

I slightly modified Thorstensen's code to print out the time between evening twilight and morning twilight. For Okie-Tex site (site code = o) near Kenton OK I used same time zone as for Oklahoma City.

W. Romanishin- August 2013 - email: wromanishin at ou.edu - Here is stuff from John T. intro:

***** 2013 Night-time Astronomical Calendar for Cerro Tololo *****

By John Thorstensen, Dartmouth College

This calendar is designed to provide information useful for the planning of nighttime observations. The format should minimize confusion; each line gives the phenomena for a single (local!) night, and each line is labeled with both evening and morning (local) day and date. Note that all times given are LOCAL CIVIL (zone) times. DAYLIGHT SAVINGS time is used, with a non-USA convention.

The rise/set times printed are the times at which the center of the object is 50 arcminutes below the geometrical horizon. At the given twilight, the center of the sun is -0.8 degrees below the geometrical horizon.

The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae in the Astronomical Almanac. The Almanac states that the error seldom exceeds 0.3 degrees. Topocentric corrections are included. Comparisons with tables for Kitt Peak in the NOAO Newsletter indicate that the rise-set times are good to +/- 2 min or so. The moon's RA, Dec, and illuminated fraction are given for local midnight, regardless of whether the moon is actually up at that time. Note that the moonrise and moonset times are not printed if they occur near mid-day.

The LST at evening and morning twilight are tabulated. This gives an accurate idea of the range of RA's accessible during the night.

The JD is given (severely rounded off) for local midnight. Again, this avoids any ambiguity.

Some credits: The sidereal time and Julian date routines were originally coded in PL/I by Steve Maker of Dartmouth College. The algorithms originated in the old American Ephemeris. The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

CAUTIONS: I believe that the program which generates these tables is reasonably accurate. However, it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results. Also, in view of the approximations used, the results should not be used when high precision is needed. Extension to dates far from the present (1990) should be done with great caution. The code has not been tested for the eastern or southern hemispheres. Rise/set times are slightly inaccurate and rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change. I know that the code has many infelicities; if you should find actual errors, please notify
John.Thorstensen@dartmouth.edu

[This output comes from a (hopefully) portable, completely self-contained program in the c language. It is available from the author and may be used freely for scientific or educational purposes. If you use it for profit, please contact the author to arrange a (modest!) fee. Source code is copyright John Thorstensen, 1990.]

MOON PHASES FOR 2013, at Cerro Tololo

Times and dates are given in local time, zone = 4 hr West.
 They are generally better than +/- 2 minutes.
 Daylight savings time used.

The end of the previous year and the beginning of the next
 are included for continuity.

NEW		1ST		FULL		LAST	
Dec 13	5 42	Dec 20	2 20	Dec 28	7 23	Jan 05	0 59
Jan 11	16 45	Jan 18	20 46	Jan 27	1 40	Feb 03	10 58
Feb 10	4 23	Feb 17	17 31	Feb 25	17 29	Mar 04	18 55
Mar 11	15 54	Mar 19	13 28	Mar 27	5 30	Apr 03	0 39
Apr 10	5 39	Apr 18	8 33	Apr 25	16 00	May 02	7 17
May 09	20 32	May 18	0 36	May 25	0 27	May 31	15 00
Jun 08	11 59	Jun 16	13 25	Jun 23	7 34	Jun 30	0 55
Jul 08	3 16	Jul 15	23 20	Jul 22	14 17	Jul 29	13 45
Aug 06	17 52	Aug 14	6 58	Aug 20	21 45	Aug 28	5 36
Sep 05	7 36	Sep 12	13 10	Sep 19	7 13	Sep 26	23 56
Oct 04	20 34	Oct 11	19 04	Oct 18	20 38	Oct 26	20 42
Nov 03	9 50	Nov 10	2 59	Nov 17	12 17	Nov 25	16 30
Dec 02	21 22	Dec 09	12 13	Dec 17	6 29	Dec 25	10 50
Jan 01	8 15	Jan 08	0 40	Jan 16	1 54	Jan 24	2 21

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 JANUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Tue Jan 01/Wed Jan 02	5 04	20 56	22 24	5 10	6 38	3 29	10 15	23 20	.....	80	10 23.1	5 27	6.8
Wed Jan 02/Thu Jan 03	5 08	20 56	22 25	5 11	6 39	3 33	10 20	23 54	.....	71	11 11.3	0 55	6.8
Thu Jan 03/Fri Jan 04	5 12	20 57	22 25	5 12	6 40	3 37	10 25	0 29	.....	61	12 00.3	- 3 43	6.8
Fri Jan 04/Sat Jan 05	5 16	20 57	22 25	5 13	6 41	3 40	10 30	1 06	.....	50	12 51.0	- 8 14	6.8
Sat Jan 05/Sun Jan 06	5 20	20 57	22 24	5 14	6 41	3 44	10 35	1 47	.....	39	13 44.1	-12 23	6.8
Sun Jan 06/Mon Jan 07	5 24	20 57	22 24	5 15	6 42	3 48	10 40	2 32	.....	28	14 40.2	-15 55	6.8
Mon Jan 07/Tue Jan 08	5 28	20 57	22 24	5 16	6 43	3 52	10 45	3 23	.....	19	15 39.3	-18 31	6.9
Tue Jan 08/Wed Jan 09	5 32	20 57	22 24	5 17	6 44	3 56	10 50	4 21	17 50	10	16 41.0	-19 55	6.9
Wed Jan 09/Thu Jan 10	5 36	20 57	22 24	5 18	6 45	4 00	10 55	5 25	18 53	4	17 44.1	-19 56	6.9
Thu Jan 10/Fri Jan 11	5 40	20 57	22 24	5 19	6 46	4 03	11 00	.....	19 52	1	18 46.8	-18 30	6.9
Fri Jan 11/Sat Jan 12	5 44	20 57	22 23	5 20	6 46	4 07	11 05	.....	20 45	0	19 47.7	-15 48	6.9
Sat Jan 12/Sun Jan 13	5 48	20 57	22 23	5 21	6 47	4 11	11 10	.....	21 33	3	20 45.8	-12 05	7.0
Sun Jan 13/Mon Jan 14	5 52	20 57	22 23	5 22	6 48	4 14	11 15	.....	22 15	7	21 40.9	- 7 43	7.0
Mon Jan 14/Tue Jan 15	5 56	20 56	22 22	5 23	6 49	4 18	11 20	.....	22 54	14	22 33.2	- 3 01	7.0
Tue Jan 15/Wed Jan 16	6 00	20 56	22 22	5 24	6 50	4 21	11 25	.....	23 30	22	23 23.4	1 43	7.0
Wed Jan 16/Thu Jan 17	6 04	20 56	22 21	5 25	6 51	4 25	11 30	.....	0 05	31	0 12.2	6 16	7.1
Thu Jan 17/Fri Jan 18	6 07	20 56	22 21	5 27	6 52	4 28	11 35	.....	0 40	41	1 00.3	10 27	7.1
Fri Jan 18/Sat Jan 19	6 11	20 56	22 20	5 28	6 53	4 32	11 40	.....	1 16	51	1 48.5	14 07	7.1
Sat Jan 19/Sun Jan 20	6 15	20 55	22 20	5 29	6 53	4 35	11 45	.....	1 55	60	2 37.1	17 09	7.2
Sun Jan 20/Mon Jan 21	6 19	20 55	22 19	5 30	6 54	4 38	11 50	.....	2 35	70	3 26.6	19 27	7.2
Mon Jan 21/Tue Jan 22	6 23	20 55	22 19	5 31	6 55	4 42	11 55	.....	3 19	78	4 17.0	20 56	7.2
Tue Jan 22/Wed Jan 23	6 27	20 54	22 18	5 32	6 56	4 45	12 01	.....	4 06	85	5 08.0	21 30	7.2
Wed Jan 23/Thu Jan 24	6 31	20 54	22 17	5 34	6 57	4 48	12 06	18 00	4 56	91	5 59.5	21 08	7.3
Thu Jan 24/Fri Jan 25	6 35	20 53	22 17	5 35	6 58	4 51	12 11	18 46	5 49	96	6 51.0	19 49	7.3
Fri Jan 25/Sat Jan 26	6 39	20 53	22 16	5 36	6 59	4 55	12 16	19 28	.....	99	7 42.0	17 37	7.3
Sat Jan 26/Sun Jan 27	6 43	20 52	22 15	5 37	7 00	4 58	12 21	20 08	.....	100	8 32.3	14 36	7.4
Sun Jan 27/Mon Jan 28	6 47	20 52	22 14	5 38	7 01	5 01	12 26	20 46	.....	99	9 21.9	10 54	7.4
Mon Jan 28/Tue Jan 29	6 51	20 51	22 14	5 39	7 02	5 04	12 31	21 22	.....	96	10 11.0	6 42	7.4
Tue Jan 29/Wed Jan 30	6 55	20 51	22 13	5 41	7 03	5 07	12 36	21 57	.....	91	10 59.9	2 10	7.5
Wed Jan 30/Thu Jan 31	6 59	20 50	22 12	5 42	7 03	5 10	12 41	22 32	.....	84	11 49.4	- 2 29	7.5
Thu Jan 31/Fri Feb 01	7 03	20 50	22 11	5 43	7 04	5 13	12 47	23 08	.....	75	12 39.9	- 7 03	7.5

