

# THE COMET HANDBOOK FOR 2023

# 彗星年表 2023

彗星年表編集委員会発行  
Published by the Editorial Committee  
for the Comet Handbook

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## Comet 29P/Schwassmann-Wachmann

Epoch = 2023 June 25.0 TT  
 T = 2019 Apr. 25.70480 TT  
 Peri. = 51.36733  
 Node = 312.40084 2000.0  
 Incl. = 9.36233  
 q = 5.7798278 AU

e = 0.0445653  
 a = 6.0494221 AU  
 n = 0.06624197  
 P = 14.88 years

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	06 34.31	+29 26.3	5.088	6.059	-0.54 -0.4	.	170.2
Jan. 16	06 29.09	+29 21.0	5.128	6.062	-0.49 -0.7	.	160.2
Jan. 26	06 24.46	+29 12.8	5.197	6.065	-0.42 -1.0	.	149.4
Feb. 5	06 20.75	+29 02.2	5.293	6.068	-0.31 -1.2	.	138.7
Feb. 15	06 18.15	+28 49.8	5.412	6.072	-0.19 -1.3	.	128.1
Feb. 25	06 16.79	+28 36.4	5.550	6.075	-0.07 -1.4	.	117.8
Mar. 7	06 16.72	+28 22.3	5.701	6.078	+0.06 -1.4	.	107.8
Mar. 17	06 17.90	+28 08.0	5.860	6.081	+0.19 -1.4	.	98.1
Mar. 27	06 20.28	+27 53.7	6.023	6.084	+0.30 -1.4	.	88.8
Apr. 6	06 23.77	+27 39.4	6.186	6.087	+0.40 -1.4	.	79.7
Apr. 16	06 28.23	+27 24.9	6.344	6.090	+0.50 -1.5	.	70.9
Apr. 26	06 33.56	+27 10.1	6.494	6.093	+0.58 -1.5	.	62.3
May 6	06 39.63	+26 54.8	6.634	6.096	+0.64 -1.6	.	54.0
May 16	06 46.32	+26 38.8	6.759	6.099	+0.70 -1.6	.	45.9
May 26	06 53.53	+26 21.9	6.869	6.102	+0.74 -1.7	.	37.9
June 5	07 01.13	+26 04.0	6.962	6.105	+0.78 -1.9	.	30.1
June 15	07 09.03	+25 44.9	7.035	6.108	+0.80 -2.0	.	22.4
June 25	07 17.14	+25 24.7	7.088	6.111	+0.82 -2.1	.	14.8
July 5	07 25.36	+25 03.3	7.121	6.114	+0.82 -2.2	.	7.5
July 15	07 33.61	+24 40.8	7.132	6.117	+0.82 -2.3	.	3.0
July 25	07 41.81	+24 17.3	7.122	6.120	+0.81 -2.4	.	8.9
Aug. 4	07 49.86	+23 53.1	7.090	6.123	+0.79 -2.5	.	16.3
Aug. 14	07 57.69	+23 28.4	7.038	6.126	+0.77 -2.5	.	24.0
Aug. 24	08 05.21	+23 03.6	6.965	6.129	+0.73 -2.5	.	31.8
Sept. 3	08 12.34	+22 39.0	6.874	6.132	+0.69 -2.4	.	39.7
Sept. 13	08 18.99	+22 15.2	6.765	6.135	+0.63 -2.3	.	47.8
Sept. 23	08 25.06	+21 52.5	6.641	6.138	+0.57 -2.2	.	56.1
Oct. 3	08 30.45	+21 31.5	6.503	6.141	+0.50 -2.0	.	64.6
Oct. 13	08 35.08	+21 12.7	6.355	6.144	+0.42 -1.7	.	73.3
Oct. 23	08 38.83	+20 56.8	6.200	6.146	+0.32 -1.4	.	82.3
Nov. 2	08 41.62	+20 44.1	6.041	6.149	+0.22 -1.1	.	91.6
Nov. 12	08 43.35	+20 35.1	5.883	6.152	+0.11 -0.7	.	101.2
Nov. 22	08 43.95	+20 30.0	5.730	6.155	0.00 -0.3	.	111.1
Dec. 2	08 43.39	+20 28.9	5.587	6.158	-0.12 +0.1	.	121.4
Dec. 12	08 41.68	+20 31.5	5.459	6.161	-0.23 +0.5	.	131.9
Dec. 22	08 38.89	+20 37.4	5.352	6.163	-0.33 +0.7	.	142.7
Jan. 1	08 35.15	+20 45.8	5.269	6.166	-0.42 +0.9	.	153.8
Jan. 11	08 30.69	+20 55.6	5.214	6.169	-0.48 +1.0	.	165.0
Jan. 21	08 25.77	+21 05.7	5.190	6.172	-0.50 +1.0	.	176.0
Jan. 31	08 20.73	+21 15.0	5.197	6.174	-0.50 +0.8	.	172.1
Feb. 10	08 15.91	+21 22.5	5.236	6.177	-0.46 +0.6	.	160.9
Feb. 20	08 11.61	+21 27.4	5.305	6.180	-0.39 +0.3	.	149.8
Mar. 1	08 08.11	+21 29.4	5.400	6.182	-0.30 0.0	.	139.0
Mar. 11	08 05.59	+21 28.2	5.518	6.185	-0.19 -0.3	.	128.4
Mar. 21	08 04.18	+21 23.9	5.655	6.188	-0.08 -0.6	.	118.2
Mar. 31	08 03.91	+21 16.4	5.805	6.190	+0.04 -0.9	.	108.2

Comet 378P/McNaught

Epoch = 2023 June 25.0 TT  
 T = 2020 Oct. 14.88453 TT  
 Peri. = 193.54102 e = 0.4667779  
 Node = 93.98226 2000.0 a = 6.3141775 AU  
 Incl. = 19.08273 n = 0.06211963  
 q = 3.3668590 AU P = 15.87 years

$$m1 = 9.0 + 5 \log(\Delta) + 10.0 \log(r(t-900))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	01 53.30	-06 58.1	5.401	5.627	+0.10 +4.6	18.0	98.3
Jan. 16	01 54.74	-06 10.0	5.590	5.662	+0.20 +5.0	18.1	89.2
Jan. 26	01 57.22	-05 18.6	5.780	5.696	+0.30 +5.3	18.1	80.3
Feb. 5	02 00.62	-04 24.9	5.965	5.731	+0.39 +5.4	18.2	71.6
Feb. 15	02 04.84	-03 30.1	6.144	5.765	+0.46 +5.5	18.2	63.2
Feb. 25	02 09.78	-02 34.9	6.312	5.800	+0.53 +5.5	18.3	54.9
Mar. 7	02 15.33	-01 40.2	6.466	5.834	+0.58 +5.4	18.3	46.9
Mar. 17	02 21.37	+00 46.7	6.605	5.868	+0.63 +5.3	18.4	39.2
Mar. 27	02 27.82	+00 05.1	6.727	5.902	+0.66 +5.1	18.4	31.7
Apr. 6	02 34.57	+00 54.6	6.829	5.936	+0.69 +4.8	18.4	24.8
Apr. 16	02 41.55	+01 41.4	6.912	5.969	+0.71 +4.5	18.5	18.6
Apr. 26	02 48.66	+02 25.0	6.973	6.003	+0.72 +4.2	18.5	14.2
May 6	02 55.82	+03 05.2	7.013	6.036	+0.72 +3.8	18.5	13.3
May 16	03 02.96	+03 41.7	7.032	6.069	+0.71 +3.4	18.5	16.5
May 26	03 09.99	+04 14.2	7.030	6.102	+0.69 +3.0	18.5	22.0
June 5	03 16.83	+04 42.4	7.007	6.135	+0.67 +2.6	18.5	28.6
June 15	03 23.40	+05 06.4	6.964	6.168	+0.64 +2.1	18.5	35.7
June 25	03 29.62	+05 25.8	6.903	6.201	+0.60 +1.7	18.5	43.1
July 5	03 35.38	+05 40.7	6.826	6.233	+0.55 +1.2	18.5	50.8
July 15	03 40.62	+05 51.0	6.733	6.265	+0.49 +0.8	18.5	58.7
July 25	03 45.23	+05 56.7	6.628	6.298	+0.42 +0.3	18.5	66.8
Aug. 4	03 49.12	+05 58.0	6.514	6.329	+0.35 -0.1	18.5	75.1
Aug. 14	03 52.21	+05 55.1	6.392	6.361	+0.26 -0.5	18.4	83.7
Aug. 24	03 54.39	+05 48.2	6.268	6.393	+0.17 -0.9	18.4	92.5
Sept. 3	03 55.61	+05 37.7	6.145	6.424	+0.07 -1.2	18.4	101.6
Sept. 13	03 55.81	+05 24.3	6.027	6.456	-0.04 -1.5	18.4	111.0
Sept. 23	03 54.97	+05 08.5	5.919	6.487	-0.14 -1.7	18.4	120.5
Oct. 3	03 53.11	+04 51.3	5.825	6.518	-0.24 -1.8	18.3	130.3
Oct. 13	03 50.30	+04 33.7	5.751	6.549	-0.33 -1.7	18.3	140.2
Oct. 23	03 46.68	+04 17.0	5.700	6.579	-0.40 -1.6	18.3	149.8
Nov. 2	03 42.42	+04 02.2	5.676	6.610	-0.45 -1.3	18.4	158.5
Nov. 12	03 37.77	+03 50.6	5.681	6.640	-0.48 -0.9	18.4	164.3
Nov. 22	03 33.00	+03 43.3	5.717	6.670	-0.47 -0.5	18.4	163.4
Dec. 2	03 28.39	+03 41.1	5.784	6.700	-0.44 +0.1	18.5	156.5
Dec. 12	03 24.19	+03 44.4	5.880	6.730	-0.39 +0.6	18.6	147.3
Dec. 22	03 20.64	+03 53.3	6.003	6.759	-0.31 +1.2	18.6	137.3
Jan. 1	03 17.91	+04 07.7	6.149	6.789	-0.22 +1.7	18.7	127.2
Jan. 11	03 16.10	+04 27.2	6.313	6.818	-0.13 +2.2	18.8	117.1
Jan. 21	03 15.27	+04 51.2	6.491	6.847	-0.03 +2.6	18.9	107.2
Jan. 31	03 15.42	+05 18.8	6.678	6.876	+0.07 +2.9	19.0	97.5
Feb. 10	03 16.53	+05 49.3	6.869	6.905	+0.16 +3.2	19.1	88.0
Feb. 20	03 18.54	+06 22.0	7.059	6.933	+0.25 +3.4	19.2	78.7
Mar. 1	03 21.37	+06 56.1	7.244	6.962	+0.32 +3.5	19.3	69.6
Mar. 11	03 24.92	+07 30.9	7.420	6.990	+0.39 +3.5	19.4	60.8
Mar. 21	03 29.11	+08 05.7	7.584	7.018	+0.45 +3.5	19.4	52.2
Mar. 31	03 33.84	+08 40.1	7.733	7.046	+0.50 +3.4	19.5	43.8

Comet 246P/NEAT

Epoch = 2023 June 25.0 TT  
 T = 2021 Feb. 28.70415 TT  
 Peri. = 178.73107 e = 0.2906452  
 Node = 77.27573 2000.0 a = 4.0456746 AU  
 Incl. = 16.13710 n = 0.12112050  
 q = 2.8698187 AU P = 8.14 years

$$m1 = 5.0 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	00 16.67	-13 41.0	4.386	4.217	+0.55 +7.5	17.6	73.7
Jan. 16	00 22.62	-12 25.2	4.550	4.241	+0.64 +7.7	17.7	65.7
Jan. 26	00 29.42	-11 07.9	4.706	4.264	+0.72 +7.8	17.8	57.8
Feb. 5	00 36.91	-09 50.0	4.851	4.287	+0.78 +7.8	17.9	50.2
Feb. 15	00 44.98	-08 32.2	4.983	4.310	+0.83 +7.7	18.0	42.7
Feb. 25	00 53.50	-07 15.2	5.100	4.332	+0.87 +7.6	18.1	35.5
Mar. 7	01 02.39	-05 59.7	5.201	4.355	+0.90 +7.5	18.2	28.5
Mar. 17	01 11.54	-04 46.1	5.284	4.377	+0.93 +7.2	18.2	21.9
Mar. 27	01 20.88	-03 35.0	5.349	4.399	+0.94 +7.0	18.3	16.0
Apr. 6	01 30.32	-02 26.9	5.395	4.421	+0.95 +6.6	18.3	11.9
Apr. 16	01 39.79	-01 22.2	5.422	4.442	+0.95 +6.3	18.4	11.3
Apr. 26	01 49.23	+00 21.3	5.429	4.463	+0.94 +5.9	18.4	14.7
May 6	01 58.56	+00 35.3	5.417	4.484	+0.92 +5.4	18.4	20.2
May 16	02 07.70	+01 27.4	5.387	4.505	+0.90 +4.9	18.5	26.5
May 26	02 16.58	+02 14.5	5.339	4.525	+0.87 +4.4	18.5	33.2
June 5	02 25.12	+02 56.4	5.274	4.545	+0.83 +3.9	18.5	40.1
June 15	02 33.22	+03 32.9	5.194	4.565	+0.78 +3.3	18.5	47.2
June 25	02 40.79	+04 03.5	5.099	4.585	+0.72 +2.7	18.5	54.6
July 5	02 47.72	+04 28.2	4.991	4.604	+0.65 +2.1	18.4	62.1
July 15	02 53.90	+04 46.9	4.873	4.623	+0.57 +1.5	18.4	69.9
July 25	02 59.20	+04 59.2	4.747	4.642	+0.48 +0.9	18.4	77.9
Aug. 4	03 03.49	+05 05.4	4.616	4.661	+0.37 +0.3	18.3	86.2
Aug. 14	03 06.66	+05 05.4	4.483	4.679	+0.25 -0.3	18.3	94.9
Aug. 24	03 08.56	+04 59.4	4.351	4.697	+0.12 -0.9	18.3	103.8
Sept. 3	03 09.11	+04 48.1	4.226	4.715	-0.02 -1.4	18.2	113.2
Sept. 13	03 08.24	+04 32.0	4.110	4.732	-0.17 -1.8	18.2	122.8
Sept. 23	03 05.94	+04 12.1	4.010	4.749	-0.31 -2.1	18.2	132.8
Oct. 3	03 02.30	+03 49.9	3.929	4.766	-0.43 -2.3	18.1	143.0
Oct. 13	02 57.49	+03 27.2	3.871	4.783	-0.54 -2.2	18.1	153.1
Oct. 23	02 51.79	+03 05.7	3.841	4.799	-0.61 -2.0	18.1	162.2
Nov. 2	02 45.58	+02 47.8	3.841	4.815	-0.63 -1.5	18.2	167.4
Nov. 12	02 39.27	+02 35.2	3.872	4.830	-0.62 -0.9	18.2	163.7
Nov. 22	02 33.30	+02 29.5	3.933	4.846	-0.56 -0.1	18.3	154.8
Dec. 2	02 28.08	+02 31.7	4.023	4.861	-0.47 +0.7	18.3	144.6
Dec. 12	02 23.89	+02 42.1	4.138	4.876	-0.35 +1.5	18.4	134.2
Dec. 22	02 20.96	+03 00.6	4.274	4.890	-0.22 +2.3	18.5	123.8
Jan. 1	02 19.38	+03 26.5	4.426	4.904	-0.08 +3.0	18.6	113.7
Jan. 11	02 19.18	+03 58.9	4.590	4.918	+0.05 +3.6	18.7	103.8
Jan. 21	02 20.32	+04 37.0	4.761	4.932	+0.18 +4.1	18.8	94.2
Jan. 31	02 22.70	+05 19.5	4.933	4.945	+0.30 +4.5	18.9	85.0
Feb. 10	02 26.22	+06 05.5	5.103	4.958	+0.41 +4.8	19.0	76.0
Feb. 20	02 30.74	+06 53.9	5.268	4.970	+0.50 +4.9	19.1	67.3
Mar. 1	02 36.16	+07 44.0	5.423	4.983	+0.58 +5.1	19.1	58.8
Mar. 11	02 42.33	+08 34.8	5.566	4.995	+0.66 +5.1	19.2	50.6
Mar. 21	02 49.15	+09 25.7	5.694	5.007	+0.71 +5.1	19.3	42.6
Mar. 31	02 56.52	+10 16.1	5.806	5.018	+0.76 +5.0	19.3	34.8



Comet C/2019 T3 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2021 Mar. 4.31194 TT  
 Peri. = 112.45341  
 Node = 139.53225 2000.0  
 Incl. = 121.84149  
 q = 5.9519831 AU  
 e = 0.9983225

$$m1 = -1.0 + 5 \log(\Delta) + 17.5 \log(r(t-90))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	21 24.07	-04 50.8	8.294	7.542	+0.34	-2.0	18.6	37.9
Jan. 16	21 27.63	-05 08.3	8.431	7.583	+0.37	-1.5	18.7	28.8
Jan. 26	21 31.42	-05 21.9	8.542	7.624	+0.39	-1.2	18.7	20.0
Feb. 5	21 35.32	-05 32.1	8.627	7.666	+0.39	-0.9	18.8	12.0
Feb. 15	21 39.24	-05 39.9	8.684	7.707	+0.39	-0.7	18.8	7.9
Feb. 25	21 43.08	-05 46.0	8.713	7.749	+0.38	-0.5	18.9	12.3
Mar. 7	21 46.74	-05 51.2	8.715	7.791	+0.35	-0.5	18.9	20.2
Mar. 17	21 50.14	-05 56.3	8.690	7.834	+0.32	-0.5	19.0	28.9
Mar. 27	21 53.19	-06 02.1	8.640	7.876	+0.28	-0.7	19.0	37.8
Apr. 6	21 55.81	-06 09.4	8.568	7.919	+0.23	-0.8	19.0	47.0
Apr. 16	21 57.91	-06 19.0	8.476	7.963	+0.18	-1.1	19.0	56.3
Apr. 26	21 59.42	-06 31.5	8.368	8.006	+0.12	-1.5	19.1	65.7
May 6	22 00.27	-06 47.8	8.248	8.050	+0.05	-1.9	19.1	75.2
May 16	22 00.39	-07 08.5	8.120	8.093	-0.03	-2.3	19.1	84.9
May 26	21 59.74	-07 33.9	7.989	8.137	-0.11	-2.8	19.1	94.8
June 5	21 58.27	-08 04.6	7.862	8.182	-0.19	-3.4	19.1	104.9
June 15	21 55.98	-08 40.7	7.742	8.226	-0.27	-3.9	19.1	115.2
June 25	21 52.88	-09 22.1	7.637	8.271	-0.35	-4.4	19.1	125.7
July 5	21 49.02	-10 08.4	7.550	8.316	-0.42	-4.9	19.1	136.4
July 15	21 44.51	-10 58.9	7.488	8.361	-0.48	-5.2	19.1	147.2
July 25	21 39.46	-11 52.5	7.454	8.406	-0.53	-5.5	19.2	158.2
Aug. 4	21 34.05	-12 48.0	7.452	8.451	-0.55	-5.6	19.2	169.3
Aug. 14	21 28.47	-13 44.0	7.484	8.497	-0.56	-5.6	19.3	178.7
Aug. 24	21 22.93	-14 39.0	7.550	8.542	-0.54	-5.4	19.3	168.2
Sept. 3	21 17.65	-15 31.7	7.650	8.588	-0.51	-5.1	19.4	157.1
Sept. 13	21 12.82	-16 20.9	7.781	8.634	-0.45	-4.7	19.5	146.0
Sept. 23	21 08.59	-17 05.8	7.941	8.681	-0.38	-4.2	19.6	135.1
Oct. 3	21 05.09	-17 45.9	8.124	8.727	-0.31	-3.7	19.6	124.3
Oct. 13	21 02.40	-18 21.0	8.325	8.773	-0.22	-3.2	19.7	113.6
Oct. 23	21 00.57	-18 51.0	8.540	8.820	-0.14	-2.7	19.8	103.2
Nov. 2	20 59.58	-19 16.3	8.762	8.867	-0.05	-2.3	19.9	92.8
Nov. 12	20 59.41	-19 37.0	8.985	8.913	+0.03	-1.8	20.0	82.7
Nov. 22	21 00.02	-19 53.7	9.205	8.960	+0.10	-1.5	20.1	72.7
Dec. 2	21 01.31	-20 06.7	9.415	9.008	+0.16	-1.1	20.2	62.8
Dec. 12	21 03.22	-20 16.7	9.612	9.055	+0.22	-0.8	20.3	53.1
Dec. 22	21 05.64	-20 24.1	9.791	9.102	+0.27	-0.6	20.4	43.5
Jan. 1	21 08.49	-20 29.5	9.949	9.150	+0.30	-0.5	20.5	34.0
Jan. 11	21 11.66	-20 33.4	10.082	9.197	+0.33	-0.3	20.5	24.6
Jan. 21	21 15.07	-20 36.4	10.189	9.245	+0.35	-0.3	20.6	15.5
Jan. 31	21 18.60	-20 39.1	10.269	9.292	+0.36	-0.3	20.6	7.2
Feb. 10	21 22.18	-20 41.9	10.320	9.340	+0.36	-0.3	20.7	6.4
Feb. 20	21 25.71	-20 45.5	10.343	9.388	+0.35	-0.4	20.7	14.3
Mar. 1	21 29.10	-20 50.4	10.339	9.436	+0.33	-0.6	20.8	23.3
Mar. 11	21 32.26	-20 57.2	10.308	9.484	+0.30	-0.8	20.8	32.4
Mar. 21	21 35.12	-21 06.3	10.253	9.533	+0.27	-1.1	20.8	41.7
Mar. 31	21 37.59	-21 18.4	10.177	9.581	+0.22	-1.4	20.9	51.0

## Comet C/2019 03 (Palomar)

Epoch = 2023 June 25.0 TT  
 T = 2021 Mar. 9.62335 TT  
 Peri. = 60.13078  
 Node = 300.42468 2000.0  
 Incl. = 89.81795  
 q = 8.8211152 AU  
 e = 1.0043930

$$m1 = -4.8 + 5 \log(\Delta) + 17.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	17 58.51	+64 07.8	9.612	9.622	+0.71	+4.1	17.3	87.7
Jan. 16	18 05.50	+64 52.6	9.625	9.645	+0.69	+5.0	17.3	88.2
Jan. 26	18 12.20	+65 46.0	9.641	9.668	+0.65	+5.8	17.4	88.7
Feb. 5	18 18.40	+66 47.3	9.660	9.692	+0.58	+6.5	17.4	88.9
Feb. 15	18 23.88	+67 55.7	9.683	9.715	+0.50	+7.2	17.4	89.0
Feb. 25	18 28.39	+69 09.9	9.709	9.739	+0.38	+7.7	17.4	88.8
Mar. 7	18 31.60	+70 28.9	9.740	9.763	+0.24	+8.1	17.5	88.4
Mar. 17	18 33.15	+71 51.0	9.775	9.788	+0.05	+8.3	17.5	87.8
Mar. 27	18 32.58	+73 14.7	9.814	9.812	-0.20	+8.4	17.5	87.0
Apr. 6	18 29.31	+74 38.0	9.857	9.837	-0.50	+8.2	17.5	85.9
Apr. 16	18 22.69	+75 58.6	9.904	9.862	-0.88	+7.8	17.6	84.7
Apr. 26	18 11.95	+77 13.9	9.954	9.887	-1.33	+7.1	17.6	83.3
May 6	17 56.42	+78 20.6	10.006	9.913	-1.84	+6.1	17.6	81.8
May 16	17 35.70	+79 15.5	10.059	9.939	-2.35	+4.7	17.7	80.3
May 26	17 10.16	+79 55.1	10.113	9.965	-2.77	+3.0	17.7	78.8
June 5	16 41.31	+80 16.6	10.166	9.991	-2.97	+1.1	17.7	77.3
June 15	16 11.72	+80 19.1	10.217	10.018	-2.89	-0.8	17.8	75.9
June 25	15 44.19	+80 03.8	10.266	10.044	-2.55	-2.4	17.8	74.6
July 5	15 20.83	+79 33.9	10.311	10.071	-2.06	-3.6	17.8	73.6
July 15	15 02.52	+78 53.4	10.352	10.099	-1.55	-4.5	17.8	72.8
July 25	14 49.20	+78 06.2	10.387	10.126	-1.08	-5.0	17.9	72.4
Aug. 4	14 40.29	+77 15.7	10.417	10.154	-0.68	-5.1	17.9	72.2
Aug. 14	14 35.06	+76 24.6	10.441	10.181	-0.35	-5.1	17.9	72.5
Aug. 24	14 32.82	+75 35.1	10.458	10.210	-0.08	-4.8	18.0	73.1
Sept. 3	14 32.97	+74 49.0	10.468	10.238	+0.13	-4.4	18.0	74.1
Sept. 13	14 35.03	+74 07.5	10.472	10.266	+0.30	-3.8	18.0	75.5
Sept. 23	14 38.60	+73 31.8	10.470	10.295	+0.43	-3.2	18.0	77.3
Oct. 3	14 43.38	+73 02.7	10.462	10.324	+0.53	-2.5	18.0	79.3
Oct. 13	14 49.10	+72 41.1	10.449	10.353	+0.62	-1.7	18.1	81.7
Oct. 23	14 55.54	+72 27.5	10.433	10.382	+0.68	-0.9	18.1	84.3
Nov. 2	15 02.51	+72 22.4	10.415	10.411	+0.72	0.0	18.1	87.1
Nov. 12	15 09.83	+72 26.1	10.396	10.441	+0.74	+0.9	18.1	89.9
Nov. 22	15 17.32	+72 38.8	10.377	10.471	+0.75	+1.8	18.1	92.7
Dec. 2	15 24.79	+73 00.3	10.361	10.501	+0.74	+2.6	18.1	95.5
Dec. 12	15 32.06	+73 30.6	10.349	10.531	+0.71	+3.5	18.2	98.0
Dec. 22	15 38.87	+74 09.3	10.343	10.561	+0.65	+4.3	18.2	100.2
Jan. 1	15 44.95	+74 55.7	10.344	10.592	+0.56	+5.0	18.2	102.0
Jan. 11	15 49.95	+75 49.0	10.354	10.623	+0.42	+5.7	18.2	103.2
Jan. 21	15 53.41	+76 48.2	10.374	10.654	+0.24	+6.2	18.3	103.9
Jan. 31	15 54.72	+77 51.8	10.404	10.685	-0.01	+6.5	18.3	104.0
Feb. 10	15 53.11	+78 58.1	10.445	10.716	-0.36	+6.7	18.3	103.4
Feb. 20	15 47.43	+80 05.0	10.497	10.747	-0.84	+6.6	18.4	102.1
Mar. 1	15 36.29	+81 09.8	10.559	10.779	-1.48	+6.2	18.4	100.2
Mar. 11	15 17.94	+82 08.9	10.630	10.811	-2.30	+5.4	18.4	97.8
Mar. 21	14 50.79	+82 57.6	10.710	10.843	-3.23	+4.1	18.5	95.0
Mar. 31	14 14.67	+83 30.6	10.797	10.875	-4.03	+2.2	18.5	91.8

## Comet C/2020 F5 (MASTER)

Epoch = 2023 June 25.0 TT  
 T = 2021 Mar. 17.50757 TT  
 Peri. = 310.68012 e = 0.9755047  
 Node = 350.50010 2000.0 a = 176.5524162 AU  
 Incl. = 52.20606 n = 0.00042014  
 q = 4.3247044 AU P = 2345.91 years

$$m1 = 5.2 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	23 20.95	+15 56.5	6.926	6.712	+0.32 +2.5	17.7	73.4
Jan. 16	23 24.48	+16 24.1	7.127	6.768	+0.39 +3.1	17.8	64.8
Jan. 26	23 28.59	+16 57.2	7.317	6.823	+0.44 +3.6	17.9	56.5
Feb. 5	23 33.17	+17 35.4	7.493	6.878	+0.48 +4.1	17.9	48.4
Feb. 15	23 38.11	+18 18.3	7.652	6.934	+0.51 +4.5	18.0	40.8
Feb. 25	23 43.32	+19 05.5	7.792	6.990	+0.53 +4.9	18.1	33.7
Mar. 7	23 48.68	+19 56.7	7.912	7.046	+0.54 +5.3	18.2	27.4
Mar. 17	23 54.13	+20 51.3	8.010	7.102	+0.55 +5.6	18.2	22.6
Mar. 27	23 59.56	+21 49.0	8.086	7.158	+0.54 +5.9	18.3	20.2
Apr. 6	00 04.89	+22 49.3	8.140	7.215	+0.52 +6.1	18.3	21.0
Apr. 16	00 10.05	+23 51.7	8.172	7.271	+0.50 +6.3	18.4	24.5
Apr. 26	00 14.94	+24 55.8	8.183	7.327	+0.47 +6.5	18.4	29.9
May 6	00 19.48	+26 01.2	8.174	7.384	+0.43 +6.6	18.4	36.2
May 16	00 23.60	+27 07.4	8.146	7.441	+0.39 +6.6	18.5	43.2
May 26	00 27.21	+28 13.9	8.101	7.498	+0.33 +6.6	18.5	50.5
June 5	00 30.21	+29 20.1	8.042	7.554	+0.26 +6.6	18.5	58.0
June 15	00 32.53	+30 25.5	7.971	7.611	+0.19 +6.5	18.5	65.8
June 25	00 34.09	+31 29.4	7.891	7.668	+0.11 +6.3	18.5	73.7
July 5	00 34.81	+32 30.8	7.806	7.725	+0.02 +6.0	18.5	81.7
July 15	00 34.63	+33 29.0	7.718	7.782	-0.07 +5.6	18.5	89.9
July 25	00 33.52	+34 22.8	7.631	7.840	-0.16 +5.1	18.6	98.1
Aug. 4	00 31.45	+35 11.1	7.551	7.897	-0.26 +4.5	18.6	106.4
Aug. 14	00 28.46	+35 52.7	7.479	7.954	-0.35 +3.8	18.6	114.6
Aug. 24	00 24.63	+36 26.6	7.422	8.011	-0.42 +2.9	18.6	122.6
Sept. 3	00 20.09	+36 51.7	7.381	8.069	-0.49 +2.0	18.6	130.1
Sept. 13	00 15.03	+37 07.5	7.361	8.126	-0.53 +1.0	18.6	137.0
Sept. 23	00 09.66	+37 13.7	7.365	8.183	-0.54 +0.1	18.7	142.4
Oct. 3	00 04.27	+37 10.7	7.394	8.241	-0.53 -0.8	18.7	145.8
Oct. 13	23 59.09	+36 59.4	7.449	8.298	-0.50 -1.5	18.8	146.3
Oct. 23	23 54.38	+36 41.3	7.531	8.355	-0.44 -2.1	18.8	143.9
Nov. 2	23 50.35	+36 18.3	7.639	8.413	-0.36 -2.5	18.9	139.0
Nov. 12	23 47.14	+35 52.3	7.770	8.470	-0.27 -2.7	18.9	132.5
Nov. 22	23 44.86	+35 25.4	7.923	8.528	-0.17 -2.7	19.0	125.0
Dec. 2	23 43.55	+34 59.7	8.093	8.585	-0.08 -2.4	19.1	116.9
Dec. 12	23 43.21	+34 36.8	8.277	8.642	+0.02 -2.1	19.2	108.6
Dec. 22	23 43.79	+34 18.0	8.471	8.700	+0.11 -1.6	19.2	100.2
Jan. 1	23 45.24	+34 04.4	8.670	8.757	+0.19 -1.0	19.3	91.8
Jan. 11	23 47.46	+33 56.6	8.871	8.815	+0.26 -0.4	19.4	83.6
Jan. 21	23 50.36	+33 55.1	9.068	8.872	+0.32 +0.2	19.5	75.4
Jan. 31	23 53.84	+33 59.9	9.258	8.929	+0.38 +0.8	19.5	67.6
Feb. 10	23 57.80	+34 11.0	9.439	8.987	+0.42 +1.4	19.6	60.0
Feb. 20	00 02.15	+34 28.2	9.606	9.044	+0.45 +2.0	19.7	52.9
Mar. 1	00 06.79	+34 51.2	9.757	9.101	+0.48 +2.6	19.7	46.3
Mar. 11	00 11.63	+35 19.5	9.891	9.159	+0.49 +3.1	19.8	40.5
Mar. 21	00 16.57	+35 52.7	10.005	9.216	+0.50 +3.6	19.8	35.8
Mar. 31	00 21.54	+36 30.4	10.099	9.273	+0.50 +4.0	19.9	32.6

Comet C/2019 F1 (ATLAS-Africano)

Epoch = 2023 June 25.0 TT  
 T = 2021 June 22.89343 TT  
 Peri. = 251.31513  
 Node = 38.66483 2000.0  
 Incl. = 54.23295  
 q = 3.6034216 AU  
 e = 1.0027545

$$m1 = 7.6 + 5 \log(\Delta) + 7.5 \log(r(t+150))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	01 14.26	-18° 13.9	6.021	6.017	+0.09	+8.4	17.8	85.1
Jan. 16	01 15.58	-16 49.7	6.233	6.080	+0.19	+8.4	17.9	76.5
Jan. 26	01 17.83	-15 25.9	6.442	6.143	+0.27	+8.3	18.0	68.1
Feb. 5	01 20.88	-14 03.6	6.643	6.206	+0.34	+8.1	18.1	59.8
Feb. 15	01 24.61	-12 43.3	6.833	6.270	+0.41	+7.9	18.2	51.8
Feb. 25	01 28.89	-11 25.6	7.009	6.333	+0.45	+7.6	18.3	43.9
Mar. 7	01 33.61	-10 11.1	7.168	6.397	+0.49	+7.3	18.4	36.4
Mar. 17	01 38.67	-09 00.0	7.310	6.460	+0.52	+6.9	18.4	29.3
Mar. 27	01 43.95	-07 52.6	7.431	6.524	+0.54	+6.5	18.5	23.0
Apr. 6	01 49.38	-06 49.2	7.530	6.588	+0.55	+6.1	18.6	18.3
Apr. 16	01 54.85	-05 50.0	7.608	6.652	+0.55	+5.7	18.6	16.5
Apr. 26	02 00.29	-04 55.2	7.663	6.716	+0.54	+5.2	18.7	18.4
May 6	02 05.61	-04 04.9	7.696	6.780	+0.52	+4.8	18.7	23.1
May 16	02 10.73	-03 19.2	7.707	6.844	+0.50	+4.3	18.7	29.4
May 26	02 15.57	-02 38.2	7.697	6.908	+0.47	+3.8	18.8	36.4
June 5	02 20.05	-02 02.1	7.667	6.973	+0.43	+3.3	18.8	43.9
June 15	02 24.09	-01 30.8	7.620	7.037	+0.38	+2.9	18.8	51.8
June 25	02 27.61	-01 04.4	7.557	7.101	+0.32	+2.4	18.8	59.9
July 5	02 30.52	+00 42.8	7.481	7.165	+0.26	+1.9	18.8	68.2
July 15	02 32.76	+00 25.9	7.394	7.229	+0.18	+1.4	18.8	76.7
July 25	02 34.25	+00 13.6	7.302	7.294	+0.10	+1.0	18.8	85.6
Aug. 4	02 34.92	+00 05.6	7.206	7.358	+0.02	+0.6	18.8	94.6
Aug. 14	02 34.74	+00 01.5	7.113	7.422	-0.07	+0.2	18.8	103.9
Aug. 24	02 33.67	+00 00.8	7.026	7.486	-0.16	-0.1	18.8	113.4
Sept. 3	02 31.73	+00 02.9	6.951	7.550	-0.24	-0.3	18.8	123.2
Sept. 13	02 28.96	+00 07.1	6.891	7.614	-0.32	-0.5	18.8	133.1
Sept. 23	02 25.44	+00 12.3	6.852	7.679	-0.39	-0.5	18.8	143.1
Oct. 3	02 21.30	+00 17.6	6.839	7.743	-0.44	-0.5	18.8	152.9
Oct. 13	02 16.73	+00 21.8	6.853	7.807	-0.47	-0.3	18.8	161.7
Oct. 23	02 11.91	+00 24.0	6.898	7.871	-0.49	-0.1	18.9	167.0
Nov. 2	02 07.07	+00 23.2	6.974	7.935	-0.48	+0.3	18.9	164.4
Nov. 12	02 02.44	+00 18.8	7.082	7.999	-0.44	+0.7	19.0	156.3
Nov. 22	01 58.22	+00 10.1	7.220	8.062	-0.39	+1.1	19.1	146.5
Dec. 2	01 54.58	+00 03.1	7.385	8.126	-0.33	+1.6	19.1	136.3
Dec. 12	01 51.64	+00 20.8	7.572	8.190	-0.25	+2.0	19.2	126.0
Dec. 22	01 49.48	+00 42.8	7.779	8.254	-0.17	+2.4	19.3	115.7
Jan. 1	01 48.15	+01 08.7	7.999	8.317	-0.09	+2.8	19.4	105.6
Jan. 11	01 47.64	+01 38.2	8.228	8.381	-0.01	+3.1	19.4	95.6
Jan. 21	01 47.91	+02 10.6	8.460	8.445	+0.07	+3.4	19.5	85.8
Jan. 31	01 48.93	+02 45.5	8.690	8.508	+0.14	+3.6	19.6	76.2
Feb. 10	01 50.61	+03 22.3	8.914	8.572	+0.20	+3.8	19.7	66.7
Feb. 20	01 52.88	+04 00.5	9.127	8.635	+0.26	+3.9	19.8	57.4
Mar. 1	01 55.66	+04 39.5	9.325	8.698	+0.30	+3.9	19.8	48.3
Mar. 11	01 58.85	+05 19.0	9.507	8.761	+0.34	+4.0	19.9	39.4
Mar. 21	02 02.39	+05 58.5	9.667	8.825	+0.37	+3.9	19.9	30.6
Mar. 31	02 06.17	+06 37.6	9.806	8.888	+0.39	+3.9	20.0	22.0

## Comet C/2020 H6 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2021 Sept. 30.65198 TT  
 Peri. = 20.29968  
 Node = 213.71988 2000.0  
 Incl. = 79.97781  
 q = 4.7017905 AU  
 e = 0.9994102

$$m1 = 6.0 + 5 \log(\Delta) + 10.0 \log(r(t-170))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	17 33.74	+40 53.6	6.229	5.914	+1.12	+6.4	17.2	67.0
Jan. 16	17 44.81	+42 02.2	6.235	5.960	+1.09	+7.4	17.2	69.3
Jan. 26	17 55.57	+43 20.1	6.241	6.006	+1.05	+8.3	17.2	71.8
Feb. 5	18 05.87	+44 46.7	6.246	6.052	+1.00	+9.1	17.3	74.2
Feb. 15	18 15.58	+46 20.9	6.253	6.099	+0.93	+9.8	17.3	76.5
Feb. 25	18 24.56	+48 01.4	6.261	6.146	+0.85	+10.3	17.3	78.8
Mar. 7	18 32.66	+49 46.7	6.273	6.194	+0.75	+10.7	17.4	80.9
Mar. 17	18 39.72	+51 35.2	6.288	6.242	+0.64	+11.0	17.4	82.8
Mar. 27	18 45.56	+53 25.2	6.307	6.291	+0.51	+11.0	17.4	84.5
Apr. 6	18 50.02	+55 14.5	6.330	6.340	+0.36	+10.8	17.5	86.0
Apr. 16	18 52.94	+57 01.2	6.357	6.389	+0.20	+10.4	17.5	87.3
Apr. 26	18 54.15	+58 43.0	6.388	6.439	+0.02	+9.8	17.5	88.4
May 6	18 53.54	+60 17.5	6.423	6.488	-0.16	+9.0	17.6	89.3
May 16	18 51.08	+61 42.5	6.461	6.539	-0.35	+7.9	17.6	90.0
May 26	18 46.79	+62 55.8	6.502	6.589	-0.52	+6.6	17.7	90.5
June 5	18 40.87	+63 55.2	6.546	6.640	-0.67	+5.1	17.7	90.9
June 15	18 33.67	+64 39.4	6.592	6.691	-0.77	+3.5	17.8	91.2
June 25	18 25.66	+65 07.1	6.640	6.743	-0.82	+1.8	17.8	91.4
July 5	18 17.47	+65 18.1	6.690	6.794	-0.81	+0.2	17.9	91.6
July 15	18 09.70	+65 13.1	6.742	6.846	-0.73	-1.3	17.9	91.6
July 25	18 02.93	+64 53.3	6.795	6.898	-0.60	-2.7	18.0	91.6
Aug. 4	17 57.62	+64 20.6	6.850	6.951	-0.44	-3.9	18.0	91.5
Aug. 14	17 54.04	+63 37.2	6.906	7.003	-0.26	-4.8	18.1	91.3
Aug. 24	17 52.34	+62 45.7	6.964	7.056	-0.07	-5.5	18.1	91.1
Sept. 3	17 52.52	+61 48.4	7.023	7.109	+0.12	-6.0	18.2	90.8
Sept. 13	17 54.51	+60 47.6	7.085	7.162	+0.29	-6.2	18.2	90.4
Sept. 23	17 58.17	+59 45.3	7.148	7.216	+0.45	-6.2	18.3	89.8
Oct. 3	18 03.33	+58 43.7	7.214	7.269	+0.59	-6.1	18.3	89.2
Oct. 13	18 09.83	+57 44.1	7.283	7.323	+0.72	-5.8	18.4	88.4
Oct. 23	18 17.49	+56 48.2	7.354	7.377	+0.82	-5.3	18.5	87.4
Nov. 2	18 26.13	+55 57.2	7.428	7.431	+0.91	-4.8	18.5	86.3
Nov. 12	18 35.59	+55 12.2	7.505	7.485	+0.99	-4.1	18.6	85.1
Nov. 22	18 45.73	+54 34.0	7.584	7.539	+1.05	-3.4	18.6	83.7
Dec. 2	18 56.39	+54 03.4	7.665	7.593	+1.09	-2.6	18.7	82.2
Dec. 12	19 07.45	+53 40.9	7.748	7.648	+1.12	-1.8	18.7	80.5
Dec. 22	19 18.77	+53 26.7	7.832	7.702	+1.14	-0.9	18.8	78.9
Jan. 1	19 30.22	+53 21.2	7.917	7.757	+1.15	-0.1	18.8	77.1
Jan. 11	19 41.71	+53 24.1	8.001	7.812	+1.15	+0.8	18.9	75.4
Jan. 21	19 53.11	+53 35.5	8.085	7.867	+1.13	+1.6	19.0	73.8
Jan. 31	20 04.32	+53 55.0	8.166	7.922	+1.11	+2.4	19.0	72.3
Feb. 10	20 15.24	+54 22.0	8.245	7.977	+1.07	+3.1	19.1	70.9
Feb. 20	20 25.78	+54 56.3	8.320	8.032	+1.03	+3.8	19.1	69.8
Mar. 1	20 35.82	+55 37.0	8.391	8.088	+0.97	+4.4	19.2	68.9
Mar. 11	20 45.29	+56 23.4	8.457	8.143	+0.91	+4.9	19.2	68.4
Mar. 21	20 54.07	+57 14.8	8.517	8.198	+0.84	+5.4	19.3	68.1
Mar. 31	21 02.06	+58 10.1	8.571	8.254	+0.75	+5.7	19.3	68.3

Comet P/2021 N2 (Fuls)

Epoch = 2023 June 25.0 TT  
 T = 2021 Nov. 13.91743 TT  
 Peri. = 177.45873  
 Node = 221.73491 2000.0  
 Incl. = 13.06135  
 q = 3.7982230 AU  
 e = 0.4525770  
 a = 6.9383694 AU  
 n = 0.05392845  
 P = 18.28 years

$$m1 = -4.1 + 5 \log(\Delta) + 30.0 \log(r(t-160))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	06 24.41	+09 22.4	3.539	4.491	-0.54	0.0	17.0	163.5
Jan. 16	06 19.29	+09 25.1	3.606	4.520	-0.47	+0.6	17.1	155.5
Jan. 26	06 15.06	+09 33.5	3.701	4.549	-0.36	+1.1	17.2	145.8
Feb. 5	06 12.05	+09 46.4	3.820	4.578	-0.23	+1.5	17.4	135.7
Feb. 15	06 10.42	+10 02.5	3.960	4.608	-0.08	+1.7	17.5	125.8
Feb. 25	06 10.26	+10 20.6	4.117	4.638	+0.07	+1.9	17.7	116.1
Mar. 7	06 11.58	+10 39.4	4.286	4.668	+0.21	+1.9	17.8	106.7
Mar. 17	06 14.27	+10 57.6	4.462	4.698	+0.34	+1.8	18.0	97.6
Mar. 27	06 18.24	+11 14.5	4.643	4.729	+0.46	+1.6	18.2	88.9
Apr. 6	06 23.34	+11 29.0	4.823	4.760	+0.57	+1.3	18.3	80.4
Apr. 16	06 29.43	+11 40.6	5.000	4.791	+0.66	+1.0	18.5	72.3
Apr. 26	06 36.37	+11 48.7	5.171	4.822	+0.73	+0.6	18.6	64.4
May 6	06 44.00	+11 53.0	5.333	4.854	+0.80	+0.2	18.8	56.8
May 16	06 52.21	+11 53.1	5.484	4.886	+0.85	-0.2	18.9	49.4
May 26	07 00.87	+11 48.9	5.622	4.917	+0.89	-0.7	19.1	42.1
June 5	07 09.87	+11 40.3	5.745	4.949	+0.91	-1.1	19.2	35.1
June 15	07 19.11	+11 27.3	5.853	4.982	+0.93	-1.5	19.3	28.3
June 25	07 28.49	+11 09.9	5.943	5.014	+0.94	-2.0	19.4	21.8
July 5	07 37.92	+10 48.4	6.016	5.046	+0.94	-2.4	19.5	16.0
July 15	07 47.32	+10 22.8	6.070	5.079	+0.94	-2.8	19.6	11.6
July 25	07 56.61	+09 53.5	6.105	5.111	+0.92	-3.1	19.7	10.9
Aug. 4	08 05.71	+09 20.7	6.121	5.144	+0.90	-3.5	19.8	14.3
Aug. 14	08 14.55	+08 44.9	6.118	5.177	+0.87	-3.7	19.9	19.9
Aug. 24	08 23.05	+08 06.4	6.096	5.210	+0.83	-4.0	20.0	26.4
Sept. 3	08 31.12	+07 25.7	6.055	5.242	+0.78	-4.2	20.1	33.4
Sept. 13	08 38.70	+06 43.3	5.998	5.275	+0.73	-4.3	20.1	40.7
Sept. 23	08 45.68	+05 59.8	5.923	5.308	+0.66	-4.4	20.2	48.3
Oct. 3	08 51.99	+05 16.0	5.835	5.341	+0.59	-4.4	20.2	56.1
Oct. 13	08 57.53	+04 32.6	5.733	5.375	+0.51	-4.3	20.3	64.2
Oct. 23	09 02.20	+03 50.3	5.621	5.408	+0.42	-4.1	20.3	72.6
Nov. 2	09 05.90	+03 10.1	5.503	5.441	+0.31	-3.9	20.4	81.2
Nov. 12	09 08.56	+02 33.0	5.380	5.474	+0.20	-3.5	20.4	90.2
Nov. 22	09 10.09	+02 00.0	5.258	5.507	+0.09	-3.0	20.4	99.5
Dec. 2	09 10.45	+01 32.3	5.140	5.540	-0.03	-2.4	20.5	109.0
Dec. 12	09 09.63	+01 10.8	5.031	5.573	-0.15	-1.8	20.5	118.8
Dec. 22	09 07.66	+00 56.4	4.937	5.606	-0.26	-1.0	20.5	128.8
Jan. 1	09 04.66	+00 49.9	4.861	5.640	-0.35	-0.2	20.6	138.9
Jan. 11	09 00.81	+00 51.4	4.809	5.673	-0.42	+0.6	20.6	148.8
Jan. 21	08 56.34	+01 00.8	4.783	5.706	-0.47	+1.4	20.7	157.7
Jan. 31	08 51.58	+01 17.3	4.787	5.739	-0.48	+2.0	20.8	163.6
Feb. 10	08 46.85	+01 39.8	4.821	5.772	-0.46	+2.5	20.9	163.0
Feb. 20	08 42.48	+02 06.6	4.886	5.805	-0.41	+2.8	21.0	156.4
Mar. 1	08 38.75	+02 35.9	4.979	5.838	-0.33	+3.0	21.1	147.4
Mar. 11	08 35.88	+03 05.8	5.098	5.871	-0.23	+3.0	21.3	137.7
Mar. 21	08 34.04	+03 34.8	5.239	5.903	-0.12	+2.8	21.4	127.9
Mar. 31	08 33.28	+04 01.3	5.398	5.936	-0.01	+2.5	21.6	118.2

Comet 402P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2021 Dec. 14.92467 TT  
 Peri. = 326.77953 e = 0.4396067  
 Node = 123.08702 2000.0 a = 7.0275583 AU  
 Incl. = 30.83994 n = 0.05290508  
 q = 3.9381966 AU P = 18.63 years

$$m1 = 7.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	10 25.46	+23 02.2	3.753	4.493	-0.14 +7.4	17.2	134.1
Jan. 16	10 23.40	+24 18.6	3.683	4.519	-0.28 +7.9	17.2	144.3
Jan. 26	10 19.99	+25 38.0	3.640	4.545	-0.40 +7.9	17.2	154.0
Feb. 5	10 15.53	+26 56.1	3.625	4.571	-0.49 +7.6	17.2	161.8
Feb. 15	10 10.40	+28 08.8	3.640	4.598	-0.53 +6.8	17.2	164.2
Feb. 25	10 05.08	+29 12.3	3.686	4.625	-0.52 +5.7	17.3	159.3
Mar. 7	10 00.07	+30 03.8	3.762	4.653	-0.47 +4.4	17.4	150.8
Mar. 17	09 55.81	+30 42.1	3.864	4.680	-0.37 +3.1	17.4	141.2
Mar. 27	09 52.65	+31 06.8	3.989	4.708	-0.24 +1.8	17.5	131.4
Apr. 6	09 50.83	+31 18.8	4.132	4.737	-0.10 +0.6	17.6	121.8
Apr. 16	09 50.45	+31 19.5	4.291	4.765	+0.04 -0.5	17.7	112.5
Apr. 26	09 51.53	+31 10.4	4.459	4.794	+0.19 -1.4	17.9	103.5
May 6	09 53.99	+30 53.1	4.633	4.823	+0.32 -2.1	18.0	94.8
May 16	09 57.72	+30 29.1	4.809	4.852	+0.44 -2.7	18.1	86.4
May 26	10 02.59	+29 59.5	4.983	4.882	+0.54 -3.2	18.2	78.4
June 5	10 08.44	+29 25.4	5.154	4.911	+0.63 -3.6	18.3	70.6
June 15	10 15.13	+28 47.8	5.317	4.941	+0.71 -3.9	18.4	63.1
June 25	10 22.53	+28 07.4	5.470	4.971	+0.77 -4.2	18.5	55.9
July 5	10 30.51	+27 24.9	5.612	5.001	+0.83 -4.3	18.5	48.8
July 15	10 38.97	+26 41.1	5.740	5.032	+0.87 -4.4	18.6	42.1
July 25	10 47.79	+25 56.4	5.853	5.062	+0.90 -4.5	18.7	35.6
Aug. 4	10 56.90	+25 11.6	5.951	5.093	+0.92 -4.5	18.7	29.6
Aug. 14	11 06.21	+24 27.3	6.031	5.123	+0.94 -4.4	18.8	24.2
Aug. 24	11 15.66	+23 44.1	6.093	5.154	+0.95 -4.2	18.8	20.0
Sept. 3	11 25.16	+23 02.7	6.136	5.185	+0.95 -4.0	18.9	17.9
Sept. 13	11 34.66	+22 23.7	6.161	5.216	+0.95 -3.7	18.9	18.6
Sept. 23	11 44.10	+21 47.9	6.166	5.248	+0.94 -3.4	18.9	21.8
Oct. 3	11 53.41	+21 16.1	6.153	5.279	+0.92 -2.9	19.0	26.8
Oct. 13	12 02.51	+20 48.9	6.121	5.310	+0.90 -2.4	19.0	32.8
Oct. 23	12 11.35	+20 27.3	6.072	5.342	+0.87 -1.8	19.0	39.5
Nov. 2	12 19.83	+20 12.1	6.007	5.373	+0.83 -1.2	19.0	46.6
Nov. 12	12 27.88	+20 03.9	5.927	5.405	+0.78 -0.4	19.0	54.0
Nov. 22	12 35.39	+20 03.6	5.834	5.436	+0.72 +0.4	19.0	61.7
Dec. 2	12 42.27	+20 11.9	5.731	5.468	+0.65 +1.3	19.0	69.7
Dec. 12	12 48.41	+20 29.2	5.621	5.499	+0.57 +2.2	19.0	77.9
Dec. 22	12 53.70	+20 55.9	5.507	5.531	+0.48 +3.2	18.9	86.3
Jan. 1	12 58.01	+21 31.9	5.392	5.563	+0.37 +4.1	18.9	94.9
Jan. 11	13 01.25	+22 16.8	5.281	5.595	+0.26 +4.9	18.9	103.6
Jan. 21	13 03.31	+23 09.5	5.179	5.626	+0.14 +5.7	18.9	112.3
Jan. 31	13 04.13	+24 08.5	5.088	5.658	+0.01 +6.2	18.9	121.0
Feb. 10	13 03.69	+25 11.6	5.014	5.690	-0.11 +6.4	18.9	129.3
Feb. 20	13 02.02	+26 16.0	4.960	5.722	-0.23 +6.4	18.9	136.9
Mar. 1	12 59.25	+27 18.2	4.929	5.753	-0.33 +6.0	18.9	143.3
Mar. 11	12 55.56	+28 15.2	4.923	5.785	-0.41 +5.3	18.9	147.4
Mar. 21	12 51.21	+29 03.7	4.945	5.817	-0.46 +4.3	18.9	148.5
Mar. 31	12 46.54	+29 41.2	4.993	5.849	-0.47 +3.1	19.0	146.1

## Comet 395P/Catalina-NEAT

Epoch = 2023 June 25.0 TT  
 T = 2022 Jan. 20.69080 TT  
 Peri. = 94.53925 e = 0.4070192  
 Node = 221.58458 2000.0 a = 6.9020591 AU  
 Incl. = 3.43391 n = 0.05435457  
 q = 4.0927885 AU P = 18.13 years

$$m_1 = 1.7 + 5 \log(\Delta) + 20.0 \log(r(t-170))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	23 23.80	-01 41.9	4.806	4.496	+0.75	+4.1	17.6	66.0
Jan. 16	23 31.55	+00 58.9	4.963	4.517	+0.81	+4.6	17.7	57.8
Jan. 26	23 39.88	+00 11.3	5.110	4.539	+0.86	+5.0	17.8	49.9
Feb. 5	23 48.68	+00 40.2	5.244	4.561	+0.90	+5.3	17.9	42.1
Feb. 15	23 57.85	+01 34.7	5.364	4.584	+0.93	+5.6	17.9	34.5
Feb. 25	00 07.29	+02 31.4	5.467	4.606	+0.96	+5.8	18.0	26.9
Mar. 7	00 16.92	+03 29.8	5.553	4.630	+0.97	+5.9	18.1	19.5
Mar. 17	00 26.67	+04 28.9	5.621	4.653	+0.98	+5.9	18.1	12.2
Mar. 27	00 36.46	+05 28.3	5.670	4.677	+0.98	+5.9	18.2	5.0
Apr. 6	00 46.23	+06 27.3	5.700	4.701	+0.97	+5.8	18.2	2.8
Apr. 16	00 55.90	+07 25.2	5.711	4.726	+0.96	+5.7	18.3	9.8
Apr. 26	01 05.43	+08 21.6	5.704	4.750	+0.94	+5.5	18.3	17.0
May 6	01 14.72	+09 15.8	5.677	4.775	+0.91	+5.3	18.3	24.2
May 16	01 23.71	+10 07.5	5.634	4.801	+0.88	+5.0	18.4	31.5
May 26	01 32.34	+10 56.1	5.573	4.826	+0.84	+4.7	18.4	38.8
June 5	01 40.50	+11 41.3	5.498	4.852	+0.79	+4.3	18.4	46.3
June 15	01 48.13	+12 22.5	5.408	4.878	+0.73	+3.9	18.4	53.8
June 25	01 55.11	+12 59.4	5.306	4.904	+0.66	+3.4	18.4	61.6
July 5	02 01.35	+13 31.6	5.194	4.931	+0.58	+2.9	18.4	69.5
July 15	02 06.74	+13 58.8	5.075	4.958	+0.49	+2.4	18.4	77.6
July 25	02 11.17	+14 20.4	4.950	4.984	+0.39	+1.8	18.4	86.1
Aug. 4	02 14.53	+14 36.2	4.824	5.012	+0.27	+1.2	18.3	94.8
Aug. 14	02 16.73	+14 45.8	4.700	5.039	+0.15	+0.6	18.3	103.8
Aug. 24	02 17.70	+14 49.0	4.582	5.066	+0.03	-0.1	18.3	113.2
Sept. 3	02 17.40	+14 45.5	4.475	5.094	-0.10	-0.7	18.3	122.9
Sept. 13	02 15.86	+14 35.4	4.382	5.121	-0.22	-1.4	18.3	133.0
Sept. 23	02 13.17	+14 19.0	4.308	5.149	-0.33	-2.0	18.3	143.5
Oct. 3	02 09.51	+13 57.1	4.258	5.177	-0.41	-2.5	18.3	154.2
Oct. 13	02 05.14	+13 30.8	4.234	5.205	-0.46	-2.8	18.4	165.3
Oct. 23	02 00.39	+13 01.8	4.240	5.234	-0.48	-3.0	18.4	176.4
Nov. 2	01 55.62	+12 31.9	4.277	5.262	-0.46	-3.0	18.5	172.3
Nov. 12	01 51.19	+12 03.2	4.344	5.290	-0.41	-2.7	18.6	161.1
Nov. 22	01 47.42	+11 37.9	4.440	5.319	-0.33	-2.3	18.7	150.0
Dec. 2	01 44.57	+11 17.5	4.563	5.347	-0.23	-1.7	18.8	139.1
Dec. 12	01 42.79	+11 03.1	4.708	5.376	-0.11	-1.1	18.9	128.5
Dec. 22	01 42.20	+10 55.6	4.871	5.405	+0.01	-0.4	19.0	118.1
Jan. 1	01 42.80	+10 55.1	5.048	5.434	+0.12	+0.3	19.1	108.1
Jan. 11	01 44.56	+11 01.4	5.233	5.463	+0.24	+1.0	19.2	98.3
Jan. 21	01 47.41	+11 13.9	5.422	5.492	+0.34	+1.6	19.4	88.9
Jan. 31	01 51.26	+11 32.0	5.611	5.521	+0.43	+2.1	19.5	79.7
Feb. 10	01 55.99	+11 55.0	5.796	5.550	+0.52	+2.5	19.6	70.8
Feb. 20	02 01.49	+12 21.9	5.973	5.579	+0.59	+2.9	19.7	62.1
Mar. 1	02 07.66	+12 52.0	6.139	5.608	+0.65	+3.1	19.8	53.6
Mar. 11	02 14.40	+13 24.4	6.291	5.637	+0.70	+3.3	19.9	45.3
Mar. 21	02 21.59	+13 58.4	6.428	5.666	+0.74	+3.5	20.0	37.2
Mar. 31	02 29.15	+14 33.2	6.546	5.695	+0.77	+3.5	20.1	29.2



## Comet C/2019 L3 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Jan. 9.68435 TT  
 Peri. = 171.62597  
 Node = 290.77328 2000.0  
 Incl. = 48.34843  
 q = 3.5544960 AU  
 e = 1.0021661

$$m1 = -3.0 + 5 \log(\Delta) + 17.5 \log(r(t-90)) \text{ (vis)}$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	09 53.46	-31 28.6	4.321	4.786	-0.47	-9.1	11.3	112.6
Jan. 16	09 48.15	-32 52.5	4.289	4.843	-0.60	-7.4	11.3	119.0
Jan. 26	09 41.71	-33 58.2	4.275	4.900	-0.69	-5.5	11.4	124.5
Feb. 5	09 34.56	-34 43.8	4.280	4.958	-0.74	-3.4	11.5	128.8
Feb. 15	09 27.18	-35 09.0	4.307	5.016	-0.73	-1.4	11.6	131.5
Feb. 25	09 20.08	-35 14.5	4.355	5.075	-0.68	+0.5	11.7	132.4
Mar. 7	09 13.75	-35 02.7	4.426	5.135	-0.58	+2.0	11.9	131.3
Mar. 17	09 08.56	-34 37.3	4.517	5.195	-0.45	+3.2	12.0	128.5
Mar. 27	09 04.77	-34 02.0	4.627	5.255	-0.30	+3.9	12.1	124.4
Apr. 6	09 02.50	-33 21.1	4.754	5.315	-0.14	+4.2	12.3	119.3
Apr. 16	09 01.78	-32 38.4	4.895	5.376	+0.01	+4.2	12.4	113.7
Apr. 26	09 02.53	-31 57.1	5.048	5.438	+0.15	+4.0	12.6	107.6
May 6	09 04.65	-31 19.7	5.209	5.499	+0.28	+3.4	12.8	101.5
May 16	09 07.99	-30 48.3	5.376	5.561	+0.39	+2.8	12.9	95.3
May 26	09 12.38	-30 24.0	5.547	5.623	+0.49	+2.0	13.1	89.1
June 5	09 17.69	-30 07.9	5.718	5.686	+0.57	+1.1	13.2	83.1
June 15	09 23.76	-30 00.2	5.888	5.749	+0.64	+0.3	13.4	77.2
June 25	09 30.46	-30 01.4	6.054	5.811	+0.70	-0.6	13.5	71.5
July 5	09 37.67	-30 11.2	6.214	5.875	+0.74	-1.5	13.7	66.0
July 15	09 45.27	-30 29.5	6.367	5.938	+0.78	-2.3	13.8	60.8
July 25	09 53.16	-30 56.1	6.510	6.001	+0.80	-3.1	13.9	56.0
Aug. 4	10 01.26	-31 30.6	6.644	6.065	+0.82	-3.9	14.1	51.5
Aug. 14	10 09.48	-32 12.4	6.765	6.128	+0.83	-4.6	14.2	47.7
Aug. 24	10 17.73	-33 01.3	6.874	6.192	+0.82	-5.3	14.3	44.4
Sept. 3	10 25.94	-33 56.6	6.969	6.256	+0.82	-5.9	14.4	42.1
Sept. 13	10 34.03	-34 57.9	7.050	6.320	+0.80	-6.4	14.5	40.7
Sept. 23	10 41.93	-36 04.7	7.116	6.384	+0.78	-7.0	14.6	40.4
Oct. 3	10 49.54	-37 16.4	7.167	6.449	+0.74	-7.4	14.7	41.2
Oct. 13	10 56.79	-38 32.3	7.204	6.513	+0.70	-7.8	14.8	43.2
Oct. 23	11 03.58	-39 51.9	7.226	6.577	+0.65	-8.1	14.9	46.3
Nov. 2	11 09.80	-41 14.4	7.234	6.642	+0.59	-8.4	15.0	50.1
Nov. 12	11 15.35	-42 39.0	7.230	6.706	+0.51	-8.5	15.1	54.7
Nov. 22	11 20.10	-44 04.7	7.214	6.771	+0.43	-8.6	15.1	59.8
Dec. 2	11 23.93	-45 30.5	7.187	6.835	+0.33	-8.5	15.2	65.4
Dec. 12	11 26.72	-46 55.1	7.153	6.900	+0.22	-8.3	15.3	71.3
Dec. 22	11 28.33	-48 17.1	7.113	6.965	+0.09	-8.0	15.3	77.4
Jan. 1	11 28.66	-49 34.7	7.069	7.029	-0.04	-7.5	15.4	83.7
Jan. 11	11 27.65	-50 46.3	7.025	7.094	-0.18	-6.7	15.5	90.0
Jan. 21	11 25.26	-51 49.7	6.983	7.158	-0.31	-5.8	15.5	96.3
Jan. 31	11 21.58	-52 43.1	6.947	7.223	-0.44	-4.7	15.6	102.4
Feb. 10	11 16.74	-53 24.6	6.918	7.288	-0.54	-3.4	15.7	108.2
Feb. 20	11 10.99	-53 52.7	6.901	7.352	-0.61	-2.0	15.7	113.6
Mar. 1	11 04.70	-54 06.5	6.897	7.417	-0.64	-0.6	15.8	118.2
Mar. 11	10 58.26	-54 06.0	6.909	7.481	-0.64	+0.8	15.9	121.9
Mar. 21	10 52.09	-53 51.7	6.938	7.546	-0.59	+2.1	16.0	124.4
Mar. 31	10 46.58	-53 25.4	6.985	7.610	-0.50	+3.2	16.0	125.7

## Comet C/2021 S1 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Mar. 1.15988 TT  
 Peri. = 148.20090  
 Node = 299.87723 2000.0  
 Incl. = 52.06964  
 q = 6.1195242 AU  
 e = 1.0020728

$$m1 = 2.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT 2023/24	R. A. (2000) h m	Decl. ° ' "	Delta	r	Daily motion		m1	Elong. °
					m	'		
Jan. 6	08 09.84	+24 08.2	5.532	6.487	-0.57	-2.8	18.4	165.1
Jan. 16	08 04.01	+23 39.8	5.529	6.510	-0.59	-2.9	18.4	175.6
Jan. 26	07 58.17	+23 09.9	5.559	6.534	-0.57	-3.1	18.5	171.2
Feb. 5	07 52.64	+22 38.4	5.622	6.558	-0.52	-3.2	18.5	160.2
Feb. 15	07 47.74	+22 05.5	5.716	6.583	-0.45	-3.4	18.6	149.1
Feb. 25	07 43.70	+21 31.5	5.838	6.609	-0.35	-3.5	18.6	138.2
Mar. 7	07 40.68	+20 56.7	5.983	6.635	-0.24	-3.5	18.7	127.6
Mar. 17	07 38.75	+20 21.3	6.147	6.661	-0.13	-3.6	18.8	117.2
Mar. 27	07 37.95	+19 45.6	6.325	6.688	-0.02	-3.6	18.9	107.2
Apr. 6	07 38.25	+19 09.5	6.512	6.716	+0.09	-3.6	19.0	97.5
Apr. 16	07 39.55	+18 33.1	6.702	6.744	+0.18	-3.7	19.1	88.1
Apr. 26	07 41.79	+17 56.1	6.893	6.773	+0.27	-3.7	19.2	79.0
May 6	07 44.84	+17 18.5	7.079	6.803	+0.35	-3.8	19.2	70.1
May 16	07 48.60	+16 39.9	7.256	6.832	+0.41	-3.9	19.3	61.5
May 26	07 52.95	+16 00.2	7.423	6.863	+0.46	-4.0	19.4	53.1
June 5	07 57.79	+15 19.2	7.575	6.894	+0.51	-4.2	19.5	44.9
June 15	08 03.01	+14 36.8	7.711	6.925	+0.54	-4.3	19.5	36.8
June 25	08 08.52	+13 52.8	7.828	6.957	+0.56	-4.5	19.6	29.0
July 5	08 14.22	+13 07.1	7.926	6.989	+0.58	-4.7	19.7	21.4
July 15	08 20.02	+12 19.7	8.003	7.022	+0.58	-4.8	19.7	14.2
July 25	08 25.85	+11 30.6	8.057	7.055	+0.58	-5.0	19.8	8.7
Aug. 4	08 31.61	+10 39.9	8.090	7.088	+0.57	-5.2	19.8	8.7
Aug. 14	08 37.24	+09 47.6	8.100	7.122	+0.55	-5.3	19.8	14.3
Aug. 24	08 42.64	+08 53.8	8.088	7.157	+0.53	-5.4	19.9	21.5
Sept. 3	08 47.75	+07 58.9	8.055	7.192	+0.49	-5.6	19.9	29.2
Sept. 13	08 52.49	+07 02.9	8.002	7.227	+0.45	-5.6	19.9	37.3
Sept. 23	08 56.76	+06 06.2	7.930	7.263	+0.40	-5.7	19.9	45.5
Oct. 3	09 00.50	+05 09.2	7.842	7.299	+0.34	-5.7	19.9	54.0
Oct. 13	09 03.62	+04 12.2	7.740	7.335	+0.28	-5.7	19.9	62.7
Oct. 23	09 06.05	+03 15.7	7.627	7.372	+0.20	-5.6	19.9	71.5
Nov. 2	09 07.70	+02 20.4	7.506	7.409	+0.12	-5.5	19.9	80.6
Nov. 12	09 08.53	+01 26.8	7.383	7.447	+0.03	-5.2	19.9	89.9
Nov. 22	09 08.47	+00 35.6	7.260	7.484	-0.05	-4.9	19.9	99.4
Dec. 2	09 07.52	+00 12.3	7.144	7.523	-0.14	-4.6	19.9	109.0
Dec. 12	09 05.69	+00 56.2	7.038	7.561	-0.23	-4.1	19.9	118.8
Dec. 22	09 03.01	-01 35.4	6.948	7.600	-0.31	-3.6	19.9	128.5
Jan. 1	08 59.60	-02 09.1	6.879	7.639	-0.38	-3.1	19.9	138.1
Jan. 11	08 55.60	-02 36.9	6.834	7.679	-0.43	-2.4	20.0	147.1
Jan. 21	08 51.20	-02 58.6	6.817	7.718	-0.45	-1.8	20.0	154.7
Jan. 31	08 46.62	-03 14.2	6.830	7.758	-0.46	-1.2	20.0	159.1
Feb. 10	08 42.10	-03 24.3	6.874	7.799	-0.44	-0.7	20.1	158.2
Feb. 20	08 37.85	-03 29.4	6.948	7.839	-0.40	-0.3	20.1	152.7
Mar. 1	08 34.09	-03 30.7	7.050	7.880	-0.34	0.0	20.2	144.7
Mar. 11	08 30.97	-03 29.2	7.178	7.921	-0.27	+0.2	20.3	135.8
Mar. 21	08 28.62	-03 26.2	7.329	7.963	-0.19	+0.3	20.3	126.6
Mar. 31	08 27.09	-03 23.0	7.496	8.004	-0.11	+0.3	20.4	117.3

## Comet C/2020 U4 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Apr. 9.36668 TT  
 Peri. = 70.02675  
 Node = 120.33488 2000.0  
 Incl. = 167.02047  
 q = 5.3580230 AU  
 e = 1.0009996

$$m1 = 6.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	00 18.71	+16 01.8	5.710	5.722	-0.22	-4.4	18.2	85.8
Jan. 16	00 17.10	+15 22.4	5.920	5.748	-0.10	-3.4	18.3	75.2
Jan. 26	00 16.62	+14 53.2	6.122	5.775	+0.01	-2.4	18.3	65.0
Feb. 5	00 17.07	+14 33.1	6.311	5.802	+0.09	-1.5	18.4	55.0
Feb. 15	00 18.25	+14 21.2	6.482	5.831	+0.15	-0.8	18.5	45.4
Feb. 25	00 20.01	+14 16.2	6.631	5.860	+0.20	-0.2	18.6	36.0
Mar. 7	00 22.16	+14 17.1	6.755	5.890	+0.23	+0.4	18.6	27.1
Mar. 17	00 24.58	+14 22.7	6.853	5.920	+0.25	+0.8	18.7	18.8
Mar. 27	00 27.11	+14 32.2	6.922	5.951	+0.26	+1.1	18.7	12.3
Apr. 6	00 29.64	+14 44.5	6.962	5.983	+0.25	+1.3	18.8	11.0
Apr. 16	00 32.03	+14 58.7	6.973	6.016	+0.23	+1.5	18.8	16.0
Apr. 26	00 34.17	+15 14.1	6.956	6.049	+0.19	+1.6	18.8	23.7
May 6	00 35.93	+15 29.6	6.912	6.082	+0.15	+1.5	18.8	32.2
May 16	00 37.19	+15 44.6	6.844	6.117	+0.09	+1.4	18.8	41.0
May 26	00 37.83	+15 58.1	6.752	6.152	+0.03	+1.2	18.8	50.1
June 5	00 37.73	+16 09.2	6.642	6.187	-0.06	+0.9	18.8	59.4
June 15	00 36.76	+16 16.9	6.517	6.223	-0.15	+0.5	18.8	68.9
June 25	00 34.81	+16 20.2	6.380	6.260	-0.25	0.0	18.8	78.7
July 5	00 31.78	+16 17.9	6.238	6.297	-0.37	-0.6	18.8	88.7
July 15	00 27.59	+16 08.9	6.096	6.335	-0.48	-1.3	18.7	99.0
July 25	00 22.20	+15 52.1	5.961	6.373	-0.60	-2.2	18.7	109.6
Aug. 4	00 15.63	+15 26.3	5.838	6.412	-0.72	-3.1	18.7	120.4
Aug. 14	00 07.97	+14 51.0	5.735	6.451	-0.82	-4.1	18.7	131.5
Aug. 24	23 59.38	+14 05.8	5.657	6.491	-0.90	-5.0	18.7	142.7
Sept. 3	23 50.12	+13 11.2	5.612	6.531	-0.95	-5.9	18.7	153.6
Sept. 13	23 40.51	+12 08.7	5.602	6.572	-0.97	-6.6	18.7	163.1
Sept. 23	23 30.91	+11 00.1	5.631	6.613	-0.94	-7.1	18.8	166.9
Oct. 3	23 21.70	+09 48.3	5.699	6.654	-0.89	-7.3	18.8	161.1
Oct. 13	23 13.19	+08 36.0	5.806	6.696	-0.80	-7.1	18.9	151.0
Oct. 23	23 05.64	+07 26.1	5.947	6.738	-0.69	-6.8	19.0	139.8
Nov. 2	22 59.23	+06 21.0	6.118	6.781	-0.57	-6.2	19.0	128.5
Nov. 12	22 54.04	+05 22.4	6.313	6.824	-0.45	-5.5	19.1	117.3
Nov. 22	22 50.09	+04 31.4	6.525	6.867	-0.33	-4.7	19.2	106.2
Dec. 2	22 47.33	+03 48.5	6.747	6.911	-0.21	-3.8	19.3	95.4
Dec. 12	22 45.68	+03 13.8	6.974	6.955	-0.11	-3.0	19.4	84.8
Dec. 22	22 45.02	+02 47.1	7.198	6.999	-0.02	-2.3	19.5	74.5
Jan. 1	22 45.21	+02 27.8	7.413	7.044	+0.06	-1.6	19.6	64.4
Jan. 11	22 46.13	+02 15.1	7.615	7.089	+0.13	-0.9	19.7	54.5
Jan. 21	22 47.64	+02 08.4	7.799	7.134	+0.18	-0.4	19.8	44.8
Jan. 31	22 49.61	+02 06.9	7.961	7.180	+0.22	+0.1	19.9	35.3
Feb. 10	22 51.91	+02 09.7	8.098	7.226	+0.24	+0.5	19.9	26.1
Feb. 20	22 54.43	+02 16.0	8.209	7.272	+0.26	+0.8	20.0	17.4
Mar. 1	22 57.04	+02 25.1	8.291	7.318	+0.26	+1.0	20.0	10.3
Mar. 11	22 59.64	+02 36.2	8.345	7.365	+0.26	+1.2	20.1	9.0
Mar. 21	23 02.13	+02 48.5	8.369	7.412	+0.24	+1.3	20.1	15.2
Mar. 31	23 04.40	+03 01.3	8.365	7.459	+0.21	+1.3	20.1	23.5

## Comet 44P/Reinmuth

Epoch = 2023 June 25.0 TT  
 T = 2022 Apr. 22.96363 TT  
 Peri. = 58.02387 e = 0.4273183  
 Node = 286.42902 2000.0 a = 3.6881292 AU  
 Incl. = 5.89696 n = 0.13915374  
 q = 2.1121241 AU P = 7.08 years

$$m1 = 12.7 + 5 \log(\Delta) + 7.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	02 55.19	+22° 02.0	2.159	2.813	+0.28 -2.0	17.7	122.6
Jan. 16	02 59.03	+21 47.2	2.320	2.855	+0.50 -0.9	17.9	113.3
Jan. 26	03 04.92	+21 43.1	2.490	2.897	+0.69 +0.1	18.1	104.4
Feb. 5	03 12.59	+21 48.1	2.667	2.939	+0.85 +0.9	18.3	96.0
Feb. 15	03 21.74	+21 59.9	2.847	2.981	+0.99 +1.5	18.5	88.0
Feb. 25	03 32.13	+22 16.7	3.028	3.024	+1.10 +1.9	18.7	80.4
Mar. 7	03 43.56	+22 36.7	3.206	3.066	+1.19 +2.1	18.9	73.0
Mar. 17	03 55.82	+22 58.2	3.380	3.108	+1.27 +2.2	19.0	65.8
Mar. 27	04 08.78	+23 19.8	3.548	3.150	+1.33 +2.1	19.2	58.9
Apr. 6	04 22.28	+23 40.3	3.707	3.192	+1.37 +1.9	19.3	52.1
Apr. 16	04 36.19	+23 58.6	3.857	3.234	+1.41 +1.7	19.5	45.5
Apr. 26	04 50.42	+24 14.1	3.996	3.276	+1.44 +1.4	19.6	39.0
May 6	05 04.85	+24 26.0	4.123	3.318	+1.45 +1.0	19.7	32.6
May 16	05 19.40	+24 33.9	4.236	3.359	+1.46 +0.6	19.8	26.2
May 26	05 33.98	+24 37.5	4.334	3.400	+1.46 +0.1	19.9	19.9
June 5	05 48.50	+24 36.6	4.418	3.440	+1.45 -0.3	20.0	13.6
June 15	06 02.89	+24 31.2	4.486	3.481	+1.43 -0.8	20.0	7.4
June 25	06 17.07	+24 21.3	4.537	3.521	+1.40 -1.2	20.1	1.4
July 5	06 30.97	+24 07.2	4.571	3.560	+1.37 -1.6	20.1	5.4
July 15	06 44.51	+23 49.1	4.589	3.600	+1.33 -2.0	20.2	11.8
July 25	06 57.63	+23 27.4	4.589	3.639	+1.28 -2.4	20.2	18.3
Aug. 4	07 10.23	+23 02.5	4.572	3.677	+1.23 -2.6	20.2	25.0
Aug. 14	07 22.25	+22 35.0	4.539	3.716	+1.17 -2.9	20.3	31.7
Aug. 24	07 33.61	+22 05.6	4.489	3.753	+1.09 -3.0	20.3	38.7
Sept. 3	07 44.20	+21 34.8	4.424	3.791	+1.01 -3.1	20.3	45.8
Sept. 13	07 53.93	+21 03.7	4.345	3.828	+0.92 -3.1	20.3	53.2
Sept. 23	08 02.69	+20 32.8	4.252	3.864	+0.82 -3.0	20.2	60.9
Oct. 3	08 10.35	+20 03.3	4.149	3.900	+0.70 -2.8	20.2	68.8
Oct. 13	08 16.78	+19 36.1	4.037	3.936	+0.57 -2.6	20.2	77.1
Oct. 23	08 21.84	+19 12.1	3.918	3.971	+0.42 -2.2	20.2	85.8
Nov. 2	08 25.37	+18 52.3	3.798	4.006	+0.26 -1.7	20.1	94.9
Nov. 12	08 27.25	+18 37.5	3.678	4.040	+0.09 -1.2	20.1	104.4
Nov. 22	08 27.35	+18 28.4	3.565	4.074	-0.09 -0.6	20.0	114.4
Dec. 2	08 25.62	+18 25.2	3.463	4.107	-0.27 0.0	20.0	124.9
Dec. 12	08 22.10	+18 27.8	3.376	4.140	-0.45 +0.6	20.0	135.9
Dec. 22	08 16.92	+18 35.6	3.311	4.173	-0.60 +1.0	20.0	147.3
Jan. 1	08 10.42	+18 47.2	3.272	4.205	-0.71 +1.3	20.0	159.0
Jan. 11	08 03.02	+19 01.1	3.262	4.236	-0.77 +1.4	20.0	170.9
Jan. 21	07 55.29	+19 15.5	3.284	4.267	-0.77 +1.4	20.0	176.6
Jan. 31	07 47.86	+19 28.9	3.339	4.298	-0.71 +1.2	20.1	165.0
Feb. 10	07 41.25	+19 40.2	3.423	4.328	-0.60 +1.0	20.1	153.3
Feb. 20	07 35.92	+19 48.7	3.536	4.357	-0.45 +0.7	20.2	142.0
Mar. 1	07 32.15	+19 54.0	3.672	4.386	-0.28 +0.4	20.3	131.0
Mar. 11	07 30.09	+19 56.2	3.827	4.415	-0.11 0.0	20.5	120.5
Mar. 21	07 29.73	+19 55.3	3.995	4.443	+0.06 -0.3	20.6	110.5
Mar. 31	07 30.99	+19 51.2	4.173	4.471	+0.21 -0.6	20.7	100.9

Comet 179P/Jedicke

Epoch = 2023 June 25.0 TT  
 T = 2022 May 31.03162 TT  
 Peri. = 297.01832 e = 0.3058326  
 Node = 115.51503 2000.0 a = 5.9329194 AU  
 Incl. = 19.89693 n = 0.06820267  
 q = 4.1184392 AU P = 14.45 years

$$m1 = 4.3 + 5 \log(\Delta) + 17.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .			m		°
Jan. 6	05 08.00	+09 00.8	3.372	4.243	-0.45 +4.0	17.9	148.8
Jan. 16	05 04.03	+09 43.1	3.465	4.255	-0.32 +4.5	18.0	138.8
Jan. 26	05 01.49	+10 29.6	3.580	4.266	-0.17 +4.8	18.1	128.8
Feb. 5	05 00.52	+11 19.0	3.714	4.278	-0.01 +5.0	18.2	118.9
Feb. 15	05 01.17	+12 09.7	3.862	4.291	+0.15 +5.1	18.3	109.3
Feb. 25	05 03.41	+13 00.6	4.019	4.304	+0.31 +5.1	18.4	100.1
Mar. 7	05 07.13	+13 50.6	4.181	4.317	+0.45 +4.9	18.5	91.2
Mar. 17	05 12.20	+14 38.7	4.345	4.331	+0.58 +4.7	18.6	82.6
Mar. 27	05 18.48	+15 24.4	4.507	4.345	+0.69 +4.4	18.7	74.3
Apr. 6	05 25.81	+16 06.8	4.664	4.359	+0.79 +4.1	18.8	66.3
Apr. 16	05 34.05	+16 45.6	4.813	4.374	+0.87 +3.7	18.9	58.5
Apr. 26	05 43.06	+17 20.4	4.952	4.389	+0.94 +3.3	19.0	51.0
May 6	05 52.71	+17 51.0	5.080	4.405	+0.99 +2.8	19.1	43.6
May 16	06 02.87	+18 17.1	5.193	4.421	+1.04 +2.4	19.2	36.4
May 26	06 13.45	+18 38.8	5.292	4.437	+1.08 +1.9	19.2	29.3
June 5	06 24.32	+18 55.9	5.375	4.453	+1.10 +1.5	19.3	22.4
June 15	06 35.40	+19 08.6	5.441	4.470	+1.12 +1.0	19.4	15.5
June 25	06 46.59	+19 17.1	5.489	4.487	+1.12 +0.6	19.4	8.9
July 5	06 57.80	+19 21.6	5.519	4.505	+1.12 +0.2	19.4	3.6
July 15	07 08.95	+19 22.5	5.531	4.522	+1.11 -0.1	19.5	6.5
July 25	07 19.96	+19 20.1	5.525	4.540	+1.09 -0.4	19.5	13.0
Aug. 4	07 30.75	+19 14.9	5.500	4.559	+1.06 -0.6	19.5	19.9
Aug. 14	07 41.22	+19 07.6	5.458	4.577	+1.03 -0.8	19.5	26.9
Aug. 24	07 51.30	+18 58.7	5.398	4.596	+0.98 -0.9	19.6	34.1
Sept. 3	08 00.89	+18 49.1	5.322	4.615	+0.93 -1.0	19.6	41.5
Sept. 13	08 09.90	+18 39.4	5.231	4.634	+0.87 -0.9	19.5	49.1
Sept. 23	08 18.24	+18 30.7	5.126	4.653	+0.79 -0.8	19.5	56.9
Oct. 3	08 25.78	+18 23.9	5.009	4.673	+0.71 -0.5	19.5	64.9
Oct. 13	08 32.42	+18 20.0	4.883	4.693	+0.61 -0.2	19.5	73.2
Oct. 23	08 38.03	+18 20.1	4.750	4.713	+0.50 +0.3	19.5	81.8
Nov. 2	08 42.48	+18 25.2	4.614	4.733	+0.38 +0.8	19.4	90.8
Nov. 12	08 45.68	+18 36.2	4.478	4.754	+0.24 +1.5	19.4	100.2
Nov. 22	08 47.49	+18 53.7	4.346	4.774	+0.10 +2.1	19.4	109.9
Dec. 2	08 47.86	+19 18.3	4.225	4.795	-0.04 +2.8	19.3	120.0
Dec. 12	08 46.76	+19 49.7	4.117	4.816	-0.19 +3.5	19.3	130.6
Dec. 22	08 44.24	+20 27.2	4.028	4.837	-0.32 +4.0	19.3	141.4
Jan. 1	08 40.47	+21 09.4	3.964	4.858	-0.44 +4.4	19.3	152.6
Jan. 11	08 35.70	+21 54.3	3.927	4.879	-0.52 +4.6	19.3	163.9
Jan. 21	08 30.28	+22 39.6	3.920	4.901	-0.56 +4.5	19.3	174.5
Jan. 31	08 24.68	+23 22.8	3.946	4.922	-0.55 +4.1	19.4	171.6
Feb. 10	08 19.33	+24 02.0	4.002	4.944	-0.50 +3.6	19.5	160.7
Feb. 20	08 14.67	+24 35.5	4.088	4.966	-0.41 +3.0	19.5	149.6
Mar. 1	08 11.05	+25 02.7	4.200	4.988	-0.29 +2.4	19.6	138.7
Mar. 11	08 08.71	+25 23.2	4.335	5.010	-0.16 +1.7	19.7	128.1
Mar. 21	08 07.78	+25 37.3	4.487	5.032	-0.01 +1.1	19.8	118.0
Mar. 31	08 08.29	+25 45.5	4.652	5.054	+0.13 +0.5	20.0	108.2

Comet 113P/Spitaler

Epoch = 2023 June 25.0 TT  
 T = 2022 June 1.56611 TT  
 Peri. = 115.56626 e = 0.4199039  
 Node = 306.67429 2000.0 a = 3.6926963 AU  
 Incl. = 5.28892 n = 0.13889567  
 q = 2.1421187 AU P = 7.10 years

$$m1 = 6.9 + 5 \log(\Delta) + 25.0 \log(r(t-30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	09 53.72	+11 59.4	1.843	2.661	-0.44	+0.1	18.4	138.6
Jan. 16	09 48.25	+12 05.4	1.803	2.700	-0.67	+1.2	18.5	150.1
Jan. 26	09 40.82	+12 21.2	1.787	2.740	-0.82	+2.0	18.6	162.0
Feb. 5	09 32.28	+12 43.0	1.798	2.780	-0.88	+2.3	18.8	174.0
Feb. 15	09 23.65	+13 06.5	1.838	2.821	-0.83	+2.3	19.0	173.1
Feb. 25	09 15.90	+13 27.7	1.907	2.862	-0.69	+1.9	19.2	161.3
Mar. 7	09 09.85	+13 43.5	2.002	2.903	-0.49	+1.2	19.5	149.8
Mar. 17	09 05.96	+13 52.2	2.121	2.944	-0.26	+0.4	19.8	138.9
Mar. 27	09 04.42	+13 53.0	2.259	2.985	-0.02	-0.4	20.1	128.7
Apr. 6	09 05.19	+13 45.7	2.412	3.027	+0.20	-1.2	20.4	119.0
Apr. 16	09 08.05	+13 30.5	2.577	3.068	+0.39	-1.9	20.7	109.9
Apr. 26	09 12.74	+13 07.9	2.750	3.110	+0.56	-2.7	21.0	101.4
May 6	09 18.99	+12 38.3	2.928	3.151	+0.70	-3.3	21.3	93.3
May 16	09 26.50	+12 02.1	3.107	3.192	+0.81	-4.0	21.5	85.6
May 26	09 35.05	+11 19.8	3.285	3.233	+0.90	-4.6	21.8	78.2
June 5	09 44.42	+10 31.8	3.460	3.274	+0.98	-5.1	.	71.0
June 15	09 54.44	+09 38.7	3.630	3.315	+1.03	-5.6	.	64.1
June 25	10 04.95	+08 41.0	3.793	3.355	+1.07	-6.0	.	57.3
July 5	10 15.84	+07 39.0	3.947	3.396	+1.10	-6.4	.	50.7
July 15	10 27.00	+06 33.5	4.091	3.435	+1.13	-6.7	.	44.2
July 25	10 38.35	+05 24.7	4.223	3.475	+1.14	-7.0	.	37.7
Aug. 4	10 49.81	+04 13.3	4.342	3.515	+1.15	-7.3	.	31.3
Aug. 14	11 01.32	+02 59.7	4.447	3.554	+1.15	-7.5	.	24.9
Aug. 24	11 12.84	+01 44.5	4.537	3.592	+1.15	-7.6	.	18.4
Sept. 3	11 24.31	+00 28.1	4.611	3.631	+1.14	-7.7	.	12.1
Sept. 13	11 35.68	+00 48.8	4.668	3.669	+1.13	-7.7	.	6.0
Sept. 23	11 46.91	-02 05.9	4.708	3.706	+1.11	-7.7	.	3.6
Oct. 3	11 57.95	-03 22.5	4.729	3.744	+1.09	-7.6	.	9.0
Oct. 13	12 08.74	-04 38.2	4.732	3.781	+1.06	-7.5	.	15.6
Oct. 23	12 19.22	-05 52.3	4.717	3.817	+1.03	-7.3	.	22.5
Nov. 2	12 29.32	-07 04.3	4.684	3.853	+0.99	-7.1	.	29.6
Nov. 12	12 38.96	-08 13.8	4.634	3.889	+0.93	-6.8	.	37.0
Nov. 22	12 48.04	-09 20.0	4.566	3.924	+0.87	-6.4	.	44.5
Dec. 2	12 56.45	-10 22.3	4.484	3.959	+0.80	-6.0	.	52.3
Dec. 12	13 04.08	-11 20.2	4.388	3.993	+0.71	-5.5	.	60.3
Dec. 22	13 10.78	-12 13.0	4.280	4.027	+0.61	-5.0	.	68.6
Jan. 1	13 16.41	-13 00.0	4.163	4.060	+0.50	-4.3	.	77.2
Jan. 11	13 20.81	-13 40.4	4.040	4.093	+0.37	-3.6	.	86.1
Jan. 21	13 23.82	-14 13.4	3.915	4.126	+0.22	-2.9	.	95.4
Jan. 31	13 25.32	-14 38.1	3.792	4.158	+0.06	-2.0	.	105.0
Feb. 10	13 25.20	-14 53.7	3.675	4.189	-0.10	-1.0	.	115.0
Feb. 20	13 23.43	-14 59.4	3.570	4.221	-0.27	0.0	.	125.4
Mar. 1	13 20.08	-14 54.9	3.481	4.251	-0.42	+1.0	.	136.1
Mar. 11	13 15.33	-14 39.9	3.413	4.282	-0.54	+2.0	.	147.1
Mar. 21	13 09.47	-14 15.4	3.371	4.311	-0.63	+2.9	.	158.2
Mar. 31	13 02.94	-13 42.9	3.357	4.341	-0.67	+3.6	.	168.7

## Comet C/2019 T4 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 June 8.91678 TT  
 Peri. = 351.16551  
 Node = 199.93911 2000.0  
 Incl. = 53.63186  
 q = 4.2418011 AU  
 e = 0.9955150

$$m1 = 3.0 + 5 \log(\Delta) + 10.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	15 10.99	+00 14.5	4.980	4.587	+0.84	+5.4	12.9	61.1
Jan. 16	15 19.05	+00 44.3	4.874	4.619	+0.76	+6.5	12.9	69.3
Jan. 26	15 26.23	+01 53.8	4.762	4.652	+0.66	+7.5	12.9	77.6
Feb. 5	15 32.39	+03 13.9	4.649	4.686	+0.56	+8.6	12.9	86.1
Feb. 15	15 37.43	+04 44.2	4.539	4.721	+0.44	+9.6	12.8	94.6
Feb. 25	15 41.21	+06 23.9	4.434	4.757	+0.31	+10.4	12.8	103.1
Mar. 7	15 43.65	+08 11.4	4.340	4.794	+0.17	+11.1	12.8	111.6
Mar. 17	15 44.72	+10 04.3	4.260	4.832	+0.03	+11.5	12.8	119.8
Mar. 27	15 44.40	+11 59.6	4.199	4.871	-0.11	+11.5	12.8	127.5
Apr. 6	15 42.77	+13 53.5	4.159	4.911	-0.23	+11.2	12.8	134.4
Apr. 16	15 40.00	+15 42.0	4.144	4.952	-0.33	+10.4	12.8	139.7
Apr. 26	15 36.31	+17 21.1	4.154	4.994	-0.41	+9.2	12.9	142.9
May 6	15 32.01	+18 47.0	4.191	5.037	-0.45	+7.8	12.9	143.4
May 16	15 27.46	+19 57.4	4.253	5.080	-0.46	+6.1	13.0	141.1
May 26	15 23.01	+20 50.7	4.340	5.124	-0.43	+4.4	13.1	136.7
June 5	15 19.01	+21 26.6	4.448	5.169	-0.36	+2.7	13.2	130.9
June 15	15 15.74	+21 46.2	4.575	5.214	-0.28	+1.1	13.3	124.2
June 25	15 13.41	+21 51.0	4.718	5.261	-0.18	-0.3	13.4	117.2
July 5	15 12.15	+21 43.2	4.874	5.307	-0.06	-1.4	13.5	110.0
July 15	15 12.02	+21 25.2	5.038	5.355	+0.05	-2.3	13.6	102.8
July 25	15 13.04	+20 59.3	5.208	5.403	+0.16	-2.9	13.7	95.7
Aug. 4	15 15.17	+20 27.7	5.380	5.452	+0.27	-3.4	13.8	88.7
Aug. 14	15 18.33	+19 52.3	5.551	5.501	+0.37	-3.7	13.9	81.9
Aug. 24	15 22.46	+19 15.1	5.720	5.551	+0.46	-3.8	14.0	75.3
Sept. 3	15 27.46	+18 37.6	5.883	5.601	+0.54	-3.7	14.1	69.0
Sept. 13	15 33.23	+18 01.0	6.038	5.652	+0.62	-3.6	14.2	62.9
Sept. 23	15 39.69	+17 26.7	6.184	5.703	+0.68	-3.3	14.3	57.2
Oct. 3	15 46.73	+16 55.8	6.318	5.755	+0.73	-2.9	14.4	51.9
Oct. 13	15 54.27	+16 29.1	6.440	5.807	+0.78	-2.4	14.4	47.1
Oct. 23	16 02.22	+16 07.5	6.548	5.859	+0.81	-1.8	14.5	43.0
Nov. 2	16 10.47	+15 51.8	6.640	5.912	+0.84	-1.2	14.6	39.8
Nov. 12	16 18.95	+15 42.5	6.718	5.965	+0.86	-0.5	14.7	37.7
Nov. 22	16 27.57	+15 40.4	6.779	6.019	+0.87	+0.2	14.7	37.0
Dec. 2	16 36.22	+15 45.8	6.824	6.073	+0.86	+1.0	14.8	37.6
Dec. 12	16 44.82	+15 59.1	6.853	6.127	+0.85	+1.8	14.8	39.6
Dec. 22	16 53.27	+16 20.6	6.867	6.181	+0.83	+2.6	14.9	42.8
Jan. 1	17 01.47	+16 50.4	6.866	6.236	+0.80	+3.4	14.9	46.9
Jan. 11	17 09.31	+17 28.5	6.853	6.291	+0.76	+4.3	14.9	51.7
Jan. 21	17 16.71	+18 14.7	6.827	6.347	+0.71	+5.1	15.0	57.1
Jan. 31	17 23.54	+19 08.7	6.792	6.402	+0.65	+5.8	15.0	62.8
Feb. 10	17 29.72	+20 09.8	6.749	6.458	+0.58	+6.5	15.0	68.8
Feb. 20	17 35.13	+21 17.3	6.700	6.514	+0.50	+7.1	15.0	75.0
Mar. 1	17 39.68	+22 30.1	6.649	6.570	+0.41	+7.5	15.1	81.2
Mar. 11	17 43.30	+23 46.9	6.597	6.627	+0.31	+7.8	15.1	87.4
Mar. 21	17 45.90	+25 06.1	6.547	6.683	+0.20	+8.0	15.1	93.5
Mar. 31	17 47.42	+26 25.7	6.503	6.740	+0.09	+7.9	15.1	99.55

## Comet C/2021 E3 (ZTF)

Epoch = 2023 June 25.0 TT  
 T = 2022 June 11.89309 TT  
 Peri. = 228.84864  
 Node = 104.47729 2000.0  
 Incl. = 112.54802  
 q = 1.7773290 AU  
 e = 1.0008134

$$m1 = 9.3 + 5 \log(\Delta) + 7.5 \log(r(t+70))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	08 22.90	-41 38.8	2.562	3.086	-2.45	+12.3	15.6	113.3
Jan. 16	07 58.87	-39 12.1	2.572	3.177	-2.31	+17.5	15.7	119.7
Jan. 26	07 37.02	-35 57.9	2.617	3.267	-2.01	+21.5	15.8	123.6
Feb. 5	07 18.63	-32 10.3	2.700	3.358	-1.62	+23.9	16.0	124.5
Feb. 15	07 04.22	-28 06.6	2.819	3.450	-1.22	+24.6	16.1	122.3
Feb. 25	06 53.72	-24 02.9	2.974	3.541	-0.85	+23.9	16.3	117.5
Mar. 7	06 46.73	-20 11.1	3.158	3.632	-0.53	+22.2	16.5	110.9
Mar. 17	06 42.73	-16 38.7	3.365	3.723	-0.26	+20.0	16.7	103.4
Mar. 27	06 41.20	-13 28.9	3.589	3.814	-0.04	+17.7	16.9	95.4
Apr. 6	06 41.65	-10 42.3	3.823	3.905	+0.14	+15.4	17.1	87.3
Apr. 16	06 43.68	-08 18.0	4.063	3.996	+0.28	+13.3	17.3	79.1
Apr. 26	06 46.95	-06 14.3	4.301	4.087	+0.38	+11.3	17.5	71.1
May 6	06 51.18	-04 29.2	4.534	4.177	+0.47	+9.6	17.7	63.2
May 16	06 56.14	-03 00.6	4.759	4.267	+0.53	+8.0	17.9	55.5
May 26	07 01.63	-01 46.7	4.970	4.357	+0.57	+6.7	18.0	48.0
June 5	07 07.49	+00 45.7	5.165	4.447	+0.60	+5.4	18.1	40.8
June 15	07 13.57	+00 03.9	5.342	4.536	+0.62	+4.4	18.3	34.0
June 25	07 19.76	+00 43.5	5.499	4.625	+0.62	+3.5	18.4	27.9
July 5	07 25.93	+01 14.4	5.633	4.714	+0.61	+2.7	18.5	23.0
July 15	07 31.98	+01 37.7	5.745	4.802	+0.60	+1.9	18.6	20.0
July 25	07 37.82	+01 54.4	5.832	4.890	+0.57	+1.3	18.7	20.1
Aug. 4	07 43.34	+02 05.5	5.894	4.978	+0.53	+0.8	18.8	23.2
Aug. 14	07 48.44	+02 12.0	5.933	5.065	+0.48	+0.4	18.8	28.5
Aug. 24	07 53.04	+02 14.7	5.948	5.152	+0.43	+0.1	18.9	35.0
Sept. 3	07 57.02	+02 14.7	5.939	5.239	+0.36	-0.1	18.9	42.4
Sept. 13	08 00.29	+02 12.8	5.911	5.325	+0.28	-0.3	19.0	50.4
Sept. 23	08 02.73	+02 10.1	5.863	5.411	+0.19	-0.3	19.0	58.8
Oct. 3	08 04.22	+02 07.6	5.799	5.497	+0.09	-0.2	19.0	67.6
Oct. 13	08 04.68	+02 06.4	5.724	5.582	-0.02	0.0	19.0	76.8
Oct. 23	08 03.99	+02 07.6	5.641	5.667	-0.14	+0.3	19.0	86.4
Nov. 2	08 02.08	+02 12.5	5.555	5.751	-0.26	+0.7	19.0	96.4
Nov. 12	07 58.91	+02 22.1	5.473	5.836	-0.39	+1.3	19.0	106.8
Nov. 22	07 54.48	+02 37.4	5.400	5.919	-0.51	+1.9	19.1	117.4
Dec. 2	07 48.88	+02 59.3	5.343	6.003	-0.62	+2.6	19.1	128.2
Dec. 12	07 42.25	+03 28.1	5.308	6.086	-0.71	+3.3	19.1	139.1
Dec. 22	07 34.82	+04 03.7	5.300	6.169	-0.77	+3.9	19.1	149.6
Jan. 1	07 26.92	+04 45.5	5.325	6.252	-0.80	+4.5	19.2	158.7
Jan. 11	07 18.89	+05 32.4	5.385	6.334	-0.80	+4.9	19.2	163.5
Jan. 21	07 11.10	+06 23.0	5.481	6.416	-0.75	+5.2	19.3	160.3
Jan. 31	07 03.90	+07 15.7	5.611	6.497	-0.68	+5.3	19.4	152.0
Feb. 10	06 57.55	+08 08.8	5.775	6.579	-0.58	+5.3	19.5	141.8
Feb. 20	06 52.27	+09 00.9	5.966	6.660	-0.47	+5.1	19.6	131.3
Mar. 1	06 48.15	+09 51.0	6.180	6.740	-0.35	+4.9	19.7	120.7
Mar. 11	06 45.24	+10 38.2	6.412	6.821	-0.23	+4.5	19.8	110.3
Mar. 21	06 43.50	+11 22.0	6.655	6.901	-0.11	+4.2	20.0	100.1
Mar. 31	06 42.87	+12 02.0	6.904	6.980	-0.01	+3.8	20.1	90.2



