

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:

***** 2018 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 NAOA 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 2018, 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 18	3 31	Dec 26	6 20	Jan 01	23 25	Jan 08	19 27
Jan 16	23 18	Jan 24	19 21	Jan 31	10 28	Feb 07	12 56
Feb 15	18 07	Feb 23	5 09	Mar 01	21 52	Mar 09	8 23
Mar 17	9 14	Mar 24	11 36	Mar 31	8 38	Apr 08	3 21
Apr 15	22 00	Apr 22	17 47	Apr 29	20 59	May 07	22 12
May 15	7 50	May 21	23 51	May 29	10 21	Jun 06	14 34
Jun 13	15 45	Jun 20	6 53	Jun 28	0 55	Jul 06	3 53
Jul 12	22 50	Jul 19	15 54	Jul 27	16 22	Aug 04	14 20
Aug 11	5 59	Aug 18	3 50	Aug 26	7 58	Sep 02	22 39
Sep 09	14 03	Sep 16	19 16	Sep 24	22 55	Oct 02	5 47
Oct 08	23 48	Oct 16	15 02	Oct 24	13 48	Oct 31	13 42
Nov 07	13 03	Nov 15	11 54	Nov 23	2 41	Nov 29	21 21
Dec 07	4 22	Dec 15	8 50	Dec 22	14 50	Dec 29	6 37
Jan 05	22 30	Jan 14	3 46	Jan 21	2 17	Jan 27	18 12

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.

***** 2018 JANUARY *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon Jan 01/Tue Jan 02		5 04	20 56	22 24	5 10	6 38	3 28	10 14	20 21	.....	100	6 52.9	20 48	6.8
Tue Jan 02/Wed Jan 03		5 08	20 56	22 25	5 11	6 39	3 32	10 19	21 22	.....	98	7 58.4	19 50	6.8
Wed Jan 03/Thu Jan 04		5 11	20 57	22 25	5 12	6 40	3 36	10 24	22 18	.....	94	9 01.6	17 29	6.8
Thu Jan 04/Fri Jan 05		5 15	20 57	22 25	5 13	6 40	3 40	10 29	23 07	.....	87	10 01.3	14 06	6.8
Fri Jan 05/Sat Jan 06		5 19	20 57	22 24	5 14	6 41	3 44	10 34	23 50	.....	78	10 57.2	10 01	6.8
Sat Jan 06/Sun Jan 07		5 23	20 57	22 24	5 15	6 42	3 47	10 39	0 29	.....	68	11 49.7	5 36	6.8
Sun Jan 07/Mon Jan 08		5 27	20 57	22 24	5 16	6 43	3 51	10 44	1 06	.....	58	12 39.6	1 05	6.9
Mon Jan 08/Tue Jan 09		5 31	20 57	22 24	5 17	6 44	3 55	10 49	1 41	.....	48	13 27.7	- 3 17	6.9
Tue Jan 09/Wed Jan 10		5 35	20 57	22 24	5 18	6 45	3 59	10 54	2 15	.....	38	14 14.9	- 7 21	6.9
Wed Jan 10/Thu Jan 11		5 39	20 57	22 24	5 19	6 45	4 02	10 59	2 51	.....	29	15 01.9	-11 00	6.9
Thu Jan 11/Fri Jan 12		5 43	20 57	22 23	5 20	6 46	4 06	11 04	3 28	.....	21	15 49.1	-14 07	6.9
Fri Jan 12/Sat Jan 13		5 47	20 57	22 23	5 21	6 47	4 10	11 09	4 07	.....	13	16 37.0	-16 35	7.0
Sat Jan 13/Sun Jan 14		5 51	20 57	22 23	5 22	6 48	4 13	11 14	4 50	18 16	8	17 25.7	-18 19	7.0
Sun Jan 14/Mon Jan 15		5 55	20 57	22 22	5 23	6 49	4 17	11 19	5 35	19 07	4	18 15.0	-19 14	7.0
Mon Jan 15/Tue Jan 16		5 59	20 56	22 22	5 24	6 50	4 20	11 24	6 24	19 55	1	19 04.7	-19 18	7.0
Tue Jan 16/Wed Jan 17		6 03	20 56	22 21	5 25	6 51	4 24	11 29	.....	20 41	0	19 54.4	-18 29	7.1
Wed Jan 17/Thu Jan 18		6 07	20 56	22 21	5 26	6 51	4 27	11 34	.....	21 24	1	20 43.8	-16 50	7.1
Thu Jan 18/Fri Jan 19		6 11	20 56	22 20	5 28	6 52	4 31	11 39	.....	22 04	4	21 32.6	-14 25	7.1
Fri Jan 19/Sat Jan 20		6 15	20 55	22 20	5 29	6 53	4 34	11 44	.....	22 42	8	22 20.7	-11 19	7.1
Sat Jan 20/Sun Jan 21		6 18	20 55	22 19	5 30	6 54	4 38	11 49	.....	23 18	14	23 08.3	- 7 40	7.2
Sun Jan 21/Mon Jan 22		6 22	20 55	22 19	5 31	6 55	4 41	11 54	.....	23 52	22	23 55.9	- 3 35	7.2
Mon Jan 22/Tue Jan 23		6 26	20 54	22 18	5 32	6 56	4 44	11 59	.....	0 27	31	0 44.0	0 46	7.2
Tue Jan 23/Wed Jan 24		6 30	20 54	22 17	5 33	6 57	4 48	12 05	.....	1 03	41	1 33.3	5 14	7.3
Wed Jan 24/Thu Jan 25		6 34	20 53	22 17	5 34	6 58	4 51	12 10	.....	1 41	52	2 24.6	9 36	7.3
Thu Jan 25/Fri Jan 26		6 38	20 53	22 16	5 36	6 59	4 54	12 15	.....	2 23	63	3 18.7	13 38	7.3
Fri Jan 26/Sat Jan 27		6 42	20 53	22 15	5 37	7 00	4 57	12 20	.....	3 10	73	4 16.2	17 02	7.4
Sat Jan 27/Sun Jan 28		6 46	20 52	22 15	5 38	7 01	5 00	12 25	.....	4 03	83	5 17.1	19 30	7.4
Sun Jan 28/Mon Jan 29		6 50	20 51	22 14	5 39	7 01	5 03	12 30	17 58	5 02	91	6 20.8	20 43	7.4
Mon Jan 29/Tue Jan 30		6 54	20 51	22 13	5 40	7 02	5 07	12 35	19 01	6 06	97	7 25.8	20 31	7.5
Tue Jan 30/Wed Jan 31		6 58	20 50	22 12	5 42	7 03	5 10	12 40	19 59	.....	100	8 30.3	18 51	7.5
Wed Jan 31/Thu Feb 01		7 02	20 50	22 11	5 43	7 04	5 13	12 45	20 52	.....	99	9 32.6	15 56	7.5

