine: tipo di fenomeno, anno/mese/giorno/ora/minuti/secondi di inizio e di fine  
 Io, Europa, Ganimede, Callisto (1 = il satellite è coinvolto, 0 = non lo è)

Data nel formato aaaa/mm/gg - Tempi in T.D.T.

Io, Europa, Ganimede, Callisto (1 = the satellite is involved, 0 = it isn't)

Times in T.D.T.

**GIOVE SENZA SATELLITI - JUPITER WITHOUT SATELLITES**

YYYY MM GG hh mm ss    YYYY MM GG hh mm ss  
 -----

**GIOVE CON UN SOLO SATELLITE      -      JUPITER WITH ONLY 1 SATELLITE**

YYYY MM DD    hh mm ss	YYYY MM DD    hh mm ss	IEGC	YYYY MM DD    hh mm ss	YYYY MM DD    hh mm ss	IEGC
2012 1 14 20 26 50	2012 1 14 20 36 43	1110	2012 7 26 18 22 48	2012 7 26 19 3 17	1110
2012 1 18 9 24 4	2012 1 18 10 46 10	1110	2012 7 30 7 27 44	2012 7 30 9 21 28	1110
2012 1 21 22 25 37	2012 1 22 0 36 29	1110	2012 8 2 21 26 26	2012 8 2 22 30 15	1110
2012 1 25 12 39 31	2012 1 25 14 3 50	1110	2012 8 9 22 17 45	2012 8 9 22 27 58	1110
2012 1 29 2 28 18	2012 1 29 3 22 34	1110	2012 8 17 0 35 33	2012 8 17 1 41 27	1110
			2012 8 17 1 54 12	2012 8 17 2 23 47	1110

**OCCULTAZIONE DI UN'OMBRA DI UN SATELLITE      -      OCCULTATION OF A SATELLITE'S SHADOW**

YYYY MM DD    hh mm ss    YYYY MM DD    hh mm ss  
 Alla fine / at the end 2012 12 1 3 31 55 1->1  
 Il fenomeno riprende 2012 12 1 3 59 19 1->1

X → Y il satellite X occultata l'ombra del satellite Y  
 X → Y the satellite X occults the shadow of the satellite Y

**OCCULTAZIONE DI UN'OMBRA DA PARTE DI UN'ALTRA OMBRA DI UN SATELLITE  
OCCULTATION OF A SATELLITE'S SHADOW BY ANOTHER SATELLITE'S SHADOW**

YYYY MM DD    hh mm ss    YYYY MM DD    hh mm ss  
 -----

X → Y l'ombra del satellite X occultata l'ombra del satellite Y  
 X → Y the shadow of the satellite X occults the shadow of the satellite Y

Nell'ordine: tipo di fenomeno, anno/mese/giorno/ora/minuti/secondi di inizio e di fine  
Io, Europa, Ganimede, Callisto (1 = il satellite è coinvolto, 0 = non lo è)

Data nel formato aaaa/mm/gg - Tempi in T.D.T.

Io, Europa, Ganimede, Callisto (1 = the satellite is involved, 0 = it isn't)

Times in T.D.T.

# CONGIUNZ. TRIPLE TRA I SATELLITI DI GIOVE

## TRIPLE CONJUNCTIONS BETWEEN THE MOON OF JUPITER

DATA            ORA                            CORPI                            D12    D13    D23    CERCHIO    MAG1    MAG2    MAG3    MAGT

Questo anno non avvengono fenomeni - No phenomena this year

D12 = distanza tra il primo satellite indicato ed il secondo, in raggi gioviani  
D13 = distanza tra il primo satellite indicato ed il terzo, in raggi gioviani  
D23 = distanza tra il secondo satellite indicato ed il terzo, in raggi gioviani

Un Rj raggio gioviano è pari a circa 20"

CERCHIO = cerchio minimo, in raggi gioviani, comprendente i 3 satelliti

MAG1 = magnitudine del primo satellite indicato  
MAG2 = magnitudine del secondo satellite indicato  
MAG3 = magnitudine del terzo satellite indicato  
MAGT = magnitudine totale del gruppo

Tempi in TDT                    Sono riportati solo gli eventi entro un cerchio minimo di 0.5 Rj

D12 = distance between the first and the second satellite, in jovian radii  
D13 = distance between the first and the third satellite, in jovian radii  
D23 = distance between the second and the third satellite, in jovian radii

Rj is almost 20"

GROUP = least grouping, in jovian radii

MAG1 = magnitude of the first satellite  
MAG2 = magnitude of the second satellite  
MAG3 = magnitude of the third satellite  
MAGT = total magnitude of the group

Times in TDT                    Are listed only the events under 0.5 Rj





Date	time	Moons	Dist.°	h	h S
28/11/2012	17:27:27	I/III	25"	15,2	-19,1
30/11/2012	02:46:15	I/II	19"	41,6	-39,0
01/12/2012	09:24:55	I/II	-17"	-22,2	22,4
02/12/2012	19:15:40	I/III	-26"	38,4	-39,2
03/12/2012	00:56:43	II/III	-27"	58,4	-58,9
03/12/2012	15:45:14	I/II	19"	1,6	-0,8
04/12/2012	22:24:01	I/II	-17"	68,4	-68,8
05/12/2012	14:56:56	II/III	28"	-5,0	6,1
05/12/2012	19:51:28	I/III	24"	47,4	-45,8
06/12/2012	02:48:00	III/IV	-50"	36,2	-39,7
06/12/2012	08:35:01	I/IV	-37"	-19,7	17,0
06/12/2012	15:09:56	II/IV	-40"	-1,5	4,1
07/12/2012	04:44:11	I/II	19"	14,0	-18,4
08/12/2012	11:23:18	I/II	-17"	-25,9	25,1
09/12/2012	21:36:50	I/III	-26"	66,3	-63,6
10/12/2012	03:40:05	II/III	-28"	23,2	-30,6

Date	time	Moons	Dist.°	h	h S
10/12/2012	17:43:13	I/II	19"	27,8	-22,0
12/12/2012	00:22:41	I/II	-16"	57,2	-65,2
12/12/2012	17:41:49	II/III	27"	29,2	-21,7
12/12/2012	22:17:54	I/III	23"	69,2	-68,6
14/12/2012	06:42:18	I/II	19"	-10,6	1,1
15/12/2012	06:06:10	II/IV	35"	-5,9	-5,2
15/12/2012	13:22:24	I/II	-16"	-12,3	17,7
15/12/2012	17:42:01	III/IV	37"	31,7	-21,6
16/12/2012	23:58:03	I/III	-26"	57,5	-68,7
17/12/2012	06:24:11	II/III	-28"	-9,9	-1,8
17/12/2012	19:41:34	I/II	19"	55,0	-43,5
19/12/2012	02:22:16	I/II	-16"	30,0	-46,0
19/12/2012	20:28:33	II/III	26"	63,4	-51,9
20/12/2012	00:48:17	I/III	22"	46,6	-62,3
21/12/2012	08:41:00	I/II	19"	-25,5	16,1
21/12/2012	10:41:22	III/IV	-39"	-25,4	24,3

Date	time	Moons	Dist.°	h	h S
21/12/2012	19:22:59	I/IV	-35"	54,8	-39,7
22/12/2012	11:50:08	I/IV	-37"	-19,7	24,0
22/12/2012	15:22:36	I/II	-16"	11,9	2,8
23/12/2012	10:30:25	II/IV	-19"	-25,5	23,9
23/12/2012	11:46:43	II/IV	-20"	-19,6	24,1
24/12/2012	09:09:21	II/III	-28"	-26,9	18,8
24/12/2012	21:40:42	I/II	19"	68,7	-63,4
26/12/2012	04:23:10	I/II	-15"	2,9	-24,3
26/12/2012	23:18:15	II/III	25"	56,7	-71,3
27/12/2012	03:24:56	I/III	20"	12,1	-35,1
28/12/2012	10:40:39	I/II	18"	-23,6	24,3
29/12/2012	17:24:18	I/II	-15"	39,8	-17,1
30/12/2012	10:06:59	II/IV	39"	-25,2	23,1
30/12/2012	14:30:30	I/IV	34"	8,8	10,8

Date = data  
Time = orario  
Moons = lune coinvolte  
Dist = distanza in secondi  
H = altitudine di Giove sull'orizzonte  
H S = altitudine del Sole sull'orizzonte

Date in the format dd/mm/yyyy  
Dist = distance in seconds  
H = altitude of Jupiter above the horizon  
H S = altitude of the Sun above the horizon

I = Io  
II = Europa  
III = Ganimede  
IV = Callisto

TEMPI IN T.U.

Valori negativi delle distanze indicano che il 2° satellite transita a nord dell'altro

TIMES IN U.T.

Negative values of the distances show that the 2nd satellite transits to north of the other

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# OCCULTAZIONI TRA I SATELLITI DI GIOVE

## OCCULTATIONS BETWEEN THE MOONS OF JUPITER

Year M D h m s Event Type Ph Dur dMag %Ill Sep PA MinD h m s h m s h m s h m s h m s h m s h m s

Questo anno non avvengono fenomeni - No phenomena this year

Ore in T.U.

Legenda :

Data nel formato mese/giorno, un asterisco indica che le lune si avvicinano ma non si occultano  
Event type : tipo di evento, eclissi o occultazione  
Ph : fenomeno, M=mancato, E=eclisse penombrale, P=eclisse/occultazione parziale, T=eclisse/occultazione totale, A=eclisse/occultazione anulare  
Durn : durata in secondi  
dMag : caduta di luce in magnitudini  
%ill : cambio in illuminazione, rispetto alla illuminazione intera, della luna rimanente (occultazione) o di entrambe (eclissi)  
Sep : distanza in " tra satellite occultato/eclissato e centro del pianeta  
Pa : angolo di posizione tra satellite occultato/eclissato e pianeta  
MinD : distanza minima tra i centri delle lune o tra la luna e l'ombra  
T1-T7 : inizio/fine della fase di contatto con la penombra  
T2-T6 : inizio/fine della fase di contatto con l'ombra o tra i lembi delle lune  
T3-T5 : inizio/fine della fase di totalità  
Tmax : tempo di metà evento

Times in U.T.

Date in the format month/day, an asterisk shows that the moons are near but they don't occult  
Event type : eclipse or occultation  
Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total eclipse/occultation, A=annular eclipse/occultation  
Durn : duration in seconds  
dMag : difference magnitude  
%ill : defect of illumination, respect to integer  
Sep : distance in " between the satellite and the center of the planet  
Pa : position angle between the satellite and the center of the planet  
MinD : least distance between the satellites  
T1-T7 : penumbral phase begins/ends  
T2-T6 : umbra phase begins/ends  
T3-T5 : totalità phase begins/ends  
Tmax : middle time of the event

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Date	Time	h	h S
20/09/2012	07:55:18	39,8	30,8
27/09/2012	11:43:59	-5,1	45,1
04/10/2012	15:27:49	-26,1	13,8
11/10/2012	19:06:52	-2,3	-28,5
18/10/2012	22:41:11	40,3	-57,8

Date	Time	h	h S
26/10/2012	02:11:38	69,4	-38,5
02/11/2012	05:37:19	33,2	-1,7
09/11/2012	08:59:39	-7,3	25,2
16/11/2012	12:18:04	-26,4	26,3
23/11/2012	15:34:08	-7,4	1,3

Date	Time	h	h S
30/11/2012	18:48:59	31,8	-34,2
07/12/2012	22:03:44	67,9	-67,0
15/12/2012	01:20:10	44,9	-56,7
22/12/2012	04:38:09	3,4	-21,3
29/12/2012	07:59:34	-25,3	10,9

IV Congiunzione superiore - Superior conjunction

Date	Time	h	h S
05/01/2012	10:53:45	-6,7	25,2
22/01/2012	04:38:40	-36,6	-21,3
07/02/2012	23:18:40	-4,7	-63,2
24/02/2012	18:43:56	35,7	-20,9
12/03/2012	14:44:44	61,1	25,8
29/03/2012	11:10:57	50,3	51,6

Date	Time	h	h S
15/04/2012	07:54:40	25,6	36,4
02/05/2012	04:48:37	2,0	6,7
19/05/2012	01:45:34	-17,9	-18,4
04/06/2012	22:39:28	-28,4	-25,1
21/06/2012	19:24:51	-23,4	-5,9
08/07/2012	15:54:13	-1,7	29,9

Date	Time	h	h S
25/07/2012	12:01:34	29,7	65,7
11/08/2012	07:38:54	65,3	36,2
28/08/2012	02:37:17	47,5	-20,5
13/09/2012	20:48:05	-3,6	-34,7
30/09/2012	14:03:16	-22,7	29,1
17/10/2012	06:16:53	38,4	8,2

Date	Time	h	h S
02/11/2012	21:31:34	39,1	-57,6
19/11/2012	11:59:33	-26,5	26,8
06/12/2012	02:03:32	44,4	-47,8
22/12/2012	16:14:53	21,3	-5,8

IV Congiunzione inferiore - Inferior conjunction

Date	Time	h	h S
13/01/2012	20:33:19	40,7	-49,5
30/01/2012	14:49:09	51,3	14,1
16/02/2012	09:57:13	11,3	31,8
04/03/2012	05:46:06	-20,9	0,4
21/03/2012	02:05:42	-33,7	-33,5
06/04/2012	22:47:30	-25,1	-40,8

Date	Time	h	h S
23/04/2012	19:42:27	-5,4	-17,4
10/05/2012	16:43:29	18,0	16,4
27/05/2012	13:45:01	42,2	51,5
13/06/2012	10:39:15	63,9	70,0
30/06/2012	07:20:38	61,7	38,1
17/07/2012	03:43:25	33,9	-1,4

Date	Time	h	h S
02/08/2012	23:38:34	0,5	-30,4
19/08/2012	18:58:45	-25,2	-10,0
05/09/2012	13:35:56	-9,8	42,1
22/09/2012	07:19:54	45,0	24,5
09/10/2012	00:04:04	48,1	-51,6
25/10/2012	15:47:14	-20,9	4,3

Date	Time	h	h S
11/11/2012	06:35:02	15,3	5,6
27/11/2012	20:45:31	50,7	-55,1
14/12/2012	10:48:18	-26,3	24,7
31/12/2012	01:13:01	33,0	-59,0

IV Massima elongazione est - Maxima est elongation

Date	Time	h	h S
09/01/2012	14:52:35	39,6	9,2
26/01/2012	08:53:29	-13,5	20,0
12/02/2012	03:48:27	-36,1	-27,4
28/02/2012	23:27:22	-16,8	-55,9
16/03/2012	19:39:34	14,0	-26,1
02/04/2012	16:15:47	42,4	14,6

Date	Time	h	h S
19/04/2012	13:08:20	62,3	50,2
06/05/2012	10:08:42	59,8	61,6
23/05/2012	07:11:01	40,0	36,2
09/06/2012	04:08:59	16,3	4,6
26/06/2012	00:55:37	-7,5	-20,7
12/07/2012	21:24:46	-24,9	-21,1

Date	Time	h	h S
29/07/2012	17:29:47	-22,4	10,3
15/08/2012	13:01:02	7,1	53,9
01/09/2012	07:50:52	52,9	34,4
18/09/2012	01:50:21	52,6	-32,7
04/10/2012	18:50:21	-9,5	-23,4
21/10/2012	10:48:00	-11,0	37,1

Date	Time	h	h S
07/11/2012	01:48:10	67,2	-45,2
23/11/2012	16:04:28	-2,1	-3,9
10/12/2012	06:04:35	-1,3	-4,8
26/12/2012	20:20:26	66,0	-49,7

IV Massima elongazione ovest - Maxima west elongation

Date	Time	h	h S
01/01/2012	07:53:11	-33,8	10,0
18/01/2012	01:23:22	-14,0	-56,8
03/02/2012	19:51:16	35,5	-37,8
20/02/2012	15:07:02	60,1	16,8
08/03/2012	11:00:23	36,4	43,1
25/03/2012	07:21:55	6,8	24,0

Date	Time	h	h S
11/04/2012	04:02:17	-16,8	-7,3
28/04/2012	00:53:53	-29,7	-28,9
14/05/2012	21:50:33	-27,7	-26,5
31/05/2012	18:44:57	-12,3	-0,8
17/06/2012	15:31:21	11,8	34,0
04/07/2012	12:04:17	40,9	68,4

Date	Time	h	h S
21/07/2012	08:16:14	67,7	46,1
07/08/2012	03:59:37	49,4	-2,3
23/08/2012	23:07:31	6,8	-37,0
09/09/2012	17:29:48	-25,6	0,1
26/09/2012	10:58:19	3,0	46,5
13/10/2012	03:27:46	67,9	-22,1

Date	Time	h	h S
29/10/2012	18:56:54	7,9	-31,6
15/11/2012	09:35:18	-15,7	26,6
01/12/2012	23:44:07	68,0	-68,1
18/12/2012	13:51:55	-6,2	14,6

I = Io

II = Europa

III = Ganimede

IV = Callisto

TEMPI IN T.U.

TIMES IN U.T.

H = altitudine di Giove sull'orizzonte

H S = altitudine del Sole sull'orizzonte

Date in the format dd/mm/yyyy

H = altitude of Jupiter on the horizon

H S = altitude of the Sun on the horizon

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Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian
12/11/2012	07:32:06	17:22:30		25/11/2012	00:34:34	10:24:58	20:15:23	08/12/2012	03:27:39	13:18:03	23:08:28	21/12/2012	06:21:19	16:11:46	
13/11/2012	03:12:55	13:03:19	22:53:43	26/11/2012	06:05:46	15:56:11		09/12/2012	08:58:54	18:49:19		22/12/2012	02:02:12	11:52:39	21:43:05
14/11/2012	08:44:07	18:34:31		27/11/2012	01:46:35	11:36:59	21:27:24	10/12/2012	04:39:44	14:30:09		23/12/2012	07:33:32	17:23:59	
15/11/2012	04:24:55	14:15:20		28/11/2012	07:17:48	17:08:12		11/12/2012	00:20:34	10:10:59	20:01:25	24/12/2012	03:14:26	13:04:53	22:55:20
16/11/2012	00:05:43	09:56:07	19:46:32	29/11/2012	02:58:37	12:49:01	22:39:26	12/12/2012	05:51:50	15:42:15		25/12/2012	08:45:47	18:36:14	
17/11/2012	05:36:56	15:27:20		30/11/2012	08:29:49	18:20:14		13/12/2012	01:32:41	11:23:06	21:13:32	26/12/2012	04:26:41	14:17:08	
18/11/2012	01:17:43	11:08:08	20:58:32	01/12/2012	04:10:39	14:01:03	23:51:28	14/12/2012	07:03:58	16:54:23		27/12/2012	00:07:35	09:58:02	19:48:30
19/11/2012	06:48:56	16:39:20		02/12/2012	09:41:52	19:32:17		15/12/2012	02:44:49	12:35:14	22:25:40	28/12/2012	05:38:57	15:29:25	
20/11/2012	02:29:44	12:20:08	22:10:32	03/12/2012	05:22:41	15:13:06		16/12/2012	08:16:06	18:06:32		29/12/2012	01:19:52	11:10:20	21:00:48
21/11/2012	08:00:57	17:51:21		04/12/2012	01:03:31	10:53:55	20:44:20	17/12/2012	03:56:58	13:47:24	23:37:50	30/12/2012	06:51:15	16:41:43	
22/11/2012	03:41:44	13:32:09	23:22:33	05/12/2012	06:34:45	16:25:09		18/12/2012	09:28:16	19:18:41		31/12/2012	02:32:11	12:22:39	22:13:07
23/11/2012	09:12:57	19:03:22		06/12/2012	02:15:34	12:05:59	21:56:24	19/12/2012	05:09:08	14:59:34					
24/11/2012	04:53:45	14:44:10		07/12/2012	07:46:49	17:37:14		20/12/2012	00:50:00	10:40:27	20:30:53				

Zero meridian = Ore dei passaggi

Orari in T.U. in cui transita il Meridiano Centrale

Date in the format dd/mm/yyyy

TIMES IN U.T.

**MERIDIANO CENTRALE DI GIOVE I**  
 (Valido per le regioni equatoriali)  
**CENTRAL MERIDIAN OF JUPITER I**  
 (For equatorial zones)

Data	Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	°	°	°	°	°	°	°	°	°	°	°	°
1	268.7	118.9	11.4	218.2	267.4	115.0	166.2	16.8	229.6	287.1	145.1	206.4
2	66.5	276.6	169.0	15.9	65.1	272.7	323.9	174.6	27.5	85.1	303.1	4.4
3	224.3	74.3	326.7	173.5	222.7	70.4	121.7	332.4	185.4	243.0	101.2	162.4
4	22.1	232.0	124.3	331.1	20.4	228.1	279.4	130.2	343.2	41.0	259.2	320.5
5	179.9	29.6	282.0	128.8	178.0	25.8	77.1	288.0	141.1	199.0	57.2	118.5
6	337.6	187.3	79.6	286.4	335.7	183.5	234.9	85.8	299.0	356.9	215.3	276.5
7	135.4	345.0	237.3	84.0	133.3	341.1	32.6	243.6	96.9	154.9	13.3	74.6
8	293.2	142.7	34.9	241.7	291.0	138.8	190.3	41.4	254.8	312.9	171.4	232.6
9	91.0	300.4	192.6	39.3	88.7	296.5	348.1	199.2	52.7	110.9	329.4	30.6
10	248.7	98.1	350.2	197.0	246.3	94.2	145.8	357.0	210.6	268.9	127.4	188.6
11	46.5	255.8	147.8	354.6	44.0	251.9	303.6	154.9	8.5	66.8	285.5	346.7
12	204.3	53.4	305.5	152.2	201.6	49.6	101.3	312.7	166.4	224.8	83.5	144.7
13	2.0	211.1	103.1	309.9	359.3	207.3	259.1	110.5	324.3	22.8	241.6	302.7
14	159.8	8.8	260.8	107.5	156.9	5.0	56.8	268.3	122.2	180.8	39.6	100.7
15	317.5	166.5	58.4	265.1	314.6	162.7	214.6	66.1	280.1	338.8	197.7	258.7
16	115.3	324.1	216.0	62.8	112.3	320.4	12.4	224.0	78.0	136.8	355.7	56.7
17	273.0	121.8	13.7	220.4	269.9	118.1	170.1	21.8	236.0	294.8	153.8	214.7
18	70.8	279.5	171.3	18.1	67.6	275.8	327.9	179.6	33.9	92.8	311.8	12.7
19	228.5	77.1	329.0	175.7	225.3	73.5	125.6	337.5	191.8	250.8	109.9	170.7
20	26.3	234.8	126.6	333.3	22.9	231.3	283.4	135.3	349.7	48.8	267.9	328.7
21	184.0	32.5	284.2	131.0	180.6	29.0	81.2	293.2	147.7	206.8	65.9	126.7
22	341.7	190.1	81.9	288.6	338.3	186.7	239.0	91.0	305.6	4.9	224.0	284.7
23	139.4	347.8	239.5	86.3	135.9	344.4	36.7	248.9	103.5	162.9	22.0	82.7
24	297.2	145.4	37.1	243.9	293.6	142.1	194.5	46.7	261.5	320.9	180.1	240.7
25	94.9	303.1	194.8	41.6	91.3	299.8	352.3	204.6	59.4	118.9	338.1	38.6
26	252.6	100.8	352.4	199.2	249.0	97.6	150.1	2.4	217.3	276.9	136.2	196.6
27	50.3	258.4	150.0	356.8	46.6	255.3	307.8	160.3	15.3	75.0	294.2	354.6
28	208.0	56.1	307.7	154.5	204.3	53.0	105.6	318.1	173.2	233.0	92.3	152.5
29	5.7	213.7	105.3	312.1	2.0	210.7	263.4	116.0	331.2	31.0	250.3	310.5
30	163.5		263.0	109.8	159.7	8.5	61.2	273.9	129.2	189.0	48.3	108.5
31	321.2		60.6		317.3		219.0	71.7		347.1		266.4

Moto del meridiano centrale - Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	°	°	°	°	°	°	°	°	°	°	°	°
00	0.0	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4
10	6.1	42.7	79.3	115.8	152.4	189.0	225.6	262.2	298.7	335.3	11.9	48.5
20	12.2	48.8	85.4	121.9	158.5	195.1	231.7	268.2	304.8	341.4	18.0	54.6
30	18.3	54.9	91.4	128.0	164.6	201.2	237.8	274.3	310.9	347.5	24.1	60.7
40	24.4	61.0	97.5	134.1	170.7	207.3	243.9	280.4	317.0	353.6	30.2	66.8
50	30.5	67.1	103.6	140.2	176.8	213.4	250.0	286.5	323.1	359.7	36.3	72.9
60	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	79.0

Longitudine del meridiano che transita alle ore 0 T.U. del giorno indicato e moto medio in gradi

Longitude of the meridian that transits at 0 U.T. and motion in °

# MERIDIANO CENTRALE DI GIOVE II

(Valido per le regioni a media latitudine)

# CENTRAL MERIDIAN OF JUPITER II

(For middle latitude zones)

Data Date	Gen Jan	Feb Feb	Mar Mar	Apr Apr	Mag May	Giu Jun	Lug Jul	Ago Aug	Set Sep	Ott Oct	Nov Nov	Dic Dec
	o	o	o	o	o	o	o	o	o	o	o	o
1	286.6	260.3	291.5	261.9	82.2	53.3	235.5	209.6	185.8	14.4	355.9	188.2
2	76.8	50.4	81.6	51.9	232.2	203.3	25.6	359.7	336.1	164.7	146.3	338.6
3	226.9	200.4	231.6	201.9	22.2	353.4	175.7	149.9	126.3	315.1	296.7	129.0
4	17.1	350.5	21.6	351.9	172.3	143.4	325.8	300.1	276.6	105.4	87.1	279.4
5	167.3	140.5	171.6	141.9	322.3	293.5	115.9	90.2	66.8	255.8	237.5	69.8
6	317.4	290.6	321.6	291.9	112.3	83.5	266.0	240.4	217.1	46.1	27.9	220.2
7	107.6	80.7	111.7	81.9	262.3	233.6	56.1	30.6	7.3	196.4	178.3	10.6
8	257.7	230.7	261.7	231.9	52.3	23.7	206.3	180.8	157.6	346.8	328.7	161.0
9	47.9	20.8	51.7	21.9	202.4	173.7	356.4	331.0	307.9	137.1	119.1	311.4
10	198.0	170.8	201.7	171.9	352.4	323.8	146.5	121.1	98.1	287.5	269.5	101.8
11	348.1	320.9	351.7	321.9	142.4	113.8	296.6	271.3	248.4	77.8	59.9	252.2
12	138.3	110.9	141.7	112.0	292.5	263.9	86.7	61.5	38.7	228.2	210.4	42.6
13	288.4	261.0	291.7	262.0	82.5	54.0	236.8	211.7	189.0	18.6	0.8	193.0
14	78.5	51.0	81.7	52.0	232.5	204.1	27.0	1.9	339.2	168.9	151.2	343.4
15	228.7	201.1	231.8	202.0	22.5	354.1	177.1	152.1	129.5	319.3	301.6	133.8
16	18.8	351.1	21.8	352.0	172.6	144.2	327.2	302.3	279.8	109.7	92.0	284.1
17	168.9	141.2	171.8	142.0	322.6	294.3	117.4	92.5	70.1	260.0	242.4	74.5
18	319.0	291.2	321.8	292.0	112.6	84.4	267.5	242.7	220.4	50.4	32.9	224.9
19	109.1	81.2	111.8	82.0	262.7	234.4	57.6	32.9	10.7	200.8	183.3	15.2
20	259.2	231.3	261.8	232.0	52.7	24.5	207.8	183.1	161.0	351.2	333.7	165.6
21	49.3	21.3	51.8	22.0	202.8	174.6	357.9	333.3	311.3	141.5	124.1	316.0
22	199.4	171.3	201.8	172.1	352.8	324.7	148.0	123.5	101.6	291.9	274.5	106.3
23	349.5	321.4	351.8	322.1	142.8	114.8	298.2	273.8	251.9	82.3	64.9	256.7
24	139.6	111.4	141.8	112.1	292.9	264.8	88.3	64.0	42.2	232.7	215.4	47.0
25	289.7	261.4	291.8	262.1	82.9	54.9	238.5	214.2	192.5	23.1	5.8	197.4
26	79.8	51.4	81.8	52.1	233.0	205.0	28.6	4.4	342.8	173.5	156.2	347.7
27	229.9	201.5	231.8	202.1	23.0	355.1	178.8	154.7	133.1	323.9	306.6	138.1
28	20.0	351.5	21.9	352.1	173.1	145.2	328.9	304.9	283.4	114.3	97.0	288.4
29	170.1	141.5	171.9	142.2	323.1	295.3	119.1	95.1	73.8	264.7	247.4	78.7
30	320.1		321.9	292.2	113.2	85.4	269.2	245.4	224.1	55.1	37.8	229.1
31	110.2		111.9		263.2		59.4	35.6		205.5		19.4

## Moto del meridiano centrale - Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	o	o	o	o	o	o	o	o	o	o	o	o
0	0.0	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9
10	6.0	42.3	78.6	114.8	151.1	187.3	223.6	259.9	296.1	332.4	8.7	44.9
20	12.1	48.3	84.6	120.9	157.1	193.4	229.7	265.9	302.2	338.4	14.7	51.0
30	18.1	54.4	90.7	126.9	163.2	199.4	235.7	272.0	308.2	344.5	20.7	57.0
40	24.2	60.4	96.7	133.0	169.2	205.5	241.7	278.0	314.3	350.5	26.8	63.0
50	30.2	66.5	102.7	139.0	175.3	211.5	247.8	284.0	320.3	356.6	32.8	69.1
60	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9	75.1

Longitudine del meridiano che transita alle ore 0 T.U. del giorno indicato e moto medio in gradi

Longitude of the meridian that transits at 0 U.T. and motion in °



Date	Time	Time	Time
19/08/2012	00:50:09	10:45:52	20:41:35
20/08/2012	06:37:18	16:33:01	
21/08/2012	02:28:44	12:24:27	22:20:10
22/08/2012	08:15:53	18:11:35	
23/08/2012	04:07:18	14:03:01	23:58:43
24/08/2012	09:54:26	19:50:09	
25/08/2012	05:45:51	15:41:34	
26/08/2012	01:37:16	11:32:58	21:28:41
27/08/2012	07:24:23	17:20:05	
28/08/2012	03:15:47	13:11:30	23:07:12
29/08/2012	09:02:54	18:58:36	
30/08/2012	04:54:18	14:50:00	
31/08/2012	00:45:42	10:41:23	20:37:05
01/09/2012	06:32:47	16:28:29	
02/09/2012	02:24:10	12:19:52	22:15:33
03/09/2012	08:11:15	18:06:56	
04/09/2012	04:02:38	13:58:19	23:54:00
05/09/2012	09:49:42	19:45:23	
06/09/2012	05:41:04	15:36:45	
07/09/2012	01:32:26	11:28:07	21:23:48
08/09/2012	07:19:29	17:15:10	
09/09/2012	03:10:51	13:06:31	23:02:12
10/09/2012	08:57:53	18:53:33	
11/09/2012	04:49:14	14:44:55	
12/09/2012	00:40:35	10:36:16	20:31:56
13/09/2012	06:27:36	16:23:17	
14/09/2012	02:18:57	12:14:37	22:10:17
15/09/2012	08:05:57	18:01:37	
16/09/2012	03:57:17	13:52:57	23:48:37
17/09/2012	09:44:17	19:39:57	
18/09/2012	05:35:36	15:31:16	
19/09/2012	01:26:56	11:22:35	21:18:15
20/09/2012	07:13:54	17:09:34	
21/09/2012	03:05:13	13:00:53	22:56:32
22/09/2012	08:52:11	18:47:50	
23/09/2012	04:43:29	14:39:08	
24/09/2012	00:34:47	10:30:27	20:26:05
25/09/2012	06:21:44	16:17:23	
26/09/2012	02:13:02	12:08:41	22:04:19
27/09/2012	07:59:58	17:55:37	
28/09/2012	03:51:15	13:46:54	23:42:32
29/09/2012	09:38:11	19:33:49	
30/09/2012	05:29:27	15:25:06	
01/10/2012	01:20:44	11:16:22	21:12:00
02/10/2012	07:07:38	17:03:16	

Date	Time	Time	Time
03/10/2012	02:58:54	12:54:32	22:50:10
04/10/2012	08:45:48	18:41:26	
05/10/2012	04:37:04	14:32:41	
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28/10/2012	08:31:08	18:26:43	
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31/10/2012	06:00:15	15:55:50	
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04/11/2012	09:16:07	19:11:42	
05/11/2012	05:07:16	15:02:51	
06/11/2012	00:58:27	10:54:01	20:49:36
07/11/2012	06:45:11	16:40:46	
08/11/2012	02:36:21	12:31:56	22:27:31
09/11/2012	08:23:05	18:18:40	
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11/11/2012	00:05:24	10:00:59	19:56:34
12/11/2012	05:52:09	15:47:43	
13/11/2012	01:43:18	11:38:52	21:34:27
14/11/2012	07:30:01	17:25:36	
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16/11/2012	09:07:55	19:03:30	

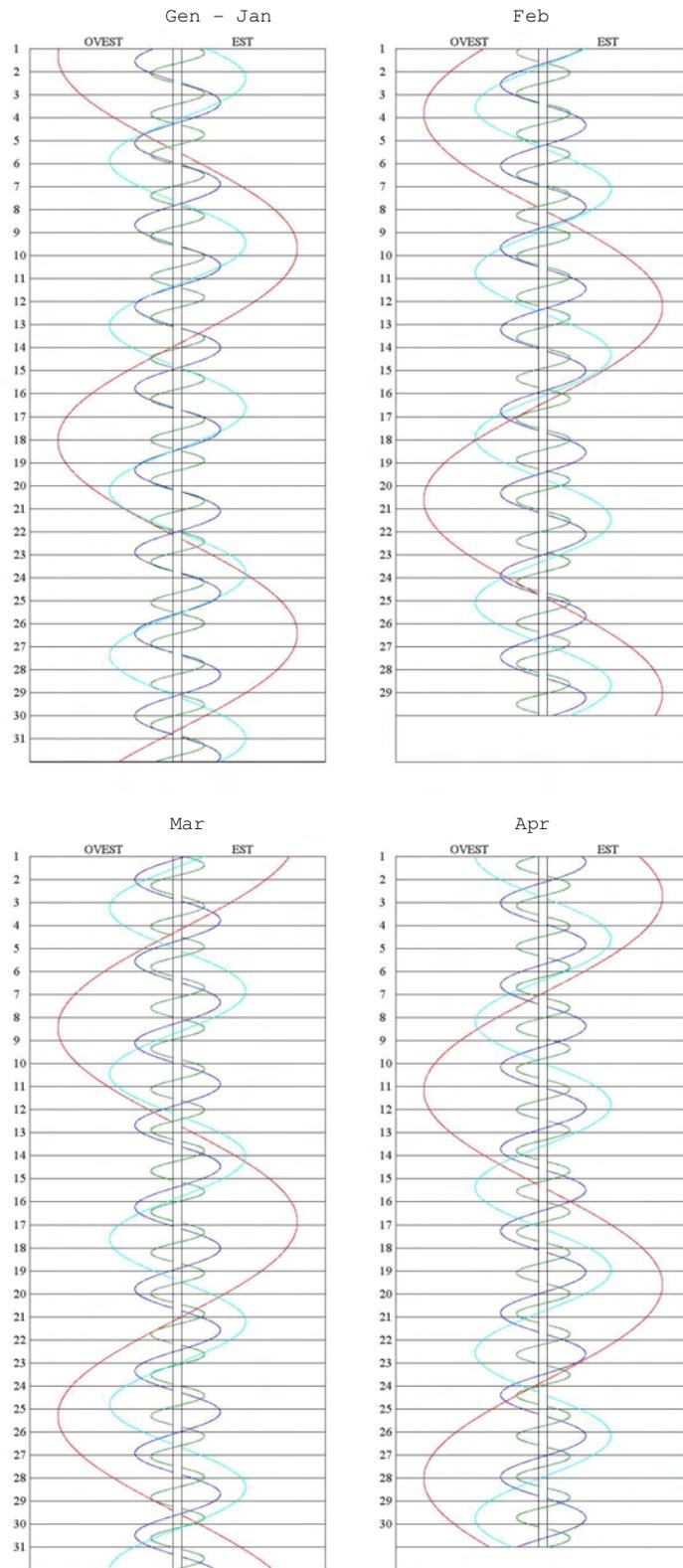
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21/11/2012	08:14:50	18:10:25	
22/11/2012	04:05:59	14:01:34	23:57:09
23/11/2012	09:52:43	19:48:18	
24/11/2012	05:43:53	15:39:27	
25/11/2012	01:35:02	11:30:37	21:26:12
26/11/2012	07:21:46	17:17:21	
27/11/2012	03:12:56	13:08:31	23:04:06
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29/11/2012	04:50:50	14:46:25	
30/11/2012	00:42:00	10:37:35	20:33:10
01/12/2012	06:28:45	16:24:20	
02/12/2012	02:19:55	12:15:30	22:11:05
03/12/2012	08:06:41	18:02:15	
04/12/2012	03:57:51	13:53:26	23:49:01
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06/12/2012	05:35:47	15:31:23	
07/12/2012	01:26:58	11:22:33	21:18:09
08/12/2012	07:13:44	17:09:20	
09/12/2012	03:04:55	13:00:31	22:56:06
10/12/2012	08:51:42	18:47:18	
11/12/2012	04:42:54	14:38:29	
12/12/2012	00:34:05	10:29:41	20:25:17
13/12/2012	06:20:53	16:16:29	
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15/12/2012	07:58:54	17:54:30	
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17/12/2012	09:36:55	19:32:32	
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20/12/2012	07:06:13	17:01:49	
21/12/2012	02:57:26	12:53:03	22:48:40
22/12/2012	08:44:17	18:39:55	
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24/12/2012	00:26:47	10:22:24	20:18:02
25/12/2012	06:13:39	16:09:17	
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27/12/2012	07:51:48	17:47:26	
28/12/2012	03:43:03	13:38:41	23:34:20
29/12/2012	09:29:58	19:25:36	
30/12/2012	05:21:14	15:16:53	
31/12/2012	01:12:31	11:08:09	21:03:48

Orari in T.U. in cui transita la grande macchia rossa

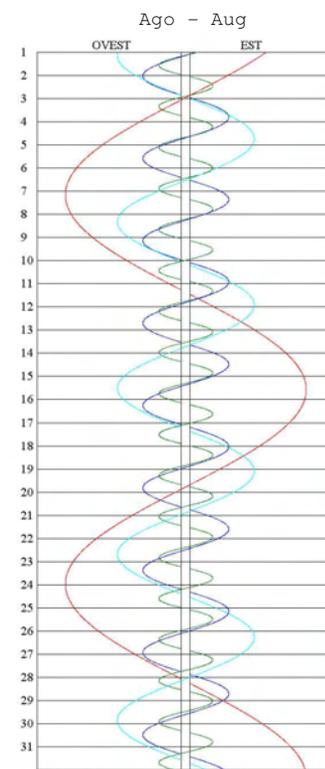
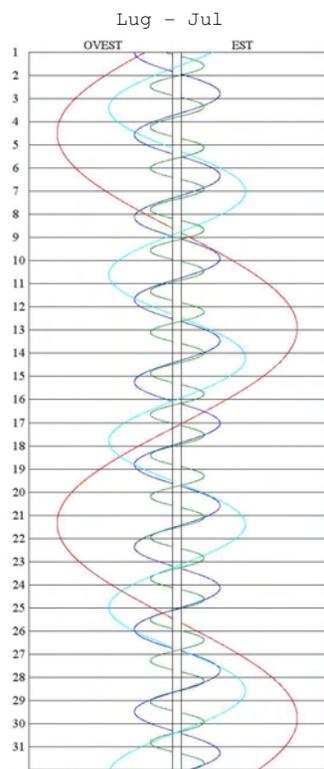
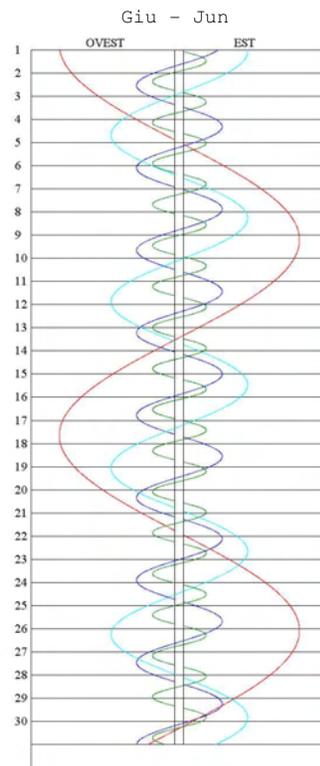
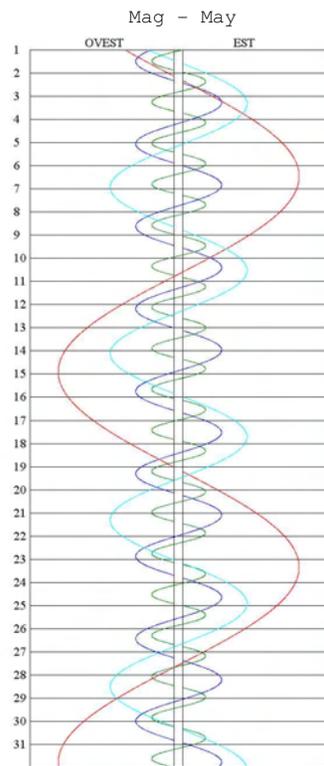
Date in the format dd/mm/yyyy

TIMES IN U.T.

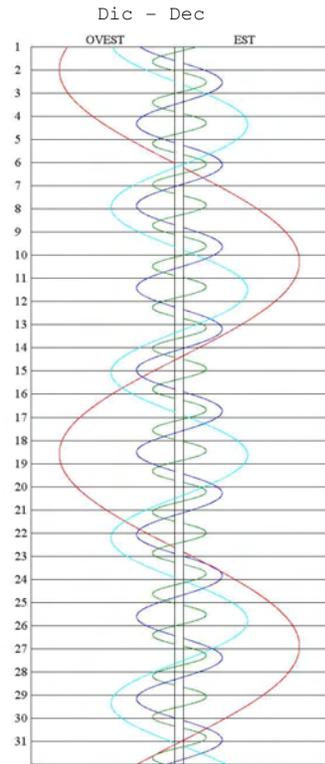
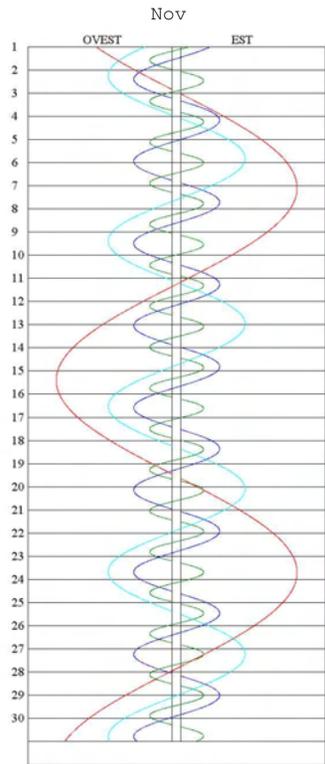
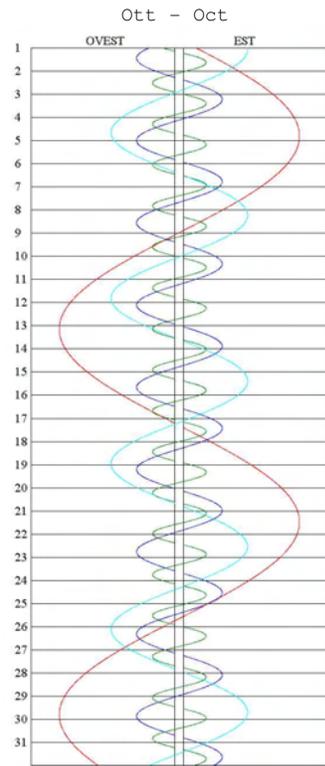
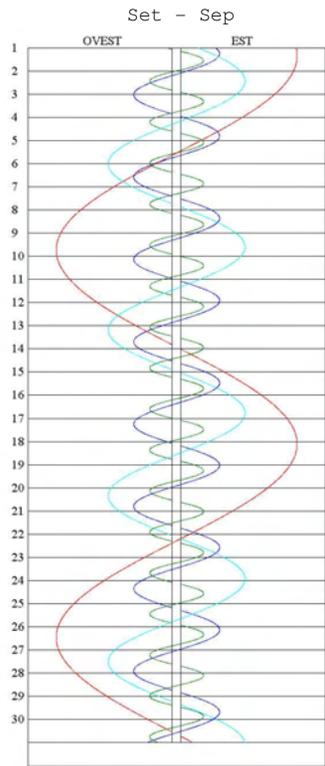
# POSIZIONE DEI SATELLITI DI GIOVE POSITION OF THE SATELLITES OF JUPITER



In verde Io, in blu Europa, in azzurro Ganimede, in rosso Callisto  
In green Io, in blue Europa, in blue light Ganimede, in red Callisto



In verde Io, in blu Europa, in azzurro Ganimede, in rosso Callisto  
 In green Io, in blue Europa, in blue light Ganimede, in red Callisto



In verde Io, in blu Europa, in azzurro Ganimede, in rosso Callisto  
 In green Io, in blue Europa, in blue light Ganimede, in red Callisto





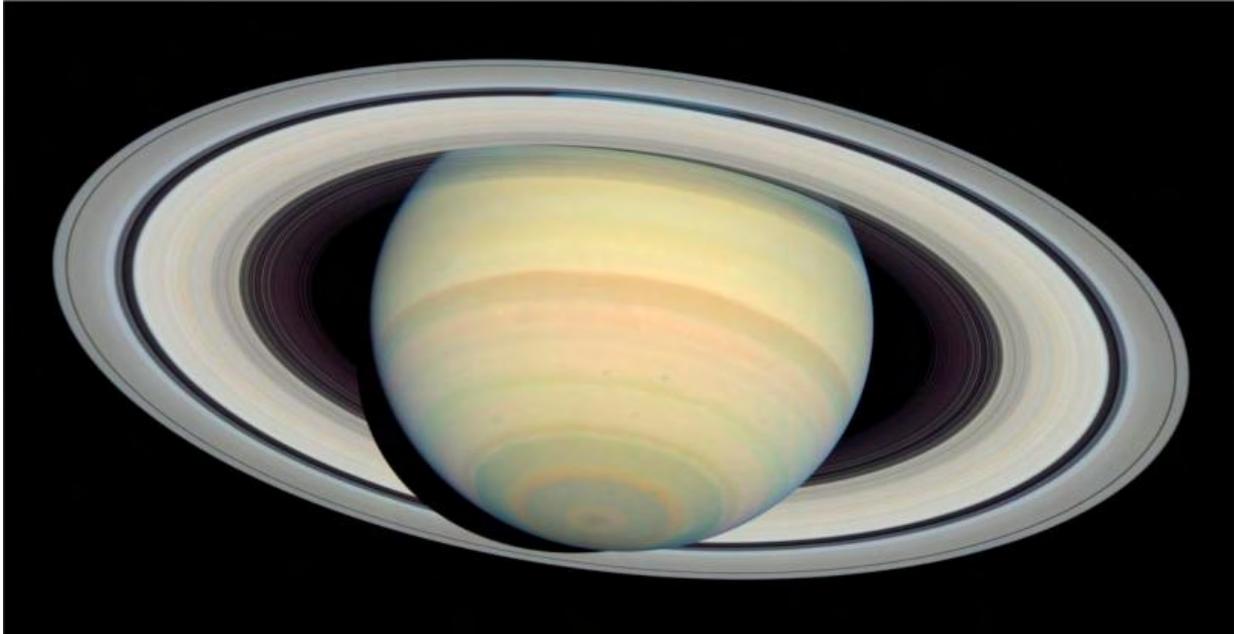




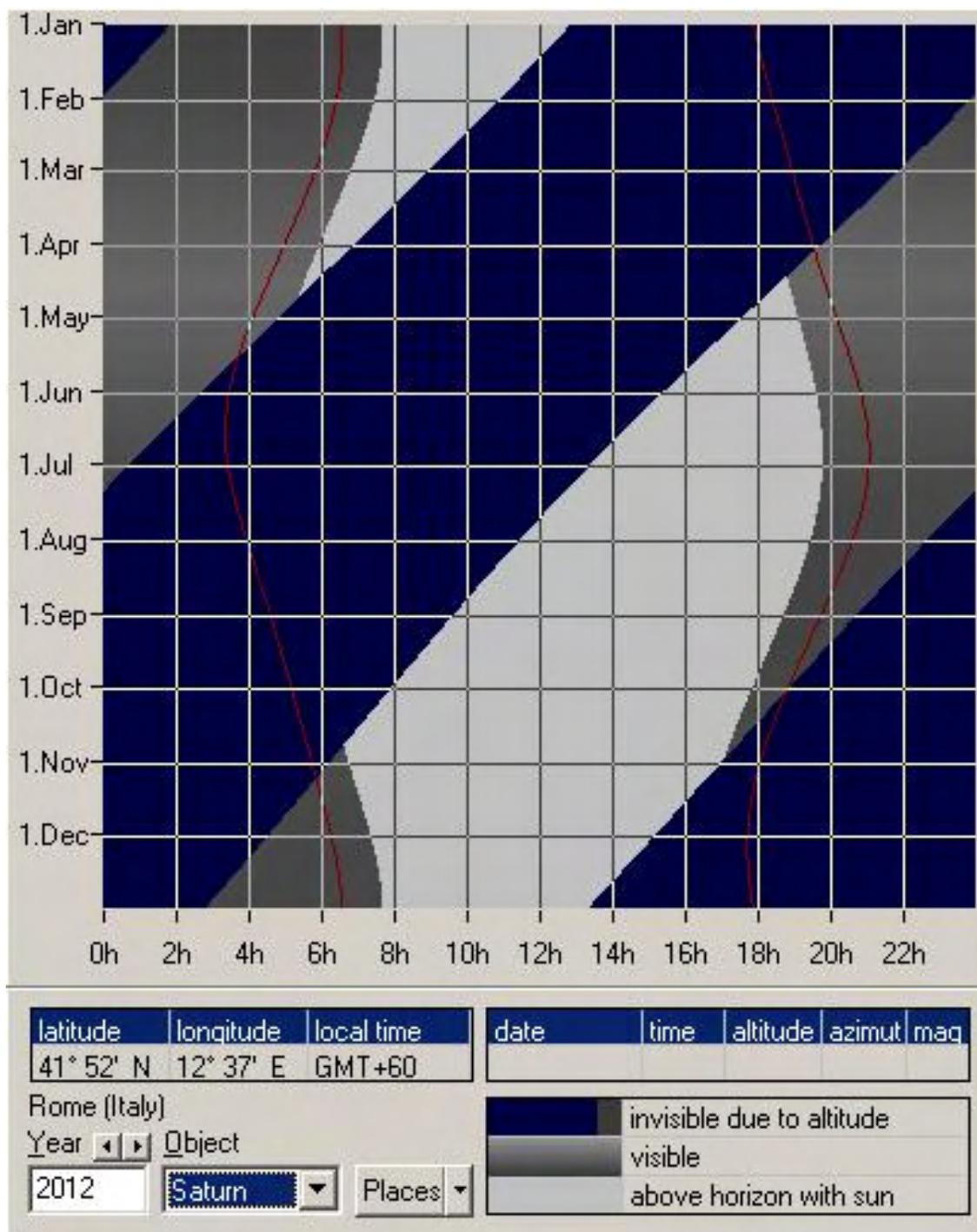
# FENOMENI DI SATURNO - PHENOMENA OF SATURN

Perielio - Perihelion	Questo anno non avviene - No phenomenon		
Afelio - Aphelion	Questo anno non avviene - No phenomenon		
Perigeo - Perigee	15/04/2012	18:44:26	8,71962 AU
Apogeo - Apogee	25/10/2012	07:30:09	10,76789 AU
Magnit. Max - Brightness maximum	16/04/2012	17:25:44	0,2 mag
Magnit. Max - Brightness maximum	26/10/2012	09:55:12	0,6 mag
Magnit. Min - Brightness minimum	18/08/2012	05:25:16	0,8 mag
Magnit. Min - Brightness minimum	09/12/2012	07:50:18	0,7 mag
Opposizione - Opposition	15/04/2012	18:26:29	
Congiunzione - Conjunction	25/10/2012	08:32:20	
Moto retrogr. - Retrograde motion	08/02/2012	12:25:01	
Moto diretto - Prograde motion	26/06/2012	09:11:09	
Max ang. Fase - Maximum phase angle	20/01/2012	03:47:50	5,8 °
Max ang. Fase - Maximum phase angle	14/07/2012	22:37:56	6,0 °
Min ang. Fase - Minimum phase angle	15/04/2012	19:31:57	0,3 °
Min ang. Fase - Minimum phase angle	25/10/2012	09:17:13	0,2 °
Estr. lat. Terra- Extremum lat. Earth	01/02/2012	05:30:06	15,14 °

© (5)



# VISIBILITA' DI SATURNO - VISIBILITY OF SATURN



Visibilità di Saturno nel corso dell'anno - Visibility of Saturn during the year

Le righe rosse più esterne indicano in quali periodi dell'anno il pianeta è sufficientemente distante dal Sole per poter essere osservato agevolmente. Le date esatte sono riportate nelle tabelle seguenti.

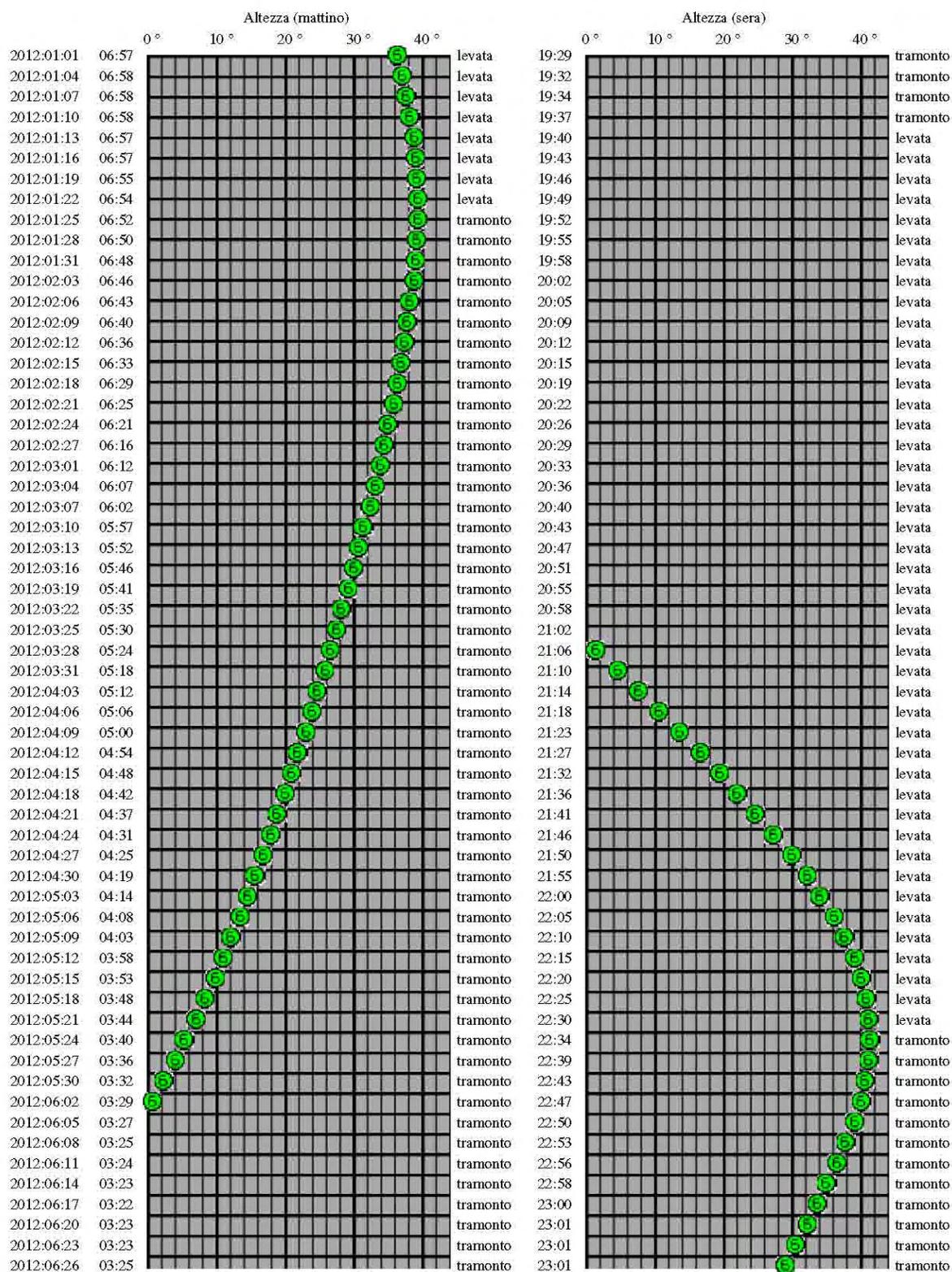
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

# Altezza ai crepuscoli

## di Saturno

nel momento in cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

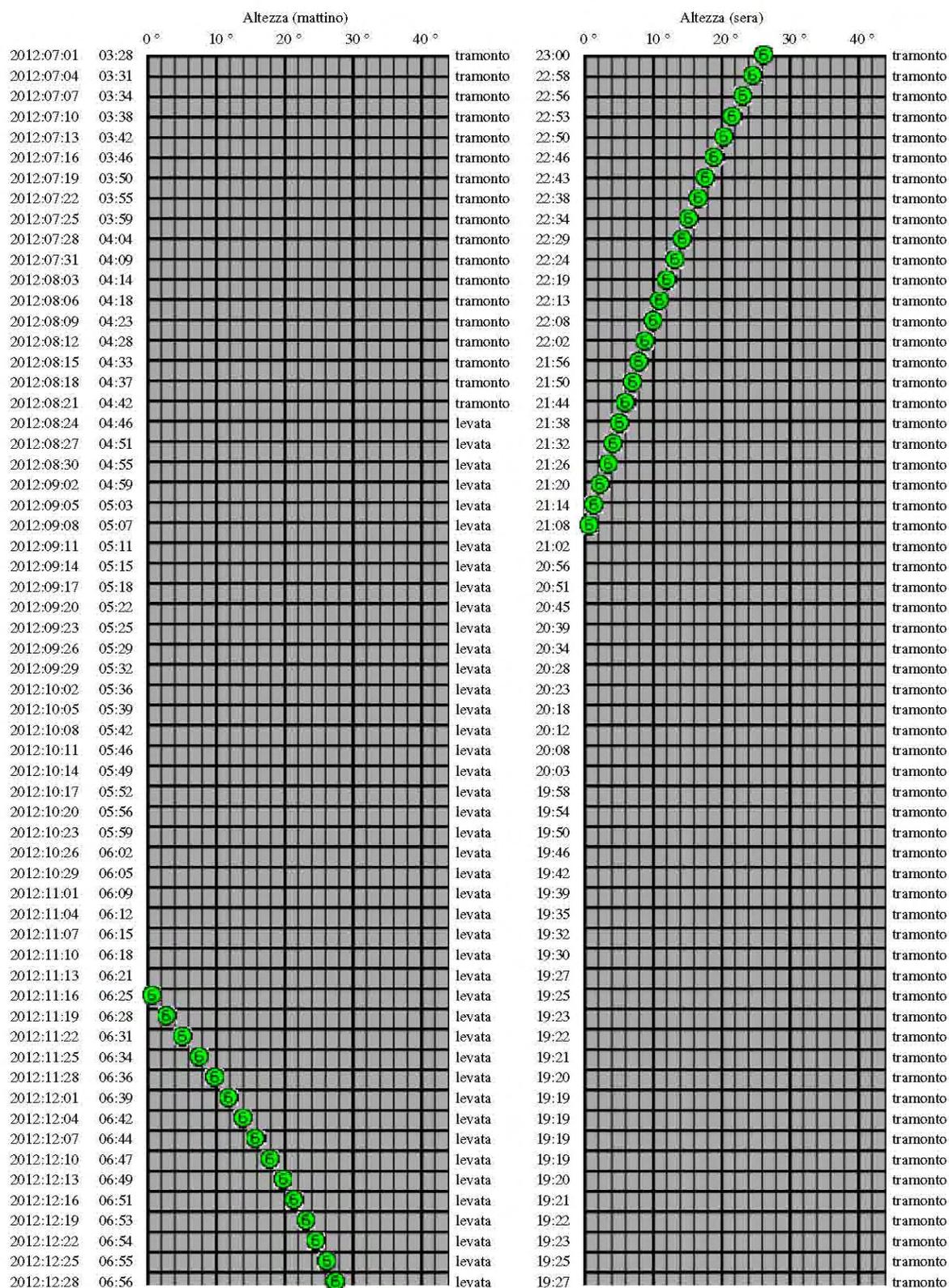


# Altezza ai crepuscoli

## di Saturno

nel momento in cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	36.3	155.1	71.9	18:29	-55.2	339.7	72.4
2012:01:04	05:58	37.1	158.5	74.8	18:32	-56.0	345.4	75.3
2012:01:07	05:58	37.7	162.0	77.7	18:34	-56.6	351.4	78.2
2012:01:10	05:58	38.3	165.4	80.6	18:37	-56.9	357.7	81.1
2012:01:13	05:57	38.7	168.8	83.5	18:40	-56.8	4.0	84.0
2012:01:16	05:57	39.0	172.1	86.4	18:43	-56.5	10.5	86.9
2012:01:19	05:55	39.2	175.4	89.3	18:46	-55.9	16.8	89.9
2012:01:22	05:54	39.2	178.6	92.3	18:49	-55.0	22.9	92.8
2012:01:25	05:52	39.2	181.7	95.3	18:52	-53.8	28.9	95.8
2012:01:28	05:50	39.1	184.8	98.3	18:55	-52.4	34.5	98.8
2012:01:31	05:48	38.9	187.7	101.3	18:59	-50.7	39.8	101.8
2012:02:03	05:46	38.6	190.6	104.3	19:02	-48.8	44.7	104.8
2012:02:06	05:43	38.3	193.4	107.3	19:05	-46.8	49.4	107.8
2012:02:09	05:40	37.9	196.1	110.3	19:09	-44.5	53.7	110.9
2012:02:12	05:36	37.5	198.7	113.4	19:12	-42.2	57.8	113.9
2012:02:15	05:33	36.9	201.2	116.4	19:15	-39.7	61.6	117.0
2012:02:18	05:29	36.4	203.6	119.5	19:19	-37.1	65.1	120.1
2012:02:21	05:25	35.8	206.0	122.6	19:22	-34.4	68.5	123.2
2012:02:24	05:21	35.2	208.2	125.7	19:26	-31.6	71.7	126.3
2012:02:27	05:16	34.5	210.4	128.8	19:29	-28.8	74.8	129.4
2012:03:01	05:12	33.8	212.5	131.9	19:33	-25.9	77.7	132.5
2012:03:04	05:07	33.1	214.5	135.0	19:36	-23.0	80.6	135.6
2012:03:07	05:02	32.4	216.5	138.1	19:40	-20.0	83.4	138.8
2012:03:10	04:57	31.6	218.4	141.3	19:44	-17.0	86.1	141.9
2012:03:13	04:52	30.8	220.3	144.4	19:47	-14.0	88.8	145.0
2012:03:16	04:46	30.0	222.1	147.5	19:51	-11.0	91.4	148.2
2012:03:19	04:41	29.2	223.8	150.7	19:55	-7.9	94.0	151.4
2012:03:22	04:35	28.3	225.5	153.8	19:58	-4.8	96.7	154.5
2012:03:25	04:29	27.5	227.2	157.0	20:02	-1.7	99.3	157.7
2012:03:28	04:24	26.6	228.8	160.1	20:06	1.4	102.0	160.8
2012:03:31	04:18	25.7	230.4	163.3	20:10	4.4	104.8	163.9
2012:04:03	04:12	24.8	231.9	166.4	20:14	7.5	107.6	167.1
2012:04:06	04:06	23.8	233.5	169.5	20:19	10.5	110.5	170.1
2012:04:09	04:00	22.9	235.0	172.5	20:23	13.5	113.6	173.1
2012:04:12	03:54	21.9	236.4	175.3	20:27	16.4	116.7	175.8
2012:04:15	03:48	20.9	237.9	177.2	20:32	19.3	120.0	177.2
2012:04:18	03:42	19.9	239.3	176.3	20:36	22.1	123.5	175.7
2012:04:21	03:36	18.9	240.7	173.7	20:41	24.8	127.1	173.0
2012:04:24	03:31	17.9	242.1	170.8	20:46	27.4	131.0	170.1
2012:04:27	03:25	16.8	243.5	167.8	20:50	29.8	135.1	167.0
2012:04:30	03:19	15.7	244.8	164.7	20:55	32.1	139.4	163.9
2012:05:03	03:13	14.5	246.2	161.6	21:00	34.2	144.0	160.9
2012:05:06	03:08	13.4	247.6	158.5	21:05	36.1	148.8	157.8
2012:05:09	03:03	12.2	249.0	155.5	21:10	37.7	153.9	154.7
2012:05:12	02:58	10.9	250.3	152.4	21:15	39.1	159.2	151.6
2012:05:15	02:53	9.6	251.7	149.3	21:20	40.1	164.6	148.5
2012:05:18	02:48	8.3	253.1	146.3	21:25	40.9	170.2	145.5
2012:05:21	02:44	6.9	254.6	143.2	21:30	41.3	175.8	142.4
2012:05:24	02:39	5.4	256.0	140.2	21:34	41.5	181.5	139.4
2012:05:27	02:36	3.9	257.5	137.2	21:39	41.3	187.0	136.4
2012:05:30	02:32	2.3	259.1	134.2	21:43	40.8	192.4	133.4
2012:06:02	02:29	0.6	260.7	131.2	21:47	40.1	197.6	130.4
2012:06:05	02:27	-1.2	262.3	128.2	21:50	39.1	202.5	127.4
2012:06:08	02:25	-3.1	264.0	125.3	21:53	37.9	207.1	124.5
2012:06:11	02:24	-5.0	265.8	122.4	21:56	36.6	211.4	121.6
2012:06:14	02:23	-7.1	267.7	119.4	21:58	35.1	215.4	118.6
2012:06:17	02:22	-9.3	269.6	116.5	22:00	33.6	219.0	115.7
2012:06:20	02:23	-11.6	271.7	113.6	22:01	32.0	222.4	112.8
2012:06:23	02:23	-13.9	273.8	110.7	22:01	30.4	225.4	110.0
2012:06:26	02:25	-16.4	276.1	107.9	22:01	28.8	228.2	107.1
2012:06:29	02:27	-19.0	278.5	105.0	22:00	27.2	230.8	104.3

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	02:28	-20.7	280.2	103.1	22:00	26.2	232.4	102.4
2012:07:04	02:31	-23.4	282.8	100.3	21:58	24.7	234.5	99.6
2012:07:07	02:34	-26.1	285.5	97.5	21:56	23.2	236.5	96.8
2012:07:10	02:38	-28.8	288.5	94.7	21:53	21.8	238.4	94.0
2012:07:13	02:42	-31.5	291.6	91.9	21:50	20.4	240.1	91.2
2012:07:16	02:46	-34.2	294.9	89.2	21:46	19.1	241.6	88.4
2012:07:19	02:50	-36.9	298.4	86.4	21:43	17.8	243.0	85.7
2012:07:22	02:55	-39.5	302.2	83.7	21:38	16.6	244.4	83.0
2012:07:25	02:59	-42.0	306.3	81.0	21:34	15.4	245.6	80.3
2012:07:28	03:04	-44.4	310.6	78.2	21:29	14.2	246.8	77.5
2012:07:31	03:09	-46.6	315.3	75.5	21:24	13.1	247.8	74.8
2012:08:03	03:14	-48.7	320.4	72.8	21:19	12.0	248.9	72.2
2012:08:06	03:19	-50.6	325.8	70.1	21:13	11.0	249.8	69.5
2012:08:09	03:23	-52.2	331.5	67.5	21:08	10.0	250.8	66.8
2012:08:12	03:28	-53.5	337.6	64.8	21:02	9.0	251.6	64.2
2012:08:15	03:33	-54.6	344.0	62.1	20:56	8.0	252.5	61.5
2012:08:18	03:37	-55.3	350.6	59.5	20:50	7.0	253.3	58.9
2012:08:21	03:42	-55.7	357.3	56.9	20:44	6.1	254.1	56.2
2012:08:24	03:46	-55.8	4.1	54.2	20:38	5.1	254.8	53.6
2012:08:27	03:51	-55.5	10.7	51.6	20:32	4.2	255.6	51.0
2012:08:30	03:55	-54.9	17.2	49.0	20:26	3.2	256.3	48.4
2012:09:02	03:59	-54.1	23.4	46.3	20:20	2.3	257.0	45.8
2012:09:05	04:03	-52.9	29.3	43.7	20:14	1.4	257.7	43.1
2012:09:08	04:07	-51.6	34.8	41.1	20:08	0.5	258.4	40.5
2012:09:11	04:11	-50.1	39.9	38.5	20:02	-0.5	259.1	37.9
2012:09:14	04:15	-48.4	44.7	35.9	19:56	-1.4	259.8	35.3
2012:09:17	04:18	-46.5	49.2	33.3	19:50	-2.4	260.5	32.7
2012:09:20	04:22	-44.5	53.4	30.7	19:45	-3.4	261.3	30.2
2012:09:23	04:25	-42.5	57.3	28.1	19:39	-4.3	262.0	27.6
2012:09:26	04:29	-40.3	60.9	25.5	19:33	-5.3	262.7	25.0
2012:09:29	04:32	-38.1	64.3	22.9	19:28	-6.3	263.4	22.4
2012:10:02	04:36	-35.8	67.6	20.3	19:23	-7.4	264.2	19.8
2012:10:05	04:39	-33.5	70.6	17.7	19:17	-8.4	265.0	17.2
2012:10:08	04:43	-31.1	73.5	15.2	19:12	-9.5	265.8	14.6
2012:10:11	04:46	-28.7	76.3	12.6	19:07	-10.6	266.6	12.1
2012:10:14	04:49	-26.3	79.0	10.0	19:03	-11.8	267.4	9.5
2012:10:17	04:52	-23.9	81.6	7.5	18:58	-13.0	268.3	7.0
2012:10:20	04:56	-21.4	84.2	5.1	18:54	-14.2	269.2	4.6
2012:10:23	04:59	-19.0	86.6	2.9	18:50	-15.4	270.2	2.6
2012:10:26	05:02	-16.5	89.0	2.3	18:46	-16.7	271.1	2.5
2012:10:29	05:05	-14.0	91.4	4.0	18:42	-18.1	272.2	4.4
2012:11:01	05:09	-11.6	93.8	6.4	18:39	-19.4	273.3	6.9
2012:11:04	05:12	-9.1	96.1	8.9	18:35	-20.9	274.4	9.4
2012:11:07	05:15	-6.7	98.4	11.5	18:32	-22.3	275.6	12.0
2012:11:10	05:18	-4.2	100.8	14.1	18:30	-23.8	276.9	14.6
2012:11:13	05:21	-1.8	103.1	16.7	18:27	-25.4	278.2	17.2
2012:11:16	05:25	0.6	105.4	19.4	18:25	-27.0	279.6	19.9
2012:11:19	05:28	2.9	107.8	22.1	18:23	-28.7	281.1	22.5
2012:11:22	05:31	5.2	110.2	24.7	18:22	-30.4	282.7	25.2
2012:11:25	05:34	7.5	112.6	27.4	18:21	-32.1	284.5	27.9
2012:11:28	05:36	9.7	115.1	30.1	18:20	-33.9	286.3	30.6
2012:12:01	05:39	11.8	117.6	32.8	18:19	-35.8	288.2	33.3
2012:12:04	05:42	13.9	120.2	35.5	18:19	-37.7	290.3	36.0
2012:12:07	05:44	15.9	122.7	38.3	18:19	-39.6	292.6	38.7
2012:12:10	05:47	17.8	125.4	41.0	18:19	-41.5	295.1	41.5
2012:12:13	05:49	19.7	128.1	43.8	18:20	-43.5	297.7	44.2
2012:12:16	05:51	21.4	130.8	46.5	18:21	-45.4	300.6	47.0
2012:12:19	05:53	23.1	133.6	49.3	18:22	-47.3	303.8	49.8
2012:12:22	05:54	24.6	136.4	52.1	18:23	-49.3	307.2	52.6
2012:12:25	05:55	26.1	139.2	54.9	18:25	-51.1	311.0	55.3
2012:12:28	05:56	27.4	142.1	57.7	18:27	-52.9	315.2	58.2
2012:12:31	05:57	28.7	145.0	60.5	18:29	-54.6	319.7	61.0

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °

heliacal dates for Saturn  
 location : Rome (Italy)  
 latitude : 41° 52' 12'' N  
 longitude: 12° 37' 12'' E  
 variable arcus visionis:  
 arcvis [°] = 10.5 + 1.4 \* magnitude  
 critical altitude: 0.00°

date eliache per Saturno  
 posizione : Roma  
 latitudine : 41° 52' 12'' N  
 longitudine: 12° 37' 12'' E

visibilità minima [°] = 10.5 + 1.4 \* magnitudine  
 altezza critica : 0.00°

	date	obj r/s	sun r/s	d r/s	age	mag
last visibility	2012-10-05	18:33	17:44	0:49h	-19d 15h	0.9
first visibility	2012-11-09	05:41	06:51	-1:09h	14d 21h	0.8

Date : data nel formato mese/giorno  
 Obj r/s : ora del tramonto o della levata del pianeta  
 Sun r/s: ora del tramonto o della levata del Sole  
 D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due oggetti  
 Age : giorni trascorsi dalla congiunzione col Sole  
 Mag : magnitudine  
 Morning visibility begins : inizio visibilità mattutina  
 Morning visibility ends : fine visibilità mattutina  
 Evening visibility begins : inizio visibilità serale  
 Evening visibility ends : fine visibilità serale  
 Last visibility : ultimo giorno di visibilità  
 First visibility : primo giorno di visibilità

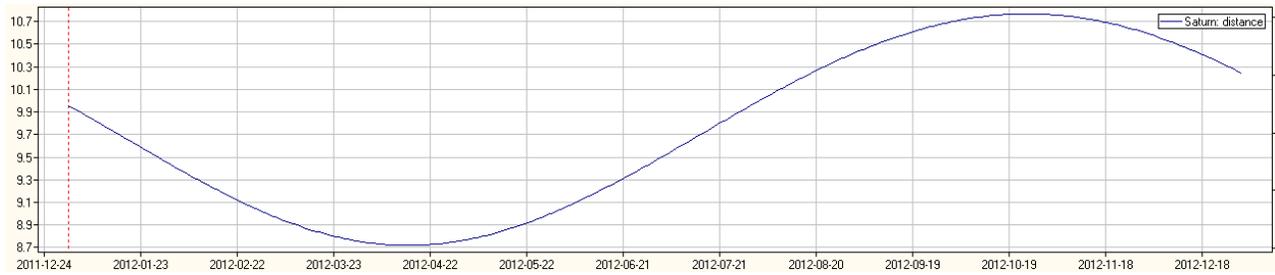
Obj r/s : rising and setting of the planet  
 Sun r/s : sunrise and sunset  
 D r/s : difference in hours and minutes between the instants of the rising or the setting of the two objects  
 Age : days from the conjunction with the Sun  
 Mag : magnitude

	date	obj r/s	sun r/s	sun alt	sun lon	obj lon	obj lat	mag	d az	d lon
L	10-05	18:33	17:44	-10° 03'	192° 53'	209° 59'	2° 15'	0.9	-14° 24'	17° 06'
F	11-09	05:41	06:51	-13° 18'	227° 11'	214° 07'	2° 14'	0.8	3° 10'	-13° 04'

Date : data nel formato mese/giorno  
 Sun alt : altezza del Sole nell'istante di visibilità del pianeta  
 Sun lon : longitudine celeste del Sole  
 Obj lon : longitudine celeste del pianeta  
 Obj lat : latitudine celeste del pianeta  
 Mag : magnitudine  
 D az : differenza in azimut tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 D lon : differenza in longitudine tra i centri del Sole e del pianeta nell'istante della sua visibilità  
 L = ultimo giorno di visibilità  
 F = primo giorno di visibilità

Date : date in the format month/day  
 Sun alt : altitude of the Sun in the instant of visibility of the planet  
 Sun lon : celestial longitude of the Sun  
 Obj lon : celestial longitude of the planet  
 Obj lat : celestial latitude of the planet  
 Mag : magnitude  
 D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility  
 D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

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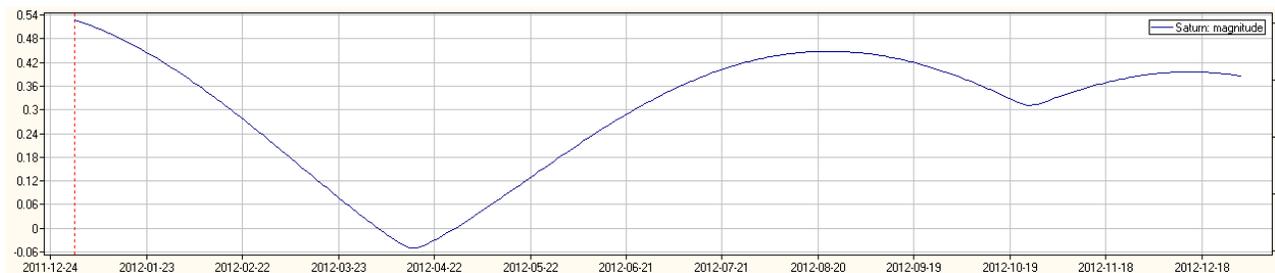
Distanza di Saturno in U.A. nel corso dell'anno - Distance of Saturn in A.U. during the year



Elongazione di Saturno in ° nel corso dell'anno - Elongation of Saturn in ° during the year



Diametro di Saturno in " nel corso dell'anno - Diameter of Saturn in " during the year



Magnitudine di Saturno nel corso dell'anno - Magnitude of Saturn during the year









	Tethys: x	Tethys: y	Tethys: z	Dione: x	Dione: y	Dione: z	Rhea: x	Rhea: y	Rhea: z	Titan: x	Titan: y	Titan: z
25/11/2012	-0.6373	1.5352	4.5891	5.9577	-0.5725	-1.7881	7.2767	1.4724	4.5954	-19.7091	-0.2394	-0.7400
26/11/2012	1.5168	-1.4890	-4.3941	-2.5026	1.7547	5.4631	-3.4142	2.4541	7.6477	-17.6526	-2.6323	-8.1897
27/11/2012	-2.3431	1.3907	4.0493	-2.6311	-1.7337	-5.3816	-8.5088	-0.5860	-1.8190	-12.6740	-4.5990	-14.2809
28/11/2012	3.0915	-1.2449	-3.5666	5.9873	0.5554	1.7183	0.3581	-2.6750	-8.2941	-5.5950	-5.8120	-18.0098
29/11/2012	-3.7324	1.0552	2.9624	-5.2898	1.0258	3.1744	8.6442	-0.3759	-1.1658	2.4019	-6.0802	-18.8033
30/11/2012	4.2479	-0.8289	-2.2575	1.0286	-1.8965	-5.8509	2.7827	2.5488	7.8735	10.0224	-5.3806	-16.6089
01/12/2012	-4.6169	0.5729	1.4757	3.9401	1.5027	4.6261	-7.6258	1.3061	4.0281	16.1039	-3.8477	-11.8577
02/12/2012	4.8294	-0.2963	-0.6440	-6.2427	-0.0698	-0.2117	-5.5308	-2.0856	-6.4114	19.7903	-1.7346	-5.3404
03/12/2012	-4.8765	0.0084	-0.2095	4.3290	-1.3933	-4.2739	5.6454	-2.0615	-6.3277	20.6190	0.6375	1.9493
04/12/2012	4.7570	0.2810	1.0554	0.5293	1.9377	5.9312	7.5749	1.3480	4.1278	18.5360	2.9277	8.9638
05/12/2012	-4.4758	-0.5619	-1.8650	-5.0216	-1.1534	-3.5201	-2.8857	2.5598	7.8290	13.8666	4.8160	14.7250
06/12/2012	4.0405	0.8245	2.6107	6.1177	-0.3947	-1.2059	-8.6149	-0.4227	-1.2873	7.2630	6.0363	18.4261
07/12/2012	-3.4685	-1.0602	-3.2669	-3.0653	1.7033	5.1846	-0.2072	-2.7211	-8.2839	-0.3642	6.4050	19.5173
08/12/2012	2.7765	1.2598	3.8113	-2.0446	-1.8433	-5.5953	8.5470	-0.5557	-1.6914	-7.9346	5.8460	17.7813
09/12/2012	-1.9908	-1.4176	-4.2253	5.7758	0.7530	2.2797	3.3099	2.5290	7.6735	-14.3170	4.4111	13.3924
10/12/2012	1.1362	1.5263	4.4948	-5.5987	0.8729	2.6436	-7.3376	1.4783	4.4792	-18.4863	2.2895	6.9402
11/12/2012	-0.2428	-1.5840	-4.6105	1.6495	-1.8909	-5.7095	-5.9528	-2.0026	-6.0498	-19.7066	-0.2047	-0.6119
12/12/2012	-0.6585	1.5864	4.5687	3.4284	1.6496	4.9717	5.2071	-2.2033	-6.6472	-17.7045	-2.6739	-8.0577
13/12/2012	1.5385	-1.5353	-4.3706	-6.1864	-0.2712	-0.8131	7.8369	1.2135	3.6532	-12.7676	-4.7082	-14.1657
14/12/2012	-2.3643	1.4302	4.0232	4.7664	-1.2726	-3.8241	-2.3547	2.6517	7.9752	-5.7135	-5.9693	-17.9296
15/12/2012	3.1112	-1.2764	-3.5382	-0.1074	1.9804	5.9396	-8.6837	-0.2546	-0.7618	2.2781	-6.2597	-18.7717
16/12/2012	-3.7497	1.0774	2.9324	-4.6144	-1.3313	-3.9825	-0.7612	-2.7516	-8.2412	9.9135	-5.5545	-16.6325
17/12/2012	4.2619	-0.8412	-2.2264	6.2167	-0.2008	-0.6030	8.4170	-0.7344	-2.1986	16.0278	-3.9905	-11.9345
18/12/2012	-4.6265	0.5749	1.4444	-3.6068	1.6245	4.8494	3.8135	2.4938	7.4480	19.7600	-1.8267	-5.4598
19/12/2012	4.8339	-0.2881	-0.6131	-1.4251	-1.9326	-5.7546	-7.0255	1.6434	4.9024	20.6396	0.6079	1.8051
20/12/2012	-4.8752	-0.0096	-0.2388	5.4994	0.9512	2.8266	-6.3423	-1.9069	-5.6732	18.6035	2.9631	8.8155
21/12/2012	4.7493	0.3079	1.0824	-5.8547	0.6985	2.0771	4.7572	-2.3332	-6.9334	13.9690	4.9095	14.5926
22/12/2012	-4.4614	-0.5966	-1.8887	2.2655	-1.8574	-5.5064	8.0622	1.0709	3.1762	7.3828	6.1726	18.3248
23/12/2012	4.0193	0.8655	2.6300	2.8697	1.7810	5.2720	-1.8259	2.7286	8.0874	-0.2463	6.5622	19.4556
24/12/2012	-3.4408	-1.1058	-3.2810	-6.0625	-0.4801	-1.4163	-8.7169	-0.0841	-0.2467	-7.8355	5.9987	17.7599
25/12/2012	2.7428	1.3081	3.8194	5.1617	-1.1263	-3.3265	-1.2997	-2.7660	-8.1685	-14.2478	4.5345	13.4060
26/12/2012	-1.9518	-1.4667	-4.2267	-0.7568	1.9966	5.8863	8.2574	-0.9093	-2.6843	-18.4505	2.3635	6.9795
27/12/2012	1.0931	1.5742	4.4889	-4.1480	-1.4997	-4.4112	4.2905	2.4441	7.2009	-19.7013	-0.1913	-0.5569
28/12/2012	-0.1968	-1.6288	-4.5971	6.2504	0.0070	0.0175	-6.6941	1.7993	5.2962	-17.7228	-2.7215	-7.9966
29/12/2012	-0.7058	1.6263	4.5475	-4.1215	1.5174	4.4567	-6.6980	-1.8003	-5.2861	-12.8012	-4.8065	-14.1070
30/12/2012	1.5855	-1.5688	-4.3418	-0.7756	-1.9981	-5.8555	4.3005	-2.4497	-7.1864	-5.7545	-6.1001	-17.8813

Distanze in raggi di Saturno - Distance in saturnian radii

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# FENOMENI MUTUI DEI SATELLITI DI SATURNO MUTUAL PHENOM. OF THE SATELLITES OF SATURN

Ec.D. : inizio dell'eclisse  
 Ec.R. : fine dell'eclisse  
 Oc.D. : inizio dell'occultazione  
 Oc.R. : fine dell'occultazione  
 Tr.I. : inizio del transito  
 Tr.E. : fine del transito  
 Sh.I. : ingresso dell'ombra  
 Sh.E. : uscita dell'ombra

TEMPI IN T.U.

Sono stati presi in considerazione solo i 4 satelliti principali

Ec.D. : beginning of the eclipse  
 Ec.R. : ending of the eclipse  
 Oc.D. : beginning of the occultation  
 Oc.R. : ending of the occultation  
 Tr.I. : beginning of the transit  
 Tr.E. : ending of the transit  
 Sh.I. : beginning of the umbra transit  
 Sh.E. : ending of the umbra transit

TIMES IN U.T.

Only the 4 main satellites

Date	Time	M	Phe	Pha	h	h S	Date	Time	M	Phe	Pha	h	h S	Date	Time	M	Phe	Pha	h	h S

Questo anno non avvengono fenomeni - No phenomena this year

Date = data  
 Time = orario  
 Phe = fenomeno  
 Pha = fase  
 H = altitudine di Saturno sull'orizzonte  
 H S = altitudine del Sole sull'orizzonte

Date in the format dd/mm/yyyy  
 Phe = phenomenon  
 Pha = phase  
 H = altitude of Saturn above the horizon  
 H S = altitude of the Sun above the horizon

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Date	time	Moons	Dist.°	h	h S	Date	time	Moons	Dist.°	h	h S	Date	time	Moons	Dist.°	h	h S
23/11/2012	10:38:03	Tethys/Dione	-6"	33,6	27,4	08/12/2012	03:56:59	Tethys/Dione	28"	8,4	-27,2	22/12/2012	06:43:14	Dione/Titan	-60"	34,5	0,6
24/11/2012	17:08:26	Tethys/Dione	20"	-28,9	-15,5	08/12/2012	17:24:44	Dione/Rhea	-19"	-40,8	-18,7	22/12/2012	14:56:05	Rhea/Titan	-31"	-23,3	6,6
25/11/2012	20:45:49	Tethys/Dione	-27"	-59,0	-55,0	09/12/2012	04:36:52	Tethys/Rhea	-34"	15,5	-20,0	22/12/2012	08:04:39	Dione/Rhea	-24"	35,4	11,8
25/11/2012	19:42:50	Tethys/Rhea	-32"	-54,1	-43,9	09/12/2012	07:27:40	Tethys/Dione	-24"	34,8	8,2	22/12/2012	13:39:47	Tethys/Rhea	-31"	-9,2	16,1
25/11/2012	03:14:33	Dione/Rhea	-14"	-7,2	-32,9	10/12/2012	11:59:17	Tethys/Dione	12"	16,0	23,9	22/12/2012	13:25:44	Tethys/Titan	-63"	-6,6	17,6
27/11/2012	00:15:14	Tethys/Dione	24"	-38,7	-63,8	11/12/2012	21:59:36	Dione/Rhea	30"	-52,0	-66,6	23/12/2012	16:56:25	Dione/Titan	-44"	-45,3	-12,9
28/11/2012	04:28:03	Tethys/Dione	-14"	8,0	-19,9	11/12/2012	18:36:29	Tethys/Rhea	31"	-53,3	-31,8	23/12/2012	14:20:41	Dione/Titan	-41"	-17,4	11,4
28/11/2012	17:25:41	Tethys/Titan	60"	-34,6	-18,8	12/12/2012	13:59:17	Tethys/Dione	-17"	-6,0	13,6	24/12/2012	21:13:37	Tethys/Dione	19"	-52,2	-59,2
28/11/2012	06:48:38	Dione/Rhea	31"	28,5	4,3	13/12/2012	23:54:36	Tethys/Rhea	-10"	-32,1	-68,7	24/12/2012	02:31:36	Rhea/Titan	-51"	3,3	-44,8
28/11/2012	14:39:24	Dione/Titan	63"	-3,8	9,0	13/12/2012	17:48:01	Tethys/Dione	-27"	-47,6	-22,8	25/12/2012	03:34:02	Tethys/Rhea	36"	14,2	-33,3
28/11/2012	08:51:54	Tethys/Rhea	21"	36,5	20,1	13/12/2012	16:55:41	Dione/Rhea	-37"	-39,0	-13,4	25/12/2012	13:03:43	Dione/Rhea	28"	-4,5	19,8
29/11/2012	22:18:45	Tethys/Rhea	-28"	-54,5	-67,8	13/12/2012	09:00:52	Tethys/Rhea	-19"	34,7	18,7	26/12/2012	00:58:34	Tethys/Dione	-28"	-12,6	-61,2
29/11/2012	13:48:24	Rhea/Titan	58"	4,7	15,6	14/12/2012	21:25:28	Dione/Titan	65"	-54,9	-61,8	27/12/2012	04:26:14	Tethys/Dione	28"	22,9	-23,8
30/11/2012	01:38:46	Dione/Rhea	-35"	-21,8	-51,3	14/12/2012	21:16:20	Tethys/Dione	-28"	-55,9	-60,3	27/12/2012	17:13:47	Tethys/Rhea	-27"	-50,2	-15,5
30/11/2012	06:38:03	Tethys/Dione	15"	28,1	2,4	14/12/2012	20:49:43	Tethys/Titan	38"	-58,3	-55,9	27/12/2012	08:10:31	Dione/Rhea	-39"	34,3	12,3
01/12/2012	22:13:40	Dione/Rhea	17"	-54,3	-67,6	14/12/2012	04:14:13	Tethys/Titan	55"	14,6	-24,8	28/12/2012	08:18:54	Tethys/Dione	-18"	33,6	13,3
01/12/2012	10:37:14	Tethys/Dione	-25"	31,0	25,9	14/12/2012	04:15:04	Rhea/Titan	68"	14,7	-24,7	29/12/2012	03:30:08	Dione/Rhea	26"	15,8	-34,3
02/12/2012	14:05:13	Tethys/Dione	27"	0,1	13,2	14/12/2012	04:19:17	Tethys/Rhea	-13"	15,4	-23,9	29/12/2012	06:26:05	Tethys/Rhea	27"	34,7	-2,5
02/12/2012	12:09:13	Tethys/Rhea	34"	19,0	24,1	15/12/2012	21:04:38	Tethys/Rhea	33"	-56,8	-58,4	30/12/2012	19:17:54	Tethys/Titan	65"	-60,3	-37,8
03/12/2012	17:46:30	Tethys/Dione	-20"	-41,4	-22,7	15/12/2012	07:37:40	Tethys/Titan	51"	35,7	8,8	30/12/2012	10:23:41	Tethys/Dione	13"	19,2	23,9
05/12/2012	01:56:57	Tethys/Rhea	-27"	-15,2	-48,8	15/12/2012	12:42:58	Dione/Rhea	22"	5,8	21,1	31/12/2012	19:59:36	Tethys/Rhea	-36"	-57,8	-45,3
05/12/2012	02:27:00	Dione/Rhea	-31"	-9,7	-43,4	16/12/2012	01:03:23	Tethys/Dione	19"	-18,2	-59,6	31/12/2012	03:52:44	Dione/Titan	65"	20,2	-30,2
05/12/2012	19:02:56	Tethys/Dione	8"	-53,8	-36,8	18/12/2012	02:54:17	Tethys/Dione	-10"	3,6	-40,0	31/12/2012	14:46:47	Tethys/Dione	-26"	-27,7	8,8
06/12/2012	23:48:38	Rhea/Titan	-72"	-37,4	-68,5	18/12/2012	17:35:08	Dione/Rhea	-29"	-48,4	-20,1	31/12/2012	09:44:32	Rhea/Titan	69"	24,1	21,7
06/12/2012	21:17:13	Dione/Rhea	36"	-58,1	-60,6	18/12/2012	11:08:54	Tethys/Rhea	-34"	19,2	24,6						
06/12/2012	03:27:41	Dione/Titan	-47"	2,3	-32,3	19/12/2012	07:35:26	Tethys/Dione	24"	35,8	8,2						
06/12/2012	15:13:44	Tethys/Rhea	24"	-15,7	3,6	20/12/2012	23:59:11	Tethys/Rhea	21"	-26,8	-68,8						
06/12/2012	13:00:11	Dione/Titan	-37"	8,5	20,0	20/12/2012	12:32:56	Dione/Rhea	38"	4,4	21,8						
07/12/2012	00:24:07	Tethys/Dione	-22"	-31,1	-64,3	21/12/2012	19:50:05	Rhea/Titan	-45"	-60,1	-44,7						
07/12/2012	03:28:00	Tethys/Titan	-62"	2,9	-32,4	21/12/2012	14:39:57	Tethys/Dione	24"	-19,7	8,7						
07/12/2012	16:08:03	Dione/Titan	-56"	-26,5	-5,4	22/12/2012	19:36:28	Tethys/Dione	-11"	-60,2	-42,1						

Date = data  
Time = orario  
Moons = lune coinvolte  
Dist = distanza in secondi  
H = altitudine di Saturno sull'orizzonte  
H S = altitudine del Sole sull'orizzonte

TEMPI IN T.U.

Date in the format dd/mm/yyyy  
Dist = distance in seconds  
H = altitude of Saturn above the horizon  
H S = altitude of the Sun above the horizon

TIMES IN U.T.

Valori negativi delle distanze indicano che il 2° satellite transita a nord dell'altro  
Negative values of the distances show that the 2nd satellite transits to north of the other

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# OCCULTAZIONI TRA I SATELLITI DI SATURNO

## OCCULTAT. BETWEEN THE SATELLITES OF SATURN

Year M D h m s Event Type Ph Dur dMag %Ill Sep PA MinD h m s h m s h m s h m s h m s h m s h m s

Questo anno non avvengono fenomeni - No phenomena this year

Ore in T.U.

Legenda :

Data nel formato mese/giorno, un asterisco indica che le lune si avvicinano ma non si occultano  
Event type : tipo di evento, eclissi o occultazione  
Ph : fenomeno, M=mancato, E=eclisse penombrale, P=eclisse/occultazione parziale, T=eclisse/occultazione totale, A=eclisse/occultazione anulare  
Durn : durata in secondi  
dMag : caduta di luce in magnitudini  
%ill : cambio in illuminazione, rispetto alla illuminazione intera, della luna rimanente (occultazione) o di entrambe (eclissi)  
Sep : distanza in " tra satellite occultato/eclissato e centro del pianeta  
Pa : angolo di posizione tra satellite occultato/eclissato e pianeta  
MinSep : distanza minima tra i centri delle lune o tra la luna e l'ombra  
T1-T7 : inizio/fine della fase di contatto con la penombra  
T2-T6 : inizio/fine della fase di contatto con l'ombra o tra i lembi delle lune  
T3-T5 : inizio/fine della fase di totalità  
Tmax : tempo di metà evento

Satelliti :

I = Mimas  
II = Enceladus  
III = Tethys  
IV = Dione  
V = Rhea  
VI = Titan  
VII = Hyperion

Times in T.U.

Date in the format month/day, an asterisk shows that the moons are near but they don't occult  
Event type : eclipse or occultation  
Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total eclipse/occultation, A=annular eclipse/occultation  
Durn : duration in seconds  
dMag : difference magnitude  
%ill : defect of illumination, respect to integer  
Sep : distance in " between the satellite and the center of the planet  
Pa : position angle between the satellite and the center of the planet  
MinD : least distance between the satellies  
T1-T7 : penumbral phase begins/ends  
T2-T6 : umbra phase begins/ends  
T3-T5 : totalità phase begins/ends  
Tmax : middle time of the event

Satellites :

I = Mimas  
II = Enceladus  
III = Tethys  
IV = Dione  
V = Rhea  
VI = Titan  
VII = Hyperion

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Titano Congiunzione superiore - Titano Superior conjunction

Date	Time	h	h S
06/01/12	17.06.48	-54,8	-13,0
22/01/12	16.29.38	-56,3	-3,3
07/02/12	15.24.44	-56,1	10,7
23/02/12	13.51.37	-54,1	28,3
10/03/12	11.52.29	-47,9	43,7
26/03/12	09.32.45	-36,4	44,0

Date	Time	h	h S
11/04/12	07.00.33	-21,0	25,6
27/04/12	04.25.42	-4,4	1,7
13/05/12	01.58.14	10,5	-18,0
28/05/12	23.46.38	21,6	-25,8
13/06/12	21.57.07	28,4	-22,5
29/06/12	20.33.01	31,2	-14,8

Date	Time	h	h S
15/07/12	19.35.10	30,5	-8,5
31/07/12	19.02.34	26,4	-6,0
16/08/12	18.52.42	18,5	-8,1
01/09/12	19.02.21	6,7	-14,5
17/09/12	19.27.38	-9,0	-24,1
03/10/12	20.04.24	-26,6	-35,7

Date	Time	h	h S
19/10/12	20.48.11	-44,1	-47,7
04/11/12	21.34.11	-56,9	-58,4
20/11/12	22.17.27	-57,3	-66,3
06/12/12	22.52.39	-46,7	-70,5
22/12/12	23.14.30	-33,7	-71,4

Titano Congiunzione inferiore - Titano Inferior conjunction

Date	Time	h	h S
14/01/12	11.38.57	-7,6	26,5
30/01/12	10.46.18	-9,3	29,6
15/02/12	09.27.34	-6,2	28,8
02/03/12	07.43.26	1,6	19,9
18/03/12	05.37.30	12,2	3,0
03/04/12	03.16.01	24,5	-17,8

Date	Time	h	h S
19/04/12	00.47.34	35,0	-32,4
04/05/12	22.21.23	40,6	-30,7
20/05/12	20.06.08	40,4	-14,9
05/06/12	18.08.38	37,0	5,1
21/06/12	16.33.08	33,7	22,8
07/07/12	15.21.36	32,6	36,0

Date	Time	h	h S
23/07/12	14.33.46	33,9	43,5
08/08/12	14.08.03	36,9	45,2
24/08/12	14.01.52	39,7	42,0
09/09/12	14.11.58	39,2	35,2
25/09/12	14.34.48	33,0	25,8
11/10/12	15.06.24	21,2	15,2

Date	Time	h	h S
27/10/12	15.42.40	5,7	4,5
12/11/12	16.19.04	-11,7	-5,3
28/11/12	16.50.50	-28,3	-12,6
14/12/12	17.13.00	-42,6	-16,4
30/12/12	17.20.27	-52,7	-16,3

Titano Massima elongazione est - Titano Maxima est elongation

Date	Time	h	h S
10/01/12	16.47.01	-54,5	-8,9
26/01/12	16.00.19	-55,6	2,4
11/02/12	14.47.45	-54,8	17,3
27/02/12	13.09.27	-51,5	34,2
14/03/12	11.08.14	-43,9	45,6
30/03/12	08.49.42	-31,8	39,9

Date	Time	h	h S
15/04/12	06.21.55	-16,9	19,6
01/05/12	03.54.05	-0,9	-2,7
17/05/12	01.35.14	11,6	-19,9
01/06/12	23.32.43	21,3	-25,6
17/06/12	21.51.34	27,0	-22,0
03/07/12	20.34.16	28,9	-15,2

Date	Time	h	h S
19/07/12	19.41.04	27,6	-9,8
04/08/12	19.10.38	22,9	-8,1
20/08/12	19.00.25	14,7	-10,5
05/09/12	19.07.15	3,2	-16,6
21/09/12	19.27.32	-11,7	-25,5
07/10/12	19.57.18	-27,9	-35,9

Date	Time	h	h S
23/10/12	20.32.27	-44,0	-46,5
08/11/12	21.08.28	-56,1	-56,0
24/11/12	21.40.47	-58,8	-63,1
10/12/12	22.04.29	-51,8	-67,2
26/12/12	22.14.38	-41,7	-67,7

Titano Massima elongazione ovest - Titano Maxima west elongation

Date	Time	h	h S
02/01/12	12.00.19	-2,6	24,3
18/01/12	11.30.12	-8,8	27,4
03/02/12	10.32.50	-9,6	30,1
19/02/12	09.07.04	-5,3	27,8
06/03/12	07.14.16	3,8	16,4
22/03/12	04.59.11	15,9	-2,7

Date	Time	h	h S
07/04/12	02.29.19	28,7	-23,9
22/04/12	23.54.16	38,2	-34,5
08/05/12	21.24.09	41,0	-26,0
24/05/12	19.07.55	37,7	-6,1
09/06/12	17.12.24	32,7	15,0
25/06/12	15.41.30	29,1	32,4

Date	Time	h	h S
11/07/12	14.36.46	28,7	44,1
27/07/12	13.57.32	31,3	49,3
12/08/12	13.41.44	35,7	48,6
28/08/12	13.46.25	39,5	43,2
13/09/12	14.07.53	38,6	34,4
29/09/12	14.42.14	30,5	23,2

Date	Time	h	h S
15/10/12	15.25.04	16,0	10,8
31/10/12	16.11.46	-1,6	-0,9
16/11/12	16.57.24	-21,5	-12,7
02/12/12	17.36.38	-39,1	-20,9
18/12/12	18.04.03	-52,5	-25,4

TEMPI IN T.U.      TIMES IN U.T.

H = altitudine di Saturno sull'orizzonte  
H S = altitudine del Sole sull'orizzonte

Date in the format dd/mm/yyyy  
H = altitude of Saturn on the horizon  
H S = altitude of the Sun on the horizon



Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian
27/10/12	04.50.06	15.04.11		13/11/12	06.13.07	16.27.11		30/11/12	07.35.25	17.49.27		17/12/12	08.56.52	19.10.53	
28/10/12	01.18.16	11.32.20	21.46.26	14/11/12	02.41.15	12.55.19	23.09.23	01/12/12	04.03.30	14.17.33		18/12/12	05.24.55	15.38.56	
29/10/12	08.00.30	18.14.35		15/11/12	09.23.27	19.37.31		02/12/12	00.31.36	10.45.38	20.59.41	19/12/12	01.52.57	12.06.59	22.21.00
30/10/12	04.28.40	14.42.45		16/11/12	05.51.34	16.05.38		03/12/12	07.13.44	17.27.46		20/12/12	08.35.01	18.49.02	
31/10/12	00.56.50	11.10.55	21.24.59	17/11/12	02.19.42	12.33.46	22.47.49	04/12/12	03.41.49	13.55.51		21/12/12	05.03.04	15.17.05	
01/11/12	07.39.04	17.53.09		18/11/12	09.01.53	19.15.57		05/12/12	00.09.54	10.23.56	20.37.59	22/12/12	01.31.06	11.45.07	21.59.08
02/11/12	04.07.14	14.21.18		19/11/12	05.30.01	15.44.04		06/12/12	06.52.01	17.06.03		23/12/12	08.13.09	18.27.10	
03/11/12	00.35.23	10.49.28	21.03.32	20/11/12	01.58.08	12.12.12	22.26.15	07/12/12	03.20.06	13.34.08	23.48.10	24/12/12	04.41.11	14.55.12	
04/11/12	07.17.37	17.31.41		21/11/12	08.40.18	18.54.22		08/12/12	10.02.13	20.16.15		25/12/12	01.09.13	11.23.14	21.37.15
05/11/12	03.45.46	13.59.50		22/11/12	05.08.25	15.22.29		09/12/12	06.30.17	16.44.19		26/12/12	07.51.15	18.05.16	
06/11/12	00.13.55	10.27.59	20.42.04	23/11/12	01.36.32	11.50.35	22.04.39	10/12/12	02.58.21	13.12.23	23.26.25	27/12/12	04.19.17	14.33.18	
07/11/12	06.56.08	17.10.13		24/11/12	08.18.42	18.32.45		11/12/12	09.40.27	19.54.29		28/12/12	00.47.18	11.01.19	21.15.19
08/11/12	03.24.17	13.38.21	23.52.25	25/11/12	04.46.48	15.00.52		12/12/12	06.08.31	16.22.33		29/12/12	07.29.20	17.43.20	
09/11/12	10.06.30	20.20.34		26/11/12	01.14.55	11.28.58	21.43.01	13/12/12	02.36.35	12.50.37	23.04.39	30/12/12	03.57.21	14.11.21	
10/11/12	06.34.38	16.48.43		27/11/12	07.57.04	18.11.07		14/12/12	09.18.40	19.32.42		31/12/12	00.25.22	10.39.22	20.53.23
11/11/12	03.02.47	13.16.51	23.30.55	28/11/12	04.25.10	14.39.13		15/12/12	05.46.44	16.00.45					
12/11/12	09.44.59	19.59.03		29/11/12	00.53.16	11.07.19	21.21.22	16/12/12	02.14.47	12.28.49	22.42.50				

Orari in T.U. in cui transita il Meridiano Centrale

Date in the format dd/mm/yyyy

TIMES IN U.T.



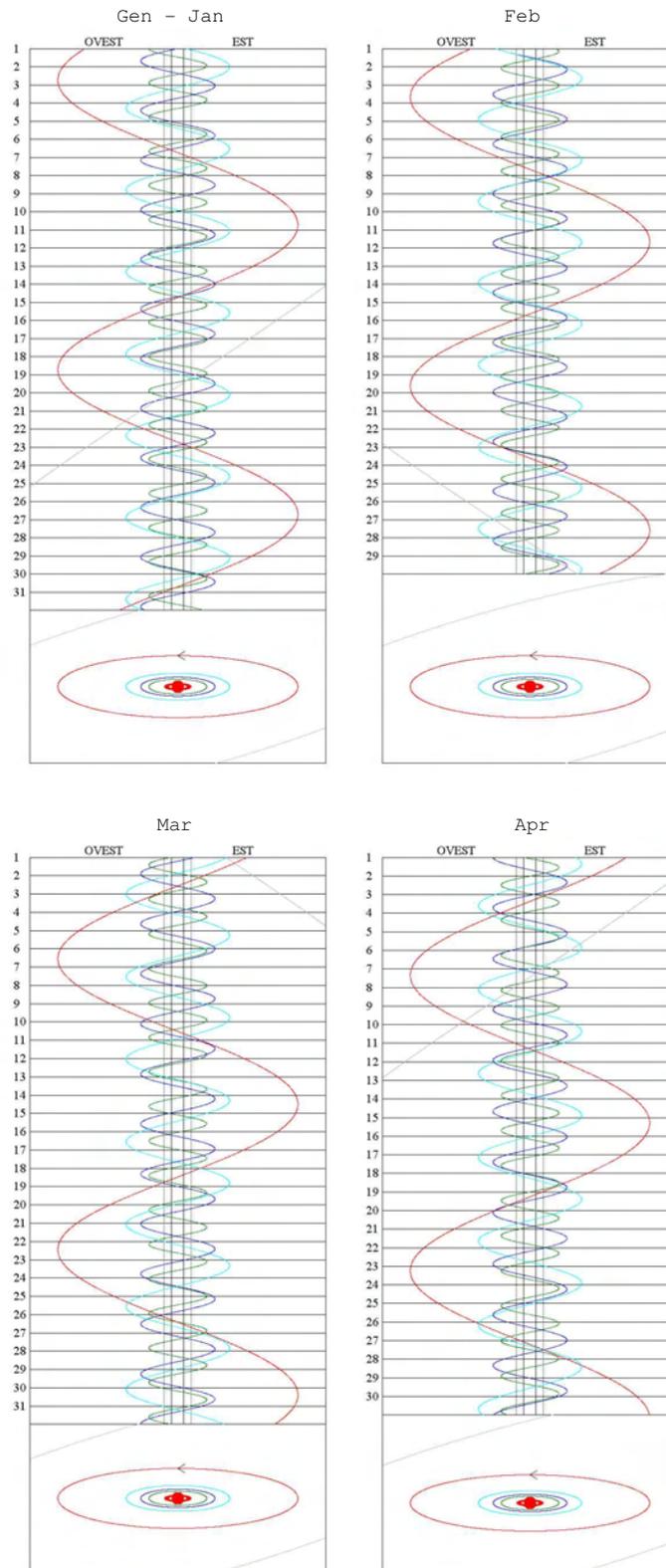
Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian	Date	Zero meridian	Zero meridian	Zero meridian
23/10/12	08.37.28	19.16.56		10/11/12	02.55.50	13.35.17		28/11/12	07.52.52	18.32.18		16/12/12	02.09.32	12.48.57	23.28.21
24/10/12	05.56.23	16.35.52		11/11/12	00.14.45	10.54.12	21.33.38	29/11/12	05.11.44	15.51.09		17/12/12	10.07.45	20.47.09	
25/10/12	03.15.20	13.54.48		12/11/12	08.13.05	18.52.32		30/11/12	02.30.35	13.10.00	23.49.26	18/12/12	07.26.33	18.05.58	
26/10/12	00.34.16	11.13.44	21.53.12	13/11/12	05.31.59	16.11.26		01/12/12	10.28.51	21.08.17		19/12/12	04.45.21	15.24.45	
27/10/12	08.32.40	19.12.07		14/11/12	02.50.53	13.30.19		02/12/12	07.47.42	18.27.08		20/12/12	02.04.09	12.43.33	23.22.57
28/10/12	05.51.35	16.31.03		15/11/12	00.09.46	10.49.13	21.28.39	03/12/12	05.06.33	15.45.59		21/12/12	10.02.21	20.41.45	
29/10/12	03.10.30	13.49.58		16/11/12	08.08.06	18.47.32		04/12/12	02.25.24	13.04.49	23.44.14	22/12/12	07.21.09	18.00.32	
30/10/12	00.29.26	11.08.54	21.48.22	17/11/12	05.26.59	16.06.26		05/12/12	10.23.39	21.03.05		23/12/12	04.39.56	15.19.19	
31/10/12	08.27.49	19.07.16		18/11/12	02.45.52	13.25.19		06/12/12	07.42.30	18.21.55		24/12/12	01.58.43	12.38.07	23.17.30
01/11/12	05.46.44	16.26.12		19/11/12	00.04.45	10.44.11	21.23.38	07/12/12	05.01.20	15.40.45		25/12/12	09.56.54	20.36.17	
02/11/12	03.05.39	13.45.07		20/11/12	08.03.04	18.42.30		08/12/12	02.20.10	12.59.35	23.38.59	26/12/12	07.15.41	17.55.04	
03/11/12	00.24.34	11.04.02	21.43.29	21/11/12	05.21.57	16.01.23		09/12/12	10.18.24	20.57.49		27/12/12	04.34.27	15.13.50	
04/11/12	08.22.56	19.02.24		22/11/12	02.40.49	13.20.15	23.59.41	10/12/12	07.37.14	18.16.39		28/12/12	01.53.14	12.32.37	23.12.00
05/11/12	05.41.51	16.21.19		23/11/12	10.39.07	21.18.33		11/12/12	04.56.03	15.35.28		29/12/12	09.51.23	20.30.46	
06/11/12	03.00.46	13.40.13		24/11/12	07.57.59	18.37.26		12/12/12	02.14.53	12.54.17	23.33.42	30/12/12	07.10.09	17.49.32	
07/11/12	00.19.41	10.59.08	21.38.35	25/11/12	05.16.52	15.56.18		13/12/12	10.13.06	20.52.31		31/12/12	04.28.55	15.08.18	
08/11/12	08.18.02	18.57.29		26/11/12	02.35.43	13.15.09	23.54.35	14/12/12	07.31.55	18.11.20					
09/11/12	05.36.56	16.16.23		27/11/12	10.34.01	21.13.27		15/12/12	04.50.44	15.30.08					

Orari in T.U. in cui transita il Meridiano Centrale

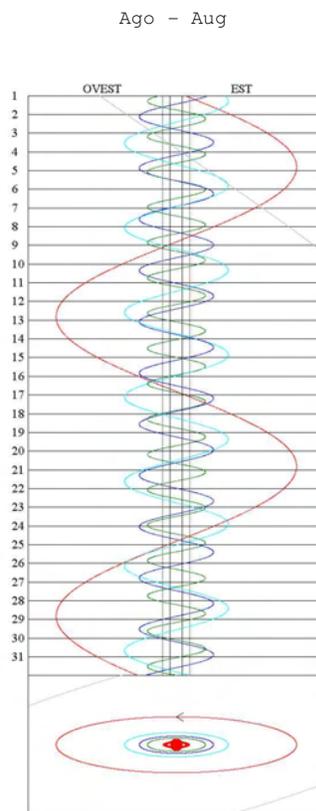
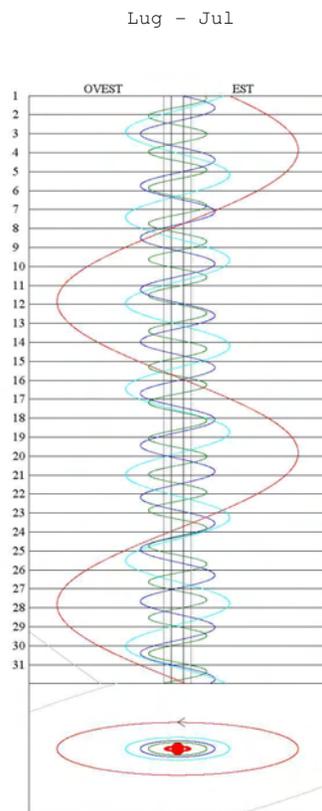
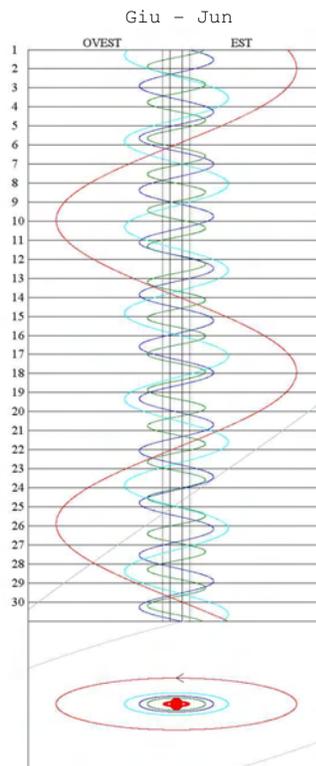
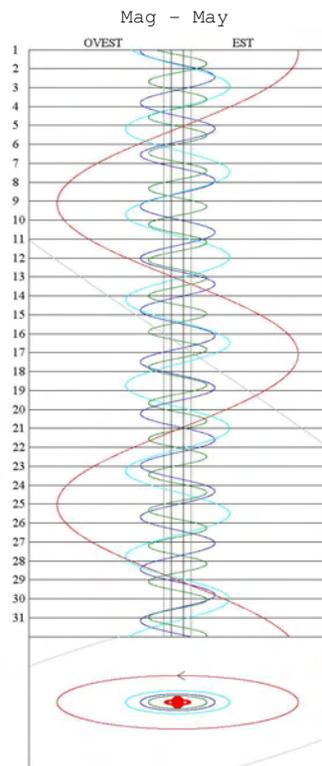
Date in the format dd/mm/yyyy

TIMES IN U.T.

# POSIZIONE DEI SATELLITI DI SATURNO POSITION OF THE SATELLITES OF SATURNO



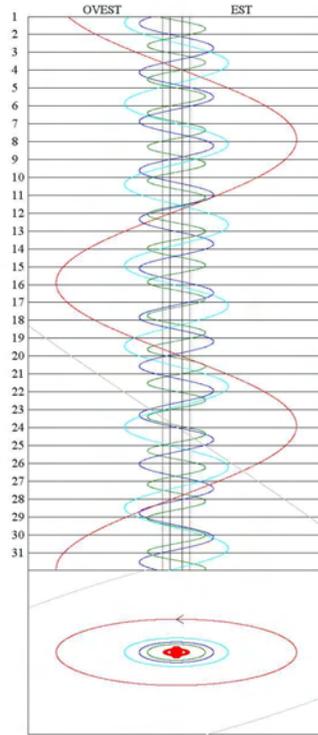
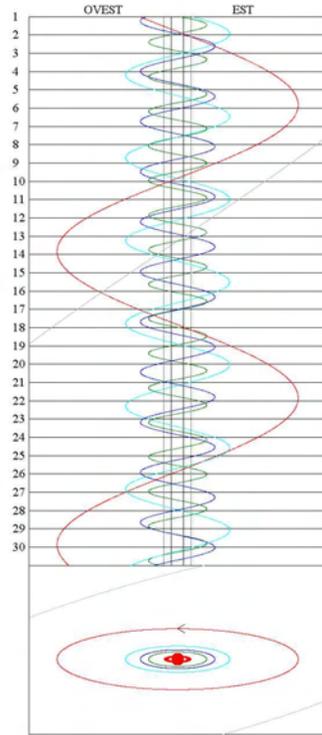
In verde Tethys, in blu Dione, in azzurro Rhea, in rosso Titano, in grigio Japetus  
 In green Tethys, in blue Dione, in light blue Rhea, in red Titano, in black Japetus



In verde Tethys, in blu Dione, in azzurro Rhea, in rosso Titano, in grigio Japetus  
 In green Tethys, in blue Dione, in light blue Rhea, in red Titano, in black Japetus

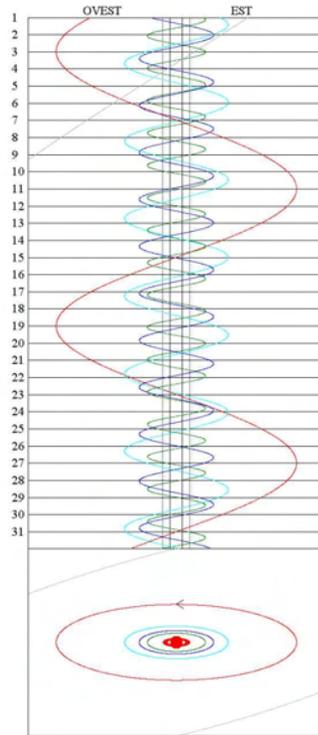
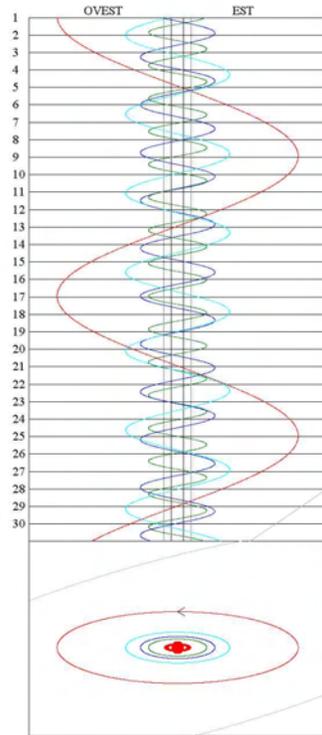
Set - Sep

Ott - Oct



Nov

Dic - Dec



In verde Tethys, in blu Dione, in azzurro Rhea, in rosso Titano, in grigio Japetus  
 In green Tethys, in blue Dione, in light blue Rhea, in red Titano, in black Japetus







Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
02/11/2012	00h 20m 38.56s	+01° 25' 28.4"	20,06105	19,237229	159,99	145,3	3,6	5,7	15,33	21,40	3,51
03/11/2012	00h 20m 31.78s	+01° 24' 46.3"	20,06099	19,247259	160,07	144,3	3,6	5,7	15,29	21,36	3,47
04/11/2012	00h 20m 25.12s	+01° 24' 05.0"	20,06094	19,257539	160,16	143,3	3,6	5,7	15,25	21,32	3,43
05/11/2012	00h 20m 18.58s	+01° 23' 24.5"	20,06088	19,268064	160,25	142,2	3,6	5,7	15,21	21,28	3,39
06/11/2012	00h 20m 12.17s	+01° 22' 44.8"	20,06083	19,278831	160,34	141,2	3,6	5,7	15,17	21,24	3,35
07/11/2012	00h 20m 05.88s	+01° 22' 06.0"	20,06077	19,289838	160,43	140,2	3,6	5,7	15,13	21,20	3,31
08/11/2012	00h 19m 59.72s	+01° 21' 28.1"	20,06072	19,301082	160,52	139,1	3,6	5,7	15,09	21,16	3,27
09/11/2012	00h 19m 53.70s	+01° 20' 51.1"	20,06066	19,312558	160,62	138,1	3,6	5,8	15,05	21,12	3,23
10/11/2012	00h 19m 47.81s	+01° 20' 14.9"	20,06060	19,324263	160,72	137,1	3,6	5,8	15,01	21,08	3,19
11/11/2012	00h 19m 42.06s	+01° 19' 39.7"	20,06055	19,336195	160,81	136,0	3,6	5,8	14,57	21,04	3,14
12/11/2012	00h 19m 36.46s	+01° 19' 05.5"	20,06049	19,348348	160,92	135,0	3,6	5,8	14,53	21,00	3,10
13/11/2012	00h 19m 31.00s	+01° 18' 32.3"	20,06044	19,360720	161,02	134,0	3,6	5,8	14,49	20,56	3,06
14/11/2012	00h 19m 25.70s	+01° 18' 00.1"	20,06038	19,373306	161,12	132,9	3,6	5,8	14,45	20,52	3,02
15/11/2012	00h 19m 20.55s	+01° 17' 28.9"	20,06032	19,386102	161,23	131,9	3,6	5,8	14,41	20,48	2,98
16/11/2012	00h 19m 15.56s	+01° 16' 58.7"	20,06027	19,399103	161,34	130,9	3,6	5,8	14,37	20,44	2,94
17/11/2012	00h 19m 10.72s	+01° 16' 29.6"	20,06021	19,412304	161,45	129,9	3,6	5,8	14,33	20,40	2,90
18/11/2012	00h 19m 06.04s	+01° 16' 01.5"	20,06015	19,425701	161,56	128,8	3,6	5,8	14,29	20,36	2,86
19/11/2012	00h 19m 01.51s	+01° 15' 34.5"	20,06010	19,439290	161,67	127,8	3,6	5,8	14,25	20,32	2,82
20/11/2012	00h 18m 57.15s	+01° 15' 08.5"	20,06004	19,453064	161,79	126,8	3,6	5,8	14,21	20,28	2,78
21/11/2012	00h 18m 52.94s	+01° 14' 43.6"	20,05999	19,467020	161,90	125,7	3,6	5,8	14,17	20,24	2,74
22/11/2012	00h 18m 48.90s	+01° 14' 19.7"	20,05993	19,481154	162,02	124,7	3,6	5,8	14,13	20,20	2,70
23/11/2012	00h 18m 45.03s	+01° 13' 57.0"	20,05987	19,495459	162,14	123,7	3,6	5,8	14,09	20,16	2,66
24/11/2012	00h 18m 41.32s	+01° 13' 35.3"	20,05982	19,509932	162,26	122,7	3,6	5,8	14,05	20,12	2,62
25/11/2012	00h 18m 37.78s	+01° 13' 14.8"	20,05976	19,524569	162,38	121,6	3,6	5,8	14,01	20,08	2,58
26/11/2012	00h 18m 34.42s	+01° 12' 55.4"	20,05970	19,539363	162,50	120,6	3,6	5,8	13,57	20,04	2,54
27/11/2012	00h 18m 31.24s	+01° 12' 37.2"	20,05965	19,554312	162,63	119,6	3,6	5,8	13,53	20,00	2,50
28/11/2012	00h 18m 28.23s	+01° 12' 20.1"	20,05959	19,569410	162,75	118,5	3,6	5,8	13,49	19,56	2,46
29/11/2012	00h 18m 25.39s	+01° 12' 04.2"	20,05953	19,584653	162,88	117,5	3,6	5,8	13,45	19,52	2,02
30/11/2012	00h 18m 22.74s	+01° 11' 49.5"	20,05948	19,600035	163,01	116,5	3,6	5,8	13,41	19,48	1,58
01/12/2012	00h 18m 20.26s	+01° 11' 35.9"	20,05942	19,615554	163,14	115,5	3,6	5,8	13,37	19,44	1,54
02/12/2012	00h 18m 17.96s	+01° 11' 23.5"	20,05936	19,631203	163,27	114,5	3,6	5,8	13,33	19,40	1,50
03/12/2012	00h 18m 15.84s	+01° 11' 12.3"	20,05931	19,646978	163,40	113,4	3,6	5,8	13,29	19,36	1,46
04/12/2012	00h 18m 13.90s	+01° 11' 02.3"	20,05925	19,662875	163,53	112,4	3,6	5,8	13,26	19,32	1,42
05/12/2012	00h 18m 12.14s	+01° 10' 53.4"	20,05919	19,678888	163,66	111,4	3,6	5,8	13,22	19,28	1,38
06/12/2012	00h 18m 10.56s	+01° 10' 45.7"	20,05914	19,695014	163,80	110,4	3,6	5,8	13,18	19,24	1,34
07/12/2012	00h 18m 09.16s	+01° 10' 39.3"	20,05908	19,711246	163,93	109,3	3,6	5,8	13,14	19,20	1,30
08/12/2012	00h 18m 07.95s	+01° 10' 34.0"	20,05902	19,727580	164,07	108,3	3,6	5,8	13,10	19,16	1,26
09/12/2012	00h 18m 06.93s	+01° 10' 29.9"	20,05897	19,744012	164,21	107,3	3,6	5,8	13,06	19,12	1,22
10/12/2012	00h 18m 06.09s	+01° 10' 27.1"	20,05891	19,760535	164,34	106,3	3,5	5,8	13,02	19,08	1,18
11/12/2012	00h 18m 05.45s	+01° 10' 25.6"	20,05885	19,777144	164,48	105,3	3,5	5,8	12,58	19,04	1,14
12/12/2012	00h 18m 05.00s	+01° 10' 25.3"	20,05879	19,793835	164,62	104,2	3,5	5,8	12,54	19,00	1,10
13/12/2012	00h 18m 04.74s	+01° 10' 26.3"	20,05874	19,810601	164,76	103,2	3,5	5,8	12,50	18,56	1,06
14/12/2012	00h 18m 04.68s	+01° 10' 28.5"	20,05868	19,827436	164,90	102,2	3,5	5,8	12,46	18,52	1,03
15/12/2012	00h 18m 04.81s	+01° 10' 31.9"	20,05862	19,844336	165,04	101,2	3,5	5,8	12,42	18,48	0,99
16/12/2012	00h 18m 05.12s	+01° 10' 36.6"	20,05857	19,861294	165,18	100,2	3,5	5,8	12,38	18,45	0,95
17/12/2012	00h 18m 05.62s	+01° 10' 42.5"	20,05851	19,878304	165,32	99,2	3,5	5,8	12,34	18,41	0,91
18/12/2012	00h 18m 06.31s	+01° 10' 49.6"	20,05845	19,895361	165,46	98,1	3,5	5,8	12,30	18,37	0,87
19/12/2012	00h 18m 07.19s	+01° 10' 58.0"	20,05839	19,912460	165,61	97,1	3,5	5,8	12,26	18,33	0,83
20/12/2012	00h 18m 08.26s	+01° 11' 07.5"	20,05834	19,929594	165,75	96,1	3,5	5,8	12,23	18,29	0,79
21/12/2012	00h 18m 09.52s	+01° 11' 18.3"	20,05828	19,946758	165,89	95,1	3,5	5,8	12,19	18,25	0,75
22/12/2012	00h 18m 10.97s	+01° 11' 30.3"	20,05822	19,963948	166,04	94,1	3,5	5,8	12,15	18,21	0,71
23/12/2012	00h 18m 12.61s	+01° 11' 43.6"	20,05816	19,981158	166,18	93,1	3,5	5,8	12,11	18,17	0,67
24/12/2012	00h 18m 14.44s	+01° 11' 58.1"	20,05811	19,998383	166,32	92,1	3,5	5,8	12,07	18,13	0,63
25/12/2012	00h 18m 16.46s	+01° 12' 13.8"	20,05805	20,015617	166,47	91,1	3,5	5,8	12,03	18,09	0,20
26/12/2012	00h 18m 18.68s	+01° 12' 30.8"	20,05799	20,032856	166,61	90,1	3,5	5,8	11,59	18,05	0,16
27/12/2012	00h 18m 21.08s	+01° 12' 49.0"	20,05793	20,050094	166,75	89,1	3,5	5,8	11,55	18,02	0,12
28/12/2012	00h 18m 23.67s	+01° 13' 08.4"	20,05788	20,067328	166,90	88,0	3,5	5,8	11,51	17,58	0,08
29/12/2012	00h 18m 26.45s	+01° 13' 29.0"	20,05782	20,084551	167,04	87,0	3,5	5,8	11,47	17,54	0,04
30/12/2012	00h 18m 29.41s	+01° 13' 50.8"	20,05776	20,101758	167,18	86,0	3,5	5,8	11,43	17,50	23,56
31/12/2012	00h 18m 32.56s	+01° 14' 13.8"	20,05770	20,118946	167,32	85,0	3,5	5,8	11,40	17,46	23,53

A.R., Dec. = coordinate apparenti  
Distance = distanza dalla Terra in U.A.  
El. = elongazione dal Sole in °  
Mag. = magnitudine

R. = distanza dal Sole in U.A.  
Light = distanza in minuti-luce  
Diam. = diametro in "

Tempi di levata e tramonto in T.U.+1, calcolati per Roma (42°N, 12°E), aggiungere un'ora quando si adotta l'ora legale

A.R., Dec. = apparent coordinates  
Distance = distance from the Earth in A.U.  
El. = elongation from the Sun in °  
Mag. = magnitude

R. = distance from the Sun in A.U.  
Light = distance in minutes  
Diam. = diameter in "

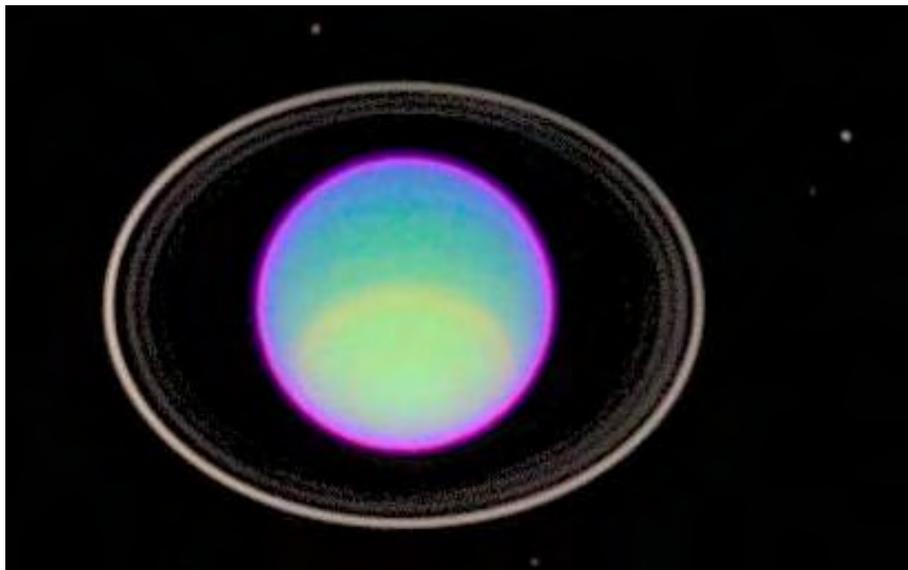
Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

© (12)

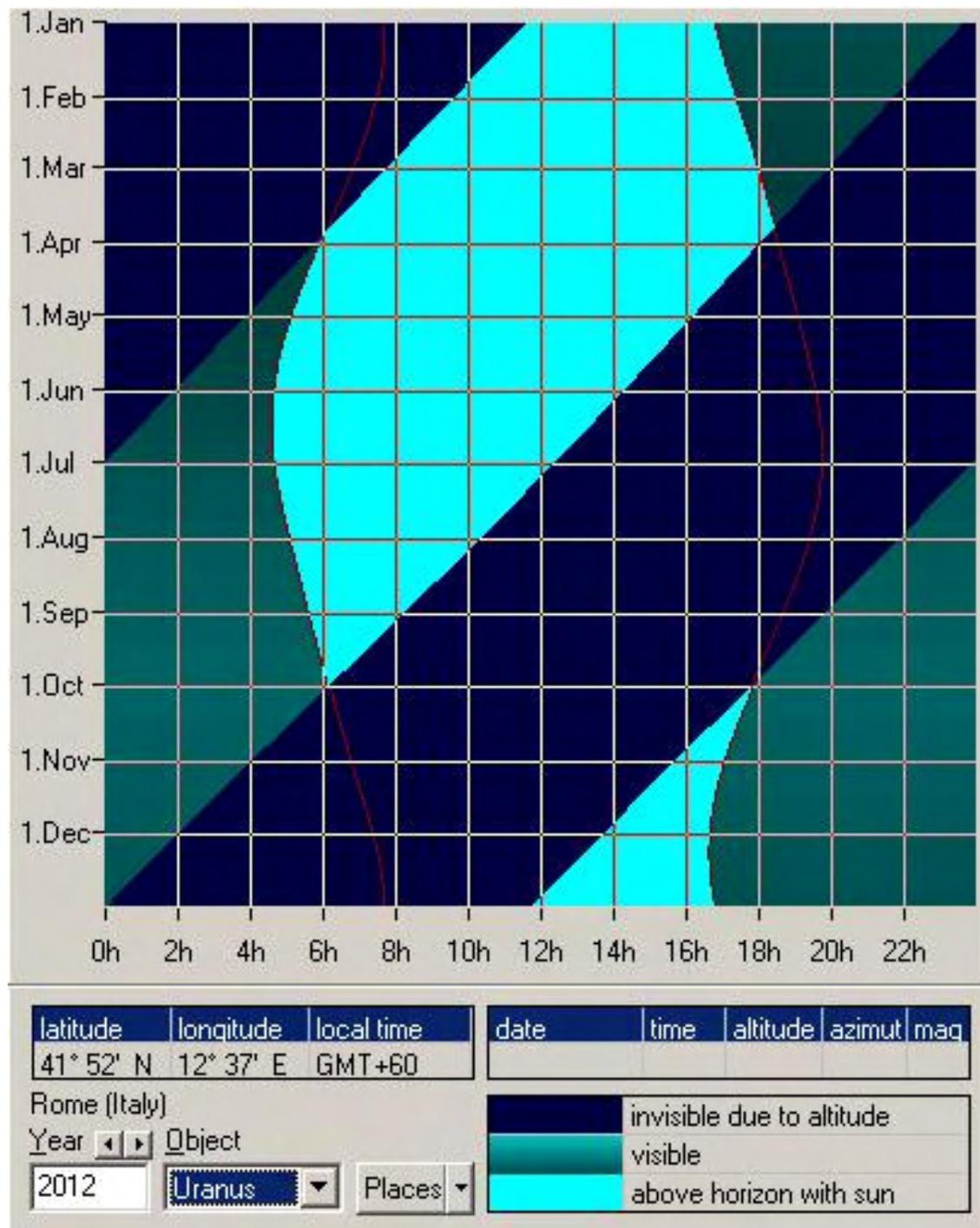
# FENOMENI DI URANO - PHENOMENA OF URANUS

Perielio - Perihelion	Questo anno non avviene - No phenomenon		
Afelio - Aphelion	Questo anno non avviene - No phenomenon		
Perigeo - Perigee	28/09/2012	12:31:08	19,06133 AU
Apogeo - Apogee	25/03/2012	14:34:03	21,06977 AU
Magnit. Max - Brightness maximum	28/09/2012	16:37:21	5,7 mag
Magnit. Min - Brightness minimum	25/03/2012	10:18:22	5,9 mag
Opposizione - Opposition	29/09/2012	07:14:44	
Congiunzione - Conjunction	24/03/2012	18:20:02	
Moto retrogr. - Retrograde motion	13/07/2012	16:49:25	
Moto diretto - Prograde motion	13/12/2012	20:05:09	
Max ang. Fase - Maximum phase angle	30/06/2012	01:16:16	2,9 °
Max ang. Fase - Maximum phase angle	26/12/2012	00:07:25	2,8 °
Min ang. Fase - Minimum phase angle	24/03/2012	21:39:16	0,0 °
Min ang. Fase - Minimum phase angle	29/09/2012	10:50:04	0,0 °

© (5)



# VISIBILITA' DI URANO - VISIBILITY OF URANUS



Visibilità di Urano nel corso dell'anno - Visibility of Uranus during the year

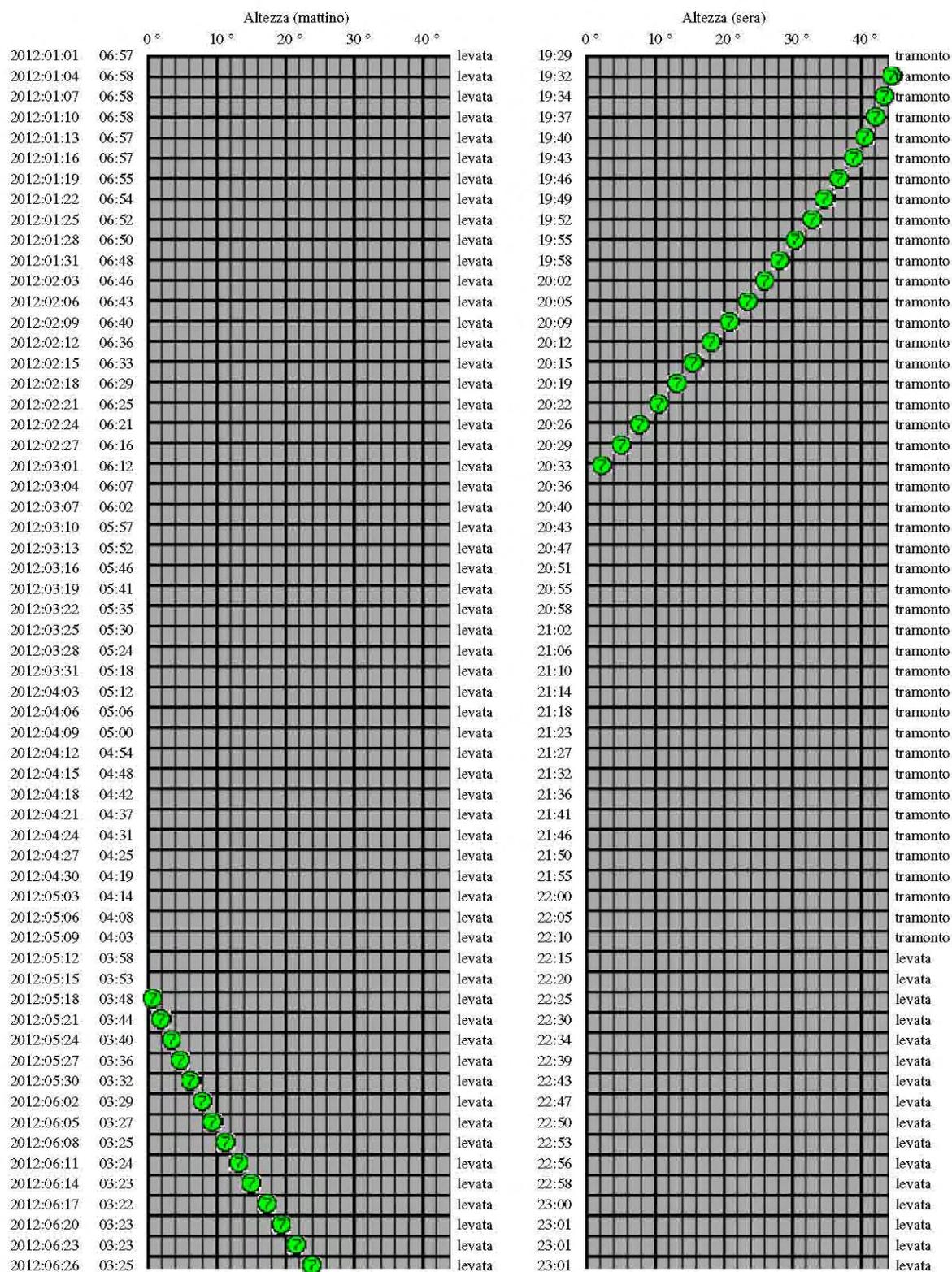
© (3)

# Altezza ai crepuscoli

## di Urano

nel momento in cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

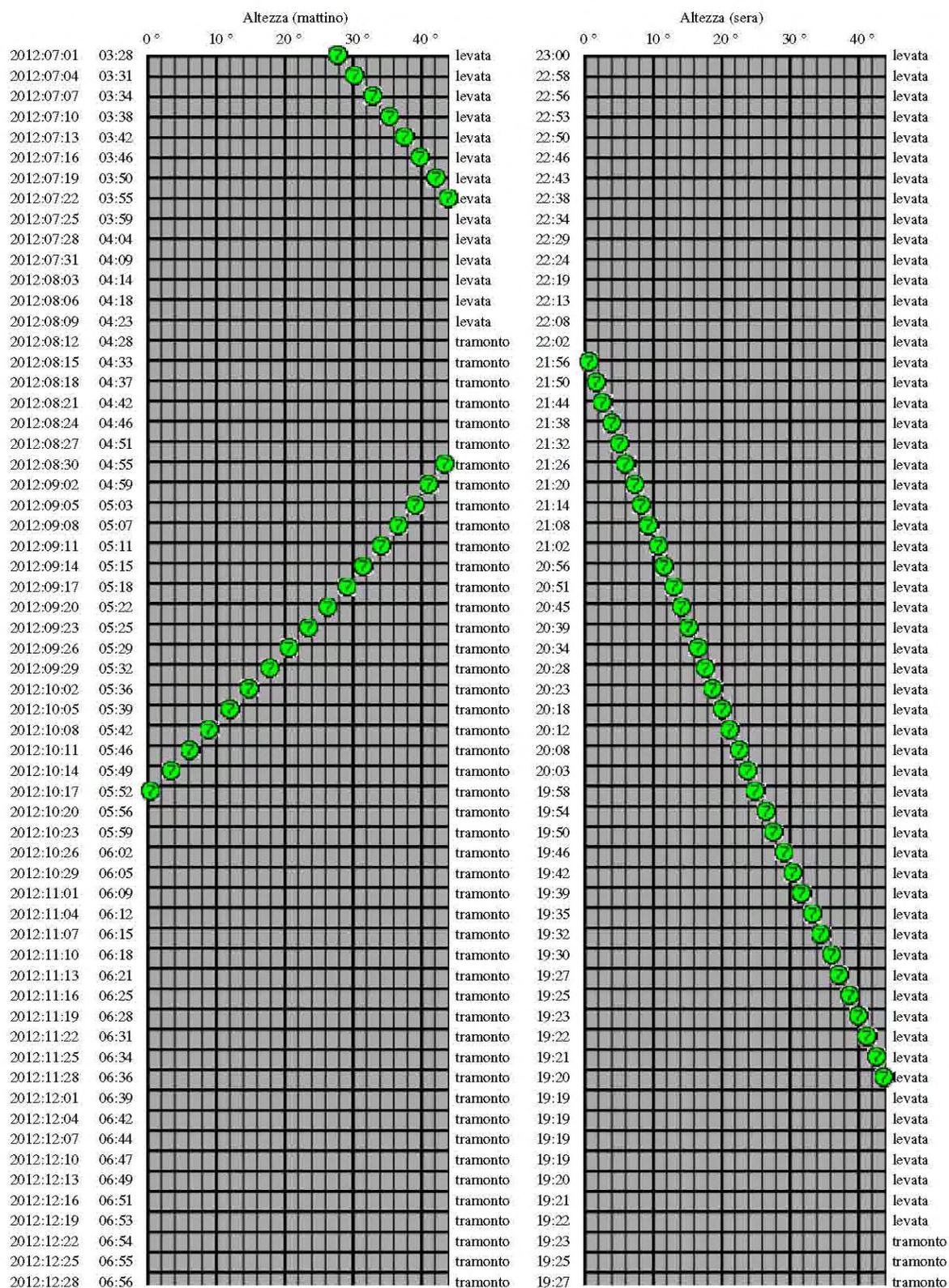


# Altezza ai crepuscoli

## di Urano

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	-48.1	9.0	80.7	18:29	45.8	201.1	80.2
2012:01:04	05:58	-47.6	13.5	77.7	18:32	44.8	205.8	77.2
2012:01:07	05:58	-47.0	17.7	74.7	18:34	43.6	210.5	74.2
2012:01:10	05:58	-46.3	21.7	71.7	18:37	42.2	214.9	71.2
2012:01:13	05:57	-45.4	25.5	68.7	18:40	40.6	219.2	68.2
2012:01:16	05:57	-44.5	29.0	65.8	18:43	38.9	223.3	65.2
2012:01:19	05:55	-43.4	32.4	62.8	18:46	37.0	227.3	62.3
2012:01:22	05:54	-42.3	35.5	59.9	18:49	35.0	231.0	59.3
2012:01:25	05:52	-41.2	38.4	56.9	18:52	32.8	234.6	56.4
2012:01:28	05:50	-40.0	41.1	54.0	18:55	30.6	238.0	53.5
2012:01:31	05:48	-38.9	43.6	51.1	18:59	28.3	241.3	50.5
2012:02:03	05:46	-37.7	46.0	48.1	19:02	25.9	244.4	47.6
2012:02:06	05:43	-36.5	48.2	45.2	19:05	23.4	247.4	44.7
2012:02:09	05:40	-35.2	50.2	42.3	19:09	20.9	250.3	41.8
2012:02:12	05:36	-34.0	52.2	39.4	19:12	18.3	253.1	38.9
2012:02:15	05:33	-32.8	54.0	36.5	19:15	15.7	255.9	36.0
2012:02:18	05:29	-31.7	55.7	33.7	19:19	13.1	258.5	33.1
2012:02:21	05:25	-30.5	57.3	30.8	19:22	10.4	261.1	30.2
2012:02:24	05:21	-29.3	58.8	27.9	19:26	7.7	263.7	27.4
2012:02:27	05:16	-28.2	60.3	25.1	19:29	5.1	266.2	24.5
2012:03:01	05:12	-27.1	61.6	22.2	19:33	2.4	268.8	21.7
2012:03:04	05:07	-26.0	62.9	19.4	19:36	-0.4	271.3	18.8
2012:03:07	05:02	-24.9	64.2	16.6	19:40	-3.1	273.8	16.0
2012:03:10	04:57	-23.8	65.4	13.7	19:44	-5.8	276.3	13.1
2012:03:13	04:52	-22.7	66.5	10.9	19:47	-8.5	278.9	10.3
2012:03:16	04:46	-21.7	67.6	8.1	19:51	-11.1	281.5	7.5
2012:03:19	04:41	-20.7	68.6	5.3	19:55	-13.8	284.2	4.7
2012:03:22	04:35	-19.6	69.7	2.6	19:58	-16.4	287.0	2.0
2012:03:25	04:29	-18.6	70.7	0.8	20:02	-19.1	289.8	1.2
2012:03:28	04:24	-17.6	71.6	3.2	20:06	-21.6	292.8	3.8
2012:03:31	04:18	-16.6	72.6	6.0	20:10	-24.2	295.9	6.6
2012:04:03	04:12	-15.6	73.5	8.7	20:14	-26.7	299.1	9.4
2012:04:06	04:06	-14.6	74.4	11.5	20:19	-29.1	302.5	12.1
2012:04:09	04:00	-13.6	75.3	14.3	20:23	-31.4	306.1	14.9
2012:04:12	03:54	-12.7	76.2	17.1	20:27	-33.6	309.9	17.7
2012:04:15	03:48	-11.7	77.0	19.8	20:32	-35.8	313.9	20.5
2012:04:18	03:42	-10.7	77.9	22.6	20:36	-37.7	318.2	23.2
2012:04:21	03:36	-9.6	78.8	25.4	20:41	-39.6	322.7	26.0
2012:04:24	03:31	-8.6	79.7	28.1	20:46	-41.2	327.5	28.8
2012:04:27	03:25	-7.6	80.6	30.9	20:50	-42.7	332.5	31.6
2012:04:30	03:19	-6.5	81.5	33.6	20:55	-43.9	337.8	34.3
2012:05:03	03:13	-5.4	82.4	36.4	21:00	-44.8	343.3	37.1
2012:05:06	03:08	-4.3	83.3	39.2	21:05	-45.5	349.0	39.9
2012:05:09	03:03	-3.2	84.3	41.9	21:10	-45.9	354.8	42.6
2012:05:12	02:58	-2.0	85.3	44.7	21:15	-45.9	0.7	45.4
2012:05:15	02:53	-0.8	86.3	47.4	21:20	-45.7	6.5	48.2
2012:05:18	02:48	0.5	87.4	50.2	21:25	-45.2	12.3	50.9
2012:05:21	02:44	1.8	88.5	53.0	21:30	-44.3	17.8	53.7
2012:05:24	02:39	3.2	89.7	55.7	21:34	-43.2	23.2	56.5
2012:05:27	02:36	4.7	91.0	58.5	21:39	-41.9	28.2	59.2
2012:05:30	02:32	6.2	92.3	61.3	21:43	-40.4	33.0	62.0
2012:06:02	02:29	7.8	93.7	64.1	21:47	-38.7	37.5	64.8
2012:06:05	02:27	9.5	95.2	66.8	21:50	-36.9	41.6	67.6
2012:06:08	02:25	11.3	96.8	69.6	21:53	-35.0	45.5	70.4
2012:06:11	02:24	13.2	98.5	72.4	21:56	-33.1	49.0	73.2
2012:06:14	02:23	15.1	100.3	75.2	21:58	-31.1	52.3	76.0
2012:06:17	02:22	17.2	102.3	78.0	22:00	-29.1	55.3	78.8
2012:06:20	02:23	19.4	104.5	80.8	22:01	-27.1	58.1	81.6
2012:06:23	02:23	21.6	106.8	83.6	22:01	-25.1	60.7	84.4
2012:06:26	02:25	24.0	109.3	86.4	22:01	-23.2	63.1	87.2
2012:06:29	02:27	26.3	111.9	89.3	22:00	-21.4	65.2	90.0

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza del pianeta sull'orizzonte, in °  
 Az = azimut del pianeta, in °  
 Elong = elongazione del pianeta, in °

Alt = altitude of the planet above the horizon, in °  
 Az = azimuth of the planet, in °  
 Elong = elongation of the planet, in °

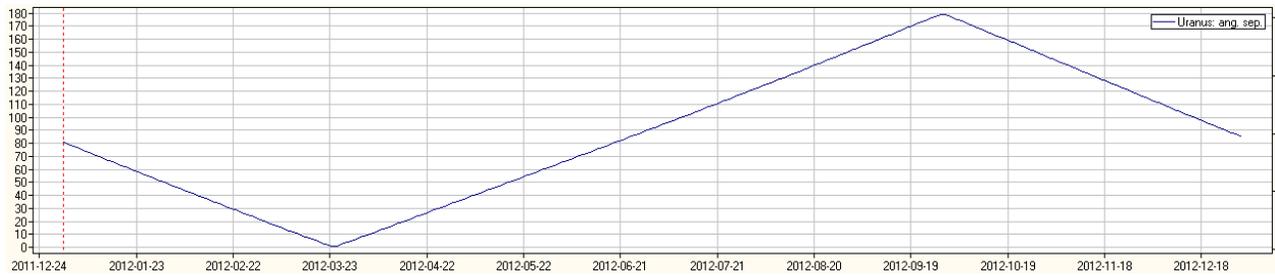
Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	02:28	28.0	113.8	91.1	22:00	-20.2	66.6	91.9
2012:07:04	02:31	30.4	116.9	94.0	21:58	-18.4	68.5	94.7
2012:07:07	02:34	32.8	120.2	96.8	21:56	-16.8	70.3	97.6
2012:07:10	02:38	35.3	123.8	99.7	21:53	-15.1	72.0	100.4
2012:07:13	02:42	37.6	127.7	102.5	21:50	-13.6	73.6	103.3
2012:07:16	02:46	39.9	131.9	105.4	21:46	-12.1	75.1	106.2
2012:07:19	02:50	42.1	136.4	108.3	21:43	-10.7	76.5	109.0
2012:07:22	02:55	44.1	141.3	111.2	21:38	-9.3	77.8	111.9
2012:07:25	02:59	45.9	146.6	114.0	21:34	-8.0	79.1	114.8
2012:07:28	03:04	47.5	152.2	116.9	21:29	-6.7	80.3	117.7
2012:07:31	03:09	48.8	158.2	119.9	21:24	-5.4	81.5	120.6
2012:08:03	03:14	49.8	164.4	122.8	21:19	-4.2	82.7	123.5
2012:08:06	03:19	50.4	170.9	125.7	21:13	-3.0	83.8	126.4
2012:08:09	03:23	50.7	177.5	128.6	21:08	-1.8	84.9	129.4
2012:08:12	03:28	50.6	184.1	131.6	21:02	-0.6	86.0	132.3
2012:08:15	03:33	50.2	190.7	134.5	20:56	0.5	87.0	135.3
2012:08:18	03:37	49.4	197.0	137.5	20:50	1.6	88.1	138.2
2012:08:21	03:42	48.3	203.1	140.5	20:44	2.8	89.2	141.2
2012:08:24	03:46	46.9	208.9	143.5	20:38	3.9	90.2	144.2
2012:08:27	03:51	45.3	214.4	146.4	20:32	5.0	91.3	147.1
2012:08:30	03:55	43.4	219.5	149.4	20:26	6.1	92.3	150.1
2012:09:02	03:59	41.3	224.3	152.4	20:20	7.2	93.4	153.1
2012:09:05	04:03	39.1	228.7	155.5	20:14	8.3	94.5	156.1
2012:09:08	04:07	36.7	232.9	158.5	20:08	9.5	95.5	159.2
2012:09:11	04:11	34.3	236.7	161.5	20:02	10.6	96.6	162.2
2012:09:14	04:15	31.7	240.4	164.5	19:56	11.7	97.8	165.2
2012:09:17	04:18	29.0	243.8	167.6	19:50	12.9	98.9	168.2
2012:09:20	04:22	26.3	247.1	170.6	19:45	14.0	100.1	171.3
2012:09:23	04:25	23.5	250.2	173.7	19:39	15.2	101.3	174.3
2012:09:26	04:29	20.7	253.2	176.7	19:33	16.4	102.5	177.3
2012:09:29	04:32	17.8	256.0	179.2	19:28	17.6	103.7	179.1
2012:10:02	04:36	14.9	258.8	177.0	19:23	18.8	105.0	176.4
2012:10:05	04:39	12.0	261.5	174.0	19:17	20.0	106.4	173.3
2012:10:08	04:43	9.1	264.1	170.9	19:12	21.3	107.8	170.3
2012:10:11	04:46	6.2	266.7	167.8	19:07	22.5	109.2	167.2
2012:10:14	04:49	3.3	269.3	164.7	19:03	23.8	110.7	164.1
2012:10:17	04:52	0.4	271.9	161.7	18:58	25.1	112.2	161.0
2012:10:20	04:56	-2.6	274.4	158.6	18:54	26.4	113.9	158.0
2012:10:23	04:59	-5.5	277.0	155.5	18:50	27.8	115.6	154.9
2012:10:26	05:02	-8.3	279.6	152.4	18:46	29.1	117.3	151.8
2012:10:29	05:05	-11.2	282.3	149.3	18:42	30.5	119.2	148.7
2012:11:01	05:09	-14.0	285.0	146.2	18:39	31.9	121.2	145.6
2012:11:04	05:12	-16.8	287.7	143.1	18:35	33.2	123.3	142.5
2012:11:07	05:15	-19.5	290.6	140.0	18:32	34.6	125.5	139.4
2012:11:10	05:18	-22.2	293.5	136.9	18:30	36.0	127.8	136.3
2012:11:13	05:21	-24.8	296.6	133.8	18:27	37.4	130.3	133.2
2012:11:16	05:25	-27.3	299.7	130.7	18:25	38.7	132.9	130.1
2012:11:19	05:28	-29.7	303.1	127.6	18:23	40.1	135.7	127.1
2012:11:22	05:31	-32.0	306.5	124.5	18:22	41.4	138.8	124.0
2012:11:25	05:34	-34.2	310.1	121.4	18:21	42.7	142.0	120.9
2012:11:28	05:36	-36.3	313.9	118.4	18:20	43.9	145.4	117.8
2012:12:01	05:39	-38.2	317.9	115.3	18:19	45.0	149.0	114.8
2012:12:04	05:42	-40.0	322.0	112.2	18:19	46.1	152.9	111.7
2012:12:07	05:44	-41.5	326.2	109.2	18:19	47.0	157.0	108.6
2012:12:10	05:47	-42.9	330.7	106.1	18:19	47.8	161.4	105.6
2012:12:13	05:49	-44.1	335.2	103.0	18:20	48.4	165.9	102.5
2012:12:16	05:51	-45.1	339.9	100.0	18:21	48.9	170.7	99.5
2012:12:19	05:53	-45.9	344.6	96.9	18:22	49.2	175.6	96.4
2012:12:22	05:54	-46.4	349.3	93.9	18:23	49.3	180.7	93.4
2012:12:25	05:55	-46.7	354.0	90.9	18:25	49.2	185.8	90.4
2012:12:28	05:56	-46.9	358.7	87.9	18:27	48.8	191.0	87.3
2012:12:31	05:57	-46.8	3.2	84.8	18:29	48.2	196.1	84.3

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza del pianeta sull'orizzonte, in °  
Az = azimut del pianeta, in °  
Elong = elongazione del pianeta, in °

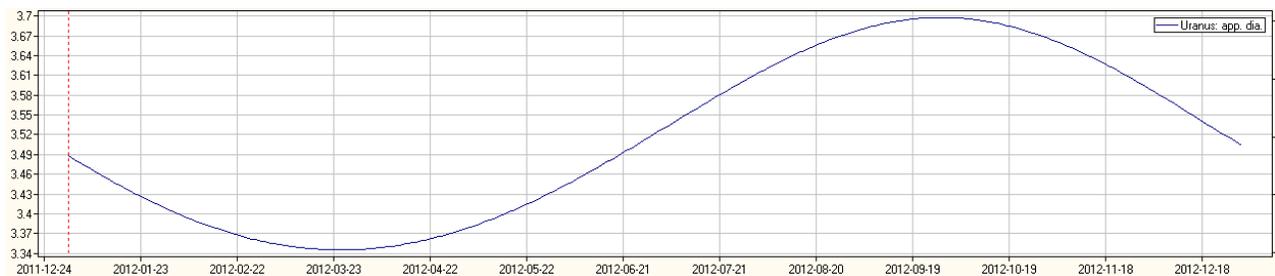
Alt = altitude of the planet above the horizon, in °  
Az = azimuth of the planet, in °  
Elong = elongation of the planet, in °



Distanza di Urano in U.A. nel corso dell'anno - Distance of Uranus in A.U. during the year



Elongazione di Urano in ° nel corso dell'anno - Elongation of Uranus in ° during the year



Diametro di Urano in " nel corso dell'anno - Diameter of Uranus in " during the year



Magnitudine di Urano nel corso dell'anno - Magnitude of Uranus during the year

# OCCULTAZIONI TRA I SATELLITI DI URANO

## OCCULTATIONS BETWEEN THE SATELLITES OF URANUS

Year	M	D	h	m	s	Event Type	Ph	Dur	dMag	%Ill	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
														T1	T2	T3	Tmax	T5	T6	T7														

Questo anno non avvengono fenomeni - No phenomena this year

Ore in T.U.

Legenda :

Data nel formato mese/giorno, un asterisco indica che le lune si avvicinano ma non si occultano  
 Event type : tipo di evento, eclissi o occultazione  
 Ph : fenomeno, M=mancato, E=eclisse penombrale, P=eclisse/occultazione parziale, T=eclisse/occultazione totale, A=eclisse/occultazione anulare  
 Durn : durata in secondi  
 dMag : caduta di luce in magnitudini  
 %ill : cambio in illuminazione, rispetto alla illuminazione intera, della luna rimanente (occultazione) o di entrambe (eclissi)  
 Sep : distanza in " tra satellite occultato/eclissato e centro del pianeta  
 Pa : angolo di posizione tra satellite occultato/eclissato e pianeta  
 MinD : distanza minima tra i centri delle lune o tra la luna e l'ombra  
 T1-T7 : inizio/fine della fase di contatto con la penombra  
 T2-T6 : inizio/fine della fase di contatto con l'ombra o tra i lembi delle lune  
 T3-T5 : inizio/fine della fase di totalità  
 Tmax : tempo di metà evento

Satelliti :

I = Miranda  
 II = Ariel  
 III = Umbriel  
 IV = Titania  
 V = Oberon

Times in T.U.

Date in the format month/day, an asterisk shows that the moons are near but they don't occult  
 Event type : eclipse or occultation  
 Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total eclipse/occultation, A=annular eclipse/occultation  
 Durn : duration in seconds  
 dMag : difference magnitude  
 %ill : defect of illumination, respect to integer  
 Sep : distance in " between the satellite and the center of the planet  
 Pa : position angle between the satellite and the center of the planet  
 MinD : least distance between the satellies  
 T1-T7 : penumbral phase begins/ends  
 T2-T6 : umbra phase begins/ends  
 T3-T5 : totalità phase begins/ends  
 Tmax : middle time of the event

Satellites :

I = Miranda  
 II = Ariel  
 III = Umbriel  
 IV = Titania  
 V = Oberon

© (8)









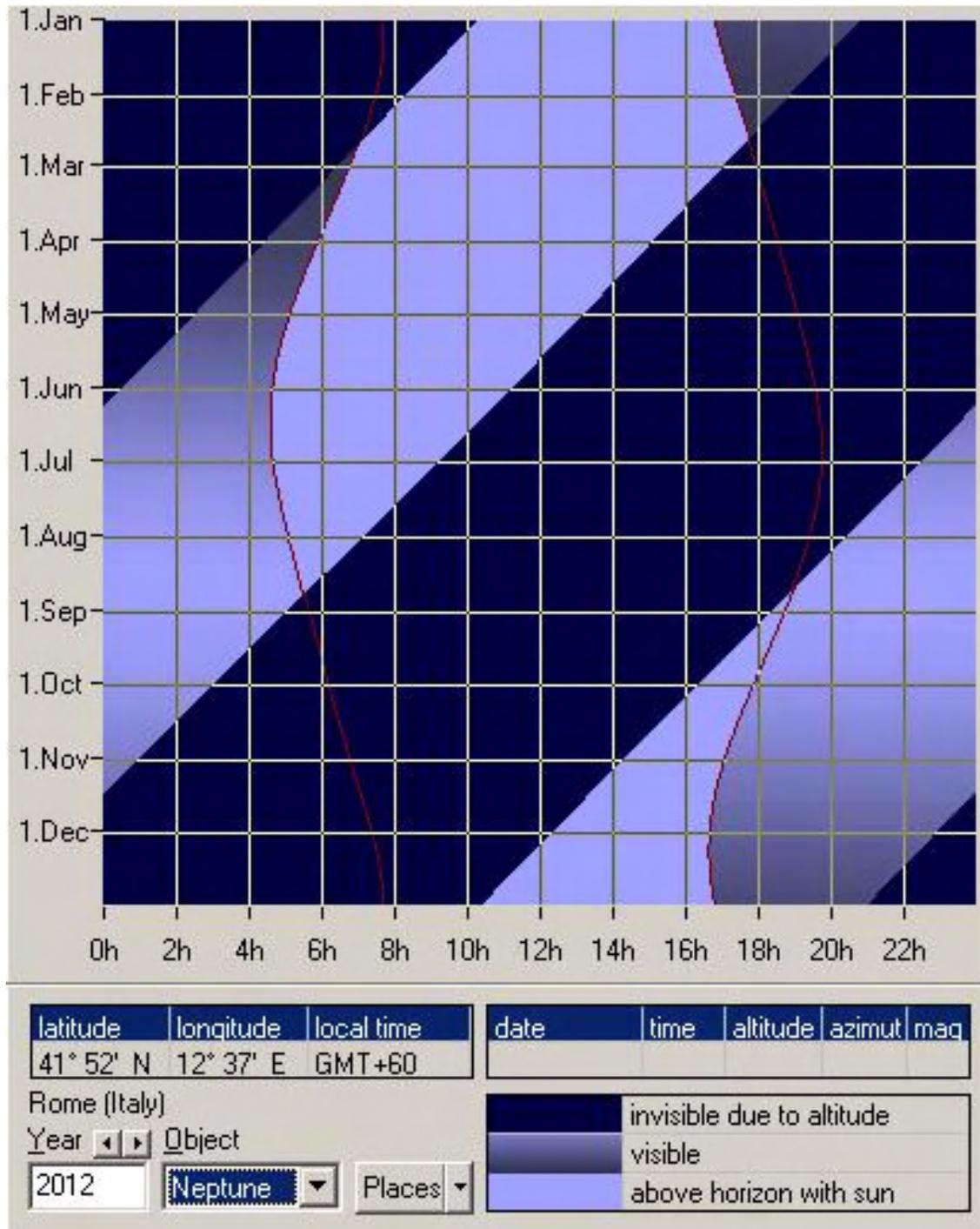
# FENOMENI DI NETTUNO - PHENOMENA OF NEPTUNE

Perielio - Perihelion	Questo anno non avviene - No phenomenon		
Afelio - Aphelion	Questo anno non avviene - No phenomenon		
Perigeo - Perigee	23/08/2012	20:51:32	28,98385 AU
Apogeo - Apogee	20/02/2012	11:44:47	30,98935 AU
Magnit. Max - Brightness maximum	23/08/2012	23:23:05	7,8 mag
Magnit. Min - Brightness minimum	20/02/2012	08:59:59	8,0 mag
Opposizione - Opposition	24/08/2012	12:32:10	
Congiunzione - Conjunction	19/02/2012	20:41:10	
Moto retrogr. - Retrograde motion	05/06/2012	05:42:38	
Moto diretto - Prograde motion	11/11/2012	10:47:22	
Max ang. Fase - Maximum phase angle	24/05/2012	17:15:06	1,9 °
Max ang. Fase - Maximum phase angle	21/11/2012	20:04:53	1,9 °
Min ang. Fase - Minimum phase angle	19/02/2012	23:33:46	0,0 °
Min ang. Fase - Minimum phase angle	24/08/2012	16:41:05	0,0 °

© (5)



# VISIBILITA' DI NETTUNO - VISIBILITY OF NEPTUNE



Visibilità di Nettuno nel corso dell'anno - Visibility of Neptune during the year

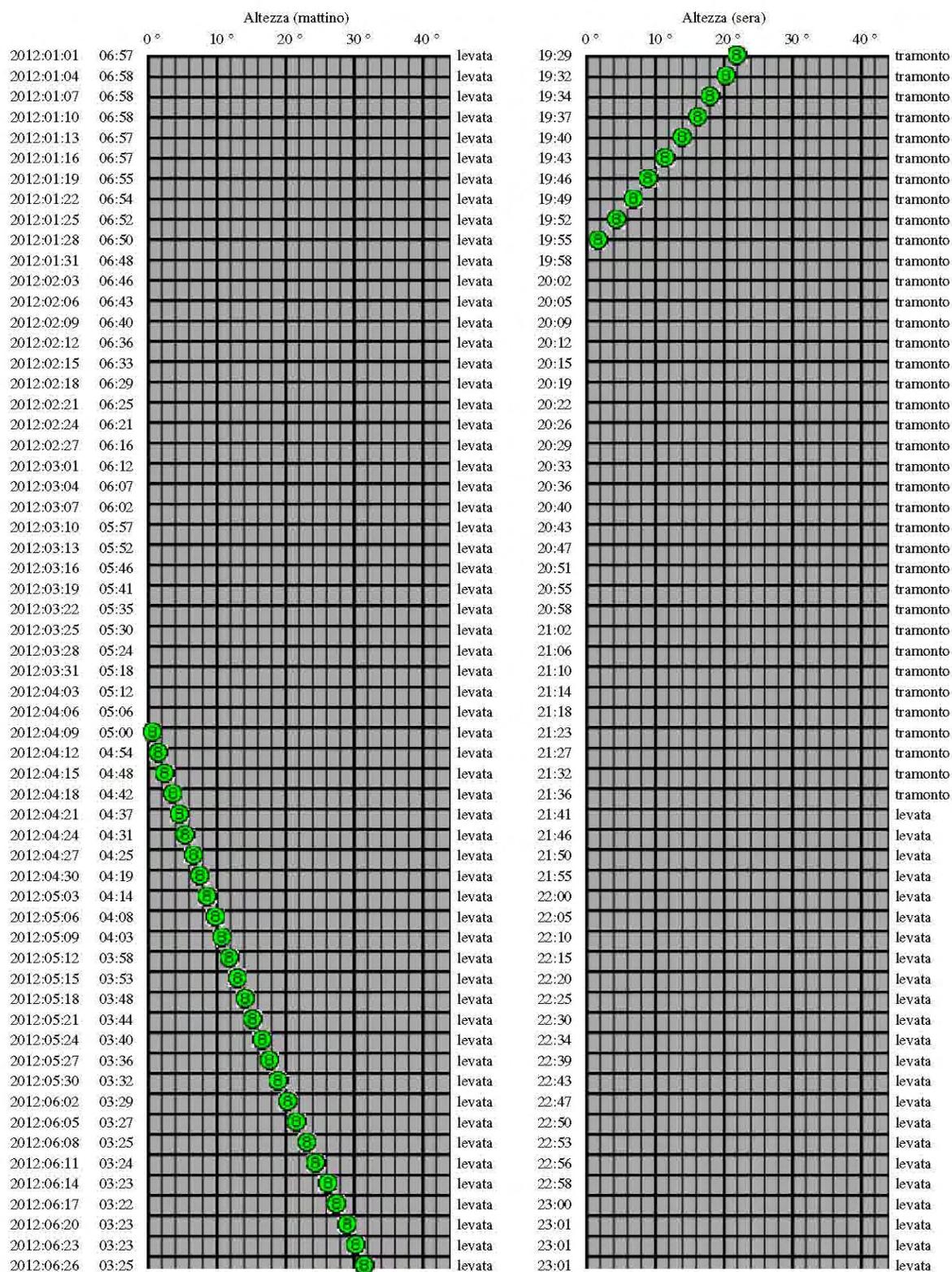
© (3)

# Altezza ai crepuscoli

## di Nettuno

nel momento in cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)

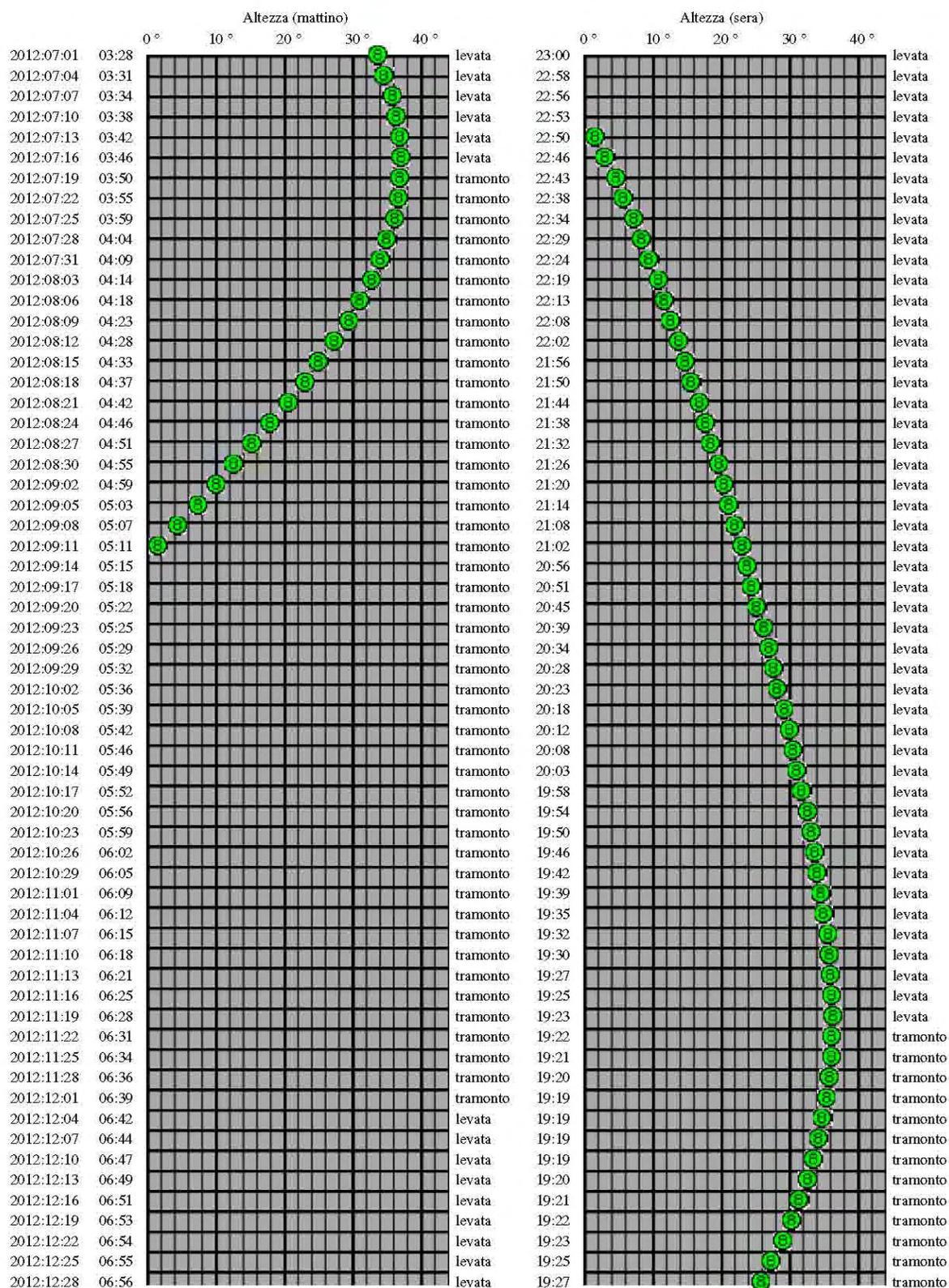


# Altezza ai crepuscoli

## di Nettuno

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	-47.1	57.2	48.7	18:29	22.1	227.5	48.2
2012:01:04	05:58	-45.2	60.4	45.8	18:32	20.2	230.5	45.2
2012:01:07	05:58	-43.2	63.3	42.8	18:34	18.2	233.4	42.3
2012:01:10	05:58	-41.3	65.9	39.8	18:37	16.1	236.3	39.3
2012:01:13	05:57	-39.4	68.4	36.9	18:40	13.8	239.1	36.3
2012:01:16	05:57	-37.5	70.7	33.9	18:43	11.5	241.8	33.4
2012:01:19	05:55	-35.6	72.9	30.9	18:46	9.2	244.5	30.4
2012:01:22	05:54	-33.8	74.9	28.0	18:49	6.7	247.1	27.5
2012:01:25	05:52	-32.0	76.8	25.0	18:52	4.2	249.6	24.5
2012:01:28	05:50	-30.3	78.5	22.1	18:55	1.6	252.1	21.6
2012:01:31	05:48	-28.6	80.2	19.2	18:59	-1.0	254.6	18.6
2012:02:03	05:46	-26.9	81.8	16.2	19:02	-3.6	257.1	15.7
2012:02:06	05:43	-25.3	83.3	13.3	19:05	-6.3	259.6	12.8
2012:02:09	05:40	-23.8	84.7	10.4	19:09	-8.9	262.0	9.8
2012:02:12	05:36	-22.2	86.1	7.5	19:12	-11.7	264.4	6.9
2012:02:15	05:33	-20.8	87.4	4.6	19:15	-14.4	266.9	4.0
2012:02:18	05:29	-19.3	88.6	1.7	19:19	-17.1	269.4	1.2
2012:02:21	05:25	-17.9	89.8	1.4	19:22	-19.9	271.9	1.9
2012:02:24	05:21	-16.6	91.0	4.2	19:26	-22.6	274.5	4.8
2012:02:27	05:16	-15.3	92.1	7.1	19:29	-25.3	277.1	7.7
2012:03:01	05:12	-14.0	93.2	10.0	19:33	-28.0	279.8	10.6
2012:03:04	05:07	-12.7	94.3	12.9	19:36	-30.8	282.7	13.5
2012:03:07	05:02	-11.5	95.3	15.8	19:40	-33.4	285.6	16.4
2012:03:10	04:57	-10.3	96.3	18.7	19:44	-36.1	288.8	19.3
2012:03:13	04:52	-9.2	97.2	21.5	19:47	-38.7	292.1	22.1
2012:03:16	04:46	-8.0	98.2	24.4	19:51	-41.2	295.6	25.0
2012:03:19	04:41	-6.9	99.1	27.3	19:55	-43.7	299.3	27.9
2012:03:22	04:35	-5.8	100.1	30.2	19:58	-46.1	303.4	30.8
2012:03:25	04:29	-4.7	101.0	33.0	20:02	-48.4	307.8	33.7
2012:03:28	04:24	-3.7	101.9	35.9	20:06	-50.6	312.5	36.5
2012:03:31	04:18	-2.6	102.8	38.8	20:10	-52.6	317.7	39.4
2012:04:03	04:12	-1.6	103.7	41.6	20:14	-54.4	323.4	42.3
2012:04:06	04:06	-0.6	104.6	44.5	20:19	-56.0	329.5	45.1
2012:04:09	04:00	0.4	105.5	47.4	20:23	-57.3	336.1	48.0
2012:04:12	03:54	1.4	106.4	50.2	20:27	-58.3	343.2	50.9
2012:04:15	03:48	2.5	107.3	53.1	20:32	-58.9	350.6	53.7
2012:04:18	03:42	3.5	108.3	55.9	20:36	-59.2	358.3	56.6
2012:04:21	03:36	4.5	109.2	58.8	20:41	-59.1	6.1	59.5
2012:04:24	03:31	5.5	110.2	61.6	20:46	-58.5	13.7	62.3
2012:04:27	03:25	6.5	111.2	64.5	20:50	-57.6	21.2	65.2
2012:04:30	03:19	7.5	112.2	67.3	20:55	-56.3	28.2	68.0
2012:05:03	03:13	8.6	113.2	70.2	21:00	-54.6	34.8	70.9
2012:05:06	03:08	9.6	114.3	73.1	21:05	-52.7	40.8	73.8
2012:05:09	03:03	10.7	115.4	75.9	21:10	-50.6	46.5	76.6
2012:05:12	02:58	11.8	116.6	78.8	21:15	-48.2	51.6	79.5
2012:05:15	02:53	13.0	117.9	81.6	21:20	-45.7	56.3	82.4
2012:05:18	02:48	14.1	119.2	84.5	21:25	-43.1	60.7	85.2
2012:05:21	02:44	15.3	120.6	87.3	21:30	-40.3	64.7	88.1
2012:05:24	02:39	16.5	122.1	90.2	21:34	-37.5	68.4	90.9
2012:05:27	02:36	17.8	123.7	93.1	21:39	-34.7	71.8	93.8
2012:05:30	02:32	19.1	125.3	95.9	21:43	-31.9	75.0	96.7
2012:06:02	02:29	20.4	127.2	98.8	21:47	-29.0	78.0	99.6
2012:06:05	02:27	21.8	129.2	101.7	21:50	-26.2	80.9	102.4
2012:06:08	02:25	23.2	131.3	104.5	21:53	-23.5	83.6	105.3
2012:06:11	02:24	24.6	133.6	107.4	21:56	-20.8	86.1	108.2
2012:06:14	02:23	26.0	136.1	110.3	21:58	-18.2	88.5	111.1
2012:06:17	02:22	27.5	138.9	113.2	22:00	-15.7	90.7	114.0
2012:06:20	02:23	28.9	141.8	116.1	22:01	-13.3	92.9	116.8
2012:06:23	02:23	30.3	145.1	118.9	22:01	-11.0	94.9	119.7
2012:06:26	02:25	31.7	148.6	121.8	22:01	-8.8	96.9	122.6
2012:06:29	02:27	32.9	152.3	124.7	22:00	-6.7	98.7	125.5

Morning twilights = crepuscolo mattutino

Evening twilight = crepuscolo serale

Date = data nel formato aaaa/mm/gg

Times = ore

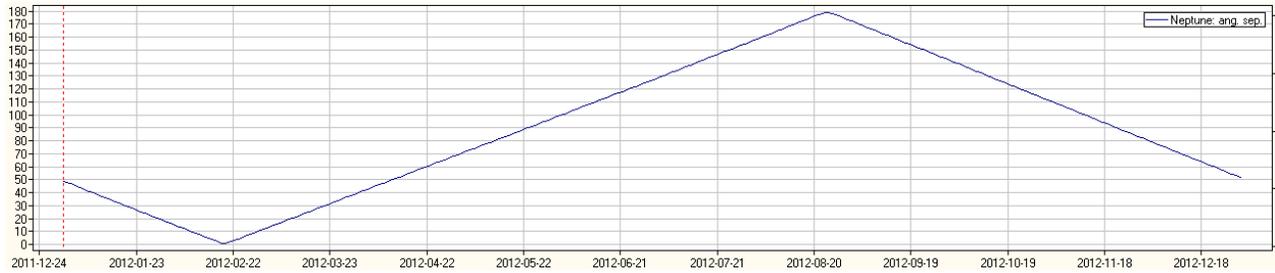
Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:01	02:28	33.7	154.9	126.7	22:00	-5.4	99.9	127.5
2012:07:04	02:31	34.8	159.1	129.6	21:58	-3.5	101.6	130.4
2012:07:07	02:34	35.7	163.6	132.5	21:56	-1.8	103.3	133.3
2012:07:10	02:38	36.3	168.2	135.4	21:53	-0.1	104.8	136.2
2012:07:13	02:42	36.8	173.0	138.3	21:50	1.5	106.3	139.1
2012:07:16	02:46	37.0	178.0	141.2	21:46	3.0	107.8	142.0
2012:07:19	02:50	37.0	183.0	144.2	21:43	4.4	109.2	144.9
2012:07:22	02:55	36.6	188.1	147.1	21:38	5.8	110.6	147.8
2012:07:25	02:59	36.0	193.2	150.0	21:34	7.1	111.9	150.8
2012:07:28	03:04	35.2	198.1	153.0	21:29	8.3	113.2	153.7
2012:07:31	03:09	34.0	203.0	155.9	21:24	9.5	114.5	156.6
2012:08:03	03:14	32.7	207.7	158.8	21:19	10.6	115.7	159.6
2012:08:06	03:19	31.1	212.2	161.8	21:13	11.7	117.0	162.5
2012:08:09	03:23	29.3	216.5	164.8	21:08	12.8	118.2	165.5
2012:08:12	03:28	27.3	220.6	167.7	21:02	13.8	119.4	168.4
2012:08:15	03:33	25.1	224.6	170.7	20:56	14.8	120.7	171.4
2012:08:18	03:37	22.9	228.3	173.6	20:50	15.7	121.9	174.3
2012:08:21	03:42	20.5	231.8	176.6	20:44	16.7	123.1	177.3
2012:08:24	03:46	17.9	235.2	179.3	20:38	17.6	124.3	179.3
2012:08:27	03:51	15.4	238.5	177.3	20:32	18.5	125.6	176.7
2012:08:30	03:55	12.7	241.6	174.4	20:26	19.4	126.9	173.7
2012:09:02	03:59	10.0	244.5	171.4	20:20	20.3	128.1	170.7
2012:09:05	04:03	7.2	247.4	168.4	20:14	21.1	129.5	167.8
2012:09:08	04:07	4.4	250.2	165.4	20:08	22.0	130.8	164.8
2012:09:11	04:11	1.5	252.9	162.5	20:02	22.8	132.1	161.8
2012:09:14	04:15	-1.3	255.5	159.5	19:56	23.7	133.5	158.8
2012:09:17	04:18	-4.2	258.1	156.5	19:50	24.5	134.9	155.8
2012:09:20	04:22	-7.1	260.7	153.5	19:45	25.3	136.4	152.8
2012:09:23	04:25	-10.0	263.2	150.4	19:39	26.1	137.9	149.8
2012:09:26	04:29	-12.9	265.7	147.4	19:33	26.8	139.5	146.8
2012:09:29	04:32	-15.8	268.3	144.4	19:28	27.6	141.1	143.8
2012:10:02	04:36	-18.7	270.8	141.4	19:23	28.3	142.7	140.8
2012:10:05	04:39	-21.6	273.4	138.4	19:17	29.1	144.4	137.8
2012:10:08	04:43	-24.5	276.1	135.4	19:12	29.8	146.2	134.8
2012:10:11	04:46	-27.3	278.8	132.4	19:07	30.5	148.0	131.8
2012:10:14	04:49	-30.1	281.6	129.4	19:03	31.2	149.9	128.8
2012:10:17	04:52	-32.9	284.5	126.3	18:58	31.8	151.9	125.7
2012:10:20	04:56	-35.6	287.6	123.3	18:54	32.5	154.0	122.7
2012:10:23	04:59	-38.3	290.8	120.3	18:50	33.1	156.1	119.7
2012:10:26	05:02	-40.9	294.3	117.3	18:46	33.6	158.4	116.7
2012:10:29	05:05	-43.5	297.9	114.3	18:42	34.2	160.7	113.7
2012:11:01	05:09	-45.9	301.8	111.2	18:39	34.6	163.1	110.7
2012:11:04	05:12	-48.3	306.0	108.2	18:35	35.1	165.6	107.7
2012:11:07	05:15	-50.5	310.6	105.2	18:32	35.4	168.3	104.6
2012:11:10	05:18	-52.5	315.5	102.2	18:30	35.8	171.0	101.6
2012:11:13	05:21	-54.4	320.8	99.2	18:27	36.0	173.8	98.6
2012:11:16	05:25	-56.0	326.5	96.1	18:25	36.1	176.7	95.6
2012:11:19	05:28	-57.4	332.6	93.1	18:23	36.2	179.8	92.6
2012:11:22	05:31	-58.5	339.1	90.1	18:22	36.2	182.9	89.6
2012:11:25	05:34	-59.4	345.9	87.1	18:21	36.0	186.1	86.6
2012:11:28	05:36	-59.8	352.9	84.1	18:20	35.8	189.3	83.6
2012:12:01	05:39	-60.0	360.0	81.1	18:19	35.4	192.6	80.5
2012:12:04	05:42	-59.8	7.0	78.1	18:19	34.9	196.0	77.5
2012:12:07	05:44	-59.3	13.8	75.1	18:19	34.2	199.4	74.5
2012:12:10	05:47	-58.6	20.2	72.1	18:19	33.4	202.8	71.5
2012:12:13	05:49	-57.5	26.3	69.1	18:20	32.5	206.2	68.5
2012:12:16	05:51	-56.3	32.0	66.1	18:21	31.4	209.5	65.5
2012:12:19	05:53	-54.8	37.2	63.1	18:22	30.2	212.9	62.6
2012:12:22	05:54	-53.3	41.9	60.1	18:23	28.9	216.2	59.6
2012:12:25	05:55	-51.6	46.3	57.1	18:25	27.4	219.5	56.6
2012:12:28	05:56	-49.8	50.3	54.1	18:27	25.8	222.7	53.6
2012:12:31	05:57	-48.0	53.9	51.1	18:29	24.0	225.8	50.6

Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale

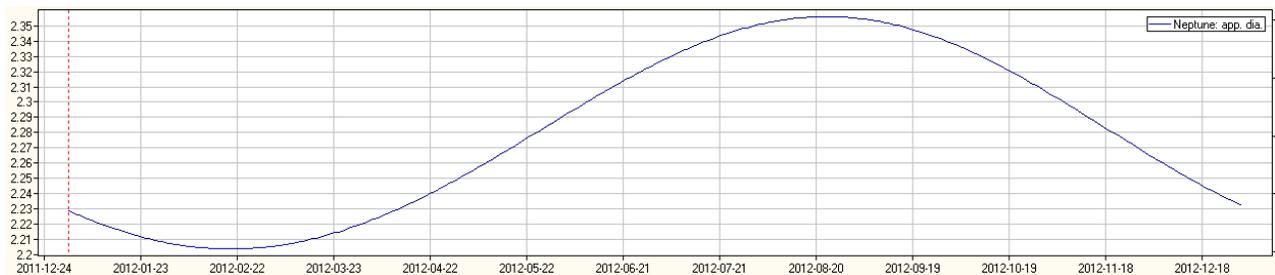
Date = data nel formato aaaa/mm/gg  
Times = ore



Distanza di Nettuno in U.A. nel corso dell'anno - Distance of Neptune in A.U. during the year



Elongazione di Nettuno in ° nel corso dell'anno - Elongation of Neptune in ° during the year



Diametro di Nettuno in " nel corso dell'anno - Diameter of Neptune in " during the year



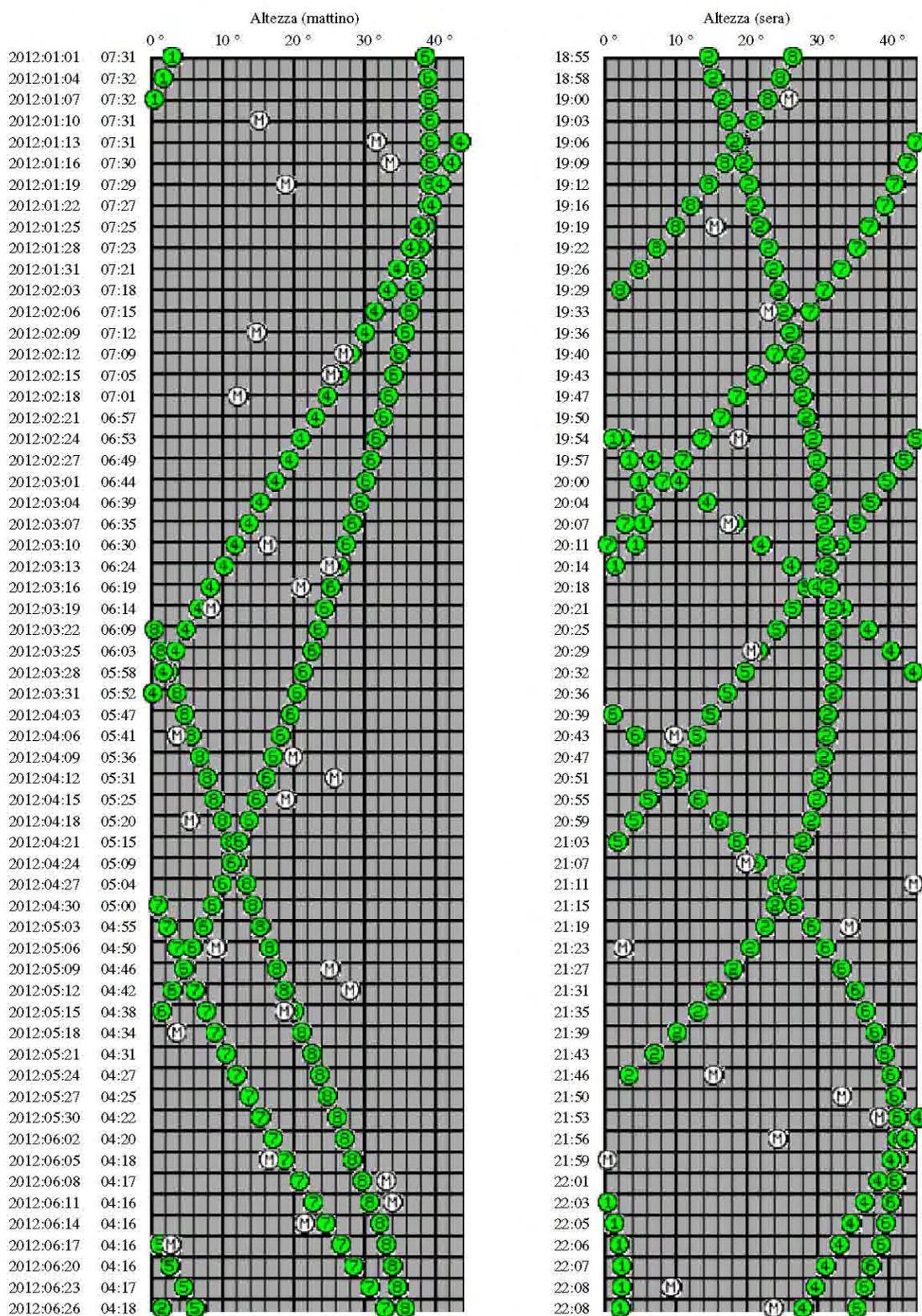
Magnitudine di Nettuno nel corso dell'anno - Magnitude of Neptune during the year

# Altezza ai crepuscoli

## di Luna e Pianeti

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



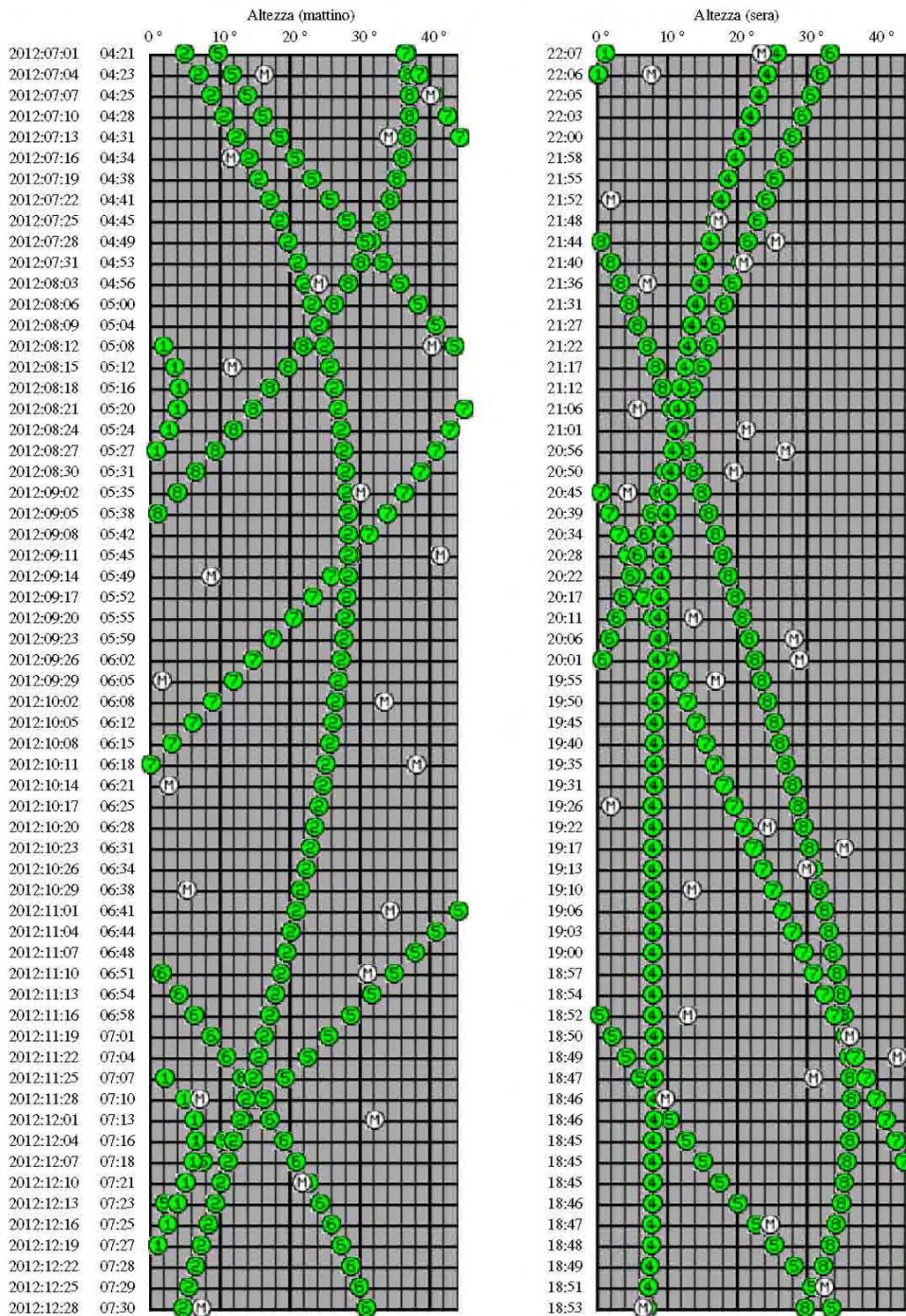
1 = Mercurio, 2 = Venere, 4 = Marte, 5 = Giove, 6 = Saturno, 7 = Urano, 8 = Nettuno, M = Luna  
 1 = Mercury, 2 = Venus, 4 = Mars, 5 = Jupiter, 6 = Saturn, 7 = Uranus, 8 = Neptune, M = Moon

# Altezza ai crepuscoli

## di Luna e Pianeti

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



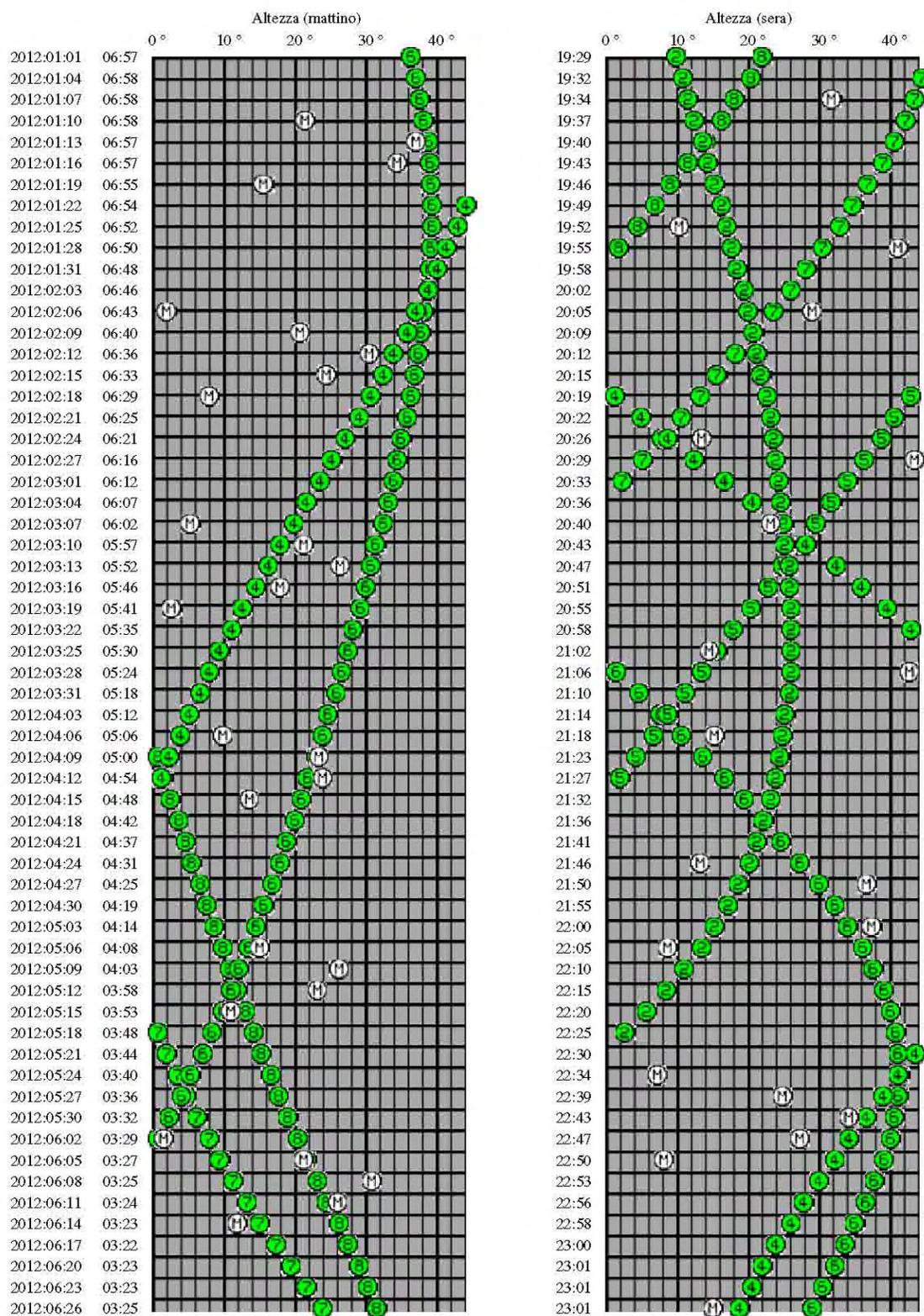
1 = Mercurio, 2 = Venere, 4 = Marte, 5 = Giove, 6 = Saturno, 7 = Urano, 8 = Nettuno, M = Luna  
 1 = Mercury, 2 = Venus, 4 = Mars, 5 = Jupiter, 6 = Saturn, 7 = Uranus, 8 = Neptune, M = Moon

# Altezza ai crepuscoli

## di Luna e Pianeti

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



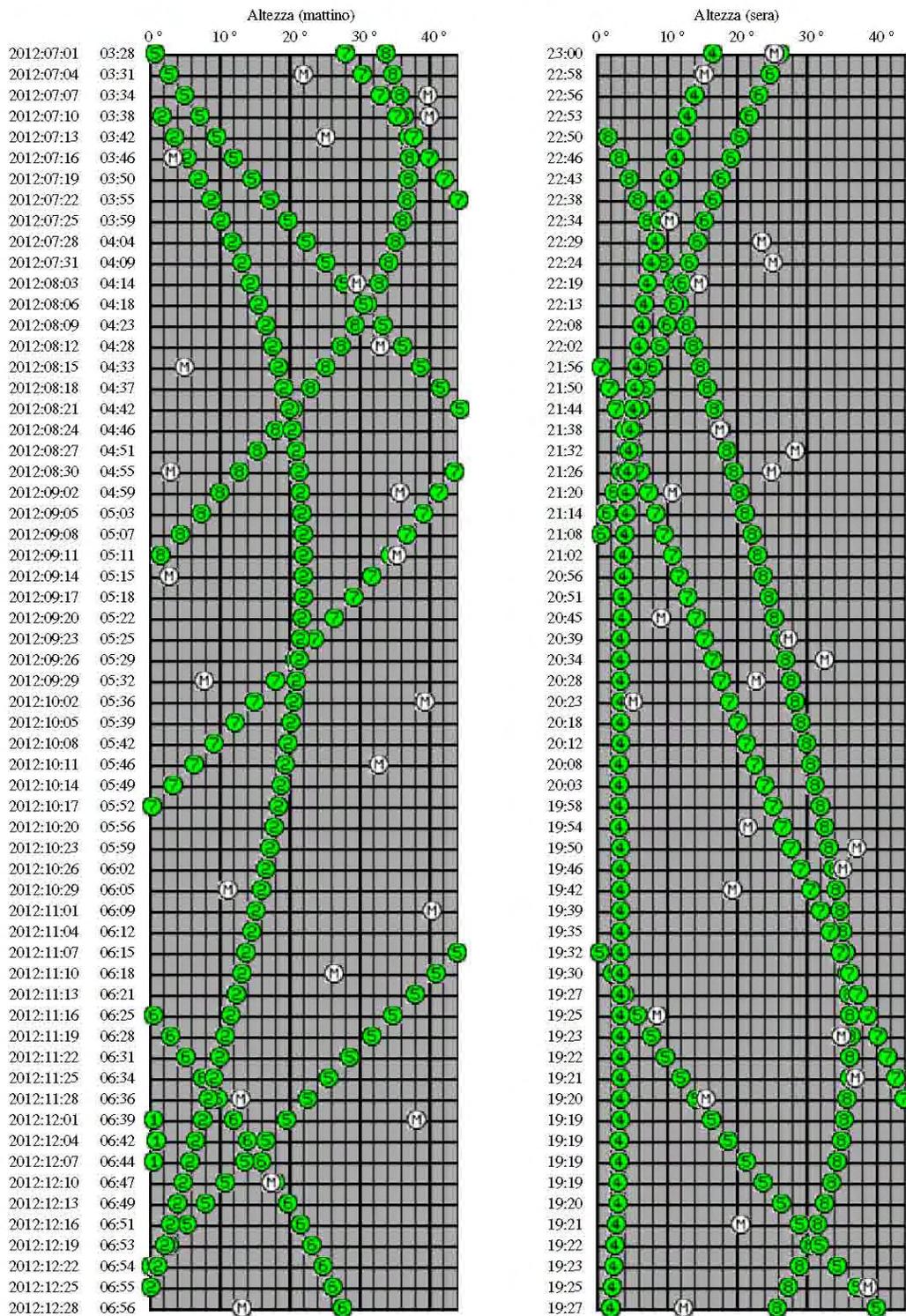
1 = Mercurio, 2 = Venere, 4 = Marte, 5 = Giove, 6 = Saturno, 7 = Urano, 8 = Nettuno, M = Luna  
 1 = Mercury, 2 = Venus, 4 = Mars, 5 = Jupiter, 6 = Saturn, 7 = Uranus, 8 = Neptune, M = Moon

# Altezza ai crepuscoli

## di Luna e Pianeti

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Rome 41:53 N, 12:30 E (UT +02:00)



1 = Mercurio, 2 = Venere, 4 = Marte, 5 = Giove, 6 = Saturno, 7 = Urano, 8 = Nettuno, M = Luna  
 1 = Mercury , 2 = Venus , 4 = Mars , 5 = Jupiter, 6 = Saturn , 7 = Uranus, 8 = Neptune, M = Moon

## EVENTI GEOCENTRICI <5° TRA PIANETI GEOCENTRIC EVENTS <5° BETWEEN PLANETS

Date	TT	Dm	Dl	r1	r2	p	e	m1	m2	tm(s)	tw(h)		
2012/01/13	15:46:29	1.08121	0.00411	1.220	30.786	338	36	-3.9	8.0		99.0	Venus	Neptune
2012/02/10	02:08:48	0.30352	0.00487	1.046	20.802	153	41	-4.0	5.9		106.0	Venus	Uranus
2012/02/14	07:29:42	1.19794	0.00271	1.344	30.984	337	5	-1.4	8.0		64.9	Mercury	Neptune
2012/03/04	21:27:04	2.42263	0.00392	0.935	21.010	143	19	-0.4	5.9		103.6	Mercury	Uranus
2012/03/13	22:26:46	2.99864	0.01018	0.811	5.628	156	46	-4.2	-2.0		110.5	Venus	Jupiter
2012/03/19	00:20:28	4.22634	0.00565	0.632	21.063	153	5	2.7	5.9		77.1	Mercury	Uranus
2012/04/22	18:22:56	1.99982	0.00399	0.917	20.963	340	-27	0.3	5.9		99.0	Mercury	Uranus
2012/05/22	05:32:11	0.38379	0.00662	1.308	6.006	161	-6	-1.7	-1.9		63.1	Mercury	Jupiter
2012/06/01	20:18:51	0.19221	0.01517	1.295	0.291	168	7	-1.7	-1.5		43.3	Mercury	Venus
2012/08/15	08:28:41	2.67992	0.00413	1.713	10.190	22	62	1.0	0.7		185.1	Mars	Saturn
2012/10/05	05:01:45	3.14652	0.00442	1.313	10.717	25	18	-0.3	0.8		67.6	Mercury	Saturn
2012/11/27	01:11:50	0.52551	0.00527	1.399	10.634	20	-29	-3.9	0.8		105.8	Venus	Saturn

## OCCULTAZIONI TRA PIANETI OCCULTATION BETWEEN PLANETS

Date	TT	Dm	Dl	r1	r2	p	e	m1	m2	tm(s)	tw(h)
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Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei pianeti

Dl = parametro limite, se Dm < Dl vi è una occultazione tra i pianeti

R1 = distanza in U.A. del corpo 1 dalla Terra

R2 = distanza in U.A. del corpo 2 dalla Terra

P = angolo di posizione tra i pianeti, in gradi

e = elongazione, in gradi

m1 = magnitudine del primo pianeta

m2 = magnitudine del secondo pianeta

tm = se presente, uno dei pianeti viene occultato massimo per x secondi

tw = semiperiodo in ore in cui i due pianeti distano meno di 5° tra loro

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the planets

Dl = parameter limit, if Dm < Dl there is an occultation between the planets

R1 = distance in A.U. of the body 1 from the Earth

R2 = distance in A.U. of the body 2 from the Earth

P = angle of position between the planets, in °

e = elongation, in °

m1 = magnitude of the first planet

m2 = magnitude of the second planet

tm = if present, one of the planets is occulted maximum for x seconds

tw = semiperiod in hours in which the two planets are near less than 5°

# CONGIUNZIONI MULTIPLE PLANETARIE

(eventi con 3 o più pianeti entro 5°)

# MULTIPLE PLANETARY CONJUNCTIONS

(events with 3 or more planets within 5°)

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri dei pianeti, in gradi

Dmax = diametro del cerchio comprendente i pianeti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo pianeta più debole

mmax = magnitudine del pianeta più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the center of the planets, in gradi

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

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Per le congiunzioni multiple stellari o lunari consultare più avanti

**CONGIUNZIONI MULTIPLE MISTE**  
**CERCHI MINIMI TOPOCENTRICI TRA PIANETI**  
**MULTIPLE CONJUNCTIONS**  
**LEAST TOPOCENTRIC GROUPING BETWEEN PLANETS**  
**42°N - 12°E**

DATE            TIME            BODIES                            D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.

Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora  
 Bodies = corpi  
 Dxy = distanza tra il corpo x e quello y, in gradi  
 Group = cerchio minimo comprendente tutto il gruppo, in gradi  
 EL = elongazione dal Sole, in gradi  
 MAGx = magnitudine del corpo x  
 MAGT = magnitudine totale del gruppo  
 ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi  
 AZ = azimut del baricentro geometrico del gruppo, in gradi da nord  
 ALT.S. = altezza sull'orizzonte del Sole, in gradi            AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno  
 Moon=Luna

Ore in T.U.

Date in the format day/month/year  
 Dxy = distance between the body x and y, in °  
 GROUP = least group, in °  
 EL = elongation from the Sun, in °  
 MAGx = magnitude of body x  
 MAGT = total magnitude  
 ALT = height on the horizon of the baricenter of the group, in °  
 AZ = azimuth of the baricenter of the group, in ° from north  
 ALT.S. = height on the horizon of the Sun, in °            AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# 3 PIANETI IN LINEA RETTA

## 3 PLANETS IN STRAIGHT LINE

DATE	TIME	BODIES	C	ALT	AZ	ALT.S.	AZ.S
------	------	--------	---	-----	----	--------	------

Questo anno non avvengono fenomeni - No phenomena this year

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

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# GEOMETRIE SPAZIALI PLANETARIE TRIANGOLI EQUILATERI PLANETARY SPATIAL GEOMETRIES EQUILATERAL TRIANGLES

DATE            TIME            BODIES                    D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.  
Questo anno non avvengono fenomeni - No phenomena this year

# GEOMETRIE SPAZIALI PLANETARIE - QUADRATI PLANETARY SPATIAL GEOMETRIES - SQUARES

DATE            TIME            BODIES                    D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.  
Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora  
Bodies = corpi  
Dxy = distanza tra il corpo x e quello y, in gradi  
DQM = distanza media tra i 4 corpi, in gradi  
MAX = distanza massima tra i 4 corpi, in gradi  
Group = cerchio minimo comprendente tutto il gruppo, in gradi  
EL = elongazione dal Sole, in gradi  
MAGx = magnitudine del corpo x  
MAGT = magnitudine totale del gruppo  
ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi  
AZ = azimut del baricentro geometrico del gruppo, in gradi da nord  
ALT.S. = altezza sull'orizzonte del Sole, in gradi  
AZ.S. = azimut del Sole, in gradi da nord  
Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno  
Moon=Luna

Ore in T.U.

Si è considerato equilatero ogni triangolo in cui ogni cateto differisce dall'altro per massimo ±10%.  
Si è considerato quadrato ogni quadrilatero in cui ogni lato differisce dall'altro per massimo ±10% e con diagonali diverse meno del 15%.

NB : queste tabelle sono state create esclusivamente ai fini di "foto d'effetto", con tre o quattro corpi celesti praticamente equidistanti!

Dxy = distance between the body x and y, in °  
DQM = middle distance between the 4 bodies, in °  
MAX = maxima distance between the 4 bodies, in °  
GROUP = least group, in °  
EL = elongation from the Sun, in °  
MAGx = magnitude of body x  
MAGT = total magnitude  
ALT = height on the horizon of the baricenter of the group, in °  
AZ = azimuth of the baricenter of the group, in ° from north  
ALT.S. = height on the horizon of the Sun, in °  
AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum ± 10%.  
I have considered square every quadrilateral in which every side differs from the other for maximum ± 10% and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

**CONGIUNZIONI GEOCENTRICHE <0,2°**  
**PIANETI-STELLE m<6**  
**GEOCENTRIC CONJUNCTIONS <0,2°**  
**PLANETS-STARS m<6**

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)			
2012/01/10	05:31:38	0.00098	0.00259	1.305	183	-17	-0.4	5.0	77.5	Mercury		SGR
2012/01/13	15:22:57	0.13758	0.00252	1.339	181	-15	-0.5	5.5		Mercury		SGR
2012/01/28	22:26:32	0.17886	0.00239	1.414	168	-7	-0.9	5.8		Mercury		CAP
2012/01/28	13:49:37	0.03042	0.00422	1.128	335	39	-3.9	4.2		Venus	Phi	AQR
2012/02/06	13:03:21	0.07462	0.00241	1.401	162	2	-1.2	5.4		Mercury		CAP
2012/02/19	16:39:43	0.17065	0.00486	0.980	154	43	-4.1	5.7		Venus		
2012/03/11	06:18:40	0.05283	0.00573	0.831	156	45	-4.2	5.7		Venus		ARI
2012/03/26	09:49:21	0.16038	0.00665	0.716	160	46	-4.3	4.9		Venus	Zeta	ARI
2012/04/12	00:13:31	0.15828	0.00445	0.759	352	-26	0.5	5.5		Mercury		PSC
2012/04/13	02:43:06	0.19542	0.00823	0.579	167	45	-4.5	5.4		Venus	Chi	TAU
2012/05/05	17:07:12	0.04538	0.00055	20.846	157	-39	5.9	5.8		Uranus		PSC
2012/05/17	08:06:16	0.06438	0.00266	1.267	159	-12	-1.1	5.5		Mercury	Sigma	ARI
2012/05/23	13:22:56	0.19592	0.00257	1.315	342	-5	-1.8	5.7		Mercury		TAU
2012/05/28	06:54:20	0.11269	0.00256	1.320	167	1	-2.0	5.3		Mercury	Kappa2	TAU
2012/05/28	07:01:38	0.01882	0.00256	1.320	167	1	-2.0	4.2		Mercury	Kappal	TAU
2012/05/31	18:31:38	0.09157	0.00259	1.304	350	5	-1.8	5.8		Mercury		TAU
2012/06/01	20:47:55	0.02852	0.00261	1.295	352	7	-1.7	5.5		Mercury		TAU
2012/06/12	19:57:49	0.02425	0.00295	1.145	5	18	-0.5	3.0		Mercury	Epsilon	GEM Mebsuta
2012/06/19	15:59:21	0.19810	0.01504	0.317	323	-20	-3.7	3.5		Venus	Epsilon	TAU Ain
2012/06/21	00:40:43	0.04079	0.00337	1.001	194	23	0.1	5.9		Mercury		
2012/06/25	14:03:11	0.16819	0.01387	0.343	115	-27	-4.2	4.3		Venus	Delta3	TAU
2012/07/10	11:51:06	0.01851	0.00510	5.717	350	-42	-2.0	4.9		Jupiter	Omega2	TAU
2012/07/16	15:24:55	0.05736	0.00516	5.652	351	-47	-2.0	6.0		Jupiter		
2012/07/18	03:49:22	0.17172	0.00517	5.635	351	-48	-2.0	6.0		Jupiter		
2012/08/06	10:31:49	0.16710	0.00747	0.638	356	-45	-4.4	5.9		Venus		ORI
2012/08/08	16:13:33	0.03154	0.00727	0.655	176	-46	-4.4	5.1		Venus		ORI
2012/08/10	21:19:25	0.04600	0.00708	0.672	177	-46	-4.3	5.8		Venus		ORI
2012/08/16	09:59:50	0.09843	0.00217	1.719	203	61	1.0	5.2		Mars		VIR
2012/08/17	02:04:32	0.08800	0.00368	0.918	359	-19	-0.1	5.4		Mercury	Theta	CNC
2012/09/10	21:19:00	0.07629	0.00245	1.378	25	2	-1.4	4.0		Mercury	Sigma	LEO
2012/09/23	11:57:02	0.01131	0.00060	19.065	337	-174	5.7	5.8		Uranus		PSC
2012/10/02	09:43:03	0.12746	0.00253	1.336	26	16	-0.4	5.2		Mercury		VIR
2012/10/01	03:24:00	0.16207	0.00451	1.057	197	-41	-4.0	5.3		Venus	Nu	LEO
2012/10/03	07:15:10	0.11666	0.00444	1.072	18	-40	-4.0	1.4		Venus	Alpha	LEO Regulus
2012/11/04	13:50:27	0.13551	0.00181	2.068	184	38	1.1	5.1		Mars	Omicron	OPH
2012/11/07	02:58:45	0.11220	0.00180	2.076	4	37	1.1	4.1		Mars		OPH
2012/11/05	17:08:57	0.09531	0.00411	0.820	158	21	0.1	5.9		Mercury		
2012/11/12	15:38:33	0.03162	0.00360	1.323	202	-32	-3.9	4.4		Venus	Theta	VIR
2012/11/16	00:30:14	0.13794	0.00498	0.678	28	4	3.2	4.7		Mercury	Kappa	LIB
2012/11/16	14:41:31	0.13912	0.00499	0.677	28	2	4.1	5.4		Mercury		LIB
2012/11/18	11:01:22	0.17724	0.00177	2.111	360	35	1.1	6.0		Mars		M8
2012/11/18	12:17:39	0.19308	0.00177	2.111	360	35	1.1	6.0		Mars		SGR
2012/11/19	12:49:22	0.07818	0.00350	1.361	201	-31	-3.9	5.0		Venus		VIR
2012/12/07	04:18:46	0.08455	0.00318	1.060	19	-20	-0.4	5.5		Mercury	Zeta4	LIB
2012/12/06	04:48:43	0.14747	0.00325	1.038	199	-20	-0.3	5.6		Mercury	Zeta1	LIB
2012/12/06	15:54:51	0.14161	0.00322	1.049	19	-20	-0.4	5.8		Mercury	Zeta3	LIB
2012/12/18	21:31:09	0.19268	0.00318	1.499	192	-24	-3.9	2.6		Venus	Betal	SCO Graffias
2012/12/18	21:31:44	0.18879	0.00318	1.499	192	-24	-3.9	4.5		Venus	Beta2	SCO

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri degli oggetti

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

A.R. e DEC. = coordinate apparenti geocentriche

Rl = distanza in U.A. del pianeta

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del pianeta

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

A.R. e DEC. = apparent geocentric coordinates

Rl = distance in A.U. of the planet

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the planet

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

**CONGIUNZIONI GEOCENTRICHE <5°**  
**PIANETI-STELLE m<2**  
**GEOCENTRIC CONJUNCTIONS <5°**  
**PLANETS-STARS m<2**

Date	TT	Dm	Dl	rl	p	e	ml	m*	tm(s)	tw(h)			
2012/04/16 04:48:43		4.30258	0.00447	0.836	260	127	-0.5	1.4	1255.5	Mars	Alpha	LEO Regulus	
2012/05/07 02:00:20		0.81603	0.01178	0.404	4	36	-4.5	1.7	386.3	Venus	Beta	TAU Elnath	
2012/05/21 01:23:43		4.77678	0.00278	8.902	198	143	0.4	1.1	662.7	Saturn	Alpha	VIR Spica	
2012/06/04 00:28:35		3.80684	0.00265	1.274	354	9	-1.5	1.7	37.0	Mercury	Beta	TAU Elnath	
2012/06/20 14:31:25		2.97812	0.01486	0.320	141	-21	-3.8	1.0	301.5	Venus	Alpha	TAU Aldebaran	
2012/07/09 14:24:09		0.91498	0.01111	0.429	175	-38	-4.5	1.0	294.1	Venus	Alpha	TAU Aldebaran	
2012/07/30 07:24:06		4.69288	0.00531	5.489	172	-58	-2.1	1.0	238.5	Jupiter	Alpha	TAU Aldebaran	
2012/08/07 17:50:57		4.45602	0.00246	10.076	205	69	0.7	1.1	813.6	Saturn	Alpha	VIR Spica	
2012/08/14 05:08:11		1.75792	0.00219	1.707	203	62	1.0	1.1	180.7	Mars	Alpha	VIR Spica	
2012/09/01 02:11:02		1.21217	0.00265	1.274	199	-9	-1.5	1.4	60.1	Mercury	Alpha	LEO Regulus	
2012/10/01 13:48:29		1.60741	0.00251	1.342	206	15	-0.4	1.1	73.5	Mercury	Alpha	VIR Spica	
2012/10/03 07:15:10		0.11666	0.00444	1.072	18	-40	-4.0	1.4	103.1	Venus	Alpha	LEO Regulus	
2012/10/21 01:34:03		3.59379	0.00185	2.019	189	42	1.1	1.1	115.1	Mars	Alpha	SCO Antares	
2012/11/17 04:58:44		3.84588	0.00353	1.348	202	-31	-3.9	1.1	62.3	Venus	Alpha	VIR Spica	
2012/12/12 02:44:54		4.69663	0.00714	4.086	173	170	-2.7	1.0	311.8	Jupiter	Alpha	TAU Aldebaran	

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

Rl = distanza in U.A. del pianeta dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

ml = magnitudine del pianeta

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 5° tra loro

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Rl = distance in A.U. of the planet from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

ml = magnitude of the planet

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 5°

**CONGIUNZIONI MULTIPLE PIANETI - STELLE**  
**(eventi con 2 o più pianeti ed una stella di mag<2 entro 5°)**  
**MULTIPLE CONJUNCTIONS PLANETS - STARS**  
**(events with 2 or more planets and a Messier object within 5°)**

Date	TT	Dmed	Dmax	emin	m2d	mmax				
2012/08/14 15:41		3.194	4.486	62	+1.0	1.1	Saturn	Alpha	VIR Spica	Mars

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the center of the planets, in gradi

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude







DATE	TIME	BODIES	D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
19 08 2012 19	MARS	SATURN	3.6	3.9	4.5	4.8	59	1.1	0.8	0.9	-0.2	15	241	3	286
19 08 2012 20	MARS	SATURN	3.6	3.9	4.5	4.8	59	1.1	0.8	0.9	-0.2	4	251	-5	298
19 08 2012 21	MARS	SATURN	3.6	4.0	4.5	4.8	59	1.1	0.8	0.9	-0.2	-7	261	-12	311
19 08 2012 22	MARS	SATURN	3.6	4.0	4.5	4.8	59	1.1	0.8	0.9	-0.2	-18	271	-18	325
19 08 2012 23	MARS	SATURN	3.6	4.0	4.5	4.8	59	1.1	0.8	0.9	-0.2	-29	282	-22	340
20 08 2012 00	MARS	SATURN	3.6	4.0	4.5	4.8	59	1.1	0.8	0.9	-0.2	-39	295	-24	356
20 08 2012 01	MARS	SATURN	3.7	4.0	4.5	4.8	59	1.1	0.8	0.9	-0.2	-48	311	-23	12
20 08 2012 02	MARS	SATURN	3.7	4.1	4.5	4.8	59	1.1	0.8	0.9	-0.2	-55	333	-20	28
20 08 2012 03	MARS	SATURN	3.7	4.1	4.5	4.8	59	1.1	0.8	0.9	-0.2	-57	0	-15	42
20 08 2012 04	MARS	SATURN	3.7	4.1	4.5	4.9	59	1.1	0.8	0.9	-0.2	-54	27	-8	55
20 08 2012 05	MARS	SATURN	3.7	4.1	4.5	4.9	59	1.1	0.8	0.9	-0.2	-47	49	-0	68
20 08 2012 06	MARS	SATURN	3.7	4.2	4.5	4.9	59	1.1	0.8	0.9	-0.2	-38	65	7	80
20 08 2012 07	MARS	SATURN	3.8	4.2	4.5	4.9	59	1.1	0.8	0.9	-0.2	-28	77	16	92
20 08 2012 08	MARS	SATURN	3.8	4.2	4.5	4.9	59	1.1	0.8	0.9	-0.2	-17	88	25	104
20 08 2012 09	MARS	SATURN	3.8	4.2	4.5	4.9	59	1.1	0.8	0.9	-0.2	-5	98	33	118
20 08 2012 10	MARS	SATURN	3.8	4.3	4.5	4.9	59	1.1	0.8	0.9	-0.2	6	108	40	134
20 08 2012 11	MARS	SATURN	3.8	4.3	4.5	5.0	59	1.1	0.8	0.9	-0.2	16	119	45	153
20 08 2012 12	MARS	SATURN	3.8	4.3	4.5	5.0	59	1.1	0.8	0.9	-0.2	25	131	48	175
20 08 2012 13	MARS	SATURN	3.9	4.3	4.5	5.0	59	1.1	0.8	0.9	-0.2	32	145	47	197
20 08 2012 14	MARS	SATURN	3.9	4.4	4.5	5.0	59	1.1	0.8	0.9	-0.2	37	162	43	217
20 08 2012 15	MARS	SATURN	3.9	4.4	4.5	5.0	59	1.1	0.8	0.9	-0.2	39	180	36	234
20 08 2012 16	MARS	SATURN	3.9	4.4	4.5	5.0	59	1.1	0.8	0.9	-0.2	37	198	29	249
20 08 2012 17	MARS	SATURN	3.9	4.4	4.5	5.0	59	1.1	0.8	0.9	-0.2	31	214	20	262

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# PIANETI-STELLE IN LINEA RETTA PLANETS-STARS IN STRAIGHT LINE

DATE	TIME	BODIES	C	ALT	AZ	ALT.S.	AZ.S
14	08 2012 00	MARS SATURN α VIR	0.485	-36	294	-22	356
14	08 2012 01	MARS SATURN α VIR	0.450	-46	309	-21	11
14	08 2012 02	MARS SATURN α VIR	0.415	-53	330	-18	27
14	08 2012 03	MARS SATURN α VIR	0.380	-56	356	-13	41
14	08 2012 04	MARS SATURN α VIR	0.346	-55	22	-7	54
14	08 2012 05	MARS SATURN α VIR	0.311	-49	45	0	66
14	08 2012 06	MARS SATURN α VIR	0.276	-40	61	9	78
14	08 2012 07	MARS SATURN α VIR	0.241	-30	74	17	90
14	08 2012 08	MARS SATURN α VIR	0.206	-19	85	26	103
14	08 2012 09	MARS SATURN α VIR	0.172	-8	95	35	117
14	08 2012 10	MARS SATURN α VIR	0.137	3	105	42	133
14	08 2012 11	MARS SATURN α VIR	0.102	14	116	47	152
14	08 2012 12	MARS SATURN α VIR	0.067	23	128	50	174
14	08 2012 13	MARS SATURN α VIR	0.032	31	142	49	197
14	08 2012 14	MARS SATURN α VIR	-0.001	37	159	45	217
14	08 2012 15	MARS SATURN α VIR	-0.036	39	177	38	235
14	08 2012 16	MARS SATURN α VIR	-0.071	38	196	30	250
14	08 2012 17	MARS SATURN α VIR	-0.106	34	213	22	263
14	08 2012 18	MARS SATURN α VIR	-0.141	26	227	13	275
14	08 2012 19	MARS SATURN α VIR	-0.176	17	240	4	287
14	08 2012 20	MARS SATURN α VIR	-0.210	7	251	-3	299
14	08 2012 21	MARS SATURN α VIR	-0.245	-4	261	-11	312
14	08 2012 22	MARS SATURN α VIR	-0.280	-15	271	-16	325
14	08 2012 23	MARS SATURN α VIR	-0.315	-26	282	-20	340
15	08 2012 00	MARS SATURN α VIR	-0.350	-37	294	-22	356
15	08 2012 01	MARS SATURN α VIR	-0.385	-46	309	-22	11
15	08 2012 02	MARS SATURN α VIR	-0.420	-53	330	-19	27
15	08 2012 03	MARS SATURN α VIR	-0.454	-57	356	-14	41
15	08 2012 04	MARS SATURN α VIR	-0.489	-55	23	-7	54

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

Date in the format day/month/year

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# OCCULTAZIONI GEOCENTRICHE PIANETI-STELLE m<9

## GEOCENTRIC OCCULTATIONS PLANETS-STARS m<9

Date		U.T.		Diameter		Durn	Star	Elon	%	Star	Planet	Min.D	R.A. (J2000)			Dec.			
y	m	d	h	m	km	"	sec/m	mag	o	Ill	No.		h	m	s	o	'	"	
2012	01	10	5	29.2	4877	5.15	84.0s	5.0	17	90	HIP 89153	Mercury	0.53	18	11	43.340	-23	42	4.79
2012	01	17	21	31.3	12244	14.14	280s	8.6	37	78	TYC 5807-01427-1	Venus	1.77	22	26	48.958	-11	20	58.67
2012	01	20	15	34.9	12244	14.33	285s	6.9	38	78	HIP 111843	Venus	0.58	22	39	15.989	-10	1	40.16
2012	03	8	23	32.0142796	35.36	73.1m	8.7	50	99	HIP 11271	Jupiter	1.06	2	25	9.222	13	24	9.05	
2012	03	9	5	7.5	3130	0.775	88.6s	8.7	49		HIP 11271	Europa (II)	1.16	2	25	9.222	13	24	9.05
2012	03	25	0	25.1	4878	11.21	306s	8.9	7	2	TYC 0587-00694-1	Mercury	0.04	23	50	20.766	1	55	4.39
2012	03	31	9	20.5	12244	24.90	627s	8.2	46	49	HIP 16668	Venus	0.53	3	34	30.313	22	45	33.71
2012	04	3	11	27.8	12244	25.81	670s	8.2	46	47	TYC 1800-01621-1	Venus	1.81	3	46	34.210	23	37	25.94
2012	05	28	4	18.0142796	32.84	56.0m	8.7	11	100	HIP 16896	Jupiter	4.66	3	37	22.813	18	35	48.72	
2012	05	31	12	45.9	12244	57.62	37.7m	8.9	9	1	TYC 1850-02111-1	Venus	1.15	5	11	19.487	24	24	36.96
2012	06	1	5	43.9	4878	5.17	57.3s	8.4	6	97	HIP 23436	Mercury	1.24	5	2	15.894	24	1	44.95
2012	06	1	9	51.7	4878	5.18	57.4s	8.3	6	97	TYC 1845-02033-1	Mercury	1.64	5	3	52.636	24	4	59.45
2012	06	3	5	57.9	12244	58.21	35.5m	7.8	4	0	HIP 23606	Venus	0.61	5	4	33.787	23	38	58.26
2012	06	17	14	13.3	4878	6.33	96.1s	9.0	21	65	HIP 35429	Mercury	1.63	7	18	51.479	24	7	6.06
2012	06	29	21	19.1	4878	7.91	184s	9.0	26	43	TYC 1387-00745-1	Mercury	1.42	8	25	50.122	19	36	17.87
2012	08	5	14	19.1	12244	26.75	737s	7.3	46	44	HIP 27697	Venus	0.95	5	51	52.093	19	31	16.84
2012	08	7	1	49.6	4878	9.73	846s	8.1	14	11	TYC 1377-00215-1	Mercury	1.21	8	10	55.895	16	21	25.78
2012	08	13	3	54.6	12244	24.47	624s	8.3	46	49	TYC 1323-00338-1	Venus	0.51	6	21	1.853	19	55	32.82
2012	08	18	15	14.9	4878	7.02	140s	8.8	19	50	TYC 1395-02708-1	Mercury	1.21	8	38	54.200	17	58	10.40
2012	09	5	6	38.6	12244	19.45	433s	7.1	45	60	HIP 39158	Venus	0.57	8	0	32.404	18	50	35.17
2012	09	20	9	48.6	12244	17.23	366s	8.9	43	67	TYC 1401-00874-1	Venus	1.91	9	9	28.240	15	48	55.12
2012	09	28	2	56.2	4878	4.93	74.1s	8.4	13	93	HIP 64115	Mercury	0.51	13	8	25.600	-7	18	29.40
2012	10	3	13	57.2	4878	5.07	80.2s	8.6	16	90	TYC 5549-01119-1	Mercury	1.50	13	39	19.223	-11	3	55.14
2012	10	16	19	20.8	4878	5.69	104s	8.5	22	78	TYC 6159-01416-1	Mercury	1.63	14	50	33.808	-18	37	49.40
2012	11	22	17	13.7	12244	12.26	238s	7.7	30	86	HIP 68107	Venus	0.17	13	56	36.180	-10	2	2.61
2012	12	15	8	6.1	4878	5.53	93.7s	8.1	18	84	HIP 79690	Mercury	0.64	16	15	50.503	-20	4	35.70
2012	12	15	16	32.9	12244	11.36	218s	8.0	25	91	HIP 77473	Venus	1.66	15	49	6.092	-18	42	14.75
2012	12	30	5	58.0	12244	10.93	210s	7.1	22	93	HIP 83629	Venus	0.27	17	5	30.303	-22	4	22.10

Date = data nel formato anno/mese/giorno

U.T. = ora dell'evento

Diameter = diametro in km ed in " del pianeta

Durn = durata dell'evento, in minuti o secondi

Star mag = magnitudine della stella

Elon = elongazione, in gradi

% ill = percentuale illuminata del pianeta

Star = stella coinvolta

Planet = pianeta

Min.D. = distanza del centro dell'occultazione dal centro della Terra

Dist = distanza del percorso

Alt = altezza sull'orizzonte del pianeta, in gradi

Sole alt = altezza sull'orizzonte del Sole, in gradi

Date = date in the format year/month/day

U.T. = times

Diameter = diameter in km and in " of the planet

Durn = duration of the event, in minutes or seconds

Obj Mag = magnitude of the star

Elon = elongation, in °

% ill = illumination of the planet

Alt = height on the horizon of the planet, in °

Sun alt = height on the horizon of the Sun, in °

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# OCCULTAZIONI TOPOCENTRICHE PIANETI-STELLE m<9

## TOPOCENTRIC OCCULTATIONS PLANETS-STARS m<9

42°N - 12°E

Date	U.T.	Diameter	Durn	Star	Elon	%	Star	Planet	Alt	Dist	Sun	Proba-	Moon	R.A. (J2000)	Dec.
y m d	h m	km "	sec/m	mag	o	Ill	No.		o	km	Alt	bility	ill	h m s	o ' "
2012 Aug 13	3 54.6	12244 24.47	624s	8.3	46	49	TYC 1323-00338-1	Venus	33	165	-4	100%	20 7	6 21	1.853 19 55 32.82
2012 Dec 30	5 58.0	12244 10.93	210s	7.1	22	93	HIP 83629	Venus	8	6371	-7	94%	97 138	17 5	30.303 -22 4 22.10

Date = data nel formato anno/mese/giorno

U.T. = ora dell'evento

Diameter = diametro in km ed in " del pianeta

Durn = durata dell'evento, in minuti o secondi

Obj mag = magnitudine della stella

Elon = elongazione, in gradi

% ill = percentuale illuminata del pianeta

Star = stella coinvolta

Planet = pianeta

Alt = altezza sull'orizzonte del pianeta, in gradi

Dist. = distanza del centro dell'occultazione dal centro della Terra

Sun alt = altezza sull'orizzonte del Sole, in gradi

Probabilità = probabilità che l'evento accada

Moon ill = percentuale di Luna illuminata

Moon elon = elongazione lunare

Date = date in the format year/month/day

U.T. = times

Diameter = diameter in km and in " of the planet

Durn = duration of the event, in minutes or seconds

Obj Mag = magnitude of the star

Elon = elongation, in °

% ill = illumination of the planet

Alt = height on the horizon of the planet, in °

Sun alt = height on the horizon of the Sun, in °

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NB : non si riportano le condizioni di osservabilità vista la bassa elongazione solare.

# CONGIUNZIONI <1° PIANETI - OGGETTI MESSIER m<9

## CONJUNCTIONS <1° PLANETS - OBJECTS MESSIER m<9

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)	tw(h)		
2012/01/08 18:14:06		0.57506	0.00262	1.289	5	-17	-0.4	9.0		13.5	Mercury	M20
2012/01/09 00:24:24		0.80302	0.00261	1.292	184	-17	-0.4	6.0		9.8	Mercury	M8
2012/01/14 00:30:10		0.00160	0.00251	1.342	180	-15	-0.5	5.1	61.4	15.9	Mercury	M22
2012/01/27 06:12:49		0.23077	0.00239	1.411	350	-8	-0.8	8.5		14.3	Mercury	M75
2012/04/03 17:39:41		0.43643	0.00731	0.651	343	46	-4.4	1.6		23.4	Venus	M45
2012/10/16 09:43:37		0.67309	0.00187	2.002	190	43	1.1	7.3		24.7	Mars	M80
2012/11/18 11:01:22		0.17724	0.00177	2.111	360	35	1.1	6.0		31.2	Mars	M8
2012/11/24 16:29:55		0.41306	0.00176	2.129	178	33	1.1	6.8		28.7	Mars	M28
2012/11/28 06:47:01		0.41826	0.00175	2.139	356	32	1.1	5.1		28.5	Mars	M22
2012/12/25 00:25:57		0.44179	0.00169	2.208	168	26	1.0	8.5		27.5	Mars	M75

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

R1 = distanza in U.A. del pianeta dalla Terra

p = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del pianeta

m\* = magnitudine dell'oggetto

tm = se presente, l'oggetto viene occultato massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the planet from the Earth

p = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the planet

m\* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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## CONGIUNZIONI MULTIPLE PIANETI-OGGETTI (eventi con 2 o più pianeti ed un oggetto Messier entro 5°) MULTIPLE CONJUNCTIONS PLANETS-OBJECTS (events with 2 or more planets and a Messier object within 5°)

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the center of the planets, in gradi

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

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# CONGIUNZIONI MULTIPLE MISTE

## CERCHI MINIMI PIANETI - OGGETTI

(eventi con 2 o più pianeti ed un oggetto Messier di mag<2 entro 5°)

## LEAST GROUPING PLANETS - OBJECTS

(events with 2 or more planets and a Messier object with mag<2 within 5°)

DATE TIME BODIES D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.

Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

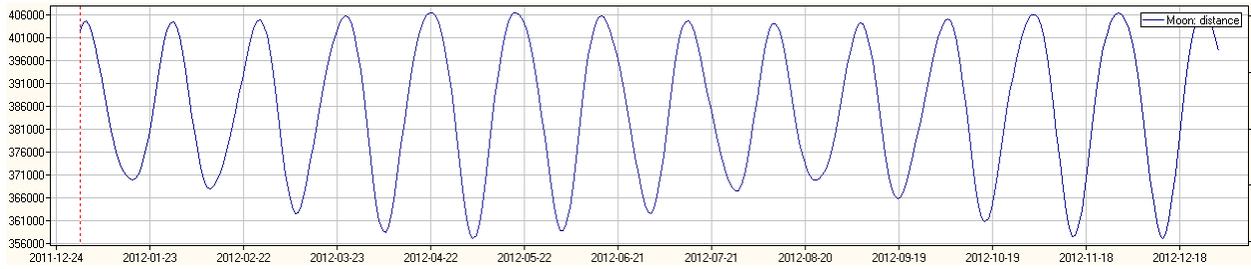
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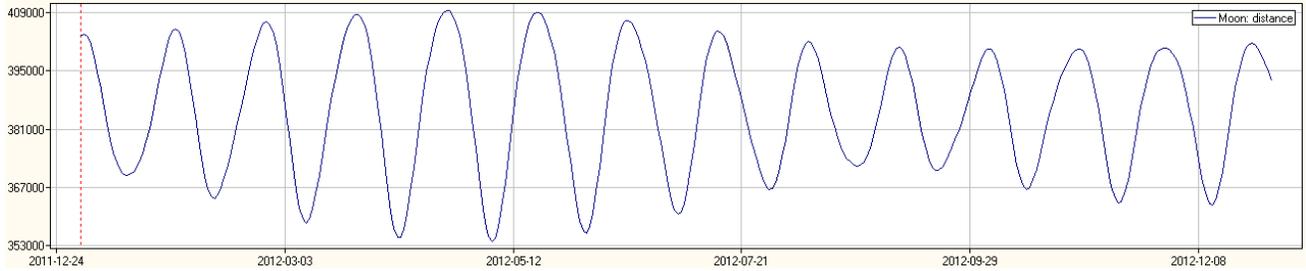






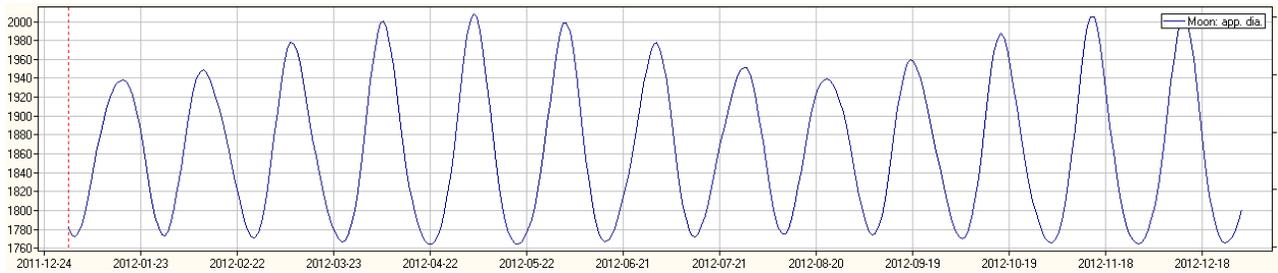
Distanza geocentrica della Luna in km nel corso dell'anno

Geocentric distance of the Moon in km during the year



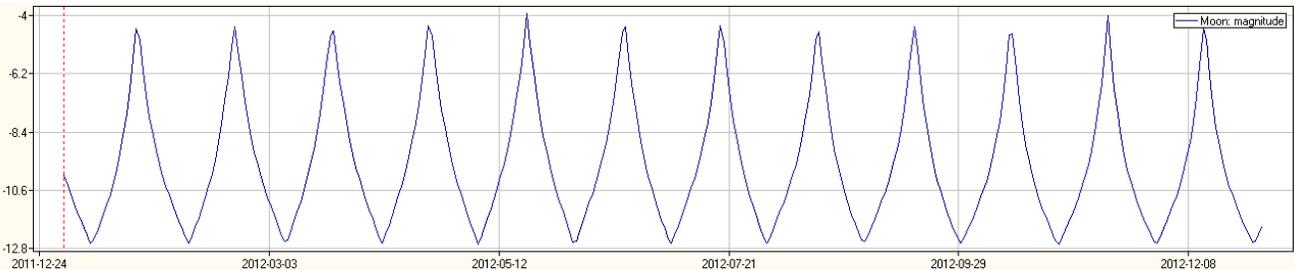
Distanza topocentrica della Luna in km nel corso dell'anno

Topocentric distance of the Moon in km during the year



Diametro geocentrico della Luna in " nel corso dell'anno

Geocentric diameter of the Moon in " during the year



Magnitudine della Luna nel corso dell'anno

Magnitude of the Moon during the year

# EFFEMERIDI FISICHE DELLA LUNA

## PHYSICAL EPHEMERIDES OF THE MOON

Date	l	b	Axis	Coln	Lat	%ill	Date	l	b	Axis	Coln	Lat	%ill
	o	o	o	o	o	o		o	o	o	o	o	o
Jan 1	3,3	-6,2	335,9	354,1	0,7	48	Apr 2	-7,6	5,9	14,0	33,6	1,3	72
Gen 3	0,7	-4,6	338,1	18,4	0,7	66	4	-6,4	6,6	21,3	57,9	1,2	89
5	-2,0	-2,2	344,3	42,7	0,8	82	6	-3,4	5,8	24,2	82,2	1,2	99
7	-4,1	0,6	353,7	66,9	0,8	94	8	0,5	3,5	21,0	106,5	1,2	98
9	-5,2	3,4	4,7	91,2	0,9	100	10	3,9	0,2	11,8	130,9	1,1	85
11	-5,0	5,6	14,7	115,5	0,9	97	12	6,1	-3,1	359,7	155,2	1,1	66
13	-3,9	6,7	21,6	139,7	1,0	85	14	6,8	-5,5	348,6	179,6	1,0	44
15	-2,2	6,2	24,1	164,0	1,0	66	16	6,3	-6,6	340,6	204,0	1,0	25
17	-0,3	4,2	21,2	188,3	1,1	43	18	4,8	-6,4	336,4	228,5	1,0	10
19	1,6	1,2	12,8	212,7	1,1	22	20	2,7	-5,1	336,2	252,9	0,9	2
21	3,4	-2,1	1,1	237,0	1,1	6	22	0,1	-3,0	340,0	277,4	0,9	0
23	4,7	-4,8	349,6	261,4	1,2	0	24	-2,7	-0,3	347,4	301,8	0,8	6
25	5,0	-6,3	341,2	285,8	1,2	3	26	-5,4	2,4	357,3	326,3	0,8	18
27	4,2	-6,6	336,6	310,1	1,3	14	28	-7,3	4,9	7,7	350,7	0,7	36
29	2,3	-5,6	336,2	334,5	1,3	30	30	-8,0	6,4	16,8	15,1	0,7	56
31	-0,4	-3,7	339,8	358,8	1,3	48	May 2	-6,9	6,7	22,8	39,5	0,6	77
Feb 2	-3,1	-1,1	347,1	23,1	1,3	67	Mag 4	-4,1	5,3	24,0	63,9	0,6	93
4	-5,1	1,7	357,1	47,4	1,4	84	6	-0,2	2,5	19,0	88,2	0,5	100
6	-5,8	4,3	8,1	71,7	1,4	96	8	3,6	-1,0	8,3	112,6	0,5	95
8	-5,0	6,1	17,4	96,0	1,4	100	10	6,3	-4,1	355,7	136,9	0,4	80
10	-3,0	6,5	23,1	120,2	1,4	94	12	7,4	-6,2	345,2	161,3	0,4	60
12	-0,5	5,4	23,7	144,5	1,5	79	14	7,0	-6,8	338,5	185,8	0,3	39
14	1,7	2,9	18,6	168,8	1,5	58	16	5,3	-6,1	335,8	210,2	0,3	21
16	3,2	-0,3	8,6	193,2	1,5	36	18	2,9	-4,4	337,1	234,7	0,2	8
18	4,2	-3,3	356,8	217,5	1,5	17	20	0,0	-1,9	342,4	259,2	0,2	1
20	4,7	-5,5	346,4	241,9	1,5	4	22	-2,8	0,8	351,0	283,6	0,1	1
22	4,4	-6,5	339,2	266,3	1,5	0	24	-5,2	3,5	1,3	308,1	0,1	8
24	3,3	-6,2	336,0	290,7	1,5	4	26	-6,9	5,6	11,4	332,6	0,0	22
26	1,2	-4,8	336,9	315,1	1,5	15	28	-7,4	6,8	19,3	357,0	0,0	41
28	-1,4	-2,6	341,8	339,4	1,5	31	30	-6,6	6,4	23,8	21,5	-0,1	63
Mar 1	-4,2	0,0	350,2	3,8	1,5	50	Jun 1	-4,3	4,6	23,2	45,9	-0,2	83
3	-6,2	2,8	0,6	28,1	1,5	69	Giu 3	-0,9	1,5	16,5	70,3	-0,2	97
5	-6,8	5,1	11,1	52,4	1,5	86	5	2,8	-2,0	4,8	94,6	-0,3	100
7	-5,6	6,4	19,6	76,7	1,5	97	7	5,7	-4,9	352,2	119,0	-0,3	91
9	-2,8	6,2	23,9	101,0	1,5	99	9	7,2	-6,6	342,6	143,4	-0,4	74
11	0,5	4,4	22,6	125,3	1,5	91	11	6,9	-6,7	337,1	167,8	-0,4	54
13	3,2	1,5	15,3	149,6	1,5	73	13	5,3	-5,6	335,8	192,3	-0,5	35
15	5,0	-1,7	4,1	174,0	1,5	51	15	2,8	-3,5	338,6	216,8	-0,5	18
17	5,6	-4,5	352,5	198,3	1,5	30	17	-0,1	-0,8	345,3	241,2	-0,6	6
19	5,3	-6,2	343,3	222,7	1,4	13	19	-2,7	1,9	354,8	265,7	-0,6	0
21	4,4	-6,5	337,6	247,2	1,4	3	21	-4,7	4,4	5,3	290,2	-0,7	2
23	2,8	-5,7	335,8	271,6	1,4	0	23	-5,9	6,2	14,8	314,7	-0,7	11
25	0,5	-3,9	338,2	296,0	1,4	5	25	-6,2	6,8	21,6	339,2	-0,8	27
27	-2,3	-1,5	344,4	320,4	1,4	17	27	-5,4	5,9	24,3	3,7	-0,8	48
29	-5,0	1,2	353,6	344,8	1,3	33	29	-3,6	3,6	21,7	28,1	-0,9	71
31	-7,0	3,9	4,1	9,2	1,3	52	Jul 1	-0,9	0,3	13,4	52,5	-0,9	89

Legenda:

l = librazione in longitudine, in °  
 b = librazione in latitudine, in °  
 axis = angolo di posizione del polo nord lunare, in °  
 coln = colongitudine del Sole, ossia longitudine del terminatore lunare, in °  
 lat = latitudine del Sole, riferita all'equatore lunare, in °  
 ill = percentuale di Luna illuminata

l = libration in longitude, in °  
 b = libration in latitude, in °  
 axis = angle of position from the lunar north pole, in °  
 coln = solar colongitude, alias longitude of the lunar limb, in °  
 lat = latitude of the Sun, referred to the lunar equator, in °  
 ill = lunar lightning

Date	l	b	Axis	Coln	Lat	%ill	Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°			°	°	°	°	°	
Jul 1	-0,9	0,3	13,4	52,5	-0,9	89	Oct 1	4,0	-4,2	336,3	95,9	-1,2	99
Lug 3	2,2	-3,0	1,1	76,9	-0,9	99	Ott 3	1,8	-1,8	340,6	120,3	-1,1	92
5	4,9	-5,5	349,0	101,3	-1,0	98	5	-1,0	1,0	348,5	144,6	-1,1	80
7	6,3	-6,6	340,4	125,7	-1,0	87	7	-3,8	3,6	358,5	169,0	-1,1	63
9	6,2	-6,3	336,2	150,1	-1,1	70	9	-6,0	5,6	8,8	193,4	-1,0	43
11	4,6	-4,8	336,3	174,5	-1,1	51	11	-6,9	6,7	17,5	217,8	-1,0	24
13	2,1	-2,4	340,6	199,0	-1,1	32	13	-6,1	6,3	23,2	242,2	-0,9	8
15	-0,7	0,3	348,4	223,5	-1,2	16	15	-3,6	4,5	24,0	266,6	-0,9	0
17	-3,0	2,9	358,6	247,9	-1,2	5	17	-0,3	1,4	18,7	291,0	-0,9	3
19	-4,5	5,2	9,1	272,4	-1,2	0	19	3,0	-2,0	8,0	315,5	-0,8	17
21	-5,0	6,5	17,9	296,9	-1,3	4	21	5,4	-4,9	355,5	339,9	-0,8	37
23	-4,6	6,4	23,2	321,4	-1,3	16	23	6,7	-6,5	345,0	4,2	-0,7	59
25	-3,5	5,0	24,0	345,9	-1,3	35	25	6,7	-6,7	338,2	28,6	-0,7	79
27	-1,9	2,3	19,3	10,4	-1,4	57	27	5,7	-5,5	335,6	52,9	-0,6	93
29	0,2	-1,0	9,5	34,8	-1,4	79	29	3,9	-3,3	337,4	77,2	-0,6	99
31	2,4	-4,0	357,1	59,2	-1,4	94	Nov 31	1,4	-0,7	343,1	101,5	-0,5	99
Aug 2	4,4	-6,0	346,0	83,5	-1,4	100	Nov 2	-1,4	2,1	352,0	125,8	-0,4	91
Ago 4	5,5	-6,6	338,6	107,9	-1,4	96	4	-4,2	4,5	2,2	150,1	-0,4	78
6	5,2	-5,7	335,7	132,3	-1,5	84	6	-6,4	6,2	12,0	174,4	-0,3	60
8	3,5	-3,8	337,3	156,7	-1,5	67	8	-7,5	6,8	19,8	198,8	-0,3	40
10	1,0	-1,3	342,8	181,1	-1,5	48	10	-6,9	6,0	24,1	223,2	-0,2	20
12	-1,7	1,4	351,6	205,6	-1,5	30	12	-4,6	3,7	23,2	247,5	-0,2	5
14	-3,9	3,9	2,1	230,0	-1,5	14	14	-1,0	0,4	16,2	272,0	-0,1	0
16	-4,9	5,8	12,3	254,5	-1,5	3	16	2,9	-3,0	4,2	296,4	-0,1	6
18	-4,7	6,5	20,2	279,0	-1,5	0	18	5,9	-5,6	351,6	320,7	0,0	23
20	-3,4	5,9	24,1	303,5	-1,5	7	20	7,5	-6,8	342,0	345,1	0,1	43
22	-1,6	3,8	22,8	328,0	-1,5	22	22	7,5	-6,4	336,7	9,4	0,1	64
24	0,3	0,8	16,0	352,4	-1,5	43	24	6,1	-4,7	335,7	33,7	0,2	82
26	2,0	-2,4	4,9	16,8	-1,5	66	26	3,8	-2,3	339,1	58,0	0,2	94
28	3,5	-5,0	352,8	41,2	-1,5	85	28	1,1	0,4	346,1	82,3	0,3	100
30	4,7	-6,4	343,0	65,6	-1,5	97	Dec 30	-1,7	3,1	355,8	106,6	0,3	98
Sep 1	5,1	-6,3	337,1	89,9	-1,5	100	Dec 2	-4,2	5,3	6,1	130,9	0,4	90
Set 3	4,4	-5,0	335,7	114,3	-1,5	94	Dec 4	-6,2	6,6	15,2	155,2	0,5	76
5	2,5	-2,8	338,7	138,7	-1,5	81	Dec 6	-7,3	6,7	21,8	179,5	0,5	57
7	-0,2	-0,2	345,5	163,1	-1,5	65	8	-7,0	5,4	24,5	203,8	0,6	36
9	-2,9	2,5	354,9	187,5	-1,5	46	10	-5,2	2,7	21,9	228,1	0,6	16
11	-5,0	4,8	5,5	211,9	-1,4	27	12	-1,9	-0,7	13,3	252,5	0,7	3
13	-5,9	6,3	15,1	236,3	-1,4	11	14	2,1	-3,9	0,6	276,9	0,7	1
15	-5,1	6,5	22,0	260,8	-1,4	2	16	5,6	-6,1	348,3	301,3	0,8	10
17	-3,1	5,2	24,4	285,2	-1,4	1	18	7,6	-6,7	339,7	325,6	0,8	27
19	-0,4	2,6	21,0	309,7	-1,4	11	20	7,7	-5,8	335,8	350,0	0,9	48
21	2,1	-0,7	12,0	334,1	-1,3	30	22	6,1	-3,8	336,5	14,3	0,9	67
23	4,0	-3,8	0,1	358,6	-1,3	52	24	3,6	-1,2	341,3	38,6	1,0	83
25	5,1	-5,9	348,7	22,9	-1,3	74	26	0,7	1,6	349,4	62,9	1,0	95
27	5,6	-6,7	340,3	47,3	-1,2	90	28	-1,9	4,0	359,6	87,1	1,0	100
29	5,3	-6,0	336,1	71,6	-1,2	99	30	-4,1	5,8	9,8	111,4	1,1	98

Legenda:

l = librazione in longitudine, in °  
b = librazione in latitudine, in °  
axis = angolo di posizione del polo nord lunare, in °  
coln = colongitudine del Sole, ossia longitudine del terminatore lunare, in °  
lat = latitudine del Sole, riferita all'equatore lunare, in °  
ill = percentuale di Luna illuminata

l = libration in longitude, in °  
b = libration in latitude, in °  
axis = angle of position from the lunar north pole, in °  
coln = solar colongitude, alias longitude of the lunar limb, in °  
lat = latitude of the Sun, referred to the lunar equator, in °  
ill = lunar lightning

# FENOMENI LUNARI - LUNAR PHENOMENA

Perigei - Perigea				Apogei - Apogea			
Jan 17	21:29	369882 km	N-5d10h	Jan 2	20:20	404579 km	F-6d11h
Feb 11	18:33	367919 km	F+3d20h	Jan 30	17:43	404324 km	N+7d10h
Mar 10	10:03	362399 km	F+2d 0h	Feb 27	14:03	404862 km	N+5d15h
Apr 7	17:00	358313 km	F+ 21h	Mar 26	6:05	405779 km	N+3d15h
May 6	3:34	356953 km ++	F- 0h	Apr 22	13:50	406420 km -	N+1d 6h
Jun 3	13:21	358482 km	F- 21h	May 19	16:14	406450 km --	N-1d 7h
Jul 1	18:02	362361 km	F-2d 0h	Jun 16	1:25	405790 km	N-3d13h
Jul 29	8:31	367317 km	F-3d18h	Jul 13	16:48	404782 km	N-5d11h
Aug 23	19:40	369730 km	N+6d 3h	Aug 10	10:53	404124 km	N-7d 5h
Sep 19	2:53	365748 km	N+3d 0h	Sep 7	6:01	404295 km	F+6d16h
Oct 17	1:03	360672 km	N+1d13h	Oct 5	0:44	405161 km	F+4d21h
Nov 14	10:23	357360 km -	N+ 12h	Nov 1	15:31	406049 km +	F+2d19h
Dec 12	23:15	357073 km -	N- 9h	Nov 28	19:36	406364 km +	F+ 4h
				Dec 25	21:21	406099 km +	F-2d13h

Tutti gli orari sono in T.U., le distanze sono calcolate da centro Luna a centro Terra; F indica che il fenomeno avviene in prossimità della luna piena, N che avviene in prossimità della luna nuova, "-" o "+" indicano di quanti giorni ed ore il perigeo o l'apogeo precedono la fase lunare.  
Jan=gennaio, May=maggio, Jun=giugno, Jul=luglio, Aug=agosto, Sep=settembre, Oct=ottobre, Dec=dicembre

All the scheduled times are in U.T., the distances are calculated from the center of the Moon to the center of the Earth; F means that the phenomenon happens in proximity of the full moon, N that happens in proximity of the new moon, "-" or "+" shows how many days and hour the lunar phase precedes or follows the perigeum or the apogeuum.

## Passage through node

06/01/2012	14:28:36	10/04/2012	00:48:17	14/07/2012	20:54:02	17/10/2012	18:27:16
19/01/2012	18:27:21	24/04/2012	03:43:01	28/07/2012	10:34:41	31/10/2012	10:35:21
02/02/2012	20:00:59	07/05/2012	09:43:23	11/08/2012	00:03:53	14/11/2012	04:37:46
15/02/2012	20:15:26	21/05/2012	09:20:12	24/08/2012	11:37:28	27/11/2012	17:03:52
29/02/2012	22:35:29	03/06/2012	20:37:53	07/09/2012	02:06:46	11/12/2012	15:57:29
13/03/2012	20:40:47	17/06/2012	15:40:33	20/09/2012	12:53:34	24/12/2012	22:26:11
28/03/2012	00:16:24	01/07/2012	05:45:38	04/10/2012	05:14:40		

## Maximal libration

09/01/2012	19:06:11	-5,1°	12/05/2012	09:26:35	7,4°	31/08/2012	19:25:08	5,2°
24/01/2012	15:07:02	4,9°	27/05/2012	22:06:47	-7,4°	13/09/2012	02:18:31	-5,7°
05/02/2012	20:51:44	-5,8°	09/06/2012	16:08:02	7,3°	24/10/2012	00:47:51	6,8°
20/02/2012	04:20:19	4,7°	24/06/2012	10:16:53	-6,2°	08/11/2012	07:00:07	-7,4°
04/03/2012	15:38:39	-6,9°	07/07/2012	18:39:08	6,6°	20/11/2012	20:53:13	7,7°
17/03/2012	10:46:20	5,7°	20/07/2012	23:43:45	-5,1°	06/12/2012	15:01:59	-7,4°
01/04/2012	17:28:54	-7,8°	04/08/2012	13:56:07	5,7°	19/12/2012	01:48:24	7,9°
14/04/2012	04:11:45	6,9°	16/08/2012	15:53:41	-5,0°			

Passage through node = passaggio al nodo, tempi in T.U.  
Maximal libration = librazione massima, times in U.T.

# FASI LUNARI - LUNAR PHASES

Luna nuova	h m s	Primo quarto	h m s	Luna piena	h m s	Ultimo quarto	h m s
New Moon		First quarter		Full Moon		Last quarter	
		01/01/2012	06:14:47	09/01/2012	07:30:15	16/01/2012	09:08:07
23/01/2012	07:39:26	31/01/2012	04:09:51	07/02/2012	21:53:59	14/02/2012	17:04:00
21/02/2012	22:34:50	01/03/2012	01:21:42	08/03/2012	09:39:36	15/03/2012	01:25:14
22/03/2012	14:37:16	30/03/2012	19:40:57	06/04/2012	19:18:43	13/04/2012	10:49:43
21/04/2012	07:18:34	29/04/2012	09:57:42	06/05/2012	03:35:11	12/05/2012	21:46:48
20/05/2012	23:47:12	28/05/2012	20:16:07	04/06/2012	11:11:38	11/06/2012	10:41:26
19/06/2012	15:02:12	27/06/2012	03:30:32	03/07/2012	18:51:51	11/07/2012	01:48:03
19/07/2012	04:24:08	26/07/2012	08:56:18	02/08/2012	03:27:29	09/08/2012	18:55:11
17/08/2012	15:54:35	24/08/2012	13:53:37	31/08/2012	13:58:09	08/09/2012	13:15:09
16/09/2012	02:10:43	22/09/2012	19:40:52	30/09/2012	03:18:38	08/10/2012	07:33:27
15/10/2012	12:02:35	22/10/2012	03:32:05	29/10/2012	19:49:36	07/11/2012	00:35:52
13/11/2012	22:08:06	20/11/2012	14:31:30	28/11/2012	14:46:08	06/12/2012	15:31:37
13/12/2012	08:41:39	20/12/2012	05:19:08	28/12/2012	10:21:19		

Jan=Gen, May=Mag, Jun=Giu, Jul=Lug, Aug=Ago, Sept=Set, Oct=Ott, Dec=Dic

# LEVATA E TRAMONTO DELLA LUNA RISING AND SETTING OF THE MOON

for Greenwich Meridian      for Rome :      Longitude E 12 00.0  
Latitude N 42 00.0  
Time Zone UT +1

Date	Ephemeris Transit		Rise (Azim)		Trans (Alt)		Set (Azim)	
	TDT	JD	h	m s	h	m °	h	m °
2012-01- 1	2455928.256410		18	09 13.8	11	35 ( 78)	18	20 (s58) f 1 13 (285)
2012-01- 2	2455929.286396		18	52 24.6	12	02 ( 72)	19	03 (s62) f 2 12 (291)
2012-01- 3	2455930.317525		19	37 14.2	12	32 ( 67)	19	48 (s66) f 3 11 (295)
2012-01- 4	2455931.350111		20	24 09.6	13	06 ( 63)	20	35 (s68) f 4 09 (299)
2012-01- 5	2455932.384227		21	13 17.2	13	46 ( 61)	21	24 (s70) f 5 05 (301)
2012-01- 6	2455933.419655		22	04 18.2	14	32 ( 59)	22	15 (s71) f 5 58 (301)
2012-01- 7	2455934.455901		22	56 29.9	15	25 ( 59)	23	07 (s70) f 6 45 (299)
2012-01- 8	2455935.492326		23	48 57.0	16	24 ( 62)	23	59 (s68) f 7 28 (296)
2012-01-10	2455936.528352		0	40 49.6	p17	28 ( 65)	0	51 (s65) 8 06 (292)
2012-01-11	2455937.563639		1	31 38.4	p18	35 ( 71)	1	42 (s61) 8 39 (286)
2012-01-12	2455938.598167		2	21 21.6	p19	43 ( 77)	2	32 (s56) 9 10 (279)
2012-01-13	2455939.632213		3	10 23.2	p20	52 ( 84)	3	21 (s51) 9 39 (272)
2012-01-14	2455940.666266		3	59 25.4	p22	02 ( 91)	4	10 (s46) 10 08 (265)
2012-01-15	2455941.700929		4	49 20.3	p23	12 ( 99)	5	00 (s40) 10 38 (258)
2012-01-16	2455942.736807		5	41 00.1	0	23 (106)	5	51 (s35) 11 11 (251)
2012-01-17	2455943.774357		6	35 04.4	1	35 (112)	6	45 (s31) 11 49 (246)
2012-01-18	2455944.813708		7	31 44.4	2	46 (117)	7	42 (s28) 12 33 (241)
2012-01-19	2455945.854490		8	30 27.9	3	55 (120)	8	41 (s26) 13 24 (239)
2012-01-20	2455946.895805		9	29 57.5	4	57 (121)	9	40 (s26) 14 23 (239)
2012-01-21	2455947.936475		10	28 31.4	5	52 (120)	10	39 (s27) 15 28 (241)
2012-01-22	2455948.975456		11	24 39.4	6	38 (117)	11	35 (s29) 16 36 (245)
2012-01-23	2455950.012163		12	17 30.9	7	18 (112)	12	28 (s33) 17 45 (250)
2012-01-24	2455951.046526		13	06 59.8	7	51 (106)	13	17 (s37) 18 52 (257)
2012-01-25	2455952.078858		13	53 33.3	8	20 (100)	14	04 (s42) 19 56 (263)
2012-01-26	2455953.109681		14	37 56.5	8	47 ( 93)	14	48 (s47) 20 59 (270)
2012-01-27	2455954.139597		15	21 01.1	9	12 ( 87)	15	32 (s52) 22 00 (277)
2012-01-28	2455955.169208		16	03 39.6	9	38 ( 81)	16	14 (s56) 23 00 (283)
2012-01-29	2455956.199082		16	46 40.7	10	04 ( 75)	16	57 (s60) 23 59 (288)
2012-01-30	2455957.229715		17	30 47.4	10	33 ( 70)	17	41 (s64) f 0 58 (293)
2012-01-31	2455958.261490		18	16 32.7	11	05 ( 65)	18	27 (s67) f 1 56 (297)
2012-02- 1	2455959.294625		19	04 15.6	11	41 ( 62)	19	15 (s69) f 2 53 (300)
2012-02- 2	2455960.329116		19	53 55.6	12	24 ( 60)	20	04 (s70) f 3 46 (301)
2012-02- 3	2455961.364711		20	45 11.0	13	13 ( 59)	20	55 (s70) f 4 36 (300)
2012-02- 4	2455962.400958		21	37 22.8	14	09 ( 61)	21	48 (s69) f 5 21 (298)
2012-02- 5	2455963.437338		22	29 46.0	15	11 ( 64)	22	40 (s67) f 6 01 (294)
2012-02- 6	2455964.473426		23	21 44.0	16	17 ( 68)	23	32 (s63) f 6 37 (289)
2012-02- 8	2455965.509030		0	13 00.2	p17	26 ( 74)	0	23 (s59) 7 10 (282)
2012-02- 9	2455966.544225		1	03 41.0	p18	37 ( 81)	1	14 (s53) 7 41 (275)
2012-02-10	2455967.579321		1	54 13.3	p19	48 ( 88)	2	05 (s48) 8 11 (268)
2012-02-11	2455968.614774		2	45 16.4	p21	00 ( 96)	2	56 (s42) 8 41 (260)
2012-02-12	2455969.651074		3	37 32.8	p22	13 (103)	3	48 (s37) 9 14 (254)
2012-02-13	2455970.688611		4	31 36.0	p23	26 (110)	4	42 (s32) 9 51 (248)
2012-02-14	2455971.727518		5	27 37.6	0	37 (115)	5	38 (s29) 10 33 (243)
2012-02-15	2455972.767539		6	25 15.4	1	46 (119)	6	35 (s27) 11 21 (240)
2012-02-16	2455973.808000		7	23 31.2	2	50 (121)	7	34 (s26) 12 17 (239)
2012-02-17	2455974.847974		8	21 05.0	3	46 (120)	8	31 (s26) 13 19 (240)
2012-02-18	2455975.886586		9	16 41.0	4	34 (118)	9	27 (s28) 14 24 (244)
2012-02-19	2455976.923278		10	09 31.2	5	15 (114)	10	20 (s31) 15 30 (248)
2012-02-20	2455977.957902		10	59 22.7	5	50 (109)	11	10 (s35) 16 37 (254)
2012-02-21	2455978.990653		11	46 32.4	6	21 (103)	11	57 (s40) 17 41 (260)
2012-02-22	2455980.021937		12	31 35.4	6	48 ( 96)	12	42 (s45) 18 45 (267)
2012-02-23	2455981.052256		13	15 14.9	7	14 ( 90)	13	26 (s50) 19 46 (274)
2012-02-24	2455982.082132		13	58 16.2	7	40 ( 83)	14	09 (s54) 20 47 (280)
2012-02-25	2455983.112064		14	41 22.3	8	06 ( 77)	14	52 (s59) 21 47 (286)
2012-02-26	2455984.142493		15	25 11.4	8	34 ( 72)	15	36 (s62) 22 46 (291)
2012-02-27	2455985.173770		16	10 13.7	9	05 ( 67)	16	21 (s66) 23 44 (295)
2012-02-28	2455986.206122		16	56 49.0	9	39 ( 63)	17	07 (s68) f 0 41 (298)
2012-02-29	2455987.239615		17	45 02.7	10	19 ( 61)	17	55 (s70) f 1 35 (300)
2012-03- 1	2455988.274131		18	34 44.9	11	04 ( 60)	18	45 (s70) f 2 26 (300)
2012-03- 2	2455989.309396		19	25 31.8	11	56 ( 60)	19	36 (s70) f 3 12 (299)
2012-03- 3	2455990.345054		20	16 52.6	12	54 ( 62)	20	27 (s68) f 3 54 (296)
2012-03- 4	2455991.380784		21	08 19.7	13	57 ( 66)	21	19 (s65) f 4 31 (291)
2012-03- 5	2455992.416405		21	59 37.4	15	04 ( 71)	22	10 (s61) f 5 06 (285)
2012-03- 6	2455993.451942		22	50 47.8	16	14 ( 78)	23	01 (s56) f 5 38 (279)
2012-03- 7	2455994.487623		23	42 10.6	17	26 ( 85)	23	52 (s51) f 6 09 (271)
2012-03- 9	2455995.523821		0	34 18.2	p18	39 ( 92)	0	45 (s45) 6 40 (264)
2012-03-10	2455996.560964		1	27 47.3	p19	53 (100)	1	38 (s39) 7 13 (257)
2012-03-11	2455997.599388		2	23 07.2	p21	09 (107)	2	33 (s34) 7 50 (250)
2012-03-12	2455998.639178		3	20 25.0	p22	24 (113)	3	31 (s30) 8 31 (245)
2012-03-13	2455999.680017		4	19 13.4	p23	36 (118)	4	29 (s27) 9 19 (241)
2012-03-14	2456000.721170		5	18 29.1	0	43 (120)	5	29 (s26) 10 13 (240)
2012-03-15	2456001.761666		6	16 48.0	1	42 (120)	6	27 (s26) 11 14 (240)

Ephemeris Transit							
Date	TDJ JD	TDJ Time	Rise (Azm)	Trans (Alt)	Set (Azm)		
		h m s	h m °	h m °	h m °		
2012-03-16	2456002.800622	7 12 53.8	2 32 (118)	7 23 (s28)	12 18 (243)		
2012-03-17	2456003.837507	8 06 00.6	3 15 (115)	8 16 (s31)	13 23 (247)		
2012-03-18	2456004.872217	8 55 59.5	3 51 (110)	9 06 (s34)	14 28 (252)		
2012-03-19	2456005.904986	9 43 10.8	4 23 (104)	9 54 (s38)	15 32 (258)		
2012-03-20	2456006.936248	10 28 11.9	4 51 ( 98)	10 39 (s43)	16 35 (265)		
2012-03-21	2456007.966518	11 11 47.2	5 17 ( 92)	11 22 (s48)	17 36 (271)		
2012-03-22	2456008.996316	11 54 41.7	5 43 ( 86)	12 05 (s52)	18 37 (278)		
2012-03-23	2456010.026128	12 37 37.4	6 09 ( 80)	12 48 (s57)	19 36 (284)		
2012-03-24	2456011.056368	13 21 10.2	6 36 ( 74)	13 32 (s61)	20 36 (289)		
2012-03-25	2456012.087356	14 05 47.6	7 06 ( 69)	14 16 (s64)	21 34 (293)		
2012-03-26	2456013.119283	14 51 46.1	7 39 ( 65)	15 02 (s67)	22 31 (297)		
2012-03-27	2456014.152188	15 39 09.0	8 17 ( 62)	15 50 (s69)	23 26 (299)		
2012-03-28	2456015.185948	16 27 45.9	9 00 ( 60)	16 38 (s70)	f 0 18 (300)		
2012-03-29	2456016.220315	17 17 15.2	9 48 ( 60)	17 28 (s70)	f 1 05 (299)		
2012-03-30	2456017.254988	18 07 11.0	10 43 ( 61)	18 18 (s68)	f 1 47 (297)		
2012-03-31	2456018.289715	18 57 11.3	11 42 ( 64)	19 08 (s66)	f 2 26 (293)		
2012-04- 1	2456019.324377	19 47 06.2	12 45 ( 69)	19 57 (s63)	f 3 01 (288)		
2012-04- 2	2456020.359046	20 37 01.6	13 52 ( 74)	20 47 (s58)	f 3 33 (282)		
2012-04- 3	2456021.393986	21 27 20.4	15 01 ( 81)	21 38 (s53)	f 4 04 (275)		
2012-04- 4	2456022.429616	22 18 38.8	16 12 ( 89)	22 29 (s48)	f 4 35 (268)		
2012-04- 5	2456023.466433	23 11 39.8	17 26 ( 96)	23 22 (s42)	f 5 08 (260)		
2012-04- 7	2456024.504887	0 07 02.2	p18 42 (104)	0 17 (s37)	5 43 (253)		
2012-04- 8	2456025.545196	1 05 04.9	p19 59 (111)	1 15 (s32)	6 24 (247)		
2012-04- 9	2456026.587127	2 05 27.7	p21 16 (116)	2 15 (s29)	7 10 (243)		
2012-04-10	2456027.629881	3 07 01.7	p22 27 (119)	3 17 (s27)	8 04 (240)		
2012-04-11	2456028.672246	4 08 02.0	p23 32 (120)	4 18 (s26)	9 05 (240)		
2012-04-12	2456029.713011	5 06 44.2	0 27 (119)	5 17 (s27)	10 09 (242)		
2012-04-13	2456030.751387	6 01 59.8	1 14 (116)	6 12 (s30)	11 16 (246)		
2012-04-14	2456031.787154	6 53 30.1	1 52 (111)	7 04 (s33)	12 22 (251)		
2012-04-15	2456032.820556	7 41 36.0	2 25 (106)	7 52 (s37)	13 26 (257)		
2012-04-16	2456033.852097	8 27 01.2	2 54 (100)	8 38 (s42)	14 29 (263)		
2012-04-17	2456034.882380	9 10 37.6	3 21 ( 94)	9 21 (s46)	15 30 (269)		
2012-04-18	2456035.912011	9 53 17.8	3 47 ( 88)	10 04 (s51)	16 30 (276)		
2012-04-19	2456036.941545	10 35 49.5	4 13 ( 82)	10 46 (s56)	17 29 (282)		
2012-04-20	2456037.971457	11 18 53.9	4 39 ( 76)	11 29 (s60)	18 28 (287)		
2012-04-21	2456039.002108	12 03 02.1	5 08 ( 71)	12 14 (s63)	19 27 (292)		
2012-04-22	2456040.033717	12 48 33.2	5 40 ( 66)	12 59 (s66)	20 24 (296)		
2012-04-23	2456041.066325	13 35 30.4	6 17 ( 63)	13 46 (s68)	21 20 (298)		
2012-04-24	2456042.099785	14 23 41.4	6 58 ( 61)	14 34 (s70)	22 12 (300)		
2012-04-25	2456043.133800	15 12 40.3	7 44 ( 60)	15 23 (s70)	23 01 (299)		
2012-04-26	2456044.168006	16 01 55.7	8 36 ( 61)	16 12 (s69)	23 44 (298)		
2012-04-27	2456045.202089	16 51 00.5	9 33 ( 63)	17 01 (s67)	f 0 23 (295)		
2012-04-28	2456046.235886	17 39 40.6	10 33 ( 67)	17 50 (s64)	f 0 59 (290)		
2012-04-29	2456047.269450	18 28 00.5	11 37 ( 72)	18 38 (s60)	f 1 31 (285)		
2012-04-30	2456048.303048	19 16 23.4	12 42 ( 78)	19 27 (s55)	f 2 01 (278)		
2012-05- 1	2456049.337135	20 05 28.4	13 50 ( 85)	20 16 (s50)	f 2 31 (271)		
2012-05- 2	2456050.372294	20 56 06.2	15 01 ( 92)	21 06 (s45)	f 3 02 (264)		
2012-05- 3	2456051.409149	21 49 10.5	16 14 (100)	21 59 (s40)	f 3 35 (257)		
2012-05- 4	2456052.448207	22 45 25.1	17 30 (107)	22 56 (s35)	f 4 13 (250)		
2012-05- 5	2456053.489618	23 45 03.0	18 47 (113)	23 55 (s30)	f 4 57 (245)		
2012-05- 7	2456054.532916	0 47 23.9	p20 03 (118)	0 57 (s28)	5 48 (241)		
2012-05- 8	2456055.576925	1 50 46.3	p21 13 (120)	2 01 (s26)	6 48 (240)		
2012-05- 9	2456056.620084	2 52 55.3	p22 15 (120)	3 03 (s27)	7 53 (241)		
2012-05-10	2456057.661049	3 51 54.6	p23 07 (117)	4 02 (s29)	9 01 (244)		
2012-05-11	2456058.699132	4 46 45.0	p23 50 (113)	4 57 (s32)	10 10 (249)		
2012-05-12	2456059.734333	5 37 26.4	0 26 (108)	5 48 (s36)	11 17 (255)		
2012-05-13	2456060.767105	6 24 37.8	0 57 (102)	6 35 (s40)	12 21 (261)		
2012-05-14	2456061.798101	7 09 16.0	1 25 ( 96)	7 20 (s45)	13 23 (267)		
2012-05-15	2456062.828021	7 52 21.0	1 51 ( 89)	8 03 (s50)	14 24 (274)		
2012-05-16	2456063.857520	8 34 49.7	2 17 ( 83)	8 45 (s54)	15 23 (280)		
2012-05-17	2456064.887177	9 17 32.1	2 43 ( 78)	9 28 (s58)	16 22 (286)		
2012-05-18	2456065.917459	10 01 08.5	3 11 ( 72)	10 12 (s62)	17 21 (291)		
2012-05-19	2456066.948687	10 46 06.6	3 42 ( 68)	10 57 (s65)	18 18 (295)		
2012-05-20	2456067.980994	11 32 37.9	4 17 ( 64)	11 43 (s68)	19 15 (298)		
2012-05-21	2456069.014296	12 20 35.2	4 56 ( 61)	12 31 (s69)	20 08 (299)		
2012-05-22	2456070.048300	13 09 33.1	5 41 ( 60)	13 20 (s70)	20 58 (300)		
2012-05-23	2456071.082580	13 58 54.9	6 32 ( 61)	14 09 (s69)	21 43 (298)		
2012-05-24	2456072.116707	14 48 03.4	7 27 ( 63)	14 58 (s67)	22 24 (296)		
2012-05-25	2456073.150383	15 36 33.1	8 26 ( 66)	15 47 (s65)	23 00 (292)		
2012-05-26	2456074.183534	16 24 17.3	9 28 ( 71)	16 35 (s61)	23 32 (286)		
2012-05-27	2456075.216333	17 11 31.2	10 32 ( 76)	17 22 (s57)	f 0 03 (281)		
2012-05-28	2456076.249174	17 58 48.6	11 37 ( 83)	18 09 (s52)	f 0 32 (274)		
2012-05-29	2456077.282621	18 46 58.5	12 44 ( 89)	18 57 (s47)	f 1 01 (267)		
2012-05-30	2456078.317346	19 36 58.7	13 54 ( 97)	19 47 (s42)	f 1 32 (260)		
2012-05-31	2456079.354026	20 29 47.8	15 06 (104)	20 40 (s37)	f 2 06 (253)		
2012-06- 1	2456080.393169	21 26 09.8	16 20 (110)	21 36 (s32)	f 2 45 (247)		
2012-06- 2	2456081.434857	22 26 11.6	17 35 (116)	22 36 (s29)	f 3 32 (243)		
2012-06- 3	2456082.478465	23 28 59.4	18 48 (119)	23 39 (s27)	f 4 27 (240)		
2012-06- 5	2456083.522643	0 32 36.4	p19 55 (120)	0 42 (s26)	5 30 (240)		
2012-06- 6	2456084.565731	1 34 39.1	p20 54 (119)	1 45 (s28)	6 39 (242)		
2012-06- 7	2456085.606421	2 33 14.8	p21 42 (115)	2 43 (s30)	7 50 (247)		
2012-06- 8	2456086.644146	3 27 34.2	p22 23 (110)	3 38 (s34)	9 00 (252)		

Ephemeris Transit							
Date	TDT JD	TDT Time	Rise (Azm)	Trans (Alt)	Set (Azm)		
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2012-06- 9	2456087.679027	4 17 47.9	p22 57 (104)	4 28 (s38)	10 07 (258)		
2012-06-10	2456088.711593	5 04 41.6	p23 27 ( 98)	5 15 (s43)	11 12 (265)		
2012-06-11	2456089.742542	5 49 15.7	p23 54 ( 92)	6 00 (s48)	12 14 (271)		
2012-06-12	2456090.772588	6 32 31.6	0 20 ( 85)	6 43 (s53)	13 15 (278)		
2012-06-13	2456091.802389	7 15 26.4	0 46 ( 79)	7 26 (s57)	14 14 (284)		
2012-06-14	2456092.832511	7 58 49.0	1 14 ( 74)	8 09 (s61)	15 13 (289)		
2012-06-15	2456093.863396	8 43 17.4	1 44 ( 69)	8 54 (s64)	16 11 (293)		
2012-06-16	2456094.895314	9 29 15.1	2 17 ( 65)	9 40 (s67)	17 08 (297)		
2012-06-17	2456095.928325	10 16 47.3	2 55 ( 62)	10 27 (s69)	18 03 (299)		
2012-06-18	2456096.962251	11 05 38.5	3 38 ( 61)	11 16 (s70)	18 55 (300)		
2012-06-19	2456097.996714	11 55 16.1	4 27 ( 60)	12 06 (s69)	19 42 (299)		
2012-06-20	2456099.031235	12 44 58.7	5 21 ( 62)	12 55 (s68)	20 24 (297)		
2012-06-21	2456100.065389	13 34 09.6	6 20 ( 65)	13 45 (s66)	21 02 (293)		
2012-06-22	2456101.098935	14 22 28.0	7 21 ( 69)	14 33 (s63)	21 36 (288)		
2012-06-23	2456102.131880	15 09 54.4	8 25 ( 74)	15 20 (s59)	22 07 (282)		
2012-06-24	2456103.164477	15 56 50.8	9 29 ( 80)	16 07 (s54)	22 36 (276)		
2012-06-25	2456104.197182	16 43 56.5	10 35 ( 87)	16 54 (s49)	23 04 (269)		
2012-06-26	2456105.230594	17 32 03.3	11 42 ( 94)	17 42 (s44)	23 34 (263)		
2012-06-27	2456106.265377	18 22 08.6	12 51 (101)	18 32 (s39)	f 0 05 (256)		
2012-06-28	2456107.302154	19 15 06.1	14 02 (108)	19 25 (s34)	f 0 41 (250)		
2012-06-29	2456108.341318	20 11 29.9	15 15 (113)	20 22 (s30)	f 1 23 (245)		
2012-06-30	2456109.382791	21 11 13.1	16 27 (118)	21 21 (s28)	f 2 12 (241)		
2012-07- 1	2456110.425821	22 13 10.9	17 35 (120)	22 23 (s26)	f 3 10 (240)		
2012-07- 2	2456111.469065	23 15 27.2	18 37 (120)	23 25 (s27)	f 4 16 (241)		
2012-07- 4	2456112.511047	0 15 54.5	p19 31 (117)	0 26 (s29)	5 26 (244)		
2012-07- 5	2456113.550707	1 13 01.1	p20 15 (113)	1 23 (s32)	6 37 (249)		
2012-07- 6	2456114.587661	2 06 13.9	p20 53 (107)	2 16 (s36)	7 47 (255)		
2012-07- 7	2456115.622101	2 55 49.5	p21 26 (101)	3 06 (s41)	8 55 (262)		
2012-07- 8	2456116.654550	3 42 33.1	p21 55 ( 95)	3 53 (s46)	10 00 (269)		
2012-07- 9	2456117.685660	4 27 21.0	p22 22 ( 88)	4 38 (s51)	11 03 (275)		
2012-07-10	2456118.716089	5 11 10.1	p22 49 ( 82)	5 22 (s55)	12 04 (281)		
2012-07-11	2456119.746440	5 54 52.4	p23 16 ( 76)	6 05 (s59)	13 03 (287)		
2012-07-12	2456120.777219	6 39 11.8	p23 45 ( 71)	6 50 (s63)	14 02 (292)		
2012-07-13	2456121.808803	7 24 40.6	0 17 ( 67)	7 35 (s66)	15 00 (296)		
2012-07-14	2456122.841392	8 11 36.3	0 53 ( 63)	8 22 (s68)	15 55 (298)		
2012-07-15	2456123.874974	8 59 57.8	1 34 ( 61)	9 10 (s69)	16 48 (300)		
2012-07-16	2456124.909320	9 49 25.3	2 21 ( 60)	10 00 (s70)	17 37 (299)		
2012-07-17	2456125.944039	10 39 25.0	3 14 ( 61)	10 50 (s69)	18 22 (298)		
2012-07-18	2456126.978692	11 29 19.0	4 11 ( 63)	11 40 (s67)	19 02 (294)		
2012-07-19	2456128.012932	12 18 37.3	5 12 ( 67)	12 29 (s64)	19 37 (290)		
2012-07-20	2456129.046609	13 07 07.1	6 16 ( 72)	13 18 (s60)	20 10 (285)		
2012-07-21	2456130.079810	13 54 55.6	7 21 ( 78)	14 05 (s56)	20 40 (278)		
2012-07-22	2456131.112836	14 42 29.1	8 27 ( 85)	14 53 (s51)	21 09 (272)		
2012-07-23	2456132.146156	15 30 27.9	9 34 ( 92)	15 41 (s45)	21 38 (265)		
2012-07-24	2456133.180331	16 19 40.6	10 43 ( 99)	16 30 (s40)	22 09 (258)		
2012-07-25	2456134.215929	17 10 56.3	11 52 (105)	17 21 (s36)	22 43 (252)		
2012-07-26	2456135.253395	18 04 53.3	13 03 (111)	18 15 (s32)	23 21 (247)		
2012-07-27	2456136.292868	19 01 43.8	14 13 (116)	19 12 (s29)	f 0 06 (243)		
2012-07-28	2456137.334010	20 00 58.4	15 21 (119)	20 11 (s27)	f 0 59 (240)		
2012-07-29	2456138.375948	21 01 21.9	16 24 (120)	21 11 (s27)	f 1 59 (240)		
2012-07-30	2456139.417493	22 01 11.4	17 20 (118)	22 11 (s28)	f 3 06 (243)		
2012-07-31	2456140.457555	22 58 52.7	18 08 (115)	23 09 (s30)	f 4 16 (247)		
2012-08- 1	2456141.495479	23 53 29.4	18 48 (110)	f 0 04 (s34)	f 5 26 (252)		
2012-08- 3	2456142.531139	0 44 50.4	p19 23 (104)	0 55 (s39)	6 35 (259)		
2012-08- 4	2456143.564807	1 33 19.3	p19 54 ( 98)	1 44 (s43)	7 42 (265)		
2012-08- 5	2456144.596972	2 19 38.3	p20 23 ( 91)	2 30 (s48)	8 46 (272)		
2012-08- 6	2456145.628198	3 04 36.3	p20 50 ( 85)	3 15 (s53)	9 49 (278)		
2012-08- 7	2456146.659042	3 49 01.2	p21 18 ( 79)	4 00 (s58)	10 50 (284)		
2012-08- 8	2456147.689996	4 33 35.7	p21 46 ( 73)	4 44 (s61)	11 50 (290)		
2012-08- 9	2456148.721457	5 18 53.9	p22 17 ( 69)	5 29 (s65)	12 49 (294)		
2012-08-10	2456149.753689	6 05 18.8	p22 52 ( 65)	6 16 (s67)	13 45 (297)		
2012-08-11	2456150.786790	6 52 58.7	p23 31 ( 62)	7 03 (s69)	14 39 (299)		
2012-08-12	2456151.820678	7 41 46.6	0 15 ( 61)	7 52 (s69)	15 30 (299)		
2012-08-13	2456152.855110	8 31 21.5	1 05 ( 61)	8 42 (s69)	16 16 (298)		
2012-08-14	2456153.889756	9 21 14.9	2 00 ( 62)	9 32 (s68)	16 58 (296)		
2012-08-15	2456154.924297	10 10 59.3	3 00 ( 66)	10 21 (s65)	17 36 (292)		
2012-08-16	2456155.958535	11 00 17.4	4 03 ( 70)	11 11 (s62)	18 10 (287)		
2012-08-17	2456156.992451	11 49 07.8	5 08 ( 76)	12 00 (s57)	18 41 (281)		
2012-08-18	2456158.026224	12 37 45.8	6 15 ( 82)	12 48 (s53)	19 12 (274)		
2012-08-19	2456159.060193	13 26 40.7	7 23 ( 89)	13 37 (s47)	19 41 (267)		
2012-08-20	2456160.094803	14 16 31.0	8 32 ( 96)	14 27 (s42)	20 12 (260)		
2012-08-21	2456161.130520	15 07 56.9	9 43 (103)	15 18 (s37)	20 46 (254)		
2012-08-22	2456162.167717	16 01 30.7	10 54 (109)	16 12 (s33)	21 23 (248)		
2012-08-23	2456163.206532	16 57 24.4	12 04 (114)	17 08 (s30)	22 06 (244)		
2012-08-24	2456164.246728	17 55 17.3	13 13 (118)	18 05 (s27)	22 55 (241)		
2012-08-25	2456165.287647	18 54 12.7	14 16 (119)	19 04 (s27)	23 52 (240)		
2012-08-26	2456166.328352	19 52 49.6	15 13 (119)	20 03 (s27)	f 0 55 (242)		
2012-08-27	2456167.367920	20 49 48.3	16 02 (116)	21 00 (s29)	f 2 02 (245)		
2012-08-28	2456168.405732	21 44 15.2	16 45 (112)	21 54 (s33)	f 3 10 (250)		
2012-08-29	2456169.441583	22 35 52.8	17 21 (107)	22 46 (s37)	f 4 19 (256)		
2012-08-30	2456170.475629	23 24 54.3	17 53 (101)	23 35 (s41)	f 5 25 (262)		
2012-09- 1	2456171.508245	0 11 52.4	p18 23 ( 94)	0 22 (s46)	6 30 (269)		

Ephemeris Transit							
Date	TDT JD	TDT Time	Rise (AzM)	Trans (Alt)	Set (AzM)		
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2012-09- 2	2456172.539906	0 57 27.8	p18 51 ( 88)	1 08 (s51)	7 34 (275)		
2012-09- 3	2456173.571096	1 42 22.7	p19 19 ( 82)	1 53 (s56)	8 36 (282)		
2012-09- 4	2456174.602255	2 27 14.8	p19 47 ( 76)	2 38 (s60)	9 37 (287)		
2012-09- 5	2456175.633741	3 12 35.2	p20 18 ( 71)	3 23 (s63)	10 36 (292)		
2012-09- 6	2456176.665798	3 58 44.9	p20 51 ( 67)	4 09 (s66)	11 34 (296)		
2012-09- 7	2456177.698537	4 45 53.6	p21 28 ( 63)	4 56 (s68)	12 29 (298)		
2012-09- 8	2456178.731924	5 33 58.2	p22 10 ( 61)	5 44 (s69)	13 21 (299)		
2012-09- 9	2456179.765802	6 22 45.3	p22 57 ( 61)	6 33 (s69)	14 08 (299)		
2012-09-10	2456180.799939	7 11 54.8	p23 49 ( 62)	7 22 (s68)	14 51 (297)		
2012-09-11	2456181.834111	8 01 07.2	0 46 ( 64)	8 11 (s66)	15 31 (294)		
2012-09-12	2456182.868172	8 50 10.1	1 47 ( 68)	9 01 (s63)	16 06 (289)		
2012-09-13	2456183.902121	9 39 03.3	2 51 ( 73)	9 49 (s59)	16 39 (283)		
2012-09-14	2456184.936114	10 28 00.3	3 57 ( 79)	10 38 (s55)	17 10 (277)		
2012-09-15	2456185.970453	11 17 27.1	5 05 ( 86)	11 28 (s50)	17 41 (270)		
2012-09-16	2456187.005538	12 07 58.5	6 15 ( 93)	12 18 (s44)	18 12 (263)		
2012-09-17	2456188.041793	13 00 10.9	7 27 (100)	13 10 (s39)	18 46 (257)		
2012-09-18	2456189.079550	13 54 33.1	8 40 (107)	14 05 (s35)	19 23 (250)		
2012-09-19	2456190.118905	14 51 13.4	9 52 (113)	15 01 (s31)	20 05 (245)		
2012-09-20	2456191.159572	15 49 47.0	11 03 (117)	16 00 (s28)	20 53 (242)		
2012-09-21	2456192.200849	16 49 13.3	12 09 (119)	16 59 (s27)	21 48 (241)		
2012-09-22	2456193.241773	17 48 09.2	13 09 (119)	17 58 (s27)	22 49 (242)		
2012-09-23	2456194.281429	18 45 15.5	14 00 (117)	18 55 (s29)	23 55 (244)		
2012-09-24	2456195.319226	19 39 41.1	14 44 (113)	19 50 (s32)	f 1 02 (249)		
2012-09-25	2456196.354998	20 31 11.8	15 21 (108)	20 41 (s35)	f 2 08 (254)		
2012-09-26	2456197.388932	21 20 03.8	15 54 (103)	21 30 (s40)	f 3 14 (260)		
2012-09-27	2456198.421429	22 06 51.5	16 24 ( 97)	22 17 (s44)	f 4 19 (266)		
2012-09-28	2456199.452975	22 52 17.1	16 53 ( 90)	23 03 (s49)	f 5 22 (273)		
2012-09-29	2456200.484060	23 37 02.8	17 20 ( 84)	23 48 (s54)	f 6 24 (279)		
2012-10- 1	2456201.515118	0 21 46.2	p17 48 ( 78)	0 32 (s58)	7 25 (285)		
2012-10- 2	2456202.546495	1 06 57.2	p18 18 ( 73)	1 17 (s62)	8 25 (290)		
2012-10- 3	2456203.578413	1 52 54.9	p18 50 ( 68)	2 03 (s65)	9 23 (294)		
2012-10- 4	2456204.610955	2 39 46.5	p19 26 ( 65)	2 50 (s67)	10 19 (297)		
2012-10- 5	2456205.644056	3 27 26.4	p20 06 ( 62)	3 38 (s69)	11 12 (298)		
2012-10- 6	2456206.677538	4 15 39.3	p20 51 ( 61)	4 26 (s69)	12 01 (299)		
2012-10- 7	2456207.711164	5 04 04.6	p21 41 ( 62)	5 14 (s68)	12 45 (297)		
2012-10- 8	2456208.744723	5 52 24.0	p22 35 ( 63)	6 03 (s67)	13 26 (295)		
2012-10- 9	2456209.778098	6 40 27.7	p23 33 ( 67)	6 51 (s64)	14 02 (291)		
2012-10-10	2456210.811326	7 28 18.5	0 34 ( 71)	7 39 (s61)	14 35 (286)		
2012-10-11	2456211.844601	8 16 13.6	1 37 ( 77)	8 27 (s57)	15 06 (280)		
2012-10-12	2456212.878273	9 04 42.8	2 44 ( 83)	9 15 (s52)	15 37 (274)		
2012-10-13	2456213.912800	9 54 25.9	3 52 ( 90)	10 05 (s47)	16 08 (267)		
2012-10-14	2456214.948691	10 46 06.9	5 03 ( 97)	10 56 (s42)	16 41 (260)		
2012-10-15	2456215.986395	11 40 24.6	6 16 (104)	11 51 (s37)	17 17 (253)		
2012-10-16	2456217.026135	12 37 38.0	7 31 (110)	12 48 (s32)	17 58 (248)		
2012-10-17	2456218.067705	13 37 29.7	8 45 (115)	13 47 (s29)	18 45 (243)		
2012-10-18	2456219.110350	14 38 54.2	9 56 (118)	14 49 (s27)	19 40 (241)		
2012-10-19	2456220.152889	15 40 09.6	11 00 (119)	15 50 (s27)	20 41 (241)		
2012-10-20	2456221.194102	16 39 30.4	11 56 (118)	16 50 (s28)	21 47 (243)		
2012-10-21	2456222.233154	17 35 44.5	12 43 (114)	17 46 (s31)	22 54 (247)		
2012-10-22	2456223.269765	18 28 27.7	13 22 (110)	18 39 (s34)	f 0 02 (252)		
2012-10-23	2456224.304129	19 17 56.7	13 57 (104)	19 28 (s38)	f 1 07 (258)		
2012-10-24	2456225.336716	20 04 52.3	14 27 ( 98)	20 15 (s43)	f 2 11 (265)		
2012-10-25	2456226.368106	20 50 04.4	14 56 ( 92)	21 01 (s48)	f 3 14 (271)		
2012-10-26	2456227.398879	21 34 23.1	15 23 ( 86)	21 45 (s52)	f 4 15 (277)		
2012-10-27	2456228.429552	22 18 33.3	15 51 ( 80)	22 29 (s57)	f 5 16 (283)		
2012-10-28	2456229.460542	23 03 10.8	16 20 ( 75)	23 14 (s60)	f 6 16 (288)		
2012-10-29	2456230.492128	23 48 39.9	16 51 ( 70)	23 59 (s64)	f 7 15 (293)		
2012-10-31	2456231.524424	0 35 10.2	p17 25 ( 66)	0 46 (s66)	8 11 (296)		
2012-11- 1	2456232.557366	1 22 36.4	p18 04 ( 63)	1 33 (s68)	9 06 (298)		
2012-11- 2	2456233.590734	2 10 39.4	p18 47 ( 62)	2 21 (s69)	9 56 (299)		
2012-11- 3	2456234.624217	2 58 52.3	p19 35 ( 61)	3 09 (s69)	10 42 (298)		
2012-11- 4	2456235.657513	3 46 49.1	p20 27 ( 63)	3 57 (s67)	11 23 (296)		
2012-11- 5	2456236.690428	4 34 13.0	p21 23 ( 65)	4 45 (s65)	12 00 (292)		
2012-11- 6	2456237.722939	5 21 01.9	p22 22 ( 69)	5 31 (s62)	12 33 (288)		
2012-11- 7	2456238.755214	6 07 30.5	p23 23 ( 74)	6 18 (s59)	13 05 (283)		
2012-11- 8	2456239.787607	6 54 09.2	0 26 ( 80)	7 05 (s54)	13 34 (277)		
2012-11- 9	2456240.820616	7 41 41.2	1 31 ( 87)	7 52 (s49)	14 04 (270)		
2012-11-10	2456241.854845	8 30 58.6	2 39 ( 93)	8 41 (s44)	14 35 (263)		
2012-11-11	2456242.890924	9 22 55.8	3 49 (100)	9 33 (s39)	15 09 (257)		
2012-11-12	2456243.929370	10 18 17.6	5 03 (107)	10 28 (s35)	15 47 (250)		
2012-11-13	2456244.970369	11 17 19.9	6 18 (113)	11 27 (s31)	16 31 (245)		
2012-11-14	2456246.013507	12 19 27.0	7 32 (117)	12 29 (s28)	17 23 (242)		
2012-11-15	2456247.057659	13 23 01.8	8 42 (119)	13 33 (s27)	18 24 (241)		
2012-11-16	2456248.101266	14 25 49.4	9 44 (118)	14 36 (s28)	19 30 (242)		
2012-11-17	2456249.142923	15 25 48.6	10 36 (116)	15 36 (s30)	20 40 (246)		
2012-11-18	2456250.181861	16 21 52.8	11 20 (112)	16 32 (s33)	21 50 (251)		
2012-11-19	2456251.218009	17 13 55.9	11 58 (106)	17 24 (s37)	22 58 (256)		
2012-11-20	2456252.251774	18 02 33.3	12 30 (100)	18 13 (s42)	f 0 04 (263)		
2012-11-21	2456253.283792	18 48 39.6	12 59 ( 94)	18 59 (s46)	f 1 07 (269)		
2012-11-22	2456254.314741	19 33 13.6	13 27 ( 88)	19 44 (s51)	f 2 09 (275)		
2012-11-23	2456255.345258	20 17 10.3	13 54 ( 82)	20 28 (s55)	f 3 10 (281)		
2012-11-24	2456256.375880	21 01 16.0	14 23 ( 76)	21 12 (s59)	f 4 09 (287)		

Date	Ephemeris Transit						
	TDT JD	TDT Time			Rise (Azm)	Trans (Alt)	Set (Azm)
		h	m	s	h m °	h m °	h m °
2012-11-25	2456257.407012	21	46	05.8	14 53 ( 71)	21 57 (s63)	f 5 08 (291)
2012-11-26	2456258.438890	22	32	00.1	15 26 ( 67)	22 42 (s66)	f 6 05 (295)
2012-11-27	2456259.471552	23	19	02.1	16 03 ( 64)	23 29 (s68)	f 7 00 (297)
2012-11-29	2456260.504831	0	06	57.4	p16 45 ( 62)	0 17 (s69)	7 52 (299)
2012-11-30	2456261.538401	0	55	17.9	p17 31 ( 61)	1 06 (s69)	8 39 (298)
2012-12- 1	2456262.571874	1	43	29.9	p18 22 ( 62)	1 54 (s68)	9 22 (297)
2012-12- 2	2456263.604919	2	31	05.0	p19 17 ( 64)	2 41 (s66)	10 01 (294)
2012-12- 3	2456264.637368	3	17	48.6	p20 14 ( 68)	3 28 (s63)	10 35 (290)
2012-12- 4	2456265.669259	4	03	44.0	p21 14 ( 72)	4 14 (s60)	11 06 (285)
2012-12- 5	2456266.700846	4	49	13.1	p22 15 ( 78)	5 00 (s56)	11 36 (279)
2012-12- 6	2456267.732562	5	34	53.4	p23 17 ( 84)	5 45 (s51)	12 04 (273)
2012-12- 7	2456268.764985	6	21	34.7	0 22 ( 90)	6 32 (s47)	12 33 (266)
2012-12- 8	2456269.798784	7	10	14.9	1 28 ( 97)	7 21 (s42)	13 04 (260)
2012-12- 9	2456270.834644	8	01	53.2	2 38 (104)	8 12 (s37)	13 39 (254)
2012-12-10	2456271.873113	8	57	17.0	3 50 (110)	9 07 (s33)	14 18 (248)
2012-12-11	2456272.914360	9	56	40.7	5 03 (115)	10 07 (s29)	15 05 (244)
2012-12-12	2456273.957882	10	59	21.0	6 16 (118)	11 09 (s28)	16 01 (241)
2012-12-13	2456275.002417	12	03	28.9	7 23 (119)	12 13 (s27)	17 05 (241)
2012-12-14	2456276.046290	13	06	39.5	8 22 (117)	13 17 (s28)	18 15 (244)
2012-12-15	2456277.088069	14	06	49.1	9 12 (114)	14 17 (s31)	19 28 (248)
2012-12-16	2456278.127033	15	02	55.6	9 53 (109)	15 13 (s35)	20 40 (254)
2012-12-17	2456279.163189	15	54	59.6	10 29 (103)	16 05 (s40)	21 49 (260)
2012-12-18	2456280.197008	16	43	41.5	11 01 ( 97)	16 54 (s44)	22 56 (267)
2012-12-19	2456281.229155	17	29	59.0	11 30 ( 90)	17 40 (s49)	24 00 (273)
2012-12-20	2456282.260323	18	14	51.9	11 58 ( 84)	18 25 (s54)	f 1 02 (279)
2012-12-21	2456283.291143	18	59	14.8	12 26 ( 78)	19 10 (s58)	f 2 02 (285)
2012-12-22	2456284.322136	19	43	52.5	12 56 ( 73)	19 54 (s62)	f 3 01 (290)
2012-12-23	2456285.353676	20	29	17.6	13 28 ( 68)	20 40 (s65)	f 3 59 (294)
2012-12-24	2456286.385956	21	15	46.6	14 03 ( 65)	21 26 (s67)	f 4 55 (297)
2012-12-25	2456287.418964	22	03	18.5	14 43 ( 63)	22 14 (s68)	f 5 47 (298)
2012-12-26	2456288.452486	22	51	34.8	15 27 ( 61)	23 02 (s69)	f 6 37 (299)
2012-12-27	2456289.486169	23	40	05.0	16 17 ( 62)	23 50 (s68)	f 7 21 (297)
2012-12-29	2456290.519627	0	28	15.8	p17 11 ( 63)	0 39 (s67)	8 01 (295)
2012-12-30	2456291.552562	1	15	41.4	p18 08 ( 67)	1 26 (s64)	8 37 (291)
2012-12-31	2456292.584853	2	02	11.3	p19 07 ( 71)	2 13 (s61)	9 10 (286)

for Greenwich Meridian = per il meridiano di Greenwich  
for Rome : per Roma  
Longitude = longitudine  
Latitude = latitudine  
Time Zone = fuso orario  
UT = tempo universale  
Ephemeris Transit = transito  
Date = data nel formato anno/mese/giorno  
Time = ora  
Rise, trans, set = orari di levata, altezza in gradi durante il transito a sud e tramonto.  
p = l'evento accade il giorno precedente  
F = l'evento accade il giorno seguente

Per località differenti da quella calcolata (42°N, 12°E) fare riferimento alla tabella correttiva posta in fondo all'almanacco.

Tempi in T.U.+1, aggiungere un'ora quando si adotta l'ora legale

Legenda:  
Rise, transits, set = times of rising, transit and setting, altitude in ° during the south transit.  
P = the event happens in the past day  
F = the event happens in the forward day

For different places (42°N, 12°E) to refer to the corrective table in the last pages of the almanac.

Times in local time, to add an hour when it is in use daylight saving time

# VISIBILITA' DELLA LUNA - VISIBILITY OF THE MOON

First and last visibility of the Moon      prima ed ultima visibilità della Luna

location : Rome (Italy)      posizione : Roma  
 latitude : 41° 52' 12'' N      latitudine : 41° 52' 12'' N  
 longitude: 12° 37' 12'' E      longitudine : 12° 37' 12'' E  
 visibility arc: 8°  
 factor : 0.33

	date	sun r/s	moon r/s	d r/s	moon phs	moon age	period
last visibility	2012-01-22	07:31	06:35	-0:55h	1.4%	-25:09h	
first visibility	2012-01-24	17:13	18:49	1:35h	2.3%	32:33h	30
last visibility	2012-02-21	06:57	06:17	-0:39h	0.7%	-16:38h	
first visibility	2012-02-22	17:50	18:41	0:51h	0.8%	18:14h	29
last visibility	2012-03-21	06:10	05:15	-0:55h	2.1%	-33:27h	
first visibility	2012-03-23	18:25	19:33	1:08h	1.3%	26:47h	30
last visibility	2012-04-20	05:21	04:37	-0:44h	1.2%	-26:58h	
first visibility	2012-04-22	18:58	20:21	1:22h	1.9%	34:38h	30
last visibility	2012-05-19	04:45	03:40	-1:05h	3.0%	-44:02h	
first visibility	2012-05-22	19:29	20:55	1:25h	2.9%	42:41h	30
last visibility	2012-06-18	04:34	03:36	-0:57h	2.0%	-35:29h	
first visibility	2012-06-20	19:48	20:20	0:32h	1.4%	27:44h	29
last visibility	2012-07-18	04:50	04:08	-0:41h	1.2%	-24:34h	
first visibility	2012-07-20	19:39	20:06	0:27h	2.9%	38:14h	30
last visibility	2012-08-16	05:18	04:00	-1:18h	2.6%	-35:36h	
first visibility	2012-08-19	19:03	19:38	0:35h	5.4%	50:07h	30
last visibility	2012-09-15	05:49	05:02	-0:47h	1.2%	-21:21h	
first visibility	2012-09-17	18:15	18:43	0:28h	3.7%	39:03h	29
last visibility	2012-10-14	06:20	05:00	-1:20h	2.4%	-30:42h	
first visibility	2012-10-16	17:26	17:55	0:29h	2.1%	28:22h	29
last visibility	2012-11-13	06:56	06:14	-0:42h	0.7%	-16:12h	
first visibility	2012-11-15	16:48	18:21	1:33h	4.6%	41:39h	30
last visibility	2012-12-12	07:28	06:12	-1:15h	1.8%	-26:14h	
first visibility	2012-12-14	16:39	18:13	1:34h	2.6%	30:56h	29

Date = data nel formato anno/mese/giorno  
 Sun r/s = ora della levata o del tramonto del Sole      Moon r/s = ora della levata o del tramonto della Luna  
 D r/s = differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due corpi  
 Moon phs = fase delle Luna  
 Moon age = età della Luna      period = giorni tra due eventi  
 Last visibility = ultimo giorno di visibilità mattutina prima della congiunzione con il Sole  
 First visibility = primo giorno di visibilità serale dopo la congiunzione con il Sole

Sun r/s = sunrise and sunset      Moon r/s = rise and set of the Moon  
 D r/s = difference in hours and minutes between the instants of the rising or the setting of the two objects  
 Moon phs = phase of the Moon  
 Moon age : age of the Moon      Period = days between two events

	date	sun r/s	moon r/s	sun lon	moon lon	moon lat	moon alt	moon phs	d az	d lon
L vis	2012-01-22	07:31	06:35	301° 38'	288° 24'	2° 57'	7° 53'	1.4%	9° 37'	-13° 13'
F vis	2012-01-24	17:13	18:49	304° 04'	320° 47'	4° 44'	15° 04'	2.3%	-4° 34'	16° 43'
L vis	2012-02-21	06:57	06:17	332° 00'	323° 47'	4° 47'	6° 19'	0.7%	5° 13'	-8° 13'
F vis	2012-02-22	17:50	18:41	333° 28'	342° 22'	5° 00'	8° 30'	0.8%	1° 28'	8° 54'
L vis	2012-03-21	06:10	05:15	0° 59'	345° 13'	5° 00'	9° 28'	2.1%	12° 19'	-15° 47'
F vis	2012-03-23	18:25	19:33	3° 29'	15° 54'	3° 56'	11° 23'	1.3%	-0° 10'	12° 25'
L vis	2012-04-20	05:21	04:37	30° 30'	18° 14'	3° 49'	7° 14'	1.2%	9° 19'	-12° 16'
F vis	2012-04-22	18:58	20:21	33° 00'	48° 39'	1° 30'	13° 18'	1.9%	-4° 55'	15° 39'
L vis	2012-05-19	04:45	03:40	58° 35'	38° 42'	2° 21'	10° 42'	3.0%	15° 51'	-19° 52'
F vis	2012-05-22	19:29	20:55	62° 03'	81° 29'	-1° 30'	13° 25'	2.9%	-12° 29'	19° 26'
L vis	2012-06-18	04:34	03:36	87° 19'	70° 58'	-0° 32'	8° 46'	2.0%	12° 41'	-16° 21'
F vis	2012-06-20	19:48	20:20	89° 50'	102° 52'	-3° 13'	4° 52'	1.4%	-11° 47'	13° 02'
L vis	2012-07-18	04:50	04:08	115° 56'	104° 02'	-3° 18'	6° 08'	1.2%	9° 37'	-11° 54'
F vis	2012-07-20	19:39	20:06	118° 26'	137° 29'	-4° 54'	4° 20'	2.9%	-18° 45'	19° 03'
L vis	2012-08-16	05:18	04:00	143° 43'	125° 31'	-4° 31'	12° 52'	2.6%	11° 53'	-18° 12'
F vis	2012-08-19	19:03	19:38	147° 09'	173° 47'	-4° 37'	5° 48'	5.4%	-26° 00'	26° 38'
L vis	2012-09-15	05:49	05:02	172° 45'	161° 06'	-4° 56'	7° 42'	1.2%	8° 29'	-11° 39'
F vis	2012-09-17	18:15	18:43	175° 13'	197° 00'	-3° 20'	4° 17'	3.7%	-21° 15'	21° 47'
L vis	2012-10-14	06:20	05:00	201° 16'	183° 48'	-4° 08'	13° 07'	2.4%	10° 10'	-17° 28'
F vis	2012-10-16	17:26	17:55	203° 43'	220° 09'	-1° 27'	4° 11'	2.1%	-15° 27'	16° 26'
L vis	2012-11-13	06:56	06:14	231° 16'	221° 44'	-1° 19'	5° 59'	0.7%	5° 48'	-9° 32'
F vis	2012-11-15	16:48	18:21	233° 41'	258° 16'	2° 01'	12° 30'	4.6%	-20° 18'	24° 35'
L vis	2012-12-12	07:28	06:12	260° 38'	245° 07'	0° 50'	10° 19'	1.8%	9° 52'	-15° 31'
F vis	2012-12-14	16:39	18:13	263° 04'	281° 18'	3° 44'	12° 58'	2.6%	-11° 29'	18° 14'

Sun lon = longitudine celeste del Sole  
 Moon lon = longitudine celeste della Luna      Moon lat = latitudine celeste della Luna  
 Moon alt = altezza della Luna sull'orizzonte quando il Sole è sull'orizzonte  
 D az = differenza in azimut tra i centri del Sole e della Luna nell'istante della sua visibilità  
 D lon = differenza in longitudine tra i centri del Sole e della Luna nell'istante della sua visibilità

Sun lon = celestial longitude of the Sun  
 Moon lon = celestial longitude of the Moon      Moon lat = celestial latitude of the Moon  
 Moon alt = altitude of the Moon above the horizon when the Sun is above the horizon  
 D az : difference in azimuth between the center of the Sun and of the Moon  
 D lon : difference in longitude between the center of the Sun and the Moon

**First and last visibility of the Moon      prima ed ultima visibilità della Luna**

location    : Rome (Italy)	posizione    : Roma
latitude    : 41° 52' 12" N	latitudine   : 41° 52' 12" N
longitude   : 12° 37' 12" E	longitudine  : 12° 37' 12" E
visibility arc: 4°	
factor       : 0.33	

	date	sun r/s	moon r/s	d r/s	moon phs	moon age	period
last visibility	2012-01-22	07:31	06:35	-0:55h	1.4%	-25:09h	
first visibility	2012-01-23	17:12	17:42	0:30h	0.3%	8:31h	29
last visibility	2012-02-21	06:57	06:17	-0:39h	0.7%	-16:38h	
first visibility	2012-02-22	17:50	18:41	0:51h	0.8%	18:14h	30
last visibility	2012-03-22	06:09	05:40	-0:28h	0.3%	-9:29h	
first visibility	2012-03-23	18:25	19:33	1:08h	1.3%	26:47h	30
last visibility	2012-04-20	05:21	04:37	-0:44h	1.2%	-26:58h	
first visibility	2012-04-21	18:57	19:23	0:26h	0.2%	10:37h	29
last visibility	2012-05-20	04:44	04:14	-0:29h	0.6%	-20:03h	
first visibility	2012-05-21	19:28	20:04	0:36h	0.5%	18:40h	30
last visibility	2012-06-18	04:34	03:36	-0:57h	2.0%	-35:29h	
first visibility	2012-06-20	19:48	20:20	0:32h	1.4%	27:44h	30
last visibility	2012-07-18	04:50	04:08	-0:41h	1.2%	-24:34h	
first visibility	2012-07-20	19:39	20:06	0:27h	2.9%	38:14h	30
last visibility	2012-08-17	05:19	05:05	-0:14h	0.5%	-11:35h	
first visibility	2012-08-18	19:04	19:08	0:04h	1.6%	26:09h	29
last visibility	2012-09-15	05:49	05:02	-0:47h	1.2%	-21:21h	
first visibility	2012-09-17	18:15	18:43	0:28h	3.7%	39:03h	30
last visibility	2012-10-14	06:20	05:00	-1:20h	2.4%	-30:42h	
first visibility	2012-10-16	17:26	17:55	0:29h	2.1%	28:22h	29
last visibility	2012-11-13	06:56	06:14	-0:42h	0.7%	-16:12h	
first visibility	2012-11-14	16:49	17:21	0:31h	0.8%	17:40h	29
last visibility	2012-12-12	07:28	06:12	-1:15h	1.8%	-26:14h	
first visibility	2012-12-13	16:38	17:02	0:24h	0.2%	6:56h	29

Date = data nel formato anno/mese/giorno  
Sun r/s = ora della levata o del tramonto del Sole  
Moon r/s = ora della levata o del tramonto della Luna  
D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due corpi  
Moon phs = fase delle Luna  
Moon age = età della Luna  
Period = giorni tra due eventi  
last visibility = ultimo giorno di visibilità mattutina prima della congiunzione con il Sole  
first visibility = primo giorno di visibilità serale dopo la congiunzione con il Sole

Sun r/s = sunrise and sunset  
Moon r/s = rise and set of the Moon  
D r/s = difference in hours and minutes between the instants of the rising or the setting of the two objects  
Moon phs = phase of the Moon  
Moon age = age of the Moon  
Period = days between two events

	date	sun r/s	moon r/s	sun lon	moon lon	moon lat	moon alt	moon phs	d az	d lon
L vis	2012-01-22	07:31	06:35	301° 38'	288° 24'	2° 57'	7° 53'	1.4%	9° 37'	-13° 13'
F vis	2012-01-23	17:12	17:42	303° 03'	307° 29'	4° 09'	4° 23'	0.3%	1° 15'	4° 26'
L vis	2012-02-21	06:57	06:17	332° 00'	323° 47'	4° 47'	6° 19'	0.7%	5° 13'	-8° 13'
F vis	2012-02-22	17:50	18:41	333° 28'	342° 22'	5° 00'	8° 30'	0.8%	1° 28'	8° 54'
L vis	2012-03-22	06:09	05:40	1° 59'	357° 33'	4° 44'	4° 35'	0.3%	2° 03'	-4° 26'
F vis	2012-03-23	18:25	19:33	3° 29'	15° 54'	3° 56'	11° 23'	1.3%	-0° 10'	12° 25'
L vis	2012-04-20	05:21	04:37	30° 30'	18° 14'	3° 49'	7° 14'	1.2%	9° 19'	-12° 16'
F vis	2012-04-21	18:57	19:23	32° 01'	36° 50'	2° 29'	3° 55'	0.2%	0° 24'	4° 49'
L vis	2012-05-20	04:44	04:14	59° 32'	50° 29'	1° 20'	4° 22'	0.6%	6° 59'	-9° 03'
F vis	2012-05-21	19:28	20:04	61° 05'	69° 34'	-0° 25'	5° 15'	0.5%	-5° 06'	8° 28'
L vis	2012-06-18	04:34	03:36	87° 19'	70° 58'	-0° 32'	8° 46'	2.0%	12° 41'	-16° 21'
F vis	2012-06-20	19:48	20:20	89° 50'	102° 52'	-3° 13'	4° 52'	1.4%	-11° 47'	13° 02'
L vis	2012-07-18	04:50	04:08	115° 56'	104° 02'	-3° 18'	6° 08'	1.2%	9° 37'	-11° 54'
F vis	2012-07-20	19:39	20:06	118° 26'	137° 29'	-4° 54'	4° 20'	2.9%	-18° 45'	19° 03'
L vis	2012-08-17	05:19	05:05	144° 40'	138° 41'	-4° 54'	1° 58'	0.5%	6° 55'	-5° 59'
F vis	2012-08-18	19:04	19:08	146° 11'	159° 58'	-4° 57'	0° 24'	1.6%	-14° 31'	13° 47'
L vis	2012-09-15	05:49	05:02	172° 45'	161° 06'	-4° 56'	7° 42'	1.2%	8° 29'	-11° 39'
F vis	2012-09-17	18:15	18:43	175° 13'	197° 00'	-3° 20'	4° 17'	3.7%	-21° 15'	21° 47'
L vis	2012-10-14	06:20	05:00	201° 16'	183° 48'	-4° 08'	13° 07'	2.4%	10° 10'	-17° 28'
F vis	2012-10-16	17:26	17:55	203° 43'	220° 09'	-1° 27'	4° 11'	2.1%	-15° 27'	16° 26'
L vis	2012-11-13	06:56	06:14	231° 16'	221° 44'	-1° 19'	5° 59'	0.7%	5° 48'	-9° 32'
F vis	2012-11-14	16:49	17:21	232° 41'	243° 08'	0° 39'	4° 14'	0.8%	-8° 39'	10° 27'
L vis	2012-12-12	07:28	06:12	260° 38'	245° 07'	0° 50'	10° 19'	1.8%	9° 52'	-15° 31'
F vis	2012-12-13	16:38	17:02	262° 03'	266° 10'	2° 39'	3° 04'	0.2%	-1° 25'	4° 07'

Sun lon = longitudine celeste del Sole  
Moon lon = longitudine celeste della Luna      Moon lat = latitudine celeste della Luna  
Moon alt = altezza della Luna sull'orizzonte quando il Sole è sull'orizzonte  
D az = differenza in azimut tra i centri del Sole e della Luna nell'istante della sua visibilità  
D lon = differenza in longitudine tra i centri del Sole e della Luna nell'istante della sua visibilità

Sun lon = celestial longitude of the Sun  
Moon lon = celestial longitude of the Moon      Moon lat = celestial latitude of the Moon  
Moon alt = altitude of the Moon above the horizon when the Sun is above the horizon  
D az = difference in azimuth between the center of the Sun and of the Moon  
D lon = difference in longitude between the center of the Sun and the Moon

**First and last visibility of the Moon      prima ed ultima visibilità della Luna**

location : Rome (Italy)      posizione : Roma  
latitude : 41° 52' 12'' N      latitudine : 41° 52' 12'' N  
longitude: 12° 37' 12'' E      longitudine : 12° 37' 12'' E  
visibility arc: 0°  
factor : 0.33

	date	sun r/s	moon r/s	d r/s	moon phs	moon age	period
last visibility	2012-01-23	07:30	07:14	-0:15h	0.1%	-1:09h	
first visibility	2012-01-23	17:12	17:42	0:30h	0.3%	8:31h	29
last visibility	2012-02-22	06:56	06:45	-0:10h	0.3%	7:20h	
first visibility	2012-02-22	17:50	18:41	0:51h	0.8%	18:14h	30
last visibility	2012-03-22	06:09	05:40	-0:28h	0.3%	-9:29h	
first visibility	2012-03-22	18:24	18:33	0:09h	0.2%	2:45h	29
last visibility	2012-04-21	05:19	05:06	-0:13h	0.1%	-2:59h	
first visibility	2012-04-21	18:57	19:23	0:26h	0.2%	10:37h	30
last visibility	2012-05-20	04:44	04:14	-0:29h	0.6%	-20:03h	
first visibility	2012-05-21	19:28	20:04	0:36h	0.5%	18:40h	30
last visibility	2012-06-19	04:34	04:25	-0:09h	0.2%	-11:29h	
first visibility	2012-06-20	19:48	20:20	0:32h	1.4%	27:44h	30
last visibility	2012-07-18	04:50	04:08	-0:41h	1.2%	-24:34h	
first visibility	2012-07-20	19:39	20:06	0:27h	2.9%	38:14h	30
last visibility	2012-08-17	05:19	05:05	-0:14h	0.5%	-11:35h	
first visibility	2012-08-18	19:04	19:08	0:04h	1.6%	26:09h	29
last visibility	2012-09-15	05:49	05:02	-0:47h	1.2%	-21:21h	
first visibility	2012-09-17	18:15	18:43	0:28h	3.7%	39:03h	30
last visibility	2012-10-15	06:22	06:13	-0:08h	0.2%	-6:41h	
first visibility	2012-10-16	17:26	17:55	0:29h	2.1%	28:22h	29
last visibility	2012-11-13	06:56	06:14	-0:42h	0.7%	-16:12h	
first visibility	2012-11-14	16:49	17:21	0:31h	0.8%	17:40h	29
last visibility	2012-12-13	07:28	07:19	-0:09h	0.0%	-2:13h	
first visibility	2012-12-13	16:38	17:02	0:24h	0.2%	6:56h	29

Sun r/s = ora della levata o del tramonto del Sole  
Moon r/s = ora della levata o del tramonto della Luna  
D r/s : differenza in ore e minuti tra gli istanti del sorgere o del tramonto dei due corpi  
Moon phs = fase della Luna  
Moon age = età della Luna  
Period = giorni tra due eventi  
Last visibility = ultimo giorno di visibilità mattutina prima della congiunzione con il Sole  
First visibility = primo giorno di visibilità serale dopo la congiunzione con il Sole

Sun r/s = sunrise and sunset  
Moon r/s = rise and set of the Moon  
D r/s = difference in hours and minutes between the instants of the rising or the setting of the two objects  
Moon phs = phase of the Moon  
Moon age = age of the Moon  
Period = days between two events

	date	sun r/s	moon r/s	sun lon	moon lon	moon lat	moon alt	moon phs	d az	d lon
L vis	2012-01-23	07:30	07:14	302° 39'	302° 03'	3° 51'	2° 05'	0.1%	-1° 33'	-0° 36'
F vis	2012-01-23	17:12	17:42	303° 03'	307° 29'	4° 09'	4° 23'	0.3%	1° 15'	4° 26'
L vis	2012-02-22	06:56	06:45	333° 01'	336° 37'	4° 59'	1° 30'	0.3%	-5° 27'	3° 36'
F vis	2012-02-22	17:50	18:41	333° 28'	342° 22'	5° 00'	8° 30'	0.8%	1° 28'	8° 54'
L vis	2012-03-22	06:09	05:40	1° 59'	357° 33'	4° 44'	4° 35'	0.3%	2° 03'	-4° 26'
F vis	2012-03-22	18:24	18:33	2° 29'	3° 47'	4° 31'	1° 19'	0.2%	3° 53'	1° 18'
L vis	2012-04-21	05:19	05:06	31° 28'	30° 07'	3° 00'	1° 52'	0.1%	-0° 08'	-1° 21'
F vis	2012-04-21	18:57	19:23	32° 01'	36° 50'	2° 29'	3° 55'	0.2%	0° 24'	4° 49'
L vis	2012-05-20	04:44	04:14	59° 32'	50° 29'	1° 20'	4° 22'	0.6%	6° 59'	-9° 03'
F vis	2012-05-21	19:28	20:04	61° 05'	69° 34'	-0° 25'	5° 15'	0.5%	-5° 06'	8° 28'
L vis	2012-06-19	04:34	04:25	88° 16'	82° 57'	-1° 37'	1° 01'	0.2%	5° 02'	-5° 19'
F vis	2012-06-20	19:48	20:20	89° 50'	102° 52'	-3° 13'	4° 52'	1.4%	-11° 47'	13° 02'
L vis	2012-07-18	04:50	04:08	115° 56'	104° 02'	-3° 18'	6° 08'	1.2%	9° 37'	-11° 54'
F vis	2012-07-20	19:39	20:06	118° 26'	137° 29'	-4° 54'	4° 20'	2.9%	-18° 45'	19° 03'
L vis	2012-08-17	05:19	05:05	144° 40'	138° 41'	-4° 54'	1° 58'	0.5%	6° 55'	-5° 59'
F vis	2012-08-18	19:04	19:08	146° 11'	159° 58'	-4° 57'	0° 24'	1.6%	-14° 31'	13° 47'
L vis	2012-09-15	05:49	05:02	172° 45'	161° 06'	-4° 56'	7° 42'	1.2%	8° 29'	-11° 39'
F vis	2012-09-17	18:15	18:43	175° 13'	197° 00'	-3° 20'	4° 17'	3.7%	-21° 15'	21° 47'
L vis	2012-10-15	06:22	06:13	202° 16'	198° 26'	-3° 12'	1° 02'	0.2%	4° 21'	-3° 50'
F vis	2012-10-16	17:26	17:55	203° 43'	220° 09'	-1° 27'	4° 11'	2.1%	-15° 27'	16° 26'
L vis	2012-11-13	06:56	06:14	231° 16'	221° 44'	-1° 19'	5° 59'	0.7%	5° 48'	-9° 32'
F vis	2012-11-14	16:49	17:21	232° 41'	243° 08'	0° 39'	4° 14'	0.8%	-8° 39'	10° 27'
L vis	2012-12-13	07:28	07:19	261° 39'	260° 21'	2° 10'	0° 59'	0.0%	-0° 43'	-1° 19'
F vis	2012-12-13	16:38	17:02	262° 03'	266° 10'	2° 39'	3° 04'	0.2%	-1° 25'	4° 07'

Sun lon = longitudine celeste del Sole  
Moon lon = longitudine celeste della Luna      Moon lat = latitudine celeste della Luna  
Moon alt = altezza della Luna sull'orizzonte quando il Sole è sull'orizzonte  
D az = differenza in azimut tra i centri del Sole e della Luna nell'istante della sua visibilità  
D lon = differenza in longitudine tra i centri del Sole e della Luna nell'istante della sua visibilità

Sun lon = celestial longitude of the Sun  
Moon lon = celestial longitude of the Moon      Moon lat = celestial latitude of the Moon  
Moon alt = altitude of the Moon above the horizon when the Sun is above the horizon  
D az = difference in azimuth between the center of the Sun and of the Moon  
D lon = difference in longitude between the center of the Sun and the Moon

© (3)

- Crescent Visibility on: Wednesday 22/02/2012 CE  
 - Calculations are Done at Sunset Time at: 17:52 LT  
 - Calculations are Topocentric.  
 - ITALY Rome, Long: 12:14:00,0, Lat: 41:48:00,0, Ele:0,0, Zone:1,00  
 - Summer time is: Off  
 - Height above mean sea-level affects rise and set events.  
 - Refraction Settings: Temperature: 10 °C Pressure: 1010 mb  
 - Delta T: 65,15 Second(s)

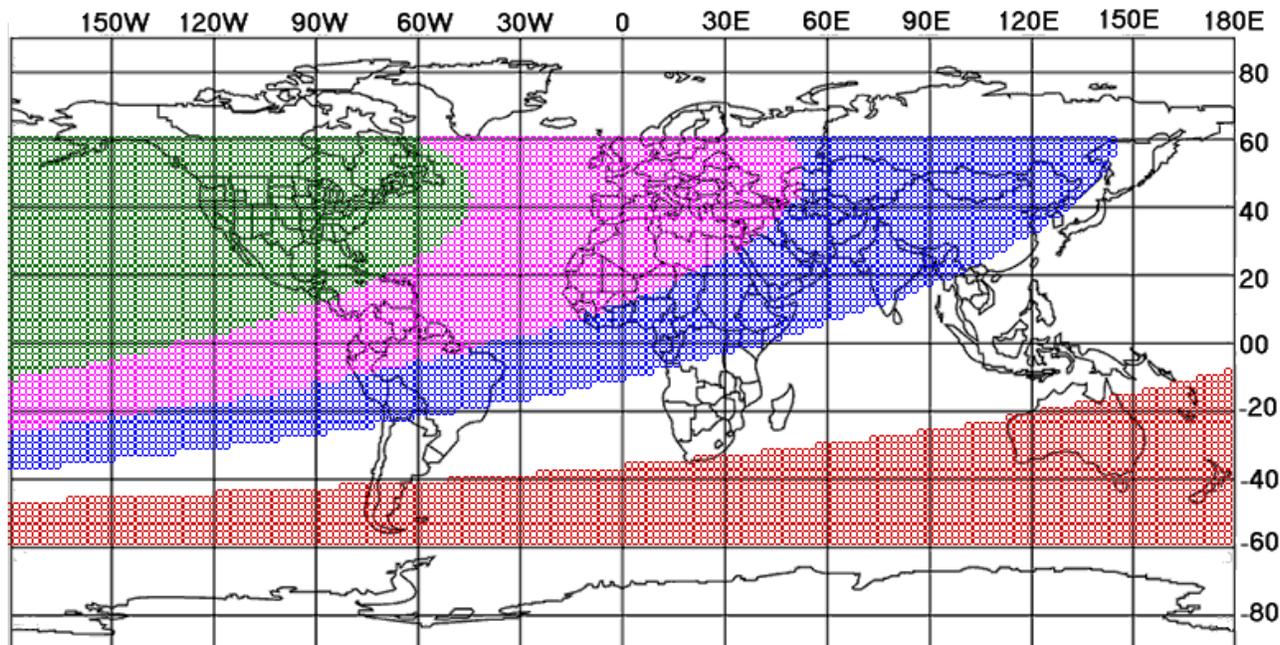
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- T. Conjunction Time: 22/02/2012 CE, 00:03 LT  
 - Julian Date at Time of Calculations: 2455980,20280

- Sunset: 17:52 LT	T. Moon Age: +17H 49M
- Moonset: 18:44 LT	Moon Lag Time: +00H 52M
- T. Moon Right Ascension: +22H 44M 43S	T. Moon Declination: -02°:54':47"
- T. Sun Right Ascension: +22H 21M 33S	T. Sun Declination: -10°:14':06"
- T. Moon Longitude: +341°:31':36"	T. Moon Latitude: +04°:40':32"
- T. Sun Longitude: +333°:28':01"	T. Sun Latitude: -00°:00':02"
- T. Moon Altitude: +08°:21':20"	T. Moon Azimuth: +258°:26':59"
- T. Sun Altitude: -00°:50':20"	T. Sun Azimuth: +256°:58':48"
- T. Relative Altitude: +09°:11':40"	T. Elongation: +09°:18':38"
- T. Relative Azimuth: +01°:28':11"	T. Phase Angle: +170°:39':53"
- T. Crescent Width: +00°:00':12"	T. Moon Semi-Diameter: +00°:15':12"
- T. Illumination: 00,66 %	G. Horizontal Parallax: +00°:55':37"
- T. Magnitude: -04,90	G. Distance: 394275,98 Km

Note

- formato data : gg/mm/aaaa
- Il prefisso "G" stà per geocentrico, "T" per topocentrico
- LT = local time, ora locale
- Date format: dd/mm/yyyy
- The Prefix 'G.' means Geocentric, and 'T.' means Topocentric
- For New Crescent: Moon Lag Time = Moonset - Sunset
- For Old Crescent: Moon Lag Time = Sunrise - Moonrise
- For New Crescent: Best Time = Sunset + 4/9 (Moon Lag Time)
- For Old Crescent: Best Time = Sunrise - 4/9 (Moon Lag Time)



Rosso : non visibile  
 Bianco : impossibile da vedere  
 Blu : visibile con strumenti  
 Rosa : potrebbe essere vista ad occhio nudo  
 Verde : facilmente visibile ad occhio nudo

- Crescent Visibility on: Friday 23/03/2012 CE  
 - Calculations are Done at Sunset Time at: 18:27 LT  
 - Calculations are Topocentric.  
 - ITALY Rome, Long: 12:14:00,0, Lat: 41:48:00,0, Ele:0,0, Zone:1,00  
 - Summer time is: Off  
 - Height above mean sea-level affects rise and set events.  
 - Refraction Settings: Temperature: 10 °C Pressure: 1010 mb  
 - Delta T: 65,14 Second(s)

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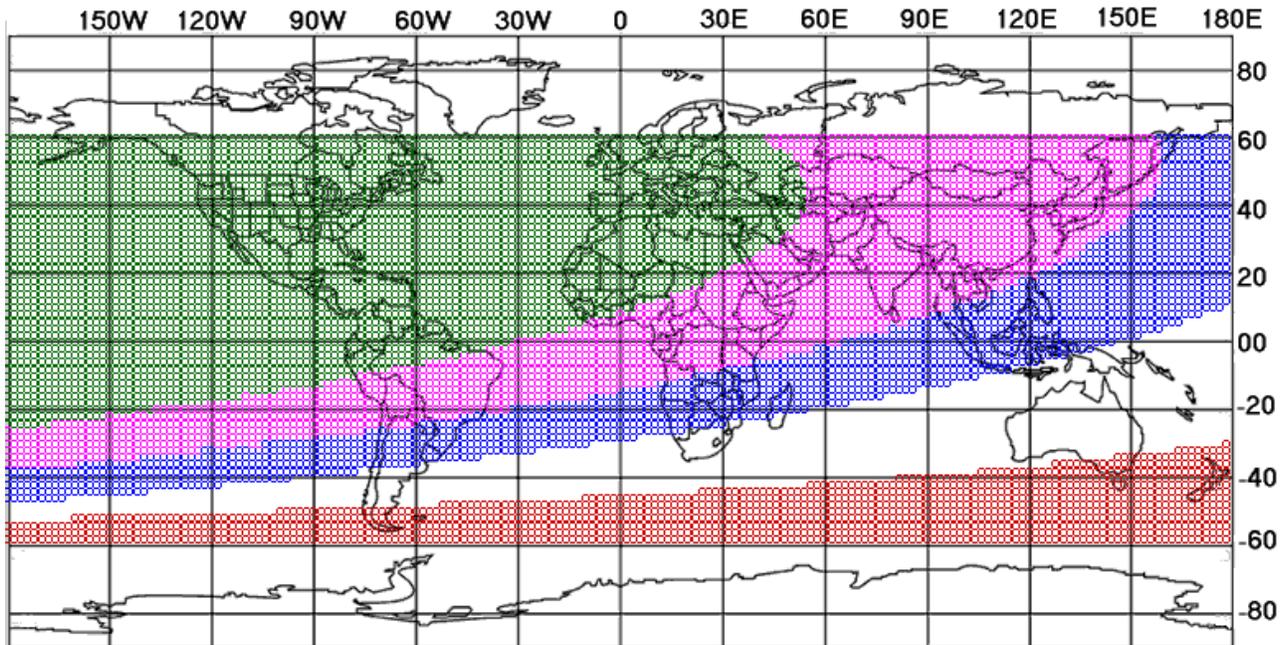
- T. Conjunction Time: 22/03/2012 CE, 17:26 LT  
 - Julian Date at Time of Calculations: 2456010,22700

- Sunset: 18:27 LT	T. Moon Age: +25H 01M
- Moonset: 19:35 LT	Moon Lag Time: +01H 08M
- T. Moon Right Ascension: +00H 49M 46S	T. Moon Declination: +09°:18':58"
- T. Sun Right Ascension: +00H 12M 47S	T. Sun Declination: +01°:23':00"
- T. Moon Longitude: +15°:04':14"	T. Moon Latitude: +03°:40':00"
- T. Sun Longitude: +03°:28':53"	T. Sun Latitude: -00°:00':02"
- T. Moon Altitude: +11°:18':37"	T. Moon Azimuth: +272°:26':35"
- T. Sun Altitude: -00°:50':12"	T. Sun Azimuth: +272°:36':17"
- T. Relative Altitude: +12°:08':49"	T. Elongation: +12°:08':53"
- T. Relative Azimuth: -00°:09':42"	T. Phase Angle: +167°:49':09"
- T. Crescent Width: +00°:00':20"	T. Moon Semi-Diameter: +00°:14':52"
- T. Illumination: 01,13 %	G. Horizontal Parallax: +00°:54':23"
- T. Magnitude: -05,19	G. Distance: 403207,16 Km

Note

- formato data : gg/mm/aaaa  
 - Il prefisso "G" sta per geocentrico, "T" per topocentrico  
 - LT = local time, ora locale

- Date format: dd/mm/yyyy  
 - The Prefix 'G.' means Geocentric, and 'T.' means Topocentric  
 - For New Crescent: Moon Lag Time = Moonset - Sunset  
 - For Old Crescent: Moon Lag Time = Sunrise - Moonrise  
 - For New Crescent: Best Time = Sunset + 4/9 (Moon Lag Time)  
 - For Old Crescent: Best Time = Sunrise - 4/9 (Moon Lag Time)



Rosso : non visibile  
 Bianco : impossibile da vedere  
 Blu : visibile con strumenti  
 Rosa : potrebbe essere vista ad occhio nudo  
 Verde : facilmente visibile ad occhio nudo

- Crescent Visibility on: Wednesday 12/12/2012 CE  
 - Calculations are Done at Sunrise Time at: 07:29 LT  
 - Calculations are Topocentric.  
 - ITALY Rome, Long: 12:14:00,0, Lat: 41:48:00,0, Ele:0,0, Zone:1,00  
 - Summer time is: Off  
 - Height above mean sea-level affects rise and set events.  
 - Refraction Settings: Temperature: 10 °C Pressure: 1010 mb  
 - Delta T: 65,09 Second(s)

=====

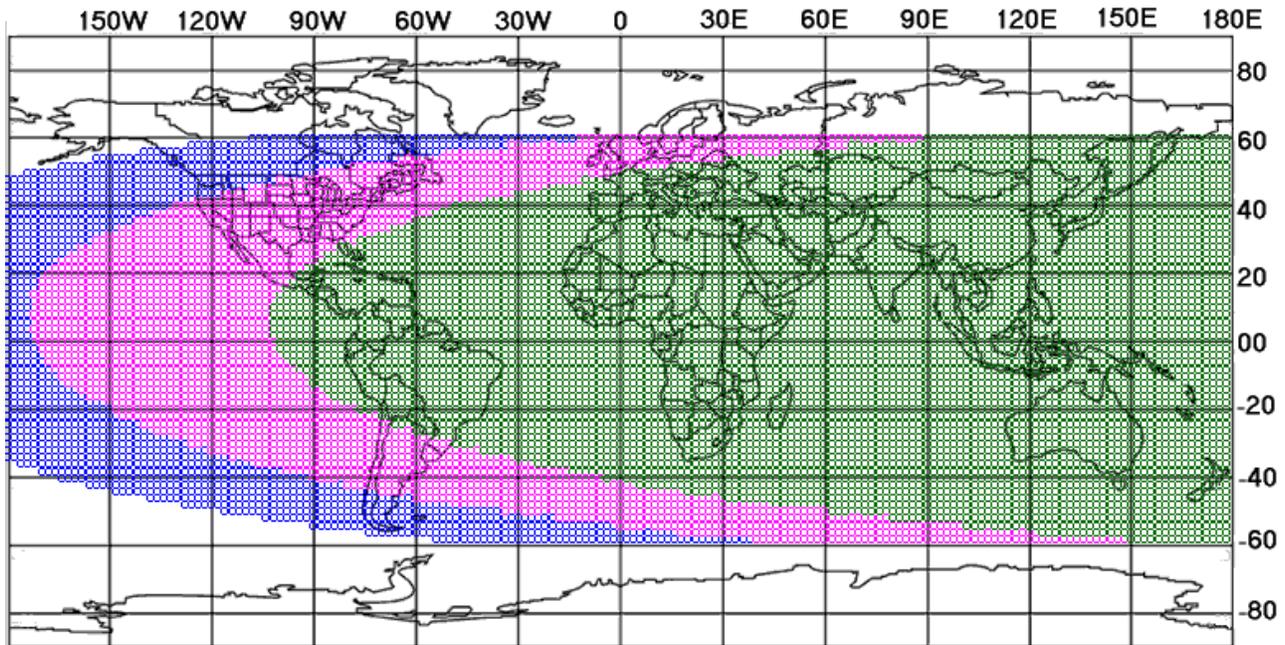
- T. Conjunction Time: 13/12/2012 CE, 08:35 LT  
 - Julian Date at Time of Calculations: 2456273,77035

- Moonrise: 06:14 LT	T. Moon Age: -25H 06M
- Sunrise: 07:29 LT	Moon Lag Time: +01H 15M
- T. Moon Right Ascension: +16H 16M 02S	T. Moon Declination: -21°:07':33"
- T. Sun Right Ascension: +17H 19M 16S	T. Sun Declination: -23°:06':26"
- T. Moon Longitude: +245°:52':13"	T. Moon Latitude: +00°:09':34"
- T. Sun Longitude: +260°:38':28"	T. Sun Latitude: -00°:00':06"
- T. Moon Altitude: +10°:13':16"	T. Moon Azimuth: +130°:43':46"
- T. Sun Altitude: -00°:50':24"	T. Sun Azimuth: +120°:53':25"
- T. Relative Altitude: +11°:03':41"	T. Elongation: +14°:46':18"
- T. Relative Azimuth: +09°:50':21"	T. Phase Angle: +165°:11':34"
- T. Crescent Width: +00°:00':33"	T. Moon Semi-Diameter: +00°:16':46"
- T. Illumination: 01,66 %	G. Horizontal Parallax: +01°:01':20"
- T. Magnitude: -05,46	G. Distance: 357558,45 Km

Note

- formato data : gg/mm/aaaa  
 - Il prefisso "G" stà per geocentrico, "T" per topocentrico  
 - LT = local time, ora locale

- Date format: dd/mm/yyyy  
 - The Prefix 'G.' means Geocentric, and 'T.' means Topocentric  
 - For New Crescent: Moon Lag Time = Moonset - Sunset  
 - For Old Crescent: Moon Lag Time = Sunrise - Moonrise  
 - For New Crescent: Best Time = Sunset + 4/9 (Moon Lag Time)  
 - For Old Crescent: Best Time = Sunrise - 4/9 (Moon Lag Time)



Rosso : non visibile  
 Bianco : impossibile da vedere  
 Blu : visibile con strumenti  
 Rosa : potrebbe essere vista ad occhio nudo  
 Verde : facilmente visibile ad occhio nudo

Altezza ai crepuscoli. Il Sole è 12° sotto l'orizzonte

Altitude in the twilights. The Sun is 12° under the horizon

Date	Morning twilight			Evening twilight				
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	06:31	-40.0	10.8	89.7	17:55	57.5	169.9	94.8
2012:01:02	06:31	-36.5	357.7	100.5	17:56	58.6	149.3	105.6
2012:01:03	06:31	-31.8	345.9	111.3	17:57	56.3	129.5	116.4
2012:01:04	06:32	-26.3	335.2	122.1	17:58	51.1	113.1	127.3
2012:01:05	06:32	-20.1	325.4	133.1	17:59	43.9	100.6	138.4
2012:01:06	06:32	-13.3	316.0	144.2	18:00	35.3	91.0	149.6
2012:01:07	06:32	-6.3	306.9	155.5	18:01	25.9	83.3	161.0
2012:01:08	06:32	1.0	297.6	167.0	18:01	15.8	76.9	172.4
2012:01:09	06:31	8.3	288.0	177.0	18:02	5.2	71.1	174.2
2012:01:10	06:31	15.3	277.6	168.3	18:03	-5.7	65.6	162.5
2012:01:11	06:31	21.9	266.3	156.1	18:04	-16.7	60.0	150.1
2012:01:12	06:31	27.6	253.6	143.5	18:05	-27.8	53.7	137.4
2012:01:13	06:31	32.0	239.5	130.8	18:06	-38.6	46.0	124.6
2012:01:14	06:31	34.7	224.0	118.0	18:07	-48.8	35.5	111.7
2012:01:15	06:30	35.3	207.8	105.0	18:08	-57.6	20.0	98.7
2012:01:16	06:30	33.8	191.7	92.0	18:09	-63.4	356.6	85.6
2012:01:17	06:30	30.3	176.3	78.9	18:10	-64.0	327.4	72.5
2012:01:18	06:29	25.2	162.2	65.8	18:11	-59.0	302.4	59.4
2012:01:19	06:29	19.0	149.3	52.7	18:12	-50.5	285.6	46.3
2012:01:20	06:28	12.1	137.4	39.6	18:13	-40.2	274.6	33.3
2012:01:21	06:28	4.9	126.1	26.7	18:15	-29.2	266.9	20.5
2012:01:22	06:27	-2.3	115.2	14.1	18:16	-17.9	260.9	8.3
2012:01:23	06:27	-9.2	104.3	4.0	18:17	-6.6	255.9	6.5
2012:01:24	06:26	-15.6	93.2	12.1	18:18	4.6	251.4	17.9
2012:01:25	06:25	-21.2	81.7	23.8	18:19	15.6	246.9	29.6
2012:01:26	06:25	-25.9	69.7	35.4	18:20	26.2	242.0	41.1
2012:01:27	06:24	-29.5	57.2	46.8	18:21	36.4	236.3	52.4
2012:01:28	06:23	-31.8	44.3	58.0	18:22	46.1	229.0	63.5
2012:01:29	06:23	-32.8	31.1	68.9	18:23	54.9	218.9	74.4
2012:01:30	06:22	-32.5	18.0	79.7	18:25	62.2	203.5	85.2
2012:01:31	06:21	-31.0	5.1	90.5	18:26	66.8	180.5	96.0
2012:02:01	06:20	-28.4	352.7	101.3	18:27	66.9	152.5	106.8
2012:02:02	06:19	-24.8	340.8	112.3	18:28	62.2	128.9	117.9
2012:02:03	06:18	-20.4	329.4	123.4	18:29	54.5	113.1	129.1
2012:02:04	06:17	-15.3	318.4	134.8	18:30	44.9	102.7	140.7
2012:02:05	06:16	-9.6	307.5	146.5	18:32	34.4	95.4	152.5
2012:02:06	06:15	-3.5	296.6	158.4	18:33	23.1	89.9	164.5
2012:02:07	06:14	2.8	285.4	170.2	18:34	11.4	85.2	174.9
2012:02:08	06:13	9.0	273.8	173.8	18:35	-0.7	81.0	168.3
2012:02:09	06:12	14.9	261.4	162.3	18:36	-13.0	76.8	155.6
2012:02:10	06:11	20.1	248.2	149.3	18:37	-25.3	72.1	142.5
2012:02:11	06:10	24.3	234.0	136.1	18:38	-37.5	66.2	129.2
2012:02:12	06:09	27.1	219.0	122.9	18:40	-49.1	58.1	116.0
2012:02:13	06:08	28.2	203.4	109.7	18:41	-59.6	45.2	102.8
2012:02:14	06:06	27.7	188.0	96.5	18:42	-67.7	22.5	89.7
2012:02:15	06:05	25.5	173.0	83.5	18:43	-70.1	347.6	76.7
2012:02:16	06:04	22.0	158.9	70.7	18:44	-65.5	316.4	63.9
2012:02:17	06:03	17.5	145.6	58.0	18:45	-56.7	298.2	51.3
2012:02:18	06:01	12.3	133.3	45.5	18:47	-46.4	287.7	38.9
2012:02:19	06:00	6.8	121.5	33.2	18:48	-35.5	280.9	26.7
2012:02:20	05:59	1.0	110.2	21.2	18:49	-24.4	275.9	15.0
2012:02:21	05:57	-4.6	99.1	9.9	18:50	-13.3	272.0	5.4
2012:02:22	05:56	-10.0	88.1	5.9	18:51	-2.4	268.5	10.6
2012:02:23	05:54	-14.9	77.0	15.5	18:52	8.4	265.1	21.4
2012:02:24	05:53	-19.2	65.6	26.5	18:54	19.0	261.5	32.4
2012:02:25	05:52	-22.8	53.9	37.4	18:55	29.3	257.5	43.4
2012:02:26	05:50	-25.5	41.8	48.3	18:56	39.4	252.5	54.2
2012:02:27	05:49	-27.3	29.4	59.1	18:57	49.0	245.6	65.0
2012:02:28	05:47	-28.0	16.9	69.8	18:58	57.9	235.3	75.8
2012:02:29	05:46	-27.8	4.2	80.6	18:59	65.4	218.5	86.6
2012:03:01	05:44	-26.5	351.6	91.5	19:01	69.6	191.5	97.6
2012:03:02	05:42	-24.1	339.1	102.6	19:02	68.3	159.9	108.9
2012:03:03	05:41	-20.9	326.8	114.0	19:03	61.8	136.6	120.5
2012:03:04	05:39	-16.8	314.7	125.7	19:04	52.5	122.5	132.4
2012:03:05	05:38	-11.9	302.7	137.8	19:05	41.7	113.5	144.7
2012:03:06	05:36	-6.5	290.7	150.2	19:06	29.9	107.1	157.4
2012:03:07	05:34	-0.6	278.5	162.9	19:07	17.5	102.1	169.9
2012:03:08	05:33	5.3	266.0	174.2	19:09	4.8	97.7	173.2
2012:03:09	05:31	11.1	253.0	168.3	19:10	-8.1	93.4	160.9
2012:03:10	05:29	16.4	239.2	155.1	19:11	-20.9	88.7	147.3
2012:03:11	05:28	20.7	224.8	141.5	19:12	-33.5	83.1	133.7
2012:03:12	05:26	23.7	209.7	127.9	19:13	-45.4	75.5	120.2
2012:03:13	05:24	25.3	194.3	114.5	19:14	-56.2	64.0	106.9
2012:03:14	05:23	25.3	179.1	101.3	19:16	-64.9	44.9	93.8
2012:03:15	05:21	23.9	164.3	88.5	19:17	-69.0	14.7	81.1
2012:03:16	05:19	21.2	150.3	75.9	19:18	-66.7	342.7	68.7
2012:03:17	05:17	17.5	137.2	63.6	19:19	-59.6	321.4	56.5
2012:03:18	05:16	13.2	124.9	51.6	19:20	-50.5	308.7	44.6
2012:03:19	05:14	8.4	113.2	39.8	19:21	-40.5	300.5	32.9
2012:03:20	05:12	3.4	102.1	28.2	19:23	-30.3	294.7	21.5
2012:03:21	05:10	-1.7	91.2	17.0	19:24	-19.9	290.0	10.7
2012:03:22	05:09	-6.7	80.5	6.8	19:25	-9.6	286.0	4.8
2012:03:23	05:07	-11.4	69.7	7.6	19:26	0.6	282.2	13.4
2012:03:24	05:05	-15.7	58.8	17.7	19:27	10.7	278.3	24.0
2012:03:25	05:03	-19.5	47.6	28.3	19:29	20.6	274.1	34.8
2012:03:26	05:01	-22.7	35.9	39.1	19:30	30.3	269.0	45.5
2012:03:27	05:00	-25.1	23.9	49.8	19:31	39.7	262.7	56.3
2012:03:28	04:58	-26.5	11.5	60.6	19:32	48.7	254.1	67.2
2012:03:29	04:56	-27.0	358.8	71.5	19:33	56.6	241.5	78.2

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:03:30	04:54	-26.5	345.9	82.6	19:35	62.6	222.6	89.5
2012:03:31	04:52	-24.9	333.0	93.9	19:36	64.8	196.9	101.0
2012:04:01	04:51	-22.2	320.1	105.5	19:37	62.1	170.7	112.9
2012:04:02	04:49	-18.5	307.3	117.6	19:38	55.0	151.0	125.3
2012:04:03	04:47	-13.9	294.6	130.1	19:40	45.4	137.6	138.1
2012:04:04	04:45	-8.6	282.0	143.1	19:41	34.3	128.1	151.4
2012:04:05	04:43	-2.7	269.3	156.4	19:42	22.2	120.7	164.9
2012:04:06	04:41	3.5	256.4	169.8	19:43	9.7	114.4	176.1
2012:04:07	04:40	9.6	243.0	174.0	19:45	-2.9	108.4	165.9
2012:04:08	04:38	15.2	229.1	160.8	19:46	-15.4	102.2	152.0
2012:04:09	04:36	19.9	214.5	146.9	19:47	-27.4	95.1	138.1
2012:04:10	04:34	23.4	199.4	133.1	19:48	-38.5	86.4	124.5
2012:04:11	04:32	25.4	184.1	119.6	19:50	-48.4	74.8	111.2
2012:04:12	04:31	25.8	168.8	106.5	19:51	-56.1	58.7	98.4
2012:04:13	04:29	24.7	154.2	93.8	19:52	-60.6	37.2	85.9
2012:04:14	04:27	22.4	140.3	81.5	19:54	-60.8	13.1	73.8
2012:04:15	04:25	19.1	127.4	69.6	19:55	-57.0	352.1	62.0
2012:04:16	04:23	15.0	115.3	57.9	19:56	-50.6	336.5	50.5
2012:04:17	04:22	10.5	104.0	46.5	19:57	-42.7	325.2	39.1
2012:04:18	04:20	5.6	93.2	35.2	19:59	-34.2	316.7	28.0
2012:04:19	04:18	0.5	82.7	24.2	20:00	-25.2	309.8	17.0
2012:04:20	04:16	-4.5	72.4	13.3	20:01	-16.1	303.9	6.5
2012:04:21	04:15	-9.5	62.1	3.6	20:03	-7.0	298.3	5.8
2012:04:22	04:13	-14.1	51.6	9.2	20:04	2.1	292.9	16.2
2012:04:23	04:11	-18.4	40.8	19.8	20:05	11.1	287.2	26.9
2012:04:24	04:09	-22.2	29.5	30.6	20:07	20.0	280.9	37.8
2012:04:25	04:08	-25.2	17.6	41.4	20:08	28.5	273.7	48.8
2012:04:26	04:06	-27.4	5.2	52.4	20:09	36.5	264.8	59.9
2012:04:27	04:04	-28.6	352.2	63.5	20:11	43.7	253.6	71.1
2012:04:28	04:03	-28.6	338.8	74.9	20:12	49.5	239.2	82.7
2012:04:29	04:01	-27.4	325.3	86.5	20:14	53.0	221.2	94.6
2012:04:30	03:59	-25.0	311.8	98.5	20:15	53.2	200.7	106.9
2012:05:01	03:58	-21.3	298.5	111.0	20:16	49.9	181.0	119.7
2012:05:02	03:56	-16.5	285.5	123.8	20:18	43.4	164.2	132.9
2012:05:03	03:55	-10.7	272.6	137.2	20:19	34.7	150.8	146.6
2012:05:04	03:53	-4.3	259.9	151.0	20:20	24.6	139.7	160.6
2012:05:05	03:52	2.5	247.1	165.0	20:22	13.8	130.1	174.6
2012:05:06	03:50	9.3	234.0	178.2	20:23	2.7	121.3	170.6
2012:05:07	03:49	15.6	220.3	166.2	20:24	-8.2	112.6	156.5
2012:05:08	03:47	21.1	206.1	152.2	20:26	-18.5	103.4	142.6
2012:05:09	03:46	25.3	191.2	138.4	20:27	-27.9	93.3	129.0
2012:05:10	03:44	27.9	176.0	125.0	20:29	-35.9	81.7	115.9
2012:05:11	03:43	28.8	160.7	112.1	20:30	-42.3	68.2	103.3
2012:05:12	03:42	28.2	146.0	99.6	20:31	-46.5	52.8	91.1
2012:05:13	03:40	26.1	132.2	87.6	20:33	-48.3	36.1	79.3
2012:05:14	03:39	22.9	119.3	75.9	20:34	-47.6	19.5	67.9
2012:05:15	03:38	18.8	107.5	64.5	20:35	-44.7	4.4	56.6
2012:05:16	03:36	14.1	96.5	53.4	20:36	-40.1	351.2	45.5
2012:05:17	03:35	9.0	86.1	42.3	20:38	-34.5	339.9	34.6
2012:05:18	03:34	3.5	76.2	31.4	20:39	-28.0	330.1	23.7
2012:05:19	03:33	-2.1	66.5	20.6	20:40	-21.0	321.4	12.8
2012:05:20	03:32	-7.7	56.8	9.7	20:42	-13.8	313.3	2.0
2012:05:21	03:31	-13.1	46.9	1.3	20:43	-6.4	305.5	9.0
2012:05:22	03:29	-18.4	36.6	12.1	20:44	1.0	297.7	20.0
2012:05:23	03:28	-23.2	25.8	23.1	20:45	8.4	289.7	31.1
2012:05:24	03:27	-27.3	14.1	34.3	20:46	15.5	281.0	42.4
2012:05:25	03:26	-30.6	1.5	45.6	20:48	22.3	271.4	53.9
2012:05:26	03:26	-32.8	348.1	57.1	20:49	28.4	260.6	65.5
2012:05:27	03:25	-33.5	333.9	68.8	20:50	33.5	248.2	77.5
2012:05:28	03:24	-32.8	319.4	80.8	20:51	37.3	233.9	89.8
2012:05:29	03:23	-30.4	305.0	93.2	20:52	39.2	218.1	102.4
2012:05:30	03:22	-26.4	291.1	105.9	20:53	38.8	201.3	115.5
2012:05:31	03:21	-21.0	277.8	119.1	20:54	36.0	184.8	129.0
2012:06:01	03:21	-14.4	265.2	132.6	20:55	31.0	169.3	142.8
2012:06:02	03:20	-7.0	253.1	146.5	20:56	24.5	155.3	156.8
2012:06:03	03:20	0.9	241.2	160.6	20:57	16.8	142.6	171.0
2012:06:04	03:19	8.9	229.2	174.8	20:58	8.6	130.9	174.7
2012:06:05	03:18	16.5	216.8	171.0	20:59	0.3	119.8	160.8
2012:06:06	03:18	23.4	203.6	157.2	21:00	-7.6	108.9	147.2
2012:06:07	03:18	29.1	189.6	143.7	21:00	-14.8	97.9	134.0
2012:06:08	03:17	33.1	174.8	130.6	21:01	-21.2	86.5	121.2
2012:06:09	03:17	35.3	159.4	118.0	21:02	-26.5	74.7	108.9
2012:06:10	03:17	35.6	144.2	105.8	21:03	-30.6	62.2	97.1
2012:06:11	03:16	34.0	129.7	94.1	21:03	-33.4	49.3	85.6
2012:06:12	03:16	31.0	116.4	82.6	21:04	-34.8	36.1	74.3
2012:06:13	03:16	26.7	104.4	71.5	21:04	-34.8	22.8	63.3
2012:06:14	03:16	21.6	93.6	60.5	21:05	-33.5	9.9	52.4
2012:06:15	03:16	15.8	83.7	49.6	21:05	-31.1	357.6	41.5
2012:06:16	03:16	9.5	74.5	38.7	21:06	-27.7	345.9	30.7
2012:06:17	03:16	2.9	65.8	27.9	21:06	-23.5	334.8	19.8
2012:06:18	03:16	-4.0	57.2	17.0	21:07	-18.8	324.3	8.9
2012:06:19	03:16	-10.9	48.5	6.1	21:07	-13.5	314.1	3.3
2012:06:20	03:16	-17.8	39.5	5.8	21:07	-7.9	304.2	14.0
2012:06:21	03:16	-24.5	29.7	16.9	21:07	-2.1	294.2	25.4
2012:06:22	03:17	-30.7	18.8	28.4	21:08	3.7	284.1	37.1
2012:06:23	03:17	-36.1	6.5	40.1	21:08	9.4	273.6	48.9
2012:06:24	03:17	-40.2	352.4	52.0	21:08	14.8	262.4	61.0
2012:06:25	03:18	-42.5	336.7	64.2	21:08	19.7	250.4	73.4
2012:06:26	03:18	-42.6	320.1	76.6	21:08	23.8	237.4	86.0
2012:06:27	03:19	-40.3	303.6	89.3	21:08	26.8	223.2	99.0
2012:06:28	03:19	-35.8	288.4	102.4	21:08	28.5	208.2	112.2
2012:06:29	03:20	-29.3	274.8	115.7	21:07	28.5	192.6	125.7
2012:06:30	03:20	-21.4	262.9	129.2	21:07	26.8	177.0	139.4
2012:07:01	03:21	-12.4	252.1	143.0	21:07	23.5	161.9	153.2

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:07:02	03:22	-2.9	242.2	156.7	21:07	19.0	147.6	166.8
2012:07:03	03:22	6.8	232.5	170.3	21:06	13.5	134.2	176.7
2012:07:04	03:23	16.4	222.6	174.5	21:06	7.7	121.7	165.3
2012:07:05	03:24	25.4	212.0	161.8	21:06	1.7	109.8	152.3
2012:07:06	03:25	33.5	200.2	148.9	21:05	-4.2	98.3	139.6
2012:07:07	03:26	40.1	186.8	136.3	21:04	-9.6	87.0	127.3
2012:07:08	03:26	44.8	171.5	124.1	21:04	-14.6	75.8	115.4
2012:07:09	03:27	47.2	154.8	112.3	21:03	-18.9	64.4	103.9
2012:07:10	03:28	47.0	138.0	100.9	21:03	-22.4	52.9	92.7
2012:07:11	03:29	44.4	122.4	89.7	21:02	-25.2	41.0	81.7
2012:07:12	03:30	40.0	108.9	78.7	21:01	-27.0	28.9	70.8
2012:07:13	03:31	34.1	97.5	67.8	21:00	-28.0	16.5	59.9
2012:07:14	03:32	27.3	87.8	57.0	21:00	-27.9	4.0	49.1
2012:07:15	03:33	19.7	79.4	46.1	20:59	-26.8	351.5	38.1
2012:07:16	03:34	11.5	71.9	35.1	20:58	-24.8	339.1	27.1
2012:07:17	03:36	3.0	64.9	24.0	20:57	-21.9	327.0	16.0
2012:07:18	03:37	-5.9	58.1	12.9	20:56	-18.1	315.1	5.6
2012:07:19	03:38	-14.9	51.1	4.1	20:55	-13.7	303.5	8.8
2012:07:20	03:39	-24.0	43.4	11.9	20:54	-8.8	292.1	20.2
2012:07:21	03:40	-32.9	34.6	23.6	20:53	-3.5	280.7	32.3
2012:07:22	03:41	-41.2	23.9	35.8	20:52	2.0	269.2	44.6
2012:07:23	03:43	-48.4	10.1	48.2	20:50	7.4	257.5	57.2
2012:07:24	03:44	-53.5	352.3	60.8	20:49	12.6	245.2	69.9
2012:07:25	03:45	-55.4	331.0	73.6	20:48	17.3	232.2	82.8
2012:07:26	03:46	-53.3	309.6	86.6	20:47	21.2	218.5	95.9
2012:07:27	03:48	-47.8	291.4	99.8	20:46	24.0	204.0	109.1
2012:07:28	03:49	-39.7	277.3	113.1	20:44	25.5	188.8	122.5
2012:07:29	03:50	-30.2	266.5	126.4	20:43	25.4	173.4	135.8
2012:07:30	03:51	-19.7	257.8	139.8	20:42	23.9	158.2	149.1
2012:07:31	03:53	-8.7	250.3	153.1	20:40	20.9	143.7	162.2
2012:08:01	03:54	2.4	243.5	166.0	20:39	16.9	129.9	173.8
2012:08:02	03:55	13.4	236.7	175.3	20:37	12.2	117.1	170.0
2012:08:03	03:57	24.2	229.6	166.5	20:36	7.0	105.0	158.2
2012:08:04	03:58	34.3	221.5	154.4	20:34	1.7	93.5	146.1
2012:08:05	03:59	43.5	211.6	142.5	20:33	-3.6	82.4	134.4
2012:08:06	04:00	51.4	198.8	130.8	20:31	-8.7	71.6	122.9
2012:08:07	04:02	57.1	181.9	119.4	20:30	-13.3	60.7	111.7
2012:08:08	04:03	59.9	161.2	108.2	20:28	-17.6	49.7	100.7
2012:08:09	04:04	58.9	139.7	97.2	20:27	-21.2	38.4	89.8
2012:08:10	04:06	54.7	121.5	86.3	20:25	-24.2	26.7	78.9
2012:08:11	04:07	48.2	107.6	75.5	20:23	-26.3	14.4	68.1
2012:08:12	04:08	40.2	97.3	64.5	20:22	-27.5	1.7	57.1
2012:08:13	04:10	31.4	89.4	53.5	20:20	-27.6	348.7	46.0
2012:08:14	04:11	21.8	82.9	42.3	20:18	-26.6	335.5	34.6
2012:08:15	04:12	11.8	77.4	30.8	20:17	-24.5	322.3	23.1
2012:08:16	04:13	1.3	72.2	19.3	20:15	-21.2	309.3	11.7
2012:08:17	04:15	-9.5	67.2	8.2	20:13	-17.0	296.6	5.3
2012:08:18	04:16	-20.4	61.8	7.8	20:12	-12.0	284.3	15.2
2012:08:19	04:17	-31.4	55.5	19.3	20:10	-6.4	272.1	27.6
2012:08:20	04:19	-42.2	47.4	31.9	20:08	-0.4	260.1	40.4
2012:08:21	04:20	-52.3	36.0	44.8	20:06	5.6	247.9	53.4
2012:08:22	04:21	-60.6	18.4	57.9	20:05	11.5	235.4	66.5
2012:08:23	04:22	-65.2	351.9	71.1	20:03	16.8	222.3	79.6
2012:08:24	04:24	-63.9	322.1	84.2	20:01	21.2	208.6	92.8
2012:08:25	04:25	-57.4	299.3	97.4	19:59	24.6	194.1	105.9
2012:08:26	04:26	-48.1	284.8	110.5	19:57	26.5	179.1	118.9
2012:08:27	04:27	-37.5	275.3	123.5	19:56	26.9	163.9	131.8
2012:08:28	04:29	-26.3	268.4	136.4	19:54	25.8	149.0	144.6
2012:08:29	04:30	-14.8	262.9	149.1	19:52	23.2	134.6	157.1
2012:08:30	04:31	-3.3	258.2	161.5	19:50	19.4	121.2	169.0
2012:08:31	04:32	8.1	253.7	172.7	19:48	14.8	108.7	174.5
2012:09:01	04:33	19.3	249.1	171.6	19:46	9.7	97.0	164.8
2012:09:02	04:35	30.1	244.0	160.7	19:45	4.2	86.0	153.5
2012:09:03	04:36	40.4	237.7	149.3	19:43	-1.3	75.4	142.2
2012:09:04	04:37	50.0	229.2	138.1	19:41	-6.7	65.0	131.1
2012:09:05	04:38	58.5	216.9	127.0	19:39	-11.9	54.7	120.1
2012:09:06	04:39	64.9	198.0	116.0	19:37	-16.7	44.1	109.3
2012:09:07	04:41	67.6	171.7	105.2	19:35	-21.1	33.0	98.5
2012:09:08	04:42	65.4	144.8	94.3	19:33	-24.8	21.4	87.6
2012:09:09	04:43	59.3	125.2	83.4	19:32	-27.7	9.1	76.6
2012:09:10	04:44	51.0	112.4	72.4	19:30	-29.5	356.1	65.5
2012:09:11	04:45	41.5	103.8	61.1	19:28	-30.2	342.4	54.1
2012:09:12	04:46	31.1	97.5	49.5	19:26	-29.5	328.3	42.3
2012:09:13	04:47	20.1	92.4	37.7	19:24	-27.4	314.2	30.3
2012:09:14	04:49	8.7	88.1	25.5	19:22	-23.8	300.4	18.0
2012:09:15	04:50	-3.2	83.9	13.1	19:20	-19.1	287.1	6.4
2012:09:16	04:51	-15.3	79.6	4.6	19:19	-13.3	274.2	9.8
2012:09:17	04:52	-27.5	74.6	14.8	19:17	-6.8	261.8	22.6
2012:09:18	04:53	-39.6	68.3	27.9	19:15	0.1	249.6	35.9
2012:09:19	04:54	-51.2	59.1	41.3	19:13	7.1	237.3	49.4
2012:09:20	04:55	-61.4	44.0	54.8	19:11	13.7	224.7	62.8
2012:09:21	04:56	-68.3	17.6	68.2	19:10	19.6	211.6	76.1
2012:09:22	04:58	-68.8	341.9	81.4	19:08	24.5	197.8	89.1
2012:09:23	04:59	-62.6	314.6	94.5	19:06	28.0	183.3	102.0
2012:09:24	05:00	-53.2	298.9	107.3	19:04	30.0	168.2	114.7
2012:09:25	05:01	-42.6	289.5	119.9	19:02	30.3	153.1	127.2
2012:09:26	05:02	-31.6	283.2	132.3	19:01	28.8	138.3	139.4
2012:09:27	05:03	-20.4	278.3	144.5	18:59	25.9	124.4	151.4
2012:09:28	05:04	-9.2	274.3	156.4	18:57	21.8	111.6	163.1
2012:09:29	05:05	1.8	270.6	167.9	18:55	16.9	99.7	173.8
2012:09:30	05:06	12.6	266.8	176.1	18:54	11.3	88.8	172.3
2012:10:01	05:07	23.2	262.7	167.8	18:52	5.5	78.4	161.6
2012:10:02	05:08	33.5	257.9	156.9	18:50	-0.6	68.5	150.7
2012:10:03	05:10	43.4	251.7	146.0	18:48	-6.6	58.8	139.8

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:10:04	05:11	52.6	243.0	135.1	18:47	-12.4	49.0	129.0
2012:10:05	05:12	60.7	229.8	124.3	18:45	-18.0	38.8	118.2
2012:10:06	05:13	66.5	209.1	113.5	18:43	-23.1	28.1	107.3
2012:10:07	05:14	68.2	180.9	102.6	18:42	-27.5	16.6	96.4
2012:10:08	05:15	64.8	154.3	91.5	18:40	-31.1	4.1	85.3
2012:10:09	05:16	57.7	136.0	80.3	18:38	-33.5	350.4	73.9
2012:10:10	05:17	48.5	124.2	68.7	18:37	-34.5	335.9	62.2
2012:10:11	05:18	38.1	116.2	56.8	18:35	-33.7	320.8	50.0
2012:10:12	05:19	26.9	110.1	44.5	18:34	-31.2	305.8	37.5
2012:10:13	05:20	15.1	105.0	31.7	18:32	-26.9	291.3	24.5
2012:10:14	05:21	2.8	100.3	18.5	18:30	-21.0	277.6	11.3
2012:10:15	05:22	-9.8	95.6	5.5	18:29	-14.0	264.8	4.1
2012:10:16	05:24	-22.5	90.3	9.7	18:27	-6.2	252.6	17.1
2012:10:17	05:25	-34.9	83.7	23.4	18:26	1.9	240.7	30.9
2012:10:18	05:26	-46.7	74.7	37.2	18:24	10.0	228.8	44.7
2012:10:19	05:27	-57.1	60.9	51.0	18:23	17.5	216.5	58.3
2012:10:20	05:28	-64.7	38.5	64.5	18:22	24.2	203.6	71.6
2012:10:21	05:29	-66.9	7.4	77.7	18:20	29.6	189.7	84.6
2012:10:22	05:30	-62.9	339.3	90.5	18:19	33.4	174.9	97.2
2012:10:23	05:31	-55.0	321.1	103.0	18:17	35.4	159.5	109.5
2012:10:24	05:32	-45.6	309.7	115.2	18:16	35.3	144.1	121.5
2012:10:25	05:33	-35.6	301.9	127.1	18:15	33.4	129.4	133.3
2012:10:26	05:35	-25.3	296.1	138.8	18:13	30.0	115.8	144.9
2012:10:27	05:36	-15.0	291.2	150.3	18:12	25.2	103.6	156.2
2012:10:28	05:37	-4.8	286.7	161.6	18:11	19.6	92.5	167.4
2012:10:29	05:38	5.4	282.4	172.6	18:10	13.4	82.4	177.8
2012:10:30	05:39	15.3	277.8	175.8	18:08	6.8	73.0	170.3
2012:10:31	05:40	25.0	272.7	165.1	18:07	0.0	64.0	159.5
2012:11:01	05:41	34.4	266.5	154.3	18:06	-6.8	55.1	148.7
2012:11:02	05:42	43.2	258.6	143.4	18:05	-13.6	46.2	137.9
2012:11:03	05:43	51.2	247.9	132.6	18:04	-20.1	36.7	127.0
2012:11:04	05:44	57.7	232.9	121.7	18:03	-26.3	26.5	116.1
2012:11:05	05:46	61.7	212.4	110.7	18:02	-31.8	15.2	105.0
2012:11:06	05:47	61.8	188.7	99.5	18:01	-36.3	2.3	93.7
2012:11:07	05:48	57.7	167.2	88.0	18:00	-39.5	347.9	82.0
2012:11:08	05:49	50.6	150.9	76.1	17:59	-40.8	332.0	70.0
2012:11:09	05:50	41.5	139.1	63.9	17:58	-39.9	315.4	57.5
2012:11:10	05:51	31.1	130.0	51.1	17:57	-36.6	299.2	44.5
2012:11:11	05:52	19.8	122.5	37.9	17:56	-31.2	284.2	31.1
2012:11:12	05:53	7.9	115.8	24.3	17:55	-23.9	270.7	17.3
2012:11:13	05:54	-4.3	109.2	10.3	17:54	-15.4	258.5	3.2
2012:11:14	05:55	-16.5	102.2	4.0	17:54	-6.1	247.2	11.1
2012:11:15	05:56	-28.3	94.1	18.2	17:53	3.6	236.4	25.3
2012:11:16	05:58	-39.3	83.9	32.3	17:52	13.0	225.6	39.2
2012:11:17	05:59	-48.7	70.4	46.2	17:51	21.8	214.3	52.9
2012:11:18	06:00	-55.5	52.1	59.6	17:51	29.7	202.0	66.1
2012:11:19	06:01	-58.5	29.4	72.6	17:50	36.1	188.3	78.8
2012:11:20	06:02	-57.2	6.5	85.1	17:50	40.6	173.2	91.2
2012:11:21	06:03	-52.3	347.7	97.3	17:49	43.0	156.9	103.1
2012:11:22	06:04	-45.3	333.7	109.1	17:49	42.9	140.6	114.7
2012:11:23	06:05	-37.3	323.3	120.6	17:48	40.6	125.2	126.1
2012:11:24	06:06	-28.6	315.1	131.9	17:48	36.5	111.4	137.3
2012:11:25	06:07	-19.7	308.1	143.0	17:47	31.0	99.5	148.3
2012:11:26	06:08	-10.8	301.9	154.0	17:47	24.5	89.2	159.3
2012:11:27	06:09	-1.8	295.9	164.9	17:47	17.3	80.1	170.1
2012:11:28	06:10	7.1	289.8	175.6	17:46	9.7	71.9	178.6
2012:11:29	06:11	15.7	283.4	173.3	17:46	1.9	64.1	168.1
2012:11:30	06:12	24.1	276.2	162.5	17:46	-6.1	56.6	157.3
2012:12:01	06:13	32.0	267.8	151.7	17:46	-14.1	48.9	146.4
2012:12:02	06:14	39.2	257.6	140.7	17:45	-22.0	40.7	135.4
2012:12:03	06:15	45.3	245.0	129.6	17:45	-29.6	31.5	124.3
2012:12:04	06:16	49.5	229.6	118.4	17:45	-36.7	20.9	112.9
2012:12:05	06:16	51.3	211.7	106.9	17:45	-42.8	8.1	101.3
2012:12:06	06:17	50.1	193.1	95.1	17:45	-47.4	352.5	89.4
2012:12:07	06:18	46.0	175.9	83.0	17:45	-49.6	334.2	77.1
2012:12:08	06:19	39.5	161.1	70.5	17:45	-48.7	314.9	64.4
2012:12:09	06:20	31.2	148.8	57.5	17:45	-44.5	296.7	51.2
2012:12:10	06:21	21.6	138.2	44.1	17:45	-37.6	281.2	37.5
2012:12:11	06:21	11.3	128.5	30.3	17:46	-28.7	268.4	23.6
2012:12:12	06:22	0.6	119.4	16.2	17:46	-18.6	257.6	9.6
2012:12:13	06:23	-10.1	110.0	2.9	17:46	-7.7	248.1	5.5
2012:12:14	06:24	-20.4	100.0	12.6	17:46	3.4	239.3	19.2
2012:12:15	06:24	-29.6	88.6	26.5	17:47	14.3	230.5	33.0
2012:12:16	06:25	-37.5	75.4	40.1	17:47	24.7	221.3	46.4
2012:12:17	06:25	-43.3	60.1	53.3	17:47	34.2	210.8	59.4
2012:12:18	06:26	-46.5	43.0	66.0	17:48	42.3	198.5	71.9
2012:12:19	06:27	-47.0	25.4	78.2	17:48	48.6	183.6	83.9
2012:12:20	06:27	-44.9	8.8	90.1	17:48	52.4	165.9	95.5
2012:12:21	06:28	-40.8	354.4	101.5	17:49	53.2	147.0	106.8
2012:12:22	06:28	-35.4	342.1	112.7	17:49	51.0	129.0	117.9
2012:12:23	06:29	-29.1	331.5	123.7	17:50	46.3	113.8	128.8
2012:12:24	06:29	-22.2	322.3	134.5	17:51	40.0	101.6	139.6
2012:12:25	06:29	-15.0	313.8	145.3	17:51	32.5	91.8	150.4
2012:12:26	06:30	-7.6	305.8	156.0	17:52	24.3	83.7	161.1
2012:12:27	06:30	-0.2	297.9	166.7	17:52	15.6	76.8	171.6
2012:12:28	06:30	7.2	289.8	176.1	17:53	6.5	70.5	175.3
2012:12:29	06:31	14.4	281.2	170.4	17:54	-2.8	64.6	165.3
2012:12:30	06:31	21.3	271.9	159.6	17:55	-12.2	58.7	154.3
2012:12:31	06:31	27.5	261.4	148.4	17:55	-21.6	52.3	143.1

Date = data nel formato aaaa/mm/gg  
 Times = ore  
 Morning twilights = crepuscolo mattutino  
 Evening twilight = crepuscolo serale  
 Alt = altezza della Luna sull'orizzonte, in °  
 Az = azimut della Luna, in °  
 Elong = elongazione della Luna, in °  
  
 Alt = altitude of the Moon above the horizon, in °  
 Az = azimuth of the Moon, in °  
 Elong = elongation of the Moon, in °

Altezza ai crepuscoli. Il Sole è 18° sotto l'orizzonte

Altitude in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:01:01	05:57	-40.7	0.2	89.4	18:29	57.9	185.3	95.1
2012:01:02	05:57	-35.8	347.9	100.2	18:30	61.1	164.7	105.9
2012:01:03	05:58	-30.0	337.1	111.0	18:31	60.7	142.2	116.7
2012:01:04	05:58	-23.4	327.4	121.9	18:32	56.6	122.5	127.6
2012:01:05	05:58	-16.4	318.4	132.8	18:33	49.8	107.6	138.6
2012:01:06	05:58	-8.9	309.8	143.9	18:33	41.4	96.7	149.9
2012:01:07	05:58	-1.2	301.3	155.3	18:34	31.9	88.5	161.3
2012:01:08	05:58	6.5	292.4	166.7	18:35	21.7	81.9	172.7
2012:01:09	05:58	14.2	282.9	176.9	18:36	11.0	76.3	173.9
2012:01:10	05:58	21.4	272.5	168.5	18:37	-0.1	71.2	162.2
2012:01:11	05:58	28.0	260.6	156.4	18:38	-11.5	66.1	149.8
2012:01:12	05:57	33.4	247.0	143.8	18:39	-22.8	60.7	137.1
2012:01:13	05:57	37.1	231.7	131.1	18:40	-34.1	54.2	124.3
2012:01:14	05:57	38.7	215.1	118.3	18:41	-45.1	45.8	111.4
2012:01:15	05:57	37.8	198.2	105.3	18:42	-55.1	33.4	98.4
2012:01:16	05:57	34.6	182.1	92.3	18:43	-63.0	13.6	85.3
2012:01:17	05:56	29.5	167.5	79.2	18:44	-66.5	344.4	72.2
2012:01:18	05:56	23.0	154.3	66.1	18:45	-63.7	314.3	59.1
2012:01:19	05:55	15.7	142.4	53.0	18:46	-56.0	293.6	46.0
2012:01:20	05:55	7.9	131.3	39.9	18:47	-46.1	280.7	33.0
2012:01:21	05:55	-0.1	120.6	27.0	18:48	-35.1	272.3	20.2
2012:01:22	05:54	-7.8	110.0	14.4	18:49	-23.7	266.1	8.0
2012:01:23	05:54	-15.1	99.2	4.1	18:50	-12.3	261.2	6.7
2012:01:24	05:53	-21.6	87.9	11.8	18:51	-1.0	256.9	18.1
2012:01:25	05:52	-27.1	76.0	23.5	18:52	10.1	252.8	29.9
2012:01:26	05:52	-31.4	63.2	35.2	18:53	20.9	248.6	41.4
2012:01:27	05:51	-34.3	49.8	46.6	18:54	31.3	243.8	52.7
2012:01:28	05:50	-35.7	36.0	57.7	18:55	41.3	237.9	63.7
2012:01:29	05:50	-35.5	22.3	68.7	18:56	50.7	230.0	74.6
2012:01:30	05:49	-34.0	9.0	79.5	18:57	59.2	218.1	85.4
2012:01:31	05:48	-31.2	356.3	90.3	18:59	65.8	199.4	96.2
2012:02:01	05:47	-27.3	344.5	101.1	19:00	68.8	171.8	107.1
2012:02:02	05:47	-22.6	333.3	112.0	19:01	66.4	143.1	118.1
2012:02:03	05:46	-17.1	322.6	123.1	19:02	59.7	122.7	129.4
2012:02:04	05:45	-11.1	312.2	134.5	19:03	50.6	109.8	141.0
2012:02:05	05:44	-4.7	301.9	146.2	19:04	40.2	101.4	152.8
2012:02:06	05:43	1.9	291.4	158.1	19:05	29.0	95.3	164.8
2012:02:07	05:42	8.5	280.4	169.9	19:06	17.2	90.5	175.0
2012:02:08	05:41	14.9	268.6	174.0	19:07	5.0	86.3	168.0
2012:02:09	05:40	20.7	255.9	162.6	19:09	-7.4	82.3	155.3
2012:02:10	05:39	25.5	241.9	149.6	19:10	-19.8	78.0	142.2
2012:02:11	05:38	28.9	226.9	136.4	19:11	-32.1	72.9	128.9
2012:02:12	05:36	30.5	211.1	123.2	19:12	-44.1	66.2	115.7
2012:02:13	05:35	30.3	195.1	110.0	19:13	-55.3	56.2	102.5
2012:02:14	05:34	28.1	179.6	96.8	19:14	-64.8	38.9	89.4
2012:02:15	05:33	24.4	165.1	83.8	19:15	-70.3	8.6	76.4
2012:02:16	05:32	19.6	151.6	71.0	19:17	-68.8	332.6	63.7
2012:02:17	05:30	14.0	139.1	58.3	19:18	-61.5	308.7	51.1

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:02:18	05:29	7.9	127.4	45.8	19:19	-51.7	295.3	38.6
2012:02:19	05:28	1.6	116.1	33.5	19:20	-41.0	287.3	26.5
2012:02:20	05:26	-4.6	105.1	21.5	19:21	-30.0	281.7	14.8
2012:02:21	05:25	-10.4	94.1	10.2	19:22	-19.0	277.4	5.3
2012:02:22	05:24	-15.8	82.9	5.7	19:24	-8.1	273.8	10.8
2012:02:23	05:22	-20.6	71.3	15.2	19:25	2.7	270.4	21.6
2012:02:24	05:21	-24.4	59.4	26.2	19:26	13.3	267.0	32.7
2012:02:25	05:19	-27.3	47.0	37.2	19:27	23.6	263.3	43.6
2012:02:26	05:18	-29.1	34.3	48.1	19:28	33.7	258.9	54.4
2012:02:27	05:16	-29.8	21.5	58.9	19:29	43.5	253.1	65.2
2012:02:28	05:15	-29.4	8.6	69.6	19:30	52.8	244.9	76.0
2012:02:29	05:13	-27.8	356.0	80.4	19:32	61.2	232.0	86.9
2012:03:01	05:12	-25.2	343.7	91.3	19:33	67.5	210.8	97.9
2012:03:02	05:10	-21.7	331.7	102.4	19:34	69.3	180.2	109.2
2012:03:03	05:09	-17.4	320.1	113.7	19:35	65.3	151.6	120.7
2012:03:04	05:07	-12.4	308.6	125.4	19:36	57.1	133.0	132.7
2012:03:05	05:05	-6.8	297.1	137.5	19:38	46.8	121.5	145.0
2012:03:06	05:04	-0.8	285.5	150.0	19:39	35.3	113.8	157.7
2012:03:07	05:02	5.3	273.4	162.6	19:40	23.1	108.1	170.1
2012:03:08	05:00	11.2	260.8	174.1	19:41	10.5	103.2	173.0
2012:03:09	04:59	16.7	247.3	168.6	19:42	-2.4	98.7	160.6
2012:03:10	04:57	21.3	232.9	155.4	19:44	-15.2	94.0	147.0
2012:03:11	04:55	24.6	217.7	141.8	19:45	-27.7	88.7	133.4
2012:03:12	04:53	26.4	201.9	128.2	19:46	-39.8	81.8	119.9
2012:03:13	04:52	26.4	186.2	114.8	19:47	-50.9	72.2	106.6
2012:03:14	04:50	24.8	170.9	101.6	19:48	-60.4	57.1	93.6
2012:03:15	04:48	21.9	156.6	88.8	19:50	-66.7	33.0	80.8
2012:03:16	04:46	17.9	143.2	76.2	19:51	-67.5	1.7	68.4
2012:03:17	04:44	13.2	130.7	63.9	19:52	-62.6	335.8	56.3
2012:03:18	04:43	8.1	118.9	51.8	19:53	-54.6	319.4	44.3
2012:03:19	04:41	2.7	107.7	40.0	19:55	-45.3	309.1	32.7
2012:03:20	04:39	-2.6	96.7	28.5	19:56	-35.4	301.9	21.3
2012:03:21	04:37	-7.8	85.9	17.3	19:57	-25.4	296.5	10.4
2012:03:22	04:35	-12.6	74.9	7.0	19:58	-15.3	291.9	4.9
2012:03:23	04:33	-17.0	63.8	7.4	20:00	-5.2	287.7	13.7
2012:03:24	04:31	-20.8	52.3	17.4	20:01	4.8	283.6	24.3
2012:03:25	04:29	-23.8	40.5	28.1	20:02	14.6	279.3	35.0
2012:03:26	04:28	-26.0	28.3	38.8	20:04	24.2	274.5	45.8
2012:03:27	04:26	-27.2	15.7	49.5	20:05	33.6	268.6	56.6
2012:03:28	04:24	-27.3	3.0	60.3	20:06	42.6	261.0	67.5
2012:03:29	04:22	-26.5	350.3	71.2	20:08	50.9	250.5	78.5
2012:03:30	04:20	-24.6	337.7	82.3	20:09	57.8	235.3	89.7
2012:03:31	04:18	-21.7	325.2	93.6	20:10	62.1	213.8	101.3
2012:04:01	04:16	-17.9	313.0	105.3	20:12	62.0	188.3	113.2
2012:04:02	04:14	-13.3	300.8	117.3	20:13	57.3	165.5	125.6
2012:04:03	04:12	-8.1	288.7	129.8	20:14	49.1	148.9	138.4
2012:04:04	04:10	-2.3	276.4	142.8	20:16	38.8	137.1	151.7
2012:04:05	04:08	3.7	263.8	156.1	20:17	27.4	128.2	165.2
2012:04:06	04:06	9.7	250.6	169.5	20:19	15.3	120.9	176.2
2012:04:07	04:04	15.2	236.7	174.2	20:20	2.9	114.2	165.6
2012:04:08	04:02	19.8	221.9	161.1	20:21	-9.3	107.6	151.7
2012:04:09	04:00	23.2	206.5	147.2	20:23	-21.1	100.5	137.8
2012:04:10	03:58	25.1	190.8	133.4	20:24	-32.2	92.2	124.2
2012:04:11	03:56	25.3	175.1	120.0	20:26	-42.1	81.8	110.9
2012:04:12	03:54	24.0	160.0	106.8	20:27	-50.3	68.2	98.0
2012:04:13	03:52	21.4	145.8	94.1	20:29	-56.0	50.5	85.6
2012:04:14	03:50	17.8	132.6	81.8	20:30	-58.4	29.3	73.5
2012:04:15	03:48	13.5	120.4	69.9	20:32	-56.9	8.1	61.7
2012:04:16	03:46	8.7	108.8	58.2	20:33	-52.4	350.5	50.2
2012:04:17	03:44	3.8	97.8	46.8	20:35	-45.9	337.0	38.8
2012:04:18	03:42	-1.3	87.2	35.5	20:36	-38.2	326.7	27.7
2012:04:19	03:40	-6.2	76.6	24.5	20:38	-30.0	318.4	16.7
2012:04:20	03:38	-11.0	66.0	13.6	20:39	-21.5	311.4	6.2
2012:04:21	03:36	-15.4	55.3	3.7	20:41	-12.8	305.1	6.1
2012:04:22	03:34	-19.3	44.1	9.0	20:42	-4.1	299.1	16.5
2012:04:23	03:33	-22.6	32.6	19.5	20:44	4.6	293.1	27.2
2012:04:24	03:31	-25.1	20.5	30.3	20:46	13.1	286.7	38.1
2012:04:25	03:29	-26.8	8.1	41.1	20:47	21.4	279.6	49.1
2012:04:26	03:27	-27.4	355.2	52.1	20:49	29.4	271.3	60.2
2012:04:27	03:25	-27.0	342.3	63.2	20:50	36.7	261.3	71.5
2012:04:28	03:23	-25.4	329.2	74.6	20:52	42.9	248.9	83.0
2012:04:29	03:21	-22.8	316.4	86.2	20:54	47.5	233.6	94.9
2012:04:30	03:19	-19.1	303.6	98.2	20:55	49.6	215.4	107.3
2012:05:01	03:17	-14.6	291.1	110.6	20:57	48.6	196.1	120.0
2012:05:02	03:15	-9.2	278.6	123.5	20:59	44.4	178.0	133.3
2012:05:03	03:13	-3.3	266.1	136.8	21:00	37.5	162.6	147.0
2012:05:04	03:12	3.0	253.3	150.6	21:02	28.8	149.6	161.0
2012:05:05	03:10	9.3	240.1	164.6	21:04	19.0	138.5	175.0
2012:05:06	03:08	15.1	226.1	178.0	21:05	8.8	128.6	170.2
2012:05:07	03:06	20.1	211.5	166.7	21:07	-1.4	119.2	156.1
2012:05:08	03:04	23.9	196.2	152.6	21:09	-11.2	109.7	142.2
2012:05:09	03:03	26.0	180.5	138.8	21:10	-20.2	99.8	128.6
2012:05:10	03:01	26.5	164.9	125.4	21:12	-28.2	89.0	115.6
2012:05:11	02:59	25.4	150.0	112.5	21:13	-34.8	77.0	103.0
2012:05:12	02:58	23.0	135.9	100.0	21:15	-39.8	63.6	90.8
2012:05:13	02:56	19.6	123.0	88.0	21:17	-42.8	49.1	79.0
2012:05:14	02:54	15.5	110.9	76.3	21:18	-43.8	33.9	67.5
2012:05:15	02:53	10.8	99.7	64.9	21:20	-42.9	19.1	56.3
2012:05:16	02:51	5.8	89.1	53.7	21:22	-40.3	5.3	45.2
2012:05:17	02:50	0.7	78.9	42.7	21:23	-36.3	352.9	34.2
2012:05:18	02:48	-4.5	68.8	31.8	21:25	-31.3	341.8	23.3
2012:05:19	02:46	-9.5	58.7	20.9	21:27	-25.5	331.8	12.5
2012:05:20	02:45	-14.4	48.4	10.1	21:28	-19.4	322.6	1.6
2012:05:21	02:44	-18.8	37.7	0.9	21:30	-12.9	313.9	9.4