***** 2013 FEBRUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Feb 01/Sat Feb 02	7 07	20 49	22 10	5 44	7 05	5 16	12 52	23 47	.....	65	13 32.1	-11 17	7.6
Sat Feb 02/Sun Feb 03	7 11	20 48	22 09	5 45	7 06	5 19	12 57	0 30	.....	55	14 26.5	-14 56	7.6
Sun Feb 03/Mon Feb 04	7 15	20 48	22 08	5 46	7 07	5 22	13 02	1 17	.....	43	15 23.5	-17 45	7.6
Mon Feb 04/Tue Feb 05	7 18	20 47	22 07	5 48	7 08	5 25	13 07	2 10	.....	32	16 22.7	-19 29	7.7
Tue Feb 05/Wed Feb 06	7 22	20 46	22 06	5 49	7 09	5 28	13 12	3 09	.....	22	17 23.3	-19 58	7.7
Wed Feb 06/Thu Feb 07	7 26	20 45	22 05	5 50	7 10	5 31	13 17	4 13	17 38	13	18 24.3	-19 07	7.7
Thu Feb 07/Fri Feb 08	7 30	20 45	22 04	5 51	7 11	5 34	13 22	5 19	18 32	7	19 24.4	-16 59	7.8
Fri Feb 08/Sat Feb 09	7 34	20 44	22 03	5 52	7 11	5 37	13 27	6 25	19 21	2	20 22.6	-13 45	7.8
Sat Feb 09/Sun Feb 10	7 38	20 43	22 02	5 53	7 12	5 40	13 32	.....	20 06	0	21 18.4	- 9 43	7.8
Sun Feb 10/Mon Feb 11	7 42	20 42	22 01	5 54	7 13	5 43	13 37	.....	20 46	1	22 11.8	- 5 10	7.9
Mon Feb 11/Tue Feb 12	7 46	20 41	22 00	5 55	7 14	5 46	13 42	.....	21 24	4	23 03.3	- 0 26	7.9
Tue Feb 12/Wed Feb 13	7 50	20 41	21 59	5 56	7 15	5 49	13 47	.....	22 01	9	23 53.3	4 14	8.0
Wed Feb 13/Thu Feb 14	7 54	20 40	21 58	5 57	7 16	5 51	13 52	.....	22 37	16	0 42.4	8 37	8.0
Thu Feb 14/Fri Feb 15	7 58	20 39	21 57	5 58	7 16	5 54	13 57	.....	23 14	24	1 31.2	12 32	8.0
Fri Feb 15/Sat Feb 16	8 02	20 38	21 55	6 00	7 17	5 57	14 02	.....	23 52	33	2 20.3	15 50	8.1
Sat Feb 16/Sun Feb 17	8 06	20 37	21 54	6 01	7 18	6 00	14 07	.....	0 32	43	3 09.7	18 25	8.1
Sun Feb 17/Mon Feb 18	8 10	20 36	21 53	6 02	7 19	6 02	14 12	.....	1 15	52	3 59.8	20 12	8.1
Mon Feb 18/Tue Feb 19	8 14	20 35	21 52	6 03	7 20	6 05	14 17	.....	2 00	61	4 50.5	21 06	8.2
Tue Feb 19/Wed Feb 20	8 18	20 34	21 51	6 04	7 20	6 08	14 22	.....	2 49	70	5 41.5	21 05	8.2
Wed Feb 20/Thu Feb 21	8 22	20 33	21 50	6 05	7 21	6 11	14 27	.....	3 40	79	6 32.7	20 08	8.3
Thu Feb 21/Fri Feb 22	8 25	20 32	21 48	6 06	7 22	6 13	14 32	17 23	4 33	86	7 23.7	18 17	8.3
Fri Feb 22/Sat Feb 23	8 29	20 31	21 47	6 07	7 23	6 16	14 37	18 04	5 29	92	8 14.3	15 36	8.3
Sat Feb 23/Sun Feb 24	8 33	20 30	21 46	6 07	7 23	6 19	14 42	18 43	6 25	97	9 04.5	12 09	8.4
Sun Feb 24/Mon Feb 25	8 37	20 29	21 45	6 08	7 24	6 22	14 47	19 20	.....	99	9 54.5	8 06	8.4
Mon Feb 25/Tue Feb 26	8 41	20 28	21 43	6 09	7 25	6 24	14 52	19 56	.....	100	10 44.5	3 37	8.4
Tue Feb 26/Wed Feb 27	8 45	20 27	21 42	6 10	7 26	6 27	14 56	20 32	.....	98	11 35.0	- 1 05	8.5
Wed Feb 27/Thu Feb 28	8 49	20 26	21 41	6 11	7 26	6 30	15 01	21 09	.....	94	12 26.5	- 5 46	8.5
Thu Feb 28/Fri Mar 01	8 53	20 24	21 40	6 12	7 27	6 32	15 06	21 48	.....	87	13 19.5	-10 11	8.5