***** 2018 FEBRUARY *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Feb 01/Fri Feb 02		7 06	20 49	22 10	5 44	7 05	5 16	12 51	21 40	.....	96	10 31.8	12 03	7.6
Fri Feb 02/Sat Feb 03		7 10	20 48	22 09	5 45	7 06	5 19	12 56	22 22	.....	91	11 27.6	7 36	7.6
Sat Feb 03/Sun Feb 04		7 14	20 48	22 08	5 46	7 07	5 22	13 01	23 01	.....	83	12 20.5	2 56	7.6
Sun Feb 04/Mon Feb 05		7 18	20 47	22 07	5 47	7 08	5 25	13 06	23 38	.....	74	13 11.1	- 1 41	7.7
Mon Feb 05/Tue Feb 06		7 22	20 46	22 07	5 48	7 09	5 28	13 11	0 14	.....	65	14 00.2	- 6 02	7.7
Tue Feb 06/Wed Feb 07		7 26	20 46	22 05	5 50	7 09	5 31	13 16	0 50	.....	55	14 48.5	- 9 56	7.7
Wed Feb 07/Thu Feb 08		7 29	20 45	22 04	5 51	7 10	5 34	13 21	1 27	.....	45	15 36.5	-13 17	7.8
Thu Feb 08/Fri Feb 09		7 33	20 44	22 03	5 52	7 11	5 37	13 26	2 06	.....	36	16 24.8	-15 58	7.8
Fri Feb 09/Sat Feb 10		7 37	20 43	22 02	5 53	7 12	5 39	13 31	2 47	.....	27	17 13.5	-17 55	7.8
Sat Feb 10/Sun Feb 11		7 41	20 42	22 01	5 54	7 13	5 42	13 36	3 31	.....	19	18 02.7	-19 03	7.9
Sun Feb 11/Mon Feb 12		7 45	20 42	22 00	5 55	7 14	5 45	13 41	4 19	17 51	12	18 52.4	-19 21	7.9
Mon Feb 12/Tue Feb 13		7 49	20 41	21 59	5 56	7 15	5 48	13 46	5 09	18 38	7	19 42.1	-18 46	8.0
Tue Feb 13/Wed Feb 14		7 53	20 40	21 58	5 57	7 15	5 51	13 51	6 01	19 22	3	20 31.6	-17 19	8.0
Wed Feb 14/Thu Feb 15		7 57	20 39	21 57	5 58	7 16	5 54	13 56	.....	20 03	1	21 20.7	-15 05	8.0
Thu Feb 15/Fri Feb 16		8 01	20 38	21 56	5 59	7 17	5 56	14 01	.....	20 42	0	22 09.2	-12 07	8.1
Fri Feb 16/Sat Feb 17		8 05	20 37	21 55	6 00	7 18	5 59	14 06	.....	21 19	1	22 57.3	- 8 34	8.1
Sat Feb 17/Sun Feb 18		8 09	20 36	21 53	6 01	7 19	6 02	14 11	.....	21 54	5	23 45.1	- 4 33	8.1
Sun Feb 18/Mon Feb 19		8 13	20 35	21 52	6 02	7 19	6 05	14 16	.....	22 29	10	0 33.1	- 0 14	8.2
Mon Feb 19/Tue Feb 20		8 17	20 34	21 51	6 03	7 20	6 07	14 21	.....	23 05	17	1 21.9	4 12	8.2
Tue Feb 20/Wed Feb 21		8 21	20 33	21 50	6 04	7 21	6 10	14 26	.....	23 42	26	2 12.1	8 34	8.2
Wed Feb 21/Thu Feb 22		8 25	20 32	21 49	6 05	7 22	6 13	14 31	.....	0 22	36	3 04.3	12 37	8.3
Thu Feb 22/Fri Feb 23		8 29	20 31	21 47	6 06	7 23	6 16	14 36	.....	1 05	47	3 59.2	16 07	8.3
Fri Feb 23/Sat Feb 24		8 33	20 30	21 46	6 07	7 23	6 18	14 41	.....	1 54	58	4 57.0	18 48	8.4
Sat Feb 24/Sun Feb 25		8 36	20 29	21 45	6 08	7 24	6 21	14 46	.....	2 48	69	5 57.4	20 25	8.4
Sun Feb 25/Mon Feb 26		8 40	20 28	21 44	6 09	7 25	6 24	14 51	.....	3 48	80	6 59.7	20 45	8.4
Mon Feb 26/Tue Feb 27		8 44	20 27	21 42	6 10	7 26	6 26	14 55	17 44	4 52	88	8 02.5	19 43	8.5
Tue Feb 27/Wed Feb 28		8 48	20 26	21 41	6 11	7 26	6 29	15 00	18 38	5 58	95	9 04.4	17 22	8.5
Wed Feb 28/Thu Mar 01		8 52	20 25	21 40	6 12	7 27	6 32	15 05	19 27	.....	99	10 04.3	13 55	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.

***** 2018 MARCH *****

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 Mar 01/Fri Mar 02	8 56	20 24	21 39	6 13	7 28	6 34	15 10	20 12	.....	100	11 01.7	9 41	8.6
Fri Mar 02/Sat Mar 03	9 00	20 22	21 37	6 14	7 28	6 37	15 15	20 53	.....	98	11 56.5	5 00	8.6
Sat Mar 03/Sun Mar 04	9 04	20 21	21 36	6 14	7 29	6 40	15 20	21 32	.....	94	12 49.2	0 13	8.6
Sun Mar 04/Mon Mar 05	9 08	20 20	21 35	6 15	7 30	6 42	15 24	22 09	.....	88	13 40.2	- 4 24	8.7
Mon Mar 05/Tue Mar 06	9 12	20 19	21 33	6 16	7 31	6 45	15 29	22 45	.....	80	14 30.3	- 8 38	8.7
Tue Mar 06/Wed Mar 07	9 16	20 18	21 32	6 17	7 31	6 48	15 34	23 23	.....	72	15 19.8	-12 19	8.7
Wed Mar 07/Thu Mar 08	9 20	20 17	21 31	6 18	7 32	6 50	15 39	0 01	.....	62	16 09.2	-15 19	8.8
Thu Mar 08/Fri Mar 09	9 24	20 16	21 30	6 19	7 33	6 53	15 43	0 42	.....	53	16 58.7	-17 33	8.8
Fri Mar 09/Sat Mar 10	9 28	20 14	21 28	6 19	7 33	6 56	15 48	1 26	.....	43	17 48.4	-18 57	8.9
Sat Mar 10/Sun Mar 11*	9 32	20 13	21 27	5 20	6 34	6 58	15 53	1 12	.....	34	18 38.2	-19 29	8.9
Sun Mar 11/Mon Mar 12	10 36	19 12	20 26	5 21	6 35	7 01	15 58	2 01	.....	25	19 30.8	-19 09	8.9
Mon Mar 12/Tue Mar 13	10 40	19 11	20 24	5 22	6 35	7 03	16 02	2 53	.....	17	20 20.4	-17 54	9.0
Tue Mar 13/Wed Mar 14	10 44	19 10	20 23	5 22	6 36	7 06	16 07	3 46	17 00	11	21 09.7	-15 49	9.0
Wed Mar 14/Thu Mar 15	10 48	19 08	20 22	5 23	6 37	7 09	16 12	4 41	17 39	6	21 58.4	-13 00	9.0
Thu Mar 15/Fri Mar 16	10 52	19 07	20 20	5 24	6 37	7 11	16 16	5 37	18 17	2	22 46.7	- 9 31	9.1
Fri Mar 16/Sat Mar 17	10 55	19 06	20 19	5 25	6 38	7 14	16 21	6 34	18 53	0	23 34.9	- 5 33	9.1
Sat Mar 17/Sun Mar 18	10 59	19 05	20 18	5 25	6 38	7 17	16 26	.....	19 29	0	0 23.2	- 1 13	9.1
Sun Mar 18/Mon Mar 19	11 03	19 04	20 17	5 26	6 39	7 19	16 30	.....	20 05	3	1 12.3	3 17	9.2
Mon Mar 19/Tue Mar 20	11 07	19 02	20 15	5 27	6 40	7 22	16 35	.....	20 42	8	2 02.6	7 44	9.2
Tue Mar 20/Wed Mar 21	11 11	19 01	20 14	5 27	6 40	7 25	16 40	.....	21 21	14	2 54.6	11 53	9.2
Wed Mar 21/Thu Mar 22	11 15	19 00	20 13	5 28	6 41	7 27	16 44	.....	22 04	23	3 48.9	15 31	9.3
Thu Mar 22/Fri Mar 23	11 19	18 59	20 11	5 29	6 42	7 30	16 49	.....	22 51	33	4 45.5	18 21	9.3
Fri Mar 23/Sat Mar 24	11 23	18 58	20 10	5 29	6 42	7 33	16 53	.....	23 43	44	5 44.3	20 10	9.3
Sat Mar 24/Sun Mar 25	11 27	18 56	20 09	5 30	6 43	7 35	16 58	.....	0 40	55	6 44.5	20 46	9.4
Sun Mar 25/Mon Mar 26	11 31	18 55	20 08	5 31	6 43	7 38	17 03	.....	1 41	66	7 45.3	20 06	9.4
Mon Mar 26/Tue Mar 27	11 35	18 54	20 06	5 31	6 44	7 41	17 07	.....	2 44	77	8 45.4	18 09	9.4
Tue Mar 27/Wed Mar 28	11 39	18 53	20 05	5 32	6 45	7 43	17 12	.....	3 49	86	9 44.0	15 06	9.4
Wed Mar 28/Thu Mar 29	11 43	18 51	20 04	5 33	6 45	7 46	17 16	17 05	4 53	93	10 40.7	11 11	9.5
Thu Mar 29/Fri Mar 30	11 47	18 50	20 03	5 33	6 46	7 49	17 21	17 47	5 56	98	11 35.4	6 41	9.5
Fri Mar 30/Sat Mar 31	11 51	18 49	20 02	5 34	6 46	7 52	17 25	18 25	6 57	100	12 28.3	1 54	9.5
Sat Mar 31/Sun Apr 01	11 55	18 48	20 00	5 34	6 47	7 54	17 30	19 03	.....	99	13 20.1	- 2 52	9.6

