

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:

***** 2015 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 -0.0 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 2015, 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 21	22 36	Dec 28	15 33	Jan 05	1 54	Jan 13	6 49
Jan 20	10 15	Jan 27	1 50	Feb 03	20 10	Feb 12	0 52
Feb 18	20 49	Feb 25	14 15	Mar 05	15 07	Mar 13	13 49
Mar 20	5 39	Mar 27	3 44	Apr 04	8 07	Apr 11	23 45
Apr 18	14 59	Apr 25	19 57	May 03	23 45	May 11	6 37
May 18	0 16	May 25	13 21	Jun 02	12 22	Jun 09	11 43
Jun 16	10 08	Jun 24	7 04	Jul 01	22 22	Jul 08	16 26
Jul 15	21 26	Jul 24	0 05	Jul 31	6 46	Aug 06	22 06
Aug 14	10 55	Aug 22	15 32	Aug 29	14 38	Sep 05	5 57
Sep 13	2 43	Sep 21	5 00	Sep 27	22 52	Oct 04	17 08
Oct 12	21 07	Oct 20	17 32	Oct 27	9 06	Nov 03	9 26
Nov 11	14 48	Nov 19	3 28	Nov 25	19 45	Dec 03	4 42
Dec 11	7 30	Dec 18	12 15	Dec 25	8 12	Jan 02	2 32

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.

***** 2015 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	
Thu Jan 01/Fri Jan 02	5 02	20 56	22 24	5 10	6 38	3 27	10 13	17 35	4 48	90	4 15.9	18 06	6.8
Fri Jan 02/Sat Jan 03	5 06	20 56	22 25	5 11	6 39	3 31	10 18	18 30	5 38	96	5 10.7	19 11	6.8
Sat Jan 03/Sun Jan 04	5 10	20 57	22 25	5 11	6 39	3 35	10 23	19 22	6 29	99	6 05.0	19 17	6.8
Sun Jan 04/Mon Jan 05	5 14	20 57	22 25	5 12	6 40	3 39	10 28	20 11	.....	100	6 58.2	18 27	6.8
Mon Jan 05/Tue Jan 06	5 18	20 57	22 24	5 13	6 41	3 42	10 32	20 56	.....	99	7 49.8	16 46	6.8
Tue Jan 06/Wed Jan 07	5 22	20 57	22 24	5 14	6 42	3 46	10 37	21 37	.....	96	8 39.6	14 23	6.8
Wed Jan 07/Thu Jan 08	5 26	20 57	22 24	5 15	6 43	3 50	10 42	22 15	.....	92	9 27.6	11 27	6.9
Thu Jan 08/Fri Jan 09	5 30	20 57	22 24	5 16	6 43	3 54	10 47	22 51	.....	86	10 14.1	8 07	6.9
Fri Jan 09/Sat Jan 10	5 34	20 57	22 24	5 17	6 44	3 58	10 52	23 24	.....	79	10 59.5	4 30	6.9
Sat Jan 10/Sun Jan 11	5 38	20 57	22 24	5 18	6 45	4 01	10 57	23 57	.....	71	11 44.5	0 46	6.9
Sun Jan 11/Mon Jan 12	5 42	20 57	22 23	5 19	6 46	4 05	11 02	0 31	.....	62	12 29.6	- 3 00	6.9
Mon Jan 12/Tue Jan 13	5 46	20 57	22 23	5 21	6 47	4 09	11 07	1 05	.....	52	13 15.5	- 6 39	7.0
Tue Jan 13/Wed Jan 14	5 50	20 57	22 23	5 22	6 48	4 12	11 12	1 41	.....	43	14 03.0	-10 03	7.0
Wed Jan 14/Thu Jan 15	5 54	20 57	22 22	5 23	6 49	4 16	11 17	2 21	.....	33	14 52.7	-13 04	7.0
Thu Jan 15/Fri Jan 16	5 58	20 56	22 22	5 24	6 49	4 19	11 22	3 06	.....	24	15 45.0	-15 30	7.0
Fri Jan 16/Sat Jan 17	6 02	20 56	22 22	5 25	6 50	4 23	11 27	3 56	.....	15	16 40.1	-17 09	7.1
Sat Jan 17/Sun Jan 18	6 06	20 56	22 21	5 26	6 51	4 26	11 33	4 51	18 10	8	17 37.8	-17 50	7.1
Sun Jan 18/Mon Jan 19	6 10	20 56	22 21	5 27	6 52	4 30	11 38	5 52	19 08	3	18 37.3	-17 24	7.1
Mon Jan 19/Tue Jan 20	6 13	20 55	22 20	5 28	6 53	4 33	11 43	.....	20 03	1	19 37.7	-15 46	7.1
Tue Jan 20/Wed Jan 21	6 17	20 55	22 20	5 30	6 54	4 37	11 48	.....	20 55	1	20 37.9	-13 02	7.2
Wed Jan 21/Thu Jan 22	6 21	20 55	22 19	5 31	6 55	4 40	11 53	.....	21 44	4	21 36.9	- 9 23	7.2
Thu Jan 22/Fri Jan 23	6 25	20 54	22 18	5 32	6 56	4 43	11 58	.....	22 29	9	22 34.5	- 5 06	7.2
Fri Jan 23/Sat Jan 24	6 29	20 54	22 18	5 33	6 57	4 47	12 03	.....	23 12	17	23 30.6	- 0 31	7.3
Sat Jan 24/Sun Jan 25	6 33	20 54	22 17	5 34	6 58	4 50	12 08	.....	23 54	27	0 25.6	4 03	7.3
Sun Jan 25/Mon Jan 26	6 37	20 53	22 16	5 35	6 59	4 53	12 13	.....	0 35	38	1 19.9	8 21	7.3
Mon Jan 26/Tue Jan 27	6 41	20 53	22 16	5 37	6 59	4 56	12 19	.....	1 17	49	2 13.9	12 07	7.3
Tue Jan 27/Wed Jan 28	6 45	20 52	22 15	5 38	7 00	4 59	12 24	.....	2 01	59	3 08.0	15 12	7.4
Wed Jan 28/Thu Jan 29	6 49	20 52	22 14	5 39	7 01	5 03	12 29	.....	2 47	70	4 02.2	17 27	7.4
Thu Jan 29/Fri Jan 30	6 53	20 51	22 13	5 40	7 02	5 06	12 34	.....	3 35	79	4 56.3	18 48	7.4
Fri Jan 30/Sat Jan 31	6 57	20 50	22 12	5 41	7 03	5 09	12 39	.....	4 25	86	5 50.0	19 12	7.5
Sat Jan 31/Sun Feb 01	7 01	20 50	22 11	5 42	7 04	5 12	12 44	18 08	5 17	92	6 42.8	18 41	7.5

