

**Пояснение для эфемерид больших планет.** В эфемеридах планет приводятся: Date (год, месяц, день), Right Asc. – прямое восхождение, Declination – склонение, Distance - геоцентрическое расстояние от Земли до планеты в астрономических единицах, dia – видимый диаметр в секундах дуги, mag - звездная величина, Elong – видимое угловое удаление (элонгация) от Солнца в градусах, I - фазовый угол (угол при центре планеты между направлениями на Солнце и Землю), Фаза - величина освещенной части диска планеты (от 0 до 100%), Limb - позиционный угол средней точки светлого лимба в градусах (отсчитывается от точки севера против часовой стрелки от 0° до 360°), De - угол наклона оси планеты к картинной плоскости перпендикулярной лучу зрения в градусах, причем знак указывает наклон северного «+» или южного «-» полюса планеты к Земле (для Сатурна это также наклон колец), Pr – позиционный угол северного полюса планеты по отношению к полюсу мира в градусах (отсчитывается при центре планеты против часовой стрелки от 0° до 360°). (*Occult v4.0*)

Mercury  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pr
year mth d	h m s	o ' "	AU	"		o	o		o	o	o
2031 Jan 1	17 7 9.00	-20 31 1.1	0.935999	7.1	-0.3	22.4w	86	53.6	100.9	-6	11
2031 Jan 4	17 17 58.38	-21 8 31.3	0.998713	6.7	-0.3	22.9w	76	61.8	98.8	-6	10
2031 Jan 7	17 31 14.97	-21 46 25.3	1.057486	6.3	-0.3	22.8w	68	68.4	96.4	-5	9
2031 Jan 10	17 46 19.26	-22 20 53.6	1.111566	6.0	-0.3	22.3w	62	73.8	93.9	-5	7
2031 Jan 13	18 2 43.49	-22 49 16.0	1.160696	5.8	-0.3	21.5w	56	78.1	91.3	-5	5
2031 Jan 16	18 20 8.03	-23 9 40.4	1.204874	5.5	-0.3	20.6w	51	81.7	88.5	-5	3
2031 Jan 19	18 38 18.72	-23 20 47.5	1.244223	5.4	-0.3	19.5w	46	84.7	85.6	-5	1
2031 Jan 22	18 57 5.08	-23 21 40.1	1.278906	5.2	-0.3	18.2w	42	87.3	82.6	-5	358
2031 Jan 25	19 16 19.10	-23 11 35.9	1.309090	5.1	-0.3	16.9w	38	89.4	79.5	-5	356
2031 Jan 28	19 35 54.61	-22 50 3.4	1.334916	5.0	-0.4	15.5w	34	91.3	76.3	-5	354
2031 Jan 31	19 55 46.82	-22 16 38.1	1.356479	4.9	-0.4	13.9w	31	93.0	72.9	-5	352
2031 Feb 3	20 15 52.03	-21 31 0.8	1.373807	4.9	-0.5	12.3w	27	94.5	69.3	-5	349
2031 Feb 6	20 36 7.44	-20 32 56.6	1.386848	4.8	-0.7	10.6w	23	95.9	65.4	-5	347
2031 Feb 9	20 56 31.01	-19 22 13.9	1.395450	4.8	-0.8	8.7w	20	97.1	60.7	-5	345
2031 Feb 12	21 17 1.35	-17 58 44.7	1.399346	4.8	-1.0	6.8w	16	98.2	54.7	-5	343
2031 Feb 15	21 37 37.51	-16 22 25.2	1.398125	4.8	-1.2	4.8w	11	99.0	45.4	-5	341
2031 Feb 18	21 58 18.80	-14 33 18.0	1.391214	4.8	-1.5	2.9w	7	99.6	25.1	-5	339
2031 Feb 21	22 19 4.25	-12 31 36.1	1.377851	4.8	-1.7	2.0e	5	99.8	328.4	-5	337
2031 Feb 24	22 39 51.99	-10 17 49.9	1.357087	4.9	-1.7	3.4e	9	99.4	278.7	-5	336
2031 Feb 27	23 0 38.11	- 7 52 58.6	1.327815	5.0	-1.5	5.7e	16	98.0	261.8	-5	334
2031 Mar 2	23 21 14.88	- 5 18 47.9	1.288879	5.2	-1.4	8.3e	25	95.4	254.1	-5	333
2031 Mar 5	23 41 28.43	- 2 38 12.6	1.239324	5.4	-1.3	10.9e	35	90.8	249.6	-5	332
2031 Mar 8	0 0 56.12	0 4 20.3	1.178820	5.7	-1.2	13.5e	47	84.0	246.7	-5	332
2031 Mar 11	0 19 5.07	2 42 42.9	1.108196	6.0	-1.0	15.7e	60	74.6	244.5	-5	331
2031 Mar 14	0 35 13.47	5 9 27.9	1.029823	6.5	-0.8	17.4e	75	63.2	242.8	-6	331
2031 Mar 17	0 48 35.75	7 16 42.8	0.947514	7.1	-0.5	18.3e	89	50.5	241.4	-6	331
2031 Mar 20	0 58 30.10	8 57 14.0	0.865870	7.7	-0.1	18.3e	104	37.7	239.8	-6	331
2031 Mar 23	1 4 26.12	10 5 10.8	0.789422	8.5	0.6	17.2e	119	25.9	237.8	-6	331
2031 Mar 26	1 6 11.78	10 36 30.8	0.722020	9.3	1.5	15.0e	133	15.8	235.1	-7	331
2031 Mar 29	1 4 0.19	10 29 37.9	0.666571	10.0	2.8	11.6e	147	8.0	230.6	-7	331
2031 Apr 1	0 58 34.75	9 46 32.6	0.624974	10.7	4.3	7.4e	161	2.8	221.3	-7	331
2031 Apr 4	0 51 7.81	8 34 2.3	0.598080	11.2	5.8	3.2e	172	0.5	184.7	-7	331
2031 Apr 7	0 43 8.62	7 3 33.5	0.585667	11.4	5.4	4.5w	169	0.9	96.8	-6	331
2031 Apr 10	0 36 3.34	5 28 53.5	0.586549	11.4	4.1	9.2w	158	3.5	76.0	-6	331
2031 Apr 13	0 30 56.88	4 2 43.0	0.598865	11.2	2.9	13.8w	148	7.8	69.4	-5	331
2031 Apr 16	0 28 25.35	2 54 0.7	0.620487	10.8	2.1	17.7w	138	13.0	66.3	-4	331
2031 Apr 19	0 28 39.30	2 7 28.5	0.649374	10.3	1.6	20.9w	129	18.7	64.4	-4	331
2031 Apr 22	0 31 32.33	1 44 24.3	0.683787	9.8	1.1	23.4w	121	24.3	63.3	-3	331
2031 Apr 25	0 36 49.71	1 44 0.5	0.722361	9.2	0.8	25.1w	114	29.8	62.5	-2	331
2031 Apr 28	0 44 14.35	2 4 28.3	0.764073	8.7	0.6	26.2w	107	35.1	62.0	-2	331
2031 May 1	0 53 30.33	2 43 37.8	0.808178	8.3	0.4	26.8w	101	40.2	61.7	-1	331
2031 May 4	1 4 24.46	3 39 18.6	0.854132	7.8	0.3	26.8w	96	45.0	61.6	-1	332
2031 May 7	1 16 46.93	4 49 28.1	0.901521	7.4	0.2	26.5w	90	49.8	61.8	0	332
2031 May 10	1 30 31.33	6 12 13.6	0.949993	7.0	0.1	25.7w	85	54.6	62.1	0	332
2031 May 13	1 45 34.47	7 45 49.2	0.999186	6.7	-0.1	24.5w	79	59.4	62.6	0	333
2031 May 16	2 1 56.07	9 28 31.9	1.048671	6.4	-0.2	23.0w	73	64.3	63.4	1	333
2031 May 19	2 19 38.55	11 18 35.5	1.097881	6.1	-0.4	21.2w	67	69.5	64.5	1	334
2031 May 22	2 38 46.59	13 14 2.8	1.146015	5.8	-0.5	19.0w	60	74.9	65.9	1	335
2031 May 25	2 59 26.44	15 12 34.7	1.191947	5.6	-0.7	16.5w	52	80.5	67.8	2	337
2031 May 28	3 21 44.49	17 11 17.2	1.234126	5.4	-1.0	13.6w	44	86.1	70.2	2	338
2031 May 31	3 45 44.86	19 6 28.5	1.270538	5.3	-1.2	10.5w	34	91.5	73.3	2	340
2031 Jun 3	4 11 25.71	20 53 33.0	1.298812	5.1	-1.6	7.1w	23	96.0	78.0	2	343
2031 Jun 6	4 38 35.00	22 27 14.0	1.316568	5.1	-2.0	3.5w	11	99.0	87.6	2	346
2031 Jun 9	5 6 47.73	23 42 15.3	1.322010	5.1	-2.4	0.9e	3	99.9	192.7	3	349
2031 Jun 12	5 35 27.53	24 34 25.9	1.314536	5.1	-1.9	4.2e	14	98.6	250.1	3	352