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 MARCH *****

Date (eve/morn)	LMST midn	----- Sun: -----					LST twilight:		----- Moon: -----					Twilight hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec		
Fri Mar 01/Sat Mar 02	8 57	20 23	21 38	6 13	7 28	6 35	15 11	22 30	.....	79	14 14.4	-14 02	8.6
Sat Mar 02/Sun Mar 03	9 01	20 22	21 37	6 14	7 29	6 38	15 16	23 16	.....	69	15 11.3	-17 04	8.6
Sun Mar 03/Mon Mar 04	9 05	20 21	21 36	6 15	7 29	6 40	15 21	0 07	.....	58	16 10.0	-19 03	8.6
Mon Mar 04/Tue Mar 05	9 09	20 20	21 34	6 15	7 30	6 43	15 25	1 03	.....	47	17 09.7	-19 50	8.7
Tue Mar 05/Wed Mar 06	9 13	20 19	21 33	6 16	7 31	6 46	15 30	2 04	.....	36	18 09.6	-19 19	8.7
Wed Mar 06/Thu Mar 07	9 17	20 18	21 32	6 17	7 31	6 48	15 35	3 07	.....	25	19 08.4	-17 35	8.8
Thu Mar 07/Fri Mar 08	9 21	20 16	21 31	6 18	7 32	6 51	15 40	4 11	17 15	16	20 05.6	-14 47	8.8	
Fri Mar 08/Sat Mar 09	9 25	20 15	21 29	6 19	7 33	6 53	15 44	5 15	18 00	9	21 00.6	-11 07	8.8	
Sat Mar 09/Sun Mar 10*	9 29	20 14	21 28	5 20	6 33	6 56	15 49	5 17	18 41	4	21 53.7	- 6 51	8.9	
Sun Mar 10/Mon Mar 11	10 33	19 13	20 27	5 20	6 34	6 59	15 54	6 18	18 19	1	22 47.9	- 2 05	8.9	
Mon Mar 11/Tue Mar 12	10 37	19 12	20 25	5 21	6 35	7 01	15 59	.....	18 56	0	23 37.9	2 32	8.9
Tue Mar 12/Wed Mar 13	10 41	19 11	20 24	5 22	6 35	7 04	16 03	.....	19 33	2	0 27.1	6 58	9.0
Wed Mar 13/Thu Mar 14	10 44	19 09	20 23	5 23	6 36	7 07	16 08	.....	20 09	6	1 16.1	11 00	9.0
Thu Mar 14/Fri Mar 15	10 48	19 08	20 21	5 23	6 37	7 09	16 13	.....	20 47	11	2 05.2	14 30	9.0
Fri Mar 15/Sat Mar 16	10 52	19 07	20 20	5 24	6 37	7 12	16 17	.....	21 27	18	2 54.6	17 18	9.1
Sat Mar 16/Sun Mar 17	10 56	19 06	20 19	5 25	6 38	7 15	16 22	.....	22 09	26	3 44.5	19 19	9.1
Sun Mar 17/Mon Mar 18	11 00	19 05	20 18	5 25	6 39	7 17	16 27	.....	22 54	35	4 34.8	20 29	9.1
Mon Mar 18/Tue Mar 19	11 04	19 03	20 16	5 26	6 39	7 20	16 31	.....	23 41	44	5 25.3	20 45	9.2
Tue Mar 19/Wed Mar 20	11 08	19 02	20 15	5 27	6 40	7 23	16 36	.....	0 31	53	6 15.8	20 08	9.2
Wed Mar 20/Thu Mar 21	11 12	19 01	20 14	5 28	6 40	7 25	16 41	.....	1 23	63	7 06.1	18 37	9.2
Thu Mar 21/Fri Mar 22	11 16	19 00	20 12	5 28	6 41	7 28	16 45	.....	2 17	72	7 56.1	16 16	9.3
Fri Mar 22/Sat Mar 23	11 20	18 58	20 11	5 29	6 42	7 31	16 50	.....	3 12	80	8 45.8	13 10	9.3
Sat Mar 23/Sun Mar 24	11 24	18 57	20 10	5 30	6 42	7 33	16 54	.....	4 08	88	9 35.5	9 23	9.3
Sun Mar 24/Mon Mar 25	11 28	18 56	20 09	5 30	6 43	7 36	16 59	16 52	5 06	94	10 25.5	5 05	9.4	
Mon Mar 25/Tue Mar 26	11 32	18 55	20 07	5 31	6 44	7 39	17 04	17 28	6 06	98	11 16.3	0 26	9.4	
Tue Mar 26/Wed Mar 27	11 36	18 54	20 06	5 32	6 44	7 41	17 08	18 06	7 07	100	12 08.4	- 4 20	9.4	
Wed Mar 27/Thu Mar 28	11 40	18 52	20 05	5 32	6 45	7 44	17 13	18 45	.....	99	13 02.5	- 8 57	9.5
Thu Mar 28/Fri Mar 29	11 44	18 51	20 04	5 33	6 45	7 47	17 17	19 27	.....	96	13 58.7	-13 05	9.5
Fri Mar 29/Sat Mar 30	11 48	18 50	20 03	5 33	6 46	7 49	17 22	20 13	.....	90	14 57.2	-16 27	9.5
Sat Mar 30/Sun Mar 31	11 52	18 49	20 01	5 34	6 47	7 52	17 26	21 03	.....	82	15 57.5	-18 45	9.5
Sun Mar 31/Mon Apr 01	11 55	18 48	20 00	5 35	6 47	7 55	17 31	21 59	.....	72	16 58.7	-19 47	9.6

***** 2013 APRIL *****

Date (eve/morn)	LMST midn	----- Sun: -----					LST twilight:		----- Moon: -----					Twilight hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec		
Mon Apr 01/Tue Apr 02	11 59	18 46	19 59	5 35	6 48	7 58	17 36	22 59	.....	61	17 59.6	-19 30	9.6
Tue Apr 02/Wed Apr 03	12 03	18 45	19 58	5 36	6 48	8 00	17 40	0 01	.....	50	18 59.2	-17 57	9.6
Wed Apr 03/Thu Apr 04	12 07	18 44	19 57	5 36	6 49	8 03	17 45	1 04	.....	38	19 56.5	-15 20	9.7
Thu Apr 04/Fri Apr 05	12 11	18 43	19 55	5 37	6 50	8 06	17 49	2 07	.....	28	20 51.3	-11 51	9.7
Fri Apr 05/Sat Apr 06	12 15	18 42	19 54	5 38	6 50	8 09	17 54	3 08	.....	19	21 43.8	- 7 47	9.7
Sat Apr 06/Sun Apr 07	12 19	18 41	19 53	5 38	6 51	8 11	17 58	4 08	.....	11	22 34.5	- 3 23	9.8
Sun Apr 07/Mon Apr 08	12 23	18 39	19 52	5 39	6 51	8 14	18 03	5 07	16 54	5	23 23.8	1 08	9.8	
Mon Apr 08/Tue Apr 09	12 27	18 38	19 51	5 39	6 52	8 17	18 07	6 05	17 30	2	0 12.5	5 33	9.8	
Tue Apr 09/Wed Apr 10	12 31	18 37	19 50	5 40	6 53	8 20	18 12	7 02	18 06	0	1 01.0	9 39	9.8	
Wed Apr 10/Thu Apr 11	12 35	18 36	19 49	5 40	6 53	8 23	18 16	.....	18 44	1	1 49.7	13 16	9.9
Thu Apr 11/Fri Apr 12	12 39	18 35	19 48	5 41	6 54	8 26	18 21	.....	19 23	3	2 38.9	16 16	9.9
Fri Apr 12/Sat Apr 13	12 43	18 34	19 46	5 42	6 54	8 29	18 25	.....	20 04	7	3 28.6	18 31	9.9
Sat Apr 13/Sun Apr 14	12 47	18 33	19 45	5 42	6 55	8 31	18 30	.....	20 48	13	4 18.8	19 57	9.9
Sun Apr 14/Mon Apr 15	12 51	18 32	19 44	5 43	6 56	8 34	18 34	.....	21 35	20	5 09.1	20 30	10.0
Mon Apr 15/Tue Apr 16	12 55	18 30	19 43	5 43	6 56	8 37	18 39	.....	22 24	28	5 59.2	20 09	10.0
Tue Apr 16/Wed Apr 17	12 59	18 29	19 42	5 44	6 57	8 40	18 43	.....	23 14	36	6 49.0	18 57	10.0
Wed Apr 17/Thu Apr 18	13 02	18 28	19 41	5 44	6 57	8 43	18 48	.....	0 07	46	7 38.2	16 55	10.1
Thu Apr 18/Fri Apr 19	13 06	18 27	19 40	5 45	6 58	8 46	18 52	.....	1 00	56	8 27.0	14 09	10.1
Fri Apr 19/Sat Apr 20	13 10	18 26	19 39	5 45	6 59	8 49	18 57	.....	1 55	65	9 15.6	10 42	10.1
Sat Apr 20/Sun Apr 21	13 14	18 25	19 38	5 46	6 59	8 52	19 01	.....	2 51	75	10 04.5	6 41	10.1
Sun Apr 21/Mon Apr 22	13 18	18 24	19 37	5 46	7 00	8 55	19 06	.....	3 49	83	10 54.1	2 15	10.2
Mon Apr 22/Tue Apr 23	13 22	18 23	19 37	5 47	7 00	8 58	19 10	.....	4 49	91	11 45.1	- 2 25	10.2
Tue Apr 23/Wed Apr 24	13 26	18 22	19 36	5 48	7 01	9 01	19 15	16 37	5 52	96	12 38.3	- 7 07	10.2	
Wed Apr 24/Thu Apr 25	13 30	18 21	19 35	5 48	7 02	9 04	19 19	17 18	6 57	99	13 34.2	-11 31	10.2	
Thu Apr 25/Fri Apr 26	13 34	18 20	19 34	5 49	7 02	9 07	19 24	18 03	.....	100	14 33.1	-15 18	10.2
Fri Apr 26/Sat Apr 27	13 38	18 19	19 33	5 49	7 03	9 10	19 28	18 53	.....	97	15 34.7	-18 06	10.3
Sat Apr 27/Sun Apr 28	13 42	18 18	19 32	5 50	7 04	9 13	19 33	19 48	.....	92	16 38.0	-19 38	10.3
Sun Apr 28/Mon Apr 29	13 46	18 18	19 31	5 50	7 04	9 16	19 37	20 49	.....	84	17 41.5	-19 45	10.3
Mon Apr 29/Tue Apr 30	13 50	18 17	19 31	5 51	7 05	9 20	19 41	21 52	.....	75	18 43.6	-18 30	10.3
Tue Apr 30/Wed May 01	13 54	18 16	19 30	5 51	7 05	9 23	19 46	22 57	64	19 43.1	-16 04	10.4	