***** 2015 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	
Sun Feb 01/Mon Feb 02	7 05	20 49	22 11	5 44	7 05	5 15	12 49	18 53	6 09	97	7 34.5	17 18	7.5
Mon Feb 02/Tue Feb 03	7 09	20 49	22 10	5 45	7 06	5 18	12 54	19 35	.....	99	8 24.6	15 11	7.6
Tue Feb 03/Wed Feb 04	7 13	20 48	22 09	5 46	7 07	5 21	12 59	20 14	.....	100	9 13.2	12 27	7.6
Wed Feb 04/Thu Feb 05	7 17	20 47	22 08	5 47	7 07	5 24	13 04	20 51	.....	99	10 00.3	9 15	7.7
Thu Feb 05/Fri Feb 06	7 20	20 47	22 07	5 48	7 08	5 27	13 10	21 25	.....	96	10 46.4	5 43	7.7
Fri Feb 06/Sat Feb 07	7 24	20 46	22 06	5 49	7 09	5 30	13 15	21 59	.....	91	11 31.7	2 00	7.7
Sat Feb 07/Sun Feb 08	7 28	20 45	22 05	5 50	7 10	5 33	13 20	22 32	.....	85	12 16.9	- 1 45	7.8
Sun Feb 08/Mon Feb 09	7 32	20 44	22 04	5 51	7 11	5 36	13 25	23 05	.....	78	13 02.5	- 5 25	7.8
Mon Feb 09/Tue Feb 10	7 36	20 43	22 03	5 53	7 12	5 39	13 30	23 41	.....	69	13 49.2	- 8 53	7.8
Tue Feb 10/Wed Feb 11	7 40	20 43	22 02	5 54	7 13	5 41	13 35	0 18	.....	60	14 37.4	-11 59	7.9
Wed Feb 11/Thu Feb 12	7 44	20 42	22 01	5 55	7 14	5 44	13 40	0 59	.....	50	15 27.6	-14 35	7.9
Thu Feb 12/Fri Feb 13	7 48	20 41	21 59	5 56	7 14	5 47	13 45	1 45	.....	40	16 20.3	-16 29	7.9
Fri Feb 13/Sat Feb 14	7 52	20 40	21 58	5 57	7 15	5 50	13 50	2 36	.....	30	17 15.5	-17 33	8.0
Sat Feb 14/Sun Feb 15	7 56	20 39	21 57	5 58	7 16	5 53	13 55	3 33	.....	20	18 12.8	-17 37	8.0
Sun Feb 15/Mon Feb 16	8 00	20 38	21 56	5 59	7 17	5 56	14 00	4 34	17 46	12	19 11.7	-16 33	8.0
Mon Feb 16/Tue Feb 17	8 04	20 37	21 55	6 00	7 18	5 58	14 05	5 40	18 39	5	20 11.4	-14 22	8.1
Tue Feb 17/Wed Feb 18	8 08	20 36	21 54	6 01	7 18	6 01	14 10	6 48	19 29	1	21 10.9	-11 09	8.1
Wed Feb 18/Thu Feb 19	8 12	20 35	21 53	6 02	7 19	6 04	14 15	.....	20 17	0	22 09.7	- 7 08	8.2
Thu Feb 19/Fri Feb 20	8 16	20 34	21 51	6 03	7 20	6 07	14 20	.....	21 02	2	23 07.6	- 2 36	8.2
Fri Feb 20/Sat Feb 21	8 20	20 33	21 50	6 04	7 21	6 09	14 25	.....	21 46	7	0 04.6	2 06	8.2
Sat Feb 21/Sun Feb 22	8 24	20 32	21 49	6 05	7 22	6 12	14 30	.....	22 30	14	1 00.8	6 38	8.3
Sun Feb 22/Mon Feb 23	8 28	20 31	21 48	6 06	7 22	6 15	14 35	.....	23 13	23	1 56.6	10 42	8.3
Mon Feb 23/Tue Feb 24	8 31	20 30	21 46	6 07	7 23	6 18	14 39	.....	23 58	33	2 52.0	14 06	8.3
Tue Feb 24/Wed Feb 25	8 35	20 29	21 45	6 08	7 24	6 20	14 44	.....	0 45	43	3 47.2	16 39	8.4
Wed Feb 25/Thu Feb 26	8 39	20 28	21 44	6 09	7 25	6 23	14 49	.....	1 33	54	4 41.9	18 16	8.4
Thu Feb 26/Fri Feb 27	8 43	20 27	21 43	6 10	7 25	6 26	14 54	.....	2 23	64	5 35.9	18 56	8.5
Fri Feb 27/Sat Feb 28	8 47	20 26	21 41	6 11	7 26	6 28	14 59	.....	3 14	73	6 28.9	18 41	8.5
Sat Feb 28/Sun Mar 01	8 51	20 25	21 40	6 12	7 27	6 31	15 04	.....	4 06	81	7 20.6	17 34	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.

***** 2015 MARCH *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Sun Mar 01/Mon Mar 02	8 55	20 24	21 39	6 12	7 28	6 34	15 09	17 35	4 58	88	8 10.8	15 41	8.6	
Mon Mar 02/Tue Mar 03	8 59	20 23	21 38	6 13	7 28	6 36	15 13	18 14	5 50	94	8 59.5	13 09	8.6	
Tue Mar 03/Wed Mar 04	9 03	20 22	21 36	6 14	7 29	6 39	15 18	18 51	6 42	98	9 47.0	10 07	8.6	
Wed Mar 04/Thu Mar 05	9 07	20 21	21 35	6 15	7 30	6 42	15 23	19 27	.....	100	10 33.4	6 41	8.7
Thu Mar 05/Fri Mar 06	9 11	20 19	21 34	6 16	7 30	6 44	15 28	20 00	.....	100	11 19.1	3 02	8.7
Fri Mar 06/Sat Mar 07	9 15	20 18	21 32	6 17	7 31	6 47	15 33	20 34	.....	98	12 04.7	- 0 44	8.7
Sat Mar 07/Sun Mar 08*	9 19	20 17	21 31	5 18	6 32	6 50	15 37	21 07	.....	95	12 50.5	- 4 27	8.8
Sun Mar 08/Mon Mar 09	10 23	19 16	20 30	5 18	6 32	6 52	15 42	20 42	.....	90	13 38.6	- 8 08	8.8
Mon Mar 09/Tue Mar 10	10 27	19 15	20 29	5 19	6 33	6 55	15 47	21 18	.....	83	14 26.7	-11 20	8.8
Tue Mar 10/Wed Mar 11	10 31	19 14	20 27	5 20	6 34	6 57	15 52	21 58	.....	75	15 16.4	-14 03	8.9
Wed Mar 11/Thu Mar 12	10 35	19 12	20 26	5 21	6 34	7 00	15 56	22 41	.....	66	16 08.0	-16 07	8.9
Thu Mar 12/Fri Mar 13	10 39	19 11	20 25	5 21	6 35	7 03	16 01	23 28	.....	55	17 01.6	-17 23	8.9
Fri Mar 13/Sat Mar 14	10 43	19 10	20 23	5 22	6 36	7 05	16 06	0 21	.....	45	17 57.0	-17 43	9.0
Sat Mar 14/Sun Mar 15	10 47	19 09	20 22	5 23	6 36	7 08	16 10	1 18	.....	34	18 53.9	-17 02	9.0
Sun Mar 15/Mon Mar 16	10 50	19 08	20 21	5 24	6 37	7 11	16 15	2 20	.....	24	19 51.7	-15 17	9.0
Mon Mar 16/Tue Mar 17	10 54	19 06	20 20	5 24	6 38	7 13	16 20	3 25	.....	15	20 49.7	-12 30	9.1
Tue Mar 17/Wed Mar 18	10 58	19 05	20 18	5 25	6 38	7 16	16 24	4 32	17 04	7	21 47.6	- 8 52	9.1	
Wed Mar 18/Thu Mar 19	11 02	19 04	20 17	5 26	6 39	7 19	16 29	5 40	17 50	2	22 45.2	- 4 34	9.1	
Thu Mar 19/Fri Mar 20	11 06	19 03	20 16	5 27	6 40	7 21	16 34	6 48	18 34	0	23 42.4	0 04	9.2	
Fri Mar 20/Sat Mar 21	11 10	19 02	20 14	5 27	6 40	7 24	16 38	.....	19 18	1	0 39.4	4 43	9.2
Sat Mar 21/Sun Mar 22	11 14	19 00	20 13	5 28	6 41	7 27	16 43	.....	20 03	4	1 36.2	9 02	9.2
Sun Mar 22/Mon Mar 23	11 18	18 59	20 12	5 29	6 41	7 29	16 48	.....	20 49	10	2 33.0	12 46	9.3
Mon Mar 23/Tue Mar 24	11 22	18 58	20 11	5 29	6 42	7 32	16 52	.....	21 36	18	3 29.6	15 40	9.3
Tue Mar 24/Wed Mar 25	11 26	18 57	20 09	5 30	6 43	7 35	16 57	.....	22 25	28	4 25.8	17 38	9.3
Wed Mar 25/Thu Mar 26	11 30	18 55	20 08	5 31	6 43	7 37	17 01	.....	23 16	38	5 21.0	18 35	9.4
Thu Mar 26/Fri Mar 27	11 34	18 54	20 07	5 31	6 44	7 40	17 06	.....	0 08	48	6 15.0	18 35	9.4
Fri Mar 27/Sat Mar 28	11 38	18 53	20 06	5 32	6 44	7 43	17 11	.....	1 00	58	7 07.3	17 41	9.4
Sat Mar 28/Sun Mar 29	11 42	18 52	20 04	5 32	6 45	7 45	17 15	.....	1 53	67	7 58.0	16 00	9.5
Sun Mar 29/Mon Mar 30	11 46	18 51	20 03	5 33	6 46	7 48	17 20	.....	2 45	76	8 46.9	13 38	9.5
Mon Mar 30/Tue Mar 31	11 50	18 49	20 02	5 34	6 46	7 51	17 24	.....	3 37	84	9 34.5	10 45	9.5
Tue Mar 31/Wed Apr 01	11 54	18 48	20 01	5 34	6 47	7 54	17 29	.....	4 28	90	10 20.9	7 26	9.6