2031 Jun 15	6	3	53.17	25	1	38.2	1.294978	5.2	-1.5	7.7e	25	95.2	258.6	3	355
2031 Jun 18	6	31	27.02	25	4	3.6	1.265288	5.3	-1.2	11.1e	36	90.4	263.8	3	358
2031 Jun 21	6	57	40.74	24	43	45.4	1.227899	5.4	-0.9	14.2e	46	84.9	268.0	4	2
2031 Jun 24	7	22	16.46	24	3	50.8	1.185161	5.6	-0.7	16.9e	54	79.2	271.6	4	5
2031 Jun 27	7	45	4.92	23	7	49.1	1.139028	5.9	-0.5	19.4e	62	73.6	274.8	5	7
2031 Jun 30	8	6	2.57	21	59	6.6	1.090990	6.1	-0.3	21.4e	69	68.1	277.8	5	10
2031 Jul 3	8	25	8.86	20	40	54.9	1.042125	6.4	-0.2	23.2e	75	63.0	280.4	5	12
2031 Jul 6	8	42	24.35	19	16	9.3	0.993194	6.7	0.0	24.6e	81	58.0	282.8	6	14
2031 Jul 9	8	57	49.25	17	47	31.0	0.944736	7.1	0.1	25.6e	86	53.2	285.0	6	15
2031 Jul 12	9	11	22.41	16	17	32.9	0.897156	7.4	0.2	26.3e	92	48.4	287.0	7	17
2031 Jul 15	9	23	0.62	14	48	45.9	0.850798	7.9	0.4	26.6e	97	43.6	288.9	8	18
2031 Jul 18	9	32	38.14	13	23	45.3	0.806021	8.3	0.5	26.4e	103	38.7	290.8	8	19
2031 Jul 21	9	40	6.52	12	5	17.4	0.763262	8.8	0.7	25.7e	109	33.7	292.7	9	20
2031 Jul 24	9	45	14.94	10	56	24.3	0.723103	9.2	0.9	24.5e	116	28.4	294.7	9	20
2031 Jul 27	9	47	51.32	10	0	26.8	0.686344	9.7	1.3	22.6e	123	22.9	297.0	10	20
2031 Jul 30	9	47	44.84	9	20	57.6	0.654073	10.2	1.7	20.1e	131	17.4	299.8	11	20
2031 Aug 2	9	44	50.74	9	1	21.6	0.627717	10.6	2.3	16.8e	139	12.0	303.7	11	20
2031 Aug 5	9	39	17.44	9	4	13.3	0.609041	11.0	3.1	13.0e	149	7.1	309.9	12	20
2031 Aug 8	9	31	34.72	9	30	13.4	0.600047	11.1	4.2	8.8e	159	3.3	322.2	12	19
2031 Aug 11	9	22	39.17	10	17	3.4	0.602740	11.1	5.2	5.3e	167	1.3	354.8	12	18
2031 Aug 14	9	13	51.68	11	18	59.3	0.618791	10.8	5.0	5.5w	166	1.5	52.7	12	17
2031 Aug 17	9	6	44.44	12	27	36.2	0.649177	10.3	3.7	9.0w	156	4.4	81.1	11	16
2031 Aug 20	9	2	41.74	13	33	32.1	0.693933	9.6	2.4	12.6w	143	10.1	92.3	10	16
2031 Aug 23	9	2	44.01	14	28	7.4	0.752070	8.9	1.3	15.5w	129	18.3	98.3	9	16
2031 Aug 26	9	7	21.00	15	4	15.7	0.821571	8.1	0.5	17.4w	115	28.6	102.5	8	16
2031 Aug 29	9	16	32.71	15	16	33.2	0.899409	7.4	-0.1	18.2w	101	40.6	105.9	8	17
2031 Sep 1	9	29	53.74	15	1	24.0	0.981612	6.8	-0.6	18.0w	86	53.4	109.1	7	19
2031 Sep 4	9	46	38.75	14	17	21.4	1.063571	6.3	-0.9	16.8w	71	65.9	112.2	6	20
2031 Sep 7	10	5	50.10	13	5	33.0	1.140723	5.9	-1.0	15.0w	57	77.0	115.3	6	22
2031 Sep 10	10	26	28.33	11	29	34.1	1.209425	5.5	-1.2	12.6w	44	85.8	118.6	5	23
2031 Sep 13	10	47	42.51	9	34	36.5	1.267548	5.3	-1.3	10.0w	32	92.2	122.3	5	25
2031 Sep 16	11	8	56.13	7	26	15.4	1.314482	5.1	-1.4	7.4w	22	96.3	127.0	4	26
2031 Sep 19	11	29	47.47	5	9	33.0	1.350705	4.9	-1.6	4.7w	13	98.6	134.8	4	27
2031 Sep 22	11	50	6.31	2	48	32.7	1.377246	4.9	-1.7	2.4w	6	99.7	155.7	4	28
2031 Sep 25	12	9	50.05	0	26	17.4	1.395289	4.8	-1.7	1.6e	4	99.9	232.9	4	28
2031 Sep 28	12	29	0.44	-1	54	59.9	1.405945	4.8	-1.4	3.4e	8	99.5	273.9	3	29
2031 Oct 1	12	47	41.40	-4	13	43.7	1.410149	4.7	-1.1	5.5e	13	98.7	284.4	3	29
2031 Oct 4	13	5	57.70	-6	28	44.2	1.408642	4.7	-0.9	7.6e	18	97.7	288.7	3	28
2031 Oct 7	13	23	54.19	-8	39	8.6	1.401972	4.8	-0.7	9.5e	22	96.5	290.9	3	28
2031 Oct 10	13	41	35.29	-10	44	14.4	1.390530	4.8	-0.6	11.4e	26	95.1	292.0	3	28
2031 Oct 13	13	59	4.80	-12	43	25.6	1.374571	4.9	-0.5	13.1e	29	93.6	292.5	2	27
2031 Oct 16	14	16	25.65	-14	36	8.5	1.354243	4.9	-0.4	14.8e	33	91.9	292.6	2	26
2031 Oct 19	14	33	39.71	-16	21	50.4	1.329599	5.0	-0.3	16.3e	37	90.0	292.4	2	25
2031 Oct 22	14	50	47.50	-17	59	56.9	1.300627	5.1	-0.3	17.8e	41	87.9	291.8	2	24
2031 Oct 25	15	7	47.89	-19	29	51.4	1.267260	5.3	-0.2	19.1e	45	85.5	291.1	2	23
2031 Oct 28	15	24	37.54	-20	50	53.6	1.229394	5.4	-0.2	20.3e	49	82.7	290.2	1	21
2031 Oct 31	15	41	10.19	-22	2	18.6	1.186907	5.6	-0.2	21.3e	54	79.4	289.2	1	20
2031 Nov 3	15	57	15.38	-23	3	15.9	1.139694	5.9	-0.3	22.2e	59	75.4	288.0	1	19
2031 Nov 6	16	12	36.84	-23	52	48.1	1.087716	6.1	-0.3	22.8e	66	70.6	286.8	1	17
2031 Nov 9	16	26	49.94	-24	29	49.4	1.031109	6.5	-0.3	23.1e	73	64.7	285.5	0	16
2031 Nov 12	16	39	18.52	-24	53	1.8	0.970344	6.9	-0.3	23.0e	81	57.5	284.3	0	14
2031 Nov 15	16	49	11.03	-25	0	48.5	0.906504	7.4	-0.2	22.2e	91	48.7	283.2	0	13
2031 Nov 18	16	55	17.98	-24	51	2.0	0.841722	7.9	0.1	20.5e	104	38.1	282.4	-1	13
2031 Nov 21	16	56	16.26	-24	20	51.6	0.779770	8.6	0.6	17.6e	119	26.1	281.7	-1	13
2031 Nov 24	16	50	53.13	-23	27	4.7	0.726602	9.2	1.6	13.2e	136	13.9	280.9	-2	13
2031 Nov 27	16	39	3.85	-22	8	41.7	0.690148	9.7	3.5	7.2e	157	4.1	278.0	-3	14
2031 Nov 30	16	23	2.57	-20	33	0.6	0.678237	9.8	6.2	1.0e	177	0.1	204.4	-3	16
2031 Dec 3	16	7	14.74	-18	59	35.8	0.694663	9.6	3.5	7.0w	157	3.9	116.4	-4	18
2031 Dec 6	15	55	59.26	-17	51	38.9	0.736567	9.1	1.5	12.8w	136	14.2	112.7	-4	19
2031 Dec 9	15	51	17.17	-17	21	18.1	0.796157	8.4	0.4	17.1w	117	27.5	111.2	-4	19
2031 Dec 12	15	52	54.29	-17	26	25.3	0.864785	7.7	-0.1	19.7w	101	40.8	109.8	-4	19
2031 Dec 15	15	59	35.62	-17	57	34.3	0.935672	7.1	-0.4	21.0w	87	52.4	108.2	-4	18
2031 Dec 18	16	10	1.21	-18	44	33.1	1.004496	6.7	-0.4	21.5w	76	62.0	106.3	-4	17
2031 Dec 21	16	23	7.21	-19	39	6.1	1.068891	6.2	-0.5	21.3w	67	69.6	104.3	-4	16
2031 Dec 24	16	38	8.09	-20	35	15.1	1.127759	5.9	-0.4	20.7w	59	75.6	102.0	-4	14
2031 Dec 27	16	54	32.74	-21	28	51.2	1.180730	5.7	-0.4	19.8w	53	80.4	99.5	-4	13