## Comet C/2020 Y2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 June 18.04995 TT  
 Peri. = 266.19327  
 Node = 26.51241 2000.0  
 Incl. = 101.30109  
 q = 3.1346789 AU  
 e = 0.9979352

$$m1 = 7.0 + 5 \log(\Delta) + 10.0 \log(r(t+90))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	02 27.25	-39 03.2	3.540	3.682	-0.92	+21.7	15.9	90.5
Jan. 16	02 19.67	-35 28.1	3.706	3.731	-0.57	+21.1	16.1	83.9
Jan. 26	02 15.27	-32 01.2	3.883	3.782	-0.29	+20.1	16.3	76.9
Feb. 5	02 13.36	-28 46.2	4.064	3.835	-0.08	+18.8	16.4	69.7
Feb. 15	02 13.37	-25 44.8	4.246	3.888	+0.09	+17.4	16.6	62.4
Feb. 25	02 14.87	-22 57.4	4.422	3.943	+0.22	+16.0	16.7	55.3
Mar. 7	02 17.50	-20 23.9	4.590	3.999	+0.31	+14.6	16.9	48.3
Mar. 17	02 20.96	-18 03.7	4.745	4.056	+0.38	+13.3	17.0	41.7
Mar. 27	02 25.05	-15 56.1	4.884	4.114	+0.43	+12.1	17.1	35.6
Apr. 6	02 29.55	-14 00.3	5.005	4.173	+0.47	+11.0	17.3	30.4
Apr. 16	02 34.31	-12 15.6	5.105	4.233	+0.48	+9.9	17.4	26.7
Apr. 26	02 39.18	-10 41.2	5.185	4.293	+0.49	+8.9	17.4	24.9
May 6	02 44.02	-09 16.8	5.242	4.355	+0.48	+7.9	17.5	25.6
May 16	02 48.71	-08 01.6	5.277	4.417	+0.46	+7.0	17.6	28.7
May 26	02 53.13	-06 55.2	5.288	4.479	+0.42	+6.2	17.7	33.5
June 5	02 57.15	-05 57.3	5.278	4.542	+0.38	+5.3	17.7	39.6
June 15	03 00.65	-05 07.5	5.247	4.606	+0.32	+4.6	17.8	46.4
June 25	03 03.49	-04 25.4	5.197	4.670	+0.24	+3.8	17.8	53.8
July 5	03 05.53	-03 50.7	5.130	4.735	+0.16	+3.1	17.8	61.8
July 15	03 06.65	-03 23.1	5.049	4.800	+0.05	+2.4	17.8	70.1
July 25	03 06.67	-03 02.3	4.957	4.866	-0.06	+1.7	17.9	78.9
Aug. 4	03 05.47	-02 47.6	4.859	4.932	-0.19	+1.2	17.9	88.1
Aug. 14	03 02.91	-02 38.4	4.759	4.998	-0.33	+0.6	17.9	97.8
Aug. 24	02 58.90	-02 34.0	4.663	5.064	-0.48	+0.2	17.9	107.8
Sept. 3	02 53.39	-02 33.4	4.577	5.131	-0.63	-0.1	17.9	118.2
Sept. 13	02 46.40	-02 35.1	4.506	5.198	-0.78	-0.2	17.9	128.9
Sept. 23	02 38.07	-02 37.7	4.458	5.265	-0.90	-0.2	17.9	139.9
Oct. 3	02 28.65	-02 39.3	4.438	5.333	-0.99	0.0	18.0	150.6
Oct. 13	02 18.48	-02 38.3	4.451	5.400	-1.04	+0.3	18.0	160.2
Oct. 23	02 08.02	-02 33.2	4.499	5.468	-1.04	+0.8	18.1	165.4
Nov. 2	01 57.74	-02 22.5	4.585	5.536	-1.00	+1.4	18.2	161.7
Nov. 12	01 48.09	-02 05.9	4.707	5.604	-0.92	+2.0	18.3	152.6
Nov. 22	01 39.45	-01 42.9	4.862	5.672	-0.80	+2.6	18.4	141.9
Dec. 2	01 32.07	-01 13.8	5.047	5.741	-0.66	+3.2	18.5	130.9
Dec. 12	01 26.11	+00 39.3	5.255	5.809	-0.52	+3.7	18.7	119.9
Dec. 22	01 21.60	+00 00.1	5.481	5.877	-0.37	+4.2	18.8	109.1
Jan. 1	01 18.49	+00 43.5	5.718	5.946	-0.24	+4.5	19.0	98.6
Jan. 11	01 16.69	+01 30.3	5.961	6.014	-0.11	+4.8	19.1	88.4
Jan. 21	01 16.08	+02 19.7	6.204	6.083	0.00	+5.1	19.2	78.4
Jan. 31	01 16.50	+03 11.1	6.441	6.151	+0.09	+5.2	19.3	68.7
Feb. 10	01 17.80	+04 04.0	6.668	6.220	+0.17	+5.4	19.5	59.2
Feb. 20	01 19.84	+04 58.0	6.880	6.289	+0.24	+5.4	19.6	49.9
Mar. 1	01 22.47	+05 52.5	7.075	6.357	+0.29	+5.5	19.7	40.8
Mar. 11	01 25.57	+06 47.1	7.249	6.426	+0.33	+5.5	19.8	31.8
Mar. 21	01 29.01	+07 41.6	7.400	6.494	+0.36	+5.4	19.9	22.9
Mar. 31	01 32.67	+08 35.6	7.527	6.563	+0.37	+5.4	19.9	14.2

## Comet P/2022 P2 (ZTF)

Epoch = 2023 June 25.0 TT  
 T = 2022 July 10.85309 TT  
 Peri. = 137.62185 e = 0.5581153  
 Node = 291.22518 2000.0 a = 4.4865885 AU  
 Incl. = 12.44129 n = 0.10371217  
 q = 1.9825548 AU P = 9.50 years

$$m1 = 6.3 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	10 02.44	+04 13.3	1.747	2.526	-0.44 -4.6	18.6	133.5
Jan. 16	09 56.93	+03 34.6	1.713	2.577	-0.68 -2.9	18.8	144.3
Jan. 26	09 49.35	+03 12.9	1.702	2.628	-0.84 -1.3	19.0	155.3
Feb. 5	09 40.56	+03 06.7	1.715	2.680	-0.91 +0.1	19.2	165.2
Feb. 15	09 31.61	+03 13.1	1.757	2.733	-0.86 +1.2	19.5	169.1
Feb. 25	09 23.50	+03 28.2	1.827	2.787	-0.73 +1.8	19.8	162.4
Mar. 7	09 17.07	+03 47.2	1.924	2.840	-0.53 +1.9	20.2	152.4
Mar. 17	09 12.81	+04 05.8	2.045	2.895	-0.30 +1.7	20.5	142.0
Mar. 27	09 10.91	+04 21.1	2.186	2.949	-0.06 +1.2	20.9	132.0
Apr. 6	09 11.32	+04 30.5	2.344	3.003	+0.16 +0.6	21.3	122.5
Apr. 16	09 13.81	+04 32.9	2.515	3.058	+0.36 -0.2	21.7	113.6
Apr. 26	09 18.15	+04 27.6	2.696	3.113	+0.52 -1.0	22.0	105.1
May 6	09 24.03	+04 14.4	2.882	3.167	+0.66 -1.7	.	97.0
May 16	09 31.17	+03 53.5	3.072	3.222	+0.77 -2.5	.	89.3
May 26	09 39.35	+03 25.2	3.262	3.276	+0.87 -3.2	.	81.9
June 5	09 48.34	+02 50.0	3.450	3.330	+0.94 -3.9	.	74.8
June 15	09 57.96	+02 08.4	3.634	3.384	+0.99 -4.5	.	67.8
June 25	10 08.08	+01 21.0	3.813	3.438	+1.03 -5.0	.	61.1
July 5	10 18.56	+00 28.3	3.984	3.492	+1.06 -5.5	.	54.4
July 15	10 29.31	+00 29.1	4.145	3.545	+1.09 -6.0	.	47.9
July 25	10 40.24	-01 30.6	4.295	3.598	+1.10 -6.4	.	41.5
Aug. 4	10 51.27	-02 35.8	4.433	3.651	+1.11 -6.7	.	35.2
Aug. 14	11 02.34	-03 43.9	4.558	3.703	+1.11 -7.0	.	28.9
Aug. 24	11 13.41	-04 54.6	4.667	3.755	+1.10 -7.2	.	22.8
Sept. 3	11 24.40	-06 07.2	4.760	3.807	+1.09 -7.4	.	16.9
Sept. 13	11 35.29	-07 21.4	4.837	3.858	+1.08 -7.5	.	11.9
Sept. 23	11 46.02	-08 36.5	4.896	3.909	+1.06 -7.5	.	9.3
Oct. 3	11 56.53	-09 52.1	4.936	3.959	+1.04 -7.6	.	11.2
Oct. 13	12 06.76	-11 07.7	4.958	4.009	+1.01 -7.5	.	16.1
Oct. 23	12 16.66	-12 22.8	4.961	4.059	+0.97 -7.5	.	22.3
Nov. 2	12 26.14	-13 37.0	4.946	4.108	+0.92 -7.3	.	29.1
Nov. 12	12 35.12	-14 49.6	4.913	4.157	+0.87 -7.2	.	36.3
Nov. 22	12 43.51	-16 00.2	4.862	4.205	+0.80 -6.9	.	43.8
Dec. 2	12 51.19	-17 08.2	4.795	4.253	+0.73 -6.6	.	51.5
Dec. 12	12 58.05	-18 13.1	4.714	4.300	+0.64 -6.3	.	59.5
Dec. 22	13 03.95	-19 14.1	4.621	4.347	+0.53 -5.9	.	67.8
Jan. 1	13 08.74	-20 10.4	4.519	4.393	+0.41 -5.4	.	76.4
Jan. 11	13 12.28	-21 01.4	4.410	4.440	+0.28 -4.8	.	85.3
Jan. 21	13 14.43	-21 45.7	4.299	4.485	+0.13 -4.0	.	94.5
Jan. 31	13 15.10	-22 22.5	4.190	4.530	-0.02 -3.2	.	104.0
Feb. 10	13 14.21	-22 50.3	4.087	4.575	-0.18 -2.2	.	113.8
Feb. 20	13 11.78	-23 07.8	3.995	4.619	-0.33 -1.1	.	123.8
Mar. 1	13 07.90	-23 14.1	3.920	4.663	-0.46 0.0	.	134.0
Mar. 11	13 02.81	-23 08.4	3.865	4.706	-0.57 +1.2	.	144.1
Mar. 21	12 56.82	-22 50.7	3.835	4.749	-0.63 +2.4	.	153.7
Mar. 31	12 50.37	-22 22.1	3.833	4.791	-0.65 +3.4	.	161.5

## Comet C/2020 F2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 July 14.81369 TT  
 Peri. = 48.32542  
 Node = 250.29106 2000.0  
 Incl. = 163.58844  
 q = 8.8165276 AU  
 e = 1.0053390

$$m1 = -6.6 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	13 35.54	+04 49.8	8.908	8.875	-0.10	+3.0	17.1	84.9
Jan. 16	13 34.15	+05 22.1	8.736	8.882	-0.18	+3.5	17.1	95.3
Jan. 26	13 31.94	+06 00.0	8.568	8.889	-0.27	+4.1	17.0	105.9
Feb. 5	13 28.88	+06 43.0	8.411	8.897	-0.35	+4.6	17.0	116.6
Feb. 15	13 24.96	+07 30.3	8.270	8.905	-0.44	+4.9	17.0	127.4
Feb. 25	13 20.23	+08 20.8	8.152	8.913	-0.51	+5.2	17.0	138.0
Mar. 7	13 14.78	+09 13.1	8.062	8.921	-0.58	+5.3	16.9	148.3
Mar. 17	13 08.75	+10 05.5	8.004	8.931	-0.63	+5.2	16.9	157.5
Mar. 27	13 02.31	+10 56.3	7.980	8.940	-0.66	+4.9	16.9	163.3
Apr. 6	12 55.67	+11 43.7	7.992	8.950	-0.67	+4.5	16.9	162.1
Apr. 16	12 49.05	+12 26.4	8.040	8.960	-0.65	+4.0	17.0	155.1
Apr. 26	12 42.66	+13 03.1	8.122	8.970	-0.62	+3.3	17.0	145.7
May 6	12 36.71	+13 33.3	8.233	8.981	-0.57	+2.6	17.0	135.6
May 16	12 31.34	+13 56.6	8.370	8.992	-0.50	+2.0	17.1	125.3
May 26	12 26.67	+14 13.1	8.528	9.004	-0.43	+1.3	17.1	115.1
June 5	12 22.77	+14 23.4	8.700	9.016	-0.35	+0.7	17.2	105.0
June 15	12 19.67	+14 27.9	8.881	9.028	-0.27	+0.2	17.3	95.1
June 25	12 17.36	+14 27.5	9.066	9.041	-0.19	-0.3	17.3	85.4
July 5	12 15.82	+14 22.9	9.249	9.054	-0.11	-0.7	17.4	75.8
July 15	12 14.98	+14 14.9	9.424	9.067	-0.05	-1.0	17.4	66.5
July 25	12 14.79	+14 04.3	9.588	9.081	+0.01	-1.2	17.5	57.4
Aug. 4	12 15.18	+13 52.0	9.736	9.094	+0.07	-1.3	17.5	48.4
Aug. 14	12 16.05	+13 38.5	9.866	9.109	+0.11	-1.4	17.6	39.7
Aug. 24	12 17.33	+13 24.6	9.973	9.123	+0.15	-1.4	17.6	31.3
Sept. 3	12 18.93	+13 10.9	10.055	9.138	+0.17	-1.3	17.6	23.5
Sept. 13	12 20.78	+12 58.1	10.111	9.154	+0.19	-1.2	17.7	17.0
Sept. 23	12 22.77	+12 46.9	10.140	9.169	+0.20	-1.0	17.7	14.0
Oct. 3	12 24.83	+12 37.7	10.141	9.185	+0.21	-0.8	17.7	16.4
Oct. 13	12 26.87	+12 31.3	10.114	9.202	+0.20	-0.5	17.7	22.7
Oct. 23	12 28.79	+12 28.1	10.060	9.218	+0.18	-0.1	17.7	30.7
Nov. 2	12 30.51	+12 28.9	9.981	9.235	+0.16	+0.3	17.7	39.4
Nov. 12	12 31.92	+12 34.1	9.879	9.252	+0.12	+0.8	17.7	48.5
Nov. 22	12 32.94	+12 44.2	9.756	9.270	+0.08	+1.3	17.7	57.9
Dec. 2	12 33.46	+12 59.7	9.618	9.288	+0.02	+1.9	17.7	67.6
Dec. 12	12 33.41	+13 20.8	9.468	9.306	-0.04	+2.4	17.7	77.6
Dec. 22	12 32.68	+13 47.6	9.312	9.325	-0.11	+3.0	17.6	87.7
Jan. 1	12 31.21	+14 20.2	9.155	9.343	-0.19	+3.6	17.6	98.0
Jan. 11	12 28.94	+14 58.1	9.003	9.362	-0.27	+4.1	17.6	108.5
Jan. 21	12 25.85	+15 40.7	8.864	9.382	-0.35	+4.5	17.6	119.1
Jan. 31	12 21.94	+16 27.0	8.742	9.402	-0.43	+4.8	17.6	129.7
Feb. 10	12 17.26	+17 15.7	8.644	9.422	-0.51	+4.9	17.6	140.1
Feb. 20	12 11.90	+18 05.2	8.574	9.442	-0.57	+4.9	17.6	149.9
Mar. 1	12 05.99	+18 53.8	8.536	9.462	-0.61	+4.7	17.6	158.0
Mar. 11	11 59.72	+19 39.7	8.533	9.483	-0.64	+4.4	17.6	162.0
Mar. 21	11 53.28	+20 21.4	8.566	9.504	-0.64	+3.9	17.6	159.3
Mar. 31	11 46.90	+20 57.6	8.633	9.526	-0.63	+3.3	17.7	151.9

## Comet 116P/Wild

Epoch = 2023 June 25.0 TT  
 T = 2022 July 16.77694 TT  
 Peri. = 173.24577 e = 0.3703503  
 Node = 20.97714 2000.0 a = 3.4888472 AU  
 Incl. = 3.60301 n = 0.15124504  
 q = 2.1967516 AU P = 6.52 years

$$m1 = 4.2 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	17 15.67	-25 05.4	3.350	2.496	+2.04 -2.8	14.8	25.2
Jan. 16	17 35.79	-25 29.2	3.321	2.527	+1.98 -1.9	14.9	30.8
Jan. 26	17 55.31	-25 43.7	3.281	2.559	+1.91 -1.0	14.9	36.6
Feb. 5	18 14.07	-25 49.9	3.231	2.591	+1.83 -0.2	15.0	42.5
Feb. 15	18 31.94	-25 49.1	3.172	2.625	+1.73 +0.4	15.1	48.6
Feb. 25	18 48.79	-25 42.5	3.102	2.659	+1.62 +0.9	15.2	54.8
Mar. 7	19 04.46	-25 31.8	3.024	2.693	+1.50 +1.2	15.2	61.3
Mar. 17	19 18.81	-25 18.7	2.939	2.728	+1.36 +1.4	15.3	68.1
Mar. 27	19 31.68	-25 04.8	2.847	2.764	+1.20 +1.4	15.3	75.1
Apr. 6	19 42.90	-24 52.0	2.750	2.799	+1.03 +1.2	15.3	82.4
Apr. 16	19 52.32	-24 41.9	2.651	2.836	+0.83 +0.8	15.4	90.1
Apr. 26	19 59.72	-24 36.3	2.551	2.872	+0.62 +0.3	15.4	98.1
May 6	20 04.92	-24 36.5	2.454	2.908	+0.39 -0.4	15.4	106.7
May 16	20 07.75	-24 43.5	2.362	2.945	+0.15 -1.1	15.4	115.7
May 26	20 08.07	-24 57.4	2.280	2.982	-0.11 -1.8	15.5	125.2
June 5	20 05.86	-25 17.7	2.212	3.018	-0.36 -2.3	15.5	135.3
June 15	20 01.25	-25 42.6	2.161	3.055	-0.58 -2.6	15.6	145.9
June 25	19 54.57	-26 09.3	2.132	3.092	-0.76 -2.6	15.6	156.7
July 5	19 46.43	-26 34.6	2.128	3.128	-0.86 -2.3	15.7	167.5
July 15	19 37.63	-26 55.4	2.151	3.165	-0.88 -1.7	15.9	174.7
July 25	19 29.04	-27 09.6	2.203	3.201	-0.81 -1.0	16.0	167.2
Aug. 4	19 21.51	-27 16.3	2.281	3.237	-0.67 -0.3	16.2	156.5
Aug. 14	19 15.67	-27 15.9	2.385	3.273	-0.47 +0.4	16.4	145.8
Aug. 24	19 11.92	-27 09.5	2.511	3.309	-0.25 +0.9	16.6	135.5
Sept. 3	19 10.43	-26 58.3	2.655	3.344	-0.03 +1.3	16.8	125.6
Sept. 13	19 11.16	-26 43.4	2.813	3.380	+0.19 +1.7	17.0	116.2
Sept. 23	19 13.97	-26 25.3	2.982	3.415	+0.39 +2.0	17.2	107.1
Oct. 3	19 18.64	-26 04.4	3.158	3.449	+0.56 +2.2	17.5	98.4
Oct. 13	19 24.93	-25 40.8	3.337	3.484	+0.71 +2.5	17.7	90.0
Oct. 23	19 32.60	-25 14.3	3.517	3.518	+0.83 +2.8	17.9	81.9
Nov. 2	19 41.43	-24 44.7	3.694	3.551	+0.94 +3.1	18.0	74.0
Nov. 12	19 51.20	-24 11.9	3.867	3.584	+1.02 +3.5	18.2	66.3
Nov. 22	20 01.73	-23 35.6	4.031	3.617	+1.09 +3.8	18.4	58.7
Dec. 2	20 12.84	-22 55.9	4.186	3.650	+1.14 +4.2	18.6	51.2
Dec. 12	20 24.39	-22 12.7	4.329	3.682	+1.17 +4.5	18.7	43.8
Dec. 22	20 36.24	-21 26.2	4.458	3.714	+1.20 +4.8	18.8	36.5
Jan. 1	20 48.28	-20 36.5	4.572	3.745	+1.21 +5.1	19.0	29.3
Jan. 11	21 00.40	-19 44.0	4.669	3.776	+1.21 +5.4	19.1	22.1
Jan. 21	21 12.51	-18 49.1	4.749	3.807	+1.21 +5.6	19.2	15.0
Jan. 31	21 24.51	-17 52.1	4.810	3.837	+1.19 +5.8	19.3	8.0
Feb. 10	21 36.34	-16 53.7	4.852	3.866	+1.17 +5.9	19.4	2.5
Feb. 20	21 47.93	-15 54.4	4.875	3.896	+1.14 +6.0	19.5	7.1
Mar. 1	21 59.19	-14 54.8	4.878	3.924	+1.11 +5.9	19.5	14.1
Mar. 11	22 10.09	-13 55.6	4.863	3.953	+1.07 +5.9	19.6	21.2
Mar. 21	22 20.54	-12 57.5	4.829	3.981	+1.02 +5.7	19.6	28.4
Mar. 31	22 30.48	-12 01.2	4.777	4.008	+0.96 +5.5	19.7	35.7

Comet C/2022 P3 (ZTF)

Epoch = 2023 June 25.0 TT  
 T = 2022 July 27.37442 TT  
 Peri. = 0.10720  
 Node = 72.23037 2000.0  
 Incl. = 59.51654  
 q = 2.5615945 AU  
 e = 0.9895809

$$m1 = 13.3 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	07 54.19	+77 58.8	2.416	3.079	-2.95	+12.9	17.7	124.3
Jan. 16	07 20.56	+79 43.0	2.511	3.137	-3.74	+7.3	17.8	121.3
Jan. 26	06 43.08	+80 31.8	2.623	3.196	-3.54	+2.1	17.9	117.3
Feb. 5	06 12.30	+80 35.2	2.747	3.257	-2.40	-1.5	18.1	112.7
Feb. 15	05 54.68	+80 10.0	2.882	3.320	-0.99	-3.5	18.2	107.8
Feb. 25	05 50.58	+79 30.3	3.024	3.384	+0.24	-4.4	18.4	102.8
Mar. 7	05 57.43	+78 44.3	3.170	3.450	+1.17	-4.8	18.5	97.9
Mar. 17	06 12.21	+77 54.9	3.320	3.516	+1.82	-5.1	18.6	93.1
Mar. 27	06 32.52	+77 02.2	3.470	3.584	+2.26	-5.5	18.8	88.4
Apr. 6	06 56.41	+76 05.5	3.620	3.653	+2.52	-5.9	18.9	84.0
Apr. 16	07 22.32	+75 03.5	3.768	3.722	+2.66	-6.5	19.0	79.7
Apr. 26	07 49.13	+73 55.2	3.913	3.792	+2.70	-7.2	19.2	75.7
May 6	08 15.97	+72 40.3	4.055	3.863	+2.66	-7.8	19.3	71.9
May 16	08 42.24	+71 18.9	4.193	3.935	+2.58	-8.5	19.4	68.4
May 26	09 07.60	+69 51.5	4.327	4.007	+2.48	-9.0	19.5	65.1
June 5	09 31.84	+68 19.1	4.456	4.080	+2.36	-9.5	19.6	62.1
June 15	09 54.90	+66 42.5	4.579	4.153	+2.24	-9.8	19.7	59.3
June 25	10 16.81	+65 03.1	4.697	4.227	+2.13	-10.0	19.8	56.8
July 5	10 37.62	+63 22.2	4.809	4.301	+2.02	-10.1	19.9	54.6
July 15	10 57.42	+61 40.7	4.914	4.375	+1.93	-10.1	20.0	52.8
July 25	11 16.30	+60 00.1	5.012	4.449	+1.84	-10.0	20.0	51.4
Aug. 4	11 34.36	+58 21.5	5.104	4.524	+1.76	-9.7	20.1	50.3
Aug. 14	11 51.68	+56 45.9	5.188	4.599	+1.69	-9.3	20.2	49.8
Aug. 24	12 08.33	+55 14.5	5.265	4.674	+1.63	-8.9	20.3	49.7
Sept. 3	12 24.38	+53 48.5	5.333	4.749	+1.57	-8.3	20.3	50.1
Sept. 13	12 39.86	+52 28.6	5.394	4.824	+1.52	-7.6	20.4	51.0
Sept. 23	12 54.82	+51 16.0	5.447	4.900	+1.47	-6.8	20.4	52.4
Oct. 3	13 09.26	+50 11.5	5.491	4.975	+1.42	-6.0	20.5	54.4
Oct. 13	13 23.19	+49 16.1	5.527	5.050	+1.37	-5.0	20.5	56.8
Oct. 23	13 36.60	+48 30.6	5.556	5.126	+1.31	-4.0	20.6	59.7
Nov. 2	13 49.45	+47 55.6	5.577	5.201	+1.25	-2.9	20.6	63.0
Nov. 12	14 01.70	+47 31.7	5.591	5.277	+1.19	-1.8	20.6	66.6
Nov. 22	14 13.28	+47 19.5	5.599	5.352	+1.12	-0.6	20.7	70.5
Dec. 2	14 24.10	+47 19.2	5.603	5.427	+1.04	+0.6	20.7	74.7
Dec. 12	14 34.08	+47 30.8	5.603	5.502	+0.95	+1.8	20.7	79.1
Dec. 22	14 43.07	+47 54.0	5.600	5.578	+0.84	+2.9	20.8	83.6
Jan. 1	14 50.95	+48 28.3	5.597	5.653	+0.72	+4.0	20.8	88.2
Jan. 11	14 57.57	+49 12.5	5.596	5.728	+0.59	+4.9	20.8	92.7
Jan. 21	15 02.74	+50 05.3	5.598	5.803	+0.43	+5.7	20.9	97.1
Jan. 31	15 06.31	+51 04.5	5.605	5.877	+0.26	+6.2	20.9	101.3
Feb. 10	15 08.12	+52 07.8	5.619	5.952	+0.08	+6.4	20.9	105.1
Feb. 20	15 08.03	+53 12.0	5.642	6.027	-0.12	+6.3	21.0	108.3
Mar. 1	15 05.98	+54 13.8	5.676	6.101	-0.31	+5.9	21.0	110.9
Mar. 11	15 01.98	+55 09.6	5.722	6.175	-0.50	+5.1	21.0	112.8
Mar. 21	14 56.17	+55 55.7	5.781	6.249	-0.67	+4.0	21.1	113.8
Mar. 31	14 48.86	+56 29.1	5.854	6.323	-0.80	+2.5	21.1	113.8

Comet 119P/Parker-Hartley

Epoch = 2023 June 25.0 TT  
 T = 2022 Aug. 12.11162 TT  
 Peri. = 322.10037 e = 0.3882698  
 Node = 104.56934 2000.0 a = 3.8052457 AU  
 Incl. = 7.39299 n = 0.13277919  
 q = 2.3277837 AU P = 7.42 years

$$m1 = 7.3 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	07 53.84	+22° 25' 6"	1.566	2.538	-0.78 +5.6	14.3	168.8
Jan. 16	07 45.79	+23 20.7	1.582	2.565	-0.81 +5.3	14.4	177.6
Jan. 26	07 37.97	+24 09.9	1.625	2.593	-0.72 +4.5	14.6	166.6
Feb. 5	07 31.54	+24 49.9	1.696	2.622	-0.53 +3.4	14.7	154.9
Feb. 15	07 27.31	+25 19.3	1.791	2.653	-0.28 +2.4	14.9	143.8
Feb. 25	07 25.71	+25 38.3	1.906	2.684	-0.01 +1.4	15.1	133.4
Mar. 7	07 26.85	+25 47.7	2.038	2.716	+0.26 +0.5	15.4	123.6
Mar. 17	07 30.56	+25 48.6	2.183	2.749	+0.50 -0.3	15.6	114.5
Mar. 27	07 36.56	+25 41.8	2.338	2.782	+0.71 -1.1	15.8	105.9
Apr. 6	07 44.51	+25 27.7	2.499	2.816	+0.89 -1.8	16.0	97.9
Apr. 16	07 54.04	+25 06.9	2.664	2.851	+1.03 -2.4	16.3	90.2
Apr. 26	08 04.87	+24 39.5	2.830	2.886	+1.14 -3.1	16.5	83.0
May 6	08 16.71	+24 05.8	2.995	2.922	+1.23 -3.7	16.7	76.1
May 16	08 29.30	+23 26.1	3.158	2.957	+1.29 -4.3	16.9	69.4
May 26	08 42.46	+22 40.6	3.316	2.994	+1.34 -4.8	17.0	62.9
June 5	08 56.02	+21 49.8	3.468	3.030	+1.37 -5.4	17.2	56.6
June 15	09 09.83	+20 54.1	3.612	3.067	+1.39 -5.8	17.4	50.4
June 25	09 23.80	+19 54.0	3.748	3.104	+1.40 -6.2	17.5	44.4
July 5	09 37.82	+18 49.9	3.874	3.141	+1.40 -6.6	17.7	38.4
July 15	09 51.83	+17 42.6	3.989	3.178	+1.40 -6.9	17.8	32.4
July 25	10 05.78	+16 32.4	4.092	3.215	+1.39 -7.1	18.0	26.5
Aug. 4	10 19.60	+15 20.2	4.182	3.252	+1.37 -7.3	18.1	20.6
Aug. 14	10 33.27	+14 06.4	4.259	3.289	+1.36 -7.4	18.2	14.8
Aug. 24	10 46.74	+12 51.9	4.320	3.326	+1.34 -7.5	18.3	9.2
Sept. 3	10 59.99	+11 37.2	4.367	3.363	+1.31 -7.4	18.4	5.1
Sept. 13	11 12.98	+10 23.1	4.398	3.400	+1.28 -7.4	18.5	6.7
Sept. 23	11 25.68	+09 10.2	4.412	3.437	+1.25 -7.2	18.6	12.0
Oct. 3	11 38.04	+07 59.4	4.411	3.474	+1.22 -6.9	18.6	18.1
Oct. 13	11 50.03	+06 51.3	4.393	3.510	+1.18 -6.6	18.7	24.6
Oct. 23	12 01.58	+05 46.9	4.358	3.546	+1.13 -6.2	18.7	31.4
Nov. 2	12 12.63	+04 46.8	4.308	3.582	+1.07 -5.7	18.8	38.3
Nov. 12	12 23.11	+03 52.0	4.242	3.618	+1.01 -5.2	18.8	45.5
Nov. 22	12 32.91	+03 03.3	4.162	3.654	+0.94 -4.5	18.8	53.0
Dec. 2	12 41.93	+02 21.6	4.070	3.689	+0.85 -3.8	18.9	60.7
Dec. 12	12 50.05	+01 47.8	3.967	3.724	+0.76 -2.9	18.9	68.7
Dec. 22	12 57.12	+01 22.7	3.856	3.759	+0.64 -2.0	18.9	77.0
Jan. 1	13 03.00	+01 07.1	3.739	3.794	+0.52 -1.0	18.8	85.7
Jan. 11	13 07.51	+01 01.6	3.620	3.828	+0.37 0.0	18.8	94.7
Jan. 21	13 10.52	+01 06.7	3.502	3.862	+0.21 +1.1	18.8	104.1
Jan. 31	13 11.88	+01 22.5	3.390	3.895	+0.04 +2.1	18.8	113.9
Feb. 10	13 11.54	+01 48.4	3.289	3.928	-0.13 +3.1	18.8	124.1
Feb. 20	13 09.47	+02 23.5	3.203	3.961	-0.30 +3.9	18.8	134.7
Mar. 1	13 05.80	+03 05.6	3.138	3.994	-0.45 +4.5	18.8	145.5
Mar. 11	13 00.77	+03 52.0	3.097	4.026	-0.56 +4.7	18.8	156.2
Mar. 21	12 54.76	+04 39.2	3.084	4.058	-0.64 +4.6	18.9	165.9
Mar. 31	12 48.25	+05 23.5	3.101	4.089	-0.66 +4.1	18.9	170.2

## Comet C/2021 QM45 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Aug. 13.51318 TT  
 Peri. = 72.82434  
 Node = 354.59128 2000.0  
 Incl. = 22.82158  
 q = 2.7735792 AU  
 e = 0.9924224

$$m1 = 8.7 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	08 01.56	+51 00.9	2.256	3.144	-0.85	-1.4	17.9	149.5
Jan. 16	07 52.96	+50 36.5	2.299	3.192	-0.85	-3.7	18.1	150.5
Jan. 26	07 44.88	+49 49.9	2.367	3.242	-0.73	-5.8	18.2	147.7
Feb. 5	07 38.41	+48 43.9	2.459	3.294	-0.53	-7.5	18.4	142.2
Feb. 15	07 34.23	+47 23.5	2.574	3.348	-0.28	-8.6	18.6	135.2
Feb. 25	07 32.59	+45 53.8	2.710	3.404	-0.02	-9.3	18.8	127.4
Mar. 7	07 33.49	+44 19.3	2.864	3.461	+0.22	-9.6	19.1	119.4
Mar. 17	07 36.65	+42 43.3	3.033	3.520	+0.43	-9.6	19.3	111.4
Mar. 27	07 41.76	+41 07.8	3.213	3.580	+0.61	-9.5	19.5	103.5
Apr. 6	07 48.49	+39 34.1	3.402	3.641	+0.75	-9.3	19.8	95.8
Apr. 16	07 56.50	+38 02.5	3.596	3.704	+0.86	-9.0	20.0	88.3
Apr. 26	08 05.52	+36 33.0	3.792	3.767	+0.95	-8.8	20.2	80.9
May 6	08 15.30	+35 05.6	3.989	3.832	+1.01	-8.6	20.5	73.8
May 16	08 25.64	+33 40.0	4.183	3.897	+1.06	-8.5	20.7	66.8
May 26	08 36.37	+32 15.7	4.373	3.963	+1.09	-8.3	20.9	59.9
June 5	08 47.35	+30 52.8	4.556	4.030	+1.11	-8.2	21.1	53.2
June 15	08 58.46	+29 31.0	4.731	4.098	+1.11	-8.1	21.3	46.5
June 25	09 09.61	+28 10.2	4.895	4.166	+1.11	-8.0	21.4	39.9
July 5	09 20.72	+26 50.4	5.047	4.235	+1.11	-7.9	21.6	33.4
July 15	09 31.73	+25 31.8	5.186	4.305	+1.09	-7.8	21.8	27.0
July 25	09 42.58	+24 14.3	5.310	4.374	+1.07	-7.7	21.9	20.7
Aug. 4	09 53.20	+22 58.3	5.417	4.445	+1.05	-7.5	.	14.9
Aug. 14	10 03.57	+21 44.0	5.508	4.515	+1.02	-7.3	.	10.3
Aug. 24	10 13.62	+20 31.7	5.581	4.586	+0.99	-7.1	.	9.2
Sept. 3	10 23.32	+19 21.7	5.636	4.657	+0.95	-6.9	.	12.8
Sept. 13	10 32.61	+18 14.5	5.672	4.729	+0.90	-6.6	.	18.6
Sept. 23	10 41.44	+17 10.4	5.689	4.800	+0.86	-6.2	.	25.3
Oct. 3	10 49.74	+16 10.0	5.687	4.872	+0.80	-5.8	.	32.5
Oct. 13	10 57.47	+15 13.7	5.667	4.944	+0.74	-5.4	.	40.0
Oct. 23	11 04.53	+14 22.1	5.630	5.016	+0.67	-4.9	.	47.8
Nov. 2	11 10.85	+13 35.7	5.578	5.089	+0.59	-4.3	.	55.9
Nov. 12	11 16.34	+12 55.1	5.512	5.161	+0.50	-3.7	.	64.3
Nov. 22	11 20.91	+12 20.8	5.435	5.234	+0.40	-3.1	.	73.1
Dec. 2	11 24.46	+11 53.2	5.351	5.306	+0.30	-2.4	.	82.1
Dec. 12	11 26.91	+11 32.5	5.262	5.379	+0.18	-1.7	.	91.5
Dec. 22	11 28.18	+11 19.1	5.174	5.451	+0.06	-1.0	.	101.2
Jan. 1	11 28.22	+11 12.7	5.091	5.524	-0.06	-0.3	.	111.3
Jan. 11	11 27.04	+11 12.8	5.018	5.597	-0.19	+0.4	.	121.6
Jan. 21	11 24.67	+11 18.8	4.960	5.669	-0.30	+0.9	.	132.3
Jan. 31	11 21.24	+11 29.4	4.923	5.742	-0.40	+1.2	.	143.1
Feb. 10	11 16.92	+11 43.0	4.911	5.814	-0.47	+1.5	.	154.1
Feb. 20	11 11.99	+11 57.8	4.927	5.887	-0.52	+1.5	.	164.9
Mar. 1	11 06.74	+12 12.0	4.974	5.959	-0.53	+1.3	.	173.5
Mar. 11	11 01.49	+12 23.9	5.052	6.032	-0.51	+1.0	.	169.5
Mar. 21	10 56.58	+12 32.1	5.162	6.104	-0.46	+0.6	.	159.4
Mar. 31	10 52.26	+12 35.4	5.300	6.176	-0.39	+0.1	.	148.8

## Comet 107P/(4015) Wilson-Harrington

Epoch = 2023 June 25.0 TT  
 T = 2022 Aug. 24.64926 TT  
 Peri. = 95.45703 e = 0.6316169  
 Node = 266.76844 2000.0 a = 2.6246272 AU  
 Incl. = 2.79899 n = 0.23179424  
 q = 0.9668683 AU P = 4.25 years

H = 15.8 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	07 23.33	+20 00.0	0.904	1.886	-1.70	+1.9	175.1
Jan. 16	07 07.69	+20 16.5	0.992	1.969	-1.37	+1.4	170.3
Jan. 26	06 55.83	+20 27.9	1.105	2.050	-0.94	+0.9	157.5
Feb. 5	06 48.40	+20 35.3	1.242	2.130	-0.50	+0.6	145.7
Feb. 15	06 45.21	+20 39.7	1.398	2.208	-0.11	+0.3	134.8
Feb. 25	06 45.72	+20 41.6	1.569	2.284	+0.23	0.0	124.9
Mar. 7	06 49.32	+20 40.6	1.753	2.359	+0.50	-0.3	115.7
Mar. 17	06 55.34	+20 36.4	1.945	2.431	+0.72	-0.6	107.1
Mar. 27	07 03.29	+20 28.4	2.143	2.502	+0.88	-1.0	99.1
Apr. 6	07 12.72	+20 16.2	2.345	2.572	+1.01	-1.5	91.4
Apr. 16	07 23.25	+19 59.3	2.547	2.639	+1.10	-2.0	84.1
Apr. 26	07 34.64	+19 37.5	2.747	2.705	+1.18	-2.5	77.0
May 6	07 46.63	+19 10.7	2.943	2.769	+1.22	-3.0	70.2
May 16	07 59.04	+18 38.9	3.134	2.832	+1.26	-3.4	63.5
May 26	08 11.74	+18 02.3	3.317	2.893	+1.28	-3.9	57.0
June 5	08 24.60	+17 21.1	3.491	2.952	+1.29	-4.4	50.5
June 15	08 37.52	+16 35.5	3.654	3.009	+1.29	-4.8	44.1
June 25	08 50.44	+15 45.8	3.804	3.066	+1.29	-5.2	37.8
July 5	09 03.27	+14 52.4	3.941	3.120	+1.28	-5.5	31.5
July 15	09 15.98	+13 55.8	4.063	3.173	+1.26	-5.8	25.2
July 25	09 28.52	+12 56.4	4.169	3.225	+1.24	-6.1	18.9
Aug. 4	09 40.83	+11 54.6	4.258	3.275	+1.22	-6.3	12.6
Aug. 14	09 52.89	+10 51.0	4.329	3.324	+1.19	-6.4	6.3
Aug. 24	10 04.66	+09 46.0	4.381	3.371	+1.16	-6.6	2.0
Sept. 3	10 16.08	+08 40.2	4.415	3.417	+1.12	-6.6	7.4
Sept. 13	10 27.13	+07 34.2	4.429	3.462	+1.08	-6.6	14.1
Sept. 23	10 37.76	+06 28.5	4.424	3.505	+1.04	-6.5	20.9
Oct. 3	10 47.89	+05 24.0	4.400	3.547	+0.98	-6.4	28.0
Oct. 13	10 57.47	+04 21.1	4.356	3.587	+0.92	-6.2	35.2
Oct. 23	11 06.41	+03 20.8	4.295	3.627	+0.86	-5.9	42.7
Nov. 2	11 14.61	+02 23.8	4.217	3.665	+0.78	-5.5	50.4
Nov. 12	11 21.98	+01 31.0	4.123	3.701	+0.69	-5.0	58.4
Nov. 22	11 28.37	+00 43.5	4.017	3.737	+0.58	-4.4	66.7
Dec. 2	11 33.64	+00 02.3	3.899	3.771	+0.46	-3.7	75.3
Dec. 12	11 37.64	+00 31.5	3.774	3.804	+0.32	-2.9	84.3
Dec. 22	11 40.19	+00 56.6	3.645	3.836	+0.17	-2.0	93.7
Jan. 1	11 41.14	-01 11.9	3.517	3.867	0.00	-0.9	103.5
Jan. 11	11 40.36	-01 16.2	3.393	3.897	-0.18	+0.2	113.9
Jan. 21	11 37.78	-01 08.8	3.281	3.925	-0.36	+1.4	124.7
Jan. 31	11 33.44	+00 49.3	3.185	3.952	-0.53	+2.6	135.9
Feb. 10	11 27.49	+00 18.4	3.110	3.978	-0.67	+3.7	147.6
Feb. 20	11 20.24	+00 22.4	3.062	4.003	-0.78	+4.5	159.5
Mar. 1	11 12.19	+01 10.5	3.045	4.027	-0.83	+5.1	171.2
Mar. 11	11 03.89	+02 02.2	3.060	4.050	-0.82	+5.2	174.4
Mar. 21	10 55.95	+02 53.7	3.108	4.072	-0.75	+5.0	163.2
Mar. 31	10 48.91	+03 41.3	3.186	4.092	-0.64	+4.4	151.6



Comet 73P/Schwassmann-Wachmann

Epoch = 2023 June 25.0 TT  
 T = 2022 Aug. 25.90231 TT  
 Peri. = 199.50727 e = 0.6858572  
 Node = 69.56884 2000.0 a = 3.0938767 AU  
 Incl. = 11.23826 n = 0.18111297  
 q = 0.9719191 AU P = 5.44 years

$$m1 = 11.1 + 5 \log(\Delta) + 22.5 \log(r(t-80))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	23 21.76	-13° 07.6	2.211	1.941	+2.10	+17.3	14.8	61.3
Jan. 16	23 42.13	-10 19.7	2.393	2.030	+1.96	+16.2	15.6	56.9
Jan. 26	00 01.24	-07 41.6	2.575	2.118	+1.85	+15.3	16.4	52.1
Feb. 5	00 19.38	-05 13.0	2.753	2.204	+1.77	+14.3	17.2	47.2
Feb. 15	00 36.73	-02 53.5	2.926	2.289	+1.70	+13.5	17.9	42.0
Feb. 25	00 53.45	+00 42.6	3.091	2.372	+1.64	+12.6	18.5	36.6
Mar. 7	01 09.64	+01 20.1	3.248	2.453	+1.59	+11.8	19.2	31.2
Mar. 17	01 25.36	+03 14.8	3.393	2.533	+1.55	+11.0	19.8	25.6
Mar. 27	01 40.67	+05 01.9	3.526	2.611	+1.51	+10.3	20.3	20.0
Apr. 6	01 55.60	+06 41.4	3.645	2.688	+1.47	+9.5	20.8	14.4
Apr. 16	02 10.16	+08 13.5	3.749	2.763	+1.44	+8.8	21.3	9.0
Apr. 26	02 24.36	+09 38.4	3.838	2.836	+1.40	+8.1	21.7	4.8
May 6	02 38.17	+10 56.2	3.909	2.908	+1.36	+7.4	.	6.1
May 16	02 51.58	+12 07.0	3.963	2.979	+1.32	+6.7	.	11.3
May 26	03 04.54	+13 11.1	4.000	3.047	+1.27	+6.0	.	17.2
June 5	03 17.01	+14 08.4	4.019	3.115	+1.22	+5.4	.	23.5
June 15	03 28.92	+14 59.4	4.020	3.181	+1.16	+4.8	.	29.9
June 25	03 40.19	+15 44.2	4.004	3.245	+1.09	+4.1	.	36.6
July 5	03 50.73	+16 23.0	3.971	3.308	+1.01	+3.6	.	43.5
July 15	04 00.45	+16 56.1	3.922	3.370	+0.92	+3.0	.	50.6
July 25	04 09.20	+17 23.8	3.859	3.430	+0.82	+2.5	.	58.0
Aug. 4	04 16.84	+17 46.4	3.783	3.489	+0.70	+2.0	.	65.6
Aug. 14	04 23.23	+18 04.4	3.696	3.547	+0.56	+1.5	.	73.7
Aug. 24	04 28.19	+18 17.9	3.601	3.604	+0.41	+1.1	.	82.1
Sept. 3	04 31.52	+18 27.3	3.501	3.659	+0.24	+0.7	.	90.9
Sept. 13	04 33.06	+18 32.9	3.400	3.713	+0.05	+0.4	.	100.2
Sept. 23	04 32.66	+18 34.7	3.302	3.766	-0.15	0.0	.	110.0
Oct. 3	04 30.22	+18 33.0	3.212	3.818	-0.36	-0.4	.	120.4
Oct. 13	04 25.74	+18 27.6	3.136	3.868	-0.56	-0.7	.	131.3
Oct. 23	04 19.37	+18 18.7	3.079	3.918	-0.73	-1.1	.	142.7
Nov. 2	04 11.43	+18 06.5	3.047	3.966	-0.86	-1.4	.	154.5
Nov. 12	04 02.41	+17 51.7	3.043	4.013	-0.94	-1.6	.	166.6
Nov. 22	03 52.96	+17 35.4	3.072	4.059	-0.94	-1.6	.	177.3
Dec. 2	03 43.76	+17 19.4	3.134	4.104	-0.88	-1.5	.	168.2
Dec. 12	03 35.43	+17 05.4	3.228	4.148	-0.76	-1.2	.	156.2
Dec. 22	03 28.49	+16 55.2	3.351	4.191	-0.60	-0.8	.	144.4
Jan. 1	03 23.25	+16 50.1	3.500	4.233	-0.42	-0.2	.	133.0
Jan. 11	03 19.84	+16 50.9	3.669	4.274	-0.24	+0.4	.	122.1
Jan. 21	03 18.27	+16 57.7	3.854	4.313	-0.06	+1.0	.	111.6
Jan. 31	03 18.45	+17 10.1	4.048	4.352	+0.11	+1.5	.	101.5
Feb. 10	03 20.21	+17 27.6	4.247	4.390	+0.26	+2.0	.	91.8
Feb. 20	03 23.40	+17 49.4	4.445	4.427	+0.39	+2.4	.	82.6
Mar. 1	03 27.81	+18 14.4	4.640	4.463	+0.50	+2.7	.	73.6
Mar. 11	03 33.29	+18 42.0	4.828	4.498	+0.60	+2.9	.	65.0
Mar. 21	03 39.66	+19 11.2	5.004	4.532	+0.68	+3.0	.	56.6
Mar. 31	03 46.78	+19 41.3	5.167	4.566	+0.75	+3.0	.	48.4

Comet 157P/Tritton

Epoch = 2023 June 25.0 TT  
 T = 2022 Sept. 9.84076 TT  
 Peri. = 155.07937 e = 0.5567112  
 Node = 287.54189 2000.0 a = 3.5458918 AU  
 Incl. = 12.41994 n = 0.14761003  
 q = 1.5718541 AU P = 6.68 years

$$m1 = 13.8 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	11 17.81	-07 23.3	1.370	1.956	+0.19 -12.2	18.9	111.4
Jan. 16	11 18.07	-09 15.3	1.327	2.011	-0.17 -9.9	19.0	120.3
Jan. 26	11 14.75	-10 41.8	1.293	2.069	-0.52 -7.1	19.1	130.0
Feb. 5	11 08.19	-11 38.4	1.275	2.127	-0.81 -3.9	19.2	140.0
Feb. 15	10 59.17	-12 02.5	1.275	2.186	-1.00 -0.6	19.4	149.9
Feb. 25	10 48.87	-11 54.7	1.297	2.246	-1.04 +2.4	19.6	158.2
Mar. 7	10 38.77	-11 20.5	1.344	2.307	-0.95 +4.5	19.9	161.6
Mar. 17	10 30.13	-10 28.8	1.417	2.368	-0.75 +5.8	20.2	157.8
Mar. 27	10 23.85	-09 29.5	1.514	2.429	-0.48 +6.0	20.5	150.0
Apr. 6	10 20.36	-08 31.8	1.632	2.490	-0.19 +5.4	20.8	141.0
Apr. 16	10 19.64	-07 42.0	1.770	2.552	+0.07 +4.4	21.1	131.9
Apr. 26	10 21.49	-07 03.7	1.923	2.613	+0.31 +3.1	21.5	123.1
May 6	10 25.55	-06 38.6	2.089	2.673	+0.51 +1.8	21.8	114.8
May 16	10 31.44	-06 26.8	2.264	2.734	+0.68 +0.5	.	106.9
May 26	10 38.83	-06 27.7	2.445	2.793	+0.81 -0.8	.	99.3
June 5	10 47.42	-06 40.3	2.631	2.853	+0.91 -1.9	.	92.0
June 15	10 56.96	-07 03.3	2.818	2.912	+1.00 -2.8	.	85.0
June 25	11 07.24	-07 35.6	3.005	2.970	+1.06 -3.7	.	78.3
July 5	11 18.10	-08 15.9	3.190	3.028	+1.11 -4.4	.	71.6
July 15	11 29.42	-09 02.9	3.371	3.085	+1.15 -5.0	.	65.2
July 25	11 41.08	-09 55.8	3.545	3.142	+1.18 -5.6	.	58.8
Aug. 4	11 53.01	-10 53.5	3.712	3.197	+1.20 -6.0	.	52.5
Aug. 14	12 05.15	-11 55.0	3.870	3.253	+1.22 -6.3	.	46.2
Aug. 24	12 17.43	-12 59.6	4.017	3.307	+1.23 -6.6	.	40.0
Sept. 3	12 29.81	-14 06.6	4.151	3.361	+1.24 -6.8	.	33.9
Sept. 13	12 42.24	-15 15.1	4.272	3.414	+1.25 -6.9	.	27.8
Sept. 23	12 54.70	-16 24.7	4.378	3.466	+1.24 -7.0	.	21.8
Oct. 3	13 07.12	-17 34.6	4.468	3.518	+1.24 -7.0	.	16.1
Oct. 13	13 19.48	-18 44.3	4.541	3.569	+1.23 -6.9	.	11.5
Oct. 23	13 31.72	-19 53.4	4.596	3.619	+1.22 -6.9	.	9.6
Nov. 2	13 43.78	-21 01.3	4.633	3.668	+1.19 -6.7	.	12.1
Nov. 12	13 55.61	-22 07.7	4.651	3.717	+1.17 -6.5	.	17.2
Nov. 22	14 07.11	-23 12.1	4.650	3.765	+1.13 -6.3	.	23.5
Dec. 2	14 18.20	-24 14.2	4.630	3.812	+1.08 -6.1	.	30.4
Dec. 12	14 28.79	-25 13.8	4.593	3.859	+1.03 -5.8	.	37.5
Dec. 22	14 38.74	-26 10.6	4.537	3.905	+0.95 -5.5	.	45.0
Jan. 1	14 47.92	-27 04.4	4.467	3.950	+0.87 -5.2	.	52.7
Jan. 11	14 56.18	-27 54.9	4.381	3.994	+0.77 -4.9	.	60.7
Jan. 21	15 03.35	-28 42.0	4.284	4.038	+0.65 -4.5	.	69.0
Jan. 31	15 09.25	-29 25.3	4.178	4.080	+0.51 -4.1	.	77.5
Feb. 10	15 13.70	-30 04.4	4.066	4.123	+0.36 -3.7	.	86.4
Feb. 20	15 16.52	-30 38.6	3.951	4.164	+0.19 -3.1	.	95.5
Mar. 1	15 17.55	-31 07.1	3.838	4.205	0.00 -2.5	.	105.0
Mar. 11	15 16.70	-31 28.8	3.732	4.245	-0.19 -1.7	.	114.8
Mar. 21	15 13.95	-31 42.3	3.637	4.284	-0.38 -0.8	.	124.8
Mar. 31	15 09.40	-31 46.1	3.558	4.323	-0.55 +0.2	.	135.1

## Comet P/2022 W1 (Rankin)

Epoch = 2023 June 25.0 TT  
 T = 2022 Sept. 15.78594 TT  
 Peri. = 17.80069 e = 0.5165823  
 Node = 38.81661 2000.0 a = 6.9671843 AU  
 Incl. = 13.46620 n = 0.05359424  
 q = 3.3680602 AU P = 18.39 years

$$m1 = 11.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	04 13.53	+32 34.0	2.632	3.451	-0.27 -0.3	19.4	140.9
Jan. 16	04 11.81	+32 30.8	2.743	3.466	-0.05 -0.3	19.5	130.8
Jan. 26	04 12.36	+32 28.1	2.872	3.483	+0.18 -0.2	19.6	121.0
Feb. 5	04 15.16	+32 27.5	3.014	3.500	+0.40 +0.1	19.7	111.7
Feb. 15	04 20.05	+32 29.5	3.166	3.519	+0.60 +0.4	19.9	102.8
Feb. 25	04 26.84	+32 34.2	3.323	3.538	+0.77 +0.6	20.0	94.3
Mar. 7	04 35.29	+32 41.0	3.484	3.559	+0.93 +0.8	20.1	86.2
Mar. 17	04 45.19	+32 49.1	3.644	3.580	+1.06 +0.9	20.2	78.5
Mar. 27	04 56.31	+32 57.7	3.801	3.603	+1.17 +0.8	20.4	71.0
Apr. 6	05 08.47	+33 05.8	3.954	3.627	+1.27 +0.8	20.5	63.9
Apr. 16	05 21.48	+33 12.6	4.100	3.651	+1.34 +0.6	20.6	57.0
Apr. 26	05 35.18	+33 17.3	4.237	3.677	+1.40 +0.3	20.7	50.3
May 6	05 49.43	+33 19.3	4.365	3.703	+1.45 0.0	20.8	43.8
May 16	06 04.07	+33 18.1	4.482	3.730	+1.48 -0.3	20.9	37.4
May 26	06 19.01	+33 13.4	4.587	3.758	+1.50 -0.7	21.0	31.3
June 5	06 34.10	+33 05.0	4.678	3.786	+1.51 -1.0	21.0	25.3
June 15	06 49.26	+32 52.9	4.757	3.816	+1.52 -1.4	21.1	19.7
June 25	07 04.38	+32 37.2	4.821	3.846	+1.51 -1.8	21.2	14.7
July 5	07 19.37	+32 18.1	4.870	3.877	+1.49 -2.1	21.2	11.0
July 15	07 34.16	+31 56.0	4.904	3.908	+1.46 -2.4	21.3	10.3
July 25	07 48.66	+31 31.3	4.922	3.940	+1.43 -2.6	21.3	13.1
Aug. 4	08 02.80	+31 04.8	4.925	3.972	+1.39 -2.7	21.4	17.9
Aug. 14	08 16.51	+30 36.9	4.913	4.005	+1.34 -2.8	21.4	23.6
Aug. 24	08 29.72	+30 08.6	4.885	4.039	+1.29 -2.8	21.4	29.8
Sept. 3	08 42.35	+29 40.7	4.842	4.073	+1.23 -2.7	21.4	36.3
Sept. 13	08 54.33	+29 14.0	4.785	4.107	+1.16 -2.6	21.4	43.0
Sept. 23	09 05.58	+28 49.7	4.715	4.142	+1.08 -2.3	21.4	50.0
Oct. 3	09 16.00	+28 28.8	4.632	4.177	+0.99 -1.9	21.4	57.3
Oct. 13	09 25.50	+28 12.3	4.539	4.213	+0.90 -1.4	21.4	64.9
Oct. 23	09 33.96	+28 01.3	4.436	4.249	+0.78 -0.8	21.4	72.8
Nov. 2	09 41.27	+27 56.8	4.328	4.285	+0.66 -0.1	21.4	80.9
Nov. 12	09 47.29	+27 59.6	4.216	4.322	+0.53 +0.7	21.4	89.5
Nov. 22	09 51.87	+28 10.5	4.105	4.359	+0.37 +1.5	21.4	98.3
Dec. 2	09 54.90	+28 29.4	3.997	4.396	+0.21 +2.3	21.3	107.6
Dec. 12	09 56.26	+28 56.0	3.897	4.434	+0.04 +3.1	21.3	117.1
Dec. 22	09 55.90	+29 29.3	3.810	4.471	-0.13 +3.6	21.3	127.0
Jan. 1	09 53.83	+30 07.0	3.741	4.509	-0.30 +3.9	21.3	136.9
Jan. 11	09 50.17	+30 46.6	3.693	4.547	-0.44 +3.9	21.3	146.7
Jan. 21	09 45.19	+31 24.6	3.671	4.586	-0.56 +3.6	21.3	155.7
Jan. 31	09 39.28	+31 57.5	3.677	4.624	-0.62 +2.9	21.4	162.0
Feb. 10	09 32.93	+32 22.4	3.713	4.663	-0.64 +2.0	21.4	162.3
Feb. 20	09 26.69	+32 37.2	3.779	4.701	-0.60 +0.9	21.5	156.4
Mar. 1	09 21.08	+32 41.0	3.872	4.740	-0.51 -0.2	21.6	147.8
Mar. 11	09 16.51	+32 33.9	3.991	4.779	-0.39 -1.3	21.7	138.3
Mar. 21	09 13.29	+32 16.9	4.133	4.818	-0.24 -2.2	21.8	128.7
Mar. 31	09 11.56	+31 51.6	4.292	4.857	-0.09 -2.9	21.9	119.1

## Comet C/2020 R7 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Sept. 16.25024 TT  
 Peri. = 347.84125  
 Node = 268.28514 2000.0  
 Incl. = 114.89737  
 q = 2.9559749 AU  
 e = 1.0002746

$$m1 = 10.1 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	17 46.92	-11 21.9	4.050	3.158	+0.64	+11.2	15.6	21.8
Jan. 16	17 53.06	-09 26.5	4.006	3.194	+0.58	+12.0	15.6	30.2
Jan. 26	17 58.53	-07 21.8	3.940	3.232	+0.50	+13.0	15.6	38.8
Feb. 5	18 03.11	-05 06.1	3.855	3.273	+0.40	+14.2	15.6	47.6
Feb. 15	18 06.61	-02 37.7	3.755	3.316	+0.28	+15.6	15.6	56.6
Feb. 25	18 08.81	+00 04.9	3.644	3.361	+0.14	+17.1	15.5	65.7
Mar. 7	18 09.43	+03 02.7	3.527	3.408	-0.04	+18.6	15.5	75.0
Mar. 17	18 08.20	+06 16.0	3.411	3.457	-0.24	+20.2	15.5	84.3
Mar. 27	18 04.83	+09 43.8	3.301	3.508	-0.47	+21.5	15.4	93.6
Apr. 6	17 59.03	+13 23.1	3.204	3.560	-0.72	+22.4	15.4	102.7
Apr. 16	17 50.61	+17 08.6	3.128	3.614	-0.99	+22.6	15.4	111.2
Apr. 26	17 39.45	+20 52.1	3.080	3.669	-1.26	+21.8	15.4	118.6
May 6	17 25.69	+24 23.2	3.063	3.726	-1.50	+20.0	15.4	124.3
May 16	17 09.76	+27 30.8	3.082	3.784	-1.69	+17.1	15.4	127.5
May 26	16 52.42	+30 05.3	3.137	3.843	-1.77	+13.4	15.5	127.9
June 5	16 34.68	+32 01.2	3.227	3.903	-1.75	+9.4	15.6	125.4
June 15	16 17.60	+33 17.6	3.347	3.964	-1.63	+5.6	15.7	120.8
June 25	16 02.12	+33 58.1	3.493	4.026	-1.43	+2.3	15.8	114.8
July 5	15 48.88	+34 09.1	3.659	4.089	-1.19	-0.2	16.0	108.0
July 15	15 38.18	+33 57.8	3.839	4.153	-0.93	-2.1	16.1	100.9
July 25	15 30.07	+33 31.2	4.028	4.217	-0.67	-3.3	16.3	93.7
Aug. 4	15 24.41	+32 55.3	4.219	4.283	-0.44	-3.9	16.4	86.7
Aug. 14	15 20.95	+32 14.8	4.409	4.348	-0.23	-4.2	16.5	79.9
Aug. 24	15 19.43	+31 33.4	4.594	4.415	-0.06	-4.1	16.6	73.5
Sept. 3	15 19.57	+30 54.0	4.770	4.481	+0.10	-3.7	16.7	67.5
Sept. 13	15 21.13	+30 18.6	4.933	4.549	+0.22	-3.2	16.9	62.0
Sept. 23	15 23.86	+29 49.0	5.083	4.616	+0.33	-2.6	17.0	57.2
Oct. 3	15 27.57	+29 26.6	5.216	4.685	+0.42	-1.8	17.0	53.1
Oct. 13	15 32.07	+29 12.5	5.332	4.753	+0.49	-0.9	17.1	50.1
Oct. 23	15 37.19	+29 07.7	5.429	4.822	+0.54	+0.1	17.2	48.1
Nov. 2	15 42.79	+29 13.3	5.507	4.891	+0.58	+1.2	17.3	47.4
Nov. 12	15 48.71	+29 30.0	5.567	4.960	+0.61	+2.3	17.3	48.1
Nov. 22	15 54.83	+29 58.6	5.608	5.030	+0.62	+3.6	17.4	50.0
Dec. 2	16 00.97	+30 39.9	5.632	5.099	+0.61	+4.8	17.4	53.0
Dec. 12	16 07.02	+31 34.3	5.641	5.169	+0.59	+6.2	17.4	56.9
Dec. 22	16 12.82	+32 42.4	5.637	5.239	+0.56	+7.6	17.5	61.5
Jan. 1	16 18.19	+34 04.1	5.623	5.310	+0.51	+8.9	17.5	66.6
Jan. 11	16 22.96	+35 39.4	5.600	5.380	+0.44	+10.3	17.5	72.1
Jan. 21	16 26.94	+37 27.8	5.574	5.451	+0.35	+11.5	17.5	77.7
Jan. 31	16 29.91	+39 27.9	5.547	5.521	+0.23	+12.6	17.5	83.4
Feb. 10	16 31.65	+41 38.1	5.524	5.592	+0.10	+13.5	17.5	88.8
Feb. 20	16 31.89	+43 56.0	5.507	5.662	-0.07	+14.1	17.6	94.0
Mar. 1	16 30.39	+46 18.2	5.501	5.733	-0.26	+14.3	17.6	98.6
Mar. 11	16 26.89	+48 40.9	5.508	5.804	-0.47	+14.1	17.6	102.4
Mar. 21	16 21.18	+50 59.3	5.532	5.875	-0.70	+13.4	17.7	105.4
Mar. 31	16 13.13	+53 08.6	5.572	5.945	-0.93	+12.2	17.7	107.3

Comet 211P/Hill

Epoch = 2023 June 25.0 TT  
 T = 2022 Oct. 4.61589 TT  
 Peri. = 4.28798 e = 0.3440133  
 Node = 117.12624 2000.0 a = 3.5482169 AU  
 Incl. = 18.91861 n = 0.14746496  
 q = 2.3275831 AU P = 6.68 years

$$m1 = 8.4 + 5 \log(\Delta) + 22.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	11 51.69	+15 39.4	1.851	2.407	+0.77 +7.4	18.3	112.6
Jan. 16	11 58.31	+17 02.8	1.763	2.424	+0.52 +9.5	18.3	121.3
Jan. 26	12 02.30	+18 46.4	1.688	2.443	+0.25 +11.3	18.3	130.2
Feb. 5	12 03.48	+20 45.5	1.630	2.463	-0.04 +12.5	18.3	139.2
Feb. 15	12 01.89	+22 52.3	1.593	2.484	-0.30 +12.7	18.3	147.6
Feb. 25	11 57.80	+24 56.2	1.579	2.507	-0.52 +11.7	18.4	154.0
Mar. 7	11 51.90	+26 45.0	1.590	2.530	-0.65 +9.6	18.5	156.4
Mar. 17	11 45.16	+28 08.6	1.626	2.555	-0.68 +6.7	18.6	153.5
Mar. 27	11 38.64	+29 00.8	1.686	2.581	-0.60 +3.4	18.8	147.1
Apr. 6	11 33.35	+29 20.0	1.768	2.608	-0.43 +0.2	19.0	139.2
Apr. 16	11 29.96	+29 08.9	1.868	2.635	-0.22 -2.6	19.2	130.8
Apr. 26	11 28.81	+28 31.9	1.984	2.664	+0.01 -4.9	19.5	122.6
May 6	11 29.97	+27 34.2	2.111	2.693	+0.24 -6.7	19.7	114.7
May 16	11 33.25	+26 20.8	2.249	2.723	+0.44 -8.1	19.9	107.1
May 26	11 38.44	+24 55.4	2.392	2.753	+0.61 -9.1	20.2	99.9
June 5	11 45.24	+23 21.4	2.541	2.784	+0.76 -9.8	20.4	93.0
June 15	11 53.38	+21 41.3	2.691	2.816	+0.88 -10.3	20.7	86.4
June 25	12 02.63	+19 57.0	2.842	2.848	+0.98 -10.6	20.9	80.0
July 5	12 12.79	+18 10.0	2.992	2.880	+1.06 -10.8	21.1	73.9
July 15	12 23.68	+16 21.5	3.139	2.912	+1.12 -10.9	21.3	67.9
July 25	12 35.17	+14 32.7	3.282	2.945	+1.18 -10.9	21.5	62.0
Aug. 4	12 47.16	+12 44.4	3.420	2.978	+1.22 -10.8	21.7	56.2
Aug. 14	12 59.55	+10 57.5	3.551	3.011	+1.26 -10.6	21.9	50.6
Aug. 24	13 12.28	+09 12.6	3.675	3.045	+1.29 -10.3	.	45.0
Sept. 3	13 25.28	+07 30.5	3.789	3.078	+1.31 -10.0	.	39.5
Sept. 13	13 38.50	+05 51.9	3.894	3.112	+1.33 -9.7	.	34.1
Sept. 23	13 51.91	+04 17.3	3.987	3.145	+1.35 -9.2	.	28.8
Oct. 3	14 05.46	+02 47.4	4.069	3.178	+1.36 -8.7	.	23.8
Oct. 13	14 19.09	+01 22.8	4.137	3.212	+1.37 -8.2	.	19.3
Oct. 23	14 32.78	+00 03.9	4.191	3.245	+1.37 -7.5	.	15.8
Nov. 2	14 46.45	-01 08.6	4.231	3.278	+1.36 -6.9	.	14.2
Nov. 12	15 00.06	-02 14.4	4.256	3.311	+1.36 -6.2	.	15.3
Nov. 22	15 13.54	-03 13.0	4.265	3.344	+1.34 -5.4	.	18.7
Dec. 2	15 26.81	-04 04.0	4.259	3.377	+1.31 -4.7	.	23.5
Dec. 12	15 39.79	-04 47.2	4.237	3.410	+1.28 -3.9	.	29.1
Dec. 22	15 52.39	-05 22.3	4.199	3.442	+1.23 -3.1	.	35.2
Jan. 1	16 04.48	-05 49.3	4.146	3.474	+1.18 -2.3	.	41.7
Jan. 11	16 15.97	-06 08.2	4.079	3.506	+1.11 -1.4	.	48.5
Jan. 21	16 26.71	-06 19.0	4.000	3.538	+1.03 -0.7	.	55.6
Jan. 31	16 36.55	-06 22.1	3.908	3.569	+0.93 +0.1	.	62.9
Feb. 10	16 45.36	-06 17.9	3.807	3.600	+0.82 +0.8	.	70.5
Feb. 20	16 52.97	-06 06.9	3.699	3.631	+0.69 +1.4	.	78.4
Mar. 1	16 59.20	-05 49.9	3.586	3.662	+0.54 +2.0	.	86.5
Mar. 11	17 03.90	-05 27.9	3.471	3.692	+0.38 +2.4	.	95.0
Mar. 21	17 06.92	-05 02.1	3.357	3.722	+0.20 +2.7	.	103.7
Mar. 31	17 08.13	-04 33.9	3.249	3.751	+0.02 +2.9	.	112.8

## Comet 408P/Novichonok-Gerke

Epoch = 2023 June 25.0 TT  
 T = 2022 Oct. 5.31694 TT  
 Peri. = 226.50575 e = 0.2687280  
 Node = 189.44163 2000.0 a = 4.7421217 AU  
 Incl. = 19.35689 n = 0.09544321  
 q = 3.4677808 AU P = 10.33 years

$$m1 = -2.3 + 5 \log(\Delta) + 30.0 \log(r(t+90))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	04 01.69	-01 22.7	2.790	3.496	-0.19	+2.3	16.5	129.3
Jan. 16	04 00.64	+00 54.1	2.904	3.502	0.00	+3.5	16.7	120.1
Jan. 26	04 01.43	+00 15.3	3.031	3.509	+0.18	+4.3	16.8	111.2
Feb. 5	04 04.05	+00 30.8	3.168	3.517	+0.36	+4.9	16.9	102.6
Feb. 15	04 08.37	+01 21.5	3.310	3.525	+0.52	+5.2	17.1	94.3
Feb. 25	04 14.24	+02 14.6	3.455	3.534	+0.67	+5.3	17.2	86.4
Mar. 7	04 21.50	+03 07.9	3.599	3.543	+0.80	+5.3	17.4	78.8
Mar. 17	04 29.97	+03 59.8	3.741	3.553	+0.91	+5.1	17.5	71.5
Mar. 27	04 39.49	+04 49.0	3.877	3.563	+1.00	+4.7	17.6	64.5
Apr. 6	04 49.90	+05 34.3	4.006	3.574	+1.08	+4.3	17.7	57.8
Apr. 16	05 01.07	+06 14.8	4.127	3.586	+1.15	+3.8	17.9	51.3
Apr. 26	05 12.86	+06 49.8	4.238	3.598	+1.21	+3.2	18.0	45.0
May 6	05 25.16	+07 18.7	4.338	3.611	+1.25	+2.5	18.1	39.0
May 16	05 37.85	+07 41.0	4.426	3.624	+1.29	+1.9	18.2	33.3
May 26	05 50.83	+07 56.5	4.502	3.637	+1.31	+1.2	18.3	27.8
June 5	06 04.01	+08 05.0	4.564	3.651	+1.32	+0.5	18.4	22.9
June 15	06 17.29	+08 06.4	4.613	3.666	+1.33	-0.3	18.5	18.8
June 25	06 30.59	+08 00.7	4.647	3.681	+1.33	-1.0	18.5	16.0
July 5	06 43.82	+07 47.9	4.667	3.696	+1.32	-1.6	18.6	15.3
July 15	06 56.90	+07 28.4	4.673	3.712	+1.30	-2.3	18.7	16.9
July 25	07 09.77	+07 02.4	4.663	3.728	+1.27	-3.0	18.7	20.3
Aug. 4	07 22.32	+06 30.2	4.640	3.744	+1.24	-3.5	18.8	24.9
Aug. 14	07 34.49	+05 52.3	4.602	3.761	+1.19	-4.1	18.8	30.2
Aug. 24	07 46.19	+05 09.1	4.550	3.778	+1.14	-4.6	18.9	35.9
Sept. 3	07 57.33	+04 21.4	4.485	3.796	+1.08	-5.0	18.9	42.0
Sept. 13	08 07.83	+03 29.7	4.407	3.814	+1.01	-5.4	18.9	48.4
Sept. 23	08 17.58	+02 34.9	4.317	3.832	+0.93	-5.6	19.0	55.1
Oct. 3	08 26.46	+01 37.9	4.217	3.851	+0.84	-5.8	19.0	62.0
Oct. 13	08 34.37	+00 39.6	4.108	3.870	+0.73	-5.8	19.0	69.3
Oct. 23	08 41.17	+00 18.5	3.992	3.889	+0.61	-5.8	19.0	76.9
Nov. 2	08 46.73	-01 15.2	3.872	3.908	+0.48	-5.5	19.0	84.8
Nov. 12	08 50.91	-02 08.9	3.749	3.928	+0.34	-5.1	19.0	93.0
Nov. 22	08 53.60	-02 57.6	3.629	3.947	+0.18	-4.5	19.0	101.6
Dec. 2	08 54.69	-03 39.3	3.513	3.968	+0.02	-3.7	19.0	110.5
Dec. 12	08 54.15	-04 11.8	3.406	3.988	-0.14	-2.7	19.0	119.8
Dec. 22	08 51.99	-04 33.0	3.314	4.008	-0.30	-1.4	19.0	129.2
Jan. 1	08 48.39	-04 40.8	3.239	4.029	-0.43	0.0	19.0	138.5
Jan. 11	08 43.59	-04 34.2	3.186	4.050	-0.53	+1.5	19.0	147.4
Jan. 21	08 38.00	-04 12.7	3.159	4.071	-0.58	+2.9	19.1	154.6
Jan. 31	08 32.11	-03 37.5	3.161	4.092	-0.58	+4.2	19.2	158.2
Feb. 10	08 26.46	-02 50.7	3.191	4.113	-0.53	+5.2	19.2	156.2
Feb. 20	08 21.53	-01 55.6	3.249	4.134	-0.44	+5.8	19.4	149.9
Mar. 1	08 17.75	+00 56.0	3.334	4.156	-0.30	+6.1	19.5	141.5
Mar. 11	08 15.36	+00 04.6	3.442	4.177	-0.15	+6.0	19.6	132.4
Mar. 21	08 14.54	+01 03.1	3.571	4.199	0.00	+5.6	19.8	123.1
Mar. 31	08 15.29	+01 56.8	3.714	4.221	+0.16	+5.0	19.9	114.0

## Comet 61P/Shajn-Schaldach

Epoch = Epoch 2023 June 25.0 TT  
 T = 2022 Oct. 23.73752 TT  
 Peri. = 221.64000 e = 0.4236964  
 Node = 162.96358 2000.0 a = 3.6887693 AU  
 Incl. = 6.00006 n = 0.13911752  
 q = 2.1258510 AU P = 7.08 years

$$m1 = 10.4 + 5 \log(\Delta) + 15.0 \log(r(t+30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	01 45.86	+03 34.2	1.794	2.200	+1.13 +8.3	17.0	100.7
Jan. 16	01 57.90	+04 59.7	1.925	2.220	+1.28 +8.8	17.2	93.9
Jan. 26	02 11.34	+06 29.8	2.060	2.243	+1.41 +9.2	17.5	87.4
Feb. 5	02 25.96	+08 01.8	2.197	2.268	+1.52 +9.2	17.7	81.3
Feb. 15	02 41.55	+09 33.4	2.336	2.295	+1.61 +9.1	17.9	75.3
Feb. 25	02 57.97	+11 02.5	2.475	2.323	+1.68 +8.7	18.1	69.6
Mar. 7	03 15.07	+12 27.6	2.612	2.353	+1.74 +8.2	18.3	64.0
Mar. 17	03 32.72	+13 47.0	2.747	2.385	+1.79 +7.6	18.5	58.6
Mar. 27	03 50.83	+14 59.7	2.879	2.418	+1.83 +6.9	18.7	53.2
Apr. 6	04 09.29	+16 04.6	3.007	2.452	+1.86 +6.0	18.9	48.0
Apr. 16	04 28.00	+17 01.0	3.129	2.487	+1.88 +5.2	19.1	42.8
Apr. 26	04 46.88	+17 48.4	3.245	2.524	+1.89 +4.2	19.3	37.6
May 6	05 05.84	+18 26.4	3.354	2.561	+1.90 +3.3	19.4	32.5
May 16	05 24.78	+18 54.9	3.455	2.600	+1.89 +2.3	19.6	27.4
May 26	05 43.63	+19 13.8	3.548	2.639	+1.88 +1.4	19.8	22.3
June 5	06 02.30	+19 23.4	3.630	2.678	+1.85 +0.5	19.9	17.2
June 15	06 20.72	+19 24.0	3.703	2.718	+1.83 -0.4	20.0	12.2
June 25	06 38.83	+19 15.9	3.764	2.759	+1.79 -1.3	20.2	7.4
July 5	06 56.54	+18 59.9	3.813	2.800	+1.75 -2.0	20.3	3.9
July 15	07 13.80	+18 36.4	3.851	2.841	+1.70 -2.7	20.4	5.8
July 25	07 30.56	+18 06.4	3.875	2.883	+1.65 -3.3	20.5	10.6
Aug. 4	07 46.74	+17 30.5	3.886	2.924	+1.59 -3.9	20.6	16.1
Aug. 14	08 02.32	+16 49.8	3.883	2.966	+1.52 -4.3	20.7	21.7
Aug. 24	08 17.22	+16 05.0	3.867	3.008	+1.45 -4.7	20.8	27.6
Sept. 3	08 31.38	+15 17.3	3.837	3.050	+1.37 -4.9	20.8	33.7
Sept. 13	08 44.76	+14 27.6	3.793	3.092	+1.29 -5.0	20.9	40.1
Sept. 23	08 57.26	+13 37.0	3.737	3.134	+1.20 -5.1	21.0	46.6
Oct. 3	09 08.82	+12 46.9	3.667	3.175	+1.10 -4.9	21.0	53.5
Oct. 13	09 19.33	+11 58.3	3.586	3.217	+0.99 -4.7	21.0	60.6
Oct. 23	09 28.68	+11 12.7	3.495	3.258	+0.87 -4.3	21.1	68.1
Nov. 2	09 36.74	+10 31.5	3.396	3.299	+0.73 -3.8	21.1	76.0
Nov. 12	09 43.36	+09 56.2	3.291	3.340	+0.58 -3.1	21.1	84.3
Nov. 22	09 48.38	+09 28.4	3.182	3.381	+0.41 -2.3	21.1	93.0
Dec. 2	09 51.66	+09 09.5	3.074	3.422	+0.23 -1.3	21.1	102.2
Dec. 12	09 53.05	+09 00.9	2.970	3.462	+0.03 -0.2	21.1	112.0
Dec. 22	09 52.45	+09 03.6	2.876	3.502	-0.17 +0.9	21.1	122.3
Jan. 1	09 49.89	+09 18.2	2.795	3.541	-0.36 +2.1	21.1	133.1
Jan. 11	09 45.47	+09 44.0	2.734	3.580	-0.53 +3.2	21.1	144.4
Jan. 21	09 39.51	+10 19.7	2.697	3.619	-0.66 +4.0	21.1	156.1
Jan. 31	09 32.50	+11 02.4	2.688	3.658	-0.74 +4.5	21.2	167.9
Feb. 10	09 25.03	+11 48.8	2.710	3.696	-0.75 +4.7	21.3	176.8
Feb. 20	09 17.78	+12 35.1	2.763	3.733	-0.69 +4.5	21.4	167.1
Mar. 1	09 11.40	+13 18.0	2.846	3.771	-0.57 +4.0	21.5	155.5
Mar. 11	09 06.35	+13 54.8	2.957	3.807	-0.42 +3.3	21.6	144.2
Mar. 21	09 02.96	+14 24.1	3.091	3.844	-0.24 +2.5	21.8	133.4
Mar. 31	09 01.36	+14 45.2	3.244	3.880	-0.06 +1.6	22.0	123.0

Comet P/2022 L3 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Oct. 29.94800 TT  
 Peri. = 10.32892 e = 0.6277414  
 Node = 29.80567 2000.0 a = 6.5007060 AU  
 Incl. = 21.54321 n = 0.05946526  
 q = 2.4199437 AU P = 16.57 years

$$m1 = 12.1 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	02 05.10	+28° 24.0	1.936	2.492	+0.63 +5.7	15.5	113.1
Jan. 16	02 12.59	+29 21.8	2.071	2.514	+0.89 +5.9	15.7	105.1
Jan. 26	02 22.47	+30 22.3	2.212	2.538	+1.11 +6.2	15.8	97.6
Feb. 5	02 34.42	+31 24.6	2.358	2.566	+1.30 +6.3	16.0	90.6
Feb. 15	02 48.15	+32 27.6	2.506	2.595	+1.46 +6.3	16.2	84.0
Feb. 25	03 03.41	+33 29.9	2.655	2.627	+1.60 +6.1	16.3	77.6
Mar. 7	03 19.97	+34 30.3	2.803	2.661	+1.72 +5.9	16.5	71.5
Mar. 17	03 37.64	+35 27.1	2.949	2.697	+1.82 +5.4	16.6	65.7
Mar. 27	03 56.25	+36 19.3	3.093	2.735	+1.91 +4.9	16.7	60.1
Apr. 6	04 15.62	+37 05.7	3.232	2.775	+1.97 +4.3	16.9	54.6
Apr. 16	04 35.59	+37 45.3	3.366	2.816	+2.02 +3.6	17.0	49.3
Apr. 26	04 56.01	+38 17.5	3.494	2.859	+2.06 +2.8	17.1	44.1
May 6	05 16.73	+38 41.8	3.615	2.903	+2.08 +2.0	17.2	39.1
May 16	05 37.58	+38 57.8	3.728	2.948	+2.09 +1.2	17.3	34.3
May 26	05 58.44	+39 05.7	3.833	2.994	+2.08 +0.3	17.4	29.6
June 5	06 19.17	+39 05.6	3.928	3.042	+2.06 -0.4	17.5	25.3
June 15	06 39.64	+38 58.0	4.014	3.091	+2.03 -1.2	17.6	21.4
June 25	06 59.75	+38 43.4	4.089	3.140	+1.99 -1.8	17.6	18.3
July 5	07 19.38	+38 22.7	4.152	3.190	+1.93 -2.4	17.7	16.4
July 15	07 38.47	+37 56.7	4.204	3.241	+1.88 -2.8	17.8	16.3
July 25	07 56.94	+37 26.5	4.243	3.292	+1.81 -3.2	17.8	18.1
Aug. 4	08 14.73	+36 53.2	4.269	3.344	+1.74 -3.5	17.9	21.3
Aug. 14	08 31.80	+36 18.0	4.282	3.396	+1.66 -3.6	17.9	25.5
Aug. 24	08 48.08	+35 42.1	4.282	3.449	+1.58 -3.6	17.9	30.5
Sept. 3	09 03.55	+35 06.8	4.269	3.502	+1.50 -3.5	18.0	36.0
Sept. 13	09 18.15	+34 33.3	4.242	3.556	+1.41 -3.2	18.0	41.8
Sept. 23	09 31.83	+34 03.2	4.202	3.610	+1.31 -2.8	18.0	48.1
Oct. 3	09 44.51	+33 37.6	4.151	3.664	+1.21 -2.3	18.0	54.6
Oct. 13	09 56.15	+33 18.0	4.089	3.718	+1.10 -1.6	18.0	61.5
Oct. 23	10 06.61	+33 05.6	4.017	3.772	+0.98 -0.8	18.0	68.7
Nov. 2	10 15.81	+33 01.8	3.938	3.826	+0.85 +0.1	18.0	76.3
Nov. 12	10 23.61	+33 07.4	3.853	3.881	+0.70 +1.1	18.0	84.2
Nov. 22	10 29.84	+33 23.2	3.766	3.935	+0.53 +2.2	18.0	92.5
Dec. 2	10 34.36	+33 49.3	3.681	3.989	+0.35 +3.2	17.9	101.1
Dec. 12	10 37.01	+34 25.4	3.600	4.044	+0.16 +4.1	17.9	110.0
Dec. 22	10 37.65	+35 09.9	3.528	4.098	-0.05 +4.8	17.9	119.1
Jan. 1	10 36.21	+36 00.3	3.471	4.152	-0.26 +5.2	17.9	128.3
Jan. 11	10 32.73	+36 52.9	3.432	4.207	-0.46 +5.2	17.9	137.2
Jan. 21	10 27.38	+37 43.3	3.415	4.261	-0.62 +4.7	17.9	145.3
Jan. 31	10 20.54	+38 26.4	3.423	4.315	-0.75 +3.8	17.9	151.5
Feb. 10	10 12.74	+38 58.2	3.460	4.368	-0.81 +2.4	18.0	154.1
Feb. 20	10 04.63	+39 15.2	3.525	4.422	-0.80 +0.8	18.1	152.0
Mar. 1	09 56.91	+39 16.2	3.617	4.476	-0.73 -0.8	18.1	146.3
Mar. 11	09 50.15	+39 01.7	3.736	4.529	-0.60 -2.3	18.2	138.6
Mar. 21	09 44.82	+38 33.1	3.877	4.582	-0.44 -3.5	18.3	130.1
Mar. 31	09 41.15	+37 53.1	4.037	4.635	-0.27 -4.5	18.5	121.3



## Comet 204P/LINEAR-NEAT

Epoch = 2023 June 25.0 TT  
 T = 2022 Nov. 16.88001 TT  
 Peri. = 356.66270 e = 0.4879425  
 Node = 108.49669 2000.0 a = 3.5824147 AU  
 Incl. = 6.59598 n = 0.14535845  
 q = 1.8344023 AU P = 6.78 years

$$m1 = 11.0 + 5 \log(\Delta) + 20.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	10 17.13	+15 01.7	1.065	1.887	+0.34	+5.2	16.4	134.2
Jan. 16	10 18.92	+16 03.4	1.023	1.909	-0.02	+7.2	16.3	144.2
Jan. 26	10 17.23	+17 22.0	0.998	1.935	-0.34	+8.5	16.3	154.8
Feb. 5	10 12.77	+18 47.8	0.995	1.964	-0.56	+8.5	16.3	165.3
Feb. 15	10 06.70	+20 08.6	1.014	1.996	-0.64	+7.3	16.4	172.0
Feb. 25	10 00.49	+21 13.2	1.056	2.031	-0.57	+5.2	16.5	166.2
Mar. 7	09 55.57	+21 54.4	1.122	2.068	-0.38	+2.7	16.8	156.1
Mar. 17	09 52.93	+22 10.1	1.208	2.108	-0.12	+0.2	17.0	146.0
Mar. 27	09 53.01	+22 02.1	1.313	2.149	+0.16	-2.0	17.3	136.4
Apr. 6	09 55.86	+21 33.7	1.434	2.192	+0.43	-3.8	17.6	127.6
Apr. 16	10 01.17	+20 48.8	1.567	2.237	+0.65	-5.3	18.0	119.3
Apr. 26	10 08.57	+19 50.4	1.711	2.283	+0.84	-6.5	18.3	111.7
May 6	10 17.66	+18 41.4	1.863	2.330	+0.99	-7.4	18.7	104.5
May 16	10 28.06	+17 24.0	2.021	2.378	+1.10	-8.1	19.0	97.7
May 26	10 39.47	+15 59.8	2.184	2.427	+1.19	-8.7	19.3	91.2
June 5	10 51.63	+14 30.4	2.350	2.476	+1.25	-9.2	19.7	84.9
June 15	11 04.35	+12 57.0	2.517	2.526	+1.30	-9.5	20.0	78.9
June 25	11 17.48	+11 20.4	2.683	2.576	+1.33	-9.8	20.3	73.0
July 5	11 30.91	+09 41.9	2.848	2.627	+1.35	-9.9	20.6	67.2
July 15	11 44.53	+08 02.0	3.010	2.677	+1.37	-10.0	20.9	61.4
July 25	11 58.31	+06 21.7	3.167	2.728	+1.38	-10.0	21.2	55.8
Aug. 4	12 12.19	+04 41.6	3.319	2.779	+1.39	-10.0	21.5	50.1
Aug. 14	12 26.13	+03 02.3	3.463	2.830	+1.40	-9.9	21.7	44.4
Aug. 24	12 40.12	+01 24.5	3.599	2.880	+1.40	-9.7	22.0	38.7
Sept. 3	12 54.12	+00 11.3	3.725	2.931	+1.40	-9.4	.	33.0
Sept. 13	13 08.11	-01 44.4	3.841	2.981	+1.40	-9.2	.	27.2
Sept. 23	13 22.09	-03 14.5	3.943	3.031	+1.39	-8.8	.	21.4
Oct. 3	13 36.01	-04 40.9	4.033	3.080	+1.39	-8.4	.	15.5
Oct. 13	13 49.85	-06 03.3	4.108	3.130	+1.38	-8.0	.	9.9
Oct. 23	14 03.59	-07 21.0	4.168	3.178	+1.37	-7.5	.	5.4
Nov. 2	14 17.16	-08 33.8	4.211	3.227	+1.35	-7.0	.	6.3
Nov. 12	14 30.54	-09 41.2	4.238	3.275	+1.32	-6.4	.	11.6
Nov. 22	14 43.64	-10 42.8	4.248	3.322	+1.29	-5.8	.	17.9
Dec. 2	14 56.39	-11 38.4	4.241	3.369	+1.25	-5.2	.	24.6
Dec. 12	15 08.72	-12 27.8	4.217	3.416	+1.21	-4.6	.	31.5
Dec. 22	15 20.51	-13 10.7	4.176	3.462	+1.15	-3.9	.	38.6
Jan. 1	15 31.65	-13 47.0	4.119	3.507	+1.07	-3.3	.	46.0
Jan. 11	15 42.02	-14 16.9	4.048	3.552	+0.99	-2.6	.	53.5
Jan. 21	15 51.45	-14 40.3	3.963	3.597	+0.89	-2.0	.	61.3
Jan. 31	15 59.80	-14 57.3	3.868	3.641	+0.77	-1.4	.	69.4
Feb. 10	16 06.91	-15 08.2	3.764	3.684	+0.64	-0.8	.	77.8
Feb. 20	16 12.59	-15 13.3	3.654	3.727	+0.48	-0.2	.	86.5
Mar. 1	16 16.68	-15 13.0	3.542	3.769	+0.32	+0.3	.	95.5
Mar. 11	16 19.04	-15 07.6	3.432	3.811	+0.13	+0.8	.	104.9
Mar. 21	16 19.53	-14 57.6	3.327	3.852	-0.06	+1.2	.	114.7
Mar. 31	16 18.13	-14 43.7	3.233	3.892	-0.24	+1.6	.	124.9

Comet 244P/Scotti

Epoch = 2023 June 25.0 TT  
 T = 2022 Nov. 17.72650 TT  
 Peri. = 93.16575 e = 0.1995006  
 Node = 353.99897 2000.0 a = 4.8976543 AU  
 Incl. = 2.25929 n = 0.09093308  
 q = 3.9205693 AU P = 10.84 years

$$m1 = 3.2 + 5 \log(\Delta) + 20.0 \log(r(t+140))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	06 01.65	+26 23.0	2.967	3.925	-0.64 -0.3	17.6	165.0
Jan. 16	05 55.76	+26 18.9	3.021	3.927	-0.52 -0.5	17.6	153.7
Jan. 26	05 51.23	+26 13.0	3.103	3.930	-0.36 -0.7	17.7	142.5
Feb. 5	05 48.42	+26 06.0	3.207	3.933	-0.18 -0.7	17.8	131.8
Feb. 15	05 47.51	+25 59.0	3.329	3.936	+0.02 -0.7	17.9	121.5
Feb. 25	05 48.53	+25 52.2	3.466	3.939	+0.21 -0.6	18.0	111.6
Mar. 7	05 51.43	+25 46.0	3.612	3.943	+0.39 -0.6	18.1	102.2
Mar. 17	05 56.03	+25 40.1	3.764	3.948	+0.55 -0.6	18.2	93.3
Mar. 27	06 02.16	+25 34.0	3.917	3.952	+0.69 -0.6	18.3	84.7
Apr. 6	06 09.65	+25 27.1	4.068	3.957	+0.81 -0.7	18.4	76.6
Apr. 16	06 18.28	+25 19.0	4.215	3.963	+0.92 -0.9	18.5	68.7
Apr. 26	06 27.90	+25 09.0	4.355	3.968	+1.01 -1.1	18.6	61.1
May 6	06 38.32	+24 56.5	4.486	3.975	+1.08 -1.4	18.7	53.8
May 16	06 49.39	+24 41.2	4.606	3.981	+1.14 -1.7	18.8	46.7
May 26	07 00.99	+24 22.6	4.714	3.988	+1.18 -2.0	18.9	39.7
June 5	07 12.97	+24 00.5	4.809	3.995	+1.22 -2.4	18.9	32.9
June 15	07 25.24	+23 34.9	4.889	4.002	+1.24 -2.8	19.0	26.2
June 25	07 37.70	+23 05.6	4.954	4.010	+1.25 -3.1	19.0	19.5
July 5	07 50.24	+22 32.7	5.002	4.018	+1.26 -3.5	19.1	13.0
July 15	08 02.78	+21 56.5	5.035	4.027	+1.25 -3.8	19.1	6.5
July 25	08 15.25	+21 17.1	5.051	4.035	+1.24 -4.1	19.2	1.5
Aug. 4	08 27.57	+20 34.9	5.049	4.044	+1.22 -4.4	19.2	7.0
Aug. 14	08 39.67	+19 50.4	5.031	4.054	+1.20 -4.6	19.2	13.6
Aug. 24	08 51.48	+19 04.0	4.996	4.063	+1.16 -4.7	19.2	20.3
Sept. 3	09 02.92	+18 16.3	4.945	4.073	+1.12 -4.8	19.2	27.1
Sept. 13	09 13.94	+17 28.0	4.878	4.083	+1.07 -4.8	19.2	34.1
Sept. 23	09 24.44	+16 39.8	4.795	4.094	+1.02 -4.8	19.2	41.2
Oct. 3	09 34.34	+15 52.5	4.699	4.104	+0.95 -4.6	19.2	48.5
Oct. 13	09 43.55	+15 07.0	4.589	4.115	+0.88 -4.4	19.2	56.0
Oct. 23	09 51.95	+14 24.3	4.468	4.126	+0.79 -4.1	19.1	63.8
Nov. 2	09 59.45	+13 45.4	4.339	4.138	+0.69 -3.6	19.1	71.8
Nov. 12	10 05.91	+13 11.3	4.202	4.149	+0.58 -3.1	19.1	80.2
Nov. 22	10 11.19	+12 43.1	4.062	4.161	+0.46 -2.5	19.0	88.9
Dec. 2	10 15.17	+12 21.9	3.921	4.173	+0.32 -1.7	19.0	98.0
Dec. 12	10 17.71	+12 08.4	3.784	4.186	+0.17 -0.9	18.9	107.4
Dec. 22	10 18.70	+12 03.4	3.654	4.198	+0.01 0.0	18.9	117.4
Jan. 1	10 18.11	+12 07.1	3.537	4.211	-0.15 +0.8	18.8	127.7
Jan. 11	10 15.95	+12 19.1	3.437	4.224	-0.30 +1.6	18.8	138.4
Jan. 21	10 12.35	+12 38.4	3.359	4.237	-0.43 +2.3	18.8	149.6
Jan. 31	10 07.58	+13 03.1	3.307	4.250	-0.53 +2.7	18.8	160.9
Feb. 10	10 01.99	+13 30.9	3.284	4.264	-0.59 +2.9	18.8	172.4
Feb. 20	09 56.08	+13 59.2	3.291	4.277	-0.59 +2.7	18.8	175.6
Mar. 1	09 50.36	+14 25.0	3.329	4.291	-0.54 +2.4	18.9	164.3
Mar. 11	09 45.30	+14 46.3	3.396	4.305	-0.45 +1.8	18.9	153.0
Mar. 21	09 41.31	+15 01.4	3.490	4.319	-0.33 +1.1	19.0	142.1
Mar. 31	09 38.66	+15 09.4	3.606	4.333	-0.18 +0.4	19.1	131.5

## Comet 118P/Shoemaker-Levy

Epoch = 2023 June 25.0 TT  
 T = 2022 Nov. 24.36520 TT  
 Peri. = 314.84933 e = 0.4535509  
 Node = 142.09627 2000.0 a = 3.3471449 AU  
 Incl. = 10.09127 n = 0.16095049  
 q = 1.8290443 AU P = 6.12 years

$$m1 = 8.9 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	08 43.46	+09 22.3	0.934	1.865	-0.30 +8.5	12.8	153.1
Jan. 16	08 39.41	+10 58.7	0.918	1.883	-0.51 +10.8	12.8	164.2
Jan. 26	08 33.87	+12 53.5	0.923	1.905	-0.58 +12.0	12.9	173.9
Feb. 5	08 28.40	+14 53.6	0.952	1.930	-0.49 +11.8	13.1	169.4
Feb. 15	08 24.42	+16 45.9	1.005	1.958	-0.27 +10.4	13.3	158.5
Feb. 25	08 22.98	+18 21.1	1.080	1.989	+0.02 +8.3	13.5	147.9
Mar. 7	08 24.59	+19 34.0	1.173	2.022	+0.33 +6.0	13.8	137.9
Mar. 17	08 29.23	+20 23.8	1.282	2.057	+0.62 +3.7	14.1	128.8
Mar. 27	08 36.60	+20 51.6	1.405	2.095	+0.87 +1.6	14.5	120.4
Apr. 6	08 46.29	+20 59.3	1.539	2.134	+1.08 -0.2	14.8	112.7
Apr. 16	08 57.79	+20 49.2	1.680	2.175	+1.23 -1.9	15.1	105.5
Apr. 26	09 10.69	+20 23.6	1.829	2.218	+1.35 -3.3	15.4	98.8
May 6	09 24.62	+19 44.4	1.982	2.261	+1.44 -4.6	15.7	92.4
May 16	09 39.25	+18 53.7	2.139	2.306	+1.49 -5.6	16.0	86.3
May 26	09 54.37	+17 53.0	2.297	2.351	+1.53 -6.5	16.3	80.4
June 5	10 09.79	+16 44.0	2.456	2.397	+1.55 -7.3	16.5	74.7
June 15	10 25.36	+15 28.2	2.614	2.444	+1.56 -7.9	16.8	69.2
June 25	10 41.00	+14 06.9	2.769	2.491	+1.56 -8.4	17.1	63.7
July 5	10 56.63	+12 41.1	2.922	2.539	+1.56 -8.8	17.3	58.3
July 15	11 12.20	+11 12.2	3.070	2.586	+1.55 -9.0	17.5	52.9
July 25	11 27.69	+09 41.0	3.212	2.634	+1.54 -9.2	17.7	47.5
Aug. 4	11 43.08	+08 08.6	3.347	2.682	+1.53 -9.3	18.0	42.1
Aug. 14	11 58.35	+06 35.8	3.474	2.730	+1.52 -9.3	18.1	36.7
Aug. 24	12 13.51	+05 03.4	3.591	2.778	+1.51 -9.2	18.3	31.3
Sept. 3	12 28.54	+03 32.3	3.698	2.825	+1.50 -9.0	18.5	25.9
Sept. 13	12 43.43	+02 03.1	3.794	2.872	+1.48 -8.8	18.7	20.5
Sept. 23	12 58.19	+00 36.6	3.877	2.920	+1.47 -8.5	18.8	15.1
Oct. 3	13 12.80	+00 46.6	3.946	2.966	+1.45 -8.1	19.0	10.1
Oct. 13	13 27.23	-02 05.8	4.001	3.013	+1.43 -7.7	19.1	6.8
Oct. 23	13 41.47	-03 20.4	4.041	3.059	+1.41 -7.2	19.2	7.9
Nov. 2	13 55.46	-04 29.7	4.066	3.104	+1.38 -6.6	19.3	12.6
Nov. 12	14 09.18	-05 33.2	4.074	3.149	+1.35 -6.0	19.4	18.3
Nov. 22	14 22.55	-06 30.5	4.066	3.194	+1.32 -5.4	19.5	24.6
Dec. 2	14 35.50	-07 20.8	4.042	3.238	+1.27 -4.6	19.6	31.2
Dec. 12	14 47.95	-08 04.0	4.002	3.282	+1.21 -3.9	19.7	38.0
Dec. 22	14 59.79	-08 39.5	3.947	3.325	+1.15 -3.1	19.7	45.1
Jan. 1	15 10.89	-09 07.1	3.877	3.368	+1.07 -2.3	19.8	52.4
Jan. 11	15 21.13	-09 26.6	3.795	3.410	+0.97 -1.5	19.8	59.9
Jan. 21	15 30.34	-09 37.8	3.702	3.452	+0.86 -0.7	19.8	67.7
Jan. 31	15 38.36	-09 40.6	3.600	3.493	+0.73 +0.2	19.8	75.8
Feb. 10	15 45.03	-09 35.2	3.492	3.533	+0.58 +1.0	19.8	84.3
Feb. 20	15 50.14	-09 21.8	3.381	3.573	+0.42 +1.8	19.8	93.0
Mar. 1	15 53.55	-09 00.9	3.271	3.612	+0.24 +2.5	19.8	102.2
Mar. 11	15 55.11	-08 33.1	3.165	3.651	+0.05 +3.1	19.8	111.6
Mar. 21	15 54.72	-07 59.5	3.069	3.689	-0.15 +3.6	19.8	121.5
Mar. 31	15 52.40	-07 21.6	2.987	3.726	-0.34 +4.0	19.8	131.6

## Comet C/2022 P1 (NEOWISE)

Epoch = 2023 June 25.0 TT  
 T = 2022 Nov. 28.49093 TT  
 Peri. = 249.94341 e = 0.9134578  
 Node = 205.08232 2000.0 a = 18.4330188 AU  
 Incl. = 154.60668 n = 0.01245401  
 q = 1.5952340 AU P = 79.14 years

$$m1 = 1.0 + 5 \log(\Delta) + 40.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m			°
Jan. 6	19 27.00	-38° 05' 6"	2.593	1.671	-0.05	+0.5	12.0	16.2
Jan. 16	19 26.54	-38 04.2	2.625	1.714	-0.05	-0.4	12.5	17.7
Jan. 26	19 25.84	-38 12.1	2.618	1.764	-0.10	-1.4	13.0	24.0
Feb. 5	19 24.35	-38 30.6	2.574	1.822	-0.21	-2.5	13.5	32.5
Feb. 15	19 21.46	-39 00.8	2.497	1.885	-0.39	-3.7	14.0	42.2
Feb. 25	19 16.38	-39 44.4	2.389	1.954	-0.67	-5.2	14.5	52.6
Mar. 7	19 08.01	-40 42.8	2.259	2.027	-1.07	-6.7	15.0	63.8
Mar. 17	18 54.91	-41 55.6	2.112	2.103	-1.64	-8.0	15.5	75.9
Mar. 27	18 35.06	-43 18.5	1.959	2.183	-2.45	-8.4	16.0	89.0
Apr. 6	18 06.08	-44 37.5	1.813	2.265	-3.48	-6.7	16.5	103.5
Apr. 16	17 26.14	-45 22.9	1.690	2.349	-4.60	-1.0	17.0	119.3
Apr. 26	16 36.28	-44 48.8	1.609	2.435	-5.33	+9.5	17.5	136.0
May 6	15 42.80	-42 18.2	1.589	2.522	-5.19	+21.5	18.1	151.6
May 16	14 54.52	-38 02.4	1.639	2.610	-4.29	+29.3	18.7	159.5
May 26	14 16.80	-32 58.8	1.760	2.699	-3.15	+30.5	19.5	152.4
June 5	13 50.02	-28 07.1	1.940	2.788	-2.15	+27.0	20.2	139.2
June 15	13 32.10	-23 59.1	2.164	2.877	-1.40	+22.0	21.0	125.7
June 25	13 20.76	-20 42.3	2.418	2.967	-0.85	+17.0	21.8	113.1
July 5	13 14.15	-18 12.1	2.689	3.057	-0.46	+12.8	.	101.4
July 15	13 10.92	-16 20.2	2.968	3.147	-0.17	+9.4	.	90.6
July 25	13 10.17	-14 58.6	3.247	3.237	+0.03	+6.8	.	80.4
Aug. 4	13 11.22	-14 00.6	3.520	3.327	+0.18	+4.7	.	70.8
Aug. 14	13 13.60	-13 20.5	3.781	3.416	+0.30	+3.2	.	61.5
Aug. 24	13 16.98	-12 54.4	4.028	3.505	+0.38	+2.0	.	52.5
Sept. 3	13 21.08	-12 38.7	4.256	3.594	+0.44	+1.1	.	43.7
Sept. 13	13 25.71	-12 30.9	4.462	3.683	+0.48	+0.4	.	35.0
Sept. 23	13 30.69	-12 28.8	4.644	3.771	+0.51	0.0	.	26.3
Oct. 3	13 35.87	-12 30.7	4.800	3.858	+0.52	-0.3	.	17.7
Oct. 13	13 41.12	-12 35.1	4.928	3.946	+0.52	-0.5	.	9.1
Oct. 23	13 46.32	-12 40.7	5.027	4.033	+0.51	-0.6	.	1.6
Nov. 2	13 51.33	-12 46.2	5.098	4.119	+0.49	-0.5	.	8.7
Nov. 12	13 56.05	-12 50.7	5.139	4.205	+0.45	-0.3	.	17.5
Nov. 22	14 00.33	-12 53.0	5.151	4.291	+0.40	-0.1	.	26.6
Dec. 2	14 04.02	-12 52.2	5.136	4.376	+0.33	+0.3	.	35.9
Dec. 12	14 07.00	-12 47.2	5.097	4.460	+0.25	+0.8	.	45.4
Dec. 22	14 09.09	-12 37.1	5.035	4.545	+0.15	+1.3	.	55.1
Jan. 1	14 10.13	-12 20.8	4.954	4.628	+0.04	+2.0	.	65.2
Jan. 11	14 09.97	-11 57.3	4.860	4.712	-0.09	+2.8	.	75.5
Jan. 21	14 08.44	-11 25.6	4.757	4.794	-0.23	+3.7	.	86.2
Jan. 31	14 05.43	-10 44.8	4.652	4.877	-0.39	+4.6	.	97.3
Feb. 10	14 00.87	-09 54.5	4.552	4.958	-0.54	+5.6	.	108.8
Feb. 20	13 54.73	-08 54.4	4.464	5.040	-0.70	+6.5	.	120.6
Mar. 1	13 47.14	-07 45.2	4.395	5.121	-0.83	+7.4	.	132.8
Mar. 11	13 38.29	-06 28.3	4.354	5.201	-0.94	+8.0	.	145.3
Mar. 21	13 28.52	-05 06.1	4.345	5.281	-1.01	+8.4	.	157.8
Mar. 31	13 18.27	-03 42.0	4.374	5.361	-1.03	+8.4	.	170.0

