

THE COMET HANDBOOK FOR 2021

彗星年表 2021

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Comet 174P/(60558) Echeclus

Epoch = 2021 July 5.0 TT
 T = 2015 Apr. 25.17164 TT
 Peri. = 163.09847
 Node = 173.21976 2000.0
 Incl. = 4.34323
 q = 5.8162078 AU

e = 0.4574150
 a = 10.7194408 AU
 n = 0.02808315
 P = 35.10 years

H = 9.1 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		V	Elong.
2020/21	h m	° ' "			m	' "		°
Jan. 6	05 46.79	+18 38.8	9.323	10.256	-0.30	+0.1	19.2	160.7
Jan. 16	05 43.95	+18 40.0	9.417	10.281	-0.26	+0.2	19.3	150.1
Jan. 26	05 41.55	+18 42.1	9.539	10.306	-0.21	+0.2	19.4	139.4
Feb. 5	05 39.71	+18 44.8	9.683	10.331	-0.15	+0.3	19.5	128.9
Feb. 15	05 38.51	+18 48.3	9.847	10.356	-0.08	+0.4	19.6	118.6
Feb. 25	05 37.98	+18 52.4	10.026	10.381	-0.01	+0.4	19.6	108.4
Mar. 7	05 38.15	+18 56.9	10.213	10.406	+0.05	+0.5	19.7	98.4
Mar. 17	05 39.00	+19 01.8	10.405	10.430	+0.12	+0.5	19.7	88.7
Mar. 27	05 40.50	+19 06.8	10.597	10.455	+0.18	+0.5	19.8	79.2
Apr. 6	05 42.61	+19 11.7	10.783	10.479	+0.24	+0.5	19.8	69.8
Apr. 16	05 45.26	+19 16.4	10.959	10.504	+0.29	+0.4	19.8	60.7
Apr. 26	05 48.39	+19 20.6	11.123	10.528	+0.34	+0.4	19.8	51.7
May 6	05 51.93	+19 24.3	11.270	10.553	+0.37	+0.3	19.8	42.8
May 16	05 55.80	+19 27.2	11.399	10.577	+0.40	+0.2	19.8	34.1
May 26	05 59.94	+19 29.3	11.506	10.602	+0.43	+0.2	19.8	25.6
June 5	06 04.27	+19 30.4	11.591	10.626	+0.44	+0.1	19.8	17.2
June 15	06 08.72	+19 30.6	11.652	10.650	+0.45	0.0	19.7	9.1
June 25	06 13.21	+19 29.8	11.688	10.674	+0.45	-0.1	19.7	3.9
July 5	06 17.68	+19 27.9	11.700	10.698	+0.44	-0.2	19.7	9.6
July 15	06 22.06	+19 25.2	11.686	10.722	+0.43	-0.3	19.8	17.7
July 25	06 26.28	+19 21.6	11.650	10.746	+0.41	-0.4	19.9	26.1
Aug. 4	06 30.26	+19 17.3	11.590	10.770	+0.38	-0.5	19.9	34.6
Aug. 14	06 33.95	+19 12.4	11.510	10.794	+0.35	-0.5	19.9	43.3
Aug. 24	06 37.27	+19 07.0	11.410	10.818	+0.31	-0.5	19.9	52.1
Sept. 3	06 40.17	+19 01.5	11.295	10.842	+0.26	-0.6	19.9	61.0
Sept. 13	06 42.57	+18 55.9	11.167	10.866	+0.21	-0.6	19.9	70.1
Sept. 23	06 44.43	+18 50.5	11.029	10.889	+0.15	-0.5	19.9	79.4
Oct. 3	06 45.70	+18 45.4	10.887	10.913	+0.09	-0.5	19.9	88.9
Oct. 13	06 46.33	+18 41.0	10.743	10.936	+0.03	-0.4	19.9	98.6
Oct. 23	06 46.32	+18 37.2	10.604	10.960	-0.04	-0.3	19.8	108.4
Nov. 2	06 45.66	+18 34.4	10.475	10.983	-0.10	-0.2	19.8	118.5
Nov. 12	06 44.37	+18 32.5	10.359	11.007	-0.16	-0.1	19.8	128.8
Nov. 22	06 42.52	+18 31.7	10.263	11.030	-0.21	0.0	19.7	139.3
Dec. 2	06 40.17	+18 31.8	10.190	11.053	-0.26	+0.1	19.6	149.9
Dec. 12	06 37.43	+18 32.9	10.144	11.077	-0.29	+0.2	19.6	160.4
Dec. 22	06 34.45	+18 34.8	10.128	11.100	-0.31	+0.2	19.5	170.6
Jan. 1	06 31.36	+18 37.5	10.143	11.123	-0.31	+0.3	19.5	174.6
Jan. 11	06 28.33	+18 40.7	10.191	11.146	-0.29	+0.4	19.6	165.6
Jan. 21	06 25.51	+18 44.4	10.269	11.169	-0.27	+0.4	19.6	155.1
Jan. 31	06 23.04	+18 48.4	10.376	11.192	-0.22	+0.4	19.7	144.4
Feb. 10	06 21.02	+18 52.7	10.508	11.215	-0.17	+0.4	19.8	133.9
Feb. 20	06 19.55	+18 57.1	10.661	11.238	-0.11	+0.4	19.9	123.5
Mar. 2	06 18.69	+19 01.4	10.832	11.260	-0.05	+0.4	19.9	113.3
Mar. 12	06 18.46	+19 05.6	11.014	11.283	+0.01	+0.4	20.0	103.2
Mar. 22	06 18.87	+19 09.5	11.202	11.306	+0.08	+0.4	20.0	93.4

Comet 29P/Schwassmann-Wachmann

Epoch = 2021 July 5.0 TT
 T = 2019 Mar. 26.71417 TT
 Peri. = 49.15502
 Node = 312.37547 2000.0
 Incl. = 9.36677
 q = 5.7691514 AU

e = 0.0446239
 a = 6.0386181 AU
 n = 0.06641983
 P = 14.84 years

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	02 14.63	+24 14.8	5.385	5.848	+0.05	-1.6	.	113.6
Jan. 16	02 15.69	+24 01.3	5.539	5.851	+0.17	-1.0	.	103.7
Jan. 26	02 17.93	+23 53.7	5.699	5.853	+0.29	-0.4	.	94.1
Feb. 5	02 21.27	+23 52.0	5.861	5.855	+0.39	+0.1	.	84.8
Feb. 15	02 25.60	+23 56.0	6.021	5.858	+0.48	+0.7	.	75.8
Feb. 25	02 30.84	+24 05.1	6.175	5.860	+0.57	+1.2	.	67.0
Mar. 7	02 36.85	+24 18.7	6.320	5.862	+0.64	+1.6	.	58.5
Mar. 17	02 43.54	+24 36.1	6.452	5.865	+0.70	+1.9	.	50.2
Mar. 27	02 50.81	+24 56.7	6.570	5.867	+0.75	+2.2	.	42.1
Apr. 6	02 58.55	+25 19.7	6.670	5.870	+0.80	+2.4	.	34.2
Apr. 16	03 06.68	+25 44.5	6.753	5.872	+0.83	+2.6	.	26.6
Apr. 26	03 15.11	+26 10.6	6.815	5.875	+0.86	+2.7	.	19.3
May 6	03 23.75	+26 37.4	6.858	5.877	+0.87	+2.7	.	12.6
May 16	03 32.53	+27 04.5	6.879	5.880	+0.88	+2.7	.	8.1
May 26	03 41.35	+27 31.4	6.880	5.883	+0.88	+2.7	.	9.3
June 5	03 50.15	+27 57.9	6.860	5.885	+0.87	+2.6	.	14.9
June 15	03 58.82	+28 23.7	6.819	5.888	+0.86	+2.5	.	21.8
June 25	04 07.29	+28 48.6	6.759	5.891	+0.83	+2.4	.	29.0
July 5	04 15.46	+29 12.5	6.680	5.893	+0.80	+2.3	.	36.5
July 15	04 23.24	+29 35.3	6.583	5.896	+0.75	+2.2	.	44.1
July 25	04 30.52	+29 57.0	6.471	5.899	+0.70	+2.1	.	51.9
Aug. 4	04 37.19	+30 17.6	6.345	5.901	+0.63	+2.0	.	59.9
Aug. 14	04 43.13	+30 37.1	6.208	5.904	+0.55	+1.9	.	68.0
Aug. 24	04 48.22	+30 55.4	6.062	5.907	+0.46	+1.8	.	76.4
Sept. 3	04 52.35	+31 12.7	5.911	5.910	+0.35	+1.7	.	85.1
Sept. 13	04 55.38	+31 28.6	5.757	5.913	+0.24	+1.5	.	94.0
Sept. 23	04 57.21	+31 43.1	5.605	5.915	+0.11	+1.4	.	103.2
Oct. 3	04 57.76	+31 55.7	5.459	5.918	-0.02	+1.1	.	112.7
Oct. 13	04 56.99	+32 05.8	5.324	5.921	-0.15	+0.9	.	122.6
Oct. 23	04 54.92	+32 12.9	5.204	5.924	-0.28	+0.5	.	132.7
Nov. 2	04 51.63	+32 16.2	5.104	5.927	-0.39	+0.1	.	143.0
Nov. 12	04 47.32	+32 14.9	5.029	5.930	-0.48	-0.4	.	153.3
Nov. 22	04 42.26	+32 08.7	4.981	5.933	-0.53	-0.9	.	163.1
Dec. 2	04 36.79	+31 57.5	4.962	5.936	-0.55	-1.4	.	169.9
Dec. 12	04 31.32	+31 41.8	4.976	5.939	-0.53	-1.8	.	166.9
Dec. 22	04 26.23	+31 22.5	5.019	5.942	-0.47	-2.1	.	157.7
Jan. 1	04 21.88	+31 01.0	5.092	5.945	-0.38	-2.2	.	147.4
Jan. 11	04 18.54	+30 38.7	5.192	5.948	-0.27	-2.2	.	136.9
Jan. 21	04 16.40	+30 17.2	5.313	5.950	-0.14	-2.1	.	126.4
Jan. 31	04 15.56	+29 57.6	5.452	5.953	-0.01	-1.8	.	116.2
Feb. 10	04 16.04	+29 40.8	5.604	5.957	+0.12	-1.5	.	106.3
Feb. 20	04 17.80	+29 27.1	5.764	5.960	+0.24	-1.2	.	96.6
Mar. 2	04 20.76	+29 16.7	5.927	5.963	+0.36	-0.9	.	87.3
Mar. 12	04 24.83	+29 09.4	6.089	5.966	+0.46	-0.6	.	78.2
Mar. 22	04 29.88	+29 05.0	6.246	5.969	+0.55	-0.3	.	69.4

Comet C/2018 N2 (ASASSN)

Epoch = 2021 July 5.0 TT
 T = 2019 Nov. 10.99046 TT
 Peri. = 24.41101
 Node = 25.23528 2000.0
 Incl. = 77.53172
 q = 3.1249981 AU
 e = 1.0001772

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	16 26.38	+60 17.9	4.917	4.999	+0.68	+3.4	14.9	89.1
Jan. 16	16 32.38	+60 58.8	4.950	5.066	+0.50	+4.9	15.0	91.1
Jan. 26	16 36.50	+61 53.1	4.983	5.133	+0.29	+6.1	15.1	93.2
Feb. 5	16 38.36	+62 58.4	5.019	5.200	+0.05	+7.0	15.2	95.1
Feb. 15	16 37.54	+64 11.5	5.058	5.268	-0.25	+7.6	15.2	96.8
Feb. 25	16 33.53	+65 28.5	5.103	5.335	-0.59	+7.7	15.3	98.2
Mar. 7	16 25.87	+66 44.6	5.154	5.403	-0.98	+7.4	15.4	99.3
Mar. 17	16 14.18	+67 54.2	5.213	5.471	-1.40	+6.4	15.5	99.8
Mar. 27	15 58.41	+68 50.9	5.280	5.540	-1.79	+4.7	15.5	99.9
Apr. 6	15 39.04	+69 28.7	5.356	5.608	-2.10	+2.5	15.6	99.4
Apr. 16	15 17.20	+69 42.3	5.443	5.676	-2.26	-0.1	15.7	98.4
Apr. 26	14 54.63	+69 28.8	5.538	5.745	-2.22	-2.9	15.8	96.8
May 6	14 33.19	+68 48.3	5.644	5.813	-2.02	-5.5	15.9	94.7
May 16	14 14.35	+67 43.3	5.757	5.882	-1.70	-7.7	16.0	92.1
May 26	13 58.96	+66 18.3	5.879	5.951	-1.34	-9.4	16.1	89.2
June 5	13 47.20	+64 38.4	6.007	6.019	-0.98	-10.6	16.2	85.9
June 15	13 38.85	+62 48.3	6.139	6.088	-0.66	-11.4	16.3	82.4
June 25	13 33.50	+60 52.3	6.275	6.157	-0.39	-11.8	16.4	78.7
July 5	13 30.66	+58 53.6	6.413	6.226	-0.16	-11.9	16.5	74.9
July 15	13 29.90	+56 55.1	6.550	6.295	+0.02	-11.8	16.6	71.1
July 25	13 30.83	+54 58.7	6.684	6.363	+0.17	-11.4	16.7	67.4
Aug. 4	13 33.10	+53 06.3	6.815	6.432	+0.29	-11.0	16.8	63.8
Aug. 14	13 36.47	+51 18.9	6.939	6.501	+0.39	-10.4	16.8	60.5
Aug. 24	13 40.69	+49 37.9	7.056	6.570	+0.46	-9.7	16.9	57.6
Sept. 3	13 45.59	+48 03.9	7.164	6.638	+0.52	-9.0	17.0	55.1
Sept. 13	13 51.00	+46 37.6	7.260	6.707	+0.56	-8.2	17.1	53.3
Sept. 23	13 56.79	+45 19.8	7.345	6.776	+0.59	-7.3	17.1	52.1
Oct. 3	14 02.83	+44 10.8	7.417	6.844	+0.61	-6.4	17.2	51.9
Oct. 13	14 09.01	+43 11.2	7.476	6.913	+0.62	-5.4	17.3	52.5
Oct. 23	14 15.22	+42 21.4	7.520	6.981	+0.62	-4.4	17.3	54.0
Nov. 2	14 21.36	+41 41.7	7.551	7.050	+0.61	-3.4	17.4	56.4
Nov. 12	14 27.31	+41 12.4	7.568	7.118	+0.58	-2.4	17.4	59.6
Nov. 22	14 32.97	+40 53.6	7.573	7.186	+0.55	-1.3	17.5	63.5
Dec. 2	14 38.22	+40 45.3	7.566	7.255	+0.50	-0.3	17.5	68.0
Dec. 12	14 42.94	+40 47.5	7.549	7.323	+0.44	+0.8	17.5	73.1
Dec. 22	14 47.00	+40 59.6	7.524	7.391	+0.37	+1.7	17.6	78.5
Jan. 1	14 50.29	+41 21.2	7.494	7.459	+0.28	+2.6	17.6	84.2
Jan. 11	14 52.65	+41 51.4	7.462	7.527	+0.18	+3.4	17.6	90.0
Jan. 21	14 53.98	+42 28.6	7.430	7.594	+0.07	+4.1	17.7	95.9
Jan. 31	14 54.16	+43 11.4	7.402	7.662	-0.05	+4.5	17.7	101.7
Feb. 10	14 53.09	+43 57.6	7.380	7.730	-0.18	+4.7	17.7	107.2
Feb. 20	14 50.72	+44 44.8	7.369	7.797	-0.31	+4.7	17.8	112.2
Mar. 2	14 47.06	+45 30.3	7.371	7.865	-0.44	+4.4	17.8	116.6
Mar. 12	14 42.17	+46 11.3	7.388	7.932	-0.55	+3.7	17.8	120.0
Mar. 22	14 36.19	+46 45.1	7.423	7.999	-0.65	+2.9	17.9	122.3

Comet C/2019 C1 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2020 May 5.39811 TT
 Peri. = 319.17620
 Node = 212.38618 2000.0
 Incl. = 36.03074
 q = 6.5809365 AU
 e = 0.9908247

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	13 08.46	-20 19.2	6.844	6.781	+0.34	-1.0	17.7	82.2
Jan. 16	13 11.42	-20 26.9	6.701	6.797	+0.25	-0.5	17.7	91.5
Jan. 26	13 13.46	-20 28.6	6.558	6.814	+0.15	+0.2	17.6	101.0
Feb. 5	13 14.57	-20 23.6	6.421	6.832	+0.06	+0.9	17.6	110.7
Feb. 15	13 14.74	-20 11.3	6.293	6.850	-0.03	+1.6	17.6	120.6
Feb. 25	13 14.02	-19 51.4	6.181	6.868	-0.12	+2.4	17.5	130.7
Mar. 7	13 12.52	-19 24.0	6.089	6.887	-0.19	+3.1	17.5	140.9
Mar. 17	13 10.37	-18 49.4	6.019	6.907	-0.24	+3.8	17.5	151.1
Mar. 27	13 07.77	-18 08.4	5.977	6.927	-0.28	+4.4	17.5	160.9
Apr. 6	13 04.94	-17 22.5	5.964	6.948	-0.29	+4.8	17.5	168.9
Apr. 16	13 02.11	-16 33.1	5.981	6.970	-0.27	+5.0	17.5	169.4
Apr. 26	12 59.50	-15 42.4	6.028	6.992	-0.24	+5.1	17.5	161.9
May 6	12 57.31	-14 52.1	6.104	7.014	-0.19	+4.9	17.6	152.4
May 16	12 55.70	-14 04.1	6.207	7.037	-0.12	+4.6	17.6	142.6
May 26	12 54.80	-13 20.0	6.334	7.061	-0.05	+4.1	17.7	132.7
June 5	12 54.67	-12 41.0	6.481	7.085	+0.03	+3.6	17.8	123.0
June 15	12 55.35	-12 07.7	6.643	7.109	+0.11	+3.0	17.8	113.5
June 25	12 56.84	-11 40.7	6.817	7.134	+0.19	+2.4	17.9	104.2
July 5	12 59.11	-11 19.9	6.998	7.159	+0.27	+1.7	18.0	95.0
July 15	13 02.11	-11 05.3	7.182	7.185	+0.34	+1.1	18.0	86.1
July 25	13 05.79	-10 56.4	7.366	7.212	+0.40	+0.6	18.1	77.4
Aug. 4	13 10.08	-10 52.7	7.544	7.239	+0.46	+0.1	18.2	68.8
Aug. 14	13 14.91	-10 53.8	7.715	7.266	+0.51	-0.3	18.2	60.3
Aug. 24	13 20.22	-10 58.8	7.874	7.294	+0.55	-0.7	18.3	51.9
Sept. 3	13 25.94	-11 07.2	8.020	7.322	+0.59	-1.0	18.4	43.6
Sept. 13	13 31.99	-11 18.4	8.149	7.351	+0.62	-1.2	18.4	35.3
Sept. 23	13 38.31	-11 31.5	8.259	7.380	+0.64	-1.4	18.5	27.1
Oct. 3	13 44.84	-11 46.0	8.349	7.409	+0.66	-1.5	18.5	18.9
Oct. 13	13 51.49	-12 01.2	8.418	7.439	+0.67	-1.5	18.5	10.6
Oct. 23	13 58.20	-12 16.4	8.464	7.470	+0.67	-1.5	18.6	2.3
Nov. 2	14 04.91	-12 31.2	8.487	7.501	+0.67	-1.4	18.6	6.1
Nov. 12	14 11.52	-12 44.8	8.486	7.532	+0.65	-1.3	18.6	14.5
Nov. 22	14 17.97	-12 56.7	8.462	7.563	+0.63	-1.1	18.6	23.1
Dec. 2	14 24.18	-13 06.5	8.416	7.595	+0.60	-0.8	18.6	31.7
Dec. 12	14 30.05	-13 13.5	8.350	7.627	+0.57	-0.5	18.6	40.5
Dec. 22	14 35.51	-13 17.3	8.264	7.660	+0.52	-0.2	18.6	49.4
Jan. 1	14 40.47	-13 17.6	8.163	7.693	+0.47	+0.2	18.6	58.4
Jan. 11	14 44.84	-13 14.0	8.048	7.726	+0.40	+0.6	18.6	67.6
Jan. 21	14 48.55	-13 06.1	7.923	7.760	+0.33	+1.0	18.6	76.9
Jan. 31	14 51.53	-12 53.8	7.793	7.794	+0.25	+1.5	18.6	86.5
Feb. 10	14 53.71	-12 36.9	7.661	7.829	+0.17	+1.9	18.6	96.2
Feb. 20	14 55.06	-12 15.5	7.533	7.863	+0.09	+2.4	18.5	106.0
Mar. 2	14 55.58	-11 49.8	7.413	7.898	+0.01	+2.8	18.5	116.0
Mar. 12	14 55.27	-11 20.2	7.306	7.934	-0.07	+3.2	18.5	126.2
Mar. 22	14 54.20	-10 47.1	7.218	7.969	-0.15	+3.5	18.5	136.4

Comet C/2019 K7 (Smith)

Epoch = 2021 July 5.0 TT
 T = 2020 June 17.07235 TT
 Peri. = 27.32511
 Node = 307.92948 2000.0
 Incl. = 103.54216
 q = 4.4756898 AU
 e = 0.9999504

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	18 54.50	+22 39.2	5.407	4.767	+0.54	+7.2	16.4	45.3
Jan. 16	18 59.85	+23 57.3	5.417	4.795	+0.53	+8.5	16.5	46.6
Jan. 26	19 05.02	+25 28.2	5.410	4.824	+0.50	+9.8	16.5	49.2
Feb. 5	19 09.85	+27 11.7	5.388	4.855	+0.46	+11.0	16.5	52.7
Feb. 15	19 14.16	+29 07.8	5.354	4.886	+0.40	+12.3	16.5	56.9
Feb. 25	19 17.75	+31 16.0	5.310	4.918	+0.31	+13.5	16.5	61.7
Mar. 7	19 20.44	+33 35.4	5.260	4.952	+0.21	+14.5	16.6	66.7
Mar. 17	19 21.98	+36 04.9	5.206	4.986	+0.08	+15.4	16.6	71.8
Mar. 27	19 22.11	+38 42.6	5.152	5.021	-0.07	+16.1	16.6	76.9
Apr. 6	19 20.56	+41 26.0	5.102	5.058	-0.26	+16.5	16.6	81.9
Apr. 16	19 17.01	+44 11.8	5.058	5.095	-0.48	+16.6	16.6	86.4
Apr. 26	19 11.14	+46 55.7	5.024	5.133	-0.73	+16.1	16.6	90.5
May 6	19 02.67	+49 32.7	5.003	5.172	-1.00	+15.1	16.6	94.0
May 16	18 51.40	+51 57.3	4.996	5.211	-1.28	+13.5	16.7	96.7
May 26	18 37.32	+54 03.2	5.005	5.252	-1.55	+11.3	16.7	98.6
June 5	18 20.72	+55 45.0	5.030	5.293	-1.78	+8.7	16.7	99.5
June 15	18 02.25	+56 58.3	5.072	5.335	-1.91	+5.6	16.8	99.5
June 25	17 42.90	+57 40.9	5.130	5.377	-1.94	+2.6	16.9	98.7
July 5	17 23.86	+57 53.2	5.202	5.421	-1.84	-0.3	16.9	97.0
July 15	17 06.23	+57 38.2	5.285	5.465	-1.65	-2.8	17.0	94.8
July 25	16 50.86	+57 01.0	5.379	5.509	-1.39	-4.7	17.1	92.1
Aug. 4	16 38.19	+56 07.2	5.479	5.555	-1.11	-6.1	17.1	89.0
Aug. 14	16 28.36	+55 02.6	5.584	5.600	-0.83	-6.8	17.2	85.7
Aug. 24	16 21.26	+53 52.6	5.690	5.647	-0.57	-7.1	17.3	82.4
Sept. 3	16 16.61	+52 41.6	5.796	5.694	-0.34	-7.0	17.4	79.2
Sept. 13	16 14.14	+51 33.0	5.898	5.741	-0.14	-6.6	17.4	76.2
Sept. 23	16 13.53	+50 29.9	5.994	5.789	+0.03	-5.9	17.5	73.5
Oct. 3	16 14.46	+49 34.3	6.083	5.837	+0.17	-5.1	17.6	71.2
Oct. 13	16 16.70	+48 48.0	6.163	5.886	+0.28	-4.1	17.6	69.4
Oct. 23	16 19.98	+48 12.4	6.233	5.935	+0.38	-2.9	17.7	68.2
Nov. 2	16 24.09	+47 48.6	6.293	5.985	+0.45	-1.7	17.8	67.6
Nov. 12	16 28.84	+47 37.5	6.341	6.035	+0.50	-0.4	17.8	67.7
Nov. 22	16 34.04	+47 39.8	6.379	6.086	+0.54	+1.0	17.9	68.5
Dec. 2	16 39.50	+47 55.8	6.406	6.137	+0.55	+2.4	17.9	69.9
Dec. 12	16 45.05	+48 25.9	6.424	6.188	+0.55	+3.8	18.0	71.8
Dec. 22	16 50.51	+49 10.2	6.434	6.240	+0.53	+5.2	18.0	74.3
Jan. 1	16 55.69	+50 08.4	6.438	6.291	+0.49	+6.6	18.0	77.1
Jan. 11	17 00.38	+51 20.1	6.438	6.344	+0.43	+7.9	18.1	80.1
Jan. 21	17 04.34	+52 44.3	6.437	6.396	+0.35	+9.1	18.1	83.3
Jan. 31	17 07.33	+54 19.9	6.436	6.449	+0.23	+10.1	18.1	86.4
Feb. 10	17 09.03	+56 05.1	6.438	6.502	+0.09	+11.0	18.2	89.4
Feb. 20	17 09.10	+57 57.6	6.446	6.556	-0.10	+11.5	18.2	92.0
Mar. 2	17 07.16	+59 54.5	6.461	6.609	-0.32	+11.8	18.3	94.3
Mar. 12	17 02.76	+61 52.5	6.486	6.663	-0.59	+11.7	18.3	96.0
Mar. 22	16 55.47	+63 47.3	6.521	6.717	-0.91	+11.1	18.3	97.1

Comet C/2020 M3 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2020 Oct. 25.63432 TT
 Peri. = 328.45290 e = 0.9527994
 Node = 71.24439 2000.0 a = 26.8683025 AU
 Incl. = 23.47205 n = 0.00707691
 q = 1.2682000 AU P = 139.27 years

$$m_1 = 8.6 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	05 14.57	+46 39.2	0.733	1.647	+0.27	+11.7	12.3	146.8
Jan. 16	05 19.04	+48 05.6	0.869	1.738	+0.66	+5.4	13.1	139.3
Jan. 26	05 27.30	+48 40.5	1.020	1.833	+1.01	+1.5	13.9	132.2
Feb. 5	05 38.62	+48 42.7	1.184	1.931	+1.27	-1.1	14.7	125.5
Feb. 15	05 52.25	+48 23.5	1.360	2.031	+1.46	-2.8	15.4	119.0
Feb. 25	06 07.54	+47 49.9	1.546	2.134	+1.60	-4.0	16.1	112.7
Mar. 7	06 23.91	+47 06.4	1.742	2.237	+1.68	-4.8	16.8	106.5
Mar. 17	06 40.94	+46 15.4	1.946	2.340	+1.73	-5.4	17.4	100.4
Mar. 27	06 58.31	+45 18.7	2.156	2.444	+1.75	-5.9	18.0	94.4
Apr. 6	07 15.77	+44 17.6	2.370	2.549	+1.74	-6.3	18.6	88.5
Apr. 16	07 33.14	+43 12.8	2.588	2.653	+1.73	-6.7	19.1	82.6
Apr. 26	07 50.31	+42 05.1	2.807	2.756	+1.70	-6.9	19.6	76.8
May 6	08 07.16	+40 55.1	3.024	2.860	+1.67	-7.1	20.1	71.0
May 16	08 23.65	+39 43.3	3.240	2.962	+1.63	-7.3	20.6	65.2
May 26	08 39.74	+38 30.3	3.451	3.065	+1.59	-7.3	21.0	59.5
June 5	08 55.40	+37 16.6	3.656	3.166	+1.54	-7.4	21.4	53.9
June 15	09 10.61	+36 02.6	3.854	3.267	+1.50	-7.4	21.8	48.3
June 25	09 25.39	+34 49.0	4.043	3.368	+1.45	-7.3	.	42.8
July 5	09 39.71	+33 36.2	4.220	3.468	+1.41	-7.2	.	37.4
July 15	09 53.59	+32 24.6	4.386	3.567	+1.36	-7.1	.	32.1
July 25	10 07.03	+31 15.0	4.538	3.665	+1.32	-6.8	.	27.3
Aug. 4	10 20.02	+30 07.7	4.675	3.762	+1.28	-6.6	.	23.0
Aug. 14	10 32.57	+29 03.3	4.796	3.859	+1.23	-6.2	.	19.9
Aug. 24	10 44.66	+28 02.5	4.901	3.955	+1.18	-5.9	.	18.6
Sept. 3	10 56.29	+27 05.9	4.987	4.051	+1.14	-5.4	.	19.5
Sept. 13	11 07.44	+26 14.0	5.056	4.146	+1.09	-4.9	.	22.7
Sept. 23	11 18.07	+25 27.7	5.106	4.240	+1.03	-4.3	.	27.3
Oct. 3	11 28.16	+24 47.6	5.138	4.333	+0.98	-3.6	.	33.0
Oct. 13	11 37.64	+24 14.4	5.151	4.426	+0.91	-2.9	.	39.4
Oct. 23	11 46.46	+23 48.9	5.148	4.518	+0.84	-2.1	.	46.3
Nov. 2	11 54.55	+23 31.8	5.129	4.609	+0.77	-1.2	.	53.6
Nov. 12	12 01.82	+23 23.9	5.095	4.700	+0.68	-0.3	.	61.3
Nov. 22	12 08.18	+23 25.6	5.049	4.790	+0.58	+0.7	.	69.3
Dec. 2	12 13.52	+23 37.3	4.994	4.879	+0.47	+1.7	.	77.6
Dec. 12	12 17.72	+23 59.3	4.934	4.968	+0.35	+2.8	.	86.3
Dec. 22	12 20.67	+24 31.3	4.872	5.057	+0.22	+3.7	.	95.2
Jan. 1	12 22.27	+25 12.5	4.812	5.144	+0.08	+4.6	.	104.3
Jan. 11	12 22.44	+26 01.6	4.760	5.231	-0.06	+5.3	.	113.6
Jan. 21	12 21.15	+26 56.4	4.720	5.318	-0.21	+5.7	.	122.8
Jan. 31	12 18.42	+27 54.2	4.697	5.404	-0.35	+5.8	.	131.8
Feb. 10	12 14.38	+28 51.8	4.695	5.489	-0.47	+5.6	.	140.1
Feb. 20	12 09.23	+29 45.5	4.719	5.574	-0.57	+5.0	.	147.0
Mar. 2	12 03.26	+30 32.0	4.770	5.658	-0.63	+4.1	.	151.2
Mar. 12	11 56.86	+31 08.3	4.849	5.742	-0.65	+3.0	.	151.5
Mar. 22	11 50.44	+31 32.6	4.958	5.825	-0.63	+1.7	.	147.9

Comet 156P/Russell-LINEAR

Epoch = 2021 July 5.0 TT
 T = 2020 Nov. 17.88678 TT
 Peri. = 0.43847 e = 0.6148432
 Node = 35.36340 2000.0 a = 3.4609523 AU
 Incl. = 17.26245 n = 0.15307725
 q = 1.3330093 AU P = 6.44 years

m1 = 6.9 + 5 log(Delta) + 40.0 log(r)
 m1 = 14.0 + 5 log(Delta) + 8.0 log(r) (r > 1.7 AU)

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	01 24.61	+28 32.9	0.851	1.449	+2.73	+23.9	13.0	104.1
Jan. 16	01 52.73	+32 11.2	0.950	1.496	+2.91	+19.4	13.8	101.3
Jan. 26	02 22.43	+35 05.8	1.059	1.549	+3.04	+15.2	14.6	98.5
Feb. 5	02 53.20	+37 20.3	1.177	1.607	+3.12	+11.4	15.5	95.6
Feb. 15	03 24.56	+38 58.6	1.304	1.669	+3.15	+8.0	16.4	92.4
Feb. 25	03 56.05	+40 04.7	1.440	1.734	+3.14	+5.0	16.7	89.1
Mar. 7	04 27.23	+40 42.1	1.583	1.801	+3.09	+2.3	17.0	85.5
Mar. 17	04 57.74	+40 54.4	1.733	1.871	+3.00	0.0	17.4	81.8
Mar. 27	05 27.33	+40 45.2	1.888	1.941	+2.90	-2.0	17.7	77.9
Apr. 6	05 55.77	+40 17.6	2.048	2.012	+2.78	-3.7	18.0	73.8
Apr. 16	06 22.98	+39 34.6	2.211	2.084	+2.65	-5.0	18.3	69.6
Apr. 26	06 48.91	+38 38.9	2.375	2.156	+2.52	-6.2	18.5	65.2
May 6	07 13.54	+37 32.7	2.540	2.228	+2.39	-7.1	18.8	60.7
May 16	07 36.92	+36 18.0	2.704	2.300	+2.27	-7.9	19.1	56.2
May 26	07 59.12	+34 56.8	2.865	2.372	+2.16	-8.4	19.3	51.5
June 5	08 20.19	+33 30.4	3.022	2.443	+2.05	-8.9	19.5	46.8
June 15	08 40.24	+32 00.1	3.174	2.513	+1.95	-9.2	19.7	42.0
June 25	08 59.33	+30 27.1	3.319	2.583	+1.86	-9.4	19.9	37.2
July 5	09 17.53	+28 52.3	3.455	2.652	+1.78	-9.5	20.1	32.3
July 15	09 34.93	+27 16.7	3.582	2.720	+1.70	-9.6	20.2	27.4
July 25	09 51.58	+25 41.0	3.698	2.787	+1.63	-9.5	20.4	22.6
Aug. 4	10 07.53	+24 06.0	3.801	2.854	+1.56	-9.4	20.5	18.0
Aug. 14	10 22.83	+22 32.3	3.892	2.920	+1.50	-9.3	20.7	14.1
Aug. 24	10 37.51	+21 00.7	3.967	2.984	+1.44	-9.0	20.8	11.7
Sept. 3	10 51.60	+19 31.6	4.028	3.048	+1.38	-8.7	20.9	11.9
Sept. 13	11 05.11	+18 05.8	4.073	3.111	+1.32	-8.4	21.0	14.9
Sept. 23	11 18.03	+16 44.0	4.100	3.173	+1.26	-7.9	21.1	19.6
Oct. 3	11 30.36	+15 26.8	4.111	3.234	+1.20	-7.4	21.1	25.2
Oct. 13	11 42.07	+14 14.9	4.105	3.294	+1.13	-6.9	21.2	31.3
Oct. 23	11 53.10	+13 09.1	4.082	3.353	+1.06	-6.2	21.3	37.9
Nov. 2	12 03.40	+12 10.1	4.043	3.411	+0.99	-5.5	21.3	44.8
Nov. 12	12 12.90	+11 18.7	3.988	3.468	+0.90	-4.7	21.3	52.1
Nov. 22	12 21.48	+10 35.8	3.919	3.525	+0.80	-3.8	21.3	59.7
Dec. 2	12 29.03	+10 02.2	3.837	3.580	+0.69	-2.8	21.4	67.6
Dec. 12	12 35.42	+09 38.7	3.746	3.634	+0.57	-1.8	21.4	75.9
Dec. 22	12 40.47	+09 25.9	3.647	3.688	+0.43	-0.7	21.3	84.7
Jan. 1	12 44.05	+09 24.2	3.545	3.740	+0.27	+0.5	21.3	93.8
Jan. 11	12 45.97	+09 34.0	3.443	3.792	+0.10	+1.6	21.3	103.3
Jan. 21	12 46.11	+09 54.8	3.346	3.843	-0.09	+2.6	21.3	113.3
Jan. 31	12 44.38	+10 25.5	3.260	3.893	-0.28	+3.6	21.3	123.6
Feb. 10	12 40.79	+11 04.2	3.190	3.942	-0.46	+4.2	21.3	134.2
Feb. 20	12 35.48	+11 48.0	3.140	3.990	-0.62	+4.5	21.3	144.9
Mar. 2	12 28.72	+12 33.2	3.116	4.037	-0.74	+4.4	21.3	155.2
Mar. 12	12 20.96	+13 15.7	3.121	4.084	-0.81	+3.9	21.4	163.5
Mar. 22	12 12.75	+13 51.5	3.157	4.130	-0.82	+3.1	21.4	165.6

Comet 162P/Siding Spring

Epoch = 2021 July 5.0 TT
 T = 2020 Dec. 7.83152 TT
 Peri. = 357.14460 e = 0.5829461
 Node = 30.90691 2000.0 a = 3.0911100 AU
 Incl. = 27.55447 n = 0.18135619
 q = 1.2891595 AU P = 5.43 years

H = 13.4 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2020/21	h m	° ' "			m		°
Jan. 6	23 52.70	+11 39.5	1.133	1.332	+2.47 +39.4	16.0	77.7
Jan. 16	00 17.99	+17 56.9	1.212	1.365	+2.60 +35.7	16.2	76.1
Jan. 26	00 44.70	+23 36.5	1.301	1.406	+2.75 +31.8	16.4	74.5
Feb. 5	01 12.97	+28 37.3	1.397	1.454	+2.92 +27.9	16.5	72.9
Feb. 15	01 42.93	+32 59.1	1.500	1.507	+3.09 +24.0	16.7	71.2
Feb. 25	02 14.58	+36 41.7	1.610	1.565	+3.25 +20.1	16.9	69.4
Mar. 7	02 47.78	+39 45.1	1.725	1.626	+3.40 +16.2	17.1	67.4
Mar. 17	03 22.25	+42 09.4	1.846	1.691	+3.50 +12.3	17.2	65.2
Mar. 27	03 57.56	+43 55.7	1.972	1.757	+3.56 +8.6	17.4	62.8
Apr. 6	04 33.14	+45 05.4	2.102	1.826	+3.55 +5.0	17.6	60.2
Apr. 16	05 08.40	+45 41.1	2.235	1.895	+3.49 +1.8	17.7	57.4
Apr. 26	05 42.78	+45 46.2	2.371	1.965	+3.37 -1.0	17.9	54.5
May 6	06 15.80	+45 24.8	2.507	2.035	+3.22 -3.4	18.0	51.3
May 16	06 47.18	+44 41.1	2.643	2.105	+3.04 -5.4	18.2	48.0
May 26	07 16.74	+43 39.2	2.778	2.175	+2.85 -7.0	18.3	44.5
June 5	07 44.43	+42 23.2	2.911	2.244	+2.67 -8.3	18.4	40.9
June 15	08 10.33	+40 56.3	3.039	2.313	+2.49 -9.2	18.5	37.2
June 25	08 34.53	+39 21.6	3.162	2.382	+2.33 -9.8	18.6	33.5
July 5	08 57.16	+37 41.7	3.278	2.450	+2.18 -10.2	18.6	29.9
July 15	09 18.38	+35 58.5	3.386	2.516	+2.05 -10.4	18.7	26.4
July 25	09 38.33	+34 13.9	3.485	2.582	+1.93 -10.5	18.8	23.1
Aug. 4	09 57.12	+32 29.2	3.574	2.647	+1.82 -10.4	18.8	20.5
Aug. 14	10 14.89	+30 45.9	3.651	2.711	+1.72 -10.2	18.9	18.8
Aug. 24	10 31.71	+29 04.9	3.715	2.774	+1.63 -9.9	19.0	18.5
Sept. 3	10 47.67	+27 27.4	3.765	2.836	+1.55 -9.5	19.1	19.8
Sept. 13	11 02.82	+25 54.1	3.801	2.897	+1.47 -9.1	19.2	22.6
Sept. 23	11 17.20	+24 26.1	3.822	2.957	+1.40 -8.5	19.3	26.5
Oct. 3	11 30.82	+23 04.0	3.827	3.016	+1.32 -7.8	19.4	31.2
Oct. 13	11 43.69	+21 49.0	3.817	3.074	+1.24 -7.1	19.4	36.6
Oct. 23	11 55.76	+20 41.8	3.791	3.131	+1.16 -6.3	19.5	42.5
Nov. 2	12 07.01	+19 43.3	3.751	3.187	+1.08 -5.3	19.6	48.9
Nov. 12	12 17.35	+18 54.5	3.695	3.242	+0.98 -4.3	19.6	55.6
Nov. 22	12 26.68	+18 16.2	3.627	3.295	+0.87 -3.2	19.6	62.8
Dec. 2	12 34.90	+17 49.5	3.548	3.348	+0.75 -2.0	19.6	70.3
Dec. 12	12 41.83	+17 35.0	3.460	3.400	+0.62 -0.7	19.6	78.3
Dec. 22	12 47.31	+17 33.4	3.365	3.450	+0.46 +0.6	19.6	86.6
Jan. 1	12 51.15	+17 44.9	3.268	3.500	+0.29 +1.9	19.6	95.4
Jan. 11	12 53.15	+18 09.2	3.171	3.548	+0.09 +3.1	19.5	104.5
Jan. 21	12 53.14	+18 45.3	3.081	3.596	-0.12 +4.2	19.4	114.0
Jan. 31	12 50.98	+19 31.1	3.001	3.642	-0.34 +5.0	19.4	123.8
Feb. 10	12 46.65	+20 23.1	2.937	3.688	-0.55 +5.4	19.3	133.7
Feb. 20	12 40.28	+21 16.7	2.894	3.733	-0.74 +5.3	19.2	143.1
Mar. 2	12 32.20	+22 06.7	2.877	3.776	-0.88 +4.6	19.1	151.4
Mar. 12	12 22.92	+22 47.4	2.887	3.819	-0.97 +3.4	19.1	156.5
Mar. 22	12 13.13	+23 14.2	2.928	3.861	-0.98 +1.8	19.1	156.2

Comet 141P/Machholz

Epoch = 2021 July 5.0 TT
 T = 2020 Dec. 16.27759 TT
 Peri. = 153.55037 e = 0.7357544
 Node = 241.84352 2000.0 a = 3.0572963 AU
 Incl. = 13.94456 n = 0.18437319
 q = 0.8078771 AU P = 5.35 years

$$m1 = 13.1 + 5 \log(\Delta) + 25.0 \log(r(t-10))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	23 19.07	-07 50.1	0.575	0.875	+7.30	+6.4	9.8	62.0
Jan. 16	00 35.80	-06 27.4	0.536	0.947	+7.98	+10.7	10.3	70.2
Jan. 26	01 55.09	-04 22.6	0.544	1.035	+7.67	+14.2	11.2	79.6
Feb. 5	03 07.07	-01 57.1	0.598	1.133	+6.54	+14.5	12.4	87.7
Feb. 15	04 06.73	+00 20.0	0.690	1.236	+5.28	+12.5	13.6	93.2
Feb. 25	04 54.70	+02 13.9	0.810	1.342	+4.26	+10.0	14.9	95.9
Mar. 7	05 33.71	+03 42.3	0.952	1.449	+3.52	+7.5	16.2	96.3
Mar. 17	06 06.41	+04 47.7	1.111	1.555	+3.00	+5.4	17.4	95.1
Mar. 27	06 34.70	+05 33.0	1.281	1.660	+2.64	+3.5	18.4	92.7
Apr. 6	06 59.87	+06 00.9	1.462	1.764	+2.38	+1.9	19.4	89.4
Apr. 16	07 22.77	+06 13.5	1.651	1.866	+2.19	+0.5	20.4	85.6
Apr. 26	07 43.97	+06 12.8	1.845	1.965	+2.04	-0.7	21.2	81.4
May 6	08 03.83	+06 00.3	2.043	2.062	+1.92	-1.8	22.0	76.8
May 16	08 22.63	+05 37.5	2.243	2.158	+1.83	-2.8	.	72.1
May 26	08 40.54	+05 05.6	2.442	2.250	+1.75	-3.6	.	67.1
June 5	08 57.69	+04 25.8	2.639	2.341	+1.68	-4.4	.	62.0
June 15	09 14.19	+03 39.0	2.832	2.430	+1.62	-5.0	.	56.8
June 25	09 30.10	+02 46.1	3.020	2.516	+1.56	-5.6	.	51.5
July 5	09 45.48	+01 48.1	3.200	2.600	+1.51	-6.1	.	46.1
July 15	10 00.38	+00 45.7	3.371	2.683	+1.47	-6.5	.	40.7
July 25	10 14.84	+00 20.5	3.531	2.763	+1.42	-6.8	.	35.1
Aug. 4	10 28.86	-01 29.8	3.679	2.842	+1.38	-7.1	.	29.6
Aug. 14	10 42.49	-02 41.5	3.813	2.918	+1.34	-7.3	.	24.1
Aug. 24	10 55.72	-03 55.1	3.933	2.993	+1.30	-7.4	.	18.7
Sept. 3	11 08.55	-05 10.1	4.036	3.066	+1.26	-7.5	.	13.8
Sept. 13	11 20.99	-06 25.9	4.122	3.137	+1.22	-7.6	.	10.4
Sept. 23	11 33.01	-07 41.9	4.190	3.207	+1.18	-7.6	.	10.2
Oct. 3	11 44.58	-08 57.8	4.239	3.275	+1.13	-7.6	.	13.7
Oct. 13	11 55.68	-10 12.9	4.268	3.341	+1.08	-7.5	.	19.1
Oct. 23	12 06.24	-11 26.8	4.279	3.406	+1.02	-7.3	.	25.4
Nov. 2	12 16.21	-12 39.0	4.270	3.470	+0.96	-7.1	.	32.1
Nov. 12	12 25.50	-13 48.8	4.242	3.532	+0.89	-6.8	.	39.3
Nov. 22	12 34.01	-14 55.7	4.196	3.592	+0.80	-6.5	.	46.8
Dec. 2	12 41.62	-15 59.1	4.134	3.652	+0.71	-6.1	.	54.6
Dec. 12	12 48.19	-16 58.1	4.057	3.709	+0.59	-5.6	.	62.7
Dec. 22	12 53.57	-17 51.9	3.967	3.766	+0.47	-5.1	.	71.1
Jan. 1	12 57.60	-18 39.6	3.868	3.821	+0.32	-4.4	.	79.9
Jan. 11	13 00.10	-19 20.0	3.763	3.875	+0.16	-3.6	.	89.1
Jan. 21	13 00.93	-19 51.6	3.657	3.927	-0.01	-2.6	.	98.7
Jan. 31	12 59.96	-20 12.9	3.553	3.979	-0.20	-1.5	.	108.6
Feb. 10	12 57.15	-20 22.3	3.458	4.029	-0.38	-0.2	.	118.9
Feb. 20	12 52.57	-20 18.2	3.376	4.078	-0.55	+1.2	.	129.6
Mar. 2	12 46.42	-19 59.8	3.313	4.126	-0.69	+2.7	.	140.4
Mar. 12	12 39.05	-19 26.7	3.275	4.172	-0.79	+4.1	.	151.0
Mar. 22	12 30.96	-18 40.4	3.265	4.218	-0.83	+5.3	.	160.6

Comet 405P/Lemmon

Epoch = 2021 July 5.0 TT
 T = 2020 Dec. 24.30962 TT
 Peri. = 112.24059 e = 0.6891497
 Node = 3.31284 2000.0 a = 3.6089532 AU
 Incl. = 9.36524 n = 0.14375806
 q = 1.1218442 AU P = 6.86 years

$$m_1 = 17.6 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	13 05.29	+12 42.4	0.482	1.135	+2.47	-32.9	16.6	95.4
Jan. 16	13 26.89	+07 30.1	0.494	1.162	+1.79	-29.1	16.7	98.3
Jan. 26	13 41.91	+02 57.1	0.505	1.204	+1.15	-25.1	16.9	103.1
Feb. 5	13 50.57	+00 57.0	0.514	1.257	+0.51	-21.3	17.1	109.8
Feb. 15	13 52.72	-04 13.3	0.524	1.320	-0.14	-17.6	17.4	118.3
Feb. 25	13 48.45	-06 52.3	0.537	1.390	-0.76	-13.9	17.7	128.6
Mar. 7	13 38.49	-08 53.7	0.558	1.465	-1.26	-10.0	18.0	140.3
Mar. 17	13 24.44	-10 16.6	0.591	1.545	-1.54	-6.3	18.3	153.0
Mar. 27	13 08.86	-11 04.5	0.642	1.628	-1.53	-3.2	18.8	165.7
Apr. 6	12 54.44	-11 25.8	0.713	1.712	-1.30	-1.1	19.2	174.8
Apr. 16	12 43.06	-11 31.8	0.806	1.798	-0.93	-0.2	19.7	166.9
Apr. 26	12 35.64	-11 33.7	0.919	1.884	-0.52	-0.3	20.2	156.0
May 6	12 32.16	-11 38.9	1.052	1.970	-0.15	-0.9	20.7	145.8
May 16	12 32.18	-11 51.2	1.201	2.056	+0.17	-1.7	21.1	136.5
May 26	12 35.11	-12 12.4	1.365	2.141	+0.43	-2.6	21.6	127.8
June 5	12 40.35	-12 42.1	1.541	2.225	+0.63	-3.4	22.0	119.7
June 15	12 47.43	-13 19.6	1.727	2.309	+0.79	-4.1	.	112.1
June 25	12 55.95	-14 03.8	1.920	2.392	+0.92	-4.7	.	104.8
July 5	13 05.59	-14 53.3	2.120	2.473	+1.02	-5.2	.	97.8
July 15	13 16.14	-15 47.0	2.324	2.554	+1.10	-5.6	.	91.1
July 25	13 27.41	-16 44.0	2.529	2.633	+1.16	-5.8	.	84.5
Aug. 4	13 39.27	-17 43.0	2.734	2.711	+1.21	-6.0	.	78.0
Aug. 14	13 51.61	-18 43.3	2.938	2.788	+1.26	-6.1	.	71.5
Aug. 24	14 04.36	-19 44.1	3.137	2.863	+1.29	-6.1	.	65.2
Sept. 3	14 17.43	-20 44.5	3.331	2.938	+1.32	-6.0	.	58.8
Sept. 13	14 30.79	-21 44.1	3.517	3.011	+1.35	-5.9	.	52.4
Sept. 23	14 44.38	-22 42.2	3.693	3.083	+1.37	-5.7	.	46.1
Oct. 3	14 58.13	-23 38.4	3.859	3.154	+1.38	-5.5	.	39.6
Oct. 13	15 12.03	-24 32.1	4.012	3.223	+1.39	-5.2	.	33.2
Oct. 23	15 25.99	-25 23.0	4.150	3.292	+1.40	-4.9	.	26.8
Nov. 2	15 39.98	-26 10.9	4.272	3.359	+1.40	-4.6	.	20.3
Nov. 12	15 53.93	-26 55.5	4.377	3.425	+1.39	-4.3	.	14.1
Nov. 22	16 07.77	-27 36.6	4.464	3.490	+1.37	-3.9	.	8.6
Dec. 2	16 21.43	-28 14.2	4.531	3.554	+1.35	-3.6	.	6.8
Dec. 12	16 34.82	-28 48.4	4.579	3.617	+1.32	-3.2	.	10.9
Dec. 22	16 47.84	-29 19.4	4.607	3.679	+1.28	-2.9	.	17.2
Jan. 1	17 00.40	-29 47.3	4.614	3.739	+1.23	-2.6	.	24.2
Jan. 11	17 12.39	-30 12.7	4.602	3.799	+1.16	-2.4	.	31.5
Jan. 21	17 23.68	-30 35.8	4.571	3.858	+1.09	-2.2	.	39.1
Jan. 31	17 34.16	-30 57.3	4.522	3.915	+1.00	-2.1	.	46.8
Feb. 10	17 43.67	-31 17.8	4.457	3.972	+0.89	-2.0	.	54.8
Feb. 20	17 52.06	-31 37.9	4.378	4.027	+0.77	-2.0	.	63.0
Mar. 2	17 59.18	-31 58.3	4.287	4.082	+0.64	-2.1	.	71.5
Mar. 12	18 04.87	-32 19.5	4.188	4.136	+0.48	-2.2	.	80.2
Mar. 22	18 08.94	-32 41.8	4.083	4.188	+0.31	-2.3	.	89.1

Comet 398P/Boattini

Epoch = 2021 July 5.0 TT
 T = 2020 Dec. 26.73812 TT
 Peri. = 320.22590 e = 0.5826160
 Node = 127.46265 2000.0 a = 3.1280562 AU
 Incl. = 11.01530 n = 0.17815264
 q = 1.3056006 AU P = 5.53 years

$$m_1 = 11.8 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	04 52.37	+02 51.5	0.389	1.311	+1.43	+37.0	12.1	141.8
Jan. 16	05 08.46	+09 01.1	0.416	1.326	+1.83	+36.1	12.3	139.1
Jan. 26	05 28.31	+14 44.6	0.458	1.351	+2.16	+31.6	12.7	135.6
Feb. 5	05 51.09	+19 32.3	0.516	1.384	+2.40	+25.1	13.2	131.7
Feb. 15	06 15.84	+23 12.1	0.589	1.425	+2.55	+18.2	13.7	127.4
Feb. 25	06 41.69	+25 44.3	0.676	1.472	+2.61	+11.8	14.3	123.0
Mar. 7	07 07.78	+27 16.7	0.776	1.525	+2.60	+6.3	14.9	118.6
Mar. 17	07 33.53	+27 59.4	0.888	1.582	+2.54	+1.9	15.5	114.2
Mar. 27	07 58.59	+28 02.3	1.012	1.643	+2.46	-1.5	16.1	109.7
Apr. 6	08 22.68	+27 34.3	1.145	1.707	+2.35	-4.2	16.7	105.2
Apr. 16	08 45.74	+26 42.7	1.288	1.773	+2.25	-6.2	17.3	100.6
Apr. 26	09 07.79	+25 33.0	1.439	1.840	+2.15	-7.8	17.9	96.1
May 6	09 28.82	+24 10.1	1.596	1.909	+2.05	-8.9	18.4	91.4
May 16	09 48.95	+22 37.3	1.759	1.978	+1.97	-9.7	19.0	86.7
May 26	10 08.26	+20 57.4	1.926	2.048	+1.89	-10.3	19.4	82.0
June 5	10 26.81	+19 12.7	2.096	2.118	+1.82	-10.7	19.9	77.2
June 15	10 44.73	+17 24.8	2.268	2.187	+1.76	-10.9	20.4	72.4
June 25	11 02.07	+15 35.1	2.440	2.256	+1.71	-11.0	20.8	67.5
July 5	11 18.91	+13 44.9	2.611	2.325	+1.66	-11.0	21.2	62.6
July 15	11 35.32	+11 54.9	2.780	2.393	+1.62	-11.0	21.6	57.5
July 25	11 51.35	+10 05.9	2.944	2.461	+1.58	-10.8	22.0	52.5
Aug. 4	12 07.06	+08 18.7	3.103	2.527	+1.55	-10.6	.	47.3
Aug. 14	12 22.48	+06 33.9	3.255	2.593	+1.53	-10.3	.	42.1
Aug. 24	12 37.66	+04 52.0	3.398	2.658	+1.50	-10.0	.	36.8
Sept. 3	12 52.61	+03 13.5	3.532	2.722	+1.48	-9.6	.	31.4
Sept. 13	13 07.36	+01 39.0	3.655	2.785	+1.46	-9.2	.	26.0
Sept. 23	13 21.91	+00 08.8	3.764	2.847	+1.44	-8.8	.	20.6
Oct. 3	13 36.26	-01 16.6	3.861	2.908	+1.42	-8.3	.	15.3
Oct. 13	13 50.42	-02 36.7	3.942	2.968	+1.40	-7.7	.	10.7
Oct. 23	14 04.34	-03 51.0	4.008	3.027	+1.38	-7.1	.	8.3
Nov. 2	14 18.01	-04 59.3	4.057	3.085	+1.35	-6.5	.	10.0
Nov. 12	14 31.38	-06 01.2	4.089	3.142	+1.32	-5.8	.	14.7
Nov. 22	14 44.39	-06 56.2	4.104	3.198	+1.28	-5.1	.	20.5
Dec. 2	14 56.98	-07 44.1	4.101	3.253	+1.23	-4.4	.	27.0
Dec. 12	15 09.06	-08 24.5	4.080	3.306	+1.18	-3.6	.	33.7
Dec. 22	15 20.53	-08 57.4	4.042	3.359	+1.11	-2.9	.	40.8
Jan. 1	15 31.27	-09 22.5	3.988	3.411	+1.03	-2.1	.	48.1
Jan. 11	15 41.16	-09 39.7	3.919	3.462	+0.94	-1.3	.	55.7
Jan. 21	15 50.04	-09 49.1	3.838	3.512	+0.83	-0.5	.	63.6
Jan. 31	15 57.76	-09 50.8	3.745	3.561	+0.70	+0.3	.	71.7
Feb. 10	16 04.15	-09 44.9	3.644	3.609	+0.56	+1.0	.	80.2
Feb. 20	16 09.03	-09 31.8	3.537	3.655	+0.40	+1.7	.	88.9
Mar. 2	16 12.25	-09 12.0	3.430	3.701	+0.22	+2.3	.	98.1
Mar. 12	16 13.65	-08 46.2	3.325	3.746	+0.04	+2.9	.	107.6
Mar. 22	16 13.15	-08 15.4	3.227	3.790	-0.16	+3.3	.	117.4

Comet 277P/LINEAR

Epoch = 2021 July 5.0 TT
 T = 2020 Dec. 30.18282 TT
 Peri. = 152.32074 e = 0.5057473
 Node = 276.34384 2000.0 a = 3.8531646 AU
 Incl. = 16.77796 n = 0.13031000
 q = 1.9044370 AU P = 7.56 years

$$m_1 = 4.1 + 5 \log(\Delta) + 40.0 \log(r(t-40))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	' .		°
Jan. 6	02 40.70	+27 01.6	1.214	1.905	+1.31	-11.0	15.9	119.9
Jan. 16	02 54.90	+25 22.0	1.302	1.910	+1.54	-8.7	16.0	112.7
Jan. 26	03 11.17	+24 04.1	1.400	1.919	+1.72	-6.7	16.1	105.9
Feb. 5	03 29.03	+23 03.9	1.507	1.932	+1.86	-5.2	16.2	99.5
Feb. 15	03 48.12	+22 17.1	1.621	1.949	+1.97	-4.1	16.3	93.5
Feb. 25	04 08.14	+21 39.5	1.740	1.969	+2.04	-3.4	16.5	87.8
Mar. 7	04 28.81	+21 07.2	1.863	1.993	+2.09	-3.1	16.8	82.5
Mar. 17	04 49.93	+20 36.7	1.990	2.020	+2.13	-3.0	17.0	77.3
Mar. 27	05 11.31	+20 05.5	2.119	2.050	+2.15	-3.3	17.3	72.3
Apr. 6	05 32.79	+19 31.4	2.250	2.083	+2.15	-3.6	17.6	67.5
Apr. 16	05 54.23	+18 52.7	2.381	2.119	+2.14	-4.2	18.0	62.8
Apr. 26	06 15.54	+18 08.4	2.511	2.157	+2.12	-4.8	18.3	58.2
May 6	06 36.58	+17 17.7	2.640	2.197	+2.09	-5.4	18.7	53.6
May 16	06 57.31	+16 20.4	2.767	2.239	+2.05	-6.1	19.1	49.1
May 26	07 17.65	+15 16.3	2.890	2.282	+2.01	-6.8	19.4	44.6
June 5	07 37.55	+14 05.6	3.009	2.327	+1.96	-7.4	19.8	40.1
June 15	07 56.98	+12 48.5	3.124	2.373	+1.92	-8.0	20.2	35.6
June 25	08 15.90	+11 25.6	3.232	2.421	+1.86	-8.6	20.6	31.2
July 5	08 34.31	+09 57.2	3.334	2.469	+1.81	-9.1	21.0	26.8
July 15	08 52.20	+08 24.0	3.428	2.518	+1.76	-9.6	21.4	22.4
July 25	09 09.56	+06 46.6	3.513	2.568	+1.71	-10.0	21.8	18.2
Aug. 4	09 26.39	+05 05.6	3.589	2.618	+1.66	-10.3	.	14.3
Aug. 14	09 42.71	+03 21.4	3.655	2.669	+1.60	-10.6	.	11.3
Aug. 24	09 58.49	+01 34.9	3.709	2.719	+1.55	-10.8	.	10.1
Sept. 3	10 13.75	+00 13.6	3.752	2.771	+1.50	-10.9	.	11.6
Sept. 13	10 28.48	-02 03.3	3.782	2.822	+1.44	-11.0	.	15.0
Sept. 23	10 42.65	-03 53.8	3.799	2.873	+1.39	-11.1	.	19.6
Oct. 3	10 56.25	-05 44.5	3.802	2.925	+1.33	-11.1	.	24.8
Oct. 13	11 09.24	-07 34.8	3.792	2.976	+1.26	-11.0	.	30.5
Oct. 23	11 21.55	-09 24.2	3.769	3.027	+1.19	-10.9	.	36.5
Nov. 2	11 33.14	-11 12.1	3.732	3.078	+1.12	-10.7	.	42.8
Nov. 12	11 43.90	-12 57.9	3.682	3.129	+1.03	-10.4	.	49.4
Nov. 22	11 53.73	-14 41.0	3.620	3.179	+0.93	-10.1	.	56.3
Dec. 2	12 02.51	-16 20.7	3.547	3.230	+0.81	-9.7	.	63.5
Dec. 12	12 10.08	-17 56.0	3.465	3.280	+0.68	-9.3	.	71.0
Dec. 22	12 16.25	-19 26.0	3.376	3.329	+0.54	-8.7	.	78.9
Jan. 1	12 20.87	-20 49.4	3.282	3.378	+0.37	-7.9	.	87.1
Jan. 11	12 23.72	-22 04.5	3.187	3.427	+0.18	-7.0	.	95.7
Jan. 21	12 24.66	-23 09.4	3.094	3.476	-0.02	-5.9	.	104.6
Jan. 31	12 23.59	-24 01.9	3.007	3.524	-0.22	-4.5	.	113.9
Feb. 10	12 20.49	-24 39.4	2.931	3.571	-0.42	-2.8	.	123.4
Feb. 20	12 15.55	-24 59.3	2.871	3.618	-0.59	-1.0	.	133.0
Mar. 2	12 09.08	-25 00.2	2.830	3.665	-0.71	+1.0	.	142.3
Mar. 12	12 01.60	-24 41.3	2.814	3.711	-0.78	+2.9	.	150.6
Mar. 22	11 53.78	-24 04.3	2.824	3.757	-0.77	+4.6	.	156.2

