THE COMET HANDBOOK FOR 2016

彗 星 年 表

2016

彗 星 年 表 編 集 委 員 会 発 行
Published by the Editorial Committee
for the Comet Handbook

INDEX TO EPHEMERIDES

Comet 95P/(2060) Chiron
Epoch 1996 Feb. 7.0 TT = JDT 2450120.5
T 1996 Feb. 14.74485 TT Sato
q 8.4539293 (2000.0) P Q
n 0.01942786 Peri. 339.55377 -0.98660440 +0.15200963
a 13.7041717 Node 209.38439 -0.12782227 -0.94583865
e 0.3831127 Incl. 6.92993 -0.10135691 -0.28684895
P 50.73
From 1426 observations 1895 Apr. 24-2015 Dec. 31, mean residual 0″.48.

Comet C/2009 F4 (McNaught)
Epoch 2011 Dec. 25.0 TT = JDT 2455920.5
T 2011 Dec. 31.89154 TT Sato
q 5.4548629 (2000.0) P Q
z -0.0002918 Peri. 260.38340 +0.04749535 +0.61014591
+/-0.0000003 Node 53.58443 +0.16282320 +0.77643873
e 1.0015919 Incl. 79.34756 -0.98551144 +0.15768597
From 1138 observations 2009 Mar. 19-2015 Feb. 20, mean residual 0″.63.

Comet C/2006 S3 (LONEOS)
Epoch 2012 Apr. 23.0 TT = JDT 2456040.5
T 2012 Apr. 16.32402 TT Sato
q 5.1311762 (2000.0) P Q
z -0.0006907 Peri. 140.12918 -0.21555482 -0.96492884
+/-0.0000001 Node 38.37054 -0.94614323 +0.24433782
e 1.0035439 Incl. 166.03269 -0.24155560 -0.09597586
From 5957 observations 2006 Aug. 29-2015 Dec. 19, mean residual 0″.72.

Comet 158P/Kowal-LINEAR
Epoch 2012 Sept. 30.0 TT = JDT 2456200.5
T 2012 Sept. 27.48044 TT Sato
q 4.5764201 (2000.0) P Q
n 0.09607372 Peri. 232.84935 +0.97919880 -0.18018656
a 4.7213513 Node 137.30455 +0.20025199 +0.93228800
e 0.0306970 Incl. 7.90734 -0.03269345 +0.31364292
P 10.26
From 589 observations 1979 July 24-2015 Dec. 9, mean residual 0″.74.

Comet 246P/NEAT
Epoch 2013 Jan. 28.0 TT = JDT 2456320.5
T 2013 Jan. 28.70967 TT Sato
q 2.8797635 (2000.0) P Q
n 0.12191754 Peri. 176.18900 -0.25681662 +0.92800669
a 4.0280229 Node 78.78049 -0.89382598 -0.12184599
e 0.2850677 Incl. 15.97178 -0.36758719 -0.35207547
P 8.08
From 2850 observations 2003 Jan. 24-2015 Dec. 8, mean residual 0″.57.

Comet C/2010 S1 (LINEAR)
Epoch 2013 May 28.0 TT = JDT 2456440.5
T 2013 May 20.29893 TT Sato
q 5.8998960 (2000.0) P Q
z -0.0003245 Peri. 118.61470 +0.53547221 -0.22396637
+/-0.0000002 Node 93.43038 -0.69560055 -0.66377677
e 1.0019142 Incl. 125.33579 +0.47896700 -0.71361016
From 8340 observations 2010 Sept. 21-2015 July 19, mean residual 0″.53.

Comet C/2012 K6 (McNaught)
Epoch 2013 May 28.0 TT = JDT 2456440.5
T 2013 May 21.49612 TT Sato
q 3.3530827 (2000.0) P Q
z +0.0001561 Peri. 338.83322 -0.71568385 -0.62148144
+/-0.0000004 Node 206.89892 -0.49561721 +0.13042448
e 0.9994767 Incl. 135.21934 -0.49209776 +0.77249613
From 1072 observations 2012 May 27-2015 Apr. 9, mean residual 0″.46.

Comet C/2012 A1 (PANSTARRS)
Epoch 2013 Dec. 14.0 TT = JDT 2456640.5
T 2013 Dec. 2.21708 TT Sato

q	7.6025295	(2000.0)	P	Q
z	-0.0002146	Peri.	191.93469	-0.03047876	+0.52641073
+/-	0.0000016	Node	277.97147	+0.97306836	+0.20995402
e	1.0016316	Incl.	120.91011	+0.22849289	-0.82389990

From 311 observations 2012 Jan. 2-2015 Mar. 9, mean residual 0″.58.

Comet C/2011 J2 (LINEAR)
Epoch 2013 Dec. 14.0 TT = JDT 2456640.5
T 2013 Dec. 25.29203 TT Sato

q	3.4434438	(2000.0)	P	Q
z	-0.0001509	Peri.	85.29283	+0.07042148	+0.97005814
+/-	0.0000001	Node	163.94719	+0.16358636	-0.24109383
e	1.0005197	Incl.	122.79880	+0.98401236	-0.02934238

From 6215 observations 2011 Mar. 10-2015 Dec. 4, mean residual 0″.56.

Comet C/2013 H2 (Boattini)
Epoch 2014 Jan. 23.0 TT = JDT 2456680.5
T 2014 Jan. 23.18809 TT Sato

q	7.4987336	(2000.0)	P	Q
z	-0.0002315	Peri.	35.99678	-0.46428024	-0.42426258
+/-	0.0000024	Node	262.74590	-0.87728581	+0.34091679
e	1.0017359	Incl.	128.39628	+0.12171058	+0.83891418

From 218 observations 2013 Apr. 22-2015 June 11, mean residual 0″.65.

Comet C/2013 G7 (McNaught)
Epoch 2014 Mar. 4.0 TT = JDT 2456720.5
T 2014 Mar. 18.66186 TT Sato

q	4.6774781	(2000.0)	P	Q
z	+0.0005476	Peri.	218.26026	-0.64197915	+0.25812816
+/-	0.0000015	Node	48.39988	-0.20262690	+0.85102834
e	0.9974387	Incl.	105.10377	-0.73946272	-0.45729707

From 307 observations 2012 May 21-2015 Feb. 28, mean residual 0″.57.

Comet 117P/Helin-Roman-Alu
Epoch 2014 Apr. 13.0 TT = JDT 2456760.5
T 2014 Mar. 27.15978 TT Sato

q	3.0563567	(2000.0)	P	Q
n	0.11887905	Peri.	222.68228	+0.19405097	+0.97240930
a	4.0963699	Node	58.89713	-0.85433636	+0.23238686
e	0.2538866	Incl.	8.69740	-0.48213442	-0.02040838
P	8.29				

From 3477 observations 1995 Jan. 28-2016 Jan. 13, mean residual 0″.74.
Nongravitational parameters Y1 = -0.38, Y2 = -0.1791.

Comet 17P/Holmes
Epoch 2014 Apr. 13.0 TT = JDT 2456760.5
T 2014 Mar. 27.51268 TT Sato

q	2.0565990	(2000.0)	P	Q
n	0.14309107	Peri.	24.51455	+0.97593041	+0.12419137
a	3.6201593	Node	326.76462	-0.21060645	+0.75009307
e	0.4319037	Incl.	19.09165	+0.05661052	+0.64956670
P	6.89				

From 4900 observations 2007 May 13-2015 Apr. 18, mean residual 0″.57.
Nongravitational parameters A1 = -1.99, A2 = -2.4904.

Comet 119P/Parker-Hartley
Epoch 2014 Apr. 13.0 TT = JDT 2456760.5
T 2014 Apr. 2.59918 TT Sato

q	3.0264997	(2000.0)	P	Q
n	0.11139551	Peri.	181.30401	+0.41628461	-0.90557760
a	4.2778373	Node	244.10105	+0.83502384	+0.41622322
e	0.2925164	Incl.	5.19576	+0.35978091	+0.08177672
P	8.85				

From 1591 observations 1989 Mar. 2-2015 Apr. 29, mean residual 0″.66.
Nongravitational parameters A1 = +4.77, A2 = +1.4258.

Comet C/2012 U1 (PANSTARRS)
Epoch 2014 July 2.0 TT = JDT 2456840.5
T 2014 July 4.89701 TT Sato
q 5.2637233 (2000.0) P Q
z +0.0000831 Peri. 70.07060 +0.06733684 -0.92350224
+/-0.0000014 Node 26.98197 +0.25668354 -0.34972080
e 0.9995625 Incl. 56.33885 +0.96414693 +0.15760388
From 170 observations 2012 Oct. 17-2015 July 10, mean residual 0".48.

Comet C/2013 P4 (PANSTARRS)
Epoch 2014 Aug. 11.0 TT = JDT 2456880.5
T 2014 Aug. 12.39454 TT Sato
q 5.9670500 (2000.0) P Q
n 0.01736516 Peri. 113.56032 +0.98180800 -0.17555651
a 14.7689676 Node 256.61339 +0.13548385 +0.91464418
e 0.5959738 Incl. 4.26443 +0.13303074 +0.36415097
P 56.76
From 225 observations 2013 Aug. 15-2015 Nov. 14, mean residual 0".55.

Comet C/2013 TW5 (Spacewatch)
Epoch 2014 Aug. 11.0 TT = JDT 2456880.5
T 2014 Aug. 17.84661 TT Sato
q 5.8305758 (2000.0) P Q
z +0.0023498 Peri. 190.39255 -0.84978249 -0.40534015
+/-0.0000008 Node 319.70475 +0.51327472 -0.49063134
e 0.9862995 Incl. 31.40512 +0.12007824 -0.77134963
From 398 observations 2013 Oct. 3-2015 June 10, mean residual 0".36.

Comet C/2012 K8 (Lemmon)
Epoch 2014 Aug. 11.0 TT = JDT 2456880.5
T 2014 Aug. 19.35365 TT Sato
q 6.4630034 (2000.0) P Q
z -0.0002904 Peri. 75.85133 -0.03131424 -0.70868867
+/-0.0000007 Node 312.80739 -0.70286346 +0.51697913
e 1.0018767 Incl. 106.11184 +0.71063520 +0.48009681
From 920 observations 2012 May 30-2015 Oct. 11, mean residual 0".55.

Comet P/2011 S1 (Gibbs)
Epoch 2014 Aug. 11.0 TT = JDT 2456880.5
T 2014 Aug. 27.34366 TT Sato
q 6.8931142 (2000.0) P Q
n 0.03877968 Peri. 193.56180 +0.60948203 -0.79225592
a 8.6443674 Node 218.89778 +0.73167192 +0.57636406
e 0.2025889 Incl. 2.68027 +0.30526686 +0.20033731
P 25.42
From 140 observations 2010 Sept. 29-2015 Dec. 31, mean residual 0".57.

Comet C/2012 K1 (PANSTARRS)
Epoch 2014 Aug. 11.0 TT = JDT 2456880.5
T 2014 Aug. 27.65616 TT Sato
q 1.0545588 (2000.0) P Q
z -0.0001478 Peri. 203.10600 -0.47153163 +0.78070333
+/-0.0000009 Node 317.73820 +0.87390859 +0.47595242
e 1.0001559 Incl. 142.42805 +0.11807500 -0.40493407
From 7542 observations 2012 May 14-2015 Dec. 2, mean residual 0".58.
Nongravitational parameters A1 = +1.82, A2 = +0.2408, A3 = -0.36.

Comet 170P/Christensen
Epoch 2014 Sept. 20.0 TT = JDT 2456920.5
T 2014 Sept. 17.97705 TT Sato
q 2.9206591 (2000.0) P Q
n 0.11451689 Peri. 225.82952 +0.98162551 -0.15865283
a 4.1997459 Node 142.91951 +0.18154477 +0.94759747
e 0.3045629 Incl. 10.12770 -0.05876107 +0.27728742
P 8.61
From 255 observations 2005 June 17-2015 Feb. 20, mean residual 0".58.
Nongravitational parameters A1 = -14.01, A2 = -8.1908.

Comet C/2015 K1 (MASTER)
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Oct. 13.58828 TT Sato

q	2.5577370	(2000.0)	P	Q
z	+0.0055858	Peri.	280.20292	+0.25384554	+0.96622994
	+/-0.0000049	Node	5.18033	-0.57689180	+0.18800074
e	0.9857131	Incl.	29.37962	-0.77637510	+0.17622548

From 544 observations 2015 May 17-Dec. 26, mean residual 0″.54.

Comet C/2013 V2 (Borisov)
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Oct. 14.36304 TT Sato

q	3.5079195	(2000.0)	P	Q
z	-0.0012374	Peri.	94.47193	-0.64067944	-0.61548919
	+/-0.0000005	Node	48.42731	+0.18243738	-0.70274581
e	1.0043408	Incl.	37.84840	+0.74581932	-0.35682123

From 1718 observations 2012 Nov. 17-2015 July 17, mean residual 0″.50.

Comet 32P/Comas Sola
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Oct. 17.59866 TT Sato

q	2.0011829	(2000.0)	P	Q
n	0.10291081	Peri.	53.33853	-0.35115989	-0.92477182
a	4.5098496	Node	57.84860	+0.79430956	-0.37711167
e	0.5562639	Incl.	9.96944	+0.49574091	-0.05083174
P	9.58				

From 3134 observations 1995 Aug. 1-2015 July 12, mean residual 0″.65.
Nongravitational parameters A1 = -0.52, A2 = -0.1637.

Comet C/2013 A1 (Siding Spring)
poch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Oct. 25.30216 TT Sato

q	1.3987460	(2000.0)	P	Q
z	-0.0005074	Peri.	2.42310	+0.49138410	-0.56134385
	+/-0.0000008	Node	300.97590	-0.81156811	-0.57258772
e	1.0007098	Incl.	129.04282	-0.31606782	+0.59752522

From 2638 observations 2012 Oct. 4-2016 Jan. 22, mean residual 0″.77.
Nongravitational parameters A1 = -2.36, A2 = -6.4922.

Comet C/2013 U2 (Holvorcem)
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Oct. 25.86245 TT Sato

q	5.1167437	(2000.0)	P	Q
z	+0.0011149	Peri.	107.37412	-0.38133640	-0.92067737
	+/-0.0000012	Node	7.00171	+0.34188272	-0.22415677
e	0.9942951	Incl.	43.09400	+0.85889391	-0.31954175

From 371 observations 2013 Oct. 23-2015 June 13, mean residual 0″.48.

Comet 269P/Jedicke
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Nov. 14.60952 TT Sato

q	4.0793218	(2000.0)	P	Q
n	0.04971064	Peri.	223.36850	-0.37175848	-0.92212667
a	7.3254865	Node	248.71775	+0.88004539	-0.31333324
e	0.4431330	Incl.	6.60227	+0.29549238	-0.22694642
P	19.83				

From 806 observations 1993 Oct. 12-2015 Dec. 18, mean residual 0″.55.

Comet C/2013 G3 (PANSTARRS)
Epoch 2014 Oct. 30.0 TT = JDT 2456960.5
T 2014 Nov. 15.19340 TT Sato

q	3.8521899	(2000.0)	P	Q
z	-0.0001289	Peri.	76.49759	-0.00979638	+0.90462478
	+/-0.0000006	Node	208.12657	-0.78719353	+0.25579140
e	1.0004963	Incl.	64.66956	+0.61662823	+0.34091754

From 863 observations 2013 Apr. 10-2015 Nov. 1, mean residual 0″.52.

Comet C/2013 P3 (Palomar)
Epoch 2014 Dec. 9.0 TT = JDT 2457000.5
T 2014 Nov. 23.82332 TT Sato
q 8.6465381 (2000.0) P Q
z -0.0001387 Peri. 177.18328 +0.99782213 +0.04584829
+/-0.0000011 Node 177.27550 -0.05998922 +0.33181037
e 1.0011989 Incl. 93.91012 +0.02742786 -0.94223130
From 427 observations 2013 Aug. 8-2015 Nov. 5, mean residual 0″.43.

Comet 110P/Hartley
Epoch 2014 Dec. 9.0 TT = JDT 2457000.5
T 2014 Dec. 17.79362 TT Sato
q 2.4753517 (2000.0) P Q
n 0.14362361 Peri. 167.75044 -0.09943083 -0.97613505
a 3.6112051 Node 287.71448 +0.89497758 -0.00293201
e 0.3145359 Incl. 11.69339 +0.43488923 -0.21714456
P 6.86
From 2532 observations 1988 Feb. 19-2015 May 20, mean residual 0″.59.
Nongravitational parameters A1 = -0.23, A2 = -0.0331.

Comet 287P/Christensen
Epoch 2014 Dec. 9.0 TT = JDT 2457000.5
T 2014 Dec. 28.38800 TT Sato
q 3.0540493 (2000.0) P Q
n 0.11536365 Peri. 189.07178 +0.84511537 +0.50194593
a 4.1791702 Node 139.06047 -0.47118260 +0.86193211
e 0.2692211 Incl. 16.30181 -0.25252121 +0.07157738
P 8.54
From 175 observations 2006 Aug. 30-2015 Dec. 7, mean residual 0″.79.

Comet C/2014 F2 (Tenagra)
Epoch 2015 Jan. 18.0 TT = JDT 2457040.5
T 2015 Jan. 2.37200 TT Sato
q 4.3143878 (2000.0) P Q
z +0.0067905 Peri. 86.05165 -0.48716888 +0.01100550
+/-0.0000013 Node 267.44809 -0.39019106 +0.89182142
e 0.9707032 Incl. 119.06074 +0.78129215 +0.45225373
From 290 observations 2014 Mar. 31-2015 Dec. 10, mean residual 0″.54.

Comet C/2013 W2 (PANSTARRS)
Epoch 2015 Jan. 18.0 TT = JDT 2457040.5
T 2015 Jan. 5.28812 TT Sato
q 4.4444563 (2000.0) P Q
n 0.02918287 Peri. 307.19393 -0.60244657 -0.79815918
a 10.4484227 Node 179.85092 +0.75520921 -0.57011210
e 0.5746290 Incl. 4.56655 +0.25829667 -0.19471545
P 33.77
From 134 observations 2013 Nov. 27-2015 Dec. 16, mean residual 0″.54.

Comet C/2013 G9 (Tenagra)
Epoch 2015 Jan. 18.0 TT = JDT 2457040.5
T 2015 Jan. 14.75508 TT Sato
q 5.3375393 (2000.0) P Q
z -0.0001756 Peri. 204.94472 -0.94096328 -0.09715726
+/-0.0000013 Node 35.68756 -0.13079493 +0.98788241
e 1.0009375 Incl. 146.23039 -0.31221915 -0.12103227
From 423 observations 2013 Apr. 15-2015 Dec. 12, mean residual 0″.59.

Comet C/2014 Q2 (Lovejoy)
Epoch 2015 Jan. 18.0 TT = JDT 2457040.5
T 2015 Jan. 30.06925 TT Sato
q 1.2903573 (2000.0) P Q
z 0.0017122 Peri. 12.39493 -0.12073223 -0.14529019
+/-0.0000002 Node 94.97561 +0.80568034 -0.59224026
e 0.9977907 Incl. 80.30209 +0.57991630 +0.79255425
From 7204 observations 2014 July 1-2016 Jan. 26, mean residual 0″.56.

Comet C/2014 G3 (PANSTARRS)
Epoch 2015 Jan. 18.0 TT = JDT 2457040.5
T 2015 Feb. 2.61558 TT Sato

q	4.6979441	(2000.0)	P	Q
n	0.00238173	Peri. 147.81064	-0.80511735	-0.59222688
a	55.5317240	Node 4.54526	-0.59280431	+0.80526169
e	0.9154007	Incl. 155.82318	-0.01921217	-0.02865183

From 259 observations 2014 Apr. 10-2015 May 22, mean residual 0″.60.

Comet 299P/Catalina-PANSTARRS
Epoch 2015 Feb. 27.0 TT = JDT 2457080.5
T 2015 Feb. 23.30175 TT Sato

q	3.1395216	(2000.0)	P	Q
n	0.10774796	Peri. 323.51349	-0.56086981	+0.80769405
a	4.3738446	Node 271.68155	-0.71005461	-0.58221621
e	0.2822055	Incl. 10.47985	-0.42573173	-0.09303017
P	9.15			

From 252 observations 2005 Mar. 11-2015 Oct. 1, mean residual 0″.59.

Comet C/2014 N3 (NEOWISE)
Epoch 2015 Feb. 27.0 TT = JDT 2457080.5
T 2015 Mar. 13.23436 TT Sato

q	3.8822649	(2000.0)	P	Q
z	+0.0001383	Peri. 353.57141	+0.95234641	-0.05564056
	+/-0.0000006	Node 19.92686	+0.30403833	+0.09440434
e	0.9994632	Incl. 61.63487	+0.02443369	+0.99397784

From 1338 observations 2014 July 4-2016 Jan. 28, mean residual 0″.50.

Comet 44P/Reinmuth
Epoch 2015 Apr. 8.0 TT = JDT 2457120.5
T 2015 Mar. 24.14474 TT Sato

q	2.1186364	(2000.0)	P	Q
n	0.13881128	Peri. 58.28160	+0.96046045	+0.26041061
a	3.6941927	Node 286.46567	-0.27729246	+0.86296058
e	0.4264954	Incl. 5.89531	-0.02499245	+0.43299580
P	7.10			

From 1137 observations 1993 Feb. 26-2015 Dec. 19, mean residual 0″.69.
Nongravitational parameters A1 = -0.10, A2 = -0.1165.

Comet 88P/Howell
Epoch 2015 Apr. 8.0 TT = JDT 2457120.5
T 2015 Apr. 6.23131 TT Sato

q	1.3586014	(2000.0)	P	Q
n	0.17977211	Peri. 235.91759	+0.38253899	+0.92172915
a	3.1092418	Node 56.69903	-0.82053077	+0.37068921
e	0.5630442	Incl. 4.38265	-0.42472719	+0.11403893
P	5.48			

From 1672 observations 2008 Dec. 30-2016 Jan. 20, mean residual 0″.73.
Nongravitational parameters A1 = +0.29, A2 = -0.2476.

Comet 174P/(60558) Echeclus
Epoch 2015 Apr. 8.0 TT = JDT 2457120.5
T 2015 Apr. 22.53244 TT Sato

q	5.8170665	(2000.0)	P	Q
n	0.02822877	Peri. 162.93222	+0.91553930	+0.40213249
a	10.6825465	Node 173.33628	-0.37731604	+0.86619981
e	0.4554607	Incl. 4.34378	-0.13935706	+0.29662662
P	34.92			

From 1378 observations 1979 Sept. 23-2015 Dec. 16, mean residual 0″.42.

Comet 113P/Spitaler
Epoch 2015 Apr. 8.0 TT = JDT 2457120.5
T 2015 Apr. 23.73997 TT Sato
q 2.1188410 (2000.0) P Q
n 0.13951773 Peri. 50.01746 +0.43298506 -0.90105419
a 3.6817118 Node 14.38681 +0.79331306 +0.36774702
e 0.4244957 Incl. 5.77603 +0.42799337 +0.22992059
P 7.06
From 451 observations 1986 Sept. 30-2015 Jan. 20, mean residual 0″.66.

Comet C/2015 LC2 (PANSTARRS)
Epoch 2015 May 18.0 TT = JDT 2457160.5
T 2015 May 1.59173 TT Sato
q 5.8903635 (2000.0) P Q
z -0.0002940 Peri. 341.82472 -0.67449109 -0.26847147
+/-0.0000158 Node 223.56596 -0.49039992 -0.53341809
e 1.0017315 Incl. 93.71758 -0.55187833 +0.80211484
From 45 observations 2015 June 7-Sept. 23, mean residual 0″.32.

Comet 308P/Lagerkvist-Carsenty
Epoch 2015 May 18.0 TT = JDT 2457160.5
T 2015 May 7.36948 TT Sato
q 4.2257272 (2000.0) P Q
n 0.05763693 Peri. 334.06018 +0.79523327 -0.60159914
a 6.6374633 Node 63.13043 +0.56994174 +0.69933100
e 0.3633521 Incl. 4.84762 +0.20681018 +0.38602413
P 17.10
From 295 observations 1997 Oct. 5-2015 Dec. 18, mean residual 0″.55.

Comet C/2015 G2 (MASTER)
Epoch 2015 May 8.0 TT = JDT 2457160.5
T 2015 May 23.78555 TT Sato
q 0.7798760 (2000.0) P Q
z -0.0004750 Peri. 257.45838 -0.69940297 -0.50694442
+/-0.0000014 Node 110.05814 -0.23812697 +0.82992656
e 1.0003704 Incl. 147.56373 -0.67389245 +0.23287178
From 481 observations 2015 Apr. 8-2016 Jan. 1, mean residual 0″.69.

Comet 19P/Borrelly
Epoch 2015 May 18.0 TT = JDT 2457160.5
T 2015 May 28.91914 TT Sato
q 1.3489599 (2000.0) P Q
n 0.14420727 Peri. 353.45947 +0.34590825 -0.80065791
a 3.6014546 Node 75.37704 +0.88212775 +0.09987718
e 0.6254402 Incl. 30.36807 +0.31968441 +0.59073806
P 6.83
From 1826 observations 1995 Jan. 2-2016 Jan. 1, mean residual 0″.80.
Nongravitational parameters A1 = -0.06, A2 = -0.1323.

Comet C/2014 W11 (PANSTARRS)
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 June 17.31218 TT Sato
q 3.4268041 (2000.0) P Q
n 0.03217316 Peri. 225.63902 -0.93299732 -0.30066202
a 9.7905463 Node 295.93632 +0.35954932 -0.80241453
e 0.6499885 Incl. 12.70523 -0.01550115 -0.51549322
P 30.63
From 833 observations 2014 Nov. 3-2016 Jan. 24, mean residual 0″.37.

Comet P/2016 A2 (Christensen)
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 June 19.69350 TT Sato
q 3.4445593 (2000.0) P Q
n 0.09544831 Peri. 140.27277 +0.24533176 -0.87509055
a 4.7419528 Node 291.75361 +0.73536303 +0.44838838
e 0.2735990 Incl. 26.68939 +0.63170684 -0.18211095
P 10.33
From 48 observations 2016 Jan. 2-17, mean residual 0″.61.

Comet P/2015 R1 (PANSTARRS)
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 June 25.77232 TT Sato
q 2.1653737 (2000.0) P Q
n 0.06879722 Peri. 300.53560 +0.93196180 +0.21932702
a 5.8986886 Node 48.51572 -0.00179631 +0.79905020
e 0.6329059 Incl. 22.66643 -0.36255204 +0.55983429
P 14.33
From 235 observations 2015 Sept. 8-Dec. 11, mean residual 0″.46.

Comet C/2014 Q1 (PANSTARRS)
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 July 6.51102 TT Sato
q 0.3145879 (2000.0) P Q
z +0.0009045 Peri. 120.05065 -0.59117649 -0.79979659
+/-0.0000019 Node 8.76145 +0.26772784 -0.31634224
e 0.9997155 Incl. 43.10938 +0.76081021 -0.51014998
From 635 observations 2014 Aug. 16-2015 Oct. 23, mean residual 0″.65.

Comet 162P/Siding Spring
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 July 11.99093 TT Sato
q 1.2373503 (2000.0) P Q
n 0.18446984 Peri. 356.40944 +0.88228041 -0.40400449
a 3.0562284 Node 31.21293 +0.44266257 +0.53753833
e 0.5951381 Incl. 27.78634 +0.16009723 +0.74015736
P 5.34
From 1667 observations 1990 Mar. 23-2016 Jan. 21, mean residual 0″.45.

Comet P/2015 D6 (Lemmon-PANSTARRS)
Epoch 2015 June 27.0 TT = JDT 2457200.5
T 2015 July 21.17542 TT Sato
q 4.5607833 (2000.0) P Q
n 0.05057407 Peri. 126.52362 -0.95630126 -0.15261600
a 7.2418705 Node 46.22798 -0.02602657 -0.80514306
e 0.3702203 Incl. 20.20445 +0.29122246 -0.57310820
P 19.49
From 34 observations 2015 Feb. 27-May 19, mean residual 0″.51.

Comet P/2004 FY140 (LINEAR)
Epoch 2015 Aug. 6.0 TT = JDT 2457240.5
T 2015 July 24.84123 TT Sato
q 4.0592851 (2000.0) P Q
n 0.09108177 Peri. 241.96556 -0.87638332 +0.48118091
a 4.8923225 Node 326.78530 -0.42774739 -0.79715235
e 0.1702744 Incl. 2.13695 -0.22132429 -0.36470957
P 10.82
From 52 observations 2004 Mar. 27-July 12, mean residual 0″.42.
From CHB 2014.

Comet 140P/Bowell-Skiff
Epoch 2015 Aug. 6.0 TT = JDT 2457240.5
T 2015 Aug. 8.63628 TT Sato
q 1.9877791 (2000.0) P Q
n 0.06011932 Peri. 172.94238 -0.91599252 -0.40074294
a 6.4534708 Node 343.39354 +0.36475559 -0.81208560
e 0.6919829 Incl. 3.82138 +0.16706604 -0.42417221
P 16.39
From 108 observations 1983 Mar. 17-1999 May 8, mean residual 0″.68.
From CHB 2014.

Comet C/2015 F4 (Jacques)
Epoch 2015 Aug. 6.0 TT = JDT 2457240.5
T 2015 Aug. 10.86267 TT Sato
q 1.6439255 (2000.0) P Q
z +0.0085932 Peri. 36.34632 +0.59749422 +0.34811606
+/-0.0000006 Node 285.95816 -0.78897045 +0.41616973
e 0.9858735 Incl. 48.70504 +0.14326994 +0.84001069
From 2654 observations 2015 Mar. 27-2016 Jan. 24, mean residual 0″.48.

Comet 67P/Churyumov-Gerasimenko
Epoch 2015 Aug. 6.0 TT = JDT 2457240.5
T 2015 Aug. 13.08587 TT Sato
q 1.2432612 (2000.0) P Q
n 0.15301629 Peri. 12.79600 +0.45633347 -0.88482152
a 3.4618714 Node 50.13574 +0.80520553 +0.36563454
e 0.6408702 Incl. 7.04026 +0.37868696 +0.28879452
P 6.44
From 5348 observations 1970 May 8-2016 Jan. 24, mean residual 0″.68.
Nongravitational parameters A1 = +0.15, A2 = +0.0331.

Comet C/2014 M1 (PANSTARRS)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Aug. 26.52630 TT Sato
q 5.5766836 (2000.0) P Q
z -0.0003982 Peri. 336.74530 -0.22819169 -0.93346921
+/-0.0000044 Node 234.67563 -0.83152547 +0.03901875
e 1.0022205 Incl. 160.17550 -0.50645231 +0.35652879
From 48 observations 2014 June 24-2015 Sept. 12, mean residual 0″.38.

Comet C/2015 GX (PANSTARRS)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Aug. 26.66258 TT Sato
q 1.9717497 (2000.0) P Q
n 0.01513364 Peri. 108.95823 +0.18047818 +0.53666076
a 16.1872774 Node 235.51549 -0.12832075 +0.84371696
e 0.8781914 Incl. 90.25451 +0.97517250 +0.01170135
P 65.13
From 262 observations 2015 Apr. 8-2016 Jan. 7, mean residual 0″.50.

Comet C/2013 C2 (Tenagra)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Aug. 30.26699 TT Sato
q 9.1310630 (2000.0) P Q
n 0.01531134 Peri. 308.79000 -0.91035583 +0.24122510
a 16.0617893 Node 247.52462 -0.16365186 -0.95615327
e 0.4315040 Incl. 21.33913 -0.38009254 -0.16607642
P 64.37
From 323 observations 2013 Feb. 14-2015 Dec. 18, mean residual 0″.55.

Comet C/2014 A4 (SONEAR)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 5.85968 TT Sato
q 4.1801999 (2000.0) P Q
z -0.0001971 Peri. 356.78769 +0.85257187 +0.30630595
+/-0.0000005 Node 29.72717 +0.49650505 -0.72761331
e 1.0008240 Incl. 121.35894 +0.16310715 +0.61380415
From 1699 observations 2014 Jan. 12-2016 Jan. 24, mean residual 0″.56.

Comet C/2014 W8 (PANSTARRS)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 7.77492 TT Sato
q 5.0556366 (2000.0) P Q
z +0.0061560 Peri. 227.39323 +0.09414945 -0.87522891
+/-0.0031468 Node 224.93414 +0.98947308 +0.02965286
e 0.9688773 Incl. 42.20284 -0.10990411 -0.48279920
From 30 observations 2014 Nov. 22-Dec. 18, mean residual 0″.31.
From CHB 2015.

Comet C/2015 J2 (PANSTARRS)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 8.84755 TT Sato

q	4.3204891	(2000.0)	P	Q
z	+0.0040440	Peri.	203.67884	-0.18134197	+0.95151937
	+/-0.0000079	Node	56.75541	-0.84814955	-0.02345470
e	0.9825280	Incl.	17.28144	-0.49775238	-0.30669328

From 79 observations 2015 Mar. 21-Aug. 25, mean residual 0″.47.

Comet P/2015 Q1 (Scotti)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 9.15547 TT Sato

q	1.7516849	(2000.0)	P	Q
n	0.15518135	Peri.	198.96473	+0.74984339	-0.64382806
a	3.4295965	Node	203.31017	+0.64584280	+0.76227937
e	0.4892446	Incl.	22.64913	+0.14360350	-0.06644985
P	6.35				

From 232 observations 2015 Aug. 18-Dec. 18, mean residual 0″.54.

Comet C/2015 B1 (PANSTARRS)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 20.84418 TT Sato

q	5.9755475	(2000.0)	P	Q
n	0.03288969	Peri.	188.35723	-0.99872653	+0.03552329
a	9.6478267	Node	353.35603	-0.00301932	-0.75090157
e	0.3806328	Incl.	18.03738	-0.05036081	-0.65945805
P	29.97				

From 86 observations 2014 Nov. 30-2015 Apr. 22, mean residual 0″.31.

Comet C/2015 YG1 (NEOWISE)
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Sept. 28.96168 TT Sato

q	2.0736923	(2000.0)	P	Q
n	0.01387919	Peri.	102.79645	-0.13170472	-0.98152507
a	17.1485165	Node	350.51127	+0.18314395	+0.11350521
e	0.8790745	Incl.	57.34050	+0.97422388	-0.15402956
P	71.01				

From 73 observations 2015 Dec. 17-2016 Jan. 17, mean residual 0″.58.

Comet P/2015 W2 (Catalina)
Epoch 2015 Oct. 5.0 TT = JDT 2457300.5
T 2015 Sept. 30.70218 TT Sato

q	2.6776524	(2000.0)	P	Q
n	0.04973908	Peri.	117.55387	+0.60168620	-0.77738189
a	7.3226943	Node	294.26006	+0.64335292	+0.60779362
e	0.6343351	Incl.	11.60781	+0.47336111	+0.16206265
P	19.82				

From 153 observations 2015 Nov. 21-Dec. 18, mean residual 0″.40.

Comet 61P/Shajn-Schaldachh
Epoch 2015 Sept. 15.0 TT = JDT 2457280.5
T 2015 Oct. 2.17550 TT Sato

q	2.1139223	(2000.0)	P	Q
n	0.13953006	Peri.	221.92317	+0.90568040	-0.42285809
a	3.6814949	Node	163.01659	+0.41146000	+0.85931179
e	0.4257978	Incl.	6.00594	+0.10219437	+0.28770519
P	7.06				

From 1204 observations 2008 June 7-2016 Jan. 14, mean residual 0″.82.
Nongravitational parameters A1 = -11.16, A2 = -3.5375.

Comet C/2013 V4 (Catalina)
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 7.60861 TT Sato

q	5.1853757	(2000.0)	P	Q
z	-0.0004935	Peri.	40.45019	+0.22785006	-0.60308430
	+/-0.0000006	Node	55.62130	+0.46388293	-0.62303734
e	1.0025590	Incl.	67.85530	+0.85609402	+0.49811022

From 1564 observations 2013 Oct. 23-2016 Jan. 17, mean residual 0″.51.

Comet 151P/Helin
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 8.07389 TT Sato

q	2.4737768	(2000.0)	P	Q
n	0.07088928	Peri.	216.26487	+0.99874618	+0.00847650
a	5.7820566	Node	143.15553	+0.00860585	+0.94181656
e	0.5721632	Incl.	4.71954	-0.04931547	+0.33602042
P	13.90				

From 360 observations 1987 Sept. 18-2015 Dec. 12, mean residual 0″.57.

Comet P/2001 H5 (NEAT)
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 21.75992 TT Sato

q	2.4356926	(2000.0)	P	Q
n	0.06551780	Peri.	224.73284	-0.96876182	+0.23614392
a	6.0939165	Node	328.69388	-0.16634069	-0.84526768
e	0.6003075	Incl.	8.38149	-0.18393288	-0.47933141
P	15.04				

From 43 observations 2001 Mar. 20-June 26, mean residual 0″.55.
From CHB 2015.

Comet 318P/McNaught-Hartley
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 22.47314 TT Sato

q	2.4482496	(2000.0)	P	Q
n	0.04783725	Peri.	313.22368	+0.96093260	+0.21097642
a	7.5155120	Node	35.72503	-0.06075318	+0.79227676
e	0.6742405	Incl.	17.86839	-0.27003258	+0.57252641
P	20.60				

From 346 observations 1994 July 6-2016 Jan. 29, mean residual 0″.67.

Comet 326P/Hill
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 22.65616 TT Sato

q	2.7795975	(2000.0)	P	Q
n	0.11996335	Peri.	278.82833	+0.94662293	-0.31953256
a	4.0716489	Node	99.81483	+0.31009337	+0.86673071
e	0.3173288	Incl.	2.47044	+0.08801776	+0.38298410
P	8.22				

From 170 observations 1990 Sept. 24-2016 Jan. 4, mean residual 0″.56.

Comet C/2015 X8 (NEOWISE)
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 23.15152 TT Sato

q	1.1904285	(2000.0)	P	Q
n	0.01125554	Peri.	20.41604	-0.98066920	+0.17832596
a	19.7193183	Node	191.10553	+0.06163247	+0.67219091
e	0.9396314	Incl.	155.28083	+0.18571312	+0.71858141
P	87.57				

From 94 observations 2015 Dec. 14-2016 Jan. 20, mean residual 0″.66.

Comet C/2015 X4 (Elenin)
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2015 Nov. 3.59034 TT Sato

q	3.3942928	(2000.0)	P	Q
n	0.01278899	Peri. 176.35742	+0.18282074	-0.85333651
a	18.1097253	Node 262.63227	+0.88912070	+0.35544839
e	0.8125707	Incl. 29.49320	+0.41957236	-0.38140955
P	77.07			

From 383 observations 2015 Nov. 24-2016 Jan. 17, mean residual 0″.42.