Comet 81P/Wild

Epoch = 2023 June 25.0 TT  
 T = 2022 Dec. 15.60510 TT  
 Peri. = 41.62219 e = 0.5372378  
 Node = 136.09558 2000.0 a = 3.4539474 AU  
 Incl. = 3.23665 n = 0.15354317  
 q = 1.5983563 AU P = 6.42 years

$$m1 = 4.0 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	14 45.59	-13 33.2	1.821	1.612	+2.70 -10.6	11.0	62.0
Jan. 16	15 12.29	-15 11.4	1.769	1.629	+2.63 -8.8	11.1	65.5
Jan. 26	15 38.11	-16 31.4	1.717	1.650	+2.52 -7.0	11.2	69.3
Feb. 5	16 02.71	-17 33.1	1.666	1.677	+2.38 -5.2	11.3	73.5
Feb. 15	16 25.74	-18 17.3	1.614	1.709	+2.20 -3.5	11.4	78.1
Feb. 25	16 46.83	-18 45.5	1.561	1.746	+1.99 -2.0	11.6	83.1
Mar. 7	17 05.58	-19 00.1	1.507	1.786	+1.73 -0.8	11.8	88.7
Mar. 17	17 21.65	-19 03.8	1.453	1.830	+1.44 +0.1	12.0	94.9
Mar. 27	17 34.63	-18 59.6	1.400	1.877	+1.11 +0.7	12.2	101.7
Apr. 6	17 44.16	-18 50.5	1.348	1.926	+0.75 +1.1	12.5	109.3
Apr. 16	17 49.97	-18 39.5	1.300	1.978	+0.37 +1.1	12.7	117.7
Apr. 26	17 51.83	-18 28.8	1.260	2.031	-0.03 +1.0	13.0	127.0
May 6	17 49.79	-18 20.4	1.231	2.086	-0.41 +0.7	13.2	137.1
May 16	17 44.22	-18 15.3	1.217	2.142	-0.73 +0.3	13.5	148.0
May 26	17 35.91	-18 13.5	1.222	2.199	-0.94 0.0	13.8	159.3
June 5	17 26.10	-18 15.2	1.250	2.257	-1.01 -0.4	14.2	170.5
June 15	17 16.19	-18 20.2	1.303	2.316	-0.95 -0.7	14.6	174.0
June 25	17 07.45	-18 28.8	1.381	2.374	-0.77 -1.1	15.0	164.0
July 5	17 00.89	-18 41.2	1.482	2.433	-0.52 -1.5	15.5	153.3
July 15	16 56.95	-18 57.5	1.604	2.492	-0.24 -1.8	15.9	143.0
July 25	16 55.79	-19 17.3	1.745	2.551	+0.03 -2.1	16.4	133.2
Aug. 4	16 57.29	-19 39.7	1.902	2.610	+0.28 -2.3	16.9	124.1
Aug. 14	17 01.14	-20 03.7	2.071	2.668	+0.50 -2.4	17.3	115.5
Aug. 24	17 07.08	-20 28.1	2.249	2.726	+0.70 -2.4	17.7	107.3
Sept. 3	17 14.78	-20 51.8	2.434	2.784	+0.86 -2.3	18.2	99.5
Sept. 13	17 23.96	-21 13.6	2.623	2.841	+0.99 -2.0	18.6	92.0
Sept. 23	17 34.37	-21 32.7	2.814	2.898	+1.10 -1.7	19.0	84.6
Oct. 3	17 45.79	-21 48.1	3.005	2.954	+1.19 -1.3	19.3	77.5
Oct. 13	17 58.02	-21 59.3	3.193	3.010	+1.26 -0.9	19.7	70.5
Oct. 23	18 10.91	-22 05.7	3.376	3.065	+1.32 -0.4	20.0	63.5
Nov. 2	18 24.29	-22 06.9	3.553	3.120	+1.36 +0.2	20.3	56.7
Nov. 12	18 38.04	-22 02.8	3.721	3.174	+1.39 +0.7	20.6	49.8
Nov. 22	18 52.04	-21 53.2	3.878	3.227	+1.41 +1.3	20.9	43.0
Dec. 2	19 06.16	-21 38.1	4.023	3.279	+1.42 +1.8	21.2	36.2
Dec. 12	19 20.31	-21 17.8	4.154	3.331	+1.41 +2.3	21.5	29.3
Dec. 22	19 34.41	-20 52.5	4.270	3.382	+1.40 +2.8	21.7	22.5
Jan. 1	19 48.34	-20 22.5	4.369	3.432	+1.38 +3.2	21.9	15.6
Jan. 11	20 02.05	-19 48.3	4.451	3.482	+1.36 +3.6	.	8.7
Jan. 21	20 15.45	-19 10.5	4.514	3.531	+1.32 +4.0	.	1.8
Jan. 31	20 28.47	-18 29.8	4.559	3.579	+1.28 +4.2	.	5.4
Feb. 10	20 41.04	-17 46.7	4.584	3.627	+1.23 +4.4	.	12.4
Feb. 20	20 53.10	-17 02.2	4.590	3.674	+1.17 +4.5	.	19.6
Mar. 1	21 04.58	-16 16.8	4.578	3.720	+1.11 +4.5	.	26.8
Mar. 11	21 15.42	-15 31.6	4.547	3.765	+1.05 +4.5	.	34.1
Mar. 21	21 25.53	-14 47.4	4.498	3.810	+0.97 +4.3	.	41.5
Mar. 31	21 34.85	-14 05.0	4.434	3.854	+0.89 +4.1	.	49.0

## Comet C/2017 K2 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2022 Dec. 19.67086 TT  
 Peri. = 236.18456  
 Node = 88.23551 2000.0  
 Incl. = 87.56373  
 q = 1.7971261 AU  
 e = 1.0012951

$$m1 = 4.3 + 5 \log(\Delta) + 7.5 \log(r) \quad (\text{vis})$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	19 15.59	-66 49.2	2.380	1.811	+5.96	-19.9	8.1	44.3
Jan. 16	20 24.57	-69 39.5	2.321	1.831	+8.07	-12.5	8.1	48.9
Jan. 26	21 53.17	-70 48.6	2.272	1.860	+9.52	+0.8	8.1	53.3
Feb. 5	23 27.16	-69 28.8	2.238	1.896	+8.84	+16.5	8.1	57.3
Feb. 15	00 46.80	-65 44.8	2.227	1.940	+6.83	+28.6	8.2	60.4
Feb. 25	01 46.46	-60 25.3	2.243	1.991	+5.01	+35.1	8.3	62.5
Mar. 7	02 30.58	-54 20.9	2.288	2.048	+3.77	+37.4	8.4	63.5
Mar. 17	03 04.46	-48 07.9	2.362	2.110	+2.98	+36.8	8.6	63.2
Mar. 27	03 31.78	-42 09.6	2.462	2.176	+2.47	+34.4	8.8	61.8
Apr. 6	03 54.75	-36 39.9	2.582	2.247	+2.11	+31.1	9.0	59.5
Apr. 16	04 14.72	-31 45.2	2.718	2.322	+1.87	+27.5	9.2	56.6
Apr. 26	04 32.55	-27 27.1	2.863	2.399	+1.69	+23.8	9.4	53.1
May 6	04 48.75	-23 44.7	3.013	2.479	+1.54	+20.4	9.7	49.5
May 16	05 03.66	-20 35.1	3.161	2.561	+1.43	+17.3	9.9	45.8
May 26	05 17.50	-17 55.2	3.303	2.645	+1.33	+14.5	10.1	42.4
June 5	05 30.38	-15 41.6	3.437	2.730	+1.24	+12.0	10.3	39.4
June 15	05 42.40	-13 51.1	3.558	2.817	+1.16	+9.9	10.4	37.2
June 25	05 53.60	-12 21.0	3.664	2.905	+1.07	+8.0	10.6	36.1
July 5	06 03.96	-11 08.7	3.754	2.993	+0.99	+6.3	10.7	36.1
July 15	06 13.48	-10 11.8	3.825	3.083	+0.90	+4.9	10.9	37.6
July 25	06 22.12	-09 28.5	3.877	3.172	+0.81	+3.7	11.0	40.4
Aug. 4	06 29.80	-08 56.9	3.910	3.263	+0.71	+2.6	11.1	44.4
Aug. 14	06 36.45	-08 35.2	3.924	3.353	+0.60	+1.7	11.2	49.4
Aug. 24	06 41.97	-08 22.0	3.919	3.444	+0.48	+0.9	11.3	55.2
Sept. 3	06 46.23	-08 15.4	3.897	3.535	+0.35	+0.4	11.4	61.8
Sept. 13	06 49.09	-08 13.9	3.860	3.625	+0.20	0.0	11.4	69.1
Sept. 23	06 50.42	-08 15.4	3.811	3.716	+0.04	-0.2	11.5	77.0
Oct. 3	06 50.05	-08 17.9	3.753	3.807	-0.13	-0.2	11.5	85.5
Oct. 13	06 47.87	-08 19.1	3.691	3.898	-0.32	+0.1	11.6	94.4
Oct. 23	06 43.78	-08 16.2	3.630	3.988	-0.52	+0.6	11.6	103.9
Nov. 2	06 37.77	-08 06.5	3.577	4.078	-0.70	+1.5	11.6	113.7
Nov. 12	06 29.95	-07 47.3	3.537	4.168	-0.87	+2.6	11.7	123.7
Nov. 22	06 20.55	-07 16.0	3.517	4.258	-1.01	+3.9	11.8	133.5
Dec. 2	06 10.02	-06 31.2	3.524	4.348	-1.10	+5.2	11.8	142.5
Dec. 12	05 58.89	-05 32.7	3.561	4.437	-1.12	+6.6	11.9	149.4
Dec. 22	05 47.78	-04 21.5	3.633	4.526	-1.08	+7.7	12.0	152.1
Jan. 1	05 37.33	-03 00.3	3.741	4.615	-0.99	+8.6	12.1	149.5
Jan. 11	05 28.02	-01 32.3	3.882	4.703	-0.85	+9.0	12.3	142.8
Jan. 21	05 20.23	+00 00.8	4.055	4.791	-0.69	+9.2	12.4	134.1
Jan. 31	05 14.15	+01 31.1	4.254	4.879	-0.51	+9.1	12.6	124.5
Feb. 10	05 09.83	+03 01.0	4.474	4.967	-0.34	+8.8	12.8	114.6
Feb. 20	05 07.20	+04 27.3	4.710	5.054	-0.17	+8.4	12.9	104.8
Mar. 1	05 06.15	+05 48.8	4.955	5.141	-0.03	+7.9	13.1	95.2
Mar. 11	05 06.50	+07 05.1	5.205	5.227	+0.11	+7.3	13.3	85.8
Mar. 21	05 08.08	+08 15.7	5.454	5.313	+0.22	+6.8	13.4	76.6
Mar. 31	05 10.69	+09 20.7	5.698	5.399	+0.31	+6.2	13.6	67.7

## Comet P/2022 02 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 7.06133 TT  
 Peri. = 48.62845 e = 0.7215102  
 Node = 330.48878 2000.0 a = 6.3081585 AU  
 Incl. = 9.42447 n = 0.06220856  
 q = 1.7567578 AU P = 15.84 years

$$m1 = 15.2 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	23 06.10	+01 00.3	1.967	1.757	+2.36 +17.1	19.1	63.1
Jan. 16	23 30.02	+03 52.4	2.039	1.760	+2.43 +17.3	19.2	59.6
Jan. 26	23 54.54	+06 46.2	2.115	1.769	+2.48 +17.4	19.3	56.3
Feb. 5	00 19.56	+09 38.6	2.195	1.785	+2.53 +17.0	19.4	53.1
Feb. 15	00 44.98	+12 26.5	2.279	1.808	+2.56 +16.4	19.6	49.9
Feb. 25	01 10.74	+15 07.2	2.369	1.837	+2.59 +15.6	19.7	46.7
Mar. 7	01 36.76	+17 37.8	2.462	1.871	+2.61 +14.4	19.9	43.5
Mar. 17	02 02.94	+19 56.2	2.560	1.911	+2.63 +13.1	20.1	40.2
Mar. 27	02 29.23	+22 00.7	2.660	1.955	+2.63 +11.6	20.2	36.8
Apr. 6	02 55.50	+23 50.0	2.762	2.004	+2.62 +10.0	20.4	33.4
Apr. 16	03 21.64	+25 23.1	2.865	2.056	+2.60 +8.4	20.6	29.8
Apr. 26	03 47.54	+26 40.0	2.968	2.112	+2.57 +6.8	20.8	26.1
May 6	04 13.08	+27 40.6	3.069	2.171	+2.53 +5.2	21.0	22.4
May 16	04 38.13	+28 25.5	3.167	2.232	+2.47 +3.7	21.2	18.5
May 26	05 02.58	+28 55.4	3.261	2.295	+2.41 +2.2	21.4	14.5
June 5	05 26.32	+29 11.5	3.349	2.360	+2.33 +0.9	21.6	10.6
June 15	05 49.25	+29 15.0	3.430	2.426	+2.25 -0.3	21.7	7.2
June 25	06 11.31	+29 07.2	3.503	2.494	+2.15 -1.3	21.9	5.7
July 5	06 32.42	+28 49.5	3.566	2.562	+2.06 -2.3	22.0	7.7
July 15	06 52.54	+28 23.4	3.619	2.632	+1.96 -3.0	.	11.7
July 25	07 11.65	+27 50.4	3.660	2.702	+1.85 -3.6	.	16.5
Aug. 4	07 29.68	+27 11.9	3.689	2.772	+1.74 -4.1	.	21.8
Aug. 14	07 46.64	+26 29.3	3.705	2.843	+1.64 -4.4	.	27.3
Aug. 24	08 02.49	+25 44.0	3.708	2.915	+1.52 -4.6	.	33.2
Sept. 3	08 17.19	+24 57.3	3.697	2.986	+1.41 -4.7	.	39.4
Sept. 13	08 30.71	+24 10.7	3.672	3.057	+1.28 -4.6	.	45.8
Sept. 23	08 42.97	+23 25.4	3.635	3.129	+1.16 -4.4	.	52.6
Oct. 3	08 53.92	+22 42.7	3.585	3.200	+1.02 -4.1	.	59.7
Oct. 13	09 03.47	+22 04.0	3.524	3.271	+0.87 -3.6	.	67.3
Oct. 23	09 11.49	+21 30.5	3.454	3.342	+0.71 -3.0	.	75.2
Nov. 2	09 17.87	+21 03.5	3.378	3.412	+0.54 -2.3	.	83.6
Nov. 12	09 22.47	+20 43.9	3.297	3.483	+0.36 -1.5	.	92.5
Nov. 22	09 25.15	+20 32.6	3.216	3.553	+0.16 -0.7	.	101.8
Dec. 2	09 25.81	+20 30.0	3.139	3.622	-0.05 +0.2	.	111.8
Dec. 12	09 24.39	+20 35.9	3.072	3.692	-0.26 +1.0	.	122.2
Dec. 22	09 20.91	+20 49.2	3.019	3.761	-0.45 +1.7	.	133.2
Jan. 1	09 15.58	+21 08.1	2.985	3.829	-0.62 +2.1	.	144.5
Jan. 11	09 08.73	+21 30.1	2.977	3.897	-0.75 +2.3	.	156.2
Jan. 21	09 00.88	+21 52.3	2.998	3.965	-0.82 +2.1	.	167.8
Jan. 31	08 52.67	+22 11.8	3.049	4.032	-0.82 +1.7	.	175.5
Feb. 10	08 44.75	+22 26.4	3.133	4.099	-0.75 +1.1	.	166.6
Feb. 20	08 37.75	+22 34.8	3.247	4.165	-0.63 +0.5	.	155.2
Mar. 1	08 32.10	+22 36.7	3.389	4.231	-0.48 -0.2	.	144.0
Mar. 11	08 28.10	+22 32.3	3.555	4.296	-0.31 -0.8	.	133.2
Mar. 21	08 25.84	+22 22.3	3.740	4.361	-0.13 -1.3	.	122.8
Mar. 31	08 25.30	+22 07.5	3.940	4.425	+0.04 -1.7	.	112.9

Comet 285P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 12.22142 TT  
 Peri. = 178.39374 e = 0.6187180  
 Node = 185.50548 2000.0 a = 4.5090067 AU  
 Incl. = 25.03764 n = 0.10293966  
 q = 1.7192031 AU P = 9.57 years

$$m1 = 12.4 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	22 24.71	-08° 06.9	2.180	1.720	+2.73 +3.7	16.4	49.9
Jan. 16	22 52.09	-07 23.1	2.246	1.720	+2.74 +5.2	16.5	46.3
Jan. 26	23 19.46	-06 25.7	2.313	1.725	+2.73 +6.4	16.6	42.8
Feb. 5	23 46.68	-05 17.6	2.382	1.737	+2.71 +7.3	16.7	39.4
Feb. 15	00 13.65	-04 01.9	2.452	1.754	+2.68 +7.9	16.8	36.1
Feb. 25	00 40.32	-02 41.5	2.524	1.777	+2.65 +8.2	16.9	33.0
Mar. 7	01 06.61	-01 19.4	2.596	1.805	+2.61 +8.2	17.0	29.9
Mar. 17	01 32.51	+00 01.8	2.668	1.839	+2.57 +8.0	17.2	27.0
Mar. 27	01 58.00	+01 19.6	2.741	1.876	+2.53 +7.5	17.3	24.2
Apr. 6	02 23.05	+02 31.8	2.812	1.918	+2.48 +6.8	17.5	21.6
Apr. 16	02 47.63	+03 36.8	2.883	1.964	+2.43 +6.0	17.6	19.2
Apr. 26	03 11.73	+04 33.1	2.951	2.012	+2.38 +5.1	17.8	17.2
May 6	03 35.29	+05 19.5	3.017	2.064	+2.33 +4.1	17.9	15.7
May 16	03 58.29	+05 55.3	3.079	2.118	+2.27 +3.0	18.1	14.8
May 26	04 20.69	+06 19.9	3.136	2.174	+2.20 +1.8	18.3	14.9
June 5	04 42.43	+06 33.2	3.189	2.231	+2.14 +0.7	18.4	16.0
June 15	05 03.46	+06 35.2	3.235	2.290	+2.06 -0.4	18.5	18.0
June 25	05 23.73	+06 26.2	3.274	2.351	+1.98 -1.5	18.7	20.6
July 5	05 43.19	+06 06.4	3.306	2.412	+1.90 -2.5	18.8	23.9
July 15	06 01.78	+05 36.5	3.329	2.474	+1.81 -3.5	18.9	27.7
July 25	06 19.46	+04 57.1	3.343	2.537	+1.71 -4.4	19.1	31.8
Aug. 4	06 36.16	+04 08.9	3.348	2.600	+1.61 -5.3	19.2	36.3
Aug. 14	06 51.83	+03 12.8	3.342	2.664	+1.51 -6.0	19.3	41.1
Aug. 24	07 06.40	+02 09.5	3.326	2.728	+1.39 -6.7	19.4	46.3
Sept. 3	07 19.79	+01 00.1	3.301	2.791	+1.27 -7.2	19.5	51.8
Sept. 13	07 31.93	+00 14.5	3.265	2.855	+1.14 -7.7	19.5	57.6
Sept. 23	07 42.69	-01 33.1	3.220	2.919	+1.00 -8.0	19.6	63.8
Oct. 3	07 51.98	-02 54.5	3.166	2.982	+0.84 -8.2	19.6	70.3
Oct. 13	07 59.66	-04 17.1	3.106	3.046	+0.67 -8.3	19.7	77.3
Oct. 23	08 05.58	-05 39.3	3.041	3.109	+0.49 -8.1	19.7	84.6
Nov. 2	08 09.60	-06 58.8	2.973	3.171	+0.29 -7.7	19.8	92.3
Nov. 12	08 11.61	-08 13.1	2.906	3.234	+0.08 -7.0	19.8	100.4
Nov. 22	08 11.50	-09 19.1	2.842	3.296	-0.13 -6.0	19.8	108.8
Dec. 2	08 09.27	-10 13.4	2.787	3.357	-0.34 -4.7	19.9	117.4
Dec. 12	08 05.05	-10 52.5	2.744	3.418	-0.52 -2.9	19.9	126.1
Dec. 22	07 59.10	-11 13.0	2.719	3.479	-0.67 -0.9	20.0	134.4
Jan. 1	07 51.90	-11 12.6	2.714	3.539	-0.77 +1.2	20.1	141.7
Jan. 11	07 44.05	-10 50.7	2.735	3.599	-0.80 +3.3	20.1	146.9
Jan. 21	07 36.23	-10 08.6	2.781	3.658	-0.75 +5.2	20.3	148.7
Jan. 31	07 29.11	-09 09.6	2.855	3.716	-0.65 +6.7	20.4	146.4
Feb. 10	07 23.22	-07 58.3	2.956	3.774	-0.51 +7.6	20.5	141.0
Feb. 20	07 18.94	-06 39.8	3.081	3.832	-0.33 +8.0	20.7	133.8
Mar. 1	07 16.45	-05 19.1	3.227	3.889	-0.15 +8.0	20.8	125.6
Mar. 11	07 15.78	-04 00.2	3.391	3.945	+0.03 +7.7	21.0	117.2
Mar. 21	07 16.86	-02 46.0	3.569	4.001	+0.20 +7.1	21.2	108.7
Mar. 31	07 19.52	-01 38.7	3.755	4.056	+0.35 +6.3	21.4	100.4



## Comet C/2022 E3 (ZTF)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 12.78483 TT  
 Peri. = 145.82119  
 Node = 302.55604 2000.0  
 Incl. = 109.16857  
 q = 1.1122965 AU  
 e = 1.0002580

$$m1 = 6.9 + 5 \log(\Delta) + 10.0 \log(r) \quad (\text{vis})$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° '			m		°
Jan. 6	15 51.75	+33 36.7	0.900	1.118	-0.38 +37.0	7.2	72.7
Jan. 16	15 44.21	+42 34.6	0.616	1.114	-1.56 +84.0	6.3	84.9
Jan. 26	14 53.30	+65 54.9	0.361	1.133	-20.52 233.3	5.2	105.0
Feb. 5	05 17.15	+51 59.3	0.304	1.174	-8.58 326.3	5.0	121.7
Feb. 15	04 42.14	+16 26.8	0.523	1.235	-0.92 110.1	6.4	105.5
Feb. 25	04 38.09	+04 04.3	0.817	1.311	0.00 -45.0	7.6	92.6
Mar. 7	04 39.75	-01 33.0	1.118	1.399	+0.32 -23.7	8.6	82.9
Mar. 17	04 43.80	-04 43.9	1.411	1.497	+0.49 -14.7	9.4	74.7
Mar. 27	04 49.28	-06 49.7	1.689	1.600	+0.61 -10.5	10.1	67.5
Apr. 6	04 55.73	-08 24.0	1.950	1.708	+0.69 -8.4	10.7	61.1
Apr. 16	05 02.87	-09 43.0	2.190	1.820	+0.75 -7.4	11.2	55.4
Apr. 26	05 10.54	-10 55.7	2.410	1.933	+0.79 -7.2	11.7	50.5
May 6	05 18.58	-12 08.0	2.607	2.048	+0.82 -7.4	12.1	46.5
May 16	05 26.85	-13 23.5	2.782	2.163	+0.84 -7.8	12.5	43.5
May 26	05 35.27	-14 45.0	2.935	2.278	+0.84 -8.6	12.8	41.6
June 5	05 43.70	-16 14.6	3.066	2.393	+0.84 -9.5	13.1	40.9
June 15	05 52.05	-17 53.8	3.177	2.508	+0.83 -10.5	13.4	41.5
June 25	06 00.21	-19 44.1	3.269	2.622	+0.80 -11.7	13.7	43.2
July 5	06 08.06	-21 46.6	3.343	2.736	+0.76 -12.9	13.9	46.0
July 15	06 15.46	-24 02.0	3.401	2.849	+0.71 -14.3	14.1	49.6
July 25	06 22.28	-26 31.2	3.445	2.961	+0.64 -15.7	14.3	53.8
Aug. 4	06 28.33	-29 14.1	3.479	3.072	+0.56 -17.0	14.5	58.5
Aug. 14	06 33.41	-32 10.7	3.505	3.183	+0.45 -18.4	14.7	63.4
Aug. 24	06 37.26	-35 20.1	3.526	3.292	+0.31 -19.6	14.8	68.5
Sept. 3	06 39.56	-38 40.7	3.546	3.401	+0.13 -20.6	15.0	73.6
Sept. 13	06 39.94	-42 09.7	3.568	3.509	-0.09 -21.2	15.1	78.5
Sept. 23	06 37.90	-45 43.5	3.595	3.616	-0.36 -21.4	15.3	83.2
Oct. 3	06 32.90	-49 16.4	3.631	3.722	-0.69 -21.0	15.4	87.4
Oct. 13	06 24.31	-52 41.8	3.678	3.827	-1.08 -19.8	15.6	91.0
Oct. 23	06 11.52	-55 51.3	3.739	3.931	-1.53 -17.7	15.7	93.7
Nov. 2	05 54.14	-58 35.4	3.815	4.035	-1.99 -14.7	15.9	95.6
Nov. 12	05 32.33	-60 44.9	3.907	4.138	-2.40 -10.7	16.0	96.5
Nov. 22	05 07.08	-62 12.0	4.015	4.240	-2.64 -6.2	16.2	96.3
Dec. 2	04 40.36	-62 52.9	4.138	4.341	-2.66 -1.6	16.4	95.3
Dec. 12	04 14.57	-62 49.4	4.273	4.441	-2.44 +2.6	16.5	93.4
Dec. 22	03 51.82	-62 08.1	4.419	4.541	-2.05 +5.9	16.7	90.8
Jan. 1	03 33.32	-60 58.4	4.573	4.639	-1.60 +8.1	16.9	87.7
Jan. 11	03 19.36	-59 30.1	4.733	4.738	-1.15 +9.5	17.0	84.3
Jan. 21	03 09.65	-57 51.6	4.895	4.835	-0.76 +10.1	17.2	80.7
Jan. 31	03 03.60	-56 09.6	5.057	4.932	-0.43 +10.2	17.3	77.1
Feb. 10	03 00.57	-54 28.9	5.215	5.028	-0.16 +9.8	17.5	73.7
Feb. 20	02 59.98	-52 53.1	5.369	5.123	+0.05 +9.2	17.6	70.4
Mar. 1	03 01.32	-51 24.8	5.515	5.218	+0.22 +8.4	17.8	67.6
Mar. 11	03 04.19	-50 05.5	5.652	5.312	+0.36 +7.4	17.9	65.2
Mar. 21	03 08.26	-48 56.5	5.779	5.406	+0.46 +6.3	18.0	63.3
Mar. 31	03 13.24	-47 58.7	5.894	5.499	+0.54 +5.1	18.2	62.1

Comet C/2022 U2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 14.22513 TT  
 Peri. = 147.91375  
 Node = 304.47387 2000.0  
 Incl. = 48.24934  
 q = 1.3280679 AU  
 e = 0.9862594

$$m1 = 6.8 + 5 \log(\Delta) + 35.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	22 38.79	+77 27.4	0.684	1.334	+19.13	+7.6	10.4	104.8
Jan. 16	02 01.11	+74 19.2	0.606	1.328	+16.64	-54.0	10.0	111.1
Jan. 26	03 59.31	+61 49.8	0.566	1.339	+7.34	-93.5	10.0	117.0
Feb. 5	04 54.55	+45 29.2	0.580	1.367	+3.94	-98.1	10.4	119.3
Feb. 15	05 27.31	+30 17.9	0.651	1.408	+2.66	-80.4	11.1	117.0
Feb. 25	05 51.12	+18 34.8	0.769	1.463	+2.11	-58.5	12.0	112.0
Mar. 7	06 10.90	+10 12.0	0.916	1.529	+1.85	-41.3	13.1	106.5
Mar. 17	06 28.69	+04 15.1	1.081	1.604	+1.71	-29.7	14.2	101.1
Mar. 27	06 45.50	+00 04.8	1.258	1.687	+1.65	-22.1	15.2	96.1
Apr. 6	07 01.83	-03 22.0	1.441	1.775	+1.62	-17.2	16.3	91.4
Apr. 16	07 17.90	-05 58.8	1.629	1.868	+1.60	-14.1	17.4	87.0
Apr. 26	07 33.87	-08 09.8	1.818	1.964	+1.59	-12.1	18.4	82.8
May 6	07 49.76	-10 04.8	2.008	2.063	+1.58	-10.9	19.3	78.7
May 16	08 05.58	-11 50.2	2.198	2.165	+1.58	-10.2	20.2	74.8
May 26	08 21.34	-13 30.2	2.386	2.267	+1.57	-9.8	21.1	70.9
June 5	08 37.00	-15 08.1	2.572	2.370	+1.56	-9.7	22.0	67.1
June 15	08 52.55	-16 45.5	2.756	2.474	+1.55	-9.8	.	63.4
June 25	09 07.97	-18 23.9	2.936	2.579	+1.53	-9.9	.	59.8
July 5	09 23.22	-20 04.1	3.111	2.683	+1.52	-10.1	.	56.3
July 15	09 38.30	-21 46.6	3.282	2.788	+1.50	-10.4	.	52.8
July 25	09 53.19	-23 31.6	3.446	2.892	+1.48	-10.7	.	49.5
Aug. 4	10 07.87	-25 19.4	3.604	2.996	+1.46	-10.9	.	46.4
Aug. 14	10 22.32	-27 09.6	3.755	3.099	+1.43	-11.2	.	43.5
Aug. 24	10 36.54	-29 02.5	3.897	3.202	+1.41	-11.4	.	40.9
Sept. 3	10 50.49	-30 57.7	4.030	3.305	+1.38	-11.6	.	38.8
Sept. 13	11 04.17	-32 55.1	4.153	3.407	+1.35	-11.9	.	37.3
Sept. 23	11 17.53	-34 54.5	4.265	3.508	+1.32	-12.0	.	36.4
Oct. 3	11 30.55	-36 55.6	4.366	3.609	+1.28	-12.2	.	36.3
Oct. 13	11 43.18	-38 58.2	4.456	3.709	+1.24	-12.3	.	37.1
Oct. 23	11 55.35	-41 02.0	4.533	3.809	+1.19	-12.4	.	38.8
Nov. 2	12 06.98	-43 06.6	4.598	3.907	+1.13	-12.5	.	41.3
Nov. 12	12 17.98	-45 11.9	4.650	4.006	+1.06	-12.5	.	44.6
Nov. 22	12 28.22	-47 17.4	4.690	4.103	+0.98	-12.5	.	48.5
Dec. 2	12 37.54	-49 22.5	4.719	4.200	+0.87	-12.5	.	53.0
Dec. 12	12 45.75	-51 26.8	4.737	4.297	+0.75	-12.4	.	58.0
Dec. 22	12 52.61	-53 29.4	4.745	4.393	+0.60	-12.1	.	63.3
Jan. 1	12 57.85	-55 29.1	4.746	4.488	+0.42	-11.8	.	69.0
Jan. 11	13 01.17	-57 24.7	4.740	4.583	+0.21	-11.3	.	74.9
Jan. 21	13 02.21	-59 14.3	4.729	4.677	-0.03	-10.5	.	80.9
Jan. 31	13 00.66	-60 55.2	4.718	4.770	-0.31	-9.5	.	87.1
Feb. 10	12 56.26	-62 24.7	4.707	4.863	-0.60	-8.2	.	93.2
Feb. 20	12 48.92	-63 39.1	4.700	4.955	-0.89	-6.5	.	99.2
Mar. 1	12 38.87	-64 34.9	4.700	5.047	-1.14	-4.4	.	104.9
Mar. 11	12 26.68	-65 09.0	4.709	5.138	-1.30	-2.1	.	110.2
Mar. 21	12 13.31	-65 19.2	4.731	5.228	-1.35	+0.3	.	114.9
Mar. 31	11 59.98	-65 05.6	4.767	5.318	-1.29	+2.6	.	118.7

Comet P/2021 V2 (Fuls)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 21.41707 TT  
 Peri. = 259.83231 e = 0.6141767  
 Node = 232.28014 2000.0 a = 9.0627360 AU  
 Incl. = 12.69422 n = 0.03612560  
 q = 3.4966147 AU P = 27.28 years

$$m1 = 1.4 + 5 \log(\Delta) + 25.0 \log(r(t+200))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	09 01.15	+00 07.5	2.656	3.498	-0.33	-2.2	17.8	143.8
Jan. 16	08 57.27	+00 22.8	2.593	3.497	-0.45	-0.8	17.9	152.8
Jan. 26	08 52.49	+00 24.0	2.555	3.497	-0.51	+0.6	17.9	160.0
Feb. 5	08 47.39	+00 12.0	2.545	3.498	-0.50	+1.9	18.0	162.5
Feb. 15	08 42.59	+00 11.2	2.563	3.501	-0.44	+2.8	18.1	158.6
Feb. 25	08 38.64	+00 42.6	2.608	3.505	-0.33	+3.4	18.2	150.9
Mar. 7	08 36.03	+01 18.3	2.677	3.511	-0.17	+3.7	18.3	141.9
Mar. 17	08 35.06	+01 54.8	2.768	3.519	0.00	+3.6	18.5	132.6
Mar. 27	08 35.86	+02 29.1	2.877	3.527	+0.18	+3.2	18.7	123.5
Apr. 6	08 38.45	+02 58.5	3.001	3.538	+0.35	+2.6	18.8	114.7
Apr. 16	08 42.71	+03 21.4	3.136	3.549	+0.51	+1.9	19.0	106.2
Apr. 26	08 48.51	+03 36.7	3.278	3.562	+0.66	+1.1	19.2	98.1
May 6	08 55.67	+03 43.6	3.425	3.576	+0.78	+0.2	19.4	90.4
May 16	09 03.98	+03 42.1	3.574	3.592	+0.89	-0.6	19.6	82.9
May 26	09 13.26	+03 32.1	3.722	3.609	+0.98	-1.5	19.8	75.8
June 5	09 23.36	+03 13.8	3.868	3.627	+1.05	-2.3	19.9	68.8
June 15	09 34.09	+02 47.8	4.009	3.647	+1.10	-3.0	20.1	62.1
June 25	09 45.35	+02 14.5	4.145	3.668	+1.15	-3.7	20.3	55.6
July 5	09 57.01	+01 34.5	4.273	3.690	+1.18	-4.3	20.4	49.2
July 15	10 08.97	+00 48.4	4.392	3.713	+1.21	-4.9	20.6	42.9
July 25	10 21.15	+00 03.2	4.501	3.737	+1.23	-5.4	20.8	36.7
Aug. 4	10 33.46	+00 59.5	4.599	3.762	+1.24	-5.9	20.9	30.6
Aug. 14	10 45.84	-02 00.0	4.685	3.788	+1.24	-6.2	21.0	24.7
Aug. 24	10 58.25	-03 03.9	4.759	3.816	+1.24	-6.6	21.2	18.9
Sept. 3	11 10.62	-04 10.5	4.818	3.844	+1.23	-6.8	21.3	13.5
Sept. 13	11 22.90	-05 19.2	4.863	3.873	+1.22	-7.0	21.4	9.4
Sept. 23	11 35.05	-06 29.2	4.892	3.903	+1.21	-7.1	21.5	8.8
Oct. 3	11 47.01	-07 39.9	4.906	3.934	+1.18	-7.1	21.6	12.3
Oct. 13	11 58.73	-08 50.6	4.905	3.966	+1.16	-7.0	21.7	17.8
Oct. 23	12 10.14	-10 00.5	4.887	3.999	+1.12	-6.9	21.8	24.0
Nov. 2	12 21.18	-11 09.0	4.854	4.032	+1.08	-6.7	21.9	30.7
Nov. 12	12 31.78	-12 15.5	4.805	4.066	+1.03	-6.5	22.0	37.6
Nov. 22	12 41.83	-13 19.1	4.742	4.101	+0.97	-6.2	22.0	44.8
Dec. 2	12 51.24	-14 19.2	4.666	4.137	+0.90	-5.8	.	52.3
Dec. 12	12 59.90	-15 15.0	4.577	4.173	+0.82	-5.3	.	60.0
Dec. 22	13 07.68	-16 05.9	4.478	4.209	+0.72	-4.8	.	68.0
Jan. 1	13 14.45	-16 50.9	4.371	4.247	+0.62	-4.2	.	76.3
Jan. 11	13 20.07	-17 29.3	4.259	4.285	+0.49	-3.4	.	84.9
Jan. 21	13 24.41	-18 00.2	4.144	4.323	+0.36	-2.6	.	93.8
Jan. 31	13 27.35	-18 22.7	4.032	4.362	+0.21	-1.8	.	103.1
Feb. 10	13 28.83	-18 36.0	3.925	4.401	+0.06	-0.8	.	112.7
Feb. 20	13 28.80	-18 39.2	3.829	4.441	-0.08	+0.2	.	122.6
Mar. 1	13 27.33	-18 32.0	3.748	4.481	-0.22	+1.3	.	132.9
Mar. 11	13 24.58	-18 14.2	3.685	4.521	-0.34	+2.4	.	143.3
Mar. 21	13 20.79	-17 46.3	3.647	4.562	-0.42	+3.3	.	153.8
Mar. 31	13 16.32	-17 09.9	3.635	4.603	-0.47	+4.0	.	164.0

## Comet C/2022 S3 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 21.68469 TT  
 Peri. = 267.96386  
 Node = 157.32269 2000.0  
 Incl. = 78.55143  
 q = 0.8384136 AU  
 e = 1.0003924

$$m1 = 14.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	21 21.53	-49 19.1	1.429	0.888	+2.36	-27.7	14.5	37.8
Jan. 16	21 48.55	-54 00.2	1.315	0.845	+3.21	-28.5	14.0	40.0
Jan. 26	22 27.23	-58 45.5	1.168	0.842	+4.89	-28.1	13.7	45.1
Feb. 5	23 29.85	-63 07.5	0.998	0.880	+8.38	-21.9	13.7	52.7
Feb. 15	01 17.54	-65 07.0	0.824	0.952	+13.65	+7.1	13.8	62.7
Feb. 25	03 40.39	-59 08.6	0.674	1.049	+13.32	+76.4	14.0	75.6
Mar. 7	05 29.82	-41 13.5	0.599	1.163	+8.12	136.1	14.4	90.4
Mar. 17	06 34.50	-18 18.8	0.643	1.286	+4.87	126.6	15.2	101.3
Mar. 27	07 15.34	+00 25.9	0.796	1.415	+3.32	+83.4	16.3	103.6
Apr. 6	07 44.65	+10 46.4	1.013	1.546	+2.54	+50.4	17.4	100.3
Apr. 16	08 07.99	+17 33.8	1.263	1.679	+2.12	+30.9	18.4	94.9
Apr. 26	08 27.99	+21 45.9	1.528	1.812	+1.88	+19.4	19.3	88.8
May 6	08 45.99	+24 24.9	1.799	1.944	+1.72	+12.3	20.1	82.5
May 16	09 02.66	+26 05.6	2.070	2.075	+1.61	+7.7	20.8	76.1
May 26	09 18.44	+27 07.9	2.338	2.205	+1.54	+4.6	21.5	69.8
June 5	09 33.54	+27 44.1	2.600	2.333	+1.48	+2.5	.	63.6
June 15	09 48.12	+28 02.1	2.852	2.460	+1.43	+1.0	.	57.5
June 25	10 02.27	+28 07.3	3.093	2.585	+1.39	0.0	.	51.4
July 5	10 16.05	+28 03.7	3.321	2.709	+1.36	-0.7	.	45.6
July 15	10 29.49	+27 54.0	3.534	2.831	+1.33	-1.2	.	39.9
July 25	10 42.63	+27 40.6	3.731	2.951	+1.30	-1.5	.	34.5
Aug. 4	10 55.48	+27 25.3	3.911	3.070	+1.27	-1.6	.	29.7
Aug. 14	11 08.03	+27 09.8	4.072	3.188	+1.24	-1.5	.	25.6
Aug. 24	11 20.31	+26 55.6	4.213	3.304	+1.21	-1.3	.	22.8
Sept. 3	11 32.28	+26 44.0	4.335	3.419	+1.18	-1.0	.	21.9
Sept. 13	11 43.95	+26 36.2	4.437	3.533	+1.15	-0.5	.	23.1
Sept. 23	11 55.29	+26 33.7	4.518	3.646	+1.11	+0.1	.	26.3
Oct. 3	12 06.25	+26 37.6	4.579	3.757	+1.07	+0.8	.	31.0
Oct. 13	12 16.80	+26 49.1	4.621	3.867	+1.03	+1.6	.	36.7
Oct. 23	12 26.88	+27 09.6	4.645	3.976	+0.98	+2.6	.	43.0
Nov. 2	12 36.41	+27 40.2	4.652	4.084	+0.92	+3.7	.	49.9
Nov. 12	12 45.31	+28 22.1	4.645	4.191	+0.85	+4.9	.	57.1
Nov. 22	12 53.46	+29 16.3	4.626	4.297	+0.77	+6.1	.	64.7
Dec. 2	13 00.75	+30 23.5	4.597	4.401	+0.68	+7.4	.	72.5
Dec. 12	13 07.03	+31 44.0	4.563	4.505	+0.57	+8.8	.	80.4
Dec. 22	13 12.13	+33 17.6	4.527	4.608	+0.44	+10.1	.	88.5
Jan. 1	13 15.87	+35 03.4	4.495	4.711	+0.29	+11.2	.	96.6
Jan. 11	13 18.07	+36 59.5	4.470	4.812	+0.13	+12.1	.	104.5
Jan. 21	13 18.55	+39 03.1	4.457	4.912	-0.05	+12.6	.	112.1
Jan. 31	13 17.17	+41 10.1	4.460	5.012	-0.24	+12.7	.	119.0
Feb. 10	13 13.86	+43 15.8	4.483	5.111	-0.44	+12.3	.	124.8
Feb. 20	13 08.64	+45 14.6	4.528	5.209	-0.62	+11.3	.	129.1
Mar. 1	13 01.69	+47 01.1	4.599	5.306	-0.78	+9.8	.	131.4
Mar. 11	12 53.37	+48 30.7	4.694	5.403	-0.89	+7.9	.	131.4
Mar. 21	12 44.18	+49 40.1	4.813	5.499	-0.94	+5.7	.	129.3
Mar. 31	12 34.72	+50 27.6	4.956	5.594	-0.94	+3.6	.	125.4

## Comet C/2021 P2 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 22.77938 TT  
 Peri. = 76.69972  
 Node = 32.08026 2000.0  
 Incl. = 150.06350  
 q = 5.0691528 AU  
 e = 0.9981283

$$m1 = 4.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	20 36.44	+07 04.4	5.820	5.071	+0.20	-0.5	18.9	37.1
Jan. 16	20 38.63	+07 02.8	5.891	5.069	+0.23	+0.3	18.9	30.7
Jan. 26	20 41.02	+07 09.5	5.934	5.069	+0.24	+1.1	18.9	26.2
Feb. 5	20 43.42	+07 23.7	5.950	5.070	+0.24	+1.8	18.9	24.6
Feb. 15	20 45.69	+07 44.8	5.938	5.072	+0.21	+2.5	18.9	26.4
Feb. 25	20 47.66	+08 12.2	5.898	5.075	+0.17	+3.1	18.9	31.0
Mar. 7	20 49.16	+08 45.1	5.832	5.080	+0.12	+3.6	18.9	37.4
Mar. 17	20 50.03	+09 22.8	5.742	5.085	+0.05	+4.0	18.9	44.9
Mar. 27	20 50.09	+10 04.5	5.630	5.092	-0.05	+4.4	18.9	53.0
Apr. 6	20 49.15	+10 49.3	5.501	5.100	-0.16	+4.6	18.8	61.5
Apr. 16	20 47.04	+11 36.0	5.357	5.109	-0.28	+4.7	18.8	70.4
Apr. 26	20 43.57	+12 23.3	5.204	5.119	-0.43	+4.7	18.7	79.6
May 6	20 38.56	+13 09.2	5.048	5.130	-0.59	+4.5	18.7	89.0
May 16	20 31.87	+13 51.9	4.894	5.142	-0.77	+4.0	18.6	98.5
May 26	20 23.41	+14 28.7	4.749	5.155	-0.95	+3.2	18.6	108.2
June 5	20 13.17	+14 56.6	4.619	5.170	-1.12	+2.2	18.5	117.7
June 15	20 01.29	+15 12.7	4.513	5.185	-1.27	+0.8	18.5	126.8
June 25	19 48.03	+15 14.2	4.435	5.202	-1.38	-0.7	18.5	134.9
July 5	19 33.86	+14 59.2	4.390	5.219	-1.45	-2.4	18.5	140.9
July 15	19 19.32	+14 27.0	4.384	5.238	-1.45	-4.1	18.5	143.7
July 25	19 05.05	+13 38.7	4.416	5.257	-1.39	-5.6	18.5	142.4
Aug. 4	18 51.65	+12 37.0	4.486	5.278	-1.27	-6.8	18.6	137.4
Aug. 14	18 39.56	+11 25.3	4.592	5.299	-1.12	-7.6	18.7	129.9
Aug. 24	18 29.13	+10 07.6	4.727	5.322	-0.94	-7.9	18.8	121.2
Sept. 3	18 20.51	+08 47.8	4.887	5.345	-0.76	-8.0	18.9	111.8
Sept. 13	18 13.70	+07 28.9	5.065	5.370	-0.58	-7.7	19.0	102.3
Sept. 23	18 08.65	+06 13.3	5.254	5.395	-0.41	-7.3	19.1	92.7
Oct. 3	18 05.21	+05 02.7	5.448	5.421	-0.26	-6.7	19.2	83.2
Oct. 13	18 03.19	+03 58.2	5.639	5.448	-0.13	-6.1	19.3	73.9
Oct. 23	18 02.41	+03 00.5	5.824	5.476	-0.02	-5.4	19.4	64.9
Nov. 2	18 02.67	+02 09.9	5.997	5.505	+0.08	-4.7	19.5	56.1
Nov. 12	18 03.78	+01 26.5	6.153	5.534	+0.15	-3.9	19.6	47.6
Nov. 22	18 05.58	+00 50.3	6.289	5.565	+0.21	-3.2	19.7	39.7
Dec. 2	18 07.87	+00 21.2	6.401	5.596	+0.25	-2.5	19.7	32.6
Dec. 12	18 10.51	+00 01.0	6.489	5.628	+0.28	-1.8	19.8	26.8
Dec. 22	18 13.32	+00 16.4	6.549	5.660	+0.29	-1.2	19.9	23.5
Jan. 1	18 16.16	+00 25.5	6.582	5.694	+0.28	-0.6	19.9	23.5
Jan. 11	18 18.88	+00 28.3	6.586	5.728	+0.26	0.0	20.0	27.0
Jan. 21	18 21.31	+00 25.3	6.564	5.763	+0.22	+0.6	20.0	32.9
Jan. 31	18 23.32	+00 16.9	6.515	5.798	+0.17	+1.1	20.0	40.2
Feb. 10	18 24.75	+00 03.5	6.443	5.834	+0.11	+1.6	20.0	48.3
Feb. 20	18 25.46	+00 14.4	6.350	5.871	+0.02	+2.0	20.0	57.0
Mar. 1	18 25.28	+00 36.1	6.241	5.908	-0.07	+2.4	20.0	66.1
Mar. 11	18 24.09	+01 01.0	6.118	5.946	-0.18	+2.6	20.0	75.4
Mar. 21	18 21.75	+01 28.2	5.988	5.985	-0.30	+2.8	20.0	85.0
Mar. 31	18 18.14	+01 56.4	5.856	6.024	-0.43	+2.8	20.0	94.9

Comet 71P/Clark

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 22.79445 TT  
 Peri. = 209.06951 e = 0.4937756  
 Node = 59.39181 2000.0 a = 3.1386521 AU  
 Incl. = 9.43806 n = 0.17725125  
 q = 1.5888623 AU P = 5.56 years

$$m1 = 12.0 + 5 \log(\Delta) + 10.0 \log(r(t-40))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	17 52.73	-25 22.3	2.513	1.597	+3.34	-4.0	16.2	16.8
Jan. 16	18 26.29	-25 50.7	2.483	1.590	+3.37	-1.4	16.2	19.5
Jan. 26	18 59.96	-25 52.2	2.457	1.589	+3.36	+1.3	16.1	22.2
Feb. 5	19 33.31	-25 27.5	2.434	1.594	+3.30	+3.8	16.0	24.9
Feb. 15	20 05.94	-24 38.6	2.413	1.604	+3.21	+6.1	15.9	27.6
Feb. 25	20 37.53	-23 28.4	2.395	1.620	+3.09	+8.0	15.9	30.4
Mar. 7	21 07.83	-22 00.7	2.377	1.641	+2.95	+9.6	15.9	33.3
Mar. 17	21 36.68	-20 19.6	2.360	1.667	+2.80	+10.7	15.9	36.4
Mar. 27	22 04.00	-18 29.3	2.343	1.698	+2.65	+11.4	15.9	39.6
Apr. 6	22 29.77	-16 33.8	2.324	1.733	+2.49	+11.7	15.9	43.0
Apr. 16	22 54.01	-14 36.6	2.302	1.771	+2.34	+11.7	16.0	46.6
Apr. 26	23 16.73	-12 41.1	2.277	1.812	+2.19	+11.4	16.0	50.5
May 6	23 37.96	-10 49.8	2.248	1.857	+2.04	+10.8	16.1	54.7
May 16	23 57.72	-09 05.2	2.214	1.903	+1.89	+10.0	16.1	59.1
May 26	00 15.99	-07 29.2	2.174	1.952	+1.74	+9.1	16.2	63.8
June 5	00 32.72	-06 03.5	2.129	2.002	+1.59	+8.0	16.2	69.0
June 15	00 47.83	-04 49.5	2.078	2.054	+1.42	+6.7	16.3	74.5
June 25	01 01.21	-03 48.3	2.022	2.107	+1.23	+5.4	16.3	80.4
July 5	01 12.67	-03 01.1	1.962	2.161	+1.03	+3.9	16.4	86.9
July 15	01 22.03	-02 28.4	1.900	2.215	+0.81	+2.4	16.4	93.9
July 25	01 29.02	-02 11.1	1.836	2.270	+0.56	+0.9	16.4	101.6
Aug. 4	01 33.40	-02 09.2	1.775	2.325	+0.29	-0.6	16.5	109.9
Aug. 14	01 34.94	-02 22.2	1.718	2.380	-0.01	-2.1	16.5	118.9
Aug. 24	01 33.50	-02 48.7	1.671	2.435	-0.31	-3.3	16.6	128.7
Sept. 3	01 29.13	-03 25.9	1.638	2.490	-0.59	-4.1	16.6	139.2
Sept. 13	01 22.14	-04 09.2	1.623	2.545	-0.82	-4.5	16.7	150.0
Sept. 23	01 13.18	-04 53.0	1.631	2.599	-0.97	-4.1	16.8	160.6
Oct. 3	01 03.21	-05 30.7	1.666	2.653	-1.01	-3.2	17.0	168.3
Oct. 13	00 53.30	-05 57.0	1.728	2.707	-0.95	-1.8	17.1	165.9
Oct. 23	00 44.47	-06 08.1	1.818	2.760	-0.79	-0.2	17.4	156.6
Nov. 2	00 37.50	-06 02.8	1.934	2.813	-0.58	+1.4	17.6	146.1
Nov. 12	00 32.79	-05 41.9	2.072	2.865	-0.34	+2.9	17.8	135.6
Nov. 22	00 30.48	-05 07.0	2.229	2.916	-0.10	+4.2	18.1	125.5
Dec. 2	00 30.47	-04 20.5	2.401	2.967	+0.12	+5.2	18.3	115.9
Dec. 12	00 32.55	-03 24.6	2.583	3.017	+0.31	+6.0	18.6	106.7
Dec. 22	00 36.45	-02 21.1	2.772	3.066	+0.48	+6.7	18.8	97.9
Jan. 1	00 41.91	-01 12.1	2.965	3.115	+0.62	+7.2	19.0	89.4
Jan. 11	00 48.67	+00 01.2	3.158	3.163	+0.74	+7.5	19.2	81.3
Jan. 21	00 56.51	+01 17.5	3.348	3.210	+0.84	+7.8	19.4	73.5
Jan. 31	01 05.24	+02 35.7	3.533	3.256	+0.92	+7.9	19.6	65.8
Feb. 10	01 14.70	+03 54.8	3.710	3.302	+0.98	+7.9	19.8	58.4
Feb. 20	01 24.75	+05 14.2	3.878	3.347	+1.03	+7.9	19.9	51.1
Mar. 1	01 35.28	+06 32.9	4.033	3.391	+1.07	+7.8	20.1	44.0
Mar. 11	01 46.17	+07 50.4	4.176	3.435	+1.11	+7.7	20.2	37.0
Mar. 21	01 57.35	+09 06.1	4.303	3.477	+1.13	+7.4	20.4	30.1
Mar. 31	02 08.74	+10 19.4	4.415	3.519	+1.15	+7.2	20.5	23.2

Comet 263P/Gibbs

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 30.58539 TT  
 Peri. = 35.04787 e = 0.5935731  
 Node = 105.50610 2000.0 a = 3.0418501 AU  
 Incl. = 11.52180 n = 0.18577932  
 q = 1.2362897 AU P = 5.31 years

$$m1 = 18.1 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	10 38.53	+17 46.8	0.391	1.270	+4.07 +16.6	17.1	130.0
Jan. 16	11 19.85	+20 43.7	0.359	1.248	+4.15 +18.6	16.8	131.0
Jan. 26	12 00.34	+23 48.7	0.342	1.237	+3.86 +17.9	16.7	131.3
Feb. 5	12 36.40	+26 36.6	0.340	1.238	+3.23 +15.1	16.7	131.6
Feb. 15	13 04.94	+28 50.7	0.348	1.250	+2.36 +11.2	16.8	132.6
Feb. 25	13 24.25	+30 23.3	0.365	1.273	+1.41 +6.7	17.0	134.4
Mar. 7	13 34.46	+31 07.8	0.390	1.305	+0.57 +1.6	17.2	137.2
Mar. 17	13 37.08	+30 59.9	0.422	1.347	-0.07 -3.8	17.5	140.4
Mar. 27	13 34.43	+29 56.5	0.462	1.396	-0.44 -9.4	17.9	143.3
Apr. 6	13 29.37	+27 59.3	0.514	1.451	-0.54 -14.3	18.3	145.0
Apr. 16	13 24.30	+25 19.4	0.577	1.512	-0.44 -17.8	18.7	144.8
Apr. 26	13 20.82	+22 10.6	0.654	1.576	-0.22 -19.9	19.2	142.4
May 6	13 19.78	+18 47.5	0.746	1.643	+0.04 -20.6	19.6	138.5
May 16	13 21.29	+15 22.0	0.852	1.713	+0.28 -20.4	20.1	133.5
May 26	13 25.17	+12 01.4	0.972	1.784	+0.51 -19.6	20.6	128.0
June 5	13 31.13	+08 50.0	1.105	1.856	+0.69 -18.5	21.0	122.2
June 15	13 38.78	+05 49.9	1.250	1.928	+0.85 -17.4	21.4	116.3
June 25	13 47.86	+03 01.3	1.405	2.001	+0.98 -16.2	21.9	110.4
July 5	13 58.10	+00 24.1	1.570	2.074	+1.08 -15.1	.	104.6
July 15	14 09.28	-02 02.1	1.742	2.146	+1.16 -14.0	.	98.7
July 25	14 21.26	-04 17.9	1.920	2.218	+1.24 -13.0	.	92.9
Aug. 4	14 33.91	-06 24.0	2.103	2.289	+1.30 -12.1	.	87.1
Aug. 14	14 47.13	-08 20.7	2.289	2.359	+1.35 -11.2	.	81.3
Aug. 24	15 00.83	-10 08.6	2.475	2.429	+1.40 -10.3	.	75.5
Sept. 3	15 14.96	-11 47.7	2.661	2.497	+1.43 -9.4	.	69.7
Sept. 13	15 29.44	-13 18.4	2.844	2.565	+1.47 -8.6	.	63.8
Sept. 23	15 44.23	-14 40.9	3.023	2.631	+1.49 -7.8	.	57.9
Oct. 3	15 59.27	-15 55.1	3.196	2.696	+1.52 -7.0	.	51.9
Oct. 13	16 14.52	-17 01.3	3.361	2.761	+1.53 -6.2	.	45.9
Oct. 23	16 29.91	-17 59.4	3.516	2.824	+1.54 -5.4	.	39.7
Nov. 2	16 45.39	-18 49.7	3.661	2.886	+1.55 -4.6	.	33.5
Nov. 12	17 00.89	-19 32.2	3.792	2.947	+1.55 -3.8	.	27.2
Nov. 22	17 16.36	-20 07.2	3.909	3.007	+1.54 -3.1	.	20.9
Dec. 2	17 31.70	-20 34.8	4.010	3.065	+1.53 -2.4	.	14.4
Dec. 12	17 46.87	-20 55.4	4.095	3.123	+1.50 -1.7	.	8.0
Dec. 22	18 01.77	-21 09.5	4.162	3.179	+1.47 -1.1	.	2.4
Jan. 1	18 16.33	-21 17.6	4.210	3.234	+1.43 -0.5	.	6.3
Jan. 11	18 30.45	-21 20.1	4.240	3.289	+1.39 0.0	.	13.0
Jan. 21	18 44.06	-21 17.9	4.250	3.342	+1.33 +0.5	.	19.9
Jan. 31	18 57.06	-21 11.7	4.242	3.394	+1.26 +0.8	.	27.0
Feb. 10	19 09.37	-21 02.4	4.215	3.445	+1.19 +1.1	.	34.3
Feb. 20	19 20.87	-20 50.9	4.171	3.495	+1.10 +1.2	.	41.7
Mar. 1	19 31.48	-20 38.3	4.110	3.543	+1.01 +1.3	.	49.2
Mar. 11	19 41.08	-20 25.6	4.034	3.591	+0.90 +1.2	.	57.0
Mar. 21	19 49.55	-20 14.0	3.946	3.638	+0.78 +1.1	.	65.0
Mar. 31	19 56.76	-20 04.7	3.847	3.684	+0.65 +0.8	.	73.2

Comet 96P/Machholz

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 31.08538 TT  
 Peri. = 14.74778 e = 0.9615867  
 Node = 93.95314 2000.0 a = 3.0306144 AU  
 Incl. = 57.50727 n = 0.18681341  
 q = 0.1164159 AU P = 5.28 years

m1 = 12.5 + 5 log(Delta) + 10.0 log(r) (vis) (r<2.4AU)  
 H = 14.6 , G = 0.15 (r>2.4AU)

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	Mag.	Elong.
2023/24	h m	° '			m		°
Jan. 6	20 08.56	-41 14.0	1.621	0.811	+3.18 +17.3	12.6	22.9
Jan. 16	20 42.44	-37 20.2	1.374	0.561	+3.62 +34.0	10.7	20.0
Jan. 26	21 16.56	-28 02.5	1.053	0.255	+1.85 106.4	6.7	13.8
Feb. 5	20 25.20	-07 29.2	0.996	0.248	-3.69 +23.4	6.4	14.4
Feb. 15	20 10.41	-06 28.0	1.242	0.556	-0.14 -1.9	10.4	25.8
Feb. 25	20 11.84	-06 53.9	1.399	0.807	+0.34 -2.9	12.3	34.4
Mar. 7	20 15.54	-07 21.4	1.497	1.023	+0.37 -2.6	13.5	42.8
Mar. 17	20 18.71	-07 46.5	1.552	1.217	+0.24 -2.5	14.3	51.6
Mar. 27	20 20.22	-08 12.0	1.573	1.395	+0.03 -2.7	14.9	61.0
Apr. 6	20 19.31	-08 42.0	1.568	1.560	-0.25 -3.4	15.4	70.9
Apr. 16	20 15.36	-09 20.0	1.544	1.714	-0.59 -4.4	15.8	81.6
Apr. 26	20 07.72	-10 09.7	1.508	1.860	-0.99 -5.7	16.1	93.3
May 6	19 55.86	-11 13.6	1.471	1.998	-1.43 -7.2	16.3	105.9
May 16	19 39.50	-12 31.8	1.440	2.130	-1.88 -8.5	16.6	119.6
May 26	19 18.85	-14 01.3	1.428	2.256	-2.27 -9.3	16.8	134.3
June 5	18 55.02	-15 35.0	1.445	2.376	-2.49 -9.3	17.1	149.7
June 15	18 29.91	-17 03.9	1.497	2.492	-2.49 -8.3	17.9	164.9
June 25	18 05.79	-18 20.9	1.590	2.603	-2.27 -6.9	17.9	174.7
July 5	17 44.65	-19 23.3	1.721	2.711	-1.90 -5.5	18.4	163.5
July 15	17 27.60	-20 12.7	1.886	2.815	-1.46 -4.4	18.9	150.3
July 25	17 14.93	-20 52.6	2.080	2.915	-1.03 -3.6	19.3	137.9
Aug. 4	17 06.42	-21 26.5	2.296	3.012	-0.64 -3.2	19.7	126.5
Aug. 14	17 01.50	-21 56.7	2.528	3.106	-0.32 -2.9	20.0	115.8
Aug. 24	16 59.63	-22 24.8	2.771	3.197	-0.04 -2.7	20.3	105.8
Sept. 3	17 00.25	-22 51.5	3.018	3.286	+0.18 -2.6	20.5	96.3
Sept. 13	17 02.91	-23 17.1	3.267	3.372	+0.36 -2.5	20.7	87.3
Sept. 23	17 07.22	-23 41.6	3.512	3.456	+0.51 -2.4	20.9	78.5
Oct. 3	17 12.87	-24 04.7	3.751	3.537	+0.63 -2.2	21.1	70.1
Oct. 13	17 19.58	-24 26.2	3.980	3.616	+0.72 -2.1	21.2	61.7
Oct. 23	17 27.15	-24 46.0	4.196	3.693	+0.80 -1.9	21.3	53.6
Nov. 2	17 35.38	-25 03.9	4.397	3.768	+0.85 -1.7	21.4	45.5
Nov. 12	17 44.12	-25 19.6	4.579	3.841	+0.90 -1.5	21.4	37.4
Nov. 22	17 53.22	-25 33.2	4.742	3.912	+0.92 -1.2	21.5	29.5
Dec. 2	18 02.54	-25 44.7	4.882	3.981	+0.94 -1.0	21.5	21.5
Dec. 12	18 11.96	-25 54.1	4.999	4.049	+0.94 -0.8	21.5	13.6
Dec. 22	18 21.37	-26 01.6	5.092	4.115	+0.93 -0.7	21.4	5.9
Jan. 1	18 30.64	-26 07.6	5.159	4.179	+0.92 -0.5	21.4	4.0
Jan. 11	18 39.66	-26 12.4	5.201	4.241	+0.88 -0.4	21.6	11.4
Jan. 21	18 48.32	-26 16.3	5.217	4.302	+0.84 -0.4	21.7	19.5
Jan. 31	18 56.49	-26 20.1	5.209	4.362	+0.79 -0.4	21.9	27.8
Feb. 10	19 04.06	-26 24.2	5.177	4.420	+0.72 -0.5	21.9	36.2
Feb. 20	19 10.89	-26 29.5	5.123	4.476	+0.64 -0.6	.	44.8
Mar. 1	19 16.87	-26 36.4	5.050	4.531	+0.54 -0.8	.	53.5
Mar. 11	19 21.84	-26 45.9	4.960	4.585	+0.44 -1.1	.	62.4
Mar. 21	19 25.65	-26 58.7	4.856	4.638	+0.31 -1.5	.	71.5
Mar. 31	19 28.17	-27 15.2	4.742	4.689	+0.17 -1.9	.	80.9



Comet C/2022 Q2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Jan. 31.60643 TT  
 Peri. = 44.07167 e = 0.9496569  
 Node = 352.94484 2000.0 a = 32.6581180 AU  
 Incl. = 151.48532 n = 0.00528101  
 q = 1.6441109 AU P = 186.63 years

$$m1 = 13.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	20 49.41	-08° 49' 3"	2.475	1.678	-0.28 +7.3	17.2	28.5
Jan. 16	20 47.02	-07° 35' 1"	2.551	1.657	-0.20 +7.6	17.2	19.5
Jan. 26	20 45.26	-06° 16' 6"	2.590	1.646	-0.16 +8.1	17.2	13.1
Feb. 5	20 43.66	-04° 52' 2"	2.589	1.645	-0.17 +8.8	17.2	13.3
Feb. 15	20 41.78	-03° 20' 2"	2.550	1.655	-0.22 +9.7	17.2	19.8
Feb. 25	20 39.17	-01° 38' 3"	2.474	1.675	-0.32 +10.8	17.2	28.7
Mar. 7	20 35.30	+00° 16' 4"	2.364	1.704	-0.48 +12.3	17.2	38.5
Mar. 17	20 29.47	+02° 27' 7"	2.226	1.742	-0.72 +14.2	17.1	49.0
Mar. 27	20 20.73	+05° 00' 2"	2.065	1.789	-1.08 +16.6	17.1	60.0
Apr. 6	20 07.75	+07° 59' 2"	1.891	1.843	-1.60 +19.5	17.0	71.8
Apr. 16	19 48.64	+11° 29' 0"	1.715	1.903	-2.34 +22.7	17.0	84.6
Apr. 26	19 20.94	+15° 28' 2"	1.554	1.969	-3.35 +25.0	16.9	98.3
May 6	18 42.13	+19° 38' 2"	1.428	2.040	-4.54 +24.0	16.9	112.6
May 16	17 51.78	+23° 11' 5"	1.363	2.115	-5.54 +16.7	16.9	125.3
May 26	16 54.67	+25° 04' 5"	1.377	2.193	-5.72 +4.1	17.1	132.6
June 5	16 00.42	+24° 50' 6"	1.474	2.274	-4.92 -7.4	17.4	131.2
June 15	15 16.56	+23° 04' 5"	1.642	2.358	-3.71 -13.6	17.8	123.3
June 25	14 44.73	+20° 38' 3"	1.861	2.443	-2.58 -15.3	18.2	112.9
July 5	14 23.03	+18° 06' 4"	2.112	2.530	-1.72 -14.8	18.7	102.2
July 15	14 08.82	+15° 43' 9"	2.380	2.618	-1.10 -13.5	19.1	91.8
July 25	13 59.97	+13° 34' 8"	2.655	2.707	-0.65 -12.2	19.4	82.0
Aug. 4	13 54.93	+11° 39' 1"	2.927	2.797	-0.34 -10.9	19.8	72.6
Aug. 14	13 52.63	+09° 55' 6"	3.191	2.887	-0.11 -9.8	20.1	63.6
Aug. 24	13 52.32	+08° 22' 5"	3.442	2.978	+0.06 -8.8	20.4	54.9
Sept. 3	13 53.46	+06° 58' 8"	3.675	3.069	+0.18 -7.9	20.7	46.5
Sept. 13	13 55.67	+05° 43' 3"	3.888	3.160	+0.27 -7.1	20.9	38.3
Sept. 23	13 58.64	+04° 35' 3"	4.076	3.251	+0.33 -6.4	21.2	30.5
Oct. 3	14 02.12	+03° 34' 5"	4.239	3.343	+0.37 -5.7	21.4	23.2
Oct. 13	14 05.93	+02° 40' 5"	4.375	3.434	+0.39 -5.0	21.6	17.2
Oct. 23	14 09.88	+01° 53' 2"	4.481	3.525	+0.40 -4.4	21.7	14.1
Nov. 2	14 13.79	+01° 12' 8"	4.559	3.615	+0.38 -3.7	21.9	16.0
Nov. 12	14 17.53	+00° 39' 3"	4.607	3.706	+0.36 -2.9	22.0	21.7
Nov. 22	14 20.91	+00° 13' 2"	4.627	3.796	+0.31 -2.2	.	29.3
Dec. 2	14 23.78	+00° 05' 2"	4.619	3.886	+0.25 -1.4	.	37.7
Dec. 12	14 25.94	+00° 15' 6"	4.586	3.975	+0.17 -0.6	.	46.6
Dec. 22	14 27.21	+00° 17' 3"	4.531	4.064	+0.07 +0.3	.	56.1
Jan. 1	14 27.40	+00° 09' 9"	4.457	4.153	-0.05 +1.3	.	65.9
Jan. 11	14 26.28	+00° 07' 1"	4.369	4.242	-0.19 +2.2	.	76.1
Jan. 21	14 23.67	+00° 33' 8"	4.272	4.330	-0.35 +3.2	.	86.8
Jan. 31	14 19.39	+01° 10' 4"	4.174	4.417	-0.53 +4.2	.	97.8
Feb. 10	14 13.31	+01° 56' 2"	4.081	4.504	-0.71 +5.1	.	109.3
Feb. 20	14 05.39	+02° 50' 2"	4.001	4.591	-0.89 +5.8	.	121.2
Mar. 1	13 55.71	+03° 50' 2"	3.943	4.677	-1.06 +6.2	.	133.2
Mar. 11	13 44.53	+04° 53' 4"	3.913	4.763	-1.19 +6.4	.	145.3
Mar. 21	13 32.24	+05° 56' 1"	3.918	4.849	-1.27 +6.1	.	156.6
Mar. 31	13 19.41	+06° 54' 4"	3.962	4.934	-1.29 +5.5	.	164.9

## Comet 5D/Brorsen [Orbit 2]

Epoch = 2023 June 25.0 TT  
 T = 2023 Feb. 7.96285 TT  
 Peri. = 25.77519 e = 0.8302707  
 Node = 89.96951 2000.0 a = 3.1627609 AU  
 Incl. = 14.37099 n = 0.17522841  
 q = 0.5368132 AU P = 5.62 years

$$m1 = 15.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation		m1	Mot. /PA	Elong.
2023/24	h m	° ' "			for T=+1 day				°
Jan. 6	22 38.97	-18° 44.6	1.038	0.853	+0.71	-2.1	14.4	31.6/43	49.8
Jan. 16	22 53.29	-14 30.6	0.910	0.717	+1.48	-4.9	13.3	33.7/33	44.3
Jan. 26	23 02.00	-09 20.9	0.754	0.603	+3.35	-7.7	12.2	34.3/4	37.7
Feb. 5	22 52.64	-03 18.8	0.588	0.541	+7.64	-6.8	11.2	54.8/313	27.8
Feb. 15	22 08.24	+02 28.3	0.463	0.557	+13.91	+10.1	10.8	99.8/286	15.9
Feb. 25	20 59.15	+05 33.7	0.421	0.645	+15.47	+45.5	11.2	100.6/274	27.2
Mar. 7	20 01.08	+05 42.2	0.439	0.771	+11.32	+65.4	12.1	69.5/267	48.0
Mar. 17	19 21.75	+04 49.0	0.473	0.911	+7.05	+66.4	13.0	49.2/263	66.0
Mar. 27	18 51.54	+03 50.6	0.503	1.055	+4.03	+61.7	13.7	43.2/262	82.3
Apr. 6	18 22.73	+02 52.7	0.529	1.197	+1.83	+56.0	14.4	44.9/262	98.3
Apr. 16	17 51.85	+01 48.6	0.556	1.336	+0.11	+49.7	15.0	49.1/262	114.9
Apr. 26	17 18.63	+00 31.6	0.595	1.470	-1.20	+42.7	15.5	51.3/260	131.7
May 6	16 45.52	+00 59.1	0.654	1.600	-2.04	+35.4	16.1	48.6/259	147.6
May 16	16 15.79	-02 37.9	0.740	1.725	-2.40	+28.6	16.7	41.5/256	160.1
May 26	15 51.76	-04 17.7	0.855	1.847	-2.41	+22.9	17.3	32.1/252	162.8
June 5	15 34.24	-05 54.1	0.995	1.964	-2.22	+18.4	17.9	23.0/246	155.4
June 15	15 22.73	-07 25.1	1.159	2.077	-1.96	+14.9	18.5	15.5/235	145.4
June 25	15 16.26	-08 50.9	1.343	2.186	-1.71	+12.2	19.0	10.3/216	135.4
July 5	15 13.86	-10 11.9	1.542	2.293	-1.47	+10.1	19.5	7.9/186	126.0
July 15	15 14.61	-11 28.6	1.754	2.395	-1.27	+8.4	20.0	8.1/156	117.2
July 25	15 17.86	-12 41.5	1.975	2.495	-1.10	+7.1	20.4	9.6/138	108.8
Aug. 4	15 23.07	-13 50.7	2.202	2.592	-0.96	+6.0	20.9	11.1/127	100.9
Aug. 14	15 29.81	-14 56.4	2.433	2.687	-0.84	+5.1	21.2	12.6/120	93.2
Aug. 24	15 37.80	-15 58.5	2.665	2.778	-0.75	+4.4	21.6	13.8/116	85.7
Sept. 3	15 46.79	-16 56.9	2.896	2.868	-0.66	+3.7	21.9	14.7/113	78.4
Sept. 13	15 56.59	-17 51.4	3.122	2.954	-0.59	+3.2	.	15.5/110	71.1
Sept. 23	16 07.05	-18 42.0	3.342	3.039	-0.53	+2.8	.	16.0/108	64.0
Oct. 3	16 18.03	-19 28.5	3.554	3.121	-0.48	+2.4	.	16.5/106	56.9
Oct. 13	16 29.44	-20 10.7	3.754	3.202	-0.43	+2.1	.	16.8/104	49.8
Oct. 23	16 41.16	-20 48.6	3.942	3.280	-0.39	+1.8	.	17.0/102	42.6
Nov. 2	16 53.11	-21 22.0	4.115	3.356	-0.36	+1.6	.	17.1/100	35.5
Nov. 12	17 05.20	-21 50.9	4.270	3.431	-0.33	+1.4	.	17.1/99	28.3
Nov. 22	17 17.33	-22 15.4	4.407	3.504	-0.30	+1.2	.	17.0/98	21.1
Dec. 2	17 29.43	-22 35.5	4.525	3.575	-0.27	+1.1	.	16.8/96	13.8
Dec. 12	17 41.40	-22 51.4	4.621	3.644	-0.25	+1.0	.	16.5/95	6.4
Dec. 22	17 53.15	-23 03.4	4.695	3.712	-0.23	+0.9	.	16.0/94	1.2
Jan. 1	18 04.58	-23 11.8	4.747	3.778	-0.22	+0.8	.	15.5/92	8.7
Jan. 11	18 15.60	-23 17.1	4.776	3.843	-0.20	+0.7	.	14.8/91	16.3
Jan. 21	18 26.11	-23 19.7	4.783	3.906	-0.19	+0.7	.	14.0/91	24.1
Jan. 31	18 36.00	-23 20.2	4.768	3.967	-0.18	+0.6	.	13.1/90	32.0
Feb. 10	18 45.17	-23 19.3	4.733	4.028	-0.17	+0.6	.	12.0/89	40.0
Feb. 20	18 53.48	-23 17.8	4.678	4.086	-0.16	+0.6	.	10.7/89	48.2
Mar. 1	19 00.82	-23 16.3	4.606	4.144	-0.16	+0.5	.	9.3/89	56.6
Mar. 11	19 07.07	-23 15.8	4.519	4.200	-0.15	+0.5	.	7.7/90	65.2
Mar. 21	19 12.07	-23 17.0	4.420	4.255	-0.15	+0.5	.	5.9/92	74.0
Mar. 31	19 15.69	-23 20.6	4.313	4.309	-0.15	+0.5	.	3.9/98	83.1

## Comet C/2020 S4 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Feb. 9.23528 TT  
 Peri. = 20.99214  
 Node = 117.71942 2000.0  
 Incl. = 20.56870  
 q = 3.3697443 AU  
 e = 1.0014430

$$m1 = 9.0 + 5 \log(\Delta) + 7.5 \log(r(t+170))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	09 36.92	+20 46.3	2.533	3.385	-0.02	+7.8	15.2	144.8
Jan. 16	09 36.06	+22 08.2	2.460	3.377	-0.17	+8.5	15.2	155.1
Jan. 26	09 33.82	+23 35.0	2.413	3.372	-0.28	+8.7	15.1	164.7
Feb. 5	09 30.68	+25 01.0	2.394	3.370	-0.34	+8.3	15.2	170.1
Feb. 15	09 27.22	+26 20.6	2.405	3.370	-0.34	+7.4	15.2	165.4
Feb. 25	09 24.07	+27 28.8	2.444	3.373	-0.27	+6.0	15.3	156.1
Mar. 7	09 21.86	+28 22.3	2.509	3.378	-0.15	+4.5	15.4	146.1
Mar. 17	09 21.05	+28 59.5	2.597	3.386	+0.01	+2.8	15.5	136.3
Mar. 27	09 21.95	+29 20.4	2.704	3.397	+0.19	+1.2	15.6	126.8
Apr. 6	09 24.68	+29 26.0	2.827	3.410	+0.37	-0.2	15.7	117.8
Apr. 16	09 29.20	+29 17.9	2.961	3.426	+0.55	-1.5	15.9	109.2
Apr. 26	09 35.38	+28 57.7	3.105	3.444	+0.70	-2.6	16.0	101.1
May 6	09 43.03	+28 26.9	3.253	3.464	+0.84	-3.6	16.2	93.5
May 16	09 51.94	+27 47.0	3.405	3.487	+0.95	-4.4	16.3	86.2
May 26	10 01.90	+26 59.1	3.558	3.512	+1.05	-5.2	16.4	79.2
June 5	10 12.71	+26 04.4	3.710	3.539	+1.12	-5.8	16.6	72.5
June 15	10 24.19	+25 04.0	3.859	3.568	+1.18	-6.3	16.7	66.0
June 25	10 36.19	+23 58.7	4.003	3.600	+1.22	-6.8	16.8	59.7
July 5	10 48.59	+22 49.5	4.142	3.633	+1.26	-7.1	16.9	53.6
July 15	11 01.26	+21 37.3	4.274	3.668	+1.28	-7.4	17.0	47.7
July 25	11 14.14	+20 22.9	4.399	3.706	+1.29	-7.5	17.2	41.9
Aug. 4	11 27.12	+19 07.2	4.514	3.744	+1.30	-7.6	17.2	36.3
Aug. 14	11 40.17	+17 50.9	4.619	3.785	+1.31	-7.6	17.3	30.8
Aug. 24	11 53.23	+16 34.9	4.713	3.827	+1.30	-7.6	17.4	25.7
Sept. 3	12 06.23	+15 20.0	4.796	3.871	+1.30	-7.4	17.5	21.0
Sept. 13	12 19.16	+14 06.9	4.866	3.916	+1.29	-7.2	17.6	17.3
Sept. 23	12 31.96	+12 56.6	4.922	3.963	+1.27	-6.9	17.6	15.3
Oct. 3	12 44.59	+11 49.8	4.965	4.011	+1.25	-6.5	17.7	15.7
Oct. 13	12 57.00	+10 47.1	4.994	4.060	+1.23	-6.0	17.8	18.6
Oct. 23	13 09.15	+09 49.5	5.008	4.111	+1.20	-5.5	17.8	23.0
Nov. 2	13 20.97	+08 57.6	5.007	4.162	+1.16	-4.8	17.8	28.5
Nov. 12	13 32.40	+08 12.2	4.992	4.215	+1.12	-4.2	17.9	34.6
Nov. 22	13 43.37	+07 33.8	4.963	4.268	+1.07	-3.4	17.9	41.1
Dec. 2	13 53.79	+07 03.3	4.921	4.323	+1.01	-2.6	17.9	48.0
Dec. 12	14 03.56	+06 40.9	4.866	4.378	+0.94	-1.8	17.9	55.1
Dec. 22	14 12.58	+06 27.3	4.801	4.435	+0.86	-0.9	17.9	62.6
Jan. 1	14 20.73	+06 22.6	4.727	4.492	+0.76	0.0	18.0	70.3
Jan. 11	14 27.91	+06 27.0	4.646	4.549	+0.66	+0.9	18.0	78.3
Jan. 21	14 33.98	+06 40.4	4.562	4.608	+0.54	+1.8	17.9	86.5
Jan. 31	14 38.83	+07 02.1	4.477	4.667	+0.41	+2.6	17.9	95.0
Feb. 10	14 42.37	+07 31.5	4.396	4.727	+0.28	+3.3	17.9	103.6
Feb. 20	14 44.53	+08 07.3	4.321	4.787	+0.14	+3.9	17.9	112.5
Mar. 1	14 45.27	+08 47.7	4.257	4.848	0.00	+4.2	17.9	121.4
Mar. 11	14 44.64	+09 30.5	4.209	4.909	-0.14	+4.3	18.0	130.2
Mar. 21	14 42.72	+10 13.0	4.179	4.971	-0.25	+4.1	18.0	138.7
Mar. 31	14 39.72	+10 52.4	4.171	5.033	-0.35	+3.7	18.0	146.3

Comet C/2021 G5 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Feb. 11.07335 TT  
 Peri. = 270.92385  
 Node = 323.68004 2000.0  
 Incl. = 50.78215  
 q = 3.2419256 AU  
 e = 0.9985586

$$m1 = 8.3 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	14 45.54	-61 40.9	3.665	3.260	+2.73	-16.1	16.3	58.4
Jan. 16	15 13.95	-64 16.9	3.597	3.251	+2.99	-15.0	16.2	61.9
Jan. 26	15 45.09	-66 40.3	3.530	3.246	+3.27	-13.5	16.2	65.4
Feb. 5	16 19.01	-68 47.9	3.463	3.242	+3.54	-11.8	16.1	68.9
Feb. 15	16 55.55	-70 37.1	3.399	3.242	+3.78	-9.8	16.1	72.5
Feb. 25	17 34.06	-72 06.5	3.335	3.245	+3.92	-7.8	16.0	76.2
Mar. 7	18 13.35	-73 16.0	3.272	3.250	+3.92	-5.9	16.0	80.0
Mar. 17	18 51.92	-74 07.6	3.211	3.258	+3.75	-4.3	16.0	83.9
Mar. 27	19 28.05	-74 45.1	3.150	3.269	+3.41	-3.1	15.9	87.9
Apr. 6	20 00.17	-75 13.2	3.091	3.282	+2.95	-2.5	15.9	92.0
Apr. 16	20 27.13	-75 37.0	3.034	3.299	+2.37	-2.3	15.9	96.3
Apr. 26	20 47.89	-76 01.0	2.980	3.318	+1.70	-2.5	15.9	100.7
May 6	21 01.57	-76 27.7	2.930	3.339	+0.94	-2.8	15.9	105.2
May 16	21 07.20	-76 57.4	2.886	3.363	+0.07	-3.1	15.9	109.6
May 26	21 03.60	-77 27.2	2.849	3.389	-0.91	-2.8	15.9	114.0
June 5	20 49.98	-77 50.1	2.821	3.418	-1.91	-1.5	15.9	118.1
June 15	20 26.86	-77 56.0	2.806	3.449	-2.74	+0.8	15.9	121.6
June 25	19 57.32	-77 32.9	2.805	3.482	-3.10	+4.3	16.0	124.4
July 5	19 26.98	-76 32.9	2.820	3.517	-2.85	+8.1	16.0	126.2
July 15	19 01.14	-74 55.5	2.854	3.554	-2.21	+11.6	16.1	126.5
July 25	18 42.46	-72 46.8	2.908	3.594	-1.45	+14.2	16.2	125.4
Aug. 4	18 31.08	-70 16.2	2.982	3.635	-0.78	+15.9	16.3	122.9
Aug. 14	18 25.78	-67 32.6	3.076	3.677	-0.25	+16.8	16.4	119.1
Aug. 24	18 25.19	-64 43.7	3.189	3.722	+0.15	+17.0	16.5	114.3
Sept. 3	18 28.14	-61 55.1	3.320	3.768	+0.45	+16.7	16.7	108.8
Sept. 13	18 33.66	-59 10.5	3.467	3.815	+0.67	+16.1	16.8	102.6
Sept. 23	18 41.10	-56 32.5	3.626	3.864	+0.83	+15.4	17.0	96.1
Oct. 3	18 49.94	-54 02.1	3.795	3.915	+0.94	+14.6	17.1	89.4
Oct. 13	18 59.80	-51 39.8	3.971	3.966	+1.03	+13.8	17.3	82.5
Oct. 23	19 10.39	-49 25.5	4.151	4.019	+1.09	+13.0	17.4	75.5
Nov. 2	19 21.49	-47 18.5	4.331	4.073	+1.13	+12.3	17.6	68.5
Nov. 12	19 32.92	-45 18.3	4.509	4.128	+1.16	+11.7	17.7	61.4
Nov. 22	19 44.55	-43 24.2	4.682	4.184	+1.17	+11.1	17.9	54.3
Dec. 2	19 56.25	-41 35.5	4.847	4.240	+1.17	+10.6	18.0	47.3
Dec. 12	20 07.91	-39 51.6	5.002	4.298	+1.16	+10.1	18.1	40.3
Dec. 22	20 19.46	-38 12.1	5.143	4.357	+1.14	+9.7	18.2	33.5
Jan. 1	20 30.80	-36 36.5	5.269	4.416	+1.12	+9.4	18.4	27.0
Jan. 11	20 41.87	-35 04.6	5.379	4.476	+1.09	+9.0	18.5	21.1
Jan. 21	20 52.61	-33 36.2	5.471	4.537	+1.05	+8.6	18.6	16.6
Jan. 31	21 02.95	-32 11.4	5.543	4.598	+1.01	+8.3	18.6	14.8
Feb. 10	21 12.83	-30 50.1	5.596	4.660	+0.96	+7.9	18.7	16.7
Feb. 20	21 22.18	-29 32.5	5.629	4.722	+0.90	+7.6	18.8	21.4
Mar. 1	21 30.94	-28 18.7	5.641	4.785	+0.84	+7.2	18.9	27.6
Mar. 11	21 39.06	-27 09.0	5.634	4.848	+0.77	+6.7	18.9	34.5
Mar. 21	21 46.46	-26 03.6	5.608	4.912	+0.70	+6.3	19.0	41.9
Mar. 31	21 53.07	-25 02.8	5.565	4.976	+0.61	+5.8	19.0	49.6

## Comet C/2022 A2 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Feb. 18.27828 TT  
 Peri. = 88.37350  
 Node = 171.58114 2000.0  
 Incl. = 108.14522  
 q = 1.7353255 AU  
 e = 1.0004405

$$m1 = 3.0 + 5 \log(\Delta) + 20.0 \log(r) \quad (\text{vis})$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° '			m		°
Jan. 6	16 06.47	+51 02.6	1.653	1.824	+6.61 +34.9	9.3	83.5
Jan. 16	17 20.72	+56 05.7	1.613	1.789	+8.33 +23.0	9.1	83.3
Jan. 26	18 47.93	+58 34.8	1.635	1.762	+8.85 +4.7	9.0	80.4
Feb. 5	20 11.97	+58 07.3	1.710	1.744	+7.61 -10.5	9.0	75.3
Feb. 15	21 19.77	+55 44.3	1.824	1.736	+5.77 -17.5	9.1	69.0
Feb. 25	22 10.28	+52 41.1	1.962	1.738	+4.26 -18.5	9.3	62.2
Mar. 7	22 47.81	+49 42.1	2.109	1.749	+3.21 -16.9	9.5	55.5
Mar. 17	23 16.52	+47 04.2	2.253	1.770	+2.51 -14.4	9.7	49.1
Mar. 27	23 39.25	+44 51.1	2.386	1.800	+2.02 -12.0	10.0	43.6
Apr. 6	23 57.73	+43 00.7	2.502	1.838	+1.66 -9.9	10.3	39.2
Apr. 16	00 13.06	+41 29.1	2.596	1.885	+1.39 -8.3	10.6	36.4
Apr. 26	00 25.88	+40 12.6	2.666	1.938	+1.16 -7.0	10.9	35.6
May 6	00 36.54	+39 07.2	2.710	1.997	+0.96 -6.1	11.2	36.9
May 16	00 45.25	+38 09.4	2.727	2.062	+0.77 -5.5	11.5	40.3
May 26	00 52.04	+37 16.0	2.718	2.132	+0.57 -5.2	11.7	45.4
June 5	00 56.84	+36 23.3	2.684	2.206	+0.37 -5.4	12.0	51.8
June 15	00 59.52	+35 27.7	2.629	2.283	+0.14 -5.9	12.3	59.3
June 25	00 59.85	+34 24.9	2.554	2.364	-0.11 -6.9	12.5	67.7
July 5	00 57.57	+33 09.7	2.465	2.446	-0.38 -8.4	12.7	77.0
July 15	00 52.41	+31 35.9	2.367	2.531	-0.68 -10.7	12.9	87.3
July 25	00 44.17	+29 36.0	2.267	2.618	-1.00 -13.7	13.1	98.5
Aug. 4	00 32.82	+27 02.4	2.174	2.706	-1.30 -17.5	13.3	110.8
Aug. 14	00 18.64	+23 48.8	2.098	2.795	-1.55 -21.7	13.5	124.1
Aug. 24	00 02.31	+19 53.8	2.052	2.885	-1.71 -25.6	13.8	138.2
Sept. 3	23 44.91	+15 24.2	2.044	2.976	-1.75 -28.3	14.0	152.5
Sept. 13	23 27.73	+10 35.9	2.083	3.067	-1.66 -29.1	14.3	165.2
Sept. 23	23 11.99	+05 50.2	2.173	3.159	-1.46 -27.6	14.7	167.1
Oct. 3	22 58.61	+01 27.0	2.310	3.251	-1.19 -24.5	15.1	156.1
Oct. 13	22 48.04	-02 21.2	2.490	3.343	-0.90 -20.7	15.5	143.2
Oct. 23	22 40.40	-05 29.9	2.705	3.435	-0.61 -16.7	15.9	130.5
Nov. 2	22 35.51	-08 00.5	2.945	3.528	-0.35 -13.1	16.3	118.5
Nov. 12	22 33.08	-09 57.5	3.202	3.620	-0.12 -10.1	16.7	107.2
Nov. 22	22 32.76	-11 26.4	3.468	3.712	+0.07 -7.5	17.1	96.5
Dec. 2	22 34.20	-12 32.4	3.738	3.804	+0.23 -5.5	17.5	86.3
Dec. 12	22 37.09	-13 20.1	4.006	3.896	+0.36 -3.9	17.8	76.6
Dec. 22	22 41.14	-13 53.4	4.266	3.988	+0.46 -2.7	18.2	67.1
Jan. 1	22 46.11	-14 15.4	4.514	4.080	+0.54 -1.7	18.5	58.0
Jan. 11	22 51.79	-14 29.0	4.747	4.171	+0.60 -1.0	18.8	49.2
Jan. 21	22 58.02	-14 36.1	4.961	4.262	+0.65 -0.5	19.1	40.6
Jan. 31	23 04.62	-14 39.0	5.154	4.352	+0.68 -0.1	19.3	32.2
Feb. 10	23 11.49	-14 39.1	5.324	4.442	+0.70 +0.1	19.6	24.2
Feb. 20	23 18.49	-14 38.1	5.469	4.532	+0.70 +0.1	19.8	16.9
Mar. 1	23 25.52	-14 37.2	5.589	4.622	+0.70 0.0	20.0	11.5
Mar. 11	23 32.49	-14 37.7	5.683	4.711	+0.69 -0.2	20.2	11.0
Mar. 21	23 39.30	-14 40.7	5.750	4.800	+0.67 -0.5	20.4	15.9
Mar. 31	23 45.86	-14 47.5	5.793	4.889	+0.64 -0.9	20.6	23.0

Comet P/2022 V1 = 2010 BN109 (WISE-Lemmon)

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 3.03364 TT  
 Peri. = 70.83068 e = 0.5825781  
 Node = 42.89665 2000.0 a = 5.4585258 AU  
 Incl. = 27.06777 n = 0.07728426  
 q = 2.2785082 AU P = 12.75 years

$$m1 = 10.5 + 5 \log(\Delta) + 17.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	04 54.57	+56 08.6	1.498	2.330	-0.94 +2.9	17.8	138.7
Jan. 16	04 47.26	+56 25.1	1.541	2.313	-0.46 +0.2	17.8	131.5
Jan. 26	04 45.19	+56 18.6	1.600	2.300	+0.10 -1.6	17.8	124.0
Feb. 5	04 48.75	+55 57.7	1.670	2.290	+0.66 -2.6	17.9	116.8
Feb. 15	04 57.59	+55 27.8	1.749	2.283	+1.15 -3.4	18.0	109.9
Feb. 25	05 11.05	+54 51.5	1.835	2.279	+1.57 -4.0	18.1	103.5
Mar. 7	05 28.37	+54 09.0	1.925	2.279	+1.91 -4.6	18.2	97.5
Mar. 17	05 48.70	+53 19.0	2.020	2.282	+2.17 -5.5	18.3	91.9
Mar. 27	06 11.28	+52 19.6	2.117	2.288	+2.35 -6.5	18.4	86.7
Apr. 6	06 35.37	+51 09.3	2.217	2.298	+2.46 -7.7	18.6	81.7
Apr. 16	07 00.28	+49 47.0	2.318	2.310	+2.52 -8.9	18.7	77.0
Apr. 26	07 25.50	+48 12.2	2.421	2.326	+2.52 -10.2	18.8	72.5
May 6	07 50.55	+46 25.1	2.526	2.345	+2.48 -11.3	19.0	68.1
May 16	08 15.09	+44 26.7	2.631	2.367	+2.42 -12.4	19.1	63.9
May 26	08 38.92	+42 18.3	2.737	2.391	+2.34 -13.3	19.3	59.7
June 5	09 01.88	+40 01.6	2.844	2.418	+2.25 -14.1	19.5	55.5
June 15	09 23.93	+37 38.3	2.950	2.448	+2.15 -14.6	19.7	51.4
June 25	09 45.07	+35 10.2	3.055	2.480	+2.06 -15.0	19.8	47.2
July 5	10 05.31	+32 38.9	3.159	2.514	+1.98 -15.2	20.0	43.1
July 15	10 24.71	+30 06.1	3.260	2.550	+1.90 -15.3	20.2	38.9
July 25	10 43.34	+27 33.0	3.358	2.588	+1.82 -15.3	20.4	34.7
Aug. 4	11 01.25	+25 01.1	3.451	2.628	+1.75 -15.1	20.5	30.5
Aug. 14	11 18.52	+22 31.1	3.539	2.669	+1.69 -14.8	20.7	26.4
Aug. 24	11 35.20	+20 04.2	3.620	2.712	+1.64 -14.5	20.9	22.4
Sept. 3	11 51.33	+17 41.2	3.693	2.756	+1.58 -14.1	21.0	18.7
Sept. 13	12 06.96	+15 22.6	3.756	2.802	+1.54 -13.6	21.2	15.8
Sept. 23	12 22.12	+13 09.3	3.810	2.848	+1.49 -13.0	21.4	14.3
Oct. 3	12 36.82	+11 01.6	3.852	2.895	+1.44 -12.4	21.5	14.7
Oct. 13	12 51.06	+09 00.1	3.882	2.944	+1.40 -11.8	21.7	17.2
Oct. 23	13 04.83	+07 05.2	3.900	2.993	+1.35 -11.1	21.8	21.1
Nov. 2	13 18.11	+05 17.3	3.903	3.042	+1.30 -10.4	21.9	26.0
Nov. 12	13 30.85	+03 36.7	3.892	3.093	+1.24 -9.6	22.0	31.6
Nov. 22	13 43.00	+02 03.8	3.867	3.144	+1.18 -8.9	.	37.6
Dec. 2	13 54.47	+00 38.7	3.829	3.195	+1.11 -8.1	.	44.1
Dec. 12	14 05.17	+00 38.4	3.776	3.247	+1.02 -7.3	.	50.9
Dec. 22	14 14.98	-01 47.3	3.711	3.298	+0.93 -6.4	.	58.1
Jan. 1	14 23.76	-02 48.0	3.635	3.351	+0.82 -5.6	.	65.6
Jan. 11	14 31.35	-03 40.5	3.549	3.403	+0.69 -4.8	.	73.5
Jan. 21	14 37.59	-04 24.9	3.456	3.456	+0.54 -4.0	.	81.8
Jan. 31	14 42.29	-05 01.6	3.359	3.508	+0.38 -3.2	.	90.5
Feb. 10	14 45.29	-05 30.8	3.261	3.561	+0.20 -2.5	.	99.6
Feb. 20	14 46.42	-05 52.9	3.166	3.614	+0.01 -1.9	.	109.2
Mar. 1	14 45.59	-06 08.8	3.079	3.667	-0.19 -1.3	.	119.2
Mar. 11	14 42.79	-06 19.2	3.005	3.719	-0.39 -0.8	.	129.7
Mar. 21	14 38.12	-06 25.3	2.949	3.772	-0.56 -0.4	.	140.6
Mar. 31	14 31.87	-06 28.5	2.916	3.825	-0.70 -0.2	.	151.7

Comet C/2022 R3 (Leonard)

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 5.19867 TT  
 Peri. = 72.85420  
 Node = 8.23800 2000.0  
 Incl. = 43.08263  
 q = 5.1289689 AU  
 e = 1.0006741

$$m1 = 8.4 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	02 15.99	+61 07.9	4.611	5.148	+0.01	-3.4	18.8	118.1
Jan. 16	02 17.26	+60 33.9	4.696	5.142	+0.27	-3.3	18.9	111.7
Jan. 26	02 21.12	+60 02.6	4.792	5.137	+0.52	-2.9	18.9	105.1
Feb. 5	02 27.37	+59 36.0	4.896	5.133	+0.75	-2.3	19.0	98.4
Feb. 15	02 35.75	+59 15.3	5.005	5.131	+0.95	-1.7	19.0	91.7
Feb. 25	02 46.05	+59 00.7	5.116	5.129	+1.13	-1.1	19.0	85.2
Mar. 7	02 58.05	+58 52.3	5.227	5.129	+1.29	-0.5	19.1	78.9
Mar. 17	03 11.57	+58 49.2	5.335	5.130	+1.43	0.0	19.1	72.8
Mar. 27	03 26.46	+58 50.7	5.439	5.132	+1.56	+0.4	19.2	67.0
Apr. 6	03 42.55	+58 55.8	5.537	5.135	+1.67	+0.7	19.2	61.5
Apr. 16	03 59.73	+59 03.2	5.627	5.139	+1.77	+0.8	19.3	56.3
Apr. 26	04 17.86	+59 11.9	5.709	5.144	+1.86	+0.9	19.3	51.6
May 6	04 36.80	+59 21.0	5.781	5.150	+1.93	+0.9	19.3	47.3
May 16	04 56.43	+59 29.2	5.843	5.158	+2.00	+0.8	19.4	43.5
May 26	05 16.61	+59 36.0	5.895	5.166	+2.04	+0.6	19.4	40.5
June 5	05 37.18	+59 40.7	5.936	5.176	+2.07	+0.3	19.4	38.2
June 15	05 58.00	+59 42.8	5.965	5.187	+2.09	+0.1	19.4	36.8
June 25	06 18.90	+59 42.2	5.983	5.199	+2.09	-0.2	19.4	36.3
July 5	06 39.72	+59 38.8	5.989	5.212	+2.07	-0.5	19.5	36.9
July 15	07 00.33	+59 32.9	5.984	5.225	+2.04	-0.7	19.5	38.4
July 25	07 20.57	+59 24.9	5.967	5.240	+2.00	-0.9	19.5	40.8
Aug. 4	07 40.30	+59 15.5	5.940	5.256	+1.94	-1.0	19.5	43.9
Aug. 14	07 59.41	+59 05.4	5.902	5.274	+1.87	-1.0	19.5	47.7
Aug. 24	08 17.79	+58 55.6	5.854	5.292	+1.79	-0.9	19.5	52.0
Sept. 3	08 35.32	+58 47.1	5.797	5.311	+1.70	-0.7	19.5	56.7
Sept. 13	08 51.92	+58 41.0	5.732	5.331	+1.60	-0.4	19.5	61.8
Sept. 23	09 07.49	+58 38.3	5.659	5.352	+1.49	0.0	19.4	67.2
Oct. 3	09 21.90	+58 40.2	5.581	5.374	+1.37	+0.5	19.4	73.0
Oct. 13	09 35.06	+58 47.5	5.498	5.396	+1.24	+1.1	19.4	78.9
Oct. 23	09 46.82	+59 01.2	5.414	5.420	+1.09	+1.7	19.4	85.1
Nov. 2	09 57.02	+59 21.5	5.329	5.445	+0.93	+2.4	19.4	91.4
Nov. 12	10 05.49	+59 48.7	5.246	5.470	+0.74	+3.1	19.4	97.9
Nov. 22	10 12.00	+60 22.3	5.169	5.497	+0.54	+3.7	19.4	104.3
Dec. 2	10 16.36	+61 01.1	5.099	5.524	+0.31	+4.1	19.4	110.6
Dec. 12	10 18.34	+61 43.3	5.040	5.552	+0.06	+4.3	19.4	116.6
Dec. 22	10 17.76	+62 26.2	4.995	5.581	-0.20	+4.2	19.4	122.2
Jan. 1	10 14.58	+63 06.2	4.966	5.611	-0.46	+3.7	19.4	126.8
Jan. 11	10 08.91	+63 39.3	4.955	5.641	-0.69	+2.8	19.4	130.3
Jan. 21	10 01.12	+64 01.5	4.964	5.673	-0.87	+1.5	19.4	132.3
Jan. 31	09 51.84	+64 09.1	4.994	5.705	-0.98	-0.1	19.5	132.4
Feb. 10	09 41.93	+64 00.1	5.046	5.737	-0.99	-1.9	19.5	130.7
Feb. 20	09 32.32	+63 33.4	5.118	5.771	-0.91	-3.6	19.6	127.3
Mar. 1	09 23.87	+62 50.0	5.210	5.805	-0.76	-5.2	19.6	122.7
Mar. 11	09 17.15	+61 52.0	5.319	5.840	-0.56	-6.5	19.7	117.1
Mar. 21	09 12.51	+60 42.2	5.444	5.875	-0.34	-7.5	19.8	111.0
Mar. 31	09 10.03	+59 23.5	5.582	5.911	-0.13	-8.2	19.9	104.5