Comet 98P/Takamizawa

Epoch = 2021 July 5.0 TT
 T = 2021 Jan. 4.89007 TT
 Peri. = 157.89750 e = 0.5624129
 Node = 114.70851 2000.0 a = 3.7996890 AU
 Incl. = 10.56041 n = 0.13307056
 q = 1.6626949 AU P = 7.41 years

$$m1 = 10.0 + 5 \log(\Delta) + 20.0 \log(r(t-30))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	18 34.36	-20 46.1	2.631	1.663	+3.15	-0.9	16.6	7.9
Jan. 16	19 05.80	-20 45.4	2.624	1.666	+3.13	+1.3	16.6	10.6
Jan. 26	19 36.88	-20 23.0	2.618	1.676	+3.08	+3.4	16.5	13.4
Feb. 5	20 07.33	-19 40.9	2.615	1.691	+3.00	+5.2	16.5	16.3
Feb. 15	20 36.92	-18 41.6	2.612	1.712	+2.90	+6.8	16.5	19.4
Feb. 25	21 05.44	-17 28.2	2.609	1.738	+2.79	+8.0	16.6	22.7
Mar. 7	21 32.79	-16 04.0	2.606	1.769	+2.67	+8.9	16.6	26.1
Mar. 17	21 58.90	-14 32.2	2.602	1.805	+2.54	+9.5	16.7	29.6
Mar. 27	22 23.74	-12 56.3	2.594	1.844	+2.41	+9.7	16.9	33.4
Apr. 6	22 47.32	-11 19.1	2.583	1.887	+2.29	+9.7	17.0	37.3
Apr. 16	23 09.64	-09 43.4	2.568	1.933	+2.16	+9.4	17.2	41.5
Apr. 26	23 30.70	-08 11.5	2.547	1.982	+2.04	+8.9	17.3	45.8
May 6	23 50.53	-06 45.6	2.521	2.033	+1.91	+8.2	17.5	50.5
May 16	00 09.10	-05 27.5	2.488	2.086	+1.79	+7.3	17.7	55.4
May 26	00 26.37	-04 18.8	2.449	2.141	+1.65	+6.3	17.9	60.6
June 5	00 42.31	-03 20.9	2.403	2.197	+1.52	+5.1	18.1	66.1
June 15	00 56.80	-02 35.1	2.352	2.255	+1.36	+3.9	18.2	72.0
June 25	01 09.72	-02 02.6	2.295	2.313	+1.20	+2.5	18.4	78.2
July 5	01 20.93	-01 44.2	2.234	2.372	+1.02	+1.0	18.6	85.0
July 15	01 30.23	-01 40.8	2.170	2.431	+0.82	-0.5	18.7	92.2
July 25	01 37.41	-01 53.0	2.106	2.491	+0.59	-2.1	18.9	100.0
Aug. 4	01 42.28	-02 20.6	2.043	2.551	+0.35	-3.6	19.1	108.3
Aug. 14	01 44.61	-03 03.2	1.987	2.611	+0.09	-5.0	19.2	117.3
Aug. 24	01 44.32	-03 58.9	1.940	2.671	-0.17	-6.2	19.4	126.8
Sept. 3	01 41.44	-05 04.4	1.907	2.731	-0.43	-6.9	19.5	136.8
Sept. 13	01 36.17	-06 14.9	1.893	2.790	-0.64	-7.1	19.7	146.9
Sept. 23	01 29.04	-07 24.1	1.901	2.850	-0.79	-6.6	19.9	156.5
Oct. 3	01 20.75	-08 25.4	1.936	2.909	-0.86	-5.5	20.2	163.4
Oct. 13	01 12.18	-09 12.8	1.999	2.968	-0.84	-3.8	20.4	163.1
Oct. 23	01 04.23	-09 42.4	2.089	3.026	-0.73	-1.9	20.7	156.1
Nov. 2	00 57.59	-09 52.9	2.206	3.084	-0.57	0.0	21.0	146.7
Nov. 12	00 52.75	-09 44.7	2.346	3.141	-0.37	+1.8	21.3	136.8
Nov. 22	00 49.94	-09 20.0	2.506	3.198	-0.17	+3.3	21.6	126.9
Dec. 2	00 49.16	-08 41.7	2.681	3.254	+0.03	+4.5	21.9	117.4
Dec. 12	00 50.32	-07 52.3	2.869	3.310	+0.21	+5.4	.	108.1
Dec. 22	00 53.21	-06 54.4	3.064	3.365	+0.38	+6.2	.	99.3
Jan. 1	00 57.61	-05 50.3	3.263	3.420	+0.51	+6.7	.	90.7
Jan. 11	01 03.31	-04 41.7	3.463	3.474	+0.63	+7.0	.	82.4
Jan. 21	01 10.10	-03 30.3	3.661	3.527	+0.73	+7.3	.	74.4
Jan. 31	01 17.79	-02 17.2	3.854	3.580	+0.81	+7.4	.	66.7
Feb. 10	01 26.23	-01 03.5	4.039	3.632	+0.88	+7.4	.	59.1
Feb. 20	01 35.27	+00 09.8	4.214	3.683	+0.93	+7.3	.	51.7
Mar. 2	01 44.79	+01 22.0	4.377	3.734	+0.97	+7.1	.	44.4
Mar. 12	01 54.69	+02 32.4	4.526	3.784	+1.01	+6.9	.	37.3
Mar. 22	02 04.87	+03 40.2	4.660	3.834	+1.03	+6.6	.	30.4

Comet 102P/Shoemaker

Epoch = 2021 July 5.0 TT
 T = 2021 Jan. 22.49122 TT
 Peri. = 20.54946 e = 0.4571128
 Node = 339.36492 2000.0 a = 3.8129053 AU
 Incl. = 25.88354 n = 0.13237929
 q = 2.0699775 AU P = 7.45 years

$$m_1 = 12.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	22 08.50	-06 21.4	2.626	2.074	+1.80	+17.7	18.1	46.4
Jan. 16	22 26.63	-03 22.8	2.699	2.071	+1.83	+18.0	18.1	41.7
Jan. 26	22 45.06	+00 21.3	2.767	2.070	+1.86	+18.3	18.2	37.2
Feb. 5	23 03.75	+02 42.3	2.830	2.073	+1.88	+18.4	18.2	32.9
Feb. 15	23 22.70	+05 47.3	2.889	2.079	+1.91	+18.5	18.3	28.8
Feb. 25	23 41.93	+08 52.7	2.942	2.088	+1.94	+18.5	18.3	25.0
Mar. 7	00 01.43	+11 57.6	2.990	2.099	+1.97	+18.4	18.4	21.6
Mar. 17	00 21.26	+15 00.8	3.034	2.114	+2.00	+18.2	18.5	18.6
Mar. 27	00 41.42	+18 01.0	3.072	2.132	+2.04	+17.8	18.5	16.2
Apr. 6	01 01.96	+20 57.0	3.106	2.152	+2.08	+17.3	18.6	14.6
Apr. 16	01 22.92	+23 47.5	3.135	2.175	+2.12	+16.7	18.7	14.1
Apr. 26	01 44.29	+26 31.4	3.158	2.201	+2.16	+16.0	18.7	14.8
May 6	02 06.12	+29 07.2	3.177	2.228	+2.21	+15.1	18.8	16.4
May 16	02 28.38	+31 34.0	3.191	2.258	+2.25	+14.1	18.9	18.8
May 26	02 51.06	+33 50.7	3.199	2.290	+2.29	+13.1	18.9	21.8
June 5	03 14.11	+35 56.5	3.202	2.323	+2.32	+12.0	19.0	25.1
June 15	03 37.45	+37 50.9	3.199	2.358	+2.35	+10.8	19.1	28.7
June 25	04 00.96	+39 33.3	3.189	2.395	+2.36	+9.6	19.1	32.5
July 5	04 24.51	+41 03.9	3.172	2.433	+2.35	+8.4	19.2	36.6
July 15	04 47.93	+42 23.1	3.149	2.472	+2.33	+7.3	19.2	40.9
July 25	05 11.00	+43 31.4	3.119	2.512	+2.28	+6.3	19.3	45.4
Aug. 4	05 33.52	+44 30.1	3.081	2.553	+2.21	+5.4	19.3	50.2
Aug. 14	05 55.25	+45 20.6	3.036	2.595	+2.12	+4.7	19.4	55.2
Aug. 24	06 15.93	+46 04.7	2.984	2.638	+2.00	+4.1	19.4	60.5
Sept. 3	06 35.34	+46 44.3	2.925	2.681	+1.86	+3.8	19.4	66.2
Sept. 13	06 53.19	+47 21.9	2.860	2.725	+1.69	+3.7	19.4	72.1
Sept. 23	07 09.21	+47 59.5	2.790	2.769	+1.49	+3.9	19.5	78.4
Oct. 3	07 23.11	+48 39.5	2.716	2.814	+1.26	+4.2	19.5	85.1
Oct. 13	07 34.54	+49 23.5	2.640	2.858	+0.99	+4.7	19.5	92.2
Oct. 23	07 43.11	+50 12.7	2.565	2.903	+0.69	+5.2	19.5	99.7
Nov. 2	07 48.43	+51 07.2	2.493	2.949	+0.34	+5.7	19.5	107.6
Nov. 12	07 50.05	+52 05.4	2.428	2.994	-0.06	+5.9	19.5	115.8
Nov. 22	07 47.65	+53 03.6	2.373	3.039	-0.47	+5.6	19.5	124.1
Dec. 2	07 41.10	+53 55.9	2.334	3.084	-0.88	+4.6	19.5	132.3
Dec. 12	07 30.69	+54 34.6	2.313	3.130	-1.22	+2.8	19.6	139.7
Dec. 22	07 17.39	+54 51.7	2.315	3.175	-1.44	+0.3	19.6	145.5
Jan. 1	07 02.68	+54 41.8	2.342	3.220	-1.48	-2.6	19.7	148.2
Jan. 11	06 48.39	+54 03.5	2.396	3.264	-1.34	-5.3	19.8	146.9
Jan. 21	06 36.15	+53 00.5	2.475	3.309	-1.07	-7.4	20.0	142.3
Jan. 31	06 27.00	+51 39.5	2.580	3.353	-0.72	-8.8	20.1	135.4
Feb. 10	06 21.36	+50 08.0	2.706	3.397	-0.37	-9.5	20.3	127.4
Feb. 20	06 19.17	+48 32.7	2.850	3.441	-0.04	-9.5	20.4	119.1
Mar. 2	06 20.05	+46 58.2	3.009	3.484	+0.24	-9.3	20.6	110.7
Mar. 12	06 23.57	+45 27.2	3.179	3.527	+0.48	-8.8	20.8	102.4
Mar. 22	06 29.25	+44 01.0	3.355	3.570	+0.67	-8.3	21.0	94.3

Comet C/2021 A2 (NEOWISE)

Epoch = 2021 July 5.0 TT
 T = 2021 Jan. 22.67581 TT
 Peri. = 338.86974
 Node = 125.22611 2000.0
 Incl. = 107.01042
 q = 1.4132584 AU
 e = 0.9986324

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	10 48.19	-50 07.4	1.000	1.434	-4.35	+15.9	12.3	92.6
Jan. 16	09 53.59	-45 25.6	0.760	1.417	-6.88	+49.3	11.6	108.0
Jan. 26	08 35.51	-32 04.3	0.569	1.414	-8.54	125.4	11.0	129.1
Feb. 5	07 13.21	-05 58.0	0.510	1.426	-7.35	172.6	10.8	142.9
Feb. 15	06 11.23	+18 41.3	0.631	1.453	-4.78	109.7	11.3	126.3
Feb. 25	05 33.31	+32 31.4	0.855	1.492	-2.74	+57.1	12.1	107.7
Mar. 7	05 12.35	+39 57.3	1.116	1.544	-1.43	+32.9	12.8	94.0
Mar. 17	05 02.15	+44 29.3	1.385	1.606	-0.59	+21.8	13.5	83.1
Mar. 27	04 58.89	+47 39.6	1.647	1.676	-0.04	+16.3	14.0	74.1
Apr. 6	05 00.34	+50 08.3	1.897	1.754	+0.35	+13.4	14.5	66.4
Apr. 16	05 05.22	+52 14.9	2.130	1.838	+0.64	+11.9	15.0	59.6
Apr. 26	05 12.74	+54 09.5	2.343	1.926	+0.88	+11.1	15.4	53.7
May 6	05 22.40	+55 58.0	2.536	2.018	+1.07	+10.7	15.8	48.7
May 16	05 33.95	+57 43.9	2.706	2.113	+1.25	+10.5	16.1	44.8
May 26	05 47.22	+59 29.5	2.855	2.210	+1.42	+10.6	16.4	42.1
June 5	06 02.16	+61 16.4	2.983	2.309	+1.59	+10.8	16.7	40.6
June 15	06 18.89	+63 05.8	3.089	2.409	+1.78	+11.1	17.0	40.5
June 25	06 37.55	+64 58.5	3.176	2.510	+1.98	+11.5	17.2	41.7
July 5	06 58.49	+66 54.8	3.244	2.612	+2.24	+11.8	17.4	44.1
July 15	07 22.29	+68 54.9	3.297	2.714	+2.57	+12.2	17.6	47.4
July 25	07 49.77	+70 58.1	3.335	2.816	+3.00	+12.4	17.8	51.4
Aug. 4	08 22.34	+73 02.6	3.363	2.918	+3.61	+12.4	18.0	55.9
Aug. 14	09 02.08	+75 04.8	3.382	3.020	+4.47	+11.9	18.1	60.8
Aug. 24	09 51.94	+76 58.0	3.397	3.122	+5.68	+10.4	18.3	65.8
Sept. 3	10 55.35	+78 30.1	3.411	3.224	+7.17	+7.4	18.4	70.9
Sept. 13	12 13.30	+79 24.0	3.427	3.325	+8.42	+2.6	18.6	75.7
Sept. 23	13 39.21	+79 22.6	3.449	3.426	+8.53	-3.5	18.7	80.3
Oct. 3	15 00.16	+78 21.8	3.480	3.526	+7.41	-9.0	18.9	84.4
Oct. 13	16 07.46	+76 33.8	3.523	3.626	+5.91	-12.7	19.0	87.9
Oct. 23	17 00.61	+74 16.9	3.581	3.726	+4.65	-14.7	19.2	90.6
Nov. 2	17 42.83	+71 46.3	3.654	3.825	+3.75	-15.3	19.3	92.3
Nov. 12	18 17.33	+69 13.5	3.744	3.923	+3.12	-15.1	19.5	93.1
Nov. 22	18 46.41	+66 46.3	3.849	4.021	+2.67	-14.2	19.7	92.8
Dec. 2	19 11.62	+64 30.2	3.969	4.118	+2.35	-12.8	19.8	91.7
Dec. 12	19 33.97	+62 28.9	4.101	4.215	+2.10	-11.2	20.0	89.8
Dec. 22	19 54.10	+60 44.7	4.244	4.311	+1.91	-9.4	20.2	87.3
Jan. 1	20 12.45	+59 18.6	4.394	4.407	+1.75	-7.6	20.4	84.3
Jan. 11	20 29.33	+58 11.2	4.548	4.502	+1.61	-5.7	20.5	81.1
Jan. 21	20 44.90	+57 21.9	4.704	4.596	+1.49	-4.0	20.7	77.7
Jan. 31	20 59.30	+56 49.9	4.859	4.690	+1.38	-2.3	20.8	74.4
Feb. 10	21 12.62	+56 34.3	5.009	4.784	+1.27	-0.7	21.0	71.2
Feb. 20	21 24.86	+56 33.7	5.154	4.877	+1.17	+0.7	21.1	68.4
Mar. 2	21 36.05	+56 46.7	5.290	4.969	+1.06	+2.0	21.3	66.0
Mar. 12	21 46.14	+57 12.1	5.416	5.061	+0.95	+3.2	21.4	64.1
Mar. 22	21 55.08	+57 48.3	5.531	5.153	+0.83	+4.2	21.5	62.8

Comet P/2007 B1 = 2020 W3 (Christensen)

Epoch = 2021 July 5.0 TT
 T = 2021 Jan. 24.44886 TT
 Peri. = 46.68152 e = 0.5808643
 Node = 77.67007 2000.0 a = 5.8183366 AU
 Incl. = 12.37710 n = 0.07022727
 q = 2.4386726 AU P = 14.03 years

$$m_1 = 12.4 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	08 47.31	+31 27.2	1.512	2.444	-0.33	+8.8	19.1	156.1
Jan. 16	08 43.08	+32 52.6	1.481	2.440	-0.52	+8.1	19.1	163.4
Jan. 26	08 37.50	+34 06.6	1.475	2.439	-0.59	+6.4	19.1	164.6
Feb. 5	08 31.74	+35 01.6	1.495	2.441	-0.54	+4.3	19.1	158.7
Feb. 15	08 27.04	+35 33.4	1.540	2.445	-0.37	+1.9	19.2	150.0
Feb. 25	08 24.42	+35 41.6	1.606	2.453	-0.12	-0.4	19.3	140.7
Mar. 7	08 24.48	+35 28.5	1.691	2.463	+0.16	-2.4	19.4	131.6
Mar. 17	08 27.40	+34 57.4	1.791	2.477	+0.45	-4.0	19.6	122.9
Mar. 27	08 33.07	+34 11.5	1.903	2.492	+0.71	-5.3	19.7	114.8
Apr. 6	08 41.14	+33 13.7	2.025	2.511	+0.92	-6.4	19.9	107.2
Apr. 16	08 51.20	+32 05.8	2.155	2.532	+1.10	-7.3	20.1	100.1
Apr. 26	09 02.87	+30 49.4	2.290	2.555	+1.24	-8.1	20.3	93.4
May 6	09 15.75	+29 25.6	2.429	2.581	+1.34	-8.7	20.5	87.0
May 16	09 29.54	+27 55.4	2.570	2.609	+1.42	-9.3	20.7	80.9
May 26	09 43.97	+26 19.6	2.712	2.639	+1.47	-9.8	20.9	75.1
June 5	09 58.83	+24 39.1	2.853	2.671	+1.50	-10.3	21.1	69.4
June 15	10 13.95	+22 54.7	2.994	2.705	+1.52	-10.6	21.3	63.9
June 25	10 29.22	+21 07.1	3.132	2.740	+1.53	-10.9	21.4	58.4
July 5	10 44.52	+19 17.2	3.266	2.777	+1.53	-11.1	21.6	53.1
July 15	10 59.82	+17 25.7	3.396	2.816	+1.53	-11.2	21.8	47.8
July 25	11 15.04	+15 33.5	3.521	2.856	+1.52	-11.2	22.0	42.5
Aug. 4	11 30.16	+13 41.2	3.639	2.897	+1.51	-11.2	.	37.2
Aug. 14	11 45.16	+11 49.7	3.749	2.939	+1.49	-11.1	.	32.0
Aug. 24	12 00.02	+09 59.5	3.851	2.983	+1.48	-10.9	.	26.7
Sept. 3	12 14.72	+08 11.5	3.943	3.027	+1.46	-10.7	.	21.5
Sept. 13	12 29.25	+06 26.1	4.024	3.072	+1.44	-10.4	.	16.5
Sept. 23	12 43.59	+04 44.0	4.093	3.119	+1.42	-10.0	.	11.9
Oct. 3	12 57.73	+03 05.9	4.150	3.165	+1.40	-9.6	.	8.9
Oct. 13	13 11.63	+01 32.3	4.194	3.213	+1.38	-9.1	.	9.2
Oct. 23	13 25.27	+00 03.7	4.223	3.261	+1.35	-8.6	.	12.9
Nov. 2	13 38.60	-01 19.4	4.238	3.310	+1.31	-8.0	.	18.1
Nov. 12	13 51.57	-02 36.4	4.238	3.359	+1.27	-7.4	.	24.1
Nov. 22	14 04.11	-03 47.0	4.223	3.408	+1.23	-6.7	.	30.4
Dec. 2	14 16.15	-04 50.8	4.193	3.458	+1.17	-6.0	.	37.1
Dec. 12	14 27.58	-05 47.4	4.148	3.508	+1.11	-5.3	.	44.0
Dec. 22	14 38.29	-06 36.6	4.090	3.558	+1.03	-4.5	.	51.3
Jan. 1	14 48.17	-07 18.2	4.019	3.608	+0.94	-3.7	.	58.8
Jan. 11	14 57.07	-07 52.0	3.937	3.659	+0.83	-3.0	.	66.5
Jan. 21	15 04.84	-08 18.2	3.847	3.710	+0.71	-2.2	.	74.6
Jan. 31	15 11.33	-08 36.8	3.750	3.761	+0.57	-1.4	.	83.1
Feb. 10	15 16.37	-08 48.0	3.650	3.811	+0.42	-0.7	.	91.8
Feb. 20	15 19.82	-08 52.1	3.551	3.862	+0.25	-0.1	.	101.0
Mar. 2	15 21.57	-08 49.8	3.455	3.913	+0.08	+0.6	.	110.5
Mar. 12	15 21.53	-08 41.7	3.368	3.964	-0.10	+1.1	.	120.3
Mar. 22	15 19.73	-08 29.0	3.295	4.015	-0.27	+1.5	.	130.6

Comet 409P/LONEOS-Hill

Epoch = 2021 July 5.0 TT
 T = 2021 Jan. 28.16060 TT
 Peri. = 15.13203 e = 0.7099793
 Node = 143.67135 2000.0 a = 6.0479376 AU
 Incl. = 17.11867 n = 0.06626636
 q = 1.7540271 AU P = 14.87 years

$$m_1 = 9.0 + 5 \log(\Delta) + 27.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	' .		°
Jan. 6	11 56.56	+01 44.3	1.212	1.771	+2.00	+3.0	16.2	107.1
Jan. 16	12 16.00	+02 28.4	1.123	1.759	+1.86	+6.3	16.0	113.0
Jan. 26	12 33.82	+03 46.8	1.046	1.754	+1.67	+9.8	15.8	119.5
Feb. 5	12 49.47	+05 40.4	0.982	1.756	+1.42	+13.2	15.7	126.3
Feb. 15	13 02.33	+08 06.6	0.933	1.765	+1.11	+16.1	15.6	133.5
Feb. 25	13 11.91	+10 56.9	0.900	1.780	+0.77	+17.8	15.7	140.7
Mar. 7	13 18.02	+13 56.6	0.885	1.802	+0.42	+17.8	15.8	147.3
Mar. 17	13 20.79	+16 47.5	0.890	1.830	+0.11	+15.8	16.0	152.2
Mar. 27	13 20.90	+19 10.2	0.914	1.863	-0.10	+12.1	16.2	154.1
Apr. 6	13 19.41	+20 50.4	0.958	1.902	-0.19	+7.4	16.6	152.4
Apr. 16	13 17.50	+21 41.6	1.020	1.945	-0.17	+2.4	17.0	148.0
Apr. 26	13 16.30	+21 44.5	1.100	1.993	-0.05	-2.1	17.4	142.1
May 6	13 16.54	+21 05.9	1.196	2.044	+0.12	-5.8	17.9	135.8
May 16	13 18.56	+19 54.4	1.307	2.099	+0.31	-8.6	18.4	129.3
May 26	13 22.48	+18 18.8	1.431	2.156	+0.49	-10.6	19.0	123.0
June 5	13 28.14	+16 27.0	1.566	2.216	+0.65	-11.8	19.5	116.8
June 15	13 35.34	+14 25.2	1.712	2.279	+0.80	-12.6	20.0	110.7
June 25	13 43.87	+12 18.0	1.867	2.343	+0.92	-12.9	20.5	104.8
July 5	13 53.50	+10 09.2	2.030	2.408	+1.02	-12.9	21.0	99.0
July 15	14 04.05	+08 01.4	2.199	2.475	+1.10	-12.7	21.5	93.3
July 25	14 15.37	+05 56.4	2.373	2.543	+1.17	-12.3	22.0	87.6
Aug. 4	14 27.32	+03 55.8	2.552	2.611	+1.23	-11.8	.	82.0
Aug. 14	14 39.80	+02 00.6	2.732	2.680	+1.27	-11.2	.	76.3
Aug. 24	14 52.73	+00 11.6	2.913	2.750	+1.31	-10.5	.	70.7
Sept. 3	15 06.01	-01 30.6	3.093	2.820	+1.35	-9.8	.	65.0
Sept. 13	15 19.61	-03 05.6	3.271	2.891	+1.37	-9.1	.	59.3
Sept. 23	15 33.45	-04 32.8	3.444	2.961	+1.39	-8.3	.	53.6
Oct. 3	15 47.47	-05 52.2	3.612	3.032	+1.41	-7.5	.	47.8
Oct. 13	16 01.63	-07 03.5	3.771	3.102	+1.42	-6.7	.	42.0
Oct. 23	16 15.86	-08 06.5	3.921	3.172	+1.42	-5.8	.	36.1
Nov. 2	16 30.10	-09 01.3	4.061	3.243	+1.42	-5.0	.	30.3
Nov. 12	16 44.30	-09 47.7	4.187	3.313	+1.41	-4.2	.	24.6
Nov. 22	16 58.38	-10 25.9	4.300	3.382	+1.40	-3.4	.	19.2
Dec. 2	17 12.27	-10 56.0	4.397	3.452	+1.38	-2.6	.	14.6
Dec. 12	17 25.89	-11 18.3	4.478	3.521	+1.34	-1.8	.	12.0
Dec. 22	17 39.17	-11 33.0	4.542	3.590	+1.31	-1.1	.	12.9
Jan. 1	17 52.02	-11 40.6	4.588	3.658	+1.26	-0.4	.	16.9
Jan. 11	18 04.36	-11 41.5	4.616	3.726	+1.20	+0.3	.	22.5
Jan. 21	18 16.08	-11 36.3	4.625	3.794	+1.14	+0.8	.	28.9
Jan. 31	18 27.11	-11 25.7	4.617	3.861	+1.06	+1.3	.	35.8
Feb. 10	18 37.33	-11 10.3	4.592	3.928	+0.97	+1.8	.	42.9
Feb. 20	18 46.66	-10 51.1	4.551	3.994	+0.88	+2.1	.	50.4
Mar. 2	18 54.98	-10 28.7	4.496	4.060	+0.77	+2.4	.	58.1
Mar. 12	19 02.19	-10 04.3	4.428	4.125	+0.66	+2.5	.	66.0
Mar. 22	19 08.18	-09 38.7	4.350	4.190	+0.53	+2.6	.	74.2

Comet P/2009 U4 (McNaught)

Epoch = 2021 July 5.0 TT
 T = 2021 Feb. 1.08770 TT
 Peri. = 259.83241 e = 0.6759465
 Node = 55.34796 2000.0 a = 5.0809835 AU
 Incl. = 10.08094 n = 0.08605624
 q = 1.6465105 AU P = 11.45 years

$$m_1 = 14.6 + 5 \log(\Delta) + 7.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot./PA	Elong.
2021/22	h m	° '			for T=+1 day			°
Jan. 6	19 48.64	-26 56.4	2.630	1.671	-1.64 -2.2	18.4	44.6/ 81	10.3
Jan. 16	20 21.51	-25 35.9	2.623	1.656	-1.64 -3.8	18.3	45.3/ 78	8.4
Jan. 26	20 53.94	-23 50.4	2.621	1.648	-1.61 -5.2	18.3	45.6/ 75	7.0
Feb. 5	21 25.60	-21 42.8	2.623	1.647	-1.56 -6.5	18.3	45.6/ 72	6.3
Feb. 15	21 56.26	-19 16.9	2.631	1.654	-1.50 -7.6	18.3	45.3/ 70	6.5
Feb. 25	22 25.78	-16 37.3	2.643	1.667	-1.43 -8.3	18.4	44.7/ 68	7.6
Mar. 7	22 54.09	-13 48.5	2.660	1.688	-1.35 -8.9	18.4	43.8/ 67	9.3
Mar. 17	23 21.20	-10 54.9	2.680	1.715	-1.28 -9.1	18.5	42.7/ 66	11.4
Mar. 27	23 47.15	-08 00.4	2.702	1.749	-1.20 -9.2	18.6	41.4/ 65	13.8
Apr. 6	00 11.98	-05 08.6	2.725	1.788	-1.13 -9.1	18.7	40.0/ 65	16.5
Apr. 16	00 35.78	-02 22.2	2.747	1.832	-1.06 -8.8	18.8	38.4/ 65	19.5
Apr. 26	00 58.58	+00 16.6	2.768	1.880	-1.00 -8.5	18.9	36.8/ 65	22.8
May 6	01 20.44	+02 46.1	2.785	1.933	-0.94 -8.1	19.0	35.1/ 66	26.3
May 16	01 41.39	+05 05.3	2.798	1.989	-0.89 -7.6	19.1	33.3/ 66	30.1
May 26	02 01.43	+07 13.4	2.804	2.047	-0.84 -7.2	19.2	31.5/ 67	34.2
June 5	02 20.56	+09 10.0	2.804	2.109	-0.80 -6.7	19.3	29.7/ 68	38.6
June 15	02 38.73	+10 55.3	2.796	2.172	-0.76 -6.3	19.4	27.8/ 69	43.3
June 25	02 55.88	+12 29.2	2.780	2.237	-0.73 -5.9	19.4	25.8/ 70	48.3
July 5	03 11.94	+13 52.4	2.755	2.303	-0.70 -5.6	19.5	23.7/ 71	53.6
July 15	03 26.79	+15 05.3	2.721	2.370	-0.67 -5.3	19.6	21.5/ 72	59.4
July 25	03 40.28	+16 08.7	2.679	2.439	-0.66 -5.0	19.6	19.2/ 72	65.5
Aug. 4	03 52.27	+17 03.5	2.628	2.508	-0.65 -4.8	19.7	16.7/ 72	72.0
Aug. 14	04 02.54	+17 50.5	2.570	2.577	-0.64 -4.6	19.7	13.9/ 72	79.0
Aug. 24	04 10.88	+18 30.5	2.508	2.647	-0.64 -4.5	19.8	10.9/ 70	86.6
Sept. 3	04 17.09	+19 04.5	2.442	2.717	-0.65 -4.4	19.8	7.6/ 66	94.7
Sept. 13	04 20.90	+19 33.1	2.376	2.787	-0.67 -4.4	19.8	4.3/ 53	103.4
Sept. 23	04 22.13	+19 56.7	2.314	2.857	-0.70 -4.5	19.8	2.1/351	112.8
Oct. 3	04 20.68	+20 15.4	2.260	2.927	-0.74 -4.5	19.9	4.4/291	122.9
Oct. 13	04 16.56	+20 29.1	2.219	2.996	-0.78 -4.6	19.9	7.8/278	133.7
Oct. 23	04 10.05	+20 37.4	2.196	3.066	-0.82 -4.8	20.0	10.8/273	145.1
Nov. 2	04 01.66	+20 40.0	2.197	3.135	-0.85 -4.9	20.0	12.8/270	157.0
Nov. 12	03 52.15	+20 37.5	2.226	3.203	-0.87 -5.1	20.1	13.7/268	169.2
Nov. 22	03 42.45	+20 31.0	2.284	3.272	-0.87 -5.1	20.3	13.3/267	178.3
Dec. 2	03 33.46	+20 22.8	2.374	3.340	-0.85 -5.1	20.4	11.7/266	166.2
Dec. 12	03 25.91	+20 15.4	2.493	3.407	-0.82 -5.0	20.6	9.2/266	154.3
Dec. 22	03 20.30	+20 11.2	2.639	3.474	-0.78 -4.8	20.8	6.2/268	142.9
Jan. 1	03 16.85	+20 11.7	2.807	3.540	-0.74 -4.6	21.0	3.2/276	131.9
Jan. 11	03 15.57	+20 18.0	2.994	3.606	-0.69 -4.3	21.2	1.0/350	121.4
Jan. 21	03 16.35	+20 30.0	3.195	3.672	-0.64 -4.0	21.4	3.0/ 59	111.5
Jan. 31	03 18.96	+20 47.4	3.405	3.736	-0.60 -3.7	21.6	5.4/ 68	102.0
Feb. 10	03 23.21	+21 09.4	3.620	3.801	-0.56 -3.4	21.7	7.5/ 71	92.9
Feb. 20	03 28.85	+21 35.1	3.837	3.864	-0.52 -3.1	21.9	9.2/ 73	84.2
Mar. 2	03 35.66	+22 03.4	4.051	3.928	-0.48 -2.8	.	10.7/ 74	75.8
Mar. 12	03 43.46	+22 33.4	4.260	3.990	-0.45 -2.5	.	11.9/ 75	67.7
Mar. 22	03 52.07	+23 04.2	4.461	4.052	-0.43 -2.3	.	12.8/ 76	59.8

Comet P/2020 K9 (Lemmon-PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2021 Feb. 11.86676 TT
 Peri. = 196.88875 e = 0.3214010
 Node = 166.24069 2000.0 a = 4.1990558 AU
 Incl. = 23.20989 n = 0.11454512
 q = 2.8494751 AU P = 8.60 years

$$m_1 = 13.6 + 5 \log(\Delta) + 7.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	22 42.68	-11 08.3	3.349	2.857	+1.45	+4.2	19.6	52.4
Jan. 16	22 57.45	-10 22.5	3.449	2.854	+1.50	+5.0	19.7	45.9
Jan. 26	23 12.66	-09 29.8	3.539	2.851	+1.54	+5.6	19.8	39.6
Feb. 5	23 28.21	-08 31.8	3.619	2.850	+1.57	+6.1	19.8	33.5
Feb. 15	23 44.03	-07 29.5	3.688	2.850	+1.59	+6.4	19.8	27.6
Feb. 25	00 00.05	-06 24.5	3.745	2.850	+1.61	+6.6	19.9	21.9
Mar. 7	00 16.22	-05 17.8	3.790	2.853	+1.62	+6.7	19.9	16.5
Mar. 17	00 32.49	-04 10.8	3.823	2.856	+1.63	+6.7	19.9	11.8
Mar. 27	00 48.84	-03 04.6	3.843	2.860	+1.64	+6.5	19.9	8.5
Apr. 6	01 05.21	-02 00.4	3.852	2.866	+1.64	+6.3	20.0	8.5
Apr. 16	01 21.59	+00 59.4	3.849	2.873	+1.64	+5.9	20.0	11.6
Apr. 26	01 37.93	+00 02.6	3.834	2.880	+1.63	+5.4	20.0	16.1
May 6	01 54.19	+00 49.0	3.808	2.889	+1.62	+4.8	20.0	21.1
May 16	02 10.33	+01 34.4	3.771	2.899	+1.60	+4.2	19.9	26.3
May 26	02 26.28	+02 12.6	3.723	2.910	+1.58	+3.4	19.9	31.7
June 5	02 42.00	+02 42.8	3.666	2.922	+1.56	+2.6	19.9	37.2
June 15	02 57.39	+03 04.3	3.600	2.936	+1.52	+1.6	19.9	42.7
June 25	03 12.38	+03 16.2	3.525	2.950	+1.47	+0.6	19.9	48.4
July 5	03 26.86	+03 18.0	3.442	2.965	+1.42	-0.4	19.8	54.2
July 15	03 40.71	+03 09.1	3.353	2.980	+1.34	-1.5	19.8	60.2
July 25	03 53.79	+02 49.2	3.258	2.997	+1.26	-2.6	19.7	66.3
Aug. 4	04 05.95	+02 18.1	3.158	3.015	+1.16	-3.7	19.7	72.6
Aug. 14	04 17.03	+01 35.6	3.055	3.033	+1.04	-4.9	19.6	79.2
Aug. 24	04 26.82	+00 42.0	2.951	3.052	+0.90	-5.9	19.6	86.1
Sept. 3	04 35.13	+00 22.0	2.847	3.072	+0.74	-6.9	19.5	93.2
Sept. 13	04 41.75	-01 35.5	2.746	3.093	+0.56	-7.8	19.5	100.6
Sept. 23	04 46.48	-02 56.6	2.651	3.114	+0.36	-8.4	19.4	108.3
Oct. 3	04 49.15	-04 22.8	2.564	3.136	+0.15	-8.8	19.4	116.2
Oct. 13	04 49.64	-05 50.7	2.489	3.159	-0.07	-8.7	19.3	124.1
Oct. 23	04 47.97	-07 15.5	2.430	3.182	-0.28	-8.1	19.3	131.9
Nov. 2	04 44.29	-08 32.1	2.389	3.206	-0.47	-7.0	19.3	139.1
Nov. 12	04 38.95	-09 34.9	2.370	3.230	-0.61	-5.3	19.3	144.8
Nov. 22	04 32.50	-10 18.7	2.376	3.255	-0.68	-3.2	19.3	147.8
Dec. 2	04 25.63	-10 40.4	2.406	3.280	-0.68	-0.9	19.4	147.4
Dec. 12	04 19.06	-10 38.5	2.461	3.305	-0.61	+1.5	19.4	143.5
Dec. 22	04 13.46	-10 14.2	2.540	3.331	-0.49	+3.5	19.5	137.4
Jan. 1	04 09.34	-09 30.6	2.640	3.357	-0.32	+5.3	19.7	130.0
Jan. 11	04 07.00	-08 31.6	2.758	3.384	-0.13	+6.6	19.8	122.0
Jan. 21	04 06.58	-07 21.5	2.891	3.411	+0.06	+7.5	19.9	113.9
Jan. 31	04 08.06	-06 04.4	3.035	3.438	+0.25	+8.0	20.0	105.9
Feb. 10	04 11.32	-04 43.8	3.187	3.465	+0.42	+8.1	20.2	98.0
Feb. 20	04 16.22	-03 22.6	3.344	3.492	+0.57	+8.1	20.3	90.3
Mar. 2	04 22.56	-02 02.9	3.503	3.520	+0.71	+7.8	20.4	82.9
Mar. 12	04 30.15	+00 46.6	3.660	3.548	+0.82	+7.4	20.5	75.7
Mar. 22	04 38.82	+00 25.1	3.815	3.576	+0.92	+6.9	20.7	68.7

Comet 17P/Holmes

Epoch = 2021 July 5.0 TT
 T = 2021 Feb. 19.81933 TT
 Peri. = 24.46761 e = 0.4276319
 Node = 326.62060 2000.0 a = 3.6352578 AU
 Incl. = 19.03211 n = 0.14220054
 q = 2.0807056 AU P = 6.93 years

$$m_1 = 8.6 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2021/22	h m	° '			m		°
Jan. 6	21 21.86	-13 39.4	2.865	2.110	+2.02 +15.0	15.7	33.0
Jan. 16	21 42.05	-11 06.1	2.911	2.098	+2.02 +15.7	15.7	28.4
Jan. 26	22 02.24	-08 26.2	2.951	2.090	+2.02 +16.3	15.8	23.9
Feb. 5	22 22.39	-05 40.5	2.986	2.084	+2.01 +16.8	15.8	19.6
Feb. 15	22 42.52	-02 50.1	3.015	2.081	+2.01 +17.3	15.8	15.6
Feb. 25	23 02.62	+00 04.0	3.039	2.081	+2.01 +17.6	15.8	11.9
Mar. 7	23 22.69	+03 00.3	3.058	2.084	+2.01 +17.7	15.8	9.0
Mar. 17	23 42.78	+05 57.9	3.072	2.090	+2.01 +17.8	15.8	7.5
Mar. 27	00 02.90	+08 55.2	3.082	2.099	+2.01 +17.7	15.9	8.1
Apr. 6	00 23.07	+11 50.9	3.086	2.110	+2.02 +17.4	15.9	10.5
Apr. 16	00 43.34	+14 43.8	3.086	2.124	+2.03 +17.1	16.0	13.7
Apr. 26	01 03.72	+17 32.6	3.081	2.141	+2.04 +16.6	16.0	17.3
May 6	01 24.22	+20 16.0	3.071	2.160	+2.06 +16.0	16.1	21.1
May 16	01 44.86	+22 53.0	3.056	2.182	+2.07 +15.3	16.1	25.0
May 26	02 05.60	+25 22.5	3.036	2.206	+2.08 +14.5	16.2	29.0
June 5	02 26.44	+27 43.6	3.011	2.232	+2.09 +13.6	16.2	33.2
June 15	02 47.31	+29 55.9	2.980	2.260	+2.09 +12.7	16.3	37.5
June 25	03 08.12	+31 58.7	2.944	2.290	+2.07 +11.8	16.3	41.9
July 5	03 28.77	+33 52.0	2.902	2.322	+2.05 +10.8	16.4	46.5
July 15	03 49.13	+35 35.7	2.854	2.355	+2.01 +9.9	16.5	51.2
July 25	04 09.00	+37 10.3	2.800	2.389	+1.95 +9.0	16.5	56.2
Aug. 4	04 28.19	+38 36.5	2.740	2.425	+1.87 +8.2	16.6	61.5
Aug. 14	04 46.46	+39 55.3	2.674	2.462	+1.76 +7.5	16.6	67.0
Aug. 24	05 03.51	+41 07.9	2.603	2.499	+1.63 +7.0	16.6	72.9
Sept. 3	05 19.04	+42 15.8	2.528	2.538	+1.46 +6.6	16.7	79.1
Sept. 13	05 32.70	+43 20.4	2.450	2.578	+1.25 +6.3	16.7	85.7
Sept. 23	05 44.07	+44 22.9	2.370	2.618	+1.00 +6.2	16.7	92.7
Oct. 3	05 52.74	+45 24.3	2.291	2.659	+0.70 +6.1	16.8	100.3
Oct. 13	05 58.24	+46 24.5	2.215	2.700	+0.36 +5.9	16.8	108.3
Oct. 23	06 00.16	+47 22.0	2.146	2.742	-0.02 +5.5	16.8	116.7
Nov. 2	05 58.21	+48 13.6	2.087	2.784	-0.41 +4.7	16.9	125.5
Nov. 12	05 52.33	+48 54.1	2.043	2.826	-0.79 +3.2	16.9	134.5
Nov. 22	05 42.99	+49 17.1	2.017	2.868	-1.09 +1.1	17.0	143.1
Dec. 2	05 31.18	+49 16.9	2.014	2.911	-1.26 -1.5	17.1	150.2
Dec. 12	05 18.40	+48 50.3	2.036	2.954	-1.26 -4.1	17.2	154.2
Dec. 22	05 06.34	+47 58.6	2.085	2.996	-1.11 -6.4	17.3	153.2
Jan. 1	04 56.38	+46 47.5	2.161	3.039	-0.84 -7.9	17.5	147.8
Jan. 11	04 49.41	+45 24.9	2.262	3.082	-0.52 -8.6	17.7	140.0
Jan. 21	04 45.75	+43 58.7	2.386	3.124	-0.19 -8.6	17.9	131.3
Jan. 31	04 45.28	+42 34.9	2.528	3.166	+0.12 -8.1	18.1	122.3
Feb. 10	04 47.71	+41 17.3	2.686	3.208	+0.39 -7.3	18.3	113.4
Feb. 20	04 52.62	+40 07.5	2.854	3.250	+0.61 -6.5	18.6	104.8
Mar. 2	04 59.58	+39 05.6	3.029	3.292	+0.80 -5.8	18.8	96.5
Mar. 12	05 08.26	+38 11.1	3.209	3.333	+0.95 -5.1	19.0	88.5
Mar. 22	05 18.29	+37 22.6	3.389	3.375	+1.07 -4.6	19.2	80.7

Comet 246P/NEAT

Epoch = 2021 July 5.0 TT
 T = 2021 Feb. 22.95456 TT
 Peri. = 176.33087 e = 0.2872246
 Node = 78.74500 2000.0 a = 4.0180852 AU
 Incl. = 15.98438 n = 0.12237011
 q = 2.8639923 AU P = 8.05 years

$$m_1 = 4.5 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	16 55.16	-19 26.7	3.674	2.876	+1.69	-5.2	14.2	31.0
Jan. 16	17 11.96	-20 15.5	3.594	2.871	+1.67	-4.5	14.1	37.1
Jan. 26	17 28.52	-20 58.1	3.503	2.868	+1.64	-3.9	14.1	43.4
Feb. 5	17 44.71	-21 35.1	3.403	2.866	+1.59	-3.4	14.0	49.7
Feb. 15	18 00.40	-22 07.3	3.295	2.864	+1.54	-3.0	13.9	56.1
Feb. 25	18 15.44	-22 35.8	3.179	2.864	+1.46	-2.7	13.9	62.8
Mar. 7	18 29.66	-23 02.0	3.057	2.865	+1.37	-2.5	13.8	69.5
Mar. 17	18 42.89	-23 27.2	2.931	2.867	+1.26	-2.5	13.7	76.5
Mar. 27	18 54.93	-23 53.4	2.802	2.869	+1.13	-2.7	13.6	83.7
Apr. 6	19 05.59	-24 22.2	2.672	2.873	+0.98	-3.1	13.5	91.2
Apr. 16	19 14.63	-24 55.7	2.544	2.878	+0.81	-3.7	13.4	99.0
Apr. 26	19 21.82	-25 35.7	2.420	2.884	+0.61	-4.4	13.3	107.3
May 6	19 26.93	-26 23.5	2.304	2.891	+0.39	-5.3	13.2	115.9
May 16	19 29.72	-27 20.1	2.198	2.898	+0.14	-6.1	13.1	125.0
May 26	19 30.03	-28 25.0	2.106	2.907	-0.11	-6.9	13.1	134.5
June 5	19 27.83	-29 36.5	2.031	2.917	-0.35	-7.4	13.0	144.4
June 15	19 23.27	-30 51.3	1.978	2.927	-0.57	-7.5	13.0	154.4
June 25	19 16.78	-32 04.5	1.949	2.939	-0.73	-7.0	13.0	163.8
July 5	19 09.08	-33 11.0	1.946	2.951	-0.80	-6.1	13.0	169.2
July 15	19 01.06	-34 06.4	1.971	2.965	-0.78	-4.8	13.1	165.2
July 25	18 53.76	-34 48.1	2.021	2.979	-0.66	-3.4	13.1	156.2
Aug. 4	18 48.02	-35 15.9	2.095	2.993	-0.46	-2.1	13.2	146.4
Aug. 14	18 44.47	-35 31.1	2.191	3.009	-0.22	-0.9	13.4	136.6
Aug. 24	18 43.45	-35 36.1	2.305	3.025	+0.04	0.0	13.5	127.2
Sept. 3	18 45.00	-35 32.9	2.433	3.042	+0.29	+0.7	13.7	118.2
Sept. 13	18 49.04	-35 23.2	2.572	3.060	+0.53	+1.3	13.8	109.6
Sept. 23	18 55.33	-35 08.2	2.719	3.079	+0.74	+1.8	14.0	101.4
Oct. 3	19 03.59	-34 48.5	2.871	3.098	+0.92	+2.2	14.2	93.5
Oct. 13	19 13.55	-34 24.3	3.025	3.117	+1.08	+2.7	14.3	85.9
Oct. 23	19 24.92	-33 55.6	3.178	3.137	+1.20	+3.1	14.5	78.6
Nov. 2	19 37.44	-33 22.3	3.329	3.158	+1.31	+3.6	14.6	71.5
Nov. 12	19 50.90	-32 44.2	3.476	3.179	+1.39	+4.1	14.7	64.6
Nov. 22	20 05.06	-32 01.4	3.616	3.201	+1.45	+4.5	14.9	57.8
Dec. 2	20 19.75	-31 13.9	3.748	3.223	+1.49	+5.0	15.0	51.2
Dec. 12	20 34.82	-30 21.8	3.871	3.245	+1.52	+5.5	15.1	44.7
Dec. 22	20 50.10	-29 25.4	3.983	3.268	+1.54	+5.9	15.2	38.3
Jan. 1	21 05.49	-28 25.2	4.083	3.291	+1.54	+6.2	15.3	32.1
Jan. 11	21 20.90	-27 21.6	4.170	3.315	+1.54	+6.5	15.4	26.1
Jan. 21	21 36.21	-26 15.4	4.243	3.339	+1.52	+6.7	15.5	20.5
Jan. 31	21 51.36	-25 07.2	4.301	3.363	+1.50	+6.9	15.6	15.6
Feb. 10	22 06.30	-23 57.7	4.345	3.387	+1.48	+7.0	15.6	12.2
Feb. 20	22 20.96	-22 47.8	4.373	3.412	+1.45	+7.0	15.7	11.9
Mar. 2	22 35.31	-21 38.4	4.386	3.436	+1.42	+6.9	15.8	14.7
Mar. 12	22 49.29	-20 30.2	4.383	3.461	+1.38	+6.7	15.8	19.3
Mar. 22	23 02.86	-19 24.3	4.366	3.487	+1.33	+6.4	15.8	24.8

Comet C/2020 R4 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 1.94392 TT
 Peri. = 46.73194
 Node = 323.27672 2000.0
 Incl. = 164.46284
 q = 1.0284176 AU
 e = 0.9892788

$$m_1 = 9.0 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .9			m	'		°
Jan. 6	21 13.28	-18 25.9	2.133	1.367	-0.67	+6.3	12.7	29.6
Jan. 16	21 07.06	-17 21.9	2.165	1.269	-0.57	+6.5	12.2	18.3
Jan. 26	21 01.54	-16 15.9	2.152	1.182	-0.54	+6.8	11.8	7.2
Feb. 5	20 56.05	-15 06.0	2.090	1.110	-0.57	+7.3	11.3	4.5
Feb. 15	20 50.10	-13 49.0	1.977	1.059	-0.64	+8.3	10.9	15.6
Feb. 25	20 43.10	-12 19.6	1.811	1.032	-0.78	+9.9	10.5	27.0
Mar. 7	20 34.31	-10 28.3	1.597	1.032	-1.02	+12.9	10.2	38.8
Mar. 17	20 22.26	-07 57.1	1.343	1.059	-1.49	+18.5	10.0	51.3
Mar. 27	20 03.46	-04 08.1	1.062	1.111	-2.51	+29.9	9.8	65.2
Apr. 6	19 28.94	+02 30.1	0.776	1.183	-5.06	+56.1	9.5	82.4
Apr. 16	18 11.95	+15 24.6	0.537	1.270	-12.18	105.0	9.2	107.2
Apr. 26	15 24.27	+31 27.0	0.473	1.368	-19.69	+46.7	9.4	132.0
May 6	12 48.24	+31 40.1	0.655	1.475	-9.81	-27.9	10.6	123.5
May 16	11 41.31	+26 59.8	0.952	1.587	-3.95	-24.8	11.9	107.8
May 26	11 13.31	+23 27.3	1.282	1.702	-1.75	-17.5	13.0	95.0
June 5	11 00.70	+20 54.5	1.618	1.819	-0.78	-13.0	13.9	84.1
June 15	10 55.38	+18 56.9	1.948	1.938	-0.28	-10.4	14.8	74.3
June 25	10 54.01	+17 20.6	2.266	2.057	+0.01	-8.8	15.5	65.1
July 5	10 54.99	+15 58.0	2.567	2.175	+0.19	-7.7	16.1	56.4
July 15	10 57.47	+14 44.6	2.848	2.294	+0.31	-6.9	16.7	47.9
July 25	11 00.90	+13 37.9	3.106	2.412	+0.38	-6.4	17.2	39.6
Aug. 4	11 04.95	+12 36.5	3.339	2.529	+0.43	-5.9	17.7	31.4
Aug. 14	11 09.37	+11 39.4	3.545	2.645	+0.46	-5.5	18.1	23.4
Aug. 24	11 13.98	+10 46.4	3.722	2.761	+0.46	-5.1	18.5	15.4
Sept. 3	11 18.60	+09 57.2	3.871	2.875	+0.46	-4.7	18.8	8.0
Sept. 13	11 23.12	+09 12.0	3.989	2.988	+0.44	-4.3	19.1	5.3
Sept. 23	11 27.38	+08 31.1	4.077	3.100	+0.41	-3.8	19.4	11.7
Oct. 3	11 31.26	+07 54.9	4.134	3.212	+0.36	-3.3	19.7	19.9
Oct. 13	11 34.61	+07 24.1	4.163	3.322	+0.30	-2.8	19.9	28.6
Oct. 23	11 37.27	+06 59.3	4.164	3.431	+0.22	-2.1	20.1	37.7
Nov. 2	11 39.07	+06 41.4	4.140	3.539	+0.13	-1.4	20.3	47.1
Nov. 12	11 39.83	+06 31.4	4.092	3.646	+0.01	-0.5	20.5	56.8
Nov. 22	11 39.33	+06 30.5	4.027	3.752	-0.13	+0.4	20.6	67.0
Dec. 2	11 37.37	+06 39.5	3.948	3.858	-0.28	+1.5	20.8	77.6
Dec. 12	11 33.73	+06 59.5	3.860	3.962	-0.46	+2.6	20.9	88.7
Dec. 22	11 28.23	+07 31.1	3.773	4.065	-0.66	+3.8	21.0	100.3
Jan. 1	11 20.75	+08 14.4	3.692	4.168	-0.86	+4.9	21.1	112.4
Jan. 11	11 11.28	+09 08.4	3.627	4.269	-1.05	+5.9	21.3	125.1
Jan. 21	10 59.97	+10 11.1	3.587	4.370	-1.22	+6.6	21.4	138.2
Jan. 31	10 47.19	+11 19.2	3.578	4.470	-1.34	+7.0	21.5	151.7
Feb. 10	10 33.48	+12 28.5	3.608	4.569	-1.39	+6.8	21.7	165.2
Feb. 20	10 19.56	+13 34.4	3.680	4.667	-1.38	+6.3	21.9	177.0
Mar. 2	10 06.14	+14 33.3	3.794	4.765	-1.29	+5.4	.	167.1
Mar. 12	09 53.87	+15 22.5	3.948	4.862	-1.14	+4.3	.	154.2
Mar. 22	09 43.22	+16 00.9	4.138	4.958	-0.96	+3.3	.	141.6

Comet C/2019 T3 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 2.84388 TT
 Peri. = 112.29040
 Node = 139.52079 2000.0
 Incl. = 121.86220
 q = 5.9465839 AU
 e = 0.9980931

$$m1 = -3.0 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .5			m	'		°
Jan. 6	22 15.85	+48 59.5	6.001	5.960	+0.51	-10.4	16.4	82.9
Jan. 16	22 21.25	+47 22.1	6.112	5.955	+0.57	-8.9	16.4	76.2
Jan. 26	22 27.09	+46 00.4	6.221	5.952	+0.60	-7.3	16.5	69.7
Feb. 5	22 33.18	+44 53.8	6.324	5.949	+0.62	-5.9	16.5	63.5
Feb. 15	22 39.37	+44 01.5	6.416	5.948	+0.62	-4.5	16.5	57.7
Feb. 25	22 45.53	+43 22.5	6.495	5.947	+0.61	-3.2	16.5	52.7
Mar. 7	22 51.53	+42 55.6	6.558	5.947	+0.59	-2.1	16.6	48.5
Mar. 17	22 57.25	+42 39.6	6.602	5.947	+0.55	-1.0	16.6	45.5
Mar. 27	23 02.58	+42 33.3	6.627	5.949	+0.51	-0.2	16.6	43.9
Apr. 6	23 07.40	+42 35.4	6.632	5.951	+0.45	+0.6	16.6	43.9
Apr. 16	23 11.61	+42 44.6	6.616	5.955	+0.38	+1.3	16.6	45.4
Apr. 26	23 15.06	+42 59.7	6.580	5.959	+0.30	+1.8	16.6	48.4
May 6	23 17.64	+43 19.3	6.524	5.964	+0.21	+2.2	16.6	52.5
May 16	23 19.21	+43 42.1	6.451	5.969	+0.10	+2.4	16.6	57.6
May 26	23 19.63	+44 06.3	6.361	5.976	-0.03	+2.4	16.5	63.4
June 5	23 18.75	+44 30.2	6.258	5.983	-0.16	+2.3	16.5	69.8
June 15	23 16.46	+44 51.7	6.145	5.992	-0.31	+1.9	16.5	76.6
June 25	23 12.64	+45 08.4	6.025	6.001	-0.47	+1.3	16.5	83.8
July 5	23 07.25	+45 17.5	5.902	6.010	-0.63	+0.4	16.4	91.2
July 15	23 00.30	+45 16.1	5.782	6.021	-0.78	-0.8	16.4	98.8
July 25	22 51.93	+45 00.9	5.668	6.032	-0.91	-2.4	16.4	106.3
Aug. 4	22 42.39	+44 29.2	5.566	6.045	-1.01	-4.2	16.4	113.6
Aug. 14	22 32.04	+43 38.5	5.481	6.058	-1.06	-6.2	16.3	120.4
Aug. 24	22 21.36	+42 27.7	5.418	6.071	-1.07	-8.2	16.3	126.3
Sept. 3	22 10.87	+40 57.2	5.380	6.086	-1.02	-10.1	16.3	130.7
Sept. 13	22 01.05	+39 08.8	5.371	6.101	-0.93	-11.7	16.4	132.9
Sept. 23	21 52.32	+37 06.0	5.393	6.117	-0.80	-12.9	16.4	132.6
Oct. 3	21 44.97	+34 53.4	5.445	6.134	-0.65	-13.6	16.4	129.8
Oct. 13	21 39.16	+32 36.0	5.527	6.152	-0.49	-13.8	16.5	124.8
Oct. 23	21 34.93	+30 18.8	5.636	6.170	-0.34	-13.5	16.6	118.3
Nov. 2	21 32.24	+28 06.1	5.768	6.189	-0.19	-12.9	16.6	110.7
Nov. 12	21 30.97	+26 01.3	5.918	6.209	-0.05	-11.9	16.7	102.6
Nov. 22	21 30.98	+24 06.8	6.081	6.229	+0.07	-10.8	16.8	94.0
Dec. 2	21 32.11	+22 24.1	6.251	6.250	+0.17	-9.6	16.9	85.4
Dec. 12	21 34.19	+20 53.9	6.424	6.272	+0.25	-8.3	17.0	76.7
Dec. 22	21 37.05	+19 36.3	6.593	6.294	+0.32	-7.1	17.1	68.2
Jan. 1	21 40.55	+18 30.9	6.755	6.317	+0.38	-5.9	17.2	59.8
Jan. 11	21 44.52	+17 36.9	6.904	6.341	+0.42	-4.8	17.2	51.7
Jan. 21	21 48.84	+16 53.5	7.036	6.365	+0.45	-3.8	17.3	44.0
Jan. 31	21 53.38	+16 19.7	7.150	6.390	+0.46	-2.9	17.4	37.0
Feb. 10	21 58.01	+15 54.3	7.241	6.416	+0.46	-2.1	17.4	31.0
Feb. 20	22 02.63	+15 36.3	7.309	6.442	+0.46	-1.4	17.5	26.8
Mar. 2	22 07.13	+15 24.5	7.352	6.469	+0.44	-0.9	17.5	25.2
Mar. 12	22 11.40	+15 17.9	7.370	6.497	+0.41	-0.4	17.6	26.6
Mar. 22	22 15.36	+15 15.3	7.362	6.525	+0.37	-0.1	17.6	30.6