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
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***** 2013 MAY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Wed May 01/Thu May 02	13 58	18 15	19 29	5 52	7 06	9 26	19 50	0 01	.....	53	20 39.6	-12 42	10.4
Thu May 02/Fri May 03	14 02	18 14	19 28	5 52	7 07	9 29	19 55	1 03	.....	41	21 33.1	- 8 42	10.4
Fri May 03/Sat May 04	14 06	18 13	19 28	5 53	7 07	9 32	19 59	2 03	.....	31	22 24.1	- 4 21	10.4
Sat May 04/Sun May 05	14 10	18 12	19 27	5 53	7 08	9 36	20 04	3 01	.....	22	23 13.3	0 07	10.4
Sun May 05/Mon May 06	14 13	18 12	19 26	5 54	7 08	9 39	20 08	3 58	.....	14	0 01.6	4 30	10.5
Mon May 06/Tue May 07	14 17	18 11	19 25	5 54	7 09	9 42	20 13	4 55	16 07	8	0 49.4	8 37	10.5
Tue May 07/Wed May 08	14 21	18 10	19 25	5 55	7 10	9 45	20 17	5 50	16 43	3	1 37.5	12 19	10.5
Wed May 08/Thu May 09	14 25	18 09	19 24	5 55	7 10	9 49	20 22	6 45	17 21	1	2 26.1	15 27	10.5
Thu May 09/Fri May 10	14 29	18 09	19 24	5 56	7 11	9 52	20 26	7 39	18 01	0	3 15.3	17 53	10.5
Fri May 10/Sat May 11	14 33	18 08	19 23	5 56	7 12	9 55	20 31	.....	18 44	1	4 05.1	19 32	10.6
Sat May 11/Sun May 12	14 37	18 07	19 22	5 57	7 12	9 59	20 35	.....	19 29	4	4 55.1	20 19	10.6
Sun May 12/Mon May 13	14 41	18 07	19 22	5 57	7 13	10 02	20 40	.....	20 18	9	5 45.2	20 13	10.6
Mon May 13/Tue May 14	14 45	18 06	19 21	5 58	7 13	10 06	20 44	.....	21 08	15	6 34.7	19 16	10.6
Tue May 14/Wed May 15	14 49	18 05	19 21	5 59	7 14	10 09	20 48	.....	21 59	22	7 23.6	17 29	10.6
Wed May 15/Thu May 16	14 53	18 05	19 20	5 59	7 15	10 13	20 53	.....	22 52	30	8 11.8	14 58	10.6
Thu May 16/Fri May 17	14 57	18 04	19 20	6 00	7 15	10 16	20 57	.....	23 45	39	8 59.5	11 48	10.7
Fri May 17/Sat May 18	15 01	18 04	19 20	6 00	7 16	10 20	21 02	.....	0 40	49	9 46.9	8 04	10.7
Sat May 18/Sun May 19	15 05	18 03	19 19	6 01	7 16	10 23	21 06	.....	1 35	59	10 34.8	3 54	10.7
Sun May 19/Mon May 20	15 09	18 03	19 19	6 01	7 17	10 27	21 11	.....	2 33	69	11 23.8	- 0 35	10.7
Mon May 20/Tue May 21	15 13	18 02	19 18	6 02	7 18	10 30	21 15	.....	3 33	79	12 14.7	- 5 10	10.7
Tue May 21/Wed May 22	15 17	18 02	19 18	6 02	7 18	10 34	21 20	.....	4 35	87	13 08.3	- 9 39	10.7
Wed May 22/Thu May 23	15 20	18 01	19 18	6 03	7 19	10 37	21 24	.....	5 41	94	14 05.2	-13 44	10.7
Thu May 23/Fri May 24	15 24	18 01	19 17	6 03	7 19	10 41	21 28	16 38	6 48	98	15 05.8	-17 02	10.8
Fri May 24/Sat May 25	15 28	18 01	19 17	6 03	7 20	10 45	21 33	17 32	7 55	100	16 09.4	-19 12	10.8
Sat May 25/Sun May 26	15 32	18 00	19 17	6 04	7 21	10 48	21 37	18 31	.....	98	17 14.7	-19 59	10.8
Sun May 26/Mon May 27	15 36	18 00	19 17	6 04	7 21	10 52	21 42	19 35	.....	94	18 19.8	-19 15	10.8
Mon May 27/Tue May 28	15 40	18 00	19 16	6 05	7 22	10 56	21 46	20 42	.....	87	19 22.9	-17 08	10.8
Tue May 28/Wed May 29	15 44	17 59	19 16	6 05	7 22	10 59	21 50	21 49	.....	77	20 22.7	-13 55	10.8
Wed May 29/Thu May 30	15 48	17 59	19 16	6 06	7 23	11 03	21 55	22 54	.....	67	21 19.0	- 9 56	10.8
Thu May 30/Fri May 31	15 52	17 59	19 16	6 06	7 23	11 07	21 59	23 56	.....	56	22 12.1	- 5 32	10.8
Fri May 31/Sat Jun 01	15 56	17 59	19 16	6 07	7 24	11 11	22 04	0 56	.....	45	23 02.7	- 0 59	10.9

***** 2013 JUNE *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sat Jun 01/Sun Jun 02	16 00	17 58	19 15	6 07	7 24	11 15	22 08	1 54	.....	35	23 51.6	3 29	10.9
Sun Jun 02/Mon Jun 03	16 04	17 58	19 15	6 08	7 25	11 18	22 12	2 50	.....	26	0 39.7	7 42	10.9
Mon Jun 03/Tue Jun 04	16 08	17 58	19 15	6 08	7 25	11 22	22 17	3 46	.....	17	1 27.5	11 30	10.9
Tue Jun 04/Wed Jun 05	16 12	17 58	19 15	6 08	7 26	11 26	22 21	4 40	.....	11	2 15.7	14 45	10.9
Wed Jun 05/Thu Jun 06	16 16	17 58	19 15	6 09	7 26	11 30	22 25	5 34	16 00	5	3 04.4	17 21	10.9
Thu Jun 06/Fri Jun 07	16 20	17 58	19 15	6 09	7 27	11 34	22 30	6 26	16 42	2	3 53.7	19 10	10.9
Fri Jun 07/Sat Jun 08	16 24	17 58	19 15	6 10	7 27	11 38	22 34	7 16	17 26	0	4 43.5	20 10	10.9
Sat Jun 08/Sun Jun 09	16 27	17 58	19 15	6 10	7 28	11 42	22 38	8 04	18 13	0	5 33.3	20 18	10.9
Sun Jun 09/Mon Jun 10	16 31	17 58	19 15	6 10	7 28	11 46	22 43	.....	19 03	2	6 22.9	19 34	10.9
Mon Jun 10/Tue Jun 11	16 35	17 58	19 15	6 11	7 28	11 50	22 47	.....	19 54	5	7 11.8	18 00	10.9
Tue Jun 11/Wed Jun 12	16 39	17 58	19 15	6 11	7 29	11 54	22 51	.....	20 46	10	7 59.9	15 42	10.9
Wed Jun 12/Thu Jun 13	16 43	17 58	19 15	6 11	7 29	11 58	22 56	.....	21 39	17	8 47.2	12 43	10.9
Thu Jun 13/Fri Jun 14	16 47	17 58	19 15	6 12	7 29	12 02	23 00	.....	22 33	25	9 34.0	9 12	10.9
Fri Jun 14/Sat Jun 15	16 51	17 58	19 16	6 12	7 30	12 06	23 04	.....	23 27	34	10 20.6	5 14	10.9
Sat Jun 15/Sun Jun 16	16 55	17 58	19 16	6 12	7 30	12 10	23 08	.....	0 22	43	11 07.8	0 58	10.9
Sun Jun 16/Mon Jun 17	16 59	17 58	19 16	6 12	7 30	12 14	23 13	.....	1 19	54	11 56.4	- 3 28	10.9
Mon Jun 17/Tue Jun 18	17 03	17 58	19 16	6 13	7 31	12 18	23 17	.....	2 19	64	12 47.1	- 7 52	10.9
Tue Jun 18/Wed Jun 19	17 07	17 58	19 16	6 13	7 31	12 22	23 21	.....	3 21	75	13 40.8	-12 02	10.9
Wed Jun 19/Thu Jun 20	17 11	17 58	19 16	6 13	7 31	12 26	23 25	.....	4 26	84	14 38.1	-15 38	10.9
Thu Jun 20/Fri Jun 21	17 15	17 59	19 17	6 13	7 31	12 31	23 29	.....	5 32	92	15 39.2	-18 20	10.9
Fri Jun 21/Sat Jun 22	17 19	17 59	19 17	6 14	7 32	12 35	23 33	16 11	6 38	97	16 43.4	-19 49	10.9
Sat Jun 22/Sun Jun 23	17 23	17 59	19 17	6 14	7 32	12 39	23 38	17 13	7 40	100	17 49.2	-19 50	10.9
Sun Jun 23/Mon Jun 24	17 27	17 59	19 17	6 14	7 32	12 43	23 42	18 20	.....	99	18 54.7	-18 20	10.9
Mon Jun 24/Tue Jun 25	17 31	18 00	19 18	6 14	7 32	12 47	23 46	19 28	.....	95	19 57.9	-15 30	10.9
Tue Jun 25/Wed Jun 26	17 35	18 00	19 18	6 14	7 32	12 52	23 50	20 37	.....	89	20 57.8	-11 41	10.9
Wed Jun 26/Thu Jun 27	17 38	18 00	19 18	6 14	7 32	12 56	23 54	21 42	.....	80	21 54.2	- 7 14	10.9
Thu Jun 27/Fri Jun 28	17 42	18 01	19 18	6 15	7 32	13 00	23 58	22 45	.....	71	22 47.5	- 2 33	10.9
Fri Jun 28/Sat Jun 29	17 46	18 01	19 19	6 15	7 32	13 04	0 02	23 46	.....	60	23 38.5	2 07	10.9
Sat Jun 29/Sun Jun 30	17 50	18 01	19 19	6 15	7 32	13 09	0 06	0 44	.....	50	0 28.0	6 32	10.9
Sun Jun 30/Mon Jul 01	17 54	18 02	19 19	6 15	7 32	13 13	0 10	1 40	.....	39	1 16.7	10 31	10.9