***** 2018 APRIL *****

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 Apr 01/Mon Apr 02	11 59	18 47	19 59	5 35	6 48	7 57	17 35	19 39	.....	97	14 11.0	- 7 22	9.6
Mon Apr 02/Tue Apr 03	12 03	18 45	19 58	5 36	6 48	8 00	17 39	20 17	.....	92	15 01.6	-11 22	9.6
Tue Apr 03/Wed Apr 04	12 06	18 44	19 57	5 36	6 49	8 03	17 44	20 55	.....	85	15 52.2	-14 43	9.7
Wed Apr 04/Thu Apr 05	12 10	18 43	19 56	5 37	6 49	8 05	17 48	21 36	.....	78	16 42.9	-17 17	9.7
Thu Apr 05/Fri Apr 06	12 14	18 42	19 54	5 37	6 50	8 08	17 53	22 19	.....	69	17 33.7	-19 00	9.7
Fri Apr 06/Sat Apr 07	12 18	18 41	19 53	5 38	6 51	8 11	17 57	23 04	.....	60	18 24.4	-19 48	9.7
Sat Apr 07/Sun Apr 08	12 22	18 40	19 52	5 39	6 51	8 14	18 02	23 53	.....	51	19 14.9	-19 42	9.8
Sun Apr 08/Mon Apr 09	12 26	18 38	19 51	5 39	6 52	8 17	18 06	0 43	.....	41	20 04.9	-18 42	9.8
Mon Apr 09/Tue Apr 10	12 30	18 37	19 50	5 40	6 52	8 19	18 11	1 36	.....	32	20 54.2	-16 52	9.8
Tue Apr 10/Wed Apr 11	12 34	18 36	19 49	5 40	6 53	8 22	18 15	2 30	.....	23	21 43.0	-14 15	9.9
Wed Apr 11/Thu Apr 12	12 38	18 35	19 48	5 41	6 54	8 25	18 20	3 25	.....	16	22 31.2	-10 57	9.9
Thu Apr 12/Fri Apr 13	12 42	18 34	19 47	5 41	6 54	8 28	18 24	4 22	16 50	9	23 19.3	- 7 05	9.9
Fri Apr 13/Sat Apr 14	12 46	18 33	19 46	5 42	6 55	8 31	18 29	5 20	17 26	4	0 07.7	- 2 48	9.9
Sat Apr 14/Sun Apr 15	12 50	18 32	19 45	5 43	6 55	8 34	18 33	6 19	18 02	1	0 56.8	1 45	10.0
Sun Apr 15/Mon Apr 16	12 54	18 31	19 44	5 43	6 56	8 37	18 38	7 20	18 39	0	1 47.3	6 20	10.0
Mon Apr 16/Tue Apr 17	12 58	18 30	19 43	5 44	6 57	8 40	18 42	.....	19 18	2	2 39.6	10 43	10.0
Tue Apr 17/Wed Apr 18	13 02	18 29	19 42	5 44	6 57	8 42	18 47	.....	20 00	5	3 34.3	14 38	10.0
Wed Apr 18/Thu Apr 19	13 06	18 28	19 41	5 45	6 58	8 45	18 51	.....	20 47	12	4 31.3	17 47	10.1
Thu Apr 19/Fri Apr 20	13 10	18 26	19 40	5 45	6 58	8 48	18 56	.....	21 38	20	5 30.4	19 55	10.1
Fri Apr 20/Sat Apr 21	13 13	18 25	19 39	5 46	6 59	8 51	19 00	.....	22 34	30	6 30.8	20 50	10.1
Sat Apr 21/Sun Apr 22	13 17	18 24	19 38	5 46	7 00	8 54	19 05	.....	23 35	41	7 31.4	20 27	10.1
Sun Apr 22/Mon Apr 23	13 21	18 23	19 37	5 47	7 00	8 57	19 09	.....	0 37	52	8 31.1	18 49	10.2
Mon Apr 23/Tue Apr 24	13 25	18 22	19 36	5 47	7 01	9 00	19 14	.....	1 41	63	9 29.1	16 03	10.2
Tue Apr 24/Wed Apr 25	13 29	18 21	19 35	5 48	7 02	9 03	19 18	.....	2 44	74	10 24.9	12 24	10.2
Wed Apr 25/Thu Apr 26	13 33	18 21	19 34	5 48	7 02	9 07	19 23	.....	3 45	83	11 18.6	8 07	10.2
Thu Apr 26/Fri Apr 27	13 37	18 20	19 33	5 49	7 03	9 10	19 27	16 24	4 46	90	12 10.7	3 27	10.3
Fri Apr 27/Sat Apr 28	13 41	18 19	19 32	5 50	7 03	9 13	19 32	17 00	5 45	96	13 01.7	- 1 18	10.3
Sat Apr 28/Sun Apr 29	13 45	18 18	19 32	5 50	7 04	9 16	19 36	17 36	6 44	99	13 52.1	- 5 54	10.3
Sun Apr 29/Mon Apr 30	13 49	18 17	19 31	5 51	7 05	9 19	19 41	18 13	7 42	100	14 42.5	-10 08	10.3
Mon Apr 30/Tue May 01	13 53	18 16	19 30	5 51	7 05	9 22	19 45	18 50	98	15 33.1	-13 48	10.4