***** 2015 APRIL *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Wed Apr 01/Thu Apr 02	11 57	18 47	19 59	5 35	6 47	7 56	17 33	17 02	5 20	95	11 06.8	3 50	9.6	
Thu Apr 02/Fri Apr 03	12 01	18 46	19 58	5 36	6 48	7 59	17 38	17 35	6 12	98	11 52.5	0 05	9.6	
Fri Apr 03/Sat Apr 04	12 05	18 45	19 57	5 36	6 49	8 02	17 42	18 09	7 04	100	12 38.6	- 3 40	9.7	
Sat Apr 04/Sun Apr 05	12 09	18 43	19 56	5 37	6 49	8 05	17 47	18 43	.....	100	13 25.5	- 7 18	9.7
Sun Apr 05/Mon Apr 06	12 13	18 42	19 55	5 37	6 50	8 07	17 51	19 19	.....	97	14 13.7	-10 38	9.7
Mon Apr 06/Tue Apr 07	12 17	18 41	19 54	5 38	6 50	8 10	17 56	19 58	.....	93	15 03.5	-13 31	9.7
Tue Apr 07/Wed Apr 08	12 21	18 40	19 52	5 38	6 51	8 13	18 01	20 40	.....	87	15 55.1	-15 47	9.8
Wed Apr 08/Thu Apr 09	12 25	18 39	19 51	5 39	6 52	8 16	18 05	21 26	.....	79	16 48.4	-17 16	9.8
Thu Apr 09/Fri Apr 10	12 29	18 38	19 50	5 40	6 52	8 19	18 10	22 16	.....	70	17 43.1	-17 50	9.8
Fri Apr 10/Sat Apr 11	12 33	18 37	19 49	5 40	6 53	8 21	18 14	23 11	.....	60	18 39.0	-17 26	9.9
Sat Apr 11/Sun Apr 12	12 37	18 35	19 48	5 41	6 53	8 24	18 19	0 09	.....	49	19 35.3	-16 00	9.9
Sun Apr 12/Mon Apr 13	12 41	18 34	19 47	5 41	6 54	8 27	18 23	1 10	.....	38	20 31.8	-13 36	9.9
Mon Apr 13/Tue Apr 14	12 45	18 33	19 46	5 42	6 55	8 30	18 28	2 14	.....	27	21 28.0	-10 19	9.9
Tue Apr 14/Wed Apr 15	12 49	18 32	19 45	5 42	6 55	8 33	18 32	3 19	.....	18	22 24.0	- 6 21	10.0
Wed Apr 15/Thu Apr 16	12 53	18 31	19 44	5 43	6 56	8 36	18 37	4 26	16 24	10	23 19.8	- 1 56	10.0	
Thu Apr 16/Fri Apr 17	12 57	18 30	19 43	5 43	6 56	8 39	18 41	5 32	17 07	4	0 15.7	2 40	10.0	
Fri Apr 17/Sat Apr 18	13 01	18 29	19 42	5 44	6 57	8 42	18 46	6 39	17 51	1	1 12.0	7 08	10.0	
Sat Apr 18/Sun Apr 19	13 05	18 28	19 41	5 45	6 58	8 45	18 50	7 45	18 36	0	2 08.8	11 09	10.1	
Sun Apr 19/Mon Apr 20	13 08	18 27	19 40	5 45	6 58	8 48	18 55	.....	19 23	3	3 06.1	14 28	10.1
Mon Apr 20/Tue Apr 21	13 12	18 26	19 39	5 46	6 59	8 51	18 59	.....	20 12	7	4 03.4	16 52	10.1
Tue Apr 21/Wed Apr 22	13 16	18 25	19 38	5 46	7 00	8 54	19 03	.....	21 04	14	5 00.2	18 15	10.1
Wed Apr 22/Thu Apr 23	13 20	18 24	19 37	5 47	7 00	8 57	19 08	.....	21 57	22	5 55.8	18 37	10.2
Thu Apr 23/Fri Apr 24	13 24	18 23	19 36	5 47	7 01	9 00	19 12	.....	22 51	31	6 49.8	18 01	10.2
Fri Apr 24/Sat Apr 25	13 28	18 22	19 35	5 48	7 01	9 03	19 17	.....	23 45	41	7 41.7	16 34	10.2
Sat Apr 25/Sun Apr 26	13 32	18 21	19 34	5 48	7 02	9 06	19 21	.....	0 38	51	8 31.7	14 23	10.2
Sun Apr 26/Mon Apr 27	13 36	18 20	19 33	5 49	7 03	9 09	19 26	.....	1 30	60	9 19.8	11 38	10.3
Mon Apr 27/Tue Apr 28	13 40	18 19	19 33	5 49	7 03	9 12	19 30	.....	2 22	70	10 06.6	8 26	10.3
Tue Apr 28/Wed Apr 29	13 44	18 18	19 32	5 50	7 04	9 15	19 35	.....	3 14	78	10 52.4	4 55	10.3
Wed Apr 29/Thu Apr 30	13 48	18 17	19 31	5 50	7 04	9 18	19 39	.....	4 05	85	11 38.0	1 12	10.3
Thu Apr 30/Fri May 01	13 52	18 16	19 30	5 51	7 05	9 21	19 44	16 09	4 57	91	12 23.8	- 2 34	10.3	

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.