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 JULY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Jul 01/Tue Jul 02	17 58	18 02	19 20	6 15	7 32	13 17	0 14	2 36	.....	30	2 05.2	13 58	10.9
Tue Jul 02/Wed Jul 03	18 02	18 02	19 20	6 15	7 32	13 21	0 18	3 30	.....	22	2 54.0	16 44	10.9
Wed Jul 03/Thu Jul 04	18 06	18 03	19 20	6 15	7 32	13 26	0 22	4 22	.....	14	3 43.2	18 46	10.9
Thu Jul 04/Fri Jul 05	18 10	18 03	19 21	6 15	7 32	13 30	0 26	5 13	.....	8	4 32.8	19 58	10.9
Fri Jul 05/Sat Jul 06	18 14	18 04	19 21	6 15	7 32	13 34	0 30	6 01	16 11	4	5 22.5	20 20	10.9
Sat Jul 06/Sun Jul 07	18 18	18 04	19 22	6 15	7 32	13 39	0 34	6 47	16 59	1	6 12.1	19 49	10.9
Sun Jul 07/Mon Jul 08	18 22	18 05	19 22	6 15	7 32	13 43	0 37	7 30	17 50	0	7 01.2	18 28	10.9
Mon Jul 08/Tue Jul 09	18 26	18 05	19 22	6 15	7 32	13 47	0 41	8 09	18 42	1	7 49.6	16 21	10.9
Tue Jul 09/Wed Jul 10	18 30	18 06	19 23	6 14	7 32	13 52	0 45	.....	19 35	3	8 37.1	13 32	10.9
Wed Jul 10/Thu Jul 11	18 34	18 06	19 23	6 14	7 31	13 56	0 49	.....	20 28	7	9 23.8	10 10	10.9
Thu Jul 11/Fri Jul 12	18 38	18 07	19 24	6 14	7 31	14 00	0 53	.....	21 22	13	10 10.2	6 21	10.8
Fri Jul 12/Sat Jul 13	18 42	18 07	19 24	6 14	7 31	14 05	0 56	.....	22 17	20	10 56.7	2 13	10.8
Sat Jul 13/Sun Jul 14	18 45	18 08	19 24	6 14	7 31	14 09	1 00	.....	23 12	29	11 43.9	- 2 06	10.8
Sun Jul 14/Mon Jul 15	18 49	18 08	19 25	6 13	7 30	14 14	1 04	.....	0 09	39	12 32.6	- 6 24	10.8
Mon Jul 15/Tue Jul 16	18 53	18 09	19 25	6 13	7 30	14 18	1 08	.....	1 09	49	13 23.5	-10 31	10.8
Tue Jul 16/Wed Jul 17	18 57	18 09	19 26	6 13	7 29	14 22	1 11	.....	2 10	60	14 17.5	-14 13	10.8
Wed Jul 17/Thu Jul 18	19 01	18 10	19 26	6 13	7 29	14 27	1 15	.....	3 14	71	15 14.9	-17 12	10.8
Thu Jul 18/Fri Jul 19	19 05	18 10	19 27	6 12	7 29	14 31	1 19	.....	4 18	81	16 15.8	-19 11	10.8
Fri Jul 19/Sat Jul 20	19 09	18 11	19 27	6 12	7 28	14 35	1 22	.....	5 21	90	17 19.3	-19 53	10.7
Sat Jul 20/Sun Jul 21	19 13	18 11	19 28	6 12	7 28	14 40	1 26	15 57	6 20	96	18 24.1	-19 08	10.7
Sun Jul 21/Mon Jul 22	19 17	18 12	19 28	6 11	7 27	14 44	1 29	17 04	7 14	99	19 28.3	-16 58	10.7
Mon Jul 22/Tue Jul 23	19 21	18 12	19 28	6 11	7 27	14 49	1 33	18 13	8 03	100	20 30.4	-13 35	10.7
Tue Jul 23/Wed Jul 24	19 25	18 13	19 29	6 10	7 26	14 53	1 36	19 21	.....	97	21 29.7	- 9 20	10.7
Wed Jul 24/Thu Jul 25	19 29	18 13	19 29	6 10	7 26	14 57	1 40	20 28	.....	91	22 26.0	- 4 37	10.7
Thu Jul 25/Fri Jul 26	19 33	18 14	19 30	6 10	7 25	15 02	1 43	21 31	.....	84	23 19.7	0 14	10.7
Fri Jul 26/Sat Jul 27	19 37	18 15	19 30	6 09	7 25	15 06	1 47	22 32	.....	75	0 11.5	4 54	10.6
Sat Jul 27/Sun Jul 28	19 41	18 15	19 31	6 09	7 24	15 11	1 50	23 31	.....	65	1 02.0	9 10	10.6
Sun Jul 28/Mon Jul 29	19 45	18 16	19 31	6 08	7 23	15 15	1 54	0 28	.....	55	1 51.8	12 53	10.6
Mon Jul 29/Tue Jul 30	19 49	18 16	19 32	6 07	7 23	15 20	1 57	1 23	.....	45	2 41.5	15 55	10.6
Tue Jul 30/Wed Jul 31	19 53	18 17	19 32	6 07	7 22	15 24	2 00	2 17	.....	36	3 31.2	18 11	10.6
Wed Jul 31/Thu Aug 01	19 56	18 18	19 33	6 06	7 21	15 28	2 04	3 08	.....	27	4 21.0	19 38	10.6

