

\*\*\*\*\* 2008 Night-time Astronomical Calendar for Kitt Peak \*\*\*\*\*

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.

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 18.0 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 hemishpheres. 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  
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[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 2008, at Kitt Peak

Times and dates are given in local time, zone = 7 hr West.  
They are generally better than +- 2 minutes.

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

NEW		1ST		FULL		LAST	
Dec 09	10 41	Dec 17	3 18	Dec 23	18 17	Dec 31	0 51
Jan 08	4 38	Jan 15	12 46	Jan 22	6 35	Jan 29	22 03
Feb 06	20 45	Feb 13	20 34	Feb 20	20 31	Feb 28	19 20
Mar 07	10 15	Mar 14	3 46	Mar 21	11 40	Mar 29	14 49
Apr 05	20 56	Apr 12	11 32	Apr 20	3 26	Apr 28	7 14
May 05	5 19	May 11	20 47	May 19	19 12	May 27	19 58
Jun 03	12 24	Jun 10	8 03	Jun 18	10 31	Jun 26	5 11
Jul 02	19 20	Jul 09	21 35	Jul 18	1 00	Jul 25	11 43
Aug 01	3 14	Aug 08	13 21	Aug 16	14 18	Aug 23	16 51
Aug 30	12 59	Sep 07	7 06	Sep 15	2 15	Sep 21	22 06
Sep 29	1 13	Oct 07	2 06	Oct 14	13 04	Oct 21	4 57
Oct 28	16 15	Nov 05	21 05	Nov 12	23 19	Nov 19	14 33
Nov 27	9 56	Dec 05	14 26	Dec 12	9 39	Dec 19	3 31
Dec 27	5 24	Jan 04	4 57	Jan 10	20 28	Jan 17	19 47

\*\*\*\*\* 2008 JANUARY \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Jan 01/Wed Jan 02	4467.8	6 18 49	17 38	19 00	6 00	7 22	1 18	12 20	2 21	.....	31	13 58.3	-17 05
Wed Jan 02/Thu Jan 03	4468.8	6 22 45	17 39	19 01	6 00	7 22	1 23	12 24	3 17	.....	23	14 44.7	-21 13
Thu Jan 03/Fri Jan 04	4469.8	6 26 42	17 40	19 01	6 00	7 22	1 27	12 28	4 15	.....	16	15 33.5	-24 32
Fri Jan 04/Sat Jan 05	4470.8	6 30 38	17 40	19 02	6 01	7 23	1 32	12 32	5 12	.....	9	16 24.7	-26 49
Sat Jan 05/Sun Jan 06	4471.8	6 34 35	17 41	19 03	6 01	7 23	1 37	12 36	6 08	.....	5	17 18.1	-27 56
Sun Jan 06/Mon Jan 07	4472.8	6 38 31	17 42	19 04	6 01	7 23	1 41	12 41	6 59	16 05	2	18 12.6	-27 43
Mon Jan 07/Tue Jan 08	4473.8	6 42 28	17 43	19 04	6 01	7 23	1 46	12 45	7 45	17 02	0	19 07.1	-26 10
Tue Jan 08/Wed Jan 09	4474.8	6 46 24	17 43	19 05	6 01	7 23	1 51	12 49	.....	18 03	1	20 00.5	-23 20
Wed Jan 09/Thu Jan 10	4475.8	6 50 21	17 44	19 06	6 01	7 23	1 55	12 53	.....	19 06	3	20 52.2	-19 20
Thu Jan 10/Fri Jan 11	4476.8	6 54 18	17 45	19 06	6 01	7 23	2 00	12 57	.....	20 08	8	21 41.9	-14 23
Fri Jan 11/Sat Jan 12	4477.8	6 58 14	17 46	19 07	6 01	7 23	2 05	13 01	.....	21 11	14	22 30.2	- 8 43
Sat Jan 12/Sun Jan 13	4478.8	7 02 11	17 47	19 08	6 01	7 23	2 09	13 05	.....	22 13	23	23 17.8	- 2 35
Sun Jan 13/Mon Jan 14	4479.8	7 06 07	17 48	19 09	6 01	7 22	2 14	13 09	.....	23 16	32	0 05.8	3 46
Mon Jan 14/Tue Jan 15	4480.8	7 10 04	17 49	19 10	6 01	7 22	2 19	13 12	.....	0 20	43	0 55.4	10 03
Tue Jan 15/Wed Jan 16	4481.8	7 14 00	17 49	19 10	6 01	7 22	2 24	13 16	.....	1 28	55	1 47.7	15 57
Wed Jan 16/Thu Jan 17	4482.8	7 17 57	17 50	19 11	6 01	7 22	2 28	13 20	.....	2 38	66	2 44.0	21 05
Thu Jan 17/Fri Jan 18	4483.8	7 21 53	17 51	19 12	6 01	7 22	2 33	13 24	.....	3 50	76	3 44.7	25 02
Fri Jan 18/Sat Jan 19	4484.8	7 25 50	17 52	19 13	6 01	7 21	2 38	13 28	.....	5 00	86	4 49.1	27 22
Sat Jan 19/Sun Jan 20	4485.8	7 29 47	17 53	19 13	6 01	7 21	2 42	13 32	.....	6 04	93	5 55.5	27 47
Sun Jan 20/Mon Jan 21	4486.8	7 33 43	17 54	19 14	6 01	7 21	2 47	13 35	15 49	6 59	98	7 01.0	26 14
Mon Jan 21/Tue Jan 22	4487.8	7 37 40	17 55	19 15	6 00	7 20	2 52	13 39	16 59	7 45	100	8 03.2	22 57
Tue Jan 22/Wed Jan 23	4488.8	7 41 36	17 56	19 16	6 00	7 20	2 57	13 43	18 10	.....	99	9 00.8	18 19
Wed Jan 23/Thu Jan 24	4489.8	7 45 33	17 57	19 17	6 00	7 20	3 01	13 46	19 17	.....	96	9 53.7	12 49
Thu Jan 24/Fri Jan 25	4490.8	7 49 29	17 58	19 17	5 59	7 19	3 06	13 50	20 20	.....	91	10 42.7	6 52
Fri Jan 25/Sat Jan 26	4491.8	7 53 26	17 58	19 18	5 59	7 19	3 11	13 54	21 20	.....	84	11 29.1	0 48
Sat Jan 26/Sun Jan 27	4492.8	7 57 22	17 59	19 19	5 59	7 18	3 16	13 57	22 17	.....	76	12 13.9	- 5 08
Sun Jan 27/Mon Jan 28	4493.8	8 01 19	18 00	19 20	5 58	7 18	3 20	14 01	23 14	.....	67	12 58.2	-10 43
Mon Jan 28/Tue Jan 29	4494.8	8 05 16	18 01	19 21	5 58	7 17	3 25	14 04	0 10	.....	58	13 43.1	-15 47
Tue Jan 29/Wed Jan 30	4495.8	8 09 12	18 02	19 21	5 57	7 17	3 30	14 08	1 07	.....	48	14 29.5	-20 12
Wed Jan 30/Thu Jan 31	4496.8	8 13 09	18 03	19 22	5 57	7 16	3 35	14 11	2 04	.....	39	15 17.8	-23 48
Thu Jan 31/Fri Feb 01	4497.8	8 17 05	18 04	19 23	5 56	7 15	3 39	14 15	3 02	.....	30	16 08.4	-26 25