Comet C/2019 03 (Palomar)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 8.25148 TT
 Peri. = 60.06404
 Node = 300.38264 2000.0
 Incl. = 89.81607
 q = 8.8195334 AU
 e = 1.0026529

$$m_1 = -73.0 + 5 \log(\Delta) + 90.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 18. 81	+30 23. 0	9. 384	8. 827	+0. 43	+3. 2	17. 0	53. 0
Jan. 16	19 23. 16	+30 58. 9	9. 390	8. 825	+0. 43	+4. 0	17. 0	52. 4
Jan. 26	19 27. 47	+31 43. 0	9. 382	8. 823	+0. 42	+4. 9	17. 0	52. 9
Feb. 5	19 31. 63	+32 35. 1	9. 358	8. 821	+0. 40	+5. 6	17. 0	54. 4
Feb. 15	19 35. 54	+33 34. 9	9. 321	8. 820	+0. 37	+6. 4	16. 9	56. 9
Feb. 25	19 39. 08	+34 41. 9	9. 273	8. 820	+0. 33	+7. 1	16. 9	60. 0
Mar. 7	19 42. 14	+35 55. 4	9. 213	8. 820	+0. 28	+7. 7	16. 9	63. 7
Mar. 17	19 44. 60	+37 14. 6	9. 146	8. 820	+0. 21	+8. 2	16. 9	67. 9
Mar. 27	19 46. 35	+38 38. 4	9. 073	8. 820	+0. 13	+8. 6	16. 9	72. 3
Apr. 6	19 47. 29	+40 05. 7	8. 996	8. 821	+0. 04	+8. 9	16. 9	76. 8
Apr. 16	19 47. 31	+41 35. 1	8. 918	8. 822	-0. 05	+9. 0	16. 9	81. 3
Apr. 26	19 46. 29	+43 04. 9	8. 841	8. 824	-0. 16	+8. 9	16. 8	85. 7
May 6	19 44. 19	+44 33. 3	8. 768	8. 826	-0. 27	+8. 7	16. 8	90. 0
May 16	19 40. 93	+45 58. 4	8. 701	8. 829	-0. 39	+8. 2	16. 8	93. 9
May 26	19 36. 51	+47 18. 0	8. 642	8. 831	-0. 50	+7. 6	16. 8	97. 5
June 5	19 30. 97	+48 30. 0	8. 592	8. 835	-0. 61	+6. 7	16. 8	100. 6
June 15	19 24. 42	+49 32. 6	8. 553	8. 838	-0. 70	+5. 7	16. 8	103. 1
June 25	19 17. 04	+50 24. 0	8. 525	8. 842	-0. 77	+4. 5	16. 8	104. 9
July 5	19 09. 09	+51 03. 0	8. 511	8. 846	-0. 82	+3. 2	16. 9	106. 1
July 15	19 00. 86	+51 28. 9	8. 508	8. 851	-0. 82	+1. 9	16. 9	106. 5
July 25	18 52. 71	+51 41. 8	8. 518	8. 856	-0. 80	+0. 6	16. 9	106. 2
Aug. 4	18 44. 97	+51 42. 3	8. 540	8. 862	-0. 74	-0. 6	16. 9	105. 3
Aug. 14	18 37. 94	+51 31. 6	8. 572	8. 867	-0. 65	-1. 6	17. 0	103. 8
Aug. 24	18 31. 87	+51 11. 6	8. 613	8. 874	-0. 55	-2. 4	17. 0	101. 7
Sept. 3	18 26. 93	+50 44. 5	8. 663	8. 880	-0. 43	-3. 0	17. 0	99. 2
Sept. 13	18 23. 23	+50 12. 4	8. 718	8. 887	-0. 30	-3. 4	17. 1	96. 4
Sept. 23	18 20. 79	+49 37. 8	8. 778	8. 894	-0. 18	-3. 5	17. 1	93. 4
Oct. 3	18 19. 59	+49 02. 7	8. 841	8. 902	-0. 05	-3. 5	17. 2	90. 3
Oct. 13	18 19. 57	+48 29. 1	8. 904	8. 910	+0. 06	-3. 2	17. 2	87. 1
Oct. 23	18 20. 65	+47 59. 0	8. 966	8. 919	+0. 16	-2. 8	17. 3	84. 1
Nov. 2	18 22. 71	+47 33. 7	9. 026	8. 927	+0. 26	-2. 2	17. 3	81. 2
Nov. 12	18 25. 63	+47 14. 7	9. 081	8. 936	+0. 34	-1. 5	17. 4	78. 5
Nov. 22	18 29. 29	+47 03. 2	9. 131	8. 946	+0. 40	-0. 7	17. 4	76. 1
Dec. 2	18 33. 57	+46 59. 7	9. 175	8. 956	+0. 46	+0. 1	17. 5	74. 1
Dec. 12	18 38. 33	+47 05. 2	9. 212	8. 966	+0. 50	+1. 1	17. 6	72. 6
Dec. 22	18 43. 44	+47 20. 0	9. 241	8. 977	+0. 53	+2. 0	17. 6	71. 4
Jan. 1	18 48. 79	+47 44. 4	9. 263	8. 988	+0. 54	+3. 0	17. 7	70. 8
Jan. 11	18 54. 23	+48 18. 4	9. 277	8. 999	+0. 54	+3. 9	17. 7	70. 6
Jan. 21	18 59. 64	+49 01. 9	9. 285	9. 010	+0. 53	+4. 9	17. 8	70. 9
Jan. 31	19 04. 89	+49 54. 5	9. 286	9. 022	+0. 51	+5. 8	17. 8	71. 5
Feb. 10	19 09. 84	+50 55. 9	9. 282	9. 035	+0. 47	+6. 6	17. 9	72. 6
Feb. 20	19 14. 34	+52 05. 2	9. 273	9. 047	+0. 42	+7. 3	17. 9	73. 8
Mar. 2	19 18. 24	+53 21. 6	9. 260	9. 061	+0. 35	+8. 0	18. 0	75. 4
Mar. 12	19 21. 39	+54 44. 1	9. 246	9. 074	+0. 27	+8. 5	18. 0	77. 0
Mar. 22	19 23. 61	+56 11. 3	9. 230	9. 088	+0. 16	+8. 9	18. 1	78. 7

Comet 28P/Neujmin

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 11.87482 TT
 Peri. = 347.40691
 Node = 346.33252 2000.0
 Incl. = 14.31213
 q = 1.5782499 AU

e = 0.7737481
 a = 6.9756316 AU
 n = 0.05349692
 P = 18.42 years

H = 12.0 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2020/21	h m	° ' "			m		°
Jan. 6	19 37.63	-28 55.4	2.720	1.757	+3.11 +10.8	15.8	9.3
Jan. 16	20 08.80	-26 55.3	2.680	1.709	+3.11 +13.5	15.7	7.2
Jan. 26	20 39.81	-24 29.1	2.643	1.667	+3.08 +16.0	15.6	5.9
Feb. 5	21 10.40	-21 38.4	2.611	1.633	+3.03 +18.3	15.5	5.7
Feb. 15	21 40.39	-18 26.1	2.584	1.606	+2.96 +20.3	15.5	6.5
Feb. 25	22 09.65	-14 55.8	2.563	1.588	+2.88 +21.8	15.5	8.0
Mar. 7	22 38.13	-11 12.1	2.548	1.579	+2.81 +22.9	15.5	9.7
Mar. 17	23 05.84	-07 19.5	2.541	1.579	+2.73 +23.6	15.6	11.7
Mar. 27	23 32.80	-03 22.9	2.539	1.589	+2.66 +23.7	15.6	13.8
Apr. 6	23 59.07	+00 33.0	2.544	1.607	+2.59 +23.4	15.7	16.1
Apr. 16	00 24.71	+04 24.3	2.553	1.634	+2.53 +22.7	15.8	18.6
Apr. 26	00 49.76	+08 07.3	2.566	1.668	+2.48 +21.7	15.9	21.2
May 6	01 14.29	+11 39.2	2.580	1.710	+2.42 +20.5	16.0	24.1
May 16	01 38.29	+14 58.1	2.596	1.758	+2.37 +19.1	16.1	27.2
May 26	02 01.77	+18 02.5	2.610	1.812	+2.32 +17.6	16.3	30.5
June 5	02 24.69	+20 51.7	2.622	1.871	+2.26 +16.1	16.4	34.1
June 15	02 46.99	+23 25.5	2.630	1.934	+2.19 +14.5	16.5	38.0
June 25	03 08.57	+25 44.3	2.634	2.000	+2.11 +13.1	16.6	42.2
July 5	03 29.33	+27 48.9	2.631	2.070	+2.03 +11.7	16.7	46.7
July 15	03 49.12	+29 40.5	2.621	2.142	+1.92 +10.5	16.8	51.5
July 25	04 07.75	+31 20.3	2.604	2.216	+1.79 +9.4	16.9	56.7
Aug. 4	04 25.06	+32 50.2	2.580	2.291	+1.65 +8.5	17.0	62.3
Aug. 14	04 40.81	+34 11.9	2.548	2.368	+1.48 +7.8	17.0	68.3
Aug. 24	04 54.73	+35 27.2	2.509	2.446	+1.28 +7.2	17.0	74.7
Sept. 3	05 06.59	+36 37.9	2.465	2.524	+1.06 +6.9	17.1	81.7
Sept. 13	05 16.04	+37 45.3	2.416	2.603	+0.80 +6.6	17.1	89.1
Sept. 23	05 22.78	+38 50.3	2.366	2.683	+0.51 +6.4	17.1	97.1
Oct. 3	05 26.49	+39 53.0	2.318	2.762	+0.19 +6.1	17.0	105.7
Oct. 13	05 26.89	+40 52.1	2.274	2.842	-0.15 +5.6	17.0	114.8
Oct. 23	05 23.88	+41 44.9	2.241	2.921	-0.49 +4.8	17.0	124.4
Nov. 2	05 17.56	+42 27.4	2.222	3.000	-0.80 +3.5	16.9	134.3
Nov. 12	05 08.41	+42 55.1	2.222	3.080	-1.04 +1.8	16.9	144.1
Nov. 22	04 57.34	+43 03.8	2.247	3.158	-1.17 -0.2	16.8	153.0
Dec. 2	04 45.54	+42 52.2	2.298	3.237	-1.17 -2.3	16.8	158.9
Dec. 12	04 34.31	+42 21.8	2.378	3.315	-1.05 -3.9	17.0	158.8
Dec. 22	04 24.76	+41 37.2	2.486	3.393	-0.83 -5.0	17.2	153.1
Jan. 1	04 17.58	+40 44.4	2.622	3.470	-0.57 -5.5	17.4	144.5
Jan. 11	04 13.09	+39 49.3	2.782	3.547	-0.30 -5.4	17.7	135.1
Jan. 21	04 11.30	+38 56.6	2.962	3.623	-0.04 -5.0	17.9	125.5
Jan. 31	04 12.00	+38 09.2	3.158	3.699	+0.20 -4.4	18.1	116.1
Feb. 10	04 14.90	+37 28.4	3.367	3.774	+0.40 -3.7	18.3	106.9
Feb. 20	04 19.68	+36 54.7	3.583	3.849	+0.57 -3.0	18.5	98.1
Mar. 2	04 26.04	+36 27.5	3.803	3.923	+0.71 -2.4	18.7	89.6
Mar. 12	04 33.70	+36 06.0	4.023	3.997	+0.83 -1.9	18.8	81.3
Mar. 22	04 42.42	+35 49.1	4.241	4.070	+0.92 -1.5	19.0	73.4

Comet C/2020 N1 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 12.22627 TT
 Peri. = 186.76869
 Node = 279.98093 2000.0
 Incl. = 29.70311
 q = 1.3206951 AU
 e = 1.0004966

$$m1 = 12.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	' .		°
Jan. 6	00 23.04	+32 20.7	1.250	1.631	+2.39	-13.7	15.5	93.1
Jan. 16	00 48.66	+30 07.2	1.238	1.552	+2.77	-13.1	15.3	87.9
Jan. 26	01 17.89	+27 57.7	1.230	1.481	+3.10	-12.9	15.1	83.1
Feb. 5	01 50.18	+25 47.1	1.228	1.421	+3.37	-13.3	14.9	79.0
Feb. 15	02 24.92	+23 30.4	1.233	1.373	+3.58	-14.2	14.7	75.5
Feb. 25	03 01.37	+21 04.0	1.246	1.340	+3.71	-15.3	14.6	72.6
Mar. 7	03 38.71	+18 26.2	1.269	1.323	+3.75	-16.4	14.6	70.4
Mar. 17	04 16.23	+15 38.3	1.304	1.323	+3.74	-17.2	14.7	68.7
Mar. 27	04 53.27	+12 43.4	1.351	1.339	+3.66	-17.7	14.8	67.6
Apr. 6	05 29.35	+09 45.4	1.411	1.371	+3.54	-17.8	15.0	66.8
Apr. 16	06 04.19	+06 48.5	1.485	1.418	+3.41	-17.5	15.3	66.2
Apr. 26	06 37.61	+03 55.9	1.572	1.478	+3.26	-16.9	15.6	65.8
May 6	07 09.51	+01 09.6	1.672	1.548	+3.11	-16.2	15.9	65.2
May 16	07 39.91	-01 29.1	1.784	1.627	+2.96	-15.5	16.3	64.4
May 26	08 08.81	-04 00.3	1.908	1.713	+2.81	-14.7	16.6	63.4
June 5	08 36.26	-06 24.0	2.043	1.805	+2.67	-14.0	17.0	62.0
June 15	09 02.36	-08 40.7	2.187	1.901	+2.54	-13.3	17.4	60.3
June 25	09 27.18	-10 51.2	2.339	2.000	+2.41	-12.7	17.8	58.2
July 5	09 50.80	-12 56.1	2.498	2.101	+2.30	-12.2	18.1	55.7
July 15	10 13.34	-14 55.9	2.662	2.204	+2.20	-11.7	18.5	52.9
July 25	10 34.89	-16 51.3	2.829	2.308	+2.10	-11.3	18.8	49.8
Aug. 4	10 55.53	-18 42.5	2.997	2.413	+2.02	-10.9	19.1	46.5
Aug. 14	11 15.37	-20 30.1	3.165	2.519	+1.94	-10.6	19.4	42.9
Aug. 24	11 34.46	-22 14.3	3.330	2.625	+1.87	-10.2	19.7	39.2
Sept. 3	11 52.88	-23 55.1	3.490	2.731	+1.81	-9.9	20.0	35.4
Sept. 13	12 10.68	-25 32.9	3.644	2.836	+1.75	-9.6	20.2	31.6
Sept. 23	12 27.90	-27 07.6	3.790	2.942	+1.69	-9.3	20.5	28.0
Oct. 3	12 44.56	-28 39.4	3.925	3.047	+1.64	-9.0	20.7	24.9
Oct. 13	13 00.69	-30 08.3	4.049	3.152	+1.58	-8.7	20.9	22.6
Oct. 23	13 16.27	-31 34.2	4.160	3.256	+1.53	-8.4	21.1	21.7
Nov. 2	13 31.28	-32 57.3	4.256	3.360	+1.47	-8.2	21.3	22.4
Nov. 12	13 45.69	-34 17.7	4.336	3.463	+1.40	-7.9	21.5	24.9
Nov. 22	13 59.42	-35 35.2	4.400	3.565	+1.33	-7.6	21.6	28.7
Dec. 2	14 12.42	-36 50.1	4.447	3.667	+1.26	-7.3	21.8	33.7
Dec. 12	14 24.58	-38 02.3	4.477	3.769	+1.17	-7.1	21.9	39.4
Dec. 22	14 35.78	-39 11.9	4.491	3.869	+1.06	-6.8	22.0	45.7
Jan. 1	14 45.89	-40 19.0	4.490	3.970	+0.94	-6.6	.	52.6
Jan. 11	14 54.73	-41 23.5	4.474	4.069	+0.81	-6.3	.	59.8
Jan. 21	15 02.15	-42 25.2	4.445	4.168	+0.66	-6.0	.	67.4
Jan. 31	15 07.95	-43 23.7	4.407	4.266	+0.48	-5.7	.	75.4
Feb. 10	15 11.94	-44 18.3	4.362	4.364	+0.29	-5.2	.	83.6
Feb. 20	15 13.98	-45 08.0	4.313	4.461	+0.09	-4.6	.	92.1
Mar. 2	15 13.93	-45 51.3	4.265	4.557	-0.12	-3.9	.	100.9
Mar. 12	15 11.74	-46 26.3	4.222	4.653	-0.33	-2.9	.	109.8
Mar. 22	15 07.52	-46 50.6	4.188	4.748	-0.53	-1.8	.	118.8

Comet C/2021 A4 (NEOWISE)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 20.00957 TT
 Peri. = 204.63794 e = 0.9742565
 Node = 307.07927 2000.0 a = 44.5025968 AU
 Incl. = 111.58004 n = 0.00331991
 q = 1.1456526 AU P = 296.88 years

$$m_1 = 16.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	14 25.05	+39 51.2	1.253	1.601	-0.40	+23.2	18.5	90.6
Jan. 16	14 16.48	+44 59.3	0.973	1.503	-1.65	+42.3	17.7	100.4
Jan. 26	13 44.88	+54 27.6	0.706	1.411	-6.30	+78.1	16.7	112.2
Feb. 5	11 08.12	+68 48.0	0.495	1.329	-36.34	+44.9	15.7	124.2
Feb. 15	05 52.65	+51 52.0	0.441	1.258	-13.00	202.8	15.2	118.2
Feb. 25	04 42.63	+23 15.7	0.587	1.202	-3.02	122.2	15.6	96.0
Mar. 7	04 23.16	+08 01.0	0.820	1.164	-1.08	-62.7	16.2	79.3
Mar. 17	04 15.77	+00 12.3	1.071	1.147	-0.43	-36.8	16.7	67.3
Mar. 27	04 12.87	-05 19.9	1.311	1.151	-0.15	-24.9	17.2	57.9
Apr. 6	04 12.13	-08 57.6	1.527	1.177	+0.01	-18.7	17.6	50.4
Apr. 16	04 12.71	-11 49.0	1.713	1.222	+0.11	-15.6	18.0	44.6
Apr. 26	04 14.22	-14 17.3	1.866	1.284	+0.19	-14.1	18.4	40.7
May 6	04 16.43	-16 36.6	1.985	1.360	+0.25	-13.8	18.8	39.1
May 16	04 19.17	-18 57.1	2.071	1.447	+0.30	-14.4	19.2	39.8
May 26	04 22.23	-21 27.0	2.126	1.541	+0.31	-15.8	19.5	42.6
June 5	04 25.38	-24 13.1	2.153	1.642	+0.31	-17.8	19.8	47.2
June 15	04 28.37	-27 22.0	2.157	1.746	+0.28	-20.4	20.1	53.0
June 25	04 30.81	-30 59.5	2.143	1.854	+0.20	-23.5	20.3	59.8
July 5	04 32.25	-35 10.6	2.117	1.963	+0.07	-27.1	20.6	67.3
July 15	04 32.00	-39 58.9	2.087	2.074	-0.16	-30.9	20.8	75.1
July 25	04 29.00	-45 24.5	2.060	2.185	-0.51	-34.5	21.0	83.1
Aug. 4	04 21.60	-51 21.9	2.045	2.296	-1.08	-37.1	21.2	90.9
Aug. 14	04 06.99	-57 37.6	2.050	2.408	-2.02	-37.7	21.4	97.9
Aug. 24	03 40.34	-63 44.7	2.083	2.519	-3.59	-34.8	21.6	103.5
Sept. 3	02 54.37	-69 00.4	2.150	2.629	-5.96	-26.5	21.9	107.0
Sept. 13	01 43.43	-72 23.3	2.252	2.739	-8.25	-11.6	.	108.2
Sept. 23	00 19.28	-73 01.5	2.389	2.848	-8.02	+5.3	.	107.0
Oct. 3	23 09.47	-71 12.1	2.557	2.957	-5.56	+16.4	.	103.6
Oct. 13	22 24.83	-68 04.0	2.750	3.065	-3.26	+20.7	.	98.7
Oct. 23	21 59.50	-64 32.2	2.963	3.171	-1.77	+21.3	.	92.8
Nov. 2	21 46.21	-61 03.5	3.189	3.278	-0.87	+20.2	.	86.3
Nov. 12	21 40.28	-57 48.6	3.423	3.383	-0.31	+18.6	.	79.3
Nov. 22	21 38.95	-54 50.9	3.660	3.487	+0.05	+16.8	.	72.2
Dec. 2	21 40.59	-52 10.3	3.893	3.591	+0.29	+15.2	.	65.1
Dec. 12	21 44.22	-49 45.8	4.120	3.693	+0.44	+13.6	.	58.0
Dec. 22	21 49.15	-47 35.9	4.335	3.795	+0.55	+12.2	.	51.1
Jan. 1	21 54.97	-45 39.3	4.536	3.896	+0.62	+11.0	.	44.5
Jan. 11	22 01.35	-43 54.7	4.720	3.996	+0.66	+9.8	.	38.4
Jan. 21	22 08.05	-42 21.3	4.883	4.096	+0.68	+8.8	.	33.2
Jan. 31	22 14.88	-40 58.2	5.025	4.194	+0.69	+7.8	.	29.3
Feb. 10	22 21.71	-39 45.0	5.144	4.292	+0.68	+6.8	.	27.4
Feb. 20	22 28.37	-38 41.5	5.239	4.389	+0.65	+5.8	.	27.8
Mar. 2	22 34.77	-37 47.6	5.310	4.485	+0.62	+4.9	.	30.6
Mar. 12	22 40.79	-37 03.2	5.357	4.581	+0.58	+3.9	.	35.2
Mar. 22	22 46.30	-36 28.7	5.381	4.676	+0.52	+2.9	.	41.0

Comet P/2016 G1 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 22.08326 TT
 Peri. = 111.17325 e = 0.2111374
 Node = 204.02507 2000.0 a = 2.5831956 AU
 Incl. = 10.97035 n = 0.23739312
 q = 2.0377864 AU P = 4.15 years

$$m_1 = 13.0 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot./PA	Elong.
2021/22	h m	° '			for T=+1 day			°
Jan. 6	19 09.25	-15 01.5	3.050	2.079	-1.00 -2.0	20.2	34.4/83	7.5
Jan. 16	19 32.74	-14 11.9	3.038	2.069	-1.00 -2.4	20.1	34.6/81	8.1
Jan. 26	19 56.12	-13 09.5	3.020	2.060	-1.01 -2.7	20.1	34.7/79	10.6
Feb. 5	20 19.27	-11 55.2	2.996	2.053	-1.01 -3.0	20.1	34.7/77	13.9
Feb. 15	20 42.15	-10 30.0	2.966	2.047	-1.01 -3.3	20.0	34.7/75	17.7
Feb. 25	21 04.67	-08 55.3	2.930	2.043	-1.01 -3.5	20.0	34.5/73	21.6
Mar. 7	21 26.80	-07 12.5	2.888	2.039	-1.01 -3.7	19.9	34.3/72	25.6
Mar. 17	21 48.52	-05 23.1	2.842	2.038	-1.01 -3.8	19.9	34.0/71	29.7
Mar. 27	22 09.79	-03 28.8	2.790	2.038	-1.02 -3.9	19.9	33.6/70	33.8
Apr. 6	22 30.61	-01 31.3	2.733	2.039	-1.02 -3.9	19.8	33.1/69	38.0
Apr. 16	22 50.97	+00 27.8	2.672	2.042	-1.03 -3.9	19.8	32.4/68	42.2
Apr. 26	23 10.86	+02 26.7	2.606	2.047	-1.04 -3.8	19.7	31.7/68	46.5
May 6	23 30.26	+04 23.9	2.535	2.053	-1.05 -3.7	19.7	30.8/68	50.8
May 16	23 49.14	+06 17.8	2.460	2.060	-1.07 -3.5	19.7	29.8/68	55.3
May 26	00 07.45	+08 06.7	2.381	2.069	-1.09 -3.3	19.6	28.7/68	60.0
June 5	00 25.14	+09 49.2	2.297	2.079	-1.12 -3.1	19.6	27.4/69	64.8
June 15	00 42.10	+11 23.7	2.210	2.090	-1.15 -2.9	19.5	25.9/70	69.8
June 25	00 58.20	+12 48.8	2.120	2.103	-1.19 -2.6	19.5	24.1/71	75.1
July 5	01 13.29	+14 03.0	2.027	2.116	-1.23 -2.4	19.4	22.1/72	80.7
July 15	01 27.13	+15 04.7	1.932	2.131	-1.29 -2.2	19.4	19.7/74	86.7
July 25	01 39.46	+15 52.5	1.836	2.147	-1.35 -2.1	19.3	16.9/76	93.2
Aug. 4	01 49.98	+16 24.6	1.741	2.164	-1.42 -2.0	19.2	13.7/80	100.2
Aug. 14	01 58.33	+16 39.2	1.648	2.182	-1.51 -2.1	19.2	10.1/88	107.8
Aug. 24	02 04.14	+16 34.4	1.559	2.200	-1.61 -2.3	19.1	6.4/105	116.1
Sept. 3	02 07.10	+16 08.6	1.479	2.219	-1.72 -2.6	19.0	4.2/154	125.2
Sept. 13	02 06.99	+15 20.2	1.410	2.239	-1.82 -3.1	19.0	6.6/203	135.3
Sept. 23	02 03.87	+14 09.6	1.356	2.260	-1.92 -3.8	19.0	10.6/220	146.1
Oct. 3	01 58.13	+12 39.4	1.323	2.281	-2.00 -4.5	19.0	14.1/226	157.8
Oct. 13	01 50.58	+10 55.7	1.313	2.302	-2.03 -5.0	19.0	16.1/228	170.0
Oct. 23	01 42.39	+09 08.1	1.330	2.324	-2.01 -5.4	19.1	15.9/229	177.2
Nov. 2	01 34.78	+07 27.2	1.374	2.347	-1.93 -5.4	19.2	13.8/228	165.0
Nov. 12	01 28.81	+06 02.3	1.444	2.369	-1.82 -5.2	19.4	10.2/224	153.1
Nov. 22	01 25.18	+04 59.4	1.536	2.392	-1.69 -4.8	19.6	6.0/214	141.8
Dec. 2	01 24.17	+04 20.4	1.648	2.415	-1.56 -4.3	19.8	2.7/165	131.2
Dec. 12	01 25.79	+04 04.5	1.776	2.438	-1.43 -3.8	20.1	4.5/95	121.4
Dec. 22	01 29.84	+04 08.8	1.915	2.461	-1.31 -3.4	20.3	8.0/80	112.2
Jan. 1	01 36.01	+04 30.1	2.062	2.484	-1.20 -3.0	20.5	11.2/75	103.6
Jan. 11	01 44.04	+05 04.9	2.214	2.507	-1.11 -2.7	20.7	14.0/73	95.5
Jan. 21	01 53.63	+05 50.1	2.368	2.530	-1.03 -2.4	20.9	16.2/72	87.9
Jan. 31	02 04.53	+06 42.6	2.522	2.553	-0.97 -2.1	21.1	18.1/72	80.6
Feb. 10	02 16.53	+07 40.1	2.673	2.576	-0.91 -1.9	21.3	19.6/72	73.6
Feb. 20	02 29.47	+08 40.3	2.821	2.598	-0.86 -1.7	21.5	20.8/73	67.0
Mar. 2	02 43.18	+09 41.4	2.963	2.621	-0.82 -1.5	21.6	21.7/74	60.5
Mar. 12	02 57.55	+10 41.8	3.098	2.643	-0.78 -1.2	21.8	22.5/75	54.2
Mar. 22	03 12.47	+11 40.1	3.224	2.665	-0.75 -1.1	21.9	23.0/76	48.1

Comet C/2020 F5 (MASTER)

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 24.35061 TT
 Peri. = 311.09045
 Node = 350.61399 2000.0
 Incl. = 51.72058
 q = 4.3261385 AU
 e = 1.0041416

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	20 51.39	-55 11.9	5.107	4.373	+1.79	+11.2	15.1	37.9
Jan. 16	21 08.90	-53 19.9	5.124	4.362	+1.70	+11.1	15.1	35.6
Jan. 26	21 25.56	-51 29.3	5.130	4.352	+1.62	+11.0	15.1	34.3
Feb. 5	21 41.36	-49 40.8	5.125	4.344	+1.54	+10.7	15.1	34.1
Feb. 15	21 56.35	-47 55.3	5.107	4.337	+1.45	+10.4	15.1	35.2
Feb. 25	22 10.51	-46 13.5	5.077	4.332	+1.37	+9.9	15.1	37.3
Mar. 7	22 23.85	-44 36.2	5.035	4.329	+1.29	+9.5	15.1	40.5
Mar. 17	22 36.36	-43 04.2	4.980	4.327	+1.21	+8.9	15.0	44.5
Mar. 27	22 48.02	-41 38.1	4.913	4.326	+1.12	+8.3	15.0	49.1
Apr. 6	22 58.80	-40 18.5	4.835	4.327	+1.03	+7.6	15.0	54.3
Apr. 16	23 08.64	-39 06.2	4.745	4.330	+0.93	+6.8	14.9	59.9
Apr. 26	23 17.47	-38 01.6	4.647	4.335	+0.83	+6.0	14.9	65.9
May 6	23 25.23	-37 05.2	4.540	4.341	+0.71	+5.2	14.9	72.3
May 16	23 31.80	-36 17.4	4.426	4.348	+0.59	+4.3	14.8	79.0
May 26	23 37.07	-35 38.2	4.308	4.357	+0.45	+3.4	14.8	86.1
June 5	23 40.91	-35 07.6	4.188	4.368	+0.30	+2.6	14.7	93.4
June 15	23 43.18	-34 45.1	4.069	4.380	+0.13	+1.8	14.7	101.1
June 25	23 43.74	-34 29.7	3.955	4.394	-0.04	+1.2	14.6	109.1
July 5	23 42.49	-34 19.9	3.848	4.409	-0.23	+0.8	14.6	117.3
July 15	23 39.34	-34 13.5	3.754	4.425	-0.42	+0.6	14.5	125.8
July 25	23 34.33	-34 07.4	3.675	4.443	-0.60	+0.7	14.5	134.2
Aug. 4	23 27.61	-33 58.2	3.617	4.463	-0.76	+1.2	14.5	142.3
Aug. 14	23 19.46	-33 42.4	3.582	4.484	-0.88	+2.1	14.5	149.4
Aug. 24	23 10.35	-33 16.6	3.575	4.506	-0.94	+3.2	14.5	154.1
Sept. 3	23 00.85	-32 38.5	3.596	4.530	-0.95	+4.5	14.5	154.8
Sept. 13	22 51.56	-31 47.3	3.648	4.555	-0.89	+5.9	14.6	151.1
Sept. 23	22 43.08	-30 43.2	3.728	4.581	-0.78	+7.1	14.7	144.3
Oct. 3	22 35.86	-29 28.0	3.835	4.608	-0.64	+8.0	14.8	136.0
Oct. 13	22 30.19	-28 04.0	3.967	4.637	-0.47	+8.8	14.9	127.0
Oct. 23	22 26.25	-26 33.6	4.120	4.667	-0.30	+9.3	15.0	117.8
Nov. 2	22 24.01	-24 59.0	4.288	4.698	-0.13	+9.6	15.1	108.5
Nov. 12	22 23.40	-23 22.0	4.468	4.730	+0.02	+9.8	15.2	99.3
Nov. 22	22 24.29	-21 43.8	4.655	4.763	+0.16	+9.8	15.3	90.3
Dec. 2	22 26.49	-20 05.3	4.846	4.798	+0.29	+9.8	15.4	81.4
Dec. 12	22 29.82	-18 27.1	5.035	4.833	+0.39	+9.8	15.6	72.6
Dec. 22	22 34.11	-16 49.3	5.219	4.870	+0.47	+9.7	15.7	64.1
Jan. 1	22 39.17	-15 12.2	5.395	4.907	+0.54	+9.7	15.8	55.6
Jan. 11	22 44.87	-13 35.9	5.559	4.945	+0.60	+9.6	15.9	47.3
Jan. 21	22 51.04	-12 00.4	5.709	4.985	+0.64	+9.5	16.0	39.1
Jan. 31	22 57.58	-10 25.7	5.843	5.025	+0.67	+9.4	16.0	31.0
Feb. 10	23 04.37	-08 51.8	5.959	5.066	+0.69	+9.3	16.1	23.0
Feb. 20	23 11.28	-07 18.9	6.056	5.108	+0.70	+9.2	16.2	15.1
Mar. 2	23 18.24	-05 47.1	6.132	5.150	+0.69	+9.1	16.3	7.2
Mar. 12	23 25.15	-04 16.4	6.187	5.193	+0.68	+9.0	16.3	0.9
Mar. 22	23 31.93	-02 47.0	6.221	5.238	+0.67	+8.9	16.4	8.6

Comet 10P/Tempel

Epoch = 2021 July 5.0 TT
 T = 2021 Mar. 24.25972 TT
 Peri. = 195.49663 e = 0.5385749
 Node = 117.80868 2000.0 a = 3.0610340 AU
 Incl. = 12.03942 n = 0.18403560
 q = 1.4124379 AU P = 5.36 years

m1 = 9.4 + 5 log(Delta) + 22.5 log(r) (r < 2.0 AU & pre -T)
 m1 = 10.2 + 5 log(Delta) + 17.5 log(r) (r < 2.0 AU & post-T)
 H = 13.6 , G = 0.15 (r > 2.0 AU)

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		Mag.	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	18 05.92	-19 00.2	2.555	1.624	+3.13	-3.1	16.2	14.8
Jan. 16	18 37.73	-19 22.0	2.489	1.577	+3.24	-1.0	15.8	17.3
Jan. 26	19 10.60	-19 21.5	2.427	1.535	+3.34	+1.3	15.5	19.5
Feb. 5	19 44.30	-18 57.4	2.369	1.497	+3.40	+3.7	15.2	21.6
Feb. 15	20 18.51	-18 09.3	2.317	1.466	+3.44	+6.1	15.0	23.6
Feb. 25	20 52.90	-16 58.1	2.272	1.442	+3.44	+8.3	14.8	25.4
Mar. 7	21 27.16	-15 25.8	2.234	1.424	+3.41	+10.3	14.6	27.1
Mar. 17	22 01.01	-13 35.3	2.203	1.415	+3.35	+11.9	14.5	28.8
Mar. 27	22 34.21	-11 30.9	2.179	1.413	+3.28	+13.0	14.5	30.4
Apr. 6	23 06.57	-09 16.9	2.162	1.419	+3.19	+13.7	14.5	32.2
Apr. 16	23 37.98	-06 58.1	2.151	1.433	+3.08	+14.0	14.6	34.0
Apr. 26	00 08.33	-04 39.1	2.143	1.454	+2.98	+13.7	14.7	36.0
May 6	00 37.59	-02 24.1	2.139	1.482	+2.86	+13.2	14.8	38.1
May 16	01 05.72	+00 16.4	2.136	1.517	+2.75	+12.2	15.0	40.5
May 26	01 32.66	+01 41.1	2.134	1.557	+2.63	+11.1	15.2	43.1
June 5	01 58.41	+03 26.2	2.129	1.602	+2.51	+9.8	15.4	46.1
June 15	02 22.90	+04 57.5	2.122	1.651	+2.38	+8.3	15.6	49.3
June 25	02 46.08	+06 14.3	2.111	1.704	+2.24	+6.9	15.9	52.9
July 5	03 07.87	+07 16.2	2.094	1.759	+2.10	+5.4	16.1	56.9
July 15	03 28.16	+08 03.3	2.072	1.817	+1.94	+3.9	16.3	61.3
July 25	03 46.82	+08 36.1	2.042	1.876	+1.77	+2.5	16.5	66.1
Aug. 4	04 03.72	+08 55.3	2.006	1.937	+1.59	+1.2	16.7	71.3
Aug. 14	04 18.65	+09 01.9	1.964	1.998	+1.38	0.0	16.9	77.1
Aug. 24	04 31.41	+08 57.1	1.916	2.060	+1.15	-1.1	17.9	83.4
Sept. 3	04 41.76	+08 42.2	1.863	2.123	+0.89	-2.0	17.8	90.3
Sept. 13	04 49.41	+08 18.9	1.807	2.186	+0.61	-2.7	17.8	97.9
Sept. 23	04 54.10	+07 49.2	1.752	2.249	+0.30	-3.2	17.7	106.2
Oct. 3	04 55.61	+07 15.3	1.700	2.311	-0.03	-3.5	17.7	115.3
Oct. 13	04 53.77	+06 40.2	1.655	2.374	-0.37	-3.5	17.6	125.1
Oct. 23	04 48.69	+06 07.3	1.624	2.435	-0.68	-3.0	17.5	135.5
Nov. 2	04 40.73	+05 40.2	1.610	2.497	-0.93	-2.2	17.4	146.3
Nov. 12	04 30.64	+05 22.8	1.619	2.557	-1.09	-1.1	17.3	156.4
Nov. 22	04 19.52	+05 18.0	1.655	2.617	-1.12	+0.3	17.3	163.5
Dec. 2	04 08.57	+05 27.4	1.720	2.677	-1.04	+1.7	17.4	162.6
Dec. 12	03 58.92	+05 50.9	1.812	2.735	-0.86	+3.1	17.7	154.7
Dec. 22	03 51.37	+06 26.9	1.932	2.793	-0.62	+4.2	18.0	144.7
Jan. 1	03 46.33	+07 12.9	2.074	2.850	-0.36	+5.1	18.3	134.4
Jan. 11	03 43.92	+08 06.4	2.235	2.906	-0.10	+5.7	18.5	124.4
Jan. 21	03 44.02	+09 04.8	2.410	2.961	+0.14	+6.0	18.8	114.8
Jan. 31	03 46.37	+10 05.8	2.596	3.015	+0.35	+6.2	19.0	105.7
Feb. 10	03 50.70	+11 07.9	2.789	3.068	+0.53	+6.2	19.2	96.9
Feb. 20	03 56.71	+12 09.3	2.984	3.121	+0.68	+6.1	19.4	88.6
Mar. 2	04 04.14	+13 09.0	3.179	3.172	+0.81	+5.8	19.6	80.6
Mar. 12	04 12.76	+14 06.0	3.372	3.223	+0.92	+5.5	19.7	72.9
Mar. 22	04 22.36	+14 59.6	3.558	3.272	+1.01	+5.1	19.8	65.4

Comet C/2020 S8 (Lemmon)

Epoch = 2021 July 5.0 TT
 T = 2021 Apr. 10.93110 TT
 Peri. = 160.33326
 Node = 24.05205 2000.0
 Incl. = 108.51965
 q = 2.3639064 AU
 e = 0.9914177

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	16 51.42	+18 06.0	3.064	2.586	+0.32	-5.6	19.1	52.5
Jan. 16	16 54.15	+17 16.4	2.928	2.544	+0.21	-4.2	18.9	57.8
Jan. 26	16 55.53	+16 40.8	2.772	2.506	+0.05	-2.8	18.7	64.2
Feb. 5	16 55.06	+16 18.2	2.598	2.471	-0.17	-1.6	18.5	71.6
Feb. 15	16 52.07	+16 07.6	2.411	2.441	-0.47	-0.5	18.3	80.0
Feb. 25	16 45.69	+16 07.0	2.215	2.416	-0.87	+0.4	18.1	89.4
Mar. 7	16 34.79	+16 12.9	2.017	2.396	-1.39	+0.7	17.8	99.9
Mar. 17	16 17.97	+16 19.0	1.826	2.380	-2.07	+0.2	17.6	111.6
Mar. 27	15 53.74	+16 13.4	1.655	2.370	-2.87	-1.8	17.3	124.7
Apr. 6	15 21.27	+15 38.1	1.520	2.365	-3.69	-6.0	17.1	138.6
Apr. 16	14 41.55	+14 12.8	1.437	2.365	-4.24	-11.9	17.0	150.9
Apr. 26	13 58.51	+11 47.6	1.422	2.370	-4.27	-17.4	17.0	154.5
May 6	13 17.77	+08 37.2	1.477	2.380	-3.76	-20.4	17.1	145.8
May 16	12 43.63	+05 11.1	1.596	2.396	-2.97	-20.4	17.3	132.2
May 26	12 17.57	+01 53.2	1.763	2.416	-2.18	-18.8	17.6	118.5
June 5	11 58.93	-01 06.5	1.960	2.442	-1.51	-16.9	17.8	105.9
June 15	11 46.29	-03 47.7	2.175	2.472	-0.99	-15.2	18.1	94.5
June 25	11 38.25	-06 14.1	2.396	2.506	-0.60	-14.0	18.4	84.2
July 5	11 33.64	-08 29.9	2.616	2.544	-0.31	-13.1	18.6	74.7
July 15	11 31.59	-10 38.8	2.829	2.587	-0.09	-12.6	18.9	65.9
July 25	11 31.46	-12 43.9	3.030	2.633	+0.07	-12.4	19.1	57.8
Aug. 4	11 32.74	-14 47.4	3.215	2.682	+0.19	-12.3	19.3	50.2
Aug. 14	11 35.07	-16 51.1	3.383	2.735	+0.28	-12.4	19.5	43.2
Aug. 24	11 38.15	-18 56.4	3.531	2.790	+0.34	-12.7	19.7	37.0
Sept. 3	11 41.74	-21 04.4	3.657	2.848	+0.38	-13.0	19.9	31.6
Sept. 13	11 45.64	-23 16.3	3.761	2.908	+0.40	-13.4	20.0	27.7
Sept. 23	11 49.64	-25 32.8	3.843	2.970	+0.40	-13.9	20.2	25.7
Oct. 3	11 53.58	-27 54.7	3.902	3.035	+0.38	-14.5	20.3	26.1
Oct. 13	11 57.25	-30 22.8	3.939	3.101	+0.34	-15.2	20.4	28.7
Oct. 23	12 00.42	-32 57.4	3.955	3.169	+0.28	-15.8	20.5	33.1
Nov. 2	12 02.86	-35 39.0	3.953	3.238	+0.19	-16.6	20.6	38.7
Nov. 12	12 04.24	-38 27.8	3.933	3.309	+0.07	-17.3	20.7	45.0
Nov. 22	12 04.17	-41 23.3	3.899	3.380	-0.10	-17.9	20.7	51.9
Dec. 2	12 02.19	-44 24.6	3.855	3.453	-0.33	-18.4	20.8	59.0
Dec. 12	11 57.66	-47 29.6	3.804	3.526	-0.62	-18.6	20.9	66.3
Dec. 22	11 49.82	-50 34.4	3.751	3.601	-1.00	-18.3	20.9	73.7
Jan. 1	11 37.82	-53 33.4	3.701	3.676	-1.47	-17.3	21.0	80.9
Jan. 11	11 20.72	-56 17.6	3.658	3.752	-2.02	-15.2	21.1	87.8
Jan. 21	10 57.97	-58 35.5	3.628	3.828	-2.59	-11.8	21.1	94.2
Jan. 31	10 29.82	-60 13.9	3.614	3.905	-3.06	-7.2	21.2	99.8
Feb. 10	09 57.93	-61 00.9	3.621	3.982	-3.28	-1.6	21.3	104.3
Feb. 20	09 25.35	-60 51.3	3.652	4.059	-3.16	+4.0	21.4	107.4
Mar. 2	08 55.41	-59 49.1	3.706	4.137	-2.75	+8.7	21.5	109.0
Mar. 12	08 30.44	-58 05.7	3.785	4.215	-2.18	+12.0	21.6	109.0
Mar. 22	08 11.24	-55 56.4	3.886	4.293	-1.61	+13.8	21.8	107.6

Comet 16P/Brooks

Epoch = 2021 July 5.0 TT
 T = 2021 Apr. 18.25234 TT
 Peri. = 245.18145 e = 0.4862061
 Node = 138.86499 2000.0 a = 3.6554971 AU
 Incl. = 3.01155 n = 0.14102120
 q = 1.8781721 AU P = 6.99 years

$$m_1 = 11.2 + 5 \log(\Delta) + 15.0 \log(r(t-40))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	21 41.50	-14 40.6	2.770	2.074	+2.13	+10.0	18.6	37.2
Jan. 16	22 03.06	-12 55.4	2.800	2.040	+2.18	+11.1	18.5	32.5
Jan. 26	22 25.05	-10 59.7	2.823	2.008	+2.22	+12.1	18.4	28.1
Feb. 5	22 47.40	-08 54.8	2.842	1.980	+2.25	+13.0	18.3	23.8
Feb. 15	23 10.06	-06 41.8	2.856	1.955	+2.28	+13.7	18.2	19.7
Feb. 25	23 32.99	-04 22.5	2.866	1.933	+2.31	+14.2	18.1	15.8
Mar. 7	23 56.18	-01 58.7	2.873	1.914	+2.33	+14.6	18.0	12.1
Mar. 17	00 19.63	+00 27.6	2.878	1.899	+2.36	+14.7	17.9	8.5
Mar. 27	00 43.33	+02 54.3	2.880	1.888	+2.38	+14.6	17.9	5.1
Apr. 6	01 07.28	+05 19.1	2.881	1.881	+2.41	+14.3	17.8	2.2
Apr. 16	01 31.49	+07 40.0	2.880	1.878	+2.43	+13.8	17.7	2.6
Apr. 26	01 55.94	+09 54.6	2.878	1.879	+2.46	+13.0	17.7	5.6
May 6	02 20.60	+12 00.9	2.875	1.885	+2.48	+12.1	17.6	8.8
May 16	02 45.45	+13 57.0	2.871	1.894	+2.49	+11.0	17.6	12.0
May 26	03 10.40	+15 41.3	2.865	1.907	+2.50	+9.7	17.6	15.3
June 5	03 35.37	+17 12.5	2.857	1.924	+2.49	+8.4	17.6	18.7
June 15	04 00.26	+18 29.6	2.846	1.944	+2.48	+6.9	17.6	22.2
June 25	04 24.93	+19 32.0	2.833	1.968	+2.45	+5.4	17.6	25.8
July 5	04 49.25	+20 19.6	2.816	1.995	+2.41	+4.0	17.7	29.5
July 15	05 13.07	+20 52.6	2.794	2.025	+2.35	+2.5	17.7	33.5
July 25	05 36.22	+21 11.7	2.767	2.058	+2.27	+1.2	17.7	37.6
Aug. 4	05 58.56	+21 18.0	2.735	2.093	+2.18	0.0	17.8	41.9
Aug. 14	06 19.94	+21 12.7	2.697	2.131	+2.08	-1.1	17.9	46.5
Aug. 24	06 40.20	+20 57.6	2.652	2.170	+1.96	-2.0	17.9	51.4
Sept. 3	06 59.22	+20 34.3	2.600	2.212	+1.83	-2.7	18.0	56.6
Sept. 13	07 16.85	+20 04.9	2.542	2.254	+1.68	-3.2	18.0	62.1
Sept. 23	07 32.93	+19 31.5	2.477	2.299	+1.52	-3.5	18.1	68.1
Oct. 3	07 47.32	+18 56.2	2.406	2.344	+1.34	-3.5	18.2	74.4
Oct. 13	07 59.83	+18 21.6	2.329	2.391	+1.14	-3.3	18.2	81.3
Oct. 23	08 10.26	+17 49.8	2.249	2.438	+0.92	-2.9	18.3	88.7
Nov. 2	08 18.41	+17 23.3	2.168	2.486	+0.68	-2.3	18.3	96.6
Nov. 12	08 24.03	+17 04.4	2.087	2.535	+0.41	-1.4	18.3	105.3
Nov. 22	08 26.92	+16 55.1	2.011	2.584	+0.13	-0.4	18.4	114.6
Dec. 2	08 26.93	+16 56.6	1.944	2.634	-0.16	+0.8	18.4	124.8
Dec. 12	08 24.04	+17 09.5	1.890	2.684	-0.44	+1.9	18.5	135.6
Dec. 22	08 18.49	+17 32.8	1.854	2.734	-0.68	+2.8	18.6	147.2
Jan. 1	08 10.78	+18 04.0	1.842	2.784	-0.86	+3.4	18.7	159.2
Jan. 11	08 01.74	+18 39.6	1.857	2.834	-0.94	+3.6	18.9	171.5
Jan. 21	07 52.43	+19 15.6	1.902	2.884	-0.91	+3.5	19.0	175.5
Jan. 31	07 43.88	+19 48.6	1.976	2.934	-0.78	+3.0	19.2	163.5
Feb. 10	07 36.98	+20 16.4	2.077	2.983	-0.57	+2.4	19.5	151.7
Feb. 20	07 32.30	+20 38.0	2.204	3.033	-0.34	+1.8	19.7	140.5
Mar. 2	07 30.05	+20 53.1	2.351	3.082	-0.09	+1.2	20.0	129.9
Mar. 12	07 30.24	+21 02.2	2.515	3.131	+0.15	+0.6	20.2	119.9
Mar. 22	07 32.67	+21 05.4	2.691	3.180	+0.36	0.0	20.5	110.5

Comet C/2020 P3 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2021 Apr. 20.84421 TT
 Peri. = 82.24665
 Node = 19.48419 2000.0
 Incl. = 61.88477
 q = 6.8123361 AU
 e = 0.9990896

$$m_1 = 5.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m ₁	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	00 18.33	+81 01.0	6.443	6.847	+0.25	-4.0	17.9	110.3
Jan. 16	00 23.28	+80 23.2	6.486	6.841	+0.77	-3.5	17.9	107.1
Jan. 26	00 32.87	+79 51.7	6.538	6.835	+1.17	-2.8	17.9	103.5
Feb. 5	00 46.19	+79 27.6	6.598	6.830	+1.51	-2.0	17.9	99.5
Feb. 15	01 02.71	+79 10.9	6.663	6.826	+1.82	-1.3	18.0	95.3
Feb. 25	01 22.15	+79 01.3	6.732	6.822	+2.10	-0.6	18.0	91.0
Mar. 7	01 44.34	+78 58.0	6.803	6.819	+2.37	0.0	18.0	86.8
Mar. 17	02 09.29	+78 59.6	6.874	6.816	+2.65	+0.4	18.0	82.5
Mar. 27	02 37.01	+79 04.7	6.944	6.814	+2.93	+0.6	18.0	78.4
Apr. 6	03 07.52	+79 11.1	7.011	6.813	+3.20	+0.6	18.1	74.5
Apr. 16	03 40.76	+79 16.8	7.075	6.812	+3.47	+0.4	18.1	70.9
Apr. 26	04 16.45	+79 19.4	7.134	6.812	+3.69	0.0	18.1	67.5
May 6	04 54.09	+79 16.9	7.188	6.813	+3.84	-0.6	18.1	64.4
May 16	05 32.93	+79 07.5	7.235	6.814	+3.92	-1.4	18.1	61.7
May 26	06 12.03	+78 49.8	7.276	6.816	+3.88	-2.2	18.1	59.4
June 5	06 50.40	+78 23.4	7.309	6.819	+3.77	-3.1	18.2	57.5
June 15	07 27.26	+77 48.4	7.335	6.822	+3.58	-3.9	18.2	56.2
June 25	08 02.01	+77 05.9	7.354	6.826	+3.35	-4.6	18.2	55.3
July 5	08 34.36	+76 16.9	7.365	6.830	+3.10	-5.2	18.2	54.9
July 15	09 04.28	+75 23.0	7.367	6.835	+2.86	-5.6	18.2	55.0
July 25	09 31.85	+74 25.8	7.363	6.841	+2.63	-5.8	18.2	55.6
Aug. 4	09 57.26	+73 26.9	7.350	6.847	+2.43	-5.9	18.2	56.8
Aug. 14	10 20.75	+72 27.7	7.330	6.854	+2.25	-5.9	18.2	58.4
Aug. 24	10 42.51	+71 29.8	7.303	6.862	+2.09	-5.7	18.2	60.5
Sept. 3	11 02.75	+70 34.4	7.270	6.870	+1.95	-5.4	18.2	63.0
Sept. 13	11 21.64	+69 42.8	7.230	6.879	+1.82	-4.9	18.2	65.8
Sept. 23	11 39.29	+68 56.1	7.184	6.888	+1.70	-4.4	18.2	69.0
Oct. 3	11 55.81	+68 15.5	7.134	6.898	+1.59	-3.7	18.2	72.4
Oct. 13	12 11.26	+67 41.9	7.080	6.909	+1.49	-2.9	18.1	76.1
Oct. 23	12 25.64	+67 16.1	7.023	6.920	+1.38	-2.1	18.1	80.0
Nov. 2	12 38.95	+66 58.9	6.964	6.932	+1.27	-1.2	18.1	84.1
Nov. 12	12 51.13	+66 50.8	6.905	6.945	+1.15	-0.3	18.1	88.2
Nov. 22	13 02.08	+66 52.1	6.847	6.958	+1.02	+0.6	18.1	92.3
Dec. 2	13 11.67	+67 02.7	6.792	6.971	+0.88	+1.6	18.1	96.4
Dec. 12	13 19.71	+67 22.4	6.741	6.985	+0.71	+2.4	18.1	100.3
Dec. 22	13 25.96	+67 50.3	6.697	7.000	+0.52	+3.2	18.1	104.0
Jan. 1	13 30.15	+68 25.1	6.660	7.016	+0.29	+3.8	18.1	107.3
Jan. 11	13 31.96	+69 04.9	6.633	7.031	+0.04	+4.2	18.1	110.1
Jan. 21	13 31.07	+69 47.2	6.617	7.048	-0.25	+4.3	18.1	112.2
Jan. 31	13 27.21	+70 29.0	6.613	7.065	-0.56	+4.0	18.1	113.6
Feb. 10	13 20.20	+71 06.5	6.621	7.083	-0.87	+3.4	18.1	114.2
Feb. 20	13 10.15	+71 35.8	6.644	7.101	-1.16	+2.3	18.1	113.8
Mar. 2	12 57.48	+71 52.9	6.679	7.119	-1.38	+0.9	18.1	112.6
Mar. 12	12 43.04	+71 54.6	6.728	7.139	-1.50	-0.8	18.2	110.6
Mar. 22	12 27.98	+71 38.7	6.790	7.158	-1.49	-2.6	18.2	107.8

Comet P/2015 J3 = 2021 B1 (NEOWISE)

Epoch = 2021 July 5.0 TT
 T = 2021 Apr. 22.18190 TT
 Peri. = 129.46248 e = 0.5543803
 Node = 111.35115 2000.0 a = 3.3482279 AU
 Incl. = 8.13095 n = 0.16087241
 q = 1.4920363 AU P = 6.13 years

$$m1 = 16.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2021/22	h m	° '			m		°
Jan. 6	14 03.27	-04 26.2	1.819	1.838	+2.40 -9.2	20.4	75.5
Jan. 16	14 27.68	-05 55.5	1.681	1.784	+2.49 -8.5	20.1	79.4
Jan. 26	14 52.96	-07 16.5	1.550	1.733	+2.58 -7.6	19.8	83.0
Feb. 5	15 19.10	-08 27.6	1.428	1.685	+2.66 -6.5	19.5	86.5
Feb. 15	15 45.99	-09 27.0	1.314	1.641	+2.72 -5.2	19.2	89.8
Feb. 25	16 13.43	-10 13.5	1.209	1.602	+2.77 -3.9	19.0	93.0
Mar. 7	16 41.17	-10 46.8	1.115	1.568	+2.78 -2.6	18.7	96.0
Mar. 17	17 08.83	-11 07.1	1.029	1.539	+2.74 -1.4	18.4	99.0
Mar. 27	17 35.92	-11 16.4	0.954	1.517	+2.66 -0.4	18.2	102.0
Apr. 6	18 01.93	-11 17.8	0.887	1.502	+2.52 +0.1	18.0	105.3
Apr. 16	18 26.23	-11 15.9	0.827	1.493	+2.31 +0.1	17.8	108.9
Apr. 26	18 48.18	-11 16.8	0.776	1.493	+2.04 -0.5	17.7	113.1
May 6	19 07.19	-11 27.2	0.732	1.499	+1.71 -1.8	17.6	118.1
May 16	19 22.59	-11 53.9	0.694	1.513	+1.32 -3.8	17.5	123.9
May 26	19 33.87	-12 43.5	0.665	1.533	+0.89 -6.4	17.5	130.9
June 5	19 40.73	-13 59.6	0.645	1.560	+0.44 -9.1	17.5	139.1
June 15	19 43.13	-15 41.9	0.636	1.593	+0.01 -11.5	17.5	148.5
June 25	19 41.69	-17 44.1	0.641	1.631	-0.31 -12.9	17.7	158.9
July 5	19 37.59	-19 54.3	0.664	1.674	-0.50 -12.9	17.8	169.9
July 15	19 32.43	-21 58.4	0.705	1.721	-0.50 -11.6	18.1	178.9
July 25	19 28.02	-23 44.8	0.766	1.772	-0.35 -9.4	18.4	167.9
Aug. 4	19 25.63	-25 07.3	0.846	1.825	-0.10 -6.9	18.7	157.6
Aug. 14	19 26.00	-26 05.2	0.944	1.881	+0.20 -4.5	19.1	147.9
Aug. 24	19 29.35	-26 40.4	1.059	1.938	+0.49 -2.4	19.5	138.9
Sept. 3	19 35.42	-26 56.3	1.189	1.998	+0.74 -0.6	19.9	130.6
Sept. 13	19 43.86	-26 55.7	1.331	2.058	+0.96 +0.9	20.3	122.8
Sept. 23	19 54.25	-26 41.3	1.486	2.120	+1.13 +2.1	20.6	115.4
Oct. 3	20 06.14	-26 14.9	1.649	2.182	+1.26 +3.2	21.0	108.3
Oct. 13	20 19.19	-25 38.1	1.821	2.244	+1.36 +4.2	21.3	101.5
Oct. 23	20 33.08	-24 52.1	1.998	2.306	+1.43 +5.1	21.6	94.9
Nov. 2	20 47.56	-23 58.0	2.180	2.369	+1.47 +5.8	21.9	88.4
Nov. 12	21 02.45	-22 56.8	2.364	2.432	+1.50 +6.5	.	81.9
Nov. 22	21 17.58	-21 49.4	2.549	2.494	+1.52 +7.1	.	75.6
Dec. 2	21 32.81	-20 36.5	2.733	2.556	+1.53 +7.5	.	69.3
Dec. 12	21 48.07	-19 19.1	2.913	2.617	+1.52 +8.0	.	63.0
Dec. 22	22 03.28	-17 58.0	3.089	2.678	+1.51 +8.3	.	56.7
Jan. 1	22 18.36	-16 33.9	3.258	2.739	+1.50 +8.5	.	50.5
Jan. 11	22 33.29	-15 07.7	3.418	2.799	+1.48 +8.7	.	44.2
Jan. 21	22 48.03	-13 40.1	3.569	2.858	+1.46 +8.8	.	38.0
Jan. 31	23 02.54	-12 12.0	3.708	2.916	+1.44 +8.8	.	31.7
Feb. 10	23 16.82	-10 43.9	3.834	2.974	+1.41 +8.8	.	25.5
Feb. 20	23 30.83	-09 16.7	3.946	3.031	+1.39 +8.6	.	19.4
Mar. 2	23 44.56	-07 51.0	4.043	3.088	+1.36 +8.5	.	13.5
Mar. 12	23 57.99	-06 27.5	4.123	3.143	+1.33 +8.2	.	8.2
Mar. 22	00 11.09	-05 06.9	4.187	3.198	+1.29 +7.9	.	5.8