***** 2013 AUGUST *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Thu Aug 01/Fri Aug 02	20 00	18 18	19 33	6 06	7 21	15 33	2 07	3 58	.....	19	5 10.9	20 14	10.5
Fri Aug 02/Sat Aug 03	20 04	18 19	19 34	6 05	7 20	15 37	2 10	4 44	.....	12	6 00.7	19 57	10.5
Sat Aug 03/Sun Aug 04	20 08	18 19	19 34	6 04	7 19	15 42	2 14	5 28	.....	7	6 50.0	18 50	10.5
Sun Aug 04/Mon Aug 05	20 12	18 20	19 35	6 04	7 18	15 46	2 17	6 09	16 37	3	7 38.6	16 56	10.5
Mon Aug 05/Tue Aug 06	20 16	18 20	19 35	6 03	7 18	15 50	2 20	6 47	17 30	1	8 26.5	14 19	10.5
Tue Aug 06/Wed Aug 07	20 20	18 21	19 36	6 02	7 17	15 55	2 23	7 24	18 24	0	9 13.7	11 05	10.4
Wed Aug 07/Thu Aug 08	20 24	18 22	19 36	6 02	7 16	15 59	2 27	.....	19 18	2	10 00.4	7 22	10.4
Thu Aug 08/Fri Aug 09	20 28	18 22	19 36	6 01	7 15	16 04	2 30	.....	20 12	5	10 47.0	3 19	10.4
Fri Aug 09/Sat Aug 10	20 32	18 23	19 37	6 00	7 14	16 08	2 33	.....	21 08	10	11 34.1	- 0 55	10.4
Sat Aug 10/Sun Aug 11	20 36	18 23	19 37	5 59	7 13	16 13	2 36	.....	22 04	17	12 22.1	- 5 12	10.4
Sun Aug 11/Mon Aug 12	20 40	18 24	19 38	5 58	7 12	16 17	2 39	.....	23 03	25	13 11.9	- 9 18	10.3
Mon Aug 12/Tue Aug 13	20 44	18 24	19 38	5 58	7 11	16 21	2 42	.....	0 02	35	14 03.9	-13 01	10.3
Tue Aug 13/Wed Aug 14	20 48	18 25	19 39	5 57	7 11	16 26	2 45	.....	1 04	46	14 58.7	-16 08	10.3
Wed Aug 14/Thu Aug 15	20 52	18 26	19 39	5 56	7 10	16 30	2 49	.....	2 06	57	15 56.4	-18 23	10.3
Thu Aug 15/Fri Aug 16	20 56	18 26	19 40	5 55	7 09	16 35	2 52	.....	3 07	68	16 56.8	-19 30	10.3
Fri Aug 16/Sat Aug 17	21 00	18 27	19 40	5 54	7 08	16 39	2 55	.....	4 06	79	17 58.9	-19 21	10.2
Sat Aug 17/Sun Aug 18	21 03	18 27	19 41	5 53	7 07	16 44	2 58	.....	5 01	88	19 01.4	-17 50	10.2
Sun Aug 18/Mon Aug 19	21 07	18 28	19 41	5 52	7 06	16 48	3 01	.....	5 51	95	20 03.1	-15 04	10.2
Mon Aug 19/Tue Aug 20	21 11	18 28	19 42	5 51	7 05	16 52	3 04	16 59	6 37	99	21 03.0	-11 16	10.2
Tue Aug 20/Wed Aug 21	21 15	18 29	19 42	5 50	7 04	16 57	3 07	18 06	7 20	100	22 00.6	- 6 46	10.1
Wed Aug 21/Thu Aug 22	21 19	18 29	19 43	5 49	7 03	17 01	3 10	19 11	.....	98	22 56.1	- 1 56	10.1
Thu Aug 22/Fri Aug 23	21 23	18 30	19 43	5 48	7 01	17 06	3 13	20 14	.....	94	23 49.8	2 53	10.1
Fri Aug 23/Sat Aug 24	21 27	18 31	19 44	5 47	7 00	17 10	3 15	21 16	.....	87	0 42.2	7 26	10.1
Sat Aug 24/Sun Aug 25	21 31	18 31	19 44	5 46	6 59	17 14	3 18	22 15	.....	80	1 33.7	11 28	10.0
Sun Aug 25/Mon Aug 26	21 35	18 32	19 45	5 45	6 58	17 19	3 21	23 12	.....	71	2 24.8	14 50	10.0
Mon Aug 26/Tue Aug 27	21 39	18 32	19 45	5 44	6 57	17 23	3 24	0 08	.....	61	3 15.7	17 25	10.0
Tue Aug 27/Wed Aug 28	21 43	18 33	19 46	5 43	6 56	17 28	3 27	1 01	.....	52	4 06.4	19 09	10.0
Wed Aug 28/Thu Aug 29	21 47	18 33	19 46	5 42	6 55	17 32	3 30	1 51	.....	42	4 57.0	20 01	9.9
Thu Aug 29/Fri Aug 30	21 51	18 34	19 47	5 41	6 54	17 37	3 33	2 39	.....	33	5 47.1	20 00	9.9
Fri Aug 30/Sat Aug 31	21 55	18 34	19 47	5 40	6 52	17 41	3 36	3 24	.....	24	6 36.7	19 09	9.9
Sat Aug 31/Sun Sep 01	21 59	18 35	19 48	5 39	6 51	17 46	3 38	4 06	.....	17	7 25.7	17 28	9.9

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 SEPTEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sun Sep 01/Mon Sep 02	22 03	18 35	19 48	5 38	6 50	17 50	3 41	4 46	.....	10	8 13.9	15 04	9.8
Mon Sep 02/Tue Sep 03	22 07	18 36	19 49	5 36	6 49	17 54	3 44	5 23	.....	5	9 01.4	12 02	9.8
Tue Sep 03/Wed Sep 04	22 11	18 36	19 49	5 35	6 48	17 59	3 47	5 59	17 10	2	9 48.6	8 27	9.8
Wed Sep 04/Thu Sep 05	22 14	18 37	19 50	5 34	6 47	18 03	3 49	6 34	18 05	0	10 35.7	4 29	9.7
Thu Sep 05/Fri Sep 06	22 18	18 38	19 50	5 33	6 45	18 08	3 52	7 09	19 01	1	11 23.1	0 17	9.7
Fri Sep 06/Sat Sep 07	22 22	18 38	19 51	5 32	6 44	18 12	3 55	.....	19 58	3	12 11.4	- 4 00	9.7
Sat Sep 07/Sun Sep 08	22 26	18 39	19 51	5 30	6 43	18 17	3 58	.....	20 57	7	13 01.2	- 8 10	9.7
Sun Sep 08/Mon Sep 09	22 30	18 39	19 52	5 29	6 42	18 21	4 00	.....	21 57	14	13 52.9	-11 58	9.6
Mon Sep 09/Tue Sep 10	22 34	18 40	19 52	5 28	6 40	18 26	4 03	.....	22 58	22	14 46.9	-15 12	9.6
Tue Sep 10/Wed Sep 11	22 38	18 40	19 53	5 27	6 39	18 30	4 06	.....	23 59	32	15 43.2	-17 37	9.6
Wed Sep 11/Thu Sep 12	22 42	18 41	19 53	5 26	6 38	18 35	4 08	.....	1 00	43	16 41.7	-19 00	9.5
Thu Sep 12/Fri Sep 13	22 46	18 41	19 54	5 24	6 37	18 39	4 11	.....	1 58	54	17 41.6	-19 12	9.5
Fri Sep 13/Sat Sep 14	22 50	18 42	19 54	5 23	6 36	18 44	4 14	.....	2 53	66	18 42.0	-18 08	9.5
Sat Sep 14/Sun Sep 15	22 54	18 42	19 55	5 22	6 34	18 48	4 16	.....	3 43	76	19 41.9	-15 52	9.4
Sun Sep 15/Mon Sep 16	22 58	18 43	19 55	5 20	6 33	18 53	4 19	.....	4 30	86	20 40.5	-12 34	9.4
Mon Sep 16/Tue Sep 17	23 02	18 43	19 56	5 19	6 32	18 57	4 22	.....	5 13	93	21 37.5	- 8 27	9.4
Tue Sep 17/Wed Sep 18	23 06	18 44	19 57	5 18	6 31	19 02	4 24	16 53	5 53	98	22 32.8	- 3 51	9.4
Wed Sep 18/Thu Sep 19	23 10	18 44	19 57	5 17	6 29	19 06	4 27	17 56	6 33	100	23 26.8	0 55	9.3
Thu Sep 19/Fri Sep 20	23 14	18 45	19 58	5 15	6 28	19 11	4 30	18 58	7 11	99	0 19.8	5 35	9.3
Fri Sep 20/Sat Sep 21	23 18	18 46	19 58	5 14	6 27	19 15	4 32	19 59	.....	96	1 12.3	9 52	9.3
Sat Sep 21/Sun Sep 22	23 21	18 46	19 59	5 13	6 25	19 20	4 35	20 58	.....	91	2 04.5	13 33	9.2
Sun Sep 22/Mon Sep 23	23 25	18 47	20 00	5 11	6 24	19 24	4 38	21 55	.....	85	2 56.5	16 29	9.2
Mon Sep 23/Tue Sep 24	23 29	18 47	20 00	5 10	6 23	19 29	4 40	22 50	.....	77	3 48.4	18 34	9.2
Tue Sep 24/Wed Sep 25	23 33	18 48	20 01	5 09	6 22	19 34	4 43	23 43	.....	68	4 39.9	19 45	9.1
Wed Sep 25/Thu Sep 26	23 37	18 48	20 02	5 07	6 20	19 38	4 45	0 32	.....	59	5 30.9	20 02	9.1
Thu Sep 26/Fri Sep 27	23 41	18 49	20 02	5 06	6 19	19 43	4 48	1 18	.....	49	6 21.2	19 26	9.1
Fri Sep 27/Sat Sep 28	23 45	18 49	20 03	5 05	6 18	19 47	4 51	2 01	.....	40	7 10.5	18 01	9.0
Sat Sep 28/Sun Sep 29	23 49	18 50	20 03	5 03	6 17	19 52	4 53	2 42	.....	31	7 59.0	15 51	9.0
Sun Sep 29/Mon Sep 30	23 53	18 51	20 04	5 02	6 16	19 57	4 56	3 20	.....	23	8 46.7	13 02	9.0
Mon Sep 30/Tue Oct 01	23 57	18 51	20 05	5 01	6 14	20 01	4 58	3 56	.....	15	9 33.9	9 38	8.9