Comet C/2022 W2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 8.68494 TT  
 Peri. = 123.25766  
 Node = 320.45213 2000.0  
 Incl. = 63.53013  
 q = 3.1227804 AU  
 e = 0.9906340

$$m1 = 11.1 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	20 41.69	+78 37.9	2.824	3.179	+4.96	+5.9	18.4	102.1
Jan. 16	21 38.03	+79 35.5	2.812	3.163	+6.52	+5.2	18.3	101.8
Jan. 26	22 50.78	+80 16.5	2.811	3.149	+8.14	+2.3	18.3	100.9
Feb. 5	00 16.66	+80 16.8	2.824	3.138	+8.87	-3.0	18.3	99.3
Feb. 15	01 42.85	+79 18.8	2.850	3.130	+8.07	-9.1	18.3	97.1
Feb. 25	02 56.60	+77 24.7	2.892	3.125	+6.49	-13.9	18.4	94.2
Mar. 7	03 54.71	+74 49.8	2.949	3.123	+5.05	-17.1	18.4	90.7
Mar. 17	04 40.12	+71 49.8	3.020	3.124	+4.00	-18.9	18.4	86.6
Mar. 27	05 16.64	+68 36.5	3.106	3.128	+3.28	-19.7	18.5	82.1
Apr. 6	05 47.04	+65 18.1	3.202	3.135	+2.78	-19.9	18.6	77.1
Apr. 16	06 13.18	+61 59.7	3.309	3.145	+2.43	-19.7	18.7	71.9
Apr. 26	06 36.26	+58 44.7	3.423	3.158	+2.17	-19.2	18.8	66.4
May 6	06 57.06	+55 35.0	3.541	3.173	+1.97	-18.6	18.9	60.8
May 16	07 16.08	+52 31.8	3.661	3.192	+1.82	-18.0	19.0	55.1
May 26	07 33.69	+49 35.4	3.780	3.213	+1.69	-17.3	19.1	49.3
June 5	07 50.12	+46 45.9	3.896	3.237	+1.59	-16.6	19.2	43.5
June 15	08 05.55	+44 03.1	4.007	3.264	+1.49	-15.9	19.3	37.8
June 25	08 20.12	+41 26.6	4.109	3.293	+1.41	-15.3	19.3	32.1
July 5	08 33.88	+38 56.0	4.202	3.324	+1.34	-14.8	19.4	26.6
July 15	08 46.92	+36 30.8	4.283	3.358	+1.27	-14.2	19.5	21.6
July 25	08 59.27	+34 10.6	4.350	3.394	+1.20	-13.8	19.6	17.4
Aug. 4	09 10.95	+31 55.2	4.403	3.432	+1.13	-13.3	19.7	15.0
Aug. 14	09 21.97	+29 44.0	4.440	3.473	+1.07	-12.9	19.7	15.3
Aug. 24	09 32.33	+27 37.1	4.460	3.515	+1.00	-12.5	19.8	18.4
Sept. 3	09 41.98	+25 34.0	4.463	3.559	+0.93	-12.1	19.9	23.4
Sept. 13	09 50.91	+23 34.7	4.448	3.605	+0.85	-11.7	19.9	29.3
Sept. 23	09 59.06	+21 39.2	4.416	3.652	+0.77	-11.4	20.0	36.0
Oct. 3	10 06.34	+19 47.3	4.368	3.701	+0.68	-11.0	20.0	43.1
Oct. 13	10 12.67	+17 59.1	4.303	3.752	+0.58	-10.6	20.0	50.7
Oct. 23	10 17.95	+16 14.7	4.225	3.803	+0.46	-10.2	20.0	58.7
Nov. 2	10 22.04	+14 34.2	4.134	3.856	+0.34	-9.8	20.0	67.0
Nov. 12	10 24.81	+12 57.7	4.034	3.911	+0.20	-9.4	20.1	75.8
Nov. 22	10 26.10	+11 25.6	3.928	3.966	+0.04	-9.0	20.1	85.0
Dec. 2	10 25.77	+09 58.2	3.821	4.023	-0.13	-8.5	20.1	94.7
Dec. 12	10 23.70	+08 35.7	3.716	4.080	-0.31	-7.9	20.1	104.8
Dec. 22	10 19.79	+07 18.9	3.621	4.139	-0.49	-7.4	20.1	115.4
Jan. 1	10 14.09	+06 08.0	3.540	4.198	-0.67	-6.7	20.1	126.4
Jan. 11	10 06.72	+05 03.9	3.480	4.258	-0.82	-6.0	20.1	137.7
Jan. 21	09 57.96	+04 06.9	3.446	4.319	-0.94	-5.3	20.1	149.0
Jan. 31	09 48.27	+03 17.4	3.443	4.381	-1.00	-4.5	20.2	159.9
Feb. 10	09 38.20	+02 35.5	3.474	4.443	-1.00	-3.8	20.3	167.8
Feb. 20	09 28.36	+02 00.5	3.540	4.506	-0.95	-3.2	20.4	166.1
Mar. 1	09 19.32	+01 31.4	3.641	4.569	-0.84	-2.6	20.5	157.0
Mar. 11	09 11.51	+01 07.0	3.773	4.633	-0.70	-2.2	20.6	146.5
Mar. 21	09 05.23	+00 45.6	3.932	4.698	-0.54	-2.0	20.8	135.8
Mar. 31	09 00.62	+00 25.6	4.113	4.763	-0.37	-2.0	20.9	125.4



Comet 256P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 12.20824 TT  
 Peri. = 124.18656 e = 0.4179756  
 Node = 81.32797 2000.0 a = 4.6394924 AU  
 Incl. = 27.62032 n = 0.09862758  
 q = 2.7002978 AU P = 9.99 years

$$m1 = 14.5 + 5 \log(\Delta) + 5.0 \log(r(t+80))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	14 37.01	+11 19.4	2.840	2.736	+1.37	-3.1	18.9	73.9
Jan. 16	14 50.31	+10 52.9	2.720	2.726	+1.27	-2.1	18.8	79.9
Jan. 26	15 02.45	+10 37.3	2.600	2.718	+1.14	-1.0	18.7	86.2
Feb. 5	15 13.19	+10 32.3	2.480	2.711	+0.99	+0.1	18.6	92.7
Feb. 15	15 22.28	+10 37.0	2.362	2.706	+0.81	+1.0	18.5	99.5
Feb. 25	15 29.43	+10 50.1	2.248	2.702	+0.60	+1.7	18.4	106.6
Mar. 7	15 34.34	+11 09.2	2.141	2.701	+0.36	+2.1	18.3	114.0
Mar. 17	15 36.79	+11 30.9	2.043	2.700	+0.10	+2.2	18.3	121.6
Mar. 27	15 36.59	+11 50.9	1.956	2.702	-0.17	+1.7	18.2	129.4
Apr. 6	15 33.74	+12 03.5	1.885	2.705	-0.42	+0.6	18.1	137.1
Apr. 16	15 28.45	+12 02.8	1.833	2.711	-0.65	-1.0	18.1	144.2
Apr. 26	15 21.22	+11 43.0	1.801	2.717	-0.80	-3.2	18.0	149.7
May 6	15 12.80	+11 00.0	1.793	2.726	-0.87	-5.7	18.0	152.1
May 16	15 04.14	+09 52.4	1.810	2.735	-0.84	-8.1	18.1	150.6
May 26	14 56.15	+08 21.7	1.851	2.747	-0.73	-10.2	18.1	145.6
June 5	14 49.64	+06 31.7	1.915	2.760	-0.55	-11.9	18.2	138.7
June 15	14 45.10	+04 27.8	2.001	2.775	-0.33	-13.0	18.3	130.9
June 25	14 42.80	+02 15.0	2.105	2.791	-0.10	-13.6	18.5	122.9
July 5	14 42.78	+00 02.0	2.224	2.808	+0.12	-13.8	18.6	114.9
July 15	14 44.92	-02 19.9	2.356	2.827	+0.33	-13.7	18.8	107.1
July 25	14 49.07	-04 36.1	2.496	2.847	+0.52	-13.5	18.9	99.6
Aug. 4	14 55.01	-06 48.9	2.643	2.868	+0.68	-13.1	19.1	92.3
Aug. 14	15 02.54	-08 57.3	2.794	2.891	+0.83	-12.6	19.2	85.2
Aug. 24	15 11.46	-11 00.4	2.947	2.915	+0.96	-12.0	19.3	78.3
Sept. 3	15 21.61	-12 57.8	3.099	2.940	+1.08	-11.4	19.5	71.6
Sept. 13	15 32.84	-14 48.9	3.248	2.965	+1.18	-10.8	19.6	64.9
Sept. 23	15 45.02	-16 33.6	3.393	2.992	+1.27	-10.1	19.7	58.4
Oct. 3	15 58.02	-18 11.5	3.532	3.020	+1.34	-9.4	19.8	52.0
Oct. 13	16 11.76	-19 42.5	3.663	3.049	+1.41	-8.7	19.9	45.6
Oct. 23	16 26.13	-21 06.3	3.784	3.078	+1.47	-8.0	20.0	39.2
Nov. 2	16 41.02	-22 22.9	3.895	3.108	+1.52	-7.3	20.1	32.8
Nov. 12	16 56.36	-23 32.3	3.994	3.139	+1.55	-6.5	20.2	26.5
Nov. 22	17 12.05	-24 34.4	4.080	3.171	+1.58	-5.8	20.2	20.1
Dec. 2	17 27.97	-25 29.4	4.152	3.203	+1.60	-5.1	20.3	13.8
Dec. 12	17 44.06	-26 17.5	4.209	3.236	+1.61	-4.4	20.3	7.6
Dec. 22	18 00.19	-26 59.1	4.250	3.269	+1.61	-3.8	20.4	3.6
Jan. 1	18 16.27	-27 34.8	4.275	3.303	+1.60	-3.3	20.4	7.4
Jan. 11	18 32.20	-28 05.1	4.284	3.337	+1.58	-2.8	20.5	13.7
Jan. 21	18 47.86	-28 30.9	4.277	3.371	+1.55	-2.4	20.5	20.3
Jan. 31	19 03.16	-28 53.1	4.254	3.406	+1.51	-2.1	20.5	27.1
Feb. 10	19 17.99	-29 12.8	4.216	3.442	+1.45	-1.9	20.5	34.0
Feb. 20	19 32.25	-29 31.2	4.162	3.477	+1.39	-1.8	20.5	41.0
Mar. 1	19 45.81	-29 49.6	4.096	3.513	+1.32	-1.9	20.5	48.1
Mar. 11	19 58.60	-30 09.5	4.017	3.549	+1.23	-2.1	20.4	55.4
Mar. 21	20 10.46	-30 32.3	3.928	3.585	+1.13	-2.5	20.4	62.9
Mar. 31	20 21.29	-30 59.6	3.831	3.621	+1.02	-3.0	20.4	70.5

Comet C/2023 A1 (Leonard)

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 18.73440 TT  
 Peri. = 159.25579  
 Node = 318.29634 2000.0  
 Incl. = 94.75422  
 q = 1.8348502 AU  
 e = 0.9938333

$$m1 = 13.4 + 5 \log(\Delta) + 12.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	15 48.16	+50 40.7	1.876	2.044	-0.23	+19.4	18.6	85.2
Jan. 16	15 43.36	+54 29.3	1.700	1.992	-0.87	+27.3	18.3	91.9
Jan. 26	15 29.45	+59 41.5	1.530	1.947	-2.24	+36.0	17.9	99.2
Feb. 5	14 54.56	+66 13.6	1.378	1.909	-5.61	+41.8	17.6	106.5
Feb. 15	13 25.63	+72 40.4	1.261	1.878	-14.03	+28.2	17.3	112.8
Feb. 25	10 34.85	+73 28.7	1.195	1.855	-16.83	-28.7	17.1	115.9
Mar. 7	08 31.63	+65 24.0	1.196	1.841	-7.32	-64.1	17.1	114.2
Mar. 17	07 42.09	+54 16.6	1.264	1.835	-2.86	-66.5	17.2	108.0
Mar. 27	07 22.65	+43 47.6	1.389	1.838	-1.10	-57.6	17.4	99.4
Apr. 6	07 15.71	+34 59.5	1.552	1.849	-0.30	-47.1	17.7	90.2
Apr. 16	07 14.84	+27 51.2	1.739	1.869	+0.13	-38.1	18.0	81.2
Apr. 26	07 17.34	+22 03.1	1.936	1.897	+0.38	-31.2	18.3	72.7
May 6	07 21.87	+17 14.2	2.134	1.933	+0.53	-26.3	18.6	64.8
May 16	07 27.69	+13 07.5	2.327	1.976	+0.64	-22.9	18.9	57.4
May 26	07 34.38	+09 30.0	2.509	2.025	+0.71	-20.5	19.2	50.7
June 5	07 41.65	+06 12.3	2.678	2.080	+0.75	-19.0	19.5	44.5
June 15	07 49.31	+03 07.3	2.831	2.140	+0.78	-18.0	19.8	39.0
June 25	07 57.22	+00 09.6	2.967	2.205	+0.80	-17.5	20.1	34.4
July 5	08 05.25	-02 44.9	3.085	2.274	+0.81	-17.4	20.3	30.9
July 15	08 13.30	-05 39.3	3.184	2.346	+0.80	-17.5	20.5	28.9
July 25	08 21.27	-08 36.3	3.265	2.421	+0.79	-17.9	20.8	28.5
Aug. 4	08 29.06	-11 38.1	3.329	2.499	+0.77	-18.5	21.0	29.7
Aug. 14	08 36.57	-14 46.4	3.376	2.579	+0.73	-19.2	21.2	32.4
Aug. 24	08 43.68	-18 02.7	3.409	2.661	+0.68	-20.1	21.4	36.2
Sept. 3	08 50.25	-21 27.9	3.428	2.745	+0.62	-21.0	21.6	40.8
Sept. 13	08 56.12	-25 02.9	3.437	2.830	+0.54	-22.0	21.7	45.8
Sept. 23	09 01.08	-28 47.9	3.437	2.916	+0.44	-23.0	21.9	51.2
Oct. 3	09 04.87	-32 42.4	3.432	3.002	+0.30	-23.9	22.0	56.7
Oct. 13	09 07.17	-36 45.4	3.425	3.090	+0.13	-24.7	.	62.3
Oct. 23	09 07.53	-40 54.6	3.419	3.178	-0.09	-25.1	.	67.7
Nov. 2	09 05.41	-45 06.5	3.417	3.267	-0.37	-25.2	.	73.0
Nov. 12	09 00.11	-49 15.9	3.422	3.355	-0.74	-24.6	.	77.8
Nov. 22	08 50.77	-53 15.8	3.437	3.445	-1.19	-23.1	.	82.2
Dec. 2	08 36.46	-56 56.8	3.464	3.534	-1.74	-20.7	.	85.9
Dec. 12	08 16.41	-60 08.1	3.505	3.623	-2.34	-17.0	.	88.9
Dec. 22	07 50.50	-62 37.5	3.561	3.713	-2.88	-12.2	.	91.1
Jan. 1	07 19.94	-64 15.1	3.632	3.802	-3.22	-6.7	.	92.4
Jan. 11	06 47.48	-64 56.0	3.717	3.891	-3.21	-1.0	.	92.8
Jan. 21	06 16.71	-64 43.2	3.815	3.980	-2.86	+3.9	.	92.4
Jan. 31	05 50.54	-63 47.5	3.924	4.069	-2.30	+7.4	.	91.4
Feb. 10	05 30.27	-62 22.4	4.041	4.158	-1.69	+9.6	.	89.9
Feb. 20	05 15.90	-60 40.8	4.165	4.247	-1.14	+10.6	.	88.0
Mar. 1	05 06.65	-58 53.4	4.292	4.335	-0.68	+10.8	.	85.9
Mar. 11	05 01.59	-57 07.5	4.422	4.423	-0.31	+10.3	.	83.6
Mar. 21	04 59.86	-55 28.3	4.550	4.511	-0.02	+9.4	.	81.5
Mar. 31	05 00.70	-53 59.4	4.677	4.599	+0.20	+8.2	.	79.4

Comet 5D/Brorsen [Orbit 3]

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 26.30050 TT  
 Peri. = 21.21978 e = 0.8336350  
 Node = 94.46123 2000.0 a = 3.1546996 AU  
 Incl. = 18.69756 n = 0.17590049  
 q = 0.5248316 AU P = 5.60 years

$$m1 = 15.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot. /PA	Elong.
2023/24	h m	°			for T=+1 day			°
Jan. 6	22 31.44	-24 19.8	1.992	1.505	-0.43 -2.1	18.3	28.0/ 58	47.0
Jan. 16	22 49.70	-21 40.2	1.934	1.371	-0.50 -3.6	17.8	32.1/ 58	42.0
Jan. 26	23 10.21	-18 36.8	1.856	1.232	-0.59 -5.6	17.2	36.8/ 57	37.6
Feb. 5	23 33.12	-15 03.1	1.758	1.089	-0.71 -8.3	16.6	42.3/ 57	33.9
Feb. 15	23 58.73	-10 49.9	1.639	0.943	-0.84 -11.9	15.8	49.0/ 55	31.1
Feb. 25	00 27.47	-05 44.4	1.499	0.799	-0.98 -17.1	14.9	57.0/ 53	29.2
Mar. 7	00 59.67	+00 30.7	1.336	0.664	-1.07 -24.4	13.9	66.2/ 51	28.6
Mar. 17	01 35.06	+08 14.4	1.149	0.562	-0.92 -33.9	12.8	75.0/ 46	29.3
Mar. 27	02 11.86	+17 37.1	0.946	0.525	-0.22 -45.0	12.1	80.8/ 40	31.2
Apr. 6	02 48.92	+28 36.2	0.750	0.573	+0.92 -58.9	12.0	87.9/ 35	34.6
Apr. 16	03 34.39	+41 28.5	0.588	0.682	+1.49 -82.8	12.2	106.7/ 37	41.2
Apr. 26	04 59.98	+55 57.3	0.475	0.818	-1.97 117.0	12.5	138.4/ 52	53.5
May 6	08 15.61	+63 30.6	0.427	0.963	-18.15 -84.2	13.0	159.5/ 96	71.6
May 16	11 13.35	+52 02.1	0.455	1.109	-16.19 +21.1	13.7	139.7/134	90.0
May 26	12 26.59	+36 17.7	0.550	1.251	-9.36 +45.9	14.7	101.0/146	102.3
June 5	13 02.64	+24 11.2	0.689	1.390	-5.98 +40.2	15.6	70.6/148	107.8
June 15	13 25.69	+15 31.6	0.857	1.523	-4.19 +31.2	16.5	51.7/147	108.6
June 25	13 43.36	+09 10.5	1.044	1.652	-3.13 +23.9	17.3	40.3/144	106.6
July 5	13 58.54	+04 19.0	1.245	1.776	-2.43 +18.6	18.0	33.3/140	103.1
July 15	14 12.49	+00 27.2	1.457	1.896	-1.95 +14.7	18.6	29.0/135	98.6
July 25	14 25.88	-02 43.4	1.676	2.012	-1.60 +11.8	19.2	26.3/131	93.5
Aug. 4	14 39.02	-05 24.1	1.901	2.124	-1.34 +9.6	19.7	24.4/127	88.0
Aug. 14	14 52.08	-07 42.2	2.129	2.233	-1.13 +7.9	20.1	23.2/123	82.3
Aug. 24	15 05.18	-09 42.6	2.358	2.338	-0.97 +6.6	20.6	22.4/120	76.5
Sept. 3	15 18.35	-11 28.5	2.585	2.440	-0.85 +5.6	20.9	21.8/117	70.4
Sept. 13	15 31.61	-13 02.2	2.808	2.539	-0.74 +4.7	21.3	21.3/114	64.3
Sept. 23	15 44.98	-14 25.4	3.025	2.635	-0.65 +4.0	21.6	21.0/112	58.0
Oct. 3	15 58.42	-15 39.0	3.234	2.728	-0.58 +3.4	21.9	20.6/110	51.7
Oct. 13	16 11.92	-16 44.1	3.432	2.819	-0.52 +3.0	.	20.3/107	45.2
Oct. 23	16 25.46	-17 41.1	3.618	2.908	-0.46 +2.6	.	20.0/105	38.7
Nov. 2	16 38.97	-18 30.7	3.789	2.994	-0.42 +2.2	.	19.7/103	32.0
Nov. 12	16 52.41	-19 13.3	3.944	3.078	-0.38 +2.0	.	19.4/102	25.2
Nov. 22	17 05.74	-19 49.3	4.081	3.159	-0.34 +1.7	.	18.9/100	18.4
Dec. 2	17 18.88	-20 19.0	4.199	3.239	-0.31 +1.6	.	18.5/ 98	11.5
Dec. 12	17 31.76	-20 42.9	4.297	3.316	-0.28 +1.4	.	18.0/ 97	4.8
Dec. 22	17 44.31	-21 01.5	4.373	3.392	-0.26 +1.3	.	17.3/ 95	4.0
Jan. 1	17 56.43	-21 15.2	4.427	3.466	-0.23 +1.2	.	16.6/ 94	10.8
Jan. 11	18 08.06	-21 24.8	4.459	3.538	-0.22 +1.1	.	15.8/ 93	18.1
Jan. 21	18 19.09	-21 30.7	4.470	3.608	-0.20 +1.0	.	14.9/ 92	25.7
Jan. 31	18 29.40	-21 33.7	4.459	3.677	-0.19 +1.0	.	13.8/ 91	33.5
Feb. 10	18 38.92	-21 34.7	4.427	3.744	-0.17 +0.9	.	12.6/ 90	41.4
Feb. 20	18 47.50	-21 34.3	4.377	3.810	-0.17 +0.9	.	11.2/ 90	49.5
Mar. 1	18 55.02	-21 33.6	4.310	3.874	-0.16 +0.9	.	9.6/ 90	57.8
Mar. 11	19 01.36	-21 33.4	4.228	3.936	-0.15 +0.9	.	7.9/ 90	66.3
Mar. 21	19 06.36	-21 34.5	4.135	3.997	-0.15 +0.9	.	5.9/ 92	75.1
Mar. 31	19 09.89	-21 38.0	4.034	4.057	-0.15 +0.9	.	3.7/ 98	84.2

## Comet C/2019 U5 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Mar. 29.81766 TT  
 Peri. = 181.49083  
 Node = 2.63713 2000.0  
 Incl. = 113.51919  
 q = 3.6241752 AU  
 e = 1.0014228

$$m1 = 6.0 + 5 \log(\Delta) + 7.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	13 50.34	+03 15.3	3.726	3.701	-0.30	-5.2	13.1	80.9
Jan. 16	13 46.36	+02 25.5	3.525	3.683	-0.52	-4.7	13.0	91.4
Jan. 26	13 39.97	+01 40.8	3.325	3.668	-0.79	-4.2	12.8	102.6
Feb. 5	13 30.78	+01 00.7	3.134	3.655	-1.09	-3.8	12.7	114.6
Feb. 15	13 18.46	+00 24.9	2.960	3.645	-1.41	-3.4	12.6	127.3
Feb. 25	13 02.90	+00 07.0	2.815	3.636	-1.73	-3.0	12.5	140.9
Mar. 7	12 44.33	+00 35.7	2.706	3.630	-2.00	-2.7	12.4	155.1
Mar. 17	12 23.52	-01 02.0	2.642	3.626	-2.16	-2.5	12.3	169.9
Mar. 27	12 01.65	-01 26.7	2.629	3.624	-2.19	-2.4	12.3	175.1
Apr. 6	11 40.20	-01 50.9	2.667	3.625	-2.07	-2.4	12.3	160.2
Apr. 16	11 20.49	-02 15.9	2.753	3.627	-1.83	-2.6	12.4	145.9
Apr. 26	11 03.47	-02 43.0	2.878	3.632	-1.53	-2.9	12.5	132.3
May 6	10 49.56	-03 13.2	3.034	3.640	-1.22	-3.2	12.6	119.6
May 16	10 38.77	-03 47.5	3.212	3.649	-0.92	-3.7	12.8	107.8
May 26	10 30.85	-04 26.4	3.402	3.661	-0.65	-4.2	12.9	96.7
June 5	10 25.45	-05 10.4	3.596	3.675	-0.42	-4.7	13.0	86.4
June 15	10 22.16	-05 59.7	3.788	3.691	-0.23	-5.2	13.1	76.7
June 25	10 20.60	-06 54.5	3.974	3.709	-0.07	-5.8	13.3	67.7
July 5	10 20.43	-07 54.9	4.147	3.729	+0.05	-6.3	13.4	59.1
July 15	10 21.37	-09 00.9	4.305	3.751	+0.14	-6.9	13.5	51.1
July 25	10 23.15	-10 12.8	4.446	3.775	+0.22	-7.5	13.6	43.6
Aug. 4	10 25.56	-11 30.6	4.565	3.801	+0.27	-8.1	13.6	36.7
Aug. 14	10 28.41	-12 54.4	4.663	3.829	+0.30	-8.7	13.7	30.8
Aug. 24	10 31.52	-14 24.3	4.738	3.858	+0.32	-9.3	13.8	26.4
Sept. 3	10 34.71	-16 00.6	4.790	3.890	+0.32	-10.0	13.8	24.0
Sept. 13	10 37.85	-17 43.2	4.817	3.923	+0.30	-10.6	13.9	24.4
Sept. 23	10 40.74	-19 32.6	4.822	3.957	+0.27	-11.3	13.9	27.3
Oct. 3	10 43.23	-21 28.6	4.805	3.994	+0.22	-12.0	13.9	32.2
Oct. 13	10 45.11	-23 31.5	4.767	4.032	+0.15	-12.7	13.9	38.3
Oct. 23	10 46.16	-25 41.0	4.710	4.071	+0.05	-13.3	13.9	45.2
Nov. 2	10 46.13	-27 56.8	4.638	4.111	-0.07	-13.9	13.9	52.6
Nov. 12	10 44.74	-30 18.1	4.553	4.153	-0.23	-14.4	13.9	60.3
Nov. 22	10 41.65	-32 43.6	4.460	4.197	-0.42	-14.7	13.9	68.3
Dec. 2	10 36.48	-35 10.8	4.364	4.241	-0.64	-14.7	13.9	76.4
Dec. 12	10 28.87	-37 36.4	4.269	4.287	-0.91	-14.3	13.9	84.4
Dec. 22	10 18.45	-39 55.4	4.181	4.334	-1.21	-13.3	13.9	92.3
Jan. 1	10 05.02	-42 01.2	4.105	4.382	-1.51	-11.6	13.9	99.8
Jan. 11	09 48.59	-43 46.3	4.048	4.430	-1.80	-9.1	13.9	106.6
Jan. 21	09 29.59	-45 02.9	4.013	4.480	-2.01	-5.8	13.9	112.3
Jan. 31	09 08.93	-45 44.9	4.006	4.531	-2.11	-2.2	13.9	116.4
Feb. 10	08 47.86	-45 49.5	4.026	4.583	-2.08	+1.6	14.0	118.7
Feb. 20	08 27.75	-45 18.5	4.076	4.635	-1.91	+4.9	14.0	118.9
Mar. 1	08 09.76	-44 17.8	4.154	4.688	-1.65	+7.4	14.1	117.0
Mar. 11	07 54.60	-42 55.7	4.258	4.742	-1.35	+9.0	14.2	113.5
Mar. 21	07 42.55	-41 21.3	4.383	4.797	-1.04	+9.8	14.3	108.8
Mar. 31	07 33.52	-39 42.8	4.525	4.852	-0.75	+9.8	14.4	103.2

Comet 77P/Longmore

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 3.10022 TT  
 Peri. = 196.72508 e = 0.3518387  
 Node = 14.76791 2000.0 a = 3.6237171 AU  
 Incl. = 24.31859 n = 0.14288039  
 q = 2.3487532 AU P = 6.90 years

$$m1 = 8.1 + 5 \log(\Delta) + 15.0 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	13 52.25	-07 00.2	2.450	2.418	+1.19	-13.1	16.1	76.5
Jan. 16	14 03.72	-09 10.6	2.311	2.404	+1.08	-13.0	15.9	83.3
Jan. 26	14 13.97	-11 20.8	2.173	2.391	+0.95	-13.0	15.7	90.3
Feb. 5	14 22.68	-13 31.5	2.036	2.379	+0.77	-13.1	15.5	97.8
Feb. 15	14 29.50	-15 43.5	1.904	2.370	+0.56	-13.3	15.3	105.6
Feb. 25	14 34.01	-17 57.0	1.780	2.362	+0.31	-13.4	15.1	113.9
Mar. 7	14 35.76	-20 12.0	1.666	2.356	+0.01	-13.5	14.9	122.8
Mar. 17	14 34.37	-22 26.9	1.566	2.352	-0.32	-13.4	14.8	132.1
Mar. 27	14 29.59	-24 38.5	1.483	2.349	-0.67	-12.8	14.6	141.8
Apr. 6	14 21.52	-26 41.2	1.421	2.349	-0.97	-11.5	14.5	151.3
Apr. 16	14 10.75	-28 28.7	1.384	2.350	-1.19	-9.6	14.4	159.5
Apr. 26	13 58.43	-29 54.8	1.373	2.354	-1.26	-7.3	14.4	163.1
May 6	13 46.15	-30 57.5	1.388	2.359	-1.16	-5.0	14.4	159.4
May 16	13 35.44	-31 38.9	1.428	2.366	-0.93	-3.2	14.4	151.5
May 26	13 27.51	-32 05.0	1.490	2.375	-0.61	-2.1	14.5	142.5
June 5	13 23.03	-32 23.3	1.571	2.386	-0.25	-1.7	14.6	133.5
June 15	13 22.12	-32 40.2	1.666	2.398	+0.10	-1.8	14.8	125.0
June 25	13 24.62	-33 00.3	1.774	2.412	+0.43	-2.3	14.9	117.0
July 5	13 30.21	-33 26.1	1.890	2.428	+0.71	-2.9	15.1	109.6
July 15	13 38.48	-33 58.4	2.013	2.445	+0.96	-3.6	15.3	102.6
July 25	13 49.11	-34 36.9	2.140	2.463	+1.18	-4.2	15.4	96.0
Aug. 4	14 01.78	-35 20.9	2.269	2.483	+1.37	-4.6	15.6	89.8
Aug. 14	14 16.22	-36 08.8	2.400	2.505	+1.53	-4.9	15.7	83.9
Aug. 24	14 32.24	-36 59.0	2.531	2.528	+1.68	-5.1	15.9	78.3
Sept. 3	14 49.64	-37 50.0	2.661	2.551	+1.81	-5.1	16.0	72.8
Sept. 13	15 08.28	-38 39.8	2.790	2.576	+1.93	-4.9	16.2	67.4
Sept. 23	15 28.02	-39 26.9	2.915	2.602	+2.03	-4.5	16.3	62.2
Oct. 3	15 48.71	-40 09.8	3.036	2.629	+2.12	-4.0	16.5	57.0
Oct. 13	16 10.23	-40 47.0	3.153	2.657	+2.19	-3.4	16.6	52.0
Oct. 23	16 32.44	-41 17.4	3.265	2.686	+2.25	-2.6	16.8	47.0
Nov. 2	16 55.16	-41 39.8	3.369	2.715	+2.29	-1.8	16.9	42.1
Nov. 12	17 18.24	-41 53.5	3.467	2.745	+2.32	-0.9	17.0	37.3
Nov. 22	17 41.51	-41 58.1	3.557	2.776	+2.33	0.0	17.2	32.6
Dec. 2	18 04.78	-41 53.5	3.637	2.807	+2.32	+1.0	17.3	28.2
Dec. 12	18 27.89	-41 39.7	3.708	2.839	+2.30	+1.9	17.4	24.3
Dec. 22	18 50.69	-41 17.2	3.768	2.871	+2.26	+2.7	17.5	21.0
Jan. 1	19 13.02	-40 46.7	3.817	2.904	+2.20	+3.5	17.6	18.8
Jan. 11	19 34.77	-40 09.2	3.854	2.937	+2.14	+4.1	17.7	18.3
Jan. 21	19 55.82	-39 25.7	3.879	2.970	+2.06	+4.6	17.8	19.5
Jan. 31	20 16.09	-38 37.6	3.892	3.003	+1.98	+5.0	17.8	22.3
Feb. 10	20 35.53	-37 46.2	3.891	3.037	+1.90	+5.3	17.9	26.2
Feb. 20	20 54.07	-36 52.8	3.878	3.071	+1.80	+5.4	18.0	30.8
Mar. 1	21 11.68	-35 59.0	3.852	3.105	+1.71	+5.3	18.0	35.9
Mar. 11	21 28.33	-35 06.2	3.814	3.139	+1.61	+5.2	18.1	41.4
Mar. 21	21 43.96	-34 16.0	3.763	3.172	+1.51	+4.8	18.1	47.2
Mar. 31	21 58.54	-33 29.6	3.702	3.206	+1.40	+4.4	18.2	53.3

## Comet A/2019 02

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 7.10691 TT  
 Peri. = 129.63418 e = 0.8329914  
 Node = 48.26098 2000.0 a = 57.9777910 AU  
 Incl. = 93.30896 n = 0.00223260  
 q = 9.6827897 AU P = 441.46 years

$$m1 = 9.2 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	16 35.12	+30 01.1	10.088	9.694	+0.29 0.0	19.2	63.8
Jan. 16	16 37.82	+30 03.7	10.005	9.691	+0.24 +0.6	19.1	68.7
Jan. 26	16 40.01	+30 12.8	9.911	9.689	+0.19 +1.2	19.1	74.2
Feb. 5	16 41.59	+30 27.6	9.810	9.688	+0.12 +1.8	19.1	80.0
Feb. 15	16 42.47	+30 47.3	9.704	9.686	+0.05 +2.2	19.1	86.1
Feb. 25	16 42.58	+31 10.7	9.595	9.685	-0.03 +2.5	19.0	92.3
Mar. 7	16 41.86	+31 36.5	9.489	9.684	-0.12 +2.6	19.0	98.4
Mar. 17	16 40.25	+32 03.0	9.386	9.683	-0.21 +2.6	19.0	104.5
Mar. 27	16 37.76	+32 28.6	9.293	9.683	-0.30 +2.4	19.0	110.2
Apr. 6	16 34.41	+32 51.5	9.210	9.683	-0.38 +2.1	19.0	115.5
Apr. 16	16 30.27	+33 09.9	9.142	9.683	-0.45 +1.5	18.9	120.0
Apr. 26	16 25.44	+33 22.0	9.091	9.683	-0.52 +0.8	18.9	123.5
May 6	16 20.08	+33 26.3	9.059	9.684	-0.56 0.0	18.9	125.8
May 16	16 14.37	+33 21.9	9.048	9.685	-0.58 -1.0	18.9	126.6
May 26	16 08.51	+33 07.8	9.057	9.686	-0.59 -1.9	18.9	125.9
June 5	16 02.73	+32 44.0	9.088	9.687	-0.57 -2.9	18.9	123.7
June 15	15 57.21	+32 10.8	9.138	9.689	-0.53 -3.8	18.9	120.2
June 25	15 52.15	+31 28.7	9.208	9.691	-0.48 -4.6	19.0	115.6
July 5	15 47.68	+30 39.0	9.294	9.693	-0.41 -5.3	19.0	110.3
July 15	15 43.92	+29 43.0	9.394	9.696	-0.33 -5.9	19.0	104.4
July 25	15 40.93	+28 42.0	9.505	9.698	-0.26 -6.3	19.0	98.0
Aug. 4	15 38.74	+27 37.6	9.623	9.701	-0.17 -6.6	19.1	91.4
Aug. 14	15 37.35	+26 31.1	9.746	9.705	-0.10 -6.7	19.1	84.7
Aug. 24	15 36.74	+25 23.9	9.870	9.708	-0.02 -6.7	19.1	77.9
Sept. 3	15 36.85	+24 17.2	9.992	9.712	+0.05 -6.6	19.1	71.1
Sept. 13	15 37.64	+23 12.0	10.107	9.716	+0.11 -6.4	19.2	64.5
Sept. 23	15 39.03	+22 09.2	10.213	9.720	+0.17 -6.1	19.2	58.1
Oct. 3	15 40.95	+21 09.7	10.307	9.725	+0.22 -5.8	19.2	52.1
Oct. 13	15 43.31	+20 14.0	10.387	9.730	+0.26 -5.3	19.2	46.7
Oct. 23	15 46.04	+19 22.7	10.449	9.735	+0.29 -4.9	19.2	42.2
Nov. 2	15 49.05	+18 36.4	10.493	9.740	+0.31 -4.4	19.2	38.9
Nov. 12	15 52.24	+17 55.3	10.516	9.745	+0.33 -3.8	19.3	37.2
Nov. 22	15 55.54	+17 19.7	10.518	9.751	+0.33 -3.2	19.3	37.3
Dec. 2	15 58.84	+16 49.9	10.499	9.757	+0.33 -2.7	19.3	39.4
Dec. 12	16 02.06	+16 25.9	10.459	9.764	+0.31 -2.1	19.2	43.2
Dec. 22	16 05.11	+16 07.7	10.398	9.770	+0.29 -1.5	19.2	48.2
Jan. 1	16 07.88	+15 55.3	10.319	9.777	+0.26 -0.9	19.2	54.3
Jan. 11	16 10.28	+15 48.5	10.222	9.784	+0.22 -0.4	19.2	61.1
Jan. 21	16 12.23	+15 46.9	10.112	9.792	+0.17 +0.1	19.2	68.4
Jan. 31	16 13.64	+15 50.1	9.990	9.799	+0.11 +0.6	19.2	76.0
Feb. 10	16 14.44	+15 57.3	9.861	9.807	+0.04 +0.9	19.1	84.0
Feb. 20	16 14.54	+16 07.9	9.729	9.815	-0.03 +1.2	19.1	92.1
Mar. 1	16 13.92	+16 20.9	9.598	9.824	-0.10 +1.4	19.1	100.3
Mar. 11	16 12.54	+16 35.2	9.472	9.832	-0.18 +1.4	19.0	108.5
Mar. 21	16 10.39	+16 49.4	9.356	9.841	-0.26 +1.4	19.0	116.5
Mar. 31	16 07.50	+17 02.4	9.254	9.850	-0.33 +1.2	19.0	124.2

Comet 300P/Catalina

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 11.11309 TT  
 Peri. = 222.95284 e = 0.6917035  
 Node = 95.62248 2000.0 a = 2.6988886 AU  
 Incl. = 5.67411 n = 0.22229344  
 q = 0.8320579 AU P = 4.43 years

$$m1 = 15.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	16 12.61	-17 43.6	2.174	1.566	+3.18 -9.3	19.5	40.7
Jan. 16	16 45.99	-19 09.8	2.027	1.467	+3.54 -7.7	19.1	42.8
Jan. 26	17 23.22	-20 17.2	1.888	1.366	+3.95 -5.4	18.6	44.1
Feb. 5	18 04.67	-20 56.4	1.764	1.267	+4.39 -1.9	18.2	44.5
Feb. 15	18 50.48	-20 56.0	1.658	1.169	+4.81 +2.7	17.7	44.0
Feb. 25	19 40.22	-20 03.7	1.576	1.076	+5.15 +8.5	17.2	42.4
Mar. 7	20 32.79	-18 10.8	1.522	0.991	+5.35 +14.8	16.8	39.8
Mar. 17	21 26.61	-15 15.9	1.499	0.919	+5.38 +20.6	16.4	36.6
Mar. 27	22 19.95	-11 28.1	1.507	0.865	+5.25 +25.0	16.2	33.1
Apr. 6	23 11.40	-07 05.5	1.544	0.836	+5.00 +27.3	16.1	29.6
Apr. 16	00 00.11	-02 29.8	1.603	0.836	+4.70 +27.5	16.1	26.5
Apr. 26	00 45.71	+01 59.0	1.679	0.864	+4.38 +25.8	16.4	24.1
May 6	01 28.10	+06 05.5	1.764	0.917	+4.07 +23.0	16.8	22.5
May 16	02 07.42	+09 41.3	1.854	0.989	+3.77 +19.7	17.2	21.7
May 26	02 43.87	+12 43.0	1.945	1.074	+3.49 +16.3	17.7	21.9
June 5	03 17.65	+15 11.0	2.032	1.167	+3.24 +13.1	18.1	22.9
June 15	03 48.97	+17 08.2	2.114	1.264	+3.00 +10.2	18.5	24.7
June 25	04 18.00	+18 38.1	2.187	1.364	+2.78 +7.6	18.9	27.1
July 5	04 44.87	+19 44.4	2.251	1.464	+2.57 +5.5	19.3	30.2
July 15	05 09.71	+20 31.0	2.302	1.564	+2.38 +3.7	19.7	33.8
July 25	05 32.59	+21 01.3	2.341	1.662	+2.18 +2.3	20.0	38.0
Aug. 4	05 53.54	+21 18.5	2.366	1.759	+1.99 +1.1	20.2	42.6
Aug. 14	06 12.62	+21 25.4	2.377	1.854	+1.80 +0.2	20.5	47.7
Aug. 24	06 29.80	+21 24.7	2.374	1.947	+1.61 -0.4	20.7	53.4
Sept. 3	06 45.03	+21 18.9	2.356	2.038	+1.41 -0.8	20.9	59.5
Sept. 13	06 58.25	+21 10.4	2.325	2.127	+1.21 -0.9	21.0	66.1
Sept. 23	07 09.30	+21 01.5	2.283	2.213	+0.98 -0.8	21.1	73.3
Oct. 3	07 18.02	+20 54.3	2.230	2.297	+0.74 -0.5	21.3	81.0
Oct. 13	07 24.20	+20 50.8	2.169	2.379	+0.47 -0.1	21.3	89.5
Oct. 23	07 27.57	+20 53.0	2.105	2.459	+0.17 +0.6	21.4	98.6
Nov. 2	07 27.89	+21 02.3	2.041	2.537	-0.14 +1.3	21.5	108.5
Nov. 12	07 24.96	+21 19.1	1.982	2.613	-0.48 +2.1	21.6	119.3
Nov. 22	07 18.72	+21 42.9	1.934	2.686	-0.80 +2.7	21.6	130.8
Dec. 2	07 09.39	+22 11.9	1.905	2.758	-1.08 +3.1	21.7	143.2
Dec. 12	06 57.57	+22 42.6	1.900	2.828	-1.28 +3.0	21.8	156.1
Dec. 22	06 44.24	+23 11.6	1.924	2.896	-1.37 +2.7	21.9	169.4
Jan. 1	06 30.71	+23 35.7	1.980	2.962	-1.32 +2.1	.	177.3
Jan. 11	06 18.20	+23 53.8	2.069	3.027	-1.15 +1.5	.	164.2
Jan. 21	06 07.77	+24 06.4	2.188	3.090	-0.90 +1.0	.	151.7
Jan. 31	06 00.00	+24 14.9	2.334	3.151	-0.62 +0.7	.	139.7
Feb. 10	05 55.11	+24 20.9	2.502	3.210	-0.33 +0.5	.	128.5
Feb. 20	05 53.02	+24 25.8	2.686	3.268	-0.06 +0.4	.	117.9
Mar. 1	05 53.46	+24 30.0	2.882	3.324	+0.17 +0.4	.	108.0
Mar. 11	05 56.12	+24 33.7	3.085	3.379	+0.38 +0.3	.	98.5
Mar. 21	06 00.67	+24 36.8	3.291	3.432	+0.55 +0.3	.	89.6
Mar. 31	06 06.77	+24 38.8	3.495	3.483	+0.68 +0.1	.	81.1

Comet 5D/Brorsen [Orbit 1]

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 11.28696 TT  
 Peri. = 20.50486 e = 0.8365387  
 Node = 94.80200 2000.0 a = 3.1554038 AU  
 Incl. = 18.62104 n = 0.17584162  
 q = 0.5157864 AU P = 5.61 years

$$m1 = 15.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation		m1	Mot. /PA	Elong.
2023/24	h m	°			for T=+1 day				°
Jan. 6	22 21.45	-24 55.3	2.268	1.715	-0.42	-1.7	19.1	25.7/60	44.7
Jan. 16	22 38.66	-22 39.1	2.221	1.587	-0.49	-2.8	18.7	29.2/60	39.3
Jan. 26	22 57.81	-20 05.3	2.156	1.455	-0.57	-4.2	18.3	33.0/60	34.5
Feb. 5	23 19.01	-17 10.1	2.072	1.319	-0.68	-6.0	17.8	37.3/60	30.4
Feb. 15	23 42.51	-13 48.0	1.970	1.177	-0.82	-8.4	17.2	42.4/59	26.9
Feb. 25	00 08.72	-09 51.5	1.850	1.031	-0.99	-11.6	16.5	48.7/58	24.3
Mar. 7	00 38.23	-05 10.9	1.715	0.884	-1.21	-15.9	15.6	56.5/57	22.5
Mar. 17	01 11.89	+00 26.9	1.562	0.739	-1.47	-21.9	14.7	66.1/55	21.9
Mar. 27	01 50.67	+07 16.8	1.392	0.612	-1.74	-29.8	13.6	77.1/54	22.9
Apr. 6	02 35.20	+15 27.1	1.204	0.529	-1.88	-38.8	12.6	86.9/52	25.7
Apr. 16	03 25.60	+24 42.2	1.006	0.526	-1.82	-47.3	12.2	93.6/52	30.3
Apr. 26	04 25.86	+34 19.7	0.828	0.605	-2.23	-55.6	12.4	103.3/56	36.9
May 6	05 49.44	+42 59.8	0.697	0.731	-4.45	-60.7	12.9	120.0/69	46.5
May 16	07 47.81	+47 02.4	0.628	0.875	-8.47	-43.1	13.4	133.4/90	59.2
May 26	09 50.80	+42 39.2	0.633	1.023	-9.54	-2.0	14.1	127.2/112	72.7
June 5	11 17.88	+33 05.0	0.706	1.169	-7.41	+23.5	14.9	104.1/125	83.5
June 15	12 12.93	+23 28.0	0.832	1.310	-5.31	+28.4	15.8	79.6/131	89.8
June 25	12 50.14	+15 34.5	0.993	1.447	-3.88	+25.3	16.6	61.1/133	92.1
July 5	13 17.87	+09 22.8	1.178	1.580	-2.95	+20.8	17.3	48.6/132	91.8
July 15	13 40.36	+04 28.9	1.379	1.707	-2.31	+16.8	18.0	40.3/130	89.6
July 25	13 59.81	+00 31.3	1.590	1.830	-1.86	+13.6	18.6	34.8/128	86.2
Aug. 4	14 17.43	-02 45.2	1.809	1.949	-1.53	+11.0	19.2	31.0/125	82.1
Aug. 14	14 33.90	-05 30.8	2.032	2.063	-1.28	+9.0	19.7	28.3/122	77.4
Aug. 24	14 49.66	-07 52.8	2.257	2.174	-1.09	+7.5	20.1	26.4/120	72.3
Sept. 3	15 04.95	-09 55.8	2.481	2.282	-0.94	+6.2	20.6	25.0/117	66.9
Sept. 13	15 19.92	-11 43.2	2.701	2.386	-0.81	+5.2	20.9	24.0/115	61.2
Sept. 23	15 34.70	-13 17.5	2.916	2.487	-0.71	+4.4	21.3	23.2/112	55.4
Oct. 3	15 49.32	-14 40.2	3.122	2.585	-0.63	+3.8	21.6	22.5/110	49.4
Oct. 13	16 03.81	-15 52.7	3.319	2.680	-0.56	+3.2	21.9	21.9/108	43.2
Oct. 23	16 18.18	-16 56.0	3.503	2.772	-0.50	+2.8	.	21.3/106	36.9
Nov. 2	16 32.42	-17 50.6	3.674	2.862	-0.44	+2.4	.	20.8/104	30.4
Nov. 12	16 46.48	-18 37.4	3.828	2.950	-0.40	+2.1	.	20.3/102	23.8
Nov. 22	17 00.35	-19 16.8	3.965	3.035	-0.36	+1.9	.	19.8/100	17.2
Dec. 2	17 13.95	-19 49.4	4.083	3.118	-0.32	+1.6	.	19.2/99	10.5
Dec. 12	17 27.24	-20 15.6	4.180	3.199	-0.29	+1.5	.	18.6/97	4.2
Dec. 22	17 40.14	-20 36.0	4.257	3.278	-0.27	+1.3	.	17.9/96	5.0
Jan. 1	17 52.57	-20 51.2	4.312	3.355	-0.24	+1.2	.	17.1/94	11.7
Jan. 11	18 04.45	-21 01.8	4.345	3.430	-0.22	+1.1	.	16.2/93	19.0
Jan. 21	18 15.69	-21 08.5	4.356	3.503	-0.20	+1.1	.	15.2/92	26.5
Jan. 31	18 26.19	-21 12.1	4.346	3.575	-0.19	+1.0	.	14.1/91	34.2
Feb. 10	18 35.84	-21 13.3	4.316	3.644	-0.18	+1.0	.	12.8/90	42.1
Feb. 20	18 44.52	-21 13.0	4.268	3.713	-0.17	+1.0	.	11.3/90	50.2
Mar. 1	18 52.10	-21 12.2	4.202	3.779	-0.16	+1.0	.	9.7/90	58.4
Mar. 11	18 58.45	-21 11.8	4.122	3.844	-0.16	+1.0	.	7.9/90	67.0
Mar. 21	19 03.43	-21 12.7	4.031	3.907	-0.15	+1.0	.	5.8/92	75.8
Mar. 31	19 06.89	-21 15.7	3.932	3.969	-0.15	+1.0	.	3.6/97	84.9



## Comet D/1978 R1 (Hanedá-Campos) [Orbit-2]

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 16.35365 TT  
 Peri. = 307.18156 e = 0.6293660  
 Node = 66.48946 2000.0 a = 3.4565353 AU  
 Incl. = 4.94605 n = 0.15337076  
 q = 1.2811095 AU P = 6.43 years

$$m1 = 12.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation		m1	Mot. /PA	Elong.
2023/24	h m	°			for T=+1 day				°
Jan. 6	19 56.73	-23° 26.9	2.674	1.724	-1.24	-2.6	17.0	39.5/ 80	11.8
Jan. 16	20 25.38	-22 04.6	2.620	1.654	-1.33	-3.8	16.8	41.7/ 77	8.6
Jan. 26	20 54.97	-20 19.5	2.564	1.588	-1.41	-5.1	16.6	43.9/ 75	5.8
Feb. 5	21 25.35	-18 10.8	2.507	1.525	-1.48	-6.5	16.3	46.1/ 72	3.7
Feb. 15	21 56.40	-15 38.6	2.452	1.466	-1.55	-8.0	16.1	48.3/ 70	2.9
Feb. 25	22 28.04	-12 43.9	2.401	1.414	-1.60	-9.4	15.9	50.3/ 68	3.4
Mar. 7	23 00.16	-09 29.4	2.356	1.369	-1.65	-10.6	15.7	52.1/ 67	4.3
Mar. 17	23 32.70	-05 58.6	2.319	1.332	-1.70	-11.7	15.6	53.5/ 66	5.2
Mar. 27	00 05.64	-02 16.5	2.292	1.304	-1.73	-12.4	15.5	54.6/ 66	6.0
Apr. 6	00 38.91	+01 30.7	2.276	1.287	-1.75	-12.7	15.4	55.1/ 66	6.6
Apr. 16	01 12.49	+05 16.2	2.271	1.281	-1.77	-12.6	15.4	55.0/ 66	7.1
Apr. 26	01 46.32	+08 53.1	2.277	1.286	-1.77	-12.0	15.4	54.4/ 67	7.6
May 6	02 20.28	+12 14.6	2.293	1.303	-1.76	-11.1	15.5	53.3/ 69	8.2
May 16	02 54.25	+15 15.4	2.318	1.330	-1.74	-9.8	15.6	51.8/ 71	9.0
May 26	03 28.02	+17 51.3	2.351	1.366	-1.70	-8.4	15.7	49.9/ 73	10.1
June 5	04 01.36	+20 00.0	2.390	1.411	-1.64	-6.8	15.9	47.9/ 76	11.5
June 15	04 34.02	+21 40.5	2.432	1.462	-1.57	-5.3	16.1	45.7/ 79	13.3
June 25	05 05.75	+22 53.8	2.476	1.520	-1.49	-3.9	16.3	43.4/ 82	15.4
July 5	05 36.28	+23 41.5	2.519	1.583	-1.39	-2.7	16.5	41.1/ 85	17.9
July 15	06 05.46	+24 06.3	2.560	1.649	-1.30	-1.6	16.7	38.9/ 88	20.7
July 25	06 33.14	+24 11.4	2.596	1.718	-1.20	-0.7	16.9	36.7/ 91	24.0
Aug. 4	06 59.20	+24 00.1	2.626	1.790	-1.10	+0.1	17.1	34.5/ 93	27.6
Aug. 14	07 23.61	+23 35.7	2.648	1.863	-1.01	+0.6	17.3	32.5/ 95	31.6
Aug. 24	07 46.35	+23 01.3	2.662	1.937	-0.93	+1.1	17.5	30.4/ 97	36.0
Sept. 3	08 07.41	+22 20.1	2.665	2.011	-0.86	+1.4	17.7	28.3/ 99	40.7
Sept. 13	08 26.80	+21 34.7	2.658	2.086	-0.79	+1.7	17.8	26.2/100	45.9
Sept. 23	08 44.51	+20 47.8	2.639	2.161	-0.73	+1.9	18.0	24.0/101	51.5
Oct. 3	09 00.52	+20 01.9	2.609	2.236	-0.69	+2.0	18.1	21.7/102	57.4
Oct. 13	09 14.78	+19 19.2	2.569	2.310	-0.65	+2.2	18.2	19.2/102	63.9
Oct. 23	09 27.21	+18 42.2	2.518	2.384	-0.62	+2.3	18.3	16.5/102	70.8
Nov. 2	09 37.69	+18 13.0	2.459	2.457	-0.61	+2.5	18.4	13.6/100	78.3
Nov. 12	09 46.08	+17 53.7	2.393	2.529	-0.60	+2.7	18.4	10.3/ 97	86.3
Nov. 22	09 52.17	+17 46.3	2.323	2.601	-0.61	+2.9	18.5	6.8/ 90	94.9
Dec. 2	09 55.77	+17 52.4	2.253	2.672	-0.63	+3.1	18.5	3.4/ 66	104.2
Dec. 12	09 56.70	+18 12.8	2.186	2.741	-0.66	+3.4	18.6	3.0/343	114.2
Dec. 22	09 54.80	+18 47.4	2.129	2.810	-0.70	+3.6	18.6	6.4/310	124.9
Jan. 1	09 50.12	+19 34.1	2.086	2.878	-0.75	+3.9	18.7	10.1/301	136.3
Jan. 11	09 42.91	+20 29.3	2.064	2.945	-0.80	+4.1	18.8	13.2/296	148.2
Jan. 21	09 33.70	+21 27.7	2.067	3.011	-0.85	+4.1	18.9	15.1/292	160.2
Jan. 31	09 23.37	+22 22.8	2.099	3.076	-0.88	+4.0	19.0	15.5/289	171.0
Feb. 10	09 12.90	+23 09.5	2.163	3.140	-0.90	+3.8	19.1	14.5/286	170.5
Feb. 20	09 03.33	+23 44.0	2.257	3.203	-0.89	+3.5	19.3	12.3/283	159.8
Mar. 1	08 55.44	+24 05.2	2.379	3.265	-0.87	+3.2	19.5	9.3/279	148.4
Mar. 11	08 49.72	+24 13.7	2.527	3.326	-0.82	+2.9	19.7	6.1/272	137.3
Mar. 21	08 46.37	+24 11.1	2.694	3.386	-0.77	+2.6	19.9	2.9/254	126.7
Mar. 31	08 45.34	+23 59.3	2.877	3.444	-0.72	+2.4	20.2	1.6/172	116.8

## Comet D/1978 R1 (Hanedá-Campos) [Orbit-1]

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 17.57941 TT  
 Peri. = 307.18242 e = 0.6294324  
 Node = 66.48702 2000.0 a = 3.4566236 AU  
 Incl. = 4.94529 n = 0.15336489  
 q = 1.2809127 AU P = 6.43 years

$$m1 = 12.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot. /PA	Elong.
2023/24	h m	°			for T=+1 day			°
Jan. 6	19 55.17	-23 30.1	2.685	1.732	-1.24 -2.5	17.0	39.3/ 80	11.5
Jan. 16	20 23.72	-22 09.4	2.630	1.662	-1.32 -3.7	16.8	41.5/ 77	8.2
Jan. 26	20 53.21	-20 25.9	2.573	1.595	-1.40 -5.0	16.6	43.7/ 75	5.4
Feb. 5	21 23.51	-18 18.9	2.515	1.532	-1.47 -6.4	16.4	45.9/ 72	3.5
Feb. 15	21 54.48	-15 48.4	2.459	1.473	-1.54 -7.9	16.1	48.1/ 70	2.9
Feb. 25	22 26.05	-12 55.5	2.406	1.420	-1.60 -9.3	15.9	50.1/ 68	3.7
Mar. 7	22 58.11	-09 42.5	2.360	1.374	-1.65 -10.5	15.7	51.9/ 67	4.8
Mar. 17	23 30.61	-06 12.9	2.322	1.336	-1.69 -11.6	15.6	53.4/ 66	5.7
Mar. 27	00 03.50	-02 31.7	2.293	1.307	-1.73 -12.3	15.5	54.5/ 66	6.5
Apr. 6	00 36.75	+01 15.2	2.275	1.289	-1.75 -12.7	15.4	55.0/ 66	7.1
Apr. 16	01 10.32	+05 00.8	2.268	1.281	-1.77 -12.6	15.4	55.1/ 66	7.7
Apr. 26	01 44.15	+08 38.4	2.273	1.285	-1.77 -12.1	15.4	54.5/ 67	8.2
May 6	02 18.13	+12 01.1	2.287	1.300	-1.77 -11.1	15.4	53.5/ 69	8.8
May 16	02 52.13	+15 03.4	2.312	1.326	-1.74 -9.9	15.5	52.0/ 71	9.6
May 26	03 25.96	+17 41.2	2.343	1.361	-1.70 -8.5	15.7	50.1/ 73	10.6
June 5	03 59.37	+19 51.6	2.381	1.405	-1.65 -7.0	15.9	48.0/ 76	12.0
June 15	04 32.12	+21 34.1	2.422	1.456	-1.58 -5.4	16.1	45.9/ 79	13.7
June 25	05 03.95	+22 49.0	2.465	1.513	-1.50 -4.0	16.3	43.6/ 82	15.8
July 5	05 34.60	+23 38.2	2.508	1.575	-1.40 -2.7	16.5	41.3/ 85	18.3
July 15	06 03.90	+24 04.4	2.548	1.641	-1.31 -1.6	16.7	39.0/ 88	21.1
July 25	06 31.69	+24 10.6	2.584	1.710	-1.21 -0.7	16.9	36.8/ 90	24.3
Aug. 4	06 57.87	+24 00.1	2.613	1.781	-1.11 0.0	17.1	34.7/ 93	27.9
Aug. 14	07 22.40	+23 36.4	2.635	1.854	-1.02 +0.6	17.3	32.6/ 95	31.9
Aug. 24	07 45.24	+23 02.6	2.648	1.928	-0.94 +1.1	17.5	30.5/ 97	36.2
Sept. 3	08 06.39	+22 21.8	2.651	2.002	-0.86 +1.4	17.6	28.4/ 99	41.0
Sept. 13	08 25.86	+21 36.7	2.644	2.077	-0.80 +1.7	17.8	26.3/100	46.1
Sept. 23	08 43.64	+20 50.0	2.625	2.152	-0.74 +1.9	17.9	24.1/101	51.7
Oct. 3	08 59.70	+20 04.3	2.596	2.227	-0.69 +2.0	18.0	21.7/102	57.6
Oct. 13	09 14.01	+19 21.8	2.555	2.301	-0.66 +2.2	18.2	19.3/102	64.1
Oct. 23	09 26.47	+18 44.9	2.505	2.375	-0.63 +2.3	18.3	16.5/101	71.0
Nov. 2	09 36.97	+18 15.9	2.446	2.448	-0.61 +2.5	18.3	13.6/100	78.4
Nov. 12	09 45.37	+17 56.8	2.380	2.521	-0.61 +2.7	18.4	10.3/ 97	86.5
Nov. 22	09 51.45	+17 49.6	2.310	2.592	-0.61 +2.9	18.5	6.8/ 90	95.1
Dec. 2	09 55.04	+17 56.0	2.241	2.663	-0.63 +3.1	18.5	3.4/ 65	104.4
Dec. 12	09 55.92	+18 16.7	2.175	2.733	-0.66 +3.4	18.6	3.0/342	114.4
Dec. 22	09 53.97	+18 51.6	2.118	2.802	-0.70 +3.7	18.6	6.5/310	125.1
Jan. 1	09 49.24	+19 38.7	2.076	2.870	-0.76 +3.9	18.7	10.2/301	136.5
Jan. 11	09 41.96	+20 34.1	2.054	2.937	-0.81 +4.1	18.7	13.3/296	148.4
Jan. 21	09 32.69	+21 32.5	2.058	3.003	-0.86 +4.1	18.8	15.1/292	160.4
Jan. 31	09 22.32	+22 27.5	2.091	3.068	-0.89 +4.0	19.0	15.6/289	171.2
Feb. 10	09 11.83	+23 13.9	2.155	3.132	-0.91 +3.8	19.1	14.5/286	170.3
Feb. 20	09 02.26	+23 48.1	2.250	3.195	-0.90 +3.5	19.3	12.3/283	159.6
Mar. 1	08 54.41	+24 08.9	2.374	3.257	-0.87 +3.2	19.5	9.3/278	148.1
Mar. 11	08 48.74	+24 17.1	2.521	3.318	-0.83 +2.9	19.7	6.0/272	137.1
Mar. 21	08 45.45	+24 14.2	2.689	3.378	-0.78 +2.6	19.9	2.8/253	126.5
Mar. 31	08 44.48	+24 02.0	2.873	3.437	-0.72 +2.4	20.2	1.7/169	116.6

## Comet 170P/Christensen

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 19.26807 TT  
 Peri. = 225.34417  
 Node = 142.87889 2000.0  
 Incl. = 10.11384  
 q = 2.9238514 AU

e = 0.3057846  
 a = 4.2117351 AU  
 n = 0.11402826  
 P = 8.64 years

$$m1 = 5.5 + 5 \log(\Delta) + 22.5 \log(r(t+160))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	22 17.40	-14 02.9	3.575	2.979	+1.43	+6.7	18.8	46.2
Jan. 16	22 31.90	-12 53.1	3.658	2.969	+1.47	+7.3	18.9	39.7
Jan. 26	22 46.79	-11 38.0	3.731	2.960	+1.51	+7.8	18.9	33.4
Feb. 5	23 01.96	-10 18.5	3.793	2.952	+1.53	+8.2	19.0	27.3
Feb. 15	23 17.35	-08 55.4	3.843	2.945	+1.55	+8.5	19.1	21.4
Feb. 25	23 32.91	-07 29.7	3.880	2.939	+1.56	+8.7	19.1	15.6
Mar. 7	23 48.56	-06 02.5	3.905	2.934	+1.57	+8.8	19.2	10.1
Mar. 17	00 04.28	-04 34.5	3.918	2.930	+1.57	+8.8	19.2	5.7
Mar. 27	00 20.03	-03 06.8	3.918	2.927	+1.57	+8.7	19.3	5.4
Apr. 6	00 35.76	-01 40.3	3.907	2.925	+1.57	+8.5	19.3	9.5
Apr. 16	00 51.47	+00 16.0	3.883	2.924	+1.57	+8.3	19.3	14.7
Apr. 26	01 07.10	+01 05.3	3.848	2.924	+1.56	+7.9	19.4	20.1
May 6	01 22.61	+02 22.6	3.802	2.925	+1.54	+7.5	19.4	25.6
May 16	01 37.97	+03 35.2	3.746	2.928	+1.53	+7.0	19.4	31.1
May 26	01 53.13	+04 42.2	3.679	2.931	+1.50	+6.4	19.4	36.7
June 5	02 08.01	+05 42.9	3.603	2.935	+1.47	+5.7	19.4	42.4
June 15	02 22.54	+06 36.7	3.518	2.941	+1.43	+5.0	19.5	48.2
June 25	02 36.64	+07 22.8	3.425	2.947	+1.38	+4.2	19.5	54.1
July 5	02 50.17	+08 00.8	3.325	2.955	+1.32	+3.3	19.5	60.2
July 15	03 03.03	+08 30.2	3.219	2.963	+1.24	+2.4	19.4	66.5
July 25	03 15.06	+08 50.5	3.107	2.972	+1.15	+1.5	19.4	73.0
Aug. 4	03 26.07	+09 01.7	2.991	2.983	+1.04	+0.6	19.4	79.7
Aug. 14	03 35.89	+09 03.5	2.874	2.994	+0.91	-0.3	19.4	86.8
Aug. 24	03 44.29	+08 56.1	2.756	3.006	+0.75	-1.2	19.4	94.3
Sept. 3	03 51.04	+08 39.8	2.640	3.019	+0.58	-2.1	19.4	102.2
Sept. 13	03 55.93	+08 15.2	2.530	3.033	+0.38	-2.9	19.3	110.6
Sept. 23	03 58.74	+07 43.4	2.427	3.048	+0.16	-3.5	19.3	119.4
Oct. 3	03 59.36	+07 06.0	2.336	3.064	-0.06	-4.0	19.3	128.8
Oct. 13	03 57.76	+06 25.2	2.261	3.080	-0.28	-4.2	19.3	138.5
Oct. 23	03 54.09	+05 44.0	2.206	3.097	-0.47	-4.0	19.3	148.3
Nov. 2	03 48.72	+05 06.0	2.174	3.115	-0.61	-3.5	19.4	157.7
Nov. 12	03 42.22	+04 34.9	2.169	3.134	-0.69	-2.6	19.4	164.4
Nov. 22	03 35.32	+04 14.0	2.191	3.153	-0.68	-1.4	19.5	164.0
Dec. 2	03 28.81	+04 05.8	2.242	3.172	-0.60	-0.1	19.6	156.9
Dec. 12	03 23.36	+04 11.2	2.319	3.193	-0.46	+1.3	19.8	147.4
Dec. 22	03 19.51	+04 30.1	2.420	3.214	-0.28	+2.6	19.9	137.4
Jan. 1	03 17.57	+05 00.9	2.541	3.235	-0.08	+3.7	20.1	127.5
Jan. 11	03 17.63	+05 41.6	2.679	3.257	+0.12	+4.5	20.3	117.9
Jan. 21	03 19.68	+06 30.1	2.828	3.280	+0.31	+5.2	20.5	108.8
Jan. 31	03 23.57	+07 24.1	2.986	3.303	+0.48	+5.6	20.7	100.0
Feb. 10	03 29.13	+08 21.6	3.149	3.326	+0.64	+5.9	20.9	91.6
Feb. 20	03 36.18	+09 20.8	3.313	3.350	+0.78	+5.9	21.1	83.6
Mar. 1	03 44.51	+10 20.1	3.476	3.374	+0.90	+5.9	21.2	75.9
Mar. 11	03 53.94	+11 18.2	3.635	3.398	+1.00	+5.7	21.4	68.5
Mar. 21	04 04.32	+12 14.0	3.789	3.423	+1.08	+5.4	21.6	61.3
Mar. 31	04 15.48	+13 06.7	3.934	3.448	+1.15	+5.1	21.7	54.3

## Comet 279P/LaSagra

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 19.54288 TT  
 Peri. = 5.84635 e = 0.3992312  
 Node = 346.22987 2000.0 a = 3.5755635 AU  
 Incl. = 5.05119 n = 0.14577644  
 q = 2.1480870 AU P = 6.76 years

$$m1 = 13.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .3			m		°
Jan. 6	20 36.77	-20 30.3	3.166	2.278	+2.13 +9.1	20.0	21.3
Jan. 16	20 58.13	-18 54.2	3.181	2.255	+2.14 +10.2	19.9	16.4
Jan. 26	21 19.51	-17 08.1	3.190	2.234	+2.13 +11.1	19.9	11.6
Feb. 5	21 40.81	-15 12.9	3.191	2.215	+2.12 +12.0	19.9	7.0
Feb. 15	22 02.00	-13 09.4	3.185	2.199	+2.11 +12.8	19.8	2.5
Feb. 25	22 23.03	-10 58.8	3.173	2.184	+2.09 +13.4	19.8	2.4
Mar. 7	22 43.88	-08 42.5	3.154	2.172	+2.07 +13.9	19.8	6.7
Mar. 17	23 04.55	-06 21.6	3.130	2.162	+2.06 +14.3	19.7	11.0
Mar. 27	23 25.04	-03 57.6	3.101	2.155	+2.04 +14.5	19.7	15.3
Apr. 6	23 45.34	-01 31.9	3.067	2.150	+2.02 +14.6	19.7	19.6
Apr. 16	00 05.47	+00 54.0	3.027	2.148	+2.00 +14.6	19.6	23.8
Apr. 26	00 25.44	+03 18.9	2.984	2.149	+1.99 +14.4	19.6	28.1
May 6	00 45.23	+05 41.3	2.935	2.152	+1.97 +14.1	19.6	32.3
May 16	01 04.85	+08 00.0	2.883	2.157	+1.95 +13.6	19.5	36.6
May 26	01 24.26	+10 13.8	2.826	2.165	+1.93 +13.1	19.5	40.9
June 5	01 43.43	+12 21.7	2.765	2.175	+1.90 +12.4	19.5	45.4
June 15	02 02.31	+14 22.7	2.699	2.188	+1.87 +11.7	19.5	49.9
June 25	02 20.81	+16 16.1	2.630	2.203	+1.82 +10.9	19.4	54.6
July 5	02 38.81	+18 01.4	2.556	2.221	+1.77 +10.1	19.4	59.5
July 15	02 56.18	+19 38.1	2.478	2.240	+1.70 +9.2	19.4	64.7
July 25	03 12.75	+21 06.3	2.396	2.262	+1.60 +8.3	19.3	70.1
Aug. 4	03 28.30	+22 25.9	2.311	2.285	+1.49 +7.5	19.3	75.8
Aug. 14	03 42.59	+23 37.3	2.224	2.310	+1.35 +6.7	19.3	81.9
Aug. 24	03 55.31	+24 40.9	2.135	2.337	+1.17 +6.0	19.2	88.4
Sept. 3	04 06.14	+25 37.3	2.045	2.365	+0.97 +5.3	19.2	95.5
Sept. 13	04 14.71	+26 27.1	1.958	2.395	+0.72 +4.6	19.2	103.1
Sept. 23	04 20.65	+27 10.3	1.874	2.426	+0.43 +4.0	19.1	111.3
Oct. 3	04 23.62	+27 46.8	1.797	2.458	+0.12 +3.3	19.1	120.3
Oct. 13	04 23.39	+28 15.7	1.730	2.492	-0.20 +2.4	19.1	130.0
Oct. 23	04 19.95	+28 35.1	1.678	2.526	-0.51 +1.3	19.0	140.4
Nov. 2	04 13.65	+28 43.1	1.646	2.562	-0.76 +0.1	19.1	151.4
Nov. 12	04 05.20	+28 38.1	1.636	2.598	-0.92 -1.2	19.1	162.5
Nov. 22	03 55.73	+28 20.4	1.654	2.634	-0.95 -2.4	19.2	171.4
Dec. 2	03 46.54	+27 52.6	1.698	2.672	-0.86 -3.2	19.3	168.4
Dec. 12	03 38.76	+27 19.2	1.771	2.710	-0.66 -3.4	19.5	158.1
Dec. 22	03 33.24	+26 45.6	1.869	2.748	-0.41 -3.2	19.6	147.2
Jan. 1	03 30.41	+26 16.5	1.989	2.787	-0.13 -2.6	19.8	136.5
Jan. 11	03 30.31	+25 54.4	2.129	2.826	+0.14 -1.8	20.1	126.4
Jan. 21	03 32.82	+25 40.7	2.283	2.865	+0.38 -0.9	20.3	116.8
Jan. 31	03 37.66	+25 35.2	2.447	2.904	+0.60 -0.1	20.5	107.8
Feb. 10	03 44.51	+25 36.9	2.620	2.944	+0.79 +0.5	20.7	99.2
Feb. 20	03 53.09	+25 44.2	2.796	2.983	+0.94 +1.0	20.9	91.1
Mar. 1	04 03.11	+25 55.5	2.974	3.023	+1.07 +1.3	21.1	83.3
Mar. 11	04 14.31	+26 09.2	3.150	3.062	+1.18 +1.5	21.3	75.8
Mar. 21	04 26.51	+26 23.9	3.323	3.102	+1.27 +1.5	21.4	68.7
Mar. 31	04 39.49	+26 38.3	3.490	3.141	+1.34 +1.4	21.6	61.7

## Comet 452P/Sheppard-Jewitt

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 25.60950 TT  
 Peri. = 37.04538 e = 0.4274279  
 Node = 123.69690 2000.0 a = 7.2971940 AU  
 Incl. = 6.42207 n = 0.05000003  
 q = 4.1781697 AU P = 19.71 years

$$m1 = 9.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	10 35.60	+11 58.0	3.533	4.221	-0.04 +1.9	18.5	129.0
Jan. 16	10 34.58	+12 21.1	3.417	4.214	-0.18 +2.8	18.4	139.5
Jan. 26	10 32.17	+12 51.9	3.323	4.207	-0.31 +3.4	18.3	150.3
Feb. 5	10 28.60	+13 28.3	3.255	4.201	-0.41 +3.9	18.3	161.3
Feb. 15	10 24.19	+14 07.6	3.215	4.196	-0.47 +4.0	18.3	172.1
Feb. 25	10 19.38	+14 46.7	3.205	4.191	-0.48 +3.8	18.3	174.0
Mar. 7	10 14.67	+15 22.3	3.226	4.187	-0.45 +3.3	18.3	163.7
Mar. 17	10 10.53	+15 51.7	3.274	4.184	-0.37 +2.5	18.3	152.8
Mar. 27	10 07.35	+16 13.1	3.349	4.181	-0.25 +1.7	18.3	142.1
Apr. 6	10 05.44	+16 25.4	3.445	4.180	-0.11 +0.7	18.4	131.8
Apr. 16	10 04.97	+16 28.3	3.560	4.179	+0.03 -0.2	18.5	121.9
Apr. 26	10 05.98	+16 22.0	3.689	4.178	+0.18 -1.1	18.5	112.5
May 6	10 08.46	+16 07.0	3.827	4.179	+0.32 -2.0	18.6	103.4
May 16	10 12.30	+15 44.0	3.972	4.180	+0.45 -2.7	18.7	94.8
May 26	10 17.39	+15 13.7	4.119	4.182	+0.57 -3.4	18.8	86.5
June 5	10 23.57	+14 36.9	4.265	4.184	+0.67 -4.0	18.9	78.6
June 15	10 30.69	+13 54.2	4.408	4.187	+0.76 -4.6	18.9	70.9
June 25	10 38.64	+13 06.3	4.545	4.191	+0.83 -5.0	19.0	63.5
July 5	10 47.26	+12 13.9	4.675	4.196	+0.90 -5.5	19.1	56.3
July 15	10 56.46	+11 17.7	4.795	4.201	+0.95 -5.8	19.1	49.2
July 25	11 06.14	+10 18.0	4.903	4.208	+0.99 -6.1	19.2	42.3
Aug. 4	11 16.19	+09 15.7	5.000	4.214	+1.02 -6.4	19.2	35.5
Aug. 14	11 26.54	+08 11.2	5.082	4.222	+1.05 -6.5	19.3	28.7
Aug. 24	11 37.13	+07 05.1	5.150	4.230	+1.07 -6.7	19.3	22.1
Sept. 3	11 47.89	+05 58.1	5.203	4.239	+1.08 -6.7	19.4	15.5
Sept. 13	11 58.75	+04 50.8	5.239	4.248	+1.09 -6.7	19.4	9.2
Sept. 23	12 09.66	+03 43.8	5.258	4.259	+1.09 -6.7	19.4	4.6
Oct. 3	12 20.57	+02 37.7	5.261	4.270	+1.09 -6.5	19.4	7.1
Oct. 13	12 31.40	+01 33.2	5.246	4.281	+1.08 -6.3	19.4	13.3
Oct. 23	12 42.11	+00 30.9	5.214	4.293	+1.06 -6.1	19.4	20.0
Nov. 2	12 52.61	+00 28.5	5.166	4.306	+1.04 -5.8	19.4	27.1
Nov. 12	13 02.84	-01 24.3	5.101	4.319	+1.00 -5.4	19.4	34.3
Nov. 22	13 12.71	-02 15.9	5.021	4.333	+0.96 -4.9	19.4	41.7
Dec. 2	13 22.12	-03 02.5	4.926	4.348	+0.91 -4.4	19.3	49.3
Dec. 12	13 30.97	-03 43.5	4.819	4.363	+0.85 -3.8	19.3	57.1
Dec. 22	13 39.14	-04 18.4	4.701	4.379	+0.77 -3.1	19.3	65.1
Jan. 1	13 46.49	-04 46.5	4.574	4.395	+0.69 -2.4	19.2	73.4
Jan. 11	13 52.90	-05 07.4	4.442	4.412	+0.58 -1.7	19.2	81.9
Jan. 21	13 58.23	-05 20.5	4.306	4.429	+0.47 -0.9	19.1	90.7
Jan. 31	14 02.35	-05 25.8	4.172	4.447	+0.34 -0.1	19.1	99.8
Feb. 10	14 05.14	-05 23.2	4.042	4.465	+0.20 +0.7	19.0	109.2
Feb. 20	14 06.52	-05 12.8	3.921	4.484	+0.06 +1.4	19.0	119.0
Mar. 1	14 06.48	-04 55.3	3.814	4.504	-0.08 +2.1	18.9	129.0
Mar. 11	14 05.04	-04 31.8	3.724	4.524	-0.22 +2.6	18.9	139.3
Mar. 21	14 02.35	-04 03.7	3.656	4.544	-0.33 +3.0	18.9	149.7
Mar. 31	13 58.64	-03 33.1	3.613	4.565	-0.41 +3.1	18.9	160.0

Comet C/2021 Y1 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Apr. 30.71137 TT  
 Peri. = 245.81974  
 Node = 244.77050 2000.0  
 Incl. = 77.19081  
 q = 2.0323970 AU  
 e = 1.0008570

$$m1 = 10.8 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	03 27.75	-05 04.2	1.801	2.446	-0.92	-21.2	14.0	120.1
Jan. 16	03 20.17	-08 17.1	1.891	2.384	-0.56	-17.0	14.1	107.8
Jan. 26	03 16.08	-10 51.0	1.992	2.325	-0.22	-13.5	14.1	96.9
Feb. 5	03 15.27	-12 53.5	2.095	2.271	+0.09	-10.8	14.2	87.2
Feb. 15	03 17.41	-14 32.8	2.194	2.221	+0.36	-8.9	14.2	78.6
Feb. 25	03 22.17	-15 56.0	2.283	2.176	+0.61	-7.7	14.3	71.2
Mar. 7	03 29.28	-17 09.8	2.360	2.136	+0.83	-7.1	14.3	64.8
Mar. 17	03 38.49	-18 19.2	2.422	2.102	+1.03	-6.9	14.3	59.6
Mar. 27	03 49.67	-19 28.5	2.468	2.075	+1.22	-7.1	14.3	55.6
Apr. 6	04 02.70	-20 41.7	2.498	2.054	+1.40	-7.6	14.4	52.8
Apr. 16	04 17.56	-22 01.4	2.514	2.040	+1.59	-8.4	14.4	51.2
Apr. 26	04 34.27	-23 30.4	2.516	2.033	+1.78	-9.5	14.3	50.7
May 6	04 52.91	-25 10.7	2.508	2.033	+1.97	-10.7	14.3	51.2
May 16	05 13.58	-27 03.4	2.492	2.041	+2.19	-12.0	14.3	52.5
May 26	05 36.45	-29 08.9	2.473	2.055	+2.41	-13.2	14.3	54.4
June 5	06 01.64	-31 26.3	2.455	2.076	+2.65	-14.3	14.3	56.6
June 15	06 29.30	-33 52.8	2.443	2.104	+2.91	-15.0	14.4	58.8
June 25	06 59.50	-36 24.3	2.441	2.138	+3.16	-15.2	14.4	60.8
July 5	07 32.16	-38 55.0	2.454	2.178	+3.39	-14.7	14.4	62.4
July 15	08 07.03	-41 17.8	2.485	2.223	+3.59	-13.6	14.5	63.4
July 25	08 43.63	-43 26.5	2.535	2.274	+3.73	-11.9	14.6	63.6
Aug. 4	09 21.26	-45 15.7	2.606	2.328	+3.79	-9.7	14.7	63.0
Aug. 14	09 59.11	-46 42.8	2.696	2.387	+3.76	-7.5	14.8	61.6
Aug. 24	10 36.34	-47 47.8	2.803	2.450	+3.66	-5.4	15.0	59.5
Sept. 3	11 12.24	-48 32.8	2.924	2.515	+3.50	-3.5	15.1	56.7
Sept. 13	11 46.34	-49 01.2	3.055	2.584	+3.30	-2.1	15.3	53.4
Sept. 23	12 18.36	-49 17.0	3.191	2.655	+3.08	-1.0	15.4	49.7
Oct. 3	12 48.19	-49 23.4	3.330	2.729	+2.86	-0.3	15.6	45.8
Oct. 13	13 15.90	-49 23.5	3.466	2.804	+2.66	+0.2	15.7	41.9
Oct. 23	13 41.58	-49 19.6	3.596	2.881	+2.46	+0.5	15.9	38.2
Nov. 2	14 05.35	-49 13.2	3.717	2.960	+2.28	+0.7	16.0	35.0
Nov. 12	14 27.34	-49 05.4	3.826	3.039	+2.11	+0.8	16.1	32.6
Nov. 22	14 47.67	-48 57.1	3.921	3.120	+1.94	+0.8	16.2	31.4
Dec. 2	15 06.38	-48 48.6	3.999	3.202	+1.78	+0.8	16.3	31.7
Dec. 12	15 23.52	-48 40.3	4.059	3.285	+1.63	+0.8	16.4	33.6
Dec. 22	15 39.08	-48 32.5	4.100	3.368	+1.47	+0.8	16.5	37.1
Jan. 1	15 53.02	-48 25.2	4.121	3.452	+1.30	+0.7	16.6	41.9
Jan. 11	16 05.27	-48 18.6	4.123	3.536	+1.13	+0.6	16.6	47.6
Jan. 21	16 15.74	-48 12.6	4.107	3.620	+0.94	+0.6	16.7	54.2
Jan. 31	16 24.27	-48 07.0	4.074	3.705	+0.74	+0.5	16.7	61.4
Feb. 10	16 30.73	-48 01.4	4.026	3.790	+0.52	+0.6	16.7	69.2
Feb. 20	16 34.93	-47 55.1	3.967	3.876	+0.29	+0.7	16.7	77.5
Mar. 1	16 36.71	-47 46.9	3.899	3.961	+0.04	+1.0	16.7	86.3
Mar. 11	16 35.95	-47 34.9	3.828	4.046	-0.22	+1.5	16.8	95.5
Mar. 21	16 32.58	-47 16.9	3.759	4.132	-0.48	+2.2	16.8	105.1
Mar. 31	16 26.69	-46 49.9	3.696	4.217	-0.72	+3.3	16.8	115.0

Comet 291P/NEAT

Epoch = 2023 June 25.0 TT  
 T = 2023 May 4.09141 TT  
 Peri. = 173.52168 e = 0.4346127  
 Node = 237.66136 2000.0 a = 4.5368184 AU  
 Incl. = 6.30892 n = 0.10199455  
 q = 2.5650595 AU P = 9.66 years

$$m1 = 8.5 + 5 \log(\Delta) + 15.0 \log(r(t-130))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	23 46.81	+02 44.4	2.813	2.695	+1.25 +5.6	18.1	73.0
Jan. 16	23 59.81	+03 44.6	2.915	2.675	+1.36 +6.5	18.1	66.2
Jan. 26	00 13.82	+04 53.0	3.013	2.656	+1.45 +7.2	18.1	59.7
Feb. 5	00 28.70	+06 07.8	3.104	2.639	+1.53 +7.8	18.0	53.5
Feb. 15	00 44.35	+07 27.6	3.188	2.623	+1.60 +8.2	18.0	47.5
Feb. 25	01 00.68	+08 50.9	3.265	2.610	+1.67 +8.5	18.0	41.6
Mar. 7	01 17.62	+10 16.1	3.334	2.598	+1.72 +8.6	18.0	36.0
Mar. 17	01 35.10	+11 41.7	3.395	2.588	+1.78 +8.5	18.0	30.5
Mar. 27	01 53.08	+13 06.4	3.447	2.579	+1.82 +8.4	17.9	25.2
Apr. 6	02 11.50	+14 28.7	3.490	2.573	+1.87 +8.0	17.9	20.0
Apr. 16	02 30.33	+15 47.4	3.525	2.568	+1.90 +7.6	17.9	14.9
Apr. 26	02 49.51	+17 01.1	3.551	2.566	+1.94 +7.1	17.8	9.9
May 6	03 09.00	+18 08.7	3.568	2.565	+1.96 +6.4	17.8	4.9
May 16	03 28.73	+19 09.2	3.577	2.566	+1.98 +5.6	17.7	0.2
May 26	03 48.64	+20 01.8	3.578	2.570	+2.00 +4.8	17.7	4.8
June 5	04 08.64	+20 45.6	3.569	2.575	+2.00 +3.9	17.6	9.7
June 15	04 28.65	+21 20.1	3.553	2.582	+2.00 +2.9	17.6	14.6
June 25	04 48.57	+21 44.9	3.527	2.591	+1.98 +1.9	17.5	19.5
July 5	05 08.29	+21 59.8	3.494	2.602	+1.96 +0.9	17.5	24.4
July 15	05 27.70	+22 04.9	3.451	2.615	+1.92 0.0	17.4	29.5
July 25	05 46.68	+22 00.4	3.401	2.629	+1.87 -1.0	17.4	34.6
Aug. 4	06 05.11	+21 46.7	3.342	2.645	+1.81 -1.8	17.3	39.9
Aug. 14	06 22.86	+21 24.6	3.276	2.663	+1.73 -2.7	17.2	45.4
Aug. 24	06 39.80	+20 54.7	3.201	2.683	+1.64 -3.4	17.2	51.0
Sept. 3	06 55.78	+20 18.1	3.119	2.704	+1.54 -4.0	17.1	56.9
Sept. 13	07 10.69	+19 36.1	3.030	2.726	+1.42 -4.5	17.0	63.0
Sept. 23	07 24.34	+18 49.7	2.936	2.750	+1.29 -4.8	17.0	69.5
Oct. 3	07 36.59	+18 00.7	2.836	2.775	+1.14 -5.0	16.9	76.3
Oct. 13	07 47.26	+17 10.4	2.733	2.801	+0.97 -5.0	16.8	83.5
Oct. 23	07 56.15	+16 20.6	2.628	2.829	+0.78 -4.9	16.8	91.1
Nov. 2	08 03.06	+15 33.1	2.524	2.857	+0.58 -4.6	16.7	99.3
Nov. 12	08 07.80	+14 49.6	2.423	2.887	+0.35 -4.0	16.7	108.0
Nov. 22	08 10.18	+14 12.1	2.329	2.918	+0.11 -3.4	16.6	117.3
Dec. 2	08 10.14	+13 42.1	2.246	2.949	-0.14 -2.5	16.6	127.2
Dec. 12	08 07.69	+13 20.7	2.179	2.982	-0.37 -1.6	16.5	137.7
Dec. 22	08 03.05	+13 08.7	2.131	3.015	-0.57 -0.7	16.5	148.7
Jan. 1	07 56.70	+13 05.9	2.108	3.049	-0.70 +0.2	16.5	159.7
Jan. 11	07 49.32	+13 11.2	2.111	3.084	-0.76 +0.9	16.6	169.6
Jan. 21	07 41.75	+13 23.0	2.144	3.119	-0.73 +1.4	16.7	170.6
Jan. 31	07 34.85	+13 38.9	2.206	3.155	-0.62 +1.7	16.8	161.3
Feb. 10	07 29.32	+13 56.8	2.295	3.191	-0.46 +1.8	17.0	150.5
Feb. 20	07 25.67	+14 14.8	2.409	3.227	-0.25 +1.7	17.1	139.8
Mar. 1	07 24.13	+14 31.3	2.543	3.265	-0.04 +1.5	17.3	129.5
Mar. 11	07 24.72	+14 45.0	2.694	3.302	+0.17 +1.2	17.5	119.8
Mar. 21	07 27.34	+14 54.8	2.857	3.340	+0.37 +0.7	17.7	110.5
Mar. 31	07 31.79	+15 00.2	3.029	3.378	+0.54 +0.3	17.9	101.8

Comet C/2020 V2 (ZTF)

Epoch = 2023 June 25.0 TT  
 T = 2023 May 8.54735 TT  
 Peri. = 162.42250  
 Node = 212.37148 2000.0  
 Incl. = 131.61221  
 q = 2.2278030 AU  
 e = 1.0012954

$$m1 = 4.5 + 5 \log(\Delta) + 10.0 \log(r(t+100)) \text{ (vis)}$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	01 50.75	+76 58.1	2.062	2.627	-3.57	-49.4	9.6	114.5
Jan. 16	01 31.05	+68 44.7	2.090	2.570	-0.73	-48.3	9.6	108.0
Jan. 26	01 28.19	+61 01.2	2.164	2.516	+0.11	-43.6	9.7	99.2
Feb. 5	01 31.05	+54 12.1	2.275	2.466	+0.45	-37.6	9.8	89.2
Feb. 15	01 36.46	+48 24.1	2.408	2.420	+0.63	-31.5	9.9	78.9
Feb. 25	01 43.18	+43 34.0	2.552	2.378	+0.72	-26.1	10.1	68.7
Mar. 7	01 50.62	+39 34.0	2.697	2.341	+0.77	-21.6	10.2	58.7
Mar. 17	01 58.44	+36 14.8	2.835	2.308	+0.79	-18.0	10.4	49.1
Mar. 27	02 06.44	+33 27.8	2.957	2.281	+0.80	-15.2	10.5	39.7
Apr. 6	02 14.47	+31 05.3	3.060	2.259	+0.80	-13.2	10.7	30.8
Apr. 16	02 22.42	+29 00.9	3.139	2.243	+0.79	-11.7	10.8	22.2
Apr. 26	02 30.20	+27 09.1	3.192	2.233	+0.77	-10.7	10.9	14.6
May 6	02 37.72	+25 25.2	3.216	2.228	+0.73	-10.1	11.0	9.5
May 16	02 44.88	+23 45.0	3.212	2.229	+0.69	-10.0	11.1	11.3
May 26	02 51.58	+22 04.7	3.178	2.237	+0.64	-10.2	11.2	18.0
June 5	02 57.68	+20 20.2	3.116	2.250	+0.57	-10.8	11.2	26.1
June 15	03 03.03	+18 27.7	3.028	2.269	+0.49	-11.9	11.2	34.8
June 25	03 07.45	+16 22.6	2.915	2.294	+0.38	-13.4	11.3	43.9
July 5	03 10.68	+13 59.5	2.781	2.324	+0.25	-15.5	11.3	53.4
July 15	03 12.41	+11 12.3	2.632	2.358	+0.08	-18.3	11.2	63.4
July 25	03 12.23	+07 53.5	2.471	2.398	-0.14	-21.9	11.2	73.9
Aug. 4	03 09.62	+03 54.9	2.309	2.442	-0.42	-26.4	11.2	85.1
Aug. 14	03 03.98	+00 51.5	2.154	2.490	-0.76	-31.5	11.1	97.0
Aug. 24	02 54.53	-06 30.9	2.018	2.542	-1.18	-36.8	11.1	109.6
Sept. 3	02 40.55	-12 59.3	1.916	2.597	-1.67	-41.0	11.1	122.2
Sept. 13	02 21.49	-19 57.5	1.861	2.656	-2.19	-42.2	11.1	133.5
Sept. 23	01 57.40	-26 48.5	1.864	2.717	-2.65	-39.0	11.2	140.9
Oct. 3	01 29.45	-32 47.9	1.929	2.781	-2.93	-31.7	11.4	141.2
Oct. 13	00 59.97	-37 23.5	2.052	2.848	-2.92	-22.4	11.6	135.1
Oct. 23	00 31.89	-40 27.1	2.223	2.916	-2.63	-13.7	11.9	125.5
Nov. 2	00 07.63	-42 11.3	2.428	2.986	-2.16	-6.9	12.2	115.0
Nov. 12	23 48.41	-42 57.6	2.657	3.058	-1.63	-2.2	12.5	104.4
Nov. 22	23 34.36	-43 05.7	2.897	3.131	-1.14	+0.6	12.7	94.3
Dec. 2	23 24.95	-42 51.3	3.141	3.205	-0.72	+2.3	13.0	84.8
Dec. 12	23 19.41	-42 24.5	3.382	3.281	-0.37	+3.1	13.2	75.7
Dec. 22	23 17.00	-41 52.1	3.613	3.358	-0.10	+3.4	13.5	67.2
Jan. 1	23 17.04	-41 18.5	3.831	3.435	+0.12	+3.3	13.7	59.3
Jan. 11	23 19.00	-40 46.3	4.031	3.513	+0.28	+3.1	13.9	52.1
Jan. 21	23 22.43	-40 17.7	4.210	3.592	+0.41	+2.6	14.1	45.7
Jan. 31	23 26.99	-39 54.1	4.367	3.672	+0.51	+2.0	14.2	40.3
Feb. 10	23 32.40	-39 36.8	4.500	3.752	+0.58	+1.4	14.4	36.4
Feb. 20	23 38.43	-39 26.8	4.608	3.832	+0.63	+0.5	14.5	34.3
Mar. 1	23 44.88	-39 25.3	4.691	3.913	+0.66	-0.4	14.6	34.3
Mar. 11	23 51.60	-39 33.3	4.750	3.993	+0.68	-1.4	14.7	36.3
Mar. 21	23 58.44	-39 52.0	4.786	4.075	+0.69	-2.5	14.8	40.1
Mar. 31	00 05.27	-40 22.5	4.800	4.156	+0.68	-3.7	14.9	45.1



## Comet C/2020 K1 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 May 9.08519 TT  
 Peri. = 213.98610  
 Node = 94.35602 2000.0  
 Incl. = 89.67134  
 q = 3.0732784 AU  
 e = 0.9999687

$$m1 = 4.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	18 30.39	-26 03.8	4.268	3.299	+1.09	-9.7	12.8	8.7
Jan. 16	18 41.45	-27 41.7	4.196	3.266	+1.12	-9.9	12.8	16.7
Jan. 26	18 52.81	-29 22.6	4.102	3.234	+1.15	-10.3	12.7	24.7
Feb. 5	19 04.38	-31 08.4	3.990	3.205	+1.17	-10.9	12.6	32.7
Feb. 15	19 16.10	-33 01.5	3.861	3.179	+1.18	-11.8	12.5	40.7
Feb. 25	19 27.90	-35 04.8	3.718	3.156	+1.18	-13.0	12.3	48.8
Mar. 7	19 39.71	-37 21.4	3.564	3.135	+1.18	-14.5	12.2	56.9
Mar. 17	19 51.48	-39 54.6	3.403	3.117	+1.17	-16.4	12.1	65.1
Mar. 27	20 03.14	-42 48.2	3.240	3.102	+1.16	-18.6	12.0	73.2
Apr. 6	20 14.62	-46 05.8	3.078	3.090	+1.14	-21.2	11.8	81.3
Apr. 16	20 25.85	-49 50.7	2.925	3.082	+1.10	-24.1	11.7	89.4
Apr. 26	20 36.70	-54 05.0	2.785	3.076	+1.06	-27.1	11.6	97.1
May 6	20 46.99	-58 48.3	2.665	3.073	+0.99	-29.8	11.5	104.3
May 16	20 56.44	-63 57.4	2.571	3.074	+0.88	-32.1	11.4	110.5
May 26	21 04.45	-69 25.1	2.506	3.078	+0.68	-33.4	11.4	115.2
June 5	21 09.64	-74 59.7	2.475	3.085	+0.26	-33.3	11.4	118.0
June 15	21 07.90	-80 27.3	2.477	3.095	-0.99	-31.8	11.4	118.6
June 25	20 38.05	-85 30.3	2.511	3.107	-8.06	-27.8	11.4	117.0
July 5	15 00.13	-88 28.4	2.574	3.123	-55.74	+10.4	11.5	113.6
July 15	11 28.21	-85 17.4	2.659	3.142	-4.12	+21.0	11.6	109.1
July 25	11 08.55	-82 01.6	2.762	3.164	-0.48	+17.6	11.7	103.9
Aug. 4	11 08.16	-79 23.7	2.876	3.189	+0.33	+13.6	11.8	98.5
Aug. 14	11 13.05	-77 24.6	2.997	3.216	+0.63	+9.8	12.0	93.2
Aug. 24	11 20.02	-76 02.2	3.119	3.246	+0.75	+6.3	12.1	88.0
Sept. 3	11 27.81	-75 13.6	3.239	3.278	+0.80	+3.1	12.2	83.3
Sept. 13	11 35.88	-74 55.5	3.353	3.313	+0.81	+0.2	12.3	79.1
Sept. 23	11 43.81	-75 05.3	3.460	3.350	+0.77	-2.4	12.4	75.4
Oct. 3	11 51.19	-75 40.1	3.557	3.389	+0.69	-4.8	12.6	72.3
Oct. 13	11 57.56	-76 37.8	3.644	3.431	+0.56	-6.9	12.7	69.9
Oct. 23	12 02.14	-77 56.2	3.719	3.474	+0.31	-8.9	12.8	68.1
Nov. 2	12 03.49	-79 33.2	3.784	3.519	-0.13	-10.6	12.9	67.1
Nov. 12	11 58.73	-81 26.1	3.838	3.566	-1.03	-12.0	12.9	66.8
Nov. 22	11 40.52	-83 30.6	3.883	3.615	-3.16	-12.7	13.0	67.1
Dec. 2	10 47.14	-85 34.1	3.920	3.665	-9.18	-11.1	13.1	67.9
Dec. 12	08 22.63	-86 49.9	3.952	3.717	-20.08	-0.9	13.2	69.2
Dec. 22	05 29.31	-85 49.4	3.979	3.770	-11.20	+12.8	13.3	70.7
Jan. 1	04 16.90	-83 14.7	4.005	3.825	-3.81	+17.8	13.3	72.4
Jan. 11	03 52.43	-80 06.6	4.032	3.881	-1.23	+19.8	13.4	74.1
Jan. 21	03 45.62	-76 42.9	4.063	3.937	-0.16	+20.9	13.5	75.7
Jan. 31	03 46.60	-73 11.1	4.099	3.995	+0.36	+21.5	13.6	77.0
Feb. 10	03 51.62	-69 35.3	4.143	4.054	+0.65	+21.7	13.7	78.0
Feb. 20	03 58.99	-65 59.3	4.195	4.114	+0.83	+21.5	13.8	78.5
Mar. 1	04 07.79	-62 26.7	4.256	4.175	+0.94	+21.0	13.9	78.6
Mar. 11	04 17.50	-59 00.5	4.328	4.237	+1.01	+20.2	14.0	78.1
Mar. 21	04 27.81	-55 43.6	4.409	4.299	+1.05	+19.1	14.1	77.2
Mar. 31	04 38.49	-52 38.2	4.498	4.362	+1.08	+17.8	14.2	75.8

## Comet P/2008 L2 (Hill)

Epoch = 2023 June 25.0 TT  
 T = 2023 May 11.02833 TT  
 Peri. = 141.25322 e = 0.6140435  
 Node = 218.01200 2000.0 a = 6.0367601 AU  
 Incl. = 25.87000 n = 0.06645049  
 q = 2.3299268 AU P = 14.83 years

$$m1 = -0.2 + 5 \log(\Delta) + 40.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation		m1	Mot. /PA	Elong.
2023/24	h m	° ' "			for T=+1 day				°
Jan. 6	20 26.75	+00 33.0	3.371	2.572	-0.82	-2.4	20.4	29.0/ 82	30.5
Jan. 16	20 46.08	+01 20.0	3.380	2.537	-0.84	-2.4	20.2	29.8/ 80	26.4
Jan. 26	21 05.80	+02 17.4	3.382	2.504	-0.87	-2.3	19.9	30.5/ 78	22.8
Feb. 5	21 25.84	+03 24.4	3.379	2.474	-0.89	-2.3	19.6	31.1/ 77	19.9
Feb. 15	21 46.12	+04 39.6	3.369	2.446	-0.92	-2.2	19.3	31.5/ 75	17.7
Feb. 25	22 06.58	+06 02.1	3.354	2.421	-0.94	-2.1	19.1	31.8/ 74	16.5
Mar. 7	22 27.17	+07 30.2	3.333	2.399	-0.96	-2.0	18.8	32.0/ 74	16.6
Mar. 17	22 47.85	+09 02.3	3.308	2.380	-0.98	-1.8	18.6	32.1/ 73	17.7
Mar. 27	23 08.58	+10 37.0	3.278	2.364	-1.00	-1.5	18.3	32.0/ 73	19.8
Apr. 6	23 29.33	+12 12.3	3.242	2.350	-1.02	-1.2	18.1	31.9/ 73	22.6
Apr. 16	23 50.08	+13 46.6	3.203	2.340	-1.04	-0.9	17.9	31.6/ 73	25.8
Apr. 26	00 10.78	+15 18.3	3.158	2.334	-1.06	-0.5	17.7	31.2/ 73	29.3
May 6	00 31.40	+16 45.4	3.109	2.330	-1.07	0.0	17.5	30.7/ 74	33.1
May 16	00 51.88	+18 06.5	3.055	2.330	-1.09	+0.5	17.3	30.1/ 75	37.1
May 26	01 12.16	+19 20.1	2.996	2.334	-1.10	+1.0	17.1	29.3/ 76	41.4
June 5	01 32.16	+20 24.7	2.932	2.340	-1.11	+1.6	17.0	28.4/ 78	45.8
June 15	01 51.76	+21 19.0	2.863	2.350	-1.12	+2.1	16.9	27.5/ 80	50.5
June 25	02 10.85	+22 01.9	2.788	2.363	-1.12	+2.7	16.7	26.3/ 82	55.3
July 5	02 29.25	+22 32.3	2.710	2.380	-1.13	+3.3	16.7	25.0/ 85	60.5
July 15	02 46.81	+22 49.4	2.626	2.399	-1.13	+3.8	16.6	23.5/ 88	66.0
July 25	03 03.30	+22 52.5	2.539	2.421	-1.14	+4.4	16.5	21.9/ 91	71.8
Aug. 4	03 18.49	+22 40.9	2.448	2.446	-1.15	+4.8	16.5	20.0/ 96	77.9
Aug. 14	03 32.14	+22 14.1	2.355	2.474	-1.16	+5.2	16.5	18.0/101	84.5
Aug. 24	03 43.95	+21 31.7	2.262	2.504	-1.17	+5.6	16.5	15.8/109	91.6
Sept. 3	03 53.66	+20 33.3	2.170	2.537	-1.19	+5.8	16.5	13.6/119	99.3
Sept. 13	04 01.01	+19 19.0	2.082	2.571	-1.22	+5.9	16.6	11.8/135	107.6
Sept. 23	04 05.75	+17 49.0	2.001	2.608	-1.26	+5.8	16.7	10.9/155	116.5
Oct. 3	04 07.76	+16 04.5	1.931	2.647	-1.30	+5.7	16.8	11.2/176	126.0
Oct. 13	04 07.06	+14 07.7	1.877	2.688	-1.34	+5.3	16.9	12.6/194	136.2
Oct. 23	04 03.85	+12 02.8	1.843	2.730	-1.38	+4.9	17.1	14.3/207	146.7
Nov. 2	03 58.66	+09 55.6	1.833	2.773	-1.41	+4.4	17.3	15.4/215	157.0
Nov. 12	03 52.18	+07 53.4	1.850	2.818	-1.41	+3.9	17.5	15.5/221	165.3
Nov. 22	03 45.32	+06 03.7	1.896	2.865	-1.39	+3.5	17.8	14.2/225	166.1
Dec. 2	03 38.95	+04 32.7	1.971	2.912	-1.35	+3.2	18.2	11.7/228	158.7
Dec. 12	03 33.81	+03 23.7	2.073	2.961	-1.29	+2.9	18.6	8.5/228	148.9
Dec. 22	03 30.40	+02 37.5	2.200	3.010	-1.21	+2.7	19.0	4.9/226	138.7
Jan. 1	03 28.99	+02 12.3	2.347	3.060	-1.13	+2.6	19.4	1.5/197	128.8
Jan. 11	03 29.59	+02 05.0	2.509	3.111	-1.05	+2.4	19.8	2.5/ 87	119.3
Jan. 21	03 32.13	+02 12.2	2.684	3.162	-0.97	+2.3	20.2	5.5/ 76	110.2
Jan. 31	03 36.43	+02 30.2	2.868	3.215	-0.90	+2.3	20.7	8.1/ 74	101.6
Feb. 10	03 42.28	+02 55.7	3.056	3.267	-0.83	+2.2	21.1	10.3/ 74	93.4
Feb. 20	03 49.47	+03 26.0	3.247	3.320	-0.77	+2.1	21.5	12.2/ 75	85.6
Mar. 1	03 57.78	+03 58.5	3.436	3.373	-0.72	+2.1	21.9	13.7/ 76	78.1
Mar. 11	04 07.05	+04 31.5	3.622	3.427	-0.67	+2.0	.	14.9/ 77	70.8
Mar. 21	04 17.10	+05 03.3	3.803	3.481	-0.63	+2.0	.	15.9/ 79	63.9
Mar. 31	04 27.77	+05 32.4	3.976	3.535	-0.59	+2.0	.	16.6/ 80	57.1