\*\*\*\*\* 2008 FEBRUARY \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Feb 01/Sat Feb 02	4498.8	8 21 02	18 05	19 24	5 56	7 15	3 44	14 18	3 58	.....	22	17 01.2	-27 54
Sat Feb 02/Sun Feb 03	4499.8	8 24 58	18 06	19 25	5 55	7 14	3 49	14 21	4 51	.....	15	17 55.5	-28 05
Sun Feb 03/Mon Feb 04	4500.8	8 28 55	18 07	19 25	5 55	7 13	3 54	14 25	5 39	.....	8	18 50.3	-26 56
Mon Feb 04/Tue Feb 05	4501.8	8 32 51	18 08	19 26	5 54	7 13	3 58	14 28	6 22	.....	4	19 44.4	-24 27
Tue Feb 05/Wed Feb 06	4502.8	8 36 48	18 08	19 27	5 54	7 12	4 03	14 31	7 00	16 53	1	20 37.1	-20 43
Wed Feb 06/Thu Feb 07	4503.8	8 40 45	18 09	19 28	5 53	7 11	4 08	14 35	7 34	17 56	0	21 28.1	-15 56
Thu Feb 07/Fri Feb 08	4504.8	8 44 41	18 10	19 28	5 52	7 10	4 12	14 38	.....	19 00	1	22 17.5	-10 20
Fri Feb 08/Sat Feb 09	4505.8	8 48 38	18 11	19 29	5 52	7 10	4 17	14 41	.....	20 04	5	23 06.1	- 4 11
Sat Feb 09/Sun Feb 10	4506.8	8 52 34	18 12	19 30	5 51	7 09	4 22	14 44	.....	21 08	11	23 54.6	2 15
Sun Feb 10/Mon Feb 11	4507.8	8 56 31	18 13	19 31	5 50	7 08	4 27	14 48	.....	22 13	19	0 44.1	8 38
Mon Feb 11/Tue Feb 12	4508.8	9 00 27	18 14	19 32	5 49	7 07	4 31	14 51	.....	23 20	29	1 35.8	14 40
Tue Feb 12/Wed Feb 13	4509.8	9 04 24	18 15	19 32	5 49	7 06	4 36	14 54	.....	0 29	39	2 30.7	19 58
Wed Feb 13/Thu Feb 14	4510.8	9 08 20	18 15	19 33	5 48	7 05	4 41	14 57	.....	1 40	51	3 29.2	24 09
Thu Feb 14/Fri Feb 15	4511.8	9 12 17	18 16	19 34	5 47	7 04	4 45	15 00	.....	2 49	62	4 31.1	26 51
Fri Feb 15/Sat Feb 16	4512.8	9 16 14	18 17	19 35	5 46	7 03	4 50	15 03	.....	3 54	73	5 35.1	27 48
Sat Feb 16/Sun Feb 17	4513.8	9 20 10	18 18	19 35	5 45	7 02	4 55	15 06	.....	4 51	83	6 39.1	26 54
Sun Feb 17/Mon Feb 18	4514.8	9 24 07	18 19	19 36	5 44	7 01	5 00	15 09	.....	5 39	90	7 40.7	24 15
Mon Feb 18/Tue Feb 19	4515.8	9 28 03	18 20	19 37	5 43	7 00	5 04	15 12	.....	6 19	96	8 38.6	20 09
Tue Feb 19/Wed Feb 20	4516.8	9 32 00	18 21	19 38	5 42	6 59	5 09	15 15	16 59	6 53	99	9 32.4	15 01
Wed Feb 20/Thu Feb 21	4517.8	9 35 56	18 21	19 38	5 41	6 58	5 14	15 18	18 03	7 23	100	10 22.6	9 14
Thu Feb 21/Fri Feb 22	4518.8	9 39 53	18 22	19 39	5 40	6 57	5 18	15 21	19 04	.....	98	11 10.1	3 09
Fri Feb 22/Sat Feb 23	4519.8	9 43 49	18 23	19 40	5 39	6 56	5 23	15 24	20 03	.....	95	11 55.8	- 2 56
Sat Feb 23/Sun Feb 24	4520.8	9 47 46	18 24	19 41	5 38	6 55	5 28	15 27	21 01	.....	89	12 40.9	- 8 45
Sun Feb 24/Mon Feb 25	4521.8	9 51 43	18 25	19 41	5 37	6 54	5 32	15 30	21 58	.....	83	13 26.3	-14 08
Mon Feb 25/Tue Feb 26	4522.8	9 55 39	18 25	19 42	5 36	6 53	5 37	15 33	22 55	.....	75	14 12.7	-18 53
Tue Feb 26/Wed Feb 27	4523.8	9 59 36	18 26	19 43	5 35	6 52	5 42	15 36	23 52	.....	66	15 00.9	-22 49
Wed Feb 27/Thu Feb 28	4524.8	10 03 32	18 27	19 44	5 34	6 51	5 46	15 39	0 50	.....	57	15 51.1	-25 48
Thu Feb 28/Fri Feb 29	4525.8	10 07 29	18 28	19 44	5 33	6 50	5 51	15 41	1 47	.....	47	16 43.3	-27 41
Fri Feb 29/Sat Mar 01	4526.8	10 11 25	18 28	19 45	5 32	6 48	5 56	15 44	2 41	.....	38	17 37.0	-28 19

\*\*\*\*\* 2008 MARCH \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn)		JDmid	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----			RA	Dec
(2008 at start)		(-2450000)		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum		
Sat Mar 01/Sun Mar 02	4527.8	10 15 22	18 29	19 46	5 31	6 47	6 00	15 47	3 30	.....	29	18 31.4	-27 38	
Sun Mar 02/Mon Mar 03	4528.8	10 19 18	18 30	19 47	5 30	6 46	6 05	15 50	4 15	.....	21	19 25.5	-25 37	
Mon Mar 03/Tue Mar 04	4529.8	10 23 15	18 31	19 47	5 28	6 45	6 10	15 53	4 55	.....	13	20 18.5	-22 20	
Tue Mar 04/Wed Mar 05	4530.8	10 27 12	18 31	19 48	5 27	6 44	6 15	15 55	5 31	.....	7	21 10.1	-17 55	
Wed Mar 05/Thu Mar 06	4531.8	10 31 08	18 32	19 49	5 26	6 43	6 19	15 58	6 04	16 43	3	22 00.4	-12 33	
Thu Mar 06/Fri Mar 07	4532.8	10 35 05	18 33	19 49	5 25	6 41	6 24	16 01	6 34	17 48	0	22 49.8	- 6 29	
Fri Mar 07/Sat Mar 08	4533.8	10 39 01	18 34	19 50	5 24	6 40	6 29	16 04	7 05	18 53	0	23 39.1	- 0 00	
Sat Mar 08/Sun Mar 09	4534.8	10 42 58	18 34	19 51	5 22	6 39	6 33	16 06	.....	19 59	3	0 29.4	6 34	
Sun Mar 09/Mon Mar 10	4535.8	10 46 54	18 35	19 52	5 21	6 38	6 38	16 09	.....	21 07	8	1 21.6	12 53	
Mon Mar 10/Tue Mar 11	4536.8	10 50 51	18 36	19 52	5 20	6 36	6 43	16 12	.....	22 18	16	2 16.7	18 31	
Tue Mar 11/Wed Mar 12	4537.8	10 54 47	18 37	19 53	5 19	6 35	6 47	16 14	.....	23 30	25	3 15.2	23 04	
Wed Mar 12/Thu Mar 13	4538.8	10 58 44	18 37	19 54	5 17	6 34	6 52	16 17	.....	0 41	36	4 16.8	26 09	
Thu Mar 13/Fri Mar 14	4539.8	11 02 41	18 38	19 55	5 16	6 33	6 57	16 20	.....	1 48	47	5 20.2	27 31	
Fri Mar 14/Sat Mar 15	4540.8	11 06 37	18 39	19 55	5 15	6 31	7 01	16 22	.....	2 47	59	6 23.5	27 04	
Sat Mar 15/Sun Mar 16	4541.8	11 10 34	18 39	19 56	5 13	6 30	7 06	16 25	.....	3 36	70	7 24.7	24 53	
Sun Mar 16/Mon Mar 17	4542.8	11 14 30	18 40	19 57	5 12	6 29	7 11	16 27	.....	4 18	79	8 22.3	21 15	
Mon Mar 17/Tue Mar 18	4543.8	11 18 27	18 41	19 58	5 11	6 28	7 15	16 30	.....	4 53	87	9 15.9	16 30	
Tue Mar 18/Wed Mar 19	4544.8	11 22 23	18 41	19 58	5 09	6 26	7 20	16 33	.....	5 24	94	10 06.1	11 01	
Wed Mar 19/Thu Mar 20	4545.8	11 26 20	18 42	19 59	5 08	6 25	7 25	16 35	16 53	5 52	98	10 53.6	5 07	
Thu Mar 20/Fri Mar 21	4546.8	11 30 16	18 43	20 00	5 07	6 24	7 30	16 38	17 52	6 19	100	11 39.4	- 0 55	
Fri Mar 21/Sat Mar 22	4547.8	11 34 13	18 44	20 01	5 05	6 22	7 34	16 40	18 49	6 45	100	12 24.5	- 6 49	
Sat Mar 22/Sun Mar 23	4548.8	11 38 10	18 44	20 01	5 04	6 21	7 39	16 43	19 46	7 13	97	13 09.8	-12 23	
Sun Mar 23/Mon Mar 24	4549.8	11 42 06	18 45	20 02	5 03	6 20	7 44	16 45	20 44	.....	94	13 56.2	-17 23	
Mon Mar 24/Tue Mar 25	4550.8	11 46 03	18 46	20 03	5 01	6 19	7 48	16 48	21 41	.....	88	14 44.1	-21 39	
Tue Mar 25/Wed Mar 26	4551.8	11 49 59	18 46	20 04	5 00	6 17	7 53	16 51	22 39	.....	81	15 34.0	-24 59	
Wed Mar 26/Thu Mar 27	4552.8	11 53 56	18 47	20 05	4 58	6 16	7 58	16 53	23 36	.....	73	16 25.9	-27 14	
Thu Mar 27/Fri Mar 28	4553.8	11 57 52	18 48	20 05	4 57	6 15	8 03	16 56	0 31	.....	65	17 19.2	-28 17	
Fri Mar 28/Sat Mar 29	4554.8	12 01 49	18 48	20 06	4 56	6 13	8 07	16 58	1 22	.....	55	18 13.1	-28 03	
Sat Mar 29/Sun Mar 30	4555.8	12 05 45	18 49	20 07	4 54	6 12	8 12	17 01	2 08	.....	46	19 06.9	-26 30	
Sun Mar 30/Mon Mar 31	4556.8	12 09 42	18 50	20 08	4 53	6 11	8 17	17 03	2 49	.....	36	19 59.6	-23 42	
Mon Mar 31/Tue Apr 01	4557.8	12 13 39	18 50	20 09	4 51	6 10	8 22	17 06	3 26	.....	27	20 51.0	-19 45	