2031 Dec 30 17 12 0.12 -22 17 3.1 1.227818 5.4 -0.4 18.7w 47 84.2 96.8 -4 11

Venus  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp
year mth d	h m s	o ' "	AU	"		o	o		o	o	o
2031 Jan 1	19 59 59.90	-22 0 32.4	1.599987	10.5	-3.9	17.8e	24	95.6	262.9	1	350
2031 Jan 6	20 26 18.56	-20 43 49.4	1.584552	10.6	-3.9	18.9e	26	94.9	260.6	1	348
2031 Jan 11	20 52 6.10	-19 12 0.4	1.568228	10.7	-3.9	20.1e	28	94.3	258.5	1	345
2031 Jan 16	21 17 20.77	-17 26 30.9	1.551019	10.8	-3.9	21.2e	29	93.6	256.5	1	344
2031 Jan 21	21 42 2.48	-15 28 53.6	1.532905	11.0	-3.9	22.4e	31	92.8	254.7	1	342
2031 Jan 26	22 6 12.37	-13 20 45.9	1.513841	11.1	-3.9	23.5e	33	92.1	253.1	1	341
2031 Jan 31	22 29 52.51	-11 3 48.3	1.493805	11.3	-3.9	24.6e	34	91.2	251.8	1	339
2031 Feb 5	22 53 6.05	- 8 39 40.4	1.472806	11.4	-3.9	25.8e	36	90.3	250.6	1	339
2031 Feb 10	23 15 57.10	- 6 9 58.9	1.450855	11.6	-3.9	26.9e	38	89.4	249.6	0	338
2031 Feb 15	23 38 30.44	- 3 36 18.4	1.427954	11.8	-3.9	28.0e	40	88.4	248.9	0	337
2031 Feb 20	0 0 51.22	- 1 0 11.9	1.404073	12.0	-3.9	29.1e	42	87.3	248.4	0	337
2031 Feb 25	0 23 4.51	1 36 47.3	1.379165	12.2	-3.9	30.2e	44	86.2	248.1	0	337
2031 Mar 2	0 45 15.07	4 13 5.6	1.353209	12.4	-3.9	31.3e	45	85.1	248.0	-1	337
2031 Mar 7	1 7 27.62	6 47 11.4	1.326215	12.7	-3.9	32.4e	47	83.8	248.2	-1	338
2031 Mar 12	1 29 46.83	9 17 34.6	1.298205	13.0	-4.0	33.4e	49	82.5	248.6	-1	339
2031 Mar 17	1 52 17.17	11 42 46.4	1.269194	13.3	-4.0	34.5e	51	81.2	249.2	-1	339
2031 Mar 22	2 15 2.64	14 1 17.7	1.239166	13.6	-4.0	35.5e	53	79.7	250.1	-2	341
2031 Mar 27	2 38 6.07	16 11 38.5	1.208097	13.9	-4.0	36.5e	56	78.2	251.1	-2	342
2031 Apr 1	3 1 29.03	18 12 19.8	1.175989	14.3	-4.0	37.5e	58	76.7	252.4	-2	343
2031 Apr 6	3 25 11.89	20 1 56.1	1.142880	14.7	-4.0	38.5e	60	75.0	254.0	-2	345
2031 Apr 11	3 49 13.83	21 39 7.6	1.108825	15.2	-4.1	39.4e	62	73.3	255.7	-3	347
2031 Apr 16	4 13 32.84	23 2 41.9	1.073876	15.7	-4.1	40.3e	65	71.5	257.6	-3	349
2031 Apr 21	4 38 5.30	24 11 36.2	1.038053	16.2	-4.1	41.1e	67	69.6	259.6	-3	351
2031 Apr 26	5 2 45.41	25 4 59.8	1.001375	16.8	-4.2	42.0e	69	67.6	261.8	-3	353
2031 May 1	5 27 25.53	25 42 17.8	0.963888	17.5	-4.2	42.7e	72	65.6	264.1	-3	356
2031 May 6	5 51 56.74	26 3 13.8	0.925675	18.2	-4.2	43.4e	74	63.4	266.4	-3	358
2031 May 11	6 16 9.55	26 7 50.5	0.886841	19.0	-4.3	44.0e	77	61.1	268.8	-3	0
2031 May 16	6 39 54.57	25 56 29.6	0.847488	19.8	-4.3	44.5e	80	58.8	271.1	-3	3
2031 May 21	7 3 2.32	25 29 52.2	0.807687	20.8	-4.3	44.9e	83	56.3	273.4	-3	5
2031 May 26	7 25 22.94	24 48 58.6	0.767514	21.9	-4.4	45.2e	86	53.8	275.6	-3	7
2031 May 31	7 46 46.60	23 55 5.8	0.727081	23.1	-4.4	45.4e	89	51.0	277.6	-3	9
2031 Jun 5	8 7 3.69	22 49 44.5	0.686536	24.5	-4.5	45.4e	92	48.2	279.6	-3	11
2031 Jun 10	8 26 5.15	21 34 34.7	0.646072	26.0	-4.5	45.2e	96	45.2	281.4	-2	12
2031 Jun 15	8 43 42.40	20 11 23.1	0.605879	27.8	-4.5	44.7e	99	42.0	283.1	-2	14
2031 Jun 20	8 59 45.73	18 42 7.3	0.566139	29.7	-4.6	44.0e	103	38.6	284.7	-1	15
2031 Jun 25	9 14 3.07	17 8 57.4	0.527077	31.9	-4.6	42.9e	107	35.0	286.2	-1	16
2031 Jun 30	9 26 19.45	15 34 17.2	0.488990	34.4	-4.7	41.4e	112	31.1	287.6	0	17
2031 Jul 5	9 36 16.63	14 0 44.8	0.452277	37.2	-4.7	39.4e	117	27.0	289.1	1	18
2031 Jul 10	9 43 34.01	12 31 12.1	0.417450	40.3	-4.7	36.8e	123	22.7	290.7	2	18
2031 Jul 15	9 47 49.47	11 8 49.6	0.385100	43.7	-4.7	33.5e	129	18.2	292.6	3	18
2031 Jul 20	9 48 40.33	9 57 16.1	0.355930	47.3	-4.6	29.4e	137	13.6	295.0	4	18
2031 Jul 25	9 45 48.67	9 0 31.0	0.330796	50.8	-4.5	24.5e	145	9.2	298.7	5	18
2031 Jul 30	9 39 11.88	8 22 24.8	0.310703	54.1	-4.3	18.8e	153	5.3	305.0	6	18
2031 Aug 4	9 29 17.35	8 5 38.5	0.296709	56.7	-4.1	12.7e	162	2.4	318.3	7	17
2031 Aug 9	9 17 13.93	8 10 22.2	0.289688	58.1	-4.1	8.0e	169	0.9	352.8	8	17
2031 Aug 14	9 4 44.43	8 33 36.9	0.290053	58.0	-4.1	9.0w	167	1.2	47.1	8	16
2031 Aug 19	8 53 39.69	9 9 49.1	0.297657	56.5	-4.2	14.5w	160	3.1	73.2	8	15
2031 Aug 24	8 45 29.44	9 52 18.4	0.311871	53.9	-4.4	20.6w	151	6.4	83.9	8	14
2031 Aug 29	8 41 5.74	10 34 49.6	0.331770	50.7	-4.6	26.2w	142	10.5	89.6	8	14
2031 Sep 3	8 40 44.37	11 12 21.3	0.356332	47.2	-4.7	31.0w	134	15.0	93.4	7	14
2031 Sep 8	8 44 14.61	11 41 17.3	0.384549	43.7	-4.7	34.9w	127	19.6	96.3	6	14
2031 Sep 13	8 51 9.95	11 59 20.9	0.415535	40.5	-4.8	38.0w	121	24.0	98.8	6	15
2031 Sep 18	9 0 58.46	12 5 11.3	0.448585	37.5	-4.7	40.5w	116	28.3	101.0	5	15
2031 Sep 23	9 13 9.17	11 58 3.6	0.483176	34.8	-4.7	42.4w	111	32.2	103.0	4	16
2031 Sep 28	9 27 15.16	11 37 34.7	0.518925	32.4	-4.7	43.9w	106	35.9	104.9	4	17
2031 Oct 3	9 42 54.20	11 3 38.6	0.555524	30.3	-4.7	44.9w	102	39.4	106.7	3	18
2031 Oct 8	9 59 47.57	10 16 29.1	0.592692	28.4	-4.6	45.7w	98	42.7	108.3	2	19
2031 Oct 13	10 17 39.26	9 16 40.1	0.630196	26.7	-4.6	46.1w	95	45.7	109.8	2	20
2031 Oct 18	10 36 16.18	8 5 0.6	0.667862	25.2	-4.5	46.3w	92	48.6	111.2	1	21
2031 Oct 23	10 55 28.23	6 42 29.3	0.705574	23.8	-4.5	46.4w	88	51.3	112.3	1	22

2031 Oct 28	11 15 8.42	5 10 10.3	0.743256	22.6	-4.4	46.3w	86	53.9	113.3	1	22
2031 Nov 2	11 35 12.36	3 29 13.5	0.780820	21.5	-4.4	46.0w	83	56.3	114.0	0	23
2031 Nov 7	11 55 37.18	1 40 57.6	0.818160	20.6	-4.4	45.6w	80	58.7	114.5	0	23
2031 Nov 12	12 16 21.06	- 0 13 11.0	0.855178	19.7	-4.3	45.1w	77	60.9	114.8	0	23
2031 Nov 17	12 37 23.17	- 2 11 41.0	0.891799	18.9	-4.3	44.6w	75	63.0	114.8	-1	23
2031 Nov 22	12 58 43.72	- 4 12 59.0	0.927986	18.1	-4.3	43.9w	72	65.1	114.6	-1	22
2031 Nov 27	13 20 24.21	- 6 15 32.0	0.963725	17.5	-4.2	43.2w	70	67.0	114.1	-1	22
2031 Dec 2	13 42 26.95	- 8 17 44.9	0.998972	16.8	-4.2	42.4w	68	68.9	113.4	-1	21
2031 Dec 7	14 4 54.28	-10 17 58.8	1.033664	16.3	-4.2	41.6w	66	70.7	112.4	-1	20
2031 Dec 12	14 27 48.28	-12 14 31.9	1.067739	15.8	-4.1	40.8w	63	72.4	111.1	-1	19
2031 Dec 17	14 51 10.54	-14 5 41.0	1.101151	15.3	-4.1	39.9w	61	74.0	109.6	-1	17
2031 Dec 22	15 15 2.18	-15 49 44.0	1.133895	14.8	-4.1	38.9w	59	75.6	107.9	-1	16
2031 Dec 27	15 39 24.16	-17 25 1.4	1.165979	14.4	-4.1	38.0w	57	77.1	105.9	-1	14