***** 2013 OCTOBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Tue Oct 01/Wed Oct 02	0 01	18 52	20 06	4 59	6 13	20 06	5 01	4 31	.....	9	10 21.0	5 48	8.9
Wed Oct 02/Thu Oct 03	0 05	18 52	20 06	4 58	6 12	20 10	5 04	5 07	16 50	4	11 08.6	1 40	8.9
Thu Oct 03/Fri Oct 04	0 09	18 53	20 07	4 57	6 11	20 15	5 06	5 43	17 47	1	11 57.1	- 2 37	8.8
Fri Oct 04/Sat Oct 05	0 13	18 54	20 08	4 55	6 09	20 20	5 09	6 21	18 46	0	12 47.2	- 6 51	8.8
Sat Oct 05/Sun Oct 06	0 17	18 54	20 08	4 54	6 08	20 24	5 11	7 02	19 47	1	13 39.2	-10 49	8.8
Sun Oct 06/Mon Oct 07	0 21	18 55	20 09	4 53	6 07	20 29	5 14	.....	20 49	5	14 33.5	-14 14	8.7
Mon Oct 07/Tue Oct 08	0 25	18 55	20 10	4 51	6 06	20 34	5 17	.....	21 52	11	15 30.1	-16 53	8.7
Tue Oct 08/Wed Oct 09	0 28	18 56	20 11	4 50	6 05	20 39	5 19	.....	22 54	19	16 28.6	-18 31	8.7
Wed Oct 09/Thu Oct 10	0 32	18 57	20 12	4 49	6 03	20 43	5 22	.....	23 53	29	17 28.2	-18 59	8.6
Thu Oct 10/Fri Oct 11	0 36	18 57	20 12	4 47	6 02	20 48	5 25	.....	0 49	40	18 28.1	-18 13	8.6
Fri Oct 11/Sat Oct 12	0 40	18 58	20 13	4 46	6 01	20 53	5 27	.....	1 40	52	19 27.1	-16 16	8.5
Sat Oct 12/Sun Oct 13*	0 44	18 59	20 14	5 45	7 00	20 58	5 30	.....	3 27	63	20 24.6	-13 18	8.5
Sun Oct 13/Mon Oct 14	23 48	19 59	21 15	5 43	6 59	21 02	5 32	.....	4 10	73	21 18.7	- 9 43	8.5
Mon Oct 14/Tue Oct 15	23 52	20 00	21 16	5 42	6 58	21 07	5 35	.....	4 50	83	22 13.1	- 5 24	8.4
Tue Oct 15/Wed Oct 16	23 56	20 01	21 16	5 41	6 57	21 12	5 38	.....	5 29	91	23 06.2	- 0 48	8.4
Wed Oct 16/Thu Oct 17	24 00	20 01	21 17	5 40	6 56	21 17	5 40	17 45	6 07	96	23 58.5	3 49	8.4
Thu Oct 17/Fri Oct 18	0 04	20 02	21 18	5 38	6 54	21 22	5 43	18 45	6 45	99	0 50.4	8 12	8.3
Fri Oct 18/Sat Oct 19	0 08	20 03	21 19	5 37	6 53	21 26	5 46	19 44	.....	100	1 42.4	12 06	8.3
Sat Oct 19/Sun Oct 20	0 12	20 03	21 20	5 36	6 52	21 31	5 48	20 42	.....	98	2 34.6	15 21	8.3
Sun Oct 20/Mon Oct 21	0 16	20 04	21 21	5 35	6 51	21 36	5 51	21 38	.....	95	3 26.9	17 48	8.2
Mon Oct 21/Tue Oct 22	0 20	20 05	21 22	5 33	6 50	21 41	5 54	22 32	.....	90	4 19.2	19 21	8.2
Tue Oct 22/Wed Oct 23	0 24	20 06	21 23	5 32	6 49	21 46	5 56	23 23	.....	83	5 11.0	20 00	8.2
Wed Oct 23/Thu Oct 24	0 27	20 06	21 24	5 31	6 48	21 51	5 59	0 11	.....	75	6 02.0	19 44	8.1
Thu Oct 24/Fri Oct 25	0 31	20 07	21 25	5 30	6 47	21 56	6 02	0 56	.....	67	6 52.0	18 36	8.1
Fri Oct 25/Sat Oct 26	0 35	20 08	21 26	5 28	6 46	22 01	6 05	1 37	.....	58	7 40.8	16 43	8.0
Sat Oct 26/Sun Oct 27	0 39	20 09	21 27	5 27	6 45	22 06	6 07	2 16	.....	48	8 28.5	14 09	8.0
Sun Oct 27/Mon Oct 28	0 43	20 09	21 28	5 26	6 44	22 10	6 10	2 52	.....	39	9 15.4	11 00	8.0
Mon Oct 28/Tue Oct 29	0 47	20 10	21 29	5 25	6 43	22 15	6 13	3 27	.....	30	10 02.1	7 23	7.9
Tue Oct 29/Wed Oct 30	0 51	20 11	21 30	5 24	6 43	22 20	6 16	4 02	.....	21	10 48.9	3 24	7.9
Wed Oct 30/Thu Oct 31	0 55	20 12	21 31	5 23	6 42	22 25	6 19	4 38	.....	13	11 36.7	- 0 48	7.9
Thu Oct 31/Fri Nov 01	0 59	20 13	21 32	5 22	6 41	22 30	6 21	5 15	17 31	7	12 26.0	- 5 04	7.8