Comet P/2008 Y2 (Gibbs)
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Nov. 5.96512 TT Sato

q	1.6294084	(2000.0)	P	Q
n	0.14540687	Peri. 162.33604	-0.68573136	-0.72522932
a	3.5816194	Node 330.86323	+0.65154793	-0.57380139
e	0.5450638	Incl. 7.28788	+0.32443458	-0.38051859
P	6.78			

From 362 observations 2008 Dec. 1-2009 Apr. 30, mean residual 0″.51.

Comet 214P/LINEAR
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Nov. 12.70890 TT Sato

q	1.8515158	(2000.0)	P	Q
n	0.14352786	Peri. 190.24716	-0.99839710	-0.01893298
a	3.6128110	Node 348.26651	+0.04795176	-0.78356408
e	0.4875138	Incl. 15.20518	-0.03006436	-0.62102244
P	6.87			

From 131 observations 2002 Jan. 15-2009 May 3, mean residual 0″.65.
From CHB 2015.

Comet 10P/Tempel
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Nov. 14.25567 TT Sato

q	1.4176477	(2000.0)	P	Q
n	0.18374307	Peri. 195.54565	+0.68126041	+0.70845072
a	3.0642820	Node 117.80533	-0.64745951	+0.70063237
e	0.5373638	Incl. 12.02887	-0.34158517	+0.08492271
P	5.36			

From 3530 observations 1999 Feb. 14-2016 Jan. 1, mean residual 0″.62.
Nongravitational parameters A1 = +0.03, A2 = +0.0010.

Comet C/2013 US10 (Catalina)
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Nov. 15.72204 TT Sato

q	0.8229786	(2000.0)	P	Q
z	-0.0003887	Peri. 340.35949	-0.90560914	-0.42048934
	+/-0.0000002	Node 186.14473	-0.28587033	+0.50884238
e	1.0003199	Incl. 148.87834	-0.31328940	+0.75117784

From 2313 observations 2013 Aug. 14-2016 Jan. 30, mean residual 0″.62.

Comet 230P/LINEAR
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Nov. 18.07451 TT Sato

q	1.4852798	(2000.0)	P	Q
n	0.15726233	Peri. 308.92020	+0.45659613	-0.85838027
a	3.3992746	Node 112.39488	+0.87432416	+0.38431129
e	0.5630598	Incl. 14.65309	+0.16455159	+0.33983547
P	6.27			

From 766 observations 1997 Jan. 10-2016 Jan. 17, mean residual 0″.45.

Comet C/2015 V3 (PANSTARRS)
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Nov. 24.62080 TT Sato
q 4.2360848 (2000.0) P Q
z +0.0010853 Peri. 0.78204 +0.99903667 -0.01631692
+/-0.0001135 Node 2.33975 +0.03285653 -0.33722370
e 0.9954026 Incl. 86.23627 +0.02908923 +0.94128313
From 72 observations 2015 Nov. 2-Dec. 10, mean residual 0″.61.

Comet 249P/LINEAR
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Nov. 26.70066 TT Sato
q 0.4990133 (2000.0) P Q
n 0.21453538 Peri. 65.61679 +0.56213511 +0.81749580
a 2.7635677 Node 239.16894 -0.80180927 +0.50154385
e 0.8194315 Incl. 8.39188 -0.20274619 +0.28311549
P 4.59
From 391 observations 2006 Oct. 19-2016 Jan. 17, mean residual 0″.52.
Nongravitational parameters A1 = +0.29, A2 = -0.0120.

Comet 329P/LINEAR-Catalina
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 5.55197 TT Sato
q 1.6595577 (2000.0) P Q
n 0.08355489 Peri. 342.37868 +0.30203905 -0.88032232
a 5.1818894 Node 88.77540 +0.91276587 +0.15636445
e 0.6797389 Incl. 21.46158 +0.27501070 +0.44786467
P 11.80
From 390 observations 2003 Nov. 18-2016 Jan. 28, mean residual 0″.57.

Comet C/2014 S2 (PANSTARRS)
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 9.80308 TT Sato
q 2.1006431 (2000.0) P Q
z +0.0058919 Peri. 87.80906 -0.02255718 -0.99155533
+/-0.0000009 Node 8.12255 +0.03398232 -0.12842662
e 0.9876231 Incl. 64.67044 +0.99916784 -0.01801745
From 1434 observations 2014 Sept. 2-2016 Jan. 22, mean residual 0″.58.

Comet 204P/LINEAR-NEAT
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 11.60392 TT Sato
q 1.9295993 (2000.0) P Q
n 0.14102730 Peri. 355.08394 -0.24505034 -0.96342619
a 3.6553917 Node 109.06926 +0.89337391 -0.26783966
e 0.4721224 Incl. 6.58871 +0.37660773 +0.00847846
P 6.99
From 906 observations 2001 Oct. 13-2016 Jan. 21, mean residual 0″.67.
Nongravitational parameters A1 = +0.13, A2 = -0.0225.

Comet 327P/Van Ness
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 12.42842 TT Sato
q 1.5603428 (2000.0) P Q
n 0.14631064 Peri. 185.09479 +0.99806035 -0.00379032
a 3.5668548 Node 173.96277 -0.00987394 +0.97587185
e 0.5625438 Incl. 36.21453 -0.06146577 -0.21831115
P 6.74
From 108 observations 2002 Aug. 17-2015 Dec. 14, mean residual 0″.81.

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Comet 180P/NEAT
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 12.72522 TT                                    Sato
q   2.4893326           (2000.0)            P               Q
n   0.12994782     Peri.   94.87299     -0.95726951     -0.01312552
a   3.8603206      Node    84.58347     -0.11002559     -0.90731848
e   0.3551487      Incl.   16.86964     +0.26744991     -0.42023909
P   7.58
From 360 observations 1955 May 14-2015 Nov. 15, mean residual 0".71.
   Nongravitational parameters A1 = -3.19, A2 = +0.1021.

Comet C/2015 X2 (Catalina)
Epoch 2015 Dec. 4.0 TT = JDT 2457360.5
T 2015 Dec. 21.01850 TT                                    Sato
q   1.9005184           (2000.0)            P               Q
n   0.01944653     Peri.   42.13850     -0.34071463     -0.09265112
a  13.6953971      Node   100.98118     +0.37802262     -0.92464801
e   0.8612294      Incl.   72.37161     +0.86082080     +0.36938033
P  50.68
From 36 observations 2015 Dec. 2-8, mean residual 0".53.

Comet 328P/LONEOS-Tucker
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2015 Dec. 24.11382 TT                                    Sato
q   1.8865469           (2000.0)            P               Q
n   0.11436308     Peri.   30.61065     +0.96980854     -0.22430651
a   4.2035106      Node   341.60080     +0.11178926     +0.75765975
e   0.5511973      Incl.   17.64925     +0.21673614     +0.61289338
P   8.62
From 310 observations 1998 Aug. 27-2016 Jan. 4, mean residual 0".93.

Comet P/2014 W4 (PANSTARRS)
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2015 Dec. 29.65816 TT                                    Sato
q   4.2610752           (2000.0)            P               Q
n   0.05830236     Peri.   67.43195     -0.16918564     -0.97488358
a   6.5868633      Node    33.35279     +0.77951088     -0.22228559
e   0.3530949      Incl.   15.27441     +0.60310780     +0.01382461
P  16.91
From 59 observations 2014 Oct. 25-2015 Dec. 18, mean residual 0".31.

Comet 116P/Wild
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2016 Jan. 11.54782 TT                                    Sato
q   2.1870989           (2000.0)            P               Q
n   0.15149381     Peri.  173.31933     -0.96889378     +0.24644793
a   3.4850269      Node    20.98979     -0.22986879     -0.86246621
e   0.3724298      Incl.    3.60849     -0.09167980     -0.44205820
P   6.51
From 1784 observations 2007 Oct. 16-2016 Jan. 21, mean residual 0".57.
   Nongravitational parameters A1 = +0.95, A2 = -0.5574.