\*\*\*\*\* 2008 APRIL \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Apr 01/Wed Apr 02	4558.8	12 17 35	18 51	20 09	4 50	6 08	8 26	17 08	4 00	.....	18	21 41.1	-14 49
Wed Apr 02/Thu Apr 03	4559.8	12 21 32	18 52	20 10	4 49	6 07	8 31	17 11	4 31	.....	11	22 30.4	- 9 04
Thu Apr 03/Fri Apr 04	4560.8	12 25 28	18 52	20 11	4 47	6 06	8 36	17 13	5 01	.....	5	23 19.6	- 2 46
Fri Apr 04/Sat Apr 05	4561.8	12 29 25	18 53	20 12	4 46	6 05	8 41	17 16	5 33	17 38	1	0 09.8	3 50
Sat Apr 05/Sun Apr 06	4562.8	12 33 21	18 54	20 13	4 44	6 03	8 46	17 18	6 06	18 46	0	1 02.1	10 21
Sun Apr 06/Mon Apr 07	4563.8	12 37 18	18 54	20 14	4 43	6 02	8 50	17 21	6 44	19 58	2	1 57.3	16 22
Mon Apr 07/Tue Apr 08	4564.8	12 41 14	18 55	20 15	4 41	6 01	8 55	17 23	.....	21 12	6	2 56.2	21 26
Tue Apr 08/Wed Apr 09	4565.8	12 45 11	18 56	20 15	4 40	6 00	9 00	17 26	.....	22 26	13	3 58.5	25 05
Wed Apr 09/Thu Apr 10	4566.8	12 49 08	18 57	20 16	4 39	5 58	9 05	17 29	.....	23 37	23	5 03.1	26 59
Thu Apr 10/Fri Apr 11	4567.8	12 53 04	18 57	20 17	4 37	5 57	9 10	17 31	.....	0 40	33	6 07.7	26 59
Fri Apr 11/Sat Apr 12	4568.8	12 57 01	18 58	20 18	4 36	5 56	9 14	17 34	.....	1 34	44	7 10.1	25 11
Sat Apr 12/Sun Apr 13	4569.8	13 00 57	18 59	20 19	4 34	5 55	9 19	17 36	.....	2 18	55	8 08.6	21 53
Sun Apr 13/Mon Apr 14	4570.8	13 04 54	18 59	20 20	4 33	5 54	9 24	17 39	.....	2 55	66	9 02.8	17 25
Mon Apr 14/Tue Apr 15	4571.8	13 08 50	19 00	20 21	4 32	5 52	9 29	17 41	.....	3 27	75	9 53.2	12 11
Tue Apr 15/Wed Apr 16	4572.8	13 12 47	19 01	20 22	4 30	5 51	9 34	17 44	.....	3 56	84	10 40.6	6 29
Wed Apr 16/Thu Apr 17	4573.8	13 16 43	19 01	20 23	4 29	5 50	9 39	17 46	.....	4 22	91	11 26.1	0 35
Thu Apr 17/Fri Apr 18	4574.8	13 20 40	19 02	20 23	4 28	5 49	9 44	17 49	.....	4 49	96	12 10.7	- 5 16
Fri Apr 18/Sat Apr 19	4575.8	13 24 37	19 03	20 24	4 26	5 48	9 48	17 52	17 39	5 16	99	12 55.5	-10 51
Sat Apr 19/Sun Apr 20	4576.8	13 28 33	19 03	20 25	4 25	5 47	9 53	17 54	18 35	5 45	100	13 41.3	-16 00
Sun Apr 20/Mon Apr 21	4577.8	13 32 30	19 04	20 26	4 23	5 46	9 58	17 57	19 32	6 17	99	14 28.8	-20 28
Mon Apr 21/Tue Apr 22	4578.8	13 36 26	19 05	20 27	4 22	5 44	10 03	17 59	20 30	.....	96	15 18.3	-24 05
Tue Apr 22/Wed Apr 23	4579.8	13 40 23	19 06	20 28	4 21	5 43	10 08	18 02	21 28	.....	92	16 09.8	-26 41
Wed Apr 23/Thu Apr 24	4580.8	13 44 19	19 06	20 29	4 19	5 42	10 13	18 05	22 23	.....	86	17 03.0	-28 05
Thu Apr 24/Fri Apr 25	4581.8	13 48 16	19 07	20 30	4 18	5 41	10 18	18 07	23 15	.....	79	17 56.9	-28 12
Fri Apr 25/Sat Apr 26	4582.8	13 52 12	19 08	20 31	4 17	5 40	10 23	18 10	0 03	.....	71	18 50.5	-27 02
Sat Apr 26/Sun Apr 27	4583.8	13 56 09	19 08	20 32	4 16	5 39	10 28	18 12	0 45	.....	62	19 43.1	-24 38
Sun Apr 27/Mon Apr 28	4584.8	14 00 06	19 09	20 33	4 14	5 38	10 33	18 15	1 23	.....	52	20 34.1	-21 06
Mon Apr 28/Tue Apr 29	4585.8	14 04 02	19 10	20 34	4 13	5 37	10 38	18 18	1 57	.....	42	21 23.7	-16 35
Tue Apr 29/Wed Apr 30	4586.8	14 07 59	19 11	20 35	4 12	5 36	10 42	18 20	2 28	.....	32	22 12.2	-11 14
Wed Apr 30/Thu May 01	4587.8	14 11 55	19 11	20 36	4 11	5 35	10 47	18 23	2 58	.....	23	23 00.3	- 5 16