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
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 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2018 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	
Tue May 01/Wed May 02	13 57	18 15	19 29	5 52	7 06	9 25	19 49	19 30	.....	95	16 24.1	-16 44	10.4
Wed May 02/Thu May 03	14 01	18 14	19 28	5 52	7 06	9 28	19 54	20 12	.....	90	17 15.5	-18 49	10.4
Thu May 03/Fri May 04	14 05	18 13	19 28	5 53	7 07	9 32	19 58	20 57	.....	83	18 07.0	-19 59	10.4
Fri May 04/Sat May 05	14 09	18 13	19 27	5 53	7 08	9 35	20 03	21 44	.....	76	18 58.2	-20 12	10.4
Sat May 05/Sun May 06	14 13	18 12	19 26	5 54	7 08	9 38	20 07	22 34	.....	67	19 48.8	-19 30	10.5
Sun May 06/Mon May 07	14 17	18 11	19 26	5 54	7 09	9 41	20 12	23 26	.....	58	20 38.5	-17 56	10.5
Mon May 07/Tue May 08	14 21	18 10	19 25	5 55	7 10	9 45	20 16	0 19	.....	49	21 27.4	-15 33	10.5
Tue May 08/Wed May 09	14 24	18 10	19 24	5 55	7 10	9 48	20 21	1 13	.....	39	22 15.5	-12 29	10.5
Wed May 09/Thu May 10	14 28	18 09	19 24	5 56	7 11	9 51	20 25	2 08	.....	30	23 03.1	- 8 48	10.5
Thu May 10/Fri May 11	14 32	18 08	19 23	5 56	7 11	9 55	20 30	3 05	.....	21	23 50.8	- 4 39	10.6
Fri May 11/Sat May 12	14 36	18 08	19 23	5 57	7 12	9 58	20 34	4 03	.....	13	0 39.2	- 0 10	10.6
Sat May 12/Sun May 13	14 40	18 07	19 22	5 57	7 13	10 02	20 39	5 03	16 33	7	1 28.9	4 28	10.6
Sun May 13/Mon May 14	14 44	18 06	19 22	5 58	7 13	10 05	20 43	6 05	17 11	2	2 20.6	9 02	10.6
Mon May 14/Tue May 15	14 48	18 06	19 21	5 58	7 14	10 08	20 48	7 10	17 52	0	3 14.9	13 15	10.6
Tue May 15/Wed May 16	14 52	18 05	19 21	5 59	7 15	10 12	20 52	.....	18 38	1	4 12.1	16 48	10.6
Wed May 16/Thu May 17	14 56	18 04	19 20	5 59	7 15	10 15	20 56	.....	19 28	4	5 11.9	19 24	10.7
Thu May 17/Fri May 18	15 00	18 04	19 20	6 00	7 16	10 19	21 01	.....	20 24	10	6 13.5	20 46	10.7
Fri May 18/Sat May 19	15 04	18 03	19 19	6 00	7 16	10 22	21 05	.....	21 25	18	7 15.6	20 47	10.7
Sat May 19/Sun May 20	15 08	18 03	19 19	6 01	7 17	10 26	21 10	.....	22 29	27	8 16.7	19 27	10.7
Sun May 20/Mon May 21	15 12	18 02	19 18	6 01	7 18	10 29	21 14	.....	23 34	38	9 15.8	16 55	10.7
Mon May 21/Tue May 22	15 16	18 02	19 18	6 02	7 18	10 33	21 19	.....	0 37	49	10 12.2	13 26	10.7
Tue May 22/Wed May 23	15 20	18 02	19 18	6 02	7 19	10 37	21 23	.....	1 39	60	11 06.0	9 17	10.7
Wed May 23/Thu May 24	15 24	18 01	19 17	6 03	7 19	10 40	21 27	.....	2 40	71	11 57.8	4 44	10.8
Thu May 24/Fri May 25	15 28	18 01	19 17	6 03	7 20	10 44	21 32	.....	3 39	80	12 48.0	0 01	10.8
Fri May 25/Sat May 26	15 31	18 00	19 17	6 04	7 20	10 48	21 36	.....	4 36	88	13 37.6	- 4 36	10.8
Sat May 26/Sun May 27	15 35	18 00	19 17	6 04	7 21	10 51	21 41	16 13	5 34	94	14 27.0	- 8 56	10.8
Sun May 27/Mon May 28	15 39	18 00	19 16	6 05	7 22	10 55	21 45	16 49	6 30	98	15 16.8	-12 48	10.8
Mon May 28/Tue May 29	15 43	17 59	19 16	6 05	7 22	10 59	21 50	17 27	7 26	100	16 07.3	-16 00	10.8
Tue May 29/Wed May 30	15 47	17 59	19 16	6 06	7 23	11 02	21 54	18 08	.....	100	16 58.4	-18 25	10.8
Wed May 30/Thu May 31	15 51	17 59	19 16	6 06	7 23	11 06	21 58	18 51	.....	97	17 50.1	-19 56	10.8
Thu May 31/Fri Jun 01	15 55	17 59	19 16	6 07	7 24	11 10	22 03	19 38	.....	94	18 41.8	-20 30	10.8

***** 2018 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	
Fri Jun 01/Sat Jun 02	15 59	17 58	19 16	6 07	7 24	11 14	22 07	20 27	.....	88	19 33.0	-20 07	10.9
Sat Jun 02/Sun Jun 03	16 03	17 58	19 15	6 07	7 25	11 18	22 11	21 18	.....	81	20 23.4	-18 49	10.9
Sun Jun 03/Mon Jun 04	16 07	17 58	19 15	6 08	7 25	11 22	22 16	22 10	.....	73	21 12.7	-16 42	10.9
Mon Jun 04/Tue Jun 05	16 11	17 58	19 15	6 08	7 26	11 25	22 20	23 04	.....	65	22 00.8	-13 50	10.9
Tue Jun 05/Wed Jun 06	16 15	17 58	19 15	6 09	7 26	11 29	22 25	23 58	.....	55	22 48.2	-10 22	10.9
Wed Jun 06/Thu Jun 07	16 19	17 58	19 15	6 09	7 27	11 33	22 29	0 53	.....	45	23 35.2	- 6 24	10.9
Thu Jun 07/Fri Jun 08	16 23	17 58	19 15	6 09	7 27	11 37	22 33	1 49	.....	35	0 22.5	- 2 04	10.9
Fri Jun 08/Sat Jun 09	16 27	17 58	19 15	6 10	7 27	11 41	22 37	2 46	.....	26	1 10.7	2 29	10.9
Sat Jun 09/Sun Jun 10	16 31	17 58	19 15	6 10	7 28	11 45	22 42	3 47	.....	17	2 00.8	7 05	10.9
Sun Jun 10/Mon Jun 11	16 35	17 58	19 15	6 11	7 28	11 49	22 46	4 50	.....	10	2 53.4	11 28	10.9
Mon Jun 11/Tue Jun 12	16 38	17 58	19 15	6 11	7 29	11 53	22 50	5 55	16 26	4	3 49.2	15 21	10.9
Tue Jun 12/Wed Jun 13	16 42	17 58	19 15	6 11	7 29	11 57	22 55	7 02	17 14	1	4 48.3	18 26	10.9
Wed Jun 13/Thu Jun 14	16 46	17 58	19 15	6 12	7 29	12 01	22 59	8 09	18 08	0	5 50.1	20 22	10.9
Thu Jun 14/Fri Jun 15	16 50	17 58	19 16	6 12	7 30	12 05	23 03	.....	19 09	3	6 53.5	20 57	10.9
Fri Jun 15/Sat Jun 16	16 54	17 58	19 16	6 12	7 30	12 09	23 07	.....	20 13	8	7 56.8	20 05	10.9
Sat Jun 16/Sun Jun 17	16 58	17 58	19 16	6 12	7 30	12 13	23 12	.....	21 20	15	8 58.2	17 53	10.9
Sun Jun 17/Mon Jun 18	17 02	17 58	19 16	6 13	7 31	12 17	23 16	.....	22 27	25	9 56.9	14 35	10.9
Mon Jun 18/Tue Jun 19	17 06	17 58	19 16	6 13	7 31	12 21	23 20	.....	23 31	35	10 52.5	10 31	10.9
Tue Jun 19/Wed Jun 20	17 10	17 58	19 16	6 13	7 31	12 26	23 24	.....	0 33	46	11 45.3	5 59	10.9
Wed Jun 20/Thu Jun 21	17 14	17 59	19 17	6 13	7 31	12 30	23 28	.....	1 33	57	12 36.0	1 16	10.9
Thu Jun 21/Fri Jun 22	17 18	17 59	19 17	6 14	7 32	12 34	23 33	.....	2 32	67	13 25.5	- 3 24	10.9
Fri Jun 22/Sat Jun 23	17 22	17 59	19 17	6 14	7 32	12 38	23 37	.....	3 29	77	14 14.4	- 7 48	10.9
Sat Jun 23/Sun Jun 24	17 26	17 59	19 17	6 14	7 32	12 42	23 41	.....	4 25	85	15 03.5	-11 47	10.9
Sun Jun 24/Mon Jun 25	17 30	18 00	19 18	6 14	7 32	12 47	23 45	.....	5 20	91	15 53.1	-15 11	10.9
Mon Jun 25/Tue Jun 26	17 34	18 00	19 18	6 14	7 32	12 51	23 49	16 07	6 15	96	16 43.6	-17 50	10.9
Tue Jun 26/Wed Jun 27	17 38	18 00	19 18	6 14	7 32	12 55	23 53	16 49	7 08	99	17 34.8	-19 39	10.9
Wed Jun 27/Thu Jun 28	17 42	18 01	19 18	6 15	7 32	12 59	23 57	17 34	7 58	100	18 26.4	-20 32	10.9
Thu Jun 28/Fri Jun 29	17 46	18 01	19 19	6 15	7 32	13 03	0 01	18 22	.....	99	19 18.0	-20 27	10.9
Fri Jun 29/Sat Jun 30	17 49	18 01	19 19	6 15	7 32	13 08	0 05	19 12	.....	96	20 08.9	-19 26	10.9
Sat Jun 30/Sun Jul 01	17 53	18 02	19 19	6 15	7 32	13 12	0 09	20 04	.....	92	20 58.8	-17 33	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.