Comet C/2014 Y1 (PANSTARRS)
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2016 Jan. 17.58509 TT                                    Sato
q   2.2420579           (2000.0)            P               Q
z  -0.0008168      Peri.  182.26272     -0.92935192     +0.35906919
 +/-0.0000036      Node    19.47210     -0.33455556     -0.72069223
e   1.0018312      Incl.   14.92833     -0.15613325     -0.59301942
From 255 observations 2014 Nov. 17-2016 Jan. 1, mean residual 0".54.
```

Comet P/2015 P4 (PANSTARRS)
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2016 Jan. 19.04274 TT Sato
q 2.5251071 (2000.0) P Q
n 0.06586981 Peri. 280.82263 +0.89111523 -0.42947534
a 6.0721866 Node 104.74468 +0.45250168 +0.81683190
e 0.5841519 Incl. 8.71368 +0.03399814 +0.38514489
P 14.96
From 75 observations 2015 July 24-Dec. 11, mean residual 0″.44.

Comet 211P/Hill
Epoch 2016 Jan. 13.0 TT = JDT 2457400.5
T 2016 Jan. 27.33509 TT Sato
q 2.3505216 (2000.0) P Q
n 0.14683117 Peri. 4.43521 -0.52183245 -0.80305600
a 3.5584201 Node 117.26896 +0.77236154 -0.58798082
e 0.3394480 Incl. 18.88752 +0.36214437 +0.09684837
P 6.71
From 340 observations 2003 Apr. 1-2016 Jan. 22, mean residual 0″.68.
Nongravitational parameters A1 = -4.93, A2 = -0.1726.

Comet 50P/Arend
Epoch 2016 Feb. 22.0 TT = JDT 2457440.5
T 2016 Feb. 8.18649 TT Sato
q 1.9187996 (2000.0) P Q
n 0.11940504 Peri. 49.22101 +0.71098726 -0.70266419
a 4.0843312 Node 355.17618 +0.50487351 +0.53736012
e 0.5302047 Incl. 19.13923 +0.48948938 +0.46637661
P 8.25
From 1495 observations 1959 July 6-2016 Jan. 17, mean residual 0″.69.
Nongravitational parameters A1 = +0.38, A2 = -0.013.

Comet 147P/Kushida-Muramatsu
Epoch 2016 Feb. 22.0 TT = JDT 2457440.5
T 2016 Feb. 27.88514 TT Sato
q 2.7464945 (2000.0) P Q
n 0.13305696 Peri. 347.08489 +0.15953906 -0.98633052
a 3.7999480 Node 93.72391 +0.90936377 +0.13058165
e 0.2772284 Incl. 2.36762 +0.38419372 +0.10050145
P 7.41
From 79 observations 1994 Dec. 8-2009 Feb. 28, mean residual 0″.74.
From CHB 2015.

Comet 194P/LINEAR
Epoch 2016 Feb. 22.0 TT = JDT 2457440.5
T 2016 Mar. 2.45800 TT Sato
q 1.6977249 (2000.0) P Q
n 0.12323933 Peri. 130.71210 -0.54231748 -0.83974275
a 3.9991698 Node 351.99394 +0.70080322 -0.43446094
e 0.5754807 Incl. 11.13801 +0.46342916 -0.32569282
P 8.00
From 199 observations 2000 Jan. 27-2008 May 6, mean residual 0″.64.
From CHB 2015.

Comet P/2015 TO19 (Lemmon-PANSTARRS)
Epoch 2016 Feb. 22.0 TT = JDT 2457440.5
T 2016 Mar. 6.93605 TT Sato
q 2.9256812 (2000.0) P Q
n 0.10113486 Peri. 89.27120 +0.62642681 -0.77630905
a 4.5624922 Node 321.64806 +0.66255319 +0.57776284
e 0.3587537 Incl. 6.49990 +0.41062481 +0.25206024
P 9.75
From 43 observations 2015 Sept. 12-Dec. 12, mean residual 0″.34.

Comet C/2014 W2 (PANSTARRS)
Epoch 2016 Feb. 22.0 TT = JDT 2457440.5
T 2016 Mar. 10.48616 TT Sato

q	2.6701812	(2000.0)	P	Q
z	+0.0006302	Peri.	85.01043	-0.10047624	-0.35270615
	+/-0.0000007	Node	69.96277	-0.27385265	-0.88913454
e	0.9983174	Incl.	81.99859	+0.95650889	-0.29161301

From 1340 observations 2014 Oct. 24-2016 Jan. 27, mean residual 0″.43.

Comet 252P/LINEAR
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Mar. 15.27163 TT Sato

q	0.9961016	(2000.0)	P	Q
n	0.18513942	Peri.	343.31299	-0.99409497	-0.10292558
a	3.0488551	Node	190.95231	+0.10807314	-0.96758665
e	0.6732867	Incl.	10.42332	-0.00976670	-0.23061308
P	5.32				

From 171 observations 2000 Apr. 7-2015 Dec. 31, mean residual 0″.67.
Nongravitational parameters A1 = +0.22, A2 = +0.0343.

Comet P/2010 V1-B (Ikeya-Murakami)
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Mar. 17.28648 TT Sato

q	1.5730197	(2000.0)	P	Q
n	0.18173945	Peri.	152.45975	-0.91485404	-0.40364124
a	3.0867627	Node	3.78329	+0.33394719	-0.77133762
e	0.4903983	Incl.	9.38733	+0.22698316	-0.49204880
P	5.42				

From 490 observations 2010 Nov. 3-2016 Jan. 19, mean residual 0″.72.

Comet P/2010 V1-A (Ikeya-Murakami)
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Mar. 17.29785 TT Sato

q	1.5729769	(2000.0)	P	Q
n	0.18173765	Peri.	152.45366	-0.91481036	-0.40374026
a	3.0867830	Node	3.78318	+0.33403199	-0.77130352
e	0.4904155	Incl.	9.38708	+0.22703445	-0.49202102
P	5.42				

From 533 observations 2010 Nov. 3-2016 Jan. 21, mean residual 0″.69.

Comet 104P/Kowal
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Mar. 28.15158 TT Sato

q	1.1792547	(2000.0)	P	Q
n	0.16728812	Peri.	200.65911	+0.24499512	-0.95837885
a	3.2620653	Node	235.43340	+0.91263466	+0.27899740
e	0.6384945	Incl.	10.25389	+0.32722372	-0.06058411
P	5.89				

From 371 observations 1997 May 15-2016 Jan. 10, mean residual 0″.94.
Nongravitational parameters A1 = +0.27, A2 = +0.1255.

Comet 100P/Hartley
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Apr. 2.02451 TT Sato

q	2.0105594	(2000.0)	P	Q
n	0.15529371	Peri.	181.86183	-0.77260885	+0.57726337
a	3.4279420	Node	37.72507	-0.57676898	-0.46420826
e	0.4134792	Incl.	25.58918	-0.26535468	-0.67177205
P	6.35				

From 182 observations 1985 June 13-2010 July 12, mean residual 0″.72.
Nongravitational parameters A1 = +0.20, A2 = -0.0059.
From CHB 2015.

Comet P/2007 VA85 (LINEAR)
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Apr. 3.89028 TT Sato

q	1.1151601	(2000.0)	P	Q
n	0.11349781	Peri. 26.14436	-0.12205106	+0.73072006
a	4.2248477	Node 115.56559	+0.72892721	-0.39330771
e	0.7360473	Incl. 131.87709	+0.67362353	+0.55799394
P	8.68			

From 112 observations 2007 Nov. 4-2016 Jan. 16, mean residual 0″.43.

Comet 190P/Mueller
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Apr. 7.86507 TT Sato

q	2.0331986	(2000.0)	P	Q
n	0.11277924	Peri. 50.42246	+0.89875891	-0.43816236
a	4.2427745	Node 335.55215	+0.38974630	+0.81481522
e	0.5207856	Incl. 2.17264	+0.20082392	+0.37959175
P	8.74			

From 282 observations 1998 Sept. 14-2015 Oct. 25, mean residual 0″.57.

Comet C/2013 X1 (PANSTARRS)
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Apr. 20.72536 TT Sato

q	1.3142738	(2000.0)	P	Q
z	-0.0007905	Peri. 164.45902	+0.82525583	-0.52103732
	+/-0.0000011	Node 130.95632	-0.54402763	-0.62984833
e	1.0010389	Incl. 163.23144	-0.15161381	-0.57603056

From 1867 observations 2013 Nov. 29-2016 Jan. 31, mean residual 0″.68.

Comet 53P/Van Biesbroeck
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 Apr. 29.93286 TT Sato

q	2.4271097	(2000.0)	P	Q
n	0.07826349	Peri. 134.19716	+0.22945064	+0.97150578
a	5.4128988	Node 148.92287	-0.92260941	+0.23653393
e	0.5516063	Incl. 6.60840	-0.31007141	+0.01510680
P	12.59			

From 1660 observations 1954 Sept. 3-2015 Aug. 7, mean residual 0″.67.
Nongravitational parameters A1 = +0.25, A2 = -0.0288.

Comet C/2015 D3 (PANSTARRS)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 Apr. 30.83649 TT Sato

q	8.1486732	(2000.0)	P	Q
z	-0.0003090	Peri. 2.85280	-0.90711111	+0.28899146
	+/-0.0000049	Node 156.98025	+0.36901195	+0.19639641
e	1.0025179	Incl. 128.50989	+0.20243421	+0.93696979

From 68 observations 2015 Feb. 17-Dec. 14, mean residual 0″.52.

Comet C/2015 B2 (PANSTARRS)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 6.57589 TT Sato

q	3.3696062	(2000.0)	P	Q
z	-0.0001239	Peri. 284.76922	+0.32050409	+0.89850794
	+/-0.0000018	Node 341.90200	+0.51822671	-0.43137150
e	1.0004176	Incl. 105.08806	-0.79291753	+0.08125340

From 100 observations 2015 Jan. 6-Dec. 31, mean residual 0″.33.

Comet 77P/Longmore
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 13.64616 TT Sato

q	2.3377222	(2000.0)	P	Q
n	0.14328442	Peri. 196.72720	-0.85890025	+0.50119449
a	3.6169019	Node 14.80342	-0.40990154	-0.54943941
e	0.3536673	Incl. 24.34597	-0.30703596	-0.66852107
P	6.88			

From 1016 observations 1975 Oct. 4-2016 Jan. 21, mean residual 0″.74.
Nongravitational parameters A1 = +0.13, A2 = -0.0471.

Comet C/2015 Y1 (LINEAR)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 15.17239 TT Sato

q	2.5141261	(2000.0)	P	Q
z	+0.0033623	Peri.	24.70709	-0.74488198	+0.09553690
+/-	0.0002976	Node	135.77656	+0.33543609	-0.80189689
e	0.9915469	Incl.	71.21845	+0.57674385	+0.58977460

From 109 observations 2015 Dec. 16-2016 Jan. 19, mean residual 0″.43.

Comet C/2015 W1 (Gibbs)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 17.20619 TT Sato

q	2.2318571	(2000.0)	P	Q
z	-0.0004973	Peri.	48.11725	-0.30667247	+0.27803587
+/-	0.0000521	Node	114.31408	+0.24918599	-0.89957474
e	1.0011098	Incl.	87.31421	+0.91861762	+0.33684023

From 183 observations 2015 Nov. 18-2016 Jan. 19, mean residual 0″.50.

Comet 224P/LINEAR-NEAT
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 24.61627 TT Sato

q	1.9933207	(2000.0)	P	Q
n	0.15633208	Peri.	16.32263	+0.55258240	-0.81971743
a	3.4127460	Node	40.47508	+0.73637826	+0.39546796
e	0.4159188	Incl.	13.42603	+0.39038411	+0.41432888
P	6.30				

From 93 observations 2003 Nov. 20-2009 Nov. 11, mean residual 0″.56.

Cocmet C/2011 KP36 (Spacewatch)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 26.89943 TT Sato

q	4.8832980	(2000.0)	P	Q
n	0.00414062	Peri.	180.59816	+0.99445386	+0.09830204
a	38.4083930	Node	173.40033	-0.09509365	+0.99227984
e	0.8728586	Incl.	18.98677	-0.04493015	+0.07561365

From 1484 observations 2011 May 21-2015 Dec. 23, mean residual 0″.41.

Comet P/2007 R3 (Gibbs)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 27.42614 TT Sato

q	2.5208262	(2000.0)	P	Q
n	0.11049725	Peri.	312.19161	+0.95163640	+0.30543320
a	4.3009898	Node	30.06852	-0.25876686	+0.85501320
e	0.4138963	Incl.	3.79329	-0.16561365	+0.41912169
P	8.92				

From 118 observations 2007 Sept. 10-Nov. 10, mean residual 0″.62.

Comet 136P/Mueller
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 31.21273 TT Sato

q	2.9791065	(2000.0)	P	Q
n	0.11437068	Peri.	225.17204	+0.99248932	-0.05222196
a	4.2033245	Node	137.45298	+0.08171477	+0.95597638
e	0.2912499	Incl.	9.41584	-0.09103651	+0.28875948
P	8.62				

From 262 observations 1990 Sept. 17-2015 Oct. 1, mean residual 0″.82.
Nongravitational parameters Y1 = -0.50, Y2 = -0.0139.

Comet 216P/LINEAR
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 31.16315 TT Sato

q	2.1497471	(2000.0)	P	Q
n	0.12913714	Peri.	151.59559	-0.87857026	-0.47761300
a	3.8764598	Node	359.87321	+0.40303527	-0.74099297
e	0.4454355	Incl.	9.04816	+0.25627499	-0.47203310
P	7.63				

From 148 observations 2001 Feb. 1-2009 Apr. 29, mean residual 0″.79.
From CHB 2015.

Comet 157P/Tritton
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 10.36276 TT Sato

q	1.3580845	(2000.0)	P	Q
n	0.15664312	Peri. 148.89263	+0.01572128	-0.99382754
a	3.4082269	Node 299.99960	+0.88933795	+0.06409502
e	0.6015276	Incl. 7.28498	+0.45698015	-0.09054635
P	6.29			

From 1028 observations 2003 Oct. 6-2015 Oct. 16, mean residual 0".81.
Nongravitational parameters A1 = +1.22, A2 = +0.0198.

Comet 202P/Scotti
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 11.00109 TT Sato

q	2.5183185	(2000.0)	P	Q
n	0.13465098	Peri. 255.73546	-0.00441197	-0.99994440
a	3.7698989	Node 194.52748	+0.93156464	-0.00062778
e	0.3319931	Incl. 2.18824	+0.36354898	-0.01052653
P	7.32			

From 382 observations 1929 Dec. 3-2015 Dec. 3, mean residual 0".66.
Nongravitational parameters A1 = +2.75, A2 = +0.0443.

Comet P/2011 A2 (Scotti)
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 13.96671 TT Sato

q	1.5528892	(2000.0)	P	Q
n	0.18013695	Peri. 94.64843	-0.85758344	-0.51038967
a	3.1050423	Node 54.67521	+0.43553990	-0.78644577
e	0.4998815	Incl. 4.47532	+0.27359759	-0.34785836
P	5.47			

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

Comet 118P/Shoemaker-Levy
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 16.97041 TT Sato

q	1.9800655	(2000.0)	P	Q
n	0.15299338	Peri. 302.33709	-0.07527931	-0.99469327
a	3.4622170	Node 151.72678	+0.95741093	-0.09175918
e	0.4280932	Incl. 8.51430	+0.27874243	+0.04653549
P	6.44			

From 1927 observations 1991 Feb. 11-2015 Dec. 30, mean residual 0".81.
Nongravitational parameters A1 = +0.26, A2 = -0.2040.

Comet C/2015 T4 (PANSTARRS)
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 18.94393 TT Sato

q	2.2964007	(2000.0)	P	Q
z	+0.0114175	Peri. 270.13635	-0.03519997	-0.31240692
	+/-0.0000182	Node 251.79066	+0.40583982	-0.87250384
e	0.9737808	Incl. 87.92126	-0.91326612	-0.37568467

From 202 observations 2015 Oct. 14-2016 Jan. 12, mean residual 0".45.

Comet 146P/Shoemaker-LINEAR
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 June 30.14563 TT Sato

q	1.4301237	(2000.0)	P	Q
n	0.12136666	Peri. 316.98310	+0.93961242	-0.13416836
a	4.0402023	Node 53.45397	+0.30237116	+0.75636982
e	0.6460267	Incl. 23.07284	-0.16031274	+0.64023710
P	8.12			

From 56 observations 1984 Nov. 30-2008 Sept. 9, mean residual 0".73.
Nongravitational parameters A1 = +0.19, A2 = -0.0275.

Comet 207P/NEAT
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 July 1.28449 TT Sato
q 0.9374512 (2000.0) P Q
n 0.12912737 Peri. 271.28336 -0.36634265 -0.92841790
a 3.8766552 Node 200.54612 +0.90837767 -0.34243146
e 0.7581804 Incl. 10.16076 +0.20160126 -0.14415580
P 7.63
From 124 observations 2000 Oct. 7-2009 May 22, mean residual 0″.76.

Comet 208P/McMillan
Epoch 2016 June 21.0 TT = JDT 2457560.5
T 2016 July 1.76695 TT Sato
q 2.5445851 (2000.0) P Q
n 0.12079947 Peri. 310.51361 +0.97275384 +0.22730756
a 4.0528392 Node 36.41487 -0.18260385 +0.87243156
e 0.3721475 Incl. 4.40755 -0.14284884 +0.43265973
P 8.16
From 129 observations 2000 Sept. 23-2009 Jan. 30, mean residual 0″.66.

Comet P/2010 N1 (WISE)
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 13.82393 TT Sato
q 1.6549416 (2000.0) P Q
n 0.16535345 Peri. 160.85154 -0.04186907 +0.96615185
a 3.2874605 Node 106.10280 -0.94777295 +0.04222106
e 0.4965897 Incl. 15.36391 -0.31618572 -0.25449555
P 5.96
From 52 observations 2010 Apr. 13-Aug. 9, mean residual 0″.57.

Comet 279P/La Sagra
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 14.54950 TT Sato
q 2.1592103 (2000.0) P Q
n 0.14545056 Peri. 5.87678 +0.99047970 +0.13606196
a 3.5809021 Node 346.25018 -0.12961149 +0.87059209
e 0.3970206 Incl. 5.04640 -0.04637701 +0.47281767
P 6.78
From 137 observations 2002 July 11-2009 Nov. 17, mean residual 0″.56.

Comet 56P/Slaughter-Burnham
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 18.43885 TT Sato
q 2.5086383 (2000.0) P Q
n 0.08595741 Peri. 44.21966 +0.86252501 -0.50484911
a 5.0848776 Node 345.98547 +0.41599882 +0.74607264
e 0.5066473 Incl. 8.14781 +0.28808956 +0.43416931
P 11.47
From 536 observations 1959 Feb. 2-2015 Sept. 8, mean residual 0″.77.
Nongravitational parameters A1 = +0.92, A2 = +0.0234.

Comet 81P/Wild
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 20.30921 TT Sato
q 1.5921667 (2000.0) P Q
n 0.15386481 Peri. 41.69874 -0.99854183 -0.03715945
a 3.4491323 Node 136.12430 +0.02060446 -0.93281114
e 0.5383863 Incl. 3.23883 +0.04989665 -0.35844464
P 6.41
From 4365 observations 1995 Aug. 27-2016 Jan. 17, mean residual 0″.61.
Nongravitational parameters A1 = +0.06, A2 = -0.0180.

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Comet P/2009 K1 (Gibbs)
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 24.37288 TT                                    Sato
q   1.3397447          (2000.0)            P              Q
n   0.13893977     Peri.   27.43230     -0.93818237     +0.34591217
a   3.6919148      Node   172.77095     -0.33308914     -0.89231070
e   0.6371139      Incl.    5.74395     -0.09415659     -0.29004550
P   7.09
From 121 observations 2009 Apr. 24-Sept. 18, mean residual 0".67.

Comet 150P/LONEOS
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 24.93779 TT                                    Sato
q   1.7597037          (2000.0)            P              Q
n   0.12875257     Peri.  245.67836     -0.88079054     -0.35162745
a   3.8841748      Node   272.42670     +0.45901623     -0.79847603
e   0.5469556      Incl.   18.50614     -0.11624168     -0.48866570
P   7.66
From 385 observations 1978 Mar. 6-2015 Dec. 29, mean residual 0".54.

Comet C/2015 X7 (ATLAS)
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 July 30.45374 TT                                    Sato
q   3.6826790          (2000.0)            P              Q
z  -0.0008533      Peri.  348.55912     -0.68093177     -0.49024700
 +/-0.0002008      Node   139.87545     +0.72072391     -0.58042195
e   1.0031424      Incl.   57.58693     +0.12995755     +0.65020631
From 62 observations 2015 Dec. 12-2016 Jan. 20, mean residual 0".47.

Comet 9P/Tempel
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 Aug. 2.58237 TT                                     Sato
q   1.5425392          (2000.0)            P              Q
n   0.17668217     Peri.  179.20623     -0.37510769     +0.91136613
a   3.1453880      Node    68.74950     -0.85148729     -0.26650691
e   0.5095870      Incl.   10.47400     -0.36642001     -0.31366519
P   5.58
From 5517 observations 1982 Dec. 11-2016 Jan. 21, mean residual 0".55.
   Nongravitational parameters A1 = +0.00, A2 = +0.0033.

Comet C/2014 R3 (PANSTARRS)
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 Aug. 7.89532 TT                                     Sato
q   7.2753525          (2000.0)            P              Q
z  +0.0000147      Peri.  113.40125     -0.36316808     -0.82311526
 +/-0.0000032      Node   334.11202     -0.21699121     +0.53039356
e   0.9998931      Incl.   90.83741     +0.90610362     -0.20288899
From 80 observations 2014 Sept. 6-2015 Nov. 5, mean residual 0".35.

Comet 225P/LINEAR
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 Aug. 16.95666 TT                                    Sato
q   1.3245015          (2000.0)            P              Q
n   0.14106045     Peri.    3.92395     +0.95163246     -0.29402418
a   3.6548189      Node    14.18200     +0.27105551     +0.66685404
e   0.6376013      Incl.   21.33506     +0.14465331     +0.68473022
P   6.99
From 445 observations 2002 Sept. 29-2009 Nov. 24, mean residual 0".55.
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Comet 43P/Wolf-Harrington
Epoch 2016 July 31.0 TT = JDT 2457600.5
T 2016 Aug. 19.69354 TT Sato
q 1.3579406 (2000.0) P Q
n 0.16081300 Peri. 191.59724 +0.15628902 -0.95336877
a 3.3490525 Node 249.83317 +0.92678099 +0.23193919
e 0.5945299 Incl. 15.96511 +0.34154172 -0.19311187
P 6.13
From 2227 observations 1996 Sept. 17-2015 Oct. 10, mean residual 0″.72.
Nongravitational parameters A1 = +0.42, A2 = -0.0804.

Comet 33P/Daniel
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Aug. 22.46436 TT Sato
q 2.1602162 (2000.0) P Q
n 0.12214865 Peri. 19.06989 +0.09999411 -0.93163862
a 4.0229404 Node 66.49103 +0.85619908 -0.09830207
e 0.4630255 Incl. 22.39438 +0.50687702 +0.34983736
P 8.07
From 255 observations 1992 July 29-2009 Apr. 29, mean residual 0″.76.
Nongravitational parameters A1 = +0.48, A2 = +0.0787.

Comet C/2015 V4 (PANSTARRS)
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Aug. 26.45677 TT Sato
q 5.4643882 (2000.0) P Q
n 0.01237070 Peri. 306.71882 -0.59733268 -0.80199261
a 18.5156868 Node 179.91879 +0.63832576 -0.47449721
e 0.7048779 Incl. 60.74949 -0.48552436 +0.36285018
P 79.67
From 32 observations 2015 Nov. 3-Dec. 15, mean residual 0″.33.

Comet C/2015 TQ209 (LINEAR)
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Aug. 27.57481 TT Sato
q 1.4129210 (2000.0) P Q
z +0.0006346 Peri. 281.51057 -0.81161371 -0.56779805
+/-0.0000255 Node 224.08282 +0.58270810 -0.77005602
e 0.9991034 Incl. 11.39378 +0.04164684 -0.29089361
From 175 observations 2015 Oct. 10-2016 Jan. 13, mean residual 0″.37.

Comet 330P/Catalina
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Aug. 29.96607 TT Sato
q 2.9530140 (2000.0) P Q
n 0.05850549 Peri. 186.94498 -0.51578392 -0.82111578
a 6.5716077 Node 294.37539 +0.79836611 -0.35719244
e 0.5506406 Incl. 15.56477 +0.31077082 -0.44517686
P 16.85
From 165 observations 1999 Nov. 5-2016 Jan. 6, mean residual 0″.65.

Comet 144P/Kushida
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Aug. 30.96879 TT Sato
q 1.4314344 (2000.0) P Q
n 0.13012760 Peri. 216.15011 -0.20037506 -0.97754122
a 3.8567643 Node 245.48971 +0.91487347 -0.16285402
e 0.6288509 Incl. 4.11497 +0.35050874 -0.13376001
P 7.57
From 2538 observations 1994 Jan. 7-2009 June 19, mean residual 0″.55.
Nongravitational parameters A1 = +0.68, A2 = -0.0908.

Comet 226P/Pigott-LINEAR-Kowalski
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Sept. 5.12160 TT Sato
q 1.7763593 (2000.0) P Q
n 0.13461403 Peri. 341.12516 +0.74436295 -0.36055254
a 3.7705888 Node 54.00623 +0.66632823 +0.34565214
e 0.5288907 Incl. 44.00372 +0.04393731 +0.86632930
P 7.32
From 209 observations 2003 Jan. 5-2010 Apr. 12, mean residual 0".76.

Comet 212P/NEAT
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Sept. 10.41312 TT Sato
q 1.6445534 (2000.0) P Q
n 0.12716160 Peri. 15.08059 -0.38676203 -0.84162276
a 3.9165053 Node 98.88612 +0.80168260 -0.50887005
e 0.5800967 Incl. 22.42803 +0.45576324 +0.18089335
P 7.75
From 110 observations 2000 Dec. 1-2009 Mar. 2, mean residual 0".70.

Comet C/2015 H2 (PANSTARRS)
Epoch 2016 Sept. 9.0 TT = JDT 2457640.5
T 2016 Sept. 13.30086 TT Sato
q 4.9666983 (2000.0) P Q
z -0.0006938 Peri. 287.91706 +0.17554862 +0.98037019
+/-0.0000566 Node 350.69117 -0.55230934 +0.02260032
e 1.0034457 Incl. 33.70480 -0.81494606 +0.19586605
From 51 observations 2015 Apr. 20-Aug. 25, mean residual 0".41.

Comet 314P/Montani
Epoch 2016 Oct. 19.0 TT = JDT 2457680.5
T 2016 Oct. 7.86618 TT Sato
q 4.2337663 (2000.0) P Q
n 0.05037361 Peri. 213.74176 -0.52035449 -0.85113152
a 7.2610709 Node 267.70406 +0.79801583 -0.45576663
e 0.4169226 Incl. 3.97858 +0.30397688 -0.26048401
P 19.57
From 167 observations 1997 Apr. 9-2016 Jan. 13, mean residual 0".61.

Comet 237P/LINEAR
Epoch 2016 Oct. 19.0 TT = JDT 2457680.5
T 2016 Oct. 11.67974 TT Sato
q 1.9848455 (2000.0) P Q
n 0.14990640 Peri. 25.04115 -0.00318275 +0.97540941
a 3.5095864 Node 245.43380 -0.95343626 -0.06942167
e 0.4344503 Incl. 14.02300 -0.30157781 +0.20918201
P 6.57
From 112 observations 2002 May 17-2015 Jan. 21, mean residual 0".57.

Comet 238P/Read
Epoch 2016 Oct. 19.0 TT = JDT 2457680.5
T 2016 Oct. 22.95805 TT Sato
q 2.3661804 (2000.0) P Q
n 0.17500307 Peri. 324.94955 +0.95819243 -0.28560049
a 3.1654754 Node 51.65454 +0.26729830 +0.87192448
e 0.2525039 Incl. 1.26465 +0.10207293 +0.39771856
P 5.63
From 121 observations 2005 Oct. 23-2007 Jan. 27, mean residual 0".54.

Comet 94P/Russell
Epoch 2016 Oct. 19.0 TT = JDT 2457680.5
T 2016 Oct. 27.67018 TT Sato

q	2.2299893	(2000.0)	P	Q
n	0.14982433	Peri. 92.77341	-0.95409077	-0.28168506
a	3.5108679	Node 70.88168	+0.21363980	-0.87824356
e	0.3648325	Incl. 6.18553	+0.20992582	-0.38644763
P	6.58			

From 1089 observations 1984 Mar. 2-2015 Dec. 31, mean residual 0″.60.
Nongravitational parameters A1 = -0.01, A2 = +0.0042.

Comet P/2005 S3 (Read)
Epoch 2016 Oct. 19.0 TT = JDT 2457680.5
T 2016 Nov. 1.77828 TT Sato

q	2.8206494	(2000.0)	P	Q
n	0.09144218	Peri. 140.61034	+0.58953985	-0.80545017
a	4.8794588	Node 273.18193	+0.72487548	+0.56075318
e	0.4219340	Incl. 3.48930	+0.35636820	+0.19184862
P	10.78			

From 268 observations 2005 Sept. 30-2006 Feb. 24, mean residual 0″.57.

Comet 288P/(300163) Spacewatch
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 8.24082 TT Sato

q	2.4360543	(2000.0)	P	Q
n	0.18509666	Peri. 281.05301	+0.99570323	-0.07365900
a	3.0493246	Node 83.18864	+0.09009548	+0.91062555
e	0.2011168	Incl. 3.24001	-0.02139801	+0.40661463
P	5.32			

From 151 observations 2000 Sept. 3-2015 May 21, mean residual 0″.39.

Comet P/2010 A2 (LINEAR)
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 9.24230 TT Sato

q	2.0053328	(2000.0)	P	Q
n	0.28431806	Peri. 132.90258	-0.05643992	-0.99668332
a	2.2905147	Node 320.21978	+0.88725044	-0.02314410
e	0.1245056	Incl. 5.25704	+0.45782223	-0.07801743
P	3.47			

From 103 observations 2009 Dec. 10-2010 Apr. 17, mean residual 0″.92.

Comet D/1978 R1 (Haneda-Campos) [Orbit 2]
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 9.94843 TT Sato

q	1.2871096	(2000.0)	P	Q
n	0.15298541	Peri. 307.16505	+0.96885465	-0.23468813
a	3.4623373	Node 66.52960	+0.24559706	+0.86988069
e	0.6282541	Incl. 4.94121	+0.03166631	+0.43385374
P	6.44			

From 42 observations 1978 July 30-Nov. 22, mean residual 0″.95.
From CHB 2015.

Comet D/1978 R1 (Haneda-Campos) [Orbit 1]
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 11.19976 TT Sato

q	1.2869111	(2000.0)	P	Q
n	0.15297822	Peri. 307.16575	+0.96886399	-0.23465469
a	3.4624458	Node 66.52689	+0.24556051	+0.86989173
e	0.6283231	Incl. 4.94035	+0.03166402	+0.43384968
P	6.44			

From 51 observations 1978 July 30-Nov. 29, mean residual 1″.10.
From CHB 2015.

Comet P/2008 T1 (Boattini)
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 18.26711 TT Sato

q	3.0630036	(2000.0)	P	Q
n	0.11246420	Peri. 35.80773	+0.84334454	+0.53631613
a	4.2506940	Node 291.72541	-0.50108580	+0.76220136
e	0.2794109	Incl. 2.07832	-0.19412112	+0.36251083
P	8.76			

From 236 observations 2008 Sept. 2-2009 Dec. 11, mean residual 0″.64.

Comet P/2008 J3 (McNaught)
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 22.89288 TT Sato

q	2.3019794	(2000.0)	P	Q
n	0.12769065	Peri. 4.55984	+0.97001735	-0.23182837
a	3.9056799	Node 9.81022	+0.20724331	+0.63222278
e	0.4106073	Incl. 25.35065	+0.12695096	+0.73929017
P	7.72			

From 195 observations 2008 May 10-2010 Mar. 16, mean residual 0″.74.

Comet 315P/LONEOS
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Dec. 6.82860 TT Sato

q	2.4204240	(2000.0)	P	Q
n	0.08780380	Peri. 67.18893	-0.68638489	-0.66768485
a	5.0133403	Node 69.55201	+0.50163443	-0.72163074
e	0.5172033	Incl. 17.91500	+0.52653460	-0.18288252
P	11.23			

From 750 observations 2004 Nov. 3-2015 Dec. 14, mean residual 0″.65.

Comet C/2014 OE4 (PANSTARRS)
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Dec. 10.74441 TT Sato

q	6.2443685	(2000.0)	P	Q
z	+0.0000867	Peri. 65.74251	-0.08369151	+0.50406210
	+/-0.0000024	Node 240.40004	-0.74842243	+0.53774427
e	0.9994589	Incl. 81.34899	+0.65792066	+0.67583467

From 147 observations 2014 May 8-2015 Sept. 10, mean residual 0″.37.

Comet 89P/Russell
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Dec. 14.68847 TT Sato

q	2.2204777	(2000.0)	P	Q
n	0.13567179	Peri. 250.14963	+0.35426150	+0.92483588
a	3.7509649	Node 41.44514	-0.76049048	+0.37109760
e	0.4080249	Incl. 12.07657	-0.54419943	+0.08345756
P	7.26			

From 112 observations 1980 Aug. 9-2009 Oct. 19, mean residual 0″.70.
Nongravitational parameters A1 = +1.17, A2 = -0.0315.

Comet 45P/Honda-Mrkos-Pajdusakova
Epoch 2017 Jan. 7.0 TT = JDT 2457760.5
T 2016 Dec. 31.45440 TT Sato

q	0.5325626	(2000.0)	P	Q
n	0.18732953	Peri. 326.26457	+0.56816787	-0.81957054
a	3.0250453	Node 89.00651	+0.77043265	+0.49813561
e	0.8239489	Incl. 4.24960	+0.28916917	+0.28313432
P	5.26			

From 901 observations 2001 Apr. 4-2012 Apr. 12, mean residual 0″.65.
Nongravitational parameters A1 = +0.55, A2 = +0.0461.

Comet 128P-B/Shoemaker-Holt
Epoch 2017 Jan. 7.0 TT = JDT 2457760.5
T 2017 Jan. 10.78288 TT Sato

q	3.0558712	(2000.0)	P	Q
n	0.10318908	Peri. 210.57830	+0.42549235	-0.90394568
a	4.5017382	Node 214.29248	+0.84492603	+0.41378854
e	0.3211797	Incl. 4.36457	+0.32412384	+0.10798731
P	9.55			