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:05:22	02:42	-22.8	26.4	11.8	21:31	-6.2	305.5	20.4
2012:05:23	02:41	-26.1	14.5	22.8	21:33	0.5	297.0	31.5
2012:05:24	02:39	-28.5	2.0	33.9	21:34	7.1	288.2	42.8
2012:05:25	02:38	-29.8	348.8	45.2	21:36	13.5	278.9	54.2
2012:05:26	02:37	-29.9	335.3	56.7	21:37	19.5	268.7	65.9
2012:05:27	02:36	-28.8	321.7	68.4	21:39	24.9	257.5	77.9
2012:05:28	02:35	-26.3	308.2	80.4	21:40	29.5	244.8	90.2
2012:05:29	02:33	-22.6	295.0	92.7	21:42	32.7	230.7	102.9
2012:05:30	02:32	-17.7	282.2	105.5	21:43	34.3	215.3	115.9
2012:05:31	02:31	-11.9	269.7	118.6	21:44	33.9	199.2	129.4
2012:06:01	02:30	-5.4	257.4	132.1	21:45	31.5	183.1	143.3
2012:06:02	02:29	1.5	245.1	146.0	21:47	27.2	167.8	157.3
2012:06:03	02:29	8.6	232.6	160.1	21:48	21.6	153.7	171.5
2012:06:04	02:28	15.3	219.5	174.3	21:49	15.0	140.6	174.2
2012:06:05	02:27	21.3	205.7	171.5	21:50	8.0	128.5	160.3
2012:06:06	02:26	26.1	191.1	157.7	21:51	1.0	117.0	146.7
2012:06:07	02:26	29.4	175.8	144.1	21:52	-5.7	105.8	133.5
2012:06:08	02:25	31.0	160.4	131.1	21:53	-11.8	94.8	120.8
2012:06:09	02:24	30.7	145.4	118.4	21:54	-17.2	83.7	108.5
2012:06:10	02:24	29.0	131.2	106.3	21:55	-21.8	72.4	96.7
2012:06:11	02:24	25.9	118.1	94.5	21:56	-25.5	60.7	85.2
2012:06:12	02:23	21.9	106.2	83.1	21:57	-28.2	48.8	73.9
2012:06:13	02:23	17.1	95.2	71.9	21:57	-29.9	36.5	62.9
2012:06:14	02:23	11.9	85.1	60.9	21:58	-30.6	24.1	52.0
2012:06:15	02:23	6.2	75.5	50.0	21:59	-30.2	11.7	41.1
2012:06:16	02:22	0.4	66.3	39.1	21:59	-28.9	359.5	30.3
2012:06:17	02:22	-5.6	57.1	28.3	22:00	-26.6	347.6	19.4
2012:06:18	02:22	-11.6	47.8	17.4	22:00	-23.5	336.0	8.5
2012:06:19	02:22	-17.5	38.2	6.5	22:00	-19.8	324.8	3.6
2012:06:20	02:23	-23.1	27.9	5.4	22:01	-15.4	313.9	14.4
2012:06:21	02:23	-28.2	16.8	16.5	22:01	-10.6	303.3	25.9
2012:06:22	02:23	-32.5	4.5	28.0	22:01	-5.5	292.7	37.5
2012:06:23	02:23	-35.7	351.0	39.7	22:01	-0.2	282.0	49.4
2012:06:24	02:24	-37.4	336.5	51.6	22:01	5.1	271.0	61.5
2012:06:25	02:24	-37.4	321.4	63.7	22:01	10.3	259.6	73.9
2012:06:26	02:25	-35.5	306.4	76.2	22:01	15.1	247.5	86.5
2012:06:27	02:25	-31.8	292.0	88.9	22:01	19.5	234.5	99.5
2012:06:28	02:26	-26.5	278.7	101.9	22:01	22.9	220.6	112.7
2012:06:29	02:27	-19.8	266.4	115.2	22:00	25.2	205.8	126.2
2012:06:30	02:28	-12.1	255.0	128.7	22:00	26.1	190.3	139.9
2012:07:01	02:28	-3.7	244.2	142.4	22:00	25.4	174.7	153.7
2012:07:02	02:29	5.0	233.6	156.2	21:59	23.2	159.4	167.3
2012:07:03	02:30	13.7	222.8	169.8	21:59	19.7	144.8	176.5
2012:07:04	02:31	21.9	211.5	174.9	21:58	15.3	131.2	164.8
2012:07:05	02:32	29.3	199.1	162.3	21:57	10.3	118.5	151.8
2012:07:06	02:33	35.4	185.5	149.4	21:57	5.0	106.5	139.2
2012:07:07	02:34	39.7	170.6	136.8	21:56	-0.3	95.2	126.9
2012:07:08	02:35	41.9	154.8	124.6	21:55	-5.4	84.2	115.0
2012:07:09	02:37	41.9	139.0	112.8	21:54	-10.2	73.3	103.5
2012:07:10	02:38	39.9	124.1	101.3	21:53	-14.7	62.5	92.3
2012:07:11	02:39	36.2	110.9	90.1	21:52	-18.6	51.5	81.3
2012:07:12	02:40	31.1	99.3	79.1	21:51	-21.9	40.2	70.4
2012:07:13	02:42	25.1	89.2	68.2	21:50	-24.5	28.4	59.5
2012:07:14	02:43	18.4	80.3	57.3	21:49	-26.3	16.2	48.7
2012:07:15	02:44	11.1	72.2	46.4	21:48	-27.2	3.7	37.7
2012:07:16	02:46	3.4	64.5	35.5	21:46	-27.1	350.9	26.7
2012:07:17	02:47	-4.6	57.1	24.4	21:45	-25.9	338.0	15.6
2012:07:18	02:49	-12.8	49.5	13.3	21:44	-23.7	325.2	5.4
2012:07:19	02:50	-21.0	41.5	4.2	21:43	-20.6	312.7	9.2
2012:07:20	02:52	-29.1	32.5	11.5	21:41	-16.5	300.4	20.6
2012:07:21	02:53	-36.7	21.9	23.2	21:40	-11.8	288.5	32.7
2012:07:22	02:55	-43.4	9.1	35.4	21:38	-6.5	276.7	45.0
2012:07:23	02:56	-48.4	353.4	47.8	21:37	-0.9	264.9	57.6
2012:07:24	02:58	-51.0	334.8	60.4	21:35	4.8	253.0	70.3
2012:07:25	02:59	-50.4	315.3	73.2	21:34	10.3	240.7	83.2
2012:07:26	03:01	-46.5	297.2	86.2	21:32	15.5	227.8	96.3
2012:07:27	03:03	-40.1	282.1	99.4	21:31	20.0	214.2	109.6
2012:07:28	03:04	-31.8	269.9	112.6	21:29	23.5	199.7	122.9
2012:07:29	03:06	-22.3	259.8	126.0	21:27	25.6	184.5	136.2
2012:07:30	03:07	-12.1	251.2	139.4	21:26	26.2	169.0	149.5
2012:07:31	03:09	-1.6	243.5	152.7	21:24	25.1	153.6	162.6
2012:08:01	03:11	9.1	236.0	165.6	21:22	22.6	138.9	174.1
2012:08:02	03:12	19.5	228.2	175.3	21:20	19.0	125.1	169.7
2012:08:03	03:14	29.5	219.8	166.9	21:19	14.4	112.3	157.8
2012:08:04	03:15	38.7	209.8	154.8	21:17	9.4	100.4	145.8
2012:08:05	03:17	46.6	197.6	142.8	21:15	4.1	89.2	134.0
2012:08:06	03:19	52.6	182.2	131.1	21:13	-1.3	78.4	122.6
2012:08:07	03:20	56.1	163.6	119.7	21:11	-6.5	67.9	111.4
2012:08:08	03:22	56.2	143.7	108.5	21:09	-11.5	57.4	100.4
2012:08:09	03:23	53.3	125.6	97.5	21:08	-16.2	46.8	89.5
2012:08:10	03:25	48.0	110.8	86.6	21:06	-20.4	35.7	78.6
2012:08:11	03:26	41.0	99.4	75.8	21:04	-23.9	24.1	67.8
2012:08:12	03:28	33.0	90.5	64.9	21:02	-26.7	11.8	56.8
2012:08:13	03:30	24.2	83.2	53.8	21:00	-28.4	358.8	45.7
2012:08:14	03:31	14.8	76.9	42.6	20:58	-29.1	345.3	34.3
2012:08:15	03:33	5.0	71.2	31.2	20:56	-28.4	331.5	22.8
2012:08:16	03:34	-5.2	65.8	19.6	20:54	-26.4	317.6	11.4
2012:08:17	03:36	-15.6	60.2	8.4	20:52	-23.1	304.1	5.4
2012:08:18	03:37	-26.2	53.9	7.5	20:50	-18.7	291.0	15.5
2012:08:19	03:39	-36.7	46.3	19.0	20:48	-13.3	278.3	27.9
2012:08:20	03:40	-46.6	36.2	31.6	20:46	-7.3	266.1	40.7
2012:08:21	03:42	-55.4	21.7	44.5	20:44	-0.9	254.1	53.8
2012:08:22	03:43	-61.6	0.3	57.6	20:42	5.6	242.0	66.9
2012:08:23	03:45	-63.1	332.9	70.7	20:40	11.8	229.6	80.0

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:08:24	03:46	-59.2	307.6	83.9	20:38	17.6	216.7	93.1
2012:08:25	03:48	-51.5	289.6	97.0	20:36	22.5	203.0	106.2
2012:08:26	03:49	-41.7	277.6	110.2	20:34	26.1	188.5	119.3
2012:08:27	03:51	-31.0	269.1	123.2	20:32	28.3	173.3	132.2
2012:08:28	03:52	-19.8	262.6	136.1	20:30	28.8	158.0	144.9
2012:08:29	03:53	-8.5	257.2	148.8	20:28	27.6	142.9	157.4
2012:08:30	03:55	2.9	252.2	161.2	20:26	24.9	128.6	169.2
2012:08:31	03:56	14.2	247.3	172.4	20:24	20.9	115.3	174.4
2012:09:01	03:58	25.1	242.1	171.9	20:22	16.1	103.0	164.6
2012:09:02	03:59	35.6	236.0	161.0	20:20	10.8	91.7	153.2
2012:09:03	04:00	45.5	228.1	149.6	20:18	5.1	81.0	141.9
2012:09:04	04:02	54.4	217.3	138.3	20:16	-0.7	70.8	130.8
2012:09:05	04:03	61.6	201.3	127.2	20:14	-6.5	60.8	119.9
2012:09:06	04:04	65.8	178.4	116.3	20:12	-12.1	50.7	109.0
2012:09:07	04:06	65.6	151.9	105.4	20:10	-17.3	40.3	98.2
2012:09:08	04:07	61.1	129.9	94.6	20:08	-22.1	29.4	87.3
2012:09:09	04:08	53.9	114.8	83.7	20:06	-26.3	17.7	76.4
2012:09:10	04:10	45.1	104.5	72.6	20:04	-29.5	5.0	65.2
2012:09:11	04:11	35.4	97.2	61.4	20:02	-31.7	351.4	53.8
2012:09:12	04:12	25.0	91.6	49.8	20:00	-32.4	337.0	42.0
2012:09:13	04:13	14.0	86.9	37.9	19:58	-31.5	322.2	30.0
2012:09:14	04:15	2.6	82.5	25.7	19:56	-29.0	307.5	17.7
2012:09:15	04:16	-9.1	78.3	13.4	19:54	-24.8	293.3	6.2
2012:09:16	04:17	-21.1	73.6	4.6	19:52	-19.3	279.8	10.1
2012:09:17	04:18	-33.1	68.0	14.5	19:50	-12.8	267.0	22.9
2012:09:18	04:19	-44.9	60.5	27.6	19:49	-5.7	254.8	36.2
2012:09:19	04:21	-55.9	48.9	41.0	19:47	1.8	242.9	49.7
2012:09:20	04:22	-64.9	29.3	54.5	19:45	9.2	231.0	63.1
2012:09:21	04:23	-69.1	357.3	67.9	19:43	16.1	218.6	76.4
2012:09:22	04:24	-66.1	324.0	81.1	19:41	22.3	205.7	89.4
2012:09:23	04:25	-58.1	302.8	94.2	19:39	27.3	191.8	102.3
2012:09:24	04:27	-47.9	290.6	107.0	19:37	30.8	177.1	115.0
2012:09:25	04:28	-37.0	282.8	119.6	19:35	32.6	161.8	127.4
2012:09:26	04:29	-25.8	277.2	132.0	19:33	32.6	146.5	139.7
2012:09:27	04:30	-14.6	272.8	144.2	19:32	30.7	131.7	151.7
2012:09:28	04:31	-3.4	268.9	156.1	19:30	27.3	118.0	163.4
2012:09:29	04:32	7.6	265.1	167.6	19:28	22.7	105.4	174.0
2012:09:30	04:34	18.5	261.2	176.1	19:26	17.3	94.0	172.0
2012:10:01	04:35	29.0	256.8	168.1	19:24	11.3	83.5	161.4
2012:10:02	04:36	39.2	251.4	157.2	19:23	5.0	73.7	150.4
2012:10:03	04:37	48.9	244.0	146.2	19:21	-1.4	64.2	139.5
2012:10:04	04:38	57.6	233.1	135.4	19:19	-7.8	54.8	128.7
2012:10:05	04:39	64.7	216.1	124.5	19:17	-14.0	45.3	117.9
2012:10:06	04:40	68.6	190.3	113.7	19:16	-20.0	35.3	107.1
2012:10:07	04:41	67.3	161.2	102.8	19:14	-25.5	24.5	96.2
2012:10:08	04:43	61.6	139.2	91.8	19:12	-30.3	12.6	85.0
2012:10:09	04:44	53.3	125.1	80.6	19:11	-34.1	359.4	73.7
2012:10:10	04:45	43.5	115.8	69.0	19:09	-36.5	344.9	61.9
2012:10:11	04:46	32.8	109.2	57.1	19:07	-37.1	329.3	49.8
2012:10:12	04:47	21.4	104.0	44.7	19:06	-35.7	313.3	37.2
2012:10:13	04:48	9.5	99.4	32.0	19:04	-32.2	297.7	24.2
2012:10:14	04:49	-2.9	95.0	18.8	19:03	-26.7	283.2	11.0
2012:10:15	04:50	-15.5	90.4	5.8	19:01	-19.8	269.8	4.3
2012:10:16	04:51	-28.1	84.9	9.4	19:00	-11.8	257.5	17.4
2012:10:17	04:52	-40.5	77.8	23.1	18:58	-3.3	245.9	31.2
2012:10:18	04:54	-52.1	67.4	36.9	18:57	5.4	234.5	45.0
2012:10:19	04:55	-61.8	50.3	50.7	18:55	13.8	223.0	58.6
2012:10:20	04:56	-67.6	22.3	64.2	18:54	21.6	211.0	71.9
2012:10:21	04:57	-66.8	348.9	77.4	18:52	28.3	198.1	84.9
2012:10:22	04:58	-60.2	324.8	90.2	18:51	33.6	184.1	97.5
2012:10:23	04:59	-51.1	310.4	102.7	18:50	37.1	168.9	109.8
2012:10:24	05:00	-41.0	301.3	114.9	18:48	38.5	153.2	121.8
2012:10:25	05:01	-30.6	294.9	126.8	18:47	37.8	137.5	133.6
2012:10:26	05:02	-20.0	289.8	138.5	18:46	35.2	122.9	145.1
2012:10:27	05:03	-9.5	285.5	150.0	18:44	30.9	109.6	156.5
2012:10:28	05:04	0.8	281.4	161.3	18:43	25.5	97.9	167.6
2012:10:29	05:05	11.1	277.3	172.4	18:42	19.3	87.4	177.9
2012:10:30	05:07	21.1	272.7	176.0	18:41	12.5	77.9	170.0
2012:10:31	05:08	30.9	267.4	165.3	18:40	5.4	69.1	159.2
2012:11:01	05:09	40.2	260.8	154.5	18:39	-1.9	60.6	148.4
2012:11:02	05:10	48.9	251.8	143.7	18:37	-9.2	52.1	137.6
2012:11:03	05:11	56.5	239.1	132.8	18:36	-16.4	43.4	126.8
2012:11:04	05:12	62.1	220.6	122.0	18:35	-23.4	34.0	115.8
2012:11:05	05:13	64.2	196.6	110.9	18:34	-29.9	23.7	104.7
2012:11:06	05:14	61.9	172.2	99.7	18:33	-35.7	11.7	93.4
2012:11:07	05:15	55.8	153.2	88.3	18:32	-40.3	357.9	81.8
2012:11:08	05:16	47.3	139.9	76.4	18:31	-43.2	342.0	69.7
2012:11:09	05:17	37.4	130.2	64.2	18:31	-43.8	324.5	57.2
2012:11:10	05:18	26.4	122.7	51.4	18:30	-41.6	306.9	44.2
2012:11:11	05:19	14.7	116.2	38.2	18:29	-36.8	290.5	30.8
2012:11:12	05:20	2.5	110.2	24.6	18:28	-29.8	276.0	17.0
2012:11:13	05:21	-9.9	104.1	10.6	18:27	-21.2	263.4	2.9
2012:11:14	05:22	-22.2	97.2	3.6	18:27	-11.6	252.2	11.4
2012:11:15	05:24	-34.1	88.9	17.9	18:26	-1.5	241.8	25.6
2012:11:16	05:25	-45.0	77.8	32.0	18:25	8.6	231.7	39.5
2012:11:17	05:26	-54.0	62.3	45.8	18:25	18.3	221.4	53.2
2012:11:18	05:27	-59.8	40.5	59.3	18:24	27.1	210.3	66.4
2012:11:19	05:28	-60.8	14.9	72.3	18:23	34.8	197.9	79.1
2012:11:20	05:29	-57.2	352.0	84.9	18:23	40.9	183.8	91.4
2012:11:21	05:30	-50.5	335.3	97.0	18:22	44.9	167.9	103.4
2012:11:22	05:31	-42.3	323.5	108.8	18:22	46.4	150.9	115.0
2012:11:23	05:32	-33.4	314.7	120.3	18:21	45.4	134.1	126.4
2012:11:24	05:33	-24.2	307.7	131.6	18:21	42.0	118.9	137.6
2012:11:25	05:34	-14.9	301.7	142.7	18:21	36.9	105.8	148.6

Morning twilight				Evening twilight				
Date	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2012:11:26	05:35	-5.6	296.0	153.7	18:20	30.6	94.7	159.5
2012:11:27	05:36	3.7	290.5	164.6	18:20	23.4	85.2	170.4
2012:11:28	05:36	12.8	284.7	175.4	18:20	15.6	76.9	178.4
2012:11:29	05:37	21.7	278.4	173.6	18:19	7.4	69.3	167.9
2012:11:30	05:38	30.2	271.0	162.8	18:19	-0.9	62.1	157.1
2012:12:01	05:39	38.1	262.0	151.9	18:19	-9.4	55.0	146.2
2012:12:02	05:40	45.1	250.7	141.0	18:19	-17.9	47.6	135.1
2012:12:03	05:41	50.7	236.3	129.9	18:19	-26.2	39.5	124.0
2012:12:04	05:42	53.9	218.6	118.6	18:19	-34.2	30.2	112.6
2012:12:05	05:43	54.0	198.9	107.2	18:19	-41.5	18.8	101.0
2012:12:06	05:44	50.9	180.1	95.4	18:19	-47.7	4.4	89.1
2012:12:07	05:44	45.1	164.1	83.3	18:19	-51.7	346.5	76.8
2012:12:08	05:45	37.1	151.1	70.8	18:19	-52.6	325.8	64.1
2012:12:09	05:46	27.7	140.4	57.8	18:19	-49.7	305.3	50.8
2012:12:10	05:47	17.4	131.1	44.4	18:19	-43.5	287.8	37.2
2012:12:11	05:47	6.4	122.5	30.6	18:19	-34.8	273.8	23.3
2012:12:12	05:48	-4.8	114.0	16.5	18:20	-24.5	262.6	9.2
2012:12:13	05:49	-15.9	105.0	3.1	18:20	-13.4	253.2	5.8
2012:12:14	05:50	-26.3	94.9	12.3	18:20	-1.9	244.8	19.6
2012:12:15	05:50	-35.7	83.0	26.2	18:20	9.5	236.9	33.3
2012:12:16	05:51	-43.2	68.5	39.8	18:21	20.4	228.7	46.7
2012:12:17	05:52	-48.3	51.3	53.0	18:21	30.7	219.6	59.7
2012:12:18	05:52	-50.3	32.3	65.7	18:22	39.9	209.0	72.1
2012:12:19	05:53	-49.1	13.6	78.0	18:22	47.7	196.0	84.2
2012:12:20	05:53	-45.3	357.3	89.8	18:22	53.3	179.6	95.8
2012:12:21	05:54	-39.8	343.9	101.2	18:23	56.0	160.3	107.1
2012:12:22	05:54	-33.2	332.8	112.4	18:23	55.5	140.3	118.2
2012:12:23	05:55	-25.9	323.4	123.4	18:24	51.8	122.7	129.1
2012:12:24	05:55	-18.3	315.1	134.3	18:25	46.0	108.5	139.9
2012:12:25	05:55	-10.4	307.4	145.1	18:25	38.6	97.6	150.6
2012:12:26	05:56	-2.5	300.0	155.8	18:26	30.4	89.0	161.4
2012:12:27	05:56	5.4	292.5	166.4	18:26	21.6	81.9	171.8
2012:12:28	05:56	13.1	284.7	175.9	18:27	12.3	75.7	175.1
2012:12:29	05:57	20.5	276.1	170.6	18:28	2.8	70.1	165.1
2012:12:30	05:57	27.5	266.4	159.8	18:28	-6.9	64.6	154.1
2012:12:31	05:57	33.6	255.2	148.7	18:29	-16.7	59.0	142.8

Date = data nel formato aaaa/mm/gg  
Times = ore  
Morning twilights = crepuscolo mattutino  
Evening twilight = crepuscolo serale  
Alt = altezza della Luna sull'orizzonte, in °  
Az = azimut della Luna, in °  
Elong = elongazione della Luna, in °

Alt = altitude of the Moon above the horizon, in °  
Az = azimuth of the Moon, in °  
Elong = elongation of the Moon, in °

# EVENTI GEOCENTRICI <5° LUNA-PIANETI

## GEOCENTRIC EVENTS <5° MOON-PLANETS

Date	TT	Dm	Dl	r1	r2	p	e	m1	m2	tm(s)		
2012/01/02	23:54:43	4.82475	1.15454	4.573	0.003	343	109	-2.5	-11.3		Jupiter	Moon
2012/01/22	11:14:53	4.67844	1.23147	1.397	0.003	346	-11	-0.7	-6.6		Mercury	Moon
2012/01/30	12:07:00	4.36313	1.15487	5.010	0.003	344	83	-2.3	-10.6		Jupiter	Moon
2012/02/25	19:29:54	3.10742	1.15318	0.937	0.003	342	44	-4.1	-9.4		Venus	Moon
2012/02/27	04:18:14	3.71164	1.15313	5.427	0.003	345	59	-2.1	-9.9		Jupiter	Moon
2012/03/22	11:54:38	1.44062	1.15836	0.606	0.003	338	-5	4.1	-4.6		Mercury	Moon
2012/03/25	22:33:43	3.01168	1.15014	5.757	0.003	347	37	-2.0	-9.0		Jupiter	Moon
2012/03/26	19:02:34	1.82106	1.14602	0.713	0.003	171	46	-4.3	-9.4		Venus	Moon
2012/04/22	17:37:28	2.34665	1.14809	5.957	0.003	349	16	-1.9	-7.1		Jupiter	Moon
2012/05/20	05:16:02	2.03975	1.14303	1.294	0.003	352	-8	-1.4	-5.8		Mercury	Moon
2012/05/20	12:55:35	1.72554	1.14867	6.008	0.003	351	-5	-1.9	-4.6		Jupiter	Moon
2012/05/22	20:44:49	4.71024	1.15304	0.318	0.003	181	21	-3.8	-7.7		Venus	Moon
2012/06/17	08:12:24	1.11715	1.15191	5.908	0.003	354	-25	-1.9	-8.1	903.4	Jupiter	Moon
2012/06/18	00:31:54	2.05472	1.14995	0.311	0.003	356	-18	-3.5	-7.4		Venus	Moon
2012/07/10	05:18:31	4.99076	1.16997	19.871	0.003	340	-100	5.8	-11.0		Uranus	Moon
2012/07/15	15:16:18	3.81791	1.15403	0.471	0.003	358	-40	-4.5	-9.1		Venus	Moon
2012/07/15	03:02:50	0.49792	1.15606	5.669	0.003	356	-46	-2.0	-9.4	3338	Jupiter	Moon
2012/07/20	07:34:03	0.52673	1.19472	0.601	0.003	197	14	1.6	-7.0	2994	Mercury	Moon
2012/07/24	19:35:27	3.98240	1.24136	1.582	0.003	200	70	0.9	-10.4		Mars	Moon
2012/08/06	13:20:59	4.81289	1.17732	19.452	0.003	340	-126	5.8	-11.7		Uranus	Moon
2012/08/11	20:31:57	0.11029	1.15856	5.321	0.003	177	-68	-2.1	-10.2	3678	Jupiter	Moon
2012/08/13	19:51:43	0.55244	1.16934	0.695	0.003	7	-46	-4.3	-9.4	3398	Venus	Moon
2012/08/16	02:58:56	3.38169	1.19597	0.892	0.003	197	-19	-0.1	-7.7		Mercury	Moon
2012/08/22	06:44:22	2.21697	1.25462	1.752	0.002	196	60	1.0	-10.1		Mars	Moon
2012/09/02	20:29:04	4.69343	1.17954	19.160	0.003	340	-153	5.7	-12.3		Uranus	Moon
2012/09/08	11:07:30	0.62316	1.15761	4.912	0.003	179	-91	-2.3	-10.8	3110	Jupiter	Moon
2012/09/12	14:58:04	3.58234	1.19868	0.924	0.003	197	-44	-4.1	-9.4		Venus	Moon
2012/09/18	12:08:31	4.79222	1.27230	10.600	0.002	197	33	0.8	-8.9		Saturn	Moon
2012/09/19	20:35:52	0.14791	1.26954	1.894	0.002	191	51	1.1	-9.8	3383	Mars	Moon
2012/09/30	02:12:17	4.70129	1.17627	19.062	0.003	340	176	5.7	-12.6		Uranus	Moon
2012/10/05	20:59:52	0.91327	1.15406	4.509	0.003	179	-117	-2.5	-11.4	2248	Jupiter	Moon
2012/10/16	02:41:13	4.43788	1.28833	10.757	0.002	196	9	0.8	-6.1		Saturn	Moon
2012/10/17	02:09:56	1.28253	1.28780	1.176	0.002	11	22	-0.1	-8.1	315.6	Mercury	Moon
2012/10/18	13:22:38	2.03043	1.28208	2.010	0.002	4	42	1.1	-9.5		Mars	Moon
2012/10/27	06:39:51	4.80161	1.17161	19.184	0.003	340	151	5.7	-12.3		Uranus	Moon
2012/11/02	01:09:47	0.89121	1.15100	4.201	0.003	179	-145	-2.7	-12.1	2309	Jupiter	Moon
2012/11/11	14:56:29	5.08614	1.27472	1.318	0.002	198	-32	-3.9	-8.9		Venus	Moon
2012/11/12	19:04:34	4.17050	1.29346	10.725	0.002	195	-16	0.8	-7.5		Saturn	Moon
2012/11/14	10:33:40	1.03427	1.29883	0.686	0.002	8	7	1.8	-5.8	1784	Mercury	Moon
2012/11/16	09:11:41	4.02465	1.28762	2.104	0.002	356	35	1.1	-9.1		Mars	Moon
2012/11/23	11:01:31	4.86498	1.17230	19.500	0.003	340	123	5.8	-11.6		Uranus	Moon
2012/11/29	00:58:33	0.63428	1.15016	4.070	0.003	177	-175	-2.7	-12.5	3026	Jupiter	Moon
2012/12/10	10:56:15	3.92738	1.28292	10.506	0.002	194	-41	0.8	-9.5		Saturn	Moon
2012/12/11	13:25:57	1.58388	1.29497	1.468	0.002	188	-26	-3.9	-8.5		Venus	Moon
2012/12/12	00:34:25	1.11208	1.29757	1.160	0.002	185	-19	-0.4	-7.9	1788	Mercury	Moon
2012/12/20	17:07:17	4.77026	1.18201	19.940	0.003	340	96	5.8	-11.0		Uranus	Moon
2012/12/26	00:14:49	0.41541	1.15075	4.161	0.003	176	154	-2.7	-12.3	3393	Jupiter	Moon

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione del pianeta

R1 = distanza in U.A. del pianeta dalla Terra

R2 = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del pianeta

m2 = magnitudine della Luna

tm = se presente, il pianeta viene occultato massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation of the planet

R1 = distance in A.U. of the planet from the Earth

R2 = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

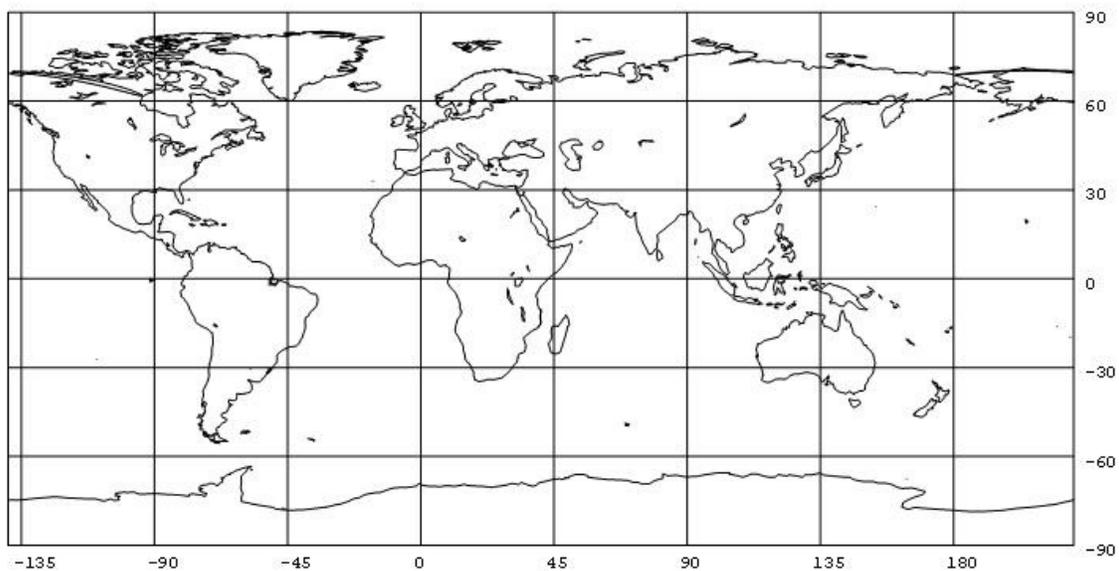
e = elongation, in °

m1 = magnitude of the planet

m2 = magnitude of the Moon

tm = if present, the planet is occulted maximum for x seconds

### Occultation of Jupiter, Magnitude -1.9, on 2012 Jun 17

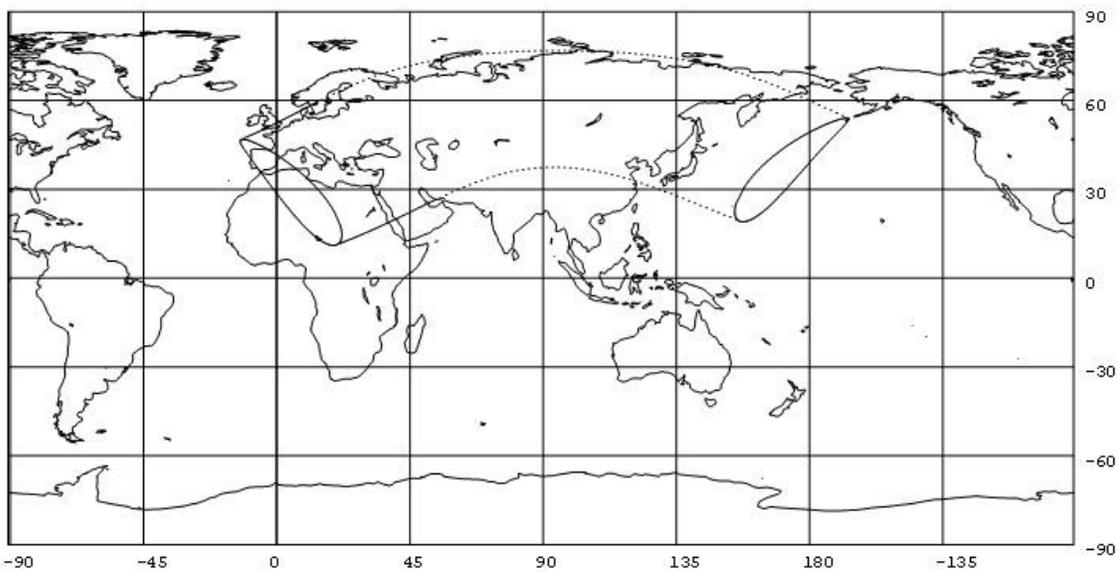


Occult4.09.0

UT of conjunction = 8h 26.7m

Non visibile - Not visible

### Occultation of Jupiter, Magnitude -1.9, on 2012 Jul 15



Occult4.09.0

UT of conjunction = 3h 6.3m

Luna: % illuminazione 15-, elongazione solare 46°

Moon: % illumination 15-, solar elongation 46°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o
DZ Annaba	1	15	25	1	64	-66N	55	66	-0.6	+1.6
EG Abu Simbel	0	56	54	11	72	-51S	119	130	+0.6	-0.2
EG Alexandria	1	0	45	13	73	-79S	90	102	+0.1	+1.0
EG Aswan	0	57	19	13	73	-55S	115	126	+0.5	+0.0
EG Asyut	0	57	37	12	73	-67S	103	114	+0.3	+0.5
EG Cairo	0	59	57	14	74	-75S	95	106	+0.2	+0.9
EG El Arish	1	1	22	16	75	-74S	95	106	+0.3	+0.9

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
EG El-Gora	1	1	27	16	75	-74S	96	107	+0.3	+0.9	
EG El-Tor	0	59	7	15	74	-67S	103	114	+0.4	+0.6	
EG Embaba	0	59	53	13	74	-75S	95	106	+0.2	+0.9	
EG Hurghada	0	58	36	15	74	-64S	106	117	+0.4	+0.4	
EG Luxor	0	57	35	13	73	-60S	109	120	+0.4	+0.3	
EG Mersa-Matruh	1	0	48	11	72	-83S	87	98	+0.0	+1.1	
EG Port Said	1	1	10	15	75	-77S	93	104	+0.2	+1.0	
EG St. Catherine	0	59	29	15	74	-68S	102	113	+0.4	+0.6	
LY Benghazi	1	2	45	6	69	-88N	78	89	-0.3	+1.2	
LY Buattifel	0	58	45	5	69	-82S	88	99	-0.2	+0.9	
LY Dahra	1	0	26	3	68	-88S	82	93	-0.3	+1.1	
LY El Beida	1	3	10	7	70	-88N	78	89	-0.2	+1.3	
LY Giallo	0	58	43	5	69	-82S	87	99	-0.2	+0.9	
LY Hon	1	0	44	1	67	-89S	81	92	-0.4	+1.0	
LY Kufra	0	55	19	4	69	-68S	102	113	+0.0	+0.5	
LY Marsa Brega	1	0	56	4	68	-88S	81	92	-0.3	+1.1	
LY Ras Lanouf V 40	1	1	24	4	68	-90S	80	91	-0.3	+1.1	
LY Tripoli	1	6	13	1	66	-80N	70	81	-0.5	+1.3	
LY Zella 74	0	59	44	2	67	-86S	83	94	-0.3	+1.0	
SD Dongola	0	58	7	9	71	-39S	131	142	+0.8	-1.1	
SD El Fasher	1	5	54	4	70	-13S	157	168	+3.4	-8.1	
SD Port Sudan	1	6	47	17	74	-23S	147	158	+2.5	-3.8	
SY Palmyra	1	6	25	22	79	-78S	92	103	+0.4	+1.1	
TN Bizerte	1	14	54	2	65	-66N	56	67	-0.6	+1.7	
TN Bordj El Amri	1	13	57	2	65	-68N	57	68	-0.6	+1.6	
TN Djerba	1	9	7	0	65	-75N	65	76	-0.5	+1.4	
TN Monastir	1	11	56	2	66	-71N	60	71	-0.6	+1.6	
TN Sfax	1	10	24	1	65	-73N	63	74	-0.6	+1.5	
TN Tunis	1	14	0	2	66	-68N	57	68	-0.6	+1.6	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
DZ Ain Oussera	2	5	45	6	69	65N	285	296	-0.1	+0.7	
DZ Algier	2	6	38	7	69	63N	287	298	+0.0	+0.7	
DZ Annaba	2	6	46	10	72	67N	282	293	+0.1	+0.9	
DZ Bejaja	2	6	37	8	70	65N	285	296	+0.0	+0.8	
DZ Biskra	2	5	0	8	70	70N	280	291	+0.0	+0.8	
DZ Blida	2	6	30	6	69	63N	287	298	+0.0	+0.7	
DZ Bou Saada	2	5	31	7	69	67N	283	294	-0.1	+0.8	
DZ Bou Sfer	2	6	16	3	67	61N	289	300	-0.1	+0.6	
DZ Boufarik	2	6	32	6	69	63N	287	298	+0.0	+0.7	
DZ Constantine	2	6	14	9	71	67N	282	293	+0.0	+0.8	
DZ Djanet	1	53	25	5	69	80S	249	260	-0.3	+1.3	
DZ Ech-Cheliff	2	6	22	5	68	62N	288	299	-0.1	+0.7	
DZ El Golea	2	1	44	3	68	77N	272	283	-0.2	+0.9	
DZ Ghardaia	2	3	7	5	69	74N	276	287	-0.2	+0.8	
DZ Ghriess	2	5	48	4	67	63N	287	298	-0.1	+0.7	
DZ Hassi-Messaoud	2	2	9	6	69	78N	272	283	-0.1	+0.9	
DZ Illizi	1	56	21	5	69	87S	256	267	-0.3	+1.1	
DZ In Salah	1	58	50	1	67	85N	264	275	-0.3	+0.9	
DZ Jijel	2	6	42	9	71	65N	284	295	+0.0	+0.8	
DZ Laghouat	2	4	22	5	68	70N	280	291	-0.1	+0.8	
DZ Mecheria	2	4	40	2	67	67N	283	294	-0.2	+0.7	
DZ Oran	2	6	11	3	67	61N	288	299	-0.1	+0.6	
DZ Ouargla	2	2	29	6	69	77N	273	284	-0.1	+0.9	
DZ Relizane	2	6	7	4	67	62N	287	298	-0.1	+0.7	
DZ Setif	2	6	8	8	70	66N	284	295	+0.0	+0.8	
DZ Sidi Bel Abbes	2	5	52	3	67	62N	287	298	-0.1	+0.6	
DZ Tamanrasset	1	53	8	1	68	80S	250	261	-0.4	+1.2	
DZ Tebessa	2	5	29	10	71	71N	279	290	+0.0	+0.9	
DZ Telergma	2	6	5	9	71	67N	282	293	+0.0	+0.8	
DZ Tiaret	2	5	43	5	68	64N	286	297	-0.1	+0.7	
DZ Tilremp	2	3	38	5	68	72N	278	289	-0.1	+0.8	
DZ Timimoun	2	1	17	1	66	78N	272	283	-0.3	+0.8	
DZ Tlemcen	2	5	54	2	66	62N	288	299	-0.2	+0.6	
DZ Touggourt	2	3	28	7	70	75N	275	286	-0.1	+0.9	
TD Abeche	1	25	59	5	70	25S	195	206	-1.3	+3.7	
TD Faya-Largeau	1	38	43	8	71	47S	217	228	-0.6	+2.2	
EG Abu Simbel	1	43	25	21	75	43S	213	224	-0.4	+2.8	
EG Alexandria	2	2	53	26	80	73S	243	254	+0.2	+1.8	
EG Aswan	1	47	18	24	77	47S	217	228	-0.2	+2.6	
EG Asyut	1	54	47	24	78	60S	230	241	+0.0	+2.2	
EG Cairo	2	1	12	27	80	68S	238	249	+0.2	+2.0	
EG El Arish	2	3	45	-10	29	82	67S	237	248	+0.3	+2.1
EG El-Gora	2	3	49	-10	30	82	67S	237	248	+0.3	+2.1
EG El-Tor	1	57	32	27	80	59S	229	240	+0.1	+2.3	
EG Embaba	2	1	3	26	80	68S	238	249	+0.2	+2.0	
EG Hurghada	1	55	10	27	79	56S	226	237	+0.0	+2.4	
EG Luxor	1	51	34	25	78	53S	223	234	-0.1	+2.4	
EG Mersa-Matruh	2	2	31	24	79	77S	247	258	+0.2	+1.7	
EG Port Said	2	3	42	-11	28	82	70S	240	251	+0.3	+2.0
EG St. Catherine	1	58	38	-12	28	80	60S	230	241	+0.2	+2.2
LY Benghazi	2	2	28	18	76	87S	257	268	+0.1	+1.4	
LY Buattifel	1	57	45	18	76	77S	246	257	+0.0	+1.6	
LY Dahra	1	58	42	15	74	83S	253	264	+0.0	+1.4	
LY El Beida	2	3	41	20	77	87S	257	268	+0.2	+1.4	
LY Ghadames	2	0	8	8	71	86N	264	275	-0.1	+1.1	
LY Ghat	1	54	15	6	70	81S	251	262	-0.3	+1.3	
LY Giallo	1	57	30	17	75	77S	247	258	+0.0	+1.6	
LY Hon	1	58	17	13	73	85S	255	266	-0.1	+1.3	
LY Kufra	1	49	38	16	74	62S	232	243	-0.2	+1.9	
LY Marsa Brega	2	0	0	16	75	84S	254	265	+0.0	+1.4	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
LY Ras Lanouf V 40	2	0	9	16	75	85S	255	266	+0.0	+1.4	
LY Sebha	1	55	40	10	72	81S	251	262	-0.2	+1.3	
LY Tripoli	2	2	46	12	73	83N	267	277	+0.0	+1.1	
LY Zella 74	1	57	33	14	74	82S	252	263	-0.1	+1.4	
MA Al Hociema	2	6	25	1	65	59N	291	302	-0.2	+0.5	
MA Nador	2	6	14	1	65	60N	290	301	-0.2	+0.6	
MA Oujda	2	5	49	2	66	62N	288	299	-0.2	+0.6	
NE Dirkou	1	44	16	4	69	60S	230	241	-0.5	+1.7	
SD Dongola	1	34	19	17	73	31S	201	212	-0.8	+3.4	
SD El Fasher	1	16	19	7	70	6S	176	187	+9.9	+9.9	
SD Port Sudan	1	27	49	22	75	14S	184	195	-2.1	+6.4	
SY Palmyra	2	12	53	-3	35	88	71S	241	252	+0.6	+2.1
TN Bizerte	2	7	17	12	73	68N	281	292	+0.1	+0.9	
TN Bordj El Amri	2	6	49	12	73	70N	280	291	+0.1	+0.9	
TN Djerba	2	4	2	11	72	78N	272	283	+0.0	+1.0	
TN El Borma	2	1	51	9	71	81N	268	279	-0.1	+1.0	
TN Gabes	2	4	2	11	72	77N	273	284	+0.0	+1.0	
TN Gafsa	2	4	34	10	72	74N	276	286	+0.0	+1.0	
TN Monastir	2	5	56	12	73	73N	277	288	+0.1	+1.0	
TN Remada	2	2	24	10	72	81N	269	280	+0.0	+1.1	
TN Sfax	2	4	54	11	73	76N	274	285	+0.0	+1.0	
TN Tozeur	2	4	9	9	71	75N	275	286	+0.0	+0.9	
TN Tunis	2	6	58	12	73	70N	280	291	+0.1	+0.9	

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AF Herat	1	36	55	8	48	96	-40S	130	141	+2.6	-1.2
AF Jalalabad	2	4	39	20	60	109	-19S	150	162	+4.8	-6.8
AF Kabul	1	57	54	18	58	106	-25S	145	156	+3.9	-4.3
AF Kunduz	1	51	39	17	55	107	-39S	131	142	+2.8	-1.6
AF Maimama	1	41	27	11	50	101	-43S	127	138	+2.5	-1.0
AF Mazar-I-Sharif	1	46	57	14	53	105	-42S	128	139	+2.6	-1.1
AF Sheberghan	1	43	35	13	52	103	-45S	125	136	+2.5	-0.8
AF Shindand	1	38	9	8	48	95	-36S	134	145	+2.8	-1.8
AF Taluqan	1	53	5	17	56	108	-39S	131	142	+2.9	-1.7
CN Beijing	3	37	34	69	52	252	-37S	133	144	+1.2	-3.3
CN Dalian	3	46	26	72	47	259	-37S	133	144	+0.9	-3.2
CN Hailar	3	21	16	61	49	241	-71S	98	109	+1.3	-1.5
CN Harbin	3	34	54	66	44	254	-64S	105	116	+1.1	-1.9
CN Hotan	2	28	34	33	69	137	-19S	151	162	+4.2	-7.3
CN Huhhot	3	28	41	66	56	243	-37S	133	144	+1.5	-3.4
CN Jiamusi	3	36	58	64	40	257	-71S	99	110	+0.9	-1.7
CN Kashi	2	6	56	26	62	125	-42S	128	139	+2.8	-1.6
CN Mudanjiang	3	40	16	67	41	259	-64S	106	117	+0.9	-1.9
CN Qingdao	3	55	37	75	46	263	-23S	147	158	+0.6	-4.5
CN Shijiazhuang	3	42	7	71	53	253	-27S	143	154	+1.1	-4.4
CN Taiyuan	3	42	21	70	54	252	-21S	149	160	+1.0	-5.2
CN Tianjin	3	41	39	71	51	254	-34S	136	147	+1.1	-3.6
CN Urumqi	2	29	55	39	66	163	-50S	120	131	+2.4	-1.4
CN Yanji	3	43	29	68	41	261	-58S	111	122	+0.9	-2.1
CN Yantai	3	51	37	74	46	262	-30S	140	151	+0.7	-3.8
GE Sukhumi	1	19	33	-6	28	86	-86N	75	87	+0.4	+1.7
GE Tbilisi	1	19	17	-4	30	88	-87S	82	93	+0.6	+1.6
JP Akita	3	57	16	66	30	273	-59S	111	122	+0.4	-2.0
JP Aomori	3	55	19	65	30	272	-63S	107	118	+0.5	-1.9
JP Asahikawa	3	51	8	63	30	271	-72S	97	108	+0.5	-1.6
JP Ashiya	4	8	53	74	35	273	-27S	143	154	+0.1	-3.7
JP Atsugi	4	6	7	68	29	276	-45S	125	136	+0.2	-2.4
JP Chitose	3	52	10	64	30	271	-69S	100	112	+0.5	-1.7
JP Fukue	4	14	2	75	36	274	-17S	153	164	-0.2	-4.8
JP Fukui	4	3	32	70	32	274	-43S	127	138	+0.3	-2.6
JP Fukuoka	4	10	0	74	35	273	-25S	145	156	+0.1	-3.8
JP Gifu	4	5	40	70	31	275	-41S	128	140	+0.3	-2.6
JP Hachijojima	4	12	12	68	27	278	-37S	133	144	+0.0	-2.7
JP Hachinoe	3	56	1	65	29	273	-63S	107	118	+0.5	-1.9
JP Hakodate	3	53	28	65	30	272	-66S	104	115	+0.5	-1.8
JP Hamamatsu	4	7	35	69	30	276	-40S	130	141	+0.2	-2.7
JP Hanamaki	3	58	2	66	29	274	-59S	111	122	+0.4	-2.0
JP Hiroshima	4	7	26	73	34	274	-32S	137	149	+0.2	-3.2
JP Hofu	4	8	25	73	34	273	-29S	141	152	+0.2	-3.5
JP Hyakuri	4	4	38	67	28	276	-48S	121	132	+0.3	-2.3
JP Iki	4	9	19	74	36	273	-24S	145	157	+0.1	-3.9
JP Iruma	4	5	10	68	29	276	-46S	124	135	+0.3	-2.4
JP Iwakuni	4	8	10	73	34	273	-30S	140	151	+0.2	-3.4
JP Izumo	4	4	26	72	34	272	-36S	134	145	+0.3	-3.0
JP Kagoshima	4	17	31	74	33	275	-16S	154	165	-0.4	-4.8
JP Kanazawa	4	2	56	70	32	274	-44S	125	137	+0.3	-2.5
JP Kanoya	4	19	44	74	32	276	-13S	157	168	-0.5	-5.2
JP Kisarazu	4	6	21	68	28	277	-45S	125	136	+0.2	-2.4
JP Kitakyushu	4	9	6	74	35	273	-27S	143	154	+0.1	-3.7
JP Kochi	4	10	24	72	32	275	-30S	140	151	+0.1	-3.3
JP Kohnan	4	7	13	72	33	274	-34S	135	146	+0.2	-3.1
JP Kumamoto	4	12	51	74	34	274	-22S	148	159	-0.1	-4.1
JP Matsumoto	4	3	59	69	30	275	-45S	124	135	+0.3	-2.5
JP Matsushima	4	0	2	66	29	275	-56S	114	125	+0.4	-2.0
JP Matsuyama	4	9	20	73	33	274	-29S	140	152	+0.1	-3.4
JP Memanbetsu	3	51	39	62	28	272	-75S	95	106	+0.5	-1.6
JP Miho	4	4	19	72	34	273	-37S	133	144	+0.3	-2.9
JP Minami Tori Shima	4	31	1	53	9	289	-23S	147	158	-0.8	-3.0
JP Misawa	3	55	43	65	30	273	-63S	107	118	+0.5	-1.9
JP Miyake Jima	4	9	40	68	28	277	-40S	130	141	+0.1	-2.6
JP Miyazaki	4	17	0	74	33	276	-17S	152	164	-0.3	-4.5

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
JP Monbetsu	3	50	35	62	29	271	-75S	95	106	+0.5	-1.6
JP Nagasaki	4	12	40	75	35	274	-20S	150	161	-0.1	-4.3
JP Nagoya	4	6	3	70	31	275	-41S	129	140	+0.3	-2.7
JP Nakashibetsu	3	52	31	62	28	273	-74S	95	106	+0.5	-1.6
JP Nanki-Shirahama	4	10	14	71	31	276	-33S	137	148	+0.1	-3.1
JP Nyutabaru	4	16	10	74	33	275	-19S	151	162	-0.2	-4.4
JP Obihiro	3	53	4	63	29	273	-71S	99	110	+0.5	-1.7
JP Oita	4	10	29	73	34	274	-26S	144	155	+0.1	-3.7
JP Okayama	4	6	41	72	33	274	-35S	135	146	+0.2	-3.0
JP Oki Island	4	2	24	72	34	272	-40S	130	141	+0.4	-2.8
JP Osaka	4	7	33	71	31	275	-37S	133	144	+0.2	-2.9
JP Oshima	4	7	47	68	28	277	-42S	127	139	+0.2	-2.5
JP Ozuki	4	8	17	74	35	273	-28S	142	153	+0.2	-3.6
JP Rishiri Island	3	47	51	63	31	269	-75S	94	105	+0.6	-1.6
JP Sapporo	3	52	13	64	30	271	-69S	100	112	+0.5	-1.7
JP Sendai	4	0	29	66	29	275	-55S	115	126	+0.4	-2.1
JP Shimofusa	4	5	26	67	28	276	-47S	123	134	+0.2	-2.4
JP Shonai	3	58	38	67	30	273	-56S	114	125	+0.4	-2.1
JP Takamatsu	4	8	19	72	32	274	-33S	137	148	+0.2	-3.1
JP Tanegashima	4	24	11	73	31	277	-7S	163	174	-1.0	-6.3
JP Tateyama	4	7	23	68	28	277	-44S	126	137	+0.2	-2.5
JP Tokachi	3	52	47	63	29	272	-71S	99	110	+0.5	-1.7
JP Tokushima	4	8	41	71	32	275	-34S	136	147	+0.2	-3.1
JP Tokyo	4	5	36	67	28	276	-47S	123	134	+0.2	-2.3
JP Tottori	4	4	32	71	33	273	-38S	131	143	+0.3	-2.8
JP Toyama	4	2	33	69	31	274	-46S	124	135	+0.3	-2.4
JP Tsuiki	4	9	40	74	35	273	-26S	144	155	+0.1	-3.7
JP Tsushima	4	7	11	75	37	272	-26S	144	155	+0.2	-3.8
JP Wakkanai	3	47	57	62	31	269	-76S	93	104	+0.6	-1.6
JP Yaizu	4	7	31	69	29	276	-41S	129	140	+0.2	-2.6
JP Yakushima	4	25	44	73	31	277	-5S	165	176	-1.3	-7.0
JP Yamagata	3	59	42	67	29	274	-55S	114	126	+0.4	-2.1
JP Yamaguchi	4	8	45	74	35	273	-28S	142	153	+0.1	-3.6
JP Yokota	4	5	23	68	29	276	-46S	124	135	+0.2	-2.4
JP Zama	4	5	58	68	29	276	-45S	125	136	+0.2	-2.4
KZ Alma-Ata	2	5	53	27	60	131	-56S	114	125	+2.2	-0.4
KR Busan	4	3	52	74	37	270	-30S	140	151	+0.3	-3.5
KR Cheju	4	10	15	76	38	271	-17S	153	164	-0.1	-4.9
KR Chinhae	4	3	51	74	38	270	-29S	141	152	+0.3	-3.6
KR Chongju	3	58	5	74	40	267	-35S	135	146	+0.5	-3.3
KR Chunchon	3	54	36	73	40	266	-40S	130	141	+0.6	-3.0
KR Jhunju	4	0	35	75	40	268	-30S	139	150	+0.4	-3.5
KR Kangnung	3	55	46	73	39	267	-40S	129	140	+0.6	-2.9
KR Kimhae	4	3	47	74	38	270	-30S	140	151	+0.3	-3.5
KR Kunsan	4	0	17	75	40	268	-30S	140	151	+0.5	-3.6
KR Kwangju	4	3	19	75	39	269	-27S	143	154	+0.3	-3.9
KR Kyungju	4	1	38	74	38	270	-33S	137	148	+0.4	-3.3
KR Mokpo	4	4	37	76	40	269	-24S	146	157	+0.3	-4.1
KR Osan	3	56	36	74	41	267	-36S	134	145	+0.6	-3.2
KR Pohang	4	1	22	74	38	270	-34S	136	147	+0.4	-3.2
KR Pyongtaek	3	57	1	74	41	267	-35S	135	146	+0.6	-3.2
KR Pyongyang	3	49	50	72	43	263	-42S	128	139	+0.8	-2.9
KR Sachon	4	3	48	75	38	270	-28S	142	153	+0.3	-3.7
KR Seoul	3	54	59	73	41	266	-37S	133	144	+0.6	-3.1
KR Seoul East	3	55	32	73	41	266	-37S	133	144	+0.6	-3.1
KR Sokch'O	3	54	24	73	40	266	-42S	128	139	+0.6	-2.8
KR Suwon	3	56	6	74	41	266	-36S	134	145	+0.6	-3.2
KR Taegu	4	1	17	74	38	269	-33S	137	148	+0.4	-3.3
KR Ulsan	4	2	35	74	38	270	-32S	138	149	+0.4	-3.3
KR Wonju	3	56	6	73	40	267	-38S	132	143	+0.6	-3.0
KR Yangku	3	54	41	73	40	266	-41S	129	140	+0.6	-2.9
KR Yecheon	3	58	48	74	39	268	-35S	135	146	+0.5	-3.2
KR Yeosu	4	4	40	75	39	270	-26S	144	155	+0.3	-3.8
MN Ulan Bator	3	3	41	55	58	219	-62S	108	119	+1.7	-1.5
PK Chitral	2	2	25	21	60	112	-28S	142	153	+3.6	-3.6
PK Gilgit	2	12	3	25	64	118	-22S	148	159	+4.2	-5.7
PK Parachinar	2	6	1	20	60	108	-15S	155	166	+5.9	-9.7
PK Saidu Sharif	2	10	48	23	62	113	-17S	153	164	+5.2	-8.4
PK Skardu	2	23	55	28	67	123	-10S	160	171	+9.9	+9.9
RU Abakan	2	33	9	39	57	176	-82S	88	99	+1.6	+0.2
RU Aktyubinsk	1	42	58	11	42	109	-85N	75	86	+0.9	+1.8
RU Ashkhabad	1	28	37	5	42	96	-61S	109	120	+1.6	+0.5
RU Astrakhan	1	28	58	2	34	95	-85N	75	86	+0.6	+1.8
RU Baku	1	21	11	-1	34	91	-79S	91	102	+0.9	+1.3
RU Balkhash	2	2	23	25	56	131	-70S	100	111	+1.8	+0.5
RU Barnaul	2	20	33	33	56	157	-84S	86	97	+1.6	+0.7
RU Bishkek	2	0	27	24	58	125	-58S	112	123	+2.2	-0.2
RU Blagoveschensk	3	28	15	61	43	249	-79S	90	102	+1.1	-1.4
RU Bratsk	2	48	56	45	53	199	-89S	81	92	+1.4	-0.1
RU Bryansk	1	40	33	0	27	90	-57N	46	57	+0.0	+2.5
RU Bukhara	1	39	55	12	49	105	-58S	111	122	+1.9	+0.3
RU Chardzhou	1	38	6	11	48	103	-57S	112	124	+1.9	+0.2
RU Chelyabinsk	1	56	21	17	44	121	-77N	66	77	+0.8	+2.0
RU Chernovtsk	1	29	50	-9	19	80	-59N	48	59	-0.2	+2.3
RU Chimkent	1	50	6	18	54	115	-61S	109	120	+1.9	+0.2
RU Chita	3	8	37	55	52	226	-77S	92	104	+1.4	-1.1
RU Dnepropetrovsk	1	29	12	-4	25	87	-68N	57	69	+0.1	+2.2
RU Donetsk	1	28	51	-3	27	88	-71N	61	72	+0.2	+2.1
RU Dushanbe	1	49	17	17	54	109	-48S	122	133	+2.4	-0.7
RU Dzhezkazgan	1	51	10	18	50	119	-79S	91	102	+1.4	+1.1
RU Gomel	1	39	5	-2	24	87	-55N	44	56	-0.1	+2.5
RU Irkutsk	2	54	52	50	56	208	-76S	93	105	+1.6	-0.7
RU Kaliningrad	1	48	28	-4	20	82	-38N	27	38	-0.5	+2.8
RU Kazan	1	49	20	10	36	107	-66N	55	67	+0.4	+2.4

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
RU Kemerovo	2	25	38	35	55	164	-88S	81	92	+1.5	+0.7
RU Khabarovsk	3	38	23	62	37	260	-79S	90	101	+0.8	-1.5
RU Kharkov	1	32	9	-7	21	82	-57N	47	58	-0.2	+2.3
RU Kiev	1	33	49	-5	23	85	-59N	49	60	-0.1	+2.3
RU Krasnodar	1	22	58	-5	27	87	-79N	69	80	+0.2	+1.9
RU Krasnovodsk	1	23	30	1	37	93	-74S	96	107	+1.1	+1.1
RU Kurgan	2	0	11	20	46	127	-79N	69	80	+1.0	+1.8
RU Kustanay	1	54	15	17	45	121	-83N	73	84	+1.0	+1.8
RU Lvov	1	34	0	-8	19	80	-53N	43	54	-0.3	+2.4
RU Magadan	3	37	5	48	26	266	-59N	48	59	+0.6	-0.7
RU Magnetiogorsk	1	50	17	14	42	115	-79N	69	80	+0.8	+2.0
RU Makhachkala	1	22	46	-1	33	91	-87S	83	94	+0.7	+1.6
RU Mineralnye Vody	1	22	43	-3	30	89	-85N	74	86	+0.4	+1.8
RU Minsk	1	43	8	-3	23	86	-48N	38	49	-0.2	+2.6
RU Moscow	1	46	34	3	29	96	-55N	44	55	+0.0	+2.6
RU Nizhnevartovsk	2	20	43	28	47	151	-72N	61	72	+1.0	+1.7
RU Nukus	1	34	10	8	44	102	-73S	97	108	+1.3	+1.1
RU Odessa	1	25	6	-8	21	82	-67N	57	68	-0.1	+2.1
RU Okha	3	37	48	56	31	263	-82N	71	82	+0.7	-1.1
RU Omsk	2	7	58	25	50	138	-86N	76	87	+1.2	+1.4
RU Orenburg	1	44	33	11	40	109	-80N	70	81	+0.7	+2.0
RU Osh	1	57	28	22	58	119	-51S	119	130	+2.4	-0.6
RU Perm	1	58	8	15	40	118	-66N	56	67	+0.6	+2.3
RU Petropavlovsk	3	46	40	49	21	278	-69N	59	70	+0.4	-0.9
RU Polyarny	3	2	28	43	42	213	-60N	50	61	+0.9	+0.4
RU Rostov	1	27	33	-3	28	89	-75N	65	76	+0.2	+2.1
RU Salekhard	2	24	55	24	41	143	-51N	40	51	+0.5	+2.5
RU Samara	1	44	53	9	37	105	-71N	61	72	+0.5	+2.2
RU Samarkand	1	44	43	15	52	108	-55S	115	126	+2.1	-0.1
RU Semiplatinsk	2	13	21	30	57	147	-77S	93	104	+1.7	+0.6
RU Shevchenko	1	26	55	2	36	95	-86S	84	95	+0.8	+1.6
RU Simferopol	1	22	13	-8	23	83	-74N	63	74	+0.1	+2.0
RU Sochi	1	20	12	-6	27	86	-83N	73	84	+0.3	+1.8
RU St. Petersburg	1	59	8	4	27	94	-37N	27	38	-0.3	+3.0
RU Stavropol	1	23	59	-3	29	89	-82N	71	83	+0.4	+1.9
RU Surgut	2	18	27	27	46	147	-69N	59	70	+0.9	+1.8
RU Sverdlovsk	1	58	43	17	43	122	-73N	62	73	+0.8	+2.1
RU Syktyvkar	2	5	8	14	37	117	-53N	43	54	+0.3	+2.7
RU Termez	1	46	35	15	53	106	-45S	125	136	+2.5	-0.9
RU Tselinograd	2	0	22	23	52	130	-85S	85	96	+1.4	+1.2
RU Tver	1	49	48	4	29	96	-50N	40	51	+0.0	+2.7
RU Ufa	1	50	33	13	40	113	-74N	64	75	+0.7	+2.1
RU Ulan-Ude	3	0	5	52	55	215	-75S	95	106	+1.6	-0.9
RU Uralsk	1	40	37	8	37	104	-78N	67	79	+0.6	+2.1
RU Vitebsk	1	46	0	0	25	89	-48N	38	49	-0.2	+2.7
RU Vladivostok	3	44	39	67	38	263	-62S	107	119	+0.8	-2.0
RU Volgograd	1	32	6	1	32	94	-76N	66	77	+0.4	+2.1
RU Voronezh	1	37	29	1	29	93	-65N	54	65	+0.2	+2.3
RU Yakutsk	3	19	32	49	37	241	-67N	57	68	+0.9	-0.5
RU Yerevan	1	16	41	-6	29	87	-84S	85	96	+0.6	+1.5
RU Yuzhno-Sakhalinsk	3	46	13	61	30	269	-81S	89	100	+0.6	-1.5
SG Bratislava	1	32	47		14	75	-50N	39	50	-0.5	+2.3
SG Kosice	1	32	13	-10	17	77	-53N	42	53	-0.4	+2.3
SG Malacky	1	33	22		14	75	-49N	38	50	-0.5	+2.4
SG Piešťany	1	33	33	-12	15	75	-49N	39	50	-0.5	+2.4
SG Poprad	1	33	34	-10	16	77	-51N	40	51	-0.4	+2.4
SG Sliac	1	33	0	-11	15	76	-51N	40	51	-0.4	+2.4
SG Trenčín	1	34	3	-11	15	76	-49N	38	49	-0.5	+2.4
SG Zilina	1	34	39	-11	16	76	-49N	38	49	-0.5	+2.4
TR Adana	1	8	37		20	79	-87S	82	94	+0.2	+1.4
TR Adana	1	8	33		20	79	-87S	82	94	+0.2	+1.4
TR Afyon	1	10	40		17	77	-84N	73	84	+0.0	+1.6
TR Akhisar	1	11	0		15	75	-81N	70	81	-0.1	+1.6
TR Ankara	1	13	0		20	79	-83N	72	84	+0.1	+1.7
TR Ankara Acc/fir/fic	1	12	52		19	79	-82N	72	83	+0.0	+1.7
TR Antalya	1	7	54		17	76	-88N	78	89	+0.0	+1.5
TR Aydin	1	9	24		15	75	-83N	73	84	-0.1	+1.6
TR Balikesir	1	12	20		16	76	-79N	69	80	-0.1	+1.7
TR Bandirma	1	13	33		16	76	-78N	67	78	-0.1	+1.7
TR Batman	1	11	51	-10	26	83	-83S	87	98	+0.5	+1.4
TR Bursa	1	13	17		17	77	-79N	68	80	-0.1	+1.7
TR Canakkale	1	13	25		15	75	-76N	66	77	-0.2	+1.7
TR Corlu	1	15	0		17	77	-76N	65	76	-0.1	+1.8
TR Dalaman	1	7	39		15	75	-86N	76	87	+0.0	+1.5
TR Denizli	1	9	12		16	76	-85N	74	86	+0.0	+1.6
TR Diyarbakir	1	11	23	-10	25	82	-84S	86	97	+0.4	+1.4
TR Elazig	1	12	0	-10	24	82	-87S	83	94	+0.4	+1.5
TR Eregli	1	15	0		19	79	-79N	69	80	+0.0	+1.8
TR Erzincan	1	13	44	-9	25	83	-89S	81	92	+0.3	+1.5
TR Erzurum	1	14	43	-8	26	84	-88S	82	93	+0.4	+1.5
TR Eskisehir	1	12	26		18	78	-81N	71	82	+0.0	+1.7
TR Eskissehir	1	12	29		18	78	-81N	71	82	+0.0	+1.7
TR Gaziantep	1	9	5		22	80	-85S	85	96	+0.3	+1.4
TR Iskenderun	1	8	11		21	79	-85S	84	95	+0.3	+1.4
TR Isparta	1	9	12		17	76	-86N	75	86	+0.0	+1.5
TR Istanbul	1	14	37		17	77	-77N	67	78	-0.1	+1.8
TR Istanbul	1	14	37		18	77	-77N	67	78	-0.1	+1.8
TR Izmir	1	10	36		15	75	-80N	70	81	-0.1	+1.6
TR Kars	1	16	32	-6	28	86	-87S	83	94	+0.5	+1.5
TR Kastamonu	1	15	11	-11	21	80	-81N	71	82	+0.1	+1.7
TR Kayseri	1	11	13		21	80	-89N	78	90	+0.2	+1.5
TR Konya	1	9	37		18	78	-87N	77	88	+0.1	+1.5
TR Kutahya	1	11	51		17	77	-81N	71	82	+0.0	+1.7
TR Malatya	1	11	21	-11	23	81	-88S	82	93	+0.3	+1.5

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
TR Merzifon	1	14	33	-11	22	81	-84N	74	85	+0.2	+1.7
TR Mus	1	13	13	-9	26	84	-84S	85	96	+0.5	+1.4
TR Nevsehir	1	11	4		20	79	-88N	77	89	+0.2	+1.6
TR Niniop	1	16	36	-10	22	82	-81N	71	82	+0.1	+1.8
TR Samsun	1	15	27	-10	23	82	-84N	74	85	+0.2	+1.7
TR Sanliurfa	1	9	46		23	81	-84S	86	97	+0.4	+1.3
TR Siirt	1	12	15	-9	26	83	-82S	87	99	+0.5	+1.3
TR Sivas	1	13	8	-11	23	81	-88N	78	89	+0.2	+1.6
TR Sivrihisar	1	11	54		18	78	-83N	72	84	+0.0	+1.6
TR Tokat	1	13	51	-11	23	81	-86N	76	87	+0.2	+1.6
TR Topel	1	14	6		18	78	-79N	68	80	+0.0	+1.7
TR Trabzon	1	15	56	-8	26	84	-89N	78	89	+0.3	+1.6
TR Usak	1	10	40		16	76	-83N	72	83	+0.0	+1.6
TR Van	1	13	39	-8	28	85	-82S	88	99	+0.6	+1.4
TR Yalova	1	14	4		18	77	-78N	68	79	-0.1	+1.8
TR Yenisehir	1	13	17		17	77	-79N	69	80	-0.1	+1.7
TR Zonguldak	1	15	28		20	80	-79N	69	80	+0.0	+1.8
UZ Tashkent	1	49	35	18	54	113	-57S	112	124	+2.1	+0.0

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AF Herat	2	28	28	18	58	106	33S	203	214	+0.6	+4.7
AF Jalalabad	2	32	5	26	65	117	15S	185	196	+9.9	+9.9
AF Kabul	2	33	55	25	64	116	21S	191	202	+0.1	+7.7
AF Kunduz	2	46	4	27	65	124	35S	205	216	+1.1	+4.8
AF Maimama	2	38	20	22	61	114	38S	208	219	+1.0	+4.4
AF Mazar-I-Sharif	2	44	18	26	64	121	38S	208	219	+1.1	+4.4
AF Sheberghan	2	43	2	24	63	119	40S	210	221	+1.1	+4.2
AF Shindand	2	24	22	17	58	104	29S	199	210	+0.4	+5.3
AF Taluqan	2	47	20	28	66	126	35S	205	216	+1.1	+4.9
CN Beijing	4	38	57	71	40	264	61S	231	241	+1.6	+0.5
CN Dalian	4	46	2	70	35	269	62S	232	243	+1.4	+0.3
CN Hailar	4	37	34	62	37	259	87N	263	274	+0.9	-1.3
CN Harbin	4	47	10	62	31	269	89S	258	269	+0.8	-1.1
CN Hotan	3	0	37	39	73	157	20S	190	201	+1.0	+9.4
CN Huhhot	4	31	16	71	45	258	58S	228	239	+1.8	+0.8
CN Jiamusi	4	48	25	59	28	271	84N	265	276	+0.5	-1.4
CN Kashi	3	9	8	38	70	155	42S	212	223	+1.7	+4.0
CN Mudanjiang	4	50	45	61	28	272	89S	258	269	+0.6	-1.1
CN Qingdao	4	41	59	73	37	270	48S	218	229	+1.9	+1.5
CN Shijiazhuang	4	33	49	73	43	263	50S	220	231	+2.0	+1.5
CN Taiyuan	4	28	25	74	46	262	44S	214	225	+2.3	+2.4
CN Tianjin	4	39	38	72	40	266	58S	227	238	+1.7	+0.7
CN Urumqi	3	45	1	52	65	207	58S	228	239	+2.1	+1.9
CN Yanji	4	52	21	62	28	273	84S	254	265	+0.7	-0.9
CN Yantai	4	44	59	71	35	270	55S	225	236	+1.6	+0.8
GE Sukhumi	2	30	25	6	41	99	90S	259	270	+0.9	+1.7
GE Tbilisi	2	32	7	8	44	101	82S	252	263	+1.0	+1.8
JP Akita	5	0	56	56	18	282	86S	256	267	+0.3	-0.9
JP Aomori	4	59	59	55	18	282	90S	259	270	+0.3	-1.0
JP Asahikawa	4	56	53	53	18	282	81N	268	279	+0.1	-1.3
JP Ashiya	4	55	43	66	25	279	54S	224	235	+1.3	+0.8
JP Atsugi	5	3	26	57	17	284	73S	243	254	+0.5	-0.4
JP Chitose	4	57	53	54	18	282	84N	266	277	+0.2	-1.2
JP Fukue	4	51	34	69	28	278	45S	215	226	+1.8	+1.8
JP Fukui	5	1	21	60	20	281	71S	241	252	+0.7	-0.3
JP Fukuoka	4	55	12	66	26	279	53S	223	234	+1.3	+0.9
JP Gifu	5	1	56	60	19	282	69S	239	250	+0.7	-0.2
JP Hachiojima	5	4	3	58	16	285	65S	235	246	+0.6	+0.0
JP Hachinoe	5	0	22	55	17	283	90S	260	271	+0.2	-1.0
JP Hakodate	4	58	53	55	18	282	88N	262	273	+0.2	-1.1
JP Hamamatsu	5	2	35	59	18	283	68S	238	249	+0.7	-0.1
JP Hanamaki	5	1	24	55	17	283	86S	256	267	+0.3	-0.9
JP Hiroshima	4	58	40	64	23	280	60S	230	241	+1.0	+0.3
JP Hofu	4	56	58	65	24	279	57S	227	237	+1.2	+0.6
JP Hyakuri	5	3	33	56	16	284	76S	246	257	+0.4	-0.5
JP Iki	4	54	28	67	26	278	52S	222	233	+1.4	+1.0
JP Iruma	5	3	15	57	17	283	74S	244	255	+0.5	-0.4
JP Iwakuni	4	57	48	64	24	280	58S	228	239	+1.1	+0.5
JP Izumo	4	58	46	63	23	280	64S	234	245	+0.9	+0.1
JP Kagoshima	4	53	15	67	26	280	44S	214	225	+1.7	+1.9
JP Kanazawa	5	1	23	60	20	281	72S	242	253	+0.6	-0.3
JP Kanoya	4	52	34	68	26	280	41S	211	222	+1.9	+2.3
JP Kisarazu	5	3	41	57	17	284	73S	243	254	+0.5	-0.4
JP Kitakyushu	4	56	3	66	25	279	55S	225	236	+1.3	+0.7
JP Kochi	4	59	4	63	22	281	58S	228	239	+1.0	+0.5
JP Kohnan	4	59	38	63	22	281	62S	232	243	+0.9	+0.2
JP Kumamoto	4	55	0	67	25	279	50S	220	231	+1.4	+1.2
JP Matsumoto	5	2	23	59	19	283	73S	243	254	+0.6	-0.4
JP Matsushima	5	2	18	55	17	284	84S	254	265	+0.3	-0.8
JP Matsuyama	4	58	8	64	23	280	58S	228	238	+1.1	+0.5
JP Memanbetsu	4	56	47	52	17	283	79N	271	282	+0.1	-1.4
JP Miho	4	59	6	63	23	280	65S	235	246	+0.9	+0.0
JP Misawa	5	0	11	55	17	283	90N	260	271	+0.2	-1.1
JP Miyake Jima	5	3	50	58	17	284	69S	238	249	+0.6	-0.1
JP Miyazaki	4	54	35	67	25	280	46S	216	227	+1.6	+1.7
JP Monbetsu	4	56	7	53	17	282	79N	271	282	+0.1	-1.4
JP Nagasaki	4	53	43	67	26	279	48S	218	229	+1.5	+1.4
JP Nagoya	5	2	0	60	19	282	69S	239	250	+0.7	-0.2
JP Nakashibetsu	4	57	16	52	16	284	79N	271	282	+0.1	-1.4
JP Nanki-Shirahama	5	0	45	62	21	282	61S	231	242	+0.9	+0.3
JP Nyutabaru	4	54	55	66	25	280	47S	217	228	+1.5	+1.5





Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
TR Tokat	2	22	6	0	36	92	89S	258	269	+0.8	+1.7
TR Topel	2	18	33	-5	30	88	83N	267	278	+0.6	+1.4
TR Trabzon	2	26	3	3	39	96	86S	256	267	+0.9	+1.7
TR Usak	2	15	4	-7	29	86	87N	262	273	+0.5	+1.5
TR Van	2	24	22	4	42	96	76S	245	256	+0.9	+2.0
TR Yalova	2	18	2	-5	30	87	83N	267	278	+0.6	+1.4
TR Yenisehir	2	17	31	-5	30	87	84N	266	277	+0.6	+1.4
TR Zonguldak	2	21	0	-3	32	90	84N	266	277	+0.7	+1.5
UZ Tashkent	3	3	22	31	65	140	55S	225	236	+1.6	+2.8

#### Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AL Tirana	1	17	30		11	72	-67N	56	68	-0.4	+1.9
AT Graz	1	30	57		12	73	-50N	40	51	-0.5	+2.3
AT Innsbruck	1	33	59		10	71	-45N	35	46	-0.6	+2.4
AT Klagenfurt	1	30	46		11	72	-50N	39	50	-0.5	+2.3
AT Klagenfurt	1	30	45		11	72	-50N	39	50	-0.5	+2.3
AT Langenlebarn	1	33	42		14	74	-48N	38	49	-0.5	+2.4
AT Linz	1	34	34		12	73	-46N	36	47	-0.6	+2.4
AT Salzburg	1	34	13		12	72	-46N	35	46	-0.6	+2.4
AT Vienna	1	32	58		14	74	-49N	38	50	-0.5	+2.3
AT Wels	1	34	32		12	73	-46N	35	47	-0.6	+2.4
AT Wiener Neustadt Ost	1	32	30		13	74	-49N	39	50	-0.5	+2.3
AT Zeltweg	1	31	49		12	72	-49N	38	50	-0.5	+2.3
BE Antwerp	1	49	57		10	69	-25N	14	25	-1.1	+3.2
BE Beauvechain	1	48	17		10	69	-27N	16	27	-1.0	+3.0
BE Bertrix	1	45	18		9	69	-30N	20	31	-0.9	+2.8
BE Brasschaat	1	50	22		10	69	-24N	14	25	-1.1	+3.2
BE Brussels	1	49	0		10	69	-26N	15	27	-1.0	+3.1
BE Charleroi	1	47	42		9	69	-27N	17	28	-1.0	+3.0
BE Chievres	1	48	41		9	68	-26N	15	27	-1.0	+3.1
BE Florennes	1	46	53		9	69	-28N	18	29	-1.0	+2.9
BE Kleine Brogel	1	48	49		10	70	-27N	16	27	-1.0	+3.1
BE Koksijde	1	51	39		9	68	-22N	11	22	-1.2	+3.4
BE Kortrijk-Vevelgem	1	50	7		9	68	-24N	13	25	-1.1	+3.2
BE Liege	1	47	16		10	69	-28N	18	29	-1.0	+2.9
BE Ostend	1	51	46		9	68	-22N	11	22	-1.2	+3.4
BE Sint-Truiden	1	47	57		10	69	-27N	17	28	-1.0	+3.0
BE Ursel	1	50	53		9	69	-23N	13	24	-1.1	+3.3
BE Weelde	1	50	4		10	70	-25N	15	26	-1.1	+3.2
BE Zoersel	1	49	52		10	69	-25N	15	26	-1.1	+3.1
BE Zutendaal	1	48	3		10	70	-28N	17	28	-1.0	+3.0
BA Banja Luka	1	25	33		12	73	-57N	46	57	-0.5	+2.1
BA Mostar	1	21	54		11	72	-61N	50	62	-0.4	+2.0
BA Sarajevo	1	22	48		12	73	-60N	50	61	-0.4	+2.0
BG Bourgas	1	17	42		17	77	-72N	62	73	-0.1	+1.9
BG Gorna Orechovica	1	19	7		16	77	-69N	59	70	-0.2	+1.9
BG Plovdiv	1	17	12		15	76	-71N	60	71	-0.2	+1.9
BG Sofia	1	18	47		14	75	-68N	57	68	-0.3	+1.9
BG Stara Zagora	1	17	38		16	76	-71N	60	71	-0.2	+1.9
BG Varna	1	18	55		18	78	-71N	61	72	-0.1	+1.9
CH Alpnach	1	35	16		8	69	-42N	32	43	-0.7	+2.4
CH Altenrhein	1	35	40		9	70	-42N	32	43	-0.7	+2.4
CH Bern	1	35	47		8	68	-41N	31	42	-0.7	+2.4
CH Buochs	1	35	16		8	69	-42N	32	43	-0.7	+2.4
CH Dubendorf	1	36	7		9	69	-42N	31	42	-0.7	+2.4
CH Emmen	1	35	37		9	69	-42N	31	43	-0.7	+2.4
CH Geneva	1	35	14		7	67	-42N	31	42	-0.8	+2.4
CH Grenchen	1	36	30		8	68	-41N	30	41	-0.7	+2.4
CH Interlaken	1	34	56		8	68	-42N	32	43	-0.7	+2.4
CH Les Eplatures	1	36	44		8	68	-40N	30	41	-0.8	+2.4
CH Lugano	1	32	40		8	68	-45N	35	46	-0.7	+2.3
CH Meiringen	1	34	56		8	68	-43N	32	43	-0.7	+2.4
CH Mollis	1	35	2		9	69	-43N	32	43	-0.7	+2.4
CH Payerne	1	36	3		8	68	-41N	30	42	-0.8	+2.4
CH Raron	1	34	6		8	68	-43N	33	44	-0.7	+2.3
CH Saanen	1	34	57		8	68	-42N	32	43	-0.7	+2.4
CH Samedan	1	33	15		9	69	-45N	35	46	-0.7	+2.3
CH Sion	1	34	15		7	68	-43N	33	44	-0.7	+2.3
CH Turtmann	1	34	11		8	68	-43N	33	44	-0.7	+2.3
CH Ulrichen	1	34	14		8	68	-43N	33	44	-0.7	+2.3
CH Zurich	1	36	21		9	69	-41N	31	42	-0.7	+2.4
CY Akrotiri	1	4	59		17	76	-84S	85	97	+0.2	+1.3
CY Larnaca	1	5	27		18	77	-84S	85	97	+0.2	+1.3
CY Paphos	1	5	3		17	76	-85S	85	96	+0.1	+1.3
CZ Caslav	1	38	2	-11	14	75	-43N	33	44	-0.6	+2.5
CZ Ceske Budejovice	1	36	9		13	73	-45N	34	45	-0.6	+2.4
CZ Chotebor	1	37	15	-11	14	75	-44N	34	45	-0.6	+2.5
CZ Hradec Kralove	1	38	34	-11	15	75	-43N	33	44	-0.6	+2.5
CZ Karlovy Vary	1	40	12	-12	13	73	-40N	29	40	-0.6	+2.6
CZ Kunovice	1	34	44	-11	15	75	-48N	37	48	-0.5	+2.4
CZ Line	1	38	38	-12	13	73	-42N	31	42	-0.6	+2.5
CZ Mnichovo Hradiste	1	39	47	-11	14	75	-42N	31	42	-0.6	+2.6
CZ Namest	1	35	45	-12	14	75	-46N	36	47	-0.5	+2.4
CZ Ostrava	1	36	3	-10	16	76	-47N	37	48	-0.5	+2.4
CZ Pardubice	1	38	1	-11	14	75	-44N	33	44	-0.6	+2.5
CZ Prague	1	39	7	-11	14	74	-42N	31	42	-0.6	+2.5
CZ Praha	1	38	59	-11	14	74	-42N	31	43	-0.6	+2.5
CZ Prerov	1	35	44	-11	15	76	-47N	36	48	-0.5	+2.4
CZ Pribram	1	38	13	-12	13	74	-42N	32	43	-0.6	+2.5
CZ Sobeslav	1	36	41	-12	13	74	-44N	34	45	-0.6	+2.5

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o	
CZ Turany	1	35	25	-11	14	75	-47N	36	47	-0.5	+2.4
CZ Vodochody	1	39	20	-11	14	74	-42N	31	42	-0.6	+2.5
DE Aachen	1	47	6		10	70	-29N	18	29	-0.9	+2.9
DE Aalen-Heidenheim	1	38	22		11	71	-40N	30	41	-0.7	+2.5
DE Allendorf	1	45	32	-12	12	71	-32N	21	33	-0.8	+2.8
DE Altenburg	1	42	31	-11	13	74	-37N	27	38	-0.7	+2.7
DE Anklam	1	49	41	-7	16	77	-31N	21	32	-0.7	+3.0
DE Arnsberg	1	47	28	-12	12	71	-29N	19	30	-0.9	+2.9
DE Augsburg	1	37	2		11	71	-42N	31	42	-0.7	+2.5
DE Baden-Baden	1	39	54		10	70	-38N	27	38	-0.8	+2.6
DE Bamberg	1	40	49		12	72	-38N	28	39	-0.7	+2.6
DE Barth	1	51	58	-7	16	76	-28N	18	29	-0.8	+3.1
DE Baumholder	1	42	53		10	70	-34N	23	35	-0.8	+2.7
DE Bautzen	1	41	46	-10	15	75	-39N	29	40	-0.6	+2.6
DE Bayreuth	1	40	30		12	72	-39N	28	39	-0.7	+2.6
DE Berlin	1	45	38	-9	15	75	-35N	25	36	-0.7	+2.8
DE Biberach	1	37	4		10	70	-41N	31	42	-0.7	+2.5
DE Borkum	1	55	30	-9	13	72	-20N	9	21	-1.2	+3.7
DE Braunschweig	1	47	41	-10	13	73	-31N	21	32	-0.8	+2.9
DE Bremen	1	51	25	-10	13	73	-26N	15	27	-1.0	+3.2
DE Bremerhaven	1	53	7	-9	13	73	-24N	13	25	-1.0	+3.3
DE Brueckeberg	1	48	47	-10	13	73	-29N	18	29	-0.9	+3.0
DE Brueggen	1	48	16		11	70	-28N	17	28	-1.0	+3.0
DE Buechel	1	44	30		10	70	-32N	22	33	-0.9	+2.8
DE Burg Feuerstein	1	40	22		12	72	-39N	28	39	-0.7	+2.6
DE Celle	1	48	53	-10	13	73	-29N	19	30	-0.9	+3.0
DE Coburg	1	41	41		12	72	-37N	27	38	-0.7	+2.6
DE Cochstedt	1	45	41	-10	14	74	-34N	23	34	-0.8	+2.8
DE Coleman	1	41	41		10	70	-36N	25	36	-0.8	+2.6
DE Cologne	1	46	21		11	70	-30N	20	31	-0.9	+2.9
DE Cottbus	1	43	36	-9	15	76	-38N	27	38	-0.6	+2.7
DE Dahlemer Binz	1	45	37		10	70	-31N	20	31	-0.9	+2.8
DE Dessau	1	45	2	-10	14	74	-35N	24	35	-0.7	+2.8
DE Diepholz	1	50	24	-10	13	72	-27N	16	27	-0.9	+3.1
DE Donaueschingen	1	37	36		9	69	-40N	29	41	-0.7	+2.5
DE Dortmund	1	47	50	-12	11	71	-29N	18	30	-0.9	+3.0
DE Dresden	1	42	5	-10	14	75	-39N	28	39	-0.6	+2.6
DE Duesseldorf	1	47	56		11	70	-28N	18	29	-0.9	+3.0
DE Egelsbach	1	42	37		11	71	-35N	24	36	-0.8	+2.7
DE Eggebeck	1	56	10	-8	15	75	-21N	11	22	-1.1	+3.6
DE Eggenfelden	1	35	48		12	72	-44N	33	45	-0.6	+2.4
DE Eisenach	1	44	0	-11	12	72	-35N	24	35	-0.8	+2.7
DE Eisenhuettenstadt	1	44	26	-9	15	76	-37N	26	38	-0.6	+2.7
DE Emden	1	54	11	-10	13	72	-22N	11	22	-1.1	+3.5
DE Erding	1	36	6		11	72	-43N	33	44	-0.6	+2.4
DE Erfurt	1	43	37	-11	13	73	-35N	25	36	-0.7	+2.7
DE Essen	1	48	7	-12	11	71	-28N	18	29	-0.9	+3.0
DE Fassberg	1	49	45	-9	14	74	-29N	18	29	-0.9	+3.0
DE Flensburg	1	56	37	-8	15	75	-21N	10	21	-1.1	+3.6
DE Frankfurt	1	42	52		11	71	-35N	24	35	-0.8	+2.7
DE Freiburg	1	38	14		9	69	-39N	29	40	-0.8	+2.5
DE Friedrichshafen	1	36	10		10	70	-42N	31	43	-0.7	+2.4
DE Fritzlar	1	45	16	-12	12	72	-33N	22	33	-0.8	+2.8
DE Fuerstenfeldbruck	1	36	16		11	71	-43N	32	43	-0.7	+2.4
DE Geilenkirchen	1	47	39		10	70	-28N	18	29	-0.9	+3.0
DE Giebelstadt	1	40	47		11	71	-38N	27	38	-0.7	+2.6
DE Grafenwoehr	1	39	33		12	72	-40N	29	40	-0.7	+2.6
DE Guetersloh	1	48	24	-11	12	72	-29N	18	29	-0.9	+3.0
DE Hahn	1	43	43		10	70	-33N	23	34	-0.8	+2.7
DE Halle	1	44	23	-10	14	74	-35N	25	36	-0.7	+2.7
DE Hamburg	1	52	8	-9	14	74	-26N	16	27	-0.9	+3.2
DE Hamburg	1	51	58	-9	14	74	-26N	16	27	-0.9	+3.2
DE Hanau	1	42	55		11	71	-35N	24	35	-0.8	+2.7
DE Hannover	1	48	47	-10	13	73	-29N	19	30	-0.9	+3.0
DE Hassfurt	1	41	21		12	72	-37N	27	38	-0.7	+2.6
DE Heidelberg	1	41	7		10	70	-37N	26	37	-0.8	+2.6
DE Heringsdorf	1	49	28	-7	16	77	-32N	21	32	-0.7	+3.0
DE Hildesheim	1	47	45	-10	13	73	-31N	20	31	-0.8	+2.9
DE Hof	1	41	8	-12	13	73	-38N	28	39	-0.7	+2.6
DE Hohenfels	1	38	25		12	72	-41N	30	42	-0.7	+2.5
DE Hohn	1	54	51	-8	14	75	-23N	12	23	-1.0	+3.4
DE Holzdorf	1	44	11	-10	14	75	-36N	26	37	-0.7	+2.7
DE Hopsten	1	50	24	-11	12	72	-26N	16	27	-1.0	+3.1
DE Ingolstadt	1	37	21		11	72	-42N	31	42	-0.7	+2.5
DE Itzehoe	1	53	44	-8	14	74	-24N	14	25	-1.0	+3.3
DE Jena	1	42	54	-11	13	73	-36N	26	37	-0.7	+2.7
DE Jever	1	53	57	-9	13	73	-23N	12	23	-1.1	+3.4
DE Kamenz	1	42	18	-10	14	75	-39N	28	39	-0.6	+2.7
DE Kamp	1	48	52	-12	11	71	-27N	17	28	-1.0	+3.0
DE Karlsruhe	1	40	18		10	70	-37N	27	38	-0.8	+2.6
DE Kassel	1	46	1	-11	12	72	-32N	21	32	-0.8	+2.8
DE Kiel	1	54	26	-8	15	75	-24N	13	24	-1.0	+3.4
DE Kitzingen	1	40	52		11	71	-38N	27	38	-0.7	+2.6
DE Koblenz	1	44	30		11	70	-32N	22	33	-0.8	+2.8
DE Koethen	1	44	54	-10	14	74	-35N	24	35	-0.7	+2.8
DE Kyritz	1	47	56	-9	15	75	-32N	22	33	-0.8	+2.9
DE Laage	1	51	1	-8	15	76	-29N	18	29	-0.8	+3.1
DE Laarbruch	1	49	29	-12	11	70	-26N	16	27	-1.0	+3.1
DE Landsberg	1	36	11		11	71	-43N	32	43	-0.7	+2.4
DE Laupheim	1	37	14		10	70	-41N	31	42	-0.7	+2.5
DE Lechfeld	1	36	29		11	71	-42N	32	43	-0.7	+2.4
DE Leer	1	53	33	-10	13	72	-23N	12	23	-1.1	+3.4
DE Leipzig	1	43	53	-10	14	74	-36N	25	36	-0.7	+2.7
DE Lemwerder	1	51	53	-10	13	73	-25N	15	26	-1.0	+3.2

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
DE Leutkirch	1	36	16		10	70	-42N	32	43	-0.7	+2.4
DE Luebeck	1	52	1	-8	15	75	-27N	16	27	-0.9	+3.2
DE Magdeburg	1	46	8	-10	14	74	-33N	23	34	-0.8	+2.8
DE Mainz	1	43	2		11	70	-34N	24	35	-0.8	+2.7
DE Mannheim	1	41	25		10	70	-36N	26	37	-0.8	+2.6
DE Meinerzhagen	1	46	38		11	71	-30N	20	31	-0.9	+2.9
DE Memmingen	1	36	26		10	70	-42N	32	43	-0.7	+2.4
DE Mendig	1	44	48		10	70	-32N	21	33	-0.9	+2.8
DE Mengen	1	37	12		10	70	-41N	30	41	-0.7	+2.5
DE Moenchengladbach	1	48	0		11	70	-28N	18	29	-0.9	+3.0
DE Muehlhausen	1	43	57	-11	13	74	-36N	25	36	-0.7	+2.7
DE Muenster/osnabrueck	1	49	37	-11	12	72	-27N	17	28	-0.9	+3.1
DE Munich	1	36	17		11	71	-43N	32	44	-0.6	+2.4
DE Neubrandenburg	1	43	22	-10	14	74	-37N	26	37	-0.7	+2.7
DE Neuburg	1	37	33		11	71	-41N	31	42	-0.7	+2.5
DE Niederstetten	1	40	9		11	71	-38N	28	39	-0.7	+2.6
DE Noervenich	1	46	40		11	70	-30N	19	30	-0.9	+2.9
DE Norderney	1	55	17	-9	13	73	-21N	10	21	-1.2	+3.6
DE Nordholz	1	53	55	-9	14	74	-23N	13	24	-1.1	+3.4
DE Nuernberg	1	39	37		12	72	-39N	29	40	-0.7	+2.6
DE Oberpfaffenhofen	1	35	57		11	71	-43N	33	44	-0.7	+2.4
DE Paderborn	1	47	13	-11	12	72	-30N	20	31	-0.9	+2.9
DE Parchim	1	49	55	-8	15	75	-30N	19	30	-0.8	+3.0
DE Preschen	1	42	57	-9	15	75	-38N	28	39	-0.6	+2.7
DE Ramstein	1	42	4		10	70	-35N	24	36	-0.8	+2.7
DE Rechlin-Laerz	1	48	50	-8	15	76	-31N	21	32	-0.8	+2.9
DE Rendsburg	1	54	28	-8	14	74	-23N	13	24	-1.0	+3.4
DE Rheine-Brentlange	1	50	24	-11	12	72	-26N	16	27	-1.0	+3.1
DE Riesa	1	42	46	-10	14	74	-38N	27	38	-0.7	+2.7
DE Rosenthal	1	40	5		12	72	-39N	29	40	-0.7	+2.6
DE Roth	1	38	53		12	72	-40N	30	41	-0.7	+2.5
DE Rothenburg/ol	1	41	57	-10	15	75	-39N	29	40	-0.6	+2.6
DE Saarbruecken	1	41	52		10	69	-35N	24	36	-0.8	+2.6
DE Schleswig	1	55	22	-8	15	75	-22N	12	23	-1.1	+3.5
DE Schoenhagen	1	45	24	-9	15	75	-35N	25	36	-0.7	+2.8
DE Schwaebisch Hall	1	39	35		11	71	-39N	28	39	-0.7	+2.6
DE Siegerland	1	45	8		11	71	-32N	22	33	-0.8	+2.8
DE Soest	1	43	22	-10	14	75	-37N	27	38	-0.7	+2.7
DE Spangdahlem	1	44	15		10	70	-32N	22	33	-0.9	+2.8
DE Speyer	1	41	2		10	70	-36N	26	37	-0.8	+2.6
DE Stadtlohn	1	50	1	-11	12	71	-26N	16	27	-1.0	+3.1
DE Stendal	1	47	34	-9	14	74	-32N	21	33	-0.8	+2.9
DE Straubing	1	37	10		12	72	-42N	32	43	-0.6	+2.5
DE Strausberg	1	45	56	-9	15	76	-35N	25	36	-0.7	+2.8
DE Stuttgart	1	38	53		10	70	-39N	29	40	-0.7	+2.5
DE Suhl	1	42	40	-10	14	75	-38N	27	38	-0.7	+2.7
DE Trier	1	43	52		10	70	-33N	22	33	-0.9	+2.7
DE Vilseck	1	39	30		12	72	-40N	29	40	-0.7	+2.6
DE Vilshofen	1	36	6		12	72	-44N	33	45	-0.6	+2.4
DE Westerland	1	58	28	-8	14	74	-18N	7	18	-1.3	+4.0
DE Wiesbaden	1	43	6		11	71	-34N	24	35	-0.8	+2.7
DE Wilhelmshaven	1	53	40	-9	13	73	-23N	13	24	-1.1	+3.4
DE Wittmundhafen	1	54	14	-9	13	73	-22N	12	23	-1.1	+3.5
DE Worms	1	41	54		10	70	-36N	25	36	-0.8	+2.6
DE Wunstorf	1	49	1	-10	13	73	-29N	18	29	-0.9	+3.0
DE Zweibruecken	1	41	37		10	69	-35N	25	36	-0.8	+2.6
DK Aalborg	2	6	22	-5	17	78	-9N	359	10	-2.5	+6.4
DK Aarhus	2	1	2	-6	16	77	-17N	6	17	-1.4	+4.2
DK Billund	2	0	43	-7	15	76	-16N	5	16	-1.5	+4.3
DK Copenhagen	1	56	36	-6	16	77	-23N	13	24	-1.0	+3.5
DK Esbjerg	2	0	41	-7	15	75	-15N	5	16	-1.5	+4.4
DK Gronholt	1	57	35	-6	17	78	-22N	12	23	-1.0	+3.5
DK Karup	2	3	22	-6	16	76	-12N	2	13	-1.9	+5.1
DK Kolding	1	59	15	-7	15	75	-18N	7	18	-1.3	+4.0
DK Krusa-Padborg	1	57	7	-7	15	75	-20N	10	21	-1.2	+3.7
DK Laeso	2	4	52	-4	17	78	-13N	2	13	-1.8	+5.1
DK Lindtorp	2	5	28	-6	16	76	-9N	358	9	-2.7	+6.6
DK Mariibo	1	54	16	-7	16	76	-25N	14	26	-0.9	+3.3
DK Odense	1	58	7	-7	16	76	-20N	9	20	-1.2	+3.7
DK Ronne	1	52	35	-6	17	78	-29N	19	30	-0.8	+3.1
DK Sindal	2	8	4	-4	17	79	-7N	357	8	-3.4	+8.1
DK Skive	2	4	44	-6	16	77	-11N	0	11	-2.2	+5.6
DK Skrydstrup	1	58	28	-7	15	75	-19N	8	19	-1.3	+3.9
DK Soenderborg	1	56	51	-7	15	75	-21N	10	21	-1.1	+3.6
DK Stauning	2	3	17	-6	15	76	-12N	1	12	-2.0	+5.3
DK Vaerlose	1	57	1	-6	17	78	-23N	12	23	-1.0	+3.5
DK Vandel	2	0	28	-7	15	76	-16N	6	17	-1.4	+4.2
DK Vesthimmerland	2	5	49	-5	17	77	-10N	359	10	-2.4	+6.2
EE Armari Air Force Base	1	59	51	1	24	89	-31N	21	32	-0.5	+3.2
EE Kardla	1	59	41	1	23	88	-30N	19	30	-0.6	+3.3
EE Kuressaare	1	57	27	0	23	87	-32N	21	32	-0.5	+3.2
EE Parnu	1	57	4	1	24	88	-34N	23	34	-0.5	+3.1
EE Tallinn-Ulemiste Internationa	2	0	1	2	24	90	-31N	21	32	-0.5	+3.2
EE Tartu-Ulenurme	1	55	48	1	25	90	-37N	26	37	-0.4	+3.0
ES Barcelona	1	27	33		1	63	-50N	39	50	-0.8	+2.0
ES Gerona	1	28	15		2	63	-49N	38	49	-0.8	+2.0
ES Menorca	1	23	11		1	63	-55N	45	56	-0.7	+1.9
ES Pamplona	1	33	44		0	61	-42N	31	42	-0.9	+2.2
ES Reus	1	27	58		0	62	-49N	39	50	-0.8	+2.0
ES San Luis	1	23	9		1	63	-55N	45	56	-0.7	+1.9
ES San Sebastian	1	35	9		0	61	-40N	30	41	-0.9	+2.2
ES Seo De Urgel	1	30	16		1	63	-46N	36	47	-0.8	+2.1
FI Eura	2	7	37	3	24	90	-22N	11	22	-0.8	+3.9
FI Halli	2	8	28	4	25	93	-24N	13	24	-0.7	+3.7

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
FI Hameenkyro	2	9	10	3	24	91	-21N	11	22	-0.8	+4.0
FI Hanko	2	2	25	2	24	89	-28N	17	28	-0.6	+3.4
FI Helsinki	2	2	38	3	25	91	-29N	19	30	-0.5	+3.3
FI Hyvinkaa	2	4	6	3	25	91	-28N	17	28	-0.6	+3.4
FI Immola	2	4	10	5	27	95	-32N	21	32	-0.4	+3.3
FI Joensuu	2	8	38	6	27	97	-28N	18	29	-0.4	+3.5
FI Jyvaskyla	2	9	56	5	26	94	-23N	13	24	-0.7	+3.8
FI Kajaani	2	16	3	7	27	98	-19N	9	20	-0.8	+4.3
FI Kauhajoki	2	13	6	4	24	92	-16N	6	17	-1.2	+4.7
FI Kauhava	2	15	29	5	25	93	-14N	4	15	-1.4	+5.1
FI Kikala	2	4	11	2	24	90	-27N	16	27	-0.6	+3.5
FI Kitee	2	6	45	6	27	97	-31N	20	31	-0.4	+3.4
FI Kruunupyyl	2	18	55	6	25	94	-10N	360	11	-2.0	+6.6
FI Kuopio	2	10	52	6	27	96	-25N	14	25	-0.6	+3.7
FI Kuusamo	2	22	49	9	28	102	-13N	3	14	-1.3	+5.7
FI Lappeenranta	2	3	49	4	26	94	-31N	21	32	-0.4	+3.3
FI Mariehamn	2	5	48	1	22	87	-21N	11	22	-0.9	+3.9
FI Menkijarvi	2	14	4	5	25	93	-16N	6	17	-1.1	+4.7
FI Mikkeli	2	6	25	5	26	94	-28N	18	29	-0.5	+3.5
FI Nummela	2	3	21	2	24	90	-28N	17	29	-0.6	+3.4
FI Oulu	2	22	42	7	27	98	-8N	358	9	-2.6	+8.3
FI PattiJoki	2	22	24	7	26	97	-8N	357	8	-2.9	+9.0
FI Piikajarvi	2	8	9	3	24	90	-21N	11	22	-0.9	+3.9
FI Pori	2	9	21	3	24	90	-20N	9	20	-1.0	+4.1
FI Pudasjarvi	2	22	53	8	27	100	-11N	0	11	-1.9	+6.8
FI Pyhasalmi	2	15	13	6	26	96	-18N	8	19	-0.9	+4.5
FI Rantasalmi	2	7	8	5	27	96	-29N	18	29	-0.5	+3.5
FI Rayskala	2	4	53	3	24	91	-26N	16	27	-0.6	+3.5
FI Savonlinna	2	6	26	6	27	96	-30N	19	30	-0.4	+3.4
FI Selanpaa	2	4	27	4	26	93	-29N	19	30	-0.5	+3.4
FI Tampere	2	7	41	3	24	91	-23N	13	24	-0.7	+3.8
FI Teisko	2	8	44	4	25	92	-23N	12	23	-0.8	+3.8
FI Turku	2	5	19	2	24	89	-24N	14	25	-0.7	+3.6
FI Utti	2	3	50	4	26	93	-30N	20	31	-0.5	+3.3
FI Vaasa	2	17	19	5	25	92	-10N	360	11	-2.0	+6.5
FI Varkaus	2	7	45	5	26	95	-27N	17	28	-0.5	+3.5
FI Vesivehmaa	2	5	20	4	25	92	-27N	17	28	-0.6	+3.5
FI Ylivieska-Raudaskyla	2	18	7	6	26	96	-13N	3	14	-1.4	+5.5
FR Abbeville	1	49	31	8	67	-24N	13	25	-1.1	+3.2	
FR Agen	1	34	55	2	63	-41N	30	41	-0.9	+2.3	
FR Aire-Sur-L'Adour	1	34	35	1	62	-41N	30	42	-0.9	+2.3	
FR Aix-Les-Milles	1	29	39	4	65	-48N	37	48	-0.7	+2.1	
FR Albert	1	48	1	8	67	-26N	16	27	-1.1	+3.0	
FR Albi	1	33	2	3	64	-43N	33	44	-0.8	+2.2	
FR Ales	1	31	48	4	65	-45N	34	45	-0.8	+2.2	
FR Amberieu	1	35	14	6	66	-41N	31	42	-0.8	+2.4	
FR Amiens	1	48	3	8	67	-26N	15	27	-1.1	+3.0	
FR Ancenis	1	44	38	4	64	-29N	18	29	-1.0	+2.8	
FR Angers	1	44	15	5	64	-29N	19	30	-1.0	+2.8	
FR Angouleme	1	38	54	3	64	-36N	25	36	-0.9	+2.5	
FR Annecy	1	34	30	6	67	-42N	32	43	-0.8	+2.3	
FR Annemasse	1	35	0	7	67	-42N	31	42	-0.8	+2.4	
FR Apt	1	30	46	5	66	-46N	36	47	-0.7	+2.2	
FR Arcachon	1	37	23	2	62	-37N	27	38	-0.9	+2.4	
FR Aubenas-Vals-Lanas	1	32	39	5	65	-44N	33	44	-0.8	+2.2	
FR Auch	1	33	48	2	63	-42N	31	43	-0.9	+2.2	
FR Aurillac	1	35	2	4	64	-41N	30	41	-0.8	+2.3	
FR Autun	1	38	26	6	66	-37N	27	38	-0.8	+2.5	
FR Auxerre	1	41	21	7	66	-34N	23	35	-0.9	+2.6	
FR Avignon	1	30	52	4	65	-46N	36	47	-0.8	+2.2	
FR Avord	1	40	4	6	66	-35N	25	36	-0.9	+2.5	
FR Bagnole-De-L'Orne	1	47	5	5	65	-26N	15	27	-1.1	+3.0	
FR Beaune	1	38	1	7	67	-38N	28	39	-0.8	+2.5	
FR Beauvais	1	47	6	7	67	-27N	16	28	-1.0	+3.0	
FR Bergerac	1	36	29	3	63	-39N	28	39	-0.9	+2.3	
FR Besancon-La-Veze	1	37	34	7	68	-39N	29	40	-0.8	+2.5	
FR Beziers	1	30	48	3	64	-46N	35	46	-0.8	+2.2	
FR Biarritz-Bayonne	1	35	10	1	62	-40N	30	41	-0.9	+2.3	
FR Bordeaux	1	37	36	2	63	-37N	27	38	-0.9	+2.4	
FR Bourg	1	35	46	6	67	-41N	30	41	-0.8	+2.4	
FR Bourges	1	40	18	6	65	-35N	24	35	-0.9	+2.6	
FR Brest	1	51	47	4	63	-19N	8	19	-1.4	+3.6	
FR Bretagne-Sur-Orge	1	44	24	7	66	-30N	20	31	-1.0	+2.8	
FR Brienne-Le Chateau	1	42	0	8	67	-34N	23	34	-0.9	+2.6	
FR Brive	1	36	25	4	64	-39N	28	40	-0.9	+2.4	
FR Broye-Les-Pesmes	1	38	20	7	67	-38N	28	39	-0.8	+2.5	
FR Caen	1	49	4	6	65	-24N	13	24	-1.2	+3.2	
FR Cahors	1	34	34	3	64	-41N	31	42	-0.8	+2.3	
FR Calais	1	52	5	9	68	-21N	10	22	-1.2	+3.5	
FR Cambrai	1	48	18	8	68	-26N	16	27	-1.1	+3.1	
FR Cambrai	1	47	57	8	68	-26N	16	27	-1.0	+3.0	
FR Cannes	1	28	34	5	66	-49N	39	50	-0.7	+2.1	
FR Carcassonne	1	31	23	2	64	-45N	35	46	-0.8	+2.2	
FR Carpentras	1	31	0	4	65	-46N	35	47	-0.7	+2.2	
FR Cassagnes-Beghones	1	33	19	3	64	-43N	32	43	-0.8	+2.2	
FR Castres	1	32	7	3	64	-44N	34	45	-0.8	+2.2	
FR Cazaux	1	37	15	2	62	-38N	27	38	-0.9	+2.4	
FR Chalons	1	37	39	7	67	-39N	28	39	-0.8	+2.4	
FR Chalons	1	43	11	8	67	-32N	22	33	-0.9	+2.7	
FR Chambery	1	33	59	6	67	-43N	32	43	-0.8	+2.3	
FR Chambery	1	33	44	6	67	-43N	33	44	-0.8	+2.3	
FR Charleville	1	45	31	9	68	-30N	19	30	-0.9	+2.8	
FR Chateaudun	1	43	51	6	65	-30N	20	31	-1.0	+2.7	
FR Chateauroux	1	40	23	5	65	-34N	24	35	-0.9	+2.6	

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o
FR Cherbourg	1	51	58	6	65	-20N	9	20	-1.4	+3.6
FR Cholet	1	43	26	4	64	-30N	20	31	-1.0	+2.7
FR Clermont Ferrand	1	36	29	5	65	-39N	29	40	-0.8	+2.4
FR Cognac	1	39	14	3	63	-35N	25	36	-0.9	+2.5
FR Colmar	1	38	49	9	69	-38N	28	39	-0.8	+2.5
FR Corte	1	24	31	5	67	-54N	44	55	-0.6	+2.0
FR Coulommiers	1	44	25	7	67	-30N	20	31	-1.0	+2.8
FR Creil	1	46	5	7	67	-28N	18	29	-1.0	+2.9
FR Cuers	1	28	32	4	66	-49N	39	50	-0.7	+2.1
FR Damblain	1	40	6	8	68	-36N	26	37	-0.8	+2.6
FR Deauville	1	48	59	6	66	-24N	13	24	-1.2	+3.2
FR Dijon	1	38	30	7	67	-38N	27	38	-0.8	+2.5
FR Dinard	1	49	11	5	64	-23N	12	23	-1.2	+3.2
FR Dole	1	37	41	7	67	-39N	28	39	-0.8	+2.5
FR Epinal	1	40	23	8	68	-36N	26	37	-0.8	+2.6
FR Etain	1	43	5	9	68	-33N	22	34	-0.9	+2.7
FR Evreux	1	46	46	7	66	-27N	16	28	-1.1	+3.0
FR Granville	1	49	30	5	64	-23N	12	23	-1.2	+3.2
FR Grenoble	1	33	46	6	66	-43N	32	43	-0.8	+2.3
FR Guiscrieff-Scaer	1	49	26	4	63	-22N	12	23	-1.3	+3.3
FR Haguenau	1	40	13	10	69	-37N	27	38	-0.8	+2.6
FR Hyeres	1	28	12	4	66	-49N	39	50	-0.7	+2.1
FR Ile D'Yeu	1	44	0	3	63	-29N	19	30	-1.1	+2.7
FR Istres	1	30	2	4	65	-47N	37	48	-0.7	+2.1
FR Joigny	1	41	49	7	66	-33N	23	34	-0.9	+2.6
FR La Baule	1	45	33	4	63	-27N	17	28	-1.1	+2.9
FR La Roche-Sur-Yon	1	42	56	3	63	-31N	20	31	-1.0	+2.7
FR La Rochelle	1	32	43	2	63	-43N	33	44	-0.8	+2.2
FR Landivisiau	1	51	42	4	63	-19N	8	20	-1.4	+3.6
FR Lannion	1	51	33	4	63	-19N	9	20	-1.4	+3.6
FR Lanvedoc	1	51	14	4	63	-20N	9	20	-1.4	+3.5
FR Laval	1	45	57	5	64	-27N	17	28	-1.1	+2.9
FR Le Castellet	1	28	47	4	65	-49N	38	49	-0.7	+2.1
FR Le Havre	1	49	36	7	66	-23N	13	24	-1.2	+3.2
FR Le Luc	1	28	38	5	66	-49N	38	50	-0.7	+2.1
FR Le Mans	1	44	43	5	65	-29N	19	30	-1.0	+2.8
FR Le Puy	1	34	22	5	65	-42N	31	42	-0.8	+2.3
FR Le Tourquet	1	50	57	8	67	-22N	12	23	-1.2	+3.3
FR Lezignan-Corbieres	1	30	58	3	64	-46N	35	46	-0.8	+2.1
FR Libourne	1	37	25	3	63	-38N	27	38	-0.9	+2.4
FR Lille	1	49	26	9	68	-25N	14	25	-1.1	+3.1
FR Limoges	1	38	24	4	64	-37N	26	37	-0.9	+2.4
FR Lorient	1	48	12	3	63	-24N	13	24	-1.2	+3.1
FR Luneville	1	40	41	9	69	-36N	25	37	-0.8	+2.6
FR Lure	1	38	26	8	68	-38N	28	39	-0.8	+2.5
FR Luxeuil	1	38	46	8	68	-38N	27	38	-0.8	+2.5
FR Lyon	1	34	55	6	66	-42N	31	42	-0.8	+2.3
FR Lyon	1	34	48	6	66	-42N	31	42	-0.8	+2.3
FR MacOn	1	36	22	6	66	-40N	29	40	-0.8	+2.4
FR Marmande	1	35	59	2	63	-39N	29	40	-0.9	+2.3
FR Marseille	1	29	37	4	65	-48N	37	48	-0.7	+2.1
FR Maubeuge	1	47	40	9	68	-27N	17	28	-1.0	+3.0
FR Melun	1	44	6	7	66	-31N	20	31	-1.0	+2.8
FR Mende	1	33	13	4	65	-43N	32	44	-0.8	+2.3
FR Merville	1	50	6	9	68	-24N	13	24	-1.1	+3.2
FR Metz	1	42	17	9	69	-34N	24	35	-0.8	+2.7
FR Metz	1	41	57	9	69	-34N	24	35	-0.8	+2.7
FR Millau	1	32	22	3	64	-44N	33	45	-0.8	+2.2
FR Mimizan	1	36	25	1	62	-39N	28	39	-0.9	+2.3
FR Mont-De-Marsan	1	35	16	2	62	-40N	30	41	-0.9	+2.3
FR Montauban	1	33	54	3	63	-42N	31	43	-0.8	+2.2
FR Montbeliard	1	37	42	8	68	-39N	29	40	-0.8	+2.5
FR Montlucon	1	38	23	5	65	-37N	27	38	-0.9	+2.5
FR Montlucon-Gueret	1	38	15	5	65	-37N	27	38	-0.9	+2.5
FR Montpellier	1	30	52	4	65	-46N	35	47	-0.8	+2.2
FR Morlaix	1	51	29	4	63	-19N	9	20	-1.4	+3.5
FR Moulins	1	38	4	6	66	-38N	27	38	-0.8	+2.5
FR Mulhouse	1	37	23	8	69	-40N	29	40	-0.8	+2.5
FR Nancy	1	41	9	8	68	-35N	25	36	-0.8	+2.6
FR Nangis	1	43	47	7	67	-31N	21	32	-0.9	+2.7
FR Nantes	1	44	23	4	63	-29N	18	30	-1.0	+2.8
FR Nevers	1	39	29	6	66	-36N	25	36	-0.9	+2.5
FR Nice	1	28	38	5	66	-49N	39	50	-0.7	+2.1
FR Nimes	1	30	55	4	65	-46N	35	47	-0.8	+2.2
FR Niort	1	40	58	4	63	-33N	23	34	-1.0	+2.6
FR Orange	1	31	24	4	65	-45N	35	46	-0.8	+2.2
FR Orleans	1	42	40	6	66	-32N	22	33	-0.9	+2.7
FR Orleans	1	43	18	6	66	-31N	21	32	-1.0	+2.7
FR Ouessant	1	52	48	4	62	-17N	7	18	-1.5	+3.8
FR Pamiers	1	31	36	2	63	-45N	34	45	-0.8	+2.2
FR Paris	1	45	21	7	67	-29N	19	30	-1.0	+2.8
FR Pau	1	34	1	1	62	-42N	31	42	-0.9	+2.2
FR Perigueux	1	37	6	3	64	-38N	28	39	-0.9	+2.4
FR Peronne	1	47	23	8	67	-27N	17	28	-1.0	+3.0
FR Perpignan	1	29	56	2	64	-47N	36	47	-0.8	+2.1
FR Phalsbourg	1	40	37	9	69	-36N	26	37	-0.8	+2.6
FR Poitiers	1	41	0	4	64	-33N	23	34	-0.9	+2.6
FR Pontarlier	1	36	39	7	67	-40N	30	41	-0.8	+2.4
FR Pontivy	1	48	31	4	63	-23N	13	24	-1.2	+3.1
FR Pontoise	1	46	7	7	66	-28N	18	29	-1.0	+2.9
FR Propriano	1	23	27	5	66	-56N	45	56	-0.6	+2.0
FR Quimper	1	49	49	3	62	-22N	11	22	-1.3	+3.3
FR Reims	1	44	24	8	68	-31N	20	31	-0.9	+2.8
FR Reims	1	44	46	8	68	-30N	20	31	-0.9	+2.8

Luogo - Location	U.T.			Sun Moon			CA o	PA o	WA o	a m/o	b m/o
	h	m	s	Alt	Alt	Az					
FR Rennes	1	47	9	4	64	-26N	15	26	-1.1	+3.0	
FR Roanne	1	36	27	6	66	-40N	29	40	-0.8	+2.4	
FR Rochefort	1	40	26	3	63	-34N	23	34	-1.0	+2.5	
FR Rodez	1	33	51	3	64	-42N	32	43	-0.8	+2.3	
FR Rouen	1	47	53	7	66	-26N	15	26	-1.1	+3.0	
FR Royan	1	39	46	3	63	-35N	24	35	-0.9	+2.5	
FR Salon	1	30	4	4	65	-47N	37	48	-0.7	+2.1	
FR Saumur	1	43	9	5	64	-31N	20	31	-1.0	+2.7	
FR St.-Brieuc Armor	1	49	59	4	63	-22N	11	22	-1.3	+3.3	
FR St.-Dizier	1	42	11	8	68	-34N	23	34	-0.9	+2.7	
FR St.-Etienne	1	35	0	5	66	-41N	31	42	-0.8	+2.3	
FR St.-Flour	1	34	59	4	65	-41N	30	41	-0.8	+2.3	
FR St.-Girons	1	31	54	2	63	-44N	34	45	-0.8	+2.2	
FR St.-Nazaire	1	45	25	4	63	-28N	17	28	-1.1	+2.8	
FR St.-Simon	1	46	52	8	67	-28N	17	28	-1.0	+2.9	
FR St.-Yan	1	37	18	6	66	-39N	28	39	-0.8	+2.4	
FR Strassbourg	1	39	41	9	69	-37N	27	38	-0.8	+2.6	
FR Tarbes	1	33	12	1	62	-43N	32	43	-0.9	+2.2	
FR Toul	1	41	38	9	68	-35N	24	35	-0.8	+2.6	
FR Toulouse	1	32	48	2	63	-43N	33	44	-0.8	+2.2	
FR Tours	1	42	48	5	65	-31N	21	32	-1.0	+2.7	
FR Toussous-Le-Noble	1	45	4	7	66	-29N	19	30	-1.0	+2.8	
FR Troyes	1	42	8	7	67	-33N	23	34	-0.9	+2.7	
FR Ussel	1	36	31	4	65	-39N	29	40	-0.8	+2.4	
FR Valence	1	33	2	5	66	-44N	33	44	-0.8	+2.3	
FR Valenciennes	1	48	18	9	68	-26N	16	27	-1.0	+3.0	
FR Vannes	1	47	16	4	63	-25N	15	26	-1.2	+3.0	
FR Verdun	1	42	59	9	68	-33N	22	34	-0.9	+2.7	
FR Vesoul-Frotey	1	38	32	8	68	-38N	28	39	-0.8	+2.5	
FR Vichy	1	37	13	5	65	-39N	28	39	-0.8	+2.4	
FR Vilefrance	1	35	36	6	66	-41N	30	41	-0.8	+2.4	
FR Villacoublay	1	45	2	7	66	-29N	19	30	-1.0	+2.8	
FR Villeneuve-Sur-Lot	1	35	16	3	63	-40N	30	41	-0.9	+2.3	
GB Benson	2	0	17	8	67	-8N	357	8	-3.2	+7.3	
GB Biggin Hill	1	56	16	8	67	-14N	4	15	-1.7	+4.4	
GB Blackbushe	1	57	59	8	67	-12N	1	12	-2.1	+5.2	
GB Boscombe Down	1	59	8	8	66	-9N	359	10	-2.6	+6.2	
GB Bournemouth	1	57	13	7	66	-12N	2	13	-2.0	+5.0	
GB Bracknell	1	58	9	8	67	-11N	1	12	-2.1	+5.3	
GB Cambridge	2	0	35	9	68	-8N	358	9	-3.0	+6.9	
GB Chalsgrove	2	0	39	8	67	-7N	357	8	-3.5	+8.0	
GB Coltishall	2	0	55	-11 10	69	-9N	358	9	-2.8	+6.6	
GB Dunsfold	1	56	16	8	67	-14N	4	15	-1.8	+4.5	
GB Farnborough	1	57	32	8	67	-12N	2	13	-2.0	+5.0	
GB Hatfield	1	57	53	9	68	-12N	2	13	-2.0	+5.0	
GB Honington	1	59	56	10	68	-10N	359	10	-2.5	+6.0	
GB Jersey	1	51	23	5	64	-20N	10	21	-1.3	+3.5	
GB Lakenheath	2	0	51	-12 10	68	-8N	358	9	-3.0	+7.0	
GB Lasham	1	57	39	8	66	-12N	1	12	-2.1	+5.1	
GB London	1	57	55	8	67	-12N	1	12	-2.1	+5.1	
GB Lydd	1	53	22	8	67	-19N	8	19	-1.4	+3.7	
GB Manston	1	54	17	9	68	-18N	7	18	-1.4	+3.8	
GB Mildenhall	2	0	44	10	68	-8N	358	9	-3.0	+6.9	
GB North Weald	1	57	52	9	67	-12N	2	13	-2.0	+5.0	
GB Northolt	1	58	16	8	67	-11N	1	12	-2.1	+5.2	
GB Norwich	2	0	37	-12 10	69	-9N	359	10	-2.7	+6.4	
GB Odiham	1	57	42	8	67	-12N	1	12	-2.1	+5.1	
GB Shoreham By Sea	1	54	43	8	66	-16N	6	17	-1.6	+4.0	
GB Southampton	1	57	3	7	66	-13N	2	13	-2.0	+4.9	
GB Southend	1	56	11	9	68	-15N	5	16	-1.7	+4.3	
GB Wattisham	1	58	17	9	68	-12N	2	13	-2.0	+5.0	
GE Sukhumi	1	19	33	-6 28	86	-86N	75	87	+0.4	+1.7	
GE Tbilisi	1	19	17	-4 30	88	-87S	82	93	+0.6	+1.6	
GR Agrinion	1	11	58	11	72	-75N	64	75	-0.3	+1.7	
GR Alexandria	1	15	12	13	73	-71N	61	72	-0.3	+1.8	
GR Alexandroupolis	1	14	47	15	75	-74N	64	75	-0.2	+1.8	
GR Andravida	1	10	51	10	72	-76N	66	77	-0.3	+1.6	
GR Athens	1	10	9	12	73	-78N	68	79	-0.2	+1.6	
GR Chania	1	6	25	11	72	-84N	74	85	-0.2	+1.4	
GR Chios	1	10	27	14	74	-80N	70	81	-0.1	+1.6	
GR Dekelia	1	10	30	12	73	-78N	68	79	-0.2	+1.6	
GR Elefsis	1	10	29	12	73	-78N	68	79	-0.2	+1.6	
GR Heraklion	1	6	0	11	73	-86N	75	86	-0.2	+1.4	
GR Ioannina	1	13	59	11	72	-72N	61	72	-0.3	+1.8	
GR Kalamata	1	9	16	10	72	-79N	68	79	-0.3	+1.6	
GR Karpathos	1	5	54	13	74	-88N	77	88	-0.1	+1.4	
GR Kasos	1	5	55	13	73	-87N	77	88	-0.1	+1.4	
GR Kasteli	1	5	45	11	73	-86N	76	87	-0.1	+1.4	
GR Kastoria	1	15	10	12	73	-70N	60	71	-0.3	+1.8	
GR Kavala	1	15	18	14	75	-72N	62	73	-0.2	+1.8	
GR Keffallinia	1	11	25	10	71	-75N	64	75	-0.3	+1.7	
GR Kerkyra/corfu	1	14	8	10	72	-71N	61	72	-0.3	+1.8	
GR Kithira	1	7	47	10	72	-81N	71	82	-0.2	+1.5	
GR Kos	1	7	52	14	74	-84N	74	85	-0.1	+1.5	
GR Kozani	1	14	43	12	73	-71N	61	72	-0.3	+1.8	
GR Larissa	1	13	26	12	73	-73N	63	74	-0.3	+1.7	
GR Leros	1	8	31	14	74	-83N	73	84	-0.1	+1.5	
GR Limnos	1	13	15	14	75	-76N	65	76	-0.2	+1.7	
GR Marathon	1	10	31	12	73	-78N	68	79	-0.2	+1.6	
GR Megara	1	10	24	12	73	-78N	68	79	-0.2	+1.6	
GR Mykonos	1	9	6	13	74	-81N	71	82	-0.2	+1.6	
GR Mytilini	1	11	33	15	75	-79N	68	80	-0.1	+1.7	
GR Nea Anghialos	1	12	37	12	73	-75N	64	75	-0.3	+1.7	
GR Patras	1	11	11	10	72	-76N	65	76	-0.3	+1.7	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
GR Preveza	1	12	42	10	72	-73N	63	74	-0.3	+1.7	
GR Rhodos	1	7	14	14	74	-86N	76	87	-0.1	+1.5	
GR Rhodos	1	7	12	14	75	-86N	76	87	-0.1	+1.5	
GR Samos	1	9	18	14	74	-82N	72	83	-0.1	+1.6	
GR Santorini	1	7	29	12	73	-84N	73	84	-0.2	+1.5	
GR Sitia	1	5	43	12	73	-87N	77	88	-0.1	+1.4	
GR Skiathos	1	12	20	12	73	-75N	65	76	-0.2	+1.7	
GR Skiros	1	11	47	13	74	-77N	66	78	-0.2	+1.7	
GR Sparti	1	8	58	10	72	-79N	69	80	-0.3	+1.6	
GR Stefanovikion	1	13	3	12	73	-74N	64	75	-0.3	+1.7	
GR Syros	1	9	10	12	73	-81N	70	81	-0.2	+1.6	
GR Tanagra	1	10	56	12	73	-77N	67	78	-0.2	+1.6	
GR Thessaloniki	1	14	50	13	74	-72N	62	73	-0.3	+1.8	
GR Tripolis	1	9	53	11	72	-78N	67	79	-0.3	+1.6	
GR Zakynthos	1	10	41	10	71	-76N	66	77	-0.3	+1.6	
HU Azentkilyszabadja	1	29	56	14	74	-53N	42	53	-0.5	+2.3	
HU Budapest	1	30	12	15	75	-53N	43	54	-0.4	+2.3	
HU Debrecen	1	29	23	-11	16	77	-56N	45	56	-0.4	+2.3
HU Godollo	1	30	28	15	76	-53N	43	54	-0.4	+2.3	
HU Kaposvar	1	28	30	13	74	-54N	44	55	-0.5	+2.2	
HU Kecskemet	1	28	49	15	75	-55N	45	56	-0.4	+2.2	
HU Nyirregyhaza	1	30	29	-11	17	77	-55N	44	55	-0.4	+2.3
HU Ocseny	1	27	51	14	74	-55N	45	56	-0.4	+2.2	
HU Papa	1	30	48	14	74	-52N	41	52	-0.5	+2.3	
HU Sarmellek	1	29	26	13	74	-53N	42	53	-0.5	+2.2	
HU Siofok	1	29	24	14	74	-53N	43	54	-0.4	+2.2	
HU Szolnok	1	29	5	15	76	-55N	45	56	-0.4	+2.2	
HU Taszar	1	28	25	13	74	-54N	44	55	-0.4	+2.2	
HU Tokol	1	30	6	15	75	-53N	43	54	-0.4	+2.3	
HR Cepin	1	26	15	13	74	-57N	46	58	-0.4	+2.2	
HR Dubrovnik	1	20	18	11	72	-63N	52	64	-0.4	+2.0	
HR Grobnik	1	27	52	11	71	-53N	42	54	-0.5	+2.2	
HR Osijek	1	26	1	13	74	-57N	47	58	-0.4	+2.1	
HR Pula	1	27	9	10	71	-53N	43	54	-0.5	+2.1	
HR Rijeka	1	27	30	11	71	-53N	43	54	-0.5	+2.2	
HR Split	1	23	5	11	71	-59N	48	59	-0.5	+2.0	
HR Udbina	1	25	28	11	72	-56N	45	57	-0.5	+2.1	
HR Varazdin	1	28	56	12	73	-53N	42	53	-0.5	+2.2	
HR Zadar	1	24	44	10	71	-57N	46	57	-0.5	+2.1	
HR Zagreb	1	27	53	12	72	-54N	43	54	-0.5	+2.2	
IT Rome	1	19	3	6	68	-62N	51	62	-0.5	+1.9	
LU Luxemburg	1	43	43	9	69	-33N	22	33	-0.9	+2.7	
MK Ohrid	1	16	42	12	73	-68N	58	69	-0.3	+1.9	
MK Skopje	1	17	54	13	74	-68N	57	68	-0.3	+1.9	
MT Malta	1	10	11	4	67	-74N	64	75	-0.5	+1.5	
MT Malta Acc	1	10	19	4	67	-74N	63	74	-0.5	+1.5	
NL Amsterdam	1	53	18	-11	11	70	-21N	11	22	-1.2	+3.5
NL De Kooy	1	55	30	-11	11	71	-19N	8	19	-1.3	+3.8
NL Deelen	1	51	13	-11	11	71	-24N	14	25	-1.1	+3.2
NL Drachten	1	54	30	-10	12	72	-21N	10	21	-1.2	+3.6
NL Eindhoven	1	49	47	10	70	-26N	15	26	-1.0	+3.1	
NL Enschede	1	50	51	-11	12	71	-25N	15	26	-1.0	+3.2
NL Gilze-Rijen	1	50	39	10	70	-24N	14	25	-1.1	+3.2	
NL Groningen	1	53	58	-10	12	72	-22N	11	22	-1.2	+3.5
NL Leeuwarden	1	55	22	-10	12	71	-19N	9	20	-1.3	+3.7
NL Lelystad	1	52	55	-11	11	71	-22N	12	23	-1.1	+3.4
NL Maastricht	1	47	45	10	70	-28N	17	29	-1.0	+3.0	
NL Rotterdam	1	52	28	-12	10	70	-22N	11	23	-1.2	+3.4
NL Soesterberg	1	52	5	-11	11	70	-23N	12	23	-1.1	+3.3
NL Valkenburg	1	53	14	-12	11	70	-21N	11	22	-1.2	+3.5
NL Weert	1	48	58	10	70	-27N	16	27	-1.0	+3.1	
NL Woensdrecht	1	50	52	10	69	-24N	13	24	-1.1	+3.2	
PL Gdansk	1	48	10	-5	19	80	-36N	26	37	-0.6	+2.8
PL Katowice	1	37	30	-9	17	77	-46N	36	47	-0.5	+2.5
PL Koszalin	1	48	31	-6	17	78	-34N	24	35	-0.6	+2.9
PL Krakow	1	36	11	-9	17	78	-48N	38	49	-0.4	+2.5
PL Lodz	1	40	29	-8	18	79	-44N	33	45	-0.5	+2.6
PL Mielec	1	36	5	-8	18	79	-49N	39	50	-0.4	+2.4
PL Poznan	1	43	40	-8	17	77	-39N	29	40	-0.6	+2.7
PL Rzeszow	1	35	21	-8	18	79	-51N	40	51	-0.4	+2.4
PL Slupsk	1	49	15	-6	18	79	-34N	24	35	-0.6	+2.9
PL Szczecin	1	47	44	-8	16	77	-34N	23	34	-0.7	+2.9
PL Szczecin	1	48	6	-7	16	77	-34N	23	34	-0.7	+2.9
PL Warsaw	1	40	57	-7	19	80	-45N	34	45	-0.4	+2.6
PL Wroclaw	1	40	9	-9	16	76	-42N	32	43	-0.5	+2.6
PL Zielona Gora	1	43	31	-9	16	77	-39N	28	39	-0.6	+2.7
RO Arad	1	26	36	15	76	-58N	48	59	-0.4	+2.2	
RO Bacau	1	25	49	-10	19	80	-63N	53	64	-0.2	+2.1
RO Baia Mare	1	29	9	-10	17	78	-57N	47	58	-0.3	+2.2
RO Bucharest	1	21	44	17	78	-67N	56	67	-0.2	+2.0	
RO Caransebes	1	24	40	15	76	-61N	50	62	-0.3	+2.1	
RO Cluj-Napoca	1	27	9	-11	17	78	-59N	49	60	-0.3	+2.2
RO Constanta	1	21	4	-11	19	79	-69N	59	70	-0.1	+2.0
RO Craiova	1	21	53	16	76	-65N	54	66	-0.3	+2.0	
RO Iasi	1	27	7	-9	20	81	-63N	52	63	-0.2	+2.2
RO Oradea	1	28	15	-12	16	77	-57N	47	58	-0.3	+2.2
RO Satu Mare	1	29	27	-11	17	78	-57N	46	57	-0.3	+2.3
RO Sibiu	1	24	54	-12	17	77	-62N	51	63	-0.3	+2.1
RO Suceava	1	28	29	-9	19	80	-60N	50	61	-0.2	+2.2
RO Timisoara	1	25	46	15	76	-59N	49	60	-0.3	+2.1	
RO Tirgu Mures	1	26	16	-11	17	78	-61N	50	62	-0.3	+2.2
RO Tulcea	1	22	27	-11	19	80	-68N	58	69	-0.1	+2.0
SE Anderstorp	2	1	12	-4	18	80	-20N	9	20	-1.1	+3.9
SE Angelholm	1	58	22	-5	17	78	-22N	11	22	-1.0	+3.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
SE Arboga	2	7	10	-1	20	84	-15N	5	16	-1.4	+4.6
SE Bjorkvik	2	3	53	-1	20	83	-20N	9	20	-1.1	+3.9
SE Byholma	1	59	23	-4	18	79	-21N	11	22	-1.0	+3.7
SE Emmaboda	1	56	55	-4	19	80	-26N	15	26	-0.8	+3.3
SE Eskilstuna	2	6	2	-1	21	84	-17N	7	18	-1.2	+4.2
SE Falkoping	2	4	59	-3	19	81	-15N	5	16	-1.5	+4.5
SE Gavle	2	11	51	1	22	86	-11N	1	12	-2.0	+5.9
SE Gimo	2	7	42	0	22	86	-17N	7	18	-1.2	+4.3
SE Gothenborg	2	5	51	-4	18	80	-12N	2	13	-1.9	+5.2
SE Hagshult	2	0	42	-4	18	80	-21N	10	21	-1.1	+3.8
SE Halmstad	1	59	52	-5	17	79	-20N	10	21	-1.1	+3.8
SE Hasslosa	2	6	36	-3	19	81	-13N	2	13	-1.7	+5.1
SE Hultsfred	1	59	54	-3	19	81	-23N	13	24	-0.9	+3.6
SE Joenkeoping	2	2	36	-3	19	81	-18N	8	19	-1.2	+4.0
SE Kalkmar	1	56	36	-4	19	81	-27N	16	27	-0.8	+3.3
SE Karlsborg	2	5	11	-2	19	82	-16N	5	17	-1.4	+4.4
SE Karlskoga	2	9	31	-1	20	83	-11N	0	11	-2.1	+5.9
SE Knislinge	1	56	45	-5	18	79	-25N	14	25	-0.9	+3.4
SE Kosta	1	57	52	-4	19	80	-25N	14	25	-0.9	+3.4
SE Kristianstad	1	55	54	-5	17	79	-25N	15	26	-0.9	+3.3
SE Landskrona	1	57	8	-5	17	78	-23N	13	24	-1.0	+3.5
SE Lidkoping	2	7	5	-2	19	81	-12N	2	13	-1.8	+5.3
SE Linkoepping	2	3	29	-2	20	82	-19N	8	20	-1.1	+4.0
SE Ljungby	1	59	40	-4	18	80	-21N	11	22	-1.0	+3.7
SE Malmo	1	55	14	-6	17	78	-26N	15	26	-0.9	+3.3
SE Moholm	2	6	9	-2	19	82	-14N	4	15	-1.5	+4.7
SE Norrkoeping	2	3	24	-2	20	83	-20N	9	20	-1.1	+3.9
SE Orebro	2	7	43	-1	20	83	-14N	3	14	-1.6	+5.0
SE Oskarshamn	1	58	41	-3	19	82	-25N	14	25	-0.8	+3.4
SE Rada	2	7	34	-2	19	81	-12N	1	12	-2.0	+5.5
SE Ronneby	1	56	3	-4	18	80	-26N	16	27	-0.8	+3.3
SE Satenas	2	7	53	-3	19	81	-11N	0	11	-2.1	+5.8
SE Skovde	2	5	43	-2	19	81	-15N	4	15	-1.5	+4.6
SE Stockholm	2	4	2	-1	21	85	-21N	10	21	-1.0	+3.8
SE Strangnas	2	5	23	-1	21	84	-19N	8	19	-1.1	+4.1
SE Trollhattan	2	8	2	-3	19	81	-10N	360	11	-2.3	+6.1
SE Uppsala	2	7	18	0	21	85	-17N	7	18	-1.2	+4.3
SE Vasteras	2	7	7	0	21	84	-16N	6	17	-1.3	+4.5
SE Vaxjo	1	58	49	-4	18	80	-23N	13	24	-0.9	+3.5
SE Visby	1	58	16	-2	20	83	-27N	16	28	-0.7	+3.3
SI Cerklje	1	28	29	12		72	-53N	42	53	-0.5	+2.2
SI Ljubliana	1	29	45	11		72	-51N	40	52	-0.5	+2.2
SI Maribor	1	29	41	12		73	-52N	41	52	-0.5	+2.2
SI Portoroz	1	28	34	10		71	-52N	41	52	-0.6	+2.2
SI Slovenj Gradec	1	29	57	12		72	-51N	41	52	-0.5	+2.2

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o	
AL Tirana	2	14	6	-11	22	81	70N	280	291	+0.4	+1.1	
AT Graz	2	17	38	-9	20	81	51N	298	309	+0.5	+0.8	
AT Innsbruck	2	15	52	-11	17	78	46N	304	315	+0.5	+0.7	
AT Klagenfurt	2	16	50	-10	19	80	51N	299	310	+0.5	+0.8	
AT Klagenfurt	2	16	48	-10	19	80	51N	299	310	+0.5	+0.8	
AT Langenlebern	2	19	4	-8	21	82	49N	301	312	+0.6	+0.8	
AT Linz	2	17	58	-9	20	80	47N	303	314	+0.5	+0.7	
AT Salzburg	2	17	2	-10	19	79	46N	303	314	+0.5	+0.7	
AT Vienna	2	19	9	-7	21	82	50N	300	311	+0.6	+0.8	
AT Wels	2	17	51	-9	19	80	47N	303	314	+0.5	+0.7	
AT Wiener Neustadt Ost	2	18	45	-8	21	82	50N	299	310	+0.5	+0.8	
AT Zeltweg	2	17	25	-9	20	80	50N	300	311	+0.5	+0.8	
BE Antwerp	2	13	37	-11	13	73	24N	326	337	+0.7	-0.2	
BE Beauvechain	2	13	49	-11	13	74	26N	324	335	+0.7	+0.0	
BE Bertrix	2	13	53	-12	14	74	30N	320	331	+0.6	+0.1	
BE Brasschaat	2	13	37	-11	13	74	23N	326	337	+0.7	-0.2	
BE Brussels	2	13	41	-11	13	73	25N	325	336	+0.7	-0.1	
BE Charleroi	2	13	34	-11	13	73	26N	323	334	+0.6	+0.0	
BE Chievres	2	13	15	-12	13	73	25N	325	336	+0.7	-0.1	
BE Florennes	2	13	39	-11	13	73	28N	322	333	+0.6	+0.0	
BE Kleine Brogel	2	14	18	-10	14	74	26N	324	335	+0.7	+0.0	
BE Koksijde	2	12	17	-12	12	72	21N	329	340	+0.8	-0.4	
BE Kortrijk-Vevelgem	2	12	48	-12	12	72	23N	327	338	+0.7	-0.2	
BE Liege	2	14	11	-11	14	74	28N	322	333	+0.6	+0.1	
BE Ostend	2	12	24	-11	12	72	21N	329	340	+0.8	-0.4	
BE Sint-Truiden	2	14	3	-11	14	74	27N	323	334	+0.7	+0.0	
BE Ursel	2	12	54	-11	13	73	22N	327	338	+0.8	-0.3	
BE Weelde	2	13	58	-10	14	74	24N	326	337	+0.7	-0.1	
BE Zoersel	2	13	50	-11	14	74	24N	325	336	+0.7	-0.1	
BE Zutendaal	2	14	18	-10	14	74	27N	323	334	+0.7	+0.0	
BA Banja Luka	2	16	41	-10	21	81	59N	291	302	+0.5	+0.9	
BA Mostar	2	15	20	-11	21	81	63N	287	297	+0.4	+1.0	
BA Sarajevo	2	16	3	-10	21	81	62N	287	298	+0.5	+1.0	
BG Bourgas	2	19	28	-5	29	87	76N	274	285	+0.6	+1.3	
BG Gorna Orechovica	2	19	8	-6	27	86	72N	277	288	+0.6	+1.2	
BG Plovdiv	2	17	19	-7	26	85	74N	276	287	+0.5	+1.2	
BG Sofia	2	17	17	-8	25	84	71N	279	290	+0.5	+1.2	
BG Stara Zagora	2	18	8	-6	27	86	74N	276	286	+0.6	+1.3	
BG Varna	2	20	33	-4	29	88	75N	275	286	+0.6	+1.3	
CH Alpnach	2	14	20			15	75	43N	307	318	+0.4	+0.6
CH Altenrhein	2	15	12	-12		16	76	43N	307	318	+0.4	+0.6
CH Bern	2	14	0			14	75	42N	308	319	+0.4	+0.5
CH Buochs	2	14	24			15	75	43N	307	318	+0.4	+0.6
CH Dubendorf	2	14	45			15	76	42N	308	319	+0.4	+0.5

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CH Emmen	2	14	27		15	75	42N	307	318	+0.4	+0.5
CH Geneva	2	13	7		13	73	42N	308	319	+0.4	+0.5
CH Grenchen	2	14	5		14	75	41N	309	320	+0.4	+0.5
CH Interlaken	2	14	1		14	75	43N	307	318	+0.4	+0.6
CH Les Eplatures	2	13	43		14	74	40N	309	320	+0.4	+0.5
CH Lugano	2	14	3		15	75	46N	304	315	+0.4	+0.6
CH Meiringen	2	14	8		15	75	43N	307	318	+0.4	+0.6
CH Mollis	2	14	45		15	76	43N	306	317	+0.4	+0.6
CH Payerne	2	13	42		14	74	41N	309	320	+0.4	+0.5
CH Raron	2	13	47		14	75	44N	306	317	+0.4	+0.6
CH Saanen	2	13	39		14	74	42N	307	318	+0.4	+0.5
CH Samedan	2	14	41		16	76	46N	304	315	+0.4	+0.6
CH Sion	2	13	34		14	74	43N	306	317	+0.4	+0.6
CH Turtmann	2	13	44		14	75	44N	306	317	+0.4	+0.6
CH Ulrichen	2	14	2		15	75	44N	306	317	+0.4	+0.6
CH Zurich	2	14	43		15	76	42N	308	319	+0.4	+0.5
CY Akrotiri	2	10	13	-7	30	85	78S	248	259	+0.5	+1.8
CY Larnaca	2	11	2	-7	31	85	78S	248	259	+0.5	+1.8
CY Paphos	2	10	13	-8	30	84	79S	249	260	+0.5	+1.8
CZ Caslav	2	19	52	-7	21	82	44N	306	317	+0.6	+0.7
CZ Ceske Budejovice	2	18	38	-8	20	81	45N	304	315	+0.6	+0.7
CZ Chotebor	2	19	51	-7	21	82	45N	305	316	+0.6	+0.7
CZ Hradec Kralove	2	20	22	-6	21	83	44N	306	317	+0.6	+0.7
CZ Karlovy Vary	2	18	29	-8	19	80	40N	310	321	+0.6	+0.6
CZ Kunovice	2	20	24	-6	22	83	49N	301	312	+0.6	+0.8
CZ Line	2	18	26	-8	19	80	42N	308	319	+0.6	+0.6
CZ Mnichovo Hradiste	2	20	2	-6	21	82	42N	308	319	+0.6	+0.6
CZ Namest	2	19	43	-7	21	82	47N	303	314	+0.6	+0.8
CZ Ostrava	2	21	20	-5	23	84	48N	302	313	+0.6	+0.8
CZ Pardubice	2	20	9	-6	21	83	44N	305	316	+0.6	+0.7
CZ Prague	2	19	18	-7	20	81	42N	308	319	+0.6	+0.6
CZ Praha	2	19	30	-7	20	82	42N	307	318	+0.6	+0.6
CZ Prerov	2	20	42	-6	22	84	48N	302	313	+0.6	+0.8
CZ Pribram	2	18	57	-7	20	81	43N	307	318	+0.6	+0.7
CZ Sobeslav	2	18	59	-8	20	81	45N	305	316	+0.6	+0.7
CZ Turany	2	20	3	-7	22	83	48N	302	313	+0.6	+0.8
CZ Vodochody	2	19	27	-7	20	82	42N	308	319	+0.6	+0.6
DE Aachen	2	14	39	-10	14	75	28N	321	332	+0.6	+0.1
DE Aalen-Heidenheim	2	16	13	-10	17	78	40N	309	320	+0.5	+0.5
DE Allendorf	2	16	16	-9	16	77	31N	318	329	+0.6	+0.3
DE Altenburg	2	18	42	-7	19	80	37N	312	323	+0.6	+0.5
DE Anklam	2	20	43	-4	20	83	31N	319	330	+0.8	+0.3
DE Arnsberg	2	15	51	-9	16	77	29N	321	332	+0.7	+0.2
DE Augsburg	2	16	25	-10	17	78	42N	308	319	+0.5	+0.6
DE Baden-Baden	2	15	13	-11	15	76	37N	312	323	+0.5	+0.4
DE Bamberg	2	17	11	-9	18	78	38N	312	323	+0.6	+0.5
DE Barth	2	20	4	-5	20	82	27N	322	333	+0.8	+0.2
DE Baumholder	2	15	2	-11	15	75	34N	316	327	+0.5	+0.3
DE Bautzen	2	20	5	-6	21	82	39N	310	321	+0.6	+0.6
DE Bayreuth	2	17	37	-9	18	79	39N	311	322	+0.6	+0.5
DE Berlin	2	20	2	-6	20	82	35N	315	326	+0.7	+0.5
DE Biberach	2	15	36	-11	16	77	41N	308	319	+0.5	+0.6
DE Borkum	2	14	50	-8	16	76	19N	331	342	+1.0	-0.5
DE Braunschweig	2	17	54	-7	18	79	30N	319	330	+0.7	+0.3
DE Bremen	2	16	49	-7	17	78	25N	325	336	+0.8	+0.0
DE Bremerhaven	2	16	37	-7	17	78	23N	327	338	+0.9	-0.1
DE Brueckeberg	2	16	50	-8	17	78	28N	321	332	+0.7	+0.2
DE Brueggen	2	14	41	-10	15	75	27N	323	334	+0.7	+0.0
DE Buechel	2	15	2	-10	15	75	32N	318	329	+0.6	+0.3
DE Burg Feuerstein	2	17	14	-9	18	79	39N	311	322	+0.6	+0.5
DE Celle	2	17	34	-7	18	79	29N	321	332	+0.7	+0.2
DE Coburg	2	17	24	-9	18	79	37N	312	323	+0.6	+0.5
DE Cochstedt	2	18	22	-7	18	80	33N	316	327	+0.7	+0.4
DE Coleman	2	15	42	-10	16	76	36N	314	325	+0.5	+0.4
DE Cologne	2	15	15	-10	15	76	30N	320	331	+0.6	+0.2
DE Cottbus	2	20	30	-6	21	82	38N	312	323	+0.7	+0.5
DE Dahlemer Binz	2	14	43	-11	15	75	30N	320	331	+0.6	+0.2
DE Dessau	2	18	56	-7	19	80	34N	315	326	+0.7	+0.4
DE Diepholz	2	16	24	-8	16	77	26N	324	335	+0.8	+0.0
DE Donaueschingen	2	14	57	-12	15	76	40N	310	321	+0.5	+0.5
DE Dortmund	2	15	42	-9	16	76	28N	321	332	+0.7	+0.1
DE Dresden	2	19	34	-7	20	81	39N	311	322	+0.6	+0.6
DE Duesseldorf	2	15	7	-10	15	76	28N	322	333	+0.7	+0.1
DE Egelsbach	2	15	57	-10	16	77	35N	315	326	+0.6	+0.4
DE Eggebeck	2	17	6	-6	18	79	20N	330	341	+1.0	-0.3
DE Eggenfelden	2	17	19	-9	18	79	45N	305	316	+0.5	+0.7
DE Eisenach	2	17	26	-8	18	79	34N	315	326	+0.6	+0.4
DE Eisenhuettenstadt	2	20	44	-5	21	83	37N	313	324	+0.7	+0.5
DE Emden	2	15	24	-8	16	76	21N	329	340	+0.9	-0.3
DE Erding	2	16	51	-10	18	79	44N	306	317	+0.5	+0.6
DE Erfurt	2	17	41	-8	18	79	35N	315	326	+0.6	+0.4
DE Essen	2	15	14	-10	15	76	27N	322	333	+0.7	+0.1
DE Fassberg	2	17	45	-7	18	79	28N	322	333	+0.8	+0.2
DE Flensburg	2	17	5	-6	18	79	19N	330	341	+1.0	-0.4
DE Frankfurt	2	15	56	-10	16	77	34N	315	326	+0.6	+0.4
DE Freiburg	2	14	40	-12	15	75	39N	311	322	+0.5	+0.5
DE Friedrichshafen	2	15	19	-11	16	76	42N	307	318	+0.5	+0.6
DE Fritzlär	2	16	43	-9	17	78	32N	317	328	+0.6	+0.3
DE Fuerstfeldbruck	2	16	26	-10	17	78	43N	307	318	+0.5	+0.6
DE Geilenkirchen	2	14	36	-10	14	75	27N	322	333	+0.7	+0.1
DE Giebelstadt	2	16	32	-10	17	78	37N	312	323	+0.5	+0.5
DE Grafenwoehr	2	17	39	-9	18	79	40N	310	321	+0.6	+0.6
DE Guetersloh	2	16	13	-8	16	77	28N	322	333	+0.7	+0.1
DE Hahn	2	15	7	-11	15	76	33N	317	328	+0.6	+0.3

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
DE Halle	2	18	39	-7	19	80	35N	315	326	+0.7	+0.4
DE Hamburg	2	17	48	-6	18	79	25N	324	335	+0.8	+0.0
DE Hamburg	2	17	40	-7	18	79	25N	324	335	+0.8	+0.0
DE Hanau	2	16	14	-10	16	77	35N	315	326	+0.6	+0.4
DE Hannover	2	17	17	-7	17	78	29N	321	332	+0.7	+0.2
DE Hassfurt	2	17	2	-9	17	78	37N	312	323	+0.6	+0.5
DE Heidelberg	2	15	45	-10	16	76	36N	313	324	+0.5	+0.4
DE Heringsdorf	2	21	5	-4	21	83	31N	318	329	+0.8	+0.3
DE Hildesheim	2	17	24	-8	18	79	30N	320	331	+0.7	+0.2
DE Hof	2	17	53	-8	18	79	38N	311	322	+0.6	+0.5
DE Hohenfels	2	17	18	-9	18	79	41N	308	319	+0.5	+0.6
DE Hohn	2	17	20	-6	18	79	22N	328	339	+0.9	-0.2
DE Holzdorf	2	19	32	-6	20	81	36N	314	325	+0.7	+0.5
DE Hopsten	2	15	48	-9	16	76	25N	324	335	+0.8	+0.0
DE Ingolstadt	2	16	55	-10	18	78	42N	308	318	+0.5	+0.6
DE Itzehoe	2	17	27	-6	18	79	23N	327	338	+0.9	-0.1
DE Jena	2	18	12	-8	18	80	36N	313	324	+0.6	+0.5
DE Jever	2	15	57	-7	16	77	21N	328	339	+0.9	-0.3
DE Kamenz	2	19	54	-6	20	82	39N	311	322	+0.6	+0.6
DE Kamp	2	15	0	-10	15	75	26N	323	334	+0.7	+0.0
DE Karlsruhe	2	15	24	-11	15	76	37N	313	324	+0.5	+0.4
DE Kassel	2	16	50	-8	17	78	31N	318	329	+0.7	+0.3
DE Kiel	2	17	55	-6	18	79	23N	327	338	+0.9	-0.1
DE Kitzingen	2	16	43	-9	17	78	38N	312	323	+0.6	+0.5
DE Koblenz	2	15	24	-10	15	76	32N	318	329	+0.6	+0.3
DE Koethen	2	18	43	-7	19	80	34N	315	326	+0.7	+0.4
DE Kyritz	2	19	27	-6	19	81	32N	318	329	+0.7	+0.3
DE Laage	2	19	35	-5	20	81	28N	321	332	+0.8	+0.2
DE Laarbruch	2	14	45	-10	15	75	25N	324	335	+0.7	+0.0
DE Landsberg	2	16	10	-10	17	78	43N	307	318	+0.5	+0.6
DE Laupheim	2	15	44	-11	16	77	41N	308	319	+0.5	+0.6
DE Lechfeld	2	16	13	-10	17	78	43N	307	318	+0.5	+0.6
DE Leer	2	15	37	-8	16	77	22N	328	339	+0.9	-0.2
DE Leipzig	2	18	45	-7	19	80	36N	314	325	+0.6	+0.5
DE Lemwerder	2	16	40	-7	17	78	24N	325	336	+0.8	+0.0
DE Leutkirch	2	15	38	-11	16	77	42N	307	318	+0.5	+0.6
DE Luebeck	2	18	24	-6	18	80	26N	324	335	+0.8	+0.1
DE Magdeburg	2	18	36	-7	19	80	33N	317	328	+0.7	+0.4
DE Mainz	2	15	40	-10	16	76	34N	316	327	+0.6	+0.3
DE Mannheim	2	15	41	-10	16	76	36N	314	325	+0.5	+0.4
DE Meinerzhagen	2	15	33	-9	16	76	30N	320	331	+0.6	+0.2
DE Memmingen	2	15	49	-11	17	77	42N	307	318	+0.5	+0.6
DE Mendig	2	15	16	-10	15	76	31N	318	329	+0.6	+0.3
DE Mengen	2	15	23	-11	16	77	41N	309	320	+0.5	+0.5
DE Moenchengladbach	2	14	56	-10	15	75	27N	322	333	+0.7	+0.1
DE Muehlhausen	2	18	32	-7	19	80	35N	314	325	+0.6	+0.5
DE Muenster/osnabruECK	2	15	51	-9	16	77	26N	323	334	+0.7	+0.0
DE Munich	2	16	47	-10	18	79	43N	306	317	+0.5	+0.6
DE Neubrandenburg	2	18	58	-7	19	81	37N	313	324	+0.6	+0.5
DE Neuburg	2	16	43	-10	17	78	42N	308	319	+0.5	+0.6
DE Niederstetten	2	16	22	-10	17	78	38N	311	322	+0.5	+0.5
DE Noervenich	2	14	57	-10	15	75	29N	321	332	+0.6	+0.1
DE Norderney	2	15	22	-8	16	77	19N	330	341	+1.0	-0.4
DE Nordholz	2	16	38	-7	17	78	22N	327	338	+0.9	-0.2
DE Nuernberg	2	17	3	-9	18	78	39N	310	321	+0.5	+0.5
DE Oberpfaffenhofen	2	16	21	-10	17	78	43N	306	317	+0.5	+0.6
DE Paderborn	2	16	21	-9	16	77	30N	320	331	+0.7	+0.2
DE Parchim	2	19	5	-6	19	81	29N	321	332	+0.8	+0.2
DE Preschen	2	20	26	-6	21	82	38N	311	322	+0.7	+0.6
DE Ramstein	2	15	10	-11	15	76	35N	315	326	+0.5	+0.4
DE Rechlin-Laerz	2	19	50	-5	20	81	31N	319	330	+0.8	+0.3
DE Rendsburg	2	17	26	-6	18	79	22N	327	338	+0.9	-0.2
DE Rheine-Brentlange	2	15	42	-9	16	76	25N	324	335	+0.8	+0.0
DE Riesa	2	19	24	-7	20	81	38N	312	323	+0.6	+0.5
DE Rosenthal	2	17	38	-9	18	79	39N	310	321	+0.6	+0.5
DE Roth	2	16	55	-9	18	78	40N	309	320	+0.5	+0.6
DE Rothenburg/ol	2	20	28	-6	21	83	40N	310	321	+0.7	+0.6
DE Saarbruecken	2	14	50	-11	15	75	35N	315	326	+0.5	+0.3
DE Schleswig	2	17	16	-6	18	79	21N	328	339	+1.0	-0.3
DE Schoenhagen	2	19	42	-6	20	81	35N	315	326	+0.7	+0.4
DE Schwaebisch Hall	2	16	9	-10	17	77	39N	311	322	+0.5	+0.5
DE Siegerland	2	15	47	-10	16	76	32N	318	329	+0.6	+0.3
DE Soest	2	19	49	-6	20	82	37N	312	323	+0.7	+0.5
DE Spangdahlem	2	14	47	-11	15	75	32N	318	329	+0.6	+0.2
DE Speyer	2	15	36	-11	16	76	36N	313	324	+0.5	+0.4
DE Stadtlohn	2	15	16	-9	15	76	25N	324	335	+0.7	+0.0
DE Stendal	2	18	55	-6	19	80	31N	318	329	+0.7	+0.3
DE Straubing	2	17	31	-9	18	79	43N	307	318	+0.5	+0.6
DE Strausberg	2	20	24	-5	20	82	35N	315	326	+0.7	+0.5
DE Stuttgart	2	15	39	-11	16	77	39N	311	322	+0.5	+0.5
DE Suhl	2	19	31	-7	20	81	38N	312	323	+0.6	+0.5
DE Trier	2	14	52	-11	15	75	32N	317	328	+0.6	+0.3
DE Vilseck	2	17	31	-9	18	79	40N	310	321	+0.6	+0.6
DE Vilshofen	2	17	45	-9	19	80	45N	305	316	+0.5	+0.7
DE Westerland	2	15	49	-6	17	78	16N	333	344	+1.2	-0.7
DE Wiesbaden	2	15	49	-10	16	76	34N	316	327	+0.6	+0.4
DE Wilhelmshaven	2	16	8	-7	16	77	22N	328	339	+0.9	-0.2
DE Wittmundhafen	2	15	45	-8	16	77	21N	329	340	+0.9	-0.3
DE Worms	2	15	39	-10	16	76	35N	314	325	+0.5	+0.4
DE Wunstorf	2	17	7	-8	17	78	28N	321	332	+0.7	+0.2
DE Zweibruecken	2	14	56	-11	15	75	35N	315	326	+0.5	+0.4
DK Aalborg	2	15	5	-4	18	80	8N	342	353	+2.5	-3.1
DK Aarhus	2	17	38	-4	19	80	15N	334	345	+1.3	-0.9
DK Billund	2	16	6	-5	18	79	14N	335	346	+1.4	-1.0

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
DK Copenhagen	2	19	40	-4	20	82	22N	328	339	+1.0	-0.2
DK Esbjerg	2	15	31	-6	17	78	14N	336	347	+1.4	-1.1
DK Gronholt	2	19	50	-4	20	82	21N	329	340	+1.0	-0.2
DK Karup	2	15	20	-5	18	79	11N	339	350	+1.8	-1.8
DK Kolding	2	16	38	-5	18	79	16N	333	344	+1.2	-0.7
DK Krusa-Padborg	2	16	56	-6	18	79	19N	331	342	+1.1	-0.5
DK Laeso	2	17	0	-3	19	81	11N	339	350	+1.8	-1.8
DK Lindtorp	2	13	46	-5	17	78	7N	342	353	+2.6	-3.3
DK Maribo	2	19	5	-5	19	81	24N	326	337	+0.9	+0.0
DK Odense	2	17	48	-5	18	80	19N	331	342	+1.1	-0.5
DK Ronne	2	21	57	-3	21	84	28N	321	332	+0.9	+0.2
DK Sindal	2	14	31	-4	18	80	5N	344	355	+3.4	-4.7
DK Skive	2	14	51	-5	18	79	9N	340	351	+2.1	-2.4
DK Skrydstrup	2	16	41	-6	18	79	17N	332	343	+1.2	-0.6
DK Soenderborg	2	17	26	-5	18	79	20N	330	341	+1.1	-0.4
DK Stauning	2	14	29	-5	17	78	10N	339	350	+1.9	-2.0
DK Vaerloose	2	19	50	-4	20	82	22N	328	339	+1.0	-0.2
DK Vandel	2	16	11	-5	18	79	15N	335	346	+1.4	-1.0
DK Vesthimmerland	2	14	46	-4	18	79	8N	342	353	+2.4	-2.9
EE Armari Air Force Base	2	32	3	5	28	96	30N	320	331	+1.0	+0.3
EE Kardla	2	30	38	4	27	94	28N	321	332	+1.0	+0.2
EE Kuressaare	2	30	3	3	27	94	30N	319	330	+1.0	+0.3
EE Parnu	2	32	6	4	28	96	33N	317	328	+1.0	+0.4
EE Tallinn-Ulemiste Internationa	2	32	44	5	28	97	30N	320	331	+1.0	+0.3
EE Tartu-Ulenurme	2	34	11	5	30	98	36N	314	325	+1.0	+0.5
ES Albacete	2	8	10	4	67	51N	298	309	+0.0	+0.5	
ES Alicante	2	7	46	5	67	55N	295	306	+0.0	+0.6	
ES Almeria	2	7	7	3	66	56N	293	304	-0.1	+0.5	
ES Aviles	2	9	22	3	64	33N	316	327	+0.1	+0.0	
ES Badajoz	2	8	30	1	64	46N	304	315	-0.1	+0.3	
ES Barcelona	2	9	35	8	69	50N	300	311	+0.1	+0.6	
ES Bilbao	2	9	46	5	66	38N	311	322	+0.1	+0.2	
ES Burgos	2	9	24	4	66	40N	310	321	+0.1	+0.3	
ES Cordoba	2	7	54	1	65	51N	299	310	-0.1	+0.4	
ES Gerona	2	10	0	9	70	49N	301	312	+0.1	+0.6	
ES Granada	2	7	22	2	65	54N	296	306	-0.1	+0.5	
ES Ibiza	2	8	6	6	68	55N	294	305	+0.0	+0.6	
ES Jerez	2	7	35	0	64	53N	297	308	-0.2	+0.4	
ES La Coruna	2	9	4	2	63	31N	319	330	+0.1	-0.1	
ES Leon	2	9	16	3	65	37N	313	324	+0.1	+0.1	
ES Madrid	2	8	53	4	66	45N	304	315	+0.0	+0.4	
ES Malaga	2	7	18	1	65	55N	295	306	-0.1	+0.5	
ES Menorca	2	8	54	9	70	56N	294	305	+0.1	+0.7	
ES Murcia	2	7	37	4	67	55N	295	306	-0.1	+0.5	
ES Ocana	2	8	41	3	66	47N	303	314	+0.0	+0.4	
ES Palma De Mallorca	2	8	34	8	69	55N	295	306	+0.1	+0.6	
ES Pamplona	2	9	46	6	67	41N	308	319	+0.1	+0.3	
ES Reus	2	9	24	7	69	49N	301	312	+0.1	+0.5	
ES Salamanca	2	8	59	2	65	42N	308	319	+0.0	+0.3	
ES San Luis	2	8	54	9	70	56N	294	305	+0.1	+0.7	
ES San Sebastian	2	9	57	6	67	39N	310	321	+0.1	+0.3	
ES Santander	2	9	41	5	66	37N	313	324	+0.1	+0.2	
ES Santiago	2	9	5	1	63	32N	318	329	+0.1	-0.1	
ES Seo De Urgel	2	10	0	8	69	46N	303	314	+0.1	+0.5	
ES Sevilla	2	7	52	0	64	51N	299	310	-0.1	+0.4	
ES Son Bonet	2	8	36	8	69	55N	295	306	+0.1	+0.6	
ES Valencia	2	8	27	5	67	52N	298	309	+0.0	+0.5	
ES Valladolid	2	9	9	3	65	40N	309	320	+0.0	+0.2	
ES Vigo	2	9	7	1	63	34N	316	327	+0.0	+0.0	
ES Vitoria	2	9	39	5	67	40N	310	321	+0.1	+0.3	
ES Zaragoza	2	9	29	6	67	45N	305	316	+0.1	+0.4	
FI Eura	2	30	2	5	26	95	20N	330	341	+1.3	-0.3
FI Halli	2	33	0	6	28	98	21N	328	339	+1.2	-0.2
FI Hameenkyro	2	30	57	5	27	96	19N	331	342	+1.3	-0.4
FI Hanko	2	31	7	4	27	95	26N	324	335	+1.1	+0.1
FI Helsingi	2	33	13	6	28	98	28N	322	333	+1.1	+0.2
FI Hyvinkaa	2	33	9	6	28	98	26N	324	335	+1.1	+0.1
FI Immola	2	37	29	8	31	103	30N	320	331	+1.1	+0.2
FI Joensuu	2	38	36	9	31	104	26N	324	335	+1.1	+0.0
FI Jyvaszkyla	2	34	0	7	28	100	21N	329	340	+1.2	-0.3
FI Kajaani	2	35	44	9	29	103	16N	334	345	+1.4	-0.8
FI Kauhajoki	2	29	22	6	26	96	14N	336	347	+1.6	-1.1
FI Kauhava	2	29	42	6	27	97	11N	338	349	+1.8	-1.6
FI Kikala	2	31	48	5	27	96	25N	325	336	+1.1	+0.0
FI Kitee	2	38	59	9	31	105	28N	321	332	+1.1	+0.1
FI Kruunupyty	2	28	38	6	26	97	7N	342	353	+2.5	-3.1
FI Kuopio	2	36	27	9	30	102	22N	328	339	+1.2	-0.2
FI Kuusamo	2	35	50	11	29	105	10N	340	351	+1.9	-2.2
FI Lappeenranta	2	36	39	8	30	102	29N	320	331	+1.1	+0.2
FI Mariehamn	2	27	32	3	25	92	19N	330	341	+1.3	-0.4
FI Menkijarvi	2	30	39	6	27	97	14N	336	347	+1.6	-1.1
FI Mikkeli	2	35	50	8	29	101	26N	324	335	+1.1	+0.1
FI Nummela	2	32	28	5	28	97	26N	323	334	+1.1	+0.1
FI Oulu	2	30	3	8	27	100	5N	345	356	+3.1	-4.8
FI Pattijoki	2	28	54	8	27	99	4N	345	356	+3.4	-5.4
FI Piikajarvi	2	30	1	5	26	95	19N	331	342	+1.3	-0.4
FI Pori	2	29	20	5	26	94	17N	332	343	+1.4	-0.6
FI Pudasjarvi	2	32	39	9	28	102	7N	343	354	+2.4	-3.3
FI Pyhasalmi	2	33	35	8	28	100	15N	334	345	+1.5	-0.9
FI Rantasalmi	2	37	7	8	30	103	26N	323	334	+1.1	+0.1
FI Rayskala	2	32	20	5	28	97	24N	325	336	+1.1	+0.0
FI Savonlinna	2	37	44	9	30	103	27N	322	333	+1.1	+0.1
FI Selanpaa	2	35	15	7	29	100	27N	322	333	+1.1	+0.2
FI Tampere	2	31	39	6	27	97	21N	329	340	+1.2	-0.2

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
FI Teisko	2	32	8	6	28	97	20N	329	340	+1.2	-0.3
FI Turku	2	30	15	4	27	95	22N	327	338	+1.2	-0.1
FI Utti	2	35	20	7	29	100	28N	321	332	+1.1	+0.2
FI Vaasa	2	27	11	5	26	95	8N	342	353	+2.4	-2.9
FI Varkaus	2	36	38	8	30	102	25N	324	335	+1.1	+0.0
FI Vesivehmaa	2	34	5	6	29	99	25N	324	335	+1.1	+0.1
FI Ylivieska-Raudaskyla	2	31	7	7	27	99	10N	339	350	+1.9	-2.0
FR Abbeville	2	12	0	11	71	23N	327	338	+0.7	-0.3	
FR Agen	2	10	39	8	69	40N	309	320	+0.2	+0.4	
FR Aire-Sur-L'Adour	2	10	20	7	68	40N	309	320	+0.2	+0.3	
FR Aix-Les-Milles	2	11	24	11	72	48N	302	313	+0.2	+0.6	
FR Albert	2	12	35	12	72	25N	324	335	+0.6	-0.1	
FR Albi	2	10	54	9	70	43N	307	318	+0.2	+0.4	
FR Ales	2	11	28	11	71	45N	305	316	+0.2	+0.5	
FR Amberieu	2	12	42	12	73	41N	308	319	+0.3	+0.5	
FR Amiens	2	12	24	12	71	25N	325	336	+0.6	-0.1	
FR Ancenis	2	10	41	8	68	28N	322	333	+0.4	-0.1	
FR Angers	2	10	56	9	69	28N	321	332	+0.4	+0.0	
FR Angouleme	2	11	0	9	69	35N	314	325	+0.3	+0.2	
FR Annecy	2	12	59	13	73	42N	307	318	+0.3	+0.5	
FR Annemasse	2	13	10	13	74	42N	308	319	+0.4	+0.5	
FR Apt	2	11	44	12	72	47N	303	314	+0.3	+0.6	
FR Arcachon	2	10	26	7	68	37N	313	324	+0.2	+0.2	
FR Aubenas-Vals-Lanas	2	11	45	11	72	44N	306	317	+0.3	+0.5	
FR Auch	2	10	30	8	69	42N	308	319	+0.2	+0.4	
FR Aurillac	2	11	19	10	70	41N	309	320	+0.3	+0.4	
FR Autun	2	12	45	12	72	37N	312	323	+0.4	+0.4	
FR Auxerre	2	12	41	12	72	33N	316	327	+0.4	+0.2	
FR Avignon	2	11	33	11	72	46N	303	314	+0.2	+0.6	
FR Avord	2	12	11	11	71	35N	315	326	+0.4	+0.3	
FR Bagnole-De-L'Orne	2	10	58	9	69	25N	325	336	+0.5	-0.2	
FR Beaune	2	12	59	12	73	38N	312	323	+0.4	+0.4	
FR Beauvais	2	12	14	11	71	26N	324	335	+0.6	-0.1	
FR Bergerac	2	10	51	8	69	38N	311	322	+0.2	+0.3	
FR Besancon-La-Veze	2	13	32	13	74	39N	311	322	+0.4	+0.4	
FR Beziers	2	10	53	10	71	46N	304	315	+0.2	+0.5	
FR Biarritz-Bayonne	2	10	1	6	67	39N	310	321	+0.2	+0.3	
FR Bordeaux	2	10	34	8	68	37N	313	324	+0.2	+0.2	
FR Bourg	2	12	48	12	73	41N	309	320	+0.3	+0.5	
FR Bourges	2	12	4	11	71	34N	315	326	+0.4	+0.2	
FR Brest	2	8	35	6	66	17N	333	344	+0.7	-0.9	
FR Bretigny-Sur-Orge	2	12	15	11	71	29N	320	331	+0.5	+0.1	
FR Brienne-Le Chateau	2	13	18	13	73	33N	316	327	+0.5	+0.3	
FR Brive	2	11	12	9	70	39N	311	322	+0.3	+0.3	
FR Broye-Les-Pesmes	2	13	22	13	73	38N	312	323	+0.4	+0.4	
FR Caen	2	10	48	9	69	22N	327	338	+0.6	-0.4	
FR Cahors	2	10	54	9	70	41N	309	320	+0.2	+0.4	
FR Calais	2	11	47	-12	12	71	20N	330	341	+0.8	-0.5
FR Cambrai	2	12	51	12	72	25N	325	336	+0.6	-0.1	
FR Cambrai	2	12	52	12	72	25N	324	335	+0.6	-0.1	
FR Cannes	2	11	50	13	73	50N	300	311	+0.3	+0.6	
FR Carcassonne	2	10	39	9	70	45N	305	316	+0.2	+0.5	
FR Carpentras	2	11	40	11	72	46N	303	314	+0.3	+0.6	
FR Cassagnes-Beghones	2	11	5	10	70	43N	307	318	+0.2	+0.4	
FR Castres	2	10	47	9	70	44N	306	317	+0.2	+0.5	
FR Cazaux	2	10	25	7	68	37N	313	324	+0.2	+0.2	
FR Chalon	2	12	53	12	73	38N	311	322	+0.4	+0.4	
FR Chalons	2	13	12	12	73	32N	318	329	+0.5	+0.2	
FR Chambery	2	12	45	13	73	43N	307	318	+0.3	+0.5	
FR Chambery	2	12	45	13	73	43N	306	317	+0.3	+0.5	
FR Charleville	2	13	36	-12	13	73	29N	321	332	+0.6	+0.1
FR Chateaudun	2	11	45	10	70	30N	320	331	+0.5	+0.1	
FR Chateauroux	2	11	47	10	70	34N	316	327	+0.4	+0.2	
FR Cherbourg	2	9	50	9	68	18N	332	343	+0.8	-0.8	
FR Cholet	2	10	46	8	68	29N	320	331	+0.4	+0.0	
FR Clermont Ferrand	2	11	54	11	71	39N	311	322	+0.3	+0.4	
FR Cognac	2	10	52	8	69	35N	315	326	+0.3	+0.2	
FR Colmar	2	14	30	14	75	38N	311	322	+0.5	+0.4	
FR Corte	2	11	28	14	74	56N	294	305	+0.2	+0.8	
FR Coulommiers	2	12	36	12	72	30N	320	331	+0.5	+0.1	
FR Creil	2	12	25	11	71	27N	322	333	+0.5	+0.0	
FR Cuers	2	11	26	12	73	50N	300	311	+0.2	+0.6	
FR Damblain	2	13	43	13	74	36N	314	325	+0.4	+0.4	
FR Deauville	2	11	6	10	70	23N	327	338	+0.6	-0.3	
FR Dijon	2	13	11	13	73	37N	312	323	+0.4	+0.4	
FR Dinard	2	10	1	8	68	21N	328	339	+0.6	-0.5	
FR Dole	2	13	13	13	73	39N	311	322	+0.4	+0.4	
FR Epinal	2	13	59	14	74	36N	314	325	+0.5	+0.4	
FR Etain	2	14	5	-12	14	74	32N	317	328	+0.5	+0.3
FR Evreux	2	11	46	10	70	26N	324	335	+0.5	-0.1	
FR Granville	2	10	13	8	68	21N	328	339	+0.6	-0.5	
FR Grenoble	2	12	26	12	73	43N	307	318	+0.3	+0.5	
FR Guiscrieff-Scaer	2	9	21	7	66	21N	329	340	+0.6	-0.6	
FR Haguenaun	2	15	3	-11	15	76	37N	313	324	+0.5	+0.4
FR Hyeres	2	11	21	12	73	50N	300	311	+0.2	+0.6	
FR Ile D'Yeu	2	10	13	7	67	28N	322	333	+0.4	-0.1	
FR Istres	2	11	20	11	72	47N	302	313	+0.2	+0.6	
FR Joigny	2	12	41	12	72	33N	317	328	+0.4	+0.2	
FR La Baule	2	10	14	7	67	26N	324	335	+0.4	-0.2	
FR La Roche-Sur-Yon	2	10	34	8	68	30N	320	331	+0.4	+0.0	
FR La Rochelle	2	10	32	8	69	43N	307	318	+0.2	+0.4	
FR Landivisiau	2	8	41	6	66	17N	332	343	+0.7	-0.9	
FR Lannion	2	9	0	7	67	18N	332	343	+0.7	-0.8	
FR Lanvedoc	2	8	42	6	66	18N	332	343	+0.7	-0.8	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
FR Laval	2	10	51		9	69	26N	323	334	+0.5	-0.1
FR Le Castellet	2	11	20		12	72	49N	301	312	+0.2	+0.6
FR Le Havre	2	11	0		10	70	22N	328	339	+0.7	-0.4
FR Le Luc	2	11	35		12	73	50N	300	311	+0.2	+0.6
FR Le Mans	2	11	13		9	69	28N	322	333	+0.5	+0.0
FR Le Puy	2	11	47		11	71	42N	308	319	+0.3	+0.5
FR Le Tourquet	2	11	42		11	71	21N	329	340	+0.7	-0.4
FR Lezignan-Corbieres	2	10	43		9	70	46N	304	315	+0.2	+0.5
FR Libourne	2	10	46		8	69	37N	313	324	+0.2	+0.3
FR Lille	2	12	45	-12	12	72	24N	326	337	+0.7	-0.2
FR Limoges	2	11	20		9	70	36N	314	325	+0.3	+0.3
FR Lorient	2	9	39		7	67	22N	327	338	+0.5	-0.4
FR Luneville	2	14	20		14	75	36N	314	325	+0.5	+0.4
FR Lure	2	13	57		14	74	38N	311	322	+0.4	+0.4
FR Luxeuil	2	13	55		14	74	38N	312	323	+0.4	+0.4
FR Lyon	2	12	29		12	72	42N	308	319	+0.3	+0.5
FR Lyon	2	12	33		12	73	42N	308	319	+0.3	+0.5
FR MacOn	2	12	40		12	73	40N	310	321	+0.3	+0.4
FR Marmande	2	10	41		8	69	39N	311	322	+0.2	+0.3
FR Marseille	2	11	20		11	72	48N	302	313	+0.2	+0.6
FR Maubeuge	2	13	19	-12	13	73	26N	323	334	+0.6	+0.0
FR Melun	2	12	24		11	71	30N	320	331	+0.5	+0.1
FR Mende	2	11	26		10	71	43N	307	318	+0.3	+0.5
FR Merville	2	12	26	-12	12	72	23N	327	338	+0.7	-0.3
FR Metz	2	14	16	-12	14	74	34N	316	327	+0.5	+0.3
FR Metz	2	14	19	-12	14	74	34N	316	327	+0.5	+0.3
FR Millau	2	11	8		10	71	44N	306	317	+0.2	+0.5
FR Mimizan	2	10	16		7	68	38N	312	323	+0.2	+0.3
FR Mont-De-Marsan	2	10	20		7	68	40N	310	321	+0.2	+0.3
FR Montauban	2	10	48		9	70	42N	308	319	+0.2	+0.4
FR Montbeliard	2	13	58		14	74	39N	310	321	+0.4	+0.5
FR Montlucon	2	11	56		10	71	37N	313	324	+0.3	+0.3
FR Montlucon-Gueret	2	11	48		10	71	37N	313	324	+0.3	+0.3
FR MontPELLIER	2	11	9		10	71	46N	304	315	+0.2	+0.5
FR Morlaix	2	8	52		7	66	18N	332	343	+0.7	-0.8
FR Moulins	2	12	17		11	72	37N	312	323	+0.3	+0.3
FR Mulhouse	2	14	20		14	75	40N	310	321	+0.4	+0.5
FR Nancy	2	14	0		14	74	35N	315	326	+0.5	+0.3
FR Nangis	2	12	35		12	72	30N	319	330	+0.5	+0.1
FR Nantes	2	10	30		8	68	28N	322	333	+0.4	-0.1
FR Nevers	2	12	20		11	71	35N	314	325	+0.4	+0.3
FR Nice	2	11	59		13	73	50N	300	311	+0.3	+0.7
FR Nimes	2	11	21		11	72	46N	303	314	+0.2	+0.5
FR Niort	2	10	56		8	69	32N	317	328	+0.3	+0.1
FR Orange	2	11	41		11	72	46N	304	315	+0.3	+0.5
FR Orleans	2	12	7		11	71	31N	318	329	+0.4	+0.1
FR Orleans	2	11	56		10	71	30N	319	330	+0.4	+0.1
FR Ouessant	2	8	5		6	65	15N	334	345	+0.8	-1.2
FR Pamiers	2	10	28		8	70	45N	305	316	+0.2	+0.5
FR Paris	2	12	21		11	71	28N	321	332	+0.5	+0.0
FR Pau	2	10	10		7	68	41N	308	319	+0.2	+0.4
FR Perigueux	2	11	3		9	69	38N	312	323	+0.3	+0.3
FR Peronne	2	12	44		12	72	26N	324	335	+0.6	-0.1
FR Perpignan	2	10	29		9	70	47N	303	314	+0.2	+0.5
FR Phalsbourg	2	14	43	-12	15	75	36N	314	325	+0.5	+0.4
FR Poitiers	2	11	13		9	69	33N	317	328	+0.3	+0.2
FR Pontarlier	2	13	28		13	74	40N	310	321	+0.4	+0.5
FR Pontivy	2	9	47		7	67	22N	328	339	+0.5	-0.4
FR Pontoise	2	12	8		11	71	27N	323	334	+0.5	+0.0
FR Propriano	2	10	56		13	74	57N	293	304	+0.2	+0.8
FR Quimper	2	9	8		6	66	20N	330	341	+0.6	-0.6
FR Reims	2	13	15		13	73	30N	319	330	+0.5	+0.1
FR Reims	2	13	12		13	73	30N	320	331	+0.5	+0.1
FR Rennes	2	10	25		8	68	24N	325	336	+0.5	-0.3
FR Roanne	2	12	17		11	72	39N	310	321	+0.3	+0.4
FR Rochefort	2	10	41		8	68	33N	317	328	+0.3	+0.1
FR Rodez	2	11	11		10	70	42N	308	319	+0.2	+0.4
FR Rouen	2	11	43		11	70	24N	325	336	+0.6	-0.2
FR Royan	2	10	40		8	68	34N	316	327	+0.3	+0.2
FR Salon	2	11	25		11	72	47N	302	313	+0.2	+0.6
FR Saumur	2	11	3		9	69	30N	320	331	+0.4	+0.0
FR St.-Brieuc Armor	2	9	36		7	67	20N	329	340	+0.6	-0.6
FR St.-Dizier	2	13	33		13	73	33N	316	327	+0.5	+0.3
FR St.-Etienne	2	12	9		11	72	41N	308	319	+0.3	+0.5
FR St.-Flour	2	11	31		10	71	41N	309	320	+0.3	+0.4
FR St.-Girons	2	10	18		8	69	44N	306	317	+0.2	+0.4
FR St.-Nazaire	2	10	18		7	68	26N	323	334	+0.4	-0.2
FR St.-Simon	2	12	48		12	72	27N	323	334	+0.6	+0.0
FR St.-Yan	2	12	26		11	72	38N	311	322	+0.3	+0.4
FR Strassbourg	2	14	50	-12	15	75	37N	312	323	+0.5	+0.4
FR Tarbes	2	10	12		7	68	42N	307	318	+0.2	+0.4
FR Toul	2	14	7		14	74	34N	315	326	+0.5	+0.3
FR Toulouse	2	10	38		9	70	43N	307	318	+0.2	+0.4
FR Tours	2	11	27		10	70	31N	319	330	+0.4	+0.1
FR Toussous-Le-Noble	2	12	11		11	71	28N	321	332	+0.5	+0.0
FR Troyes	2	13	3		12	72	33N	317	328	+0.5	+0.2
FR Ussel	2	11	33		10	71	39N	311	322	+0.3	+0.4
FR Valence	2	12	7		12	72	44N	306	317	+0.3	+0.5
FR Valenciennes	2	13	1	-12	12	72	25N	324	335	+0.6	-0.1
FR Vannes	2	10	0		7	67	24N	326	337	+0.5	-0.3
FR Verdun	2	13	56		13	74	32N	317	328	+0.5	+0.3
FR Vesoul-Frotey	2	13	46		13	74	38N	312	323	+0.4	+0.4
FR Vichy	2	12	7		11	71	38N	311	322	+0.3	+0.4
FR Vilefrance	2	12	26		12	72	41N	309	320	+0.3	+0.4

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
FR Villacoublay	2	12	13		11	71	28N	321	332	+0.5	+0.0
FR Villeneuve-Sur-Lot	2	10	46		8	69	40N	310	321	+0.2	+0.4
GB Benson	2	6	56		9	68	6N	344	355	+2.6	-4.4
GB Biggin Hill	2	9	27		10	70	13N	337	348	+1.2	-1.5
GB Blackbushe	2	8	16		9	69	10N	340	351	+1.6	-2.3
GB Boscombe Down	2	7	13		9	68	7N	342	353	+2.1	-3.4
GB Bournemouth	2	7	59		9	68	10N	339	350	+1.5	-2.2
GB Bracknell	2	8	15		10	69	10N	340	351	+1.6	-2.4
GB Cambridge	2	7	46	-12	10	69	6N	343	354	+2.5	-4.0
GB Chalsgrove	2	6	38		9	68	5N	344	355	+2.9	-5.1
GB Coltishall	2	8	39	-11	11	71	7N	343	354	+2.4	-3.6
GB Dunsfold	2	9	6		10	69	12N	337	348	+1.3	-1.6
GB Farnborough	2	8	31		10	69	11N	339	350	+1.5	-2.1
GB Hatfield	2	9	5		10	70	11N	339	350	+1.5	-2.0
GB Honington	2	8	34	-11	11	70	8N	341	352	+2.0	-3.0
GB Jersey	2	9	36		8	68	18N	331	342	+0.7	-0.7
GB Lakenheath	2	7	55	-11	11	70	6N	343	354	+2.6	-4.1
GB Lasham	2	8	17		9	68	10N	339	350	+1.5	-2.2
GB London	2	8	34		10	69	10N	339	350	+1.6	-2.2
GB Lydd	2	10	53		11	70	17N	332	343	+0.9	-0.8
GB Manston	2	10	58	-12	11	71	16N	333	344	+1.0	-0.9
GB Mildenhall	2	7	57	-12	11	70	7N	343	354	+2.5	-4.0
GB North Weald	2	9	0		10	70	11N	339	350	+1.5	-2.0
GB Northolt	2	8	27		10	69	10N	340	351	+1.6	-2.3
GB Norwich	2	8	44	-11	11	71	7N	342	353	+2.3	-3.4
GB Odiham	2	8	20		9	69	10N	339	350	+1.5	-2.2
GB Shoreham By Sea	2	9	47		10	69	15N	335	346	+1.0	-1.1
GB Southampton	2	8	22		9	68	11N	339	350	+1.4	-2.0
GB Southend	2	9	59	-12	11	70	13N	336	347	+1.2	-1.4
GB Wattisham	2	9	26	-11	11	70	11N	339	350	+1.6	-2.0
GE Sukhumi	2	30	25	6	41	99	90S	259	270	+0.9	+1.7
GE Tbilisi	2	32	7	8	44	101	82S	252	263	+1.0	+1.8
GI Gibraltar	2	7	11		0	64	55N	295	306	-0.2	+0.5
GR Agrinion	2	11	22		22	80	78N	272	282	+0.4	+1.2
GR Alexandria	2	14	24	-10	24	82	75N	275	286	+0.4	+1.2
GR Alexandroupolis	2	16	19	-7	27	85	78N	272	283	+0.5	+1.3
GR Andravida	2	10	29		22	80	80N	270	281	+0.3	+1.3
GR Athens	2	11	21	-11	24	81	83N	267	278	+0.4	+1.3
GR Chania	2	8	11		23	80	89N	261	272	+0.3	+1.4
GR Chios	2	12	59	-9	26	83	84N	265	276	+0.5	+1.4
GR Dekelia	2	11	40	-11	24	82	82N	268	279	+0.4	+1.3
GR Elefsis	2	11	31	-11	24	81	82N	268	279	+0.4	+1.3
GR Heraklion	2	8	14		24	81	89S	259	270	+0.3	+1.5
GR Ioannina	2	12	31	-12	22	81	75N	275	286	+0.4	+1.2
GR Kalamata	2	9	39		22	80	83N	267	278	+0.3	+1.3
GR Karpathos	2	9	4	-11	26	82	87S	257	268	+0.4	+1.5
GR Kasos	2	8	58	-11	25	82	88S	257	268	+0.4	+1.5
GR Kasteli	2	8	3		24	81	89S	259	270	+0.3	+1.5
GR Kastoria	2	13	35	-11	23	81	74N	276	287	+0.4	+1.2
GR Kavala	2	15	39	-8	25	84	76N	274	285	+0.5	+1.3
GR Keffallinia	2	10	28		21	80	78N	271	282	+0.3	+1.2
GR Kerkyra/corfu	2	12	5		21	80	74N	276	286	+0.4	+1.2
GR Kithira	2	8	52		22	80	86N	264	275	+0.3	+1.4
GR Kos	2	11	7	-10	26	83	89N	261	272	+0.4	+1.5
GR Kozani	2	13	38	-11	23	82	75N	275	286	+0.4	+1.2
GR Larissa	2	13	8	-11	23	82	77N	273	284	+0.4	+1.2
GR Leros	2	11	35	-10	26	83	88N	262	273	+0.4	+1.5
GR Limnos	2	14	43	-9	26	84	80N	270	281	+0.5	+1.3
GR Marathon	2	11	49	-11	24	82	82N	267	278	+0.4	+1.3
GR Megara	2	11	20	-12	23	81	82N	268	279	+0.4	+1.3
GR Mykonos	2	11	21	-11	25	82	86N	264	275	+0.4	+1.4
GR Mytilini	2	14	14	-8	27	84	83N	267	278	+0.5	+1.4
GR Nea Anghialos	2	12	42	-11	23	82	78N	271	282	+0.4	+1.3
GR Patras	2	10	50		22	80	79N	270	281	+0.4	+1.3
GR Preveza	2	11	34		22	80	77N	273	284	+0.4	+1.2
GR Rhodos	2	10	57	-10	27	83	89S	258	269	+0.4	+1.5
GR Rhodos	2	10	56	-10	27	83	89S	258	269	+0.4	+1.5
GR Samos	2	12	22	-9	26	83	87N	263	274	+0.5	+1.5
GR Santorini	2	9	54	-11	25	81	88N	262	272	+0.4	+1.4
GR Sitia	2	8	22	-12	25	81	88S	258	269	+0.3	+1.5
GR Skiathos	2	12	57	-10	24	82	79N	270	281	+0.4	+1.3
GR Skiros	2	13	7	-10	25	83	81N	269	280	+0.4	+1.3
GR Sparti	2	9	41		22	80	83N	266	277	+0.3	+1.3
GR Stefanovikion	2	13	2	-11	23	82	78N	272	283	+0.4	+1.3
GR Syros	2	11	11	-11	24	82	85N	265	276	+0.4	+1.4
GR Tanagra	2	11	53	-11	24	82	81N	268	279	+0.4	+1.3
GR Thessaloniki	2	14	26	-10	24	83	76N	274	285	+0.5	+1.2
GR Tripolis	2	10	21		22	80	82N	268	279	+0.4	+1.3
GR Zakynthos	2	10	8		21	80	80N	270	281	+0.3	+1.3
HU Azentkilyszabadja	2	19	0	-8	22	83	54N	295	306	+0.5	+0.9
HU Budapest	2	20	4	-6	23	84	55N	295	306	+0.6	+0.9
HU Debrecen	2	21	32	-5	25	86	58N	292	303	+0.6	+1.0
HU Godollo	2	20	14	-6	23	84	55N	295	306	+0.6	+0.9
HU Kaposvar	2	18	16	-8	22	82	56N	294	305	+0.5	+0.9
HU Kecskemet	2	19	52	-7	23	84	57N	293	304	+0.6	+1.0
HU Nyirregyhaza	2	22	4	-5	25	86	56N	293	304	+0.6	+1.0
HU Ocseny	2	18	45	-8	22	83	57N	293	304	+0.5	+0.9
HU Papa	2	19	1	-8	22	83	53N	297	308	+0.5	+0.9
HU Sarmellek	2	18	14	-8	21	82	54N	295	306	+0.5	+0.9
HU Siofok	2	18	53	-8	22	83	55N	295	306	+0.5	+0.9
HU Szolnok	2	20	21	-6	24	85	57N	293	304	+0.6	+1.0
HU Taszar	2	18	22	-8	22	82	56N	294	305	+0.5	+0.9
HU Tokol	2	19	50	-7	23	84	55N	295	306	+0.6	+0.9
HR Cepin	2	17	55	-8	22	82	59N	291	302	+0.5	+1.0

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
HR Dubrovnik	2	14	46	-11	21	81	65N	284	295	+0.4	+1.0
HR Grobnik	2	15	48	-11	19	79	54N	295	306	+0.4	+0.8
HR Osijek	2	17	56	-8	22	83	59N	291	302	+0.5	+1.0
HR Pula	2	15	10	-12	18	79	55N	295	306	+0.4	+0.8
HR Rijeka	2	15	43	-11	19	79	55N	295	306	+0.4	+0.9
HR Split	2	14	54	-11	20	80	61N	289	300	+0.4	+1.0
HR Udbina	2	15	37	-11	20	80	58N	292	303	+0.4	+0.9
HR Varazdin	2	17	29	-9	21	81	54N	295	306	+0.5	+0.9
HR Zadar	2	15	3	-11	19	79	58N	291	302	+0.4	+0.9
HR Zagreb	2	16	51	-10	20	81	55N	294	305	+0.5	+0.9
IT Rome	2	10	41		15	76	64N	286	297	+0.2	+0.9
LU Luxembourg	2	14	27	-11	14	75	32N	318	329	+0.5	+0.3
MK Ohrid	2	14	12	-11	22	81	71N	278	289	+0.4	+1.2
MK Skopje	2	15	33	-9	23	83	71N	279	290	+0.5	+1.2
MT Malta	2	6	26		15	75	77N	273	284	+0.1	+1.1
MT Malta Acc	2	6	29		15	75	77N	273	284	+0.1	+1.1
NL Amsterdam	2	13	35	-10	14	74	20N	330	341	+0.9	-0.4
NL De Kooy	2	13	13	-9	14	74	17N	332	343	+1.0	-0.7
NL Deelen	2	14	33	-9	15	75	23N	326	337	+0.8	-0.2
NL Drachten	2	14	31	-9	15	75	19N	330	341	+1.0	-0.5
NL Eindhoven	2	14	14	-10	14	74	25N	325	336	+0.7	-0.1
NL Enschede	2	15	18	-9	15	76	24N	325	336	+0.8	-0.1
NL Gilze-Rijen	2	13	55	-10	14	74	23N	326	337	+0.8	-0.2
NL Groningen	2	14	55	-8	15	76	20N	329	340	+0.9	-0.4
NL Leeuwarden	2	14	4	-9	15	75	18N	331	342	+1.0	-0.6
NL Lelystad	2	14	9	-9	14	75	21N	329	340	+0.9	-0.3
NL Maastricht	2	14	24	-10	14	75	27N	322	333	+0.7	+0.1
NL Rotterdam	2	13	24	-10	14	74	21N	329	340	+0.8	-0.4
NL Soesterberg	2	14	3	-10	14	74	22N	328	339	+0.8	-0.3
NL Valkenburg	2	13	20	-10	14	74	20N	330	341	+0.9	-0.5
NL Weert	2	14	23	-10	14	74	26N	324	335	+0.7	+0.0
NL Woensdrecht	2	13	29	-11	13	73	23N	327	338	+0.8	-0.2
PL Gdansk	2	24	47	-2	24	87	36N	314	325	+0.8	+0.5
PL Katowice	2	22	35	-4	24	86	47N	302	313	+0.7	+0.8
PL Koszalin	2	22	52	-3	22	85	34N	316	327	+0.8	+0.5
PL Krakow	2	22	45	-4	24	86	49N	301	312	+0.7	+0.8
PL Lodz	2	23	49	-3	24	87	44N	305	316	+0.7	+0.7
PL Mielec	2	24	6	-3	25	88	50N	299	310	+0.7	+0.9
PL Poznan	2	22	24	-4	22	85	39N	310	321	+0.7	+0.6
PL Rzeszow	2	24	18	-3	26	88	52N	298	309	+0.7	+0.9
PL Slupsk	2	23	44	-2	23	86	34N	316	327	+0.8	+0.5
PL Szczecin	2	21	18	-4	21	83	33N	316	327	+0.8	+0.4
PL Szczecin	2	21	35	-4	21	84	33N	316	327	+0.8	+0.4
PL Warsaw	2	25	19	-2	25	88	45N	304	315	+0.7	+0.8
PL Wroclaw	2	21	37	-5	22	84	43N	307	318	+0.7	+0.7
PL Zielona Gora	2	21	31	-5	22	84	39N	311	322	+0.7	+0.6
PT Braga	2	9	7		1	63	36N	313	324	+0.0	+0.1
PT Braganca	2	9	7		2	64	37N	312	323	+0.0	+0.1
PT Coimbo	2	8	55		0	63	41N	309	320	-0.1	+0.2
PT Covilha	2	8	51		1	63	41N	308	319	+0.0	+0.2
PT Espinho	2	9	2		0	63	38N	312	323	+0.0	+0.1
PT Ovar	2	9	2		0	63	38N	312	323	+0.0	+0.1
PT Porto	2	9	5		0	62	37N	313	324	+0.0	+0.1
PT Vila Real	2	9	1		1	63	38N	312	323	+0.0	+0.1
PT Viseu	2	8	56		1	63	39N	310	321	+0.0	+0.2
RO Arad	2	19	59	-6	24	85	60N	289	300	+0.6	+1.0
RO Bacau	2	23	59	-2	29	90	66N	284	295	+0.7	+1.1
RO Baia Mare	2	22	53	-4	26	88	59N	290	301	+0.7	+1.0
RO Bucharest	2	21	3	-4	28	88	70N	280	291	+0.6	+1.2
RO Caransebes	2	19	47	-6	25	85	63N	287	297	+0.6	+1.1
RO Cluj-Napoca	2	22	6	-4	26	87	62N	288	299	+0.6	+1.1
RO Constanta	2	22	25	-3	30	89	73N	277	288	+0.7	+1.3
RO Craiova	2	19	29	-6	26	86	68N	282	293	+0.6	+1.1
RO Iasi	2	25	16	-1	30	91	65N	285	296	+0.7	+1.1
RO Oradea	2	21	14	-5	25	86	59N	291	302	+0.6	+1.0
RO Satu Mare	2	22	33	-4	26	87	59N	291	302	+0.6	+1.0
RO Sibiu	2	21	15	-5	27	87	64N	285	296	+0.6	+1.1
RO Suceava	2	24	53	-2	29	90	62N	287	298	+0.7	+1.1
RO Timisoara	2	19	39	-7	24	85	61N	288	299	+0.6	+1.0
RO Tirgu Mures	2	22	15	-4	27	88	63N	287	297	+0.6	+1.1
RO Tulcea	2	23	28	-2	30	90	71N	278	289	+0.7	+1.2
SE Anderstorp	2	20	47	-2	21	84	18N	332	343	+1.2	-0.5
SE Angelholm	2	20	17	-3	20	83	21N	329	340	+1.1	-0.3
SE Arboga	2	22	22	0	22	87	13N	336	347	+1.6	-1.1
SE Bjorkvik	2	23	47	0	23	88	18N	332	343	+1.3	-0.5
SE Byholma	2	20	59	-2	21	84	20N	329	340	+1.1	-0.3
SE Emmaboda	2	23	4	-2	22	86	25N	325	336	+1.0	+0.0
SE Eskilstuna	2	23	39	1	23	88	16N	334	345	+1.4	-0.8
SE Falkoping	2	20	1	-1	21	84	13N	336	347	+1.6	-1.1
SE Gavle	2	22	14	2	23	88	9N	341	352	+2.2	-2.4
SE Gimo	2	25	2	2	24	90	15N	334	345	+1.5	-0.8
SE Gothenborg	2	17	43	-3	20	82	10N	339	350	+1.9	-1.9
SE Hagshult	2	21	27	-2	21	84	19N	330	341	+1.2	-0.4
SE Halmstad	2	20	8	-3	20	83	19N	331	342	+1.2	-0.4
SE Hasslosa	2	19	13	-1	21	84	11N	339	350	+1.8	-1.7
SE Hultsfred	2	23	14	-1	22	86	22N	328	339	+1.1	-0.2
SE Joenkoeeping	2	21	4	-1	21	84	17N	333	344	+1.3	-0.6
SE Kalkmar	2	23	44	-1	23	86	26N	324	335	+1.0	+0.1
SE Karlsborg	2	21	5	-1	21	85	14N	335	346	+1.5	-1.0
SE Karlskoga	2	19	43	0	21	85	9N	341	352	+2.2	-2.4
SE Knislinge	2	21	37	-3	21	84	24N	326	337	+1.0	+0.0
SE Kosta	2	22	54	-1	22	86	23N	326	337	+1.0	+0.0
SE Kristianstad	2	21	34	-3	21	84	24N	325	336	+1.0	+0.0
SE Landskrona	2	20	21	-3	20	83	22N	328	339	+1.0	-0.1

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
SE Lidköping	2	18	55	-1	21	84	10N	339	350	+1.9	-1.9
SE Linköping	2	22	36	0	22	86	17N	332	343	+1.3	-0.6
SE Ljungby	2	21	18	-2	21	84	20N	329	340	+1.1	-0.3
SE Malmö	2	20	52	-3	21	83	24N	325	336	+0.9	+0.0
SE Moholm	2	20	20	-1	21	85	13N	337	348	+1.7	-1.3
SE Norrköping	2	23	29	0	23	87	18N	331	342	+1.3	-0.5
SE Örebro	2	21	9	0	22	86	12N	338	349	+1.8	-1.5
SE Öskarshamn	2	24	0	-1	23	87	24N	326	337	+1.0	+0.0
SE Rada	2	18	35	-2	20	83	10N	340	351	+2.1	-2.1
SE Ronneby	2	22	42	-2	22	85	25N	324	335	+1.0	+0.1
SE Satenas	2	17	59	-2	20	83	9N	341	352	+2.2	-2.4
SE Skövde	2	20	18	-1	21	84	13N	337	348	+1.6	-1.2
SE Stockholm	2	25	22	1	24	89	19N	330	341	+1.2	-0.4
SE Strängnäs	2	24	12	1	23	88	17N	333	344	+1.4	-0.6
SE Trollhättan	2	17	28	-2	20	82	8N	341	352	+2.3	-2.7
SE Uppsala	2	24	27	2	24	89	15N	335	346	+1.5	-0.9
SE Vasterås	2	23	17	1	23	88	14N	335	346	+1.5	-1.0
SE Vaxjö	2	22	8	-2	22	85	22N	328	339	+1.1	-0.1
SE Visby	2	25	53	1	24	89	26N	324	335	+1.0	+0.1
SI Cerklje	2	16	44	-10	20	80	54N	295	306	+0.5	+0.9
SI Ljubljana	2	16	31	-10	19	80	52N	298	308	+0.5	+0.8
SI Maribor	2	17	18	-9	20	81	53N	297	308	+0.5	+0.8
SI Portoroz	2	15	32	-11	18	79	53N	297	308	+0.4	+0.8
SI Slovenj Gradec	2	17	2	-10	20	80	52N	297	308	+0.5	+0.8

Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BH Bahrain	1	22	15	-8	34	82	-22S	148	159	+3.8	-4.6
IR Abadan	1	11	41	-9	30	82	-51S	118	129	+1.4	+0.0
IR Abadan	1	11	28	-8	30	83	-61S	108	120	+1.1	+0.5
IR Ahajari	1	13	44	-8	32	83	-50S	120	131	+1.5	-0.1
IR Ahwaz	1	12	24	-8	31	83	-54S	116	127	+1.3	+0.1
IR Arak	1	14	42	-6	33	86	-62S	108	119	+1.2	+0.6
IR Ardabil	1	17	7	-4	32	88	-75S	94	106	+0.8	+1.2
IR Bakhtarān	1	12	3	-8	30	84	-66S	104	115	+1.0	+0.8
IR Bam	1	40	6	4	45	89	-15S	155	166	+9.9	+9.9
IR Bandar Mahshahr	1	12	58	-8	32	83	-51S	119	130	+1.4	-0.1
IR Bastak	1	31	40	-2	40	85	-16S	154	165	+5.9	-8.5
IR Birjand	1	31	2	4	44	92	-40S	130	141	+2.4	-1.1
IR Bojnord	1	26	39	4	41	94	-61S	109	120	+1.5	+0.5
IR Bushehr	1	16	38	-7	34	83	-40S	129	141	+2.0	-1.0
IR Darab	1	25	19	-3	39	85	-30S	140	151	+3.0	-2.6
IR Daran	1	16	24	-5	35	86	-55S	115	126	+1.4	+0.2
IR Dasht-E-Naz	1	20	29	-1	37	90	-64S	106	117	+1.3	+0.7
IR Dezful	1	12	20	-8	31	84	-58S	111	123	+1.2	+0.4
IR Emam Shahr	1	22	49	1	39	92	-61S	109	120	+1.4	+0.5
IR Esfahan	1	16	32	-5	35	86	-53S	116	127	+1.5	+0.1
IR Esfahan	1	16	48	-4	35	86	-54S	116	127	+1.5	+0.1
IR Fasa	1	23	0	-4	38	85	-33S	137	148	+2.6	-2.0
IR Gachsaran	1	15	35	-7	34	84	-47S	123	134	+1.7	-0.4
IR Ghazvin	1	16	30	-4	33	88	-67S	102	113	+1.1	+0.8
IR Golbandi	1	23	27	-5	36	83	-27S	143	154	+3.2	-3.2
IR Gorgan	1	22	15	0	38	91	-63S	106	118	+1.3	+0.7
IR Hamadan	1	13	47	-6	32	85	-66S	104	115	+1.0	+0.8
IR Ilam	1	10	46	-9	29	83	-65S	105	116	+0.9	+0.7
IR Jahrom	1	23	12	-4	37	85	-31S	138	150	+2.7	-2.2
IR Jiroft	1	38	32	3	44	88	-15S	155	166	+6.6	-9.9
IR Kalaleh	1	23	59	2	39	93	-63S	106	118	+1.4	+0.7
IR Kerman	1	28	56	1	42	88	-32S	138	149	+2.9	-2.3
IR Khark Island	1	15	23	-7	33	83	-43S	127	138	+1.8	-0.7
IR Lamerd	1	25	37	-4	37	84	-24S	146	157	+3.6	-4.1
IR Lar	1	28	46	-2	39	85	-21S	149	160	+4.2	-5.1
IR Lavan Island	1	29	43	-3	38	84	-17S	153	164	+5.5	-7.8
IR Mahmood Abad	1	16	37	-4	34	87	-59S	110	122	+1.3	+0.4
IR Maragheh	1	14	8	-7	30	86	-76S	94	105	+0.8	+1.2
IR Masjid Soleiman	1	13	11	-7	32	84	-55S	114	125	+1.3	+0.2
IR Noshahr	1	18	28	-2	35	89	-67S	103	114	+1.1	+0.8
IR Omiyeh	1	13	30	-8	32	83	-51S	119	130	+1.5	-0.1
IR Parsabad	1	18	16	-3	32	89	-79S	91	102	+0.8	+1.3
IR Rafsanjan	1	26	33	0	40	87	-35S	135	146	+2.6	-1.8
IR Ramsar	1	17	50	-3	34	89	-68S	101	112	+1.1	+0.9
IR Rasht	1	17	9	-4	33	88	-71S	99	110	+1.0	+1.0
IR Sanandaj	1	12	40	-7	30	85	-69S	101	112	+0.9	+0.9
IR Sarakhs	1	32	55	7	46	97	-52S	118	129	+2.0	-0.1
IR Semnan	1	20	9	-1	37	90	-61S	109	120	+1.4	+0.5
IR Sepah	1	16	32	-5	35	86	-54S	116	127	+1.5	+0.1
IR Shahr Abad	1	25	7	2	40	94	-63S	107	118	+1.4	+0.6
IR Shiraz	1	19	26	-5	36	85	-39S	131	142	+2.1	-1.1
IR Sirjan	1	26	49	-1	40	87	-31S	139	150	+2.9	-2.3
IR Tabas	1	25	24	1	41	91	-48S	121	133	+1.9	-0.3
IR Tabriz	1	15	7	-6	30	86	-77S	92	103	+0.7	+1.2
IR Teheran	1	17	29	-3	35	88	-64S	106	117	+1.2	+0.7
IR Yazd	1	21	0	-2	38	87	-46S	124	135	+1.9	-0.5
IR Zabol	1	42	18	7	49	93	-22S	148	159	+4.3	-5.1
IR Zanjan	1	15	20	-5	32	87	-71S	99	110	+0.9	+1.0
IR Zarghan	1	19	26	-5	36	85	-40S	130	141	+2.1	-1.0
IQ Baghdad	1	8	44	-11	27	82	-67S	103	114	+0.8	+0.8
IQ Basrah	1	10	53	-10	30	82	-53S	117	128	+1.3	+0.1
IL Beer-Sheba	1	1	49	17	76	76	-74S	96	107	+0.3	+0.9
IL Elat	1	0	30	17	75	75	-69S	101	112	+0.4	+0.7
IL Eyn-Shemer	1	3	1	18	76	76	-77S	93	104	+0.3	+1.0

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
IL Eyn-Yahav	1	1	26	17	76	-72S	98	109	+0.4	+0.8	
IL Haifa	1	3	24	18	77	-77S	92	103	+0.3	+1.0	
IL Haztor	1	2	16	17	76	-75S	95	106	+0.3	+1.0	
IL Jerusalem	1	2	30	18	76	-75S	95	106	+0.3	+0.9	
IL Megido Airstrip	1	3	14	18	77	-77S	93	104	+0.3	+1.0	
IL Metzada	1	2	7	18	76	-73S	97	108	+0.4	+0.9	
IL Nevatim	1	1	50	17	76	-73S	96	107	+0.3	+0.9	
IL Ovda	1	0	46	17	75	-70S	100	111	+0.4	+0.7	
IL Ramat David	1	3	17	18	77	-77S	93	104	+0.3	+1.0	
IL Ramon	1	1	20	17	75	-73S	97	108	+0.3	+0.9	
IL Rosh Pina	1	3	43	19	77	-77S	92	104	+0.3	+1.0	
IL Tel-Aviv	1	2	38	18	76	-76S	94	105	+0.3	+1.0	
IL Tel-Nof	1	2	22	17	76	-75S	94	106	+0.3	+1.0	
JO Amman	1	2	37	18	77	-74S	96	107	+0.4	+0.9	
JO Aqaba	1	0	33	17	75	-69S	101	112	+0.4	+0.7	
JO Jerusalem	1	2	29	18	76	-75S	95	106	+0.3	+0.9	
JO Mafrag	1	3	19	19	77	-75S	95	106	+0.4	+1.0	
KW Kuwait	1	11	32	-10	30	82	-48S	122	133	+1.5	-0.3
LB Beirut	1	4	37	19	77	-79S	90	101	+0.3	+1.1	
LB Kleiat	1	5	39	20	78	-81S	89	100	+0.3	+1.2	
SA Abqaiq	1	19	3	-9	33	81	-26S	144	155	+3.0	-3.3
SA Al-Ahsa	1	21	0	-9	33	81	-21S	149	160	+3.9	-5.0
SA Al-Jouf	1	3	18	22	78	-63S	107	118	+0.7	+0.5	
SA Arar	1	4	42	23	79	-64S	105	116	+0.7	+0.6	
SA Dammam	1	18	3	-9	33	81	-30S	140	151	+2.7	-2.5
SA Dhahran	1	19	38	-8	33	81	-27S	143	154	+3.0	-3.1
SA Gassim	1	6	48	25	78	-44S	126	137	+1.4	-0.6	
SA Guriat	1	2	52	19	77	-71S	99	110	+0.5	+0.8	
SA Hafr Al-Batin	1	9	8	28	80	-48S	122	133	+1.4	-0.3	
SA Hail	1	3	55	23	77	-52S	117	129	+1.0	+0.0	
SA Jeddah	1	5	11	19	75	-32S	138	149	+1.7	-2.0	
SA Jubail	1	16	4	-9	32	81	-34S	136	147	+2.3	-1.7
SA King Khalid Mil.City	1	8	28	27	80	-47S	123	134	+1.4	-0.4	
SA Madinah	1	2	42	20	76	-45S	125	136	+1.1	-0.6	
SA Petroline 10	1	4	45	21	76	-40S	130	141	+1.4	-1.0	
SA Petroline 3	1	15	10	-12	30	79	-28S	141	153	+2.6	-2.7
SA Petroline 6	1	10	27	26	78	-33S	137	148	+2.0	-1.8	
SA Rabigh	1	3	36	19	75	-38S	132	143	+1.4	-1.2	
SA Rafha	1	6	3	25	79	-57S	113	124	+1.0	+0.3	
SA Ras Tanajib	1	13	44	-10	31	81	-40S	130	141	+1.9	-1.0
SA Ras Tanura	1	18	2	-8	33	82	-30S	139	151	+2.6	-2.3
SA Rash Mishab	1	13	14	-10	31	81	-41S	128	140	+1.8	-0.8
SA Riyadh	1	13	44	29	79	-30S	140	151	+2.5	-2.4	
SA Tabuk	1	0	27	18	75	-63S	106	118	+0.5	+0.5	
SA Taif	1	8	17	21	75	-26S	144	155	+2.4	-3.1	
SA Thumamah	1	13	2	29	79	-31S	138	150	+2.3	-2.1	
SA Turaif	1	3	49	21	78	-70S	100	111	+0.5	+0.8	
SA Wejh	0	59	40	17	75	-57S	113	124	+0.7	+0.1	
SA Yenbo	1	1	14	18	75	-46S	124	135	+1.0	-0.5	
SY Aleppo	1	8	0	21	79	-83S	86	98	+0.3	+1.3	
SY Damascus	1	4	28	20	78	-77S	92	104	+0.3	+1.1	
SY Deire Zor	1	8	6	24	81	-78S	92	103	+0.5	+1.1	
SY Kamishli	1	10	41	-10	25	82	-81S	89	100	+0.5	+1.3
SY Latakia	1	6	38	20	78	-83S	87	98	+0.3	+1.3	
SY Palmyra	1	6	25	22	79	-78S	92	103	+0.4	+1.1	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BH Bahrain	1	45	12	-3	39	84	12S	182	193	-2.1	+8.0
IR Abadan	2	6	44	1	42	89	43S	213	224	+0.3	+3.4
IR Abadan	2	14	15	3	43	92	53S	223	234	+0.6	+2.9
IR Aghajari	2	8	27	3	44	90	42S	212	223	+0.3	+3.5
IR Ahwaz	2	10	7	3	43	90	46S	216	226	+0.4	+3.3
IR Arak	2	19	13	6	46	95	54S	224	235	+0.7	+2.9
IR Ardabil	2	28	45	9	46	100	69S	239	250	+1.0	+2.3
IR Bakhtaran	2	17	56	4	44	93	58S	228	239	+0.7	+2.6
IR Bam	1	55	52	7	49	91	6S	176	187	+9.9	+9.9
IR Bandar Mahshahr	2	7	37	2	43	89	42S	212	223	+0.3	+3.5
IR Bastak	1	47	40	1	43	86	6S	176	187	+9.9	+9.9
IR Birjand	2	20	41	14	55	100	33S	203	214	+0.4	+4.7
IR Bojnord	2	35	48	16	55	108	55S	225	236	+1.1	+2.9
IR Bushehr	2	1	35	2	43	88	31S	201	212	-0.1	+4.4
IR Darab	1	59	11	4	46	89	20S	190	201	-0.8	+6.1
IR Daran	2	16	42	7	47	94	47S	217	228	+0.6	+3.3
IR Dasht-E-Naz	2	29	9	12	51	102	57S	227	238	+1.0	+2.8
IR Dezful	2	13	19	4	44	91	50S	220	231	+0.5	+3.0
IR Emam Shahr	2	30	21	13	52	103	54S	224	235	+1.0	+3.0
IR Esfahan	2	15	34	7	47	94	45S	215	226	+0.5	+3.4
IR Esfahan	2	16	17	7	47	94	46S	216	227	+0.6	+3.4
IR Fasa	2	0	29	4	46	89	24S	194	205	-0.5	+5.5
IR Gachsaran	2	7	15	3	45	90	38S	208	219	+0.2	+3.8
IR Ghazvin	2	25	11	9	47	98	60S	230	241	+0.9	+2.6
IR Golbandi	1	53	6	1	43	86	17S	187	198	-1.2	+6.6
IR Gorgan	2	31	6	13	52	104	57S	227	238	+1.0	+2.8
IR Hamadan	2	20	19	6	45	95	58S	228	239	+0.8	+2.7
IR Ilam	2	15	24	3	43	92	57S	227	238	+0.6	+2.7
IR Jahrom	1	58	58	3	45	89	22S	192	203	-0.6	+5.7
IR Jiroft	1	54	1	6	48	90	6S	176	187	+9.9	+9.9
IR Kalaleh	2	33	30	15	53	106	57S	227	238	+1.1	+2.8
IR Kerman	2	6	52	8	50	93	23S	193	204	-0.4	+5.8
IR Khark Island	2	2	58	2	43	88	34S	204	215	+0.0	+4.1
IR Lamerd	1	51	30	1	43	86	14S	184	195	-1.6	+7.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
IR Lar	1	51	57	2	44	87	12S	182	193	-2.0	+8.6
IR Lavan Island	1	46	11	0	42	85	7S	177	188	+9.9	+9.9
IR Mahmood Abad	2	20	23	8	48	96	52S	222	233	+0.7	+3.0
IR Maragheh	2	24	26	6	44	97	69S	239	250	+0.9	+2.3
IR Masjed Soleiman	2	12	28	4	44	91	47S	217	228	+0.5	+3.2
IR Noshahr	2	27	36	10	49	100	60S	230	241	+0.9	+2.6
IR Omidyeh	2	8	46	3	44	90	42S	212	223	+0.3	+3.5
IR Parsabad	2	31	2	9	46	101	73S	243	254	+1.0	+2.1
IR Rafsanjan	2	7	18	8	49	93	26S	196	207	-0.2	+5.3
IR Ramsar	2	27	29	10	48	100	62S	232	243	+0.9	+2.6
IR Rasht	2	27	33	9	47	100	64S	234	245	+0.9	+2.4
IR Sanandaj	2	20	7	5	44	94	62S	231	242	+0.8	+2.5
IR Sarakhs	2	36	46	19	58	111	46S	216	227	+1.1	+3.6
IR Semnan	2	26	23	11	50	100	53S	223	234	+0.9	+3.0
IR Sepah	2	15	46	7	47	94	45S	215	226	+0.6	+3.4
IR Shahr Abad	2	34	58	15	54	107	57S	227	238	+1.1	+2.8
IR Shiraz	2	4	5	4	46	90	30S	200	211	-0.1	+4.6
IR Sirjan	2	3	21	6	48	91	22S	192	203	-0.5	+5.9
IR Tabas	2	22	39	12	53	100	41S	211	222	+0.7	+3.9
IR Tabriz	2	26	19	7	44	98	71S	241	252	+0.9	+2.2
IR Teheran	2	24	44	9	48	99	57S	227	238	+0.9	+2.8
IR Yazd	2	14	24	8	49	94	38S	208	219	+0.4	+4.0
IR Zabol	2	9	29	13	54	97	14S	184	195	-1.2	+8.7
IR Zanzjan	2	25	2	7	46	98	64S	234	245	+0.9	+2.4
IR Zarghan	2	5	2	4	46	90	31S	201	212	+0.0	+4.5
IQ Baghdad	2	13	17	1	40	90	59S	229	240	+0.6	+2.5
IQ Basrah	2	7	8	1	42	89	45S	214	225	+0.3	+3.3
IL Beer-Sheba	2	4	27	-9	30	83	67S	237	248	+0.3	+2.1
IL Elat	2	0	47	-10	29	81	62S	231	242	+0.2	+2.2
IL Eyn-Shemer	2	6	57	-8	31	84	70S	240	251	+0.4	+2.0
IL Eyn-Yahav	2	3	12	-9	30	82	64S	234	245	+0.3	+2.2
IL Haifa	2	7	44	-7	31	84	71S	241	252	+0.4	+2.0
IL Haztor	2	5	27	-9	31	83	68S	238	249	+0.4	+2.1
IL Jerusalem	2	5	50	-8	31	83	68S	238	249	+0.4	+2.1
IL Megido Airstrip	2	7	21	-7	31	84	70S	240	251	+0.4	+2.0
IL Metzada	2	4	47	-8	31	83	66S	236	247	+0.3	+2.1
IL Nevatim	2	4	23	-9	31	83	66S	236	247	+0.3	+2.1
IL Ovda	2	1	37	-10	30	82	63S	233	244	+0.2	+2.2
IL Ramat David	2	7	28	-7	31	84	70S	240	251	+0.4	+2.0
IL Ramon	2	3	22	-9	30	82	66S	235	246	+0.3	+2.1
IL Rosh Pina	2	8	17	-7	32	85	70S	240	251	+0.4	+2.0
IL Tel-Aviv	2	6	12	-8	31	83	69S	239	250	+0.4	+2.0
IL Tel-Nof	2	5	38	-8	31	83	68S	238	249	+0.4	+2.1
JO Amman	2	5	48	-8	32	84	66S	236	247	+0.4	+2.1
JO Aqaba	2	0	54	-10	30	82	62S	232	242	+0.2	+2.2
JO Jerusalem	2	5	49	-8	31	83	68S	238	249	+0.4	+2.1
JO Mafrag	2	7	15	-7	32	84	68S	238	249	+0.4	+2.1
KW Kuwait	2	2	40	0	41	87	39S	209	220	+0.1	+3.6
LB Beirut	2	9	53	-6	32	85	73S	243	254	+0.5	+2.0
LB Kleiat	2	11	41	-5	33	86	74S	244	255	+0.5	+2.0
SA Abqaiq	1	46	43	-3	39	83	16S	186	197	-1.4	+6.6
SA Al-Ahsa	1	42	28	-5	38	82	11S	181	192	-2.3	+8.2
SA Al-Jouf	2	2	34	-6	34	84	55S	224	235	+0.3	+2.6
SA Arar	2	5	48	-4	36	86	56S	226	237	+0.4	+2.6
SA Dammam	1	49	52	-2	40	84	20S	190	201	-1.0	+5.8
SA Dhahran	1	48	14	-3	40	84	17S	187	198	-1.3	+6.5
SA Gassim	1	52	13	-7	35	82	35S	205	216	-0.2	+3.7
SA Guriat	2	5	35	-7	33	84	64S	234	245	+0.4	+2.2
SA Hafr Al-Batin	1	59	19	-3	39	85	39S	209	220	+0.0	+3.6
SA Hail	1	56	14	-7	34	82	44S	214	225	+0.0	+3.1
SA Jeddah	1	36	10	26	77	22S	192	203	-1.1	+4.7	
SA Jubail	1	53	7	-2	40	85	25S	195	206	-0.6	+5.0
SA King Khalid Mil.City	1	57	47	-4	38	84	38S	208	219	+0.0	+3.6
SA Madinah	1	47	12	-12	30	79	36S	206	217	-0.4	+3.5
SA Petroline 10	1	44	57	-12	30	79	31S	201	212	-0.5	+3.9
SA Petroline 3	1	44	56	-6	36	82	19S	189	200	-1.2	+5.9
SA Petroline 6	1	44	52	-8	34	81	24S	194	205	-0.8	+4.9
SA Rabigh	1	40	40	27	78	28S	198	209	-0.7	+4.0	
SA Rafha	2	3	2	-3	37	85	48S	218	229	+0.3	+2.9
SA Ras Tanajib	1	57	18	-1	41	86	31S	201	212	-0.2	+4.3
SA Ras Tanura	1	51	7	-2	40	85	21S	191	202	-0.9	+5.7
SA Rash Mishab	1	58	11	-1	41	86	32S	202	213	-0.2	+4.2
SA Riyadh	1	44	34	-7	36	81	20S	190	201	-1.1	+5.6
SA Tabuk	1	58	15	-10	30	81	55S	225	236	+0.1	+2.5
SA Taif	1	33	22	27	77	16S	186	197	-1.6	+5.9	
SA Thumamah	1	46	0	-6	36	82	22S	192	203	-0.9	+5.3
SA Turaif	2	6	46	-5	34	85	62S	232	243	+0.4	+2.3
SA Wejh	1	52	42	28	79	48S	218	229	+0.0	+2.7	
SA Yenbo	1	46	21	28	78	37S	207	218	-0.3	+3.3	
SY Aleppo	2	15	26	-3	35	89	77S	247	258	+0.6	+1.9
SY Damascus	2	9	34	-6	33	86	70S	240	251	+0.5	+2.1
SY Deire Zor	2	15	32	-1	37	90	71S	241	252	+0.6	+2.1
SY Kamishli	2	19	48	1	39	92	74S	244	255	+0.7	+2.0
SY Latakia	2	13	12	-4	34	87	76S	246	257	+0.6	+1.9
SY Palmyra	2	12	53	-3	35	88	71S	241	252	+0.6	+2.1

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimuth della Luna, in gradi

CA : angolo di cuspede, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspede più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °  
 Moon alt : height of the Moon above the horizon, in °  
 Moon az : azimuth of the Moon, in °  
 CA : angle of cusps, angle of the event along the limb of the Moon, measured by the nearest cusp;  
 a negative value means that the phenomenon happens along the bright limb  
 PA : angle of position , angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
 Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

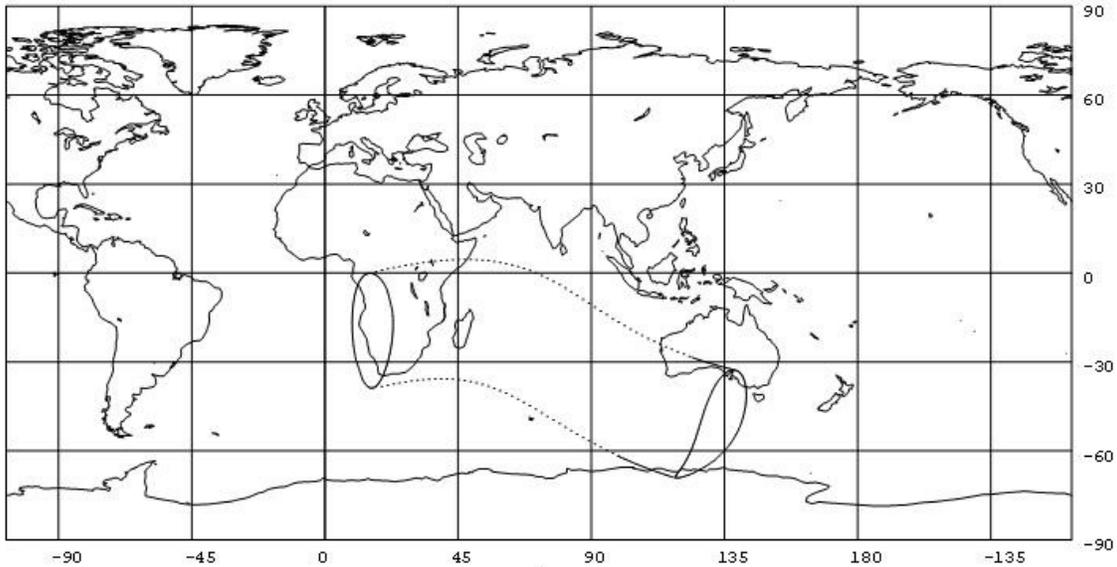
Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.  
 U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
 Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

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### Occultation of Mercury, Magnitude 3.0, on 2012 Jul 20



Occult4090

UT of conjunction = 7h 50.1m

Luna: % illuminazione 1+, elongazione solare 14°      Moon: % illumination 1+, solar elongation 14°

#### Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o
AU Adelaide	8	51	49	-12	2	288	18N	52	37	+1.0 +3.5
AU Edinburgh	8	52	34	-12	2	288	17N	51	35	+1.0 +3.7

#### Riapparizione - Reappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o
AU Albany	9	25	2	-2	12	296	-68N	325	310	+0.1 -0.7
AU Kalgoorlie	9	18	47	-2	12	294	-44N	350	334	-0.4 -2.4

Sun alt : altezza del Sole sull'orizzonte, in gradi  
 Moon alt : altezza della Luna sull'orizzonte, in gradi  
 Moon az : azimut della Luna, in gradi  
 CA : angolo di cuspidè, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidè piú vicina;  
 un valore negativo indica che il fenomeno avviene lungo il bordo luminoso  
 PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °  
 Moon alt : height of the Moon above the horizon, in °  
 Moon az : azimuth of the Moon, in °  
 CA : angle of cuspidè, angle of the event along the limb of the Moon, measured by the nearest cuspidè;  
 a negative value means that the phenomenon happens along the bright limb  
 PA : angle of position , angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
 Si utilizza la seguente formula:

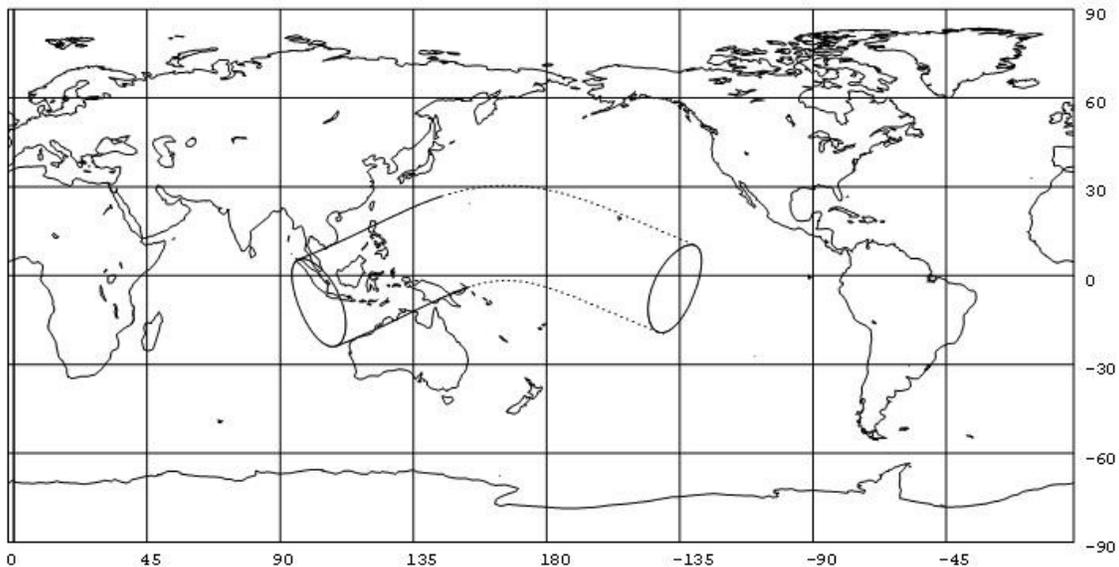
$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città piú vicina in tabella.  
 U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
 Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.  
 B same as for A, but for changes in latitude (+ve to the north).