***** 2015 MAY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Fri May 01/Sat May 02	13 56	18 15	19 29	5 52	7 06	9 24	19 48	16 43	5 50	96	13 10.6	- 6 17	10.4
Sat May 02/Sun May 03	14 00	18 14	19 29	5 52	7 06	9 28	19 53	17 18	6 44	99	13 58.7	- 9 46	10.4
Sun May 03/Mon May 04	14 04	18 14	19 28	5 53	7 07	9 31	19 57	17 56	7 39	100	14 48.5	-12 51	10.4
Mon May 04/Tue May 05	14 08	18 13	19 27	5 53	7 08	9 34	20 02	18 38	.....	99	15 40.4	-15 22	10.4
Tue May 05/Wed May 06	14 12	18 12	19 26	5 54	7 08	9 37	20 06	19 23	.....	95	16 34.1	-17 08	10.5
Wed May 06/Thu May 07	14 15	18 11	19 26	5 54	7 09	9 41	20 11	20 12	.....	90	17 29.5	-17 59	10.5
Thu May 07/Fri May 08	14 19	18 11	19 25	5 55	7 09	9 44	20 15	21 06	.....	83	18 25.8	-17 50	10.5
Fri May 08/Sat May 09	14 23	18 10	19 25	5 55	7 10	9 47	20 20	22 03	.....	74	19 22.4	-16 39	10.5
Sat May 09/Sun May 10	14 27	18 09	19 24	5 56	7 11	9 50	20 24	23 03	.....	63	20 18.8	-14 28	10.5
Sun May 10/Mon May 11	14 31	18 08	19 23	5 56	7 11	9 54	20 28	0 05	.....	52	21 14.5	-11 25	10.5
Mon May 11/Tue May 12	14 35	18 08	19 23	5 57	7 12	9 57	20 33	1 08	.....	41	22 09.4	- 7 41	10.6
Tue May 12/Wed May 13	14 39	18 07	19 22	5 57	7 13	10 01	20 37	2 12	.....	30	23 03.8	- 3 27	10.6
Wed May 13/Thu May 14	14 43	18 06	19 22	5 58	7 13	10 04	20 42	3 16	.....	20	23 58.1	1 01	10.6
Thu May 14/Fri May 15	14 47	18 06	19 21	5 58	7 14	10 07	20 46	4 21	.....	12	0 52.8	5 28	10.6
Fri May 15/Sat May 16	14 51	18 05	19 21	5 59	7 14	10 11	20 51	5 26	16 27	5	1 48.0	9 37	10.6
Sat May 16/Sun May 17	14 55	18 05	19 20	5 59	7 15	10 14	20 55	6 30	17 12	1	2 44.2	13 11	10.7
Sun May 17/Mon May 18	14 59	18 04	19 20	6 00	7 16	10 18	21 00	7 33	18 00	0	3 41.0	15 59	10.7
Mon May 18/Tue May 19	15 03	18 04	19 19	6 00	7 16	10 21	21 04	.....	18 50	1	4 38.1	17 49	10.7
Tue May 19/Wed May 20	15 07	18 03	19 19	6 01	7 17	10 25	21 09	.....	19 43	5	5 34.6	18 36	10.7
Wed May 20/Thu May 21	15 11	18 03	19 19	6 01	7 17	10 28	21 13	.....	20 38	10	6 29.9	18 23	10.7
Thu May 21/Fri May 22	15 15	18 02	19 18	6 02	7 18	10 32	21 17	.....	21 33	17	7 23.3	17 14	10.7
Fri May 22/Sat May 23	15 19	18 02	19 18	6 02	7 19	10 36	21 22	.....	22 27	26	8 14.6	15 17	10.7
Sat May 23/Sun May 24	15 23	18 01	19 18	6 03	7 19	10 39	21 26	.....	23 21	35	9 03.9	12 42	10.8
Sun May 24/Mon May 25	15 26	18 01	19 17	6 03	7 20	10 43	21 31	.....	0 14	44	9 51.3	9 37	10.8
Mon May 25/Tue May 26	15 30	18 00	19 17	6 04	7 20	10 47	21 35	.....	1 06	53	10 37.4	6 11	10.8
Tue May 26/Wed May 27	15 34	18 00	19 17	6 04	7 21	10 50	21 40	.....	1 57	63	11 22.8	2 32	10.8
Wed May 27/Thu May 28	15 38	18 00	19 16	6 05	7 21	10 54	21 44	.....	2 49	72	12 08.2	- 1 14	10.8
Thu May 28/Fri May 29	15 42	17 59	19 16	6 05	7 22	10 58	21 48	.....	3 41	80	12 54.2	- 4 59	10.8
Fri May 29/Sat May 30	15 46	17 59	19 16	6 06	7 23	11 01	21 53	.....	4 35	87	13 41.6	- 8 34	10.8
Sat May 30/Sun May 31	15 50	17 59	19 16	6 06	7 23	11 05	21 57	15 54	5 29	93	14 30.8	-11 51	10.8
Sun May 31/Mon Jun 01	15 54	17 59	19 16	6 06	7 24	11 09	22 02	16 33	6 26	97	15 22.2	-14 39	10.8

***** 2015 JUNE *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon Jun 01/Tue Jun 02	15 58	17 58	19 16	6 07	7 24	11 13	22 06	17 17	7 22	100	16 16.0	-16 44	10.9
Tue Jun 02/Wed Jun 03	16 02	17 58	19 15	6 07	7 25	11 17	22 10	18 06	.....	100	17 11.9	-17 58	10.9
Wed Jun 03/Thu Jun 04	16 06	17 58	19 15	6 08	7 25	11 20	22 15	18 59	.....	97	18 09.3	-18 10	10.9
Thu Jun 04/Fri Jun 05	16 10	17 58	19 15	6 08	7 26	11 24	22 19	19 56	.....	92	19 07.4	-17 17	10.9
Fri Jun 05/Sat Jun 06	16 14	17 58	19 15	6 09	7 26	11 28	22 23	20 57	.....	85	20 05.2	-15 20	10.9
Sat Jun 06/Sun Jun 07	16 18	17 58	19 15	6 09	7 26	11 32	22 28	21 59	.....	76	21 02.0	-12 27	10.9
Sun Jun 07/Mon Jun 08	16 22	17 58	19 15	6 09	7 27	11 36	22 32	23 02	.....	66	21 57.7	- 8 49	10.9
Mon Jun 08/Tue Jun 09	16 26	17 58	19 15	6 10	7 27	11 40	22 36	0 05	.....	55	22 52.2	- 4 41	10.9
Tue Jun 09/Wed Jun 10	16 30	17 58	19 15	6 10	7 28	11 44	22 41	1 08	.....	43	23 46.0	- 0 16	10.9
Wed Jun 10/Thu Jun 11	16 33	17 58	19 15	6 10	7 28	11 48	22 45	2 11	.....	32	0 39.6	4 09	10.9
Thu Jun 11/Fri Jun 12	16 37	17 58	19 15	6 11	7 29	11 52	22 49	3 14	.....	22	1 33.5	8 21	10.9
Fri Jun 12/Sat Jun 13	16 41	17 58	19 15	6 11	7 29	11 56	22 53	4 17	.....	14	2 28.0	12 04	10.9
Sat Jun 13/Sun Jun 14	16 45	17 58	19 15	6 11	7 29	12 00	22 58	5 19	15 53	7	3 23.4	15 05	10.9
Sun Jun 14/Mon Jun 15	16 49	17 58	19 16	6 12	7 30	12 04	23 02	6 19	16 41	3	4 19.3	17 15	10.9
Mon Jun 15/Tue Jun 16	16 53	17 58	19 16	6 12	7 30	12 08	23 06	7 16	17 32	0	5 15.4	18 26	10.9
Tue Jun 16/Wed Jun 17	16 57	17 58	19 16	6 12	7 30	12 12	23 10	8 10	18 25	1	6 10.9	18 36	10.9
Wed Jun 17/Thu Jun 18	17 01	17 58	19 16	6 13	7 30	12 16	23 15	.....	19 20	3	7 05.0	17 48	10.9
Thu Jun 18/Fri Jun 19	17 05	17 58	19 16	6 13	7 31	12 20	23 19	.....	20 15	7	7 57.3	16 09	10.9
Fri Jun 19/Sat Jun 20	17 09	17 58	19 16	6 13	7 31	12 24	23 23	.....	21 10	13	8 47.5	13 47	10.9
Sat Jun 20/Sun Jun 21	17 13	17 59	19 17	6 13	7 31	12 29	23 27	.....	22 04	20	9 35.7	10 52	10.9
Sun Jun 21/Mon Jun 22	17 17	17 59	19 17	6 14	7 31	12 33	23 31	.....	22 56	28	10 22.4	7 33	10.9
Mon Jun 22/Tue Jun 23	17 21	17 59	19 17	6 14	7 32	12 37	23 36	.....	23 48	37	11 07.9	3 58	10.9
Tue Jun 23/Wed Jun 24	17 25	17 59	19 17	6 14	7 32	12 41	23 40	.....	0 40	46	11 52.9	0 15	10.9
Wed Jun 24/Thu Jun 25	17 29	18 00	19 17	6 14	7 32	12 45	23 44	.....	1 32	56	12 38.2	- 3 30	10.9
Thu Jun 25/Fri Jun 26	17 33	18 00	19 18	6 14	7 32	12 50	23 48	.....	2 24	65	13 24.4	- 7 08	10.9
Fri Jun 26/Sat Jun 27	17 37	18 00	19 18	6 14	7 32	12 54	23 52	.....	3 18	74	14 12.2	-10 32	10.9
Sat Jun 27/Sun Jun 28	17 40	18 00	19 18	6 14	7 32	12 58	23 56	.....	4 13	83	15 02.2	-13 32	10.9
Sun Jun 28/Mon Jun 29	17 44	18 01	19 19	6 15	7 32	13 02	0 00	.....	5 09	90	15 54.8	-15 57	10.9
Mon Jun 29/Tue Jun 30	17 48	18 01	19 19	6 15	7 32	13 07	0 04	15 56	6 06	95	16 50.0	-17 35	10.9
Tue Jun 30/Wed Jul 01	17 52	18 01	19 19	6 15	7 32	13 11	0 08	16 48	7 02	99	17 47.5	-18 15	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.