From 495 observations 1987 Sept. 24-2008 Apr. 28, mean residual 0".74.
Nongravitational parameters A1 = -11.58, A2 = -1.4580.

Comet P/2013 YG46 (Spacewatch)
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Jan. 28.82036 TT Sato

q	1.7891486	(2000.0)	P	Q
n	0.16623574	Peri. 242.30843	+0.35594331	+0.92880582
a	3.2758182	Node 48.92767	-0.80201247	+0.36022717
e	0.4538315	Incl. 7.85830	-0.47966693	+0.08692602
P	5.93			

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

Comet P/2003 SQ215 (NEAT-LONEOS)
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 2.33225 TT Sato

q	2.2802644	(2000.0)	P	Q
n	0.07682636	Peri. 137.54318	+0.81823392	-0.56700354
a	5.4801934	Node 257.23605	+0.49787605	+0.78141746
e	0.5839080	Incl. 5.58218	+0.28742424	+0.26056429
P	12.83			

From 48 observations 2003 Sept. 18-2004 Feb. 20, mean residual 0".72.
From CHB 2015.

Comet P/2006 G1 (McNaught)
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 3.19761 TT Sato

q	2.7815581	(2000.0)	P	Q
n	0.08756010	Peri. 308.48516	-0.36165427	+0.89239395
a	5.0226380	Node 298.26022	-0.73118324	-0.45109059
e	0.4461958	Incl. 17.84298	-0.57842654	+0.01226049
P	11.26			

From 126 observations 2006 Apr. 5-Aug. 29, mean residual 0".57.
From CHB 2015.

Comet P/2007 T6 (Catalina)
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 15.44881 TT Sato

q	2.2207802	(2000.0)	P	Q
n	0.10407943	Peri. 335.89935	+0.17134648	-0.91366534
a	4.4760279	Node 102.51391	+0.95410314	+0.06061670
e	0.5038502	Incl. 22.18238	+0.24561672	+0.40192196
P	9.47			

From 285 observations 2007 Oct. 6-2008 June 10, mean residual 0".77.
From CHB 2015.

Comet 188P/LINEAR-Mueller
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 17.06643 TT Sato

q	2.5651445	(2000.0)	P	Q
n	0.10738179	Peri. 26.77222	+0.90053760	-0.43476603
a	4.3837820	Node 358.98124	+0.35902429	+0.74781887
e	0.4148558	Incl. 10.51134	+0.24522150	+0.50174240
P	9.18			

From 867 observations 1998 Sept. 17-2009 Apr. 21, mean residual 0".67.
From CHB 2015.

Comet 219P/LINEAR
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 20.61974 TT Sato
q 2.3652272 (2000.0) P Q
n 0.14118203 Peri. 107.40764 +0.91502058 +0.37228525
a 3.6527204 Node 231.02511 -0.40200843 +0.87354664
e 0.3524752 Incl. 11.52865 +0.03356437 +0.31356013
P 6.98
From 517 observations 2002 June 5-2011 Jan. 9, mean residual 0″.73.

Comet 18D/Perrine-Mrkos [Orbit 2]
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Feb. 26.21747 TT Sato
q 1.6463195 (2000.0) P Q
n 0.12525851 Peri. 157.02101 +0.80515027 -0.53961337
a 3.9560753 Node 237.95410 +0.48902276 +0.83879798
e 0.5838503 Incl. 16.87627 +0.33554402 +0.07235577
P 7.87
From 22 observations 1961-1968, mean residual 2″.39.
From Muraoka's orbit (CHB 2009).

Comet 93P/Lovas
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Mar. 1.45525 TT Sato
q 1.7001610 (2000.0) P Q
n 0.10716605 Peri. 74.89878 +0.57273576 -0.81642976
a 4.3896636 Node 339.62732 +0.64722376 +0.50547197
e 0.6126899 Incl. 12.20461 +0.50306576 +0.27917831
P 9.20
From 2172 observations 1989 July 15-2009 Apr. 2, mean residual 0″.52.
Nongravitational parameters A1 = -0.75, A2 = -0.5265.

Comet 2P/Encke
Epoch 2017 Mar. 28.0 TT = JDT 2457840.5
T 2017 Mar. 9.98015 TT Sato
q 0.3360220 (2000.0) P Q
n 0.29902184 Peri. 186.55671 -0.94514231 -0.31467020
a 2.2147979 Node 334.55917 +0.30821099 -0.77010662
e 0.8482832 Incl. 11.77791 +0.10822194 -0.55490401
P 3.30
From 191 observations 2014 June 26-2015 Nov. 3, mean residual 0″.36.

Comet 176P/LINEAR
Epoch 2017 Mar. 28.0 TT = JDT 2457840.5
T 2017 Mar. 12.14488 TT Sato
q 2.5798033 (2000.0) P Q
n 0.17251310 Peri. 35.35602 +0.93151577 -0.36369958
a 3.1958619 Node 345.97145 +0.33273988 +0.85331615
e 0.1927676 Incl. 0.23452 +0.14684188 +0.37359625
P 5.71
From 559 observations 1999 Aug. 17-2015 Aug. 10, mean residual 0″.46.

Comet 172P/Yeung
Epoch 2017 Mar. 28.0 TT = JDT 2457840.5
T 2017 Mar. 13.11314 TT Sato
q 3.3369361 (2000.0) P Q
n 0.11414285 Peri. 209.12775 -0.50452925 +0.85757886
a 4.2089158 Node 30.88955 -0.74962281 -0.37760339
e 0.2071744 Incl. 11.23718 -0.42838753 -0.34924803
P 8.63
From 390 observations 1993 Oct. 20-2015 Mar. 23, mean residual 0″.56.

Comet 103P/Hartley
Epoch 2017 May 7.0 TT = JDT 2457880.5
T 2017 Apr. 20.50238 TT Sato
q 1.0659809 (2000.0) P Q
n 0.15199433 Peri. 181.30102 +0.75482642 -0.63849331
a 3.4773718 Node 219.72427 +0.60390189 +0.76587212
e 0.6934521 Incl. 13.59384 +0.25600700 +0.07593544
P 6.48
From 6160 observations 1997 May 2-2013 May 14, mean residual 0".60.
Nongravitational parameters A1 = +0.15, A2 = -0.0398.

Comet 73P-C/Schwassmann-Wachmann
Epoch 2017 Mar. 28.0 TT = JDT 2457840.5
T 2017 Mar. 16.77716 TT Sato
q 0.9721770 (2000.0) P Q
n 0.18133876 Peri. 199.38758 -0.02251850 +0.98290717
a 3.0913081 Node 69.66404 -0.88959642 +0.06369749
e 0.6855127 Incl. 11.23685 -0.45619198 -0.17273135
P 5.44
From 2003 observations 1996 Feb. 5-2011 Nov. 26, mean residual 0".81.
Nongravitational parameters A1 = +0.44, A2 = +0.0002.

Comet 41P/Tuttle-Giacobini-Kresak
Epoch 2017 Mar. 28.0 TT = JDT 2457840.5
T 2017 Apr. 12.22659 TT Sato
q 1.0450460 (2000.0) P Q
n 0.18196870 Peri. 62.13144 -0.91185651 +0.39796056
a 3.0841696 Node 141.08225 -0.40985268 -0.86869929
e 0.6611580 Incl. 9.22632 -0.02320546 -0.29493887
P 5.42
From 525 observations 2000 Nov. 17-2006 Aug. 27, mean residual 0".78.
Nongravitational parameters A1 = +1.49, A2 = -0.0445.

Comet P/2016 A3 (PANSTARRS)
Epoch 2017 May 7.0 TT = JDT 2457880.5
T 2017 May 2.72643 TT Sato
q 4.7929184 (2000.0) P Q
n 0.04643324 Peri. 340.19295 -0.97735374 -0.21065177
a 7.6662574 Node 187.73007 +0.20866794 -0.94356406
e 0.3748034 Incl. 8.61014 +0.03517611 -0.25556347
P 21.23
From 25 observations 2016 Jan. 4-12, mean residual 0".28.

Comet 255P/Levy
Epoch 2017 May 7.0 TT = JDT 2457880.5
T 2017 May 3.71039 TT Sato
q 1.0093490 (2000.0) P Q
n 0.18605573 Peri. 179.71462 -0.16395336 -0.93690629
a 3.0388366 Node 279.70747 +0.90444506 -0.01781660
e 0.6678502 Incl. 18.25423 +0.39382538 -0.34912630
P 5.30
From 413 observations 2006 Oct. 2-2012 Feb. 15, mean residual 0".98.

Comet P/2001 F1 = 2016 A4 (NEAT)
Epoch 2017 May 7.0 TT = JDT 2457880.5
T 2017 May 5.29734 TT Sato
q 4.1845088 (2000.0) P Q
n 0.05901055 Peri. 80.51424 -0.93891548 -0.10995560
a 6.5340570 Node 92.65280 -0.01663010 -0.93198291
e 0.3595849 Incl. 19.05402 +0.34374579 -0.34542382
P 16.70
From 140 observations 2001 Feb. 24-2016 Jan. 10, mean residual 0".70.

Comet C/2015 T2 (PANSTARRS)
Epoch 2017 May 7.0 TT = JDT 2457880.5
T 2017 May 20.54172 TT Sato

q	6.9356978	(2000.0)	P	Q
z	+0.0002208	Peri.	30.75424	+0.76555898	+0.05755582
	+/-0.0001608	Node	51.06298	+0.27857961	-0.92743323
e	0.9984684	Incl.	124.53249	+0.57992487	+0.36953341

From 53 observations 2015 Oct. 9-Dec. 16, mean residual 0″.24.

Comet 234P/LINEAR
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 1.68232 TT Sato

q	2.8477837	(2000.0)	P	Q
n	0.13238404	Peri.	358.08955	-0.99927486	-0.03806352
a	3.8128141	Node	179.72347	+0.03704467	-0.97775730
e	0.2531019	Incl.	11.52548	+0.00880080	-0.20625671
P	7.45				

From 167 observations 2001 Dec. 26-2010 July 8, mean residual 0″.76.

Comet 47P/Ashbrook-Jackson
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 10.16488 TT Sato

q	2.8182238	(2000.0)	P	Q
n	0.11757366	Peri.	357.66704	+0.99568519	+0.09202923
a	4.1266348	Node	356.97446	-0.08106995	+0.80028988
e	0.3170649	Incl.	13.03029	-0.04515153	+0.59250885
P	8.38				

From 1419 observations 1948 Oct. 7-2015 June 7, mean residual 0″.84.
Nongravitational parameters A1 = +0.07, A2 = +0.0243.

Comet C/2015 V2 (Johnson)
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 12.31982 TT Sato

q	1.6369048	(2000.0)	P	Q
z	-0.0011243	Peri.	164.89491	-0.49021004	+0.49431660
	+/-0.0000222	Node	69.85123	-0.85776591	-0.12741756
e	1.0018404	Incl.	49.87785	-0.15469893	-0.85989294

From 417 observations 2015 Nov. 3-2016 Jan. 30, mean residual 0″.37.

Comet 227P/Catalina-LINEAR
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 22.17656 TT Sato

q	1.7879217	(2000.0)	P	Q
n	0.14526630	Peri.	90.26083	-0.76177912	-0.64199244
a	3.5839296	Node	49.80030	+0.53994148	-0.70323756
e	0.5011281	Incl.	6.52708	+0.35798851	-0.30545481
P	6.78				

From 119 observations 1997 Jan. 15-2011 May 31, mean residual 0″.66.

Comet P/2000 S1 (Skiff)
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 24.83182 TT Sato

q	2.5360913	(2000.0)	P	Q
n	0.05776139	Peri.	309.09008	+0.89781564	+0.40654709
a	6.6279255	Node	28.15750	-0.20233096	+0.72219408
e	0.6173627	Incl.	21.01823	-0.39113842	+0.55960270
P	17.06				

From 168 observations 2000 Aug. 26-Dec. 22, mean residual 0″.76.

Comet 71P/Clark
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 30.30593 TT Sato
q 1.5863439 (2000.0) P Q
n 0.17733558 Peri. 208.93707 -0.03394763 +0.98938315
a 3.1376569 Node 59.44129 -0.88247105 +0.03669676
e 0.4944177 Incl. 9.44510 -0.46914007 -0.14062122
P 5.56
From 627 observations 2006 Apr. 27-2012 Nov. 10, mean residual 0".81.
Nongravitational parameters A1 = -1.15, A2 = -1.0545.

Comet 18D/Perrine-Mrkos [Orbit 3]
Epoch 2017 July 26.0 TT = JDT 2457960.5
T 2017 July 22.08322 TT Sato
q 1.7568799 (2000.0) P Q
n 0.11828080 Peri. 153.45485 +0.84488686 -0.48697794
a 4.1101710 Node 237.43955 +0.43214002 +0.86526875
e 0.5725531 Incl. 15.22975 +0.31531126 +0.11900623
P 8.33
From 34 observations 1955 Oct. 20-1968 Dec. 26, mean residual 1".76.
Nongravitational parameters A1 = +3.06, A2 = -0.4865.

Comet 30P/Reinmuth
Epoch 2017 Sept. 4.0 TT = JDT 2458000.5
T 2017 Aug. 19.17749 TT Sato
q 1.8767003 (2000.0) P Q
n 0.13467957 Peri. 13.29189 -0.67993671 -0.72291165
a 3.7693653 Node 119.70379 +0.65916969 -0.67596428
e 0.5021177 Incl. 8.12889 +0.32121861 -0.14307702
P 7.32
From 2272 observations 1981 Mar. 12-2011 June 25, mean residual 0".69.
Nongravitational parameters A1 = -2.00, A2 = -1.9605.

Comet C/2014 B1 (Schwartz)
Epoch 2017 Sept. 4.0 TT = JDT 2458000.5
T 2017 Sept. 10.52569 TT Sato
q 9.5566135 (2000.0) P Q
z -0.0004003 Peri. 345.84184 -0.85029299 -0.50400178
+/-0.0000081 Node 161.39548 +0.51719172 -0.85353233
e 1.0038251 Incl. 28.37234 +0.09754256 +0.13215432
From 78 observations 2014 Jan. 28-2016 Jan. 14, mean residual 0".47.

Comet P/2010 H2 (Vales)
Epoch 2017 Sept. 4.0 TT = JDT 2458000.5
T 2017 Sept. 15.86843 TT Sato
q 3.0965370 (2000.0) P Q
n 0.13065115 Peri. 129.52406 -0.94975271 +0.22069691
a 3.8464541 Node 64.26633 -0.30377265 -0.82084709
e 0.1949632 Incl. 14.26389 +0.07544513 -0.52678547
P 7.54
From 1598 observations 2010 Apr. 16-July 14, mean residual 0".47.
From CHB 2015.

Comet 213P/Van Ness
Epoch 2017 Oct. 14.0 TT = JDT 2458040.5
T 2017 Sept. 24.37929 TT Sato
q 1.9833824 (2000.0) P Q
n 0.16089872 Peri. 5.54405 +0.72864379 +0.67139845
a 3.3478628 Node 311.32817 -0.63509729 +0.58841308
e 0.4075676 Incl. 10.37884 -0.25637795 +0.45054874
P 6.13
From 2982 observations 2005 Aug. 4-2012 Feb. 2, mean residual 0".55.
Nongravitational parameters A1 = +0.91, A2 = -2.2531.

Comet 65P/Gunn
Epoch 2017 Oct. 14.0 TT = JDT 2458040.5
T 2017 Oct. 16.81760 TT Sato

q	2.9100609	(2000.0)	P	Q
n	0.12895755	Peri.	213.53897	+0.09061175	+0.98585880
a	3.8800579	Node	62.01988	-0.87503614	+0.14639971
e	0.2499955	Incl.	9.18522	-0.47550106	-0.08154480
P	7.64				

From 2979 observations 1984 Aug. 24-2015 Nov. 17, mean residual 0″.77.
Nongravitational parameters A1 = -2.66, A2 = +3.3785.

Comet 18D/Perrine-Mrkos [Orbit 1]
Epoch 2017 Oct. 14.0 TT = JDT 2458040.5
T 2017 Oct. 21.23154 TT Sato

q	1.7927378	(2000.0)	P	Q
n	0.11460626	Peri.	152.14641	+0.86482030	-0.46347516
a	4.1975624	Node	236.76433	+0.40699929	+0.87231422
e	0.5729098	Incl.	13.34594	+0.29400242	+0.15575199
P	8.60				

From 27 observations 1955 to 1969, mean residual 3″.02.
Nongravitational parameters A1 = +1.15, A2 = -0.4481.
From Muraoka's orbit (CHB 2009).

Comet 183P/Korlevic-Juric
Epoch 2017 Oct. 14.0 TT = JDT 2458040.5
T 2017 Nov. 11.19883 TT Sato

q	3.8723592	(2000.0)	P	Q
n	0.10366183	Peri.	161.24139	-0.97297050	-0.22859661
a	4.4880409	Node	5.84526	+0.14833035	-0.72730998
e	0.1371827	Incl.	18.75308	+0.17699296	-0.64711961
P	9.51				

From 177 observations 1954 Feb. 26-2014 Oct. 22, mean residual 0″.81.

Comet C/2016 A1 (PANSTARRS)
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2017 Dec. 7.74227 TT Sato

q	5.4707100	(2000.0)	P	Q
n	0.00171772	Peri.	9.21943	-0.54825110	+0.49836955
a	69.0506368	Node	128.39033	+0.70228699	-0.16169424
e	0.9207725	Incl.	121.03472	+0.45410761	+0.85175276

From 33 observations 2016 Jan. 1-7, mean residual 0″.21.

Comet C/2015 V1 (PANSTARRS)
Epoch 2018 Jan. 2.0 TT = JDT 2458120.5
T 2017 Dec. 18.05581 TT Sato

q	4.2659701	(2000.0)	P	Q
z	+0.0000909	Peri.	179.67327	+0.95398949	+0.22938176
	+/-0.0000882	Node	197.19929	+0.27359536	-0.40244250
e	0.9996122	Incl.	139.22889	+0.12267693	-0.88624153

From 73 observations 2015 Nov. 2-2016 Jan. 14, mean residual 0″.35.

Comet C/2015 X5 (PANSTARRS)
Epoch 2018 Jan. 2.0 TT = JDT 2458120.5
T 2018 Jan. 1.80325 TT Sato

q	6.8045505	(2000.0)	P	Q
z	+0.0011835	Peri.	27.77233	-0.25226441	+0.66951641
	+/-0.0000177	Node	122.35562	+0.66107206	-0.40800920
e	0.9919469	Incl.	124.20257	+0.70664446	+0.62070627

From 30 observations 2015 Dec. 6-2016 Jan. 12, mean residual 0″.28.

Comet 74P/Smirnova-Chernykh
Epoch 2018 Feb. 11.0 TT = JDT 2458160.5
T 2018 Jan. 26.70335 TT Sato

q	3.5365101	(2000.0)	P	Q
n	0.11626522	Peri. 87.13502	-0.95561685	-0.27210992
a	4.1575374	Node 77.05558	+0.20254074	-0.88514972
e	0.1493738	Incl. 6.65393	+0.21394785	-0.37744691
P	8.48			

From 2809 observations 1976 Mar. 5-2015 Dec. 16, mean residual 0″.66.
Nongravitational parameters Y1 = -1.45, Y2 = +0.2366.

Comet C/2015 O1 (PANSTARRS)
Epoch 2018 Feb. 11.0 TT = JDT 2458160.5
T 2018 Feb. 19.11019 TT Sato

q	3.7301747	(2000.0)	P	Q
z	-0.0000157	Peri. 89.59136	-0.52095536	-0.50153807
	+/-0.0000234	Node 299.85520	-0.59866927	+0.79146992
e	1.0000586	Incl. 127.21316	+0.60844114	+0.34933498

From 110 observations 2015 June 15-Oct. 31, mean residual 0″.46.

Comet P/2006 F1 (Kowalski)
Epoch 2018 Mar. 23.0 TT = JDT 2458200.5
T 2018 Mar. 14.88476 TT Sato

q	4.1082508	(2000.0)	P	Q
n	0.09766923	Peri. 186.14776	+0.64868032	+0.70020306
a	4.6697921	Node 124.74765	-0.68188806	+0.70874252
e	0.1202498	Incl. 21.28038	-0.33799781	-0.08602162
P	10.09			

From 216 observations 2005 May 10-2007 Sept. 1, mean residual 0″.71.
From CHB 2015.

Comet C/2015 XY1 (Lemmon)
Epoch 2018 May 2.0 TT = JDT 2458240.5
T 2018 Apr. 27.09820 TT Sato

q	7.9203482	(2000.0)	P	Q
z	-0.0025596	Peri. 196.33011	+0.04379297	+0.86144086
	+/-0.0011368	Node 281.54783	+0.96462708	+0.09532082
e	1.0202729	Incl. 148.90761	+0.25995534	-0.49883222

From 35 observations 2015 Dec. 4-2016 Jan. 19, mean residual 0″.48.

Comet 143P/Kowal-Mrkos
Epoch 2018 May 2.0 TT = JDT 2458240.5
T 2018 May 7.30201 TT Sato

q	2.5322557	(2000.0)	P	Q
n	0.11065436	Peri. 320.86794	-0.89555505	+0.43868997
a	4.2969178	Node 245.30331	-0.38492062	-0.84768391
e	0.4106809	Incl. 4.69592	-0.22319783	-0.29830036
P	8.91			

From 404 observations 1984 Apr. 23-2015 Oct. 24, mean residual 0″.52.
Nongravitational parameters A1 = +0.01, A2 = +0.0072.

Comet P/2011 CR42 (Catalina)
Epoch 2018 June 11.0 TT = JDT 2458280.5
T 2018 June 22.57823 TT Sato

q	2.5216698	(2000.0)	P	Q
n	0.14989969	Peri. 173.11830	-0.61674849	+0.77704196
a	3.5096911	Node 58.72138	-0.72903995	-0.50359601
e	0.2815123	Incl. 8.46476	-0.29685358	-0.37761998
P	6.58			

From 119 observations 2011 Feb. 10-2013 Oct. 30, mean residual 0″.59.

Comet C/2010 U3 (Boattini)
Epoch 2019 Mar. 18.0 TT = JDT 2458560.5
T 2019 Feb. 26.62978 TT Sato
q 8.4457700 (2000.0) P Q
z +0.0001954 Peri. 88.08489 -0.36202883 -0.74306729
+/-0.0000016 Node 43.06717 +0.07257642 -0.62443080
e 0.9983495 Incl. 55.51166 +0.92933728 -0.24070145
From 444 observations 2010 Oct. 31-2016 Jan. 14, mean residual 0″.67.

Comet 29P/Schwassmann-Wachmann
Epoch 2019 Mar. 18.0 TT = JDT 2458560.5
T 2019 Mar. 7.75168 TT Sato
q 5.7668176 (2000.0) P Q
n 0.06662630 Peri. 47.77406 +0.99270166 -0.00956506
a 6.0261357 Node 312.39469 -0.05135503 +0.86841736
e 0.0430322 Incl. 9.36831 +0.10911500 +0.49574166
P 14.79
From 20247 observations 1902 Mar. 5-2015 Nov. 16, mean residual 0″.67.09

References:

Comet P/2015 X3 (PANSTARRS)
Epoch 2015 Aug. 6.0 TT = JDT 2457240.5
T 2015 Aug. 7.77914 TT Sato
q 2.8218784 (2000.0) P Q
n 0.08752952 Peri. 306.86948 +0.84253207 -0.35786897
a 5.0238079 Node 77.33692 +0.52182986 +0.72758396
e 0.4382989 Incl. 24.36921 -0.13354139 +0.58527889
P 11.26
From 28 observations 2015 Nov. 6-Dec. 10, mean residual 0″.44.

Comet P/2015 X1 (PANSTARRS)
Epoch 2015 Oct. 25.0 TT = JDT 2457320.5
T 2015 Oct. 10.67518 TT Sato
q 2.1035513 (2000.0) P Q
n 0.14254592 Peri. 219.02948 +0.93028096 -0.36089233
a 3.6293835 Node 161.79118 +0.36656805 +0.90747298
e 0.4204109 Incl. 12.16222 +0.01432486 +0.21505703
P 6.91
From 52 observations 2015 Aug. 12-Dec. 8, mean residual 0″.37.

Comet C/2015 T5 (Sheppard-Tholen)
Epoch 2016 Apr. 2.0 TT = JDT 2457480.5
T 2016 Mar. 26.40921 TT Sato
q 9.3071244 (2000.0) P Q
n 0.00641751 Peri. 64.75673 +0.94944538 -0.27882629
a 28.6786350 Node 311.07928 +0.17143557 +0.84544540
e 0.6754684 Incl. 11.03272 +0.26298919 +0.45549750
P 153.58
From 16 observations 2015 Oct. 13-Nov. 17, mean residual 0″.32.

Comet D/1918 W1 (Schorr)
Epoch 2016 May 12.0 TT = JDT 2457520.5
T 2016 May 4.47255 TT Sato
q 2.8710267 (2000.0) P Q
n 0.11530635 Peri. 326.87383 +0.73008234 -0.67369379
a 4.1805546 Node 75.92108 +0.64983531 +0.63259847
e 0.3132426 Incl. 6.78095 +0.21140917 +0.38204168
P 8.55
From 18 observations 1918 Nov. 23-Dec. 31, mean residual 1″.44.
From Muraoka's orbit (CHB 2006).

Comet D/1978 R1 (Haneda-Campos) [Orbit 3]
Epoch 2016 Nov. 28.0 TT = JDT 2457720.5
T 2016 Nov. 11.08140 TT Sato

q	1.2869298	(2000.0)	P	Q
n	0.15297889	Peri. 307.16556	+0.96886312	-0.23465777
a	3.4624357	Node 66.52727	+0.24556393	+0.86989077
e	0.6283166	Incl. 4.94044	+0.03166408	+0.43384995
P	6.44			

From 49 observations 1978 July 30-Nov. 29, mean residual 1″.07.
From Muraoka's orbit (CHB 2004).

Comet D/1952 B1 (Harrington-Wilson)
Epoch 2017 Feb. 16.0 TT = JDT 2457800.5
T 2017 Mar. 1.92038 TT Sato

q	1.2775678	(2000.0)	P	Q
n	0.17649905	Peri. 0.92728	-0.48943027	-0.84417996
a	3.1475633	Node 118.40523	+0.79847442	-0.53462922
e	0.5941089	Incl. 14.39495	+0.35056612	+0.03913820
P	5.58			

From 7 observations 1952 Jan. 30-Feb. 25, mean residual 0″.49.

Comet P/1999 XN120 (Catalina)
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 12.51782 TT Sato

q	3.2972310	(2000.0)	P	Q
n	0.11524014	Peri. 162.03508	+0.04547400	-0.99538095
a	4.1821556	Node 285.29287	+0.90544300	+0.07682547
e	0.2115953	Incl. 5.02871	+0.42202499	-0.05757274
P	8.55			

From 71 observations 1999 Nov. 3-2000 Mar. 30, mean residual 0″.62.
From CHB 2015.

Comert D/1894 F1 (Denning) [Orbit 2]
Epoch 2017 June 16.0 TT = JDT 2457920.5
T 2017 June 26.03781 TT Sato

q	1.6166561	(2000.0)	P	Q
n	0.10271599	Peri. 102.66382	-0.62952973	-0.77674993
a	4.5155504	Node 26.38012	+0.69547485	-0.57409463
e	0.6419803	Incl. 2.41960	+0.34642034	-0.25898824
P	9.60			

From 142 observations 1894 Mar. 27-June 5, mean residual 2″.72.
From Muraoka's orbit (CHB 2006).

Comet P/2010 P4 (WISE)
Epoch 2017 Sept. 4.0 TT = JDT 2458000.5
T 2017 Aug. 18.34103 TT Sato

q	1.8607315	(2000.0)	P	Q
n	0.13816727	Peri. 354.15556	+0.99766950	+0.06635310
a	3.7056631	Node 2.23359	-0.03313391	+0.67485725
e	0.4978681	Incl. 24.07862	-0.05964659	+0.73495915
P	7.13			

From 61 observations 2010 Aug. 6-2011 Jan. 2, mean residual 0″.58.
From CHB 2015.

Comet P/2004 T1 (LINEAR-NEAT)
Epoch 2017 Oct. 14.0 TT = JDT 2458040.5
T 2017 Oct. 13.26078 TT Sato

q	1.7159662	(2000.0)	P	Q
n	0.15202516	Peri. 336.34483	+0.87874792	-0.45320714
a	3.4769017	Node 51.45919	+0.46274066	+0.73215206
e	0.5064669	Incl. 11.03285	+0.11693233	+0.50848466
P	6.48			

From 455 observations 2004 July 16-2005 Mar. 7, mean residual 0″.66.
From CHB 2015.

Comet P/2010 D1 (WISE)
Epoch 2018 Jan. 2.0 TT = JDT 2458120.5
T 2017 Dec. 18.88891 TT Sato

q	2.6896035	(2000.0)	P	Q
n	0.11590298	Peri. 226.13847	+0.88809412	-0.45636032
a	4.1661955	Node 160.80754	+0.45493089	+0.85552136
e	0.3544222	Incl. 9.62967	+0.06577784	+0.24457812
P	8.50			

From 16 observations 2009 Nov. 9-2010 Feb. 20, mean residual 0″.57.
From CHB 2015.

Comet P/2009 S2 (McNaught)
Epoch 2018 Jan. 2.0 TT = JDT 2458120.5
T 2017 Dec. 20.99894 TT Sato

q	2.2140042	(2000.0)	P	Q
n	0.11570575	Peri. 230.39337	+0.91111469	+0.07431251
a	4.1709286	Node 121.57366	-0.02697091	+0.99225290
e	0.4691819	Incl. 28.41389	-0.41126948	+0.09955822
P	8.52			

From 71 observations 2008 May 30-2010 Jan. 26, mean residual 0″.61.
From CHB 2015.

Comet P/1998 VS24 (LINEAR)
Epoch 2018 Jan. 2.0 TT = JDT 2458120.5
T 2018 Jan. 19.18926 TT Sato

q	3.4386887	(2000.0)	P	Q
n	0.10207450	Peri. 244.94979	+0.71806205	-0.69527502
a	4.5344492	Node 159.05304	+0.66593646	+0.67330157
e	0.2416524	Incl. 5.02236	+0.20227587	+0.25151070
P	9.66			

From 47 observations 1998 Oct. 14-1999 Jan. 14, mean residual 0″.66.
From CHB 2015.

Comet P/2010 J5 (McNaught)
Epoch 2018 Feb. 11.0 TT = JDT 2458160.5
T 2018 Jan. 29.26033 TT Sato

q	3.7508630	(2000.0)	P	Q
n	0.11767789	Peri. 146.68855	-0.84197859	+0.52675272
a	4.1241976	Node 65.52147	-0.51875746	-0.73106099
e	0.0905230	Incl. 7.36290	-0.14819833	-0.43368352
P	8.38			

From 112 observations 2005 Nov. 1-2011 Aug. 26, mean residual 0″.58.
From CHB 2015.

Comet P/2011 VJ5 (Lemmon)
Epoch 2018 Mar. 23.0 TT = JDT 2458200.5
T 2018 Mar. 22.31012 TT Sato

q	1.5078430	(2000.0)	P	Q
n	0.15695936	Peri. 315.28069	-0.57669645	-0.81686835
a	3.4036475	Node 169.91705	+0.76761113	-0.54688718
e	0.5569920	Incl. 3.97529	+0.27963255	-0.18341351
P	6.28			

From 60 observations 2011 Nov. 3-2012 Mar. 30, mean residual 0″.78.

Comet P/2012 T1 (PANSTARRS)
Epoch 2018 Mar. 23.0 TT = JDT 2458200.5
T 2018 Apr. 11.72180 TT Sato

q	2.4020153	(2000.0)	P	Q
n	0.17624668	Peri. 299.89300	+0.88567661	-0.42308647
a	3.1505672	Node 85.72135	+0.46387615	+0.78866321
e	0.2375927	Incl. 11.05667	+0.01989613	+0.44610333
P	5.59			

From 165 observations 2012 Oct. 6-2013 Jan. 15, mean residual 0″.45.

Comet P/2008 T4 (Hill)
Epoch 2018 June 11.0 TT = JDT 2458280.5
T 2018 May 29.66538 TT Sato

q	2.5265382	(2000.0)	P	Q
n	0.10440508	Peri.	1.53794	+0.69292570	-0.71686734
a	4.4667155	Node	44.60897	+0.66033414	+0.58799318
e	0.4343633	Incl.	6.30881	+0.28950440	+0.37465348
P	9.44				

From 263 observations 2008 Sept. 28-2009 Feb. 27, mean residual 0″.59.
From CHB 2015.

Comet P/2001 T3 (NEAT)
Epoch 2018 June 11.0 TT = JDT 2458280.5
T 2018 June 10.93847 TT Sato

q	2.4853449	(2000.0)	P	Q
n	0.06021593	Peri.	356.78276	+0.61378810	-0.74091424
a	6.4465659	Node	55.16332	+0.73153767	+0.40393408
e	0.6144699	Incl.	19.39753	+0.29684474	+0.53654762
P	16.37				

From 146 observations 2001 Aug. 20-2002 Feb. 7, mean residual 0″.61.
From CHB 2015.

Comet P/2002 EJ57 (LINEAR)
Epoch 2018 June 11.0 TT = JDT 2458280.5
T 2018 June 18.53987 TT Sato

q	2.6272068	(2000.0)	P	Q
n	0.06000514	Peri.	167.02122	-0.73714449	-0.67437782
a	6.4616551	Node	330.43210	+0.61196693	-0.63937524
e	0.5934158	Incl.	4.97681	+0.28655625	-0.36934247
P	16.43				

From 57 observations 2002 Feb. 16-May 12, mean residual 0″.59.
From CHB 2015.

Comet P/2007 T2 (Kowalski)
Epoch 2018 July 21.0 TT = JDT 2458320.5
T 2018 July 21.73472 TT Sato

q	0.6565317	(2000.0)	P	Q
n	0.18520874	Peri.	359.62719	+0.99859181	-0.05208930
a	3.0480943	Node	3.40781	+0.04910058	+0.83571274
e	0.7846091	Incl.	9.73871	+0.02008807	+0.54669088
P	5.32				

From 114 observations 2007 Oct. 9-2008 Jan. 18, mean residual 0″.77.

Comet P/2005 JN (Spacewatch)
Epoch 2018 July 21.0 TT = JDT 2458320.5
T 2018 July 23.42123 TT Sato

q	2.2770971	(2000.0)	P	Q
n	0.15052055	Peri.	153.41719	-0.71208789	+0.68687378
a	3.5000334	Node	70.76507	-0.66845360	-0.59995394
e	0.3494070	Incl.	8.85737	-0.21471055	-0.41019468
P	6.55				

From 27 observations 2005 Apr. 4-May 25, mean residual 0″.60.

Comet 21P/Giacobini-Zinner
Epoch 2018 Aug. 30.0 TT = JDT 2458360.5
T 2018 Sept. 10.50718 TT Sato

q	1.0127723	(2000.0)	P	Q
n	0.15064123	Peri.	172.86304	+0.98462546	-0.10358317
a	3.4981638	Node	195.39313	+0.12225970	+0.98376452
e	0.7104846	Incl.	31.99767	+0.12476082	-0.14655340
P	6.54				

From 773 observations 2005 Mar. 5-2013 Apr. 1, mean residual 0″.73.
Nongravitational parameters A1 = +0.52, A2 = +0.1568.

Comet P/2005 R1 (NEAT)
Epoch 2018 Aug. 30.0 TT = JDT 2458360.5
T 2018 Sept. 14.32838 TT Sato
q 2.0677858 (2000.0) P Q
n 0.07589049 Peri. 118.80130 +0.92631227 -0.27159090
a 5.5251553 Node 257.97849 +0.17788997 +0.92623813
e 0.6257506 Incl. 15.48437 +0.33211554 +0.26138346
P 12.99
From 355 observations 2005 July 5-2006 Jan. 28, mean residual 0″.59.
From CHB 2015.

Comet P/2011 V1 (Boattini)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Sept. 30.85318 TT Sato
q 1.7319793 (2000.0) P Q
n 0.13045836 Peri. 269.24626 +0.71375370 +0.69410605
a 3.8502426 Node 46.79139 -0.58058416 +0.66114094
e 0.5501636 Incl. 7.38309 -0.39176229 +0.28479721
P 7.55
From 25 observations 2011 Oct. 22-Nov. 20, mean residual 0″.40.

Comet 3D/Biela [Orbit 2]
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 3.61567 TT Sato
q 0.8078392 (2000.0) P Q
n 0.14926486 Peri. 274.44599 -0.31062480 -0.94996314
a 3.5196353 Node 193.78805 +0.91764959 -0.29067469
e 0.7704764 Incl. 7.93410 +0.24785373 -0.11436020
P 6.60
From 19 observations 1846-1852, mean residual 3″.41.
From Muraoka's orbit (CHB 2004).

Comet P/2001 R6 (LINEAR-Skiff)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 4.24891 TT Sato
q 2.1910765 (2000.0) P Q
n 0.11529116 Peri. 308.47544 +0.92918791 -0.24624704
a 4.1809218 Node 67.33511 +0.35562777 +0.79880548
e 0.4759346 Incl. 17.37940 -0.10069117 +0.54888269
P 8.55
From 99 observations 2001 Aug. 19-2002 Feb. 1, mean residual 0″.69.
From CHB 2015.

Comet D/1886 K1 (Brooks)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 12.0348 TT Sato
q 1.880668 (2000.0) P Q
n 0.1474341 Peri. 208.4584 -0.3856237 +0.9148314
a 3.548712 Node 39.1984 -0.8064845 -0.2710814
e 0.470042 Incl. 10.9368 -0.4481932 -0.2993300
P 6.69
From 39 observations 1886 May 25-July 3, mean residual 5″.0.
From Buckley's orbit (1979).

Comet P/2005 J1 (McNaught)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 12.55253 TT Sato
q 1.5334417 (2000.0) P Q
n 0.14616381 Peri. 338.92433 -0.32526988 +0.78557929
a 3.5692433 Node 268.79575 -0.77471511 -0.54056597
e 0.5703735 Incl. 31.76831 -0.54223243 +0.30108738
P 6.74
From 94 observations 2005 May 3-Aug. 7, mean residual 0″.57.

Comet P/2010 A1 (Hill)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 14.26134 TT Sato

q	1.9574079	(2000.0)	P	Q
n	0.10715595	Peri. 13.29608	+0.49345816	-0.85976500
a	4.3899394	Node 47.31539	+0.78073394	+0.37119257
e	0.5541151	Incl. 10.30829	+0.38334522	+0.35074239
P	9.20			

From 159 observations 2010 Jan. 6-Mar. 17, mean residual 0″.70.
From CHB 2015.

Comet P/2008 O2 (McNaught)
Epoch 2018 Oct. 9.0 TT = JDT 2458400.5
T 2018 Oct. 19.88832 TT Sato

q	3.8151751	(2000.0)	P	Q
n	0.10332246	Peri. 26.94344	+0.98858995	+0.11867184