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### Occultation of Jupiter, Magnitude -2.1, on 2012 Aug 11



Occult 4.09.0

UT of conjunction = 20h 30.2m

Luna: % illuminazione 31-, elongazione solare 68°

Moon: % illumination 31-, solar elongation 68°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o
BN Brunei	18	19	51	11	69	-54N	45	55	-0.3	+1.7
ID Ambon	18	18	1	19	66	-77S	95	105	+1.0	-0.4
ID Balikpapan	18	12	38	9	68	-78N	70	79	+0.1	+0.6
ID Banjarmasin	18	11	25	6	68	-82N	74	84	+0.1	+0.4
ID Batu Licin	18	11	31	7	68	-84N	76	85	+0.1	+0.3
ID Biak	18	27	33	30	64	-72S	100	109	+1.6	-0.5

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
ID Bima	18	13	1	8	67	-75S	97	107	+0.6	-0.6	
ID Denpasar	18	11	32	4	68	-79S	93	102	+0.3	-0.4	
ID Ende	18	15	13	11	66	-69S	103	113	+0.8	-0.9	
ID Gorontalo	18	15	9	16	68	-81N	73	82	+0.4	+0.6	
ID Jayapura	18	37	35	35	61	-58S	114	123	+2.4	-1.4	
ID Kaimana	18	25	10	26	64	-67S	105	114	+1.6	-0.8	
ID Kendari	18	13	38	13	67	-84S	88	97	+0.6	-0.1	
ID Ketapang	18	12	49	2	68	-70N	62	71	-0.2	+0.8	
ID Kupang	18	18	34	13	65	-60S	112	121	+1.1	-1.3	
ID Labuhan Bajo	18	13	43	9	67	-73S	99	108	+0.6	-0.7	
ID Langgur	18	25	32	25	63	-61S	111	120	+1.7	-1.2	
ID Luwuk	18	14	16	15	67	-86N	78	87	+0.4	+0.4	
ID Madiun	18	10	31	1	68	-88S	84	93	+0.1	-0.1	
ID Makale	18	12	28	11	67	-88N	80	89	+0.3	+0.2	
ID Malang	18	10	40	2	68	-85S	87	96	+0.1	-0.2	
ID Manado	18	16	36	18	68	-81N	73	82	+0.5	+0.7	
ID Manokwari	18	24	17	27	65	-77S	95	105	+1.4	-0.3	
ID Masamba	18	12	49	12	67	-87N	79	89	+0.3	+0.3	
ID Mataram	18	11	47	5	67	-78S	94	103	+0.4	-0.4	
ID Maumere	18	15	31	12	66	-69S	103	113	+0.8	-0.9	
ID Merauke	18	55	20	36	55	-25S	148	157	+5.4	-7.3	
ID Nabire	18	27	58	29	63	-65S	107	116	+1.8	-0.9	
ID Nangapinoh	18	13	44	5	68	-68N	60	69	-0.2	+1.0	
ID Natuna	18	21	3	5	69	-47N	38	48	-0.6	+1.9	
ID Palangkaraya	18	12	0	6	68	-77N	69	78	+0.0	+0.6	
ID Palu	18	13	21	12	68	-81N	73	83	+0.2	+0.5	
ID Pangkalan Bun	18	11	54	3	68	-76N	68	77	-0.1	+0.6	
ID Ponggaluku	18	13	40	13	67	-83S	89	98	+0.6	-0.1	
ID Pontianak	18	14	36	3	69	-64N	56	65	-0.3	+1.1	
ID Poso	18	13	18	12	68	-84N	76	85	+0.3	+0.4	
ID Putusibau	18	14	41	6	68	-65N	57	66	-0.2	+1.1	
ID Ruteng	18	14	5	10	66	-72S	100	110	+0.7	-0.7	
ID Samarinda	18	13	11	10	68	-76N	68	77	+0.1	+0.7	
ID Sampit	18	11	53	5	68	-77N	69	78	-0.1	+0.6	
ID Semarang	18	10	31	0	68	-88N	80	89	+0.0	+0.1	
ID Sintang	18	14	12	5	68	-66N	58	67	-0.3	+1.0	
ID Solo City	18	10	29	0	68	-89S	83	92	+0.0	+0.0	
ID Soroako	18	13	12	13	67	-89N	81	90	+0.4	+0.2	
ID Sorong	18	20	36	24	66	-81S	91	100	+1.1	-0.1	
ID Sumbawa	18	12	20	7	67	-77S	95	105	+0.5	-0.5	
ID Surabaya	18	10	38	2	68	-87S	85	94	+0.1	-0.1	
ID Tahuna	18	18	36	20	68	-75N	67	76	+0.4	+1.0	
ID Tanjung Redep	18	15	34	11	69	-67N	59	69	+0.0	+1.1	
ID Tanjung Santan	18	13	29	10	68	-75N	67	76	+0.1	+0.8	
ID Taraken	18	16	57	12	69	-64N	56	65	-0.1	+1.3	
ID Ternate	18	17	38	21	67	-87N	79	88	+0.7	+0.4	
ID Timika	18	32	2	30	62	-58S	114	124	+2.1	-1.5	
ID Ujung Pandang	18	12	16	10	67	-85S	87	96	+0.4	-0.1	
ID Waikabubak	18	13	57	8	67	-71S	101	111	+0.7	-0.8	
ID Waingapu	18	14	53	9	66	-68S	104	113	+0.8	-0.9	
ID Wamena	18	35	53	33	61	-55S	117	126	+2.4	-1.6	
ID Yogyakarta	18	10	29	0	68	-89S	83	92	+0.0	+0.0	
JP Iwojima	19	25	44	-10	56	88	-15N	7	16	-1.0	+8.8
JP Minami Tori Shima	19	32	58	2	69	93	-45N	37	46	+1.8	+3.9
MY Alor Setar	18	36	13	2	69	-15N	7	16	-2.0	+5.2	
MY Bintulu	18	17	39	8	69	-57N	49	58	-0.3	+1.5	
MY Butterworth	18	32	58	1	69	-21N	13	22	-1.6	+4.0	
MY Ipoh	18	28	54	0	68	-29N	21	30	-1.2	+3.0	
MY Kerteh	18	26	18	2	69	-34N	26	35	-1.0	+2.6	
MY Kota Bahru	18	32	50	3	69	-22N	14	23	-1.5	+4.0	
MY Kota Kinabalu	18	21	16	13	69	-52N	44	53	-0.3	+1.8	
MY Kuala Terengganu	18	29	1	2	69	-29N	21	30	-1.2	+3.1	
MY Kuantan	18	24	39	1	69	-38N	30	39	-0.9	+2.4	
MY Kuching	18	16	13	5	69	-59N	51	60	-0.4	+1.3	
MY Labuan	18	20	23	12	69	-53N	45	54	-0.3	+1.8	
MY Lahad Datu	18	19	16	14	69	-59N	51	60	-0.1	+1.5	
MY Marudi	18	18	47	10	69	-55N	47	57	-0.3	+1.6	
MY Miri	18	19	7	10	69	-54N	46	55	-0.3	+1.6	
MY Penang	18	32	30	0	68	-22N	14	23	-1.5	+3.9	
MY Pulau	18	38	40	2	69	-11N	3	12	-2.6	+6.7	
MY Pulau Pioman	18	21	48	1	69	-44N	36	45	-0.8	+2.0	
MY Sibul	18	16	41	7	69	-59N	51	60	-0.3	+1.4	
MY Tawau	18	18	15	13	69	-61N	53	62	-0.1	+1.4	
PG Goroka	19	5	13	44	53	-25S	147	156	+5.7	-7.2	
PG Madang	19	1	58	44	54	-31S	141	150	+4.7	-5.2	
PG Mount Hagen	18	58	11	41	55	-32S	140	149	+4.5	-5.0	
PG Wewak	18	48	15	40	58	-47S	125	134	+3.2	-2.5	
PH Bacolod	18	29	37	23	71	-46N	38	47	-0.2	+2.4	
PH Bagabag	18	57	55	29	74	-2N	354	3	+9.9	+9.9	
PH Baguio	18	58	33	29	74	1N	351	1	+9.9	+9.9	
PH Calbayog	18	32	57	25	72	-43N	35	44	-0.2	+2.7	
PH Catarman	18	34	7	26	72	-41N	33	42	-0.2	+2.8	
PH Cauayan	18	59	59	30	75	0N	352	1	+9.9	+9.9	
PH Cebu	18	22	43	21	70	-61N	53	62	+0.2	+1.6	
PH Cubi Nas	18	21	20	21	69	-66N	58	67	+0.3	+1.4	
PH Daet	18	39	58	26	73	-30N	22	31	-0.6	+3.8	
PH Dumaguete	18	26	38	22	71	-51N	43	53	+0.0	+2.1	
PH Floridablanca	18	46	25	26	73	-17N	9	18	-1.6	+5.7	
PH Guiuan	18	30	18	26	71	-49N	41	51	+0.0	+2.3	
PH Iba	18	49	36	26	73	-11N	3	12	-2.4	+7.3	
PH Iloilo	18	29	51	22	71	-45N	37	46	-0.2	+2.5	
PH Jose Panganiban	18	40	49	26	73	-28N	20	29	-0.7	+3.9	
PH Kalibo	18	32	25	23	71	-40N	32	41	-0.3	+2.8	
PH Ladag	18	24	53	22	70	-57N	49	58	+0.1	+1.8	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
PH Legazpi	18	23	44	21	70	-57N	49	58	+0.1	+1.8	
PH Lingayen	18	55	19	28	74	-4N	356	5	+9.9	+9.9	
PH Lipa	18	40	42	25	72	-26N	18	27	-0.9	+4.1	
PH Mamburao	18	38	12	23	72	-29N	21	30	-0.8	+3.8	
PH Manila	18	43	15	25	73	-22N	14	23	-1.1	+4.7	
PH Marinduque	18	37	55	24	72	-31N	23	32	-0.6	+3.6	
PH Masbate	18	28	41	23	71	-49N	41	50	-0.1	+2.3	
PH Naga	18	37	54	26	72	-33N	25	34	-0.5	+3.4	
PH Ormoc	18	30	24	24	71	-47N	39	48	-0.1	+2.4	
PH Puerto Princesa	18	28	35	18	70	-41N	33	42	-0.4	+2.6	
PH Romblon	18	21	14	21	69	-66N	58	67	+0.3	+1.4	
PH Roxas	18	32	5	23	71	-41N	33	42	-0.3	+2.7	
PH San Jose	18	30	6	22	71	-43N	35	44	-0.3	+2.6	
PH Sangley Point	18	27	33	24	71	-54N	46	55	+0.1	+2.0	
PH Tacloban	18	30	47	25	71	-47N	39	48	+0.0	+2.4	
PH Virac	18	37	27	27	73	-36N	28	37	-0.4	+3.3	
PH Zamboanga	18	22	6	19	70	-58N	50	59	+0.0	+1.7	
TH Narathiwat	18	35	17	3	69	-17N	9	18	-1.8	+4.8	
TH Pattani	18	37	55	3	69	-12N	4	13	-2.4	+6.2	
TH Songkhla	18	43	8	4	69	-3N	354	4	+9.9	+9.9	
TH Songkhla	18	41	14	3	69	-6N	358	7	-3.8	+9.6	
TH Ya La	18	36	15	3	69	-15N	7	16	-2.0	+5.2	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BN Brunei	19	18	48	25	69	66N	287	296	+1.4	-0.5	
ID Ambon	19	31	41	36	60	63S	235	244	+1.1	+1.4	
ID Balikpapan	19	21	34	25	66	90S	262	271	+1.0	+0.3	
ID Bandung	19	13	50	12	66	85S	257	266	+0.4	+0.2	
ID Banjarmasin	19	19	2	21	65	86S	258	267	+0.8	+0.3	
ID Batam	19	9	47	11	68	61N	291	300	+0.8	-0.8	
ID Batu Licin	19	20	3	23	65	84S	256	265	+0.8	+0.4	
ID Bengkulu	19	11	24	8	68	77N	276	285	+0.5	-0.3	
ID Biak	19	46	44	47	56	59S	231	240	+1.6	+1.9	
ID Bima	19	18	15	22	62	62S	235	244	+0.5	+1.1	
ID Cilacap	19	14	21	13	66	81S	253	262	+0.4	+0.3	
ID Cirebon	19	14	19	13	66	84S	256	265	+0.4	+0.2	
ID Denpasar	19	16	23	19	64	67S	240	249	+0.4	+0.8	
ID Dumai	19	7	12	8	69	54N	298	307	+0.8	-1.1	
ID Ende	19	19	24	25	61	56S	228	237	+0.5	+1.4	
ID Gorontalo	19	29	9	33	65	86S	258	267	+1.3	+0.5	
ID Gunung Sitoli	19	4	55	4	69	49N	303	312	+0.7	-1.4	
ID Jakarta	19	13	40	12	66	88S	261	270	+0.4	+0.1	
ID Jambi	19	11	12	10	68	71N	281	290	+0.6	-0.5	
ID Jayapura	19	50	31	51	51	46S	218	227	+1.5	+2.9	
ID Kaimana	19	38	24	42	57	54S	226	235	+1.2	+2.0	
ID Kendari	19	25	26	29	63	71S	244	253	+0.9	+0.9	
ID Ketapang	19	15	33	17	67	81N	271	280	+0.8	-0.1	
ID Kupang	19	18	10	26	60	47S	220	229	+0.4	+1.8	
ID Labuhan Bajo	19	18	57	24	62	60S	233	242	+0.5	+1.2	
ID Langgur	19	33	4	39	56	48S	220	229	+0.9	+2.3	
ID Lhok Sukon	18	55	10	3	69	23N	329	338	+2.0	-4.6	
ID Luwuk	19	28	8	32	64	81S	253	262	+1.2	+0.7	
ID Madiun	19	15	24	16	65	77S	249	258	+0.5	+0.5	
ID Makale	19	23	42	27	64	79S	251	260	+1.0	+0.6	
ID Malang	19	15	48	17	65	74S	246	255	+0.5	+0.6	
ID Manado	19	32	30	36	64	86S	258	267	+1.5	+0.6	
ID Manokwari	19	44	0	45	58	63S	235	244	+1.6	+1.6	
ID Masamba	19	24	33	28	64	80S	252	261	+1.0	+0.6	
ID Mataram	19	16	57	20	63	66S	239	248	+0.5	+0.9	
ID Maumere	19	19	59	26	61	56S	228	237	+0.5	+1.4	
ID Medan	19	1	37	5	69	38N	314	323	+1.1	-2.1	
ID Merauke	19	24	24	42	51	12S	184	193	-1.6	+8.5	
ID Muko Muko	19	10	15	7	68	70N	282	291	+0.5	-0.5	
ID Nabire	19	41	18	44	55	52S	224	233	+1.3	+2.2	
ID Nangapinoh	19	16	50	19	67	79N	273	282	+0.9	-0.1	
ID Natuna	19	11	30	17	69	57N	295	304	+1.1	-0.9	
ID Padang	19	8	46	7	68	62N	290	299	+0.6	-0.8	
ID Padang Sidempuan	19	5	53	6	69	51N	301	310	+0.8	-1.3	
ID Palangkaraya	19	18	40	21	66	89N	263	272	+0.8	+0.2	
ID Palembang	19	12	18	11	68	77N	275	284	+0.6	-0.3	
ID Palu	19	24	51	28	65	86S	258	267	+1.1	+0.4	
ID Pangkal Pinang	19	12	57	13	67	77N	276	285	+0.6	-0.3	
ID Pangkalan Bun	19	16	48	18	66	87N	265	274	+0.8	+0.1	
ID Pekanbaru	19	8	20	8	68	59N	293	302	+0.7	-0.9	
ID Pendoro	19	11	58	10	68	77N	275	284	+0.5	-0.3	
ID Ponggaluku	19	25	15	29	62	71S	243	252	+0.9	+1.0	
ID Pontianak	19	14	48	17	67	75N	278	287	+0.8	-0.3	
ID Poso	19	25	27	29	64	83S	255	264	+1.1	+0.5	
ID Putusibau	19	17	47	21	67	77N	275	284	+1.0	-0.2	
ID Rengat	19	9	38	9	68	64N	288	297	+0.7	-0.7	
ID Ruteng	19	19	3	24	62	59S	231	240	+0.5	+1.2	
ID Samarinda	19	22	2	25	66	88N	264	273	+1.0	+0.2	
ID Sampit	19	17	50	20	66	88N	264	273	+0.8	+0.1	
ID Semarang	19	15	10	15	66	81S	253	262	+0.5	+0.4	
ID Sibolga	19	5	16	5	69	49N	303	312	+0.8	-1.4	
ID Singkep	19	11	14	11	68	68N	284	293	+0.7	-0.6	
ID Sintang	19	16	33	19	67	77N	275	284	+0.9	-0.2	
ID Solo City	19	15	9	15	65	78S	251	260	+0.4	+0.4	
ID Soroako	19	25	34	29	64	78S	250	259	+1.0	+0.7	
ID Sorong	19	39	25	42	60	68S	240	249	+1.5	+1.4	
ID Sumbawa	19	17	41	21	63	65S	237	246	+0.5	+1.0	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
ID Surabaya	19	16	9	17	65	76S	248	257	+0.5	+0.5	
ID Tahuna	19	34	27	38	66	88N	264	273	+1.6	+0.4	
ID Tangerang	19	13	31	12	67	89S	261	270	+0.4	+0.1	
ID Tanjung Karang	19	12	57	11	67	86N	267	276	+0.5	-0.1	
ID Tanjung Pandan	19	14	7	14	67	81N	271	280	+0.6	-0.1	
ID Tanjung Pinang	19	10	17	12	68	62N	290	299	+0.8	-0.7	
ID Tanjung Redep	19	22	40	27	67	80N	272	281	+1.2	+0.0	
ID Tanjung Santan	19	22	25	26	66	87N	265	274	+1.1	+0.2	
ID Taraken	19	22	46	27	67	76N	276	285	+1.3	-0.1	
ID Tasikmalaya	19	14	3	13	66	83S	255	264	+0.4	+0.3	
ID Ternate	19	35	47	38	63	80S	252	261	+1.5	+0.8	
ID Timika	19	40	14	45	54	44S	217	226	+1.1	+2.7	
ID Ujung Pandang	19	22	3	26	63	73S	245	254	+0.8	+0.8	
ID Waikabubak	19	17	32	22	62	58S	230	239	+0.4	+1.2	
ID Waingapu	19	17	38	23	62	55S	228	237	+0.4	+1.4	
ID Wamena	19	43	50	47	52	42S	214	224	+1.2	+3.0	
ID Whok Seumawe	18	53	42	2	69	19N	333	342	+2.4	-5.8	
ID Yogyakarta	19	14	54	15	65	78S	250	259	+0.4	+0.4	
JP Iwojima	19	55	41	-3	63	91	23N	329	338	+5.1	-6.9
JP Minami Tori Shima	20	47	14	19	85	124	45N	307	316	+3.5	-2.7
MY Alor Setar	18	56	33	6	69	24N	328	337	+2.0	-4.3	
MY Bintulu	19	17	15	22	68	69N	283	292	+1.2	-0.4	
MY Butterworth	18	58	56	7	69	31N	321	331	+1.6	-3.1	
MY Ipoh	19	2	16	8	69	38N	314	323	+1.2	-2.1	
MY Johor Bahru	19	8	59	11	68	58N	294	303	+0.8	-0.9	
MY Kerteh	19	5	10	11	69	44N	308	317	+1.2	-1.7	
MY Kluang	19	8	17	10	69	56N	296	305	+0.9	-1.0	
MY Kota Bahru	18	59	57	9	69	31N	321	330	+1.6	-3.0	
MY Kota Kinabalu	19	19	51	26	69	64N	288	297	+1.5	-0.6	
MY Kuala Lumpur	19	6	3	9	69	49N	303	312	+0.9	-1.4	
MY Kuala Terengganu	19	3	6	10	69	39N	313	322	+1.3	-2.1	
MY Kuantan	19	6	6	10	69	48N	305	314	+1.1	-1.5	
MY Kuching	19	15	5	18	68	70N	282	291	+1.0	-0.4	
MY Labuan	19	19	1	25	69	65N	287	296	+1.4	-0.6	
MY Lahad Datu	19	23	30	29	68	71N	281	290	+1.5	-0.3	
MY Malacca	19	7	9	9	69	53N	299	308	+0.9	-1.2	
MY Marudi	19	18	22	24	68	67N	285	294	+1.3	-0.5	
MY Miri	19	17	53	23	68	66N	286	295	+1.3	-0.5	
MY Penang	18	59	20	7	69	31N	321	330	+1.5	-2.9	
MY Pulau	18	54	23	5	69	20N	332	341	+2.6	-5.7	
MY Pulau Pioman	19	8	15	11	69	54N	298	307	+0.9	-1.1	
MY Sibul	19	16	26	20	68	70N	282	291	+1.1	-0.4	
MY Simpang	19	5	32	9	69	48N	304	314	+1.0	-1.5	
MY Tawau	19	23	22	29	68	73N	279	288	+1.4	-0.2	
PG Goroka	19	38	32	50	46	14S	186	195	-0.9	+8.7	
PG Madang	19	45	17	-10	52	45	20S	193	202	+0.2	+6.8
PG Mount Hagen	19	40	50	50	47	20S	192	201	+0.0	+6.5	
PG Wewak	19	51	40	-10	53	47	35S	208	217	+1.3	+4.0
PH Bacolod	19	28	47	36	71	58N	294	303	+2.1	-0.8	
PH Bagabag	19	7	23	32	75	13N	339	348	+9.9	+9.9	
PH Baguio	19	5	14	31	74	11N	341	350	+9.9	+9.9	
PH Calbayog	19	31	3	39	72	56N	297	306	+2.3	-1.0	
PH Catarman	19	30	50	39	72	54N	298	307	+2.3	-1.1	
PH Cauayan	19	7	6	32	75	12N	340	349	+9.9	+9.9	
PH Cebu	19	32	45	37	68	74N	278	287	+1.8	-0.1	
PH Cubi Nas	19	34	36	38	67	79N	273	282	+1.8	+0.1	
PH Daet	19	24	22	37	74	42N	310	319	+2.6	-2.0	
PH Dumaguete	19	30	25	37	70	64N	288	297	+2.0	-0.5	
PH Floridablanca	19	14	38	32	74	29N	323	332	+3.4	-3.9	
PH Guiuan	19	34	33	41	71	62N	290	299	+2.2	-0.6	
PH Iba	19	11	20	31	74	23N	329	338	+4.1	-5.6	
PH Iloilo	19	27	55	36	71	57N	295	304	+2.1	-0.9	
PH Jose Panganiban	19	23	5	36	74	40N	312	321	+2.7	-2.2	
PH Kalibo	19	26	38	36	72	53N	299	308	+2.2	-1.1	
PH Ladag	19	33	18	38	69	70N	282	291	+1.9	-0.3	
PH Legazpi	19	31	16	37	69	70N	282	291	+1.9	-0.3	
PH Lingayen	19	7	16	31	74	16N	337	346	+9.9	+9.9	
PH Lipa	19	19	42	34	73	38N	314	323	+2.7	-2.4	
PH Mamburao	19	20	4	33	73	41N	311	320	+2.5	-2.1	
PH Manila	19	17	57	33	74	34N	318	327	+2.9	-2.9	
PH Marinduque	19	22	52	35	73	43N	309	318	+2.5	-1.9	
PH Masbate	19	31	12	38	71	62N	290	299	+2.1	-0.6	
PH Naga	19	26	10	37	73	46N	306	315	+2.5	-1.7	
PH Ormoc	19	31	57	39	71	60N	292	301	+2.2	-0.7	
PH Puerto Princesa	19	21	17	31	71	54N	299	308	+1.9	-1.1	
PH Romblon	19	34	20	38	67	79N	273	282	+1.8	+0.1	
PH Roxas	19	27	31	36	72	54N	298	307	+2.2	-1.1	
PH San Jose	19	26	35	35	71	56N	296	305	+2.1	-1.0	
PH Sangley Point	19	34	39	40	70	67N	286	295	+2.1	-0.4	
PH Tacloban	19	32	51	40	71	60N	292	301	+2.2	-0.7	
PH Virac	19	28	27	38	73	48N	304	313	+2.5	-1.5	
PH Zamboanga	19	28	58	34	69	71N	281	290	+1.7	-0.2	
SG Paya Lebar	19	9	26	11	68	60N	293	302	+0.8	-0.9	
SG Sembawang	19	9	17	11	68	59N	293	302	+0.8	-0.9	
SG Singapore	19	9	30	11	68	60N	292	301	+0.8	-0.9	
SG Tengah	19	9	14	11	68	59N	293	302	+0.8	-0.9	
TH Narathiwat	18	57	49	8	69	27N	325	334	+1.9	-3.8	
TH Pattani	18	55	26	7	69	22N	330	339	+2.5	-5.1	
TH Songkhla	18	50	38	6	69	12N	340	349	+9.9	+9.9	
TH Songkhla	18	52	9	6	69	15N	337	346	+3.8	-8.6	
TH Ya La	18	56	52	7	69	25N	327	336	+2.1	-4.2	

## Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
Broome	18	42	10	13	62	-13S	159	168	+9.9	+9.9	
Darwin	18	37	31	22	60	-31S	141	150	+3.2	-4.7	

## Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
Broome	18	51	49	15	61	1S	174	183	+9.9	+9.9	
Darwin	19	11	8	29	56	18S	190	199	-1.1	+5.2	

## Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
US Hilo HI	21	48	46	80	32	284	-35N	27	36	+3.4	+5.0
US Honolulu HI	21	47	9	77	35	282	-31N	23	32	+4.3	+7.0
US Kahului HI	21	50	38	79	33	283	-28N	20	29	+4.8	+8.4
US Kamuela HI	21	48	10	79	33	283	-35N	27	36	+3.5	+5.1
US Kaneohe Bay HI	21	48	48	77	35	282	-28N	20	29	+4.9	+8.6
US Kona HI	21	45	38	78	34	283	-39N	31	40	+3.1	+4.1
US Lahania-Kapalua HI	21	50	0	78	34	283	-29N	21	30	+4.7	+8.1
US Lanai HI	21	47	43	78	34	282	-32N	24	33	+3.9	+6.2

## Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
US Hilo HI	22	13	44	84	26	285	4N	348	357	-1.6	-6.6
US Honolulu HI	22	7	20	80	31	283	0N	352	1	-2.2	-8.6
US Kahului HI	22	7	28	82	29	284	-3N	355	4	+9.9	+9.9
US Kamuela HI	22	12	56	84	27	285	4N	348	357	-1.6	-6.7
US Kaneohe Bay HI	22	5	45	80	31	283	-3N	355	4	+9.9	+9.9
US Kona HI	22	15	8	84	27	285	8N	344	353	-1.2	-5.7
US Lahania-Kapalua HI	22	7	29	82	30	284	-2N	354	3	-2.7	-9.7
US Lanai HI	22	9	37	82	29	284	1N	351	360	-2.0	-7.8

## Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
KI Kiritimati	21	33	8	70	32	294	-66S	106	115	+1.2	-0.8
KI Tabiteuea North	20	54	37	35	61	322	-13S	159	168	+2.2	-8.1
KI Tarawa	20	34	19	30	67	331	-30S	142	151	+3.3	-4.6
MH Eniwetok Island	19	33	15	7	73	52	-78S	94	104	+3.5	-0.1
MH Kwajalein	19	54	47	17	77	14	-64S	108	117	+3.8	-1.2
MH Majuro	20	10	38	24	75	345	-56S	116	125	+3.8	-1.8
FM Chuuk	19	0	9	-12	55	63	-77S	95	105	+2.8	-0.1
FM Kosrae	19	41	7	8	70	34	-54S	118	127	+4.1	-2.0
FM Pohnpei	19	20	43	-1	65	53	-66S	106	115	+3.6	-0.9
FM Yap	18	34	43	38	70	70	-75N	67	77	+1.2	+1.3
PW Babelthuap	18	28	27	32	69	69	-77N	69	78	+0.9	+1.1

## Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
KI Kiritimati	22	47	17	77	15	292	82N	270	279	+0.6	-0.1
KI Tabiteuea North	21	38	25	46	53	310	34S	207	216	+4.8	+7.3
KI Tarawa	21	44	44	46	55	307	49S	222	231	+3.9	+3.8
MH Eniwetok Island	21	25	21	34	73	309	84S	256	265	+3.5	+0.7
MH Kwajalein	21	41	42	43	64	302	77S	249	258	+3.4	+1.1
MH Majuro	21	51	30	48	58	300	73S	245	254	+3.3	+1.3
FM Chuuk	20	43	23	13	74	26	71S	243	252	+3.3	+1.8
FM Kosrae	21	18	20	32	70	324	60S	232	241	+3.7	+2.6
FM Pohnpei	21	4	35	24	75	344	66S	239	248	+3.6	+2.1
FM Yap	20	4	15	-9	58	64	88N	265	274	+2.7	+0.6
PW Babelthuap	19	54	8	52	64	64	90N	262	271	+2.3	+0.6

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (\text{Long}.n - \text{Long}.o) + b \times (\text{Lat}.n - \text{Lat}.o)$$

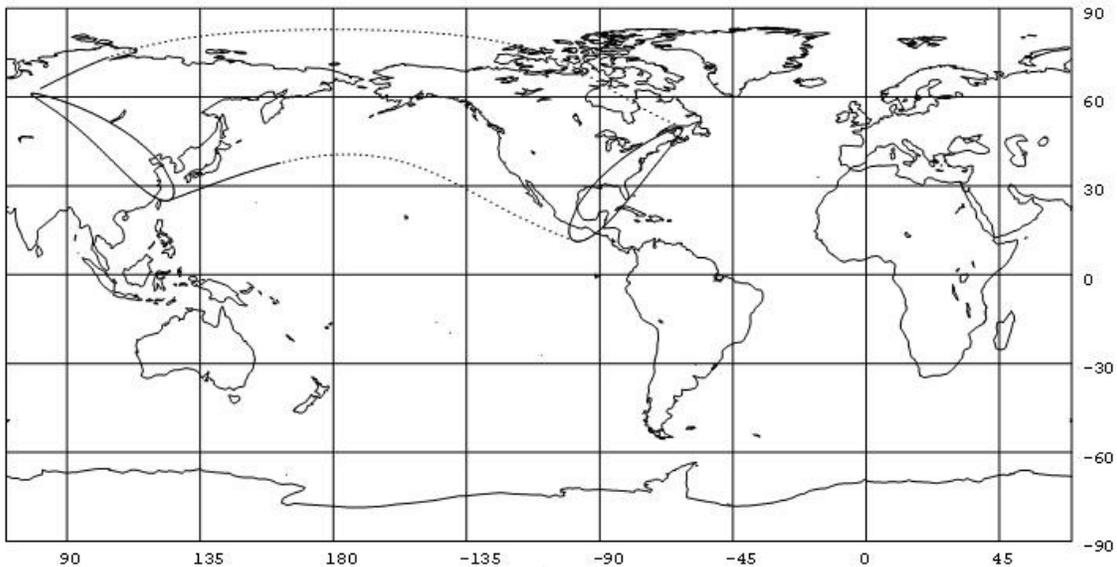
Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella. U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali. Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

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### Occultation of Venus, Magnitude -4.4, on 2012 Aug 13



Occult 4.090

UT of conjunction = 19h 41.6m

Luna: % illuminazione 15-, elongazione solare 46°

Moon: % illumination 15-, solar elongation 46°

#### Sparizione - Disappearance

Luogo - Location	U.T. h m s	Sun Alt	Moon Alt	Az	CA o	PA o	WA o	a m/o	b m/o
CF Yalinga	20 34 11	45	17	282	-70N	69	68	+0.3	-1.0

#### Riapparizione - Reappearance

Luogo - Location	U.T. h m s	Sun Alt	Moon Alt	Az	CA o	PA o	WA o	a m/o	b m/o
CF Yalinga	21 24 28	37	8	290	41N	319	317	-0.6	-2.1

#### Sparizione - Disappearance

Luogo - Location	U.T. h m s	Sun Alt	Moon Alt	Az	CA o	PA o	WA o	a m/o	b m/o
CN Dalian	17 43 33	1	65	-73S	106	105	-0.3	+0.7	
CN Hailar	17 56 0	6	66	-82N	81	80	-0.4	+1.5	
CN Harbin	17 49 6	7	69	-84S	95	94	-0.2	+1.3	
CN Jiamusi	17 50 4	11	72	-84S	95	94	-0.1	+1.3	
CN Mudanjiang	17 47 20	9	71	-79S	100	99	-0.1	+1.1	
CN Yanji	17 45 37	8	70	-75S	104	103	-0.1	+1.0	
JP Akita	17 45 8	15	76	-55S	124	123	+0.5	+0.3	
JP Amami	17 46 56	4	69	-22S	157	156	+1.2	-3.0	
JP Aomori	17 45 43	15	77	-58S	121	120	+0.4	+0.4	
JP Asahikawa	17 48 19	18	79	-65S	114	113	+0.4	+0.8	
JP Ashiya	17 41 25	5	69	-47S	132	131	+0.3	-0.2	
JP Atsugi	17 45 9	13	75	-41S	138	137	+0.7	-0.6	
JP Chitose	17 47 22	17	78	-63S	116	115	+0.4	+0.7	
JP Fukue	17 41 18	3	68	-45S	134	133	+0.3	-0.4	
JP Fukui	17 43 0	10	73	-48S	131	130	+0.4	-0.1	
JP Fukuoka	17 41 27	5	69	-47S	133	132	+0.3	-0.3	

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o
JP Gifu	17	43	31	11	73	-44S	135	134	+0.5	-0.4
JP Hachiojima	17	47	58	13	75	-28S	151	150	+1.2	-1.9
JP Hachinoe	17	46	3	16	77	-57S	123	122	+0.5	+0.4
JP Hakodate	17	46	22	16	77	-61S	118	117	+0.4	+0.6
JP Hamamatsu	17	44	21	11	74	-40S	139	138	+0.7	-0.7
JP Hanamaki	17	45	27	15	77	-53S	126	125	+0.5	+0.2
JP Hiroshima	17	41	59	7	71	-46S	133	132	+0.4	-0.3
JP Hofu	17	41	39	6	70	-47S	132	131	+0.3	-0.3
JP Hyakuri	17	45	24	14	75	-42S	137	136	+0.7	-0.5
JP Iejima	17	50	54	2	69	-12S	167	166	+2.7	-7.0
JP Iki	17	41	12	4	69	-48S	131	130	+0.2	-0.2
JP Iruma	17	44	52	13	75	-42S	137	136	+0.7	-0.5
JP Iwakuni	17	41	51	6	70	-46S	133	132	+0.4	-0.3
JP Izumo	17	41	47	7	71	-50S	129	128	+0.3	-0.1
JP Kagoshima	17	42	28	5	69	-39S	140	139	+0.5	-0.8
JP Kanazawa	17	43	2	11	73	-49S	130	129	+0.4	-0.1
JP Kanoya	17	42	57	5	69	-37S	142	141	+0.5	-1.0
JP Kisarazu	17	45	32	14	75	-40S	139	138	+0.8	-0.7
JP Kitakyushu	17	41	31	5	70	-47S	132	131	+0.3	-0.3
JP Kochi	17	42	42	8	71	-42S	138	136	+0.5	-0.6
JP Kohnan	17	42	23	8	71	-45S	134	133	+0.4	-0.3
JP Kumamoto	17	41	50	5	69	-43S	136	135	+0.4	-0.5
JP Kumejima	17	50	41	1	68	-12S	167	166	+2.5	-6.7
JP Matsumoto	17	43	49	12	74	-46S	133	132	+0.6	-0.3
JP Matsushima	17	45	23	15	76	-50S	130	129	+0.6	+0.0
JP Matsuyama	17	42	8	7	71	-44S	135	134	+0.4	-0.4
JP Memanbetsu	17	49	14	19	80	-64S	115	114	+0.5	+0.7
JP Miho	17	41	53	8	71	-50S	129	128	+0.3	-0.1
JP Misawa	17	46	3	16	77	-57S	122	121	+0.5	+0.4
JP Miyake Jima	17	46	26	13	75	-34S	145	144	+0.9	-1.2
JP Miyazaki	17	42	48	5	70	-38S	141	140	+0.5	-0.9
JP Monbetsu	17	49	16	19	80	-66S	114	112	+0.4	+0.8
JP Nagasaki	17	41	31	4	69	-45S	134	133	+0.3	-0.4
JP Nagoya	17	43	36	11	73	-44S	135	134	+0.6	-0.4
JP Nakashibetsu	17	49	23	20	81	-62S	117	116	+0.5	+0.7
JP Nanki-Shirahama	17	43	36	9	72	-40S	140	139	+0.6	-0.7
JP Nyutabaru	17	42	37	5	70	-39S	140	139	+0.5	-0.8
JP Obihiro	17	47	59	18	79	-61S	118	117	+0.5	+0.6
JP Oita	17	41	54	6	70	-44S	135	134	+0.4	-0.4
JP Okayama	17	42	16	8	71	-46S	133	132	+0.4	-0.3
JP Oki Island	17	41	55	8	71	-52S	127	126	+0.3	+0.0
JP Okierabu	17	49	8	3	69	-16S	163	162	+1.8	-4.7
JP Osaka	17	43	9	9	72	-43S	136	135	+0.5	-0.5
JP Oshima	17	45	34	13	75	-38S	141	140	+0.8	-0.9
JP Ozuki	17	41	29	5	70	-47S	132	131	+0.3	-0.2
JP Rishiri Island	17	49	21	17	79	-70S	109	108	+0.3	+1.0
JP Sapporo	17	47	22	17	78	-63S	116	115	+0.4	+0.7
JP Sendai	17	45	13	15	76	-49S	130	129	+0.6	+0.0
JP Shimofusa	17	45	21	14	75	-41S	138	137	+0.7	-0.6
JP Shonai	17	44	41	14	76	-53S	126	125	+0.5	+0.2
JP Takamatsu	17	42	32	8	71	-44S	135	134	+0.5	-0.4
JP Tanegashima	17	43	58	5	70	-32S	147	146	+0.7	-1.4
JP Tateyama	17	45	47	13	75	-38S	141	140	+0.8	-0.8
JP Tokachi	17	48	3	18	79	-62S	117	116	+0.5	+0.6
JP Tokunoshima	17	47	45	3	69	-20S	160	159	+1.4	-3.6
JP Tokushima	17	42	51	8	72	-43S	137	135	+0.5	-0.5
JP Tokyo	17	45	39	14	75	-41S	139	138	+0.8	-0.6
JP Tottori	17	42	14	8	72	-49S	131	130	+0.4	-0.1
JP Toyama	17	43	22	11	74	-49S	131	130	+0.5	-0.1
JP Tsuiki	17	41	35	5	70	-46S	133	132	+0.3	-0.3
JP Tsushima	17	41	0	4	69	-51S	129	128	+0.2	-0.1
JP Wakkanai	17	49	42	18	80	-70S	109	108	+0.3	+1.0
JP Yaizu	17	44	44	12	74	-40S	139	138	+0.7	-0.7
JP Yakushima	17	43	59	4	69	-32S	147	146	+0.7	-1.4
JP Yamagata	17	44	55	15	76	-51S	128	127	+0.5	+0.0
JP Yamaguchi	17	41	36	6	70	-47S	132	131	+0.3	-0.3
JP Yokota	17	44	52	13	75	-42S	137	136	+0.7	-0.5
JP Yoron	17	50	34	3	69	-13S	166	165	+2.4	-6.3
JP Zama	17	45	3	13	75	-41S	138	137	+0.7	-0.6
KR Busan	17	41	1	4	69	-54S	125	124	+0.1	+0.1
KR Cheju	17	40	40	2	67	-52S	128	127	+0.1	-0.1
KR Chinhae	17	41	0	4	68	-54S	125	124	+0.1	+0.1
KR Chongju	17	41	21	4	68	-61S	119	118	+0.0	+0.4
KR Chunchon	17	41	53	4	68	-64S	115	114	+0.0	+0.5
KR Jhunju	17	41	3	3	68	-58S	121	120	+0.0	+0.3
KR Kangnung	17	41	48	5	69	-62S	117	116	+0.0	+0.5
KR Kimhae	17	41	1	4	68	-54S	125	124	+0.1	+0.1
KR Kunsan	17	41	3	3	67	-59S	120	119	+0.0	+0.3
KR Kwangju	17	40	54	2	67	-57S	123	122	+0.0	+0.2
KR Kyungju	17	41	11	5	69	-56S	123	122	+0.1	+0.2
KR Mokpo	17	40	50	2	67	-56S	123	122	+0.0	+0.1
KR Osan	17	41	31	3	68	-62S	117	116	+0.0	+0.4
KR Pohang	17	41	14	5	69	-56S	123	122	+0.1	+0.2
KR Pyongtaek	17	41	28	3	68	-62S	117	116	+0.0	+0.4
KR Pyongyang	17	42	48	4	67	-69S	110	109	-0.1	+0.7
KR Sachon	17	40	57	3	68	-55S	124	123	+0.1	+0.1
KR Seoul	17	41	46	4	68	-64S	115	114	-0.1	+0.5
KR Seoul East	17	41	41	4	68	-63S	116	115	+0.0	+0.5
KR Sokch'O	17	42	1	5	69	-63S	116	115	+0.0	+0.5
KR Suwon	17	41	35	4	68	-63S	117	115	+0.0	+0.4
KR Taegu	17	41	8	4	68	-57S	122	121	+0.1	+0.2
KR Ulsan	17	41	9	5	69	-55S	124	123	+0.1	+0.1
KR Wonju	17	41	39	4	68	-62S	117	116	+0.0	+0.4
KR Yangku	17	41	58	5	69	-63S	116	115	+0.0	+0.5

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
KR Yechon	17	41	18		4	68	-59S	120	119	+0.0	+0.3
KR Yeosu	17	40	53		3	68	-55S	125	123	+0.1	+0.1
RU Anadyr	18	41	22	16	40	135	-80N	79	78	+0.8	+1.7
RU Blagoveschensk	17	55	45		11	72	-86N	85	84	-0.2	+1.6
RU Bratsk	18	18	34		3	57	-54N	52	51	-0.7	+1.9
RU Chita	18	3	30		4	63	-71N	70	69	-0.5	+1.7
RU Irkutsk	18	9	13		1	57	-64N	63	62	-0.7	+1.7
RU Khabarovsk	17	52	15		15	76	-84S	96	94	+0.0	+1.4
RU Magadan	18	15	20	0	28	98	-81N	80	79	+0.3	+2.0
RU Okha	18	1	2	-9	22	85	-89S	90	89	+0.2	+1.7
RU Petropavlovsk	18	7	47	-1	32	99	-77S	102	101	+0.7	+1.3
RU Pevek	18	41	37	13	36	129	-71N	70	69	+0.6	+2.1
RU Polyarny	18	35	0	-6	13	70	-42N	41	40	-0.5	+2.6
RU Provideniya Bay	18	37	8	13	38	129	-80N	79	78	+0.8	+1.8
RU Ulan-Ude	18	6	28		1	59	-67N	66	65	-0.6	+1.7
RU Vladivostok	17	46	5		10	72	-74S	105	104	+0.0	+1.0
RU Yakutsk	18	18	26	-6	18	81	-64N	63	62	-0.2	+2.3
RU Yuzhno-Sakhalinsk	17	51	34		19	81	-73S	106	105	+0.3	+1.1

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CN Beijing	18	44	0		8	71	82S	261	260	-0.2	+1.5
CN Dalian	18	41	8		11	73	74S	253	252	-0.2	+1.7
CN Hailar	18	56	23		15	77	79N	280	279	+0.1	+1.3
CN Hangzhou	18	24	28		4	69	47S	227	226	-0.7	+2.4
CN Harbin	18	51	49		18	80	87S	266	265	+0.1	+1.6
CN Hefei	18	29	48		3	69	57S	236	235	-0.6	+2.0
CN Huhhot	18	46	8		6	68	88S	268	266	-0.3	+1.3
CN Jiamusi	18	54	35		22	83	86S	266	264	+0.2	+1.7
CN Mudanjiang	18	50	30		20	81	81S	260	259	+0.1	+1.7
CN Nanjing	18	28	49		4	69	55S	234	233	-0.6	+2.1
CN Ninbo	18	22	44		5	70	44S	224	222	-0.8	+2.5
CN Qingdao	18	36	43		9	72	67S	247	245	-0.3	+1.8
CN Shanghai	18	26	7		6	70	50S	229	228	-0.6	+2.3
CN Shijiazhuang	18	41	51		6	69	79S	258	257	-0.3	+1.5
CN Taiyuan	18	41	47		4	68	80S	259	258	-0.4	+1.4
CN Tianjin	18	42	20		8	71	79S	258	257	-0.3	+1.5
CN Wuhan	18	29	54		0	67	58S	237	236	-0.7	+1.9
CN Yanji	18	47	31		19	80	77S	256	255	+0.1	+1.8
CN Yantai	18	38	26		10	73	70S	249	248	-0.3	+1.8
CN Zhengzhou	18	36	29		3	68	69S	249	248	-0.5	+1.6
JP Akita	18	41	40		25	84	56S	235	234	+0.1	+2.7
JP Amami	18	9	43		8	72	21S	200	199	-1.6	+5.2
JP Aomori	18	44	36	-12	27	86	59S	239	237	+0.2	+2.5
JP Asahikawa	18	52	17	-8	29	90	67S	246	245	+0.4	+2.3
JP Ashiya	18	27	46		14	75	47S	226	225	-0.4	+2.7
JP Atsugi	18	29	18		22	80	41S	220	219	-0.3	+3.4
JP Chitose	18	49	56	-9	28	88	65S	244	243	+0.3	+2.4
JP Fukue	18	25	20		12	74	45S	224	223	-0.5	+2.8
JP Fukui	18	32	14		20	79	48S	227	226	-0.2	+2.9
JP Fukuoka	18	27	2		14	75	46S	225	224	-0.5	+2.8
JP Gifu	18	29	51		20	79	44S	224	222	-0.3	+3.1
JP Hachijojima	18	20	5		20	79	28S	207	206	-0.8	+4.6
JP Hachinoe	18	44	20	-11	27	86	58S	237	236	+0.2	+2.6
JP Hakodate	18	47	16	-10	27	87	63S	242	241	+0.3	+2.4
JP Hamamatsu	18	27	32		20	79	40S	219	218	-0.4	+3.4
JP Hanamaki	18	41	15		26	85	54S	234	232	+0.1	+2.8
JP Hiroshima	18	28	21		16	77	46S	225	224	-0.4	+2.8
JP Hofu	18	27	47		15	76	46S	226	224	-0.4	+2.8
JP Hyakuri	18	31	33		23	82	42S	222	221	-0.2	+3.3
JP Iejima	18	2	57		5	70	10S	190	188	-3.2	+9.0
JP Iki	18	27	46		13	75	48S	227	226	-0.4	+2.7
JP Iruma	18	30	39		22	81	42S	222	221	-0.2	+3.3
JP Iwakuni	18	27	48		16	76	46S	225	224	-0.4	+2.8
JP Izumo	18	31	4		17	77	50S	229	228	-0.3	+2.7
JP Kagoshima	18	21	39		12	74	38S	217	216	-0.7	+3.2
JP Kanazawa	18	32	55		20	80	49S	228	227	-0.2	+2.8
JP Kanoya	18	20	9		12	74	36S	215	214	-0.8	+3.4
JP Kisarazu	18	29	0		22	81	40S	219	218	-0.3	+3.5
JP Kitakyushu	18	27	30		14	75	46S	226	225	-0.4	+2.8
JP Kochi	18	25	23		16	76	41S	220	219	-0.5	+3.1
JP Kohnan	18	28	26		17	77	45S	224	223	-0.4	+2.9
JP Kumamoto	18	24	45		13	75	42S	222	221	-0.5	+2.9
JP Kumejima	18	2	58		4	70	11S	190	189	-3.1	+8.7
JP Matsumoto	18	31	56		21	80	46S	225	224	-0.2	+3.0
JP Matsushima	18	38	22		26	84	50S	230	228	+0.0	+2.9
JP Matsuyama	18	26	42		16	76	44S	223	222	-0.5	+2.9
JP Memanbetsu	18	53	33	-6	31	91	66S	245	244	+0.5	+2.4
JP Miho	18	31	11		17	78	50S	229	228	-0.3	+2.7
JP Misawa	18	44	40	-11	27	86	58S	238	237	+0.2	+2.6
JP Miyake Jima	18	24	16		21	79	34S	213	212	-0.5	+4.0
JP Miyazaki	18	21	22		13	74	37S	217	215	-0.7	+3.3
JP Monbetsu	18	54	12	-6	30	91	68S	247	246	+0.5	+2.3
JP Nagasaki	18	25	27		13	74	44S	224	222	-0.5	+2.8
JP Nagoya	18	29	26		20	79	44S	223	222	-0.3	+3.1
JP Nakashibetsu	18	53	12	-6	31	92	64S	244	243	+0.5	+2.5
JP Nanki-Shirahama	18	24	58		17	77	39S	218	217	-0.5	+3.3
JP Nyutabaru	18	22	4		13	75	38S	218	216	-0.7	+3.2
JP Obihiro	18	50	23	-8	30	89	63S	243	241	+0.4	+2.5
JP Oita	18	26	8		15	76	44S	223	222	-0.5	+2.9
JP Okayama	18	28	55		17	77	46S	225	224	-0.4	+2.9
JP Oki Island	18	32	57		18	78	52S	231	230	-0.2	+2.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
JP Okierabu	18	5	47	6	71	15S	194	193	-2.3	+6.8	
JP Osaka	18	27	52	18	78	43S	222	221	-0.4	+3.1	
JP Oshima	18	27	0	21	80	38S	217	216	-0.4	+3.6	
JP Ozuki	18	28	2	15	76	47S	226	225	-0.4	+2.7	
JP Rishiri Island	18	55	17	-7	29	90	73S	252	251	+0.4	+2.1
JP Sapporo	18	49	54	-9	28	88	65S	244	243	+0.3	+2.4
JP Sendai	18	37	35	25	84	50S	229	228	+0.0	+3.0	
JP Shimofusa	18	30	19	23	81	41S	221	219	-0.3	+3.4	
JP Shonai	18	39	25	25	84	54S	233	232	+0.1	+2.7	
JP Takamatsu	18	27	18	17	77	43S	223	222	-0.4	+3.0	
JP Tanegashima	18	17	12	11	73	31S	211	210	-0.9	+3.7	
JP Tateyama	18	27	33	22	80	38S	217	216	-0.4	+3.6	
JP Tokachi	18	50	46	-8	30	89	64S	243	242	+0.4	+2.4
JP Tokunoshima	18	7	58	7	71	18S	197	196	-1.8	+5.7	
JP Tokushima	18	26	50	17	77	42S	222	220	-0.4	+3.1	
JP Tokyo	18	30	6	23	81	41S	220	219	-0.3	+3.5	
JP Tottori	18	31	1	18	78	48S	228	227	-0.3	+2.8	
JP Toyama	18	33	30	21	80	49S	228	227	-0.2	+2.9	
JP Tsuiki	18	27	2	14	75	46S	225	224	-0.5	+2.8	
JP Tsushima	18	29	21	14	75	50S	230	228	-0.4	+2.5	
JP Wakkanai	18	55	54	-7	30	91	73S	252	251	+0.5	+2.1
JP Yaizu	18	27	32	21	79	39S	219	218	-0.4	+3.4	
JP Yakushima	18	16	51	11	73	31S	210	209	-1.0	+3.8	
JP Yamagata	18	38	20	25	84	51S	231	230	+0.0	+2.9	
JP Yamaguchi	18	27	36	15	76	46S	226	224	-0.4	+2.8	
JP Yokota	18	30	21	22	81	42S	221	220	-0.3	+3.3	
JP Yoron	18	3	37	5	70	11S	191	190	-2.9	+8.3	
JP Zama	18	29	31	22	81	41S	220	219	-0.3	+3.4	
KR Busan	18	31	35	14	75	54S	233	232	-0.3	+2.4	
KR Cheju	18	28	40	11	73	51S	231	229	-0.5	+2.4	
KR Chinhae	18	31	40	14	75	54S	234	232	-0.3	+2.4	
KR Chongju	18	35	34	14	75	61S	240	239	-0.2	+2.1	
KR Chunchon	18	37	57	15	76	64S	244	242	-0.2	+2.1	
KR Jhunju	18	33	48	13	75	59S	238	237	-0.3	+2.2	
KR Kangnung	18	37	29	16	77	62S	242	241	-0.2	+2.1	
KR Kimhae	18	31	41	14	75	54S	233	232	-0.3	+2.4	
KR Kunsan	18	34	1	13	75	59S	239	237	-0.3	+2.2	
KR Kwangju	18	32	16	12	74	56S	236	235	-0.3	+2.2	
KR Kyungju	18	33	13	15	76	56S	235	234	-0.3	+2.3	
KR Mokpo	18	31	37	12	74	56S	235	234	-0.4	+2.3	
KR Osan	18	36	28	14	75	63S	242	241	-0.2	+2.1	
KR Pohang	18	33	28	15	76	56S	236	234	-0.3	+2.3	
KR Pyongtaek	18	36	11	14	75	62S	241	240	-0.2	+2.1	
KR Pyongyang	18	40	29	14	76	70S	249	248	-0.1	+1.9	
KR Sachon	18	31	45	13	75	55S	234	233	-0.3	+2.3	
KR Seoul	18	37	28	14	75	64S	244	242	-0.2	+2.0	
KR Seoul East	18	37	10	14	76	64S	243	242	-0.2	+2.1	
KR Sokch'O	18	38	22	16	77	64S	243	242	-0.1	+2.1	
KR Suwon	18	36	46	14	75	63S	242	241	-0.2	+2.1	
KR Taegu	18	33	25	14	76	57S	236	235	-0.3	+2.3	
KR Ulsan	18	32	32	15	76	55S	234	233	-0.3	+2.4	
KR Wonju	18	36	59	15	76	63S	242	241	-0.2	+2.1	
KR Yangku	18	38	11	16	77	64S	243	242	-0.1	+2.1	
KR Yechon	18	35	10	15	76	60S	239	238	-0.2	+2.2	
KR Yeosu	18	31	20	13	74	55S	234	233	-0.4	+2.3	
MN Ulan Bator	18	55	8	6	67	71N	288	287	-0.1	+1.0	
RU Abakan	19	2	8	1	57	44N	315	314	-0.1	+0.5	
RU Anadyr	19	56	9	24	44	158	64N	295	294	+1.0	-0.2
RU Blagoveschensk	18	59	27	-11	21	83	82N	277	276	+0.3	+1.5
RU Bratsk	19	3	5	8	66	47N	312	310	+0.0	+0.7	
RU Chita	18	59	20	12	73	67N	292	291	+0.1	+1.1	
RU Irkutsk	18	59	37	7	67	59N	300	299	-0.1	+0.9	
RU Khabarovsk	18	58	56	-9	26	88	87S	266	265	+0.4	+1.7
RU Magadan	19	26	23	8	36	115	73N	287	285	+0.8	+1.1
RU Okha	19	11	25	0	32	100	85N	274	272	+0.7	+1.6
RU Petropavlovsk	19	24	36	10	43	117	85S	265	263	+1.1	+1.6
RU Pevek	19	49	26	20	40	149	56N	303	301	+0.9	-0.1
RU Polyarny	19	12	38	-4	17	79	33N	326	325	+0.3	+0.7
RU Provideniya Bay	19	51	30	21	43	151	65N	294	293	+1.0	+0.1
RU Ulan-Ude	18	59	4	9	69	63N	297	295	+0.0	+1.0	
RU Vladivostok	18	48	51	21	82	76S	255	254	+0.2	+1.9	
RU Yakutsk	19	15	23	-2	25	94	56N	303	302	+0.5	+1.1
RU Yuzhno-Sakhalinsk	18	59	26	-5	31	93	76S	256	255	+0.5	+2.0
TW Matsu	18	13	51	0	68	30S	209	208	-1.3	+3.4	

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
CA Abbotsford	20	4	39	55	44	248	-82S	97	96	+1.1	-1.6
CA Armstrong	20	29	9	43	18	279	-59N	58	57	+0.5	-0.9
CA Atikokan	20	29	19	46	20	278	-65N	64	63	+0.5	-1.0
CA Bagotville	20	36	16	33	5	294	-41N	40	39	+0.2	-0.1
CA Baie Comeau	20	37	4	30	4	296	-35N	34	32	+0.3	+0.3
CA Baker Lake	20	12	50	37	25	264	-35N	33	32	+1.1	-0.4
CA Brandon	20	23	21	49	26	270	-72N	71	70	+0.7	-1.2
CA Buffalo Narrows	20	9	18	47	33	257	-69N	68	67	+0.9	-1.2
CA Burwash	19	29	12	39	46	208	-81N	80	79	+1.3	-0.5
CA Calgary	20	10	14	53	37	255	-85N	84	83	+1.0	-1.4
CA Cambridge Bay	20	1	20	35	28	251	-34N	33	31	+1.1	-0.2
CA Campbell River	19	59	44	54	46	243	-81S	98	97	+1.2	-1.6
CA Castlegar	20	9	19	55	40	253	-87S	92	91	+1.0	-1.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CA Chapleau	20	33	30	41	14	285	-58N	57	56	+0.3	-0.8
CA Charlo	20	37	21	29	2	297	-36N	35	34	+0.2	+0.2
CA Chatham	20	37	15	29	1	298	-38N	37	36	+0.1	+0.1
CA Chilliwack	20	4	55	55	43	248	-83S	96	95	+1.1	-1.6
CA Churchill	20	18	13	41	24	270	-46N	45	44	+0.8	-0.8
CA Cold Lake	20	9	21	49	34	256	-74N	73	72	+0.9	-1.3
CA Comox	20	0	35	54	46	244	-81S	98	97	+1.2	-1.6
CA Coppermine	19	51	50	37	33	239	-48N	47	46	+1.0	-0.5
CA Coral Harbour	20	9	32	54	39	254	-88N	87	86	+1.0	-1.5
CA Coronation	20	11	21	51	35	257	-80N	79	78	+0.9	-1.4
CA Cranbrook	20	10	44	55	39	255	-90N	89	88	+1.0	-1.5
CA Dauphin	20	21	48	48	27	269	-70N	69	68	+0.7	-1.2
CA Dawson	19	28	8	37	44	206	-74N	73	72	+1.2	-0.2
CA Dawson Creek	19	57	30	49	41	243	-81N	80	79	+1.1	-1.2
CA Dease Lake	19	42	47	44	45	225	-83N	82	81	+1.3	-0.9
CA Dryden	20	27	39	46	21	276	-64N	63	62	+0.5	-1.1
CA Earlton	20	34	36	39	11	287	-54N	53	52	+0.3	-0.7
CA Edmonton	20	7	21	50	37	253	-79N	78	77	+1.0	-1.3
CA Edson	20	4	20	51	39	250	-82N	81	80	+1.0	-1.3
CA Eskimo Point	20	16	26	39	24	268	-40N	39	38	+0.9	-0.6
CA Estevan	20	22	10	51	28	268	-77N	76	75	+0.7	-1.3
CA Faro	19	35	45	40	44	217	-76N	75	74	+1.2	-0.6
CA Flin Flon	20	16	20	46	28	265	-64N	63	62	+0.8	-1.1
CA Forestville	20	36	41	31	4	295	-37N	36	35	+0.3	+0.1
CA Fort Chipewyan	20	3	22	45	34	251	-65N	64	63	+1.0	-1.1
CA Fort McMurray	20	5	42	47	35	253	-70N	69	68	+1.0	-1.2
CA Fort McPherson	19	32	13	35	40	211	-63N	62	61	+1.0	-0.1
CA Fort Nelson	19	51	13	45	41	236	-76N	75	74	+1.1	-1.0
CA Fort Resolution	19	58	23	43	35	246	-63N	62	60	+1.0	-1.0
CA Fort Saint John	19	56	16	48	41	241	-80N	79	78	+1.1	-1.2
CA Fort Simpson	19	49	58	42	39	235	-68N	67	66	+1.1	-0.9
CA Fort Smith	20	1	14	44	34	249	-64N	62	61	+1.0	-1.0
CA Fredericton	20	37	11	30	2	297	-43N	42	41	+0.0	-0.1
CA Gaspe	20	38	15	28	2	299	-29N	28	27	+0.4	+0.8
CA Gatineau	20	36	44	36	7	291	-55N	54	53	+0.1	-0.6
CA Geraldton	20	30	29	42	17	281	-58N	57	56	+0.4	-0.9
CA Gillam	20	19	49	43	24	271	-53N	52	50	+0.7	-0.9
CA Gore Bay	20	35	18	41	12	286	-62N	61	60	+0.2	-0.8
CA Grande Prairie	19	59	38	49	40	245	-81N	80	79	+1.1	-1.3
CA Hamilton	20	37	52	40	9	289	-65N	64	63	+0.1	-0.8
CA Hay River	19	56	32	44	36	243	-65N	64	63	+1.0	-1.0
CA High Level	19	57	26	46	38	244	-72N	71	69	+1.1	-1.1
CA Holman Island	19	48	7	34	33	233	-43N	42	40	+1.0	-0.2
CA Hudson Bay	20	18	5	48	28	266	-69N	68	67	+0.8	-1.2
CA Inuvik	19	33	32	34	39	213	-60N	59	58	+1.0	-0.1
CA Kamloops	20	4	8	54	42	248	-88S	91	90	+1.1	-1.5
CA Kapuskasing	20	32	33	40	14	285	-53N	52	51	+0.4	-0.7
CA Kelowna	20	6	27	54	41	250	-87S	92	91	+1.1	-1.5
CA Kenora	20	26	51	46	22	275	-66N	65	64	+0.6	-1.1
CA Kindersley	20	14	10	51	33	260	-79N	78	77	+0.9	-1.4
CA Kingston	20	37	26	37	7	291	-59N	58	57	+0.1	-0.6
CA Kuujjuarapik	20	32	46	34	12	287	-29N	28	27	+1.0	+0.4
CA La Grande Riviere	20	32	44	35	12	288	-35N	34	33	+0.7	-0.1
CA La Ronge	20	12	53	47	31	261	-67N	66	65	+0.9	-1.2
CA Lethbridge	20	13	34	54	36	258	-87N	86	85	+0.9	-1.5
CA Lloydminster	20	10	57	50	34	257	-76N	75	74	+0.9	-1.3
CA London	20	37	54	41	10	288	-67N	65	64	+0.1	-0.8
CA Lynn Lake	20	14	27	45	28	264	-59N	58	57	+0.8	-1.0
CA Maniwaki	20	36	14	36	8	291	-53N	52	51	+0.2	-0.6
CA Matagami	20	33	55	37	11	288	-47N	46	44	+0.3	-0.5
CA Mayo	19	32	7	38	44	212	-74N	73	72	+1.2	-0.4
CA Meadow Lake	20	11	19	49	33	258	-73N	72	71	+0.9	-1.2
CA Medicine Hat	20	14	53	53	35	260	-84N	83	82	+0.9	-1.4
CA Mont Joli	20	36	57	31	4	296	-37N	35	34	+0.3	+0.1
CA Montreal	20	36	45	35	6	292	-53N	51	50	+0.1	-0.5
CA Moose Jaw	20	18	46	51	31	265	-78N	77	76	+0.8	-1.3
CA Moosonee	20	32	0	38	13	286	-46N	45	44	+0.4	-0.5
CA Muskoka	20	36	36	39	10	289	-60N	59	58	+0.1	-0.7
CA Nakina	20	30	14	42	17	281	-57N	56	55	+0.4	-0.9
CA Nanaimo	20	2	52	55	45	246	-80S	99	98	+1.2	-1.7
CA Norman Wells	19	41	27	38	39	224	-64N	63	62	+1.1	-0.5
CA North Battleford	20	13	17	50	33	260	-75N	74	73	+0.9	-1.3
CA North Bay	20	35	36	39	10	288	-57N	56	55	+0.2	-0.7
CA Old Crow	19	26	59	33	41	203	-66N	64	63	+1.1	+0.1
CA Ottawa	20	36	50	36	7	291	-55N	54	53	+0.1	-0.6
CA Peace River	19	59	53	48	39	246	-77N	76	75	+1.1	-1.2
CA Penticton	20	6	57	55	42	251	-86S	93	92	+1.1	-1.6
CA Petawawa	20	36	13	37	9	290	-56N	55	53	+0.2	-0.6
CA Peterborough	20	37	17	38	9	289	-61N	60	59	+0.1	-0.7
CA Pickle Lake	20	27	23	43	20	278	-58N	57	56	+0.5	-0.9
CA Pitt Meadows	20	3	56	55	44	247	-82S	97	96	+1.1	-1.6
CA Port Hardy	19	55	58	53	47	239	-81S	98	97	+1.3	-1.6
CA Port Menier	20	39	48	27	2	299	-23N	22	21	+1.0	+2.2
CA Portage-La-Prairie	20	24	25	48	25	272	-71N	70	68	+0.6	-1.2
CA Prince Albert	20	14	55	49	31	262	-72N	71	70	+0.8	-1.2
CA Prince George	19	57	0	50	43	241	-87N	86	85	+1.2	-1.3
CA Prince Rupert	19	46	48	48	48	229	-87S	92	91	+1.3	-1.3
CA Princeton	20	6	0	55	42	250	-85S	94	93	+1.1	-1.6
CA Quebec	20	36	37	33	5	294	-46N	45	44	+0.1	-0.3
CA Quessnel	19	58	23	51	43	243	-89N	88	87	+1.2	-1.4
CA Rankin Inlet	20	17	38	37	23	270	-32N	31	30	+1.1	-0.2
CA Red Deer Industrial	20	8	51	52	37	254	-82N	81	80	+1.0	-1.4
CA Regina	20	19	18	51	30	266	-76N	75	74	+0.8	-1.3
CA Riviere Du Loup	20	36	38	32	4	295	-41N	40	39	+0.2	-0.1

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
CA Roberval	20	35	57	33	6	293	-43N	42	40	+0.2	-0.2
CA Rocky Mountain House	20	7	30	52	38	253	-83N	82	81	+1.0	-1.4
CA Rouyn	20	34	26	38	11	288	-52N	51	50	+0.3	-0.6
CA Sachs Harbour	19	41	5	32	34	223	-45N	44	43	+0.9	+0.0
CA Sandspit	19	46	19	49	49	228	-83S	96	95	+1.4	-1.3
CA Sarnia	20	37	47	41	11	287	-68N	67	66	+0.1	-0.9
CA Saskatoon	20	15	23	50	32	262	-75N	74	73	+0.8	-1.3
CA Sault Sainte Marie	20	34	16	42	14	284	-62N	61	60	+0.3	-0.9
CA Sept-Iles	20	38	41	29	3	298	-26N	25	24	+0.8	+1.3
CA Sherbrooke	20	37	3	34	5	294	-50N	49	48	+0.1	-0.4
CA Sioux Lookout	20	27	49	45	20	277	-63N	62	61	+0.5	-1.0
CA Slave Lake	20	3	49	49	37	250	-77N	76	75	+1.0	-1.2
CA Smithers	19	50	19	49	45	234	-89N	88	87	+1.3	-1.2
CA St. Jean	20	37	1	35	6	293	-53N	52	50	+0.1	-0.5
CA Sudbury	20	35	6	40	11	287	-58N	57	56	+0.2	-0.7
CA Swift Current	20	17	7	52	32	263	-80N	79	78	+0.8	-1.4
CA Terrace	19	49	0	49	46	232	-89S	90	89	+1.3	-1.3
CA Teslin	19	37	54	42	45	219	-80N	79	78	+1.2	-0.7
CA Thompson	20	18	4	44	26	268	-58N	57	55	+0.8	-1.0
CA Thunder Bay	20	30	46	44	18	280	-64N	63	62	+0.4	-1.0
CA Timmins	20	33	33	39	12	286	-54N	53	52	+0.3	-0.7
CA Tofino	20	0	31	55	46	243	-79S	100	99	+1.2	-1.7
CA Toronto	20	37	26	39	9	289	-63N	62	61	+0.1	-0.8
CA Trenton	20	37	25	38	8	290	-60N	59	58	+0.1	-0.7
CA Tuktoyaktuk	19	33	54	33	38	213	-57N	56	55	+1.0	+0.0
CA Val D'Or	20	34	49	37	10	289	-51N	50	49	+0.3	-0.6
CA Vancouver	20	3	26	55	44	247	-81S	98	97	+1.2	-1.6
CA Vermillion	20	10	11	50	35	257	-77N	76	75	+0.9	-1.3
CA Victoria	20	4	3	56	45	247	-80S	99	98	+1.2	-1.7
CA Waterloo	20	37	36	40	10	288	-65N	64	63	+0.1	-0.8
CA Watson Lake	19	42	45	43	43	226	-78N	77	76	+1.2	-0.8
CA Whitecourt	20	4	17	50	38	250	-80N	79	78	+1.0	-1.3
CA Whitehorse	19	34	37	41	46	215	-81N	80	79	+1.3	-0.6
CA Wiaraton	20	36	30	40	11	287	-63N	62	60	+0.2	-0.8
CA Williams Lake	20	0	7	52	43	244	-90S	90	88	+1.2	-1.4
CA Windsor	20	38	21	42	11	287	-70N	69	68	+0.1	-0.9
CA Winnipeg	20	25	0	48	24	273	-69N	68	67	+0.6	-1.2
CA Wrigley	19	46	25	41	39	231	-66N	65	64	+1.1	-0.7
CA Yellowknife	19	56	26	42	35	244	-60N	59	58	+1.0	-0.9
CA Yorkton	20	19	54	49	28	267	-72N	71	70	+0.7	-1.2
US Aberdeen MD	20	40	47	38	5	292	-70N	69	68	-0.1	-0.7
US Abilene TX	20	48	35	56	19	282	-70S	109	108	+0.1	-1.6
US Akron OH	20	39	36	41	9	288	-71N	70	69	+0.1	-0.9
US Alamoordo NM	20	46	32	61	25	278	-64S	116	115	+0.3	-1.9
US Albany NY	20	38	27	36	5	293	-60N	58	57	+0.0	-0.6
US Alexandria VA	20	50	18	50	13	286	-76S	103	102	+0.0	-1.4
US Alice TX	20	56	19	55	15	285	-61S	118	117	-0.1	-1.7
US Altoona PA	20	40	17	39	7	290	-70N	69	68	+0.0	-0.8
US Altus OK	20	44	58	56	20	281	-76S	103	102	+0.2	-1.6
US Amarillo TX	20	43	34	57	23	279	-74S	105	104	+0.3	-1.6
US Anchorage AK	19	15	0	34	49	188	-87N	86	85	+1.3	-0.1
US Andersen SC	20	45	52	43	7	289	-87N	86	85	-0.1	-1.0
US Anniston AL	20	47	9	45	9	288	-88S	91	90	-0.1	-1.1
US Ardmore OK	20	45	56	54	18	282	-78S	102	100	+0.1	-1.5
US Atlanta GA	20	46	58	44	8	289	-89S	90	89	-0.1	-1.1
US Atlantic City NJ	20	40	38	36	4	293	-68N	67	66	-0.1	-0.7
US Augusta GA	20	37	33	32	3	295	-51N	50	49	+0.0	-0.4
US Austin TX	20	52	18	55	17	284	-67S	112	111	+0.0	-1.6
US Bakersfield CA	20	35	13	68	38	268	-53S	126	125	+0.6	-2.4
US Baltimore MD	20	41	4	38	5	292	-71N	70	69	-0.1	-0.8
US Bangor MA	20	37	24	32	2	296	-49N	48	47	+0.0	-0.3
US Barter Island AK	19	23	51	30	39	197	-60N	59	58	+1.0	+0.4
US Baton Rouge LA	20	51	28	50	11	287	-75S	104	103	-0.1	-1.4
US Baudette MN	20	27	55	47	22	276	-69N	68	67	+0.5	-1.1
US Beaufort SC	20	47	34	41	4	291	-90N	89	88	-0.2	-1.0
US Beaumont TX	20	52	34	52	13	286	-71S	108	107	-0.1	-1.5
US Bedford MA	20	38	30	34	3	294	-58N	57	55	-0.1	-0.5
US Belleville IL	20	41	19	48	14	284	-85N	84	83	+0.1	-1.2
US Bellingham WA	20	4	51	56	44	248	-81S	98	97	+1.1	-1.7
US Biloxi MS	20	51	23	48	10	288	-77S	102	101	-0.1	-1.3
US Birmingham AL	20	47	16	46	10	288	-87S	92	91	-0.1	-1.2
US Blytheville AR	20	44	24	48	13	285	-89S	90	89	+0.1	-1.2
US Boise ID	20	20	27	60	38	261	-76S	103	102	+0.9	-1.8
US Boston MA	20	38	32	34	3	295	-58N	57	55	-0.1	-0.5
US Brownsville TX	20	59	24	54	14	286	-57S	123	121	-0.2	-1.8
US Bryan TX	20	51	29	54	16	284	-70S	109	108	+0.0	-1.5
US Buckley CO	20	35	7	58	27	274	-81S	98	97	+0.5	-1.6
US Buffalo NY	20	38	9	39	8	290	-64N	63	62	+0.1	-0.8
US Burbank CA	20	38	36	68	37	270	-51S	129	128	+0.5	-2.5
US Burlington VT	20	37	30	35	5	293	-55N	54	52	+0.0	-0.5
US Bush Field SC	20	46	54	42	6	290	-89N	88	87	-0.2	-1.0
US Calexico CA	20	43	37	68	34	273	-51S	129	128	+0.4	-2.4
US Camp Springs MD	20	41	21	38	5	292	-72N	71	70	-0.1	-0.8
US Caribou MA	20	36	59	31	3	296	-42N	41	40	+0.1	-0.1
US Carlsbad NM	20	47	55	60	23	280	-65S	115	113	+0.2	-1.8
US Casper WY	20	28	58	57	30	270	-86S	93	92	+0.6	-1.6
US Cedar City UT	20	34	9	64	34	270	-66S	113	112	+0.6	-2.0
US Charleston NC	20	47	0	41	4	291	-88N	87	86	-0.2	-1.0
US Charlotte VA	20	44	56	41	6	290	-84N	83	82	-0.1	-1.0
US Chattanooga TN	20	45	30	45	9	288	-88N	87	86	-0.1	-1.1
US Cherry Point NC	20	44	32	38	3	292	-81N	80	79	-0.2	-0.8
US Cheyenne WY	20	32	42	57	28	273	-84S	95	94	+0.5	-1.6
US Chicago IL	20	37	22	46	15	284	-75N	74	73	+0.2	-1.0
US Chico CA	20	23	4	64	43	261	-60S	119	118	+0.9	-2.2

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Chicopee Falls MA	20	38	43	35	4	294	-60N	58	57	-0.1	-0.6
US Childress TX	20	45	10	57	21	280	-74S	105	104	+0.2	-1.6
US China CA	20	35	33	67	37	269	-55S	124	123	+0.6	-2.3
US Cincinnati OH	20	41	19	44	11	287	-79N	78	77	+0.1	-1.0
US Clear Mews AK	19	16	16	33	46	189	-78N	77	76	+1.2	+0.2
US Cleveland OH	20	39	15	41	10	288	-71N	70	69	+0.1	-0.9
US Clovis NM	20	44	35	59	24	279	-71S	109	107	+0.3	-1.7
US Coco Beach FL	20	51	59	41	2	292	-80S	99	98	-0.3	-1.1
US College Station TX	20	51	41	54	16	284	-70S	109	108	+0.0	-1.6
US Colombia FL	20	46	11	42	5	290	-87N	86	85	-0.2	-1.0
US Columbus OH	20	47	13	47	11	287	-85S	94	93	+0.0	-1.2
US Colorado Springs CO	20	36	37	58	27	275	-79S	100	99	+0.5	-1.6
US Conroe TX	20	52	2	53	15	285	-70S	109	108	+0.0	-1.5
US Corpus Christi TX	20	56	13	55	15	285	-61S	118	117	-0.1	-1.7
US Cotulla TX	20	55	10	56	17	284	-61S	118	117	+0.0	-1.7
US Crestview FL	20	50	33	46	8	289	-81S	99	97	-0.2	-1.2
US Dalhart TX	20	42	0	58	24	278	-75S	104	103	+0.3	-1.6
US Dallas TX	20	48	8	54	17	283	-74S	105	104	+0.1	-1.5
US Fort Worth TX	20	48	3	54	18	283	-74S	105	104	+0.1	-1.5
US Dayton OH	20	40	33	43	11	287	-77N	76	75	+0.1	-1.0
US Deadhorse AK	19	19	17	29	40	190	-62N	61	60	+0.9	+0.6
US Del Rio TX	20	53	36	57	19	283	-62S	118	117	+0.0	-1.8
US Delta Junction AK	19	20	19	34	45	195	-78N	77	76	+1.2	+0.0
US Denver CO	20	34	55	58	27	274	-81S	98	97	+0.5	-1.6
US Deridder LA	20	51	13	51	13	285	-74S	106	104	+0.0	-1.4
US Des Moines IA	20	36	52	50	19	280	-83N	82	81	+0.3	-1.2
US Detroit MI	20	38	22	42	11	287	-71N	70	69	+0.1	-0.9
US Dothan AL	20	49	43	45	7	289	-83S	96	95	-0.2	-1.2
US Dover MA	20	40	58	37	4	292	-70N	69	68	-0.1	-0.7
US Duluth MN	20	31	12	47	20	279	-70N	69	68	+0.4	-1.1
US Durango CO	20	38	5	61	29	274	-72S	107	106	+0.5	-1.8
US Eagle Pass TX	20	54	47	57	18	283	-60S	119	118	+0.0	-1.8
US Edwards Afb CA	20	37	11	68	37	270	-53S	126	125	+0.6	-2.4
US El Centro CA	20	43	10	68	34	273	-51S	128	127	+0.4	-2.4
US El Dorado KS	20	47	49	51	14	285	-80S	99	98	+0.0	-1.4
US El Paso TX	20	48	21	62	25	279	-61S	118	117	+0.2	-1.9
US Elizabeth City NC	20	43	16	38	3	293	-77N	76	75	-0.2	-0.8
US Elkins WV	20	41	30	40	7	290	-74N	73	72	+0.0	-0.9
US Enid OK	20	42	45	54	20	281	-81S	98	97	+0.2	-1.5
US Fairbanks AK	19	17	49	33	45	191	-76N	75	74	+1.2	+0.2
US Fairfield CA	20	26	31	66	42	263	-56S	123	122	+0.8	-2.4
US Fallon NV	20	26	36	64	40	264	-64S	116	115	+0.8	-2.1
US Falmouth MA	20	38	51	33	2	295	-59N	58	57	-0.1	-0.5
US Farmington NM	20	38	36	61	29	274	-70S	109	108	+0.5	-1.8
US Fayetteville AR	20	44	41	40	5	291	-82N	81	80	-0.2	-0.9
US Florence SC	20	45	42	41	5	291	-85N	84	83	-0.2	-0.9
US Fort Benning GA	20	48	27	45	7	289	-86S	93	92	-0.1	-1.1
US Fort Carson CO	20	36	47	58	27	275	-79S	100	99	+0.5	-1.6
US Fort Dodge IA	20	35	25	50	20	279	-81N	80	79	+0.4	-1.2
US Fort Drum FL	20	37	37	37	7	291	-58N	57	56	+0.1	-0.6
US Fort Eustis FL	20	42	38	38	4	292	-75N	74	73	-0.1	-0.8
US Fort Hood TX	20	50	47	55	17	283	-69S	110	109	+0.0	-1.6
US Fort Huachuca AZ	20	47	53	65	28	277	-55S	124	123	+0.3	-2.2
US Fort Irwin CA	20	37	6	67	36	270	-56S	123	122	+0.6	-2.3
US Fort Knox TN	20	42	25	45	11	287	-83N	82	81	+0.0	-1.1
US Fort Leavenworth KS	20	39	16	51	19	281	-89N	88	87	+0.3	-1.3
US Fort Leonardwood MO	20	41	57	50	16	283	-90N	89	88	+0.2	-1.3
US Fort Lewis VA	20	7	44	57	44	250	-77S	102	101	+1.1	-1.8
US Fort Meade FL	20	41	8	38	5	292	-71N	70	69	-0.1	-0.8
US Fort Myers FL	20	54	17	42	2	291	-75S	104	103	-0.4	-1.2
US Fort Polk LA	20	50	53	51	13	285	-74S	105	104	+0.0	-1.4
US Fort Richardson AK	19	15	27	34	49	188	-87N	86	85	+1.3	-0.1
US Fort Riley KS	20	39	9	53	20	280	-88S	91	90	+0.3	-1.4
US Fort Sill OK	20	45	9	55	20	281	-77S	102	101	+0.2	-1.5
US Fort Smith AR	20	44	48	52	17	283	-83S	96	95	+0.1	-1.4
US Fort Worth TX	20	48	9	54	18	283	-74S	105	104	+0.1	-1.5
US Fort Yukon AK	19	21	5	33	43	195	-71N	70	69	+1.1	+0.2
US Fresno CA	20	31	41	67	40	266	-56S	124	123	+0.7	-2.4
US Gage OK	20	42	22	56	22	280	-79S	100	99	+0.3	-1.5
US Gainesville FL	20	50	54	42	4	291	-82S	97	96	-0.3	-1.1
US Galena TX	20	53	40	53	14	285	-68S	111	110	-0.1	-1.5
US Garden City CA	20	39	34	56	23	278	-82S	98	97	+0.3	-1.5
US Goldsboro NC	20	44	22	39	4	292	-81N	80	79	-0.2	-0.9
US Grand Forks ND	20	27	26	49	24	274	-73N	72	71	+0.6	-1.2
US Grand Rapids MI	20	37	23	44	13	285	-71N	70	69	+0.2	-1.0
US Grandview MO	20	40	3	51	18	281	-90N	89	88	+0.2	-1.3
US Grants CA	20	41	40	62	28	276	-67S	112	111	+0.4	-1.9
US Great Falls MT	20	18	7	55	35	262	-90N	89	88	+0.9	-1.5
US Green Bay WI	20	35	10	45	16	283	-71N	70	69	+0.3	-1.0
US Greenville TX	20	47	52	53	17	283	-76S	103	102	+0.1	-1.5
US Greenwood MS	20	47	28	49	12	286	-83S	96	95	+0.0	-1.3
US Gwinn MI	20	33	30	44	16	282	-66N	65	64	+0.3	-1.0
US Hampton DE	20	42	38	38	4	292	-75N	74	73	-0.2	-0.8
US Harlingen TX	20	58	51	55	14	286	-57S	122	121	-0.2	-1.8
US Harrisburg PA	20	40	17	38	6	291	-68N	67	66	-0.1	-0.7
US Harrison AR	20	43	43	51	16	283	-86S	93	92	+0.1	-1.3
US Hartford MA	20	39	0	35	3	294	-61N	60	59	-0.1	-0.6
US Havre MT	20	17	52	54	34	262	-86N	85	84	+0.8	-1.5
US Hawthorne CA	20	39	18	68	37	271	-50S	129	128	+0.5	-2.5
US Helena MT	20	18	58	56	35	262	-88S	91	90	+0.9	-1.6
US Hibbing MN	20	30	18	47	20	278	-70N	69	68	+0.5	-1.1
US Hickory NC	20	44	29	42	7	290	-83N	82	81	-0.1	-1.0
US Hobart OK	20	44	30	55	20	281	-77S	102	101	+0.2	-1.5
US Hobbs NM	20	47	33	59	23	280	-67S	112	111	+0.2	-1.8

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Hopkinsville KY	20	43	42	46	12	286	-87N	86	85	+0.0	-1.1
US Houghton Lake MI	20	36	9	43	13	285	-67N	66	65	+0.2	-0.9
US Houlton MA	20	37	7	31	2	296	-44N	43	42	+0.1	-0.1
US Houston TX	20	52	36	53	14	285	-69S	110	109	+0.0	-1.5
US Hunter Aaf FL	20	48	8	42	4	291	-89S	90	89	-0.2	-1.0
US Huron SD	20	31	24	52	23	275	-82N	81	80	+0.5	-1.3
US Imperial CA	20	43	11	68	34	273	-51S	128	127	+0.4	-2.4
US Indian Springs CA	20	34	47	65	36	269	-60S	119	118	+0.6	-2.2
US Indianapolis IN	20	40	29	45	12	286	-79N	78	77	+0.1	-1.0
US Intl Falls MN	20	28	43	47	21	277	-68N	67	66	+0.5	-1.1
US Islip NY	20	39	35	35	3	294	-63N	62	61	-0.1	-0.6
US Jackson MS	20	49	1	49	11	286	-81S	99	98	+0.0	-1.3
US Jackson TN	20	44	54	48	12	286	-89S	90	89	+0.0	-1.2
US Jacksonville FL	20	44	48	39	3	292	-82N	81	80	-0.2	-0.9
US Jonesboro AR	20	44	31	49	14	285	-88S	91	90	+0.1	-1.2
US Juneau AK	19	36	59	43	47	218	-86N	85	84	+1.3	-0.9
US Kankakee IL	20	38	49	46	14	284	-78N	77	76	+0.2	-1.1
US Kansas City MO	20	39	25	51	19	281	-89N	88	87	+0.3	-1.3
US Killeen TX	20	50	54	55	17	283	-69S	110	109	+0.0	-1.6
US King Salmon HI	19	5	59	32	51	175	-84S	95	94	+1.4	-0.1
US Kingsville TX	20	56	42	55	15	285	-60S	119	118	-0.1	-1.7
US Kirtland NM	20	42	23	61	27	276	-68S	111	110	+0.4	-1.8
US Knobnoster MO	20	40	26	51	17	282	-89N	88	87	+0.2	-1.3
US Knoxville TN	20	44	36	44	9	288	-85N	84	83	-0.1	-1.0
US Kodiak AK	19	12	16	35	52	183	-83S	97	96	+1.5	-0.3
US Lafayette IN	20	52	1	50	12	286	-74S	106	104	-0.1	-1.4
US Lake Charles LA	20	52	15	51	13	286	-72S	107	106	-0.1	-1.4
US Lakehurst NJ	20	40	12	36	4	293	-67N	65	64	-0.1	-0.7
US Lansing MI	20	37	40	43	12	286	-71N	70	69	+0.2	-0.9
US Laredo TX	20	56	45	56	16	284	-59S	121	120	-0.1	-1.8
US Las Vegas NV	20	35	54	65	35	270	-60S	119	118	+0.6	-2.1
US Lemooore CA	20	32	34	67	40	267	-54S	125	124	+0.7	-2.4
US Lincoln NE	20	36	43	52	21	279	-88N	87	86	+0.4	-1.3
US Little Rock AR	20	45	46	50	14	284	-84S	95	94	+0.1	-1.3
US Lompoc CA	20	36	3	69	40	268	-49S	130	129	+0.6	-2.6
US Long Beach CA	20	39	39	68	37	271	-50S	129	128	+0.5	-2.5
US Longview TX	20	48	57	52	15	284	-76S	103	102	+0.0	-1.4
US Los Angeles CA	20	39	13	68	37	270	-50S	129	128	+0.5	-2.5
US Louisiana LA	20	52	14	50	12	286	-73S	106	105	-0.1	-1.4
US Louisville KY	20	42	5	45	11	287	-82N	81	80	+0.1	-1.0
US Lubbock TX	20	46	9	58	22	280	-71S	108	107	+0.2	-1.7
US Lufkin TX	20	50	40	52	15	285	-73S	106	105	+0.0	-1.5
US MacOn GA	20	47	56	44	7	289	-88S	91	90	-0.2	-1.1
US Madison WI	20	36	14	46	16	282	-75N	74	73	+0.3	-1.1
US Marietta GA	20	46	41	44	8	289	-90S	89	88	-0.1	-1.1
US Marquette IL	20	33	16	44	16	282	-66N	65	64	+0.3	-1.0
US Mary Esther FL	20	51	0	46	8	289	-80S	100	98	-0.2	-1.2
US Massena IA	20	37	7	36	6	292	-55N	54	53	+0.1	-0.6
US McAlester OK	20	45	15	53	17	282	-80S	99	98	+0.1	-1.4
US McAllen TX	20	59	4	55	15	285	-56S	123	122	-0.2	-1.8
US Melbourne FL	20	52	8	41	2	292	-80S	99	98	-0.3	-1.1
US Memphis TN	20	45	32	48	13	285	-87S	92	91	+0.0	-1.2
US Meridian MS	20	48	37	47	10	287	-83S	96	95	-0.1	-1.2
US Midland TX	20	49	2	58	21	281	-66S	113	112	+0.2	-1.7
US Millington TN	20	45	9	48	13	285	-88S	91	90	+0.0	-1.2
US Millinocket MA	20	37	11	31	3	296	-46N	45	44	+0.0	-0.2
US Millville DE	20	40	45	37	4	293	-69N	68	67	-0.1	-0.7
US Milton FL	20	50	41	46	8	288	-80S	99	98	-0.2	-1.2
US Milwaukee WI	20	36	48	45	15	284	-74N	73	72	+0.2	-1.0
US Mineral Wells TX	20	48	9	55	18	282	-73S	106	105	+0.1	-1.6
US Minneapolis MN	20	32	58	48	20	279	-75N	74	73	+0.4	-1.2
US Minot ND	20	24	18	51	27	270	-77N	76	75	+0.7	-1.3
US Miramar CA	20	42	28	68	35	272	-49S	130	129	+0.4	-2.5
US Mobile AL	20	50	55	47	9	288	-79S	100	99	-0.1	-1.3
US Modesto CA	20	28	47	66	41	264	-56S	123	122	+0.8	-2.4
US Monroe LA	20	48	49	50	13	285	-79S	100	99	+0.0	-1.4
US Montgomery AL	20	48	36	46	9	288	-84S	95	94	-0.1	-1.2
US Montpelier VT	20	37	41	34	5	293	-55N	54	52	+0.0	-0.5
US Mount Clemens MI	20	38	3	42	11	287	-69N	68	67	+0.1	-0.9
US Mountain Home CA	20	21	45	61	38	262	-75S	104	103	+0.9	-1.8
US Mountain View CA	20	28	26	67	42	264	-54S	125	124	+0.8	-2.4
US Muir PA	20	40	6	38	5	292	-68N	67	66	+0.0	-0.7
US Muskogee OK	20	44	13	53	18	282	-82S	97	96	+0.2	-1.4
US Myrtle Beach SC	20	46	2	40	4	292	-85N	84	83	-0.2	-0.9
US Nantucket MA	20	39	0	33	1	295	-59N	58	57	-0.1	-0.5
US Nashville TN	20	44	20	46	11	287	-87N	86	85	+0.0	-1.1
US New Bern NC	20	44	25	38	3	292	-80N	80	78	-0.2	-0.8
US New Orleans LA	20	52	6	49	10	287	-75S	104	103	-0.1	-1.3
US New York NY	20	39	38	36	4	293	-64N	63	62	-0.1	-0.6
US Newark NJ	20	39	43	36	4	293	-65N	64	63	-0.1	-0.7
US Newburgh NY	20	39	14	36	4	293	-63N	62	61	-0.1	-0.6
US Newport News VA	20	42	37	38	4	292	-75N	74	73	-0.1	-0.8
US Niagara Falls NY	20	38	0	39	8	289	-64N	63	62	+0.1	-0.8
US Nogales AZ	20	48	5	65	29	277	-54S	125	124	+0.3	-2.2
US Norfolk VA	20	42	45	38	3	292	-76N	75	73	-0.2	-0.8
US Oakland CA	20	27	35	66	42	263	-55S	125	124	+0.8	-2.4
US Oceana VA	20	42	47	38	3	293	-76N	75	73	-0.2	-0.8
US Ogden UT	20	28	20	61	34	268	-76S	103	102	+0.7	-1.8
US Ogdensburg NY	20	37	13	36	7	291	-57N	56	54	+0.1	-0.6
US Oklahoma City OK	20	44	13	54	19	281	-80S	99	98	+0.2	-1.5
US Omaha NE	20	36	39	51	20	279	-86N	85	84	+0.3	-1.3
US Ontario CA	20	39	20	68	36	271	-51S	128	127	+0.5	-2.4
US Orlando FL	20	52	0	41	2	291	-80S	99	98	-0.3	-1.1
US Oscoda MI	20	36	18	42	12	286	-66N	65	64	+0.2	-0.9

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Palacios TX	20	54	36	54	14	285	-65S	114	113	-0.1	-1.6
US Palm Springs CA	20	40	26	68	35	272	-52S	127	126	+0.5	-2.4
US Palmdale CA	20	37	44	68	37	270	-52S	127	126	+0.5	-2.4
US Panama City FL	20	51	13	45	7	289	-80S	99	98	-0.2	-1.2
US Patuxent River MD	20	41	43	38	4	292	-73N	72	70	-0.1	-0.8
US Pembina ND	20	26	12	48	24	273	-71N	70	69	+0.6	-1.2
US Pensacola FL	20	51	13	46	8	288	-79S	100	99	-0.2	-1.2
US Peru IL	20	39	30	45	13	286	-77N	76	75	+0.1	-1.0
US Philadelphia PA	20	40	24	37	4	292	-68N	67	66	-0.1	-0.7
US Phoenix AZ	20	42	57	65	31	274	-57S	122	121	+0.4	-2.2
US Pine Bluff AR	20	46	34	50	14	285	-83S	96	95	+0.0	-1.3
US Pittsburgh PA	20	40	7	40	8	289	-71N	70	69	+0.0	-0.8
US Plattsburgh NY	20	37	24	35	5	293	-54N	53	52	+0.1	-0.5
US Point Mugu CA	20	38	24	69	38	270	-49S	130	129	+0.5	-2.5
US Ponca City OK	20	42	21	54	19	281	-83S	96	95	+0.2	-1.4
US Port Angeles CA	20	4	56	56	45	248	-79S	100	99	+1.2	-1.7
US Port Huron MI	20	37	49	42	11	287	-68N	67	66	+0.1	-0.9
US Portland OR	20	10	28	59	44	252	-74S	105	104	+1.1	-1.9
US Prescott AZ	20	40	40	65	32	273	-60S	119	118	+0.5	-2.1
US Presque Isle MA	20	37	0	31	3	296	-43N	41	40	+0.1	-0.1
US Princeton MN	20	32	2	48	20	278	-74N	73	72	+0.4	-1.2
US Providence RI	20	38	54	34	3	295	-60N	59	57	-0.1	-0.5
US Pueblo NM	20	37	33	58	26	275	-78S	101	100	+0.4	-1.6
US Quantico VA	20	41	39	39	5	291	-73N	72	71	-0.1	-0.8
US Raleigh Durham WV	20	44	2	40	5	291	-80N	79	78	-0.1	-0.9
US Rancho Murieta CA	20	26	36	66	42	263	-58S	121	120	+0.8	-2.3
US Rapid City SD	20	29	9	54	27	272	-88N	87	86	+0.6	-1.4
US Red River ND	20	27	17	49	24	274	-74N	73	72	+0.6	-1.2
US Redstone AL	20	45	58	46	10	287	-89S	90	89	+0.0	-1.1
US Reno NV	20	25	32	65	41	263	-62S	117	116	+0.8	-2.2
US Richmond VA	20	42	26	39	5	292	-75N	74	73	-0.1	-0.8
US Riverside CA	20	39	56	68	36	271	-51S	128	127	+0.5	-2.4
US Robinson AR	20	45	37	50	15	284	-84S	95	94	+0.1	-1.3
US Rochester NY	20	38	8	38	8	290	-63N	62	61	+0.1	-0.7
US Rome NY	20	38	8	37	6	292	-60N	59	58	+0.0	-0.6
US Roswell NM	20	46	9	60	24	279	-67S	113	112	+0.3	-1.8
US Sacramento CA	20	25	57	65	42	263	-58S	121	120	+0.8	-2.3
US Salisbury MD	20	41	33	37	4	293	-72N	71	69	-0.1	-0.7
US Salt Lake City UT	20	28	57	61	34	268	-75S	104	103	+0.7	-1.8
US San Angelo CA	20	50	14	57	20	282	-67S	112	111	+0.1	-1.7
US San Antonio TX	20	53	21	56	17	284	-65S	114	113	+0.0	-1.7
US San Diego CA	20	42	49	68	35	272	-48S	131	130	+0.4	-2.5
US San Francisco CA	20	27	43	67	43	263	-54S	125	124	+0.8	-2.4
US San Jose CA	20	28	40	67	42	264	-54S	125	124	+0.8	-2.4
US San Luis CA	20	9	51	59	44	252	-74S	105	104	+1.1	-1.9
US Sandusky OH	20	39	9	42	10	287	-72N	71	70	+0.1	-0.9
US Santa Ana CA	20	40	8	68	36	271	-50S	129	128	+0.5	-2.5
US Santa Barbara CA	20	47	46	43	6	290	-89S	90	89	-0.2	-1.0
US Santa Fe NM	20	41	33	60	27	276	-70S	109	108	+0.4	-1.8
US Savannah GA	20	48	2	42	4	291	-89S	90	89	-0.2	-1.0
US Seattle WA	20	7	22	57	44	250	-78S	101	100	+1.1	-1.7
US Selma AL	20	48	40	46	9	288	-84S	95	94	-0.1	-1.2
US Shreveport LA	20	48	52	52	15	285	-77S	102	101	+0.0	-1.4
US Sioux City IA	20	34	48	51	21	278	-84N	83	82	+0.4	-1.3
US Sitka AK	19	37	8	44	49	218	-90S	89	88	+1.3	-0.9
US Skagway AK	19	35	8	42	47	216	-84N	83	82	+1.3	-0.7
US Smithfield RI	20	38	49	34	3	294	-59N	58	57	-0.1	-0.5
US Spokane WA	20	12	14	57	40	255	-84S	95	94	+1.0	-1.6
US St. Louis MO	20	41	0	48	15	284	-85N	85	83	+0.2	-1.2
US St. Petersburg FL	20	53	2	42	3	291	-78S	102	101	-0.3	-1.2
US Stockton CA	20	27	56	66	42	264	-56S	123	122	+0.8	-2.4
US Stratford CT	20	39	22	35	3	294	-63N	62	61	-0.1	-0.6
US Sumter SC	20	46	3	41	5	291	-86N	85	84	-0.2	-1.0
US Syracuse NY	20	38	13	37	6	291	-61N	60	59	+0.0	-0.7
US Tacoma WA	20	7	46	57	44	250	-77S	102	101	+1.1	-1.8
US Tallahassee FL	20	50	36	44	6	290	-82S	97	96	-0.2	-1.1
US Tampa FL	20	52	55	42	3	291	-78S	101	100	-0.3	-1.1
US Terre Haute IN	20	40	38	46	13	285	-81N	80	79	+0.1	-1.1
US Teterboro NJ	20	39	36	36	4	293	-64N	63	62	-0.1	-0.6
US Texarkana AR	20	47	28	52	15	284	-79S	100	99	+0.1	-1.4
US Tonopah NV	20	31	29	65	37	267	-62S	117	116	+0.7	-2.1
US Topeka KS	20	39	37	52	19	280	-89S	90	89	+0.3	-1.3
US Trenton NJ	20	40	5	37	4	293	-66N	65	64	-0.1	-0.7
US Tucson AZ	20	46	34	65	29	276	-55S	124	123	+0.3	-2.2
US Tucumcari NM	20	43	7	59	24	278	-72S	107	106	+0.3	-1.7
US Tulsa OK	20	43	20	53	18	282	-83S	96	95	+0.2	-1.4
US Tustin CA	20	40	5	68	36	271	-50S	129	128	+0.5	-2.5
US Twenty Nine Palms CA	20	39	35	67	35	271	-54S	125	124	+0.5	-2.3
US Tyler TX	20	48	59	53	16	284	-75S	104	103	+0.0	-1.5
US Valdosta GA	20	49	40	43	5	290	-84S	95	94	-0.2	-1.1
US Valparaiso FL	20	50	54	46	8	289	-80S	99	98	-0.2	-1.2
US Vero Beach FL	20	52	33	41	1	292	-79S	100	99	-0.4	-1.1
US Victorville CA	20	38	12	68	37	270	-53S	126	125	+0.5	-2.4
US Waco TX	20	50	4	54	17	283	-71S	108	107	+0.1	-1.6
US Wallops Island VA	20	41	52	37	3	293	-72N	71	70	-0.1	-0.7
US Washington DC	20	41	20	38	5	292	-72N	71	70	-0.1	-0.8
US Watertown NY	20	37	38	37	7	291	-59N	58	57	+0.1	-0.6
US Wendover UT	20	27	38	62	36	266	-72S	107	106	+0.7	-1.9
US West Chicago IL	20	37	50	46	15	284	-76N	75	74	+0.2	-1.1
US West Hampton Beach FL	20	39	31	35	3	294	-63N	62	61	-0.1	-0.6
US Whidbey Island WA	20	5	26	56	44	248	-80S	99	98	+1.1	-1.7
US White Plains NY	20	39	28	36	4	293	-63N	62	61	-0.1	-0.6
US White Sands NM	20	47	23	62	25	279	-62S	117	116	+0.2	-1.9
US Wichita KS	20	40	57	54	20	280	-85S	95	93	+0.3	-1.4

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
US Wichita Falls TX	20	46	11	55	19	282	-75S	104	103	+0.2	-1.5
US Wildwood NJ	20	40	59	37	4	293	-69N	68	67	-0.1	-0.7
US Williamsport PA	20	39	30	38	6	291	-66N	65	64	+0.0	-0.7
US Williston ND	20	23	6	52	29	268	-80N	79	78	+0.7	-1.4
US Willow Grove DE	20	40	9	37	4	292	-67N	66	65	-0.1	-0.7
US Wilmington NC	20	40	34	37	4	292	-69N	68	66	-0.1	-0.7
US Windsor Locks CT	20	38	52	35	4	294	-60N	59	58	-0.1	-0.6
US Wink TX	20	49	7	59	22	280	-65S	115	114	+0.2	-1.8
US Winston-Salem NX	20	43	59	41	6	290	-81N	80	79	-0.1	-0.9
US Wright GA	20	48	21	42	5	291	-88S	91	90	-0.2	-1.0
US Wrightstown NJ	20	40	14	36	4	293	-67N	66	65	-0.1	-0.7
US Youngstown PA	20	39	27	41	9	289	-70N	69	68	+0.1	-0.8
US Yuma AZ	20	43	59	67	33	274	-52S	127	126	+0.4	-2.3
US Zuni Pueblo NM	20	41	28	62	29	275	-66S	114	112	+0.4	-1.9
MX Acapulco	21	20	5	52	8	288	-24S	155	154	-0.8	-2.9
MX Aguascalientes	21	9	14	57	15	286	-38S	141	140	-0.4	-2.3
MX Bahias Dehuatulco	21	19	50	49	5	289	-26S	153	152	-0.8	-2.7
MX Campeche	21	7	35	47	4	290	-48S	131	130	-0.5	-1.8
MX Cancun	21	3	46	44	2	291	-56S	124	123	-0.5	-1.5
MX Celaya	21	11	18	56	13	287	-36S	143	142	-0.5	-2.3
MX Chetumal	21	8	40	44	1	291	-46S	133	132	-0.6	-1.8
MX Chihuahua	20	54	35	62	23	281	-53S	126	125	+0.1	-2.1
MX Chilpancingo	21	17	41	53	9	288	-28S	152	150	-0.7	-2.6
MX Ciudad Del Carmen	21	10	26	47	4	290	-43S	137	136	-0.6	-1.9
MX Ciudad Juarez	20	48	45	62	25	279	-60S	119	118	+0.2	-1.9
MX Ciudad Mante	21	5	45	55	13	286	-46S	133	132	-0.3	-2.0
MX Ciudad Obregon	20	57	22	65	25	280	-44S	135	134	+0.0	-2.4
MX Ciudad Victoria	21	3	46	55	13	286	-49S	131	129	-0.3	-2.0
MX Colima	21	15	52	57	14	287	-27S	152	151	-0.6	-2.8
MX Cozumel	21	4	34	44	2	291	-54S	125	124	-0.5	-1.6
MX Cuernavaca	21	14	27	53	10	288	-33S	146	145	-0.6	-2.4
MX Culiacan	21	3	28	62	21	283	-40S	139	138	-0.2	-2.4
MX Del Bajio	21	10	33	56	13	286	-37S	142	141	-0.4	-2.3
MX Durango	21	4	22	60	18	284	-42S	137	136	-0.2	-2.3
MX Ensenada	20	45	25	69	34	274	-47S	133	132	+0.3	-2.5
MX Guadalajara	21	12	32	58	15	286	-33S	147	146	-0.5	-2.6
MX Guaymas	20	55	57	66	27	280	-44S	135	134	+0.0	-2.4
MX Hermosillo	20	53	17	66	28	279	-47S	132	131	+0.1	-2.3
MX Isla Mujeres	21	3	22	44	2	291	-56S	123	122	-0.5	-1.5
MX Iztepec	21	17	16	49	5	289	-30S	149	148	-0.8	-2.4
MX Jalapa	21	11	36	52	9	288	-39S	141	139	-0.5	-2.2
MX La Paz	21	5	54	65	23	282	-33S	146	145	-0.3	-2.8
MX Lazard Cardenas	21	18	28	55	11	287	-25S	155	153	-0.8	-2.9
MX Loreto	21	0	58	66	26	281	-38S	142	141	-0.1	-2.6
MX Los Mochis	21	1	29	64	23	282	-40S	139	138	-0.1	-2.5
MX Manzanillo	21	16	52	58	14	287	-25S	154	153	-0.7	-2.9
MX Matamoros	20	59	40	54	14	286	-56S	123	122	-0.2	-1.8
MX Mazatlan	21	7	6	61	19	284	-37S	143	142	-0.3	-2.5
MX Merida	21	5	13	46	4	290	-52S	127	126	-0.5	-1.7
MX Mexicali	20	43	48	67	33	274	-51S	128	127	+0.4	-2.4
MX Mexico City	21	12	57	54	10	288	-35S	144	143	-0.6	-2.3
MX Minatitlan	21	13	14	49	6	289	-37S	142	141	-0.6	-2.2
MX Monclova	20	58	3	58	18	284	-54S	125	124	-0.1	-1.9
MX Monterrey	20	59	53	57	16	285	-53S	126	125	-0.2	-1.9
MX Morelia	21	13	1	55	12	287	-34S	145	144	-0.5	-2.4
MX Nogales	20	48	26	65	29	277	-53S	126	125	+0.3	-2.2
MX Nuevo Casas Grandes	20	50	57	63	26	279	-55S	124	123	+0.2	-2.1
MX Nuevo Laredo	20	56	55	56	16	284	-58S	121	120	-0.1	-1.8
MX Oaxaca	21	17	11	50	6	289	-30S	149	148	-0.7	-2.5
MX Pachuca	21	11	21	54	11	288	-38S	141	140	-0.5	-2.2
MX Piedras Negras	20	54	55	57	18	283	-60S	119	118	+0.0	-1.8
MX Poza Rico	21	9	31	53	10	288	-41S	138	137	-0.5	-2.1
MX Puebla	21	13	12	53	10	288	-36S	144	143	-0.6	-2.3
MX Puerto Escondido	21	20	16	50	6	289	-25S	154	153	-0.9	-2.7
MX Puerto Vallarta	21	13	3	59	16	286	-30S	150	148	-0.5	-2.7
MX Punta Penasco	20	47	24	67	31	276	-50S	129	128	+0.3	-2.4
MX Queretaro	21	10	53	55	12	287	-37S	142	141	-0.5	-2.3
MX Reynosa	20	59	22	55	14	285	-56S	123	122	-0.2	-1.8
MX Saltillo	21	0	37	57	16	285	-51S	128	127	-0.2	-2.0
MX San Filipe	20	48	8	68	32	275	-47S	132	131	+0.3	-2.5
MX San Jose Del Cabo	21	8	14	64	22	283	-31S	148	147	-0.4	-2.8
MX San Luis Potosi	21	7	27	56	14	286	-42S	137	136	-0.4	-2.2
MX Tampico	21	6	14	54	12	287	-46S	133	132	-0.4	-2.0
MX Tamuin	21	7	6	54	12	287	-44S	135	134	-0.4	-2.1
MX Tapachula	21	19	1	45	1	290	-28S	151	150	-0.9	-2.5
MX Tehuacan	21	14	8	52	8	288	-35S	145	144	-0.6	-2.3
MX Tepic	21	10	57	59	17	285	-33S	146	145	-0.4	-2.6
MX Tijuana	20	43	24	68	35	273	-48S	131	130	+0.4	-2.5
MX Tlaxcala	21	12	15	53	10	288	-37S	142	141	-0.5	-2.2
MX Toluca	21	13	27	54	11	288	-34S	145	144	-0.6	-2.4
MX Torreon	21	1	1	59	18	284	-48S	131	130	-0.1	-2.1
MX Tuxpan	21	14	52	57	14	287	-29S	150	149	-0.6	-2.7
MX Tuxtla Gutierrez	21	15	19	47	4	290	-34S	145	144	-0.7	-2.2
MX Uruapan	21	14	40	56	13	287	-31S	149	148	-0.6	-2.6
MX Vera Cruz	21	11	57	51	8	288	-38S	141	140	-0.6	-2.2
MX Villahermosa	21	12	22	48	4	290	-39S	140	139	-0.6	-2.0
MX Zacatecas	21	6	40	58	16	285	-41S	138	137	-0.3	-2.2
MX Zamora	21	13	12	56	13	287	-33S	147	146	-0.5	-2.5
MX Zapopan	21	12	1	58	15	286	-33S	146	145	-0.5	-2.5
MX Zihuatanejo	21	19	3	54	11	288	-24S	155	154	-0.8	-2.9
MS Plymouth	20	46	22	41	5	291	-87N	86	85	-0.2	-1.0

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CA Abbotsford	21	19	57	53	32	264	66N	294	292	+0.4	-2.1
CA Armstrong	21	12	31	37	12	287	30N	329	328	-0.6	-2.4
CA Atikokan	21	17	41	39	12	287	36N	323	322	-0.5	-2.3
CA Bagotville	21	2	57	28	1	299	15N	344	343	-1.0	-2.7
CA Baie Comeau	20	57	38	27	1	300	9N	350	349	-1.2	-3.0
CA Baker Lake	20	36	51	35	22	270	8N	351	349	-0.7	-3.4
CA Brandon	21	18	37	43	17	280	42N	317	316	-0.3	-2.4
CA Buffalo Narrows	21	5	43	44	25	269	39N	320	318	-0.1	-2.6
CA Burwash	20	42	47	43	41	230	55N	304	303	+0.7	-2.2
CA Calgary	21	17	25	48	27	269	53N	306	305	+0.1	-2.3
CA Cambridge Bay	20	25	47	34	26	257	9N	350	349	-0.5	-3.5
CA Campbell River	21	16	38	53	34	261	67N	293	291	+0.5	-2.1
CA Castlegar	21	20	58	51	28	268	60N	299	298	+0.2	-2.2
CA Chapleau	21	14	46	34	7	292	30N	329	328	-0.7	-2.3
CA Chilliwack	21	19	52	53	31	265	65N	294	293	+0.4	-2.1
CA Churchill	20	52	59	37	19	277	19N	340	339	-0.6	-2.9
CA Cold Lake	21	9	32	45	26	269	44N	315	314	-0.1	-2.5
CA Comox	21	17	20	53	34	261	67N	292	291	+0.5	-2.1
CA Coppermine	20	32	42	36	30	249	23N	336	335	-0.1	-3.0
CA Coral Harbour	21	18	59	50	28	268	57N	303	301	+0.2	-2.3
CA Coronation	21	15	17	47	25	270	49N	310	309	+0.0	-2.4
CA Cranbrook	21	20	37	50	27	269	58N	301	300	+0.2	-2.2
CA Dauphin	21	15	47	42	18	279	40N	319	318	-0.3	-2.4
CA Dawson	20	36	46	40	40	227	49N	310	308	+0.6	-2.3
CA Dawson Creek	21	5	15	47	32	259	51N	308	307	+0.2	-2.5
CA Dease Lake	20	54	59	46	37	245	54N	305	304	+0.5	-2.4
CA Dryden	21	15	45	39	13	285	35N	324	323	-0.5	-2.4
CA Earleton	21	12	24	33	5	294	26N	333	331	-0.8	-2.4
CA Edmonton	21	11	36	47	27	267	48N	311	309	+0.1	-2.4
CA Edson	21	11	16	48	29	265	51N	308	307	+0.1	-2.4
CA Eskimo Point	20	45	54	37	20	275	13N	346	344	-0.7	-3.1
CA Estevan	21	21	4	44	19	279	46N	313	312	-0.2	-2.3
CA Faro	20	44	14	42	38	236	49N	310	309	+0.5	-2.4
CA Flin Flon	21	7	17	42	21	275	35N	324	323	-0.3	-2.6
CA Forestville	20	59	48	27	1	300	11N	348	347	-1.1	-2.9
CA Fort Chipewyan	20	58	13	43	27	264	37N	322	321	-0.1	-2.7
CA Fort McMurray	21	3	50	44	27	266	41N	318	317	+0.0	-2.6
CA Fort McPherson	20	30	46	37	36	228	39N	320	319	+0.4	-2.5
CA Fort Nelson	20	56	52	45	33	253	47N	312	311	+0.3	-2.5
CA Fort Resolution	20	51	44	41	29	259	35N	324	323	+0.0	-2.8
CA Fort Saint John	21	3	52	47	32	258	50N	309	308	+0.3	-2.5
CA Fort Simpson	20	49	34	42	33	251	40N	319	317	+0.2	-2.7
CA Fort Smith	20	54	50	42	28	262	35N	324	323	-0.1	-2.7
CA Gatineau	21	13	58	30	1	298	27N	332	331	-0.8	-2.3
CA Geraldton	21	12	32	36	10	289	29N	330	329	-0.6	-2.4
CA Gillam	21	0	2	39	18	279	24N	335	334	-0.5	-2.7
CA Gore Bay	21	18	38	34	5	293	33N	326	325	-0.7	-2.2
CA Grande Prairie	21	6	55	47	31	261	51N	309	307	+0.2	-2.5
CA Hamilton	21	22	31	32	2	296	36N	323	321	-0.7	-2.1
CA Hay River	20	52	39	42	30	257	37N	322	321	+0.0	-2.7
CA High Level	20	58	31	44	30	258	43N	316	315	+0.1	-2.6
CA Holman Island	20	23	51	33	30	243	19N	340	339	-0.1	-3.2
CA Hudson Bay	21	12	15	43	20	277	39N	320	319	-0.3	-2.5
CA Inuvik	20	28	52	36	36	229	36N	323	322	+0.3	-2.6
CA Kamloops	21	17	3	51	31	264	60N	299	297	+0.3	-2.2
CA Kapuskasing	21	10	17	34	8	292	25N	334	333	-0.8	-2.5
CA Kelowna	21	19	2	51	30	266	61N	298	297	+0.3	-2.2
CA Kenora	21	16	40	40	14	284	37N	322	321	-0.5	-2.4
CA Kindersley	21	16	34	46	24	273	48N	311	310	-0.1	-2.4
CA Kuujjuarapik	20	49	9	32	10	290	3N	356	355	-1.4	-3.7
CA La Grande Riviere	20	54	41	32	9	292	8N	351	349	-1.1	-3.2
CA La Ronge	21	6	58	43	23	272	38N	322	320	-0.2	-2.6
CA Lethbridge	21	20	56	49	25	272	55N	304	303	+0.1	-2.3
CA Lloyminster	21	12	14	46	25	270	46N	314	312	+0.0	-2.5
CA London	21	23	43	33	2	295	38N	321	320	-0.7	-2.1
CA Lynn Lake	21	1	20	41	22	274	30N	329	328	-0.3	-2.7
CA Maniwaki	21	12	35	30	2	297	26N	333	332	-0.9	-2.3
CA Matagami	21	5	41	32	6	294	19N	340	339	-0.9	-2.6
CA Mayo	20	39	35	40	39	232	48N	311	310	+0.5	-2.4
CA Meadow Lake	21	10	9	45	24	271	43N	316	315	-0.1	-2.5
CA Medicine Hat	21	20	7	48	24	273	52N	307	306	+0.0	-2.3
CA Moose Jaw	21	18	58	45	21	276	47N	313	311	-0.2	-2.4
CA Moosonee	21	4	6	33	8	292	19N	340	339	-0.8	-2.7
CA Muskoka	21	18	11	32	3	296	32N	327	326	-0.8	-2.2
CA Nakina	21	11	23	36	10	289	28N	331	330	-0.7	-2.5
CA Nanaimo	21	19	14	53	33	263	67N	292	291	+0.5	-2.1
CA Norman Wells	20	38	53	39	34	240	38N	321	320	+0.3	-2.7
CA North Battleford	21	13	26	45	24	272	45N	314	313	-0.1	-2.5
CA North Bay	21	15	12	32	4	295	29N	330	329	-0.8	-2.3
CA Old Crow	20	28	11	36	38	222	42N	317	316	+0.5	-2.4
CA Ottawa	21	14	31	30	1	298	28N	331	330	-0.8	-2.3
CA Peace River	21	4	35	46	30	261	47N	312	311	+0.2	-2.5
CA Penticton	21	20	2	52	30	266	62N	297	296	+0.3	-2.2
CA Petawawa	21	14	28	31	2	296	28N	331	330	-0.8	-2.3
CA Peterborough	21	19	6	31	2	297	33N	326	325	-0.8	-2.1
CA Pickle Lake	21	10	26	38	13	286	29N	330	329	-0.6	-2.5
CA Pitt Meadows	21	19	24	53	32	264	66N	294	292	+0.4	-2.1
CA Port Hardy	21	13	54	53	36	258	67N	292	291	+0.6	-2.1
CA Portage-La-Prairie	21	18	2	42	16	282	40N	319	318	-0.4	-2.4
CA Prince Albert	21	12	1	44	22	274	41N	318	316	-0.2	-2.5
CA Prince George	21	8	57	49	33	259	56N	303	301	+0.4	-2.3
CA Prince Rupert	21	4	13	50	38	250	63N	296	295	+0.6	-2.2
CA Princeton	21	19	44	52	31	265	63N	296	295	+0.3	-2.2

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CA Quesnel	21	11	1	50	33	260	58N	301	300	+0.4	-2.3
CA Rankin Inlet	20	38	44	35	20	274	6N	353	352	-0.9	-3.6
CA Red Deer Industrial	21	14	56	48	27	268	51N	308	307	+0.1	-2.4
CA Regina	21	18	33	45	21	277	45N	314	312	-0.2	-2.4
CA Roberval	21	3	44	29	2	298	16N	343	342	-1.0	-2.6
CA Rocky Mountain House	21	14	14	48	28	267	52N	307	306	+0.1	-2.4
CA Rouyn	21	10	24	32	5	294	24N	335	334	-0.8	-2.4
CA Sachs Harbour	20	20	11	32	32	233	22N	337	336	+0.0	-3.0
CA Sandspit	21	5	34	51	39	250	66N	293	292	+0.7	-2.1
CA Sarnia	21	24	39	33	3	295	39N	320	319	-0.7	-2.0
CA Saskatoon	21	14	43	45	23	274	44N	315	313	-0.1	-2.4
CA Sault Sainte Marie	21	18	39	35	7	292	34N	326	324	-0.7	-2.2
CA Sept-Iles	20	51	18	27	1	300	0N	359	358	-1.6	-4.1
CA Sioux Lookout	21	14	40	39	13	286	33N	326	324	-0.5	-2.4
CA Slave Lake	21	7	14	46	28	264	46N	313	311	+0.1	-2.5
CA Smithers	21	4	50	49	36	253	59N	300	299	+0.5	-2.3
CA Sudbury	21	15	40	33	5	294	30N	329	328	-0.8	-2.3
CA Swift Current	21	19	20	46	22	275	49N	310	309	-0.1	-2.3
CA Terrace	21	4	56	50	37	252	61N	298	297	+0.6	-2.3
CA Teslin	20	49	25	44	38	240	53N	306	305	+0.5	-2.4
CA Thompson	21	2	59	40	19	277	29N	330	329	-0.4	-2.7
CA Thunder Bay	21	17	21	38	10	288	34N	325	323	-0.6	-2.3
CA Timmins	21	11	30	33	7	293	26N	333	332	-0.8	-2.4
CA Tofino	21	18	8	54	34	261	69N	290	289	+0.6	-2.1
CA Toronto	21	20	39	32	2	296	34N	325	323	-0.8	-2.1
CA Trenton	21	18	40	31	1	297	32N	327	326	-0.8	-2.1
CA Tuktoyaktuk	20	26	5	35	35	228	33N	326	324	+0.3	-2.7
CA Val D'Or	21	9	55	32	4	295	23N	336	334	-0.8	-2.4
CA Vancouver	21	19	15	53	32	263	66N	293	292	+0.5	-2.1
CA Vermillion	21	12	10	46	25	270	46N	313	312	+0.0	-2.5
CA Victoria	21	20	17	53	32	264	67N	292	290	+0.5	-2.1
CA Waterloo	21	22	15	32	2	296	36N	323	322	-0.7	-2.1
CA Watson Lake	20	51	27	44	36	245	50N	309	308	+0.4	-2.5
CA Whitecourt	21	9	58	47	29	265	49N	310	308	+0.1	-2.5
CA Whitehorse	20	46	49	44	39	236	54N	306	304	+0.6	-2.3
CA Wlarton	21	20	5	33	3	295	34N	325	324	-0.7	-2.2
CA Williams Lake	21	13	7	50	32	261	59N	300	299	+0.4	-2.3
CA Windsor	21	26	33	34	3	295	41N	318	317	-0.7	-2.0
CA Winnipeg	21	17	13	41	16	282	39N	320	319	-0.4	-2.4
CA Wrigley	20	45	16	41	33	247	39N	320	318	+0.2	-2.7
CA Yellowknife	20	48	10	41	29	256	33N	326	325	+0.0	-2.8
CA Yorkton	21	16	6	44	20	278	42N	317	316	-0.3	-2.4
US Abilene TX	21	51	12	44	7	289	77N	283	281	-0.2	-1.3
US Alamoordo NM	21	51	34	49	12	286	82N	277	276	+0.0	-1.3
US Alice TX	21	56	3	42	3	291	86N	273	272	-0.3	-1.0
US Altus OK	21	47	56	44	8	289	71N	288	287	-0.3	-1.5
US Amarillo TX	21	47	43	45	10	287	72N	287	286	-0.2	-1.5
US Anchorage AK	20	34	9	40	45	215	63N	296	295	+1.0	-1.7
US Ardmore OK	21	47	46	42	6	290	70N	289	288	-0.3	-1.5
US Austin TX	21	53	23	42	4	291	80N	279	278	-0.3	-1.2
US Bakersfield CA	21	44	58	59	24	278	89S	268	267	+0.5	-1.2
US Barter Island AK	20	20	21	33	37	214	38N	321	320	+0.5	-2.3
US Baudette MN	21	19	19	40	14	285	39N	320	319	-0.5	-2.3
US Beaumont TX	21	52	24	39	1	292	77N	282	281	-0.4	-1.2
US Belleville IL	21	37	45	37	4	292	55N	304	303	-0.5	-1.8
US Bellingham WA	21	20	23	53	32	264	66N	293	292	+0.4	-2.1
US Blytheville AR	21	42	9	37	2	293	60N	299	298	-0.5	-1.6
US Boise ID	21	33	7	53	25	274	70N	289	288	+0.3	-1.9
US Brownsville TX	21	57	31	41	1	292	90S	269	268	-0.2	-0.8
US Bryan TX	21	52	21	41	3	291	77N	282	281	-0.3	-1.2
US Buckley CO	21	40	55	47	15	284	66N	293	292	-0.1	-1.8
US Burbank CA	21	46	50	59	23	279	87S	266	265	+0.5	-1.1
US Calexico CA	21	49	55	57	20	281	87S	266	265	+0.4	-1.1
US Carlsbad NM	21	52	7	47	10	287	81N	278	277	-0.1	-1.3
US Casper WY	21	35	8	48	18	281	61N	298	297	-0.1	-2.0
US Cedar City UT	21	44	4	54	20	280	79N	281	279	+0.2	-1.6
US Cheyenne WY	21	38	17	47	16	283	63N	296	295	-0.1	-1.9
US Chicago IL	21	29	23	37	6	292	45N	314	313	-0.6	-2.0
US Chico CA	21	37	19	59	28	273	84N	275	274	+0.6	-1.5
US Childress TX	21	48	33	44	8	288	73N	287	285	-0.2	-1.5
US China CA	21	45	22	58	23	279	89N	271	269	+0.5	-1.3
US Cincinnati OH	21	33	49	34	1	295	49N	310	309	-0.6	-1.8
US Clear Mews AK	20	29	15	38	43	212	55N	304	303	+0.8	-1.9
US Cleveland OH	21	27	30	33	1	296	42N	317	316	-0.7	-2.0
US Clovis NM	21	49	14	47	11	287	76N	284	282	-0.1	-1.4
US College Station TX	21	52	30	41	3	291	78N	282	280	-0.3	-1.2
US Colorado Springs CO	21	42	29	48	14	284	68N	292	290	-0.1	-1.7
US Conroe TX	21	52	28	40	2	292	77N	282	281	-0.4	-1.2
US Corpus Christi TX	21	55	53	42	2	291	86N	274	272	-0.3	-1.0
US Cotulla TX	21	55	38	43	4	290	85N	274	272	-0.2	-1.0
US Dalhart TX	21	46	40	46	11	287	71N	288	286	-0.2	-1.5
US Dallas TX	21	49	46	42	5	291	73N	286	285	-0.3	-1.4
US Fort Worth TX	21	49	46	42	5	290	73N	286	285	-0.3	-1.4
US Dayton OH	21	31	59	34	1	295	47N	312	311	-0.7	-1.9
US Deadhorse AK	20	17	50	32	38	207	40N	319	318	+0.5	-2.1
US Del Rio TX	21	55	1	44	6	290	85N	274	273	-0.2	-1.1
US Delta Junction AK	20	32	28	39	42	218	54N	305	304	+0.7	-2.0
US Denver CO	21	40	38	47	15	284	65N	294	292	-0.1	-1.8
US Deridder LA	21	51	3	39	1	293	74N	285	283	-0.4	-1.2
US Des Moines IA	21	34	9	40	8	289	52N	307	306	-0.5	-1.9
US Detroit MI	21	26	58	34	3	295	41N	318	316	-0.7	-2.0
US Duluth MN	21	22	26	39	11	287	40N	319	318	-0.5	-2.2
US Durango CO	21	45	26	50	16	283	74N	285	284	+0.0	-1.6
US Eagle Pass TX	21	55	38	44	5	290	86N	273	272	-0.2	-1.0

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Edwards Afb CA	21	46	16	58	23	279	89S	269	267	+0.5	-1.2
US El Centro CA	21	49	40	57	20	281	87S	266	265	+0.4	-1.1
US El Dorado KS	21	47	39	39	2	292	69N	291	289	-0.4	-1.4
US El Paso TX	21	52	46	49	12	286	85N	275	273	+0.0	-1.2
US Enid OK	21	44	58	43	8	289	66N	293	291	-0.3	-1.6
US Fairbanks AK	20	29	15	37	42	214	53N	306	305	+0.7	-2.0
US Fairfield CA	21	39	31	59	28	274	88N	272	270	+0.6	-1.4
US Fallon NV	21	39	37	57	26	276	81N	278	277	+0.4	-1.6
US Farmington NM	21	46	3	50	16	283	76N	284	282	+0.0	-1.5
US Fort Carson CO	21	42	42	48	14	284	68N	291	290	-0.1	-1.7
US Fort Dodge IA	21	32	25	40	9	288	50N	309	307	-0.4	-2.0
US Fort Hood TX	21	52	16	42	5	291	78N	282	280	-0.3	-1.2
US Fort Huachuca AZ	21	52	43	52	15	285	90N	270	268	+0.2	-1.1
US Fort Irwin CA	21	46	22	57	22	279	88N	271	270	+0.4	-1.3
US Fort Knox TN	21	36	38	35	1	295	53N	306	305	-0.6	-1.7
US Fort Leavenworth KS	21	38	43	41	8	289	57N	302	300	-0.4	-1.8
US Fort Leonardwood MO	21	40	19	39	5	291	58N	301	300	-0.5	-1.7
US Fort Lewis VA	21	23	53	54	31	266	70N	290	288	+0.5	-2.0
US Fort Polk LA	21	50	43	39	1	293	74N	285	284	-0.4	-1.3
US Fort Richardson AK	20	34	19	40	45	215	62N	297	295	+0.9	-1.8
US Fort Riley KS	21	40	0	42	9	289	60N	299	298	-0.4	-1.8
US Fort Sill OK	21	47	42	43	7	289	70N	289	287	-0.3	-1.5
US Fort Smith AR	21	45	13	40	5	291	65N	294	293	-0.4	-1.5
US Fort Worth TX	21	49	58	42	5	290	74N	286	284	-0.3	-1.4
US Fort Yukon AK	20	27	26	36	40	216	47N	312	310	+0.6	-2.1
US Fresno CA	21	42	52	59	25	277	89N	271	269	+0.5	-1.3
US Gage OK	21	45	35	44	9	288	68N	291	290	-0.3	-1.6
US Galena TX	21	53	30	40	1	292	79N	280	278	-0.4	-1.1
US Garden City CA	21	43	11	45	11	287	66N	293	292	-0.3	-1.7
US Grand Forks ND	21	22	11	42	15	284	43N	316	315	-0.4	-2.3
US Grand Rapids MI	21	27	3	35	4	293	42N	317	316	-0.6	-2.0
US Grandview MO	21	39	30	41	7	290	58N	301	300	-0.4	-1.8
US Grants CA	21	48	27	50	15	284	79N	281	279	+0.0	-1.4
US Great Falls MT	21	25	48	49	23	274	57N	302	300	+0.0	-2.2
US Green Bay WI	21	25	20	37	7	291	41N	318	317	-0.6	-2.1
US Greenville TX	21	49	11	41	4	291	72N	287	286	-0.4	-1.4
US Gwinn MI	21	20	48	37	8	290	37N	323	321	-0.6	-2.2
US Harlingen TX	21	57	18	42	2	291	90N	270	268	-0.2	-0.8
US Harrison AR	21	43	14	39	5	291	62N	297	296	-0.5	-1.6
US Havre MT	21	23	28	48	23	275	54N	305	304	+0.0	-2.2
US Hawthorne CA	21	47	9	59	23	279	86S	266	264	+0.6	-1.1
US Helena MT	21	27	39	50	23	275	60N	299	298	+0.1	-2.1
US Hibbing MN	21	21	31	39	12	287	40N	319	318	-0.5	-2.3
US Hobart OK	21	47	23	44	8	289	70N	289	288	-0.3	-1.5
US Hobbs NM	21	51	32	47	10	288	79N	280	279	-0.1	-1.3
US Hopkinsville KY	21	39	38	36	1	294	57N	303	301	-0.6	-1.7
US Houghton Lake MI	21	23	23	35	5	293	38N	321	320	-0.7	-2.1
US Houston TX	21	52	52	40	2	292	78N	281	280	-0.4	-1.2
US Huron SD	21	30	17	43	13	285	51N	309	307	-0.3	-2.1
US Imperial CA	21	49	42	57	20	281	87S	266	265	+0.4	-1.1
US Indian Springs CA	21	45	0	56	22	279	84N	275	274	+0.3	-1.4
US Indianapolis IN	21	33	37	35	3	294	49N	310	309	-0.6	-1.8
US Intl Falls MN	21	19	4	40	13	286	38N	321	320	-0.5	-2.3
US Jackson TN	21	42	10	36	1	294	60N	299	298	-0.6	-1.6
US Jonesboro AR	21	42	43	38	3	293	61N	298	297	-0.5	-1.6
US Juneau AK	20	52	31	46	40	240	58N	301	300	+0.6	-2.2
US Kankakee IL	21	32	1	36	5	293	48N	311	310	-0.6	-1.9
US Kansas City MO	21	38	46	41	8	290	57N	302	300	-0.4	-1.8
US Killeen TX	21	52	24	42	5	291	78N	281	280	-0.3	-1.2
US King Salmon HI	20	30	34	40	49	206	73N	286	285	+1.2	-1.2
US Kingsville TX	21	56	12	42	2	291	86N	273	271	-0.3	-0.9
US Kirtland NM	21	48	36	49	14	285	78N	282	280	+0.0	-1.4
US Knobnoster MO	21	39	15	40	6	290	57N	302	300	-0.5	-1.8
US Kodiak AK	20	36	53	43	49	214	73N	286	285	+1.2	-1.4
US Lansing MI	21	26	39	35	4	294	41N	318	316	-0.7	-2.0
US Laredo TX	21	56	33	43	4	291	88N	271	270	-0.2	-0.9
US Las Vegas NV	21	45	41	55	21	280	84N	275	274	+0.3	-1.4
US Lemoore CA	21	43	20	59	25	277	90N	269	268	+0.6	-1.3
US Lincoln NE	21	36	43	42	10	288	56N	303	302	-0.4	-1.9
US Little Rock AR	21	45	12	39	3	292	65N	294	293	-0.5	-1.5
US Lompoc CA	21	44	53	60	25	277	85S	265	263	+0.7	-1.1
US Long Beach CA	21	47	22	58	23	279	86S	266	264	+0.5	-1.1
US Longview TX	21	49	37	40	3	292	72N	287	286	-0.4	-1.3
US Los Angeles CA	21	47	5	59	23	279	86S	266	264	+0.6	-1.1
US Louisville KY	21	35	53	35	1	295	52N	307	306	-0.6	-1.8
US Lubbock TX	21	49	59	46	9	288	76N	283	282	-0.2	-1.4
US Lufkin TX	21	51	7	40	2	292	75N	284	283	-0.4	-1.3
US Madison WI	21	28	47	38	7	291	45N	314	313	-0.6	-2.0
US Marquette IL	21	20	29	37	8	290	36N	323	321	-0.6	-2.2
US McAlester OK	21	46	29	41	5	291	68N	292	290	-0.4	-1.5
US McAllen TX	21	57	29	42	2	291	90S	269	268	-0.2	-0.8
US Memphis TN	21	43	36	37	2	293	62N	297	296	-0.5	-1.5
US Midland TX	21	52	20	46	8	288	80N	279	278	-0.2	-1.3
US Millington TN	21	43	3	37	2	293	61N	298	296	-0.5	-1.6
US Milwaukee WI	21	28	21	37	6	292	44N	315	314	-0.6	-2.0
US Mineral Wells TX	21	50	15	43	6	290	74N	285	284	-0.3	-1.4
US Minneapolis MN	21	27	11	40	10	288	45N	314	313	-0.5	-2.1
US Minot ND	21	22	29	44	17	281	46N	313	312	-0.3	-2.3
US Miramar CA	21	48	58	58	21	281	85S	264	263	+0.5	-1.0
US Modesto CA	21	41	0	59	27	275	88N	271	270	+0.6	-1.4
US Monroe LA	21	48	17	38	1	293	69N	290	288	-0.5	-1.4
US Mount Clemens MI	21	25	47	34	3	295	40N	319	318	-0.7	-2.0
US Mountain Home CA	21	34	11	53	25	275	71N	289	287	+0.2	-1.9
US Mountain View CA	21	40	36	60	28	275	90N	269	268	+0.7	-1.3

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Muskogee OK	21	45	7	41	6	290	66N	294	292	-0.4	-1.6
US Niagara Falls NY	21	21	55	31	1	297	36N	323	322	-0.8	-2.1
US Nogales AZ	21	52	47	53	15	284	89S	269	267	+0.2	-1.1
US Oakland CA	21	40	5	60	28	274	89N	270	269	+0.7	-1.4
US Ogden UT	21	38	27	52	21	279	70N	289	288	+0.1	-1.8
US Oklahoma City OK	21	46	14	42	7	290	68N	291	290	-0.3	-1.5
US Omaha NE	21	35	54	42	10	288	55N	304	303	-0.4	-1.9
US Ontario CA	21	47	24	58	22	280	88S	267	266	+0.5	-1.1
US Oscoda MI	21	22	21	34	4	294	37N	322	321	-0.7	-2.1
US Palacios TX	21	54	35	41	2	292	82N	277	276	-0.3	-1.1
US Palm Springs CA	21	48	11	57	21	280	88S	268	266	+0.4	-1.2
US Palmdale CA	21	46	31	58	23	279	88S	268	266	+0.5	-1.2
US Pembina ND	21	19	55	42	15	283	41N	318	317	-0.4	-2.3
US Peru IL	21	31	48	35	3	294	47N	312	311	-0.6	-1.9
US Phoenix AZ	21	49	57	54	18	283	87N	272	271	+0.2	-1.2
US Pine Bluff AR	21	45	53	38	2	293	66N	293	292	-0.5	-1.5
US Point Mugu CA	21	46	28	59	24	279	86S	265	264	+0.6	-1.1
US Ponca City OK	21	44	4	42	8	289	65N	294	293	-0.4	-1.6
US Port Angeles CA	21	21	19	54	32	264	68N	291	289	+0.5	-2.1
US Port Huron MI	21	24	59	33	3	295	39N	320	319	-0.7	-2.0
US Portland OR	21	26	49	55	31	268	73N	287	285	+0.5	-1.9
US Prescott AZ	21	48	34	54	18	282	85N	275	273	+0.2	-1.3
US Princeton MN	21	25	55	40	11	287	44N	315	314	-0.5	-2.2
US Pueblo NM	21	43	18	47	14	285	69N	291	289	-0.1	-1.7
US Rancho Murietta CA	21	39	41	59	27	275	86N	273	272	+0.6	-1.5
US Rapid City SD	21	32	7	46	16	282	56N	303	302	-0.2	-2.0
US Red River ND	21	22	14	42	15	283	43N	316	315	-0.4	-2.3
US Reno NV	21	39	0	57	27	275	82N	277	276	+0.5	-1.6
US Riverside CA	21	47	47	58	22	280	88S	267	266	+0.5	-1.1
US Robinson AR	21	45	3	39	3	292	65N	295	293	-0.5	-1.5
US Roswell NM	21	50	52	48	11	287	79N	280	279	-0.1	-1.3
US Sacramento CA	21	39	15	59	28	274	86N	273	272	+0.6	-1.5
US Salt Lake City UT	21	39	3	52	21	279	71N	288	287	+0.1	-1.8
US San Angelo CA	21	52	44	44	7	289	80N	279	278	-0.2	-1.2
US San Antonio TX	21	54	22	43	4	291	82N	277	276	-0.3	-1.1
US San Diego CA	21	49	5	58	21	281	85S	264	263	+0.5	-1.0
US San Francisco CA	21	40	7	60	28	274	90N	269	268	+0.7	-1.3
US San Jose CA	21	40	45	60	28	275	90N	269	268	+0.7	-1.3
US San Luis CA	21	26	20	55	31	267	73N	287	285	+0.5	-1.9
US Sandusky OH	21	28	2	33	2	295	42N	317	315	-0.7	-2.0
US Santa Ana CA	21	47	41	58	22	280	86S	266	264	+0.5	-1.1
US Santa Fe NM	21	47	44	49	13	285	76N	283	282	-0.1	-1.5
US Seattle WA	21	23	15	54	31	266	69N	291	289	+0.4	-2.0
US Shreveport LA	21	49	10	39	3	292	71N	288	287	-0.4	-1.4
US Sioux City IA	21	33	36	42	11	287	53N	306	305	-0.4	-2.0
US Sitka AK	20	54	51	47	40	241	62N	298	296	+0.7	-2.2
US Skagway AK	20	49	32	45	40	238	56N	303	301	+0.6	-2.3
US Spokane WA	21	24	31	52	28	270	63N	296	295	+0.2	-2.1
US St. Louis MO	21	37	40	38	4	292	55N	304	303	-0.5	-1.8
US Stockton CA	21	40	28	59	27	275	88N	271	270	+0.6	-1.4
US Tacoma WA	21	23	49	54	31	266	69N	290	288	+0.5	-2.0
US Terre Haute IN	21	34	43	36	3	293	51N	308	307	-0.6	-1.8
US Texarkana AR	21	47	50	40	3	292	69N	290	289	-0.4	-1.4
US Tonopah NV	21	42	55	56	23	278	83N	277	275	+0.4	-1.5
US Topeka KS	21	39	46	41	8	289	59N	300	299	-0.4	-1.8
US Tucson AZ	21	51	58	53	16	284	89N	270	269	+0.2	-1.1
US Tucumcari NM	21	48	6	47	11	287	74N	285	284	-0.1	-1.5
US Tulsa OK	21	44	28	41	6	290	65N	294	293	-0.4	-1.6
US Tustin CA	21	47	40	58	22	280	86S	266	264	+0.5	-1.1
US Twenty Nine Palms CA	21	47	48	57	21	280	90S	269	268	+0.4	-1.2
US Tyler TX	21	49	55	41	4	291	73N	286	285	-0.4	-1.3
US Victorville CA	21	46	54	58	22	279	89S	268	267	+0.5	-1.2
US Waco TX	21	51	31	42	4	291	76N	283	282	-0.3	-1.3
US Wendover UT	21	38	51	53	22	278	73N	286	285	+0.2	-1.8
US West Chicago IL	21	30	38	37	5	292	46N	313	311	-0.6	-2.0
US Whidbey Island WA	21	21	16	53	32	265	67N	292	291	+0.4	-2.1
US White Sands NM	21	52	11	49	12	286	83N	276	274	+0.0	-1.2
US Wichita KS	21	42	39	42	8	289	63N	296	295	-0.3	-1.7
US Wichita Falls TX	21	48	42	43	7	289	72N	287	286	-0.3	-1.4
US Williston ND	21	23	34	45	19	279	49N	310	309	-0.2	-2.3
US Wink TX	21	52	41	47	9	288	81N	278	276	-0.1	-1.2
US Yuma AZ	21	50	17	56	19	282	88S	267	266	+0.4	-1.1
US Zuni Pueblo NM	21	48	32	51	15	284	80N	279	278	+0.1	-1.4
MX Aguascalientes	22	0	25	45	3	290	72S	252	251	+0.1	-0.2
MX Celaya	22	0	37	44	2	291	70S	250	249	+0.0	-0.1
MX Chihuahua	21	56	6	49	10	288	88S	267	266	+0.0	-0.9
MX Ciudad Juarez	21	53	0	49	12	286	85N	274	273	+0.0	-1.2
MX Ciudad Mante	21	59	52	42	1	291	79S	259	257	-0.1	-0.4
MX Ciudad Obregon	21	56	34	52	12	286	80S	259	258	+0.3	-0.7
MX Ciudad Victoria	21	59	25	42	1	291	82S	262	260	-0.1	-0.5
MX Colima	22	0	0	47	4	290	62S	242	240	+0.3	+0.4
MX Culiacan	21	58	36	50	9	288	75S	255	253	+0.2	-0.4
MX Del Bajio	22	0	33	45	2	290	71S	251	249	+0.1	-0.1
MX Durango	21	59	26	48	6	289	77S	257	255	+0.1	-0.4
MX Ensenada	21	50	22	58	21	281	83S	262	261	+0.5	-0.9
MX Guadalajara	22	0	19	46	4	290	67S	247	245	+0.2	+0.1
MX Guaymas	21	55	51	53	14	286	80S	259	258	+0.3	-0.7
MX Hermosillo	21	54	59	53	14	285	83S	262	261	+0.3	-0.8
MX La Paz	21	57	48	53	12	287	69S	248	247	+0.5	-0.1
MX Lazard Cardenas	21	59	44	45	2	290	59S	238	237	+0.3	+0.6
MX Loreto	21	56	49	54	13	286	74S	253	252	+0.4	-0.4
MX Los Mochis	21	57	46	52	11	287	76S	255	254	+0.3	-0.5
MX Manzanillo	21	59	31	48	5	289	60S	239	238	+0.4	+0.5
MX Matamoros	21	57	38	41	1	292	89S	269	267	-0.2	-0.8

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
MX Mazatlan	21	59	23	49	8	288	72S	251	250	+0.2	-0.2
MX Mexicali	21	50	4	56	20	282	87S	266	265	+0.4	-1.1
MX Monclova	21	57	25	45	5	290	88S	268	266	-0.1	-0.8
MX Monterrey	21	58	7	44	4	290	87S	266	265	-0.1	-0.7
MX Morelia	22	0	38	44	2	291	68S	247	246	+0.1	+0.1
MX Nogales	21	52	58	53	15	284	89S	268	267	+0.2	-1.0
MX Nuevo Casas Grandes	21	54	20	50	12	286	90N	270	268	+0.1	-1.0
MX Nuevo Laredo	21	56	40	43	4	290	88N	271	270	-0.2	-0.9
MX Piedras Negras	21	55	43	44	5	290	86N	273	272	-0.2	-1.0
MX Puerto Vallarta	21	59	44	48	6	289	65S	244	243	+0.3	+0.2
MX Punta Penasco	21	52	2	55	18	283	86S	265	264	+0.4	-1.0
MX Queretaro	22	0	39	44	1	291	71S	251	249	+0.0	-0.1
MX Reynosa	21	57	37	42	2	291	89S	269	267	-0.2	-0.8
MX Saltillo	21	58	30	44	4	290	85S	265	263	-0.1	-0.7
MX San Filipe	21	52	2	56	19	283	83S	262	261	+0.4	-0.9
MX San Jose Del Cabo	21	58	9	53	11	287	67S	246	245	+0.5	+0.0
MX San Luis Potosi	22	0	19	44	2	291	76S	255	254	+0.0	-0.3
MX Tepic	22	0	0	48	6	289	68S	247	246	+0.2	+0.0
MX Tijuana	21	49	25	58	21	281	85S	264	263	+0.5	-1.0
MX Torreon	21	58	41	47	6	289	83S	262	261	+0.0	-0.6
MX Tuxpan	22	0	10	46	4	290	64S	243	242	+0.3	+0.3
MX Uruapan	22	0	24	45	2	290	65S	244	243	+0.2	+0.2
MX Zacatecas	22	0	6	46	4	290	76S	255	254	+0.0	-0.3
MX Zamora	22	0	27	45	3	290	67S	246	245	+0.2	+0.1
MX Zapopan	22	0	20	47	4	290	68S	247	246	+0.2	+0.0
MX Zihuatanejo	21	59	44	45	1	290	59S	238	237	+0.3	+0.6

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BR Ciudad Acuna	20	53	39	58	19	283	-61S	118	117	+0.0	-1.8

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BR Ciudad Acuna	21	55	5	45	6	290	85N	274	273	-0.2	-1.1

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina; un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi; a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.

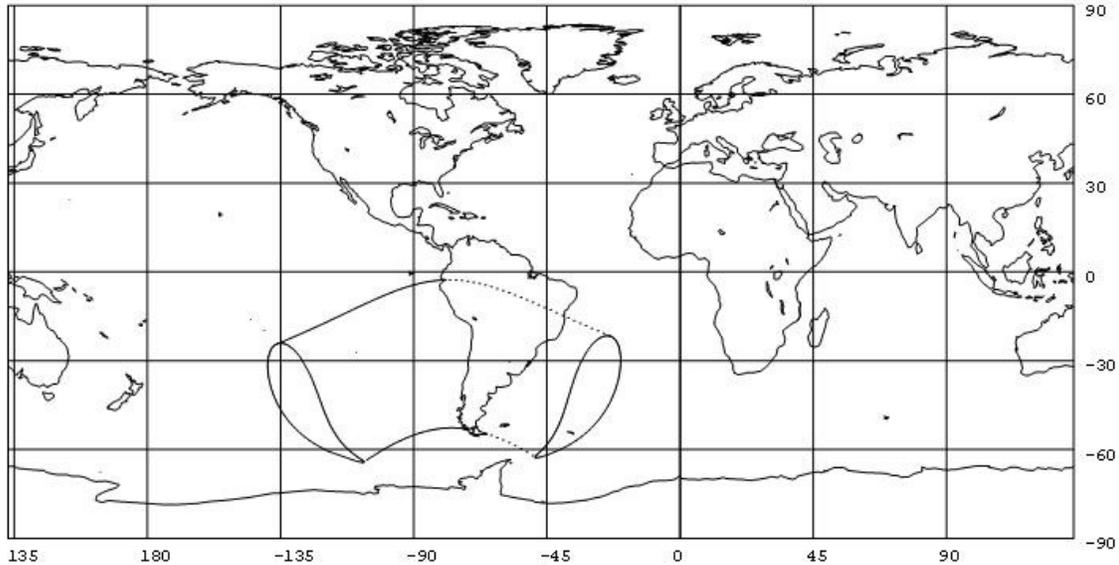
U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.

Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

## Occultation of Jupiter, Magnitude -2.2, on 2012 Sep 8



Occult 4.090

UT of conjunction = 11h 46m

Luna: % illuminazione 51-, elongazione solare 91°

Moon: % illumination 51-, solar elongation 91°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o	
AR Bahia Blanca	11	8	19	9	27	340	-46S	127	135	+2.0	-0.5
AR Bolivar	11	9	17	10	29	339	-53S	121	129	+2.1	-0.4
AR Buenos Aires	11	14	29	14	29	334	-58S	116	123	+2.0	-0.1
AR Catamarca	10	55	41	5	38	346	-69S	105	113	+2.8	-0.2
AR Chilecito	10	51	11	3	38	349	-67S	107	115	+2.8	-0.4
AR Chosmadal	10	49	42	-1	31	354	-47S	127	135	+2.4	-1.0
AR Colonel Suarez	11	8	14	9	28	340	-49S	124	132	+2.0	-0.5
AR Comodoro Rivadavia	11	4	34	3	22	347	-27S	146	154	+1.7	-1.2
AR Concordia	11	15	16	15	32	333	-66S	108	115	+2.2	+0.1
AR Cordoba	11	0	28	7	35	343	-63S	111	119	+2.5	-0.3
AR Corrientes	11	14	10	15	36	333	-75S	99	107	+2.5	+0.3
AR Curuzu Cuatia	11	15	35	16	33	332	-70S	104	112	+2.3	+0.1
AR Cutralco	10	53	31	0	29	352	-43S	130	138	+2.3	-1.0
AR Dolores	11	15	59	14	27	334	-55S	119	127	+1.9	-0.2
AR El Bolson	10	51	53	-2	26	355	-36S	138	146	+2.2	-1.3
AR El Maiten	10	52	50	-2	26	354	-36S	138	146	+2.2	-1.3
AR El Palomar	11	14	6	14	29	335	-58S	116	124	+2.1	-0.1
AR Esquel	10	53	59	-1	25	354	-33S	140	148	+2.1	-1.4
AR Formosa	11	15	50	16	37	331	-78S	95	103	+2.5	+0.4
AR Fuerte Gral Roca	10	57	14	2	29	349	-44S	130	138	+2.2	-0.9
AR General Pico	11	3	18	7	31	343	-53S	121	129	+2.2	-0.5
AR Gobernador Gordillo	10	54	44	4	37	347	-64S	110	117	+2.7	-0.4
AR Goya	11	12	44	14	35	334	-70S	103	111	+2.4	+0.1
AR Gualeguaychu	11	13	51	14	31	334	-62S	112	120	+2.2	-0.1
AR Iguazu Falls	11	25	17	22	34	325	-83S	91	99	+2.4	+0.6
AR Jose C. Paz	11	13	44	13	30	335	-58S	116	124	+2.1	-0.2
AR Jose De San Martin	10	56	48	-1	24	352	-31S	143	151	+2.0	-1.4
AR Jujuy	10	57	16	7	42	344	-79S	95	102	+3.0	+0.1
AR Junin	11	9	4	11	31	338	-57S	117	125	+2.2	-0.3
AR La Cumbre	10	59	36	7	36	344	-63S	111	118	+2.6	-0.3
AR La Plata	11	15	34	14	29	334	-58S	116	124	+2.0	-0.1
AR La Quiaca	10	56	23	6	45	344	-85S	89	97	+3.1	+0.3
AR La Rioja	10	53	0	3	38	348	-66S	107	115	+2.8	-0.4
AR Laboulaye	11	3	29	8	32	342	-56S	117	125	+2.3	-0.4
AR Lago Argentino	11	4	35	-1	18	353	-12S	162	169	+1.6	-2.4
AR Las Heras	11	3	0	1	21	349	-25S	149	157	+1.7	-1.4
AR Las Lomitas	11	10	12	14	39	335	-81S	93	101	+2.7	+0.4
AR Malargue	10	49	27	0	33	353	-51S	122	130	+2.5	-0.9
AR Mar Del Plata	11	16	38	14	26	334	-51S	123	130	+1.8	-0.2
AR Marcos Juarez	11	5	53	10	33	340	-60S	113	121	+2.3	-0.3
AR Mendoza	10	49	26	1	35	352	-58S	116	124	+2.6	-0.7
AR Mercedes	11	15	25	16	34	332	-71S	103	111	+2.4	+0.2
AR Monte Caseros	11	16	15	16	33	332	-69S	105	113	+2.3	+0.1
AR Moron	11	14	3	13	29	335	-58S	116	124	+2.0	-0.1
AR Necochea	11	14	33	12	26	336	-49S	125	133	+1.8	-0.3
AR Neuquen	10	56	0	2	29	350	-44S	130	138	+2.2	-1.0
AR Obera	11	22	49	20	33	327	-77S	96	104	+2.3	+0.5
AR Olavarria	11	11	22	11	28	337	-52S	122	130	+2.0	-0.3
AR Oran	10	59	48	8	43	342	-83S	91	99	+3.0	+0.3

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Parana	11	9	39	12	33	337	-63S	110	118	+2.3	-0.1
AR Paso De Los Libres	11	17	30	17	33	331	-71S	103	111	+2.3	+0.2
AR Pehuajo	11	7	31	9	30	340	-53S	121	128	+2.1	-0.4
AR Posadas	11	20	56	19	34	328	-77S	97	104	+2.4	+0.4
AR Presidencia R.S.Pena	11	9	52	13	38	335	-75S	98	106	+2.6	+0.2
AR Puerto Deseado	11	9	20	4	19	345	-23S	151	159	+1.5	-1.2
AR Puerto Madryn	11	5	40	5	24	345	-36S	138	146	+1.8	-0.9
AR Punta Indio	11	16	43	15	28	333	-57S	117	124	+1.9	-0.1
AR Reconquista	11	11	35	14	35	335	-70S	104	112	+2.4	+0.1
AR Resistencia	11	13	24	15	36	333	-75S	99	107	+2.5	+0.2
AR Rio Cuarto	11	1	1	7	33	343	-58S	115	123	+2.4	-0.4
AR Rio Gallegos	11	11	31	1	16	348	-9S	165	173	+1.2	-2.5
AR Rio Turbio	11	8	0	-1	16	352	-7S	167	175	+1.3	-3.2
AR Rosario	11	9	4	11	32	338	-61S	113	121	+2.3	-0.2
AR Salta	10	56	7	6	42	345	-78S	96	104	+3.0	+0.1
AR San Carlos De Barilocho	10	51	46	-2	27	354	-38S	136	144	+2.2	-1.3
AR San Fernando	11	14	6	14	30	335	-58S	115	123	+2.1	-0.1
AR San Julian	11	9	0	2	18	347	-17S	156	164	+1.4	-1.6
AR San Justo	11	14	8	14	29	335	-58S	116	124	+2.0	-0.1
AR San Luis	10	55	53	4	34	347	-57S	116	124	+2.5	-0.6
AR San Martin Des Andes	10	50	31	-2	28	354	-40S	133	141	+2.3	-1.2
AR San Rafael	10	51	34	1	33	351	-54S	120	128	+2.5	-0.8
AR Santa Cruz	11	8	59	2	17	348	-15S	159	167	+1.4	-1.8
AR Santa Fe	11	8	52	11	33	337	-63S	110	118	+2.3	-0.1
AR Santa Rosa	11	2	44	6	30	344	-50S	123	131	+2.2	-0.6
AR Santa Teresita	11	17	53	15	27	332	-55S	119	127	+1.8	-0.1
AR Santiago Del Estero	10	59	35	7	39	343	-71S	103	110	+2.7	-0.1
AR Tandil	11	13	24	12	27	336	-51S	122	130	+1.9	-0.3
AR Tartagal	11	1	37	9	43	340	-84S	89	97	+3.0	+0.4
AR Tinogasta	10	50	28	2	40	349	-69S	104	112	+2.9	-0.3
AR Trelew	11	5	45	5	24	345	-34S	139	147	+1.8	-0.9
AR Tres Arroyos	11	11	41	11	27	338	-48S	125	133	+1.9	-0.4
AR Tucuman	10	57	17	6	40	344	-73S	101	108	+2.8	-0.1
AR Viedma	11	8	5	7	25	342	-41S	133	140	+1.9	-0.7
AR Villa Dolores	10	58	19	6	35	345	-61S	113	121	+2.5	-0.4
AR Villa Gesell	11	17	25	15	26	333	-53S	121	128	+1.8	-0.2
AR Villa Reynolds	10	58	29	5	33	345	-56S	117	125	+2.4	-0.5
BO Apolo	10	52	20	4	53	347	-75N	68	76	+3.5	+1.3
BO Ascension De Guarayos	11	9	29	13	49	334	-75N	69	77	+3.4	+1.4
BO Bermejo	10	59	58	8	43	341	-84S	90	98	+3.0	+0.3
BO Camiri	11	3	44	10	45	338	-89N	82	90	+3.2	+0.7
BO Chapacura	11	1	1	9	49	340	-81N	74	82	+3.4	+1.0
BO Charana	10	45	55	1	50	352	-84N	77	85	+3.4	+0.7
BO Cobiya	10	57	17	5	56	344	-62N	56	64	+3.7	+2.2
BO Cochabamba	10	57	10	7	49	343	-82N	76	84	+3.4	+0.9
BO Conception	11	12	27	14	47	332	-76N	70	78	+3.3	+1.4
BO Guayaramerin	11	10	36	12	54	334	-60N	53	61	+3.7	+2.5
BO La Paz	10	51	4	3	51	348	-80N	74	82	+3.4	+1.0
BO Magdalena	11	10	0	12	51	334	-68N	61	69	+3.6	+1.9
BO Oruro	10	53	39	5	49	346	-84N	78	86	+3.4	+0.8
BO Potosi	10	57	2	7	47	343	-88N	82	90	+3.3	+0.6
BO Puerto Suarez	11	22	11	20	42	326	-81N	75	83	+3.0	+1.2
BO Reyes	10	56	38	6	52	344	-73N	67	74	+3.5	+1.4
BO Riberalta	11	7	24	10	54	336	-61N	54	62	+3.7	+2.4
BO Robore	11	17	2	17	44	329	-81N	75	83	+3.1	+1.1
BO Rurrenabaque	10	55	56	6	52	344	-73N	67	75	+3.5	+1.4
BO San Borja	10	58	3	7	52	343	-75N	68	76	+3.5	+1.3
BO San Ignacio De Moxos	11	1	46	9	51	340	-74N	68	76	+3.5	+1.4
BO San Ignacio De Velasco	11	15	38	16	46	330	-76N	70	78	+3.3	+1.4
BO San Joaquin	11	8	14	11	52	335	-67N	61	69	+3.6	+1.9
BO San Mathias	11	23	58	20	44	325	-74N	67	75	+3.2	+1.6
BO San Ramon	11	8	3	11	52	335	-68N	62	70	+3.6	+1.8
BO Santa Ana	11	4	14	10	52	338	-70N	64	72	+3.5	+1.6
BO Santa Cruz	11	7	2	12	47	336	-81N	75	83	+3.3	+1.0
BO Sucre	10	58	50	8	47	342	-87N	80	88	+3.3	+0.7
BO Tarija	10	59	12	8	45	342	-87S	87	95	+3.1	+0.4
BO Trinidad	11	4	27	10	51	338	-74N	67	75	+3.5	+1.4
BR Alpinopolis	11	49	58	36	29	311	-73N	67	75	+2.3	+1.7
BR Alta Floresta	11	49	36	30	43	313	-42N	36	44	+4.2	+5.0
BR Aracatuba	11	39	30	30	33	317	-80N	74	82	+2.5	+1.4
BR Araracuara	11	44	3	33	30	314	-79N	73	81	+2.3	+1.4
BR Assis	11	37	33	29	32	318	-85N	78	86	+2.4	+1.2
BR Bage	11	23	36	20	29	327	-69S	105	113	+2.0	+0.3
BR Barbacena	11	54	43	39	26	309	-72N	65	73	+2.2	+1.9
BR Barra Do Garcas	11	43	26	31	38	315	-65N	58	66	+3.0	+2.2
BR Bauru	11	41	13	31	31	316	-82N	76	84	+2.3	+1.3
BR Belo Horizonte	11	57	5	40	26	308	-67N	60	68	+2.3	+2.1
BR Bom Jesus Da Lapa	12	27	5	50	24	301	-22N	15	23	+9.9	+9.9
BR Brasilia	11	56	32	38	32	309	-57N	51	59	+2.9	+2.8
BR Campinas	11	44	38	33	29	314	-82N	76	83	+2.2	+1.4
BR Campo Grande	11	29	23	24	38	322	-83N	77	84	+2.7	+1.2
BR Campos	11	59	2	42	23	307	-69N	63	71	+2.0	+2.0
BR Caravelas	12	14	31	48	21	302	-47N	41	48	+2.7	+3.8
BR Cascavel	11	28	8	24	34	323	-85S	88	96	+2.4	+0.8
BR Castilho	11	37	9	29	35	318	-80N	74	82	+2.5	+1.3
BR Caxias Do Sul	11	30	29	25	29	322	-77S	97	105	+2.0	+0.6
BR Chapeco	11	28	34	24	32	323	-81S	93	101	+2.2	+0.6
BR Corumba	11	22	35	20	42	326	-81N	75	83	+3.0	+1.2
BR Criciuma	11	34	9	27	28	320	-80S	94	102	+2.0	+0.7
BR Cruzeiro Do Sul	10	51	56	0	60	352	-49N	42	50	+3.7	+3.5
BR Cuiaba	11	32	21	25	42	320	-69N	62	70	+3.1	+1.9
BR Curitiba	11	37	20	29	30	318	-89S	85	93	+2.1	+1.0
BR Florianopolis	11	36	43	29	28	318	-83S	90	98	+2.0	+0.8
BR Foz Do Iguacu	11	25	21	22	34	325	-83S	91	99	+2.4	+0.6

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
BR Franca	11	47	44	35	30	312	-75N	68	76	+2.4	+1.7
BR Fronteira	11	43	51	32	32	314	-76N	70	77	+2.5	+1.6
BR Goiania	11	50	50	35	34	311	-63N	56	64	+2.8	+2.4
BR Guajara-Mirim	11	10	54	12	54	334	-59N	53	61	+3.7	+2.5
BR Guaratingueta	11	49	3	36	27	312	-79N	72	80	+2.1	+1.5
BR Ipatinga	12	1	19	42	25	307	-63N	56	64	+2.3	+2.4
BR Itumbiara	11	46	58	34	33	313	-70N	63	71	+2.6	+1.9
BR Joinville	11	37	25	29	29	318	-87S	87	95	+2.1	+0.9
BR Juiz De Fora	11	54	34	39	25	309	-73N	66	74	+2.1	+1.8
BR Lagoa Santa	11	57	38	40	26	308	-66N	60	67	+2.3	+2.2
BR Lajes	11	33	13	26	29	320	-81S	92	100	+2.0	+0.7
BR Lins	11	40	32	31	32	316	-81N	75	82	+2.4	+1.3
BR Londrina	11	35	12	28	33	319	-88N	81	89	+2.4	+1.1
BR Marilia	11	39	21	30	32	317	-83N	77	84	+2.4	+1.3
BR Maringa	11	33	14	27	33	320	-89N	82	90	+2.4	+1.0
BR Montes Claros	12	5	33	43	27	306	-53N	46	54	+2.7	+3.2
BR Navegantes	11	37	11	29	28	318	-85S	88	96	+2.0	+0.9
BR Passo Fundo	11	28	39	24	30	323	-78S	96	103	+2.1	+0.6
BR Pelotas	11	27	2	22	28	325	-70S	104	112	+1.9	+0.4
BR Piracununga	11	45	37	34	30	313	-79N	73	80	+2.3	+1.5
BR Pocos De Caldas	11	47	37	35	29	312	-78N	71	79	+2.2	+1.5
BR Ponta Grossa	11	35	34	28	31	319	-88S	85	93	+2.2	+0.9
BR Ponta Pora	11	24	32	22	37	325	-90N	84	91	+2.6	+0.9
BR Porto Alegre	11	30	3	24	28	323	-75S	99	107	+2.0	+0.5
BR Porto Velho	11	22	30	16	53	327	-49N	43	50	+4.0	+3.8
BR President Prudente	11	35	46	28	34	319	-84N	78	86	+2.4	+1.2
BR Ribeirao Preto	11	45	54	34	30	313	-77N	70	78	+2.3	+1.6
BR Rio Branco	11	3	25	7	56	340	-57N	51	59	+3.8	+2.7
BR Rio De Janeiro	11	53	4	38	25	310	-76N	70	77	+2.0	+1.6
BR Rio Grande	11	27	10	22	27	325	-69S	105	113	+1.9	+0.4
BR Santarem	11	25	5	21	30	326	-73S	100	108	+2.1	+0.4
BR Santo Angelo	11	24	39	21	32	326	-76S	97	105	+2.2	+0.5
BR Santos	11	45	10	34	28	313	-84N	77	85	+2.1	+1.3
BR Sao Jose Do Rio Preto	11	42	31	32	32	315	-78N	72	79	+2.4	+1.5
BR Sao Jose Dos Campos	11	47	5	35	27	313	-81N	75	82	+2.1	+1.4
BR Sao Paulo	11	44	49	33	28	314	-83N	77	85	+2.1	+1.3
BR Sao Pedro Da Aldeia	11	55	23	40	24	308	-74N	68	76	+2.0	+1.7
BR Tabatinga	11	21	47	11	60	332	-26N	20	27	+9.9	+9.9
BR Tarauaca	10	57	32	3	59	347	-51N	45	52	+3.8	+3.3
BR Telemaco Borba	11	35	18	28	32	319	-90N	83	91	+2.3	+1.0
BR Teodoro Sampaio	11	31	35	26	35	321	-87N	81	89	+2.5	+1.0
BR Uberaba	11	47	44	34	31	313	-72N	66	74	+2.5	+1.8
BR Uruguaiiana	11	17	44	17	33	331	-70S	103	111	+2.3	+0.2
BR Varginha	11	50	27	36	28	311	-75N	69	77	+2.2	+1.7
BR Vilhena	11	25	16	20	48	324	-62N	56	64	+3.5	+2.3
BR Vitoria	12	4	20	44	22	305	-62N	56	63	+2.2	+2.4
BR Vitoria Da Conquista	12	24	2	51	22	301	-30N	24	32	+4.8	+8.7
CL Alto Palena	10	53	25	-2	25	354	-32S	142	150	+2.1	-1.4
CL Ancud	10	46	44	-5	26	358	-36S	138	146	+2.3	-1.5
CL Antofagasta	10	40	47	-2	45	355	-81S	93	101	+3.2	+0.0
CL Arica	10	42	23	-1	50	354	-86N	79	87	+3.4	+0.6
CL Balmaceda	10	57	10	-2	22	354	-26S	148	156	+1.9	-1.6
CL Calama	10	45	45	1	45	352	-83S	91	98	+3.2	+0.1
CL Castro	10	47	38	-5	26	358	-35S	139	147	+2.3	-1.5
CL Chaiten	10	50	35	-3	25	356	-33S	140	148	+2.2	-1.5
CL Chile Chico	10	58	5	-2	22	353	-24S	150	158	+1.9	-1.6
CL Chillan	10	44	16	-4	32	357	-49S	125	133	+2.5	-1.1
CL Concepcion	10	41	49	-5	32	359	-48S	125	133	+2.6	-1.2
CL Copiapo	10	41	52	-2	41	355	-71S	103	111	+3.0	-0.4
CL Coyhaique	10	55	50	-2	23	354	-27S	147	155	+2.0	-1.6
CL Curico	10	44	38	-3	33	356	-53S	121	129	+2.6	-1.0
CL Easter Island	9	14	30	16	54	72N	66	74	+0.8	-0.1	
CL Iquique	10	41	56	-1	48	354	-88S	85	93	+3.3	+0.3
CL La Serena	10	40	50	-3	38	357	-65S	109	117	+2.9	-0.6
CL Los Angeles	10	44	10	-4	31	357	-47S	127	135	+2.5	-1.2
CL Osorno	10	46	40	-4	28	357	-39S	135	142	+2.3	-1.4
CL Puerto Montt	10	47	42	-4	27	357	-37S	137	144	+2.3	-1.4
CL Punta Arenas	11	14	26	1	15	349	1S	175	182	+0.3	-7.5
CL Rancagua	10	45	5	-2	34	355	-54S	119	127	+2.6	-0.9
CL Santiago	10	45	6	-2	35	355	-56S	118	125	+2.7	-0.8
CL Santo Domingo	10	42	23	-3	35	357	-56S	118	126	+2.7	-0.9
CL Temuco	10	45	19	-4	30	357	-44S	130	138	+2.4	-1.2
CL Valdivia	10	45	20	-4	29	358	-41S	132	140	+2.4	-1.3
CL Vallenar	10	41	22	-2	40	356	-68S	106	114	+2.9	-0.5
CO Leticia	11	22	22	11	60	332	-25N	19	27	+9.9	+9.9
EC Cuenca	11	1	11	-3	65	360	-13N	7	15	+9.9	+9.9
EC Gualaquiza	10	55	11	-4	65	2	-21N	14	22	+9.9	+9.9
EC MacAra	10	43	9	-9	63	11	-28N	22	29	+2.8	+7.0
EC MacHala	10	53	16	-6	65	6	-17N	11	19	+9.9	+9.9
EC Maragrosa	11	1	26	-4	65	2	-10N	4	12	+9.9	+9.9
EC Santa Rosa	10	51	14	-7	65	7	-19N	13	21	+9.9	+9.9
FK Mount Pleasant	11	22	11	9	13	335	-18S	156	164	+0.8	-0.9
FK Stanley	11	22	43	10	13	335	-19S	155	163	+0.8	-0.8
PY Asuncion	11	18	5	18	37	330	-81S	92	100	+2.6	+0.5
PY Ayolas	11	18	50	18	35	330	-76S	97	105	+2.4	+0.4
PY Conception	11	19	17	19	38	329	-86S	87	95	+2.7	+0.7
PY Filadelfia	11	12	40	15	41	333	-87S	87	94	+2.9	+0.6
PY Itaipu	11	25	10	22	34	325	-83S	90	98	+2.4	+0.7
PY Mariscal Estigarribia	11	11	13	14	42	334	-88S	86	94	+2.9	+0.6
PY Pilar	11	15	24	16	36	332	-77S	97	105	+2.5	+0.3
PE Anta	10	30	2	-10	58	11	-55N	49	56	+3.2	+2.5
PE Arequipa	10	39	32	-3	52	357	-80N	74	81	+3.4	+0.9
PE Atalaya	10	39	58	-4	58	360	-61N	55	63	+3.5	+2.1
PE Ayacucho	10	34	4	-6	55	3	-70N	63	71	+3.4	+1.4

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
PE Caballococha	11	22	42	10	61	333	-23N	16	24	+9.9	+9.9
PE Cajamarca	10	33	53	-10	60	12	-45N	39	46	+3.1	+3.6
PE Chachapoyas	10	39	33	-8	62	8	-41N	34	42	+3.2	+4.3
PE Chiclayo	10	31	16	-12	60	16	-42N	36	44	+3.0	+3.9
PE Chimbote	10	27	45	-12	58	14	-53N	47	55	+3.1	+2.6
PE Ciro Alegria	10	47	41	-6	64	5	-31N	25	33	+3.2	+6.4
PE Collique	10	26	36	-11	56	11	-64N	58	66	+3.3	+1.7
PE Cuzco	10	41	26	-2	55	356	-71N	65	73	+3.5	+1.4
PE Huanuco	10	33	24	-8	58	7	-57N	51	59	+3.4	+2.3
PE Iberia	10	53	56	3	56	347	-64N	57	65	+3.6	+2.0
PE Ilo	10	39	23	-2	51	357	-84N	77	85	+3.4	+0.7
PE Iquitos	11	10	55	5	63	343	-25N	18	26	+9.9	+9.9
PE Jauja	10	32	0	-8	56	6	-65N	58	66	+3.4	+1.8
PE Juanjui	10	39	37	-7	61	6	-46N	40	47	+3.3	+3.6
PE Juliaca	10	45	21	0	52	352	-77N	71	79	+3.5	+1.1
PE Las Palmas	10	26	24	-11	55	11	-65N	59	67	+3.3	+1.7
PE Lima	10	26	16	-11	56	11	-65N	58	66	+3.3	+1.7
PE Moquegua	10	41	11	-2	51	355	-82N	76	84	+3.4	+0.7
PE Moyobamba	10	43	20	-6	62	5	-40N	34	42	+3.3	+4.5
PE Nazca	10	29	31	-8	53	6	-75N	68	76	+3.4	+1.1
PE Pisco	10	26	36	-10	54	9	-71N	64	72	+3.3	+1.3
PE Piura	10	36	16	-11	62	15	-33N	27	34	+2.8	+5.5
PE Pucallpa	10	43	4	-4	60	0	-52N	46	53	+3.5	+3.0
PE Puerto Esperanza	10	53	9	2	58	349	-58N	51	59	+3.7	+2.5
PE Puerto Maldonado	10	52	34	3	55	348	-68N	62	69	+3.6	+1.7
PE San Juan	10	28	26	-9	53	7	-76N	70	78	+3.3	+1.0
PE San Ramon	10	33	42	-7	57	5	-62N	56	64	+3.4	+2.0
PE Tacna	10	42	46	-1	50	354	-85N	78	86	+3.4	+0.6
PE Talara	10	38	17	-11	63	16	-28N	22	29	+2.6	+6.7
PE Tarapoto	10	43	18	-5	62	3	-43N	37	44	+3.4	+4.1
PE Tingo Maria	10	35	33	-7	59	6	-55N	49	57	+3.4	+2.6
PE Trujillo	10	28	55	-12	59	15	-49N	42	50	+3.1	+3.1
PE Tumbes	10	48	57	-8	64	9	-20N	14	22	+9.9	+9.9
PE Yurimaguas	10	46	50	-4	62	1	-40N	33	41	+3.4	+4.6
UY Artigas	11	18	48	17	32	330	-69S	104	112	+2.2	+0.2
UY Colonia	11	15	47	15	29	333	-59S	115	123	+2.0	-0.1
UY Durazno	11	18	18	16	29	331	-62S	111	119	+2.0	+0.0
UY Maldonado	11	21	0	18	27	330	-60S	114	122	+1.9	+0.1
UY Melo	11	23	5	20	29	328	-66S	107	115	+2.0	+0.2
UY Montevideo	11	19	14	16	28	331	-59S	114	122	+1.9	+0.0
UY Montevideo	11	18	47	16	28	331	-59S	115	122	+1.9	+0.0
UY Paysandu	11	15	7	15	31	333	-63S	110	118	+2.2	+0.0
UY Punta Del Este	11	21	19	18	27	329	-60S	114	122	+1.9	+0.1
UY Rivera	11	20	52	18	31	329	-69S	105	113	+2.1	+0.2
UY Salto	11	15	17	15	32	333	-66S	108	116	+2.2	+0.0
UY Tacuarembó	11	19	43	18	30	330	-66S	107	115	+2.1	+0.2

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Bahia Blanca	12	23	8	22	20	323	66S	240	248	+2.1	+2.0
AR Bolivar	12	30	10	25	21	320	74S	248	255	+2.0	+1.8
AR Buenos Aires	12	37	54	30	19	316	81S	255	262	+1.8	+1.6
AR Catamarca	12	31	21	25	29	321	88S	262	270	+2.2	+1.1
AR Chilecito	12	26	50	23	30	324	85S	259	267	+2.3	+1.2
AR Chosmadal	12	7	8	14	26	334	62S	236	243	+2.5	+1.9
AR Colonel Suarez	12	26	16	24	21	322	70S	243	251	+2.1	+1.9
AR Comodoro Rivadavia	11	55	18	11	19	335	43S	216	224	+2.3	+2.5
AR Concordia	12	43	10	32	21	314	90S	264	271	+1.7	+1.2
AR Cordoba	12	31	20	26	26	321	83S	257	264	+2.1	+1.4
AR Corrientes	12	45	54	34	23	313	81N	273	281	+1.6	+0.8
AR Curuzu Cuatia	12	45	0	34	21	313	86N	268	275	+1.6	+1.1
AR Cutralco	12	6	31	14	25	333	59S	233	240	+2.4	+2.0
AR Dolores	12	36	18	29	18	316	77S	251	258	+1.8	+1.7
AR El Bolson	11	54	39	9	24	339	49S	223	231	+2.4	+2.2
AR El Maiten	11	55	19	10	23	338	49S	223	231	+2.4	+2.2
AR El Palomar	12	37	30	29	20	316	80S	254	262	+1.8	+1.6
AR Esquel	11	53	26	9	23	339	47S	221	229	+2.4	+2.3
AR Formosa	12	47	39	36	24	312	77N	277	285	+1.5	+0.6
AR Fuerte Gral Roca	12	10	23	16	24	331	60S	234	242	+2.4	+2.1
AR General Pico	12	25	31	23	23	323	72S	246	254	+2.2	+1.8
AR Gobernador Gordillo	12	28	3	24	28	323	83S	257	265	+2.3	+1.3
AR Goya	12	43	38	33	23	314	86N	268	276	+1.7	+1.0
AR Gualeguaychu	12	39	50	31	20	315	85S	258	266	+1.8	+1.4
AR Iguazu Falls	12	53	9	40	20	308	71N	283	291	+1.2	+0.4
AR Jose C. Paz	12	37	15	29	20	316	80S	254	262	+1.8	+1.6
AR Jose De San Martin	11	52	29	9	21	339	45S	218	226	+2.4	+2.4
AR Jujuy	12	36	25	28	31	318	80N	274	282	+2.1	+0.6
AR Junin	12	33	19	27	21	319	78S	252	260	+2.0	+1.6
AR La Cumbre	12	31	5	25	26	321	83S	257	265	+2.1	+1.3
AR La Plata	12	38	12	30	19	316	80S	254	262	+1.8	+1.6
AR La Quiaca	12	36	34	29	33	318	74N	280	287	+2.1	+0.3
AR La Rioja	12	28	7	24	29	323	85S	259	267	+2.3	+1.2
AR Laboulaye	12	29	0	24	24	322	77S	250	258	+2.1	+1.6
AR Lago Argentino	11	31	36	3	17	346	24S	198	206	+2.3	+3.3
AR Las Heras	11	49	51	9	19	338	39S	213	221	+2.3	+2.6
AR Las Lomitas	12	44	45	34	27	313	75N	278	286	+1.7	+0.5
AR Malargue	12	12	21	16	27	331	67S	241	249	+2.5	+1.8
AR Mar Del Plata	12	33	39	28	17	317	73S	247	254	+1.8	+1.9
AR Marcos Juarez	12	33	37	27	23	319	82S	255	263	+2.0	+1.5
AR Mendoza	12	18	41	19	29	328	75S	249	256	+2.4	+1.6
AR Mercedes	12	45	25	34	22	313	85N	269	277	+1.6	+1.0
AR Monte Caseros	12	44	58	34	21	313	87N	267	274	+1.6	+1.1

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
AR Moron	12	37	20	29	20	316	80S	254	262	+1.8	+1.6
AR Necochea	12	30	20	26	18	319	70S	244	252	+1.9	+1.9
AR Neuquen	12	9	13	15	24	331	60S	234	241	+2.4	+2.0
AR Obera	12	51	15	38	20	309	77N	277	285	+1.3	+0.7
AR Olavarria	12	30	37	26	20	319	73S	247	254	+2.0	+1.8
AR Oran	12	38	34	30	31	317	75N	278	286	+2.0	+0.4
AR Parana	12	38	8	29	23	317	86S	260	267	+1.9	+1.3
AR Paso De Los Libres	12	46	26	35	21	312	85N	269	276	+1.6	+1.0
AR Pehuajoy	12	29	11	25	22	321	74S	248	255	+2.0	+1.8
AR Posadas	12	50	10	37	21	310	77N	276	284	+1.4	+0.7
AR Presidencia R.S.Pena	12	43	32	33	25	314	81N	273	281	+1.7	+0.8
AR Puerto Deseado	11	53	45	11	17	334	39S	212	220	+2.3	+2.7
AR Puerto Madryn	12	7	57	16	20	330	53S	227	234	+2.3	+2.3
AR Punta Indio	12	38	39	30	18	315	80S	254	261	+1.7	+1.6
AR Reconquista	12	42	40	32	23	315	87N	267	275	+1.7	+1.0
AR Resistencia	12	45	25	34	24	313	81N	273	280	+1.6	+0.8
AR Rio Cuarto	12	28	48	24	25	322	78S	252	260	+2.2	+1.5
AR Rio Gallegos	11	34	7	5	15	343	22S	196	204	+2.4	+3.7
AR Rio Turbio	11	27	14	2	16	347	19S	193	200	+2.3	+4.1
AR Rosario	12	36	0	28	22	318	82S	256	264	+1.9	+1.5
AR Salta	12	35	21	28	31	319	81N	272	280	+2.1	+0.7
AR San Carlos De Bariloch	11	57	17	10	24	338	52S	226	233	+2.4	+2.2
AR San Fernando	12	37	45	29	20	316	81S	255	262	+1.8	+1.6
AR San Julian	11	45	1	8	16	338	32S	206	213	+2.3	+2.9
AR San Justo	12	37	20	29	19	316	80S	254	262	+1.8	+1.6
AR San Luis	12	23	47	22	26	325	76S	250	257	+2.3	+1.6
AR San Martin Des Andes	11	59	34	11	25	337	54S	228	236	+2.5	+2.1
AR San Rafael	12	16	50	18	27	329	71S	244	252	+2.4	+1.7
AR Santa Cruz	11	41	5	7	16	340	29S	203	210	+2.3	+3.1
AR Santa Fe	12	37	37	29	23	317	86S	259	267	+1.9	+1.3
AR Santa Rosa	12	22	46	22	23	324	69S	243	251	+2.2	+1.9
AR Santa Teresita	12	37	40	30	17	315	78S	251	259	+1.7	+1.7
AR Santiago Del Estero	12	35	17	28	28	319	88N	266	274	+2.1	+1.0
AR Tandil	12	31	53	27	19	318	73S	247	254	+1.9	+1.8
AR Tartagal	12	39	46	31	31	316	73N	281	288	+1.9	+0.3
AR Tinogasta	12	27	51	23	31	324	88S	262	270	+2.3	+1.1
AR Trelew	12	6	32	15	19	330	51S	225	233	+2.3	+2.4
AR Tres Arroyos	12	27	34	24	19	320	69S	243	250	+2.0	+2.0
AR Tucuman	12	34	34	27	29	320	86N	268	275	+2.1	+0.9
AR Viedma	12	16	54	20	19	325	60S	234	241	+2.2	+2.2
AR Villa Dolores	12	28	30	24	26	323	80S	254	262	+2.2	+1.4
AR Villa Gesell	12	35	54	29	17	316	75S	249	257	+1.7	+1.8
AR Villa Reynolds	12	25	15	22	25	324	76S	249	257	+2.2	+1.6
BO Apolo	12	28	30	27	42	318	55N	299	307	+2.1	-1.0
BO Ascension De Guarayos	12	39	12	34	35	312	51N	302	310	+1.6	-0.9
BO Bermejo	12	38	42	30	31	317	74N	280	287	+2.0	+0.3
BO Camiri	12	40	36	32	33	314	65N	288	296	+1.8	-0.1
BO Chapacura	12	36	36	31	36	315	58N	296	303	+1.9	-0.6
BO Charana	12	28	11	25	40	321	65N	289	296	+2.3	-0.3
BO Cobjija	12	22	22	26	45	317	42N	312	319	+2.0	-2.0
BO Cochabamba	12	35	1	30	37	316	61N	293	301	+2.0	-0.5
BO Conception	12	41	16	35	34	311	51N	302	310	+1.5	-0.9
BO Guayaramerin	12	28	3	30	42	313	37N	317	325	+1.6	-2.3
BO La Paz	12	30	29	27	40	319	60N	293	301	+2.2	-0.6
BO Magdalena	12	34	40	33	39	312	44N	310	317	+1.6	-1.5
BO Oruro	12	33	28	28	37	318	64N	290	298	+2.1	-0.3
BO Potosi	12	36	34	30	35	317	67N	287	295	+2.0	-0.1
BO Puerto Suarez	12	48	58	39	28	309	55N	299	307	+1.2	-0.5
BO Reyes	12	30	9	28	41	317	52N	302	309	+2.0	-1.1
BO Riberalta	12	27	19	29	43	314	38N	315	323	+1.7	-2.1
BO Robore	12	46	5	37	30	310	55N	298	306	+1.4	-0.6
BO Rurrenabaque	12	29	58	28	41	317	53N	301	309	+2.0	-1.1
BO San Borja	12	31	55	29	40	316	53N	301	308	+1.9	-1.0
BO San Ignacio De Moxos	12	34	7	30	39	315	52N	302	309	+1.8	-1.0
BO San Ignacio De Velasco	12	43	2	36	33	310	51N	303	311	+1.4	-0.9
BO San Joaquin	12	33	24	32	39	313	44N	310	317	+1.6	-1.5
BO San Mathias	12	46	18	39	30	308	47N	307	315	+1.2	-1.0
BO San Ramon	12	33	51	32	39	313	45N	309	317	+1.6	-1.5
BO Santa Ana	12	33	6	31	39	314	48N	306	314	+1.8	-1.3
BO Santa Cruz	12	40	32	33	34	313	58N	296	304	+1.7	-0.5
BO Sucre	12	37	18	30	35	316	65N	289	297	+1.9	-0.2
BO Tarija	12	38	23	30	33	316	71N	282	290	+2.0	+0.2
BO Trinidad	12	35	14	31	38	314	51N	303	311	+1.8	-1.1
BR Alpinopolis	12	59	13	50	16	301	44N	310	318	+0.4	-0.8
BR Alta Floresta	12	32	57	41	35	305	13N	340	348	-0.1	-4.7
BR Aracatuba	12	57	13	46	19	304	51N	302	310	+0.7	-0.5
BR Araracuara	12	59	2	48	17	302	50N	304	311	+0.6	-0.5
BR Assis	12	57	41	46	18	304	56N	298	305	+0.8	-0.2
BR Bage	12	49	4	36	17	310	86N	268	275	+1.4	+1.1
BR Barbacena	13	0	25	52	13	300	42N	312	320	+0.2	-0.8
BR Barra Do Garcas	12	50	43	46	25	304	35N	318	326	+0.5	-1.6
BR Bauru	12	58	38	47	17	303	53N	300	308	+0.7	-0.3
BR Belo Horizonte	12	58	55	52	14	300	36N	317	325	+0.1	-1.2
BR Bom Jesus Da Lapa	12	34	51	51	22	301	-10N	4	11	+9.9	+9.9
BR Brasilia	12	52	8	50	21	302	27N	327	335	+0.0	-2.2
BR Campinas	13	0	2	48	15	302	53N	301	309	+0.6	-0.3
BR Campo Grande	12	53	14	42	24	306	55N	299	306	+1.0	-0.4
BR Campos	13	1	2	53	11	299	39N	315	322	+0.1	-0.9
BR Caravelas	12	53	34	56	13	298	16N	338	346	-0.8	-3.0
BR Cascavel	12	54	34	41	20	307	68N	286	294	+1.1	+0.3
BR Castilho	12	56	11	45	20	304	52N	302	310	+0.8	-0.5
BR Caxias Do Sul	12	54	52	41	16	307	77N	277	285	+1.1	+0.8
BR Chapeco	12	54	35	41	18	307	73N	281	289	+1.1	+0.6
BR Corumbá	12	49	10	40	27	308	55N	299	307	+1.2	-0.5

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BR Criciuma	12	56	59	42	14	305	73N	281	288	+1.0	+0.7
BR Cruzeiro Do Sul	12	4	56	18	53	324	33N	321	329	+2.3	-3.3
BR Cuiaba	12	47	44	42	29	306	41N	313	321	+0.9	-1.4
BR Curitiba	12	58	40	45	16	304	63N	291	298	+0.8	+0.2
BR Florianopolis	12	58	24	44	14	304	69N	285	293	+0.9	+0.5
BR Foz Do Iguacu	12	53	12	40	20	308	71N	283	291	+1.2	+0.4
BR Franca	12	58	45	49	17	302	45N	309	317	+0.4	-0.8
BR Fronteira	12	57	34	48	19	303	47N	307	315	+0.6	-0.7
BR Goiania	12	53	15	49	21	302	33N	321	329	+0.3	-1.7
BR Guajara-Mirim	12	28	6	30	42	313	36N	317	325	+1.6	-2.3
BR Guaratingueta	13	0	54	50	14	301	49N	305	312	+0.4	-0.4
BR Ipatinga	12	58	22	53	13	299	32N	322	329	+0.0	-1.5
BR Itumbiara	12	55	47	48	20	302	40N	314	321	+0.4	-1.1
BR Joinville	12	58	46	45	15	304	65N	289	296	+0.8	+0.3
BR Juiz De Fora	13	0	55	52	13	300	43N	311	319	+0.2	-0.8
BR Lagoa Santa	12	58	40	52	14	300	36N	318	326	+0.1	-1.3
BR Lajes	12	56	47	42	15	305	71N	282	290	+1.0	+0.6
BR Lins	12	57	56	47	18	303	52N	302	309	+0.7	-0.4
BR Londrina	12	57	11	45	19	305	59N	294	302	+0.9	-0.1
BR Marilia	12	58	0	46	18	304	54N	300	307	+0.7	-0.3
BR Maringa	12	56	30	44	19	305	61N	293	301	+0.9	+0.0
BR Montes Claros	12	53	28	53	17	300	22N	332	340	-0.3	-2.5
BR Navegantes	12	58	39	44	14	304	67N	287	295	+0.8	+0.4
BR Passo Fundo	12	54	17	40	17	307	75N	279	286	+1.2	+0.7
BR Pelotas	12	51	6	38	15	308	85N	269	277	+1.3	+1.1
BR Piracununga	12	59	32	49	16	302	50N	304	312	+0.5	-0.5
BR Pocos De Caldas	12	59	54	49	15	302	48N	306	313	+0.5	-0.5
BR Ponta Grossa	12	57	56	44	17	305	64N	290	298	+0.9	+0.2
BR Ponta Pora	12	52	25	40	23	308	63N	291	298	+1.2	+0.0
BR Porto Alegre	12	54	10	40	15	307	79N	275	283	+1.1	+0.9
BR Porto Velho	12	24	10	31	43	311	25N	329	337	+1.1	-3.5
BR President Prudente	12	56	47	45	19	305	56N	298	305	+0.8	-0.2
BR Ribeirao Preto	12	58	52	49	17	302	47N	306	314	+0.5	-0.6
BR Rio Branco	12	21	32	27	46	316	36N	317	325	+1.8	-2.5
BR Rio De Janeiro	13	1	36	51	12	300	46N	308	315	+0.3	-0.6
BR Rio Grande	12	50	53	37	15	308	86N	268	276	+1.3	+1.1
BR Santarem	12	51	22	38	18	309	81N	273	280	+1.3	+0.9
BR Santo Angelo	12	51	57	38	19	309	78N	276	284	+1.3	+0.8
BR Santos	13	0	41	48	14	302	54N	299	307	+0.6	-0.2
BR Sao Jose Do Rio Preto	12	57	44	47	18	303	49N	305	313	+0.6	-0.6
BR Sao Jose Dos Campos	13	0	47	49	14	301	52N	302	310	+0.5	-0.3
BR Sao Paulo	13	0	29	48	14	302	54N	300	307	+0.6	-0.2
BR Sao Pedro Da Aldeia	13	1	51	52	11	299	44N	309	317	+0.2	-0.6
BR Tabatinga	11	52	33	18	56	321	7N	347	355	+9.9	+9.9
BR Tarauaca	12	11	7	21	51	320	33N	321	329	+2.1	-3.1
BR Telemaco Borba	12	57	36	44	18	305	62N	292	300	+0.9	+0.1
BR Teodoro Sampaio	12	55	23	43	21	306	59N	294	302	+1.0	-0.1
BR Uberaba	12	57	45	49	18	302	43N	311	319	+0.4	-0.9
BR Uruguaiana	12	46	30	35	21	312	85N	269	276	+1.6	+1.0
BR Varginha	13	0	13	50	14	301	45N	308	316	+0.4	-0.7
BR Vilhena	12	38	57	37	35	309	36N	318	326	+1.1	-2.0
BR Vitoria	12	59	16	55	11	298	31N	322	330	-0.1	-1.4
BR Vitoria Da Conquista	12	43	7	55	18	299	-1N	355	3	-2.7	-8.0
CL Alto Palena	11	50	19	8	22	340	45S	219	226	+2.4	+2.3
CL Ancud	11	49	17	7	24	342	48S	222	230	+2.4	+2.1
CL Antofagasta	12	24	46	22	36	325	82N	272	279	+2.5	+0.6
CL Arica	12	26	0	23	40	322	68N	286	294	+2.4	-0.2
CL Balmaceda	11	45	5	7	20	342	39S	212	220	+2.3	+2.5
CL Calama	12	29	1	24	36	322	78N	275	283	+2.4	+0.4
CL Castro	11	48	7	6	24	343	47S	221	228	+2.4	+2.2
CL Chaiten	11	49	45	7	23	341	46S	220	228	+2.4	+2.2
CL Chile Chico	11	43	22	6	20	342	37S	211	218	+2.3	+2.5
CL Chillan	12	4	15	12	28	336	63S	237	244	+2.5	+1.8
CL Concepcion	12	1	15	11	28	338	62S	235	243	+2.6	+1.8
CL Copiapo	12	21	44	20	34	327	87S	261	269	+2.5	+1.0
CL Coyhaique	11	44	55	6	21	342	39S	213	221	+2.3	+2.4
CL Curico	12	9	10	14	29	334	67S	241	249	+2.5	+1.7
CL Easter Island	10	35	56	30	40	40	82N	272	279	+2.1	-0.9
CL Iquique	12	26	24	23	38	323	74N	280	287	+2.4	+0.1
CL La Serena	12	16	49	17	32	330	80S	254	262	+2.6	+1.3
CL Los Angeles	12	1	44	11	27	337	60S	234	242	+2.5	+1.9
CL Osorno	11	53	47	8	25	340	52S	226	233	+2.5	+2.1
CL Puerto Montt	11	51	57	8	25	341	50S	224	231	+2.4	+2.1
CL Punta Arenas	11	23	43	2	14	347	12S	185	193	+3.2	+8.5
CL Rancagua	12	11	40	15	29	332	70S	244	251	+2.5	+1.7
CL Santiago	12	13	25	16	29	331	72S	245	253	+2.5	+1.6
CL Santo Domingo	12	10	23	15	30	333	70S	244	252	+2.6	+1.6
CL Temuco	11	58	34	10	27	338	57S	231	238	+2.5	+2.0
CL Valdivia	11	55	39	9	26	340	54S	228	236	+2.5	+2.0
CL Vallenar	12	19	28	19	33	329	84S	258	265	+2.5	+1.2
CO Leticia	11	51	52	18	56	321	6N	348	356	+9.9	+9.9
EC Cuenca	11	18	37	1	65	350	4N	350	357	+9.9	+9.9
EC Gualaquiza	11	27	8	4	64	345	11N	342	350	+9.9	+9.9
EC MacAra	11	30	33	3	63	347	20N	334	341	+3.4	-6.7
EC MacHala	11	20	26	0	65	351	10N	344	352	+9.9	+9.9
EC Maragrosa	11	13	46	-1	65	354	3N	351	359	+9.9	+9.9
EC Santa Rosa	11	22	26	1	64	350	12N	342	350	+9.9	+9.9
FK Mount Pleasant	11	58	33	15	10	327	35S	209	217	+2.1	+3.0
FK Stanley	12	0	16	15	10	326	37S	210	218	+2.1	+2.9
PY Asuncion	12	49	14	37	23	311	73N	281	288	+1.5	+0.5
PY Ayolas	12	48	54	36	22	311	78N	275	283	+1.5	+0.7
PY Concepcion	12	50	1	38	24	310	68N	286	294	+1.4	+0.2
PY Filadelfia	12	46	21	36	28	312	68N	286	293	+1.6	+0.1
PY Itaipu	12	53	6	40	21	308	70N	284	291	+1.2	+0.4

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
PY Mariscal Estigarribia	12	45	29	35	28	312	68N	286	294	+1.6	+0.1
PY Pilar	12	47	1	35	23	312	79N	275	283	+1.6	+0.7
PE Anta	11	57	2	11	55	334	44N	309	317	+3.0	-2.3
PE Arequipa	12	22	24	22	43	324	63N	291	298	+2.5	-0.5
PE Atalaya	12	10	28	18	51	326	47N	307	315	+2.6	-1.9
PE Ayacucho	12	13	1	18	49	327	55N	298	306	+2.7	-1.2
PE Caballococha	11	48	20	17	57	323	4N	350	358	+9.9	+9.9
PE Cajamarca	11	48	4	8	59	338	36N	318	326	+3.1	-3.4
PE Chachapoyas	11	46	27	9	59	337	31N	323	331	+3.0	-4.1
PE Chiclayo	11	42	20	6	60	342	34N	319	327	+3.3	-3.6
PE Chimbote	11	53	32	9	56	337	44N	310	317	+3.1	-2.4
PE Ciro Alegria	11	38	22	7	62	339	21N	333	341	+3.0	-6.1
PE Collique	12	3	10	13	52	333	53N	300	308	+3.0	-1.5
PE Cuzco	12	19	19	21	46	323	55N	299	307	+2.5	-1.1
PE Huanuco	12	2	15	14	54	331	45N	308	316	+2.9	-2.1
PE Iberia	12	21	40	25	46	319	44N	309	317	+2.1	-1.8
PE Ilo	12	23	23	22	42	324	67N	287	295	+2.5	-0.3
PE Iquitos	11	43	32	13	60	329	9N	345	353	+9.9	+9.9
PE Jauja	12	7	46	16	51	329	52N	302	310	+2.8	-1.5
PE Juanjui	11	53	13	11	57	333	34N	319	327	+2.9	-3.4
PE Juliaca	12	25	22	24	43	321	59N	295	302	+2.3	-0.7
PE Las Palmas	12	3	43	13	52	333	54N	300	307	+3.0	-1.4
PE Lima	12	3	8	13	52	333	54N	300	308	+3.0	-1.4
PE Moquegua	12	24	19	23	42	323	65N	289	296	+2.4	-0.4
PE Moyobamba	11	48	4	10	59	334	29N	325	333	+2.9	-4.3
PE Nazca	12	12	24	17	48	329	61N	292	300	+2.8	-0.8
PE Pisco	12	7	49	14	50	331	59N	295	303	+2.9	-1.0
PE Piura	11	33	0	3	62	347	26N	328	335	+3.5	-5.2
PE Pucallpa	12	2	54	16	54	327	38N	316	324	+2.6	-2.8
PE Puerto Esperanza	12	15	38	22	49	320	40N	314	322	+2.2	-2.3
PE Puerto Maldonado	12	24	9	25	44	319	49N	305	313	+2.1	-1.5
PE San Juan	12	12	16	16	47	330	63N	291	298	+2.8	-0.7
PE San Ramon	12	6	51	16	52	329	49N	305	312	+2.8	-1.7
PE Tacna	12	26	6	24	40	322	67N	287	294	+2.4	-0.3
PE Talara	11	27	5	1	63	351	22N	332	340	+3.6	-6.4
PE Tarapoto	11	51	47	11	58	332	31N	323	331	+2.8	-3.9
PE Tingo Maria	12	1	21	14	54	330	43N	311	319	+2.8	-2.3
PE Trujillo	11	48	52	8	58	339	40N	314	322	+3.2	-2.9
PE Tumbes	11	22	6	0	64	351	13N	341	348	+9.9	+9.9
PE Yurimaguas	11	50	4	11	59	332	27N	326	334	+2.7	-4.4
UY Artigas	12	46	39	35	20	312	86N	268	275	+1.5	+1.1
UY Colonia	12	39	9	30	19	315	82S	256	263	+1.7	+1.5
UY Durazno	12	42	55	32	18	313	86S	260	267	+1.6	+1.4
UY Maldonado	12	42	57	33	16	313	84S	258	265	+1.6	+1.5
UY Melo	12	47	45	35	17	310	89N	265	273	+1.4	+1.2
UY Montevideo	12	41	30	32	17	313	83S	257	264	+1.6	+1.5
UY Montevideo	12	41	11	31	18	314	83S	256	264	+1.6	+1.5
UY Paysandu	12	41	41	32	20	314	87S	261	268	+1.7	+1.3
UY Punta Del Este	12	43	8	33	16	312	84S	258	265	+1.5	+1.5
UY Rivera	12	47	33	35	19	311	87N	267	275	+1.5	+1.1
UY Salto	12	43	0	32	21	314	89S	263	271	+1.7	+1.2
UY Tacuarembó	12	45	56	34	19	312	89N	265	272	+1.5	+1.2

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimuth della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina; un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi; a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

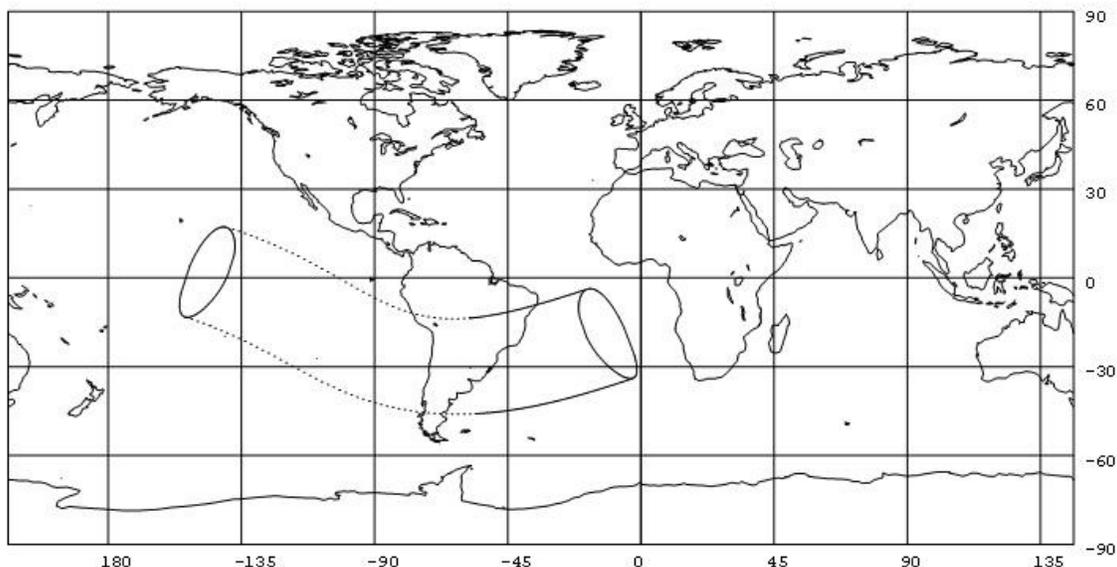
Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.

U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali. Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

## Occultation of Mars, Magnitude 1.2, on 2012 Sep 19



Occult 4.090

UT of conjunction = 20h 37.7m

Luna: % illuminazione 18+, elongazione solare 50°

Moon: % illumination 18+, solar elongation 50°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Bahia Blanca	20	52	16	13	60	307	61S	136	118	+1.8	-1.6
AR Bolivar	20	51	15	13	61	302	71S	126	108	+1.9	-1.0
AR Buenos Aires	20	55	6	10	59	295	78S	119	101	+2.0	-0.6
AR Catamarca	20	36	58	21	71	300	83N	100	82	+2.5	-0.1
AR Chilecito	20	32	53	23	73	307	86N	103	85	+2.5	-0.3
AR Chosmadal	20	35	9	23	68	327	62S	134	117	+1.9	-1.8
AR Colonel Suarez	20	51	4	13	61	305	66S	131	113	+1.9	-1.3
AR Comodoro Rivadavia	21	10	42	12	56	316	11S	186	168	+9.9	+9.9
AR Concordia	20	54	46	10	60	289	90S	107	89	+2.1	-0.1
AR Cordoba	20	41	17	18	68	302	88S	109	91	+2.3	-0.4
AR Corrientes	20	53	48	12	62	284	76N	93	76	+2.2	+0.5
AR Curuzu Cuatia	20	54	49	10	61	287	85N	102	84	+2.1	+0.1
AR Cutralco	20	39	49	21	66	325	57S	140	122	+1.8	-2.1
AR Dolores	20	57	46	9	57	296	71S	126	108	+1.9	-0.9
AR El Bolson	20	43	46	20	64	331	41S	155	138	+1.5	-3.3
AR El Maiten	20	44	37	20	63	330	41S	156	138	+1.5	-3.3
AR El Palomar	20	54	45	10	59	295	77S	119	102	+2.0	-0.6
AR Esquel	20	47	47	19	62	329	36S	161	143	+1.4	-3.8
AR Formosa	20	55	40	11	61	281	72N	89	71	+2.3	+0.7
AR Fuerte Gral Roca	20	42	53	19	64	320	57S	139	121	+1.8	-2.0
AR General Pico	20	45	27	16	64	307	72S	125	107	+2.0	-1.1
AR Gobernador Gordillo	20	36	4	21	71	305	89N	106	88	+2.4	-0.4
AR Goya	20	52	14	12	62	287	83N	99	82	+2.2	+0.2
AR Gualaguaychu	20	53	53	11	60	293	83S	113	96	+2.0	-0.4
AR Iguazu Falls	21	4	12	6	56	276	70N	87	69	+2.0	+0.8
AR Jose C. Paz	20	54	22	11	60	296	78S	119	101	+2.0	-0.6
AR Jose De San Martin	20	53	25	17	60	326	29S	168	150	+1.3	-5.0
AR Jujuy	20	40	6	21	71	286	67N	84	66	+2.7	+0.8
AR Junin	20	50	5	13	62	300	77S	120	102	+2.0	-0.7
AR La Cumbre	20	40	26	19	68	302	89S	108	90	+2.3	-0.4
AR La Plata	20	56	22	9	58	295	76S	121	103	+1.9	-0.7
AR La Quiaca	20	41	4	21	72	280	58N	75	57	+2.9	+1.3
AR La Rioja	20	34	30	22	72	305	86N	103	85	+2.4	-0.3
AR Laboulaye	20	44	45	16	65	304	78S	119	101	+2.1	-0.8
AR Las Lomitas	20	51	28	14	65	280	66N	83	66	+2.4	+0.9
AR Malargue	20	33	25	23	69	324	70S	127	109	+2.0	-1.4
AR Mar Del Plata	20	59	37	8	56	297	65S	132	114	+1.8	-1.2
AR Marcos Juarez	20	46	20	15	64	299	84S	113	95	+2.1	-0.5
AR Mendoza	20	31	56	24	71	318	81S	116	99	+2.2	-0.9
AR Mercedes	20	54	40	11	61	286	83N	100	82	+2.2	+0.2
AR Monte Caseros	20	55	28	10	60	287	87N	104	86	+2.1	+0.1
AR Moron	20	54	43	10	59	295	77S	120	102	+2.0	-0.6
AR Necochea	20	58	0	9	57	300	62S	135	117	+1.8	-1.3
AR Neuquen	20	41	49	19	65	322	57S	139	122	+1.8	-2.0
AR Obera	21	1	34	7	57	280	77N	94	76	+2.1	+0.5
AR Olavarria	20	53	36	12	60	301	68S	128	111	+1.9	-1.1
AR Oran	20	43	18	20	70	281	61N	79	61	+2.7	+1.1
AR Parana	20	49	37	13	63	294	88S	109	92	+2.1	-0.3
AR Paso De Los Libres	20	56	35	9	60	286	84N	101	84	+2.1	+0.2
AR Pehuajo	20	49	23	14	62	303	72S	125	107	+2.0	-1.0

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Posadas	20	59	55	8	58	280	76N	93	75	+2.1	+0.6
AR Presidencia R.S.Pena	20	50	9	14	65	285	74N	91	73	+2.4	+0.5
AR Puerto Madryn	20	56	15	13	59	315	40S	156	138	+1.6	-3.2
AR Punta Indio	20	57	47	9	58	294	75S	122	104	+1.9	-0.7
AR Reconquista	20	51	9	13	63	288	83N	100	82	+2.2	+0.1
AR Resistencia	20	53	7	12	62	284	76N	93	76	+2.3	+0.5
AR Rio Cuarto	20	42	7	18	66	305	82S	115	97	+2.2	-0.7
AR Rosario	20	49	21	14	63	297	83S	113	96	+2.1	-0.5
AR Salta	20	38	42	21	72	289	69N	86	68	+2.7	+0.6
AR San Carlos De Bariloeh	20	41	56	21	64	330	46S	151	133	+1.6	-2.9
AR San Fernando	20	54	41	10	59	295	78S	119	101	+2.0	-0.6
AR San Justo	20	54	51	10	59	295	77S	120	102	+2.0	-0.7
AR San Luis	20	37	41	20	68	311	80S	117	99	+2.2	-0.8
AR San Martin Des Andes	20	39	1	22	65	330	51S	146	128	+1.7	-2.5
AR San Rafael	20	34	40	22	69	319	74S	122	105	+2.1	-1.2
AR Santa Fe	20	48	53	14	63	295	88S	109	91	+2.2	-0.3
AR Santa Rosa	20	45	25	16	64	310	69S	128	110	+2.0	-1.2
AR Santa Teresita	20	59	48	8	56	295	70S	127	109	+1.8	-0.9
AR Santiago Del Estero	20	40	35	19	69	294	79N	96	78	+2.5	+0.2
AR Tandil	20	55	50	10	58	300	67S	130	112	+1.9	-1.1
AR Tartagal	20	45	21	19	69	279	59N	76	58	+2.7	+1.2
AR Tinogasta	20	32	22	24	73	304	82N	99	81	+2.5	-0.1
AR Trelew	20	57	29	13	58	315	38S	159	141	+1.5	-3.5
AR Tres Arroyos	20	55	9	11	59	303	62S	134	117	+1.8	-1.4
AR Tucuman	20	38	48	21	71	294	76N	93	75	+2.5	+0.3
AR Viedma	20	54	39	13	59	310	51S	146	128	+1.7	-2.2
AR Villa Dolores	20	39	26	19	68	305	86S	111	93	+2.2	-0.6
AR Villa Gesell	20	59	52	8	56	296	67S	129	112	+1.8	-1.0
AR Villa Reynolds	20	40	10	19	67	309	79S	118	100	+2.1	-0.8
BO Apolo	20	54	10	22	72	257	19N	36	18	+3.9	+7.3
BO Ascension De Guarayos	21	5	42	14	64	261	23N	40	22	+2.9	+5.4
BO Bermejo	20	43	45	20	70	280	60N	77	59	+2.7	+1.2
BO Camiri	20	50	23	18	68	271	48N	65	47	+2.8	+2.1
BO Chapacura	20	53	54	19	69	264	33N	50	32	+3.1	+3.7
BO Charana	20	37	47	27	77	266	40N	57	39	+3.5	+2.9
BO Cochabamba	20	49	14	21	71	265	36N	53	35	+3.2	+3.3
BO Concepcion	21	6	36	13	63	262	26N	43	25	+2.7	+4.7
BO La Paz	20	45	47	24	74	262	32N	49	31	+3.5	+3.9
BO Oruro	20	44	41	23	73	267	40N	57	39	+3.3	+2.9
BO Potosi	20	45	2	21	72	272	47N	64	46	+3.0	+2.2
BO Puerto Suarez	21	7	22	9	59	266	42N	59	41	+2.3	+2.6
BO Reyes	21	2	1	19	69	257	12N	29	12	+9.9	+9.9
BO Robore	21	4	30	11	61	266	38N	55	38	+2.5	+2.9
BO Rurrenabaque	21	0	6	20	69	257	14N	31	13	+3.8	+9.2
BO San Borja	20	59	27	19	69	259	18N	35	17	+3.6	+7.3
BO San Ignacio De Moxos	21	2	28	18	67	259	18N	35	17	+3.3	+7.1
BO San Ignacio De Velasco	21	8	17	12	61	262	27N	44	26	+2.6	+4.4
BO San Mathias	21	14	38	8	57	262	27N	44	26	+2.2	+4.3
BO Santa Cruz	20	57	37	16	66	265	35N	53	35	+2.9	+3.3
BO Sucre	20	47	30	20	71	270	44N	61	43	+3.0	+2.4
BO Tarija	20	44	21	20	71	277	55N	72	54	+2.8	+1.5
BO Trinidad	21	5	54	16	65	259	16N	33	15	+3.2	+7.8
BR Alpinopolis	21	25	5	-6	44	265	53N	70	52	+1.5	+1.7
BR Aracaju	21	59	14	25	255	12N	29	11	-0.3	+5.1	
BR Aracatuba	21	17	47	-1	50	267	53N	70	52	+1.8	+1.7
BR Araracuara	21	20	34	-4	47	267	57N	74	56	+1.6	+1.5
BR Assis	21	15	26	0	50	269	59N	76	58	+1.8	+1.4
BR Bage	21	2	33	5	55	284	89S	108	90	+1.9	+0.0
BR Barbacena	21	27	48	-9	41	264	57N	74	56	+1.3	+1.5
BR Barra Do Garcas	21	28	0	-1	48	261	26N	43	25	+1.6	+4.0
BR Bauru	21	18	17	-2	48	268	58N	75	58	+1.7	+1.4
BR Belo Horizonte	21	29	46	-10	41	263	51N	68	50	+1.3	+1.7
BR Bom Jesus Da Lapa	21	47	56	35	257	18N	35	17	+0.5	+4.5	
BR Brasilia	21	34	11	-7	43	260	29N	47	29	+1.2	+3.3
BR Campinas	21	20	33	-5	46	268	62N	79	61	+1.6	+1.3
BR Campo Grande	21	10	57	5	55	268	49N	66	48	+2.1	+2.0
BR Campos	21	30	16	38	264	60N	77	59	+1.2	+1.3	
BR Caravelas	21	38	47	34	260	46N	63	45	+0.9	+1.9	
BR Cascavel	21	6	51	4	55	274	67N	84	67	+2.0	+1.0
BR Castilho	21	16	21	0	51	267	51N	68	50	+1.8	+1.8
BR Caxias Do Sul	21	8	28	2	52	278	83N	100	82	+1.8	+0.4
BR Chapeco	21	6	46	3	54	277	75N	92	75	+1.9	+0.6
BR Corumba	21	7	38	8	59	266	42N	59	41	+2.3	+2.5
BR Criciuma	21	11	46	-1	50	276	82N	99	81	+1.7	+0.4
BR Cuiaba	21	22	28	4	53	261	23N	40	22	+1.9	+4.8
BR Curitiba	21	14	26	-1	49	272	70N	87	69	+1.7	+0.9
BR Florianopolis	21	13	51	-2	49	274	78N	95	78	+1.7	+0.6
BR Foz Do Iguacu	21	4	17	6	56	276	69N	86	69	+2.1	+0.9
BR Franca	21	23	42	-5	45	265	52N	69	51	+1.5	+1.7
BR Fronteira	21	21	24	-3	48	265	50N	67	49	+1.6	+1.9
BR Goiania	21	30	1	-5	45	261	33N	50	32	+1.4	+3.1
BR Guaratingueta	21	23	44	-7	43	266	62N	79	61	+1.5	+1.3
BR Ilheus	21	45	14	31	258	33N	50	32	+0.6	+2.6	
BR Ipatinga	21	32	10	-12	39	262	51N	68	50	+1.2	+1.7
BR Itumbiara	21	25	10	-4	46	263	42N	59	41	+1.5	+2.4
BR Joinville	21	14	25	-2	49	272	73N	90	72	+1.7	+0.8
BR Juiz De Fora	21	27	34	-10	41	265	59N	76	58	+1.3	+1.4
BR Lagoa Santa	21	30	10	-10	40	263	50N	67	50	+1.3	+1.8
BR Lajes	21	10	48	0	51	275	78N	95	77	+1.8	+0.6
BR Lins	21	18	8	-2	49	267	55N	72	55	+1.7	+1.6
BR Londrina	21	13	18	1	51	270	62N	79	61	+1.8	+1.3
BR MacEio	22	8	11	22	254	-2N	15	358	+9.9	+9.9	
BR Marilia	21	17	0	-1	49	268	57N	74	57	+1.7	+1.5
BR Maringa	21	11	43	2	52	271	62N	79	61	+1.9	+1.3

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BR Montes Claros	21	36	24	-12	38	260	37N	54	37	+1.1	+2.5
BR Navegantes	21	14	11	-2	49	273	76N	93	75	+1.7	+0.7
BR Passo Fundo	21	6	46	3	54	278	80N	97	79	+1.9	+0.5
BR Pelotas	21	5	53	3	53	283	88S	109	91	+1.8	+0.0
BR Piracununga	21	21	35	-5	46	266	58N	75	57	+1.6	+1.4
BR Pocos De Caldas	21	23	0	-6	45	266	58N	75	57	+1.5	+1.5
BR Ponta Grossa	21	13	2	0	50	272	69N	86	68	+1.8	+1.0
BR Ponta Pora	21	5	14	7	57	272	58N	75	57	+2.2	+1.5
BR Porto Alegre	21	8	11	2	52	279	86N	103	85	+1.8	+0.3
BR President Prudente	21	14	20	1	51	269	57N	74	56	+1.8	+1.5
BR Ribeirao Preto	21	22	12	-4	46	266	54N	71	53	+1.6	+1.6
BR Rio De Janeiro	21	26	26	-10	41	266	63N	80	62	+1.3	+1.2
BR Rio Grande	21	6	9	3	53	283	87S	110	93	+1.8	-0.1
BR Salvador	21	51	15	29	256	23N	40	22	+0.3	+3.4	
BR Santarem	21	3	35	5	55	281	85N	102	84	+1.9	+0.3
BR Santo Angelo	21	3	9	5	56	280	79N	96	79	+2.0	+0.5
BR Santos	21	20	43	-5	45	268	66N	83	65	+1.5	+1.1
BR Sao Jose Do Rio Preto	21	20	4	-2	48	266	52N	69	51	+1.7	+1.7
BR Sao Jose Dos Campos	21	22	14	-6	44	267	63N	80	62	+1.5	+1.2
BR Sao Paulo	21	20	33	-5	46	268	64N	81	64	+1.6	+1.2
BR Sao Pedro Da Aldeia	21	27	56	-11	40	265	64N	81	63	+1.3	+1.2
BR Telemaco Borba	21	12	59	0	51	271	65N	82	65	+1.8	+1.1
BR Teodoro Sampaio	21	10	52	3	54	270	58N	75	57	+2.0	+1.5
BR Uberaba	21	24	21	-5	46	264	48N	65	48	+1.5	+1.9
BR Uruguiana	20	56	48	9	59	286	85N	102	84	+2.1	+0.2
BR Varginha	21	24	58	-7	43	265	57N	74	56	+1.4	+1.5
BR Vitoria	21	33	26	36	262	262	55N	72	55	+1.1	+1.5
BR Vitoria Da Conquista	21	43	54	34	258	258	31N	48	30	+0.7	+2.8
CL Alto Palena	20	49	44	19	62	330	31S	166	148	+1.3	-4.6
CL Ancud	20	40	19	23	65	337	40S	157	139	+1.4	-3.5
CL Antofagasta	20	25	35	29	79	299	67N	84	66	+2.9	+0.6
CL Arica	20	32	37	29	79	270	45N	62	44	+3.4	+2.3
CL Calama	20	30	55	27	77	288	62N	79	61	+3.0	+0.9
CL Castro	20	42	30	22	64	336	36S	160	143	+1.4	-3.9
CL Chaiten	20	45	41	21	63	333	35S	162	144	+1.3	-4.1
CL Chillan	20	30	12	25	70	333	65S	132	114	+1.9	-1.8
CL Concepcion	20	28	33	26	70	337	63S	134	116	+1.9	-1.9
CL Copiapo	20	24	55	28	77	314	81N	98	80	+2.6	-0.2
CL Curico	20	29	17	25	71	330	71S	126	108	+2.1	-1.4
CL Easter Island	19	16	2	62	46	88	44S	153	135	+0.3	-3.1
CL Iquique	20	29	12	29	79	282	55N	72	54	+3.2	+1.4
CL La Serena	20	24	3	28	76	324	89S	108	90	+2.4	-0.7
CL Los Angeles	20	30	54	25	69	335	61S	136	118	+1.9	-2.0
CL Osorno	20	37	21	23	66	336	47S	150	132	+1.6	-2.8
CL Puerto Montt	20	39	45	22	65	335	43S	154	136	+1.5	-3.2
CL Rancagua	20	29	8	25	71	328	74S	122	105	+2.1	-1.3
CL Santiago	20	28	44	25	72	326	77S	120	102	+2.2	-1.2
CL Santo Domingo	20	26	39	27	72	331	76S	121	103	+2.2	-1.3
CL Temuco	20	33	24	24	68	335	55S	141	124	+1.8	-2.3
CL Valdivia	20	34	39	24	67	337	51S	146	128	+1.7	-2.5
CL Vallenar	20	24	21	28	76	319	86N	103	85	+2.5	-0.4
PY Asuncion	20	58	4	10	60	278	68N	85	67	+2.2	+0.9
PY Ayolas	20	58	2	9	60	281	76N	93	75	+2.2	+0.5
PY Conception	21	0	12	9	60	275	61N	78	60	+2.3	+1.2
PY Filadelfia	20	55	24	13	64	275	57N	74	56	+2.5	+1.4
PY Itaipu	21	4	11	6	56	276	69N	86	68	+2.1	+0.9
PY Mariscal Estigarribia	20	54	28	14	64	274	56N	73	55	+2.5	+1.5
PY Pilar	20	55	5	11	62	282	74N	91	73	+2.2	+0.6
PE Arequipa	20	33	54	30	80	259	35N	52	34	+3.8	+3.5
PE Ayacucho	20	41	23	31	79	242	13N	30	12	+9.9	+9.9
PE Cuzco	20	49	52	27	76	250	11N	28	10	+9.9	+9.9
PE Ilo	20	30	40	30	80	267	42N	59	42	+3.6	+2.5
PE Juliaca	20	43	5	26	76	258	27N	44	26	+3.9	+5.0
PE Las Palmas	20	36	30	35	82	224	7N	24	7	+9.9	+9.9
PE Moquegua	20	33	34	29	79	264	39N	56	38	+3.6	+3.0
PE Nazca	20	25	39	35	84	238	31N	48	30	+4.4	+4.3
PE Pisco	20	25	19	37	84	221	25N	42	25	+5.0	+5.8
PE San Juan	20	22	59	36	85	238	35N	52	34	+4.2	+3.6
PE Tacna	20	33	34	28	79	269	43N	60	42	+3.5	+2.5
UY Artigas	20	57	50	8	59	286	87N	104	86	+2.0	+0.1
UY Colonia	20	56	17	9	59	294	78S	119	101	+1.9	-0.6
UY Durazno	20	58	16	8	58	290	82S	115	97	+1.9	-0.4
UY Maldonado	21	1	35	6	55	290	77S	120	102	+1.9	-0.5
UY Melo	21	2	22	5	55	286	86S	111	93	+1.9	-0.1
UY Montevideo	20	59	50	7	56	291	77S	120	102	+1.9	-0.6
UY Montevideo	20	59	22	7	57	292	77S	120	102	+1.9	-0.6
UY Paysandu	20	54	49	10	60	291	86S	111	93	+2.0	-0.3
UY Punta Del Este	21	1	56	6	55	290	76S	120	103	+1.8	-0.5
UY Rivera	20	59	54	7	57	285	89N	106	88	+2.0	+0.0
UY Salto	20	54	48	10	60	290	89S	108	90	+2.1	-0.1
UY Tacuarembó	20	59	2	8	57	287	88S	109	91	+2.0	-0.1

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Bahia Blanca	21	58	28	0	49	288	-49S	245	228	+1.4	+2.2
AR Bolivar	22	4	56	-2	47	283	-58S	255	237	+1.4	+1.7
AR Buenos Aires	22	11	6	-5	44	278	-64S	260	243	+1.3	+1.5
AR Catamarca	22	4	24	2	53	278	-87S	284	266	+1.9	+0.2
AR Chilecito	22	1	4	4	55	280	-85S	282	264	+1.9	+0.2
AR Chosmadal	21	47	49	9	57	297	-55S	252	234	+1.9	+1.8
AR Colonel Suarez	22	1	28	-1	48	286	-54S	250	233	+1.4	+1.9
AR Comodoro Rivadavia	21	19	32	10	55	313	-2S	198	181	+9.9	+9.9

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Concordia	22	15	33	-7	43	274	-75S	272	254	+1.4	+0.9
AR Cordoba	22	5	57	0	51	280	-77S	274	256	+1.7	+0.7
AR Corrientes	22	16	31	-7	44	271	-89S	286	268	+1.5	+0.2
AR Curuzu Cuatia	22	16	48	-7	43	273	-80S	277	259	+1.4	+0.6
AR Cutralco	21	46	41	8	56	299	-49S	245	228	+1.8	+2.2
AR Dolores	22	9	6	-6	44	280	-57S	253	236	+1.2	+1.8
AR El Bolson	21	34	33	11	57	309	-34S	231	213	+1.9	+3.3
AR El Maiten	21	34	57	11	57	309	-34S	230	213	+1.9	+3.3
AR El Palomar	22	10	46	-5	44	279	-63S	260	242	+1.3	+1.5
AR Esquel	21	31	48	11	57	311	-29S	225	208	+1.9	+3.9
AR Formosa	22	17	29	-7	43	269	-87N	290	272	+1.6	+0.0
AR Fuerte Gral Roca	21	49	24	6	54	296	-49S	245	227	+1.7	+2.2
AR General Pico	22	1	45	1	50	285	-61S	258	240	+1.6	+1.5
AR Gobernador Gordillo	22	2	55	3	53	281	-81S	278	260	+1.8	+0.5
AR Goya	22	15	19	-6	44	273	-83S	280	262	+1.5	+0.5
AR Gualeguaychu	22	12	56	-6	44	277	-69S	266	248	+1.4	+1.2
AR Iguazu Falls	22	23	4		39	267	-87N	289	272	+1.4	+0.1
AR Jose C. Paz	22	10	37	-5	45	279	-64S	260	243	+1.3	+1.5
AR Jose De San Martin	21	28	1	11	56	312	-21S	218	200	+1.9	+5.2
AR Jujuy	22	4	39	2	52	272	-77N	299	282	+2.0	-0.7
AR Junin	22	7	41	-3	47	281	-65S	261	244	+1.4	+1.4
AR La Cumbre	22	5	40	1	51	280	-78S	275	257	+1.7	+0.7
AR La Plata	22	11	11	-6	44	278	-62S	258	241	+1.3	+1.6
AR La Quiaca	22	1	39	3	54	269	-68N	308	291	+2.1	-1.3
AR La Rioja	22	2	16	4	54	280	-85S	281	264	+1.9	+0.3
AR Laboulaye	22	4	35	0	50	283	-67S	263	246	+1.6	+1.3
AR Las Lomitas	22	13	22	-4	46	269	-80N	297	279	+1.8	-0.4
AR Malargue	21	52	7	8	56	293	-63S	259	242	+1.9	+1.4
AR Mar Del Plata	22	6	6	-5	44	282	-50S	247	229	+1.2	+2.2
AR Marcos Juarez	22	8	7	-2	48	280	-72S	268	251	+1.6	+1.0
AR Mendoza	21	56	34	6	56	287	-72S	269	251	+1.9	+0.9
AR Mercedes	22	16	58	-7	43	272	-82S	279	261	+1.4	+0.5
AR Monte Caseros	22	16	54	-8	43	273	-78S	275	257	+1.4	+0.7
AR Moron	22	10	38	-5	44	279	-63S	260	242	+1.3	+1.5
AR Necochea	22	3	25	-3	45	284	-49S	245	228	+1.2	+2.3
AR Neuquen	21	48	36	7	55	297	-49S	245	228	+1.7	+2.2
AR Oera	22	21	49	-11	39	269	-87S	283	266	+1.4	+0.4
AR Olavarría	22	4	51	-3	46	283	-56S	252	234	+1.3	+1.9
AR Oran	22	5	11	1	52	270	-73N	304	286	+2.0	-1.0
AR Parana	22	11	32	-4	46	277	-74S	271	253	+1.5	+0.9
AR Paso De Los Libres	22	18	1	-8	42	272	-80S	277	259	+1.4	+0.7
AR Pehuajo	22	4	23	-1	48	283	-60S	257	239	+1.5	+1.6
AR Posadas	22	20	40	-10	40	269	-88S	284	267	+1.4	+0.3
AR Presidencia R.S.Pena	22	13	49	-5	46	271	-88N	289	271	+1.7	+0.0
AR Puerto Madryn	21	42	42	5	52	300	-30S	227	209	+1.5	+3.7
AR Punta Indio	22	11	20	-6	43	278	-60S	257	239	+1.2	+1.6
AR Reconquista	22	14	33	-5	45	273	-83S	280	262	+1.5	+0.5
AR Resistencia	22	16	4	-6	44	271	-89S	286	268	+1.6	+0.2
AR Rio Cuarto	22	4	20	1	51	282	-71S	267	250	+1.7	+1.0
AR Rosario	22	9	57	-3	47	279	-70S	267	249	+1.5	+1.1
AR Salta	22	4	13	2	53	273	-79N	298	280	+2.0	-0.6
AR San Carlos De Bariloche	21	37	44	11	57	307	-38S	235	217	+1.9	+2.9
AR San Fernando	22	11	2	-5	44	278	-64S	261	243	+1.3	+1.4
AR San Justo	22	10	37	-5	44	279	-63S	260	242	+1.3	+1.5
AR San Luis	22	0	34	3	53	285	-71S	267	250	+1.8	+1.0
AR San Martin Des Andes	21	40	38	10	57	304	-44S	240	223	+1.9	+2.5
AR San Rafael	21	55	27	6	55	290	-66S	263	245	+1.8	+1.2
AR Santa Fe	22	11	6	-4	47	277	-75S	271	254	+1.5	+0.9
AR Santa Rosa	21	59	28	2	51	287	-58S	254	237	+1.6	+1.7
AR Santa Teresita	22	9	53	-6	43	279	-55S	252	234	+1.2	+1.9
AR Santiago Del Estero	22	7	7	0	51	275	-90S	287	269	+1.8	+0.1
AR Tandil	22	5	29	-4	45	283	-54S	250	233	+1.3	+2.0
AR Tartagal	22	5	43	0	51	269	-71N	306	288	+2.0	-1.1
AR Tinogasta	22	0	56	5	55	279	-90S	286	269	+2.0	+0.0
AR Trelew	21	40	38	5	52	301	-28S	224	206	+1.5	+4.1
AR Tres Arroyos	22	1	42	-2	47	285	-50S	246	229	+1.3	+2.2
AR Tucuman	22	5	36	1	52	275	-87N	290	273	+1.9	-0.2
AR Viedma	21	51	52	2	50	293	-40S	236	219	+1.4	+2.9
AR Villa Dolores	22	3	54	2	52	282	-75S	272	254	+1.7	+0.8
AR Villa Gesell	22	8	11	-6	43	280	-53S	250	232	+1.2	+2.0
AR Villa Reynolds	22	1	44	2	52	284	-69S	265	248	+1.7	+1.1
BO Apolo	21	30	22	13	63	259	-26N	351	333	+2.3	-7.9
BO Ascension De Guarayos	21	49	42	4	53	261	-35N	342	324	+2.5	-5.3
BO Bermejo	22	4	49	1	52	269	-71N	306	288	+2.0	-1.1
BO Camiri	22	2	26	1	51	266	-60N	317	300	+2.1	-2.0
BO Chapacura	21	50	32	5	55	263	-43N	334	316	+2.4	-3.8
BO Charana	21	42	36	11	61	265	-47N	330	313	+2.4	-3.5
BO Cochabamba	21	49	41	7	57	264	-46N	331	314	+2.4	-3.5
BO Concepcion	21	54	25	1	51	261	-39N	338	320	+2.4	-4.5
BO La Paz	21	41	18	11	60	263	-40N	337	319	+2.4	-4.4
BO Oruro	21	49	25	7	58	265	-49N	328	311	+2.4	-3.2
BO Potosi	21	56	47	4	55	266	-57N	320	302	+2.3	-2.3
BO Puerto Suarez	22	12	9	-7	44	263	-58N	319	302	+2.0	-2.0
BO Reyes	21	29	2	13	62	259	-21N	356	338	+9.9	+9.9
BO Robore	22	6	46	-4	47	263	-53N	324	306	+2.1	-2.5
BO Rurrenabaque	21	29	55	13	62	259	-23N	354	337	+2.2	-9.7
BO San Borja	21	35	10	11	60	260	-27N	350	332	+2.4	-7.7
BO San Ignacio De Moxos	21	38	35	9	58	260	-28N	349	331	+2.5	-7.3
BO San Ignacio De Velasco	21	58	3	0	50	261	-41N	336	318	+2.4	-4.1
BO San Mathias	22	3	50	-4	46	261	-43N	334	316	+2.3	-3.8
BO Santa Cruz	21	57	27	2	52	263	-48N	329	311	+2.3	-3.2
BO Sucre	21	56	27	4	54	265	-54N	323	305	+2.3	-2.5
BO Tarija	22	2	36	2	52	268	-66N	311	293	+2.1	-1.5
BO Trinidad	21	39	16	8	57	260	-27N	350	333	+2.5	-7.9

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
BR Alpinopolis	22	32	17	28	260	-75N	302	284	+1.2	-0.6	
BR Aracaju	22	27	14	19	255	-37N	340	322	+1.9	-4.3	
BR Aracatuba	22	27	20	33	262	-73N	304	286	+1.4	-0.7	
BR Araracuara	22	30	40	31	261	-77N	299	282	+1.2	-0.4	
BR Assis	22	28	3	33	263	-79N	298	280	+1.3	-0.4	
BR Bage	22	20	28	-11	39	272	-73S	269	252	+1.2	+1.0
BR Barbacena	22	35	21	25	260	-79N	297	280	+1.0	-0.3	
BR Barra Do Garcas	22	15	17	37	259	-46N	331	314	+2.0	-3.2	
BR Bauru	22	29	44	32	262	-79N	298	280	+1.2	-0.4	
BR Belo Horizonte	22	34	30	26	259	-74N	303	285	+1.1	-0.6	
BR Bom Jesus Da Lapa	22	24	16	26	256	-42N	335	318	+1.9	-3.6	
BR Brasilia	22	23	47	31	258	-51N	326	308	+1.7	-2.4	
BR Campinas	22	32	8	30	262	-83N	294	276	+1.1	-0.1	
BR Campo Grande	22	20	13	-12	39	263	-67N	310	292	+1.7	-1.2
BR Campos	22	37	36	23	259	-83N	293	276	+0.8	-0.1	
BR Caravelas	22	37	39	20	257	-70N	307	289	+0.9	-0.8	
BR Cascavel	22	24	26	37	266	-85N	291	274	+1.4	+0.0	
BR Castilho	22	25	24	35	262	-70N	306	289	+1.5	-0.9	
BR Caxias Do Sul	22	25	44	35	268	-78S	275	257	+1.1	+0.8	
BR Chapeco	22	25	10	36	267	-87S	283	266	+1.2	+0.4	
BR Corumba	22	12	31	-7	43	263	-58N	319	301	+2.0	-1.9
BR Criciuma	22	27	54	33	266	-79S	276	258	+1.0	+0.8	
BR Cuiaba	22	6	23	-7	43	260	-40N	337	319	+2.3	-4.1
BR Curitiba	22	29	41	32	264	-90N	287	269	+1.1	+0.2	
BR Florianopolis	22	29	32	32	265	-82S	279	261	+1.0	+0.6	
BR Foz Do Iguacu	22	23	3	39	267	-87N	290	272	+1.4	+0.0	
BR Franca	22	31	0	30	261	-73N	303	286	+1.2	-0.7	
BR Fronteira	22	28	22	32	261	-70N	306	289	+1.4	-0.8	
BR Goiania	22	23	13	33	259	-54N	323	305	+1.7	-2.2	
BR Guaratingueta	22	34	8	27	261	-84N	293	275	+1.0	-0.1	
BR Ilheus	22	34	31	20	256	-58N	319	302	+1.2	-1.7	
BR Ipatinga	22	35	47	24	258	-74N	303	285	+1.0	-0.6	
BR Itumbiara	22	26	21	32	260	-63N	314	297	+1.5	-1.4	
BR Joinville	22	29	54	32	264	-87S	284	266	+1.1	+0.4	
BR Juiz De Fora	22	35	50	25	260	-82N	295	277	+0.9	-0.2	
BR Lagoa Santa	22	34	28	25	259	-73N	304	286	+1.1	-0.7	
BR Lajes	22	27	41	34	266	-83S	279	262	+1.1	+0.6	
BR Lins	22	28	35	33	262	-76N	301	284	+1.3	-0.5	
BR Londrina	22	27	25	34	264	-81N	296	278	+1.3	-0.3	
BR MacEio	22	21	21	19	254	-25N	352	335	+9.9	+9.9	
BR Marilia	22	28	34	33	262	-77N	299	282	+1.3	-0.4	
BR Maringa	22	26	24	35	264	-81N	296	279	+1.3	-0.3	
BR Montes Claros	22	31	32	25	258	-60N	316	299	+1.3	-1.5	
BR Navegantes	22	29	47	32	265	-85S	281	264	+1.0	+0.5	
BR Passo Fundo	22	25	7	36	268	-82S	279	262	+1.2	+0.6	
BR Pelotas	22	22	3	37	271	-70S	267	249	+1.1	+1.1	
BR Piracununga	22	31	41	30	261	-79N	298	280	+1.2	-0.3	
BR Pocos De Caldas	22	32	33	29	261	-79N	298	280	+1.1	-0.3	
BR Ponta Grossa	22	28	41	33	264	-88N	288	271	+1.2	+0.1	
BR Ponta Pora	22	20	23	-11	40	265	-75N	302	285	+1.6	-0.7
BR Porto Alegre	22	25	3	35	268	-76S	272	255	+1.1	+0.9	
BR President Prudente	22	26	33	35	263	-76N	301	283	+1.4	-0.5	
BR Ribeirao Preto	22	30	47	30	261	-75N	302	284	+1.2	-0.6	
BR Rio De Janeiro	22	35	55	25	260	-85N	291	274	+0.9	+0.0	
BR Rio Grande	22	21	48	37	271	-69S	266	248	+1.0	+1.2	
BR Salvador	22	31	32	19	255	-48N	329	311	+1.4	-2.6	
BR Santarem	22	22	26	38	270	-78S	275	257	+1.2	+0.8	
BR Santo Angelo	22	22	48	-12	38	269	-83S	280	263	+1.3	+0.5
BR Santos	22	32	59	29	262	-87N	290	272	+1.0	+0.1	
BR Sao Jose Do Rio Preto	22	28	30	32	261	-72N	304	287	+1.3	-0.7	
BR Sao Jose Dos Campos	22	33	29	28	261	-85N	292	274	+1.0	+0.0	
BR Sao Paulo	22	32	39	29	262	-85N	291	274	+1.0	+0.0	
BR Sao Pedro Da Aldeia	22	36	55	24	260	-87N	290	273	+0.8	+0.1	
BR Telemaco Borba	22	28	8	34	264	-85N	292	274	+1.2	+0.0	
BR Teodoro Sampaio	22	24	31	37	264	-76N	300	283	+1.5	-0.5	
BR Uberaba	22	29	35	30	260	-70N	307	290	+1.3	-0.9	
BR Uruguaiiana	22	18	6	-8	42	272	-80S	277	259	+1.4	+0.7
BR Varginha	22	33	39	27	260	-79N	298	280	+1.1	-0.3	
BR Vitoria	22	38	10	21	258	-79N	298	280	+0.8	-0.3	
BR Vitoria Da Conquista	22	32	22	22	256	-55N	322	304	+1.3	-1.9	
CL Alto Palena	21	27	35	12	57	314	-24S	220	203	+2.0	+4.7
CL Ancud	21	30	12	14	59	314	-34S	230	213	+2.0	+3.3
CL Antofagasta	21	52	24	9	60	275	-73N	304	286	+2.3	-1.1
CL Arica	21	42	45	12	62	266	-51N	326	309	+2.4	-3.0
CL Calama	21	54	46	8	58	272	-69N	308	290	+2.2	-1.4
CL Castro	21	28	14	14	59	316	-30S	227	209	+2.1	+3.7
CL Chaiten	21	28	39	13	58	314	-28S	225	207	+2.0	+4.0
CL Chillan	21	45	46	11	59	299	-58S	255	237	+2.0	+1.5
CL Concepcion	21	43	25	12	60	301	-57S	254	236	+2.0	+1.6
CL Copiapo	21	54	57	8	59	281	-88N	289	272	+2.1	-0.2
CL Curico	21	49	37	9	58	295	-65S	261	244	+2.0	+1.2
CL Easter Island	20	15	24	58	59	79	-54S	251	233	+2.7	+0.3
CL Iquique	21	48	31	10	61	270	-61N	316	298	+2.3	-2.0
CL La Serena	21	53	24	9	59	286	-83S	280	262	+2.1	+0.3
CL Los Angeles	21	43	40	11	59	301	-55S	252	234	+2.0	+1.7
CL Osorno	21	35	33	13	59	309	-41S	237	220	+2.0	+2.7
CL Puerto Montt	21	33	8	13	59	311	-37S	233	215	+2.0	+3.0
CL Rancagua	21	51	25	9	58	292	-68S	264	246	+2.0	+1.1
CL Santiago	21	52	35	8	58	291	-70S	267	249	+2.0	+0.9
CL Santo Domingo	21	50	16	10	59	293	-69S	266	248	+2.0	+1.0
CL Temuco	21	40	42	12	59	305	-49S	246	228	+2.0	+2.1
CL Valdivia	21	37	54	12	59	307	-45S	242	224	+2.0	+2.3
CL Vallenar	21	54	24	9	59	283	-88S	284	267	+2.1	+0.0
PY Asuncion	22	18	33	-8	42	268	-84N	293	275	+1.6	-0.2

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
PY Ayolas	22	19	24	-9	42	270	-88S	285	267	+1.4	+0.3
PY Conception	22	18	4	-8	42	267	-77N	300	282	+1.7	-0.6
PY Filadelfia	22	12	40	-5	46	267	-71N	306	288	+1.9	-1.0
PY Itaipu	22	22	52	-12	39	267	-86N	291	273	+1.4	+0.0
PY Mariscal Estigarribia	22	11	17	-4	47	267	-70N	307	289	+1.9	-1.1
PY Pilar	22	17	18	-7	43	270	-89N	287	270	+1.5	+0.1
PE Arequipa	21	32	26	16	66	262	-40N	337	319	+2.3	-4.5
PE Ayacucho	21	4	16	26	74	250	-14N	3	345	+9.9	+9.9
PE Cuzco	21	11	25	22	70	254	-15N	2	344	+9.9	+9.9
PE Ilo	21	38	15	14	64	265	-47N	329	312	+2.4	-3.4
PE Juliaca	21	31	23	15	64	261	-33N	344	326	+2.3	-5.8
PE Las Palmas	20	48	28	32	80	235	-6N	11	353	+9.9	+9.9
PE Moquegua	21	37	26	14	64	264	-45N	332	315	+2.4	-3.8
PE Nazca	21	17	9	23	72	257	-32N	345	327	+2.1	-5.8
PE Pisco	21	7	30	27	75	251	-25N	352	334	+1.6	-7.6
PE San Juan	21	19	32	22	72	259	-36N	341	323	+2.2	-5.1
PE Tacna	21	41	59	12	62	266	-49N	328	310	+2.4	-3.2
UY Artigas	22	18	19	-9	41	272	-77S	274	256	+1.3	+0.8
UY Colonia	22	12	5	-6	43	278	-64S	260	243	+1.3	+1.5
UY Durazno	22	15	15	-8	42	275	-67S	264	246	+1.2	+1.3
UY Maldonado	22	14	42	-9	41	276	-61S	258	240	+1.1	+1.6
UY Melo	22	19	15	-11	39	273	-69S	266	248	+1.1	+1.2
UY Montevideo	22	13	40	-8	42	277	-61S	258	240	+1.2	+1.6
UY Montevideo	22	13	28	-8	42	277	-62S	258	241	+1.2	+1.6
UY Paysandu	22	14	25	-7	43	276	-71S	268	250	+1.4	+1.1
UY Punta Del Este	22	14	49	-9	40	276	-61S	257	240	+1.1	+1.6
UY Rivera	22	19	11	-10	40	272	-75S	272	254	+1.3	+0.9
UY Salto	22	15	26	-7	43	274	-74S	271	253	+1.4	+0.9
UY Tacuarembó	22	17	52	-9	41	273	-72S	269	251	+1.3	+1.0

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.

U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.

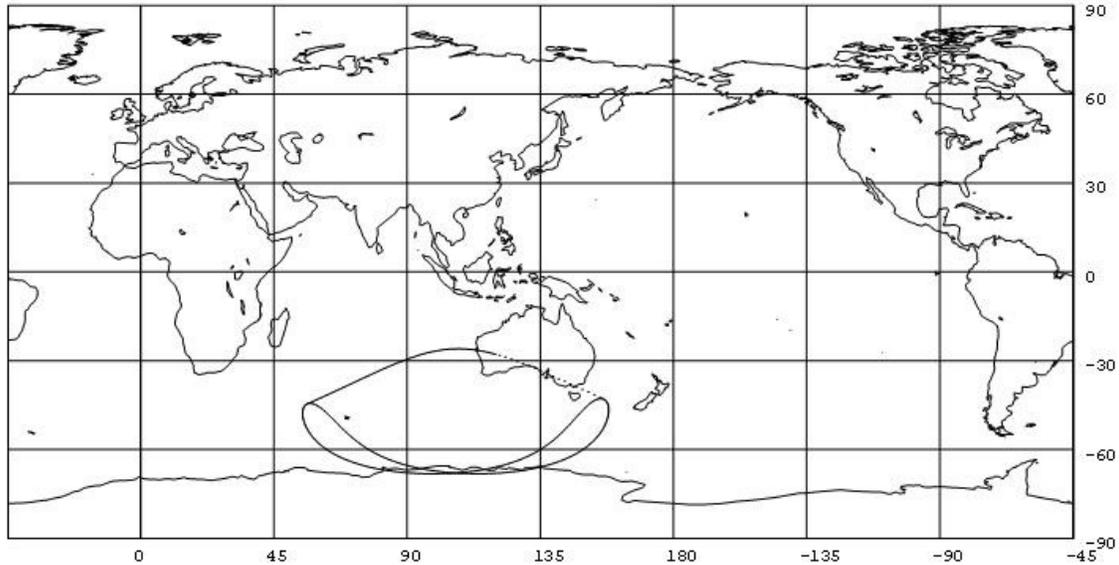
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

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## Occultation of Jupiter, Magnitude -2.4, on 2012 Oct 5



Occult 4.090

UT of conjunction = 20h 57.0m

Luna: % illuminazione 72-, elongazione solare 117°

Moon: % illumination 72-, solar elongation 117°

### Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
Albany	20	50	41	-10	32	349	-53N	48	55	+2.7	+1.9
Ballarat	21	59	36	24	12	310	-20N	14	22	+9.9	+9.9
Bunbury	20	47	49		34	352	-49N	44	51	+2.8	+2.1
Busselton	20	46	22		34	353	-50N	45	52	+2.8	+2.0
Geelong	21	56	3	24	12	311	-25N	20	27	+4.3	+8.3
Geraldton	20	58	40		39	349	-32N	26	34	+3.3	+4.6
Hobart	21	41	50	22	9	312	-45N	39	47	+2.0	+3.3
Kalgoorlie	21	13	30	-4	34	338	-35N	30	37	+3.5	+4.3
Launceston	21	46	44	23	10	311	-39N	33	41	+2.3	+4.0
Mt Gambier	21	45	42	19	16	315	-35N	29	37	+3.0	+4.8
Perth	20	51	42		36	350	-45N	39	47	+2.9	+2.6
Portland	21	45	48	20	15	315	-35N	30	37	+2.9	+4.7

### Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
Albany	21	58	4	3	28	331	37N	318	325	+1.6	-1.0
Ballarat	22	8	58	26	11	309	-6N	0	8	+9.9	+9.9
Bunbury	21	52	25	0	31	335	34N	321	328	+1.7	-1.4
Busselton	21	52	20	0	30	335	35N	319	327	+1.8	-1.3
Geelong	22	12	18	27	10	308	0N	355	2	-2.3	-6.2
Geraldton	21	39	53	-4	36	338	17N	338	345	+1.6	-4.0
Hobart	22	21	35	29	4	304	21N	334	341	-0.3	-1.0
Kalgoorlie	21	54	50	5	30	328	16N	339	346	+0.8	-3.3
Launceston	22	19	40	29	5	305	15N	340	347	-0.6	-1.8
Mt Gambier	22	15	26	25	12	310	10N	345	352	-0.7	-2.8
Perth	21	50	28	0	32	334	29N	326	333	+1.7	-1.9
Portland	22	16	16	26	11	309	11N	344	351	-0.7	-2.6

### Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AU Avalon	21	57	34	24	12	310	-23N	18	25	+4.9	+9.6
AU Hobart	21	42	25	22	9	312	-44N	39	46	+2.0	+3.4
AU Kalgoorlie	21	13	9	-4	34	338	-36N	31	38	+3.5	+4.2
AU Launceston	21	46	29	23	10	311	-39N	34	41	+2.3	+4.0
AU Perth	20	52	5		36	350	-44N	39	46	+2.9	+2.6
AU Point Cook	22	0	24	25	11	310	-19N	14	21	+9.9	+9.9

### Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AU Avalon	22	11	12	27	10	308	-2N	357	4	-2.9	-7.6
AU Hobart	22	21	29	29	4	304	20N	334	342	-0.3	-1.1

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AU Kalgoorlie	21	55	9	5	30	328	17N	338	345	+0.8	-3.2
AU Launceston	22	19	50	29	5	305	15N	340	347	-0.6	-1.7
AU Perth	21	50	41	0	32	334	29N	326	333	+1.7	-1.9
AU Point Cook	22	9	12	27	10	308	-6N	1	8	+9.9	+9.9

Sun alt : altezza del Sole sull'orizzonte, in gradi  
Moon alt : altezza della Luna sull'orizzonte, in gradi  
Moon az : azimut della Luna, in gradi  
CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso  
PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °  
Moon alt : height of the Moon above the horizon, in °  
Moon az : azimuth of the Moon, in °  
CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb  
PA : angle of position , angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
Si utilizza la seguente formula:

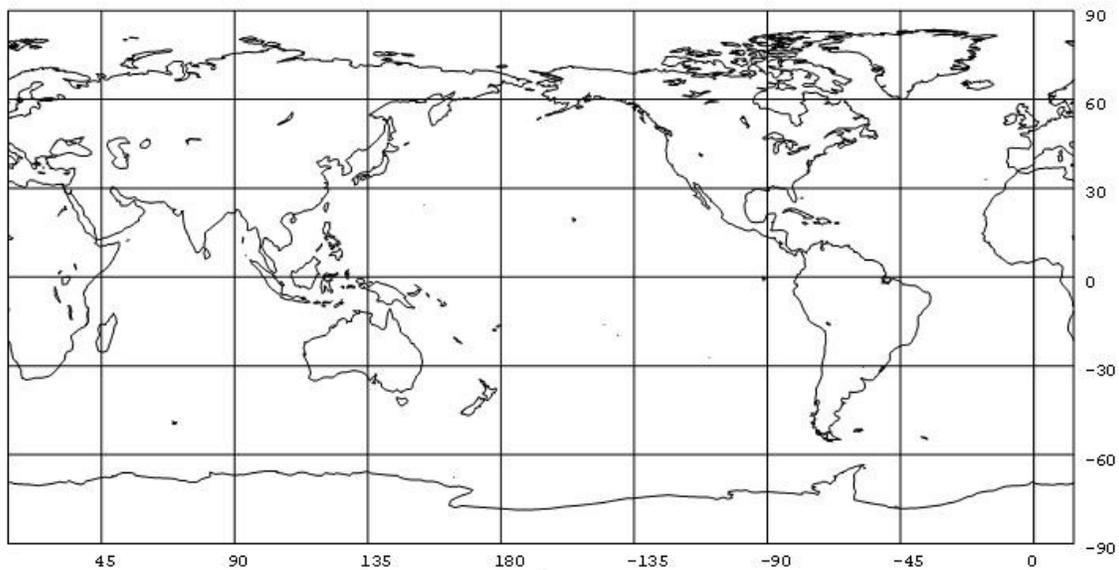
$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.  
U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.  
B same as for A, but for changes in latitude (+ve to the north).

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### Occultation of Mercury, Magnitude -0.2, on 2012 Oct 17

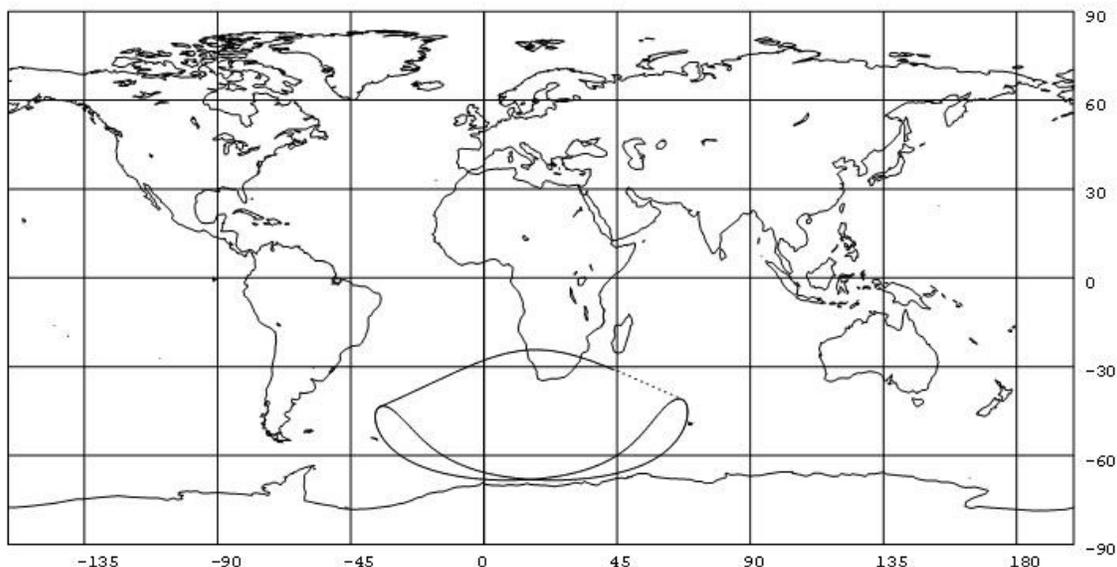


Occult 4.090

UT of conjunction = 1h 43.0m

Non visibile - Not visible

## Occultation of Jupiter, Magnitude -2.6, on 2012 Nov 2



Occult 4.090

UT of conjunction = 1h 6.1m

Luna: % illuminazione 15-, elongazione solare 46°

Moon: % illumination 15-, solar elongation 46°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Alt	Moon Alt	CA Az	PA o	WA o	a m/o	b m/o
	h	m	s							
LS Maseru	1	9	37	37	345	-41N	36	44	+3.1	+3.2
ZA Aggeneys	0	45	9	39	2	-41N	36	44	+2.6	+2.6
ZA Alexander Bay	0	41	21	40	6	-37N	32	40	+2.4	+2.9
ZA Bethlehem	1	16	32	38	342	-35N	30	38	+3.4	+4.2
ZA Bisho	1	0	22	35	348	-53N	48	56	+2.8	+2.0
ZA Bloemfontein	1	6	58	38	347	-40N	35	43	+3.1	+3.2
ZA Bothaville	1	14	40	39	344	-32N	27	35	+3.4	+4.7
ZA Brakpan	1	27	57	39	338	-22N	17	25	+4.5	+8.9
ZA Calvinia	0	42	40	37	2	-49N	44	52	+2.6	+1.9
ZA Cape Town	0	36	12	34	5	-55N	50	58	+2.4	+1.3
ZA Carletonville	1	22	55	40	341	-24N	20	27	+4.0	+7.2
ZA De Aar	0	55	43	37	353	-46N	41	49	+2.8	+2.4
ZA Dundee	1	23	22	37	338	-33N	28	36	+3.6	+4.8
ZA Durban	1	18	46	35	339	-40N	35	43	+3.2	+3.4
ZA East London	1	1	38	34	348	-53N	48	56	+2.8	+2.0
ZA Ermelo	1	33	23	38	335	-20N	16	23	+9.9	+9.9
ZA Ficksburg	1	12	55	38	343	-38N	33	41	+3.2	+3.6
ZA George	0	45	30	34	358	-56N	51	59	+2.6	+1.4
ZA Grahamstown	0	57	31	34	350	-54N	49	57	+2.7	+1.8
ZA Greytown	1	20	35	36	338	-37N	32	40	+3.3	+3.9
ZA Harmony	1	12	23	39	345	-35N	30	38	+3.3	+4.0
ZA Harrismith	1	19	13	38	340	-34N	29	37	+3.4	+4.4
ZA Heibron	1	19	50	39	341	-30N	25	33	+3.6	+5.3
ZA Heidelberg	1	26	10	39	339	-24N	19	27	+4.2	+7.6
ZA Hendrik Verwoerddam	1	0	30	37	350	-46N	41	49	+2.9	+2.5
ZA Johannesburg	1	28	36	39	338	-21N	16	24	+4.6	+9.5
ZA Kimberley	1	3	14	39	350	-39N	35	42	+3.0	+3.2
ZA Kleinsee	0	39	52	38	6	-42N	37	45	+2.5	+2.4
ZA Klerksdorp	1	17	30	40	343	-29N	24	32	+3.6	+5.5
ZA Komati Power Station	1	35	20	38	335	-17N	12	20	+9.9	+9.9
ZA Kriel	1	31	59	38	336	-20N	15	23	+9.9	+9.9
ZA Kroonstad	1	15	39	39	343	-33N	28	36	+3.4	+4.6
ZA Krugersdorp	1	26	45	39	339	-21N	16	24	+4.4	+9.1
ZA Kuruman	1	3	50	40	351	-34N	29	37	+3.1	+4.0
ZA Ladybrand	1	10	13	38	345	-40N	35	43	+3.1	+3.3
ZA Ladysmith	1	19	59	37	339	-35N	30	38	+3.4	+4.2
ZA Langebaanweg	0	36	26	35	6	-52N	47	55	+2.4	+1.5
ZA Lichtenburg	1	19	45	40	343	-24N	20	27	+3.8	+7.0
ZA Mafikeng	1	20	46	41	343	-21N	17	24	+4.0	+8.5
ZA Majuba Power Station	1	27	42	38	337	-26N	21	29	+4.0	+6.7
ZA Margate	1	14	7	35	341	-44N	39	47	+3.0	+2.9
ZA Mkuze	1	33	39	36	333	-26N	21	29	+4.3	+7.1
ZA Newcastle	1	24	32	37	338	-31N	26	34	+3.7	+5.3
ZA Oudtshoorn	0	45	37	35	358	-55N	50	58	+2.6	+1.5
ZA Overberg	0	39	27	34	2	-57N	52	60	+2.5	+1.2
ZA Parys	1	20	9	39	341	-28N	23	31	+3.7	+5.8
ZA Pietermaritzburg	1	18	4	36	339	-40N	35	43	+3.2	+3.5
ZA Plettenberg Bay	0	47	48	34	356	-56N	51	59	+2.6	+1.5
ZA Pomfret	1	12	23	42	348	-24N	19	27	+3.5	+6.7
ZA Port Elizabeth	0	53	59	34	352	-56N	51	59	+2.6	+1.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
ZA Port Saint Johns	1	9	34	35	343	-48N	43	51	+2.9	+2.5	
ZA Potchefstroom	1	19	52	40	342	-27N	22	30	+3.7	+6.1	
ZA Pretoria	1	35	3	39	336	-13N	8	16	+9.9	+9.9	
ZA Queenstown	1	1	15	36	349	-50N	45	53	+2.8	+2.2	
ZA Richard'S Bay	1	27	33	35	335	-33N	28	36	+3.6	+4.8	
ZA Robertson	0	39	34	35	3	-55N	50	58	+2.5	+1.4	
ZA Rustenburg	1	29	22	40	339	-17N	12	20	+9.9	+9.9	
ZA Sace	1	36	0	38	335	-15N	10	18	+9.9	+9.9	
ZA Saldanha	0	35	59	35	6	-52N	47	55	+2.4	+1.5	
ZA Secunda	1	29	23	38	337	-23N	18	26	+4.4	+8.4	
ZA Sishen	1	1	54	40	352	-35N	30	38	+3.0	+3.8	
ZA Springbok	0	41	54	39	4	-42N	37	45	+2.5	+2.4	
ZA Springs	1	28	17	39	338	-22N	17	25	+4.5	+9.0	
ZA Swartkop	1	31	53	39	337	-17N	12	20	+9.9	+9.9	
ZA Tommy'S Field	0	59	40	40	353	-38N	33	41	+3.0	+3.4	
ZA Tutuka	1	28	5	38	337	-25N	20	28	+4.2	+7.4	
ZA Ulundi	1	27	5	36	336	-32N	27	35	+3.7	+5.1	
ZA Umtata	1	7	13	35	345	-48N	43	51	+2.9	+2.5	
ZA Upington	0	54	16	40	357	-38N	33	41	+2.8	+3.1	
ZA Vanderbijlpark	1	22	22	39	340	-26N	21	29	+3.8	+6.4	
ZA Vereeniging	1	23	57	39	340	-25N	20	28	+4.0	+7.0	
ZA Vredendal	0	39	29	37	4	-49N	44	52	+2.5	+1.8	
ZA Vryburg	1	10	7	40	348	-31N	26	34	+3.3	+4.8	
ZA Vryheid	1	27	30	37	336	-29N	25	32	+3.8	+5.7	
ZA Waterkloof	1	31	54	39	337	-17N	12	20	+9.9	+9.9	
ZA Welkom	1	12	4	39	345	-35N	30	38	+3.3	+4.1	
ZA Wesselsbrunn	1	11	40	39	345	-34N	30	37	+3.3	+4.1	
ZA Ysterplaat	0	36	2	34	5	-55N	50	58	+2.4	+1.3	
ZA Zeerust	1	23	58	41	342	-19N	14	22	+9.9	+9.9	
SZ Manzini	1	41	18	36	331	-15N	10	18	+9.9	+9.9	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
LS Maseru	2	3	20	33	331	26N	329	337	+1.5	-2.3	
ZA Aggeneys	1	45	49	38	344	33N	322	330	+2.4	-2.2	
ZA Alexander Bay	1	38	24	39	349	31N	324	332	+2.6	-2.6	
ZA Bethlehem	2	1	3	34	330	20N	336	343	+1.2	-3.3	
ZA Bisho	2	8	17	30	331	39N	317	324	+1.6	-1.1	
ZA Bloemfontein	2	0	30	34	332	26N	329	337	+1.6	-2.4	
ZA Bothaville	1	55	38	36	333	17N	338	346	+1.3	-4.0	
ZA Brakpan	1	51	9	37	332	6N	349	357	+0.2	-8.1	
ZA Calvinia	1	51	55	35	342	40N	315	323	+2.2	-1.4	
ZA Cape Town	1	52	15	33	344	47N	308	315	+2.3	-0.9	
ZA Carletonville	1	51	40	37	333	9N	346	354	+0.8	-6.4	
ZA De Aar	1	59	18	34	336	34N	321	329	+1.9	-1.7	
ZA Dundee	2	2	44	33	328	16N	339	347	+0.9	-3.8	
ZA Durban	2	8	40	-11	30	326	23N	332	340	+1.1	-2.4
ZA East London	2	9	15	29	330	38N	317	325	+1.6	-1.1	
ZA Ermelo	1	53	15	36	330	3N	352	360	-0.4	-9.3	
ZA Ficksburg	2	2	14	34	330	23N	332	340	+1.4	-2.8	
ZA George	2	0	17	31	338	46N	310	317	+2.0	-0.8	
ZA Grahamstown	2	7	19	30	332	40N	315	322	+1.7	-1.0	
ZA Greytown	2	6	12	32	327	20N	335	343	+1.0	-2.9	
ZA Harmony	1	58	30	35	332	21N	334	342	+1.4	-3.2	
ZA Harrismith	2	1	57	34	329	18N	337	345	+1.1	-3.5	
ZA Heibron	1	56	56	35	331	15N	341	348	+1.0	-4.4	
ZA Heidelberg	1	53	10	36	331	8N	347	355	+0.5	-6.7	
ZA Hendrik Verwoerddam	2	2	3	33	333	33N	323	330	+1.7	-1.7	
ZA Johannesburg	1	50	24	37	332	5N	350	358	+0.1	-8.7	
ZA Kimberley	1	57	12	35	335	27N	329	336	+1.7	-2.5	
ZA Kleinsee	1	42	28	38	347	35N	320	328	+2.5	-2.1	
ZA Klerksdorp	1	53	40	37	333	14N	341	349	+1.2	-4.8	
ZA Komati Power Station	1	49	14	37	331	0N	355	3	+9.9	+9.9	
ZA Kriel	1	51	13	36	331	3N	352	360	-0.4	-9.8	
ZA Kroonstad	1	57	43	35	332	18N	337	345	+1.3	-3.7	
ZA Krugersdorp	1	49	45	37	333	6N	349	357	+0.3	-8.2	
ZA Kuruman	1	50	54	38	338	22N	333	341	+1.8	-3.4	
ZA Ladybrand	2	2	31	33	331	25N	330	338	+1.5	-2.5	
ZA Ladysmith	2	3	40	33	328	19N	336	344	+1.1	-3.3	
ZA Langebaanweg	1	50	10	34	345	45N	310	318	+2.3	-1.1	
ZA Lichtenburg	1	49	24	38	335	10N	345	353	+1.0	-6.3	
ZA Mafikeng	1	45	51	39	336	8N	348	355	+0.8	-7.7	
ZA Majuba Power Station	1	57	30	35	329	9N	346	354	+0.5	-5.8	
ZA Margate	2	9	50	-11	30	327	28N	327	335	+1.3	-1.9
ZA Mkuze	2	0	52	33	326	8N	348	355	+0.0	-6.1	
ZA Newcastle	2	0	55	34	328	14N	341	349	+0.8	-4.4	
ZA Oudtshoorn	1	59	35	32	338	45N	311	318	+2.0	-0.9	
ZA Overberg	1	56	20	32	341	48N	307	315	+2.1	-0.8	
ZA Parys	1	54	36	36	332	13N	342	350	+1.0	-5.0	
ZA Pietermaritzburg	2	7	23	31	327	23N	332	340	+1.1	-2.5	
ZA Plettenberg Bay	2	2	14	31	336	45N	310	318	+1.9	-0.8	
ZA Pomfret	1	43	55	40	339	12N	343	351	+1.5	-6.0	
ZA Port Elizabeth	2	6	21	29	333	43N	312	320	+1.8	-0.8	
ZA Port Saint Johns	2	9	54	-12	30	328	32N	323	331	+1.4	-1.5
ZA Potchefstroom	1	53	2	37	333	12N	343	351	+1.0	-5.3	
ZA Pretoria	1	44	9	38	334	-3N	358	6	+9.9	+9.9	
ZA Queenstown	2	6	26	31	331	36N	319	327	+1.7	-1.3	
ZA Richard'S Bay	2	6	2	-11	31	325	15N	340	348	+0.7	-3.7
ZA Robertson	1	54	59	32	342	46N	309	316	+2.2	-0.9	
ZA Rustenburg	1	45	17	38	334	2N	354	1	+9.9	+9.9	
ZA Sace	1	47	29	37	332	-1N	357	4	+9.9	+9.9	
ZA Saldanha	1	49	44	34	345	45N	310	318	+2.3	-1.1	

Luogo - Location	U.T.			Sun Moon		CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o
ZA Secunda	1	53	28	36	330	6N	349	357	+0.2	-7.5
ZA Sishen	1	50	43	38	338	23N	332	340	+1.9	-3.2
ZA Springbok	1	44	38	37	346	35N	320	328	+2.4	-2.0
ZA Springs	1	51	16	37	332	6N	350	357	+0.2	-8.1
ZA Swartkop	1	47	4	38	333	1N	354	2	+9.9	+9.9
ZA Tommy'S Field	1	52	33	37	338	26N	329	337	+1.9	-2.8
ZA Tutuka	1	55	22	35	330	8N	347	355	+0.4	-6.5
ZA Ulundi	2	4	6	32	326	14N	341	349	+0.7	-4.1
ZA Umtata	2	8	39	30	329	33N	322	330	+1.5	-1.5
ZA Upington	1	49	20	38	341	28N	327	335	+2.1	-2.6
ZA Vanderbijlpark	1	53	49	36	332	11N	344	352	+0.8	-5.6
ZA Vereeniging	1	53	20	36	332	10N	346	353	+0.7	-6.1
ZA Vredendal	1	49	20	35	344	41N	314	322	+2.3	-1.4
ZA Vryburg	1	51	23	38	336	18N	337	345	+1.6	-4.1
ZA Vryheid	2	1	28	33	327	12N	343	351	+0.6	-4.7
ZA Waterkloof	1	47	15	38	333	1N	354	2	+9.9	+9.9
ZA Welkom	1	57	59	35	332	21N	335	342	+1.4	-3.3
ZA Wesselsbrunn	1	57	1	36	333	20N	335	343	+1.5	-3.4
ZA Ysterplaat	1	51	57	33	344	47N	308	316	+2.3	-0.9
ZA Zeerust	1	44	52	39	336	5N	350	358	+0.4	-9.5
SZ Manzini	1	51	19	35	329	-3N	358	6	+9.9	+9.9

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina; un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi; a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.

U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.

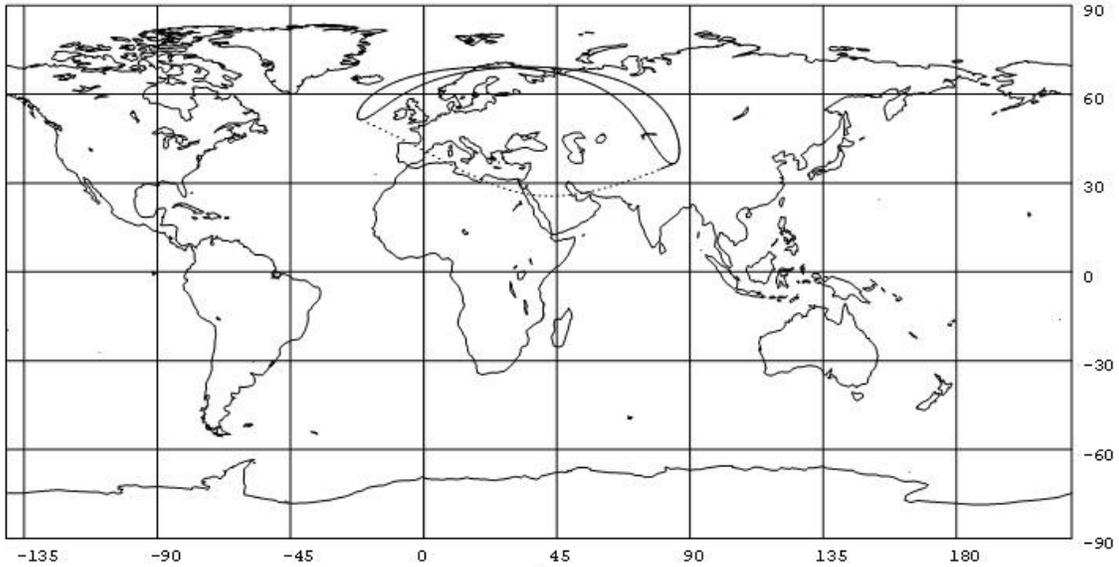
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude ('+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude ('+ve to the north).

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Occultation of Mercury, Magnitude 3.5, on 2012 Nov 14

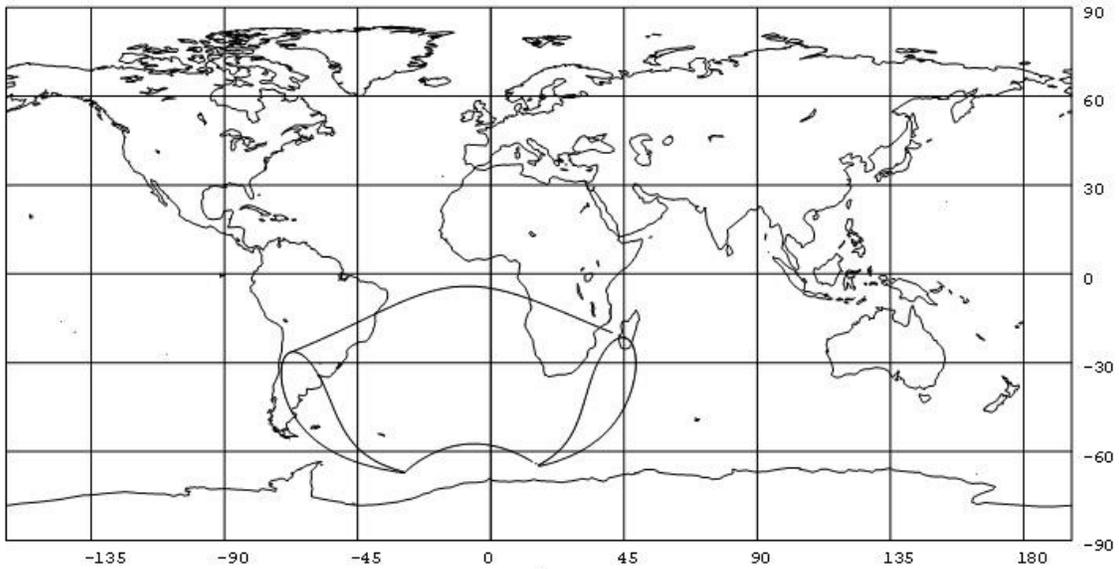


Occult 4.09.0

UT of conjunction = 10h 18.9m

Non visibile - Not visible

Occultation of Jupiter, Magnitude -2.7, on 2012 Nov 29



Occult 4.09.0

UT of conjunction = 0h 54.0m

Luna: % illuminazione 100-, elongazione solare 75°

Moon: % illumination 100-, solar elongation 75°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AO Benguela	1	33	23	42	315	-40N	44	54	+3.4	+3.3	
AO Huambo	1	40	31	39	312	-37N	42	51	+3.3	+3.6	
AO Kuito	1	46	12	37	309	-32N	37	46	+3.5	+4.3	

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
AO Lobito	1	34	36	42	314	-39N	43	52	+3.4	+3.4	
AO Luanda	1	53	2	41	309	-12N	17	26	+9.9	+9.9	
AO Luena	2	1	13	32	305	-18N	23	32	+4.8	+8.1	
AO Menongue	1	40	47	36	311	-43N	47	56	+3.0	+3.0	
AO Mocamedes	1	22	24	43	320	-53N	57	66	+3.1	+2.1	
AO N'Giva	1	29	8	38	316	-56N	60	69	+2.8	+2.0	
AO Porto Amboim	1	42	8	41	311	-28N	33	42	+3.9	+5.0	
AO Xangongo	1	27	41	39	317	-56N	60	69	+2.9	+2.0	
BW Francistown	1	49	6	23	306	-55N	59	68	+2.0	+2.1	
BW Gaberone	1	40	1	24	310	-69N	72	81	+1.9	+1.5	
BW Jwaneng	1	37	42	25	311	-71N	74	83	+1.9	+1.4	
BW Kasane	1	52	2	26	306	-44N	49	58	+2.5	+2.8	
BW Maun	1	42	52	28	309	-56N	60	69	+2.3	+2.0	
BW Orapa	1	44	24	26	308	-58N	62	71	+2.1	+1.9	
BW Selebi-Phikwe	1	47	57	23	307	-58N	61	70	+1.9	+2.0	
LS Maseru	1	36	22	20	311	-82N	84	94	+1.5	+1.1	
MG Morombe	2	18	38	0	4	295	-21N	26	35	+2.6	+5.9
MG Toliara	2	12	1	0	5	296	-32N	37	46	+1.7	+3.7
MZ Beira	2	8	9	-10	14	299	-33N	38	47	+2.2	+3.8
MZ Chimoi	2	7	14	-12	16	300	-33N	38	47	+2.3	+3.9
MZ Inhambane	1	57	25	-10	14	301	-52N	56	65	+1.6	+2.3
MZ Maputo	1	48	59	17	305	-64N	68	77	+1.5	+1.7	
MZ Vilankulu	2	1	52	-10	14	301	-44N	48	58	+1.8	+2.7
ZA Aggeneys	1	21	26	28	320	-89S	93	102	+1.9	+0.7	
ZA Alexander Bay	1	17	20	30	323	-89S	93	102	+2.1	+0.7	
ZA Arnot Power Station	1	44	40	20	307	-68N	72	81	+1.6	+1.6	
ZA Bethlehem	1	39	5	20	310	-77N	80	89	+1.6	+1.3	
ZA Bisho	1	32	26	19	313	-88S	94	103	+1.4	+0.9	
ZA Bloemfontein	1	34	49	22	312	-82N	85	94	+1.6	+1.1	
ZA Bothaville	1	37	25	22	311	-77N	80	89	+1.7	+1.3	
ZA Brakpan	1	41	47	21	309	-71N	74	84	+1.7	+1.5	
ZA Calvinia	1	21	41	26	320	-85S	97	107	+1.8	+0.7	
ZA Cape Town	1	18	13	25	323	-77S	104	113	+1.7	+0.5	
ZA Carletonville	1	39	56	22	310	-73N	76	85	+1.7	+1.4	
ZA De Aar	1	29	25	23	315	-89N	91	100	+1.6	+0.9	
ZA Dundee	1	42	1	18	308	-75N	78	87	+1.5	+1.4	
ZA Durban	1	40	39	17	308	-79N	82	91	+1.4	+1.3	
ZA Dwaalboom	1	41	19	23	309	-69N	72	81	+1.8	+1.5	
ZA East London	1	33	2	18	312	-89S	93	103	+1.4	+0.9	
ZA Ellisras	1	44	37	22	308	-64N	67	76	+1.8	+1.7	
ZA Ermelo	1	44	7	19	307	-70N	73	82	+1.6	+1.5	
ZA Ficksburg	1	37	41	20	310	-80N	82	92	+1.5	+1.2	
ZA George	1	24	23	22	318	-81S	101	110	+1.5	+0.7	
ZA Giyani	1	50	43	19	305	-58N	61	71	+1.8	+2.0	
ZA Grahamstown	1	31	2	19	314	-87S	95	105	+1.4	+0.9	
ZA Greytown	1	41	18	18	308	-77N	80	89	+1.4	+1.3	
ZA Harmony	1	36	56	22	311	-79N	81	91	+1.6	+1.2	
ZA Harrismith	1	40	18	19	309	-76N	79	88	+1.5	+1.3	
ZA Heibron	1	39	48	21	309	-75N	78	87	+1.6	+1.3	
ZA Heidelberg	1	41	31	21	309	-72N	75	84	+1.6	+1.4	
ZA Hendrik Verwoerddam	1	32	6	22	313	-87N	89	99	+1.6	+1.0	
ZA Hoedspruit	1	49	20	19	305	-61N	65	74	+1.7	+1.8	
ZA Johannesburg	1	41	50	21	309	-71N	74	83	+1.7	+1.5	
ZA Kimberley	1	32	35	23	313	-83N	86	95	+1.7	+1.1	
ZA Kleinsee	1	17	48	29	323	-87S	95	104	+2.0	+0.6	
ZA Klerksdorp	1	38	13	22	310	-75N	78	87	+1.7	+1.3	
ZA Komati Power Station	1	43	52	20	307	-69N	72	82	+1.6	+1.5	
ZA Komatipoort	1	48	50	18	305	-64N	67	76	+1.6	+1.8	
ZA Kriel	1	43	14	20	308	-70N	73	83	+1.6	+1.5	
ZA Kroonstad	1	38	11	21	310	-77N	80	89	+1.6	+1.3	
ZA Krugersdorp	1	41	2	22	309	-72N	75	84	+1.7	+1.4	
ZA Kuruman	1	31	42	25	314	-81N	83	93	+1.8	+1.1	
ZA Ladybrand	1	36	33	21	311	-81N	84	93	+1.6	+1.2	
ZA Ladysmith	1	40	47	19	308	-77N	79	89	+1.5	+1.3	
ZA Langebaanweg	1	18	0	26	323	-79S	102	111	+1.8	+0.5	
ZA Lichtenburg	1	38	13	23	311	-74N	77	86	+1.8	+1.3	
ZA Louis Trichardt	1	49	16	20	306	-59N	62	72	+1.8	+1.9	
ZA Mafikeng	1	37	45	24	311	-73N	76	85	+1.8	+1.4	
ZA Majuba Power Station	1	42	54	19	308	-72N	75	84	+1.6	+1.4	
ZA Malalane	1	48	13	18	305	-64N	68	77	+1.6	+1.7	
ZA Marble Hall	1	45	19	20	307	-66N	69	78	+1.7	+1.6	
ZA Margate	1	38	44	17	309	-82N	85	94	+1.4	+1.2	
ZA Messina	1	51	25	20	305	-55N	59	68	+1.9	+2.1	
ZA Middelburg	1	44	27	20	307	-68N	71	80	+1.6	+1.6	
ZA Mkuze	1	45	29	17	306	-71N	74	83	+1.4	+1.5	
ZA Nelspruit	1	47	8	19	306	-65N	69	78	+1.6	+1.7	
ZA Newcastle	1	42	13	19	308	-74N	77	86	+1.5	+1.4	
ZA Nylstroom	1	44	22	21	308	-66N	69	79	+1.7	+1.6	
ZA Oudtshoorn	1	24	23	23	318	-82S	100	109	+1.6	+0.7	
ZA Overberg	1	20	39	23	321	-77S	104	113	+1.6	+0.5	
ZA Parys	1	39	30	22	310	-74N	77	86	+1.7	+1.4	
ZA Phalaborwa	1	50	18	19	305	-59N	63	72	+1.7	+1.9	
ZA Pietermaritzburg	1	40	20	18	308	-79N	82	91	+1.4	+1.3	
ZA Pietersburg	1	47	36	21	306	-62N	65	74	+1.8	+1.8	
ZA Pilanesberg	1	41	9	22	309	-70N	73	82	+1.8	+1.5	
ZA Plettenberg Bay	1	25	47	21	317	-81S	100	109	+1.5	+0.7	
ZA Pomfret	1	33	51	26	313	-76N	79	88	+1.9	+1.2	
ZA Port Elizabeth	1	29	11	20	315	-84S	98	107	+1.4	+0.8	
ZA Port Saint Johns	1	36	49	18	310	-86N	88	97	+1.4	+1.1	
ZA Potchefstroom	1	39	5	22	310	-74N	77	86	+1.7	+1.3	
ZA Potgietersrus	1	46	5	21	307	-64N	67	76	+1.8	+1.7	
ZA Pretoria	1	42	29	21	308	-69N	73	82	+1.7	+1.5	
ZA Pullenshope	1	44	18	20	307	-69N	72	81	+1.6	+1.6	
ZA Queenstown	1	32	47	20	313	-89N	92	101	+1.5	+1.0	

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o
ZA Richard'S Bay	1	43	52	16	306	-74N	77	86	+1.4	+1.4
ZA Robertson	1	20	32	24	321	-79S	103	112	+1.7	+0.5
ZA Rustenburg	1	40	53	22	309	-71N	74	83	+1.7	+1.5
ZA Sace	1	43	39	20	308	-69N	72	82	+1.6	+1.5
ZA Saldanha	1	17	40	26	323	-79S	102	111	+1.8	+0.5
ZA Secunda	1	42	47	20	308	-71N	74	83	+1.6	+1.5
ZA Sishen	1	30	44	25	315	-82N	84	94	+1.8	+1.1
ZA Skukuza	1	49	9	18	305	-62N	66	75	+1.6	+1.8
ZA Springbok	1	19	30	29	322	-88S	94	104	+2.0	+0.7
ZA Springs	1	41	56	21	308	-71N	74	84	+1.7	+1.5
ZA Swartkop	1	42	11	21	308	-70N	73	82	+1.7	+1.5
ZA Thohoyandou	1	50	40	20	305	-57N	61	70	+1.8	+2.0
ZA Tommy'S Field	1	30	6	25	315	-84N	86	95	+1.8	+1.0
ZA Tutuka	1	42	40	20	308	-72N	75	84	+1.6	+1.5
ZA Tzaneen	1	49	7	20	305	-60N	64	73	+1.7	+1.9
ZA Ulundi	1	43	32	17	307	-74N	77	86	+1.4	+1.4
ZA Umtata	1	35	44	18	311	-86N	89	98	+1.4	+1.1
ZA Upington	1	26	51	27	317	-86N	88	97	+1.9	+0.9
ZA Vanderbijlpark	1	40	12	21	309	-73N	76	86	+1.7	+1.4
ZA Vereeniging	1	40	40	21	309	-73N	76	85	+1.7	+1.4
ZA Vredendal	1	19	24	27	322	-83S	99	108	+1.8	+0.6
ZA Vryburg	1	34	37	24	312	-78N	81	90	+1.8	+1.2
ZA Vryheid	1	43	23	18	307	-73N	76	85	+1.5	+1.4
ZA Waterkloof	1	42	15	21	308	-70N	73	82	+1.7	+1.5
ZA Welkom	1	36	43	22	311	-79N	81	91	+1.6	+1.2
ZA Wesselsbrunn	1	36	23	22	311	-79N	81	91	+1.7	+1.2
ZA Witbank	1	43	50	20	308	-69N	72	81	+1.6	+1.5
ZA Ysterplaat	1	18	4	25	323	-77S	104	113	+1.7	+0.5
ZA Zeerust	1	38	44	23	310	-72N	75	84	+1.8	+1.4
SZ Manzini	1	46	4	18	306	-68N	71	81	+1.5	+1.6
ZM Kalabo	1	54	19	30	306	-35N	39	49	+3.0	+3.8
ZM Livingstone	1	53	38	26	305	-43N	47	57	+2.4	+2.9
ZM Lusaka	2	11	45	21	301	-19N	24	33	+4.1	+7.4
ZM Mongu	1	54	53	29	306	-35N	40	49	+2.9	+3.8
ZM Zambezi	2	2	44	28	304	-23N	28	37	+3.9	+6.1
ZW Bulawayo	1	54	9	22	305	-48N	52	61	+2.1	+2.5
ZW Chiredzi	1	57	35	19	303	-47N	51	60	+1.9	+2.6
ZW Gwert	1	58	21	21	303	-43N	47	56	+2.2	+2.9
ZW Harare	2	6	37	19	301	-31N	35	45	+2.6	+4.2
ZW Hwange National Park	1	54	15	24	305	-45N	49	58	+2.3	+2.8
ZW Kariba	2	6	25	21	302	-28N	33	42	+3.0	+4.8
ZW Masvingo	1	58	43	19	303	-44N	48	57	+2.1	+2.8
ZW Mutare	2	5	58	17	301	-34N	39	48	+2.3	+3.7
ZW Mutoko	2	11	41	17	300	-24N	29	38	+3.1	+5.5
ZW Victoria Falls	1	52	57	26	306	-44N	49	58	+2.4	+2.8
ZW Zisco	1	59	13	21	303	-41N	45	55	+2.2	+3.0
ZW Zvishavane	1	56	27	20	303	-46N	51	60	+2.1	+2.6

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AO Benguela	2	29	12	31	305	38N	327	336	+0.5	-2.7	
AO Huambo	2	30	50	29	304	34N	331	340	+0.2	-3.0	
AO Kuito	2	29	38	29	303	29N	336	345	-0.1	-3.6	
AO Lobito	2	28	39	32	305	36N	329	338	+0.5	-2.8	
AO Luanda	2	10	46	37	306	11N	355	4	+9.9	+9.9	
AO Luena	2	24	26	28	302	15N	351	360	-1.7	-7.5	
AO Menongue	2	36	4	25	303	39N	326	335	+0.3	-2.2	
AO Mocamedes	2	33	26	30	306	51N	313	322	+1.0	-1.5	
AO N'Giva	2	38	52	25	304	52N	312	321	+0.7	-1.2	
AO Porto Amboim	2	22	50	33	305	26N	339	348	+0.0	-4.5	
AO Xangongo	2	37	58	26	305	52N	312	321	+0.8	-1.2	
BW Francistown	2	47	57	-8	12	299	49N	315	324	+0.1	-1.0
BW Gaborone	2	49	28	-7	11	300	63N	301	310	+0.4	-0.2
BW Jwaneng	2	48	56	-8	12	300	65N	299	308	+0.5	-0.1
BW Kasane	2	43	16	-12	16	299	39N	325	334	-0.1	-1.9
BW Maun	2	45	59	-12	16	300	51N	313	322	+0.3	-1.0
BW Orapa	2	47	39	-9	13	300	53N	311	320	+0.3	-0.8
BW Selebi-Phikwe	2	48	45	-7	11	299	52N	312	321	+0.1	-0.8
LS Maseru	2	49	26	-3	7	300	76N	288	297	+0.5	+0.5
MZ Beira	2	43	17	-3	7	296	28N	337	346	-0.8	-2.7
MZ Chimoi	2	42	47	-4	9	296	28N	337	346	-0.8	-2.8
MZ Inhambane	2	49	45	1	4	295	47N	318	327	-0.2	-0.9
MZ Maputo	2	51	14	-1	5	296	59N	305	315	+0.1	-0.3
MZ Vilankulu	2	47	34	-1	5	295	39N	326	335	-0.4	-1.5
ZA Aggeneys	2	42	47	-11	15	306	85N	278	287	+1.0	+0.8
ZA Alexander Bay	2	40	45		17	307	86N	277	286	+1.2	+0.7
ZA Arnot Power Station	2	50	56	-3	7	298	62N	301	310	+0.2	-0.1
ZA Bethlehem	2	50	16	-3	7	299	71N	292	301	+0.4	+0.3
ZA Bisho	2	46	50	-3	6	300	85N	278	287	+0.6	+0.9
ZA Bloemfontein	2	48	55	-5	9	300	76N	287	296	+0.6	+0.5
ZA Bothaville	2	49	41	-5	9	300	71N	293	302	+0.5	+0.2
ZA Brakpan	2	50	32	-4	8	299	65N	298	307	+0.3	+0.0
ZA Calvinia	2	41	48	-10	13	306	90N	273	282	+1.0	+1.0
ZA Cape Town	2	37	40	-10	13	308	83S	265	274	+1.2	+1.3
ZA Carletonville	2	50	10	-5	9	299	67N	297	306	+0.4	+0.0
ZA De Aar	2	46	22	-6	10	302	83N	280	289	+0.8	+0.7
ZA Dundee	2	50	56	-2	6	298	69N	295	304	+0.3	+0.2
ZA Durban	2	50	32	0	4	298	73N	290	299	+0.3	+0.4
ZA Dwaalboom	2	49	51	-6	10	299	63N	301	310	+0.4	-0.2
ZA East London	2	47	2	-2	6	300	85N	278	287	+0.6	+0.9
ZA Ellisras	2	49	48	-6	10	299	58N	306	315	+0.2	-0.4

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
ZA Ermelo	2	51	2	-2	7	298	64N	300	309	+0.2	-0.1
ZA Ficksburg	2	49	53	-3	7	299	73N	290	299	+0.5	+0.4
ZA George	2	41	45	-6	10	304	87S	269	278	+1.0	+1.2
ZA Giyani	2	49	50	-4	8	297	52N	312	321	+0.0	-0.7
ZA Grahamstown	2	45	56	-3	7	301	87N	276	285	+0.7	+1.0
ZA Greytown	2	50	48	-1	5	298	71N	292	301	+0.3	+0.3
ZA Harmony	2	49	35	-5	8	300	73N	291	300	+0.5	+0.3
ZA HarriSmith	2	50	33	-3	6	298	70N	293	302	+0.4	+0.2
ZA Heibron	2	50	20	-4	8	299	69N	295	304	+0.4	+0.2
ZA Heidelberg	2	50	33	-4	8	299	66N	298	307	+0.3	+0.0
ZA Hendrik Verwoerddam	2	47	36	-5	9	301	81N	282	291	+0.7	+0.7
ZA Hoedspruit	2	50	33	-3	7	297	55N	309	318	+0.1	-0.5
ZA Johannesburg	2	50	30	-4	8	299	65N	299	308	+0.3	+0.0
ZA Kimberley	2	48	8	-6	10	301	77N	286	295	+0.6	+0.5
ZA Kleinsee	2	40	30		16	307	88N	275	284	+1.2	+0.9
ZA Klerksdorp	2	49	51	-5	9	300	69N	294	303	+0.5	+0.1
ZA Komati Power Station	2	50	53	-3	7	298	63N	300	309	+0.3	-0.1
ZA Komatipoort	2	51	5	-1	5	297	58N	306	315	+0.1	-0.3
ZA Kriel	2	50	49	-3	7	298	64N	300	309	+0.3	-0.1
ZA Kroonstad	2	49	57	-4	8	299	71N	293	302	+0.5	+0.2
ZA Krugersdorp	2	50	20	-5	9	299	66N	298	307	+0.4	+0.0
ZA Kuruman	2	47	50	-8	12	302	75N	288	297	+0.7	+0.4
ZA Ladybrand	2	49	32	-4	8	300	75N	288	297	+0.5	+0.4
ZA Ladysmith	2	50	40	-2	6	298	70N	293	302	+0.3	+0.3
ZA Langebaanweg	2	38	25	-11	14	307	85S	267	276	+1.2	+1.2
ZA Lichtenburg	2	49	41	-6	10	300	68N	296	305	+0.5	+0.1
ZA Louis Trichardt	2	49	44	-4	9	298	53N	311	320	+0.1	-0.7
ZA Mafikeng	2	49	25	-7	11	300	67N	296	305	+0.5	+0.0
ZA Majuba Power Station	2	50	59	-2	6	298	66N	298	307	+0.3	+0.0
ZA Malalane	2	51	2	-2	6	297	58N	306	315	+0.1	-0.3
ZA Marble Hall	2	50	34	-4	8	298	60N	304	313	+0.2	-0.3
ZA Margate	2	49	55	-1	4	298	76N	287	296	+0.4	+0.5
ZA Messina	2	49	8	-5	9	298	50N	315	324	+0.0	-0.9
ZA Middelburg	2	50	48	-3	7	298	62N	302	311	+0.2	-0.2
ZA Mkuze	2	51	23	0	4	297	65N	299	308	+0.2	+0.0
ZA Nelspruit	2	51	0	-2	6	297	59N	305	314	+0.1	-0.3
ZA Newcastle	2	50	56	-2	6	298	68N	296	305	+0.3	+0.1
ZA Nylstroom	2	50	18	-5	9	298	60N	304	313	+0.2	-0.3
ZA Oudtshoorn	2	42	1	-7	10	304	88S	270	279	+1.0	+1.1
ZA Overberg	2	38	49	-8	12	306	83S	265	274	+1.1	+1.3
ZA Parys	2	50	11	-4	8	299	68N	295	304	+0.4	+0.1
ZA Phalaborwa	2	50	16	-3	7	297	54N	310	320	+0.0	-0.6
ZA Pietermaritzburg	2	50	31	-1	5	298	73N	291	300	+0.4	+0.4
ZA Pietersburg	2	50	11	-4	8	298	56N	308	317	+0.1	-0.5
ZA Pilanesberg	2	50	3	-5	9	299	64N	300	309	+0.4	-0.1
ZA Plettenberg Bay	2	42	31	-6	9	304	88S	270	279	+0.9	+1.1
ZA Pomfret	2	48	16	-8	12	301	70N	293	302	+0.6	+0.1
ZA Port Elizabeth	2	44	32	-4	7	302	90N	273	282	+0.8	+1.1
ZA Port Saint Johns	2	49	5	-1	5	299	79N	284	293	+0.5	+0.7
ZA Potchefstroom	2	50	2	-5	9	299	68N	295	304	+0.4	+0.1
ZA Potgietersrus	2	50	18	-4	9	298	58N	306	315	+0.2	-0.4
ZA Pretoria	2	50	28	-4	8	299	64N	300	309	+0.3	-0.1
ZA Pullenshope	2	50	53	-3	7	298	63N	301	310	+0.2	-0.1
ZA Queenstown	2	47	25	-3	7	301	83N	280	289	+0.6	+0.8
ZA Richard'S Bay	2	51	15	0	4	297	68N	296	305	+0.2	+0.2
ZA Robertson	2	39	25	-9	12	306	85S	267	276	+1.1	+1.2
ZA Rustenburg	2	50	7	-5	9	299	65N	299	308	+0.4	-0.1
ZA Sace	2	50	48	-3	7	298	63N	301	310	+0.3	-0.1
ZA Saldanha	2	38	12	-11	14	308	85S	267	276	+1.2	+1.2
ZA Secunda	2	50	48	-3	7	298	65N	299	308	+0.3	+0.0
ZA Sishen	2	47	26	-8	12	302	76N	287	296	+0.7	+0.4
ZA Skukuza	2	50	52	-2	6	297	57N	307	316	+0.1	-0.4
ZA Springbok	2	41	31		16	306	87N	276	285	+1.1	+0.8
ZA Springs	2	50	33	-4	8	299	65N	299	308	+0.3	+0.0
ZA Swartkop	2	50	28	-4	8	299	64N	300	309	+0.3	-0.1
ZA Thohoyandou	2	49	41	-4	8	297	52N	312	322	+0.0	-0.7
ZA Tommy'S Field	2	47	11	-8	12	302	78N	285	295	+0.7	+0.5
ZA Tutuka	2	50	51	-3	7	298	66N	298	307	+0.3	+0.0
ZA Tzaneen	2	50	13	-4	8	297	55N	310	319	+0.1	-0.6
ZA Ulundi	2	51	11	-1	5	297	68N	296	305	+0.2	+0.2
ZA Umtata	2	48	44	-2	6	299	80N	283	292	+0.5	+0.7
ZA Upington	2	45	41	-9	13	304	80N	283	292	+0.8	+0.6
ZA Vanderbijlpark	2	50	19	-4	8	299	67N	296	305	+0.4	+0.1
ZA Vereeniging	2	50	23	-4	8	299	67N	297	306	+0.4	+0.0
ZA Vredendal	2	40	20	-11	14	307	89S	271	280	+1.1	+1.0
ZA Vryburg	2	48	47	-7	11	301	72N	291	300	+0.6	+0.2
ZA Vryheid	2	51	9	-1	5	298	67N	297	306	+0.3	+0.1
ZA Waterkloof	2	50	29	-4	8	299	64N	300	309	+0.3	-0.1
ZA Welkom	2	49	32	-5	9	300	73N	291	300	+0.5	+0.3
ZA Wesselsbrunn	2	49	24	-5	9	300	72N	291	300	+0.5	+0.3
ZA Witbank	2	50	46	-3	8	298	63N	301	310	+0.3	-0.1
ZA Ysterplaat	2	37	38	-10	13	308	83S	265	274	+1.2	+1.3
ZA Zeerust	2	49	37	-6	10	300	66N	297	306	+0.4	+0.0
SZ Manzini	2	51	14	-1	5	297	62N	302	311	+0.2	-0.1
ZM Kalabo	2	37	1		21	300	30N	335	344	-0.3	-3.0
ZM Livingstone	2	43	14	-11	16	299	38N	327	336	-0.1	-2.0
ZM Lusaka	2	33	2		17	299	15N	351	360	-2.0	-6.5
ZM Mongu	2	37	37		20	300	31N	334	343	-0.3	-3.0
ZM Zambezi	2	30	57		23	300	19N	346	355	-1.2	-5.4
ZW Bulawayo	2	46	30	-7	12	298	43N	322	331	-0.1	-1.4
ZW Chiredzi	2	47	21	-4	8	297	42N	323	332	-0.2	-1.4
ZW Gwert	2	45	25	-7	11	298	38N	327	336	-0.3	-1.8
ZW Harare	2	40	44	-8	12	297	26N	339	348	-0.9	-3.3
ZW Hwange National Park	2	44	31	-10	14	299	40N	325	334	-0.1	-1.8

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
ZW Kariba	2	38	11	-10	15	298	23N	342	351	-1.0	-3.9
ZW Masvingo	2	46	9	-6	10	297	39N	326	335	-0.3	-1.7
ZW Mutare	2	43	3	-5	9	297	29N	336	345	-0.7	-2.7
ZW Mutoko	2	38	9	-7	12	297	20N	346	355	-1.4	-4.5
ZW Victoria Falls	2	43	43	-11	15	299	39N	325	334	-0.1	-1.8
ZW Zisco	2	44	41	-7	12	298	36N	329	338	-0.4	-2.0
ZW Zvishavane	2	46	38	-6	10	297	41N	323	333	-0.2	-1.5

Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Concordia	23	3	32	-5	2	64	-42N	46	56	-0.1	+0.4
AR Corrientes	23	6	55	-7	3	64	-25N	30	39	-0.5	+1.4
AR Curuzu Cuatia	23	4	18	-6	2	64	-37N	41	50	-0.2	+0.7
AR Formosa	23	8	39	-9	5	63	-20N	25	34	-0.6	+1.9
AR Goya	23	5	11	-6	2	64	-32N	36	45	-0.3	+1.0
AR Iguazu Falls	23	7	37	-12	8	62	-26N	30	39	-0.3	+1.5
AR Las Lomitas	23	15	3	-9	5	64	-4N	9	18	-1.6	+4.2
AR Mercedes	23	4	47	-7	3	64	-34N	39	48	-0.2	+0.8
AR Monte Caseros	23	3	58	-6	2	64	-39N	43	52	-0.1	+0.6
AR Obera	23	5	39	-10	6	62	-32N	37	46	-0.2	+1.0
AR Paso De Los Libres	23	4	13	-7	3	63	-38N	42	51	-0.2	+0.6
AR Posadas	23	5	57	-9	5	63	-30N	35	44	-0.3	+1.1
AR Presidencia R.S.Pena	23	9	7	-7	3	64	-18N	23	32	-0.7	+2.0
AR Reconquista	23	5	13	-5	1	64	-31N	36	45	-0.3	+1.0
AR Resistencia	23	7	2	-7	3	64	-25N	29	38	-0.5	+1.5
BR Alpinopolis	23	14	31		18	58	-19N	24	33	-0.3	+2.4
BR Aracatuba	23	15	42		15	60	-10N	15	24	-0.9	+3.3
BR Araracuara	23	12	36		16	59	-20N	25	34	-0.3	+2.2
BR Assis	23	11	41		13	60	-19N	24	33	-0.4	+2.2
BR Bage	23	3	33	-8	4	62	-49N	52	62	+0.1	+0.1
BR Barbacena	23	13	3		19	57	-27N	32	41	+0.1	+1.7
BR Bauru	23	11	46		14	59	-21N	26	35	-0.3	+2.1
BR Belo Horizonte	23	15	58		21	57	-20N	25	34	-0.2	+2.4
BR Campinas	23	10	13		15	58	-28N	33	42	+0.0	+1.5
BR Campos	23	13	3		21	55	-34N	38	48	+0.3	+1.3
BR Caravelas	23	21	8		27	54	-20N	25	34	+0.0	+2.6
BR Cascavel	23	8	23		9	61	-24N	29	38	-0.4	+1.7
BR Castilho	23	18	27		15	60	-4N	9	18	-1.5	+4.6
BR Caxias Do Sul	23	4	26	-12	8	60	-45N	49	59	+0.2	+0.4
BR Chapeco	23	5	37	-12	8	61	-35N	39	49	-0.1	+0.9
BR Criciuma	23	4	59		10	59	-46N	50	60	+0.2	+0.4
BR Curitiba	23	7	12		12	59	-34N	39	48	+0.0	+1.0
BR Florianopolis	23	5	38		11	59	-44N	48	57	+0.2	+0.5
BR Foz Do Iguacu	23	7	50	-12	8	62	-25N	30	39	-0.4	+1.6
BR Franca	23	15	12		17	58	-16N	20	30	-0.5	+2.7
BR Fronteira	23	17	34		17	59	-8N	13	22	-1.0	+3.7
BR Guaratingueta	23	10	36		17	57	-31N	36	45	+0.1	+1.4
BR Ilheus	23	31	37		30	54	-3N	8	17	-1.2	+5.6
BR Ipatinga	23	16	43		22	56	-22N	27	36	-0.1	+2.3
BR Itumbiara	23	29	42		20	58	12N	353	2	+9.9	+9.9
BR Joinville	23	6	31		12	59	-38N	42	52	+0.1	+0.8
BR Juiz De Fora	23	12	16		19	56	-31N	35	44	+0.2	+1.5
BR Lagoa Santa	23	16	24		21	57	-19N	24	33	-0.2	+2.5
BR Lajes	23	5	12		9	60	-42N	46	55	+0.1	+0.6
BR Lins	23	13	39		15	59	-16N	20	30	-0.6	+2.6
BR Londrina	23	10	31		12	60	-21N	26	35	-0.4	+2.0
BR Marilia	23	12	26		14	60	-18N	23	32	-0.5	+2.4
BR Maringa	23	10	39		11	61	-20N	25	34	-0.5	+2.1
BR Montes Claros	23	27	31		25	56	0N	5	14	-1.9	+6.4
BR Navegantes	23	6	5		11	59	-41N	45	54	+0.2	+0.7
BR Passo Fundo	23	4	47	-11	8	61	-40N	44	53	+0.0	+0.6
BR Pelotas	23	3	51	-9	6	61	-52N	56	65	+0.2	+0.0
BR Piracununga	23	12	2		16	58	-23N	28	37	-0.2	+2.0
BR Pocos De Caldas	23	12	6		17	58	-24N	29	38	-0.1	+1.9
BR Ponta Grossa	23	7	27		11	60	-32N	36	45	-0.1	+1.2
BR Ponta Pora	23	16	42		10	62	-3N	8	17	-1.6	+4.6
BR Porto Alegre	23	4	17	-11	7	60	-48N	52	61	+0.2	+0.2
BR President Prudente	23	13	22		13	60	-14N	19	28	-0.7	+2.8
BR Ribeirao Preto	23	14	2		17	59	-18N	22	32	-0.4	+2.5
BR Rio De Janeiro	23	11	2		19	56	-35N	39	48	+0.3	+1.2
BR Rio Grande	23	3	52	-9	6	60	-54N	57	67	+0.2	-0.1
BR Santarem	23	4	1	-9	6	61	-43N	47	56	+0.0	+0.4
BR Santo Angelo	23	4	48	-10	6	62	-37N	41	51	-0.1	+0.7
BR Santos	23	9	6		15	58	-34N	38	47	+0.1	+1.2
BR Sao Jose Do Rio Preto	23	15	55		16	59	-11N	16	25	-0.8	+3.2
BR Sao Jose Dos Campos	23	9	58		16	58	-32N	36	45	+0.1	+1.3
BR Sao Paulo	23	9	22		15	58	-32N	36	45	+0.1	+1.3
BR Sao Pedro Da Aldeia	23	11	22		20	55	-37N	41	50	+0.4	+1.1
BR Telemaco Borba	23	8	39		12	60	-27N	31	41	-0.2	+1.5
BR Teodoro Sampaio	23	13	36		12	61	-12N	17	26	-0.9	+3.0
BR Uberaba	23	18	15		18	58	-9N	14	23	-0.9	+3.7
BR Uruguaiiana	23	4	9	-7	3	63	-38N	42	52	-0.1	+0.6
BR Varginha	23	12	29		18	57	-25N	30	39	-0.1	+1.8
BR Vitoria	23	15	29		23	55	-30N	35	44	+0.3	+1.7
BR Vitoria Da Conquista	23	34	39		30	54	5N	360	9	-3.0	+9.3
PY Asuncion	23	10	7	-10	6	63	-16N	21	30	-0.7	+2.3
PY Ayolas	23	6	15	-9	5	63	-28N	33	42	-0.3	+1.2
PY Conception	23	15	34	-12	8	63	-4N	9	18	-1.5	+4.2
PY Itaipu	23	8	13	-12	8	62	-24N	28	38	-0.4	+1.7
PY Pilar	23	7	34	-8	4	64	-23N	28	37	-0.5	+1.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
UY Artigas	23	3	47	-7	3	63	-41N	45	55	-0.1	+0.5
UY Durazno	23	3	14	-5	2	63	-52N	56	65	+0.1	-0.1
UY Maldonado	23	3	43	-6	2	62	-59N	62	71	+0.2	-0.3
UY Melo	23	3	28	-8	4	62	-52N	55	65	+0.2	+0.0
UY Montevideo	23	3	33	-5	1	63	-57N	61	70	+0.2	-0.3
UY Montevideo	23	3	30	-5	1	63	-57N	60	70	+0.2	-0.3
UY Paysandu	23	3	15	-5	1	64	-46N	50	59	+0.0	+0.2
UY Punta Del Este	23	3	48	-6	2	62	-59N	62	72	+0.2	-0.3
UY Rivera	23	3	32	-7	4	62	-45N	49	58	+0.0	+0.3
UY Salto	23	3	28	-5	1	64	-43N	47	56	-0.1	+0.3
UY Tacuarembó	23	3	21	-7	3	63	-47N	51	60	+0.0	+0.2

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Bahia Blanca	0	8	38	-10	6	56	89N	273	282	+0.9	-1.3
AR Bolivar	0	6	8	-11	8	56	84N	278	287	+1.0	-1.5
AR Buenos Aires	0	6	37		11	54	83N	280	289	+1.2	-1.5
AR Catamarca	23	44	30	-9	5	63	49N	315	324	+1.6	-3.4
AR Chilecito	23	44	0	-7	3	63	49N	315	324	+1.5	-3.4
AR Colonel Suarez	0	7	9	-10	7	56	86N	276	285	+0.9	-1.4
AR Concordia	0	1	57		12	55	74N	289	298	+1.4	-1.8
AR Cordoba	23	54	3	-10	6	60	64N	299	308	+1.2	-2.2
AR Corrientes	23	52	38		12	58	58N	305	314	+1.7	-2.6
AR Curuzu Cuatia	23	59	6		13	56	69N	295	304	+1.5	-2.0
AR Cutralco	0	3	25	-4	1	61	82N	281	290	+0.7	-1.6
AR Dolores	0	9	48		11	53	88N	274	283	+1.1	-1.3
AR El Palomar	0	6	28		11	54	83N	280	289	+1.1	-1.5
AR Formosa	23	50	10		13	58	54N	310	319	+1.9	-3.0
AR Fuerte Gral Roca	0	4	42	-5	2	60	84N	279	288	+0.7	-1.5
AR General Pico	0	2	46	-9	6	58	79N	283	292	+1.0	-1.6
AR Gobernador Gordillo	23	49	2	-8	4	62	57N	307	316	+1.3	-2.7
AR Goya	23	55	54		12	57	64N	299	308	+1.5	-2.2
AR Gualeguaychu	0	4	2		11	55	78N	285	294	+1.2	-1.6
AR Iguazu Falls	23	56	3		17	55	60N	304	313	+1.9	-2.5
AR Jose C. Paz	0	6	12		11	55	82N	280	289	+1.1	-1.5
AR Junin	0	3	49		9	56	80N	283	292	+1.1	-1.6
AR La Cumbre	23	52	53	-10	6	61	63N	301	310	+1.2	-2.3
AR La Plata	0	7	49		11	54	85N	278	287	+1.1	-1.4
AR La Rioja	23	45	27	-8	4	63	51N	313	322	+1.5	-3.2
AR Laboulaye	0	0	33	-10	7	58	75N	288	297	+1.0	-1.8
AR Las Lomitas	23	39	21		10	61	38N	326	335	+2.7	-5.3
AR Malargue	23	57	7	-5	1	63	71N	292	301	+0.8	-1.9
AR Mar Del Plata	0	11	59		10	52	87S	269	278	+1.0	-1.2
AR Marcos Juarez	23	59	14	-12	8	58	72N	291	300	+1.2	-1.9
AR Mendoza	23	52	18	-6	2	63	63N	301	310	+1.0	-2.3
AR Mercedes	23	57	48		13	56	67N	297	306	+1.5	-2.1
AR Monte Caseros	0	0	33		13	56	71N	292	301	+1.4	-1.9
AR Moron	0	6	32		11	54	83N	280	289	+1.1	-1.5
AR Necochea	0	11	26		9	53	87S	269	278	+1.0	-1.2
AR Neuquen	0	4	15	-5	2	61	83N	279	288	+0.7	-1.6
AR Obera	23	58	59		16	55	65N	298	307	+1.7	-2.2
AR Olavarría	0	7	59	-12	9	55	87N	275	284	+1.0	-1.4
AR Parana	23	59	36		10	57	72N	291	300	+1.3	-1.9
AR Paso De Los Libres	0	0	10		14	55	70N	293	302	+1.5	-1.9
AR Pehuajo	0	4	50	-11	8	57	82N	280	289	+1.0	-1.5
AR Posadas	23	57	15		15	56	63N	300	309	+1.7	-2.3
AR Presidencia R.S.Pena	23	47	31		10	60	52N	312	321	+1.8	-3.2
AR Puerto Madryn	0	11	35	-6	3	57	84S	266	275	+0.7	-1.2
AR Punta Indio	0	9	1		12	53	86N	276	285	+1.1	-1.3
AR Reconquista	23	55	25		11	58	64N	300	309	+1.5	-2.3
AR Resistencia	23	52	9		12	58	58N	306	315	+1.7	-2.6
AR Rio Cuarto	23	57	37	-10	6	60	70N	293	302	+1.1	-1.9
AR Rosario	0	1	17		9	57	75N	288	297	+1.2	-1.8
AR San Fernando	0	6	16		11	55	82N	280	289	+1.2	-1.5
AR San Justo	0	6	40		11	54	83N	279	288	+1.1	-1.5
AR San Luis	23	55	46	-8	4	61	68N	295	304	+1.0	-2.1
AR San Rafael	23	56	26	-6	2	62	70N	294	303	+0.9	-2.0
AR Santa Fe	23	59	2		10	57	71N	292	301	+1.3	-1.9
AR Santa Rosa	0	3	42	-9	5	58	81N	281	290	+0.9	-1.6
AR Santa Teresita	0	11	11		12	52	90S	272	281	+1.1	-1.2
AR Santiago Del Estero	23	44	4	-10	6	62	48N	316	325	+1.7	-3.5
AR Tandil	0	9	25		9	54	89N	273	282	+1.0	-1.3
AR Tinogasta	23	39	6	-6	2	64	41N	323	332	+1.9	-4.5
AR Trelew	0	12	1	-6	3	57	83S	265	274	+0.6	-1.2
AR Tres Arroyos	0	9	51	-11	8	55	89S	271	280	+0.9	-1.3
AR Tucuman	23	38	44	-9	5	63	40N	325	334	+2.2	-4.8
AR Viedma	0	10	45	-8	5	56	86S	268	277	+0.8	-1.3
AR Villa Dolores	23	54	17	-9	5	61	65N	298	307	+1.2	-2.2
AR Villa Gesell	0	11	43		11	52	88S	270	280	+1.1	-1.2
AR Villa Reynolds	23	57	40	-9	5	60	71N	292	301	+1.0	-1.9
BR Alpinópolis	0	1	15		27	51	54N	310	319	+2.8	-3.0
BR Aracatuba	23	51	5		22	55	46N	318	327	+2.9	-4.0
BR Araracuara	23	59	42		25	52	55N	308	317	+2.6	-2.9
BR Assis	23	56	18		22	54	54N	310	319	+2.5	-3.0
BR Bage	0	7	30		16	52	79N	283	292	+1.4	-1.5
BR Barbacena	0	9	38		30	48	62N	301	311	+2.7	-2.3
BR Bauru	23	58	54		23	53	56N	308	317	+2.5	-2.9
BR Belo Horizonte	0	5	29		30	49	56N	308	317	+2.9	-2.9
BR Campinas	0	5	13		26	50	63N	301	310	+2.4	-2.3
BR Campos	0	17	4		32	44	68N	295	304	+2.6	-1.9
BR Caravelas	0	13	41		36	45	56N	308	317	+3.3	-2.9
BR Cascavel	23	56	4		18	55	58N	305	314	+2.1	-2.6

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BR Castilho	23	45	50	20	56	40N	325	334	+3.4	-5.3	
BR Caxias Do Sul	0	8	42	19	50	77N	286	295	+1.7	-1.6	
BR Chapeco	0	2	30	19	53	68N	295	304	+1.8	-2.0	
BR Criciuma	0	11	2	21	49	78N	285	294	+1.8	-1.5	
BR Curitiba	0	5	41	23	51	68N	295	305	+2.1	-2.0	
BR Florianopolis	0	11	2	23	49	76N	287	296	+1.9	-1.6	
BR Foz Do Iguacu	23	55	39	17	55	59N	305	314	+2.0	-2.6	
BR Franca	23	57	49	26	52	51N	313	322	+2.8	-3.4	
BR Fronteira	23	51	13	23	55	44N	320	329	+3.2	-4.4	
BR Guaratingueta	0	9	21	28	48	65N	298	307	+2.4	-2.1	
BR Ilheus	0	3	7	36	49	40N	325	334	+4.6	-5.8	
BR Ipatinga	0	8	43	32	48	57N	307	316	+3.0	-2.8	
BR Itumbiara	23	37	58	22	57	25N	340	349	+9.9	+9.9	
BR Joinville	0	8	6	23	50	71N	292	301	+2.0	-1.8	
BR Juiz De Fora	0	11	48	30	47	65N	299	308	+2.6	-2.1	
BR Lagoa Santa	0	5	6	30	49	55N	309	318	+2.9	-3.0	
BR Lajes	0	8	0	21	50	74N	289	298	+1.8	-1.7	
BR Lins	23	54	57	23	54	51N	313	322	+2.7	-3.4	
BR Londrina	23	56	44	21	54	56N	308	317	+2.3	-2.8	
BR Marilia	23	56	14	22	54	53N	311	320	+2.5	-3.1	
BR Maringa	23	55	16	20	55	55N	309	318	+2.3	-3.0	
BR Montes Claros	23	52	50	30	53	37N	328	337	+4.7	-6.7	
BR Navegantes	0	9	33	23	49	74N	289	298	+1.9	-1.7	
BR Passo Fundo	0	5	10	19	52	72N	291	300	+1.7	-1.8	
BR Pelotas	0	10	35	17	50	83N	280	289	+1.5	-1.4	
BR Piracununga	0	2	12	26	51	58N	306	315	+2.5	-2.7	
BR Pocos De Caldas	0	3	46	26	50	59N	305	314	+2.6	-2.6	
BR Ponta Grossa	0	3	21	22	52	65N	298	307	+2.1	-2.1	
BR Ponta Pora	23	41	53	15	59	39N	326	335	+3.1	-5.4	
BR Porto Alegre	0	9	57	19	50	79N	283	292	+1.6	-1.5	
BR President Prudente	23	52	16	21	55	49N	315	324	+2.6	-3.6	
BR Ribeirao Preto	23	58	33	25	52	53N	311	320	+2.7	-3.2	
BR Rio De Janeiro	0	14	12	30	46	69N	295	304	+2.5	-1.9	
BR Rio Grande	0	11	19	17	50	84N	278	287	+1.5	-1.3	
BR Santarem	0	5	30	17	52	75N	288	297	+1.6	-1.7	
BR Santo Angelo	0	2	9	17	54	70N	294	303	+1.7	-1.9	
BR Santos	0	9	9	26	49	67N	296	305	+2.3	-2.0	
BR Sao Jose Do Rio Preto	23	52	51	23	54	47N	317	326	+2.9	-3.9	
BR Sao Jose Dos Campos	0	8	41	27	49	66N	298	307	+2.4	-2.1	
BR Sao Paulo	0	7	40	26	49	66N	298	307	+2.3	-2.1	
BR Sao Pedro Da Aldeia	0	17	2	31	44	70N	293	302	+2.5	-1.8	
BR Telemaco Borba	0	0	21	21	53	61N	302	311	+2.2	-2.4	
BR Teodoro Sampaio	23	49	30	19	56	47N	317	326	+2.6	-3.8	
BR Uberaba	23	52	56	25	54	45N	319	328	+3.2	-4.3	
BR Uruguaiiana	0	0	30	14	55	70N	293	302	+1.5	-1.9	
BR Varginha	0	5	56	28	49	60N	304	313	+2.6	-2.5	
BR Vitoria	0	16	57	34	44	64N	299	308	+2.8	-2.1	
BR Vitoria Da Conquista	23	54	7	33	51	32N	333	342	+6.2	-9.5	
FK Mount Pleasant	0	24	40	-5	3	49	58S	239	248	+0.5	-0.8
FK Stanley	0	24	55	-5	3	49	58S	238	247	+0.5	-0.8
PY Asuncion	23	48	25	14	58	51N	313	322	+2.1	-3.3	
PY Ayolas	23	55	41	14	56	62N	302	311	+1.7	-2.4	
PY Conception	23	41	22	13	59	39N	325	334	+2.9	-5.2	
PY Itaipu	23	54	54	17	56	58N	306	315	+2.0	-2.7	
PY Pilar	23	51	55	13	58	57N	307	316	+1.8	-2.7	
UY Artigas	0	2	26	14	55	73N	290	299	+1.4	-1.8	
UY Colonia	0	7	13	12	54	83N	279	288	+1.2	-1.4	
UY Durazno	0	7	10	13	53	82N	281	290	+1.3	-1.5	
UY Maldonado	0	10	58	14	51	88N	274	284	+1.2	-1.3	
UY Melo	0	8	44	15	52	82N	280	290	+1.4	-1.4	
UY Montevideo	0	9	48	13	52	87N	276	285	+1.2	-1.3	
UY Montevideo	0	9	28	13	52	86N	276	285	+1.2	-1.3	
UY Paysandu	0	3	41	12	55	77N	286	295	+1.3	-1.7	
UY Punta Del Este	0	11	15	14	51	88N	274	283	+1.2	-1.3	
UY Rivera	0	4	54	15	53	76N	286	296	+1.4	-1.6	
UY Salto	0	2	13	12	55	74N	289	298	+1.3	-1.8	
UY Tacuarembó	0	5	31	14	53	78N	285	294	+1.4	-1.6	

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb

PA : angle of position , angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

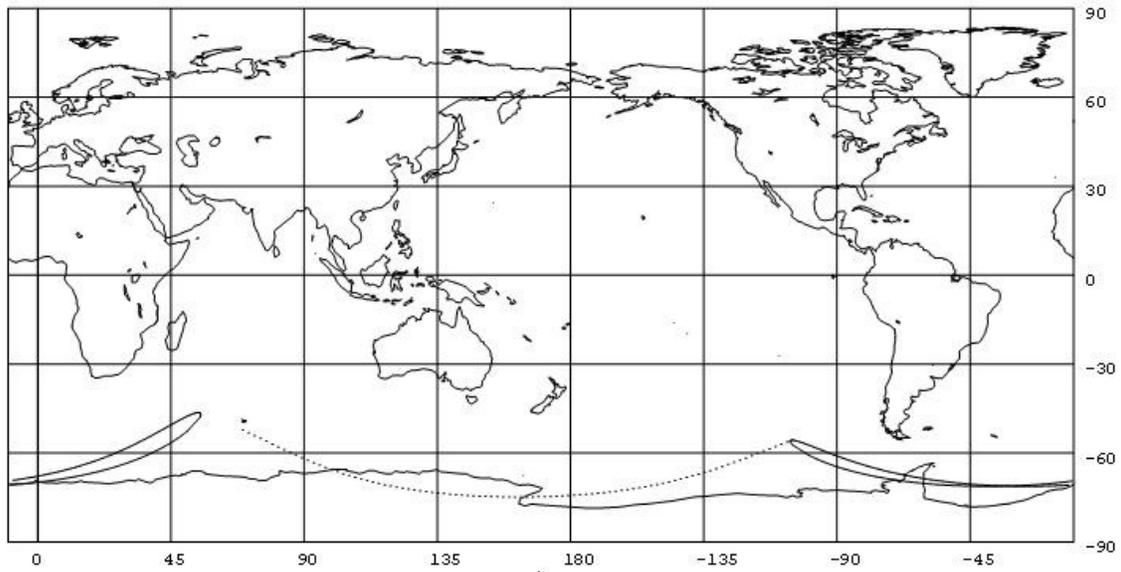
$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella. U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali. Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+'ve for changes towards the East) from the prediction site.  
B same as for A, but for changes in latitude (+'ve to the north).

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### Occultation of Mercury, Magnitude -0.5, on 2012 Dec 12

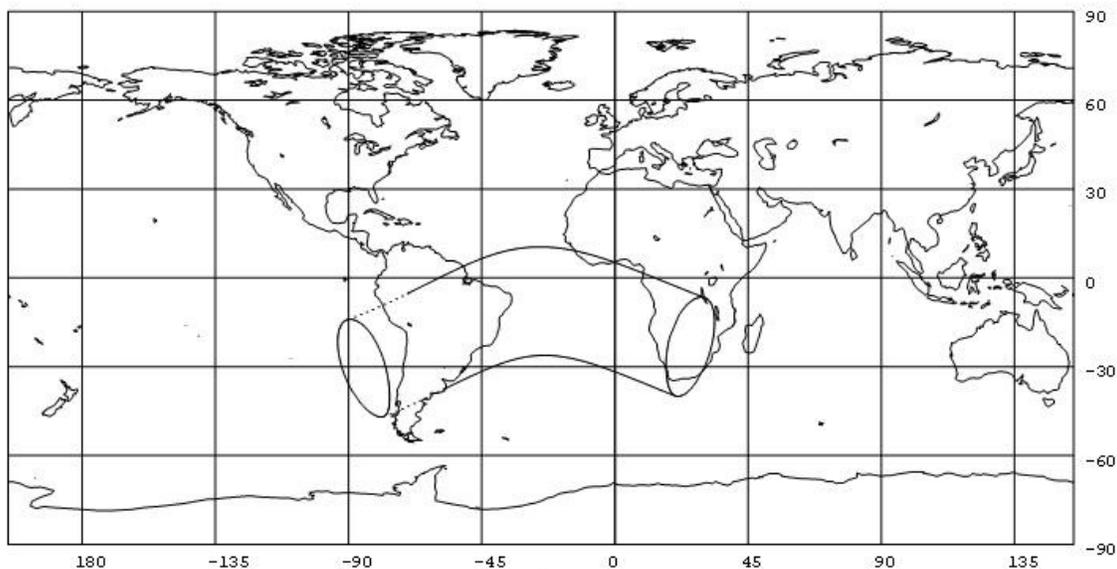


Occult 4.09.0

UT of conjunction = 0h 44.2m

Non visibile - Not visible

## Occultation of Jupiter, Magnitude -2.6, on 2012 Dec 26



Occult 4.090

UT of conjunction = 0h 10.2m

Luna: % illuminazione 95+, elongazione solare 153°

Moon: % illumination 95+, solar elongation 153°

### Sparizione - Disappearance

Luogo - Location	U.T.			Sun Alt	Moon Alt	Az	CA o	PA o	WA o	a m/o	b m/o
	h	m	s								
AO Benguela	1	12	37	22	299	89S	81	91	91	+1.4	+0.8
AO Cabinda	1	19	29	25	296	67N	56	67	67	+1.9	+1.8
AO Camaxilo	1	25	35	17	295	67N	57	67	67	+1.4	+1.8
AO Cazombo	1	24	54	12	295	75N	64	75	75	+1.1	+1.4
AO Chitato	1	30	20	14	294	59N	49	59	59	+1.5	+2.3
AO Huambo	1	15	36	20	298	89N	78	89	89	+1.3	+0.9
AO Kuito	1	17	29	18	297	86N	75	86	86	+1.2	+1.0
AO Lobito	1	13	1	22	299	90S	80	90	90	+1.4	+0.9
AO Luanda	1	16	17	24	298	78N	68	78	78	+1.6	+1.3
AO Luena	1	21	43	15	296	79N	69	79	79	+1.2	+1.3
AO M'Banza-Congo	1	22	0	23	296	66N	56	66	66	+1.7	+1.9
AO Malanje	1	20	3	20	296	76N	66	76	76	+1.4	+1.4
AO Menongue	1	16	14	17	298	88S	82	92	92	+1.1	+0.8
AO Mocamedes	1	9	12	23	301	79S	91	101	101	+1.3	+0.5
AO N'Giva	1	12	26	18	300	77S	92	103	103	+1.1	+0.5
AO Negage	1	21	8	21	296	71N	60	71	71	+1.6	+1.6
AO Porto Amboim	1	14	53	23	298	84N	74	84	84	+1.4	+1.1
AO Saurimo	1	25	22	15	295	70N	60	70	70	+1.3	+1.6
AO Soyo	1	18	53	25	297	69N	58	69	69	+1.8	+1.7
AO Toto	1	20	27	23	296	70N	59	70	70	+1.7	+1.7
AO Uige	1	20	58	21	296	71N	60	71	71	+1.6	+1.6
AO Xangongo	1	11	49	19	300	77S	92	103	103	+1.1	+0.5
BW Francistown	1	18	44	5	295	79S	90	101	101	+0.5	+0.7
BW Gaborone	1	16	2	6	296	67S	103	113	113	+0.4	+0.5
BW Jwaneng	1	15	30	7	297	65S	104	115	115	+0.4	+0.4
BW Kasane	1	20	3	8	295	87S	82	93	93	+0.7	+0.9
BW Maun	1	17	15	10	297	78S	92	102	102	+0.7	+0.7
BW Orapa	1	17	34	7	296	76S	93	104	104	+0.6	+0.6
BW Selebi-Phikwe	1	18	17	5	295	77S	93	103	103	+0.5	+0.7
CG Brazzaville	1	28	20	21	294	55N	44	55	55	+2.0	+2.7
CG Loudima	1	23	15	25	295	60N	49	60	60	+2.0	+2.3
CG Makabana	1	24	56	25	295	56N	45	56	56	+2.1	+2.6
CG Pointe-Noire	1	20	27	26	296	64N	53	64	64	+1.9	+2.0
CI Abidjan	1	8	15	47	295	38N	27	38	38	+4.1	+6.1
CI Daloa	1	8	16	50	295	30N	19	29	29	+9.9	+9.9
CI Man	1	7	27	51	295	27N	16	27	27	+9.9	+9.9
CI San Pedro	0	55	24	52	299	47N	36	47	47	+3.6	+4.1
CI Yamoussoukro	1	16	47	47	294	22N	11	22	22	+9.9	+9.9
GA Franceville	1	32	49	23	294	43N	32	43	43	+2.7	+4.3
GA Lambarene	1	28	2	27	294	45N	34	45	45	+2.8	+4.0
GA Lastourville	1	34	46	23	293	38N	27	38	38	+3.1	+5.4
GA Libreville	1	30	50	28	294	39N	28	38	38	+3.3	+5.5
GA Moanda	1	32	54	23	294	43N	32	42	42	+2.7	+4.4
GA Okondja	1	38	56	21	293	33N	22	32	32	+3.9	+7.4
GA Omboue Hospial	1	22	33	29	295	53N	42	53	53	+2.5	+3.0
GA Port Gentil	1	24	0	29	295	49N	38	49	49	+2.7	+3.5
GA Tchibanga	1	22	47	27	295	57N	46	56	56	+2.2	+2.6
GH Takoradi	1	14	53	43	294	35N	24	35	35	+4.3	+7.1
GN N'Zerekore	1	8	2	52	295	23N	12	23	23	+9.9	+9.9

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o
LS Maseru	1	14	50	2	296	54S	116	127	+0.2	+0.2
LR Monrovia	0	46	56	58	300	43N	32	43	+3.8	+4.9
MW Kasungu	1	32	35	0	292	62N	52	62	+0.8	+2.0
MZ Estima	1	27	23	1	292	75N	64	75	+0.6	+1.5
MZ Songo	1	27	37	1	292	74N	64	74	+0.6	+1.5
MZ Tete	1	27	21	0	292	75N	64	75	+0.6	+1.5
ST Principe	1	30	56	30	293	34N	23	34	+4.0	+7.0
ST Sao Tome	1	22	17	32	295	47N	36	47	+2.9	+3.8
SL Freetown	0	53	4	60	298	27N	16	26	+9.9	+9.9
SL Hastings	0	51	1	60	298	29N	18	29	+4.7	+9.7
ZA Aggeneys	1	12	34	10	301	43S	127	137	+0.3	-0.2
ZA Alexander Bay	1	11	27	12	302	42S	127	138	+0.4	-0.3
ZA Arnot Power Station	1	16	44	2	294	67S	102	113	+0.3	+0.5
ZA Bethlehem	1	15	23	2	295	59S	111	122	+0.2	+0.3
ZA Bisho	1	14	32	1	296	42S	127	138	+0.0	-0.1
ZA Bloemfontein	1	14	38	4	296	53S	116	127	+0.2	+0.2
ZA Bothaville	1	15	13	4	296	59S	111	121	+0.3	+0.3
ZA Brakpan	1	16	7	3	295	65S	105	116	+0.3	+0.4
ZA Calvinia	1	13	31	8	300	37S	133	144	+0.2	-0.4
ZA Cape Town	1	14	49	7	301	26S	144	155	-0.1	-0.9
ZA Carletonville	1	15	45	4	296	63S	107	117	+0.3	+0.4
ZA De Aar	1	14	5	5	298	45S	124	135	+0.2	-0.1
ZA Dundee	1	15	44	1	294	61S	109	119	+0.2	+0.4
ZA Dwaalboom	1	16	17	5	296	67S	102	113	+0.4	+0.5
ZA East London	1	14	31	1	296	43S	127	138	+0.0	-0.1
ZA Ellisras	1	17	13	4	295	72S	98	109	+0.4	+0.6
ZA Ermelo	1	16	30	1	294	66S	104	114	+0.2	+0.5
ZA Ficksburg	1	15	5	2	296	56S	113	124	+0.2	+0.3
ZA George	1	14	44	4	299	32S	138	149	+0.0	-0.5
ZA Giyani	1	18	33	2	294	77S	93	103	+0.3	+0.7
ZA Grahamstown	1	14	35	2	296	40S	130	140	+0.0	-0.2
ZA Greytown	1	15	27	0	294	59S	111	122	+0.1	+0.3
ZA Harmony	1	15	2	4	296	57S	112	123	+0.3	+0.3
ZA Harrismith	1	15	32	2	295	59S	110	121	+0.2	+0.3
ZA Heibron	1	15	36	3	295	61S	109	119	+0.3	+0.4
ZA Heidelberg	1	16	3	3	295	64S	106	116	+0.3	+0.4
ZA Hendrik Verwoerddam	1	14	23	4	297	48S	122	133	+0.2	+0.0
ZA Hoedspruit	1	17	58	1	294	74S	96	106	+0.3	+0.7
ZA Johannesburg	1	16	10	3	295	65S	105	115	+0.3	+0.4
ZA Kimberley	1	14	18	5	297	52S	117	128	+0.3	+0.1
ZA Kleinsee	1	12	4	11	302	39S	130	141	+0.3	-0.4
ZA Klerksdorp	1	15	23	4	296	61S	109	119	+0.3	+0.3
ZA Komati Power Station	1	16	33	2	295	66S	103	114	+0.3	+0.5
ZA Komatipoort	1	17	30	0	293	72S	98	109	+0.2	+0.6
ZA Kriel	1	16	24	2	295	66S	104	115	+0.3	+0.5
ZA Kroonstad	1	15	19	3	296	59S	111	121	+0.3	+0.3
ZA Krugersdorp	1	16	3	4	295	64S	105	116	+0.3	+0.4
ZA Kuruman	1	14	7	7	298	55S	115	125	+0.3	+0.2
ZA Ladybrand	1	14	53	3	296	55S	115	126	+0.2	+0.2
ZA Ladysmith	1	15	31	1	295	59S	110	121	+0.2	+0.4
ZA Langebaanweg	1	14	0	8	301	29S	141	151	+0.1	-0.8
ZA Lichtenburg	1	15	27	5	296	62S	107	118	+0.3	+0.4
ZA Louis Trichardt	1	18	20	3	294	76S	94	104	+0.4	+0.7
ZA Mafikeng	1	15	24	6	296	63S	107	117	+0.4	+0.4
ZA Majuba Power Station	1	16	10	1	294	64S	106	116	+0.2	+0.4
ZA Malalane	1	17	24	0	294	71S	99	109	+0.3	+0.6
ZA Marble Hall	1	17	3	3	295	70S	100	110	+0.3	+0.6
ZA Messina	1	18	59	3	294	79S	91	101	+0.4	+0.7
ZA Middelburg	1	16	44	2	295	68S	102	112	+0.3	+0.5
ZA Nelspruit	1	17	14	1	294	70S	99	110	+0.3	+0.6
ZA Newcastle	1	15	51	1	294	62S	108	118	+0.2	+0.4
ZA Nylstroom	1	16	58	3	295	70S	100	111	+0.3	+0.5
ZA Oudtshoorn	1	14	34	5	299	33S	137	148	+0.0	-0.5
ZA Overberg	1	15	12	5	300	26S	144	154	-0.1	-0.9
ZA Parys	1	15	36	3	296	62S	108	119	+0.3	+0.4
ZA Phalaborwa	1	18	17	1	294	75S	94	105	+0.3	+0.7
ZA Pietermaritzburg	1	15	12	0	294	57S	113	124	+0.1	+0.3
ZA Pietersburg	1	17	50	3	294	73S	96	107	+0.4	+0.6
ZA Pilanesberg	1	16	9	4	296	66S	104	114	+0.4	+0.5
ZA Plettenberg Bay	1	14	46	4	298	33S	137	148	+0.0	-0.5
ZA Pomfret	1	14	32	7	298	60S	110	120	+0.4	+0.3
ZA Port Elizabeth	1	14	41	2	297	37S	133	144	+0.0	-0.3
ZA Port Saint Johns	1	14	38	0	295	50S	120	131	+0.1	+0.1
ZA Potchefstroom	1	15	33	4	296	62S	108	118	+0.3	+0.4
ZA Potgietersrus	1	17	25	3	295	72S	98	109	+0.4	+0.6
ZA Pretoria	1	16	22	3	295	66S	103	114	+0.3	+0.5
ZA Pullenshope	1	16	39	2	294	67S	103	113	+0.3	+0.5
ZA Queenstown	1	14	29	2	296	45S	125	135	+0.1	+0.0
ZA Robertson	1	14	40	6	300	29S	141	152	+0.0	-0.7
ZA Rustenburg	1	16	3	4	296	65S	104	115	+0.3	+0.4
ZA Sace	1	16	32	2	295	67S	103	114	+0.3	+0.5
ZA Saldanha	1	13	59	8	301	29S	141	152	+0.0	-0.8
ZA Secunda	1	16	14	2	295	65S	105	115	+0.3	+0.5
ZA Sishen	1	13	54	7	298	54S	116	127	+0.3	+0.1
ZA Skukuza	1	17	43	0	293	73S	97	108	+0.3	+0.6
ZA Springbok	1	12	24	10	301	41S	129	140	+0.3	-0.3
ZA Springs	1	16	9	3	295	65S	105	115	+0.3	+0.4
ZA Swartkop	1	16	18	3	295	66S	104	114	+0.3	+0.5
ZA Thohoyandou	1	18	36	2	294	77S	93	103	+0.4	+0.7
ZA Tommy'S Field	1	13	51	7	298	52S	118	128	+0.3	+0.1
ZA Tutuka	1	16	11	2	295	64S	105	116	+0.3	+0.4
ZA Tzaneen	1	18	6	2	294	75S	95	106	+0.3	+0.7
ZA Umtata	1	14	37	1	295	49S	121	132	+0.1	+0.1
ZA Upington	1	13	18	8	299	49S	121	131	+0.3	+0.0

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
ZA Vanderbijlpark	1	15	46	3	295	63S	107	118	+0.3	+0.4	
ZA Vereeniging	1	15	51	3	295	63S	106	117	+0.3	+0.4	
ZA Vredendal	1	13	18	9	301	35S	135	146	+0.2	-0.5	
ZA Vryburg	1	14	43	6	297	58S	112	122	+0.3	+0.2	
ZA Vryheid	1	15	59	0	294	63S	107	117	+0.2	+0.4	
ZA Waterkloof	1	16	19	3	295	66S	104	114	+0.3	+0.5	
ZA Welkom	1	15	1	4	296	57S	112	123	+0.3	+0.3	
ZA Wesselsbrunn	1	14	58	4	296	57S	112	123	+0.3	+0.3	
ZA Witbank	1	16	36	2	295	67S	103	113	+0.3	+0.5	
ZA Ysterplaat	1	14	46	7	301	26S	144	154	-0.1	-0.9	
ZA Zeerust	1	15	39	5	296	64S	106	116	+0.4	+0.4	
SZ Manzini	1	16	43	0	294	67S	102	113	+0.2	+0.5	
ZM Kalabo	1	20	48	12	296	87N	76	87	+0.9	+1.0	
ZM Kasompe	1	28	43	6	293	70N	59	70	+0.9	+1.7	
ZM Livingstone	1	20	31	8	295	88S	81	92	+0.7	+0.9	
ZM Lusaka	1	25	7	5	293	80N	69	80	+0.7	+1.3	
ZM Mansa	1	32	15	5	293	62N	51	62	+1.0	+2.1	
ZM Mfuwe	1	30	54	2	292	66N	55	66	+0.8	+1.8	
ZM Mongu	1	21	0	11	296	87N	76	87	+0.9	+1.0	
ZM Mufulira	1	29	6	6	293	69N	59	69	+0.9	+1.7	
ZM Ndola	1	28	41	5	293	70N	60	70	+0.9	+1.6	
ZM Southdowns	1	28	22	6	293	71N	60	71	+0.9	+1.6	
ZM Zambezi	1	22	54	11	295	81N	70	81	+1.0	+1.2	
ZW Bulawayo	1	20	14	4	294	84S	85	96	+0.5	+0.9	
ZW Chiredzi	1	20	40	1	293	85S	84	95	+0.4	+0.9	
ZW Gwert	1	21	24	3	294	88S	81	92	+0.5	+1.0	
ZW Harare	1	23	43	3	293	85N	74	85	+0.5	+1.2	
ZW Hwange National Park	1	20	34	6	295	87S	83	93	+0.6	+0.9	
ZW Kariba	1	23	56	5	294	83N	73	83	+0.7	+1.2	
ZW Masvingo	1	21	17	2	293	87S	82	93	+0.5	+0.9	
ZW Mutare	1	23	11	1	293	87N	76	87	+0.5	+1.1	
ZW Mutoko	1	24	48	1	293	82N	71	82	+0.5	+1.2	
ZW Victoria Falls	1	20	17	8	295	87S	82	93	+0.7	+0.9	
ZW Zisaco	1	21	45	4	294	89S	80	91	+0.5	+1.0	
ZW Zvishavane	1	20	42	3	294	85S	84	95	+0.5	+0.9	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AO Benguela	2	21	14	7	293	-58N	291	301	+0.2	-0.3	
AO Cabinda	2	14	58	13	293	-33N	316	326	-0.2	-1.7	
AO Camaxilo	2	17	26	5	292	-34N	315	326	-0.4	-1.4	
AO Chitato	2	14	46	4	292	-26N	324	334	-0.6	-2.0	
AO Huambo	2	21	42	5	293	-56N	293	304	+0.1	-0.3	
AO Kuito	2	21	33	4	293	-53N	297	307	+0.0	-0.5	
AO Lobito	2	21	11	7	293	-57N	292	302	+0.2	-0.3	
AO Luanda	2	19	4	9	293	-45N	304	315	+0.0	-0.9	
AO Luena	2	20	49	2	292	-46N	303	314	-0.2	-0.7	
AO M'Banza-Congo	2	15	41	10	293	-33N	316	327	-0.2	-1.6	
AO Malanje	2	19	34	6	293	-43N	306	317	-0.1	-1.0	
AO Menongue	2	22	12	2	292	-60N	290	300	+0.0	-0.1	
AO Mocamedes	2	20	57	7	294	-69N	280	291	+0.4	+0.2	
AO N'Giva	2	21	39	3	293	-70N	279	290	+0.3	+0.3	
AO Negage	2	17	40	8	293	-37N	312	322	-0.2	-1.3	
AO Porto Amboim	2	20	30	8	293	-51N	298	309	+0.1	-0.6	
AO Saurimo	2	18	36	3	292	-37N	312	323	-0.4	-1.2	
AO Soyo	2	15	48	12	293	-35N	314	324	-0.1	-1.5	
AO Toto	2	17	0	10	293	-37N	313	323	-0.2	-1.4	
AO Uige	2	17	29	9	293	-37N	312	322	-0.2	-1.3	
AO Xangongo	2	21	33	4	293	-70N	279	290	+0.3	+0.3	
CG Brazzaville	2	11	9	11	292	-21N	328	339	-0.6	-2.6	
CG Loudima	2	12	10	13	293	-26N	323	333	-0.3	-2.2	
CG Makabana	2	10	33	14	293	-22N	327	337	-0.4	-2.5	
CG Pointe-Noire	2	13	36	14	293	-30N	319	329	-0.2	-1.9	
CI Abidjan	1	42	12	39	293	-7N	342	352	-0.4	-6.4	
CI Daloa	1	31	51	45	293	0N	349	359	+9.9	+9.9	
CI Man	1	28	5	47	293	2N	351	1	+9.9	+9.9	
CI San Pedro	1	44	37	41	294	-18N	331	342	+0.5	-4.3	
CI Yamoussoukro	1	27	53	44	293	8N	357	7	+9.9	+9.9	
GA Franceville	2	4	1	16	292	-9N	340	351	-1.1	-4.3	
GA Lambarene	2	3	5	19	293	-11N	338	348	-0.8	-4.1	
GA Lastourville	2	0	55	17	292	-4N	345	355	-1.5	-5.5	
GA Libreville	1	58	31	21	292	-5N	344	355	-1.3	-5.6	
GA Moanda	2	3	42	16	292	-9N	340	351	-1.1	-4.4	
GA Okondja	1	58	12	17	292	1N	350	1	-2.3	-7.5	
GA Omboue Hospial	2	6	44	19	293	-19N	330	340	-0.4	-3.0	
GA Port Gentil	2	4	10	20	293	-15N	334	344	-0.6	-3.5	
GA Tchibanga	2	9	44	16	293	-23N	326	337	-0.4	-2.6	
GH Takoradi	1	43	14	37	293	-4N	345	356	-0.9	-7.4	
GN N'Zerekore	1	22	37	49	293	5N	354	5	+9.9	+9.9	
LR Monrovia	1	34	55	48	294	-16N	333	343	+0.8	-5.0	
ST Principe	1	53	57	25	292	-1N	348	359	-1.8	-7.2	
ST Sao Tome	2	1	15	23	293	-14N	335	346	-0.6	-3.9	
SL Freetown	1	17	1	55	294	-1N	348	358	+9.9	+9.9	
SL Hastings	1	19	22	54	294	-4N	345	356	+0.1	-9.9	
ZA Alexander Bay	2	9	33	1	294	-72S	242	252	+0.8	+1.9	
ZA Kleinsee	2	7	45	0	294	-69S	239	249	+0.8	+2.1	

## Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
AR Bahia Blanca	22	49	7	7	13	49	19S	151	162	+3.7	-6.6
AR Bolivar	22	40	2	7	14	50	32S	138	148	+2.5	-3.8
AR Buenos Aires	22	40	41	4	17	49	34S	136	146	+2.5	-3.7
AR Catamarca	22	15	11	13	11	59	70S	100	110	+1.1	-1.3
AR Chilecito	22	14	18	14	9	60	70S	99	110	+1.0	-1.3
AR Chosmadal	22	27	9	17	5	58	45S	125	135	+1.4	-2.7
AR Colonel Suarez	22	43	5	7	13	50	27S	143	153	+2.7	-4.5
AR Concordia	22	31	50	4	18	51	48S	122	133	+2.0	-2.5
AR Cordoba	22	21	28	11	12	56	58S	111	122	+1.4	-1.9
AR Corrientes	22	22	38	5	18	54	63S	107	117	+1.6	-1.6
AR Curuzu Cuatia	22	28	17	4	18	52	53S	116	127	+1.9	-2.1
AR Cutralco	22	33	0	15	6	57	37S	133	143	+1.7	-3.3
AR Dolores	22	50	29	3	18	46	21S	149	159	+3.7	-5.9
AR El Bolson	22	40	1	16	4	57	26S	144	154	+2.1	-4.5
AR El Maiten	22	41	13	16	5	56	25S	145	156	+2.3	-4.7
AR El Palomar	22	40	22	4	17	49	34S	136	146	+2.5	-3.6
AR Esquel	22	46	16	15	5	55	18S	152	163	+3.0	-6.4
AR Formosa	22	21	40	4	19	54	66S	103	114	+1.6	-1.4
AR Fuerte Gral Roca	22	36	13	13	8	55	33S	137	147	+2.0	-3.7
AR General Pico	22	32	42	10	12	54	41S	129	140	+1.9	-3.0
AR Gobernador Gordillo	22	17	11	13	10	58	65S	105	115	+1.1	-1.6
AR Goya	22	24	51	5	17	53	58S	112	122	+1.7	-1.9
AR Gualeguaychu	22	35	10	5	17	50	42S	128	139	+2.2	-2.9
AR Iguazu Falls	22	27	22	0	23	51	62S	108	118	+1.9	-1.6
AR Jose C. Paz	22	39	47	5	17	49	35S	135	145	+2.5	-3.6
AR Jujuy	22	11	23	11	13	60	82S	87	98	+0.9	-0.8
AR Junin	22	34	50	7	14	51	40S	130	141	+2.1	-3.1
AR La Cumbre	22	20	25	11	12	57	60S	110	120	+1.3	-1.8
AR La Plata	22	43	29	3	17	48	31S	139	150	+2.8	-4.1
AR La Quiaca	22	9	32	11	13	60	90S	79	90	+0.7	-0.4
AR La Rioja	22	15	14	14	10	59	69S	101	111	+1.0	-1.4
AR Laboulaye	22	29	1	10	12	54	46S	123	134	+1.7	-2.6
AR Las Lomitas	22	16	35	7	17	56	75S	95	105	+1.3	-1.1
AR Malargue	22	23	4	16	6	59	52S	118	129	+1.2	-2.3
AR Marcos Juarez	22	27	24	9	14	54	50S	120	130	+1.7	-2.4
AR Mendoza	22	18	39	16	7	59	60S	110	120	+1.1	-1.8
AR Mercedes	22	26	59	4	18	52	56S	114	125	+1.8	-2.0
AR Monte Caseros	22	30	1	4	18	51	51S	119	129	+2.0	-2.3
AR Moron	22	40	32	4	17	49	34S	136	146	+2.5	-3.7
AR Neuquen	22	35	2	14	7	56	35S	135	146	+1.9	-3.5
AR Obera	22	29	16	1	22	50	57S	113	124	+2.0	-1.9
AR Olavarria	22	45	15	6	15	49	26S	144	155	+3.0	-4.8
AR Oran	22	11	13	10	14	59	85S	84	95	+0.9	-0.6
AR Parana	22	28	14	7	15	53	50S	119	130	+1.8	-2.3
AR Paso De Los Libres	22	29	41	3	19	51	52S	117	128	+2.0	-2.2
AR Pehuajo	22	37	4	8	13	51	36S	134	145	+2.2	-3.5
AR Posadas	22	27	25	2	21	51	59S	111	122	+1.9	-1.8
AR Presidencia R.S.Pena	22	19	6	7	17	55	68S	102	112	+1.4	-1.4
AR Punta Indio	22	46	56	2	18	46	27S	143	154	+3.1	-4.7
AR Reconquista	22	24	16	6	17	54	58S	111	122	+1.6	-1.9
AR Resistencia	22	22	10	5	18	54	63S	106	117	+1.6	-1.6
AR Rio Cuarto	22	24	56	11	11	56	52S	118	128	+1.5	-2.3
AR Rosario	22	30	27	7	15	52	47S	123	134	+1.9	-2.6
AR Salta	22	11	23	12	12	60	81S	88	99	+0.9	-0.8
AR San Carlos De Barilocho	22	37	30	16	4	57	30S	140	151	+1.9	-4.0
AR San Fernando	22	39	54	4	17	49	35S	135	145	+2.5	-3.5
AR San Justo	22	40	50	4	17	49	34S	136	147	+2.6	-3.7
AR San Luis	22	22	25	13	9	57	55S	115	126	+1.3	-2.1
AR San Martin Des Andes	22	33	44	17	4	58	35S	134	145	+1.6	-3.4
AR San Rafael	22	22	35	15	7	58	53S	116	127	+1.3	-2.2
AR Santa Fe	22	27	27	7	15	53	51S	119	129	+1.7	-2.3
AR Santa Rosa	22	34	28	10	11	53	38S	132	143	+2.0	-3.3
AR Santa Teresita	22	56	23	1	19	44	14S	156	166	+5.3	-9.0
AR Santiago Del Estero	22	15	40	11	13	58	70S	99	110	+1.1	-1.3
AR Tandil	22	50	33	4	16	47	20S	150	161	+3.8	-6.4
AR Tartagal	22	11	23	10	15	59	86S	83	94	+0.9	-0.6
AR Tinogasta	22	12	42	14	9	60	74S	95	106	+0.9	-1.2
AR Tres Arroyos	22	54	37	5	15	47	13S	157	168	+9.9	+9.9
AR Tucuman	22	13	43	12	12	59	75S	95	106	+1.0	-1.1
AR Villa Dolores	22	21	22	12	11	57	58S	112	123	+1.3	-2.0
AR Villa Reynolds	22	24	44	12	10	56	51S	118	129	+1.5	-2.3
BO Apolo	22	9	54	11	14	63	61N	50	61	+0.2	+0.9
BO Ascension De Guarayos	22	11	26	6	19	61	73N	62	73	+0.6	+0.4
BO Bermejo	22	11	1	10	14	60	86S	83	94	+0.9	-0.6
BO Camiri	22	10	34	9	16	60	86N	75	86	+0.8	-0.2
BO Chapacura	22	9	46	9	16	61	74N	63	74	+0.5	+0.3
BO Charana	22	7	33	14	12	63	70N	59	69	+0.3	+0.5
BO Cobija	22	14	48	9	17	64	46N	35	46	-0.1	+1.8
BO Cochabamba	22	8	58	10	15	62	74N	63	74	+0.5	+0.3
BO Conception	22	11	55	6	20	60	76N	65	76	+0.7	+0.3
BO Guayaramerin	22	15	13	6	20	63	52N	41	52	+0.1	+1.6
BO La Paz	22	8	27	12	14	63	68N	57	68	+0.3	+0.6
BO Magdalena	22	12	36	6	19	62	63N	52	63	+0.4	+0.9
BO Oruro	22	8	18	12	14	62	74N	64	74	+0.4	+0.3
BO Potosi	22	8	47	11	14	61	81N	71	81	+0.6	+0.0
BO Puerto Suarez	22	15	55	2	22	57	89S	81	91	+1.2	-0.3
BO Reyes	22	10	35	10	16	63	61N	51	61	+0.2	+0.9
BO Riberalta	22	14	50	7	19	63	51N	40	51	+0.1	+1.6
BO Robore	22	13	39	4	21	58	86N	76	86	+1.0	-0.1
BO Rurrenabaque	22	10	26	10	15	63	62N	51	61	+0.2	+0.9
BO San Borja	22	10	17	10	16	63	64N	54	64	+0.3	+0.8
BO San Ignacio De Moxos	22	10	35	9	17	62	66N	56	66	+0.4	+0.7
BO San Ignacio De Velasco	22	12	40	5	21	59	78N	68	78	+0.8	+0.2

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o	
BO San Joaquin	22	12	35	7	19	62	61N	51	61	+0.3	+1.0	
BO San Mathias	22	14	58	2	23	58	82N	71	82	+1.0	+0.1	
BO San Ramon	22	12	23	7	19	62	62N	51	62	+0.4	+1.0	
BO Santa Ana	22	11	38	8	18	62	63N	52	62	+0.3	+0.9	
BO Santa Cruz	22	10	49	7	18	60	79N	68	79	+0.7	+0.1	
BO Sucre	22	9	7	10	15	61	80N	70	80	+0.6	+0.0	
BO Tarija	22	10	3	10	14	60	89N	79	89	+0.8	-0.4	
BO Trinidad	22	10	57	8	18	62	67N	56	67	+0.4	+0.7	
BR Almeirim	22	42	18			42	60	36N	25	35	+0.3	+3.6
BR Alpinopolis	22	37	39	-11	34	45	65S	104	115	+2.4	-1.3	
BR Alta Floresta	22	20	57	-4	30	59	65N	54	64	+0.9	+1.1	
BR Altamira	22	35	32			39	59	47N	36	47	+0.7	+2.5
BR Amapa	22	55	33			48	61	24N	13	23	-0.3	+5.7
BR Aracaju	22	55	14			50	38	83S	87	97	+2.8	-0.1
BR Aracatuba	22	29	4	-6	29	49	71S	99	110	+2.0	-1.1	
BR Araracuara	22	34	50	-9	31	46	65S	105	116	+2.3	-1.4	
BR Assis	22	30	52	-6	28	48	66S	104	115	+2.1	-1.4	
BR Bage	22	41	5	-1	22	46	39S	130	141	+2.6	-3.1	
BR Barbacena	22	45	7			36	41	59S	110	121	+2.8	-1.6
BR Barra Do Garcas	22	22	30	-5	30	54	90N	79	90	+1.5	-0.1	
BR Bauru	22	33	29	-7	30	47	64S	105	116	+2.2	-1.4	
BR Belem	22	43	32			45	58	47N	36	47	+1.0	+2.7
BR Belo Horizonte	22	42	35			37	42	64S	105	116	+2.6	-1.3
BR Bom Jesus Da Lapa	22	39	7			41	46	85S	85	95	+2.3	-0.2
BR Brasilia	22	30	12	-11	35	50	83S	86	97	+2.0	-0.4	
BR Campinas	22	39	4	-10	32	44	59S	111	121	+2.5	-1.7	
BR Campo Grande	22	20	56	-1	25	54	79S	90	101	+1.5	-0.7	
BR Campos	22	53	0			38	36	54S	116	126	+3.1	-1.9
BR Caravelas	22	53	6			43	37	65S	105	116	+3.0	-1.2
BR Carolina	22	34	5			41	54	70N	60	70	+1.6	+1.1
BR Cascavel	22	28	3	-2	24	50	63S	107	118	+2.0	-1.6	
BR Castilho	22	26	33	-5	28	51	74S	96	107	+1.9	-1.0	
BR Caxias Do Sul	22	42	16	-4	25	44	43S	127	138	+2.7	-2.8	
BR Chapeco	22	33	38	-2	24	48	54S	116	127	+2.2	-2.1	
BR Conceicao Do Araguaia	22	30	15			38	55	71N	60	71	+1.4	+1.0
BR Corumba	22	16	5	2	23	57	88S	81	92	+1.2	-0.3	
BR Criciuma	22	45	52	-6	27	42	41S	129	139	+2.9	-3.0	
BR Cruziero Do Sul	22	27	52	8	18	65	16N	5	16	-1.9	+5.7	
BR Cuiaba	22	17	32	-1	26	57	83N	73	83	+1.2	+0.1	
BR Curitiba	22	38	10	-7	29	45	54S	116	126	+2.5	-2.0	
BR Fernando Do Noronha	23	11	54			60	32	80N	70	80	+3.0	+1.0
BR Florianopolis	22	45	22	-8	28	42	44S	126	136	+2.9	-2.7	
BR Fortaleza	22	55	46			54	45	72N	62	72	+2.3	+1.3
BR Foz Do Iguacu	22	27	6	0	23	51	62S	107	118	+1.9	-1.6	
BR Franca	22	35	0	-10	33	46	67S	102	113	+2.3	-1.2	
BR Fronteira	22	30	44	-8	31	48	71S	98	109	+2.1	-1.0	
BR Goiania	22	28	2	-9	33	51	83S	86	97	+1.9	-0.4	
BR Guajara-Mirim	22	15	17	6	20	63	52N	41	52	+0.1	+1.6	
BR Guaratingueta	22	43	42			34	42	56S	113	124	+2.7	-1.8
BR Ilheus	22	51	9			45	38	74S	96	107	+2.8	-0.7
BR Imperatriz	22	36	25			42	55	64N	54	64	+1.4	+1.5
BR Ipatinga	22	45	58			38	40	63S	106	117	+2.8	-1.3
BR Itaituba	22	33	55	-8	34	62	32N	21	32	-0.2	+3.6	
BR Itumbiara	22	29	5	-8	32	50	77S	92	103	+2.0	-0.7	
BR Jacare-Acanga	22	25	37	-5	31	61	48N	37	48	+0.4	+2.1	
BR Joao Pessoa	22	59	15			54	38	87N	76	87	+2.8	+0.5
BR Joinville	22	41	1	-7	29	44	50S	120	130	+2.6	-2.3	
BR Juiz De Fora	22	47	0			36	40	57S	113	123	+2.9	-1.8
BR Lagoa Santa	22	42	27			37	42	65S	105	115	+2.6	-1.3
BR Lajes	22	40	54	-5	27	44	47S	123	134	+2.6	-2.5	
BR Lins	22	31	6	-7	30	48	68S	102	112	+2.1	-1.2	
BR Londrina	22	30	24	-5	27	49	64S	105	116	+2.1	-1.4	
BR MacApa	22	46	18			44	60	35N	24	34	+0.4	+3.8
BR MacEio	22	58	53			52	36	86S	84	94	+2.9	+0.1
BR Manaus	22	34	45	-7	33	63	27N	17	27	-0.5	+4.1	
BR Manicore	22	25	50	-2	28	62	39N	28	39	+0.0	+2.7	
BR Maraba	22	34	25			41	56	61N	50	61	+1.3	+1.6
BR Marilia	22	31	23	-6	29	48	66S	103	114	+2.1	-1.3	
BR Maringa	22	28	59	-4	27	49	65S	104	115	+2.0	-1.4	
BR Mocord	22	56	57			54	42	79N	68	78	+2.5	+1.0
BR Montes Claros	22	39	44			39	44	74S	95	106	+2.4	-0.7
BR Natal	23	1	57			56	38	84N	73	83	+2.8	+0.8
BR Navegantes	22	43	1	-7	29	43	47S	122	133	+2.7	-2.5	
BR Oriximina	22	39	46	-12	38	62	29N	18	29	-0.2	+4.2	
BR Parnaiba	22	50	17			51	50	65N	54	64	+1.9	+1.7
BR Passo Fundo	22	36	52	-3	24	47	49S	121	131	+2.4	-2.4	
BR Paulo Alfonso	22	52	4			50	41	89S	80	91	+2.7	+0.2
BR Pelotas	22	47	12	-3	24	43	34S	136	147	+3.0	-3.7	
BR Petrolina	22	46	13			47	45	87N	77	87	+2.4	+0.4
BR Piracununga	22	36	55	-10	32	45	63S	107	117	+2.4	-1.5	
BR Pocos De Caldas	22	38	33	-11	33	44	62S	108	118	+2.5	-1.5	
BR Ponta Grossa	22	35	34	-6	28	46	56S	113	124	+2.4	-1.9	
BR Ponta Pora	22	21	9	1	23	53	74S	95	106	+1.6	-1.0	
BR Porto Alegre	22	44	44	-4	25	44	39S	131	141	+2.8	-3.1	
BR Porto Nacional	22	29	49			37	53	80N	69	80	+1.6	+0.5
BR Porto Velho	22	19	3	3	23	63	46N	35	46	+0.1	+2.0	
BR President Prudente	22	28	19	-5	28	50	69S	101	111	+2.0	-1.2	
BR Recife	23	1	43			54	36	89S	80	91	+2.9	+0.3
BR Ribeirao Preto	22	34	47	-9	32	46	66S	103	114	+2.3	-1.3	
BR Rio Branco	22	16	55	7	19	64	43N	32	43	-0.2	+2.1	
BR Rio De Janeiro	22	49	17			36	39	53S	117	127	+3.0	-2.0
BR Rio Grande	22	48	55	-3	24	43	31S	139	149	+3.2	-4.0	
BR Salvador	22	52	5			47	39	79S	91	102	+2.8	-0.4
BR Santarem	22	37	17	-1	23	47	46S	124	135	+2.4	-2.6	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az						o
BR Santo Angelo	22	32	44	0	23	49	52S	118	128	+2.2	-2.2	
BR Santos	22	42	53	-11	32	42	54S	115	126	+2.7	-2.0	
BR Sao Jose Do Rio Preto	22	30	48	-7	30	48	70S	100	110	+2.1	-1.1	
BR Sao Jose Dos Campos	22	42	44	-11	33	42	56S	114	124	+2.7	-1.9	
BR Sao Luis	22	46	24			49	53	59N	49	59	+1.6	+2.0
BR Sao Paulo	22	41	21	-10	32	43	56S	114	124	+2.6	-1.9	
BR Sao Pedro Da Aldeia	22	52	45		37	37	51S	119	129	+3.1	-2.1	
BR Tarauaca	22	22	52	8	18	65	27N	16	27	-0.9	+3.6	
BR Tefe	22	38	36	-3	29	64	12N	1	12	-2.4	+7.6	
BR Telemaco Borba	22	32	53	-5	28	47	60S	109	120	+2.2	-1.7	
BR Teodoro Sampaio	22	25	45	-3	26	51	70S	99	110	+1.8	-1.2	
BR Teresina	22	44	52		48	51	70N	59	70	+1.9	+1.3	
BR Tucuruí	22	36	37		42	57	54N	43	54	+1.1	+2.1	
BR Uberaba	22	32	48	-9	32	47	71S	98	109	+2.2	-1.0	
BR Uruguiana	22	30	5	3	19	51	52S	118	129	+2.0	-2.2	
BR Varginha	22	40	59		34	43	61S	109	119	+2.6	-1.5	
BR Vilhena	22	15	9	2	24	60	68N	57	67	+0.7	+0.8	
BR Vitoria	22	53	35		40	36	57S	112	123	+3.1	-1.7	
BR Vitoria Da Conquista	22	46	3		43	41	76S	94	104	+2.7	-0.6	
CL Alto Palena	22	48	57	16	4	55	14S	156	167	+3.8	-8.3	
CL Ancud	22	35	44	19	2	59	32S	138	148	+1.6	-3.7	
CL Antofagasta	22	7	16	17	8	63	87N	77	87	+0.5	-0.4	
CL Arica	22	7	16	15	11	64	71N	60	71	+0.3	+0.4	
CL Calama	22	7	36	15	10	62	86N	76	86	+0.5	-0.3	
CL Castro	22	38	2	19	2	59	29S	141	152	+1.8	-4.1	
CL Chaiten	22	42	3	17	3	57	23S	147	157	+2.3	-5.0	
CL Chillan	22	22	46	19	4	60	52S	118	129	+1.1	-2.3	
CL Concepcion	22	22	8	20	3	61	53S	117	128	+1.0	-2.2	
CL Copiapo	22	9	45	17	7	62	81S	89	99	+0.7	-0.9	
CL Curico	22	20	13	18	5	60	56S	113	124	+1.0	-2.0	
CL Iquique	22	6	52	15	10	63	78N	68	78	+0.4	+0.0	
CL La Serena	22	12	6	18	6	62	73S	96	107	+0.7	-1.2	
CL Los Angeles	22	24	17	19	3	60	49S	121	131	+1.1	-2.4	
CL Osorno	22	32	29	19	3	59	37S	133	144	+1.5	-3.3	
CL Puerto Montt	22	35	16	18	3	59	33S	137	148	+1.6	-3.6	
CL Rancagua	22	19	8	18	5	60	58S	111	122	+1.0	-1.9	
CL Santiago	22	17	59	17	6	60	61S	109	120	+1.0	-1.8	
CL Santo Domingo	22	17	20	18	5	61	61S	108	119	+0.9	-1.8	
CL Temuco	22	27	34	19	3	60	44S	126	136	+1.3	-2.7	
CL Valdivia	22	29	31	19	3	60	41S	129	139	+1.3	-2.9	
CL Vallenar	22	10	50	18	6	62	77S	93	103	+0.7	-1.1	
PY Asuncion	22	21	26	3	20	54	68S	101	112	+1.6	-1.3	
PY Ayolas	22	25	45	3	20	52	60S	110	120	+1.8	-1.7	
PY Concepcion	22	19	29	3	21	54	74S	95	106	+1.5	-1.0	
PY Filadelfia	22	15	4	6	19	57	81S	88	99	+1.2	-0.7	
PY Itaipu	22	26	32	0	23	51	63S	106	117	+1.9	-1.6	
PY Mariscal Estigarribia	22	14	12	6	18	57	83S	86	97	+1.1	-0.6	
PY Pilar	22	22	31	4	19	54	64S	105	116	+1.6	-1.5	
PE Anta	22	27	34	14	13	66	11N	0	11	-2.7	+7.3	
PE Arequipa	22	8	3	15	11	64	62N	51	62	+0.1	+0.8	
PE Atalaya	22	17	16	13	13	65	34N	23	34	-0.6	+2.6	
PE Ayacucho	22	12	10	15	11	65	45N	34	45	-0.3	+1.7	
PE Collique	22	16	27	17	9	66	33N	22	32	-0.8	+2.6	
PE Cuzco	22	11	2	14	12	65	51N	40	50	-0.1	+1.4	
PE Huanuco	22	22	11	14	12	66	22N	11	22	-1.3	+4.1	
PE Iberia	22	14	15	10	16	64	46N	36	46	-0.1	+1.8	
PE Ilo	22	7	20	15	10	64	67N	56	67	+0.2	+0.5	
PE Jauja	22	15	32	15	11	66	36N	25	35	-0.6	+2.4	
PE Juliaca	22	8	50	13	12	64	61N	50	61	+0.1	+0.9	
PE Las Palmas	22	15	50	17	9	66	34N	23	34	-0.7	+2.5	
PE Lima	22	16	15	17	9	66	33N	22	33	-0.8	+2.6	
PE Moquegua	22	7	38	15	11	64	66N	55	66	+0.2	+0.6	
PE Nazca	22	9	59	17	9	65	51N	40	50	-0.2	+1.3	
PE Pisco	22	12	5	17	9	66	44N	33	43	-0.4	+1.8	
PE Pucallpa	22	26	54	11	16	65	16N	5	15	-2.0	+5.8	
PE Puerto Esperanza	22	18	3	10	16	65	36N	25	36	-0.5	+2.5	
PE Puerto Maldonado	22	12	20	11	15	64	52N	41	52	+0.0	+1.4	
PE San Juan	22	9	25	18	8	66	52N	42	52	-0.2	+1.2	
PE San Ramon	22	17	15	15	12	66	33N	22	32	-0.7	+2.7	
PE Tacna	22	7	21	15	11	64	70N	59	70	+0.2	+0.4	
PE Tingo Maria	22	24	36	13	13	66	18N	7	18	-1.7	+5.0	
UY Artigas	22	32	40	2	20	50	48S	121	132	+2.1	-2.4	
UY Colonia	22	41	57	3	18	48	33S	137	147	+2.7	-3.8	
UY Durazno	22	41	22	2	19	47	36S	134	145	+2.6	-3.5	
UY Maldonado	22	51	51	0	20	44	23S	147	158	+3.7	-5.6	
UY Melo	22	43	58	-1	22	45	35S	135	145	+2.8	-3.6	
UY Montevideo	22	48	31	1	19	45	26S	144	154	+3.3	-4.9	
UY Montevideo	22	47	35	1	19	46	27S	143	153	+3.2	-4.7	
UY Paysandu	22	34	32	4	18	50	43S	126	137	+2.2	-2.8	
UY Punta Del Este	22	52	51	-1	21	43	22S	148	159	+3.9	-5.9	
UY Rivera	22	36	27	1	20	48	44S	126	136	+2.3	-2.8	
UY Salto	22	32	12	4	18	51	47S	123	133	+2.0	-2.5	
UY Tacuarembó	22	37	38	2	20	48	42S	128	139	+2.4	-2.9	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
AR Bahia Blanca	23	10	33	3	16	45	-13S	183	194	-1.5	+4.9
AR Bolivar	23	18	3	0	20	43	-26S	196	207	-0.1	+2.5
AR Buenos Aires	23	21	54	-3	23	41	-28S	198	208	+0.1	+2.4
AR Catamarca	23	24	4	-1	23	48	-62S	232	242	+0.9	+0.5
AR Chilecito	23	22	14	1	21	49	-63S	233	243	+0.9	+0.4

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Chosmadal	23	15	34	8	13	50	-40S	210	220	+0.1	+1.0
AR Colonel Suarez	23	15	1	2	18	44	-21S	191	202	-0.5	+3.0
AR Concordia	23	28	22	-7	27	40	-41S	211	221	+0.7	+1.6
AR Cordoba	23	23	39	-1	22	46	-51S	221	231	+0.7	+0.8
AR Corrientes	23	32	16	-9	30	41	-55S	225	236	+1.2	+1.0
AR Curuzu Cuatia	23	30	33	-8	28	40	-46S	216	227	+0.9	+1.3
AR Cutralco	23	13	42	8	13	50	-32S	202	212	-0.1	+1.6
AR Dolores	23	16	1	-2	21	41	-16S	186	196	-1.1	+4.6
AR El Bolson	23	8	58	11	9	52	-22S	192	202	-0.8	+2.5
AR El Maiten	23	8	24	11	9	52	-20S	190	201	-0.9	+2.8
AR El Palomar	23	21	46	-3	23	41	-28S	198	209	+0.1	+2.4
AR Esquel	23	5	26	12	8	52	-14S	184	194	-1.7	+4.4
AR Formosa	23	34	3	-10	31	41	-58S	228	239	+1.3	+0.9
AR Fuerte Gral Roca	23	13	16	7	13	48	-28S	198	208	-0.3	+1.9
AR General Pico	23	18	56	2	19	45	-34S	204	215	+0.2	+1.6
AR Gobernador Gordillo	23	22	43	0	21	48	-58S	227	238	+0.8	+0.6
AR Goya	23	30	6	-7	28	41	-51S	220	231	+1.0	+1.1
AR Gualeguaychu	23	25	9	-5	24	40	-35S	205	216	+0.5	+1.8
AR Iguazu Falls	23	39	40		34	36	-54S	224	234	+1.4	+1.2
AR Jose C. Paz	23	21	54	-3	23	41	-29S	199	209	+0.1	+2.3
AR Jujuy	23	26	8	-4	27	48	-74S	244	254	+1.3	+0.2
AR Junin	23	21	31	-2	21	43	-34S	203	214	+0.3	+1.8
AR La Cumbre	23	23	36	-1	22	46	-53S	223	233	+0.8	+0.8
AR La Plata	23	20	46	-3	23	40	-25S	195	205	-0.1	+2.9
AR La Quiaca	23	25	32	-5	28	49	-81S	251	261	+1.4	+0.0
AR La Rioja	23	22	47	0	22	48	-61S	231	242	+0.9	+0.4
AR Laboulaye	23	21	18	0	20	45	-40S	210	220	+0.4	+1.3
AR Las Lomitas	23	32	2	-9	30	43	-66S	236	247	+1.4	+0.6
AR Malargue	23	17	24	6	15	50	-46S	216	226	+0.3	+0.8
AR Marcos Juarez	23	23	46	-2	22	44	-43S	213	223	+0.6	+1.2
AR Mendoza	23	19	36	4	18	49	-53S	223	234	+0.6	+0.6
AR Mercedes	23	31	7	-8	28	40	-48S	218	229	+1.0	+1.2
AR Monte Caseros	23	30	10	-8	28	39	-44S	214	224	+0.9	+1.4
AR Moron	23	21	36	-3	23	41	-28S	198	208	+0.1	+2.4
AR Neuquen	23	13	33	7	13	49	-29S	199	210	-0.2	+1.8
AR Obera	23	36	32		32	37	-49S	219	230	+1.2	+1.4
AR Olavarrria	23	15	47	0	19	43	-20S	190	200	-0.6	+3.4
AR Oran	23	27	19	-6	28	48	-77S	246	257	+1.4	+0.2
AR Parana	23	25	56	-4	24	42	-43S	213	224	+0.7	+1.3
AR Paso De Los Libres	23	31	24	-9	29	39	-45S	215	226	+0.9	+1.4
AR Pehuajo	23	18	53	0	20	44	-30S	200	210	+0.0	+2.1
AR Posadas	23	35	40	-12	32	38	-51S	221	231	+1.2	+1.2
AR Presidencia R.S.Pena	23	30	47	-8	29	43	-60S	230	240	+1.2	+0.7
AR Punta Indio	23	19	34	-3	23	40	-21S	191	201	-0.4	+3.5
AR Reconquista	23	29	31	-7	27	42	-51S	221	231	+1.0	+1.1
AR Resistencia	23	31	55	-8	29	41	-56S	226	236	+1.2	+0.9
AR Rio Cuarto	23	22	2	0	21	46	-45S	215	226	+0.6	+1.0
AR Rosario	23	24	14	-3	23	42	-40S	210	220	+0.5	+1.5
AR Salta	23	25	30	-3	26	48	-73S	243	253	+1.2	+0.2
AR San Carlos De Barilocho	23	10	20	11	9	51	-25S	195	206	-0.5	+2.1
AR San Fernando	23	22	11	-3	23	41	-29S	199	209	+0.1	+2.3
AR San Justo	23	21	27	-3	23	41	-28S	198	208	+0.0	+2.5
AR San Luis	23	20	40	2	19	47	-48S	218	228	+0.5	+0.8
AR San Martin Des Andes	23	12	18	10	10	51	-30S	200	211	-0.2	+1.6
AR San Rafael	23	18	38	4	17	49	-47S	217	227	+0.4	+0.8
AR Santa Fe	23	25	47	-4	24	43	-44S	214	225	+0.7	+1.3
AR Santa Rosa	23	17	20	3	18	46	-32S	202	212	+0.0	+1.8
AR Santa Teresita	23	13	23	-2	21	40	-9S	179	190	-2.6	+7.7
AR Santiago Del Estero	23	25	54	-3	25	46	-63S	232	243	+1.0	+0.5
AR Tandil	23	13	26	0	19	42	-14S	184	195	-1.4	+5.0
AR Tartagal	23	28	10	-6	29	48	-77S	247	257	+1.4	+0.1
AR Tinogasta	23	22	30	0	22	49	-67S	236	247	+0.9	+0.3
AR Tres Arroyos	23	8	43	2	17	44	-8S	178	188	-3.1	+8.4
AR Tucuman	23	25	27	-3	25	47	-67S	236	247	+1.1	+0.4
AR Villa Dolores	23	22	29	0	21	46	-51S	220	231	+0.7	+0.8
AR Villa Reynolds	23	20	47	1	19	46	-45S	215	225	+0.5	+1.0
BO Apolo	23	17	52	-4	29	56	-71N	279	289	+1.8	-0.9
BO Ascension De Guarayos	23	28	34	-10	34	50	-83N	267	277	+2.0	-0.4
BO Bermejo	23	27	25	-6	29	48	-78S	247	258	+1.4	+0.1
BO Camiri	23	28	38	-8	31	48	-85S	254	265	+1.6	+0.0
BO Chapacura	23	25	15	-7	31	51	-83N	266	277	+1.8	-0.4
BO Charana	23	18	9	-2	26	55	-79N	271	281	+1.6	-0.7
BO Cobiya	23	12	41	-4	29	58	-56N	293	304	+2.2	-1.6
BO Cochabamba	23	23	30	-6	30	52	-83N	266	277	+1.7	-0.4
BO Conception	23	30	45	-12	35	49	-86N	264	274	+2.0	-0.3
BO Guayaramerin	23	20	4	-9	34	56	-62N	288	298	+2.3	-1.3
BO La Paz	23	19	28	-4	28	54	-77N	272	283	+1.7	-0.7
BO Magdalena	23	25	14	-10	34	53	-73N	277	287	+2.1	-0.8
BO Oruro	23	22	11	-5	29	53	-84N	266	276	+1.6	-0.5
BO Potosi	23	24	52	-6	29	51	-89S	259	269	+1.6	-0.2
BO Puerto Suarez	23	39	3		37	42	-80S	249	260	+1.9	+0.3
BO Reyes	23	19	30	-5	30	55	-71N	279	289	+1.9	-0.9
BO Riberalta	23	18	40	-8	33	56	-61N	288	299	+2.2	-1.3
BO Robore	23	35	20		36	45	-84S	254	264	+1.9	+0.1
BO Rurrenabaque	23	19	20	-5	30	55	-71N	278	289	+1.9	-0.9
BO San Borja	23	21	8	-6	31	54	-74N	276	286	+1.9	-0.8
BO San Ignacio De Moxos	23	23	17	-7	32	53	-76N	273	284	+1.9	-0.7
BO San Ignacio De Velasco	23	32	56		36	47	-88N	262	272	+2.0	-0.2
BO San Joaquin	23	23	48	-9	34	53	-71N	278	289	+2.1	-0.8
BO San Mathias	23	38	13		39	44	-88S	258	268	+2.1	+0.0
BO San Ramon	23	24	6	-9	34	53	-72N	277	288	+2.1	-0.8
BO Santa Ana	23	22	48	-8	33	54	-72N	277	288	+2.0	-0.8
BO Santa Cruz	23	29	3	-10	33	49	-89N	261	271	+1.8	-0.2
BO Sucre	23	25	29	-6	30	51	-90N	260	270	+1.6	-0.2

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
BO Tarija	23	26	53	-6	29	49	-82S	251	262	+1.5	+0.0
BO Trinidad	23	24	34	-8	33	53	-77N	273	283	+1.9	-0.6
BR Almeirim	23	42	3		54	51	-45N	304	315	+3.9	-2.5
BR Alpinopolis	0	1	21		45	24	-59S	229	240	+2.2	+1.5
BR Alta Floresta	23	42	15		46	46	-74N	275	286	+2.7	-0.5
BR Altamira	23	47	57		54	46	-56N	293	303	+3.5	-1.5
BR Amapa	23	39	30		57	53	-32N	317	328	+4.8	-4.5
BR Aracaju	0	40	44		58	358	-82S	252	262	+3.4	+1.0
BR Aracatuba	23	52	3		42	31	-63S	233	243	+2.0	+1.2
BR Araracuara	23	55	51		43	27	-58S	228	238	+2.0	+1.5
BR Assis	23	50	10		40	31	-58S	228	239	+1.9	+1.3
BR Bage	23	30	47	-10	29	36	-33S	203	213	+0.6	+2.3
BR Barbacena	0	6	12		46	19	-54S	224	235	+2.3	+1.9
BR Barra Do Garcas	23	51	59		45	36	-82S	251	262	+2.4	+0.5
BR Bauru	23	53	14		42	29	-57S	227	238	+2.0	+1.4
BR Belem	23	59	2		60	41	-55N	294	305	+3.8	-1.6
BR Belo Horizonte	0	8	16		47	19	-59S	229	240	+2.4	+1.7
BR Bom Jesus Da Lapa	0	18	14		54	17	-79S	249	259	+3.0	+0.9
BR Brasilia	0	3	8		49	27	-76S	246	256	+2.6	+0.8
BR Campinas	23	55	56		42	25	-53S	223	233	+2.0	+1.7
BR Campo Grande	23	44	19		39	38	-71S	241	251	+1.9	+0.7
BR Campos	0	11	6		46	14	-50S	220	231	+2.3	+2.2
BR Caravelas	0	24	35		51	7	-62S	232	242	+2.9	+1.8
BR Carolina	0	7	23		57	31	-78N	272	282	+3.3	-0.2
BR Cascavel	23	41	57		36	35	-55S	225	235	+1.5	+1.2
BR Castilho	23	50	12		41	33	-66S	235	246	+2.0	+1.0
BR Caxias Do Sul	23	38	0		33	32	-37S	206	217	+1.0	+2.3
BR Chapeco	23	40	12		34	34	-47S	217	227	+1.3	+1.6
BR Conceicao Do Araguaia	0	1	40		54	35	-79N	271	281	+3.1	-0.2
BR Corumba	23	39	18		38	42	-79S	249	259	+1.9	+0.3
BR Criciuma	23	40	57		34	30	-35S	205	216	+1.0	+2.5
BR Cruziro Do Sul	22	52	58	3	23	63	-25N	324	334	+3.6	-5.4
BR Cuiaba	23	43	13		42	42	-87S	257	267	+2.3	+0.1
BR Curitiba	23	48	3		38	29	-47S	217	228	+1.6	+1.8
BR Fernando Do Noronha	0	59	57		63	337	-76N	274	284	+3.5	-0.2
BR Florianopolis	23	44	28		36	28	-38S	208	218	+1.2	+2.4
BR Fortaleza	0	38	3		65	2	-74N	276	286	+3.7	-0.3
BR Foz Do Iguacu	23	39	48		34	36	-55S	225	235	+1.4	+1.2
BR Franca	23	59	10		44	26	-61S	231	241	+2.2	+1.4
BR Fronteira	23	55	42		44	29	-64S	234	244	+2.2	+1.2
BR Goiania	23	59	13		47	30	-75S	245	255	+2.5	+0.8
BR Guajara-Mirim	23	20	10	-9	34	56	-62N	288	298	+2.3	-1.3
BR Guaratingueta	0	0	13		43	22	-51S	221	231	+2.0	+1.9
BR Ilheus	0	29	51		54	5	-71S	241	251	+3.1	+1.4
BR Imperatriz	0	6	46		58	33	-72N	278	288	+3.4	-0.5
BR Ipatinga	0	12	37		48	16	-59S	229	239	+2.5	+1.8
BR Itaituba	23	25	47		45	56	-43N	307	317	+3.6	-2.7
BR Itumbiara	23	57	37		45	29	-70S	240	250	+2.3	+1.0
BR Jacare-Acanga	23	34	6		45	52	-58N	291	301	+3.0	-1.4
BR Joao Pessoa	0	47	13		62	352	-86N	263	274	+3.5	+0.4
BR Joinville	23	47	15		38	28	-44S	214	224	+1.5	+2.0
BR Juiz De Fora	0	6	2		45	18	-52S	222	233	+2.2	+2.0
BR Lagoa Santa	0	8	42		47	19	-60S	230	240	+2.5	+1.6
BR Lajes	23	41	59		35	31	-40S	210	221	+1.2	+2.1
BR Lins	23	52	50		42	30	-60S	230	241	+2.0	+1.3
BR Londrina	23	47	59		39	32	-57S	227	237	+1.8	+1.3
BR MacApa	23	45	44		57	49	-43N	306	316	+4.1	-2.7
BR MacEio	0	46	18		59	353	-86S	256	266	+3.4	+0.8
BR Manaus	23	19	38		42	58	-38N	311	322	+3.7	-3.3
BR Manicore	23	22	49		40	56	-49N	300	311	+3.0	-2.1
BR Maraba	0	0	57		57	37	-69N	280	291	+3.4	-0.7
BR Marilia	23	51	45		41	30	-59S	229	239	+1.9	+1.3
BR Maringa	23	46	31		38	33	-58S	228	238	+1.7	+1.2
BR Mocord	0	42	27		64	357	-79N	270	281	+3.6	+0.0
BR Montes Claros	0	13	16		51	18	-69S	239	249	+2.7	+1.3
BR Natal	0	49	59		63	349	-82N	267	278	+3.5	+0.2
BR Navegantes	23	46	7		37	28	-41S	211	222	+1.4	+2.2
BR Oriximina	23	28	48		48	56	-39N	310	321	+4.0	-3.2
BR Parnaiba	0	25	50		65	16	-69N	281	291	+3.7	-0.7
BR Passo Fundo	23	38	42		33	33	-42S	212	223	+1.1	+1.9
BR Paulo Alfonso	0	37	53		60	1	-88S	257	268	+3.4	+0.7
BR Pelotas	23	30	48	-11	29	34	-28S	198	208	+0.4	+2.9
BR Petrolina	0	30	3		59	9	-89S	259	269	+3.4	+0.5
BR Piracununga	23	57	12		43	26	-56S	226	237	+2.1	+1.6
BR Pocos De Caldas	23	59	0		44	24	-56S	226	236	+2.1	+1.6
BR Ponta Grossa	23	46	56		38	30	-50S	219	230	+1.6	+1.7
BR Ponta Pora	23	40	54		36	38	-66S	236	246	+1.7	+0.8
BR Porto Alegre	23	36	11		32	32	-33S	203	214	+0.8	+2.5
BR Porto Nacional	0	4	25		53	31	-88N	262	272	+3.0	+0.2
BR Porto Velho	23	20	36	-11	36	56	-56N	293	304	+2.6	-1.6
BR President Prudente	23	48	55		40	32	-61S	231	241	+1.9	+1.2
BR Recife	0	50	11		60	349	-89N	260	271	+3.5	+0.6
BR Ribeirao Preto	23	57	34		44	26	-60S	229	240	+2.1	+1.4
BR Rio Branco	23	12	45	-5	31	58	-53N	297	307	+2.3	-1.8
BR Rio De Janeiro	0	4	21		44	18	-49S	218	229	+2.1	+2.2
BR Rio Grande	23	29	47	-10	29	34	-26S	196	206	+0.2	+3.2
BR Salvador	0	34	29		56	3	-77S	246	257	+3.2	+1.2
BR Santarem	23	34	37	-12	31	35	-39S	209	219	+0.9	+1.9
BR Santo Angelo	23	36	33		32	36	-45S	215	226	+1.1	+1.6
BR Santos	23	55	59		42	24	-49S	218	229	+1.9	+2.0
BR Sao Jose Do Rio Preto	23	54	32		43	29	-63S	233	243	+2.1	+1.2
BR Sao Jose Dos Campos	23	58	3		42	23	-50S	220	231	+2.0	+1.9
BR Sao Luis	0	16	19		64	26	-65N	284	295	+3.7	-0.9
BR Sao Paulo	23	55	45		42	25	-50S	220	230	+1.9	+1.9

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	
BR Sao Pedro Da Aldeia	0	6	49	45	16	-47S	217	228	+2.2	+2.4	
BR Tarauaca	23	1	20	-1	27	62	-37N	313	323	+2.8	-3.2
BR Tefe	23	1	57	-8	34	62	-22N	327	337	+5.0	-6.9
BR Telemaco Borba	23	47	28	38	31	-53S	223	234	+1.7	+1.5	
BR Teodoro Sampaio	23	45	40	39	35	-62S	232	242	+1.8	+1.0	
BR Teresina	0	22	51	63	18	-75N	274	285	+3.6	-0.3	
BR Tukurui	23	57	36	57	40	-62N	287	297	+3.5	-1.1	
BR Uberaba	23	59	0	45	27	-64S	234	244	+2.3	+1.3	
BR Uruguaiiana	23	31	23	-9	29	39	-45S	215	225	+0.9	+1.4
BR Varginha	0	1	47	44	22	-55S	225	236	+2.2	+1.7	
BR Vilhena	23	33	35	39	49	-78N	272	282	+2.3	-0.5	
BR Vitoria	0	16	43	48	11	-54S	224	235	+2.6	+2.1	
BR Vitoria Da Conquista	0	24	10	54	11	-72S	242	252	+3.0	+1.3	
CL Alto Palena	23	3	27	13	7	53	-10S	180	190	-2.5	+6.2
CL Ancud	23	10	17	13	7	53	-28S	198	208	-0.4	+1.7
CL Antofagasta	23	19	33	1	22	53	-85S	254	265	+1.2	-0.2
CL Arica	23	17	30	-1	25	55	-80N	270	280	+1.5	-0.6
CL Calama	23	21	5	-1	24	52	-85S	255	265	+1.3	-0.2
CL Castro	23	9	11	13	7	53	-25S	194	205	-0.6	+2.0
CL Chaiten	23	7	28	13	7	53	-19S	189	199	-1.0	+2.9
CL Chillan	23	16	0	8	13	52	-46S	216	226	+0.2	+0.7
CL Concepcion	23	15	38	9	12	52	-47S	217	227	+0.2	+0.6
CL Copiapo	23	20	1	3	20	52	-73S	243	253	+0.9	+0.0
CL Curico	23	17	15	7	14	51	-50S	220	230	+0.4	+0.6
CL Iquique	23	18	53	0	24	54	-87N	263	273	+1.4	-0.4
CL La Serena	23	19	7	5	18	52	-66S	236	246	+0.8	+0.2
CL Los Angeles	23	15	21	9	12	52	-44S	214	224	+0.2	+0.8
CL Osorno	23	12	3	11	9	52	-32S	202	213	-0.2	+1.4
CL Puerto Montt	23	10	49	12	8	53	-28S	198	209	-0.4	+1.7
CL Rancagua	23	17	52	6	15	51	-52S	222	232	+0.5	+0.5
CL Santiago	23	18	20	6	16	51	-54S	224	234	+0.5	+0.5
CL Santo Domingo	23	17	44	7	15	52	-55S	225	235	+0.5	+0.4
CL Temuco	23	14	8	10	11	52	-39S	209	219	+0.0	+1.0
CL Valdivia	23	13	16	11	10	52	-36S	206	217	-0.1	+1.1
CL Vallenar	23	19	36	4	19	52	-70S	239	250	+0.8	+0.1
PY Asuncion	23	35	52	-12	32	40	-60S	230	241	+1.4	+0.9
PY Ayolas	23	34	37	-11	31	39	-53S	222	233	+1.2	+1.1
PY Concepcion	23	37	27	34	40	-66S	235	246	+1.6	+0.7	
PY Filadelfia	23	33	54	-11	33	44	-73S	242	253	+1.6	+0.4
PY Itaipu	23	39	50	35	36	-55S	225	236	+1.5	+1.2	
PY Mariscal Estigarribia	23	33	8	-10	32	44	-74S	244	255	+1.6	+0.3
PY Pilar	23	33	19	-10	30	41	-56S	226	237	+1.2	+0.9
PE Anta	22	45	35	9	17	65	-20N	329	340	+3.9	-7.1
PE Arequipa	23	13	52	0	24	57	-71N	279	289	+1.6	-1.0
PE Atalaya	23	1	20	3	23	62	-43N	306	317	+2.2	-2.5
PE Ayacucho	23	5	19	3	22	61	-54N	296	306	+1.8	-1.7
PE Collique	22	57	31	7	19	63	-41N	308	318	+2.0	-2.6
PE Cuzco	23	9	59	0	25	59	-60N	289	300	+1.8	-1.4
PE Huanuco	22	52	40	7	19	64	-31N	318	329	+2.7	-4.0
PE Iberia	23	11	47	-3	28	58	-56N	293	304	+2.1	-1.6
PE Ilo	23	15	33	0	24	56	-76N	274	284	+1.5	-0.8
PE Jauja	23	0	7	5	21	62	-44N	305	315	+2.0	-2.4
PE Juliaca	23	15	19	-2	26	57	-70N	279	290	+1.7	-1.0
PE Las Palmas	22	58	12	7	19	63	-43N	307	317	+2.0	-2.5
PE Lima	22	57	39	7	18	63	-42N	308	318	+2.0	-2.6
PE Moquegua	23	15	42	0	25	56	-75N	275	285	+1.6	-0.8
PE Nazca	23	6	50	4	21	60	-59N	290	300	+1.6	-1.5
PE Pisco	23	3	0	6	20	61	-52N	297	308	+1.7	-1.8
PE Pucallpa	22	50	49	5	21	64	-25N	325	335	+3.5	-5.5
PE Puerto Esperanza	23	5	59	-1	27	60	-46N	303	314	+2.3	-2.3
PE Puerto Maldonado	23	14	4	-3	28	58	-61N	288	298	+2.0	-1.3
PE San Juan	23	7	19	5	21	60	-61N	288	299	+1.6	-1.4
PE San Ramon	22	58	56	5	21	62	-41N	308	318	+2.1	-2.7
PE Tacna	23	17	22	-1	25	55	-79N	271	281	+1.5	-0.7
PE Tingo Maria	22	50	44	7	19	64	-27N	322	333	+3.1	-4.8
UY Artigas	23	30	57	-9	28	38	-41S	211	222	+0.8	+1.6
UY Colonia	23	22	10	-4	23	40	-27S	197	207	+0.0	+2.6
UY Durazno	23	25	10	-6	25	39	-29S	199	210	+0.3	+2.4
UY Maldonado	23	20	15	-5	24	38	-17S	187	198	-0.8	+4.4
UY Melo	23	28	26	-9	28	36	-29S	199	209	+0.4	+2.6
UY Montevideo	23	20	52	-5	24	39	-20S	190	201	-0.4	+3.7
UY Montevideo	23	21	8	-5	24	39	-21S	191	202	-0.3	+3.5
UY Paysandu	23	26	35	-6	25	40	-37S	207	217	+0.6	+1.8
UY Punta Del Este	23	19	55	-5	24	38	-16S	186	197	-0.9	+4.7
UY Rivera	23	30	44	-9	28	37	-37S	207	218	+0.7	+1.9
UY Salto	23	28	9	-6	26	40	-40S	210	221	+0.7	+1.6
UY Tacuarembó	23	28	57	-8	27	38	-35S	205	216	+0.6	+2.0

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb

PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.  
U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude ('+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude ('+ve to the north).