***** 2015 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	
Wed Jul 01/Thu Jul 02	17 56	18 02	19 20	6 15	7 32	13 15	0 12	17 44	7 57	100	18 46.5	-17 48	10.9
Thu Jul 02/Fri Jul 03	18 00	18 02	19 20	6 15	7 32	13 19	0 16	18 45	.....	98	19 46.0	-16 14	10.9
Fri Jul 03/Sat Jul 04	18 04	18 03	19 20	6 15	7 32	13 24	0 20	19 48	.....	94	20 44.9	-13 36	10.9
Sat Jul 04/Sun Jul 05	18 08	18 03	19 21	6 15	7 32	13 28	0 24	20 53	.....	87	21 42.7	-10 05	10.9
Sun Jul 05/Mon Jul 06	18 12	18 04	19 21	6 15	7 32	13 32	0 28	21 57	.....	78	22 39.1	- 5 58	10.9
Mon Jul 06/Tue Jul 07	18 16	18 04	19 21	6 15	7 32	13 37	0 32	23 01	.....	68	23 34.2	- 1 31	10.9
Tue Jul 07/Wed Jul 08	18 20	18 04	19 22	6 15	7 32	13 41	0 36	0 05	.....	57	0 28.4	2 59	10.9
Wed Jul 08/Thu Jul 09	18 24	18 05	19 22	6 15	7 32	13 45	0 39	1 08	.....	46	1 22.3	7 15	10.9
Thu Jul 09/Fri Jul 10	18 28	18 05	19 23	6 14	7 32	13 50	0 43	2 10	.....	35	2 16.4	11 06	10.9
Fri Jul 10/Sat Jul 11	18 32	18 06	19 23	6 14	7 31	13 54	0 47	3 11	.....	25	3 10.8	14 17	10.9
Sat Jul 11/Sun Jul 12	18 36	18 06	19 23	6 14	7 31	13 58	0 51	4 10	.....	16	4 05.7	16 40	10.8
Sun Jul 12/Mon Jul 13	18 40	18 07	19 24	6 14	7 31	14 03	0 55	5 08	.....	9	5 00.8	18 07	10.8
Mon Jul 13/Tue Jul 14	18 44	18 07	19 24	6 14	7 31	14 07	0 58	6 02	16 17	4	5 55.6	18 37	10.8
Tue Jul 14/Wed Jul 15	18 48	18 08	19 25	6 14	7 30	14 11	1 02	6 52	17 11	1	6 49.5	18 08	10.8
Wed Jul 15/Thu Jul 16	18 51	18 08	19 25	6 13	7 30	14 16	1 06	7 38	18 05	0	7 41.9	16 47	10.8
Thu Jul 16/Fri Jul 17	18 55	18 09	19 26	6 13	7 30	14 20	1 10	.....	19 00	1	8 32.5	14 41	10.8
Fri Jul 17/Sat Jul 18	18 59	18 09	19 26	6 13	7 29	14 25	1 13	.....	19 54	4	9 21.3	11 57	10.8
Sat Jul 18/Sun Jul 19	19 03	18 10	19 26	6 12	7 29	14 29	1 17	.....	20 48	9	10 08.4	8 47	10.8
Sun Jul 19/Mon Jul 20	19 07	18 10	19 27	6 12	7 28	14 33	1 20	.....	21 40	15	10 54.2	5 18	10.8
Mon Jul 20/Tue Jul 21	19 11	18 11	19 27	6 12	7 28	14 38	1 24	.....	22 32	22	11 39.1	1 39	10.7
Tue Jul 21/Wed Jul 22	19 15	18 12	19 28	6 11	7 28	14 42	1 28	.....	23 23	31	12 23.9	- 2 03	10.7
Wed Jul 22/Thu Jul 23	19 19	18 12	19 28	6 11	7 27	14 47	1 31	.....	0 15	40	13 09.1	- 5 41	10.7
Thu Jul 23/Fri Jul 24	19 23	18 13	19 29	6 11	7 27	14 51	1 35	.....	1 07	49	13 55.5	- 9 07	10.7
Fri Jul 24/Sat Jul 25	19 27	18 13	19 29	6 10	7 26	14 55	1 38	.....	2 01	59	14 43.6	-12 14	10.7
Sat Jul 25/Sun Jul 26	19 31	18 14	19 30	6 10	7 25	15 00	1 42	.....	2 56	69	15 34.0	-14 52	10.7
Sun Jul 26/Mon Jul 27	19 35	18 14	19 30	6 09	7 25	15 04	1 45	.....	3 52	78	16 27.1	-16 49	10.7
Mon Jul 27/Tue Jul 28	19 39	18 15	19 31	6 09	7 24	15 09	1 49	.....	4 48	86	17 22.9	-17 56	10.6
Tue Jul 28/Wed Jul 29	19 43	18 16	19 31	6 08	7 24	15 13	1 52	.....	5 43	93	18 21.0	-18 02	10.6
Wed Jul 29/Thu Jul 30	19 47	18 16	19 31	6 08	7 23	15 17	1 55	16 28	6 36	98	19 20.7	-16 59	10.6
Thu Jul 30/Fri Jul 31	19 51	18 17	19 32	6 07	7 22	15 22	1 59	17 31	7 27	100	20 20.9	-14 47	10.6
Fri Jul 31/Sat Aug 01	19 55	18 17	19 32	6 07	7 22	15 26	2 02	18 36	.....	99	21 20.7	-11 34	10.6