a	4.4978630	Node 325.84392	-0.14970294	+0.84232440
e	0.1517805	Incl. 9.51113	+0.01670140	+0.52574385
P	9.54			

From 405 observations 2008 July 28-2009 Dec. 9, mean residual 0″.64
From CHB 2015.

Comet P/2006 D1 (Hill)
Epoch 2018 Dec. 28.0 TT = JDT 2458480.5
T 2018 Dec. 21.44783 TT Sato

q	1.8951424	(2000.0)	P	Q
n	0.07511958	Peri. 119.42596	-0.49077703	-0.87128518
a	5.5628917	Node 359.96407	+0.65957887	-0.37138685
e	0.6593242	Incl. 17.36471	+0.56929221	-0.32083319
P	13.12			

From 80 observations 2005 Dec. 5-2006 Apr. 7, mean residual 0″.55.
From CHB 2015.

Comet P/2007 V1 (Larson)
Epoch 2018 Dec. 28.0 TT = JDT 2458480.5
T 2019 Jan. 12.10062 TT Sato

q	2.6767413	(2000.0)	P	Q
n	0.08871963	Peri. 51.60586	+0.50882626	-0.86048347
a	4.9787798	Node 7.93494	+0.72014879	+0.40906041
e	0.4623700	Incl. 10.75813	+0.47167950	+0.30370672
P	11.11			

From 185 observations 2007 Sept. 10-2008 Mar. 3, mean residual 0″.63.
From CHB 2015.

Comet P/1996 R2 (Lagerkvist)
Epoch 2019 Feb. 6.0 TT = JDT 2458520.5
T 2019 Feb. 11.44969 TT Sato

q	2.5902784	(2000.0)	P	Q
n	0.13448738	Peri. 333.28687	+0.97272894	-0.23009950
a	3.7729556	Node 40.05092	+0.22009482	+0.87596443
e	0.3134617	Incl. 2.60090	+0.07318931	+0.42395817
P	7.33			

From 125 observations 1996 Aug. 12-1997 Jan. 12, mean residual 0″.62.

Comet P/2012 O1 (McNaught)
Epoch 2019 Feb. 26.0 TT = JDT 2458540.5
T 2019 Mar. 2.47325 TT Sato

q	1.4352593	(2000.0)	P	Q
n	0.14811417	Peri. 238.17877	+0.86034754	+0.49304164
a	3.5378411	Node 91.98856	-0.41292590	+0.82288805
e	0.5943121	Incl. 7.43221	-0.29882154	+0.28242733
P	6.65			

From 94 observations 2012 July 18-Nov. 18, mean residual 0″.59.

Comet P/2011 W2 (Rinner)
Epoch 2019 Apr. 7.0 TT = JDT 2458580.5
T 2019 Apr. 9.58041 TT Sato

q	2.3134907	(2000.0)	P	Q
n	0.13262436	Peri. 221.20354	-0.04029394	-0.98147534
a	3.8082068	Node 231.95960	+0.96771542	+0.00834458
e	0.3924987	Incl. 13.75806	+0.24880366	-0.19140668
P	7.43			

From 624 observations 2011 Nov. 28-2012 Mar. 24, mean residual 0″.61.

Comet P/2007 T4 (Gibbs)
Epoch 2019 July 16.0 TT = JDT 2458680.5
T 2019 July 23.65264 TT Sato

q	2.0050243	(2000.0)	P	Q
n	0.08193580	Peri. 42.42394	+0.21727170	-0.94518569
a	5.2499310	Node 37.05887	+0.75131903	+0.00251523
e	0.6180856	Incl. 23.85877	+0.62314743	+0.32652363
P	12.03			

From 64 observations 2007 Oct. 12-2008 Apr. 25, mean residual 0″.70.
From CHB 2015.

Comet P/2008 Y1 (Boattini)
Epoch 2019 Aug. 25.0 TT = JDT 2458720.5
T 2019 Sept. 10.64729 TT Sato

q	1.2678134	(2000.0)	P	Q
n	0.09354592	Peri. 162.80752	+0.46373943	-0.87277377
a	4.8060265	Node 259.33646	+0.79354713	+0.48564624
e	0.7362034	Incl. 8.91860	+0.39399073	+0.04912916
P	10.54			

From 160 observations 2008 Dec. 22-2009 Apr. 13, mean residual 0″.63.
From CHB 2015.

Comet P/2010 U2 (Hill)
Epoch 2019 Sept. 14.0 TT = JDT 2458740.5
T 2019 Sept. 15.25031 TT Sato

q	2.5676541	(2000.0)	P	Q
n	0.11104358	Peri. 44.32897	+0.74846972	-0.66300513
a	4.2868709	Node 357.08124	+0.49898697	+0.57767092
e	0.4010424	Incl. 16.82682	+0.43681241	+0.47615177
P	8.88			

From 271 observations 2010 Oct. 1-2011 Mar. 7, mean residual 0″.62.

Comet P/2000 S4 (LINEAR-Spacewatch)
Epoch 2019 Oct. 4.0 TT = JDT 2458760.5
T 2019 Sept. 23.39159 TT Sato

q	2.2654184	(2000.0)	P	Q
n	0.05199774	Peri. 173.08431	+0.97546992	+0.21406094
a	7.1090747	Node 173.79822	-0.21778760	+0.97241450
e	0.6813343	Incl. 28.37800	-0.03204672	-0.09267126
P	18.95			

From 35 observations 2000 Sept. 1-Nov. 21, mean residual 0″.67.
From CHB 2015.

Comet P/2005 GF8 (LONEOS)
Epoch 2019 Oct. 4.0 TT = JDT 2458760.5
T 2019 Sept. 30.71597 TT Sato

q	2.8308946	(2000.0)	P	Q
n	0.06941511	Peri. 285.40276	-0.49545468	+0.86850867
a	5.8636320	Node 314.88775	-0.78876352	-0.45694213
e	0.5172114	Incl. 1.19232	-0.36383619	-0.19208481
P	14.20			

From 214 observations 2005 Apr. 2-Sept. 15, mean residual 0″.61.
From CHB 2015.

Comet P/2009 SK280 (Spacewatch-Hill)
Epoch 2019 Oct. 4.0 TT = JDT 2458760.5
T 2019 Oct. 23.96850 TT Sato
q 4.2087510 (2000.0) P Q
n 0.09426334 Peri. 327.96216 +0.98363892 -0.05490616
a 4.7816102 Node 36.41850 +0.14777834 +0.79064032
e 0.1198047 Incl. 16.79881 -0.10303414 +0.60981407
P 10.46
From 88 observations 2009 Sept. 17-2011 Dec. 23, mean residual 0″.52.
From CHB 2015.

Comet P/2003 F2 (NEAT)
Epoch 2019 Nov. 13.0 TT = JDT 2458800.5
T 2019 Nov. 11.96905 TT Sato
q 2.9699870 (2000.0) P Q
n 0.05969567 Peri. 191.82454 -0.98184012 +0.18968342
a 6.4839673 Node 359.09124 -0.15349811 -0.80419643
e 0.5419491 Incl. 11.60601 -0.11148234 -0.56328350
P 16.51
From 74 observations 2003 Mar. 27-May 28, mean residual 0″.64.
From CHB 2015.

Comet P/2006 H1 (McNaught)
Epoch 2019 Dec. 23.0 TT = JDT 2458840.5
T 2019 Dec. 7.45448 TT Sato
q 2.4226579 (2000.0) P Q
n 0.07103453 Peri. 309.27800 +0.63169207 +0.77521930
a 5.7741721 Node 359.89445 -0.62537704 +0.50928087
e 0.5804320 Incl. 12.80409 -0.45811426 +0.37372187
P 13.88
From 213 observations 2006 Apr. 29-Nov. 26, mean residual 0″.58.
From CHB 2015.

Comet P/2006 R1 (Siding Spring)
Epoch 2019 Dec. 23.0 TT = JDT 2458840.5
T 2019 Dec. 22.35278 TT Sato
q 1.6632690 (2000.0) P Q
n 0.07392988 Peri. 249.29568 +0.82684676 -0.52021803
a 5.6224126 Node 218.83557 -0.29822177 -0.72777829
e 0.7041717 Incl. 160.06868 -0.47685240 -0.44689144
P 13.33
From 52 observations 2006 Sept. 1-26, mean residual 0″.47.

Comet P/2006 W1 (Gibbs)
Epoch 2020 Mar. 12.0 TT = JDT 2458920.5
T 2020 Mar. 31.77114 TT Sato
q 1.6993566 (2000.0) P Q
n 0.07049605 Peri. 232.38153 +0.88976687 -0.43170762
a 5.8035385 Node 152.25973 +0.44936146 +0.88543339
e 0.7071861 Incl. 18.55703 -0.07993241 +0.17215181
P 13.98
From 105 observations 2006 Nov. 16-2007 Feb. 17, mean residual 0″.68.

Comet P/2004 WR9 (LINEAR)
Epoch 2020 Mar. 12.0 TT = JDT 2458920.5
T 2020 Apr. 1.65490 TT Sato
q 1.9502588 (2000.0) P Q
n 0.06460706 Peri. 71.99982 -0.11844256 -0.99230220
a 6.1510517 Node 24.88784 +0.87542601 -0.12154070
e 0.6829390 Incl. 4.92937 +0.46861569 -0.02375276
P 15.26
From 139 observations 2004 Dec. 15-2005 Mar. 30, mean residual 0″.57.

Comet P/2003 L1 (Scotti)
Epoch 2020 July 10.0 TT = JDT 2459040.5
T 2020 July 11.46743 TT Sato
q 5.0165609 (2000.0) P Q
n 0.05666188 Peri. 355.00090 -0.75324022 +0.64798108
a 6.7133931 Node 226.05959 -0.59790399 -0.74608926
e 0.2527533 Incl. 9.02191 -0.27411673 -0.15320360
P 17.39
From 69 observations 2002 Apr. 5-2003 June 20, mean residual 0″.43.

Comet P/2007 VQ11 (Catalina)
Epoch 2020 Sept. 28.0 TT = JDT 2459120.5
T 2020 Sept. 18.07816 TT Sato
q 2.6953448 (2000.0) P Q
n 0.07796326 Peri. 277.67753 +0.14156877 -0.98814025
a 5.4267863 Node 163.81547 +0.97139211 +0.12709511
e 0.5033258 Incl. 12.32007 +0.19067160 +0.08617235
P 12.64
From 71 observations 2007 Nov. 3-2008 Mar. 27, mean residual 0″.71.

Comet P/2005 Y2 (McNaught)
Epoch 2020 Nov. 7.0 TT = JDT 2459160.5
T 2020 Oct. 20.83639 TT Sato
q 3.3808651 (2000.0) P Q
n 0.06112710 Peri. 194.04843 +0.30500496 +0.89476247
a 6.3823438 Node 94.51305 -0.83913164 +0.41444584
e 0.4702784 Incl. 19.09660 -0.45036659 -0.16623710
P 16.12
From 153 observations 2003 May 30-2009 Dec. 11, mean residual 0″.69.

Comet P/2007 Q2 (Gilmore)
Epoch 2020 Dec. 17.0 TT = JDT 2459200.5
T 2020 Nov. 27.38903 TT Sato
q 1.8646520 (2000.0) P Q
n 0.07329011 Peri. 162.77511 +0.90646767 +0.42158340
a 5.6550849 Node 172.16005 -0.40529390 +0.88465274
e 0.6702699 Incl. 10.20270 -0.11854624 +0.19914057
P 13.45
From 145 observations 2007 Aug. 22-Oct. 15, mean residual 0″.51.

Comet P/2007 B1 (Christensen)
Epoch 2021 Jan. 26.0 TT = JDT 2459240.5
T 2021 Jan. 25.51837 TT Sato
q 2.4388379 (2000.0) P Q
n 0.07020483 Peri. 46.74346 -0.54857970 -0.80945623
a 5.8195767 Node 77.66671 +0.69152748 -0.58002461
e 0.5809252 Incl. 12.37614 +0.46994686 -0.09138969
P 14.04
From 118 observations 2007 Jan. 17-Mar. 23, mean residual 0″.57.

Comet P/2005 XA54 (LONEOS-Hill)
Epoch 2021 Jan. 26.0 TT = JDT 2459240.5
T 2021 Jan. 29.30599 TT Sato
q 1.7540827 (2000.0) P Q
n 0.06620667 Peri. 15.13690 -0.92552013 -0.33615922
a 6.0515720 Node 143.67104 +0.30964198 -0.93685090
e 0.7101443 Incl. 17.11898 +0.21802368 -0.09647468
P 14.89
From 577 observations 2005 Dec. 4-2006 June 10, mean residual 0″.53.

Comet P/2009 U4 (McNaught)
Epoch 2021 Jan. 26.0 TT = JDT 2459240.5
T 2021 Feb. 1.10972 TT Sato
q 1.6465651 (2000.0) P Q
n 0.08598023 Peri. 259.83839 +0.69698186 +0.70248234
a 5.0839778 Node 55.35445 -0.57011354 +0.66464150
e 0.6761266 Incl. 10.08051 -0.43495614 +0.25449997
P 11.46
From 84 observations 2009 Oct. 11-2010 Jan. 16, mean residual 0″.59.

Comet P/2008 CL94 (Lemmon)
Epoch 2021 Sept. 23.0 TT = JDT 2459480.5
T 2021 Sept. 19.33891 TT Sato
q 5.4205365 (2000.0) P Q
n 0.06441096 Peri. 80.37878 -0.39608203 -0.91474773
a 6.1635300 Node 33.31304 +0.77522222 -0.37966757
e 0.1205467 Incl. 8.34637 +0.49208692 -0.13816339
P 15.30
From 63 observations 2008 Feb. 8-2009 June 13, mean residual 0″.52.

Comet P/2005 W3 (Kowalski)
Epoch 2021 Sept. 23.0 TT = JDT 2459480.5
T 2021 Sept. 21.40556 TT Sato
q 2.8898628 (2000.0) P Q
n 0.06189617 Peri. 200.73504 +0.63902991 -0.75602009
a 6.3293658 Node 210.08245 +0.73952005 +0.65453392
e 0.5434199 Incl. 16.41927 +0.21154401 -0.00435612
P 15.92
From 116 observations 2005 Sept. 30-2006 Mar. 24, mean residual 0″.72.

Comet P/2007 R4 (Garradd)
Epoch 2021 Dec. 12.0 TT = JDT 2459560.5
T 2021 Dec. 8.69919 TT Sato
q 1.9575922 (2000.0) P Q
n 0.06821439 Peri. 282.59008 +0.92544406 -0.15652557
a 5.9322400 Node 87.19361 +0.29271574 +0.87358294
e 0.6700079 Incl. 20.20957 -0.24056348 +0.46081732
P 14.45
From 87 observations 2007 Aug. 12-Dec. 29, mean residual 0″.69.

Comet P/2002 T5 (LINEAR)
Epoch 2021 Dec. 12.0 TT = JDT 2459560.5
T 2021 Dec. 15.36863 TT Sato
q 3.9379132 (2000.0) P Q
n 0.05303748 Peri. 326.73362 -0.06197520 -0.90087227
a 7.0158584 Node 123.09144 +0.99049019 -0.10849169
e 0.4387126 Incl. 30.85158 +0.12283428 +0.42030787
P 18.58
From 1004 observations 2002 Oct. 5-2005 Apr. 5, mean residual 0″.63.

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).

Comet 95P/(2060) Chiron

Epoch = 2016 July 31.0 TT
T = 1996 Feb. 26.31052 TT
Peri. = 339.53731 e = 0.3827273
Node = 209.21581 2000.0 a = 13.6394653 AU
Incl. = 6.94720 n = 0.01956627
q = 8.4192696 AU P = 50.37 years

H = 5.8 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	23 06.61	-01 02.9	18.638	18.254	+0.14	+0.6	18.8	65.6
Jan. 13	23 08.00	-00 56.9	18.795	18.260	+0.17	+0.8	18.8	55.8
Jan. 23	23 09.66	-00 49.0	18.935	18.266	+0.19	+1.0	18.7	46.1
Feb. 2	23 11.52	-00 39.5	19.055	18.272	+0.20	+1.1	18.7	36.5
Feb. 12	23 13.55	-00 28.4	19.153	18.278	+0.22	+1.2	18.7	27.0
Feb. 22	23 15.71	-00 16.2	19.225	18.285	+0.22	+1.3	18.7	17.6
Mar. 3	23 17.93	-00 03.1	19.270	18.291	+0.23	+1.4	18.6	8.7
Mar. 13	23 20.19	+00 10.6	19.287	18.297	+0.22	+1.4	18.6	4.4
Mar. 23	23 22.43	+00 24.5	19.277	18.303	+0.22	+1.4	18.7	11.8
Apr. 2	23 24.59	+00 38.5	19.240	18.309	+0.21	+1.4	18.7	20.7
Apr. 12	23 26.65	+00 52.1	19.177	18.314	+0.19	+1.3	18.7	29.9
Apr. 22	23 28.56	+01 05.1	19.090	18.320	+0.17	+1.2	18.8	39.0
May 2	23 30.27	+01 17.2	18.982	18.326	+0.15	+1.1	18.8	48.2
May 12	23 31.76	+01 28.1	18.855	18.332	+0.12	+0.9	18.8	57.5
May 22	23 32.99	+01 37.6	18.714	18.338	+0.09	+0.8	18.8	66.7
June 1	23 33.94	+01 45.4	18.562	18.344	+0.06	+0.6	18.8	76.0
June 11	23 34.58	+01 51.4	18.403	18.349	+0.03	+0.4	18.8	85.4
June 21	23 34.90	+01 55.4	18.242	18.355	0.00	+0.2	18.7	94.8
July 1	23 34.90	+01 57.2	18.083	18.361	-0.03	0.0	18.7	104.3
July 11	23 34.57	+01 57.0	17.931	18.366	-0.06	-0.2	18.7	113.9
July 21	23 33.94	+01 54.5	17.791	18.372	-0.09	-0.5	18.7	123.6
July 31	23 33.01	+01 50.0	17.666	18.378	-0.12	-0.6	18.6	133.3
Aug. 10	23 31.84	+01 43.5	17.562	18.383	-0.14	-0.8	18.6	143.1
Aug. 20	23 30.45	+01 35.3	17.481	18.389	-0.15	-1.0	18.5	153.0
Aug. 30	23 28.91	+01 25.7	17.427	18.394	-0.16	-1.1	18.5	162.8
Sept. 9	23 27.27	+01 15.0	17.401	18.399	-0.17	-1.1	18.4	172.2
Sept.19	23 25.61	+01 03.6	17.405	18.405	-0.16	-1.2	18.4	174.2
Sept.29	23 23.98	+00 52.0	17.439	18.410	-0.15	-1.1	18.5	165.4
Oct. 9	23 22.46	+00 40.5	17.503	18.416	-0.14	-1.1	18.5	155.4
Oct. 19	23 21.10	+00 29.8	17.594	18.421	-0.11	-1.0	18.6	145.2
Oct. 29	23 19.98	+00 20.2	17.710	18.426	-0.09	-0.8	18.6	135.0
Nov. 8	23 19.12	+00 12.0	17.848	18.431	-0.05	-0.6	18.7	124.8
Nov. 18	23 18.58	+00 05.5	18.003	18.437	-0.02	-0.4	18.7	114.6
Nov. 28	23 18.36	+00 01.1	18.171	18.442	+0.01	-0.2	18.7	104.5
Dec. 8	23 18.50	-00 01.2	18.346	18.447	+0.05	0.0	18.8	94.3
Dec. 18	23 18.97	-00 01.3	18.524	18.452	+0.08	+0.2	18.8	84.3
Dec. 28	23 19.78	+00 00.8	18.698	18.457	+0.11	+0.4	18.8	74.4
Jan. 7	23 20.90	+00 05.2	18.865	18.462	+0.14	+0.6	18.8	64.5
Jan. 17	23 22.30	+00 11.5	19.019	18.467	+0.16	+0.8	18.8	54.7
Jan. 27	23 23.94	+00 19.7	19.156	18.472	+0.19	+1.0	18.8	45.0
Feb. 6	23 25.79	+00 29.5	19.272	18.477	+0.20	+1.1	18.8	35.4
Feb. 16	23 27.81	+00 40.7	19.366	18.482	+0.21	+1.2	18.8	25.9
Feb. 26	23 29.94	+00 53.1	19.434	18.487	+0.22	+1.3	18.7	16.5
Mar. 8	23 32.14	+01 06.2	19.475	18.492	+0.22	+1.4	18.7	7.7
Mar. 18	23 34.37	+01 19.9	19.489	18.497	+0.22	+1.4	18.6	4.6
Mar. 28	23 36.57	+01 33.8	19.474	18.502	+0.21	+1.4	18.7	12.6

Comet C/2009 F4 (McNaught)

Epoch = 2016 July 31.0 TT
T = 2011 Dec. 31.64384 TT
Peri. = 260.38373
Node = 53.55831 2000.0
Incl. = 79.42454
q = 5.4545731 AU
e = 0.9991669

m1 = 3.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 11.45	+09 22.2	10.650	11.254	−0.20	+1.5	18.6	125.8
Jan. 13	03 09.45	+09 37.3	10.849	11.306	−0.14	+1.7	18.7	115.4
Jan. 23	03 08.07	+09 54.6	11.062	11.358	−0.08	+1.9	18.8	105.1
Feb. 2	03 07.31	+10 14.1	11.283	11.410	−0.01	+2.1	18.8	94.9
Feb. 12	03 07.17	+10 35.3	11.507	11.462	+0.04	+2.3	18.9	84.9
Feb. 22	03 07.62	+10 58.0	11.728	11.514	+0.10	+2.4	19.0	75.1
Mar. 3	03 08.60	+11 22.0	11.943	11.566	+0.15	+2.5	19.0	65.4
Mar. 13	03 10.07	+11 46.9	12.145	11.617	+0.19	+2.5	19.1	55.9
Mar. 23	03 11.95	+12 12.3	12.332	11.669	+0.22	+2.6	19.1	46.6
Apr. 2	03 14.19	+12 38.1	12.500	11.721	+0.25	+2.6	19.2	37.4
Apr. 12	03 16.70	+13 03.8	12.646	11.773	+0.27	+2.5	19.2	28.4
Apr. 22	03 19.43	+13 29.3	12.768	11.825	+0.29	+2.5	19.3	19.5
May 2	03 22.30	+13 54.3	12.865	11.877	+0.29	+2.4	19.3	10.9
May 12	03 25.25	+14 18.7	12.936	11.929	+0.29	+2.3	19.3	4.4
May 22	03 28.19	+14 42.1	12.980	11.981	+0.29	+2.2	19.4	8.7
June 1	03 31.08	+15 04.6	12.999	12.033	+0.28	+2.1	19.4	17.0
June 11	03 33.83	+15 25.9	12.992	12.084	+0.26	+2.0	19.4	25.6
June 21	03 36.39	+15 45.9	12.961	12.136	+0.23	+1.9	19.4	34.4
July 1	03 38.69	+16 04.7	12.908	12.188	+0.20	+1.7	19.4	43.3
July 11	03 40.67	+16 22.0	12.836	12.240	+0.16	+1.6	19.4	52.3
July 21	03 42.28	+16 37.8	12.746	12.291	+0.12	+1.4	19.4	61.3
July 31	03 43.45	+16 52.1	12.644	12.343	+0.07	+1.3	19.4	70.5
Aug. 10	03 44.15	+17 04.8	12.532	12.395	+0.02	+1.1	19.4	79.9
Aug. 20	03 44.32	+17 16.0	12.416	12.446	−0.04	+1.0	19.4	89.4
Aug. 30	03 43.96	+17 25.6	12.299	12.498	−0.09	+0.8	19.4	99.1
Sept. 9	03 43.03	+17 33.6	12.186	12.550	−0.15	+0.6	19.4	109.0
Sept.19	03 41.55	+17 40.1	12.083	12.601	−0.20	+0.5	19.4	119.0
Sept.29	03 39.55	+17 45.1	11.995	12.653	−0.25	+0.4	19.4	129.3
Oct. 9	03 37.07	+17 48.7	11.926	12.704	−0.29	+0.2	19.4	139.7
Oct. 19	03 34.18	+17 51.1	11.882	12.756	−0.32	+0.1	19.4	150.2
Oct. 29	03 30.98	+17 52.5	11.865	12.807	−0.34	+0.1	19.4	160.9
Nov. 8	03 27.59	+17 53.2	11.878	12.859	−0.35	0.0	19.5	171.7
Nov. 18	03 24.13	+17 53.4	11.923	12.910	−0.34	0.0	19.5	177.3
Nov. 28	03 20.72	+17 53.7	12.000	12.962	−0.32	+0.1	19.5	166.5
Dec. 8	03 17.51	+17 54.3	12.110	13.013	−0.29	+0.1	19.6	155.6
Dec. 18	03 14.59	+17 55.6	12.248	13.064	−0.25	+0.2	19.6	144.8
Dec. 28	03 12.08	+17 58.1	12.413	13.116	−0.20	+0.4	19.6	134.0
Jan. 7	03 10.03	+18 02.0	12.600	13.167	−0.15	+0.6	19.7	123.4
Jan. 17	03 08.52	+18 07.6	12.805	13.218	−0.10	+0.7	19.7	112.9
Jan. 27	03 07.54	+18 14.9	13.021	13.269	−0.04	+0.9	19.8	102.5
Feb. 6	03 07.13	+18 24.0	13.244	13.321	+0.01	+1.1	19.9	92.3
Feb. 16	03 07.25	+18 34.9	13.469	13.372	+0.06	+1.3	19.9	82.3
Feb. 26	03 07.87	+18 47.6	13.689	13.423	+0.11	+1.4	20.0	72.4
Mar. 8	03 08.96	+19 01.8	13.900	13.474	+0.15	+1.6	20.0	62.7
Mar. 18	03 10.46	+19 17.3	14.099	13.525	+0.19	+1.7	20.1	53.1
Mar. 28	03 12.31	+19 34.1	14.280	13.576	+0.21	+1.8	20.1	43.7

Comet C/2006 S3 (LONEOS)

Epoch = 2016 July 31.0 TT
T = 2012 Apr. 13.66306 TT
Peri. = 140.00122
Node = 38.35250 2000.0
Incl. = 166.02365
q = 5.1334077 AU
e = 1.0001219

m1 = 4.0 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	11 11.81	-07 15.4	10.350	10.720	-0.30	+0.5	16.8	109.6
Jan. 13	11 08.79	-07 10.4	10.245	10.774	-0.36	+1.0	16.8	120.2
Jan. 23	11 05.19	-07 00.7	10.157	10.827	-0.41	+1.4	16.8	130.9
Feb. 2	11 01.10	-06 46.4	10.092	10.881	-0.45	+1.9	16.8	141.6
Feb. 12	10 56.64	-06 27.7	10.054	10.935	-0.47	+2.2	16.8	151.9
Feb. 22	10 51.94	-06 05.3	10.047	10.988	-0.48	+2.5	16.8	161.3
Mar. 3	10 47.15	-05 39.8	10.072	11.042	-0.47	+2.8	16.8	167.3
Mar. 13	10 42.44	-05 12.2	10.132	11.095	-0.45	+2.9	16.9	165.0
Mar. 23	10 37.95	-04 43.5	10.225	11.149	-0.41	+2.9	16.9	156.9
Apr. 2	10 33.82	-04 14.7	10.350	11.202	-0.37	+2.8	16.9	147.1
Apr. 12	10 30.16	-03 46.8	10.503	11.256	-0.31	+2.6	17.0	136.9
Apr. 22	10 27.04	-03 20.7	10.680	11.309	-0.25	+2.4	17.0	126.7
May 2	10 24.50	-02 57.1	10.876	11.363	-0.19	+2.1	17.1	116.6
May 12	10 22.58	-02 36.6	11.087	11.416	-0.13	+1.7	17.2	106.6
May 22	10 21.27	-02 19.4	11.307	11.470	-0.07	+1.4	17.2	96.7
June 1	10 20.54	-02 05.8	11.530	11.523	-0.02	+1.0	17.3	87.1
June 11	10 20.36	-01 56.0	11.752	11.576	+0.03	+0.6	17.3	77.6
June 21	10 20.68	-01 49.7	11.967	11.630	+0.08	+0.3	17.4	68.3
July 1	10 21.43	-01 47.0	12.172	11.683	+0.11	-0.1	17.4	59.1
July 11	10 22.56	-01 47.6	12.362	11.736	+0.14	-0.4	17.5	50.1
July 21	10 23.99	-01 51.3	12.534	11.789	+0.17	-0.6	17.5	41.3
July 31	10 25.67	-01 57.8	12.685	11.843	+0.19	-0.9	17.6	32.6
Aug. 10	10 27.53	-02 06.8	12.812	11.896	+0.20	-1.1	17.6	24.3
Aug. 20	10 29.50	-02 17.9	12.914	11.949	+0.20	-1.3	17.6	16.7
Aug. 30	10 31.51	-02 30.8	12.990	12.002	+0.20	-1.4	17.7	11.5
Sept. 9	10 33.50	-02 45.1	13.038	12.055	+0.19	-1.5	17.7	12.2
Sept.19	10 35.40	-03 00.4	13.058	12.108	+0.17	-1.6	17.7	18.3
Sept.29	10 37.14	-03 16.2	13.052	12.161	+0.15	-1.6	17.7	26.3
Oct. 9	10 38.65	-03 32.2	13.020	12.214	+0.12	-1.6	17.7	35.0
Oct. 19	10 39.88	-03 47.7	12.964	12.267	+0.09	-1.5	17.7	44.0
Oct. 29	10 40.76	-04 02.5	12.887	12.320	+0.05	-1.3	17.7	53.4
Nov. 8	10 41.23	-04 15.9	12.793	12.373	0.00	-1.2	17.7	62.9
Nov. 18	10 41.24	-04 27.4	12.684	12.426	-0.05	-0.9	17.7	72.7
Nov. 28	10 40.76	-04 36.6	12.567	12.479	-0.10	-0.6	17.7	82.6
Dec. 8	10 39.74	-04 43.1	12.446	12.532	-0.16	-0.3	17.7	92.7
Dec. 18	10 38.19	-04 46.3	12.327	12.585	-0.21	0.0	17.7	103.0
Dec. 28	10 36.10	-04 46.0	12.215	12.637	-0.26	+0.4	17.7	113.4
Jan. 7	10 33.50	-04 42.0	12.116	12.690	-0.30	+0.8	17.7	123.8
Jan. 17	10 30.46	-04 34.1	12.036	12.743	-0.34	+1.2	17.7	134.3
Jan. 27	10 27.04	-04 22.4	11.980	12.796	-0.37	+1.5	17.7	144.6
Feb. 6	10 23.33	-04 07.3	11.951	12.848	-0.39	+1.8	17.7	154.5
Feb. 16	10 19.47	-03 49.2	11.953	12.901	-0.39	+2.1	17.7	162.9
Feb. 26	10 15.57	-03 28.6	11.988	12.953	-0.38	+2.2	17.7	166.7
Mar. 8	10 11.76	-03 06.3	12.055	13.006	-0.36	+2.3	17.8	162.6
Mar. 18	10 08.15	-02 43.1	12.155	13.058	-0.33	+2.3	17.8	154.2
Mar. 28	10 04.85	-02 19.8	12.285	13.111	-0.29	+2.3	17.8	144.6

Comet 158P/Kowal-LINEAR

Epoch = 2016 July 31.0 TT
T = 2012 Dec. 19.26438 TT
Peri. = 241.62285 e = 0.0294344
Node = 137.27374 2000.0 a = 4.7434878 AU
Incl. = 7.90274 n = 0.09540198
q = 4.6038661 AU P = 10.33 years

m1 = 2.2 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 05.69	+15 01.2	3.928	4.785	−0.45	+2.7	18.8	147.3
Jan. 13	09 01.24	+15 28.5	3.858	4.788	−0.52	+3.1	18.7	158.7
Jan. 23	08 56.00	+15 59.5	3.817	4.790	−0.56	+3.3	18.7	170.2
Feb. 2	08 50.36	+16 32.3	3.807	4.792	−0.56	+3.2	18.7	177.8
Feb. 12	08 44.77	+17 04.7	3.829	4.794	−0.51	+3.0	18.7	166.5
Feb. 22	08 39.69	+17 34.8	3.881	4.796	−0.42	+2.6	18.8	155.1
Mar. 3	08 35.50	+18 01.0	3.961	4.798	−0.30	+2.1	18.8	144.0
Mar. 13	08 32.48	+18 22.3	4.065	4.800	−0.16	+1.6	18.9	133.2
Mar. 23	08 30.83	+18 38.1	4.188	4.803	−0.02	+1.0	18.9	122.9
Apr. 2	08 30.62	+18 48.2	4.327	4.805	+0.12	+0.4	19.0	112.9
Apr. 12	08 31.84	+18 52.6	4.476	4.807	+0.26	−0.1	19.1	103.3
Apr. 22	08 34.41	+18 51.5	4.631	4.809	+0.38	−0.6	19.2	94.1
May 2	08 38.23	+18 45.1	4.787	4.811	+0.49	−1.1	19.2	85.3
May 12	08 43.16	+18 33.7	4.942	4.813	+0.59	−1.6	19.3	76.8
May 22	08 49.07	+18 17.5	5.091	4.815	+0.67	−2.1	19.4	68.6
June 1	08 55.80	+17 56.9	5.233	4.817	+0.74	−2.5	19.4	60.6
June 11	09 03.24	+17 32.0	5.363	4.819	+0.80	−2.9	19.5	52.9
June 21	09 11.25	+17 03.3	5.481	4.821	+0.85	−3.2	19.6	45.3
July 1	09 19.73	+16 31.0	5.585	4.822	+0.89	−3.6	19.6	37.8
July 11	09 28.58	+15 55.4	5.672	4.824	+0.91	−3.8	19.6	30.5
July 21	09 37.70	+15 17.0	5.743	4.826	+0.93	−4.1	19.7	23.3
July 31	09 47.01	+14 36.2	5.795	4.828	+0.94	−4.3	19.7	16.1
Aug. 10	09 56.44	+13 53.3	5.829	4.830	+0.95	−4.4	19.7	8.9
Aug. 20	10 05.90	+13 08.8	5.843	4.832	+0.94	−4.5	19.7	2.2
Aug. 30	10 15.34	+12 23.4	5.837	4.833	+0.93	−4.6	19.7	5.7
Sept. 9	10 24.67	+11 37.4	5.811	4.835	+0.92	−4.6	19.7	12.9
Sept.19	10 33.84	+10 51.7	5.766	4.837	+0.89	−4.5	19.7	20.3
Sept.29	10 42.76	+10 06.7	5.703	4.838	+0.86	−4.3	19.7	27.7
Oct. 9	10 51.37	+09 23.2	5.620	4.840	+0.82	−4.1	19.6	35.3
Oct. 19	10 59.58	+08 42.1	5.521	4.842	+0.77	−3.8	19.6	43.1
Oct. 29	11 07.31	+08 04.1	5.406	4.843	+0.71	−3.4	19.6	51.1
Nov. 8	11 14.44	+07 30.0	5.277	4.845	+0.64	−2.9	19.5	59.2
Nov. 18	11 20.88	+07 00.9	5.136	4.846	+0.56	−2.3	19.5	67.6
Nov. 28	11 26.52	+06 37.5	4.987	4.848	+0.47	−1.7	19.4	76.3
Dec. 8	11 31.23	+06 20.9	4.831	4.850	+0.37	−0.9	19.3	85.2
Dec. 18	11 34.89	+06 11.9	4.674	4.851	+0.25	−0.1	19.3	94.5
Dec. 28	11 37.39	+06 11.1	4.519	4.852	+0.12	+0.8	19.2	104.1
Jan. 7	11 38.63	+06 19.1	4.370	4.854	−0.01	+1.7	19.1	114.0
Jan. 17	11 38.56	+06 36.0	4.233	4.855	−0.14	+2.5	19.1	124.3
Jan. 27	11 37.17	+07 01.3	4.111	4.857	−0.26	+3.3	19.0	134.9
Feb. 6	11 34.53	+07 34.0	4.011	4.858	−0.37	+3.8	18.9	145.7
Feb. 16	11 30.82	+08 12.4	3.936	4.859	−0.45	+4.2	18.9	156.8
Feb. 26	11 26.28	+08 54.1	3.889	4.860	−0.50	+4.2	18.9	167.6
Mar. 8	11 21.27	+09 36.2	3.872	4.862	−0.51	+4.0	18.9	175.0
Mar. 18	11 16.18	+10 16.0	3.886	4.863	−0.48	+3.5	18.9	167.5
Mar. 28	11 11.39	+10 50.9	3.931	4.864	−0.41	+2.8	18.9	156.8

Comet 246P/NEAT

Epoch = 2016 July 31.0 TT
T = 2013 Jan. 28.57845 TT
Peri. = 175.99033 e = 0.2857136
Node = 78.74727 2000.0 a = 4.0229443 AU
Incl. = 15.97815 n = 0.12214847
q = 2.8735344 AU P = 8.07 years

m1 = 5.4 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	02 25.60	+04 10.4	4.443	4.915	−0.02	+3.2	19.0	113.3
Jan. 13	02 25.45	+04 42.5	4.606	4.928	+0.12	+3.7	19.1	103.4
Jan. 23	02 26.63	+05 20.0	4.775	4.940	+0.24	+4.2	19.2	93.9
Feb. 2	02 29.06	+06 01.8	4.946	4.952	+0.36	+4.5	19.3	84.6
Feb. 12	02 32.62	+06 47.0	5.115	4.964	+0.46	+4.8	19.4	75.7
Feb. 22	02 37.20	+07 34.6	5.278	4.975	+0.55	+4.9	19.5	67.0
Mar. 3	02 42.66	+08 23.7	5.431	4.986	+0.62	+5.0	19.5	58.5
Mar. 13	02 48.88	+09 13.5	5.572	4.996	+0.69	+5.0	19.6	50.3
Mar. 23	02 55.76	+10 03.3	5.699	5.007	+0.74	+4.9	19.7	42.3
Apr. 2	03 03.17	+10 52.5	5.809	5.017	+0.79	+4.8	19.7	34.5
Apr. 12	03 11.02	+11 40.6	5.900	5.026	+0.82	+4.6	19.8	26.9
Apr. 22	03 19.22	+12 27.0	5.973	5.036	+0.85	+4.4	19.8	19.4
May 2	03 27.67	+13 11.4	6.025	5.045	+0.86	+4.2	19.8	12.4
May 12	03 36.29	+13 53.4	6.056	5.054	+0.87	+3.9	19.9	6.4
May 22	03 45.00	+14 32.7	6.067	5.062	+0.87	+3.6	19.9	6.4
June 1	03 53.70	+15 09.2	6.057	5.070	+0.86	+3.3	19.9	12.3
June 11	04 02.32	+15 42.7	6.026	5.078	+0.84	+3.0	19.9	19.2
June 21	04 10.76	+16 13.0	5.975	5.086	+0.82	+2.7	19.9	26.5
July 1	04 18.94	+16 40.2	5.906	5.093	+0.78	+2.4	19.9	33.9
July 11	04 26.75	+17 04.3	5.818	5.100	+0.73	+2.1	19.8	41.4
July 21	04 34.09	+17 25.4	5.714	5.107	+0.68	+1.8	19.8	49.1
July 31	04 40.86	+17 43.5	5.595	5.113	+0.61	+1.5	19.8	57.0
Aug. 10	04 46.92	+17 58.9	5.463	5.119	+0.52	+1.3	19.7	65.1
Aug. 20	04 52.15	+18 11.7	5.322	5.124	+0.43	+1.1	19.7	73.4
Aug. 30	04 56.42	+18 22.3	5.173	5.130	+0.32	+0.9	19.6	82.0
Sept. 9	04 59.59	+18 30.9	5.020	5.135	+0.19	+0.7	19.6	90.9
Sept.19	05 01.54	+18 37.9	4.867	5.140	+0.06	+0.5	19.5	100.1
Sept.29	05 02.16	+18 43.3	4.719	5.144	−0.08	+0.4	19.4	109.7
Oct. 9	05 01.37	+18 47.6	4.579	5.148	−0.22	+0.3	19.4	119.7
Oct. 19	04 59.14	+18 50.9	4.453	5.152	−0.36	+0.2	19.3	130.1
Oct. 29	04 55.54	+18 53.3	4.346	5.155	−0.48	+0.2	19.3	140.9
Nov. 8	04 50.71	+18 54.9	4.263	5.158	−0.58	+0.1	19.2	152.0
Nov. 18	04 44.91	+18 56.1	4.207	5.161	−0.64	+0.1	19.2	163.3
Nov. 28	04 38.50	+18 56.9	4.181	5.164	−0.66	+0.1	19.2	174.3
Dec. 8	04 31.90	+18 58.0	4.188	5.166	−0.63	+0.2	19.2	172.5
Dec. 18	04 25.56	+18 59.8	4.226	5.168	−0.57	+0.3	19.2	161.3
Dec. 28	04 19.90	+19 03.2	4.295	5.169	−0.46	+0.6	19.3	149.9
Jan. 7	04 15.27	+19 08.7	4.391	5.171	−0.34	+0.8	19.3	138.7
Jan. 17	04 11.90	+19 17.0	4.510	5.171	−0.20	+1.1	19.4	127.7
Jan. 27	04 09.94	+19 28.3	4.648	5.172	−0.05	+1.4	19.4	117.2
Feb. 6	04 09.43	+19 42.6	4.798	5.172	+0.09	+1.7	19.5	106.9
Feb. 16	04 10.34	+19 59.9	4.957	5.172	+0.23	+2.0	19.6	97.1
Feb. 26	04 12.59	+20 19.8	5.118	5.172	+0.35	+2.2	19.7	87.6
Mar. 8	04 16.09	+20 41.7	5.278	5.171	+0.46	+2.3	19.7	78.4
Mar. 18	04 20.69	+21 05.2	5.433	5.170	+0.56	+2.4	19.8	69.6
Mar. 28	04 26.28	+21 29.7	5.578	5.169	+0.64	+2.5	19.8	61.0

Comet C/2010 S1 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2013 May 19.71977 TT
Peri. = 118.55142
Node = 93.43490 2000.0
Incl. = 125.32033
q = 5.8966762 AU
e = 1.0025850

m1 = 3.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	17 59.18	-29 42.2	9.744	8.791	+0.35	-2.1	17.4	13.5
Jan. 13	18 02.64	-30 03.6	9.739	8.838	+0.32	-2.2	17.4	22.4
Jan. 23	18 05.82	-30 26.0	9.708	8.885	+0.28	-2.3	17.4	31.6
Feb. 2	18 08.62	-30 49.4	9.652	8.933	+0.23	-2.5	17.4	41.0
Feb. 12	18 10.94	-31 14.2	9.575	8.980	+0.17	-2.6	17.4	50.6
Feb. 22	18 12.67	-31 40.4	9.479	9.028	+0.10	-2.8	17.4	60.2
Mar. 3	18 13.70	-32 08.2	9.368	9.076	+0.02	-2.9	17.4	69.9
Mar. 13	18 13.94	-32 37.5	9.247	9.124	-0.06	-3.1	17.4	79.8
Mar. 23	18 13.30	-33 08.1	9.122	9.172	-0.16	-3.2	17.4	89.7
Apr. 2	18 11.74	-33 39.9	8.997	9.220	-0.25	-3.2	17.4	99.8
Apr. 12	18 09.21	-34 12.2	8.877	9.268	-0.35	-3.2	17.4	110.0
Apr. 22	18 05.70	-34 44.6	8.770	9.316	-0.44	-3.2	17.4	120.2
May 2	18 01.25	-35 16.1	8.679	9.365	-0.53	-3.0	17.4	130.5
May 12	17 55.95	-35 45.9	8.610	9.413	-0.60	-2.7	17.4	140.6
May 22	17 49.93	-36 13.1	8.568	9.462	-0.66	-2.4	17.4	150.5
June 1	17 43.38	-36 36.8	8.554	9.511	-0.69	-2.0	17.4	159.5
June 11	17 36.51	-36 56.5	8.573	9.559	-0.69	-1.5	17.5	165.6
June 21	17 29.57	-37 11.8	8.624	9.608	-0.68	-1.1	17.5	164.8
July 1	17 22.81	-37 22.8	8.707	9.657	-0.63	-0.7	17.5	158.0
July 11	17 16.47	-37 29.8	8.821	9.706	-0.57	-0.4	17.6	149.0
July 21	17 10.73	-37 33.5	8.963	9.755	-0.50	-0.1	17.7	139.2
July 31	17 05.76	-37 34.6	9.129	9.804	-0.41	+0.1	17.7	129.3
Aug. 10	17 01.66	-37 34.1	9.316	9.853	-0.32	+0.1	17.8	119.4
Aug. 20	16 58.49	-37 32.8	9.518	9.902	-0.22	+0.1	17.9	109.6
Aug. 30	16 56.26	-37 31.4	9.730	9.952	-0.13	+0.1	17.9	99.8
Sept. 9	16 54.95	-37 30.7	9.947	10.001	-0.04	0.0	18.0	90.2