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# EVENTI TOPOCENTRICI <5° LUNA-PIANETI

## TOPOCENTRIC EVENT <5° MOON-PLANETS

42°N - 12°E

Date	UT	Dm	Alt.	r1	r2	p	e	m1	m2	tm(s)		
2012/01/03	02:23:06	4.37226	-14.81	4.574	0.003	350	109	-2.5	-11.3		Jupiter	Moon
2012/01/22	10:34:30	3.88952	24.76	1.396	0.003	339	-11	-0.7	-6.7		Mercury	Moon
2012/01/25	07:44:06	4.66762	-0.73	30.890	0.003	340	25	8.0	-8.3		Neptune	Moon
2012/01/30	10:29:24	3.62592	5.91	5.009	0.003	339	82	-2.3	-10.6		Jupiter	Moon
2012/02/24	07:34:09	4.50576	4.96	20.943	0.003	336	28	5.9	-8.4		Uranus	Moon
2012/02/25	21:49:03	2.69438	-12.68	0.936	0.003	348	44	-4.1	-9.4		Venus	Moon
2012/03/20	02:53:01	4.76685	-15.43	30.875	0.003	342	-28	8.0	-8.5		Neptune	Moon
2012/03/22	12:21:45	1.02014	47.98	0.606	0.003	329	-4	4.1	-4.5		Mercury	Moon
2012/03/25	23:54:22	2.35548	-28.75	5.757	0.003	352	37	-2.0	-8.9		Jupiter	Moon
2012/03/26	20:02:30	2.28182	15.53	0.713	0.003	178	45	-4.3	-9.4		Venus	Moon
2012/04/19	03:13:46	4.35023	-4.51	20.989	0.003	338	-24	5.9	-8.0		Uranus	Moon
2012/04/22	19:34:23	1.84653	-3.63	5.957	0.003	356	16	-1.9	-7.1		Jupiter	Moon
2012/05/16	15:01:07	4.82580	-9.61	20.722	0.003	343	-48	5.9	-9.5		Uranus	Moon
2012/05/20	03:33:36	1.34129	0.82	1.294	0.003	346	-9	-1.4	-5.8		Mercury	Moon
2012/05/20	14:23:10	1.38508	38.80	6.008	0.003	356	-5	-1.9	-4.6		Jupiter	Moon
2012/06/10	00:08:50	5.03538	12.26	29.698	0.003	337	-107	7.9	-11.2		Neptune	Moon
2012/06/17	07:21:36	0.72610	55.62	5.908	0.003	346	-25	-1.9	-8.2		Jupiter	Moon
2012/06/17	23:55:04	1.26915	-22.85	0.310	0.003	354	-18	-3.5	-7.4		Venus	Moon
2012/07/10	03:49:24	4.54018	49.65	19.872	0.003	329	-100	5.8	-11.1		Uranus	Moon
2012/07/15	01:46:38	0.12963	11.23	5.670	0.003	169	-46	-2.0	-9.4	3538	Jupiter	Moon
2012/07/15	16:59:10	3.13535	-13.74	0.472	0.003	4	-40	-4.5	-9.1		Venus	Moon
2012/07/20	06:08:45	0.91108	8.76	0.601	0.003	193	14	1.6	-7.0		Mercury	Moon
2012/07/24	20:29:38	4.85293	10.39	1.582	0.002	199	70	0.9	-10.4		Mars	Moon
2012/08/03	17:45:59	4.84348	-17.33	29.044	0.003	342	-159	7.8	-12.5		Neptune	Moon
2012/08/11	20:05:19	0.90411	-22.96	5.321	0.003	176	-68	-2.1	-10.2		Jupiter	Moon
2012/08/13	19:45:54	0.25129	-27.89	0.695	0.003	186	-46	-4.3	-9.4	2739	Venus	Moon
2012/08/16	02:12:33	3.86817	-6.62	0.892	0.003	191	-19	-0.1	-7.6		Mercury	Moon
2012/09/02	19:15:41	3.89448	6.02	19.160	0.003	337	-153	5.7	-12.3		Uranus	Moon
2012/09/08	12:09:26	1.25401	1.91	4.911	0.003	185	-91	-2.3	-10.8		Jupiter	Moon
2012/09/12	15:30:29	4.40804	-0.97	0.924	0.003	199	-44	-4.1	-9.4		Venus	Moon
2012/09/19	21:43:51	0.81370	-27.93	1.894	0.002	185	51	1.1	-9.8		Mars	Moon
2012/09/30	03:42:41	4.37325	15.53	19.062	0.003	340	176	5.7	-12.6		Uranus	Moon
2012/10/05	20:02:04	1.56674	2.18	4.510	0.003	173	-117	-2.5	-11.4		Jupiter	Moon
2012/10/18	13:10:14	1.14802	24.82	2.010	0.002	7	43	1.1	-9.5		Mars	Moon
2012/10/24	11:46:05	5.07505	-23.44	29.496	0.003	344	119	7.9	-11.6		Neptune	Moon
2012/11/02	01:08:43	1.21825	69.62	4.201	0.003	177	-145	-2.7	-12.1		Jupiter	Moon
2012/11/14	09:58:05	0.20538	23.95	0.687	0.002	15	7	1.8	-5.8	3924	Mercury	Moon
2012/11/16	08:43:43	3.27685	-3.08	2.104	0.002	2	35	1.1	-9.1		Mars	Moon
2012/11/23	10:45:43	4.07244	-26.59	19.500	0.003	342	124	5.8	-11.6		Uranus	Moon
2012/11/29	01:34:46	0.98619	55.14	4.070	0.003	182	-175	-2.7	-12.6		Jupiter	Moon
2012/12/10	11:50:17	4.82202	17.34	10.506	0.002	192	-41	0.8	-9.5		Saturn	Moon
2012/12/11	15:00:40	2.35722	-8.42	1.468	0.002	182	-25	-3.9	-8.4		Venus	Moon
2012/12/15	07:33:30	4.70735	-10.74	2.184	0.002	354	28	1.0	-8.7		Mars	Moon
2012/12/20	15:33:50	4.18863	41.36	19.939	0.003	330	95	5.8	-11.0		Uranus	Moon
2012/12/26	01:15:23	0.82280	36.63	4.161	0.003	182	153	-2.7	-12.3		Jupiter	Moon

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Alt = altezza in gradi sull'orizzonte dell'evento nel momento centrale

R1 = distanza in U.A. del pianeta dalla Terra

R2 = distanza in U.A. della Luna dalla Terra

p = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del pianeta

m2 = magnitudine della Luna

tm = se presente, il pianeta viene occultato massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in ° on the horizon of the event in the central moment

R1 = distance in A.U. of the planet from the Earth

R2 = distance in A.U. of the Moon from the Earth

p = angle of position between the bodies, in °

e = elongation, in °

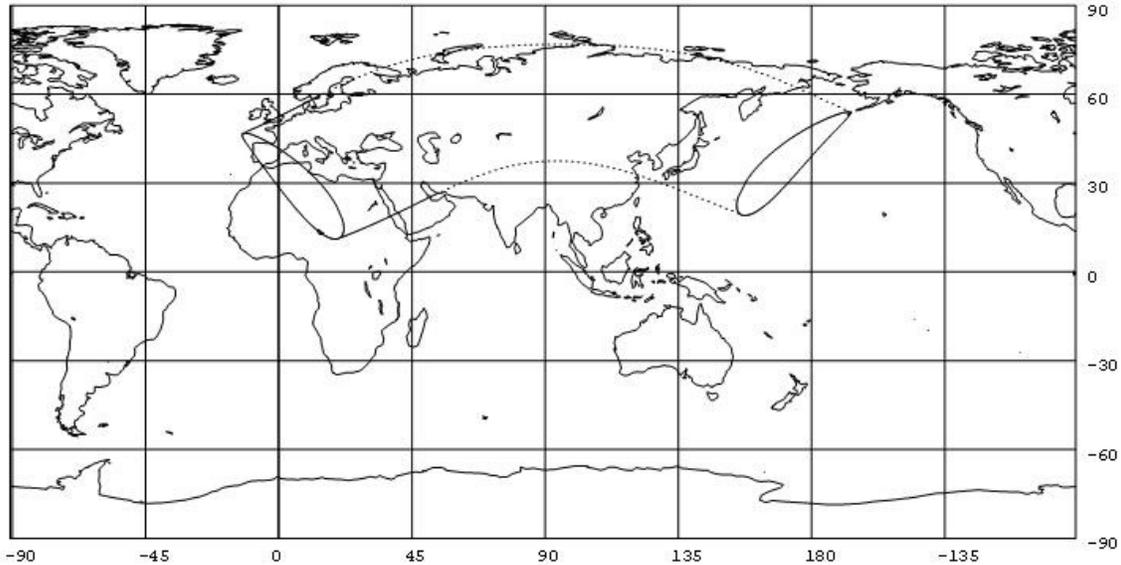
m1 = magnitude of the planet

m2 = magnitude of the Moon

tm = if present, the planet is occulted maximum for x seconds

NB : i presenti dati, con una variazione di pochi centesimi di grado del valore Dm e di pochi minuti del valore U.T., sono altresì validi per il resto di Italia

## Occultation of Jupiter, Magnitude -1.9, on 2012 Jul 15



Occult 4.09.0

UT of conjunction = 3h 6.3m

### Sparizione - Disappearance

Luogo - Location	U.T.			Sun Alt	Moon Alt	Az	CA °	PA °	WA °	a m/o	b m/o
	h	m	s								
AGRIGENTO	1	12	52	5	67	-70N	59	71	-0.5	+1.6	
ALESSANDRIA	1	30	23	7	68	-48N	37	48	-0.7	+2.2	
ANCONA	1	24	40	9	70	-56N	45	56	-0.5	+2.1	
AOSTA	1	33	8	7	67	-44N	34	45	-0.7	+2.3	
AREZZO	1	25	14	8	69	-54N	44	55	-0.6	+2.1	
ASCOLI PICENO	1	23	5	8	70	-58N	47	58	-0.5	+2.0	
ASTI	1	30	41	7	67	-47N	37	48	-0.7	+2.2	
AVELLINO	1	18	41	8	69	-63N	53	64	-0.5	+1.9	
BARI	1	18	7	9	71	-65N	54	65	-0.4	+1.9	
BELLUNO	1	30	49	10	70	-49N	38	49	-0.6	+2.3	
BENEVENTO	1	19	6	8	69	-63N	52	63	-0.5	+1.9	
BERGAMO	1	31	29	8	69	-47N	36	48	-0.7	+2.3	
BOLOGNA	1	27	44	8	69	-52N	41	52	-0.6	+2.1	
BOLZANO	1	32	11	10	70	-47N	36	48	-0.6	+2.3	
BRESCIA	1	30	43	8	69	-48N	37	49	-0.6	+2.2	
BRINDISI	1	16	51	10	71	-67N	56	67	-0.4	+1.8	
CAGLIARI	1	18	44	3	66	-61N	51	62	-0.6	+1.8	
CALTANISSETTA	1	12	57	5	68	-70N	60	71	-0.5	+1.7	
CAMPOBASSO	1	19	59	8	70	-61N	51	62	-0.5	+1.9	
CASERTA	1	19	13	8	69	-62N	52	63	-0.5	+1.9	
CATANIA	1	12	31	6	68	-71N	60	72	-0.5	+1.6	
CATANZARO	1	14	13	8	69	-69N	59	70	-0.4	+1.7	
CHIETI	1	21	45	8	70	-59N	49	60	-0.5	+2.0	
COMO	1	31	56	8	69	-46N	36	47	-0.7	+2.3	
COSENZA	1	15	3	8	69	-68N	58	69	-0.4	+1.8	
CREMONA	1	29	57	8	69	-49N	38	49	-0.6	+2.2	
CUNEO	1	29	59	6	67	-48N	37	48	-0.7	+2.2	
ENNA	1	12	56	5	68	-70N	60	71	-0.5	+1.7	
FERRARA	1	28	20	9	69	-51N	41	52	-0.6	+2.2	
FIRENZE	1	26	14	8	69	-53N	43	54	-0.6	+2.1	
FOGGIA	1	19	22	9	70	-63N	52	63	-0.5	+1.9	
FORLI`	1	26	45	8	69	-53N	42	54	-0.6	+2.1	
FROSINONE	1	20	49	7	69	-60N	50	61	-0.5	+1.9	
GENOVA	1	29	6	7	68	-49N	39	50	-0.7	+2.2	
GORIZIA	1	29	33	11	71	-51N	40	51	-0.6	+2.2	
GROSSETO	1	24	16	7	68	-55N	45	56	-0.6	+2.0	
IMPERIA	1	28	31	6	67	-50N	39	50	-0.7	+2.1	
ISERNIA	1	19	54	8	69	-61N	51	62	-0.5	+1.9	
LA SPEZIA	1	27	48	7	68	-51N	40	52	-0.6	+2.1	
L'AQUILA	1	22	10	8	69	-58N	48	59	-0.5	+2.0	
LATINA	1	20	42	7	69	-60N	50	61	-0.5	+1.9	
LECCE	1	16	8	10	71	-68N	57	68	-0.4	+1.8	
LIVORNO	1	26	20	7	68	-53N	42	53	-0.6	+2.1	
LUCCA	1	26	52	7	68	-52N	42	53	-0.6	+2.1	
MACERATA	1	24	2	9	70	-56N	46	57	-0.5	+2.0	
MANTOVA	1	29	30	8	69	-49N	39	50	-0.6	+2.2	
MASSA	1	27	29	7	68	-51N	41	52	-0.6	+2.1	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
MATERA	1	17	22	9	70	-65N	55	66	-0.4	+1.8	
MESSINA	1	13	26	6	69	-70N	59	71	-0.5	+1.7	
MILANO	1	31	14	8	68	-47N	37	48	-0.7	+2.2	
MODENA	1	28	19	8	69	-51N	40	51	-0.6	+2.2	
NAPOLI	1	18	51	7	69	-63N	52	63	-0.5	+1.9	
NOVARA	1	31	35	7	68	-46N	36	47	-0.7	+2.2	
NUORO	1	20	35	4	66	-59N	49	60	-0.6	+1.9	
ORISTANO	1	20	16	3	66	-59N	49	60	-0.6	+1.8	
PADOVA	1	29	23	9	70	-50N	40	51	-0.6	+2.2	
PALERMO	1	14	26	5	68	-68N	57	69	-0.5	+1.7	
PARMA	1	29	1	8	69	-50N	39	50	-0.6	+2.2	
PAVIA	1	30	39	8	68	-48N	37	48	-0.7	+2.2	
PERUGIA	1	24	14	8	69	-56N	45	56	-0.6	+2.0	
PESARO	1	25	35	9	70	-55N	44	55	-0.6	+2.1	
PESCARA	1	21	56	9	70	-59N	49	60	-0.5	+2.0	
PIACENZA	1	29	59	8	68	-48N	38	49	-0.7	+2.2	
PISA	1	26	41	7	68	-52N	42	53	-0.6	+2.1	
PISTOIA	1	26	47	8	69	-52N	42	53	-0.6	+2.1	
PORDENONE	1	30	9	10	71	-50N	39	50	-0.6	+2.2	
POTENZA	1	17	41	8	70	-65N	54	65	-0.5	+1.9	
RAGUSA	1	11	45	5	68	-72N	61	72	-0.5	+1.6	
RAVENNA	1	27	5	9	69	-53N	42	53	-0.6	+2.1	
REGGIO CALABRIA	1	13	15	6	69	-70N	60	71	-0.5	+1.7	
REGGIO EMILIA	1	28	35	8	69	-50N	40	51	-0.6	+2.2	
RIETI	1	22	34	8	69	-58N	47	58	-0.5	+2.0	
ROMA	1	21	50	7	68	-58N	48	59	-0.6	+2.0	
ROVIGO	1	28	42	9	70	-51N	40	51	-0.6	+2.2	
SALERNO	1	18	15	8	69	-64N	53	64	-0.5	+1.9	
SASSARI	1	21	51	4	66	-57N	47	58	-0.6	+1.9	
SAVONA	1	29	8	7	67	-49N	39	50	-0.7	+2.2	
SIENA	1	25	17	7	68	-54N	44	55	-0.6	+2.1	
SIRACUSA	1	11	42	6	68	-72N	62	73	-0.5	+1.6	
SONDRIO	1	32	24	9	69	-46N	36	47	-0.7	+2.3	
TARANTO	1	16	44	9	70	-66N	56	67	-0.4	+1.8	
TERAMO	1	22	35	8	70	-58N	48	59	-0.5	+2.0	
TERNI	1	22	59	8	69	-57N	47	58	-0.6	+2.0	
TORINO	1	31	24	7	67	-46N	36	47	-0.7	+2.2	
TRAPANI	1	14	41	4	67	-67N	57	68	-0.5	+1.7	
TRENTO	1	31	19	9	70	-48N	37	48	-0.6	+2.3	
TREVISO	1	29	43	10	70	-50N	39	50	-0.6	+2.2	
TRIESTE	1	28	50	10	71	-52N	41	52	-0.6	+2.2	
UDINE	1	30	2	10	71	-50N	40	51	-0.6	+2.2	
VARESE	1	30	29	7	68	-48N	37	48	-0.7	+2.2	
VENEZIA	1	29	11	10	70	-50N	40	51	-0.6	+2.2	
VERCELLI	1	31	27	7	68	-46N	36	47	-0.7	+2.2	
VERONA	1	30	0	9	69	-49N	39	50	-0.6	+2.2	
VICENZA	1	29	53	9	70	-49N	39	50	-0.6	+2.2	
VITERBO	1	22	59	7	69	-57N	47	58	-0.6	+2.0	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AGRIGENTO	2	7	49	15	75	73N	277	288	+0.2	+1.0	
ALESSANDRIA	2	13	14	14	75	48N	301	312	+0.3	+0.7	
ANCONA	2	13	54	17	78	57N	292	303	+0.4	+0.9	
AOSTA	2	13	20	14	74	45N	305	316	+0.3	+0.6	
AREZZO	2	13	12	16	77	56N	294	305	+0.3	+0.8	
ASCOLI PICENO	2	13	14	17	77	59N	290	301	+0.3	+0.9	
ASTI	2	13	5	14	75	48N	302	313	+0.3	+0.6	
AVELLINO	2	11	49	17	77	65N	284	295	+0.3	+1.0	
BARI	2	12	42	19	79	67N	283	293	+0.3	+1.0	
BELLUNO	2	15	27	-11	17	78	50N	300	311	+0.4	+0.7
BENEVENTO	2	12	1	18	77	65N	285	296	+0.3	+1.0	
BERGAMO	2	14	8	15	76	48N	302	313	+0.4	+0.7	
BOLOGNA	2	13	51	16	77	53N	297	308	+0.4	+0.8	
BOLZANO	2	15	21	-12	17	77	48N	302	313	+0.4	+0.7
BRESCIA	2	14	14	16	76	49N	301	312	+0.4	+0.7	
BRINDISI	2	12	31	20	79	69N	280	291	+0.4	+1.1	
CAGLIARI	2	8	59	12	73	63N	287	298	+0.1	+0.8	
CALTANISSETTA	2	8	5	15	75	73N	277	288	+0.2	+1.0	
CAMPOBASSO	2	12	24	18	78	64N	286	297	+0.3	+1.0	
CASERTA	2	11	49	17	77	64N	285	296	+0.3	+1.0	
CATANIA	2	8	20	16	76	74N	276	287	+0.2	+1.1	
CATANZARO	2	10	12	18	78	72N	278	289	+0.3	+1.1	
CHIETI	2	12	59	18	78	61N	289	299	+0.3	+0.9	
COMO	2	14	2	15	76	47N	303	314	+0.4	+0.6	
COSENZA	2	10	32	18	78	71N	279	290	+0.3	+1.1	
CREMONA	2	13	52	15	76	50N	300	311	+0.4	+0.7	
CUNEO	2	12	33	13	74	48N	301	312	+0.3	+0.6	
ENNA	2	8	11	16	76	73N	277	288	+0.2	+1.1	
FERRARA	2	14	14	16	77	52N	298	308	+0.4	+0.8	
FIRENZE	2	13	14	16	76	54N	295	306	+0.3	+0.8	
FOGGIA	2	12	36	18	78	65N	285	296	+0.3	+1.0	
FORLI`	2	13	53	17	77	54N	295	306	+0.4	+0.8	
FROSINONE	2	12	4	17	77	62N	288	299	+0.3	+0.9	
GENOVA	2	12	59	14	75	50N	300	311	+0.3	+0.7	
GORIZIA	2	15	55	-11	18	79	52N	298	309	+0.4	+0.8
GROSSETO	2	12	23	15	76	57N	293	304	+0.3	+0.8	
IMPERIA	2	12	21	13	74	50N	299	310	+0.3	+0.7	
ISERNIA	2	12	9	17	77	64N	286	297	+0.3	+1.0	
LA SPEZIA	2	13	3	15	75	52N	298	309	+0.3	+0.7	
L'AQUILA	2	12	43	17	77	60N	289	300	+0.3	+0.9	
LATINA	2	11	46	16	76	62N	288	299	+0.3	+0.9	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
LECCE	2	12	19	20	79	71N	279	290	+0.4	+1.1	
LIVORNO	2	12	45	15	75	54N	296	307	+0.3	+0.8	
LUCCA	2	13	3	15	76	53N	296	307	+0.3	+0.8	
MACERATA	2	13	34	17	78	58N	292	303	+0.4	+0.9	
MANTOVA	2	14	10	16	76	50N	299	310	+0.4	+0.7	
MASSA	2	13	6	15	76	52N	297	308	+0.3	+0.7	
MATERA	2	12	6	19	78	68N	282	293	+0.3	+1.0	
MESSINA	2	9	10	17	77	73N	277	288	+0.2	+1.1	
MILANO	2	13	47	15	75	48N	302	313	+0.4	+0.7	
MODENA	2	13	49	16	76	52N	298	309	+0.4	+0.8	
NAPOLI	2	11	36	17	77	65N	285	296	+0.3	+1.0	
NOVARA	2	13	35	14	75	47N	303	314	+0.4	+0.6	
NUORO	2	9	55	13	74	61N	289	300	+0.2	+0.8	
ORISTANO	2	9	27	12	73	61N	289	300	+0.2	+0.8	
PADOVA	2	14	47	17	77	51N	299	310	+0.4	+0.8	
PALERMO	2	8	40	15	75	70N	279	290	+0.2	+1.0	
PARMA	2	13	45	16	76	51N	299	310	+0.4	+0.7	
PAVIA	2	13	36	15	75	48N	301	312	+0.3	+0.7	
PERUGIA	2	13	4	16	77	57N	292	303	+0.3	+0.8	
PESARO	2	13	57	17	77	56N	294	305	+0.4	+0.8	
PESCARA	2	13	5	18	78	61N	289	300	+0.3	+0.9	
PIACENZA	2	13	41	15	76	49N	300	311	+0.4	+0.7	
PISA	2	12	56	15	76	53N	296	307	+0.3	+0.8	
PISTOIA	2	13	16	16	76	54N	296	307	+0.3	+0.8	
PORDENONE	2	15	30	-11	18	78	51N	299	310	+0.4	+0.8
POTENZA	2	11	49	18	78	67N	283	294	+0.3	+1.0	
RAGUSA	2	7	40	16	76	75N	275	286	+0.2	+1.1	
RAVENNA	2	14	7	17	77	54N	296	307	+0.4	+0.8	
REGGIO CALABRIA	2	9	6	17	77	73N	277	288	+0.2	+1.1	
REGGIO EMILIA	2	13	46	16	76	51N	298	309	+0.4	+0.7	
RIETI	2	12	36	17	77	60N	290	301	+0.3	+0.9	
ROMA	2	12	3	16	76	60N	289	300	+0.3	+0.9	
ROVIGO	2	14	29	17	77	52N	298	309	+0.4	+0.8	
SALERNO	2	11	34	17	77	66N	284	295	+0.3	+1.0	
SASSARI	2	10	6	13	73	59N	291	302	+0.2	+0.8	
SAVONA	2	12	46	14	75	50N	300	311	+0.3	+0.7	
SIENA	2	12	54	16	76	56N	294	305	+0.3	+0.8	
SIRACUSA	2	7	53	16	76	75N	275	286	+0.2	+1.1	
SONDRIO	2	14	32	16	76	47N	303	314	+0.4	+0.7	
TARANTO	2	12	8	19	79	69N	281	292	+0.3	+1.1	
TERAMO	2	13	6	17	77	60N	290	301	+0.3	+0.9	
TERNI	2	12	40	16	77	59N	291	302	+0.3	+0.9	
TORINO	2	13	2	14	74	47N	303	314	+0.3	+0.6	
TRAPANI	2	8	24	14	75	70N	280	291	+0.2	+1.0	
TRENTO	2	14	57	17	77	49N	301	312	+0.4	+0.7	
TREVISO	2	15	7	-12	17	78	51N	299	310	+0.4	+0.8
TRIESTE	2	15	43	-11	18	79	53N	297	308	+0.4	+0.8
UDINE	2	15	51	-11	18	79	51N	299	310	+0.4	+0.8
VARESE	2	13	22	14	75	48N	301	312	+0.3	+0.7	
VENEZIA	2	14	59	-12	17	78	52N	298	309	+0.4	+0.8
VERCELLI	2	13	26	14	75	47N	303	314	+0.3	+0.6	
VERONA	2	14	26	16	77	50N	300	311	+0.4	+0.7	
VICENZA	2	14	44	17	77	50N	299	310	+0.4	+0.7	
VITERBO	2	12	22	16	76	59N	291	302	+0.3	+0.9	

Sun alt : altezza del Sole sull'orizzonte, in gradi  
Moon alt : altezza della Luna sull'orizzonte, in gradi  
Moon az : azimuth della Luna, in gradi  
CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso  
PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °  
Moon alt : height of the Moon above the horizon, in °  
Moon az : azimuth of the Moon, in °  
CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb  
PA : angle of position, angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.  
U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude ('+ve for changes towards the East) from the prediction site.  
B same as for A, but for changes in latitude ('+ve to the north).

**CONGIUNZIONI MULTIPLE PIANETI-LUNA**  
 (eventi con 2 o più pianeti e la Luna entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-MOON**  
 (events with 2 or more planets and the Moon within 5°)

**Geocentriche - Geocentric**

Date	TT	Dmed	Dmax	emin	m2d	mmax			
2012/05/20	10:23	2.858	3.392	-5	-1.9	-1.5	Mercury	Jupiter	Moon

**Topocentriche - Topocentric 42°N - 12°E**

Date	UT	Dmed	Dmax	emin	m2d	mmax			
2012/05/20	10:47	2.718	3.360	-5	-1.9	-1.5	Mercury	Jupiter	Moon

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest body

mmax = least magnitude

© (6)

Per le congiunzioni multiple stellari consultare più avanti

**CONGIUNZIONI MULTIPLE MISTE**  
**CERCHI MINIMI GEOCENTRICI PIANETI-LUNA**  
(eventi con 2 pianeti e la Luna entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**LEAST GEOCENTRIC GROUPING PLANETS-MOON**  
(events with 2 planets and the Moon within 5°)

DATE	TIME	BODIES	D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
20 05 2012 04		MERCURY JUPITER MOON	3.8	2.1	4.6	4.6	5	-1.4	-2.0	-4.9	-5.0	5	71	-0	52
20 05 2012 05		MERCURY JUPITER MOON	3.8	2.0	4.1	4.2	4	-1.4	-2.0	-4.8	-4.9	16	81	6	64
20 05 2012 06		MERCURY JUPITER MOON	3.7	2.0	3.7	3.9	4	-1.4	-2.0	-4.8	-4.9	27	90	15	76
20 05 2012 07		MERCURY JUPITER MOON	3.6	2.1	3.3	3.7	4	-1.4	-2.0	-4.7	-4.8	38	101	24	87
20 05 2012 08		MERCURY JUPITER MOON	3.5	2.3	2.9	3.6	4	-1.4	-2.0	-4.7	-4.8	48	114	32	100
20 05 2012 09		MERCURY JUPITER MOON	3.4	2.5	2.5	3.5	4	-1.4	-2.0	-4.6	-4.7	58	133	41	114
20 05 2012 10		MERCURY JUPITER MOON	3.4	2.8	2.2	3.4	4	-1.4	-2.0	-4.6	-4.7	65	160	48	131
20 05 2012 11		MERCURY JUPITER MOON	3.3	3.1	1.9	3.4	4	-1.4	-2.0	-4.5	-4.7	66	194	54	152
20 05 2012 12		MERCURY JUPITER MOON	3.2	3.4	1.7	3.5	4	-1.4	-2.0	-4.5	-4.7	61	222	56	177
20 05 2012 13		MERCURY JUPITER MOON	3.1	3.7	1.7	3.8	3	-1.4	-2.0	-4.4	-4.6	53	242	55	202
20 05 2012 14		MERCURY JUPITER MOON	3.1	4.1	1.8	4.1	3	-1.4	-2.0	-4.4	-4.6	42	256	50	224
20 05 2012 15		MERCURY JUPITER MOON	3.0	4.4	2.0	4.5	3	-1.4	-2.0	-4.3	-4.5	31	267	43	242
20 05 2012 16		MERCURY JUPITER MOON	2.9	4.8	2.2	4.8	3	-1.4	-2.0	-4.3	-4.5	20	277	34	256

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

**CONGIUNZIONI MULTIPLE MISTE**  
**CERCHI MINIMI TOPOCENTRICI PIANETI-LUNA**  
(eventi con 2 pianeti e la Luna entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**LEAST TOPOCENTRIC GROUPING PLANETS-MOON**  
(eventi with 2 planets and the Moon within 5°)  
42°N - 12°E

DATE	TIME	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
20 05 2012 02		MERCURY	JUPITER	MOON	4.0	1.5	4.9	5.0	5	-1.4	-2.0	-5.0	-5.1	-14	50	-12	27
20 05 2012 03		MERCURY	JUPITER	MOON	3.9	1.3	4.4	4.4	5	-1.4	-2.0	-4.9	-5.0	-5	61	-7	40
20 05 2012 04		MERCURY	JUPITER	MOON	3.8	1.3	3.8	3.9	5	-1.4	-2.0	-4.9	-5.0	5	71	-0	52
20 05 2012 05		MERCURY	JUPITER	MOON	3.8	1.4	3.4	3.8	4	-1.4	-2.0	-4.8	-4.9	16	81	6	64
20 05 2012 06		MERCURY	JUPITER	MOON	3.7	1.7	3.0	3.7	4	-1.4	-2.0	-4.8	-4.9	27	90	15	76
20 05 2012 07		MERCURY	JUPITER	MOON	3.6	1.9	2.6	3.6	4	-1.4	-2.0	-4.7	-4.8	38	101	24	87
20 05 2012 08		MERCURY	JUPITER	MOON	3.5	2.1	2.3	3.6	4	-1.4	-2.0	-4.7	-4.8	48	114	32	100
20 05 2012 09		MERCURY	JUPITER	MOON	3.4	2.4	2.1	3.5	4	-1.4	-2.0	-4.6	-4.7	58	133	41	114
20 05 2012 10		MERCURY	JUPITER	MOON	3.4	2.6	1.9	3.4	4	-1.4	-2.0	-4.6	-4.7	65	160	48	131
20 05 2012 11		MERCURY	JUPITER	MOON	3.3	2.8	1.7	3.3	4	-1.4	-2.0	-4.5	-4.7	66	194	54	152
20 05 2012 12		MERCURY	JUPITER	MOON	3.2	3.0	1.5	3.3	4	-1.4	-2.0	-4.5	-4.7	61	222	56	177
20 05 2012 13		MERCURY	JUPITER	MOON	3.1	3.2	1.4	3.3	3	-1.4	-2.0	-4.4	-4.6	53	242	55	202
20 05 2012 14		MERCURY	JUPITER	MOON	3.1	3.4	1.3	3.5	3	-1.4	-2.0	-4.4	-4.6	42	256	50	224
20 05 2012 15		MERCURY	JUPITER	MOON	3.0	3.7	1.4	3.7	3	-1.4	-2.0	-4.3	-4.5	31	267	43	242
20 05 2012 16		MERCURY	JUPITER	MOON	2.9	4.0	1.5	4.0	3	-1.4	-2.0	-4.3	-4.5	20	277	34	256
20 05 2012 17		MERCURY	JUPITER	MOON	2.8	4.3	1.7	4.4	3	-1.4	-2.0	-4.2	-4.4	10	287	26	269
20 05 2012 18		MERCURY	JUPITER	MOON	2.8	4.7	2.1	4.7	3	-1.4	-2.0	-4.2	-4.4	0	296	17	281

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

**CONGIUNZIONI MULTIPLE MISTE**  
**QUARTETTI GEOCENTRICI PIANETI-LUNA**  
(eventi con 3 pianeti e la Luna entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**GEOCENTRIC QUARTETS PLANETS-MOON**  
(events with 3 planets and the Moon within 5°)

DATE TIME BODIES D12 D13 D14 D23 D24 D34 DQM MAX EL. MAG1 MAG2 MAG3 MAG4 MAGT

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE MISTE**  
**QUARTETTI TOPOCENTRICI PIANETI-LUNA**  
(eventi con 3 pianeti e la Luna entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**TOPOCENTRIC QUARTETS PLANETS-MOON**  
(events with 3 planets and the Moon within 5°)  
42°N - 12°E

DATE TIME BODIES D12 D13 D14 D23 D24 D34 DQM MAX EL. MAG1 MAG2 MAG3 MAG4 MAGT ALT AZ

Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora  
Dxy = distanza tra il corpo x e quello y, in gradi  
Group = cerchio minimo comprendente tutto il gruppo, in gradi  
EL = elongazione dal Sole, in gradi  
MAGx = magnitudine del corpo x  
MAGT = magnitudine totale del gruppo  
ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi  
AZ = azimut del baricentro geometrico del gruppo, in gradi da nord  
ALT.S. = altezza sull'orizzonte del Sole, in gradi  
AZ.S. = azimut del Sole, in gradi da nord  
ALT.S. = height on the horizon of the Sun, in °  
AZ.S. = azimuth of the Sun, in ° from north  
Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno  
Moon=Luna

Ore in T.U.

Date in the format day/month/year  
Dxy = distance between the body x and y, in °  
GROUP = least group, in °  
EL = elongation from the Sun, in °  
MAGx = magnitude of body x  
MAGT = total magnitude  
ALT = height on the horizon of the baricenter of the group, in °  
AZ = azimuth of the baricenter of the group, in ° from north

Times in U.T.

# PIANETI-LUNA IN LINEA RETTA - GEOCENTRICI PLANETS-MOON IN STRAIGHT LINE - GEOCENTRIC

DATE TIME BODIES C ALT AZ ALT.S. AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

# PIANETI-LUNA IN LINEA RETTA - TOPOCENTRICI PLANETS-MOON IN STRAIGHT LINE-TOPOCENTRIC

42°N - 12°E

DATE TIME BODIES C ALT AZ ALT.S. AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

Date in the format day/month/year

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# PIANETI-LUNA IN LINEA RETTA (4) - GEOCENTRICI PLANETS-MOON IN STRAIGHT LINE (4) - GEOCENTRIC

DATE TIME BODIES C ALT AZ ALT.S. AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

# PIANETI-LUNA IN LINEA RETTA (4) - TOPOCENTRICI PLANETS-MOON IN STRAIGHT LINE (4) - TOPOCENTRIC

42°N - 12°E

DATE TIME BODIES C ALT AZ ALT.S. AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

Date in the format day/month/year

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# GEOMETRIE SPAZIALI LUNARI-TRIANGOLI EQUILATERI LUNAR SPATIAL GEOMETRIES-EQUILATERAL TRIANGLES

Geocentrici - geocentric

DATE TIME BODIES D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.

Questo anno non avvengono fenomeni - No phenomena this year

# GEOMETRIE SPAZIALI LUNARI-TRIANGOLI EQUILATERI LUNAR SPATIAL GEOMETRIES-EQUILATERAL TRIANGLES

42°N - 12°E

DATE TIME BODIES D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.

Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

DQM = distanza media tra i 4 corpi, in gradi

MAX = distanza massima tra i 4 corpi, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Si è considerato equilatero ogni triangolo in cui ogni cateto differisce dall'altro per massimo  $\pm 10\%$ .

Si è considerato quadrato ogni quadrilatero in cui ogni lato differisce dall'altro per massimo  $\pm 10\%$  e con diagonali diverse meno del 15%.

NB : queste tabelle sono state create esclusivamente ai fini di "foto d'effetto", con tre o quattro corpi celesti praticamente equidistanti!

Date in the format day/month/year

Dxy = distance between the body x and y, in  $^{\circ}$

DQM = middle distance between the 4 bodies, in  $^{\circ}$

MAX = maxima distance between the 4 bodies, in  $^{\circ}$

GROUP = least group, in  $^{\circ}$

EL = elongation from the Sun, in  $^{\circ}$

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in  $^{\circ}$

AZ = azimuth of the baricenter of the group, in  $^{\circ}$  from north

ALT.S. = height on the horizon of the Sun, in  $^{\circ}$

AZ.S. = azimuth of the Sun, in  $^{\circ}$  from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum  $\pm 10\%$ .

I have considered square every quadrilateral in which every side differs from the other for maximum  $\pm 10\%$  and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

**GEOMETRIE SPAZIALI LUNARI - QUADRATI**  
**LUNAR SPATIAL GEOMETRIES - SQUARES**  
Geocentrici - geocentric

DATA ORA CORPI D12 D13 D14 D23 D24 D34 DQM MAX EL. MAG1 MAG2 MAG3 MAG4 MAGT

Questo anno non avvengono fenomeni - No phenomena this year

**GEOMETRIE SPAZIALI LUNARI - QUADRATI**  
**LUNAR SPATIAL GEOMETRIES - SQUARES**  
42°N - 12°E

DATA ORA CORPI D12 D13 D14 D23 D24 D34 DQM MAX EL. MAG1 MAG2 MAG3 MAG4 MAGT ALT AZ

Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora  
Bodies = corpi  
Dxy = distanza tra il corpo x e quello y, in gradi  
DQM = distanza media tra i 4 corpi, in gradi  
MAX = distanza massima tra i 4 corpi, in gradi  
Group = cerchio minimo comprendente tutto il gruppo, in gradi  
EL = elongazione dal Sole, in gradi  
MAGx = magnitudine del corpo x  
MAGT = magnitudine totale del gruppo  
ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi  
AZ = azimut del baricentro geometrico del gruppo, in gradi da nord  
ALT.S. = altezza sull'orizzonte del Sole, in gradi  
AZ.S. = azimut del Sole, in gradi da nord  
Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno  
Moon=Luna

Ore in T.U.

Si è considerato equilatero ogni triangolo in cui ogni cateto differisce dall'altro per massimo  $\pm 10\%$ .  
Si è considerato quadrato ogni quadrilatero in cui ogni lato differisce dall'altro per massimo  $\pm 10\%$  e con diagonali diverse meno del 15%.

NB : queste tabelle sono state create esclusivamente ai fini di "foto d'effetto", con tre o quattro corpi celesti praticamente equidistanti!

Date in the format day/month/year  
Dxy = distance between the body x and y, in °  
DQM = middle distance between the 4 bodies, in °  
MAX = maxima distance between the 4 bodies, in °  
GROUP = least group, in °  
EL = elongation from the Sun, in °  
MAGx = magnitude of body x  
MAGT = total magnitude  
ALT = height on the horizon of the baricenter of the group, in °  
AZ = azimuth of the baricenter of the group, in ° from north  
ALT.S. = height on the horizon of the Sun, in °  
AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum  $\pm 10\%$ .  
I have considered square every quadrilateral in which every side differs from the other for maximum  $\pm 10\%$  and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

# EVENTI GEOCENTRICI <5° LUNA-STELLE m<2

## GEOCENTRIC EVENTS <5° MOON-STARS m<2

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)			
2012/01/16	06:35:44	1.87687	1.25485	0.002	18	-91	-11.0	1.1		Moon	Alpha	VIR Spica
2012/01/19	11:44:19	4.23198	1.25441	0.002	184	-49	-9.8	1.1		Moon	Alpha	SCO Antares
2012/02/12	12:10:15	1.65462	1.26303	0.002	18	-119	-11.7	1.1		Moon	Alpha	VIR Spica
2012/02/15	17:24:00	4.44182	1.24645	0.002	184	-77	-10.7	1.1		Moon	Alpha	SCO Antares
2012/03/10	19:51:46	1.45924	1.28258	0.002	18	-146	-12.4	1.1		Moon	Alpha	VIR Spica
2012/03/13	23:00:44	4.71033	1.25660	0.002	184	-104	-11.3	1.1		Moon	Alpha	SCO Antares
2012/04/07	05:59:31	1.38187	1.29687	0.002	18	-173	-12.8	1.1		Moon	Alpha	VIR Spica
2012/04/10	06:43:28	4.91663	1.27757	0.002	184	-131	-12.0	1.1		Moon	Alpha	SCO Antares
2012/04/24	14:16:49	5.01263	1.14822	0.003	177	36	-8.9	1.0		Moon	Alpha	TAU Aldebaran
2012/05/04	17:01:18	1.40452	1.29514	0.002	18	159	-12.6	1.1		Moon	Alpha	VIR Spica
2012/05/07	16:45:16	4.99823	1.29411	0.002	183	-158	-12.6	1.1		Moon	Alpha	SCO Antares
2012/05/21	20:13:45	4.99056	1.14834	0.003	177	9	-6.0	1.0		Moon	Alpha	TAU Aldebaran
2012/06/01	02:58:13	1.42477	1.27899	0.002	18	133	-12.0	1.1		Moon	Alpha	VIR Spica
2012/06/04	03:38:37	4.99944	1.29575	0.002	183	176	-12.8	1.1		Moon	Alpha	SCO Antares
2012/06/18	02:29:11	4.99611	1.15075	0.003	177	-17	-7.3	1.0		Moon	Alpha	TAU Aldebaran
2012/06/28	10:39:33	1.34918	1.25943	0.002	18	107	-11.3	1.1		Moon	Alpha	VIR Spica
2012/07/01	13:31:38	5.02578	1.28291	0.002	184	149	-12.4	1.1		Moon	Alpha	SCO Antares
2012/07/15	09:30:16	4.92537	1.15310	0.003	177	-43	-9.3	1.0		Moon	Alpha	TAU Aldebaran
2012/07/25	16:24:03	1.16458	1.24905	0.002	18	81	-10.7	1.1	1193	Moon	Alpha	VIR Spica
2012/08/11	17:15:13	4.73644	1.15346	0.003	177	-69	-10.2	1.0		Moon	Alpha	TAU Aldebaran
2012/08/21	21:52:02	0.94122	1.25392	0.002	18	55	-10.0	1.1	2167	Moon	Alpha	VIR Spica
2012/09/08	01:15:20	4.48040	1.15128	0.003	177	-95	-10.9	1.0		Moon	Alpha	TAU Aldebaran
2012/09/18	04:59:03	0.77969	1.26944	0.002	18	29	-8.6	1.1	2550	Moon	Alpha	VIR Spica
2012/10/05	08:52:37	4.26574	1.14782	0.003	177	-122	-11.5	1.0		Moon	Alpha	TAU Aldebaran
2012/10/15	14:32:53	0.73442	1.28290	0.002	17	3	-3.9	1.1	2620	Moon	Alpha	VIR Spica
2012/11/01	15:45:24	4.17273	1.14509	0.003	177	-149	-12.2	1.0		Moon	Alpha	TAU Aldebaran
2012/11/12	01:36:28	0.75909	1.28203	0.002	17	-26	-8.5	1.1	2582	Moon	Alpha	VIR Spica
2012/11/28	22:03:07	4.17813	1.14417	0.003	177	-176	-12.6	1.0		Moon	Alpha	TAU Aldebaran
2012/12/09	12:00:06	0.73323	1.26488	0.002	17	-54	-10.0	1.1	2655	Moon	Alpha	VIR Spica
2012/12/26	04:18:52	4.16467	1.14494	0.003	177	156	-12.3	1.0		Moon	Alpha	TAU Aldebaran

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

Rl = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Rl = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

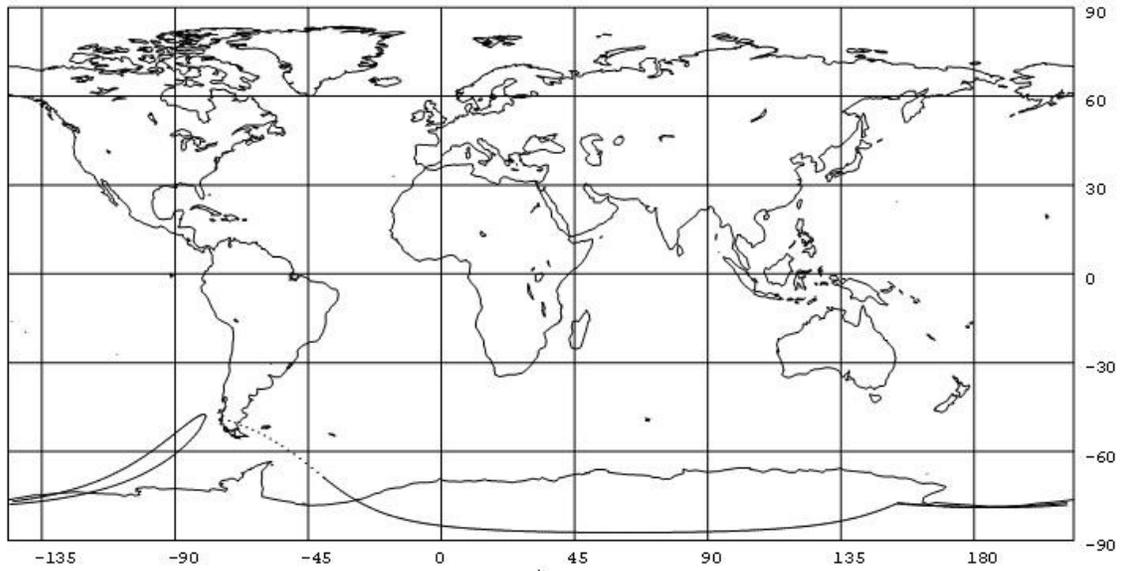
m1 = magnitude of the Moon

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

© (6)

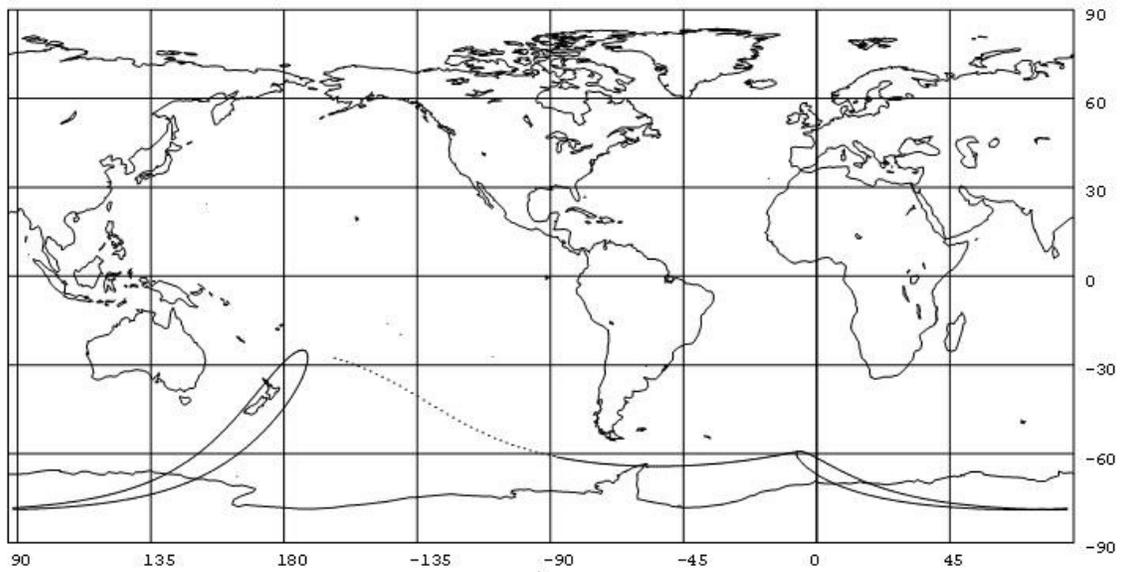
Occultation of 1925SB1, Magnitude 1.0, on 2012 Jul 25



Occult 4.090

UT of conjunction = 17h 1.4m

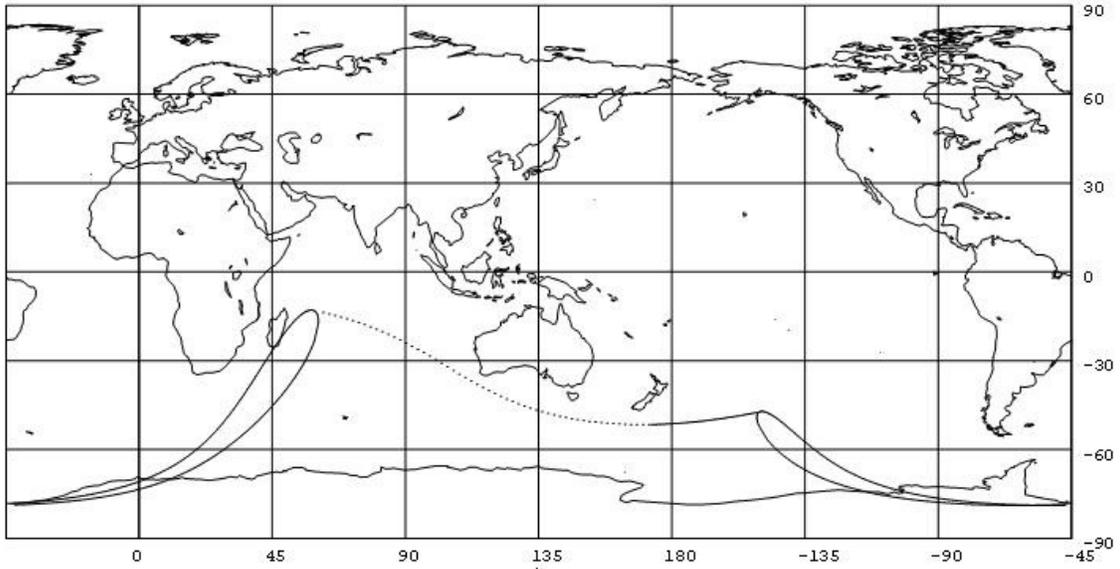
Occultation of 1925SB1, Magnitude 1.0, on 2012 Aug 21



Occult 4.090

UT of conjunction = 22h 21.5m

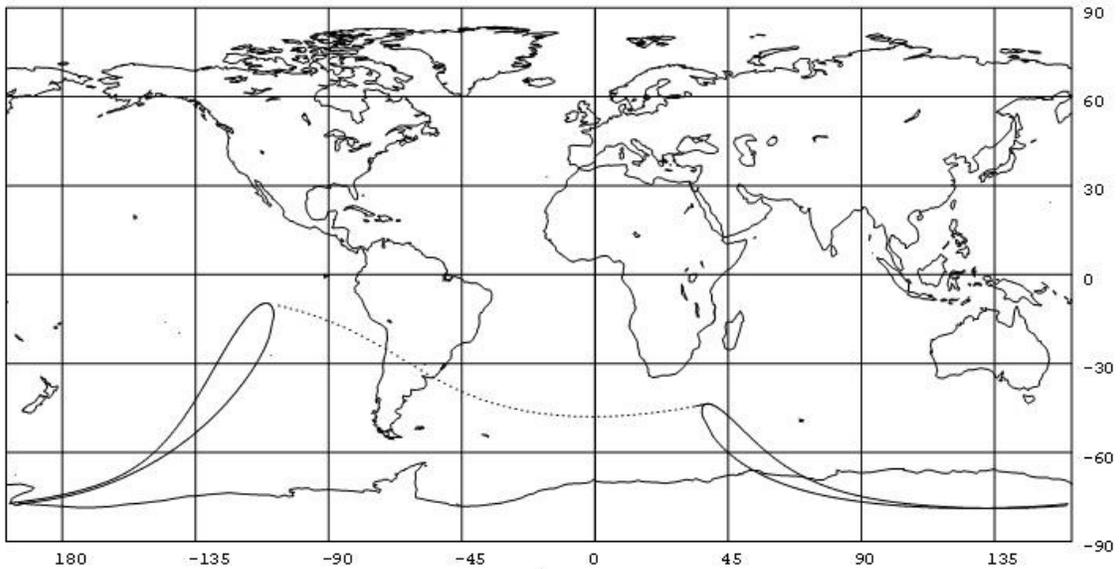
Occultation of 1925SB1, Magnitude 1.0, on 2012 Sep 18



Occult 4.09.0

UT of conjunction = 5h 22.3m

Occultation of 1925SB1, Magnitude 1.0, on 2012 Oct 15

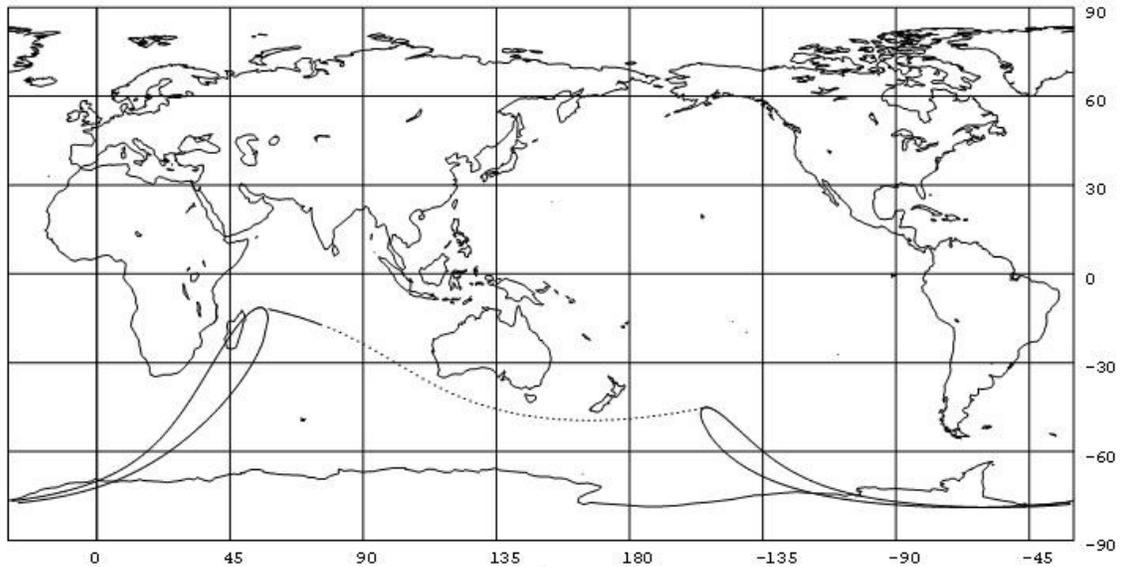


Occult 4.09.0

UT of conjunction = 14h 54.0m

Non visible - not visible

Occultation of 1925SB1, Magnitude 1.0, on 2012 Nov 12



Occult 4.090

UT of conjunction = 1h 58.3m

Luna: % illuminazione 5-, elongazione solare 26°      Moon: % illumination 5-, solar elongation 26°

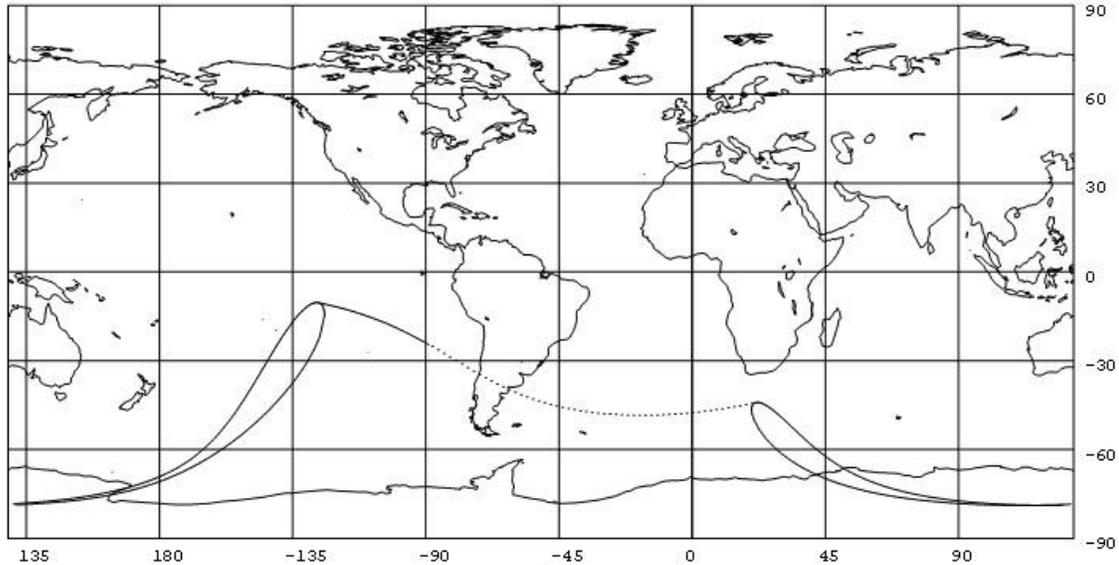
Sparizione - Disappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
MU Plaisance	23	55	4	1	102	-59N	76	53	+0.0	-0.2	
MU Rodriguez Island	23	55	31	6	100	-52N	69	46	+0.2	+0.0	

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
MG Antalaha	0	28	27	1	101	36N	341	318	-0.5	-2.5	
MG Antananarivo	0	37	32	1	102	53N	324	301	-0.3	-1.8	
MG Farafangana	0	44	13	3	101	65N	312	290	-0.2	-1.6	
MG Fianarantsoa	0	42	11	2	101	61N	316	293	-0.3	-1.6	
MG Manakara	0	43	5	3	101	63N	315	292	-0.3	-1.6	
MG Mananjary	0	41	28	3	101	60N	317	294	-0.3	-1.7	
MG Maroantsetra	0	29	50	0	102	39N	338	315	-0.5	-2.3	
MG Sainte Marie	0	33	23	2	101	45N	332	309	-0.4	-2.1	
MG Toamasina	0	35	35	2	101	49N	328	305	-0.4	-2.0	
MG Tolagnaro	0	47	49	4	101	71N	306	283	-0.2	-1.5	
MG Toliara	0	46	11	0	102	69N	309	286	-0.3	-1.5	
MU Plaisance	0	37	57	-11	11	98	50N	327	304	-0.2	-2.1
MU Rodriguez Island	0	35	25	-6	15	97	42N	336	313	-0.2	-2.4

## Occultation of 1925SB1, Magnitude 1.0, on 2012 Dec 9



Occult 4.090

UT of conjunction = 12h 21.9m

Luna: % illuminazione 21-, elongazione solare 54°

Moon: % illumination 21-, solar elongation 54°

Sparizione - Disappearance

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	m/o	m/o
AR Chosmadal	11	31	4	25	58	40	-30N	51	27	+3.7 +2.5
AR Comodoro Rivadavia	11	32	25	28	53	29	-58N	78	55	+2.0 -0.1
AR Cutralco	11	31	27	26	58	37	-36N	56	33	+3.2 +1.6
AR El Bolson	11	23	36	23	53	41	-53N	73	50	+2.2 +0.0
AR El Maiten	11	24	23	24	53	40	-52N	73	49	+2.2 +0.0
AR Esquel	11	24	36	24	53	39	-55N	75	52	+2.1 -0.1
AR Fuerte Gral Roca	11	36	51	28	59	32	-31N	51	28	+3.6 +2.4
AR Jose De San Martin	11	26	9	25	52	37	-57N	78	55	+2.0 -0.2
AR Lago Argentino	11	27	4	24	47	34	-76N	96	73	+1.4 -0.9
AR Las Heras	11	29	47	27	51	31	-62N	83	59	+1.8 -0.4
AR Neuquen	11	35	6	27	58	34	-33N	53	30	+3.5 +2.1
AR Puerto Deseado	11	35	42	30	52	24	-61N	82	59	+1.8 -0.2
AR Puerto Madryn	11	38	43	31	57	24	-44N	64	41	+2.6 +0.9
AR Rio Gallegos	11	32	14	27	47	28	-75N	95	72	+1.4 -0.8
AR Rio Grande	11	36	3	29	46	24	-78N	99	76	+1.3 -0.8
AR Rio Turbio	11	28	18	25	46	33	-78N	99	75	+1.3 -1.0
AR San Carlos De Bariloche	11	24	33	23	54	41	-49N	70	47	+2.3 +0.2
AR San Julian	11	32	59	28	49	27	-68N	88	65	+1.6 -0.5
AR San Martin Des Andes	11	24	57	23	55	41	-45N	66	43	+2.5 +0.5
AR Santa Cruz	11	32	11	28	49	28	-71N	91	68	+1.5 -0.6
AR Trelew	11	37	54	30	56	25	-46N	66	43	+2.5 +0.8
AR Ushuaia	11	36	14	29	45	24	-81N	101	78	+1.2 -0.9
AR Viedma	11	48	38	34	60	17	-28N	48	25	+3.7 +3.3
CL Alto Palena	11	23	23	23	52	40	-58N	78	55	+2.0 -0.3
CL Ancud	11	18	54	21	51	46	-56N	77	54	+2.0 -0.3
CL Balmaceda	11	24	35	24	50	37	-64N	85	62	+1.7 -0.6
CL Castro	11	19	10	21	51	45	-58N	78	55	+1.9 -0.4
CL Chaiten	11	21	25	22	52	42	-58N	78	55	+2.0 -0.3
CL Chile Chico	11	24	57	24	50	37	-66N	86	63	+1.7 -0.6
CL Chillan	11	26	24	22	57	46	-31N	51	28	+3.7 +2.2
CL Concepcion	11	22	36	21	56	48	-36N	56	33	+3.2 +1.5
CL Coyhaique	11	23	42	23	50	39	-64N	84	61	+1.7 -0.6
CL Easter Island	10	22	59		17	94	-67N	87	64	+0.4 -0.8
CL Los Angeles	11	23	46	22	56	46	-37N	57	34	+3.1 +1.3
CL Osorno	11	20	15	21	53	45	-51N	71	48	+2.2 +0.0
CL Porvenir	11	32	19	27	45	29	-80N	100	77	+1.3 -0.9
CL Puerto Montt	11	20	15	21	52	45	-54N	74	51	+2.1 -0.1
CL Puerto Williams	11	37	9	29	45	23	-81N	101	78	+1.2 -0.8
CL Punta Arenas	11	31	24	26	45	30	-80N	100	77	+1.3 -0.9
CL Temuco	11	21	50	21	55	46	-44N	64	41	+2.6 +0.6
CL Valdivia	11	20	20	21	54	46	-48N	68	45	+2.4 +0.2
FK Mount Pleasant	11	48	58	37	49	6	-64N	84	61	+1.6 +0.1
FK Stanley	11	50	6	37	50	5	-63N	83	60	+1.7 +0.1

Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
AR Chosmadal	12	2	19	31	62	27	17N	3	340	-0.5	-5.6
AR Comodoro Rivadavia	12	32	32	39	56	4	48N	332	309	+1.0	-2.3
AR Cutralco	12	9	33	33	61	20	23N	357	334	+0.1	-4.6
AR El Bolson	12	19	5	33	58	18	41N	339	316	+0.8	-2.9
AR El Maiten	12	19	38	34	58	17	41N	339	316	+0.8	-2.9
AR Esquel	12	22	4	34	58	16	44N	336	313	+0.9	-2.7
AR Fuerte Gral Roca	12	9	47	34	62	17	19N	1	338	-0.2	-5.3
AR Jose De San Martin	12	25	34	35	57	12	47N	333	310	+0.9	-2.5
AR Lago Argentino	12	35	31	35	51	10	67N	313	290	+1.1	-1.5
AR Las Heras	12	32	37	37	55	6	53N	327	304	+1.0	-2.0
AR Neuquen	12	9	37	34	61	18	20N	0	337	-0.1	-5.1
AR Puerto Deseado	12	38	11	40	54	359	53N	327	304	+1.0	-1.9
AR Puerto Madryn	12	26	11	39	59	3	33N	347	324	+0.6	-3.4
AR Rio Gallegos	12	40	35	38	50	3	68N	312	289	+1.1	-1.3
AR Rio Grande	12	44	55	39	48	359	72N	308	285	+1.1	-1.1
AR Rio Turbio	12	37	17	36	50	9	71N	310	287	+1.1	-1.3
AR San Carlos De Bariloeh	12	16	56	33	59	19	37N	343	320	+0.7	-3.1
AR San Julian	12	38	56	39	52	1	60N	320	297	+1.1	-1.6
AR San Martin Des Andes	12	13	25	33	60	21	33N	347	324	+0.6	-3.5
AR Santa Cruz	12	39	12	38	51	2	63N	318	294	+1.1	-1.5
AR Trelew	12	27	33	40	58	2	35N	345	322	+0.7	-3.2
AR Ushuaia	12	45	24	38	47	360	75N	305	282	+1.1	-1.0
AR Viedma	12	18	46	40	61	2	17N	3	340	-0.3	-5.7
CL Alto Palena	12	23	12	34	57	16	47N	333	310	+0.9	-2.5
CL Ancud	12	17	1	31	58	23	45N	335	312	+0.9	-2.7
CL Balmaceda	12	28	29	35	55	13	54N	326	303	+1.1	-2.1
CL Castro	12	18	33	32	57	22	47N	334	310	+0.9	-2.6
CL Chaiten	12	20	41	33	57	19	46N	334	311	+0.9	-2.5
CL Chile Chico	12	29	48	35	54	12	56N	324	301	+1.1	-2.0
CL Chillan	11	58	22	28	61	33	17N	3	340	-0.5	-5.4
CL Concepcion	11	59	36	28	61	34	22N	358	335	-0.1	-4.7
CL Coyhaique	12	27	23	34	55	14	54N	326	303	+1.0	-2.1
CL Easter Island	11	16	46	29	88	88	59N	321	298	+0.3	-2.2
CL Los Angeles	12	2	24	29	61	31	23N	357	334	+0.0	-4.5
CL Osorno	12	13	55	31	59	24	39N	341	318	+0.7	-3.0
CL Porvenir	12	41	27	37	48	4	73N	307	284	+1.1	-1.1
CL Puerto Montt	12	16	22	32	58	22	42N	338	315	+0.8	-2.8
CL Puerto Williams	12	46	13	39	46	358	75N	305	282	+1.1	-0.9
CL Punta Arenas	12	40	34	37	48	5	73N	307	284	+1.1	-1.2
CL Temuco	12	7	55	30	60	27	30N	350	327	+0.4	-3.7
CL Valdivia	12	10	47	30	59	26	35N	345	322	+0.6	-3.3
FK Mount Pleasant	12	52	45	46	48	342	58N	322	299	+1.1	-1.3
FK Stanley	12	53	17	46	48	341	57N	323	300	+1.0	-1.4

Sun alt : altezza del Sole sull'orizzonte, in gradi

Moon alt : altezza della Luna sull'orizzonte, in gradi

Moon az : azimut della Luna, in gradi

CA : angolo di cuspide, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspide più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso

PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °

Moon alt : height of the Moon above the horizon, in °

Moon az : azimuth of the Moon, in °

CA : angle of cuspide, angle of the event along the limb of the Moon, measured by the nearest cuspide;  
a negative value means that the phenomenon happens along the bright limb

PA : angle of position , angle of the event along the limb of the Moon, measured from north

I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.

Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (Long.n - Long.o) + b \times (Lat.n - Lat.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.

U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude (+ve for changes towards the East) from the prediction site.

B same as for A, but for changes in latitude (+ve to the north).

**EVENTI TOPOCENTRICI <5° LUNA-STELLE m<2**  
**TOPOCENTRIC EVENTS <5° MOON-STARS m<2**  
**42°N - 12°E**

Date	UT	Dm	Alt.	r1	p	e	m1	m*	tm(s)			
2012/01/06	08:05:23	5.01267	-25.73	0.003	179	145	-12.2	1.0		Moon	Alpha	TAU Aldebaran
2012/01/16	05:55:15	2.72141	32.48	0.002	25	-92	-11.1	1.1		Moon	Alpha	VIR Spica
2012/01/19	12:01:33	3.48496	2.60	0.002	177	-50	-9.8	1.1		Moon	Alpha	SCO Antares
2012/03/01	02:17:30	4.70149	-15.01	0.003	182	90	-10.8	1.0		Moon	Alpha	TAU Aldebaran
2012/03/10	18:19:00	1.81260	-19.89	0.002	20	-146	-12.4	1.1		Moon	Alpha	VIR Spica
2012/03/13	22:34:52	4.15871	-11.74	0.002	191	-104	-11.3	1.1		Moon	Alpha	SCO Antares
2012/03/28	06:26:46	4.40379	-14.01	0.003	173	62	-10.0	1.0		Moon	Alpha	TAU Aldebaran
2012/04/07	07:03:09	2.17107	-25.74	0.002	13	-172	-12.8	1.1		Moon	Alpha	VIR Spica
2012/04/10	06:56:16	4.17785	0.41	0.002	177	-132	-12.0	1.1		Moon	Alpha	SCO Antares
2012/04/24	15:43:47	4.69101	56.24	0.003	181	36	-8.9	1.0		Moon	Alpha	TAU Aldebaran
2012/05/04	15:23:18	1.78924	-12.32	0.002	21	159	-12.6	1.1		Moon	Alpha	VIR Spica
2012/05/21	21:35:26	4.25805	-20.01	0.003	181	9	-6.0	1.0		Moon	Alpha	TAU Aldebaran
2012/06/04	03:54:15	4.29039	-5.13	0.002	177	175	-12.8	1.1		Moon	Alpha	SCO Antares
2012/06/18	01:03:21	4.25010	-14.29	0.003	174	-17	-7.3	1.0		Moon	Alpha	TAU Aldebaran
2012/07/15	11:35:54	4.57347	43.18	0.003	183	-43	-9.3	1.0		Moon	Alpha	TAU Aldebaran
2012/07/25	15:02:32	1.86808	32.33	0.002	27	81	-10.7	1.1		Moon	Alpha	VIR Spica
2012/07/28	21:18:23	4.28897	19.73	0.002	180	123	-11.8	1.1		Moon	Alpha	SCO Antares
2012/08/11	17:47:22	3.94746	-26.89	0.003	179	-69	-10.2	1.0		Moon	Alpha	TAU Aldebaran
2012/09/07	22:55:41	3.92918	17.05	0.003	169	-96	-10.9	1.0		Moon	Alpha	TAU Aldebaran
2012/10/05	10:50:39	3.63642	-6.69	0.003	183	-122	-11.5	1.0		Moon	Alpha	TAU Aldebaran
2012/10/15	15:17:13	1.63053	9.19	0.002	16	4	-4.4	1.1		Moon	Alpha	VIR Spica
2012/10/18	15:47:50	4.90630	21.06	0.002	180	44	-9.6	1.1		Moon	Alpha	SCO Antares
2012/11/01	14:57:10	3.39457	-22.63	0.003	175	-149	-12.2	1.0		Moon	Alpha	TAU Aldebaran
2012/11/28	20:02:17	3.77955	44.48	0.003	169	-177	-12.6	1.0		Moon	Alpha	TAU Aldebaran
2012/12/09	12:59:24	1.58754	-4.46	0.002	14	-54	-10.0	1.1		Moon	Alpha	VIR Spica
2012/12/12	13:21:19	4.98005	13.32	0.002	179	-12	-6.9	1.1		Moon	Alpha	SCO Antares
2012/12/26	06:03:20	3.50101	-11.96	0.003	182	156	-12.3	1.0		Moon	Alpha	TAU Aldebaran

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Alt = altezza in gradi sull'orizzonte dell'evento nel momento centrale

R1 = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in ° on the horizon of the event in the central moment

R1 = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the Moon

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

















Data						StellaSp	Mag	% Elon	Sole Luna				
a	m	g	h	m	s				No D	V	ill	Alt	Alt
12	11	1	4	58	59	R	614 K2	5.5	95-	155	-9	31	267
12	11	3	5	36	37	Gr	888cB9	6.0	84-	133	-3	41	**
12	11	3	5	47	46	r	888cB9	6.0	84-	133	-2	39	259
12	11	5	4	27	56	R	1141 K2	5.5	68-	111		60	202
12	11	7	2	32	14	R	1359cB8	5.2	49-	88		41	123
12	11	12	5	15	58	r	1949SA0	5.9	4-	23	-9	10	120
12	11	16	16	25	41	D	2633SB2	3.8	11+	38	-8	14	219
12	11	16	17	16	27	D	2638dB0	5.3	11+	39		8	230
12	11	17	17	36	54	D	2814cK0	4.9	20+	53		14	223
12	11	18	20	28	6	D	2969SA5	3.1	31+	67		2	247

Data						StellaSp	Mag	% Elon	Sole Luna				
a	m	g	h	m	s				No D	V	ill	Alt	Alt
12	11	19	17	24	33	D	3093 G8	4.5	40+	79		32	197
12	11	23	22	22	16	D	68SB9	5.8	81+	128		37	238
12	11	30	19	11	4	r	940SB9	5.8	95-	155		19	80
12	12	2	21	14	29	Gr	1197 K3	5.8	84-	133		21	**
12	12	3	22	32	41	r	1318 A1	5.9	76-	121		24	97
12	12	4	4	13	44	R	1332cK5	5.4	74-	119		54	206
12	12	19	19	48	1	D	3453wA0	5.0	45+	85		30	237
12	12	26	18	19	49	D	765cA5	5.3	98+	162		39	101
12	12	27	21	24	32	D	915SB2	4.6	100+	173		60	139
12	12	31	6	31	1	r	1318 A1	5.9	93-	148	-4	17	270

Data nel formato anno/mese/giorno, ore in T.U.

P : tipo di fenomeno

D = sparizione	d = sparizione visibile con difficoltà
R = riapparizione	r = riapparizione visibile con difficoltà
G = radente	g = radente visibile con difficoltà
	m = missing

Stella : nnnn = ZC catalogue no.  
 nnnnn or nnnnnn = SAO catalogue number  
 Xnnnnn = XZ80 catalogue no.  
 Pppnnnnn = Hubble catalogue

D : stella doppia (vedere codice XZ catalogue)  
 Sp : tipo spettrale  
 Mag : magnitudine  
 V : stella variabile ad eclisse (e), varia (v), sospetta (s)  
 % : percentuale di Luna illuminata  
 Elon : elongazione della Luna, in gradi  
 Sole alt : altezza del Sole, in gradi  
 Luna alt : altezza della Luna sull'orizzonte, in gradi  
 Luna az : azimut della Luna, in gradi

Date in the format year/month/day, times in T.U.

P : type of phenomenon

D = disappearing	d = disappearing, visibile with difficulty
R = reappearing	r = reappearing, visibile with difficulty
G = radent	g = radent, visibile with difficulty
	m = missing

Stella : nnnn = ZC catalogue no.  
 nnnnn or nnnnnn = SAO catalogue number  
 Xnnnnn = XZ80 catalogue no.  
 Pppnnnnn = Hubble catalogue

D : double star (XZ catalogue)  
 Sp : spectral type  
 Mag : magnitude  
 V : variable star : eclipse (e), variable (v), suspect (s)  
 % : percentage of Moon illumination  
 Elon : elongation of the Moon, in °  
 Sun alt : height of the Sun, in °  
 Moon alt : height of the Moon, in °  
 Moon az : azimuth of the Moon, in °

© (8)

**CONGIUNZIONI MULTIPLE PIANETI-LUNA-STELLE**  
 (eventi con 1 o più pianeti, la Luna ed una stella di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-MOON-STARS**  
 (events with 1 or more planets, the Moon and a star with mag<2 within  
 5°)

**Geocentriche - Geocentric**

Date	TT	Dmed	Dmax	emin	m2d	mmax		Alpha	TAU Aldebaran	Venus
2012/06/18	01:30	3.613	5.020	-17	-3.5	1.0	Moon	Alpha	TAU Aldebaran	Venus
2012/07/15	12:07	4.151	5.094	-41	-4.5	1.0	Moon	Alpha	TAU Aldebaran	Venus
2012/11/28	23:32	3.837	5.029	-175	-2.7	1.0	Moon	Alpha	TAU Aldebaran	Jupiter
2012/12/26	02:14	3.852	5.001	154	-2.7	1.0	Moon	Alpha	TAU Aldebaran	Jupiter

**Topocentriche - Topocentric 42°N - 12°E**

Date	UT	Dmed	Dmax	emin	m2d	mmax		Alpha	TAU Aldebaran	Venus
2012/06/18	00:30	3.133	4.266	-17	-3.5	1.0	Moon	Alpha	TAU Aldebaran	Venus
2012/07/15	14:32	3.805	4.740	-41	-4.5	1.0	Moon	Alpha	TAU Aldebaran	Venus
2012/10/18	14:52	3.749	4.931	43	1.1	1.1	Moon	Alpha	SCO Antares	Mars
2012/11/28	23:42	3.745	5.028	-175	-2.7	1.0	Moon	Alpha	TAU Aldebaran	Jupiter
2012/12/26	03:56	3.700	5.004	154	-2.7	1.0	Moon	Alpha	TAU Aldebaran	Jupiter

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest body

mmax = least magnitude

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**CONGIUNZIONI MULTIPLE MISTE**  
**CERCHI MINIMI GEOCENTRICI PIANETI-LUNA-STELLE**  
(eventi con 1 o più pianeti, la Luna ed una stella di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**LEAST GEOCENTRIC GROUPINGS PLANETS-MOON-STARS**  
(events with 1 or more planets, the Moon and a star with mag<2 within 5°)

DATE	TIME	BODIES		D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.	
18 06	2012 01	VENUS	MOON	α TAU	2.0	3.0	5.0	5.0	18	-4.2	-5.7	0.8	-5.9	-15	44	-12	11
18 06	2012 02	VENUS	MOON	α TAU	2.1	3.0	4.9	5.0	18	-4.2	-5.7	0.8	-5.9	-7	55	-9	25
18 06	2012 03	VENUS	MOON	α TAU	2.4	3.0	5.0	5.0	17	-4.2	-5.6	0.8	-5.9	3	66	-4	38
15 07	2012 10	VENUS	MOON	α TAU	4.5	2.9	4.9	5.0	42	-4.5	-7.7	0.8	-7.8	59	226	48	127
15 07	2012 11	VENUS	MOON	α TAU	4.3	2.9	4.9	5.0	42	-4.5	-7.7	0.8	-7.8	49	245	54	148
28 11	2012 20	JUPITER	MOON	α TAU	2.5	5.0	4.2	5.0	176	-2.8	-12.7	0.8	-12.7	44	99	-35	281
28 11	2012 21	JUPITER	MOON	α TAU	2.0	5.0	4.2	5.0	176	-2.8	-12.7	0.8	-12.7	54	113	-43	295
28 11	2012 22	JUPITER	MOON	α TAU	1.6	5.0	4.1	5.0	176	-2.8	-12.6	0.8	-12.6	63	134	-51	313
28 11	2012 23	JUPITER	MOON	α TAU	1.1	5.0	4.2	5.0	176	-2.8	-12.6	0.8	-12.6	69	166	-56	334
29 11	2012 00	JUPITER	MOON	α TAU	0.7	5.0	4.2	5.0	175	-2.8	-12.6	0.8	-12.6	67	204	-58	0
29 11	2012 01	JUPITER	MOON	α TAU	0.6	5.0	4.4	5.0	175	-2.8	-12.6	0.8	-12.6	60	233	-56	26
29 11	2012 02	JUPITER	MOON	α TAU	0.8	5.0	4.6	5.0	175	-2.8	-12.6	0.8	-12.6	51	250	-50	47
29 11	2012 03	JUPITER	MOON	α TAU	1.2	5.0	4.8	5.0	175	-2.8	-12.6	0.8	-12.6	40	263	-43	65
25 12	2012 23	JUPITER	MOON	α TAU	0.7	4.9	4.8	5.0	154	-2.8	-12.0	0.8	-12.0	60	232	-57	329
26 12	2012 00	JUPITER	MOON	α TAU	0.4	4.9	4.6	5.0	154	-2.8	-12.0	0.8	-12.0	50	250	-59	354
26 12	2012 01	JUPITER	MOON	α TAU	0.5	4.9	4.4	5.0	154	-2.8	-12.1	0.8	-12.1	39	263	-58	21
26 12	2012 02	JUPITER	MOON	α TAU	0.9	4.9	4.3	5.0	154	-2.8	-12.1	0.8	-12.1	28	273	-53	44
26 12	2012 03	JUPITER	MOON	α TAU	1.4	4.9	4.2	5.0	154	-2.8	-12.1	0.8	-12.1	17	282	-46	63
26 12	2012 04	JUPITER	MOON	α TAU	1.9	4.9	4.1	5.0	154	-2.8	-12.1	0.8	-12.1	7	292	-37	78
26 12	2012 05	JUPITER	MOON	α TAU	2.4	4.9	4.1	5.0	155	-2.8	-12.1	0.8	-12.1	-3	302	-29	90
26 12	2012 06	JUPITER	MOON	α TAU	2.9	4.9	4.2	5.0	155	-2.8	-12.1	0.8	-12.1	-12	313	-20	102

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# CONGIUNZIONI MULTIPLE MISTE

## CERCHI MINIMI TOPOCENTRICI PIANETI-LUNA-STELLE

(eventi con 1 o più pianeti, la Luna ed una stella di mag<2 entro 5°)

## MULTIPLE CONJUNCTIONS

## LEAST TOPOCENTRIC GROUPINGS PLANETS-MOON-STARS

(events with 1 or more planets, the Moon and a star with mag<2 within 5°)

42°N - 12°E

DATE	TIME	BODIES		D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
17 06 2012 22	VENUS	MOON	α TAU	1.8	3.0	4.7	4.7	18	-4.2	-5.8	0.8	-6.0	-28	0	-8	329
17 06 2012 23	VENUS	MOON	α TAU	1.4	3.0	4.4	4.5	18	-4.2	-5.8	0.8	-6.0	-26	16	-11	343
18 06 2012 00	VENUS	MOON	α TAU	1.2	3.0	4.3	4.3	18	-4.2	-5.8	0.8	-6.0	-22	31	-13	357
18 06 2012 01	VENUS	MOON	α TAU	1.4	3.0	4.2	4.2	18	-4.2	-5.7	0.8	-5.9	-15	44	-12	11
18 06 2012 02	VENUS	MOON	α TAU	1.8	3.0	4.2	4.3	18	-4.2	-5.7	0.8	-5.9	-7	55	-9	25
18 06 2012 03	VENUS	MOON	α TAU	2.3	3.0	4.4	4.4	17	-4.2	-5.6	0.8	-5.9	3	66	-4	38
18 06 2012 04	VENUS	MOON	α TAU	2.8	3.0	4.6	4.6	17	-4.2	-5.6	0.8	-5.9	13	75	1	50
18 06 2012 05	VENUS	MOON	α TAU	3.2	3.0	4.8	4.9	17	-4.2	-5.5	0.8	-5.8	24	85	8	62
15 07 2012 08	VENUS	MOON	α TAU	4.9	2.9	4.6	5.0	42	-4.5	-7.8	0.8	-7.9	67	165	32	97
15 07 2012 09	VENUS	MOON	α TAU	4.6	2.9	4.6	4.9	42	-4.5	-7.8	0.8	-7.9	66	199	40	111
15 07 2012 10	VENUS	MOON	α TAU	4.4	2.9	4.5	4.8	42	-4.5	-7.7	0.8	-7.8	59	226	48	127
15 07 2012 11	VENUS	MOON	α TAU	4.2	2.9	4.5	4.7	42	-4.5	-7.7	0.8	-7.8	49	245	54	148
15 07 2012 12	VENUS	MOON	α TAU	4.0	3.0	4.5	4.7	41	-4.5	-7.7	0.8	-7.8	39	258	57	172
15 07 2012 13	VENUS	MOON	α TAU	3.7	3.0	4.6	4.6	41	-4.5	-7.6	0.8	-7.7	28	269	56	198
15 07 2012 14	VENUS	MOON	α TAU	3.5	3.0	4.6	4.7	41	-4.5	-7.6	0.8	-7.7	17	279	52	221
15 07 2012 15	VENUS	MOON	α TAU	3.3	3.0	4.8	4.8	41	-4.5	-7.6	0.8	-7.7	6	288	45	240
15 07 2012 16	VENUS	MOON	α TAU	3.1	3.0	5.0	5.0	40	-4.5	-7.5	0.8	-7.6	-4	299	37	255
18 10 2012 14	MARS	MOON	α SCO	1.2	3.9	4.9	5.0	43	1.2	-7.8	0.9	-7.8	26	183	21	213
18 10 2012 15	MARS	MOON	α SCO	1.3	3.9	4.9	4.9	43	1.2	-7.8	0.9	-7.8	24	198	15	227
18 10 2012 16	MARS	MOON	α SCO	1.6	3.9	4.9	4.9	43	1.2	-7.8	0.9	-7.8	19	212	8	240
18 10 2012 17	MARS	MOON	α SCO	2.0	3.9	4.9	4.9	44	1.2	-7.9	0.9	-7.9	13	224	0	252
28 11 2012 20	JUPITER	MOON	α TAU	2.2	5.0	3.7	5.0	176	-2.8	-12.7	0.8	-12.7	44	99	-35	281
28 11 2012 21	JUPITER	MOON	α TAU	1.9	5.0	3.7	5.0	176	-2.8	-12.7	0.8	-12.7	54	113	-43	295
28 11 2012 22	JUPITER	MOON	α TAU	1.6	5.0	3.8	5.0	176	-2.8	-12.6	0.8	-12.6	63	134	-51	313
28 11 2012 23	JUPITER	MOON	α TAU	1.3	5.0	3.8	5.0	176	-2.8	-12.6	0.8	-12.6	69	166	-56	334
29 11 2012 00	JUPITER	MOON	α TAU	1.1	5.0	3.9	5.0	175	-2.8	-12.6	0.8	-12.6	67	204	-58	0
29 11 2012 01	JUPITER	MOON	α TAU	1.0	5.0	4.0	5.0	175	-2.8	-12.6	0.8	-12.6	60	233	-56	26
29 11 2012 02	JUPITER	MOON	α TAU	0.9	5.0	4.1	5.0	175	-2.8	-12.6	0.8	-12.6	51	250	-50	47
29 11 2012 03	JUPITER	MOON	α TAU	1.1	5.0	4.2	5.0	175	-2.8	-12.6	0.8	-12.6	40	263	-43	65
29 11 2012 04	JUPITER	MOON	α TAU	1.3	5.0	4.3	5.0	175	-2.8	-12.6	0.8	-12.6	29	273	-34	79
29 11 2012 05	JUPITER	MOON	α TAU	1.7	5.0	4.6	5.0	174	-2.8	-12.6	0.8	-12.6	18	283	-25	91
26 12 2012 00	JUPITER	MOON	α TAU	0.9	4.9	4.5	5.0	154	-2.8	-12.0	0.8	-12.0	50	250	-59	354
26 12 2012 01	JUPITER	MOON	α TAU	0.8	4.9	4.3	5.0	154	-2.8	-12.1	0.8	-12.1	39	263	-58	21
26 12 2012 02	JUPITER	MOON	α TAU	0.8	4.9	4.1	5.0	154	-2.8	-12.1	0.8	-12.1	28	273	-53	44
26 12 2012 03	JUPITER	MOON	α TAU	1.1	4.9	3.8	5.0	154	-2.8	-12.1	0.8	-12.1	17	282	-46	63
26 12 2012 04	JUPITER	MOON	α TAU	1.5	4.9	3.6	5.0	154	-2.8	-12.1	0.8	-12.1	7	292	-37	78
26 12 2012 05	JUPITER	MOON	α TAU	2.0	4.9	3.5	5.0	155	-2.8	-12.1	0.8	-12.1	-3	302	-29	90
26 12 2012 06	JUPITER	MOON	α TAU	2.5	4.9	3.5	5.0	155	-2.8	-12.1	0.8	-12.1	-12	313	-20	102
26 12 2012 07	JUPITER	MOON	α TAU	3.1	4.9	3.5	5.0	155	-2.8	-12.1	0.8	-12.1	-19	325	-11	113
26 12 2012 08	JUPITER	MOON	α TAU	3.7	4.9	3.7	5.0	155	-2.8	-12.1	0.8	-12.1	-24	339	-3	125

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# EVENTI GEOCENTRICI <5° LUNA-OGGETTI m<4

## GEOCENTRIC EVENTS <5° MOON-OBJECTS m<4

Date	TT	Dm	Dl	rl	p	e	m1	m*	tm(s)		
2012/01/05	10:23:14	2.80740	1.16014	0.003	353	135	-11.9	1.6		Moon	M45
2012/02/01	18:51:49	2.97858	1.15762	0.003	352	107	-11.2	1.6		Moon	M45
2012/02/29	03:00:58	3.24633	1.15244	0.003	352	80	-10.6	1.6		Moon	M45
2012/03/27	10:13:45	3.48463	1.14762	0.003	353	53	-9.7	1.6		Moon	M45
2012/04/23	16:33:22	3.60094	1.14520	0.003	353	26	-8.2	1.6		Moon	M45
2012/05/20	22:33:03	3.61055	1.14545	0.003	353	-1	-0.5	1.6		Moon	M45
2012/06/17	04:52:09	3.61143	1.14744	0.003	353	-27	-8.2	1.6		Moon	M45
2012/07/14	11:54:44	3.70205	1.14972	0.003	353	-53	-9.7	1.6		Moon	M45
2012/08/10	19:37:54	3.90878	1.15084	0.003	353	-79	-10.5	1.6		Moon	M45
2012/09/07	03:34:11	4.16691	1.15013	0.003	353	-105	-11.1	1.6		Moon	M45
2012/10/04	11:08:27	4.36719	1.14811	0.003	353	-132	-11.8	1.6		Moon	M45
2012/10/31	18:00:41	4.44318	1.14596	0.003	353	-159	-12.4	1.6		Moon	M45
2012/11/28	00:18:50	4.43593	1.14471	0.003	353	173	-12.5	1.6		Moon	M45
2012/12/25	06:34:23	4.46840	1.14526	0.003	353	146	-12.1	1.6		Moon	M45

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

Rl = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine dell'oggetto

tm = se presente, l'oggetto viene occultato massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in ° on the horizon of the event in the central moment

Rl = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the Moon

m\* = magnitude of the object

tm = if present, the star is occulted maximum for x seconds

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**EVENTI TOPOCENTRICI <5° LUNA-OGGETTI m<4**  
**TOPOCENTRIC EVENTS <5° MOON-OBJECTS m<4**  
**42°N - 12°E**

Date	UT	Dm	Alt.	r1	p	e	m1	m*	tm(s)		
2012/01/05	10:01:28	3.61987	-21.82	0.003	352	135	-11.9	1.6		Moon	M45
2012/02/01	19:23:26	3.28544	64.58	0.003	352	107	-11.3	1.6		Moon	M45
2012/02/29	03:08:27	4.00306	-25.21	0.003	356	80	-10.5	1.6		Moon	M45
2012/03/27	10:18:39	4.07085	30.84	0.003	344	53	-9.7	1.6		Moon	M45
2012/04/23	16:59:35	3.99829	33.92	0.003	359	25	-8.2	1.6		Moon	M45
2012/05/20	22:31:24	4.38501	-27.72	0.003	355	-1	-0.8	1.6		Moon	M45
2012/06/17	04:58:41	4.19486	31.21	0.003	344	-26	-8.2	1.6		Moon	M45
2012/07/14	12:20:34	4.14088	25.73	0.003	359	-53	-9.7	1.6		Moon	M45
2012/08/10	19:18:42	4.71005	-24.72	0.003	352	-79	-10.5	1.6		Moon	M45
2012/09/07	04:14:22	4.50455	67.41	0.003	349	-105	-11.1	1.6		Moon	M45
2012/10/04	11:18:21	5.05507	-17.62	0.003	358	-132	-11.8	1.6		Moon	M45
2012/11/28	00:44:44	4.77009	54.03	0.003	355	173	-12.6	1.6		Moon	M45

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Alt = altezza in gradi sull'orizzonte dell'evento nel momento centrale

R1 = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine dell'oggetto

tm = se presente, l'oggetto viene occultato massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in ° on the horizon of the event in the central moment

R1 = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the Moon

m\* = magnitude of the object

tm = if present, the star is occulted maximum for x seconds

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**CONGIUNZIONI MULTIPLE PIANETI-LUNA-OGGETTI**  
 (eventi con 1 pianeta, la Luna ed un oggetto di mag<4 entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-MOON-OBJECTS**  
 (events with 1 planet, the Moon and an object with mag<4 within 5°)

**Geocentriche - Geocentric**

Date	TT	Dmed	Dmax	emin	m2d	mmax			
2012/06/17	06:07	3.802	4.993	-25	-1.9	1.6	Moon	M45	Jupiter

**Topocentriche - Topocentric 42°N - 12°E**

Date	TT	Dmed	Dmax	emin	m2d	mmax			
2012/06/17	06:04	3.809	5.003	-25	-1.9	1.6	Moon	M45	Jupiter

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest body

mmax = least magnitude

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**CONGIUNZIONI MULTIPLE MISTE  
CERCHI MINIMI GEOCENTRICI  
PIANETI - LUNA - OGGETTI MESSIER**  
(eventi con 1 pianeta, la Luna ed un oggetto di mag<4 entro 5°)  
**MULTIPLE CONJUNCTIONS  
LEAST GEOCENTRIC GROUPINGS  
PLANETS - MOON - MESSIER OBJECTS**  
(events with 1 planet, the Moon and an object with mag<4 within 5°)

DATE	TIME	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
17 06 2012 02		JUPITER	MOON	PLEIADES	3.2	5.0	3.8	5.0	27	-2.0	-6.6	1.6	-6.6	-1	61	-9	25
17 06 2012 03		JUPITER	MOON	PLEIADES	2.7	5.0	3.6	5.0	26	-2.0	-6.6	1.6	-6.6	9	71	-4	38
17 06 2012 04		JUPITER	MOON	PLEIADES	2.3	5.0	3.6	5.0	26	-2.0	-6.6	1.6	-6.6	20	80	1	50
17 06 2012 05		JUPITER	MOON	PLEIADES	1.9	5.0	3.6	5.0	26	-2.0	-6.5	1.6	-6.5	31	90	8	62
17 06 2012 06		JUPITER	MOON	PLEIADES	1.5	5.0	3.6	5.0	26	-2.0	-6.5	1.6	-6.5	42	101	17	73

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

Times in U.T.

**CONGIUNZIONI MULTIPLE MISTE  
CERCHI MINIMI TOPOCENTRICI  
PIANETI - LUNA - OGGETTI MESSIER**  
(eventi con 1 pianeta, la Luna ed un oggetto di mag<4 entro 5°)  
**MULTIPLE CONJUNCTIONS  
LEAST TOPOCENTRIC GROUPINGS  
PLANETS - MOON - MESSIER OBJECTS**  
(events with 1 planet, the Moon and an object with mag<4 within 5°)  
42°N - 12°E

DATE	TIME	BODIES		D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ	ALT.S.	AZ.S.
17 06 2012	02	JUPITER MOON	PLEIADES	2.4	5.0	4.3	5.0	27	-2.0	-6.6	1.6	-6.6	-1	61	-9	25
17 06 2012	03	JUPITER MOON	PLEIADES	1.9	5.0	4.2	5.0	26	-2.0	-6.6	1.6	-6.6	9	71	-4	38
17 06 2012	04	JUPITER MOON	PLEIADES	1.5	5.0	4.2	5.0	26	-2.0	-6.6	1.6	-6.6	20	80	1	50
17 06 2012	05	JUPITER MOON	PLEIADES	1.1	5.0	4.2	5.0	26	-2.0	-6.5	1.6	-6.5	31	90	8	62
17 06 2012	06	JUPITER MOON	PLEIADES	0.8	5.0	4.2	5.0	26	-2.0	-6.5	1.6	-6.5	42	101	17	73

Date, Time = data ed ora

Bodies = corpi

Dxy = distanza tra il corpo x e quello y, in gradi

Group = cerchio minimo comprendente tutto il gruppo, in gradi

EL = elongazione dal Sole, in gradi

MAGx = magnitudine del corpo x

MAGT = magnitudine totale del gruppo

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

Date in the format day/month/year

Dxy = distance between the body x and y, in °

GROUP = least group, in °

EL = elongation from the Sun, in °

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

# PIANETI-LUNA-STELLE IN LINEA RETTA GEOCENTRICI PLANETS-MOON-STARS IN STRAIGHT LINE GEOCENTRIC

DATE	TIME	BODIES			C	ALT	AZ	ALT.S.	AZ.S
29 11 2012	00	JUPITER	MOON	α TAU	-0.490	67	204	-58	0
29 11 2012	01	JUPITER	MOON	α TAU	0.383	60	233	-56	26
26 12 2012	00	JUPITER	MOON	α TAU	-0.481	50	250	-59	354
26 12 2012	01	JUPITER	MOON	α TAU	0.345	39	263	-58	21

# PIANETI-LUNA-STELLE IN LINEA RETTA TOPOCENTRICI PLANETS-MOON-STARS IN STRAIGHT LINE TOPOCENTRIC

42°N - 12°E

DATE	TIME	BODIES			C	ALT	AZ	ALT.S.	AZ.S
17 06 2012	23	VENUS	MOON	α TAU	-0.314	-26	16	-11	343
18 06 2012	00	VENUS	MOON	α TAU	0.409	-22	31	-13	357
14 08 2012	06	MARS	SATURN	α VIR	0.275	-40	61	9	78
14 08 2012	07	MARS	SATURN	α VIR	0.240	-30	74	17	90
14 08 2012	08	MARS	SATURN	α VIR	0.205	-19	85	26	103
14 08 2012	09	MARS	SATURN	α VIR	0.170	-8	95	35	117
14 08 2012	10	MARS	SATURN	α VIR	0.135	3	105	42	133
14 08 2012	11	MARS	SATURN	α VIR	0.100	14	116	47	152
14 08 2012	12	MARS	SATURN	α VIR	0.066	23	128	50	174
14 08 2012	13	MARS	SATURN	α VIR	0.031	31	142	49	197
14 08 2012	14	MARS	SATURN	α VIR	-0.003	37	159	45	217
14 08 2012	15	MARS	SATURN	α VIR	-0.037	39	177	38	235
14 08 2012	16	MARS	SATURN	α VIR	-0.072	38	196	30	250
14 08 2012	17	MARS	SATURN	α VIR	-0.106	34	213	22	263
14 08 2012	18	MARS	SATURN	α VIR	-0.141	26	227	13	275
14 08 2012	19	MARS	SATURN	α VIR	-0.175	17	240	4	287
14 08 2012	20	MARS	SATURN	α VIR	-0.210	7	251	-3	299
14 08 2012	21	MARS	SATURN	α VIR	-0.245	-4	261	-11	312
14 08 2012	22	MARS	SATURN	α VIR	-0.280	-15	271	-16	325
14 08 2012	23	MARS	SATURN	α VIR	-0.314	-26	282	-20	340
15 08 2012	00	MARS	SATURN	α VIR	-0.350	-37	294	-22	356
29 11 2012	01	JUPITER	MOON	α TAU	0.039	60	233	-56	26
26 12 2012	02	JUPITER	MOON	α TAU	-0.238	28	273	-53	44
26 12 2012	03	JUPITER	MOON	α TAU	0.478	17	282	-46	63

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

Date in the format day/month/year

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

**PIANETI-LUNA-OGGETTI IN LINEA RETTA GEOCENTRICI**  
**PLANETS-MOON-OBJECTS IN STRAIGHT LINE**  
**GEOCENTRIC**

DATE            TIME            BODIES                            C    ALT    AZ    ALT.S.   AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

**PIANETI-LUNA-OGGETTI IN LINEA RETTA**  
**TOPOCENTRICI**  
**PLANETS-MOON-STARS IN STRAIGHT LINE**  
**TOPOCENTRIC**

42°N - 12°E

DATE            TIME            BODIES                            C    ALT    AZ    ALT.S.   AZ.S

Questo anno non avvengono fenomeni - No phenomena this year

Quanto più il parametro C è prossimo a zero tanto più i corpi sono allineati

Date, Time = data ed ora

Bodies = corpi

ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi

AZ = azimut del baricentro geometrico del gruppo, in gradi da nord

ALT.S. = altezza sull'orizzonte del Sole, in gradi

AZ.S. = azimut del Sole, in gradi da nord

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Ore in T.U.

How much anymore the parameter C is next to zero so much the bodies are lined up

Date in the format day/month/year

ALT = height on the horizon of the baricenter of the group, in °

AZ = azimuth of the baricenter of the group, in ° from north

ALT.S. = height on the horizon of the Sun, in °

AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

**GEOMETRIE SPAZIALI PIANETI-LUNA-OGGETTI  
 TRIANGOLI EQUILATERI  
 SPATIAL GEOMETRIES PLANETS-MOON-OBJECTS  
 EQUILATERAL TRIANGLES  
 Geocentrici - geocentric**

DATE            TIME            BODIES                    D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.  
 Questo anno non avvengono fenomeni - No phenomena this year

**GEOMETRIE SPAZIALI PIANETI-LUNA-OGGETTI  
 TRIANGOLI EQUILATERI  
 SPATIAL GEOMETRIES PLANETS-MOON-OBJECTS  
 EQUILATERAL TRIANGLES  
 42°N - 12°E**

DATE            TIME            BODIES                    D12 D13 D23 GROUP EL. MAG1 MAG2 MAG3 MAGT ALT AZ ALT.S. AZ.S.  
 Questo anno non avvengono fenomeni - No phenomena this year

Date, Time = data ed ora  
 Bodies = corpi  
 Dxy = distanza tra il corpo x e quello y, in gradi  
 Group = cerchio minimo comprendente tutto il gruppo, in gradi  
 EL = elongazione dal Sole, in gradi  
 MAGx = magnitudine del corpo x  
 MAGT = magnitudine totale del gruppo  
 ALT = altezza sull'orizzonte del baricentro geometrico del gruppo, in gradi  
 AZ = azimut del baricentro geometrico del gruppo, in gradi da nord  
 ALT.S. = altezza sull'orizzonte del Sole, in gradi  
 AZ.S. = azimut del Sole, in gradi da nord  
 Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno  
 Moon=Luna

Ore in T.U.

Si è considerato equilatero ogni triangolo in cui ogni cateto differisce dall'altro per massimo ±10%.  
 Si è considerato quadrato ogni quadrilatero in cui ogni lato differisce dall'altro per massimo ±10% e con diagonali diverse meno del 15%.

NB : queste tabelle sono state create esclusivamente ai fini di "foto d'effetto", con tre o quattro corpi celesti praticamente equidistanti!

Date in the format day/month/year  
 Dxy = distance between the body x and y, in °  
 DQM = middle distance between the 4 bodies, in °  
 MAX = maxima distance between the 4 bodies, in °  
 EL = elongation from the Sun, in °  
 MAGx = magnitude of body x  
 MAGT = total magnitude  
 ALT = height on the horizon of the baricenter of the group, in °  
 AZ = azimuth of the baricenter of the group, in ° from north  
 ALT.S. = height on the horizon of the Sun, in °  
 AZ.S. = azimuth of the Sun, in ° from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum ± 10%.  
 I have considered square every quadrilateral in which every side differs from the other for maximum ± 10% and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

**CONGIUNZIONI LUNARI GEOCENTRICHE <1°  
 CON LE PLEIADI  
 LUNAR GEOCENTRIC CONJUNCTIONS <1°  
 WITH THE PLEIADES**

Date      TT      Dm      Dl      r1   p      e      m1      m\*      tm(s)   tw(h)

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi

Rl = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies

Rl = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the Moon

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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**CONGIUNZIONI LUNARI TOPOCENTRICHE <1°**  
**CON LE PLEIADI**  
**LUNAR TOPOCENTRIC CONJUNCTIONS <1°**  
**WITH THE PLEIADES**  
**42°N - 12°E**

Date      TT      Dm      Alt      r1   p      e      m1      m\*      tm(s)   tw(h)

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Alt = altezza in gradi sull'orizzonte dell'evento nel momento centrale

R1 = distanza in U.A. della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della Luna

m\* = magnitudine della stella

tm = se presente, la stella viene occultata massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in ° on the horizon of the event in the central moment

R1 = distance in A.U. of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the Moon

m\* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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# LUNA A BARCHETTA E LUNA A PONTE

## MOON LIKE A BOAT AND LIKE A BRIDGE

ANCONA						GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
						23/ 2/2012	18:50	189.0	4	-0	-22
GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.						
22/ 2/2012	17:20	173.0	1	2	-7	23/ 3/2012	17:50	183.9	1	8	-4
22/ 2/2012	17:30	173.1	1	1	-9	23/ 3/2012	18:0	184.2	1	6	-6
22/ 2/2012	17:40	173.2	1	-0	-11	23/ 3/2012	18:10	184.6	1	5	-8
						23/ 3/2012	18:20	185.0	1	3	-10
						23/ 3/2012	18:30	185.5	1	1	-11
23/ 2/2012	16:50	189.4	3	18	-2	23/ 3/2012	18:40	186.0	1	0	-13
23/ 2/2012	17:0	189.0	3	16	-3						
23/ 2/2012	17:10	188.6	3	15	-5	CAGLIARI					
23/ 2/2012	17:20	188.3	3	13	-7	GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
23/ 2/2012	17:30	188.1	3	11	-9	24/ 1/2012	17:10	189.6	2	9	-7
23/ 2/2012	17:40	187.9	3	10	-11	24/ 1/2012	17:20	189.0	2	8	-9
23/ 2/2012	17:50	187.8	3	8	-12	24/ 1/2012	17:30	188.4	2	6	-11
23/ 2/2012	18:0	187.8	3	6	-14	24/ 1/2012	17:40	187.9	2	4	-13
23/ 2/2012	18:10	187.8	4	4	-16	24/ 1/2012	17:50	187.4	3	2	-15
23/ 2/2012	18:20	187.8	4	3	-18	24/ 1/2012	18:0	187.0	3	0	-17
23/ 2/2012	18:30	187.9	4	1	-20	24/ 1/2012	18:10	186.6	3	-0	-19
23/ 2/2012	18:40	188.1	4	-0	-21						
						25/ 1/2012	18:50	189.9	7	3	-26
23/ 3/2012	17:40	182.9	1	8	-4	25/ 1/2012	19:0	189.6	7	1	-28
23/ 3/2012	17:50	183.2	1	6	-6	25/ 1/2012	19:10	189.4	7	-0	-30
23/ 3/2012	18:0	183.6	1	5	-8						
23/ 3/2012	18:10	184.0	1	3	-9	23/ 2/2012	17:20	184.5	3	17	-3
23/ 3/2012	18:20	184.5	1	1	-11	23/ 2/2012	17:30	184.2	3	15	-5
23/ 3/2012	18:30	185.0	1	-0	-13	23/ 2/2012	17:40	183.9	3	13	-7
						23/ 2/2012	17:50	183.7	3	12	-9
AOSTA						23/ 2/2012	18:0	183.6	3	10	-11
GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.	23/ 2/2012	18:10	183.5	4	8	-13
22/ 2/2012	17:40	175.6	1	3	-7	23/ 2/2012	18:20	183.4	4	6	-15
22/ 2/2012	17:50	175.7	1	1	-8	23/ 2/2012	18:30	183.4	4	4	-17
22/ 2/2012	18:0	175.7	1	0	-10	23/ 2/2012	18:40	183.5	4	2	-19
						23/ 2/2012	18:50	183.6	4	0	-20
23/ 3/2012	18:10	185.4	1	8	-5	23/ 2/2012	19:0	183.8	4	-1	-22
23/ 3/2012	18:20	185.8	1	6	-7						
23/ 3/2012	18:30	186.2	1	4	-8	24/ 2/2012	17:40	189.6	8	24	-7
23/ 3/2012	18:40	186.6	1	3	-10	24/ 2/2012	17:50	189.2	8	22	-9
23/ 3/2012	18:50	187.1	1	1	-12	24/ 2/2012	18:0	188.9	8	21	-11
23/ 3/2012	19:0	187.6	1	-0	-13	24/ 2/2012	18:10	188.7	8	19	-13
						24/ 2/2012	18:20	188.5	8	17	-14
BARI						24/ 2/2012	18:30	188.4	8	15	-16
GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.	24/ 2/2012	18:40	188.3	8	13	-18
24/ 1/2012	17:10	189.5	2	3	-14	24/ 2/2012	18:50	188.3	8	11	-20
24/ 1/2012	17:20	189.0	2	1	-15	24/ 2/2012	19:0	188.4	8	9	-22
24/ 1/2012	17:30	188.6	2	0	-17	24/ 2/2012	19:10	188.5	8	8	-24
						24/ 2/2012	19:20	188.6	8	6	-26
22/ 2/2012	17:0	170.2	1	4	-6	24/ 2/2012	19:30	188.8	8	4	-28
22/ 2/2012	17:10	170.3	1	2	-8	24/ 2/2012	19:40	189.1	8	2	-30
22/ 2/2012	17:20	170.3	1	0	-9	24/ 2/2012	19:50	189.4	8	0	-32
23/ 2/2012	16:40	186.6	3	18	-2	23/ 3/2012	18:0	178.7	1	7	-5
23/ 2/2012	16:50	186.2	3	16	-4	23/ 3/2012	18:10	179.1	1	5	-7
23/ 2/2012	17:0	185.9	3	15	-5	23/ 3/2012	18:20	179.5	1	4	-9
23/ 2/2012	17:10	185.7	3	13	-7	23/ 3/2012	18:30	180.0	1	2	-11
23/ 2/2012	17:20	185.4	3	11	-9	23/ 3/2012	18:40	180.5	1	0	-13
23/ 2/2012	17:30	185.3	3	9	-11						
23/ 2/2012	17:40	185.2	3	7	-13	24/ 3/2012	16:30	189.7	4	35	12
23/ 2/2012	17:50	185.2	3	6	-15	24/ 3/2012	16:40	189.3	4	33	10
23/ 2/2012	18:0	185.2	3	4	-17	24/ 3/2012	16:50	189.0	4	31	8
23/ 2/2012	18:10	185.3	4	2	-19	24/ 3/2012	17:0	188.8	4	29	6
23/ 2/2012	18:20	185.4	4	0	-20	24/ 3/2012	17:10	188.6	4	27	4
						24/ 3/2012	17:20	188.5	4	25	2
23/ 3/2012	17:30	180.3	1	7	-5	24/ 3/2012	17:30	188.5	4	23	0
23/ 3/2012	17:40	180.7	1	5	-7	24/ 3/2012	17:40	188.5	4	22	-1
23/ 3/2012	17:50	181.1	1	4	-9	24/ 3/2012	17:50	188.6	4	20	-3
23/ 3/2012	18:0	181.5	1	2	-11	24/ 3/2012	18:0	188.7	4	18	-5
23/ 3/2012	18:10	182.0	1	0	-12	24/ 3/2012	18:10	188.9	4	16	-7
						24/ 3/2012	18:20	189.1	4	14	-9
						24/ 3/2012	18:30	189.4	4	12	-11
BOLOGNA						24/ 3/2012	18:40	189.8	4	10	-12
GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.						
22/ 2/2012	17:20	174.0	1	4	-6	21/ 7/2012	6:50	350.2	5	2	28
22/ 2/2012	17:30	174.1	1	2	-8	21/ 7/2012	7:0	350.5	5	4	30
22/ 2/2012	17:40	174.1	1	0	-9	21/ 7/2012	7:10	350.7	5	6	32
22/ 2/2012	17:50	174.2	1	-1	-11	21/ 7/2012	7:20	350.8	5	8	34
						21/ 7/2012	7:30	350.9	5	10	35
23/ 2/2012	17:10	189.9	3	16	-4	21/ 7/2012	7:40	351.0	5	12	37
23/ 2/2012	17:20	189.5	3	14	-6	21/ 7/2012	7:50	350.9	5	14	39
23/ 2/2012	17:30	189.2	3	13	-7	21/ 7/2012	8:0	350.9	5	15	41
23/ 2/2012	17:40	189.0	3	11	-9	21/ 7/2012	8:10	350.8	5	17	43
23/ 2/2012	17:50	188.8	3	9	-11	21/ 7/2012	8:20	350.6	5	19	45
23/ 2/2012	18:0	188.7	3	8	-13	21/ 7/2012	8:30	350.4	5	21	47
23/ 2/2012	18:10	188.7	4	6	-14	21/ 7/2012	8:40	350.1	5	23	49
23/ 2/2012	18:20	188.7	4	4	-16						
23/ 2/2012	18:30	188.7	4	3	-18	20/ 8/2012	7:40	350.4	9	-0	33
23/ 2/2012	18:40	188.8	4	1	-20	20/ 8/2012	7:50	350.2	9	1	35

## CAMPOBASSO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	17:20	189.9	2	3	-14
24/ 1/2012	17:30	189.4	2	1	-16
24/ 1/2012	17:40	189.0	2	-0	-18
22/ 2/2012	17:10	170.8	1	3	-6
22/ 2/2012	17:20	170.9	1	2	-8
22/ 2/2012	17:30	171.0	1	0	-10

23/ 2/2012	16:50	187.1	3	18	-2
23/ 2/2012	17: 0	186.7	3	16	-4
23/ 2/2012	17:10	186.4	3	14	-6
23/ 2/2012	17:20	186.1	3	13	-8
23/ 2/2012	17:30	185.9	3	11	-9
23/ 2/2012	17:40	185.8	3	9	-11
23/ 2/2012	17:50	185.7	3	7	-13
23/ 2/2012	18: 0	185.7	3	5	-15
23/ 2/2012	18:10	185.7	4	4	-17
23/ 2/2012	18:20	185.8	4	2	-19
23/ 2/2012	18:30	185.9	4	0	-21

23/ 3/2012	17:40	180.9	1	7	-5
23/ 3/2012	17:50	181.2	1	5	-7
23/ 3/2012	18: 0	181.6	1	3	-9
23/ 3/2012	18:10	182.1	1	2	-11
23/ 3/2012	18:20	182.6	1	0	-13

## CATANZARO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	16:30	189.8	2	11	-5
24/ 1/2012	16:40	189.1	2	9	-7
24/ 1/2012	16:50	188.5	2	8	-9
24/ 1/2012	17: 0	187.9	2	6	-11
24/ 1/2012	17:10	187.4	2	4	-13
24/ 1/2012	17:20	186.9	2	2	-15
24/ 1/2012	17:30	186.5	2	0	-17

25/ 1/2012	18:10	189.8	7	5	-24
25/ 1/2012	18:20	189.5	7	3	-26
25/ 1/2012	18:30	189.2	7	1	-28
25/ 1/2012	18:40	189.0	7	-0	-30

23/ 2/2012	16:50	184.0	3	17	-3
23/ 2/2012	17: 0	183.7	3	15	-5
23/ 2/2012	17:10	183.4	3	13	-7
23/ 2/2012	17:20	183.2	3	11	-9
23/ 2/2012	17:30	183.1	3	10	-11
23/ 2/2012	17:40	183.0	3	8	-13
23/ 2/2012	17:50	183.0	3	6	-15
23/ 2/2012	18: 0	183.0	3	4	-17
23/ 2/2012	18:10	183.0	4	2	-19
23/ 2/2012	18:20	183.2	4	0	-20

24/ 2/2012	17: 0	189.6	8	26	-5
24/ 2/2012	17:10	189.2	8	24	-7
24/ 2/2012	17:20	188.8	8	22	-9
24/ 2/2012	17:30	188.5	8	21	-11
24/ 2/2012	17:40	188.3	8	19	-12
24/ 2/2012	17:50	188.1	8	17	-14
24/ 2/2012	18: 0	188.0	8	15	-16
24/ 2/2012	18:10	187.9	8	13	-18
24/ 2/2012	18:20	187.9	8	11	-20
24/ 2/2012	18:30	188.0	8	9	-22
24/ 2/2012	18:40	188.1	8	7	-24
24/ 2/2012	18:50	188.2	8	6	-26
24/ 2/2012	19: 0	188.4	8	4	-28
24/ 2/2012	19:10	188.7	8	2	-30
24/ 2/2012	19:20	189.0	8	0	-32

23/ 3/2012	17:30	178.0	1	7	-5
23/ 3/2012	17:40	178.4	1	5	-7
23/ 3/2012	17:50	178.8	1	3	-9
23/ 3/2012	18: 0	179.3	1	2	-11
23/ 3/2012	18:10	179.8	1	0	-13

24/ 3/2012	16:20	188.5	4	31	8
24/ 3/2012	16:30	188.3	4	29	6
24/ 3/2012	16:40	188.1	4	27	4
24/ 3/2012	16:50	188.0	4	25	2
24/ 3/2012	17: 0	188.0	4	23	0
24/ 3/2012	17:10	188.0	4	21	-1
24/ 3/2012	17:20	188.1	4	19	-3
24/ 3/2012	17:30	188.3	4	18	-5
24/ 3/2012	17:40	188.4	4	16	-7
24/ 3/2012	17:50	188.7	4	14	-9
24/ 3/2012	18: 0	189.0	4	12	-11
24/ 3/2012	18:10	189.3	4	10	-13
24/ 3/2012	18:20	189.7	4	8	-14

21/ 7/2012	6:10	350.3	5	1	26
21/ 7/2012	6:20	350.6	5	3	28
21/ 7/2012	6:30	350.8	5	4	30
21/ 7/2012	6:40	351.0	5	6	32
21/ 7/2012	6:50	351.2	5	8	33

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
21/ 7/2012	7: 0	351.3	5	10	35
21/ 7/2012	7:10	351.3	5	12	37
21/ 7/2012	7:20	351.3	5	14	39
21/ 7/2012	7:30	351.3	5	16	41
21/ 7/2012	7:40	351.2	5	17	43
21/ 7/2012	7:50	351.0	5	19	45
21/ 7/2012	8: 0	350.8	5	21	47
21/ 7/2012	8:10	350.5	5	23	49
21/ 7/2012	8:20	350.1	5	25	51

20/ 8/2012	7:10	350.8	9	0	33
20/ 8/2012	7:20	350.6	9	2	35
20/ 8/2012	7:30	350.3	9	3	37

## FIRENZE

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:20	173.3	1	4	-6
22/ 2/2012	17:30	173.3	1	2	-7
22/ 2/2012	17:40	173.4	1	0	-9
22/ 2/2012	17:50	173.5	1	-0	-11

23/ 2/2012	17: 0	189.5	3	18	-2
23/ 2/2012	17:10	189.1	3	16	-4
23/ 2/2012	17:20	188.8	3	15	-5
23/ 2/2012	17:30	188.5	3	13	-7
23/ 2/2012	17:40	188.3	3	11	-9
23/ 2/2012	17:50	188.1	3	10	-11
23/ 2/2012	18: 0	188.0	3	8	-13
23/ 2/2012	18:10	187.9	4	6	-14
23/ 2/2012	18:20	187.9	4	4	-16
23/ 2/2012	18:30	188.0	4	3	-18
23/ 2/2012	18:40	188.1	4	1	-20
23/ 2/2012	18:50	188.2	4	-0	-22

23/ 3/2012	17:50	183.1	1	8	-4
23/ 3/2012	18: 0	183.5	1	6	-6
23/ 3/2012	18:10	183.8	1	5	-8
23/ 3/2012	18:20	184.3	1	3	-10
23/ 3/2012	18:30	184.7	1	1	-11
23/ 3/2012	18:40	185.3	1	-0	-13

## GENOVA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:30	174.2	1	4	-6
22/ 2/2012	17:40	174.2	1	2	-8
22/ 2/2012	17:50	174.3	1	0	-9
22/ 2/2012	18: 0	174.4	1	-1	-11

23/ 2/2012	17:20	189.8	3	16	-4
23/ 2/2012	17:30	189.5	3	14	-6
23/ 2/2012	17:40	189.2	3	13	-7
23/ 2/2012	17:50	189.0	3	11	-9
23/ 2/2012	18: 0	188.8	3	9	-11
23/ 2/2012	18:10	188.7	4	8	-13
23/ 2/2012	18:20	188.7	4	6	-14
23/ 2/2012	18:30	188.7	4	4	-16
23/ 2/2012	18:40	188.7	4	3	-18
23/ 2/2012	18:50	188.8	4	1	-20
23/ 2/2012	19: 0	189.0	4	-0	-22

23/ 3/2012	18: 0	183.9	1	8	-4
23/ 3/2012	18:10	184.3	1	6	-6
23/ 3/2012	18:20	184.6	1	5	-8
23/ 3/2012	18:30	185.1	1	3	-10
23/ 3/2012	18:40	185.5	1	1	-11
23/ 3/2012	18:50	186.1	1	0	-13

## L AQUILA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:20	171.8	1	2	-7
22/ 2/2012	17:30	171.8	1	1	-9
22/ 2/2012	17:40	171.9	1	-0	-11

23/ 2/2012	17: 0	187.7	3	17	-3
23/ 2/2012	17:10	187.4	3	15	-5
23/ 2/2012	17:20	187.1	3	13	-7
23/ 2/2012	17:30	186.8	3	12	-9
23/ 2/2012	17:40	186.7	3	10	-10
23/ 2/2012	17:50	186.6	3	8	-12
23/ 2/2012	18: 0	186.5	3	6	-14
23/ 2/2012	18:10	186.5	4	5	-16
23/ 2/2012	18:20	186.5	4	3	-18
23/ 2/2012	18:30	186.6	4	1	-20
23/ 2/2012	18:40	186.8	4	-0	-21

23/ 3/2012	17:40	181.6	1	8	-4
23/ 3/2012	17:50	181.9	1	6	-6
23/ 3/2012	18: 0	182.3	1	4	-8
23/ 3/2012	18:10	182.7	1	3	-10
23/ 3/2012	18:20	183.2	1	1	-11
23/ 3/2012	18:30	183.7	1	-0	-13

## MILANO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:30	175.2	1	3	-6
22/ 2/2012	17:40	175.2	1	2	-8
22/ 2/2012	17:50	175.3	1	0	-10
23/ 2/2012	18: 0	189.8	3	9	-11
23/ 2/2012	18:10	189.7	4	7	-13
23/ 2/2012	18:20	189.7	4	6	-15
23/ 2/2012	18:30	189.7	4	4	-16
23/ 2/2012	18:40	189.7	4	2	-18
23/ 2/2012	18:50	189.9	4	1	-20
23/ 3/2012	18: 0	185.0	1	8	-4
23/ 3/2012	18:10	185.3	1	6	-6
23/ 3/2012	18:20	185.7	1	5	-8
23/ 3/2012	18:30	186.1	1	3	-10
23/ 3/2012	18:40	186.6	1	1	-11
23/ 3/2012	18:50	187.1	1	0	-13

## NAPOLI

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	17:10	189.8	2	5	-12
24/ 1/2012	17:20	189.3	2	3	-13
24/ 1/2012	17:30	188.8	2	2	-15
24/ 1/2012	17:40	188.4	2	0	-17
22/ 2/2012	17:20	170.2	1	2	-7
22/ 2/2012	17:30	170.3	1	0	-9
23/ 2/2012	16:50	186.4	3	18	-2
23/ 2/2012	17: 0	186.0	3	17	-3
23/ 2/2012	17:10	185.7	3	15	-5
23/ 2/2012	17:20	185.4	3	13	-7
23/ 2/2012	17:30	185.2	3	11	-9
23/ 2/2012	17:40	185.1	3	9	-11
23/ 2/2012	17:50	185.0	3	8	-13
23/ 2/2012	18: 0	185.0	3	6	-15
23/ 2/2012	18:10	185.0	4	4	-17
23/ 2/2012	18:20	185.0	4	2	-19
23/ 2/2012	18:30	185.2	4	0	-20
24/ 2/2012	18:30	189.9	8	11	-20
23/ 3/2012	17:40	180.1	1	7	-5
23/ 3/2012	17:50	180.5	1	5	-7
23/ 3/2012	18: 0	180.9	1	4	-9
23/ 3/2012	18:10	181.4	1	2	-11
23/ 3/2012	18:20	181.9	1	0	-12

## PALERMO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	16:40	189.4	2	12	-5
24/ 1/2012	16:50	188.7	2	10	-6
24/ 1/2012	17: 0	188.0	2	8	-8
24/ 1/2012	17:10	187.4	2	7	-10
24/ 1/2012	17:20	186.9	2	5	-12
24/ 1/2012	17:30	186.4	2	3	-14
24/ 1/2012	17:40	185.9	2	1	-16
24/ 1/2012	17:50	185.5	3	-0	-18
25/ 1/2012	18:10	189.6	7	7	-22
25/ 1/2012	18:20	189.2	7	5	-24
25/ 1/2012	18:30	188.8	7	3	-25
25/ 1/2012	18:40	188.6	7	2	-27
25/ 1/2012	18:50	188.3	7	0	-29
26/ 1/2012	19:10	189.9	13	7	-33
26/ 1/2012	19:20	189.8	13	5	-35
26/ 1/2012	19:30	189.6	13	3	-37
26/ 1/2012	19:40	189.6	13	2	-39
26/ 1/2012	19:50	189.6	13	0	-41
23/ 2/2012	17: 0	183.4	3	18	-2
23/ 2/2012	17:10	183.1	3	16	-4
23/ 2/2012	17:20	182.8	3	14	-6
23/ 2/2012	17:30	182.6	3	12	-8
23/ 2/2012	17:40	182.4	3	10	-10
23/ 2/2012	17:50	182.3	3	8	-12
23/ 2/2012	18: 0	182.3	3	7	-14
23/ 2/2012	18:10	182.3	4	5	-16
23/ 2/2012	18:20	182.3	4	3	-18
23/ 2/2012	18:30	182.4	4	1	-20
23/ 2/2012	18:40	182.6	4	-0	-22
24/ 2/2012	17: 0	189.4	8	29	-2
24/ 2/2012	17:10	188.9	8	27	-4
24/ 2/2012	17:20	188.5	8	25	-6
24/ 2/2012	17:30	188.1	8	23	-8
24/ 2/2012	17:40	187.8	8	21	-10
24/ 2/2012	17:50	187.6	8	19	-12
24/ 2/2012	18: 0	187.4	8	17	-14
24/ 2/2012	18:10	187.3	8	16	-16
24/ 2/2012	18:20	187.2	8	14	-18

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 2/2012	18:30	187.2	8	12	-20
24/ 2/2012	18:40	187.2	8	10	-22
24/ 2/2012	18:50	187.3	8	8	-24
24/ 2/2012	19: 0	187.4	8	6	-26
24/ 2/2012	19:10	187.6	8	4	-28
24/ 2/2012	19:20	187.9	8	2	-29
24/ 2/2012	19:30	188.2	8	0	-31
24/ 2/2012	19:40	188.5	8	-1	-33
23/ 3/2012	17:40	177.3	1	8	-5
23/ 3/2012	17:50	177.7	1	6	-7
23/ 3/2012	18: 0	178.1	1	4	-8
23/ 3/2012	18:10	178.6	1	2	-10
23/ 3/2012	18:20	179.1	1	0	-12

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 3/2012	16:20	188.1	4	33	10
24/ 3/2012	16:30	187.8	4	31	8
24/ 3/2012	16:40	187.5	4	30	7
24/ 3/2012	16:50	187.4	4	28	5
24/ 3/2012	17: 0	187.3	4	26	3
24/ 3/2012	17:10	187.2	4	24	1
24/ 3/2012	17:20	187.3	4	22	-0
24/ 3/2012	17:30	187.3	4	20	-2
24/ 3/2012	17:40	187.5	4	18	-4
24/ 3/2012	17:50	187.6	4	16	-6
24/ 3/2012	18: 0	187.9	4	14	-8
24/ 3/2012	18:10	188.2	4	13	-10
24/ 3/2012	18:20	188.5	4	11	-12
24/ 3/2012	18:30	188.9	4	9	-14
24/ 3/2012	18:40	189.3	4	7	-16
24/ 3/2012	18:50	189.8	4	5	-18

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
21/ 7/2012	6:20	350.9	5	0	25
21/ 7/2012	6:30	351.2	5	2	27
21/ 7/2012	6:40	351.5	5	4	29
21/ 7/2012	6:50	351.7	5	6	31
21/ 7/2012	7: 0	351.9	5	7	33
21/ 7/2012	7:10	352.0	5	9	35
21/ 7/2012	7:20	352.1	5	11	37
21/ 7/2012	7:30	352.1	5	13	39
21/ 7/2012	7:40	352.1	5	15	41
21/ 7/2012	7:50	352.0	5	17	43
21/ 7/2012	8: 0	351.8	5	19	45
21/ 7/2012	8:10	351.6	5	21	47
21/ 7/2012	8:20	351.4	5	23	49
21/ 7/2012	8:30	351.1	5	24	50
21/ 7/2012	8:40	350.7	5	26	52
21/ 7/2012	8:50	350.2	5	28	54

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 7/2012	7:40	350.0	11	3	41
22/ 7/2012	7:50	350.1	11	5	43
22/ 7/2012	8: 0	350.1	11	7	45
22/ 7/2012	8:10	350.0	11	9	47

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
20/ 8/2012	7:20	351.6	9	-0	33
20/ 8/2012	7:30	351.4	9	1	35
20/ 8/2012	7:40	351.1	9	3	37
20/ 8/2012	7:50	350.7	9	5	39
20/ 8/2012	8: 0	350.4	9	7	40

## PERUGIA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:20	172.6	1	3	-6
22/ 2/2012	17:30	172.6	1	1	-8
22/ 2/2012	17:40	172.7	1	0	-10
23/ 2/2012	17: 0	188.7	3	17	-2
23/ 2/2012	17:10	188.3	3	16	-4
23/ 2/2012	17:20	188.0	3	14	-6
23/ 2/2012	17:30	187.7	3	12	-8
23/ 2/2012	17:40	187.5	3	11	-10
23/ 2/2012	17:50	187.4	3	9	-12
23/ 2/2012	18: 0	187.3	3	7	-13
23/ 2/2012	18:10	187.3	4	5	-15
23/ 2/2012	18:20	187.3	4	3	-17
23/ 2/2012	18:30	187.4	4	2	-19
23/ 2/2012	18:40	187.5	4	0	-21
23/ 3/2012	17:50	182.6	1	7	-5
23/ 3/2012	18: 0	182.9	1	5	-7
23/ 3/2012	18:10	183.3	1	4	-9
23/ 3/2012	18:20	183.8	1	2	-11
23/ 3/2012	18:30	184.3	1	0	-12

## POTENZA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	17: 0	189.8	2	6	-11
24/ 1/2012	17:10	189.2	2	4	-13
24/ 1/2012	17:20	188.7	2	2	-15
24/ 1/2012	17:30	188.3	2	1	-16
24/ 1/2012	17:40	187.9	2	-0	-18
22/ 2/2012	17:30	170.0	1	-0	-10

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
23/ 2/2012	16:50	185.9	3	17	-3
23/ 2/2012	17: 0	185.6	3	15	-5
23/ 2/2012	17:10	185.3	3	14	-6
23/ 2/2012	17:20	185.1	3	12	-8
23/ 2/2012	17:30	184.9	3	10	-10
23/ 2/2012	17:40	184.8	3	8	-12
23/ 2/2012	17:50	184.7	3	6	-14
23/ 2/2012	18: 0	184.7	3	5	-16
23/ 2/2012	18:10	184.8	4	3	-18
23/ 2/2012	18:20	184.9	4	1	-20
23/ 2/2012	18:30	185.0	4	-0	-22

24/ 2/2012	18: 0	189.8	8	15	-16
24/ 2/2012	18:10	189.7	8	14	-18
24/ 2/2012	18:20	189.7	8	12	-20
24/ 2/2012	18:30	189.7	8	10	-21
24/ 2/2012	18:40	189.8	8	8	-23
24/ 2/2012	18:50	189.9	8	6	-25

23/ 3/2012	17:30	179.7	1	8	-4
23/ 3/2012	17:40	180.1	1	6	-6
23/ 3/2012	17:50	180.5	1	4	-8
23/ 3/2012	18: 0	180.9	1	2	-10
23/ 3/2012	18:10	181.4	1	1	-12
23/ 3/2012	18:20	181.9	1	-0	-14

24/ 3/2012	17: 0	189.9	4	24	1
24/ 3/2012	17:10	189.9	4	22	-0

#### ROMA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
24/ 1/2012	17:40	189.8	2	1	-16
24/ 1/2012	17:50	189.4	3	-0	-18

22/ 2/2012	17:20	171.4	1	3	-6
22/ 2/2012	17:30	171.4	1	1	-8
22/ 2/2012	17:40	171.5	1	0	-10

23/ 2/2012	17: 0	187.4	3	18	-2
23/ 2/2012	17:10	187.1	3	16	-4
23/ 2/2012	17:20	186.8	3	14	-6
23/ 2/2012	17:30	186.5	3	12	-8
23/ 2/2012	17:40	186.3	3	11	-10
23/ 2/2012	17:50	186.2	3	9	-12
23/ 2/2012	18: 0	186.1	3	7	-13
23/ 2/2012	18:10	186.1	4	5	-15
23/ 2/2012	18:20	186.1	4	3	-17
23/ 2/2012	18:30	186.2	4	2	-19
23/ 2/2012	18:40	186.3	4	0	-21

23/ 3/2012	17:50	181.4	1	7	-5
23/ 3/2012	18: 0	181.8	1	5	-7
23/ 3/2012	18:10	182.2	1	3	-9
23/ 3/2012	18:20	182.6	1	2	-11
23/ 3/2012	18:30	183.1	1	0	-13

#### TORINO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:40	174.9	1	3	-7
22/ 2/2012	17:50	175.0	1	1	-9
22/ 2/2012	18: 0	175.1	1	-0	-10

23/ 2/2012	17:50	189.8	3	12	-8
23/ 2/2012	18: 0	189.6	3	10	-10
23/ 2/2012	18:10	189.4	4	9	-12
23/ 2/2012	18:20	189.4	4	7	-14

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
23/ 2/2012	18:30	189.3	4	5	-15
23/ 2/2012	18:40	189.4	4	3	-17
23/ 2/2012	18:50	189.4	4	2	-19
23/ 2/2012	19: 0	189.6	4	0	-21
23/ 3/2012	18:10	184.8	1	7	-5
23/ 3/2012	18:20	185.1	1	6	-7
23/ 3/2012	18:30	185.5	1	4	-9
23/ 3/2012	18:40	186.0	1	2	-10
23/ 3/2012	18:50	186.5	1	1	-12
23/ 3/2012	19: 0	187.0	1	-0	-14

#### TRENTO

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:20	175.6	1	4	-6
22/ 2/2012	17:30	175.6	1	2	-8
22/ 2/2012	17:40	175.7	1	0	-9
22/ 2/2012	17:50	175.8	1	-0	-11

23/ 3/2012	17:50	185.4	1	8	-4
23/ 3/2012	18: 0	185.7	1	7	-6
23/ 3/2012	18:10	186.1	1	5	-7
23/ 3/2012	18:20	186.5	1	3	-9
23/ 3/2012	18:30	187.0	1	2	-11
23/ 3/2012	18:40	187.5	1	0	-12

#### TRIESTE

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:10	175.0	1	4	-6
22/ 2/2012	17:20	175.0	1	2	-8
22/ 2/2012	17:30	175.1	1	0	-9

23/ 2/2012	17:50	189.8	3	8	-13
23/ 2/2012	18: 0	189.8	3	6	-14
23/ 2/2012	18:10	189.8	4	4	-16
23/ 2/2012	18:20	189.8	4	3	-18
23/ 2/2012	18:30	189.9	4	1	-20

23/ 3/2012	17:40	184.9	1	8	-4
23/ 3/2012	17:50	185.2	1	6	-6
23/ 3/2012	18: 0	185.6	1	5	-8
23/ 3/2012	18:10	186.0	1	3	-9
23/ 3/2012	18:20	186.5	1	1	-11
23/ 3/2012	18:30	187.0	1	0	-13

#### VENEZIA

GG MM AAAA	HH MM	ZABL	K	ALT	ALT.S.
22/ 2/2012	17:20	174.9	1	3	-7
22/ 2/2012	17:30	174.9	1	1	-8
22/ 2/2012	17:40	175.0	1	0	-10

23/ 2/2012	17:40	189.9	3	10	-10
23/ 2/2012	17:50	189.7	3	9	-12
23/ 2/2012	18: 0	189.6	3	7	-13
23/ 2/2012	18:10	189.6	4	5	-15
23/ 2/2012	18:20	189.6	4	4	-17
23/ 2/2012	18:30	189.7	4	2	-19
23/ 2/2012	18:40	189.8	4	0	-20

23/ 3/2012	17:50	184.9	1	7	-5
23/ 3/2012	18: 0	185.2	1	6	-7
23/ 3/2012	18:10	185.6	1	4	-8
23/ 3/2012	18:20	186.1	1	2	-10
23/ 3/2012	18:30	186.6	1	1	-12
23/ 3/2012	18:40	187.1	1	-0	-13

Si definisce "luna a barchetta" quel curioso aspetto in cui la Luna al tramonto o all'alba appare sottile e con le cuspidi rivolte verso l'alto alla stessa altezza. La "luna a ponte" è il fenomeno opposto, con la Luna con le cuspidi rivolte verso il basso.

Ore in T.U.

ZABL = angolo zenitale del lembo illuminato della Luna, in °, nel range  $350^\circ < ZABL < 10^\circ$  e  $170^\circ < ZABL < 190^\circ$ . Se l'angolo ZABL è prossimo a  $180^\circ$  si ha la Luna "a barchetta", se è prossimo a  $0^\circ$  si ha la luna "a ponte".

K = percentuale di Luna illuminata

ALT = altezza della Luna sull'orizzonte, in °

ALT.S. = altezza del Sole sull'orizzonte, in °

It is a "small boat Moon" that curious aspect in which the Moon at the sunset or at the dawn appears thin and with the cuspidis turned upward to the same height. The "Moon like a bridge" is the opposite phenomenon, with the Moon with the cuspidis turned downward.

Times in U.T.

ZABL = zenital angle of the bright lunar limb, in °, in a range  $350^\circ < ZABL < 10^\circ$  and  $170^\circ < ZABL < 190^\circ$ . If the angle ZABL is near  $180^\circ$  the Moon is like a boat, if is near  $0^\circ$  is "like a bridge".

K = percentage of illuminated Moon

ALT = height of the Moon above the horizon, in °

ALT.S. = height of the Sun above the horizon, in °

# LUNA IN PIEDI - STANDING MOON

Questo anno non avvengono fenomeni - No phenomena this year

Si definisce "luna in piedi" il fenomeno in cui la Luna al tramonto o all'alba appare con le cuspidi allineate in verticale rispetto all'orizzonte dell'osservatore.

Ore in T.U.

ZABL = angolo zenitale del lembo illuminato della Luna, in °, nel range  $85^\circ < \text{ZABL} < 95^\circ$  e  $265^\circ < \text{ZABL} < 275^\circ$ .

K = percentuale di Luna illuminata

ALT = altezza della Luna sull'orizzonte, in °

ALT.S. = altezza del Sole sull'orizzonte, in °

NB: sono visualizzati solo i giorni in cui la Luna è in piedi vicino all'orizzonte, ossia con altezza inferiore a  $18^\circ$

It is "standing Moon" the phenomenon in which the Moon at the setting or at the dawn appears with the cuspidis lined up in vertical in comparison to the horizon of the observer.

Times in U.T.

ZABL = zenital angle of the bright lunar limb, in °, in a range  $85^\circ < \text{ZABL} < 95^\circ$  and  $265^\circ < \text{ZABL} < 275^\circ$ .

K = percentage of illuminated Moon

ALT = height of the Moon above the horizon, in °

ALT.S. = height of the Sun above the horizon, in °

NB: are listed only the events when the Moon is standing next to the horizon, or rather with an height inferior to  $18^\circ$















000015 Enumia	r	R	RA app.	Dec. app.	Rise	Trans.	Set	Elong.	mag
01/01/2012	2,2506	1,4124	3h42m29s	31°17'25"	11:55:45	20:10:50	04:30:02	139,2° East	8,6 mag
02/01/2012	2,2520	1,4213	3h42m23s	31°08'07"	11:52:42	20:06:50	04:25:05	138,2° East	8,6 mag
03/01/2012	2,2535	1,4304	3h42m20s	30°58'57"	11:49:40	20:02:53	04:20:12	137,2° East	8,7 mag
04/01/2012	2,2550	1,4397	3h42m18s	30°49'54"	11:46:38	19:58:57	04:15:24	136,3° East	8,7 mag
05/01/2012	2,2564	1,4492	3h42m19s	30°40'59"	11:43:37	19:55:04	04:10:40	135,3° East	8,7 mag
06/01/2012	2,2579	1,4588	3h42m22s	30°32'13"	11:40:37	19:51:12	04:06:00	134,3° East	8,7 mag
07/01/2012	2,2594	1,4686	3h42m27s	30°23'34"	11:37:38	19:47:23	04:01:24	133,3° East	8,8 mag
08/01/2012	2,2609	1,4785	3h42m34s	30°15'05"	11:34:39	19:43:36	03:56:53	132,3° East	8,8 mag
09/01/2012	2,2624	1,4887	3h42m43s	30°06'43"	11:31:40	19:39:51	03:52:24	131,4° East	8,8 mag
10/01/2012	2,2639	1,4989	3h42m55s	29°58'31"	11:28:42	19:36:08	03:47:57	130,4° East	8,8 mag
11/01/2012	2,2654	1,5094	3h43m08s	29°50'28"	11:25:45	19:32:27	03:43:31	129,5° East	8,9 mag
12/01/2012	2,2669	1,5199	3h43m23s	29°42'34"	11:22:49	19:28:48	03:39:08	128,5° East	8,9 mag
13/01/2012	2,2684	1,5307	3h43m41s	29°34'49"	11:19:53	19:25:11	03:34:46	127,6° East	8,9 mag
14/01/2012	2,2700	1,5415	3h44m00s	29°27'13"	11:16:58	19:21:36	03:30:27	126,6° East	8,9 mag
15/01/2012	2,2715	1,5525	3h44m21s	29°19'46"	11:14:04	19:18:03	03:26:10	125,7° East	9,0 mag
16/01/2012	2,2730	1,5637	3h44m45s	29°12'29"	11:11:10	19:14:32	03:21:56	124,8° East	9,0 mag
01/01/2012	2,2506	1,4124	3h42m29s	31°17'25"	11:55:45	20:10:50	04:30:02	139,2° East	8,6 mag
02/01/2012	2,2520	1,4213	3h42m23s	31°08'07"	11:52:42	20:06:50	04:25:05	138,2° East	8,6 mag
03/01/2012	2,2535	1,4304	3h42m20s	30°58'57"	11:49:40	20:02:53	04:20:12	137,2° East	8,7 mag

000433 Eros	r	R	RA app.	Dec. app.	Rise	Trans.	Set	Elong.	mag
14/01/2012	1,1338	0,1967	10h41m22s	13°38'14"	19:28:43	02:21:30	09:12:37	136,3° West	9,0 mag
15/01/2012	1,1337	0,1947	10h41m34s	12°36'15"	19:28:57	02:17:45	09:04:46	136,9° West	9,0 mag
16/01/2012	1,1335	0,1929	10h41m41s	11°33'26"	19:29:06	02:13:56	08:56:49	137,6° West	8,9 mag
17/01/2012	1,1335	0,1912	10h41m43s	10°29'53"	19:29:11	02:10:02	08:48:48	138,2° West	8,9 mag
18/01/2012	1,1335	0,1895	10h41m40s	9°25'38"	19:29:10	02:06:03	08:40:42	138,9° West	8,9 mag
19/01/2012	1,1335	0,1880	10h41m33s	8°20'46"	19:29:05	02:01:59	08:32:33	139,5° West	8,9 mag
20/01/2012	1,1336	0,1866	10h41m20s	7°15'23"	19:28:54	01:57:50	08:24:22	140,2° West	8,8 mag
21/01/2012	1,1338	0,1853	10h41m02s	6°09'31"	19:28:39	01:53:36	08:16:08	140,8° West	8,8 mag
22/01/2012	1,1340	0,1841	10h40m40s	5°03'19"	19:28:18	01:49:18	08:07:53	141,5° West	8,8 mag
23/01/2012	1,1342	0,1830	10h40m13s	3°56'49"	19:27:52	01:44:54	07:59:38	142,1° West	8,8 mag
24/01/2012	1,1345	0,1821	10h39m41s	2°50'10"	19:27:21	01:40:26	07:51:18	142,7° West	8,7 mag
25/01/2012	1,1349	0,1812	10h39m05s	1°43'27"	19:26:45	01:35:54	07:42:51	143,3° West	8,7 mag
26/01/2012	1,1353	0,1805	10h38m24s	0°36'46"	19:26:04	01:31:17	07:34:17	143,8° West	8,7 mag
27/01/2012	1,1357	0,1799	10h37m39s	-0°29'46"	19:25:17	01:26:36	07:25:36	144,4° West	8,7 mag
28/01/2012	1,1362	0,1794	10h36m49s	-1°36'01"	19:24:26	01:21:51	07:16:50	144,9° West	8,7 mag
29/01/2012	1,1368	0,1791	10h35m56s	-2°41'54"	19:23:29	01:17:02	07:07:59	145,4° West	8,6 mag
30/01/2012	1,1374	0,1788	10h34m59s	-3°47'17"	19:22:27	01:12:09	06:59:06	145,8° West	8,6 mag
31/01/2012	1,1380	0,1787	10h33m58s	-4°52'03"	19:21:19	01:07:12	06:50:10	146,2° West	8,6 mag
01/02/2012	1,1387	0,1787	10h32m53s	-5°56'05"	19:20:06	01:02:12	06:41:14	146,6° West	8,6 mag
02/02/2012	1,1395	0,1788	10h31m45s	-6°59'16"	19:18:48	00:57:08	06:32:18	147,0° West	8,6 mag
03/02/2012	1,1403	0,1791	10h30m34s	-8°01'30"	19:17:24	00:52:01	06:23:24	147,3° West	8,6 mag
04/02/2012	1,1411	0,1795	10h29m20s	-9°02'40"	19:15:55	00:46:52	06:14:32	147,5° West	8,6 mag
05/02/2012	1,1420	0,1799	10h28m03s	-10°02'41"	19:14:20	00:41:40	06:05:45	147,8° West	8,6 mag
06/02/2012	1,1430	0,1805	10h26m44s	-11°01'27"	19:12:40	00:36:25	05:57:02	147,9° West	8,6 mag
07/02/2012	1,1440	0,1812	10h25m22s	-11°58'51"	19:10:54	00:31:08	05:48:17	148,1° West	8,6 mag
08/02/2012	1,1450	0,1820	10h23m58s	-12°54'50"	19:09:03	00:25:48	05:39:29	148,2° West	8,6 mag
09/02/2012	1,1461	0,1830	10h22m32s	-13°49'18"	19:07:06	00:20:27	05:30:40	148,3° West	8,7 mag
10/02/2012	1,1472	0,1840	10h21m05s	-14°42'12"	19:05:03	00:15:05	05:21:51	148,3° West	8,7 mag
11/02/2012	1,1484	0,1851	10h19m36s	-15°33'27"	19:02:55	00:09:40	05:13:02	148,3° West	8,7 mag
12/02/2012	1,1497	0,1864	10h18m06s	-16°23'00"	19:00:41	00:04:15	05:04:16	148,2° West	8,7 mag
13/02/2012	1,1509	0,1877	10h16m35s	-17°10'48"	18:58:21	23:53:22	04:55:33	148,2° West	8,7 mag
14/02/2012	1,1523	0,1892	10h15m04s	-17°56'49"	18:55:56	23:47:54	04:46:55	148,1° West	8,7 mag
15/02/2012	1,1536	0,1907	10h13m31s	-18°41'01"	18:53:24	23:42:27	04:38:22	147,9° West	8,8 mag
16/02/2012	1,1550	0,1924	10h11m59s	-19°23'22"	18:50:48	23:36:59	04:29:57	147,7° West	8,8 mag
17/02/2012	1,1565	0,1941	10h10m27s	-20°03'52"	18:48:06	23:31:32	04:21:39	147,6° West	8,8 mag
18/02/2012	1,1580	0,1959	10h08m55s	-20°42'29"	18:45:18	23:26:06	04:13:32	147,3° West	8,8 mag
19/02/2012	1,1595	0,1979	10h07m24s	-21°19'14"	18:42:25	23:20:40	04:05:34	147,1° West	8,9 mag
20/02/2012	1,1611	0,1999	10h05m54s	-21°54'06"	18:39:28	23:15:16	03:57:47	146,9° West	8,9 mag
21/02/2012	1,1628	0,2020	10h04m25s	-22°27'08"	18:36:25	23:09:53	03:50:05	146,6° West	8,9 mag
22/02/2012	1,1644	0,2041	10h02m58s	-22°58'20"	18:33:18	23:04:33	03:42:28	146,3° West	9,0 mag
23/02/2012	1,1661	0,2064	10h01m33s	-23°27'44"	18:30:06	22:59:14	03:34:57	146,0° West	9,0 mag

Data : ore 00 TU  
r = distanza dal Sole  
R = distanza dalla Terra  
RA app, Dec app = A.R. e Decl. Apparenti  
Rise, set, trans = sorge, tramonta, tramonta  
Elong = East (est), West (ovest)  
Mag = magnitudine

Date : 00 UT  
r = distance from the Sun  
R = distance from the Earth

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**CONGIUNZIONI <1° PIANETI - ASTEROIDI m<9**  
**CONJUNCTIONS <1° PLANETS - ASTEROIDS m<9**

Date TT Dm Dl r1 r2 p e m1 m2 tm(s) tw(h)

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE PIANETI - ASTEROIDI**  
**(eventi con 2 o più pianeti ed un asteroide entro 5°)**  
**MULTIPLE CONJUNCTIONS PLANETS - ASTEROIDS**  
**(events with 2 or more planets and a bright asteroid within 5°)**

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi  
Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi  
R1 = distanza in U.A. del pianeta dalla Terra  
R2 = distanza in U.A. dell'asteroide dalla Terra  
P = angolo di posizione tra i corpi, in gradi  
e = elongazione, in gradi  
m1 = magnitudine del pianeta  
m2 = magnitudine dell'asteroide  
tm = se presente, uno dei due corpi viene occultato massimo per x secondi  
tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi  
Dmax = diametro del cerchio comprendente gli oggetti, in gradi  
emin = elongazione minima, in gradi  
m2d = magnitudine del penultimo corpo più debole  
mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dm = least distance between the centers of the bodies  
Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies  
R1 = distance in A.U. of the planet from the Earth  
R2 = distance in A.U. of asteroid from the Earth  
P = angle of position between the bodies, in °  
e = elongation, in °  
m1 = magnitude of the planet  
m2 = magnitude of the asteroid  
tm = if present, an object is occulted maximum for x seconds  
tw = semiperiod in hours in which the two bodies are near less than 1°

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °  
Dmax = diameter of the group, in °  
emin = least elongation, in °  
m2d = magnitude of the 2nd brightest object  
mmax = least magnitude

**CONGIUNZIONI <1° ASTEROIDI m<9 - STELLE m<2**  
**CONJUNCTIONS <1° ASTEROIDS m<9 - STARS m<2**

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)	tw(h)	
2012/08/05	23:24:56	0.17400	0.00090	2.821	173	-64	8.1	1.0		69.4	Vesta Alpha TAU Aldebaran

**CONGIUNZIONI <1° ASTEROIDI m<9 - OGGETTI MESSIER m<9**  
**CONJUNCTIONS <1° ASTEROIDS m<9 - MESSIER OBJECTS m<9**

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)	tw(h)	
2012/11/23	17:14:27	0.74212	0.00146	1.787	24	-150	7.2	5.3		97.2	Ceres M35

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

R1 = distanza in U.A. del pianeta dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del pianeta

m\* = magnitudine dell'oggetto

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of planet from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the planet

m\* = magnitude of the object

tm = if present, an object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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**CONGIUNZIONI MULTIPLE PIANETI-ASTEROIDI-STELLE**  
 (eventi con 1 pianeta, una stella di mag<2 ed un asteroide entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-ASTEROIDS-STARS**  
 (events with 1 planet, a star with mag<2 and a bright asteroid within  
 5°)

Data	TT	Dmed	Dmax	emin	m2d	mmax				
2012/07/12	10:22	3.237	4.285	-39	1.0	8.7	Venus	Alpha	TAU Aldebaran	Ceres
2012/07/20	19:57	3.679	4.997	-49	1.0	8.7	Jupiter	Alpha	TAU Aldebaran	Ceres
2012/08/05	22:42	3.869	4.822	-63	1.0	8.1	Jupiter	Alpha	TAU Aldebaran	Vesta

**CONGIUNZIONI MULTIPLE PIANETI - ASTEROIDI -  
 OGGETTI MESSIER**

(eventi con 1 pianeta, un oggetto mag<2 ed un asteroide entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS - ASTEROIDS -  
 MESSIER OBJECTS**

(events with 1 planet, an object with mag<2 and a bright asteroid  
 within 5°)

Data	TT	Dmed	Dmax	emin	m2d	mmax
------	----	------	------	------	-----	------

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

# CONGIUNZIONI <1° TRA ASTEROIDI m<9

## CONJUNCTIONS <1° BETWEEN ASTEROIDS m<9

Data TT Dm Dl r1 r2 p (°) e m1 m2 tm(s) tw(h)

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi

R1 = distanza in U.A. del corpo 1 dalla Terra

R2 = distanza in U.A. del corpo 2 dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del primo corpo

m2 = magnitudine del secondo corpo

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

tw = semiperiodo in ore in cui i due corpi distano meno di 1° tra loro

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, an object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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# EVENTI <1° LUNA-ASTEROIDI m<9

## EVENTS <1° MOON-ASTEROIDS m<9

### Geocentriche - Geocentric

Date	TT	Dm	Dl	r1	r2	p	e	m1	m2	tm(s)		
2012/09/09 09:12:53		0.59274	1.15744	2.717	0.003	3	-81	8.3	-10.6	3132	Ceres	Moon
2012/10/07 04:23:45		0.88201	1.15424	2.328	0.003	185	-102	7.9	-11.1	2336	Ceres	Moon

### Topocentriche - Topocentric 42°N - 12°E

Date	UT	Dm	Alt.	r1	r2	p	e	m1	m2	tm(s)		
2012/09/09 10:28:24		0.06512	26.63	2.717	0.003	11	-81	8.3	-10.6	4026	Ceres	Moon

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm < Dl vi è una occultazione tra i corpi

R1 = distanza in U.A. dell'asteroide dalla Terra

R2 = distanza in milioni di km della Luna dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine dell'asteroide

m2 = magnitudine della Luna

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the asteroid from the Earth

R2 = distance in billions kms of the Moon from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

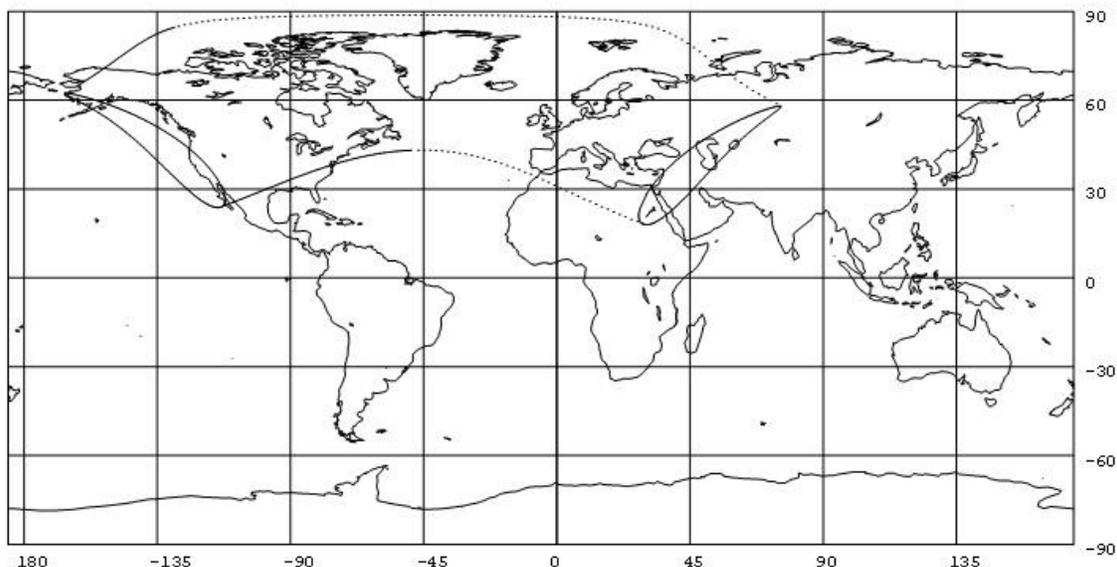
m1 = magnitude of the asteroid

m2 = magnitude of the Moon

tm = if present, an object is occulted maximum for x seconds

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## Occultation of Ceres, Magnitude 8.8, on 2012 Sep 9



Occult 4.090

UT of conjunction = 9h 7.8m

Luna: % illuminazione 42-, elongazione solare 81°

Moon: % illumination 42-, solar elongation 81°

### Riapparizione - Reappearance

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az					
CA Abbotsford	8	24	36	13	74	79N	279	282	+0.0	+1.3	
CA Armstrong	8	37	26	37	102	76S	254	257	+0.7	+2.0	
CA Atikokan	8	32	37	34	98	75S	253	255	+0.6	+2.0	
CA Bagotville	8	49	32	50	121	58S	236	238	+1.2	+2.6	
CA Baie Comeau	8	55	3	-11	52	127	59S	237	240	+1.3	+2.5
CA Baker Lake	8	54	2	31	109	65N	293	295	+0.6	+1.2	
CA Brandon	8	30	27	29	92	84S	262	265	+0.4	+1.8	
CA Buffalo Narrows	8	36	28	24	89	76N	282	285	+0.4	+1.4	
CA Calgary	8	28	8	19	81	81N	277	280	+0.2	+1.4	
CA Cambridge Bay	8	54	43	27	103	50N	308	311	+0.5	+1.1	
CA Campbell River	8	25	47	12	72	74N	284	286	+0.0	+1.2	
CA Cape Dorset	9	8	23	-7	40	133	74N	284	287	+0.9	+0.9
CA Castlegar	8	25	9	16	77	82N	276	279	+0.1	+1.4	
CA Chapleau	8	36	15	41	105	65S	243	246	+0.8	+2.3	
CA Charlo	8	54	27	-11	54	128	53S	231	234	+1.3	+2.8
CA Charlottetown	8	53	22	-9	56	130	44S	222	225	+1.4	+3.6
CA Chatham	8	52	38	-11	54	128	49S	227	230	+1.3	+3.2
CA Chilliwack	8	24	46	13	74	79N	279	282	+0.0	+1.3	
CA Churchill	8	48	0	33	106	79N	279	282	+0.7	+1.4	
CA Cold Lake	8	33	46	23	86	77N	281	284	+0.3	+1.4	
CA Comox	8	25	29	12	72	75N	283	286	+0.0	+1.2	
CA Coppermine	8	49	9	23	91	47N	311	314	+0.4	+1.1	
CA Coral Harbour	8	26	45	18	79	81N	276	279	+0.1	+1.4	
CA Coronation	8	30	5	21	84	81N	277	279	+0.2	+1.4	
CA Cranbrook	8	25	45	18	79	83N	275	278	+0.1	+1.4	
CA Dauphin	8	32	29	29	93	87S	265	268	+0.5	+1.7	
CA Dawson Creek	8	33	12	17	79	67N	291	294	+0.2	+1.2	
CA Dease Lake	8	35	0	13	72	54N	304	307	+0.1	+1.0	
CA Deer Lake	9	11	7	-2	58	149	55S	233	236	+1.7	+2.5
CA Dryden	8	34	5	34	98	78S	256	259	+0.6	+1.9	
CA Earlington	8	38	52	43	109	62S	240	243	+0.9	+2.5	
CA Edmonton	8	31	43	21	83	77N	281	284	+0.2	+1.4	
CA Edson	8	31	5	19	81	74N	284	287	+0.2	+1.3	
CA Eskimo Point	8	51	14	33	108	74N	284	287	+0.7	+1.3	
CA Estevan	8	28	3	26	89	85S	263	266	+0.4	+1.7	
CA Flin Flon	8	37	35	28	94	83N	275	278	+0.5	+1.5	
CA Forestville	8	52	55	51	125	58S	236	239	+1.2	+2.6	
CA Fort Chipewyan	8	39	31	23	89	68N	290	293	+0.4	+1.3	
CA Fort McMurray	8	36	37	23	87	72N	286	289	+0.3	+1.4	
CA Fort McPherson	8	43	5	15	72	33N	325	328	+0.2	+0.9	
CA Fort Nelson	8	36	30	17	79	59N	299	302	+0.2	+1.2	
CA Fort Resolution	8	41	43	22	88	61N	297	300	+0.3	+1.2	
CA Fort Saint John	8	33	44	17	79	65N	293	295	+0.2	+1.2	
CA Fort Simpson	8	40	14	19	81	54N	304	307	+0.2	+1.1	
CA Fort Smith	8	40	52	23	89	65N	293	296	+0.4	+1.3	
CA Fredericton	8	47	23	54	123	45S	223	225	+1.2	+3.6	
CA Gaspé	8	59	4	-8	55	133	56S	234	237	+1.4	+2.6
CA Gatineau	8	36	41	47	110	50S	228	231	+0.9	+3.1	
CA Geraldton	8	37	49	38	104	74S	252	254	+0.7	+2.1	

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CA Gillam	8	44	5	33	103		84N	274	277	+0.6	+1.5
CA Gjoa Haven	8	58	56	-11	30	113	56N	302	305	+0.6	+1.0
CA Goose Bay	9	14	36	-3	54	149	71S	249	251	+1.5	+1.6
CA Gore Bay	8	32	3	41	103		58S	236	239	+0.7	+2.6
CA Grande Prairie	8	32	44	18	80		69N	289	292	+0.2	+1.3
CA Greenwood	8	46	0	55	124		39S	217	220	+1.2	+4.2
CA Halifax	8	47	17	-11	56	126	37S	215	218	+1.3	+4.4
CA Hall Beach	9	8	18	-7	36	131	61N	297	300	+0.7	+0.7
CA Hamilton	8	25	47	42	102		46S	224	226	+0.6	+3.3
CA Hay River	8	40	38	21	86		60N	298	301	+0.3	+1.2
CA High Level	8	37	30	20	83		64N	294	297	+0.3	+1.2
CA Holman Island	8	51	21	22	90		39N	319	322	+0.4	+1.1
CA Hudson Bay	8	34	19	28	92		87N	271	274	+0.4	+1.6
CA Iles De La Madeleine	8	59	8	-7	57	136	49S	227	230	+1.5	+3.1
CA Inuvik	8	44	14	15	74		33N	325	328	+0.2	+0.9
CA Iqaluit	9	15	25	-4	43	145	78N	280	283	+1.0	+0.7
CA Kamloops	8	26	48	15	76		77N	281	284	+0.1	+1.3
CA Kapuskasing	8	40	36	41	108		69S	247	250	+0.8	+2.2
CA Kelowna	8	25	53	15	76		79N	279	282	+0.1	+1.3
CA Kenora	8	33	5	33	96		79S	257	260	+0.6	+1.9
CA Kindersley	8	29	52	23	85		84N	274	276	+0.3	+1.5
CA Kingston	8	31	40	45	107		46S	224	227	+0.8	+3.4
CA Kuujjuararapik	8	56	10	44	122		83S	261	264	+1.0	+1.6
CA La Grande Riviere	8	53	31	44	120		78S	256	259	+1.0	+1.8
CA La Ronge	8	36	41	26	91		80N	278	281	+0.4	+1.5
CA Lethbridge	8	26	12	20	81		86N	272	275	+0.2	+1.5
CA Lloydminster	8	32	15	23	86		80N	278	281	+0.3	+1.4
CA London	8	24	38	41	100		46S	224	227	+0.6	+3.3
CA Lynn Lake	8	41	9	29	97		79N	279	282	+0.5	+1.5
CA Maniwaki	8	38	32	46	111		54S	232	235	+0.9	+2.9
CA Matagami	8	45	38	45	114		67S	245	248	+1.0	+2.2
CA Meadow Lake	8	33	56	24	88		79N	279	282	+0.3	+1.5
CA Medicine Hat	8	27	10	21	83		86N	271	274	+0.2	+1.5
CA Moncton	8	50	37	-11	55	127	44S	222	225	+1.3	+3.6
CA Mont Joli	8	53	42	-12	52	126	57S	235	238	+1.3	+2.6
CA Montreal	8	38	37	48	112		50S	228	231	+1.0	+3.1
CA Moose Jaw	8	29	2	25	87		90S	268	271	+0.3	+1.6
CA Moosonee	8	46	13	43	113		73S	251	254	+0.9	+2.0
CA Muskoka	8	31	55	43	105		52S	230	233	+0.8	+3.0
CA Nakina	8	38	49	38	104		74S	252	255	+0.8	+2.0
CA Nanaimo	8	24	39	12	73		77N	281	283	+0.0	+1.2
CA Nanisivik	9	8	53	-5	32	129	50N	308	311	+0.6	+0.6
CA Natashquan	9	6	33	-5	56	141	60S	238	241	+1.5	+2.3
CA Norman Wells	8	42	49	17	78		43N	314	317	+0.2	+1.0
CA North Battleford	8	32	3	24	87		82N	275	278	+0.3	+1.5
CA North Bay	8	35	47	44	107		57S	235	238	+0.8	+2.7
CA Ottawa	8	35	59	46	110		50S	228	231	+0.9	+3.1
CA Peace River	8	34	21	19	81		68N	290	293	+0.2	+1.3
CA Pelly Bay	9	2	24	-10	33	120	59N	299	302	+0.6	+0.9
CA Penticton	8	25	14	15	76		80N	278	281	+0.1	+1.3
CA Petawawa	8	36	25	45	109		54S	232	235	+0.9	+2.9
CA Peterborough	8	30	19	44	105		48S	226	229	+0.7	+3.2
CA Pickle Lake	8	38	45	36	102		80S	258	261	+0.7	+1.9
CA Pitt Meadows	8	24	51	13	74		78N	280	283	+0.0	+1.3
CA Pond Inlet	9	12	41	-3	34	137	53N	305	308	+0.6	+0.4
CA Port Hardy	8	26	42	11	71		71N	287	290	+0.0	+1.1
CA Port Menier	9	2	5	-8	54	136	60S	238	240	+1.4	+2.4
CA Portage-La-Prairie	8	31	12	30	93		83S	261	264	+0.5	+1.8
CA Prince Albert	8	33	37	26	89		84N	274	277	+0.4	+1.5
CA Prince George	8	30	36	15	76		69N	289	292	+0.1	+1.2
CA Prince Rupert	8	30	42	11	70		61N	296	299	+0.0	+1.0
CA Princeton	8	25	11	15	75		79N	279	281	+0.0	+1.3
CA Quebec	8	44	44	50	118		52S	230	233	+1.1	+3.0
CA Quesnel	8	29	34	15	76		70N	288	290	+0.1	+1.2
CA Quujuaq	9	10	24	-6	47	140	87S	265	268	+1.2	+1.2
CA Rankin Inlet	8	54	44	34	112		71N	287	290	+0.7	+1.2
CA Red Deer Industrial	8	29	40	20	82		79N	279	282	+0.2	+1.4
CA Regina	8	29	30	25	88		89S	267	270	+0.3	+1.6
CA Repulse Bay	9	2	54	-10	35	122	65N	293	296	+0.7	+0.9
CA Resolute	9	4	45	-6	28	118	42N	315	318	+0.5	+0.7
CA Riviere Du Loup	8	49	37	51	122		55S	233	235	+1.2	+2.8
CA Roberval	8	48	35	49	120		59S	237	240	+1.1	+2.6
CA Rocky Mountain House	8	29	48	19	81		78N	280	283	+0.2	+1.4
CA Rouyn	8	41	1	44	111		63S	241	244	+0.9	+2.4
CA Sachs Harbour	8	50	10	19	84		32N	326	329	+0.3	+1.0
CA Sarnia	8	23	52	40	99		48S	226	228	+0.5	+3.2
CA Saskatoon	8	31	38	25	88		85N	273	276	+0.3	+1.5
CA Sault Sainte Marie	8	32	11	40	102		62S	240	243	+0.7	+2.5
CA Schefferville	9	8	6	-7	50	139	77S	255	258	+1.3	+1.5
CA Sept-Iles	9	0	13	-9	53	133	62S	240	243	+1.4	+2.3
CA Sherbrooke	8	40	9	50	115		47S	225	228	+1.0	+3.4
CA Sioux Lookout	8	35	9	35	99		78S	256	259	+0.6	+1.9
CA Slave Lake	8	33	45	20	83		72N	286	289	+0.2	+1.3
CA Smithers	8	31	22	13	73		63N	295	298	+0.1	+1.1
CA Spence Bay	9	1	7	-10	31	116	55N	303	306	+0.6	+0.9
CA St. Jean	8	38	6	48	113		48S	226	228	+1.0	+3.3
CA St. John	8	46	8	54	123		41S	219	222	+1.2	+3.9
CA Stephenville	9	7	29	-3	58	145	52S	230	233	+1.6	+2.7
CA Sudbury	8	35	21	43	106		59S	237	240	+0.8	+2.6
CA Summerside	8	52	56	-10	56	129	45S	223	226	+1.4	+3.5
CA Swift Current	8	28	20	23	86		88N	270	272	+0.3	+1.6
CA Sydney	8	57	22	-7	58	136	42S	220	223	+1.5	+3.8
CA Terrace	8	30	55	12	72		63N	295	298	+0.0	+1.1
CA Teslin	8	36	32	12	71		48N	310	313	+0.1	+1.0

Luogo - Location	U.T.			Sun	Moon	CA	PA	WA	a	b	
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
CA Thompson	8	41	19		31	99	83N	275	277	+0.6	+1.5
CA Thunder Bay	8	33	17		36	100	71S	249	252	+0.6	+2.1
CA Timmins	8	39	37		42	108	66S	244	247	+0.9	+2.3
CA Tofino	8	24	47		11	72	76N	282	285	-0.1	+1.2
CA Toronto	8	28	26		43	103	48S	226	229	+0.7	+3.2
CA Trenton	8	30	36		45	106	47S	225	228	+0.7	+3.3
CA Tuktoyaktuk	8	45	25		16	75	31N	327	330	+0.3	+0.9
CA Val D'Or	8	41	39		45	112	61S	239	242	+0.9	+2.5
CA Vancouver	8	24	49		13	73	78N	280	283	+0.0	+1.2
CA Vermillion	8	32	6		22	85	79N	279	282	+0.3	+1.4
CA Victoria	8	24	8		12	73	79N	279	282	+0.0	+1.2
CA Wabush	9	4	55	-8	51	136	71S	249	252	+1.3	+1.8
CA Waterloo	8	26	28		42	102	47S	225	228	+0.6	+3.2
CA Watson Lake	8	36	56		14	74	52N	306	309	+0.1	+1.0
CA Whitecourt	8	31	58		19	82	74N	284	287	+0.2	+1.3
CA Wiarton	8	29	56		42	103	53S	231	234	+0.7	+2.9
CA Williams Lake	8	28	32		15	76	72N	285	288	+0.1	+1.2
CA Windsor	8	21	11		39	98	45S	223	226	+0.5	+3.3
CA Winnipeg	8	32	5		31	94	82S	260	263	+0.5	+1.8
CA Wrigley	8	41	21		18	80	50N	308	311	+0.2	+1.1
CA Yellowknife	8	43	4		22	88	58N	300	303	+0.3	+1.2
CA Yorkton	8	31	42		27	91	90S	268	270	+0.4	+1.6
US Aberdeen MD	8	10	27		43	98	20S	198	201	-0.3	+6.8
US Abilene TX	7	48	24		19	77	28S	206	209	-0.8	+3.9
US Akron OH	8	17	25		40	97	38S	216	219	+0.3	+3.8
US Alamoordo NM	7	53	42		15	75	42S	220	223	-0.5	+2.7
US Albany NY	8	28	12		47	107	36S	214	217	+0.7	+4.2
US Altoona PA	8	15	9		42	98	30S	208	211	+0.2	+4.8
US Altus OK	7	55	59		22	79	38S	216	219	-0.4	+3.2
US Amarillo TX	7	58	28		20	79	44S	222	225	-0.3	+2.8
US Ardmore OK	7	53	47		23	80	32S	210	213	-0.5	+3.6
US Atlantic City NJ	8	9	44		44	99	16S	194	197	-0.7	+8.4
US Augusta GA	8	38	0		51	115	40S	218	221	+1.0	+4.0
US Baltimore MD	8	8	41		42	97	19S	197	200	-0.5	+7.1
US Bangor MA	8	40	51		52	118	41S	219	222	+1.1	+3.9
US Baudette MN	8	30	54		32	95	77S	255	258	+0.5	+1.9
US Bedford MA	8	28	36		49	109	32S	210	213	+0.6	+4.9
US Belleville IL	8	6	59		32	88	39S	217	220	+0.0	+3.4
US Bellingham WA	8	24	18		13	74	79N	279	282	+0.0	+1.3
US Blytheville AR	7	56	58		29	85	27S	205	208	-0.5	+4.5
US Boise ID	8	16	50		15	75	84S	262	265	+0.0	+1.5
US Boston MA	8	28	14		49	109	31S	209	212	+0.6	+5.1
US Buckley CO	8	9	39		21	80	62S	240	243	+0.0	+2.1
US Buffalo NY	8	25	44		43	102	43S	221	224	+0.6	+3.5
US Burlington VT	8	35	24		48	111	44S	222	225	+0.9	+3.6
US Camp Springs MD	8	6	13		42	96	16S	194	197	-0.8	+8.0
US Caribou MA	8	48	56		53	123	50S	228	231	+1.2	+3.1
US Carlsbad NM	7	51	14		16	76	37S	215	217	-0.6	+3.1
US Casper WY	8	15	58		21	81	73S	251	254	+0.1	+1.9
US Cedar City UT	8	6	42		13	74	66S	244	247	-0.2	+1.8
US Cheyenne WY	8	12	39		22	81	67S	245	247	+0.0	+2.0
US Chicago IL	8	19	29		35	94	52S	230	233	+0.4	+2.9
US Chico CA	8	12	11		9	70	80S	258	261	-0.2	+1.4
US Chicopee Falls MA	8	26	31		48	107	32S	210	213	+0.6	+4.8
US Childress TX	7	55	40		21	79	39S	217	220	-0.4	+3.1
US Cincinnati OH	8	8	59		36	92	34S	212	215	+0.0	+4.1
US Cleveland OH	8	18	42		40	97	40S	218	221	+0.4	+3.6
US Clovis NM	7	56	42		18	77	43S	221	224	-0.4	+2.8
US Colorado Springs CO	8	7	44		20	80	60S	238	241	-0.1	+2.2
US Dalhart TX	8	0	50		20	79	48S	226	229	-0.2	+2.6
US Dallas TX	7	47	53		21	79	24S	202	205	-0.9	+4.5
US Fort Worth TX	7	48	16		21	79	25S	203	206	-0.9	+4.4
US Dayton OH	8	12	8		37	93	36S	214	217	+0.2	+3.9
US Denver CO	8	10	0		21	80	63S	241	244	+0.0	+2.1
US Des Moines IA	8	15	11		30	89	55S	233	236	+0.2	+2.6
US Detroit MI	8	20	47		39	97	46S	224	227	+0.5	+3.3
US Dover MA	8	7	35		43	98	15S	193	196	-0.9	+8.6
US Duluth MN	8	28	18		34	95	70S	248	251	+0.5	+2.2
US Durango CO	8	4	33		17	77	58S	236	239	-0.2	+2.1
US El Dorado KS	7	45	27		24	81	16S	194	197	-1.5	+6.3
US El Paso TX	7	51	1		14	74	38S	216	219	-0.6	+2.9
US Elkins WV	8	7	56		40	95	24S	202	205	-0.2	+5.6
US Enid OK	8	0	44		24	81	43S	221	224	-0.2	+3.0
US Fallon NV	8	10	50		10	72	76S	254	257	-0.2	+1.6
US Falmouth MA	8	24	39		49	108	25S	203	206	+0.4	+6.0
US Farmington NM	8	3	45		16	76	58S	236	239	-0.2	+2.1
US Fort Carson CO	8	7	28		20	79	59S	237	240	-0.1	+2.2
US Fort Dodge IA	8	17	38		30	89	59S	237	240	+0.3	+2.4
US Fort Drum FL	8	31	44		46	107	45S	223	226	+0.8	+3.5
US Fort Hood TX	7	40	15		19	77	14S	192	195	-1.8	+6.4
US Fort Knox TN	8	4	15		34	89	30S	208	211	-0.2	+4.4
US Fort Leavenworth KS	8	9	13		28	86	50S	228	230	+0.1	+2.8
US Fort Leonardwood MO	8	4	20		29	86	40S	218	220	-0.1	+3.4
US Fort Lewis VA	8	22	9		12	73	83N	275	278	-0.1	+1.3
US Fort Meade FL	8	8	7		42	97	18S	196	199	-0.5	+7.3
US Fort Riley KS	8	8	14		27	84	51S	229	232	+0.0	+2.7
US Fort Sill OK	7	55	37		22	80	36S	214	217	-0.4	+3.3
US Fort Smith AR	7	56	22		26	82	32S	210	213	-0.4	+3.8
US Fort Worth TX	7	48	12		21	79	25S	203	206	-0.8	+4.3
US Gage OK	8	0	58		22	80	45S	223	226	-0.2	+2.8
US Garden City CA	8	5	25		23	81	52S	230	233	-0.1	+2.5
US Grand Forks ND	8	28	9		30	92	77S	255	258	+0.4	+1.9
US Grand Rapids MI	8	21	49		38	96	51S	229	232	+0.5	+2.9
US Grandview MO	8	7	46		28	85	47S	225	228	+0.0	+2.9

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Grants CA	8	0	11	16	76		52S	230	233	-0.3	+2.3
US Great Falls MT	8	23	7	20	81		88S	266	269	+0.1	+1.6
US Green Bay WI	8	24	57	36	96		59S	237	240	+0.5	+2.6
US Greenville TX	7	48	12	22	79		24S	202	205	-0.9	+4.6
US Greenwood MS	7	42	0	26	82		7S	185	188	+9.9	+9.9
US Gwinn MI	8	29	56	37	99		64S	242	245	+0.6	+2.4
US Harrisburg PA	8	14	51	43	99		26S	204	207	+0.1	+5.4
US Harrison AR	7	59	20	27	84		35S	213	216	-0.3	+3.6
US Hartford MA	8	24	7	48	106		29S	207	210	+0.5	+5.2
US Havre MT	8	25	4	21	83		89S	267	270	+0.2	+1.6
US Helena MT	8	21	40	19	80		87S	265	268	+0.1	+1.6
US Hibbing MN	8	29	9	33	95		72S	250	253	+0.5	+2.1
US Hobart OK	7	56	57	22	80		39S	217	220	-0.4	+3.1
US Hobbs NM	7	51	43	17	76		36S	214	217	-0.6	+3.1
US Hopkinsville KY	7	59	5	32	87		26S	204	207	-0.5	+4.8
US Houghton Lake MI	8	26	30	39	99		55S	233	236	+0.6	+2.8
US Houlton MA	8	46	47	53	122		47S	225	228	+1.2	+3.4
US Huron SD	8	20	32	28	88		69S	247	249	+0.3	+2.1
US Indian Springs CA	8	5	22	11	73		66S	244	247	-0.3	+1.8
US Indianapolis IN	8	11	22	35	92		39S	217	220	+0.2	+3.6
US Intl Falls MN	8	31	12	33	96		75S	253	256	+0.5	+2.0
US Islip NY	8	18	45	47	104		24S	202	205	+0.1	+6.2
US Jackson TN	7	54	37	30	85		23S	200	203	-0.7	+5.2
US Jonesboro AR	7	56	43	29	84		28S	206	209	-0.5	+4.4
US Kankakee IL	8	15	30	35	92		47S	225	228	+0.3	+3.1
US Kansas City MO	8	9	1	28	86		49S	227	230	+0.1	+2.8
US Killeen TX	7	40	1	19	77		14S	192	195	-1.8	+6.4
US Kirtland NM	7	59	29	16	76		50S	228	231	-0.3	+2.4
US Knobnoster MO	8	7	27	29	86		45S	223	226	+0.0	+3.0
US Knoxville TN	7	49	49	33	87		8S	186	189	+9.9	+9.9
US Lakehurst NJ	8	13	51	45	101		20S	198	201	-0.2	+6.9
US Lansing MI	8	21	59	38	97		49S	227	230	+0.5	+3.0
US Las Vegas NV	8	4	32	11	73		64S	242	245	-0.3	+1.8
US Lincoln NE	8	12	52	28	86		57S	235	238	+0.2	+2.5
US Little Rock AR	7	52	43	27	83		25S	203	206	-0.7	+4.6
US Longview TX	7	43	1	22	79		15S	193	196	-1.6	+6.4
US Louisville KY	8	5	35	35	90		31S	209	212	-0.1	+4.3
US Lubbock TX	7	53	57	19	77		38S	216	219	-0.5	+3.1
US Madison WI	8	20	49	35	94		56S	234	237	+0.4	+2.7
US Marquette IL	8	30	16	37	99		65S	243	246	+0.6	+2.3
US Massena IA	8	35	28	47	110		47S	225	228	+0.9	+3.3
US McAlester OK	7	55	18	24	81		33S	211	214	-0.4	+3.7
US Memphis TN	7	52	32	28	84		21S	199	202	-0.8	+5.3
US Midland TX	7	48	34	17	76		31S	209	212	-0.7	+3.5
US Millington TN	7	54	6	29	84		23S	201	204	-0.7	+5.0
US Millinocket MA	8	44	4	52	120		45S	223	226	+1.1	+3.5
US Millville DE	8	9	21	44	99		16S	194	197	-0.7	+8.1
US Milwaukee WI	8	20	57	36	95		54S	232	234	+0.4	+2.8
US Mineral Wells TX	7	48	36	21	78		27S	205	208	-0.8	+4.1
US Minneapolis MN	8	23	28	32	92		65S	243	246	+0.4	+2.3
US Minot ND	8	27	15	27	89		82S	260	263	+0.4	+1.8
US Montpelier VT	8	34	56	49	111		42S	220	223	+0.9	+3.7
US Mount Clemens MI	8	22	21	40	98		47S	225	228	+0.5	+3.2
US Mountain Home CA	8	16	0	14	75		82S	260	263	-0.1	+1.5
US Muir PA	8	16	9	44	100		28S	206	209	+0.2	+5.2
US Muskogee OK	7	57	54	25	82		36S	214	217	-0.3	+3.5
US Nantucket MA	8	22	8	49	108		21S	199	202	+0.2	+7.0
US Nashville TN	7	55	49	32	87		21S	198	201	-0.8	+5.7
US New York NY	8	18	30	46	103		25S	203	206	+0.2	+5.9
US Newark NJ	8	17	57	46	102		25S	203	206	+0.1	+5.8
US Newburgh NY	8	22	19	46	104		30S	208	211	+0.4	+5.0
US Niagara Falls NY	8	26	11	43	103		44S	222	225	+0.6	+3.5
US Ogden UT	8	12	40	16	77		74S	252	255	-0.1	+1.7
US Ogdensburg NY	8	34	6	46	109		47S	225	228	+0.8	+3.3
US Oklahoma City OK	7	57	42	24	81		38S	216	219	-0.3	+3.2
US Omaha NE	8	13	40	28	87		57S	235	237	+0.2	+2.5
US Oscoda MI	8	27	32	40	100		54S	232	235	+0.6	+2.8
US Patuxent River MD	8	0	10	41	95		7S	185	188	+9.9	+9.9
US Pembina ND	8	30	1	30	93		80S	258	261	+0.5	+1.9
US Peru IL	8	14	36	36	93		43S	221	224	+0.3	+3.4
US Philadelphia PA	8	12	53	44	100		21S	199	202	-0.2	+6.6
US Pine Bluff AR	7	49	46	26	82		20S	198	201	-1.0	+5.3
US Pittsburgh PA	8	15	38	41	97		34S	212	215	+0.2	+4.3
US Plattsburgh NY	8	35	43	48	111		45S	223	226	+0.9	+3.5
US Ponca City OK	8	1	44	25	82		43S	221	224	-0.2	+3.0
US Port Angeles CA	8	23	31	12	73		80N	278	281	+0.0	+1.2
US Port Huron MI	8	23	28	40	99		47S	225	228	+0.5	+3.2
US Portland OR	8	20	11	11	72		86N	272	275	-0.1	+1.3
US Prescott AZ	8	0	35	12	73		56S	234	237	-0.4	+2.1
US Presque Isle MA	8	48	19	53	123		49S	227	230	+1.2	+3.2
US Princeton MN	8	24	47	32	93		67S	245	248	+0.4	+2.2
US Providence RI	8	24	38	49	107		27S	205	208	+0.4	+5.6
US Pueblo NM	8	6	35	20	79		58S	236	239	-0.1	+2.2
US Quantico VA	8	4	3	41	95		14S	192	195	-1.1	+8.7
US Rancho Murieta CA	8	10	3	8	70		76S	254	257	-0.3	+1.5
US Rapid City SD	8	18	50	24	84		73S	251	254	+0.2	+1.9
US Red River ND	8	28	5	30	92		77S	255	258	+0.4	+1.9
US Redstone AL	7	44	26	29	84		5S	183	186	+9.9	+9.9
US Reno NV	8	11	12	10	72		78S	256	258	-0.2	+1.5
US Robinson AR	7	53	19	27	83		26S	204	207	-0.7	+4.5
US Rochester NY	8	27	2	44	104		43S	221	224	+0.7	+3.6
US Rome NY	8	29	1	46	106		41S	219	222	+0.7	+3.8
US Roswell NM	7	54	11	17	76		41S	219	222	-0.5	+2.8
US Sacramento CA	8	10	25	8	70		77S	255	258	-0.3	+1.5

Luogo - Location	U.T.			Sun Moon			CA	PA	WA	a	b
	h	m	s	Alt	Alt	Az	o	o	o	m/o	m/o
US Salt Lake City UT	8	12	6	16	77	73S	251	254	-0.1	+1.8	
US San Angelo CA	7	44	52	18	76	24S	202	205	-1.0	+4.3	
US San Luis CA	8	20	28	11	72	85N	273	276	-0.1	+1.3	
US Sandusky OH	8	18	26	39	97	42S	220	223	+0.4	+3.5	
US Santa Fe NM	8	0	42	17	77	52S	230	232	-0.3	+2.4	
US Seattle WA	8	22	36	12	73	82N	276	279	+0.0	+1.3	
US Shreveport LA	7	41	48	23	79	12S	190	193	-2.0	+7.5	
US Sioux City IA	8	16	41	29	88	61S	239	242	+0.2	+2.3	
US Smithfield RI	8	25	41	49	108	29S	207	210	+0.5	+5.4	
US Spokane WA	8	22	53	16	77	86N	272	275	+0.0	+1.4	
US St. Louis MO	8	7	38	31	88	41S	219	222	+0.0	+3.3	
US Stratford CT	8	20	53	47	104	26S	204	207	+0.3	+5.7	
US Syracuse NY	8	28	3	45	105	41S	219	222	+0.7	+3.8	
US Tacoma WA	8	22	13	12	73	83N	275	278	+0.0	+1.3	
US Terre Haute IN	8	10	18	34	91	40S	218	221	+0.1	+3.5	
US Teterboro NJ	8	18	52	46	103	26S	204	207	+0.2	+5.7	
US Texarkana AR	7	48	3	24	80	21S	199	202	-1.0	+5.1	
US Tonopah NV	8	7	45	11	72	70S	248	251	-0.3	+1.7	
US Topeka KS	8	8	0	27	85	49S	227	230	+0.0	+2.8	
US Trenton NJ	8	15	27	45	101	23S	201	204	+0.0	+6.1	
US Tucumcari NM	7	58	56	19	78	47S	225	228	-0.3	+2.6	
US Tulsa OK	7	59	50	25	82	39S	217	220	-0.2	+3.2	
US Tyler TX	7	43	53	22	79	17S	195	198	-1.4	+5.8	
US Waco TX	7	42	15	20	78	17S	195	198	-1.5	+5.8	
US Washington DC	8	6	35	42	96	17S	195	198	-0.7	+7.7	
US Watertown NY	8	31	16	46	107	45S	223	226	+0.8	+3.5	
US Wendover UT	8	12	8	15	75	75S	253	256	-0.1	+1.7	
US West Chicago IL	8	17	51	35	93	50S	228	231	+0.4	+2.9	
US West Hampton Beach FL	8	19	6	47	104	23S	201	204	+0.1	+6.3	
US Whidbey Island WA	8	23	45	13	73	80N	278	281	+0.0	+1.3	
US White Plains NY	8	20	9	46	104	27S	205	208	+0.3	+5.6	
US White Sands NM	7	52	28	14	75	40S	218	221	-0.6	+2.8	
US Wichita KS	8	4	27	25	83	47S	225	228	-0.1	+2.8	
US Wichita Falls TX	7	53	26	21	79	34S	212	215	-0.5	+3.5	
US Wildwood NJ	8	5	55	43	98	11S	189	192	+9.9	+9.9	
US Williamsport PA	8	19	56	44	101	33S	211	214	+0.4	+4.5	
US Williston ND	8	26	2	25	87	83S	261	264	+0.3	+1.7	
US Willow Grove DE	8	15	0	44	101	23S	201	204	+0.0	+6.1	
US Wilmington NC	8	11	44	44	99	20S	198	201	-0.3	+6.8	
US Windsor Locks CT	8	25	8	48	107	31S	209	212	+0.5	+5.0	
US Wink TX	7	48	45	16	76	32S	210	213	-0.7	+3.4	
US Wrightstown NJ	8	13	45	45	101	21S	199	202	-0.2	+6.7	
US Youngstown PA	8	18	33	41	98	38S	216	219	+0.4	+3.9	
US Zuni Pueblo NM	8	0	17	15	75	53S	231	234	-0.3	+2.2	
MX Ciudad Juarez	7	50	26	14	74	37S	215	218	-0.6	+3.0	

Sun alt : altezza del Sole sull'orizzonte, in gradi  
Moon alt : altezza della Luna sull'orizzonte, in gradi  
Moon az : azimut della Luna, in gradi  
CA : angolo di cuspidi, angolo dell'evento lungo il lembo della Luna, misurato dalla cuspidi più vicina;  
un valore negativo indica che il fenomeno avviene lungo il bordo luminoso  
PA : angolo di posizione, angolo dell'evento lungo il lembo della Luna, misurato da nord

Sun alt : height of the Sun above the horizon, in °  
Moon alt : height of the Moon above the horizon, in °  
Moon az : azimuth of the Moon, in °  
CA : angle of cuspidi, angle of the event along the limb of the Moon, measured by the nearest cuspidi;  
a negative value means that the phenomenon happens along the bright limb  
PA : angle of position, angle of the event along the limb of the Moon, measured from north

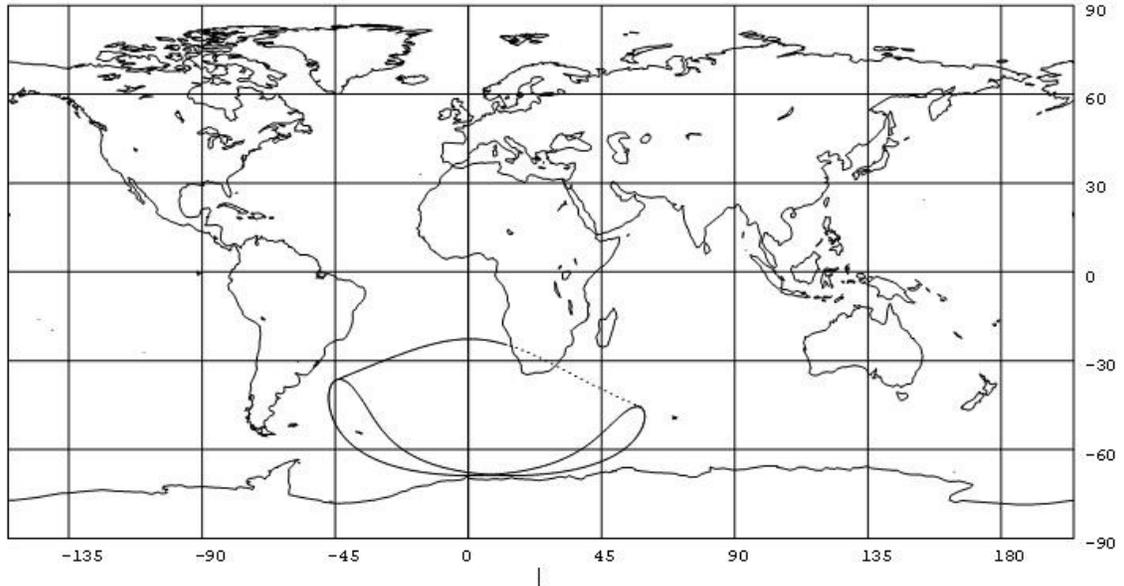
I parametri "a" e "b" servono per il calcolo dei fenomeni nelle città non in tabella.  
Si utilizza la seguente formula:

$$U.T.n = U.T.o + a \times (\text{Long}.n - \text{Long}.o) + b \times (\text{Lat}.n - \text{Lat}.o)$$

Ove "n" è l'indice relativo alla città ignota ed "o" quello relativo alla città più vicina in tabella.  
U.T. deve essere espresso in minuti e decimali, mentre la longitudine e la latitudine in gradi e decimali.  
Le longitudini sono positive ad est di Greenwich.