Comet 364P/PANSTARRS

Epoch = 2023 June 25.0 TT  
 T = 2023 May 14.01904 TT  
 Peri. = 212.02107 e = 0.7217063  
 Node = 46.14795 2000.0 a = 2.8792980 AU  
 Incl. = 12.13757 n = 0.20173170  
 q = 0.8012905 AU P = 4.89 years

$$m1 = 17.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	12 09.17	+17 41.8	1.356	1.920	+1.51 -0.1	20.5	109.3
Jan. 16	12 24.32	+17 47.8	1.167	1.822	+1.52 +1.6	19.9	115.5
Jan. 26	12 39.68	+18 12.3	0.989	1.721	+1.56 +3.6	19.3	121.4
Feb. 5	12 55.55	+18 59.0	0.821	1.618	+1.64 +6.0	18.7	126.9
Feb. 15	13 12.56	+20 12.2	0.667	1.514	+1.80 +9.0	17.9	131.5
Feb. 25	13 31.98	+21 57.9	0.524	1.409	+2.17 +12.6	17.1	134.7
Mar. 7	13 56.92	+24 23.4	0.395	1.303	+3.04 +17.2	16.1	135.3
Mar. 17	14 35.66	+27 40.5	0.280	1.199	+5.33 +22.9	15.0	131.6
Mar. 27	15 54.18	+31 33.5	0.181	1.097	+12.40 +17.4	13.7	119.2
Apr. 6	18 56.10	+27 48.9	0.122	1.002	+23.03 102.5	12.5	87.5
Apr. 16	22 01.09	+06 47.0	0.153	0.919	+11.66 103.0	12.6	52.8
Apr. 26	23 23.07	-04 40.9	0.244	0.853	+5.32 -37.0	13.2	45.5
May 6	00 05.78	-08 30.5	0.356	0.812	+3.38 -9.9	13.9	47.6
May 16	00 36.00	-09 06.7	0.475	0.802	+2.70 +2.5	14.4	51.0
May 26	01 01.37	-08 11.9	0.591	0.825	+2.37 +8.3	15.0	54.5
June 5	01 23.93	-06 37.5	0.697	0.876	+2.12 +10.4	15.6	58.1
June 15	01 44.07	-04 52.8	0.788	0.950	+1.87 +10.3	16.3	62.1
June 25	02 01.59	-03 15.0	0.860	1.039	+1.60 +9.0	16.8	66.6
July 5	02 16.28	-01 52.3	0.915	1.137	+1.30 +7.3	17.4	71.9
July 15	02 27.90	+00 48.5	0.952	1.240	+0.98 +5.3	17.8	78.0
July 25	02 36.09	+00 05.1	0.973	1.345	+0.62 +3.2	18.2	85.1
Aug. 4	02 40.48	+00 17.8	0.982	1.451	+0.22 +1.2	18.6	93.2
Aug. 14	02 40.67	+00 20.9	0.983	1.556	-0.23 -0.7	18.9	102.4
Aug. 24	02 36.26	+00 05.5	0.981	1.659	-0.70 -2.5	19.2	112.8
Sept. 3	02 27.17	+00 25.3	0.982	1.761	-1.16 -3.7	19.4	124.4
Sept. 13	02 13.78	-01 06.3	0.994	1.861	-1.54 -4.4	19.7	137.0
Sept. 23	01 57.16	-01 50.2	1.023	1.958	-1.77 -4.2	20.0	150.1
Oct. 3	01 39.15	-02 28.0	1.077	2.054	-1.80 -3.1	20.3	162.6
Oct. 13	01 21.76	-02 52.6	1.158	2.147	-1.63 -1.5	20.6	169.3
Oct. 23	01 06.75	-02 59.7	1.268	2.237	-1.32 +0.3	21.0	162.6
Nov. 2	00 55.18	-02 48.7	1.404	2.326	-0.95 +2.0	21.4	151.6
Nov. 12	00 47.31	-02 21.9	1.565	2.412	-0.59 +3.5	21.8	140.4
Nov. 22	00 42.99	-01 41.7	1.745	2.496	-0.25 +4.6	.	129.9
Dec. 2	00 41.78	+00 51.2	1.940	2.578	+0.03 +5.5	.	119.9
Dec. 12	00 43.18	+00 07.2	2.147	2.658	+0.26 +6.2	.	110.6
Dec. 22	00 46.72	+01 11.7	2.361	2.735	+0.46 +6.7	.	101.7
Jan. 1	00 51.98	+02 20.5	2.580	2.811	+0.61 +7.1	.	93.2
Jan. 11	00 58.63	+03 32.4	2.800	2.885	+0.73 +7.3	.	85.0
Jan. 21	01 06.39	+04 46.4	3.018	2.957	+0.83 +7.5	.	77.0
Jan. 31	01 15.02	+06 01.5	3.231	3.028	+0.90 +7.5	.	69.3
Feb. 10	01 24.36	+07 17.0	3.437	3.096	+0.97 +7.5	.	61.8
Feb. 20	01 34.26	+08 32.3	3.633	3.163	+1.01 +7.5	.	54.5
Mar. 1	01 44.58	+09 46.6	3.818	3.228	+1.05 +7.4	.	47.2
Mar. 11	01 55.23	+10 59.4	3.989	3.292	+1.08 +7.2	.	40.1
Mar. 21	02 06.13	+12 10.4	4.144	3.354	+1.10 +7.0	.	33.0
Mar. 31	02 17.18	+13 19.0	4.283	3.414	+1.11 +6.7	.	26.1

## Comet 237P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2023 May 14.67877 TT  
 Peri. = 25.26078 e = 0.4339712  
 Node = 245.35956 2000.0 a = 3.5104981 AU  
 Incl. = 14.01669 n = 0.14984801  
 q = 1.9870430 AU P = 6.58 years

$$m1 = 4.2 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	15 45.25	-24 35.7	2.802	2.229	+2.27 -4.1	16.0	45.6
Jan. 16	16 08.05	-25 10.5	2.685	2.196	+2.29 -2.7	15.7	50.6
Jan. 26	16 31.05	-25 31.0	2.564	2.165	+2.30 -1.2	15.5	55.5
Feb. 5	16 54.06	-25 36.0	2.441	2.135	+2.30 +0.4	15.2	60.5
Feb. 15	17 16.91	-25 24.4	2.318	2.108	+2.27 +2.1	14.9	65.5
Feb. 25	17 39.35	-24 55.7	2.194	2.084	+2.21 +3.8	14.7	70.5
Mar. 7	18 01.12	-24 09.4	2.071	2.061	+2.13 +5.6	14.4	75.6
Mar. 17	18 21.98	-23 05.7	1.950	2.042	+2.02 +7.3	14.2	80.8
Mar. 27	18 41.62	-21 45.2	1.832	2.025	+1.89 +8.9	13.9	86.1
Apr. 6	18 59.77	-20 08.8	1.717	2.011	+1.72 +10.5	13.7	91.6
Apr. 16	19 16.16	-18 17.9	1.607	2.000	+1.53 +11.8	13.5	97.3
Apr. 26	19 30.44	-16 14.3	1.503	1.993	+1.30 +13.0	13.3	103.4
May 6	19 42.32	-14 00.4	1.406	1.988	+1.05 +13.8	13.1	109.8
May 16	19 51.51	-11 39.2	1.317	1.987	+0.76 +14.4	13.0	116.6
May 26	19 57.69	-09 14.6	1.239	1.989	+0.44 +14.4	12.9	123.8
June 5	20 00.68	-06 51.8	1.172	1.994	+0.12 +14.0	12.8	131.5
June 15	20 00.48	-04 37.1	1.119	2.003	-0.19 +12.8	12.7	139.4
June 25	19 57.29	-02 37.8	1.083	2.014	-0.46 +10.8	12.7	147.3
July 5	19 51.81	-01 01.3	1.066	2.029	-0.64 +8.2	12.8	154.0
July 15	19 45.02	+00 06.8	1.068	2.047	-0.70 +5.1	12.9	158.1
July 25	19 38.16	+00 43.9	1.091	2.067	-0.64 +2.0	13.1	157.6
Aug. 4	19 32.50	+00 52.0	1.135	2.090	-0.46 -0.6	13.3	152.8
Aug. 14	19 28.94	+00 36.6	1.198	2.115	-0.21 -2.6	13.5	145.9
Aug. 24	19 28.06	+00 04.9	1.279	2.143	+0.07 -3.8	13.8	138.3
Sept. 3	19 30.04	+00 35.5	1.376	2.173	+0.35 -4.2	14.2	130.7
Sept. 13	19 34.74	-01 18.0	1.486	2.204	+0.61 -4.2	14.5	123.2
Sept. 23	19 41.91	-01 57.8	1.608	2.238	+0.84 -3.7	14.9	116.0
Oct. 3	19 51.20	-02 30.9	1.739	2.273	+1.03 -2.9	15.2	109.1
Oct. 13	20 02.25	-02 55.2	1.879	2.310	+1.19 -1.9	15.6	102.4
Oct. 23	20 14.74	-03 09.1	2.025	2.347	+1.32 -0.8	15.9	96.0
Nov. 2	20 28.37	-03 11.9	2.176	2.386	+1.41 +0.3	16.3	89.7
Nov. 12	20 42.85	-03 03.4	2.330	2.427	+1.49 +1.5	16.6	83.5
Nov. 22	20 57.99	-02 43.7	2.486	2.467	+1.54 +2.6	17.0	77.4
Dec. 2	21 13.59	-02 13.5	2.642	2.509	+1.58 +3.6	17.3	71.5
Dec. 12	21 29.49	-01 33.5	2.797	2.551	+1.60 +4.5	17.6	65.5
Dec. 22	21 45.58	+00 44.5	2.949	2.594	+1.61 +5.4	17.9	59.6
Jan. 1	22 01.73	+00 12.5	3.097	2.638	+1.62 +6.1	18.2	53.7
Jan. 11	22 17.89	+01 16.4	3.239	2.681	+1.61 +6.7	18.5	47.9
Jan. 21	22 33.98	+02 26.3	3.374	2.725	+1.60 +7.3	18.8	42.1
Jan. 31	22 49.95	+03 40.9	3.501	2.769	+1.59 +7.7	19.1	36.3
Feb. 10	23 05.77	+04 59.3	3.617	2.813	+1.57 +8.0	19.3	30.6
Feb. 20	23 21.41	+06 20.6	3.723	2.857	+1.55 +8.2	19.6	25.0
Mar. 1	23 36.83	+07 43.6	3.816	2.902	+1.53 +8.4	19.8	19.5
Mar. 11	23 52.02	+09 07.6	3.897	2.946	+1.51 +8.4	20.1	14.5
Mar. 21	00 06.96	+10 31.8	3.964	2.990	+1.48 +8.4	20.3	10.4
Mar. 31	00 21.61	+11 55.2	4.017	3.034	+1.45 +8.3	20.5	8.8

Comet 94P/Russell

Epoch = 2023 June 25.0 TT  
 T = 2023 May 21.07016 TT  
 Peri. = 92.41659 e = 0.3655244  
 Node = 70.85435 2000.0 a = 3.5100913 AU  
 Incl. = 6.18765 n = 0.14987405  
 q = 2.2270673 AU P = 6.58 years

$$m1 = 13.7 + 5 \log(\Delta) + 7.5 \log(r(t-80))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	08 49.82	+25 32.4	1.479	2.411	-0.51 +5.9	17.7	156.0
Jan. 16	08 43.73	+26 32.0	1.419	2.386	-0.72 +5.9	17.6	166.3
Jan. 26	08 35.93	+27 28.7	1.385	2.363	-0.83 +5.2	17.5	171.4
Feb. 5	08 27.67	+28 14.7	1.378	2.342	-0.80 +3.8	17.4	164.1
Feb. 15	08 20.35	+28 44.9	1.396	2.322	-0.63 +2.0	17.4	153.5
Feb. 25	08 15.20	+28 57.0	1.436	2.303	-0.36 +0.2	17.5	142.8
Mar. 7	08 13.07	+28 51.7	1.495	2.287	-0.03 -1.4	17.5	132.6
Mar. 17	08 14.25	+28 31.0	1.570	2.272	+0.30 -2.8	17.6	123.2
Mar. 27	08 18.71	+27 57.0	1.656	2.260	+0.62 -4.1	17.7	114.5
Apr. 6	08 26.15	+27 11.3	1.750	2.249	+0.89 -5.2	17.7	106.5
Apr. 16	08 36.13	+26 15.2	1.849	2.240	+1.12 -6.2	17.8	99.2
Apr. 26	08 48.20	+25 09.1	1.952	2.234	+1.31 -7.1	17.9	92.4
May 6	09 01.96	+23 53.6	2.057	2.230	+1.45 -8.1	18.0	86.1
May 16	09 17.01	+22 29.0	2.163	2.227	+1.56 -8.9	18.1	80.3
May 26	09 33.06	+20 55.8	2.269	2.227	+1.65 -9.8	18.2	74.7
June 5	09 49.84	+19 14.5	2.373	2.229	+1.71 -10.5	18.3	69.4
June 15	10 07.14	+17 25.9	2.476	2.234	+1.75 -11.2	18.3	64.4
June 25	10 24.80	+15 30.7	2.577	2.240	+1.78 -11.8	18.4	59.5
July 5	10 42.71	+13 30.0	2.676	2.249	+1.80 -12.3	18.5	54.8
July 15	11 00.77	+11 24.7	2.772	2.259	+1.81 -12.7	18.5	50.2
July 25	11 18.93	+09 15.8	2.864	2.272	+1.82 -13.0	18.6	45.6
Aug. 4	11 37.15	+07 04.6	2.953	2.287	+1.82 -13.2	18.7	41.1
Aug. 14	11 55.40	+04 52.1	3.037	2.303	+1.83 -13.3	18.7	36.5
Aug. 24	12 13.69	+02 39.4	3.116	2.321	+1.83 -13.2	18.8	32.0
Sept. 3	12 31.99	+00 27.6	3.190	2.341	+1.83 -13.1	18.8	27.4
Sept. 13	12 50.32	-01 42.3	3.258	2.363	+1.83 -12.8	18.9	22.8
Sept. 23	13 08.68	-03 49.3	3.319	2.386	+1.84 -12.5	18.9	18.2
Oct. 3	13 27.05	-05 52.4	3.373	2.410	+1.84 -12.1	19.0	13.4
Oct. 13	13 45.45	-07 50.7	3.418	2.436	+1.84 -11.5	19.0	8.7
Oct. 23	14 03.87	-09 43.3	3.455	2.463	+1.84 -10.9	19.1	4.2
Nov. 2	14 22.26	-11 29.5	3.482	2.492	+1.84 -10.2	19.1	3.2
Nov. 12	14 40.61	-13 08.7	3.499	2.521	+1.83 -9.5	19.2	7.5
Nov. 22	14 58.88	-14 40.3	3.505	2.551	+1.82 -8.7	19.2	12.7
Dec. 2	15 16.99	-16 03.7	3.500	2.582	+1.80 -7.9	19.2	18.2
Dec. 12	15 34.89	-17 18.9	3.484	2.614	+1.77 -7.0	19.2	23.8
Dec. 22	15 52.46	-18 25.5	3.456	2.647	+1.74 -6.2	19.3	29.7
Jan. 1	16 09.62	-19 23.7	3.417	2.680	+1.69 -5.4	19.3	35.7
Jan. 11	16 26.24	-20 13.7	3.366	2.714	+1.63 -4.6	19.3	41.8
Jan. 21	16 42.18	-20 55.9	3.304	2.748	+1.55 -3.8	19.3	48.2
Jan. 31	16 57.29	-21 30.9	3.231	2.783	+1.46 -3.1	19.3	54.8
Feb. 10	17 11.41	-21 59.7	3.149	2.818	+1.35 -2.6	19.2	61.7
Feb. 20	17 24.34	-22 23.1	3.059	2.853	+1.22 -2.1	19.2	68.7
Mar. 1	17 35.91	-22 42.3	2.961	2.889	+1.07 -1.7	19.2	76.1
Mar. 11	17 45.91	-22 58.5	2.859	2.924	+0.90 -1.5	19.2	83.8
Mar. 21	17 54.10	-23 12.9	2.755	2.960	+0.71 -1.4	19.1	91.9
Mar. 31	18 00.28	-23 26.9	2.651	2.996	+0.50 -1.4	19.1	100.4

## Comet C/2021 X1 (Maury-Attard)

Epoch = 2023 June 25.0 TT  
 T = 2023 May 27.35474 TT  
 Peri. = 334.60490  
 Node = 10.58990 2000.0  
 Incl. = 140.11505  
 q = 3.2336281 AU  
 e = 1.0012751

$$m_1 = 6.3 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	03 32.18	-21 15.0	3.012	3.502	-1.90	+11.1	14.1	112.0
Jan. 16	03 14.81	-19 16.7	3.130	3.467	-1.53	+12.5	14.2	101.8
Jan. 26	03 01.10	-17 08.7	3.268	3.434	-1.18	+13.0	14.2	91.3
Feb. 5	02 50.77	-14 58.6	3.417	3.403	-0.86	+12.9	14.3	80.9
Feb. 15	02 43.36	-12 51.2	3.569	3.375	-0.60	+12.5	14.3	70.8
Feb. 25	02 38.39	-10 49.3	3.716	3.349	-0.38	+11.8	14.4	61.0
Mar. 7	02 35.39	-08 54.2	3.851	3.326	-0.21	+11.1	14.4	51.5
Mar. 17	02 33.93	-07 06.3	3.969	3.305	-0.07	+10.4	14.5	42.5
Mar. 27	02 33.67	-05 25.7	4.066	3.286	+0.03	+9.7	14.5	34.0
Apr. 6	02 34.30	-03 52.0	4.139	3.271	+0.10	+9.0	14.5	26.1
Apr. 16	02 35.54	-02 25.0	4.186	3.258	+0.15	+8.4	14.5	19.6
Apr. 26	02 37.17	-01 04.2	4.205	3.248	+0.18	+7.7	14.5	15.7
May 6	02 38.96	+00 10.6	4.195	3.240	+0.18	+7.2	14.5	16.4
May 16	02 40.70	+01 19.8	4.157	3.235	+0.16	+6.6	14.5	21.2
May 26	02 42.18	+02 23.7	4.091	3.234	+0.12	+6.1	14.5	28.1
June 5	02 43.16	+03 22.4	3.999	3.235	+0.06	+5.6	14.4	36.1
June 15	02 43.40	+04 16.0	3.881	3.239	-0.03	+5.1	14.3	44.7
June 25	02 42.62	+05 04.6	3.741	3.245	-0.15	+4.6	14.3	53.7
July 5	02 40.46	+05 48.0	3.583	3.255	-0.30	+4.0	14.2	63.3
July 15	02 36.55	+06 25.9	3.410	3.267	-0.50	+3.5	14.1	73.3
July 25	02 30.42	+06 57.8	3.228	3.282	-0.75	+2.8	14.0	84.0
Aug. 4	02 21.57	+07 22.7	3.044	3.299	-1.06	+2.1	13.9	95.5
Aug. 14	02 09.46	+07 39.3	2.867	3.320	-1.41	+1.1	13.8	107.8
Aug. 24	01 53.66	+07 45.6	2.707	3.342	-1.79	0.0	13.7	121.0
Sept. 3	01 34.00	+07 39.7	2.575	3.368	-2.17	-1.3	13.6	135.3
Sept. 13	01 10.85	+07 20.1	2.483	3.395	-2.47	-2.7	13.6	150.5
Sept. 23	00 45.24	+06 46.9	2.442	3.425	-2.63	-4.0	13.6	166.2
Oct. 3	00 18.90	+06 03.4	2.459	3.458	-2.60	-4.7	13.6	175.6
Oct. 13	23 53.76	+05 15.4	2.534	3.492	-2.38	-4.8	13.7	160.8
Oct. 23	23 31.42	+04 29.5	2.662	3.528	-2.04	-4.3	13.9	145.6
Nov. 2	23 12.80	+03 51.0	2.834	3.567	-1.64	-3.3	14.1	131.2
Nov. 12	22 58.12	+03 22.9	3.039	3.607	-1.26	-2.2	14.3	117.7
Nov. 22	22 47.14	+03 06.4	3.265	3.649	-0.91	-1.0	14.5	105.1
Dec. 2	22 39.39	+03 01.4	3.503	3.693	-0.62	+0.1	14.7	93.3
Dec. 12	22 34.31	+03 07.0	3.743	3.739	-0.38	+1.1	14.9	82.2
Dec. 22	22 31.41	+03 22.1	3.978	3.786	-0.19	+2.0	15.1	71.7
Jan. 1	22 30.22	+03 45.8	4.202	3.834	-0.04	+2.8	15.3	61.7
Jan. 11	22 30.35	+04 17.1	4.409	3.884	+0.07	+3.5	15.4	52.1
Jan. 21	22 31.47	+04 55.2	4.597	3.935	+0.16	+4.1	15.6	43.0
Jan. 31	22 33.30	+05 39.3	4.761	3.988	+0.21	+4.7	15.7	34.4
Feb. 10	22 35.61	+06 28.7	4.900	4.041	+0.25	+5.2	15.8	26.5
Feb. 20	22 38.18	+07 23.0	5.011	4.096	+0.26	+5.7	15.9	19.9
Mar. 1	22 40.82	+08 21.5	5.095	4.152	+0.26	+6.1	16.0	16.1
Mar. 11	22 43.36	+09 23.9	5.149	4.208	+0.24	+6.4	16.1	16.8
Mar. 21	22 45.64	+10 29.6	5.176	4.266	+0.21	+6.7	16.2	21.6
Mar. 31	22 47.49	+11 38.2	5.176	4.324	+0.15	+7.0	16.2	28.4

Comet C/2021 Q4 (Fuls)

Epoch = 2023 June 25.0 TT  
 T = 2023 June 10.67544 TT  
 Peri. = 147.01444  
 Node = 183.33199 2000.0  
 Incl. = 71.47511  
 q = 7.5645706 AU  
 e = 1.0031568

$$m1 = -6.2 + 5 \log(\Delta) + 22.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	21 41.24	+26 59.2	8.035	7.627	+0.65	-3.7	18.2	62.3
Jan. 16	21 47.82	+26 25.7	8.132	7.619	+0.67	-2.9	18.2	55.6
Jan. 26	21 54.65	+26 00.5	8.218	7.612	+0.69	-2.1	18.2	49.3
Feb. 5	22 01.61	+25 43.2	8.289	7.605	+0.70	-1.3	18.2	43.6
Feb. 15	22 08.64	+25 33.0	8.345	7.599	+0.70	-0.6	18.2	38.7
Feb. 25	22 15.64	+25 29.5	8.382	7.593	+0.70	0.0	18.2	35.1
Mar. 7	22 22.53	+25 31.8	8.401	7.588	+0.68	+0.5	18.2	33.0
Mar. 17	22 29.24	+25 39.1	8.400	7.584	+0.66	+1.0	18.2	32.8
Mar. 27	22 35.69	+25 50.6	8.379	7.579	+0.63	+1.4	18.2	34.6
Apr. 6	22 41.82	+26 05.6	8.339	7.576	+0.59	+1.6	18.2	38.0
Apr. 16	22 47.54	+26 23.0	8.279	7.573	+0.55	+1.9	18.2	42.7
Apr. 26	22 52.79	+26 42.1	8.202	7.570	+0.50	+2.0	18.1	48.3
May 6	22 57.49	+27 01.9	8.108	7.568	+0.44	+2.0	18.1	54.6
May 16	23 01.58	+27 21.5	7.999	7.566	+0.37	+1.9	18.1	61.3
May 26	23 05.00	+27 39.7	7.878	7.565	+0.30	+1.7	18.1	68.5
June 5	23 07.66	+27 55.6	7.747	7.565	+0.22	+1.4	18.0	75.9
June 15	23 09.54	+28 08.0	7.609	7.565	+0.14	+1.0	18.0	83.7
June 25	23 10.58	+28 15.7	7.468	7.565	+0.06	+0.5	17.9	91.6
July 5	23 10.77	+28 17.4	7.327	7.566	-0.03	-0.2	17.9	99.7
July 15	23 10.11	+28 12.0	7.191	7.568	-0.11	-1.0	17.9	108.0
July 25	23 08.64	+27 58.1	7.063	7.570	-0.19	-1.9	17.8	116.4
Aug. 4	23 06.45	+27 35.0	6.948	7.572	-0.26	-2.9	17.8	124.7
Aug. 14	23 03.64	+27 01.8	6.850	7.575	-0.31	-3.9	17.8	132.8
Aug. 24	23 00.39	+26 18.3	6.773	7.579	-0.34	-4.9	17.7	140.3
Sept. 3	22 56.89	+25 24.9	6.720	7.583	-0.36	-5.9	17.7	146.6
Sept. 13	22 53.34	+24 22.4	6.694	7.588	-0.35	-6.7	17.7	150.7
Sept. 23	22 49.98	+23 12.2	6.697	7.593	-0.32	-7.4	17.7	151.3
Oct. 3	22 47.02	+21 56.6	6.729	7.598	-0.27	-7.8	17.8	148.3
Oct. 13	22 44.62	+20 37.7	6.789	7.604	-0.20	-8.0	17.8	142.4
Oct. 23	22 42.93	+19 18.0	6.877	7.611	-0.13	-7.9	17.8	134.8
Nov. 2	22 42.04	+18 00.0	6.989	7.618	-0.04	-7.6	17.9	126.2
Nov. 12	22 42.00	+16 45.7	7.122	7.626	+0.04	-7.2	17.9	117.2
Nov. 22	22 42.82	+15 36.8	7.271	7.634	+0.13	-6.5	18.0	108.0
Dec. 2	22 44.47	+14 34.5	7.432	7.643	+0.21	-5.8	18.0	98.6
Dec. 12	22 46.91	+13 39.5	7.600	7.652	+0.28	-5.1	18.1	89.3
Dec. 22	22 50.07	+12 52.2	7.770	7.662	+0.35	-4.3	18.1	80.1
Jan. 1	22 53.86	+12 12.7	7.937	7.672	+0.41	-3.5	18.2	70.9
Jan. 11	22 58.21	+11 40.6	8.096	7.682	+0.46	-2.8	18.3	61.9
Jan. 21	23 03.02	+11 15.6	8.245	7.694	+0.50	-2.1	18.3	53.1
Jan. 31	23 08.20	+10 57.0	8.378	7.705	+0.54	-1.5	18.4	44.4
Feb. 10	23 13.67	+10 44.0	8.494	7.717	+0.56	-1.0	18.4	35.9
Feb. 20	23 19.34	+10 36.0	8.590	7.730	+0.58	-0.6	18.5	27.8
Mar. 1	23 25.13	+10 32.2	8.664	7.743	+0.58	-0.2	18.5	20.3
Mar. 11	23 30.97	+10 31.6	8.715	7.756	+0.58	+0.1	18.5	14.3
Mar. 21	23 36.78	+10 33.6	8.742	7.770	+0.58	+0.3	18.5	12.1
Mar. 31	23 42.48	+10 37.2	8.744	7.785	+0.56	+0.4	18.6	15.3

Comet 72P/Denning-Fujikawa

Epoch = 2023 June 25.0 TT  
 T = 2023 June 15.41508 TT  
 Peri. = 346.73395 e = 0.8186774  
 Node = 26.70347 2000.0 a = 4.3072072 AU  
 Incl. = 10.94869 n = 0.11025808  
 q = 0.7809940 AU P = 8.94 years

$$m1 = 17.2 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	17 25.48	-29 03.5	3.260	2.389	+2.10 -3.0	.	23.3
Jan. 16	17 47.12	-29 29.5	3.099	2.286	+2.24 -2.1	.	28.7
Jan. 26	18 10.19	-29 46.5	2.929	2.180	+2.39 -1.1	.	33.7
Feb. 5	18 34.83	-29 52.1	2.751	2.072	+2.56 +0.2	.	38.5
Feb. 15	19 01.23	-29 43.5	2.568	1.962	+2.75 +1.8	.	42.8
Feb. 25	19 29.63	-29 17.0	2.383	1.849	+2.96 +3.8	.	46.7
Mar. 7	20 00.25	-28 27.7	2.199	1.735	+3.20 +6.4	.	49.9
Mar. 17	20 33.38	-27 09.2	2.022	1.619	+3.46 +9.7	.	52.4
Mar. 27	21 09.30	-25 13.5	1.853	1.501	+3.75 +14.0	.	54.0
Apr. 6	21 48.18	-22 31.2	1.700	1.383	+4.05 +19.2	21.2	54.5
Apr. 16	22 30.09	-18 52.4	1.567	1.266	+4.35 +25.3	20.2	53.7
Apr. 26	23 14.88	-14 10.6	1.461	1.150	+4.62 +31.7	19.2	51.6
May 6	00 02.14	-08 27.2	1.389	1.040	+4.84 +37.3	18.3	48.3
May 16	00 51.35	-01 56.3	1.354	0.941	+5.01 +40.7	17.3	44.0
May 26	01 41.96	+04 54.4	1.360	0.858	+5.12 +40.8	16.5	39.1
June 5	02 33.49	+11 29.5	1.402	0.802	+5.19 +37.3	16.0	34.3
June 15	03 25.54	+17 15.8	1.473	0.781	+5.21 +30.9	15.9	30.0
June 25	04 17.28	+21 49.3	1.565	0.799	+5.11 +22.8	16.2	26.6
July 5	05 07.46	+25 00.3	1.667	0.852	+4.88 +14.6	16.9	24.4
July 15	05 54.73	+26 53.1	1.774	0.933	+4.52 +7.5	17.8	23.4
July 25	06 38.09	+27 41.4	1.881	1.032	+4.10 +1.9	18.8	23.5
Aug. 4	07 17.08	+27 41.8	1.983	1.141	+3.66 -2.0	19.8	24.6
Aug. 14	07 51.78	+27 09.2	2.078	1.256	+3.25 -4.6	20.8	26.5
Aug. 24	08 22.51	+26 15.9	2.164	1.373	+2.87 -6.1	21.6	29.3
Sept. 3	08 49.68	+25 11.0	2.238	1.491	+2.54 -6.8	.	32.7
Sept. 13	09 13.74	+24 01.3	2.299	1.609	+2.25 -7.1	.	36.7
Sept. 23	09 35.05	+22 51.4	2.345	1.725	+1.99 -6.8	.	41.4
Oct. 3	09 53.87	+21 45.2	2.377	1.840	+1.76 -6.3	.	46.6
Oct. 13	10 10.43	+20 45.5	2.393	1.952	+1.54 -5.5	.	52.4
Oct. 23	10 24.83	+19 54.6	2.394	2.062	+1.32 -4.5	.	58.8
Nov. 2	10 37.11	+19 14.8	2.381	2.171	+1.11 -3.3	.	65.7
Nov. 12	10 47.24	+18 47.8	2.356	2.277	+0.89 -1.9	.	73.2
Nov. 22	10 55.10	+18 35.4	2.319	2.380	+0.66 -0.4	.	81.4
Dec. 2	11 00.56	+18 39.1	2.276	2.482	+0.41 +1.3	.	90.1
Dec. 12	11 03.40	+18 59.7	2.229	2.582	+0.13 +3.0	.	99.6
Dec. 22	11 03.43	+19 37.3	2.183	2.680	-0.16 +4.6	.	109.7
Jan. 1	11 00.52	+20 30.2	2.144	2.776	-0.45 +6.0	.	120.5
Jan. 11	10 54.67	+21 35.2	2.118	2.869	-0.74 +7.0	.	131.8
Jan. 21	10 46.09	+22 46.5	2.112	2.962	-0.99 +7.2	.	143.5
Jan. 31	10 35.39	+23 56.9	2.132	3.052	-1.16 +6.7	.	154.8
Feb. 10	10 23.39	+24 58.8	2.180	3.141	-1.23 +5.5	.	164.0
Feb. 20	10 11.19	+25 46.0	2.261	3.228	-1.19 +3.8	.	165.5
Mar. 1	09 59.86	+26 15.4	2.373	3.313	-1.05 +1.9	.	158.1
Mar. 11	09 50.22	+26 26.7	2.514	3.397	-0.85 +0.2	.	147.8
Mar. 21	09 42.81	+26 21.9	2.682	3.479	-0.61 -1.3	.	137.2
Mar. 31	09 37.81	+26 04.0	2.870	3.560	-0.37 -2.4	.	126.9



## Comet C/2022 W3 (Leonard)

Epoch = 2023 June 25.0 TT  
 T = 2023 June 22.77454 TT  
 Peri. = 116.52255  
 Node = 132.26926 2000.0  
 Incl. = 103.55848  
 q = 1.3976828 AU  
 e = 0.9950911

$$m1 = 11.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	10 41.65	+53 41.2	1.921	2.653	-0.63	+42.3	17.6	129.1
Jan. 16	10 31.17	+61 04.6	1.794	2.551	-1.70	+46.1	17.2	131.1
Jan. 26	10 05.46	+68 46.2	1.717	2.449	-3.97	+45.0	17.0	128.0
Feb. 5	09 05.73	+75 38.8	1.689	2.348	-9.15	+34.4	16.7	120.5
Feb. 15	07 00.67	+79 36.8	1.704	2.248	-15.69	+7.9	16.6	110.4
Feb. 25	04 37.34	+78 48.4	1.751	2.149	-10.83	-16.7	16.4	99.5
Mar. 7	03 19.11	+75 26.2	1.817	2.052	-4.90	-22.0	16.3	88.9
Mar. 17	02 43.70	+71 54.4	1.889	1.958	-2.28	-19.6	16.2	78.9
Mar. 27	02 26.76	+68 56.7	1.958	1.867	-1.14	-15.5	16.1	69.9
Apr. 6	02 18.06	+66 40.1	2.014	1.781	-0.61	-11.5	15.9	62.1
Apr. 16	02 13.18	+65 01.6	2.050	1.699	-0.37	-7.9	15.8	55.6
Apr. 26	02 09.90	+63 56.6	2.063	1.624	-0.30	-4.9	15.6	50.7
May 6	02 06.75	+63 20.0	2.047	1.557	-0.35	-2.3	15.4	47.6
May 16	02 02.66	+63 07.9	2.002	1.500	-0.50	0.0	15.2	46.6
May 26	01 56.48	+63 17.4	1.926	1.454	-0.79	+2.0	14.9	47.8
June 5	01 46.75	+63 45.3	1.819	1.421	-1.24	+3.7	14.7	51.1
June 15	01 31.33	+64 28.0	1.683	1.402	-1.97	+4.9	14.5	56.3
June 25	01 06.70	+65 18.0	1.521	1.398	-3.16	+4.8	14.3	63.2
July 5	00 27.37	+65 53.2	1.341	1.409	-4.99	+1.0	14.0	71.9
July 15	23 27.35	+65 16.0	1.152	1.434	-7.21	-11.9	13.8	82.6
July 25	22 08.85	+61 18.0	0.970	1.473	-8.19	-41.9	13.5	95.7
Aug. 4	20 52.10	+51 03.6	0.825	1.524	-6.69	-86.5	13.3	111.5
Aug. 14	19 55.92	+33 42.5	0.758	1.586	-4.34	119.8	13.3	126.5
Aug. 24	19 21.33	+13 45.0	0.804	1.656	-2.51	112.0	13.6	131.3
Sept. 3	19 02.06	-02 38.3	0.955	1.734	-1.31	-80.7	14.2	124.1
Sept. 13	18 52.66	-13 55.7	1.171	1.818	-0.54	-53.7	14.8	113.0
Sept. 23	18 49.76	-21 26.4	1.424	1.907	-0.02	-36.1	15.5	102.2
Oct. 3	18 51.28	-26 33.9	1.692	2.000	+0.34	-25.2	16.1	92.3
Oct. 13	18 55.91	-30 12.2	1.965	2.095	+0.60	-18.3	16.6	83.1
Oct. 23	19 02.85	-32 53.2	2.236	2.193	+0.80	-13.8	17.1	74.6
Nov. 2	19 11.51	-34 56.0	2.498	2.292	+0.94	-10.7	17.5	66.6
Nov. 12	19 21.49	-36 32.4	2.749	2.393	+1.06	-8.5	17.9	58.9
Nov. 22	19 32.49	-37 50.3	2.985	2.494	+1.15	-7.0	18.2	51.6
Dec. 2	19 44.27	-38 54.8	3.204	2.596	+1.21	-5.9	18.6	44.6
Dec. 12	19 56.66	-39 49.8	3.403	2.698	+1.27	-5.1	18.9	38.2
Dec. 22	20 09.49	-40 38.2	3.581	2.801	+1.30	-4.6	19.1	32.5
Jan. 1	20 22.63	-41 22.5	3.736	2.903	+1.33	-4.3	19.4	27.8
Jan. 11	20 35.99	-42 04.6	3.869	3.006	+1.34	-4.2	19.6	24.9
Jan. 21	20 49.45	-42 46.6	3.979	3.108	+1.35	-4.3	19.8	24.2
Jan. 31	21 02.93	-43 30.1	4.066	3.210	+1.35	-4.5	20.0	26.0
Feb. 10	21 16.36	-44 16.9	4.131	3.311	+1.34	-4.9	20.2	29.8
Feb. 20	21 29.67	-45 08.7	4.175	3.412	+1.32	-5.5	20.3	34.9
Mar. 1	21 42.79	-46 07.1	4.200	3.513	+1.30	-6.3	20.5	41.0
Mar. 11	21 55.66	-47 13.8	4.207	3.613	+1.27	-7.2	20.6	47.6
Mar. 21	22 08.20	-48 30.5	4.200	3.712	+1.23	-8.3	20.7	54.6
Mar. 31	22 20.34	-49 58.6	4.181	3.811	+1.19	-9.5	20.8	61.7

Comet 126P/IRAS

Epoch = 2023 June 25.0 TT  
 T = 2023 July 4.85856 TT  
 Peri. = 356.59254 e = 0.6965192  
 Node = 357.87167 2000.0 a = 5.6363994 AU  
 Incl. = 45.87578 n = 0.07365486  
 q = 1.7105390 AU P = 13.38 years

$$m1 = 9.5 + 5 \log(\Delta) + 15.0 \log(r(t-30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	19 13.15	-55 37.6	3.292	2.526	+3.48 +7.7	18.6	33.1
Jan. 16	19 47.55	-54 10.2	3.222	2.457	+3.38 +10.0	18.4	33.1
Jan. 26	20 20.76	-52 19.5	3.149	2.390	+3.24 +12.3	18.2	33.5
Feb. 5	20 52.39	-50 06.8	3.072	2.324	+3.07 +14.4	18.0	34.2
Feb. 15	21 22.26	-47 33.7	2.993	2.259	+2.89 +16.3	17.7	35.2
Feb. 25	21 50.29	-44 42.6	2.912	2.195	+2.70 +18.0	17.5	36.4
Mar. 7	22 16.53	-41 35.8	2.830	2.134	+2.53 +19.5	17.3	37.8
Mar. 17	22 41.08	-38 15.3	2.746	2.075	+2.37 +20.7	17.0	39.4
Mar. 27	23 04.08	-34 43.2	2.660	2.019	+2.22 +21.8	16.7	41.2
Apr. 6	23 25.66	-31 01.0	2.572	1.966	+2.09 +22.7	16.5	43.2
Apr. 16	23 45.99	-27 09.7	2.483	1.916	+1.97 +23.6	16.2	45.4
Apr. 26	00 05.20	-23 10.3	2.392	1.871	+1.86 +24.4	16.0	47.8
May 6	00 23.39	-19 02.9	2.299	1.830	+1.77 +25.2	15.7	50.5
May 16	00 40.67	-14 47.2	2.204	1.795	+1.68 +26.0	15.5	53.4
May 26	00 57.13	-10 22.6	2.108	1.765	+1.60 +27.0	15.2	56.6
June 5	01 12.81	-05 47.8	2.010	1.742	+1.53 +28.1	15.0	60.1
June 15	01 27.75	-01 01.1	1.911	1.724	+1.45 +29.4	14.7	63.8
June 25	01 41.95	+03 59.5	1.813	1.714	+1.38 +30.9	14.5	67.9
July 5	01 55.35	+09 16.1	1.718	1.711	+1.29 +32.6	14.3	72.4
July 15	02 07.87	+14 51.2	1.626	1.714	+1.20 +34.6	14.1	77.1
July 25	02 19.28	+20 46.4	1.540	1.725	+1.07 +36.6	13.9	82.1
Aug. 4	02 29.28	+27 02.0	1.462	1.742	+0.91 +38.7	13.8	87.5
Aug. 14	02 37.38	+33 36.5	1.395	1.766	+0.68 +40.3	13.7	92.9
Aug. 24	02 42.76	+40 24.4	1.342	1.796	+0.35 +41.2	13.7	98.5
Sept. 3	02 44.23	+47 15.7	1.305	1.831	-0.13 +40.8	13.7	103.9
Sept. 13	02 40.00	+53 54.9	1.286	1.872	-0.83 +38.5	13.8	108.9
Sept. 23	02 27.48	+60 00.1	1.286	1.918	-1.82 +33.7	13.9	113.2
Oct. 3	02 03.86	+65 05.0	1.305	1.967	-3.05 +26.1	14.0	116.5
Oct. 13	01 28.00	+68 42.4	1.342	2.020	-4.15 +16.1	14.2	118.7
Oct. 23	00 44.42	+70 34.7	1.395	2.077	-4.39 +5.5	14.5	119.7
Nov. 2	00 03.69	+70 50.1	1.463	2.136	-3.52 -2.7	14.7	119.6
Nov. 12	23 34.58	+70 00.1	1.544	2.197	-2.14 -7.2	15.0	118.6
Nov. 22	23 19.18	+68 39.8	1.636	2.260	-0.86 -8.6	15.3	116.8
Dec. 2	23 15.28	+67 14.4	1.738	2.325	+0.12 -8.2	15.6	114.4
Dec. 12	23 19.94	+65 57.0	1.848	2.392	+0.84 -7.0	16.0	111.5
Dec. 22	23 30.88	+64 53.6	1.966	2.459	+1.37 -5.5	16.3	108.3
Jan. 1	23 46.42	+64 05.8	2.091	2.528	+1.76 -4.0	16.6	104.8
Jan. 11	00 05.46	+63 32.4	2.221	2.597	+2.07 -2.6	16.9	101.1
Jan. 21	00 27.26	+63 11.5	2.358	2.666	+2.31 -1.5	17.2	97.2
Jan. 31	00 51.24	+63 00.4	2.499	2.736	+2.50 -0.7	17.5	93.2
Feb. 10	01 17.01	+62 56.0	2.644	2.806	+2.66 -0.2	17.8	89.0
Feb. 20	01 44.25	+62 55.6	2.793	2.877	+2.79 +0.1	18.1	84.8
Mar. 1	02 12.63	+62 56.3	2.944	2.947	+2.89 0.0	18.4	80.5
Mar. 11	02 41.88	+62 55.7	3.096	3.017	+2.96 -0.2	18.7	76.2
Mar. 21	03 11.70	+62 51.7	3.249	3.087	+3.00 -0.6	18.9	71.8
Mar. 31	03 41.75	+62 42.8	3.401	3.157	+3.01 -1.2	19.2	67.5

## Comet 287P/Christensen

Epoch = 2023 June 25.0 TT  
 T = 2023 July 6.10854 TT  
 Peri. = 189.13894 e = 0.2713755  
 Node = 139.04196 2000.0 a = 4.1640943 AU  
 Incl. = 16.32133 n = 0.11599072  
 q = 3.0340611 AU P = 8.50 years

$$m1 = 2.0 + 5 \log(\Delta) + 27.5 \log(r(t+20))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	19 25.00	-16° 10.6	4.141	3.170	+1.60 +1.0	18.8	7.9
Jan. 16	19 41.06	-15 57.1	4.134	3.156	+1.61 +1.7	18.7	5.5
Jan. 26	19 57.14	-15 36.9	4.112	3.143	+1.61 +2.4	18.7	8.8
Feb. 5	20 13.15	-15 10.4	4.076	3.130	+1.59 +3.0	18.6	14.2
Feb. 15	20 28.99	-14 38.6	4.027	3.118	+1.57 +3.5	18.5	20.2
Feb. 25	20 44.61	-14 02.1	3.963	3.107	+1.55 +3.9	18.5	26.3
Mar. 7	20 59.91	-13 22.0	3.888	3.097	+1.51 +4.2	18.4	32.4
Mar. 17	21 14.83	-12 39.4	3.800	3.087	+1.47 +4.4	18.3	38.7
Mar. 27	21 29.31	-11 55.5	3.702	3.078	+1.42 +4.4	18.2	45.0
Apr. 6	21 43.26	-11 11.5	3.594	3.070	+1.36 +4.4	18.1	51.3
Apr. 16	21 56.63	-10 28.8	3.477	3.062	+1.30 +4.1	18.0	57.8
Apr. 26	22 09.31	-09 48.9	3.353	3.056	+1.23 +3.8	17.9	64.4
May 6	22 21.22	-09 13.3	3.223	3.050	+1.14 +3.3	17.8	71.2
May 16	22 32.26	-08 43.7	3.089	3.045	+1.05 +2.6	17.7	78.1
May 26	22 42.28	-08 21.9	2.952	3.041	+0.94 +1.7	17.6	85.3
June 5	22 51.16	-08 09.8	2.815	3.038	+0.82 +0.6	17.5	92.8
June 15	22 58.73	-08 09.2	2.680	3.036	+0.68 -0.6	17.4	100.6
June 25	23 04.81	-08 21.9	2.550	3.035	+0.52 -2.1	17.3	108.8
July 5	23 09.23	-08 49.5	2.428	3.034	+0.34 -3.6	17.2	117.5
July 15	23 11.83	-09 32.8	2.316	3.034	+0.16 -5.2	17.1	126.7
July 25	23 12.51	-10 31.8	2.219	3.036	-0.04 -6.7	17.0	136.3
Aug. 4	23 11.27	-11 44.9	2.140	3.038	-0.22 -8.0	16.9	146.4
Aug. 14	23 08.27	-13 08.8	2.084	3.041	-0.39 -8.8	16.9	156.7
Aug. 24	23 03.83	-14 38.1	2.052	3.044	-0.50 -9.0	16.9	166.4
Sept. 3	22 58.52	-16 06.2	2.048	3.049	-0.55 -8.5	16.9	171.2
Sept. 13	22 53.00	-17 26.4	2.072	3.055	-0.54 -7.3	17.0	164.9
Sept. 23	22 48.00	-18 32.9	2.122	3.061	-0.44 -5.7	17.1	154.9
Oct. 3	22 44.18	-19 21.9	2.197	3.068	-0.30 -3.9	17.2	144.6
Oct. 13	22 42.00	-19 52.1	2.294	3.076	-0.12 -2.0	17.3	134.4
Oct. 23	22 41.73	-20 03.5	2.409	3.085	+0.08 -0.2	17.4	124.6
Nov. 2	22 43.47	-19 57.7	2.537	3.094	+0.28 +1.5	17.6	115.3
Nov. 12	22 47.13	-19 36.6	2.676	3.105	+0.47 +2.9	17.8	106.4
Nov. 22	22 52.57	-19 02.3	2.822	3.116	+0.63 +4.1	17.9	97.9
Dec. 2	22 59.58	-18 16.9	2.971	3.127	+0.78 +5.1	18.1	89.8
Dec. 12	23 07.93	-17 22.1	3.121	3.140	+0.90 +5.9	18.2	82.0
Dec. 22	23 17.43	-16 19.4	3.269	3.153	+1.01 +6.6	18.4	74.5
Jan. 1	23 27.87	-15 10.4	3.413	3.167	+1.09 +7.2	18.5	67.3
Jan. 11	23 39.10	-13 56.4	3.552	3.181	+1.16 +7.6	18.7	60.3
Jan. 21	23 50.96	-12 38.5	3.682	3.196	+1.22 +8.0	18.8	53.5
Jan. 31	00 03.32	-11 18.0	3.803	3.212	+1.26 +8.2	19.0	46.9
Feb. 10	00 16.09	-09 55.8	3.914	3.228	+1.30 +8.3	19.1	40.5
Feb. 20	00 29.18	-08 33.0	4.014	3.245	+1.32 +8.3	19.2	34.3
Mar. 1	00 42.51	-07 10.5	4.101	3.263	+1.34 +8.2	19.3	28.3
Mar. 11	00 56.01	-05 49.1	4.175	3.280	+1.36 +8.0	19.4	22.7
Mar. 21	01 09.63	-04 29.8	4.235	3.299	+1.37 +7.8	19.5	17.5
Mar. 31	01 23.31	-03 13.5	4.281	3.318	+1.37 +7.5	19.6	13.4

## Comet 180P/NEAT

Epoch = 2023 June 25.0 TT  
 T = 2023 July 12.18970 TT  
 Peri. = 94.66699 e = 0.3534165  
 Node = 84.56544 2000.0 a = 3.8677628 AU  
 Incl. = 16.86008 n = 0.12957294  
 q = 2.5008316 AU P = 7.61 years

$$m1 = 7.0 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	09 50.06	+31 03.8	1.919	2.765	-0.16 +10.0	17.2	142.5
Jan. 16	09 47.27	+32 46.0	1.836	2.740	-0.42 +10.4	17.1	151.3
Jan. 26	09 42.03	+34 28.2	1.778	2.716	-0.64 +9.8	16.9	157.9
Feb. 5	09 34.95	+36 00.5	1.747	2.693	-0.77 +8.3	16.8	159.5
Feb. 15	09 27.02	+37 13.8	1.742	2.670	-0.80 +6.0	16.7	155.1
Feb. 25	09 19.43	+38 01.7	1.762	2.649	-0.69 +3.3	16.7	147.2
Mar. 7	09 13.40	+38 21.9	1.805	2.629	-0.48 +0.5	16.7	138.2
Mar. 17	09 09.80	+38 15.9	1.867	2.611	-0.21 -1.9	16.7	129.1
Mar. 27	09 09.10	+37 47.2	1.943	2.594	+0.10 -4.0	16.7	120.3
Apr. 6	09 11.41	+36 59.8	2.031	2.578	+0.39 -5.6	16.8	111.9
Apr. 16	09 16.52	+35 57.5	2.126	2.563	+0.65 -7.0	16.8	104.1
Apr. 26	09 24.13	+34 42.7	2.227	2.550	+0.88 -8.1	16.9	96.8
May 6	09 33.84	+33 17.6	2.330	2.538	+1.07 -9.0	16.9	89.9
May 16	09 45.25	+31 43.7	2.434	2.528	+1.22 -9.8	17.0	83.5
May 26	09 58.04	+30 01.8	2.537	2.519	+1.34 -10.6	17.0	77.4
June 5	10 11.91	+28 12.9	2.639	2.512	+1.43 -11.2	17.1	71.7
June 15	10 26.59	+26 17.8	2.738	2.507	+1.51 -11.8	17.2	66.2
June 25	10 41.90	+24 17.0	2.834	2.503	+1.56 -12.4	17.2	60.9
July 5	10 57.69	+22 11.5	2.926	2.501	+1.60 -12.8	17.3	55.8
July 15	11 13.82	+20 02.0	3.014	2.501	+1.63 -13.1	17.4	50.9
July 25	11 30.23	+17 49.4	3.097	2.502	+1.65 -13.4	17.4	46.1
Aug. 4	11 46.83	+15 34.7	3.175	2.505	+1.67 -13.6	17.5	41.4
Aug. 14	12 03.59	+13 18.7	3.248	2.510	+1.68 -13.6	17.6	36.7
Aug. 24	12 20.48	+11 02.4	3.314	2.516	+1.69 -13.6	17.6	32.1
Sept. 3	12 37.46	+08 46.8	3.374	2.524	+1.70 -13.5	17.7	27.6
Sept. 13	12 54.54	+06 32.8	3.427	2.533	+1.71 -13.3	17.7	23.2
Sept. 23	13 11.70	+04 21.3	3.473	2.544	+1.72 -13.0	17.8	18.9
Oct. 3	13 28.92	+02 13.4	3.511	2.557	+1.72 -12.6	17.9	15.0
Oct. 13	13 46.19	+00 09.9	3.540	2.571	+1.73 -12.1	17.9	11.7
Oct. 23	14 03.49	-01 48.4	3.560	2.586	+1.73 -11.5	18.0	10.1
Nov. 2	14 20.80	-03 40.6	3.571	2.603	+1.73 -10.9	18.1	10.9
Nov. 12	14 38.09	-05 26.2	3.572	2.621	+1.73 -10.2	18.1	13.9
Nov. 22	14 55.29	-07 04.4	3.562	2.640	+1.71 -9.4	18.2	18.0
Dec. 2	15 12.36	-08 34.8	3.541	2.661	+1.70 -8.6	18.2	22.9
Dec. 12	15 29.23	-09 57.0	3.510	2.683	+1.67 -7.8	18.3	28.2
Dec. 22	15 45.80	-11 10.9	3.468	2.705	+1.64 -6.9	18.3	33.7
Jan. 1	16 01.96	-12 16.5	3.415	2.729	+1.59 -6.1	18.4	39.5
Jan. 11	16 17.61	-13 13.8	3.351	2.754	+1.53 -5.3	18.4	45.6
Jan. 21	16 32.61	-14 03.4	3.277	2.779	+1.46 -4.5	18.5	51.9
Jan. 31	16 46.80	-14 45.7	3.194	2.806	+1.37 -3.9	18.5	58.4
Feb. 10	17 00.03	-15 21.7	3.102	2.833	+1.26 -3.3	18.5	65.2
Feb. 20	17 12.11	-15 52.2	3.003	2.861	+1.14 -2.8	18.5	72.2
Mar. 1	17 22.83	-16 18.5	2.899	2.890	+0.99 -2.5	18.5	79.6
Mar. 11	17 32.00	-16 42.0	2.791	2.919	+0.82 -2.2	18.5	87.3
Mar. 21	17 39.38	-17 04.1	2.682	2.949	+0.63 -2.2	18.5	95.5
Mar. 31	17 44.76	-17 26.2	2.575	2.979	+0.42 -2.3	18.5	104.0

Comet 185P/Petriew

Epoch = 2023 June 25.0 TT  
 T = 2023 July 12.90194 TT  
 Peri. = 181.88819 e = 0.6997484  
 Node = 214.11421 2000.0 a = 3.0984138 AU  
 Incl. = 14.01467 n = 0.18071531  
 q = 0.9303037 AU P = 5.45 years

$$m1 = 13.0 + 5 \log(\Delta) + 10.0 \log(r(t-20))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	18 33.19	-14 23.3	3.390	2.433	+1.85	+2.4	19.8	11.2
Jan. 16	18 52.07	-13 54.0	3.283	2.349	+1.93	+3.6	19.6	15.3
Jan. 26	19 11.73	-13 12.8	3.164	2.263	+2.01	+4.8	19.4	19.9
Feb. 5	19 32.16	-12 18.5	3.034	2.176	+2.09	+6.2	19.1	24.5
Feb. 15	19 53.42	-11 10.2	2.895	2.087	+2.17	+7.6	18.9	29.0
Feb. 25	20 15.58	-09 46.8	2.750	1.996	+2.27	+9.2	18.6	33.2
Mar. 7	20 38.75	-08 07.2	2.599	1.904	+2.38	+10.9	18.3	37.1
Mar. 17	21 03.09	-06 10.4	2.448	1.811	+2.51	+12.7	17.9	40.5
Mar. 27	21 28.83	-03 55.5	2.297	1.716	+2.66	+14.5	17.6	43.5
Apr. 6	21 56.23	-01 22.0	2.149	1.621	+2.85	+16.4	17.2	45.9
Apr. 16	22 25.68	+01 30.0	2.009	1.525	+3.07	+18.2	16.9	47.6
Apr. 26	22 57.62	+04 39.3	1.880	1.430	+3.35	+19.7	16.5	48.6
May 6	23 32.53	+08 01.9	1.764	1.336	+3.68	+20.8	16.1	48.8
May 16	00 10.93	+11 31.2	1.666	1.246	+4.05	+20.9	15.7	48.2
May 26	00 53.20	+14 56.0	1.589	1.160	+4.45	+19.7	15.3	46.8
June 5	01 39.39	+18 01.0	1.536	1.083	+4.82	+16.7	14.9	44.7
June 15	02 29.07	+20 28.6	1.508	1.017	+5.12	+12.1	14.5	42.1
June 25	03 21.07	+22 03.4	1.506	0.968	+5.26	+6.1	14.2	39.4
July 5	04 13.68	+22 36.2	1.526	0.938	+5.22	-0.2	14.0	36.9
July 15	05 05.01	+22 07.9	1.565	0.931	+5.00	-5.9	13.8	34.7
July 25	05 53.48	+20 47.1	1.618	0.948	+4.64	-10.5	13.8	33.1
Aug. 4	06 38.07	+18 47.2	1.681	0.986	+4.23	-13.6	13.8	32.3
Aug. 14	07 18.45	+16 21.9	1.749	1.043	+3.80	-15.5	14.0	32.2
Aug. 24	07 54.65	+13 42.4	1.817	1.114	+3.40	-16.4	14.2	32.9
Sept. 3	08 27.00	+10 57.2	1.883	1.195	+3.04	-16.6	14.6	34.4
Sept. 13	08 55.92	+08 12.1	1.944	1.283	+2.72	-16.4	14.9	36.5
Sept. 23	09 21.79	+05 30.6	1.996	1.375	+2.43	-15.8	15.3	39.3
Oct. 3	09 44.95	+02 55.2	2.039	1.469	+2.18	-15.2	15.6	42.7
Oct. 13	10 05.69	+00 27.1	2.070	1.565	+1.95	-14.4	16.0	46.7
Oct. 23	10 24.19	-01 52.7	2.089	1.661	+1.73	-13.5	16.3	51.3
Nov. 2	10 40.54	-04 03.5	2.096	1.756	+1.52	-12.6	16.6	56.5
Nov. 12	10 54.81	-06 04.8	2.089	1.850	+1.31	-11.6	16.8	62.3
Nov. 22	11 06.92	-07 55.6	2.070	1.943	+1.09	-10.5	17.0	68.7
Dec. 2	11 16.78	-09 35.0	2.040	2.034	+0.86	-9.3	17.2	75.7
Dec. 12	11 24.24	-11 01.5	2.000	2.124	+0.60	-7.9	17.4	83.3
Dec. 22	11 29.06	-12 13.2	1.954	2.213	+0.33	-6.3	17.5	91.6
Jan. 1	11 31.03	-13 07.6	1.904	2.299	+0.03	-4.4	17.7	100.7
Jan. 11	11 30.00	-13 41.6	1.856	2.384	-0.27	-2.2	17.8	110.4
Jan. 21	11 25.91	-13 51.9	1.813	2.467	-0.57	+0.4	17.9	120.9
Jan. 31	11 18.98	-13 35.7	1.783	2.548	-0.83	+3.1	18.0	131.9
Feb. 10	11 09.72	-12 51.8	1.770	2.628	-1.02	+5.9	18.2	143.2
Feb. 20	10 59.01	-11 41.7	1.782	2.706	-1.11	+8.2	18.3	154.0
Mar. 1	10 47.94	-10 11.4	1.822	2.782	-1.08	+9.9	18.5	162.2
Mar. 11	10 37.61	-08 29.0	1.892	2.856	-0.95	+10.5	18.7	162.9
Mar. 21	10 28.94	-06 44.1	1.992	2.929	-0.75	+10.3	18.9	155.9
Mar. 31	10 22.48	-05 05.3	2.119	3.001	-0.51	+9.3	19.2	146.1

## Comet 347P/PANSTARRS

Epoch = 2023 June 25.0 TT  
 T = 2023 July 20.05351 TT  
 Peri. = 98.43234 e = 0.3863627  
 Node = 261.01489 2000.0 a = 3.6055517 AU  
 Incl. = 11.75371 n = 0.14396154  
 q = 2.2125010 AU P = 6.85 years

$$m1 = 2.2 + 5 \log(\Delta) + 45.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .			m		°
Jan. 6	19 39.50	-16° 17.1	3.553	2.591	+1.87 +6.2	.	10.2
Jan. 16	19 58.30	-15 10.5	3.533	2.558	+1.89 +7.2	.	6.3
Jan. 26	20 17.24	-13 54.0	3.503	2.526	+1.90 +8.2	.	6.0
Feb. 5	20 36.23	-12 27.9	3.462	2.495	+1.90 +9.1	.	9.5
Feb. 15	20 55.21	-10 52.5	3.411	2.465	+1.90 +10.0	.	14.0
Feb. 25	21 14.14	-09 08.4	3.352	2.436	+1.89 +10.9	.	18.8
Mar. 7	21 32.96	-07 16.1	3.285	2.409	+1.87 +11.6	.	23.6
Mar. 17	21 51.64	-05 16.5	3.210	2.383	+1.86 +12.3	.	28.4
Mar. 27	22 10.17	-03 10.3	3.129	2.358	+1.84 +12.9	.	33.2
Apr. 6	22 28.52	+00 58.6	3.042	2.335	+1.82 +13.4	.	37.9
Apr. 16	22 46.67	+01 17.5	2.951	2.314	+1.80 +13.8	.	42.5
Apr. 26	23 04.62	+03 37.1	2.856	2.294	+1.78 +14.1	21.9	47.2
May 6	23 22.34	+05 58.8	2.758	2.277	+1.76 +14.2	21.6	51.8
May 16	23 39.81	+08 21.5	2.658	2.261	+1.73 +14.3	21.3	56.4
May 26	23 56.99	+10 44.0	2.555	2.247	+1.70 +14.2	21.0	61.1
June 5	00 13.81	+13 04.8	2.451	2.236	+1.66 +13.9	20.7	65.8
June 15	00 30.22	+15 22.7	2.346	2.227	+1.61 +13.6	20.4	70.7
June 25	00 46.08	+17 36.3	2.241	2.220	+1.55 +13.1	20.2	75.7
July 5	01 01.24	+19 44.1	2.136	2.215	+1.47 +12.4	19.9	80.9
July 15	01 15.53	+21 44.9	2.031	2.213	+1.37 +11.6	19.7	86.3
July 25	01 28.68	+23 37.1	1.928	2.213	+1.24 +10.7	19.5	92.1
Aug. 4	01 40.38	+25 18.9	1.828	2.215	+1.08 +9.6	19.2	98.3
Aug. 14	01 50.29	+26 48.7	1.731	2.220	+0.88 +8.2	19.0	104.9
Aug. 24	01 58.00	+28 03.9	1.639	2.227	+0.63 +6.6	18.9	112.1
Sept. 3	02 03.13	+29 01.9	1.555	2.236	+0.36 +4.7	18.7	119.9
Sept. 13	02 05.38	+29 39.3	1.480	2.247	+0.06 +2.4	18.6	128.3
Sept. 23	02 04.62	+29 52.0	1.418	2.261	-0.23 -0.2	18.5	137.4
Oct. 3	02 01.13	+29 37.0	1.372	2.276	-0.48 -3.1	18.4	146.8
Oct. 13	01 55.53	+28 52.9	1.346	2.294	-0.64 -6.0	18.4	156.1
Oct. 23	01 48.89	+27 41.9	1.342	2.313	-0.67 -8.3	18.5	163.4
Nov. 2	01 42.48	+26 11.0	1.363	2.335	-0.58 -9.8	18.6	164.4
Nov. 12	01 37.45	+24 30.5	1.410	2.358	-0.39 -10.2	18.8	158.2
Nov. 22	01 34.62	+22 51.4	1.480	2.382	-0.14 -9.4	19.0	149.0
Dec. 2	01 34.42	+21 23.2	1.573	2.408	+0.13 -8.0	19.3	139.3
Dec. 12	01 36.87	+20 11.5	1.685	2.436	+0.39 -6.1	19.6	129.8
Dec. 22	01 41.82	+19 18.7	1.812	2.464	+0.62 -4.2	19.9	120.7
Jan. 1	01 48.98	+18 44.6	1.952	2.494	+0.82 -2.4	20.2	112.1
Jan. 11	01 58.01	+18 27.4	2.102	2.525	+1.00 -0.9	20.6	103.9
Jan. 21	02 08.64	+18 24.4	2.258	2.558	+1.14 +0.4	20.9	96.1
Jan. 31	02 20.58	+18 32.8	2.418	2.590	+1.26 +1.4	21.3	88.7
Feb. 10	02 33.60	+18 49.8	2.580	2.624	+1.35 +2.1	21.7	81.6
Feb. 20	02 47.52	+19 12.8	2.741	2.659	+1.43 +2.5	22.0	74.8
Mar. 1	03 02.17	+19 39.5	2.901	2.694	+1.50 +2.8	.	68.2
Mar. 11	03 17.41	+20 07.8	3.056	2.729	+1.55 +2.9	.	61.7
Mar. 21	03 33.12	+20 36.0	3.206	2.766	+1.59 +2.8	.	55.4
Mar. 31	03 49.20	+21 02.6	3.350	2.802	+1.62 +2.5	.	49.3

## Comet C/2021 T4 (Lemmon)

Epoch = 2023 June 25.0 TT  
 T = 2023 July 31.53269 TT  
 Peri. = 329.81929  
 Node = 257.88324 2000.0  
 Incl. = 160.77651  
 q = 1.4832479 AU  
 e = 0.9998300

$$m_1 = 7.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	00 33.41	-13 46.9	3.109	3.052	-0.69	+0.3	14.8	77.5
Jan. 16	00 27.55	-13 39.3	3.204	2.952	-0.46	+1.3	14.7	66.4
Jan. 26	00 23.86	-13 23.4	3.285	2.852	-0.26	+1.9	14.6	55.9
Feb. 5	00 21.99	-13 02.0	3.345	2.752	-0.10	+2.3	14.5	45.9
Feb. 15	00 21.60	-12 37.6	3.381	2.653	+0.03	+2.5	14.4	36.5
Feb. 25	00 22.39	-12 12.0	3.389	2.554	+0.13	+2.6	14.2	27.6
Mar. 7	00 24.10	-11 47.0	3.366	2.456	+0.21	+2.4	14.0	19.8
Mar. 17	00 26.48	-11 24.2	3.310	2.359	+0.27	+2.1	13.8	14.2
Mar. 27	00 29.34	-11 05.0	3.221	2.263	+0.30	+1.6	13.6	13.5
Apr. 6	00 32.45	-10 51.5	3.097	2.169	+0.32	+1.0	13.3	18.1
Apr. 16	00 35.64	-10 45.6	2.940	2.077	+0.31	+0.1	13.0	25.2
Apr. 26	00 38.67	-10 50.0	2.751	1.989	+0.29	-1.1	12.7	33.4
May 6	00 41.30	-11 08.6	2.530	1.904	+0.23	-2.8	12.3	42.0
May 16	00 43.19	-11 47.0	2.280	1.823	+0.13	-5.2	11.9	51.1
May 26	00 43.85	-12 54.4	2.005	1.748	-0.03	-8.9	11.4	60.7
June 5	00 42.38	-14 46.8	1.709	1.680	-0.32	-14.7	10.9	71.1
June 15	00 37.10	-17 54.1	1.398	1.620	-0.86	-24.8	10.3	82.7
June 25	00 23.95	-23 18.9	1.084	1.570	-2.07	-44.3	9.6	96.6
July 5	23 50.81	-33 13.7	0.791	1.530	-5.59	-82.1	8.8	115.0
July 15	22 08.73	-49 44.9	0.579	1.501	-18.96	-99.2	8.1	138.8
July 25	18 03.63	-53 19.8	0.566	1.486	-20.85	+81.2	8.0	138.1
Aug. 4	15 55.55	-37 59.8	0.761	1.484	-6.17	+79.6	8.6	112.6
Aug. 14	15 15.43	-27 36.8	1.046	1.495	-2.25	+44.5	9.3	93.1
Aug. 24	14 59.86	-21 46.2	1.353	1.520	-0.93	+25.9	10.0	78.5
Sept. 3	14 53.46	-18 15.2	1.656	1.556	-0.36	+16.3	10.5	66.4
Sept. 13	14 51.41	-15 58.1	1.942	1.604	-0.05	+11.0	11.0	55.5
Sept. 23	14 51.77	-14 23.1	2.203	1.661	+0.13	+7.9	11.4	45.4
Oct. 3	14 53.56	-13 13.3	2.436	1.727	+0.23	+6.0	11.8	35.8
Oct. 13	14 56.25	-12 18.8	2.637	1.799	+0.30	+4.9	12.2	26.5
Oct. 23	14 59.48	-11 33.1	2.803	1.878	+0.34	+4.3	12.5	17.6
Nov. 2	15 02.97	-10 51.9	2.933	1.962	+0.35	+4.0	12.8	9.6
Nov. 12	15 06.50	-10 11.6	3.028	2.050	+0.35	+4.1	13.0	7.3
Nov. 22	15 09.84	-09 29.4	3.086	2.140	+0.31	+4.4	13.3	13.9
Dec. 2	15 12.75	-08 42.7	3.110	2.234	+0.26	+5.0	13.5	22.7
Dec. 12	15 15.02	-07 48.9	3.101	2.329	+0.18	+5.9	13.6	32.3
Dec. 22	15 16.33	-06 45.4	3.062	2.426	+0.07	+7.0	13.8	42.2
Jan. 1	15 16.39	-05 29.6	2.997	2.523	-0.08	+8.4	13.9	52.6
Jan. 11	15 14.82	-03 58.4	2.911	2.622	-0.26	+10.1	14.0	63.4
Jan. 21	15 11.20	-02 08.9	2.810	2.721	-0.49	+12.1	14.1	74.7
Jan. 31	15 05.09	+00 01.5	2.702	2.821	-0.77	+14.3	14.2	86.6
Feb. 10	14 56.02	+02 34.3	2.597	2.921	-1.09	+16.5	14.2	99.2
Feb. 20	14 43.62	+05 28.7	2.504	3.021	-1.43	+18.5	14.3	112.3
Mar. 1	14 27.74	+08 39.9	2.437	3.120	-1.77	+19.7	14.4	125.7
Mar. 11	14 08.62	+11 57.8	2.406	3.220	-2.07	+19.6	14.5	138.8
Mar. 21	13 47.02	+15 07.7	2.420	3.320	-2.25	+17.9	14.6	149.8
Mar. 31	13 24.31	+17 53.9	2.486	3.419	-2.27	+14.8	14.8	155.2

Comet C/2022 U4 (Bok)

Epoch = 2023 June 25.0 TT  
 T = 2023 Aug. 3.68094 TT  
 Peri. = 89.00833  
 Node = 132.92739 2000.0  
 Incl. = 52.03499  
 q = 2.8983942 AU  
 e = 0.9991696

$$m1 = 7.4 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	12 42.73	+31 36.5	3.164	3.566	+0.98	+13.2	18.2	106.2
Jan. 16	12 52.11	+33 57.5	3.008	3.511	+0.88	+15.1	18.0	113.0
Jan. 26	13 00.39	+36 36.5	2.870	3.457	+0.76	+16.8	17.8	119.1
Feb. 5	13 07.32	+39 29.9	2.753	3.406	+0.61	+17.9	17.6	124.1
Feb. 15	13 12.62	+42 31.8	2.660	3.356	+0.43	+18.4	17.4	127.7
Feb. 25	13 16.03	+45 34.5	2.590	3.308	+0.23	+18.0	17.3	129.4
Mar. 7	13 17.39	+48 28.7	2.544	3.262	+0.02	+16.6	17.1	129.1
Mar. 17	13 16.71	+51 05.2	2.521	3.218	-0.17	+14.4	17.0	126.9
Mar. 27	13 14.20	+53 15.9	2.517	3.176	-0.33	+11.4	16.9	123.4
Apr. 6	13 10.45	+54 54.3	2.529	3.137	-0.41	+7.9	16.9	118.9
Apr. 16	13 06.24	+55 57.2	2.555	3.101	-0.41	+4.3	16.8	114.0
Apr. 26	13 02.50	+56 24.2	2.590	3.067	-0.31	+0.8	16.8	108.9
May 6	13 00.13	+56 16.8	2.632	3.036	-0.14	-2.5	16.7	103.9
May 16	12 59.75	+55 38.7	2.678	3.007	+0.09	-5.4	16.7	99.0
May 26	13 01.70	+54 33.6	2.726	2.982	+0.33	-7.8	16.7	94.5
June 5	13 06.07	+53 05.4	2.775	2.960	+0.56	-9.9	16.7	90.3
June 15	13 12.70	+51 17.8	2.824	2.941	+0.78	-11.7	16.7	86.5
June 25	13 21.39	+49 13.6	2.872	2.926	+0.97	-13.2	16.7	82.9
July 5	13 31.84	+46 55.6	2.920	2.914	+1.13	-14.5	16.7	79.6
July 15	13 43.77	+44 26.1	2.968	2.905	+1.27	-15.5	16.7	76.5
July 25	13 56.94	+41 47.1	3.017	2.900	+1.38	-16.3	16.7	73.7
Aug. 4	14 11.13	+39 01.1	3.067	2.898	+1.47	-16.9	16.8	70.9
Aug. 14	14 26.15	+36 10.1	3.119	2.900	+1.54	-17.3	16.8	68.2
Aug. 24	14 41.85	+33 16.4	3.174	2.906	+1.60	-17.4	16.9	65.6
Sept. 3	14 58.08	+30 22.4	3.233	2.914	+1.65	-17.3	16.9	62.8
Sept. 13	15 14.74	+27 30.3	3.296	2.927	+1.69	-17.0	17.0	60.1
Sept. 23	15 31.74	+24 42.6	3.363	2.942	+1.71	-16.4	17.1	57.2
Oct. 3	15 48.98	+22 01.5	3.434	2.961	+1.73	-15.7	17.2	54.1
Oct. 13	16 06.37	+19 28.8	3.509	2.984	+1.75	-14.7	17.2	51.0
Oct. 23	16 23.85	+17 06.3	3.586	3.009	+1.75	-13.6	17.3	47.8
Nov. 2	16 41.31	+14 55.5	3.665	3.037	+1.74	-12.4	17.5	44.5
Nov. 12	16 58.70	+12 57.2	3.744	3.069	+1.73	-11.1	17.6	41.2
Nov. 22	17 15.94	+11 12.2	3.821	3.103	+1.71	-9.8	17.7	38.0
Dec. 2	17 32.93	+09 40.7	3.895	3.139	+1.68	-8.4	17.8	35.1
Dec. 12	17 49.60	+08 22.7	3.964	3.179	+1.65	-7.1	17.9	32.6
Dec. 22	18 05.87	+07 17.8	4.026	3.220	+1.60	-5.8	18.0	30.8
Jan. 1	18 21.66	+06 25.4	4.080	3.264	+1.55	-4.6	18.2	29.9
Jan. 11	18 36.90	+05 44.7	4.123	3.311	+1.49	-3.5	18.3	30.2
Jan. 21	18 51.50	+05 14.7	4.155	3.359	+1.42	-2.5	18.4	31.7
Jan. 31	19 05.38	+04 54.2	4.175	3.409	+1.35	-1.6	18.5	34.4
Feb. 10	19 18.48	+04 42.0	4.182	3.461	+1.26	-0.8	18.6	38.2
Feb. 20	19 30.71	+04 36.7	4.175	3.514	+1.17	-0.2	18.7	42.8
Mar. 1	19 41.98	+04 36.9	4.155	3.569	+1.07	+0.3	18.8	48.0
Mar. 11	19 52.22	+04 41.1	4.121	3.626	+0.96	+0.6	18.9	53.9
Mar. 21	20 01.35	+04 47.6	4.075	3.683	+0.85	+0.7	18.9	60.2
Mar. 31	20 09.26	+04 54.9	4.017	3.743	+0.72	+0.7	19.0	67.0



Comet 280P/Larsen

Epoch = 2023 June 25.0 TT  
 T = 2023 Aug. 4.64508 TT  
 Peri. = 104.72515 e = 0.4171545  
 Node = 131.38390 2000.0 a = 4.5298389 AU  
 Incl. = 11.77204 n = 0.10223037  
 q = 2.6401962 AU P = 9.64 years

$$m1 = 2.5 + 5 \log(\Delta) + 30.0 \log(r(t+210))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	13 35.17	+00 09.7	2.942	2.989	+1.08	-1.8	17.5	83.2
Jan. 16	13 45.56	+00 03.6	2.779	2.960	+0.98	-0.7	17.4	90.7
Jan. 26	13 54.83	+00 04.7	2.619	2.932	+0.86	+0.6	17.3	98.6
Feb. 5	14 02.73	+00 07.5	2.463	2.904	+0.71	+2.0	17.1	106.7
Feb. 15	14 09.03	+00 33.2	2.316	2.878	+0.53	+3.3	17.0	115.1
Feb. 25	14 13.47	+01 12.3	2.180	2.853	+0.33	+4.6	16.9	123.9
Mar. 7	14 15.83	+02 03.6	2.058	2.829	+0.12	+5.7	16.9	133.0
Mar. 17	14 16.03	+03 04.6	1.953	2.806	-0.10	+6.5	16.8	142.2
Mar. 27	14 14.09	+04 11.0	1.869	2.784	-0.30	+6.7	16.8	151.0
Apr. 6	14 10.28	+05 17.1	1.808	2.764	-0.46	+6.3	16.8	158.5
Apr. 16	14 05.13	+06 16.1	1.773	2.745	-0.56	+5.3	16.8	162.2
Apr. 26	13 59.33	+07 01.5	1.762	2.727	-0.58	+3.6	16.9	159.5
May 6	13 53.72	+07 27.8	1.776	2.711	-0.52	+1.5	17.0	152.5
May 16	13 49.08	+07 32.5	1.813	2.697	-0.39	-0.8	17.1	143.9
May 26	13 46.01	+07 14.9	1.870	2.684	-0.20	-2.9	17.3	135.0
June 5	13 44.93	+06 36.7	1.944	2.672	+0.01	-4.8	17.5	126.3
June 15	13 45.98	+05 40.8	2.031	2.663	+0.22	-6.4	17.7	117.9
June 25	13 49.17	+04 30.3	2.129	2.655	+0.43	-7.7	17.9	110.0
July 5	13 54.38	+03 08.5	2.234	2.648	+0.63	-8.7	18.1	102.6
July 15	14 01.44	+01 38.2	2.344	2.644	+0.80	-9.4	18.3	95.5
July 25	14 10.17	+00 02.0	2.459	2.641	+0.96	-9.9	18.6	88.8
Aug. 4	14 20.38	-01 37.8	2.574	2.640	+1.10	-10.1	18.8	82.5
Aug. 14	14 31.90	-03 19.2	2.690	2.641	+1.22	-10.2	19.0	76.3
Aug. 24	14 44.60	-05 00.7	2.806	2.644	+1.33	-10.1	19.3	70.4
Sept. 3	14 58.33	-06 40.5	2.919	2.648	+1.43	-9.8	19.5	64.6
Sept. 13	15 12.98	-08 17.3	3.029	2.654	+1.51	-9.5	19.7	58.9
Sept. 23	15 28.46	-09 49.8	3.136	2.662	+1.59	-9.0	19.9	53.4
Oct. 3	15 44.66	-11 16.9	3.237	2.671	+1.66	-8.4	20.1	47.9
Oct. 13	16 01.51	-12 37.4	3.333	2.682	+1.72	-7.7	20.3	42.4
Oct. 23	16 18.92	-13 50.6	3.423	2.695	+1.77	-6.9	20.5	36.9
Nov. 2	16 36.78	-14 55.4	3.505	2.709	+1.81	-6.0	20.7	31.5
Nov. 12	16 55.02	-15 51.4	3.579	2.725	+1.84	-5.1	20.9	26.1
Nov. 22	17 13.53	-16 38.0	3.644	2.742	+1.86	-4.1	21.1	20.7
Dec. 2	17 32.21	-17 15.0	3.700	2.761	+1.87	-3.2	21.2	15.3
Dec. 12	17 50.96	-17 42.1	3.745	2.781	+1.87	-2.2	21.4	10.2
Dec. 22	18 09.67	-17 59.5	3.779	2.803	+1.86	-1.2	21.5	6.1
Jan. 1	18 28.23	-18 07.6	3.802	2.826	+1.84	-0.3	21.7	5.9
Jan. 11	18 46.53	-18 06.7	3.813	2.849	+1.81	+0.6	21.8	10.1
Jan. 21	19 04.48	-17 57.7	3.811	2.875	+1.77	+1.3	22.0	15.4
Jan. 31	19 21.96	-17 41.2	3.798	2.901	+1.72	+2.0	.	21.1
Feb. 10	19 38.90	-17 18.4	3.772	2.928	+1.66	+2.6	.	27.1
Feb. 20	19 55.20	-16 50.3	3.734	2.956	+1.59	+3.1	.	33.2
Mar. 1	20 10.76	-16 18.2	3.684	2.985	+1.51	+3.4	.	39.4
Mar. 11	20 25.52	-15 43.3	3.622	3.015	+1.43	+3.6	.	45.8
Mar. 21	20 39.38	-15 07.3	3.551	3.046	+1.33	+3.6	.	52.3
Mar. 31	20 52.25	-14 31.4	3.469	3.077	+1.23	+3.5	.	59.0

Comet 199P/Shoemaker

Epoch = 2023 June 25.0 TT  
 T = 2023 Aug. 7.61122 TT  
 Peri. = 191.77822 e = 0.5052215  
 Node = 92.34828 2000.0 a = 5.8820864 AU  
 Incl. = 24.93722 n = 0.06908869  
 q = 2.9103299 AU P = 14.27 years

$$m1 = 6.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	16 37.39	-10 11.9	3.999	3.274	+1.40 -5.0	17.2	37.5
Jan. 16	16 51.34	-10 59.0	3.883	3.243	+1.39 -4.4	17.1	43.7
Jan. 26	17 05.07	-11 40.7	3.756	3.214	+1.36 -3.9	17.0	50.1
Feb. 5	17 18.44	-12 17.3	3.620	3.186	+1.31 -3.4	16.8	56.6
Feb. 15	17 31.32	-12 49.6	3.476	3.158	+1.26 -3.0	16.7	63.3
Feb. 25	17 43.56	-13 18.6	3.326	3.132	+1.18 -2.8	16.5	70.2
Mar. 7	17 54.98	-13 45.4	3.172	3.107	+1.09 -2.6	16.4	77.2
Mar. 17	18 05.42	-14 11.6	3.015	3.084	+0.98 -2.6	16.2	84.6
Mar. 27	18 14.68	-14 38.8	2.857	3.061	+0.85 -2.9	16.1	92.1
Apr. 6	18 22.53	-15 09.1	2.702	3.040	+0.70 -3.3	15.9	100.0
Apr. 16	18 28.76	-15 44.5	2.552	3.021	+0.53 -3.9	15.7	108.3
Apr. 26	18 33.15	-16 27.3	2.409	3.003	+0.33 -4.8	15.6	117.0
May 6	18 35.48	-17 19.4	2.278	2.986	+0.11 -5.8	15.4	126.2
May 16	18 35.62	-18 22.4	2.161	2.971	-0.11 -6.9	15.3	135.9
May 26	18 33.51	-19 36.6	2.062	2.958	-0.33 -8.0	15.1	146.1
June 5	18 29.31	-21 01.3	1.986	2.946	-0.52 -8.9	15.0	156.8
June 15	18 23.36	-22 33.6	1.935	2.936	-0.67 -9.5	14.9	167.9
June 25	18 16.28	-24 09.6	1.911	2.927	-0.74 -9.6	14.9	178.9
July 5	18 08.90	-25 44.7	1.915	2.920	-0.72 -9.3	14.9	169.3
July 15	18 02.12	-27 14.6	1.947	2.915	-0.61 -8.6	14.9	158.2
July 25	17 56.77	-28 36.6	2.004	2.912	-0.43 -7.7	15.0	147.4
Aug. 4	17 53.52	-29 49.4	2.084	2.910	-0.19 -6.8	15.1	137.1
Aug. 14	17 52.72	-30 52.9	2.182	2.911	+0.06 -5.9	15.2	127.4
Aug. 24	17 54.55	-31 47.6	2.295	2.913	+0.33 -5.0	15.3	118.2
Sept. 3	17 58.97	-32 34.3	2.419	2.916	+0.58 -4.2	15.4	109.6
Sept. 13	18 05.81	-33 13.3	2.551	2.922	+0.81 -3.5	15.5	101.4
Sept. 23	18 14.86	-33 45.0	2.688	2.929	+1.02 -2.8	15.6	93.7
Oct. 3	18 25.86	-34 09.4	2.828	2.938	+1.20 -2.0	15.8	86.3
Oct. 13	18 38.55	-34 26.3	2.967	2.949	+1.35 -1.3	15.9	79.2
Oct. 23	18 52.69	-34 35.4	3.105	2.961	+1.48 -0.5	16.0	72.4
Nov. 2	19 08.00	-34 36.6	3.240	2.975	+1.59 +0.3	16.2	65.8
Nov. 12	19 24.28	-34 29.7	3.369	2.990	+1.67 +1.1	16.3	59.5
Nov. 22	19 41.30	-34 14.7	3.493	3.007	+1.74 +1.9	16.4	53.2
Dec. 2	19 58.87	-33 51.7	3.608	3.026	+1.78 +2.7	16.5	47.2
Dec. 12	20 16.79	-33 21.1	3.715	3.046	+1.81 +3.5	16.6	41.3
Dec. 22	20 34.93	-32 43.2	3.813	3.067	+1.82 +4.2	16.7	35.6
Jan. 1	20 53.13	-31 58.9	3.900	3.090	+1.82 +4.8	16.8	30.2
Jan. 11	21 11.28	-31 08.9	3.976	3.114	+1.81 +5.3	16.9	25.2
Jan. 21	21 29.28	-30 14.0	4.040	3.139	+1.79 +5.7	17.0	20.7
Jan. 31	21 47.04	-29 15.4	4.093	3.166	+1.76 +6.0	17.1	17.3
Feb. 10	22 04.50	-28 14.1	4.133	3.193	+1.73 +6.2	17.1	15.6
Feb. 20	22 21.60	-27 11.4	4.160	3.222	+1.69 +6.3	17.2	16.1
Mar. 1	22 38.30	-26 08.3	4.175	3.251	+1.65 +6.3	17.3	18.7
Mar. 11	22 54.56	-25 06.0	4.177	3.282	+1.60 +6.1	17.3	22.6
Mar. 21	23 10.35	-24 05.9	4.167	3.314	+1.55 +5.9	17.4	27.3
Mar. 31	23 25.63	-23 09.0	4.145	3.346	+1.50 +5.5	17.5	32.5

Comet P/2023 B1 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Aug. 17.99421 TT  
 Peri. = 89.10512 e = 0.1280245  
 Node = 78.56281 2000.0 a = 7.0269199 AU  
 Incl. = 14.58790 n = 0.05291229  
 q = 6.1273020 AU P = 18.63 years

$$m1 = 5.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .			m		°
Jan. 6	11 09.04	+22 22.5	5.546	6.152	-0.05 +3.1	16.6	124.1
Jan. 16	11 08.05	+22 55.1	5.426	6.150	-0.16 +3.5	16.6	134.0
Jan. 26	11 05.99	+23 30.8	5.327	6.148	-0.26 +3.7	16.5	143.7
Feb. 5	11 02.98	+24 07.6	5.252	6.146	-0.35 +3.6	16.5	152.9
Feb. 15	10 59.23	+24 43.1	5.206	6.144	-0.41 +3.4	16.5	160.2
Feb. 25	10 54.97	+25 15.0	5.189	6.143	-0.44 +2.9	16.5	163.1
Mar. 7	10 50.53	+25 41.0	5.202	6.141	-0.44 +2.2	16.5	159.5
Mar. 17	10 46.21	+25 59.5	5.244	6.139	-0.41 +1.4	16.5	151.9
Mar. 27	10 42.32	+26 09.6	5.313	6.138	-0.35 +0.5	16.5	142.9
Apr. 6	10 39.12	+26 10.9	5.406	6.136	-0.27 -0.4	16.5	133.4
Apr. 16	10 36.82	+26 03.6	5.519	6.135	-0.18 -1.2	16.6	123.9
Apr. 26	10 35.52	+25 48.3	5.648	6.134	-0.07 -1.9	16.6	114.5
May 6	10 35.30	+25 25.8	5.788	6.133	+0.04 -2.6	16.7	105.3
May 16	10 36.14	+24 57.1	5.936	6.132	+0.14 -3.2	16.7	96.4
May 26	10 38.02	+24 23.0	6.087	6.131	+0.24 -3.7	16.8	87.7
June 5	10 40.85	+23 44.6	6.238	6.130	+0.33 -4.1	16.8	79.3
June 15	10 44.55	+23 02.6	6.384	6.129	+0.41 -4.4	16.9	71.0
June 25	10 49.03	+22 17.6	6.523	6.129	+0.49 -4.6	16.9	63.0
July 5	10 54.18	+21 30.3	6.651	6.128	+0.55 -4.8	17.0	55.2
July 15	10 59.91	+20 41.3	6.768	6.128	+0.60 -5.0	17.0	47.6
July 25	11 06.14	+19 51.1	6.869	6.128	+0.65 -5.1	17.1	40.1
Aug. 4	11 12.76	+19 00.2	6.954	6.127	+0.68 -5.1	17.1	32.9
Aug. 14	11 19.71	+18 09.2	7.022	6.127	+0.71 -5.1	17.1	26.0
Aug. 24	11 26.90	+17 18.3	7.070	6.127	+0.73 -5.0	17.1	19.7
Sept. 3	11 34.27	+16 28.3	7.098	6.127	+0.74 -4.9	17.1	14.6
Sept. 13	11 41.74	+15 39.6	7.106	6.128	+0.75 -4.8	17.1	12.5
Sept. 23	11 49.24	+14 52.6	7.093	6.128	+0.75 -4.6	17.1	14.8
Oct. 3	11 56.69	+14 08.1	7.059	6.128	+0.74 -4.3	17.1	20.0
Oct. 13	12 04.04	+13 26.5	7.005	6.129	+0.73 -4.0	17.1	26.6
Oct. 23	12 11.20	+12 48.4	6.931	6.129	+0.70 -3.6	17.1	33.9
Nov. 2	12 18.08	+12 14.4	6.838	6.130	+0.67 -3.1	17.0	41.5
Nov. 12	12 24.61	+11 45.2	6.728	6.131	+0.63 -2.6	17.0	49.5
Nov. 22	12 30.70	+11 21.3	6.604	6.132	+0.58 -2.1	17.0	57.6
Dec. 2	12 36.24	+11 03.3	6.466	6.133	+0.52 -1.5	16.9	66.1
Dec. 12	12 41.14	+10 51.6	6.319	6.134	+0.45 -0.8	16.9	74.7
Dec. 22	12 45.30	+10 46.8	6.166	6.135	+0.37 -0.1	16.8	83.7
Jan. 1	12 48.60	+10 48.8	6.010	6.137	+0.28 +0.6	16.8	92.8
Jan. 11	12 50.98	+10 57.9	5.855	6.138	+0.18 +1.3	16.7	102.1
Jan. 21	12 52.33	+11 13.6	5.707	6.140	+0.08 +1.9	16.7	111.7
Jan. 31	12 52.64	+11 35.3	5.570	6.141	-0.03 +2.5	16.6	121.4
Feb. 10	12 51.87	+12 01.9	5.448	6.143	-0.13 +2.9	16.6	131.2
Feb. 20	12 50.09	+12 32.0	5.346	6.145	-0.23 +3.1	16.5	140.9
Mar. 1	12 47.39	+13 03.5	5.267	6.147	-0.31 +3.2	16.5	150.2
Mar. 11	12 43.95	+13 34.4	5.215	6.149	-0.38 +3.0	16.5	158.3
Mar. 21	12 39.98	+14 02.4	5.192	6.151	-0.41 +2.6	16.5	162.9
Mar. 31	12 35.77	+14 25.5	5.198	6.153	-0.42 +2.0	16.5	161.4

Comet 339P/Gibbs

Epoch = 2023 June 25.0 TT  
 T = 2023 Aug. 30.94753 TT  
 Peri. = 27.46255 e = 0.6356767  
 Node = 172.72320 2000.0 a = 3.7007586 AU  
 Incl. = 5.73326 n = 0.13844202  
 q = 1.3482726 AU P = 7.12 years

$$m1 = 8.5 + 5 \log(\Delta) + 50.0 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	05 39.87	+14 45.0	1.810	2.748	-1.05	+0.5	.	158.3
Jan. 16	05 29.98	+14 52.9	1.802	2.677	-0.89	+1.2	.	146.5
Jan. 26	05 22.12	+15 07.7	1.817	2.606	-0.64	+1.9	.	134.8
Feb. 5	05 17.03	+15 29.3	1.852	2.535	-0.34	+2.5	.	123.6
Feb. 15	05 15.09	+15 56.6	1.899	2.462	-0.02	+3.0	.	113.2
Feb. 25	05 16.38	+16 28.4	1.955	2.389	+0.31	+3.4	.	103.6
Mar. 7	05 20.84	+17 03.1	2.013	2.316	+0.61	+3.5	.	94.7
Mar. 17	05 28.26	+17 38.7	2.070	2.243	+0.90	+3.5	.	86.6
Mar. 27	05 38.43	+18 13.2	2.123	2.169	+1.16	+3.3	.	79.2
Apr. 6	05 51.13	+18 44.4	2.170	2.095	+1.40	+2.9	.	72.3
Apr. 16	06 06.15	+19 10.1	2.209	2.022	+1.62	+2.2	.	66.1
Apr. 26	06 23.33	+19 28.3	2.240	1.950	+1.83	+1.3	.	60.4
May 6	06 42.50	+19 36.7	2.262	1.878	+2.02	+0.2	.	55.2
May 16	07 03.51	+19 33.1	2.275	1.808	+2.20	-1.1	.	50.5
May 26	07 26.26	+19 15.5	2.281	1.740	+2.36	-2.6	.	46.2
June 5	07 50.60	+18 41.8	2.279	1.675	+2.52	-4.3	.	42.4
June 15	08 16.39	+17 50.3	2.271	1.613	+2.66	-6.2	.	39.0
June 25	08 43.52	+16 39.5	2.258	1.555	+2.78	-8.2	.	36.0
July 5	09 11.83	+15 08.5	2.243	1.502	+2.89	-10.2	.	33.4
July 15	09 41.18	+13 17.1	2.227	1.456	+2.99	-12.3	.	31.2
July 25	10 11.44	+11 05.7	2.212	1.416	+3.07	-14.2	21.4	29.3
Aug. 4	10 42.47	+08 36.2	2.199	1.385	+3.14	-15.9	20.6	27.8
Aug. 14	11 14.14	+05 51.2	2.192	1.363	+3.20	-17.2	19.8	26.5
Aug. 24	11 46.37	+02 54.4	2.192	1.351	+3.25	-18.1	19.0	25.5
Sept. 3	12 19.01	+00 09.1	2.200	1.349	+3.28	-18.5	18.4	24.5
Sept. 13	12 51.98	-03 13.9	2.217	1.357	+3.31	-18.3	17.8	23.7
Sept. 23	13 25.16	-06 14.4	2.245	1.375	+3.32	-17.6	17.3	22.7
Oct. 3	13 58.41	-09 04.7	2.283	1.403	+3.32	-16.3	17.0	21.7
Oct. 13	14 31.60	-11 40.1	2.332	1.439	+3.31	-14.5	16.9	20.4
Oct. 23	15 04.55	-13 56.5	2.389	1.483	+3.27	-12.5	16.9	18.9
Nov. 2	15 37.06	-15 51.1	2.454	1.534	+3.22	-10.2	17.1	17.1
Nov. 12	16 08.95	-17 22.6	2.525	1.590	+3.15	-7.9	17.4	15.0
Nov. 22	16 40.03	-18 30.6	2.601	1.650	+3.06	-5.5	17.9	12.5
Dec. 2	17 10.11	-19 15.8	2.678	1.714	+2.95	-3.3	18.5	9.7
Dec. 12	17 39.04	-19 39.7	2.755	1.781	+2.83	-1.3	19.3	6.8
Dec. 22	18 06.73	-19 44.4	2.830	1.851	+2.69	+0.5	20.0	4.2
Jan. 1	18 33.06	-19 32.0	2.901	1.922	+2.56	+2.1	20.9	4.1
Jan. 11	18 58.01	-19 05.1	2.966	1.994	+2.42	+3.4	21.7	7.2
Jan. 21	19 21.56	-18 26.0	3.022	2.067	+2.28	+4.5	.	11.3
Jan. 31	19 43.69	-17 37.1	3.070	2.140	+2.14	+5.3	.	16.0
Feb. 10	20 04.43	-16 40.6	3.107	2.214	+2.00	+6.0	.	21.0
Feb. 20	20 23.80	-15 38.4	3.132	2.287	+1.86	+6.4	.	26.2
Mar. 1	20 41.81	-14 32.6	3.145	2.361	+1.73	+6.7	.	31.7
Mar. 11	20 58.48	-13 24.8	3.145	2.434	+1.59	+6.8	.	37.5
Mar. 21	21 13.81	-12 16.7	3.133	2.506	+1.46	+6.8	.	43.5
Mar. 31	21 27.79	-11 09.8	3.107	2.578	+1.32	+6.6	.	49.8

Comet C/2022 A3 (Lemmon-ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Sept. 28.84621 TT  
 Peri. = 234.84723  
 Node = 325.48161 2000.0  
 Incl. = 88.34462  
 q = 3.7034541 AU  
 e = 0.9959274

$$m1 = 5.7 + 5 \log(\Delta) + 12.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	10 15.76	+00 05.5	3.698	4.378	-0.86	-8.1	16.6	128.5
Jan. 16	10 06.19	-01 25.1	3.537	4.333	-1.07	-7.7	16.4	139.6
Jan. 26	09 54.72	-02 39.7	3.407	4.289	-1.24	-7.1	16.3	150.2
Feb. 5	09 41.75	-03 47.5	3.313	4.247	-1.36	-6.3	16.2	158.7
Feb. 15	09 27.89	-04 46.9	3.258	4.205	-1.41	-5.4	16.1	161.3
Feb. 25	09 13.91	-05 36.9	3.243	4.165	-1.37	-4.5	16.0	155.8
Mar. 7	09 00.60	-06 17.6	3.265	4.126	-1.27	-3.6	16.0	146.1
Mar. 17	08 48.66	-06 50.4	3.321	4.088	-1.10	-2.9	16.0	135.3
Mar. 27	08 38.56	-07 17.5	3.405	4.052	-0.90	-2.5	16.0	124.4
Apr. 6	08 30.58	-07 41.6	3.508	4.018	-0.68	-2.4	16.0	113.8
Apr. 16	08 24.77	-08 05.4	3.626	3.985	-0.47	-2.4	16.0	103.7
Apr. 26	08 21.03	-08 31.0	3.750	3.953	-0.27	-2.7	16.0	94.2
May 6	08 19.20	-09 00.5	3.875	3.923	-0.09	-3.2	16.1	85.3
May 16	08 19.05	-09 35.5	3.997	3.895	+0.07	-3.8	16.1	77.0
May 26	08 20.36	-10 17.2	4.111	3.869	+0.20	-4.6	16.1	69.2
June 5	08 22.91	-11 06.6	4.213	3.844	+0.32	-5.4	16.1	62.1
June 15	08 26.50	-12 04.4	4.302	3.821	+0.41	-6.3	16.1	55.6
June 25	08 30.95	-13 11.5	4.376	3.800	+0.49	-7.2	16.2	49.8
July 5	08 36.09	-14 28.5	4.433	3.782	+0.55	-8.3	16.2	44.9
July 15	08 41.77	-15 55.8	4.472	3.765	+0.59	-9.3	16.1	41.0
July 25	08 47.86	-17 34.3	4.494	3.750	+0.63	-10.5	16.1	38.3
Aug. 4	08 54.24	-19 24.4	4.499	3.737	+0.65	-11.7	16.1	36.9
Aug. 14	09 00.79	-21 26.7	4.487	3.726	+0.66	-12.9	16.1	36.9
Aug. 24	09 07.38	-23 42.0	4.459	3.717	+0.66	-14.3	16.1	38.2
Sept. 3	09 13.90	-26 10.6	4.417	3.711	+0.64	-15.6	16.0	40.7
Sept. 13	09 20.20	-28 53.2	4.363	3.706	+0.61	-17.0	16.0	44.1
Sept. 23	09 26.14	-31 50.2	4.298	3.704	+0.57	-18.5	16.0	48.1
Oct. 3	09 31.52	-35 01.8	4.227	3.704	+0.50	-19.9	15.9	52.5
Oct. 13	09 36.13	-38 27.7	4.150	3.706	+0.41	-21.4	15.9	57.2
Oct. 23	09 39.63	-42 07.4	4.072	3.710	+0.28	-22.7	15.9	61.9
Nov. 2	09 41.65	-45 59.4	3.997	3.716	+0.10	-23.8	15.8	66.6
Nov. 12	09 41.62	-50 01.4	3.926	3.724	-0.14	-24.6	15.8	71.1
Nov. 22	09 38.75	-54 09.5	3.863	3.735	-0.48	-24.9	15.8	75.2
Dec. 2	09 31.96	-58 18.0	3.812	3.747	-0.95	-24.6	15.8	78.8
Dec. 12	09 19.69	-62 19.2	3.773	3.762	-1.60	-23.3	15.8	81.8
Dec. 22	08 59.89	-66 01.6	3.750	3.778	-2.48	-20.7	15.8	84.1
Jan. 1	08 30.40	-69 10.4	3.742	3.797	-3.54	-16.4	15.8	85.7
Jan. 11	07 50.18	-71 27.9	3.750	3.818	-4.55	-10.2	15.8	86.5
Jan. 21	07 01.93	-72 37.9	3.771	3.840	-5.01	-3.0	15.9	86.6
Jan. 31	06 13.06	-72 36.1	3.806	3.864	-4.59	+3.8	15.9	86.0
Feb. 10	05 31.36	-71 34.2	3.850	3.890	-3.60	+8.7	16.0	85.0
Feb. 20	05 00.36	-69 53.7	3.903	3.918	-2.51	+11.3	16.1	83.6
Mar. 1	04 39.44	-67 55.1	3.960	3.948	-1.62	+12.3	16.1	82.1
Mar. 11	04 26.45	-65 52.8	4.018	3.979	-0.95	+12.0	16.2	80.6
Mar. 21	04 19.30	-63 56.7	4.077	4.012	-0.46	+11.0	16.3	79.2
Mar. 31	04 16.34	-62 12.7	4.132	4.046	-0.11	+9.6	16.4	78.1