\*\*\*\*\* 2008 MAY \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn)		JDmid	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----			RA	Dec
(2008 at start)		(-2450000)		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum		
Thu May 01/Fri May 02	4588.8	14 15 52	19 12	20 37	4 09	5 34	10 52	18 26	3 28	.....	14	23 49.3	1 06	
Fri May 02/Sat May 03	4589.8	14 19 48	19 13	20 38	4 08	5 33	10 57	18 29	4 00	.....	7	0 40.1	7 35	
Sat May 03/Sun May 04	4590.8	14 23 45	19 13	20 39	4 07	5 32	11 02	18 31	4 35	17 32	2	1 33.9	13 48	
Sun May 04/Mon May 05	4591.8	14 27 41	19 14	20 40	4 06	5 32	11 07	18 34	5 17	18 45	0	2 31.8	19 18	
Mon May 05/Tue May 06	4592.8	14 31 38	19 15	20 41	4 05	5 31	11 12	18 37	6 06	20 01	1	3 33.9	23 35	
Tue May 06/Wed May 07	4593.8	14 35 35	19 16	20 42	4 04	5 30	11 17	18 40	.....	21 16	5	4 39.4	26 11	
Wed May 07/Thu May 08	4594.8	14 39 31	19 16	20 43	4 02	5 29	11 22	18 43	.....	22 26	11	5 46.0	26 50	
Thu May 08/Fri May 09	4595.8	14 43 28	19 17	20 44	4 01	5 28	11 27	18 45	.....	23 25	20	6 50.9	25 32	
Fri May 09/Sat May 10	4596.8	14 47 24	19 18	20 45	4 00	5 27	11 32	18 48	.....	0 15	29	7 52.1	22 34	
Sat May 10/Sun May 11	4597.8	14 51 21	19 19	20 46	3 59	5 27	11 37	18 51	.....	0 55	40	8 48.4	18 18	
Sun May 11/Mon May 12	4598.8	14 55 17	19 19	20 47	3 58	5 26	11 42	18 54	.....	1 29	51	9 40.3	13 12	
Mon May 12/Tue May 13	4599.8	14 59 14	19 20	20 48	3 57	5 25	11 47	18 57	.....	1 59	61	10 28.5	7 35	
Tue May 13/Wed May 14	4600.8	15 03 10	19 21	20 49	3 56	5 25	11 52	19 00	.....	2 26	71	11 14.3	1 46	
Wed May 14/Thu May 15	4601.8	15 07 07	19 21	20 50	3 55	5 24	11 57	19 03	.....	2 52	80	11 58.8	- 4 03	
Thu May 15/Fri May 16	4602.8	15 11 04	19 22	20 51	3 54	5 23	12 02	19 06	.....	3 19	87	12 43.2	- 9 38	
Fri May 16/Sat May 17	4603.8	15 15 00	19 23	20 52	3 53	5 23	12 06	19 09	.....	3 47	93	13 28.3	-14 50	
Sat May 17/Sun May 18	4604.8	15 18 57	19 23	20 53	3 52	5 22	12 11	19 12	.....	4 18	97	14 15.0	-19 26	
Sun May 18/Mon May 19	4605.8	15 22 53	19 24	20 54	3 52	5 21	12 16	19 15	18 24	4 53	99	15 03.9	-23 15	
Mon May 19/Tue May 20	4606.8	15 26 50	19 25	20 55	3 51	5 21	12 21	19 18	19 21	5 33	100	15 54.9	-26 06	
Tue May 20/Wed May 21	4607.8	15 30 46	19 25	20 56	3 50	5 20	12 26	19 21	20 17	6 19	98	16 47.9	-27 49	
Wed May 21/Thu May 22	4608.8	15 34 43	19 26	20 57	3 49	5 20	12 31	19 25	21 10	.....	95	17 41.9	-28 16	
Thu May 22/Fri May 23	4609.8	15 38 39	19 27	20 58	3 48	5 19	12 36	19 28	21 59	.....	91	18 35.9	-27 24	
Fri May 23/Sat May 24	4610.8	15 42 36	19 27	20 59	3 48	5 19	12 41	19 31	22 43	.....	84	19 28.8	-25 18	
Sat May 24/Sun May 25	4611.8	15 46 33	19 28	20 59	3 47	5 18	12 46	19 34	23 22	.....	77	20 20.1	-22 03	
Sun May 25/Mon May 26	4612.8	15 50 29	19 29	21 00	3 46	5 18	12 50	19 37	23 56	.....	68	21 09.5	-17 49	
Mon May 26/Tue May 27	4613.8	15 54 26	19 29	21 01	3 46	5 18	12 55	19 41	0 27	.....	58	21 57.5	-12 46	
Tue May 27/Wed May 28	4614.8	15 58 22	19 30	21 02	3 45	5 17	13 00	19 44	0 57	.....	48	22 44.6	- 7 06	
Wed May 28/Thu May 29	4615.8	16 02 19	19 31	21 03	3 45	5 17	13 05	19 47	1 26	.....	37	23 32.0	- 1 01	
Thu May 29/Fri May 30	4616.8	16 06 15	19 31	21 04	3 44	5 17	13 10	19 51	1 56	.....	27	0 20.8	5 16	
Fri May 30/Sat May 31	4617.8	16 10 12	19 32	21 05	3 43	5 16	13 14	19 54	2 28	.....	17	1 12.2	11 27	
Sat May 31/Sun Jun 01	4618.8	16 14 08	19 32	21 05	3 43	5 16	13 19	19 58	3 06	.....	9	2 07.4	17 09	

\*\*\*\*\* 2008 JUNE \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----			LST twilight:		----- Moon: -----					
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sun Jun 01/Mon Jun 02	4619.8	16 18 05	19 33	21 06	3 43	5 16	13 24	20 01	3 51	17 33	4	3 07.2	21 54
Mon Jun 02/Tue Jun 03	4620.8	16 22 02	19 33	21 07	3 42	5 16	13 28	20 05	4 45	18 49	1	4 11.4	25 11
Tue Jun 03/Wed Jun 04	4621.8	16 25 58	19 34	21 08	3 42	5 15	13 33	20 08	5 49	20 03	0	5 18.5	26 38
Wed Jun 04/Thu Jun 05	4622.8	16 29 55	19 35	21 08	3 41	5 15	13 38	20 12	.....	21 09	3	6 25.5	26 02
Thu Jun 05/Fri Jun 06	4623.8	16 33 51	19 35	21 09	3 41	5 15	13 42	20 16	.....	22 04	9	7 29.6	23 34
Fri Jun 06/Sat Jun 07	4624.8	16 37 48	19 36	21 10	3 41	5 15	13 47	20 19	.....	22 50	16	8 29.2	19 35
Sat Jun 07/Sun Jun 08	4625.8	16 41 44	19 36	21 10	3 41	5 15	13 51	20 23	.....	23 27	26	9 23.7	14 35
Sun Jun 08/Mon Jun 09	4626.8	16 45 41	19 36	21 11	3 40	5 15	13 56	20 27	.....	24 00	36	10 14.0	8 58
Mon Jun 09/Tue Jun 10	4627.8	16 49 37	19 37	21 11	3 40	5 15	14 01	20 30	.....	0 28	46	11 01.1	3 06
Tue Jun 10/Wed Jun 11	4628.8	16 53 34	19 37	21 12	3 40	5 15	14 05	20 34	.....	0 55	56	11 46.4	- 2 46
Wed Jun 11/Thu Jun 12	4629.8	16 57 31	19 38	21 12	3 40	5 15	14 09	20 38	.....	1 22	66	12 30.9	- 8 26
Thu Jun 12/Fri Jun 13	4630.8	17 01 27	19 38	21 13	3 40	5 15	14 14	20 42	.....	1 50	75	13 15.7	-13 43
Fri Jun 13/Sat Jun 14	4631.8	17 05 24	19 39	21 13	3 40	5 15	14 18	20 46	.....	2 20	83	14 01.9	-18 26
Sat Jun 14/Sun Jun 15	4632.8	17 09 20	19 39	21 14	3 40	5 15	14 23	20 50	.....	2 54	89	14 50.0	-22 26
Sun Jun 15/Mon Jun 16	4633.8	17 13 17	19 39	21 14	3 40	5 15	14 27	20 54	.....	3 32	94	15 40.3	-25 32
Mon Jun 16/Tue Jun 17	4634.8	17 17 13	19 40	21 15	3 40	5 15	14 31	20 58	18 12	4 16	98	16 32.8	-27 31
Tue Jun 17/Wed Jun 18	4635.8	17 21 10	19 40	21 15	3 40	5 15	14 36	21 02	19 06	5 05	100	17 26.8	-28 17
Wed Jun 18/Thu Jun 19	4636.8	17 25 06	19 40	21 15	3 40	5 15	14 40	21 06	19 57	6 00	100	18 21.2	-27 44
Thu Jun 19/Fri Jun 20	4637.8	17 29 03	19 40	21 15	3 41	5 16	14 44	21 10	20 42	.....	98	19 14.9	-25 54
Fri Jun 20/Sat Jun 21	4638.8	17 33 00	19 41	21 16	3 41	5 16	14 48	21 14	21 22	.....	94	20 07.0	-22 53
Sat Jun 21/Sun Jun 22	4639.8	17 36 56	19 41	21 16	3 41	5 16	14 52	21 19	21 58	.....	88	20 57.1	-18 50
Sun Jun 22/Mon Jun 23	4640.8	17 40 53	19 41	21 16	3 41	5 16	14 56	21 23	22 30	.....	81	21 45.3	-13 57
Mon Jun 23/Tue Jun 24	4641.8	17 44 49	19 41	21 16	3 42	5 17	15 01	21 27	22 59	.....	72	22 32.3	- 8 26
Tue Jun 24/Wed Jun 25	4642.8	17 48 46	19 41	21 16	3 42	5 17	15 05	21 31	23 27	.....	63	23 18.9	- 2 29
Wed Jun 25/Thu Jun 26	4643.8	17 52 42	19 41	21 16	3 42	5 17	15 09	21 36	23 56	.....	52	0 06.3	3 39
Thu Jun 26/Fri Jun 27	4644.8	17 56 39	19 41	21 16	3 43	5 18	15 13	21 40	0 26	.....	41	0 55.5	9 44
Fri Jun 27/Sat Jun 28	4645.8	18 00 35	19 42	21 16	3 43	5 18	15 16	21 44	1 00	.....	30	1 48.0	15 27
Sat Jun 28/Sun Jun 29	4646.8	18 04 32	19 42	21 16	3 44	5 18	15 20	21 49	1 40	.....	20	2 44.7	20 25
Sun Jun 29/Mon Jun 30	4647.8	18 08 29	19 42	21 16	3 44	5 19	15 24	21 53	2 29	.....	11	3 45.9	24 12
Mon Jun 30/Tue Jul 01	4648.8	18 12 25	19 42	21 16	3 45	5 19	15 28	21 58	3 27	17 38	5	4 51.0	26 19