Comet C/2016 Q2 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2021 May 11.92508 TT
 Peri. = 84.53106
 Node = 322.29550 2000.0
 Incl. = 109.38821
 q = 7.0819272 AU
 e = 1.0008332

$$m1 = 9.8 + 5 \log(\Delta) + 5.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .2			m	'		°
Jan. 6	18 11.21	+35 47.2	7.572	7.129	+0.37	+4.1	18.5	59.8
Jan. 16	18 14.77	+36 33.2	7.532	7.121	+0.34	+5.2	18.4	61.9
Jan. 26	18 18.00	+37 30.6	7.480	7.115	+0.30	+6.3	18.4	64.7
Feb. 5	18 20.75	+38 38.9	7.418	7.109	+0.24	+7.4	18.4	68.1
Feb. 15	18 22.83	+39 57.5	7.348	7.104	+0.16	+8.4	18.4	71.9
Feb. 25	18 24.06	+41 25.4	7.272	7.099	+0.07	+9.2	18.4	76.0
Mar. 7	18 24.23	+43 01.2	7.194	7.095	-0.05	+10.0	18.3	80.3
Mar. 17	18 23.14	+44 43.3	7.116	7.091	-0.19	+10.5	18.3	84.5
Mar. 27	18 20.56	+46 29.3	7.042	7.088	-0.35	+10.7	18.3	88.6
Apr. 6	18 16.30	+48 16.5	6.974	7.086	-0.53	+10.7	18.3	92.4
Apr. 16	18 10.16	+50 01.8	6.914	7.084	-0.72	+10.3	18.3	95.7
Apr. 26	18 02.03	+51 41.3	6.866	7.083	-0.92	+9.5	18.2	98.4
May 6	17 51.88	+53 11.2	6.831	7.082	-1.12	+8.3	18.2	100.3
May 16	17 39.82	+54 27.5	6.811	7.082	-1.30	+6.7	18.2	101.5
May 26	17 26.17	+55 26.7	6.805	7.083	-1.43	+4.9	18.2	101.8
June 5	17 11.43	+56 06.2	6.815	7.084	-1.51	+2.8	18.2	101.3
June 15	16 56.25	+56 24.7	6.839	7.085	-1.51	+0.7	18.2	99.9
June 25	16 41.36	+56 22.3	6.877	7.088	-1.45	-1.3	18.2	97.8
July 5	16 27.43	+56 00.7	6.927	7.091	-1.32	-3.1	18.3	95.1
July 15	16 14.98	+55 22.6	6.987	7.094	-1.15	-4.6	18.3	91.9
July 25	16 04.35	+54 31.4	7.054	7.098	-0.96	-5.7	18.3	88.4
Aug. 4	15 55.68	+53 30.9	7.125	7.103	-0.76	-6.4	18.3	84.6
Aug. 14	15 48.98	+52 24.6	7.199	7.108	-0.56	-6.8	18.3	80.8
Aug. 24	15 44.14	+51 16.0	7.272	7.114	-0.39	-6.9	18.4	77.1
Sept. 3	15 40.99	+50 07.7	7.341	7.120	-0.23	-6.7	18.4	73.5
Sept. 13	15 39.34	+49 02.2	7.405	7.127	-0.09	-6.3	18.4	70.2
Sept. 23	15 38.97	+48 01.6	7.461	7.135	+0.03	-5.7	18.4	67.3
Oct. 3	15 39.69	+47 07.5	7.508	7.143	+0.12	-5.0	18.4	65.0
Oct. 13	15 41.32	+46 21.3	7.543	7.152	+0.20	-4.1	18.5	63.4
Oct. 23	15 43.66	+45 44.4	7.565	7.161	+0.27	-3.2	18.5	62.5
Nov. 2	15 46.54	+45 17.4	7.575	7.171	+0.31	-2.1	18.5	62.5
Nov. 12	15 49.80	+45 01.5	7.570	7.181	+0.34	-1.0	18.5	63.3
Nov. 22	15 53.27	+44 57.1	7.553	7.192	+0.35	+0.2	18.5	65.0
Dec. 2	15 56.79	+45 04.7	7.523	7.203	+0.35	+1.4	18.5	67.5
Dec. 12	16 00.18	+45 24.8	7.483	7.215	+0.32	+2.7	18.5	70.6
Dec. 22	16 03.25	+45 57.3	7.432	7.228	+0.28	+3.9	18.5	74.3
Jan. 1	16 05.84	+46 42.1	7.374	7.241	+0.22	+5.1	18.4	78.4
Jan. 11	16 07.71	+47 38.7	7.312	7.255	+0.14	+6.3	18.4	82.8
Jan. 21	16 08.66	+48 46.2	7.248	7.269	+0.03	+7.3	18.4	87.4
Jan. 31	16 08.43	+50 03.2	7.185	7.284	-0.10	+8.2	18.4	91.9
Feb. 10	16 06.78	+51 27.7	7.126	7.299	-0.25	+8.8	18.4	96.2
Feb. 20	16 03.42	+52 57.3	7.075	7.315	-0.44	+9.1	18.4	100.2
Mar. 2	15 58.13	+54 28.7	7.035	7.331	-0.65	+9.1	18.4	103.6
Mar. 12	15 50.68	+55 58.1	7.008	7.348	-0.87	+8.7	18.4	106.2
Mar. 22	15 40.96	+57 21.3	6.997	7.365	-1.10	+7.8	18.4	108.0

Comet 201P/LONEOS

Epoch = 2021 July 5.0 TT
 T = 2021 May 26.68937 TT
 Peri. = 41.54786 e = 0.6370004
 Node = 19.74504 2000.0 a = 3.3536654 AU
 Incl. = 5.73873 n = 0.16048132
 q = 1.2173792 AU P = 6.14 years

$$m1 = 12.8 + 5 \log(\Delta) + 17.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	m1	Elong.
2021/22	h m	° ' "			m		°
Jan. 6	21 18.93	-18 55.6	2.786	2.007	+2.02 +10.9	20.3	30.8
Jan. 16	21 39.61	-17 00.7	2.765	1.929	+2.12 +12.2	20.0	25.9
Jan. 26	22 01.22	-14 52.0	2.733	1.852	+2.21 +13.6	19.7	21.4
Feb. 5	22 23.75	-12 29.0	2.693	1.775	+2.30 +15.1	19.3	17.2
Feb. 15	22 47.23	-09 51.5	2.645	1.699	+2.40 +16.6	18.9	13.4
Feb. 25	23 11.73	-06 59.5	2.591	1.626	+2.51 +18.0	18.6	10.0
Mar. 7	23 37.33	-03 53.8	2.535	1.555	+2.63 +19.3	18.2	7.0
Mar. 17	00 04.17	+00 35.5	2.477	1.487	+2.76 +20.4	17.8	4.5
Mar. 27	00 32.40	+02 53.1	2.420	1.424	+2.91 +21.3	17.4	2.4
Apr. 6	01 02.22	+06 28.8	2.367	1.366	+3.08 +21.8	17.0	0.7
Apr. 16	01 33.81	+10 06.8	2.320	1.316	+3.26 +21.7	16.7	0.6
Apr. 26	02 07.33	+13 40.8	2.281	1.275	+3.46 +20.9	16.4	1.5
May 6	02 42.85	+17 03.3	2.252	1.244	+3.66 +19.3	16.2	2.2
May 16	03 20.35	+20 05.6	2.234	1.225	+3.85 +16.8	16.1	2.7
May 26	03 59.56	+22 39.0	2.228	1.217	+4.00 +13.4	16.0	3.1
June 5	04 39.99	+24 35.9	2.234	1.223	+4.09 +9.5	16.1	3.4
June 15	05 20.95	+25 51.6	2.252	1.241	+4.09 +5.2	16.2	3.8
June 25	06 01.59	+26 24.1	2.282	1.270	+4.01 +0.9	16.4	4.2
July 5	06 41.08	+26 15.5	2.320	1.310	+3.86 -3.0	16.7	4.9
July 15	07 18.77	+25 30.6	2.367	1.359	+3.65 -6.3	17.0	5.7
July 25	07 54.19	+24 15.8	2.418	1.415	+3.41 -8.9	17.4	7.0
Aug. 4	08 27.16	+22 38.2	2.473	1.478	+3.16 -10.8	17.7	8.6
Aug. 14	08 57.65	+20 44.3	2.529	1.545	+2.92 -12.1	18.1	10.7
Aug. 24	09 25.78	+18 39.9	2.583	1.616	+2.69 -12.8	18.5	13.3
Sept. 3	09 51.74	+16 29.8	2.633	1.689	+2.48 -13.2	18.9	16.3
Sept. 13	10 15.72	+14 17.7	2.678	1.764	+2.30 -13.2	19.3	19.7
Sept. 23	10 37.92	+12 06.5	2.716	1.841	+2.13 -13.0	19.6	23.6
Oct. 3	10 58.50	+09 58.4	2.745	1.918	+1.98 -12.6	19.9	27.9
Oct. 13	11 17.60	+07 55.2	2.763	1.996	+1.83 -12.0	20.3	32.6
Oct. 23	11 35.31	+05 58.2	2.770	2.073	+1.70 -11.3	20.6	37.6
Nov. 2	11 51.68	+04 08.6	2.765	2.150	+1.57 -10.5	20.8	43.1
Nov. 12	12 06.74	+02 27.2	2.747	2.227	+1.43 -9.6	21.1	49.0
Nov. 22	12 20.44	+00 55.0	2.718	2.304	+1.29 -8.7	21.3	55.3
Dec. 2	12 32.73	+00 27.3	2.676	2.379	+1.15 -7.7	21.5	62.1
Dec. 12	12 43.48	-01 38.8	2.623	2.454	+0.98 -6.5	21.7	69.3
Dec. 22	12 52.54	-02 38.7	2.561	2.527	+0.81 -5.3	21.9	76.9
Jan. 1	12 59.74	-03 26.3	2.491	2.600	+0.61 -4.0	22.0	85.2
Jan. 11	13 04.84	-04 00.6	2.418	2.672	+0.39 -2.7	.	93.9
Jan. 21	13 07.66	-04 20.9	2.343	2.742	+0.15 -1.2	.	103.3
Jan. 31	13 08.00	-04 26.7	2.272	2.812	-0.11 +0.2	.	113.4
Feb. 10	13 05.77	-04 17.6	2.209	2.880	-0.36 +1.7	.	124.1
Feb. 20	13 01.03	-03 54.5	2.161	2.948	-0.60 +3.0	.	135.4
Mar. 2	12 54.07	-03 19.1	2.133	3.014	-0.80 +4.1	.	147.3
Mar. 12	12 45.41	-02 34.5	2.129	3.079	-0.93 +4.8	.	159.5
Mar. 22	12 35.83	-01 45.4	2.154	3.143	-0.98 +5.0	.	171.9

Comet 7P/Pons-Winnecke

Epoch = 2021 July 5.0 TT
 T = 2021 May 27.11257 TT
 Peri. = 172.59661 e = 0.6384931
 Node = 93.37514 2000.0 a = 3.4141470 AU
 Incl. = 22.36339 n = 0.15623587
 q = 1.2342377 AU P = 6.31 years

$$m_1 = 13.4 + 5 \log(\Delta) + 10.0 \log(r(t-70))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	14 12.45	+11 12.7	1.945	2.017	+2.17	-3.7	18.9	79.7
Jan. 16	14 34.54	+10 39.8	1.780	1.939	+2.25	-2.8	18.6	83.9
Jan. 26	14 57.45	+10 15.5	1.621	1.863	+2.34	-2.0	18.2	87.7
Feb. 5	15 21.25	+09 59.4	1.471	1.786	+2.43	-1.2	17.9	91.1
Feb. 15	15 45.98	+09 50.6	1.329	1.712	+2.53	-0.5	17.5	94.1
Feb. 25	16 11.71	+09 47.0	1.197	1.639	+2.63	-0.2	17.2	96.6
Mar. 7	16 38.53	+09 44.7	1.075	1.568	+2.75	-0.3	16.8	98.6
Mar. 17	17 06.52	+09 38.5	0.963	1.501	+2.87	-1.1	16.4	100.1
Mar. 27	17 35.81	+09 20.5	0.861	1.439	+3.01	-2.8	16.0	101.2
Apr. 6	18 06.62	+08 40.6	0.768	1.382	+3.17	-5.6	15.5	102.0
Apr. 16	18 39.12	+07 26.8	0.685	1.333	+3.35	-9.8	15.1	102.6
Apr. 26	19 13.54	+05 24.3	0.612	1.292	+3.56	-15.5	14.7	103.2
May 6	19 50.06	+02 19.0	0.551	1.261	+3.76	-22.5	14.2	104.1
May 16	20 28.48	-02 00.1	0.501	1.242	+3.93	-30.2	13.9	105.4
May 26	21 08.21	-07 34.3	0.466	1.234	+4.01	-37.1	13.5	107.3
June 5	21 48.09	-14 07.6	0.446	1.239	+3.93	-41.5	13.2	109.8
June 15	22 26.20	-21 08.8	0.443	1.256	+3.63	-42.2	13.0	112.9
June 25	23 00.49	-28 02.0	0.454	1.284	+3.14	-39.7	12.9	116.4
July 5	23 29.02	-34 19.8	0.479	1.323	+2.47	-35.2	12.9	120.1
July 15	23 50.16	-39 49.0	0.514	1.371	+1.67	-30.0	13.0	123.8
July 25	00 03.03	-44 23.0	0.558	1.426	+0.82	-24.2	13.1	127.4
Aug. 4	00 07.45	-47 57.8	0.612	1.487	-0.01	-18.0	13.2	130.5
Aug. 14	00 04.14	-50 27.7	0.674	1.553	-0.69	-11.2	13.5	133.0
Aug. 24	23 55.17	-51 47.3	0.746	1.623	-1.10	-4.1	13.8	134.3
Sept. 3	23 43.43	-51 57.0	0.829	1.695	-1.21	+2.7	14.1	134.3
Sept. 13	23 31.93	-51 03.3	0.924	1.770	-1.04	+8.4	14.4	132.8
Sept. 23	23 22.94	-49 19.0	1.032	1.845	-0.71	+12.6	14.8	130.1
Oct. 3	23 17.43	-46 59.0	1.152	1.922	-0.35	+15.4	15.2	126.3
Oct. 13	23 15.51	-44 16.4	1.285	1.999	-0.01	+17.1	15.7	121.8
Oct. 23	23 16.80	-41 21.6	1.430	2.076	+0.28	+17.8	16.1	116.7
Nov. 2	23 20.71	-38 22.1	1.586	2.153	+0.51	+18.0	16.5	111.2
Nov. 12	23 26.72	-35 22.4	1.752	2.230	+0.70	+17.8	16.9	105.4
Nov. 22	23 34.36	-32 25.7	1.926	2.306	+0.84	+17.4	17.3	99.6
Dec. 2	23 43.24	-29 33.6	2.108	2.382	+0.95	+16.9	17.7	93.6
Dec. 12	23 53.09	-26 47.1	2.294	2.456	+1.03	+16.3	18.0	87.5
Dec. 22	00 03.67	-24 06.9	2.483	2.530	+1.09	+15.7	18.4	81.4
Jan. 1	00 14.81	-21 33.1	2.673	2.603	+1.14	+15.0	18.7	75.3
Jan. 11	00 26.39	-19 05.8	2.862	2.675	+1.18	+14.4	19.0	69.1
Jan. 21	00 38.28	-16 45.1	3.048	2.746	+1.20	+13.7	19.3	63.0
Jan. 31	00 50.41	-14 31.2	3.229	2.815	+1.22	+13.0	19.6	56.9
Feb. 10	01 02.71	-12 24.0	3.403	2.884	+1.24	+12.3	19.8	50.9
Feb. 20	01 15.12	-10 23.6	3.569	2.952	+1.24	+11.7	20.1	44.9
Mar. 2	01 27.60	-08 30.1	3.724	3.019	+1.25	+11.0	20.3	39.0
Mar. 12	01 40.09	-06 43.5	3.867	3.084	+1.25	+10.3	20.5	33.2
Mar. 22	01 52.56	-05 03.9	3.996	3.149	+1.24	+9.6	20.7	27.7

Comet P/2014 W12 (Gibbs)

Epoch = 2021 July 5.0 TT
 T = 2021 June 18.25990 TT
 Peri. = 36.86501 e = 0.5240827
 Node = 299.29046 2000.0 a = 3.5187744 AU
 Incl. = 8.51331 n = 0.14931964
 q = 1.6746456 AU P = 6.60 years

$$m_1 = 13.8 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Variation	m1	Mot./PA	Elong.
2021/22	h m	° '			for T=+1 day			°
Jan. 6	17 56.46	-27 05.8	3.160	2.237	-1.04 -1.7	19.8	32.2/88	16.8
Jan. 16	18 20.82	-26 45.4	3.069	2.183	-1.09 -2.5	19.6	33.1/85	21.4
Jan. 26	18 45.65	-26 09.6	2.972	2.130	-1.15 -3.4	19.4	34.0/83	25.9
Feb. 5	19 10.84	-25 17.2	2.870	2.079	-1.20 -4.4	19.3	34.9/80	30.2
Feb. 15	19 36.25	-24 07.6	2.765	2.029	-1.24 -5.4	19.1	35.8/77	34.4
Feb. 25	20 01.76	-22 40.3	2.657	1.981	-1.29 -6.5	18.9	36.7/75	38.5
Mar. 7	20 27.27	-20 55.4	2.549	1.935	-1.32 -7.6	18.7	37.5/72	42.3
Mar. 17	20 52.67	-18 53.1	2.442	1.891	-1.36 -8.8	18.5	38.3/70	46.0
Mar. 27	21 17.88	-16 34.2	2.336	1.851	-1.39 -9.9	18.3	39.0/68	49.5
Apr. 6	21 42.85	-13 59.6	2.233	1.813	-1.42 -10.9	18.1	39.6/66	52.8
Apr. 16	22 07.54	-11 10.9	2.134	1.780	-1.45 -11.8	17.9	40.1/64	56.0
Apr. 26	22 31.90	-08 10.1	2.039	1.750	-1.48 -12.6	17.8	40.5/63	59.1
May 6	22 55.94	-04 59.2	1.949	1.725	-1.51 -13.3	17.6	40.7/61	62.1
May 16	23 19.63	-01 41.0	1.864	1.705	-1.55 -13.7	17.5	40.5/60	65.0
May 26	23 42.93	+01 41.7	1.784	1.690	-1.59 -13.9	17.3	40.2/59	68.0
June 5	00 05.83	+05 05.8	1.710	1.680	-1.63 -13.8	17.2	39.5/59	71.0
June 15	00 28.24	+08 28.2	1.639	1.675	-1.68 -13.5	17.1	38.4/59	74.1
June 25	00 50.05	+11 45.8	1.573	1.676	-1.73 -12.9	17.0	37.0/58	77.4
July 5	01 11.12	+14 55.8	1.511	1.682	-1.80 -12.1	17.0	35.1/58	80.9
July 15	01 31.23	+17 55.8	1.451	1.694	-1.87 -11.1	16.9	32.7/58	84.8
July 25	01 50.06	+20 43.3	1.394	1.711	-1.95 -10.1	16.9	29.9/58	89.1
Aug. 4	02 07.28	+23 17.1	1.338	1.733	-2.05 -8.9	16.8	26.6/57	93.9
Aug. 14	02 22.40	+25 35.6	1.285	1.760	-2.16 -7.8	16.8	22.7/55	99.3
Aug. 24	02 34.88	+27 37.5	1.235	1.791	-2.29 -6.8	16.8	18.3/52	105.4
Sept. 3	02 44.19	+29 21.7	1.188	1.826	-2.44 -6.1	16.8	13.4/46	112.2
Sept. 13	02 49.73	+30 45.6	1.146	1.864	-2.61 -5.7	16.8	8.3/31	119.9
Sept. 23	02 51.16	+31 46.1	1.112	1.906	-2.79 -5.7	16.8	4.8/346	128.5
Oct. 3	02 48.46	+32 19.2	1.089	1.950	-2.95 -6.3	16.9	6.3/285	137.9
Oct. 13	02 42.16	+32 20.8	1.081	1.997	-3.05 -7.4	17.0	10.1/261	147.7
Oct. 23	02 33.50	+31 50.0	1.092	2.046	-3.07 -8.7	17.1	12.8/248	157.1
Nov. 2	02 24.14	+30 50.6	1.125	2.096	-2.99 -9.9	17.3	13.7/238	163.8
Nov. 12	02 15.80	+29 31.7	1.182	2.148	-2.82 -10.6	17.5	12.7/228	163.1
Nov. 22	02 09.79	+28 05.8	1.263	2.202	-2.59 -10.7	17.7	10.3/215	155.9
Dec. 2	02 06.77	+26 44.1	1.366	2.256	-2.34 -10.3	18.0	7.8/193	146.6
Dec. 12	02 06.87	+25 34.5	1.490	2.311	-2.10 -9.5	18.3	6.5/158	137.1
Dec. 22	02 09.90	+24 41.2	1.632	2.366	-1.88 -8.5	18.6	7.5/126	127.8
Jan. 1	02 15.46	+24 04.7	1.788	2.422	-1.68 -7.5	18.9	9.7/106	119.0
Jan. 11	02 23.16	+23 43.8	1.956	2.479	-1.51 -6.5	19.2	12.1/96	110.6
Jan. 21	02 32.63	+23 36.3	2.132	2.535	-1.37 -5.6	19.5	14.2/90	102.6
Jan. 31	02 43.52	+23 39.5	2.314	2.591	-1.25 -4.7	19.8	15.9/87	94.9
Feb. 10	02 55.58	+23 50.8	2.500	2.648	-1.14 -4.0	20.0	17.4/85	87.5
Feb. 20	03 08.57	+24 07.7	2.687	2.704	-1.05 -3.3	20.3	18.5/84	80.4
Mar. 2	03 22.31	+24 28.2	2.873	2.760	-0.97 -2.7	20.5	19.4/83	73.5
Mar. 12	03 36.64	+24 50.4	3.055	2.816	-0.90 -2.1	20.7	20.0/83	66.8
Mar. 22	03 51.43	+25 12.7	3.233	2.871	-0.84 -1.7	20.9	20.5/84	60.2

Comet C/2020 T4 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2021 July 5.24176 TT
 Peri. = 79.59981
 Node = 50.62067 2000.0
 Incl. = 83.81804
 q = 2.1919914 AU
 e = 1.0002301

$$m1 = 12.3 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	01 32.61	+31 41.0	2.554	2.988	-0.98	+4.1	19.1	106.7
Jan. 16	01 24.31	+32 25.1	2.649	2.916	-0.65	+4.8	19.1	95.7
Jan. 26	01 19.17	+33 18.1	2.745	2.846	-0.35	+5.9	19.0	85.7
Feb. 5	01 16.81	+34 22.5	2.838	2.778	-0.10	+7.1	19.0	76.5
Feb. 15	01 16.89	+35 39.7	2.921	2.712	+0.13	+8.5	19.0	68.1
Feb. 25	01 19.06	+37 10.9	2.990	2.649	+0.32	+9.9	18.9	60.6
Mar. 7	01 23.04	+38 56.4	3.044	2.588	+0.49	+11.4	18.8	54.0
Mar. 17	01 28.65	+40 56.9	3.080	2.531	+0.64	+12.9	18.8	48.3
Mar. 27	01 35.76	+43 13.1	3.098	2.476	+0.79	+14.5	18.7	43.8
Apr. 6	01 44.32	+45 45.5	3.097	2.426	+0.94	+16.2	18.6	40.6
Apr. 16	01 54.43	+48 35.2	3.078	2.380	+1.10	+18.0	18.5	38.8
Apr. 26	02 06.27	+51 43.1	3.042	2.338	+1.29	+19.8	18.4	38.3
May 6	02 20.26	+55 10.0	2.992	2.300	+1.54	+21.8	18.3	39.2
May 16	02 37.19	+58 56.9	2.930	2.268	+1.90	+23.8	18.2	41.1
May 26	02 58.50	+63 03.2	2.861	2.241	+2.46	+25.6	18.1	43.7
June 5	03 27.01	+67 26.1	2.787	2.220	+3.44	+27.0	18.0	46.8
June 15	04 08.74	+71 56.7	2.714	2.205	+5.31	+26.7	17.9	50.1
June 25	05 16.65	+76 08.8	2.647	2.195	+9.05	+22.1	17.8	53.3
July 5	07 11.33	+78 52.7	2.590	2.192	+14.21	+7.0	17.8	56.1
July 15	09 36.01	+78 16.7	2.550	2.195	+13.09	-16.2	17.7	58.4
July 25	11 22.74	+74 19.8	2.529	2.204	+7.90	-30.7	17.7	60.0
Aug. 4	12 25.89	+68 41.9	2.531	2.219	+4.78	-36.5	17.8	60.7
Aug. 14	13 05.95	+62 27.7	2.556	2.240	+3.25	-38.1	17.8	60.6
Aug. 24	13 34.46	+56 08.5	2.605	2.267	+2.45	-37.5	17.9	59.6
Sept. 3	13 56.72	+50 01.3	2.674	2.298	+2.00	-35.6	18.0	57.7
Sept. 13	14 15.31	+44 16.1	2.759	2.335	+1.72	-33.0	18.2	55.2
Sept. 23	14 31.57	+38 58.8	2.856	2.377	+1.53	-30.1	18.3	52.2
Oct. 3	14 46.23	+34 11.4	2.961	2.423	+1.40	-27.1	18.5	48.9
Oct. 13	14 59.76	+29 54.2	3.067	2.474	+1.30	-24.1	18.7	45.6
Oct. 23	15 12.39	+26 06.2	3.171	2.528	+1.22	-21.3	18.8	42.5
Nov. 2	15 24.27	+22 45.6	3.268	2.585	+1.15	-18.6	19.0	39.8
Nov. 12	15 35.47	+19 50.2	3.354	2.646	+1.08	-16.2	19.2	38.0
Nov. 22	15 46.01	+17 18.0	3.427	2.709	+1.02	-14.0	19.3	37.4
Dec. 2	15 55.87	+15 06.7	3.483	2.775	+0.95	-12.1	19.4	38.1
Dec. 12	16 05.00	+13 14.5	3.522	2.843	+0.87	-10.2	19.6	40.2
Dec. 22	16 13.29	+11 39.5	3.543	2.913	+0.78	-8.6	19.7	43.8
Jan. 1	16 20.67	+10 20.1	3.544	2.985	+0.68	-7.1	19.8	48.5
Jan. 11	16 26.97	+09 14.7	3.526	3.058	+0.56	-5.8	19.9	54.3
Jan. 21	16 32.03	+08 21.7	3.490	3.133	+0.43	-4.7	20.0	60.9
Jan. 31	16 35.68	+07 39.4	3.439	3.208	+0.28	-3.7	20.0	68.3
Feb. 10	16 37.71	+07 06.3	3.375	3.285	+0.10	-2.9	20.1	76.4
Feb. 20	16 37.89	+06 40.4	3.301	3.363	-0.09	-2.3	20.2	85.0
Mar. 2	16 36.04	+06 19.7	3.223	3.442	-0.31	-1.9	20.2	94.3
Mar. 12	16 31.97	+06 01.9	3.145	3.521	-0.53	-1.7	20.3	104.1
Mar. 22	16 25.58	+05 44.1	3.074	3.601	-0.77	-1.9	20.3	114.4

Comet C/2020 T2 (Palomar)

Epoch = 2021 July 5.0 TT
 T = 2021 July 11.14821 TT
 Peri. = 150.38273
 Node = 83.04833 2000.0
 Incl. = 27.87303
 q = 2.0547046 AU
 e = 0.9934158

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	13 16.62	+25 40.7	2.673	2.969	+1.24	+2.8	15.9	97.7
Jan. 16	13 28.65	+26 14.7	2.493	2.892	+1.15	+4.2	15.6	103.9
Jan. 26	13 39.64	+27 02.3	2.323	2.816	+1.03	+5.5	15.3	110.0
Feb. 5	13 49.29	+28 02.6	2.163	2.742	+0.88	+6.7	15.1	115.9
Feb. 15	13 57.26	+29 13.8	2.017	2.669	+0.69	+7.6	14.8	121.5
Feb. 25	14 03.16	+30 31.9	1.885	2.599	+0.46	+8.0	14.5	126.6
Mar. 7	14 06.69	+31 51.0	1.768	2.532	+0.21	+7.7	14.3	131.0
Mar. 17	14 07.56	+33 03.1	1.668	2.467	-0.06	+6.4	14.0	134.3
Mar. 27	14 05.75	+33 57.8	1.584	2.406	-0.32	+4.1	13.8	136.3
Apr. 6	14 01.56	+34 24.0	1.517	2.348	-0.53	+0.6	13.6	136.7
Apr. 16	13 55.64	+34 11.4	1.467	2.294	-0.65	-3.8	13.4	135.6
Apr. 26	13 49.04	+33 11.8	1.434	2.245	-0.65	-8.7	13.3	133.0
May 6	13 42.95	+31 22.5	1.417	2.200	-0.54	-13.6	13.2	129.4
May 16	13 38.41	+28 45.0	1.415	2.161	-0.33	-18.2	13.1	125.0
May 26	13 36.22	+25 25.5	1.429	2.127	-0.07	-21.9	13.1	120.2
June 5	13 36.74	+21 33.0	1.456	2.100	+0.20	-24.7	13.0	115.2
June 15	13 40.03	+17 17.0	1.497	2.078	+0.48	-26.5	13.1	110.1
June 25	13 45.99	+12 47.1	1.552	2.064	+0.73	-27.4	13.1	105.0
July 5	13 54.33	+08 11.9	1.619	2.056	+0.96	-27.5	13.2	100.0
July 15	14 04.82	+03 38.4	1.698	2.055	+1.16	-27.0	13.3	95.1
July 25	14 17.19	+00 47.9	1.788	2.061	+1.33	-26.0	13.4	90.3
Aug. 4	14 31.22	-05 02.5	1.889	2.074	+1.49	-24.7	13.5	85.6
Aug. 14	14 46.73	-09 02.4	1.999	2.094	+1.63	-23.1	13.7	81.0
Aug. 24	15 03.55	-12 45.5	2.117	2.120	+1.75	-21.3	13.9	76.4
Sept. 3	15 21.53	-16 10.1	2.243	2.152	+1.86	-19.4	14.1	71.8
Sept. 13	15 40.57	-19 15.6	2.374	2.191	+1.96	-17.5	14.3	67.2
Sept. 23	16 00.52	-22 01.4	2.510	2.234	+2.04	-15.5	14.5	62.6
Oct. 3	16 21.25	-24 27.5	2.650	2.282	+2.11	-13.5	14.7	58.0
Oct. 13	16 42.66	-26 34.1	2.791	2.335	+2.17	-11.6	14.9	53.3
Oct. 23	17 04.57	-28 21.6	2.932	2.392	+2.21	-9.7	15.1	48.5
Nov. 2	17 26.85	-29 50.7	3.073	2.453	+2.24	-7.9	15.3	43.7
Nov. 12	17 49.35	-31 02.2	3.210	2.517	+2.25	-6.2	15.5	38.8
Nov. 22	18 11.89	-31 57.2	3.344	2.583	+2.25	-4.6	15.7	33.9
Dec. 2	18 34.31	-32 36.9	3.471	2.653	+2.23	-3.2	15.9	29.0
Dec. 12	18 56.48	-33 02.9	3.592	2.725	+2.20	-1.9	16.1	24.3
Dec. 22	19 18.24	-33 16.7	3.705	2.798	+2.15	-0.8	16.3	19.7
Jan. 1	19 39.49	-33 19.9	3.807	2.874	+2.09	+0.2	16.5	15.9
Jan. 11	20 00.12	-33 14.4	3.899	2.951	+2.03	+1.0	16.7	13.3
Jan. 21	20 20.04	-33 01.9	3.979	3.029	+1.95	+1.6	16.8	13.2
Jan. 31	20 39.20	-32 44.3	4.047	3.109	+1.87	+2.0	17.0	15.5
Feb. 10	20 57.54	-32 23.4	4.101	3.189	+1.79	+2.2	17.1	19.6
Feb. 20	21 15.02	-32 00.9	4.142	3.271	+1.70	+2.3	17.2	24.7
Mar. 2	21 31.62	-31 38.5	4.170	3.353	+1.61	+2.2	17.4	30.4
Mar. 12	21 47.30	-31 17.9	4.184	3.435	+1.52	+1.9	17.5	36.4
Mar. 22	22 02.03	-31 00.7	4.185	3.518	+1.42	+1.5	17.6	42.7

Comet 15P/Finlay

Epoch = 2021 July 5.0 TT
 T = 2021 July 13.54326 TT
 Peri. = 347.82436 e = 0.7170497
 Node = 13.71366 2000.0 a = 3.5058885 AU
 Incl. = 6.79750 n = 0.15014364
 q = 0.9919922 AU P = 6.56 years

$$m_1 = 11.8 + 5 \log(\Delta) + 15.0 \log(r(t-20))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m ₁	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	17 00.41	-26 47.0	3.286	2.475	+2.01	-3.7	20.7	29.1
Jan. 16	17 20.91	-27 20.8	3.131	2.389	+2.10	-3.0	20.4	34.7
Jan. 26	17 42.41	-27 46.5	2.966	2.301	+2.21	-2.1	20.1	40.1
Feb. 5	18 05.00	-28 02.8	2.794	2.212	+2.32	-1.1	19.7	45.2
Feb. 15	18 28.74	-28 08.1	2.617	2.122	+2.44	+0.1	19.3	50.1
Feb. 25	18 53.74	-28 00.4	2.437	2.031	+2.57	+1.6	18.9	54.6
Mar. 7	19 20.13	-27 37.4	2.257	1.938	+2.72	+3.3	18.5	58.8
Mar. 17	19 48.07	-26 56.0	2.080	1.845	+2.89	+5.3	18.0	62.5
Mar. 27	20 17.73	-25 52.6	1.907	1.750	+3.07	+7.7	17.5	65.6
Apr. 6	20 49.33	-24 22.4	1.743	1.656	+3.27	+10.7	17.0	68.2
Apr. 16	21 23.05	-22 19.8	1.590	1.562	+3.50	+14.3	16.5	69.9
Apr. 26	21 59.06	-19 38.8	1.451	1.469	+3.73	+18.5	15.9	70.8
May 6	22 37.47	-16 13.4	1.330	1.378	+3.97	+23.1	15.3	70.7
May 16	23 18.21	-12 00.7	1.230	1.291	+4.19	+27.8	14.8	69.5
May 26	00 01.04	-07 03.3	1.155	1.209	+4.38	+31.9	14.2	67.4
June 5	00 45.54	-01 32.1	1.108	1.136	+4.52	+34.3	13.7	64.6
June 15	01 31.13	+04 12.6	1.088	1.075	+4.59	+34.3	13.2	61.3
June 25	02 17.14	+09 46.1	1.095	1.028	+4.60	+31.8	12.8	58.1
July 5	03 02.94	+14 45.6	1.123	1.000	+4.54	+27.4	12.5	55.4
July 15	03 47.89	+18 55.2	1.167	0.992	+4.42	+21.9	12.3	53.5
July 25	04 31.31	+22 08.1	1.222	1.006	+4.23	+16.1	12.2	52.5
Aug. 4	05 12.56	+24 25.2	1.280	1.040	+3.98	+10.9	12.3	52.4
Aug. 14	05 51.04	+25 52.8	1.337	1.091	+3.68	+6.4	12.5	53.2
Aug. 24	06 26.30	+26 40.3	1.388	1.156	+3.34	+2.9	12.8	55.0
Sept. 3	06 58.13	+26 57.7	1.432	1.232	+2.99	+0.5	13.1	57.6
Sept. 13	07 26.42	+26 54.6	1.465	1.315	+2.63	-1.1	13.6	61.0
Sept. 23	07 51.18	+26 39.7	1.487	1.404	+2.28	-1.9	14.0	65.3
Oct. 3	08 12.47	+26 20.2	1.498	1.495	+1.94	-2.0	14.5	70.3
Oct. 13	08 30.30	+26 02.3	1.497	1.589	+1.59	-1.5	14.9	76.2
Oct. 23	08 44.62	+25 51.1	1.486	1.683	+1.24	-0.6	15.3	82.9
Nov. 2	08 55.32	+25 50.9	1.467	1.778	+0.86	+0.7	15.6	90.5
Nov. 12	09 02.15	+26 04.9	1.442	1.872	+0.46	+2.3	16.0	99.0
Nov. 22	09 04.85	+26 34.9	1.415	1.965	+0.03	+3.9	16.3	108.4
Dec. 2	09 03.18	+27 20.5	1.391	2.057	-0.41	+5.3	16.6	118.9
Dec. 12	08 57.04	+28 18.4	1.376	2.148	-0.85	+6.2	16.9	130.3
Dec. 22	08 46.75	+29 21.5	1.377	2.238	-1.23	+6.2	17.2	142.4
Jan. 1	08 33.20	+30 20.2	1.399	2.327	-1.48	+5.3	17.5	154.7
Jan. 11	08 17.89	+31 05.2	1.449	2.414	-1.56	+3.5	17.9	165.6
Jan. 21	08 02.71	+31 30.3	1.527	2.499	-1.44	+1.4	18.2	168.4
Jan. 31	07 49.35	+31 35.1	1.636	2.583	-1.19	-0.5	18.6	159.9
Feb. 10	07 38.98	+31 22.9	1.771	2.665	-0.85	-2.0	19.0	148.9
Feb. 20	07 32.11	+30 58.9	1.931	2.746	-0.49	-2.9	19.4	138.0
Mar. 2	07 28.67	+30 27.6	2.109	2.826	-0.17	-3.4	19.8	127.6
Mar. 12	07 28.35	+29 52.2	2.304	2.904	+0.12	-3.7	20.2	117.8
Mar. 22	07 30.68	+29 14.6	2.509	2.980	+0.36	-3.8	20.6	108.6

Comet C/2021 A7 (NEOWISE)

Epoch = 2021 July 5.0 TT
 T = 2021 July 15.58891 TT
 Peri. = 356.07194
 Node = 154.56801 2000.0
 Incl. = 78.12909
 q = 1.9687737 AU
 e = 0.9951359

$$m1 = 9.6 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	06 36.99	-68 02.6	2.821	2.976	-1.73	+6.4	16.6	89.3
Jan. 16	06 20.56	-66 36.7	2.709	2.894	-1.50	+11.3	16.4	90.8
Jan. 26	06 07.32	-64 21.4	2.598	2.814	-1.09	+16.2	16.2	92.2
Feb. 5	05 58.56	-61 18.1	2.492	2.736	-0.61	+20.9	16.0	93.5
Feb. 15	05 54.63	-57 29.0	2.394	2.659	-0.13	+25.3	15.7	94.4
Feb. 25	05 55.25	-52 58.5	2.307	2.584	+0.29	+29.1	15.5	94.8
Mar. 7	05 59.79	-47 51.9	2.234	2.512	+0.64	+32.4	15.3	94.3
Mar. 17	06 07.57	-42 15.9	2.180	2.442	+0.93	+34.9	15.2	92.9
Mar. 27	06 18.00	-36 20.0	2.148	2.375	+1.16	+36.3	15.0	90.5
Apr. 6	06 30.50	-30 14.7	2.137	2.312	+1.35	+36.6	14.9	87.0
Apr. 16	06 44.65	-24 11.7	2.150	2.253	+1.49	+35.7	14.8	82.6
Apr. 26	07 00.10	-18 21.8	2.185	2.197	+1.60	+33.9	14.7	77.4
May 6	07 16.53	-12 53.7	2.239	2.147	+1.69	+31.4	14.7	71.7
May 16	07 33.74	-07 53.3	2.308	2.102	+1.76	+28.4	14.6	65.6
May 26	07 51.53	-03 23.4	2.388	2.063	+1.80	+25.3	14.6	59.3
June 5	08 09.75	+00 35.6	2.475	2.030	+1.84	+22.3	14.6	52.8
June 15	08 28.32	+04 05.3	2.564	2.004	+1.87	+19.4	14.7	46.4
June 25	08 47.16	+07 08.1	2.653	1.985	+1.90	+16.9	14.7	40.0
July 5	09 06.22	+09 47.1	2.736	1.973	+1.92	+14.7	14.7	33.7
July 15	09 25.49	+12 05.6	2.813	1.969	+1.94	+12.8	14.8	27.6
July 25	09 44.95	+14 06.9	2.879	1.972	+1.96	+11.3	14.8	21.7
Aug. 4	10 04.62	+15 54.0	2.935	1.983	+1.98	+10.0	14.9	16.5
Aug. 14	10 24.53	+17 29.9	2.978	2.001	+2.00	+9.1	15.0	12.5
Aug. 24	10 44.69	+18 57.3	3.009	2.027	+2.03	+8.4	15.1	11.2
Sept. 3	11 05.16	+20 18.8	3.027	2.059	+2.07	+7.9	15.1	13.3
Sept. 13	11 25.99	+21 37.0	3.033	2.097	+2.10	+7.7	15.2	17.7
Sept. 23	11 47.19	+22 54.3	3.028	2.141	+2.14	+7.8	15.3	23.1
Oct. 3	12 08.82	+24 12.8	3.014	2.191	+2.19	+8.0	15.4	28.8
Oct. 13	12 30.92	+25 34.9	2.993	2.246	+2.24	+8.5	15.5	34.7
Oct. 23	12 53.50	+27 02.5	2.966	2.305	+2.28	+9.1	15.6	40.7
Nov. 2	13 16.56	+28 37.3	2.937	2.368	+2.33	+9.9	15.7	46.6
Nov. 12	13 40.09	+30 20.8	2.907	2.434	+2.38	+10.9	15.8	52.4
Nov. 22	14 04.02	+32 13.8	2.881	2.503	+2.41	+11.8	15.9	58.1
Dec. 2	14 28.27	+34 16.6	2.861	2.576	+2.44	+12.8	16.0	63.4
Dec. 12	14 52.72	+36 28.9	2.848	2.650	+2.45	+13.7	16.1	68.5
Dec. 22	15 17.15	+38 49.6	2.846	2.727	+2.44	+14.5	16.2	73.0
Jan. 1	15 41.38	+41 17.1	2.856	2.805	+2.40	+15.1	16.4	77.1
Jan. 11	16 05.11	+43 49.5	2.879	2.885	+2.33	+15.4	16.5	80.5
Jan. 21	16 28.03	+46 24.6	2.914	2.966	+2.24	+15.6	16.6	83.3
Jan. 31	16 49.85	+49 00.2	2.962	3.048	+2.11	+15.5	16.8	85.5
Feb. 10	17 10.20	+51 34.6	3.022	3.131	+1.94	+15.3	17.0	87.1
Feb. 20	17 28.72	+54 05.9	3.091	3.215	+1.74	+14.9	17.1	88.1
Mar. 2	17 45.08	+56 32.8	3.169	3.299	+1.50	+14.4	17.3	88.7
Mar. 12	17 58.86	+58 54.0	3.253	3.384	+1.22	+13.7	17.5	89.0
Mar. 22	18 09.68	+61 07.8	3.342	3.470	+0.90	+12.9	17.6	88.9

Comet P/2020 V4 (Rankin)

Epoch = 2021 July 5.0 TT
 T = 2021 July 17.87173 TT
 Peri. = 256.99021 e = 0.4488538
 Node = 203.50798 2000.0 a = 9.3418004 AU
 Incl. = 14.24315 n = 0.03451900
 q = 5.1486978 AU P = 28.55 years

$$m_1 = 8.0 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	04 59.99	+08 17.8	4.395	5.240	-0.33	+0.1	18.4	146.2
Jan. 16	04 57.14	+08 21.6	4.476	5.231	-0.23	+0.7	18.4	136.2
Jan. 26	04 55.38	+08 30.9	4.580	5.223	-0.11	+1.2	18.5	126.3
Feb. 5	04 54.86	+08 45.1	4.700	5.214	+0.02	+1.6	18.5	116.5
Feb. 15	04 55.62	+09 03.0	4.833	5.207	+0.15	+2.0	18.6	106.9
Feb. 25	04 57.66	+09 23.5	4.974	5.199	+0.27	+2.2	18.6	97.7
Mar. 7	05 00.93	+09 45.7	5.119	5.193	+0.39	+2.3	18.7	88.8
Mar. 17	05 05.33	+10 08.4	5.263	5.186	+0.50	+2.3	18.8	80.1
Mar. 27	05 10.77	+10 30.7	5.405	5.180	+0.60	+2.2	18.8	71.8
Apr. 6	05 17.12	+10 51.8	5.539	5.175	+0.68	+2.0	18.9	63.8
Apr. 16	05 24.28	+11 10.8	5.665	5.170	+0.76	+1.8	18.9	56.0
Apr. 26	05 32.13	+11 27.2	5.778	5.166	+0.82	+1.5	18.9	48.4
May 6	05 40.56	+11 40.5	5.879	5.162	+0.87	+1.1	19.0	41.1
May 16	05 49.47	+11 50.1	5.965	5.159	+0.91	+0.8	19.0	34.1
May 26	05 58.76	+11 55.9	6.034	5.156	+0.95	+0.3	19.0	27.4
June 5	06 08.32	+11 57.4	6.087	5.153	+0.97	-0.1	19.0	21.1
June 15	06 18.09	+11 54.6	6.122	5.151	+0.98	-0.5	19.1	15.6
June 25	06 27.95	+11 47.4	6.140	5.150	+0.99	-1.0	19.1	12.0
July 5	06 37.83	+11 35.7	6.139	5.149	+0.99	-1.4	19.1	12.0
July 15	06 47.65	+11 19.6	6.120	5.149	+0.98	-1.8	19.1	15.6
July 25	06 57.32	+10 59.3	6.084	5.149	+0.96	-2.3	19.0	21.1
Aug. 4	07 06.76	+10 34.8	6.030	5.149	+0.93	-2.7	19.0	27.3
Aug. 14	07 15.89	+10 06.6	5.959	5.151	+0.89	-3.0	19.0	34.0
Aug. 24	07 24.60	+09 35.0	5.872	5.152	+0.85	-3.3	19.0	41.0
Sept. 3	07 32.82	+09 00.4	5.772	5.154	+0.79	-3.6	18.9	48.2
Sept. 13	07 40.44	+08 23.3	5.657	5.157	+0.73	-3.8	18.9	55.6
Sept. 23	07 47.37	+07 44.3	5.532	5.160	+0.65	-4.0	18.8	63.3
Oct. 3	07 53.50	+07 04.2	5.398	5.164	+0.57	-4.0	18.8	71.2
Oct. 13	07 58.72	+06 23.8	5.257	5.168	+0.47	-4.0	18.7	79.4
Oct. 23	08 02.94	+05 44.0	5.112	5.172	+0.36	-3.9	18.7	87.9
Nov. 2	08 06.04	+05 05.9	4.967	5.177	+0.25	-3.7	18.6	96.7
Nov. 12	08 07.96	+04 30.7	4.826	5.183	+0.12	-3.3	18.6	105.7
Nov. 22	08 08.64	+03 59.6	4.693	5.189	0.00	-2.8	18.5	115.1
Dec. 2	08 08.08	+03 33.9	4.572	5.195	-0.12	-2.2	18.5	124.6
Dec. 12	08 06.32	+03 14.7	4.467	5.202	-0.24	-1.5	18.4	134.3
Dec. 22	08 03.50	+03 03.0	4.383	5.210	-0.33	-0.7	18.4	143.9
Jan. 1	07 59.84	+02 59.4	4.323	5.218	-0.40	+0.1	18.4	152.9
Jan. 11	07 55.61	+03 04.2	4.291	5.226	-0.44	+0.9	18.3	160.1
Jan. 21	07 51.17	+03 16.7	4.288	5.235	-0.44	+1.6	18.4	162.6
Jan. 31	07 46.88	+03 36.0	4.315	5.244	-0.41	+2.3	18.4	158.7
Feb. 10	07 43.10	+04 00.8	4.370	5.254	-0.34	+2.7	18.4	150.9
Feb. 20	07 40.13	+04 29.1	4.452	5.264	-0.24	+3.0	18.5	141.8
Mar. 2	07 38.19	+04 59.1	4.558	5.275	-0.13	+3.0	18.5	132.3
Mar. 12	07 37.43	+05 29.3	4.683	5.286	-0.01	+3.0	18.6	122.7
Mar. 22	07 37.90	+05 58.0	4.824	5.298	+0.12	+2.7	18.7	113.3

Comet P/2014 E1 = 2020 W4 (Larson)

Epoch = 2021 July 5.0 TT
 T = 2021 July 20.21202 TT
 Peri. = 186.04205 e = 0.4232920
 Node = 39.02513 2000.0 a = 3.7104712 AU
 Incl. = 15.97760 n = 0.13789880
 q = 2.1398584 AU P = 7.15 years

$$m1 = 11.0 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	12 41.67	+12 49.8	2.202	2.574	+0.90	-2.7	18.9	100.8
Jan. 16	12 49.93	+12 27.4	2.047	2.537	+0.73	-1.6	18.6	108.5
Jan. 26	12 56.28	+12 16.0	1.899	2.501	+0.52	-0.5	18.4	116.7
Feb. 5	13 00.38	+12 15.2	1.762	2.466	+0.27	+0.5	18.1	125.2
Feb. 15	13 01.87	+12 23.6	1.638	2.432	-0.01	+1.2	17.9	134.2
Feb. 25	13 00.49	+12 37.8	1.530	2.399	-0.30	+1.6	17.6	143.5
Mar. 7	12 56.21	+12 52.8	1.441	2.367	-0.58	+1.3	17.4	152.7
Mar. 17	12 49.32	+13 01.6	1.375	2.337	-0.81	+0.2	17.2	160.6
Mar. 27	12 40.55	+12 56.5	1.334	2.309	-0.94	-1.5	17.1	164.0
Apr. 6	12 31.05	+12 31.1	1.317	2.283	-0.94	-3.8	17.0	159.9
Apr. 16	12 22.09	+11 41.9	1.325	2.258	-0.82	-6.3	16.9	151.5
Apr. 26	12 14.90	+10 28.7	1.354	2.235	-0.59	-8.5	16.9	142.1
May 6	12 10.28	+08 54.5	1.403	2.215	-0.30	-10.4	16.9	132.7
May 16	12 08.61	+07 03.2	1.468	2.197	0.00	-11.9	17.0	123.8
May 26	12 09.96	+04 59.0	1.544	2.181	+0.29	-13.0	17.0	115.5
June 5	12 14.10	+02 45.4	1.630	2.168	+0.56	-13.8	17.1	107.8
June 15	12 20.76	+00 25.1	1.723	2.157	+0.79	-14.3	17.2	100.7
June 25	12 29.64	-01 59.9	1.820	2.149	+1.00	-14.7	17.3	94.2
July 5	12 40.42	-04 27.7	1.920	2.143	+1.17	-14.9	17.4	88.1
July 15	12 52.87	-06 57.0	2.023	2.140	+1.33	-15.0	17.5	82.4
July 25	13 06.78	-09 26.6	2.126	2.140	+1.46	-14.9	17.6	77.0
Aug. 4	13 21.99	-11 55.0	2.229	2.143	+1.59	-14.7	17.7	71.9
Aug. 14	13 38.40	-14 21.1	2.333	2.148	+1.70	-14.4	17.8	66.9
Aug. 24	13 55.89	-16 43.6	2.435	2.156	+1.81	-14.0	17.9	62.1
Sept. 3	14 14.39	-19 01.0	2.536	2.167	+1.90	-13.4	18.1	57.5
Sept. 13	14 33.87	-21 12.2	2.634	2.180	+2.00	-12.7	18.2	52.9
Sept. 23	14 54.24	-23 15.8	2.731	2.196	+2.08	-11.9	18.3	48.4
Oct. 3	15 15.46	-25 10.3	2.824	2.214	+2.17	-10.9	18.4	43.9
Oct. 13	15 37.48	-26 54.6	2.914	2.234	+2.24	-9.8	18.6	39.4
Oct. 23	16 00.19	-28 27.5	2.999	2.257	+2.31	-8.6	18.7	35.0
Nov. 2	16 23.51	-29 47.9	3.080	2.281	+2.36	-7.3	18.8	30.5
Nov. 12	16 47.32	-30 55.2	3.155	2.308	+2.40	-6.0	18.9	26.1
Nov. 22	17 11.47	-31 48.7	3.224	2.336	+2.43	-4.6	19.1	21.8
Dec. 2	17 35.80	-32 28.2	3.287	2.366	+2.44	-3.2	19.2	17.6
Dec. 12	18 00.15	-32 53.8	3.342	2.397	+2.43	-1.8	19.3	13.9
Dec. 22	18 24.34	-33 06.0	3.388	2.430	+2.40	-0.5	19.4	11.0
Jan. 1	18 48.20	-33 05.5	3.426	2.464	+2.36	+0.7	19.5	10.1
Jan. 11	19 11.59	-32 53.5	3.455	2.499	+2.31	+1.8	19.7	11.6
Jan. 21	19 34.35	-32 31.2	3.473	2.535	+2.24	+2.7	19.8	15.0
Jan. 31	19 56.38	-32 00.2	3.482	2.573	+2.16	+3.5	19.9	19.3
Feb. 10	20 17.57	-31 22.2	3.480	2.611	+2.07	+4.1	20.0	24.2
Feb. 20	20 37.86	-30 38.9	3.467	2.649	+1.98	+4.5	20.0	29.3
Mar. 2	20 57.19	-29 52.2	3.443	2.689	+1.88	+4.8	20.1	34.7
Mar. 12	21 15.50	-29 04.0	3.409	2.729	+1.77	+4.8	20.2	40.3
Mar. 22	21 32.74	-28 16.0	3.364	2.769	+1.67	+4.7	20.3	46.1

Comet 241P/LINEAR

Epoch = 2021 July 5.0 TT
 T = 2021 July 25.82681 TT
 Peri. = 111.42694 e = 0.6098963
 Node = 305.48332 2000.0 a = 4.9154489 AU
 Incl. = 21.10735 n = 0.09043974
 q = 1.9175348 AU P = 10.90 years

$$m_1 = 10.9 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	21 39.94	-03 26.1	3.314	2.659	+1.42	+9.2	19.9	41.5
Jan. 16	21 54.54	-01 49.7	3.337	2.601	+1.50	+10.2	19.7	35.7
Jan. 26	22 09.93	+00 03.9	3.347	2.545	+1.58	+11.1	19.6	30.2
Feb. 5	22 26.02	+01 51.0	3.346	2.490	+1.65	+12.0	19.5	25.2
Feb. 15	22 42.81	+03 54.8	3.335	2.435	+1.72	+12.8	19.3	20.6
Feb. 25	23 00.26	+06 06.9	3.312	2.382	+1.78	+13.6	19.2	16.8
Mar. 7	23 18.38	+08 26.7	3.281	2.331	+1.85	+14.4	19.0	14.0
Mar. 17	23 37.21	+10 53.2	3.242	2.281	+1.92	+15.0	18.8	12.6
Mar. 27	23 56.78	+13 25.4	3.196	2.234	+2.00	+15.5	18.7	12.7
Apr. 6	00 17.17	+16 01.9	3.145	2.188	+2.09	+15.8	18.5	14.2
Apr. 16	00 38.46	+18 41.0	3.089	2.145	+2.18	+16.0	18.3	16.4
Apr. 26	01 00.72	+21 20.8	3.030	2.105	+2.28	+15.9	18.2	19.1
May 6	01 24.07	+23 58.8	2.970	2.069	+2.40	+15.6	18.0	21.9
May 16	01 48.58	+26 32.3	2.909	2.035	+2.52	+15.0	17.8	24.7
May 26	02 14.33	+28 58.3	2.849	2.005	+2.64	+14.0	17.7	27.5
June 5	02 41.33	+31 13.3	2.789	1.979	+2.77	+12.8	17.6	30.2
June 15	03 09.57	+33 14.0	2.730	1.958	+2.89	+11.1	17.5	33.0
June 25	03 38.90	+34 57.0	2.674	1.941	+2.99	+9.2	17.4	35.7
July 5	04 09.13	+36 19.2	2.619	1.928	+3.06	+7.0	17.3	38.4
July 15	04 39.92	+37 18.2	2.565	1.920	+3.09	+4.6	17.2	41.2
July 25	05 10.85	+37 52.8	2.512	1.918	+3.08	+2.1	17.1	44.1
Aug. 4	05 41.45	+38 02.6	2.460	1.920	+3.02	-0.4	17.1	47.1
Aug. 14	06 11.24	+37 48.5	2.407	1.927	+2.92	-2.6	17.1	50.4
Aug. 24	06 39.75	+37 12.6	2.353	1.938	+2.77	-4.7	17.1	53.9
Sept. 3	07 06.63	+36 17.7	2.297	1.955	+2.59	-6.4	17.1	57.7
Sept. 13	07 31.58	+35 07.2	2.239	1.975	+2.38	-7.8	17.1	61.9
Sept. 23	07 54.35	+33 44.7	2.177	2.001	+2.15	-8.8	17.1	66.5
Oct. 3	08 14.81	+32 13.6	2.113	2.030	+1.91	-9.4	17.1	71.5
Oct. 13	08 32.79	+30 37.6	2.044	2.063	+1.66	-9.8	17.2	77.0
Oct. 23	08 48.15	+28 59.6	1.973	2.099	+1.39	-9.8	17.2	83.0
Nov. 2	09 00.74	+27 22.4	1.899	2.138	+1.10	-9.6	17.2	89.7
Nov. 12	09 10.36	+25 48.5	1.824	2.181	+0.79	-9.1	17.3	97.1
Nov. 22	09 16.78	+24 19.6	1.751	2.226	+0.46	-8.6	17.3	105.3
Dec. 2	09 19.80	+22 57.0	1.683	2.273	+0.11	-7.9	17.4	114.3
Dec. 12	09 19.25	+21 41.4	1.622	2.322	-0.25	-7.2	17.4	124.2
Dec. 22	09 15.16	+20 32.6	1.574	2.374	-0.59	-6.5	17.5	134.9
Jan. 1	09 07.87	+19 29.6	1.545	2.426	-0.88	-6.0	17.6	146.5
Jan. 11	08 58.06	+18 31.3	1.538	2.480	-1.08	-5.6	17.8	158.7
Jan. 21	08 46.90	+17 36.4	1.559	2.536	-1.14	-5.3	17.9	171.2
Jan. 31	08 35.71	+16 44.4	1.608	2.592	-1.07	-5.0	18.1	175.8
Feb. 10	08 25.75	+15 55.3	1.687	2.649	-0.89	-4.7	18.4	163.7
Feb. 20	08 17.97	+15 09.2	1.794	2.707	-0.64	-4.4	18.7	151.9
Mar. 2	08 12.84	+14 26.2	1.925	2.765	-0.36	-4.1	18.9	140.8
Mar. 12	08 10.49	+13 45.7	2.077	2.824	-0.09	-4.0	19.2	130.4

Comet 106P/Schuster

Epoch = 2021 July 5.0 TT
 T = 2021 Aug. 18.76591 TT
 Peri. = 353.66534 e = 0.5936931
 Node = 48.88614 2000.0 a = 3.7622593 AU
 Incl. = 19.53636 n = 0.13506132
 q = 1.5286319 AU P = 7.30 years

$$m1 = 9.4 + 5 \log(\Delta) + 25.0 \log(r(t+10))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	20 18.77	-33 59.2	3.544	2.637	+2.00	+6.5	.	19.4
Jan. 16	20 39.04	-32 50.3	3.503	2.572	+2.05	+7.4	.	15.9
Jan. 26	20 59.73	-31 32.4	3.450	2.506	+2.09	+8.3	21.8	14.1
Feb. 5	21 20.77	-30 05.1	3.385	2.441	+2.12	+9.2	21.4	14.2
Feb. 15	21 42.10	-28 28.3	3.310	2.376	+2.15	+10.2	21.1	15.9
Feb. 25	22 03.66	-26 41.9	3.225	2.310	+2.17	+11.2	20.7	18.8
Mar. 7	22 25.43	-24 45.9	3.133	2.245	+2.19	+12.1	20.3	22.1
Mar. 17	22 47.41	-22 40.4	3.035	2.181	+2.21	+13.1	20.0	25.6
Mar. 27	23 09.59	-20 25.6	2.932	2.117	+2.23	+14.0	19.6	29.1
Apr. 6	23 32.00	-18 01.8	2.826	2.054	+2.25	+14.9	19.1	32.5
Apr. 16	23 54.66	-15 29.3	2.718	1.993	+2.28	+15.7	18.7	35.8
Apr. 26	00 17.61	-12 48.9	2.610	1.933	+2.31	+16.5	18.3	38.9
May 6	00 40.91	-10 00.9	2.503	1.875	+2.35	+17.2	17.9	41.8
May 16	01 04.61	-07 06.4	2.398	1.820	+2.39	+17.8	17.5	44.5
May 26	01 28.77	-04 06.4	2.296	1.768	+2.44	+18.3	17.1	47.0
June 5	01 53.45	-01 02.0	2.198	1.720	+2.50	+18.6	16.7	49.4
June 15	02 18.70	+02 05.2	2.105	1.675	+2.56	+18.8	16.4	51.6
June 25	02 44.57	+05 13.3	2.017	1.635	+2.62	+18.8	16.0	53.7
July 5	03 11.10	+08 20.4	1.935	1.601	+2.69	+18.6	15.8	55.7
July 15	03 38.30	+11 24.3	1.859	1.573	+2.76	+18.1	15.5	57.8
July 25	04 06.13	+14 22.4	1.788	1.551	+2.82	+17.4	15.3	59.9
Aug. 4	04 34.56	+17 12.7	1.723	1.537	+2.87	+16.5	15.2	62.1
Aug. 14	05 03.45	+19 53.1	1.663	1.529	+2.91	+15.4	15.1	64.5
Aug. 24	05 32.61	+22 22.0	1.607	1.530	+2.92	+14.2	15.1	67.1
Sept. 3	06 01.82	+24 38.7	1.555	1.537	+2.91	+13.0	15.1	70.0
Sept. 13	06 30.73	+26 43.3	1.506	1.552	+2.86	+11.8	15.2	73.3
Sept. 23	06 58.98	+28 37.3	1.460	1.574	+2.77	+10.9	15.3	77.0
Oct. 3	07 26.16	+30 23.2	1.416	1.603	+2.64	+10.3	15.5	81.1
Oct. 13	07 51.79	+32 04.6	1.373	1.637	+2.46	+10.1	15.7	85.8
Oct. 23	08 15.40	+33 45.7	1.332	1.677	+2.23	+10.3	15.9	91.0
Nov. 2	08 36.49	+35 31.4	1.294	1.722	+1.95	+11.0	16.2	96.8
Nov. 12	08 54.47	+37 26.1	1.258	1.770	+1.60	+12.1	16.4	103.3
Nov. 22	09 08.75	+39 32.5	1.227	1.823	+1.20	+13.3	16.7	110.3
Dec. 2	09 18.66	+41 51.1	1.203	1.878	+0.72	+14.5	17.0	117.8
Dec. 12	09 23.51	+44 18.6	1.188	1.936	+0.19	+14.9	17.3	125.7
Dec. 22	09 22.83	+46 45.7	1.187	1.996	-0.38	+14.2	17.6	133.5
Jan. 1	09 16.57	+48 59.1	1.201	2.057	-0.91	+12.0	18.0	140.5
Jan. 11	09 05.51	+50 42.7	1.235	2.120	-1.30	+8.2	18.3	145.5
Jan. 21	08 51.62	+51 43.6	1.290	2.184	-1.45	+3.5	18.7	147.3
Jan. 31	08 37.47	+51 56.9	1.366	2.248	-1.33	-1.2	19.2	145.4
Feb. 10	08 25.52	+51 26.6	1.464	2.313	-1.00	-5.1	19.6	140.7
Feb. 20	08 17.36	+50 22.9	1.581	2.378	-0.58	-7.8	20.1	134.2
Mar. 2	08 13.41	+48 57.1	1.716	2.444	-0.17	-9.4	20.6	127.0
Mar. 12	08 13.46	+47 18.4	1.865	2.509	+0.20	-10.3	21.0	119.6
Mar. 22	08 16.88	+45 33.6	2.026	2.575	+0.50	-10.7	21.5	112.3