Comet 79P/du Toit-Hartley

Epoch = 2023 June 25.0 TT  
 T = 2023 Sept. 30.35007 TT  
 Peri. = 281.78707  
 Node = 280.51918 2000.0  
 Incl. = 3.14873  
 q = 1.1210235 AU  
 e = 0.6192028  
 a = 2.9438859 AU  
 n = 0.19512936  
 P = 5.05 years

$$m1 = 15.0 + 5 \log(\Delta) + 7.5 \log(r(t+40))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	04 00.54	+22 27.7	2.065	2.868	-0.74 -3.2	19.7	137.5
Jan. 16	03 54.42	+21 58.4	2.112	2.804	-0.45 -2.5	19.7	125.8
Jan. 26	03 51.28	+21 37.1	2.174	2.738	-0.15 -1.6	19.6	114.9
Feb. 5	03 51.17	+21 25.0	2.246	2.671	+0.15 -0.7	19.6	104.7
Feb. 15	03 53.95	+21 22.1	2.321	2.603	+0.43 +0.2	19.6	95.2
Feb. 25	03 59.43	+21 27.5	2.396	2.533	+0.69 +0.9	19.5	86.3
Mar. 7	04 07.37	+21 39.4	2.466	2.462	+0.92 +1.5	19.5	78.2
Mar. 17	04 17.54	+21 55.9	2.530	2.390	+1.13 +1.8	19.4	70.5
Mar. 27	04 29.76	+22 15.0	2.584	2.317	+1.33 +2.0	19.3	63.5
Apr. 6	04 43.86	+22 34.5	2.627	2.242	+1.51 +1.9	19.2	56.9
Apr. 16	04 59.71	+22 52.1	2.658	2.166	+1.68 +1.6	19.1	50.7
Apr. 26	05 17.24	+23 05.6	2.676	2.089	+1.84 +1.0	19.0	45.0
May 6	05 36.34	+23 12.9	2.682	2.012	+1.99 +0.3	18.9	39.7
May 16	05 56.97	+23 11.6	2.676	1.933	+2.15 -0.7	18.7	34.7
May 26	06 19.08	+22 59.5	2.659	1.854	+2.29 -1.9	18.5	30.2
June 5	06 42.62	+22 34.0	2.630	1.775	+2.43 -3.4	18.3	26.0
June 15	07 07.55	+21 52.8	2.592	1.697	+2.57 -5.1	18.2	22.3
June 25	07 33.83	+20 53.5	2.546	1.618	+2.70 -7.0	18.0	18.9
July 5	08 01.40	+19 33.9	2.493	1.542	+2.83 -9.2	17.8	16.0
July 15	08 30.23	+17 51.9	2.436	1.467	+2.95 -11.5	17.6	13.5
July 25	09 00.27	+15 45.9	2.377	1.396	+3.07 -14.0	17.4	11.5
Aug. 4	09 31.48	+13 15.1	2.317	1.329	+3.18 -16.5	17.3	9.9
Aug. 14	10 03.83	+10 19.5	2.261	1.269	+3.30 -18.9	17.2	8.8
Aug. 24	10 37.32	+07 00.9	2.209	1.216	+3.41 -21.0	17.1	8.1
Sept. 3	11 11.93	+03 22.7	2.165	1.174	+3.52 -22.7	17.1	7.9
Sept. 13	11 47.68	+00 29.6	2.131	1.143	+3.64 -23.7	17.1	7.9
Sept. 23	12 24.54	-04 28.5	2.109	1.125	+3.74 -23.9	17.2	8.2
Oct. 3	13 02.43	-08 24.8	2.101	1.122	+3.84 -23.1	17.3	8.6
Oct. 13	13 41.23	-12 08.5	2.108	1.133	+3.92 -21.3	17.5	8.9
Oct. 23	14 20.70	-15 30.0	2.129	1.157	+3.97 -18.6	17.7	9.1
Nov. 2	15 00.45	-18 21.5	2.165	1.195	+3.97 -15.3	17.8	9.0
Nov. 12	15 40.04	-20 37.6	2.213	1.243	+3.93 -11.6	18.1	8.6
Nov. 22	16 18.96	-22 16.0	2.272	1.300	+3.83 -7.8	18.3	7.7
Dec. 2	16 56.69	-23 17.2	2.340	1.364	+3.69 -4.2	18.5	6.3
Dec. 12	17 32.82	-23 44.1	2.413	1.433	+3.51 -0.9	18.7	4.5
Dec. 22	18 07.03	-23 40.7	2.489	1.506	+3.31 +1.8	18.9	2.1
Jan. 1	18 39.14	-23 12.0	2.565	1.582	+3.09 +4.1	19.1	0.7
Jan. 11	19 09.10	-22 22.9	2.639	1.659	+2.88 +5.9	19.3	4.0
Jan. 21	19 36.93	-21 17.8	2.708	1.738	+2.67 +7.2	19.5	7.6
Jan. 31	20 02.71	-20 00.9	2.771	1.817	+2.47 +8.2	19.7	11.6
Feb. 10	20 26.57	-18 35.5	2.825	1.896	+2.29 +8.9	19.8	16.0
Feb. 20	20 48.63	-17 04.5	2.869	1.975	+2.11 +9.3	20.0	20.6
Mar. 1	21 09.01	-15 30.3	2.902	2.053	+1.95 +9.5	20.1	25.5
Mar. 11	21 27.81	-13 55.0	2.923	2.130	+1.80 +9.5	20.2	30.7
Mar. 21	21 45.13	-12 20.2	2.930	2.206	+1.65 +9.4	20.3	36.2
Mar. 31	22 01.00	-10 47.5	2.925	2.281	+1.51 +9.1	20.4	41.9

## Comet P/2022 R1 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Oct. 10.15770 TT  
 Peri. = 222.29426 e = 0.5061106  
 Node = 176.15930 2000.0 a = 7.2328369 AU  
 Incl. = 7.39934 n = 0.05066885  
 q = 3.5722215 AU P = 19.45 years

$$m1 = 10.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	22 47.87	-07 10.3	4.455	3.982	+0.95 +4.6	20.1	55.6
Jan. 16	22 57.64	-06 21.6	4.547	3.956	+1.01 +5.2	20.2	47.9
Jan. 26	23 08.05	-05 27.7	4.626	3.930	+1.07 +5.7	20.2	40.5
Feb. 5	23 18.98	-04 29.1	4.691	3.904	+1.12 +6.1	20.2	33.2
Feb. 15	23 30.35	-03 26.7	4.742	3.880	+1.16 +6.4	20.2	26.1
Feb. 25	23 42.07	-02 21.3	4.777	3.856	+1.19 +6.7	20.2	19.2
Mar. 7	23 54.06	-01 13.6	4.796	3.833	+1.21 +6.9	20.1	12.3
Mar. 17	00 06.28	+00 04.3	4.799	3.811	+1.23 +7.0	20.1	5.6
Mar. 27	00 18.65	+01 05.6	4.786	3.789	+1.24 +7.0	20.1	1.3
Apr. 6	00 31.12	+02 15.6	4.758	3.769	+1.25 +7.0	20.0	7.6
Apr. 16	00 43.65	+03 24.8	4.714	3.749	+1.25 +6.8	20.0	14.1
Apr. 26	00 56.17	+04 32.5	4.656	3.730	+1.25 +6.7	20.0	20.6
May 6	01 08.64	+05 37.9	4.583	3.713	+1.24 +6.4	19.9	27.0
May 16	01 20.99	+06 40.4	4.498	3.696	+1.23 +6.1	19.8	33.4
May 26	01 33.17	+07 39.4	4.400	3.680	+1.21 +5.7	19.8	39.9
June 5	01 45.10	+08 34.0	4.291	3.665	+1.18 +5.2	19.7	46.4
June 15	01 56.70	+09 23.8	4.172	3.651	+1.14 +4.7	19.6	53.0
June 25	02 07.86	+10 08.0	4.045	3.639	+1.09 +4.1	19.5	59.7
July 5	02 18.47	+10 46.0	3.910	3.627	+1.03 +3.4	19.5	66.5
July 15	02 28.42	+11 17.4	3.770	3.616	+0.95 +2.8	19.4	73.6
July 25	02 37.55	+11 41.5	3.626	3.607	+0.86 +2.0	19.3	80.8
Aug. 4	02 45.70	+11 58.0	3.481	3.599	+0.75 +1.2	19.2	88.4
Aug. 14	02 52.69	+12 06.5	3.336	3.591	+0.63 +0.4	19.1	96.3
Aug. 24	02 58.34	+12 06.6	3.195	3.585	+0.48 -0.5	19.0	104.5
Sept. 3	03 02.48	+11 58.3	3.060	3.580	+0.33 -1.3	18.9	113.2
Sept. 13	03 04.97	+11 41.7	2.936	3.577	+0.15 -2.1	18.8	122.3
Sept. 23	03 05.71	+11 17.2	2.824	3.574	-0.02 -2.8	18.7	131.9
Oct. 3	03 04.72	+10 46.0	2.731	3.573	-0.19 -3.4	18.6	141.9
Oct. 13	03 02.12	+10 09.6	2.659	3.572	-0.34 -3.8	18.6	152.3
Oct. 23	02 58.22	+09 30.4	2.611	3.573	-0.45 -4.0	18.5	162.6
Nov. 2	02 53.47	+08 51.4	2.591	3.575	-0.50 -3.8	18.5	171.3
Nov. 12	02 48.40	+08 15.7	2.600	3.579	-0.50 -3.3	18.5	169.8
Nov. 22	02 43.63	+07 46.7	2.637	3.583	-0.44 -2.4	18.5	160.3
Dec. 2	02 39.71	+07 26.7	2.702	3.589	-0.33 -1.4	18.6	149.8
Dec. 12	02 37.06	+07 17.3	2.791	3.595	-0.18 -0.3	18.7	139.3
Dec. 22	02 35.98	+07 19.1	2.902	3.603	-0.02 +0.8	18.8	129.0
Jan. 1	02 36.60	+07 31.5	3.029	3.612	+0.16 +1.8	18.9	119.2
Jan. 11	02 38.92	+07 53.6	3.169	3.622	+0.32 +2.7	19.0	109.8
Jan. 21	02 42.89	+08 23.9	3.319	3.633	+0.48 +3.4	19.1	100.8
Jan. 31	02 48.38	+09 00.9	3.473	3.646	+0.63 +4.0	19.2	92.2
Feb. 10	02 55.23	+09 42.8	3.630	3.659	+0.75 +4.4	19.3	83.9
Feb. 20	03 03.30	+10 28.1	3.785	3.673	+0.87 +4.7	19.4	76.0
Mar. 1	03 12.42	+11 15.3	3.937	3.689	+0.96 +4.8	19.5	68.4
Mar. 11	03 22.45	+12 03.1	4.084	3.705	+1.05 +4.8	19.6	61.0
Mar. 21	03 33.27	+12 50.4	4.222	3.722	+1.12 +4.7	19.7	53.9
Mar. 31	03 44.75	+13 36.0	4.351	3.741	+1.18 +4.4	19.8	46.9

Comet 103P/Hartley

Epoch = 2023 June 25.0 TT  
 T = 2023 Oct. 12.46950 TT  
 Peri. = 181.30244 e = 0.6937730  
 Node = 219.75090 2000.0 a = 3.4750029 AU  
 Incl. = 13.61029 n = 0.15214978  
 q = 1.0641397 AU P = 6.48 years

$$m1 = 9.5 + 5 \log(\Delta) + 12.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	18 22.67	-14 59.0	4.086	3.134	+1.44 +1.8	18.8	12.6
Jan. 16	18 37.25	-14 37.6	3.982	3.063	+1.47 +2.6	18.6	18.2
Jan. 26	18 52.11	-14 08.1	3.862	2.991	+1.50 +3.4	18.4	24.2
Feb. 5	19 07.17	-13 30.2	3.726	2.918	+1.52 +4.3	18.2	30.3
Feb. 15	19 22.38	-12 43.5	3.577	2.843	+1.53 +5.2	17.9	36.4
Feb. 25	19 37.70	-11 47.7	3.415	2.767	+1.53 +6.1	17.7	42.5
Mar. 7	19 53.06	-10 42.6	3.243	2.689	+1.54 +7.0	17.4	48.4
Mar. 17	20 08.45	-09 27.8	3.063	2.610	+1.54 +8.0	17.1	54.3
Mar. 27	20 23.84	-08 03.1	2.876	2.530	+1.54 +9.0	16.8	60.0
Apr. 6	20 39.21	-06 28.1	2.684	2.448	+1.54 +10.1	16.5	65.7
Apr. 16	20 54.57	-04 42.4	2.491	2.365	+1.54 +11.2	16.2	71.2
Apr. 26	21 09.92	-02 45.4	2.296	2.281	+1.54 +12.3	15.8	76.5
May 6	21 25.30	+00 36.6	2.103	2.196	+1.54 +13.6	15.4	81.7
May 16	21 40.78	+01 45.0	1.912	2.110	+1.56 +14.9	15.0	86.6
May 26	21 56.44	+04 20.4	1.727	2.022	+1.58 +16.3	14.5	91.3
June 5	22 12.43	+07 10.8	1.548	1.934	+1.63 +17.9	14.0	95.8
June 15	22 28.97	+10 17.8	1.377	1.845	+1.70 +19.7	13.5	99.9
June 25	22 46.39	+13 43.2	1.215	1.757	+1.81 +21.6	13.0	103.5
July 5	23 05.20	+17 28.6	1.064	1.668	+1.99 +23.7	12.4	106.6
July 15	23 26.22	+21 35.8	0.924	1.580	+2.27 +25.9	11.8	108.9
July 25	23 50.69	+26 04.8	0.797	1.494	+2.71 +28.0	11.2	110.4
Aug. 4	00 20.68	+30 51.8	0.685	1.411	+3.42 +29.4	10.5	110.8
Aug. 14	00 59.37	+35 44.3	0.587	1.332	+4.50 +28.5	9.9	109.8
Aug. 24	01 50.98	+40 07.3	0.506	1.258	+6.04 +22.3	9.3	107.4
Sept. 3	02 58.99	+42 48.9	0.444	1.193	+7.66 +6.7	8.7	103.5
Sept. 13	04 19.63	+42 08.8	0.403	1.139	+8.25 -18.1	8.2	98.7
Sept. 23	05 38.52	+37 16.3	0.385	1.098	+7.21 -41.3	7.9	93.7
Oct. 3	06 42.95	+29 23.2	0.388	1.072	+5.50 -52.2	7.8	89.8
Oct. 13	07 30.91	+20 36.5	0.408	1.064	+4.01 -51.7	7.9	87.9
Oct. 23	08 05.76	+12 23.4	0.439	1.074	+2.91 -45.8	8.1	88.1
Nov. 2	08 31.00	+05 17.1	0.474	1.101	+2.09 -38.7	8.4	90.2
Nov. 12	08 48.75	+00 39.5	0.509	1.144	+1.41 -32.0	8.8	94.0
Nov. 22	08 59.98	-05 31.1	0.541	1.200	+0.79 -25.8	9.2	99.2
Dec. 2	09 05.17	-09 21.8	0.570	1.266	+0.20 -19.8	9.6	105.7
Dec. 12	09 04.56	-12 12.1	0.598	1.340	-0.37 -13.6	10.0	113.4
Dec. 22	08 58.60	-13 57.8	0.626	1.419	-0.85 -6.8	10.4	122.1
Jan. 1	08 48.45	-14 35.2	0.660	1.503	-1.18 +0.1	10.8	131.3
Jan. 11	08 35.87	-14 04.8	0.704	1.589	-1.31 +6.5	11.3	140.1
Jan. 21	08 23.10	-12 35.5	0.764	1.677	-1.20 +11.5	11.7	147.1
Jan. 31	08 12.20	-10 25.4	0.841	1.766	-0.93 +14.4	12.2	150.3
Feb. 10	08 04.44	-07 55.7	0.939	1.855	-0.58 +15.3	12.7	148.8
Feb. 20	08 00.35	-05 24.6	1.057	1.943	-0.21 +14.6	13.2	143.6
Mar. 1	07 59.83	-03 05.3	1.194	2.031	+0.13 +13.0	13.7	136.7
Mar. 11	08 02.40	-01 04.3	1.347	2.119	+0.41 +11.0	14.2	129.1
Mar. 21	08 07.57	+00 35.7	1.515	2.205	+0.64 +8.8	14.7	121.4
Mar. 31	08 14.80	+01 54.6	1.696	2.290	+0.82 +6.8	15.1	113.9



Comet 2P/Encke

Epoch = 2023 June 25.0 TT  
 T = 2023 Oct. 22.52476 TT  
 Peri. = 187.27730 e = 0.8469696  
 Node = 334.02924 2000.0 a = 2.2189879 AU  
 Incl. = 11.33814 n = 0.29817531  
 q = 0.3395726 AU P = 3.31 years

H = 14.2, G = 0.15 (r > 2.0 AU)  
 m1 = 13.3 + 5 log(Delta) + 10.0 log(r) (r < 2.0 AU)

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	Mag.	Elong.
2023/24	h m	° '			m		°
Jan. 6	22 51.29	-02 52.6	3.730	3.316	+0.68 +3.9	20.5	58.1
Jan. 16	22 58.60	-02 09.7	3.808	3.262	+0.79 +4.7	20.4	49.9
Jan. 26	23 06.85	-01 19.4	3.869	3.206	+0.87 +5.4	20.4	42.0
Feb. 5	23 15.91	+00 22.3	3.911	3.147	+0.95 +6.1	20.3	34.3
Feb. 15	23 25.66	+00 40.9	3.933	3.086	+1.01 +6.6	20.2	27.0
Feb. 25	23 36.03	+01 49.7	3.934	3.022	+1.07 +7.2	20.1	19.8
Mar. 7	23 46.94	+03 03.5	3.914	2.956	+1.12 +7.6	19.9	13.0
Mar. 17	23 58.34	+04 21.9	3.872	2.887	+1.17 +8.1	19.7	6.9
Mar. 27	00 10.20	+05 44.5	3.809	2.815	+1.21 +8.5	19.6	4.4
Apr. 6	00 22.51	+07 10.9	3.725	2.741	+1.25 +8.8	19.6	8.8
Apr. 16	00 35.26	+08 41.0	3.622	2.663	+1.30 +9.2	19.6	14.6
Apr. 26	00 48.49	+10 14.5	3.500	2.582	+1.35 +9.5	19.5	20.6
May 6	01 02.23	+11 51.2	3.361	2.498	+1.40 +9.9	19.5	26.4
May 16	01 16.55	+13 31.4	3.205	2.410	+1.47 +10.2	19.4	32.2
May 26	01 31.55	+15 14.9	3.036	2.319	+1.54 +10.5	19.3	37.7
June 5	01 47.37	+17 02.1	2.854	2.223	+1.63 +10.9	19.2	43.1
June 15	02 04.22	+18 53.3	2.661	2.124	+1.75 +11.4	19.0	48.2
June 25	02 22.38	+20 48.9	2.460	2.019	+1.90 +11.8	18.8	53.0
July 5	02 42.27	+22 49.5	2.252	1.910	+2.11 +12.4	17.9	57.5
July 15	03 04.53	+24 55.6	2.041	1.795	+2.39 +12.9	17.4	61.5
July 25	03 30.09	+27 06.9	1.829	1.674	+2.79 +13.4	16.8	64.9
Aug. 4	04 00.40	+29 21.5	1.620	1.546	+3.37 +13.5	16.2	67.4
Aug. 14	04 37.71	+31 32.8	1.419	1.411	+4.23 +12.4	15.6	68.6
Aug. 24	05 25.24	+33 22.2	1.233	1.268	+5.47 +8.4	14.8	68.0
Sept. 3	06 26.86	+34 05.5	1.072	1.116	+7.05 -2.2	13.9	64.8
Sept. 13	07 44.17	+32 18.3	0.954	0.953	+8.44 -23.1	13.0	58.1
Sept. 23	09 10.94	+26 26.5	0.901	0.779	+8.71 -49.8	12.0	47.9
Oct. 3	10 34.78	+16 34.2	0.936	0.597	+7.90 -68.1	10.9	35.7
Oct. 13	11 50.43	+04 39.7	1.067	0.423	+7.35 -74.0	9.7	23.3
Oct. 23	13 05.77	-07 35.4	1.259	0.340	+7.83 -69.7	9.1	11.0
Nov. 2	14 23.50	-17 36.5	1.425	0.438	+7.47 -46.8	10.5	3.2
Nov. 12	15 34.03	-23 43.4	1.572	0.614	+6.52 -25.7	12.2	9.0
Nov. 22	16 34.85	-26 52.3	1.728	0.796	+5.56 -11.7	13.5	12.9
Dec. 2	17 26.46	-28 07.3	1.894	0.969	+4.70 -3.1	14.5	14.2
Dec. 12	18 10.11	-28 13.4	2.063	1.130	+3.98 +2.0	15.4	13.7
Dec. 22	18 47.27	-27 38.8	2.228	1.282	+3.41 +5.0	16.1	11.9
Jan. 1	19 19.24	-26 40.6	2.387	1.424	+2.96 +6.7	16.7	9.1
Jan. 11	19 47.14	-25 29.0	2.533	1.558	+2.60 +7.6	17.2	6.0
Jan. 21	20 11.78	-24 10.1	2.665	1.685	+2.31 +8.1	17.7	4.1
Jan. 31	20 33.76	-22 47.7	2.781	1.806	+2.07 +8.3	18.1	6.5
Feb. 10	20 53.56	-21 24.2	2.878	1.920	+1.87 +8.3	18.4	11.2
Feb. 20	21 11.49	-20 01.5	2.956	2.029	+1.70 +8.2	18.7	16.6
Mar. 1	21 27.77	-18 40.7	3.015	2.133	+1.54 +7.9	18.9	22.5
Mar. 11	21 42.57	-17 23.1	3.053	2.232	+1.40 +7.6	19.1	28.6
Mar. 21	21 55.99	-16 09.4	3.071	2.327	+1.27 +7.1	19.3	35.1
Mar. 31	22 08.06	-15 00.8	3.069	2.419	+1.13 +6.6	19.4	41.9

Comet 310P/Hill

Epoch = 2023 June 25.0 TT  
 T = 2023 Oct. 23.84604 TT  
 Peri. = 31.65952 e = 0.4228291  
 Node = 8.92275 2000.0 a = 4.1868060 AU  
 Incl. = 13.12631 n = 0.11504820  
 q = 2.4165026 AU P = 8.57 years

$$m1 = 8.8 + 5 \log(\Delta) + 20.0 \log(r(t-40))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	21 23.44	-22 55.3	3.908	3.115	+1.42 +9.0	22.0	31.8
Jan. 16	21 37.83	-21 23.4	3.937	3.077	+1.46 +9.4	22.0	25.4
Jan. 26	21 52.54	-19 47.0	3.952	3.040	+1.49 +9.9	21.9	19.2
Feb. 5	22 07.48	-18 06.3	3.953	3.003	+1.50 +10.3	21.8	13.4
Feb. 15	22 22.59	-16 21.5	3.940	2.966	+1.52 +10.7	21.6	8.2
Feb. 25	22 37.81	-14 33.1	3.914	2.930	+1.53 +11.0	21.5	5.5
Mar. 7	22 53.08	-12 41.4	3.874	2.895	+1.53 +11.3	21.4	8.0
Mar. 17	23 08.39	-10 46.9	3.821	2.860	+1.53 +11.6	21.3	12.8
Mar. 27	23 23.70	-08 50.0	3.757	2.826	+1.53 +11.8	21.1	18.1
Apr. 6	23 38.97	-06 51.3	3.681	2.792	+1.53 +12.0	21.0	23.5
Apr. 16	23 54.21	-04 51.2	3.595	2.760	+1.52 +12.1	20.8	28.9
Apr. 26	00 09.37	-02 50.4	3.500	2.729	+1.51 +12.1	20.6	34.3
May 6	00 24.44	+00 49.3	3.396	2.698	+1.50 +12.1	20.5	39.7
May 16	00 39.40	+01 11.6	3.284	2.669	+1.49 +12.1	20.3	45.1
May 26	00 54.19	+03 11.8	3.166	2.641	+1.47 +12.0	20.1	50.5
June 5	01 08.78	+05 10.7	3.043	2.614	+1.45 +11.8	19.9	56.0
June 15	01 23.11	+07 08.0	2.915	2.589	+1.42 +11.6	19.7	61.5
June 25	01 37.09	+09 03.4	2.783	2.565	+1.37 +11.4	19.5	67.1
July 5	01 50.60	+10 56.4	2.649	2.542	+1.32 +11.2	19.4	72.9
July 15	02 03.52	+12 47.0	2.513	2.521	+1.25 +10.9	19.1	78.8
July 25	02 15.67	+14 34.9	2.378	2.502	+1.16 +10.6	18.9	85.0
Aug. 4	02 26.82	+16 20.0	2.244	2.485	+1.05 +10.4	18.7	91.4
Aug. 14	02 36.72	+18 02.4	2.112	2.469	+0.91 +10.1	18.5	98.2
Aug. 24	02 45.02	+19 41.9	1.985	2.456	+0.73 +9.8	18.3	105.4
Sept. 3	02 51.38	+21 18.3	1.865	2.444	+0.52 +9.5	18.1	113.1
Sept. 13	02 55.42	+22 50.9	1.754	2.434	+0.26 +9.0	17.9	121.4
Sept. 23	02 56.76	+24 18.3	1.654	2.427	-0.02 +8.4	17.7	130.2
Oct. 3	02 55.20	+25 38.2	1.571	2.421	-0.32 +7.5	17.6	139.6
Oct. 13	02 50.76	+26 47.4	1.505	2.418	-0.59 +6.2	17.4	149.3
Oct. 23	02 43.84	+27 41.9	1.462	2.417	-0.80 +4.5	17.4	158.8
Nov. 2	02 35.34	+28 19.4	1.442	2.417	-0.89 +2.8	17.3	166.0
Nov. 12	02 26.48	+28 39.2	1.449	2.420	-0.85 +1.1	17.3	165.6
Nov. 22	02 18.65	+28 44.4	1.481	2.426	-0.68 -0.1	17.3	158.0
Dec. 2	02 12.97	+28 40.7	1.538	2.433	-0.42 -0.6	17.4	148.4
Dec. 12	02 10.15	+28 34.1	1.615	2.442	-0.11 -0.6	17.5	138.6
Dec. 22	02 10.50	+28 30.3	1.711	2.453	+0.21 -0.1	17.6	129.1
Jan. 1	02 13.95	+28 32.6	1.822	2.467	+0.51 +0.7	17.8	120.1
Jan. 11	02 20.23	+28 42.7	1.944	2.482	+0.77 +1.4	18.0	111.7
Jan. 21	02 29.05	+29 00.7	2.075	2.499	+1.01 +2.2	18.1	103.8
Jan. 31	02 40.04	+29 25.5	2.211	2.518	+1.21 +2.8	18.3	96.3
Feb. 10	02 52.87	+29 55.5	2.352	2.538	+1.38 +3.2	18.5	89.3
Feb. 20	03 07.29	+30 29.0	2.494	2.561	+1.52 +3.5	18.7	82.5
Mar. 1	03 23.03	+31 03.9	2.637	2.584	+1.64 +3.5	18.9	76.1
Mar. 11	03 39.87	+31 38.4	2.778	2.610	+1.74 +3.4	19.0	69.9
Mar. 21	03 57.64	+32 10.9	2.917	2.636	+1.82 +3.1	19.2	64.0
Mar. 31	04 16.14	+32 39.7	3.052	2.664	+1.88 +2.6	19.4	58.2

## Comet 404P/Bressi

Epoch = 2023 June 25.0 TT  
 T = 2023 Nov. 3.18199 TT  
 Peri. = 169.23073 e = 0.1288219  
 Node = 260.06337 2000.0 a = 4.7438155 AU  
 Incl. = 9.78231 n = 0.09539209  
 q = 4.1327082 AU P = 10.33 years

$$m1 = 3.1 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	00 59.22	+14 30.8	4.043	4.230	+0.46 0.0	18.7	94.1
Jan. 16	01 04.36	+14 34.9	4.190	4.224	+0.58 +0.9	18.7	85.2
Jan. 26	01 10.67	+14 47.7	4.336	4.218	+0.69 +1.7	18.8	76.6
Feb. 5	01 18.01	+15 08.1	4.476	4.212	+0.79 +2.4	18.8	68.3
Feb. 15	01 26.25	+15 34.9	4.609	4.206	+0.87 +3.0	18.9	60.2
Feb. 25	01 35.26	+16 07.2	4.731	4.201	+0.94 +3.5	18.9	52.4
Mar. 7	01 44.94	+16 43.7	4.841	4.196	+1.00 +3.8	19.0	44.8
Mar. 17	01 55.18	+17 23.4	4.938	4.191	+1.05 +4.1	19.0	37.4
Mar. 27	02 05.90	+18 05.4	5.018	4.186	+1.10 +4.3	19.0	30.2
Apr. 6	02 17.02	+18 48.6	5.083	4.181	+1.13 +4.4	19.1	23.1
Apr. 16	02 28.45	+19 32.3	5.131	4.177	+1.16 +4.4	19.1	16.3
Apr. 26	02 40.13	+20 15.7	5.161	4.173	+1.18 +4.3	19.1	9.8
May 6	02 51.98	+20 58.0	5.173	4.169	+1.19 +4.2	19.1	4.7
May 16	03 03.94	+21 38.8	5.168	4.165	+1.20 +4.0	19.1	6.5
May 26	03 15.93	+22 17.4	5.145	4.161	+1.20 +3.7	19.0	12.4
June 5	03 27.89	+22 53.4	5.105	4.158	+1.19 +3.4	19.0	18.9
June 15	03 39.72	+23 26.5	5.048	4.155	+1.17 +3.1	19.0	25.5
June 25	03 51.36	+23 56.4	4.976	4.152	+1.15 +2.8	18.9	32.3
July 5	04 02.68	+24 22.8	4.888	4.149	+1.11 +2.4	18.9	39.1
July 15	04 13.61	+24 45.6	4.786	4.146	+1.07 +2.1	18.9	46.1
July 25	04 24.02	+25 04.8	4.671	4.144	+1.01 +1.7	18.8	53.2
Aug. 4	04 33.77	+25 20.3	4.545	4.142	+0.93 +1.4	18.7	60.6
Aug. 14	04 42.74	+25 32.3	4.410	4.140	+0.85 +1.0	18.7	68.1
Aug. 24	04 50.75	+25 40.9	4.267	4.138	+0.74 +0.7	18.6	75.9
Sept. 3	04 57.66	+25 46.2	4.119	4.137	+0.62 +0.4	18.5	84.0
Sept. 13	05 03.27	+25 48.3	3.969	4.136	+0.48 0.0	18.4	92.4
Sept. 23	05 07.42	+25 47.4	3.821	4.135	+0.33 -0.3	18.3	101.2
Oct. 3	05 09.95	+25 43.3	3.676	4.134	+0.16 -0.6	18.3	110.4
Oct. 13	05 10.74	+25 36.2	3.541	4.133	-0.02 -0.9	18.2	120.1
Oct. 23	05 09.71	+25 25.6	3.419	4.133	-0.20 -1.3	18.1	130.3
Nov. 2	05 06.92	+25 11.3	3.315	4.133	-0.37 -1.6	18.0	140.9
Nov. 12	05 02.54	+24 53.1	3.233	4.133	-0.51 -2.0	18.0	151.9
Nov. 22	04 56.90	+24 30.9	3.177	4.133	-0.62 -2.4	17.9	163.3
Dec. 2	04 50.49	+24 05.2	3.151	4.134	-0.66 -2.7	17.9	174.8
Dec. 12	04 43.88	+23 37.1	3.155	4.134	-0.65 -2.9	17.9	173.1
Dec. 22	04 37.68	+23 08.1	3.190	4.135	-0.58 -2.9	17.9	161.6
Jan. 1	04 32.44	+22 40.1	3.255	4.137	-0.45 -2.7	18.0	150.2
Jan. 11	04 28.57	+22 14.8	3.345	4.138	-0.30 -2.3	18.1	139.0
Jan. 21	04 26.34	+21 53.6	3.457	4.140	-0.13 -1.9	18.1	128.3
Jan. 31	04 25.88	+21 37.3	3.587	4.141	+0.05 -1.3	18.2	118.0
Feb. 10	04 27.17	+21 26.1	3.730	4.144	+0.22 -0.9	18.3	108.1
Feb. 20	04 30.15	+21 19.6	3.880	4.146	+0.39 -0.4	18.4	98.7
Mar. 1	04 34.68	+21 17.2	4.035	4.148	+0.53 -0.1	18.5	89.6
Mar. 11	04 40.59	+21 17.8	4.189	4.151	+0.66 +0.2	18.6	81.0
Mar. 21	04 47.72	+21 20.5	4.340	4.154	+0.77 +0.3	18.7	72.7
Mar. 31	04 55.92	+21 24.3	4.485	4.157	+0.87 +0.4	18.7	64.7

Comet 213P/Van Ness

Epoch = 2023 June 25.0 TT  
 T = 2023 Nov. 11.83400 TT  
 Peri. = 5.77503 e = 0.4081105  
 Node = 311.25769 2000.0 a = 3.3455669 AU  
 Incl. = 10.38011 n = 0.16106438  
 q = 1.9802059 AU P = 6.12 years

$$m1 = 10.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	15 22.88	-27 37.2	3.457	2.927	+1.55 -7.0	18.2	50.2
Jan. 16	15 38.39	-28 45.6	3.306	2.886	+1.54 -6.6	18.0	56.7
Jan. 26	15 53.74	-29 50.4	3.148	2.844	+1.52 -6.3	17.8	63.2
Feb. 5	16 08.80	-30 51.3	2.984	2.802	+1.48 -5.9	17.6	69.9
Feb. 15	16 23.40	-31 48.6	2.816	2.760	+1.43 -5.5	17.5	76.6
Feb. 25	16 37.32	-32 42.3	2.646	2.718	+1.35 -5.2	17.3	83.5
Mar. 7	16 50.31	-33 32.8	2.476	2.676	+1.24 -4.9	17.0	90.5
Mar. 17	17 02.11	-34 20.4	2.307	2.634	+1.10 -4.6	16.8	97.8
Mar. 27	17 12.35	-35 05.6	2.144	2.592	+0.92 -4.4	16.6	105.3
Apr. 6	17 20.66	-35 48.4	1.986	2.551	+0.71 -4.2	16.4	113.2
Apr. 16	17 26.64	-36 28.8	1.838	2.511	+0.45 -3.9	16.1	121.4
Apr. 26	17 29.85	-37 05.5	1.701	2.470	+0.15 -3.4	15.9	129.9
May 6	17 29.94	-37 36.3	1.579	2.431	-0.17 -2.6	15.6	138.9
May 16	17 26.79	-37 57.6	1.474	2.392	-0.49 -1.4	15.4	148.1
May 26	17 20.54	-38 04.3	1.388	2.354	-0.77 +0.3	15.2	157.0
June 5	17 11.96	-37 51.7	1.325	2.317	-0.94 +2.5	15.1	163.9
June 15	17 02.25	-37 16.9	1.286	2.281	-0.97 +4.7	14.9	164.7
June 25	16 52.98	-36 20.7	1.270	2.247	-0.84 +6.6	14.8	158.5
July 5	16 45.70	-35 08.7	1.276	2.213	-0.57 +7.8	14.8	149.5
July 15	16 41.47	-33 48.4	1.303	2.182	-0.23 +8.2	14.8	140.1
July 25	16 40.89	-32 27.4	1.346	2.152	+0.15 +7.9	14.8	130.8
Aug. 4	16 44.08	-31 11.2	1.403	2.124	+0.52 +7.2	14.8	122.1
Aug. 14	16 50.81	-30 02.3	1.470	2.098	+0.85 +6.5	14.9	114.1
Aug. 24	17 00.74	-29 00.9	1.545	2.074	+1.15 +5.8	14.9	106.6
Sept. 3	17 13.46	-28 05.5	1.625	2.053	+1.41 +5.3	15.0	99.7
Sept. 13	17 28.54	-27 13.7	1.710	2.034	+1.62 +5.1	15.0	93.3
Sept. 23	17 45.63	-26 22.7	1.797	2.018	+1.80 +5.2	15.1	87.4
Oct. 3	18 04.35	-25 29.7	1.886	2.004	+1.95 +5.5	15.2	81.8
Oct. 13	18 24.38	-24 32.2	1.975	1.994	+2.06 +6.1	15.3	76.5
Oct. 23	18 45.44	-23 28.1	2.065	1.986	+2.15 +6.8	15.4	71.4
Nov. 2	19 07.24	-22 15.9	2.155	1.982	+2.21 +7.7	15.4	66.6
Nov. 12	19 29.54	-20 54.4	2.245	1.980	+2.25 +8.7	15.5	61.8
Nov. 22	19 52.15	-19 23.0	2.333	1.982	+2.27 +9.7	15.6	57.3
Dec. 2	20 14.87	-17 41.7	2.421	1.986	+2.27 +10.7	15.7	52.8
Dec. 12	20 37.56	-15 50.9	2.507	1.994	+2.26 +11.6	15.8	48.4
Dec. 22	21 00.11	-13 51.1	2.592	2.005	+2.24 +12.4	15.9	44.0
Jan. 1	21 22.41	-11 43.3	2.674	2.018	+2.21 +13.2	16.0	39.7
Jan. 11	21 44.42	-09 28.8	2.754	2.035	+2.18 +13.8	16.1	35.4
Jan. 21	22 06.10	-07 08.8	2.831	2.053	+2.15 +14.2	16.2	31.2
Jan. 31	22 27.43	-04 44.7	2.905	2.075	+2.11 +14.6	16.3	26.9
Feb. 10	22 48.42	-02 17.9	2.974	2.099	+2.08 +14.8	16.4	22.7
Feb. 20	23 09.07	+00 10.2	3.038	2.125	+2.05 +14.8	16.5	18.6
Mar. 1	23 29.40	+02 38.3	3.098	2.153	+2.02 +14.8	16.6	14.5
Mar. 11	23 49.43	+05 05.1	3.151	2.183	+1.99 +14.6	16.7	10.7
Mar. 21	00 09.18	+07 29.6	3.198	2.214	+1.96 +14.3	16.8	7.5
Mar. 31	00 28.67	+09 50.5	3.238	2.248	+1.94 +13.9	16.9	6.2

Comet P/2007 T2 (Kowalski)

Epoch = 2023 June 25.0 TT  
 T = 2023 Nov. 15.40560 TT  
 Peri. = 359.66365 e = 0.7855216  
 Node = 3.38198 2000.0 a = 3.0442105 AU  
 Incl. = 9.75635 n = 0.18556328  
 q = 0.6529174 AU P = 5.31 years

$$m1 = 18.2 + 5 \log(\Delta) + 7.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot. /PA	Elong.
2023/24	h m	° ' "			for T=+1 day			°
Jan. 6	14 54.87	-21 20.1	3.975	3.548	-0.38 +2.1	.	13.8/113	57.6
Jan. 16	15 03.75	-22 13.4	3.772	3.482	-0.42 +2.2	.	13.0/114	65.6
Jan. 26	15 11.95	-23 05.0	3.558	3.415	-0.47 +2.4	.	11.8/115	73.7
Feb. 5	15 19.24	-23 54.5	3.338	3.346	-0.52 +2.5	.	10.4/118	82.0
Feb. 15	15 25.38	-24 42.0	3.114	3.275	-0.58 +2.7	.	8.7/122	90.5
Feb. 25	15 30.06	-25 27.3	2.890	3.202	-0.64 +3.0	.	6.7/131	99.3
Mar. 7	15 32.92	-26 09.9	2.669	3.128	-0.72 +3.3	.	4.7/151	108.4
Mar. 17	15 33.56	-26 49.4	2.455	3.052	-0.79 +3.7	.	3.8/195	118.0
Mar. 27	15 31.55	-27 24.1	2.253	2.973	-0.87 +4.2	.	5.8/237	128.0
Apr. 6	15 26.50	-27 51.9	2.066	2.893	-0.94 +4.9	.	9.4/256	138.6
Apr. 16	15 18.15	-28 09.6	1.900	2.811	-1.00 +5.6	.	13.5/266	149.5
Apr. 26	15 06.49	-28 12.6	1.758	2.726	-1.03 +6.5	.	17.6/272	160.3
May 6	14 52.03	-27 56.9	1.644	2.639	-1.01 +7.4	.	20.9/277	168.3
May 16	14 35.83	-27 20.3	1.559	2.550	-0.95 +8.0	.	22.7/282	165.2
May 26	14 19.36	-26 24.5	1.505	2.458	-0.84 +8.4	22.0	22.4/287	154.4
June 5	14 04.30	-25 16.1	1.479	2.364	-0.70 +8.4	21.9	20.0/291	142.2
June 15	13 51.95	-24 04.3	1.475	2.267	-0.56 +8.0	21.7	16.0/296	130.2
June 25	13 43.16	-22 58.9	1.487	2.167	-0.43 +7.3	21.6	10.9/303	118.7
July 5	13 38.27	-22 07.1	1.509	2.064	-0.33 +6.6	21.5	5.7/318	108.1
July 15	13 37.21	-21 33.1	1.534	1.959	-0.26 +6.0	21.3	2.7/ 30	98.3
July 25	13 39.80	-21 18.5	1.557	1.850	-0.22 +5.4	21.2	6.3/ 87	89.4
Aug. 4	13 45.80	-21 23.0	1.573	1.738	-0.20 +5.0	21.0	11.0/ 98	81.3
Aug. 14	13 54.99	-21 45.1	1.578	1.623	-0.21 +4.6	20.8	15.5/102	73.9
Aug. 24	14 07.32	-22 22.8	1.570	1.504	-0.25 +4.3	20.5	20.0/103	67.3
Sept. 3	14 22.77	-23 13.3	1.545	1.383	-0.30 +4.1	20.2	24.4/103	61.4
Sept. 13	14 41.51	-24 13.2	1.502	1.259	-0.39 +3.8	19.8	29.0/103	56.2
Sept. 23	15 03.88	-25 17.9	1.439	1.134	-0.50 +3.3	19.4	33.9/101	51.7
Oct. 3	15 30.30	-26 20.3	1.355	1.010	-0.64 +2.4	18.9	39.2/ 99	47.9
Oct. 13	16 01.28	-27 09.5	1.250	0.891	-0.78 +0.6	18.3	45.1/ 95	45.0
Oct. 23	16 37.18	-27 28.0	1.121	0.783	-0.88 -2.6	17.7	51.3/ 89	42.9
Nov. 2	17 17.62	-26 49.4	0.972	0.700	-0.81 -8.2	17.0	57.5/ 82	41.7
Nov. 12	18 01.11	-24 38.7	0.808	0.656	-0.40 -17.2	16.4	63.7/ 72	41.3
Nov. 22	18 45.88	-20 15.1	0.642	0.665	+0.32 -30.9	15.9	73.3/ 61	41.8
Dec. 2	19 33.12	-12 43.2	0.492	0.723	+0.92 -53.8	15.6	95.0/ 52	44.5
Dec. 12	20 30.45	+00 24.0	0.373	0.815	+0.47 -98.0	15.4	139.0/ 47	52.8
Dec. 22	21 52.23	+17 51.8	0.308	0.928	-2.65 163.6	15.4	187.2/ 50	70.5
Jan. 1	23 47.59	+35 31.3	0.320	1.049	-8.90 171.6	15.9	170.2/ 63	92.9
Jan. 11	01 46.61	+42 58.5	0.402	1.174	-12.06 103.3	16.7	113.4/ 82	108.4
Jan. 21	03 12.42	+43 16.3	0.528	1.299	-10.29 -49.5	17.7	73.7/ 96	115.0
Jan. 31	04 08.31	+41 30.9	0.681	1.422	-7.73 -23.5	18.5	51.9/103	116.0
Feb. 10	04 47.25	+39 31.1	0.852	1.542	-5.77 -11.3	19.3	40.0/106	113.9
Feb. 20	05 17.17	+37 41.8	1.036	1.660	-4.40 -5.2	19.9	33.3/108	110.1
Mar. 1	05 42.03	+36 05.7	1.232	1.774	-3.44 -1.8	20.5	29.3/108	105.3
Mar. 11	06 03.90	+34 40.3	1.438	1.885	-2.74 +0.1	21.1	26.8/107	100.0
Mar. 21	06 23.90	+33 22.7	1.650	1.993	-2.23 +1.3	21.5	25.2/107	94.5
Mar. 31	06 42.62	+32 10.4	1.867	2.097	-1.84 +2.0	22.0	24.1/107	88.7

## Comet C/2021 A9 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 1.68583 TT  
 Peri. = 211.46337  
 Node = 314.83973 2000.0  
 Incl. = 158.01707  
 q = 7.7600368 AU  
 e = 1.0019432

$$m_1 = 0.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	08 35.48	+14 01.4	7.107	8.022	-0.80	+1.2	18.3	157.0
Jan. 16	08 27.24	+14 13.8	7.040	8.006	-0.84	+1.3	18.3	168.6
Jan. 26	08 18.71	+14 27.2	7.011	7.992	-0.86	+1.4	18.3	174.6
Feb. 5	08 10.20	+14 40.5	7.021	7.977	-0.84	+1.3	18.3	165.0
Feb. 15	08 01.99	+14 53.2	7.069	7.963	-0.79	+1.2	18.3	153.3
Feb. 25	07 54.37	+15 04.6	7.151	7.950	-0.72	+1.0	18.3	141.5
Mar. 7	07 47.56	+15 14.2	7.263	7.936	-0.63	+0.9	18.3	129.9
Mar. 17	07 41.70	+15 21.8	7.399	7.924	-0.53	+0.6	18.3	118.6
Mar. 27	07 36.87	+15 27.2	7.553	7.912	-0.42	+0.4	18.4	107.6
Apr. 6	07 33.10	+15 30.5	7.718	7.900	-0.32	+0.2	18.4	96.9
Apr. 16	07 30.36	+15 31.6	7.887	7.889	-0.22	0.0	18.4	86.4
Apr. 26	07 28.59	+15 30.6	8.055	7.878	-0.13	-0.2	18.5	76.3
May 6	07 27.70	+15 27.5	8.215	7.867	-0.05	-0.4	18.5	66.5
May 16	07 27.58	+15 22.3	8.364	7.857	+0.03	-0.6	18.5	56.9
May 26	07 28.12	+15 15.2	8.497	7.848	+0.09	-0.8	18.6	47.5
June 5	07 29.21	+15 06.1	8.609	7.839	+0.13	-1.0	18.6	38.4
June 15	07 30.73	+14 55.1	8.699	7.831	+0.17	-1.2	18.6	29.4
June 25	07 32.59	+14 42.2	8.765	7.823	+0.20	-1.4	18.6	20.8
July 5	07 34.65	+14 27.7	8.803	7.815	+0.21	-1.6	18.6	12.8
July 15	07 36.82	+14 11.4	8.815	7.808	+0.22	-1.7	18.6	7.5
July 25	07 39.00	+13 53.7	8.798	7.801	+0.21	-1.9	18.6	10.5
Aug. 4	07 41.06	+13 34.5	8.754	7.795	+0.20	-2.0	18.6	18.0
Aug. 14	07 42.92	+13 14.2	8.683	7.790	+0.17	-2.1	18.6	26.5
Aug. 24	07 44.47	+12 52.8	8.586	7.784	+0.13	-2.2	18.5	35.4
Sept. 3	07 45.58	+12 30.7	8.466	7.780	+0.08	-2.2	18.5	44.6
Sept. 13	07 46.15	+12 08.1	8.326	7.776	+0.02	-2.3	18.5	53.9
Sept. 23	07 46.07	+11 45.4	8.168	7.772	-0.05	-2.3	18.4	63.5
Oct. 3	07 45.22	+11 22.8	7.997	7.769	-0.13	-2.2	18.4	73.3
Oct. 13	07 43.51	+11 00.7	7.818	7.766	-0.22	-2.2	18.3	83.4
Oct. 23	07 40.83	+10 39.6	7.635	7.764	-0.32	-2.0	18.3	93.7
Nov. 2	07 37.12	+10 19.9	7.456	7.762	-0.43	-1.9	18.2	104.3
Nov. 12	07 32.34	+10 02.0	7.287	7.761	-0.54	-1.7	18.2	115.2
Nov. 22	07 26.48	+09 46.3	7.134	7.760	-0.64	-1.4	18.1	126.3
Dec. 2	07 19.64	+09 33.1	7.004	7.760	-0.73	-1.2	18.1	137.5
Dec. 12	07 11.93	+09 22.7	6.903	7.760	-0.81	-0.9	18.0	148.6
Dec. 22	07 03.57	+09 15.3	6.835	7.761	-0.86	-0.6	18.0	158.8
Jan. 1	06 54.83	+09 10.8	6.805	7.762	-0.88	-0.3	18.0	165.8
Jan. 11	06 46.01	+09 09.2	6.814	7.764	-0.87	0.0	18.0	164.0
Jan. 21	06 37.43	+09 10.3	6.861	7.766	-0.83	+0.2	18.0	155.3
Jan. 31	06 29.38	+09 13.7	6.944	7.769	-0.77	+0.4	18.1	144.7
Feb. 10	06 22.10	+09 19.0	7.060	7.772	-0.68	+0.6	18.1	133.5
Feb. 20	06 15.77	+09 25.7	7.201	7.776	-0.58	+0.7	18.1	122.4
Mar. 1	06 10.50	+09 33.3	7.363	7.780	-0.47	+0.8	18.2	111.4
Mar. 11	06 06.32	+09 41.3	7.539	7.785	-0.36	+0.8	18.3	100.7
Mar. 21	06 03.21	+09 49.3	7.721	7.790	-0.25	+0.8	18.3	90.3
Mar. 31	06 01.11	+09 56.8	7.904	7.796	-0.16	+0.7	18.4	80.1

## Comet 147P/Kushida-Muramatsu

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 7.01337 TT  
 Peri. = 348.51416 e = 0.2139353  
 Node = 91.67154 2000.0 a = 4.0188811 AU  
 Incl. = 2.30921 n = 0.12233376  
 q = 3.1591006 AU P = 8.06 years

H = 15.6 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	00 15.93	+00 37.6	3.534	3.471	+0.73	+5.4	78.3
Jan. 16	00 23.71	+00 19.6	3.660	3.455	+0.84	+6.1	70.3
Jan. 26	00 32.57	+01 22.9	3.779	3.439	+0.94	+6.6	62.6
Feb. 5	00 42.36	+02 31.2	3.890	3.423	+1.02	+7.1	55.2
Feb. 15	00 52.95	+03 43.3	3.990	3.408	+1.10	+7.4	47.9
Feb. 25	01 04.23	+04 58.2	4.078	3.393	+1.16	+7.6	40.9
Mar. 7	01 16.11	+06 15.1	4.153	3.378	+1.22	+7.8	34.1
Mar. 17	01 28.51	+07 32.9	4.215	3.364	+1.27	+7.8	27.5
Mar. 27	01 41.37	+08 50.9	4.262	3.350	+1.31	+7.8	21.0
Apr. 6	01 54.61	+10 08.1	4.294	3.336	+1.34	+7.7	14.7
Apr. 16	02 08.18	+11 23.9	4.312	3.323	+1.37	+7.5	8.5
Apr. 26	02 22.03	+12 37.6	4.315	3.310	+1.40	+7.2	2.6
May 6	02 36.12	+13 48.4	4.303	3.298	+1.42	+6.9	4.1
May 16	02 50.38	+14 55.8	4.276	3.286	+1.43	+6.5	10.0
May 26	03 04.76	+15 59.2	4.236	3.274	+1.44	+6.1	16.0
June 5	03 19.21	+16 58.2	4.182	3.263	+1.45	+5.6	22.0
June 15	03 33.65	+17 52.4	4.115	3.253	+1.44	+5.1	28.0
June 25	03 48.02	+18 41.4	4.035	3.243	+1.43	+4.6	34.0
July 5	04 02.21	+19 25.0	3.944	3.233	+1.41	+4.1	40.1
July 15	04 16.15	+20 03.2	3.842	3.224	+1.37	+3.5	46.3
July 25	04 29.71	+20 35.8	3.730	3.216	+1.33	+3.0	52.6
Aug. 4	04 42.75	+21 03.1	3.609	3.208	+1.27	+2.4	59.1
Aug. 14	04 55.14	+21 25.3	3.481	3.200	+1.20	+2.0	65.7
Aug. 24	05 06.71	+21 42.7	3.346	3.194	+1.10	+1.5	72.6
Sept. 3	05 17.26	+21 56.0	3.207	3.187	+0.99	+1.1	79.8
Sept. 13	05 26.58	+22 05.7	3.065	3.182	+0.86	+0.8	87.4
Sept. 23	05 34.44	+22 12.6	2.923	3.177	+0.70	+0.6	95.3
Oct. 3	05 40.60	+22 17.6	2.783	3.172	+0.51	+0.4	103.7
Oct. 13	05 44.82	+22 21.2	2.649	3.169	+0.30	+0.3	112.6
Oct. 23	05 46.86	+22 24.4	2.523	3.166	+0.08	+0.3	122.0
Nov. 2	05 46.59	+22 27.3	2.411	3.163	-0.16	+0.3	132.1
Nov. 12	05 43.98	+22 30.2	2.316	3.161	-0.38	+0.3	142.7
Nov. 22	05 39.22	+22 32.7	2.243	3.160	-0.58	+0.2	153.9
Dec. 2	05 32.74	+22 34.5	2.195	3.159	-0.72	+0.1	165.5
Dec. 12	05 25.21	+22 35.2	2.175	3.159	-0.78	0.0	177.3
Dec. 22	05 17.49	+22 34.9	2.185	3.160	-0.75	-0.1	170.7
Jan. 1	05 10.48	+22 34.2	2.224	3.161	-0.63	0.0	158.9
Jan. 11	05 04.93	+22 34.4	2.290	3.163	-0.45	+0.1	147.4
Jan. 21	05 01.40	+22 36.4	2.379	3.165	-0.23	+0.3	136.4
Jan. 31	05 00.17	+22 41.0	2.488	3.169	+0.01	+0.6	126.0
Feb. 10	05 01.31	+22 48.4	2.612	3.172	+0.24	+0.9	116.1
Feb. 20	05 04.73	+22 58.2	2.747	3.177	+0.46	+1.1	106.8
Mar. 1	05 10.24	+23 09.8	2.889	3.182	+0.66	+1.2	98.0
Mar. 11	05 17.60	+23 22.1	3.034	3.187	+0.83	+1.2	89.7
Mar. 21	05 26.59	+23 34.0	3.179	3.194	+0.98	+1.1	81.8
Mar. 31	05 36.97	+23 44.5	3.323	3.200	+1.11	+0.9	74.3

Comet 62P/Tsuchinshan

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 25.05204 TT  
 Peri. = 47.30450 e = 0.6247264  
 Node = 68.66476 2000.0 a = 3.3703703 AU  
 Incl. = 4.73747 n = 0.15928968  
 q = 1.2648110 AU P = 6.19 years

$$m1 = 6.2 + 5 \log(\Delta) + 35.0 \log(r(t-30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	22 27.36	-14° 00.4	4.017	3.444	+0.93 +6.2	.	48.5
Jan. 16	22 37.09	-12 55.6	4.068	3.387	+1.02 +6.8	.	40.9
Jan. 26	22 47.60	-11 45.8	4.103	3.328	+1.09 +7.2	.	33.6
Feb. 5	22 58.77	-10 31.4	4.120	3.268	+1.15 +7.7	.	26.5
Feb. 15	23 10.52	-09 13.0	4.120	3.207	+1.20 +8.1	.	19.7
Feb. 25	23 22.78	-07 50.8	4.102	3.145	+1.25 +8.4	.	13.1
Mar. 7	23 35.50	-06 25.4	4.065	3.083	+1.29 +8.7	.	6.9
Mar. 17	23 48.63	-04 57.2	4.011	3.019	+1.33 +9.0	.	3.4
Mar. 27	00 02.15	-03 26.6	3.940	2.954	+1.37 +9.2	.	7.4
Apr. 6	00 16.04	-01 54.1	3.853	2.888	+1.41 +9.3	.	13.1
Apr. 16	00 30.29	+00 20.1	3.751	2.821	+1.45 +9.5	.	18.9
Apr. 26	00 44.91	+01 15.0	3.635	2.753	+1.48 +9.5	.	24.6
May 6	00 59.92	+02 50.7	3.507	2.684	+1.52 +9.6	.	30.2
May 16	01 15.33	+04 26.5	3.368	2.614	+1.57 +9.6	.	35.6
May 26	01 31.18	+06 02.0	3.219	2.543	+1.61 +9.5	.	41.0
June 5	01 47.51	+07 36.6	3.062	2.471	+1.66 +9.4	.	46.2
June 15	02 04.36	+09 10.0	2.899	2.398	+1.72 +9.2	.	51.3
June 25	02 21.80	+10 41.5	2.730	2.325	+1.78 +9.0	.	56.3
July 5	02 39.89	+12 10.6	2.559	2.251	+1.85 +8.8	22.0	61.1
July 15	02 58.71	+13 36.8	2.386	2.177	+1.93 +8.4	21.4	65.8
July 25	03 18.34	+14 59.4	2.212	2.102	+2.01 +8.0	20.7	70.4
Aug. 4	03 38.90	+16 17.6	2.040	2.027	+2.11 +7.6	20.1	74.8
Aug. 14	04 00.50	+17 30.7	1.871	1.952	+2.22 +7.0	19.4	79.1
Aug. 24	04 23.29	+18 37.7	1.707	1.877	+2.35 +6.3	18.7	83.2
Sept. 3	04 47.41	+19 37.7	1.549	1.804	+2.49 +5.6	17.9	87.0
Sept. 13	05 13.08	+20 29.3	1.398	1.731	+2.66 +4.6	17.1	90.6
Sept. 23	05 40.46	+21 11.0	1.256	1.661	+2.84 +3.6	16.3	94.0
Oct. 3	06 09.78	+21 40.9	1.124	1.593	+3.05 +2.3	15.4	96.9
Oct. 13	06 41.24	+21 56.6	1.004	1.528	+3.27 +0.7	14.6	99.5
Oct. 23	07 14.93	+21 55.5	0.897	1.468	+3.49 -1.2	13.7	101.7
Nov. 2	07 50.83	+21 34.5	0.803	1.414	+3.71 -3.3	12.8	103.4
Nov. 12	08 28.67	+20 51.1	0.724	1.366	+3.87 -5.6	11.9	104.6
Nov. 22	09 07.74	+19 44.6	0.658	1.326	+3.94 -7.9	11.1	105.5
Dec. 2	09 47.04	+18 17.0	0.607	1.295	+3.89 -9.7	10.4	106.3
Dec. 12	10 25.20	+16 34.7	0.568	1.275	+3.69 -10.7	9.7	107.3
Dec. 22	11 00.70	+14 47.6	0.541	1.265	+3.35 -10.6	9.1	108.7
Jan. 1	11 32.25	+13 06.5	0.522	1.268	+2.89 -9.4	8.7	111.0
Jan. 11	11 58.70	+11 41.6	0.509	1.281	+2.33 -7.3	8.4	114.5
Jan. 21	12 19.16	+10 40.1	0.503	1.306	+1.70 -4.7	8.3	119.3
Jan. 31	12 33.15	+10 04.3	0.501	1.340	+1.03 -2.2	8.3	125.7
Feb. 10	12 40.42	+09 53.0	0.504	1.383	+0.36 0.0	8.5	133.6
Feb. 20	12 41.25	+09 59.3	0.516	1.434	-0.23 +1.2	8.8	142.9
Mar. 1	12 36.81	+10 12.3	0.539	1.491	-0.67 +1.2	9.3	153.1
Mar. 11	12 28.93	+10 20.5	0.576	1.553	-0.89 +0.1	9.9	162.9
Mar. 21	12 19.97	+10 13.5	0.631	1.619	-0.87 -1.8	10.7	168.6
Mar. 31	12 12.09	+09 46.8	0.704	1.688	-0.67 -3.7	11.5	164.6



## Comet 26P/Grigg-Skjellerup

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 25.35045 TT  
 Peri. = 2.15130 e = 0.6405630  
 Node = 211.54128 2000.0 a = 3.0154789 AU  
 Incl. = 22.43309 n = 0.18822167  
 q = 1.0838747 AU P = 5.24 years

H = 15.8 , G = 0.15  
 m1 = 13.5 + 5 log(Delta) + 10.0 log(r(t-10)) (r > 2.3AU)  
 (r < 2.3AU)

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	Mag.	Elong.
2023/24	h m	° '			m		°
Jan. 6	04 10.26	+01 09.0	2.688	3.429	-0.64 -0.1	21.4	132.4
Jan. 16	04 04.79	+01 14.2	2.748	3.374	-0.43 +1.2	21.4	122.0
Jan. 26	04 01.46	+01 31.9	2.823	3.318	-0.21 +2.4	21.5	111.8
Feb. 5	04 00.35	+01 59.6	2.907	3.260	+0.01 +3.2	21.6	102.1
Feb. 15	04 01.42	+02 34.8	2.995	3.201	+0.22 +3.9	21.6	92.9
Feb. 25	04 04.57	+03 15.4	3.083	3.141	+0.42 +4.3	21.7	84.2
Mar. 7	04 09.62	+03 59.0	3.166	3.080	+0.60 +4.5	21.7	76.0
Mar. 17	04 16.42	+04 43.8	3.242	3.017	+0.77 +4.5	21.7	68.2
Mar. 27	04 24.80	+05 28.3	3.307	2.953	+0.92 +4.4	21.7	60.8
Apr. 6	04 34.61	+06 10.8	3.361	2.887	+1.05 +4.1	21.6	53.9
Apr. 16	04 45.72	+06 50.2	3.401	2.820	+1.18 +3.7	21.5	47.4
Apr. 26	04 58.03	+07 25.2	3.427	2.752	+1.29 +3.2	21.5	41.3
May 6	05 11.44	+07 54.7	3.438	2.683	+1.40 +2.6	21.4	35.6
May 16	05 25.89	+08 17.8	3.434	2.612	+1.50 +1.9	21.3	30.3
May 26	05 41.31	+08 33.4	3.416	2.539	+1.59 +1.1	21.1	25.5
June 5	05 57.66	+08 40.5	3.383	2.466	+1.68 +0.2	21.0	21.4
June 15	06 14.91	+08 38.4	3.336	2.391	+1.77 -0.8	20.9	18.0
June 25	06 33.04	+08 26.0	3.276	2.314	+1.86 -1.8	20.7	15.7
July 5	06 52.03	+08 02.5	3.204	2.236	+1.95 -3.0	19.7	14.8
July 15	07 11.91	+07 27.1	3.122	2.158	+2.04 -4.2	19.5	15.2
July 25	07 32.69	+06 38.9	3.030	2.078	+2.13 -5.5	19.2	16.7
Aug. 4	07 54.39	+05 37.3	2.930	1.997	+2.22 -6.9	19.0	18.8
Aug. 14	08 17.09	+04 21.7	2.825	1.915	+2.33 -8.4	18.8	21.1
Aug. 24	08 40.87	+02 51.5	2.715	1.832	+2.44 -9.8	18.5	23.5
Sept. 3	09 05.82	+01 06.9	2.602	1.750	+2.57 -11.2	18.2	25.8
Sept. 13	09 32.11	+00 51.9	2.489	1.667	+2.71 -12.6	17.9	27.9
Sept. 23	09 59.90	-03 04.0	2.378	1.586	+2.87 -13.9	17.6	29.6
Oct. 3	10 29.40	-05 27.3	2.271	1.505	+3.05 -14.9	17.3	31.1
Oct. 13	11 00.85	-07 59.0	2.171	1.428	+3.26 -15.5	17.0	32.1
Oct. 23	11 34.50	-10 34.3	2.079	1.353	+3.49 -15.5	16.6	32.7
Nov. 2	12 10.54	-13 07.0	1.998	1.284	+3.74 -14.8	16.3	33.0
Nov. 12	12 49.12	-15 29.0	1.929	1.222	+4.00 -13.3	16.0	32.9
Nov. 22	13 30.17	-17 30.9	1.873	1.169	+4.23 -10.7	15.7	32.5
Dec. 2	14 13.36	-19 02.9	1.833	1.127	+4.42 -7.2	15.5	32.1
Dec. 12	14 58.09	-19 56.8	1.808	1.098	+4.52 -3.0	15.3	31.6
Dec. 22	15 43.42	-20 07.0	1.797	1.085	+4.52 +1.5	15.2	31.3
Jan. 1	16 28.29	-19 32.6	1.800	1.087	+4.42 +5.8	15.1	31.3
Jan. 11	17 11.68	-18 16.8	1.814	1.106	+4.22 +9.6	15.2	31.7
Jan. 21	17 52.78	-16 26.3	1.839	1.139	+3.96 +12.6	15.3	32.5
Jan. 31	18 31.07	-14 09.4	1.870	1.185	+3.66 +14.8	15.4	33.7
Feb. 10	19 06.34	-11 34.4	1.907	1.241	+3.36 +16.2	15.6	35.4
Feb. 20	19 38.57	-08 48.5	1.945	1.306	+3.06 +16.9	15.9	37.4
Mar. 1	20 07.87	-05 57.6	1.983	1.377	+2.78 +17.2	16.1	39.8
Mar. 11	20 34.46	-03 05.9	2.018	1.453	+2.52 +17.1	16.4	42.6
Mar. 21	20 58.51	+00 16.5	2.048	1.531	+2.27 +16.7	16.7	45.9
Mar. 31	21 20.20	+02 28.3	2.071	1.612	+2.05 +16.2	16.9	49.5

## Comet P/2018 P3 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 26.58972 TT  
 Peri. = 306.00079 e = 0.4171048  
 Node = 59.16085 2000.0 a = 3.0036132 AU  
 Incl. = 8.91462 n = 0.18933813  
 q = 1.7507917 AU P = 5.21 years

$$m1 = 10.0 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation		m1	Mot. /PA	Elong.
2023/24	h m	°			for T=+1 day				°
Jan. 6	17 07.17	-24 08.6	3.868	3.026	-0.60	+1.9	.	22.2/99	27.1
Jan. 16	17 23.28	-24 39.4	3.754	2.985	-0.64	+1.8	.	22.2/97	33.6
Jan. 26	17 39.45	-25 05.2	3.627	2.943	-0.68	+1.6	.	22.1/96	40.1
Feb. 5	17 55.58	-25 26.1	3.488	2.900	-0.73	+1.3	.	21.9/95	46.6
Feb. 15	18 11.58	-25 42.6	3.339	2.858	-0.78	+1.1	.	21.5/94	53.1
Feb. 25	18 27.35	-25 55.1	3.181	2.814	-0.84	+0.8	.	21.0/93	59.7
Mar. 7	18 42.74	-26 04.5	3.016	2.770	-0.90	+0.5	.	20.4/92	66.3
Mar. 17	18 57.65	-26 11.8	2.847	2.726	-0.97	+0.1	.	19.6/92	72.9
Mar. 27	19 11.92	-26 18.1	2.674	2.681	-1.05	-0.3	.	18.6/92	79.7
Apr. 6	19 25.38	-26 25.2	2.500	2.636	-1.15	-0.7	.	17.4/93	86.5
Apr. 16	19 37.87	-26 34.7	2.327	2.591	-1.25	-1.2	.	16.0/94	93.6
Apr. 26	19 49.15	-26 48.7	2.156	2.546	-1.37	-1.7	.	14.2/97	100.9
May 6	19 58.97	-27 09.6	1.991	2.500	-1.51	-2.3	.	12.2/102	108.4
May 16	20 07.03	-27 39.4	1.833	2.455	-1.67	-2.9	22.0	9.9/111	116.3
May 26	20 12.97	-28 20.6	1.685	2.409	-1.85	-3.5	21.6	7.8/128	124.6
June 5	20 16.41	-29 14.5	1.549	2.364	-2.06	-4.0	21.2	6.6/157	133.4
June 15	20 17.00	-30 21.3	1.429	2.319	-2.29	-4.4	20.8	7.5/191	142.5
June 25	20 14.44	-31 38.7	1.326	2.274	-2.52	-4.4	20.4	9.8/214	151.9
July 5	20 08.79	-33 01.5	1.245	2.230	-2.74	-3.9	20.1	12.3/228	160.7
July 15	20 00.47	-34 21.2	1.186	2.186	-2.92	-3.0	19.7	13.9/237	166.1
July 25	19 50.54	-35 28.3	1.150	2.144	-3.01	-1.7	19.4	13.7/246	163.4
Aug. 4	19 40.60	-36 14.4	1.137	2.102	-3.01	-0.3	19.2	11.7/254	155.2
Aug. 14	19 32.37	-36 35.8	1.145	2.062	-2.92	+0.8	18.9	8.1/265	145.4
Aug. 24	19 27.33	-36 32.9	1.171	2.022	-2.78	+1.5	18.8	3.8/293	135.7
Sept. 3	19 26.37	-36 09.3	1.211	1.985	-2.60	+1.7	18.6	3.8/27	126.6
Sept. 13	19 29.73	-35 29.0	1.261	1.950	-2.43	+1.3	18.5	8.5/55	118.1
Sept. 23	19 37.26	-34 34.7	1.320	1.916	-2.28	+0.6	18.4	13.4/63	110.4
Oct. 3	19 48.49	-33 27.8	1.383	1.885	-2.15	-0.4	18.3	17.9/66	103.4
Oct. 13	20 02.84	-32 08.4	1.449	1.857	-2.03	-1.5	18.2	21.9/67	97.0
Oct. 23	20 19.77	-30 36.0	1.518	1.831	-1.94	-2.8	18.1	25.5/67	91.1
Nov. 2	20 38.70	-28 50.1	1.589	1.809	-1.85	-4.1	18.1	28.5/67	85.7
Nov. 12	20 59.15	-26 50.2	1.660	1.790	-1.77	-5.3	18.1	31.0/66	80.7
Nov. 22	21 20.71	-24 36.4	1.732	1.775	-1.69	-6.5	18.0	33.2/65	76.0
Dec. 2	21 43.01	-22 09.3	1.805	1.763	-1.62	-7.6	18.1	35.0/64	71.6
Dec. 12	22 05.79	-19 30.0	1.879	1.755	-1.55	-8.5	18.1	36.5/63	67.4
Dec. 22	22 28.85	-16 40.1	1.954	1.751	-1.49	-9.3	18.1	37.6/62	63.4
Jan. 1	22 52.02	-13 41.7	2.030	1.751	-1.43	-9.9	18.2	38.4/62	59.6
Jan. 11	23 15.22	-10 37.0	2.108	1.756	-1.38	-10.4	18.3	39.0/61	55.8
Jan. 21	23 38.41	-07 28.6	2.187	1.764	-1.33	-10.6	18.5	39.3/61	52.1
Jan. 31	00 01.56	-04 18.9	2.268	1.776	-1.28	-10.7	18.6	39.4/61	48.5
Feb. 10	00 24.66	-01 10.3	2.349	1.791	-1.24	-10.6	18.8	39.4/62	44.9
Feb. 20	00 47.75	+01 54.8	2.432	1.811	-1.21	-10.3	19.0	39.1/62	41.3
Mar. 1	01 10.84	+04 54.2	2.514	1.833	-1.17	-10.0	19.2	38.7/63	37.7
Mar. 11	01 33.95	+07 46.1	2.597	1.859	-1.15	-9.5	19.5	38.2/64	34.1
Mar. 21	01 57.11	+10 28.8	2.678	1.888	-1.12	-8.9	19.7	37.6/65	30.4
Mar. 31	02 20.33	+13 00.7	2.758	1.919	-1.10	-8.3	20.0	36.9/67	26.7

Comet 226P/Pigott-LINEAR-Kowalski

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 27.27541 TT  
 Peri. = 341.07810 e = 0.5290336  
 Node = 54.01283 2000.0 a = 3.7661194 AU  
 Incl. = 44.04435 n = 0.13485372  
 q = 1.7737157 AU P = 7.31 years

$$m1 = 9.5 + 5 \log(\Delta) + 20.0 \log(r(t-30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	18 41.53	-48 24.8	4.188	3.335	+2.08 -2.1	.	26.3
Jan. 16	19 02.65	-48 44.9	4.107	3.283	+2.15 -1.8	.	29.2
Jan. 26	19 24.50	-49 02.0	4.012	3.231	+2.22 -1.5	.	33.0
Feb. 5	19 47.00	-49 16.0	3.905	3.178	+2.28 -1.2	.	37.4
Feb. 15	20 10.08	-49 26.8	3.787	3.125	+2.34 -0.9	.	42.1
Feb. 25	20 33.67	-49 34.5	3.660	3.071	+2.38 -0.6	.	46.9
Mar. 7	20 57.71	-49 39.4	3.527	3.017	+2.43 -0.4	.	51.9
Mar. 17	21 22.13	-49 41.9	3.388	2.962	+2.46 -0.1	22.0	56.8
Mar. 27	21 46.86	-49 42.7	3.246	2.908	+2.49 0.0	21.8	61.6
Apr. 6	22 11.85	-49 42.2	3.102	2.853	+2.51 +0.1	21.5	66.4
Apr. 16	22 37.02	-49 41.3	2.959	2.798	+2.53 +0.1	21.3	71.0
Apr. 26	23 02.31	-49 41.0	2.817	2.742	+2.53 0.0	21.0	75.4
May 6	23 27.60	-49 42.0	2.679	2.687	+2.53 -0.2	20.7	79.6
May 16	23 52.80	-49 45.5	2.546	2.632	+2.51 -0.5	20.5	83.6
May 26	00 17.75	-49 52.6	2.417	2.577	+2.47 -1.0	20.2	87.3
June 5	00 42.26	-50 04.5	2.296	2.522	+2.42 -1.5	19.9	90.8
June 15	01 06.12	-50 22.1	2.181	2.467	+2.34 -2.1	19.6	93.9
June 25	01 29.01	-50 47.1	2.072	2.413	+2.22 -2.9	19.3	96.8
July 5	01 50.59	-51 20.1	1.971	2.360	+2.07 -3.8	19.0	99.4
July 15	02 10.43	-52 02.2	1.876	2.307	+1.87 -4.8	18.7	101.7
July 25	02 27.98	-52 54.2	1.787	2.256	+1.60 -5.7	18.4	103.8
Aug. 4	02 42.58	-53 55.5	1.703	2.205	+1.27 -6.6	18.1	105.7
Aug. 14	02 53.44	-55 05.0	1.624	2.156	+0.84 -7.3	17.8	107.5
Aug. 24	02 59.53	-56 19.6	1.549	2.109	+0.30 -7.5	17.5	109.1
Sept. 3	02 59.73	-57 32.5	1.479	2.063	-0.35 -6.8	17.2	110.7
Sept. 13	02 52.93	-58 33.2	1.414	2.020	-1.10 -4.8	16.9	112.1
Sept. 23	02 38.45	-59 04.7	1.354	1.979	-1.86 -0.7	16.6	113.3
Oct. 3	02 17.07	-58 44.9	1.302	1.941	-2.43 +5.7	16.4	114.3
Oct. 13	01 51.52	-57 11.2	1.259	1.906	-2.62 +14.1	16.1	114.8
Oct. 23	01 26.10	-54 08.2	1.228	1.875	-2.37 +23.4	15.9	114.6
Nov. 2	01 04.76	-49 35.5	1.212	1.847	-1.82 +31.7	15.7	113.4
Nov. 12	00 49.47	-43 47.6	1.215	1.824	-1.18 +38.1	15.5	111.2
Nov. 22	00 40.44	-37 07.5	1.236	1.804	-0.58 +41.9	15.4	107.9
Dec. 2	00 36.89	-30 00.9	1.278	1.790	-0.10 +43.2	15.4	103.7
Dec. 12	00 37.74	-22 50.3	1.340	1.780	+0.29 +42.6	15.4	98.8
Dec. 22	00 42.09	-15 52.1	1.419	1.774	+0.60 +40.7	15.4	93.5
Jan. 1	00 49.18	-09 16.4	1.512	1.774	+0.84 +38.1	15.5	88.0
Jan. 11	00 58.46	-03 07.9	1.618	1.779	+1.03 +35.3	15.6	82.4
Jan. 21	01 09.58	+02 32.8	1.732	1.789	+1.20 +32.6	15.7	77.0
Jan. 31	01 22.24	+07 46.6	1.852	1.803	+1.34 +30.0	15.8	71.7
Feb. 10	01 36.28	+12 35.8	1.975	1.822	+1.48 +27.7	16.0	66.5
Feb. 20	01 51.60	+17 02.8	2.099	1.846	+1.60 +25.6	16.2	61.6
Mar. 1	02 08.14	+21 09.7	2.221	1.873	+1.72 +23.6	16.4	56.9
Mar. 11	02 25.87	+24 58.0	2.341	1.905	+1.84 +21.9	16.6	52.4
Mar. 21	02 44.82	+28 29.3	2.457	1.939	+1.96 +20.2	16.8	48.1
Mar. 31	03 04.98	+31 44.1	2.569	1.977	+2.08 +18.6	17.0	44.1

## Comet 326P/Hill

Epoch = 2023 June 25.0 TT  
 T = 2023 Dec. 30.49191 TT  
 Peri. = 278.64861 e = 0.3184667  
 Node = 99.80748 2000.0 a = 4.0638196 AU  
 Incl. = 2.47109 n = 0.12031020  
 q = 2.7696284 AU P = 8.19 years

$$m1 = 13.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.	
2023/24	h m	° ' "			m		°	
Jan. 6	20 03.05	-21 11.3	4.341	3.392	+1.47	+4.0	21.5	13.4
Jan. 16	20 17.86	-20 28.5	4.339	3.364	+1.49	+4.6	21.5	6.8
Jan. 26	20 32.79	-19 40.4	4.321	3.337	+1.50	+5.1	21.4	0.9
Feb. 5	20 47.76	-18 47.4	4.287	3.310	+1.49	+5.6	21.4	6.4
Feb. 15	21 02.68	-17 49.9	4.238	3.283	+1.49	+6.0	21.3	12.8
Feb. 25	21 17.48	-16 48.5	4.174	3.256	+1.47	+6.3	21.2	19.2
Mar. 7	21 32.11	-15 43.8	4.096	3.230	+1.45	+6.6	21.2	25.6
Mar. 17	21 46.49	-14 36.5	4.005	3.204	+1.42	+6.8	21.1	31.9
Mar. 27	22 00.58	-13 27.4	3.901	3.178	+1.39	+7.0	21.0	38.2
Apr. 6	22 14.31	-12 17.3	3.787	3.153	+1.35	+7.0	20.9	44.6
Apr. 16	22 27.62	-11 07.2	3.662	3.128	+1.31	+7.0	20.8	50.9
Apr. 26	22 40.45	-09 58.0	3.530	3.104	+1.25	+6.8	20.7	57.3
May 6	22 52.72	-08 50.8	3.390	3.081	+1.19	+6.6	20.5	63.8
May 16	23 04.34	-07 46.6	3.245	3.058	+1.12	+6.2	20.4	70.4
May 26	23 15.20	-06 46.7	3.095	3.035	+1.04	+5.7	20.3	77.2
June 5	23 25.18	-05 52.4	2.944	3.013	+0.94	+5.1	20.1	84.1
June 15	23 34.14	-05 04.9	2.792	2.992	+0.83	+4.3	20.0	91.3
June 25	23 41.90	-04 25.6	2.642	2.972	+0.70	+3.4	19.8	98.8
July 5	23 48.27	-03 56.1	2.495	2.952	+0.55	+2.4	19.7	106.7
July 15	23 53.04	-03 37.5	2.356	2.934	+0.38	+1.2	19.5	115.0
July 25	23 56.02	-03 31.2	2.226	2.916	+0.19	-0.1	19.4	123.8
Aug. 4	23 57.04	-03 37.8	2.109	2.899	-0.01	-1.4	19.2	133.1
Aug. 14	23 56.03	-03 57.1	2.008	2.883	-0.21	-2.6	19.1	143.0
Aug. 24	23 53.05	-04 28.0	1.927	2.867	-0.40	-3.6	19.0	153.4
Sept. 3	23 48.40	-05 07.5	1.869	2.853	-0.54	-4.3	18.9	164.2
Sept. 13	23 42.58	-05 51.4	1.837	2.840	-0.62	-4.4	18.9	174.6
Sept. 23	23 36.30	-06 34.5	1.831	2.828	-0.62	-4.0	18.8	171.7
Oct. 3	23 30.40	-07 11.1	1.852	2.817	-0.54	-3.1	18.8	160.8
Oct. 13	23 25.62	-07 36.9	1.899	2.807	-0.39	-1.9	18.9	149.8
Oct. 23	23 22.57	-07 48.9	1.968	2.798	-0.19	-0.4	18.9	139.2
Nov. 2	23 21.62	-07 45.7	2.056	2.790	+0.03	+1.2	19.0	129.1
Nov. 12	23 22.89	-07 27.3	2.160	2.784	+0.25	+2.6	19.1	119.5
Nov. 22	23 26.34	-06 54.7	2.275	2.779	+0.46	+4.0	19.2	110.4
Dec. 2	23 31.81	-06 09.2	2.398	2.775	+0.65	+5.2	19.3	101.9
Dec. 12	23 39.08	-05 12.4	2.527	2.772	+0.82	+6.3	19.4	93.8
Dec. 22	23 47.93	-04 05.7	2.658	2.770	+0.96	+7.2	19.5	86.1
Jan. 1	23 58.11	-02 50.7	2.788	2.770	+1.08	+7.9	19.7	78.7
Jan. 11	00 09.44	-01 28.9	2.917	2.770	+1.19	+8.5	19.8	71.7
Jan. 21	00 21.74	+00 01.6	3.043	2.772	+1.28	+9.0	19.8	64.9
Jan. 31	00 34.85	+01 29.7	3.163	2.776	+1.35	+9.3	19.9	58.4
Feb. 10	00 48.65	+03 03.9	3.276	2.780	+1.41	+9.5	20.0	52.0
Feb. 20	01 03.05	+04 39.8	3.383	2.786	+1.47	+9.6	20.1	45.8
Mar. 1	01 17.94	+06 16.2	3.480	2.793	+1.51	+9.6	20.2	39.8
Mar. 11	01 33.26	+07 52.0	3.569	2.801	+1.55	+9.5	20.2	33.9
Mar. 21	01 48.96	+09 26.1	3.648	2.810	+1.59	+9.3	20.3	28.2
Mar. 31	02 04.97	+10 57.7	3.717	2.820	+1.62	+9.0	20.4	22.5

## Comet C/2021 S4 (Tsuchinshan)

Epoch = 2023 June 25.0 TT  
 T = 2024 Jan. 1.88728 TT  
 Peri. = 72.82766  
 Node = 5.49500 2000.0  
 Incl. = 17.47965  
 q = 6.6899792 AU  
 e = 0.9593566

$$m1 = -9.8 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	02 20.09	+27 58.4	6.598	7.087	+0.03	-0.6	17.7	116.2
Jan. 16	02 20.89	+27 53.9	6.724	7.066	+0.14	-0.2	17.7	106.5
Jan. 26	02 22.72	+27 53.4	6.859	7.046	+0.24	+0.2	17.7	96.9
Feb. 5	02 25.55	+27 57.3	6.997	7.026	+0.33	+0.6	17.7	87.7
Feb. 15	02 29.30	+28 05.7	7.134	7.006	+0.42	+1.1	17.7	78.6
Feb. 25	02 33.92	+28 18.4	7.267	6.988	+0.51	+1.5	17.7	69.8
Mar. 7	02 39.31	+28 35.2	7.392	6.969	+0.58	+1.9	17.7	61.3
Mar. 17	02 45.39	+28 55.7	7.505	6.951	+0.64	+2.2	17.7	53.0
Mar. 27	02 52.07	+29 19.4	7.605	6.934	+0.70	+2.5	17.7	44.9
Apr. 6	02 59.26	+29 45.9	7.689	6.918	+0.74	+2.8	17.7	37.1
Apr. 16	03 06.89	+30 14.6	7.755	6.901	+0.78	+3.0	17.7	29.7
Apr. 26	03 14.87	+30 45.2	7.802	6.886	+0.81	+3.1	17.7	22.8
May 6	03 23.13	+31 17.2	7.830	6.871	+0.84	+3.3	17.7	16.8
May 16	03 31.58	+31 50.3	7.838	6.856	+0.85	+3.4	17.7	12.9
May 26	03 40.15	+32 24.1	7.825	6.842	+0.86	+3.4	17.6	13.1
June 5	03 48.76	+32 58.3	7.792	6.829	+0.86	+3.4	17.6	17.1
June 15	03 57.34	+33 32.8	7.740	6.816	+0.85	+3.5	17.6	23.0
June 25	04 05.79	+34 07.4	7.669	6.804	+0.84	+3.5	17.5	29.6
July 5	04 14.04	+34 42.0	7.580	6.793	+0.81	+3.5	17.5	36.7
July 15	04 21.98	+35 16.5	7.475	6.782	+0.77	+3.5	17.4	44.1
July 25	04 29.53	+35 51.0	7.355	6.771	+0.73	+3.4	17.4	51.6
Aug. 4	04 36.57	+36 25.4	7.223	6.762	+0.67	+3.4	17.3	59.3
Aug. 14	04 43.00	+36 59.7	7.079	6.753	+0.60	+3.4	17.3	67.3
Aug. 24	04 48.69	+37 34.0	6.928	6.744	+0.52	+3.4	17.2	75.4
Sept. 3	04 53.55	+38 08.1	6.772	6.736	+0.43	+3.4	17.1	83.7
Sept. 13	04 57.44	+38 41.9	6.615	6.729	+0.33	+3.3	17.1	92.2
Sept. 23	05 00.26	+39 15.0	6.459	6.722	+0.22	+3.3	17.0	100.9
Oct. 3	05 01.93	+39 47.0	6.310	6.716	+0.10	+3.1	16.9	109.9
Oct. 13	05 02.39	+40 17.2	6.170	6.711	-0.02	+2.9	16.9	119.0
Oct. 23	05 01.63	+40 44.6	6.044	6.706	-0.14	+2.6	16.8	128.2
Nov. 2	04 59.72	+41 08.3	5.937	6.702	-0.25	+2.1	16.8	137.4
Nov. 12	04 56.79	+41 27.1	5.852	6.698	-0.34	+1.6	16.8	146.3
Nov. 22	04 53.05	+41 40.0	5.792	6.695	-0.41	+0.9	16.7	154.2
Dec. 2	04 48.81	+41 46.4	5.760	6.693	-0.44	+0.3	16.7	159.7
Dec. 12	04 44.41	+41 46.1	5.756	6.691	-0.43	-0.4	16.7	160.3
Dec. 22	04 40.22	+41 39.5	5.782	6.690	-0.39	-1.0	16.7	155.6
Jan. 1	04 36.61	+41 27.5	5.836	6.690	-0.32	-1.4	16.7	148.0
Jan. 11	04 33.84	+41 11.5	5.916	6.690	-0.22	-1.8	16.8	139.1
Jan. 21	04 32.16	+40 52.9	6.018	6.691	-0.10	-1.9	16.8	129.8
Jan. 31	04 31.69	+40 33.3	6.140	6.693	+0.02	-2.0	16.8	120.4
Feb. 10	04 32.48	+40 13.9	6.277	6.695	+0.15	-1.9	16.9	111.0
Feb. 20	04 34.56	+39 55.7	6.424	6.698	+0.28	-1.7	17.0	101.8
Mar. 1	04 37.85	+39 39.5	6.578	6.701	+0.39	-1.5	17.0	92.9
Mar. 11	04 42.27	+39 25.5	6.734	6.705	+0.50	-1.3	17.1	84.1
Mar. 21	04 47.72	+39 13.9	6.888	6.710	+0.60	-1.0	17.1	75.6
Mar. 31	04 54.09	+39 04.5	7.037	6.715	+0.68	-0.8	17.2	67.3

Comet 311P/PANSTARRS

Epoch = 2023 June 25.0 TT  
 T = 2024 Jan. 2.36587 TT  
 Peri. = 144.40781 e = 0.1159375  
 Node = 279.20325 2000.0 a = 2.1886451 AU  
 Incl. = 4.96954 n = 0.30439747  
 q = 1.9348991 AU P = 3.24 years

H = 18.0 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	19 54.04	-19 28.9	3.254	2.300	+2.04 +6.5	.	11.8
Jan. 16	20 14.38	-18 19.7	3.262	2.288	+2.03 +7.5	.	6.6
Jan. 26	20 34.62	-17 01.0	3.260	2.276	+2.02 +8.4	.	2.1
Feb. 5	20 54.70	-15 33.5	3.246	2.264	+2.00 +9.2	.	4.2
Feb. 15	21 14.56	-13 57.9	3.221	2.251	+1.97 +10.0	.	9.1
Feb. 25	21 34.20	-12 14.7	3.185	2.238	+1.95 +10.7	.	14.1
Mar. 7	21 53.58	-10 25.1	3.140	2.225	+1.92 +11.3	.	19.0
Mar. 17	22 12.71	-08 29.8	3.085	2.212	+1.90 +11.8	.	23.9
Mar. 27	22 31.58	-06 29.6	3.021	2.199	+1.87 +12.2	.	28.7
Apr. 6	22 50.20	-04 25.8	2.949	2.185	+1.85 +12.6	.	33.5
Apr. 16	23 08.57	-02 19.0	2.869	2.172	+1.83 +12.8	.	38.3
Apr. 26	23 26.72	+00 10.4	2.782	2.158	+1.80 +12.9	.	43.0
May 6	23 44.64	+01 59.2	2.689	2.145	+1.78 +13.0	.	47.7
May 16	00 02.33	+04 08.7	2.590	2.131	+1.76 +12.9	.	52.5
May 26	00 19.79	+06 17.2	2.487	2.118	+1.73 +12.8	.	57.2
June 5	00 36.99	+08 23.7	2.379	2.104	+1.70 +12.5	.	62.1
June 15	00 53.90	+10 27.3	2.268	2.091	+1.67 +12.2	.	67.0
June 25	01 10.44	+12 27.1	2.154	2.078	+1.63 +11.7	.	72.0
July 5	01 26.51	+14 22.0	2.038	2.066	+1.58 +11.2	.	77.2
July 15	01 41.98	+16 11.3	1.921	2.053	+1.51 +10.6	.	82.5
July 25	01 56.66	+17 53.9	1.804	2.041	+1.41 +9.9	.	88.1
Aug. 4	02 10.29	+19 28.9	1.688	2.030	+1.29 +9.0	22.0	94.1
Aug. 14	02 22.56	+20 55.4	1.573	2.019	+1.14 +8.1	21.8	100.4
Aug. 24	02 33.04	+22 12.0	1.461	2.008	+0.93 +7.1	21.6	107.2
Sept. 3	02 41.27	+23 17.4	1.355	1.998	+0.68 +5.9	21.4	114.6
Sept. 13	02 46.71	+24 09.7	1.255	1.989	+0.37 +4.4	21.1	122.7
Sept. 23	02 48.83	+24 45.8	1.165	1.980	+0.01 +2.6	20.9	131.7
Oct. 3	02 47.28	+25 02.4	1.088	1.972	-0.36 +0.4	20.6	141.5
Oct. 13	02 42.05	+24 55.6	1.026	1.964	-0.71 -2.1	20.3	152.0
Oct. 23	02 33.75	+24 22.7	0.985	1.958	-0.95 -4.7	20.0	162.8
Nov. 2	02 23.75	+23 25.3	0.965	1.952	-1.03 -6.9	19.8	171.0
Nov. 12	02 13.82	+22 10.3	0.970	1.947	-0.92 -8.1	19.9	166.8
Nov. 22	02 05.78	+20 49.3	0.998	1.943	-0.64 -7.9	20.2	156.2
Dec. 2	02 00.93	+19 34.9	1.047	1.939	-0.28 -6.7	20.4	145.1
Dec. 12	01 59.84	+18 36.3	1.114	1.937	+0.10 -4.8	20.7	134.7
Dec. 22	02 02.59	+17 58.3	1.195	1.935	+0.47 -2.6	21.0	125.1
Jan. 1	02 08.84	+17 41.4	1.287	1.935	+0.80 -0.6	21.2	116.3
Jan. 11	02 18.13	+17 43.4	1.387	1.935	+1.08 +1.1	21.4	108.2
Jan. 21	02 30.04	+18 01.0	1.493	1.936	+1.32 +2.5	21.6	100.8
Jan. 31	02 44.13	+18 30.2	1.602	1.939	+1.51 +3.4	21.8	94.0
Feb. 10	03 00.05	+19 07.2	1.713	1.942	+1.68 +4.0	21.9	87.7
Feb. 20	03 17.54	+19 48.4	1.824	1.946	+1.82 +4.2	.	81.7
Mar. 1	03 36.32	+20 30.5	1.935	1.950	+1.94 +4.1	.	76.1
Mar. 11	03 56.20	+21 10.5	2.044	1.956	+2.04 +3.8	.	70.8
Mar. 21	04 17.01	+21 46.1	2.150	1.962	+2.12 +3.2	.	65.7
Mar. 31	04 38.57	+22 15.1	2.254	1.970	+2.19 +2.5	.	60.8

Comet 216P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2024 Jan. 6.84534 TT  
 Peri. = 151.72065 e = 0.4485232  
 Node = 359.79879 2000.0 a = 3.8572016 AU  
 Incl. = 9.06334 n = 0.13010547  
 q = 2.1271572 AU P = 7.58 years

$$m1 = 5.0 + 5 \log(\Delta) + 37.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .			m		°
Jan. 6	02 01.25	+21 14.8	2.852	3.324	+0.15 -0.6	.	110.3
Jan. 16	02 03.71	+21 13.4	2.951	3.281	+0.36 +0.4	.	100.8
Jan. 26	02 08.24	+21 22.3	3.054	3.237	+0.56 +1.4	.	91.7
Feb. 5	02 14.66	+21 40.8	3.157	3.193	+0.74 +2.3	.	83.2
Feb. 15	02 22.80	+22 07.7	3.256	3.149	+0.90 +3.1	.	75.1
Feb. 25	02 32.50	+22 41.7	3.349	3.105	+1.05 +3.7	.	67.4
Mar. 7	02 43.59	+23 21.4	3.433	3.061	+1.18 +4.2	.	60.1
Mar. 17	02 55.96	+24 05.1	3.508	3.017	+1.30 +4.5	.	53.1
Mar. 27	03 09.51	+24 51.5	3.572	2.974	+1.42 +4.7	.	46.4
Apr. 6	03 24.13	+25 39.0	3.624	2.930	+1.52 +4.7	.	40.1
Apr. 16	03 39.75	+26 26.1	3.663	2.886	+1.61 +4.6	.	34.0
Apr. 26	03 56.31	+27 11.5	3.690	2.843	+1.70 +4.4	.	28.1
May 6	04 13.74	+27 53.7	3.704	2.800	+1.79 +4.0	.	22.6
May 16	04 31.98	+28 31.6	3.706	2.757	+1.87 +3.5	.	17.3
May 26	04 50.98	+29 03.9	3.695	2.715	+1.94 +2.9	.	12.5
June 5	05 10.66	+29 29.5	3.673	2.674	+2.00 +2.1	.	8.5
June 15	05 30.96	+29 47.2	3.639	2.632	+2.06 +1.3	.	6.5
June 25	05 51.79	+29 56.2	3.595	2.592	+2.11 +0.4	.	8.0
July 5	06 13.06	+29 55.6	3.541	2.553	+2.15 -0.6	.	11.6
July 15	06 34.68	+29 44.9	3.477	2.514	+2.18 -1.7	.	15.8
July 25	06 56.54	+29 23.5	3.405	2.477	+2.20 -2.7	.	20.2
Aug. 4	07 18.54	+28 51.2	3.325	2.441	+2.20 -3.8	.	24.7
Aug. 14	07 40.56	+28 07.9	3.239	2.406	+2.20 -4.9	21.8	29.2
Aug. 24	08 02.51	+27 13.9	3.146	2.372	+2.19 -6.0	21.6	33.7
Sept. 3	08 24.27	+26 09.6	3.047	2.340	+2.16 -7.0	21.3	38.3
Sept. 13	08 45.76	+24 55.7	2.943	2.310	+2.13 -7.9	21.0	42.9
Sept. 23	09 06.88	+23 32.9	2.836	2.281	+2.09 -8.7	20.7	47.5
Oct. 3	09 27.55	+22 02.4	2.724	2.255	+2.04 -9.4	20.4	52.3
Oct. 13	09 47.70	+20 25.3	2.610	2.231	+1.98 -10.0	20.2	57.1
Oct. 23	10 07.22	+18 43.2	2.493	2.209	+1.91 -10.4	19.9	62.0
Nov. 2	10 26.03	+16 57.5	2.375	2.189	+1.84 -10.7	19.6	67.1
Nov. 12	10 44.04	+15 09.9	2.256	2.172	+1.75 -10.8	19.4	72.4
Nov. 22	11 01.09	+13 22.1	2.137	2.158	+1.65 -10.7	19.2	77.9
Dec. 2	11 17.05	+11 36.1	2.018	2.146	+1.53 -10.4	19.0	83.7
Dec. 12	11 31.73	+09 53.5	1.901	2.137	+1.39 -10.0	18.8	89.8
Dec. 22	11 44.85	+08 16.4	1.786	2.131	+1.22 -9.3	18.6	96.3
Jan. 1	11 56.17	+06 46.5	1.675	2.128	+1.02 -8.5	18.4	103.2
Jan. 11	12 05.32	+05 25.4	1.570	2.127	+0.78 -7.6	18.3	110.7
Jan. 21	12 11.95	+04 14.8	1.472	2.130	+0.51 -6.4	18.2	118.9
Jan. 31	12 15.72	+03 15.6	1.385	2.136	+0.21 -5.3	18.1	127.8
Feb. 10	12 16.38	+02 28.4	1.311	2.144	-0.11 -4.0	18.0	137.5
Feb. 20	12 13.91	+01 53.0	1.253	2.155	-0.41 -3.0	18.0	147.9
Mar. 1	12 08.66	+01 27.7	1.215	2.169	-0.65 -2.1	18.0	159.0
Mar. 11	12 01.40	+01 09.7	1.200	2.186	-0.79 -1.5	18.1	170.6
Mar. 21	11 53.30	+00 55.0	1.210	2.205	-0.80 -1.5	18.3	177.6
Mar. 31	11 45.69	+00 39.2	1.244	2.227	-0.69 -1.8	18.5	166.0

Comet 144P/Kushida

Epoch = 2023 June 25.0 TT  
 T = 2024 Jan. 25.62288 TT  
 Peri. = 216.33910 e = 0.6350338  
 Node = 242.93318 2000.0 a = 3.8317617 AU  
 Incl. = 3.93067 n = 0.13140332  
 q = 1.3984635 AU P = 7.50 years

$$m1 = 7.5 + 5 \log(\Delta) + 20.0 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' .			m		°
Jan. 6	21 36.60	-10 46.5	4.425	3.699	+1.00 +4.5	.	38.0
Jan. 16	21 46.90	-09 58.4	4.455	3.641	+1.06 +5.1	.	30.5
Jan. 26	21 57.78	-09 04.6	4.466	3.582	+1.11 +5.7	.	23.2
Feb. 5	22 09.12	-08 05.3	4.459	3.522	+1.16 +6.2	.	16.1
Feb. 15	22 20.86	-07 01.1	4.433	3.462	+1.19 +6.7	.	9.3
Feb. 25	22 32.93	-05 52.2	4.387	3.400	+1.22 +7.1	.	3.6
Mar. 7	22 45.26	-04 39.2	4.324	3.338	+1.25 +7.5	21.9	5.7
Mar. 17	22 57.82	-03 22.5	4.242	3.275	+1.27 +7.9	21.7	11.8
Mar. 27	23 10.57	-02 02.5	4.144	3.211	+1.28 +8.2	21.5	18.1
Apr. 6	23 23.47	+00 39.6	4.029	3.146	+1.30 +8.4	21.3	24.4
Apr. 16	23 36.50	+00 45.5	3.900	3.080	+1.31 +8.6	21.1	30.7
Apr. 26	23 49.64	+02 12.6	3.758	3.014	+1.32 +8.8	20.8	36.8
May 6	00 02.88	+03 40.9	3.605	2.947	+1.33 +8.9	20.6	42.9
May 16	00 16.20	+05 10.2	3.441	2.879	+1.34 +9.0	20.3	48.9
May 26	00 29.59	+06 39.9	3.268	2.810	+1.34 +9.0	20.0	54.8
June 5	00 43.01	+08 09.3	3.089	2.740	+1.34 +8.9	19.7	60.8
June 15	00 56.47	+09 38.0	2.904	2.670	+1.35 +8.8	19.4	66.7
June 25	01 09.91	+11 05.4	2.716	2.600	+1.34 +8.6	19.1	72.6
July 5	01 23.29	+12 30.8	2.526	2.529	+1.33 +8.4	18.7	78.5
July 15	01 36.56	+13 53.7	2.335	2.457	+1.32 +8.1	18.3	84.5
July 25	01 49.63	+15 13.0	2.146	2.385	+1.29 +7.7	17.9	90.7
Aug. 4	02 02.37	+16 28.1	1.960	2.313	+1.25 +7.2	17.5	96.9
Aug. 14	02 14.64	+17 38.1	1.779	2.240	+1.19 +6.7	17.0	103.3
Aug. 24	02 26.22	+18 41.6	1.604	2.168	+1.11 +5.9	16.6	109.9
Sept. 3	02 36.84	+19 37.4	1.437	2.097	+1.00 +5.1	16.1	116.9
Sept. 13	02 46.17	+20 23.8	1.280	2.025	+0.85 +4.0	15.6	124.2
Sept. 23	02 53.78	+20 58.5	1.135	1.955	+0.65 +2.7	15.1	132.1
Oct. 3	02 59.26	+21 19.0	1.003	1.886	+0.41 +1.2	14.5	140.5
Oct. 13	03 02.17	+21 22.2	0.887	1.819	+0.14 -0.8	14.0	149.7
Oct. 23	03 02.26	+21 04.6	0.787	1.754	-0.14 -3.0	13.4	159.6
Nov. 2	02 59.76	+20 24.3	0.706	1.692	-0.37 -5.3	12.9	170.1
Nov. 12	02 55.46	+19 22.0	0.645	1.634	-0.48 -7.3	12.4	176.8
Nov. 22	02 50.89	+18 04.2	0.603	1.580	-0.39 -8.2	11.9	166.5
Dec. 2	02 48.08	+16 43.0	0.579	1.532	-0.11 -7.8	11.5	155.4
Dec. 12	02 48.80	+15 32.5	0.571	1.490	+0.32 -6.0	11.2	145.1
Dec. 22	02 54.37	+14 44.3	0.576	1.454	+0.85 -3.3	10.9	136.0
Jan. 1	03 05.27	+14 23.8	0.592	1.427	+1.38 -0.5	10.6	128.2
Jan. 11	03 21.32	+14 29.8	0.616	1.409	+1.87 +1.9	10.4	121.7
Jan. 21	03 42.03	+14 56.8	0.648	1.399	+2.30 +3.6	10.3	116.5
Jan. 31	04 06.61	+15 36.4	0.689	1.400	+2.64 +4.3	10.2	112.3
Feb. 10	04 34.15	+16 19.6	0.737	1.410	+2.88 +4.2	10.1	108.9
Feb. 20	05 03.80	+16 58.2	0.796	1.429	+3.04 +3.3	10.1	105.9
Mar. 1	05 34.61	+17 25.2	0.864	1.457	+3.11 +1.9	10.2	103.3
Mar. 11	06 05.77	+17 36.5	0.944	1.492	+3.11 +0.2	10.3	100.8
Mar. 21	06 36.66	+17 29.9	1.035	1.535	+3.05 -1.7	10.5	98.2
Mar. 31	07 06.73	+17 05.3	1.137	1.584	+2.95 -3.4	10.8	95.5