***** 2018 JULY *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sun Jul 01/Mon Jul 02		17 57	18 02	19 20	6 15	7 32	13 16	0 13	20 57	.....	86	21 47.5	-14 54	10.9
Mon Jul 02/Tue Jul 03		18 01	18 02	19 20	6 15	7 32	13 21	0 17	21 51	.....	79	22 35.0	-11 36	10.9
Tue Jul 03/Wed Jul 04		18 05	18 03	19 20	6 15	7 32	13 25	0 21	22 45	.....	70	23 21.8	- 7 47	10.9
Wed Jul 04/Thu Jul 05		18 09	18 03	19 21	6 15	7 32	13 29	0 25	23 39	.....	61	0 08.4	- 3 36	10.9
Thu Jul 05/Fri Jul 06		18 13	18 04	19 21	6 15	7 32	13 33	0 29	0 35	.....	51	0 55.5	0 50	10.9
Fri Jul 06/Sat Jul 07		18 17	18 04	19 21	6 15	7 32	13 38	0 33	1 32	.....	41	1 43.8	5 21	10.9
Sat Jul 07/Sun Jul 08		18 21	18 05	19 22	6 15	7 32	13 42	0 37	2 32	.....	30	2 34.2	9 45	10.9
Sun Jul 08/Mon Jul 09		18 25	18 05	19 22	6 15	7 32	13 46	0 41	3 35	.....	21	3 27.5	13 48	10.9
Mon Jul 09/Tue Jul 10		18 29	18 05	19 23	6 14	7 32	13 51	0 44	4 40	.....	12	4 24.2	17 12	10.9
Tue Jul 10/Wed Jul 11		18 33	18 06	19 23	6 14	7 31	13 55	0 48	5 46	15 52	6	5 24.3	19 39	10.9
Wed Jul 11/Thu Jul 12		18 37	18 06	19 24	6 14	7 31	14 00	0 52	6 52	16 49	1	6 27.1	20 50	10.8
Thu Jul 12/Fri Jul 13		18 41	18 07	19 24	6 14	7 31	14 04	0 56	7 53	17 52	0	7 31.0	20 36	10.8
Fri Jul 13/Sat Jul 14		18 45	18 07	19 24	6 14	7 31	14 08	0 59	.....	18 59	2	8 34.4	18 55	10.8
Sat Jul 14/Sun Jul 15		18 49	18 08	19 25	6 14	7 30	14 13	1 03	.....	20 08	6	9 35.6	15 57	10.8
Sun Jul 15/Mon Jul 16		18 53	18 08	19 25	6 13	7 30	14 17	1 07	.....	21 16	13	10 33.8	12 03	10.8
Mon Jul 16/Tue Jul 17		18 56	18 09	19 26	6 13	7 30	14 21	1 11	.....	22 21	22	11 29.0	7 32	10.8
Tue Jul 17/Wed Jul 18		19 00	18 10	19 26	6 13	7 29	14 26	1 14	.....	23 24	32	12 21.5	2 44	10.8
Wed Jul 18/Thu Jul 19		19 04	18 10	19 27	6 12	7 29	14 30	1 18	.....	0 24	42	13 12.1	- 2 03	10.8
Thu Jul 19/Fri Jul 20		19 08	18 11	19 27	6 12	7 28	14 35	1 21	.....	1 23	53	14 01.6	- 6 36	10.8
Fri Jul 20/Sat Jul 21		19 12	18 11	19 27	6 12	7 28	14 39	1 25	.....	2 20	63	14 50.7	-10 44	10.7
Sat Jul 21/Sun Jul 22		19 16	18 12	19 28	6 11	7 27	14 43	1 29	.....	3 16	72	15 40.1	-14 18	10.7
Sun Jul 22/Mon Jul 23		19 20	18 12	19 28	6 11	7 27	14 48	1 32	.....	4 10	81	16 30.1	-17 10	10.7
Mon Jul 23/Tue Jul 24		19 24	18 13	19 29	6 11	7 26	14 52	1 36	.....	5 04	88	17 20.8	-19 13	10.7
Tue Jul 24/Wed Jul 25		19 28	18 13	19 29	6 10	7 26	14 57	1 39	.....	5 55	94	18 12.0	-20 22	10.7
Wed Jul 25/Thu Jul 26		19 32	18 14	19 30	6 10	7 25	15 01	1 43	16 19	6 43	97	19 03.5	-20 34	10.7
Thu Jul 26/Fri Jul 27		19 36	18 15	19 30	6 09	7 25	15 05	1 46	17 08	7 28	100	19 54.6	-19 49	10.6
Fri Jul 27/Sat Jul 28		19 40	18 15	19 31	6 09	7 24	15 10	1 50	18 00	.....	100	20 45.0	-18 10	10.6
Sat Jul 28/Sun Jul 29		19 44	18 16	19 31	6 08	7 24	15 14	1 53	18 53	.....	98	21 34.3	-15 43	10.6
Sun Jul 29/Mon Jul 30		19 48	18 16	19 32	6 08	7 23	15 19	1 56	19 46	.....	95	22 22.5	-12 34	10.6
Mon Jul 30/Tue Jul 31		19 52	18 17	19 32	6 07	7 22	15 23	2 00	20 40	.....	90	23 09.7	- 8 51	10.6
Tue Jul 31/Wed Aug 01		19 56	18 17	19 33	6 06	7 22	15 27	2 03	21 34	.....	83	23 56.3	- 4 44	10.6