Sept.19	16 54.52	-37 31.1	10.164	10.050	+0.04	-0.2	18.1	80.7
Sept.29	16 54.90	-37 33.0	10.376	10.100	+0.11	-0.4	18.1	71.3
Oct. 9	16 56.01	-37 36.6	10.578	10.149	+0.18	-0.6	18.2	62.1
Oct. 19	16 57.77	-37 42.2	10.767	10.199	+0.23	-0.8	18.2	53.0
Oct. 29	17 00.07	-37 49.7	10.938	10.248	+0.27	-1.0	18.3	44.2
Nov. 8	17 02.82	-37 59.3	11.088	10.298	+0.31	-1.2	18.4	35.6
Nov. 18	17 05.91	-38 10.9	11.214	10.348	+0.33	-1.4	18.4	27.5
Nov. 28	17 09.25	-38 24.4	11.315	10.397	+0.35	-1.6	18.4	20.6
Dec. 8	17 12.72	-38 40.0	11.390	10.447	+0.35	-1.7	18.5	16.2
Dec. 18	17 16.23	-38 57.5	11.436	10.497	+0.34	-1.9	18.5	16.6
Dec. 28	17 19.66	-39 16.9	11.455	10.547	+0.32	-2.1	18.5	21.6
Jan. 7	17 22.90	-39 38.2	11.447	10.597	+0.30	-2.3	18.5	28.9
Jan. 17	17 25.85	-40 01.4	11.414	10.647	+0.26	-2.5	18.6	37.2
Jan. 27	17 28.41	-40 26.5	11.358	10.696	+0.20	-2.7	18.6	45.9
Feb. 6	17 30.45	-40 53.3	11.282	10.746	+0.14	-2.8	18.6	55.0
Feb. 16	17 31.89	-41 21.7	11.189	10.796	+0.07	-3.0	18.6	64.2
Feb. 26	17 32.63	-41 51.5	11.084	10.846	-0.01	-3.1	18.6	73.6
Mar. 8	17 32.57	-42 22.2	10.970	10.896	-0.09	-3.1	18.6	83.1
Mar. 18	17 31.66	-42 53.6	10.855	10.946	-0.18	-3.1	18.6	92.7
Mar. 28	17 29.84	-43 24.9	10.741	10.996	-0.27	-3.0	18.6	102.3

Comet C/2012 K6 (McNaught)

Epoch = 2016 July 31.0 TT
T = 2013 May 20.81234 TT
Peri. = 338.86672
Node = 206.90786 2000.0
Incl. = 135.22052
q = 3.3575567 AU
e = 0.9976871

m1 = 8.4 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	10 51.20	+61 17.7	7.974	8.566	-0.84	+7.4	19.9	124.3
Jan. 13	10 42.79	+62 31.8	7.986	8.630	-1.04	+6.6	19.9	128.3
Jan. 23	10 32.42	+63 37.8	8.023	8.695	-1.20	+5.5	20.0	130.5
Feb. 2	10 20.39	+64 32.6	8.086	8.759	-1.32	+4.1	20.0	130.6
Feb. 12	10 07.18	+65 13.7	8.175	8.824	-1.37	+2.6	20.1	128.6
Feb. 22	09 53.51	+65 39.6	8.287	8.888	-1.34	+1.1	20.1	124.7
Mar. 3	09 40.14	+65 50.3	8.422	8.952	-1.24	-0.3	20.2	119.5
Mar. 13	09 27.78	+65 46.9	8.576	9.016	-1.08	-1.5	20.2	113.4
Mar. 23	09 17.01	+65 31.5	8.745	9.080	-0.89	-2.5	20.3	106.6
Apr. 2	09 08.15	+65 06.7	8.925	9.144	-0.68	-3.2	20.4	99.6
Apr. 12	09 01.35	+64 35.1	9.112	9.208	-0.48	-3.6	20.4	92.4
Apr. 22	08 56.57	+63 59.3	9.302	9.272	-0.29	-3.8	20.5	85.2
May 2	08 53.67	+63 21.2	9.491	9.335	-0.12	-3.9	20.6	78.1
May 12	08 52.44	+62 42.5	9.675	9.399	+0.02	-3.8	20.6	71.2
May 22	08 52.67	+62 04.7	9.851	9.462	+0.14	-3.6	20.7	64.7
June 1	08 54.12	+61 28.8	10.015	9.526	+0.25	-3.3	20.7	58.6
June 11	08 56.58	+60 55.5	10.165	9.589	+0.33	-3.0	20.8	53.1
June 21	08 59.88	+60 25.6	10.298	9.652	+0.39	-2.6	20.8	48.3
July 1	09 03.81	+59 59.4	10.414	9.715	+0.44	-2.2	20.9	44.5
July 11	09 08.24	+59 37.5	10.510	9.778	+0.48	-1.7	20.9	42.0
July 21	09 13.01	+59 20.2	10.587	9.841	+0.50	-1.2	21.0	40.9
July 31	09 18.00	+59 07.9	10.642	9.904	+0.51	-0.7	21.0	41.4
Aug. 10	09 23.08	+59 00.9	10.678	9.966	+0.50	-0.1	21.0	43.5
Aug. 20	09 28.13	+58 59.5	10.693	10.029	+0.49	+0.5	21.1	46.9
Aug. 30	09 33.03	+59 04.1	10.690	10.091	+0.46	+1.1	21.1	51.4
Sept. 9	09 37.66	+59 14.9	10.670	10.154	+0.42	+1.7	21.1	56.8
Sept.19	09 41.89	+59 32.1	10.635	10.216	+0.37	+2.4	21.1	62.8
Sept.29	09 45.59	+59 55.9	10.588	10.278	+0.30	+3.0	21.1	69.4
Oct. 9	09 48.61	+60 26.3	10.531	10.340	+0.22	+3.7	21.1	76.3
Oct. 19	09 50.80	+61 02.9	10.468	10.402	+0.12	+4.3	21.1	83.5
Oct. 29	09 51.97	+61 45.5	10.403	10.464	0.00	+4.8	21.1	90.8
Nov. 8	09 51.95	+62 33.2	10.340	10.526	-0.14	+5.2	21.1	98.1
Nov. 18	09 50.53	+63 24.9	10.284	10.587	-0.30	+5.4	21.1	105.3
Nov. 28	09 47.55	+64 19.1	10.237	10.649	-0.47	+5.5	21.2	112.2
Dec. 8	09 42.83	+65 13.9	10.205	10.711	-0.65	+5.3	21.2	118.5
Dec. 18	09 36.29	+66 06.9	10.191	10.772	-0.84	+4.9	21.2	124.0
Dec. 28	09 27.93	+66 55.8	10.198	10.833	-1.00	+4.2	21.2	128.2
Jan. 7	09 17.89	+67 37.9	10.227	10.894	-1.14	+3.3	21.2	130.7
Jan. 17	09 06.52	+68 11.0	10.281	10.956	-1.22	+2.3	21.3	131.3
Jan. 27	08 54.30	+68 33.6	10.359	11.017	-1.24	+1.1	21.3	129.9
Feb. 6	08 41.85	+68 44.8	10.461	11.077	-1.20	0.0	21.3	126.6
Feb. 16	08 29.86	+68 44.7	10.584	11.138	-1.10	-1.0	21.4	121.9
Feb. 26	08 18.89	+68 34.3	10.727	11.199	-0.95	-1.9	21.4	116.2
Mar. 8	08 09.42	+68 15.2	10.886	11.260	-0.77	-2.6	21.5	109.7
Mar. 18	08 01.70	+67 49.3	11.058	11.320	-0.59	-3.1	21.5	102.8
Mar. 28	07 55.84	+67 18.7	11.238	11.381	-0.40	-3.4	21.6	95.7

Comet C/2012 A1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2013 Dec. 4.36658 TT
Peri. = 192.08425
Node = 277.99763 2000.0
Incl. = 120.92533
q = 7.6052334 AU
e = 1.0020632

m1 = 7.6 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 11.58	-29 36.6	8.468	8.927	-0.52	+0.8	19.4	114.9
Jan. 13	04 06.35	-29 29.0	8.600	8.958	-0.44	+1.5	19.4	108.3
Jan. 23	04 01.99	-29 13.8	8.745	8.990	-0.34	+2.1	19.5	101.3
Feb. 2	03 58.55	-28 52.9	8.897	9.022	-0.25	+2.5	19.5	94.1
Feb. 12	03 56.06	-28 28.0	9.053	9.054	-0.16	+2.7	19.6	86.9
Feb. 22	03 54.50	-28 01.2	9.208	9.087	-0.07	+2.7	19.6	79.9
Mar. 3	03 53.82	-27 33.9	9.358	9.119	+0.01	+2.6	19.7	73.1
Mar. 13	03 53.94	-27 07.6	9.500	9.152	+0.08	+2.4	19.7	66.7
Mar. 23	03 54.78	-26 43.6	9.630	9.186	+0.15	+2.1	19.7	60.9
Apr. 2	03 56.24	-26 22.9	9.746	9.219	+0.20	+1.6	19.8	55.7
Apr. 12	03 58.23	-26 06.5	9.845	9.253	+0.24	+1.1	19.8	51.4
Apr. 22	04 00.63	-25 55.0	9.927	9.287	+0.27	+0.6	19.8	48.2
May 2	04 03.37	-25 49.2	9.990	9.321	+0.30	0.0	19.9	46.2
May 12	04 06.33	-25 49.5	10.034	9.355	+0.31	-0.7	19.9	45.6
May 22	04 09.43	-25 56.3	10.059	9.390	+0.31	-1.4	19.9	46.4
June 1	04 12.56	-26 09.9	10.065	9.424	+0.31	-2.1	19.9	48.6
June 11	04 15.65	-26 30.6	10.053	9.459	+0.29	-2.8	19.9	51.8
June 21	04 18.58	-26 58.4	10.026	9.495	+0.27	-3.5	19.9	56.0
July 1	04 21.28	-27 33.4	9.984	9.530	+0.24	-4.2	19.9	60.8
July 11	04 23.64	-28 15.5	9.930	9.565	+0.19	-4.9	19.9	66.2
July 21	04 25.57	-29 04.3	9.867	9.601	+0.14	-5.5	19.9	72.0
July 31	04 26.97	-29 59.5	9.797	9.637	+0.08	-6.1	19.9	78.0
Aug. 10	04 27.75	-31 00.3	9.724	9.673	+0.01	-6.6	19.9	84.1
Aug. 20	04 27.82	-32 05.8	9.651	9.710	-0.07	-6.9	19.9	90.3
Aug. 30	04 27.10	-33 14.9	9.582	9.746	-0.16	-7.1	19.9	96.4
Sept. 9	04 25.51	-34 26.1	9.519	9.783	-0.25	-7.2	19.9	102.3
Sept.19	04 23.01	-35 37.7	9.468	9.820	-0.34	-7.0	19.9	107.7
Sept.29	04 19.59	-36 47.7	9.429	9.857	-0.43	-6.6	19.9	112.5
Oct. 9	04 15.25	-37 54.0	9.408	9.894	-0.52	-6.1	19.9	116.5
Oct. 19	04 10.09	-38 54.6	9.405	9.931	-0.59	-5.3	19.9	119.4
Oct. 29	04 04.21	-39 47.3	9.422	9.968	-0.64	-4.3	20.0	120.9
Nov. 8	03 57.80	-40 30.6	9.460	10.006	-0.67	-3.3	20.0	121.0
Nov. 18	03 51.09	-41 03.3	9.519	10.044	-0.68	-2.1	20.0	119.6
Nov. 28	03 44.30	-41 24.6	9.598	10.082	-0.66	-1.0	20.0	116.9
Dec. 8	03 37.72	-41 34.6	9.695	10.120	-0.62	+0.1	20.1	113.0
Dec. 18	03 31.57	-41 33.9	9.808	10.158	-0.55	+1.0	20.1	108.2
Dec. 28	03 26.04	-41 23.7	9.933	10.197	-0.47	+1.8	20.1	102.8
Jan. 7	03 21.31	-41 05.3	10.069	10.235	-0.38	+2.5	20.2	97.0
Jan. 17	03 17.46	-40 40.5	10.210	10.274	-0.29	+2.9	20.2	91.0
Jan. 27	03 14.54	-40 11.2	10.353	10.313	-0.20	+3.2	20.3	84.9
Feb. 6	03 12.55	-39 39.1	10.495	10.351	-0.11	+3.3	20.3	79.0
Feb. 16	03 11.45	-39 05.8	10.632	10.391	-0.03	+3.3	20.4	73.3
Feb. 26	03 11.18	-38 33.0	10.761	10.430	+0.05	+3.1	20.4	67.9
Mar. 8	03 11.66	-38 01.8	10.880	10.469	+0.11	+2.8	20.4	63.2
Mar. 18	03 12.80	-37 33.6	10.985	10.508	+0.17	+2.4	20.5	59.1
Mar. 28	03 14.51	-37 09.2	11.076	10.548	+0.22	+2.0	20.5	55.8

Comet C/2011 J2 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2013 Dec. 25.71506 TT
Peri. = 85.32591
Node = 163.94327 2000.0
Incl. = 122.80156
q = 3.4431548 AU
e = 1.0015568

m1 = 7.2 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 38.32	-06 19.3	7.627	7.139	+0.29	-1.0	18.0	57.0
Jan. 13	22 41.19	-06 29.6	7.834	7.205	+0.33	-0.6	18.1	47.4
Jan. 23	22 44.50	-06 35.5	8.021	7.270	+0.37	-0.2	18.2	37.9
Feb. 2	22 48.16	-06 37.9	8.186	7.336	+0.39	0.0	18.3	28.6
Feb. 12	22 52.05	-06 37.7	8.326	7.401	+0.40	+0.2	18.3	19.3
Feb. 22	22 56.07	-06 35.7	8.438	7.467	+0.41	+0.3	18.4	10.2
Mar. 3	23 00.13	-06 32.8	8.523	7.532	+0.40	+0.3	18.4	1.1
Mar. 13	23 04.14	-06 29.8	8.581	7.598	+0.39	+0.2	18.5	8.0
Mar. 23	23 08.01	-06 27.4	8.610	7.663	+0.36	+0.1	18.5	17.1
Apr. 2	23 11.65	-06 26.4	8.613	7.728	+0.33	-0.1	18.5	26.1
Apr. 12	23 14.99	-06 27.5	8.591	7.793	+0.29	-0.4	18.6	35.2
Apr. 22	23 17.94	-06 31.5	8.546	7.859	+0.25	-0.7	18.6	44.3
May 2	23 20.43	-06 38.9	8.481	7.924	+0.20	-1.2	18.6	53.5
May 12	23 22.38	-06 50.4	8.399	7.989	+0.13	-1.6	18.6	62.8
May 22	23 23.72	-07 06.6	8.304	8.054	+0.07	-2.1	18.6	72.3
June 1	23 24.39	-07 27.8	8.200	8.119	-0.01	-2.7	18.6	81.8
June 11	23 24.34	-07 54.3	8.092	8.184	-0.08	-3.2	18.6	91.6
June 21	23 23.52	-08 26.5	7.985	8.248	-0.16	-3.8	18.6	101.5
July 1	23 21.92	-09 04.1	7.885	8.313	-0.24	-4.3	18.6	111.6
July 11	23 19.54	-09 46.8	7.796	8.378	-0.31	-4.7	18.6	121.9
July 21	23 16.41	-10 34.0	7.724	8.442	-0.38	-5.1	18.6	132.4
July 31	23 12.60	-11 24.7	7.674	8.507	-0.44	-5.3	18.6	143.0
Aug. 10	23 08.23	-12 17.8	7.651	8.571	-0.48	-5.4	18.6	153.6
Aug. 20	23 03.43	-13 11.7	7.659	8.635	-0.51	-5.3	18.6	163.9
Aug. 30	22 58.38	-14 04.9	7.698	8.700	-0.51	-5.1	18.7	172.2
Sept. 9	22 53.27	-14 55.8	7.771	8.764	-0.50	-4.7	18.7	169.5
Sept.19	22 48.30	-15 43.0	7.878	8.828	-0.46	-4.2	18.8	159.8
Sept.29	22 43.67	-16 25.4	8.016	8.892	-0.41	-3.7	18.8	149.2
Oct. 9	22 39.55	-17 02.2	8.183	8.956	-0.35	-3.1	18.9	138.5
Oct. 19	22 36.05	-17 33.0	8.375	9.020	-0.28	-2.5	19.0	127.8
Oct. 29	22 33.28	-17 57.8	8.586	9.083	-0.20	-1.9	19.1	117.2
Nov. 8	22 31.30	-18 16.6	8.812	9.147	-0.12	-1.3	19.1	106.7
Nov. 18	22 30.10	-18 29.9	9.047	9.211	-0.04	-0.8	19.2	96.4
Nov. 28	22 29.69	-18 38.2	9.285	9.274	+0.03	-0.4	19.3	86.3
Dec. 8	22 30.01	-18 42.1	9.521	9.337	+0.10	0.0	19.4	76.3
Dec. 18	22 31.01	-18 42.4	9.749	9.401	+0.16	+0.3	19.4	66.5
Dec. 28	22 32.60	-18 39.6	9.966	9.464	+0.21	+0.5	19.5	56.9
Jan. 7	22 34.72	-18 34.4	10.165	9.527	+0.25	+0.7	19.6	47.4
Jan. 17	22 37.26	-18 27.6	10.345	9.590	+0.29	+0.8	19.6	38.1
Jan. 27	22 40.14	-18 19.7	10.502	9.653	+0.31	+0.8	19.7	29.0
Feb. 6	22 43.27	-18 11.4	10.634	9.716	+0.33	+0.8	19.7	20.4
Feb. 16	22 46.57	-18 03.4	10.738	9.779	+0.34	+0.7	19.8	13.0
Feb. 26	22 49.94	-17 56.1	10.816	9.841	+0.34	+0.6	19.8	9.7
Mar. 8	22 53.31	-17 50.2	10.865	9.904	+0.33	+0.4	19.8	13.8
Mar. 18	22 56.60	-17 46.2	10.887	9.966	+0.31	+0.2	19.9	21.3
Mar. 28	22 59.73	-17 44.7	10.883	10.029	+0.29	-0.1	19.9	29.7

Comet C/2013 H2 (Boattini)

Epoch = 2016 July 31.0 TT
T = 2014 Jan. 23.16488 TT
Peri. = 36.00557
Node = 262.71824 2000.0
Incl. = 128.38801
q = 7.5012145 AU
e = 0.9989584

m1 = 1.4 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 38.81	+38 18.9	8.723	8.695	+0.06	+6.9	20.2	85.1
Jan. 13	14 39.46	+39 28.1	8.635	8.725	−0.03	+7.6	20.2	92.0
Jan. 23	14 39.17	+40 44.1	8.551	8.756	−0.13	+8.1	20.2	98.8
Feb. 2	14 37.84	+42 05.4	8.477	8.787	−0.25	+8.4	20.2	105.3
Feb. 12	14 35.33	+43 29.8	8.415	8.819	−0.38	+8.5	20.2	111.1
Feb. 22	14 31.58	+44 54.9	8.370	8.851	−0.50	+8.3	20.2	116.2
Mar. 3	14 26.56	+46 17.8	8.344	8.883	−0.63	+7.8	20.2	120.1
Mar. 13	14 20.30	+47 35.6	8.340	8.915	−0.74	+7.0	20.3	122.6
Mar. 23	14 12.92	+48 45.4	8.358	8.948	−0.83	+5.9	20.3	123.5
Apr. 2	14 04.64	+49 44.7	8.401	8.980	−0.89	+4.7	20.3	122.7
Apr. 12	13 55.73	+50 31.7	8.465	9.014	−0.92	+3.3	20.4	120.4
Apr. 22	13 46.55	+51 05.2	8.551	9.047	−0.91	+2.0	20.4	116.7
May 2	13 37.46	+51 25.0	8.656	9.080	−0.86	+0.7	20.5	111.9
May 12	13 28.83	+51 31.6	8.776	9.114	−0.79	−0.5	20.5	106.5
May 22	13 20.95	+51 26.4	8.908	9.148	−0.69	−1.5	20.6	100.6
June 1	13 14.05	+51 10.9	9.049	9.182	−0.58	−2.4	20.6	94.4
June 11	13 08.26	+50 47.3	9.195	9.217	−0.46	−3.0	20.7	88.1
June 21	13 03.67	+50 17.4	9.342	9.251	−0.34	−3.4	20.7	81.8
July 1	13 00.24	+49 43.3	9.487	9.286	−0.23	−3.7	20.8	75.6
July 11	12 57.96	+49 06.7	9.626	9.321	−0.12	−3.7	20.9	69.7
July 21	12 56.72	+48 29.3	9.756	9.357	−0.03	−3.7	20.9	64.1
July 31	12 56.43	+47 52.5	9.874	9.392	+0.05	−3.5	21.0	59.0
Aug. 10	12 56.97	+47 17.4	9.979	9.428	+0.13	−3.2	21.0	54.6
Aug. 20	12 58.24	+46 45.3	10.067	9.464	+0.19	−2.8	21.1	51.0
Aug. 30	13 00.12	+46 17.1	10.138	9.500	+0.24	−2.3	21.1	48.5
Sept. 9	13 02.50	+45 53.6	10.191	9.536	+0.28	−1.8	21.1	47.3
Sept.19	13 05.26	+45 35.7	10.224	9.573	+0.30	−1.2	21.2	47.4
Sept.29	13 08.30	+45 23.9	10.238	9.609	+0.32	−0.5	21.2	48.9
Oct. 9	13 11.52	+45 19.0	10.234	9.646	+0.33	+0.3	21.2	51.7
Oct. 19	13 14.78	+45 21.6	10.212	9.683	+0.32	+1.0	21.2	55.5
Oct. 29	13 18.00	+45 32.0	10.174	9.720	+0.30	+1.9	21.3	60.3
Nov. 8	13 21.04	+45 50.8	10.122	9.758	+0.27	+2.7	21.3	65.8
Nov. 18	13 23.79	+46 17.9	10.058	9.795	+0.23	+3.6	21.3	71.8
Nov. 28	13 26.11	+46 53.6	9.986	9.833	+0.18	+4.4	21.3	78.2
Dec. 8	13 27.88	+47 37.6	9.910	9.871	+0.11	+5.2	21.3	84.9
Dec. 18	13 28.94	+48 29.3	9.833	9.909	+0.02	+5.9	21.3	91.6
Dec. 28	13 29.15	+49 27.8	9.758	9.947	−0.08	+6.4	21.3	98.2
Jan. 7	13 28.36	+50 32.0	9.691	9.985	−0.19	+6.8	21.3	104.6
Jan. 17	13 26.46	+51 40.1	9.635	10.023	−0.31	+7.0	21.3	110.6
Jan. 27	13 23.31	+52 50.1	9.594	10.062	−0.45	+6.9	21.4	115.8
Feb. 6	13 18.86	+53 59.6	9.571	10.101	−0.58	+6.6	21.4	120.1
Feb. 16	13 13.08	+55 05.9	9.568	10.140	−0.70	+6.1	21.4	123.0
Feb. 26	13 06.05	+56 06.5	9.587	10.179	−0.81	+5.2	21.4	124.4
Mar. 8	12 57.92	+56 58.9	9.628	10.218	−0.90	+4.2	21.5	124.1
Mar. 18	12 48.96	+57 41.0	9.692	10.257	−0.95	+3.1	21.5	122.2
Mar. 28	12 39.49	+58 11.6	9.777	10.297	−0.96	+1.8	21.5	118.9

Comet C/2013 G7 (McNaught)

Epoch = 2016 July 31.0 TT
T = 2014 Mar. 18.92760 TT
Peri. = 218.30453
Node = 48.37047 2000.0
Incl. = 105.10428
q = 4.6796919 AU
e = 0.9970873

m1 = 9.4 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 46.22	-51 51.0	6.545	6.848	-1.17	+6.5	19.7	103.9
Jan. 13	05 34.55	-50 45.8	6.614	6.900	-1.01	+8.1	19.8	102.9
Jan. 23	05 24.47	-49 25.0	6.698	6.953	-0.83	+9.3	19.8	101.0
Feb. 2	05 16.21	-47 52.4	6.797	7.006	-0.64	+10.1	19.9	98.2
Feb. 12	05 09.82	-46 11.8	6.907	7.059	-0.46	+10.5	20.0	94.8
Feb. 22	05 05.26	-44 27.0	7.028	7.112	-0.29	+10.5	20.0	90.9
Mar. 3	05 02.37	-42 41.6	7.156	7.165	-0.14	+10.3	20.1	86.6
Mar. 13	05 00.98	-40 58.2	7.288	7.219	-0.01	+9.9	20.2	82.1
Mar. 23	05 00.88	-39 19.3	7.423	7.272	+0.10	+9.3	20.2	77.5
Apr. 2	05 01.88	-37 46.5	7.556	7.326	+0.19	+8.5	20.3	73.0
Apr. 12	05 03.78	-36 21.2	7.685	7.380	+0.26	+7.7	20.3	68.7
Apr. 22	05 06.41	-35 04.5	7.808	7.434	+0.32	+6.8	20.4	64.7
May 2	05 09.61	-33 56.7	7.922	7.488	+0.36	+5.8	20.5	61.2
May 12	05 13.23	-32 58.5	8.025	7.543	+0.39	+4.9	20.5	58.2
May 22	05 17.15	-32 10.0	8.117	7.597	+0.41	+3.9	20.6	56.0
June 1	05 21.22	-31 31.2	8.194	7.652	+0.41	+2.9	20.6	54.6
June 11	05 25.35	-31 02.0	8.257	7.707	+0.41	+2.0	20.6	54.1
June 21	05 29.42	-30 42.4	8.306	7.762	+0.39	+1.0	20.7	54.6
July 1	05 33.32	-30 31.9	8.339	7.817	+0.36	+0.2	20.7	56.0
July 11	05 36.94	-30 30.4	8.358	7.872	+0.32	-0.7	20.7	58.3
July 21	05 40.18	-30 37.2	8.362	7.927	+0.28	-1.5	20.8	61.4
July 31	05 42.94	-30 51.9	8.354	7.982	+0.22	-2.2	20.8	65.2
Aug. 10	05 45.12	-31 13.7	8.334	8.037	+0.15	-2.8	20.8	69.6
Aug. 20	05 46.60	-31 41.7	8.304	8.093	+0.07	-3.3	20.8	74.5
Aug. 30	05 47.29	-32 15.0	8.267	8.148	-0.02	-3.7	20.8	79.7
Sept. 9	05 47.10	-32 52.2	8.226	8.204	-0.12	-4.0	20.8	85.2
Sept.19	05 45.95	-33 31.7	8.182	8.259	-0.22	-4.0	20.8	90.9
Sept.29	05 43.77	-34 11.8	8.141	8.315	-0.32	-3.9	20.9	96.6
Oct. 9	05 40.54	-34 50.5	8.103	8.371	-0.43	-3.5	20.9	102.1
Oct. 19	05 36.27	-35 25.5	8.075	8.426	-0.52	-2.9	20.9	107.4
Oct. 29	05 31.03	-35 54.6	8.057	8.482	-0.61	-2.1	20.9	112.2
Nov. 8	05 24.94	-36 15.7	8.055	8.538	-0.67	-1.1	20.9	116.2
Nov. 18	05 18.19	-36 26.7	8.069	8.594	-0.72	0.0	20.9	119.1
Nov. 28	05 11.03	-36 26.4	8.103	8.650	-0.73	+1.3	21.0	120.8
Dec. 8	05 03.73	-36 13.8	8.157	8.706	-0.71	+2.5	21.0	121.1
Dec. 18	04 56.59	-35 49.0	8.232	8.762	-0.67	+3.6	21.0	119.8
Dec. 28	04 49.87	-35 12.5	8.327	8.818	-0.61	+4.7	21.1	117.1
Jan. 7	04 43.82	-34 25.7	8.441	8.874	-0.52	+5.5	21.1	113.1
Jan. 17	04 38.60	-33 30.3	8.573	8.930	-0.43	+6.2	21.2	108.3
Jan. 27	04 34.33	-32 28.5	8.718	8.986	-0.33	+6.6	21.3	102.7
Feb. 6	04 31.07	-31 22.2	8.875	9.042	-0.23	+6.9	21.3	96.6
Feb. 16	04 28.81	-30 13.6	9.039	9.098	-0.13	+6.9	21.4	90.3
Feb. 26	04 27.51	-29 04.6	9.207	9.154	-0.04	+6.8	21.4	83.9
Mar. 8	04 27.11	-27 56.7	9.375	9.210	+0.04	+6.5	21.5	77.4
Mar. 18	04 27.51	-26 51.4	9.540	9.266	+0.11	+6.2	21.5	71.1
Mar. 28	04 28.63	-25 49.7	9.698	9.322	+0.17	+5.7	21.6	65.1

Comet 117P/Helin-Roman-Alu

Epoch = 2016 July 31.0 TT
T = 2014 Mar. 26.65347 TT
Peri. = 222.54467 e = 0.2541531
Node = 58.87407 2000.0 a = 4.0941625 AU
Incl. = 8.69958 n = 0.11897520
q = 3.0536184 AU P = 8.28 years

m1 = 4.8 + 5 log(Delta) + 15.0 log(r(t-160))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 59.23	+01 15.4	3.964	4.123	+0.42	+4.7	16.4	92.3
Jan. 13	01 03.43	+02 02.7	4.140	4.144	+0.53	+5.2	16.6	83.4
Jan. 23	01 08.78	+02 55.0	4.313	4.165	+0.63	+5.6	16.7	74.8
Feb. 2	01 15.10	+03 51.3	4.481	4.186	+0.72	+5.9	16.8	66.5
Feb. 12	01 22.28	+04 50.7	4.640	4.207	+0.79	+6.1	16.9	58.4
Feb. 22	01 30.18	+05 52.1	4.787	4.228	+0.85	+6.3	17.0	50.5
Mar. 3	01 38.66	+06 54.7	4.922	4.249	+0.90	+6.3	17.1	42.9
Mar. 13	01 47.64	+07 57.8	5.042	4.269	+0.94	+6.3	17.2	35.3
Mar. 23	01 57.01	+09 00.8	5.145	4.290	+0.97	+6.2	17.3	27.9
Apr. 2	02 06.68	+10 02.8	5.231	4.310	+0.99	+6.1	17.4	20.7
Apr. 12	02 16.58	+11 03.6	5.298	4.330	+1.00	+5.9	17.4	13.5
Apr. 22	02 26.63	+12 02.4	5.347	4.350	+1.01	+5.7	17.5	6.6
May 2	02 36.74	+12 59.0	5.376	4.369	+1.01	+5.4	17.5	2.4
May 12	02 46.85	+13 53.0	5.386	4.389	+1.00	+5.1	17.6	8.2
May 22	02 56.88	+14 44.0	5.377	4.408	+0.99	+4.8	17.6	15.2
June 1	03 06.76	+15 31.8	5.349	4.427	+0.96	+4.4	17.6	22.2
June 11	03 16.40	+16 16.3	5.304	4.446	+0.93	+4.1	17.7	29.3
June 21	03 25.70	+16 57.2	5.240	4.464	+0.89	+3.7	17.7	36.5
July 1	03 34.59	+17 34.4	5.161	4.483	+0.83	+3.4	17.7	43.8
July 11	03 42.93	+18 08.1	5.067	4.501	+0.77	+3.0	17.7	51.3
July 21	03 50.63	+18 38.1	4.959	4.519	+0.69	+2.6	17.6	58.9
July 31	03 57.55	+19 04.5	4.840	4.537	+0.60	+2.3	17.6	66.8
Aug. 10	04 03.56	+19 27.3	4.712	4.554	+0.49	+1.9	17.6	74.9
Aug. 20	04 08.51	+19 46.7	4.578	4.572	+0.37	+1.6	17.6	83.3
Aug. 30	04 12.25	+20 02.8	4.441	4.589	+0.24	+1.3	17.5	92.0
Sept. 9	04 14.64	+20 15.5	4.304	4.606	+0.09	+0.9	17.5	101.1
Sept.19	04 15.56	+20 25.0	4.172	4.622	−0.06	+0.6	17.4	110.6
Sept.29	04 14.93	+20 31.1	4.049	4.639	−0.22	+0.3	17.4	120.5
Oct. 9	04 12.72	+20 33.9	3.939	4.655	−0.37	−0.1	17.4	130.9
Oct. 19	04 09.01	+20 33.2	3.848	4.671	−0.50	−0.4	17.4	141.6
Oct. 29	04 03.99	+20 29.1	3.781	4.686	−0.60	−0.7	17.4	152.8
Nov. 8	03 57.94	+20 22.0	3.741	4.702	−0.66	−1.0	17.4	164.2
Nov. 18	03 51.32	+20 12.4	3.730	4.717	−0.67	−1.1	17.4	175.8
Nov. 28	03 44.59	+20 01.5	3.752	4.732	−0.63	−1.1	17.4	172.5
Dec. 8	03 38.25	+19 50.6	3.805	4.746	−0.55	−0.9	17.5	160.8
Dec. 18	03 32.75	+19 41.2	3.887	4.761	−0.43	−0.6	17.5	149.4
Dec. 28	03 28.44	+19 34.7	3.997	4.775	−0.29	−0.2	17.6	138.2
Jan. 7	03 25.54	+19 32.2	4.128	4.789	−0.14	+0.2	17.7	127.3
Jan. 17	03 24.16	+19 34.4	4.277	4.802	+0.01	+0.7	17.8	116.8
Jan. 27	03 24.30	+19 41.5	4.439	4.816	+0.16	+1.2	17.9	106.7
Feb. 6	03 25.92	+19 53.3	4.609	4.829	+0.30	+1.6	18.0	97.0
Feb. 16	03 28.91	+20 09.4	4.781	4.842	+0.42	+2.0	18.1	87.6
Feb. 26	03 33.13	+20 29.2	4.952	4.854	+0.53	+2.3	18.2	78.6
Mar. 8	03 38.46	+20 52.0	5.118	4.867	+0.63	+2.5	18.3	69.9
Mar. 18	03 44.75	+21 17.0	5.276	4.879	+0.71	+2.6	18.4	61.4
Mar. 28	03 51.87	+21 43.4	5.422	4.890	+0.78	+2.7	18.5	53.2

Comet 17P/Holmes

Epoch = 2016 July 31.0 TT
T = 2014 Mar. 27.01987 TT
Peri. = 24.72463 e = 0.4304531
Node = 326.77421 2000.0 a = 3.6252500 AU
Incl. = 19.07656 n = 0.14278978
q = 2.0647499 AU P = 6.90 years

m1 = 8.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 23.69	+23 23.8	3.436	4.279	−0.67	+1.7	20.2	145.1
Jan. 13	09 16.99	+23 40.8	3.389	4.309	−0.77	+1.6	20.2	156.4
Jan. 23	09 09.24	+23 56.7	3.372	4.338	−0.82	+1.2	20.2	167.3
Feb. 2	09 01.00	+24 09.2	3.387	4.367	−0.81	+0.7	20.3	172.9
Feb. 12	08 52.85	+24 16.1	3.434	4.395	−0.74	0.0	20.3	165.0
Feb. 22	08 45.42	+24 16.3	3.512	4.422	−0.63	−0.7	20.4	154.0
Mar. 3	08 39.17	+24 09.7	3.618	4.450	−0.47	−1.3	20.5	142.9
Mar. 13	08 34.43	+23 56.5	3.749	4.476	−0.30	−1.9	20.6	132.1
Mar. 23	08 31.39	+23 37.5	3.899	4.502	−0.13	−2.4	20.8	121.6
Apr. 2	08 30.06	+23 13.8	4.064	4.528	+0.03	−2.8	20.9	111.6
Apr. 12	08 30.38	+22 46.0	4.238	4.553	+0.18	−3.1	21.0	102.0
Apr. 22	08 32.21	+22 14.6	4.418	4.578	+0.32	−3.4	21.1	92.8
May 2	08 35.39	+21 40.3	4.598	4.602	+0.43	−3.7	21.3	83.9
May 12	08 39.73	+21 03.1	4.776	4.626	+0.53	−4.0	21.4	75.4
May 22	08 45.06	+20 23.4	4.948	4.649	+0.61	−4.2	21.5	67.1
June 1	08 51.20	+19 41.2	5.110	4.671	+0.68	−4.5	21.6	59.1
June 11	08 58.02	+18 56.7	5.261	4.694	+0.74	−4.7	21.7	51.3
June 21	09 05.37	+18 10.0	5.398	4.715	+0.78	−4.9	21.8	43.6
July 1	09 13.13	+17 21.2	5.520	4.736	+0.81	−5.1	21.8	36.1
July 11	09 21.20	+16 30.5	5.624	4.757	+0.83	−5.2	21.9	28.7
July 21	09 29.47	+15 38.0	5.710	4.777	+0.84	−5.4	22.0	21.3
July 31	09 37.86	+14 44.0	5.776	4.797	+0.84	−5.5	22.0	13.9
Aug. 10	09 46.29	+13 48.7	5.822	4.816	+0.84	−5.6	22.1	6.6
Aug. 20	09 54.67	+12 52.6	5.846	4.835	+0.83	−5.7	22.1	0.8
Aug. 30	10 02.94	+11 55.8	5.850	4.853	+0.81	−5.7	22.1	8.2
Sept. 9	10 11.02	+10 58.9	5.832	4.871	+0.78	−5.7	22.1	15.7
Sept.19	10 18.82	+10 02.2	5.794	4.888	+0.75	−5.6	22.2	23.3
Sept.29	10 26.27	+09 06.2	5.735	4.904	+0.70	−5.5	22.2	31.1
Oct. 9	10 33.29	+08 11.6	5.657	4.921	+0.65	−5.3	22.1	39.0
Oct. 19	10 39.78	+07 18.8	5.560	4.936	+0.59	−5.0	22.1	47.1
Oct. 29	10 45.63	+06 28.6	5.448	4.952	+0.51	−4.7	22.1	55.4
Nov. 8	10 50.74	+05 41.6	5.321	4.966	+0.43	−4.3	22.1	63.9
Nov. 18	10 54.99	+04 58.6	5.184	4.981	+0.33	−3.8	22.0	72.7
Nov. 28	10 58.27	+04 20.3	5.038	4.994	+0.22	−3.3	22.0	81.8
Dec. 8	11 00.43	+03 47.7	4.888	5.008	+0.10	−2.6	21.9	91.3
Dec. 18	11 01.39	+03 21.4	4.738	5.021	−0.03	−1.9	21.9	101.0
Dec. 28	11 01.04	+03 02.2	4.594	5.033	−0.17	−1.2	21.8	111.2
Jan. 7	10 59.33	+02 50.6	4.459	5.045	−0.30	−0.4	21.8	121.6
Jan. 17	10 56.29	+02 46.8	4.340	5.056	−0.43	+0.4	21.7	132.5
Jan. 27	10 52.01	+02 50.7	4.241	5.067	−0.53	+1.1	21.7	143.6
Feb. 6	10 46.67	+03 01.6	4.167	5.077	−0.61	+1.7	21.7	154.9
Feb. 16	10 40.58	+03 18.2	4.123	5.087	−0.65	+2.1	21.7	166.0
Feb. 26	10 34.09	+03 39.0	4.110	5.097	−0.65	+2.3	21.7	174.8
Mar. 8	10 27.61	+04 01.9	4.129	5.106	−0.60	+2.3	21.7	168.5
Mar. 18	10 21.57	+04 24.5	4.180	5.114	−0.53	+2.1	21.7	157.6
Mar. 28	10 16.31	+04 45.1	4.260	5.122	−0.42	+1.7	21.8	146.5

Comet 119P/Parker-Hartley

Epoch = 2016 July 31.0 TT
T = 2014 Apr. 3.93244 TT
Peri. = 182.38327 e = 0.3006656
Node = 242.23761 2000.0 a = 4.2793884 AU
Incl. = 5.23801 n = 0.11133495
q = 2.9927235 AU P = 8.85 years

m1 = 9.6 + 5 log(Delta) + 12.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 06.08	-06 24.9	3.996	4.243	+0.15	-2.1	20.5	97.8
Jan. 13	12 07.62	-06 46.1	3.868	4.268	0.00	-1.1	20.4	107.5
Jan. 23	12 07.66	-06 57.4	3.749	4.293	-0.15	-0.1	20.4	117.5
Feb. 2	12 06.19	-06 58.3	3.642	4.318	-0.29	+1.0	20.3	127.9
Feb. 12	12 03.28	-06 48.3	3.552	4.342	-0.42	+2.0	20.3	138.7
Feb. 22	11 59.11	-06 28.0	3.485	4.367	-0.51	+3.0	20.3	149.6
Mar. 3	11 53.98	-05 58.4	3.444	4.391	-0.57	+3.7	20.3	160.7
Mar. 13	11 48.28	-05 21.7	3.431	4.415	-0.58	+4.1	20.3	170.9
Mar. 23	11 42.48	-04 40.6	3.450	4.439	-0.55	+4.2	20.4	172.3
Apr. 2	11 37.02	-03 58.3	3.499	4.463	-0.47	+4.0	20.4	162.8
Apr. 12	11 32.32	-03 17.9	3.576	4.487	-0.36	+3.6	20.5	152.1
Apr. 22	11 28.68	-02 42.2	3.680	4.510	-0.24	+2.9	20.6	141.5
May 2	11 26.31	-02 13.1	3.807	4.534	-0.10	+2.1	20.7	131.1
May 12	11 25.29	-01 52.1	3.951	4.557	+0.03	+1.2	20.8	121.1
May 22	11 25.63	-01 39.6	4.110	4.579	+0.16	+0.4	20.9	111.6
June 1	11 27.27	-01 35.8	4.277	4.602	+0.28	-0.5	21.0	102.4
June 11	11 30.10	-01 40.4	4.450	4.624	+0.39	-1.2	21.2	93.5
June 21	11 34.02	-01 52.9	4.624	4.647	+0.49	-2.0	21.3	85.0
July 1	11 38.88	-02 12.6	4.796	4.669	+0.57	-2.6	21.4	76.7
July 11	11 44.58	-02 38.7	4.964	4.690	+0.64	-3.2	21.5	68.7
July 21	11 50.98	-03 10.5	5.123	4.712	+0.70	-3.7	21.6	60.8
July 31	11 57.99	-03 47.2	5.272	4.733	+0.75	-4.1	21.6	53.1
Aug. 10	12 05.51	-04 28.2	5.408	4.754	+0.79	-4.4	21.7	45.6
Aug. 20	12 13.44	-05 12.7	5.530	4.775	+0.83	-4.7	21.8	38.1
Aug. 30	12 21.70	-05 60.0	5.636	4.795	+0.85	-5.0	21.9	30.7
Sept. 9	12 30.23	-06 49.5	5.724	4.816	+0.87	-5.1	21.9	23.3
Sept.19	12 38.95	-07 40.6	5.793	4.836	+0.88	-5.2	22.0	16.0
Sept.29	12 47.78	-08 32.6	5.843	4.856	+0.89	-5.2	22.0	8.8
Oct. 9	12 56.67	-09 25.0	5.872	4.875	+0.89	-5.2	22.0	3.2
Oct. 19	13 05.53	-10 17.2	5.881	4.895	+0.88	-5.1	22.1	7.4
Oct. 29	13 14.30	-11 08.6	5.868	4.914	+0.86	-5.0	22.1	14.7
Nov. 8	13 22.89	-11 58.7	5.834	4.932	+0.83	-4.8	22.1	22.4
Nov. 18	13 31.21	-12 46.8	5.781	4.951	+0.80	-4.6	22.1	30.2
Nov. 28	13 39.18	-13 32.5	5.708	4.969	+0.75	-4.3	22.1	38.2
Dec. 8	13 46.68	-14 15.3	5.617	4.987	+0.69	-3.9	22.1	46.3
Dec. 18	13 53.60	-14 54.6	5.509	5.005	+0.62	-3.5	22.0	54.7
Dec. 28	13 59.83	-15 29.8	5.388	5.023	+0.54	-3.1	22.0	63.2
Jan. 7	14 05.22	-16 00.6	5.256	5.040	+0.44	-2.6	22.0	72.0
Jan. 17	14 09.66	-16 26.2	5.116	5.057	+0.34	-2.0	21.9	81.0
Jan. 27	14 13.01	-16 46.3	4.972	5.074	+0.21	-1.4	21.9	90.3
Feb. 6	14 15.15	-17 00.2	4.827	5.090	+0.09	-0.7	21.9	99.9
Feb. 16	14 16.01	-17 07.5	4.687	5.106	-0.05	0.0	21.8	109.8
Feb. 26	14 15.52	-17 07.8	4.556	5.122	-0.18	+0.7	21.8	119.9
Mar. 8	14 13.69	-17 00.8	4.439	5.138	-0.31	+1.4	21.7	130.4
Mar. 18	14 10.63	-16 46.5	4.341	5.153	-0.41	+2.1	21.7	141.1
Mar. 28	14 06.50	-16 25.3	4.266	5.168	-0.49	+2.7	21.7	152.0

Comet C/2012 U1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2014 July 5.40752 TT
Peri. = 70.17212
Node = 26.96936 2000.0
Incl. = 56.34516
q = 5.2675152 AU
e = 0.9986388

m1 = -0.6 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 25.47	+41 22.1	6.394	6.618	+0.13	+2.6	19.8	98.9
Jan. 13	13 26.73	+41 48.6	6.326	6.660	-0.01	+3.1	19.9	105.7
Jan. 23	13 26.64	+42 19.7	6.267	6.704	-0.15	+3.3	19.9	112.4
Feb. 2	13 25.15	+42 53.2	6.219	6.747	-0.29	+3.3	20.0	118.7
Feb. 12	13 22.25	+43 26.2	6.186	6.791	-0.42	+2.9	20.0	124.3
Feb. 22	13 18.03	+43 55.7	6.171	6.836	-0.54	+2.3	20.0	128.9
Mar. 3	13 12.66	+44 18.6	6.176	6.880	-0.63	+1.4	20.1	132.1
Mar. 13	13 06.39	+44 32.2	6.203	6.926	-0.68	+0.2	20.2	133.6
Mar. 23	12 59.57	+44 34.2	6.252	6.971	-0.70	-1.1	20.2	133.1
Apr. 2	12 52.57	+44 23.4	6.324	7.017	-0.68	-2.4	20.3	130.7
Apr. 12	12 45.76	+43 59.5	6.418	7.062	-0.62	-3.7	20.4	126.7
Apr. 22	12 39.52	+43 22.7	6.532	7.109	-0.54	-4.8	20.5	121.5
May 2	12 34.09	+42 34.5	6.664	7.155	-0.44	-5.8	20.6	115.5
May 12	12 29.68	+41 36.4	6.811	7.202	-0.33	-6.6	20.7	108.9
May 22	12 26.38	+40 30.4	6.970	7.249	-0.22	-7.2	20.8	102.1
June 1	12 24.22	+39 18.3	7.138	7.296	-0.10	-7.6	20.9	95.0
June 11	12 23.18	+38 02.0	7.312	7.344	0.00	-7.9	21.0	87.9
June 21	12 23.18	+36 43.1	7.487	7.392	+0.10	-8.0	21.1	80.7
July 1	12 24.14	+35 23.1	7.662	7.440	+0.18	-8.0	21.3	73.6
July 11	12 25.95	+34 02.9	7.832	7.488	+0.26	-7.9	21.4	66.7
July 21	12 28.50	+32 43.7	7.996	7.537	+0.32	-7.8	21.5	59.8
July 31	12 31.69	+31 26.2	8.149	7.585	+0.37	-7.5	21.6	53.2
Aug. 10	12 35.42	+30 11.0	8.291	7.634	+0.42	-7.2	21.6	46.9
Aug. 20	12 39.58	+28 58.9	8.417	7.683	+0.45	-6.9	21.7	41.1
Aug. 30	12 44.10	+27 50.2	8.528	7.733	+0.48	-6.5	21.8	35.9
Sept. 9	12 48.87	+26 45.5	8.620	7.782	+0.50	-6.0	21.9	31.8
Sept.19	12 53.82	+25 45.1	8.693	7.832	+0.50	-5.6	22.0	29.2