Comet C/2020 M5 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2021 Aug. 19.88142 TT
 Peri. = 126.33932
 Node = 352.09528 2000.0
 Incl. = 93.22232
 q = 3.0043577 AU
 e = 0.9999301

$$m1 = 5.3 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 41.74	+43 52.3	3.997	3.722	+0.57	+3.0	16.9	66.9
Jan. 16	19 47.60	+44 32.4	3.964	3.667	+0.60	+5.3	16.8	65.5
Jan. 26	19 53.71	+45 36.0	3.918	3.614	+0.62	+7.7	16.6	65.0
Feb. 5	19 59.84	+47 03.8	3.861	3.562	+0.61	+10.1	16.5	65.2
Feb. 15	20 05.77	+48 56.3	3.793	3.512	+0.57	+12.6	16.4	66.2
Feb. 25	20 11.17	+51 14.1	3.716	3.464	+0.50	+15.2	16.2	67.7
Mar. 7	20 15.66	+53 57.2	3.634	3.417	+0.38	+17.7	16.1	69.6
Mar. 17	20 18.70	+57 05.8	3.549	3.372	+0.20	+20.2	16.0	71.7
Mar. 27	20 19.44	+60 38.9	3.464	3.329	-0.10	+22.6	15.8	74.0
Apr. 6	20 16.46	+64 34.1	3.383	3.289	-0.59	+24.6	15.7	76.1
Apr. 16	20 07.09	+68 46.7	3.310	3.251	-1.46	+25.9	15.6	77.9
Apr. 26	19 45.88	+73 06.3	3.248	3.215	-3.14	+25.7	15.5	79.2
May 6	19 01.15	+77 10.1	3.201	3.181	-6.53	+21.8	15.4	79.8
May 16	17 32.39	+80 02.8	3.171	3.150	-11.76	+9.6	15.3	79.6
May 26	15 26.52	+80 10.0	3.161	3.122	-11.86	-10.3	15.2	78.6
June 5	13 51.24	+77 18.6	3.169	3.097	-6.66	-23.5	15.2	76.7
June 15	13 01.99	+72 56.4	3.196	3.074	-3.23	-28.5	15.1	74.0
June 25	12 38.28	+68 04.1	3.239	3.055	-1.54	-29.7	15.1	70.5
July 5	12 27.24	+63 07.4	3.297	3.039	-0.67	-29.4	15.1	66.5
July 15	12 22.96	+58 18.0	3.365	3.025	-0.18	-28.3	15.1	62.1
July 25	12 22.55	+53 42.1	3.439	3.015	+0.11	-26.7	15.2	57.4
Aug. 4	12 24.51	+49 22.4	3.515	3.008	+0.29	-25.0	15.2	52.6
Aug. 14	12 27.98	+45 20.0	3.590	3.005	+0.41	-23.3	15.2	47.8
Aug. 24	12 32.42	+41 35.1	3.659	3.005	+0.48	-21.5	15.3	43.3
Sept. 3	12 37.48	+38 07.3	3.720	3.008	+0.53	-19.9	15.3	39.3
Sept. 13	12 42.92	+34 55.9	3.769	3.014	+0.56	-18.3	15.4	36.0
Sept. 23	12 48.51	+31 59.9	3.803	3.023	+0.56	-16.8	15.4	34.0
Oct. 3	12 54.12	+29 18.6	3.820	3.036	+0.56	-15.4	15.4	33.4
Oct. 13	12 59.58	+26 51.1	3.820	3.052	+0.53	-14.0	15.5	34.6
Oct. 23	13 04.74	+24 36.7	3.799	3.071	+0.49	-12.7	15.5	37.5
Nov. 2	13 09.44	+22 34.7	3.759	3.093	+0.44	-11.5	15.5	41.9
Nov. 12	13 13.51	+20 44.7	3.699	3.117	+0.36	-10.4	15.5	47.6
Nov. 22	13 16.74	+19 06.2	3.619	3.145	+0.27	-9.2	15.6	54.2
Dec. 2	13 18.91	+17 38.7	3.523	3.175	+0.15	-8.1	15.6	61.7
Dec. 12	13 19.75	+16 22.1	3.411	3.208	0.00	-7.1	15.6	69.9
Dec. 22	13 18.95	+15 15.6	3.287	3.244	-0.18	-6.1	15.6	78.8
Jan. 1	13 16.17	+14 18.7	3.157	3.282	-0.40	-5.2	15.5	88.5
Jan. 11	13 11.07	+13 30.5	3.024	3.322	-0.65	-4.4	15.5	98.9
Jan. 21	13 03.31	+12 49.5	2.897	3.364	-0.93	-3.8	15.5	110.1
Jan. 31	12 52.67	+12 13.6	2.782	3.409	-1.23	-3.4	15.5	122.0
Feb. 10	12 39.11	+11 40.3	2.689	3.455	-1.51	-3.3	15.5	134.7
Feb. 20	12 22.96	+11 06.3	2.626	3.503	-1.73	-3.6	15.6	147.9
Mar. 2	12 04.92	+10 28.7	2.600	3.553	-1.87	-4.1	15.6	161.3
Mar. 12	11 46.06	+09 45.3	2.618	3.605	-1.88	-4.7	15.7	172.2

Comet 193P/LINEAR-NEAT

Epoch = 2021 July 5.0 TT
 T = 2021 Aug. 25.31936 TT
 Peri. = 8.12082 e = 0.3943673
 Node = 335.17491 2000.0 a = 3.5797582 AU
 Incl. = 10.68840 n = 0.14552029
 q = 2.1680186 AU P = 6.77 years

$$m_1 = 9.4 + 5 \log(\Delta) + 20.0 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m ₁	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	18 24.49	-30 24.3	3.649	2.697	+2.07	+1.9	21.4	12.5
Jan. 16	18 45.26	-30 00.8	3.583	2.660	+2.08	+2.9	21.3	17.3
Jan. 26	19 06.09	-29 27.6	3.506	2.624	+2.08	+3.8	21.1	22.5
Feb. 5	19 26.87	-28 44.9	3.419	2.588	+2.07	+4.8	20.9	27.8
Feb. 15	19 47.50	-27 52.7	3.323	2.553	+2.05	+5.7	20.7	33.1
Feb. 25	20 07.87	-26 51.5	3.219	2.519	+2.02	+6.6	20.6	38.4
Mar. 7	20 27.89	-25 41.7	3.107	2.486	+1.98	+7.4	20.4	43.7
Mar. 17	20 47.47	-24 23.9	2.990	2.454	+1.93	+8.2	20.2	48.9
Mar. 27	21 06.53	-22 59.2	2.868	2.423	+1.87	+8.8	19.9	54.2
Apr. 6	21 25.00	-21 28.3	2.741	2.393	+1.81	+9.4	19.7	59.4
Apr. 16	21 42.82	-19 52.2	2.612	2.365	+1.74	+9.8	19.5	64.7
Apr. 26	21 59.88	-18 12.1	2.481	2.338	+1.66	+10.2	19.3	70.1
May 6	22 16.12	-16 29.0	2.349	2.313	+1.57	+10.4	19.1	75.5
May 16	22 31.42	-14 44.3	2.217	2.289	+1.47	+10.5	18.8	81.0
May 26	22 45.65	-12 59.0	2.086	2.267	+1.36	+10.5	18.6	86.8
June 5	22 58.66	-11 14.5	1.958	2.247	+1.23	+10.4	18.3	92.7
June 15	23 10.24	-09 32.2	1.833	2.230	+1.07	+10.1	18.1	99.0
June 25	23 20.15	-07 53.3	1.712	2.214	+0.89	+9.6	17.8	105.6
July 5	23 28.10	-06 19.3	1.598	2.200	+0.68	+9.1	17.6	112.7
July 15	23 33.78	-04 51.6	1.492	2.189	+0.43	+8.4	17.4	120.4
July 25	23 36.88	-03 31.8	1.396	2.180	+0.16	+7.5	17.2	128.7
Aug. 4	23 37.15	-02 21.1	1.313	2.174	-0.13	+6.5	17.0	137.7
Aug. 14	23 34.52	-01 21.1	1.246	2.170	-0.42	+5.4	16.8	147.5
Aug. 24	23 29.25	+00 32.2	1.198	2.168	-0.65	+4.3	16.6	157.9
Sept. 3	23 21.98	+00 05.7	1.171	2.169	-0.80	+3.2	16.5	168.5
Sept. 13	23 13.77	+00 34.1	1.168	2.172	-0.82	+2.4	16.5	174.9
Sept. 23	23 05.91	+00 56.2	1.190	2.178	-0.72	+2.0	16.5	166.5
Oct. 3	22 59.61	+01 15.8	1.235	2.186	-0.51	+2.0	16.6	155.9
Oct. 13	22 55.75	+01 37.0	1.301	2.197	-0.23	+2.4	16.7	145.5
Oct. 23	22 54.80	+02 03.2	1.386	2.210	+0.07	+3.0	16.8	135.7
Nov. 2	22 56.79	+02 36.8	1.487	2.225	+0.35	+3.8	17.0	126.5
Nov. 12	23 01.54	+03 19.1	1.601	2.242	+0.62	+4.7	17.2	118.0
Nov. 22	23 08.73	+04 10.7	1.725	2.262	+0.84	+5.7	17.4	110.0
Dec. 2	23 17.97	+05 11.1	1.856	2.283	+1.02	+6.5	17.6	102.5
Dec. 12	23 28.93	+06 19.9	1.994	2.306	+1.18	+7.3	17.8	95.5
Dec. 22	23 41.31	+07 36.2	2.135	2.331	+1.30	+8.0	18.0	88.7
Jan. 1	23 54.82	+08 58.7	2.279	2.358	+1.41	+8.6	18.2	82.3
Jan. 11	00 09.28	+10 26.4	2.423	2.386	+1.49	+9.0	18.4	76.0
Jan. 21	00 24.50	+11 57.8	2.567	2.415	+1.56	+9.3	18.6	70.0
Jan. 31	00 40.34	+13 31.8	2.709	2.446	+1.62	+9.5	18.8	64.1
Feb. 10	00 56.72	+15 07.1	2.848	2.477	+1.66	+9.6	19.0	58.4
Feb. 20	01 13.53	+16 42.5	2.982	2.510	+1.70	+9.5	19.2	52.7
Mar. 2	01 30.71	+18 16.8	3.111	2.544	+1.74	+9.3	19.4	47.2
Mar. 12	01 48.21	+19 49.0	3.234	2.579	+1.77	+9.1	19.6	41.8
Mar. 22	02 05.97	+21 18.1	3.349	2.614	+1.79	+8.7	19.8	36.4

Comet 8P/Tuttle

Epoch = 2021 July 5.0 TT
 T = 2021 Aug. 27.7373 TT
 Peri. = 207.48941 e = 0.8202329
 Node = 270.20387 2000.0 a = 5.7074164 AU
 Incl. = 54.91139 n = 0.07228443
 q = 1.0260057 AU P = 13.64 years

$$m_1 = 6.0 + 5 \log(\Delta) + 20.0 \log(r(t-25))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m ₁	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	21 06.67	+34 22.3	3.381	3.072	+1.52	-0.6	19.0	63.5
Jan. 16	21 22.46	+34 23.5	3.357	2.981	+1.65	+1.0	18.8	59.5
Jan. 26	21 39.47	+34 40.2	3.326	2.888	+1.77	+2.5	18.5	55.7
Feb. 5	21 57.68	+35 11.5	3.287	2.794	+1.89	+3.9	18.2	52.2
Feb. 15	22 17.13	+35 56.2	3.242	2.699	+2.01	+5.2	17.9	49.0
Feb. 25	22 37.86	+36 52.9	3.190	2.603	+2.15	+6.2	17.6	46.1
Mar. 7	22 59.98	+37 59.4	3.131	2.505	+2.29	+7.1	17.3	43.4
Mar. 17	23 23.62	+39 13.3	3.067	2.407	+2.45	+7.7	16.9	41.0
Mar. 27	23 48.95	+40 31.5	2.998	2.307	+2.63	+7.9	16.5	38.8
Apr. 6	00 16.16	+41 50.2	2.924	2.206	+2.83	+7.7	16.1	36.8
Apr. 16	00 45.44	+43 04.9	2.847	2.104	+3.05	+7.0	15.7	34.9
Apr. 26	01 16.92	+44 10.0	2.768	2.001	+3.27	+5.7	15.3	33.0
May 6	01 50.65	+44 59.2	2.686	1.898	+3.50	+3.8	14.8	31.3
May 16	02 26.55	+45 25.4	2.604	1.795	+3.70	+1.1	14.3	29.6
May 26	03 04.26	+45 21.0	2.520	1.692	+3.85	-2.4	13.8	27.9
June 5	03 43.23	+44 38.6	2.436	1.590	+3.94	-6.6	13.3	26.2
June 15	04 22.71	+43 11.7	2.352	1.491	+3.94	-11.3	12.7	24.6
June 25	05 01.86	+40 55.2	2.269	1.394	+3.87	-16.5	12.1	23.2
July 5	05 40.00	+37 45.5	2.188	1.303	+3.74	-22.0	11.5	22.1
July 15	06 16.69	+33 40.9	2.108	1.220	+3.58	-27.5	10.8	21.5
July 25	06 51.77	+28 40.7	2.032	1.147	+3.42	-33.0	10.1	21.4
Aug. 4	07 25.39	+22 46.4	1.961	1.088	+3.30	-38.3	9.5	22.0
Aug. 14	07 57.97	+16 01.6	1.899	1.047	+3.22	-43.0	8.8	23.2
Aug. 24	08 30.01	+08 33.8	1.850	1.028	+3.20	-46.7	8.3	25.1
Sept. 3	09 02.11	+00 35.8	1.818	1.030	+3.23	-48.8	7.8	27.3
Sept. 13	09 34.76	-07 34.8	1.808	1.056	+3.31	-48.9	7.6	29.5
Sept. 23	10 08.35	-15 36.3	1.822	1.101	+3.42	-46.8	7.5	31.6
Oct. 3	10 43.08	-23 07.5	1.862	1.164	+3.54	-42.8	7.7	33.3
Oct. 13	11 18.94	-29 52.0	1.924	1.240	+3.64	-37.4	8.1	34.6
Oct. 23	11 55.74	-35 39.6	2.003	1.325	+3.72	-31.5	8.6	35.5
Nov. 2	12 33.09	-40 27.5	2.096	1.418	+3.75	-25.6	9.2	36.0
Nov. 12	13 10.48	-44 18.2	2.194	1.515	+3.72	-20.1	9.9	36.4
Nov. 22	13 47.28	-47 17.5	2.294	1.616	+3.62	-15.4	10.5	36.8
Dec. 2	14 22.89	-49 33.0	2.390	1.718	+3.47	-11.5	11.2	37.6
Dec. 12	14 56.76	-51 12.9	2.479	1.821	+3.27	-8.3	11.9	38.9
Dec. 22	15 28.41	-52 24.8	2.557	1.924	+3.03	-5.9	12.5	40.8
Jan. 1	15 57.57	-53 15.6	2.622	2.027	+2.77	-4.2	13.0	43.6
Jan. 11	16 23.99	-53 51.5	2.673	2.129	+2.49	-3.0	13.6	47.1
Jan. 21	16 47.53	-54 17.5	2.708	2.231	+2.19	-2.2	14.1	51.4
Jan. 31	17 08.09	-54 37.8	2.727	2.332	+1.89	-1.9	14.5	56.5
Feb. 10	17 25.53	-54 55.9	2.730	2.431	+1.57	-1.8	15.0	62.2
Feb. 20	17 39.71	-55 14.4	2.719	2.530	+1.23	-2.0	15.3	68.5
Mar. 2	17 50.42	-55 35.2	2.695	2.627	+0.87	-2.2	15.7	75.4
Mar. 12	17 57.37	-55 59.1	2.662	2.723	+0.48	-2.5	16.0	82.9
Mar. 22	18 00.23	-56 25.4	2.621	2.818	+0.05	-2.7	16.3	90.8

Comet C/2020 O2 (Amaral)

Epoch = 2021 July 5.0 TT
 T = 2021 Aug. 28.34923 TT
 Peri. = 10.25633
 Node = 256.75288 2000.0
 Incl. = 71.75137
 q = 4.8637209 AU
 e = 1.0015692

$$m1 = 6.4 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .5			m	'		°
Jan. 6	16 52.23	-38 05.5	5.991	5.193	+0.94	+3.1	17.4	32.9
Jan. 16	17 01.34	-37 34.1	5.880	5.166	+0.87	+3.2	17.4	40.1
Jan. 26	17 09.75	-37 01.4	5.749	5.141	+0.80	+3.4	17.3	47.9
Feb. 5	17 17.32	-36 26.9	5.602	5.117	+0.70	+3.6	17.2	56.0
Feb. 15	17 23.90	-35 50.2	5.441	5.093	+0.60	+3.8	17.1	64.4
Feb. 25	17 29.34	-35 10.7	5.269	5.071	+0.48	+4.1	17.1	73.1
Mar. 7	17 33.50	-34 28.0	5.090	5.049	+0.34	+4.5	17.0	82.1
Mar. 17	17 36.23	-33 41.3	4.907	5.029	+0.19	+4.9	16.9	91.3
Mar. 27	17 37.41	-32 49.8	4.724	5.010	+0.03	+5.4	16.8	100.9
Apr. 6	17 36.95	-31 52.7	4.548	4.992	-0.14	+6.1	16.7	110.8
Apr. 16	17 34.81	-30 49.0	4.382	4.975	-0.31	+6.8	16.6	121.1
Apr. 26	17 31.02	-29 37.7	4.233	4.959	-0.46	+7.6	16.5	131.7
May 6	17 25.73	-28 18.4	4.105	4.945	-0.60	+8.4	16.4	142.7
May 16	17 19.17	-26 50.8	4.003	4.931	-0.71	+9.2	16.3	153.9
May 26	17 11.71	-25 15.9	3.932	4.919	-0.78	+9.8	16.3	165.4
June 5	17 03.80	-23 35.3	3.895	4.908	-0.80	+10.3	16.3	177.0
June 15	16 55.91	-21 51.6	3.892	4.898	-0.77	+10.4	16.3	171.3
June 25	16 48.54	-20 08.2	3.923	4.890	-0.69	+10.2	16.3	159.7
July 5	16 42.08	-18 28.2	3.987	4.882	-0.58	+9.7	16.3	148.4
July 15	16 36.83	-16 54.3	4.079	4.876	-0.45	+9.0	16.3	137.4
July 25	16 32.97	-15 28.5	4.196	4.871	-0.30	+8.1	16.4	126.7
Aug. 4	16 30.60	-14 11.6	4.331	4.867	-0.16	+7.2	16.5	116.4
Aug. 14	16 29.70	-13 03.8	4.480	4.865	-0.01	+6.3	16.5	106.4
Aug. 24	16 30.23	-12 04.5	4.638	4.864	+0.13	+5.5	16.6	96.9
Sept. 3	16 32.07	-11 12.6	4.799	4.864	+0.25	+4.8	16.7	87.7
Sept. 13	16 35.13	-10 27.0	4.960	4.865	+0.37	+4.3	16.7	78.8
Sept. 23	16 39.26	-09 46.0	5.115	4.868	+0.47	+3.9	16.8	70.2
Oct. 3	16 44.35	-09 08.3	5.262	4.872	+0.56	+3.6	16.9	61.9
Oct. 13	16 50.26	-08 32.4	5.397	4.877	+0.63	+3.5	16.9	53.9
Oct. 23	16 56.87	-07 56.9	5.519	4.883	+0.69	+3.6	17.0	46.2
Nov. 2	17 04.06	-07 20.6	5.624	4.891	+0.75	+3.7	17.0	38.9
Nov. 12	17 11.73	-06 42.3	5.711	4.899	+0.79	+4.0	17.1	32.0
Nov. 22	17 19.75	-06 00.9	5.778	4.909	+0.82	+4.3	17.1	26.0
Dec. 2	17 28.02	-05 15.5	5.825	4.921	+0.84	+4.8	17.1	21.4
Dec. 12	17 36.43	-04 25.1	5.852	4.933	+0.84	+5.3	17.2	19.3
Dec. 22	17 44.87	-03 28.9	5.857	4.947	+0.84	+6.0	17.2	20.3
Jan. 1	17 53.24	-02 26.4	5.843	4.961	+0.83	+6.6	17.2	24.1
Jan. 11	18 01.41	-01 16.7	5.809	4.977	+0.80	+7.4	17.2	29.5
Jan. 21	18 09.29	+00 00.4	5.757	4.994	+0.77	+8.1	17.2	35.9
Jan. 31	18 16.75	+01 25.4	5.689	5.012	+0.72	+8.9	17.2	42.9
Feb. 10	18 23.68	+02 58.5	5.607	5.032	+0.66	+9.8	17.2	50.1
Feb. 20	18 29.95	+04 39.8	5.514	5.052	+0.59	+10.6	17.1	57.5
Mar. 2	18 35.46	+06 29.1	5.412	5.073	+0.50	+11.4	17.1	65.0
Mar. 12	18 40.06	+08 25.9	5.304	5.096	+0.41	+12.1	17.1	72.6
Mar. 22	18 43.64	+10 29.6	5.195	5.120	+0.30	+12.7	17.1	80.1

Comet 4P/Faye

Epoch = 2021 July 5.0 TT
 T = 2021 Sept. 8.83232 TT
 Peri. = 206.99469 e = 0.5766654
 Node = 192.93132 2000.0 a = 3.8240888 AU
 Incl. = 8.00814 n = 0.13179900
 q = 1.6188691 AU P = 7.48 years

$$m_1 = 8.2 + 5 \log(\Delta) + 15.0 \log(r(t-15))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .			m	'		°
Jan. 6	19 55.40	-15 03.5	3.715	2.769	+1.68	+3.9	17.9	13.5
Jan. 16	20 12.40	-14 20.5	3.677	2.707	+1.73	+4.8	17.7	8.4
Jan. 26	20 29.86	-13 28.4	3.624	2.645	+1.77	+5.7	17.6	5.4
Feb. 5	20 47.73	-12 27.3	3.558	2.583	+1.81	+6.6	17.4	7.3
Feb. 15	21 05.99	-11 17.3	3.480	2.521	+1.84	+7.5	17.2	11.8
Feb. 25	21 24.58	-09 58.6	3.391	2.459	+1.88	+8.3	17.0	16.7
Mar. 7	21 43.49	-08 31.5	3.292	2.397	+1.91	+9.2	16.7	21.6
Mar. 17	22 02.75	-06 56.5	3.185	2.336	+1.94	+9.9	16.5	26.4
Mar. 27	22 22.34	-05 14.2	3.070	2.275	+1.98	+10.6	16.2	31.1
Apr. 6	22 42.31	-03 25.2	2.950	2.215	+2.02	+11.2	16.0	35.6
Apr. 16	23 02.71	-01 30.3	2.827	2.155	+2.06	+11.8	15.7	39.9
Apr. 26	23 23.58	+00 29.4	2.701	2.097	+2.12	+12.2	15.4	44.0
May 6	23 45.00	+02 32.9	2.574	2.040	+2.18	+12.5	15.2	47.9
May 16	00 07.06	+04 38.6	2.447	1.985	+2.24	+12.6	14.9	51.7
May 26	00 29.81	+06 44.9	2.322	1.933	+2.32	+12.6	14.6	55.2
June 5	00 53.36	+08 49.8	2.199	1.882	+2.40	+12.3	14.3	58.6
June 15	01 17.76	+10 50.9	2.081	1.835	+2.49	+11.8	14.0	61.8
June 25	01 43.05	+12 45.2	1.968	1.791	+2.58	+11.0	13.7	64.9
July 5	02 09.23	+14 30.0	1.860	1.751	+2.67	+9.8	13.4	67.9
July 15	02 36.24	+16 01.8	1.758	1.716	+2.74	+8.3	13.1	70.7
July 25	03 03.93	+17 17.3	1.662	1.685	+2.80	+6.5	12.9	73.6
Aug. 4	03 32.08	+18 13.4	1.574	1.660	+2.83	+4.4	12.6	76.4
Aug. 14	04 00.32	+18 47.5	1.491	1.640	+2.81	+2.1	12.4	79.3
Aug. 24	04 28.24	+18 58.0	1.415	1.627	+2.75	-0.3	12.2	82.4
Sept. 3	04 55.32	+18 44.8	1.344	1.620	+2.64	-2.6	12.0	85.8
Sept. 13	05 21.01	+18 08.5	1.279	1.619	+2.47	-4.8	11.9	89.4
Sept. 23	05 44.73	+17 11.8	1.218	1.625	+2.24	-6.7	11.8	93.5
Oct. 3	06 05.97	+15 58.2	1.162	1.638	+1.96	-8.1	11.7	98.2
Oct. 13	06 24.14	+14 32.2	1.109	1.656	+1.63	-9.1	11.6	103.5
Oct. 23	06 38.79	+12 59.3	1.061	1.680	+1.26	-9.4	11.6	109.6
Nov. 2	06 49.50	+11 25.5	1.019	1.710	+0.84	-9.2	11.6	116.5
Nov. 12	06 55.89	+09 57.3	0.983	1.745	+0.40	-8.2	11.6	124.4
Nov. 22	06 57.89	+08 41.6	0.956	1.784	-0.04	-6.6	11.7	133.2
Dec. 2	06 55.74	+07 44.7	0.943	1.827	-0.42	-4.4	11.8	142.7
Dec. 12	06 50.15	+07 12.1	0.945	1.874	-0.70	-1.8	11.9	152.4
Dec. 22	06 42.45	+07 06.0	0.968	1.924	-0.83	+0.8	12.1	160.8
Jan. 1	06 34.24	+07 25.2	1.012	1.976	-0.79	+3.2	12.4	164.2
Jan. 11	06 27.09	+08 05.0	1.079	2.031	-0.60	+4.9	12.7	159.8
Jan. 21	06 22.21	+08 58.4	1.169	2.087	-0.34	+5.8	13.1	151.5
Jan. 31	06 20.19	+09 58.5	1.280	2.145	-0.04	+6.1	13.4	142.2
Feb. 10	06 21.19	+10 59.6	1.409	2.205	+0.26	+6.0	13.8	133.1
Feb. 20	06 25.02	+11 57.3	1.554	2.265	+0.52	+5.5	14.2	124.4
Mar. 2	06 31.31	+12 48.7	1.711	2.326	+0.75	+4.7	14.6	116.2
Mar. 12	06 39.66	+13 32.2	1.879	2.387	+0.93	+3.9	15.0	108.4
Mar. 22	06 49.69	+14 06.6	2.055	2.449	+1.08	+2.9	15.3	101.0

Comet 108P/Ciffreo

Epoch = 2021 July 5.0 TT
 T = 2021 Sept. 10.08295 TT
 Peri. = 354.41173 e = 0.5558640
 Node = 50.29273 2000.0 a = 3.7382475 AU
 Incl. = 11.43756 n = 0.13636471
 q = 1.6602903 AU P = 7.23 years

$$m_1 = 11.0 + 5 \log(\Delta) + 17.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	20 25.92	-27 50.2	3.670	2.755	+1.79	+6.3	21.5	18.5
Jan. 16	20 43.99	-26 43.8	3.643	2.696	+1.83	+7.1	21.3	13.4
Jan. 26	21 02.47	-25 29.8	3.602	2.636	+1.87	+7.8	21.1	9.5
Feb. 5	21 21.28	-24 08.1	3.548	2.577	+1.90	+8.6	20.9	8.3
Feb. 15	21 40.38	-22 38.6	3.482	2.517	+1.92	+9.4	20.7	10.4
Feb. 25	21 59.71	-21 01.5	3.405	2.458	+1.94	+10.1	20.5	14.2
Mar. 7	22 19.26	-19 17.0	3.319	2.399	+1.97	+10.8	20.3	18.6
Mar. 17	22 39.02	-17 25.4	3.223	2.340	+1.99	+11.5	20.0	23.0
Mar. 27	22 58.98	-15 27.0	3.121	2.282	+2.01	+12.2	19.7	27.4
Apr. 6	23 19.17	-13 22.4	3.012	2.225	+2.03	+12.8	19.5	31.8
Apr. 16	23 39.62	-11 11.9	2.899	2.168	+2.06	+13.3	19.2	35.9
Apr. 26	00 00.34	-08 56.4	2.784	2.113	+2.09	+13.8	18.9	39.9
May 6	00 21.40	-06 36.2	2.666	2.059	+2.13	+14.2	18.6	43.8
May 16	00 42.85	-04 12.3	2.548	2.007	+2.17	+14.6	18.3	47.4
May 26	01 04.70	-01 45.6	2.431	1.957	+2.21	+14.8	18.0	50.9
June 5	01 27.04	+00 42.9	2.316	1.910	+2.26	+14.9	17.7	54.3
June 15	01 49.88	+03 12.1	2.203	1.865	+2.31	+14.9	17.5	57.5
June 25	02 13.26	+05 40.5	2.094	1.824	+2.37	+14.8	17.2	60.6
July 5	02 37.18	+08 07.0	1.989	1.787	+2.42	+14.5	16.9	63.6
July 15	03 01.63	+10 29.8	1.888	1.753	+2.47	+14.0	16.6	66.6
July 25	03 26.54	+12 47.4	1.792	1.724	+2.51	+13.4	16.4	69.6
Aug. 4	03 51.82	+14 58.5	1.701	1.701	+2.54	+12.7	16.2	72.6
Aug. 14	04 17.32	+17 01.8	1.615	1.682	+2.55	+11.9	16.0	75.7
Aug. 24	04 42.82	+18 56.7	1.534	1.669	+2.54	+11.0	15.8	79.0
Sept. 3	05 08.04	+20 43.1	1.457	1.662	+2.49	+10.2	15.7	82.6
Sept. 13	05 32.63	+22 21.5	1.384	1.661	+2.41	+9.5	15.6	86.5
Sept. 23	05 56.18	+23 53.5	1.316	1.665	+2.28	+8.9	15.5	90.8
Oct. 3	06 18.22	+25 21.7	1.250	1.676	+2.10	+8.7	15.4	95.6
Oct. 13	06 38.20	+26 49.3	1.189	1.692	+1.86	+8.9	15.4	101.0
Oct. 23	06 55.52	+28 19.9	1.132	1.714	+1.56	+9.4	15.4	107.2
Nov. 2	07 09.57	+29 57.3	1.081	1.741	+1.20	+10.2	15.4	114.1
Nov. 12	07 19.64	+31 43.7	1.037	1.772	+0.76	+11.2	15.4	121.9
Nov. 22	07 25.16	+33 38.7	1.002	1.808	+0.29	+11.9	15.5	130.6
Dec. 2	07 25.76	+35 38.0	0.981	1.848	-0.21	+11.8	15.6	139.9
Dec. 12	07 21.52	+37 32.1	0.976	1.891	-0.66	+10.7	15.8	149.5
Dec. 22	07 13.41	+39 08.6	0.990	1.937	-0.96	+8.2	16.0	157.9
Jan. 1	07 03.16	+40 16.2	1.027	1.986	-1.06	+4.9	16.3	162.3
Jan. 11	06 53.01	+40 49.6	1.086	2.037	-0.92	+1.5	16.6	159.6
Jan. 21	06 45.04	+40 51.1	1.169	2.090	-0.62	-1.3	16.9	152.2
Jan. 31	06 40.49	+40 28.2	1.272	2.145	-0.25	-3.3	17.3	143.4
Feb. 10	06 39.79	+39 49.0	1.393	2.201	+0.14	-4.5	17.7	134.5
Feb. 20	06 42.77	+39 00.4	1.531	2.258	+0.48	-5.2	18.1	125.9
Mar. 2	06 48.88	+38 06.5	1.681	2.316	+0.76	-5.6	18.5	117.8
Mar. 12	06 57.57	+37 09.6	1.842	2.374	+0.99	-5.8	18.9	110.0
Mar. 22	07 08.26	+36 10.6	2.012	2.433	+1.16	-6.0	19.3	102.7

Comet 284P/McNaught

Epoch = 2021 July 5.0 TT
 T = 2021 Sept. 12.79757 TT
 Peri. = 202.47334 e = 0.3762343
 Node = 144.26330 2000.0 a = 3.6804069 AU
 Incl. = 11.86148 n = 0.13959193
 q = 2.2957116 AU P = 7.06 years

$$m1 = 9.2 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	18 34.38	-16 32.1	3.788	2.824	+1.78	+0.3	18.9	9.9
Jan. 16	18 52.30	-16 25.2	3.731	2.790	+1.80	+1.2	18.7	14.6
Jan. 26	19 10.36	-16 09.9	3.661	2.756	+1.81	+2.0	18.6	19.9
Feb. 5	19 28.46	-15 46.4	3.580	2.723	+1.81	+2.8	18.5	25.4
Feb. 15	19 46.54	-15 15.0	3.489	2.690	+1.80	+3.5	18.4	31.0
Feb. 25	20 04.49	-14 36.4	3.388	2.659	+1.79	+4.2	18.2	36.5
Mar. 7	20 22.26	-13 51.5	3.278	2.627	+1.76	+4.8	18.1	42.1
Mar. 17	20 39.77	-13 01.0	3.161	2.597	+1.73	+5.3	17.9	47.6
Mar. 27	20 56.95	-12 06.3	3.038	2.568	+1.70	+5.7	17.8	53.2
Apr. 6	21 13.74	-11 08.4	2.909	2.540	+1.65	+5.9	17.6	58.8
Apr. 16	21 30.06	-10 08.8	2.777	2.512	+1.60	+6.0	17.4	64.4
Apr. 26	21 45.83	-09 09.2	2.641	2.487	+1.54	+5.9	17.2	70.2
May 6	22 00.99	-08 11.4	2.503	2.462	+1.48	+5.6	17.1	76.0
May 16	22 15.40	-07 17.2	2.365	2.439	+1.40	+5.1	16.9	82.0
May 26	22 28.96	-06 29.0	2.227	2.417	+1.30	+4.4	16.7	88.2
June 5	22 41.52	-05 49.1	2.092	2.397	+1.19	+3.4	16.5	94.6
June 15	22 52.88	-05 20.3	1.960	2.378	+1.06	+2.2	16.3	101.3
June 25	23 02.83	-05 05.4	1.833	2.361	+0.91	+0.6	16.1	108.5
July 5	23 11.14	-05 07.3	1.713	2.346	+0.73	-1.2	15.9	116.1
July 15	23 17.51	-05 28.9	1.603	2.333	+0.52	-3.3	15.7	124.4
July 25	23 21.72	-06 12.2	1.505	2.322	+0.29	-5.5	15.6	133.2
Aug. 4	23 23.60	-07 17.6	1.422	2.312	+0.06	-7.7	15.4	142.7
Aug. 14	23 23.10	-08 43.4	1.357	2.305	-0.17	-9.5	15.3	152.7
Aug. 24	23 20.51	-10 24.1	1.314	2.300	-0.36	-10.6	15.2	163.0
Sept. 3	23 16.36	-12 11.2	1.294	2.297	-0.47	-10.7	15.2	171.6
Sept. 13	23 11.50	-13 53.9	1.299	2.296	-0.48	-9.6	15.2	169.6
Sept. 23	23 06.97	-15 21.4	1.328	2.297	-0.40	-7.6	15.2	159.9
Oct. 3	23 03.71	-16 26.5	1.381	2.300	-0.23	-5.1	15.3	149.5
Oct. 13	23 02.44	-17 05.0	1.454	2.305	0.00	-2.4	15.5	139.5
Oct. 23	23 03.57	-17 16.8	1.544	2.313	+0.25	+0.2	15.6	130.0
Nov. 2	23 07.14	-17 03.9	1.648	2.322	+0.49	+2.5	15.8	121.1
Nov. 12	23 13.05	-16 29.4	1.764	2.333	+0.71	+4.5	16.0	112.8
Nov. 22	23 21.04	-15 36.7	1.888	2.347	+0.90	+6.2	16.1	105.0
Dec. 2	23 30.78	-14 28.9	2.018	2.362	+1.06	+7.5	16.3	97.7
Dec. 12	23 42.00	-13 08.9	2.153	2.379	+1.19	+8.6	16.5	90.7
Dec. 22	23 54.43	-11 39.2	2.290	2.397	+1.30	+9.4	16.7	84.1
Jan. 1	00 07.82	-10 02.3	2.428	2.418	+1.38	+10.0	16.9	77.7
Jan. 11	00 21.99	-08 19.9	2.565	2.440	+1.45	+10.5	17.1	71.6
Jan. 21	00 36.79	-06 34.0	2.700	2.463	+1.51	+10.7	17.2	65.6
Jan. 31	00 52.08	-04 46.2	2.833	2.487	+1.55	+10.8	17.4	59.8
Feb. 10	01 07.79	-02 58.0	2.961	2.513	+1.59	+10.8	17.6	54.1
Feb. 20	01 23.81	-01 10.9	3.084	2.541	+1.62	+10.6	17.7	48.6
Mar. 2	01 40.10	+00 34.0	3.201	2.569	+1.64	+10.3	17.9	43.1
Mar. 12	01 56.60	+02 15.6	3.311	2.598	+1.66	+9.9	18.0	37.8
Mar. 22	02 13.25	+03 52.8	3.413	2.629	+1.67	+9.4	18.2	32.5

Comet 6P/d' Arrest

Epoch = 2021 July 5.0 TT
 T = 2021 Sept. 17.66774 TT
 Peri. = 178.10973 e = 0.6127014
 Node = 138.93546 2000.0 a = 3.4975487 AU
 Incl. = 19.51249 n = 0.15068098
 q = 1.3545957 AU P = 6.54 years

$$m_1 = 9.8 + 5 \log(\Delta) + 20.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	15 01.43	+00 21.6	3.119	2.825	+1.41	-1.2	.	63.7
Jan. 16	15 15.45	+00 28.7	2.932	2.758	+1.39	-0.1	.	70.2
Jan. 26	15 29.28	+00 23.7	2.742	2.691	+1.37	+1.2	21.8	76.6
Feb. 5	15 42.77	+00 05.5	2.551	2.623	+1.33	+2.6	21.4	83.1
Feb. 15	15 55.79	+00 27.4	2.361	2.554	+1.27	+4.1	21.1	89.6
Feb. 25	16 08.12	+01 15.8	2.174	2.484	+1.19	+5.7	20.7	96.2
Mar. 7	16 19.56	+02 20.5	1.993	2.414	+1.09	+7.4	20.3	102.7
Mar. 17	16 29.84	+03 42.1	1.819	2.343	+0.95	+9.1	19.9	109.2
Mar. 27	16 38.63	+05 20.1	1.654	2.272	+0.79	+10.7	19.5	115.7
Apr. 6	16 45.62	+07 13.4	1.501	2.201	+0.58	+12.1	19.1	122.0
Apr. 16	16 50.40	+09 18.8	1.360	2.129	+0.34	+13.0	18.6	128.0
Apr. 26	16 52.61	+11 30.9	1.233	2.058	+0.07	+13.3	18.2	133.3
May 6	16 51.98	+13 41.3	1.122	1.988	-0.23	+12.5	17.7	137.7
May 16	16 48.38	+15 38.1	1.027	1.918	-0.52	+10.4	17.3	140.4
May 26	16 42.10	+17 06.1	0.948	1.849	-0.75	+6.6	16.8	141.1
June 5	16 33.90	+17 50.0	0.884	1.782	-0.88	+1.4	16.4	139.4
June 15	16 25.02	+17 36.1	0.835	1.717	-0.86	-4.9	16.0	135.8
June 25	16 17.11	+16 16.5	0.799	1.654	-0.67	-11.6	15.6	131.0
July 5	16 11.73	+13 50.7	0.773	1.595	-0.35	-18.1	15.2	125.6
July 15	16 10.11	+10 24.0	0.756	1.541	+0.08	-23.7	14.8	120.0
July 25	16 13.08	+06 06.4	0.747	1.491	+0.57	-28.1	14.5	114.7
Aug. 4	16 20.98	+01 09.9	0.745	1.448	+1.07	-31.3	14.2	109.9
Aug. 14	16 33.97	-04 12.3	0.749	1.412	+1.58	-33.1	13.9	105.5
Aug. 24	16 52.08	-09 45.1	0.761	1.384	+2.09	-33.2	13.6	101.8
Sept. 3	17 15.17	-15 12.0	0.782	1.365	+2.58	-31.7	13.3	98.6
Sept. 13	17 43.12	-20 15.6	0.811	1.356	+3.05	-28.4	13.1	95.9
Sept. 23	18 15.50	-24 38.1	0.851	1.356	+3.45	-23.4	12.9	93.6
Oct. 3	18 51.52	-28 04.8	0.901	1.366	+3.76	-17.2	12.8	91.7
Oct. 13	19 30.06	-30 25.7	0.963	1.386	+3.94	-10.3	12.7	89.9
Oct. 23	20 09.61	-31 38.0	1.036	1.414	+3.95	-3.6	12.7	88.3
Nov. 2	20 48.68	-31 45.6	1.120	1.451	+3.83	+2.5	12.7	86.5
Nov. 12	21 26.11	-30 57.2	1.214	1.494	+3.62	+7.5	12.9	84.7
Nov. 22	22 01.17	-29 24.7	1.319	1.544	+3.36	+11.2	13.0	82.7
Dec. 2	22 33.59	-27 19.9	1.434	1.599	+3.10	+13.9	13.3	80.4
Dec. 12	23 03.48	-24 53.1	1.557	1.658	+2.86	+15.5	13.6	77.9
Dec. 22	23 31.07	-22 13.1	1.688	1.721	+2.64	+16.4	13.9	75.0
Jan. 1	23 56.69	-19 26.8	1.827	1.786	+2.47	+16.8	14.3	71.9
Jan. 11	00 20.68	-16 38.9	1.971	1.853	+2.32	+16.7	14.8	68.6
Jan. 21	00 43.32	-13 53.6	2.120	1.922	+2.20	+16.3	15.2	64.9
Jan. 31	01 04.87	-11 13.3	2.272	1.992	+2.10	+15.7	15.7	61.1
Feb. 10	01 25.54	-08 40.0	2.426	2.063	+2.02	+14.9	16.1	57.1
Feb. 20	01 45.47	-06 15.2	2.580	2.134	+1.96	+14.0	16.6	52.9
Mar. 2	02 04.81	-03 59.7	2.733	2.205	+1.91	+13.0	17.0	48.5
Mar. 12	02 23.64	-01 54.1	2.883	2.277	+1.86	+12.0	17.5	44.1
Mar. 22	02 42.04	+00 01.1	3.028	2.348	+1.82	+10.9	17.9	39.6

Comet C/2020 H6 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2021 Oct. 1.06880 TT
 Peri. = 20.34793
 Node = 213.70551 2000.0
 Incl. = 79.96379
 q = 4.7028489 AU
 e = 1.0008114

$$m1 = 6.6 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	14 17.84	-27 33.2	5.494	5.155	+0.52	+1.9	17.4	64.9
Jan. 16	14 22.63	-27 10.9	5.309	5.123	+0.42	+2.6	17.3	73.9
Jan. 26	14 26.33	-26 41.1	5.115	5.093	+0.30	+3.4	17.2	83.2
Feb. 5	14 28.80	-26 02.3	4.919	5.064	+0.17	+4.4	17.1	92.8
Feb. 15	14 29.92	-25 13.0	4.723	5.035	+0.03	+5.6	17.0	102.8
Feb. 25	14 29.59	-24 11.5	4.535	5.008	-0.11	+6.9	16.9	113.2
Mar. 7	14 27.81	-22 56.5	4.359	4.982	-0.26	+8.3	16.8	124.0
Mar. 17	14 24.59	-21 27.2	4.201	4.956	-0.40	+9.7	16.7	135.1
Mar. 27	14 20.10	-19 43.5	4.069	4.932	-0.51	+11.1	16.6	146.6
Apr. 6	14 14.57	-17 46.7	3.965	4.909	-0.60	+12.3	16.5	158.4
Apr. 16	14 08.36	-15 39.2	3.895	4.887	-0.64	+13.2	16.4	170.4
Apr. 26	14 01.86	-13 25.1	3.861	4.866	-0.65	+13.6	16.4	177.1
May 6	13 55.53	-11 09.4	3.864	4.847	-0.61	+13.5	16.4	165.4
May 16	13 49.75	-08 57.1	3.902	4.828	-0.53	+12.9	16.4	153.5
May 26	13 44.87	-06 52.9	3.973	4.811	-0.43	+11.8	16.4	142.0
June 5	13 41.12	-05 00.0	4.070	4.795	-0.31	+10.6	16.5	130.8
June 15	13 38.65	-03 20.6	4.190	4.780	-0.17	+9.2	16.5	120.0
June 25	13 37.51	-01 55.4	4.327	4.767	-0.04	+7.8	16.6	109.7
July 5	13 37.69	+00 43.9	4.474	4.754	+0.09	+6.4	16.6	99.9
July 15	13 39.13	+00 14.8	4.626	4.743	+0.21	+5.2	16.7	90.4
July 25	13 41.74	+01 02.3	4.779	4.734	+0.32	+4.2	16.7	81.3
Aug. 4	13 45.42	+01 40.3	4.928	4.725	+0.42	+3.3	16.8	72.7
Aug. 14	13 50.06	+02 10.5	5.069	4.718	+0.51	+2.7	16.9	64.3
Aug. 24	13 55.55	+02 34.6	5.199	4.713	+0.59	+2.2	16.9	56.2
Sept. 3	14 01.80	+02 54.4	5.315	4.708	+0.66	+1.8	17.0	48.5
Sept. 13	14 08.70	+03 11.5	5.416	4.705	+0.72	+1.6	17.0	41.2
Sept. 23	14 16.17	+03 27.3	5.498	4.703	+0.77	+1.6	17.0	34.3
Oct. 3	14 24.12	+03 43.4	5.562	4.703	+0.82	+1.7	17.0	28.1
Oct. 13	14 32.47	+04 01.1	5.605	4.704	+0.85	+1.9	17.1	23.2
Oct. 23	14 41.13	+04 21.9	5.627	4.706	+0.88	+2.3	17.1	20.2
Nov. 2	14 50.03	+04 47.0	5.629	4.710	+0.90	+2.8	17.1	20.2
Nov. 12	14 59.09	+05 17.8	5.610	4.715	+0.91	+3.4	17.1	23.0
Nov. 22	15 08.20	+05 55.6	5.571	4.721	+0.91	+4.2	17.1	27.9
Dec. 2	15 17.29	+06 41.6	5.514	4.728	+0.90	+5.1	17.1	34.0
Dec. 12	15 26.25	+07 37.1	5.440	4.737	+0.88	+6.1	17.0	40.7
Dec. 22	15 34.96	+08 43.3	5.351	4.747	+0.85	+7.2	17.0	47.9
Jan. 1	15 43.33	+10 01.1	5.250	4.759	+0.81	+8.5	17.0	55.3
Jan. 11	15 51.22	+11 31.5	5.139	4.772	+0.76	+9.8	16.9	62.9
Jan. 21	15 58.48	+13 15.0	5.024	4.786	+0.69	+11.1	16.9	70.5
Jan. 31	16 04.99	+15 11.7	4.906	4.801	+0.60	+12.4	16.9	78.1
Feb. 10	16 10.57	+17 21.6	4.790	4.817	+0.50	+13.7	16.8	85.7
Feb. 20	16 15.08	+19 43.5	4.680	4.835	+0.39	+14.8	16.8	93.1
Mar. 2	16 18.36	+22 15.7	4.581	4.854	+0.25	+15.7	16.8	100.1
Mar. 12	16 20.25	+24 55.7	4.495	4.874	+0.11	+16.3	16.7	106.7
Mar. 22	16 20.64	+27 39.5	4.427	4.895	-0.05	+16.4	16.7	112.5

Comet 52P/Harrington-Abell

Epoch = 2021 July 5.0 TT
 T = 2021 Oct. 5.19861 TT
 Peri. = 139.59734 e = 0.5400191
 Node = 336.83854 2000.0 a = 3.8636659 AU
 Incl. = 10.23169 n = 0.12977909
 q = 1.7772125 AU P = 7.59 years

$$m_1 = 10.0 + 5 \log(\Delta) + 20.0 \log(r(t-10))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	23 50.73	+06 22.0	3.008	2.912	+0.85	+5.1	21.8	74.9
Jan. 16	23 59.92	+07 17.2	3.088	2.856	+1.00	+6.1	21.7	67.3
Jan. 26	00 10.47	+08 22.1	3.159	2.800	+1.13	+7.0	21.6	60.0
Feb. 5	00 22.27	+09 35.4	3.220	2.744	+1.24	+7.8	21.5	53.1
Feb. 15	00 35.22	+10 56.3	3.270	2.688	+1.35	+8.5	21.3	46.5
Feb. 25	00 49.23	+12 23.6	3.308	2.632	+1.46	+9.0	21.2	40.3
Mar. 7	01 04.25	+13 56.1	3.333	2.576	+1.56	+9.5	21.0	34.4
Mar. 17	01 20.27	+15 32.6	3.347	2.520	+1.66	+9.8	20.8	28.7
Mar. 27	01 37.27	+17 11.9	3.348	2.465	+1.75	+10.0	20.7	23.4
Apr. 6	01 55.27	+18 52.5	3.338	2.410	+1.86	+10.1	20.5	18.5
Apr. 16	02 14.28	+20 33.1	3.318	2.356	+1.96	+10.0	20.2	14.0
Apr. 26	02 34.36	+22 12.0	3.287	2.303	+2.07	+9.7	20.0	10.1
May 6	02 55.52	+23 47.5	3.248	2.251	+2.18	+9.3	19.8	7.4
May 16	03 17.82	+25 17.6	3.201	2.200	+2.29	+8.6	19.6	7.0
May 26	03 41.28	+26 40.3	3.147	2.151	+2.41	+7.8	19.3	8.8
June 5	04 05.90	+27 53.2	3.087	2.103	+2.53	+6.7	19.1	11.7
June 15	04 31.66	+28 54.2	3.023	2.058	+2.64	+5.3	18.9	14.9
June 25	04 58.48	+29 40.7	2.955	2.015	+2.74	+3.8	18.6	18.1
July 5	05 26.26	+30 10.4	2.886	1.974	+2.82	+2.0	18.4	21.4
July 15	05 54.81	+30 21.3	2.815	1.936	+2.89	0.0	18.2	24.5
July 25	06 23.89	+30 11.7	2.743	1.902	+2.93	-2.1	17.9	27.6
Aug. 4	06 53.27	+29 40.5	2.671	1.871	+2.94	-4.3	17.7	30.6
Aug. 14	07 22.64	+28 47.4	2.601	1.844	+2.93	-6.5	17.5	33.6
Aug. 24	07 51.71	+27 32.8	2.531	1.821	+2.88	-8.6	17.3	36.6
Sept. 3	08 20.25	+25 57.7	2.463	1.803	+2.82	-10.6	17.2	39.5
Sept. 13	08 48.02	+24 04.1	2.396	1.790	+2.73	-12.3	17.0	42.6
Sept. 23	09 14.85	+21 54.4	2.331	1.781	+2.63	-13.8	16.9	45.7
Oct. 3	09 40.63	+19 31.3	2.266	1.777	+2.52	-14.9	16.8	48.9
Oct. 13	10 05.26	+16 57.9	2.203	1.779	+2.40	-15.8	16.7	52.4
Oct. 23	10 28.67	+14 17.4	2.139	1.785	+2.27	-16.3	16.7	56.0
Nov. 2	10 50.84	+11 32.7	2.076	1.797	+2.15	-16.6	16.6	59.9
Nov. 12	11 11.68	+08 46.8	2.011	1.813	+2.01	-16.5	16.6	64.1
Nov. 22	11 31.13	+06 02.4	1.946	1.834	+1.87	-16.3	16.6	68.6
Dec. 2	11 49.10	+03 21.7	1.879	1.859	+1.71	-15.8	16.6	73.6
Dec. 12	12 05.43	+00 47.0	1.811	1.888	+1.54	-15.1	16.7	78.9
Dec. 22	12 19.94	-01 39.8	1.741	1.921	+1.34	-14.2	16.7	84.8
Jan. 1	12 32.39	-03 57.2	1.671	1.957	+1.12	-13.1	16.8	91.2
Jan. 11	12 42.46	-06 03.3	1.601	1.996	+0.86	-11.9	16.9	98.3
Jan. 21	12 49.82	-07 56.6	1.534	2.038	+0.58	-10.6	16.9	106.0
Jan. 31	12 54.15	-09 35.4	1.471	2.083	+0.25	-9.0	17.0	114.6
Feb. 10	12 55.15	-10 57.5	1.416	2.130	-0.09	-7.2	17.1	123.9
Feb. 20	12 52.76	-12 00.5	1.373	2.178	-0.42	-5.2	17.3	133.9
Mar. 2	12 47.21	-12 42.6	1.345	2.229	-0.71	-3.0	17.4	144.6
Mar. 12	12 39.14	-13 02.7	1.338	2.280	-0.91	-0.8	17.6	155.6
Mar. 22	12 29.66	-13 02.6	1.354	2.333	-0.98	+1.0	17.8	165.8

Comet 57P/du Toit-Neujmin-Delporte

Epoch = 2021 July 5.0 TT
 T = 2021 Oct. 17.46413 TT
 Peri. = 115.25969 e = 0.5008644
 Node = 188.77853 2000.0 a = 3.4461439 AU
 Incl. = 2.85086 n = 0.15406499
 q = 1.7200931 AU P = 6.40 years

$$m_1 = 8.5 + 5 \log(\Delta) + 25.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	14 31.40	-14 16.0	3.148	2.883	+1.30	-5.5	.	65.5
Jan. 16	14 44.19	-15 08.7	2.966	2.830	+1.26	-4.9	.	72.5
Jan. 26	14 56.49	-15 55.1	2.780	2.777	+1.20	-4.3	21.8	79.6
Feb. 5	15 08.15	-16 34.6	2.593	2.724	+1.12	-3.5	21.4	86.9
Feb. 15	15 18.93	-17 06.5	2.407	2.671	+1.02	-2.8	21.1	94.4
Feb. 25	15 28.56	-17 30.3	2.223	2.617	+0.89	-1.9	20.7	102.1
Mar. 7	15 36.76	-17 45.4	2.046	2.564	+0.73	-1.0	20.3	110.2
Mar. 17	15 43.18	-17 51.4	1.876	2.510	+0.53	-0.1	19.9	118.7
Mar. 27	15 47.46	-17 47.7	1.717	2.456	+0.30	+0.9	19.4	127.6
Apr. 6	15 49.28	-17 34.0	1.572	2.403	+0.03	+1.9	19.0	137.1
Apr. 16	15 48.37	-17 10.1	1.443	2.350	-0.24	+2.9	18.6	147.1
Apr. 26	15 44.71	-16 36.4	1.335	2.298	-0.51	+3.9	18.2	157.8
May 6	15 38.59	-15 54.5	1.249	2.247	-0.72	+4.5	17.8	168.7
May 16	15 30.70	-15 07.5	1.186	2.196	-0.84	+4.8	17.4	176.1
May 26	15 22.21	-14 20.6	1.148	2.146	-0.83	+4.4	17.1	166.6
June 5	15 14.42	-13 39.9	1.133	2.098	-0.69	+3.5	16.8	155.3
June 15	15 08.60	-13 11.5	1.138	2.051	-0.43	+2.0	16.6	144.3
June 25	15 05.71	-12 59.6	1.161	2.006	-0.11	+0.2	16.4	134.1
July 5	15 06.24	-13 05.7	1.197	1.963	+0.25	-1.6	16.2	124.8
July 15	15 10.36	-13 29.4	1.242	1.923	+0.61	-3.3	16.1	116.4
July 25	15 18.00	-14 08.4	1.294	1.885	+0.95	-4.6	15.9	108.8
Aug. 4	15 28.91	-14 59.2	1.350	1.851	+1.26	-5.6	15.8	102.0
Aug. 14	15 42.85	-15 58.1	1.409	1.819	+1.55	-6.2	15.7	96.0
Aug. 24	15 59.55	-17 01.1	1.470	1.792	+1.81	-6.4	15.7	90.5
Sept. 3	16 18.72	-18 03.9	1.533	1.768	+2.04	-6.1	15.6	85.5
Sept. 13	16 40.12	-19 02.5	1.597	1.749	+2.25	-5.5	15.6	81.0
Sept. 23	17 03.47	-19 52.9	1.662	1.735	+2.43	-4.4	15.6	76.8
Oct. 3	17 28.48	-20 31.5	1.730	1.725	+2.58	-3.1	15.6	72.9
Oct. 13	17 54.85	-20 55.3	1.799	1.721	+2.70	-1.5	15.7	69.2
Oct. 23	18 22.24	-21 01.7	1.872	1.721	+2.78	+0.4	15.8	65.7
Nov. 2	18 50.28	-20 49.3	1.947	1.726	+2.83	+2.3	15.9	62.3
Nov. 12	19 18.65	-20 17.3	2.026	1.736	+2.84	+4.3	16.0	58.9
Nov. 22	19 47.01	-19 26.0	2.109	1.751	+2.82	+6.2	16.2	55.6
Dec. 2	20 15.07	-18 16.6	2.195	1.771	+2.78	+7.9	16.4	52.2
Dec. 12	20 42.63	-16 50.8	2.284	1.795	+2.72	+9.4	16.6	48.7
Dec. 22	21 09.51	-15 10.9	2.376	1.822	+2.65	+10.7	16.9	45.2
Jan. 1	21 35.61	-13 19.5	2.470	1.854	+2.57	+11.7	17.2	41.6
Jan. 11	22 00.89	-11 19.2	2.565	1.889	+2.48	+12.4	17.5	37.9
Jan. 21	22 25.32	-09 12.5	2.661	1.927	+2.40	+12.9	17.7	34.1
Jan. 31	22 48.94	-07 01.8	2.756	1.968	+2.32	+13.2	18.1	30.2
Feb. 10	23 11.80	-04 49.2	2.849	2.011	+2.24	+13.3	18.4	26.1
Feb. 20	23 33.92	-02 36.7	2.939	2.056	+2.17	+13.2	18.7	22.0
Mar. 2	23 55.38	+00 26.0	3.025	2.103	+2.11	+12.9	19.0	17.7
Mar. 12	00 16.23	+01 41.6	3.106	2.151	+2.05	+12.5	19.3	13.3
Mar. 22	00 36.52	+03 44.7	3.180	2.201	+2.00	+12.0	19.6	8.8

Comet P/2010 A5 = 2020 Y5 (LINEAR)