***** 2018 AUGUST *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Wed Aug 01/Thu Aug 02		20 00	18 18	19 33	6 06	7 21	15 32	2 06	22 29	.....	75	0 43.0	- 0 22	10.5
Thu Aug 02/Fri Aug 03		20 04	18 19	19 34	6 05	7 20	15 36	2 10	23 24	.....	66	1 30.3	4 06	10.5
Fri Aug 03/Sat Aug 04		20 07	18 19	19 34	6 05	7 19	15 41	2 13	0 22	.....	56	2 19.2	8 28	10.5
Sat Aug 04/Sun Aug 05		20 11	18 20	19 34	6 04	7 19	15 45	2 16	1 21	.....	45	3 10.3	12 34	10.5
Sun Aug 05/Mon Aug 06		20 15	18 20	19 35	6 03	7 18	15 50	2 20	2 23	.....	34	4 04.4	16 08	10.5
Mon Aug 06/Tue Aug 07		20 19	18 21	19 35	6 02	7 17	15 54	2 23	3 27	.....	24	5 01.7	18 53	10.5
Tue Aug 07/Wed Aug 08		20 23	18 21	19 36	6 02	7 16	15 58	2 26	4 31	.....	15	6 02.1	20 33	10.4
Wed Aug 08/Thu Aug 09		20 27	18 22	19 36	6 01	7 15	16 03	2 29	5 34	.....	7	7 04.7	20 54	10.4
Thu Aug 09/Fri Aug 10		20 31	18 23	19 37	6 00	7 14	16 07	2 32	6 33	16 35	2	8 07.9	19 49	10.4
Fri Aug 10/Sat Aug 11		20 35	18 23	19 37	5 59	7 14	16 12	2 35	7 26	17 43	0	9 10.1	17 22	10.4
Sat Aug 11/Sun Aug 12		20 39	18 24	19 38	5 59	7 13	16 16	2 39	.....	18 53	1	10 10.2	13 47	10.3
Sun Aug 12/Mon Aug 13		20 43	18 24	19 38	5 58	7 12	16 20	2 42	.....	20 01	4	11 07.5	9 24	10.3
Mon Aug 13/Tue Aug 14		20 47	18 25	19 39	5 57	7 11	16 25	2 45	.....	21 07	10	12 02.1	4 34	10.3
Tue Aug 14/Wed Aug 15		20 51	18 25	19 39	5 56	7 10	16 29	2 48	.....	22 10	18	12 54.6	- 0 22	10.3
Wed Aug 15/Thu Aug 16		20 55	18 26	19 40	5 55	7 09	16 34	2 51	.....	23 12	27	13 45.6	- 5 08	10.3
Thu Aug 16/Fri Aug 17		20 59	18 27	19 40	5 54	7 08	16 38	2 54	.....	0 11	37	14 35.7	- 9 30	10.2
Fri Aug 17/Sat Aug 18		21 03	18 27	19 41	5 53	7 07	16 43	2 57	.....	1 08	48	15 25.7	-13 18	10.2
Sat Aug 18/Sun Aug 19		21 07	18 28	19 41	5 52	7 06	16 47	3 00	.....	2 04	58	16 15.8	-16 24	10.2
Sun Aug 19/Mon Aug 20		21 11	18 28	19 42	5 52	7 05	16 51	3 03	.....	2 59	67	17 06.4	-18 42	10.2
Mon Aug 20/Tue Aug 21		21 14	18 29	19 42	5 51	7 04	16 56	3 06	.....	3 50	76	17 57.5	-20 06	10.1
Tue Aug 21/Wed Aug 22		21 18	18 29	19 43	5 50	7 03	17 00	3 09	.....	4 40	84	18 48.7	-20 34	10.1
Wed Aug 22/Thu Aug 23		21 22	18 30	19 43	5 49	7 02	17 05	3 12	.....	5 26	90	19 39.8	-20 05	10.1
Thu Aug 23/Fri Aug 24		21 26	18 30	19 44	5 48	7 01	17 09	3 15	.....	6 08	95	20 30.4	-18 41	10.1
Fri Aug 24/Sat Aug 25		21 30	18 31	19 44	5 47	7 00	17 14	3 18	16 48	6 48	98	21 20.1	-16 26	10.0
Sat Aug 25/Sun Aug 26		21 34	18 32	19 44	5 46	6 58	17 18	3 21	17 41	7 25	100	22 08.9	-13 26	10.0
Sun Aug 26/Mon Aug 27		21 38	18 32	19 45	5 44	6 57	17 22	3 24	18 35	.....	99	22 56.8	- 9 49	10.0
Mon Aug 27/Tue Aug 28		21 42	18 33	19 45	5 43	6 56	17 27	3 26	19 30	.....	97	23 44.0	- 5 44	10.0
Tue Aug 28/Wed Aug 29		21 46	18 33	19 46	5 42	6 55	17 31	3 29	20 24	.....	93	0 31.0	- 1 22	9.9
Wed Aug 29/Thu Aug 30		21 50	18 34	19 46	5 41	6 54	17 36	3 32	21 20	.....	87	1 18.5	3 09	9.9
Thu Aug 30/Fri Aug 31		21 54	18 34	19 47	5 40	6 53	17 40	3 35	22 16	.....	79	2 07.0	7 35	9.9
Fri Aug 31/Sat Sep 01		21 58	18 35	19 47	5 39	6 52	17 45	3 38	23 14	.....	70	2 57.2	11 45	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.

***** 2018 SEPTEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sat Sep 01/Sun Sep 02	22 02	18 35	19 48	5 38	6 50	17 49	3 41	0 14	.....	60	3 49.8	15 26	9.8
Sun Sep 02/Mon Sep 03	22 06	18 36	19 48	5 37	6 49	17 53	3 43	1 16	.....	49	4 45.2	18 23	9.8
Mon Sep 03/Tue Sep 04	22 10	18 36	19 49	5 35	6 48	17 58	3 46	2 18	.....	38	5 43.2	20 21	9.8
Tue Sep 04/Wed Sep 05	22 14	18 37	19 49	5 34	6 47	18 02	3 49	3 19	.....	27	6 43.5	21 06	9.7
Wed Sep 05/Thu Sep 06	22 18	18 37	19 50	5 33	6 46	18 07	3 52	4 18	.....	17	7 44.9	20 32	9.7
Thu Sep 06/Fri Sep 07	22 21	18 38	19 50	5 32	6 44	18 11	3 54	5 12	.....	9	8 46.2	18 36	9.7
Fri Sep 07/Sat Sep 08	22 25	18 38	19 51	5 31	6 43	18 16	3 57	6 02	16 30	4	9 46.2	15 28	9.7
Sat Sep 08/Sun Sep 09	22 29	18 39	19 52	5 30	6 42	18 20	4 00	6 47	17 38	1	10 44.1	11 22	9.6
Sun Sep 09/Mon Sep 10	22 33	18 40	19 52	5 28	6 41	18 25	4 03	7 28	18 45	0	11 39.8	6 39	9.6
Mon Sep 10/Tue Sep 11	22 37	18 40	19 53	5 27	6 40	18 29	4 05	.....	19 51	3	12 33.6	1 39	9.6
Tue Sep 11/Wed Sep 12	22 41	18 41	19 53	5 26	6 38	18 34	4 08	.....	20 54	8	13 25.8	- 3 19	9.5
Wed Sep 12/Thu Sep 13	22 45	18 41	19 54	5 25	6 37	18 38	4 11	.....	21 56	14	14 17.2	- 7 58	9.5
Thu Sep 13/Fri Sep 14	22 49	18 42	19 54	5 23	6 36	18 43	4 13	.....	22 56	23	15 08.1	-12 05	9.5
Fri Sep 14/Sat Sep 15	22 53	18 42	19 55	5 22	6 35	18 47	4 16	.....	23 54	32	15 59.0	-15 30	9.5
Sat Sep 15/Sun Sep 16	22 57	18 43	19 55	5 21	6 33	18 52	4 19	.....	0 50	41	16 50.2	-18 06	9.4
Sun Sep 16/Mon Sep 17	23 01	18 43	19 56	5 19	6 32	18 56	4 21	.....	1 44	51	17 41.5	-19 49	9.4
Mon Sep 17/Tue Sep 18	23 05	18 44	19 57	5 18	6 31	19 01	4 24	.....	2 35	61	18 32.9	-20 34	9.4
Tue Sep 18/Wed Sep 19	23 09	18 44	19 57	5 17	6 30	19 05	4 27	.....	3 22	70	19 24.0	-20 22	9.3
Wed Sep 19/Thu Sep 20	23 13	18 45	19 58	5 16	6 28	19 10	4 29	.....	4 06	78	20 14.6	-19 13	9.3
Thu Sep 20/Fri Sep 21	23 17	18 45	19 58	5 14	6 27	19 14	4 32	.....	4 46	86	21 04.5	-17 12	9.3
Fri Sep 21/Sat Sep 22	23 21	18 46	19 59	5 13	6 26	19 19	4 34	.....	5 24	92	21 53.5	-14 24	9.2
Sat Sep 22/Sun Sep 23	23 25	18 47	20 00	5 12	6 25	19 23	4 37	.....	6 00	96	22 41.7	-10 55	9.2
Sun Sep 23/Mon Sep 24	23 29	18 47	20 00	5 10	6 23	19 28	4 40	17 23	6 34	99	23 29.4	- 6 54	9.2
Mon Sep 24/Tue Sep 25	23 32	18 48	20 01	5 09	6 22	19 33	4 42	18 18	7 07	100	0 17.0	- 2 30	9.1
Tue Sep 25/Wed Sep 26	23 36	18 48	20 01	5 08	6 21	19 37	4 45	19 14	.....	99	1 05.0	2 05	9.1
Wed Sep 26/Thu Sep 27	23 40	18 49	20 02	5 06	6 19	19 42	4 47	20 11	.....	95	1 53.9	6 41	9.1
Thu Sep 27/Fri Sep 28	23 44	18 49	20 03	5 05	6 18	19 46	4 50	21 09	.....	90	2 44.5	11 02	9.0
Fri Sep 28/Sat Sep 29	23 48	18 50	20 03	5 04	6 17	19 51	4 53	22 09	.....	82	3 37.1	14 56	9.0
Sat Sep 29/Sun Sep 30	23 52	18 51	20 04	5 02	6 16	19 56	4 55	23 10	.....	73	4 32.0	18 06	9.0
Sun Sep 30/Mon Oct 01	23 56	18 51	20 05	5 01	6 15	20 00	4 58	0 12	.....	63	5 29.3	20 19	8.9