***** 2015 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	
Sat Aug 01/Sun Aug 02	19 58	18 18	19 33	6 06	7 21	15 31	2 05	19 43	.....	95	22 19.5	- 7 34	10.6
Sun Aug 02/Mon Aug 03	20 02	18 18	19 33	6 05	7 20	15 35	2 09	20 49	.....	89	23 17.0	- 3 05	10.5
Mon Aug 03/Tue Aug 04	20 06	18 19	19 34	6 05	7 20	15 39	2 12	21 55	.....	81	0 13.4	1 34	10.5
Tue Aug 04/Wed Aug 05	20 10	18 20	19 34	6 04	7 19	15 44	2 15	22 59	.....	71	1 09.1	6 03	10.5
Wed Aug 05/Thu Aug 06	20 14	18 20	19 35	6 03	7 18	15 48	2 19	0 03	.....	59	2 04.3	10 06	10.5
Thu Aug 06/Fri Aug 07	20 18	18 21	19 35	6 03	7 17	15 53	2 22	1 05	.....	48	2 59.4	13 30	10.5
Fri Aug 07/Sat Aug 08	20 22	18 21	19 36	6 02	7 16	15 57	2 25	2 05	.....	37	3 54.5	16 06	10.4
Sat Aug 08/Sun Aug 09	20 26	18 22	19 36	6 01	7 15	16 02	2 28	3 03	.....	27	4 49.4	17 47	10.4
Sun Aug 09/Mon Aug 10	20 30	18 22	19 37	6 00	7 15	16 06	2 31	3 57	.....	19	5 43.8	18 30	10.4
Mon Aug 10/Tue Aug 11	20 34	18 23	19 37	6 00	7 14	16 10	2 35	4 48	.....	11	6 37.3	18 17	10.4
Tue Aug 11/Wed Aug 12	20 38	18 24	19 38	5 59	7 13	16 15	2 38	5 35	.....	6	7 29.5	17 11	10.4
Wed Aug 12/Thu Aug 13	20 42	18 24	19 38	5 58	7 12	16 19	2 41	6 18	16 53	2	8 20.1	15 18	10.3
Thu Aug 13/Fri Aug 14	20 46	18 25	19 39	5 57	7 11	16 24	2 44	6 57	17 47	0	9 09.0	12 47	10.3
Fri Aug 14/Sat Aug 15	20 50	18 25	19 39	5 56	7 10	16 28	2 47	7 34	18 41	0	9 56.2	9 46	10.3
Sat Aug 15/Sun Aug 16	20 54	18 26	19 40	5 55	7 09	16 33	2 50	.....	19 33	2	10 42.2	6 24	10.3
Sun Aug 16/Mon Aug 17	20 58	18 26	19 40	5 55	7 08	16 37	2 53	.....	20 25	6	11 27.2	2 50	10.2
Mon Aug 17/Tue Aug 18	21 02	18 27	19 41	5 54	7 07	16 41	2 56	.....	21 17	11	12 11.8	- 0 50	10.2
Tue Aug 18/Wed Aug 19	21 06	18 27	19 41	5 53	7 06	16 46	2 59	.....	22 08	17	12 56.5	- 4 27	10.2
Wed Aug 19/Thu Aug 20	21 09	18 28	19 41	5 52	7 05	16 50	3 02	.....	23 00	25	13 41.9	- 7 54	10.2
Thu Aug 20/Fri Aug 21	21 13	18 29	19 42	5 51	7 04	16 55	3 05	.....	23 52	33	14 28.5	-11 03	10.1
Fri Aug 21/Sat Aug 22	21 17	18 29	19 42	5 50	7 03	16 59	3 08	.....	0 45	43	15 16.9	-13 47	10.1
Sat Aug 22/Sun Aug 23	21 21	18 30	19 43	5 49	7 02	17 03	3 11	.....	1 39	53	16 07.6	-15 57	10.1
Sun Aug 23/Mon Aug 24	21 25	18 30	19 43	5 48	7 01	17 08	3 14	.....	2 34	63	17 00.7	-17 23	10.1
Mon Aug 24/Tue Aug 25	21 29	18 31	19 44	5 47	7 00	17 12	3 17	.....	3 28	73	17 56.3	-17 54	10.0
Tue Aug 25/Wed Aug 26	21 33	18 31	19 44	5 46	6 59	17 17	3 20	.....	4 22	82	18 54.0	-17 24	10.0
Wed Aug 26/Thu Aug 27	21 37	18 32	19 45	5 45	6 58	17 21	3 23	.....	5 13	90	19 53.2	-15 46	10.0
Thu Aug 27/Fri Aug 28	21 41	18 32	19 45	5 44	6 56	17 26	3 26	.....	6 03	96	20 53.0	-13 04	10.0
Fri Aug 28/Sat Aug 29	21 45	18 33	19 46	5 43	6 55	17 30	3 28	17 21	6 50	99	21 52.8	- 9 23	9.9
Sat Aug 29/Sun Aug 30	21 49	18 34	19 46	5 41	6 54	17 35	3 31	18 28	7 35	100	22 52.0	- 5 02	9.9
Sun Aug 30/Mon Aug 31	21 53	18 34	19 47	5 40	6 53	17 39	3 34	19 36	.....	97	23 50.7	- 0 18	9.9
Mon Aug 31/Tue Sep 01	21 57	18 35	19 47	5 39	6 52	17 43	3 37	20 44	.....	91	0 48.7	4 26	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.

***** 2015 SEPTEMBER *****

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
Tue Sep 01/Wed Sep 02	22 01	18 35	19 48	5 38	6 51	17 48	3 40	21 50	.....	83	1 46.3	8 48	9.8
Wed Sep 02/Thu Sep 03	22 05	18 36	19 48	5 37	6 50	17 52	3 43	22 55	.....	73	2 43.5	12 33	9.8
Thu Sep 03/Fri Sep 04	22 09	18 36	19 49	5 36	6 48	17 57	3 45	23 57	.....	63	3 40.4	15 28	9.8
Fri Sep 04/Sat Sep 05	22 13	18 37	19 49	5 35	6 47	18 01	3 48	0 57	.....	52	4 36.7	17 26	9.8
Sat Sep 05/Sun Sep 06	22 16	18 37	19 50	5 33	6 46	18 06	3 51	1 53	.....	41	5 32.1	18 23	9.7
Sun Sep 06/Mon Sep 07	22 20	18 38	19 50	5 32	6 45	18 10	3 54	2 45	.....	31	6 26.2	18 23	9.7
Mon Sep 07/Tue Sep 08	22 24	18 38	19 51	5 31	6 44	18 15	3 56	3 33	.....	22	7 18.8	17 28	9.7
Tue Sep 08/Wed Sep 09	22 28	18 39	19 51	5 30	6 42	18 19	3 59	4 17	.....	15	8 09.5	15 47	9.6
Wed Sep 09/Thu Sep 10	22 32	18 39	19 52	5 29	6 41	18 23	4 02	4 57	.....	9	8 58.4	13 25	9.6
Thu Sep 10/Fri Sep 11	22 36	18 40	19 52	5 27	6 40	18 28	4 04	5 34	16 36	4	9 45.8	10 33	9.6
Fri Sep 11/Sat Sep 12	22 40	18 40	19 53	5 26	6 39	18 32	4 07	6 10	17 28	1	10 31.8	7 17	9.6
Sat Sep 12/Sun Sep 13	22 44	18 41	19 54	5 25	6 37	18 37	4 10	6 44	18 20	0	11 16.8	3 47	9.5
Sun Sep 13/Mon Sep 14	22 48	18 42	19 54	5 24	6 36	18 41	4 13	7 17	19 12	1	12 01.3	0 10	9.5
Mon Sep 14/Tue Sep 15	22 52	18 42	19 55	5 22	6 35	18 46	4 15	.....	20 03	3	12 45.9	- 3 27	9.5
Tue Sep 15/Wed Sep 16	22 56	18 43	19 55	5 21	6 34	18 50	4 18	.....	20 55	7	13 30.9	- 6 55	9.4
Wed Sep 16/Thu Sep 17	23 00	18 43	19 56	5 20	6 32	18 55	4 21	.....	21 47	13	14 16.8	-10 08	9.4
Thu Sep 17/Fri Sep 18	23 04	18 44	19 56	5 19	6 31	18 59	4 23	.....	22 39	20	15 04.1	-12 57	9.4
Fri Sep 18/Sat Sep 19	23 08	18 44	19 57	5 17	6 30	19 04	4 26	.....	23 32	28	15 53.1	-15 14	9.3
Sat Sep 19/Sun Sep 20	23 12	18 45	19 58	5 16	6 29	19 09	4 28	.....	0 25	37	16 44.2	-16 51	9.3
Sun Sep 20/Mon Sep 21	23 16	18 45	19 58	5 15	6 27	19 13	4 31	.....	1 19	47	17 37.2	-17 40	9.3
Mon Sep 21/Tue Sep 22	23 20	18 46	19 59	5 13	6 26	19 18	4 34	.....	2 11	58	18 32.2	-17 33	9.2
Tue Sep 22/Wed Sep 23	23 24	18 46	19 59	5 12	6 25	19 22	4 36	.....	3 01	68	19 28.7	-16 25	9.2
Wed Sep 23/Thu Sep 24	23 27	18 47	20 00	5 11	6 24	19 27	4 39	.....	3 50	78	20 26.4	-14 14	9.2
Thu Sep 24/Fri Sep 25	23 31	18 47	20 01	5 09	6 22	19 31	4 42	.....	4 37	87	21 24.7	-11 04	9.1
Fri Sep 25/Sat Sep 26	23 35	18 48	20 01	5 08	6 21	19 36	4 44	.....	5 23	94	22 23.3	- 7 04	9.1
Sat Sep 26/Sun Sep 27	23 39	18 49	20 02	5 07	6 20	19 40	4 47	17 12	6 07	99	23 22.1	- 2 30	9.1
Sun Sep 27/Mon Sep 28	23 43	18 49	20 03	5 05	6 19	19 45	4 49	18 20	6 52	100	0 21.1	2 19	9.0
Mon Sep 28/Tue Sep 29	23 47	18 50	20 03	5 04	6 17	19 50	4 52	19 28	.....	98	1 20.2	7 00	9.0
Tue Sep 29/Wed Sep 30	23 51	18 50	20 04	5 03	6 16	19 54	4 55	20 36	.....	93	2 19.6	11 11	9.0
Wed Sep 30/Thu Oct 01	23 55	18 51	20 05	5 01	6 15	19 59	4 57	21 42	.....	86	3 18.9	14 35	8.9