Epoch = 2021 July 5.0 TT
 T = 2021 Oct. 17.56049 TT
 Peri. = 307.09538 e = 0.6648822
 Node = 277.65961 2000.0 a = 5.0815069 AU
 Incl. = 5.79740 n = 0.08604295
 q = 1.7029034 AU P = 11.45 years

$$m_1 = 9.5 + 5 \log(\Delta) + 20.0 \log(r(t+15))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	08 57.38	+13 22.4	2.293	3.197	-0.61	+0.4	21.1	152.4
Jan. 16	08 50.48	+13 30.1	2.173	3.130	-0.78	+1.2	20.8	164.0
Jan. 26	08 42.07	+13 44.5	2.082	3.063	-0.90	+1.7	20.5	174.5
Feb. 5	08 32.88	+14 03.0	2.020	2.995	-0.93	+2.0	20.3	169.8
Feb. 15	08 23.82	+14 23.1	1.988	2.928	-0.86	+2.0	20.0	158.1
Feb. 25	08 15.87	+14 41.9	1.984	2.860	-0.70	+1.7	19.8	146.2
Mar. 7	08 09.85	+14 57.1	2.002	2.792	-0.47	+1.3	19.6	134.8
Mar. 17	08 06.32	+15 07.2	2.039	2.724	-0.20	+0.7	19.4	124.0
Mar. 27	08 05.59	+15 10.9	2.090	2.656	+0.08	0.0	19.2	114.0
Apr. 6	08 07.68	+15 07.4	2.148	2.589	+0.36	-0.8	19.1	104.6
Apr. 16	08 12.48	+14 56.0	2.211	2.522	+0.62	-1.6	18.9	96.0
Apr. 26	08 19.80	+14 35.9	2.273	2.455	+0.86	-2.5	18.7	88.1
May 6	08 29.37	+14 06.6	2.334	2.390	+1.07	-3.5	18.5	80.8
May 16	08 40.97	+13 27.2	2.390	2.325	+1.26	-4.5	18.4	74.1
May 26	08 54.35	+12 37.2	2.440	2.262	+1.43	-5.6	18.2	67.8
June 5	09 09.29	+11 36.1	2.484	2.200	+1.57	-6.7	18.0	62.1
June 15	09 25.65	+10 23.4	2.521	2.139	+1.71	-7.9	17.8	56.7
June 25	09 43.27	+08 58.9	2.551	2.081	+1.83	-9.1	17.5	51.8
July 5	10 02.01	+07 22.6	2.574	2.026	+1.93	-10.3	17.3	47.2
July 15	10 21.82	+05 34.7	2.591	1.973	+2.04	-11.4	17.1	42.9
July 25	10 42.60	+03 35.7	2.604	1.923	+2.13	-12.5	17.0	39.0
Aug. 4	11 04.33	+01 26.6	2.612	1.878	+2.22	-13.4	16.8	35.3
Aug. 14	11 26.99	+00 51.5	2.617	1.836	+2.32	-14.2	16.6	31.8
Aug. 24	11 50.55	-03 16.8	2.621	1.800	+2.41	-14.8	16.5	28.6
Sept. 3	12 15.05	-05 47.2	2.624	1.768	+2.50	-15.2	16.4	25.6
Sept. 13	12 40.48	-08 20.2	2.627	1.743	+2.59	-15.3	16.3	22.7
Sept. 23	13 06.85	-10 52.6	2.632	1.723	+2.69	-15.1	16.2	20.0
Oct. 3	13 34.14	-13 21.2	2.640	1.710	+2.78	-14.5	16.2	17.3
Oct. 13	14 02.34	-15 42.4	2.650	1.704	+2.87	-13.6	16.3	14.6
Oct. 23	14 31.36	-17 52.3	2.664	1.704	+2.94	-12.2	16.3	12.0
Nov. 2	15 01.08	-19 47.7	2.682	1.711	+3.00	-10.6	16.4	9.4
Nov. 12	15 31.33	-21 25.5	2.704	1.725	+3.05	-8.7	16.6	6.6
Nov. 22	16 01.87	-22 43.2	2.729	1.745	+3.06	-6.6	16.7	3.9
Dec. 2	16 32.44	-23 39.3	2.756	1.771	+3.05	-4.4	16.9	1.8
Dec. 12	17 02.75	-24 13.2	2.785	1.803	+3.00	-2.2	17.1	3.2
Dec. 22	17 32.47	-24 25.1	2.814	1.840	+2.93	0.0	17.3	6.4
Jan. 1	18 01.36	-24 16.3	2.842	1.881	+2.83	+2.0	17.6	10.0
Jan. 11	18 29.16	-23 48.7	2.868	1.927	+2.71	+3.7	17.8	13.8
Jan. 21	18 55.70	-23 04.4	2.891	1.977	+2.58	+5.2	18.1	17.8
Jan. 31	19 20.84	-22 06.2	2.909	2.030	+2.43	+6.5	18.3	22.1
Feb. 10	19 44.51	-20 56.7	2.921	2.086	+2.28	+7.5	18.6	26.6
Feb. 20	20 06.65	-19 38.5	2.926	2.144	+2.13	+8.2	18.8	31.4
Mar. 2	20 27.26	-18 14.1	2.923	2.205	+1.98	+8.7	19.1	36.4
Mar. 12	20 46.32	-16 45.8	2.911	2.267	+1.82	+9.0	19.3	41.6
Mar. 22	21 03.84	-15 15.6	2.891	2.331	+1.67	+9.0	19.5	47.1

Comet 110P/Hartley

Epoch = 2021 July 5.0 TT
 T = 2021 Oct. 18.32915 TT
 Peri. = 167.45241 e = 0.3181365
 Node = 287.53465 2000.0 a = 3.6014657 AU
 Incl. = 11.70721 n = 0.14420660
 q = 2.4557080 AU P = 6.83 years

$$m_1 = 5.6 + 5 \log(\Delta) + 22.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	23 50.74	+11 29.2	3.025	2.966	+1.01	+3.0	18.6	77.2
Jan. 16	00 01.37	+12 03.8	3.128	2.937	+1.13	+4.0	18.6	69.8
Jan. 26	00 13.17	+12 48.4	3.225	2.908	+1.24	+5.0	18.6	62.7
Feb. 5	00 25.99	+13 41.6	3.315	2.880	+1.33	+5.7	18.5	55.9
Feb. 15	00 39.73	+14 41.9	3.395	2.852	+1.42	+6.4	18.5	49.4
Feb. 25	00 54.29	+15 48.0	3.465	2.825	+1.50	+6.9	18.4	43.1
Mar. 7	01 09.58	+16 58.3	3.525	2.798	+1.57	+7.2	18.4	37.1
Mar. 17	01 25.58	+18 11.5	3.574	2.772	+1.64	+7.4	18.3	31.3
Mar. 27	01 42.21	+19 26.3	3.611	2.747	+1.70	+7.5	18.3	25.7
Apr. 6	01 59.46	+20 41.0	3.637	2.722	+1.76	+7.4	18.2	20.4
Apr. 16	02 17.28	+21 54.6	3.652	2.698	+1.81	+7.2	18.1	15.4
Apr. 26	02 35.65	+23 05.7	3.655	2.675	+1.87	+6.9	18.0	11.0
May 6	02 54.53	+24 12.9	3.648	2.652	+1.92	+6.5	17.9	7.8
May 16	03 13.90	+25 15.2	3.630	2.631	+1.96	+5.9	17.9	7.4
May 26	03 33.70	+26 11.3	3.602	2.610	+2.00	+5.2	17.8	9.9
June 5	03 53.87	+27 00.2	3.564	2.591	+2.04	+4.5	17.7	13.9
June 15	04 14.35	+27 40.9	3.517	2.572	+2.06	+3.6	17.6	18.3
June 25	04 35.05	+28 12.6	3.461	2.555	+2.08	+2.6	17.5	22.9
July 5	04 55.87	+28 34.6	3.396	2.539	+2.09	+1.7	17.4	27.6
July 15	05 16.71	+28 46.6	3.323	2.525	+2.08	+0.6	17.3	32.4
July 25	05 37.41	+28 48.1	3.242	2.511	+2.06	-0.4	17.2	37.3
Aug. 4	05 57.86	+28 39.3	3.155	2.499	+2.03	-1.5	17.0	42.3
Aug. 14	06 17.91	+28 20.2	3.060	2.489	+1.98	-2.5	16.9	47.4
Aug. 24	06 37.40	+27 51.4	2.959	2.479	+1.91	-3.4	16.8	52.6
Sept. 3	06 56.17	+27 13.4	2.853	2.472	+1.83	-4.3	16.7	58.0
Sept. 13	07 14.06	+26 27.3	2.741	2.465	+1.73	-5.0	16.6	63.7
Sept. 23	07 30.89	+25 34.2	2.625	2.461	+1.62	-5.7	16.5	69.5
Oct. 3	07 46.48	+24 35.2	2.506	2.458	+1.48	-6.2	16.4	75.6
Oct. 13	08 00.62	+23 32.0	2.385	2.456	+1.33	-6.5	16.3	82.1
Oct. 23	08 13.08	+22 26.0	2.263	2.456	+1.15	-6.7	16.2	89.0
Nov. 2	08 23.63	+21 19.0	2.141	2.457	+0.94	-6.7	16.0	96.3
Nov. 12	08 31.98	+20 12.8	2.022	2.460	+0.70	-6.5	15.9	104.2
Nov. 22	08 37.84	+19 09.2	1.909	2.465	+0.44	-6.2	15.8	112.7
Dec. 2	08 40.96	+18 09.7	1.805	2.471	+0.15	-5.7	15.7	121.9
Dec. 12	08 41.11	+17 15.8	1.712	2.479	-0.15	-5.0	15.6	131.7
Dec. 22	08 38.30	+16 28.4	1.636	2.488	-0.44	-4.4	15.6	142.3
Jan. 1	08 32.75	+15 48.0	1.579	2.498	-0.69	-3.7	15.5	153.5
Jan. 11	08 25.07	+15 14.2	1.547	2.510	-0.85	-3.0	15.5	165.0
Jan. 21	08 16.26	+14 46.4	1.542	2.524	-0.90	-2.5	15.6	174.6
Jan. 31	08 07.48	+14 23.3	1.565	2.538	-0.83	-2.1	15.7	168.6
Feb. 10	07 59.91	+14 04.0	1.615	2.554	-0.65	-1.8	15.8	157.4
Feb. 20	07 54.45	+13 47.0	1.690	2.571	-0.41	-1.6	16.0	146.3
Mar. 2	07 51.60	+13 31.0	1.786	2.590	-0.13	-1.6	16.2	135.7
Mar. 12	07 51.53	+13 14.8	1.899	2.609	+0.14	-1.7	16.4	125.9
Mar. 22	07 54.11	+12 56.8	2.026	2.629	+0.39	-1.9	16.6	116.7

Comet 67P/Churyumov-Gerasimenko

Epoch = 2021 July 5.0 TT
 T = 2021 Nov. 2.05049 TT
 Peri. = 22.12296 e = 0.6498117
 Node = 36.33630 2000.0 a = 3.4571186 AU
 Incl. = 3.87131 n = 0.15333195
 q = 1.2106425 AU P = 6.43 years

$$m_1 = 10.2 + 5 \log(\Delta) + 12.5 \log(r(t-50))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 35.44	-24 33.3	4.156	3.182	+1.49	+3.4	20.1	6.7
Jan. 16	19 50.48	-23 56.9	4.098	3.116	+1.52	+3.9	20.0	3.0
Jan. 26	20 05.86	-23 14.9	4.022	3.050	+1.55	+4.5	19.8	7.8
Feb. 5	20 21.51	-22 27.2	3.929	2.982	+1.58	+5.1	19.7	14.0
Feb. 15	20 37.38	-21 33.8	3.820	2.914	+1.60	+5.7	19.5	20.3
Feb. 25	20 53.42	-20 34.8	3.696	2.844	+1.61	+6.2	19.3	26.4
Mar. 7	21 09.59	-19 30.3	3.559	2.773	+1.62	+6.8	19.1	32.5
Mar. 17	21 25.87	-18 20.4	3.409	2.701	+1.63	+7.3	18.9	38.4
Mar. 27	21 42.25	-17 05.4	3.250	2.628	+1.64	+7.8	18.7	44.2
Apr. 6	21 58.73	-15 45.5	3.082	2.554	+1.65	+8.3	18.4	49.9
Apr. 16	22 15.32	-14 20.9	2.907	2.479	+1.67	+8.7	18.2	55.4
Apr. 26	22 32.03	-12 51.9	2.727	2.403	+1.68	+9.1	17.9	60.9
May 6	22 48.92	-11 18.7	2.544	2.326	+1.70	+9.6	17.6	66.1
May 16	23 06.02	-09 41.3	2.359	2.249	+1.72	+9.9	17.3	71.3
May 26	23 23.41	-08 00.1	2.175	2.171	+1.76	+10.3	17.0	76.3
June 5	23 41.17	-06 14.8	1.993	2.092	+1.80	+10.8	16.6	81.1
June 15	23 59.40	-04 25.4	1.815	2.013	+1.85	+11.2	16.3	85.8
June 25	00 18.24	-02 31.8	1.642	1.934	+1.92	+11.6	15.9	90.2
July 5	00 37.88	+00 33.4	1.475	1.855	+2.02	+12.1	15.4	94.4
July 15	00 58.52	+01 30.3	1.317	1.777	+2.13	+12.7	15.0	98.4
July 25	01 20.44	+03 40.3	1.168	1.700	+2.28	+13.4	14.5	102.0
Aug. 4	01 44.02	+05 57.7	1.030	1.625	+2.47	+14.2	14.1	105.2
Aug. 14	02 09.69	+08 23.4	0.904	1.552	+2.70	+15.1	13.6	108.0
Aug. 24	02 38.00	+10 58.4	0.792	1.483	+3.00	+16.0	13.0	110.1
Sept. 3	03 09.59	+13 42.4	0.693	1.419	+3.36	+16.8	12.5	111.6
Sept. 13	03 44.98	+16 32.1	0.610	1.360	+3.76	+17.1	12.0	112.3
Sept. 23	04 24.51	+19 20.5	0.542	1.310	+4.18	+16.4	11.5	112.3
Oct. 3	05 07.84	+21 55.6	0.491	1.268	+4.49	+14.2	11.0	111.8
Oct. 13	05 53.48	+24 02.7	0.455	1.237	+4.60	+10.7	10.6	111.1
Oct. 23	06 38.95	+25 31.3	0.433	1.217	+4.42	+6.6	10.3	110.7
Nov. 2	07 21.25	+26 21.1	0.421	1.211	+3.94	+3.2	10.0	111.3
Nov. 12	07 57.63	+26 42.7	0.418	1.217	+3.24	+1.2	9.8	113.2
Nov. 22	08 26.48	+26 51.9	0.421	1.236	+2.43	+0.8	9.6	116.9
Dec. 2	08 46.95	+27 03.0	0.427	1.267	+1.57	+1.6	9.5	122.4
Dec. 12	08 58.77	+27 25.0	0.438	1.309	+0.72	+2.9	9.5	129.8
Dec. 22	09 02.44	+27 57.7	0.455	1.360	-0.04	+3.6	9.5	138.9
Jan. 1	08 59.11	+28 34.0	0.481	1.418	-0.65	+3.4	9.7	149.3
Jan. 11	08 50.91	+29 01.7	0.520	1.482	-0.97	+1.8	9.9	160.1
Jan. 21	08 40.83	+29 10.2	0.575	1.551	-1.00	-0.4	10.3	168.7
Jan. 31	08 31.64	+28 56.0	0.648	1.624	-0.79	-2.6	10.7	167.6
Feb. 10	08 25.30	+28 22.1	0.741	1.699	-0.43	-4.3	11.2	159.0
Feb. 20	08 22.66	+27 34.2	0.852	1.776	-0.06	-5.3	11.7	149.5
Mar. 2	08 23.62	+26 37.6	0.980	1.854	+0.28	-6.0	12.3	140.3
Mar. 12	08 27.75	+25 35.7	1.125	1.933	+0.56	-6.4	12.8	131.6
Mar. 22	08 34.43	+24 30.3	1.282	2.012	+0.78	-6.7	13.4	123.6

Comet C/2018 U1 (Lemmon)

Epoch = 2021 July 5.0 TT
 T = 2021 Nov. 2.98450 TT
 Peri. = 180.45233
 Node = 75.48068 2000.0
 Incl. = 108.29641
 q = 4.9930193 AU
 e = 1.0013066

$$m1 = 4.1 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	18 03.12	+04 42.8	6.312	5.497	+0.48	-3.9	15.5	31.5
Jan. 16	18 07.79	+04 07.1	6.235	5.466	+0.45	-3.2	15.5	35.7
Jan. 26	18 12.13	+03 37.5	6.136	5.436	+0.41	-2.7	15.4	41.3
Feb. 5	18 15.98	+03 13.0	6.015	5.406	+0.35	-2.2	15.3	48.1
Feb. 15	18 19.22	+02 53.0	5.875	5.378	+0.28	-1.8	15.3	55.5
Feb. 25	18 21.67	+02 36.4	5.717	5.350	+0.20	-1.5	15.2	63.5
Mar. 7	18 23.18	+02 22.2	5.546	5.323	+0.09	-1.3	15.1	72.0
Mar. 17	18 23.58	+02 09.0	5.365	5.298	-0.03	-1.3	15.0	80.8
Mar. 27	18 22.72	+01 55.6	5.178	5.273	-0.16	-1.4	14.9	90.0
Apr. 6	18 20.45	+01 40.2	4.990	5.249	-0.31	-1.7	14.8	99.5
Apr. 16	18 16.63	+01 21.3	4.807	5.226	-0.47	-2.2	14.7	109.3
Apr. 26	18 11.18	+00 56.9	4.635	5.204	-0.63	-2.8	14.6	119.4
May 6	18 04.11	+00 25.4	4.480	5.183	-0.80	-3.6	14.5	129.7
May 16	17 55.47	+00 14.8	4.348	5.163	-0.94	-4.5	14.4	139.9
May 26	17 45.50	-01 04.7	4.246	5.144	-1.06	-5.5	14.4	149.5
June 5	17 34.53	-02 04.5	4.176	5.126	-1.14	-6.5	14.3	157.1
June 15	17 22.99	-03 13.8	4.144	5.109	-1.16	-7.4	14.3	159.8
June 25	17 11.42	-04 31.1	4.150	5.094	-1.14	-8.1	14.3	155.7
July 5	17 00.33	-05 54.4	4.193	5.079	-1.06	-8.6	14.3	147.4
July 15	16 50.19	-07 21.5	4.271	5.066	-0.95	-8.8	14.3	137.4
July 25	16 41.34	-08 50.4	4.378	5.053	-0.80	-8.9	14.3	126.8
Aug. 4	16 34.00	-10 19.2	4.510	5.042	-0.65	-8.8	14.4	116.3
Aug. 14	16 28.29	-11 46.9	4.660	5.032	-0.48	-8.7	14.5	105.8
Aug. 24	16 24.21	-13 12.6	4.822	5.023	-0.32	-8.4	14.5	95.6
Sept. 3	16 21.68	-14 35.9	4.989	5.015	-0.17	-8.2	14.6	85.7
Sept. 13	16 20.59	-15 56.9	5.156	5.008	-0.03	-8.0	14.7	76.0
Sept. 23	16 20.81	-17 15.4	5.318	5.003	+0.09	-7.7	14.7	66.5
Oct. 3	16 22.19	-18 31.7	5.470	4.999	+0.20	-7.5	14.8	57.2
Oct. 13	16 24.58	-19 46.0	5.607	4.996	+0.29	-7.3	14.8	48.1
Oct. 23	16 27.82	-20 58.5	5.727	4.994	+0.37	-7.2	14.9	39.1
Nov. 2	16 31.77	-22 09.5	5.826	4.993	+0.43	-7.0	14.9	30.2
Nov. 12	16 36.30	-23 19.4	5.902	4.993	+0.48	-6.9	14.9	21.4
Nov. 22	16 41.25	-24 28.5	5.954	4.995	+0.51	-6.9	15.0	12.7
Dec. 2	16 46.50	-25 37.2	5.980	4.998	+0.54	-6.9	15.0	4.9
Dec. 12	16 51.91	-26 46.0	5.979	5.002	+0.54	-6.9	15.0	6.6
Dec. 22	16 57.32	-27 55.5	5.952	5.007	+0.54	-7.0	15.0	14.8
Jan. 1	17 02.60	-29 06.2	5.899	5.014	+0.51	-7.2	15.0	23.6
Jan. 11	17 07.57	-30 18.9	5.822	5.021	+0.47	-7.4	14.9	32.6
Jan. 21	17 12.06	-31 34.3	5.723	5.030	+0.42	-7.7	14.9	41.6
Jan. 31	17 15.88	-32 53.1	5.604	5.040	+0.34	-8.1	14.9	50.9
Feb. 10	17 18.82	-34 16.3	5.468	5.051	+0.24	-8.6	14.8	60.2
Feb. 20	17 20.64	-35 44.3	5.320	5.063	+0.11	-9.1	14.8	69.7
Mar. 2	17 21.08	-37 17.7	5.165	5.076	-0.04	-9.6	14.7	79.4
Mar. 12	17 19.83	-38 56.5	5.006	5.091	-0.23	-10.2	14.7	89.2
Mar. 22	17 16.60	-40 40.0	4.851	5.106	-0.44	-10.6	14.6	99.2

Comet 70P/Kojima

Epoch = 2021 July 5.0 TT
 T = 2021 Nov. 3.13643 TT
 Peri. = 1.83704 e = 0.4536388
 Node = 119.26811 2000.0 a = 3.6770032 AU
 Incl. = 6.59818 n = 0.13978580
 q = 2.0089719 AU P = 7.05 years

$$m_1 = 10.6 + 5 \log(\Delta) + 15.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m ₁	Elong.
2021/22	h m	° ′			m	′		°
Jan. 6	00 43.04	-02 39.6	2.944	2.993	+0.66	+6.3	20.7	83.3
Jan. 16	00 50.38	-01 32.5	3.040	2.948	+0.82	+7.1	20.6	75.3
Jan. 26	00 59.23	+00 17.9	3.129	2.902	+0.96	+7.8	20.6	67.7
Feb. 5	01 09.41	+01 02.7	3.211	2.856	+1.09	+8.3	20.6	60.5
Feb. 15	01 20.79	+02 28.1	3.283	2.811	+1.20	+8.8	20.5	53.6
Feb. 25	01 33.28	+03 57.1	3.345	2.765	+1.30	+9.0	20.5	47.0
Mar. 7	01 46.75	+05 28.4	3.395	2.720	+1.40	+9.2	20.4	40.7
Mar. 17	02 01.16	+07 00.9	3.434	2.675	+1.49	+9.3	20.3	34.6
Mar. 27	02 16.45	+08 33.6	3.460	2.631	+1.57	+9.2	20.2	28.9
Apr. 6	02 32.56	+10 05.1	3.475	2.587	+1.66	+9.1	20.1	23.3
Apr. 16	02 49.48	+11 34.6	3.478	2.543	+1.74	+8.8	20.0	18.1
Apr. 26	03 07.18	+13 00.8	3.470	2.501	+1.81	+8.4	19.9	13.0
May 6	03 25.64	+14 22.6	3.452	2.459	+1.89	+7.9	19.8	8.4
May 16	03 44.84	+15 38.8	3.424	2.417	+1.96	+7.3	19.7	4.7
May 26	04 04.76	+16 48.3	3.386	2.377	+2.03	+6.5	19.5	4.5
June 5	04 25.36	+17 50.0	3.340	2.339	+2.10	+5.7	19.4	7.8
June 15	04 46.62	+18 42.9	3.286	2.301	+2.16	+4.8	19.3	11.8
June 25	05 08.48	+19 25.7	3.225	2.265	+2.22	+3.7	19.1	15.9
July 5	05 30.86	+19 57.8	3.159	2.231	+2.27	+2.6	19.0	20.0
July 15	05 53.71	+20 18.3	3.086	2.198	+2.31	+1.4	18.8	24.1
July 25	06 16.90	+20 26.6	3.010	2.168	+2.33	+0.2	18.6	28.2
Aug. 4	06 40.35	+20 22.5	2.929	2.140	+2.35	-1.1	18.5	32.2
Aug. 14	07 03.93	+20 05.9	2.844	2.114	+2.36	-2.3	18.3	36.2
Aug. 24	07 27.52	+19 37.1	2.757	2.090	+2.35	-3.5	18.1	40.3
Sept. 3	07 51.00	+18 56.7	2.668	2.070	+2.34	-4.6	18.0	44.3
Sept. 13	08 14.24	+18 05.7	2.576	2.052	+2.31	-5.6	17.8	48.4
Sept. 23	08 37.11	+17 05.4	2.483	2.037	+2.26	-6.5	17.6	52.7
Oct. 3	08 59.52	+15 57.5	2.388	2.025	+2.21	-7.1	17.4	57.0
Oct. 13	09 21.33	+14 43.9	2.293	2.016	+2.14	-7.6	17.3	61.5
Oct. 23	09 42.42	+13 26.9	2.196	2.011	+2.07	-7.8	17.1	66.1
Nov. 2	10 02.69	+12 09.0	2.099	2.009	+1.98	-7.7	16.9	71.0
Nov. 12	10 21.97	+10 52.8	2.002	2.010	+1.87	-7.4	16.8	76.2
Nov. 22	10 40.11	+09 41.4	1.905	2.015	+1.74	-6.8	16.6	81.7
Dec. 2	10 56.91	+08 37.6	1.809	2.023	+1.60	-5.8	16.5	87.6
Dec. 12	11 12.14	+07 44.9	1.714	2.034	+1.43	-4.5	16.3	93.9
Dec. 22	11 25.52	+07 06.2	1.622	2.048	+1.22	-3.0	16.2	100.7
Jan. 1	11 36.73	+06 44.5	1.535	2.065	+0.99	-1.1	16.1	108.2
Jan. 11	11 45.42	+06 42.7	1.453	2.085	+0.72	+1.0	16.0	116.3
Jan. 21	11 51.27	+07 02.0	1.381	2.108	+0.42	+3.1	15.9	125.2
Jan. 31	11 54.03	+07 42.6	1.321	2.133	+0.10	+5.2	15.8	134.9
Feb. 10	11 53.65	+08 42.0	1.277	2.161	-0.20	+6.8	15.8	145.2
Feb. 20	11 50.41	+09 54.2	1.251	2.191	-0.46	+7.6	15.8	155.8
Mar. 2	11 44.99	+11 10.5	1.249	2.223	-0.63	+7.5	15.8	166.0
Mar. 12	11 38.40	+12 20.9	1.271	2.257	-0.67	+6.3	15.9	170.8
Mar. 22	11 31.89	+13 15.9	1.318	2.293	-0.60	+4.4	16.1	164.2

Comet 132P/Helin-Roman-Alu

Epoch = 2021 July 5.0 TT
 T = 2021 Nov. 13.13892 TT
 Peri. = 216.34395 e = 0.5648651
 Node = 173.99887 2000.0 a = 3.8879141 AU
 Incl. = 5.38204 n = 0.12856687
 q = 1.6917671 AU P = 7.67 years

$$m_1 = 10.6 + 5 \log(\Delta) + 20.0 \log(r(t-20))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 00.26	-18° 50.0	4.135	3.155	+1.54	+2.0	.	4.1
Jan. 16	19 15.82	-18 27.0	4.067	3.098	+1.57	+2.7	.	8.7
Jan. 26	19 31.63	-17 56.9	3.982	3.040	+1.59	+3.4	.	14.7
Feb. 5	19 47.62	-17 19.7	3.883	2.982	+1.61	+4.1	.	20.8
Feb. 15	20 03.75	-16 35.6	3.770	2.923	+1.62	+4.8	.	26.9
Feb. 25	20 19.92	-15 44.8	3.644	2.864	+1.62	+5.4	.	32.9
Mar. 7	20 36.11	-14 47.5	3.507	2.805	+1.62	+6.1	.	38.9
Mar. 17	20 52.26	-13 44.1	3.360	2.745	+1.61	+6.7	.	44.8
Mar. 27	21 08.32	-12 35.2	3.205	2.685	+1.60	+7.2	.	50.6
Apr. 6	21 24.26	-11 21.3	3.044	2.626	+1.59	+7.6	21.8	56.4
Apr. 16	21 40.06	-10 03.0	2.878	2.566	+1.57	+8.0	21.5	62.1
Apr. 26	21 55.67	-08 41.2	2.709	2.506	+1.55	+8.3	21.1	67.7
May 6	22 11.07	-07 16.7	2.538	2.447	+1.53	+8.6	20.8	73.3
May 16	22 26.22	-05 50.6	2.366	2.388	+1.50	+8.7	20.5	79.0
May 26	22 41.05	-04 24.0	2.196	2.330	+1.47	+8.6	20.1	84.6
June 5	22 55.54	-02 58.2	2.029	2.272	+1.43	+8.5	19.7	90.3
June 15	23 09.57	-01 34.9	1.865	2.216	+1.37	+8.1	19.3	96.0
June 25	23 23.05	+00 16.1	1.707	2.160	+1.31	+7.6	18.9	102.0
July 5	23 35.83	+00 56.1	1.556	2.106	+1.23	+6.8	18.5	108.1
July 15	23 47.71	+01 58.9	1.413	2.054	+1.13	+5.6	18.0	114.4
July 25	23 58.45	+02 49.1	1.280	2.004	+1.00	+4.2	17.6	121.2
Aug. 4	00 07.77	+03 23.4	1.157	1.956	+0.84	+2.4	17.2	128.4
Aug. 14	00 15.31	+03 37.7	1.047	1.911	+0.65	+0.2	16.7	136.2
Aug. 24	00 20.80	+03 28.7	0.951	1.869	+0.43	-2.3	16.3	144.6
Sept. 3	00 24.04	+02 54.5	0.870	1.830	+0.20	-4.8	15.9	153.8
Sept. 13	00 25.05	+01 55.6	0.808	1.796	-0.01	-7.1	15.6	163.6
Sept. 23	00 24.33	+00 38.0	0.765	1.766	-0.14	-8.4	15.3	173.8
Oct. 3	00 22.73	+00 48.0	0.741	1.740	-0.16	-8.5	15.0	174.3
Oct. 13	00 21.48	-02 08.1	0.738	1.720	-0.05	-7.1	14.9	164.0
Oct. 23	00 21.86	-03 08.3	0.754	1.705	+0.17	-4.5	14.8	153.8
Nov. 2	00 24.75	-03 39.3	0.787	1.695	+0.45	-1.3	14.8	144.3
Nov. 12	00 30.64	-03 37.0	0.836	1.692	+0.76	+2.1	14.8	135.7
Nov. 22	00 39.55	-03 02.6	0.897	1.694	+1.05	+5.1	14.9	128.0
Dec. 2	00 51.17	-02 00.3	0.969	1.702	+1.30	+7.6	15.1	121.0
Dec. 12	01 05.14	+00 35.6	1.053	1.716	+1.51	+9.5	15.3	114.7
Dec. 22	01 21.01	+01 05.7	1.145	1.735	+1.67	+10.8	15.5	108.9
Jan. 1	01 38.37	+02 57.7	1.247	1.759	+1.81	+11.6	15.8	103.5
Jan. 11	01 56.92	+04 55.6	1.356	1.788	+1.91	+11.9	16.0	98.4
Jan. 21	02 16.38	+06 54.9	1.474	1.822	+1.99	+11.9	16.3	93.6
Jan. 31	02 36.54	+08 51.9	1.598	1.860	+2.05	+11.5	16.7	88.8
Feb. 10	02 57.24	+10 43.7	1.729	1.901	+2.09	+10.8	17.0	84.1
Feb. 20	03 18.33	+12 27.9	1.865	1.945	+2.13	+9.9	17.3	79.5
Mar. 2	03 39.69	+14 02.5	2.005	1.993	+2.15	+8.9	17.7	74.9
Mar. 12	04 01.23	+15 26.4	2.150	2.042	+2.16	+7.8	18.0	70.3
Mar. 22	04 22.83	+16 38.5	2.296	2.094	+2.16	+6.5	18.4	65.7

Comet A/2020 F7

Epoch = 2021 July 5.0 TT
 T = 2021 Nov. 14.05423 TT
 Peri. = 227.97544
 Node = 321.88701 2000.0
 Incl. = 93.95359
 q = 5.3321050 AU
 e = 0.9926669

$$m_1 = -1.0 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	09 36.14	-03 33.1	5.066	5.807	-0.76	-5.4	17.8	135.3
Jan. 16	09 28.00	-04 24.0	4.943	5.778	-0.87	-4.7	17.7	145.2
Jan. 26	09 18.93	-05 07.7	4.852	5.751	-0.94	-3.9	17.6	153.6
Feb. 5	09 09.29	-05 43.5	4.796	5.724	-0.98	-3.1	17.6	158.2
Feb. 15	08 59.51	-06 11.1	4.777	5.698	-0.97	-2.3	17.5	156.7
Feb. 25	08 50.04	-06 31.1	4.793	5.672	-0.91	-1.6	17.5	150.1
Mar. 7	08 41.30	-06 44.8	4.842	5.648	-0.82	-1.1	17.5	141.0
Mar. 17	08 33.61	-06 53.7	4.919	5.624	-0.70	-0.7	17.5	131.2
Mar. 27	08 27.22	-06 59.7	5.020	5.601	-0.56	-0.5	17.5	121.1
Apr. 6	08 22.22	-07 04.9	5.138	5.579	-0.42	-0.5	17.5	111.2
Apr. 16	08 18.66	-07 10.9	5.268	5.558	-0.28	-0.7	17.5	101.6
Apr. 26	08 16.47	-07 19.4	5.404	5.538	-0.15	-1.0	17.5	92.4
May 6	08 15.57	-07 31.5	5.540	5.518	-0.02	-1.5	17.6	83.5
May 16	08 15.82	-07 48.3	5.672	5.500	+0.08	-2.0	17.6	75.1
May 26	08 17.09	-08 10.6	5.796	5.482	+0.18	-2.6	17.6	67.1
June 5	08 19.23	-08 38.8	5.909	5.466	+0.26	-3.2	17.6	59.6
June 15	08 22.10	-09 13.7	6.007	5.450	+0.32	-3.9	17.6	52.6
June 25	08 25.57	-09 55.4	6.089	5.435	+0.37	-4.6	17.6	46.2
July 5	08 29.50	-10 44.2	6.153	5.421	+0.41	-5.3	17.6	40.6
July 15	08 33.78	-11 40.5	6.197	5.408	+0.44	-6.0	17.6	36.0
July 25	08 38.29	-12 44.5	6.221	5.396	+0.46	-6.8	17.6	32.9
Aug. 4	08 42.91	-13 56.2	6.225	5.386	+0.46	-7.6	17.6	31.4
Aug. 14	08 47.53	-15 16.0	6.209	5.376	+0.46	-8.4	17.6	31.9
Aug. 24	08 52.04	-16 43.9	6.174	5.367	+0.44	-9.2	17.5	34.1
Sept. 3	08 56.31	-18 20.0	6.120	5.359	+0.41	-10.1	17.5	37.8
Sept. 13	09 00.22	-20 04.3	6.049	5.352	+0.37	-10.9	17.5	42.6
Sept. 23	09 03.61	-21 56.8	5.963	5.346	+0.31	-11.7	17.4	48.2
Oct. 3	09 06.35	-23 57.3	5.864	5.341	+0.23	-12.5	17.4	54.2
Oct. 13	09 08.26	-26 05.2	5.755	5.337	+0.14	-13.2	17.3	60.7
Oct. 23	09 09.14	-28 19.7	5.639	5.335	+0.02	-13.8	17.3	67.3
Nov. 2	09 08.78	-30 39.8	5.520	5.333	-0.11	-14.2	17.2	74.0
Nov. 12	09 06.94	-33 03.5	5.401	5.332	-0.27	-14.5	17.2	80.8
Nov. 22	09 03.40	-35 28.3	5.286	5.332	-0.46	-14.4	17.2	87.4
Dec. 2	08 57.93	-37 50.9	5.179	5.334	-0.66	-14.0	17.1	93.7
Dec. 12	08 50.36	-40 07.1	5.084	5.336	-0.88	-13.1	17.1	99.5
Dec. 22	08 40.63	-42 12.0	5.005	5.340	-1.09	-11.7	17.0	104.6
Jan. 1	08 28.83	-44 00.5	4.945	5.344	-1.28	-9.7	17.0	108.8
Jan. 11	08 15.29	-45 27.6	4.905	5.349	-1.43	-7.4	17.0	111.8
Jan. 21	08 00.60	-46 29.8	4.888	5.356	-1.50	-4.8	17.0	113.4
Jan. 31	07 45.51	-47 05.4	4.892	5.363	-1.50	-2.1	17.0	113.6
Feb. 10	07 30.87	-47 15.1	4.917	5.372	-1.41	+0.4	17.1	112.4
Feb. 20	07 17.46	-47 01.9	4.962	5.381	-1.25	+2.4	17.1	110.0
Mar. 2	07 05.86	-46 30.6	5.023	5.392	-1.05	+3.9	17.1	106.7
Mar. 12	06 56.41	-45 46.6	5.097	5.403	-0.82	+4.9	17.2	102.7
Mar. 22	06 49.23	-44 55.5	5.181	5.416	-0.60	+5.3	17.2	98.3

Comet 402P/LINEAR

Epoch = 2021 July 5.0 TT
 T = 2021 Dec. 14.61582 TT
 Peri. = 326.74254 e = 0.4383138
 Node = 123.08921 2000.0 a = 7.0107542 AU
 Incl. = 30.85274 n = 0.05309541
 q = 3.9378439 AU P = 18.56 years

$$m1 = 1.2 + 5 \log(\Delta) + 20.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	02 32.89	-19 51.1	4.092	4.382	+0.07	+8.3	17.1	100.7
Jan. 16	02 34.30	-18 24.7	4.195	4.359	+0.22	+9.0	17.1	93.0
Jan. 26	02 37.17	-16 52.8	4.301	4.336	+0.36	+9.4	17.1	85.5
Feb. 5	02 41.38	-15 17.8	4.407	4.314	+0.49	+9.6	17.1	78.2
Feb. 15	02 46.83	-13 41.5	4.511	4.292	+0.61	+9.6	17.1	71.0
Feb. 25	02 53.40	-12 05.7	4.609	4.270	+0.71	+9.5	17.1	64.1
Mar. 7	03 00.94	-10 31.6	4.701	4.249	+0.80	+9.3	17.1	57.4
Mar. 17	03 09.35	-09 00.2	4.784	4.229	+0.88	+8.9	17.1	51.0
Mar. 27	03 18.50	-07 32.5	4.857	4.209	+0.95	+8.5	17.1	44.9
Apr. 6	03 28.30	-06 09.3	4.918	4.190	+1.01	+8.1	17.1	39.2
Apr. 16	03 38.64	-04 51.2	4.966	4.172	+1.06	+7.5	17.1	33.9
Apr. 26	03 49.44	-03 38.6	5.002	4.154	+1.10	+6.9	17.1	29.3
May 6	04 00.60	-02 32.0	5.024	4.136	+1.13	+6.3	17.0	25.5
May 16	04 12.05	-01 31.7	5.032	4.119	+1.16	+5.7	17.0	22.9
May 26	04 23.70	+00 38.1	5.026	4.103	+1.17	+5.0	17.0	21.9
June 5	04 35.48	+00 08.7	5.005	4.088	+1.18	+4.3	16.9	22.7
June 15	04 47.31	+00 48.6	4.970	4.073	+1.18	+3.6	16.9	25.1
June 25	04 59.10	+01 21.5	4.922	4.059	+1.17	+2.9	16.8	28.7
July 5	05 10.77	+01 47.4	4.859	4.046	+1.16	+2.2	16.8	33.1
July 15	05 22.24	+02 06.5	4.784	4.033	+1.13	+1.5	16.7	38.1
July 25	05 33.39	+02 19.0	4.696	4.021	+1.09	+0.9	16.6	43.6
Aug. 4	05 44.13	+02 25.2	4.596	4.010	+1.05	+0.3	16.6	49.4
Aug. 14	05 54.36	+02 25.5	4.485	4.000	+0.99	-0.3	16.5	55.5
Aug. 24	06 03.94	+02 20.5	4.365	3.990	+0.92	-0.8	16.4	61.9
Sept. 3	06 12.76	+02 11.0	4.236	3.981	+0.83	-1.2	16.3	68.6
Sept. 13	06 20.67	+01 57.8	4.101	3.973	+0.73	-1.5	16.2	75.7
Sept. 23	06 27.52	+01 42.1	3.961	3.966	+0.62	-1.7	16.2	83.0
Oct. 3	06 33.16	+01 25.2	3.819	3.960	+0.49	-1.7	16.1	90.7
Oct. 13	06 37.42	+01 08.7	3.677	3.954	+0.34	-1.5	16.0	98.8
Oct. 23	06 40.17	+00 54.7	3.539	3.949	+0.19	-1.2	15.9	107.2
Nov. 2	06 41.29	+00 45.2	3.408	3.945	+0.02	-0.6	15.8	116.0
Nov. 12	06 40.72	+00 42.6	3.288	3.942	-0.15	+0.2	15.7	125.2
Nov. 22	06 38.48	+00 49.3	3.185	3.940	-0.31	+1.3	15.6	134.5
Dec. 2	06 34.72	+01 07.3	3.101	3.939	-0.45	+2.5	15.6	143.7
Dec. 12	06 29.72	+01 38.3	3.041	3.938	-0.55	+3.8	15.5	152.1
Dec. 22	06 23.89	+02 22.7	3.008	3.938	-0.61	+5.2	15.5	158.2
Jan. 1	06 17.77	+03 19.9	3.004	3.939	-0.61	+6.4	15.5	159.3
Jan. 11	06 11.92	+04 28.0	3.030	3.941	-0.55	+7.3	15.5	154.6
Jan. 21	06 06.89	+05 44.4	3.085	3.944	-0.44	+8.0	15.6	146.6
Jan. 31	06 03.11	+07 05.8	3.166	3.947	-0.30	+8.3	15.6	137.3
Feb. 10	06 00.89	+08 29.3	3.270	3.952	-0.13	+8.3	15.7	127.7
Feb. 20	06 00.39	+09 52.0	3.392	3.957	+0.05	+8.1	15.8	118.2
Mar. 2	06 01.63	+11 12.0	3.530	3.963	+0.22	+7.8	15.9	108.9
Mar. 12	06 04.58	+12 27.5	3.677	3.970	+0.38	+7.3	16.0	99.9
Mar. 22	06 09.10	+13 37.6	3.830	3.977	+0.53	+6.7	16.1	91.2

Comet C/2021 A1 (Leonard)

Epoch = 2021 July 5.0 TT
 T = 2022 Jan. 3.31080 TT
 Peri. = 225.09183
 Node = 255.88923 2000.0
 Incl. = 132.68585
 q = 0.6152087 AU
 e = 1.0000566

$$m1 = 8.1 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	14 04.62	+41 16.1	4.873	5.049	+0.27	+10.2	18.6	94.7
Jan. 16	14 06.62	+43 06.1	4.657	4.947	+0.11	+12.0	18.4	101.4
Jan. 26	14 06.90	+45 13.6	4.452	4.845	-0.09	+13.6	18.2	107.8
Feb. 5	14 04.96	+47 36.4	4.262	4.741	-0.34	+15.0	18.0	113.4
Feb. 15	14 00.23	+50 10.8	4.092	4.636	-0.65	+15.9	17.8	117.8
Feb. 25	13 52.05	+52 50.6	3.944	4.530	-1.03	+16.0	17.6	120.7
Mar. 7	13 39.77	+55 27.3	3.821	4.423	-1.47	+15.1	17.5	121.7
Mar. 17	13 22.93	+57 50.2	3.725	4.316	-1.94	+13.1	17.3	120.5
Mar. 27	13 01.57	+59 47.6	3.655	4.207	-2.36	+9.9	17.2	117.3
Apr. 6	12 36.61	+61 08.8	3.610	4.096	-2.63	+5.8	17.0	112.4
Apr. 16	12 09.91	+61 47.1	3.586	3.985	-2.67	+1.4	16.9	106.2
Apr. 26	11 43.92	+61 41.9	3.580	3.872	-2.47	-2.8	16.7	99.3
May 6	11 20.85	+60 58.5	3.586	3.758	-2.09	-6.1	16.6	92.0
May 16	11 02.00	+59 45.3	3.599	3.643	-1.63	-8.6	16.5	84.4
May 26	10 47.77	+58 12.0	3.615	3.526	-1.18	-10.1	16.4	76.9
June 5	10 37.85	+56 26.7	3.627	3.407	-0.78	-10.9	16.2	69.5
June 15	10 31.68	+54 35.4	3.632	3.287	-0.43	-11.3	16.1	62.4
June 25	10 28.63	+52 42.6	3.625	3.165	-0.16	-11.2	15.9	55.6
July 5	10 28.07	+50 51.1	3.604	3.041	+0.06	-11.0	15.7	49.4
July 15	10 29.55	+49 02.5	3.564	2.916	+0.24	-10.7	15.5	43.7
July 25	10 32.63	+47 17.9	3.504	2.788	+0.38	-10.2	15.3	38.9
Aug. 4	10 37.01	+45 37.9	3.422	2.659	+0.50	-9.7	15.0	35.3
Aug. 14	10 42.45	+44 02.9	3.315	2.527	+0.59	-9.2	14.7	33.0
Aug. 24	10 48.74	+42 33.2	3.184	2.392	+0.67	-8.7	14.4	32.4
Sept. 3	10 55.74	+41 08.8	3.026	2.255	+0.74	-8.1	14.0	33.5
Sept. 13	11 03.37	+39 50.2	2.842	2.116	+0.79	-7.5	13.6	36.2
Sept. 23	11 11.56	+38 37.4	2.632	1.974	+0.85	-6.9	13.2	40.1
Oct. 3	11 20.34	+37 30.8	2.395	1.828	+0.91	-6.3	12.6	44.9
Oct. 13	11 29.81	+36 30.6	2.132	1.680	+0.99	-5.7	12.0	50.3
Oct. 23	11 40.27	+35 36.8	1.845	1.530	+1.12	-5.1	11.3	56.0
Nov. 2	11 52.47	+34 48.2	1.533	1.376	+1.37	-4.7	10.4	61.7
Nov. 12	12 08.29	+34 00.1	1.199	1.222	+1.93	-5.3	9.4	67.1
Nov. 22	12 33.32	+32 52.0	0.846	1.067	+3.54	-10.4	8.0	70.7
Dec. 2	13 30.10	+29 17.9	0.488	0.917	+10.13	-50.4	6.2	67.4
Dec. 12	16 49.76	+01 37.0	0.235	0.779	+32.40	351.2	3.9	25.5
Dec. 22	20 39.47	-31 21.7	0.456	0.671	+9.99	-48.9	4.7	36.0
Jan. 1	21 33.89	-35 25.4	0.832	0.617	+2.00	-9.4	5.6	38.6
Jan. 11	21 42.73	-36 19.6	1.187	0.638	-0.01	-1.9	6.5	32.5
Jan. 21	21 39.86	-36 21.5	1.478	0.724	-0.47	+1.4	7.5	25.3
Jan. 31	21 34.96	-36 00.6	1.698	0.851	-0.48	+2.6	8.5	20.7
Feb. 10	21 30.51	-35 33.5	1.852	0.996	-0.41	+2.6	9.4	21.0
Feb. 20	21 26.60	-35 09.9	1.951	1.150	-0.38	+2.0	10.2	26.2
Mar. 2	21 22.70	-34 54.7	2.002	1.305	-0.42	+0.9	10.8	34.1
Mar. 12	21 18.06	-34 51.6	2.012	1.459	-0.54	-0.4	11.3	43.3
Mar. 22	21 11.83	-35 02.6	1.990	1.611	-0.74	-1.9	11.7	53.5

Comet C/2019 L3 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2022 Jan. 9.66146 TT
 Peri. = 171.62022
 Node = 290.78815 2000.0
 Incl. = 48.36492
 q = 3.5543893 AU
 e = 1.0012401

$$m1 = 2.0 + 5 \log(\Delta) + 12.5 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	00 15.54	+56 22.8	4.529	4.827	+0.96	-7.1	13.8	101.8
Jan. 16	00 25.85	+55 15.6	4.569	4.770	+1.12	-6.3	13.8	95.8
Jan. 26	00 37.69	+54 16.9	4.616	4.714	+1.26	-5.4	13.7	89.7
Feb. 5	00 50.84	+53 27.0	4.667	4.659	+1.38	-4.5	13.7	83.5
Feb. 15	01 05.14	+52 45.8	4.720	4.604	+1.49	-3.7	13.7	77.3
Feb. 25	01 20.42	+52 12.9	4.773	4.551	+1.58	-2.9	13.6	71.2
Mar. 7	01 36.57	+51 47.3	4.823	4.498	+1.66	-2.2	13.6	65.2
Mar. 17	01 53.47	+51 27.9	4.869	4.445	+1.73	-1.6	13.5	59.4
Mar. 27	02 11.03	+51 13.6	4.910	4.394	+1.79	-1.2	13.5	53.8
Apr. 6	02 29.16	+51 03.0	4.943	4.344	+1.84	-0.9	13.4	48.4
Apr. 16	02 47.77	+50 54.8	4.967	4.295	+1.88	-0.7	13.4	43.5
Apr. 26	03 06.76	+50 47.7	4.982	4.246	+1.92	-0.7	13.3	38.9
May 6	03 26.06	+50 40.6	4.987	4.199	+1.94	-0.8	13.3	34.9
May 16	03 45.56	+50 32.3	4.980	4.153	+1.96	-0.9	13.2	31.6
May 26	04 05.15	+50 22.0	4.962	4.109	+1.96	-1.2	13.1	29.3
June 5	04 24.72	+50 08.8	4.932	4.065	+1.95	-1.5	13.1	28.1
June 15	04 44.16	+49 52.2	4.889	4.023	+1.93	-1.9	13.0	28.3
June 25	05 03.33	+49 31.8	4.834	3.982	+1.90	-2.3	12.9	29.7
July 5	05 22.12	+49 07.3	4.766	3.943	+1.85	-2.7	12.8	32.2
July 15	05 40.40	+48 38.6	4.686	3.905	+1.79	-3.1	12.7	35.7
July 25	05 58.02	+48 06.0	4.594	3.869	+1.72	-3.5	12.7	39.9
Aug. 4	06 14.87	+47 29.5	4.490	3.835	+1.64	-3.8	12.6	44.7
Aug. 14	06 30.81	+46 49.7	4.374	3.802	+1.54	-4.2	12.5	49.9
Aug. 24	06 45.70	+46 06.9	4.248	3.771	+1.43	-4.4	12.3	55.6
Sept. 3	06 59.40	+45 21.7	4.112	3.742	+1.30	-4.6	12.2	61.8
Sept. 13	07 11.75	+44 34.8	3.968	3.715	+1.15	-4.8	12.1	68.3
Sept. 23	07 22.58	+43 46.5	3.817	3.689	+0.99	-4.9	12.0	75.2
Oct. 3	07 31.71	+42 57.3	3.661	3.666	+0.81	-5.0	11.9	82.5
Oct. 13	07 38.93	+42 07.4	3.502	3.645	+0.61	-5.0	11.7	90.2
Oct. 23	07 44.02	+41 16.7	3.343	3.626	+0.38	-5.1	11.6	98.5
Nov. 2	07 46.77	+40 24.6	3.188	3.609	+0.14	-5.3	11.5	107.3
Nov. 12	07 46.97	+39 29.8	3.040	3.594	-0.12	-5.7	11.4	116.6
Nov. 22	07 44.54	+38 30.3	2.905	3.582	-0.39	-6.3	11.2	126.5
Dec. 2	07 39.51	+37 23.6	2.787	3.572	-0.64	-7.2	11.1	137.0
Dec. 12	07 32.11	+36 06.9	2.692	3.564	-0.85	-8.3	11.0	147.9
Dec. 22	07 22.91	+34 38.1	2.624	3.558	-0.99	-9.6	11.0	158.8
Jan. 1	07 12.66	+32 56.3	2.587	3.555	-1.05	-10.9	10.9	168.3
Jan. 11	07 02.32	+31 03.0	2.584	3.554	-1.00	-11.8	10.9	169.1
Jan. 21	06 52.82	+29 02.0	2.615	3.556	-0.87	-12.3	11.0	160.1
Jan. 31	06 44.91	+26 58.3	2.679	3.560	-0.68	-12.3	11.0	149.0
Feb. 10	06 39.08	+24 56.7	2.772	3.566	-0.46	-11.9	11.1	137.9
Feb. 20	06 35.56	+23 00.9	2.889	3.574	-0.22	-11.2	11.2	127.2
Mar. 2	06 34.33	+21 13.2	3.026	3.585	0.00	-10.3	11.3	116.9
Mar. 12	06 35.25	+19 34.1	3.177	3.598	+0.20	-9.5	11.5	107.2
Mar. 22	06 38.08	+18 02.8	3.337	3.613	+0.38	-8.7	11.6	98.0

Comet 104P/Kowal

Epoch = 2021 July 5.0 TT
 T = 2022 Jan. 12.86213 TT
 Peri. = 227.32366 e = 0.6656962
 Node = 207.05651 2000.0 a = 3.2119387 AU
 Incl. = 5.66765 n = 0.17121949
 q = 1.0737633 AU P = 5.76 years

$$m_1 = 13.2 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 35.62	-17 05.8	4.593	3.624	+1.21	+2.7	.	8.5
Jan. 16	19 47.89	-16 36.5	4.547	3.568	+1.24	+3.2	.	4.4
Jan. 26	20 00.38	-16 02.0	4.481	3.510	+1.26	+3.7	.	8.3
Feb. 5	20 12.99	-15 22.4	4.396	3.452	+1.27	+4.2	.	14.8
Feb. 15	20 25.66	-14 37.7	4.292	3.392	+1.27	+4.7	.	21.5
Feb. 25	20 38.31	-13 48.4	4.170	3.331	+1.26	+5.2	.	28.3
Mar. 7	20 50.88	-12 54.7	4.031	3.269	+1.25	+5.6	.	35.0
Mar. 17	21 03.29	-11 57.0	3.878	3.206	+1.23	+6.0	.	41.8
Mar. 27	21 15.48	-10 55.8	3.712	3.141	+1.20	+6.3	.	48.5
Apr. 6	21 27.39	-09 51.5	3.534	3.075	+1.17	+6.6	.	55.2
Apr. 16	21 38.95	-08 44.8	3.346	3.008	+1.13	+6.8	.	62.0
Apr. 26	21 50.07	-07 36.3	3.151	2.939	+1.09	+6.9	.	68.7
May 6	22 00.68	-06 26.8	2.950	2.869	+1.03	+7.0	.	75.5
May 16	22 10.67	-05 17.0	2.746	2.798	+0.96	+6.9	.	82.4
May 26	22 19.90	-04 08.0	2.541	2.725	+0.88	+6.8	21.8	89.4
June 5	22 28.23	-03 01.0	2.336	2.651	+0.78	+6.5	21.4	96.6
June 15	22 35.45	-01 57.5	2.134	2.576	+0.65	+6.1	21.0	104.0
June 25	22 41.31	+00 59.3	1.937	2.499	+0.50	+5.4	20.6	111.8
July 5	22 45.52	+00 08.6	1.748	2.421	+0.32	+4.5	20.2	119.9
July 15	22 47.72	+00 31.5	1.569	2.342	+0.09	+3.3	19.7	128.5
July 25	22 47.51	+00 57.5	1.404	2.261	-0.17	+1.7	19.3	137.7
Aug. 4	22 44.52	+01 05.1	1.254	2.179	-0.46	-0.4	18.8	147.6
Aug. 14	22 38.47	+00 49.7	1.122	2.096	-0.77	-3.0	18.3	157.9
Aug. 24	22 29.45	+00 07.9	1.012	2.012	-1.05	-5.7	17.8	167.8
Sept. 3	22 18.02	-01 01.1	0.926	1.927	-1.23	-8.3	17.3	170.1
Sept. 13	22 05.41	-02 33.6	0.863	1.842	-1.26	-10.2	16.9	160.4
Sept. 23	21 53.49	-04 19.8	0.822	1.756	-1.08	-10.9	16.4	148.2
Oct. 3	21 44.13	-06 07.4	0.799	1.671	-0.73	-10.4	16.1	136.0
Oct. 13	21 38.93	-07 44.5	0.790	1.586	-0.25	-8.7	15.7	124.6
Oct. 23	21 38.85	-09 02.1	0.788	1.503	+0.29	-6.5	15.3	114.4
Nov. 2	21 44.16	-09 55.6	0.789	1.422	+0.83	-3.9	15.0	105.4
Nov. 12	21 54.86	-10 22.1	0.788	1.346	+1.36	-1.1	14.6	97.7
Nov. 22	22 10.70	-10 20.2	0.782	1.274	+1.85	+1.8	14.2	91.3
Dec. 2	22 31.39	-09 49.1	0.771	1.210	+2.33	+4.8	13.9	86.2
Dec. 12	22 56.79	-08 47.4	0.753	1.156	+2.79	+7.9	13.5	82.2
Dec. 22	23 26.76	-07 14.1	0.731	1.113	+3.25	+11.1	13.2	79.5
Jan. 1	00 01.29	-05 08.6	0.707	1.086	+3.71	+14.3	13.0	78.1
Jan. 11	00 40.42	-02 31.0	0.684	1.074	+4.16	+17.4	12.8	77.9
Jan. 21	01 24.01	+00 34.4	0.667	1.079	+4.59	+19.7	12.8	79.1
Jan. 31	02 11.56	+03 57.8	0.662	1.101	+4.94	+20.8	12.9	81.4
Feb. 10	03 01.95	+07 22.7	0.673	1.138	+5.13	+19.7	13.2	84.4
Feb. 20	03 53.32	+10 27.7	0.705	1.189	+5.11	+16.6	13.6	87.4
Mar. 2	04 43.51	+12 55.1	0.760	1.249	+4.88	+12.3	14.1	90.0
Mar. 12	05 30.75	+14 36.6	0.837	1.318	+4.51	+7.6	14.6	91.7
Mar. 22	06 13.94	+15 33.3	0.934	1.393	+4.08	+3.4	15.2	92.3

Comet 19P/Borrelly

Epoch = 2021 July 5.0 TT
 T = 2022 Feb. 1.80260 TT
 Peri. = 351.88907 e = 0.6377735
 Node = 74.26378 2000.0 a = 3.6064225 AU
 Incl. = 29.30585 n = 0.14390940
 q = 1.3063418 AU P = 6.85 years

$$m_1 = 7.0 + 5 \log(\Delta) + 20.0 \log(r(t-60))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	19 34.48	-36 25.6	4.663	3.722	+1.44	+1.4	.	15.1
Jan. 16	19 49.06	-36 10.9	4.606	3.666	+1.48	+1.5	.	15.2
Jan. 26	20 03.95	-35 55.0	4.530	3.608	+1.50	+1.7	.	18.3
Feb. 5	20 19.08	-35 37.9	4.435	3.550	+1.52	+1.7	22.0	23.2
Feb. 15	20 34.38	-35 20.3	4.324	3.491	+1.54	+1.8	21.8	28.8
Feb. 25	20 49.77	-35 02.7	4.196	3.431	+1.54	+1.7	21.7	34.9
Mar. 7	21 05.21	-34 45.8	4.054	3.370	+1.54	+1.6	21.5	41.1
Mar. 17	21 20.64	-34 30.6	3.899	3.308	+1.54	+1.4	21.2	47.4
Mar. 27	21 36.03	-34 18.2	3.734	3.245	+1.53	+1.0	21.0	53.7
Apr. 6	21 51.32	-34 09.7	3.560	3.181	+1.52	+0.6	20.8	60.1
Apr. 16	22 06.48	-34 06.6	3.378	3.116	+1.51	-0.1	20.5	66.5
Apr. 26	22 21.46	-34 10.6	3.193	3.051	+1.49	-0.8	20.2	72.8
May 6	22 36.22	-34 23.3	3.005	2.984	+1.46	-1.8	19.9	79.1
May 16	22 50.70	-34 46.9	2.816	2.916	+1.43	-3.0	19.6	85.5
May 26	23 04.80	-35 23.5	2.630	2.848	+1.39	-4.5	19.3	91.8
June 5	23 18.44	-36 15.3	2.448	2.778	+1.33	-6.1	19.0	98.0
June 15	23 31.45	-37 24.7	2.273	2.708	+1.26	-8.0	18.7	104.2
June 25	23 43.63	-38 53.6	2.106	2.636	+1.16	-10.0	18.3	110.2
July 5	23 54.71	-40 43.4	1.951	2.564	+1.03	-12.2	17.9	116.0
July 15	00 04.30	-42 54.4	1.808	2.491	+0.86	-14.2	17.6	121.2
July 25	00 11.89	-45 24.8	1.680	2.418	+0.63	-16.0	17.2	125.7
Aug. 4	00 16.84	-48 10.2	1.569	2.344	+0.32	-17.1	16.9	129.0
Aug. 14	00 18.34	-51 02.6	1.474	2.269	-0.07	-17.2	16.5	130.8
Aug. 24	00 15.62	-53 49.3	1.397	2.195	-0.53	-15.8	16.1	130.7
Sept. 3	00 08.16	-56 14.7	1.335	2.120	-1.01	-12.7	15.8	128.9
Sept. 13	23 56.16	-58 00.9	1.289	2.045	-1.40	-7.8	15.5	125.5
Sept. 23	23 41.19	-58 51.8	1.255	1.970	-1.56	-1.6	15.2	121.1
Oct. 3	23 25.94	-58 38.0	1.231	1.896	-1.42	+5.1	14.8	116.0
Oct. 13	23 13.48	-57 17.3	1.214	1.823	-0.99	+11.6	14.5	110.7
Oct. 23	23 06.00	-54 55.1	1.202	1.752	-0.44	+17.3	14.2	105.4
Nov. 2	23 04.17	-51 39.1	1.193	1.683	+0.12	+22.3	13.9	100.3
Nov. 12	23 07.74	-47 36.3	1.186	1.616	+0.62	+26.6	13.6	95.5
Nov. 22	23 15.88	-42 52.0	1.180	1.554	+1.03	+30.6	13.2	91.1
Dec. 2	23 27.65	-37 29.9	1.176	1.496	+1.35	+34.2	12.9	87.1
Dec. 12	23 42.31	-31 32.9	1.175	1.443	+1.60	+37.5	12.6	83.4
Dec. 22	23 59.22	-25 05.3	1.177	1.398	+1.80	+40.3	12.2	80.1
Jan. 1	00 17.95	-18 12.4	1.185	1.361	+1.96	+42.4	11.9	77.1
Jan. 11	00 38.29	-11 01.8	1.201	1.332	+2.12	+43.7	11.6	74.4
Jan. 21	01 00.10	-03 43.5	1.226	1.314	+2.26	+43.8	11.3	72.0
Jan. 31	01 23.41	+03 31.6	1.261	1.307	+2.42	+42.9	11.0	69.9
Feb. 10	01 48.36	+10 32.2	1.307	1.310	+2.59	+40.8	10.8	68.0
Feb. 20	02 15.10	+17 07.7	1.364	1.324	+2.78	+37.8	10.6	66.3
Mar. 2	02 43.86	+23 09.0	1.431	1.349	+3.00	+34.0	10.5	64.7
Mar. 12	03 14.83	+28 29.1	1.508	1.383	+3.22	+29.5	10.4	63.3
Mar. 22	03 48.05	+33 02.5	1.594	1.426	+3.44	+24.6	10.4	61.8