A coefficient for correcting the prediction for changes in site location. The units are minutes of time per degree (or seconds of time per minute of arc). The correction to the prediction for a change in site, in seconds of time, is found by multiplying A by the change in site longitude ('+ve for changes towards the East) from the prediction site.  
B same as for A, but for changes in latitude ('+ve to the north).

Occultation of Ceres, Magnitude 8.4, on 2012 Oct 7



Occult 4.09.0

UT of conjunction = 4h 32.6m

**CONGIUNZIONI MULTIPLE PIANETI-LUNA-ASTEROIDI**  
(eventi con 1 pianeta, la Luna ed un asteroide entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-MOON-ASTEROIDS**  
(events with 1 planet, the Moon and an asteroid within 5°)

**Geocentriche - Geocentric**

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**Topocentriche - Topocentric 42°N - 12°E**

Data UT Dmed Dmax emin mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

© (6)

# CONGIUNZ. <0,5° ASTEROIDI m<9-STELLE m<6 CONJUNCTIONS <0,5° ASTEROIDS m<9-STARS m<6

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)	tw(h)			
2012/01/08 14:19:12		0.28588	0.00088	2.889	156	51	7.9	5.7			53.1	Vesta	Tau1 AQR
2012/01/09 23:45:09		0.04558	0.00087	2.904	156	50	7.9	4.1			55.1	Vesta	Tau2 AQR
2012/01/14 21:18:12		0.22247	0.00081	3.198	147	65	8.7	6.0			77.4	Ceres	
2012/01/20 21:07:08		0.16377	0.00080	3.270	148	60	8.7	5.1			75.0	Ceres	
2012/02/21 22:32:53		0.45666	0.00077	3.282	156	26	8.1	4.4			46.3	Vesta	PSC
2012/02/29 00:15:27		0.27414	0.01105	0.222	129	144	9.0	4.9			57.6	Eros	
2012/04/03 04:07:34		0.40311	0.00073	3.459	337	6	8.3	5.9			47.6	Vesta	CET
2012/04/21 05:00:36		0.33070	0.00073	3.474	339	-8	8.3	4.5			49.7	Vesta	Nu PSC
2012/04/28 18:31:17		0.45151	0.00068	3.850	159	6	8.9	4.3			53.2	Ceres	Xi2 CET
2012/05/09 20:42:13		0.38034	0.00068	3.834	160	-9	8.9	4.3			55.2	Ceres	Mu CET
2012/07/12 13:36:36		0.10988	0.00076	3.438	348	-44	8.7	3.8			64.5	Ceres	Delta1 TAU
2012/07/13 05:51:58		0.04404	0.00076	3.431	168	-44	8.7	4.8			64.9	Ceres	Delta2 TAU
2012/07/14 09:31:01		0.36079	0.00076	3.419	348	-45	8.7	4.3			60.8	Ceres	Delta3 TAU
2012/07/28 06:44:57		0.21129	0.00080	3.271	350	-53	8.6	6.0			66.9	Ceres	
2012/07/28 14:07:05		0.49561	0.00087	2.912	352	-59	8.1	5.6			58.3	Vesta	TAU
2012/07/31 17:09:58		0.48643	0.00088	2.879	172	-61	8.1	3.9			59.6	Vesta	Theta1 TAU
2012/07/31 17:47:26		0.10644	0.00081	3.231	350	-55	8.6	5.1			69.0	Ceres	TAU
2012/07/31 18:40:04		0.08807	0.00088	2.878	172	-61	8.1	5.0			68.0	Vesta	TAU
2012/08/02 03:44:55		0.32125	0.00088	2.863	172	-62	8.1	4.8			65.2	Vesta	
2012/08/05 23:24:56		0.17400	0.00090	2.821	173	-64	8.1	1.0			69.4	Vesta	Alpha TAU Aldebaran
2012/08/22 02:21:31		0.05578	0.00096	2.633	175	-74	7.9	5.5			80.1	Vesta	
2012/09/08 05:43:36		0.05826	0.00125	2.031	121	-158	8.5	5.2			84.4	Pallas	CET
2012/09/14 19:19:48		0.23818	0.00099	2.641	353	-85	8.2	6.0			96.6	Ceres	
2012/09/16 07:42:05		0.14517	0.00109	2.318	179	-92	7.7	5.0			114.9	Vesta	TAU
2012/09/19 15:05:17		0.42625	0.00111	2.276	360	-95	7.6	5.4			113.5	Vesta	TAU
2012/09/20 16:36:53		0.29802	0.00112	2.262	180	-96	7.6	5.8			123.1	Vesta	TAU
2012/09/29 13:06:50		0.21450	0.00130	1.956	307	168	8.3	3.6			75.1	Pallas	Iota CET Shemali
2012/10/05 10:16:10		0.46577	0.00122	2.077	182	-108	7.4	5.5			200.2	Vesta	TAU
2012/10/14 02:32:29		0.43991	0.00128	1.986	129	153	8.4	5.9			80.9	Pallas	
2012/11/04 22:41:07		0.04722	0.00133	1.962	242	-129	7.5	3.4			402.6	Ceres	Eta GEM Propus
2012/11/05 19:11:33		0.36745	0.00145	1.741	181	-139	6.9	5.5			196.4	Vesta	TAU
2012/11/19 05:30:52		0.22431	0.00154	1.645	182	-154	6.8	5.8			115.2	Vesta	TAU
2012/11/19 06:37:20		0.28289	0.00143	1.822	207	-145	7.2	5.8			164.8	Ceres	GEM
2012/11/20 08:29:23		0.49078	0.00154	1.639	2	-155	6.8	5.4			100.0	Vesta	TAU
2012/11/23 06:18:41		0.11340	0.00156	1.625	182	-159	6.7	5.0			106.4	Vesta	TAU
2012/12/12 22:45:23		0.18196	0.00100	2.549	168	93	8.9	4.5			174.1	Pallas	CET
2012/12/13 03:27:41		0.03325	0.00212	1.173	28	-155	8.7	5.8			121.0	Metis	GEM
2012/12/14 04:46:01		0.45599	0.00154	1.690	195	-175	7.0	5.0			87.8	Ceres	TAU
2012/12/23 20:10:36		0.32011	0.00155	1.686	14	173	7.0	5.2			94.0	Ceres	TAU

Data nel formato anno/mese/giorno  
Dm = distanza minima in gradi tra i centri dei corpi  
Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi  
A.R. e Dec = coordinate apparenti della stella  
R1 = distanza in U.A. dell'asteroide dalla Terra  
P = angolo di posizione tra i corpi, in gradi  
e = elongazione, in gradi  
m1 = magnitudine dell'asteroide  
m\* = magnitudine della stella  
tm = se presente, la stella viene occultata massimo per x secondi  
tw = semiperiodo in ore in cui i due corpi distano meno di 0.5° tra loro

Date in the format year/month/day  
Dm = least distance between the centers of the bodies  
Dl = parameter limit, if Dm < Dl there is an occultation between the bodies  
A.R. e Dec = apparent coordinates of the star  
R1 = distance in A.U. of the asteroid from the Earth  
P = angle of position between the bodies, in °  
e = elongation, in °  
m1 = magnitude of the asteroid  
m\* = magnitude of the star  
tm = if present, the star is occulted maximum for x seconds  
tw = semiperiod in hours in which the two bodies are near less than 0.5°



**OCCULTAZIONI ASTEROIDALI TOPOCENTRICHE DI  
STELLE m<6  
TOPOCENTRIC ASTEROIDAL OCCULTATIONS OF STARS  
m<6  
42°N - 12°E**

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Alt	Dist	Sun	Proba-	Moon	R.A. (J2000)	Dec.
y m d	h m	km "	sec/m	mag	V R	o	Ill	No.	No Name	o	km	Alt	bility	ill	h m s	o ' "
2012 Feb 24	1 0.6	20 0.002	4.6s	5.8	17.2 16.9	104		HIP 73566	D 63252 2001 BL41	9	71005		0%	5	128 15 2	6.508 -28 3 38.60
2012 May 6	2 12.6	32 0.017	1.1s	4.8	10.3 9.9	71		HIP 111123	D 484 Pittsburghia	8	13027		0%	100	110 22 30	38.816 -10 40 40.95
2012 Sep 17	20 5.9	16 0.013	1.8s	5.6	9.9 10.2	160		HIP 3849	d 4100 Sumiko	11	24515		0%	4	156 0 49	25.708 -13 33 41.90
2012 Sep 18	0 34.6	15 0.009	1.5s	4.3	12.5 12.5	146		HIP 3031	d 30482 2000 OG45	76	1041		0%	5	160 0 38	33.123 29 18 39.10
2012 Oct 8	3 18.6	11 0.011	2.0s	3.9	12.0 12.1	147		HIP 13701	s 25316 1999 AH23	30	8856		0%	52	65 2 56	25.717 -8 53 56.13
2012 Nov 4	18 30.1	28 0.015	2.5s	5.3	11.8 12.2	94		HIP 104974	d 1389 Onnie	31	2971		0%	71	150 21 15	44.864 -15 10 17.34
2012 Dec 5	17 18.2	11 0.007	1.8s	5.2	12.0 12.0	136		HIP 7981	d 6028 1994 ER1	50	27747		0%	60	122 1 42	29.477 20 15 57.80
2012 Dec 13	15 54.4	11 0.005	1.3s	5.6	12.6 12.5	139		HIP 12153	D 4393 Dawe	26	26972	-2	0%	0	135 2 36	38.165 12 26 50.35
2012 Dec 17	4 3.1	26 0.016	2.1s	5.9	11.2 11.6	161		HIP 31448	s 2979 Murmansk	29	18109		0%	20	141 6 35	17.597 9 59 17.91
2012 Dec 17	22 56.1	58 0.045	5.2s	5.3	7.4 7.2	153		HIP 19719	D 631 Philippina	52	4494		0%	27	95 4 13	33.101 7 42 57.75
2012 Dec 23	21 12.1	20 0.011	1.5s	6.0	10.3 10.4	160		HIP 25816	s 3015 Candy	75	1977		0%	83	44 5 30	48.654 41 27 42.72
2012 Dec 27	19 22.9	94 0.068	10.9s	3.8	9.6 9.7	151		HIP 20885	d 1107 Lictoria	55	1972		0%	100	22 4 28	34.589 15 57 43.64

Date : anno/mese/giorno  
Ora : in Tempo Universale  
Diameter : dimensione dell'asteroide in km ed in "  
Durn : durata dell'evento in secondi o minuti  
Star mag : magnitudine della stella  
Mag drop : caduta di luce  
Elon : elongazione, in gradi  
% ill : valore nullo  
Star : stella  
Alt : altezza sull'orizzonte, in gradi  
Sun alt : altezza del Sole sull'orizzonte in °  
Probability : probabilità che l'evento accada  
Moon ill : percentuale di Luna illuminata  
Moon elon : elongazione lunare in °

Date = date in the format year/month/day  
U.T. = times  
Diameter = diameter in km and in " of the asteroid  
Durn = duration of the event, in minutes or seconds  
Star Mag = star magnitude - visual  
Mag V = magnitude drop at occultation - based on visual magnitude  
Drop R = magnitude drop at occultation - based on the star's red magnitude, and an asteroid color (B-V) of 0.83. This may be a better guide for CCD observers  
Elon = elongation, in °  
% ill = null

**CONGIUNZIONI MULTIPLE LUNA-ASTEROIDI-STELLE**  
 (eventi con la Luna, 1 asteroide di mag<9 ed 1 stella di mag<2 entro  
 5°)

**MULTIPLE CONJUNCTIONS MOON-ASTEROIDS-STARS**  
 (events with the Moon, 1 asteroid with mag<9 and 1 star with mag<2  
 within 5°)

**Geocentriche - Geocentric**

Date	TT	Dmed	Dmax	emin	m2d	mmax					
2012/07/15	07:37	3.897	5.019	-44	1.0	8.7	Moon	Alpha	TAU Aldebaran	Ceres	
2012/07/15	09:55	4.079	4.926	-41	1.0	8.7	Moon	Alpha	TAU Aldebaran	Venus	Ceres
2012/08/11	19:10	3.980	4.822	-68	1.0	8.0	Moon	Alpha	TAU Aldebaran	Vesta	
2012/08/11	19:36	3.969	5.097	-68	1.0	8.0	Moon	Alpha	TAU Aldebaran	Jupiter	Vesta
2012/12/26	07:50	3.797	4.499	157	1.0	6.7	Moon	Alpha	TAU Aldebaran	Vesta	

Eccezionalmente in qualche evento è presente anche un pianeta!

**Topocentriche - Topocentric 42°N - 12°E**

Date	TT	Dmed	Dmax	emin	m2d	mmax					
2012/07/15	05:51	3.632	4.767	-44	1.0	8.7	Moon	Alpha	TAU Aldebaran	Ceres	
2012/07/15	12:00	3.900	4.730	-41	1.0	8.7	Moon	Alpha	TAU Aldebaran	Venus	Ceres
2012/08/11	19:01	3.382	4.043	-68	1.0	8.0	Moon	Alpha	TAU Aldebaran	Vesta	
2012/12/26	08:25	3.373	3.844	157	1.0	6.7	Moon	Alpha	TAU Aldebaran	Vesta	

Eccezionalmente in qualche evento è presente anche un pianeta!

**CONGIUNZIONI MULTIPLE LUNA-ASTEROIDI-OGGETTI**  
 (eventi con la Luna, 1 asteroide di mag<9 ed 1 oggetto di mag<2 entro  
 5°)

**MULTIPLE CONJUNCTIONS MOON-ASTEROIDS-OBJECTS**  
 (events with the Moon, 1 asteroid with mag<9 and 1 object with mag<2  
 within 5°)

**Geocentriche - Geocentric**

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**Topocentriche - Topocentric 42°N - 12°E**

Data UT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

**ASTEROIDI MOLTO VICINI  $\Delta < 0.01$  U.A.  
NEAR ASTEROIDS  $\Delta < 0.01$  A.U.**

Object	Date of approach (TDB) AAAA-mmm-DD HH:MM $\pm$ D_HH:MM	Nominal distance A.U.	Minima distance A.U.	V relative (km/s)	H
(2008 EJ85)	2012- 03-06 22:27 $\pm$ 2_08:47	0.0235	0.0021	6.5	25.0
(2004 RQ252)	2012- 04-13 05:48 $\pm$ 18:03	0.0388	0.0003	10.86	22.3
(2007 HV4)	2012- 04-19 03:57 $\pm$ 1_17:57	0.0122	0.0029	8.98	28.7
(2003 WH166)	2012- 04-23 12:44 $\pm$ 1_19:39	0.0509	0.0047	13.49	21.9
(2008 CB6)	2012- 05-13 10:06 $\pm$ 3_07:41	0.1103	0.0018	10.85	10.9
(2010 KK37)	2012- 05-19 10:36 $\pm$ 1_03:50	0.0058	0.0004	10.94	10.9

Legenda :

Date of approach = data calcolata (anno-mese-giorno-ora-minuti  $\pm$  incertezza in giorni-ore-minuti) di avvicinamento alla Terra

Nominal/minima distance = nominale è quella calcolata, minima è quella calcolata tenendo conto dell'incertezza  $\pm 3\sigma$

V relative = velocità relativa tra Terra ed asteroide

H = magnitudine assoluta dell'asteroide

**AVVICINAMENTI ASTEROIDI-PIANETI  $\Delta < 10^6$  KM  
APPROACHES ASTEROIDS-PLANETS  $\Delta < 10^6$  KM**

NEA	Planet	Date	Nom dist	Min dist
2000DO1	Mercury	2012/04/15.06821	0.0019343	0.0009583

**AVVICINAMENTI TRA ASTEROIDI  
APPROACHES BETWEEN ASTEROIDS**

Date	TT	Dist	V(km/s)	Err	r1	r2		
2012/01/20	20:04:44	9950	9.5903	497	2.8476	2.8476	2000SX299	2007CG15
2012/02/26	10:23:31	4298	3.8905	240	2.2775	2.2775	2000KJ63	2000QR67
2012/03/18	17:54:29	7253	4.5067	345	2.7741	2.7741	2000SA146	2000DB42
2012/03/18	23:27:06	6813	2.9001	191	2.1725	2.1725	Floss	1999RL16
2012/05/04	23:38:46	8809	1.8071	375	2.1618	2.1618	2001NF20	2005UA517
2012/06/05	13:00:30	3158	3.7753	360	2.4493	2.4493	2002FZ21	2005RE12
2012/08/18	14:17:35	1809	3.2578	239	2.2891	2.2891	1996GU17	2002RL201
2012/08/21	07:25:49	7284	5.4239	172	2.2835	2.2835	Wil	2001GK5
2012/09/10	12:33:25	5757	5.9494	295	3.0045	3.0045	Nordenski	2002GQ181
2012/09/22	08:53:26	4263	7.5224	143	2.2012	2.2012	2000JB41	2006HG82
2012/11/30	18:21:09	6920	8.3128	433	2.9373	2.9373	2001FT159	2003FX79
2012/12/29	00:56:23	7680	5.0538	332	2.2086	2.2085	5050T-3	2006VA73
2012/12/31	09:38:01	9405	2.5509	188	2.0231	2.0231	2000GO45	2000WN30

Data nel formato anno/mese/giorno

Dist = distanza minima in km tra i centri dei corpi

V = velocità relativa tra i corpi

Err = incertezza del calcolo in km

R1 = distanza in U.A. del corpo 1 dalla Terra

R2 = distanza in U.A. del corpo 2 dalla Terra

Ultime 2 colonne : nomi dei corpi

Date in the format year/month/day

Dist = least distance in km

V = relative velocity

Err = uncertainty of the calculation in km

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

Last 2 columns : names

## TRANSITI DI ASTEROIDI SUI PIANETI PLANETARY TRANSITS OF ASTEROIDS

Data	TT	Dm	r1	r2	p	e	m1	m2	tm(s)
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Questo anno non avvengono fenomeni - No phenomena this year

NB: SONO STATI PRESI IN CONSIDERAZIONE SOLO GLI ASTEROIDI CHE POTREBBERO SUPERARE 1" DI DIAMETRO ALL'OPPOSIZIONE (VEDI TABELLA SUCCESSIVA)

NB: I HAVE CONSIDERED ONLY THE ASTEROIDS THAT COULD OVERCOME 1" OF DIAMETER TO THE OPPOSITION. TO SEE THE FOLLOWING CHART.

## TRANSITI DI ASTEROIDI SUL SOLE SOLAR TRANSITS OF ASTEROIDS

Data	TT	Dm	r1	r2	p	e	m1	m2	tm(s)
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Questo anno non avvengono fenomeni - No phenomena this year

NB: SONO STATI PRESI IN CONSIDERAZIONE SOLO GLI ASTEROIDI CHE POTREBBERO SUPERARE 1" DI DIAMETRO ALL'OPPOSIZIONE (VEDI TABELLA SUCCESSIVA)

NB: I HAVE CONSIDERED ONLY THE ASTEROIDS THAT COULD OVERCOME 1" OF DIAMETER TO THE OPPOSITION. TO SEE THE FOLLOWING CHART.

# OCCULTAZIONI TRA ASTEROIDI OCCULTAZIONS BETWEEN ASTEROIDS

Date	TT	Dm	Dl	Err	r1	r2	p	e	m1	m2	tm(s)		
2012/01/03 19:43:42		0.00010	0.00011	0.00003	2.836	2.605	316	53	7.9	19.5	34.3	Vesta	2000AK9
2012/01/14 13:14:01		0.00022	0.00059	0.00031	1.720	1.220	276	171	12.2	19.1	9.7	Aeria	2002PA157
2012/01/19 18:41:28		0.00023	0.00059	0.00012	3.656	1.965	199	-73	12.8	19.4	6.6	Bamberga	2004BZ72
2012/01/27 23:44:32		0.00008	0.00009	0.00010	2.918	2.670	112	-87	12.5	18.8	35.0	Diotima	2001OJ39
2012/02/29 03:16:58		0.00044	0.00084	0.00011	2.023	1.199	357	-135	11.6	19.2	20.6	Fides	2001BZ23
2012/03/01 17:14:21		0.00006	0.00015	0.00004	2.761	2.388	212	73	11.7	21.1	29.6	Leto	2006HT13
2012/03/25 21:29:23		0.00004	0.00085	0.00006	2.765	1.421	346	-118	10.6	17.3	20.1	Juno	1998QY42
2012/04/23 06:20:14		0.00008	0.00020	0.00011	3.194	2.598	351	-69	10.8	20.9	35.0	Hygiea	2008WC2
2012/04/27 06:26:31		0.00005	0.00020	0.00024	3.728	2.929	336	-69	12.3	21.1	33.8	Davida	2002BW18
2012/05/04 01:28:15		0.00010	0.00022	0.00013	3.065	2.453	167	-76	10.8	19.2	39.7	Hygiea	1978UK7
2012/05/05 05:48:47		0.00011	0.00066	0.00014	2.779	1.606	27	111	11.2	21.1	20.9	Psyche	2003SU241
2012/05/28 09:16:05		0.00005	0.00012	0.00030	3.481	3.006	7	17	11.4	20.1	18.7	Irene	2000PC8
2012/05/30 13:10:37		0.00018	0.00031	0.00004	3.296	2.338	29	76	13.0	20.6	11.3	Siegena	2005EV50
2012/05/30 22:16:09		0.00055	0.00148	0.00012	1.855	0.877	284	154	12.1	18.8	16.9	Meliboea	1999LN3
2012/06/07 12:39:32		0.00012	0.00057	0.00009	1.934	1.333	104	130	12.7	18.8	6.0	Armor	2002QH6
2012/07/06 06:05:31		0.00002	0.00004	0.00004	3.206	3.083	313	23	12.3	20.5	10.3	Thyra	1999RK192
2012/07/07 16:57:58		0.00034	0.00052	0.00006	2.505	1.642	243	-150	12.5	17.3	12.4	Rachele	1998FT11
2012/07/22 19:42:39		0.00001	0.00055	0.00041	2.612	1.648	339	-90	12.5	20.6	5.2	Pomona	2002TC185
2012/08/18 18:08:19		0.00009	0.00105	0.00013	1.389	0.871	241	-171	12.7	16.8	9.0	Centenari	2000WE34
2012/09/05 06:28:58		0.00023	0.00043	0.00004	3.259	2.073	189	78	13.0	20.2	4.3	Chryseis	2002JT123
2012/09/06 12:10:11		0.00031	0.00043	0.00012	2.451	1.726	180	-93	10.6	19.8	8.9	Dembowska	2001VB66
2012/09/12 23:30:47		0.00001	0.00038	0.00004	2.889	2.025	2	-80	12.1	20.0	19.5	Doris	2004KR4
2012/09/13 20:25:47		0.00052	0.00073	0.01205	2.732	1.514	192	37	12.3	22.3	1.6	Desiderat	1998SH36
2012/09/20 21:03:54		0.00016	0.00057	0.00065	2.031	1.383	63	-111	12.9	19.6	3.9	Amalthea	2004TN13
2012/10/04 14:13:36		0.00009	0.00025	0.00523	1.689	1.451	297	117	11.4	20.3	32.7	Thetis	2006VR67
2012/10/10 05:05:25		0.00050	0.00052	0.00010	2.481	1.639	338	121	11.3	18.5	7.1	Eleonora	2002LZ50
2012/10/18 15:16:14		0.00022	0.00046	0.00005	3.502	2.117	153	62	12.7	19.4	3.4	Thalia	1999NB33
2012/10/26 06:49:27		0.00004	0.00041	0.00003	2.323	3.758	1	62	13.0	20.9	5.3	Roberta	2001QT39
2012/10/26 14:46:55		0.00014	0.00034	0.00013	1.331	1.132	90	126	11.7	19.2	24.3	Feronia	2002NA57
2012/11/02 18:03:07		0.00087	0.00555	0.00012	2.632	0.378	323	-98	13.0	18.1	1.7	Lomia	1998VR
2012/11/13 17:48:05		0.00041	0.00361	0.00011	2.699	0.542	204	-74	12.3	18.6	1.3	Ausonia	Nereus

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm < Dl vi è una occultazione tra i corpi

Err = incertezza del calcolo

R1 = distanza in U.A. del corpo 1 dalla Terra

R2 = distanza in U.A. del corpo 2 dalla Terra

P = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del primo corpo

m2 = magnitudine del secondo corpo

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

**NB: SONO STATI PRESI IN CONSIDERAZIONE SOLO GLI EVENTI DI DURATA MAGGIORE DI 1 SECONDO ED IN CUI IL CORPO OCCULTATO HA MAG<13**

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Err = uncertainty of the calculation in °

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, the asteroid is occulted maximum for x seconds

**NB: I HAVE CONSIDERED ONLY THE EVENTS OF DURATION GREATER THAN 1 SECOND AND IN WHICH THE HIDDEN ASTEROID HAS MAG<13**

# ELENCO ASTEROIDI CON m MIN. TEORICA <9 ASTEROIDS WITH THEORETICAL LEAST mag. <9

Asteroid	mag.	min.	H						
1 Ceres	6.4	3.3	68372 (2001 PM9)	6.9	18.7	267221 (2001 AD2)	8.9	19.1	
2 Pallas	6.3	4.1	68548 (2001 XR31)	8.3	16.2	267337 (2001 VK5)	2.2	17.7	
3 Juno	7.0	5.3	68950 (2002 QF15)	5.2	16.2	267494 (2002 JB9)	8.4	15.6	
4 Vesta	5.1	3.2	69230 Hermes	5.6	17.4	269690 (1996 RG3)	5.7	18.5	
5 Astraea	8.6	6.8	85182 (1991 AQ)	8.3	17.0	275677 (2000 RS11)	8.6	18.7	
6 Hebe	7.1	5.7	85236 (1993 KH)	4.6	18.4	276033 (2002 AJ129)	7.4	18.4	
7 Iris	6.5	5.5	85640 (1998 OX4)	6.9	21.0	277475 (2005 WK4)	8.0	20.0	
8 Flora	7.6	6.5	85713 (1998 SS49)	2.9	15.4	279744 (1998 KM3)	6.9	19.5	
9 Metis	8.1	6.3	86039 (1999 NC43)	7.8	15.8	290772 (2005 VC)	8.9	17.4	
10 Hygiea	8.9	5.4	86819 (2000 GK137)	8.3	17.1	292220 (2006 SU49)	3.6	19.5	
11 Parthenope	8.6	6.6	88254 (2001 FM129)	7.5	17.4	(1990 SM)	8.4	16.1	
12 Victoria	8.1	7.2	89830 (2002 CE)	7.0	14.7	(1994 AW1)	8.9	17.4	
14 Irene	8.3	6.3	89958 (2002 LY45)	3.2	16.8	(1996 AJ1)	8.5	20.1	
15 Eunomia	7.4	5.3	89959 (2002 NT7)	0.4	16.3	(1996 RG3)	5.4	18.5	
16 Psyche	8.8	5.9	90075 (2002 VU94)	7.5	15.1	(1996 SK)	5.2	17.1	
18 Melpomene	7.3	6.5	90416 (2003 YK118)	-0.9	18.3	(1997 GL3)	6.2	19.6	
19 Fortuna	8.8	7.1	99942 Apophis	3.4	19.7	(1997 US2)	8.7	19.7	
20 Massalia	8.3	6.5	100085 (1992 UY4)	8.4	17.6	(1997 XR2)	0.3	20.8	
21 Lutetia	9.0	7.3	101869 (1999 MM)	5.6	19.2	(1998 HH49)	8.7	21.3	
23 Thalia	8.6	6.9	101955 (1999 RQ36)	7.9	20.8	(1998 KM3)	6.8	19.4	
27 Euterpe	8.4	7.0	111253 (2001 XU10)	7.4	14.9	(1998 QA1)	7.6	18.9	
29 Amphitrite	8.4	5.8	136617 (1994 CC)	8.6	17.5	(1998 QK28)	8.3	19.3	
39 Laetitia	8.9	6.1	136618 (1994 CN2)	7.2	16.6	(1998 SC15)	1.9	19.3	
40 Harmonia	9.0	7.0	137108 (1999 AN10)	1.6	17.8	(1999 RM45)	5.8	19.3	
41 Daphne	8.8	7.1	137427 (1999 TF211)	6.3	15.0	(1999 XS35)	4.8	17.2	
42 Isis	8.7	7.5	138127 (2000 EE14)	8.6	16.8	(1999 XL136)	6.4	19.1	
43 Ariadne	8.8	7.9	139359 (2001 ME1)	7.0	16.6	(1999 YR14)	7.6	18.5	
44 Nysa	8.8	7.0	139622 (2001 QQ142)	8.8	18.2	(2000 EJ26)	8.5	19.1	
80 Sappho	8.9	8.0	140288 (2001 SN289)	7.4	16.4	(2000 EK26)	2.1	17.8	
89 Julia	8.4	6.6	141495 (2002 EZ11)	3.1	18.1	(2000 GV147)	6.1	19.0	
115 Thyra	8.9	7.5	143404 (2003 BD44)	7.9	16.6	(2000 KA)	7.7	21.3	
192 Nausikaa	8.0	7.1	143487 (2003 CR20)	2.6	18.5	(2000 OH)	8.9	17.2	
324 Bamberg	7.6	6.8	143649 (2003 QQ47)	4.9	17.1	(2000 QS7)	7.2	19.5	
344 Desiderata	9.0	8.1	143651 (2003 QO104)	3.6	15.9	(2000 QX69)	8.2	23.9	
433 Eros	7.3	11.2	143992 (2004 AF)	8.7	15.9	(2000 RS11)	8.2	18.7	
471 Papagena	9.0	6.7	144332 (2004 DV24)	5.6	16.4	(2000 TU28)	6.4	20.4	
532 Herulina	8.3	5.8	144898 (2004 VD17)	4.7	18.8	(2000 WC1)	8.8	21.8	
887 Alinda	8.8	13.8	152664 (1998 FW4)	9.0	19.5	(2000 YG29)	7.2	18.6	
1036 Ganymed	7.8	9.4	152680 (1998 KJ9)	7.9	19.3	(2001 AD2)	8.9	19.1	
1620 Geographos	8.1	15.6	152685 (1998 MZ)	5.2	19.2	(2001 BF10)	7.1	22.3	
1627 Ivar	8.7	13.2	153201 (2000 WO107)	6.7	19.0	(2001 EC)	5.5	18.5	
1685 Toro	7.9	14.2	153220 (2000 YN29)	8.5	17.4	(2001 GQ2)	8.8	20.0	
1862 Apollo	8.4	16.3	153249 (2001 BW15)	8.9	14.9	(2001 HA4)	8.7	17.4	
1866 Sisyphus	8.3	13.0	153814 (2001 WN5)	4.5	18.1	(2001 QJ96)	8.4	21.9	
1917 Cuyo	8.5	13.9	154276 (2002 SY50)	4.9	17.5	(2001 TX44)	8.9	19.0	
1981 Midas	3.2	15.5	159857 (2004 LJ1)	7.0	15.4	(2001 VK5)	-1.5	17.7	
2135 Aristaeus	7.9	17.9	161989 Cacus	8.1	17.1	(2001 WS1)	5.8	16.7	
2201 Oljato	1.2	15.3	162162 (1999 DB7)	7.0	19.6	(2001 WW1)	8.7	22.4	
2340 Hathor	8.4	19.2	162173 (1999 JU3)	5.3	19.1	(2001 XU)	4.6	19.0	
3122 Florence	7.5	14.2	162416 (2000 EH26)	6.2	21.3	(2001 XP1)	8.7	17.8	
3200 Phaethon	6.2	14.6	162474 (2000 LB16)	7.1	18.4	(2001 XU30)	8.0	19.6	
3362 Khufu	9.0	18.3	162825 (2001 BO61)	8.3	17.7	(2001 YN2)	2.0	24.9	
3671 Dionysus	7.8	16.3	163051 (2001 YJ4)	8.8	16.2	(2001 YB5)	8.6	20.6	
4179 Toutatis	4.2	15.3	163132 (2002 CU11)	1.1	18.2	(2002 AW)	8.9	20.5	
4183 Cuno	7.0	14.4	163243 (2002 FB3)	4.1	16.3	(2002 AJ129)	7.8	18.6	
4581 Asclepius	8.0	20.4	163373 (2002 PZ39)	6.2	18.8	(2002 CY9)	8.6	19.2	
4660 Nereus	5.8	18.2	163899 (2003 SD220)	8.1	16.8	(2002 EY2)	2.2	19.4	
4769 Castalia	8.5	16.9	164121 (2003 YT1)	3.8	16.1	(2002 EM7)	2.7	24.3	
4953 (1990 MU)	6.4	14.1	164207 (2004 GU9)	6.8	21.1	(2002 GM2)	8.7	18.5	
5143 Heracles	8.1	14.0	164216 (2004 OT11)	7.8	17.2	(2002 JZ8)	8.3	20.7	
5693 (1993 EA)	5.7	17.0	170086 (2002 XR14)	8.2	17.9	(2002 JB9)	8.3	15.6	
7335 (1989 JA)	8.7	17.0	171576 (1999 VP11)	4.1	18.3	(2002 LV)	6.6	16.5	
7482 (1994 PC1)	0.3	16.8	172678 (2003 YM137)	7.1	18.7	(2002 MN)	7.3	23.3	
7753 (1988 XB)	7.8	18.6	177049 (2003 EE16)	0.4	19.7	(2002 NY40)	4.5	19.1	
8566 (1996 EN)	8.3	16.5	177614 (2004 HK33)	7.4	17.5	(2002 SZ)	6.1	20.4	
12538 (1998 OH)	8.5	16.1	186844 (2004 GA1)	8.2	17.2	(2002 TR190)	7.7	18.9	
12923 Zephyr	7.9	16.1	197588 (2004 HE12)	7.9	17.7	(2003 DW10)	8.5	26.1	
13651 (1997 BR)	8.4	17.6	199801 (2007 AE12)	8.2	19.2	(2003 DZ15)	2.3	22.2	
16960 (1998 QS52)	4.8	14.2	212546 (2006 SV19)	9.0	17.6	(2003 EP4)	8.6	23.7	
20425 81998 VD35)	7.6	20.4	214869 (2007 PA8)	8.2	16.1	(2003 KO2)	6.4	20.1	
20826 (2000 UV13)	7.6	13.5	215588 (2003 HF2)	7.1	19.4	(2003 LN6)	8.0	24.4	
23187 (2000 PN9)	7.1	16.1	216985 (2000 QK130)	4.1	20.7	(2003 MH4)	6.4	19.8	
27002 (1998 DV9)	5.0	18.2	217628 Lugh	7.6	16.2	(2003 MK4)	8.3	20.8	
30825 (1990 TG1)	9.0	14.7	221455 (2006 BC10)	8.5	19.3	(2003 QC10)	3.6	17.8	
31669 (1999 JT6)	-4.4	16.0	231937 (2001 FO32)	6.2	17.7	(2003 UV11)	8.7	19.3	
33342 (1998 WT24)	8.1	17.9	242216 (2003 RN10)	5.7	15.7	(2003 WP7)	5.4	24.0	
35107 (1991 VH)	9.0	16.9	242450 (2004 QY2)	8.1	14.6	(2003 YG118)	7.3	16.9	
35396 (1997 XF11)	1.6	16.9	242643 (2005 NZ6)	7.2	17.5	(2003 YH136)	8.8	19.2	
37638 (1993 VB)	1.2	19.4	242708 (2005 UK1)	8.3	18.0	(2004 BL86)	8.7	18.8	
39572 (1993 DQ1)	8.8	16.3	243566 (1995 SA)	9.0	17.2	(2004 DC)	7.7	18.0	
52760 (1998 ML14)	8.6	17.6	244977 (2004 BE68)	8.4	18.3	(2004 FH)	4.1	26.4	
52768 (1998 OR2)	8.4	15.7	247360 (2001 XU)	6.3	19.0	(2004 FU4)	4.5	18.3	
53319 (1999 JM8)	8.6	15.1	251722 (1997 US2)	8.6	19.7	(2004 FU162)	8.0	28.6	
54509 YORP	6.2	22.5	252399 (2001 TX44)	8.5	18.7	(2004 HW)	6.9	17.1	
66146 (1998 TU3)	9.0	14.5	253841 (2003 YG118)	7.6	17.0	(2004 HZ)	4.2	22.2	
66391 (1999 KW4)	7.2	16.4	260141 (2004 QT24)	7.4	18.2	(2004 MX2)	6.6	19.1	
68216 (2001 CV26)	8.2	16.2	267131 (2000 EK26)	2.3	17.7	(2004 PZ19)	9.0	24.5	

(2004 QT24)	7.8	18.2	(2007 PV27)	5.6	20.2	(2009 KC3)	7.7	17.9
(2004 RV164)	5.9	24.1	(2007 RS1)	8.6	30.9	(2009 KN4)	8.6	18.2
(2004 RQ252)	4.8	22.3	(2007 RU9)	2.5	20.7	(2009 KK8)	8.9	18.7
(2004 ST26)	8.6	26.3	(2007 TB23)	7.8	18.6	(2009 SD)	6.6	25.4
(2004 TN1)	7.4	21.7	(2007 TU24)	6.3	20.2	(2009 ST19)	6.0	18.2
(2004 UE)	5.7	21.1	(2007 TH72)	3.5	24.2	(2009 TD17)	8.6	27.6
(2004 VC17)	5.8	18.3	(2007 UW1)	5.5	22.7	(2009 WM1)	5.8	20.4
(2004 XN14)	7.1	20.0	(2007 UT3)	8.0	25.7	(2009 WQ25)	8.7	23.9
(2004 XP14)	5.8	19.4	(2007 UO6)	8.7	27.3	(2009 XO)	7.0	20.5
(2004 XM29)	8.8	22.8	(2007 VK184)	6.2	22.0	(2009 XT6)	7.6	20.1
(2004 XL35)	8.1	19.3	(2007 VE191)	5.5	23.6	(2010 CA)	5.2	24.4
(2004 XN50)	8.2	18.7	(2007 VN243)	3.2	22.4	(2010 CK19)	5.4	27.9
(2005 AD13)	8.9	17.9	(2008 AF4)	6.9	19.6	(2010 CL19)	7.9	17.5
(2005 CZ36)	8.3	17.5	(2008 BT18)	9.0	18.2	(2010 FQ)	7.3	19.9
(2005 CC37)	7.0	22.6	(2008 CK70)	4.1	25.2	(2010 GE35)	7.8	22.9
(2005 EU2)	7.2	23.0	(2008 CC71)	8.7	24.8	(2010 HS20)	4.8	23.3
(2005 GY8)	8.7	21.7	(2008 DE)	8.0	19.6	(2010 JU39)	8.0	19.4
(2005 GC120)	8.8	19.6	(2008 DJ)	-1.5	20.4	(2010 KO10)	5.3	27.1
(2005 LW3)	5.7	21.7	(2008 EX5)	8.1	23.8	(2010 KR10)	5.9	19.4
(2005 NB7)	8.3	18.7	(2008 ER7)	5.8	20.0	(2010 KK37)	7.6	25.7
(2005 QZ151)	8.1	19.8	(2008 EZ7)	8.2	27.0	(2010 MU112)	8.9	20.9
(2005 SQ)	8.9	20.3	(2008 EM68)	9.0	27.6	(2010 PR66)	6.7	19.3
(2005 SE71)	4.3	18.1	(2008 EZ84)	7.5	26.1	(2010 RK53)	7.8	27.8
(2005 UL5)	8.8	20.0	(2008 GD110)	6.4	24.5	(2010 SC41)	5.0	19.8
(2005 VC)	8.6	17.2	(2008 HB38)	8.7	21.1	(2010 TG19)	6.9	23.9
(2005 VL1)	2.5	26.7	(2008 HC38)	8.6	26.1	(2010 TD54)	7.4	28.8
(2005 WK4)	8.1	20.1	(2008 KO)	8.0	24.4	(2010 TP55)	8.1	20.5
(2005 WY55)	8.9	20.6	(2008 KZ5)	7.5	20.0	(2010 UJ7)	8.7	25.6
(2005 XJ8)	8.1	17.0	(2008 KN11)	8.1	23.2	(2010 VB1)	8.3	23.3
(2005 YS8)	9.0	19.9	(2008 LA)	9.0	23.1	(2010 WC9)	4.7	23.4
(2005 YU55)	7.0	21.8	(2008 LV16)	8.3	20.1	(2010 XR)	8.2	26.8
(2006 BM55)	7.6	23.0	(2008 MP1)	8.0	21.8	(2010 XU)	8.6	25.3
(2006 CT)	8.4	22.3	(2008 OB9)	6.5	17.5	(2010 XC15)	7.1	21.4
(2006 DU62)	5.6	17.9	(2008 PK3)	4.6	22.0	(2010 XC25)	6.8	20.9
(2006 FX)	5.9	19.9	(2008 QT3)	8.6	18.7	(2010 XM56)	6.9	25.1
(2006 GY2)	7.7	18.7	(2008 TE)	7.3	27.6	(2010 XW58)	8.2	24.7
(2006 JF42)	6.2	19.0	(2008 TC3)	5.2	30.6	(2011 AG5)	6.6	21.8
(2006 KV86)	5.5	18.8	(2008 UM1)	5.6	32.1	(2011 AM12)	8.9	19.5
(2006 QV89)	4.3	25.2	(2008 UB7)	8.6	23.8	(2011 AM37)	6.9	29.6
(2006 RJ1)	7.8	22.1	(2008 UB95)	7.8	24.6	(2011 BT15)	6.1	21.7
(2006 RJ7)	8.9	23.6	(2008 WZ13)	8.2	18.6	(2011 BE38)	8.1	18.4
(2006 SC)	7.9	25.2	(2008 WK96)	7.9	23.1	(2011 BP40)	8.5	25.4
(2006 SU49)	3.6	19.5	(2008 XM)	8.4	19.9	(2011 DV)	8.4	20.6
(2006 VV2)	7.2	16.7	(2008 XQ2)	6.9	19.9	(2011 DE5)	4.6	26.4
(2006 WT1)	8.5	19.9	(2008 YF)	6.7	20.8	(2011 EY11)	8.8	28.5
(2007 AG)	8.7	20.1	(2008 YO2)	8.8	25.2	(2011 EF17)	8.4	19.1
(2007 AB12)	6.1	18.9	(2008 YQ27)	8.6	22.5	(2011 EU20)	8.5	27.3
(2007 CS5)	7.8	24.5	(2009 BH2)	5.5	22.3	(2011 EU29)	7.2	19.8
(2007 CA19)	-4.3	17.6	(2009 BP5)	6.8	22.6	(2011 GW9)	7.3	28.1
(2007 CN26)	7.3	21.0	(2009 DE1)	7.4	24.2	(2011 GN44)	8.7	18.3
(2007 DS7)	8.3	25.8	(2009 FD)	8.9	22.1	(2011 GS60)	8.3	18.9
(2007 DX40)	8.6	24.6	(2009 FE)	9.0	21.3	(2011 HO5)	6.6	24.2
(2007 FP3)	8.6	28.4	(2009 FG)	8.6	25.5	(2011 JA)	5.6	21.3
(2007 JD)	8.0	23.0	(2009 FH)	8.1	26.5	(2011 KE15)	5.7	26.9
(2007 JY2)	4.1	21.7	(2009 FJ)	9.0	24.8	(2011 SR5)	6.0	20.9
(2007 LF)	8.3	20.4	(2009 HG60)	7.4	22.7	(2011 SM68)	2.3	19.5
(2007 LB15)	8.5	19.4	(2009 JG2)	1.9	22.5	(2011 SD173)	8.8	19.5
(2007 LQ19)	-3.8	17.2	(2009 KK)	3.7	20.4			

La magnitudine minima teorica sarebbe quella che l'asteroide avrebbe se fosse al suo MOID (minimum orbital intersection distance).

Magnitudine assoluta (H)	Diametro
3	670 km - 1490 km
3.5	530 km - 1190 km
4	420 km - 940 km
4.5	330 km - 750 km
5	270 km - 590 km
5.5	210 km - 470 km
6	170 km - 380 km
6.5	130 km - 300 km
7	110 km - 240 km
7.5	85 km - 190 km
8	65 km - 150 km

8.5	50 km - 120 km
9	40 km - 90 km
9.5	35 km - 75 km
10	25 km - 60 km
11	15 km - 40 km
12	11 km - 24 km
13	7 km - 15 km
14	4 km - 9 km
15	3 km - 6 km
16	2 km - 4 km
17	1 km - 2 km
18	670 m - 1500 m
19	420 m - 940 m

20	270 m - 590 m
21	170 m - 380 m
22	110 m - 240 m
23	65 m - 150 m
24	40 m - 95 m
25	25 m - 60 m
26	17 m - 37 m
27	11 m - 24 m
28	7 m - 15 m
29	4 m - 9 m
30	3 m - 6 m

**ELENCO ASTEROIDI CHE ALL'OPPOSIZIONE POTREBBERO  
SUPERARE 1" DI DIAMETRO  
ASTEROIDS THAT AT THE OPPOSITION THEY COULD  
OVERCOME 1" OF DIAMETER**

(1) Ceres		1.1	2007 EL38	3.4	7.5
(4) Vesta		1.6	2007 EN53	3.4	7.6
(1981) Midas		1.9	2007 EO53	2	4.6
(2201) Oljato	2.1	4.7	2007 EP56	2.9	6.5
(4179) Toutatis		1.2	2007 JG39	2	4.5
(7482) 1994 PC1	3.3	7.3	2007 JH39	2.6	5.9
(31669) 1999 JT6		1.4	2007 JJ39	3.1	6.8
(35396) 1997 XF11	2.3	5.1	2007 JK39	2.2	4.8
(37638) 1993 VB	1.7	3.9	2007 JL39	4.1	9.1
(85236) 1993 KH		1.1	2007 JG40	5.3	11.8
(85713) 1998 SS49		1.9	2007 KL	4.5	10
(89958) 2002 LY45		1.9	2007 KM	2.3	5.1
(89959) 2002 NT7	2.1	4.8	2007 KG1	3.3	7.4
(90416) 2003 YK118		1.5	2007 KM1	2.8	6.2
(99942) Apophis	3	6.7	2007 XS23	3.4	7.6
(137108) 1999 AN10	2	4.4	2008 AS69	2.8	6.3
(141495) 2002 EZ11		1.6	2008 DN1	3.5	7.9
(143487) 2003 CR20	1.1	2.5	2008 EX80	2.7	6
(143649) 2003 QQ47		1	2008 FR17	4.6	10.3
(143651) 2003 QO104		1.2	2008 FX24	2.1	4.8
(162173) 1999 JU3		2	2008 FY24	2.2	4.9
(163132) 2002 CU11		2.2	2008 FB25	3.4	7.7
(163243) 2002 FB3		1.2	2008 FH25	2.3	5.2
(164121) 2003 YT1		1.4	2008 FR27	2.7	6
(177049) 2003 EE16	3.4	7.6	2008 FS27	2.1	4.8
(216985) 2000 QK130		1.3	2008 FH50	2.3	5.2
267131 (2000 EK26)	1.3	2.9	2008 FL50	3.7	8.3
267337 (2001 VK5)	1.3	3	2008 FM55	2.6	5.8
292220 (2006 SU49)		1.6	2008 FA56	3.6	8.1
1997 XR2	41.5	92.9	2008 FX58	1.8	3.9
1998 SC15	5	11.3	2008 FA59	4	8.9
1999 XS35		1.5	2008 GU2	3.4	7.6
2000 EK26		2.2	2008 GB13	3.3	7.3
2000 QK130		2	2008 GG13	4.9	11
2001 VK5	3.6	7.9	2008 GC20	3	6.7
2001 XU		1.3	2008 JW30	2.4	5.5
2002 EY2		2	2008 KQ5	3.9	8.7
2002 EM7	5.7	12.6	2008 MH2	1.7	3.8
2002 NY40		1.4	2008 MN2	3.3	7.4
2003 DZ15		1.2	2008 MR2	2	4.6
2003 QC10		1.9	2008 MS2	2.6	5.8
2004 FH	1.5	3.4	2008 MA3	4.9	11
2004 HE	2	4.6	2008 MK3	4.2	9.3
2004 RQ252		1	2008 QR5	4.2	9.3
2005 VL1	2.2	4.9	2008 RJ69	2.4	5.3
2006 QV89	1.6	3.5	2008 RD70	3.5	7.9
2006 SU49	6.5	14.4	2008 RE70		2.2
2007 CA19	1.5	3.3	2008 RZ92	2	4.5
2007 JY2		1.2	2009 JG2	1.7	3.8
2007 LQ19	2.9	6.5	2009 KK		1.5
2007 PV27	2.5	5.6	(2010 GA6)		1.1
2007 TH72		1.5	(2010 GE35)	93	207.9
2008 KO	1.1	2.6	(2011 SM68)	1.3	2.9
2006 YO14	2.9	6.4			
2007 CR13	5.2	11.6			
2007 DS4	2.3	5.2			

I due valori si riferiscono al massimo diametro in " che l'asteroide può raggiungere in base ad un albedo pari a 0.05 o 0.025

# COMETE AL PERIELIO - COMETS AT PERIHELIMUM

Comet	T	q	P	N	H1	K1	Peak mag
P/Spacewatch (2005 JN)	Jan 6.1	2.29	6.56	1	14.0	10.0	19
131P/Mueller	Jan 7.4	2.42	7.07	3	13.0	10.0	17
P/Gibbs (2011 C2)	Jan 9.5	5.39	20.0	0	9.0	10.0	19
P/Levy (2006 T1)	Jan 12.3	1.01	5.28	1	10.5	10.0	7
78P/Gehrels	Jan 12.9	2.01	7.23	5	7.1	10.0	11
P/McNaught (2005 J1)	Jan 15.8	1.54	6.75	1	16.5	10.0	20
244P/Scotti	Jan 20.3	3.92	10.8	2	9.0	10.0	17
P/Spacewatch-Boattini (2011 JB15)	Jan 28.6	5.01	20.1	0	9.0	10.0	19
5D/Brorsen	Feb 5.3	0.53	5.61	5			
D/Brooks (1886 K1)	Feb 6.3	1.89	6.69	1			
Gibbs (2010 M1)	Feb 7.8	2.30			9.0	10.0	15
21P/Giacobini-Zinner	Feb 11.8	1.03	6.60	14	7.8	17.7	11
198P/ODAS	Feb 15.8	2.00	6.82	2	10.5	15.0	16
105P/Singer Brewster	Feb 26.2	2.05	6.47	4	12.5	15.0	18
3D/Biela-A	Feb 27.0	0.80	6.59	6			
182P/LONEOS	Mar 5.4	1.01	5.10	2	18.0	10.0	17
242P/Spahr	Apr 3.5	3.98	13.0	2	8.0	10.0	17
58P/Jackson-Neujmin	Apr 10.0	1.37	8.22	6	11.0	15.0	18
163P/NEAT	Apr 12.8	2.06	7.30	3	14.5	10.0	19
LONEOS (2006 S3)	Apr 16.5	5.13			2.0	10.0	12
D/Denning (1894 F1)	Apr 16.8	1.36	8.11	1			
171P/Spahr	Apr 30.6	1.76	6.70	2	10.2	15.0	16
60P/Tsuchinshan	May 13.5	1.62	6.56	7	10.5	15.0	15
LINEAR (2010 R1)	May 18.9	5.62			6.0	10.0	17
P/Gibbs (2006 Y2)	May 20.8	1.26	5.35	1	18.0	10.0	20
(2011 N1)	May 30.0	2.88	16.0	0	11.5	10.0	18
P/LINEAR (2003 O2)	Jun 10.7	1.50	8.75	1	14.5	10.0	18
138P/Shoemaker-Levy	Jun 11.7	1.70	6.90	3	15.0	10.0	19
152P/Helin-Lawrence	Jul 9.2	3.12	9.54	2	10.0	10.0	18
96P/Machholz	Jul 14.8	0.12	5.28	5	13.0	12.0	2
189P/NEAT	Jul 20.4	1.18	4.99	2	19.0	10.0	16
185P/Petriew	Aug 13.5	0.93	5.46	2	11.0	10.0	11
P/LONEOS (2006 Q2)	Aug 22.0	1.34	5.96	1	19.5	10.0	19
P/McNaught (2005 K3)	Sep 12.7	1.50	7.02	1	13.5	10.0	14
160P/LINEAR	Sep 18.5	2.07	7.90	2	15.0	5.0	17
158P/Kowal-LINEAR	Sep 27.5	4.58	10.3	2	9.0	10.0	18
P/Larson (2005 N3)	Sep 29.4	2.19	6.78	1	14.0	10.0	18
168P/Hergenrother	Oct 1.7	1.41	6.89	2	15.5	10.0	15
P/Christensen (2005 T2)	Oct 7.1	2.21	7.47	1	14.5	10.0	19
3D/Biela-B	Oct 9.9	0.83	6.74	6			
P/McNaught-Russell (1994 X1)	Dec 4.5	1.28	18.3	1	10.0	10.0	11
P/Spacewatch (2006 F4)	Dec 14.1	2.34	6.63	1	15.0	10.0	21
P/LONEOS (1999 RO28)	Dec 17.6	1.22	6.58	1	18.0	5.0	19
P/Hermann (1999 D1)	Dec 18.4	1.64	13.8	1	15.0	10.0	18

T = epoca del perielio  
q = perielio  
P = periodo  
N = numero di passaggi dall'anno della scoperta  
H,K = parametri per il calcolo della luminosità  
Peak = massima magnitudine prevista

T = epoch of perihelium  
q = perihelium  
P = period  
N = number of return since discovery  
H,K = parameters of brightness  
Peak = max magnitude

# COMETE CON $m < 9$ - COMETS WITH $m < 9$

P/2006 T1 (Levy)      yyyy mm dd.dddd      q      e      per.      nodo      i      G      H  
 2012 01 12.2880    1.007426      0.667921 179.6217    279.7393    18.2632 10.5    10.0

Date	Time	AR	Dec	R	D	Elong.	[mag]
		[h m s]	[° ' ]	[AU]	[AU]	[ ° ]	
2012:01:01	00.00	00:15:14	+21°52'	0.991	0.087	92.4° E	5.2
2012:01:02	00.00	00:25:53	+18°46'	0.990	0.082	92.5° E	5.0
2012:01:03	00.00	00:37:34	+15°12'	0.990	0.077	92.6° E	4.9
2012:01:04	00.00	00:50:20	+11°08'	0.990	0.072	92.9° E	4.8
2012:01:05	00.00	01:04:17	+06°31'	0.990	0.068	93.3° E	4.6
2012:01:06	00.00	01:19:29	+01°22'	0.990	0.065	93.8° E	4.5
2012:01:07	00.00	01:35:56	-04°13'	0.990	0.063	94.5° E	4.5
2012:01:08	00.00	01:53:39	-10°06'	0.991	0.062	95.2° E	4.4
2012:01:09	00.00	02:12:33	-16°05'	0.992	0.061	96.0° E	4.4
2012:01:10	00.00	02:32:28	-21°54'	0.993	0.062	96.8° E	4.4
2012:01:11	00.00	02:53:11	-27°20'	0.994	0.064	97.5° E	4.5
2012:01:12	00.00	03:14:26	-32°13'	0.995	0.067	98.3° E	4.6
2012:01:13	00.00	03:35:51	-36°26'	0.997	0.070	99.0° E	4.7
2012:01:14	00.00	03:57:04	-39°59'	0.999	0.074	99.6° E	4.9
2012:01:15	00.00	04:17:47	-42°54'	1.001	0.079	100.2° E	5.0
2012:01:16	00.00	04:37:40	-45°16'	1.003	0.084	100.7° E	5.1
2012:01:17	00.00	04:56:31	-47°08'	1.005	0.090	101.2° E	5.3
2012:01:18	00.00	05:14:11	-48°35'	1.008	0.096	101.7° E	5.4
2012:01:19	00.00	05:30:36	-49°43'	1.011	0.102	102.2° E	5.6
2012:01:20	00.00	05:45:45	-50°35'	1.013	0.109	102.7° E	5.7
2012:01:21	00.00	05:59:39	-51°14'	1.017	0.116	103.2° E	5.9
2012:01:22	00.00	06:12:23	-51°42'	1.020	0.122	103.6° E	6.0
2012:01:23	00.00	06:24:01	-52°03'	1.023	0.129	104.1° E	6.2
2012:01:24	00.00	06:34:39	-52°17'	1.027	0.136	104.6° E	6.3
2012:01:25	00.00	06:44:21	-52°25'	1.031	0.143	105.0° E	6.4
2012:01:26	00.00	06:53:14	-52°30'	1.035	0.150	105.5° E	6.5
2012:01:27	00.00	07:01:21	-52°31'	1.039	0.157	106.0° E	6.7
2012:01:28	00.00	07:08:49	-52°29'	1.043	0.165	106.4° E	6.8
2012:01:29	00.00	07:15:40	-52°25'	1.048	0.172	106.9° E	6.9
2012:01:30	00.00	07:21:59	-52°19'	1.052	0.179	107.4° E	7.0
2012:01:31	00.00	07:27:49	-52°12'	1.057	0.186	107.8° E	7.1
2012:02:01	00.00	07:33:13	-52°03'	1.062	0.194	108.3° E	7.2
2012:02:02	00.00	07:38:14	-51°53'	1.067	0.201	108.8° E	7.3
2012:02:03	00.00	07:42:54	-51°42'	1.072	0.208	109.3° E	7.4
2012:02:04	00.00	07:47:15	-51°30'	1.078	0.216	109.8° E	7.5
2012:02:05	00.00	07:51:19	-51°18'	1.083	0.223	110.3° E	7.6
2012:02:06	00.00	07:55:08	-51°05'	1.089	0.230	110.7° E	7.7
2012:02:07	00.00	07:58:43	-50°51'	1.095	0.237	111.2° E	7.8
2012:02:08	00.00	08:02:05	-50°37'	1.101	0.245	111.7° E	7.9
2012:02:09	00.00	08:05:17	-50°22'	1.107	0.252	112.2° E	7.9
2012:02:10	00.00	08:08:18	-50°07'	1.113	0.259	112.7° E	8.0
2012:02:11	00.00	08:11:10	-49°51'	1.119	0.267	113.2° E	8.1
2012:02:12	00.00	08:13:54	-49°35'	1.125	0.274	113.7° E	8.2
2012:02:13	00.00	08:16:30	-49°18'	1.132	0.281	114.2° E	8.3
2012:02:14	00.00	08:18:59	-49°01'	1.138	0.289	114.7° E	8.4
2012:02:15	00.00	08:21:22	-48°44'	1.145	0.296	115.1° E	8.4
2012:02:16	00.00	08:23:39	-48°26'	1.152	0.303	115.6° E	8.5
2012:02:17	00.00	08:25:51	-48°08'	1.159	0.311	116.1° E	8.6
2012:02:18	00.00	08:27:58	-47°50'	1.166	0.318	116.6° E	8.7
2012:02:19	00.00	08:30:01	-47°32'	1.173	0.326	117.1° E	8.8
2012:02:20	00.00	08:32:00	-47°13'	1.180	0.333	117.5° E	8.8
2012:02:21	00.00	08:33:55	-46°53'	1.187	0.340	118.0° E	8.9
2012:02:22	00.00	08:35:48	-46°34'	1.195	0.348	118.5° E	9.0

Date = data nel formato gg/mm/aaaa  
 A.R. e DEC. = coordinate per Roma (42°N, 12°E)  
 R = distanza dal Sole in U.A.  
 D = distanza dalla Terra in U.A.  
 Elong. = elongazione dal Sole in °  
 Mag = magnitudine

Date	Object			Morning twilight				-18°	Evening twilight			
	Rise	Transit	Set	Time	Alt	Az	Elong		Time	Alt	Az	Elong
2012:01:01	10:26	17:50	01:13	05:57	-26.9	2.8	92.4	18:29	66.1	203.3	92.5	
2012:01:02	10:47	17:58	01:06	05:57	-30.2	1.0	92.5	18:30	63.3	197.5	92.6	
2012:01:03	11:11	18:06	00:59	05:58	-33.9	358.8	92.7	18:31	59.7	192.0	92.8	
2012:01:04	11:37	18:16	00:52	05:58	-38.0	355.9	93.0	18:32	55.6	186.9	93.2	
2012:01:05	12:07	18:27	00:45	05:58	-42.5	352.1	93.4	18:33	50.7	182.2	93.7	
2012:01:06	12:39	18:39	00:38	05:58	-47.4	347.1	94.0	18:33	45.2	177.9	94.3	
2012:01:07	13:13	18:53	00:30	05:58	-52.3	340.4	94.6	18:34	39.2	174.1	95.0	
2012:01:08	13:51	19:08	00:22	05:58	-56.8	331.5	95.4	18:35	32.9	170.7	95.8	
2012:01:09	14:32	19:24	00:15	05:58	-60.6	320.1	96.2	18:36	26.5	167.6	96.6	
2012:01:10	15:15	19:41	00:06	05:58	-63.1	306.5	96.9	18:37	20.4	164.9	97.4	
2012:01:11	15:59	19:58	23:48	05:58	-64.0	291.9	97.7	18:38	14.7	162.5	98.1	
2012:01:12	16:45	20:16	23:38	05:57	-63.5	278.3	98.4	18:39	9.5	160.4	98.8	
2012:01:13	17:32	20:33	23:27	05:57	-61.8	267.0	99.1	18:40	5.0	158.6	99.4	
2012:01:14	18:20	20:50	23:15	05:57	-59.7	258.2	99.7	18:41	1.0	156.9	100.0	
2012:01:15	19:08	21:07	23:00	05:57	-57.4	251.6	100.3	18:42	-2.4	155.4	100.6	
2012:01:16	19:58	21:22	22:42	05:57	-55.0	246.6	100.9	18:43	-5.3	154.1	101.1	
2012:01:17	20:58	21:36	22:10	05:56	-52.9	242.8	101.4	18:44	-7.7	153.0	101.6	
2012:01:18	--:--	21:48	--:--	05:56	-50.9	239.9	101.9	18:45	-9.7	151.9	102.1	
2012:01:19	--:--	22:00	--:--	05:55	-49.1	237.6	102.3	18:46	-11.4	151.0	102.6	
2012:01:20	--:--	22:10	--:--	05:55	-47.5	235.9	102.8	18:47	-12.8	150.2	103.1	
2012:01:21	--:--	22:19	--:--	05:55	-46.1	234.5	103.3	18:48	-14.0	149.5	103.5	
2012:01:22	--:--	22:27	--:--	05:54	-44.9	233.4	103.8	18:49	-14.9	148.9	104.0	
2012:01:23	--:--	22:34	--:--	05:54	-43.8	232.5	104.2	18:50	-15.7	148.3	104.5	
2012:01:24	--:--	22:39	--:--	05:53	-42.8	231.8	104.7	18:51	-16.3	147.8	104.9	
2012:01:25	--:--	22:44	--:--	05:52	-42.0	231.3	105.1	18:52	-16.8	147.4	105.4	
2012:01:26	--:--	22:49	--:--	05:52	-41.2	230.9	105.6	18:53	-17.1	147.0	105.9	
2012:01:27	--:--	22:52	--:--	05:51	-40.5	230.5	106.1	18:54	-17.4	146.7	106.3	
2012:01:28	--:--	22:55	--:--	05:50	-39.9	230.3	106.5	18:55	-17.5	146.4	106.8	
2012:01:29	--:--	22:57	--:--	05:50	-39.4	230.2	107.0	18:56	-17.6	146.2	107.3	
2012:01:30	--:--	22:59	--:--	05:49	-38.9	230.1	107.5	18:57	-17.6	146.0	107.7	
2012:01:31	--:--	23:01	--:--	05:48	-38.5	230.1	108.0	18:59	-17.6	145.9	108.2	
2012:02:01	--:--	23:02	--:--	05:47	-38.2	230.1	108.4	19:00	-17.4	145.7	108.7	
2012:02:02	--:--	23:03	--:--	05:47	-37.8	230.1	108.9	19:01	-17.3	145.7	109.2	
2012:02:03	--:--	23:03	--:--	05:46	-37.5	230.2	109.4	19:02	-17.1	145.6	109.7	
2012:02:04	--:--	23:03	--:--	05:45	-37.3	230.4	109.9	19:03	-16.8	145.6	110.2	
2012:02:05	--:--	23:03	--:--	05:44	-37.1	230.6	110.4	19:04	-16.5	145.6	110.6	
2012:02:06	--:--	23:03	--:--	05:43	-36.9	230.7	110.9	19:05	-16.2	145.6	111.1	
2012:02:07	--:--	23:02	--:--	05:42	-36.7	231.0	111.3	19:06	-15.9	145.6	111.6	
2012:02:08	--:--	23:01	--:--	05:41	-36.5	231.2	111.8	19:07	-15.5	145.7	112.1	
2012:02:09	--:--	23:01	--:--	05:40	-36.4	231.5	112.3	19:09	-15.1	145.8	112.6	
2012:02:10	--:--	22:59	--:--	05:39	-36.3	231.7	112.8	19:10	-14.6	145.9	113.1	
2012:02:11	--:--	22:58	--:--	05:38	-36.2	232.0	113.3	19:11	-14.2	146.0	113.6	
2012:02:12	--:--	22:57	--:--	05:36	-36.1	232.4	113.8	19:12	-13.7	146.1	114.1	
2012:02:13	--:--	22:55	--:--	05:35	-36.0	232.7	114.3	19:13	-13.3	146.3	114.6	
2012:02:14	--:--	22:54	--:--	05:34	-35.9	233.0	114.8	19:14	-12.8	146.4	115.0	
2012:02:15	22:20	22:52	23:25	05:33	-35.8	233.4	115.3	19:15	-12.2	146.6	115.5	
2012:02:16	22:06	22:51	23:36	05:32	-35.8	233.7	115.7	19:17	-11.7	146.8	116.0	
2012:02:17	21:53	22:49	23:45	05:30	-35.7	234.1	116.2	19:18	-11.2	147.0	116.5	
2012:02:18	21:42	22:47	23:53	05:29	-35.7	234.5	116.7	19:19	-10.6	147.2	117.0	
2012:02:19	21:32	22:45	23:59	05:28	-35.6	234.9	117.2	19:20	-10.0	147.5	117.4	
2012:02:20	21:23	22:43	--:--	05:26	-35.6	235.3	117.6	19:21	-9.5	147.7	117.9	
2012:02:21	21:14	22:41	00:04	05:25	-35.5	235.7	118.1	19:22	-8.9	148.0	118.4	
2012:02:22	21:05	22:39	00:09	05:24	-35.5	236.2	118.6	19:24	-8.3	148.3	118.8	

Tempi di levata e tramonto in T.U.+1, calcolati per Roma (42°N, 12°E), aggiungere un'ora quando si adotta l'ora legale

Times of rising and setting of the comet for Rome (42°N, 12°E), in U.T.+1

Date	Time	AR	Dec	R	D	Elong.	[mag]
		[h m s]	[° ' ]	[AU]	[AU]	[ ° ]	
2012:01:01	00.00	17:33:47	+26°28'	1.559	1.953	52.3° W	7.4
2012:01:02	00.00	17:33:45	+26°46'	1.560	1.943	52.9° W	7.4
2012:01:03	00.00	17:33:42	+27°04'	1.561	1.932	53.4° W	7.4
2012:01:04	00.00	17:33:38	+27°24'	1.562	1.922	54.0° W	7.4
2012:01:05	00.00	17:33:34	+27°43'	1.563	1.911	54.6° W	7.3
2012:01:06	00.00	17:33:29	+28°04'	1.565	1.900	55.3° W	7.3
2012:01:07	00.00	17:33:23	+28°24'	1.566	1.889	55.9° W	7.3
2012:01:08	00.00	17:33:16	+28°46'	1.568	1.878	56.6° W	7.3
2012:01:09	00.00	17:33:09	+29°08'	1.570	1.866	57.2° W	7.3
2012:01:10	00.00	17:33:00	+29°30'	1.571	1.854	57.9° W	7.3
2012:01:11	00.00	17:32:51	+29°53'	1.573	1.842	58.6° W	7.3
2012:01:12	00.00	17:32:40	+30°17'	1.575	1.830	59.4° W	7.3
2012:01:13	00.00	17:32:29	+30°41'	1.578	1.818	60.1° W	7.3
2012:01:14	00.00	17:32:16	+31°06'	1.580	1.805	60.8° W	7.3
2012:01:15	00.00	17:32:01	+31°32'	1.582	1.793	61.6° W	7.3
2012:01:16	00.00	17:31:45	+31°58'	1.585	1.780	62.4° W	7.3
2012:01:17	00.00	17:31:28	+32°26'	1.588	1.767	63.1° W	7.2
2012:01:18	00.00	17:31:09	+32°53'	1.590	1.754	63.9° W	7.2
2012:01:19	00.00	17:30:49	+33°22'	1.593	1.741	64.7° W	7.2
2012:01:20	00.00	17:30:26	+33°51'	1.596	1.728	65.6° W	7.2
2012:01:21	00.00	17:30:02	+34°21'	1.599	1.715	66.4° W	7.2
2012:01:22	00.00	17:29:35	+34°52'	1.603	1.701	67.2° W	7.2
2012:01:23	00.00	17:29:07	+35°24'	1.606	1.688	68.1° W	7.2
2012:01:24	00.00	17:28:36	+35°56'	1.609	1.675	69.0° W	7.2
2012:01:25	00.00	17:28:02	+36°30'	1.613	1.661	69.8° W	7.2
2012:01:26	00.00	17:27:26	+37°04'	1.616	1.647	70.7° W	7.2
2012:01:27	00.00	17:26:47	+37°39'	1.620	1.634	71.6° W	7.2
2012:01:28	00.00	17:26:05	+38°15'	1.624	1.620	72.5° W	7.2
2012:01:29	00.00	17:25:19	+38°52'	1.628	1.607	73.5° W	7.1
2012:01:30	00.00	17:24:30	+39°30'	1.632	1.593	74.4° W	7.1
2012:01:31	00.00	17:23:37	+40°08'	1.636	1.580	75.3° W	7.1
2012:02:01	00.00	17:22:41	+40°48'	1.640	1.566	76.3° W	7.1
2012:02:02	00.00	17:21:40	+41°29'	1.645	1.553	77.2° W	7.1
2012:02:03	00.00	17:20:34	+42°11'	1.649	1.540	78.2° W	7.1
2012:02:04	00.00	17:19:23	+42°53'	1.654	1.526	79.2° W	7.1
2012:02:05	00.00	17:18:07	+43°37'	1.658	1.513	80.1° W	7.1
2012:02:06	00.00	17:16:45	+44°22'	1.663	1.500	81.1° W	7.1
2012:02:07	00.00	17:15:17	+45°07'	1.668	1.488	82.1° W	7.1
2012:02:08	00.00	17:13:43	+45°54'	1.673	1.475	83.1° W	7.1
2012:02:09	00.00	17:12:01	+46°42'	1.678	1.463	84.1° W	7.1
2012:02:10	00.00	17:10:11	+47°30'	1.683	1.450	85.1° W	7.1
2012:02:11	00.00	17:08:13	+48°20'	1.688	1.438	86.1° W	7.1
2012:02:12	00.00	17:06:05	+49°11'	1.693	1.427	87.1° W	7.1
2012:02:13	00.00	17:03:48	+50°02'	1.699	1.415	88.1° W	7.1
2012:02:14	00.00	17:01:20	+50°54'	1.704	1.404	89.1° W	7.1
2012:02:15	00.00	16:58:40	+51°48'	1.710	1.393	90.2° W	7.0
2012:02:16	00.00	16:55:47	+52°42'	1.715	1.383	91.2° W	7.0
2012:02:17	00.00	16:52:40	+53°37'	1.721	1.372	92.2° W	7.0
2012:02:18	00.00	16:49:19	+54°32'	1.727	1.363	93.2° W	7.0
2012:02:19	00.00	16:45:40	+55°28'	1.733	1.353	94.2° W	7.0
2012:02:20	00.00	16:41:43	+56°25'	1.739	1.344	95.1° W	7.0
2012:02:21	00.00	16:37:27	+57°21'	1.745	1.336	96.1° W	7.0
2012:02:22	00.00	16:32:49	+58°18'	1.751	1.328	97.1° W	7.0
2012:02:23	00.00	16:27:46	+59°16'	1.757	1.320	98.0° W	7.1
2012:02:24	00.00	16:22:18	+60°13'	1.763	1.313	99.0° W	7.1
2012:02:25	00.00	16:16:21	+61°10'	1.770	1.307	99.9° W	7.1
2012:02:26	00.00	16:09:53	+62°06'	1.776	1.301	100.8° W	7.1
2012:02:27	00.00	16:02:52	+63°01'	1.782	1.295	101.7° W	7.1
2012:02:28	00.00	15:55:13	+63°56'	1.789	1.291	102.5° W	7.1
2012:02:29	00.00	15:46:54	+64°49'	1.795	1.286	103.3° W	7.1
2012:03:01	00.00	15:37:53	+65°41'	1.802	1.283	104.1° W	7.1
2012:03:02	00.00	15:28:05	+66°30'	1.809	1.280	104.9° W	7.1
2012:03:03	00.00	15:17:30	+67°17'	1.816	1.277	105.6° W	7.1
2012:03:04	00.00	15:06:05	+68°01'	1.823	1.276	106.3° W	7.1
2012:03:05	00.00	14:53:48	+68°42'	1.829	1.275	107.0° W	7.2
2012:03:06	00.00	14:40:41	+69°18'	1.836	1.275	107.6° W	7.2
2012:03:07	00.00	14:26:44	+69°51'	1.843	1.275	108.1° W	7.2
2012:03:08	00.00	14:12:01	+70°18'	1.851	1.276	108.7° W	7.2
2012:03:09	00.00	13:56:38	+70°41'	1.858	1.278	109.1° W	7.2
2012:03:10	00.00	13:40:43	+70°58'	1.865	1.281	109.5° W	7.2
2012:03:11	00.00	13:24:24	+71°09'	1.872	1.284	109.9° W	7.3
2012:03:12	00.00	13:07:54	+71°14'	1.880	1.288	110.2° W	7.3
2012:03:13	00.00	12:51:23	+71°13'	1.887	1.293	110.5° W	7.3
2012:03:14	00.00	12:35:04	+71°06'	1.894	1.298	110.7° W	7.3

Date	Time	AR	Dec	R	D	Elong.	[mag]
		[h m s]	[° ' ]	[AU]	[AU]	[ ° ]	
2012:03:15	00.00	12:19:07	+70°53'	1.902	1.305	110.9° W	7.4
2012:03:16	00.00	12:03:43	+70°35'	1.909	1.312	111.0° W	7.4
2012:03:17	00.00	11:48:59	+70°12'	1.917	1.319	111.1° W	7.4
2012:03:18	00.00	11:35:01	+69°44'	1.925	1.328	111.1° E	7.5
2012:03:19	00.00	11:21:53	+69°13'	1.932	1.337	111.1° E	7.5
2012:03:20	00.00	11:09:35	+68°37'	1.940	1.346	111.0° E	7.5
2012:03:21	00.00	10:58:09	+67°58'	1.948	1.357	110.8° E	7.6
2012:03:22	00.00	10:47:34	+67°17'	1.956	1.368	110.6° E	7.6
2012:03:23	00.00	10:37:47	+66°33'	1.964	1.380	110.4° E	7.6
2012:03:24	00.00	10:28:46	+65°47'	1.972	1.392	110.1° E	7.7
2012:03:25	00.00	10:20:29	+65°00'	1.979	1.405	109.8° E	7.7
2012:03:26	00.00	10:12:52	+64°12'	1.988	1.419	109.5° E	7.7
2012:03:27	00.00	10:05:52	+63°23'	1.996	1.433	109.1° E	7.8
2012:03:28	00.00	09:59:27	+62°33'	2.004	1.447	108.6° E	7.8
2012:03:29	00.00	09:53:34	+61°43'	2.012	1.463	108.2° E	7.9
2012:03:30	00.00	09:48:09	+60°52'	2.020	1.479	107.7° E	7.9
2012:03:31	00.00	09:43:11	+60°02'	2.028	1.495	107.1° E	7.9
2012:04:01	00.00	09:38:37	+59°11'	2.036	1.512	106.6° E	8.0
2012:04:02	00.00	09:34:25	+58°21'	2.045	1.529	106.0° E	8.0
2012:04:03	00.00	09:30:34	+57°31'	2.053	1.547	105.4° E	8.1
2012:04:04	00.00	09:27:01	+56°41'	2.061	1.565	104.8° E	8.1
2012:04:05	00.00	09:23:46	+55°52'	2.070	1.584	104.1° E	8.2
2012:04:06	00.00	09:20:45	+55°04'	2.078	1.603	103.5° E	8.2
2012:04:07	00.00	09:18:00	+54°16'	2.087	1.623	102.8° E	8.2
2012:04:08	00.00	09:15:27	+53°29'	2.095	1.643	102.1° E	8.3
2012:04:09	00.00	09:13:06	+52°42'	2.104	1.663	101.4° E	8.3
2012:04:10	00.00	09:10:57	+51°56'	2.112	1.684	100.6° E	8.4
2012:04:11	00.00	09:08:58	+51°11'	2.121	1.705	99.9° E	8.4
2012:04:12	00.00	09:07:09	+50°27'	2.130	1.726	99.1° E	8.5
2012:04:13	00.00	09:05:28	+49°43'	2.138	1.748	98.4° E	8.5
2012:04:14	00.00	09:03:55	+49°01'	2.147	1.770	97.6° E	8.6
2012:04:15	00.00	09:02:30	+48°19'	2.156	1.792	96.8° E	8.6
2012:04:16	00.00	09:01:12	+47°37'	2.164	1.815	96.1° E	8.6
2012:04:17	00.00	09:00:01	+46°57'	2.173	1.838	95.3° E	8.7
2012:04:18	00.00	08:58:55	+46°17'	2.182	1.861	94.5° E	8.7
2012:04:19	00.00	08:57:56	+45°39'	2.191	1.884	93.7° E	8.8
2012:04:20	00.00	08:57:02	+45°00'	2.200	1.907	92.9° E	8.8
2012:04:21	00.00	08:56:12	+44°23'	2.209	1.931	92.1° E	8.9
2012:04:22	00.00	08:55:27	+43°46'	2.218	1.955	91.2° E	8.9
2012:04:23	00.00	08:54:47	+43°10'	2.226	1.979	90.4° E	9.0
2012:04:24	00.00	08:54:11	+42°35'	2.235	2.003	89.6° E	9.0
2012:04:25	00.00	08:53:38	+42°01'	2.244	2.028	88.8° E	9.0

Date = data nel formato gg/mm/aaaa  
A.R. e DEC. = coordinate per Roma (42°N, 12°E)  
R = distanza dal Sole in U.A.  
D = distanza dalla Terra in U.A.  
Elong. = elongazione dal Sole in °  
Mag = magnitudine

Date	Object			Morning twilight				Evening twilight			
	Rise	Transit	Set	Time	Alt	Az	Elong	Time	Alt	Az	Elon
2012:01:01	03:13	11:02	18:52	05:57	27.1	77.6	52.4	18:29	2.8	304.1	52.7
2012:01:02	03:08	10:58	18:49	05:57	28.0	77.9	53.0	18:30	2.3	305.1	53.3
2012:01:03	03:02	10:54	18:47	05:58	29.0	78.2	53.6	18:31	1.8	306.1	53.9
2012:01:04	02:56	10:50	18:45	05:58	29.9	78.5	54.2	18:32	1.3	307.1	54.5
2012:01:05	02:51	10:46	18:42	05:58	30.8	78.8	54.8	18:33	0.9	308.1	55.1
2012:01:06	02:45	10:42	18:40	05:58	31.8	79.1	55.4	18:33	0.4	309.1	55.8
2012:01:07	02:39	10:38	18:38	05:58	32.7	79.3	56.1	18:34	-0.0	310.2	56.4
2012:01:08	02:33	10:34	18:36	05:58	33.6	79.5	56.7	18:35	-0.4	311.2	57.1
2012:01:09	02:27	10:30	18:34	05:58	34.6	79.7	57.4	18:36	-0.8	312.3	57.8
2012:01:10	02:21	10:26	18:32	05:58	35.5	79.9	58.1	18:37	-1.2	313.4	58.5
2012:01:11	02:14	10:22	18:30	05:58	36.5	80.1	58.8	18:38	-1.6	314.5	59.2
2012:01:12	02:08	10:17	18:28	05:57	37.4	80.2	59.5	18:39	-1.9	315.6	59.9
2012:01:13	02:02	10:13	18:27	05:57	38.3	80.4	60.3	18:40	-2.3	316.7	60.7
2012:01:14	01:55	10:09	18:25	05:57	39.3	80.5	61.0	18:41	-2.6	317.9	61.4
2012:01:15	01:48	10:05	18:24	05:57	40.2	80.5	61.8	18:42	-2.9	319.0	62.2
2012:01:16	01:41	10:01	18:22	05:57	41.2	80.6	62.6	18:43	-3.1	320.2	63.0
2012:01:17	01:34	09:57	18:21	05:56	42.1	80.6	63.3	18:44	-3.4	321.4	63.8
2012:01:18	01:27	09:52	18:19	05:56	43.0	80.6	64.1	18:45	-3.6	322.6	64.6
2012:01:19	01:20	09:48	18:18	05:55	44.0	80.5	65.0	18:46	-3.8	323.8	65.4
2012:01:20	01:12	09:44	18:17	05:55	44.9	80.5	65.8	18:47	-3.9	325.0	66.2
2012:01:21	01:05	09:39	18:17	05:55	45.9	80.4	66.6	18:48	-4.0	326.2	67.1
2012:01:22	00:57	09:35	18:16	05:54	46.8	80.2	67.5	18:49	-4.1	327.4	67.9
2012:01:23	00:49	09:31	18:15	05:54	47.8	80.0	68.3	18:50	-4.2	328.7	68.8
2012:01:24	00:40	09:26	18:15	05:53	48.7	79.8	69.2	18:51	-4.3	329.9	69.7
2012:01:25	00:32	09:22	18:15	05:52	49.7	79.5	70.1	18:52	-4.3	331.2	70.5
2012:01:26	00:23	09:17	18:15	05:52	50.6	79.2	70.9	18:53	-4.2	332.5	71.4
2012:01:27	00:14	09:12	18:15	05:51	51.6	78.8	71.8	18:54	-4.2	333.8	72.3
2012:01:28	00:04	09:08	18:16	05:50	52.5	78.4	72.8	18:55	-4.1	335.0	73.3
2012:01:29	23:43	09:03	18:17	05:50	53.5	77.9	73.7	18:56	-4.0	336.3	74.2
2012:01:30	23:33	08:58	18:18	05:49	54.4	77.3	74.6	18:57	-3.8	337.6	75.1
2012:01:31	23:21	08:53	18:19	05:48	55.4	76.7	75.5	18:59	-3.6	338.9	76.1
2012:02:01	23:09	08:49	18:22	05:47	56.3	76.0	76.5	19:00	-3.3	340.2	77.0
2012:02:02	22:56	08:44	18:24	05:47	57.2	75.2	77.4	19:01	-3.1	341.6	78.0
2012:02:03	22:43	08:39	18:28	05:46	58.2	74.3	78.4	19:02	-2.7	342.9	78.9
2012:02:04	22:28	08:33	18:32	05:45	59.1	73.3	79.4	19:03	-2.4	344.2	79.9
2012:02:05	22:11	08:28	18:38	05:44	60.0	72.2	80.4	19:04	-2.0	345.5	80.9
2012:02:06	21:53	08:23	18:45	05:43	60.9	71.0	81.3	19:05	-1.5	346.8	81.9
2012:02:07	21:33	08:17	18:55	05:42	61.8	69.6	82.3	19:06	-1.1	348.1	82.9
2012:02:08	21:07	08:12	19:09	05:41	62.7	68.1	83.3	19:07	-0.5	349.4	83.9
2012:02:09	20:29	08:06	19:36	05:40	63.5	66.5	84.3	19:09	0.1	350.7	84.9
2012:02:10	--:--	08:00	--:--	05:39	64.3	64.7	85.3	19:10	0.7	352.0	85.9
2012:02:11	--:--	07:55	--:--	05:38	65.1	62.7	86.3	19:11	1.3	353.3	86.9
2012:02:12	--:--	07:48	--:--	05:36	65.9	60.5	87.4	19:12	2.0	354.6	87.9
2012:02:13	--:--	07:42	--:--	05:35	66.6	58.2	88.4	19:13	2.8	355.9	88.9
2012:02:14	--:--	07:36	--:--	05:34	67.2	55.6	89.4	19:14	3.6	357.2	90.0
2012:02:15	--:--	07:29	--:--	05:33	67.9	52.8	90.4	19:15	4.4	358.4	91.0
2012:02:16	--:--	07:22	--:--	05:32	68.4	49.8	91.4	19:17	5.3	359.7	92.0
2012:02:17	--:--	07:15	--:--	05:30	68.9	46.6	92.4	19:18	6.2	0.9	93.0
2012:02:18	--:--	07:08	--:--	05:29	69.3	43.2	93.4	19:19	7.2	2.2	94.0
2012:02:19	--:--	07:00	--:--	05:28	69.6	39.6	94.4	19:20	8.2	3.4	95.0
2012:02:20	--:--	06:52	--:--	05:26	69.8	35.8	95.4	19:21	9.3	4.6	95.9
2012:02:21	--:--	06:44	--:--	05:25	69.9	32.0	96.3	19:22	10.4	5.7	96.9
2012:02:22	--:--	06:35	--:--	05:24	69.9	28.0	97.3	19:24	11.6	6.9	97.9
2012:02:23	--:--	06:26	--:--	05:22	69.8	24.1	98.2	19:25	12.7	8.1	98.8
2012:02:24	--:--	06:17	--:--	05:21	69.6	20.1	99.2	19:26	14.0	9.2	99.7
2012:02:25	--:--	06:07	--:--	05:19	69.2	16.3	100.1	19:27	15.2	10.3	100.6
2012:02:26	--:--	05:56	--:--	05:18	68.8	12.5	101.0	19:28	16.6	11.4	101.5
2012:02:27	--:--	05:45	--:--	05:16	68.2	8.9	101.9	19:29	17.9	12.5	102.4
2012:02:28	--:--	05:34	--:--	05:15	67.6	5.4	102.7	19:30	19.3	13.5	103.2
2012:02:29	--:--	05:21	--:--	05:13	66.8	2.2	103.5	19:32	20.7	14.5	104.0
2012:03:01	--:--	05:08	--:--	05:12	66.0	359.1	104.3	19:33	22.1	15.5	104.8
2012:03:02	--:--	04:55	--:--	05:10	65.1	356.3	105.0	19:34	23.6	16.5	105.5
2012:03:03	--:--	04:40	--:--	05:09	64.1	353.7	105.8	19:35	25.1	17.5	106.2
2012:03:04	--:--	04:25	--:--	05:07	63.1	351.2	106.4	19:36	26.6	18.4	106.8
2012:03:05	--:--	04:09	--:--	05:05	62.0	349.0	107.1	19:38	28.2	19.3	107.5
2012:03:06	--:--	03:52	--:--	05:04	60.9	346.9	107.7	19:39	29.8	20.1	108.0
2012:03:07	--:--	03:34	--:--	05:02	59.7	345.0	108.2	19:40	31.4	21.0	108.6
2012:03:08	--:--	03:15	--:--	05:00	58.5	343.3	108.8	19:41	33.0	21.8	109.0
2012:03:09	--:--	02:56	--:--	04:59	57.2	341.7	109.2	19:42	34.6	22.6	109.5
2012:03:10	--:--	02:37	--:--	04:57	55.9	340.2	109.6	19:44	36.3	23.3	109.9
2012:03:11	--:--	02:17	--:--	04:55	54.6	338.9	110.0	19:45	37.9	24.0	110.2
2012:03:12	--:--	01:56	--:--	04:53	53.3	337.7	110.3	19:46	39.6	24.7	110.5
2012:03:13	--:--	01:36	--:--	04:52	52.0	336.5	110.6	19:47	41.3	25.3	110.7
2012:03:14	--:--	01:16	--:--	04:50	50.6	335.5	110.8	19:48	42.9	25.9	110.9
2012:03:15	--:--	00:57	--:--	04:48	49.3	334.6	110.9	19:50	44.6	26.4	111.0
2012:03:16	--:--	00:38	--:--	04:46	47.9	333.7	111.0	19:51	46.3	26.9	111.1
2012:03:17	--:--	00:19	--:--	04:44	46.6	332.9	111.1	19:52	48.0	27.3	111.1
2012:03:18	--:--	00:01	--:--	04:43	45.2	332.1	111.1	19:53	49.7	27.7	111.1

Date	Object			Morning twilight				Evening twilight			
	Rise	Transit	Set	Time	Alt	Az	Elong	Time	Alt	Az	Elong
2012:03:19	--:--	23:28	--:--	04:41	43.8	331.5	111.0	19:55	51.3	28.0	111.0
2012:03:20	--:--	23:13	--:--	04:39	42.5	330.8	110.9	19:56	53.0	28.3	110.9
2012:03:21	--:--	22:59	--:--	04:37	41.2	330.3	110.8	19:57	54.7	28.5	110.7
2012:03:22	--:--	22:45	--:--	04:35	39.8	329.7	110.6	19:58	56.3	28.6	110.5
2012:03:23	--:--	22:32	--:--	04:33	38.5	329.3	110.4	20:00	57.9	28.6	110.2
2012:03:24	--:--	22:20	--:--	04:31	37.2	328.8	110.1	20:01	59.5	28.5	109.9
2012:03:25	--:--	22:09	--:--	04:29	36.0	328.4	109.8	20:02	61.1	28.2	109.5
2012:03:26	--:--	21:58	--:--	04:28	34.7	328.0	109.4	20:04	62.7	27.9	109.1
2012:03:27	--:--	21:47	--:--	04:26	33.4	327.7	109.0	20:05	64.3	27.4	108.7
2012:03:28	--:--	21:37	--:--	04:24	32.2	327.3	108.6	20:06	65.8	26.7	108.2
2012:03:29	--:--	21:28	--:--	04:22	31.0	327.1	108.1	20:08	67.3	25.8	107.8
2012:03:30	--:--	21:19	--:--	04:20	29.8	326.8	107.6	20:09	68.8	24.7	107.2
2012:03:31	--:--	21:11	--:--	04:18	28.6	326.5	107.1	20:10	70.2	23.3	106.7
2012:04:01	--:--	21:03	--:--	04:16	27.5	326.3	106.5	20:12	71.6	21.5	106.1
2012:04:02	--:--	20:55	--:--	04:14	26.3	326.1	105.9	20:13	72.9	19.4	105.5
2012:04:03	--:--	20:47	--:--	04:12	25.2	325.9	105.3	20:14	74.1	16.8	104.9
2012:04:04	--:--	20:40	--:--	04:10	24.1	325.8	104.7	20:16	75.3	13.6	104.2
2012:04:05	--:--	20:33	--:--	04:08	23.0	325.6	104.0	20:17	76.4	9.9	103.6
2012:04:06	--:--	20:26	--:--	04:06	22.0	325.5	103.3	20:19	77.4	5.3	102.9
2012:04:07	--:--	20:20	--:--	04:04	20.9	325.3	102.7	20:20	78.3	0.0	102.2
2012:04:08	--:--	20:14	--:--	04:02	19.9	325.2	102.0	20:21	79.0	353.9	101.5
2012:04:09	--:--	20:08	--:--	04:00	18.9	325.1	101.2	20:23	79.5	347.0	100.7
2012:04:10	--:--	20:02	--:--	03:58	17.9	325.0	100.5	20:24	79.8	339.5	100.0
2012:04:11	--:--	19:56	--:--	03:56	17.0	325.0	99.8	20:26	79.9	331.8	99.3
2012:04:12	--:--	19:50	--:--	03:54	16.0	324.9	99.0	20:27	79.8	324.2	98.5
2012:04:13	--:--	19:45	--:--	03:52	15.1	324.9	98.3	20:29	79.4	317.0	97.7
2012:04:14	--:--	19:39	--:--	03:50	14.2	324.8	97.5	20:30	78.9	310.4	97.0
2012:04:15	--:--	19:34	--:--	03:48	13.3	324.8	96.7	20:32	78.2	304.7	96.2
2012:04:16	07:54	19:29	07:11	03:46	12.4	324.8	95.9	20:33	77.4	299.7	95.4
2012:04:17	08:21	19:24	06:34	03:44	11.6	324.8	95.1	20:35	76.5	295.5	94.6
2012:04:18	08:34	19:19	06:11	03:42	10.7	324.8	94.3	20:36	75.6	292.0	93.8
2012:04:19	08:43	19:14	05:52	03:40	9.9	324.8	93.5	20:38	74.5	289.1	93.0
2012:04:20	08:50	19:09	05:35	03:38	9.1	324.8	92.7	20:39	73.4	286.6	92.2
2012:04:21	08:55	19:05	05:20	03:36	8.3	324.8	91.9	20:41	72.3	284.5	91.4
2012:04:22	09:00	19:00	05:07	03:34	7.5	324.8	91.1	20:42	71.1	282.8	90.5
2012:04:23	09:03	18:56	04:54	03:33	6.8	324.9	90.3	20:44	70.0	281.4	89.7
2012:04:24	09:06	18:51	04:42	03:31	6.0	324.9	89.5	20:46	68.8	280.3	88.9
2012:04:25	09:08	18:47	04:31	03:29	5.3	325.0	88.7	20:47	67.6	279.3	88.1

Date	Time	AR	Dec	R	D	Elong.	[mag]
		[h m s]	[° ' ]	[AU]	[AU]	[ ° ]	
2012:07:03	00.00	05:49:56	+00°15'	0.466	0.972	27.0° W	9.0
2012:07:04	00.00	05:57:17	+01°49'	0.436	0.983	25.1° W	8.6
2012:07:05	00.00	06:04:40	+03°25'	0.406	0.995	23.3° W	8.3
2012:07:06	00.00	06:12:05	+05°03'	0.376	1.008	21.4° W	7.9
2012:07:07	00.00	06:19:35	+06°44'	0.344	1.022	19.4° W	7.5
2012:07:08	00.00	06:27:14	+08°28'	0.312	1.038	17.4° W	7.0
2012:07:09	00.00	06:35:04	+10°16'	0.279	1.055	15.3° W	6.5
2012:07:10	00.00	06:43:13	+12°09'	0.246	1.073	13.1° W	5.8
2012:07:11	00.00	06:51:49	+14°08'	0.212	1.091	10.8° W	5.1
2012:07:12	00.00	07:01:09	+16°15'	0.180	1.110	8.3° W	4.3
2012:07:13	00.00	07:11:32	+18°33'	0.151	1.126	5.6° W	3.4
2012:07:14	00.00	07:23:24	+20°59'	0.130	1.136	2.8° W	2.6
2012:07:15	00.00	07:36:53	+23°25'	0.124	1.135	2.0° W	2.4
2012:07:16	00.00	07:51:18	+25°32'	0.136	1.121	4.6° E	2.8
2012:07:17	00.00	08:05:49	+27°12'	0.160	1.099	7.4° E	3.6
2012:07:18	00.00	08:20:03	+28°26'	0.190	1.075	9.9° E	4.5
2012:07:19	00.00	08:34:00	+29°21'	0.223	1.050	12.3° E	5.3
2012:07:20	00.00	08:47:43	+29°59'	0.257	1.026	14.4° E	6.0
2012:07:21	00.00	09:01:18	+30°25'	0.290	1.004	16.5° E	6.6
2012:07:22	00.00	09:14:48	+30°40'	0.322	0.984	18.5° E	7.1
2012:07:23	00.00	09:28:12	+30°45'	0.355	0.966	20.4° E	7.5
2012:07:24	00.00	09:41:31	+30°41'	0.386	0.951	22.3° E	7.9
2012:07:25	00.00	09:54:43	+30°29'	0.416	0.937	24.2° E	8.3
2012:07:26	00.00	10:07:48	+30°10'	0.446	0.925	26.0° E	8.6
2012:07:27	00.00	10:20:42	+29°43'	0.475	0.915	27.9° E	8.9

Date = data nel formato gg/mm/aaaa  
 A.R. e DEC. = coordinate per Roma (42°N, 12°E)  
 R = distanza dal Sole in U.A.  
 D = distanza dalla Terra in U.A.  
 Elong. = elongazione dal Sole in °  
 Mag = magnitudine

Date	Object			Morning twilight -18°				Evening twilight			
	Rise	Transit	Set	Time	Alt	Az	Elong	Time	Alt	Az	Elon
2012:07:03	05:10	11:16	17:24	02:30	-29.0	59.6	26.9	21:58	-43.0	332.6	25.4
2012:07:04	05:08	11:19	17:34	02:31	-28.2	57.9	25.0	21:58	-41.1	332.1	23.5
2012:07:05	05:05	11:23	17:43	02:32	-27.3	56.2	23.2	21:57	-39.2	331.5	21.6
2012:07:06	05:03	11:26	17:53	02:33	-26.4	54.5	21.3	21:56	-37.3	331.0	19.7
2012:07:07	05:00	11:30	18:03	02:34	-25.4	52.9	19.3	21:56	-35.3	330.6	17.7
2012:07:08	04:57	11:34	18:13	02:35	-24.4	51.2	17.3	21:55	-33.2	330.1	15.6
2012:07:09	04:55	11:38	18:24	02:37	-23.3	49.4	15.2	21:54	-31.0	329.6	13.4
2012:07:10	04:52	11:42	18:37	02:38	-22.2	47.6	13.0	21:53	-28.7	329.0	11.1
2012:07:11	04:49	11:47	18:50	02:39	-21.0	45.7	10.7	21:52	-26.1	328.4	8.6
2012:07:12	04:45	11:53	19:06	02:40	-19.7	43.5	8.1	21:51	-23.3	327.7	5.9
2012:07:13	04:42	12:00	19:24	02:42	-18.4	41.1	5.4	21:50	-20.3	326.8	3.1
2012:07:14	04:40	12:09	19:44	02:43	-17.1	38.4	2.6	21:49	-17.0	325.6	1.8
2012:07:15	04:39	12:19	20:05	02:45	-15.9	35.4	2.1	21:48	-13.8	324.3	4.2
2012:07:16	04:39	12:29	20:25	02:46	-15.0	32.5	4.8	21:46	-11.0	322.8	7.0
2012:07:17	04:42	12:40	20:43	02:47	-14.4	29.9	7.6	21:45	-8.6	321.2	9.6
2012:07:18	04:46	12:50	20:58	02:49	-14.1	27.5	10.1	21:44	-6.5	319.6	12.0
2012:07:19	04:51	13:00	21:12	02:50	-14.0	25.4	12.4	21:42	-4.5	318.0	14.1
2012:07:20	04:57	13:10	21:24	02:52	-14.0	23.5	14.6	21:41	-2.8	316.3	16.2
2012:07:21	05:05	13:20	21:35	02:53	-14.2	21.6	16.6	21:40	-1.1	314.6	18.2
2012:07:22	05:13	13:29	21:46	02:55	-14.5	19.8	18.6	21:38	0.4	312.9	20.1
2012:07:23	05:22	13:39	21:55	02:56	-15.0	18.1	20.6	21:37	1.9	311.0	22.0
2012:07:24	05:32	13:48	22:03	02:58	-15.5	16.5	22.5	21:35	3.3	309.2	23.9
2012:07:25	05:43	13:57	22:10	02:59	-16.1	14.8	24.3	21:34	4.6	307.3	25.8
2012:07:26	05:54	14:06	22:17	03:01	-16.7	13.3	26.2	21:32	5.9	305.3	27.6
2012:07:27	06:06	14:15	22:23	03:03	-17.5	11.7	28.0	21:30	7.1	303.3	29.4

Tempi di levata e tramonto in T.U.+1, calcolati per Roma (42°N, 12°E), aggiungere un'ora quando si adotta l'ora legale

Times of rising and setting of the comet for Rome (42°N, 12°E), in U.T.+1

NB: TUTTI I DATI RELATIVI ALLE COMETE (PARAMETRI ORBITALI E MAGNITUDINE) SONO ALTAMENTE SOGGETTI A VARIAZIONI NEL TEMPO!

**CONGIUNZIONI <5° PIANETI - COMETE m<9**  
**CONJUNCTIONS <5° PLANETS - COMETS m<9**

Date TT Dm Dl r1 r2 p e m1 m2 tm(s)

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE PIANETI - COMETE**  
**(eventi con 2 o più pianeti ed una cometa entro 5°)**  
**MULTIPLE CONJUNCTIONS PLANETS - COMETS**  
**(events with 2 or more planets and 1 comet within 5°)**

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi  
Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi  
R1 = distanza in U.A. del pianeta dalla Terra  
R2 = distanza in U.A. della cometa dalla Terra  
p = angolo di posizione tra i corpi, in gradi  
e = elongazione, in gradi  
m1 = magnitudine del pianeta  
m2 = magnitudine della cometa  
tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi  
Dmax = diametro del cerchio comprendente gli oggetti, in gradi  
emin = elongazione minima, in gradi  
m2d = magnitudine del penultimo corpo più debole  
mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dm = least distance between the centers of the bodies  
Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies  
R1 = distance in A.U. of planet from the Earth  
R2 = distance in A.U. of comet from the Earth  
P = angle of position between the bodies, in °  
e = elongation, in °  
m1 = magnitude of the planet  
m2 = magnitude of the comet  
tm = if present, an object is occulted maximum for x seconds

Dmed = middle distance between the centers of the bodies, in °  
Dmax = diameter of the group, in °  
emin = least elongation, in °  
m2d = magnitude of the 2nd brightest object  
mmax = least magnitude

# CONGIUNZIONI <5° TRA COMETE m<9

## CONJUNCTIONS <5° BETWEEN COMETS m<9

Data TT Dm Dl r1 r2 p e m1 m2 tm(s)

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi

R1 = distanza in U.A. del primo corpo dalla Terra

R2 = distanza in U.A. del secondo dalla Terra

p = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine del primo corpo

m2 = magnitudine del secondo corpo

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, an object is occulted maximum for x seconds

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# CONGIUNZIONI <1° LUNA - COMETE m<9 CONJUNCTIONS <1° MOON - COMETS m<9

## Geocentriche - Geocentric

Date	TT	Dm	Dl	r1	r2	p	e	m1	m2	tm(s)
------	----	----	----	----	----	---	---	----	----	-------

Questo anno non avvengono fenomeni - No phenomena this year

## Topocentriche - Topocentric 42°N - 12°E

Date	TT	Dm	Alt	r1	r2	p	e	m1	m2	tm(s)
------	----	----	-----	----	----	---	---	----	----	-------

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se  $Dm < Dl$  vi è una occultazione tra i corpi

Alt = altezza sull'orizzonte della cometa, in gradi

R1 = distanza in U.A. della cometa dalla Terra

R2 = distanza in milioni di km della Luna dalla Terra

p = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della cometa

m2 = magnitudine della Luna

tm = se presente, la cometa viene occultata massimo per x secondi

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if  $Dm < Dl$  there is an occultation between the bodies

Alt = height in ° on the horizon of the comet, in °

R1 = distance in A.U. of the comet from the Earth

R2 = distance in billions kms of the Moon from the Earth

p = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the comet

m2 = magnitude of the Moon

tm = if present, the comet is occulted maximum for x seconds

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**CONGIUNZIONI MULTIPLE PIANETI-LUNA-COMETE**  
(eventi con 1 o più pianeti, la Luna ed una cometa entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-MOON-COMETS**  
(events with 1 or more planets, the Moon and 1 comet within 5°)

**Geocentriche - Geocentric**

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**Topocentriche - Topocentric 42°N - 12°E**

Date UT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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**CONGIUNZIONI <1° ASTEROIDI m<9 - COMETE m<9**  
**CONJUNCTIONS <1° ASTEROIDS m<9 - COMETS m<9**

Date TT Dm Dl r1 r2 p e m1 m2 tm(s)

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE ASTEROIDI m<9 -COMETE m<9**  
**(eventi con 2 comete ed un asteroide o viceversa entro 5°)**  
**MULTIPLE CONJUNCTIONS ASTEROIDS m<9 -COMETS m<9**  
**(events with 2 comets and 1 asteroid or viceversa within 5°)**

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi  
Dl = parametro limite, se  $D_m < D_l$  vi è una occultazione tra i corpi  
R1 = distanza in U.A. dell'asteroide dalla Terra  
R2 = distanza in U.A. della cometa dalla Terra  
p = angolo di posizione tra i corpi, in gradi  
e = elongazione, in gradi  
m1 = magnitudine dell'asteroide  
m2 = magnitudine della cometa  
tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi  
Dmax = diametro del cerchio comprendente gli oggetti, in gradi  
emin = elongazione minima, in gradi  
m2d = magnitudine del penultimo corpo più debole  
mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dm = least distance between the centers of the bodies  
Dl = parameter limit, if  $D_m < D_l$  there is an occultation between the bodies  
R1 = distance in A.U. of the asteroid from the Earth  
R2 = distance in A.U. of the comet from the Earth  
p = angle of position between the bodies, in °  
e = elongation, in °  
m1 = magnitude of the asteroid  
m2 = magnitude of the comet  
tm = if present, an object is occulted maximum for x seconds

Dmed = middle distance between the centers of the bodies, in °  
Dmax = diameter of the group, in °  
emin = least elongation, in °  
m2d = magnitude of the 2nd brightest object  
mmax = least magnitude

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**CONGIUNZ. MULTIPLE PIANETI-COMETE-ASTEROIDI**  
(eventi con 1 pianeta, una cometa ed un asteroide entro 5°)  
**MULTIPLE CONJUNCT. PLANETS-COMETES-ASTEROIDS**  
(events with 1 planet, 1 comet and 1 asteroid within 5°)

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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**CONGIUNZIONI <5° COMETE m<9 - STELLE m<2**  
**CONJUNCTIONS <5° COMETS m<9 - STARS m<2**

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)			
2012/07/05	05:29:15	4.26789	0.01439	1.002	318	-22	9.2	0.6		96P	Alpha ORI	Betelgeuse
2012/07/15	20:32:14	2.57378	0.01288	1.119	330	5	4.8	1.2		96P	Beta GEM	Pollux

**CONGIUNZIONI <5° COMETE m<9-OGGETTI MESSIER m<9**  
**CONJUNCTIONS <5° COMETS m<9-MESSIER OBJECTS m<9**

Date	TT	Dm	Dl	r1	p	e	m1	m*	tm(s)		
2012/01/20	19:10:25	4.87974	0.07615	0.189	36	94	7.5	8.9		P/2006 T1	M77
2012/02/03	10:38:03	0.49534	0.00951	1.516	72	-80	7.0	6.4		C/2009 P1	M92
2012/02/10	01:18:17	2.35042	0.05743	0.251	18	106	8.4	7.7		P/2006 T1	M79
2012/03/22	20:55:05	4.89725	0.01045	1.379	314	111	7.6	6.9		C/2009 P1	M81

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm<Dl vi è una occultazione tra i corpi

R1 = distanza in U.A. della cometa dalla Terra

p = angolo di posizione tra i corpi, in gradi

e = elongazione, in gradi

m1 = magnitudine della cometa

m\* = magnitudine del secondo corpo

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the comet from the Earth

p = angle of position between the bodies, in °

e = elongation, in °

m1 = magnitude of the comet

m\* = magnitude of the second body

tm = if present, an object is occulted maximum for x seconds

**CONGIUNZIONI MULTIPLE PIANETI-COMETE-STELLE**  
(eventi con 1 pianeta, 1 cometa ed 1 stella di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-COMET-STAR**  
(events with 1 planet, 1 comet and 1 star with mag<2 within 5°)

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE PIANETI-COMETE-OGGETTI**  
(eventi con 1 pianeta, 1 cometa ed un oggetto di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS PLANETS-COMET-OBJECTS**  
(events with 1 planet, 1 comet and 1 object with mag<2 within 5°)

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno  
Dmed = distanza media in gradi tra i centri degli oggetti, in gradi  
Dmax = diametro del cerchio comprendente gli oggetti, in gradi  
emin = elongazione minima, in gradi  
m2d = magnitudine del penultimo corpo più debole  
mmax = magnitudine del corpo più debole

Date in the format year/month/day  
Dmed = middle distance between the centers of the bodies, in °  
Dmax = diameter of the group, in °  
emin = least elongation, in °  
m2d = magnitude of the 2nd brightest object  
mmax = least magnitude

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**CONGIUNZIONI MULTIPLE LUNA-COMETE-STELLE**  
(eventi con la Luna, 1 cometa ed 1 stella di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS MOON-COMETES-STARS**  
(events with the Moon, 1 comet and 1 star with mag<2 within 5°)

**Geocentriche - Geocentric**

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**Topocentriche - Topocentric 42°N - 12°E**

Date UT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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**CONGIUNZIONI MULTIPLE LUNA-COMETE-OGGETTI**  
(eventi con la Luna, 1 cometa ed un oggetto di mag<2 entro 5°)  
**MULTIPLE CONJUNCTIONS MOON-COMETE-OBJECTS**  
(events with the Moon, 1 comet and 1 object with mag<2 within 5°)

**Geocentriche - Geocentric**

Date TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**Topocentriche - Topocentric 42°N - 12°E**

Date UT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

**CONGIUNZIONI MULTIPLE**  
**STELLE - COMETE - ASTEROIDI**  
(eventi con 1 stella di mag<2, 1 cometa ed un asteroide mag<9 entro 5°)  
**MULTIPLE CONJUNCTIONS**  
**STARS - COMETS - ASTEROIDS**  
(events with 1 star with mag<2, 1 comet and 1 asteroid with mag<9  
within 5°)

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno  
Dmed = distanza media in gradi tra i centri degli oggetti, in gradi  
Dmax = diametro del cerchio comprendente gli oggetti, in gradi  
emin = elongazione minima, in gradi  
m2d = magnitudine del penultimo corpo più debole  
mmax = magnitudine del corpo più debole

Date in the format year/month/day  
Dmed = middle distance between the centers of the bodies, in °  
Dmax = diameter of the group, in °  
emin = least elongation, in °  
m2d = magnitude of the 2nd brightest object  
mmax = least magnitude

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**CONGIUNZIONI MULTIPLE  
OGGETTI - COMETE - ASTEROIDI**

(eventi con un oggetto di mag<2, 1 cometa ed un asteroide mag<9 entro  
5°)

**MULTIPLE CONJUNCTIONS  
OBJECTS - COMETS - ASTEROIDS**

(events with 1 object with mag<2, 1 comet and 1 asteroid with mag<9  
within 5°)

Data TT Dmed Dmax emin m2d mmax

Questo anno non avvengono fenomeni - No phenomena this year

Data nel formato anno/mese/giorno

Dmed = distanza media in gradi tra i centri degli oggetti, in gradi

Dmax = diametro del cerchio comprendente gli oggetti, in gradi

emin = elongazione minima, in gradi

m2d = magnitudine del penultimo corpo più debole

mmax = magnitudine del corpo più debole

Date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in °

Dmax = diameter of the group, in °

emin = least elongation, in °

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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# ECLISSI DI SOLE E DI LUNA SOLAR AND LUNAR ECLIPSES

## Annular Solar Eclipse of 2012 May 20

Geocentric Conjunction = 23:59:09.1 UT    J.D. = 2456068.499411

Greatest Eclipse = 23:52:46.6 UT    J.D. = 2456068.494984

Eclipse Magnitude = 0.9439    Gamma = 0.4827

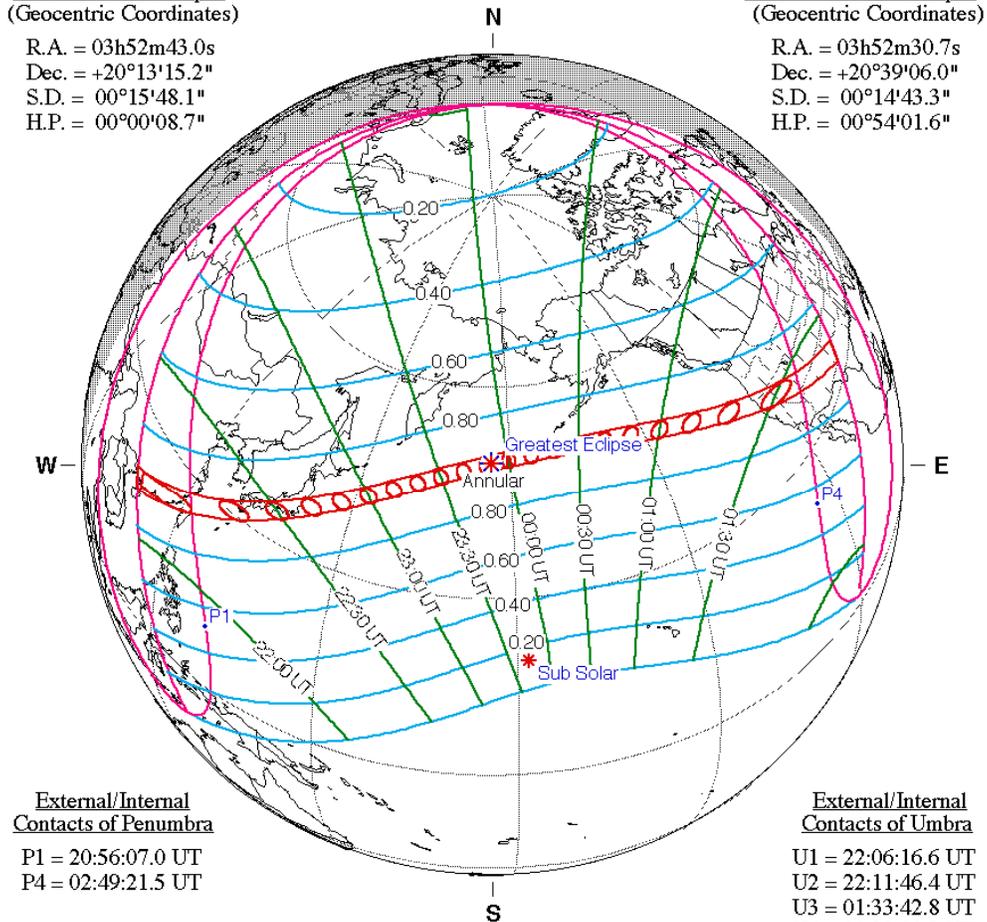
Saros Series = 128    Member = 58 of 73

### Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 03h52m43.0s  
Dec. = +20°13'15.2"  
S.D. = 00°15'48.1"  
H.P. = 00°00'08.7"

### Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 03h52m30.7s  
Dec. = +20°39'06.0"  
S.D. = 00°14'43.3"  
H.P. = 00°54'01.6"



### External/Internal Contacts of Penumbra

P1 = 20:56:07.0 UT  
P4 = 02:49:21.5 UT

### External/Internal Contacts of Umbra

U1 = 22:06:16.6 UT  
U2 = 22:11:46.4 UT  
U3 = 01:33:42.8 UT  
U4 = 01:39:11.2 UT

### Local Circumstances at Greatest Eclipse

Lat. = 49°05.3'N    Sun Alt. = 60.9°  
Long. = 176°16.8'E    Sun Azm. = 171.0°  
Path Width = 236.9 km    Duration = 05m46.4s

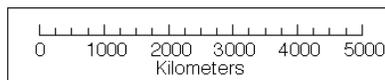
### Ephemeris & Constants

Eph. = Newcomb/ILE  
 $\Delta T = 69.0$  s  
k1 = 0.2724880  
k2 = 0.2722810  
 $\Delta b = 0.0''$      $\Delta l = 0.0''$

### Geocentric Libration (Optical + Physical)

l = -1.29°  
b = -0.58°  
c = -13.67°

Brown Lun. No. = 1106



F. Espenak, NASA's GSFC - Fri, Jul 2,  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)









P1, Primo contatto : punto della Terra in cui l'eclisse inizia come parziale al sorgere del Sole  
P2, Secondo contatto : punto della Terra in cui l'eclisse finisce come parziale al sorgere del Sole  
P3, Terzo contatto : punto della Terra in cui l'eclisse inizia come parziale al tramonto del Sole  
P4, Quarto contatto : punto della Terra in cui l'eclisse finisce come parziale al tramonto del Sole

U1, Primo contatto : punto della Terra in cui l'eclisse inizia come totale al sorgere del Sole  
U2, Secondo contatto : punto della Terra in cui l'eclisse finisce come totale al sorgere del Sole  
U3, Terzo contatto : punto della Terra in cui l'eclisse inizia come totale al tramonto del Sole  
U4, Quarto contatto : punto della Terra in cui l'eclisse finisce come totale al tramonto del Sole

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrise  
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrise  
P3, third contact : point of the Earth in which the eclipse begins as partial at sunset  
P4, fourth contact : point of the Earth in which the eclipse ends as partial at sunset

U1, first contact : point of the Earth in which the eclipse begins as total at sunrise  
U2, second contact : point of the Earth in which the eclipse ends as total at sunrise  
U3, third contact : point of the Earth in which the eclipse begins as total at sunset  
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunset

Legenda:

La località e lo stato

I vari tempi dei contatti, se presenti. Se l'evento avviene il giorno prima o quello dopo la data della predizione è presente un segno "-" o "+" immediatamente dopo l'ora.

La posizione dell'angolo di contatto per ogni evento.

L'altitudine del Sole.

La magnitudine dell'eclisse.

Nel caso delle eclissi centrali, la durata.

The site name and location.

The UTC - for 1st and 4th contacts of partial eclipse, the time of maximum eclipse, and if the eclipse is central, the times of 2nd & 3rd contacts. Times are not given if the event does not occur, or the sun is not above the horizon. If the event occurs on the day preceding or following the date of the prediction, a '-' or '+' (respectively) occurs immediately after the predicted time.

The position angle of contact - at start and end of partial eclipse, and start and end of annular or total eclipse;

The altitude of the sun - at start and end of partial eclipse, and at maximum eclipse;

If maximum eclipse is visible at the location, the magnitude at maximum eclipse;

If central eclipse occurs at the location, the duration of the central eclipse.

[Note: The magnitude is computed as the fraction of the solar diameter that is obscured by the moon.

During central eclipse, this value equals (diameter of moon / diameter of sun) - irrespective of location across the center path.]











SUD AMERICA - SOUTH AMERICA

Site	1st Contact				2nd Contact				Maximum				3rd Contact				4th Contact				Central	
	U.T.	PA	Alt		U.T.	PA			U.T.	Alt			U.T.	PA			U.T.	PA	Alt	Mag	Durn	
	h	m	s	o	h	m	s	o	h	m	s	o	h	m	s	o	h	m	s	o	o	o
BR Ciudad Acuna	0	36	15+		277	11			..	..	..	..	..	..	..	..	..	..	..	..	..	..

OCEANIA

Site	1st Contact				2nd Contact				Maximum				3rd Contact				4th Contact				Central		
	U.T.	PA	Alt		U.T.	PA			U.T.	Alt			U.T.	PA			U.T.	PA	Alt	Mag	Durn		
	h	m	s	o	h	m	s	o	h	m	s	o	h	m	s	o	h	m	s	o	o	o	
FM Chuuk	21	14	51		306	23			22	0	47	33	..	..	..	..	22	52	22	13	45	0.165	....
FM Pohnpei	21	35	19		319	33			22	7	54	41	..	..	..	..	22	43	1	0	49	0.064	....
FM Yap	20	57	47		289	6			21	54	23	20	..	..	..	..	22	59	21	34	35	0.395	....
MH Eniwetok Island	21	35	2		311	38			22	21	6	49	..	..	..	..	23	12	51	8	61	0.118	....
PW Babelthuap	20	57	24		290	2			21	51	27	15	..	..	..	..	22	52	52	34	29	0.383	....

P1, Primo contatto : punto della Terra in cui l'eclisse inizia come parziale al sorgere del Sole  
P2, Secondo contatto : punto della Terra in cui l'eclisse finisce come parziale al sorgere del Sole  
P3, Terzo contatto : punto della Terra in cui l'eclisse inizia come parziale al tramonto del Sole  
P4, Quarto contatto : punto della Terra in cui l'eclisse finisce come parziale al tramonto del Sole

U1, Primo contatto : punto della Terra in cui l'eclisse inizia come totale al sorgere del Sole  
U2, Secondo contatto : punto della Terra in cui l'eclisse finisce come totale al sorgere del Sole  
U3, Terzo contatto : punto della Terra in cui l'eclisse inizia come totale al tramonto del Sole  
U4, Quarto contatto : punto della Terra in cui l'eclisse finisce come totale al tramonto del Sole

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrising  
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrising  
P3, third contact : point of the Earth in which the eclipse begins as partial at sunseting  
P4, fourth contact : point of the Earth in which the eclipse ends as partial at sunseting

U1, first contact : point of the Earth in which the eclipse begins as total at sunrising  
U2, second contact : point of the Earth in which the eclipse ends as total at sunrising  
U3, third contact : point of the Earth in which the eclipse begins as total at sunseting  
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunseting

Legenda:

La località e lo stato  
I vari tempi dei contatti, se presenti. Se l'evento avviene il giorno prima o quello dopo la data della predizione è presente un segno "-" o "+" immediatamente dopo l'ora.  
La posizione dell'angolo di contatto per ogni evento.  
L'altitudine del Sole.  
La magnitudine dell'eclisse.  
Nel caso delle eclissi centrali, la durata.

The site name and location.  
The UTC - for 1st and 4th contacts of partial eclipse, the time of maximum eclipse, and if the eclipse is central, the times of 2nd & 3rd contacts. Times are not given if the event does not occur, or the sun is not above the horizon. If the event occurs on the day preceding or following the date of the prediction, a '-' or '+' (respectively) occurs immediately after the predicted time.  
The position angle of contact - at start and end of partial eclipse, and start and end of annular or total eclipse;  
The altitude of the sun - at start and end of partial eclipse, and at maximum eclipse;  
If maximum eclipse is visible at the location, the magnitude at maximum eclipse;  
If central eclipse occurs at the location, the duration of the central eclipse.  
[Note: The magnitude is computed as the fraction of the solar diameter that is obscured by the moon. During central eclipse, this value equals (diameter of moon / diameter of sun) - irrespective of location across the center path.]

# Partial Lunar Eclipse of 2012 Jun 04

Ecliptic Conjunction = 11:12:40.4 TD (= 11:11:32.7 UT)  
 Greatest Eclipse = 11:04:20.1 TD (= 11:03:12.3 UT)

Penumbral Magnitude = 1.3183    P. Radius = 1.2926°    Gamma = 0.8247  
 Umbral Magnitude = 0.3704    U. Radius = 0.7671°    Axis = 0.8390°

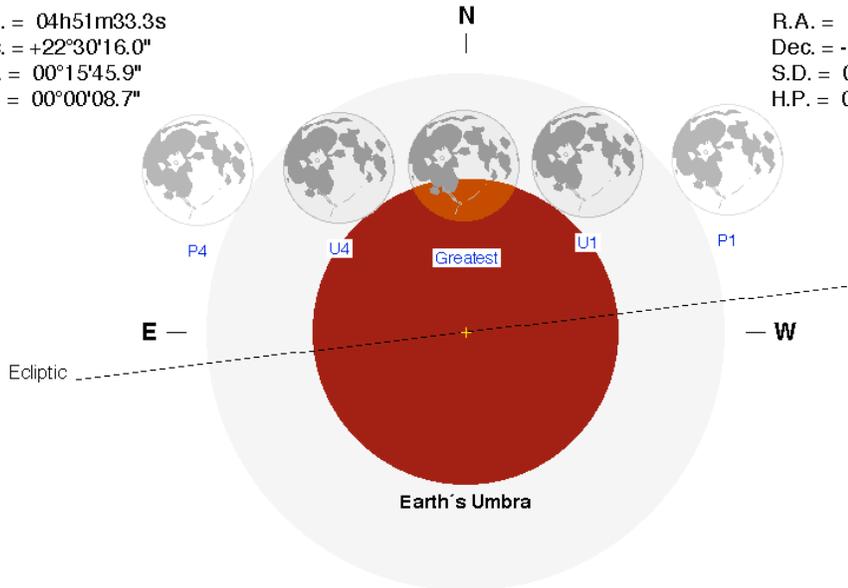
Saros Series = 140    Member = 25 of 80

**Sun at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 04h51m33.3s  
 Dec. = +22°30'16.0"  
 S.D. = 00°15'45.9"  
 H.P. = 00°00'08.7"

**Moon at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 16h51m37.6s  
 Dec. = -21°39'56.3"  
 S.D. = 00°16'37.9"  
 H.P. = 01°01'02.2"

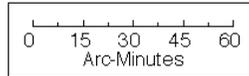


**Eclipse Durations**

Penumbral = 04h30m02s  
 Umbral = 02h06m35s

$\Delta T = 68$  s  
 Rule = CdT (Danjon)  
 Eph. = VSOP87/ELP2000-85

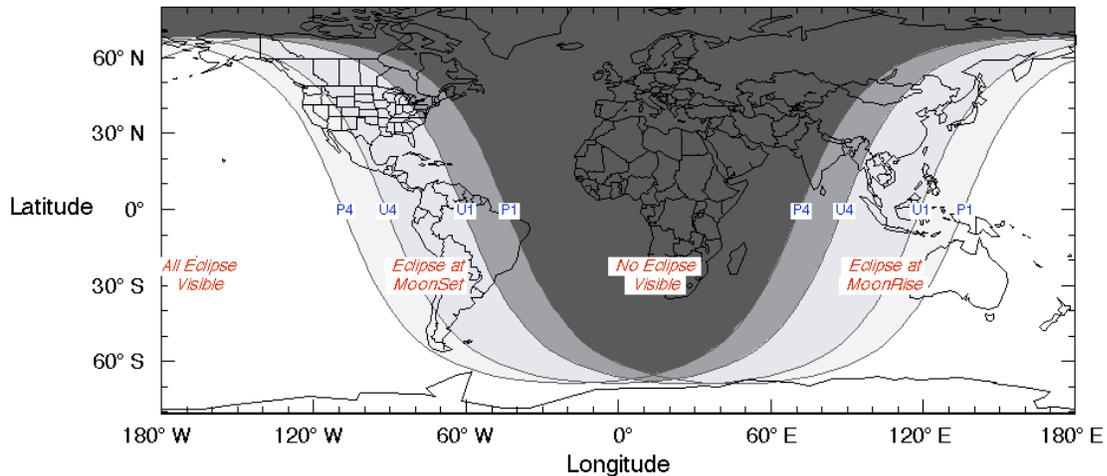
**Earth's Penumbra**



F. Espenak, NASA's GSFC  
[eclipse.gsfc.nasa.gov/eclipse.html](http://eclipse.gsfc.nasa.gov/eclipse.html)

**Eclipse Contacts**

P1 = 08:48:11 UT  
 U1 = 09:59:53 UT  
 U4 = 12:06:28 UT  
 P4 = 13:18:13 UT



2009 Apr 29

Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

Event	U.T.			P.A.	Overhead at	
	h	m	s		Long	Lat
				o	o	o
Moon Enters Penumbra	8	48	3	123	-134	-22
Moon Enters Umbra	9	59	56	145	-151	-22
Maximum Eclipse	11	3	13		-166	-22
Moon Leaves Umbra	12	6	27	218	179	-22
Moon Leaves Penumbra	13	18	23	239	161	-22

Contact times are based on an elliptic shadow

Magnitude of Umbral Eclipse = 0.371

[delta T = 67.2 secs]

[Adopted oblateness of the Earth's atmosphere = 1/298.3]

P1, Primo contatto : punto della Terra in cui l'eclisse inizia come parziale al sorgere del Sole  
P2, Secondo contatto : punto della Terra in cui l'eclisse finisce come parziale al sorgere del Sole  
P3, Terzo contatto : punto della Terra in cui l'eclisse inizia come parziale al tramonto del Sole  
P4, Quarto contatto : punto della Terra in cui l'eclisse finisce come parziale al tramonto del Sole

U1, Primo contatto : punto della Terra in cui l'eclisse inizia come totale al sorgere del Sole  
U2, Secondo contatto : punto della Terra in cui l'eclisse finisce come totale al sorgere del Sole  
U3, Terzo contatto : punto della Terra in cui l'eclisse inizia come totale al tramonto del Sole  
U4, Quarto contatto : punto della Terra in cui l'eclisse finisce come totale al tramonto del Sole

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrise  
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrise  
P3, third contact : point of the Earth in which the eclipse begins as partial at sunset  
P4, fourth contact : point of the Earth in which the eclipse ends as partial at sunset

U1, first contact : point of the Earth in which the eclipse begins as total at sunrise  
U2, second contact : point of the Earth in which the eclipse ends as total at sunrise  
U3, third contact : point of the Earth in which the eclipse begins as total at sunset  
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunset

# Total Solar Eclipse of 2012 Nov 13

Geocentric Conjunction = 22:18:04.3 UT    J.D. = 2456245.429217  
 Greatest Eclipse = 22:11:48.0 UT    J.D. = 2456245.424861

Eclipse Magnitude = 1.0500    Gamma = -0.3718

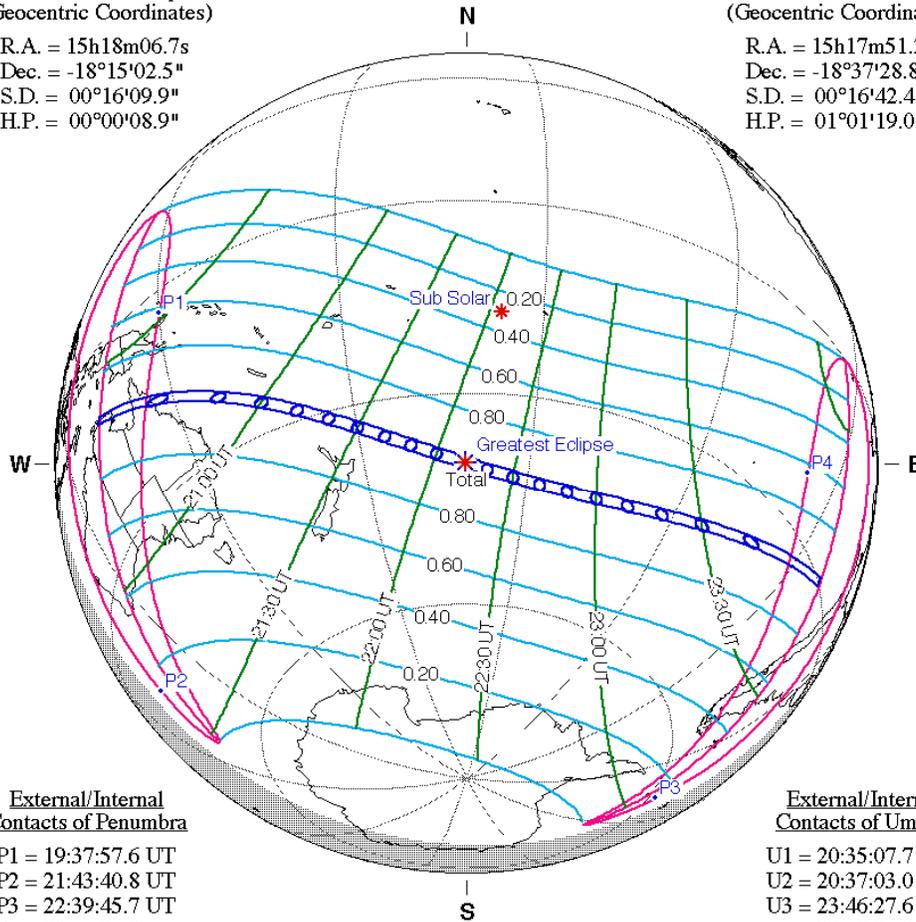
Saros Series = 133    Member = 45 of 72

Sun at Greatest Eclipse  
 (Geocentric Coordinates)

R.A. = 15h18m06.7s  
 Dec. = -18°15'02.5"  
 S.D. = 00°16'09.9"  
 H.P. = 00°00'08.9"

Moon at Greatest Eclipse  
 (Geocentric Coordinates)

R.A. = 15h17m51.2s  
 Dec. = -18°37'28.8"  
 S.D. = 00°16'42.4"  
 H.P. = 01°01'19.0"



External/Internal  
Contacts of Penumbra

P1 = 19:37:57.6 UT  
 P2 = 21:43:40.8 UT  
 P3 = 22:39:45.7 UT  
 P4 = 00:45:34.0 UT

External/Internal  
Contacts of Umbra

U1 = 20:35:07.7 UT  
 U2 = 20:37:03.0 UT  
 U3 = 23:46:27.6 UT  
 U4 = 23:48:24.2 UT

Local Circumstances at Greatest Eclipse

Lat. = 39°56.9'S    Sun Alt. = 68.0°  
 Long. = 161°19.8'W    Sun Azm. = 11.4°  
 Path Width = 178.9 km    Duration = 04m02.2s

Ephemeris & Constants

Eph. = Newcomb/ILE  
 ΔT = 69.5 s  
 k1 = 0.2724880  
 k2 = 0.2722810  
 Δb = 0.0"    Δl = 0.0"

Geocentric Libration  
 (Optical + Physical)

l = -1.00°  
 b = 0.50°  
 c = 16.49°

Brown Lun. No. = 1112



F. Espenak, NASA's GSFC - Fri, Jul 2,  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)





Site	1st Contact				2nd Contact			Maximum				3rd Contact				4th Contact				Central			
	U.T.		PA Alt		U.T.		PA	U.T.		Alt		U.T.		PA	U.T.		PA Alt		Mag	Durn			
	h	m	s	o	o	h	m	s	o	h	m	s	o	h	m	s	o	h	m	s	o	o	
CL Rancagua	22	49	46	284	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
CL Santiago	22	50	13	283	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
CL Santo Domingo	22	50	6	283	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
CL Temuco	22	46	48	290	9	..	..	..	..	23	37	28	0	..	..	..	..	..	..	..	..	0.720	..
CL Valdivia	22	46	12	291	10	..	..	..	..	23	36	47	1	..	..	..	..	..	..	..	..	0.703	..
CL Vallenar	22	53	27	275	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
EC Galapagos	23	43	32	200	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
EC San Cristobal	23	40	26	203	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
FK Mount Pleasant	22	41	2	315	5	..	..	..	..	23	19	20	0	..	..	..	..	..	..	..	..	0.346	..
FK Stanley	22	41	5	316	4	..	..	..	..	23	19	13	-1	..	..	..	..	..	..	..	..	0.344	..
PE Colligue	23	9	48	244	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Las Palmas	23	9	30	244	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Lima	23	9	42	244	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Nazca	23	5	49	250	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Pisco	23	7	25	247	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE San Juan	23	5	20	251	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

P1, Primo contatto : punto della Terra in cui l'eclisse inizia come parziale al sorgere del Sole  
P2, Secondo contatto : punto della Terra in cui l'eclisse finisce come parziale al sorgere del Sole  
P3, Terzo contatto : punto della Terra in cui l'eclisse inizia come parziale al tramonto del Sole  
P4, Quarto contatto : punto della Terra in cui l'eclisse finisce come parziale al tramonto del Sole

U1, Primo contatto : punto della Terra in cui l'eclisse inizia come totale al sorgere del Sole  
U2, Secondo contatto : punto della Terra in cui l'eclisse finisce come totale al sorgere del Sole  
U3, Terzo contatto : punto della Terra in cui l'eclisse inizia come totale al tramonto del Sole  
U4, Quarto contatto : punto della Terra in cui l'eclisse finisce come totale al tramonto del Sole

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrising  
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrising  
P3, third contact : point of the Earth in which the eclipse begins as partial at sunseting  
P4, fourth contact : point of the Earth in which the eclipse ends as partial at sunseting

U1, first contact : point of the Earth in which the eclipse begins as total at sunrising  
U2, second contact : point of the Earth in which the eclipse ends as total at sunrising  
U3, third contact : point of the Earth in which the eclipse begins as total at sunseting  
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunseting

Legenda:

La località e lo stato  
I vari tempi dei contatti, se presenti. Se l'evento avviene il giorno prima o quello dopo la data della predizione è presente un segno "-" o "+" immediatamente dopo l'ora.  
La posizione dell'angolo di contatto per ogni evento.  
L'altitudine del Sole.  
La magnitudine dell'eclisse.  
Nel caso delle eclissi centrali, la durata.

The site name and location.  
The UTC - for 1st and 4th contacts of partial eclipse, the time of maximum eclipse, and if the eclipse is central, the times of 2nd & 3rd contacts. Times are not given if the event does not occur, or the sun is not above the horizon. If the event occurs on the day preceding or following the date of the prediction, a '-' or '+' (respectively) occurs immediately after the predicted time.  
The position angle of contact - at start and end of partial eclipse, and start and end of annular or total eclipse;  
The altitude of the sun - at start and end of partial eclipse, and at maximum eclipse;  
If maximum eclipse is visible at the location, the magnitude at maximum eclipse;  
If central eclipse occurs at the location, the duration of the central eclipse.  
[Note: The magnitude is computed as the fraction of the solar diameter that is obscured by the moon. During central eclipse, this value equals (diameter of moon / diameter of sun) - irrespective of location across the center path.]

# Penumbral Lunar Eclipse of 2012 Nov 28

Ecliptic Conjunction = 14:47:02.7 TD (= 14:45:54.7 UT)  
 Greatest Eclipse = 14:34:07.1 TD (= 14:32:59.1 UT)

Penumbral Magnitude = 0.9155    P. Radius = 1.1811°    Gamma = -1.0869  
 Umbral Magnitude = -0.1873    U. Radius = 0.6406°    Axis = 0.9774°

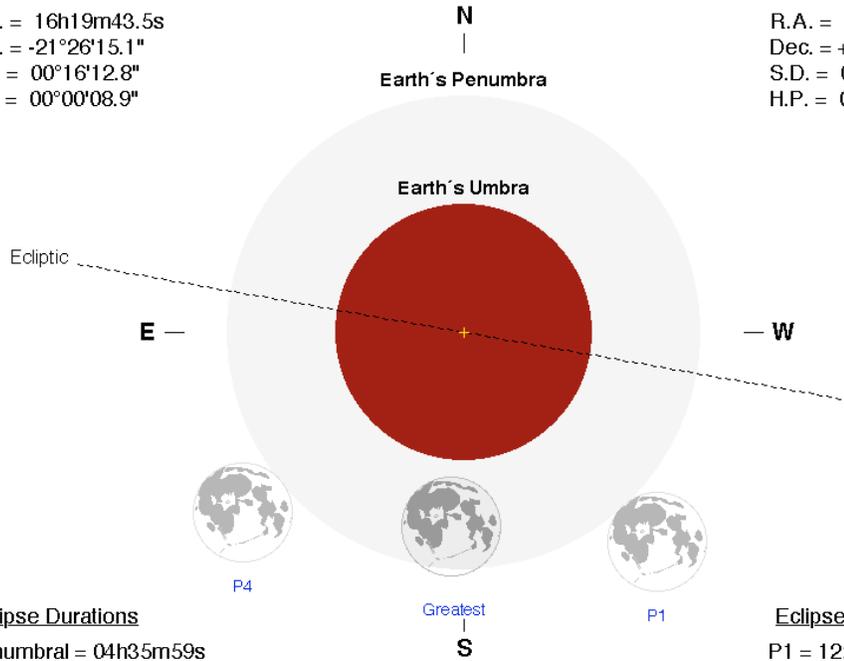
Saros Series = 145    Member = 11 of 71

**Sun at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 16h19m43.5s  
 Dec. = -21°26'15.1"  
 S.D. = 00°16'12.8"  
 H.P. = 00°00'08.9"

**Moon at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 04h20m01.1s  
 Dec. = +20°27'44.8"  
 S.D. = 00°14'42.2"  
 H.P. = 00°53'57.7"

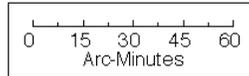


**Eclipse Durations**

Penumbral = 04h35m59s

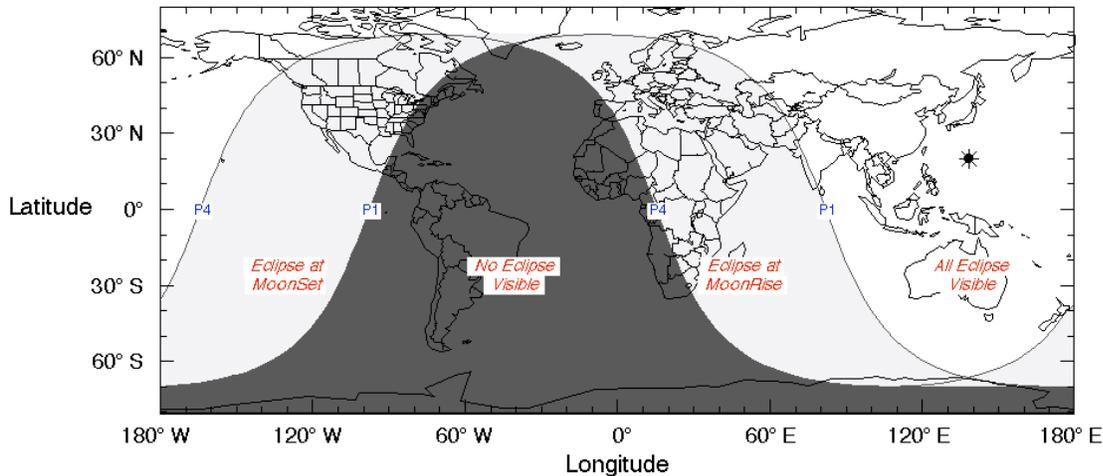
**Eclipse Contacts**

P1 = 12:14:59 UT  
 P4 = 16:50:59 UT



$\Delta T = 68$  s  
 Rule = CdT (Danjon)  
 Eph. = VSOP87/ELP2000-85

F. Espenak, NASA's GSFC  
[eclipse.gsfc.nasa.gov/eclipse.html](http://eclipse.gsfc.nasa.gov/eclipse.html)



2009 Apr 29

Event	U.T. h m s	P.A. o	Overhead at	
			Long o	Lat o
Moon Enters Penumbra	12 14 57	43	172	20
Maximum Eclipse	14 33 0		139	20
Moon Leaves Penumbra	16 51 7	309	105	21

Contact times are based on an elliptic shadow

Magnitude of Penumbral Eclipse = 0.916

[delta T = 67.2 secs]

[Adopted oblateness of the Earth's atmosphere = 1/298.3]

P1, Primo contatto : punto della Terra in cui l'eclisse inizia come parziale al sorgere del Sole  
P2, Secondo contatto : punto della Terra in cui l'eclisse finisce come parziale al sorgere del Sole  
P3, Terzo contatto : punto della Terra in cui l'eclisse inizia come parziale al tramonto del Sole  
P4, Quarto contatto : punto della Terra in cui l'eclisse finisce come parziale al tramonto del Sole

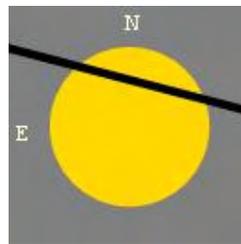
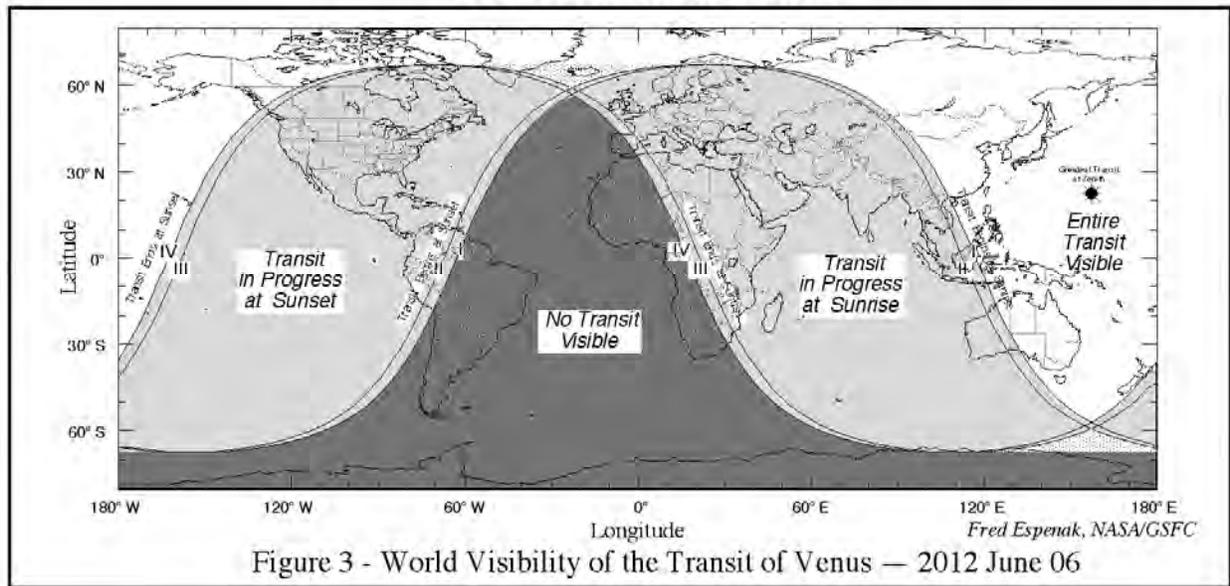
U1, Primo contatto : punto della Terra in cui l'eclisse inizia come totale al sorgere del Sole  
U2, Secondo contatto : punto della Terra in cui l'eclisse finisce come totale al sorgere del Sole  
U3, Terzo contatto : punto della Terra in cui l'eclisse inizia come totale al tramonto del Sole  
U4, Quarto contatto : punto della Terra in cui l'eclisse finisce come totale al tramonto del Sole

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrise  
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrise  
P3, third contact : point of the Earth in which the eclipse begins as partial at sunset  
P4, fourth contact : point of the Earth in which the eclipse ends as partial at sunset

U1, first contact : point of the Earth in which the eclipse begins as total at sunrise  
U2, second contact : point of the Earth in which the eclipse ends as total at sunrise  
U3, third contact : point of the Earth in which the eclipse begins as total at sunset  
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunset

# TRANSITI - TRANSITS

## 2012 Transit of Venus



Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

I, Primo contatto : Venere tocca il bordo solare esterno in entrata  
II, Secondo contatto : Venere tocca il bordo solare interno in entrata  
III, Terzo contatto : Venere tocca il bordo solare interno in uscita  
IV, Quarto contatto : Venere tocca il bordo solare esterno in uscita

I, first contact  
II, second contact  
III, third contact  
IV, fourth contact





Site	Exterior INGRESS		Interior INGRESS		Maximum		Interior EGRESS		Exterior EGRESS		Min. Sept
	U.T.	PA Alt	U.T.	PA	U.T.	PA Alt	U.T.	PA	U.T.	PA Alt	
	h m s	o o	h m s	o	h m s	o o	h m s	o	h m s	o o	"
TZ Iringa	4 37 2	293	4 54 49	290 15	.....	.....	4 37 2	293	4 54 49	290 15	.....
TZ Kilimanjaro	4 37 11	293	4 54 56	290 18	.....	.....	4 37 11	293	4 54 56	290 18	.....
TZ Lake Manyara	4 37 15	293	4 55 0	290 17	.....	.....	4 37 15	293	4 55 0	290 17	.....
TZ Moshi	4 37 10	293	4 54 56	290 18	.....	.....	4 37 10	293	4 54 56	290 18	.....
TZ Mtwara	4 36 40	293	4 54 27	290 18	.....	.....	4 36 40	293	4 54 27	290 18	.....
TZ Mwadui	4 37 20	293	4 55 7	290 15	.....	.....	4 37 20	293	4 55 7	290 15	.....
TZ Mwanza	4 37 25	293	4 55 11	290 15	.....	.....	4 37 25	293	4 55 11	290 15	.....
TZ Ngerengere	4 36 58	293	4 54 44	290 17	.....	.....	4 36 58	293	4 54 44	290 17	.....
TZ Pemba	4 36 57	293	4 54 42	290 20	.....	.....	4 36 57	293	4 54 42	290 20	.....
TZ Tanga	4 37 0	293	4 54 45	290 19	.....	.....	4 37 0	293	4 54 45	290 19	.....
TZ Zanzibar	4 36 56	293	4 54 42	290 19	.....	.....	4 36 56	293	4 54 42	290 19	.....
UG Entebbe	4 37 32	292	4 55 18	290 15	.....	.....	4 37 32	292	4 55 18	290 15	.....
UG Gulu	4 37 39	292	4 55 24	290 16	.....	.....	4 37 39	292	4 55 24	290 16	.....
UG Soroti	4 37 33	292	4 55 18	290 17	.....	.....	4 37 33	292	4 55 18	290 17	.....
ZA Arnot Power Station	.....	.....	4 53 56	291 2	.....	.....	.....	.....	4 53 56	291 2	.....
ZA Brakpan	.....	.....	4 53 58	291 0	.....	.....	.....	.....	4 53 58	291 0	.....
ZA Dundee	.....	.....	4 53 44	291 1	.....	.....	.....	.....	4 53 44	291 1	.....
ZA Durban	.....	.....	4 53 34	291 1	.....	.....	.....	.....	4 53 34	291 1	.....
ZA Ellisras	.....	.....	4 54 10	290 1	.....	.....	.....	.....	4 54 10	290 1	.....
ZA Ermelo	.....	.....	4 53 53	291 1	.....	.....	.....	.....	4 53 53	291 1	.....
ZA Giyani	.....	.....	4 54 6	291 3	.....	.....	.....	.....	4 54 6	291 3	.....
ZA Greytown	.....	.....	4 53 39	291 1	.....	.....	.....	.....	4 53 39	291 1	.....
ZA Heidelberg	.....	.....	4 53 56	291 0	.....	.....	.....	.....	4 53 56	291 0	.....
ZA Hoedspruit	.....	.....	4 54 0	291 3	.....	.....	.....	.....	4 54 0	291 3	.....
ZA Johannesburg	.....	.....	4 53 58	291 0	.....	.....	.....	.....	4 53 58	291 0	.....
ZA Komati Power Station	.....	.....	4 53 56	291 1	.....	.....	.....	.....	4 53 56	291 1	.....
ZA Komatipoort	.....	.....	4 53 53	291 3	.....	.....	.....	.....	4 53 53	291 3	.....
ZA Kriel	.....	.....	4 53 56	291 1	.....	.....	.....	.....	4 53 56	291 1	.....
ZA Ladysmith	.....	.....	4 53 44	291 0	.....	.....	.....	.....	4 53 44	291 0	.....
ZA Louis Trichardt	.....	.....	4 54 9	291 3	.....	.....	.....	.....	4 54 9	291 3	.....
ZA Majuba Power Station	.....	.....	4 53 51	291 1	.....	.....	.....	.....	4 53 51	291 1	.....
ZA Malalane	.....	.....	4 53 54	291 3	.....	.....	.....	.....	4 53 54	291 3	.....
ZA Marble Hall	.....	.....	4 54 1	291 2	.....	.....	.....	.....	4 54 1	291 2	.....
ZA Messina	.....	.....	4 54 11	290 3	.....	.....	.....	.....	4 54 11	290 3	.....
ZA Middelburg	.....	.....	4 53 58	291 1	.....	.....	.....	.....	4 53 58	291 1	.....
ZA Mkuze	.....	.....	4 53 43	291 3	.....	.....	.....	.....	4 53 43	291 3	.....
ZA Nelspruit	.....	.....	4 53 55	291 3	.....	.....	.....	.....	4 53 55	291 3	.....
ZA Newcastle	.....	.....	4 53 47	291 1	.....	.....	.....	.....	4 53 47	291 1	.....
ZA Nylstroom	.....	.....	4 54 5	291 1	.....	.....	.....	.....	4 54 5	291 1	.....
ZA Phalaborwa	.....	.....	4 54 2	291 4	.....	.....	.....	.....	4 54 2	291 4	.....
ZA Pietermaritzburg	.....	.....	4 53 37	291 0	.....	.....	.....	.....	4 53 37	291 0	.....
ZA Pietersburg	.....	.....	4 54 6	291 2	.....	.....	.....	.....	4 54 6	291 2	.....
ZA Potgietersrus	.....	.....	4 54 6	291 2	.....	.....	.....	.....	4 54 6	291 2	.....
ZA Pretoria	.....	.....	4 54 1	291 0	.....	.....	.....	.....	4 54 1	291 0	.....
ZA Pullenshope	.....	.....	4 53 56	291 1	.....	.....	.....	.....	4 53 56	291 1	.....
ZA Richard'S Bay	.....	.....	4 53 37	291 2	.....	.....	.....	.....	4 53 37	291 2	.....
ZA Sace	.....	.....	4 53 57	291 1	.....	.....	.....	.....	4 53 57	291 1	.....
ZA Secunda	.....	.....	4 53 55	291 1	.....	.....	.....	.....	4 53 55	291 1	.....
ZA Skukuza	.....	.....	4 53 56	291 3	.....	.....	.....	.....	4 53 56	291 3	.....
ZA Springs	.....	.....	4 53 58	291 0	.....	.....	.....	.....	4 53 58	291 0	.....
ZA Swartkop	.....	.....	4 54 0	291 0	.....	.....	.....	.....	4 54 0	291 0	.....
ZA Thohoyandou	.....	.....	4 54 7	291 3	.....	.....	.....	.....	4 54 7	291 3	.....
ZA Tutuka	.....	.....	4 53 53	291 1	.....	.....	.....	.....	4 53 53	291 1	.....
ZA Tzaneen	.....	.....	4 54 4	291 3	.....	.....	.....	.....	4 54 4	291 3	.....
ZA Ulundi	.....	.....	4 53 41	291 2	.....	.....	.....	.....	4 53 41	291 2	.....
ZA Vryheid	.....	.....	4 53 45	291 1	.....	.....	.....	.....	4 53 45	291 1	.....
ZA Waterkloof	.....	.....	4 54 0	291 0	.....	.....	.....	.....	4 54 0	291 0	.....
ZA Witbank	.....	.....	4 53 58	291 1	.....	.....	.....	.....	4 53 58	291 1	.....
ZM Kalabo	.....	.....	4 54 56	290 0	.....	.....	.....	.....	4 54 56	290 0	.....
ZM Kasompe	.....	.....	4 54 54	290 6	.....	.....	.....	.....	4 54 54	290 6	.....
ZM Livingstone	.....	.....	4 54 39	290 2	.....	.....	.....	.....	4 54 39	290 2	.....
ZM Lusaka	4 36 51	293	4 54 43	290 5	.....	.....	4 36 51	293	4 54 43	290 5	.....
ZM Mansa	4 37 6	293	4 54 57	290 7	.....	.....	4 37 6	293	4 54 57	290 7	.....
ZM Mfuwe	4 36 51	293	4 54 42	290 9	.....	.....	4 36 51	293	4 54 42	290 9	.....
ZM Mongu	.....	.....	4 54 54	290 1	.....	.....	.....	.....	4 54 54	290 1	.....
ZM Mufulira	4 37 2	293	4 54 53	290 6	.....	.....	4 37 2	293	4 54 53	290 6	.....
ZM Ndola	4 37 0	293	4 54 51	290 6	.....	.....	4 37 0	293	4 54 51	290 6	.....
ZM Southdowns	4 37 1	293	4 54 53	290 6	.....	.....	4 37 1	293	4 54 53	290 6	.....
ZM Zambezi	.....	.....	4 55 0	290 1	.....	.....	.....	.....	4 55 0	290 1	.....
ZW Bulawayo	.....	.....	4 54 24	290 3	.....	.....	.....	.....	4 54 24	290 3	.....
ZW Chiredzi	.....	.....	4 54 13	290 5	.....	.....	.....	.....	4 54 13	290 5	.....
ZW Gwert	4 36 30	293	4 54 24	290 5	.....	.....	4 36 30	293	4 54 24	290 5	.....
ZW Harare	4 36 36	293	4 54 28	290 6	.....	.....	4 36 36	293	4 54 28	290 6	.....
ZW Hwange National Park	.....	.....	4 54 33	290 2	.....	.....	.....	.....	4 54 33	290 2	.....
ZW Kariba	4 36 45	293	4 54 38	290 5	.....	.....	4 36 45	293	4 54 38	290 5	.....
ZW Masvingo	4 36 26	293	4 54 19	290 5	.....	.....	4 36 26	293	4 54 19	290 5	.....
ZW Mutare	4 36 26	293	4 54 19	290 7	.....	.....	4 36 26	293	4 54 19	290 7	.....
ZW Mutoko	4 36 34	293	4 54 26	290 7	.....	.....	4 36 34	293	4 54 26	290 7	.....
ZW Victoria Falls	.....	.....	4 54 38	290 2	.....	.....	.....	.....	4 54 38	290 2	.....
ZW Zisco	4 36 32	293	4 54 26	290 5	.....	.....	4 36 32	293	4 54 26	290 5	.....
ZW Zvishavane	4 36 26	293	4 54 20	290 4	.....	.....	4 36 26	293	4 54 20	290 4	.....































Site	Exterior INGRESS		Interior INGRESS		Maximum		Interior EGRESS		Exterior EGRESS		Min. Seprn "
	U.T.	PA Alt	U.T.	PA	U.T.	PA Alt	U.T.	PA	U.T.	PA Alt	
	h m s	o o	h m s	o	h m s	o o	h m s	o	h m s	o o	
SE Borlange	..	..	..	..	..	..	4 36 45	291	4 54 24	289 19	.....
SE Byholma	..	..	..	..	..	..	4 37 1	291	4 54 41	289 17	.....
SE Emmaboda	..	..	..	..	..	..	4 37 1	291	4 54 41	289 18	.....
SE Eskilstuna	..	..	..	..	..	..	4 36 49	291	4 54 29	289 20	.....
SE Falkoping	..	..	..	..	..	..	4 36 55	291	4 54 35	289 18	.....
SE Fallfors	..	..	..	..	1 29 43	345 4	4 36 20	291	4 53 59	289 22	532.7
SE Farila	..	..	..	..	..	..	4 36 38	291	4 54 17	289 20	.....
SE Gallivare	..	..	..	..	1 29 36	345 5	4 36 10	291	4 53 49	289 22	532.7
SE Gavle	..	..	..	..	..	..	4 36 43	291	4 54 23	289 20	.....
SE Gimo	..	..	..	..	..	..	4 36 45	291	4 54 24	289 20	.....
SE Gothenborg	..	..	..	..	..	..	4 36 57	291	4 54 37	289 17	.....
SE Hagfors	..	..	..	..	..	..	4 36 47	291	4 54 27	289 18	.....
SE Hagshult	..	..	..	..	..	..	4 36 59	291	4 54 39	289 18	.....
SE Hallviken	..	..	..	..	1 29 41	345 1	4 36 29	291	4 54 9	289 20	532.6
SE Halmstad	..	..	..	..	..	..	4 37 1	291	4 54 42	289 17	.....
SE Hasslosa	..	..	..	..	..	..	4 36 54	291	4 54 34	289 18	.....
SE Hede	..	..	..	..	..	..	4 36 36	291	4 54 16	289 19	.....
SE Heden	..	..	..	..	1 29 42	345 4	4 36 16	291	4 53 55	289 23	532.7
SE Hemavan	..	..	..	..	1 29 34	345 3	4 36 19	291	4 53 58	289 20	532.7
SE Hudiksvall	..	..	..	..	1 29 50	345 0	4 36 38	291	4 54 17	289 20	532.7
SE Hultsfred	..	..	..	..	..	..	4 36 57	291	4 54 37	289 19	.....
SE Idre	..	..	..	..	..	..	4 36 38	291	4 54 18	289 18	.....
SE Joenkoeping	..	..	..	..	..	..	4 36 57	291	4 54 37	289 18	.....
SE Jokkmokk	..	..	..	..	1 29 38	345 5	4 36 14	291	4 53 53	289 22	532.7
SE Kalixfors	22 4 27-	42 0	22 22 14-	40	1 29 34	345 6	4 36 7	291	4 53 46	289 22	532.7
SE Kalkmar	..	..	..	..	..	..	4 37 1	291	4 54 41	289 19	.....
SE Karlsborg	..	..	..	..	..	..	4 36 53	291	4 54 33	289 18	.....
SE Karlskoga	..	..	..	..	..	..	4 36 50	291	4 54 30	289 18	.....
SE Kiruna	22 4 27-	42 0	22 22 15-	40	1 29 34	345 6	4 36 7	291	4 53 46	289 22	532.7
SE Knislinge	..	..	..	..	..	..	4 37 3	291	4 54 44	289 18	.....
SE Kosta	..	..	..	..	..	..	4 37 0	291	4 54 40	289 18	.....
SE Kramfors	..	..	..	..	1 29 46	345 1	4 36 32	291	4 54 11	289 21	532.7
SE Kristianstad	..	..	..	..	..	..	4 37 4	291	4 54 45	289 17	.....
SE Kubbe	..	..	..	..	1 29 45	345 2	4 36 29	291	4 54 8	289 21	532.7
SE Landskrona	..	..	..	..	..	..	4 37 5	291	4 54 45	289 17	.....
SE Lidkoping	..	..	..	..	..	..	4 36 54	291	4 54 34	289 18	.....
SE Linkoeping	..	..	..	..	..	..	4 36 54	291	4 54 33	289 19	.....
SE Ljungby	..	..	..	..	..	..	4 37 0	291	4 54 40	289 18	.....
SE Lulea	..	..	..	..	1 29 43	345 4	4 36 18	291	4 53 56	289 23	532.7
SE Lycksele	..	..	..	..	1 29 43	345 3	4 36 24	291	4 54 3	289 21	532.7
SE Malmo	..	..	..	..	..	..	4 37 6	291	4 54 47	289 17	.....
SE Mohed	..	..	..	..	1 29 40	345 3	4 36 22	291	4 54 2	289 21	532.7
SE Moholm	..	..	..	..	..	..	4 36 53	291	4 54 33	289 18	.....
SE Mora	..	..	..	..	..	..	4 36 42	291	4 54 22	289 19	.....
SE Norrkoeping	..	..	..	..	..	..	4 36 53	291	4 54 32	289 19	.....
SE Optand	..	..	..	..	1 29 42	345 1	4 36 32	291	4 54 12	289 19	532.6
SE Orebro	..	..	..	..	..	..	4 36 50	291	4 54 30	289 19	.....
SE Ornskoldsvik	..	..	..	..	1 29 47	345 2	4 36 29	291	4 54 9	289 21	532.7
SE Orsa	..	..	..	..	..	..	4 36 41	291	4 54 21	289 19	.....
SE Oskarshamn	..	..	..	..	..	..	4 36 58	291	4 54 38	289 19	.....
SE Ostersund	..	..	..	..	1 29 41	345 1	4 36 32	291	4 54 12	289 19	532.6
SE Pitea	..	..	..	..	1 29 43	345 4	4 36 19	291	4 53 58	289 22	532.7
SE Rada	..	..	..	..	..	..	4 36 54	291	4 54 34	289 18	.....
SE Ronneby	..	..	..	..	..	..	4 37 3	291	4 54 43	289 18	.....
SE Satenas	..	..	..	..	..	..	4 36 54	291	4 54 34	289 17	.....
SE Sattna	..	..	..	..	1 29 47	345 1	4 36 35	291	4 54 14	289 20	532.7
SE Skelleftea	..	..	..	..	1 29 45	345 3	4 36 23	291	4 54 2	289 22	532.7
SE Skovde	..	..	..	..	..	..	4 36 54	291	4 54 34	289 18	.....
SE Stockholm	..	..	..	..	..	..	4 36 49	291	4 54 29	289 20	.....
SE Strangnas	..	..	..	..	..	..	4 36 49	291	4 54 29	289 20	.....
SE Sundsvall	..	..	..	..	1 29 48	345 1	4 36 34	291	4 54 14	289 20	532.7
SE Sveg	..	..	..	..	..	..	4 36 37	291	4 54 17	289 19	.....
SE Torsby	..	..	..	..	..	..	4 36 46	291	4 54 26	289 18	.....
SE Trollhattan	..	..	..	..	..	..	4 36 54	291	4 54 35	289 17	.....
SE Umea	..	..	..	..	1 29 47	345 3	4 36 27	291	4 54 6	289 22	532.7
SE Uppsala	..	..	..	..	..	..	4 36 46	291	4 54 26	289 20	.....
SE Vasteras	..	..	..	..	..	..	4 36 48	291	4 54 28	289 20	.....
SE Vaxjo	..	..	..	..	..	..	4 37 0	291	4 54 40	289 18	.....
SE Vidsel	..	..	..	..	1 29 40	345 4	4 36 17	291	4 53 56	289 22	532.7
SE Vilhelmina	..	..	..	..	1 29 40	345 2	4 36 24	291	4 54 4	289 21	532.7
SE Visby	..	..	..	..	..	..	4 36 56	291	4 54 35	289 20	.....
SI Cerklje	..	..	..	..	..	..	4 37 41	291	4 55 22	289 16	.....
SI Ljubliana	..	..	..	..	..	..	4 37 40	291	4 55 21	289 15	.....
SI Maribor	..	..	..	..	..	..	4 37 39	291	4 55 20	289 16	.....
SI Portoroz	..	..	..	..	..	..	4 37 42	291	4 55 24	289 14	.....
SI Slovenj Gradec	..	..	..	..	..	..	4 37 39	291	4 55 20	289 16	.....

ITALIA

Site	Exterior U.T.		INGRESS PA Alt		Interior U.T.		INGRESS PA		Maximum U.T.		INGRESS PA		Exterior U.T.		EGRESS PA Alt		Min. Seprn
	h	m s	o	o	h	m s	o	o	h	m s	o	o	h	m s	o	o	
AGRIGENTO	4	38	4	291	4	55	46	289	12	.....							
ALESSANDRIA	4	37	44	291	4	55	27	289	11	.....							
ANCONA	4	37	48	291	4	55	30	289	14	.....							
AOSTA	4	37	41	291	4	55	24	289	10	.....							
AREZZO	4	37	49	291	4	55	31	289	13	.....							
ASCOLI PICENO	4	37	50	291	4	55	32	289	13	.....							
ASTI	4	37	44	291	4	55	27	289	11	.....							
AVELLINO	4	37	55	291	4	55	37	289	14	.....							
BARI	4	37	54	291	4	55	35	289	15	.....							
BELLUNO	4	37	41	291	4	55	22	289	14	.....							
BENEVENTO	4	37	54	291	4	55	36	289	14	.....							
BERGAMO	4	37	42	291	4	55	24	289	12	.....							
BOLOGNA	4	37	46	291	4	55	28	289	12	.....							
BOLZANO	4	37	40	291	4	55	21	289	13	.....							
BRESCIA	4	37	42	291	4	55	25	289	12	.....							
BRINDISI	4	37	54	291	4	55	35	289	16	.....							
CAGLIARI	4	37	59	291	4	55	43	289	9	.....							
CALTANISSETTA	4	38	3	291	4	55	46	289	12	.....							
CAMPOBASSO	4	37	53	291	4	55	35	289	14	.....							
CASERTA	4	37	55	291	4	55	37	289	13	.....							
CATANIA	4	38	3	291	4	55	45	289	13	.....							
CATANZARO	4	37	59	291	4	55	41	289	14	.....							
CHIETI	4	37	51	291	4	55	33	289	14	.....							
COMO	4	37	42	291	4	55	24	289	12	.....							
COSENZA	4	37	58	291	4	55	40	289	14	.....							
CREMONA	4	37	44	291	4	55	26	289	12	.....							
CUNEO	4	37	45	291	4	55	29	289	10	.....							
ENNA	4	38	3	291	4	55	45	289	12	.....							
FERRARA	4	37	45	291	4	55	27	289	13	.....							
FIRENZE	4	37	48	291	4	55	30	289	12	.....							
FOGGIA	4	37	53	291	4	55	35	289	14	.....							
FORLI`	4	37	46	291	4	55	28	289	13	.....							
FROSINONE	4	37	53	291	4	55	35	289	13	.....							
GENOVA	4	37	46	291	4	55	28	289	11	.....							
GORIZIA	4	37	41	291	4	55	22	289	14	.....							
GROSSETO	4	37	51	291	4	55	33	289	12	.....							
IMPERIA	4	37	47	291	4	55	30	289	10	.....							
ISERNIA	4	37	54	291	4	55	36	289	14	.....							
LA SPEZIA	4	37	47	291	4	55	29	289	11	.....							
L'AQUILA	4	37	52	291	4	55	33	289	13	.....							
LATINA	4	37	54	291	4	55	36	289	13	.....							
LECCE	4	37	55	291	4	55	36	289	16	.....							
LIVORNO	4	37	48	291	4	55	31	289	11	.....							
LUCCA	4	37	48	291	4	55	30	289	12	.....							
MACERATA	4	37	49	291	4	55	31	289	14	.....							
MANTOVA	4	37	44	291	4	55	26	289	12	.....							
MASSA	4	37	47	291	4	55	29	289	11	.....							
MATERA	4	37	55	291	4	55	36	289	15	.....							
MESSINA	4	38	1	291	4	55	43	289	13	.....							
MILANO	4	37	43	291	4	55	25	289	11	.....							
MODENA	4	37	45	291	4	55	27	289	12	.....							
NAPOLI	4	37	55	291	4	55	37	289	13	.....							
NOVARA	4	37	42	291	4	55	25	289	11	.....							
NUORO	4	37	57	291	4	55	40	289	10	.....							
ORISTANO	4	37	58	291	4	55	41	289	9	.....							
PADOVA	4	37	43	291	4	55	25	289	13	.....							
PALERMO	4	38	2	291	4	55	45	289	12	.....							
PARMA	4	37	45	291	4	55	27	289	12	.....							
PAVIA	4	37	43	291	4	55	26	289	11	.....							
PERUGIA	4	37	50	291	4	55	32	289	13	.....							
PESARO	4	37	47	291	4	55	29	289	13	.....							
PESCARA	4	37	51	291	4	55	33	289	14	.....							
PIACENZA	4	37	44	291	4	55	26	289	12	.....							
PISA	4	37	48	291	4	55	30	289	12	.....							
PISTOIA	4	37	47	291	4	55	30	289	12	.....							
PORDENONE	4	37	41	291	4	55	23	289	14	.....							
POTENZA	4	37	55	291	4	55	37	289	14	.....							
RAGUSA	4	38	4	291	4	55	47	289	12	.....							
RAVENNA	4	37	46	291	4	55	28	289	13	.....							
REGGIO CALABRIA	4	38	1	291	4	55	43	289	14	.....							
REGGIO EMILIA	4	37	45	291	4	55	27	289	12	.....							
RIETI	4	37	52	291	4	55	34	289	13	.....							
ROMA	4	37	53	291	4	55	35	289	12	.....							
ROVIGO	4	37	44	291	4	55	26	289	13	.....							
SALERNO	4	37	56	291	4	55	37	289	14	.....							
SASSARI	4	37	56	291	4	55	39	289	9	.....							
SAVONA	4	37	46	291	4	55	29	289	10	.....							
SIENA	4	37	49	291	4	55	31	289	12	.....							
SIRACUSA	4	38	4	291	4	55	46	289	13	.....							
SONDRIO	4	37	40	291	4	55	23	289	12	.....							
TARANTO	4	37	55	291	4	55	36	289	15	.....							
TERAMO	4	37	51	291	4	55	32	289	14	.....							
TERNI	4	37	51	291	4	55	33	289	13	.....							
TORINO	4	37	43	291	4	55	26	289	10	.....							
TRAPANI	4	38	2	291	4	55	45	289	11	.....							
TRENTO	4	37	41	291	4	55	23	289	13	.....							
TREVISO	4	37	42	291	4	55	24	289	13	.....							
TRIESTE	4	37	42	291	4	55	23	289	14	.....							
UDINE	4	37	41	291	4	55	22	289	14	.....							
VARESE	4	37	44	291	4	55	27	289	11	.....							
VENEZIA	4	37	43	291	4	55	24	289	13	.....							
VERCELLI	4	37	43	291	4	55	26	289	11	.....							
VERONA	4	37	43	291	4	55	25	289	13	.....							
VICENZA	4	37	42	291	4	55	24	289	13	.....							
VITERBO	4	37	52	291	4	55	34	289	12	.....							





























Site	Exterior INGRESS				Interior INGRESS				Maximum				Interior EGRESS			Exterior EGRESS			Min. Sepn "					
	U.T.		PA Alt		U.T.		PA		U.T.		PA Alt		U.T.		PA		U.T.			PA Alt				
	h	m	s	o	o	h	m	s	o	h	m	s	o	o	h	m	s	o		h	m	s	o	o
PE Moquegua	22	7	11-	40	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Moyobamba	22	6	26-	40	11	22	24	23-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Nazca	22	7	8-	40	6	22	25	8-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Pisco	22	7	6-	40	7	22	25	5-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Piura	22	6	34-	40	15	22	24	29-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Pucallpa	22	6	32-	40	8	22	24	29-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Puerto Esperanza	22	6	28-	40	4	22	24	27-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Puerto Maldonado	22	6	40-	40	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE San Juan	22	7	12-	40	6	22	25	12-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE San Ramon	22	6	49-	40	8	22	24	47-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Shapaja	..	..	..	..	..	..	..	..	..	..	..	..	..	4	37	13	291	4	54	53	289	18	..	..
PE Tacna	22	7	14-	40	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Talara	22	6	33-	40	16	22	24	28-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Tarapoto	22	6	27-	40	11	22	24	24-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Tingo Maria	22	6	41-	40	9	22	24	38-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Trujillo	22	6	44-	40	12	22	24	41-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Tumbes	22	6	25-	40	15	22	24	20-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PE Yurimaguas	22	6	23-	40	11	22	24	19-	37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Acarigua	22	4	52-	40	11	22	22	44-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Anaco	22	4	41-	40	6	22	22	34-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Barcelona	22	4	39-	41	7	22	22	32-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Barinas	22	4	58-	40	11	22	22	51-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Barquisimeto	22	4	50-	40	11	22	22	42-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Caicara De Orinoco	22	4	52-	40	7	22	22	46-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Calabozo	22	4	50-	40	9	22	22	43-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Canaima	22	4	50-	40	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Caracas	22	4	42-	41	9	22	22	34-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Carora	22	4	51-	40	12	22	22	43-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Carrizal	22	4	47-	40	8	22	22	39-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Carupano	22	4	33-	41	6	22	22	26-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Ciudad Bolivar	22	4	44-	40	5	22	22	38-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Coro	22	4	46-	40	12	22	22	37-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Cumana	22	4	36-	41	6	22	22	29-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE El Dorado	22	4	46-	40	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Elorza	22	5	3-	40	10	22	22	56-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Guanare	22	4	55-	40	11	22	22	48-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Guasdalito	22	5	5-	40	11	22	22	58-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Guayana	22	4	42-	40	4	22	22	36-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Guiria	22	4	32-	41	5	22	22	25-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Hiquerote	22	4	40-	41	8	22	22	33-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Isla De Coche	22	4	34-	41	6	22	22	27-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE La Fria	22	5	5-	40	13	22	22	57-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE La Orchila	22	4	35-	41	9	22	22	28-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Maracaibo	22	4	45-	40	9	22	22	37-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Maracaibo	22	4	54-	40	13	22	22	46-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Maracay	22	4	45-	40	9	22	22	37-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Maturin	22	4	37-	41	5	22	22	30-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Merida	22	5	1-	40	12	22	22	53-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Palmarito	22	5	2-	40	11	22	22	55-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Paraguana	22	4	45-	41	12	22	22	37-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Porlamar	22	4	34-	41	6	22	22	27-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Puerto Ayacucho	22	5	4-	40	8	22	22	58-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Puerto Cabello	22	4	45-	40	10	22	22	37-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Antonio	22	5	7-	40	13	22	23	0-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Carlos	22	4	50-	40	10	22	22	42-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Cristobal	22	5	7-	40	13	22	22	59-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Felipe	22	4	48-	40	10	22	22	40-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Fernando De Apure	22	4	54-	40	8	22	22	47-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Fernando Deatabapo	22	5	11-	40	7	22	23	6-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Juan De Los Morros	22	4	46-	40	9	22	22	38-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE San Tome	22	4	42-	40	6	22	22	35-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Santa Barbara	22	5	1-	40	13	22	22	53-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Santo Domingo	22	5	7-	40	12	22	23	0-	38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Tucupita	22	4	37-	41	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VE Tumeremo	22	4	43-	40	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

# SCIAMI METEORICI - METEOR SHOWERS

Shower	Activity	Maximum Date	$\lambda_{\odot}$	Radiant		$V_{\infty}$ km/s	$r$	ZHR
				$\alpha$	$\delta$			
Quadrantids (QUA)	Dec 28 - Jan 12	Jan 04	283.16°	230°	+49°	41	2.1	120
$\alpha$ -Centaurids (ACE)	Jan 28 - Feb 21	Feb 08	319.2°	210°	-59°	56	2.0	6
$\gamma$ -Normids (GNO)	Feb 25 - Mar 22	Mar 15	354°	239°	-50°	56	2.4	6
Lyrids (LYR)	Apr 16 - Apr 25	Apr 22	32.32°	271°	+34°	49	2.1	18
$\pi$ -Puppids (PPU)	Apr 15 - Apr 28	Apr 24	33.5°	110°	-45°	18	2.0	Var
$\eta$ -Aquariids (ETA)	Apr 19 - May 28	May 06	45.5°	338°	-01°	66	2.4	70*
$\eta$ -Lyrids (ELY)	May 03 - May 14	May 09	48.0°	287°	+44°	43	3.0	3
June Bootids (JBO)	Jun 22 - Jul 02	Jun 27	95.7°	224°	+48°	18	2.2	Var
Piscis Austrinids (PAU)	Jul 15 - Aug 10	Jul 28	125°	341°	-30°	35	3.2	5
South. $\delta$ -Aquariids (SDA)	Jul 12 - Aug 23	Jul 30	127°	340°	-16°	41	3.2	16
$\alpha$ -Capricornids (CAP)	Jul 03 - Aug 15	Jul 30	127°	307°	-10°	23	2.5	5
Perseids (PER)*	Jul 17 - Aug 24	Aug 13	140.0°	48°	+58°	59	2.2	100
$\kappa$ -Cygnids (KCG)	Aug 03 - Aug 25	Aug 18	145°	286°	+59°	25	3.0	3
$\alpha$ -Aurigids (AUR)	Aug 28 - Sep 10	Sep 01	158.6°	93°	+39°	67	2.5	6
September $\varepsilon$ -Perseids (SPE)	Sep 05 - Sep 21	Sep 10	166.7°	48°	+40°	66	3.0	5
$\delta$ -Aurigids (DAU)	Oct 10 - Oct 18	Oct 12	198°	84°	+44°	67	3.0	2
Draconids (DRA)	Oct 06 - Oct 10	Oct 08	195.4°	262°	+54°	20	2.6	Var
Southern Taurids (STA)	Sep 10 - Nov 20	Oct 10	197°	32°	+09°	27	2.3	5
$\varepsilon$ -Geminids (EGE)	Oct 14 - Oct 27	Oct 18	205°	102°	+27°	70	3.0	3
Orionids (ORI)	Oct 02 - Nov 07	Oct 21	208°	95°	+16°	66	2.5	25*
Leo Minorids (LMI)	Oct 19 - Oct 27	Oct 24	211°	161°	+38°	62	3.0	2
Northern Taurids (NTA)	Oct 20 - Dec 10	Nov 12	230°	58°	+22°	29	2.3	5
Leonids (LEO)	Nov 06 - Nov 30	Nov 18	235.27°	152°	+22°	71	2.5	20+*
$\alpha$ -Monocerotids (AMO)	Nov 15 - Nov 25	Nov 22	239.32°	117°	+01°	65	2.4	Var
Phoenicids (PHO)	Nov 28 - Dec 09	Dec 06	254.25°	18°	-53°	18	2.8	Var
Puppilid-Velids (PUP)	Dec 01 - Dec 15	(Dec 07)	(255°)	123°	-45°	40	2.9	10
Monocerotids (MON)	Nov 27 - Dec 17	Dec 09	257°	100°	+08°	42	3.0	2
$\sigma$ -Hydrids (HYD)	Dec 03 - Dec 15	Dec 12	260°	127°	+02°	58	3.0	3
Geminids (GEM)	Dec 07 - Dec 17	Dec 14	262.2°	112°	+33°	35	2.6	120
Dec. Leonis Minorids (DLM)	Dec 05 - Feb 04	Dec 20	268°	161°	+30°	64	3.0	5
Comae Berenicids (COM)	Dec 12 - Dec 23	Dec 16	264°	175°	+18°	65	3.0	3
Ursids (URS)	Dec 17 - Dec 26	Dec 23	270.7°	217°	+76°	33	3.0	10

\* Sciami con più picchi

\* An asterisk '\*' in the 'Shower' column indicates that source may have additional peak

Shower : sciame meteorico  
 Activity : periodo di attività  
 Max : data prevista del massimo

Fonte : [www.imo.net](http://www.imo.net)

# VISIBILITA' DEI RADIANTI VISIBILITY OF THE SHOWERS

Roma : 42 N, 12 E (UT)

Oggetto: Quadrantidi

Data	Ora	Alt	Az	Sole	Luna
2012:01:03	18:00	7.4	335.0	Crep.a	Sopra
2012:01:03	19:00	3.5	344.0	Notte	Sopra
2012:01:03	20:00	1.3	353.7	Notte	Sopra
2012:01:03	21:00	1.0	3.5	Notte	Sopra
2012:01:03	22:00	2.6	13.2	Notte	Sopra
2012:01:03	23:00	6.1	22.5	Notte	Sopra
2012:01:04	00:00	11.1	31.0	Notte	Sopra
2012:01:04	01:00	17.5	38.8	Notte	Sopra
2012:01:04	02:00	25.1	45.6	Notte	Sopra
2012:01:04	03:00	33.5	51.5	Notte	Sopra
2012:01:04	04:00	42.5	56.4	Notte	Sotto
2012:01:04	05:00	52.1	60.1	Notte	Sotto
2012:01:04	06:00	61.9	61.8	Crep.a	Sotto
2012:01:04	07:00	71.7	58.9	Crep.n	Sotto

Oggetto: Liridi

Data	Ora	Alt	Az	Sole	Luna
2012:04:22	20:00	2.5	44.6	Crep.n	Sopra
2012:04:22	21:00	11.0	53.8	Notte	Sotto
2012:04:22	22:00	20.5	62.2	Notte	Sotto
2012:04:22	23:00	30.7	70.1	Notte	Sotto
2012:04:23	00:00	41.5	77.9	Notte	Sotto
2012:04:23	01:00	52.5	86.3	Notte	Sotto
2012:04:23	02:00	63.7	96.9	Notte	Sotto
2012:04:23	03:00	74.5	115.0	Notte	Sotto
2012:04:23	04:00	82.0	168.4	Crep.a	Sotto

Oggetto: Perseidi

Data	Ora	Alt	Az	Sole	Luna
2012:08:12	20:00	13.2	16.3	Crep.n	Sotto
2012:08:12	21:00	17.0	23.6	Crep.a	Sotto

2012:08:12	22:00	22.1	30.1	Notte	Sotto
2012:08:12	23:00	28.2	35.7	Notte	Sotto
2012:08:13	00:00	35.1	40.4	Notte	Sotto
2012:08:13	01:00	42.6	43.7	Notte	Sotto
2012:08:13	02:00	50.5	45.3	Notte	Sopra
2012:08:13	03:00	58.4	44.2	Notte	Sopra
2012:08:13	04:00	65.9	38.3	Crep.a	Sopra
2012:08:13	05:00	71.8	23.3	Crep.c	Sopra

Oggetto: Leonidi

Data	Ora	Alt	Az	Sole	Luna
2012:11:17	23:00	-0.6	59.2	Notte	Sotto
2012:11:18	00:00	9.5	68.9	Notte	Sotto
2012:11:18	01:00	20.2	78.1	Notte	Sotto
2012:11:18	02:00	31.3	87.5	Notte	Sotto
2012:11:18	03:00	42.5	98.0	Notte	Sotto
2012:11:18	04:00	53.3	111.2	Notte	Sotto
2012:11:18	05:00	62.9	130.5	Notte	Sotto
2012:11:18	06:00	69.3	161.8	Crep.n	Sotto

Oggetto: Geminidi

Data	Ora	Alt	Az	Sole	Luna
2012:12:14	18:00	2.5	46.2	Crep.a	Sopra
2012:12:14	19:00	11.2	55.4	Notte	Sotto
2012:12:14	20:00	20.9	63.8	Notte	Sotto
2012:12:14	21:00	31.2	71.8	Notte	Sotto
2012:12:14	22:00	42.1	79.9	Notte	Sotto
2012:12:14	23:00	53.2	88.7	Notte	Sotto
2012:12:15	00:00	64.4	100.3	Notte	Sotto
2012:12:15	01:00	74.9	121.0	Notte	Sotto
2012:12:15	02:00	81.1	177.8	Notte	Sotto
2012:12:15	03:00	75.4	237.3	Notte	Sotto
2012:12:15	04:00	65.0	259.0	Notte	Sotto
2012:12:15	05:00	53.8	270.7	Notte	Sotto
2012:12:15	06:00	42.7	279.7	Crep.a	Sotto

Data, ora, altezza ed azimut dei principali radianti; posizione del Sole (giorno, crepuscolo civile, crepuscolo nautico, crepuscolo astronomico, notte); Luna (sopra o sotto l'orizzonte)

Date, times, height and azimuth of some radiants; position of the Sun (giorno=day, crep.c.=civil twilight, crep.n.=nautical twilight, crep.a.=astronomical twilight, notte=night); Moon (sopra=up or sotto=down the horizon)

# TABELLA DI CONVERSIONE MAGNITUDINE ASSOLUTA

## TABLE OF CONVERSION OF ABSOLUTE MAGNITUDE

UA-H	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0,001	918,09	579,28	365,50	230,62	145,51	91,81	57,93	36,55	23,06	14,55	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37
0,005	183,62	115,86	73,10	46,12	29,10	18,36	11,59	7,31	4,61	2,91	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07
0,01	91,81	57,93	36,55	23,06	14,55	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04
0,05	18,36	11,59	7,31	4,61	2,91	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01
0,1	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00
0,2	4,59	2,90	1,83	1,15	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00
0,3	3,06	1,93	1,22	0,77	0,49	0,31	0,19	0,12	0,08	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00
0,4	2,30	1,45	0,91	0,58	0,36	0,23	0,14	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00
0,5	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,6	1,53	0,97	0,61	0,38	0,24	0,15	0,10	0,06	0,04	0,02	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,7	1,31	0,83	0,52	0,33	0,21	0,13	0,08	0,05	0,03	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,8	1,15	0,72	0,46	0,29	0,18	0,11	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
0,9	1,02	0,64	0,41	0,26	0,16	0,10	0,06	0,04	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
1	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
1,5	0,61	0,39	0,24	0,15	0,10	0,06	0,04	0,02	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Utilizzo: conoscendo la magnitudine assoluta di un asteroide (H) e la sua distanza dalla Terra (UA) la tabella fornisce il diametro minimo del corpo in secondi d'arco.  
 Esempio: un asteroide con H=4 che si trovi a 0.05 U.A. dalla Terra avrà una dimensione minima di circa 11.6" d'arco. La dimensione massima è pari a circa il doppio.