Mars  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp
year mth d	h m s	o ' "	AU	"		o	o		o	o	o
2031 Jan 1	13 24 12.08	- 6 58 3.1	1.563731	6.0	1.1	77.9w	35	90.8	112.2	21	35
2031 Jan 6	13 33 51.47	- 7 53 41.9	1.513742	6.2	1.1	80.4w	36	90.6	111.7	21	36
2031 Jan 11	13 43 20.76	- 8 47 9.0	1.463296	6.4	1.0	83.0w	36	90.4	111.2	20	37
2031 Jan 16	13 52 38.71	- 9 38 15.6	1.412476	6.6	0.9	85.6w	36	90.3	110.7	19	37
2031 Jan 21	14 1 43.50	-10 26 52.3	1.361373	6.9	0.8	88.3w	36	90.2	110.1	19	37
2031 Jan 26	14 10 32.88	-11 12 50.2	1.310127	7.1	0.7	91.1w	37	90.2	109.5	18	38
2031 Jan 31	14 19 4.63	-11 56 2.9	1.258910	7.4	0.7	94.0w	37	90.2	109.0	17	38
2031 Feb 5	14 27 16.55	-12 36 25.8	1.207873	7.7	0.6	96.9w	36	90.2	108.3	17	38
2031 Feb 10	14 35 6.00	-13 13 53.9	1.157143	8.1	0.5	100.0w	36	90.4	107.7	16	38
2031 Feb 15	14 42 29.67	-13 48 21.8	1.106846	8.5	0.4	103.2w	36	90.5	107.1	15	38
2031 Feb 20	14 49 23.36	-14 19 43.3	1.057136	8.9	0.2	106.5w	35	90.8	106.6	15	38
2031 Feb 25	14 55 42.39	-14 47 53.7	1.008229	9.3	0.1	109.9w	35	91.1	106.0	14	38
2031 Mar 2	15 1 22.23	-15 12 50.5	0.960359	9.7	0.0	113.5w	34	91.5	105.4	13	38
2031 Mar 7	15 6 18.17	-15 34 31.4	0.913740	10.2	-0.1	117.3w	33	92.0	104.9	13	38
2031 Mar 12	15 10 24.86	-15 52 53.1	0.868580	10.8	-0.3	121.2w	32	92.6	104.5	13	38
2031 Mar 17	15 13 36.10	-16 7 50.0	0.825106	11.3	-0.4	125.4w	30	93.3	104.1	12	38
2031 Mar 22	15 15 45.09	-16 19 15.0	0.783610	11.9	-0.6	129.8w	28	94.0	103.7	12	38
2031 Mar 27	15 16 45.73	-16 27 1.8	0.744447	12.6	-0.7	134.5w	26	94.9	103.4	12	38
2031 Apr 1	15 16 33.36	-16 31 4.8	0.707975	13.2	-0.9	139.5w	24	95.7	103.2	12	38
2031 Apr 6	15 15 4.77	-16 31 17.9	0.674536	13.9	-1.0	144.7w	21	96.6	103.1	12	38
2031 Apr 11	15 12 18.37	-16 27 34.5	0.644469	14.5	-1.2	150.3w	18	97.5	103.0	13	38
2031 Apr 16	15 8 14.81	-16 19 50.3	0.618132	15.1	-1.3	156.2w	15	98.3	102.9	13	38
2031 Apr 21	15 2 59.00	-16 8 9.8	0.595920	15.7	-1.5	162.3w	11	99.1	102.8	14	38
2031 Apr 26	14 56 41.82	-15 52 53.5	0.578182	16.2	-1.6	168.7w	7	99.6	102.1	15	39
2031 May 1	14 49 39.60	-15 34 41.1	0.565153	16.6	-1.7	175.3w	3	99.9	98.7	15	39
2031 May 6	14 42 12.35	-15 14 30.6	0.556931	16.8	-1.8	177.9e	1	100.0	300.8	16	39
2031 May 11	14 34 41.58	-14 53 35.0	0.553491	16.9	-1.8	171.3e	6	99.8	289.7	17	39
2031 May 16	14 27 28.81	-14 33 18.2	0.554728	16.9	-1.7	164.7e	10	99.3	288.6	18	39
2031 May 21	14 20 55.05	-14 15 11.4	0.560436	16.7	-1.6	158.3e	14	98.5	288.4	19	39
2031 May 26	14 15 18.46	-14 0 40.8	0.570273	16.4	-1.5	152.1e	18	97.6	288.5	19	38
2031 May 31	14 10 52.16	-13 50 55.1	0.583789	16.0	-1.4	146.3e	22	96.5	288.6	20	38
2031 Jun 5	14 7 43.50	-13 46 39.0	0.600491	15.6	-1.3	140.7e	25	95.4	288.7	20	38
2031 Jun 10	14 5 54.92	-13 48 13.5	0.619915	15.1	-1.2	135.5e	28	94.2	288.8	21	38
2031 Jun 15	14 5 26.21	-13 55 43.4	0.641664	14.6	-1.1	130.7e	31	93.1	288.9	21	38
2031 Jun 20	14 6 15.82	-14 9 2.4	0.665357	14.1	-1.0	126.2e	33	92.0	288.9	21	38
2031 Jun 25	14 8 20.59	-14 27 52.0	0.690614	13.6	-0.9	122.0e	35	90.9	288.8	21	38
2031 Jun 30	14 11 35.94	-14 51 43.8	0.717081	13.1	-0.8	118.1e	37	90.0	288.7	21	39
2031 Jul 5	14 15 56.38	-15 20 2.3	0.744462	12.6	-0.7	114.5e	38	89.2	288.5	20	39
2031 Jul 10	14 21 16.43	-15 52 9.5	0.772550	12.1	-0.6	111.1e	40	88.4	288.3	20	39
2031 Jul 15	14 27 31.82	-16 27 29.7	0.801190	11.7	-0.5	107.9e	41	87.8	288.0	20	39
2031 Jul 20	14 34 39.08	-17 5 28.3	0.830226	11.3	-0.4	105.0e	42	87.2	287.6	19	39
2031 Jul 25	14 42 34.80	-17 45 29.2	0.859501	10.9	-0.3	102.2e	43	86.7	287.2	18	39
2031 Jul 30	14 51 15.49	-18 26 55.5	0.888877	10.5	-0.3	99.6e	43	86.3	286.6	17	39
2031 Aug 4	15 0 37.66	-19 9 9.8	0.918260	10.2	-0.2	97.2e	44	86.0	286.0	17	39
2031 Aug 9	15 10 38.45	-19 51 36.2	0.947623	9.9	-0.1	94.9e	44	85.8	285.4	16	39
2031 Aug 14	15 21 16.05	-20 33 41.7	0.976943	9.6	-0.1	92.6e	45	85.6	284.6	15	39
2031 Aug 19	15 32 28.89	-21 14 53.7	1.006175	9.3	0.0	90.6e	45	85.4	283.8	14	38
2031 Aug 24	15 44 15.24	-21 54 39.2	1.035264	9.0	0.1	88.6e	45	85.3	282.9	12	38
2031 Aug 29	15 56 33.03	-22 32 25.2	1.064166	8.8	0.1	86.7e	45	85.3	281.9	11	37

2031 Sep 3	16 9 20.00	-23 7 39.3	1.092883	8.6	0.2	84.8e	45	85.3	280.8	10	36
2031 Sep 8	16 22 34.42	-23 39 50.6	1.121455	8.3	0.2	83.1e	45	85.3	279.7	9	35
2031 Sep 13	16 36 14.94	-24 8 29.9	1.149903	8.1	0.2	81.4e	45	85.4	278.5	7	35
2031 Sep 18	16 50 20.07	-24 33 9.4	1.178224	7.9	0.3	79.7e	45	85.5	277.2	6	33
2031 Sep 23	17 4 47.85	-24 53 22.6	1.206400	7.8	0.3	78.2e	44	85.7	275.9	4	32
2031 Sep 28	17 19 35.83	-25 8 45.1	1.234428	7.6	0.4	76.6e	44	85.8	274.5	3	31
2031 Oct 3	17 34 41.39	-25 18 54.6	1.262349	7.4	0.4	75.1e	44	86.0	273.0	1	29
2031 Oct 8	17 50 2.30	-25 23 31.6	1.290221	7.3	0.4	73.7e	44	86.2	271.6	0	28
2031 Oct 13	18 5 36.49	-25 22 19.6	1.318076	7.1	0.5	72.3e	43	86.5	270.1	-2	26
2031 Oct 18	18 21 21.69	-25 15 5.4	1.345919	7.0	0.5	70.9e	43	86.7	268.5	-4	24
2031 Oct 23	18 37 15.29	-25 1 40.0	1.373738	6.8	0.6	69.5e	42	87.0	267.0	-5	22
2031 Oct 28	18 53 14.34	-24 41 58.6	1.401546	6.7	0.6	68.2e	42	87.3	265.5	-7	20
2031 Nov 2	19 9 16.13	-24 15 59.6	1.429393	6.5	0.6	66.8e	41	87.6	264.0	-8	18
2031 Nov 7	19 25 18.48	-23 43 44.5	1.457332	6.4	0.7	65.5e	41	87.9	262.5	-10	16
2031 Nov 12	19 41 19.52	-23 5 18.1	1.485383	6.3	0.7	64.3e	40	88.2	261.0	-12	14
2031 Nov 17	19 57 17.46	-22 20 49.3	1.513541	6.2	0.7	63.0e	40	88.5	259.6	-13	11
2031 Nov 22	20 13 10.40	-21 30 31.0	1.541785	6.1	0.7	61.7e	39	88.8	258.2	-15	9
2031 Nov 27	20 28 56.52	-20 34 39.8	1.570126	6.0	0.8	60.4e	38	89.2	256.9	-16	7
2031 Dec 2	20 44 34.49	-19 33 33.4	1.598605	5.9	0.8	59.2e	38	89.5	255.7	-17	4
2031 Dec 7	21 0 3.57	-18 27 30.7	1.627252	5.8	0.8	57.9e	37	89.9	254.5	-19	2
2031 Dec 12	21 15 23.36	-17 16 52.0	1.656069	5.7	0.9	56.7e	36	90.2	253.4	-20	359
2031 Dec 17	21 30 33.61	-16 1 59.9	1.685026	5.6	0.9	55.5e	36	90.6	252.4	-21	357
2031 Dec 22	21 45 33.98	-14 43 19.6	1.714084	5.5	0.9	54.2e	35	90.9	251.5	-22	354
2031 Dec 27	22 0 24.24	-13 21 16.6	1.743247	5.4	1.0	53.0e	34	91.3	250.7	-23	352