***** 2015 OCTOBER *****

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
Thu Oct 01/Fri Oct 02	23 59	18 52	20 05	5 00	6 14	20 04	5 00	22 45	.....	77	4 17.8	16 59	8.9
Fri Oct 02/Sat Oct 03	0 03	18 52	20 06	4 59	6 12	20 08	5 02	23 45	.....	67	5 15.6	18 18	8.9
Sat Oct 03/Sun Oct 04	0 07	18 53	20 07	4 57	6 11	20 13	5 05	0 40	.....	57	6 11.9	18 35	8.8
Sun Oct 04/Mon Oct 05	0 11	18 53	20 07	4 56	6 10	20 18	5 08	1 30	.....	46	7 06.1	17 52	8.8
Mon Oct 05/Tue Oct 06	0 15	18 54	20 08	4 55	6 09	20 22	5 10	2 16	.....	36	7 58.1	16 20	8.8
Tue Oct 06/Wed Oct 07	0 19	18 55	20 09	4 53	6 08	20 27	5 13	2 57	.....	27	8 47.8	14 06	8.7
Wed Oct 07/Thu Oct 08	0 23	18 55	20 10	4 52	6 06	20 32	5 15	3 35	.....	19	9 35.6	11 19	8.7
Thu Oct 08/Fri Oct 09	0 27	18 56	20 10	4 51	6 05	20 36	5 18	4 11	.....	12	10 21.8	8 08	8.7
Fri Oct 09/Sat Oct 10	0 31	18 56	20 11	4 49	6 04	20 41	5 21	4 45	.....	7	11 07.0	4 41	8.6
Sat Oct 10/Sun Oct 11*	0 34	18 57	20 12	4 48	6 03	20 46	5 23	6 18	17 07	3	11 51.5	1 05	8.6
Sun Oct 11/Mon Oct 12	23 38	19 58	21 13	5 47	7 02	20 51	5 26	6 52	18 59	1	12 33.3	- 2 24	8.6
Mon Oct 12/Tue Oct 13	23 42	19 58	21 14	5 45	7 01	20 55	5 29	.....	19 50	0	13 18.2	- 5 56	8.5
Tue Oct 13/Wed Oct 14	23 46	19 59	21 14	5 44	6 59	21 00	5 31	.....	20 42	1	14 03.9	- 9 15	8.5
Wed Oct 14/Thu Oct 15	23 50	20 00	21 15	5 43	6 58	21 05	5 34	.....	21 35	4	14 50.9	-12 12	8.5
Thu Oct 15/Fri Oct 16	23 54	20 00	21 16	5 41	6 57	21 10	5 36	.....	22 28	8	15 39.4	-14 39	8.4
Fri Oct 16/Sat Oct 17	23 58	20 01	21 17	5 40	6 56	21 14	5 39	.....	23 21	15	16 29.6	-16 28	8.4
Sat Oct 17/Sun Oct 18	0 02	20 02	21 18	5 39	6 55	21 19	5 42	.....	0 14	22	17 21.5	-17 31	8.4
Sun Oct 18/Mon Oct 19	0 06	20 02	21 19	5 38	6 54	21 24	5 44	.....	1 05	31	18 14.8	-17 42	8.3
Mon Oct 19/Tue Oct 20	0 10	20 03	21 20	5 36	6 53	21 29	5 47	.....	1 55	42	19 09.4	-16 56	8.3
Tue Oct 20/Wed Oct 21	0 14	20 04	21 20	5 35	6 52	21 34	5 50	.....	2 43	52	20 04.8	-15 11	8.2
Wed Oct 21/Thu Oct 22	0 18	20 05	21 21	5 34	6 51	21 39	5 52	.....	3 29	63	21 00.8	-12 29	8.2
Thu Oct 22/Fri Oct 23	0 22	20 05	21 22	5 33	6 50	21 44	5 55	.....	4 13	74	21 57.1	- 8 57	8.2
Fri Oct 23/Sat Oct 24	0 26	20 06	21 23	5 31	6 49	21 48	5 58	.....	4 57	84	22 53.9	- 4 44	8.1
Sat Oct 24/Sun Oct 25	0 30	20 07	21 24	5 30	6 48	21 53	6 01	.....	5 40	92	23 51.3	- 0 05	8.1
Sun Oct 25/Mon Oct 26	0 33	20 07	21 25	5 29	6 47	21 58	6 03	18 03	6 24	97	0 49.5	4 40	8.1
Mon Oct 26/Tue Oct 27	0 37	20 08	21 26	5 28	6 46	22 03	6 06	19 11	.....	100	1 48.7	9 10	8.0
Tue Oct 27/Wed Oct 28	0 41	20 09	21 27	5 27	6 45	22 08	6 09	20 19	.....	99	2 48.8	13 04	8.0
Wed Oct 28/Thu Oct 29	0 45	20 10	21 28	5 25	6 44	22 13	6 12	21 25	.....	96	3 49.3	16 04	8.0
Thu Oct 29/Fri Oct 30	0 49	20 11	21 29	5 24	6 43	22 18	6 14	22 29	.....	90	4 49.6	17 59	7.9
Fri Oct 30/Sat Oct 31	0 53	20 11	21 30	5 23	6 42	22 23	6 17	23 28	.....	82	5 48.6	18 45	7.9
Sat Oct 31/Sun Nov 01	0 57	20 12	21 31	5 22	6 41	22 28	6 20	0 22	.....	73	6 45.6	18 25	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.