Comet 9P/Tempel

Epoch = 2021 July 5.0 TT
 T = 2022 Mar. 4.92666 TT
 Peri. = 179.33580 e = 0.5092791
 Node = 68.72018 2000.0 a = 3.1468580 AU
 Incl. = 10.46973 n = 0.17655839
 q = 1.5442290 AU P = 5.58 years

$$m_1 = 8.0 + 5 \log(\Delta) + 17.5 \log(r(t-20))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	08 21.21	+30 27.2	2.563	3.510	-0.89	+5.3	19.8	161.8
Jan. 16	08 11.70	+31 17.8	2.496	3.466	-1.01	+4.7	19.6	168.7
Jan. 26	08 01.38	+32 00.1	2.462	3.422	-1.04	+3.6	19.5	165.0
Feb. 5	07 51.19	+32 30.7	2.458	3.377	-0.97	+2.3	19.4	155.0
Feb. 15	07 42.09	+32 48.1	2.482	3.331	-0.82	+1.0	19.3	143.9
Feb. 25	07 34.91	+32 52.6	2.530	3.284	-0.59	-0.2	19.3	132.8
Mar. 7	07 30.17	+32 46.2	2.598	3.237	-0.33	-1.1	19.2	122.2
Mar. 17	07 28.11	+32 31.2	2.679	3.188	-0.06	-1.9	19.2	112.0
Mar. 27	07 28.75	+32 09.5	2.768	3.139	+0.21	-2.5	19.1	102.5
Apr. 6	07 31.93	+31 42.7	2.862	3.089	+0.45	-2.9	19.1	93.5
Apr. 16	07 37.42	+31 11.3	2.956	3.039	+0.67	-3.4	19.0	85.1
Apr. 26	07 44.95	+30 35.8	3.046	2.987	+0.86	-3.8	19.0	77.1
May 6	07 54.26	+29 56.0	3.129	2.935	+1.02	-4.2	18.9	69.7
May 16	08 05.10	+29 11.6	3.205	2.882	+1.16	-4.7	18.8	62.6
May 26	08 17.26	+28 22.0	3.271	2.829	+1.28	-5.2	18.8	55.8
June 5	08 30.53	+27 26.9	3.325	2.775	+1.38	-5.8	18.7	49.4
June 15	08 44.76	+26 25.8	3.368	2.720	+1.47	-6.5	18.5	43.3
June 25	08 59.82	+25 18.3	3.398	2.665	+1.55	-7.1	18.4	37.5
July 5	09 15.57	+24 04.0	3.416	2.609	+1.61	-7.8	18.3	31.9
July 15	09 31.95	+22 42.6	3.420	2.552	+1.67	-8.5	18.1	26.6
July 25	09 48.87	+21 14.1	3.412	2.496	+1.72	-9.3	18.0	21.5
Aug. 4	10 06.28	+19 38.3	3.392	2.439	+1.77	-10.0	17.8	16.8
Aug. 14	10 24.16	+17 55.2	3.360	2.381	+1.81	-10.7	17.6	12.5
Aug. 24	10 42.47	+16 04.9	3.317	2.324	+1.86	-11.4	17.4	9.0
Sept. 3	11 01.23	+14 07.5	3.264	2.267	+1.90	-12.1	17.2	7.3
Sept. 13	11 20.45	+12 03.4	3.201	2.209	+1.95	-12.8	16.9	8.2
Sept. 23	11 40.15	+09 53.0	3.129	2.153	+2.00	-13.4	16.7	11.0
Oct. 3	12 00.37	+07 36.6	3.050	2.096	+2.05	-13.9	16.4	14.4
Oct. 13	12 21.18	+05 15.0	2.965	2.041	+2.11	-14.4	16.2	18.1
Oct. 23	12 42.63	+02 48.9	2.875	1.986	+2.18	-14.8	15.9	21.9
Nov. 2	13 04.80	+00 19.3	2.781	1.933	+2.26	-15.1	15.6	25.5
Nov. 12	13 27.78	-02 12.5	2.684	1.881	+2.34	-15.2	15.4	29.1
Nov. 22	13 51.64	-04 45.1	2.586	1.832	+2.44	-15.2	15.1	32.5
Dec. 2	14 16.48	-07 16.7	2.488	1.784	+2.54	-15.0	14.8	35.8
Dec. 12	14 42.37	-09 45.3	2.391	1.740	+2.65	-14.6	14.5	39.0
Dec. 22	15 09.37	-12 08.5	2.297	1.699	+2.76	-13.9	14.2	42.0
Jan. 1	15 37.52	-14 23.6	2.206	1.662	+2.88	-13.0	13.9	44.9
Jan. 11	16 06.79	-16 27.8	2.119	1.629	+2.99	-11.7	13.7	47.7
Jan. 21	16 37.10	-18 18.2	2.037	1.601	+3.08	-10.2	13.4	50.4
Jan. 31	17 08.31	-19 52.2	1.961	1.578	+3.16	-8.4	13.2	53.0
Feb. 10	17 40.19	-21 07.7	1.890	1.561	+3.21	-6.5	13.0	55.6
Feb. 20	18 12.43	-22 03.2	1.824	1.550	+3.23	-4.4	12.8	58.1
Mar. 2	18 44.67	-22 38.4	1.763	1.545	+3.21	-2.4	12.6	60.8
Mar. 12	19 16.50	-22 54.2	1.707	1.546	+3.14	-0.6	12.5	63.5
Mar. 22	19 47.53	-22 52.6	1.655	1.553	+3.05	+1.0	12.4	66.4

Comet 22P/Kopff

Epoch = 2021 July 5.0 TT
 T = 2022 Mar. 18.10682 TT
 Peri. = 162.99818 e = 0.5488427
 Node = 120.83657 2000.0 a = 3.4413769 AU
 Incl. = 4.74197 n = 0.15438522
 q = 1.5526023 AU P = 6.38 years

$$m_1 = 8.1 + 5 \log(\Delta) + 15.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	11 17.43	+07 53.1	3.149	3.719	+0.01	+1.4	19.1	118.4
Jan. 16	11 16.69	+08 13.0	2.973	3.672	-0.18	+2.7	18.9	128.9
Jan. 26	11 14.06	+08 45.2	2.816	3.624	-0.37	+3.9	18.7	139.8
Feb. 5	11 09.56	+09 28.7	2.680	3.575	-0.55	+4.9	18.5	151.2
Feb. 15	11 03.35	+10 21.4	2.570	3.526	-0.70	+5.6	18.4	162.8
Feb. 25	10 55.82	+11 19.5	2.490	3.476	-0.80	+5.9	18.2	173.8
Mar. 7	10 47.55	+12 18.4	2.441	3.425	-0.84	+5.7	18.1	171.2
Mar. 17	10 39.26	+13 13.1	2.423	3.374	-0.80	+5.1	17.9	159.6
Mar. 27	10 31.71	+13 59.0	2.434	3.322	-0.69	+4.0	17.9	147.9
Apr. 6	10 25.55	+14 33.1	2.469	3.269	-0.52	+2.7	17.8	136.5
Apr. 16	10 21.24	+14 53.8	2.525	3.215	-0.32	+1.3	17.7	125.6
Apr. 26	10 19.06	+15 00.6	2.595	3.160	-0.10	-0.1	17.7	115.4
May 6	10 19.08	+14 54.2	2.675	3.105	+0.12	-1.3	17.6	105.8
May 16	10 21.23	+14 35.3	2.761	3.049	+0.33	-2.5	17.6	96.7
May 26	10 25.38	+14 05.1	2.847	2.993	+0.52	-3.6	17.5	88.3
June 5	10 31.34	+13 24.4	2.931	2.936	+0.69	-4.6	17.5	80.3
June 15	10 38.91	+12 34.2	3.010	2.878	+0.84	-5.5	17.4	72.8
June 25	10 47.92	+11 35.2	3.082	2.820	+0.97	-6.4	17.3	65.7
July 5	10 58.20	+10 28.0	3.145	2.761	+1.09	-7.2	17.2	58.9
July 15	11 09.62	+09 13.0	3.198	2.701	+1.20	-7.9	17.1	52.5
July 25	11 22.06	+07 51.0	3.239	2.641	+1.30	-8.6	17.0	46.3
Aug. 4	11 35.44	+06 22.3	3.269	2.581	+1.39	-9.2	16.8	40.4
Aug. 14	11 49.72	+04 47.5	3.286	2.521	+1.47	-9.8	16.7	34.7
Aug. 24	12 04.84	+03 07.1	3.292	2.460	+1.56	-10.3	16.6	29.3
Sept. 3	12 20.79	+01 21.6	3.285	2.399	+1.64	-10.8	16.4	24.0
Sept. 13	12 37.58	+00 28.2	3.267	2.338	+1.73	-11.2	16.2	19.0
Sept. 23	12 55.22	-02 21.6	3.237	2.277	+1.81	-11.5	16.0	14.1
Oct. 3	13 13.76	-04 17.8	3.198	2.217	+1.91	-11.7	15.8	9.5
Oct. 13	13 33.26	-06 15.7	3.149	2.157	+2.00	-11.8	15.6	5.4
Oct. 23	13 53.75	-08 13.9	3.091	2.098	+2.11	-11.8	15.4	3.2
Nov. 2	14 15.34	-10 11.2	3.026	2.040	+2.22	-11.6	15.1	5.5
Nov. 12	14 38.09	-12 05.9	2.954	1.983	+2.34	-11.2	14.9	9.1
Nov. 22	15 02.06	-13 55.8	2.878	1.928	+2.47	-10.6	14.7	12.9
Dec. 2	15 27.34	-15 38.7	2.798	1.874	+2.60	-9.8	14.4	16.6
Dec. 12	15 53.96	-17 12.0	2.717	1.824	+2.74	-8.7	14.2	20.1
Dec. 22	16 21.91	-18 33.0	2.635	1.775	+2.87	-7.3	13.9	23.4
Jan. 1	16 51.17	-19 38.7	2.553	1.731	+2.99	-5.6	13.7	26.6
Jan. 11	17 21.62	-20 26.3	2.474	1.690	+3.10	-3.7	13.5	29.5
Jan. 21	17 53.06	-20 53.2	2.399	1.653	+3.19	-1.5	13.3	32.3
Jan. 31	18 25.25	-20 57.6	2.328	1.622	+3.25	+0.9	13.1	34.9
Feb. 10	18 57.87	-20 38.2	2.262	1.596	+3.27	+3.2	12.9	37.4
Feb. 20	19 30.55	-19 55.2	2.202	1.575	+3.26	+5.6	12.8	39.8
Mar. 2	20 02.97	-18 49.8	2.147	1.561	+3.21	+7.7	12.7	42.1
Mar. 12	20 34.78	-17 24.2	2.098	1.554	+3.14	+9.5	12.6	44.5
Mar. 22	21 05.71	-15 42.0	2.055	1.553	+3.04	+11.0	12.5	46.8

Comet C/2020 U5 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2022 Apr. 27.84151 TT
 Peri. = 75.41186
 Node = 107.34184 2000.0
 Incl. = 97.27546
 q = 3.7559493 AU
 e = 0.9996538

$$m1 = 7.7 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .3			m	'		°
Jan. 6	07 16.97	+29 58.3	4.558	5.534	-1.00	+8.3	18.4	172.3
Jan. 16	07 06.74	+31 19.1	4.517	5.476	-1.04	+7.8	18.4	165.7
Jan. 26	06 56.46	+32 33.6	4.514	5.418	-1.01	+7.0	18.3	154.3
Feb. 5	06 46.68	+33 40.3	4.545	5.360	-0.93	+6.2	18.3	142.4
Feb. 15	06 37.91	+34 38.6	4.606	5.303	-0.80	+5.4	18.3	130.7
Feb. 25	06 30.56	+35 29.2	4.690	5.246	-0.65	+4.7	18.3	119.3
Mar. 7	06 24.87	+36 13.2	4.792	5.190	-0.47	+4.1	18.3	108.3
Mar. 17	06 20.97	+36 52.2	4.904	5.134	-0.29	+3.7	18.3	97.8
Mar. 27	06 18.88	+37 27.7	5.020	5.079	-0.11	+3.4	18.3	87.7
Apr. 6	06 18.51	+38 01.1	5.135	5.024	+0.05	+3.3	18.3	78.0
Apr. 16	06 19.75	+38 33.4	5.242	4.970	+0.21	+3.2	18.3	68.9
Apr. 26	06 22.46	+39 05.6	5.339	4.916	+0.35	+3.2	18.3	60.1
May 6	06 26.49	+39 38.3	5.421	4.863	+0.47	+3.3	18.2	51.8
May 16	06 31.68	+40 12.0	5.486	4.811	+0.58	+3.4	18.2	44.0
May 26	06 37.92	+40 47.2	5.532	4.759	+0.67	+3.6	18.2	36.8
June 5	06 45.05	+41 24.4	5.556	4.708	+0.76	+3.8	18.2	30.3
June 15	06 53.00	+42 03.9	5.559	4.658	+0.83	+4.1	18.1	25.1
June 25	07 01.63	+42 46.3	5.538	4.609	+0.90	+4.4	18.1	21.7
July 5	07 10.88	+43 32.2	5.496	4.561	+0.96	+4.8	18.0	21.0
July 15	07 20.67	+44 22.4	5.431	4.513	+1.01	+5.3	17.9	23.1
July 25	07 30.93	+45 17.6	5.345	4.467	+1.05	+5.8	17.8	27.3
Aug. 4	07 41.59	+46 19.0	5.240	4.422	+1.09	+6.5	17.8	32.8
Aug. 14	07 52.62	+47 27.8	5.116	4.377	+1.12	+7.3	17.7	39.2
Aug. 24	08 03.96	+48 45.3	4.976	4.334	+1.15	+8.3	17.6	45.9
Sept. 3	08 15.57	+50 13.4	4.823	4.292	+1.18	+9.4	17.4	53.0
Sept. 13	08 27.42	+51 53.7	4.659	4.251	+1.20	+10.8	17.3	60.3
Sept. 23	08 39.49	+53 48.3	4.489	4.211	+1.22	+12.3	17.2	67.7
Oct. 3	08 51.76	+55 59.1	4.316	4.173	+1.24	+14.1	17.1	75.1
Oct. 13	09 04.22	+58 28.1	4.145	4.136	+1.26	+16.0	17.0	82.6
Oct. 23	09 16.87	+61 16.5	3.981	4.101	+1.28	+18.0	16.8	89.8
Nov. 2	09 29.76	+64 25.2	3.829	4.067	+1.30	+20.0	16.7	96.7
Nov. 12	09 42.95	+67 53.5	3.693	4.034	+1.34	+21.8	16.6	103.1
Nov. 22	09 56.61	+71 39.2	3.579	4.003	+1.41	+23.4	16.5	108.5
Dec. 2	10 11.15	+75 38.0	3.491	3.974	+1.53	+24.4	16.4	112.5
Dec. 12	10 27.55	+79 43.8	3.430	3.946	+1.83	+24.7	16.3	114.8
Dec. 22	10 49.46	+83 48.6	3.399	3.920	+2.93	+24.1	16.3	115.2
Jan. 1	11 44.15	+87 42.1	3.396	3.896	+14.34	+21.8	16.3	113.6
Jan. 11	21 12.24	+88 22.2	3.419	3.873	+17.93	-19.5	16.3	110.4
Jan. 21	22 28.68	+85 09.0	3.464	3.853	+3.03	-18.3	16.3	106.0
Jan. 31	22 51.86	+82 17.4	3.525	3.834	+1.78	-15.6	16.3	100.8
Feb. 10	23 07.77	+79 54.0	3.598	3.817	+1.42	-12.7	16.3	95.2
Feb. 20	23 21.05	+78 00.0	3.678	3.802	+1.24	-9.8	16.3	89.6
Mar. 2	23 32.93	+76 34.7	3.759	3.790	+1.13	-7.0	16.4	84.2
Mar. 12	23 43.78	+75 37.0	3.837	3.779	+1.03	-4.3	16.4	79.2
Mar. 22	23 53.65	+75 05.3	3.909	3.770	+0.93	-1.8	16.4	74.7

Comet C/2019 T4 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2022 June 9.24667 TT
 Peri. = 351.21449
 Node = 199.94647 2000.0
 Incl. = 53.62137
 q = 4.2421532 AU
 e = 0.9958543

$$m1 = 3.2 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' "			m	' "		°
Jan. 6	08 24.64	-40 29.2	5.481	5.956	-0.42	-1.8	14.6	114.5
Jan. 16	08 20.21	-40 40.1	5.377	5.903	-0.47	-0.1	14.6	118.0
Jan. 26	08 15.42	-40 33.4	5.289	5.850	-0.48	+1.7	14.5	120.5
Feb. 5	08 10.65	-40 08.6	5.216	5.798	-0.46	+3.5	14.4	121.9
Feb. 15	08 06.28	-39 26.3	5.160	5.746	-0.40	+5.1	14.4	122.1
Feb. 25	08 02.71	-38 28.1	5.121	5.694	-0.30	+6.6	14.3	121.0
Mar. 7	08 00.22	-37 16.5	5.100	5.643	-0.18	+7.8	14.3	118.7
Mar. 17	07 59.00	-35 54.7	5.095	5.593	-0.05	+8.6	14.2	115.3
Mar. 27	07 59.19	-34 26.0	5.104	5.542	+0.10	+9.1	14.2	111.1
Apr. 6	08 00.79	-32 54.2	5.127	5.493	+0.24	+9.3	14.1	106.3
Apr. 16	08 03.78	-31 22.1	5.162	5.444	+0.37	+9.1	14.1	101.0
Apr. 26	08 08.09	-29 52.7	5.205	5.395	+0.50	+8.7	14.1	95.5
May 6	08 13.59	-28 28.2	5.256	5.347	+0.61	+8.1	14.1	89.7
May 16	08 20.17	-27 10.5	5.311	5.300	+0.71	+7.3	14.1	83.9
May 26	08 27.70	-26 00.9	5.369	5.253	+0.80	+6.5	14.1	78.0
June 5	08 36.04	-25 00.1	5.426	5.207	+0.88	+5.6	14.0	72.2
June 15	08 45.10	-24 08.8	5.482	5.161	+0.94	+4.6	14.0	66.5
June 25	08 54.75	-23 27.3	5.534	5.117	+0.99	+3.6	14.0	60.9
July 5	09 04.88	-22 55.3	5.580	5.073	+1.04	+2.7	14.0	55.4
July 15	09 15.41	-22 32.9	5.619	5.029	+1.07	+1.7	14.0	50.2
July 25	09 26.25	-22 19.5	5.649	4.987	+1.10	+0.9	13.9	45.3
Aug. 4	09 37.32	-22 14.7	5.668	4.945	+1.12	0.0	13.9	40.8
Aug. 14	09 48.54	-22 18.0	5.677	4.905	+1.13	-0.7	13.9	36.9
Aug. 24	09 59.85	-22 28.7	5.672	4.865	+1.13	-1.4	13.8	33.8
Sept. 3	10 11.18	-22 46.1	5.655	4.826	+1.13	-2.1	13.8	31.7
Sept. 13	10 22.47	-23 09.5	5.623	4.788	+1.12	-2.6	13.8	30.9
Sept. 23	10 33.65	-23 38.0	5.577	4.751	+1.11	-3.1	13.7	31.6
Oct. 3	10 44.64	-24 10.9	5.516	4.715	+1.09	-3.5	13.6	33.6
Oct. 13	10 55.39	-24 47.2	5.440	4.680	+1.06	-3.8	13.6	36.9
Oct. 23	11 05.81	-25 26.0	5.349	4.646	+1.02	-4.0	13.5	41.2
Nov. 2	11 15.81	-26 06.3	5.244	4.614	+0.97	-4.1	13.4	46.3
Nov. 12	11 25.30	-26 47.0	5.124	4.582	+0.92	-4.0	13.4	52.0
Nov. 22	11 34.17	-27 26.8	4.993	4.552	+0.85	-3.9	13.3	58.3
Dec. 2	11 42.30	-28 04.5	4.850	4.523	+0.77	-3.6	13.2	65.0
Dec. 12	11 49.56	-28 38.5	4.697	4.495	+0.67	-3.1	13.1	72.2
Dec. 22	11 55.81	-29 07.2	4.538	4.469	+0.56	-2.5	13.0	79.7
Jan. 1	12 00.91	-29 28.7	4.374	4.443	+0.44	-1.7	12.9	87.6
Jan. 11	12 04.73	-29 40.6	4.209	4.420	+0.31	-0.6	12.8	95.9
Jan. 21	12 07.16	-29 40.8	4.046	4.397	+0.16	+0.7	12.7	104.5
Jan. 31	12 08.15	-29 26.6	3.889	4.376	+0.02	+2.3	12.6	113.5
Feb. 10	12 07.69	-28 55.4	3.743	4.357	-0.12	+4.1	12.5	122.7
Feb. 20	12 05.91	-28 05.0	3.613	4.338	-0.24	+6.1	12.4	132.1
Mar. 2	12 03.02	-26 54.3	3.503	4.322	-0.34	+8.2	12.3	141.4
Mar. 12	11 59.34	-25 22.9	3.417	4.307	-0.39	+10.2	12.2	150.1
Mar. 22	11 55.31	-23 32.9	3.360	4.293	-0.41	+11.9	12.2	156.8

Comet C/2020 Y2 (ATLAS)

Epoch = 2021 July 5.0 TT
 T = 2022 June 17.70596 TT
 Peri. = 266.09748
 Node = 26.50764 2000.0
 Incl. = 101.28870
 q = 3.1326758 AU
 e = 0.9973502

$$m1 = 5.5 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	14 10.79	-14 46.6	5.970	5.711	+0.10	-5.3	16.9	70.1
Jan. 16	14 11.34	-15 39.3	5.732	5.642	-0.01	-5.2	16.8	79.9
Jan. 26	14 10.72	-16 30.5	5.489	5.574	-0.13	-5.0	16.7	89.9
Feb. 5	14 08.73	-17 19.7	5.246	5.506	-0.28	-4.8	16.5	100.2
Feb. 15	14 05.19	-18 06.3	5.009	5.438	-0.45	-4.5	16.4	110.8
Feb. 25	13 59.95	-18 49.5	4.785	5.371	-0.62	-4.1	16.2	121.7
Mar. 7	13 52.95	-19 28.2	4.579	5.303	-0.80	-3.6	16.0	132.8
Mar. 17	13 44.18	-20 01.0	4.397	5.236	-0.97	-2.9	15.9	144.0
Mar. 27	13 33.84	-20 26.6	4.247	5.168	-1.11	-2.1	15.8	155.1
Apr. 6	13 22.25	-20 44.1	4.130	5.102	-1.21	-1.3	15.7	164.6
Apr. 16	13 09.88	-20 53.2	4.051	5.035	-1.26	-0.5	15.6	167.4
Apr. 26	12 57.33	-20 54.4	4.009	4.968	-1.24	+0.2	15.5	160.3
May 6	12 45.20	-20 49.5	4.005	4.902	-1.17	+0.7	15.4	149.7
May 16	12 34.03	-20 41.1	4.033	4.837	-1.05	+0.9	15.4	138.5
May 26	12 24.26	-20 32.1	4.089	4.771	-0.89	+0.8	15.3	127.3
June 5	12 16.11	-20 25.3	4.166	4.706	-0.72	+0.5	15.3	116.4
June 15	12 09.70	-20 23.3	4.259	4.642	-0.54	-0.1	15.3	105.9
June 25	12 05.02	-20 27.8	4.361	4.578	-0.38	-0.9	15.3	95.9
July 5	12 01.97	-20 40.2	4.465	4.514	-0.22	-1.7	15.3	86.3
July 15	12 00.40	-21 01.2	4.567	4.451	-0.08	-2.6	15.3	77.1
July 25	12 00.16	-21 31.4	4.661	4.389	+0.04	-3.5	15.3	68.4
Aug. 4	12 01.07	-22 10.7	4.743	4.327	+0.15	-4.4	15.2	60.1
Aug. 14	12 02.98	-22 59.5	4.811	4.266	+0.24	-5.4	15.2	52.2
Aug. 24	12 05.72	-23 57.6	4.861	4.206	+0.31	-6.3	15.2	44.9
Sept. 3	12 09.15	-25 05.0	4.891	4.147	+0.38	-7.3	15.1	38.3
Sept. 13	12 13.14	-26 21.9	4.900	4.088	+0.42	-8.2	15.1	32.5
Sept. 23	12 17.55	-27 48.3	4.887	4.031	+0.46	-9.2	15.0	28.2
Oct. 3	12 22.25	-29 24.6	4.851	3.974	+0.48	-10.2	14.9	25.8
Oct. 13	12 27.11	-31 11.2	4.793	3.918	+0.49	-11.2	14.8	25.8
Oct. 23	12 31.99	-33 08.4	4.712	3.864	+0.48	-12.3	14.7	28.2
Nov. 2	12 36.72	-35 17.0	4.611	3.811	+0.46	-13.5	14.6	32.4
Nov. 12	12 41.12	-37 37.8	4.491	3.759	+0.41	-14.8	14.5	37.9
Nov. 22	12 44.92	-40 11.6	4.354	3.709	+0.34	-16.1	14.4	44.1
Dec. 2	12 47.83	-42 59.4	4.203	3.660	+0.23	-17.6	14.3	50.7
Dec. 12	12 49.39	-46 02.1	4.042	3.612	+0.06	-19.1	14.1	57.6
Dec. 22	12 49.01	-49 19.8	3.875	3.567	-0.18	-20.6	14.0	64.7
Jan. 1	12 45.81	-52 52.3	3.707	3.523	-0.52	-22.0	13.8	71.6
Jan. 11	12 38.40	-56 37.0	3.542	3.481	-1.04	-23.0	13.7	78.4
Jan. 21	12 24.77	-60 28.2	3.387	3.440	-1.81	-23.1	13.5	84.8
Jan. 31	12 01.87	-64 13.9	3.246	3.402	-2.95	-21.5	13.4	90.6
Feb. 10	11 25.77	-67 32.1	3.127	3.366	-4.47	-17.1	13.2	95.4
Feb. 20	10 33.91	-69 48.4	3.032	3.332	-5.98	-8.7	13.1	99.0
Mar. 2	09 30.68	-70 24.5	2.965	3.301	-6.46	+2.8	13.0	101.0
Mar. 12	08 29.60	-69 05.6	2.928	3.272	-5.46	+13.5	13.0	101.4
Mar. 22	07 42.18	-66 15.8	2.920	3.246	-3.86	+20.4	12.9	100.0

Comet 117P/Helin-Roman-Alu

Epoch = 2021 July 5.0 TT
 T = 2022 July 7.36313 TT
 Peri. = 222.85634 e = 0.2557082
 Node = 58.84228 2000.0 a = 4.0846132 AU
 Incl. = 8.70281 n = 0.11939267
 q = 3.0401441 AU P = 8.26 years

$$m_1 = 4.5 + 5 \log(\Delta) + 15.0 \log(r(t-160))$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	13 31.38	-02 10.6	3.883	3.899	+0.61	-2.7	16.9	83.7
Jan. 16	13 36.96	-02 33.7	3.709	3.877	+0.49	-1.9	16.7	92.4
Jan. 26	13 41.26	-02 48.4	3.537	3.854	+0.35	-1.0	16.6	101.4
Feb. 5	13 44.11	-02 54.4	3.370	3.832	+0.20	-0.1	16.5	110.7
Feb. 15	13 45.37	-02 51.6	3.212	3.809	+0.03	+0.8	16.3	120.5
Feb. 25	13 44.91	-02 40.4	3.067	3.787	-0.14	+1.6	16.2	130.6
Mar. 7	13 42.71	-02 21.5	2.941	3.764	-0.31	+2.3	16.1	141.0
Mar. 17	13 38.86	-01 56.5	2.836	3.742	-0.47	+2.8	16.0	151.7
Mar. 27	13 33.62	-01 27.8	2.756	3.719	-0.59	+3.0	15.9	162.3
Apr. 6	13 27.37	+00 58.3	2.705	3.697	-0.66	+2.9	15.8	171.2
Apr. 16	13 20.66	+00 31.5	2.683	3.675	-0.67	+2.4	15.7	169.7
Apr. 26	13 14.07	+00 10.5	2.690	3.652	-0.63	+1.7	15.7	160.2
May 6	13 08.19	+00 01.9	2.724	3.630	-0.53	+0.7	15.7	149.6
May 16	13 03.47	+00 04.0	2.783	3.608	-0.39	-0.4	15.7	139.1
May 26	13 00.27	+00 05.2	2.862	3.586	-0.23	-1.5	15.7	129.0
June 5	12 58.76	+00 25.5	2.957	3.565	-0.06	-2.6	15.8	119.3
June 15	12 58.99	+00 56.4	3.064	3.543	+0.12	-3.6	15.8	110.0
June 25	13 00.94	-01 37.0	3.180	3.522	+0.28	-4.5	15.8	101.2
July 5	13 04.48	-02 25.9	3.299	3.501	+0.44	-5.3	15.9	92.9
July 15	13 09.51	-03 22.2	3.420	3.480	+0.58	-6.0	15.9	84.9
July 25	13 15.87	-04 24.7	3.539	3.459	+0.70	-6.5	16.0	77.2
Aug. 4	13 23.44	-05 32.3	3.654	3.439	+0.82	-7.0	16.0	69.8
Aug. 14	13 32.10	-06 43.9	3.763	3.418	+0.92	-7.4	16.0	62.7
Aug. 24	13 41.73	-07 58.7	3.863	3.399	+1.01	-7.6	16.0	55.7
Sept. 3	13 52.23	-09 15.6	3.954	3.379	+1.10	-7.8	16.0	49.0
Sept. 13	14 03.54	-10 33.9	4.035	3.360	+1.17	-7.9	16.0	42.3
Sept. 23	14 15.56	-11 52.7	4.103	3.341	+1.24	-7.9	16.0	35.8
Oct. 3	14 28.24	-13 11.2	4.159	3.322	+1.30	-7.8	16.0	29.3
Oct. 13	14 41.53	-14 28.7	4.201	3.304	+1.36	-7.7	16.0	22.9
Oct. 23	14 55.35	-15 44.3	4.228	3.287	+1.41	-7.4	16.0	16.5
Nov. 2	15 09.66	-16 57.4	4.241	3.269	+1.46	-7.1	16.0	10.2
Nov. 12	15 24.41	-18 07.3	4.240	3.253	+1.50	-6.8	15.9	3.9
Nov. 22	15 39.52	-19 13.4	4.223	3.236	+1.53	-6.4	15.9	2.5
Dec. 2	15 54.94	-20 15.1	4.191	3.221	+1.56	-5.9	15.8	8.9
Dec. 12	16 10.58	-21 12.0	4.145	3.205	+1.57	-5.4	15.7	15.2
Dec. 22	16 26.37	-22 03.7	4.084	3.191	+1.58	-4.9	15.7	21.6
Jan. 1	16 42.21	-22 50.0	4.010	3.177	+1.58	-4.3	15.6	28.1
Jan. 11	16 58.00	-23 30.9	3.923	3.163	+1.57	-3.8	15.5	34.6
Jan. 21	17 13.61	-24 06.5	3.823	3.150	+1.55	-3.3	15.4	41.2
Jan. 31	17 28.93	-24 37.0	3.713	3.138	+1.51	-2.8	15.3	47.8
Feb. 10	17 43.82	-25 02.9	3.593	3.126	+1.46	-2.4	15.2	54.6
Feb. 20	17 58.12	-25 25.0	3.464	3.115	+1.39	-2.0	15.1	61.5
Mar. 2	18 11.69	-25 44.1	3.329	3.105	+1.31	-1.8	15.0	68.5
Mar. 12	18 24.33	-26 01.3	3.188	3.095	+1.21	-1.7	14.8	75.6
Mar. 22	18 35.87	-26 17.9	3.045	3.087	+1.09	-1.7	14.7	83.0

Comet C/2017 K2 (PANSTARRS)

Epoch = 2021 July 5.0 TT
 T = 2022 Dec. 19.74101 TT
 Peri. = 236.18899
 Node = 88.24389 2000.0
 Incl. = 87.55299
 q = 1.7974990 AU
 e = 1.0005809

$$m1 = 1.2 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° ' .5			m	'		°
Jan. 6	17 55.78	+35 03.5	7.841	7.400	+0.61	-0.4	14.4	60.1
Jan. 16	18 01.78	+35 03.7	7.736	7.322	+0.59	+0.5	14.3	61.8
Jan. 26	18 07.48	+35 13.4	7.619	7.243	+0.55	+1.5	14.2	64.1
Feb. 5	18 12.76	+35 32.3	7.491	7.165	+0.50	+2.4	14.1	67.1
Feb. 15	18 17.48	+35 59.7	7.353	7.086	+0.44	+3.2	14.0	70.6
Feb. 25	18 21.51	+36 35.1	7.207	7.007	+0.36	+3.9	13.9	74.4
Mar. 7	18 24.71	+37 17.4	7.055	6.927	+0.27	+4.6	13.8	78.6
Mar. 17	18 26.93	+38 05.3	6.898	6.848	+0.16	+5.0	13.7	83.0
Mar. 27	18 28.03	+38 57.3	6.738	6.768	+0.04	+5.4	13.6	87.5
Apr. 6	18 27.87	+39 51.5	6.578	6.687	-0.09	+5.5	13.5	91.9
Apr. 16	18 26.34	+40 45.7	6.420	6.607	-0.23	+5.3	13.4	96.3
Apr. 26	18 23.34	+41 37.2	6.267	6.526	-0.38	+4.9	13.3	100.5
May 6	18 18.85	+42 23.0	6.120	6.444	-0.53	+4.2	13.2	104.3
May 16	18 12.89	+43 00.0	5.983	6.363	-0.67	+3.1	13.1	107.7
May 26	18 05.62	+43 24.8	5.856	6.281	-0.79	+1.7	13.0	110.3
June 5	17 57.26	+43 34.5	5.743	6.199	-0.88	0.0	12.9	112.2
June 15	17 48.16	+43 26.6	5.645	6.116	-0.93	-1.8	12.8	113.2
June 25	17 38.76	+42 59.4	5.561	6.033	-0.94	-3.8	12.7	113.1
July 5	17 29.53	+42 12.4	5.494	5.950	-0.90	-5.8	12.6	112.0
July 15	17 20.91	+41 06.3	5.443	5.866	-0.81	-7.6	12.6	109.8
July 25	17 13.29	+39 42.8	5.407	5.782	-0.69	-9.2	12.5	106.7
Aug. 4	17 06.96	+38 04.5	5.386	5.698	-0.55	-10.5	12.4	102.9
Aug. 14	17 02.10	+36 14.5	5.377	5.614	-0.40	-11.5	12.3	98.3
Aug. 24	16 58.80	+34 16.3	5.378	5.529	-0.25	-12.1	12.3	93.3
Sept. 3	16 57.03	+32 13.1	5.387	5.444	-0.09	-12.5	12.2	87.9
Sept. 13	16 56.75	+30 07.8	5.401	5.358	+0.05	-12.5	12.2	82.2
Sept. 23	16 57.86	+28 03.3	5.417	5.272	+0.18	-12.3	12.1	76.4
Oct. 3	17 00.24	+26 01.7	5.433	5.186	+0.30	-11.9	12.0	70.5
Oct. 13	17 03.76	+24 04.8	5.445	5.099	+0.41	-11.4	12.0	64.7
Oct. 23	17 08.29	+22 14.2	5.450	5.013	+0.50	-10.7	11.9	59.1
Nov. 2	17 13.69	+20 31.0	5.447	4.925	+0.58	-9.9	11.8	53.7
Nov. 12	17 19.85	+18 55.9	5.432	4.838	+0.65	-9.0	11.7	48.8
Nov. 22	17 26.63	+17 29.6	5.404	4.750	+0.71	-8.1	11.6	44.5
Dec. 2	17 33.91	+16 12.5	5.361	4.662	+0.75	-7.2	11.5	41.0
Dec. 12	17 41.58	+15 04.7	5.301	4.573	+0.78	-6.3	11.4	38.6
Dec. 22	17 49.50	+14 06.3	5.223	4.484	+0.80	-5.3	11.3	37.6
Jan. 1	17 57.58	+13 17.3	5.127	4.395	+0.81	-4.4	11.2	38.1
Jan. 11	18 05.68	+12 37.4	5.012	4.306	+0.81	-3.5	11.0	40.0
Jan. 21	18 13.67	+12 06.3	4.879	4.216	+0.79	-2.6	10.9	43.2
Jan. 31	18 21.43	+11 43.6	4.728	4.126	+0.76	-1.8	10.7	47.5
Feb. 10	18 28.82	+11 28.6	4.559	4.036	+0.71	-1.1	10.6	52.6
Feb. 20	18 35.67	+11 20.7	4.375	3.946	+0.65	-0.4	10.4	58.3
Mar. 2	18 41.83	+11 18.8	4.176	3.855	+0.57	+0.1	10.2	64.5
Mar. 12	18 47.10	+11 22.0	3.965	3.765	+0.47	+0.5	9.9	71.2
Mar. 22	18 51.26	+11 28.5	3.744	3.674	+0.35	+0.8	9.7	78.3

Comet A/2019 U5

Epoch = 2021 July 5.0 TT
 T = 2023 Mar. 30.14880 TT
 Peri. = 181.56038
 Node = 2.64564 2000.0
 Incl. = 113.51815
 q = 3.6226032 AU
 e = 1.0007315

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

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	18 20.04	+36 48.0	8.052	7.614	+0.40	+1.1	17.6	60.4
Jan. 16	18 23.96	+37 04.3	7.969	7.550	+0.38	+2.2	17.5	61.6
Jan. 26	18 27.62	+37 31.4	7.872	7.486	+0.35	+3.3	17.4	63.6
Feb. 5	18 30.86	+38 08.7	7.763	7.423	+0.30	+4.3	17.3	66.3
Feb. 15	18 33.54	+38 56.0	7.644	7.359	+0.23	+5.3	17.2	69.6
Feb. 25	18 35.47	+39 52.5	7.515	7.295	+0.15	+6.1	17.1	73.4
Mar. 7	18 36.48	+40 57.2	7.380	7.231	+0.04	+6.9	17.0	77.5
Mar. 17	18 36.39	+42 08.7	7.241	7.167	-0.08	+7.5	16.9	81.8
Mar. 27	18 35.00	+43 25.4	7.100	7.103	-0.22	+7.9	16.8	86.1
Apr. 6	18 32.13	+44 45.0	6.961	7.039	-0.38	+8.0	16.7	90.3
Apr. 16	18 27.59	+46 05.1	6.826	6.975	-0.55	+7.9	16.6	94.4
Apr. 26	18 21.26	+47 22.2	6.699	6.911	-0.74	+7.4	16.5	98.0
May 6	18 13.07	+48 33.1	6.581	6.847	-0.92	+6.6	16.4	101.1
May 16	18 03.04	+49 33.7	6.474	6.783	-1.10	+5.3	16.3	103.6
May 26	17 51.38	+50 20.2	6.382	6.720	-1.24	+3.7	16.2	105.2
June 5	17 38.43	+50 49.3	6.305	6.656	-1.35	+1.8	16.1	105.9
June 15	17 24.70	+50 58.4	6.244	6.592	-1.39	-0.3	16.1	105.7
June 25	17 10.81	+50 46.2	6.199	6.529	-1.37	-2.4	16.0	104.5
July 5	16 57.40	+50 13.1	6.170	6.465	-1.29	-4.4	15.9	102.4
July 15	16 45.02	+49 20.6	6.156	6.402	-1.16	-6.2	15.8	99.5
July 25	16 34.13	+48 11.5	6.154	6.338	-1.00	-7.7	15.8	95.9
Aug. 4	16 24.97	+46 49.4	6.162	6.275	-0.82	-8.8	15.7	91.7
Aug. 14	16 17.66	+45 18.0	6.178	6.212	-0.63	-9.5	15.7	87.2
Aug. 24	16 12.17	+43 40.9	6.200	6.149	-0.45	-9.9	15.6	82.4
Sept. 3	16 08.41	+42 01.5	6.223	6.086	-0.29	-9.9	15.5	77.6
Sept. 13	16 06.23	+40 22.8	6.245	6.024	-0.14	-9.7	15.5	72.8
Sept. 23	16 05.45	+38 47.2	6.262	5.961	-0.01	-9.3	15.4	68.1
Oct. 3	16 05.88	+37 16.8	6.272	5.899	+0.10	-8.7	15.3	63.8
Oct. 13	16 07.34	+35 53.2	6.273	5.836	+0.20	-7.9	15.3	59.9
Oct. 23	16 09.65	+34 38.0	6.262	5.775	+0.27	-7.0	15.2	56.6
Nov. 2	16 12.65	+33 32.2	6.236	5.713	+0.33	-6.0	15.1	54.2
Nov. 12	16 16.16	+32 36.8	6.195	5.651	+0.37	-4.9	15.0	52.8
Nov. 22	16 20.03	+31 52.7	6.137	5.590	+0.40	-3.8	15.0	52.4
Dec. 2	16 24.10	+31 20.4	6.062	5.529	+0.41	-2.5	14.9	53.3
Dec. 12	16 28.20	+31 00.7	5.970	5.469	+0.40	-1.3	14.7	55.3
Dec. 22	16 32.16	+30 54.0	5.860	5.408	+0.38	+0.1	14.6	58.3
Jan. 1	16 35.79	+31 00.7	5.735	5.348	+0.34	+1.4	14.5	62.2
Jan. 11	16 38.90	+31 21.2	5.596	5.289	+0.27	+2.8	14.4	66.9
Jan. 21	16 41.27	+31 55.5	5.444	5.230	+0.19	+4.2	14.3	72.3
Jan. 31	16 42.66	+32 43.3	5.284	5.171	+0.07	+5.5	14.1	78.1
Feb. 10	16 42.78	+33 44.1	5.117	5.112	-0.07	+6.8	14.0	84.2
Feb. 20	16 41.34	+34 56.8	4.949	5.055	-0.24	+7.8	13.8	90.5
Mar. 2	16 38.03	+36 19.2	4.782	4.997	-0.45	+8.7	13.7	96.8
Mar. 12	16 32.49	+37 48.5	4.622	4.940	-0.69	+9.1	13.5	103.0
Mar. 22	16 24.41	+39 20.2	4.473	4.884	-0.96	+9.1	13.4	108.7

Comet C/2020 V2 (ZTF)

Epoch = 2021 July 5.0 TT
 T = 2023 May 8.42319 TT
 Peri. = 162.38589
 Node = 212.34585 2000.0
 Incl. = 131.60108
 q = 2.2281930 AU
 e = 1.0013524

$$m1 = 3.9 + 5 \log(\Delta) + 10.0 \log(r)$$

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion		m1	Elong.
2021/22	h m	° '			m	'		°
Jan. 6	13 20.27	+27 17.6	8.056	8.242	+0.03	+5.8	17.6	97.5
Jan. 16	13 20.13	+28 18.5	7.839	8.170	-0.07	+6.5	17.5	106.3
Jan. 26	13 19.01	+29 26.3	7.633	8.097	-0.17	+7.1	17.4	114.9
Feb. 5	13 16.82	+30 39.5	7.443	8.024	-0.28	+7.5	17.3	123.1
Feb. 15	13 13.52	+31 56.0	7.273	7.951	-0.39	+7.7	17.2	130.5
Feb. 25	13 09.11	+33 13.4	7.128	7.877	-0.50	+7.7	17.1	136.7
Mar. 7	13 03.67	+34 28.7	7.010	7.804	-0.60	+7.3	17.1	140.8
Mar. 17	12 57.30	+35 39.0	6.921	7.730	-0.68	+6.6	17.0	142.1
Mar. 27	12 50.25	+36 41.4	6.861	7.656	-0.73	+5.7	16.9	140.3
Apr. 6	12 42.77	+37 33.6	6.831	7.581	-0.76	+4.6	16.9	135.9
Apr. 16	12 35.19	+38 14.1	6.826	7.507	-0.75	+3.4	16.8	129.7
Apr. 26	12 27.83	+38 42.0	6.846	7.432	-0.71	+2.1	16.8	122.3
May 6	12 21.00	+38 57.6	6.884	7.357	-0.64	+0.9	16.8	114.3
May 16	12 14.94	+39 01.6	6.938	7.282	-0.55	-0.2	16.7	106.1
May 26	12 09.86	+38 55.4	7.001	7.207	-0.45	-1.1	16.7	97.7
June 5	12 05.86	+38 40.8	7.069	7.132	-0.34	-1.9	16.7	89.4
June 15	12 03.00	+38 19.4	7.138	7.056	-0.22	-2.4	16.7	81.3
June 25	12 01.27	+37 53.0	7.203	6.980	-0.11	-2.9	16.6	73.4
July 5	12 00.62	+37 23.2	7.259	6.904	-0.01	-3.1	16.6	65.7
July 15	12 01.00	+36 51.5	7.304	6.827	+0.09	-3.2	16.6	58.5
July 25	12 02.30	+36 19.2	7.334	6.751	+0.18	-3.2	16.5	51.7
Aug. 4	12 04.43	+35 47.4	7.346	6.674	+0.26	-3.1	16.5	45.5
Aug. 14	12 07.31	+35 17.4	7.339	6.597	+0.32	-2.9	16.4	40.1
Aug. 24	12 10.81	+34 50.0	7.310	6.519	+0.38	-2.5	16.4	36.0
Sept. 3	12 14.86	+34 26.4	7.259	6.442	+0.43	-2.1	16.3	33.5
Sept. 13	12 19.36	+34 07.4	7.186	6.364	+0.47	-1.6	16.2	32.9
Sept. 23	12 24.20	+33 54.3	7.089	6.286	+0.50	-1.0	16.1	34.3
Oct. 3	12 29.29	+33 47.9	6.970	6.208	+0.52	-0.2	16.0	37.7
Oct. 13	12 34.55	+33 49.4	6.829	6.130	+0.53	+0.6	15.9	42.4
Oct. 23	12 39.85	+34 00.2	6.668	6.051	+0.53	+1.6	15.8	48.2
Nov. 2	12 45.10	+34 21.4	6.489	5.972	+0.52	+2.7	15.7	54.8
Nov. 12	12 50.16	+34 54.5	6.294	5.893	+0.49	+4.0	15.6	61.9
Nov. 22	12 54.88	+35 40.7	6.087	5.814	+0.45	+5.4	15.5	69.4
Dec. 2	12 59.12	+36 41.6	5.872	5.734	+0.39	+6.9	15.3	77.2
Dec. 12	13 02.66	+37 58.2	5.653	5.655	+0.31	+8.6	15.2	85.1
Dec. 22	13 05.27	+39 31.5	5.434	5.575	+0.20	+10.3	15.0	93.1
Jan. 1	13 06.69	+41 21.7	5.221	5.495	+0.06	+11.9	14.9	101.1
Jan. 11	13 06.56	+43 28.4	5.019	5.415	-0.11	+13.5	14.7	108.7
Jan. 21	13 04.52	+45 49.6	4.834	5.334	-0.33	+14.8	14.6	115.7
Jan. 31	13 00.10	+48 22.0	4.670	5.254	-0.59	+15.7	14.5	121.6
Feb. 10	12 52.83	+51 00.4	4.532	5.173	-0.90	+15.9	14.3	126.0
Feb. 20	12 42.30	+53 37.2	4.423	5.092	-1.25	+15.3	14.2	128.1
Mar. 2	12 28.21	+56 03.9	4.344	5.011	-1.61	+13.7	14.1	127.6
Mar. 12	12 10.64	+58 11.0	4.296	4.930	-1.93	+11.3	14.0	124.7
Mar. 22	11 50.22	+59 50.3	4.277	4.849	-2.16	+8.2	13.9	119.7

Comet 95P/(2060) Chiron

Epoch = 2021 July 5.0 TT
 T = 2046 Oct. 4.03385 TT
 Peri. = 339.70608 e = 0.3772115
 Node = 209.27479 2000.0 a = 13.7010712 AU
 Incl. = 6.92983 n = 0.01943445
 q = 8.5328696 AU P = 50.71 years

H = 5.8 , G = 0.15

Oh TT	R. A. (2000)	Decl.	Delta	r	Daily motion	V	Elong.
2020/21	h m	° '			m		°
Jan. 6	00 13.81	+04 14.9	19.024	18.866	+0.08 +0.3	18.9	79.3
Jan. 16	00 14.72	+04 18.7	19.191	18.867	+0.11 +0.5	18.9	69.3
Jan. 26	00 15.93	+04 24.6	19.348	18.867	+0.14 +0.7	18.9	59.5
Feb. 5	00 17.39	+04 32.2	19.490	18.867	+0.16 +0.9	18.9	49.7
Feb. 15	00 19.09	+04 41.5	19.613	18.868	+0.18 +1.0	18.9	40.1
Feb. 25	00 20.97	+04 52.2	19.714	18.868	+0.20 +1.1	18.9	30.5
Mar. 7	00 22.99	+05 03.9	19.791	18.868	+0.21 +1.2	18.8	21.1
Mar. 17	00 25.11	+05 16.5	19.842	18.868	+0.22 +1.3	18.8	11.8
Mar. 27	00 27.28	+05 29.6	19.865	18.869	+0.22 +1.3	18.7	3.2
Apr. 6	00 29.46	+05 43.0	19.861	18.869	+0.22 +1.3	18.8	7.5
Apr. 16	00 31.60	+05 56.3	19.829	18.869	+0.21 +1.3	18.8	16.5
Apr. 26	00 33.65	+06 09.2	19.771	18.869	+0.20 +1.3	18.8	25.6
May 6	00 35.58	+06 21.5	19.689	18.869	+0.18 +1.2	18.9	34.8
May 16	00 37.35	+06 32.9	19.584	18.869	+0.17 +1.1	18.9	44.0
May 26	00 38.92	+06 43.1	19.459	18.869	+0.14 +1.0	18.9	53.1
June 5	00 40.26	+06 52.0	19.319	18.869	+0.12 +0.8	18.9	62.4
June 15	00 41.33	+06 59.4	19.165	18.869	+0.09 +0.6	18.9	71.6
June 25	00 42.11	+07 04.9	19.002	18.869	+0.06 +0.5	18.9	80.9
July 5	00 42.59	+07 08.6	18.836	18.869	+0.03 +0.3	18.9	90.3
July 15	00 42.76	+07 10.3	18.669	18.869	0.00 +0.1	18.8	99.8
July 25	00 42.60	+07 10.0	18.507	18.869	-0.03 -0.1	18.8	109.4
Aug. 4	00 42.13	+07 07.6	18.355	18.869	-0.06 -0.4	18.8	119.1
Aug. 14	00 41.36	+07 03.2	18.216	18.868	-0.09 -0.5	18.7	128.8
Aug. 24	00 40.33	+06 56.9	18.096	18.868	-0.12 -0.7	18.7	138.7
Sept. 3	00 39.06	+06 49.0	17.998	18.868	-0.14 -0.9	18.7	148.7
Sept. 13	00 37.61	+06 39.6	17.926	18.867	-0.15 -1.0	18.6	158.8
Sept. 23	00 36.03	+06 29.2	17.882	18.867	-0.16 -1.1	18.6	168.8
Oct. 3	00 34.39	+06 18.1	17.867	18.867	-0.17 -1.1	18.5	177.5
Oct. 13	00 32.75	+06 06.7	17.883	18.866	-0.16 -1.1	18.5	170.1
Oct. 23	00 31.18	+05 55.6	17.929	18.866	-0.15 -1.1	18.6	159.9
Nov. 2	00 29.75	+05 45.0	18.003	18.865	-0.13 -1.0	18.7	149.5
Nov. 12	00 28.51	+05 35.5	18.105	18.865	-0.11 -0.9	18.7	139.2
Nov. 22	00 27.53	+05 27.4	18.229	18.864	-0.08 -0.7	18.7	128.8
Dec. 2	00 26.83	+05 21.1	18.373	18.864	-0.05 -0.5	18.8	118.5
Dec. 12	00 26.46	+05 16.6	18.531	18.863	-0.02 -0.3	18.8	108.3
Dec. 22	00 26.42	+05 14.4	18.699	18.862	+0.01 -0.1	18.8	98.1
Jan. 1	00 26.71	+05 14.3	18.871	18.862	+0.05 +0.1	18.9	88.0
Jan. 11	00 27.35	+05 16.3	19.042	18.861	+0.08 +0.3	18.9	77.9
Jan. 21	00 28.29	+05 20.5	19.207	18.860	+0.11 +0.5	18.9	68.0
Jan. 31	00 29.53	+05 26.7	19.360	18.859	+0.14 +0.7	18.9	58.2
Feb. 10	00 31.03	+05 34.6	19.499	18.859	+0.16 +0.9	18.9	48.4
Feb. 20	00 32.75	+05 44.2	19.618	18.858	+0.18 +1.0	18.9	38.8
Mar. 2	00 34.66	+05 55.0	19.715	18.857	+0.20 +1.1	18.8	29.3
Mar. 12	00 36.70	+06 06.8	19.788	18.856	+0.21 +1.2	18.8	19.8
Mar. 22	00 38.83	+06 19.4	19.834	18.855	+0.22 +1.3	18.8	10.5

Orbital elements:

Comet 174P/(60558) Echeclus

Epoch 2015 Apr. 8.0 TT = JDT 2457120.5

T 2015 Apr. 22.53258 TT

		(2000.0)	P	Sato	Q
q	5.8170648				
n	0.02822877	Peri.	162.93179	+0.91553940	+0.40213228
a	10.6825465	Node	173.33672	-0.37731586	+0.86619936
e	0.4554608	Incl.	4.34369	-0.13935689	+0.29662822

P 34.92

From 4090 observations 1979 Sept. 23–2021 Jan. 14, mean residual 0".46.

Comet 29P/Schwassmann–Wachmann

Epoch 2019 Mar. 18.0 TT = JDT 2458560.5

T 2019 Mar. 7.75862 TT

		(2000.0)	P	Sato	Q
q	5.7668184				
n	0.06662629	Peri.	47.77459	+0.99270157	-0.00957196
a	6.0261364	Node	312.39456	-0.05134904	+0.86841789
e	0.0430322	Incl.	9.36831	+0.10911861	+0.49574061

P 14.79

From 33581 observations 1902 Mar. 5–2021 Jan. 19, mean residual 0".64.

Comet C/2018 N2 (ASASSN)

Epoch 2019 Nov. 13.0 TT = JDT 2458800.5

T 2019 Nov. 10.95982 TT

		(2000.0)	P	Sato	Q
q	3.1246471				
z	-0.0000531	Peri.	24.39557	+0.78558763	-0.45744249
	+/-0.0000002	Node	25.25926	+0.27011849	-0.35227636
e	1.0001660	Incl.	77.53195	+0.55667591	+0.81648499

From 3765 observations 2018 July 10–2021 Jan. 14, mean residual 0".41.

Comet C/2019 C1 (ATLAS)

Epoch 2020 Apr. 21.0 TT = JDT 2458960.5

T 2020 May 5.72035 TT

		(2000.0)	P	Sato	Q
q	6.5813057				
z	+0.0012027	Peri.	319.18943	-0.92230284	-0.22383081
	+/-0.0000010	Node	212.39717	+0.19032836	-0.97256200
e	0.9920847	Incl.	36.01647	-0.33635187	+0.06342661

From 467 observations 2019 Jan. 14–2021 Jan. 17, mean residual 0".43.

Comet C/2019 K7 (Smith)

Epoch 2020 May 31.0 TT = JDT 2459000.5

T 2020 June 16.89359 TT

		(2000.0)	P	Sato	Q
q	4.4750157				
z	-0.0003352	Peri.	27.29065	+0.46155917	-0.44585223
	+/-0.0000006	Node	307.92353	-0.88100344	-0.12911938
e	1.0015000	Incl.	103.53356	+0.10390415	+0.88574487

From 1280 observations 2019 May 30–2020 Dec. 18, mean residual 0".48.

Comet C/2020 M3 (ATLAS)

Epoch 2020 Nov. 7.0 TT = JDT 2459160.5

T 2020 Oct. 25.62317 TT

		(2000.0)	P	Sato	Q
q	1.2682451				
n	0.00709672	Peri.	328.44552	+0.72843793	-0.57193484
a	26.8182744	Node	71.25030	+0.68169319	+0.55013929
e	0.9527097	Incl.	23.47342	+0.06835625	+0.60847128

P 138.88

From 1765 observations 2020 June 27–2021 Jan. 23, mean residual 0".43.

Comet 156P/Russell-LINEAR

Epoch 2020 Nov. 7.0 TT = JDT 2459160.5

T 2020 Nov. 17.87358 TT

		(2000.0)	P	Sato	Q
q	1.3330197				
n	0.15314464	Peri.	0.42756	+0.81128830	-0.55884114
a	3.4599369	Node	35.36951	+0.53551777	+0.59242155
e	0.6147272	Incl.	17.26308	+0.23458902	+0.58028724
P	6.44				

From 1286 observations 1986 Sept. 3–2021 Jan. 23, mean residual 0".55.

Comet 162P/Siding Spring

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2020 Dec. 7.82002 TT

		(2000.0)	P	Sato	Q
q	1.2891345				
n	0.18141178	Peri.	357.13420	+0.87966214	-0.41197237
a	3.0904785	Node	30.91117	+0.44503736	+0.53678740
e	0.5828690	Incl.	27.55495	+0.16773870	+0.73630025
P	5.43				

From 2543 observations 1990 Mar. 23–2021 Jan. 18, mean residual 0".43.

Comet 141P/Machholz

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2020 Dec. 16.27096 TT

		(2000.0)	P	Sato	Q
q	0.8079273				
n	0.18445555	Peri.	153.54463	+0.80360976	-0.55593407
a	3.0563862	Node	241.84957	+0.49438218	+0.82231903
e	0.7356593	Incl.	13.94487	+0.33135723	+0.12136198
P	5.34				

From 402 observations 2005 Mar. 16–2021 Jan. 20, mean residual 0".87.

Nongravitational parameters A1 = +0.51, A2 = +0.0757.

Comet 405P/Lemmon

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2020 Dec. 24.31945 TT

		(2000.0)	P	Sato	Q
q	1.1219061				
n	0.14367824	Peri.	112.24849	-0.43077631	-0.90240972
a	3.6102897	Node	3.31362	+0.75647127	-0.36675482
e	0.6892476	Incl.	9.36478	+0.49212090	-0.22615835
P	6.86				

From 602 observations 2013 Oct. 4–2021 Jan. 13, mean residual 0".58.

Comet 398P/Boattini

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2020 Dec. 26.74224 TT

		(2000.0)	P	Sato	Q
q	1.3056984				
n	0.17816785	Peri.	320.23234	+0.03085115	-0.98795109
a	3.1278781	Node	127.46343	+0.95878087	-0.01362888
e	0.5825610	Incl.	11.01524	+0.28246674	+0.15416519
P	5.53				

From 1720 observations 2009 Aug. 26–2021 Jan. 20, mean residual 0".63.

Nongravitational parameters Y1 = +0.30, Y2 = -0.0510.