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 NOVEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Fri Nov 01/Sat Nov 02	1 03	20 13	21 33	5 21	6 40	22 35	6 24	5 55	18 31	3	13 17.4	- 9 11	7.8
Sat Nov 02/Sun Nov 03	1 07	20 14	21 34	5 19	6 39	22 40	6 27	6 39	19 33	0	14 11.5	-12 53	7.8
Sun Nov 03/Mon Nov 04	1 11	20 15	21 35	5 18	6 38	22 45	6 30	.....	20 37	0	15 08.4	-15 55	7.7
Mon Nov 04/Tue Nov 05	1 15	20 16	21 36	5 17	6 38	22 50	6 33	.....	21 41	3	16 07.7	-17 59	7.7
Tue Nov 05/Wed Nov 06	1 19	20 17	21 37	5 16	6 37	22 55	6 36	.....	22 44	9	17 08.7	-18 53	7.7
Wed Nov 06/Thu Nov 07	1 23	20 17	21 38	5 15	6 36	23 00	6 39	.....	23 43	16	18 10.0	-18 29	7.6
Thu Nov 07/Fri Nov 08	1 27	20 18	21 39	5 14	6 35	23 05	6 42	.....	0 37	26	19 10.4	-16 51	7.6
Fri Nov 08/Sat Nov 09	1 31	20 19	21 40	5 13	6 35	23 11	6 45	.....	1 26	37	20 09.0	-14 07	7.6
Sat Nov 09/Sun Nov 10	1 34	20 20	21 41	5 13	6 34	23 16	6 48	.....	2 10	48	21 05.4	-10 33	7.5
Sun Nov 10/Mon Nov 11	1 38	20 21	21 43	5 12	6 33	23 21	6 51	.....	2 51	59	21 59.5	- 6 23	7.5
Mon Nov 11/Tue Nov 12	1 42	20 22	21 44	5 11	6 33	23 26	6 54	.....	3 29	70	22 52.0	- 1 55	7.5
Tue Nov 12/Wed Nov 13	1 46	20 23	21 45	5 10	6 32	23 31	6 57	.....	4 06	80	23 43.4	2 37	7.4
Wed Nov 13/Thu Nov 14	1 50	20 23	21 46	5 09	6 32	23 36	7 00	.....	4 44	88	0 34.3	7 00	7.4
Thu Nov 14/Fri Nov 15	1 54	20 24	21 47	5 08	6 31	23 41	7 03	17 34	5 22	94	1 25.3	11 00	7.4
Fri Nov 15/Sat Nov 16	1 58	20 25	21 48	5 08	6 31	23 46	7 07	18 32	6 02	98	2 16.7	14 27	7.3
Sat Nov 16/Sun Nov 17	2 02	20 26	21 49	5 07	6 30	23 51	7 10	19 28	.....	100	3 08.6	17 10	7.3
Sun Nov 17/Mon Nov 18	2 06	20 27	21 50	5 06	6 30	23 56	7 13	20 23	.....	100	4 00.9	19 03	7.3
Mon Nov 18/Tue Nov 19	2 10	20 28	21 52	5 05	6 29	0 01	7 16	21 15	.....	98	4 53.1	20 01	7.2
Tue Nov 19/Wed Nov 20	2 14	20 29	21 53	5 05	6 29	0 06	7 19	22 05	.....	94	5 44.9	20 03	7.2
Wed Nov 20/Thu Nov 21	2 18	20 29	21 54	5 04	6 28	0 11	7 23	22 51	.....	88	6 35.7	19 12	7.2
Thu Nov 21/Fri Nov 22	2 22	20 30	21 55	5 03	6 28	0 16	7 26	23 34	.....	82	7 25.2	17 33	7.1
Fri Nov 22/Sat Nov 23	2 26	20 31	21 56	5 03	6 28	0 21	7 29	0 13	.....	74	8 13.5	15 11	7.1
Sat Nov 23/Sun Nov 24	2 30	20 32	21 57	5 02	6 28	0 27	7 33	0 50	.....	65	9 00.5	12 14	7.1
Sun Nov 24/Mon Nov 25	2 34	20 33	21 58	5 02	6 27	0 32	7 36	1 25	.....	56	9 46.8	8 47	7.1
Mon Nov 25/Tue Nov 26	2 38	20 34	21 59	5 01	6 27	0 37	7 40	1 59	.....	47	10 32.9	4 58	7.0
Tue Nov 26/Wed Nov 27	2 42	20 35	22 00	5 01	6 27	0 42	7 43	2 34	.....	37	11 19.5	0 53	7.0
Wed Nov 27/Thu Nov 28	2 45	20 35	22 02	5 01	6 27	0 47	7 47	3 09	.....	27	12 07.2	- 3 18	7.0
Thu Nov 28/Fri Nov 29	2 49	20 36	22 03	5 00	6 27	0 52	7 50	3 47	.....	19	12 56.9	- 7 26	7.0
Fri Nov 29/Sat Nov 30	2 53	20 37	22 04	5 00	6 26	0 57	7 54	4 28	.....	11	13 49.2	-11 19	6.9
Sat Nov 30/Sun Dec 01	2 57	20 38	22 05	5 00	6 26	1 02	7 58	5 14	18 16	5	14 44.7	-14 39	6.9

***** 2013 DECEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sun Dec 01/Mon Dec 02	3 01	20 39	22 06	4 59	6 26	1 07	8 01	6 06	19 21	1	15 43.4	-17 11	6.9
Mon Dec 02/Tue Dec 03	3 05	20 40	22 07	4 59	6 26	1 12	8 05	.....	20 26	0	16 44.7	-18 36	6.9
Tue Dec 03/Wed Dec 04	3 09	20 40	22 08	4 59	6 26	1 16	8 09	.....	21 29	2	17 47.5	-18 44	6.9
Wed Dec 04/Thu Dec 05	3 13	20 41	22 09	4 59	6 26	1 21	8 13	.....	22 27	6	18 50.1	-17 31	6.8
Thu Dec 05/Fri Dec 06	3 17	20 42	22 10	4 59	6 26	1 26	8 17	.....	23 20	13	19 51.1	-15 04	6.8
Fri Dec 06/Sat Dec 07	3 21	20 43	22 11	4 59	6 26	1 31	8 20	.....	0 08	23	20 49.7	-11 38	6.8
Sat Dec 07/Sun Dec 08	3 25	20 43	22 11	4 59	6 27	1 36	8 24	.....	0 51	33	21 45.6	- 7 32	6.8
Sun Dec 08/Mon Dec 09	3 29	20 44	22 12	4 59	6 27	1 41	8 28	.....	1 30	44	22 39.1	- 3 05	6.8
Mon Dec 09/Tue Dec 10	3 33	20 45	22 13	4 59	6 27	1 46	8 32	.....	2 08	55	23 30.9	1 29	6.8
Tue Dec 10/Wed Dec 11	3 37	20 46	22 14	4 59	6 27	1 50	8 36	.....	2 45	65	0 21.6	5 54	6.7
Wed Dec 11/Thu Dec 12	3 41	20 46	22 15	4 59	6 27	1 55	8 40	.....	3 23	75	1 12.0	9 59	6.7
Thu Dec 12/Fri Dec 13	3 45	20 47	22 16	4 59	6 28	2 00	8 44	.....	4 02	83	2 02.5	13 34	6.7
Fri Dec 13/Sat Dec 14	3 49	20 48	22 16	4 59	6 28	2 05	8 49	.....	4 43	90	2 53.5	16 29	6.7
Sat Dec 14/Sun Dec 15	3 52	20 48	22 17	4 59	6 28	2 09	8 53	18 17	5 26	95	3 45.1	18 37	6.7
Sun Dec 15/Mon Dec 16	3 56	20 49	22 18	5 00	6 29	2 14	8 57	19 10	6 12	99	4 37.0	19 53	6.7
Mon Dec 16/Tue Dec 17	4 00	20 50	22 18	5 00	6 29	2 19	9 01	20 00	.....	100	5 28.9	20 15	6.7
Tue Dec 17/Wed Dec 18	4 04	20 50	22 19	5 00	6 29	2 23	9 06	20 47	.....	99	6 20.2	19 42	6.7
Wed Dec 18/Thu Dec 19	4 08	20 51	22 20	5 01	6 30	2 28	9 10	21 31	.....	97	7 10.4	18 18	6.7
Thu Dec 19/Fri Dec 20	4 12	20 51	22 20	5 01	6 30	2 32	9 14	22 12	.....	93	7 59.4	16 09	6.7
Fri Dec 20/Sat Dec 21	4 16	20 52	22 21	5 02	6 31	2 37	9 19	22 50	.....	88	8 47.1	13 21	6.7
Sat Dec 21/Sun Dec 22	4 20	20 52	22 21	5 02	6 31	2 41	9 23	23 25	.....	81	9 33.7	10 03	6.7
Sun Dec 22/Mon Dec 23	4 24	20 53	22 22	5 03	6 32	2 46	9 28	23 59	.....	73	10 19.6	6 21	6.7
Mon Dec 23/Tue Dec 24	4 28	20 53	22 22	5 03	6 32	2 50	9 32	0 33	.....	64	11 05.4	2 23	6.7
Tue Dec 24/Wed Dec 25	4 32	20 54	22 23	5 04	6 33	2 54	9 37	1 07	.....	54	11 51.8	- 1 42	6.7
Wed Dec 25/Thu Dec 26	4 36	20 54	22 23	5 05	6 33	2 59	9 41	1 42	.....	44	12 39.6	- 5 47	6.7
Thu Dec 26/Fri Dec 27	4 40	20 54	22 23	5 05	6 34	3 03	9 46	2 20	.....	34	13 29.5	- 9 42	6.7
Fri Dec 27/Sat Dec 28	4 44	20 55	22 24	5 06	6 35	3 07	9 51	3 02	.....	24	14 22.2	-13 12	6.7
Sat Dec 28/Sun Dec 29	4 48	20 55	22 24	5 07	6 35	3 11	9 55	3 50	.....	15	15 18.2	-16 04	6.7
Sun Dec 29/Mon Dec 30	4 52	20 55	22 24	5 07	6 36	3 15	10 00	4 44	18 02	8	16 17.6	-18 01	6.7
Mon Dec 30/Tue Dec 31	4 56	20 56	22 24	5 08	6 37	3 20	10 05	5 44	19 06	3	17 19.5	-18 46	6.7
Tue Dec 31/Wed Jan 01	5 00	20 56	22 24	5 09	6 37	3 24	10 09	.....	20 08	0	18 22.7	-18 12	6.7