***** 2015 NOVEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Sun Nov 01/Mon Nov 02	1 01	20 13	21 32	5 21	6 40	22 33	6 23	1 11	.....	63	7 40.1	17 08	7.8
Mon Nov 02/Tue Nov 03	1 05	20 14	21 33	5 20	6 40	22 38	6 26	1 55	.....	53	8 31.8	15 04	7.8
Tue Nov 03/Wed Nov 04	1 09	20 15	21 34	5 19	6 39	22 43	6 29	2 35	.....	44	9 21.0	12 24	7.7
Wed Nov 04/Thu Nov 05	1 13	20 15	21 35	5 18	6 38	22 48	6 32	3 12	.....	34	10 08.1	9 17	7.7
Thu Nov 05/Fri Nov 06	1 17	20 16	21 37	5 17	6 37	22 53	6 35	3 46	.....	26	10 53.7	5 52	7.7
Fri Nov 06/Sat Nov 07	1 21	20 17	21 38	5 16	6 36	22 58	6 37	4 20	.....	18	11 38.4	2 17	7.6
Sat Nov 07/Sun Nov 08	1 25	20 18	21 39	5 15	6 36	23 03	6 40	4 53	.....	11	12 22.8	- 1 22	7.6
Sun Nov 08/Mon Nov 09	1 29	20 19	21 40	5 14	6 35	23 08	6 43	5 27	17 45	6	13 07.5	- 4 58	7.6	
Mon Nov 09/Tue Nov 10	1 33	20 20	21 41	5 13	6 34	23 13	6 46	6 02	18 37	3	13 53.0	- 8 22	7.5	
Tue Nov 10/Wed Nov 11	1 37	20 20	21 42	5 12	6 34	23 18	6 49	.....	19 30	1	14 39.7	-11 27	7.5
Wed Nov 11/Thu Nov 12	1 40	20 21	21 43	5 11	6 33	23 23	6 52	.....	20 23	0	15 28.1	-14 05	7.5
Thu Nov 12/Fri Nov 13	1 44	20 22	21 44	5 10	6 33	23 28	6 56	.....	21 17	2	16 18.2	-16 06	7.4
Fri Nov 13/Sat Nov 14	1 48	20 23	21 45	5 09	6 32	23 33	6 59	.....	22 11	5	17 09.9	-17 22	7.4
Sat Nov 14/Sun Nov 15	1 52	20 24	21 47	5 09	6 31	23 38	7 02	.....	23 03	11	18 02.9	-17 46	7.4
Sun Nov 15/Mon Nov 16	1 56	20 25	21 48	5 08	6 31	23 44	7 05	.....	23 54	18	18 56.9	-17 15	7.3
Mon Nov 16/Tue Nov 17	2 00	20 26	21 49	5 07	6 30	23 49	7 08	.....	0 42	27	19 51.4	-15 46	7.3
Tue Nov 17/Wed Nov 18	2 04	20 26	21 50	5 06	6 30	23 54	7 11	.....	1 27	37	20 46.0	-13 22	7.3
Wed Nov 18/Thu Nov 19	2 08	20 27	21 51	5 06	6 29	23 59	7 15	.....	2 11	48	21 40.5	-10 09	7.2
Thu Nov 19/Fri Nov 20	2 12	20 28	21 52	5 05	6 29	0 04	7 18	.....	2 53	59	22 35.1	- 6 16	7.2
Fri Nov 20/Sat Nov 21	2 16	20 29	21 53	5 04	6 29	0 09	7 21	.....	3 34	70	23 30.0	- 1 53	7.2
Sat Nov 21/Sun Nov 22	2 20	20 30	21 54	5 04	6 28	0 14	7 24	.....	4 16	80	0 25.6	2 43	7.2
Sun Nov 22/Mon Nov 23	2 24	20 31	21 56	5 03	6 28	0 19	7 28	.....	4 59	89	1 22.4	7 16	7.1
Mon Nov 23/Tue Nov 24	2 28	20 32	21 57	5 03	6 28	0 24	7 31	17 56	5 45	95	2 20.7	11 26	7.1	
Tue Nov 24/Wed Nov 25	2 32	20 32	21 58	5 02	6 27	0 29	7 35	19 02	.....	99	3 20.5	14 54	7.1
Wed Nov 25/Thu Nov 26	2 36	20 33	21 59	5 02	6 27	0 34	7 38	20 08	.....	100	4 21.1	17 25	7.0
Thu Nov 26/Fri Nov 27	2 40	20 34	22 00	5 01	6 27	0 39	7 42	21 10	.....	98	5 21.8	18 46	7.0
Fri Nov 27/Sat Nov 28	2 44	20 35	22 01	5 01	6 27	0 44	7 45	22 08	.....	93	6 21.3	18 58	7.0
Sat Nov 28/Sun Nov 29	2 47	20 36	22 02	5 00	6 27	0 49	7 49	23 01	.....	87	7 18.6	18 03	7.0
Sun Nov 29/Mon Nov 30	2 51	20 37	22 03	5 00	6 26	0 54	7 52	23 49	.....	79	8 13.2	16 14	6.9
Mon Nov 30/Tue Dec 01	2 55	20 38	22 04	5 00	6 26	0 59	7 56	0 32	.....	70	9 04.9	13 42	6.9

***** 2015 DECEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				RA	Dec	Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum				
Tue Dec 01/Wed Dec 02	2 59	20 38	22 05	4 59	6 26	1 04	8 00	1 11	.....	61	9 53.9	10 38	6.9
Wed Dec 02/Thu Dec 03	3 03	20 39	22 06	4 59	6 26	1 09	8 03	1 46	.....	51	10 40.8	7 13	6.9
Thu Dec 03/Fri Dec 04	3 07	20 40	22 07	4 59	6 26	1 14	8 07	2 20	.....	42	11 26.2	3 37	6.9
Fri Dec 04/Sat Dec 05	3 11	20 41	22 08	4 59	6 26	1 19	8 11	2 53	.....	33	12 10.8	- 0 05	6.8
Sat Dec 05/Sun Dec 06	3 15	20 42	22 09	4 59	6 26	1 24	8 15	3 27	.....	25	12 55.4	- 3 44	6.8
Sun Dec 06/Mon Dec 07	3 19	20 42	22 10	4 59	6 26	1 29	8 19	4 01	.....	17	13 40.5	- 7 14	6.8
Mon Dec 07/Tue Dec 08	3 23	20 43	22 11	4 59	6 27	1 34	8 22	4 37	.....	11	14 26.8	-10 27	6.8
Tue Dec 08/Wed Dec 09	3 27	20 44	22 12	4 59	6 27	1 39	8 26	5 16	18 15	6	15 14.7	-13 16	6.8	
Wed Dec 09/Thu Dec 10	3 31	20 45	22 13	4 59	6 27	1 43	8 30	5 59	19 09	2	16 04.5	-15 32	6.8	
Thu Dec 10/Fri Dec 11	3 35	20 45	22 14	4 59	6 27	1 48	8 34	.....	20 04	0	16 56.2	-17 04	6.8
Fri Dec 11/Sat Dec 12	3 39	20 46	22 14	4 59	6 27	1 53	8 38	.....	20 58	1	17 49.5	-17 46	6.7
Sat Dec 12/Sun Dec 13	3 43	20 47	22 15	4 59	6 27	1 58	8 42	.....	21 50	3	18 44.0	-17 31	6.7
Sun Dec 13/Mon Dec 14	3 47	20 47	22 16	4 59	6 28	2 02	8 47	.....	22 40	8	19 39.1	-16 17	6.7
Mon Dec 14/Tue Dec 15	3 51	20 48	22 17	4 59	6 28	2 07	8 51	.....	23 27	14	20 34.0	-14 07	6.7
Tue Dec 15/Wed Dec 16	3 55	20 49	22 17	5 00	6 28	2 12	8 55	.....	0 12	23	21 28.5	-11 06	6.7
Wed Dec 16/Thu Dec 17	3 58	20 49	22 18	5 00	6 29	2 16	8 59	.....	0 54	33	22 22.5	- 7 24	6.7
Thu Dec 17/Fri Dec 18	4 02	20 50	22 19	5 00	6 29	2 21	9 03	.....	1 34	44	23 16.2	- 3 13	6.7
Fri Dec 18/Sat Dec 19	4 06	20 50	22 19	5 01	6 30	2 25	9 08	.....	2 15	55	0 10.0	1 15	6.7
Sat Dec 19/Sun Dec 20	4 10	20 51	22 20	5 01	6 30	2 30	9 12	.....	2 56	66	1 04.5	5 43	6.7
Sun Dec 20/Mon Dec 21	4 14	20 52	22 21	5 01	6 30	2 35	9 17	.....	3 39	77	2 00.2	9 56	6.7
Mon Dec 21/Tue Dec 22	4 18	20 52	22 21	5 02	6 31	2 39	9 21	.....	4 25	86	2 57.4	13 37	6.7
Tue Dec 22/Wed Dec 23	4 22	20 53	22 22	5 03	6 31	2 43	9 25	17 50	5 14	93	3 56.0	16 30	6.7	
Wed Dec 23/Thu Dec 24	4 26	20 53	22 22	5 03	6 32	2 48	9 30	18 53	6 06	98	4 55.7	18 24	6.7	
Thu Dec 24/Fri Dec 25	4 30	20 53	22 22	5 04	6 33	2 52	9 34	19 52	.....	100	5 55.3	19 09	6.7
Fri Dec 25/Sat Dec 26	4 34	20 54	22 23	5 04	6 33	2 56	9 39	20 48	.....	99	6 54.0	18 46	6.7
Sat Dec 26/Sun Dec 27	4 38	20 54	22 23	5 05	6 34	3 01	9 44	21 39	.....	96	7 50.6	17 21	6.7
Sun Dec 27/Mon Dec 28	4 42	20 55	22 23	5 06	6 34	3 05	9 48	22 25	.....	92	8 44.6	15 04	6.7
Mon Dec 28/Tue Dec 29	4 46	20 55	22 24	5 06	6 35	3 09	9 53	23 06	.....	85	9 35.8	12 09	6.7
Tue Dec 29/Wed Dec 30	4 50	20 55	22 24	5 07	6 36	3 13	9 58	23 44	.....	78	10 24.6	8 47	6.7
Wed Dec 30/Thu Dec 31	4 54	20 56	22 24	5 08	6 36	3 18	10 02	0 19	.....	69	11 11.4	5 10	6.7
Thu Dec 31/Fri Jan 01	4 58	20 56	22 24	5 09	6 37	3 22	10 07	0 53	.....	60	11 56.8	1 26	6.7