***** 2018 OCTOBER *****

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 Oct 01/Tue Oct 02	0 00	18 52	20 05	5 00	6 13	20 05	5 01	1 12	.....	52	6 28.4	21 22	8.9
Tue Oct 02/Wed Oct 03	0 04	18 52	20 06	4 58	6 12	20 09	5 03	2 10	.....	41	7 28.5	21 08	8.9
Wed Oct 03/Thu Oct 04	0 08	18 53	20 07	4 57	6 11	20 14	5 06	3 04	.....	30	8 28.5	19 35	8.8
Thu Oct 04/Fri Oct 05	0 12	18 53	20 08	4 56	6 10	20 19	5 08	3 54	.....	20	9 27.3	16 51	8.8
Fri Oct 05/Sat Oct 06	0 16	18 54	20 08	4 54	6 08	20 23	5 11	4 39	.....	12	10 24.4	13 06	8.8
Sat Oct 06/Sun Oct 07	0 20	18 55	20 09	4 53	6 07	20 28	5 14	5 21	.....	5	11 19.7	8 37	8.7
Sun Oct 07/Mon Oct 08	0 24	18 55	20 10	4 52	6 06	20 33	5 16	6 00	17 31	1	12 13.2	3 42	8.7
Mon Oct 08/Tue Oct 09	0 28	18 56	20 11	4 50	6 05	20 38	5 19	6 38	18 35	0	13 05.6	- 1 19	8.7
Tue Oct 09/Wed Oct 10	0 32	18 57	20 11	4 49	6 04	20 42	5 21	.....	19 38	1	13 57.2	- 6 10	8.6
Wed Oct 10/Thu Oct 11	0 36	18 57	20 12	4 48	6 03	20 47	5 24	.....	20 40	5	14 48.6	-10 36	8.6
Thu Oct 11/Fri Oct 12	0 39	18 58	20 13	4 46	6 01	20 52	5 27	.....	21 40	10	15 40.1	-14 22	8.6
Fri Oct 12/Sat Oct 13	0 43	18 59	20 14	4 45	6 00	20 57	5 29	.....	22 38	17	16 31.8	-17 21	8.5
Sat Oct 13/Sun Oct 14*	0 47	18 59	20 15	5 44	6 59	21 01	5 32	.....	23 34	26	17 23.7	-19 26	8.5
Sun Oct 14/Mon Oct 15	23 51	20 00	21 15	5 42	6 58	21 06	5 34	.....	1 27	34	18 13.3	-20 35	8.4
Mon Oct 15/Tue Oct 16	23 55	20 01	21 16	5 41	6 57	21 11	5 37	.....	2 17	43	19 05.0	-20 44	8.4
Tue Oct 16/Wed Oct 17	23 59	20 01	21 17	5 40	6 56	21 16	5 40	.....	3 02	53	19 56.1	-19 56	8.4
Wed Oct 17/Thu Oct 18	0 03	20 02	21 18	5 39	6 55	21 21	5 42	.....	3 44	62	20 46.2	-18 13	8.3
Thu Oct 18/Fri Oct 19	0 07	20 03	21 19	5 37	6 54	21 25	5 45	.....	4 22	71	21 35.3	-15 41	8.3
Fri Oct 19/Sat Oct 20	0 11	20 03	21 20	5 36	6 53	21 30	5 48	.....	4 58	80	22 23.5	-12 25	8.3
Sat Oct 20/Sun Oct 21	0 15	20 04	21 21	5 35	6 51	21 35	5 50	.....	5 32	87	23 11.2	- 8 34	8.2
Sun Oct 21/Mon Oct 22	0 19	20 05	21 22	5 34	6 50	21 40	5 53	17 08	6 06	93	23 58.7	- 4 15	8.2
Mon Oct 22/Tue Oct 23	0 23	20 05	21 23	5 32	6 49	21 45	5 56	18 04	6 40	97	0 46.8	0 23	8.2
Tue Oct 23/Wed Oct 24	0 27	20 06	21 24	5 31	6 48	21 50	5 59	19 01	.....	100	1 35.8	5 06	8.1
Wed Oct 24/Thu Oct 25	0 31	20 07	21 25	5 30	6 47	21 55	6 01	20 00	.....	100	2 26.6	9 43	8.1
Thu Oct 25/Fri Oct 26	0 35	20 08	21 25	5 29	6 46	22 00	6 04	21 00	.....	97	3 19.6	13 56	8.1
Fri Oct 26/Sat Oct 27	0 38	20 08	21 26	5 28	6 45	22 05	6 07	22 03	.....	93	4 15.0	17 29	8.0
Sat Oct 27/Sun Oct 28	0 42	20 09	21 27	5 26	6 45	22 09	6 10	23 06	.....	86	5 12.9	20 05	8.0
Sun Oct 28/Mon Oct 29	0 46	20 10	21 28	5 25	6 44	22 14	6 12	0 08	.....	77	6 12.5	21 31	7.9
Mon Oct 29/Tue Oct 30	0 50	20 11	21 29	5 24	6 43	22 19	6 15	1 07	.....	67	7 12.9	21 38	7.9
Tue Oct 30/Wed Oct 31	0 54	20 12	21 30	5 23	6 42	22 24	6 18	2 02	.....	56	8 12.9	20 26	7.9
Wed Oct 31/Thu Nov 01	0 58	20 12	21 32	5 22	6 41	22 29	6 21	2 52	.....	45	9 11.4	18 01	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.