\*\*\*\*\* 2008 JULY \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----			RA	Dec
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum		
Tue Jul 01/Wed Jul 02	4649.8	18 16 22	19 42	21 16	3 45	5 20	15 32	22 02	4 34	18 47	1	5 57.8	26 31
Wed Jul 02/Thu Jul 03	4650.8	18 20 18	19 41	21 16	3 46	5 20	15 36	22 07	5 47	19 48	0	7 03.5	24 44
Thu Jul 03/Fri Jul 04	4651.8	18 24 15	19 41	21 15	3 46	5 20	15 39	22 11	.....	20 39	2	8 05.5	21 15
Fri Jul 04/Sat Jul 05	4652.8	18 28 11	19 41	21 15	3 47	5 21	15 43	22 16	.....	21 21	7	9 02.9	16 30
Sat Jul 05/Sun Jul 06	4653.8	18 32 08	19 41	21 15	3 48	5 21	15 47	22 20	.....	21 57	13	9 55.7	10 56
Sun Jul 06/Mon Jul 07	4654.8	18 36 04	19 41	21 15	3 48	5 22	15 50	22 25	.....	22 28	22	10 44.8	4 59
Mon Jul 07/Tue Jul 08	4655.8	18 40 01	19 41	21 14	3 49	5 22	15 54	22 30	.....	22 56	31	11 31.4	- 1 02
Tue Jul 08/Wed Jul 09	4656.8	18 43 58	19 41	21 14	3 50	5 23	15 57	22 34	.....	23 23	41	12 16.8	- 6 52
Wed Jul 09/Thu Jul 10	4657.8	18 47 54	19 40	21 13	3 50	5 23	16 01	22 39	.....	23 51	51	13 01.9	-12 20
Thu Jul 10/Fri Jul 11	4658.8	18 51 51	19 40	21 13	3 51	5 24	16 04	22 44	.....	0 21	60	13 47.9	-17 15
Fri Jul 11/Sat Jul 12	4659.8	18 55 47	19 40	21 12	3 52	5 25	16 08	22 48	.....	0 53	69	14 35.5	-21 28
Sat Jul 12/Sun Jul 13	4660.8	18 59 44	19 39	21 12	3 53	5 25	16 11	22 53	.....	1 30	78	15 25.1	-24 49
Sun Jul 13/Mon Jul 14	4661.8	19 03 40	19 39	21 11	3 54	5 26	16 14	22 58	.....	2 12	85	16 16.9	-27 07
Mon Jul 14/Tue Jul 15	4662.8	19 07 37	19 39	21 11	3 54	5 26	16 18	23 03	.....	3 00	91	17 10.5	-28 14
Tue Jul 15/Wed Jul 16	4663.8	19 11 33	19 38	21 10	3 55	5 27	16 21	23 07	17 52	3 53	96	18 05.0	-28 03
Wed Jul 16/Thu Jul 17	4664.8	19 15 30	19 38	21 09	3 56	5 28	16 24	23 12	18 40	4 50	99	18 59.2	-26 33
Thu Jul 17/Fri Jul 18	4665.8	19 19 27	19 37	21 09	3 57	5 28	16 28	23 17	19 22	5 49	100	19 52.3	-23 48
Fri Jul 18/Sat Jul 19	4666.8	19 23 23	19 37	21 08	3 58	5 29	16 31	23 22	19 59	.....	99	20 43.4	-19 56
Sat Jul 19/Sun Jul 20	4667.8	19 27 20	19 36	21 07	3 59	5 29	16 34	23 27	20 32	.....	96	21 32.7	-15 10
Sun Jul 20/Mon Jul 21	4668.8	19 31 16	19 36	21 06	4 00	5 30	16 37	23 32	21 02	.....	91	22 20.5	- 9 42
Mon Jul 21/Tue Jul 22	4669.8	19 35 13	19 35	21 05	4 00	5 31	16 40	23 36	21 31	.....	84	23 07.5	- 3 47
Tue Jul 22/Wed Jul 23	4670.8	19 39 09	19 35	21 05	4 01	5 31	16 43	23 41	21 59	.....	76	23 54.7	2 21
Wed Jul 23/Thu Jul 24	4671.8	19 43 06	19 34	21 04	4 02	5 32	16 46	23 46	22 28	.....	66	0 43.1	8 28
Thu Jul 24/Fri Jul 25	4672.8	19 47 02	19 33	21 03	4 03	5 33	16 49	23 51	23 00	.....	55	1 34.0	14 14
Fri Jul 25/Sat Jul 26	4673.8	19 50 59	19 33	21 02	4 04	5 33	16 52	23 56	23 37	.....	44	2 28.4	19 21
Sat Jul 26/Sun Jul 27	4674.8	19 54 56	19 32	21 01	4 05	5 34	16 55	0 01	0 20	.....	32	3 26.9	23 24
Sun Jul 27/Mon Jul 28	4675.8	19 58 52	19 31	21 00	4 06	5 35	16 58	0 06	1 13	.....	22	4 29.3	25 59
Mon Jul 28/Tue Jul 29	4676.8	20 02 49	19 31	20 59	4 07	5 35	17 01	0 10	2 14	.....	13	5 34.2	26 49
Tue Jul 29/Wed Jul 30	4677.8	20 06 45	19 30	20 58	4 08	5 36	17 04	0 15	3 24	17 33	6	6 39.2	25 44
Wed Jul 30/Thu Jul 31	4678.8	20 10 42	19 29	20 57	4 09	5 37	17 07	0 20	4 36	18 28	2	7 41.9	22 53
Thu Jul 31/Fri Aug 01	4679.8	20 14 38	19 28	20 56	4 10	5 37	17 10	0 25	5 48	19 13	0	8 40.7	18 34