Jupiter  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp
year mth d	h m s	o ' "	AU	"		o	o		o	o	o
2031 Jan 1	16 54 54.10	-22 1 52.1	6.208929	31.7	-1.6	25.0w	4	99.8	97.6	-3	6
2031 Jan 6	16 59 27.23	-22 8 55.8	6.170777	31.9	-1.6	29.0w	5	99.8	97.0	-3	6
2031 Jan 11	17 3 55.54	-22 15 22.0	6.127787	32.1	-1.7	33.1w	6	99.7	96.4	-3	5
2031 Jan 16	17 8 18.25	-22 21 11.2	6.080127	32.4	-1.7	37.1w	6	99.7	95.8	-3	5
2031 Jan 21	17 12 34.48	-22 26 24.1	6.027965	32.7	-1.7	41.2w	7	99.6	95.3	-3	4
2031 Jan 26	17 16 43.24	-22 31 2.0	5.971513	33.0	-1.7	45.4w	8	99.6	94.8	-3	4
2031 Jan 31	17 20 43.55	-22 35 6.3	5.911061	33.3	-1.7	49.5w	8	99.5	94.4	-3	3
2031 Feb 5	17 24 34.53	-22 38 38.7	5.846921	33.7	-1.7	53.7w	9	99.4	93.9	-3	3
2031 Feb 10	17 28 15.31	-22 41 41.0	5.779402	34.1	-1.8	57.9w	9	99.4	93.5	-3	3
2031 Feb 15	17 31 45.02	-22 44 15.4	5.708804	34.5	-1.8	62.2w	9	99.3	93.1	-3	2
2031 Feb 20	17 35 2.65	-22 46 24.3	5.635443	34.9	-1.8	66.5w	10	99.3	92.7	-3	2
2031 Feb 25	17 38 7.14	-22 48 10.2	5.559702	35.4	-1.8	70.8w	10	99.2	92.4	-3	2
2031 Mar 2	17 40 57.52	-22 49 35.6	5.482024	35.9	-1.9	75.2w	10	99.2	92.0	-3	1
2031 Mar 7	17 43 32.93	-22 50 43.1	5.402849	36.5	-1.9	79.6w	11	99.1	91.7	-3	1
2031 Mar 12	17 45 52.54	-22 51 35.3	5.322607	37.0	-1.9	84.0w	11	99.1	91.5	-3	1
2031 Mar 17	17 47 55.50	-22 52 14.8	5.241724	37.6	-2.0	88.5w	11	99.1	91.2	-3	0
2031 Mar 22	17 49 40.87	-22 52 44.1	5.160664	38.2	-2.0	93.1w	11	99.1	91.0	-3	0
2031 Mar 27	17 51 7.78	-22 53 5.5	5.079959	38.8	-2.0	97.7w	11	99.1	90.8	-3	0
2031 Apr 1	17 52 15.60	-22 53 20.9	5.000162	39.4	-2.1	102.4w	11	99.1	90.7	-3	360
2031 Apr 6	17 53 3.86	-22 53 31.9	4.921811	40.0	-2.1	107.2w	10	99.2	90.5	-3	360
2031 Apr 11	17 53 32.17	-22 53 39.8	4.845416	40.6	-2.2	112.0w	10	99.2	90.4	-3	360
2031 Apr 16	17 53 40.21	-22 53 45.6	4.771492	41.3	-2.2	116.8w	10	99.3	90.4	-3	360
2031 Apr 21	17 53 27.73	-22 53 49.8	4.700600	41.9	-2.2	121.8w	9	99.3	90.3	-3	360
2031 Apr 26	17 52 54.85	-22 53 52.5	4.633330	42.5	-2.3	126.8w	9	99.4	90.3	-3	360
2031 May 1	17 52 2.05	-22 53 53.0	4.570248	43.1	-2.3	131.8w	8	99.5	90.3	-3	0
2031 May 6	17 50 50.09	-22 53 50.4	4.511865	43.6	-2.3	137.0w	7	99.6	90.4	-3	0
2031 May 11	17 49 19.95	-22 53 43.7	4.458646	44.2	-2.4	142.2w	7	99.7	90.4	-3	0
2031 May 16	17 47 32.76	-22 53 31.6	4.411048	44.6	-2.4	147.4w	6	99.7	90.4	-3	1
2031 May 21	17 45 30.04	-22 53 12.8	4.369539	45.1	-2.4	152.7w	5	99.8	90.5	-3	1
2031 May 26	17 43 13.78	-22 52 45.7	4.334540	45.4	-2.4	158.0w	4	99.9	90.4	-3	1
2031 May 31	17 40 46.30	-22 52 9.3	4.306381	45.7	-2.4	163.4w	3	99.9	90.3	-3	1
2031 Jun 5	17 38 10.16	-22 51 22.8	4.285295	46.0	-2.5	168.8w	2	100.0	89.7	-3	2
2031 Jun 10	17 35 27.96	-22 50 26.4	4.271440	46.1	-2.5	174.2w	1	100.0	87.8	-3	2
2031 Jun 15	17 32 42.38	-22 49 20.6	4.264951	46.2	-2.5	179.4w	0	100.0	44.1	-3	2
2031 Jun 20	17 29 56.34	-22 48 6.8	4.265910	46.2	-2.5	175.0e	1	100.0	278.1	-3	2
2031 Jun 25	17 27 12.87	-22 46 46.7	4.274291	46.1	-2.5	169.6e	2	100.0	275.7	-3	3
2031 Jun 30	17 24 34.93	-22 45 23.0	4.289956	45.9	-2.5	164.2e	3	99.9	275.0	-3	3

2031 Jul 5	17 22	5.19	-22 43	59.1	4.312672	45.7	-2.4	158.9e	4	99.9	274.8	-3	3
2031 Jul 10	17 19	46.01	-22 42	38.3	4.342162	45.4	-2.4	153.6e	5	99.8	274.8	-3	3
2031 Jul 15	17 17	39.54	-22 41	24.4	4.378144	45.0	-2.4	148.3e	6	99.7	274.8	-3	4
2031 Jul 20	17 15	47.83	-22 40	21.0	4.420262	44.6	-2.4	143.1e	7	99.7	274.9	-3	4
2031 Jul 25	17 14	12.65	-22 39	31.3	4.468082	44.1	-2.4	138.0e	7	99.6	274.9	-3	4
2031 Jul 30	17 12	55.36	-22 38	58.6	4.521103	43.6	-2.3	132.9e	8	99.5	275.0	-3	4
2031 Aug 4	17 11	56.87	-22 38	45.2	4.578798	43.0	-2.3	127.9e	9	99.4	275.0	-3	4
2031 Aug 9	17 11	17.76	-22 38	53.1	4.640674	42.4	-2.3	123.0e	9	99.3	275.0	-2	4
2031 Aug 14	17 10	58.52	-22 39	23.4	4.706243	41.8	-2.2	118.1e	10	99.3	275.0	-2	4
2031 Aug 19	17 10	59.46	-22 40	16.4	4.774977	41.2	-2.2	113.3e	10	99.2	275.0	-2	4
2031 Aug 24	17 11	20.64	-22 41	32.0	4.846315	40.6	-2.2	108.6e	11	99.2	274.9	-2	4
2031 Aug 29	17 12	1.83	-22 43	9.5	4.919686	40.0	-2.1	103.9e	11	99.1	274.8	-2	4
2031 Sep 3	17 13	2.52	-22 45	7.1	4.994560	39.4	-2.1	99.3e	11	99.1	274.7	-2	4
2031 Sep 8	17 14	22.19	-22 47	23.0	5.070467	38.8	-2.1	94.8e	11	99.1	274.5	-2	4
2031 Sep 13	17 16	0.35	-22 49	54.6	5.146935	38.3	-2.0	90.3e	11	99.1	274.4	-2	4
2031 Sep 18	17 17	56.41	-22 52	38.9	5.223468	37.7	-2.0	85.9e	11	99.1	274.1	-2	4
2031 Sep 23	17 20	9.67	-22 55	32.9	5.299568	37.2	-2.0	81.5e	11	99.1	273.9	-2	3
2031 Sep 28	17 22	39.27	-22 58	33.2	5.374760	36.6	-1.9	77.2e	11	99.1	273.7	-2	3
2031 Oct 3	17 25	24.28	-23 1	36.2	5.448639	36.1	-1.9	72.9e	11	99.2	273.4	-2	3
2031 Oct 8	17 28	23.91	-23 4	38.2	5.520837	35.7	-1.9	68.7e	10	99.2	273.1	-2	3
2031 Oct 13	17 31	37.41	-23 7	35.5	5.590975	35.2	-1.9	64.5e	10	99.3	272.7	-2	2
2031 Oct 18	17 35	3.98	-23 10	24.4	5.658662	34.8	-1.8	60.3e	10	99.3	272.4	-2	2
2031 Oct 23	17 38	42.74	-23 13	1.5	5.723512	34.4	-1.8	56.2e	9	99.4	272.0	-2	1
2031 Oct 28	17 42	32.72	-23 15	23.3	5.785195	34.0	-1.8	52.1e	9	99.4	271.6	-2	1
2031 Nov 2	17 46	33.03	-23 17	26.5	5.843446	33.7	-1.8	48.0e	8	99.5	271.2	-2	1
2031 Nov 7	17 50	42.89	-23 19	7.9	5.898007	33.4	-1.8	43.9e	8	99.6	270.8	-2	0
2031 Nov 12	17 55	1.54	-23 20	24.5	5.948609	33.1	-1.8	39.9e	7	99.6	270.4	-2	360
2031 Nov 17	17 59	28.17	-23 21	13.9	5.994976	32.9	-1.7	35.9e	6	99.7	269.9	-2	359
2031 Nov 22	18 4	1.88	-23 21	33.6	6.036861	32.6	-1.7	31.9e	6	99.7	269.5	-2	359
2031 Nov 27	18 8	41.75	-23 21	21.7	6.074086	32.4	-1.7	27.9e	5	99.8	269.0	-2	358
2031 Dec 2	18 13	26.98	-23 20	36.5	6.106516	32.3	-1.7	23.9e	4	99.9	268.5	-2	358
2031 Dec 7	18 18	16.84	-23 19	16.3	6.134011	32.1	-1.7	20.0e	4	99.9	268.1	-2	357
2031 Dec 12	18 23	10.60	-23 17	20.1	6.156418	32.0	-1.7	16.0e	3	99.9	267.6	-2	357
2031 Dec 17	18 28	7.44	-23 14	47.1	6.173596	31.9	-1.7	12.1e	2	100.0	267.1	-2	356
2031 Dec 22	18 33	6.48	-23 11	37.3	6.185451	31.8	-1.7	8.1e	2	100.0	266.6	-2	356
2031 Dec 27	18 38	6.86	-23 7	50.6	6.191959	31.8	-1.7	4.2e	1	100.0	266.0	-2	355