Comet 207P/NEAT

Epoch = 2023 June 25.0 TT  
 T = 2024 Jan. 31.80843 TT  
 Peri. = 273.00540 e = 0.7583824  
 Node = 198.16013 2000.0 a = 3.8815608 AU  
 Incl. = 10.20165 n = 0.12888266  
 q = 0.9378534 AU P = 7.65 years

$$m1 = 15.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	21 27.47	-08 10.9	4.815	4.073	+0.87 +2.9	.	37.0
Jan. 16	21 36.49	-07 38.9	4.839	4.010	+0.93 +3.5	.	29.3
Jan. 26	21 46.04	-07 01.2	4.843	3.945	+0.98 +4.1	.	21.7
Feb. 5	21 56.02	-06 18.0	4.826	3.879	+1.02 +4.6	.	14.6
Feb. 15	22 06.35	-05 29.9	4.787	3.813	+1.05 +5.1	.	8.3
Feb. 25	22 16.96	-04 37.2	4.728	3.745	+1.07 +5.5	.	5.8
Mar. 7	22 27.77	-03 40.6	4.648	3.675	+1.09 +5.9	.	10.2
Mar. 17	22 38.73	-02 40.5	4.548	3.605	+1.10 +6.2	.	16.5
Mar. 27	22 49.79	-01 37.3	4.429	3.533	+1.11 +6.5	.	23.2
Apr. 6	23 00.89	+00 31.7	4.292	3.461	+1.11 +6.7	.	29.9
Apr. 16	23 11.99	+00 35.9	4.139	3.386	+1.11 +6.8	.	36.6
Apr. 26	23 23.05	+01 44.8	3.971	3.311	+1.10 +6.9	.	43.3
May 6	23 34.02	+02 54.4	3.790	3.234	+1.09 +7.0	.	49.9
May 16	23 44.86	+04 04.3	3.598	3.156	+1.07 +7.0	.	56.6
May 26	23 55.50	+05 13.6	3.396	3.076	+1.05 +6.9	.	63.3
June 5	00 05.88	+06 21.5	3.186	2.995	+1.02 +6.7	.	70.0
June 15	00 15.93	+07 27.4	2.972	2.912	+0.98 +6.4	.	76.8
June 25	00 25.52	+08 30.1	2.753	2.828	+0.93 +6.1	.	83.7
July 5	00 34.55	+09 28.4	2.534	2.743	+0.87 +5.5	21.9	90.8
July 15	00 42.84	+10 21.0	2.315	2.656	+0.78 +4.9	21.6	98.0
July 25	00 50.17	+11 06.0	2.100	2.567	+0.67 +4.0	21.2	105.6
Aug. 4	00 56.27	+11 41.0	1.890	2.476	+0.53 +2.9	20.8	113.5
Aug. 14	01 00.82	+12 03.1	1.689	2.384	+0.35 +1.3	20.4	121.9
Aug. 24	01 03.38	+12 08.1	1.498	2.291	+0.13 -0.6	20.0	130.8
Sept. 3	01 03.50	+11 50.9	1.321	2.195	-0.14 -3.2	19.5	140.5
Sept. 13	01 00.71	+11 05.3	1.160	2.099	-0.46 -6.4	19.0	151.1
Sept. 23	00 54.65	+09 44.5	1.020	2.001	-0.79 -10.2	18.6	162.7
Oct. 3	00 45.32	+07 43.6	0.902	1.901	-1.10 -14.4	18.1	175.0
Oct. 13	00 33.31	+05 02.3	0.809	1.801	-1.30 -18.1	17.6	170.5
Oct. 23	00 20.01	+01 49.6	0.740	1.699	-1.32 -20.3	17.1	156.3
Nov. 2	00 07.47	-01 35.9	0.694	1.598	-1.13 -20.4	16.7	142.1
Nov. 12	23 57.76	-04 52.7	0.665	1.497	-0.74 -18.5	16.4	128.4
Nov. 22	23 52.60	-07 43.4	0.646	1.397	-0.23 -15.3	16.0	116.0
Dec. 2	23 52.86	-10 00.5	0.629	1.300	+0.34 -11.9	15.6	105.0
Dec. 12	23 58.76	-11 44.9	0.610	1.208	+0.90 -8.8	15.2	95.5
Dec. 22	00 10.27	-13 01.7	0.584	1.123	+1.45 -6.5	14.8	87.6
Jan. 1	00 27.13	-13 59.4	0.547	1.049	+1.97 -5.1	14.4	81.2
Jan. 11	00 49.30	-14 46.8	0.499	0.991	+2.52 -4.5	14.0	76.2
Jan. 21	01 17.35	-15 31.4	0.442	0.953	+3.18 -4.6	13.5	72.9
Jan. 31	01 52.91	-16 18.3	0.379	0.938	+4.10 -4.7	13.1	71.7
Feb. 10	02 40.18	-16 59.9	0.315	0.949	+5.65 -2.8	12.8	73.8
Feb. 20	03 47.32	-16 58.8	0.258	0.983	+8.19 +5.5	12.5	81.3
Mar. 1	05 21.99	-14 40.9	0.223	1.039	+10.78 +25.7	12.4	96.2
Mar. 11	07 10.95	-08 59.6	0.228	1.110	+10.29 +40.1	12.7	115.3
Mar. 21	08 40.91	-02 45.9	0.278	1.193	+7.30 +31.2	13.5	129.7
Mar. 31	09 41.81	+01 23.6	0.364	1.284	+4.81 +17.8	14.4	135.5

Comet 194P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2024 Feb. 4.12352 TT  
 Peri. = 128.51295 e = 0.5636689  
 Node = 349.54811 2000.0 a = 4.1244007 AU  
 Incl. = 11.80876 n = 0.11766920  
 q = 1.7996043 AU P = 8.38 years

$$m1 = 12.5 + 5 \log(\Delta) + 15.0 \log(r(t-90))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	23 18.40	-01 28.6	3.947	3.640	+0.72	+5.4	.	64.8
Jan. 16	23 26.03	+00 31.4	4.030	3.586	+0.82	+6.1	.	56.8
Jan. 26	23 34.65	+00 32.6	4.099	3.533	+0.91	+6.8	.	49.0
Feb. 5	23 44.13	+01 42.8	4.154	3.479	+0.99	+7.3	.	41.6
Feb. 15	23 54.36	+02 58.5	4.194	3.424	+1.06	+7.9	.	34.3
Feb. 25	00 05.27	+04 19.1	4.217	3.369	+1.13	+8.3	.	27.3
Mar. 7	00 16.78	+05 44.1	4.224	3.314	+1.18	+8.7	.	20.6
Mar. 17	00 28.83	+07 12.8	4.213	3.258	+1.23	+9.1	.	14.2
Mar. 27	00 41.39	+08 44.8	4.186	3.201	+1.28	+9.3	.	8.2
Apr. 6	00 54.41	+10 19.4	4.142	3.145	+1.33	+9.6	.	4.2
Apr. 16	01 07.88	+11 56.0	4.082	3.088	+1.37	+9.8	.	6.8
Apr. 26	01 21.78	+13 34.3	4.007	3.031	+1.41	+9.9	.	12.1
May 6	01 36.10	+15 13.7	3.918	2.973	+1.46	+10.0	.	17.8
May 16	01 50.86	+16 53.6	3.816	2.916	+1.50	+10.0	.	23.4
May 26	02 06.05	+18 33.7	3.702	2.858	+1.54	+10.0	.	29.0
June 5	02 21.66	+20 13.4	3.577	2.800	+1.59	+9.9	.	34.5
June 15	02 37.73	+21 52.2	3.443	2.742	+1.63	+9.8	.	39.9
June 25	02 54.25	+23 29.7	3.301	2.685	+1.68	+9.7	.	45.3
July 5	03 11.22	+25 05.5	3.152	2.627	+1.72	+9.5	.	50.6
July 15	03 28.64	+26 39.0	2.998	2.570	+1.77	+9.2	.	55.9
July 25	03 46.49	+28 10.0	2.840	2.513	+1.81	+8.9	22.0	61.2
Aug. 4	04 04.75	+29 38.1	2.680	2.457	+1.85	+8.6	21.7	66.4
Aug. 14	04 23.37	+31 03.0	2.518	2.401	+1.88	+8.3	21.5	71.7
Aug. 24	04 42.27	+32 24.6	2.356	2.347	+1.90	+8.0	21.2	77.1
Sept. 3	05 01.35	+33 42.8	2.196	2.293	+1.91	+7.6	20.9	82.5
Sept. 13	05 20.48	+34 58.0	2.039	2.241	+1.91	+7.4	20.6	87.9
Sept. 23	05 39.44	+36 10.4	1.886	2.190	+1.88	+7.1	20.3	93.6
Oct. 3	05 57.99	+37 20.7	1.738	2.141	+1.82	+7.0	20.0	99.3
Oct. 13	06 15.81	+38 29.9	1.597	2.094	+1.72	+6.9	19.7	105.3
Oct. 23	06 32.45	+39 38.9	1.464	2.050	+1.58	+6.9	19.3	111.5
Nov. 2	06 47.41	+40 48.4	1.340	2.008	+1.38	+7.0	19.0	118.0
Nov. 12	07 00.07	+41 58.9	1.227	1.969	+1.11	+7.1	18.7	124.9
Nov. 22	07 09.70	+43 09.2	1.127	1.933	+0.77	+6.9	18.3	132.0
Dec. 2	07 15.67	+44 15.7	1.041	1.901	+0.37	+6.2	18.0	139.3
Dec. 12	07 17.46	+45 12.1	0.971	1.873	-0.06	+4.7	17.7	146.5
Dec. 22	07 15.12	+45 48.1	0.918	1.849	-0.43	+2.0	17.4	152.7
Jan. 1	07 09.63	+45 52.4	0.885	1.829	-0.66	-1.7	17.2	156.5
Jan. 11	07 02.81	+45 16.8	0.871	1.814	-0.67	-5.9	17.0	156.2
Jan. 21	06 57.03	+44 00.0	0.877	1.805	-0.44	-9.7	16.9	151.8
Jan. 31	06 54.29	+42 08.9	0.901	1.800	-0.06	-12.6	16.8	145.2
Feb. 10	06 55.60	+39 54.7	0.943	1.800	+0.37	-14.3	16.8	137.7
Feb. 20	07 01.16	+37 28.1	1.002	1.806	+0.77	-15.0	16.8	130.3
Mar. 1	07 10.47	+34 57.4	1.073	1.817	+1.11	-15.1	16.8	123.3
Mar. 11	07 22.80	+32 26.9	1.158	1.832	+1.37	-15.0	16.9	116.6
Mar. 21	07 37.43	+29 58.5	1.253	1.853	+1.56	-14.7	17.0	110.4
Mar. 31	07 53.68	+27 32.5	1.357	1.877	+1.69	-14.5	17.1	104.6

Comet 219P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2024 Feb. 13.73638 TT  
 Peri. = 107.59736 e = 0.3540476  
 Node = 230.95298 2000.0 a = 3.6458100 AU  
 Incl. = 11.53983 n = 0.14158363  
 q = 2.3550197 AU P = 6.96 years

$$m1 = 10.7 + 5 \log(\Delta) + 10.0 \log(r(t+90))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	16 34.68	-20 24.8	4.111	3.354	+1.41 -1.2	18.6	35.0
Jan. 16	16 48.74	-20 33.7	3.986	3.320	+1.39 -0.5	18.5	41.9
Jan. 26	17 02.54	-20 36.1	3.848	3.286	+1.36 +0.1	18.4	48.9
Feb. 5	17 15.93	-20 31.8	3.700	3.252	+1.31 +0.8	18.2	55.9
Feb. 15	17 28.78	-20 20.8	3.542	3.218	+1.25 +1.5	18.1	63.1
Feb. 25	17 40.93	-20 03.1	3.378	3.184	+1.17 +2.1	17.9	70.3
Mar. 7	17 52.18	-19 38.9	3.208	3.150	+1.07 +2.8	17.8	77.7
Mar. 17	18 02.38	-19 08.5	3.036	3.116	+0.95 +3.4	17.6	85.3
Mar. 27	18 11.29	-18 32.4	2.863	3.082	+0.81 +3.9	17.4	93.0
Apr. 6	18 18.71	-17 51.2	2.693	3.048	+0.65 +4.4	17.3	101.1
Apr. 16	18 24.40	-17 05.6	2.528	3.014	+0.47 +4.8	17.1	109.5
Apr. 26	18 28.13	-16 16.4	2.371	2.980	+0.26 +5.1	16.9	118.2
May 6	18 29.70	-15 24.8	2.225	2.947	+0.03 +5.3	16.7	127.3
May 16	18 29.00	-14 32.0	2.094	2.914	-0.20 +5.3	16.5	136.8
May 26	18 26.01	-13 39.6	1.982	2.881	-0.42 +5.1	16.4	146.5
June 5	18 20.92	-12 49.7	1.891	2.849	-0.61 +4.8	16.2	156.3
June 15	18 14.17	-12 04.4	1.824	2.817	-0.74 +4.2	16.1	164.8
June 25	18 06.42	-11 26.0	1.784	2.786	-0.80 +3.4	16.0	167.9
July 5	17 58.57	-10 56.6	1.769	2.755	-0.76 +2.4	15.9	162.2
July 15	17 51.50	-10 37.5	1.780	2.725	-0.63 +1.3	15.9	152.9
July 25	17 46.03	-10 29.2	1.814	2.695	-0.43 +0.3	15.9	142.9
Aug. 4	17 42.74	-10 30.8	1.867	2.666	-0.19 -0.7	16.0	133.2
Aug. 14	17 41.96	-10 40.8	1.936	2.638	+0.07 -1.4	16.0	123.8
Aug. 24	17 43.81	-10 57.1	2.018	2.611	+0.33 -1.9	16.1	115.0
Sept. 3	17 48.22	-11 17.1	2.108	2.585	+0.58 -2.1	16.1	106.7
Sept. 13	17 55.03	-11 38.6	2.203	2.560	+0.81 -2.1	16.2	98.9
Sept. 23	18 04.04	-11 59.1	2.302	2.536	+1.01 -1.9	16.3	91.6
Oct. 3	18 15.01	-12 16.6	2.401	2.513	+1.20 -1.5	16.4	84.6
Oct. 13	18 27.70	-12 29.2	2.499	2.492	+1.36 -0.9	16.4	78.0
Oct. 23	18 41.91	-12 35.2	2.596	2.471	+1.50 -0.2	16.5	71.7
Nov. 2	18 57.41	-12 33.2	2.689	2.453	+1.61 +0.7	16.6	65.7
Nov. 12	19 14.01	-12 22.2	2.777	2.435	+1.71 +1.6	16.6	59.8
Nov. 22	19 31.52	-12 01.3	2.861	2.420	+1.79 +2.7	16.7	54.2
Dec. 2	19 49.76	-11 30.0	2.939	2.405	+1.86 +3.7	16.8	48.7
Dec. 12	20 08.58	-10 48.1	3.011	2.393	+1.91 +4.8	16.8	43.4
Dec. 22	20 27.84	-09 55.6	3.076	2.382	+1.94 +5.8	16.9	38.2
Jan. 1	20 47.39	-08 52.8	3.135	2.373	+1.97 +6.8	16.9	33.1
Jan. 11	21 07.14	-07 40.3	3.186	2.366	+1.98 +7.8	17.0	28.2
Jan. 21	21 26.99	-06 18.7	3.231	2.360	+1.99 +8.6	17.0	23.4
Jan. 31	21 46.86	-04 49.1	3.268	2.357	+1.99 +9.4	17.1	18.8
Feb. 10	22 06.69	-03 12.6	3.298	2.355	+1.98 +10.0	17.1	14.4
Feb. 20	22 26.45	-01 30.4	3.320	2.355	+1.97 +10.5	17.2	10.6
Mar. 1	22 46.07	+00 16.2	3.335	2.358	+1.96 +10.9	17.2	7.9
Mar. 11	23 05.56	+02 05.9	3.342	2.362	+1.94 +11.1	17.3	7.6
Mar. 21	23 24.89	+03 57.4	3.342	2.367	+1.92 +11.2	17.3	10.0
Mar. 31	23 44.05	+05 49.3	3.334	2.375	+1.91 +11.2	17.3	13.6

## Comet C/2021 S3 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2024 Feb. 14.71862 TT  
 Peri. = 6.86673  
 Node = 215.62177 2000.0  
 Incl. = 58.53331  
 q = 1.3200313 AU  
 e = 1.0001335

$$m1 = 4.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	05 38.56	-38 35.0	4.527	5.029	-0.80	+0.5	15.1	115.5
Jan. 16	05 30.88	-38 21.0	4.478	4.936	-0.72	+2.5	15.0	112.3
Jan. 26	05 24.18	-37 47.2	4.442	4.842	-0.60	+4.4	14.9	108.3
Feb. 5	05 18.87	-36 56.4	4.417	4.747	-0.44	+5.9	14.8	103.6
Feb. 15	05 15.22	-35 52.2	4.401	4.652	-0.27	+7.0	14.7	98.6
Feb. 25	05 13.38	-34 38.2	4.390	4.556	-0.08	+7.8	14.6	93.4
Mar. 7	05 13.41	-33 18.3	4.381	4.460	+0.10	+8.2	14.5	88.1
Mar. 17	05 15.25	-31 55.8	4.373	4.363	+0.28	+8.3	14.4	82.9
Mar. 27	05 18.83	-30 33.7	4.363	4.265	+0.45	+8.1	14.3	77.8
Apr. 6	05 24.04	-29 14.5	4.348	4.167	+0.61	+7.7	14.2	73.0
Apr. 16	05 30.74	-28 00.3	4.327	4.068	+0.75	+7.1	14.1	68.5
Apr. 26	05 38.84	-26 52.6	4.300	3.969	+0.88	+6.3	14.0	64.3
May 6	05 48.22	-25 53.0	4.264	3.869	+1.00	+5.5	13.8	60.5
May 16	05 58.78	-25 02.5	4.220	3.768	+1.12	+4.5	13.7	57.1
May 26	06 10.44	-24 21.9	4.167	3.667	+1.22	+3.5	13.5	54.1
June 5	06 23.12	-23 52.0	4.105	3.565	+1.32	+2.4	13.4	51.6
June 15	06 36.78	-23 33.4	4.035	3.462	+1.42	+1.2	13.2	49.5
June 25	06 51.37	-23 26.6	3.957	3.359	+1.51	0.0	13.0	47.8
July 5	07 06.84	-23 31.8	3.871	3.255	+1.60	-1.2	12.9	46.5
July 15	07 23.20	-23 49.3	3.778	3.151	+1.68	-2.4	12.7	45.6
July 25	07 40.42	-24 19.1	3.680	3.046	+1.77	-3.7	12.5	44.9
Aug. 4	07 58.50	-25 01.1	3.577	2.941	+1.86	-4.8	12.3	44.6
Aug. 14	08 17.48	-25 54.8	3.470	2.836	+1.95	-6.0	12.0	44.4
Aug. 24	08 37.38	-26 59.7	3.359	2.730	+2.04	-7.1	11.8	44.4
Sept. 3	08 58.23	-28 14.6	3.247	2.624	+2.14	-8.0	11.5	44.5
Sept. 13	09 20.13	-29 38.1	3.134	2.518	+2.25	-8.8	11.3	44.6
Sept. 23	09 43.15	-31 08.4	3.020	2.413	+2.37	-9.3	11.0	44.7
Oct. 3	10 07.37	-32 43.0	2.906	2.308	+2.49	-9.6	10.7	44.9
Oct. 13	10 32.93	-34 18.8	2.792	2.203	+2.63	-9.5	10.5	45.1
Oct. 23	10 59.93	-35 52.2	2.679	2.100	+2.78	-9.0	10.2	45.2
Nov. 2	11 28.48	-37 18.3	2.565	1.999	+2.94	-8.0	9.9	45.5
Nov. 12	11 58.67	-38 32.2	2.452	1.900	+3.11	-6.5	9.5	45.8
Nov. 22	12 30.49	-39 27.7	2.339	1.804	+3.27	-4.3	9.2	46.3
Dec. 2	13 03.87	-39 57.8	2.225	1.713	+3.42	-1.3	8.9	47.1
Dec. 12	13 38.60	-39 55.3	2.110	1.627	+3.53	+2.3	8.5	48.1
Dec. 22	14 14.30	-39 12.3	1.994	1.548	+3.61	+6.9	8.2	49.5
Jan. 1	14 50.50	-37 40.5	1.878	1.477	+3.63	+12.2	7.9	51.2
Jan. 11	15 26.65	-35 12.1	1.763	1.418	+3.59	+18.3	7.5	53.4
Jan. 21	16 02.19	-31 39.3	1.652	1.371	+3.50	+25.1	7.3	56.0
Jan. 31	16 36.65	-26 55.8	1.547	1.338	+3.37	+32.4	7.0	58.9
Feb. 10	17 09.70	-20 58.1	1.454	1.322	+3.21	+39.8	6.8	62.1
Feb. 20	17 41.04	-13 48.2	1.378	1.322	+3.03	+46.6	6.7	65.5
Mar. 1	18 10.52	-05 37.2	1.326	1.340	+2.84	+51.7	6.7	68.9
Mar. 11	18 37.98	+03 13.8	1.300	1.373	+2.63	+54.2	6.7	72.1
Mar. 21	19 03.23	+12 15.7	1.303	1.421	+2.40	+53.6	6.9	75.0
Mar. 31	19 26.10	+20 59.0	1.333	1.481	+2.15	+50.4	7.1	77.4

## Comet A/2022 T1

Epoch = 2023 June 25.0 TT  
 T = 2024 Feb. 17.55484 TT  
 Peri. = 324.34384  
 Node = 236.91296 2000.0  
 Incl. = 22.54215  
 q = 3.4439657 AU  
 e = 0.9994762

H = 11.5 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		V	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	08 53.82	-09 48.7	4.231	5.007	-0.35	-2.7	18.7	138.1
Jan. 16	08 49.98	-10 10.7	4.105	4.946	-0.43	-1.5	18.5	145.3
Jan. 26	08 45.47	-10 20.4	4.005	4.886	-0.47	-0.3	18.4	150.5
Feb. 5	08 40.66	-10 17.4	3.931	4.827	-0.48	+1.0	18.3	152.4
Feb. 15	08 35.94	-10 02.2	3.885	4.768	-0.45	+2.1	18.3	150.3
Feb. 25	08 31.72	-09 36.3	3.865	4.709	-0.38	+3.1	18.3	144.9
Mar. 7	08 28.38	-09 02.1	3.870	4.651	-0.27	+3.8	18.4	137.7
Mar. 17	08 26.19	-08 22.5	3.897	4.594	-0.15	+4.2	18.4	129.5
Mar. 27	08 25.37	-07 40.3	3.942	4.538	0.00	+4.2	18.4	121.1
Apr. 6	08 26.03	-06 58.5	4.001	4.482	+0.15	+4.1	18.5	112.6
Apr. 16	08 28.18	-06 19.5	4.071	4.427	+0.30	+3.7	18.5	104.3
Apr. 26	08 31.80	-05 45.3	4.149	4.373	+0.44	+3.1	18.6	96.2
May 6	08 36.79	-05 17.5	4.229	4.320	+0.57	+2.4	18.6	88.4
May 16	08 43.05	-04 56.9	4.311	4.268	+0.69	+1.6	18.6	80.8
May 26	08 50.47	-04 44.4	4.389	4.217	+0.80	+0.8	18.6	73.6
June 5	08 58.92	-04 40.4	4.464	4.167	+0.90	-0.1	18.6	66.6
June 15	09 08.27	-04 45.0	4.532	4.118	+0.98	-0.9	18.6	59.9
June 25	09 18.42	-04 58.2	4.592	4.070	+1.06	-1.8	18.6	53.4
July 5	09 29.27	-05 19.9	4.643	4.023	+1.12	-2.6	18.5	47.2
July 15	09 40.71	-05 49.7	4.685	3.978	+1.17	-3.4	18.5	41.3
July 25	09 52.68	-06 27.4	4.715	3.934	+1.22	-4.2	18.4	35.6
Aug. 4	10 05.08	-07 12.4	4.734	3.891	+1.26	-4.9	18.4	30.3
Aug. 14	10 17.86	-08 04.3	4.741	3.850	+1.30	-5.5	18.3	25.3
Aug. 24	10 30.96	-09 02.5	4.737	3.811	+1.32	-6.1	18.2	21.1
Sept. 3	10 44.32	-10 06.4	4.720	3.773	+1.35	-6.7	18.2	18.0
Sept. 13	10 57.89	-11 15.2	4.691	3.737	+1.37	-7.1	18.1	16.5
Sept. 23	11 11.64	-12 28.3	4.650	3.702	+1.38	-7.5	18.1	17.1
Oct. 3	11 25.50	-13 44.9	4.597	3.670	+1.39	-7.8	18.1	19.7
Oct. 13	11 39.44	-15 04.1	4.533	3.639	+1.40	-8.0	18.1	23.5
Oct. 23	11 53.40	-16 25.1	4.457	3.611	+1.40	-8.2	18.1	28.3
Nov. 2	12 07.32	-17 46.9	4.370	3.584	+1.39	-8.2	18.1	33.5
Nov. 12	12 21.16	-19 08.6	4.273	3.560	+1.38	-8.1	18.1	39.1
Nov. 22	12 34.81	-20 29.2	4.166	3.538	+1.35	-8.0	18.0	45.0
Dec. 2	12 48.20	-21 47.6	4.051	3.518	+1.32	-7.7	18.0	51.2
Dec. 12	13 01.22	-23 02.9	3.928	3.500	+1.28	-7.3	18.0	57.6
Dec. 22	13 13.74	-24 13.8	3.798	3.485	+1.22	-6.8	17.9	64.2
Jan. 1	13 25.62	-25 19.4	3.664	3.472	+1.15	-6.2	17.9	71.1
Jan. 11	13 36.68	-26 18.4	3.526	3.462	+1.05	-5.5	17.8	78.2
Jan. 21	13 46.73	-27 09.7	3.386	3.453	+0.94	-4.6	17.7	85.7
Jan. 31	13 55.58	-27 51.9	3.246	3.448	+0.81	-3.7	17.6	93.4
Feb. 10	14 03.02	-28 23.6	3.110	3.445	+0.66	-2.5	17.5	101.5
Feb. 20	14 08.86	-28 43.3	2.980	3.444	+0.49	-1.3	17.4	109.9
Mar. 1	14 12.96	-28 49.6	2.858	3.446	+0.31	+0.2	17.3	118.7
Mar. 11	14 15.25	-28 40.7	2.750	3.450	+0.13	+1.8	17.2	127.9
Mar. 21	14 15.76	-28 15.6	2.657	3.457	-0.04	+3.4	17.0	137.4
Mar. 31	14 14.71	-27 33.8	2.584	3.466	-0.18	+5.1	16.9	147.2

## Comet 125P/Spacewatch

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 7.32105 TT  
 Peri. = 87.15901 e = 0.5120882  
 Node = 153.15237 2000.0 a = 3.1285866 AU  
 Incl. = 9.98560 n = 0.17810734  
 q = 1.5264743 AU P = 5.53 years

$$m1 = 12.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	°			m		°
Jan. 6	07 19.18	+12 19.1	2.555	3.526	-0.90 +2.5	.	169.2
Jan. 16	07 10.01	+12 47.4	2.516	3.483	-0.92 +3.2	.	167.6
Jan. 26	07 01.05	+13 21.1	2.507	3.439	-0.85 +3.6	.	157.7
Feb. 5	06 53.11	+13 58.2	2.529	3.394	-0.71 +3.8	.	146.4
Feb. 15	06 46.83	+14 36.7	2.575	3.348	-0.52 +3.9	.	135.1
Feb. 25	06 42.65	+15 14.9	2.642	3.302	-0.29 +3.7	.	124.2
Mar. 7	06 40.79	+15 51.4	2.724	3.254	-0.05 +3.5	.	113.9
Mar. 17	06 41.30	+16 25.1	2.816	3.206	+0.18 +3.2	.	104.1
Mar. 27	06 44.08	+16 55.2	2.913	3.157	+0.40 +2.8	.	94.8
Apr. 6	06 48.98	+17 20.9	3.010	3.107	+0.60 +2.3	.	86.1
Apr. 16	06 55.78	+17 41.4	3.105	3.057	+0.78 +1.8	.	77.9
Apr. 26	07 04.29	+17 56.3	3.194	3.006	+0.94 +1.1	.	70.2
May 6	07 14.31	+18 04.8	3.274	2.954	+1.08 +0.5	.	62.8
May 16	07 25.64	+18 06.7	3.345	2.901	+1.20 -0.2	.	55.9
May 26	07 38.14	+18 01.3	3.404	2.847	+1.31 -0.9	22.0	49.2
June 5	07 51.65	+17 48.5	3.451	2.793	+1.40 -1.7	21.9	42.8
June 15	08 06.04	+17 27.8	3.485	2.738	+1.48 -2.5	21.8	36.7
June 25	08 21.23	+16 59.0	3.505	2.683	+1.56 -3.3	21.7	30.8
July 5	08 37.10	+16 22.0	3.512	2.627	+1.62 -4.2	21.5	25.1
July 15	08 53.59	+15 36.7	3.505	2.570	+1.68 -5.0	21.4	19.6
July 25	09 10.66	+14 43.1	3.485	2.513	+1.74 -5.8	21.2	14.2
Aug. 4	09 28.24	+13 41.3	3.452	2.455	+1.79 -6.6	21.0	9.0
Aug. 14	09 46.32	+12 31.4	3.407	2.398	+1.84 -7.4	20.9	4.0
Aug. 24	10 04.88	+11 13.6	3.351	2.340	+1.88 -8.2	20.7	1.1
Sept. 3	10 23.93	+09 48.4	3.283	2.282	+1.93 -8.9	20.5	5.8
Sept. 13	10 43.48	+08 16.1	3.206	2.224	+1.98 -9.6	20.2	10.4
Sept. 23	11 03.57	+06 37.2	3.120	2.166	+2.04 -10.2	20.0	15.0
Oct. 3	11 24.22	+04 52.6	3.027	2.109	+2.10 -10.8	19.8	19.4
Oct. 13	11 45.51	+03 03.0	2.927	2.052	+2.17 -11.2	19.5	23.6
Oct. 23	12 07.50	+01 09.4	2.822	1.997	+2.24 -11.5	19.3	27.8
Nov. 2	12 30.27	+00 46.7	2.714	1.942	+2.32 -11.7	19.0	31.8
Nov. 12	12 53.91	-02 44.0	2.603	1.889	+2.41 -11.7	18.7	35.6
Nov. 22	13 18.50	-04 40.4	2.492	1.838	+2.51 -11.5	18.4	39.3
Dec. 2	13 44.11	-06 34.0	2.381	1.789	+2.62 -11.1	18.2	42.8
Dec. 12	14 10.82	-08 22.1	2.273	1.742	+2.73 -10.4	17.9	46.1
Dec. 22	14 38.65	-10 01.8	2.168	1.699	+2.84 -9.4	17.6	49.3
Jan. 1	15 07.58	-11 30.2	2.068	1.660	+2.95 -8.1	17.4	52.2
Jan. 11	15 37.54	-12 44.2	1.974	1.624	+3.05 -6.5	17.1	55.0
Jan. 21	16 08.35	-13 40.6	1.886	1.594	+3.12 -4.6	16.9	57.7
Jan. 31	16 39.77	-14 17.2	1.805	1.568	+3.16 -2.5	16.7	60.2
Feb. 10	17 11.47	-14 32.3	1.732	1.549	+3.17 -0.3	16.5	62.6
Feb. 20	17 43.06	-14 25.5	1.665	1.535	+3.14 +1.9	16.4	65.0
Mar. 1	18 14.12	-13 57.6	1.604	1.528	+3.06 +3.9	16.3	67.4
Mar. 11	18 44.25	-13 10.8	1.549	1.527	+2.95 +5.6	16.2	70.0
Mar. 21	19 13.06	-12 08.2	1.498	1.533	+2.80 +7.0	16.2	72.7
Mar. 31	19 40.24	-10 54.0	1.451	1.545	+2.62 +7.9	16.1	75.7

Comet 227P/Catalina-LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 8.13571 TT  
 Peri. = 105.51266 e = 0.5277952  
 Node = 36.81172 2000.0 a = 3.4391675 AU  
 Incl. = 7.50920 n = 0.15453401  
 q = 1.6239914 AU P = 6.38 years

$$m1 = 16.0 + 5 \log(\Delta) + 5.0 \log(r(t+260))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° ' "			m	' "		°
Jan. 6	00 05.69	-02 15.7	3.753	3.631	+0.55	+5.2	20.6	75.4
Jan. 16	00 11.74	-01 20.7	3.854	3.585	+0.67	+5.9	20.6	66.9
Jan. 26	00 18.98	+00 19.3	3.946	3.538	+0.78	+6.5	20.6	58.8
Feb. 5	00 27.25	+00 47.8	4.025	3.490	+0.88	+7.0	20.6	51.0
Feb. 15	00 36.43	+01 59.5	4.090	3.441	+0.96	+7.4	20.6	43.5
Feb. 25	00 46.43	+03 15.2	4.140	3.392	+1.04	+7.8	20.6	36.2
Mar. 7	00 57.15	+04 34.0	4.174	3.342	+1.11	+8.0	20.5	29.1
Mar. 17	01 08.51	+05 55.3	4.190	3.291	+1.17	+8.2	20.5	22.3
Mar. 27	01 20.46	+07 18.4	4.190	3.240	+1.23	+8.4	20.4	15.6
Apr. 6	01 32.94	+08 42.5	4.172	3.188	+1.28	+8.5	20.4	9.1
Apr. 16	01 45.93	+10 07.2	4.137	3.136	+1.33	+8.5	20.3	2.9
Apr. 26	01 59.39	+11 31.7	4.086	3.082	+1.37	+8.4	20.2	3.5
May 6	02 13.30	+12 55.6	4.019	3.028	+1.41	+8.3	20.2	9.5
May 16	02 27.64	+14 18.2	3.937	2.974	+1.46	+8.2	20.1	15.4
May 26	02 42.41	+15 39.1	3.840	2.919	+1.50	+8.0	20.0	21.2
June 5	02 57.58	+16 57.7	3.731	2.863	+1.54	+7.7	19.9	26.9
June 15	03 13.15	+18 13.6	3.610	2.807	+1.58	+7.4	19.8	32.6
June 25	03 29.11	+19 26.3	3.478	2.751	+1.62	+7.1	19.8	38.1
July 5	03 45.42	+20 35.3	3.336	2.694	+1.65	+6.7	19.7	43.7
July 15	04 02.08	+21 40.4	3.187	2.637	+1.68	+6.3	19.6	49.2
July 25	04 19.04	+22 41.2	3.030	2.580	+1.71	+5.8	19.5	54.7
Aug. 4	04 36.27	+23 37.5	2.868	2.522	+1.74	+5.4	19.4	60.2
Aug. 14	04 53.71	+24 29.3	2.701	2.464	+1.75	+4.9	19.3	65.7
Aug. 24	05 11.29	+25 16.6	2.532	2.407	+1.76	+4.5	19.2	71.3
Sept. 3	05 28.91	+25 59.7	2.362	2.349	+1.76	+4.1	19.1	76.9
Sept. 13	05 46.47	+26 39.1	2.192	2.292	+1.75	+3.8	19.0	82.7
Sept. 23	06 03.82	+27 15.8	2.023	2.236	+1.72	+3.6	18.9	88.5
Oct. 3	06 20.79	+27 50.8	1.858	2.180	+1.67	+3.5	18.7	94.6
Oct. 13	06 37.17	+28 26.0	1.697	2.124	+1.59	+3.6	18.6	100.8
Oct. 23	06 52.67	+29 03.3	1.543	2.070	+1.49	+3.9	18.4	107.3
Nov. 2	07 06.99	+29 45.3	1.397	2.018	+1.35	+4.6	18.3	114.2
Nov. 12	07 19.70	+30 34.8	1.260	1.967	+1.16	+5.5	18.1	121.4
Nov. 22	07 30.31	+31 34.5	1.135	1.918	+0.93	+6.6	17.9	129.0
Dec. 2	07 38.31	+32 46.2	1.024	1.871	+0.63	+7.8	17.8	137.1
Dec. 12	07 43.11	+34 09.5	0.928	1.827	+0.29	+8.9	17.6	145.6
Dec. 22	07 44.32	+35 40.5	0.850	1.786	-0.08	+9.2	17.5	153.9
Jan. 1	07 42.04	+37 09.9	0.790	1.749	-0.40	+8.4	17.4	160.9
Jan. 11	07 37.01	+38 25.0	0.751	1.716	-0.60	+6.2	17.3	163.4
Jan. 21	07 30.97	+39 12.2	0.731	1.688	-0.57	+2.8	17.3	159.2
Jan. 31	07 26.25	+39 23.0	0.730	1.664	-0.32	-1.0	17.4	151.6
Feb. 10	07 24.86	+38 56.8	0.746	1.646	+0.10	-4.5	17.4	143.2
Feb. 20	07 28.11	+37 58.1	0.776	1.633	+0.60	-7.4	17.6	135.1
Mar. 1	07 36.21	+36 33.3	0.818	1.625	+1.06	-9.7	17.7	127.7
Mar. 11	07 48.60	+34 47.9	0.870	1.624	+1.45	-11.5	17.9	121.1
Mar. 21	08 04.48	+32 45.6	0.932	1.629	+1.74	-13.1	18.1	115.2
Mar. 31	08 22.86	+30 29.1	1.002	1.639	+1.94	-14.3	18.3	110.0

## Comet C/2022 L2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 12.30126 TT  
 Peri. = 199.93691  
 Node = 39.24110 2000.0  
 Incl. = 129.31411  
 q = 2.6923487 AU  
 e = 1.0014382

$$m1 = 5.6 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	18 19.78	+14 36.0	5.723	4.995	+0.43	-1.2	16.4	38.8
Jan. 16	18 23.99	+14 28.2	5.619	4.922	+0.41	-0.2	16.3	41.2
Jan. 26	18 27.94	+14 30.5	5.492	4.848	+0.37	+0.8	16.2	45.1
Feb. 5	18 31.45	+14 42.8	5.343	4.774	+0.32	+1.8	16.0	50.3
Feb. 15	18 34.33	+15 04.7	5.176	4.701	+0.25	+2.7	15.9	56.3
Feb. 25	18 36.37	+15 36.0	4.990	4.627	+0.15	+3.6	15.7	63.1
Mar. 7	18 37.33	+16 16.0	4.791	4.554	+0.03	+4.5	15.6	70.3
Mar. 17	18 36.96	+17 04.1	4.581	4.481	-0.12	+5.2	15.4	78.0
Mar. 27	18 34.97	+17 59.0	4.365	4.409	-0.30	+5.8	15.2	86.0
Apr. 6	18 31.02	+18 59.0	4.147	4.337	-0.51	+6.2	15.1	94.2
Apr. 16	18 24.82	+20 01.6	3.932	4.265	-0.76	+6.3	14.9	102.6
Apr. 26	18 16.02	+21 02.9	3.728	4.193	-1.03	+5.9	14.7	110.9
May 6	18 04.41	+21 57.9	3.540	4.122	-1.32	+4.9	14.5	118.9
May 16	17 49.92	+22 40.1	3.374	4.052	-1.60	+3.2	14.3	126.0
May 26	17 32.75	+23 02.2	3.239	3.982	-1.84	+0.8	14.2	131.5
June 5	17 13.49	+22 56.9	3.138	3.913	-2.01	-2.2	14.0	134.2
June 15	16 53.10	+22 19.6	3.075	3.845	-2.06	-5.6	13.9	133.5
June 25	16 32.73	+21 09.0	3.051	3.777	-1.99	-8.8	13.8	129.2
July 5	16 13.56	+19 28.5	3.066	3.711	-1.81	-11.5	13.7	122.3
July 15	15 56.48	+17 24.8	3.114	3.645	-1.57	-13.3	13.7	113.8
July 25	15 42.04	+15 05.8	3.190	3.580	-1.29	-14.4	13.7	104.4
Aug. 4	15 30.40	+12 39.2	3.286	3.517	-1.01	-14.8	13.6	94.7
Aug. 14	15 21.48	+10 10.7	3.394	3.455	-0.75	-14.8	13.6	84.9
Aug. 24	15 15.05	+07 44.3	3.508	3.394	-0.52	-14.4	13.6	75.2
Sept. 3	15 10.78	+05 22.4	3.619	3.334	-0.32	-13.9	13.6	65.8
Sept. 13	15 08.37	+03 06.0	3.723	3.277	-0.15	-13.3	13.6	56.5
Sept. 23	15 07.51	+00 55.6	3.814	3.221	-0.01	-12.7	13.6	47.4
Oct. 3	15 07.92	-01 09.2	3.887	3.167	+0.10	-12.2	13.6	38.6
Oct. 13	15 09.35	-03 08.7	3.940	3.115	+0.19	-11.7	13.5	29.9
Oct. 23	15 11.58	-05 03.8	3.969	3.065	+0.26	-11.3	13.5	21.6
Nov. 2	15 14.38	-06 55.1	3.971	3.018	+0.30	-11.0	13.4	14.0
Nov. 12	15 17.56	-08 43.6	3.947	2.973	+0.33	-10.7	13.3	9.2
Nov. 22	15 20.92	-10 30.3	3.893	2.931	+0.34	-10.6	13.2	11.4
Dec. 2	15 24.25	-12 16.3	3.811	2.892	+0.32	-10.6	13.1	18.4
Dec. 12	15 27.30	-14 02.9	3.701	2.856	+0.28	-10.8	13.0	26.7
Dec. 22	15 29.82	-15 51.7	3.565	2.823	+0.21	-11.1	12.9	35.6
Jan. 1	15 31.46	-17 44.6	3.404	2.794	+0.10	-11.6	12.7	44.8
Jan. 11	15 31.82	-19 43.8	3.221	2.768	-0.05	-12.4	12.6	54.5
Jan. 21	15 30.35	-21 51.7	3.022	2.745	-0.27	-13.4	12.4	64.5
Jan. 31	15 26.32	-24 11.1	2.810	2.727	-0.58	-14.7	12.2	75.0
Feb. 10	15 18.75	-26 44.2	2.594	2.712	-1.00	-16.1	12.0	86.1
Feb. 20	15 06.29	-29 31.7	2.381	2.702	-1.58	-17.4	11.8	98.0
Mar. 1	14 47.23	-32 29.3	2.183	2.695	-2.34	-17.9	11.6	110.5
Mar. 11	14 19.73	-35 23.4	2.014	2.692	-3.27	-16.3	11.4	123.5
Mar. 21	13 42.72	-37 45.7	1.888	2.694	-4.20	-11.0	11.3	135.9
Mar. 31	12 57.76	-38 57.7	1.820	2.699	-4.76	-2.0	11.2	144.9



Comet 150P/LONEOS

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 12.40609 TT  
 Peri. = 246.07521  
 Node = 272.06284 2000.0  
 Incl. = 18.54403  
 q = 1.7459743 AU  
 e = 0.5489751  
 a = 3.8711262 AU  
 n = 0.12940411  
 P = 7.62 years

H = 14.5 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2023/24	h m	°	'		m	'	°
Jan. 6	00 59.49	+23 58.3	3.509	3.769	+0.40	-3.7	97.7
Jan. 16	01 04.22	+23 27.3	3.609	3.719	+0.56	-2.4	88.7
Jan. 26	01 10.51	+23 08.4	3.709	3.669	+0.71	-1.2	80.1
Feb. 5	01 18.19	+23 00.9	3.804	3.619	+0.84	-0.2	71.8
Feb. 15	01 27.11	+23 03.5	3.892	3.567	+0.96	+0.8	63.8
Feb. 25	01 37.14	+23 15.0	3.970	3.516	+1.06	+1.6	56.1
Mar. 7	01 48.17	+23 33.9	4.036	3.463	+1.15	+2.3	48.8
Mar. 17	02 00.08	+23 58.9	4.088	3.410	+1.24	+2.8	41.7
Mar. 27	02 12.81	+24 28.5	4.126	3.357	+1.32	+3.2	34.9
Apr. 6	02 26.29	+25 01.4	4.148	3.303	+1.39	+3.4	28.4
Apr. 16	02 40.45	+25 36.2	4.155	3.248	+1.45	+3.5	22.2
Apr. 26	02 55.26	+26 11.7	4.145	3.194	+1.51	+3.5	16.5
May 6	03 10.67	+26 46.6	4.120	3.138	+1.57	+3.4	11.5
May 16	03 26.64	+27 19.8	4.079	3.082	+1.63	+3.2	8.4
May 26	03 43.15	+27 50.2	4.022	3.026	+1.68	+2.8	9.0
June 5	04 00.14	+28 16.7	3.951	2.970	+1.72	+2.4	12.6
June 15	04 17.58	+28 38.2	3.867	2.913	+1.77	+1.8	17.3
June 25	04 35.43	+28 53.8	3.769	2.856	+1.80	+1.2	22.5
July 5	04 53.63	+29 02.4	3.659	2.799	+1.84	+0.4	27.7
July 15	05 12.11	+29 03.2	3.538	2.741	+1.86	-0.4	33.0
July 25	05 30.81	+28 55.4	3.406	2.684	+1.88	-1.3	38.3
Aug. 4	05 49.64	+28 38.0	3.266	2.626	+1.89	-2.3	43.6
Aug. 14	06 08.52	+28 10.4	3.118	2.569	+1.89	-3.3	48.9
Aug. 24	06 27.34	+27 31.9	2.964	2.512	+1.87	-4.5	54.3
Sept. 3	06 45.98	+26 41.8	2.804	2.455	+1.85	-5.7	59.7
Sept. 13	07 04.34	+25 39.6	2.641	2.399	+1.82	-6.9	65.2
Sept. 23	07 22.28	+24 24.7	2.475	2.344	+1.76	-8.2	70.7
Oct. 3	07 39.65	+22 56.6	2.308	2.289	+1.70	-9.6	76.4
Oct. 13	07 56.29	+21 14.8	2.141	2.235	+1.62	-11.0	82.1
Oct. 23	08 12.02	+19 18.6	1.977	2.183	+1.51	-12.4	88.1
Nov. 2	08 26.62	+17 07.6	1.816	2.132	+1.39	-13.9	94.2
Nov. 12	08 39.86	+14 41.0	1.661	2.083	+1.24	-15.5	100.5
Nov. 22	08 51.42	+11 58.5	1.514	2.036	+1.05	-17.1	107.1
Dec. 2	09 00.98	+08 59.7	1.375	1.991	+0.83	-18.8	113.9
Dec. 12	09 08.14	+05 44.9	1.249	1.949	+0.57	-20.3	121.1
Dec. 22	09 12.50	+02 16.3	1.136	1.910	+0.27	-21.5	128.4
Jan. 1	09 13.73	-01 21.8	1.039	1.874	-0.06	-22.1	135.8
Jan. 11	09 11.65	-05 01.6	0.961	1.842	-0.39	-21.6	142.6
Jan. 21	09 06.49	-08 30.4	0.903	1.814	-0.66	-19.7	148.1
Jan. 31	08 59.06	-11 33.6	0.866	1.791	-0.82	-16.4	150.7
Feb. 10	08 50.75	-13 57.5	0.849	1.772	-0.81	-11.8	149.7
Feb. 20	08 43.35	-15 34.3	0.851	1.758	-0.62	-7.1	145.6
Mar. 1	08 38.54	-16 25.9	0.871	1.749	-0.29	-2.9	139.9
Mar. 11	08 37.41	-16 40.1	0.905	1.746	+0.12	+0.2	133.8
Mar. 21	08 40.49	-16 28.6	0.950	1.748	+0.54	+2.1	127.8
Mar. 31	08 47.68	-16 03.3	1.006	1.755	+0.93	+2.9	122.2

## Comet C/2021 Q6 (PANSTARRS)

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 24.09685 TT  
 Peri. = 140.96983  
 Node = 133.53730 2000.0  
 Incl. = 161.84681  
 q = 8.7084021 AU  
 e = 0.9999561

$$m1 = -9.5 + 5 \log(\Delta) + 25.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	00 04.37	+17 52.3	9.140	9.081	-0.07	-3.0	19.3	83.5
Jan. 16	00 04.00	+17 25.0	9.296	9.065	0.00	-2.4	19.3	73.4
Jan. 26	00 04.29	+17 03.7	9.445	9.049	+0.06	-1.8	19.3	63.5
Feb. 5	00 05.15	+16 48.3	9.579	9.033	+0.11	-1.2	19.3	53.9
Feb. 15	00 06.48	+16 38.3	9.696	9.018	+0.15	-0.7	19.3	44.5
Feb. 25	00 08.17	+16 33.3	9.791	9.003	+0.19	-0.3	19.3	35.5
Mar. 7	00 10.14	+16 32.6	9.862	8.989	+0.21	+0.1	19.3	27.0
Mar. 17	00 12.27	+16 35.6	9.906	8.975	+0.22	+0.5	19.3	19.5
Mar. 27	00 14.48	+16 41.7	9.923	8.961	+0.22	+0.8	19.3	14.5
Apr. 6	00 16.67	+16 50.3	9.912	8.947	+0.21	+1.0	19.3	14.6
Apr. 16	00 18.75	+17 00.7	9.872	8.934	+0.20	+1.1	19.2	19.7
Apr. 26	00 20.63	+17 12.3	9.806	8.921	+0.17	+1.2	19.2	27.0
May 6	00 22.22	+17 24.3	9.713	8.909	+0.14	+1.2	19.2	35.3
May 16	00 23.42	+17 36.2	9.597	8.897	+0.10	+1.2	19.1	43.9
May 26	00 24.16	+17 47.3	9.461	8.885	+0.04	+1.0	19.1	52.8
June 5	00 24.35	+17 56.7	9.306	8.874	-0.01	+0.8	19.0	61.9
June 15	00 23.90	+18 03.8	9.138	8.863	-0.08	+0.6	19.0	71.2
June 25	00 22.75	+18 07.8	8.960	8.852	-0.16	+0.2	18.9	80.7
July 5	00 20.83	+18 07.7	8.778	8.842	-0.24	-0.3	18.9	90.3
July 15	00 18.11	+18 02.9	8.596	8.832	-0.32	-0.8	18.8	100.2
July 25	00 14.55	+17 52.5	8.420	8.823	-0.40	-1.4	18.8	110.2
Aug. 4	00 10.18	+17 35.8	8.257	8.814	-0.48	-2.0	18.7	120.4
Aug. 14	00 05.05	+17 12.3	8.111	8.805	-0.55	-2.7	18.7	130.7
Aug. 24	23 59.26	+16 41.6	7.988	8.796	-0.61	-3.5	18.6	141.0
Sept. 3	23 52.95	+16 03.9	7.893	8.788	-0.65	-4.1	18.6	150.9
Sept. 13	23 46.30	+15 19.8	7.830	8.781	-0.67	-4.7	18.6	159.7
Sept. 23	23 39.54	+14 30.1	7.802	8.774	-0.67	-5.2	18.5	164.6
Oct. 3	23 32.88	+13 36.3	7.810	8.767	-0.65	-5.5	18.5	162.0
Oct. 13	23 26.54	+12 40.1	7.853	8.760	-0.61	-5.7	18.5	153.9
Oct. 23	23 20.73	+11 43.3	7.930	8.754	-0.55	-5.6	18.6	144.0
Nov. 2	23 15.59	+10 47.8	8.037	8.748	-0.47	-5.4	18.6	133.4
Nov. 12	23 11.25	+09 55.3	8.169	8.743	-0.39	-5.0	18.6	122.6
Nov. 22	23 07.76	+09 07.0	8.322	8.738	-0.30	-4.6	18.6	111.9
Dec. 2	23 05.14	+08 23.9	8.488	8.733	-0.21	-4.0	18.7	101.2
Dec. 12	23 03.38	+07 46.6	8.662	8.729	-0.13	-3.4	18.7	90.7
Dec. 22	23 02.42	+07 15.5	8.837	8.725	-0.05	-2.8	18.8	80.3
Jan. 1	23 02.20	+06 50.4	9.007	8.722	+0.01	-2.2	18.8	70.2
Jan. 11	23 02.62	+06 31.2	9.166	8.719	+0.07	-1.6	18.8	60.2
Jan. 21	23 03.60	+06 17.5	9.311	8.716	+0.12	-1.1	18.9	50.4
Jan. 31	23 05.03	+06 08.8	9.436	8.714	+0.16	-0.6	18.9	40.8
Feb. 10	23 06.81	+06 04.6	9.538	8.712	+0.19	-0.2	18.9	31.5
Feb. 20	23 08.85	+06 04.1	9.614	8.711	+0.21	+0.1	18.9	22.7
Mar. 1	23 11.03	+06 06.8	9.663	8.709	+0.22	+0.4	18.9	14.9
Mar. 11	23 13.27	+06 11.9	9.684	8.709	+0.22	+0.6	18.9	10.4
Mar. 21	23 15.47	+06 18.8	9.676	8.708	+0.21	+0.8	18.9	13.1
Mar. 31	23 17.54	+06 26.9	9.639	8.708	+0.20	+0.8	18.9	20.2

## Comet C/2022 U1 (Leonard)

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 25.64597 TT  
 Peri. = 78.54091  
 Node = 72.51036 2000.0  
 Incl. = 128.13626  
 q = 4.2021908 AU  
 e = 0.9995996

$$m1 = 7.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	02 56.08	+34 40.1	4.933	5.553	-0.96	-1.8	18.8	124.8
Jan. 16	02 47.33	+34 22.3	5.037	5.503	-0.77	-1.7	18.8	113.4
Jan. 26	02 40.49	+34 06.7	5.157	5.452	-0.58	-1.3	18.8	102.3
Feb. 5	02 35.51	+33 55.8	5.284	5.403	-0.40	-0.8	18.8	91.6
Feb. 15	02 32.23	+33 50.8	5.413	5.354	-0.24	-0.1	18.9	81.3
Feb. 25	02 30.47	+33 52.8	5.537	5.305	-0.10	+0.6	18.9	71.4
Mar. 7	02 30.04	+34 02.2	5.650	5.257	+0.02	+1.3	18.9	62.0
Mar. 17	02 30.73	+34 18.9	5.748	5.210	+0.12	+2.1	18.9	53.0
Mar. 27	02 32.34	+34 42.9	5.827	5.164	+0.21	+2.8	18.9	44.5
Apr. 6	02 34.69	+35 13.9	5.885	5.118	+0.27	+3.5	18.8	36.7
Apr. 16	02 37.61	+35 51.5	5.920	5.073	+0.32	+4.1	18.8	29.7
Apr. 26	02 40.94	+36 35.7	5.929	5.028	+0.35	+4.8	18.8	24.2
May 6	02 44.52	+37 26.0	5.912	4.985	+0.36	+5.4	18.7	21.2
May 16	02 48.18	+38 22.6	5.870	4.942	+0.37	+6.0	18.7	21.4
May 26	02 51.78	+39 25.3	5.802	4.900	+0.35	+6.6	18.6	24.7
June 5	02 55.13	+40 34.2	5.709	4.859	+0.31	+7.2	18.5	30.2
June 15	02 58.04	+41 49.6	5.594	4.819	+0.26	+7.9	18.5	36.8
June 25	03 00.28	+43 11.5	5.458	4.780	+0.18	+8.6	18.4	44.0
July 5	03 01.59	+44 40.1	5.304	4.742	+0.07	+9.2	18.3	51.7
July 15	03 01.62	+46 15.6	5.134	4.705	-0.08	+9.9	18.2	59.7
July 25	02 59.97	+47 57.7	4.953	4.668	-0.28	+10.5	18.1	68.0
Aug. 4	02 56.12	+49 45.5	4.765	4.633	-0.53	+11.0	17.9	76.4
Aug. 14	02 49.45	+51 37.3	4.575	4.600	-0.85	+11.3	17.8	85.1
Aug. 24	02 39.19	+53 29.6	4.388	4.567	-1.25	+11.1	17.7	93.7
Sept. 3	02 24.57	+55 16.8	4.211	4.535	-1.73	+10.1	17.6	102.4
Sept. 13	02 04.94	+56 50.2	4.050	4.505	-2.25	+8.2	17.5	110.7
Sept. 23	01 40.14	+57 58.4	3.911	4.476	-2.74	+4.9	17.4	118.3
Oct. 3	01 11.04	+58 28.6	3.802	4.448	-3.08	+0.5	17.3	124.7
Oct. 13	00 39.73	+58 11.3	3.726	4.422	-3.14	-4.5	17.2	128.9
Oct. 23	00 09.15	+57 03.6	3.687	4.397	-2.91	-9.4	17.2	130.3
Nov. 2	23 41.93	+55 12.3	3.686	4.373	-2.47	-13.0	17.1	128.4
Nov. 12	23 19.60	+52 50.6	3.722	4.351	-1.94	-15.2	17.1	123.8
Nov. 22	23 02.47	+50 14.4	3.789	4.330	-1.44	-15.9	17.2	117.1
Dec. 2	22 50.11	+47 37.5	3.884	4.310	-1.00	-15.3	17.2	109.2
Dec. 12	22 41.73	+45 10.1	3.998	4.293	-0.65	-13.9	17.2	100.8
Dec. 22	22 36.55	+42 59.2	4.125	4.276	-0.37	-12.0	17.3	92.2
Jan. 1	22 33.84	+41 08.0	4.257	4.262	-0.16	-10.0	17.3	83.7
Jan. 11	22 33.02	+39 38.0	4.388	4.249	0.00	-7.8	17.4	75.5
Jan. 21	22 33.59	+38 28.9	4.512	4.237	+0.12	-5.8	17.4	67.7
Jan. 31	22 35.16	+37 40.0	4.624	4.227	+0.20	-3.8	17.5	60.5
Feb. 10	22 37.41	+37 09.7	4.720	4.219	+0.25	-2.0	17.5	54.1
Feb. 20	22 40.04	+36 56.8	4.798	4.212	+0.28	-0.4	17.6	48.7
Mar. 1	22 42.82	+36 59.6	4.855	4.207	+0.28	+1.1	17.6	44.6
Mar. 11	22 45.52	+37 16.7	4.889	4.204	+0.26	+2.5	17.6	42.0
Mar. 21	22 47.93	+37 46.9	4.900	4.202	+0.22	+3.7	17.6	41.3
Mar. 31	22 49.81	+38 28.9	4.887	4.202	+0.15	+4.8	17.6	42.3

Comet 89P/Russell

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 26.58070 TT  
 Peri. = 250.39699 e = 0.4080288  
 Node = 41.34657 2000.0 a = 3.7532002 AU  
 Incl. = 12.07203 n = 0.13555061  
 q = 2.2217864 AU P = 7.27 years

$$m1 = 10.0 + 5 \log(\Delta) + 15.0 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	13 25.91	+00 59.3	3.535	3.583	+0.65	-3.3	21.4	84.9
Jan. 16	13 31.84	-01 29.1	3.348	3.546	+0.52	-2.5	21.2	93.4
Jan. 26	13 36.45	-01 50.6	3.163	3.507	+0.38	-1.7	21.0	102.3
Feb. 5	13 39.53	-02 03.3	2.983	3.469	+0.21	-0.8	20.8	111.6
Feb. 15	13 40.85	-02 07.1	2.813	3.430	+0.03	+0.1	20.6	121.2
Feb. 25	13 40.25	-02 01.9	2.655	3.392	-0.17	+1.0	20.4	131.3
Mar. 7	13 37.62	-01 48.7	2.516	3.352	-0.37	+1.7	20.2	141.9
Mar. 17	13 33.03	-01 28.9	2.398	3.313	-0.56	+2.3	20.1	152.7
Mar. 27	13 26.69	-01 04.9	2.305	3.274	-0.71	+2.5	19.9	163.6
Apr. 6	13 19.09	+00 40.2	2.240	3.234	-0.81	+2.4	19.8	172.3
Apr. 16	13 10.86	+00 18.5	2.205	3.195	-0.83	+1.8	19.7	168.8
Apr. 26	13 02.76	+00 03.7	2.198	3.155	-0.77	+1.0	19.6	158.4
May 6	12 55.56	+00 00.9	2.218	3.115	-0.65	-0.2	19.5	147.5
May 16	12 49.86	+00 06.5	2.261	3.076	-0.47	-1.4	19.5	136.7
May 26	12 46.08	+00 26.9	2.323	3.036	-0.26	-2.8	19.5	126.5
June 5	12 44.44	-01 00.1	2.400	2.997	-0.04	-4.0	19.5	116.8
June 15	12 44.96	-01 45.4	2.486	2.957	+0.17	-5.1	19.5	107.6
June 25	12 47.57	-02 41.7	2.580	2.918	+0.37	-6.2	19.5	99.1
July 5	12 52.14	-03 47.7	2.675	2.879	+0.56	-7.1	19.5	91.0
July 15	12 58.48	-05 02.1	2.771	2.841	+0.73	-7.9	19.4	83.4
July 25	13 06.46	-06 23.8	2.864	2.802	+0.88	-8.5	19.4	76.2
Aug. 4	13 15.90	-07 51.5	2.953	2.765	+1.02	-9.1	19.4	69.4
Aug. 14	13 26.68	-09 24.3	3.036	2.727	+1.15	-9.5	19.4	62.9
Aug. 24	13 38.71	-11 01.0	3.111	2.691	+1.27	-9.8	19.4	56.6
Sept. 3	13 51.89	-12 40.5	3.179	2.654	+1.38	-10.1	19.3	50.6
Sept. 13	14 06.16	-14 21.8	3.237	2.619	+1.49	-10.2	19.3	44.7
Sept. 23	14 21.50	-16 03.8	3.286	2.585	+1.59	-10.2	19.2	39.0
Oct. 3	14 37.85	-17 45.3	3.325	2.551	+1.69	-10.1	19.1	33.5
Oct. 13	14 55.20	-19 25.0	3.355	2.519	+1.79	-9.8	19.1	28.1
Oct. 23	15 13.54	-21 01.6	3.374	2.487	+1.89	-9.4	19.0	22.8
Nov. 2	15 32.84	-22 33.9	3.384	2.457	+1.98	-8.9	18.9	17.7
Nov. 12	15 53.09	-24 00.4	3.384	2.428	+2.08	-8.3	18.8	12.8
Nov. 22	16 14.24	-25 19.8	3.375	2.401	+2.16	-7.5	18.7	8.2
Dec. 2	16 36.24	-26 30.6	3.356	2.375	+2.25	-6.6	18.6	4.9
Dec. 12	16 59.04	-27 31.5	3.329	2.351	+2.32	-5.5	18.5	5.6
Dec. 22	17 22.54	-28 21.4	3.294	2.329	+2.38	-4.3	18.4	9.4
Jan. 1	17 46.60	-28 59.2	3.251	2.308	+2.43	-3.1	18.3	13.8
Jan. 11	18 11.10	-29 24.3	3.201	2.290	+2.47	-1.8	18.2	18.4
Jan. 21	18 35.88	-29 36.1	3.145	2.273	+2.49	-0.5	18.1	23.1
Jan. 31	19 00.76	-29 34.7	3.083	2.259	+2.49	+0.9	18.0	27.8
Feb. 10	19 25.56	-29 20.4	3.016	2.247	+2.47	+2.1	17.9	32.4
Feb. 20	19 50.12	-28 53.9	2.945	2.237	+2.43	+3.3	17.8	37.1
Mar. 1	20 14.25	-28 16.4	2.869	2.230	+2.39	+4.3	17.7	41.8
Mar. 11	20 37.83	-27 29.3	2.790	2.225	+2.32	+5.2	17.6	46.4
Mar. 21	21 00.71	-26 34.3	2.707	2.222	+2.24	+5.9	17.5	51.1
Mar. 31	21 22.78	-25 33.5	2.622	2.222	+2.16	+6.3	17.4	55.9

Comet 309P/LINEAR

Epoch = 2023 June 25.0 TT  
 T = 2024 Mar. 29.06158 TT  
 Peri. = 49.94092 e = 0.6182860  
 Node = 10.14352 2000.0 a = 4.3738844 AU  
 Incl. = 17.02401 n = 0.10774649  
 q = 1.6695729 AU P = 9.15 years

$$m1 = 14.4 + 5 \log(\Delta) + 10.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	°			m	'		°
Jan. 6	20 00.79	-33° 58.7	4.999	4.067	+1.28	+4.4	.	16.7
Jan. 16	20 13.67	-33 13.7	4.963	4.012	+1.30	+4.6	.	13.3
Jan. 26	20 26.73	-32 27.0	4.907	3.957	+1.31	+4.7	.	13.6
Feb. 5	20 39.88	-31 38.9	4.832	3.901	+1.32	+4.9	.	17.1
Feb. 15	20 53.03	-30 49.7	4.739	3.844	+1.31	+5.0	.	22.4
Feb. 25	21 06.12	-29 59.6	4.628	3.787	+1.30	+5.0	.	28.5
Mar. 7	21 19.04	-29 09.3	4.500	3.730	+1.28	+5.0	.	34.9
Mar. 17	21 31.75	-28 19.0	4.358	3.672	+1.26	+5.0	.	41.4
Mar. 27	21 44.17	-27 29.7	4.202	3.613	+1.22	+4.9	.	48.1
Apr. 6	21 56.21	-26 41.9	4.035	3.553	+1.18	+4.7	.	54.8
Apr. 16	22 07.82	-25 56.5	3.857	3.493	+1.13	+4.4	.	61.6
Apr. 26	22 18.88	-25 14.4	3.671	3.433	+1.07	+4.0	.	68.5
May 6	22 29.30	-24 36.7	3.480	3.372	+1.00	+3.5	.	75.5
May 16	22 38.97	-24 04.4	3.284	3.310	+0.92	+2.9	.	82.7
May 26	22 47.73	-23 38.7	3.087	3.248	+0.82	+2.2	.	90.0
June 5	22 55.40	-23 20.7	2.891	3.186	+0.70	+1.3	.	97.5
June 15	23 01.79	-23 11.5	2.698	3.123	+0.56	+0.4	22.0	105.3
June 25	23 06.63	-23 12.1	2.511	3.060	+0.39	-0.6	21.8	113.3
July 5	23 09.64	-23 23.0	2.333	2.996	+0.19	-1.7	21.5	121.8
July 15	23 10.52	-23 44.0	2.168	2.932	-0.04	-2.6	21.3	130.5
July 25	23 08.98	-24 13.8	2.017	2.868	-0.30	-3.4	21.0	139.6
Aug. 4	23 04.83	-24 49.1	1.886	2.803	-0.56	-3.7	20.8	148.7
Aug. 14	22 58.06	-25 25.1	1.776	2.738	-0.81	-3.4	20.6	157.2
Aug. 24	22 48.97	-25 54.7	1.691	2.674	-1.01	-2.3	20.4	162.7
Sept. 3	22 38.31	-26 10.2	1.632	2.609	-1.11	-0.5	20.2	161.6
Sept. 13	22 27.16	-26 05.0	1.599	2.544	-1.09	+1.8	20.1	154.4
Sept. 23	22 16.81	-25 35.2	1.591	2.480	-0.94	+4.4	20.0	144.8
Oct. 3	22 08.46	-24 40.6	1.605	2.416	-0.69	+6.7	19.9	134.7
Oct. 13	22 02.94	-23 23.7	1.636	2.353	-0.38	+8.8	19.8	124.8
Oct. 23	22 00.70	-21 48.2	1.681	2.291	-0.04	+10.4	19.8	115.3
Nov. 2	22 01.80	-19 57.4	1.735	2.230	+0.29	+11.8	19.8	106.4
Nov. 12	22 06.03	-17 54.3	1.795	2.169	+0.59	+12.9	19.7	98.2
Nov. 22	22 13.12	-15 40.2	1.857	2.111	+0.85	+14.0	19.7	90.5
Dec. 2	22 22.72	-13 16.2	1.918	2.054	+1.08	+14.9	19.6	83.4
Dec. 12	22 34.50	-10 42.8	1.978	2.000	+1.29	+15.9	19.6	76.9
Dec. 22	22 48.20	-08 00.0	2.034	1.948	+1.47	+16.8	19.5	70.9
Jan. 1	23 03.57	-05 08.3	2.086	1.899	+1.62	+17.6	19.5	65.3
Jan. 11	23 20.45	-02 08.1	2.134	1.854	+1.77	+18.5	19.4	60.2
Jan. 21	23 38.73	+00 59.8	2.178	1.812	+1.90	+19.2	19.3	55.5
Jan. 31	23 58.31	+04 14.2	2.218	1.775	+2.03	+19.7	19.3	51.2
Feb. 10	00 19.20	+07 33.4	2.256	1.743	+2.16	+20.1	19.2	47.2
Feb. 20	00 41.39	+10 55.5	2.290	1.716	+2.29	+20.3	19.1	43.6
Mar. 1	01 04.91	+14 17.5	2.324	1.695	+2.43	+20.1	19.0	40.4
Mar. 11	01 29.83	+17 36.3	2.358	1.680	+2.57	+19.6	18.9	37.4
Mar. 21	01 56.20	+20 48.3	2.392	1.672	+2.72	+18.7	18.9	34.7
Mar. 31	02 24.03	+23 49.1	2.428	1.670	+2.86	+17.3	18.8	32.2

## Comet C/2022 S4 (Lemmon)

Epoch = 2023 June 25.0 TT  
 T = 2024 July 17.87583 TT  
 Peri. = 268.34875  
 Node = 220.16300 2000.0  
 Incl. = 101.15395  
 q = 2.7659143 AU  
 e = 1.0012653

$$m1 = 7.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	01 51.28	+17 35.0	5.573	5.935	-0.17	-6.4	19.0	106.9
Jan. 16	01 50.15	+16 34.6	5.673	5.862	-0.04	-5.6	18.9	96.2
Jan. 26	01 50.25	+15 42.5	5.777	5.788	+0.07	-4.8	18.9	85.8
Feb. 5	01 51.48	+14 58.5	5.879	5.715	+0.18	-4.0	18.9	75.6
Feb. 15	01 53.74	+14 22.1	5.974	5.642	+0.28	-3.3	18.9	65.8
Feb. 25	01 56.92	+13 52.4	6.057	5.569	+0.36	-2.6	18.9	56.3
Mar. 7	02 00.90	+13 28.4	6.124	5.496	+0.44	-2.1	18.8	47.0
Mar. 17	02 05.57	+13 08.9	6.172	5.422	+0.50	-1.7	18.8	38.0
Mar. 27	02 10.83	+12 52.8	6.198	5.349	+0.55	-1.5	18.7	29.1
Apr. 6	02 16.56	+12 38.9	6.201	5.276	+0.60	-1.3	18.7	20.5
Apr. 16	02 22.67	+12 26.2	6.180	5.203	+0.63	-1.3	18.6	12.1
Apr. 26	02 29.08	+12 13.4	6.133	5.130	+0.65	-1.3	18.5	4.4
May 6	02 35.68	+11 59.5	6.060	5.057	+0.67	-1.5	18.5	5.5
May 16	02 42.38	+11 43.3	5.963	4.984	+0.67	-1.8	18.4	13.3
May 26	02 49.11	+11 23.8	5.841	4.912	+0.67	-2.2	18.2	21.4
June 5	02 55.77	+10 59.7	5.696	4.839	+0.66	-2.7	18.1	29.5
June 15	03 02.24	+10 29.8	5.530	4.767	+0.63	-3.4	18.0	37.7
June 25	03 08.44	+09 52.9	5.344	4.695	+0.60	-4.1	17.9	45.9
July 5	03 14.23	+09 07.3	5.142	4.623	+0.55	-5.1	17.7	54.3
July 15	03 19.48	+08 11.7	4.926	4.551	+0.49	-6.2	17.5	62.8
July 25	03 24.03	+07 04.3	4.699	4.480	+0.41	-7.5	17.4	71.4
Aug. 4	03 27.72	+05 43.1	4.465	4.409	+0.31	-8.9	17.2	80.3
Aug. 14	03 30.35	+04 06.4	4.228	4.338	+0.20	-10.6	17.0	89.4
Aug. 24	03 31.70	+02 12.0	3.995	4.268	+0.05	-12.5	16.8	98.8
Sept. 3	03 31.53	+00 01.6	3.769	4.198	-0.11	-14.5	16.6	108.4
Sept. 13	03 29.61	-02 35.4	3.557	4.129	-0.30	-16.5	16.4	118.2
Sept. 23	03 25.72	-05 29.1	3.367	4.061	-0.50	-18.4	16.2	127.8
Oct. 3	03 19.71	-08 40.0	3.203	3.993	-0.72	-19.9	16.0	136.9
Oct. 13	03 11.54	-12 03.1	3.073	3.926	-0.93	-20.7	15.9	144.1
Oct. 23	03 01.37	-15 29.8	2.981	3.859	-1.11	-20.5	15.7	147.8
Nov. 2	02 49.60	-18 49.7	2.929	3.794	-1.24	-19.2	15.6	146.2
Nov. 12	02 36.86	-21 52.0	2.916	3.729	-1.30	-16.9	15.5	140.0
Nov. 22	02 23.96	-24 28.0	2.939	3.665	-1.26	-13.9	15.5	131.2
Dec. 2	02 11.79	-26 33.3	2.993	3.603	-1.15	-10.8	15.4	121.2
Dec. 12	02 01.07	-28 07.4	3.069	3.542	-0.97	-7.8	15.4	110.9
Dec. 22	01 52.36	-29 13.4	3.159	3.482	-0.75	-5.2	15.4	100.9
Jan. 1	01 45.97	-29 56.4	3.257	3.424	-0.51	-3.3	15.4	91.3
Jan. 11	01 41.96	-30 22.0	3.354	3.367	-0.27	-1.8	15.4	82.3
Jan. 21	01 40.28	-30 35.2	3.446	3.312	-0.05	-0.8	15.4	74.0
Jan. 31	01 40.76	-30 41.0	3.526	3.258	+0.16	-0.3	15.4	66.3
Feb. 10	01 43.22	-30 43.2	3.592	3.207	+0.35	-0.2	15.3	59.5
Feb. 20	01 47.46	-30 45.2	3.640	3.157	+0.52	-0.3	15.3	53.7
Mar. 1	01 53.31	-30 49.8	3.669	3.110	+0.67	-0.7	15.3	49.0
Mar. 11	02 00.64	-30 59.5	3.678	3.066	+0.81	-1.3	15.2	45.6
Mar. 21	02 09.33	-31 16.7	3.666	3.023	+0.94	-2.2	15.1	43.6
Mar. 31	02 19.31	-31 43.6	3.633	2.984	+1.07	-3.3	15.0	43.2

## Comet C/2022 U3 (Bok)

Epoch = 2023 June 25.0 TT  
 T = 2024 July 27.76432 TT  
 Peri. = 188.98925  
 Node = 272.80050 2000.0  
 Incl. = 33.62580  
 q = 4.8284201 AU  
 e = 1.0032596

$$m1 = -1.0 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	01 34.64	+39 40.7	6.091	6.487	+0.23	-5.0	19.2	109.6
Jan. 16	01 37.45	+38 53.2	6.179	6.439	+0.35	-4.4	19.1	100.9
Jan. 26	01 41.43	+38 11.9	6.275	6.391	+0.46	-3.8	19.1	92.3
Feb. 5	01 46.50	+37 37.5	6.374	6.344	+0.56	-3.1	19.1	83.8
Feb. 15	01 52.55	+37 10.1	6.471	6.296	+0.65	-2.4	19.0	75.5
Feb. 25	01 59.48	+36 49.6	6.564	6.250	+0.74	-1.7	19.0	67.3
Mar. 7	02 07.17	+36 35.7	6.649	6.204	+0.81	-1.1	19.0	59.4
Mar. 17	02 15.54	+36 27.7	6.723	6.158	+0.87	-0.5	18.9	51.8
Mar. 27	02 24.48	+36 24.9	6.784	6.112	+0.92	0.0	18.9	44.4
Apr. 6	02 33.92	+36 26.7	6.831	6.067	+0.97	+0.4	18.8	37.5
Apr. 16	02 43.75	+36 32.2	6.861	6.023	+1.00	+0.7	18.8	31.0
Apr. 26	02 53.92	+36 40.8	6.873	5.979	+1.03	+1.0	18.7	25.3
May 6	03 04.34	+36 51.6	6.867	5.935	+1.05	+1.2	18.7	20.8
May 16	03 14.92	+37 04.1	6.843	5.892	+1.07	+1.3	18.6	18.4
May 26	03 25.61	+37 17.7	6.800	5.850	+1.07	+1.4	18.5	18.8
June 5	03 36.31	+37 31.8	6.738	5.808	+1.07	+1.4	18.4	21.8
June 15	03 46.95	+37 45.9	6.658	5.767	+1.06	+1.4	18.3	26.6
June 25	03 57.45	+37 59.8	6.560	5.726	+1.04	+1.4	18.2	32.3
July 5	04 07.69	+38 13.0	6.446	5.686	+1.01	+1.3	18.1	38.6
July 15	04 17.59	+38 25.3	6.316	5.647	+0.97	+1.2	18.0	45.3
July 25	04 27.03	+38 36.5	6.172	5.608	+0.91	+1.0	17.9	52.3
Aug. 4	04 35.89	+38 46.4	6.016	5.570	+0.85	+0.9	17.8	59.5
Aug. 14	04 44.04	+38 54.8	5.849	5.533	+0.77	+0.8	17.7	67.0
Aug. 24	04 51.35	+39 01.6	5.675	5.496	+0.68	+0.6	17.6	74.8
Sept. 3	04 57.66	+39 06.5	5.495	5.460	+0.57	+0.4	17.4	82.8
Sept. 13	05 02.83	+39 09.3	5.312	5.425	+0.45	+0.1	17.3	91.1
Sept. 23	05 06.71	+39 09.5	5.130	5.391	+0.31	-0.1	17.2	99.7
Oct. 3	05 09.18	+39 06.5	4.953	5.358	+0.17	-0.5	17.1	108.6
Oct. 13	05 10.14	+38 59.4	4.784	5.325	+0.01	-1.0	16.9	117.9
Oct. 23	05 09.56	+38 47.1	4.629	5.293	-0.14	-1.6	16.8	127.4
Nov. 2	05 07.48	+38 28.5	4.490	5.262	-0.28	-2.3	16.7	137.2
Nov. 12	05 04.07	+38 02.4	4.374	5.232	-0.41	-3.1	16.6	147.0
Nov. 22	04 59.59	+37 27.9	4.282	5.203	-0.49	-3.9	16.5	156.5
Dec. 2	04 54.44	+36 44.7	4.219	5.175	-0.53	-4.8	16.4	164.2
Dec. 12	04 49.07	+35 53.3	4.186	5.147	-0.53	-5.5	16.3	166.1
Dec. 22	04 43.98	+34 55.2	4.185	5.121	-0.48	-6.1	16.3	160.2
Jan. 1	04 39.63	+33 52.6	4.213	5.096	-0.38	-6.4	16.3	151.1
Jan. 11	04 36.37	+32 47.9	4.269	5.072	-0.25	-6.5	16.3	141.1
Jan. 21	04 34.46	+31 43.7	4.350	5.049	-0.11	-6.3	16.3	130.9
Jan. 31	04 34.05	+30 42.0	4.451	5.026	+0.04	-6.0	16.3	120.8
Feb. 10	04 35.15	+29 44.4	4.567	5.005	+0.19	-5.5	16.3	110.9
Feb. 20	04 37.75	+28 51.6	4.695	4.986	+0.34	-5.0	16.3	101.4
Mar. 1	04 41.72	+28 03.9	4.830	4.967	+0.47	-4.5	16.3	92.1
Mar. 11	04 46.97	+27 20.8	4.967	4.949	+0.59	-4.1	16.4	83.2
Mar. 21	04 53.34	+26 41.9	5.102	4.933	+0.69	-3.7	16.4	74.6
Mar. 31	05 00.69	+26 06.2	5.233	4.917	+0.78	-3.4	16.4	66.3

## Comet C/2021 G2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2024 Sept. 9.57164 TT  
 Peri. = 343.32095  
 Node = 221.09550 2000.0  
 Incl. = 48.47410  
 q = 4.9814976 AU  
 e = 0.9993888

$$m1 = 1.3 + 5 \log(\Delta) + 12.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	09 10.58	-38 45.8	6.336	6.766	-0.29	-3.4	15.7	112.0
Jan. 16	09 07.32	-39 13.7	6.215	6.718	-0.36	-2.1	15.6	117.0
Jan. 26	09 03.44	-39 27.9	6.108	6.671	-0.41	-0.6	15.5	121.1
Feb. 5	08 59.22	-39 27.3	6.018	6.623	-0.43	+0.9	15.5	124.3
Feb. 15	08 54.98	-39 11.7	5.945	6.577	-0.41	+2.4	15.4	126.2
Feb. 25	08 51.05	-38 41.7	5.891	6.530	-0.36	+3.8	15.3	126.7
Mar. 7	08 47.75	-37 58.6	5.856	6.484	-0.28	+4.9	15.3	125.6
Mar. 17	08 45.33	-37 04.8	5.839	6.438	-0.19	+5.9	15.2	123.2
Mar. 27	08 43.98	-36 02.8	5.840	6.393	-0.07	+6.5	15.2	119.7
Apr. 6	08 43.82	-34 55.5	5.857	6.348	+0.05	+6.9	15.2	115.2
Apr. 16	08 44.89	-33 46.0	5.888	6.303	+0.17	+7.0	15.1	110.1
Apr. 26	08 47.17	-32 36.7	5.931	6.259	+0.29	+6.8	15.1	104.5
May 6	08 50.61	-31 30.2	5.984	6.215	+0.41	+6.4	15.1	98.6
May 16	08 55.13	-30 28.4	6.044	6.172	+0.51	+5.9	15.1	92.6
May 26	09 00.64	-29 32.8	6.108	6.129	+0.60	+5.2	15.1	86.5
June 5	09 07.02	-28 44.5	6.174	6.087	+0.68	+4.4	15.1	80.4
June 15	09 14.17	-28 04.2	6.240	6.045	+0.75	+3.6	15.0	74.3
June 25	09 21.98	-27 32.5	6.303	6.004	+0.81	+2.7	15.0	68.4
July 5	09 30.35	-27 09.4	6.361	5.963	+0.86	+1.8	15.0	62.7
July 15	09 39.20	-26 55.1	6.413	5.923	+0.91	+1.0	15.0	57.1
July 25	09 48.44	-26 49.2	6.457	5.884	+0.94	+0.1	15.0	51.8
Aug. 4	09 57.97	-26 51.6	6.490	5.845	+0.97	-0.7	14.9	46.9
Aug. 14	10 07.74	-27 01.7	6.513	5.806	+0.99	-1.4	14.9	42.5
Aug. 24	10 17.68	-27 19.1	6.523	5.769	+1.00	-2.1	14.9	38.7
Sept. 3	10 27.70	-27 43.4	6.519	5.732	+1.00	-2.8	14.8	35.8
Sept. 13	10 37.75	-28 13.8	6.501	5.695	+1.00	-3.4	14.8	34.0
Sept. 23	10 47.77	-28 49.9	6.469	5.659	+1.00	-3.9	14.8	33.5
Oct. 3	10 57.67	-29 30.9	6.421	5.624	+0.98	-4.3	14.7	34.5
Oct. 13	11 07.39	-30 16.1	6.358	5.590	+0.96	-4.7	14.7	36.7
Oct. 23	11 16.85	-31 04.8	6.280	5.557	+0.93	-5.0	14.6	40.2
Nov. 2	11 25.97	-31 56.1	6.187	5.524	+0.89	-5.3	14.5	44.6
Nov. 12	11 34.66	-32 49.3	6.079	5.492	+0.84	-5.4	14.5	49.7
Nov. 22	11 42.80	-33 43.4	5.959	5.460	+0.78	-5.4	14.4	55.5
Dec. 2	11 50.30	-34 37.4	5.827	5.430	+0.71	-5.3	14.3	61.7
Dec. 12	11 57.02	-35 30.1	5.685	5.400	+0.63	-5.2	14.2	68.4
Dec. 22	12 02.85	-36 20.2	5.534	5.372	+0.53	-4.8	14.1	75.4
Jan. 1	12 07.65	-37 06.3	5.378	5.344	+0.42	-4.3	14.1	82.8
Jan. 11	12 11.30	-37 46.7	5.219	5.317	+0.30	-3.7	14.0	90.3
Jan. 21	12 13.71	-38 19.4	5.061	5.291	+0.17	-2.8	13.9	98.2
Jan. 31	12 14.82	-38 42.4	4.906	5.266	+0.04	-1.7	13.8	106.1
Feb. 10	12 14.62	-38 53.6	4.759	5.242	-0.09	-0.4	13.7	114.2
Feb. 20	12 13.19	-38 50.6	4.624	5.218	-0.20	+1.1	13.6	122.3
Mar. 1	12 10.72	-38 31.7	4.503	5.196	-0.30	+2.8	13.5	130.0
Mar. 11	12 07.46	-37 55.8	4.402	5.175	-0.36	+4.6	13.4	137.2
Mar. 21	12 03.78	-37 02.4	4.323	5.155	-0.38	+6.3	13.4	143.2
Mar. 31	12 00.06	-35 52.8	4.269	5.136	-0.36	+7.8	13.3	147.0



Comet C/2022 E2 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2024 Sept. 14.00024 TT  
 Peri. = 41.69035  
 Node = 125.36793 2000.0  
 Incl. = 137.13190  
 q = 3.6669181 AU  
 e = 1.0009250

$$m1 = 0.2 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	10 20.62	-19 56.2	5.875	6.370	-0.60	+1.5	16.1	116.1
Jan. 16	10 14.09	-19 35.2	5.678	6.307	-0.72	+2.8	16.0	126.0
Jan. 26	10 06.41	-19 00.4	5.504	6.244	-0.82	+4.3	15.8	135.5
Feb. 5	09 57.82	-18 10.7	5.358	6.182	-0.90	+5.8	15.7	143.9
Feb. 15	09 48.64	-17 05.9	5.244	6.119	-0.94	+7.3	15.6	149.9
Feb. 25	09 39.26	-15 47.1	5.167	6.057	-0.93	+8.6	15.5	151.8
Mar. 7	09 30.10	-14 16.5	5.125	5.995	-0.89	+9.6	15.4	148.7
Mar. 17	09 21.54	-12 37.5	5.120	5.933	-0.81	+10.2	15.3	141.7
Mar. 27	09 13.92	-10 53.9	5.148	5.871	-0.70	+10.5	15.3	132.8
Apr. 6	09 07.47	-09 09.7	5.205	5.810	-0.57	+10.3	15.2	123.0
Apr. 16	09 02.32	-07 28.2	5.284	5.749	-0.44	+9.9	15.2	112.8
Apr. 26	08 58.52	-05 52.1	5.381	5.688	-0.31	+9.2	15.2	102.7
May 6	08 56.04	-04 23.3	5.488	5.627	-0.18	+8.4	15.2	92.7
May 16	08 54.80	-03 02.8	5.600	5.567	-0.06	+7.6	15.1	83.0
May 26	08 54.69	-01 51.2	5.709	5.507	+0.05	+6.7	15.1	73.4
June 5	08 55.59	+00 48.5	5.812	5.447	+0.14	+5.8	15.1	64.2
June 15	08 57.35	+00 05.8	5.903	5.387	+0.22	+5.0	15.0	55.1
June 25	08 59.85	+00 52.1	5.979	5.328	+0.29	+4.2	15.0	46.4
July 5	09 02.95	+01 31.1	6.035	5.270	+0.34	+3.5	14.9	37.9
July 15	09 06.53	+02 03.7	6.070	5.211	+0.38	+2.9	14.9	29.7
July 25	09 10.48	+02 30.5	6.082	5.154	+0.41	+2.4	14.8	22.0
Aug. 4	09 14.67	+02 52.5	6.067	5.096	+0.43	+2.0	14.7	15.4
Aug. 14	09 19.00	+03 10.5	6.027	5.039	+0.44	+1.6	14.6	11.9
Aug. 24	09 23.34	+03 25.5	5.959	4.983	+0.43	+1.4	14.5	13.9
Sept. 3	09 27.59	+03 38.6	5.864	4.927	+0.41	+1.2	14.4	19.9
Sept. 13	09 31.62	+03 50.7	5.743	4.872	+0.39	+1.2	14.3	27.5
Sept. 23	09 35.29	+04 03.2	5.596	4.818	+0.34	+1.3	14.2	35.8
Oct. 3	09 38.47	+04 17.3	5.425	4.764	+0.28	+1.6	14.0	44.5
Oct. 13	09 40.98	+04 34.6	5.234	4.711	+0.21	+2.0	13.9	53.6
Oct. 23	09 42.64	+04 56.8	5.024	4.658	+0.11	+2.6	13.7	63.1
Nov. 2	09 43.23	+05 25.9	4.799	4.607	-0.01	+3.4	13.6	72.9
Nov. 12	09 42.52	+06 04.2	4.565	4.556	-0.15	+4.4	13.4	83.2
Nov. 22	09 40.22	+06 54.1	4.327	4.506	-0.33	+5.7	13.2	94.0
Dec. 2	09 36.06	+07 58.1	4.092	4.457	-0.53	+7.3	13.0	105.4
Dec. 12	09 29.75	+09 18.5	3.867	4.409	-0.76	+9.0	12.8	117.5
Dec. 22	09 21.05	+10 56.8	3.662	4.362	-1.01	+10.8	12.6	130.2
Jan. 1	09 09.83	+12 52.9	3.485	4.316	-1.26	+12.5	12.4	143.6
Jan. 11	08 56.15	+15 04.4	3.345	4.271	-1.49	+13.8	12.3	157.6
Jan. 21	08 40.37	+17 26.2	3.250	4.227	-1.67	+14.5	12.2	172.1
Jan. 31	08 23.17	+19 50.6	3.205	4.185	-1.76	+14.3	12.1	173.1
Feb. 10	08 05.50	+22 09.3	3.210	4.143	-1.75	+13.3	12.0	158.4
Feb. 20	07 48.40	+24 15.3	3.263	4.104	-1.64	+11.7	12.0	144.0
Mar. 1	07 32.83	+26 04.9	3.356	4.065	-1.45	+10.0	12.0	130.1
Mar. 11	07 19.45	+27 37.5	3.480	4.028	-1.20	+8.4	12.0	116.9
Mar. 21	07 08.62	+28 54.8	3.626	3.992	-0.94	+7.0	12.0	104.4
Mar. 31	07 00.39	+29 59.7	3.784	3.959	-0.68	+5.9	12.1	92.7

Comet 65P/Gunn

Epoch = 2023 June 25.0 TT  
 T = 2025 June 17.06933 TT  
 Peri. = 213.84331 e = 0.2483060  
 Node = 61.98156 2000.0 a = 3.8896683 AU  
 Incl. = 9.17576 n = 0.12847991  
 q = 2.9238403 AU P = 7.67 years

$$m1 = 7.0 + 5 \log(\Delta) + 12.5 \log(r(t+250))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2023/24	h m	° ' "			m		°
Jan. 6	10 13.71	+22 33.0	3.693	4.460	-0.29 +3.9	17.4	136.7
Jan. 16	10 10.10	+23 13.7	3.585	4.445	-0.44 +4.3	17.3	147.3
Jan. 26	10 05.07	+23 57.2	3.503	4.429	-0.57 +4.4	17.2	157.6
Feb. 5	09 58.97	+24 39.8	3.450	4.413	-0.65 +4.1	17.1	166.1
Feb. 15	09 52.23	+25 18.1	3.427	4.397	-0.69 +3.5	17.1	167.6
Feb. 25	09 45.39	+25 49.1	3.436	4.381	-0.67 +2.6	17.1	160.4
Mar. 7	09 39.02	+26 10.4	3.474	4.364	-0.59 +1.6	17.1	150.5
Mar. 17	09 33.61	+26 21.1	3.538	4.347	-0.47 +0.5	17.1	140.0
Mar. 27	09 29.53	+26 21.0	3.625	4.330	-0.32 -0.6	17.1	129.7
Apr. 6	09 27.04	+26 10.8	3.729	4.313	-0.16 -1.5	17.1	119.6
Apr. 16	09 26.22	+25 51.8	3.848	4.295	+0.01 -2.3	17.2	110.0
Apr. 26	09 27.07	+25 25.0	3.974	4.277	+0.17 -3.1	17.2	100.7
May 6	09 29.49	+24 51.6	4.106	4.259	+0.32 -3.7	17.2	91.8
May 16	09 33.34	+24 12.5	4.237	4.240	+0.46 -4.2	17.3	83.3
May 26	09 38.47	+23 28.3	4.366	4.222	+0.58 -4.7	17.3	75.2
June 5	09 44.71	+22 39.9	4.489	4.203	+0.68 -5.1	17.3	67.3
June 15	09 51.90	+21 47.5	4.603	4.184	+0.77 -5.4	17.3	59.7
June 25	09 59.90	+20 51.7	4.707	4.165	+0.84 -5.8	17.4	52.3
July 5	10 08.57	+19 52.8	4.799	4.145	+0.90 -6.0	17.4	45.2
July 15	10 17.80	+18 51.2	4.876	4.125	+0.95 -6.3	17.4	38.2
July 25	10 27.50	+17 47.1	4.939	4.106	+0.99 -6.5	17.4	31.4
Aug. 4	10 37.56	+16 41.0	4.985	4.085	+1.02 -6.7	17.4	24.7
Aug. 14	10 47.91	+15 33.3	5.015	4.065	+1.05 -6.9	17.3	18.3
Aug. 24	10 58.49	+14 24.3	5.027	4.045	+1.07 -6.9	17.3	12.3
Sept. 3	11 09.21	+13 14.6	5.021	4.024	+1.08 -7.0	17.3	7.9
Sept. 13	11 20.04	+12 04.5	4.997	4.003	+1.09 -7.0	17.2	8.0
Sept. 23	11 30.90	+10 54.7	4.956	3.982	+1.09 -6.9	17.2	12.6
Oct. 3	11 41.73	+09 45.8	4.896	3.961	+1.08 -6.8	17.1	18.7
Oct. 13	11 52.49	+08 38.3	4.820	3.940	+1.07 -6.6	17.0	25.2
Oct. 23	12 03.09	+07 33.0	4.726	3.918	+1.05 -6.4	17.0	32.0
Nov. 2	12 13.47	+06 30.6	4.617	3.897	+1.02 -6.1	16.9	39.1
Nov. 12	12 23.54	+05 31.8	4.493	3.875	+0.99 -5.7	16.8	46.3
Nov. 22	12 33.21	+04 37.4	4.356	3.853	+0.94 -5.2	16.7	53.7
Dec. 2	12 42.37	+03 48.4	4.207	3.832	+0.88 -4.6	16.6	61.3
Dec. 12	12 50.89	+03 05.5	4.049	3.810	+0.81 -3.9	16.5	69.1
Dec. 22	12 58.62	+02 29.7	3.883	3.787	+0.72 -3.2	16.3	77.1
Jan. 1	13 05.41	+02 01.8	3.713	3.765	+0.62 -2.3	16.2	85.5
Jan. 11	13 11.07	+01 42.6	3.541	3.743	+0.50 -1.4	16.1	94.1
Jan. 21	13 15.42	+01 32.8	3.372	3.721	+0.35 -0.4	15.9	103.1
Jan. 31	13 18.27	+01 32.7	3.208	3.698	+0.20 +0.5	15.8	112.5
Feb. 10	13 19.45	+01 42.5	3.054	3.676	+0.02 +1.5	15.7	122.2
Feb. 20	13 18.84	+02 01.7	2.914	3.654	-0.16 +2.4	15.5	132.3
Mar. 1	13 16.44	+02 28.9	2.793	3.631	-0.34 +3.1	15.4	142.8
Mar. 11	13 12.34	+03 02.0	2.694	3.609	-0.50 +3.5	15.3	153.3
Mar. 21	13 06.80	+03 37.8	2.621	3.587	-0.62 +3.6	15.2	163.3
Mar. 31	13 00.29	+04 12.6	2.576	3.564	-0.68 +3.3	15.2	170.0

Comet C/2022 QE78 (ATLAS)

Epoch = 2023 June 25.0 TT  
 T = 2025 Sept. 10.19738 TT  
 Peri. = 0.34232  
 Node = 119.94467 2000.0  
 Incl. = 36.54824  
 q = 5.4823628 AU  
 e = 1.0030997

$$m1 = 3.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2023/24	h m	° '			m	'		°
Jan. 6	03 21.11	-20 05.5	8.372	8.767	-0.14	+3.7	17.5	110.6
Jan. 16	03 20.05	-19 25.9	8.446	8.716	-0.06	+4.3	17.5	102.8
Jan. 26	03 19.76	-18 41.3	8.527	8.666	+0.01	+4.7	17.5	94.9
Feb. 5	03 20.27	-17 53.1	8.612	8.616	+0.09	+5.0	17.5	86.9
Feb. 15	03 21.56	-17 02.5	8.697	8.566	+0.17	+5.1	17.5	79.1
Feb. 25	03 23.60	-16 10.7	8.778	8.516	+0.25	+5.2	17.5	71.5
Mar. 7	03 26.36	-15 18.8	8.853	8.466	+0.31	+5.2	17.5	64.1
Mar. 17	03 29.77	-14 27.8	8.917	8.417	+0.37	+5.0	17.5	57.0
Mar. 27	03 33.76	-13 38.5	8.968	8.367	+0.43	+4.8	17.5	50.3
Apr. 6	03 38.26	-12 51.6	9.005	8.318	+0.48	+4.5	17.5	44.2
Apr. 16	03 43.20	-12 07.8	9.026	8.268	+0.51	+4.2	17.5	38.8
Apr. 26	03 48.49	-11 27.5	9.029	8.219	+0.55	+3.8	17.4	34.5
May 6	03 54.07	-10 51.2	9.013	8.170	+0.57	+3.4	17.4	31.5
May 16	03 59.86	-10 19.4	8.979	8.121	+0.59	+2.9	17.4	30.2
May 26	04 05.79	-09 52.2	8.925	8.073	+0.60	+2.4	17.3	30.9
June 5	04 11.77	-09 30.0	8.853	8.024	+0.60	+1.9	17.3	33.3
June 15	04 17.74	-09 12.9	8.762	7.976	+0.59	+1.4	17.2	37.1
June 25	04 23.61	-09 01.0	8.654	7.928	+0.58	+0.9	17.2	42.0
July 5	04 29.32	-08 54.5	8.530	7.880	+0.56	+0.4	17.1	47.6
July 15	04 34.77	-08 53.2	8.391	7.832	+0.53	-0.2	17.1	53.7
July 25	04 39.89	-08 57.2	8.238	7.784	+0.49	-0.7	17.0	60.2
Aug. 4	04 44.59	-09 06.2	8.075	7.737	+0.44	-1.2	16.9	67.1
Aug. 14	04 48.78	-09 19.9	7.903	7.690	+0.39	-1.6	16.8	74.2
Aug. 24	04 52.38	-09 38.0	7.726	7.643	+0.32	-2.0	16.8	81.5
Sept. 3	04 55.30	-09 59.7	7.545	7.596	+0.25	-2.3	16.7	89.1
Sept. 13	04 57.46	-10 24.3	7.365	7.549	+0.17	-2.6	16.6	96.7
Sept. 23	04 58.81	-10 50.8	7.188	7.503	+0.09	-2.7	16.5	104.5
Oct. 3	04 59.28	-11 18.0	7.019	7.457	0.00	-2.7	16.5	112.3
Oct. 13	04 58.86	-11 44.4	6.861	7.411	-0.09	-2.5	16.4	120.0
Oct. 23	04 57.56	-12 08.3	6.718	7.366	-0.18	-2.2	16.3	127.5
Nov. 2	04 55.44	-12 28.1	6.593	7.320	-0.25	-1.7	16.2	134.3
Nov. 12	04 52.60	-12 42.1	6.489	7.275	-0.32	-1.0	16.2	140.0
Nov. 22	04 49.21	-12 48.5	6.409	7.231	-0.36	-0.2	16.1	143.9
Dec. 2	04 45.47	-12 46.2	6.355	7.186	-0.38	+0.7	16.1	145.2
Dec. 12	04 41.61	-12 34.3	6.326	7.142	-0.38	+1.7	16.0	143.6
Dec. 22	04 37.88	-12 12.6	6.323	7.098	-0.36	+2.7	16.0	139.3
Jan. 1	04 34.54	-11 41.4	6.345	7.055	-0.31	+3.6	16.0	133.2
Jan. 11	04 31.78	-11 01.5	6.388	7.012	-0.24	+4.4	16.0	126.0
Jan. 21	04 29.78	-10 14.1	6.451	6.969	-0.15	+5.1	16.0	118.1
Jan. 31	04 28.66	-09 20.8	6.529	6.926	-0.06	+5.6	16.0	109.9
Feb. 10	04 28.50	-08 23.1	6.619	6.884	+0.04	+6.0	16.0	101.5
Feb. 20	04 29.32	-07 22.6	6.716	6.843	+0.14	+6.1	16.0	93.2
Mar. 1	04 31.11	-06 20.7	6.817	6.801	+0.23	+6.2	16.0	84.9
Mar. 11	04 33.82	-05 18.7	6.917	6.760	+0.32	+6.2	16.0	76.8
Mar. 21	04 37.41	-04 17.8	7.013	6.720	+0.40	+6.0	16.0	68.9
Mar. 31	04 41.78	-03 18.8	7.102	6.680	+0.48	+5.8	16.0	61.3

## Comet 95P/(2060) Chiron

Epoch = 2023 June 25.0 TT  
 T = 2046 Sept. 16.45691 TT  
 Peri. = 339.39337  
 Node = 209.30680 2000.0  
 Incl. = 6.91740  
 q = 8.5524989 AU

e = 0.3763149  
 a = 13.7128479 AU  
 n = 0.01940942  
 P = 50.78 years

H = 5.8 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2023/24	h m	°	'		m		°
Jan. 6	00 40.29	+06 14.3	18.845	18.813	+0.05	+0.2	86.6
Jan. 16	00 40.96	+06 16.8	19.014	18.811	+0.08	+0.4	76.6
Jan. 26	00 41.94	+06 21.4	19.177	18.809	+0.12	+0.6	66.7
Feb. 5	00 43.22	+06 27.9	19.328	18.807	+0.14	+0.7	56.9
Feb. 15	00 44.75	+06 36.1	19.463	18.805	+0.17	+0.9	47.2
Feb. 25	00 46.51	+06 45.8	19.578	18.803	+0.19	+1.0	37.6
Mar. 7	00 48.44	+06 56.8	19.671	18.801	+0.20	+1.2	28.1
Mar. 17	00 50.50	+07 08.7	19.739	18.799	+0.21	+1.2	18.6
Mar. 27	00 52.66	+07 21.3	19.780	18.797	+0.22	+1.3	9.4
Apr. 6	00 54.86	+07 34.2	19.795	18.795	+0.22	+1.3	1.6
Apr. 16	00 57.05	+07 47.2	19.781	18.792	+0.22	+1.3	9.4
Apr. 26	00 59.20	+08 00.1	19.741	18.790	+0.21	+1.3	18.6
May 6	01 01.26	+08 12.4	19.675	18.788	+0.20	+1.2	27.7
May 16	01 03.19	+08 24.0	19.585	18.785	+0.18	+1.1	36.8
May 26	01 04.95	+08 34.7	19.473	18.783	+0.16	+1.0	46.0
June 5	01 06.50	+08 44.1	19.342	18.781	+0.14	+0.9	55.1
June 15	01 07.81	+08 52.2	19.196	18.778	+0.12	+0.7	64.4
June 25	01 08.84	+08 58.6	19.037	18.776	+0.09	+0.5	73.6
July 5	01 09.59	+09 03.2	18.871	18.773	+0.06	+0.4	82.9
July 15	01 10.02	+09 06.0	18.701	18.771	+0.03	+0.2	92.4
July 25	01 10.13	+09 06.8	18.533	18.768	-0.01	0.0	101.9
Aug. 4	01 09.91	+09 05.7	18.370	18.766	-0.04	-0.2	111.5
Aug. 14	01 09.38	+09 02.5	18.218	18.763	-0.07	-0.4	121.2
Aug. 24	01 08.54	+08 57.4	18.081	18.760	-0.10	-0.6	131.0
Sept. 3	01 07.44	+08 50.6	17.963	18.758	-0.12	-0.8	141.0
Sept. 13	01 06.12	+08 42.2	17.868	18.755	-0.14	-0.9	151.0
Sept. 23	01 04.61	+08 32.6	17.799	18.752	-0.16	-1.0	161.2
Oct. 3	01 02.99	+08 22.1	17.759	18.750	-0.17	-1.1	171.4
Oct. 13	01 01.31	+08 11.0	17.750	18.747	-0.17	-1.1	177.6
Oct. 23	00 59.65	+07 59.9	17.770	18.744	-0.16	-1.1	167.7
Nov. 2	00 58.08	+07 49.1	17.821	18.741	-0.15	-1.0	157.4
Nov. 12	00 56.67	+07 39.0	17.900	18.738	-0.13	-0.9	147.0
Nov. 22	00 55.46	+07 30.2	18.006	18.735	-0.11	-0.8	136.6
Dec. 2	00 54.53	+07 22.9	18.133	18.732	-0.08	-0.6	126.2
Dec. 12	00 53.89	+07 17.4	18.279	18.729	-0.05	-0.4	115.9
Dec. 22	00 53.58	+07 13.9	18.438	18.726	-0.01	-0.2	105.6
Jan. 1	00 53.61	+07 12.6	18.605	18.723	+0.02	0.0	95.4
Jan. 11	00 53.99	+07 13.4	18.775	18.720	+0.06	+0.2	85.3
Jan. 21	00 54.70	+07 16.3	18.942	18.717	+0.09	+0.4	75.3
Jan. 31	00 55.73	+07 21.3	19.102	18.714	+0.12	+0.6	65.4
Feb. 10	00 57.05	+07 28.1	19.250	18.711	+0.15	+0.8	55.6
Feb. 20	00 58.62	+07 36.6	19.381	18.708	+0.17	+0.9	45.9
Mar. 1	01 00.41	+07 46.5	19.493	18.704	+0.19	+1.1	36.4
Mar. 11	01 02.38	+07 57.5	19.582	18.701	+0.20	+1.2	26.9
Mar. 21	01 04.48	+08 09.4	19.645	18.698	+0.22	+1.2	17.5
Mar. 31	01 06.66	+08 22.0	19.683	18.694	+0.22	+1.3	8.2

## Orbital elements:

Comet 29P/Schwassmann-Wachmann

Epoch 2019 Mar. 18.0 TT = JDT 2458560.5

T 2019 Mar. 7.75599 TT

		(2000.0)	P	Sato	Q
q	5.7668228				
n	0.06662628	Peri.	47.77433	+0.99270158	-0.00956820
a	6.0261374	Node	312.39460	-0.05135248	+0.86841752
e	0.0430316	Incl.	9.36833	+0.10911690	+0.49574133
P	14.79				

From 39009 observations 1902 Mar. 5–2023 Jan. 3, mean residual 0".62.