\*\*\*\*\* 2008 AUGUST \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn)				JDmid	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
(2008 at start)				(-2450000)		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Aug 01/Sat Aug 02	4680.8	20 18 35	19 28	20 55	4 11	5 38	17 13	0 30	.....	19 52	1	9 35.3	13 15			
Sat Aug 02/Sun Aug 03	4681.8	20 22 31	19 27	20 54	4 12	5 39	17 16	0 35	.....	20 25	4	10 26.2	7 21			
Sun Aug 03/Mon Aug 04	4682.8	20 26 28	19 26	20 53	4 13	5 39	17 18	0 40	.....	20 55	10	11 14.2	1 14			
Mon Aug 04/Tue Aug 05	4683.8	20 30 25	19 25	20 51	4 14	5 40	17 21	0 45	.....	21 23	17	12 00.6	- 4 48			
Tue Aug 05/Wed Aug 06	4684.8	20 34 21	19 24	20 50	4 15	5 41	17 24	0 50	.....	21 51	26	12 46.4	-10 30			
Wed Aug 06/Thu Aug 07	4685.8	20 38 18	19 23	20 49	4 16	5 41	17 27	0 55	.....	22 20	35	13 32.5	-15 41			
Thu Aug 07/Fri Aug 08	4686.8	20 42 14	19 22	20 48	4 17	5 42	17 30	0 59	.....	22 52	44	14 19.8	-20 10			
Fri Aug 08/Sat Aug 09	4687.8	20 46 11	19 21	20 47	4 17	5 43	17 32	1 04	.....	23 27	54	15 08.9	-23 49			
Sat Aug 09/Sun Aug 10	4688.8	20 50 07	19 21	20 45	4 18	5 43	17 35	1 09	.....	0 08	63	16 00.0	-26 27			
Sun Aug 10/Mon Aug 11	4689.8	20 54 04	19 20	20 44	4 19	5 44	17 38	1 14	.....	0 53	72	16 52.9	-27 57			
Mon Aug 11/Tue Aug 12	4690.8	20 58 00	19 19	20 43	4 20	5 45	17 40	1 19	.....	1 44	80	17 46.9	-28 11			
Tue Aug 12/Wed Aug 13	4691.8	21 01 57	19 18	20 42	4 21	5 45	17 43	1 24	.....	2 40	87	18 41.1	-27 07			
Wed Aug 13/Thu Aug 14	4692.8	21 05 54	19 16	20 40	4 22	5 46	17 46	1 29	17 19	3 39	93	19 34.6	-24 46			
Thu Aug 14/Fri Aug 15	4693.8	21 09 50	19 15	20 39	4 23	5 47	17 48	1 34	17 58	4 39	97	20 26.7	-21 14			
Fri Aug 15/Sat Aug 16	4694.8	21 13 47	19 14	20 38	4 24	5 47	17 51	1 38	18 33	5 40	100	21 17.1	-16 40			
Sat Aug 16/Sun Aug 17	4695.8	21 17 43	19 13	20 36	4 25	5 48	17 53	1 43	19 04	6 41	100	22 06.0	-11 19			
Sun Aug 17/Mon Aug 18	4696.8	21 21 40	19 12	20 35	4 26	5 49	17 56	1 48	19 34	.....	98	22 54.0	- 5 23			
Mon Aug 18/Tue Aug 19	4697.8	21 25 36	19 11	20 34	4 27	5 49	17 59	1 53	20 03	.....	93	23 42.0	0 51			
Tue Aug 19/Wed Aug 20	4698.8	21 29 33	19 10	20 32	4 28	5 50	18 01	1 58	20 32	.....	87	0 30.9	7 06			
Wed Aug 20/Thu Aug 21	4699.8	21 33 29	19 09	20 31	4 28	5 51	18 04	2 03	21 03	.....	78	1 21.7	13 04			
Thu Aug 21/Fri Aug 22	4700.8	21 37 26	19 08	20 30	4 29	5 51	18 06	2 07	21 38	.....	68	2 15.6	18 24			
Fri Aug 22/Sat Aug 23	4701.8	21 41 23	19 07	20 28	4 30	5 52	18 09	2 12	22 19	.....	57	3 13.0	22 43			
Sat Aug 23/Sun Aug 24	4702.8	21 45 19	19 05	20 27	4 31	5 52	18 11	2 17	23 07	.....	46	4 13.8	25 39			
Sun Aug 24/Mon Aug 25	4703.8	21 49 16	19 04	20 25	4 32	5 53	18 14	2 22	0 04	.....	35	5 17.1	26 56			
Mon Aug 25/Tue Aug 26	4704.8	21 53 12	19 03	20 24	4 33	5 54	18 17	2 27	1 09	.....	24	6 20.9	26 23			
Tue Aug 26/Wed Aug 27	4705.8	21 57 09	19 02	20 22	4 34	5 54	18 19	2 32	2 19	.....	15	7 23.0	24 05			
Wed Aug 27/Thu Aug 28	4706.8	22 01 05	19 01	20 21	4 34	5 55	18 22	2 36	3 29	17 07	8	8 21.8	20 17			
Thu Aug 28/Fri Aug 29	4707.8	22 05 02	18 59	20 20	4 35	5 56	18 24	2 41	4 38	17 47	3	9 16.8	15 21			
Fri Aug 29/Sat Aug 30	4708.8	22 08 58	18 58	20 18	4 36	5 56	18 27	2 46	5 44	18 22	0	10 08.3	9 41			
Sat Aug 30/Sun Aug 31	4709.8	22 12 55	18 57	20 17	4 37	5 57	18 29	2 51	6 47	18 53	0	10 57.1	3 38			
Sun Aug 31/Mon Sep 01	4710.8	22 16 52	18 56	20 15	4 38	5 57	18 32	2 55	.....	19 22	3	11 44.0	- 2 27			

\*\*\*\*\* 2008 SEPTEMBER \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn)		JDmid	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
(2008 at start)		(-2450000)		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Sep 01/Tue Sep 02	4711.8	22 20 48	18 54	20 14	4 39	5 58	18 34	3 00	.....	19 50	7	12 30.1	- 8 20	
Tue Sep 02/Wed Sep 03	4712.8	22 24 45	18 53	20 12	4 39	5 59	18 37	3 05	.....	20 19	13	13 16.4	-13 45	
Wed Sep 03/Thu Sep 04	4713.8	22 28 41	18 52	20 11	4 40	5 59	18 39	3 10	.....	20 50	20	14 03.6	-18 32	
Thu Sep 04/Fri Sep 05	4714.8	22 32 38	18 51	20 10	4 41	6 00	18 42	3 14	.....	21 25	28	14 52.3	-22 30	
Fri Sep 05/Sat Sep 06	4715.8	22 36 34	18 49	20 08	4 42	6 01	18 44	3 19	.....	22 03	37	15 42.8	-25 29	
Sat Sep 06/Sun Sep 07	4716.8	22 40 31	18 48	20 07	4 42	6 01	18 46	3 24	.....	22 46	47	16 34.9	-27 22	
Sun Sep 07/Mon Sep 08	4717.8	22 44 27	18 47	20 05	4 43	6 02	18 49	3 28	.....	23 35	56	17 28.2	-28 02	
Mon Sep 08/Tue Sep 09	4718.8	22 48 24	18 45	20 04	4 44	6 02	18 51	3 33	.....	0 29	65	18 21.9	-27 26	
Tue Sep 09/Wed Sep 10	4719.8	22 52 21	18 44	20 02	4 45	6 03	18 54	3 38	.....	1 26	74	19 15.1	-25 33	
Wed Sep 10/Thu Sep 11	4720.8	22 56 17	18 43	20 01	4 45	6 04	18 56	3 43	.....	2 26	82	20 07.2	-22 29	
Thu Sep 11/Fri Sep 12	4721.8	23 00 14	18 41	19 59	4 46	6 04	18 59	3 47	.....	3 26	89	20 58.0	-18 19	
Fri Sep 12/Sat Sep 13	4722.8	23 04 10	18 40	19 58	4 47	6 05	19 01	3 52	17 03	4 27	95	21 47.5	-13 14	
Sat Sep 13/Sun Sep 14	4723.8	23 08 07	18 39	19 56	4 48	6 05	19 04	3 57	17 34	5 29	99	22 36.2	- 7 27	
Sun Sep 14/Mon Sep 15	4724.8	23 12 03	18 37	19 55	4 48	6 06	19 06	4 01	18 03	6 31	100	23 25.0	- 1 13	
Mon Sep 15/Tue Sep 16	4725.8	23 16 00	18 36	19 54	4 49	6 07	19 09	4 06	18 33	.....	99	0 14.6	5 12	
Tue Sep 16/Wed Sep 17	4726.8	23 19 56	18 35	19 52	4 50	6 07	19 11	4 11	19 04	.....	95	1 06.1	11 26	
Wed Sep 17/Thu Sep 18	4727.8	23 23 53	18 33	19 51	4 51	6 08	19 14	4 15	19 39	.....	89	2 00.5	17 07	
Thu Sep 18/Fri Sep 19	4728.8	23 27 50	18 32	19 49	4 51	6 09	19 16	4 20	20 18	.....	81	2 58.4	21 49	
Fri Sep 19/Sat Sep 20	4729.8	23 31 46	18 31	19 48	4 52	6 09	19 19	4 25	21 05	.....	71	3 59.6	25 11	
Sat Sep 20/Sun Sep 21	4730.8	23 35 43	18 29	19 47	4 53	6 10	19 22	4 29	21 59	.....	60	5 03.0	26 51	
Sun Sep 21/Mon Sep 22	4731.8	23 39 39	18 28	19 45	4 53	6 10	19 24	4 34	23 02	.....	48	6 06.9	26 43	
Mon Sep 22/Tue Sep 23	4732.8	23 43 36	18 27	19 44	4 54	6 11	19 27	4 38	0 09	.....	37	7 09.0	24 50	
Tue Sep 23/Wed Sep 24	4733.8	23 47 32	18 26	19 42	4 55	6 12	19 29	4 43	1 18	.....	27	8 07.8	21 25	
Wed Sep 24/Thu Sep 25	4734.8	23 51 29	18 24	19 41	4 55	6 12	19 32	4 48	2 26	.....	17	9 02.8	16 51	
Thu Sep 25/Fri Sep 26	4735.8	23 55 25	18 23	19 40	4 56	6 13	19 34	4 52	3 31	.....	10	9 54.2	11 28	
Fri Sep 26/Sat Sep 27	4736.8	23 59 22	18 22	19 38	4 57	6 14	19 37	4 57	4 34	16 53	5	10 42.8	5 38	
Sat Sep 27/Sun Sep 28	4737.8	0 03 19	18 20	19 37	4 57	6 14	19 39	5 02	5 35	17 22	1	11 29.5	- 0 22	
Sun Sep 28/Mon Sep 29	4738.8	0 07 15	18 19	19 36	4 58	6 15	19 42	5 06	6 35	17 51	0	12 15.5	- 6 16	
Mon Sep 29/Tue Sep 30	4739.8	0 11 12	18 18	19 34	4 59	6 15	19 45	5 11	.....	18 19	1	13 01.5	-11 48	
Tue Sep 30/Wed Oct 01	4740.8	0 15 08	18 16	19 33	4 59	6 16	19 47	5 15	.....	18 50	4	13 48.4	-16 47	