Saturn  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp		
year mth d	h m s	o ' "	AU	"		o	o		o	o	o		
2031 Jan 1	4 3	20.49	18 41	26.5	8.262872	20.2	-0.2	142.5e	4	99.9	256.2	-25	358
2031 Jan 6	4 2	14.76	18 39	30.7	8.316475	20.0	-0.2	137.2e	4	99.9	256.6	-25	358
2031 Jan 11	4 1	18.69	18 38	4.9	8.375712	19.9	-0.1	131.9e	5	99.8	256.9	-25	358
2031 Jan 16	4 0	32.91	18 37	11.0	8.440056	19.7	-0.1	126.6e	5	99.8	257.1	-25	358
2031 Jan 21	3 59	57.99	18 36	50.4	8.508962	19.6	-0.1	121.4e	5	99.8	257.3	-25	358
2031 Jan 26	3 59	34.42	18 37	4.2	8.581823	19.4	0.0	116.2e	6	99.8	257.6	-25	358
2031 Jan 31	3 59	22.50	18 37	52.8	8.657971	19.2	0.0	111.1e	6	99.7	257.7	-25	358
2031 Feb 5	3 59	22.34	18 39	16.2	8.736739	19.1	0.0	106.0e	6	99.7	257.9	-25	358
2031 Feb 10	3 59	33.89	18 41	13.6	8.817497	18.9	0.0	101.0e	6	99.7	258.1	-25	358
2031 Feb 15	3 59	57.07	18 43	44.2	8.899645	18.7	0.1	96.0e	6	99.7	258.3	-25	358
2031 Feb 20	4 0	31.75	18 46	46.7	8.982583	18.6	0.1	91.1e	6	99.7	258.5	-25	358
2031 Feb 25	4 1	17.73	18 50	19.6	9.065679	18.4	0.1	86.3e	6	99.7	258.8	-25	358
2031 Mar 2	4 2	14.69	18 54	20.8	9.148300	18.2	0.1	81.5e	6	99.7	259.0	-25	358
2031 Mar 7	4 3	22.16	18 58	48.2	9.229869	18.1	0.1	76.8e	6	99.7	259.2	-25	358
2031 Mar 12	4 4	39.68	19 3	39.4	9.309872	17.9	0.1	72.1e	6	99.7	259.5	-25	357
2031 Mar 17	4 6	6.79	19 8	51.9	9.387833	17.8	0.1	67.5e	6	99.7	259.8	-25	357
2031 Mar 22	4 7	43.05	19 14	23.3	9.463271	17.6	0.1	62.9e	6	99.8	260.1	-25	357
2031 Mar 27	4 9	27.96	19 20	10.9	9.535696	17.5	0.2	58.4e	5	99.8	260.4	-25	357
2031 Apr 1	4 11	20.91	19 26	12.1	9.604660	17.4	0.2	53.9e	5	99.8	260.7	-25	357
2031 Apr 6	4 13	21.29	19 32	24.1	9.669789	17.2	0.2	49.4e	5	99.8	261.1	-25	357
2031 Apr 11	4 15	28.53	19 38	44.4	9.730766	17.1	0.2	45.0e	4	99.8	261.5	-26	357
2031 Apr 16	4 17	42.08	19 45	10.4	9.787296	17.0	0.1	40.7e	4	99.9	261.9	-26	357
2031 Apr 21	4 20	1.43	19 51	40.0	9.839067	16.9	0.1	36.3e	4	99.9	262.5	-26	357
2031 Apr 26	4 22	25.98	19 58	10.5	9.885787	16.9	0.1	32.0e	3	99.9	263.0	-26	357
2031 May 1	4 24	55.09	20 4	39.8	9.927222	16.8	0.1	27.8e	3	99.9	263.7	-26	357

2031 May 6	4 27 28.15	20 11 5.7	9.963204	16.7	0.1	23.5e	3	100.0	264.5	-26	357
2031 May 11	4 30 4.60	20 17 26.4	9.993610	16.7	0.1	19.3e	2	100.0	265.6	-26	357
2031 May 16	4 32 43.93	20 23 39.9	10.018310	16.6	0.1	15.2e	2	100.0	267.1	-26	357
2031 May 21	4 35 25.60	20 29 44.7	10.037160	16.6	0.1	11.0e	1	100.0	269.5	-26	357
2031 May 26	4 38 8.99	20 35 39.2	10.050060	16.6	0.0	6.9e	1	100.0	274.4	-26	357
2031 May 31	4 40 53.49	20 41 21.9	10.056972	16.6	0.0	3.0e	0	100.0	292.1	-26	356
2031 Jun 5	4 43 38.52	20 46 51.6	10.057910	16.6	0.0	2.1w	0	100.0	38.9	-26	356
2031 Jun 10	4 46 23.57	20 52 7.3	10.052909	16.6	0.0	5.9w	1	100.0	68.3	-26	356
2031 Jun 15	4 49 8.12	20 57 8.1	10.041979	16.6	0.0	9.9w	1	100.0	74.6	-26	356
2031 Jun 20	4 51 51.59	21 1 53.2	10.025142	16.6	0.1	14.0w	2	100.0	77.4	-26	356
2031 Jun 25	4 54 33.38	21 6 22.0	10.002473	16.7	0.1	18.1w	2	100.0	79.1	-26	356
2031 Jun 30	4 57 12.87	21 10 33.9	9.974109	16.7	0.1	22.3w	2	100.0	80.2	-27	356
2031 Jul 5	4 59 49.50	21 14 28.7	9.940224	16.8	0.1	26.4w	3	99.9	81.1	-27	356
2031 Jul 10	5 2 22.78	21 18 6.0	9.900987	16.8	0.1	30.6w	3	99.9	81.8	-27	356
2031 Jul 15	5 4 52.14	21 21 26.0	9.856546	16.9	0.1	34.8w	4	99.9	82.4	-27	356
2031 Jul 20	5 7 16.98	21 24 28.5	9.807092	17.0	0.1	39.0w	4	99.9	83.0	-27	356
2031 Jul 25	5 9 36.66	21 27 13.9	9.752874	17.1	0.1	43.2w	4	99.9	83.5	-27	356
2031 Jul 30	5 11 50.57	21 29 42.2	9.694196	17.2	0.1	47.5w	5	99.8	83.9	-27	356
2031 Aug 4	5 13 58.19	21 31 54.0	9.631380	17.3	0.1	51.7w	5	99.8	84.3	-27	356
2031 Aug 9	5 15 58.99	21 33 49.7	9.564730	17.4	0.1	56.1w	5	99.8	84.6	-27	356
2031 Aug 14	5 17 52.38	21 35 29.9	9.494553	17.6	0.1	60.4w	6	99.8	85.0	-27	355
2031 Aug 19	5 19 37.75	21 36 55.0	9.421218	17.7	0.1	64.8w	6	99.7	85.3	-27	355
2031 Aug 24	5 21 14.50	21 38 6.0	9.345154	17.8	0.1	69.2w	6	99.7	85.6	-27	355
2031 Aug 29	5 22 42.09	21 39 3.3	9.266831	18.0	0.1	73.7w	6	99.7	85.9	-27	355
2031 Sep 3	5 24 0.09	21 39 47.7	9.186714	18.1	0.1	78.2w	6	99.7	86.1	-27	355
2031 Sep 8	5 25 8.03	21 40 20.1	9.105248	18.3	0.1	82.8w	6	99.7	86.4	-27	355
2031 Sep 13	5 26 5.41	21 40 41.0	9.022914	18.5	0.0	87.5w	6	99.7	86.6	-27	355
2031 Sep 18	5 26 51.79	21 40 51.3	8.940257	18.6	0.0	92.2w	6	99.7	86.8	-26	355
2031 Sep 23	5 27 26.80	21 40 51.5	8.857865	18.8	0.0	96.9w	6	99.7	87.0	-26	355
2031 Sep 28	5 27 50.20	21 40 42.3	8.776340	19.0	0.0	101.7w	6	99.7	87.1	-26	355
2031 Oct 3	5 28 1.87	21 40 24.2	8.696251	19.2	0.0	106.6w	6	99.7	87.3	-26	355
2031 Oct 8	5 28 1.68	21 39 57.8	8.618155	19.3	-0.1	111.5w	6	99.7	87.4	-26	355
2031 Oct 13	5 27 49.57	21 39 23.6	8.542651	19.5	-0.1	116.5w	6	99.8	87.6	-26	355
2031 Oct 18	5 27 25.62	21 38 41.8	8.470375	19.7	-0.1	121.5w	5	99.8	87.7	-26	355
2031 Oct 23	5 26 50.08	21 37 52.8	8.401968	19.8	-0.2	126.6w	5	99.8	87.9	-26	355
2031 Oct 28	5 26 3.41	21 36 56.9	8.338025	20.0	-0.2	131.8w	5	99.8	88.1	-26	355
2031 Nov 2	5 25 6.18	21 35 54.4	8.279078	20.1	-0.2	137.0w	4	99.9	88.2	-26	355
2031 Nov 7	5 23 59.01	21 34 45.7	8.225644	20.3	-0.3	142.3w	4	99.9	88.5	-26	355
2031 Nov 12	5 22 42.67	21 33 31.2	8.178245	20.4	-0.3	147.6w	3	99.9	88.8	-26	355
2031 Nov 17	5 21 18.13	21 32 11.3	8.137381	20.5	-0.3	152.9w	3	99.9	89.3	-26	355
2031 Nov 22	5 19 46.57	21 30 46.7	8.103489	20.6	-0.4	158.3w	2	100.0	90.0	-26	355
2031 Nov 27	5 18 9.32	21 29 18.2	8.076891	20.6	-0.4	163.7w	2	100.0	91.3	-26	355
2031 Dec 2	5 16 27.70	21 27 46.7	8.057830	20.7	-0.4	169.2w	1	100.0	94.0	-26	356
2031 Dec 7	5 14 43.08	21 26 13.6	8.046509	20.7	-0.5	174.5w	1	100.0	102.3	-26	356
2031 Dec 12	5 12 56.95	21 24 40.1	8.043087	20.7	-0.5	178.4e	0	100.0	184.0	-26	356
2031 Dec 17	5 11 10.86	21 23 7.8	8.047647	20.7	-0.5	174.0e	1	100.0	249.9	-26	356
2031 Dec 22	5 9 26.44	21 21 38.6	8.060148	20.7	-0.4	168.7e	1	100.0	257.2	-26	356
2031 Dec 27	5 7 45.22	21 20 14.3	8.080428	20.6	-0.4	163.2e	2	100.0	259.7	-27	356