***** 2018 NOVEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Nov 01/Fri Nov 02	1 02	20 13	21 33	5 21	6 40	22 34	6 24	3 37	.....	34	10 07.9	14 34	7.8
Fri Nov 02/Sat Nov 03	1 06	20 14	21 34	5 20	6 39	22 39	6 27	4 19	.....	24	11 02.3	10 21	7.8
Sat Nov 03/Sun Nov 04	1 10	20 15	21 35	5 19	6 39	22 44	6 29	4 57	.....	15	11 54.9	5 38	7.7
Sun Nov 04/Mon Nov 05	1 14	20 16	21 36	5 18	6 38	22 49	6 32	5 34	17 21	8	12 46.3	0 41	7.7
Mon Nov 05/Tue Nov 06	1 18	20 16	21 37	5 17	6 37	22 54	6 35	6 11	18 23	3	13 37.0	- 4 13	7.7
Tue Nov 06/Wed Nov 07	1 22	20 17	21 38	5 16	6 36	22 59	6 38	.....	19 24	1	14 27.7	- 8 50	7.6
Wed Nov 07/Thu Nov 08	1 26	20 18	21 39	5 15	6 36	23 04	6 41	.....	20 25	0	15 18.8	-12 56	7.6
Thu Nov 08/Fri Nov 09	1 30	20 19	21 40	5 14	6 35	23 09	6 44	.....	21 24	2	16 10.4	-16 19	7.6
Fri Nov 09/Sat Nov 10	1 34	20 20	21 41	5 13	6 34	23 15	6 47	.....	22 22	6	17 02.6	-18 50	7.5
Sat Nov 10/Sun Nov 11	1 38	20 21	21 42	5 12	6 34	23 20	6 50	.....	23 18	12	17 55.0	-20 22	7.5
Sun Nov 11/Mon Nov 12	1 42	20 21	21 43	5 11	6 33	23 25	6 53	.....	0 09	19	18 47.1	-20 55	7.5
Mon Nov 12/Tue Nov 13	1 45	20 22	21 45	5 10	6 32	23 30	6 56	.....	0 57	27	19 38.6	-20 27	7.4
Tue Nov 13/Wed Nov 14	1 49	20 23	21 46	5 09	6 32	23 35	7 00	.....	1 40	36	20 28.9	-19 03	7.4
Wed Nov 14/Thu Nov 15	1 53	20 24	21 47	5 08	6 31	23 40	7 03	.....	2 20	45	21 18.1	-16 48	7.4
Thu Nov 15/Fri Nov 16	1 57	20 25	21 48	5 08	6 31	23 45	7 06	.....	2 56	54	22 06.1	-13 49	7.3
Fri Nov 16/Sat Nov 17	2 01	20 26	21 49	5 07	6 30	23 50	7 09	.....	3 31	64	22 53.3	-10 11	7.3
Sat Nov 17/Sun Nov 18	2 05	20 27	21 50	5 06	6 30	23 55	7 12	.....	4 04	73	23 40.1	- 6 03	7.3
Sun Nov 18/Mon Nov 19	2 09	20 28	21 51	5 06	6 29	0 00	7 15	.....	4 37	81	0 27.3	- 1 32	7.2
Mon Nov 19/Tue Nov 20	2 13	20 28	21 52	5 05	6 29	0 05	7 19	.....	5 11	89	1 15.5	3 11	7.2
Tue Nov 20/Wed Nov 21	2 17	20 29	21 54	5 04	6 29	0 10	7 22	17 45	5 47	95	2 05.6	7 56	7.2
Wed Nov 21/Thu Nov 22	2 21	20 30	21 55	5 04	6 28	0 15	7 25	18 45	6 26	98	2 58.1	12 27	7.1
Thu Nov 22/Fri Nov 23	2 25	20 31	21 56	5 03	6 28	0 20	7 29	19 48	.....	100	3 53.7	16 26	7.1
Fri Nov 23/Sat Nov 24	2 29	20 32	21 57	5 02	6 28	0 25	7 32	20 52	.....	99	4 52.4	19 33	7.1
Sat Nov 24/Sun Nov 25	2 33	20 33	21 58	5 02	6 27	0 31	7 36	21 57	.....	95	5 53.6	21 30	7.1
Sun Nov 25/Mon Nov 26	2 37	20 34	21 59	5 02	6 27	0 36	7 39	23 00	.....	89	6 56.1	22 05	7.0
Mon Nov 26/Tue Nov 27	2 41	20 34	22 00	5 01	6 27	0 41	7 43	23 58	.....	80	7 58.3	21 13	7.0
Tue Nov 27/Wed Nov 28	2 45	20 35	22 01	5 01	6 27	0 46	7 46	0 51	.....	70	8 58.8	19 02	7.0
Wed Nov 28/Thu Nov 29	2 49	20 36	22 02	5 00	6 27	0 51	7 50	1 38	.....	60	9 56.6	15 44	7.0
Thu Nov 29/Fri Nov 30	2 53	20 37	22 03	5 00	6 26	0 56	7 53	2 20	.....	48	10 51.7	11 37	6.9
Fri Nov 30/Sat Dec 01	2 56	20 38	22 04	5 00	6 26	1 01	7 57	2 59	.....	37	11 44.3	6 59	6.9

***** 2018 DECEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sat Dec 01/Sun Dec 02	3 00	20 39	22 05	4 59	6 26	1 06	8 01	3 36	.....	27	12 35.2	2 06	6.9
Sun Dec 02/Mon Dec 03	3 04	20 39	22 06	4 59	6 26	1 11	8 04	4 11	.....	18	13 25.0	- 2 47	6.9
Mon Dec 03/Tue Dec 04	3 08	20 40	22 07	4 59	6 26	1 15	8 08	4 47	.....	11	14 14.5	- 7 27	6.9
Tue Dec 04/Wed Dec 05	3 12	20 41	22 08	4 59	6 26	1 20	8 12	5 25	18 14	5	15 04.4	-11 40	6.8
Wed Dec 05/Thu Dec 06	3 16	20 42	22 09	4 59	6 26	1 25	8 16	6 04	19 13	2	15 55.0	-15 16	6.8
Thu Dec 06/Fri Dec 07	3 20	20 43	22 10	4 59	6 26	1 30	8 20	.....	20 11	0	16 46.3	-18 04	6.8
Fri Dec 07/Sat Dec 08	3 24	20 43	22 11	4 59	6 27	1 35	8 23	.....	21 08	1	17 38.3	-19 58	6.8
Sat Dec 08/Sun Dec 09	3 28	20 44	22 12	4 59	6 27	1 40	8 27	.....	22 01	3	18 30.4	-20 51	6.8
Sun Dec 09/Mon Dec 10	3 32	20 45	22 13	4 59	6 27	1 45	8 31	.....	22 51	7	19 22.1	-20 45	6.8
Mon Dec 10/Tue Dec 11	3 36	20 46	22 14	4 59	6 27	1 49	8 35	.....	23 36	13	20 12.9	-19 40	6.7
Tue Dec 11/Wed Dec 12	3 40	20 46	22 15	4 59	6 27	1 54	8 39	.....	0 17	20	21 02.3	-17 43	6.7
Wed Dec 12/Thu Dec 13	3 44	20 47	22 15	4 59	6 28	1 59	8 44	.....	0 55	28	21 50.3	-14 59	6.7
Thu Dec 13/Fri Dec 14	3 48	20 48	22 16	4 59	6 28	2 04	8 48	.....	1 30	37	22 37.1	-11 37	6.7
Fri Dec 14/Sat Dec 15	3 52	20 48	22 17	4 59	6 28	2 08	8 52	.....	2 03	46	23 23.2	- 7 43	6.7
Sat Dec 15/Sun Dec 16	3 56	20 49	22 18	5 00	6 29	2 13	8 56	.....	2 35	56	0 09.1	- 3 25	6.7
Sun Dec 16/Mon Dec 17	4 00	20 49	22 18	5 00	6 29	2 18	9 00	.....	3 08	66	0 55.6	1 10	6.7
Mon Dec 17/Tue Dec 18	4 03	20 50	22 19	5 00	6 29	2 22	9 05	.....	3 41	75	1 43.7	5 51	6.7
Tue Dec 18/Wed Dec 19	4 07	20 51	22 20	5 01	6 30	2 27	9 09	.....	4 18	84	2 34.1	10 28	6.7
Wed Dec 19/Thu Dec 20	4 11	20 51	22 20	5 01	6 30	2 31	9 13	.....	4 59	91	3 27.7	14 44	6.7
Thu Dec 20/Fri Dec 21	4 15	20 52	22 21	5 02	6 31	2 36	9 18	18 31	5 45	96	4 25.0	18 20	6.7
Fri Dec 21/Sat Dec 22	4 19	20 52	22 21	5 02	6 31	2 40	9 22	19 37	.....	99	5 26.1	20 56	6.7
Sat Dec 22/Sun Dec 23	4 23	20 53	22 22	5 03	6 32	2 45	9 27	20 42	.....	100	6 29.8	22 12	6.7
Sun Dec 23/Mon Dec 24	4 27	20 53	22 22	5 03	6 32	2 49	9 31	21 45	.....	97	7 34.7	21 56	6.7
Mon Dec 24/Tue Dec 25	4 31	20 54	22 23	5 04	6 33	2 53	9 36	22 42	.....	92	8 38.5	20 10	6.7
Tue Dec 25/Wed Dec 26	4 35	20 54	22 23	5 04	6 33	2 58	9 40	23 34	.....	84	9 39.9	17 05	6.7
Wed Dec 26/Thu Dec 27	4 39	20 54	22 23	5 05	6 34	3 02	9 45	0 19	.....	74	10 37.9	13 02	6.7
Thu Dec 27/Fri Dec 28	4 43	20 55	22 24	5 06	6 35	3 06	9 50	1 00	.....	64	11 32.7	8 21	6.7
Fri Dec 28/Sat Dec 29	4 47	20 55	22 24	5 07	6 35	3 10	9 54	1 38	.....	53	12 24.9	3 24	6.7
Sat Dec 29/Sun Dec 30	4 51	20 55	22 24	5 07	6 36	3 15	9 59	2 14	.....	42	13 15.2	- 1 34	6.7
Sun Dec 30/Mon Dec 31	4 55	20 56	22 24	5 08	6 37	3 19	10 04	2 49	.....	31	14 04.7	- 6 19	6.7
Mon Dec 31/Tue Jan 01	4 59	20 56	22 24	5 09	6 37	3 23	10 08	3 26	.....	22	14 54.0	-10 38	6.7