Comet 378P/McNaught

Epoch 2020 Nov. 7.0 TT = JDT 2459160.5

T 2020 Oct. 20.88152 TT

		(2000.0)	P	Sato	Q
q	3.3808618				
n	0.06112756	Peri.	194.04842	+0.30500539	+0.89476232
a	6.3823119	Node	94.51308	-0.83913152	+0.41444622
e	0.4702763	Incl.	19.09660	-0.45036651	-0.16623695
P	16.12				

From 500 observations 2019 Feb. 17–2023 Jan. 21, mean residual 0".54.

Comet 246P/NEAT

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Feb. 22.82363 TT

		(2000.0)	P	Sato	Q
q	2.8639272				
n	0.12245310	Peri.	176.29983	-0.25557087	+0.92828777
a	4.0162696	Node	78.74763	-0.89393296	-0.12049263
e	0.2869186	Incl.	15.98676	-0.36819479	-0.35180014
P	8.05				

From 4298 observations 2002 Jan. 6–2023 Jan. 1, mean residual 0".94.

Comet C/2019 T3 (ATLAS)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 2.69751 TT

		(2000.0)	P	Sato	Q
q	5.9465048				
z	+0.0002922	Peri.	112.27608	+0.60544515	+0.57397272
	+/-0.0000005	Node	139.52083	-0.19750186	-0.56273422
e	0.9982623	Incl.	121.86224	+0.77099234	-0.59488277

From 1778 observations 2019 Jan. 17–2022 Nov. 25, mean residual 0".58.

Comet C/2019 O3 (Palomar)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 7.99335 TT

		(2000.0)	P	Sato	Q
q	8.8194564				
z	-0.0002633	Peri.	60.05073	+0.25489645	-0.43682128
	+/-0.0000004	Node	300.38077	-0.73850302	+0.48797144
e	1.0023219	Incl.	89.81510	+0.62421238	+0.75569243

From 1957 observations 2019 May 14–2023 Jan. 29, mean residual 0".46.

Comet C/2020 F5 (MASTER)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 24.27921 TT

		(2000.0)	P	Sato	Q
q	4.3259404				
z	-0.0007797	Peri.	311.07233	+0.57218187	+0.81011014
	+/-0.0000007	Node	350.62959	-0.28568480	+0.05082633
e	1.0033729	Incl.	51.70698	-0.76876011	+0.58407041

From 1755 observations 2020 Mar. 16–2023 Jan. 21, mean residual 0".56.

Comet C/2019 F1 (ATLAS-Africano)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 June 22.86442 TT

		(2000.0)	P	Sato	Q
q	3.5957168				
z	-0.0010315	Peri.	251.13162	+0.09418406	+0.85665745
	+/-0.0000003	Node	38.72428	-0.27687913	+0.51191940
e	1.0037091	Incl.	54.17424	-0.95627784	-0.06384789

From 1870 observations 2019 Feb. 8–2023 Jan. 25, mean residual 0".68.

Comet C/2020 H6 (ATLAS)  
 Epoch 2021 Sept. 23.0 TT = JDT 2459480.5  
 T 2021 Oct. 1.07566 TT  

	(2000.0)	P	Sato	Q
q	4.7028851			
z	-0.0001509	Peri. 20.34792	-0.74636309	+0.37991008
	+/-0.0000004	Node 213.70650	-0.65981026	-0.31488186
e	1.0007096	Incl. 79.96711	+0.08713532	+0.86978028

 From 1927 observations 2020 Apr. 22–2023 Jan. 27, mean residual 0".47.

Comet P/2021 N2 (Fuls)  
 Epoch 2021 Nov. 2.0 TT = JDT 2459520.5  
 T 2021 Nov. 13.24862 TT  

	(2000.0)	P	Sato	Q
q	3.7965676			
n	0.05398652	Peri. 177.33676	+0.77547483	-0.61318416
a	6.9333932	Node 221.74244	+0.57502080	+0.78433093
e	0.4524229	Incl. 13.06276	+0.26074865	+0.09396897

 P 18.26  
 From 915 observations 2021 June 27–2023 Jan. 3, mean residual 0".34.

Comet 402P/LINEAR  
 Epoch 2021 Dec. 12.0 TT = JDT 2459560.5  
 T 2021 Dec. 14.54545 TT  

	(2000.0)	P	Sato	Q
q	3.9378784			
n	0.05304382	Peri. 326.73154	-0.06194153	-0.90087482
a	7.0152986	Node 123.09140	+0.99049412	-0.10845504
e	0.4386727	Incl. 30.85152	+0.12281955	+0.42031186

 P 18.58  
 From 1876 observations 2001 Nov. 22–2023 Jan. 28, mean residual 0".59.

Comet 395P/Catalina-NEAT  
 Epoch 2021 Dec. 12.0 TT = JDT 2459560.5  
 T 2021 Dec. 30.45247 TT  

	(2000.0)	P	Sato	Q
q	4.0648959			
n	0.05865862	Peri. 89.84687	+0.68738928	+0.72521644
a	6.5601662	Node 223.66602	-0.68702430	+0.63164486
e	0.3803669	Incl. 3.27629	-0.23557076	+0.27401804

 P 16.80  
 From 878 observations 2005 May 12–2023 Jan. 19, mean residual 0".55.

Comet C/2019 L3 (ATLAS)  
 Epoch 2022 Jan. 21.0 TT = JDT 2459600.5  
 T 2022 Jan. 9.62161 TT  

	(2000.0)	P	Sato	Q
q	3.5545001			
z	-0.0004474	Peri. 171.61115	-0.26052198	-0.66630584
	+/-0.0000001	Node 290.78990	+0.83676283	+0.20517512
e	1.0015901	Incl. 48.36127	+0.48161839	-0.71689587

 From 5484 observations 2019 June 10–2023 Jan. 13, mean residual 0".45.

Comet C/2021 S1 (ATLAS)  
 Epoch 2022 Mar. 2.0 TT = JDT 2459640.5  
 T 2022 Feb. 28.95718 TT  

	(2000.0)	P	Sato	Q
q	6.1192187			
z	-0.0001471	Peri. 148.18993	-0.14243419	-0.71530748
	+/-0.0000008	Node 299.87324	+0.65865890	+0.44743888
e	1.0009001	Incl. 52.08947	+0.73883757	-0.53678083

 From 422 observations 2021 Sept. 27–2023 Jan. 18, mean residual 0".46.

Comet C/2020 U4 (PANSTARRS)  
 Epoch 2022 Apr. 11.0 TT = JDT 2459680.5  
 T 2022 Apr. 7.99290 TT  

	(2000.0)	P	Sato	Q
q	5.3536928			
z	-0.0002548	Peri. 69.53487	+0.61568389	+0.76367348
	+/-0.0000006	Node 120.01378	+0.61317186	-0.61914170
e	1.0013640	Incl. 167.03587	+0.49492790	-0.18293814

 From 926 observations 2019 Nov. 9–2023 Jan. 21, mean residual 0".55.

## Comet 44P/Reinmuth

Epoch 2022 Apr. 11.0 TT = JDT 2459680.5

T 2022 Apr. 23.28442 TT

		(2000.0)	P	Sato	Q
q	2.1126827				
n	0.13891149	Peri.	58.08586	+0.95959575	+0.26357553
a	3.6924157	Node	286.47246	-0.28013961	+0.86203381
e	0.4278319	Incl.	5.89610	-0.02641587	+0.43292684
P	7.10				

From 1986 observations 1993 Feb. 26–2023 Jan. 25, mean residual 0".70.

Nongravitational parameters A1 = -0.07, A2 = -0.1303.

## Comet 179P/Jedicke

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 May 30.31447 TT

		(2000.0)	P	Sato	Q
q	4.1177283				
n	0.06821718	Peri.	296.92043	+0.56164335	-0.76825011
a	5.9320784	Node	115.51288	+0.82691399	+0.50876072
e	0.3058540	Incl.	19.89821	+0.02774883	+0.38852837
P	14.45				

From 461 observations 1995 Jan. 8–2023 Jan. 19, mean residual 0".61.

## Comet 113P/Spitaler

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 June 1.42582 TT

		(2000.0)	P	Sato	Q
q	2.1416930				
n	0.13900607	Peri.	115.51321	+0.46345874	-0.88302788
a	3.6907407	Node	306.67675	+0.77630775	+0.44484521
e	0.4197119	Incl.	5.29005	+0.42726136	+0.14958106
P	7.09				

From 731 observations 1986 Sept. 30–2023 Jan. 3, mean residual 0".70.

## Comet C/2019 T4 (ATLAS)

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 June 9.13860 TT

		(2000.0)	P	Sato	Q
q	4.2424116				
z	+0.0009927	Peri.	351.20134	-0.95992731	+0.05605695
	+/-0.0000003	Node	199.93900	-0.18196993	-0.86982497
e	0.9957884	Incl.	53.62861	-0.21313495	+0.49016542

From 1626 observations 2019 Feb. 5–2023 Jan. 27, mean residual 0".41.

## Comet C/2021 E3 (ZTF)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 June 11.90966 TT

		(2000.0)	P	Sato	Q
q	1.7773921				
z	-0.0005129	Peri.	228.84954	-0.11524708	-0.43252806
	+/-0.0000004	Node	104.46862	-0.37418645	+0.85281292
e	1.0009116	Incl.	112.55464	-0.92016445	-0.29262535

From 1237 observations 2021 Mar. 9–2023 Jan. 28, mean residual 0".57.

## Comet C/2020 Y2 (ATLAS)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 June 17.69205 TT

		(2000.0)	P	Sato	Q
q	3.1324774				
z	+0.0009260	Peri.	266.10378	-0.14805883	+0.88680993
	+/-0.0000003	Node	26.51458	+0.52180173	+0.44607448
e	0.9970994	Incl.	101.29778	-0.84011996	+0.12077132

From 970 observations 2020 Mar. 25–2023 Jan. 6, mean residual 0".41.

## Comet P/2022 P2 (ZTF)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 July 10.77365 TT

		(2000.0)	P	Sato	Q
q	1.9822615				
n	0.10380598	Peri.	137.58440	+0.34660682	-0.91625531
a	4.4838849	Node	291.23090	+0.79240311	+0.40059470
e	0.5579143	Incl.	12.44324	+0.50195720	+0.00029455
P	9.49				

From 123 observations 2022 Aug. 15–2023 Jan. 29, mean residual 0".65.

## Comet C/2020 F2 (ATLAS)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 July 15.72122 TT

		(2000.0)	P	Sato	Q
q	8.8170920				
z	-0.0005834	Peri.	48.35631	-0.89905838	-0.34775540
	+/-0.0000004	Node	250.27255	-0.43588663	+0.76809246
e	1.0051440	Incl.	163.58494	+0.04119330	+0.53768035

From 1187 observations 2019 May 27–2023 Jan. 21, mean residual 0".36.

## Comet 116P/Wild

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 July 16.91458 TT

		(2000.0)	P	Sato	Q
q	2.1970407				
n	0.15114485	Peri.	173.28875	-0.96906352	+0.24578344
a	3.4903889	Node	20.98095	-0.22926638	-0.86266417
e	0.3705456	Incl.	3.60330	-0.09139376	-0.44204189
P	6.52				

From 4209 observations 2007 Oct. 16–2022 Aug. 21, mean residual 0".63.

Nongravitational parameters A1 = +1.98, A2 = -0.1781, A3 = +0.6246.

## Comet C/2022 P3 (ZTF)

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 July 27.32758 TT

		(2000.0)	P	Sato	Q
q	2.5612465				
z	+0.0041007	Peri.	0.08667	+0.30438330	-0.48352454
	+/-0.0000041	Node	72.23496	+0.87342783	-0.20212660
e	0.9894970	Incl.	59.51908	+0.38009818	+0.85167415

From 307 observations 2022 Aug. 2–2023 Jan. 11, mean residual 0".46.

## Comet 119P/Parker–Hartley

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 11.98206 TT

		(2000.0)	P	Sato	Q
q	2.3274717				
n	0.13284374	Peri.	322.05627	+0.39175672	-0.91160021
a	3.8040130	Node	104.57140	+0.87249402	+0.32511535
e	0.3881536	Incl.	7.39362	+0.29202888	+0.25156522
P	7.42				

From 2575 observations 1989 Mar. 2–2023 Jan. 26, mean residual 0".66.

Nongravitational parameters Y1 = +0.02, Y2 = +0.0132.

## Comet C/2021 QM45 (PANSTARRS)

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 13.43529 TT

		(2000.0)	P	Sato	Q
q	2.7732466				
z	+0.0028311	Peri.	72.80484	+0.37734823	-0.92534873
	+/-0.0000026	Node	354.58858	+0.63128473	+0.28592986
e	0.9921486	Incl.	22.82237	+0.67756026	+0.24894546

From 329 observations 2021 Aug. 4–2023 Jan. 25, mean residual 0".57.

## Comet 107P/(4015) Wilson–Harrington

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 24.66338 TT

		(2000.0)	P	Sato	Q
q	0.9666382				
n	0.23174749	Peri.	95.44153	+0.99806425	-0.03860453
a	2.6249801	Node	266.77737	+0.01624545	+0.91863046
e	0.6317541	Incl.	2.79923	+0.06003204	+0.39322738
P	4.25				

From 1523 observations 1949 Nov. 21–2023 Jan. 18, mean residual 0".46.



## Comet 73P/Schwassmann-Wachmann

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 25.78792 TT

		(2000.0)	P	Sato	Q
q	0.9729619				
n	0.18130923	Peri.	199.48777	-0.02171799	+0.98296414
a	3.0916437	Node	69.61075	-0.88948961	+0.06434611
e	0.6852930	Incl.	11.22771	-0.45643901	-0.17216583
P	5.44				

From 2304 observations 2010 Nov. 28–2023 Jan. 9, mean residual 0".84.

Nongravitational parameters A1 = +0.91, A2 = +0.1721.

## Comet 157P/Tritton

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 9.80670 TT

		(2000.0)	P	Sato	Q
q	1.5717781				
n	0.14770646	Peri.	155.05786	+0.11926641	-0.97145090
a	3.5443483	Node	287.54896	+0.87104354	+0.20150975
e	0.5565396	Incl.	12.42096	+0.47650674	-0.12520769
P	6.67				

From 1313 observations 2003 Oct. 6–2023 Jan. 28, mean residual 0".83.

Nongravitational parameters Y1 = +0.48, Y2 = +0.0319.

## Comet P/2022 W1 (Rankin)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 15.63950 TT

		(2000.0)	P	Sato	Q
q	3.3677499				
n	0.05356570	Peri.	17.76942	+0.55594953	-0.81829930
a	6.9696586	Node	38.81619	+0.73156396	+0.39832307
e	0.5167984	Incl.	13.46596	+0.39463183	+0.41439715
P	18.40				

From 102 observations 2022 Sept. 24–2023 Jan. 25, mean residual 0".36.

## Comet C/2020 R7 (ATLAS)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 16.23665 TT

		(2000.0)	P	Sato	Q
q	2.9559886				
z	-0.0000556	Peri.	347.83730	+0.05932737	-0.41758014
+/-	-0.0000008	Node	268.28180	-0.82290165	-0.53462515
e	1.0001642	Incl.	114.89115	-0.56507799	+0.73471272

From 415 observations 2019 Dec. 3–2023 Jan. 16, mean residual 0".51.

## Comet 211P/Hill

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Oct. 4.57918 TT

		(2000.0)	P	Sato	Q
q	2.3276022				
n	0.14754856	Peri.	4.27498	-0.51752823	-0.80553653
a	3.5468765	Node	117.13193	+0.77513031	-0.58419036
e	0.3437600	Incl.	18.92053	+0.36240520	+0.09915906
P	6.68				

From 707 observations 2003 Mar. 24–2023 Jan. 25, mean residual 0".72.

Nongravitational parameters A1 = -0.70, A2 = -0.1119.

## Comet 408P/Novichonok-Gerke

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Oct. 5.03494 TT

		(2000.0)	P	Sato	Q
q	3.4675217				
n	0.09538048	Peri.	226.45414	+0.56742675	-0.82162695
a	4.7442006	Node	189.44123	+0.81816985	+0.57002289
e	0.2691031	Incl.	19.35675	+0.09287084	-0.00174908
P	10.33				

From 1303 observations 2011 Sept. 7–2023 Jan. 27, mean residual 0".60.

## Comet 61P/Shajn-Schaldach

Epoch 2022 Oct. 28.0 TT = JDT 2459880.5

T 2022 Oct. 23.81130 TT

		(2000.0)	P	Sato	Q
q	2.1258481				
n	0.13895658	Peri.	221.65655	+0.90799593	-0.41785866
a	3.6916170	Node	162.96733	+0.40672038	+0.86152423
e	0.4241418	Incl.	6.00017	+0.10060774	+0.28839234
P	7.09				

From 1765 observations 2015 June 25–2023 Jan. 19, mean residual 0".72.

Nongravitational parameters Y1 = -1.04, Y2 = +0.0176.

## Comet P/2022 L3 (ATLAS)

Epoch 2022 Oct. 28.0 TT = JDT 2459880.5

T 2022 Oct. 29.96417 TT

		(2000.0)	P	Sato	Q
q	2.4198514				
n	0.05936549	Peri.	10.33010	+0.77075652	-0.61042979
a	6.5079867	Node	29.80466	+0.55523388	+0.50303961
e	0.6281720	Incl.	21.54243	+0.31248956	+0.61182237
P	16.60				

From 966 observations 2022 June 12–2023 Jan. 21, mean residual 0".56.

## Comet 204P/LINEAR-NEAT

Epoch 2022 Oct. 28.0 TT = JDT 2459880.5

T 2022 Nov. 16.85145 TT

		(2000.0)	P	Sato	Q
q	1.8343683				
n	0.14543739	Peri.	356.64869	-0.26169207	-0.95898381
a	3.5811182	Node	108.50001	+0.88815886	-0.28345308
e	0.4877666	Incl.	6.59633	+0.37774476	+0.00209905
P	6.78				

From 1091 observations 2008 Sept. 8–2023 Jan. 29, mean residual 0".60.

Nongravitational parameters A1 = +0.43, A2 = -0.0670.

## Comet 244P/Scotti

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 17.29418 TT

		(2000.0)	P	Sato	Q
q	3.9204026				
n	0.09097359	Peri.	93.11273	+0.05041600	-0.99871978
a	4.8962001	Node	353.99276	+0.89994475	+0.04722035
e	0.1992969	Incl.	2.25937	+0.43307930	+0.01813929
P	10.83				

From 1561 observations 2000 Nov. 29–2023 Jan. 19, mean residual 0".61.

Nongravitational parameters Y1 = +0.04, Y2 = -0.0234.

## Comet 118P/Shoemaker-Levy

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 24.33339 TT

		(2000.0)	P	Sato	Q
q	1.8289858				
n	0.16101803	Peri.	314.83574	-0.12744118	-0.98598729
a	3.3462088	Node	142.09682	+0.95225872	-0.15198831
e	0.4534155	Incl.	10.09184	+0.27742038	+0.06876499
P	6.12				

From 2690 observations 2002 Aug. 19–2023 Jan. 13, mean residual 0".74.

Nongravitational parameters A1 = +0.45, A2 = -0.1439.

## Comet C/2022 P1 (NEOWISE)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 28.47790 TT

		(2000.0)	P	Sato	Q
q	1.5951758				
n	0.01247591	Peri.	249.93636	+0.67043084	-0.71935815
a	18.4114416	Node	205.08196	-0.41147014	-0.56434297
e	0.9133595	Incl.	154.60676	-0.61742596	-0.40501960
P	79.00				

From 582 observations 2022 Aug. 8–Nov. 14, mean residual 0".43.

Comet 81P/Wild

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Dec. 15.62416 TT

	(2000.0)		P	Sato	Q
q	1.5984408				
n	0.15352429	Peri.	41.63184	-0.99848032	-0.03878492
a	3.4542306	Node	136.09798	+0.02212344	-0.93275992
e	0.5372513	Incl.	3.23663	+0.05047386	-0.35840573
P	6.42				

From 4634 observations 2008 Oct. 20–2023 Jan. 27, weighting mean residual 0".67.  
Nongravitational parameters A1 = +0.14, A2 = -0.0284.

Comet C/2017 K2 (PANSTARRS)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Dec. 19.66332 TT

	(2000.0)		P	Sato	Q
q	1.7970809				
z	-0.0005005	Peri.	236.18342	+0.01817090	+0.04923608
+/-	-0.0000033	Node	88.23537	-0.18118405	+0.98241270
e	1.0008995	Incl.	87.56313	-0.98328132	-0.18011411

From 10281 observations 2013 May 12–2023 Jan. 14, mean residual 0".49.  
Nongravitational parameters Y1 = +5.01, Y2 = +3.6875.

Comet P/2022 O2 (PANSTARRS)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 7.09252 TT

	(2000.0)		P	Sato	Q
q	1.7568380				
n	0.06211804	Peri.	48.63511	+0.93977936	-0.33213183
a	6.3142855	Node	330.49649	+0.24372012	+0.81664031
e	0.7217677	Incl.	9.42455	+0.23961481	+0.47200324
P	15.87				

From 80 observations 2022 June 9–Dec. 24, mean residual 0".42.

Comet 285P/LINEAR

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 12.27036 TT

	(2000.0)		P	Sato	Q
q	1.7193801				
n	0.10285545	Peri.	178.41808	+0.99740492	-0.05944344
a	4.5114677	Node	185.50742	+0.06053192	+0.99782462
e	0.6188868	Incl.	25.03840	+0.03897826	-0.02850454
P	9.58				

From 761 observations 2022 June 28–2023 Jan. 9, mean residual 0".66.

Comet C/2022 E3 (ZTF)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 12.78641 TT

	(2000.0)		P	Sato	Q
q	1.1122429				
z	-0.0003342	Peri.	145.81725	-0.60065391	-0.07338142
+/-	-0.0000025	Node	302.55568	+0.33755102	+0.87940168
e	1.0003717	Incl.	109.16918	+0.72475802	-0.47039117

From 4378 observations 2021 Oct. 25–2023 Jan. 29, mean residual 0".51.  
Nongravitational parameters A1 = -1.82, A2 = -0.1771.

Comet C/2022 U2 (ATLAS)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 14.22122 TT

	(2000.0)		P	Sato	Q
q	1.3280410				
z	+0.0103780	Peri.	147.90940	-0.18794263	-0.76577170
+/-	-0.0000137	Node	304.47526	+0.66683742	+0.36026570
e	0.9862175	Incl.	48.25102	+0.72111401	-0.53273101

From 513 observations 2022 Oct. 25–2023 Jan. 25, mean residual 0".42.

## Comet P/2021 V2 (Fuls)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 21.40146 TT

		(2000.0)	P	Sato	Q
q	3.4966155				
n	0.03616663	Peri.	259.82681	-0.65153388	-0.73843500
a	9.0558805	Node	232.28393	+0.75316689	-0.60221633
e	0.6138845	Incl.	12.69418	+0.09079225	-0.30339618
P	27.25				

From 224 observations 2021 Aug. 7–2023 Jan. 3, mean residual 0".46.

## Comet C/2022 S3 (PANSTARRS)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 21.68331 TT

		(2000.0)	P	Sato	Q
q	0.8384053				
z	-0.0004439	Peri.	267.96211	+0.10927474	-0.91938600
+/-	-0.0000893	Node	157.32262	+0.54493472	+0.37334190
e	1.0003722	Incl.	78.55349	-0.83132736	+0.12387576

From 77 observations 2022 Sept. 19–Oct. 25, mean residual 0".47.

## Comet C/2021 P2 (PANSTARRS)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 22.66864 TT

		(2000.0)	P	Sato	Q
q	5.0690756				
z	+0.0004093	Peri.	76.68550	+0.64299193	-0.71855278
+/-	-0.0000018	Node	32.07896	-0.73652500	-0.67502628
e	0.9979250	Incl.	150.06342	+0.20998167	-0.16739601

From 278 observations 2021 June 19–2022 Nov. 22, mean residual 0".50.

## Comet 71P/Clark

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 22.78497 TT

		(2000.0)	P	Sato	Q
q	1.5888198				
n	0.17729400	Peri.	209.06362	-0.03258565	+0.98945378
a	3.1381476	Node	59.39345	-0.88239119	+0.03783753
e	0.4937077	Incl.	9.43806	-0.46938680	-0.13981965
P	5.56				

From 1144 observations 2012 July 2–2022 June 16, weighting mean residual 0".77.

Nongravitational parameters A1 = +2.78, A2 = +0.1903.

## Comet 263P/Gibbs

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 30.58259 TT

		(2000.0)	P	Sato	Q
q	1.2363000				
n	0.18578790	Peri.	35.04116	-0.76105568	-0.61947525
a	3.0417564	Node	105.51114	+0.54016318	-0.76948800
e	0.5935572	Incl.	11.52204	+0.35919073	-0.15536613
P	5.31				

From 258 observations 2006 Nov. 10–2023 Jan. 7, mean residual 0".59

## Comet 96P/Machholz

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 31.08552 TT

		(2000.0)	P	Sato	Q
q	0.1164254				
n	0.18680332	Peri.	14.74852	-0.20313313	-0.50076341
a	3.0307236	Node	93.95412	+0.79107931	-0.59032383
e	0.9615850	Incl.	57.50293	+0.57700127	+0.63305117
P	5.28				

From 934 observations 2007 Apr. 9–2022 Oct. 7, mean residual 0".74.

Nongravitational parameters A1 = +0.03, A2 = -0.0028.

## Comet C/2022 Q2 (ATLAS)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 31.59937 TT

		(2000.0)	P	Sato	Q
q	1.6440797				
n	0.00528687	Peri.	44.06662	+0.63801604	-0.76778672
a	32.6339920	Node	352.94373	-0.76950440	-0.63293972
e	0.9496206	Incl.	151.48535	+0.02825805	+0.09945282

P 186.43

From 523 observations 2022 Aug. 27–Dec. 21, mean residual 0".46.

## Comet 5D/Brorsen [Orbit 2]

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 7.96258 TT

		(2000.0)	P	Sato	Q
q	0.5368430				
n	0.17521703	Peri.	25.77521	-0.42080070	-0.87254183
a	3.1628979	Node	89.97230	+0.78345658	-0.48747373
e	0.8302686	Incl.	14.37034	+0.45729920	+0.03225085

P 5.63

From 72 observations 1873–1879, mean residual 2".00. Nongravitational parameters A1 = +1.51 +/- 0.64, A2 = -0.4298 +/- 0.1181.

From Muraoka's orbits (CHB 2010).

## Comet C/2020 S4 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 9.23145 TT

		(2000.0)	P	Sato	Q
q	3.3697527				
z	-0.0003689	Peri.	20.98995	-0.73118246	-0.60715684
	+/-0.0000011	Node	117.72170	+0.56508428	-0.79447419
e	1.0012430	Incl.	20.56976	+0.38216746	+0.01308968

From 882 observations 2020 Sept. 16–2023 Jan. 4, mean residual 0".56.

## Comet C/2021 C5 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 11.07825 TT

		(2000.0)	P	Sato	Q
q	3.2419224				
z	+0.0004063	Peri.	270.92269	-0.36144710	+0.81167604
	+/-0.0000014	Node	323.68278	-0.16797528	-0.54074883
e	0.9986828	Incl.	50.78151	-0.91713701	-0.22084543

From 396 observations 2020 Dec. 22–2022 July 9, mean residual 0".49.

## Comet C/2022 A2 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 18.26708 TT

		(2000.0)	P	Sato	Q
q	1.7352819				
z	-0.0001831	Peri.	88.36726	+0.01740503	+0.99011782
	+/-0.0000007	Node	171.57947	-0.09144819	-0.13701509
e	1.0003176	Incl.	108.14712	+0.99565772	-0.02989261

From 729 observations 2022 Jan. 9–2023 Jan. 18, mean residual 0".46.

## Comet P/2022 V1 = 2010 BN109 (WISE–Lemmon)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 3.01637 TT

		(2000.0)	P	Sato	Q
q	2.2784903				
n	0.07731211	Peri.	70.82442	-0.33187461	-0.89102153
a	5.4572148	Node	42.89725	+0.59946765	-0.45273251
e	0.5824811	Incl.	27.06773	+0.72835279	-0.03337521

P 12.75

From 266 observations 2010 Jan. 28–2023 Jan. 25, mean residual 0".59.

## Comet C/2022 R3 (Leonard)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 5.09500 TT

		(2000.0)	P	Sato	Q
q	5.1289148				
z	-0.0001099	Peri.	72.84238	+0.19197201	-0.97650886
	+/-0.0000040	Node	8.23732	+0.41284257	-0.01011182
e	1.0005638	Incl.	43.08251	+0.89034137	+0.21523986

From 137 observations 2022 Sept. 15–2023 Jan. 25, mean residual 0".54.

## Comet C/2022 W2 (ATLAS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 8.66464 TT

		(2000.0)	P	Sato	Q
q	3.1227567				
z	+0.0030211	Peri.	123.25332	-0.18548407	-0.80043638
	+/-0.0000281	Node	320.45071	+0.28625022	+0.51089273
e	0.9905658	Incl.	63.53137	+0.94003004	-0.31351270

From 200 observations 2022 Nov. 5–2023 Jan. 20, mean residual 0".43.

## Comet 256P/LINEAR

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 12.24196 TT

		(2000.0)	P	Sato	Q
q	2.7003189				
n	0.09862287	Peri.	124.19341	-0.80922965	+0.36757512
a	4.6396401	Node	81.33021	-0.56089461	-0.71545151
e	0.4179896	Incl.	27.61927	+0.17477018	-0.59415290
P	9.99				

From 175 observations 2003 Jan. 27–2023 Jan. 29, mean residual 0".76.

Nongravitational parameters A1 = -0.13, A2 = +0.1567.

## Comet C/2023 A1 (Leonard)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 18.73293 TT

		(2000.0)	P	Sato	Q
q	1.8348453				
z	+0.0033517	Peri.	159.25471	-0.71772567	-0.21287353
	+/-0.0008607	Node	318.29622	+0.41027837	+0.64002093
e	0.9938501	Incl.	94.75572	+0.56262023	-0.73828049

From 91 observations 2023 Jan. 9–27, mean residual 0".49.

## Comet 5D/Brorsen [Orbit 3]

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Mar. 26.30043 TT

		(2000.0)	P	Sato	Q
q	0.5248309				
n	0.17590454	Peri.	21.21764	-0.41431506	-0.85217483
a	3.1546512	Node	94.46313	+0.78207016	-0.51295503
e	0.8336327	Incl.	18.69723	+0.46552046	+0.10332081
P	5.60				

From 72 observations 1873–1879, mean residual 2".12.

From Muraoka's orbits (CHB 2010).

## Comet C/2019 U5 (PANSTARRS)

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Mar. 29.83709 TT

		(2000.0)	P	Sato	Q
q	3.6241952				
z	-0.0004073	Peri.	181.49471	-0.99907991	+0.00770098
	+/-0.0000003	Node	2.63728	-0.02314732	+0.73133387
e	1.0014760	Incl.	113.52001	-0.03610436	-0.68197615

From 2864 observations 2019 Oct. 11–2023 Jan. 21, mean residual 0".40.

## Comet 77P/Longmore

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 3.11819 TT

		(2000.0)	P	Sato	Q
q	2.3487656				
n	0.14286878	Peri.	196.73043	-0.85916440	+0.50081624
a	3.6239136	Node	14.76813	-0.40954652	-0.55003042
e	0.3518704	Incl.	24.31877	-0.30677056	-0.66831850
P	6.90				

From 1867 observations 1975 Oct. 4–2023 Jan. 24, mean residual 0".72.

Nongravitational parameters A1 = +0.09, A2 = -0.0491.

Comet A/2019 O2

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 7.22176 TT

			P	Sato Q
q	9.6828018	(2000.0)		
n	0.00223773	Peri.	129.63950	-0.39154442
a	57.8891872	Node	48.26291	-0.76970632
e	0.8327356	Incl.	93.30725	+0.50422728
P	440.45			-0.80316811

From 282 observations 2011 Nov. 28–2023 Jan. 24, mean residual 0".30.

Comet 300P/Catalina

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 11.11275 TT

			P	Sato Q
q	0.8320740	(2000.0)		
n	0.22233165	Peri.	222.95226	+0.74651735
a	2.6985793	Node	95.62424	-0.58052656
e	0.6916622	Incl.	5.67406	-0.32511653
P	4.43			+0.23173617

From 675 observations 2005 May 6–2019 Jan. 1, mean residual 0".83.

Nongravitational parameters A1 = +0.00, A2 = +0.0338.

Comet 5D/Brorsen [Orbit 1]

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 11.28744 TT

			P	Sato Q
q	0.5157894	(2000.0)		
n	0.17582508	Peri.	20.50424	-0.40921716
a	3.1556016	Node	94.80408	+0.78634181
e	0.8365480	Incl.	18.62100	+0.46282596
P	5.61			+0.10598615

From 149 observations 1868–1879, mean residual 2".50. Nongravitational parameters A1 = +1.26 +/- 0.09, A2 = +0.1345 +/- 0.0002.

From Muraoka's orbits (CHB 2010).

Comet D/1978 R1 (Haneda-Campos) [Orbit-2]

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 16.36202 TT

			P	Sato Q
q	1.2811345	(2000.0)		
n	0.15335158	Peri.	307.18796	+0.96891872
a	3.4568235	Node	66.49032	+0.24536348
e	0.6293897	Incl.	4.94593	+0.03151643
P	6.43			+0.43394991

From 42 observations 1978 July 30–Nov. 22, mean residual 0".95.

Comet D/1978 R1 (Haneda-Campos) [Orbit-1]

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 17.58773 TT

			P	Sato Q
q	1.2809368	(2000.0)		
n	0.15334724	Peri.	307.18876	+0.96892630
a	3.4568888	Node	66.48790	+0.24533360
e	0.6294539	Incl.	4.94517	+0.03151575
P	6.43			+0.43394618

From 49 observations 1978 July 30–Nov. 29, mean residual 1".07.

From Muraoka's orbit (CHB 2004).

Comet 170P/Christensen

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 19.55890 TT

			P	Sato Q
q	2.9239438	(2000.0)		
n	0.11412077	Peri.	225.38211	+0.98287476
a	4.2094587	Node	142.90795	+0.17392561
e	0.3053872	Incl.	10.11783	-0.06088589
P	8.64			+0.27694819

From 428 observations 2005 June 17–2022 Nov. 15, mean residual 0".73.

Nongravitational parameters Y1 = +1.21, Y2 = -0.4549.

## Comet 452P/Sheppard-Jewitt

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 25.64892 TT

		(2000.0)	P	Sato	Q
q	4.1781770				
n	0.05001461	Peri.	37.04909	-0.94093081	-0.32555946
a	7.2957752	Node	123.69874	+0.27763539	-0.89913499
e	0.4273156	Incl.	6.42232	+0.19382416	-0.29251890
P	19.71				

From 174 observations 2003 Feb. 2–2023 Jan. 21, mean residual 0".78.

## Comet C/2021 Y1 (ATLAS)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 Apr. 30.70926 TT

		(2000.0)	P	Sato	Q
q	2.0323916				
z	-0.0004231	Peri.	245.81865	-0.00835814	-0.47099393
	+/-0.0000005	Node	244.77069	+0.77291161	-0.56273597
e	1.0008599	Incl.	77.19082	-0.63445866	-0.67933272

From 1562 observations 2021 Nov. 8–2023 Jan. 27, mean residual 0".46.

## Comet 291P/NEAT

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 4.11538 TT

		(2000.0)	P	Sato	Q
q	2.5650704				
n	0.10195112	Peri.	173.52826	+0.62617057	-0.77413917
a	4.5381069	Node	237.66120	+0.71033128	+0.61550604
e	0.4347708	Incl.	6.30845	+0.32146523	+0.14785419
P	9.67				

From 826 observations 2003 July 29–2023 Jan. 19, mean residual 0".66.

Nongravitational parameters A1 = +2.33, A2 = -1.0296.

## Comet C/2020 V2 (ZTF)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 8.56036 TT

		(2000.0)	P	Sato	Q
q	2.2278285				
z	-0.0005293	Peri.	162.42838	+0.69784466	+0.59394445
	+/-0.0000002	Node	212.37155	+0.53387631	-0.05875866
e	1.0011792	Incl.	131.61180	+0.47748185	-0.80235741

From 3281 observations 2020 Apr. 18–2023 Jan. 25, mean residual 0".43.

## Comet C/2020 K1 (PANSTARRS)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 9.08166 TT

		(2000.0)	P	Sato	Q
q	3.0732752				
z	+0.0000063	Peri.	213.98516	+0.06617502	-0.03770127
	+/-0.0000003	Node	94.35554	-0.53599394	+0.84152768
e	0.9999807	Incl.	89.67079	-0.84162424	-0.53889681

From 2707 observations 2020 Apr. 17–2022 Nov. 27, mean residual 0".37.

## Comet P/2008 L2 (Hill)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 11.04256 TT

		(2000.0)	P	Sato	Q
q	2.3299421				
n	0.06649136	Peri.	141.25788	+0.96129852	+0.06086019
a	6.0342864	Node	218.01293	-0.07495989	+0.99627964
e	0.6138827	Incl.	25.86930	+0.26511538	+0.06101571
P	14.82				

From 656 observations 2008 June 12–2009 Jan. 29, mean residual 0".51.

From CHB 2021.



## Comet 364P/PANSTARRS

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 14.01882 TT

		(2000.0)	P	Sato	Q
q	0.8012873				
n	0.20172027	Peri.	212.02040	-0.21358278	+0.96508664
a	2.8794068	Node	46.14803	-0.84610990	-0.10515686
e	0.7217179	Incl.	12.13758	-0.48834458	-0.23989541
P	4.89				

From 729 observations 2013 Feb. 1–2023 Jan. 24, mean residual 0".65.

Nongravitational parameters A1 = -0.02, A2 = -0.0011.

## Comet 237P/LINEAR

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 14.67607 TT

		(2000.0)	P	Sato	Q
q	1.9870405				
n	0.14983844	Peri.	25.25974	-0.00074340	+0.97546610
a	3.5106475	Node	245.35935	-0.95368011	-0.06691704
e	0.4339960	Incl.	14.01662	-0.30082171	+0.20973318
P	6.58				

From 528 observations 2002 May 17–2023 Jan. 27, mean residual 0".63.

Nongravitational parameters A1 = +0.36, A2 = -0.0178.

## Comet 94P/Russell

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 21.07388 TT

		(2000.0)	P	Sato	Q
q	2.2270689				
n	0.14988150	Peri.	92.41727	-0.95218471	-0.28805600
a	3.5099750	Node	70.85501	+0.21948565	-0.87677507
e	0.3655029	Incl.	6.18764	+0.21253311	-0.38508339
P	6.58				

From 1648 observations 1984 Mar. 2–2023 Jan. 26, mean residual 0".55.

Nongravitational parameters A1 = -0.01, A2 = +0.0021.

## Comet C/2021 X1 (Maury–Attard)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 27.42024 TT

		(2000.0)	P	Sato	Q
q	3.2336473				
z	-0.0002856	Peri.	334.61858	+0.82765979	+0.54872683
+/-	-0.0000007	Node	10.58707	+0.55827494	-0.78344731
e	1.0009238	Incl.	140.11937	-0.05751846	+0.29173479

From 904 observations 2021 Oct. 22–2023 Jan. 14, mean residual 0".39.

## Comet C/2021 Q4 (Fuls)

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 June 10.67544 TT

		(2000.0)	P	Sato	Q
q	7.5645706				
z	-0.0004173	Peri.	147.01444	+0.84744331	+0.52801775
+/-	-0.0000024	Node	183.33199	-0.31904224	+0.58950067
e	1.0031568	Incl.	71.47511	+0.42432521	-0.61129879

From 169 observations 2020 Apr. 27–2023 Jan. 21, mean residual 0".52.

## Comet 72P/Denning–Fujikawa

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 June 15.41508 TT

		(2000.0)	P	Sato	Q
q	0.7809940				
n	0.11025806	Peri.	346.73395	+0.97074730	-0.22442185
a	4.3072078	Node	26.70347	+0.23396760	+0.80431064
e	0.8186774	Incl.	10.94869	+0.05393368	+0.55019926
P	8.94				

From 42 observations 1978 Oct. 10–2014 Aug. 2, mean residual 0".80.

Comet C/2022 W3 (Leonard)

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 June 22.77454 TT

	(2000.0)	P	Sato	Q
q	1.3976828			
z	+0.0035121	Peri. 116.52255	+0.45558105	+0.52436025
	+/-0.0000452	Node 132.26926	-0.51972286	-0.49940525
e	0.9950911	Incl. 103.55848	+0.72272682	-0.68966711

From 202 observations 2022 Nov. 13–2023 Jan. 21, mean residual 0".54.

Comet 126P/IRAS

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 July 4.85856 TT

	(2000.0)	P	Sato	Q
q	1.7105390			
n	0.07365485	Peri. 356.59254	+0.99600668	+0.08520569
a	5.6364000	Node 357.87167	-0.05498155	+0.35013930
e	0.6965192	Incl. 45.87578	-0.07034009	+0.93281427

P 13.38

From 235 observations 1996 Aug. 8–2011 Feb. 7, mean residual 0".83.

Nongravitational parameters A1 = -0.46, A2 = -0.9068.

Comet 287P/Christensen

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 July 6.10854 TT

	(2000.0)	P	Sato	Q
q	3.0340611			
n	0.11599071	Peri. 189.13894	+0.84552124	+0.50115808
a	4.1640945	Node 139.04196	-0.47041265	+0.86239815
e	0.2713755	Incl. 16.32133	-0.25259806	+0.07148433

P 8.50

From 220 observations 2006 Aug. 30–2022 Aug. 20, mean residual 0".76.

Nongravitational parameters Y1 = -4.13, Y2 = +0.4427.

Comet 180P/NEAT

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 July 12.18970 TT

	(2000.0)	P	Sato	Q
q	2.5008316			
n	0.12957294	Peri. 94.66699	-0.95726124	-0.01687788
a	3.8677628	Node 84.56544	-0.10641885	-0.90770888
e	0.3534165	Incl. 16.86008	+0.26893485	-0.41926094

P 7.61

From 767 observations 1955 May 14–2023 Jan. 25, mean residual 0".69.

Nongravitational parameters A1 = +0.21, A2 = +0.0368.

Comet 185P/Petriew

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 July 12.90194 TT

	(2000.0)	P	Sato	Q
q	0.9303037			
n	0.18071529	Peri. 181.88819	+0.80954236	-0.57113408
a	3.0984140	Node 214.11421	+0.54174261	+0.81591518
e	0.6997484	Incl. 14.01467	+0.22617719	+0.08993485

P 5.45

From 1057 observations 2001 June 12–2019 Apr. 6, mean residual 0".74.

Nongravitational parameters A1 = -0.08, A2 = -0.0618.

Comet 347P/PANSTARRS

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 July 20.04511 TT

	(2000.0)	P	Sato	Q
q	2.2125017			
n	0.14391918	Peri. 98.43310	+0.97946634	+0.01273684
a	3.6062592	Node 261.01115	-0.08607969	+0.92888149
e	0.3864829	Incl. 11.75381	+0.18230736	+0.37015800

P 6.85

From 124 observations 2002 July 12–2018 Jan. 24, mean residual 0".52.

## Comet C/2021 T4 (Lemmon)

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 July 31.53466 TT

		(2000.0)	P	Sato	Q
q	1.4832438				
z	+0.0001070	Peri.	329.82091	+0.28264705	-0.90359208
	+/-0.0000019	Node	257.88332	-0.80103071	-0.40696849
e	0.9998412	Incl.	160.77648	-0.52769351	+0.13378338

From 1079 observations 2021 Aug. 7–2023 Jan. 6, mean residual 0".47.

## Comet C/2022 U4 (Bok)

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 Aug. 3.67954 TT

		(2000.0)	P	Sato	Q
q	2.8983953				
z	+0.0002984	Peri.	89.00851	-0.46217135	+0.67316159
	+/-0.0000069	Node	132.92639	-0.68627375	-0.68378487
e	0.9991351	Incl.	52.03490	+0.56162797	-0.28158785

From 96 observations 2022 Jan. 7–2023 Jan. 19, mean residual 0".43.

## Comet 280P/Larsen

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 Aug. 4.63835 TT

		(2000.0)	P	Sato	Q
q	2.6401989				
n	0.10224084	Peri.	104.72430	-0.54237912	+0.82607034
a	4.5295298	Node	131.38280	-0.82773547	-0.49424240
e	0.4171141	Incl.	11.77207	-0.14380152	-0.27079926
P	9.64				

From 162 observations 2004 Apr. 19–2014 June 21, mean residual 0".65.

## Comet 199P/Shoemaker

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 Aug. 7.61970 TT

		(2000.0)	P	Sato	Q
q	2.9103269				
n	0.06909912	Peri.	191.78011	+0.22507922	+0.87855837
a	5.8814944	Node	92.34838	-0.85620437	+0.38470662
e	0.5051722	Incl.	24.93763	-0.46503056	-0.28308304
P	14.26				

From 558 observations 2008 Apr. 1–2022 June 27, mean residual 0".59.

Nongravitational parameters Y1 = +0.05, Y2 = -0.0273.

## Comet P/2023 B1 (PANSTARRS)

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 Aug. 17.72078 TT

		(2000.0)	P	Sato	Q
q	6.1273924				
n	0.05288534	Peri.	89.04071	-0.94506110	-0.21429924
a	7.0293067	Node	78.55384	+0.09106242	-0.89783610
e	0.1283077	Incl.	14.58760	+0.31395407	-0.38466372
P	18.64				

From 92 observations 2023 Jan. 13–29, mean residual 0".16

## Comet 339P/Gibbs

Epoch 2023 Sept. 13.0 TT = JDT 2460200.5

T 2023 Aug. 30.94322 TT

		(2000.0)	P	Sato	Q
q	1.3482810				
n	0.13843581	Peri.	27.45922	-0.93830734	+0.34557087
a	3.7008694	Node	172.72310	-0.33276334	-0.89236863
e	0.6356853	Incl.	5.73325	-0.09406327	-0.29027401
P	7.12				

From 137 observations 2009 Apr. 24–2016 Sept. 26, mean residual 0".65.

## Comet C/2022 A3 (Lemmon-ATLAS)

Epoch 2023 Sept. 13.0 TT = JDT 2460200.5

T 2023 Sept. 28.84961 TT

		(2000.0)	P	Sato	Q
q	3.7034531				
z	+0.0011248	Peri.	234.84770	-0.48777644	+0.66422956
	+/-0.0000016	Node	325.48001	+0.60657551	-0.20876859
e	0.9958343	Incl.	88.34300	-0.62780593	-0.71778462

From 364 observations 2021 Apr. 30–2023 Jan. 29, mean residual 0".37.

Comet 79P/du Toit-Hartley

Epoch 2023 Sept. 13.0 TT = JDT 2460200.5

T 2023 Sept. 30.34760 TT

		(2000.0)	P	Sato	Q
q	1.1210350				
n	0.19511315	Peri.	281.78605	-0.92373166	+0.37921413
a	2.9440489	Node	280.51774	-0.32656470	-0.85335473
e	0.6192200	Incl.	3.14868	-0.20018818	-0.35774621
P	5.05				

From 199 observations 1986 Dec. 27-2013 Apr. 4, mean residual 0".76.

Comet P/2022 R1 (PANSTARRS)

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Oct. 8.86466 TT

		(2000.0)	P	Sato	Q
q	3.5728999				
n	0.05055480	Peri.	222.13678	+0.78522774	-0.61914491
a	7.2437114	Node	176.08631	+0.59687983	+0.75306745
e	0.5067584	Incl.	7.38577	+0.16477823	+0.22259605
P	19.50				

From 40 observations 2022 June 23-Nov. 18, mean residual 0".50.

Comet 103P/Hartley

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Oct. 12.46697 TT

		(2000.0)	P	Sato	Q
q	1.0641383				
n	0.15211799	Peri.	181.30255	+0.75451960	-0.63879396
a	3.4754870	Node	219.74967	+0.60423068	+0.76566123
e	0.6938161	Incl.	13.61070	+0.25613562	+0.07553246
P	6.48				

From 177 observations 2011 Dec. 29-2019 Apr. 8, mean residual 0".57.

Comet 2P/Encke

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Oct. 22.52917 TT

		(2000.0)	P	Sato	Q
q	0.3395975				
n	0.29824454	Peri.	187.28804	-0.94616585	-0.31201724
a	2.2186445	Node	334.01908	+0.30600927	-0.77556302
e	0.8469347	Incl.	11.33660	+0.10549175	-0.54876885
P	3.30				

From 1541 observations 2016 July 8-2022 Nov. 15, mean residual 0".63.

Nongravitational parameters A1 = -0.00, A2 = -0.0007.

Comet 310P/Hill

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Oct. 23.67287 TT

		(2000.0)	P	Sato	Q
q	2.4167040				
n	0.11497290	Peri.	31.61044	+0.76219984	-0.64638424
a	4.1886337	Node	8.91849	+0.53646872	+0.60029087
e	0.4230329	Incl.	13.12252	+0.36228818	+0.47099712
P	8.57				

From 264 observations 2006 Aug. 29-2022 Aug. 19, mean residual 0".59.

Comet 404P/Bressi

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Nov. 4.16819 TT

		(2000.0)	P	Sato	Q
q	4.1326060				
n	0.09560862	Peri.	169.37118	+0.34900745	-0.92202462
a	4.7366504	Node	260.04027	+0.84682979	+0.38686036
e	0.1275257	Incl.	9.79292	+0.40133915	-0.01448006
P	10.31				

From 351 observations 2011 Oct. 24-2023 Jan. 19, mean residual 0".72.

## Comet 213P/Van Ness

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Nov. 11.85628 TT

		(2000.0)	P	Sato	Q
q	1.9801641				
n	0.16109776	Peri.	5.78629	+0.73060742	+0.66922476
a	3.3451048	Node	311.25525	-0.63345928	+0.59029301
e	0.4080412	Incl.	10.38104	-0.25483746	+0.45132292
P	6.12				

From 600 observations 2011 Nov. 7–2018 Jan. 14, mean residual 0".67.

Nongravitational parameters A1 = +1.12, A2 = -1.2164, A3 = -1.2922.

## Comet P/2007 T2 (Kowalski)

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Nov. 15.40677 TT

		(2000.0)	P	Sato	Q
q	0.6528640				
n	0.18559444	Peri.	359.67060	+0.99857749	-0.05237512
a	3.0438698	Node	3.38057	+0.04929933	+0.83553073
e	0.7855151	Incl.	9.75625	+0.02031205	+0.54694172
P	5.31				

From 114 observations 2007 Oct. 9–2008 Jan. 18, mean residual 0".77.

From CHB 2022.

## Comet C/2021 A9 (PANSTARRS)

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Dec. 1.93040 TT

		(2000.0)	P	Sato	Q
q	7.7599713				
z	-0.0001665	Peri.	211.47444	-0.25801414	+0.92894880
+/-	-0.0000018	Node	314.83555	+0.94583926	+0.29890508
e	1.0012919	Incl.	158.01394	+0.19701981	-0.21842591

From 227 observations 2020 Dec. 12–2023 Jan. 26, mean residual 0".47.

## Comet 147P/Kushida–Muramatsu

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Dec. 7.27782 TT

		(2000.0)	P	Sato	Q
q	3.1591050				
n	0.12258820	Peri.	348.56654	+0.16956189	-0.98469576
a	4.0133183	Node	91.66175	+0.90734478	+0.14002516
e	0.2128446	Incl.	2.30986	+0.38467416	+0.10376517
P	8.04				

From 79 observations 1994 Dec. 8–2009 Feb. 28, mean residual 0".74.

## Comet 62P/Tsuchinshan

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2023 Dec. 25.06816 TT

		(2000.0)	P	Sato	Q
q	1.2649925				
n	0.15940087	Peri.	47.30688	-0.43551880	-0.89688603
a	3.3688028	Node	68.66042	+0.79986998	-0.42477858
e	0.6244979	Incl.	4.73784	+0.41295446	-0.12312033
P	6.18				

From 1368 observations 2004 Sept. 14–2018 May 15, mean residual 0".73.

Nongravitational parameters A1 = +0.23, A2 = -0.2961.

## Comet 26P/Grigg–Skjellerup

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2023 Dec. 25.34257 TT

		(2000.0)	P	Sato	Q
q	1.0838979				
n	0.18815573	Peri.	2.14593	-0.83356771	+0.51509049
a	3.0161835	Node	211.54050	-0.51234722	-0.85597889
e	0.6406393	Incl.	22.43293	-0.20655554	+0.04451883
P	5.24				

From 556 observations 1972 May 13–2022 Dec. 15, mean residual 0".71.

Nongravitational parameters A1 = -0.01, A2 = +0.0095.

Comet P/2018 P3 (PANSTARRS)

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2023 Dec. 26.59897 TT

	(2000.0)		P	Sato	Q
q	1.7506949				
n	0.18929706	Peri.	306.00874	+0.98754300	-0.08399844
a	3.0040475	Node	59.16040	+0.13712078	+0.87417112
e	0.4172213	Incl.	8.91471	-0.07717981	+0.47829814
P	5.21				

From 277 observations 2018 Aug. 8–2019 Feb. 4, mean residual 0".58.

Comet 226P/Pigott-LINEAR-Kowalski

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2023 Dec. 27.23954 TT

	(2000.0)		P	Sato	Q
q	1.7737251				
n	0.13475509	Peri.	341.06447	+0.74455307	-0.35943819
a	3.7679570	Node	54.01157	+0.66618148	+0.34587192
e	0.5292608	Incl.	44.04545	+0.04292968	+0.86670456
P	7.31				

From 1109 observations 2003 Jan. 5–2017 Mar. 16, mean residual 0".68.

Nongravitational parameters A1 = +0.47, A2 = +0.1136.

Comet 326P/Hill

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2023 Dec. 30.33399 TT

	(2000.0)		P	Sato	Q
q	2.7696677				
n	0.12012518	Peri.	278.62540	+0.94784660	-0.31588259
a	4.0679913	Node	99.79700	+0.30675505	+0.86791317
e	0.3191559	Incl.	2.47103	+0.08653418	+0.38333396
P	8.20				

From 181 observations 1990 Sept. 24–2017 Jan. 27, mean residual 0".61.

Comet 311P/PANSTARRS

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2024 Jan. 1.95809 TT

	(2000.0)		P	Sato	Q
q	1.9352217				
n	0.30434734	Peri.	144.27723	+0.44479189	-0.89154023
a	2.1888855	Node	279.17400	+0.80029362	+0.43850404
e	0.1158872	Incl.	4.97051	+0.40210732	+0.11344703
P	3.24				

From 105 observations 2005 Jan. 17–2021 Jan. 18, mean residual 0".32.

Comet C/2021 S4 (Tsuchinshan)

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2024 Jan. 2.58922 TT

	(2000.0)		P	Sato	Q
q	6.6895882				
z	+0.0061182	Peri.	72.89007	+0.20566950	-0.97819981
	+/-0.0000031	Node	5.48822	+0.74418630	+0.13727036
e	0.9590720	Incl.	17.47873	+0.63552089	+0.15582674

From 361 observations 2021 Sept. 8–2023 Jan. 18, mean residual 0".35.

Comet 216P/LINEAR

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2024 Jan. 6.86591 TT

	(2000.0)		P	Sato	Q
q	2.1270668				
n	0.13007217	Peri.	151.73078	-0.87908152	-0.47667114
a	3.8578599	Node	359.79849	+0.40227126	-0.74124803
e	0.4486407	Incl.	9.06319	+0.25572155	-0.47258436
P	7.58				

From 166 observations 2001 Feb. 1–2016 Apr. 27, mean residual 0".78.

## Comet 144P/Kushida

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2024 Jan. 25.61145 TT

		(2000.0)	P	Sato	Q
q	1.3989153				
n	0.13143218	Peri.	216.32578	-0.15942190	-0.98532106
a	3.8312007	Node	242.91961	+0.92113765	-0.12622370
e	0.6348624	Incl.	3.93167	+0.35509167	-0.11493469
P	7.50				

From 2847 observations 1994 Jan. 7–2017 May 16, mean residual 0".62.

Nongravitational parameters Y1 = +0.79, Y2 = +0.0304.

## Comet 207P/NEAT

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Jan. 31.80927 TT

		(2000.0)	P	Sato	Q
q	0.9382301				
n	0.12882212	Peri.	272.98473	-0.35578195	-0.93293779
a	3.8827768	Node	198.15856	+0.91230763	-0.33388784
e	0.7583611	Incl.	10.20097	+0.20276586	-0.13470708
P	7.65				

From 124 observations 2000 Oct. 7–2009 May 22, mean residual 0".76.

## Comet 194P/LINEAR

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 4.20797 TT

		(2000.0)	P	Sato	Q
q	1.7995797				
n	0.11787129	Peri.	128.56306	-0.47382994	-0.87983034
a	4.1196852	Node	349.52464	+0.73086793	-0.36934021
e	0.5631754	Incl.	11.80612	+0.49124053	-0.29914276
P	8.36				

From 246 observations 2000 Jan. 27–2016 May 2, mean residual 0".67.

Nongravitational parameters A1 = -0.11, A2 = -0.0186.

## Comet 219P/LINEAR

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 13.83022 TT

		(2000.0)	P	Sato	Q
q	2.3548437				
n	0.14163299	Peri.	107.62625	+0.91596345	+0.36996189
a	3.6449628	Node	230.95337	-0.39977719	+0.87466628
e	0.3539458	Incl.	11.54006	+0.03448420	+0.31318860
P	6.96				

From 750 observations 2002 June 5–2018 Jan. 19, mean residual 0".73.

Nongravitational parameters A1 = +0.24, A2 = -0.2340.

## Comet C/2021 S3 (PANSTARRS)

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 14.70488 TT

		(2000.0)	P	Sato	Q
q	1.3201603				
z	-0.0002219	Peri.	6.85682	-0.77077715	+0.39890282
+/-	-0.0000021	Node	215.62087	-0.61752362	-0.65959206
e	1.0002930	Incl.	58.53293	-0.15673918	+0.63703600

From 589 observations 2020 Dec. 6–2023 Jan. 13, mean residual 0".39.

## Comet A/2022 T1

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 17.47296 TT

		(2000.0)	P	Sato	Q
q	3.4441762				
z	+0.0000507	Peri.	324.33079	-0.89474562	+0.31026811
+/-	-0.0000427	Node	236.90904	-0.26577417	-0.94795450
e	0.9998252	Incl.	22.54275	-0.35887932	-0.07152602

From 51 observations 2022 Oct. 3–Dec. 30, mean residual 0".49.

## Comet 125P/Spacewatch

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Mar. 7.29428 TT

			P	Sato	Q
q	1.5266910	(2000.0)			
n	0.17804108	Peri.	87.13983	-0.48876925	+0.86889139
a	3.1293627	Node	153.15075	-0.85337974	-0.45752828
e	0.5121400	Incl.	9.98482	-0.18123917	-0.18893285
P	5.54				

From 778 observations 1991 Sept. 8–2018 Oct. 3, mean residual 0".63.  
Nongravitational parameters A1 = +0.09, A2 = -0.0340.

## Comet 227P/Catalina-LINEAR

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Mar. 8.24789 TT

			P	Sato	Q
q	1.6236298	(2000.0)			
n	0.15476009	Peri.	105.56692	-0.78709153	-0.61184685
a	3.4358173	Node	36.80972	+0.50395186	-0.71104322
e	0.5274400	Incl.	7.50874	+0.35569574	-0.34649816
P	6.37				

From 165 observations 1997 Jan. 15–2018 May 18, mean residual 0".59.

## Comet C/2022 L2 (ATLAS)

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 12.25135 TT

			P	Sato	Q
q	2.6926159	(2000.0)			
z	-0.0005375	Peri.	199.91967	-0.86471056	-0.11293036
	+/-0.0000041	Node	39.24024	-0.28741130	+0.91035186
e	1.0014473	Incl.	129.31438	-0.41191066	-0.39812841

From 820 observations 2022 May 20–Dec. 12, mean residual 0".54.

## Comet 150P/LONEOS

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 12.46256 TT

			P	Sato	Q
q	1.7455863	(2000.0)			
n	0.12946200	Peri.	246.11289	-0.88084447	-0.35080389
a	3.8699721	Node	272.05907	+0.45839631	-0.79977304
e	0.5489409	Incl.	18.54736	-0.11826175	-0.48713419
P	7.61				

From 536 observations 1986 Mar. 14–2022 Dec. 24, mean residual 0".49.

## Comet C/2021 Q6 (PANSTARRS)

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 25.05157 TT

			P	Sato	Q
q	8.7077686	(2000.0)			
z	-0.0001303	Peri.	141.02405	+0.96878023	-0.10223827
	+/-0.0000015	Node	133.53774	-0.21727748	-0.78885973
e	1.0011346	Incl.	161.84652	+0.11939585	-0.60600962

From 231 observations 2021 Jan. 2–2023 Jan. 25, mean residual 0".35.

## Comet C/2022 U1 (Leonard)

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 25.94542 TT

			P	Sato	Q
q	4.2014791	(2000.0)			
z	+0.0002053	Peri.	78.59799	+0.63690636	-0.17788494
	+/-0.0000341	Node	72.52525	-0.30045838	-0.95335303
e	0.9991375	Incl.	128.14664	+0.70998243	-0.24387485

From 124 observations 2022 Sept. 23–2023 Jan. 21, mean residual 0".47.

## Comet 89P/Russell

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 26.61064 TT

			P	Sato	Q
q	2.2218460	(2000.0)			
n	0.13563233	Peri.	250.40200	+0.35675593	+0.92392499
a	3.7516925	Node	41.34560	-0.75945817	+0.37295732
e	0.4077750	Incl.	12.07204	-0.54401149	+0.08523760
P	7.27				

From 175 observations 1980 Aug. 9–2017 Oct. 26, mean residual 0".67.  
Nongravitational parameters A1 = +0.68, A2 = -0.0802.



Comet 309P/LINEAR

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 28.99753 TT

		(2000.0)	P	Sato	Q
q	1.6697416				
n	0.10763498	Peri.	49.91258	+0.50506866	-0.86153834
a	4.3769047	Node	10.14252	+0.67565000	+0.35751647
e	0.6185109	Incl.	17.02160	+0.53703140	+0.36046312
P	9.16				

From 373 observations 2005 Aug. 31–2016 Feb. 9, mean residual 0".57.

Comet C/2022 S4 (Lemmon)

Epoch 2024 July 29.0 TT = JDT 2460520.5

T 2024 July 18.75571 TT

		(2000.0)	P	Sato	Q
q	2.7613438				
z	+0.0008803	Peri.	268.56691	+0.14452454	-0.76069464
	+/-0.0000155	Node	220.17557	+0.26858401	-0.58536289
e	0.9975692	Incl.	101.21339	-0.95235250	-0.28052444

From 135 observations 2022 Aug. 26–2023 Jan. 25, mean residual 0".32.

Comet C/2022 U3 (Bok)

Epoch 2024 July 29.0 TT = JDT 2460520.5

T 2024 July 28.53763 TT

		(2000.0)	P	Sato	Q
q	4.8265204				
z	-0.0003736	Peri.	189.10541	-0.17953584	-0.81322655
	+/-0.0000089	Node	272.78449	+0.93386727	+0.03602286
e	1.0018034	Incl.	33.65667	+0.30928758	-0.58083124

From 131 observations 2021 June 23–2023 Jan. 25, mean residual 0".46.

Comet C/2021 G2 (ATLAS)

Epoch 2024 Sept. 7.0 TT = JDT 2460560.5

T 2024 Sept. 9.20425 TT

		(2000.0)	P	Sato	Q
q	4.9823195				
z	-0.0000578	Peri.	343.27915	-0.84713504	+0.20052477
	+/-0.0000011	Node	221.09476	-0.36000336	-0.89772998
e	1.0002880	Incl.	48.47319	-0.39084498	+0.39226357

From 475 observations 2020 Nov. 3–2023 Jan. 13, mean residual 0".36.

Comet C/2022 E2 (ATLAS)

Epoch 2024 Sept. 7.0 TT = JDT 2460560.5

T 2024 Sept. 14.14970 TT

		(2000.0)	P	Sato	Q
q	3.6662932				
z	-0.0002801	Peri.	41.72687	-0.03433754	+0.83133348
	+/-0.0000027	Node	125.37646	+0.63730935	-0.40933111
e	1.0010269	Incl.	137.13110	+0.76984267	+0.37594239

From 408 observations 2022 Feb. 23–2023 Jan. 29, mean residual 0".31.

Comet 65P/Gunn

Epoch 2025 June 14.0 TT = JDT 2460840.5

T 2025 June 16.47199 TT

		(2000.0)	P	Sato	Q
q	2.9262593				
n	0.12836353	Peri.	213.67375	+0.09218025	+0.98574316
a	3.8920189	Node	61.97576	-0.87479898	+0.14769478
e	0.2481385	Incl.	9.17531	-0.47563594	-0.08060195
P	7.68				

From 1659 observations 2015 Dec. 11–2023 Jan. 24, mean residual 0".62.

Comet C/2022 QE78 (ATLAS)

Epoch 2025 Sept. 2.0 TT = JDT 2460920.5

T 2025 Sept. 11.88924 TT

		(2000.0)	P	Sato	Q
q	5.4758186				
z	-0.0003065	Peri.	0.61858	-0.50574899	-0.69033269
	+/-0.0000215	Node	119.88539	+0.78890947	-0.61275391
e	1.0016784	Incl.	36.63427	+0.34905558	+0.38467313

From 352 observations 2022 Aug. 27–2023 Jan. 14, mean residual 0".40.

Comet 95P/(2060) Chiron  
 Epoch 2046 Aug. 3.0 TT = JDT 2468560.5  
 T 2046 Aug. 3.23257 TT  

	(2000.0)	P	Sato
q	8.4622668		Q
n	0.01964671	Peri. 339.58186	+0.15029599
a	13.6022118	Node 209.25689	-0.94614538
e	0.3778757	Incl. 6.94231	-0.28674035
P	50.17		

 From 3850 observations 1895 Apr. 24–2022 Dec. 10, mean residual 0".36.

**References:**

Comet 9P/Tempel  
 Epoch 2022 Mar. 2.0 TT = JDT 2459640.5  
 T 2022 Mar. 4.94966 TT  

	(2000.0)	P	Sato
q	1.5442311		Q
n	0.17663027	Peri. 179.34957	+0.91208744
a	3.1460042	Node 68.71423	-0.26492272
e	0.5091452	Incl. 10.46999	-0.31290966
P	5.58		

 From 7771 observations 1982 Dec. 11–2023 Jan. 3, mean residual 0".53.  
 Nongravitational parameters A1 = +0.04, A2 = +0.0254.

Comet 22P/Kopff  
 Epoch 2022 Mar. 2.0 TT = JDT 2459640.5  
 T 2022 Mar. 18.12978 TT  

	(2000.0)	P	Sato
q	1.5524144		Q
n	0.15443960	Peri. 163.02791	+0.96809656
a	3.4405690	Node 120.82635	+0.24960651
e	0.5487914	Incl. 4.74204	+0.02203704
P	6.38		

 From 4542 observations 2008 Jan. 30–2023 Jan. 21, mean residual 0".71.  
 Nongravitational parameters A1 = -0.69, A2 = -0.5203, A3 = +0.1553.

Comet 127P/Holt-Olmstead  
 Epoch 2022 Aug. 9.0 TT = JDT 2459800.5  
 T 2022 Aug. 10.48832 TT  

	(2000.0)	P	Sato
q	2.2111721		Q
n	0.15349501	Peri. 6.29183	+0.94110994
a	3.4546697	Node 13.60430	+0.29843717
e	0.3599469	Incl. 14.30094	+0.15889410
P	6.42		

 From 912 observations 1990 Sept. 16–2023 Jan. 4, mean residual 0".72.  
 Nongravitational parameters A1 = -0.11, A2 = -0.0140.

Comet 442P/McNaught  
 Epoch 2022 Aug. 9.0 TT = JDT 2459800.5  
 T 2022 Aug. 19.18331 TT  

	(2000.0)	P	Sato
q	2.3225545		Q
n	0.08875251	Peri. 310.98824	+0.95411160
a	4.9775498	Node 32.01996	-0.23315339
e	0.5333940	Incl. 6.05795	-0.18791101
P	11.11		

 From 282 observations 2000 Nov. 28–2022 Dec. 10, mean residual 0".50.

Comet D/1952 B1 (Harrington-Wilson)  
 Epoch 2022 Sept. 18.0 TT = JDT 2459840.5  
 T 2022 Sept. 21.72227 TT  

	(2000.0)	P	Sato
q	1.2298627		Q
n	0.17963617	Peri. 1.68768	-0.49604912
a	3.1108102	Node 118.10547	+0.79369398
e	0.6046488	Incl. 14.44390	+0.35211524
P	5.49		

 From 7 observations 1952 Jan. 30–Feb. 25, mean residual 0".49.

Comet C/2022 L1 (Catalina)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 28.24375 TT

		(2000.0)	P	Sato	Q
q	1.5915478				
z	+0.0017972	Peri.	59.85081	-0.16157532	-0.67250738
	+/-0.0000031	Node	300.02509	-0.90483411	+0.39308174
e	0.9971397	Incl.	123.46953	+0.39391453	+0.62707302

From 399 observations 2022 June 4-2023 Jan. 29, mean residual 0".55.

Comet C/2022 Y1 (Hogan)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 27.20956 TT

		(2000.0)	P	Sato	Q
q	2.9577169				
n	0.02218656	Peri.	174.73560	-0.18955730	-0.93136376
a	12.5432306	Node	285.91507	+0.88863940	-0.02808398
e	0.7641982	Incl.	18.85917	+0.41759795	-0.36300530

P 44.42

From 100 observations 2022 Nov. 5-2023 Jan. 18, mean residual 0".35.

Comet 451P/Christensen

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 27.51948 TT

		(2000.0)	P	Sato	Q
q	2.7985179				
n	0.06178283	Peri.	186.69269	-0.59972891	-0.70281355
a	6.3371045	Node	300.91283	+0.75329516	-0.33456712
e	0.5583917	Incl.	26.48350	+0.26994746	-0.62778814

P 15.95

From 122 observations 2006 Nov. 24-2023 Jan. 21, mean residual 0".56.

Comet P/2013 YG46 (Spacewatch)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 5.88965 TT

		(2000.0)	P	Sato	Q
q	1.7869090				
n	0.16638024	Peri.	242.52993	+0.35836836	+0.92788754
a	3.2739212	Node	48.85552	-0.80103945	+0.36224760
e	0.4541991	Incl.	7.85682	-0.47948714	+0.08832545

P 5.92

From 54 observations 2013 Dec. 26-2014 Feb. 20, mean residual 0".45.

Comet 5D/Brorsen [Orbit 4]

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 9.78068 TT

		(2000.0)	P	Sato	Q
q	0.5128761				
n	0.17688869	Peri.	22.04636	-0.41129013	-0.85877651
a	3.1429394	Node	93.37491	+0.78392445	-0.50428467
e	0.8368164	Incl.	17.82148	+0.46508373	+0.09055312

P 5.57

From 50 observations 1879 Mar. 24-May 19, mean residual 3".68.

Comet P/2017 S9 = 2011 Q5 = 2022 R7 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 25.46853 TT

		(2000.0)	P	Sato	Q
q	2.1916922				
n	0.17585348	Peri.	237.56536	+0.90094851	-0.41210933
a	3.1552619	Node	146.20511	+0.43232362	+0.87937348
e	0.3053850	Incl.	14.13772	-0.03725679	+0.23847052

P 5.60

From 70 observations 2011 Aug. 21-2022 Sept. 2, mean residual 0".32.

Comet P/2019 A4 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Mar. 3.24608 TT

		(2000.0)	P	Sato	Q
q	2.3858218				
n	0.23328241	Peri.	342.99357	-0.21879485	-0.95487895
a	2.6134532	Node	119.24265	+0.91989731	-0.27049843
e	0.0870999	Incl.	13.30701	+0.32545008	+0.12262459
P	4.22				

From 65 observations 2018 Dec. 31–2019 Mar. 2, mean residual 0".54.  
From CHB 2022.

Comet 427P/ATLAS

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Mar. 19.37293 TT

		(2000.0)	P	Sato	Q
q	2.1705080				
n	0.17478831	Peri.	99.98194	+0.97103919	+0.13696312
a	3.1680677	Node	252.34964	-0.19706581	+0.92241319
e	0.3148795	Incl.	11.85503	+0.13508503	+0.36110249
P	5.64				

From 429 observations 2017 July 22–2021 June 13, mean residual 0".52.  
From CHB 2022.

Comet P/2014 A3 (PANSTARRS)

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Apr. 22.53225 TT

		(2000.0)	P	Sato	Q
q	3.4717361				
n	0.09966109	Peri.	214.16053	+0.11438320	-0.97669805
a	4.6073617	Node	229.97831	+0.95620151	+0.15781810
e	0.2464807	Incl.	13.71740	+0.26943488	-0.14544537
P	9.89				

From 56 observations 2014 Jan. 9–2015 Feb. 23, mean residual 0".41.  
From CHB 2021.

Comet P/2012 WA34 (Lemmon–PANSTARRS)

Epoch 2023 June 25.0 TT = JDT 2460120.5

T 2023 July 8.93620 TT

		(2000.0)	P	Sato	Q
q	3.0711926				
n	0.09741641	Peri.	356.65019	-0.00386126	-0.99438420
a	4.6778682	Node	93.55223	+0.91992053	-0.04499973
e	0.3434632	Incl.	6.08268	+0.39208584	+0.09578667
P	10.12				

From 30 observations 2011 Sept. 26–2013 Jan. 18, mean residual 0".37.  
From CHB 2021.

Comet 225P/LINEAR

Epoch 2023 Aug. 4.0 TT = JDT 2460160.5

T 2023 Aug. 8.05203 TT

		(2000.0)	P	Sato	Q
q	1.3187994				
n	0.14139496	Peri.	3.91156	+0.95157846	-0.29411856
a	3.6490524	Node	14.20463	+0.27123002	+0.66642605
e	0.6385913	Incl.	21.36650	+0.14468140	+0.68510626
P	6.97				

From 463 observations 2002 Sept. 29–2016 Nov. 29, mean residual 0".63.

Comet P/2005 E1 (Tubbiolo)

Epoch 2023 Sept. 13.0 TT = JDT 2460200.5

T 2023 Oct. 1.38121 TT

		(2000.0)	P	Sato	Q
q	4.4039811				
n	0.05254299	Peri.	193.91856	-0.98261531	-0.18307393
a	7.0598073	Node	335.46769	+0.17664983	-0.87086964
e	0.3761896	Incl.	4.25959	+0.05711379	-0.45614692
P	18.76				

From 60 observations 2005 Mar. 3–May 9, mean residual 0".77.  
From CHB 2021.

Comet 365P/PANSTARRS

Epoch 2023 Oct. 23.0 TT = JDT 2460240.5

T 2023 Oct. 9.38524 TT

		(2000.0)	P	Sato	Q
q	1.3213659				
n	0.17577922	Peri.	67.77513	-0.88581054	-0.43154094
a	3.1561504	Node	86.30594	+0.33726643	-0.85124959
e	0.5813362	Incl.	9.84468	+0.31873349	-0.29857421
P	5.61				

From 396 observations 2011 Nov. 24–2018 June 2, mean residual 0".46.

Comet C/2019 E3 (ATLAS)

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Nov. 15.27928 TT

		(2000.0)	P	Sato	Q
q	10.3129275				
z	+0.0001267	Peri.	280.69958	+0.15949854	+0.96239739
	+/-0.0000008	Node	347.23324	+0.26394140	-0.25620528
e	0.9986934	Incl.	84.29879	-0.95125977	+0.09027797

From 297 observations 2015 Jan. 22–2022 Dec. 23, mean residual 0".43.

Comet P/2004 V3 (Siding Spring)

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Nov. 21.94473 TT

		(2000.0)	P	Sato	Q
q	3.9498607				
n	0.05183400	Peri.	322.55492	+0.76594919	+0.64078515
a	7.1240381	Node	356.12413	-0.21718398	+0.18160006
e	0.4455587	Incl.	50.44589	-0.60510574	+0.74593285
P	19.01				

From 57 observations 2004 Nov. 3–2005 Oct. 7, mean residual 0".42.

From CHB 2021.

Comet 3D/Biela [Orbit 1]

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Dec. 1.00755 TT

		(2000.0)	P	Sato	Q
q	0.7861293				
n	0.15175997	Peri.	273.53198	-0.28175603	-0.95896758
a	3.4809509	Node	192.96588	+0.92665749	-0.26344390
e	0.7741625	Incl.	8.08068	+0.24883618	-0.10477832
P	6.49				

From 29 observations 1826–1852, mean residual 3".25. Nongravitational parameters A1 = +0.32 +/- 0.13, A2 = -0.0926 +/- 0.0001.

From Muraoka's orbits (CHB 2010).

Comet P/2014 W1 (PANSTARRS)

Epoch 2023 Dec. 2.0 TT = JDT 2460280.5

T 2023 Dec. 18.58593 TT

		(2000.0)	P	Sato	Q
q	2.7285873				
n	0.10405859	Peri.	152.03350	+0.78058027	-0.60904232
a	4.4766256	Node	246.18329	+0.54098925	+0.77094253
e	0.3904812	Incl.	8.83924	+0.31308957	+0.18631983
P	9.47				

From 50 observations 2014 Nov. 17–2015 Feb. 14, mean residual 0".49.

From CHB 2021.

Comet C/2022 H1 (PANSTARRS)

Epoch 2024 Jan. 11.0 TT = JDT 2460320.5

T 2024 Jan. 18.63182 TT

		(2000.0)	P	Sato	Q
q	7.6933760				
z	+0.0011610	Peri.	246.24921	-0.33492979	+0.93842944
	+/-0.0000794	Node	6.35968	-0.30052682	-0.02120704
e	0.9910681	Incl.	49.86705	-0.89303173	-0.34481943

From 62 observations 2022 Mar. 2–Aug. 1, mean residual 0".46.

Comet 251P/LINEAR

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 13.23053 TT

		(2000.0)	P	Sato Q
q	1.7412709			
n	0.14962851	Peri. 31.21434	-0.35987566	+0.89842574
a	3.5139303	Node 219.34168	-0.91677205	-0.39059661
e	0.5044663	Incl. 23.38687	-0.17325852	+0.20066260
P	6.59			

From 404 observations 2004 Apr. 17–2017 Sept. 21, mean residual 0".63.  
Nongravitational parameters A1 = +0.45, A2 = +0.0252.

Comet P/2001 Q6 (NEAT)

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Feb. 28.88097 TT

		(2000.0)	P	Sato Q
q	1.4057695			
n	0.04377762	Peri. 42.91746	+0.53773114	-0.78151115
a	7.9732358	Node 22.18569	+0.34263032	-0.14028997
e	0.8236890	Incl. 56.90902	+0.77035686	+0.60791368
P	22.51			

From 354 observations 2001 Aug. 18–2002 Mar. 24, mean residual 0".62.  
From CHB 2022.

Comet P/2019 A3 (PANSTARRS)

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Mar. 2.68051 TT

		(2000.0)	P	Sato Q
q	2.3071871			
n	0.17680940	Peri. 325.71504	+0.98816540	+0.06754955
a	3.1438790	Node 31.29334	+0.02733256	+0.80590726
e	0.2661336	Incl. 15.37514	-0.15093730	+0.58817561
P	5.57			

From 41 observations 2018 Aug. 8–2021 Mar. 14, mean residual 0".35.  
From CHB 2022.

Comet P/2010 T2 (PANSTARRS)

Epoch 2024 Feb. 20.0 TT = JDT 2460360.5

T 2024 Mar. 4.76130 TT

		(2000.0)	P	Sato Q
q	3.7792461			
n	0.07352819	Peri. 351.32046	+0.64618314	-0.75413780
a	5.6428712	Node 58.33326	+0.70820896	+0.53532832
e	0.3302619	Incl. 7.91129	+0.28440711	+0.38039421
P	13.40			

From 33 observations 2010 Oct. 6–2011 Jan. 2, mean residual 0".73.  
From CHB 2022.

Comet P/2013 R3 (Catalina–PANSTARRS)

Epoch 2024 Mar. 31.0 TT = JDT 2460400.5

T 2024 Mar. 20.51307 TT

		(2000.0)	P	Sato Q
q	2.1956994			
n	0.18676712	Peri. 11.37955	+0.99323770	+0.11600430
a	3.0311151	Node 341.95690	-0.10766815	+0.90529935
e	0.2756133	Incl. 0.86505	-0.04343311	+0.40862707
P	5.28			

From 314 observations 2013 Sept. 15–2014 Jan. 3, mean residual 0".52.  
From CHB 2022.

Comet P/2011 N01 (Elenin)

Epoch 2024 May 10.0 TT = JDT 2460440.5

T 2024 May 5.95747 TT

		(2000.0)	P	Sato Q
q	1.2436974			
n	0.07390191	Peri. 263.53873	-0.91132390	+0.33530557
a	5.6238309	Node 295.83166	-0.18516559	-0.85205467
e	0.7788523	Incl. 15.39002	-0.36769886	-0.40196147
P	13.34			

From 57 observations 2011 June 12–Aug. 2, mean residual 0".65.

Comet P/2004 D029 (Spacewatch-LINEAR)  
Epoch 2024 June 19.0 TT = JDT 2460480.5  
T 2024 June 2.94760 TT

		(2000.0)	P	Sato	Q
q	4.0775615				
n	0.04986230	Peri.	40.40192	-0.97963334	+0.14843977
a	7.3106250	Node	147.37504	-0.17280520	-0.96620792
e	0.4422417	Incl.	14.52520	+0.10225887	-0.21073181
P	19.77				

From 76 observations 2004 Feb. 11–2005 July 10, mean residual 0".60.  
From CHB 2022.

Comet P/2002 T6 (NEAT-LINEAR)  
Epoch 2024 July 29.0 TT = JDT 2460520.5  
T 2024 July 16.17540 TT

		(2000.0)	P	Sato	Q
q	3.3896136				
n	0.04498112	Peri.	218.95102	+0.42833197	-0.89985609
a	7.8303751	Node	205.99836	+0.86894566	+0.43519944
e	0.5671199	Incl.	10.83569	+0.24792170	+0.02933373
P	21.91				

From 412 observations 2002 Sept. 15–2004 Apr. 15, mean residual 0".69.  
From CHB 2022.

Comet P/2010 WK (LINEAR)  
Epoch 2024 July 29.0 TT = JDT 2460520.5  
T 2024 July 21.10527 TT

		(2000.0)	P	Sato	Q
q	1.7822714				
n	0.07116239	Peri.	41.00397	+0.61368043	-0.78859987
a	5.7672536	Node	11.32418	+0.66297310	+0.48797419
e	0.6909671	Incl.	11.40077	+0.42879249	+0.37415429
P	13.85				

From 584 observations 2010 Nov. 17–2011 Apr. 21, mean residual 0".57.  
From CHB 2022.

Comet P/2014 MG4 (Spacewatch-PANSTARRS)  
Epoch 2024 Sept. 7.0 TT = JDT 2460560.5  
T 2024 Sept. 6.72808 TT

		(2000.0)	P	Sato	Q
q	3.7168881				
n	0.08778285	Peri.	298.93844	-0.32294680	+0.93858446
a	5.0141379	Node	311.69220	-0.80178941	-0.33954409
e	0.2587184	Incl.	9.36496	-0.50283110	-0.06139237
P	11.23				

From 189 observations 2014 June 20–2016 Nov. 6, mean residual 0".48.  
From CHB 2022.

Comet P/2015 HG16 (PANSTARRS)  
Epoch 2024 Oct. 17.0 TT = JDT 2460600.5  
T 2024 Oct. 16.02526 TT

		(2000.0)	P	Sato	Q
q	3.1233040				
n	0.09433612	Peri.	46.74958	-0.20523746	-0.93978058
a	4.7791506	Node	57.05199	+0.77682057	-0.32627816
e	0.3464730	Incl.	19.00647	+0.59533804	+0.10175967
P	10.45				

From 44 observations 2015 Jan. 14–2018 July 14, mean residual 0".35.  
From CHB 2022.

Comet P/2012 US27 (Siding Spring)  
Epoch 2024 Oct. 17.0 TT = JDT 2460600.5  
T 2024 Oct. 21.33408 TT

		(2000.0)	P	Sato	Q
q	1.8149892				
n	0.08394292	Peri.	0.86483	+0.64436510	-0.59509785
a	5.1659078	Node	49.21111	+0.69775163	+0.20052023
e	0.6486602	Incl.	39.37007	+0.31294772	+0.77823530
P	11.74				

From 297 observations 2012 Oct. 17–2013 Apr. 18, mean residual 0".43.  
From CHB 2022.

## Comet D/1918 W1 (Schorr)

Epoch 2024 Nov. 26.0 TT = JDT 2460640.5

T 2024 Nov. 10.39063 TT

		(2000.0)	P	Sato	Q
q	2.8619638				
n	0.11546974	Peri.	326.69589	+0.73225250	-0.67132052
a	4.1766100	Node	75.91372	+0.64780174	+0.63466158
e	0.3147639	Incl.	6.78599	+0.21014084	+0.38279685
P	8.54				

From 18 observations 1918 Nov. 23–Dec. 31, mean residual 1".44.

From Muraoka's orbit (CHB 2006).

## Comet P/2015 R2 (PANSTARRS)

Epoch 2025 Jan. 5.0 TT = JDT 2460680.5

T 2025 Jan. 21.04216 TT

		(2000.0)	P	Sato	Q
q	2.4633760				
n	0.10275902	Peri.	149.44848	+0.74689921	+0.66278182
a	4.5142896	Node	168.55325	-0.65147850	+0.74551429
e	0.4543159	Incl.	15.63804	-0.13310647	+0.07020467
P	9.59				

From 24 observations 2015 Sept. 9–18, mean residual 0".45.

From CHB 2022.

## Comet P/2011 UA134 (Spacewatch-PANSTARRS)

Epoch 2025 Feb. 14.0 TT = JDT 2460720.5

T 2025 Feb. 17.35899 TT

		(2000.0)	P	Sato	Q
q	2.0752749				
n	0.07400458	Peri.	32.41018	+0.30149818	-0.94621077
a	5.6186287	Node	40.38733	+0.83160840	+0.20073105
e	0.6306439	Incl.	10.43936	+0.46639717	+0.25375624
P	13.32				

From 126 observations 2011 Oct. 24–2012 Jan. 27, mean residual 0".60.

From CHB 2022.

## Comet P/2010 H2 (Vales)

Epoch 2025 Mar. 26.0 TT = JDT 2460760.5

T 2025 Mar. 10.04193 TT

		(2000.0)	P	Sato	Q
q	3.0758291				
n	0.13129922	Peri.	128.08530	-0.95524957	+0.19541859
a	3.8337867	Node	64.18812	-0.28198074	-0.82837477
e	0.1977047	Incl.	14.28047	+0.08935953	-0.52498269
P	7.51				

From 1606 observations 2010 Apr. 16–Sept. 4, mean residual 0".47.

From CHB 2022.

## Comet P/2010 A3 (Hill)

Epoch 2025 Mar. 26.0 TT = JDT 2460760.5

T 2025 Mar. 11.31444 TT

		(2000.0)	P	Sato	Q
q	1.6210416				
n	0.06537984	Peri.	42.24898	-0.25284815	-0.94001593
a	6.1024866	Node	63.58579	+0.80516165	-0.33567662
e	0.7343638	Incl.	14.81426	+0.53645366	+0.06075577
P	15.08				

From 386 observations 2009 Oct. 14–2010 June 12, mean residual 0".51.

From CHB 2022.

## Comet P/2018 L5 (Leonard)

Epoch 2025 Mar. 26.0 TT = JDT 2460760.5

T 2025 Apr. 4.00758 TT

		(2000.0)	P	Sato	Q
q	2.3089985				
n	0.14261340	Peri.	93.94757	+0.68121238	+0.73168324
a	3.6282385	Node	219.02745	-0.68604704	+0.62644788
e	0.3636035	Incl.	2.20945	-0.25551744	+0.26870558
P	6.91				

From 197 observations 2018 June 8–2019 Dec. 19, mean residual 0".57.

From CHB 2022.



Comet 3D/Biela [Orbit 2]

Epoch 2025 May 25.0 TT = JDT 2460820.5

T 2025 May 25.81817 TT

		(2000.0)	P	Sato	Q
q	0.8208829				
n	0.14816656	Peri.	276.05226	-0.31569802	-0.94839836
a	3.5370070	Node	192.47299	+0.91572916	-0.29635953
e	0.7679160	Incl.	7.87334	+0.24854549	-0.11274564
P	6.65				

From 19 observations 1846–1852, mean residual 3".41.

From Muraoka's orbits (CHB 2010).

Comet P/2005 T5 (Broughton)

Epoch 2025 June 14.0 TT = JDT 2460840.5

T 2025 June 15.01026 TT

		(2000.0)	P	Sato	Q
q	3.2535558				
n	0.05040265	Peri.	304.84620	+0.95209485	+0.00077908
a	7.2582811	Node	56.99973	+0.17682106	+0.81447636
e	0.5517457	Incl.	21.38470	-0.24949893	+0.58019622
P	19.55				

From 93 observations 2005 Aug. 26–2006 Jan. 6, mean residual 0".59.

From CHB 2022.

Comet D/1886 K1 (Brooks)

Epoch 2025 June 14.0 TT = JDT 2460840.5

T 2025 June 18.2191 TT

		(2000.0)	P	Sato	Q
q	1.888547				
n	0.1470741	Peri.	208.3703	-0.3872616	+0.9141618
a	3.554500	Node	39.1832	-0.8060261	-0.2726438
e	0.468688	Incl.	10.9244	-0.4476052	-0.2999559
P	6.70				

From 39 observations 1886 May 25–July 3, mean residual 5".0.

From R. J. Buckley orbit (1979).

Comet P/2003 QX29 (NEAT)

Epoch 2025 July 24.0 TT = JDT 2460880.5

T 2025 Aug. 6.96959 TT

		(2000.0)	P	Sato	Q
q	4.2292330				
n	0.04356572	Peri.	37.69077	+0.52050028	+0.83088587
a	7.9990687	Node	264.48422	-0.82358747	+0.42772517
e	0.4712843	Incl.	11.40010	-0.22535115	+0.35592113
P	22.62				

From 96 observations 2002 June 11–2003 Oct. 20, mean residual 0".64.

From CHB 2022.

Comet 441P/PANSTARRS

Epoch 2025 Sept. 2.0 TT = JDT 2460920.5

T 2025 Sept. 9.33035 TT

		(2000.0)	P	Sato	Q
q	3.3278824				
n	0.11735625	Peri.	178.85856	+0.79283110	+0.60885783
a	4.1317297	Node	143.59120	-0.55950694	+0.74451827
e	0.1945547	Incl.	2.57483	-0.24160054	+0.27383334
P	8.40				

From 106 observations 2009 Sept. 25–2022 Mar. 23, mean residual 0".34.

Comet P/2016 A2 (Christensen)

Epoch 2025 Oct. 12.0 TT = JDT 2460960.5

T 2025 Oct. 25.45726 TT

		(2000.0)	P	Sato	Q
q	3.4705270				
n	0.09471247	Peri.	140.51943	+0.24456550	-0.87507997
a	4.7664817	Node	291.56921	+0.73659280	+0.44777490
e	0.2718892	Incl.	26.68513	+0.63057019	-0.18366457
P	10.41				

From 48 observations 2016 Jan. 2–17, mean residual 0".61.

From CHB 2022.

Comet P/2012 O1 (McNaught)

Epoch 2025 Nov. 1.0 TT = JDT 2460980.5

T 2025 Nov. 1.48220 TT

			P	Sato	Q
q	1.4400853	(2000.0)			
n	0.14778876	Peri.	238.32584	+0.86076575	+0.49234238
a	3.5430323	Node	91.88943	-0.41222179	+0.82313874
e	0.5935444	Incl.	7.42489	-0.29858921	+0.28291625
P	6.67				

From 94 observations 2012 July 18–Nov. 18, mean residual 0".59.

Comet P/1999 R028 (LONEOS)

Epoch 2025 Nov. 1.0 TT = JDT 2460980.5

T 2025 Nov. 4.99161 TT

			P	Sato	Q
q	1.1217901	(2000.0)			
n	0.15544926	Peri.	232.19642	+0.98256849	-0.16304877
a	3.4256549	Node	136.97863	+0.18287025	+0.93411900
e	0.6725327	Incl.	7.52071	-0.03343112	+0.31754808
P	6.34				

From 109 observations 1999 Sept. 7–Nov. 13, mean residual 0".73.

Comet P/2015 T019 (Lemmon–PANSTARRS)

Epoch 2025 Nov. 21.0 TT = JDT 2461000.5

T 2025 Nov. 23.58003 TT

			P	Sato	Q
q	2.9113113	(2000.0)			
n	0.10165794	Peri.	89.41031	+0.62507173	-0.77738988
a	4.5468277	Node	321.60815	+0.66351138	+0.57664891
e	0.3597049	Incl.	6.50512	+0.41114229	+0.25127875
P	9.70				

From 54 observations 2015 Sept. 12–2016 Aug. 12, mean residual 0".39.

From CHB 2022.

Comet P/1999 XN120 (Catalina)

Epoch 2025 Dec. 31.0 TT = JDT 2461040.5

T 2025 Dec. 20.79275 TT

			P	Sato	Q
q	3.2980753	(2000.0)			
n	0.11492588	Peri.	161.45255	+0.05597837	-0.99484341
a	4.1897762	Node	285.27064	+0.90459314	+0.08638751
e	0.2128278	Incl.	5.02963	+0.42258451	-0.05313927
P	8.58				

From 74 observations 1999 Nov. 3–2007 Dec. 16, mean residual 0".64.

From CHB 2022.

Comet P/2005 SB216 (LONEOS)

Epoch 2025 Dec. 31.0 TT = JDT 2461040.5

T 2026 Jan. 14.31068 TT

			P	Sato	Q
q	3.8229412	(2000.0)			
n	0.05125974	Peri.	83.23316	+0.10070635	-0.99488635
a	7.1771458	Node	1.08109	+0.67217501	+0.06232544
e	0.4673452	Incl.	24.10769	+0.73351141	+0.07947767
P	19.23				

From 468 observations 2005 Sept. 23–2009 June 23, mean residual 0".61.

Comet P/2007 C2 (Catalina)

Epoch 2026 Mar. 21.0 TT = JDT 2461120.5

T 2026 Mar. 20.77627 TT

			P	Sato	Q
q	3.6926489	(2000.0)			
n	0.05259233	Peri.	180.06600	-0.09190748	-0.98456777
a	7.0553916	Node	275.20809	+0.91366738	-0.02391339
e	0.4766203	Incl.	8.60054	+0.39593552	-0.17336222
P	18.74				

From 289 observations 2006 Oct. 19–2008 May 3, mean residual 0".61.

## Comet P/2012 O2 (McNaught)

Epoch 2026 Mar. 21.0 TT = JDT 2461120.5

T 2026 Apr. 1.41889 TT

		(2000.0)	P	Sato	Q
q	1.7017435				
n	0.14245637	Peri.	183.39740	+0.55535627	+0.75154666
a	3.6309042	Node	120.65336	-0.75290192	+0.63619121
e	0.5313169	Incl.	24.44749	-0.35315451	-0.17446595
P	6.92				

From 81 observations 2012 May 20–Sept. 21, mean residual 0".38.

## Comet P/2011 V1 (Boattini)

Epoch 2026 Apr. 30.0 TT = JDT 2461160.5

T 2026 Apr. 29.16078 TT

		(2000.0)	P	Sato	Q
q	1.7416896				
n	0.12992522	Peri.	269.36762	+0.71414357	+0.69373598
a	3.8607682	Node	46.70052	-0.58028222	+0.66135988
e	0.5488749	Incl.	7.37588	-0.39149905	+0.28519027
P	7.59				

From 25 observations 2011 Oct. 22–Nov. 20, mean residual 0".40.

## Comet P/2004 FY140 (LINEAR)

Epoch 2026 May 20.0 TT = JDT 2461180.5

T 2026 May 27.74127 TT

		(2000.0)	P	Sato	Q
q	4.0820744				
n	0.09048926	Peri.	241.92742	-0.87665671	+0.48068402
a	4.9136554	Node	326.79099	-0.42731672	-0.79740383
e	0.1692388	Incl.	2.13388	-0.22107338	-0.36481503
P	10.89				

From 52 observations 2004 Mar. 27–July 12, mean residual 0".42.

## Comet P/1996 R2 (Lagerkvist)

Epoch 2026 June 9.0 TT = JDT 2461200.5

T 2026 June 15.76443 TT

		(2000.0)	P	Sato	Q
q	2.5870259				
n	0.13460630	Peri.	333.56653	+0.97186317	-0.23373572
a	3.7707331	Node	39.98549	+0.22334584	+0.87513255
e	0.3139197	Incl.	2.59981	+0.07482393	+0.42368696
P	7.32				

From 125 observations 1996 Aug. 12–1997 Jan. 12, mean residual 0".62.

## Comet P/2009 B1 (Boattini)

Epoch 2026 July 19.0 TT = JDT 2461240.5

T 2026 July 1.02309 TT

		(2000.0)	P	Sato	Q
q	2.4479988				
n	0.05654693	Peri.	129.07287	+0.35289579	-0.87273958
a	6.7224879	Node	297.07226	+0.69795261	+0.48564912
e	0.6358493	Incl.	22.26159	+0.62315866	-0.04970476
P	17.43				

From 108 observations 2008 Nov. 18–2009 Mar. 29, mean residual 0".59.

## Comet P/2018 VN2 (Leonard)

Epoch 2026 Aug. 28.0 TT = JDT 2461280.5

T 2026 Aug. 15.78612 TT

		(2000.0)	P	Sato	Q
q	2.1195516				
n	0.12049430	Peri.	138.93231	+0.97167467	-0.06589478
a	4.0596792	Node	226.42615	+0.02473118	+0.98341965
e	0.4779017	Incl.	18.25557	+0.23502492	+0.16894874
P	8.18				

From 104 observations 2018 July 2–Dec. 13, mean residual 0".54.

## Comet P/2005 T3 (Read)

Epoch 2026 Aug. 28.0 TT = JDT 2461280.5

T 2026 Aug. 26.96966 TT

		(2000.0)	P	Sato	Q
q	6.2520882				
n	0.04739125	Peri.	7.38349	+0.81993397	-0.57024881
a	7.5625904	Node	27.57349	+0.51951531	+0.70436687
e	0.1732875	Incl.	6.23160	+0.24044152	+0.42270985
P	20.80				

From 42 observations 2005 Sept. 30–Nov. 26, mean residual 0".50.

## Comet P/2010 U1 (Boattini)

Epoch 2026 Aug. 28.0 TT = JDT 2461280.5

T 2026 Sept. 9.82728 TT

		(2000.0)	P	Sato	Q
q	4.8753294				
n	0.05975049	Peri.	86.68866	+0.98170800	-0.12834873
a	6.4800008	Node	280.65178	+0.05865540	+0.90657432
e	0.2476344	Incl.	8.22686	+0.18113238	+0.40205672
P	16.50				

From 111 observations 2009 Sept. 17–2011 Dec. 28, mean residual 0".54.

## Comet P/2015 X3 (PANSTARRS)

Epoch 2026 Oct. 7.0 TT = JDT 2461320.5

T 2026 Oct. 22.42528 TT

		(2000.0)	P	Sato	Q
q	2.7985671				
n	0.08835480	Peri.	306.94732	+0.84242880	-0.35747096
a	4.9924758	Node	77.25097	+0.52194161	+0.72715462
e	0.4394430	Incl.	24.41472	-0.13375604	+0.58605518
P	11.16				

From 28 observations 2015 Nov. 6–Dec. 10, mean residual 0".40.

## Comert D/1894 F1 (Denning) [Orbit 2]

Epoch 2026 Oct. 27.0 TT = JDT 2461340.5

T 2026 Nov. 2.12646 TT

		(2000.0)	P	Sato	Q
q	1.5712712				
n	0.10509074	Peri.	107.43295	-0.60598527	-0.79535405
a	4.4472658	Node	19.88641	+0.71342378	-0.55113648
e	0.6466883	Incl.	2.34549	+0.35186413	-0.25231036
P	9.38				

From 142 observations 1894 Mar. 27–June 5, mean residual 2".72.

From Muraoka's orbit (CHB 2006).

## Comet P/2009 Y2 (Kowalski)

Epoch 2026 Dec. 26.0 TT = JDT 2461400.5

T 2026 Dec. 10.69747 TT

		(2000.0)	P	Sato	Q
q	2.3698871				
n	0.05894781	Peri.	172.32363	+0.25161928	-0.83168688
a	6.5386927	Node	262.05227	+0.85929416	+0.42728608
e	0.6375595	Incl.	29.98410	+0.44531033	-0.35457516
P	16.72				

From 173 observations 2009 Dec. 20–2010 Apr. 2, mean residual 0".56.

## Comet P/2007 K2 (Gibbs)

Epoch 2026 Dec. 26.0 TT = JDT 2461400.5

T 2026 Dec. 25.88227 TT

		(2000.0)	P	Sato	Q
q	2.3209962				
n	0.04904143	Peri.	347.06252	-0.99612281	-0.08600031
a	7.3919773	Node	188.07274	+0.08777822	-0.95758767
e	0.6860115	Incl.	7.58172	+0.00585993	-0.27500874
P	20.10				

From 49 observations 2007 Apr. 11–July 11, mean residual 0".72.

Comet D/1894 F1 (Denning) [Orbit 1]

Epoch 2029 May 24.0 TT = JDT 2462280.5

T 2029 June 12.88617 TT

		(2000.0)	P	Sato	Q
q	1.1676422				
n	0.13199546	Peri.	198.57508	-0.71667985	-0.69705341
a	3.8202934	Node	297.21312	+0.64295584	-0.64814646
e	0.6943580	Incl.	1.42124	+0.27014400	-0.30663122
P	7.47				

From 120 observations 1894 Mar. 27–June 5, mean residual 2".6.

From Williams's orbit (1993).

Comet C/2014 UN271 (Bernardinelli–Bernstein)

Epoch 2031 Jan. 14.0 TT = JDT 2462880.5

T 2031 Jan. 22.97879 TT

		(2000.0)	P	Sato	Q
q	10.9504118				
z	-0.0000647	Peri.	326.32039	-0.81027577	-0.55985132
	+/-0.0000015	Node	190.02337	+0.03907981	-0.34660277
e	1.0007089	Incl.	95.45438	-0.58474434	+0.75261745

From 309 observations 2014 Aug. 14–2023 Jan. 2, mean residual 0".48.

#### Remarks:

Non-gravitational parameters Y1 and Y2 indicate that the Yabushita-style non-gravitational effect based on CO sublimation is taken into account (MN 283, 347).

#### Acknowledgments:

This Comet Handbook has made use of data and/or services provided by the International Astronomical Union's Minor Planet Center.

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## 彗星年表 2023 web 版

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2023年2月1日 発行

発行者 彗星年表編集委員会

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