How to use: knowing the absolute magnitude of an asteroid (H) and its distance from the Earth (UA) the chart furnishes the least diameter of the body in seconds of arc.

## ΔT DIFFERENZA TDT-UT      ΔT DIFFERENCE TDT-UT



Differenza in secondi tra il Tempo Dinamico Terrestre ed il Tempo Universale, utile al fine di calcolare gli istanti geocentrici e topocentrici dei fenomeni celesti

Difference in second between Terrestrial Dynamical Time and the Universal Time, useful with the purpose to calculate the instants of the geocentric and topocentric celestial phenomena

**CORREZIONI DELL'ISTANTE DEL SORGERE E  
TRAMONTARE DEL SOLE, DELLA LUNA E DEI PIANETI  
PER LATITUDINI DIVERSE DA 42°  
CORRECTION OF RISING AND SETTING OF THE SUN,  
THE MOON AND THE PLANETS FOR LATITUDE DIFFERENT  
FROM 42°**

	36	37	38	39	40	41	42	43	44	45	46	47	48
30	29	25	20	15	10	5	0	-5	-10	-16	-22	-28	-34
29	27	23	19	14	10	5	0	-5	-10	-15	-21	-27	-33
28	25	21	17	13	9	4	0	-5	-10	-15	-20	-25	-31
27	24	20	16	12	8	4	0	-5	-9	-14	-19	-24	-29
26	22	19	15	11	7	4	0	-5	-9	-13	-18	-23	-28
25	21	18	14	11	7	3	0	-4	-8	-13	-17	-21	-26
24	20	17	13	10	7	3	0	-4	-8	-12	-16	-20	-25
23	19	16	13	10	6	3	0	-4	-7	-11	-15	-19	-23
22	18	15	12	9	6	3	0	-3	-7	-10	-14	-18	-22
21	17	14	11	9	6	3	0	-3	-6	-10	-13	-17	-22
20	16	13	11	8	6	3	0	-3	-6	-9	-12	-15	-19
19	15	13	11	8	6	3	0	-2	-5	-8	-11	-14	-17
18	14	11	9	7	5	2	0	-3	-5	-8	-11	-14	-17
17	13	11	9	7	5	2	0	-2	-5	-7	-10	-13	-16
16	12	10	9	7	5	2	0	-2	-4	-7	-9	-12	-14
15	11	9	7	5	4	2	0	-2	-5	-7	-9	-11	-14
14	10	9	7	5	4	2	0	-2	-4	-6	-8	-10	-12
13	10	8	7	5	4	2	0	-1	-3	-5	-7	-9	-11
12	9	7	6	4	3	1	0	-2	-4	-5	-7	-9	-11
11	8	7	6	4	3	2	0	-1	-3	-4	-6	-8	-9
10	7	6	4	3	2	1	0	-2	-3	-5	-6	-8	-9
9	6	5	4	3	2	1	0	-1	-2	-4	-5	-6	-8
8	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6
7	5	4	3	2	2	1	0	-1	-2	-3	-4	-5	-6
6	5	4	3	2	2	1	0	-1	-1	-2	-3	-4	-5
5	3	3	2	2	1	0	0	-1	-2	-2	-3	-4	-5
4	3	3	2	2	1	1	0	0	-1	-1	-2	-3	-3
3	2	1	1	1	0	0	0	-1	-1	-2	-2	-2	-3
2	1	1	1	1	1	0	0	0	0	-1	-1	-1	-2
1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	1	1	1	1	1	1
-2	-1	-1	-1	-1	-1	0	0	0	0	1	1	1	2
-3	-2	-1	-1	-1	0	0	0	1	1	2	2	2	3
-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	3	3
-5	-3	-3	-2	-2	-1	0	0	1	2	2	3	4	5
-6	-5	-4	-3	-2	-2	-1	0	1	1	2	3	4	5
-7	-5	-4	-3	-2	-2	-1	0	1	2	3	4	5	6
-8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
-9	-6	-5	-4	-3	-2	-1	0	1	2	4	5	6	8
-10	-7	-6	-4	-3	-2	-1	0	2	3	5	6	8	9
-11	-8	-7	-6	-4	-3	-2	0	1	3	4	6	8	9
-12	-9	-7	-6	-4	-3	-1	0	2	4	5	7	9	11
-13	-10	-8	-7	-5	-4	-2	0	1	3	5	7	9	11
-14	-10	-9	-7	-5	-4	-2	0	2	4	6	8	10	12
-15	-11	-9	-7	-5	-4	-2	0	2	5	7	9	11	14
-16	-12	-10	-9	-7	-5	-2	0	2	4	7	9	12	14
-17	-13	-11	-9	-7	-5	-2	0	2	5	7	10	13	16
-18	-14	-11	-9	-7	-5	-2	0	3	5	8	11	14	17
-19	-15	-13	-11	-8	-6	-3	0	2	5	8	11	14	17
-20	-16	-13	-11	-8	-6	-3	0	3	6	9	12	15	19
-21	-17	-14	-11	-9	-6	-3	0	3	6	10	13	17	20
-22	-18	-15	-12	-9	-6	-3	0	3	7	10	14	18	22
-23	-19	-16	-13	-10	-6	-3	0	4	7	11	15	19	23
-24	-20	-17	-13	-10	-7	-3	0	4	8	12	16	20	25
-25	-21	-18	-14	-11	-7	-3	0	4	8	13	17	21	26
-26	-22	-19	-15	-11	-7	-4	0	5	9	13	18	23	28
-27	-24	-20	-16	-12	-8	-4	0	5	9	14	19	24	29
-28	-25	-21	-17	-13	-9	-4	0	5	10	15	20	25	31
-29	-27	-23	-19	-14	-10	-5	0	5	10	15	21	27	33
-30	-29	-25	-20	-15	-10	-5	0	5	10	16	22	28	34

I valori sono espressi in minuti di tempo e vanno presi con il segno indicato per il sorgere dell'oggetto, e col segno opposto per il tramonto.

In alto sono indicati i valori della latitudine, a sinistra i valori della declinazione.

Vanno aggiunti anche 4 minuti ogni grado di longitudine più verso ovest rispetto ai 12° di tutte le tabelle dell'almanacco. Sottratti se verso est.

Esempio : 01/01/2009, declinazione del Sole - 23° circa. Esso sorge a Roma (42°N) alle 07.40 e tramonta alle 16.51. Per un luogo alla stessa longitudine, ma a 46° N, il Sole sorge alle 07.40+ 15 minuti =7.55 e tramonta alle 16.51- 15 minuti =16.36 circa.

The values are express in minutes of time and must be taken with the suitable sign for rising, and with the opposite sign for the sunseting.

Aloft are suitable the values of the latitude, to the left the values of the declination. They must also be added 4 minutes every degree of longitude toward west in comparison to the 12° of all the charts of the almanac. Subtracted if toward east.

## ORIZZONTE REALE - REAL HORIZON

E' la distanza dell'orizzonte visibile da un osservatore in una giornata perfettamente limpida, trascurando la rifrazione atmosferica.

It is the distance of the visible horizon from an observer in a perfectly clear day, neglecting the atmospheric refraction.

h (m)	km
0	0,0
1	3,6
2	5,0
3	6,2
4	7,1
5	8,0
6	8,7
7	9,4
8	10,1
9	10,7
10	11,3
20	16,0

30	19,6
40	22,6
50	25,2
60	27,7
70	29,9
80	31,9
90	33,9
100	35,7
200	50,5
300	61,8
400	71,4
500	79,8
600	87,4

700	94,5
800	101,0
900	107,1
1000	112,9
1100	118,4
1200	123,7
1300	128,7
1400	133,6
1500	138,3
1600	142,8
1700	147,2
1800	151,5
1900	155,6

2000	159,7
2100	163,6
2200	167,4
2300	171,2
2400	174,9
2500	178,5
2600	182,0
2700	185,5
2800	188,9
2900	192,3

H è l'altezza a cui ci si trova sul livello del mare, in metri  
Esempio, da quota 1600 metri l'orizzonte si estende per 143 km circa.

## RIFRAZIONE - REFRACTION

Angolo in gradi Angle in degrees	Errore in primi Error in primi	Angolo in gradi Angle in degrees	Errore in primi Error in primi
0	34.5	11	4.9
15'	31.4	12	4.5
30'	28.7	13	4.1
45'	26.4	14	3.8
1.00	24.3	15	3.6
1.15	22.5	16	3.3
1.30	20.9	17	3.1
1.45	19.5	18	2.9
2.00	18.3	19	2.8
2.15	17.2	20	2.6
2.30	16.1	25	2.1
2.45	15.2	30	1.7
3.00	14.4	35	1.4
4.30	10.7	50	0.8
5	9.9	55	0.7
6	8.5	60	0.6
7	7.4	65	0.5
8	6.6	70	0.4
9	5.9	80	0.2
10	5.3	90	0.0

# COORDINATE DI ALCUNE CITTA' ITALIANE

## ITALIAN LOCALITIES COORDINATES

Località	Longitudine	Latitudine	Altezza	Località	Longitudine	Latitudine	Altezza
AGRIGENTO	13 36	37 17	230	MESSINA	15 34	38 11	3
ALESSANDRIA	8 36	44 54	95	MILANO	9 11	45 27	122
ANCONA	13 30	43 37	16	MODENA	10 53	44 38	34
AOSTA	7 19	45 44	583	NAPOLI	14 15	40 51	115
AREZZO	11 53	43 27	296	NOVARA	8 37	45 26	159
ASCOLI PICENO	13 34	42 51	154	NUORO	9 20	40 19	532
ASTI	8 12	44 54	123	ORISTANO	8 36	39 54	3
AVELLINO	14 47	40 54	348	PADOVA	11 52	45 24	38
BARI	16 52	41 07	5	PALERMO	13 22	38 08	23
BELLUNO	12 13	46 08	383	PARMA	10 20	44 48	55
BENEVENTO	14 46	41 07	135	PAVIA	9 09	45 11	77
BERGAMO	9 39	45 42	249	PERUGIA	12 23	43 06	493
BOLOGNA	11 21	44 29	84	PESARO	12 54	43 54	11
BOLZANO	11 21	46 29	262	PESCARA	14 12	42 27	4
BRESCIA	10 13	45 32	149	PIACENZA	9 41	45 03	80
BRINDISI	17 46	40 39	15	PISA	10 23	43 43	4
CAGLIARI	9 07	39 13	4	PISTOIA	10 55	43 55	65
CALTANISSETTA	14 03	37 28	568	PORDENONE	12 38	45 57	0
CAMPOBASSO	14 39	41 33	786	POTENZA	15 48	40 38	820
CASERTA	14 19	41 04	68	RAGUSA	14 45	36 56	502
CATANIA	15 05	37 30	47	RAVENNA	12 12	44 25	4
CATANZARO	16 35	38 54	343	REGGIO CALABRIA	15 38	38 06	15
CHIETI	14 10	42 21	330	REGGIO EMILIA	10 37	44 41	58
COMO	9 15	45 47	201	RIETI	12 51	42 24	406
COSENZA	16 15	39 17	238	ROMA	12 27	41 55	143
CREMONA	10 01	45 08	45	ROVIGO	11 47	45 04	7
CUNEO	7 33	44 23	534	SALERNO	14 45	40 40	4
ENNA	14 17	37 32	931	SASSARI	8 33	40 43	225
FERRARA	11 35	44 50	9	SAVONA	8 29	44 18	4
FIRENZE	11 15	43 45	184	SIENA	11 20	43 19	322
FOGGIA	15 32	41 27	72	SIRACUSA	15 18	37 03	17
FORLI`	12 02	44 13	34	SONDRIO	9 52	46 10	307
FROSINONE	13 21	41 38	291	TARANTO	17 13	40 28	15
GENOVA	8 55	44 25	108	TERAMO	13 44	42 39	398
GORIZIA	13 37	45 56	84	TERNI	12 38	42 33	130
GROSSETO	11 06	42 45	10	TORINO	7 41	45 04	239
IMPERIA	8 01	43 52	22	TRAPANI	12 30	38 01	3
ISERNIA	14 15	41 24	0	TRENTO	11 07	46 03	194
L'AQUILA	13 24	42 21	714	TREVISO	12 14	45 39	15
LA SPEZIA	9 49	44 05	3	TRIESTE	13 45	45 38	67
LATINA	12 54	41 27	21	UDINE	13 14	46 03	113
LECCE	18 10	40 21	49	VARESE	8 48	45 00	000
LIVORNO	10 18	43 31	3	VENEZIA	12 20	45 26	1
LUCCA	10 30	43 50	327	VERCELLI	8 25	45 19	130
MACERATA	13 25	43 17	314	VERONA	10 59	45 26	59
MANTOVA	10 47	45 09	19	VICENZA	11 32	45 32	39
MASSA	10 08	44 01	65	VITERBO	12 06	42 24	325
MATERA	16 36	40 39	399				

Longitudine Est e Latitudine Nord

# POTERE RISOLUTIVO DELL'OCCHIO RESOLUTION POWER OF THE EYE

Potere risolutivo dell'occhio nudo in funzione della magnitudine visuale delle due stelle "osservate".

mag1	mag2	p"	mag1	mag2	p"
-3.0	-3.0	1910.18	0.0	0.0	480.56
-3.0	-2.0	1558.02	0.0	1.0	391.96
-3.0	-1.0	1335.71	0.0	2.0	336.04
-3.0	0.0	1195.37	0.0	3.0	300.73
-3.0	1.0	1106.77	0.0	4.0	278.44
-3.0	2.0	1050.85	0.0	5.0	264.37
-3.0	3.0	1015.54	0.0	6.0	255.49
-3.0	4.0	993.25			
-3.0	5.0	979.18	1.0	1.0	303.37
-3.0	6.0	970.30	1.0	2.0	247.44
			1.0	3.0	212.13
-2.0	-2.0	1205.86	1.0	4.0	189.85
-2.0	-1.0	983.55	1.0	5.0	175.78
-2.0	0.0	843.21	1.0	6.0	166.89
-2.0	1.0	754.62			
-2.0	2.0	698.69	2.0	2.0	191.51
-2.0	3.0	663.38	2.0	3.0	156.21
-2.0	4.0	641.09	2.0	4.0	133.92
-2.0	5.0	627.02	2.0	5.0	119.85
-2.0	6.0	618.14	2.0	6.0	110.96
-1.0	-1.0	761.24	3.0	3.0	120.90
-1.0	0.0	620.90	3.0	4.0	98.61
-1.0	1.0	532.31	3.0	5.0	84.54
-1.0	2.0	476.38	3.0	6.0	75.66
-1.0	3.0	441.07			
-1.0	4.0	418.78	4.0	4.0	76.32
-1.0	5.0	404.71	4.0	5.0	62.25
-1.0	6.0	395.83	4.0	6.0	53.37
			5.0	5.0	48.18
			5.0	6.0	39.30
			6.0	6.0	30.42

Prese due stelle o oggetti di magnitudine mag1 e mag2, se la loro distanza angolare è minore del valore p indicato, l'occhio le vedrà come un oggetto unico

# ELENCO DELLE STELLE CON MAGNITUDINE < 5

## STARS WITH MAGNITUDE < 5

-1.5 Alpha CMA Sirius	2.6 Kappa VEL Markeb	3.1 Gamma PER	3.5 Epsilon HYA
-0.8 Alpha CAR Canopus	2.6 Gammal LEO Algieba	3.1 Delta PER	3.5 Lambda UMA Tania Bor.
0.0 Alpha1 CEN	2.6 Delta LEO Zosma	3.1 PUP L2 (v)	3.5 Beta PAV
RigelKentaur	2.6 Alpha PEG Markab	3.1 Beta CMI Gomeisa	3.5 Beta LYR Sheliak
0.1 Alpha LYR Vega	2.6 Beta PEG Scheat	3.1 Iota UMA Talitha	3.5 Mu HER
0.2 Beta ORI Rigel	2.6 Alpha CEP Alderamin	3.1 Epsilon LEO Asad Austr.	3.5 Gamma ARA
0.2 Alpha AUR Capella	2.6 Epsilon CYG Gienah	3.1 Psi UMA	3.5 Alpha1 HER Rasalgethi
0.2 Alpha BOO Arcturus	2.6 Eta OPH Sabik	3.1 Eta PEG Matar	3.5 Iota DRA Edasich
0.5 Alpha CMI Procyon	2.6 Zeta OPH Han	3.1 Gamma GRU	3.5 Delta BOO
0.6 Alpha ERI Achernar	2.6 Beta LIB	3.1 Zeta ARA	3.5 Nu CEN
0.6 Alpha ORI Betelgeuse	Zubeneschamali	3.1 Mu1 SCO	3.6 Eta CAS Achird
0.8 Beta CEN	2.6 Alpha LUP Men	3.1 Gamma UMI Pherkad	3.6 Tau CET
Hadar (Agena)	2.7 Beta ARI Sheratan	3.1 Epsilon CRV	3.6 Alpha TRI
0.9 Alpha AQL Altair	2.7 Alpha COL Phact	3.2 Gamma HYI	Rasalmothal.
1.0 Alpha SCO Antares	2.7 Theta AUR	3.2 Epsilon LEP	3.6 Gamma CET
1.1 Alpha TAU Aldebaran	2.7 Pi PUP	3.2 Beta COL Wazn	Alkaffaljid.
1.1 Alpha VIR Spica	2.7 Zeta SGR Ascella	3.2 Mu GEM Tejat	3.6 Delta ERI Rana
1.2 Beta GEM Pollux	2.7 Betal SCO Graffias	3.2 Nu PUP	3.6 Epsilon4 ERI
1.2 Alpha PSA Fomalhaut	2.7 Beta CRV Kraz	3.2 Epsilon GEM Mebsuta	3.6 Epsilon TAU Ain
1.3 Alpha LEO Regulus	2.7 Gamma CRV Minkar	3.2 Mu UMA Tania	3.6 Theta2 TAU
1.3 Alpha CYG Deneb	2.8 Beta HYI	Austr.	3.6 Tau ORI
1.4 Alpha2 CEN	2.8 Gamma CAS Cih	3.2 Nu HYA	3.6 Beta DOR
1.4 Beta CRU Mimosas	2.8 Delta CAS Ruchbah	3.2 Lambda CEN	3.6 Zeta LEP
1.4 Alpha1 CRU Acrux	2.8 Alpha CET Menkar	3.2 Alpha AQR Sadalmelik	3.6 Theta GEM
1.6 Epsilon CMA Adhara	2.8 Beta ERI Kursas	3.2 Alpha IND	3.6 Sigma CMA
1.6 Alpha GEM Castor	2.8 Iota ORI Hatysa	3.2 Beta CAP Dabih	3.6 Lambda GEM
1.6 Lambda SCO Shaula	2.8 Tau PUP	3.2 Betal CYG Albireo	3.6 Chi CAR
1.6 Gamma CRU Gacrux	2.8 Rho PUP Turais	3.2 Delta DRA Altais	3.6 Omicron VEL
1.7 Gamma ORI Bellatrix	2.8 Mu VEL	3.2 Phi SGR	3.6 Psi VEL
1.7 Epsilon UMA Alioth	2.8 Gamma AQL Tarazed	3.2 Eta SGR	3.6 Phi VEL
1.8 Beta TAU Elnath	2.8 Lambda SGR Kaus	3.2 SCO G Sco	3.6 Eta LEO
1.8 Epsilon ORI Alnilam	Boreal.	3.2 Delta HER Sarin	3.6 Zeta LEO Adhafera
1.8 Gamma2 VEL Regor	2.8 Delta SGR Kaus Media	3.2 Zeta DRA Aldibah	3.6 Gamma2 LEO
1.8 Epsilon CAR Avior	2.8 Upsilon SCO Lesath	3.2 Epsilon OPH Yed Poster.	3.6 Xi HYA
1.8 Beta CAR Miaplacidus	2.8 Beta ARA	3.2 Eta LUP	3.6 Omicron AND
1.9 Alpha PER Mirfak	2.8 Tau SCO	3.2 Epsilon LUP	3.6 Epsilon GRU
1.9 Gamma GEM Alhena	2.8 Beta HER Kornephoros	3.2 Kappa CEN	3.6 Zeta PEG Homam
1.9 Epsilon SGR Kaus	2.8 Delta OPH Yed Prior	3.2 Mu CEN	3.6 Zeta CEP
Austral	2.8 Alpha SER Unuk-al-hai	3.2 Gamma HYA	3.6 Beta IND
1.9 Alpha TRA Atria	2.8 Beta LUP Kekouan	3.3 Pi3 ORI	3.6 Eta CEP
1.9 Eta UMA Alkaid	2.8 Alpha2 LIB	3.3 Eta AUR	3.6 Delta PAV
2.0 Omicron CET Mira	Zubeneigenubi	3.3 Mu LEP	3.6 Xi2 SGR
2.0 Zeta ORI Alnitak	2.8 Zeta CEN	3.3 Alpha PIC	3.6 Alpha TEL
2.0 Beta CMA Mirzam	2.8 Eta BOO Muphrid	3.3 Sigma PUP	3.6 Eta PAV
2.0 Delta CMA Wezea	2.8 Iota CEN	3.3 Zeta HYA	3.6 Xi SER
2.0 Delta VEL Koo She	2.8 Alpha MUS	3.3 Alpha LYN	3.6 Mu2 SCO
2.0 Alpha UMA Dubhe	2.8 Delta CEN	3.3 Theta UMA	3.6 Eta HER
2.0 Alpha GRU Al Na'ir	2.9 Gamma PEG Algenib	3.3 Beta CEP Alfirk	3.6 Mu SER
2.0 Alpha PAV Peacock	2.9 Beta PER Algol	3.3 Gamma LYR Sulafat	3.6 Phil LUP
2.0 Sigma SGR Nunki	2.9 Zeta PER Atik	3.3 Delta LUP	3.6 Beta BOO Nekkar
2.0 Theta SCO Sargas	2.9 Iota AUR Hassaleh	3.3 Alpha CIR	3.6 Delta OCT
2.1 Alpha AND Alpheratz	2.9 Beta LEP Nihal	3.3 Beta MUS	3.6 Alpha DRA Thuban
2.1 Beta CET Diphda	2.9 Upsilon CAR	3.4 Beta PHE	3.6 Delta MUS
2.1 Alpha UMI Polaris	2.9 Theta CAR	3.4 Gamma PHE	3.6 Epsilon CRU
2.1 Beta AUR Menkalinan	2.9 Alpha TUC	3.4 Epsilon CAS Segin	3.7 Iota CET Shemali
2.1 Alpha HYA Alphard	2.9 Beta OPH Cebalrai	3.4 Thetal ERI Acamar	3.7 Zeta CAS
2.1 Alpha OPH Rasalhague	2.9 Eta DRA Aldibahin	3.4 Alpha RET	3.7 Theta CET
2.2 Alpha ARI Hamal	2.9 Beta TRA	3.4 Alpha DOR	3.7 Eta PSC Alpherq
2.2 Kappa ORI Saiph	2.9 Alpha2 CVN Cor Caroli	3.4 Eta ORI Algiebbah	3.7 Chi ERI
2.2 Lambda VEL Al Suhail	2.9 Gamma VIR Arich	3.4 Xi GEM Alzirr	3.7 Phi ERI
2.2 Beta LEO Denebola	3.0 Alpha HYI	3.4 Xi PUP Asmidiske	3.7 ARI
2.2 Beta GRU Al Dhanab	3.0 Eta TAU Alcyone	3.4 CAR	3.7 Rho PER
2.2 Beta UMI Kochab	3.0 Epsilon PER	3.4 Omega CAR	3.7 Lambda ORI Meissa
2.2 Theta CEN Menkent	3.0 Gamma ERI Zaurak	3.4 CAR q Car	3.7 Gamma LEP
2.3 Gammal AND Almaak	3.0 Zeta TAU Alhaka	3.4 CAR p Car	3.7 Eta GEM Propus
2.3 Zeta PUP Suhail	3.0 Zeta CMA Furud	3.4 Theta LEO Chertan	3.7 Kappa GEM
Hadar	3.0 Omicron2 CMA	3.4 Gamma CEP Alrai	3.7 PUP
2.3 Iota CAR Aspidiske	3.0 VEL N Vel	3.4 Delta AQR Skat	3.7 Beta VOL
2.3 Gamma CYG Sadr	3.0 Delta CAP Deneb	3.4 Zeta CYG	3.7 Alpha PYX
2.3 Alpha CRB Alphecca	Algedi	3.4 Theta AQL	3.7 Kappa UMA
2.4 Beta CAS Caph	3.0 Beta AQR Sadalsuud	3.4 Delta AQL	3.7 Lambda HYA
2.4 Alpha PHE Ankaa	3.0 Delta CYG	3.4 Tau SGR	3.7 Nu UMA Alula Bor.
2.4 Beta AND Mirach	3.0 Pi SGR Albaldah	3.4 Lambda AQL Althaimain	3.7 Delta CRT
2.4 Eta CMA Aludra	3.0 Zeta AQL Dheneb	3.4 Eta SER	3.7 Lambda MUS
2.4 Beta UMA Merak	3.0 Gamma2 SGR Alnasl	3.4 Nu OPH	3.7 Mu PEG Sadalbari
2.4 Gamma DRA Eltanin	3.0 Iotal SCO	3.4 Theta OPH	3.7 Iota CEP
2.4 Kappa SCO Girtab	3.0 Alpha ARA Choo	3.4 Pi HER	3.7 Theta PEG Biham
2.4 Epsilon SCO Wei	3.0 Beta DRA Rastaban	3.4 Eta SCO	3.7 Beta DEL Rotanev
2.4 Delta SCO Dschubba	3.0 Zeta HER Rutilulus	3.4 Kappa OPH	3.7 Alpha2 CAP Secunda
2.4 Eta CEN	3.0 Sigma SCO Alniyat	3.4 Zeta LUP	Gaedi
2.4 Epsilon CEN	3.0 Pi SCO	3.4 Sigma LIB	3.7 Gamma SGE
2.4 Zeta UMA Mizar	3.0 Gamma LUP	3.4 Pi HYA	3.7 Chi DRA
2.4 Gamma CEN	3.0 Gamma TRA	3.4 Zeta VIR Heze	3.7 OPH
2.5 Alpha CAS Schedar	3.0 Gamma BOO Seginus	3.4 Delta UMA Megrez	3.7 Gamma OPH
2.5 Delta ORI Mintaka	3.0 Epsilon VIR	3.5 Delta AND	3.7 Delta ARA
2.5 Gamma UMA Phecda	Vindemiatrix	3.5 Eta CET	3.7 Beta SER
2.5 Epsilon PEG Enif	3.0 Delta CRV Algoral	3.5 Epsilon AUR	3.7 Upsilon LIB
2.5 Epsilon BOO Izar	3.0 Delta CRU	3.5 Delta GEM Wasat	3.7 Beta CRB Nusakan
2.6 Alpha LEP Arneb	3.1 Beta TRI	3.5 Omicron UMA Muscida	3.7 Pi LUP

3.7	Delta	VIR Minelauva	4.0	Delta	PHE	4.1	Mu	LEO Rassalas	4.3		CET
3.8		AND	4.0	Delta	CET	4.1	Gamma	CHA	4.3	Betal	TUC
3.8	Zeta	CET Baten	4.0	Eta	PER	4.1	Pi	CEN	4.3	Zeta	AND
Kaitos			4.0	Eta	ERI Azha	4.1	Sigma	LEO	4.3	Phi	AND
3.8	Omicron	TAU	4.0	Kappa	PER Misam	4.1	Gamma	CRT	4.3	Alpha	PSC Al-Rischa
3.8	Xi	TAU	4.0	Alpha	FOR	4.1	Lambda	DRA Giansar	4.3	Xi2	CET
3.8	Epsilon	ERI	4.0	Tau4	ERI Angetenar	4.1	AQR	AQR	4.3		PER
3.8	Beta	RET	4.0		TAU Maia	4.1	Tau2	AQR	4.3		TAU
3.8		TAU Electra	4.0	Xi	PER Menkib	4.1	Lambda	PEG	4.3	Tau5	ERI
3.8		TAU Atlas	4.0	Lambda	TAU	4.1	Eta	AQR	4.3	Psi	PER
3.8	Alpha	HOR	4.0	Upsilon	PER Nembus	4.1	Alpha	EQU Kitalpha	4.3		TAU Merope
3.8	Upsilon2	ERI Theemini	4.0	Omicron1	ERI Beid	4.1		CYG	4.3	Lambda	PER
3.8	Pi4	ORI	4.0		ERI	4.1	Alpha	CRA	4.3	Mu	PER
3.8	Sigma	ORI	4.0	Thetal	TAU	4.1	Thetal	SER	4.3	Mu	TAU
3.8	Delta	LEP	4.0	Nu	ERI	4.1		OPH	4.3	Upsilon1	ERI
3.8	Eta	LEP	4.0		ERI Sceptum	4.1	Epsilon1	ARA	4.3		TAU
3.8	Gamma2	VOL	4.0	Eta	COL	4.1	Omegal	SCO	4.3	Tau	TAU
3.8	Omega	CMA	4.0	Delta	COL	Jabh.alAkrab			4.3	Omicron2	ORI
3.8	Beta	CNC	4.0	Delta	VOL	4.1	Theta	DRA	4.3	Lambda	ERI
3.8	Theta	HYA	4.0	Alpha	MON	4.1	Epsilon	TRA	4.3	Lambda	LEP
3.8		LYN	4.0	Beta	PYX	4.1	Delta	SER	4.3		ORI
3.8		UMA	4.0		HYA	4.1		CEN	4.3		GEM
3.8	Omicron	LEO Subra	4.0		CAR	4.1	Theta	BOO	4.3	Sigma	GEM
3.8		CAR 1 Car (v)	4.0		CAR	4.1	Psi	CEN	4.3		PUP
3.8	Beta	VIR Zavijava	4.0	Mu	HYA	4.1	Iota	LUP	4.3		PUP
3.8		AQR	4.0	Iota	LEO	4.2	Zeta	TUC	4.3		PUP
3.8	Lambda	AQR	4.0	Beta	HYA	4.2	Beta2	TUC	4.3	Theta	CHA
3.8	Nu	OCT	4.0	Omega	PSC	4.2	Kappa	CAS	4.3	Eta	HYA
3.8	Gamma	CAP Nashira	4.0	Lambda	AND	4.2	Upsilon	AND	4.3	Alpha	CNC Acubens
3.8	Zeta	CAP	4.0	Gamma	TUC	4.2	Phi	PER	4.3		VEL
3.8	Tau	CYG	4.0	Iota	GRU	4.2	Delta	HYI	4.3	Upsilon1	HYA
3.8	Epsilon	AQR Albali	4.0	Theta	GRU	4.2	Epsilon	HYI	4.3	Kappa	AND
3.8	Delta	SGE	4.0	Delta1	GRU	4.2	Theta	PER	4.3	Iota	PSC
3.8	Zeta	TEL	4.0	Delta	CEP	4.2	Tau3	ERI	4.3	Iota	AND
3.8	Omicron	HER	4.0	Gamma	AQR Sadachbia	4.2	Iota	PER	4.3	Phi	AQR
3.8	Theta	ARA	4.0	Iota	PEG	4.2	Tau6	ERI	4.3	Delta	PSA
3.8	Xi	HER	4.0	Mu	CEP Granate	4.2	Epsilon	RET	4.3	Gamma	PSA
3.8	Iota	HER	Star			4.2	Delta3	TAU	4.3	Xi	PEG
3.8	Zeta2	SCO	4.0	Nu	CYG	4.2	Beta	CAM	4.3	Delta2	GRU
3.8	Eta	ARA	4.0	Epsilon	DEL	4.2	Gamma1	CAE	4.3	Pi2	CYG
3.8	Gamma	HER	4.0		CYG	4.2	Iota	LEP	4.3	Kappa	PEG
3.8	Xi	SCO	4.0	Epsilon	PAV	4.2	Kappa	LEP	4.3		CAP
3.8	Rho	SCO	4.0	Eta	CYG	4.2		ORI	4.3	Iota	CAP
3.8	Epsilon	SER	4.0	Eta	AQL	4.2	Nu	AUR	4.3		PEG
3.8	Tau	LIB	4.0	Epsilon	DRA Tyl	4.2	Mu	ORI	4.3	Sigma	CYG
3.8	Kapp1	LUP	4.0	Alpha	SGR Rukbat	4.2	Theta	CMA	4.3		CYG
3.8	Alpha	APS	4.0	Rho1	SGR	4.2	Rho	GEM	4.3	Theta	CEP
3.8		VIR	4.0	Kappa	CYG	4.2	Upsilon	GEM	4.3		CYG
3.8	Rho	BOO	4.0	Beta	CRA	4.2		PUP	4.3	Iota	AQL
3.8	Phi	CEN	4.0	Gamma	CRA	4.2		PUP	4.3	Beta2	SGR
3.9	Epsilon	PHE	4.0		AQL	4.2		PUP	4.3		LYR
3.9	Kappa	PHE	4.0	Kappa	PAV	4.2	Zeta	MON	4.3		HER
3.9	Mu	AND	4.0	Zeta	PAV	4.2	Delta	HYA	4.3	Zeta1	LYR
3.9	Omicron	PER Ati	4.0	Alpha	SCT	4.2	Delta	CNC Asellus	4.3	Kappa	LYR
3.9	Nu	PER	4.0	Mu	SGR Polis	Aus.			4.3		HER
3.9	Nu	TAU	4.0		OPH	4.2	Iota1	CNC	4.3	Iota	OPH
3.9	Gamma	TAU Hyadum I	4.0	Theta	HER	4.2		CAR	4.3		SCO
3.9	Delta1	TAU	4.0	Gamma2	NOR	4.2	Alpha	CRT Alkes	4.3	Sigma	HER
3.9	Pi5	ORI	4.0	Nu	SCO Jabbah	4.2	Nu	VIR	4.3	Phi	HER
3.9	Zeta	AUR Sadatoni	4.0	Chi	LUP	4.2	Zeta	GRU	4.3	Iota1	NOR
3.9	Epsilon	COL	4.0	Omega	LUP	4.2	Beta	OCT	4.3	Theta	LIB
3.9	Beta	PIC	4.0	Gamma	LIB	4.2	Epsilon	PSA	4.3	Kappa	SER
3.9	Delta	AUR	Zubelhakrabi			4.2	Theta	AQR Ancha	4.3	Zeta	UMI Alifa
3.9	Kappa	CMA	4.0		LUP	4.2		LAC	4.3	Gamma	CIR
3.9	Zeta	GEM Mekbuda	4.0	Mu	VIR	4.2	Epsilon	CEP	4.3	Mu	LUP
3.9	Iota	GEM	4.0	Rho	LUP	4.2	Rho	CYG	4.3		CEN
3.9	Zeta	VOL	4.0	Upsilon1	CEN	4.2	Gamma	PAV	4.3	Lambda	BOO
3.9	Alpha	CHA	4.0		CEN	4.2	Theta	IND	4.3	Tau	VIR
3.9		CAR	4.0		UMA Alcor	4.2	Theta	CAP	4.3	Upsilon	BOO
3.9	Upsilon	UMA	4.0	Zeta	UMA	4.2	Omega	CAP	4.3		CEN
3.9	Rho	LEO	4.0		CEN	4.2	Psi	CAP	4.3	Beta	COM
3.9		VEL	4.0	Tau	CEN	4.2		CYG	4.3	Mu1	CRU
3.9		LMI Praecipua	4.0	Gamma	MUS	4.2	Iota	SGR	4.3	Beta	CVN Chara
3.9		CAR	4.0	Sigma	CEN	4.2	Chi	CYG	4.4	Theta	AND
3.9	Xi	UMA Alula	4.0	Eta	VIR Zaniah	4.2	Betal	SGR Arkab	4.4	Eta	PHE
Austr.			4.0	Rho	CEN	4.2	Epsilon	AQL	4.4	Nu	AND
3.9	Chi	UMA Alkazah	4.0	Eta	CRU	4.2	Phi	DRA	4.4	Alpha	SCL
3.9	Gamma	PSC	4.1	Zeta	PHE	4.2		SCO	4.4	Psi	PHE
3.9	Alpha	LAC	4.1	Upsilon	CET	4.2		OPH	4.4	Kappa	ERI
3.9	Xi	CYG	4.1		CAS	4.2	Xi	OPH	4.4	Pi	CET
3.9	Alpha	DEL Sualocin	4.1	Gamma	TRI	4.2	Nu	SER	4.4	Mu	CET
3.9	Beta	AQL Alshain	4.1	Iota	ERI	4.2	Beta	APS	4.4	Theta2	ERI
3.9	Iota2	CYG	4.1	Tau	PER Kerb	4.2	Phi	OPH	4.4		TAU
3.9	Omicron	SGR	4.1		ERI	4.2	Theta	LUP	4.4		TAU Taygete
3.9	Lambda	PAV	4.1	Mu	ERI	4.2	Epsilon	CRB	4.4	Tau8	ERI
3.9		HER	4.1	Gamma	MON	4.2	Theta	CRB	4.4	Gamma	RET
3.9	Xi	DRA Juza	4.1	Nu	GEM	4.2	Beta	CIR	4.4	Gamma	DOR
(Grum.)			4.1	Nu2	CMA	4.2	Lambda	LUP	4.4	Kapp1	TAU
3.9	Epsilon	HER	4.1	Omicron1	CMA	4.2	Tau2	LUP	4.4	Upsilon	TAU
3.9	Gamma	APS	4.1	Gamma	CMA Mulifen	4.2	Iota	VIR Syrma	4.4		TAU
3.9	Lambda	OPH Marfik	4.1	Delta	MON	4.2	Kappa	VIR	4.4	Alpha	CAE
3.9	Tau	HER	4.1		PUP	4.2	Upsilon2	CEN	4.4	Pi2	ORI
3.9	Delta	TRA	4.1		VEL	4.2	Eta	CRV	4.4	Alpha	CAM
3.9	Gamma	SER	4.1		VEL	4.2	Zeta	CRU	4.4		CAM
3.9	Gamma	CRB	4.1	Gamma	PYX	4.2	Epsilon	MUS	4.4		ORI
3.9	Zeta	BOO	4.1	Alpha	VOL	4.2	Alpha	CRV Alchiba	4.4	Phi2	ORI
3.9	Kappa	DRA	4.1	Iota	HYA	4.2	Omicron	VIR	4.4	Delta	DOR

4.4	Gamma	PIC	4.5		CMI	4.6		UMA	4.7	Theta	LEP
4.4	Gamma	COL	4.5	Sigma	HYA	4.6	Upsilon2	HYA	4.7	Beta	MON
4.4	Nu	ORI	4.5		CAR	4.6		LEO	4.7		MON
4.4	Xi	ORI	4.5		CAR	4.6		VEL	4.7		MON
4.4	Kappa	COL	4.5		UMA	4.6	Iota	ANT	4.7		GEM
4.4		LYN	4.5		HYA	4.6	Phi	LEO	4.7		CMA
4.4	Epsilon	MON	4.5	Lambda	LEO Alterf	4.6	Mu	MUS	4.7	Gamma	CNC Asellus
4.4	Lambda	CMA	4.5	Tau2	HYA	4.6	Epsilon	TUC	4.7		Bor.
4.4	Xil	CMA	4.5	Phi	UMA	4.6	Delta	SCL	4.7	Tau	UMA
4.4		CAR	4.5		LMI	4.6	Omega2	AQR	4.7	Chi	LEO
4.4		CAR	4.5	Alpha	SEX	4.6	Lambda	PSC	4.7		AQR
4.4	Iota	CMA	4.5	Delta2	CHA	4.6	Upsilon	PEG	4.7		PEG
4.4	Tau	CMA	4.5		LEO	4.6	Tau	PEG	4.7		PEG
4.4		PUP	4.5	Beta	CRT	4.6	Psi2	AQR	4.7		LAC
4.4	Epsilon	VOL	4.5	Upsilon	LEO	4.6	Chi	AQR	4.7	Epsilon	IND
4.4		PUP	4.5		LEO	4.6		AND	4.7	Mu1	CYG
4.4		PUP	4.5	Theta	PSC	4.6	Pi	CEP	4.7	Gamma	MIC
4.4		LYN	4.5		AQR	4.6	Beta	PSC	4.7		CYG
4.4		CAR	4.5		AQR	4.6		LAC	4.7	Zeta	DEL
4.4	Rho	HYA	4.5		LAC	4.6		LAC	4.7		VUL
4.4	Kappa	PYX	4.5	Delta	TUC	4.6	Zeta2	AQR	4.7	Rho	DRA
4.4	Alpha	ANT	4.5	Delta	IND	4.6	Pi	AQR	4.7		VUL
4.4	Beta	LMI	4.5	Nu	CEP	4.6		LAC	4.7	Epsilon1	LYR
4.4		LEO	4.5		PEG	4.6	Beta	LAC	4.7	Delta	SCT
4.4		CEN	4.5	Kappa	CAP	4.6	Mu	PSA	4.7	Gamma	SCT
4.4	Beta	SCL	4.5	Nu	AQR	4.6	Lambda	GRU	4.7		OPH
4.4	Gamma	SCL	4.5		AQR	4.6	Omicron	AQR	4.7		HER
4.4	Psi1	AQR	4.5	Lambda	CYG	4.6	Epsilon	CAP	4.7		SCO
4.4		AQR	4.5	Gamma2	DEL	4.6	Delta	EQU	4.7	Xi	CRB
4.4	Beta	PSA	4.5	Delta	DEL	4.6		CAP	4.7		SCO
4.4	Zetal	AQR	4.5		AQL	4.6	Eta	IND	4.7	Delta	CRB
4.4	Pi2	PEG	4.5		VUL	4.6	Phil	PAV	4.7	Psi2	LUP
4.4	Iota	AQR	4.5	Beta	SGE	4.6	Rho	CAP	4.7		LUP
4.4	Xi	CEP Kurhah	4.5	Theta	LYR	4.6		CYG	4.7		LIB
4.4	Iota	PSA	4.5	Eta	LYR Aladfar	4.6		SGR	4.7	Psi	BOO
4.4	Upsilon	CYG	4.5	Delta2	LYR	4.6		SGR	4.7	Omicron	BOO
4.4	Alpha1	CAP Prima Gaedi	4.5	Zeta	SCT	4.6		SGR	4.7		HYA R Hya (v)
4.4	Kappa	CEP	4.5	Gammal	SGR	4.6	Theta	CYG	4.7		VIR
4.4	Thetal	SGR	4.5	Zeta	SER	4.6	Mu	AQL	4.7		CVN
4.4	Omega	SGR	4.5	Nu	HER	4.6	Alpha	VUL	4.7		CEN
4.4	Alpha	SGE	4.5	Lambda	HER Maasym	4.6	Upsilon	SGR	4.8	Theta	OCT
4.4	Beta	SCT	4.5	Omega	OPH	4.6	Pi	DRA	4.8		CET
4.4		HER	4.5	Chi	OPH	4.6		VUL	4.8		CET
4.4	Xi	PAV	4.5	Omega	HER Cujam	4.6	Tau	DRA	4.8	Lambda1	PHE
4.4	Pi	PAV	4.5	Eta	NOR	4.6	Psi	SGR	4.8	Upsilon2	CAS
4.4		OPH	4.5	Iota	SER	4.6	Delta	CRA	4.8	Kappa	TUC
4.4		HER	4.5	Mu1	BOO Alkalurops	4.6	Nu2	SGR	4.8		CET
4.4		SGR	4.5		LIB	4.6		HER	4.8	Chi	CET
4.4	Omicron	SER	4.5		HYA	4.6	Theta	CRA	4.8	Gamma2	ARI Mesartim
4.4	Mu	OPH	4.5	Sigma	BOO	4.6	Nu	PAV	4.8	Gammal	ARI
4.4	Delta	UMI Yildun	4.5	Chi	CEN	4.6		SGR	4.8	Xi	PSC
4.4		OPH	4.5	Tau	BOO	4.6	Epsilon	TEL	4.8		CET
4.4	Sigma	OPH	4.5	Alpha	COM Diadema	4.6	Tau	OPH	4.8	Lambda	ARI
4.4	Rho	HER	4.6		PSC	4.6	Sigma	ARA	4.8		AND
4.4		OPH	4.6		CET	4.6		HER	4.8	Sigma	CET
4.4	Epsilon	UMI	4.6		PSC	4.6	Zetal	SCO	4.8	Zeta	HYI
4.4	Upsilon	OPH	4.6	Mu	PHE	4.6		OPH	4.8	Tau2	ERI
4.4	Psi	OPH	4.6	Phi1	CET	4.6	Omega2	SCO	4.8	Omega	PER
4.4	Omicron	SCO	4.6	Eta	AND	4.6	Upsilon	HER	4.8	Zeta	ERI Zibal
4.4		SCO	4.6	Phi	PSC	4.6	Chi	HER	4.8	Kappa	RET
4.4	Lambda	SER	4.6		CAS	4.6		SCO	4.8		ERI
4.4	Omicron	LUP	4.6	Iota	CAS	4.6	Psi1	LUP	4.8	Iota	RET
4.4	Sigma	LUP	4.6	Epsilon	CET	4.6	Phi2	LUP	4.8	Delta	HOR
4.4		UMI	4.6		ARI	4.6	Iotal	LIB	4.8	Omega2	TAU
4.4		CEN	4.6	Tau1	ERI	4.6		VIR	4.8	Delta2	TAU
4.4		CEN	4.6		ARI	4.6	Xi	BOO	4.8	Rho	TAU
4.4		VIR	4.6	Pi	PER	4.6		HYA	4.8		ERI
4.4	Theta	VIR	4.6	Epsilon	ARI	4.6	Tau1	LUP	4.8	Zeta	DOR
4.4	Xi2	CEN	4.6		ERI	4.6		HYA	4.8	Mu	AUR
4.4	Beta	CHA	4.6		ERI	4.6	Lambda	VIR Khambalia	4.8	Theta	DOR
4.4	Thetal	CRU	4.6	Pi	ERI	4.6	Kappa	BOO	4.8	Omicron	COL
4.5	Sigma	AND	4.6	Tau9	ERI	4.6		CEN	4.8		AUR
4.5	Pi	AND	4.6		ERI	4.6		CVN	4.8		TAU
4.5	Epsilon	AND	4.6		TAU	4.6	Iota	CRU	4.8		ORI
4.5	Delta	PSC	4.6		ERI	4.6	Gamma	COM	4.8		MON
4.5	Epsilon	PSC	4.6		ORI	4.6	Kappa	CHA	4.8	Delta	PIC
4.5	Theta	CAS Marfak	4.6	Rho	ORI	4.6	Pi	VIR	4.8	Eta2	DOR
4.5	Omicron	PSC	4.6		ORI	4.7	Omicron	CAS	4.8		CMA
4.5	Xil	CET	4.6	Upsilon	ORI Thabit	4.7	Tau	PSC	4.8		LYN
4.5	Beta	FOR	4.6	Tau	AUR	4.7	Upsilon	PSC	4.8	Pi2	UMA Ta Tsun
4.5	Delta	ARI Botein	4.6	Lambda	COL	4.7	Nu	PSC	4.8		HYA
4.5	Sigma	PER	4.6	Chi1	ORI	4.7	Eta2	HYI	4.8	Theta	PYX
4.5		ERI	4.6	Pi	AUR	4.7	Nu	FOR	4.8	Lambda	PYX
4.5	Delta	RET	4.6	Beta	MON	4.7	Omega	FOR	4.8	Tau1	HYA
4.5		TAU	4.6	Nu3	CMA	4.7	Nu	HYI	4.8		LMI
4.5	Omicron2	ERI Klid	4.6		GEM	4.7		PER	4.8		CAR
4.5		PER	4.6	Pi	CMA	4.7	Lambda	CET	4.8		UMA
4.5	Omega	ERI	4.6	Gamma	CMI	4.7		PER	4.8		LMI
4.5	Phi1	ORI	4.6		PUP	4.7		CAM	4.8	Omega	UMA
4.5	Omega	ORI	4.6	Omicron	PUP	4.7	Gamma	CAM	4.8		UMA
4.5		TAU	4.6		PUP	4.7	Pi1	ORI	4.8	Theta	CRT
4.5	Kappa	AUR	4.6	Delta	PYX	4.7	Pi6	ORI	4.8	Omicron	HYA
4.5		MON	4.6		HYA	4.7	Iota	TAU	4.8	Zeta	CRT
4.5	Xi2	CMA	4.6	Kappa	LEO	4.7	Psi1	ORI	4.8	Psi	PEG
4.5		LYN	4.6	Epsilon	ANT	4.7	Psi2	ORI	4.8	Rho	CAS
4.5	Tau	GEM	4.6		LMI	4.7		TAU	4.8		AQR
4.5		LYN	4.6		UMA	4.7	Chi2	ORI	4.8	Iota	PHE

4.8		AQR	4.9		ORI	5.0	Lambda	HYI	5.0	Tau	PSA
4.8	Rho	GRU	4.9		LYN	5.0	Nu	CAS	5.0		CEP
4.8		LAC	4.9	Mu	CMA	5.0	Upsilon1	CAS	5.0		PEG
4.8	Sigma	AQR	4.9		CMI	5.0		PSC	5.0		PEG
4.8	Mu1	GRU	4.9	Omicron	GEM	5.0		CET	5.0	Theta	PSA
4.8	Upsilon	PSA	4.9		MON	5.0	Xi	AND Adhil	5.0		CAP
4.8	Pi1	CYG Azelfalage	4.9		LYN	5.0	Psi	CAS	5.0		CYG
4.8	Xi	AQR	4.9	Zeta1	CNC Tegmine	5.0	Omega	AND	5.0	Omicron	PAV
4.8		PEG	4.9	Sigma2	UMA	5.0	Phi	PHE	5.0	Iota	IND
4.8	Theta1	MIC	4.9		UMA	5.0	Omega	CAS	5.0		VUL
4.8	Epsilon	MIC	4.9	Theta	ANT	5.0	Chi	PHE	5.0	Rho	PAV
4.8	Gamma	EQU	4.9	Pi	LEO	5.0		PER	5.0		AQL
4.8	Eta	CAP	4.9		LEO	5.0	Nu	CET	5.0		AQL
4.8	Mu	AQR	4.9	Sigma	CAS	5.0		PER	5.0		CYG
4.8		VUL	4.9	Kappa	PSC	5.0	Beta	HOR	5.0	Rho	AQL
4.8	Alpha	MIC	4.9	Omicron	CEP	5.0		PER	5.0		CYG
4.8		VUL	4.9		CAS	5.0	Zeta	ARI	5.0		SGR
4.8	Nu	CAP Alshat	4.9		AND	5.0	Kappa1	CET	5.0		CYG
4.8		CYG	4.9	Eta	GRU	5.0		PER	5.0	Zeta	SGE
4.8		SGR	4.9	Omicron	PEG	5.0	Delta	FOR	5.0		CYG
4.8	Psi	CYG	4.9		LAC	5.0		PER	5.0		SGR
4.8	Phi	CYG	4.9	Nu	TUC	5.0		TAU	5.0		CYG
4.8	Sigma	DRA	4.9		PEG	5.0		TAU	5.0	Kappa	AQL
4.8	Epsilon	CRA	4.9		PEG	5.0		ERI	5.0	Iota	TEL
4.8	Omicron	DRA	4.9		PEG	5.0	Beta	CAE	5.0		AQL
4.8		SGR	4.9	Nu	PEG	5.0		AUR	5.0	Chi1	SGR
4.8		OPH	4.9		CEP	5.0	Omega	AUR	5.0		AQL
4.8		SGR	4.9		CEP Alphirk	5.0	Eta2	PIC	5.0		SGR
4.8	Lambda	ARA	4.9		CYG	5.0		AUR	5.0		LYR
4.8		OPH	4.9		CYG	5.0		TAU	5.0	Zeta	CRA
4.8	Zeta	APS	4.9	Zeta	IND	5.0		ERI	5.0	Lambda	TEL
4.8		HER	4.9		CYG	5.0		ORI	5.0	Nu1	SGR
4.8		OPH	4.9		CYG	5.0		ORI	5.0		SGR
4.8		DRA	4.9	Omega1	CYG	5.0	Nu2	COL	5.0		AQL
4.8	Epsilon	NOR	4.9		CYG	5.0		TAU	5.0	Epsilon	SCT
4.8	Rho	OPH	4.9	Xi	TEL	5.0		TAU	5.0		DRA
4.8	Sigma	SER	4.9		CYG	5.0	Upsilon	AUR	5.0	Delta1	TEL
4.8	Delta1	APS	4.9	Xi	AQL	5.0		ORI	5.0		DRA
4.8	Delta	NOR	4.9		VUL	5.0		MON	5.0	Mu	LYR
4.8	Pi	SER	4.9		VUL	5.0	Theta	COL	5.0		HER
4.8		LIB	4.9		CYG	5.0		MON	5.0		HER
4.8	Kappa	CRB	4.9	Nu	AQL	5.0		AUR	5.0		DRA
4.8	Kappa	LIB	4.9		CYG	5.0		AUR	5.0		HER
4.8	Epsilon	CIR	4.9		VUL	5.0		MON	5.0		DRA
4.8		BOO	4.9	Eta	SCT	5.0	Psi7	AUR	5.0	Nu2	DRA Kuma
4.8		DRA	4.9	Upsilon	DRA	5.0		CAM	5.0	Nu1	DRA Kuma
4.8		UMA	4.9		DRA	5.0		MON	5.0		DRA
4.8		VIR	4.9		OPH	5.0		MON	5.0	Mu	NOR
4.8	Lambda	CRU	4.9		OPH	5.0		CMA	5.0		HER
4.8	Psi	VIR	4.9	Psi1	DRA	5.0		GEM	5.0		DRA
4.8	Chi	VIR	4.9	Omega	DRA	5.0		LYN	5.0	Eta	UMI Alasco
4.8		COM	4.9		HER	5.0		PUP	5.0	Kappa	NOR
4.8		COM	4.9		OPH	5.0		GEM	5.0	Lambda	LIB
4.9	Chi	PEG	4.9		HER	5.0	Phi	GEM	5.0		LIB
4.9	Eta	SCL	4.9		HER	5.0		PUP	5.0	Nu2	BOO
4.9	Lambda	CAS	4.9	Zeta	TRA	5.0		MON	5.0	Epsilon	LIB
4.9	Xi	CAS	4.9	Gamma1	NOR	5.0	Chi	GEM	5.0	Eta	CRB
4.9		CET	4.9	Psi	SCO	5.0		PUP	5.0	Nu1	LUP
4.9	Chi	PSC	4.9	Tau	CRB	5.0	Zeta	PYX	5.0		LUP
4.9	Zeta1	PSC	4.9	Beta2	SCO	5.0		HYA	5.0		BOO
4.9	Nu	PHE	4.9	Iota	CRB	5.0	Rho	UMA	5.0		LIB
4.9	Chi	CAS	4.9	Rho	SER	5.0	Kappa	HYA	5.0		LIB
4.9	Tau	AND	4.9		LIB	5.0	Gamma	SEX	5.0		BOO
4.9		AND	4.9		BOO	5.0		LEO	5.0	Phi	VIR
4.9	Rho	CET	4.9	Omega	BOO	5.0	Beta	SEX	5.0		HYA
4.9		PER	4.9		BOO	5.0	Phi3	HYA	5.0		BOO
4.9		PER	4.9	Pi1	BOO	5.0		LMI	5.0		HYA
4.9	Pi	TAU	4.9	Eta	APS	5.0		LEO	5.0		LEO
4.9	Sigma2	TAU	4.9	Iota	BOO	5.0		LEO	5.0		UMI
4.9	Psi	ERI	4.9		CVN	5.0	Chi1	HYA	5.0		VIR
4.9		ORI	4.9		VIR	5.0	Lambda	CRT	5.0	Iota1	MUS
4.9	Lambda	AUR	4.9	Eta	MUS	5.0	Omicron1	CEN	5.0	Sigma	VIR
4.9	Chi	AUR	4.9		COM	5.0	Epsilon	CHA	5.0		VIR
4.9		TAU	4.9	Xi1	CEN	5.0		PSC	5.0	Psi	HYA
4.9		TAU	4.9		UMA	5.0		PEG	5.0		COM
4.9	Xi	AUR	4.9		COM	5.0		AND	5.0	Rho	VIR
4.9	Xi	COL	4.9		COM	5.0		PEG	5.0		COM
4.9		TAU	5.0	Zeta	SCL	5.0	Rho	PEG	5.0		CVN
4.9		LEP	5.0	Pi	CAS	5.0		AQR	5.0	Theta2	CRU

# CATALOGO 100 STELLE PIU' LUMINOSE

## 100 BRIGHTEST STARS

Nome	HH MM SS	° ' "	magn.	moto proprio	
Bayer	J2000	J2000	vis.	AR	DEC
Alp CMa	06 45 08.9	-16 42 58	-1.46	-0.553	-1.205
Alp Car	06 23 57.1	-52 41 45	-0.72	+0.022	+0.021
Alp Boo	14 15 39.7	+19 10 57	-0.04	-1.093	-1.998
Alp1Cen	14 39 35.9	-60 50 07	-0.01	-3.642	+0.699
Alp Lyr	18 36 56.3	+38 47 01	0.03	+0.202	+0.286
Alp Aur	05 16 41.4	+45 59 53	0.08	+0.076	-0.425
Bet Ori	05 14 32.3	-08 12 06	0.12	0.000	-0.001
Alp CMi	07 39 18.1	+05 13 30	0.38	-0.710	-1.023
Alp Eri	01 37 42.9	-57 14 12	0.46	+0.095	-0.035
Alp Ori	05 55 10.3	+07 24 25	0.50	+0.026	+0.009
Bet Cen	14 03 49.4	-60 22 23	0.61	-0.032	-0.019
Alp Aql	19 50 47.0	+08 52 06	0.77	+0.538	+0.386
Alp Tau	04 35 55.2	+16 30 33	0.85	+0.063	-0.190
Alp Sco	16 29 24.4	-26 25 55	0.96	-0.010	-0.020
Alp Vir	13 25 11.6	-11 09 41	0.98	-0.041	-0.028
Bet Gem	07 45 18.9	+28 01 34	1.14	-0.628	-0.046
Alp PsA	22 57 39.1	-29 37 20	1.16	+0.333	-0.165
Bet Cru	12 47 43.2	-59 41 19	1.25	-0.048	-0.014
Alp Cyg	20 41 25.9	+45 16 49	1.25	+0.003	+0.002
Alp1Cru	12 26 35.9	-63 05 57	1.33	-0.036	-0.012
Alp2Cen	14 39 36.1	-60 50 08	1.33	-3.646	+0.700
Alp Leo	10 08 22.3	+11 58 02	1.35	-0.248	+0.006
Eps CMa	06 58 37.5	-28 58 20	1.50	+0.004	+0.003
Lam Sco	17 33 36.5	-37 06 14	1.63	-0.001	-0.029
Gam Cru	12 31 09.9	-57 06 48	1.63	+0.023	-0.262
Gam Ori	05 25 07.9	+06 20 59	1.64	-0.009	-0.014
Bet Tau	05 26 17.5	+28 36 27	1.65	+0.022	-0.175
Bet Car	09 13 12.0	-69 43 02	1.68	-0.162	+0.108
Eps Ori	05 36 12.8	-01 12 07	1.70	+0.001	-0.002
Alp2Cru	12 26 36.5	-63 05 58	1.73	-0.034	-0.007
Alp Gru	22 08 14.0	-46 57 40	1.74	+0.129	-0.151
Eps UMa	12 54 01.7	+55 57 35	1.77	+0.112	-0.006
Gam2Vel	08 09 32.0	-47 20 12	1.78	-0.004	+0.006
Alp UMa	11 03 43.7	+61 45 03	1.79	-0.119	-0.067
Alp Per	03 24 19.4	+49 51 40	1.79	+0.024	-0.025
Del CMa	07 08 23.5	-26 23 36	1.84	-0.003	+0.004
Eps Sgr	18 24 10.3	-34 23 05	1.85	-0.038	-0.124
Eta UMa	13 47 32.4	+49 18 48	1.86	-0.122	-0.011
Eps Car	08 22 30.8	-59 30 35	1.86	-0.026	+0.014
The Sco	17 37 19.2	-42 59 52	1.87	+0.015	-0.002
Bet Aur	05 59 31.7	+44 56 51	1.90	-0.057	0.000
Alp TrA	16 48 39.9	-69 01 40	1.92	+0.014	-0.034
Gam Gem	06 37 42.7	+16 23 57	1.93	+0.042	-0.042
Alp Pav	20 25 38.9	-56 44 06	1.94	+0.007	-0.089
Del Vel	08 44 42.2	-54 42 30	1.96	+0.023	-0.078
Bet CMa	06 22 42.0	-17 57 21	1.98	-0.006	0.000
Alp Hya	09 27 35.2	-08 39 31	1.98	-0.014	+0.033
Alp Gem	07 34 36.0	+31 53 18	1.98	-0.171	-0.098
	15 59 30.2	+25 55 13	2.0	-0.005	+0.013
Alp Ari	02 07 10.4	+23 27 45	2.00	+0.190	-0.148
Sig Sgr	18 55 15.9	-26 17 48	2.02	+0.013	-0.054
Alp UMi	02 31 48.7	+89 15 51	2.02	+0.038	-0.015
Bet Cet	00 43 35.4	-17 59 12	2.04	+0.234	+0.033
Zet Ori	05 40 45.5	-01 56 34	2.05	+0.003	-0.002
Kap Ori	05 47 45.4	-09 40 11	2.06	+0.002	-0.002
The Cen	14 06 41.0	-36 22 12	2.06	-0.519	-0.519
Bet And	01 09 43.9	+35 37 14	2.06	+0.178	-0.114
Alp And	00 08 23.3	+29 05 26	2.06	+0.136	-0.163
Bet UMi	14 50 42.3	+74 09 20	2.08	-0.031	+0.012
Alp Oph	17 34 56.1	+12 33 36	2.08	+0.120	-0.226
Bet Gru	22 42 40.1	-46 53 05	2.10	+0.137	-0.008
Bet Per	03 08 10.1	+40 57 20	2.12	+0.004	-0.001
Bet Leo	11 49 03.6	+14 34 19	2.14	-0.497	-0.114
Gam Cen	12 41 31.0	-48 57 35	2.17	-0.189	-0.005
Gam Cyg	20 22 13.7	+40 15 24	2.20	+0.004	0.000
Lam Vel	09 07 59.8	-43 25 57	2.21	-0.019	+0.013
Del Ori	05 32 00.4	-00 17 57	2.23	+0.001	-0.002
Alp CrB	15 34 41.3	+26 42 53	2.23	+0.121	-0.089
Gam Dra	17 56 36.4	+51 29 20	2.23	-0.008	-0.019
Alp Cas	00 40 30.5	+56 32 14	2.23	+0.053	-0.032
Zet Pup	08 03 35.1	-40 00 12	2.25	-0.027	+0.012
Iot Car	09 17 05.4	-59 16 31	2.25	-0.020	+0.008
Gam1And	02 03 54.0	+42 19 47	2.26	+0.045	-0.052
Zet UMa	13 23 55.5	+54 55 31	2.27	+0.122	-0.020
Bet Cas	00 09 10.7	+59 08 59	2.27	+0.525	-0.181
Eps Sco	16 50 09.8	-34 17 36	2.29	-0.611	-0.255

Nome	HH MM SS	° ° ' " "	magn.	moto proprio	
Bayer	J2000	J2000	vis.	AR	DEC
Alp Lup	14 41 55.8	-47 23 18	2.30	-0.021	-0.018
Eps Cen	13 39 53.2	-53 27 59	2.30	-0.028	-0.016
Eta Cen	14 35 30.4	-42 09 28	2.31	-0.035	-0.035
Del Sco	16 00 20.0	-22 37 18	2.32	-0.012	-0.022
Bet UMa	11 01 50.5	+56 22 57	2.37	+0.082	+0.034
Alp Phe	00 26 17.0	-42 18 22	2.39	+0.203	-0.396
Eps Peg	21 44 11.2	+09 52 30	2.39	+0.031	-0.001
Kap Sco	17 42 29.3	-39 01 48	2.41	-0.006	-0.027
Bet Peg	23 03 46.5	+28 04 58	2.42	+0.189	+0.137
Eta Oph	17 10 22.7	-15 43 29	2.43	+0.039	+0.098
Alp Cep	21 18 34.8	+62 35 08	2.44	+0.151	+0.049
Gam UMa	11 53 49.8	+53 41 41	2.44	+0.095	+0.012
Eta CMa	07 24 05.7	-29 18 11	2.45	-0.004	+0.005
Eps Cyg	20 46 12.7	+33 58 13	2.46	+0.356	+0.328
Gam Cas	00 56 42.5	+60 43 00	2.47	+0.026	-0.005
Alp Peg	23 04 45.7	+15 12 19	2.49	+0.063	-0.042
Kap Vel	09 22 06.8	-55 00 39	2.50	-0.008	+0.009
Alp Cet	03 02 16.8	+04 05 23	2.53	-0.009	-0.078
Zet Cen	13 55 32.4	-47 17 18	2.55	-0.057	-0.042
Del Leo	11 14 06.5	+20 31 25	2.56	+0.142	-0.130
Zet Oph	16 37 09.5	-10 34 02	2.56	+0.014	+0.026
Alp Lep	05 32 43.8	-17 49 20	2.58	+0.001	+0.002
Gam Crv	12 10 39.7	-16 59 12	2.59	-0.161	+0.023
Zet Sgr	18 56 15.0	-30 01 23	2.60	-0.015	-0.002

Moto proprio in secondi/anno  
Proper motion in seconds/year

# OGGETTI MESSIER - MESSIER OBJECTS

Numero Messier	Numero NGC	Nome comune	Tipo di oggetto	Distanza in migliaia di anni luce	Costellazione	Mag. app.
Number Messier	Number NGC	Common name	Type of object	Distance in thousand of light years	Constellation	App. mag.
M1	NGC 1952	Neb del Granchio	Resto di supernova	6,3	Toro	9,0
M2	NGC 7089		Amm. glob.	36	Acquario	7,5
M3	NGC 5272		Amm. glob.	31	Cani da Caccia	7,0
M4	NGC 6121		Amm. glob.	7	Scorpione	7,5
M5	NGC 5904		Amm. glob.	23	Serpente	7,0
M6	NGC 6405	Amm. della Farfalla	Amm. ap.	2	Scorpione	4,5
M7	NGC 6475	Amm. di Tolomeo	Amm. ap.	1	Scorpione	3,5
M8	NGC 6523	Neb Laguna	Amm. con Neb	6,5	Sagittario	5,0
M9	NGC 6333		Amm. glob.	26	Ofiuco	9,0
M10	NGC 6254		Amm. glob.	13	Ofiuco	7,5
M11	NGC 6705	Amm. dell'Anitra Selvatica	Amm. ap.	6	Scudo	7,0
M12	NGC 6218		Amm. glob.	18	Ofiuco	8,0
M13	NGC 6205	Amm. glob. di Ercole	Amm. glob.	22	Ercole	7,0
M14	NGC 6402		Amm. glob.	27	Ofiuco	9,5
M15	NGC 7078		Amm. glob.	33	Pegaso	7,5
M16	NGC 6611	Amm. della Neb Aquila	Amm. con Neb	7	Serpente	6,5
M17	NGC 6618	Neb Omega	Amm. con Neb	5	Sagittario	7,0
M18	NGC 6613		Amm. ap.	6	Sagittario	8,0
M19	NGC 6273		Amm. glob.	27	Ofiuco	8,5
M20	NGC 6514	Neb Trifida	Amm. con Neb	2,2	Sagittario	5,0
M21	NGC 6531		Amm. ap.	3	Sagittario	7,0
M22	NGC 6656		Amm. glob.	10	Sagittario	6,5
M23	NGC 6494		Amm. ap.	4,5	Sagittario	6,0
M24	Nessuno, contiene NGC 6603		nube Delle Caustiche	10	Sagittario	11,5
M25	Nessuno, IC 4725		Amm. ap.	2	Sagittario	4,9
M26	NGC 6694		Amm. ap.	5	Scudo	9,5
M27	NGC 6853	Neb Manubrio	Neb planetaria	1,25	Volpetta	7,5
M28	NGC 6626		Amm. glob.	18	Sagittario	8,5
M29	NGC 6913		Amm. ap.	7,2	Cigno	9,0
M30	NGC 7099		Amm. glob.	25	Capricorno	8,5
M31	NGC 224	Galassia di Andromeda	Galassia	2200	Andromeda	4,5
M32	NGC 221		Galassia	2200	Andromeda	10,0
M33	NGC 598	Galassia del Triangolo	Galassia	2300	Triangolo	7,0
M34	NGC 1039		Amm. ap.	1,4	Perseo	6,0
M35	NGC 2168		Amm. ap.	2,8	Gemelli	5,5
M36	NGC 1960		Amm. ap.	4,1	Auriga	6,5
M37	NGC 2099		Amm. ap.	4,6	Auriga	6,0
M38	NGC 1912		Amm. ap.	4,2	Auriga	7,0
M39	NGC 7092		Amm. ap.	0,3	Cigno	5,5
M40	Nessuno		Stella doppia WNC4		Orsa Maggiore	9,0
M41	NGC 2287		Amm. ap.	2,4	Cane Maggiore	5,0
M42	NGC 1976	Neb di Orione	Neb diffusa	1,6	Orione	5,0
M43	NGC 1982	Neb De Mairan (parte della Neb di Orione)	Neb diffusa	1,6	Orione	7,0
M44	NGC 2632	Amm. Alveare	Amm. ap.	0,5	Cancro	4,0
M45	NGC 1432	Pleiadi	Amm. ap.	0,4	Toro	1,4
M46	NGC 2437		Amm. ap.	5,4	Poppa	6,5
M47	NGC 2422		Amm. ap.	1,6	Poppa	4,5
M48	NGC 2548		Amm. ap.	1,5	Idra	5,5
M49	NGC 4472		Galassia	60000	Vergine	10,0
M50	NGC 2323		Amm. ap.	3	Unicorno	7,0
M51	NGC 5194, NGC 5195	Galassia vortice	Galassia	37000	Cani da Caccia	8,0
M52	NGC 7654		Amm. ap.	7	Cassiopea	8,0
M53	NGC 5024		Amm. glob.	56	Chioma di Berenice	8,5
M54	NGC 6715		Amm. glob.	83	Sagittario	8,5
M55	NGC 6809		Amm. glob.	17	Sagittario	7,0
M56	NGC 6779		Amm. glob.	32	Lira	9,5
M57	NGC 6720	Neb anello	Neb planetaria	4,1	Lira	9,5
M58	NGC 4579		Galassia	60000	Vergine	11,0
M59	NGC 4621		Galassia	60000	Vergine	11,5
M60	NGC 4649		Galassia	60000	Vergine	10,5
M61	NGC 4303		Galassia	60000	Vergine	10,5
M62	NGC 6266		Amm. glob.	22	Ofiuco	8,0
M63	NGC 5055	Galassia Girasole	Galassia	37000	Cani da Caccia	8,5

Numero Messier	Numero NGC	Nome comune	Tipo di oggetto	Distanza in migliaia di anni luce	Costellazione	Mag. app.
Number Messier	Number NGC	Common name	Type of object	Distance in thousand of light years	Constellation	App. mag.
M64	NGC 4826	Galassia Occhio Nero	Galassia	12000	Chioma di Berenice	9,0
M65	NGC 3623		Galassia	35000	Leone	10,5
M66	NGC 3627		Galassia	35000	Leone	10,0
M67	NGC 2682		Amm. ap.	2,25	Cancro	7,5
M68	NGC 4590		Amm. glob.	32	Idra	9,0
M69	NGC 6637		Amm. glob.	25	Sagittario	9,0
M70	NGC 6681		Amm. glob.	28	Sagittario	9,0
M71	NGC 6838		Amm. glob.	12	Freccia	8,5
M72	NGC 6981		Amm. glob.	53	Acquario	10,0
M73	NGC 6994				Acquario	9,0
M74	NGC 628		Galassia	35000	Pesci	10,5
M75	NGC 6864		Amm. glob.	58	Sagittario	9,5
M76	NGC 650, NGC 651	Neb piccola campana muta	Neb planetaria	3,4	Perseo	12,0
M77	NGC 1068		Galassia	60000	Balena	10,5
M78	NGC 2068		Neb diffusa	1,6	Orione	8,0
M79	NGC 1904		Amm. glob.	40	Lepre	8,5
M80	NGC 6093		Amm. glob.	27	Scorpione	8,5
M81	NGC 3031	Galassia di Bode	Galassia	11000	Orsa Maggiore	8,5
M82	NGC 3034	Galassia Sigaro	Galassia	11000	Orsa Maggiore	9,5
M83	NGC 5236	Galassia girandola del sud	Galassia	10000	Idra	8,5
M84	NGC 4374		Galassia	60000	Vergine	11,0
M85	NGC 4382		Galassia	60000	Chioma di Berenice	10,5
M86	NGC 4406		Galassia	60000	Vergine	11,0
M87	NGC 4486	Galassia Virgo A	Galassia	60000	Vergine	11,0
M88	NGC 4501		Galassia	60000	Chioma di Berenice	11,0
M89	NGC 4552		Galassia	60000	Vergine	11,5
M90	NGC 4569		Galassia	60000	Vergine	11,0
M91	NGC 4548		Galassia	60000	Chioma di Berenice	11,5
M92	NGC 6341		Amm. glob.	26	Ercole	7,5
M93	NGC 2447		Amm. ap.	4,5	Poppa	6,5
M94	NGC 4736		Galassia	14500	Cani da Caccia	9,5
M95	NGC 3351		Galassia	38000	Leone	11,0
M96	NGC 3368		Galassia	38000	Leone	10,5
M97	NGC 3587	Neb Gufo	Neb planetaria	2,6	Orsa Maggiore	12,0
M98	NGC 4192		Galassia	60000	Chioma di Berenice	11,0
M99	NGC 4254		Galassia	60000	Chioma di Berenice	10,5
M100	NGC 4321		Galassia	60000	Chioma di Berenice	10,5
M101	NGC 5457	Galassia girandola	Galassia	24000	Orsa Maggiore	8,5
M102		Galassia Fuso	Galassia	40000	Dragone	10,5
M103	NGC 581		Amm. ap.	8	Cassiopea	7,0
M104	NGC 4594	Galassia Sombrero	Galassia	50000	Vergine	9,5
M105	NGC 3379		Galassia	38000	Leone	11,0
M106	NGC 4258		Galassia	25000	Cani da Caccia	9,5
M107	NGC 6171		Amm. glob.	20	Ofiuco	10,0
M108	NGC 3556		Galassia	45000	Orsa Maggiore	11,0
M109	NGC 3992		Galassia	55000	Orsa Maggiore	11,0
M110	NGC 205		Galassia	2200	Andromeda	10,0

# VISIBILITA' OGGETTI MESSIER

## VISIBILITY MESSIER OBJECTS

Catalogo Messier	Costellazione	Oggetto	Mesi di visibilità
Catalog Messier	Constellation	Object	Months of visibility
M1	Toro	Nebulosa diffusa	XII-II
M2	Acquario	Ammasso globulare	X-XII
M3	Cani da Caccia	Ammasso globulare	I-IX
M4	Scorpione	Ammasso globulare	VII-VIII
M5	Serpente	Ammasso globulare	VII-X
M6	Scorpione	Ammasso aperto	VII-VIII
M7	Scorpione	Ammasso aperto	VII-VIII
M8	Sagittario	Nebulosa diffusa	VIII-IX
M9	Ofiuco	Ammasso globulare	VII-VIII
M10	Ofiuco	Ammasso globulare	VII-VIII
M11	Scudo	Ammasso aperto	VII-IX
M12	Ofiuco	Ammasso globulare	VII-VIII
M13	Ercole	Ammasso globulare	VI-IX
M14	Ofiuco	Ammasso globulare	VII-VIII
M15	Pegaso	Ammasso globulare	VIII-X
M16	Serpente	Nebulosa/ammasso	VII-X
M17	Sagittario	Nebulosa diffusa	VIII-IX
M18	Sagittario	Ammasso aperto	VIII-IX
M19	Ofiuco	Ammasso globulare	VII-VIII
M20	Sagittario	Nebulosa diffusa	VIII-IX
M21	Sagittario	Ammasso aperto	VIII-IX
M22	Sagittario	Ammasso globulare	VIII-IX
M23	Sagittario	Ammasso aperto	VIII-IX
M24	Sagittario	Ammasso aperto	VIII-IX
M25	Sagittario	Ammasso aperto	VIII-IX
M26	Scudo	Ammasso aperto	VII-IX
M27	Volpetta	Nebulosa planetaria	VIII-X
M28	Sagittario	Ammasso globulare	VIII-IX
M29	Cigno	Ammasso aperto	VIII-X
M30	Capricorno	Ammasso globulare	IX-X
M31	Andromeda	Galassia	X-XII
M32	Andromeda	Galassia	X-XII
M33	Triangolo	Galassia	X-XII
M34	Perseo	Ammasso aperto	X-XII
M35	Gemelli	Ammasso aperto	I-III
M36	Auriga	Ammasso aperto	I-III
M37	Auriga	Ammasso aperto	I-III
M38	Auriga	Ammasso aperto	I-III
M39	Cigno	Ammasso aperto	VIII-X
M40			
M41	Cane maggiore	Ammasso aperto	XII-III

Catalogo Messier	Costellazione	Oggetto	Mesi di visibilità
Catalog Messier	Constellation	Object	Months of visibility
M42	Orione	Nebulosa diffusa	XII-III
M43	Orione	Nebulosa diffusa	XII-III
M44	Cancro	Ammasso aperto	II-V
M45	Toro	Ammasso aperto	XII-II
M46	Poppa	Ammasso aperto	II-IV
M47	Poppa	Ammasso aperto	II-IV
M48	Idra	Ammasso aperto	IV-VI
M49	Vergine	Galassia	V-VII
M50	Unicorno	Ammasso aperto	II-IV
M51	Cani da caccia	Galassia	I-IX
M52	Cassiopea	Ammasso aperto	circumpolare
M53	Chioma Berenice	Ammasso globulare	VI-VIII
M54	Sagittario	Ammasso globulare	VIII-IX
M55	Sagittario	Ammasso globulare	VIII-IX
M56	Lira	Ammasso globulare	VII-IX
M57	Lira	Nebulosa planetaria	VII-IX
M58	Vergine	Galassia	V-VII
M59	Vergine	Galassia	V-VII
M60	Vergine	Galassia	V-VII
M61	Vergine	Galassia	V-VII
M62	Ofiuco	Ammasso globulare	VII-VIII
M63	Cani da caccia	Galassia	I-IX
M64	Chioma Berenice	Galassia	IV-VIII
M65	Leone	Galassia	III-IV
M66	Leone	Galassia	III-IV
M67	Cancro	ammasso aperto	II-V
M68	Cancro	Ammasso globulare	IV-VI
M69	Idra	Ammasso globulare	VIII-IX
M70	Sagittario	Ammasso globulare	VIII-IX
M71	Sagittario	Ammasso globulare	VIII-X
M72	Acquario	Ammasso globulare	X-XII
M73	Acquario	ammasso aperto	X-XII
M74	Pesci	Galassia	X-XII
M75	Sagittario	Ammasso globulare	VIII-IX
M76	Perseo	Nebulosa planetaria	IX-IV
M77	Balena	Galassia	XI-I
M78	Orione	Nebulosa diffusa	XII-III
M79	Lepre	Ammasso globulare	XII-III
M80	Scorpione	Ammasso globulare	VII-VIII
M81	Orsa maggiore	Galassia	circumpolare
M82	Orsa maggiore	Galassia	circumpolare
M83	Idra	Galassia	IV-VI
M84	Vergine	Galassia	V-VII
M85	Chioma Berenice	Galassia	VI-VII
M86	Vergine	Galassia	V-VII

Catalogo Messier	Costellazione	Oggetto	Mesi di visibilità
Catalog Messier	Constellation	Object	Months of visibility
M87	Vergine	Galassia	V-VII
M88	Chioma Berenice	Galassia	VI-VII
M89	Vergine	Galassia	V-VII
M91	Chioma Berenice	Galassia	VI-VIII
M92	Ercole	Ammasso globulare	VI-IX
M93	Poppa	Ammasso aperto	II-IV
M94	Cani da Caccia	Galassia	I-IX
M95	Leone	Galassia	III-IV
M96	Leone	Galassia	III-IV
M97	Orsa Maggiore	Nebulosa planetaria	circumpolare
M98	Chioma Berenice	Galassia	VI-VIII
M99	Chioma Berenice	Galassia	VI-VIII
M100	Chioma Berenice	Galassia	VI-VIII
M101	Orsa Maggiore	Galassia	circumpolare
M102			
M103	Cassiopea	Ammasso aperto	circumpolare
M104	Vergine	Galassia	V-VII
M105	Leone	Galassia	III-IV
M106	Cani da Caccia	Galassia	I-IX
M107	Ofiuco	Ammasso globulare	VII-VIII
M108	Orsa Maggiore	Galassia	circumpolare
M109	Orsa Maggiore	Galassia	circumpolare
M110	Andromeda	Galassia	X-XII

# STELLE DOPPIE DI MAG.<6 DOUBLE STARS WITH MAG.<6

COS	NOME	A. R.	DEC.	COMP	ALTRO NOME	Mag	Mag2	SEP	PA
AND	56 And	01 56.2	+37 15			5.7	6	190	300
AND	Gamma And	02 03.9	+42 20		Almach	2.3	5.5	9.8	63
AQR	Zeta Aqr	22 28.8	-00 01			4.3	4.5	2.3	183
ARI	Epsilon Ari	02 59.2	+21 20	AB		5.2	5.5	1.5	208
ARI	Gamma Ari	01 53.5	+19 18		Mesarthim	4.8	4.8	7.8	0
BOO	Epsilon Boo	14 45.0	+27 04		Izar	2.5	4.9	2.8	339
BOO	Pi Boo	14 40.7	+16 25			4.9	5.8	5.6	108
BOO	Zeta Boo	14 41.1	+13 44			4.5	4.6	1	307
CAM	32 Cam	12 49.2	+83 25		STF 1694	5.3	5.8	21.6	326
CAP	Alpha/2 Cap	20 18.1	-12 33		Algedi	3.6	4.2	378	291
CAR	Upsilon Car	09 47.1	-65 04			3.2	6	5	128
CEN	3 Cen	13 51.8	-33 00		K Cen	4.5	6	11.9	112
CEN	Alpha Cen	14 39.7	-60 50			0	1.5	9.4	233
CEN	Beta Cen	14 03.9	-60 23			0.7	3.9	1.3	251
CNC	Zeta Cnc	08 12.2	+17 39	AB		5.6	6	6	72
CRA	Gamma CrA	19 06.4	-37 04		h 5084	4.8	5.1	1.3	54
CRA	h 5014	18 06.8	-43 25			5.8	5.8	1.6	221
CRB	Eta CrB	15 23.2	+30 17	AB		5.6	5.9	0.5	128
CRB	Nul CrB	16 22.4	+33 48		2 CrB	5.4	5.3	364.4	165
CRB	Zeta2 CrB	15 39.4	+36 38		STF 1965	5.1	6	6.3	305
CRU	Alpha Cru	12 26.6	-63 06	AB		1.4	1.9	4.1	111
CRU	Alpha Cru	12 26.6	-63 06	AC		1.4	4.9	90.1	202
CRU	Mu Cru	12 54.6	-57 11			4	5.2	34.9	17
CVN	Alpha CVn	12 56.0	+38 19		Cor Caroli	2.9	5.5	19.4	229
CYG	61 Cyg	21 06.9	+38 45			5.2	6	28	144
CYG	Beta Cyg	19 30.7	+27 58		Albireo	3.1	5.1	34.4	54
CYG	Omicron1 Cyg	20 13.6	+46 44	AD	31 Cygni2	4	5	338	338
DEL	Gamma Del	20 46.7	+16 07			4.5	5.5	9.6	268
DRA	Mu Dra	17 05.3	+54 28			5.7	5.7	2.3	10
DRA	Nu Dra	17 32.2	+55 11		Kuma	4.9	4.9	62	312
EQU	Delta Equ	21 14.5	+10 00	AB	STF 535	5.2	5.3		25
EQU	Gamma Equ	21 10.3	+10 08			4.7	5.9	353	153
ERI	Dunlop 16	03 48.6	-37 37		f Eri	4.8	5.3	7.9	212
ERI	Rho Eri	01 39.8	-56 12		p Eri	5.8	5.8	11.4	191
ERI	STF 470	03 54	-02 57			4.5	5.7	6.9	348
ERI	Theta Eri	02 58.3	-40 18		Acamar	3.4	4.5	8.2	88
GEM	Alpha Gem	07 34.6	+31 53		Castor	1.9	2.9	2.2	164
HER	100 Her	18 07.8	+26 06		STF 2280	5.9	6	14.2	183
HER	95 Her	18 01.5	+21 35		STF 2264	5.1	5.2	6.3	258
HER	Alpha Her	17 14.6	+14 23		Ras Algethi	3.5	5.4	4.7	107
HER	Rho Her	17 23.7	+37 09			4.6	5.6	4.1	316
HER	Zeta Her	16 41.3	+31 36			2.9	5.5	1.1	210
HYA	Beta Hya	11 52.9	-33 54			4.7	5.5	0.9	8
HYA	Epsilon Hya	08 46.8	+06 25	AB		3.8	4.7	2.7	113
HYA	N Hya	11 32.3	-29 16		17 Crt; H 96	5.8	5.9	9.2	210
LEO	Gamma Leo	10 20.0	+19 51		Algieba	2.2	3.5	4.4	122
LIB	Alpha Lib	14 50.9	-16 02		Zubenelgenubi	2.8	5.2	231	314
LIB	Sh 179	14 25.5	-19 58			6	6	35	295
LUP	Mu Lup	15 15.0	-47 42			4.8	5.2	1.6	150
LUP	Pi Lup	15 01.7	-46 51		h 4728	4.7	4.8	1.5	78
LUP	Xi Lup	15 56.9	-34 58			5.3	5.8	10.4	49
LYN	12 Lyn	06 46	+59 26	AB	STF 948	5.5	6	1.8	73
LYN	15 Lyn	06 57.3	+58 25	AB		4.8	5.9	0.9	33
LYR	Delta1/2 Lyr	18 54.5	+36 54			5.6	4.5	630	115
LYR	Epsilon2 Lyr	18 44.3	+39 40	CD		5.2	5.5	2.3	94
LYR	Zeta2 Lyr	18 44.8	+37 36			4.3	5.9	43.7	150
MON	Beta Mon	06 28.8	-07 02	AB	11 Mon	4.7	5.2	7.3	132
MUS	Beta Mus	12 46.3	-68 06			3.9	4.2	1.3	4
OPH	36 Oph	17 15.3	-26 36			5.1	5.1	4.8	
OPH	70 Oph	18 05.5	+02 30			4.2	6	5.2	136
OPH	Eta Oph	17 10.4	-15 43		Sabik	3	3.5	1	325
OPH	Lambda Oph	16 30.9	+01 59		Marfik	4.2	5.2	1.6	35
OPH	Rho Oph	16 25.6	-23 27		5 Oph	5.3	6	3.1	344
OPH	Tau Oph	18 03.1	-08 11			5.2	5.9	1.6	286
ORI	42/45 Ori	05 35.4	-04 50			4.7	5.3	252	105
ORI	Eta Ori	05 24.5	-02 24			3.8	4.8	1.5	77
ORI	Lambda Ori	05 35.1	+09 56		Meissa	3.6	5.5	4.4	43
ORI	Lambda Ori	05 35.4	+09 56	AB		4	6	4.4	44
ORI	Sh 49	04 59.2	+14 32	AB		5	6	39.4	305
ORI	Sigma Ori	05 38.7	-02 36	AB		4	6	0.2	
ORI	STF 747	05 35.0	-06 00			4.8	5.7	35.7	223
ORI	Theta1/2 Ori	05 35.4	-05 25			4.9	5	135	314
ORI	Zeta Ori	05 40.8	-01 57	AB	Alnitak	1.9	4	2.4	162

PAV	L 8550	20 51.6	-62 26		RMK 26	5.8	5.8	2.7	93
PHE	Beta Phe	01 06.1	-46 43			4.1	4.2	0.7	307
PSC	Alpha Psc	02 02.0	+02 46		Al Rischa (Alrescha)	4.2	5.1	1.8	267
PSC	Psil Psc	01 05.6	+21 28			5.6	5.8	30	159
PUP	Dunlop 67	08 14.0	-36 19			5.1	6	67.4	175
PUP	H N 19	07 34.3	-23 28		South 552	5.8	5.9	9.3	114
PUP	Kappa Pup	07 38.8	-26 48	AB	Markeb	3.8	4	8.8	318
SCO	Alpha Sco	16 29.4	-26 26		Antares	1.2	5.4	2.9	275
SCO	Beta Sco	16 05.4	-19 48		Graffias	2.6	4.9	13.6	21
SCO	Xi Sco	16 04.4	-11 22	AB	STF 1998	4.8	5.1	0.5	358
SER	Delta Ser	15 34.5	+10 32			4.2	5.2	3.9	178
SER	STF 2375	18 45.5	+05 30			5.8	5.8	2.6	119
SER	Theta1/2 Ser	18 56.2	+04 12	AB	Alya	4	5	22	104
TAU	27 Tau	03 49.2	+24 03		Atlas; H N 870	3.7	5	300	180
TAU	Kappa Tau	04 25.4	+22 18			4.4	5.4	340	173
TAU	Theta Tau	04 28.7	+15 52			3.4	3.8	337.4	346
TUC	Beta Tuc	00 31.5	-62 58			4.5	4.5	27.1	170
UMA	Xi UMa	11 18.2	+31 32		Alula Australis	4.3	4.8	1.6	273
UMA	Zeta UMa	13 23.9	+54 56		Mizar/Alcor; STF 1744	2.3	4	14.4	150
VEL	Gamma2 Vel	08 09.6	-47 20	AB	Regor; Dunlop 65	2.2	4.5	41.2	220
VIR	Gamma Vir	12 41.7	-01 27		Porrina; STF 1070	3.5	3.5	0.6	209
VOL	Gamma Vol	07 08.8	-70 30			3.9	5.8	13.7	297
VUL	6/8 Vul	19 28.7	+24 40			4.4	5.8	413.7	28

# STELLE VARIABILI CON MAX MAG. <6

## VARIABLE STARS WITH MAX MAG. <6

GCVS	Cos	A.R.	J2000	DEC.	J2000	magMax	Periodo	GCVS	Cos	A.R.	J2000	DEC.	J2000	magMax	Periodo
R	And	00	24	01.9	+38 34 37	5.800	409.3300000	omi 1	Cen	11	31	46.1	-59 26 31	5.800	200.0000000
S	And	00	42	43.1	+41 16 05	5.800		LZ	Cep	22	02	04.6	+58 00 01	5.560	3.0705100
AN	And	23	18	23.3	+41 46 25	6.000	3.2195665	V0381	Cep	21	19	15.7	+58 37 25	5.510	
KK	And	01	34	16.6	+37 14 14	5.910	0.6684000	V0388	Cep	23	15	37.7	+70 53 17	5.560	
OP	And	01	36	27.2	+48 43 22	5.920		V0414	Cep	20	44	22.1	+56 29 18	5.870	
OU	And	23	49	41.0	+36 25 31	5.900		AB	Cet	02	26	00.3	-15 20 28	5.710	2.9978140
PZ	And	02	20	58.2	+50 09 05	5.590		BK	Cet	01	52	52.1	-16 55 45	5.730	
V0340	And	23	34	37.5	+40 14 11	5.590		EL	Cet	03	12	26.4	+06 39 39	5.660	
V0388	And	23	27	07.4	+42 54 43	5.730		DR	Cha	10	41	51.5	-79 47 00	5.940	
NO	Aps	17	31	27.5	-80 51 33	5.710		AX	Cir	14	52	35.3	-63 48 35	5.650	5.2732680
R	Aqr	23	43	49.5	-15 17 04	5.800	386.9600000	CO	Cir	14	48	44.6	-66 35 37	5.790	
DV	Aqr	20	58	41.8	-14 28 59	5.890	1.5755310	SW	Col	05	23	24.0	-39 40 42	5.710	
HI	Aqr	22	53	28.7	-11 36 59	5.800		V0701	CrA	19	03	17.7	-38 15 11	5.690	
R	Aql	19	06	22.3	+08 13 48	5.500	284.2000000	V0710	CrA	19	01	50.7	-36 58 10	5.840	
EL	Aql	18	56	02.0	-03 19 20	5.500		R	CrB	15	48	34.4	+28 09 24	5.710	
QS	Aql	19	41	05.5	+13 48 56	5.930	2.5132940	S	CrB	15	21	24.0	+31 22 03	5.800	360.2600000
V0606	Aql	19	20	24.3	-00 08 02	5.500		TZ	CrB	16	14	40.9	+33 51 31	5.690	1.1397890
V1208	Aql	19	19	39.3	+12 22 29	5.510	0.1496630	DS	Cru	12	51	18.0	-60 19 47	5.790	
V1286	Aql	18	58	46.9	+13 54 24	5.830	6.0500000	U	Cyg	20	19	36.6	+47 53 39	5.900	463.2400000
V1291	Aql	19	53	18.7	-03 06 52	5.610	224.5000000	X	Cyg	20	43	24.2	+35 35 16	5.850	16.3863320
V1363	Aql	18	51	26.3	-01 03 52	5.800		RT	Cyg	19	43	37.8	+48 46 41	6.000	190.2800000
V1370	Aql	19	23	21.1	+02 29 26	6.000		CH	Cyg	19	24	33.1	+50 14 29	5.600	
R	Ara	16	39	44.7	-56 59 40	6.000	4.4250700	DT	Cyg	21	06	30.2	+31 11 05	5.570	2.4992150
V0539	Ara	17	50	28.4	-53 36 45	5.660	3.1691280	V0380	Cyg	19	50	37.3	+40 35 59	5.610	12.4256120
V0854	Ara	17	11	38.7	-48 52 24	5.870		V0389	Cyg	21	08	38.9	+30 12 20	5.550	
V0862	Ara	17	31	23.3	-56 55 15	5.920		V0460	Cyg	21	42	01.1	+35 30 37	5.570	180.0000000
RZ	Ari	02	55	48.5	+18 19 54	5.620	30.0000000	V1143	Cyg	19	38	41.2	+54 58 26	5.850	7.6407613
SX	Ari	03	12	14.2	+27 15 25	5.670	0.7278925	V1334	Cyg	21	19	22.2	+38 14 15	5.770	3.3328160
VZ	Ari	02	48	45.9	+25 11 17	5.820		V1339	Cyg	21	42	08.4	+45 45 57	5.900	35.0000000
AV	Ari	02	10	37.6	+19 30 01	5.680		V1610	Cyg	21	02	18.7	+36 41 41	5.800	
WW	Aur	06	32	27.2	+32 27 18	5.790	2.5250192	V1668	Cyg	21	42	35.3	+44 01 55	6.000	
AE	Aur	05	16	18.1	+34 18 44	5.780		V1679	Cyg	20	14	31.8	+36 39 40	5.990	
OX	Aur	06	53	01.4	+38 52 09	5.940	0.1544120	V1743	Cyg	19	33	41.6	+49 15 44	5.960	40.0000000
PU	Aur	05	18	15.7	+42 47 32	5.640		V1762	Cyg	19	08	25.8	+52 25 33	5.810	
QZ	Aur	05	28	34.1	+33 18 22	6.000		V1768	Cyg	20	04	36.2	+32 13 07	5.560	
V0444	Aur	06	00	58.6	+47 54 07	5.700		V2015	Cyg	20	33	54.8	+46 41 38	5.620	
CH	Boo	14	34	39.6	+49 22 06	5.740		V2093	Cyg	19	50	46.9	+37 49 35	6.000	
CY	Boo	14	17	28.5	+15 15 48	5.740		V2119	Cyg	20	23	44.4	+37 28 35	5.740	
DE	Boo	14	53	23.8	+19 09 10	6.000		V2121	Cyg	20	27	02.2	+49 23 00	5.750	
i	Boo	15	03	47.3	+47 39 15	5.800	0.2678159	V2140	Cyg	20	55	49.8	+47 25 04	5.650	
AX	Cam	08	01	42.5	+60 19 28	5.950	8.0278000	V2157	Cyg	21	25	47.0	+36 40 03	5.870	
DL	Cam	04	32	01.8	+53 54 39	5.810		EU	Del	20	37	54.7	+18 16 07	5.790	59.7000000
X	Cnc	08	55	22.9	+17 13 53	5.600	195.0000000	UX	Dra	19	21	35.5	+76 33 35	5.940	168.0000000
BI	Cnc	08	44	45.0	+10 04 54	5.580	4.2359000	VW	Dra	17	16	29.4	+60 40 14	6.000	170.0000000
BL	Cnc	08	06	18.4	+22 38 08	5.970		CX	Dra	18	46	43.1	+52 59 17	5.680	
BM	Cnc	08	13	08.9	+29 39 24	5.530	4.1160000	DE	Dra	20	19	36.7	+62 15 27	5.720	5.2980360
BO	Cnc	08	52	28.6	+28 15 33	5.900		DQ	Dra	16	24	25.3	+55 12 18	5.740	
TU	CVn	12	54	56.5	+47 11 48	5.550	50.0000000	EE	Dra	18	58	52.6	+69 31 53	5.840	
AI	CVn	12	23	47.0	+42 32 34	5.890	0.2085000	R	Eri	04	55	18.6	-16 25 04	5.720	
R	CMa	07	19	28.2	-16 23 43	5.700	1.1359405	DO	Eri	03	55	16.1	-12 05 57	5.970	12.4580000
FV	CMa	07	07	22.6	-23 50 27	5.640		DX	Eri	04	44	05.3	-08 30 13	5.760	
FY	CMa	07	26	59.5	-23 05 10	5.540		DZ	Eri	04	32	37.6	-03 12 34	5.730	1.3740000
HZ	CMa	06	50	23.3	-31 42 22	5.690		EH	Eri	04	33	54.7	-06 44 20	5.720	3.8200000
IY	CMa	06	28	39.2	-32 22 17	5.640		EM	Eri	04	20	42.8	-07 35 33	5.840	
LS	CMa	07	01	05.9	-25 12 56	5.570		GW	Eri	04	11	36.2	-20 21 22	5.840	
LZ	CMa	07	09	43.0	-25 13 52	5.630		GZ	Eri	04	18	16.1	-20 42 55	5.940	
MM	CMa	07	12	12.2	-25 56 33	5.840		S	For	03	46	13.2	-24 23 28	5.600	
MZ	CMa	07	21	04.3	-25 53 30	5.870		AI	For	03	19	34.9	-24 07 22	5.650	
NR	CMa	07	27	08.0	-17 51 53	5.670		R	Gem	07	07	21.3	+22 42 13	6.000	369.9100000
AG	Cap	21	46	16.3	-09 16 33	5.900	25.0000000	BU	Gem	06	12	19.1	+22 54 31	5.740	
U	Car	10	57	48.2	-59 43 56	5.720	38.7681000	NP	Gem	07	02	25.5	+17 45 20	5.890	
QY	Car	10	11	46.5	-58 03 38	5.630		NZ	Gem	07	42	03.2	+14 12 31	5.520	
V0366	Car	09	54	43.4	-57 18 52	5.700	433.0000000	OT	Gem	07	24	27.6	+15 31 02	6.000	
V0372	Car	07	52	29.7	-54 22 02	5.690	0.1160000	OV	Gem	06	49	49.8	+16 12 10	5.850	
V0374	Car	07	58	50.6	-60 49 28	5.720		PU	Gem	06	09	44.0	+23 06 48	5.780	
V0448	Car	06	47	18.7	-55 32 24	5.660		S	Gru	22	26	05.5	-48 26 19	6.000	401.5100000
V0482	Car	09	30	23.4	-58 21 43	5.850		DL	Gru	23	10	09.7	-40 35 30	5.860	
V0514	Car	10	38	02.6	-57 15 23	5.830		LQ	Her	16	11	38.0	+23 29 41	5.580	
RU	Cas	01	11	41.4	+65 01 08	5.500		OP	Her	17	56	48.5	+45 21 03	5.850	120.5000000
SU	Cas	02	51	58.8	+68 53 19	5.700	1.9493190	V0636	Her	16	47	19.7	+42 14 20	5.830	
YZ	Cas	00	45	39.1	+74 59 17	5.710	4.4672240	V0640	Her	17	25	54.4	+16 55 03	5.980	
V0373	Cas	23	55	33.8	+57 24 44	5.900	13.4192000	V0819	Her	17	21	43.6	+39 58 29	5.510	
V0557	Cas	01	42	20.5	+68 02 35	5.550	3.1848000	V0839	Her	15	55	30.6	+42 33 58	5.740	
V0567	Cas	00	05	06.1	+61 18 50	5.710	6.4322000	TU	Hor	03	30	37.0	-47 22 30	5.900	0.9359710
V0638	Cas	23	02	43.9	+55 14 11	5.700	5.3600000	TW	Hor	03	12	33.2	-57 19 18	5.520	158.0000000
V0640	Cas	00	06	15.8	+58 26 12	5.960		HV	Hya	08	35	28.2	-07 58 56	5.660	5.5700000
V0705	Cas	23	41	47.2	+57 31 01	5.800		LM	Hya	08	26	27.2	-03 59 15	5.800	
V0746	Cas	00	24	15.7	+52 01 12	5.540		V0335	Hya	12	13	12.9	-34 07 31	5.840	
V0762	Cas	01	16	11.9	+71 44 38	5.920		khi 2	Hya	11	05	57.6	-27 17 16	5.650	2.2677010
T	Cen	13	41	45.6	-33 35 51	5.500	90.4400000	BN	Hya	03	07	32.1	-78 59 21	5.700	
V0716	Cen	14	13	39.8	-54 37 32	5.960	1.4900960	V0360	Lac	22	50	21.8	+41 57 12	5.910	10.0750000
V0763	Cen	11	35	13.3	-47 22 21	5.550	60.0000000	TX	Leo	10	35	02.2	+08 39 02	5.660	2.4450566
V0767	Cen	13	53	57.2	-47 07 41	5.860		VY	Leo	10	56	01.5	+06 11 07	5.690	
V0768	Cen	14	48	38.0	-36 38 05	5.930		CX	Leo	10	27	39.0	+09 45 45	5.970	7.8970000
V0788	Cen	12	08	53.8	-44 19 34	5.740	4.9663770	DE	Leo	10	25	15.2	+08 47 05	5.600	
V0869	Cen	14	09	35.0	-51 30 17	5.920		DR	Leo	09	41	35.1	+31 16 40	5.840	
V0893	Cen	14	00	29.3	-62 47 09	5.570		EO	Leo						

GCVS	Cos	A.R.	J2000	DEC.J2000	magMax	Periodo	GCVS	Cos	A.R.	J2000	DEC.J2000	magMax	Periodo
R	Lep	04 59	36.3	-14 48 23	5.500	427.0700000	V3999	Sgr	18 02	19.0	-29 59 15	5.670	470.0000000
S	Lep	06 05	45.5	-24 11 44	6.000	89.0000000	V4001	Sgr	18 02	42.0	-30 05 25	5.770	465.0000000
YY	Lep	06 06	57.5	-21 48 44	5.600		V4037	Sgr	18 02	35.0	-29 59 56	5.740	400.0000000
HR	Lup	15 08	12.1	-40 35 02	5.760		V4089	Sgr	19 34	08.4	-40 02 05	5.870	
HZ	Lup	15 06	33.2	-30 55 07	5.960		V4452	Sgr	17 44	29.4	-29 04 59	5.930	
RR	Lyn	06 26	25.8	+56 17 06	5.520	9.9450790	V4501	Sgr	17 45	31.5	-28 46 22	5.910	
XY	Lyr	18 38	06.5	+39 40 06	5.800		V4530	Sgr	17 45	56.1	-28 55 51	5.570	
V0471	Lyr	19 11	46.0	+31 17 00	5.910	1.1608980	V4531	Sgr	17 45	55.8	-28 45 18	5.810	
V0473	Lyr	19 15	59.5	+27 55 35	5.990	1.4907800	V0906	Sco	17 53	54.8	-34 45 10	5.960	2.7858470
V0542	Lyr	18 58	01.9	+38 15 58	5.830		V0923	Sco	17 03	50.9	-38 09 09	5.860	34.8269000
WX	Men	05 34	44.8	-73 44 29	5.720		V0927	Sco	15 54	39.5	-25 14 37	5.800	1.4593700
iot	Men	05 35	36.2	-78 49 15	6.000	5.2880000	V0929	Sco	16 06	06.4	-23 36 23	5.890	
T	Mon	06 25	13.0	+07 05 09	5.580	27.0246490	V0957	Sco	17 52	13.7	-34 47 57	5.870	
V	Mon	06 22	43.6	-02 11 43	6.000	340.5000000	V1003	Sco	16 38	26.3	-43 23 54	5.830	
V0474	Mon	05 59	01.1	-09 22 56	5.930	0.1361260	V1036	Sco	17 34	42.5	-32 34 54	5.710	
R	Mus	12 42	05.0	-69 24 27	5.930	7.5102110	V1068	Sco	16 53	42.4	-43 03 03	5.710	
S	Mus	12 12	47.0	-70 09 06	5.890	9.6600700	V1075	Sco	17 15	19.2	-33 32 54	5.570	
BO	Mus	12 34	54.4	-67 45 25	5.850		S	Scl	00 15	22.3	-32 02 43	5.500	362.5700000
LS	Mus	13 03	05.4	-71 28 33	5.900		AI	Scl	01 12	45.4	-37 51 23	5.890	
tet	Mus	13 08	07.2	-65 18 22	5.500	18.3410000	BU	Scl	23 59	27.9	-29 29 07	5.700	
V0360	Nor	15 51	06.8	-55 03 20	5.770		sig	Scl	01 02	26.4	-31 33 07	5.500	
V0367	Nor	16 13	17.0	-53 40 16	5.940		V0373	Sct	18 55	27.0	-07 43 05	6.000	
U	Oph	17 16	31.7	+01 12 38	5.840	1.6773461	V0432	Sct	18 29	46.8	-14 34 55	5.960	2.1912000
X	Oph	18 38	21.1	+08 50 03	5.900	328.8500000	CT	Ser	15 45	39.1	+14 22 32	6.000	
Y	Oph	17 52	38.7	-06 08 37	5.870	17.1241300	FL	Ser	15 12	04.3	+18 58 34	5.790	
V2052	Oph	17 56	18.4	+00 40 13	5.810	0.1398903	FS	Ser	16 08	28.1	+08 32 04	5.680	
V2347	Oph	18 27	51.0	+07 52 21	5.800		tau 4	Ser	15 36	28.2	+15 06 05	5.890	100.0000000
CK	Ori	05 30	19.9	+04 12 17	5.900	120.0000000	SS	Sex	10 23	27.0	-04 04 27	5.940	4.3700000
V0529	Ori	05 58	20.2	+20 15 45	6.000		TU	Tau	05 45	13.7	+24 25 12	5.900	190.0000000
V1004	Ori	05 58	24.4	+01 50 14	5.880	0.0611000	XX	Tau	05 19	24.4	+16 43 00	6.000	
AG	Peg	21 51	02.0	+12 37 32	6.000		HU	Tau	04 38	15.8	+20 41 05	5.850	2.0562997
HH	Peg	23 51	21.2	+09 18 48	5.740		V0483	Tau	04 19	57.7	+14 02 07	5.550	0.0540000
HN	Peg	21 44	31.3	+14 46 19	5.920	24.9000000	V0711	Tau	03 36	47.3	+00 35 16	5.710	2.8406120
HV	Peg	23 27	40.4	+25 10 02	5.960	6.9700000	V0731	Tau	05 43	19.5	+23 12 16	5.980	
IM	Peg	22 53	02.3	+16 50 28	5.600	24.4400000	V0775	Tau	04 22	03.5	+14 04 38	5.720	0.0625000
MR	Peg	22 54	12.1	+22 39 35	5.710		V0809	Tau	05 52	22.3	+14 10 18	5.590	2.6541000
NV	Peg	21 28	59.8	+22 10 46	5.660		V0892	Tau	04 18	40.6	+28 19 16	5.550	
NZ	Peg	21 39	01.2	+20 15 56	5.830		V0960	Tau	05 33	31.6	+18 32 25	5.530	
V0342	Peg	23 07	28.7	+21 08 03	6.000		V1083	Tau	03 43	43.9	+06 55 30	5.990	
IW	Per	03 33	35.0	+39 53 58	5.790	0.9171877	V1141	Tau	04 23	32.4	+20 58 55	6.000	
V0376	Per	03 49	08.1	+43 57 47	5.770	0.0993700	V1155	Tau	05 07	55.4	+21 42 17	5.820	
V0472	Per	02 08	40.6	+58 25 25	5.640		V1156	Tau	05 09	45.1	+28 01 50	6.000	
V0582	Per	04 08	36.6	+38 02 23	5.630		PW	Tel	19 33	21.6	-45 16 18	5.610	2.9213000
BD	Phe	01 50	54.4	-50 12 22	5.900		YY	Tri	02 18	06.0	+28 36 45	5.840	
ksi	Phe	00 41	46.4	-56 30 05	5.680	3.9516000	S	TrA	16 01	10.7	-63 46 36	5.950	6.3234400
VX	Psc	01 29	52.9	+18 21 20	5.900	0.1310000	LX	TrA	15 27	33.1	-64 31 53	5.810	
WW	Psc	00 59	49.7	+06 29 00	5.970		MX	TrA	16 59	34.0	-69 16 05	5.750	
XZ	Psc	23 54	46.6	+00 06 34	5.610		BQ	Tuc	00 53	37.9	-62 52 17	5.700	
AG	Psc	00 36	47.3	+15 13 54	5.810	0.0800000	CG	Tuc	23 29	01.0	-63 06 38	5.660	2.3148000
UU	PsA	22 04	36.8	-26 49 21	5.860		ST	UMa	11 27	50.4	+45 11 07	6.000	110.0000000
VZ	PsA	22 38	51.5	-33 04 53	5.680		VY	UMa	10 45	04.0	+67 24 41	5.870	
WX	PsA	22 59	35.8	-29 27 44	5.570		CO	UMa	11 09	19.1	+36 18 34	5.740	
MY	Pup	07 38	18.2	-48 36 05	5.540	5.6948200	CR	UMa	13 46	35.7	+54 25 58	5.650	1.3799600
PR	Pup	07 14	46.0	-46 50 59	5.690	1.9347000	EN	UMa	10 21	03.3	+68 44 52	5.830	
PT	Pup	07 36	41.0	-19 42 08	5.720	0.1628400	pi 1	UMa	08 39	11.7	+65 01 15	5.640	
QS	Pup	07 49	12.9	-46 51 28	5.840	0.1182000	RW	UMi	16 47	54.8	+77 02 12	6.000	
V0336	Pup	08 02	44.8	-41 18 35	5.520		AH	Vel	08 12	00.0	-46 38 40	5.500	4.2271710
V0363	Pup	07 12	25.8	-36 32 40	5.890		HV	Vel	08 35	52.0	-50 58 11	5.770	2.6674500
V0378	Pup	07 36	03.9	-14 29 34	5.600		IU	Vel	09 00	22.3	-43 10 26	5.970	
V0390	Pup	07 44	34.2	-24 40 27	5.530		IV	Vel	09 57	10.9	-52 38 20	5.990	0.1608000
V0392	Pup	07 46	10.5	-37 56 01	5.820		IW	Vel	10 57	07.8	-50 45 54	5.900	0.1500000
V0397	Pup	07 49	14.7	-35 14 36	5.910		IZ	Vel	09 01	20.9	-41 51 51	5.530	
V0438	Pup	08 24	57.2	-42 46 11	5.900		KL	Vel	09 12	30.5	-43 36 48	5.560	
V0468	Pup	07 39	58.0	-37 34 46	5.920		LR	Vel	09 18	42.4	-51 33 38	5.820	
XY	Pyx	08 27	59.4	-35 06 50	5.680		NN	Vel	08 09	09.5	-48 41 04	5.620	
RT	Sgr	20 17	43.6	-39 06 46	6.000	306.4600000	OP	Vel	08 46	30.5	-45 54 45	5.500	
RU	Sgr	19 58	42.9	-41 50 58	6.000	240.4900000	V0335	Vel	09 53	50.1	-51 08 48	5.880	
RY	Sgr	19 16	32.8	-33 31 20	5.800		SS	Vir	12 25	14.0	+00 46 12	6.000	364.1400000
V0732	Sgr	17 56	07.5	-27 22 17	6.000		CS	Vir	14 18	38.5	-18 42 56	5.840	9.2954000
V3970	Sgr	17 58	30.0	-29 13 08	6.000	350.0000000	FW	Vir	12 38	22.7	+01 51 17	5.630	15.0000000
V3974	Sgr	17 58	57.0	-28 50 54	5.890	450.0000000	LN	Vir	13 14	31.3	+11 19 54	5.750	

## COSTANTI ASTRONOMICHE

0,0027379093110	Anni per giorno al 2000
0,0748042315774	Anni per orbita lunare al 2000
0,999961212611	Anni per rivoluzione al 2000
365,25	Anno giuliano
365,2425	Anno gregoriano
365,24219876	Anno tropico in giorni al 1900
365,24219264	Anno tropico in giorni al 2000
13,4225120288	Cicli nodali lunari per rivoluzione solare terrestre al 2000
346,620031	Ciclo eclittico lunare, in giorni, al 1900
346,620063	Ciclo eclittico lunare, in giorni, al 2000
6.700,52877977	Ciclo lunare da punto fisso, in giorni
6.798,36320013	Ciclo lunare da punto fisso, in gradi
6.816,97578004	Ciclo lunare da punto fisso, rotazioni
40.030.005,6967	Circonferenza media terrestre, in metri
40.075.003,5535	Circonferenza terrestre, equatoriale, in metri
10.001.965,72930	Circonferenza terrestre, in metri, quadrante meridiano, IUGG
0,518102946	Diametro angolare lunare, medio geocentrico, in gradi
12.756.280,0	Diametro terrestre equatoriale, in metri, IUGG, WGS84
149.597.870.000	Distanza del Sole, in metri (unità astronomiche)
356.375.000,0	Distanza della Luna al perigeo, in metri
406.720.000,0	Distanza della Luna all'apogeo, in metri
384.400.000,0	Distanza media della Luna, in metri
25.781,5756912	Durata in anni della precessione, al 2000
9.416.519,24934	Durata in giorni della precessione, al 2000
0,054900489	Eccentricità dell'orbita lunare
0,01671022	Eccentricità dell'orbita terrestre
365,25964438	Giorni per anno anomalistico al 2000
365,25964134	Giorni per anno anomalistico, 1900
29,5305888844	Giorni per periodo sinodico medio al 2000
27,32166156	Giorni per rivoluzione lunare al 2000
365,2563605	Giorni per rivoluzione media
365,25636053	Giorni per rivoluzione, al 2000
0,99726967199	Giorni per rotazione al 2000
36525	Giorni per secolo giuliano
57,2957795131	Gradi per radiante
5,1453964	Inclinazione dell'orbita lunare
0,996647189318820	Inverso dello schiacciamento terrestre
298,257222101	Inverso dello schiacciamento terrestre, IUGG
298,257223563	Inverso dello schiacciamento terrestre, WGS84
111.950,42769	Lunghezza di un ° di circonferenza terrestre in metri
18,6133019052	Ciclo dei nodi lunari, in anni
0,00511666	Nutazione dell'asse terrestre
23,439291111	Obliquità dell'eclittica
26,8206129544	Orbita per periodo lunare nodale, °
13,3687462502	Orbite lunari per orbita solare terrestre al 2000
1,00003878889	Orbite per anno al 2000
27,55454650	Periodo anomalistico lunare in giorni
27,2122207637	Periodo nodale lunare in giorni
0,0367481951835	Periodo nodale lunare per giorno al 2000
0,0366478605569	Periodo nodale lunare per rotazione al 2000
29,5305888844	Periodo sinodico lunare, medio, al 2000
3,87873887918E-05	Precessione annuale al 2000
0,0139634599651	Precessione annuale in gradi
3,82306869946E-05	Precessione giornaliera
3,87888933117E-05	Precessione per rivoluzione al 2000
6.378.140,0	Raggio equatoriale terrestre, in metri, IAU 1979
6.371.000,79	Raggio in metri di una sfera con la stessa superficie della Terra, IUGG
6.371.007,18	Raggio in metri di una sfera con lo stesso volume della Terra, IUGG

1.738.000,0	Raggio lunare in metri
6.371.008,77	Raggio terrestre medio, in metri, IUGG
6.356.755,28816	Raggio terrestre polare, in metri
27,32166156	Rivoluzione lunare in giorni al 2000
13,1403824445	Rivoluzioni lunari per rotazione, in gradi
18,6140238945	Rivoluzioni lunari per ciclo nodale (lunar major)
0,0366009950677	Rivoluzioni lunari per giorno al 2000
0,985609119791	Rivoluzioni lunari per giorno, in gradi
13,1763582244	Rivoluzioni lunari per giorno, media, in gradi
0,036501066623457	Rivoluzioni lunari per rotazione al 2000
0,982918083604	Rivoluzioni lunari per rotazione, in gradi
359,98603654	Rivoluzioni per anno in gradi
0,00273780311053	Rivoluzioni per giorno al 2000
0,0745017026513	Rivoluzioni per mese nodale al 2000
0,0748013300039	Rivoluzioni per orbita lunare al 2000
26,9284788014	Rivoluzioni per orbita lunare in gradi
27,1580123221	Rivoluzioni per periodo anomalistico lunare, in gradi
29,1056177173	Rivoluzioni per periodo lunare sinodico in gradi
0,00273032801001	Rivoluzioni per rotazione al 2000
29,6114378225	Rotazioni lunari per ciclo sinodico
366,2421544	Rotazioni per anno tropico al 2000
366,242154403	Rotazioni per anno, al 2000
347,569040486	Rotazioni per ciclo lunare eclittico
1,00273780311	Rotazioni per giorno al 2000
27,6299854231	Rotazioni per periodo anomalistico
27,2867224663	Rotazioni per periodo nodale al 2000
366,25636053	Rotazioni per rivoluzione al 2000
27,39646289	Rotazioni per rivoluzione lunare al 2000
0,00335281068118	Schiacciamento terrestre
8640	Secondi per giorno giuliano
6.378.137,0	Semiassse maggiore terrestre, in metri, WGS84
6.356.752,3141	Semiassse minore terrestre, in metri, WGS84

# SOLE - THE SUN

Classificazione Sequenza principale  
Classe spettrale G2

PARAMETRI ORBITALI (epoca di riferimento: J2000)

Semiassse maggiore 26-28000 anni luce  
Periodo orbitale 2,25-2,50 × 10<sup>6</sup> anni  
Velocità orbitale 217 km/s (media)  
Sistema planetario sì

DATI FISICI

Diametro medio 1 392 000 km  
Superficie 6,09 × 10<sup>18</sup> m<sup>2</sup>  
Volume 1,41 × 10<sup>27</sup> m<sup>3</sup>  
Massa 1,9891 × 10<sup>30</sup> kg  
Densità 1,411 × 10<sup>3</sup> kg/m<sup>3</sup>  
Acceleraz. di gravità in superficie 274 m/s<sup>2</sup> (27,9 g)  
Velocità di fuga 617,54 km/s  
Periodo di rotazione  
All'equatore: 27 d 6 h 36 min  
A 30° di latitudine: 28 d 4 h 48 min  
A 60° di latitudine: 30 d 19 h 12 min  
A 75° di latitudine: 31 d 19 h 12 min  
Velocità di rotazione (all'equatore) 1993 m/s  
Inclinaz. dell'asse sull'eclittica 7,25°  
Inclinaz. dell'asse sul piano galattico 67,23°  
A.R. polo nord 286,13° (19 h 4 min 30 s)  
Declinazione 63,87° (63° 52')  
Temperatura superficiale 5780 K (media)  
T. della corona 5 × 10<sup>6</sup> K  
T. del nucleo ~13,6 × 10<sup>6</sup> K  
Luminosità 3,827 × 10<sup>26</sup> J/s  
Radianza 2,009 × 10<sup>7</sup> W/(sr×m<sup>2</sup>)

DATI OSSERVATIVI

Magnitudine apparente da Terra -26,8 (media)  
Magnitudine ass. 4,8

# PIANETI

	MERCURIO	VENERE	TERRA	LUNA	MARTE	GIOVE	SATURNO	URANO	NETTUNO
Massa (10 <sup>24</sup> kg)	0,33	4,87	5,97	0,073	0,642	1899	568	86,8	102
Diametro (km)	4879	12104	12756	3475	6794	142984	120536	51118	49528
Densità (kg/m <sup>3</sup> )	5427	5243	5515	3340	3933	1326	687	1270	1638
Gravità (m/s <sup>2</sup> )	3,7	8,9	9,8	1,6	3,7	23,1	9	8,7	11
Velocità di fuga (km/s)	4,3	10,4	11,2	2,4	5	59,5	35,5	21,3	23,5
Periodo di rotazione (ore)	1407,6	-5832,5	23,9	655,7	24,6	9,9	10,7	-17,2	16,1
Lunghezza del giorno (ore)	4222,6	2802	24	708,7	24,7	9,9	10,7	17,2	16,1
Distanza dal Sole (10 <sup>6</sup> km)	57,9	108,2	149,6	0,384*	227,9	778,6	1433,5	2872,5	4495,1
Perielio (10 <sup>6</sup> km)	46	107,5	147,1	0,363*	206,6	740,5	1352,6	2741,3	4444,5
Afelio (10 <sup>6</sup> km)	69,8	108,9	152,1	0,406*	249,2	816,6	1514,5	3003,6	4545,7
Periodo orbitale (giorni)	88	224,7	365,2	27,3	687	4331	10756	30706	60223
Velocità orbitale (km/s)	47,9	35	29,8	1	24,1	13,1	9,7	6,8	5,4
Inclinazione orbitale (gradi)	7	3,4	0	5,1	1,9	1,3	2,5	0,8	1,8
Eccentricità orbitale	0,205	0,007	0,017	0,055	0,094	0,049	0,057	0,046	0,011
Inclinazione dell'asse (gradi)	0,01	177,4	23,5	6,7	25,2	3,1	26,7	97,8	28,3
Temperatura media (C)	167	464	15	-20	-65	-110	-140	-195	-200
Pressione sulla superficie (bar)	0	92	1	0	0,01	Sconosciuta	Sconosciuta	Sconosciuta	Sconosciuta
Satelliti	0	0	1	0	2	63	60	27	13
Anelli	No	No	No	No	No	Yes	Yes	Yes	Yes
Campo magnetico	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes

\* valori riferiti alla Terra

	Sole	Mercurio	Venere	Terra	Luna	Marte	Giove	Saturno	Urano	Nettuno
Sole	-	4960,5	2654,8	1920,2	1920,2	1260,5	369,0	200,4	100,0	63,9
Mercurio	17,4	-	20,0	11,0	11,0	5,9	1,4	0,7	0,4	0,2
Venere	23,1	49,7	-	60,3	60,3	20,9	3,7	1,9	0,9	0,6
Terra	17,6	28,7	63,6	-	-	33,6	4,2	2,1	1,0	0,6
Luna	4,8	7,8	17,3	-	-	9,2	1,1	0,6	0,3	0,2
Marte	6,2	8,2	11,7	17,9	17,9	-	2,5	1,2	0,5	0,3
Giove	37,9	40,9	44,0	46,9	46,9	53,6	-	45,1	14,1	7,9
Saturno	17,4	18,1	18,8	19,4	19,4	20,6	38,0	-	17,3	8,1
Urano	3,7	3,7	3,8	3,9	3,9	4,0	5,0	7,3	-	6,5
Nettuno	2,3	2,3	2,3	2,4	2,4	2,4	2,8	3,3	6,3	-

Diametri medi in " che i pianeti sottendono visti da un corpo all'altro

# PLANETS

	MERCURY	VENUS	EARTH	MOON	MARS	JUPITER	SATURN	URANUS	NEPTUNE
Weight ( $10^{24}$ kg)	0,33	4,87	5,97	0,073	0,642	1899	568	86,8	102
Diameter (km)	4879	12104	12756	3475	6794	142984	120536	51118	49528
Density (kg/m <sup>3</sup> )	5427	5243	5515	3340	3933	1326	687	1270	1638
Gravity (m/s <sup>2</sup> )	3,7	8,9	9,8	1,6	3,7	23,1	9	8,7	11
Velocità of escare (km/s)	4,3	10,4	11,2	2,4	5	59,5	35,5	21,3	23,5
Period of rotation (hours)	1407,6	-5832,5	23,9	655,7	24,6	9,9	10,7	-17,2	16,1
Length of the day (hours)	4222,6	2802	24	708,7	24,7	9,9	10,7	17,2	16,1
distance from the Sun ( $10^6$ km)	57,9	108,2	149,6	0,384*	227,9	778,6	1433,5	2872,5	4495,1
Perihelion ( $10^6$ km)	46	107,5	147,1	0,363*	206,6	740,5	1352,6	2741,3	4444,5
Aphelion ( $10^6$ km)	69,8	108,9	152,1	0,406*	249,2	816,6	1514,5	3003,6	4545,7
Orbital period (days)	88	224,7	365,2	27,3	687	4331	10,747	30,589	59,8
Orbital velocity (km/s)	47,9	35	29,8	1	24,1	13,1	9,7	6,8	5,4
Orbital inclination (degrees)	7	3,4	0	5,1	1,9	1,3	2,5	0,8	1,8
Eccentricity	0,205	0,007	0,017	0,055	0,094	0,049	0,057	0,046	0,011
Inclination (gradi)	0,01	177,4	23,5	6,7	25,2	3,1	26,7	97,8	28,3
Temperatur (C)	167	464	15	-20	-65	-110	-140	-195	-200
Pressure (bar)	0	92	1	0	0,01	Sconosciuta	Sconosciuta	Sconosciuta	Sconosciuta
Satellites	0	0	1	0	2	63	60	27	13
Rings	No	No	No	No	No	Yes	Yes	Yes	Yes
Magnetic field	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes

\* data referred to the Earth

## SATELLITI DI MARTE - SATELLITES OF MARS

Nome		Diametro medio	Massa	Raggio orbitale medio	Periodo orbitale	Scoperta
Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Marte I	Fobos	27,0×21,6×18,8 km	10,8×1015 kg	9 377 km	7,66 ore	1877
Marte II	Deimos	10×12×16 km	2×1015 kg	23 460 km	30,35 ore	1877

## SATELLITI DI GIOVE - SATELLITES OF JUPITER

Nome		Diametro medio	Massa	Raggio Orbitale Medio	Periodo orbitale	Scoperta	Gruppo
Name		Diameter	Weight	Orbital radius	Orbital period	Discovery	Group
Giove XVI	Metide	43 km	120×1015 kg	127 690 km	0,294780 giorni	1979	Gruppo di Amaltea
Giove XV	Adrastea	26×20×16 km	7,5×1015 kg	128 694 km	0,29826 giorni	1979	Gruppo di Amaltea
Giove V	Amaltea	262×146×134 km	2,1×1018 kg	181 170 km	0,498179 giorni	1892	Gruppo di Amaltea
Giove XIV	Tebe	110×90 km	1,5×1018 kg	221 700 km	0,6745 giorni	1979	Gruppo di Amaltea
Giove I	Io	3 643 km	89×1021 kg	421 700 km	1,769138 giorni	1610	Satelliti galileiani
Giove II	Europa	3 122 km	48×1021 kg	671 034 km	3,551181 giorni	1610	Satelliti galileiani
Giove III	Ganimede	5 262 km	150×1021 kg	1 070 412 km	7,154553 giorni	1610	Satelliti galileiani
Giove IV	Callisto	4 821 km	110×1021 kg	1 882 709 km	16,689018 giorni	1610	Satelliti galileiani
Giove XVIII	Themisto	8 km	0,69×1015 kg	7 391 645 km	129,8276 giorni	1975	
Giove XIII	Leda	20 km	11×1015 kg	11 097 245 km	238,8242 giorni	1974	Gruppo di Imalia
Giove VI	Imalia	170 km	6,7×1018 kg	11 432 435 km	249,7263 giorni	1904	Gruppo di Imalia
Giove X	Lisitea	36 km	63×1015 kg	11 653 225 km	256,9954 giorni	1938	Gruppo di Imalia
Giove VII	Elara	86 km	870×1015 kg	11 683 115 km	257,9849 giorni	1905	Gruppo di Imalia
S/2000 J 11		4 km	90×1012 kg	12 570 575 km	287,9310 giorni	2000	Gruppo di Imalia
Giove XLVI	Carpo	3 km	45×1012 kg	17 144 875 km	1,2556 anni	2003	
S/2003 J 12		1 km	1,5×1012 kg	17 739 540 km	1,3215 anni	2000	
Giove XXXIV	Euporia	2 km	15×1012 kg	19 088 435 km	1,4751 anni	2001	Gruppo di Ananke?
S/2003 J 3		2 km	15×1012 kg	19 621 780 km	1,5374 anni	2003	Gruppo di Ananke
S/2003 J 18		2 km	15×1012 kg	19 812 575 km	1,5598 anni	2003	Gruppo di Ananke
Giove XLII	Telsinoe	2 km	15×1012 kg	20 453 755 km	1,6362 anni	2003	Gruppo di Ananke
Giove XXXIII	Euante	3 km	45×1012 kg	20 464 855 km	1,6375 anni	2001	Gruppo di Ananke
Giove XLV	Elice	4 km	90×1012 kg	20 540 265 km	1,6465 anni	2003	Gruppo di Ananke?
Giove XXXV	Ortosia	2 km	15×1012 kg	20 567 970 km	1,6499 anni	2001	Gruppo di Ananke?
Giove XXIV	Iocaste	5 km	190×1012 kg	20 722 565 km	1,6685 anni	2000	Gruppo di Ananke
S/2003 J 16		2 km	15×1012 kg	20 743 780 km	1,6711 anni	2003	Gruppo di Ananke
Giove XII	Ananke	28 km	30×1015 kg	20 815 225 km	1,6797 anni	1951	Gruppo di Ananke
Giove XXVII	Praxidike	7 km	430×1012 kg	20 823 950 km	1,6808 anni	2000	Gruppo di Ananke
Giove XXII	Arpalice	4 km	120×1012 kg	21 063 815 km	1,7099 anni	2000	Gruppo di Ananke
Giove XXX	Ermippe	4 km	90×1012 kg	21 182 085 km	1,7243 anni	2001	Gruppo di Ananke?
Giove XXIX	Tione	4 km	90×1012 kg	21 405 570 km	1,7517 anni	2001	Gruppo di Ananke
Giove XL	Mneme	2 km	15×1012 kg	21 427 110 km	1,7543 anni	2003	Gruppo di Ananke
S/2003 J 17		2 km	15×1012 kg	22 134 305 km	1,8419 anni	2003	Gruppo di Carne
Giove XXXI	Aitne	3 km	45×1012 kg	22 285 160 km	1,8608 anni	2001	Gruppo di Carne
Giove XXXVII	Cale	2 km	15×1012 kg	22 409 210 km	1,8763 anni	2001	Gruppo di Carne
Giove XX	Taigete	5 km	160×1012 kg	22 438 650 km	1,8800 anni	2000	Gruppo di Carne
S/2003 J 19		2 km	15×1012 kg	22 709 060 km	1,9141 anni	2003	Gruppo di Carne
Giove XXI	Caldene	4 km	75×1012 kg	22 713 445 km	1,9147 anni	2000	Gruppo di Carne
S/2003 J 15		2 km	15×1012 kg	22 721 000 km	1,9156 anni	2003	Gruppo di Ananke?
S/2003 J 10		2 km	15×1012 kg	22 730 815 km	1,9168 anni	2003	Gruppo di Carne?
S/2003 J 23		2 km	15×1012 kg	22 739 655 km	1,9180 anni	2003	Gruppo di Pasife
Giove XXV	Erinome	3 km	45×1012 kg	22 986 265 km	1,9493 anni	2000	Gruppo di Carne
Giove XLI	Aede	4 km	90×1012 kg	23 044 175 km	1,9566 anni	2003	Gruppo di Pasife
Giove XLIV	Callicore	2 km	15×1012 kg	23 111 825 km	1,9652 anni	2003	Gruppo di Carne?
Giove XXIII	Calice	5 km	190×1012 kg	23 180 775 km	1,9740 anni	2000	Gruppo di Carne
Giove XXXII	Euridome	3 km	45×1012 kg	23 230 860 km	1,9804 anni	2001	Gruppo di Pasife?
S/2003 J 14		2 km	15×1012 kg	23 238 595 km	1,9814 anni	2003	Gruppo di Pasife
Giove XXXVIII	Pasitee	2 km	15×1012 kg	23 307 320 km	1,9902 anni	2001	Gruppo di Carne
Giove XLVIII	Cillene	2 km	15×1012 kg	23 396 270 km	2,0016 anni	2003	Gruppo di Pasife
Giove XLVII	Eukelade	4 km	90×1012 kg	23 483 695 km	2,0129 anni	2003	Gruppo di Carne
S/2003 J 4		2 km	15×1012 kg	23 570 790 km	2,0241 anni	2003	Gruppo di Pasife
Giove XXXIX	Egemone	3 km	45×1012 kg	23 702 510 km	2,0411 anni	2003	Gruppo di Pasife
Giove XLIII	Arche	3 km	45×1012 kg	23 717 050 km	2,0429 anni	2002	Gruppo di Carne
Giove XI	Carne	46 km	0,13×1018 kg	23 734 465 km	2,0452 anni	1938	Gruppo di Carne
Giove XXVI	Isonoe	4 km	75×1012 kg	23 832 300 km	2,0579 anni	2000	Gruppo di Carne
S/2003 J 9		1 km	1,5×1012 kg	23 857 810 km	2,0612 anni	2003	Gruppo di Carne
S/2003 J 5		4 km	90×1012 kg	23 973 925 km	2,0762 anni	2003	Gruppo di Carne
Giove VIII	Pasife	60 km	300×1015 kg	24 094 770 km	2,0919 anni	1908	Gruppo di Pasife
Giove IX	Sinope	38 km	75×1015 kg	24 214 390 km	2,1075 anni	1908	Gruppo di Pasife
Giove XXXVI	Sponde	2 km	15×1012 kg	24 252 625 km	2,1125 anni	2001	Gruppo di Pasife
Giove XXVIII	Autonoe	4 km	90×1012 kg	24 264 445 km	2,1141 anni	2001	Gruppo di Pasife
Giove XVII	Calliroe	9 km	870×1012 kg	24 356 030 km	2,1261 anni	1999	Gruppo di Pasife
Giove XIX	Megaclite	5 km	210×1012 kg	24 687 240 km	2,1696 anni	2000	Gruppo di Pasife
S/2003 J 2		2 km	15×1012 kg	30 290 845 km	2,9487 anni	2003	

# SATELLITI DI SATURNO - SATELLITES OF SATURN

Nome		Diametro medio	Massa	Raggio Orbitale medio	Periodo orbitale	Scoperta	Gruppo
Name		Diameter	Weight	Orbital radius	Orbital period	Discovery	Group
Saturno XVIII	Pan	35×35×23 km	2,7×1015 kg	133 583 km	0,575 giorni	1990	
Saturno XXXV	Dafni	7 km	?	136 505 km	0,59537 giorni	2005	
Saturno XV	Atlante	40×20 km	?	137 670 km	0,6019 giorni	1980	
Saturno XVI	Prometeo	145×85×62 km	0,270×1018 kg	139 350 km	0,6130 giorni	1980	
Saturno XVII	Pandora	114×84×62 km	0,220×1018 kg	141 700 km	0,6285 giorni	1980	
Saturno XI	Epimeteo	144×108×98 km	0,560×1018 kg	151 422 km	0,6942 giorni	1980	
Saturno X	Giano	196×192×150 km	2,01×1018 kg	151 472 km	0,6945 giorni	1966	
Saturno I	Mimante	397 km	38,0×1018 kg	185 520 km	0,942422 giorni	1789	
Saturno XXXII	Metone	3 km	?	194 000 km	1,01 giorni	2004	
Saturno XLIX	Antea	2 km	?	197 700 km	1,04 giorni	2007	
Saturno XXXIII	Pallene	4 km	?	211 000 km	1,14 giorni	2004	
Saturno II	Encelado	499 km	73,0×1018 kg	238 020 km	1,370218 giorni	1789	
Saturno XIII	Telesto	34×28×36 km	?	294 660 km	1,887802 giorni	1980	
Saturno III	Teti	1 060 km	0,622×1021 kg	294 660 km	1,887802 giorni	1684	
Saturno XIV	Calipso	34×22×22 km	?	294 660 km	1,887802 giorni	1980	
Saturno XII	Elena	36×32×30 kg	?	377 400 km	2,736915 giorni	1980	
Saturno IV	Dione	1 118 km	1,05×1021 kg	377 400 km	2,736915 giorni	1684	
Saturno XXXIV	Polluce	13 km	?	377 400 km	2,736915 giorni	2004	
Saturno V	Rea	1 528 km	2,49×1021 kg	527 040 km	4,5175 giorni	1672	
Saturno VI	Titano	5 151 km	135×1021 kg	1 221 850 km	15,94542 giorni	1655	
Saturno VII	Iperione	410×260×220 km	17,7×1018 kg	1 481 100 km	21,27661 giorni	1848	
Saturno VIII	Giapeto	1 460 km	1,88×1021 kg	3 561 300 km	79,33018 giorni	1671	
Saturno XXIV	Kiviuq	16 km	3,3×1015 kg	11 365 000 km	1,2298 anni	2000	Gruppo Inuit
Saturno XXII	Ijirao	12 km	?	11 442 000 km	1,2361 anni	2000	Gruppo Inuit
Saturno IX	Febe	220 km	4,00×1018 kg	12 944 300 km	-1,5009 anni	1899	Gruppo Nordico
Saturno XX	Paaliaq	22 km	?	15 199 000 km	1,8806 anni	2000	Gruppo Inuit
Saturno XXVII	Skadi	8 km	?	15 647 000 km	-1,9956 anni	2000	Gruppo Nordico
Saturno XXVI	Albiorix	32 km	?	16 404 000 km	2,1451 anni	2000	Gruppo Gallico
S/2007 S 2		6		16 560 000 km	-2,171 anni	2007	Gruppo Nordico
Saturno XXXVII	Bebhionn	6 km	?	16 950 000 km	2,25 anni	2004	Gruppo Inuit
Saturno XLVII	Skoll	6 km	?	17 610 000 km	-2,3792 anni	2006	
Saturno XXVIII	Erriapo	10 km	?	17 616 000 km	2,3871 anni	2000	Gruppo Gallico
S/2007 S 1		7 km	?	17 910 600 km	-2,44 anni	2007	Gruppo Inuit
S/2006 S 4		6 km		18 105 000 km	-2,4778 anni	2006	
Saturno XXIX	Siarnaq	40 km	?	18 160 000 km	2,4452 anni	2000	Gruppo Inuit
Saturno XLIV	Hyrrokkin	8 km		18 217 125 km	-2,4970 anni	2004	
Saturno XXI	Tarvos	15 km	?	18 247 000 km	2,5342 anni	2000	Gruppo Gallico
S/2004 S 13		6 km	?	18 450 000 km	-2,48 anni	2004	Gruppo Nordico
S/2006 S 6		6 km		18 600 000 km	-2,5791 anni	2006	
S/2004 S 17		4 km	?	18 600 000 km	-2,70 anni	2004	Gruppo Nordico
Saturno XXV	Mundilfari	7 km	?	18 722 000 km	-2,6048 anni	2000	Gruppo Nordico
Saturno XXXVIII	Bergelmir	6 km	?	18 750 000 km	-2,76 anni	2004	Gruppo Nordico
S/2006 S 1		6 km		18 981 135 km	-2,6558 anni	2006	
Saturno XXXVI	Ægir	6 km	?	19 350 000 km	-2,81 anni	2004	Gruppo Nordico
Saturno XXXI	Narvi	7 km	?	19 370 700 km	-2,7558 anni	2003	Gruppo Nordico
S/2004 S 12		5 km	?	19 650 000 km	-2,87 anni	2004	Gruppo Nordico
Saturno XXXIX	Bestla	7 km	?	19 650 000 km	-2,88 anni	2004	Gruppo Nordico
Saturno XXIII	Suttungr	7 km	?	19 666 700 km	-2,8192 anni	2000	Gruppo Nordico
Saturno XL	Farbauti	5 km	?	19 800 800 km	-2,95 anni	2004	Gruppo Nordico
S/2004 S 7		6 km	?	19 800 000 km	-3,02 anni	2004	Gruppo Nordico
Saturno XLIII	Hati	6 km	?	19 950 000 km	-2,96 anni	2004	Gruppo Nordico
S/2007 S 3		5 km		20 518 500 km	-3,01 anni	2007	
Saturno XXX	Thrymr	7 km	?	20 810 300 km	-3,07 anni	2000	Gruppo Nordico
S/2006 S 3		6 km		21 132 000 km	-3,13 anni	2006	

## SATELLITI DI URANO - SATELLITES OF URANUS

Nome		Diametro medio	Massa	Raggio orbitale medio	Periodo orbitale	Scoperta
Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Urano VI	Cordelia	13 ± 2 km	0,8×10 <sup>18</sup> kg	49 752 km	0,3350338 giorni	1986
Urano VII	Ofelia	15 ± 8 km	0,8×10 <sup>18</sup> kg	53 764	0,376400 giorni	1986
Urano VIII	Bianca	21 ± 4 km	0,8×10 <sup>18</sup> kg	59 166	0,43457899 giorni	1986
Urano IX	Cressida	80 ± 4 km	0,343×10 <sup>18</sup> kg	61 780 km	0,463570 giorni	1986
Urano X	Desdemona	64 ± 8 km	0,178×10 <sup>18</sup> kg	62 680 km	0,473650 giorni	1986
Urano XI	Juliet	94 ± 8 km	0,557×10 <sup>18</sup> kg	64 350 km	0,493065 giorni	1986
Urano XII	Porzia	135 ± 8 km	1,68×10 <sup>18</sup> kg	66 090 km	0,513196 giorni	1986
Urano XIII	Rosalind	72 ± 12 km	0,254×10 <sup>18</sup> kg	69 940 km	0,558460 giorni	1986
Urano XXVII	Cupido	~17,8 km	3,8×10 <sup>15</sup> kg	74 800 km	0,618 giorni	2003
Urano XIV	Belinda	81 ± 16 km	0,357×10 <sup>18</sup> kg	75 260 km	0,623527 giorni	1986
Urano XXV	Perdita	~26,6 km	13×10 <sup>15</sup> kg	76 420 km	0,638 giorni	1986
Urano XV	Puck	162 ± 4 km	2,89 × 10 <sup>18</sup> kg	86 010 km	0,761833 giorni	1986
Urano XXVI	Mab	~24,8 km	1,0 × 10 <sup>16</sup> kg	97 734 km	0,923 giorni	2003
Urano V	Miranda	471,6 ± 1,4 km	(66 ± 7) × 10 <sup>18</sup> kg	129 390 km	1,413479 giorni	1948
Urano I	Ariel	1157,8 ± 1,2 km	(1,35 ± 0,12) × 10 <sup>21</sup> kg	191 020 km	2,520379 giorni	1851
Urano II	Umbriel	1169,4 ± 5,6 km	(1,17 ± 0,13) × 10 <sup>21</sup> kg	266 300 km	4,144177 giorni	1851
Urano III	Titania	1577,8 ± 3,6 km	(3,53 ± 0,09) × 10 <sup>21</sup> kg	435 910 km	8,705872 giorni	1787
Urano IV	Oberon	1522,8 ± 5,2 km	(3,01 ± 0,07) × 10 <sup>21</sup> kg	583 520 km	13,463239 giorni	1787
Urano XXII	Francisco	~12 km	1,3×10 <sup>15</sup> kg	4 276 000 km	-0,7299 anni	2001
Urano XVI	Calibano	~98 km	0,73×10 <sup>18</sup> kg	7 231 000 km	-1,5871 anni	1997
Urano XX	Stefano	~20 km	6×10 <sup>15</sup> kg	8 004 000 km	-1,8546 anni	1999
Urano XXI	Trinculo	~10 km	0,75×10 <sup>15</sup> kg	8 504 000 km	-2,0780 anni	2001
Urano XVII	Scorace	~190 km	5,4×10 <sup>18</sup> kg	12 179 000 km	-3,5272 anni	1997
Urano XXIII	Margherita	~11 km	1,3×10 <sup>15</sup> kg	14 345 000 km	4,6401 anni	2003
Urano XVIII	Prospero	~30 km	21×10 <sup>15</sup> kg	16 256 000 km	-5,4136 anni	1999
Urano XIX	Setebos	~30 km	21×10 <sup>15</sup> kg	17 418 000 km	-6,1185 anni	1999
Urano XXIV	Ferdinando	~12 km	1,3×10 <sup>15</sup> kg	20 901 000 km	-7,7300 anni	2001

## SATELLITI DI NETTUNO - SATELLITES OF NEPTUNE

Nome		Diametro medio	Massa	Raggio orbitale medio	Periodo orbitale	Scoperta
Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Nettuno III	Naiade	58 km	~0,19×10 <sup>18</sup> kg	48 227 km	0,294 giorni	1989
Nettuno IV	Talassa	80 km	~0,37×10 <sup>18</sup> kg	50 075 km	0,311 giorni	1989
Nettuno V	Despina	148 km	~2,10×10 <sup>18</sup> kg	52 526 km	0,335 giorni	1989
Nettuno VI	Galatea	158 km	~3,70×10 <sup>18</sup> kg	61 593 km	0,429 giorni	1989
Nettuno VII	Larissa	208×178 km	~4,90×10 <sup>18</sup> kg	73 548 km	0,555 giorni	1981
Nettuno VIII	Proteo	436×416×402 km	~50×10 <sup>18</sup> kg	117 647 km	1,122 giorni	1989
Nettuno I	Tritone	2700 km	21,4×10 <sup>21</sup> kg	354 800 km	-5,877 giorni	1846
Nettuno II	Nereide	340 km	~31×10 <sup>18</sup> kg	5 513 400 km	0,99 anni	1949
Nettuno IX	Alimede	60 km	~0,09×10 <sup>18</sup> kg	15 728 000 km	-5,15 anni	2002
Nettuno XI	Sao	38 km	~0,09×10 <sup>18</sup> kg	22 422 000 km	7,98 anni	2002
Nettuno XII	Laomedea	38 km	~0,09×10 <sup>18</sup> kg	23 571 000 km	8,67 anni	2002
Nettuno X	Psamate	28 km	~0,015×10 <sup>18</sup> kg	46 695 000 km	-24,96 anni	2003
Nettuno XIII	Neso	60 km	~0,09×10 <sup>18</sup> kg	48 387 000 km	-25,67 anni	2002

# EVENTI EXTRATERRESTRI

Nelle tabelle seguenti sono calcolati i transiti e le eclissi che potrebbe osservare un ipotetico essere vivente o sonda presente sul pianeta indicato.

## EXTRATERRESTRIAL EVENTS

In the following charts they are calculated the transits and the eclipses that could observe a hypothetical living being or probe present on the suitable planet.

Mercurio - Mercury

Venere - Venus

Date	TT	Dm	Dl	r1	r2	e	m1	m2	tm(s)		
2012/12/18	07:37:18	0.21963	0.37695	0.722	0.294	148	-27.6	9.6	21450	Sun	Mercury

Marte - Mars

Questo anno non avvengono fenomeni - No phenomena this year

Giove - Jupiter

Date	TT	Dm	Dl	r1	r2	e	m1	m2	tm(s)		
2012/02/26	04:38:01	0.05237	0.05406	4.983	4.667	24	-23.4	13.2	5720	Sun	Mercury
2012/09/20	09:54:19	0.00936	0.05439	5.033	4.311	14	-23.4	15.1	35759	Sun	Venus

Saturno - Saturn

Date	TT	Dm	Dl	r1	r2	e	m1	m2	tm(s)		
2012/03/28	12:19:59	0.01138	0.02764	9.717	9.293	-0	-21.9	17.8	28753	Sun	Mercury
2012/05/06	11:33:42	0.00936	0.02784	9.728	9.006	-0	-21.9	15.3	35629	Sun	Venus
2012/06/25	08:09:47	0.00308	0.02757	9.742	9.314	-0	-21.9	20.5	31635	Sun	Mercury
2012/09/22	04:16:03	0.01767	0.02750	9.766	9.334	0	-21.9	17.0	24605	Sun	Mercury
2012/12/21	17:30:48	0.01155	0.02767	9.790	9.067	0	-21.9	14.9	34408	Sun	Venus

Urano - Uranus

Questo anno non avvengono fenomeni - No phenomena this year

Nettuno - Neptune

Questo anno non avvengono fenomeni - No phenomena this year

Luna - Moon

Date	TT	Dm	Dl	r1	r2	e	m1	m2	tm(s)		
2012/06/04	11:04:18	0.83701	1.55566	1.017	0.002	1	-26.8	-4.8	13202	Sun	Earth
2012/06/06	03:30:58	0.11524	0.27170	1.017	0.291	-0	-26.8	7.3	27859	Sun	Venus
2012/07/01	05:12:59	0.80316	1.28682	0.002	5.807	-35	-12.9	-2.0	9372	Earth	Jupiter
2012/08/01	16:00:33	0.23784	1.24718	0.621	0.002	-8	2.5	-9.5	11425	Mercury	Earth
2012/10/04	07:33:21	0.95898	1.14863	0.003	1.958	46	-13.2	1.1	7710	Earth	Mars
2012/11/15	08:19:46	0.77919	1.30443	0.002	4.112	-160	-16.5	-2.7	9306	Earth	Jupiter
2012/11/28	14:34:05	0.97480	1.41300	0.989	0.003	1	-26.9	-4.9	13530	Sun	Earth
2012/12/12	14:09:03	0.50581	1.30794	0.002	4.090	169	-16.6	-2.7	10659	Earth	Jupiter
2012/12/26	09:01:48	0.59801	1.14623	1.532	0.003	-22	-3.9	-11.7	12558	Venus	Earth

Data nel formato anno/mese/giorno

Dm = distanza minima in gradi tra i centri dei corpi

Dl = parametro limite, se Dm < Dl vi è una occultazione tra i corpi

R1 = distanza in U.A. del primo corpo

R2 = distanza in U.A. del secondo corpo

e = elongazione, in gradi

m1 = magnitudine del primo corpo

m2 = magnitudine del secondo corpo

tm = se presente, uno dei due corpi viene occultato massimo per x secondi

Mercury=Mercurio Venus=Venere Mars=Marte Jupiter=Giove Saturn=Saturno Uranus=Urano Neptune=Nettuno

Moon=Luna

Esempio di lettura :

Luna. Il giorno 1 agosto la Terra occluderà Mercurio se visto dalla nostra Luna.

Date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation of the planet

R1 = distance in A.U. of the first body

R2 = distance in A.U. of the second body

e = elongation, in °

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, the planet is occulted maximum for x seconds

# EVENTI EXTRATERRESTRI

Nelle tabelle seguenti sono calcolati i fenomeni Terra-Luna che potrebbe osservare un ipotetico essere vivente o sonda presente sul pianeta indicato.

## EXTRATERRESTRIAL EVENTS

In the following charts they are calculated the phenomena Earth-Moon that could observe a hypothetical living being or probe present on the suitable planet.

Mercurio - Mercury

Date	TT	Dm	Dl	r1	r2	e2	m1	m2	tm(s)		
2012/07/20 07:38:42		0.00228	0.00519	0.601	0.598	-147	-4.5	-0.7	13866	Earth	Moon
2012/08/01 16:05:17		0.00096	0.00503	0.618	0.621	161	-4.5	-0.7	14503	Earth	Moon
2012/10/17 02:21:21		0.00264	0.00265	1.176	1.174	-56	-3.0	0.8	960.3	Earth	Moon
2012/11/14 10:38:29		0.00360	0.00454	0.686	0.684	-156	-4.3	-0.5	8317	Earth	Moon
2012/12/12 00:46:03		0.00229	0.00268	1.160	1.158	55	-3.1	0.7	8392	Earth	Moon

Venere - Venus

Date	TT	Dm	Dl	r1	r2	e2	m1	m2	tm(s)		
2012/03/11 16:47:11		0.00218	0.00376	0.828	0.830	-80	-3.2	0.6	13244	Earth	Moon
2012/08/13 19:58:28		0.00211	0.00448	0.696	0.693	91	-3.6	0.2	15634	Earth	Moon
2012/12/26 09:17:32		0.00107	0.00203	1.530	1.532	31	-2.4	1.4	15915	Earth	Moon

Marte - Mars

Date	TT	Dm	Dl	r1	r2	e2	m1	m2	tm(s)		
2012/09/19 20:53:07		0.00019	0.00164	1.894	1.891	-32	-1.3	2.5	15753	Earth	Moon
2012/10/04 07:51:40		0.00133	0.00159	1.955	1.958	-30	-1.3	2.5	9759	Earth	Moon

Giove - Jupiter

Date	TT	Dm	Dl	r1	r2	e2	m1	m2	tm(s)		
2012/06/17 09:03:24		0.00051	0.00053	5.907	5.905	5	0.6	4.4	4232	Earth	Moon
2012/07/01 06:02:41		0.00033	0.00054	5.804	5.806	7	0.8	4.6	11881	Earth	Moon
2012/07/15 03:51:31		0.00024	0.00055	5.669	5.666	8	1.0	4.8	15308	Earth	Moon
2012/07/28 22:26:41		0.00008	0.00057	5.507	5.509	10	1.2	5.0	15222	Earth	Moon
2012/08/11 21:17:17		0.00006	0.00059	5.321	5.318	11	1.4	5.2	16836	Earth	Moon
2012/08/25 11:05:50		0.00018	0.00061	5.124	5.126	11	1.6	5.4	14760	Earth	Moon
2012/09/08 11:48:52		0.00034	0.00064	4.911	4.908	12	1.8	5.6	14210	Earth	Moon
2012/09/21 20:14:16		0.00042	0.00066	4.710	4.712	11	2.0	5.8	11963	Earth	Moon
2012/10/05 21:37:17		0.00055	0.00069	4.509	4.506	10	2.2	6.0	10252	Earth	Moon
2012/10/19 03:01:06		0.00052	0.00072	4.342	4.344	9	2.6	6.4	10289	Earth	Moon
2012/11/02 01:44:08		0.00058	0.00074	4.200	4.198	6	3.3	7.1	10517	Earth	Moon
2012/11/15 08:53:23		0.00045	0.00076	4.110	4.112	4	4.4	8.2	11767	Earth	Moon
2012/11/29 01:31:36		0.00042	0.00077	4.070	4.067	1	7.5	11.4	13767	Earth	Moon
2012/12/12 14:42:30		0.00030	0.00076	4.087	4.090	-2	5.7	9.5	13476	Earth	Moon
2012/12/26 00:48:45		0.00027	0.00075	4.161	4.158	-5	3.9	7.7	15445	Earth	Moon

Saturno - Saturn

Questo anno non avvengono fenomeni - No phenomena this year

Urano - Uranus

Questo anno non avvengono fenomeni - No phenomena this year

Nettuno - Neptune

Questo anno non avvengono fenomeni - No phenomena this year

Esempio di lettura :

Il giorno 1 luglio la Terra occulterà la Luna se vista da Giove.

Data nel formato anno/mese/giorno

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Moon=Luna

Date in the format year/month/day  
Dm = least distance between the centers of the bodies  
Dl = parameter limit, if  $Dm < Dl$  there is an occultation of the planet  
R1 = distance in A.U. of the first body  
R2 = distance in A.U. of the second body  
e = elongation, in  $^{\circ}$   
m1 = magnitude of the first body  
m2 = magnitude of the second body  
tm = if present, the planet is occulted maximum for x seconds

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# GLOSSARIO ASTRONOMICO

- Aberrazione** - Deviazione della direzione dei raggi luminosi provenienti da un corpo celeste.
- Aberrazione annua** - Spostamento angolare apparente delle stelle rispetto alla volta celeste, dovuto al moto di rivoluzione della Terra attorno al Sole.
- Aberrazione astronomica** (o aberrazione della luce) - Variazione apparente della posizione di un astro dovuta al movimento della Terra e alla velocità finita della luce. L'aberrazione annua, scoperta da Bradley nel 1727, dipende dal moto di rivoluzione, quella diurna dal moto di rotazione.
- Aberrazione diurna** - Spostamento angolare apparente delle stelle rispetto alla volta celeste, dovuto al moto di rotazione della Terra attorno al proprio asse.
- Absidi** - Punti estremi dell'asse maggiore di un'orbita ellittica. La retta che li congiunge si dice linea degli absidi.
- Afelio** - Punto dell'orbita di un corpo del sistema solare di massima distanza dal Sole.
- Albedo** - Rapporto fra la luce incidente e fra quella riflessa dalla superficie di ogni corpo celeste.
- Alumcántarat** - Circolo sulla sfera celeste parallelo all'orizzonte, che unisce i punti con la stessa altezza.
- Altazimutali, coordinate** - Sistema di coordinate celesti relative all'orizzonte terrestre ed alla verticale del luogo, le cui componenti sono l'azimut e l'altezza.
- Altezza** - Distanza angolare di un oggetto celeste dall'orizzonte. E' tracciata sul cerchio verticale passante per lo zenit, il nadir e per l'astro in osservazione e si misura da 0 e 90 gradi, partendo dall'orizzonte, positivamente sopra di esso e negativamente al contrario.
- Ammasso** - Insieme di stelle o di galassie che si raggruppano per via delle forze gravitazionali reciproche.
- Ammasso aperto** - Ammasso stellare situato nel disco della Galassia e contenente migliaia di stelle giovani e molto luminose.
- Ammasso di Galassie** - Gruppo di galassie legate dall'attrazione gravitazionale. La nostra Galassia appartiene al cosiddetto Gruppo Locale.
- Ammasso globulare (cluster)** - Ammasso sferico situato nell'alone della Galassia e contenente centinaia di migliaia di stelle molto vecchie e ravvicinate.
- Ammasso stellare** - Gruppo di stelle tenute insieme dalle interazioni gravitazionali. Può essere aperto, qualora abbia una forma irregolare, o globulare se è caratterizzato da una forma sferica.
- Anello** - Insieme di detriti e particelle che disponendosi sul piano equatoriale caratterizza i pianeti gioviani. Può avere diverse dimensioni:maestose, come in Saturno, od impercettibili all'osservazione telescopica come in Giove, Urano e Nettuno.
- Angolo orario** - Distanza angolare di un corpo celeste dal meridiano del luogo.
- Anno** - Periodo di tempo corrispondente alla durata di una intera rivoluzione della Terra attorno al Sole.
- Anno anomalistico** - Periodo di tempo compreso fra due successivi passaggi della Terra al perielio.
- Anno astronomico** - Periodo definito da due passaggi consecutivi della Terra per lo stesso punto della sua orbita.
- Anno bisestile** - Anno di 366 giorni introdotto per recuperare la differenza di 0,25 giorni (6 ore) fra l'anno civile e l'anno solare. Comporta l'aggiunta, all'anno civile, di un giorno ogni 4 anni.
- Anno civile** - Periodo di tempo usato in ambito civile, che basandosi sull'anno solare tiene conto solo della parte intera di tale valore (365 giorni).
- Anno draconico** - Periodo orbitale misurato tra due passaggi della Terra al nodo lunare ascendente (346g 14h 53m).
- Anno luce** - Unità di misura delle distanze interstellari corrispondente alla distanza coperta dalla luce in un anno, alla velocità propria di 300000 km al secondo. Ammonta a circa 9.460 miliardi di km o 63 U.A.
- Anno siderale** - Intervallo di tempo fra due successivi allineamenti di una stella con la Terra. Corrisponde ad una completa rivoluzione del nostro pianeta attorno al Sole. Dura 365 giorni, 6 ore, 9 minuti.
- Anno solare o tropico** - Intervallo di tempo fra due successivi passaggi del Sole all'equinozio di primavera. E' piu' corto di quello siderale per effetto della precessione degli equinozi, ammonta infatti a circa 365 giorni, 5 ore, 48 minuti.
- Anomalia** - Distanza angolare, calcolata per un dato istante, fra la posizione di un pianeta ed il perielio della sua orbita. Può essere media, se si tiene conto della velocità orbitale media, o vera, nel caso si consideri quella effettiva.
- Apastro** - Punto dell'orbita ellittica di una stella binaria di maggior distanza dal fuoco.
- Apogeo** - Punto dell'orbita lunare, o di un satellite artificiale, di maggior distanza dalla Terra.
- Apsidi** - I due punti di intersezione tra l'orbita ellittica percorsa da un corpo e il suo asse maggiore (detto linea degli apsid). Nel caso di un'orbita intorno al Sole i punti sono detti afelio e perielio.
- Arco diurno** - Traiettoria descritta nel cielo da ogni corpo celeste, fra l'istante di levata e quello del tramonto.
- Argomento del perielio** - Angolo compreso fra il nodo ascendente ed il perielio, misurato in direzione del senso di rivoluzione del corpo celeste attorno al Sole.
- Ascensione retta** - Componente delle coordinate equatoriali che rappresenta la distanza angolare fra il punto di Ariete e l'intersezione del cerchio orario passante per l'astro in osservazione con l'equatore celeste. Si misura in ore, a partire dal punto d'ariete, in senso antiorario (verso Est), ed è compresa fra 0 e 24.
- Asse** - Retta ideale attorno alla quale ruotano su se stessi i corpi celesti. Quello della Terra, passante per i poli Nord e Sud è detto asse terrestre.
- Asse celeste** - Prolungamento dell'asse terrestre attorno al quale, per effetto della rotazione della Terra, ruota apparentemente la sfera celeste.
- Asse maggiore** - Diametro massimo di un'orbita ellittica.
- Asse polare** - Asse puntato parallelamente all'asse terrestre intorno al quale ruota un telescopio equatoriale per variare solamente l'ascensione retta.
- Associazione stellare** - Raggruppamento di giovani stelle avente origine comune.
- Asterismo** - Struttura di stelle che non costituisce una costellazione, ma che è conosciuta con un nome (per esempio il Grande Carro).
- Asteroidi** - Corpi del sistema solare dalle piccole dimensioni che ruotano attorno al Sole con orbite ellittiche. Detti anche pianetini occupano principalmente una posizione fra l'orbita di Marte e Giove chiamata fascia degli asteroidi.
- Astro** - Corpo celeste generico (stella, pianeta, satellite).

**Astrometria** - Branca dell'astronomia che studia i moti stellari.

**Attività solare** - Insieme dei fenomeni che caratterizzano la vita del Sole. Si distinguono in macchie solari, protuberanze, brillamenti, vento solare. Raggiungono il massimo di intensità ogni 11 anni, così si parla di ciclo undecennale delle attività solari.

**Aurora polare** - Fenomeno luminoso creato nell'atmosfera dall'interazione di particelle solari ionizzate con il campo magnetico terrestre. Può essere boreale od australe, a seconda dell'emisfero in cui si verifica.

**Azimut** - Distanza angolare fra l'intersezione con l'orizzonte del cerchio verticale passante per l'oggetto osservato ed il polo Nord. Si misura sull'orizzonte, in senso orario, da 0 a 360 gradi a partire dal polo Nord.

**Binaria** - Sistema costituito da due stelle legate dall'attrazione gravitazionale e orbitanti attorno al baricentro. Nell'Universo almeno la metà delle stelle è doppia o multipla. Le stelle binarie si dividono in binarie visuali, astrometriche, spettroscopiche, e a eclisse, mentre le binarie ottiche appaiono doppie solamente per causa prospettica.

**Bolide** - Meteorite che attraversando l'atmosfera terrestre dà vita ad eccezionali fenomeni luminosi ed acustici causati dall'attrito con gli strati atmosferici.

**Calendario** - Suddivisione del tempo basata sul movimento degli astri. Può essere solare, centrato sul moto apparente del Sole, lunare, riferito alle fasi lunari o lunisolare, se si riferisce ad ambedue gli astri.

**Calendario giuliano** - Calendario istituito da Giulio Cesare nel 46 a.C. costituito da 12 mesi per anno, con tre anni di 365 giorni seguiti da uno di 366 giorni. Dato che l'anno medio su 4 anni vale 365,25 giorni, dura oltre 11 minuti più lungo dell'anno tropico, nel XVI secolo venne riformato perché le stagioni non corrispondevano più all'anno civile.

**Calendario gregoriano** - Calendario civile utilizzato in molti paesi e istituito nel 1582 da Papa Gregorio XIII, quando vennero eliminati dieci giorni di calendario. Sono bisestili gli anni divisibili per 4, mentre gli anni di fine secolo sono bisestili solo se divisibili per 400. Dato che l'anno medio su 400 anni vale 365,2425 giorni, questo ha una durata molto simile ai 365,2422 giorni dell'anno tropico.

**Cassini, divisione di** - Separazione fra gli anelli del pianeta Saturno scoperta dall'omonimo astronomo.

**Cerchio di altezza** - Cerchio ottenuto intersecando la sfera celeste con un piano passante per lo zenit e l'osservatore.

**Cerchio massimo** - Intersezione di un piano con una sfera che la taglia in due parti uguali detti emisferi, ed il cui centro è corrispondente a quello della sfera.

**Cerchio meridiano** - Cerchio massimo della sfera celeste passante per i poli celesti Nord e Sud e per i punti detti Zenit e Nadir.

**Cerchio orario** - Cerchio massimo della sfera celeste passante per i poli celesti.

**Cerchio di perpetua apparizione** - Parallelo della sfera celeste che delimita le stelle circumpolari, ossia quelle stelle che in un determinato posto della Terra distano dal polo celeste visibile, attorno a cui ruotano, di una distanza angolare pari o minore alla latitudine del luogo.

**Cerchio di perpetua occultazione** - Analogamente a quello di perpetua apparizione delimita quelle stelle che ruotano ad una distanza pari o inferiore alla latitudine del luogo dal polo celeste invisibile, così da restare permanentemente occultate sotto l'orizzonte.

**Cerchio verticale** - Cerchio massimo della sfera celeste passante per lo zenit ed il nadir. Su di esso viene misurata l'altezza di un astro dall'orizzonte nel sistema di coordinate altazimutali.

**Chioma** - Involucro di gas che circonda il nucleo di una cometa per effetto della radiazione solare.

**Ciclo metonico** - Periodo scoperto da Metone nel V secolo a.C., costituito da 19 anni tropici, dopo i quali le fasi della Luna ricorrono negli stessi giorni dell'anno.

**Circolo polare** - Parallelo della superficie terrestre, distante dall'equatore 66,5 gradi, che delimita la zona polare. Può essere antartico o artico a seconda dell'emisfero cui si riferisce.

**Circumpolari** - Detto di quelle stelle che descrivendo un arco di cerchio completo, attorno al polo visibile e da un determinato posto della Terra, rimangono sempre sopra l'orizzonte ruotando attorno al polo celeste.

**Cluster** - Nome inglese di un Ammasso globulare.

**Coda** - La parte di una cometa espulsa quando questa è vicina al Sole.

**Coluro** - Nome dei cerchi orari passanti per i punti equinoziali e solstiziali.

**Cometa** - Piccolo corpo del sistema solare, orbitante attorno al Sole su un'orbita fortemente eccentrica, che in prossimità del Sole inizia ad evaporare dando vita alla classica coda.

**Congiunzione** - Configurazione planetaria di due o più corpi celesti che hanno più o meno le medesime coordinate astronomiche. Per i pianeti inferiori si distingue in inferiore e superiore.

**Congiunzione inferiore** - Configurazione planetaria di un pianeta inferiore che si trova fra la Terra ed il Sole.

**Congiunzione superiore** - Configurazione planetaria di un pianeta inferiore che si trova oltre il Sole lungo la direzione Terra-Sole-Pianeta.

**Cono d'ombra** - Regione occupata dall'ombra proiettata da un pianeta o un satellite illuminato dal Sole. Se un oggetto passa nel cono d'ombra di un corpo si è in presenza di un'eclissi.

**Contatto** - Fase di un'eclisse dove i bordi dei dischi lunari e solari sembrano apparentemente toccarsi.

**Coordinate astronomiche** - Insieme di valori che permettono l'orientamento lungo la sfera celeste. A seconda del sistema cui si riferiscono abbiamo quelle altazimutali, quelle equatoriali, quelle eclittiche e quelle galattiche.

**Coordinate Celesti (o astronomiche)** - Sistemi di coordinate che descrivono la posizione di un astro sulla sfera celeste. Le principali coordinate utilizzate sono le altazimutali, le equatoriali, le eclittiche e le galattiche.

**Coordinate Eclittiche** - Sistema di coordinate celesti in cui la posizione di un oggetto è definita dalla latitudine eclittica (b), misurata in gradi a nord e a sud dell'eclittica, e dalla longitudine eclittica (l), misurata in gradi lungo l'eclittica a partire dal punto g.

**Coordinate equatoriali** - Sistema di coordinate celesti in cui la posizione di un oggetto è definita dalla declinazione (d), misurata in gradi a nord e a sud dell'equatore celeste, e dall'ascensione retta (a, A.R.), misurata in ore, minuti e secondi lungo l'equatore celeste a partire dal punto g. A causa della precessione degli equinozi le coordinate equatoriali sono specifiche per una particolare epoca.

**Coordinate galattiche** - Sistema di coordinate in cui la posizione di un oggetto è definita dalla latitudine, misurata dal piano galattico, e dalla longitudine, misurata in gradi lungo il piano galattico a partire dal centro della Galassia.

**Coordinate geografiche** - Sistema di coordinate in cui la posizione di un punto sulla superficie è individuato dalla latitudine, misurata in gradi a nord e a sud dell'equatore, la longitudine, misurata in gradi est e ovest lungo l'equatore a partire dal meridiano di Greenwich, e l'altitudine, misurata in metri rispetto al livello del mare.

**Corona solare** - La zona più esterna dell'atmosfera solare visibile durante le eclissi totali.

**Costellazioni** - Gruppo di stelle sulla sfera celeste che unite da linee immaginarie formano delle figure. Fin dall'antichità le configurazioni celesti sono state associate a figure mitologiche o di animali, e ben 48 delle odierne costellazioni sono quelle elencate da Tolomeo nel periodo ellenistico. Dal XVII secolo furono proposte altre denominazioni, finché nel 1930 l'Unione Astronomica Internazionale ha definitivamente diviso il cielo in 88 aree, ciascuna delle quali corrisponde ad una costellazione. Le stelle più luminose sono denominate con una lettera greca minuscola seguita dal genitivo del nome latino della costellazione.

**Crepuscolo** - Passaggio graduale dal giorno alla notte per effetto dell'atmosfera terrestre che diffonde la luce solare. Si distingue in civile, nautico ed astronomico a seconda che il Sole sia sotto l'orizzonte rispettivamente di 6, 12 o 18 gradi.

**Culminazione** - Rappresenta il passaggio di un corpo celeste al meridiano. Può essere superiore, il punto di minor distanza zenitale, od inferiore, il punto di maggior distanza zenitale. Nelle stelle circumpolari ambedue i punti si trovano sopra l'orizzonte.

**Cuspide** - Una delle due estremità della falce lunare, o di quella di un pianeta inferiore.

**Data giuliana (DG)** - Intervallo di tempo in giorni trascorso dal mezzogiorno dell'1 gennaio 4713 a.C. di Greenwich.

**Declinazione** - Distanza angolare di un corpo dall'equatore celeste. Tracciata sul cerchio orario passante per i poli celesti e l'astro osservato, è compresa fra 0 e 90 gradi e si conta a partire dall'equatore celeste, positivamente verso il polo Nord celeste e negativamente verso quello Sud.

**Deep sky** - Termine con il quale si indicano alcuni oggetti celesti: ammassi stellari, galassie, nebulose.

**Dicotomia** - Aspetto di un corpo celeste illuminato per metà durante le fasi parziali.

**Disco apparente** - Diametro apparente del Sole e della Luna che a causa delle loro diverse distanze sembra avere le medesime dimensioni.

**Diretto** - Direzione del moto celeste di un pianeta da Ovest verso Est, od anche in senso antiorario, se osservato dal Nord dell'eclittica.

**Distanza Angolare** - Lunghezza di un arco espressa in radianti o gradi, corrispondente alla misura dell'angolo fra le linee immaginarie che congiungono l'osservatore con i due estremi dell'arco.

**Doppie, stelle** - Stelle ruotanti attorno ad un comune centro di massa per effetto di reciproci vincoli gravitazionali.

**Dracònico** - Periodo di tempo riferito ai nodi lunari, detti dagli antichi testa e coda del drago che mangiava il Sole durante le eclissi.

**Eccentricità** - Elemento orbitale dell'orbita di un corpo celeste pari al rapporto fra il semiasse maggiore e la distanza di un fuoco dal centro dell'orbita. Può essere uguale a 0 (circolare), ad 1 (parabolica) o compresa fra questi due valori (ellittica).

**Eclisse** - Fenomeno astronomico in cui la luce di un corpo celeste è temporaneamente oscurata a causa del passaggio nel cono d'ombra di un altro astro. Nella eclisse di Luna il nostro satellite attraversa il cono d'ombra della terra e non riceve più la luce del Sole, nella eclissi di Sole la Luna proietta il suo cono d'ombra sulla Terra. Poiché l'orbita lunare è inclinata sul piano dell'orbita terrestre, si ha una eclissi soltanto quando la Luna si trova vicino ai suoi nodi: ogni anno non si verificano più di sette eclissi e ci sono almeno due eclissi solari.

**Eclisse anulare** - Eclissi di Sole in cui il disco lunare non riesce ad ostruire completamente quello solare lasciando visibile una parte a forma di anello.

**Eclisse Lunare** - Una eclisse di Luna si verifica al plenilunio quando la Luna passa nell'ombra della Terra. Il nostro satellite non compare del tutto, ma assume una luce rossastra a causa della luce riflessa dall'atmosfera terrestre.

**Eclisse parziale** - Tipo di eclisse, solare o lunare, nella quale i dischi dei rispettivi corpi celesti sono interessati dal fenomeno solo parzialmente.

**Eclissi Solare** - Una eclisse di Sole si verifica al novilunio quando la Luna passa davanti al disco solare. Quando il diametro apparente della Luna è minore di quello del Sole l'eclisse è detta anulare. L'ombra proiettata dalla Luna è larga qualche centinaio di chilometri e si muove sulla superficie terrestre: la fase di totalità può durare al massimo 7 minuti e 40 secondi e in tutta la regione circostante si vede un'eclisse parziale.

**Eclisse totale** - Tipo di eclisse che interessa integralmente i dischi lunari e solari.

**Eclittica** - Fascia del cielo lungo la quale si muove apparentemente il Sole. Il nome significa cerchio delle eclissi, in quanto affinché possa verificarsi una di queste, è necessario che la Luna sia in prossimità di quei punti chiamati nodi che sono le intersezioni del suo piano orbitale con l'eclittica. E' anche il piano disegnato dall'orbita della Terra, nel suo moto di rivoluzione attorno al Sole, che è inclinato rispetto all'equatore celeste di 23,5 gradi.

**Eclittiche, coordinate** - Sistema di coordinate che come riferimento si basa sul piano dell'eclittica. Le sue componenti sono la longitudine eclittica e la latitudine eclittica.

**Effemeridi** - Raccolta di dati astronomici che sulla base delle coordinate astronomiche permettono di risalire alla posizione dei corpi celesti.

**Elementi orbitali** - Parametri che determinano il moto e la posizione nel sistema solare di un corpo celeste e della sua orbita. Sono: l'eccentricità, il semiasse maggiore, l'inclinazione, la distanza e la longitudine del perielio dal nodo ed il passaggio al perielio.

**Elongazione** - Distanza angolare vista dalla Terra tra il Sole e un pianeta. Valori particolari di elongazione sono la congiunzione (0°), la quadratura (90°) e l'opposizione (180°).

**Emersione** - Successiva apparizione di un corpo celeste, da dietro il disco di un altro, o dell'ombra di questo, durante il fenomeno delle occultazioni o delle eclissi.

**Emisfero** - Parti uguali di una sfera tagliata in due da un piano equatoriale. Quelli terrestri si indicano come emisferi boreale (settentrionale) ed australe (meridionale).

**Epatta** - Numero di giorni che separano la prima Luna Nuova dell'anno dal primo di Gennaio. Grazie ad un calcolo ad esso legato si ottiene la data della Pasqua.

**Epoca** - Riferimento temporale di validità, per cui sono state calcolate le effemeridi di un dato corpo celeste, al fine di correggere l'errore derivante dal fenomeno della precessione degli equinozi.

**Equatore** - Intersezione di un piano perpendicolare all'asse di una sfera con la superficie della stessa, che la taglia diametralmente in due parti uguali.

**Equatore celeste** - Prolungamento di quello terrestre è quel cerchio massimo che essendo perpendicolare all'asse di rotazione taglia la sfera celeste in due emisferi uguali.

**Equatore terrestre** - Cerchio massimo di latitudine 0 gradi che taglia la Terra in due emisferi.

**Equazione delle effemeridi** - Differenza fra il tempo siderale e quello siderale medio.

**Equazione del tempo** - Differenza fra il tempo solare e quello siderale medio.

**Equatoriali, coordinate** - Sistema di coordinate astronomiche basate sull'equatore celeste e sull'asse di rotazione del cielo. Le sue componenti sono l'ascensione retta e la declinazione.

**Equinozi** - Punti dell'orbita terrestre che segnano l'inizio della primavera e dell'autunno e nei quali la durata del giorno è uguale a quella della notte. Rappresentano inoltre le intersezioni dell'equatore

celeste con l'eclittica e sono anche chiamati nodo discendente e nodo ascendente o anche rispettivamente punto della Bilancia e punto d'Ariete. La linea che congiunge i suddetti punti è detta linea degli equinozi e ruota per effetto della precessione degli equinozi.

**Evezione** - Perturbazione causata nel moto della Luna dalla variazione nella spinta gravitazionale del Sole.

**Fasi** - Variazione della porzione illuminata del disco lunare (o di quello dei due pianeti inferiori) per effetto dei rispettivi moti orbitali.

**Fuga, velocità di** - Velocità necessaria a sfuggire all'attrazione gravitazionale di qualsiasi corpo celeste.

**Galassie** - Insieme di stelle, gas e polvere interstellare. Hanno forme diverse: di disco a spirale, ellittiche o irregolari. Furono classificate in passato da E.Hubble che studiandole scoprì anche la legge che porta il suo nome e che dimostra, basandosi sulla reciproca velocità di allontanamento delle galassie, come l'universo sia in perenne espansione. Le galassie hanno la caratteristica di aggregarsi in ammassi e superammassi.

**Galattiche, coordinate** - Sistema di coordinate astronomiche relative alla galassia le cui componenti sono la longitudine e la latitudine galattiche. Il piano di riferimento è quello equatoriale della galassia.

**Galileiani, satelliti** - Le 4 lune maggiori del pianeta Giove, scoperte da G.Galilei.

**Geocentrico** - Sistema di riferimento relativo alla Terra.

**Giorno** - Durata media del periodo di rotazione della Terra attorno al proprio asse.

**Giorno lunare** - Intervallo di tempo fra due successivi passaggi della Luna al meridiano.

**Giorno solare** - Intervallo di tempo fra due successivi passaggi del Sole al meridiano.

**Giorno siderale** - Intervallo di tempo fra due successivi passaggi di una stella per il meridiano. E' piu' breve del giorno solare di circa 4 minuti per effetto del moto orbitale della Terra attorno al Sole.

**Giorno giuliano** - Unità di misura del calendario omonimo che conta i giorni, in modo progressivo, a partire dal 1 gennaio del 4713 A.C.

**Greenwich, meridiano di** - Circolo della sfera terrestre di longitudine 0°.

**Immersione** - Inizio della occultazione di un corpo celeste da parte di un altro.

**Inclinazione** - Distanza angolare fra l'equatore di un corpo celeste ed il suo piano orbitale.

**Inclinazione orbitale** - Elemento orbitale di un corpo del sistema solare che misura la differenza angolare fra il suo piano orbitale e quello dell'eclittica.

**Index Catalogue (IC)** - Catalogo di oggetti non stellari compilato e pubblicato da J.L.E.Dreyer nel 1895 (IC 1) e nel 1908 (IC 2) e contenente circa 5.000 nuovi oggetti che si aggiungono a quelli indicati nel New General Catalogue (NGC).

**Inferiore** - Pianeta la cui orbita attorno al Sole è contenuta entro quella della Terra.

**Latitudine** - Distanza angolare, positiva o negativa, di un punto da un piano equatoriale di riferimento (terrestre, celeste, eclittico, galattico).

**Latitudine eclittica** - Distanza angolare, positiva o negativa, di un punto situato a Nord od a Sud del piano dell'eclittica.

**Latitudine galattica** - Distanza angolare di un punto posto a Nord od a Sud del piano galattico.

**Levare eliaco** - Prima apparizione di una stella ad oriente dopo la congiunzione con il Sole.

**Librazione lunare** - Oscillazione della Luna che permette di vedere fino al 10 % in piu' della superficie rivolta verso la Terra. Opera sia in latitudine che in longitudine.

**Limbo** - Bordo estremo del disco apparente di un corpo celeste.

**Longitudine** - Distanza angolare, positiva o negativa, di un punto della superficie terrestre dal meridiano di Greenwich. Può essere orientale od occidentale. In generale, distanza angolare di un punto da un cerchio massimo di riferimento.

**Longitudine del perielio** - Somma dell'argomento del perielio e della longitudine del nodo ascendente dell'orbita.

**Longitudine del nodo ascendente** - Angolo compreso fra il punto d'Ariete e l'intersezione del piano orbitale con l'eclittica.

**Longitudine eclittica** - Distanza angolare di un punto del piano dell'eclittica dal punto d'ariete.

**Longitudine galattica** - Distanza angolare di un punto del piano galattico dal punto di centro galattico.

**Luce cinerea** - Debole illuminazione del disco lunare, durante le fasi crescenti o calanti, da parte della luce solare riflessa dalla Terra verso la Luna.

**Luce zodiacale** - Fenomeno luminoso creato per diffusione della luce solare da parte di particelle di materia giacenti sul piano dell'eclittica.

**Lunazione** - Periodo di tempo compreso fra due fasi lunari uguali la cui durata è di circa 29,5 giorni. E' detta anche mese sinodico.

**M** - Riferita al catalogo Messier e sguita da un numero d'ordine (es. M32) riporta l'oggetto relativo che ha quel numero d'ordine nel catalogo (nell'esempio precedente, la galassia di Andromeda).

**Magnitudine** - Misura della luminosità dei corpi celesti. Data la differente distanza che ci separa dalle stelle essa si distingue in apparente, quella che appare nel cielo, ed in assoluta che corrisponde alla luminosità effettiva osservata dalla distanza di 10 parsec. Viene divisa in classi decrescenti con una differenza fra le piu' luminose e le meno luminose di circa 500 volte.

**Meccanica celeste** - Branchia dell'astronomia avente come studio la dinamica dei movimenti degli astri posti sotto l'effetto di campi gravitazionali.

**Megaparsec** - Unità di misura delle distanze galattiche e cosmologiche, pari a 1 milione di parsec.

**Meridiano** - Cerchio massimo della sfera celeste passante per i poli celesti, lo zenit ed il nadir di una data località terrestre.

**Mese anomalistico** - Periodo di tempo fra due successivi passaggi della Luna all'apogeo od al perigeo. E' uguale a 27,6 giorni.

**Mese draconico** - Intervallo di tempo fra due successivi passaggi della Luna allo stesso nodo. E' uguale a 27,2 giorni.

**Mese siderale** - Durata del periodo di rivoluzione della Luna attorno alla Terra. Durata 27,3 giorni.

**Mese sinodico** - Periodo di tempo fra due fasi lunari uguali. E' uguale a 29,5 giorni.

**Meteora (stella cadente)** - Raggio di luce causato da un meteorioide che si consuma per attrito con gli strati atmosferici.

**Meteorite** - Meteorioide, che attraversando l'atmosfera terrestre, resiste all'attrito con essa per via delle sue grandi dimensioni, riuscendo così a raggiungere la superficie e causando un impatto con essa.

**Meteorioide** - Corpo roccioso vagante nel sistema solare.

**Mezzanotte** - Culminazione inferiore del Sole.

**Mezzocielo** - Punto di intersezione fra il meridiano del luogo e l'equatore celeste.

**Mezzogiorno** - Culminazione superiore del Sole.

**Moto diurno** - Rotazione apparente della sfera celeste, da Est ad Ovest, dovuto al moto rotatorio della

Terra attorno al proprio asse nella direzione contraria.

**Moto planetario** - Moto apparente dei pianeti nel cielo (od orbitale nel sistema solare). Si distingue in retrogrado, se avviene da oriente verso occidente (od in senso orario, se visto dal Nord dell'eclittica), ed in diretto (antiorario) nella direzione contraria.

**Nadir** - Punto di intersezione inferiore della verticale del luogo con la sfera celeste. E' l'opposto dello Zenit.

**Nebulosa** - Nube di gas e polvere interstellare che può essere oscura, se assorbe la luce di una stella impedendone la visuale, o luminosa, se riflette (nebulosa a riflessione) o viene ionizzata (nebulosa ad emissione) dalla luce di stelle vicine.

**Nebulosa planetaria** - Gas emessi, sotto forma di anello in rapida espansione, dagli strati esterni di una stella nelle sue ultime fasi di vita.

**Nodo** - Generalmente indica l'intersezione di un'orbita con il piano dell'eclittica. Può essere ascendente o discendente.

**Numero d'oro** - Numero d'ordine, compreso fra 1 e 19, che indicava ognuno degli anni nell'ambito del ciclo di Metone.

**Nutazione** - Movimento oscillatorio dell'asse del pianeta Terra. E' causato dal fatto che l'attrazione gravitazionale della Luna e del Sole sul rigonfiamento equatoriale terrestre varia nel tempo a seconda delle loro posizioni relative. Per l'effetto congiunto della nutazione e di un'altra perturbazione di ampiezza maggiore (la precessione), l'asse di rotazione terrestre compie un moto sinuoso nel cielo, anzichè mantenere una direzione fissa nello spazio.

**Occultazione** - Fenomeno astronomico che si verifica allorchè un corpo celeste passando davanti ad un altro ne oscura la sua visuale nel cielo.

**Opposizione** - Configurazione planetaria di un corpo del sistema solare che dista dal Sole, rispetto alla Terra, di un angolo di 180° o di 12 ore in ascensione retta.

**Orarie, stelle** - Stelle che descrivono nel cielo un arco di cerchio per metà sopra l'orizzonte e per l'altra sotto di esso.

**Orbita** - Traiettoria di un corpo celeste che ruota attorno ad un altro per via della forza gravitazionale. Generalmente è di forma ellittica.

**Orizzonte** - Intersezione del piano tangente al luogo d'osservazione con la sfera celeste.

**Parallasse** - Apparente spostamento angolare di una stella. Può essere annua, se riferita al moto di rivoluzione della Terra attorno al Sole, o diurna se riferita al moto di rotazione terrestre. Da essa si risale alla distanza astronomica di un corpo celeste.

**Parallelo** - Circolo paralleli all'equatore terrestre sui quali viene misurata la longitudine.

**Parsec** - Unità di misura delle distanze interstellari, equivalente a circa 3 anni luce, che corrisponde ad uno spostamento angolare nel cielo di un primo d'arco da parte di una stella che viene osservata da due punti distanti fra loro una unità astronomica (dist. media fra Sole e Terra).

**Passaggio al perielio** - Istante del transito di ogni corpo del sistema solare per il punto più prossimo al Sole.

**Periastro** - Punto dell'orbita ellittica di una stella binaria di minor distanza dal fuoco.

**Perigeo** - Punto dell'orbita della Luna, o di un satellite artificiale, di minima distanza dalla Terra.

**Perielio** - Punto dell'orbita di un corpo del sistema solare di minima distanza dal Sole.

**Periodo orbitale** - Intervallo di tempo impiegato da un corpo celeste a descrivere una rivoluzione completa.

**Periodo siderale** - Intervallo di tempo compreso fra due successivi passaggi di un corpo celeste per lo stesso punto della sua orbita.

**Periselenio** - Punto dell'orbita di un corpo celeste più vicino alla Luna.

**Perturbazioni** - Variazioni dell'orbita di un corpo celeste causate da passaggi ravvicinati a grandi masse che con la loro forza gravitazionale ne sconvolgono gli elementi orbitali.

**Pianeta** - Corpo celeste orbitante attorno al Sole, caratterizzato da grandi dimensioni e dalla mancanza di emissione di energia.

**Pianeti esterni** - Marte, Giove, Saturno, Urano, Nettuno e Plutone sono i pianeti esterni all'orbita terrestre.

**Pianeti interni** - Mercurio e Venere sono i pianeti interni all'orbita della Terra.

**Pianetini** - Piccoli corpi del sistema solare caratterizzati dalle dimensioni e dalle orbite irregolari. Detti anche asteroidi occupano un'orbita fra Marte e Giove che per questo viene detta fascia degli asteroidi.

**Piano orbitale** - Piano descritto dall'orbita di un corpo celeste.

**Planetesimi** - Oggetti rocciosi primordiali, formati per aggregazione di polveri nella nube protosolare, dai quali si pensa si siano formati asteroidi e pianeti per mutua attrazione gravitazionale.

**Polare, stella** - Stella dell'Orsa minore che approssimativamente indica il polo Nord celeste.

**Poli** - In generale, estremità dell'asse di rotazione di ogni corpo celeste.

**Poli celesti** - Punti di intersezione del prolungamento dell'asse terrestre, l'asse celeste, con la sfera celeste.

**Poli terrestri** - Punti di intersezione dell'asse terrestre con la superficie terrestre.

**Precessione degli equinozi** - Oscillazione dell'asse terrestre, per effetto della forza gravitazionale del Sole e della Luna sul nostro pianeta, che conferisce un movimento a forma di trottola all'asse celeste, che descrive così un cerchio in circa 26000 anni. Una sua conseguenza è la variazione di tutti i riferimenti celesti, principalmente degli equinozi, che anticipano ogni anno di circa 20 minuti.

**Punti cardinali** - Intersezioni del meridiano e dell'equatore celeste con l'orizzonte, che in tal modo generano i 4 punti cardinali: Nord, Sud, Est ed Ovest.

**Quadratura** - Configurazione di un corpo celeste che dalla Terra viene visto ad una distanza angolare di 90 gradi dal Sole.

**Raggio vettore** - Linea congiungente il Sole con la posizione di un pianeta lungo la sua orbita.

**Radiante** - Punto apparente del cielo dal quale sembrano provenire le meteore durante una pioggia di stelle cadenti.

**Retrogradazione** - Particolare spostamento apparente di un pianeta rispetto alla Terra durante il quale la longitudine geocentrica decresce. La retrogradazione è un effetto ottico dovuto ai movimenti della Terra e del pianeta considerato attorno al Sole; accade così che durante la sua normale orbita apparente, il pianeta rallenti, si fermi e poi torni indietro rispetto alle stelle fisse. In seguito rallenterà di nuovo e tornerà a seguire il percorso originario, compiendo una specie di asola tra le stelle.

**Retrogrado** - Direzione del moto celeste di un pianeta da Est verso Ovest, od anche in senso orario, se osservato dal Nord dell'eclittica.

**Rivoluzione** - Moto orbitale di uno o più corpi attorno ad un centro di massa.

**Rotazione** - Moto rotatorio di un corpo celeste attorno ad un asse.

**Saros, ciclo di** - Periodo di tempo uguale a 18 anni 10 giorni ed 8 ore dopo il quale le eclissi solari e

lunari si ripetono alle medesime condizioni.

**Satellite** - In genere ogni corpo minore che orbita attorno ad un altro di dimensioni molto maggiori. Nel caso della Terra possono essere anche artificiali.

**Schiacciamento polare** - Appiattimento delle regioni polari di un pianeta, dovuto alla forza centrifuga derivante dal moto di rotazione. In generale rapporto fra il raggio equatoriale e quello polare.

**Semiasse maggiore** - La metà dell'asse maggiore di ogni orbita ellittica. Si misura in unità astronomiche.

**Sestante** - Strumento astronomico atto alla misurazione dell'altezza sull'orizzonte del Sole o di qualsiasi altro corpo celeste.

**Sfera celeste** - Astrazione geometrica di forma sferica, concentrica alla Terra, sulla quale appaiono proiettati tutti i corpi celesti per effetto prospettico.

**Siderite** - Meteorite costituito quasi completamente da ferro e nickel.

**Sigizie** - Punti dell'orbita lunare dove la Luna, il Sole e la Terra sono allineati.

**Solstizi** - Punti dell'eclittica, e corrispondentemente della sfera celeste, dove il Sole raggiunge la massima e minima declinazione del suo percorso annuale apparente. Relativi alle stagioni sono detti solstizio d'inverno e solstizio d'estate.

**Stagioni** - Intervallo di tempo impiegato dalla Terra per passare da un punto equinoziale ad uno solstiziale e viceversa.

**Stelle orarie** - Stelle delle quali si conosce con esattezza la posizione celeste, ed usate per la determinazione del tempo siderale.

**Superiore** - Pianeta la cui orbita è dislocata al di là di quella terrestre.

**Tempo solare** - Misurazione del tempo basata sul moto diurno ed annuale del Sole nel cielo, e conseguentemente sui moti del pianeta Terra. L'unità di misura è il secondo, sottomultiplo del giorno che è pari a circa 24 ore.

**Tempo siderale** - Misurazione del tempo basata sull'intervallo di tempo compreso fra due successivi passaggi di una stella al meridiano. Inferiore a quello solare, è pari a 23 ore e 56 minuti.

**Tempo universale** - Tempo locale del meridiano di Greenwich di longitudine 0°.

**Terminatore** - Linea di separazione fra l'emisfero illuminato e quello buio di un corpo celeste.

**Transito** - Passaggio di un corpo celeste al meridiano o davanti al disco di un altro corpo di dimensioni maggiori.

**Troiano** - Aggettivo riferito a un asteroide appartenente alla famiglia dei Troiani (vedi Lagrange, punti di).

**Tropici** - Paralleli delle coordinate geografiche terrestri distanti dall'equatore +23.5 gradi, quello del Cancro, e -23,5 gradi quello del Capricorno. Sono chiamati con i rispettivi nomi delle costellazioni sulle quali appariva proiettato il Sole nell'antichità, ai rispettivi solstizi d'estate e d'inverno, cui ora non corrispondono più per effetto della precessione degli equinozi.

**UA , Ua, Unità astronomica** - Distanza media della Terra dal Sole. E' pari a 149,6 milioni di km.

**Universale, tempo (T.U.)** - Corrispondente al tempo medio di Greenwich.

**Variabili, stelle** - Stelle che variano la propria luminosità in funzione di caratteristiche geometriche eclissi) o fisiche (alternanza di espansioni e contrazioni).

**Velocità radiale** - Misura della velocità in relazione alla direzione di osservazione.

**Via Lattea** - Fascia celeste lattiginosa creata dal piano equatoriale della nostra galassia.

**Zenit** - Intersezione della verticale del luogo con la volta celeste.

**Zodiaco** - Settore celeste, concentrico all'eclittica, e suddiviso in dodici segni zodiacali di 30 gradi ciascuno. Rappresenta l'insieme delle 12 costellazioni che il Sole attraversa durante il suo ciclo annuale. A causa della precessione degli equinozi le costellazioni che originariamente occupavano un segno sono attualmente spostate in quello a fianco, anche se per convenzione gli astronomi hanno sinora mantenuto la disposizione iniziale dei segni zodiacali.

**Zodiacale, luce** - Luminosità dovuta a nubi di polvere interplanetaria, che illuminata dalla luce solare è vista all'alba od al tramonto in direzione dell'eclittica essendo appunto situata lungo il suo piano.

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COPYRIGHT OF TABLES AND GRAPHICS**

- (1) ICE - Interactive computer ephemeris
- (2) [www.sym454.org](http://www.sym454.org)
- (3) Planets visibility, Alcyone software, freeware
- (4) Alcyone ephemeris
- (5) Ephemeris tools, <http://virtualskysoft.de>
- (6) Solex, A.Vitagliano
- (7) <http://www.iota-es.de/>
- (8) Win Occult
- (9) Minor Planets software, S.Foglia
- (10) <http://www.aerith.net>
- (11) Accurate times
- (12) SkyMap Demo
- (13) Programmi dell'autore dell'Almanacco

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