Sept.29	12 58.87	+24 49.4	8.746	7.881	+0.51	-5.1	22.0	28.6
Oct. 9	13 03.93	+23 58.8	8.778	7.931	+0.50	-4.5	22.1	30.3
Oct. 19	13 08.92	+23 13.7	8.789	7.981	+0.48	-3.9	22.2	33.8
Oct. 29	13 13.76	+22 34.4	8.780	8.032	+0.46	-3.3	22.2	38.9
Nov. 8	13 18.37	+22 01.1	8.752	8.082	+0.43	-2.7	22.3	45.0
Nov. 18	13 22.65	+21 34.1	8.705	8.133	+0.39	-2.1	22.3	51.9
Nov. 28	13 26.53	+21 13.6	8.642	8.183	+0.34	-1.4	22.3	59.4
Dec. 8	13 29.91	+20 59.6	8.565	8.234	+0.28	-0.8	22.4	67.2
Dec. 18	13 32.70	+20 52.0	8.477	8.285	+0.21	-0.1	22.4	75.4
Dec. 28	13 34.82	+20 50.6	8.382	8.336	+0.14	+0.4	22.4	83.9
Jan. 7	13 36.20	+20 55.0	8.284	8.387	+0.06	+0.9	22.5	92.6
Jan. 17	13 36.78	+21 04.4	8.188	8.438	-0.03	+1.4	22.5	101.5
Jan. 27	13 36.51	+21 18.0	8.097	8.490	-0.11	+1.7	22.5	110.4
Feb. 6	13 35.38	+21 34.5	8.016	8.541	-0.20	+1.8	22.6	119.2
Feb. 16	13 33.40	+21 52.6	7.950	8.593	-0.28	+1.8	22.6	127.9
Feb. 26	13 30.65	+22 10.6	7.904	8.644	-0.34	+1.6	22.6	136.1
Mar. 8	13 27.21	+22 26.8	7.880	8.696	-0.40	+1.3	22.7	143.3
Mar. 18	13 23.23	+22 39.7	7.882	8.748	-0.43	+0.8	22.7	148.7
Mar. 28	13 18.89	+22 47.8	7.911	8.800	-0.45	+0.2	22.8	151.3

Comet C/2013 P4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2014 Aug. 11.24644 TT
Peri. = 113.50014 e = 0.5943649
Node = 256.58572 2000.0 a = 14.7065281 AU
Incl. = 4.26732 n = 0.01747587
q = 5.9654840 AU P = 56.40 years

m1 = 3.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	02 42.15	+17 51.8	5.988	6.560	+0.03	−0.5	19.1	121.8
Jan. 13	02 42.43	+17 46.8	6.155	6.582	+0.13	0.0	19.2	111.7
Jan. 23	02 43.72	+17 46.5	6.332	6.604	+0.23	+0.4	19.3	101.8
Feb. 2	02 45.98	+17 50.8	6.516	6.626	+0.32	+0.9	19.4	92.2
Feb. 12	02 49.17	+17 59.3	6.700	6.649	+0.40	+1.2	19.5	82.8
Feb. 22	02 53.19	+18 11.5	6.882	6.672	+0.48	+1.5	19.6	73.7
Mar. 3	02 57.97	+18 27.0	7.057	6.695	+0.54	+1.8	19.6	64.8
Mar. 13	03 03.40	+18 45.0	7.222	6.719	+0.60	+2.0	19.7	56.1
Mar. 23	03 09.39	+19 05.0	7.374	6.743	+0.65	+2.1	19.8	47.6
Apr. 2	03 15.86	+19 26.4	7.511	6.767	+0.69	+2.2	19.8	39.3
Apr. 12	03 22.71	+19 48.5	7.630	6.791	+0.71	+2.2	19.9	31.1
Apr. 22	03 29.85	+20 11.0	7.729	6.816	+0.74	+2.2	19.9	23.1
May 2	03 37.21	+20 33.3	7.809	6.841	+0.75	+2.2	20.0	15.1
May 12	03 44.70	+20 55.0	7.867	6.866	+0.75	+2.1	20.0	7.3
May 22	03 52.24	+21 15.9	7.903	6.891	+0.75	+2.0	20.1	1.2
June 1	03 59.75	+21 35.5	7.918	6.917	+0.74	+1.8	20.1	8.5
June 11	04 07.16	+21 53.7	7.911	6.942	+0.72	+1.7	20.1	16.3
June 21	04 14.37	+22 10.3	7.883	6.969	+0.69	+1.5	20.1	24.2
July 1	04 21.32	+22 25.2	7.835	6.995	+0.66	+1.3	20.1	32.1
July 11	04 27.92	+22 38.4	7.769	7.021	+0.62	+1.1	20.1	40.1
July 21	04 34.08	+22 49.6	7.685	7.048	+0.56	+0.9	20.1	48.2
July 31	04 39.71	+22 59.1	7.586	7.075	+0.50	+0.8	20.1	56.4
Aug. 10	04 44.73	+23 06.7	7.474	7.102	+0.43	+0.6	20.1	64.8
Aug. 20	04 49.04	+23 12.6	7.351	7.129	+0.35	+0.4	20.1	73.4
Aug. 30	04 52.56	+23 16.8	7.222	7.157	+0.27	+0.3	20.1	82.3
Sept. 9	04 55.21	+23 19.3	7.090	7.185	+0.17	+0.1	20.1	91.4
Sept.19	04 56.93	+23 20.3	6.958	7.213	+0.07	−0.1	20.1	100.7
Sept.29	04 57.68	+23 19.6	6.831	7.241	−0.02	−0.2	20.1	110.3
Oct. 9	04 57.43	+23 17.3	6.714	7.269	−0.12	−0.4	20.1	120.2
Oct. 19	04 56.22	+23 13.4	6.612	7.297	−0.21	−0.5	20.0	130.4
Oct. 29	04 54.13	+23 07.9	6.528	7.326	−0.29	−0.7	20.0	140.9
Nov. 8	04 51.26	+23 00.9	6.468	7.355	−0.34	−0.8	20.1	151.6
Nov. 18	04 47.82	+22 52.5	6.435	7.384	−0.38	−0.9	20.1	162.4
Nov. 28	04 44.02	+22 43.1	6.432	7.413	−0.39	−1.0	20.1	173.4
Dec. 8	04 40.11	+22 33.0	6.459	7.442	−0.38	−1.0	20.1	175.5
Dec. 18	04 36.35	+22 22.8	6.519	7.471	−0.34	−1.0	20.2	164.5
Dec. 28	04 32.99	+22 13.0	6.608	7.501	−0.28	−0.9	20.2	153.5
Jan. 7	04 30.23	+22 04.2	6.725	7.530	−0.20	−0.7	20.3	142.6
Jan. 17	04 28.25	+21 57.0	6.867	7.560	−0.11	−0.5	20.4	132.0
Jan. 27	04 27.13	+21 51.8	7.028	7.590	−0.02	−0.3	20.4	121.5
Feb. 6	04 26.95	+21 48.7	7.206	7.620	+0.08	−0.1	20.5	111.3
Feb. 16	04 27.70	+21 47.8	7.394	7.650	+0.17	+0.1	20.6	101.4
Feb. 26	04 29.36	+21 49.0	7.587	7.681	+0.25	+0.3	20.7	91.7
Mar. 8	04 31.89	+21 52.1	7.782	7.711	+0.33	+0.5	20.8	82.3
Mar. 18	04 35.20	+21 56.7	7.973	7.742	+0.40	+0.6	20.8	73.1
Mar. 28	04 39.22	+22 02.5	8.157	7.772	+0.46	+0.7	20.9	64.1

Comet C/2013 TW5 (Spacewatch)

Epoch = 2016 July 31.0 TT
T = 2014 Aug. 18.19928 TT
Peri. = 190.48426
Node = 319.69553 2000.0
Incl. = 31.40558
q = 5.8334431 AU
e = 0.9808057

m1 = 3.6 + 5 log(Delta) + 12.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 28.94	-30 36.2	6.849	6.801	+0.14	-6.4	18.2	83.1
Jan. 13	12 30.32	-31 39.8	6.738	6.836	+0.03	-5.8	18.2	91.5
Jan. 23	12 30.65	-32 38.3	6.630	6.871	-0.07	-5.2	18.2	100.1
Feb. 2	12 29.93	-33 30.4	6.528	6.907	-0.18	-4.5	18.2	108.7
Feb. 12	12 28.17	-34 15.0	6.436	6.944	-0.27	-3.6	18.2	117.2
Feb. 22	12 25.48	-34 50.7	6.359	6.980	-0.35	-2.6	18.2	125.5
Mar. 3	12 22.00	-35 16.5	6.301	7.017	-0.41	-1.5	18.2	133.3
Mar. 13	12 17.95	-35 32.0	6.263	7.055	-0.44	-0.5	18.2	140.1
Mar. 23	12 13.58	-35 37.0	6.250	7.093	-0.44	+0.5	18.2	145.4
Apr. 2	12 09.19	-35 32.2	6.262	7.131	-0.41	+1.3	18.2	148.2
Apr. 12	12 05.05	-35 18.8	6.300	7.170	-0.36	+2.0	18.3	148.0
Apr. 22	12 01.44	-34 58.5	6.363	7.209	-0.29	+2.5	18.3	144.9
May 2	11 58.54	-34 33.6	6.451	7.248	-0.20	+2.8	18.4	139.6
May 12	11 56.52	-34 06.1	6.562	7.288	-0.11	+2.8	18.5	132.9
May 22	11 55.45	-33 38.2	6.692	7.328	-0.01	+2.6	18.5	125.6
June 1	11 55.37	-33 12.0	6.839	7.368	+0.09	+2.3	18.6	117.9
June 11	11 56.27	-32 48.8	7.000	7.409	+0.18	+1.9	18.7	110.0
June 21	11 58.10	-32 30.1	7.170	7.449	+0.27	+1.4	18.8	102.1
July 1	12 00.80	-32 16.6	7.346	7.491	+0.35	+0.8	18.9	94.3
July 11	12 04.30	-32 08.8	7.525	7.532	+0.42	+0.2	18.9	86.5
July 21	12 08.50	-32 07.2	7.703	7.574	+0.48	-0.4	19.0	78.9
July 31	12 13.32	-32 11.6	7.877	7.616	+0.54	-1.0	19.1	71.5
Aug. 10	12 18.68	-32 22.1	8.045	7.658	+0.58	-1.6	19.2	64.2
Aug. 20	12 24.50	-32 38.4	8.203	7.701	+0.62	-2.2	19.3	57.1
Aug. 30	12 30.69	-33 00.2	8.349	7.744	+0.65	-2.7	19.3	50.3
Sept. 9	12 37.19	-33 27.1	8.481	7.787	+0.67	-3.2	19.4	43.9
Sept.19	12 43.91	-33 58.8	8.597	7.830	+0.69	-3.6	19.4	38.0
Sept.29	12 50.79	-34 34.8	8.696	7.873	+0.70	-4.0	19.5	32.9
Oct. 9	12 57.75	-35 14.7	8.776	7.917	+0.70	-4.3	19.5	29.0
Oct. 19	13 04.71	-35 58.0	8.836	7.961	+0.69	-4.6	19.6	26.9
Oct. 29	13 11.60	-36 44.4	8.876	8.005	+0.67	-4.9	19.6	27.1
Nov. 8	13 18.33	-37 33.3	8.896	8.050	+0.65	-5.1	19.7	29.6
Nov. 18	13 24.82	-38 24.3	8.896	8.094	+0.62	-5.3	19.7	33.9
Nov. 28	13 30.97	-39 16.9	8.876	8.139	+0.57	-5.4	19.7	39.5
Dec. 8	13 36.69	-40 10.7	8.838	8.184	+0.52	-5.4	19.7	46.0
Dec. 18	13 41.87	-41 04.9	8.784	8.229	+0.45	-5.4	19.8	53.0
Dec. 28	13 46.42	-41 59.2	8.715	8.274	+0.38	-5.4	19.8	60.4
Jan. 7	13 50.22	-42 52.8	8.635	8.320	+0.30	-5.2	19.8	68.2
Jan. 17	13 53.17	-43 44.9	8.546	8.366	+0.20	-5.0	19.8	76.2
Jan. 27	13 55.20	-44 34.6	8.451	8.411	+0.10	-4.6	19.8	84.3
Feb. 6	13 56.22	-45 21.1	8.355	8.457	0.00	-4.2	19.8	92.6
Feb. 16	13 56.20	-46 03.1	8.262	8.503	-0.11	-3.7	19.8	100.9
Feb. 26	13 55.14	-46 39.7	8.175	8.550	-0.20	-3.0	19.8	109.1
Mar. 8	13 53.09	-47 09.6	8.098	8.596	-0.29	-2.2	19.8	117.1
Mar. 18	13 50.17	-47 31.9	8.036	8.643	-0.36	-1.4	19.8	124.8
Mar. 28	13 46.53	-47 45.9	7.991	8.689	-0.41	-0.5	19.9	131.9

Comet C/2012 K8 (Lemmon)

Epoch = 2016 July 31.0 TT
T = 2014 Aug. 19.44478 TT
Peri. = 75.87686
Node = 312.80111 2000.0
Incl. = 106.11489
q = 6.4645004 AU
e = 0.9998757

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 29.17	+55 06.1	7.119	7.284	-0.14	+7.2	18.1	95.8
Jan. 13	14 27.80	+56 18.3	7.064	7.315	-0.32	+7.9	18.1	100.9
Jan. 23	14 24.64	+57 37.0	7.019	7.345	-0.53	+8.2	18.1	105.6
Feb. 2	14 19.39	+58 59.1	6.986	7.377	-0.76	+8.2	18.1	109.7
Feb. 12	14 11.75	+60 20.8	6.968	7.408	-1.02	+7.7	18.1	112.9
Feb. 22	14 01.57	+61 37.5	6.968	7.441	-1.27	+6.7	18.1	115.1
Mar. 3	13 48.85	+62 44.5	6.986	7.473	-1.50	+5.3	18.2	115.9
Mar. 13	13 33.84	+63 37.2	7.025	7.506	-1.67	+3.5	18.2	115.4
Mar. 23	13 17.16	+64 11.8	7.085	7.539	-1.75	+1.4	18.2	113.6
Apr. 2	12 59.67	+64 25.9	7.163	7.573	-1.73	-0.7	18.3	110.6
Apr. 12	12 42.40	+64 19.0	7.259	7.607	-1.61	-2.7	18.3	106.6
Apr. 22	12 26.31	+63 52.3	7.371	7.641	-1.42	-4.4	18.4	101.9
May 2	12 12.13	+63 08.6	7.495	7.676	-1.19	-5.7	18.4	96.6
May 12	12 00.26	+62 11.3	7.629	7.711	-0.94	-6.7	18.5	90.9
May 22	11 50.83	+61 04.1	7.768	7.746	-0.71	-7.4	18.5	85.0
June 1	11 43.75	+59 50.4	7.911	7.782	-0.49	-7.7	18.6	79.1
June 11	11 38.80	+58 33.2	8.052	7.818	-0.31	-7.8	18.7	73.1
June 21	11 35.72	+57 14.8	8.190	7.854	-0.15	-7.8	18.7	67.3
July 1	11 34.22	+55 57.1	8.321	7.891	-0.02	-7.5	18.8	61.8
July 11	11 34.04	+54 41.7	8.441	7.928	+0.09	-7.2	18.8	56.6
July 21	11 34.94	+53 29.8	8.550	7.965	+0.18	-6.8	18.9	52.0
July 31	11 36.69	+52 22.2	8.644	8.003	+0.24	-6.2	18.9	48.2
Aug. 10	11 39.12	+51 19.8	8.722	8.041	+0.29	-5.7	19.0	45.3
Aug. 20	11 42.06	+50 23.2	8.782	8.079	+0.33	-5.0	19.0	43.5
Aug. 30	11 45.34	+49 33.0	8.824	8.117	+0.35	-4.3	19.0	43.2
Sept. 9	11 48.85	+48 49.7	8.847	8.156	+0.36	-3.6	19.0	44.3
Sept.19	11 52.44	+48 13.7	8.850	8.195	+0.36	-2.8	19.1	46.8
Sept.29	11 55.99	+47 45.6	8.835	8.234	+0.34	-2.0	19.1	50.5
Oct. 9	11 59.38	+47 25.6	8.802	8.273	+0.31	-1.1	19.1	55.3
Oct. 19	12 02.47	+47 14.2	8.752	8.313	+0.27	-0.3	19.1	60.9
Oct. 29	12 05.14	+47 11.6	8.689	8.353	+0.21	+0.6	19.1	67.1
Nov. 8	12 07.26	+47 17.8	8.614	8.393	+0.14	+1.5	19.1	73.9
Nov. 18	12 08.66	+47 32.7	8.530	8.433	+0.06	+2.3	19.1	81.1
Nov. 28	12 09.21	+47 56.0	8.442	8.474	-0.05	+3.1	19.1	88.5
Dec. 8	12 08.75	+48 26.9	8.353	8.515	-0.16	+3.7	19.1	96.1
Dec. 18	12 07.15	+49 04.2	8.268	8.556	-0.29	+4.2	19.1	103.8
Dec. 28	12 04.26	+49 46.2	8.191	8.597	-0.43	+4.5	19.1	111.3
Jan. 7	11 60.00	+50 31.0	8.127	8.639	-0.57	+4.5	19.1	118.4
Jan. 17	11 54.32	+51 15.8	8.080	8.680	-0.70	+4.2	19.1	124.9
Jan. 27	11 47.28	+51 57.8	8.054	8.722	-0.83	+3.6	19.1	130.2
Feb. 6	11 39.00	+52 34.1	8.051	8.764	-0.92	+2.8	19.2	133.9
Feb. 16	11 29.76	+53 01.9	8.075	8.806	-0.99	+1.7	19.2	135.4
Feb. 26	11 19.89	+53 19.1	8.125	8.848	-1.01	+0.5	19.2	134.6
Mar. 8	11 09.82	+53 24.2	8.201	8.891	-0.98	-0.7	19.3	131.6
Mar. 18	11 00.01	+53 17.0	8.303	8.934	-0.92	-1.9	19.3	126.7
Mar. 28	10 50.84	+52 57.7	8.427	8.977	-0.82	-3.0	19.4	120.6

Comet P/2011 S1 (Gibbs)

Epoch = 2016 July 31.0 TT
T = 2014 Aug. 27.15712 TT
Peri. = 193.53872 e = 0.2009057
Node = 218.92561 2000.0 a = 8.6263721 AU
Incl. = 2.68221 n = 0.03890109
q = 6.8932848 AU P = 25.34 years

m1 = 3.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 09.85	+20 50.8	6.129	7.041	−0.33	−0.4	19.7	156.4
Jan. 13	05 06.59	+20 47.0	6.215	7.047	−0.25	−0.3	19.7	145.5
Jan. 23	05 04.09	+20 44.5	6.326	7.053	−0.16	−0.1	19.7	134.7
Feb. 2	05 02.50	+20 43.4	6.458	7.059	−0.06	+0.1	19.8	124.2
Feb. 12	05 01.90	+20 44.1	6.607	7.066	+0.04	+0.2	19.8	113.9
Feb. 22	05 02.32	+20 46.3	6.768	7.072	+0.14	+0.4	19.9	103.9
Mar. 3	05 03.74	+20 49.9	6.936	7.078	+0.24	+0.5	20.0	94.2
Mar. 13	05 06.13	+20 54.7	7.105	7.085	+0.33	+0.6	20.0	84.8
Mar. 23	05 09.40	+21 00.4	7.273	7.091	+0.41	+0.6	20.1	75.6
Apr. 2	05 13.48	+21 06.5	7.434	7.098	+0.48	+0.6	20.1	66.7
Apr. 12	05 18.28	+21 12.8	7.585	7.105	+0.54	+0.6	20.2	58.0
Apr. 22	05 23.69	+21 18.9	7.724	7.112	+0.59	+0.5	20.2	49.5
May 2	05 29.62	+21 24.4	7.847	7.119	+0.64	+0.5	20.3	41.2
May 12	05 35.98	+21 29.0	7.952	7.126	+0.67	+0.4	20.3	33.0
May 22	05 42.67	+21 32.5	8.038	7.133	+0.69	+0.2	20.3	24.9
June 1	05 49.61	+21 34.8	8.104	7.140	+0.71	+0.1	20.3	17.0
June 11	05 56.72	+21 35.6	8.148	7.148	+0.72	−0.1	20.4	9.1
June 21	06 03.90	+21 34.9	8.171	7.155	+0.72	−0.2	20.4	2.1
July 1	06 11.07	+21 32.6	8.171	7.163	+0.71	−0.4	20.4	7.0
July 11	06 18.15	+21 28.9	8.149	7.170	+0.69	−0.5	20.4	14.8
July 21	06 25.07	+21 23.7	8.105	7.178	+0.67	−0.6	20.4	22.7
July 31	06 31.73	+21 17.3	8.040	7.186	+0.63	−0.8	20.4	30.7
Aug. 10	06 38.06	+21 09.7	7.956	7.194	+0.59	−0.8	20.4	38.7
Aug. 20	06 43.96	+21 01.4	7.854	7.202	+0.54	−0.9	20.3	47.0
Aug. 30	06 49.35	+20 52.5	7.736	7.210	+0.48	−0.9	20.3	55.3
Sept. 9	06 54.15	+20 43.3	7.604	7.218	+0.41	−0.9	20.3	63.9
Sept.19	06 58.26	+20 34.3	7.462	7.226	+0.33	−0.9	20.2	72.6
Sept.29	07 01.60	+20 25.8	7.312	7.235	+0.25	−0.8	20.2	81.6
Oct. 9	07 04.08	+20 18.1	7.158	7.243	+0.16	−0.7	20.2	90.9
Oct. 19	07 05.65	+20 11.6	7.005	7.251	+0.06	−0.5	20.1	100.4
Oct. 29	07 06.26	+20 06.6	6.857	7.260	−0.04	−0.3	20.1	110.2
Nov. 8	07 05.88	+20 03.1	6.718	7.269	−0.13	−0.2	20.1	120.3
Nov. 18	07 04.54	+20 01.4	6.595	7.277	−0.22	0.0	20.0	130.6
Nov. 28	07 02.30	+20 01.3	6.490	7.286	−0.30	+0.1	20.0	141.2
Dec. 8	06 59.29	+20 02.8	6.410	7.295	−0.36	+0.3	20.0	152.1
Dec. 18	06 55.68	+20 05.5	6.357	7.304	−0.40	+0.4	20.0	163.0
Dec. 28	06 51.69	+20 09.1	6.335	7.313	−0.41	+0.4	20.0	173.7
Jan. 7	06 47.57	+20 13.3	6.344	7.322	−0.40	+0.4	20.0	173.9
Jan. 17	06 43.60	+20 17.8	6.384	7.331	−0.36	+0.5	20.0	163.2
Jan. 27	06 40.03	+20 22.3	6.455	7.340	−0.30	+0.4	20.0	152.3
Feb. 6	06 37.07	+20 26.6	6.553	7.350	−0.22	+0.4	20.1	141.5
Feb. 16	06 34.90	+20 30.6	6.675	7.359	−0.13	+0.4	20.1	130.9
Feb. 26	06 33.63	+20 34.1	6.816	7.369	−0.03	+0.3	20.2	120.5
Mar. 8	06 33.32	+20 37.1	6.973	7.378	+0.07	+0.2	20.2	110.4
Mar. 18	06 33.98	+20 39.4	7.140	7.388	+0.16	+0.1	20.3	100.6
Mar. 28	06 35.59	+20 40.9	7.311	7.397	+0.25	0.0	20.4	91.1

Comet C/2012 K1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2014 Aug. 27.76732 TT
Peri. = 203.13157
Node = 317.74953 2000.0
Incl. = 142.41556
q = 1.0546532 AU
e = 1.0004554

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 37.59	-24 13.4	6.556	5.993	+0.27	+4.5	17.9	51.5
Jan. 13	22 40.31	-23 28.6	6.770	6.083	+0.33	+4.4	18.0	42.6
Jan. 23	22 43.56	-22 45.0	6.964	6.173	+0.36	+4.2	18.1	34.0
Feb. 2	22 47.20	-22 03.0	7.133	6.262	+0.39	+4.0	18.2	25.9
Feb. 12	22 51.10	-21 23.2	7.278	6.350	+0.40	+3.7	18.3	18.6
Feb. 22	22 55.13	-20 46.0	7.395	6.438	+0.40	+3.4	18.4	13.5
Mar. 3	22 59.16	-20 11.9	7.486	6.526	+0.39	+3.1	18.5	13.4
Mar. 13	23 03.11	-19 41.3	7.549	6.613	+0.37	+2.7	18.6	18.3
Mar. 23	23 06.85	-19 14.7	7.586	6.699	+0.34	+2.2	18.7	25.4
Apr. 2	23 10.30	-18 52.5	7.597	6.785	+0.31	+1.7	18.7	33.5
Apr. 12	23 13.35	-18 35.0	7.584	6.871	+0.26	+1.2	18.8	41.9
Apr. 22	23 15.92	-18 22.7	7.550	6.956	+0.20	+0.7	18.8	50.6
May 2	23 17.92	-18 16.0	7.498	7.041	+0.13	+0.1	18.9	59.5
May 12	23 19.25	-18 15.1	7.431	7.125	+0.06	-0.5	18.9	68.6
May 22	23 19.84	-18 20.2	7.353	7.209	-0.02	-1.1	18.9	77.9
June 1	23 19.60	-18 31.3	7.268	7.293	-0.11	-1.7	18.9	87.4
June 11	23 18.48	-18 48.4	7.182	7.376	-0.21	-2.3	19.0	97.1
June 21	23 16.43	-19 10.9	7.099	7.459	-0.30	-2.7	19.0	107.0
July 1	23 13.44	-19 38.2	7.025	7.542	-0.39	-3.1	19.0	117.0
July 11	23 09.51	-20 09.4	6.966	7.624	-0.48	-3.4	19.0	127.2
July 21	23 04.72	-20 43.2	6.926	7.705	-0.55	-3.5	19.1	137.4
July 31	22 59.17	-21 18.0	6.911	7.787	-0.61	-3.4	19.1	147.6
Aug. 10	22 53.03	-21 52.2	6.924	7.868	-0.65	-3.2	19.2	157.1
Aug. 20	22 46.51	-22 24.0	6.968	7.948	-0.67	-2.8	19.2	164.7
Aug. 30	22 39.84	-22 52.0	7.045	8.028	-0.66	-2.3	19.3	166.1
Sept. 9	22 33.28	-23 14.9	7.155	8.108	-0.62	-1.7	19.4	160.0
Sept.19	22 27.08	-23 31.9	7.297	8.188	-0.56	-1.1	19.4	150.8
Sept.29	22 21.44	-23 42.7	7.468	8.267	-0.49	-0.5	19.5	140.7
Oct. 9	22 16.55	-23 47.2	7.664	8.346	-0.40	+0.1	19.6	130.4
Oct. 19	22 12.52	-23 45.8	7.882	8.425	-0.31	+0.7	19.7	120.0
Oct. 29	22 09.42	-23 39.0	8.117	8.503	-0.22	+1.1	19.8	109.7
Nov. 8	22 07.26	-23 27.5	8.361	8.581	-0.12	+1.5	19.9	99.5
Nov. 18	22 06.03	-23 12.1	8.611	8.659	-0.04	+1.9	20.0	89.5
Nov. 28	22 05.66	-22 53.3	8.861	8.736	+0.04	+2.1	20.2	79.6
Dec. 8	22 06.08	-22 31.9	9.105	8.813	+0.11	+2.3	20.2	69.8
Dec. 18	22 07.20	-22 08.5	9.338	8.890	+0.17	+2.5	20.3	60.2
Dec. 28	22 08.91	-21 43.7	9.557	8.967	+0.22	+2.6	20.4	50.7
Jan. 7	22 11.13	-21 18.0	9.757	9.043	+0.26	+2.6	20.5	41.4
Jan. 17	22 13.73	-20 52.0	9.936	9.119	+0.29	+2.6	20.6	32.2
Jan. 27	22 16.63	-20 26.0	10.090	9.195	+0.31	+2.5	20.7	23.4
Feb. 6	22 19.72	-20 00.6	10.218	9.270	+0.32	+2.4	20.7	15.2
Feb. 16	22 22.91	-19 36.2	10.318	9.345	+0.32	+2.3	20.8	9.4
Feb. 26	22 26.11	-19 13.2	10.391	9.420	+0.31	+2.1	20.8	10.7
Mar. 8	22 29.22	-18 52.1	10.436	9.495	+0.30	+1.9	20.9	17.6
Mar. 18	22 32.17	-18 33.2	10.454	9.569	+0.27	+1.6	20.9	25.9
Mar. 28	22 34.88	-18 16.9	10.447	9.643	+0.24	+1.3	20.9	34.7

Comet 170P/Christensen

Epoch = 2016 July 31.0 TT
T = 2014 Sept. 17.81413 TT
Peri. = 225.83539 e = 0.3039460
Node = 142.92011 2000.0 a = 4.1974937 AU
Incl. = 10.12764 n = 0.11460907
q = 2.9216823 AU P = 8.60 years

m1 = 6.6 + 5 log(Delta) + 20.0 log(r(t-160))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 23.31	+13 31.2	2.804	3.772	−0.67	+2.5	19.4	168.5
Jan. 13	06 16.57	+13 55.8	2.861	3.799	−0.57	+2.8	19.5	159.8
Jan. 23	06 10.89	+14 23.7	2.947	3.826	−0.42	+3.0	19.6	149.3
Feb. 2	06 06.70	+14 53.8	3.058	3.853	−0.24	+3.1	19.7	138.6
Feb. 12	06 04.26	+15 24.7	3.192	3.879	−0.06	+3.1	19.9	128.1
Feb. 22	06 03.69	+15 55.5	3.342	3.906	+0.13	+3.0	20.1	118.1
Mar. 3	06 04.95	+16 25.1	3.505	3.933	+0.30	+2.8	20.2	108.4
Mar. 13	06 07.92	+16 52.8	3.677	3.959	+0.45	+2.5	20.4	99.2
Mar. 23	06 12.45	+17 17.8	3.852	3.986	+0.59	+2.2	20.6	90.4
Apr. 2	06 18.34	+17 39.7	4.028	4.012	+0.71	+1.8	20.7	82.0
Apr. 12	06 25.41	+17 57.9	4.201	4.039	+0.81	+1.4	20.9	73.8
Apr. 22	06 33.49	+18 12.0	4.369	4.065	+0.89	+1.0	21.0	66.0
May 2	06 42.39	+18 21.8	4.528	4.091	+0.96	+0.5	21.2	58.4
May 12	06 51.98	+18 27.2	4.677	4.117	+1.01	+0.1	21.3	51.0
May 22	07 02.09	+18 27.9	4.814	4.143	+1.05	−0.4	21.4	43.8
June 1	07 12.62	+18 24.1	4.938	4.169	+1.08	−0.8	21.5	36.7
June 11	07 23.44	+18 15.8	5.046	4.195	+1.10	−1.3	21.6	29.7
June 21	07 34.45	+18 03.2	5.138	4.220	+1.11	−1.7	21.7	22.9
July 1	07 45.57	+17 46.4	5.213	4.245	+1.11	−2.1	21.8	16.1
July 11	07 56.70	+17 25.8	5.270	4.270	+1.11	−2.4	21.9	9.4
July 21	08 07.76	+17 01.8	5.309	4.295	+1.09	−2.7	22.0	3.7
July 31	08 18.67	+16 34.7	5.329	4.320	+1.07	−3.0	22.1	5.7
Aug. 10	08 29.37	+16 05.1	5.330	4.345	+1.04	−3.2	22.1	12.2
Aug. 20	08 39.78	+15 33.5	5.313	4.369	+1.00	−3.3	22.2	19.1
Aug. 30	08 49.82	+15 00.6	5.277	4.393	+0.96	−3.4	22.2	26.2
Sept. 9	08 59.43	+14 26.9	5.222	4.417	+0.91	−3.4	22.3	33.5
Sept.19	09 08.50	+13 53.4	5.151	4.441	+0.85	−3.3	22.3	40.9
Sept.29	09 16.96	+13 20.7	5.064	4.465	+0.77	−3.1	22.3	48.6
Oct. 9	09 24.70	+12 49.8	4.962	4.488	+0.69	−2.8	22.3	56.4
Oct. 19	09 31.63	+12 21.8	4.848	4.511	+0.60	−2.4	22.3	64.6
Oct. 29	09 37.63	+11 57.5	4.723	4.534	+0.49	−1.9	22.3	73.0
Nov. 8	09 42.57	+11 38.0	4.592	4.557	+0.38	−1.3	22.3	81.8
Nov. 18	09 46.33	+11 24.6	4.456	4.579	+0.25	−0.7	22.3	90.9
Nov. 28	09 48.81	+11 18.0	4.320	4.601	+0.11	+0.1	22.3	100.4
Dec. 8	09 49.88	+11 19.2	4.189	4.623	−0.04	+1.0	22.3	110.3
Dec. 18	09 49.51	+11 28.8	4.066	4.645	−0.18	+1.8	22.3	120.6
Dec. 28	09 47.67	+11 46.7	3.959	4.667	−0.32	+2.6	22.3	131.3
Jan. 7	09 44.44	+12 12.7	3.870	4.688	−0.44	+3.3	22.3	142.4
Jan. 17	09 40.02	+12 45.4	3.806	4.709	−0.53	+3.8	22.3	153.8
Jan. 27	09 34.67	+13 23.1	3.770	4.729	−0.59	+4.0	22.3	165.4
Feb. 6	09 28.79	+14 03.5	3.765	4.750	−0.60	+4.0	22.3	177.0
Feb. 16	09 22.83	+14 43.8	3.791	4.770	−0.56	+3.8	22.4	171.2
Feb. 26	09 17.24	+15 21.7	3.849	4.790	−0.48	+3.4	22.5	159.6
Mar. 8	09 12.42	+15 55.2	3.937	4.810	−0.37	+2.8	22.6	148.3
Mar. 18	09 08.71	+16 22.9	4.049	4.829	−0.24	+2.1	22.7	137.4
Mar. 28	09 06.29	+16 44.0	4.184	4.848	−0.10	+1.4	22.8	126.8

Comet C/2015 K1 (MASTER)

Epoch = 2016 July 31.0 TT
T = 2014 Oct. 13.61239 TT
Peri. = 280.17552
Node = 5.17778 2000.0
Incl. = 29.38436
q = 2.5564373 AU
e = 0.9859087

m1 = 7.6 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 02.94	+05 38.7	5.129	5.071	+0.44	+4.5	18.2	81.2
Jan. 13	00 07.31	+06 23.8	5.359	5.147	+0.51	+4.9	18.4	72.3
Jan. 23	00 12.42	+07 12.6	5.583	5.222	+0.57	+5.2	18.5	63.7
Feb. 2	00 18.14	+08 04.5	5.797	5.297	+0.62	+5.5	18.7	55.2
Feb. 12	00 24.34	+08 59.1	5.997	5.372	+0.66	+5.7	18.8	47.0
Feb. 22	00 30.90	+09 55.8	6.182	5.447	+0.68	+5.8	18.9	38.9
Mar. 3	00 37.73	+10 54.1	6.349	5.522	+0.70	+5.9	19.0	30.9
Mar. 13	00 44.74	+11 53.6	6.497	5.597	+0.71	+6.0	19.1	23.2
Mar. 23	00 51.83	+12 53.7	6.624	5.672	+0.71	+6.0	19.2	15.9
Apr. 2	00 58.91	+13 54.1	6.730	5.747	+0.70	+6.0	19.3	9.5
Apr. 12	01 05.92	+14 54.4	6.814	5.822	+0.69	+6.0	19.4	7.4
Apr. 22	01 12.78	+15 54.2	6.876	5.896	+0.66	+5.9	19.5	11.9
May 2	01 19.39	+16 53.2	6.916	5.971	+0.63	+5.8	19.6	18.8
May 12	01 25.70	+17 51.1	6.934	6.045	+0.59	+5.6	19.6	26.3
May 22	01 31.62	+18 47.6	6.933	6.119	+0.54	+5.5	19.7	34.0
June 1	01 37.06	+19 42.4	6.912	6.193	+0.49	+5.3	19.7	41.8
June 11	01 41.95	+20 35.3	6.874	6.267	+0.42	+5.1	19.8	49.9
June 21	01 46.19	+21 25.8	6.820	6.341	+0.35	+4.8	19.8	58.0
July 1	01 49.71	+22 13.7	6.754	6.415	+0.27	+4.5	19.8	66.4
July 11	01 52.40	+22 58.7	6.678	6.488	+0.18	+4.1	19.8	74.9
July 21	01 54.20	+23 40.1	6.595	6.561	+0.08	+3.7	19.9	83.7
July 31	01 55.04	+24 17.5	6.510	6.635	−0.02	+3.3	19.9	92.6
Aug. 10	01 54.85	+24 50.4	6.426	6.708	−0.12	+2.8	19.9	101.8
Aug. 20	01 53.64	+25 18.0	6.348	6.781	−0.22	+2.2	19.9	111.2
Aug. 30	01 51.42	+25 39.7	6.280	6.853	−0.32	+1.5	19.9	120.8
Sept. 9	01 48.25	+25 55.0	6.228	6.926	−0.40	+0.8	20.0	130.6
Sept.19	01 44.28	+26 03.4	6.195	6.998	−0.46	+0.1	20.0	140.4
Sept.29	01 39.69	+26 04.8	6.186	7.070	−0.50	−0.5	20.1	149.9
Oct. 9	01 34.70	+25 59.5	6.204	7.142	−0.51	−1.1	20.1	158.5
Oct. 19	01 29.59	+25 48.2	6.251	7.214	−0.50	−1.6	20.2	164.1
Oct. 29	01 24.63	+25 32.0	6.329	7.286	−0.45	−1.9	20.2	163.3
Nov. 8	01 20.08	+25 12.6	6.438	7.358	−0.39	−2.1	20.3	156.6
Nov. 18	01 16.16	+24 51.7	6.575	7.429	−0.31	−2.1	20.4	147.6
Nov. 28	01 13.04	+24 30.9	6.739	7.500	−0.22	−1.9	20.5	137.9
Dec. 8	01 10.83	+24 11.9	6.926	7.571	−0.13	−1.6	20.6	127.9
Dec. 18	01 09.58	+23 56.1	7.132	7.642	−0.03	−1.2	20.7	117.9
Dec. 28	01 09.28	+23 44.3	7.351	7.713	+0.06	−0.7	20.8	108.0
Jan. 7	01 09.92	+23 37.4	7.580	7.783	+0.15	−0.2	20.9	98.3
Jan. 17	01 11.42	+23 35.5	7.813	7.854	+0.23	+0.3	21.0	88.8
Jan. 27	01 13.70	+23 38.8	8.045	7.924	+0.30	+0.8	21.1	79.4
Feb. 6	01 16.67	+23 47.2	8.272	7.994	+0.36	+1.3	21.2	70.3
Feb. 16	01 20.24	+24 00.3	8.490	8.064	+0.41	+1.7	21.3	61.4
Feb. 26	01 24.30	+24 17.8	8.695	8.133	+0.45	+2.1	21.4	52.7
Mar. 8	01 28.77	+24 39.3	8.884	8.203	+0.48	+2.5	21.5	44.3
Mar. 18	01 33.55	+25 04.1	9.055	8.272	+0.50	+2.8	21.6	36.2
Mar. 28	01 38.56	+25 31.9	9.205	8.341	+0.51	+3.0	21.6	28.5

Comet C/2013 V2 (Borisov)

Epoch = 2016 July 31.0 TT
T = 2014 Oct. 14.23525 TT
Peri. = 94.49827
Node = 48.40966 2000.0
Incl. = 37.85639
q = 3.5090104 AU
e = 1.0030939

m1 = 6.0 + 5 log(Delta) + 12.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	15 02.07	-08 28.8	5.743	5.268	+0.52	-4.2	18.8	56.7
Jan. 13	15 07.28	-09 10.5	5.665	5.329	+0.43	-3.7	18.8	65.3
Jan. 23	15 11.59	-09 47.5	5.576	5.391	+0.33	-3.3	18.9	74.1
Feb. 2	15 14.88	-10 20.0	5.480	5.453	+0.22	-2.8	18.9	83.3
Feb. 12	15 17.05	-10 48.3	5.381	5.516	+0.10	-2.4	18.9	92.7
Feb. 22	15 18.03	-11 12.6	5.282	5.578	-0.03	-2.1	18.9	102.4
Mar. 3	15 17.76	-11 33.2	5.190	5.641	-0.15	-1.7	19.0	112.3
Mar. 13	15 16.24	-11 50.4	5.108	5.705	-0.27	-1.4	19.0	122.6
Mar. 23	15 13.53	-12 04.8	5.042	5.768	-0.38	-1.2	19.0	133.0
Apr. 2	15 09.76	-12 16.8	4.996	5.832	-0.46	-1.0	19.1	143.7
Apr. 12	15 05.11	-12 26.9	4.975	5.896	-0.52	-0.9	19.1	154.5
Apr. 22	14 59.87	-12 35.7	4.982	5.959	-0.56	-0.8	19.2	165.3
May 2	14 54.31	-12 44.1	5.019	6.024	-0.55	-0.9	19.3	175.1
May 12	14 48.77	-12 52.8	5.087	6.088	-0.52	-1.0	19.3	171.6
May 22	14 43.55	-13 02.6	5.185	6.152	-0.46	-1.2	19.4	161.2
June 1	14 38.91	-13 14.2	5.313	6.217	-0.38	-1.4	19.5	150.7
June 11	14 35.06	-13 28.2	5.466	6.281	-0.29	-1.7	19.7	140.3
June 21	14 32.15	-13 45.0	5.642	6.346	-0.19	-2.0	19.8	130.2
July 1	14 30.24	-14 04.9	5.836	6.411	-0.09	-2.3	19.9	120.4
July 11	14 29.37	-14 27.9	6.045	6.475	+0.01	-2.6	20.0	110.8
July 21	14 29.50	-14 53.9	6.263	6.540	+0.11	-2.9	20.2	101.4
July 31	14 30.60	-15 22.9	6.487	6.605	+0.20	-3.2	20.3	92.2
Aug. 10	14 32.59	-15 54.5	6.712	6.670	+0.28	-3.4	20.4	83.3
Aug. 20	14 35.40	-16 28.3	6.935	6.735	+0.35	-3.6	20.6	74.5
Aug. 30	14 38.93	-17 04.1	7.151	6.800	+0.42	-3.7	20.7	65.8
Sept. 9	14 43.09	-17 41.5	7.357	6.865	+0.47	-3.9	20.8	57.3
Sept.19	14 47.81	-18 20.2	7.550	6.930	+0.52	-3.9	20.9	48.8
Sept.29	14 52.98	-18 59.6	7.728	6.995	+0.55	-4.0	21.0	40.4
Oct. 9	14 58.52	-19 39.6	7.887	7.061	+0.58	-4.0	21.1	32.1
Oct. 19	15 04.35	-20 19.9	8.026	7.126	+0.60	-4.0	21.2	23.7
Oct. 29	15 10.37	-21 00.0	8.143	7.191	+0.61	-4.0	21.3	15.5
Nov. 8	15 16.51	-21 39.9	8.237	7.256	+0.62	-3.9	21.3	7.5
Nov. 18	15 22.66	-22 19.2	8.306	7.321	+0.61	-3.9	21.4	4.1
Nov. 28	15 28.75	-22 57.7	8.351	7.386	+0.59	-3.8	21.5	11.1
Dec. 8	15 34.68	-23 35.4	8.372	7.451	+0.57	-3.7	21.5	19.5
Dec. 18	15 40.34	-24 12.1	8.369	7.516	+0.53	-3.6	21.6	28.2
Dec. 28	15 45.64	-24 47.7	8.343	7.581	+0.48	-3.4	21.6	37.0
Jan. 7	15 50.48	-25 22.1	8.297	7.646	+0.43	-3.3	21.6	45.9
Jan. 17	15 54.76	-25 55.2	8.232	7.710	+0.36	-3.2	21.7	55.0
Jan. 27	15 58.39	-26 27.1	8.152	7.775	+0.29	-3.0	21.7	64.2
Feb. 6	16 01.26	-26 57.6	8.061	7.840	+0.20	-2.9	21.7	73.6
Feb. 16	16 03.29	-27 26.5	7.962	7.905	+0.11	-2.7	21.7	83.1
Feb. 26	16 04.43	-27 53.7	7.859	7.969	+0.02	-2.5	21.7	92.8
Mar. 8	16 04.62	-28 19.0	7.758	8.034	-0.08	-2.3	21.8	102.6
Mar. 18	16 03.84	-28 41.9	7.664	8.099	-0.17	-2.0	21.8	112.6
Mar. 28	16 02.12	-29 02.3	7.581	8.163	-0.26	-1.7	21.8	122.6

Comet 32P/Comas Sola

Epoch = 2016 July 31.0 TT
T = 2014 Oct. 17.30898 TT
Peri. = 53.28349 e = 0.5558239
Node = 57.82193 2000.0 a = 4.5041460 AU
Incl. = 9.97129 n = 0.10310634
q = 2.0006340 AU P = 9.56 years

m1 = 9.0 + 5 log(Delta) + 12.5 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	15 28.39	-16 36.3	4.515	3.925	+0.89	-3.8	19.6	47.9
Jan. 13	15 37.25	-17 13.8	4.442	3.975	+0.79	-3.3	19.6	55.9
Jan. 23	15 45.15	-17 46.3	4.356	4.025	+0.68	-2.8	19.6	64.1
Feb. 2	15 51.95	-18 14.0	4.259	4.074	+0.55	-2.3	19.6	72.6
Feb. 12	15 57.50	-18 37.0	4.154	4.123	+0.41	-1.9	19.7	81.4
Feb. 22	16 01.62	-18 55.5	4.045	4.171	+0.26	-1.4	19.7	90.4
Mar. 3	16 04.20	-19 09.7	3.935	4.219	+0.09	-1.0	19.7	99.8
Mar. 13	16 05.11	-19 19.7	3.830	4.267	-0.08	-0.6	19.7	109.6
Mar. 23	16 04.28	-19 25.6	3.732	4.314	-0.25	-0.2	19.7	119.7
Apr. 2	16 01.75	-19 27.4	3.648	4.361	-0.41	+0.2	19.7	130.2
Apr. 12	15 57.62	-19 25.1	3.583	4.407	-0.55	+0.6	19.7	141.0
Apr. 22	15 52.13	-19 19.1	3.540	4.453	-0.65	+0.9	19.7	152.0
May 2	15 45.65	-19 09.9	3.523	4.498	-0.70	+1.2	19.8	163.3
May 12	15 38.61	-18 58.2	3.536	4.543	-0.71	+1.3	19.9	174.6
May 22	15 31.52	-18 45.4	3.579	4.587	-0.67	+1.3	19.9	174.0
June 1	15 24.86	-18 32.8	3.653	4.631	-0.58	+1.1	20.0	162.9
June 11	15 19.05	-18 22.0	3.755	4.675	-0.47	+0.8	20.1	151.9
June 21	15 14.40	-18 14.4	3.882	4.718	-0.33	+0.4	20.3	141.3
July 1	15 11.09	-18 10.9	4.032	4.761	-0.19	-0.1	20.4	130.9
July 11	15 09.21	-18 12.1	4.200	4.803	-0.04	-0.6	20.5	121.0
July 21	15 08.78	-18 18.2	4.381	4.845	+0.09	-1.1	20.7	111.4
July 31	15 09.72	-18 29.1	4.571	4.886	+0.22	-1.5	20.8	102.1
Aug. 10	15 11.95	-18 44.4	4.767	4.927	+0.34	-1.9	21.0	93.1
Aug. 20	15 15.35	-19 03.5	4.964	4.967	+0.44	-2.2	21.1	84.3
Aug. 30	15 19.79	-19 25.9	5.158	5.007	+0.54	-2.5	21.2	75.8
Sept. 9	15 25.17	-19 50.9	5.346	5.046	+0.62	-2.7	21.3	67.4
Sept.19	15 31.35	-20 17.7	5.525	5.085	+0.69	-2.8	21.5	59.2
Sept.29	15 38.23	-20 45.9	5.693	5.124	+0.75	-2.9	21.6	51.1
Oct. 9	15 45.70	-21 14.7	5.846	5.162	+0.80	-2.9	21.7	43.1