Uranus  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp
year mth d	h m s	o ' "	AU	"		o	o		o	o	o
2031 Jan 1	5 14 48.87	23 7 37.4	18.226412	3.8	5.5	159.7e	1	100.0	265.8	82	9
2031 Jan 6	5 13 59.12	23 6 45.6	18.259202	3.8	5.5	154.4e	1	100.0	265.7	82	7
2031 Jan 11	5 13 12.27	23 5 55.9	18.299027	3.7	5.5	149.1e	2	100.0	265.5	82	6
2031 Jan 16	5 12 28.81	23 5 9.0	18.345542	3.7	5.5	143.9e	2	100.0	265.4	82	5
2031 Jan 21	5 11 49.21	23 4 25.8	18.398372	3.7	5.5	138.6e	2	100.0	265.4	82	4
2031 Jan 26	5 11 13.94	23 3 46.8	18.457068	3.7	5.6	133.4e	2	100.0	265.3	82	3
2031 Jan 31	5 10 43.39	23 3 12.7	18.521081	3.7	5.6	128.2e	2	100.0	265.2	82	2
2031 Feb 5	5 10 17.88	23 2 44.1	18.589822	3.7	5.6	123.0e	2	100.0	265.2	82	1
2031 Feb 10	5 9 57.63	23 2 21.5	18.662706	3.7	5.6	117.9e	3	99.9	265.1	82	0
2031 Feb 15	5 9 42.85	23 2 5.2	18.739151	3.7	5.6	112.8e	3	99.9	265.1	82	360
2031 Feb 20	5 9 33.71	23 1 55.5	18.818561	3.6	5.6	107.7e	3	99.9	265.1	82	360
2031 Feb 25	5 9 30.34	23 1 52.7	18.900281	3.6	5.6	102.7e	3	99.9	265.0	82	360
2031 Mar 2	5 9 32.81	23 1 56.9	18.983618	3.6	5.6	97.6e	3	99.9	265.0	82	360
2031 Mar 7	5 9 41.07	23 2 8.0	19.067905	3.6	5.6	92.7e	3	99.9	265.0	82	360

2031 Mar 12	5 9 55.08	23 2 25.9	19.152515	3.6	5.6	87.7e	3	99.9	265.0	82	0
2031 Mar 17	5 10 14.73	23 2 50.5	19.236856	3.6	5.6	82.8e	3	99.9	265.1	82	1
2031 Mar 22	5 10 39.93	23 3 21.5	19.320323	3.5	5.7	77.9e	3	99.9	265.1	82	2
2031 Mar 27	5 11 10.54	23 3 58.5	19.402283	3.5	5.7	73.1e	3	99.9	265.1	82	3
2031 Apr 1	5 11 46.34	23 4 41.1	19.482128	3.5	5.7	68.3e	3	99.9	265.2	82	4
2031 Apr 6	5 12 27.09	23 5 28.9	19.559313	3.5	5.7	63.5e	3	99.9	265.2	82	5
2031 Apr 11	5 13 12.53	23 6 21.4	19.633351	3.5	5.7	58.8e	3	99.9	265.3	82	6
2031 Apr 16	5 14 2.39	23 7 17.9	19.703790	3.5	5.7	54.1e	2	100.0	265.4	82	7
2031 Apr 21	5 14 56.43	23 8 18.0	19.770160	3.5	5.7	49.4e	2	100.0	265.5	82	9
2031 Apr 26	5 15 54.34	23 9 21.1	19.832002	3.5	5.7	44.7e	2	100.0	265.5	82	11
2031 May 1	5 16 55.77	23 10 26.5	19.888918	3.4	5.7	40.1e	2	100.0	265.6	82	12
2031 May 6	5 18 0.36	23 11 33.8	19.940580	3.4	5.7	35.5e	2	100.0	265.7	82	14
2031 May 11	5 19 7.79	23 12 42.2	19.986722	3.4	5.7	30.9e	2	100.0	265.8	82	16
2031 May 16	5 20 17.73	23 13 51.4	20.027083	3.4	5.7	26.4e	1	100.0	265.8	81	18
2031 May 21	5 21 29.85	23 15 0.6	20.061396	3.4	5.7	21.8e	1	100.0	265.9	81	19
2031 May 26	5 22 43.77	23 16 9.6	20.089435	3.4	5.7	17.3e	1	100.0	266.0	81	21
2031 May 31	5 23 59.11	23 17 17.7	20.111047	3.4	5.7	12.8e	1	100.0	265.9	81	23
2031 Jun 5	5 25 15.48	23 18 24.5	20.126145	3.4	5.7	8.3e	0	100.0	265.8	81	25
2031 Jun 10	5 26 32.55	23 19 29.8	20.134684	3.4	5.7	3.8e	0	100.0	265.0	81	26
2031 Jun 15	5 27 49.97	23 20 33.0	20.136604	3.4	5.7	0.7w	0	100.0	96.2	81	28
2031 Jun 20	5 29 7.38	23 21 34.0	20.131856	3.4	5.7	5.2w	0	100.0	88.2	81	30
2031 Jun 25	5 30 24.40	23 22 32.4	20.120461	3.4	5.7	9.6w	1	100.0	87.7	80	31
2031 Jun 30	5 31 40.63	23 23 28.1	20.102503	3.4	5.7	14.1w	1	100.0	87.6	80	33
2031 Jul 5	5 32 55.71	23 24 21.0	20.078127	3.4	5.7	18.6w	1	100.0	87.7	80	34
2031 Jul 10	5 34 9.32	23 25 10.8	20.047485	3.4	5.7	23.1w	1	100.0	87.7	80	36
2031 Jul 15	5 35 21.13	23 25 57.4	20.010714	3.4	5.7	27.6w	1	100.0	87.8	80	37
2031 Jul 20	5 36 30.77	23 26 41.0	19.967995	3.4	5.7	32.1w	2	100.0	87.9	80	38
2031 Jul 25	5 37 37.86	23 27 21.4	19.919579	3.4	5.7	36.6w	2	100.0	87.9	79	39
2031 Jul 30	5 38 42.06	23 27 58.8	19.865779	3.5	5.7	41.1w	2	100.0	88.0	79	41
2031 Aug 4	5 39 43.06	23 28 33.1	19.806942	3.5	5.7	45.7w	2	100.0	88.1	79	42
2031 Aug 9	5 40 40.57	23 29 4.4	19.743400	3.5	5.7	50.2w	2	100.0	88.2	79	42
2031 Aug 14	5 41 34.29	23 29 32.8	19.675488	3.5	5.7	54.8w	2	100.0	88.3	79	43
2031 Aug 19	5 42 23.89	23 29 58.5	19.603609	3.5	5.7	59.4w	3	99.9	88.3	79	44
2031 Aug 24	5 43 9.07	23 30 21.6	19.528226	3.5	5.7	64.1w	3	99.9	88.4	78	45
2031 Aug 29	5 43 49.59	23 30 42.2	19.449850	3.5	5.7	68.8w	3	99.9	88.4	78	45
2031 Sep 3	5 44 25.23	23 31 0.4	19.368992	3.5	5.7	73.5w	3	99.9	88.5	78	46
2031 Sep 8	5 44 55.79	23 31 16.3	19.286139	3.6	5.7	78.2w	3	99.9	88.5	78	46
2031 Sep 13	5 45 21.06	23 31 30.1	19.201809	3.6	5.6	82.9w	3	99.9	88.6	78	47
2031 Sep 18	5 45 40.87	23 31 41.9	19.116582	3.6	5.6	87.7w	3	99.9	88.6	78	47
2031 Sep 23	5 45 55.06	23 31 51.7	19.031079	3.6	5.6	92.6w	3	99.9	88.6	78	47
2031 Sep 28	5 46 3.57	23 31 59.6	18.945937	3.6	5.6	97.4w	3	99.9	88.6	78	47
2031 Oct 3	5 46 6.39	23 32 5.5	18.861750	3.6	5.6	102.3w	3	99.9	88.6	78	47
2031 Oct 8	5 46 3.50	23 32 9.6	18.779098	3.7	5.6	107.3w	3	99.9	88.6	78	47
2031 Oct 13	5 45 54.91	23 32 11.7	18.698594	3.7	5.6	112.2w	3	99.9	88.5	78	47
2031 Oct 18	5 45 40.70	23 32 11.9	18.620882	3.7	5.6	117.3w	3	99.9	88.5	78	47
2031 Oct 23	5 45 20.99	23 32 10.0	18.546612	3.7	5.6	122.3w	3	100.0	88.5	78	46
2031 Oct 28	5 44 56.03	23 32 6.0	18.476388	3.7	5.6	127.4w	2	100.0	88.4	78	46
2031 Nov 2	5 44 26.07	23 31 59.8	18.410746	3.7	5.5	132.5w	2	100.0	88.3	78	46
2031 Nov 7	5 43 51.39	23 31 51.3	18.350206	3.7	5.5	137.6w	2	100.0	88.2	78	45
2031 Nov 12	5 43 12.32	23 31 40.5	18.295293	3.7	5.5	142.8w	2	100.0	88.1	78	45
2031 Nov 17	5 42 29.25	23 31 27.3	18.246516	3.8	5.5	148.0w	2	100.0	88.0	79	44
2031 Nov 22	5 41 42.68	23 31 11.6	18.204333	3.8	5.5	153.2w	1	100.0	87.9	79	43
2031 Nov 27	5 40 53.12	23 30 53.4	18.169096	3.8	5.5	158.5w	1	100.0	87.7	79	43
2031 Dec 2	5 40 1.11	23 30 32.9	18.141084	3.8	5.5	163.7w	1	100.0	87.5	79	42
2031 Dec 7	5 39 7.20	23 30 10.2	18.120545	3.8	5.5	169.0w	1	100.0	87.1	79	41
2031 Dec 12	5 38 11.97	23 29 45.4	18.107695	3.8	5.5	174.3w	0	100.0	86.3	79	40
2031 Dec 17	5 37 16.04	23 29 18.9	18.102693	3.8	5.5	179.6w	0	100.0	66.6	79	39
2031 Dec 22	5 36 20.09	23 28 50.7	18.105589	3.8	5.5	175.1e	0	100.0	269.5	80	38
2031 Dec 27	5 35 24.75	23 28 21.5	18.116316	3.8	5.5	169.8e	1	100.0	268.4	80	37

Neptune  
Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp
year mth d	h m s	o ' "	AU	"		o	o	o	o	o	o
2031 Jan 1	0 39 47.29	2 36 39.0	29.831143	2.5	7.9	90.2e	2	100.0	246.9	-16	314
2031 Jan 6	0 39 55.10	2 37 44.5	29.917885	2.4	7.9	85.2e	2	100.0	247.1	-16	314