\*\*\*\*\* 2008 OCTOBER \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Oct 01/Thu Oct 02	4741.8	0 19 05	18 15	19 32	5 00	6 17	19 50	5 20	.....	19 23	9	14 36.6	-21 01
Thu Oct 02/Fri Oct 03	4742.8	0 23 01	18 14	19 30	5 01	6 17	19 53	5 25	.....	19 59	15	15 26.5	-24 19
Fri Oct 03/Sat Oct 04	4743.8	0 26 58	18 13	19 29	5 01	6 18	19 55	5 29	.....	20 41	22	16 18.0	-26 34
Sat Oct 04/Sun Oct 05	4744.8	0 30 54	18 11	19 28	5 02	6 19	19 58	5 34	.....	21 28	30	17 10.6	-27 37
Sun Oct 05/Mon Oct 06	4745.8	0 34 51	18 10	19 26	5 03	6 19	20 01	5 39	.....	22 19	39	18 03.6	-27 26
Mon Oct 06/Tue Oct 07	4746.8	0 38 48	18 09	19 25	5 03	6 20	20 03	5 43	.....	23 15	48	18 56.2	-26 01
Tue Oct 07/Wed Oct 08	4747.8	0 42 44	18 08	19 24	5 04	6 21	20 06	5 48	.....	0 12	58	19 47.8	-23 25
Wed Oct 08/Thu Oct 09	4748.8	0 46 41	18 06	19 23	5 05	6 21	20 09	5 52	.....	1 12	67	20 38.1	-19 44
Thu Oct 09/Fri Oct 10	4749.8	0 50 37	18 05	19 22	5 06	6 22	20 11	5 57	.....	2 11	76	21 27.2	-15 06
Fri Oct 10/Sat Oct 11	4750.8	0 54 34	18 04	19 20	5 06	6 23	20 14	6 02	.....	3 12	85	22 15.5	- 9 41
Sat Oct 11/Sun Oct 12	4751.8	0 58 30	18 03	19 19	5 07	6 23	20 17	6 06	.....	4 14	92	23 03.9	- 3 40
Sun Oct 12/Mon Oct 13	4752.8	1 02 27	18 01	19 18	5 08	6 24	20 20	6 11	16 31	5 17	97	23 53.2	2 41
Mon Oct 13/Tue Oct 14	4753.8	1 06 23	18 00	19 17	5 08	6 25	20 23	6 15	17 02	6 23	99	0 44.6	9 05
Tue Oct 14/Wed Oct 15	4754.8	1 10 20	17 59	19 16	5 09	6 26	20 25	6 20	17 35	7 33	100	1 39.2	15 07
Wed Oct 15/Thu Oct 16	4755.8	1 14 17	17 58	19 15	5 10	6 26	20 28	6 25	18 14	.....	97	2 37.5	20 21
Thu Oct 16/Fri Oct 17	4756.8	1 18 13	17 57	19 14	5 10	6 27	20 31	6 29	18 59	.....	91	3 39.8	24 18
Fri Oct 17/Sat Oct 18	4757.8	1 22 10	17 56	19 13	5 11	6 28	20 34	6 34	19 52	.....	83	4 45.0	26 33
Sat Oct 18/Sun Oct 19	4758.8	1 26 06	17 55	19 11	5 12	6 29	20 37	6 39	20 54	.....	74	5 50.9	26 53
Sun Oct 19/Mon Oct 20	4759.8	1 30 03	17 54	19 10	5 12	6 29	20 40	6 43	22 01	.....	63	6 54.9	25 21
Mon Oct 20/Tue Oct 21	4760.8	1 33 59	17 52	19 09	5 13	6 30	20 43	6 48	23 11	.....	52	7 55.3	22 13
Tue Oct 21/Wed Oct 22	4761.8	1 37 56	17 51	19 08	5 14	6 31	20 46	6 52	0 19	.....	40	8 51.3	17 52
Wed Oct 22/Thu Oct 23	4762.8	1 41 52	17 50	19 07	5 14	6 32	20 49	6 57	1 24	.....	30	9 43.2	12 40
Thu Oct 23/Fri Oct 24	4763.8	1 45 49	17 49	19 06	5 15	6 32	20 51	7 02	2 27	.....	21	10 31.9	7 00
Fri Oct 24/Sat Oct 25	4764.8	1 49 46	17 48	19 06	5 16	6 33	20 54	7 06	3 27	.....	13	11 18.4	1 08
Sat Oct 25/Sun Oct 26	4765.8	1 53 42	17 47	19 05	5 16	6 34	20 58	7 11	4 26	.....	7	12 03.9	- 4 41
Sun Oct 26/Mon Oct 27	4766.8	1 57 39	17 46	19 04	5 17	6 35	21 01	7 16	5 24	16 21	3	12 49.3	-10 14
Mon Oct 27/Tue Oct 28	4767.8	2 01 35	17 45	19 03	5 18	6 35	21 04	7 20	6 23	16 50	1	13 35.5	-15 18
Tue Oct 28/Wed Oct 29	4768.8	2 05 32	17 44	19 02	5 19	6 36	21 07	7 25	7 22	17 22	0	14 23.0	-19 41
Wed Oct 29/Thu Oct 30	4769.8	2 09 28	17 43	19 01	5 19	6 37	21 10	7 30	.....	17 57	2	15 12.3	-23 13
Thu Oct 30/Fri Oct 31	4770.8	2 13 25	17 43	19 00	5 20	6 38	21 13	7 34	.....	18 37	5	16 03.2	-25 44
Fri Oct 31/Sat Nov 01	4771.8	2 17 21	17 42	19 00	5 21	6 39	21 16	7 39	.....	19 22	10	16 55.4	-27 06