Comet 277P/LINEAR

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2020 Dec. 30.17852 TT

		(2000.0)	P	Sato	Q
q	1.9044736				
n	0.13036144	Peri.	152.32029	+0.34416283	-0.89399881
a	3.8521509	Node	276.34482	+0.79925976	+0.43930849
e	0.5056077	Incl.	16.77891	+0.49268224	-0.08817130
P	7.56				

From 625 observations 2005 Sept. 15–2021 Jan. 15, mean residual 0".51.

Comet 98P/Takamizawa

Epoch 2020 Dec. 17.0 TT = JDT 2459200.5

T 2021 Jan. 4.93106 TT

	(2000.0)	P	Sato	Q
q	1.6630025			
n	0.13310348	Peri. 157.92380	+0.05176909	+0.98468095
a	3.7990625	Node 114.71188	-0.94147107	+0.10373189
e	0.5622598	Incl. 10.56138	-0.33309487	-0.14015388
P	7.40			

From 573 observations 1984 Sept. 18–2013 Dec. 13, mean residual 0".69.

Nongravitational parameters A1 = +0.57, A2 = +0.058.

From CHB 2020.

Comet 102P/Shoemaker

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 22.47234 TT

	(2000.0)	P	Sato	Q
q	2.0699112			
n	0.13235333	Peri. 20.54043	+0.98759452	-0.03145783
a	3.8134038	Node 339.36519	-0.09266024	+0.67421541
e	0.4572011	Incl. 25.88353	+0.12677199	+0.73786448
P	7.45			

From 370 observations 2006 July 24–2013 Dec. 22, mean residual 0".71.

Nongravitational parameters A1 = -0.87, A2 = -0.0253, A3 = -0.8615.

Comet C/2021 A2 (NEOWISE)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 22.68219 TT

	(2000.0)	P	Sato	Q
q	1.4133219			
z	+0.0009361	Peri. 338.87521	-0.62417580	+0.01503832
	+/-0.0010559	Node 125.22648	+0.78039366	+0.05971662
e	0.9986771	Incl. 107.01092	-0.03728669	+0.99810209

From 149 observations 2021 Jan. 3–26, mean residual 0".62.

Comet P/2007 B1 = 2020 W3 (Christensen)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 24.48528 TT

	(2000.0)	P	Sato	Q
q	2.4387475			
n	0.07021728	Peri. 46.68978	-0.54792125	-0.80989541
a	5.8188889	Node 77.67392	+0.69200082	-0.57947611
e	0.5808912	Incl. 12.37734	+0.47001826	-0.09097723
P	14.04			

From 148 observations 2007 Jan. 17–2021 Jan. 17, mean residual 0".56.

Comet 409P/LONEOS-Hill

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 28.17185 TT

	(2000.0)	P	Sato	Q
q	1.7540429			
n	0.06622123	Peri. 15.13679	-0.92552020	-0.33616122
a	6.0506854	Node 143.67110	+0.30964317	-0.93684954
e	0.7101084	Incl. 17.11858	+0.21802171	-0.09648095
P	14.88			

From 725 observations 2005 Dec. 4–2021 Jan. 24, mean residual 0".54.

Comet P/2009 U4 (McNaught)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Feb. 1.11188 TT

	(2000.0)	P	Sato	Q
q	1.6465651			
n	0.08598019	Peri. 259.83839	+0.69698191	+0.70248229
a	5.0839794	Node 55.35445	-0.57011348	+0.66464155
e	0.6761267	Incl. 10.08051	-0.43495613	+0.25450000
P	11.46			

From 84 observations 2009 Oct. 11–2010 Jan. 16, mean residual 0".59.

From CHB 2020.

Comet 400P/PANSTARRS

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Feb. 10.09034 TT

			P	Sato	Q
q	2.1033448	(2000.0)			
n	0.14679796	Peri.	238.78364	+0.57000057	-0.82155796
a	3.5589566	Node	176.39812	+0.80351680	+0.55433809
e	0.4089996	Incl.	10.92914	+0.17163945	+0.13323586
P	6.71				

From 232 observations 2013 Aug. 15–2020 Dec. 19, mean residual 0".42.

Comet P/2020 K9 (Lemmon-PANSTARRS)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Feb. 11.80637 TT

			P	Sato	Q
q	2.8494206	(2000.0)			
n	0.11449472	Peri.	196.87442	+0.99293585	-0.07274298
a	4.2002881	Node	166.23956	+0.07440905	+0.99712386
e	0.3216131	Incl.	23.20892	-0.09242124	+0.02127138
P	8.61				

From 119 observations 2020 May 22–Dec. 13, mean residual 0".51.

Comet 17P/Holmes

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Feb. 19.82161 TT

			P	Sato	Q
q	2.0806856	(2000.0)			
n	0.14215235	Peri.	24.46735	+0.97547037	+0.12754840
a	3.6360794	Node	326.62035	-0.21320813	+0.75022135
e	0.4277667	Incl.	19.03199	+0.05477094	+0.64876755
P	6.93				

From 5009 observations 2007 May 13–2020 Nov. 16, mean residual 0".58.

Nongravitational parameters A1 = +0.45, A2 = +0.1377.

Comet 246P/NEAT

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Feb. 22.82233 TT

			P	Sato	Q
q	2.8639215	(2000.0)			
n	0.12245312	Peri.	176.30005	-0.25557072	+0.92828771
a	4.0162692	Node	78.74744	-0.89393261	-0.12049198
e	0.2869199	Incl.	15.98679	-0.36819573	-0.35180053
P	8.05				

From 3656 observations 2002 Jan. 6–2020 Sept. 12, mean residual 0".96.

Comet C/2020 R4 (ATLAS)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 1.94208 TT

			P	Sato	Q
q	1.0283836	(2000.0)			
z	+0.0104322	Peri.	46.72841	+0.12994202	-0.97849902
	+/-0.0000173	Node	323.27620	-0.96951095	-0.15923710
e	0.9892717	Incl.	164.46284	-0.20775848	+0.13108478

From 286 observations 2020 Aug. 29–2021 Jan. 3, mean residual 0".54.

Comet C/2019 T3 (ATLAS)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 2.69931 TT

			P	Sato	Q
q	5.9464997	(2000.0)			
z	+0.0002922	Peri.	112.27620	+0.60544670	+0.57396972
	+/-0.0000008	Node	139.52070	-0.19750421	-0.56273504
e	0.9982624	Incl.	121.86225	+0.77099052	-0.59488489

From 679 observations 2019 Jan. 17–2021 Jan. 18, mean residual 0".46.

Comet C/2019 O3 (Palomar)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 7.95182 TT

			P	Sato	Q
q	8.8194703	(2000.0)			
z	-0.0002566	Peri.	60.04837	+0.25491421	-0.43681245
	+/-0.0000009	Node	300.38086	-0.73852324	+0.48794012
e	1.0022631	Incl.	89.81517	+0.62418120	+0.75571775

From 480 observations 2019 May 14–2020 Dec. 12, mean residual 0".36.

Comet 28P/Neujmin

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 11.88290 TT

		(2000.0)	P	Sato	Q
q	1.5782589				
n	0.05344611	Peri.	347.41111	+0.89842032	+0.43523462
a	6.9800521	Node	346.33232	-0.37842476	+0.69985025
e	0.7738901	Incl.	14.31172	-0.22279055	+0.56637484
P	18.44				

From 530 observations 1984 Feb. 26–2020 Sept. 16, mean residual 0".47.

Comet C/2020 N1 (PANSTARRS)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 12.22918 TT

		(2000.0)	P	Sato	Q
q	1.3207215				
z	-0.0003800	Peri.	186.77067	-0.27298368	-0.82905037
+/-	-0.0000038	Node	279.98198	+0.90424365	-0.04797526
e	1.0005019	Incl.	29.70356	+0.32836464	-0.55711206

From 514 observations 2020 July 1–2021 Jan. 23, mean residual 0".60.

Comet C/2021 A4 (NEOWISE)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 20.01045 TT

		(2000.0)	P	Sato	Q
q	1.1456391				
z	+0.0224289	Peri.	204.63783	-0.42570271	+0.51806553
+/-	-0.0005905	Node	307.07924	+0.90435090	+0.21600944
e	0.9743046	Incl.	111.58017	-0.03044114	-0.82761587

From 147 observations 2021 Jan. 3–28, mean residual 0".54.

Comet P/2016 G1 (PANSTARRS)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 22.23155 TT

		(2000.0)	P	Sato	Q
q	2.0378712				
n	0.23732624	Peri.	111.21428	+0.70328770	+0.70666758
a	2.5836809	Node	204.03894	-0.70217018	+0.67346664
e	0.2112528	Incl.	10.96841	-0.11110104	+0.21694150
P	4.15				

From 141 observations 2016 Mar. 12–Aug. 9, mean residual 0".57.

From CHB 2020.

Comet C/2020 F5 (MASTER)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 24.24043 TT

		(2000.0)	P	Sato	Q
q	4.3260765				
z	-0.0007569	Peri.	311.06558	+0.57208203	+0.81017983
+/-	-0.0000047	Node	350.62918	-0.28569648	+0.05078907
e	1.0032742	Incl.	51.70683	-0.76883007	+0.58397698

From 222 observations 2020 Mar. 16–Nov. 13, mean residual 0".51.

Comet 10P/Tempel

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 24.27645 TT

		(2000.0)	P	Sato	Q
q	1.4124763				
n	0.18398414	Peri.	195.50710	+0.68083072	+0.70882328
a	3.0616047	Node	117.80975	-0.64786745	+0.70030115
e	0.5386484	Incl.	12.03965	-0.34166841	+0.08454496
P	5.36				

From 3743 observations 1999 Feb. 14–2020 June 13, mean residual 0".68.

Comet C/2020 S8 (Lemmon)

Epoch 2021 Mar. 27.0 TT = JDT 2459300.5

T 2021 Apr. 10.92745 TT

		(2000.0)	P	Sato	Q
q	2.3639010				
z	+0.0036469	Peri.	160.33200	-0.81633131	-0.42923985
+/-	-0.0000069	Node	24.05221	-0.56862839	+0.47989110
e	0.9913790	Incl.	108.51805	+0.10131610	-0.76515207

From 85 observations 2020 July 29–2021 Jan. 17, mean residual 0".43.

Comet 16P/Brooks

Epoch 2021 Apr. 16.0 TT = JDT 2459320.5

T 2021 Apr. 18.24646 TT

		(2000.0)	P	Sato	Q
q	1.8781642				
n	0.14101595	Peri.	245.17875	+0.91241074	-0.40781392
a	3.655878	Node	138.86490	+0.39191346	+0.84624918
e	0.4862210	Incl.	3.01154	+0.11794273	+0.34285584
P	6.99				

From 346 observations 2001 Aug. 17–2021 Jan. 16, mean residual 0".88.

Nongravitational parameters A1 = +0.87, A2 = -0.2343.

Comet C/2020 P3 (ATLAS)

Epoch 2021 Apr. 16.0 TT = JDT 2459320.5

T 2021 Apr. 20.85560 TT

		(2000.0)	P	Sato	Q
q	6.8123395				
z	+0.0001579	Peri.	82.24575	-0.02858020	-0.95530165
	+/-0.0000025	Node	19.48822	+0.09752439	-0.29562883
e	0.9989244	Incl.	61.88507	+0.99482268	+0.00153626

From 303 observations 2020 Aug. 9–2021 Jan. 13, mean residual 0".48.

Comet P/2015 J3 = 2021 B1 (NEOWISE)

Epoch 2021 Apr. 16.0 TT = JDT 2459320.5

T 2021 Apr. 22.17393 TT

		(2000.0)	P	Sato	Q
q	1.4920207				
n	0.16090644	Peri.	129.45757	-0.48049772	+0.86704630
a	3.3477557	Node	111.35116	-0.84180416	-0.41386070
e	0.5543221	Incl.	8.13099	-0.24594246	-0.27739868
P	6.13				

From 118 observations 2015 May 15–2021 Jan. 18, mean residual 0".46.

Comet C/2016 Q2 (PANSTARRS)

Epoch 2021 May 26.0 TT = JDT 2459360.5

T 2021 May 11.89064 TT

		(2000.0)	P	Sato	Q
q	7.0819208				
z	-0.0000974	Peri.	84.52869	-0.12666472	-0.80693158
	+/-0.0000013	Node	322.29574	-0.66688567	+0.49981035
e	1.0006897	Incl.	109.38822	+0.73431570	+0.31472375

From 345 observations 2016 Aug. 26–2021 Jan. 17, mean residual 0".65.

Comet 201P/LONEOS

Epoch 2021 May 26.0 TT = JDT 2459360.5

T 2021 May 26.68867 TT

		(2000.0)	P	Sato	Q
q	1.2173785				
n	0.16049187	Peri.	41.54698	+0.48146385	-0.87581469
a	3.3535183	Node	19.74535	+0.77545649	+0.40769713
e	0.6369847	Incl.	5.73875	+0.40848475	+0.25832478
P	6.14				

From 807 observations 2001 Aug. 9–2015 Apr. 16, mean residual 0".70.

Comet 7P/Pons–Winnecke

Epoch 2021 May 26.0 TT = JDT 2459360.5

T 2021 May 27.11173 TT

		(2000.0)	P	Sato	Q
q	1.2342369				
n	0.15624770	Peri.	172.59576	-0.06058421	+0.92307292
a	3.4139747	Node	93.37532	-0.93419516	+0.08159451
e	0.6384751	Incl.	22.36364	-0.35158066	-0.37587062
P	6.31				

From 568 observations 1994 Dec. 31–2021 Jan. 18, mean residual 0".69.

Nongravitational parameters A1 = -0.00, A2 = +0.0046.

Comet P/2014 W12 (Gibbs)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 June 18.25990 TT

		(2000.0)	P	Sato	Q
q	1.6746456				
n	0.14931966	Peri.	36.86501	+0.90888054	+0.39656793
a	3.5187742	Node	299.29046	-0.40919298	+0.78810186
e	0.5240827	Incl.	8.51331	-0.08060561	+0.47077526
P	6.60				

From 67 observations 2014 Nov. 30–2015 Jan. 7, mean residual 0".55.

Comet C/2020 T4 (PANSTARRS)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 5.24176 TT

		(2000.0)	P	Sato	Q
q	2.1919914				
z	-0.0001050	Peri.	79.59981	+0.03266276	-0.63905444
+/-	-0.0000243	Node	50.62067	-0.19928994	-0.75760231
e	1.0002301	Incl.	83.81804	+0.97939607	-0.13284640

From 107 observations 2020 Sept. 26–2021 Jan. 9, mean residual 0".38.

Comet C/2020 T2 (Palomar)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 11.14821 TT

		(2000.0)	P	Sato	Q
q	2.0547046				
z	+0.0032045	Peri.	150.38273	-0.53887637	+0.70302558
+/-	-0.0000033	Node	83.04833	-0.83513906	-0.37375761
e	0.9934158	Incl.	27.87303	-0.11024972	-0.60502915

From 268 observations 2019 Dec. 11–2021 Jan. 23, mean residual 0".42.

Comet 15P/Finlay

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 13.54326 TT

		(2000.0)	P	Sato	Q
q	0.9919922				
n	0.15014366	Peri.	347.82436	+0.99928827	-0.02521126
a	3.5058881	Node	13.71366	+0.03587671	+0.86500493
e	0.7170497	Incl.	6.79750	-0.01165410	+0.50112960
P	6.56				

From 1136 observations 2002 Jan. 27–2016 Feb. 6, mean residual 0".70.

Nongravitational parameters A1 = +0.11, A2 = -0.0507.

Comet C/2021 A7 (NEOWISE)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 15.58891 TT

		(2000.0)	P	Sato	Q
q	1.9687737				
z	+0.0024706	Peri.	356.07194	-0.89492260	-0.14999690
+/-	-0.0019332	Node	154.56801	+0.43141997	-0.53140833
e	0.9951359	Incl.	78.12909	+0.11397517	+0.83373024

From 65 observations 2021 Jan. 9–20, mean residual 0".42.

Comet P/2020 V4 (Rankin)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 17.87173 TT

		(2000.0)	P	Sato	Q
q	5.1486978				
n	0.03451900	Peri.	256.99021	-0.17025796	-0.98050040
a	9.3418002	Node	203.50798	+0.97228144	-0.15095969
e	0.4488538	Incl.	14.24315	+0.16025298	-0.12581789
P	28.55				

From 235 observations 2019 Sept. 22–2021 Jan. 15, mean residual 0".39.

Comet P/2014 E1 = 2020 W4 (Larson)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 20.21202 TT

		(2000.0)	P	Sato	Q
q	2.1398584				
n	0.13789880	Peri.	186.04205	-0.70883757	+0.68374628
a	3.7104712	Node	39.02513	-0.63509473	-0.51173066
e	0.4232920	Incl.	15.97760	-0.30692668	-0.52021414
P	7.15				

From 394 observations 2014 Jan. 6–2021 Jan. 17, mean residual 0".62.

Comet 241P/LINEAR

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 July 25.82902 TT

		(2000.0)	P	Sato	Q
q	1.9175344				
n	0.09043230	Peri.	111.42803	+0.49508065	-0.81786727
a	4.9157185	Node	305.48326	+0.60208456	+0.56627352
e	0.6099178	Incl.	21.10736	+0.62640988	+0.10211479
P	10.90				

From 460 observations 1999 Oct. 30–2020 Oct. 19, mean residual 0".64.

Nongravitational parameters A1 = -0.23, A2 = +0.0596.

Comet 106P/Schuster

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 18.76784 TT

		(2000.0)	P	Sato	Q
q	1.5286290				
n	0.13507145	Peri.	353.66671	+0.73187171	-0.63315748
a	3.7620712	Node	48.88592	+0.63896809	+0.50914032
e	0.5936735	Incl.	19.53651	+0.23681970	+0.58299892
P	7.30				

From 266 observations 1977 Sept. 6–2015 Mar. 22, mean residual 0".76.

Nongravitational parameters A1 = +0.11, A2 = +0.0272.

Comet C/2020 M5 (ATLAS)

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 19.88046 TT

		(2000.0)	P	Sato	Q
q	3.0043577				
z	+0.0000043	Peri.	126.33913	-0.59316029	-0.79328700
	+/-0.0000016	Node	352.09466	-0.28629035	+0.36725519
e	0.9999871	Incl.	93.22267	+0.75246176	-0.48561236

From 407 observations 2019 Aug. 10–2021 Jan. 17, mean residual 0".45.

Comet 193P/LINEAR-NEAT

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 25.28644 TT

		(2000.0)	P	Sato	Q
q	2.1680466				
n	0.14553971	Peri.	8.10854	+0.95671174	+0.28042646
a	3.5794396	Node	335.17486	-0.27634647	+0.79136764
e	0.3943056	Incl.	10.68851	-0.09129775	+0.54322948
P	6.77				

From 332 observations 2001 Aug. 17–2015 Jan. 17, mean residual 0".69.

Nongravitational parameters A1 = +1.80, A2 = -0.1632.

Comet 8P/Tuttle

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 27.73681 TT

		(2000.0)	P	Sato	Q
q	1.0260079				
n	0.07227799	Peri.	207.48882	-0.26848997	-0.50829972
a	5.7077553	Node	270.20391	+0.96326400	-0.13641082
e	0.8202432	Incl.	54.91121	+0.00596695	-0.85030788
P	13.64				

From 1505 observations 1992 July 29–2021 Jan. 14, mean residual 0".57.

Nongravitational parameters A1 = +0.02, A2 = +0.0402.

Comet C/2020 O2 (Amaral)

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 28.38429 TT

		(2000.0)	P	Sato	Q
q	4.8637058				
z	-0.0003234	Peri.	10.26089	-0.17119096	+0.34075021
	+/-0.0001413	Node	256.75290	-0.95780563	-0.27742928
e	1.0015731	Incl.	71.75152	-0.23087233	+0.89828853

From 74 observations 2020 July 23–Sept. 14, mean residual 0".46.

Comet 4P/Faye

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 8.83787 TT

		(2000.0)	P	Sato	Q
q	1.6188635				
n	0.13182038	Peri.	206.99776	+0.76783113	-0.63989326
a	3.8236754	Node	192.93123	+0.61007277	+0.74517002
e	0.5766211	Incl.	8.00830	+0.19556732	+0.18777179
P	7.48				

From 4315 observations 1993 Jan. 23–2015 June 10, mean residual 0".63.

Nongravitational parameters A1 = -0.01, A2 = -0.3619.

Comet 108P/Ciffreo

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 10.08931 TT

		(2000.0)	P	Sato	Q
q	1.6602826				
n	0.13638231	Peri.	354.41562	+0.70921690	-0.68828616
a	3.7379259	Node	50.29219	+0.65424961	+0.56196662
e	0.5558279	Incl.	11.43772	+0.26261919	+0.45875449
P	7.23				

From 1380 observations 1985 Nov. 8–2015 Mar. 14, mean residual 0".58.

Nongravitational parameters A1 = +0.12, A2 = -0.0413.

Comet 284P/McNaught

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 12.72872 TT

		(2000.0)	P	Sato	Q
q	2.2957656				
n	0.13964215	Peri.	202.44976	+0.96846885	+0.21830128
a	3.6795245	Node	144.26332	-0.18571245	+0.95379126
e	0.3760700	Incl.	11.86159	-0.16606919	+0.20646255
P	7.06				

From 1799 observations 2007 Apr. 17–2020 June 26, mean residual 0".59.

Nongravitational parameters Y1 = -0.70, Y2 = +0.0955.

Comet 6P/d'Arrest

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 17.66173 TT

		(2000.0)	P	Sato	Q
q	1.3546047				
n	0.15062458	Peri.	178.10569	+0.73309181	+0.64376550
a	3.4984216	Node	138.93558	-0.62831643	+0.76453726
e	0.6127955	Incl.	19.51236	-0.26037446	-0.03238454
P	6.54				

From 1781 observations 2008 Apr. 25–2016 Jan. 14, mean residual 0".56.

Comet C/2020 H6 (ATLAS)

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Oct. 1.07713 TT

		(2000.0)	P	Sato	Q
q	4.7028431				
z	-0.0001606	Peri.	20.34884	-0.74635863	+0.37992007
+/-	-0.0000035	Node	213.70641	-0.65981331	-0.31486924
e	1.0007552	Incl.	79.96734	+0.08715039	+0.86978049

From 118 observations 2020 Apr. 22–2021 Jan. 8, mean residual 0".37.

Comet 52P/Harrington-Abell

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Oct. 5.18975 TT

		(2000.0)	P	Sato	Q
q	1.7772272				
n	0.12975346	Peri.	139.59370	-0.44918499	-0.89070274
a	3.8641747	Node	336.83799	+0.76707839	-0.34438168
e	0.5400759	Incl.	10.23173	+0.45806505	-0.29673201
P	7.60				

From 1238 observations 1983 Sept. 17–2020 Sept. 20, mean residual 0".63.

Nongravitational parameters A1 = +0.05, A2 = +0.0292.

Comet 57P/du Toit-Neujmin-Delporte
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 17.45164 TT		P		Sato Q	
q	1.7200949	(2000.0)			
n	0.15399267	Peri.	115.25863	+0.55949555	+0.82879863
a	3.4472227	Node	188.77409	-0.77721174	+0.52144696
e	0.5010201	Incl.	2.85090	-0.28793514	+0.20294308
P	6.40				

From 939 observations 1996 Aug. 1–2015 Dec. 31, mean residual 0".70.
Nongravitational parameters A1 = +0.89, A2 = +0.0276.

Comet P/2010 A5 = 2020 Y5 (LINEAR)
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 17.56728 TT		P		Sato Q	
q	1.7028930	(2000.0)			
n	0.08609259	Peri.	307.10073	-0.70604461	+0.70105541
a	5.0795533	Node	277.65722	-0.61346565	-0.67610744
e	0.6647554	Incl.	5.79746	-0.35378088	-0.22671578
P	11.45				

From 672 observations 2010 Jan. 14–2021 Jan. 19, mean residual 0".51.

Comet 110P/Hartley
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 18.30486 TT		P		Sato Q	
q	2.4557187	(2000.0)			
n	0.14415759	Peri.	167.44499	-0.09112936	-0.97686411
a	3.6022821	Node	287.53558	+0.89522343	+0.00473876
e	0.3182880	Incl.	11.70673	+0.43620001	-0.21380846
P	6.84				

From 2525 observations 1993 June 23–2020 Dec. 5, mean residual 0".62.

Comet 67P/Churyumov-Gerasimenko
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 2.06143 TT		P		Sato Q	
q	1.2106198	(2000.0)			
n	0.15340732	Peri.	22.13325	+0.52350052	-0.85108570
a	3.4559862	Node	36.33365	+0.77125057	+0.45339413
e	0.6497035	Incl.	3.87151	+0.36210464	+0.26473929
P	6.42				

From 6136 observations 1988 July 7–2018 June 14, mean residual 0".68.
Nongravitational parameters A1 = +0.08, A2 = -0.0117.

Comet C/2018 U1 (Lemmon)
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 3.07904 TT		P		Sato Q	
q	4.9929427	(2000.0)			
z	-0.0002764	Peri.	180.46429	-0.25316455	-0.30190305
+/-	-0.0000008	Node	75.48048	-0.88450510	+0.45706525
e	1.0013799	Incl.	108.29877	-0.39186534	-0.83662770

From 1556 observations 2018 Oct. 27–2020 Nov. 23, mean residual 0".45.

Comet 70P/Kojima
Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 3.11300 TT		P		Sato Q	
q	2.0090048	(2000.0)			
n	0.13974195	Peri.	1.82762	-0.51628936	-0.85052822
a	3.6777724	Node	119.26838	+0.78427980	-0.51656864
e	0.4537441	Incl.	6.59807	+0.34402107	-0.09878559
P	7.05				

>From 1157 observations 1977 Nov. 12–2020 Nov. 13, mean residual 0".58.
Nongravitational parameters A1 = +0.04, A2 = -0.0188.

Comet 132P/Helin-Roman-Alu

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 13.15184 TT

		(2000.0)	P	Sato	Q
q	1.6918012				
n	0.12865655	Peri.	216.34834	+0.86271699	-0.50559189
a	3.8861073	Node	173.99765	+0.48326197	+0.81859147
e	0.5646540	Incl.	5.38267	+0.14892031	+0.27255246
P	7.66				

From 226 observations 1989 Nov. 2–2014 Nov. 29, mean residual 0".72.

Comet A/2020 F7

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 14.00241 TT

		(2000.0)	P	Sato	Q
q	5.3321522				
z	+0.0014418	Peri.	227.96883	-0.49517662	+0.61290525
	+/-0.0000022	Node	321.88674	+0.71087394	-0.12161277
e	0.9923124	Incl.	93.95336	-0.49945806	-0.78074163

From 183 observations 2020 Jan. 4–2021 Jan. 4, mean residual 0".40.

Comet 402P/LINEAR

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 14.54817 TT

		(2000.0)	P	Sato	Q
q	3.9378771				
n	0.05304382	Peri.	326.73185	-0.06194669	-0.90087461
a	7.0152988	Node	123.09142	+0.99049350	-0.10846069
e	0.4386729	Incl.	30.85151	+0.12282196	+0.42031085
P	18.58				

From 1189 observations 2001 Nov. 22–2021 Jan. 13, mean residual 0".63.

Comet C/2021 A1 (Leonard)

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 3.31386 TT

		(2000.0)	P	Sato	Q
q	0.6152452				
z	+0.0000098	Peri.	225.09477	+0.63775637	+0.29157965
	+/-0.0000187	Node	255.89518	+0.72788805	-0.53083707
e	0.9999940	Incl.	132.68630	-0.25188450	-0.79573445

From 186 observations 2020 Apr. 11–2021 Jan. 26, mean residual 0".48.

Comet C/2019 L3 (ATLAS)

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 9.61692 TT

		(2000.0)	P	Sato	Q
q	3.5544683				
z	-0.0004545	Peri.	171.61103	-0.26052773	-0.66630657
	+/-0.0000008	Node	290.79035	+0.83676062	+0.20517166
e	1.0016155	Incl.	48.36120	+0.48161911	-0.71689619

From 1601 observations 2019 June 10–2021 Jan. 23, mean residual 0".37.

Comet 104P/Kowal

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 12.89059 TT

		(2000.0)	P	Sato	Q
q	1.0738290				
n	0.17149304	Peri.	227.34121	+0.27086312	-0.96156918
a	3.2085223	Node	207.04051	+0.90956907	+0.27093481
e	0.6653198	Incl.	5.67061	+0.31514642	+0.04448634
P	5.75				

From 109 observations 2005 Feb. 11–2016 June 28, mean residual 0".71.

Nongravitational parameters A1 = +7.33, A2 = +3.1260.

Comet 19P/Borrelly

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Feb. 1.82402 TT

		(2000.0)	P	Sato	Q
q	1.3063027				
n	0.14399703	Peri.	351.91457	+0.38682769	-0.79275032
a	3.6049592	Node	74.24750	+0.87108075	+0.14648326
e	0.6376373	Incl.	29.30489	+0.30262627	+0.59168369
P	6.84				

From 2200 observations 1994 June 12–2016 June 4, mean residual 0".76.

Nongravitational parameters A1 = +0.30, A2 = +0.0801.

Comet 9P/Tempel

Epoch 2022 Mar. 2.0 TT = JDT 2459640.5

T 2022 Mar. 4.94941 TT

		(2000.0)	P	Sato	Q
q	1.5442313				
n	0.17662976	Peri.	179.34947	-0.37339940	+0.91208680
a	3.1460102	Node	68.71423	-0.85193979	-0.26492413
e	0.5091461	Incl.	10.46999	-0.36711236	-0.31291033
P	5.58				

From 7021 observations 1982 Dec. 11–2020 Dec. 27, mean residual 0".54.

Nongravitational parameters A1 = +0.03, A2 = -0.0125.

Comet 22P/Kopff

Epoch 2022 Mar. 2.0 TT = JDT 2459640.5

T 2022 Mar. 18.13867 TT

		(2000.0)	P	Sato	Q
q	1.5524177				
n	0.15444153	Peri.	163.02285	+0.24031729	+0.96809516
a	3.4405404	Node	120.83176	-0.89992137	+0.24961176
e	0.5487867	Incl.	4.74217	-0.36385316	+0.02203925
P	6.38				

From 3320 observations 2008 Jan. 30–2020 Dec. 23, mean residual 0".65.

Nongravitational parameters A1 = -0.62, A2 = +0.4422.

Comet C/2020 U5 (PANSTARRS)

Epoch 2022 Apr. 11.0 TT = JDT 2459680.5

T 2022 Apr. 27.89860 TT

		(2000.0)	P	Sato	Q
q	3.7559086				
z	+0.0001926	Peri.	75.41865	+0.04188771	+0.31879093
	+/-0.0000407	Node	107.33618	-0.12790173	-0.93822230
e	0.9992766	Incl.	97.26993	+0.99090190	-0.13457809

From 112 observations 2020 Sept. 25–2021 Jan. 6, mean residual 0".39.

Comet C/2019 T4 (ATLAS)

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 June 9.14042 TT

		(2000.0)	P	Sato	Q
q	4.2424977				
z	+0.0009917	Peri.	351.20004	-0.95992728	+0.05603823
	+/-0.0000015	Node	199.93930	-0.18195468	-0.86982887
e	0.9957927	Incl.	53.62860	-0.21314810	+0.49016064

From 294 observations 2019 Feb. 5–2021 Jan. 16, mean residual 0".30.

Comet C/2020 Y2 (ATLAS)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 June 17.73731 TT

		(2000.0)	P	Sato	Q
q	3.1326822				
z	+0.0009520	Peri.	266.10350	-0.14805237	+0.88680862
	+/-0.0000145	Node	26.51475	+0.52178057	+0.44607815
e	0.9970179	Incl.	101.29631	-0.84013424	+0.12076736

From 81 observations 2020 Mar. 25–2021 Jan. 15, mean residual 0".38.

Comet 117P/Helin–Roman–Alu

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 July 7.79178 TT

		(2000.0)	P	Sato	Q
q	3.0396262				
n	0.11946431	Peri.	222.94601	+0.19756960	+0.97169761
a	4.0829800	Node	58.84158	-0.85339729	+0.23549183
e	0.2555373	Incl.	8.70401	-0.48236845	-0.01863759
P	8.25				

From 3748 observations 2006 May 3–2021 Jan. 10, mean residual 0".58.

Nongravitational parameters Y1 = -0.94, Y2 = +0.3136.

Comet C/2017 K2 (PANSTARRS)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Dec. 19.67511 TT

		(2000.0)	P	Sato	Q
q	1.7969688				
z	-0.0004743	Peri.	236.19675	+0.01818416	+0.04923148
	+/-0.0000005	Node	88.23545	-0.18095548	+0.98245486
e	1.0008523	Incl.	87.56305	-0.98332317	-0.17988528

From 3836 observations 2013 May 12–2021 Jan. 26, mean residual 0".45.

Comet A/2019 U5

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Mar. 29.79544 TT

		(2000.0)	P	Sato	Q
q	3.6240270				
z	-0.0004259	Peri.	181.49473	-0.99908021	+0.00770458
	+/-0.0000048	Node	2.63680	-0.02313946	+0.73133353
e	1.0015435	Incl.	113.51998	-0.03610118	-0.68197647

From 371 observations 2019 Oct. 11–2021 Jan. 15, mean residual 0".36.

Comet C/2020 V2 (ZTF)

Epoch 2023 May 16.0 TT = JDT 2460080.5

T 2023 May 8.55935 TT

		(2000.0)	P	Sato	Q
q	2.2277719				
z	-0.0005185	Peri.	162.43009	+0.69786341	+0.59392285
	+/-0.0000230	Node	212.37147	+0.53387352	-0.05877486
e	1.0011550	Incl.	131.61177	+0.47745757	-0.80237221

From 174 observations 2020 Apr. 18–2021 Jan. 22, mean residual 0".39.

Comet 95P/(2060) Chiron

Epoch 2046 Aug. 3.0 TT = JDT 2468560.5

T 2046 Aug. 3.23832 TT

		(2000.0)	P	Sato	Q
q	8.4622672				
n	0.01964670	Peri.	339.58192	-0.98687458	+0.15029645
a	13.6022143	Node	209.25684	-0.12624928	-0.94614535
e	0.3778758	Incl.	6.94232	-0.10069595	-0.28674023
P	50.17				

From 3127 observations 1941 Jan. 23–2021 Jan. 13, mean residual 0".38.

References:

Comet A/2019 T1

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 14.26730 TT

		(2000.0)	P	Sato	Q
q	4.2815820				
n	0.00416588	Peri.	91.03163	+0.04423704	-0.99360159
a	38.2529620	Node	6.95381	-0.81058098	-0.09650044
e	0.8880719	Incl.	120.86969	+0.58395338	-0.05868178
P	236.59				

From 116 observations 2017 Sept. 16–2020 Nov. 8, mean residual 0".27.

Comet C/2019 B3 (PANSTARRS)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 20.04880 TT

		(2000.0)	P	Sato	Q
q	6.8229164				
z	-0.0003634	Peri.	263.91378	-0.11684545	+0.99283131
	+/-0.0000031	Node	358.42816	+0.00237853	-0.02505588
e	1.0024795	Incl.	66.53614	-0.99314726	-0.11686828

From 92 observations 2019 Jan. 24–2020 May 21, mean residual 0".47.

Comet P/2016 J3 = 2021 A3 (STEREO)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Jan. 25.38562 TT

		(2000.0)	P	Sato	Q
q	0.5263591				
n	0.21076623	Peri.	210.73551	-0.27664654	-0.87919928
a	2.7964176	Node	257.78681	+0.94249525	-0.16946329
e	0.8117738	Incl.	23.38417	+0.18753506	-0.44529857
P	4.68				

From 78 observations 2020 Dec. 19–2021 Jan. 19, mean residual 0".54.

Comet P/2014 U4 (PANSTARRS)

Epoch 2021 Jan. 26.0 TT = JDT 2459240.5

T 2021 Feb. 13.51833 TT

		(2000.0)	P	Sato	Q
q	1.8761205				
n	0.15009881	Peri.	347.73785	+0.99970380	+0.00774445
a	3.5065864	Node	11.89098	+0.00471532	+0.86842086
e	0.4649724	Incl.	6.42913	-0.02387620	+0.49576731
P	6.57				

From 61 observations 2014 Sept. 2–Nov. 17, mean residual 0".45.

Comet P/2013 EW90 = 2020 Y4 (Tenagra)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Feb. 15.45121 TT

		(2000.0)	P	Sato	Q
q	3.3140510				
n	0.11802276	Peri.	346.31108	-0.84686805	-0.50125852
a	4.1161596	Node	160.29407	+0.52391378	-0.84370776
e	0.1948682	Incl.	31.78999	+0.09126261	+0.19208623
P	8.35				

From 70 observations 2013 Feb. 16–2021 Jan. 14, mean residual 0".40.

Comet P/2013 A2 = 2021 A8 (Scotti)

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Feb. 15.49765 TT

		(2000.0)	P	Sato	Q
q	2.1899474				
n	0.12256437	Peri.	134.52752	-0.64740038	-0.76213805
a	4.0138386	Node	355.81164	+0.68157974	-0.57643731
e	0.4544007	Incl.	3.36128	+0.34105982	-0.29472974
P	8.04				

From 91 observations 2013 Jan. 6–2021 Jan. 15, mean residual 0".44.

Comet 75D/Kohoutek

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 5.90080 TT

		(2000.0)	P	Sato	Q
q	1.7748776				
n	0.14815951	Peri.	175.55816	+0.08390594	-0.99112076
a	3.5371191	Node	269.60497	+0.91103963	+0.11823509
e	0.4982138	Incl.	5.92060	+0.40369120	-0.06082853
P	6.65				

From 72 observations 1975 Feb. 9–1988 May 19, mean residual 0".86.

Nongravitational parameters A1 = +5.05, A2 = +1.5692.

Comet 191P/McNaught

Epoch 2021 Mar. 7.0 TT = JDT 2459280.5

T 2021 Mar. 20.09712 TT

		(2000.0)	P	Sato	Q
q	2.2321596				
n	0.14226252	Peri.	284.00310	+0.91422247	-0.37556739
a	3.6342019	Node	98.23237	+0.40500339	+0.83483655
e	0.3857910	Incl.	8.84277	+0.01302027	+0.40248860
P	6.93				

From 668 observations 2000 Aug. 5–2021 Jan. 2, mean residual 0".72.

Comet C/2020 J1 (SONEAR)

Epoch 2021 Apr. 16.0 TT = JDT 2459320.5

T 2021 Apr. 18.54698 TT

		(2000.0)	P	Sato	Q
q	3.3552134				
z	-0.0000957	Peri.	341.74280	-0.47269152	-0.76105447
+/-	-0.0000060	Node	226.58153	-0.71294914	+0.03397278
e	1.0003210	Incl.	142.29340	-0.51794426	+0.64779776

From 215 observations 2020 May 1–Nov. 2, mean residual 0".41.

Comet C/2019 T2 (Lemmon)

Epoch 2021 Apr. 16.0 TT = JDT 2459320.5

T 2021 Apr. 22.27132 TT

		(2000.0)	P	Sato	Q
q	2.6459982				
z	+0.0004983	Peri.	239.38488	+0.33391712	-0.86094635
+/-	-0.0000015	Node	155.64259	-0.13767005	+0.35821626
e	0.9986815	Incl.	111.48898	-0.93249467	-0.36118209

From 696 observations 2019 Aug. 26–2020 Nov. 16, mean residual 0".57.

Comet 399P/PANSTARRS

Epoch 2021 May 26.0 TT = JDT 2459360.5

T 2021 May 22.58256 TT

		(2000.0)	P	Sato	Q
q	2.0960472				
n	0.13363495	Peri.	214.29661	+0.48494712	-0.86820368
a	3.7889832	Node	207.14646	+0.84512553	+0.49614873
e	0.4468048	Incl.	13.31918	+0.22492027	+0.00766899
P	7.38				

From 278 observations 2013 July 16–2020 Dec. 13, mean residual 0".71.

Comet P/2016 BA14 (PANSTARRS)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 June 17.29578 TT

		(2000.0)	P	Sato	Q
q	1.0128244				
n	0.18731463	Peri.	351.88801	-0.99117929	-0.13249438
a	3.0252058	Node	180.52657	+0.13231188	-0.98803374
e	0.6652048	Incl.	18.89371	+0.00756182	-0.07895927
P	5.26				

From 1835 observations 2015 Dec. 1–2016 Oct. 9, mean residual 0".45.

Comet P/2016 P1 (PANSTARRS)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 June 27.48633 TT

		(2000.0)	P	Sato	Q
q	2.2825944				
n	0.17008694	Peri.	267.76575	-0.61456639	+0.73676967
a	3.2261810	Node	319.47906	-0.43218183	-0.61342690
e	0.2924779	Incl.	25.71565	-0.65994471	-0.28439033
P	5.79				

From 40 observations 2016 Aug. 1–12, mean residual 0".42.

Comet C/2019 F1 (ATLAS–Africano)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 June 22.86199 TT

		(2000.0)	P	Sato	Q
q	3.5956750				
z	-0.0010338	Peri.	251.13209	+0.09418781	+0.85665497
	+/-0.0000008	Node	38.72433	-0.27686874	+0.51192445
e	1.0037172	Incl.	54.17470	-0.95628048	-0.06384050

From 1244 observations 2019 Feb. 8–2020 Sept. 16, mean residual 0".40.

Comet D/1977 C1 (Skiff–Kosai)

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 July 27.45999 TT

		(2000.0)	P	Sato	Q
q	2.8006153				
n	0.13168834	Peri.	25.20420	-0.26699090	-0.96212764
a	3.8262308	Node	80.31999	+0.87445462	-0.26586210
e	0.2680485	Incl.	3.19912	+0.40502466	-0.06023086
P	7.48				

From 8 observations 1977 Feb. 13–Mar. 12, mean residual 0".30.

Comet 332P/Ikeya–Murakami

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 18.39528 TT

		(2000.0)	P	Sato	Q
q	1.5771277				
n	0.18151826	Peri.	152.34091	-0.91403391	-0.40549502
a	3.0892698	Node	3.78594	+0.33554001	-0.77072230
e	0.4894821	Incl.	9.37995	+0.22793622	-0.49148848
P	5.43				

From 505 observations 2015 Dec. 31–2020 Oct. 12, mean residual 0".58.

Comet P/2008 WZ96 (LINEAR)

Epoch 2021 Aug. 14.0 TT = JDT 2459440.5

T 2021 Aug. 26.03338 TT

		(2000.0)	P	Sato	Q
q	1.8503004				
n	0.15137631	Peri.	341.98516	+0.78169609	-0.61506465
a	3.4868300	Node	56.41609	+0.58635287	+0.66844355
e	0.4693460	Incl.	7.11479	+0.21246537	+0.41818501
P	6.51				

From 130 observations 2008 Nov. 30–2009 Apr. 13, mean residual 0".48.

From CHB 2020.

Comet P/2004 R3 (LINEAR-NEAT)

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 15.23408 TT

		(2000.0)	P	Sato	Q
q	3.5304476				
n	0.09446978	Peri.	37.66970	+0.94494793	+0.27358347
a	4.7746417	Node	305.50552	-0.32718207	+0.79839362
e	0.2605838	Incl.	12.73945	+0.00502977	+0.53639510
P	10.43				

From 140 observations 2004 Sept. 10–Nov. 16, mean residual 0".60.

Comet P/2008 CL94 (Lemmon)

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 19.33889 TT

		(2000.0)	P	Sato	Q
q	5.4205364				
n	0.06441096	Peri.	80.37878	-0.39608195	-0.91474777
a	6.1635301	Node	33.31304	+0.77522225	-0.37966750
e	0.1205468	Incl.	8.34637	+0.49208693	-0.13816335
P	15.30				

From 63 observations 2008 Feb. 8–2009 June 13, mean residual 0".52.

From CHB 2020.

Comet P/2005 W3 (Kowalski)

Epoch 2021 Sept. 23.0 TT = JDT 2459480.5

T 2021 Sept. 21.36564 TT

		(2000.0)	P	Sato	Q
q	2.8898633				
n	0.06189652	Peri.	200.73463	+0.63903341	-0.75601694
a	6.3293421	Node	210.08259	+0.73951690	+0.65453755
e	0.5434181	Incl.	16.41931	+0.21154443	-0.00435604
P	15.92				

From 115 observations 2005 Sept. 30–2006 Mar. 24, mean residual 0".71.

From CHB 2020.

Comet P/2012 TK8 (Tenagra)

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 26.30005 TT

		(2000.0)	P	Sato	Q
q	2.9953116				
n	0.11753395	Peri.	128.03733	+0.54006259	-0.83511984
a	4.1275641	Node	288.96408	+0.73344370	+0.52786811
e	0.2743150	Incl.	6.34021	+0.41278655	+0.15469361
P	8.39				

From 62 observations 2012 Oct. 6–2014 Apr. 2, mean residual 0".40.

From CHB 2020.

Comet P/2015 F1 (PANSTARRS)

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 27.72873 TT

		(2000.0)	P	Sato	Q
q	2.5432749				
n	0.14916122	Peri.	187.48508	-0.67087450	+0.74089372
a	3.5212655	Node	40.38813	-0.67781910	-0.59530884
e	0.2777384	Incl.	2.80280	-0.30081337	-0.31094030
P	6.61				

From 202 observations 2015 Mar. 21–Aug. 16, mean residual 0".57.

Comet P/2012 S2 (La Sagra)

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Oct. 31.74386 TT

			P	Sato	Q
q	1.3626954	(2000.0)			
n	0.10623792	Peri.	312.47365	+0.99137901	-0.05766814
a	4.4151927	Node	51.17863	+0.10761525	+0.87060375
e	0.6913622	Incl.	8.68544	-0.07474366	+0.48859339
P	9.28				

From 367 observations 2012 Sept. 23–Dec. 18, mean residual 0".47.

From CHB 2020.

Comet P/2005 L1 (McNaught)

Epoch 2021 Nov. 2.0 TT = JDT 2459520.5

T 2021 Nov. 2.85473 TT

			P	Sato	Q
q	3.1425970	(2000.0)			
n	0.12426035	Peri.	149.74466	+0.31195442	+0.94585650
a	3.9772327	Node	138.24822	-0.89645894	+0.32429052
e	0.2098534	Incl.	7.73851	-0.31471545	+0.01382514
P	7.93				

From 248 observations 2005 May 16–Sept. 15, mean residual 0".50.

From CHB 2020.

Comet P/2011 A2 (Scotti)

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 1.51192 TT

			P	Sato	Q
q	1.5546587	(2000.0)			
n	0.18000275	Peri.	94.50352	-0.85627828	-0.51257745
a	3.1065853	Node	54.67384	+0.43755071	-0.78533082
e	0.4995603	Incl.	4.47475	+0.27447563	-0.34715970
P	5.48				

From 232 observations 2011 Jan. 11–May 12, mean residual 0".61.

From CHB 2020.

Comet P/2007 R4 (Garradd)

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 8.69908 TT

			P	Sato	Q
q	1.9575922	(2000.0)			
n	0.06821439	Peri.	282.59008	+0.92544406	-0.15652557
a	5.9322399	Node	87.19361	+0.29271574	+0.87358294
e	0.6700079	Incl.	20.20957	-0.24056348	+0.46081731
P	14.45				

From 87 observations 2007 Aug. 12–Dec. 29, mean residual 0".69.

From CHB 2020.

Comet 173P/Mueller

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 16.71450 TT

			P	Sato	Q
q	4.2170628	(2000.0)			
n	0.07230307	Peri.	29.18017	-0.61743178	-0.73539692
a	5.7064354	Node	100.40038	+0.65539484	-0.67723049
e	0.2609988	Incl.	16.49276	+0.43501219	-0.02345696
P	13.63				

From 924 observations 1992 Sept. 25–2021 Jan. 18, mean residual 0".67.

Comet 221P/LINEAR

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 18.06948 TT

			P	Sato	Q
q	1.7531219	(2000.0)			
n	0.15344865	Peri.	40.11587	-0.01290417	+0.98843213
a	3.4553656	Node	229.70297	-0.96067898	-0.05417555
e	0.4926378	Incl.	11.42761	-0.27736146	+0.14165782
P	6.42				

From 575 observations 2002 Apr. 14–2015 Sept. 23, mean residual 0".54.

Comet 395P/Catalina-NEAT

Epoch 2021 Dec. 12.0 TT = JDT 2459560.5

T 2021 Dec. 30.45951 TT

		(2000.0)	P	Sato	Q
q	4.0648875				
n	0.05865861	Peri.	89.85018	+0.68739821	+0.72520811
a	6.5601664	Node	223.66342	-0.68701626	+0.63165422
e	0.3803682	Incl.	3.27624	-0.23556818	+0.27401850
P	16.80				

From 198 observations 2005 May 12–2020 July 14, mean residual 0".58.

Comet P/2008 QP20 (LINEAR-Hill)

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 2.13714 TT

		(2000.0)	P	Sato	Q
q	1.8062427				
n	0.14730781	Peri.	75.54127	+0.78703965	-0.61163216
a	3.5507400	Node	322.07076	+0.50349810	+0.71223796
e	0.4913053	Incl.	7.52187	+0.35645230	+0.34441719
P	6.69				

From 479 observations 2008 Aug. 25–2016 Mar. 1, mean residual 0".59.

Comet 152P/Helin-Lawrence

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 13.68163 TT

		(2000.0)	P	Sato	Q
q	3.0949286				
n	0.10406005	Peri.	163.94290	-0.24118747	+0.95520421
a	4.4765835	Node	91.85825	-0.90821052	-0.15987800
e	0.3086405	Incl.	9.88051	-0.34202668	-0.24904607
P	9.47				

From 618 observations 1993 May 17–2020 Mar. 23, mean residual 0".74.

Nongravitational parameters Y1 = -0.69, Y2 = +0.2395.

Comet P/2006 S4 (Christensen)

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Jan. 14.42441 TT

		(2000.0)	P	Sato	Q
q	3.1051980				
n	0.06201278	Peri.	305.15962	+0.83662874	+0.39965123
a	6.3214289	Node	36.04909	+0.05022000	+0.62503581
e	0.5087823	Incl.	39.53660	-0.54546338	+0.67052899
P	15.89				

From 152 observations 2006 Sept. 22–Dec. 25, mean residual 0".73.

Comet P/2011 W1 (PANSTARRS)

Epoch 2022 Jan. 21.0 TT = JDT 2459600.5

T 2022 Feb. 7.87657 TT

		(2000.0)	P	Sato	Q
q	3.3220284				
n	0.09787184	Peri.	282.75043	+0.09452541	-0.99531609
a	4.6633449	Node	161.78863	+0.93669035	+0.08202534
e	0.2876297	Incl.	3.71859	+0.33715892	+0.05116377
P	10.07				

From 167 observations 2011 Nov. 23–2013 Feb. 9, mean residual 0".55.

Comet P/2015 Q1 (Scotti)

Epoch 2022 Mar. 2.0 TT = JDT 2459640.5

T 2022 Feb. 13.65859 TT

		(2000.0)	P	Sato	Q
q	1.8136739				
n	0.15230123	Peri.	199.85517	+0.74483202	-0.65065119
a	3.4726987	Node	202.84707	+0.65203929	+0.75680735
e	0.4777336	Incl.	22.39264	+0.14166871	-0.06241526
P	6.47				

From 354 observations 2015 Aug. 18–2016 Mar. 2, mean residual 0".56.

Comet P/2016 J1-B (PANSTARRS)

Epoch 2022 Mar. 2.0 TT = JDT 2459640.5

T 2022 Feb. 20.53714 TT

q	(2000.0)		P	Sato	Q
n	0.17445756	Peri.	46.97011	-0.40194800	+0.91181190
a	3.1720706	Node	199.81134	-0.89550943	-0.41056309
e	0.2277041	Incl.	14.33002	-0.19105146	+0.00608294
P	5.65				

From 53 observations 2016 Apr. 14–Aug. 4, mean residual 0".30.

Comet P/2016 J1-A (PANSTARRS)

Epoch 2022 Mar. 2.0 TT = JDT 2459640.5

T 2022 Feb. 20.69120 TT

q	(2000.0)		P	Sato	Q
n	0.17445451	Peri.	46.98560	-0.40170051	+0.91192165
a	3.1721076	Node	199.81132	-0.89561741	-0.41031873
e	0.2277424	Incl.	14.32874	-0.19106585	+0.00611943
P	5.65				

From 71 observations 2016 Mar. 4–Aug. 4, mean residual 0".31.

Comet P/1997 B1 (Kobayashi)

Epoch 2022 Apr. 11.0 TT = JDT 2459680.5

T 2022 Mar. 28.82451 TT

q	(2000.0)		P	Sato	Q
n	0.03918922	Peri.	183.31677	-0.88388200	-0.45448400
a	8.5840387	Node	328.88222	+0.43388359	-0.70860309
e	0.7604624	Incl.	12.33923	+0.17463574	-0.53974619
P	25.15				

From 237 observations 1997 Jan. 30–May 28, mean residual 0".49.

Comet 99P/Kowal

Epoch 2022 Apr. 11.0 TT = JDT 2459680.5

T 2022 Apr. 12.64666 TT

q	(2000.0)		P	Sato	Q
n	0.06532596	Peri.	174.93309	-0.92014683	+0.38994794
a	6.1058415	Node	28.10190	-0.36186768	-0.81203482
e	0.2292453	Incl.	4.33963	-0.14960481	-0.43421199
P	15.09				

From 633 observations 1977 Apr. 24–2021 Jan. 14, mean residual 0".67.

Nongravitational parameters Y1 = -0.09, Y2 = -0.0061.

Comet P/2009 Q1 (Hill)

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 May 23.69050 TT

q	(2000.0)		P	Sato	Q
n	0.07572158	Peri.	157.09557	+0.87632416	+0.48099825
a	5.5333688	Node	173.95139	-0.47160456	+0.86780093
e	0.4960388	Incl.	14.50629	-0.09820955	+0.12474866
P	13.02				

From 127 observations 2009 Aug. 16–Nov. 11, mean residual 0".74.

Comet P/2012 O3 (McNaught)

Epoch 2022 May 21.0 TT = JDT 2459720.5

T 2022 May 29.70755 TT

q	(2000.0)		P	Sato	Q
n	0.10076439	Peri.	344.75279	+0.78336924	+0.61093493
a	4.5736684	Node	336.41407	-0.53616457	+0.57108004
e	0.6471225	Incl.	16.61580	-0.31442039	+0.54829380
P	9.78				

From 301 observations 2012 July 23–2013 Feb. 8, mean residual 0".53.

Comet P/2013 G4 (PANSTARRS)

Epoch 2022 June 30.0 TT = JDT 2459760.5

T 2022 June 20.34150 TT

		(2000.0)	P	Sato	Q
q	2.6223181				
n	0.10532176	Peri.	214.57224	-0.96831814	+0.24713197
a	4.4407601	Node	339.64542	-0.19946952	-0.85184032
e	0.4094889	Incl.	5.91710	-0.15023941	-0.46183748
P	9.36				

From 41 observations 2013 Apr. 12–June 9, mean residual 0".36.

Comet P/2014 R5 (Lemmon-PANSTARRS)

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 18.70697 TT

		(2000.0)	P	Sato	Q
q	2.3779292				
n	0.12045210	Peri.	213.70154	+0.94119063	+0.33753138
a	4.0606272	Node	126.56458	-0.30565176	+0.86980336
e	0.4143936	Incl.	1.08843	-0.14400420	+0.35988147
P	8.18				

From 107 observations 2014 Sept. 7–Nov. 18, mean residual 0".57.

Comet P/2011 Q3 (McNaught)

Epoch 2022 Aug. 9.0 TT = JDT 2459800.5

T 2022 Aug. 19.10947 TT

		(2000.0)	P	Sato	Q
q	2.3223841				
n	0.08875324	Peri.	310.96671	+0.95399450	+0.29455786
a	4.9775226	Node	32.01858	-0.23349664	+0.84695654
e	0.5334257	Incl.	6.05732	-0.18807929	+0.44260624
P	11.11				

From 148 observations 2011 Aug. 29–Dec. 24, mean residual 0".61.

Comet P/2015 X1 (PANSTARRS)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 6.64913 TT

		(2000.0)	P	Sato	Q
q	2.1120628				
n	0.14211501	Peri.	218.73899	+0.93230361	-0.35562313
a	3.6367162	Node	161.75763	+0.36143828	+0.90948191
e	0.4192390	Incl.	12.15181	+0.01312826	+0.21534821
P	6.94				

From 85 observations 2015 Aug. 12–2016 Jan. 3, mean residual 0".35.

Comet P/2017 S8 (PANSTARRS)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 15.20742 TT

		(2000.0)	P	Sato	Q
q	1.6923675				
n	0.21289315	Peri.	254.84819	+0.08892698	-0.99106669
a	2.7777613	Node	191.51932	+0.99162138	+0.07870384
e	0.3907441	Incl.	29.84870	-0.09369650	-0.10766853
P	4.63				

From 172 observations 2017 Sept. 25–2018 Feb. 9, mean residual 0".62.

Comet C/2020 R7 (ATLAS)

Epoch 2022 Sept. 18.0 TT = JDT 2459840.5

T 2022 Sept. 16.23063 TT

		(2000.0)	P	Sato	Q
q	2.9555104				
z	-0.0000293	Peri.	347.84563	+0.05923807	-0.41758905
+/-	-0.0000175	Node	268.28020	-0.82298066	-0.53449588
e	1.0000866	Incl.	114.89081	-0.56497229	+0.73480171

From 130 observations 2020 Sept. 15–2021 Jan. 16, mean residual 0".38.

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
q	1.2298627				
n	0.17963617	Peri.	1.68768	-0.49604912	-0.83995640
a	3.1108102	Node	118.10547	+0.79369398	-0.54138920
e	0.6046488	Incl.	14.44390	+0.35211524	+0.03702682
P	5.49				

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

Comet P/2007 S1 (Zhao)

Epoch 2022 Oct. 28.0 TT = JDT 2459880.5

T 2022 Oct. 8.01427 TT

		(2000.0)	P	Sato	Q
q	2.5246906				
n	0.13195551	Peri.	245.25761	+0.89101785	-0.44931071
a	3.8210645	Node	141.35125	+0.44493729	+0.83597558
e	0.3392704	Incl.	5.96119	+0.09009992	+0.31506302
P	7.47				

From 73 observations 2007 Sept. 8–Oct. 16, mean residual 0".80.

Comet P/2010 T020 (LINEAR–Grauer)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 29.32790 TT

		(2000.0)	P	Sato	Q
q	5.5084003				
n	0.06995918	Peri.	267.57218	+0.65351043	+0.75633650
a	5.8331919	Node	43.28315	-0.67613787	+0.60092735
e	0.0556799	Incl.	2.47874	-0.34023770	+0.25853707
P	14.09				

From 59 observations 2010 Oct. 1–2012 Nov. 15, mean residual 0".61.

Comet P/2007 A2 (Christensen)

Epoch 2022 Dec. 7.0 TT = JDT 2459920.5

T 2022 Nov. 30.15972 TT

		(2000.0)	P	Sato	Q
q	2.7987288				
n	0.06175448	Peri.	186.67881	-0.59957238	-0.70292271
a	6.3390434	Node	300.91402	+0.75336899	-0.33436172
e	0.5584935	Incl.	26.48720	+0.27008911	-0.62777537
P	15.96				

From 89 observations 2007 Jan. 10–Mar. 17, mean residual 0".59.

Comet P/2013 YG46 (Spacewatch)

Epoch 2023 Jan. 16.0 TT = JDT 2459960.5

T 2023 Jan. 5.89031 TT

		(2000.0)	P	Sato	Q
q	1.7869075				
n	0.16638026	Peri.	242.53003	+0.35836954	+0.92788709
a	3.2739209	Node	48.85549	-0.80103897	+0.36224860
e	0.4541996	Incl.	7.85683	-0.47948707	+0.08832611
P	5.92				

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

Comet P/2017 S9 (PANSTARRS)

Epoch 2023 Feb. 25.0 TT = JDT 2460000.5

T 2023 Feb. 26.09696 TT

		(2000.0)	P	Sato	Q
q	2.1916885				
n	0.17579703	Peri.	237.55227	+0.90101699	-0.41196276
a	3.1559372	Node	146.20883	+0.43217773	+0.87944828
e	0.3055348	Incl.	14.13810	-0.03729330	+0.23844792
P	5.61				

From 39 observations 2017 Sept. 19–Oct. 22, mean residual 0".41.

Comet P/2017 S5 (ATLAS)

Epoch 2023 Apr. 6.0 TT = JDT 2460040.5

T 2023 Mar. 19.47310 TT

		(2000.0)	P	Sato	Q
q	2.1704187				
n	0.17477484	Peri.	99.95757	+0.97098305	+0.13736112
a	3.1682306	Node	252.35050	-0.19744418	+0.92233111
e	0.3149429	Incl.	11.85495	+0.13493593	+0.36116097
P	5.64				

From 423 observations 2017 July 22–2018 Jan. 18, mean residual 0".47.

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.

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.

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.

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.

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.

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.

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).

彗星年表 2021

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