2031 Jan 11	0 40 6.07	2 39 9.9	30.003981	2.4	7.9	80.1e	2 100.0	247.2	-16	314
2031 Jan 16	0 40 20.15	2 40 54.8	30.088812	2.4	7.9	75.1e	2 100.0	247.3	-16	314
2031 Jan 21	0 40 37.26	2 42 58.6	30.171757	2.4	7.9	70.1e	2 100.0	247.5	-16	314
2031 Jan 26	0 40 57.31	2 45 20.5	30.252172	2.4	7.9	65.1e	2 100.0	247.7	-16	314
2031 Jan 31	0 41 20.17	2 47 59.6	30.329427	2.4	7.9	60.1e	2 100.0	247.8	-16	314
2031 Feb 5	0 41 45.69	2 50 54.7	30.402966	2.4	7.9	55.2e	2 100.0	248.0	-16	314
2031 Feb 10	0 42 13.68	2 54 4.7	30.472296	2.4	7.9	50.3e	1 100.0	248.2	-16	314
2031 Feb 15	0 42 44.00	2 57 28.5	30.536962	2.4	7.9	45.3e	1 100.0	248.5	-16	314
2031 Feb 20	0 43 16.47	3 1 4.7	30.596509	2.4	7.9	40.4e	1 100.0	248.8	-16	314
2031 Feb 25	0 43 50.89	3 4 52.2	30.650489	2.4	7.9	35.6e	1 100.0	249.1	-16	314
2031 Mar 2	0 44 27.04	3 8 49.3	30.698525	2.4	7.9	30.7e	1 100.0	249.5	-15	314
2031 Mar 7	0 45 4.69	3 12 54.5	30.740329	2.4	7.9	25.9e	1 100.0	250.1	-15	314
2031 Mar 12	0 45 43.62	3 17 6.5	30.775672	2.4	7.9	21.1e	1 100.0	250.9	-15	314
2031 Mar 17	0 46 23.61	3 21 23.8	30.804352	2.4	7.9	16.3e	1 100.0	252.2	-15	314
2031 Mar 22	0 47 4.46	3 25 45.0	30.826171	2.4	7.9	11.5e	0 100.0	254.4	-15	314
2031 Mar 27	0 47 45.91	3 30 8.4	30.840974	2.4	8.0	6.8e	0 100.0	259.7	-15	314
2031 Apr 1	0 48 27.71	3 34 32.5	30.848696	2.4	8.0	2.4e	0 100.0	285.4	-15	314
2031 Apr 6	0 49 9.63	3 38 55.8	30.849349	2.4	8.0	3.2w	0 100.0	39.4	-15	314
2031 Apr 11	0 49 51.44	3 43 16.8	30.842989	2.4	8.0	7.7w	0 100.0	56.0	-15	314
2031 Apr 16	0 50 32.93	3 47 34.3	30.829677	2.4	7.9	12.4w	0 100.0	60.3	-15	314
2031 Apr 21	0 51 13.88	3 51 46.8	30.809485	2.4	7.9	17.1w	1 100.0	62.3	-15	314
2031 Apr 26	0 51 54.04	3 55 52.9	30.782560	2.4	7.9	21.7w	1 100.0	63.4	-15	313
2031 May 1	0 52 33.20	3 59 51.1	30.749126	2.4	7.9	26.4w	1 100.0	64.2	-15	313
2031 May 6	0 53 11.13	4 3 40.3	30.709461	2.4	7.9	31.1w	1 100.0	64.7	-15	313
2031 May 11	0 53 47.65	4 7 19.2	30.663860	2.4	7.9	35.8w	1 100.0	65.1	-14	313
2031 May 16	0 54 22.57	4 10 46.9	30.612607	2.4	7.9	40.4w	1 100.0	65.5	-14	313
2031 May 21	0 54 55.71	4 14 2.0	30.556020	2.4	7.9	45.1w	1 100.0	65.8	-14	313
2031 May 26	0 55 26.86	4 17 3.6	30.494491	2.4	7.9	49.8w	1 100.0	66.0	-14	313
2031 May 31	0 55 55.86	4 19 50.6	30.428472	2.4	7.9	54.4w	2 100.0	66.2	-14	313
2031 Jun 5	0 56 22.55	4 22 22.2	30.358437	2.4	7.9	59.1w	2 100.0	66.4	-14	313
2031 Jun 10	0 56 46.81	4 24 37.8	30.284845	2.4	7.9	63.8w	2 100.0	66.6	-14	313
2031 Jun 15	0 57 8.52	4 26 36.6	30.208146	2.4	7.9	68.4w	2 100.0	66.7	-14	313
2031 Jun 20	0 57 27.53	4 28 17.9	30.128846	2.4	7.9	73.1w	2 100.0	66.9	-14	313
2031 Jun 25	0 57 43.75	4 29 41.2	30.047505	2.4	7.9	77.8w	2 100.0	67.0	-14	313
2031 Jun 30	0 57 57.07	4 30 46.0	29.964711	2.4	7.9	82.5w	2 100.0	67.1	-14	313
2031 Jul 5	0 58 7.46	4 31 32.3	29.881040	2.4	7.9	87.3w	2 100.0	67.3	-14	313
2031 Jul 10	0 58 14.87	4 31 59.7	29.797033	2.5	7.9	92.0w	2 100.0	67.4	-14	313
2031 Jul 15	0 58 19.27	4 32 8.3	29.713236	2.5	7.9	96.7w	2 100.0	67.5	-14	313
2031 Jul 20	0 58 20.63	4 31 57.9	29.630249	2.5	7.9	101.5w	2 100.0	67.7	-14	313
2031 Jul 25	0 58 18.95	4 31 28.8	29.548692	2.5	7.9	106.3w	2 100.0	67.8	-14	313
2031 Jul 30	0 58 14.27	4 30 41.4	29.469174	2.5	7.9	111.1w	2 100.0	68.0	-14	313
2031 Aug 4	0 58 6.68	4 29 36.2	29.392260	2.5	7.8	115.9w	2 100.0	68.1	-14	313
2031 Aug 9	0 57 56.24	4 28 13.8	29.318466	2.5	7.8	120.7w	2 100.0	68.3	-14	313
2031 Aug 14	0 57 43.04	4 26 34.7	29.248332	2.5	7.8	125.6w	2 100.0	68.5	-14	313
2031 Aug 19	0 57 27.19	4 24 40.0	29.182415	2.5	7.8	130.5w	1 100.0	68.7	-14	313
2031 Aug 24	0 57 8.84	4 22 30.5	29.121256	2.5	7.8	135.4w	1 100.0	68.9	-14	313
2031 Aug 29	0 56 48.17	4 20 7.6	29.065338	2.5	7.8	140.3w	1 100.0	69.2	-14	313
2031 Sep 3	0 56 25.39	4 17 32.5	29.015070	2.5	7.8	145.2w	1 100.0	69.6	-14	313
2031 Sep 8	0 56 0.69	4 14 46.6	28.970825	2.5	7.8	150.2w	1 100.0	70.1	-14	313
2031 Sep 13	0 55 34.30	4 11 51.3	28.932985	2.5	7.8	155.1w	1 100.0	70.8	-14	313
2031 Sep 18	0 55 6.44	4 8 48.3	28.901905	2.5	7.8	160.1w	1 100.0	71.7	-14	313
2031 Sep 23	0 54 37.41	4 5 39.3	28.877882	2.5	7.8	165.1w	0 100.0	73.3	-14	313
2031 Sep 28	0 54 7.49	4 2 26.1	28.861117	2.5	7.8	170.1w	0 100.0	76.5	-14	313
2031 Oct 3	0 53 36.97	3 59 10.7	28.851732	2.5	7.8	175.0w	0 100.0	86.0	-14	313
2031 Oct 8	0 53 6.14	3 55 54.8	28.849826	2.5	7.8	178.4w	0 100.0	168.9	-14	313
2031 Oct 13	0 52 35.27	3 52 40.2	28.855478	2.5	7.8	174.4e	0 100.0	230.6	-14	313
2031 Oct 18	0 52 4.70	3 49 28.9	28.868707	2.5	7.8	169.4e	0 100.0	238.6	-15	314
2031 Oct 23	0 51 34.72	3 46 23.0	28.889439	2.5	7.8	164.3e	1 100.0	241.4	-15	314
2031 Oct 28	0 51 5.67	3 43 24.4	28.917497	2.5	7.8	159.2e	1 100.0	242.9	-15	314
2031 Nov 2	0 50 37.81	3 40 34.6	28.952652	2.5	7.8	154.1e	1 100.0	243.8	-15	314
2031 Nov 7	0 50 11.42	3 37 55.5	28.994662	2.5	7.8	149.0e	1 100.0	244.5	-15	314
2031 Nov 12	0 49 46.75	3 35 28.7	29.043245	2.5	7.8	143.9e	1 100.0	244.9	-15	314
2031 Nov 17	0 49 24.08	3 33 15.7	29.098047	2.5	7.8	138.7e	1 100.0	245.3	-15	314
2031 Nov 22	0 49 3.66	3 31 18.0	29.158619	2.5	7.8	133.6e	1 100.0	245.6	-15	314
2031 Nov 27	0 48 45.70	3 29 36.8	29.224443	2.5	7.8	128.5e	1 100.0	245.8	-15	314
2031 Dec 2	0 48 30.36	3 28 13.2	29.294998	2.5	7.8	123.3e	2 100.0	246.1	-15	314
2031 Dec 7	0 48 17.81	3 27 8.0	29.369759	2.5	7.8	118.2e	2 100.0	246.2	-15	314

2031 Dec 12	0 48	8.19	3 26	22.1	29.448165	2.5	7.8	113.1e	2 100.0	246.4	-15	314
2031 Dec 17	0 48	1.63	3 25	56.0	29.529596	2.5	7.9	108.0e	2 100.0	246.6	-15	314
2031 Dec 22	0 47	58.22	3 25	50.3	29.613369	2.5	7.9	102.9e	2 100.0	246.7	-15	314
2031 Dec 27	0 47	58.01	3 26	5.0	29.698802	2.5	7.9	97.8e	2 100.0	246.9	-15	314