\*\*\*\*\* 2008 NOVEMBER \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Nov 01/Sun Nov 02	4772.8	2 21 18	17 41	18 59	5 21	6 40	21 19	7 44	.....	20 12	16	17 48.0	-27 15
Sun Nov 02/Mon Nov 03	4773.8	2 25 15	17 40	18 58	5 22	6 40	21 23	7 48	.....	21 06	23	18 40.2	-26 11
Mon Nov 03/Tue Nov 04	4774.8	2 29 11	17 39	18 57	5 23	6 41	21 26	7 53	.....	22 02	32	19 31.2	-23 58
Tue Nov 04/Wed Nov 05	4775.8	2 33 08	17 38	18 57	5 24	6 42	21 29	7 58	.....	23 00	41	20 20.8	-20 42
Wed Nov 05/Thu Nov 06	4776.8	2 37 04	17 38	18 56	5 24	6 43	21 32	8 02	.....	23 58	50	21 08.9	-16 30
Thu Nov 06/Fri Nov 07	4777.8	2 41 01	17 37	18 55	5 25	6 44	21 36	8 07	.....	0 57	60	21 56.1	-11 31
Fri Nov 07/Sat Nov 08	4778.8	2 44 57	17 36	18 55	5 26	6 45	21 39	8 12	.....	1 56	70	22 43.0	- 5 55
Sat Nov 08/Sun Nov 09	4779.8	2 48 54	17 35	18 54	5 27	6 45	21 42	8 16	.....	2 57	79	23 30.6	0 08
Sun Nov 09/Mon Nov 10	4780.8	2 52 50	17 35	18 54	5 27	6 46	21 46	8 21	.....	4 01	88	0 20.2	6 24
Mon Nov 10/Tue Nov 11	4781.8	2 56 47	17 34	18 53	5 28	6 47	21 49	8 26	.....	5 09	94	1 12.9	12 34
Tue Nov 11/Wed Nov 12	4782.8	3 00 44	17 34	18 53	5 29	6 48	21 53	8 30	16 05	6 20	98	2 09.8	18 12
Wed Nov 12/Thu Nov 13	4783.8	3 04 40	17 33	18 52	5 30	6 49	21 56	8 35	16 47	7 35	100	3 11.6	22 48
Thu Nov 13/Fri Nov 14	4784.8	3 08 37	17 32	18 52	5 30	6 50	21 59	8 40	17 38	.....	98	4 17.7	25 51
Fri Nov 14/Sat Nov 15	4785.8	3 12 33	17 32	18 51	5 31	6 51	22 03	8 44	18 39	.....	94	5 26.0	26 56
Sat Nov 15/Sun Nov 16	4786.8	3 16 30	17 31	18 51	5 32	6 52	22 07	8 49	19 46	.....	86	6 33.6	25 58
Sun Nov 16/Mon Nov 17	4787.8	3 20 26	17 31	18 51	5 33	6 52	22 10	8 54	20 58	.....	77	7 37.7	23 10
Mon Nov 17/Tue Nov 18	4788.8	3 24 23	17 30	18 50	5 33	6 53	22 14	8 59	22 09	.....	67	8 36.9	18 57
Tue Nov 18/Wed Nov 19	4789.8	3 28 19	17 30	18 50	5 34	6 54	22 17	9 03	23 17	.....	56	9 31.1	13 48
Wed Nov 19/Thu Nov 20	4790.8	3 32 16	17 29	18 50	5 35	6 55	22 21	9 08	0 21	.....	45	10 21.2	8 08
Thu Nov 20/Fri Nov 21	4791.8	3 36 13	17 29	18 49	5 36	6 56	22 25	9 13	1 22	.....	35	11 08.5	2 16
Fri Nov 21/Sat Nov 22	4792.8	3 40 09	17 29	18 49	5 36	6 57	22 28	9 17	2 21	.....	25	11 54.2	- 3 34
Sat Nov 22/Sun Nov 23	4793.8	3 44 06	17 28	18 49	5 37	6 58	22 32	9 22	3 18	.....	17	12 39.4	- 9 07
Sun Nov 23/Mon Nov 24	4794.8	3 48 02	17 28	18 49	5 38	6 59	22 36	9 27	4 16	.....	10	13 25.0	-14 13
Mon Nov 24/Tue Nov 25	4795.8	3 51 59	17 28	18 49	5 39	6 59	22 40	9 31	5 14	.....	5	14 11.9	-18 42
Tue Nov 25/Wed Nov 26	4796.8	3 55 55	17 28	18 48	5 39	7 00	22 43	9 36	6 13	15 57	2	15 00.4	-22 23
Wed Nov 26/Thu Nov 27	4797.8	3 59 52	17 27	18 48	5 40	7 01	22 47	9 41	7 10	16 36	0	15 50.8	-25 05
Thu Nov 27/Fri Nov 28	4798.8	4 03 48	17 27	18 48	5 41	7 02	22 51	9 46	8 05	17 19	0	16 42.5	-26 41
Fri Nov 28/Sat Nov 29	4799.8	4 07 45	17 27	18 48	5 42	7 03	22 55	9 50	.....	18 07	2	17 34.9	-27 06
Sat Nov 29/Sun Nov 30	4800.8	4 11 42	17 27	18 48	5 42	7 04	22 59	9 55	.....	19 00	6	18 27.0	-26 18
Sun Nov 30/Mon Dec 01	4801.8	4 15 38	17 27	18 48	5 43	7 04	23 03	10 00	.....	19 55	11	19 18.0	-24 21

\*\*\*\*\* 2008 DECEMBER \*\*\*\*\*

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time ( 7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2008 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Dec 01/Tue Dec 02	4802.8	4 19 35	17 27	18 48	5 44	7 05	23 07	10 04	.....	20 52	17	20 07.4	-21 21
Tue Dec 02/Wed Dec 03	4803.8	4 23 31	17 27	18 48	5 44	7 06	23 11	10 09	.....	21 50	25	20 55.0	-17 27
Wed Dec 03/Thu Dec 04	4804.8	4 27 28	17 27	18 48	5 45	7 07	23 15	10 14	.....	22 47	34	21 41.2	-12 48
Thu Dec 04/Fri Dec 05	4805.8	4 31 24	17 27	18 48	5 46	7 08	23 19	10 18	.....	23 44	43	22 26.7	- 7 32
Fri Dec 05/Sat Dec 06	4806.8	4 35 21	17 27	18 49	5 47	7 08	23 23	10 23	.....	0 42	53	23 12.3	- 1 50
Sat Dec 06/Sun Dec 07	4807.8	4 39 17	17 27	18 49	5 47	7 09	23 27	10 27	.....	1 43	64	23 59.2	4 08
Sun Dec 07/Mon Dec 08	4808.8	4 43 14	17 27	18 49	5 48	7 10	23 31	10 32	.....	2 46	74	0 48.7	10 08
Mon Dec 08/Tue Dec 09	4809.8	4 47 11	17 27	18 49	5 49	7 11	23 35	10 37	.....	3 54	83	1 42.1	15 51
Tue Dec 09/Wed Dec 10	4810.8	4 51 07	17 27	18 49	5 49	7 11	23 40	10 41	.....	5 06	91	2 40.4	20 52
Wed Dec 10/Thu Dec 11	4811.8	4 55 04	17 28	18 50	5 50	7 12	23 44	10 46	.....	6 20	97	3 44.1	24 39
Thu Dec 11/Fri Dec 12	4812.8	4 59 00	17 28	18 50	5 51	7 13	23 48	10 50	16 16	7 32	100	4 52.2	26 41
Fri Dec 12/Sat Dec 13	4813.8	5 02 57	17 28	18 50	5 51	7 13	23 52	10 55	17 22	.....	99	6 01.9	26 38
Sat Dec 13/Sun Dec 14	4814.8	5 06 53	17 28	18 51	5 52	7 14	23 57	11 00	18 34	.....	96	7 10.0	24 31
Sun Dec 14/Mon Dec 15	4815.8	5 10 50	17 29	18 51	5 52	7 15	0 01	11 04	19 49	.....	90	8 13.7	20 38
Mon Dec 15/Tue Dec 16	4816.8	5 14 46	17 29	18 51	5 53	7 15	0 05	11 09	21 01	.....	81	9 12.2	15 33
Tue Dec 16/Wed Dec 17	4817.8	5 18 43	17 29	18 52	5 54	7 16	0 10	11 13	22 09	.....	72	10 05.7	9 46
Wed Dec 17/Thu Dec 18	4818.8	5 22 40	17 30	18 52	5 54	7 16	0 14	11 18	23 13	.....	61	10 55.4	3 42
Thu Dec 18/Fri Dec 19	4819.8	5 26 36	17 30	18 53	5 55	7 17	0 18	11 22	0 14	.....	51	11 42.6	- 2 19
Fri Dec 19/Sat Dec 20	4820.8	5 30 33	17 31	18 53	5 55	7 17	0 23	11 27	1 13	.....	40	12 28.7	- 8 03
Sat Dec 20/Sun Dec 21	4821.8	5 34 29	17 31	18 54	5 56	7 18	0 27	11 31	2 11	.....	31	13 14.7	-13 18
Sun Dec 21/Mon Dec 22	4822.8	5 38 26	17 32	18 54	5 56	7 18	0 32	11 36	3 09	.....	22	14 01.5	-17 55
Mon Dec 22/Tue Dec 23	4823.8	5 42 22	17 32	18 55	5 57	7 19	0 36	11 40	4 07	.....	15	14 49.6	-21 45
Tue Dec 23/Wed Dec 24	4824.8	5 46 19	17 33	18 55	5 57	7 19	0 41	11 44	5 04	.....	9	15 39.5	-24 38
Wed Dec 24/Thu Dec 25	4825.8	5 50 15	17 33	18 56	5 57	7 20	0 45	11 49	6 00	.....	4	16 30.8	-26 27
Thu Dec 25/Fri Dec 26	4826.8	5 54 12	17 34	18 56	5 58	7 20	0 50	11 53	6 52	16 03	1	17 23.0	-27 06
Fri Dec 26/Sat Dec 27	4827.8	5 58 09	17 35	18 57	5 58	7 21	0 54	11 57	7 39	16 55	0	18 15.3	-26 32
Sat Dec 27/Sun Dec 28	4828.8	6 02 05	17 35	18 57	5 59	7 21	0 59	12 02	8 21	17 50	1	19 06.6	-24 48
Sun Dec 28/Mon Dec 29	4829.8	6 06 02	17 36	18 58	5 59	7 21	1 03	12 06	.....	18 47	3	19 56.3	-22 00
Mon Dec 29/Tue Dec 30	4830.8	6 09 58	17 36	18 59	5 59	7 21	1 08	12 10	.....	19 44	7	20 44.1	-18 16
Tue Dec 30/Wed Dec 31	4831.8	6 13 55	17 37	18 59	6 00	7 22	1 12	12 15	.....	20 41	12	21 30.3	-13 47
Wed Dec 31/Thu Jan 01	4832.8	6 17 51	17 38	19 00	6 00	7 22	1 17	12 19	.....	21 38	19	22 15.3	- 8 43