Oct. 19	15 53.66	-21 43.7	5.983	5.200	+0.83	-2.9	21.8	35.1
Oct. 29	16 02.00	-22 12.3	6.101	5.237	+0.86	-2.8	21.8	27.1
Nov. 8	16 10.64	-22 40.1	6.199	5.274	+0.88	-2.7	21.9	19.2
Nov. 18	16 19.46	-23 06.9	6.276	5.310	+0.89	-2.5	22.0	11.3
Nov. 28	16 28.38	-23 32.2	6.331	5.346	+0.89	-2.4	22.0	3.6
Dec. 8	16 37.30	-23 55.9	6.362	5.382	+0.88	-2.2	22.1	5.3
Dec. 18	16 46.10	-24 17.9	6.370	5.417	+0.86	-2.0	22.1	13.2
Dec. 28	16 54.68	-24 38.1	6.356	5.452	+0.83	-1.8	22.2	21.4
Jan. 7	17 02.94	-24 56.5	6.319	5.486	+0.78	-1.7	22.2	29.6
Jan. 17	17 10.75	-25 13.4	6.261	5.520	+0.73	-1.5	22.2	38.0
Jan. 27	17 18.01	-25 28.8	6.184	5.553	+0.66	-1.4	22.2	46.5
Feb. 6	17 24.58	-25 43.0	6.090	5.586	+0.58	-1.3	22.2	55.2
Feb. 16	17 30.34	-25 56.3	5.982	5.619	+0.48	-1.3	22.2	64.0
Feb. 26	17 35.18	-26 08.9	5.861	5.651	+0.38	-1.2	22.2	72.9
Mar. 8	17 38.96	-26 21.0	5.733	5.682	+0.26	-1.2	22.2	82.1
Mar. 18	17 41.59	-26 32.9	5.601	5.714	+0.14	-1.2	22.1	91.5
Mar. 28	17 42.96	-26 44.6	5.469	5.745	+0.01	-1.1	22.1	101.1

Comet C/2013 A1 (Siding Spring)

Epoch = 2016 July 31.0 TT
T = 2014 Oct. 25.06587 TT
Peri. = 2.45159
Node = 301.00973 2000.0
Incl. = 129.02648
q = 1.4000519 AU
e = 0.9998655

m1 = 8.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 32.29	+38 53.7	5.062	5.268	-0.27	+9.5	18.7	96.7
Jan. 13	13 29.55	+40 28.3	5.022	5.359	-0.47	+10.1	18.8	104.9
Jan. 23	13 24.88	+42 09.3	4.993	5.449	-0.67	+10.3	18.9	112.7
Feb. 2	13 18.16	+43 52.2	4.982	5.538	-0.88	+9.9	18.9	119.9
Feb. 12	13 09.32	+45 31.6	4.991	5.628	-1.08	+9.0	19.0	125.9
Feb. 22	12 58.50	+47 01.8	5.027	5.716	-1.25	+7.5	19.1	130.3
Mar. 3	12 46.05	+48 17.3	5.089	5.804	-1.35	+5.6	19.2	132.4
Mar. 13	12 32.50	+49 13.6	5.181	5.892	-1.39	+3.5	19.3	132.0
Mar. 23	12 18.58	+49 48.2	5.300	5.979	-1.35	+1.3	19.4	129.1
Apr. 2	12 05.05	+50 00.7	5.446	6.066	-1.25	-0.8	19.5	124.4
Apr. 12	11 52.57	+49 52.7	5.614	6.153	-1.09	-2.6	19.6	118.2
Apr. 22	11 41.68	+49 27.1	5.803	6.238	-0.90	-3.9	19.8	111.3
May 2	11 32.65	+48 47.6	6.006	6.324	-0.71	-5.0	19.9	103.9
May 12	11 25.58	+47 57.9	6.220	6.409	-0.52	-5.7	20.0	96.3
May 22	11 20.42	+47 01.3	6.439	6.494	-0.34	-6.1	20.2	88.6
June 1	11 17.01	+46 00.7	6.661	6.578	-0.18	-6.2	20.3	81.0
June 11	11 15.17	+44 58.3	6.879	6.662	-0.05	-6.2	20.4	73.5
June 21	11 14.68	+43 55.9	7.092	6.746	+0.07	-6.1	20.5	66.2
July 1	11 15.33	+42 54.9	7.294	6.829	+0.16	-5.9	20.7	59.2
July 11	11 16.94	+41 56.2	7.483	6.912	+0.24	-5.5	20.8	52.5
July 21	11 19.32	+41 00.7	7.657	6.994	+0.30	-5.2	20.9	46.3
July 31	11 22.31	+40 09.1	7.813	7.076	+0.35	-4.7	21.0	40.8
Aug. 10	11 25.78	+39 21.8	7.949	7.158	+0.38	-4.2	21.0	36.3
Aug. 20	11 29.59	+38 39.4	8.064	7.239	+0.40	-3.7	21.1	33.2
Aug. 30	11 33.62	+38 02.4	8.157	7.320	+0.42	-3.1	21.2	32.0
Sept. 9	11 37.78	+37 31.2	8.227	7.401	+0.42	-2.5	21.3	32.8
Sept.19	11 41.94	+37 06.3	8.275	7.481	+0.41	-1.8	21.3	35.6
Sept.29	11 46.00	+36 48.1	8.300	7.561	+0.39	-1.1	21.4	40.1
Oct. 9	11 49.87	+36 37.0	8.304	7.641	+0.36	-0.3	21.4	45.8
Oct. 19	11 53.43	+36 33.5	8.288	7.720	+0.31	+0.4	21.5	52.4
Oct. 29	11 56.58	+36 37.9	8.255	7.799	+0.26	+1.3	21.5	59.6
Nov. 8	11 59.20	+36 50.5	8.207	7.878	+0.20	+2.1	21.5	67.3
Nov. 18	12 01.18	+37 11.1	8.147	7.956	+0.12	+2.9	21.6	75.4
Nov. 28	12 02.39	+37 39.8	8.081	8.035	+0.03	+3.6	21.6	83.8
Dec. 8	12 02.71	+38 15.9	8.011	8.112	-0.07	+4.3	21.6	92.4
Dec. 18	12 02.05	+38 58.7	7.943	8.190	-0.17	+4.8	21.6	101.1
Dec. 28	12 00.32	+39 46.9	7.883	8.267	-0.29	+5.2	21.7	109.8
Jan. 7	11 57.44	+40 38.6	7.834	8.344	-0.40	+5.3	21.7	118.2
Jan. 17	11 53.41	+41 31.8	7.802	8.421	-0.51	+5.2	21.7	126.2
Jan. 27	11 48.27	+42 23.9	7.792	8.497	-0.61	+4.8	21.8	133.3
Feb. 6	11 42.13	+43 12.3	7.806	8.573	-0.69	+4.2	21.8	138.9
Feb. 16	11 35.19	+43 54.5	7.847	8.649	-0.75	+3.4	21.8	142.2
Feb. 26	11 27.71	+44 28.4	7.917	8.725	-0.77	+2.4	21.9	142.6
Mar. 8	11 19.99	+44 52.4	8.016	8.800	-0.76	+1.3	22.0	140.1
Mar. 18	11 12.38	+45 05.8	8.141	8.875	-0.72	+0.3	22.0	135.2
Mar. 28	11 05.17	+45 08.4	8.292	8.950	-0.65	-0.7	22.1	128.7

Comet C/2013 U2 (Holvorcem)

Epoch = 2016 July 31.0 TT
T = 2014 Oct. 28.14434 TT
Peri. = 107.81634
Node = 6.88588 2000.0
Incl. = 43.23427
q = 5.1306496 AU
e = 0.9948626

m1 = 3.2 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 18.56	+18 13.6	5.740	6.058	−0.02	−0.6	18.7	104.3
Jan. 13	12 18.35	+18 07.8	5.632	6.097	−0.14	−0.1	18.7	113.9
Jan. 23	12 16.97	+18 06.7	5.535	6.136	−0.25	+0.2	18.7	123.7
Feb. 2	12 14.46	+18 08.7	5.455	6.176	−0.36	+0.4	18.7	133.6
Feb. 12	12 10.91	+18 12.2	5.396	6.217	−0.44	+0.3	18.8	143.4
Feb. 22	12 06.48	+18 15.3	5.362	6.258	−0.51	+0.1	18.8	152.7
Mar. 3	12 01.42	+18 16.0	5.356	6.299	−0.54	−0.3	18.8	160.4
Mar. 13	11 55.99	+18 12.6	5.381	6.341	−0.55	−0.9	18.9	163.7
Mar. 23	11 50.52	+18 03.8	5.436	6.383	−0.52	−1.5	19.0	160.4
Apr. 2	11 45.30	+17 48.7	5.520	6.426	−0.47	−2.2	19.0	152.8
Apr. 12	11 40.61	+17 26.9	5.634	6.469	−0.39	−2.8	19.1	143.7
Apr. 22	11 36.67	+16 58.5	5.772	6.513	−0.31	−3.4	19.2	134.2
May 2	11 33.61	+16 24.0	5.931	6.557	−0.21	−4.0	19.3	124.6
May 12	11 31.52	+15 44.0	6.108	6.601	−0.11	−4.5	19.4	115.1
May 22	11 30.42	+14 59.4	6.298	6.646	−0.01	−4.9	19.5	105.8
June 1	11 30.29	+14 10.9	6.496	6.691	+0.08	−5.2	19.6	96.7
June 11	11 31.08	+13 19.1	6.698	6.736	+0.16	−5.4	19.8	87.8
June 21	11 32.71	+12 24.7	6.900	6.782	+0.24	−5.6	19.9	79.1
July 1	11 35.09	+11 28.3	7.099	6.828	+0.30	−5.8	20.0	70.6
July 11	11 38.13	+10 30.3	7.290	6.875	+0.36	−5.9	20.1	62.2
July 21	11 41.74	+09 31.3	7.471	6.921	+0.41	−6.0	20.2	53.9
July 31	11 45.82	+08 31.5	7.639	6.968	+0.45	−6.0	20.3	45.7
Aug. 10	11 50.30	+07 31.2	7.791	7.016	+0.48	−6.0	20.3	37.6
Aug. 20	11 55.09	+06 31.0	7.926	7.063	+0.50	−6.0	20.4	29.6
Aug. 30	12 00.10	+05 31.0	8.040	7.111	+0.52	−5.9	20.5	21.6
Sept. 9	12 05.27	+04 31.5	8.134	7.159	+0.52	−5.9	20.6	13.7
Sept.19	12 10.50	+03 32.9	8.205	7.208	+0.52	−5.7	20.6	6.4
Sept.29	12 15.74	+02 35.4	8.253	7.256	+0.52	−5.6	20.7	5.2
Oct. 9	12 20.90	+01 39.5	8.278	7.305	+0.50	−5.4	20.7	12.3
Oct. 19	12 25.91	+00 45.4	8.279	7.354	+0.48	−5.2	20.8	20.4
Oct. 29	12 30.68	−00 06.6	8.258	7.403	+0.45	−5.0	20.8	28.8
Nov. 8	12 35.14	−00 56.2	8.215	7.453	+0.41	−4.7	20.9	37.4
Nov. 18	12 39.19	−01 42.9	8.153	7.503	+0.36	−4.4	20.9	46.2
Nov. 28	12 42.77	−02 26.4	8.072	7.552	+0.30	−4.0	20.9	55.2
Dec. 8	12 45.78	−03 06.4	7.976	7.602	+0.24	−3.6	20.9	64.4
Dec. 18	12 48.13	−03 42.7	7.869	7.653	+0.16	−3.2	20.9	73.8
Dec. 28	12 49.76	−04 14.8	7.755	7.703	+0.08	−2.8	20.9	83.4
Jan. 7	12 50.61	−04 42.6	7.637	7.754	0.00	−2.3	21.0	93.2
Jan. 17	12 50.62	−05 05.8	7.521	7.804	−0.08	−1.9	21.0	103.2
Jan. 27	12 49.79	−05 24.5	7.411	7.855	−0.17	−1.4	21.0	113.4
Feb. 6	12 48.12	−05 38.5	7.314	7.906	−0.24	−1.0	21.0	123.9
Feb. 16	12 45.68	−05 48.2	7.234	7.957	−0.31	−0.6	21.0	134.5
Feb. 26	12 42.55	−05 53.9	7.175	8.009	−0.37	−0.2	21.0	145.2
Mar. 8	12 38.88	−05 56.1	7.143	8.060	−0.40	+0.1	21.1	156.1
Mar. 18	12 34.85	−05 55.6	7.139	8.112	−0.42	+0.2	21.1	166.9
Mar. 28	12 30.64	−05 53.2	7.167	8.163	−0.42	+0.3	21.2	176.8

Comet 269P/Jedicke

Epoch = 2016 July 31.0 TT
T = 2014 Nov. 4.62080 TT
Peri. = 225.86680 e = 0.4484015
Node = 244.51898 2000.0 a = 7.3327117 AU
Incl. = 6.68247 n = 0.04963719
q = 4.0447128 AU P = 19.86 years

m1 = 1.2 + 5 log(Delta) + 20.0 log(r(t-100))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	11 42.24	-05 44.8	4.354	4.681	+0.10	-2.0	17.3	103.5
Jan. 13	11 43.20	-06 04.9	4.233	4.708	-0.04	-1.1	17.3	113.2
Jan. 23	11 42.81	-06 15.8	4.123	4.735	-0.17	-0.1	17.3	123.3
Feb. 2	11 41.15	-06 17.0	4.028	4.762	-0.28	+0.9	17.3	133.7
Feb. 12	11 38.31	-06 08.4	3.954	4.790	-0.38	+1.8	17.3	144.3
Feb. 22	11 34.54	-05 50.6	3.904	4.817	-0.44	+2.5	17.3	154.9
Mar. 3	11 30.13	-05 25.2	3.881	4.845	-0.47	+3.1	17.4	165.1
Mar. 13	11 25.45	-04 53.9	3.888	4.874	-0.46	+3.5	17.4	172.0
Mar. 23	11 20.88	-04 19.3	3.925	4.902	-0.41	+3.5	17.5	167.4
Apr. 2	11 16.80	-03 44.1	3.991	4.931	-0.33	+3.3	17.6	157.8
Apr. 12	11 13.50	-03 10.9	4.086	4.960	-0.23	+2.9	17.7	147.5
Apr. 22	11 11.21	-02 41.8	4.204	4.989	-0.12	+2.3	17.8	137.3
May 2	11 10.06	-02 18.5	4.344	5.019	0.00	+1.7	17.9	127.3
May 12	11 10.10	-02 02.0	4.500	5.049	+0.12	+0.9	18.0	117.6
May 22	11 11.32	-01 52.9	4.669	5.078	+0.23	+0.2	18.2	108.3
June 1	11 13.64	-01 51.3	4.845	5.108	+0.34	-0.6	18.3	99.3
June 11	11 16.99	-01 56.9	5.027	5.139	+0.43	-1.3	18.4	90.6
June 21	11 21.27	-02 09.6	5.209	5.169	+0.51	-1.9	18.5	82.2
July 1	11 26.34	-02 28.6	5.388	5.199	+0.58	-2.5	18.7	74.0
July 11	11 32.12	-02 53.4	5.561	5.230	+0.64	-3.0	18.8	66.0
July 21	11 38.50	-03 23.4	5.726	5.261	+0.69	-3.5	18.9	58.1
July 31	11 45.37	-03 58.0	5.880	5.292	+0.73	-3.8	19.0	50.4
Aug. 10	11 52.67	-04 36.4	6.022	5.323	+0.76	-4.2	19.1	42.8
Aug. 20	12 00.29	-05 18.1	6.148	5.354	+0.79	-4.4	19.2	35.3
Aug. 30	12 08.17	-06 02.5	6.257	5.385	+0.81	-4.6	19.3	27.8
Sept. 9	12 16.24	-06 49.0	6.349	5.416	+0.82	-4.8	19.4	20.4
Sept.19	12 24.41	-07 37.0	6.421	5.448	+0.82	-4.9	19.5	13.2
Sept.29	12 32.64	-08 25.9	6.473	5.479	+0.82	-4.9	19.5	6.6
Oct. 9	12 40.84	-09 15.1	6.504	5.511	+0.81	-4.9	19.6	5.3
Oct. 19	12 48.94	-10 04.2	6.515	5.542	+0.79	-4.8	19.6	11.5
Oct. 29	12 56.88	-10 52.5	6.504	5.574	+0.77	-4.7	19.7	19.0
Nov. 8	13 04.56	-11 39.5	6.472	5.606	+0.73	-4.5	19.7	26.8
Nov. 18	13 11.90	-12 24.6	6.421	5.637	+0.69	-4.3	19.8	34.8
Nov. 28	13 18.82	-13 07.4	6.350	5.669	+0.64	-4.0	19.8	43.0
Dec. 8	13 25.22	-13 47.2	6.263	5.701	+0.58	-3.6	19.8	51.4
Dec. 18	13 30.98	-14 23.6	6.161	5.733	+0.50	-3.2	19.8	60.0
Dec. 28	13 36.00	-14 56.0	6.046	5.765	+0.42	-2.8	19.8	68.8
Jan. 7	13 40.18	-15 23.7	5.922	5.796	+0.32	-2.3	19.8	77.9
Jan. 17	13 43.41	-15 46.4	5.793	5.828	+0.22	-1.7	19.8	87.2
Jan. 27	13 45.62	-16 03.5	5.663	5.860	+0.11	-1.1	19.8	96.7
Feb. 6	13 46.71	-16 14.4	5.535	5.892	0.00	-0.4	19.8	106.5
Feb. 16	13 46.69	-16 18.8	5.416	5.924	-0.11	+0.2	19.8	116.6
Feb. 26	13 45.55	-16 16.5	5.309	5.956	-0.22	+0.9	19.8	126.9
Mar. 8	13 43.36	-16 07.4	5.220	5.988	-0.31	+1.5	19.9	137.4
Mar. 18	13 40.29	-15 51.9	5.152	6.019	-0.38	+2.1	19.9	148.0
Mar. 28	13 36.52	-15 30.7	5.111	6.051	-0.42	+2.6	19.9	158.7

Comet C/2013 G3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2014 Nov. 15.31561 TT
Peri. = 76.51283
Node = 208.11045 2000.0
Incl. = 64.67900
q = 3.8521049 AU
e = 1.0011333

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 35.70	+30 20.5	5.373	5.218	+0.93	-5.2	19.2	75.7
Jan. 13	22 44.95	+29 28.3	5.552	5.273	+0.95	-4.0	19.3	68.6
Jan. 23	22 54.45	+28 48.4	5.728	5.328	+0.96	-2.9	19.5	61.5
Feb. 2	23 04.10	+28 19.7	5.895	5.384	+0.97	-1.9	19.6	54.6
Feb. 12	23 13.80	+28 01.2	6.053	5.440	+0.97	-1.0	19.7	47.9
Feb. 22	23 23.48	+27 51.6	6.198	5.497	+0.96	-0.2	19.8	41.5
Mar. 3	23 33.06	+27 49.9	6.327	5.554	+0.94	+0.5	19.9	35.8
Mar. 13	23 42.48	+27 54.7	6.440	5.611	+0.92	+1.0	19.9	30.9
Mar. 23	23 51.67	+28 05.2	6.535	5.669	+0.89	+1.5	20.0	27.4
Apr. 2	00 00.57	+28 20.1	6.611	5.727	+0.85	+1.8	20.1	25.8
Apr. 12	00 09.12	+28 38.6	6.666	5.785	+0.81	+2.1	20.1	26.4
Apr. 22	00 17.25	+28 59.7	6.701	5.844	+0.76	+2.3	20.2	29.1
May 2	00 24.89	+29 22.4	6.717	5.903	+0.71	+2.4	20.2	33.5
May 12	00 31.98	+29 46.2	6.712	5.962	+0.65	+2.4	20.3	39.1
May 22	00 38.44	+30 09.9	6.690	6.021	+0.58	+2.3	20.3	45.4
June 1	00 44.20	+30 32.9	6.650	6.081	+0.50	+2.1	20.4	52.2
June 11	00 49.18	+30 54.3	6.594	6.141	+0.41	+1.9	20.4	59.5
June 21	00 53.29	+31 13.2	6.526	6.201	+0.32	+1.5	20.4	67.1
July 1	00 56.46	+31 28.6	6.447	6.261	+0.22	+1.1	20.4	75.0
July 11	00 58.63	+31 39.6	6.360	6.322	+0.11	+0.5	20.4	83.2
July 21	00 59.74	+31 45.1	6.270	6.382	0.00	-0.1	20.4	91.7
July 31	00 59.76	+31 43.8	6.180	6.443	-0.11	-0.9	20.4	100.5
Aug. 10	00 58.70	+31 34.8	6.095	6.504	-0.21	-1.8	20.5	109.5
Aug. 20	00 56.62	+31 16.9	6.019	6.565	-0.30	-2.7	20.5	118.7
Aug. 30	00 53.62	+30 49.5	5.956	6.626	-0.38	-3.8	20.5	128.0
Sept. 9	00 49.87	+30 11.9	5.913	6.687	-0.43	-4.7	20.5	137.2
Sept.19	00 45.59	+29 24.4	5.893	6.749	-0.45	-5.7	20.5	146.0
Sept.29	00 41.04	+28 27.9	5.899	6.810	-0.45	-6.4	20.6	153.6
Oct. 9	00 36.50	+27 23.7	5.934	6.872	-0.42	-7.0	20.6	158.2
Oct. 19	00 32.26	+26 14.1	6.001	6.933	-0.37	-7.3	20.7	157.9
Oct. 29	00 28.54	+25 01.5	6.098	6.995	-0.30	-7.3	20.8	152.7
Nov. 8	00 25.54	+23 48.6	6.225	7.057	-0.21	-7.1	20.9	144.7
Nov. 18	00 23.40	+22 38.0	6.379	7.119	-0.12	-6.6	20.9	135.5
Nov. 28	00 22.19	+21 31.9	6.558	7.180	-0.03	-6.0	21.0	125.9
Dec. 8	00 21.94	+20 31.9	6.755	7.242	+0.07	-5.3	21.1	116.0
Dec. 18	00 22.62	+19 39.1	6.968	7.304	+0.16	-4.5	21.3	106.2
Dec. 28	00 24.18	+18 54.1	7.190	7.366	+0.24	-3.7	21.4	96.5
Jan. 7	00 26.54	+18 17.2	7.416	7.428	+0.31	-2.9	21.5	86.9
Jan. 17	00 29.62	+17 48.0	7.642	7.490	+0.37	-2.2	21.6	77.5
Jan. 27	00 33.32	+17 26.2	7.862	7.552	+0.42	-1.5	21.7	68.2
Feb. 6	00 37.54	+17 11.0	8.074	7.614	+0.46	-0.9	21.8	59.1
Feb. 16	00 42.19	+17 01.8	8.272	7.676	+0.50	-0.4	21.8	50.1
Feb. 26	00 47.17	+16 57.8	8.453	7.738	+0.52	0.0	21.9	41.4
Mar. 8	00 52.41	+16 58.1	8.615	7.800	+0.54	+0.4	22.0	32.8
Mar. 18	00 57.80	+17 02.0	8.756	7.862	+0.55	+0.7	22.1	24.6
Mar. 28	01 03.27	+17 08.7	8.874	7.924	+0.55	+0.9	22.1	16.9

Comet C/2013 P3 (Palomar)

Epoch = 2016 July 31.0 TT
T = 2014 Nov. 22.63946 TT
Peri. = 177.11796
Node = 177.27692 2000.0
Incl. = 93.92128
q = 8.6449960 AU
e = 1.0009994

m1 = 4.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	23 52.49	-20 41.8	9.267	8.964	+0.20	+0.1	18.6	69.1
Jan. 13	23 54.54	-20 41.0	9.431	8.980	+0.26	+0.3	18.6	60.0
Jan. 23	23 57.17	-20 37.8	9.579	8.996	+0.31	+0.5	18.6	51.2
Feb. 2	00 00.32	-20 33.2	9.709	9.012	+0.36	+0.5	18.7	42.9
Feb. 12	00 03.91	-20 28.0	9.819	9.028	+0.39	+0.5	18.7	35.0
Feb. 22	00 07.84	-20 23.2	9.905	9.045	+0.42	+0.4	18.7	28.1
Mar. 3	00 12.05	-20 19.4	9.968	9.062	+0.44	+0.2	18.8	22.9
Mar. 13	00 16.45	-20 17.5	10.005	9.080	+0.45	-0.1	18.8	20.4
Mar. 23	00 20.96	-20 18.2	10.018	9.098	+0.46	-0.4	18.8	21.5
Apr. 2	00 25.52	-20 22.1	10.006	9.116	+0.45	-0.8	18.8	25.8
Apr. 12	00 30.04	-20 29.9	9.970	9.134	+0.44	-1.2	18.8	31.9
Apr. 22	00 34.44	-20 42.3	9.913	9.153	+0.42	-1.7	18.8	39.0
May 2	00 38.67	-20 59.7	9.835	9.172	+0.40	-2.3	18.8	46.6
May 12	00 42.64	-21 22.6	9.741	9.192	+0.36	-2.9	18.8	54.5
May 22	00 46.28	-21 51.6	9.632	9.211	+0.32	-3.5	18.8	62.7
June 1	00 49.51	-22 26.7	9.513	9.231	+0.28	-4.2	18.7	70.9
June 11	00 52.28	-23 08.2	9.386	9.252	+0.22	-4.8	18.7	79.3
June 21	00 54.49	-23 56.1	9.256	9.272	+0.16	-5.4	18.7	87.8
July 1	00 56.10	-24 50.2	9.127	9.293	+0.09	-6.0	18.7	96.3
July 11	00 57.04	-25 49.8	9.004	9.315	+0.02	-6.4	18.7	104.7
July 21	00 57.26	-26 54.3	8.891	9.336	-0.05	-6.8	18.6	113.1
July 31	00 56.73	-28 02.5	8.792	9.358	-0.13	-7.0	18.6	121.2
Aug. 10	00 55.44	-29 13.0	8.711	9.380	-0.20	-7.1	18.6	128.8
Aug. 20	00 53.42	-30 24.0	8.652	9.402	-0.27	-7.0	18.6	135.7
Aug. 30	00 50.72	-31 33.7	8.618	9.425	-0.33	-6.6	18.6	141.1
Sept. 9	00 47.42	-32 40.1	8.610	9.448	-0.37	-6.1	18.6	144.5
Sept.19	00 43.68	-33 41.2	8.630	9.471	-0.40	-5.4	18.6	145.1
Sept.29	00 39.65	-34 35.5	8.678	9.495	-0.41	-4.6	18.7	142.8
Oct. 9	00 35.52	-35 21.5	8.752	9.519	-0.40	-3.7	18.7	138.0
Oct. 19	00 31.50	-35 58.5	8.852	9.543	-0.37	-2.8	18.7	131.6
Oct. 29	00 27.78	-36 26.3	8.973	9.567	-0.32	-1.9	18.8	124.2
Nov. 8	00 24.54	-36 44.9	9.113	9.591	-0.26	-1.0	18.8	116.2
Nov. 18	00 21.92	-36 55.1	9.267	9.616	-0.19	-0.3	18.9	107.9
Nov. 28	00 20.03	-36 57.6	9.430	9.641	-0.11	+0.4	18.9	99.5
Dec. 8	00 18.92	-36 53.7	9.598	9.667	-0.03	+0.9	19.0	91.1
Dec. 18	00 18.63	-36 44.7	9.767	9.692	+0.05	+1.3	19.0	82.8
Dec. 28	00 19.14	-36 31.7	9.931	9.718	+0.13	+1.6	19.1	74.7
Jan. 7	00 20.42	-36 16.0	10.088	9.744	+0.20	+1.7	19.1	66.9
Jan. 17	00 22.42	-35 58.8	10.233	9.770	+0.26	+1.8	19.1	59.5
Jan. 27	00 25.06	-35 41.2	10.363	9.797	+0.32	+1.7	19.2	52.7
Feb. 6	00 28.27	-35 24.1	10.475	9.824	+0.37	+1.6	19.2	46.6
Feb. 16	00 31.97	-35 08.6	10.569	9.851	+0.41	+1.3	19.3	41.5
Feb. 26	00 36.07	-34 55.4	10.641	9.878	+0.44	+1.0	19.3	37.9
Mar. 8	00 40.49	-34 45.3	10.692	9.906	+0.47	+0.6	19.3	35.9
Mar. 18	00 45.15	-34 39.1	10.722	9.933	+0.48	+0.2	19.3	36.0
Mar. 28	00 49.97	-34 37.3	10.730	9.961	+0.49	-0.3	19.3	37.9

Comet C/2013 W2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2014 Dec. 11.36268 TT
Peri. = 305.32273 e = 0.5619599
Node = 178.52728 2000.0 a = 10.0336200 AU
Incl. = 4.85237 n = 0.03101113
q = 4.3951279 AU P = 31.78 years

m1 = 4.0 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 08.86	-01 38.9	4.726	4.978	+0.20	-0.8	19.6	99.1
Jan. 13	12 10.84	-01 46.9	4.601	5.005	+0.07	0.0	19.6	108.8
Jan. 23	12 11.57	-01 46.5	4.484	5.033	-0.05	+0.9	19.5	118.8
Feb. 2	12 11.08	-01 37.8	4.381	5.061	-0.17	+1.7	19.5	129.1
Feb. 12	12 09.42	-01 21.1	4.296	5.090	-0.27	+2.4	19.5	139.8
Feb. 22	12 06.74	-00 57.5	4.234	5.119	-0.35	+2.9	19.5	150.6
Mar. 3	12 03.26	-00 28.4	4.198	5.149	-0.40	+3.2	19.6	161.7
Mar. 13	11 59.28	+00 04.0	4.191	5.179	-0.42	+3.4	19.6	172.8
Mar. 23	11 55.13	+00 37.6	4.214	5.209	-0.40	+3.2	19.7	176.1
Apr. 2	11 51.15	+01 09.8	4.267	5.239	-0.35	+2.9	19.7	165.0
Apr. 12	11 47.66	+01 38.6	4.350	5.270	-0.27	+2.4	19.8	154.2
Apr. 22	11 44.91	+02 02.1	4.458	5.302	-0.18	+1.7	19.9	143.7
May 2	11 43.09	+02 19.2	4.590	5.333	-0.08	+1.0	20.0	133.4
May 12	11 42.31	+02 29.1	4.741	5.365	+0.03	+0.3	20.1	123.5
May 22	11 42.60	+02 31.7	4.907	5.397	+0.14	-0.5	20.3	113.9
June 1	11 43.95	+02 26.9	5.084	5.429	+0.24	-1.2	20.4	104.6
June 11	11 46.32	+02 15.3	5.267	5.462	+0.33	-1.8	20.5	95.7
June 21	11 49.61	+01 57.4	5.454	5.495	+0.41	-2.4	20.6	87.0
July 1	11 53.75	+01 33.7	5.639	5.528	+0.49	-2.9	20.8	78.6
July 11	11 58.63	+01 05.0	5.821	5.562	+0.55	-3.3	20.9	70.4
July 21	12 04.16	+00 32.0	5.995	5.595	+0.61	-3.7	21.0	62.3
July 31	12 10.24	-00 04.7	6.159	5.629	+0.66	-4.0	21.1	54.4
Aug. 10	12 16.80	-00 44.5	6.312	5.663	+0.69	-4.2	21.2	46.6
Aug. 20	12 23.74	-01 26.7	6.450	5.698	+0.73	-4.4	21.3	38.9
Aug. 30	12 31.00	-02 10.6	6.572	5.732	+0.75	-4.5	21.4	31.2
Sept. 9	12 38.49	-02 55.7	6.676	5.767	+0.77	-4.6	21.4	23.5
Sept.19	12 46.15	-03 41.4	6.761	5.801	+0.78	-4.6	21.5	15.8
Sept.29	12 53.91	-04 27.2	6.826	5.836	+0.78	-4.5	21.6	8.2
Oct. 9	13 01.70	-05 12.4	6.870	5.871	+0.77	-4.4	21.6	1.3
Oct. 19	13 09.44	-05 56.6	6.892	5.907	+0.76	-4.3	21.7	7.6
Oct. 29	13 17.07	-06 39.2	6.893	5.942	+0.74	-4.0	21.7	15.5
Nov. 8	13 24.50	-07 19.7	6.873	5.978	+0.72	-3.8	21.8	23.6
Nov. 18	13 31.65	-07 57.5	6.831	6.013	+0.68	-3.5	21.8	31.7
Nov. 28	13 38.44	-08 32.2	6.771	6.049	+0.63	-3.1	21.8	40.1
Dec. 8	13 44.77	-09 03.3	6.692	6.085	+0.58	-2.7	21.9	48.6
Dec. 18	13 50.54	-09 30.3	6.597	6.121	+0.51	-2.3	21.9	57.2
Dec. 28	13 55.65	-09 52.9	6.489	6.157	+0.44	-1.8	21.9	66.1
Jan. 7	14 00.01	-10 10.5	6.371	6.193	+0.35	-1.2	21.9	75.2
Jan. 17	14 03.52	-10 23.0	6.247	6.229	+0.26	-0.7	21.9	84.5
Jan. 27	14 06.11	-10 30.0	6.119	6.266	+0.16	-0.1	21.9	94.0
Feb. 6	14 07.69	-10 31.4	5.994	6.302	+0.05	+0.4	21.9	103.8
Feb. 16	14 08.23	-10 27.1	5.875	6.339	-0.05	+1.0	21.9	113.8
Feb. 26	14 07.75	-10 17.5	5.768	6.375	-0.15	+1.5	21.9	124.0
Mar. 8	14 06.27	-10 02.8	5.677	6.412	-0.24	+1.9	21.9	134.4
Mar. 18	14 03.92	-09 43.8	5.607	6.448	-0.31	+2.2	21.9	145.0
Mar. 28	14 00.84	-09 21.4	5.562	6.485	-0.36	+2.5	21.9	155.7

Comet 110P/Hartley

Epoch = 2016 July 31.0 TT
T = 2014 Dec. 17.04174 TT
Peri. = 167.56514 e = 0.3154306
Node = 287.59938 2000.0 a = 3.6093873 AU
Incl. = 11.68354 n = 0.14373212
q = 2.4708761 AU P = 6.86 years

m1 = 5.6 + 5 log(Delta) + 22.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 07.47	-19 23.2	3.300	3.259	+0.62	-7.5	19.7	79.0
Jan. 13	13 13.66	-20 37.7	3.187	3.289	+0.45	-6.7	19.8	87.2
Jan. 23	13 18.19	-21 44.5	3.073	3.319	+0.27	-5.8	19.8	95.7
Feb. 2	13 20.89	-22 42.3	2.961	3.350	+0.07	-4.7	19.8	104.7
Feb. 12	13 21.56	-23 29.3	2.856	3.379	-0.14	-3.4	19.8	114.0
Feb. 22	13 20.15	-24 03.4	2.760	3.409	-0.35	-1.9	19.8	123.7
Mar. 3	13 16.69	-24 22.7	2.679	3.439	-0.53	-0.3	19.8	133.6
Mar. 13	13 11.42	-24 25.4	2.618	3.469	-0.66	+1.4	19.8	143.7
Mar. 23	13 04.77	-24 10.9	2.579	3.498	-0.74	+3.1	19.9	153.2
Apr. 2	12 57.36	-23 40.2	2.567	3.527	-0.75	+4.4	20.0	161.0
Apr. 12	12 49.87	-22 55.8	2.583	3.556	-0.68	+5.4	20.1	163.7
Apr. 22	12 43.04	-22 02.1	2.627	3.585	-0.56	+5.8	20.2	159.3
May 2	12 37.41	-21 04.4	2.699	3.614	-0.40	+5.7	20.3	151.0
May 12	12 33.39	-20 07.8	2.796	3.642	-0.22	+5.1	20.5	141.6
May 22	12 31.17	-19 16.6	2.915	3.670	-0.04	+4.3	20.6	132.0
June 1	12 30.78	-18 34.0	3.051	3.698	+0.14	+3.2	20.8	122.7
June 11	12 32.16	-18 01.6	3.201	3.726	+0.30	+2.1	21.0	113.6
June 21	12 35.15	-17 40.3	3.361	3.753	+0.44	+1.1	21.2	104.9
July 1	12 39.59	-17 29.7	3.528	3.780	+0.57	0.0	21.3	96.5
July 11	12 45.29	-17 29.5	3.697	3.807	+0.68	-0.9	21.5	88.4
July 21	12 52.10	-17 38.6	3.866	3.834	+0.78	-1.7	21.7	80.6
July 31	12 59.85	-17 56.0	4.032	3.860	+0.86	-2.5	21.8	73.0
Aug. 10	13 08.42	-18 20.6	4.192	3.886	+0.93	-3.1	22.0	65.6
Aug. 20	13 17.69	-18 51.3	4.345	3.911	+0.99	-3.6	22.1	58.4
Aug. 30	13 27.55	-19 27.0	4.488	3.937	+1.04	-4.0	22.3	51.3
Sept. 9	13 37.92	-20 06.7	4.620	3.962	+1.08	-4.3	22.4	44.3
Sept.19	13 48.71	-20 49.6	4.738	3.986	+1.11	-4.5	22.5	37.4
Sept.29	13 59.86	-21 34.7	4.841	4.010	+1.14	-4.7	22.6	30.5
Oct. 9	14 11.30	-22 21.2	4.928	4.034	+1.16	-4.7	22.7	23.8
Oct. 19	14 22.94	-23 08.4	4.998	4.058	+1.18	-4.7	22.8	17.3
Oct. 29	14 34.74	-23 55.6	5.049	4.081	+1.19	-4.7	22.9	11.6
Nov. 8	14 46.62	-24 42.3	5.082	4.104	+1.19	-4.6	22.9	8.3
Nov. 18	14 58.49	-25 27.9	5.095	4.126	+1.18	-4.4	23.0	10.3
Nov. 28	15 10.28	-26 12.0	5.088	4.148	+1.16	-4.2	23.0	15.9
Dec. 8	15 21.88	-26 54.2	5.063	4.170	+1.13	-4.0	.	22.5
Dec. 18	15 33.20	-27 34.3	5.018	4.191	+1.09	-3.8	.	29.7
Dec. 28	15 44.13	-28 11.9	4.955	4.212	+1.04	-3.5	.	37.1
Jan. 7	15 54.53	-28 47.1	4.875	4.233	+0.97	-3.3	.	44.7
Jan. 17	16 04.26	-29 19.8	4.779	4.253	+0.89	-3.0	.	52.5
Jan. 27	16 13.18	-29 49.9	4.670	4.273	+0.79	-2.8	.	60.6
Feb. 6	16 21.12	-30 17.6	4.549	4.292	+0.68	-2.5	.	68.8
Feb. 16	16 27.90	-30 42.9	4.419	4.311	+0.55	-2.3	.	77.3
Feb. 26	16 33.37	-31 05.7	4.284	4.330	+0.40	-2.0	.	86.1
Mar. 8	16 37.32	-31 25.9	4.146	4.348	+0.23	-1.7	.	95.1
Mar. 18	16 39.62	-31 43.3	4.011	4.366	+0.05	-1.4	.	104.4
Mar. 28	16 40.14	-31 57.2	3.882	4.383	-0.13	-1.0	.	114.0

Comet 287P/Christensen

Epoch = 2016 July 31.0 TT
T = 2014 Dec. 27.80287 TT
Peri. = 188.95067 e = 0.2690131
Node = 139.05391 2000.0 a = 4.1763902 AU
Incl. = 16.30170 n = 0.11547886
q = 3.0528865 AU P = 8.53 years

m1 = 3.4 + 5 log(Delta) + 25.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	01 41.78	-08 06.1	3.263	3.541	+0.44	+6.8	19.7	98.3
Jan. 13	01 46.14	-06 57.8	3.425	3.563	+0.57	+7.3	19.9	90.0
Jan. 23	01 51.88	-05 44.8	3.588	3.586	+0.69	+7.6	20.0	82.0
Feb. 2	01 58.80	-04 29.0	3.749	3.608	+0.80	+7.7	20.2	74.3
Feb. 12	02 06.76	-03 11.9	3.905	3.631	+0.88	+7.7	20.4	66.8
Feb. 22	02 15.60	-01 54.8	4.054	3.654	+0.96	+7.6	20.5	59.5
Mar. 3	02 25.18	-00 38.8	4.195	3.677	+1.02	+7.4	20.7	52.5
Mar. 13	02 35.39	+00 35.2	4.324	3.700	+1.07	+7.1	20.8	45.7
Mar. 23	02 46.11	+01 46.2	4.442	3.723	+1.11	+6.7	20.9	39.2
Apr. 2	02 57.25	+02 53.7	4.547	3.746	+1.15	+6.3	21.0	32.8
Apr. 12	03 08.72	+03 57.0	4.637	3.770	+1.17	+5.9	21.1	26.8
Apr. 22	03 20.44	+04 55.6	4.712	3.793	+1.19	+5.3	21.2	21.3
May 2	03 32.32	+05 49.1	4.772	3.817	+1.20	+4.8	21.3	16.5
May 12	03 44.30	+06 37.0	4.816	3.840	+1.20	+4.2	21.4	13.4
May 22	03 56.29	+07 19.2	4.843	3.864	+1.19	+3.6	21.5	13.1
June 1	04 08.23	+07 55.3	4.854	3.887	+1.18	+3.0	21.6	15.7
June 11	04 20.04	+08 25.2	4.848	3.911	+1.16	+2.4	21.6	20.2
June 21	04 31.62	+08 48.8	4.826	3.934	+1.13	+1.7	21.7	25.6
July 1	04 42.91	+09 06.1	4.789	3.958	+1.09	+1.1	21.7	31.5
July 11	04 53.80	+09 17.1	4.736	3.981	+1.04	+0.5	21.8	37.7
July 21	05 04.20	+09 22.1	4.669	4.004	+0.98	-0.1	21.8	44.3
July 31	05 14.01	+09 21.1	4.588	4.028	+0.91	-0.7	21.8	51.0
Aug. 10	05 23.10	+09 14.5	4.495	4.051	+0.82	-1.2	21.9	58.0
Aug. 20	05 31.34	+09 02.7	4.392	4.074	+0.73	-1.6	21.9	65.3
Aug. 30	05 38.62	+08 46.2	4.279	4.097	+0.62	-2.1	21.9	72.9
Sept. 9	05 44.78	+08 25.6	4.160	4.120	+0.49	-2.4	21.9	80.7
Sept.19	05 49.67	+08 01.9	4.038	4.143	+0.35	-2.6	21.9	88.9
Sept.29	05 53.17	+07 35.8	3.915	4.166	+0.20	-2.7	21.9	97.5
Oct. 9	05 55.12	+07 08.7	3.794	4.188	+0.03	-2.7	21.8	106.5
Oct. 19	05 55.45	+06 41.9	3.681	4.211	-0.13	-2.5	21.8	115.8
Oct. 29	05 54.11	+06 16.9	3.580	4.233	-0.30	-2.1	21.8	125.4
Nov. 8	05 51.14	+05 55.5	3.495	4.255	-0.44	-1.6	21.8	135.2
Nov. 18	05 46.72	+05 39.5	3.430	4.278	-0.56	-0.9	21.9	145.0
Nov. 28	05 41.11	+05 30.2	3.391	4.300	-0.64	-0.1	21.9	154.1
Dec. 8	05 34.73	+05 29.2	3.379	4.321	-0.66	+0.8	21.9	160.8
Dec. 18	05 28.08	+05 36.9	3.397	4.343	-0.64	+1.6	22.0	161.8
Dec. 28	05 21.67	+05 53.3	3.446	4.364	-0.57	+2.5	22.1	156.4
Jan. 7	05 16.01	+06 17.9	3.523	4.386	-0.45	+3.1	22.2	147.7
Jan. 17	05 11.48	+06 49.3	3.626	4.407	-0.31	+3.7	22.3	138.0
Jan. 27	05 08.36	+07 26.1	3.753	4.428	-0.16	+4.1	22.4	128.0
Feb. 6	05 06.78	+08 06.7	3.897	4.448	0.00	+4.3	22.6	118.2
Feb. 16	05 06.80	+08 49.5	4.055	4.469	+0.15	+4.4	22.7	108.6
Feb. 26	05 08.34	+09 33.1	4.221	4.489	+0.30	+4.3	22.8	99.3
Mar. 8	05 11.32	+10 16.2	4.393	4.509	+0.43	+4.2	23.0	90.3
Mar. 18	05 15.59	+10 58.0	4.565	4.529	+0.54	+3.9	.	81.7
Mar. 28	05 21.02	+11 37.4	4.733	4.549	+0.64	+3.6	.	73.3

Comet C/2014 F2 (Tenagra)

Epoch = 2016 July 31.0 TT
T = 2015 Jan. 2.58479 TT
Peri. = 86.09874 e = 0.9703852
Node = 267.45127 2000.0 a = 145.7269305 AU
Incl. = 119.06153 n = 0.00056027
q = 4.3156739 AU P = 1759.18 years

m1 = 6.6 + 5 log(Delta) + 12.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 06.10	+64 28.9	4.495	5.215	-2.87	+2.3	18.8	133.0
Jan. 13	08 37.43	+64 52.3	4.511	5.258	-2.93	-1.3	18.9	135.6
Jan. 23	08 08.11	+64 39.1	4.561	5.303	-2.73	-4.9	19.0	135.0
Feb. 2	07 40.83	+63 50.3	4.645	5.348	-2.32	-7.8	19.0	131.4
Feb. 12	07 17.59	+62 32.6	4.761	5.394	-1.83	-9.7	19.1	125.4
Feb. 22	06 59.28	+60 55.2	4.906	5.440	-1.35	-10.8	19.2	118.0
Mar. 3	06 45.82	+59 07.5	5.073	5.487	-0.92	-11.1	19.4	109.7
Mar. 13	06 36.65	+57 16.9	5.258	5.534	-0.56	-10.8	19.5	101.0
Mar. 23	06 31.05	+55 28.7	5.454	5.582	-0.28	-10.3	19.6	92.2
Apr. 2	06 28.30	+53 46.0	5.657	5.631	-0.05	-9.6	19.7	83.4
Apr. 12	06 27.80	+52 10.5	5.860	5.680	+0.12	-8.8	19.9	74.8
Apr. 22	06 29.04	+50 42.8	6.058	5.729	+0.26	-8.0	20.0	66.3
May 2	06 31.61	+49 23.0	6.248	5.779	+0.36	-7.2	20.1	58.1
May 12	06 35.18	+48 10.6	6.425	5.829	+0.43	-6.5	20.2	50.1
May 22	06 39.49	+47 05.2	6.587	5.880	+0.48	-5.9	20.3	42.5
June 1	06 44.31	+46 06.2	6.729	5.931	+0.51	-5.3	20.4	35.3
June 11	06 49.46	+45 13.1	6.851	5.982	+0.53	-4.8	20.5	28.9
June 21	06 54.77	+44 25.4	6.949	6.034	+0.53	-4.3	20.6	23.9
July 1	07 00.10	+43 42.7	7.024	6.086	+0.52	-3.8	20.6	21.0
July 11	07 05.31	+43 04.6	7.075	6.138	+0.50	-3.4	20.7	21.3
July 21	07 10.29	+42 31.1	7.100	6.191	+0.46	-2.9	20.8	24.6
July 31	07 14.90	+42 01.8	7.102	6.244	+0.41	-2.5	20.8	30.1
Aug. 10	07 19.03	+41 36.8	7.079	6.297	+0.35	-2.1	20.8	36.8
Aug. 20	07 22.55	+41 16.0	7.034	6.351	+0.28	-1.7	20.9	44.4
Aug. 30	07 25.32	+40 59.4	6.969	6.405	+0.19	-1.3	20.9	52.5
Sept. 9	07 27.22	+40 46.8	6.886	6.459	+0.09	-0.9	20.9	61.0
Sept.19	07 28.09	+40 38.2	6.789	6.513	-0.03	-0.5	20.9	69.9
Sept.29	07 27.80	+40 33.2	6.680	6.567	-0.16	-0.2	20.9	79.2
Oct. 9	07 26.20	+40 31.3	6.566	6.622	-0.30	0.0	20.9	88.9
Oct. 19	07 23.19	+40 31.7	6.451	6.677	-0.45	+0.1	21.0	98.8
Oct. 29	07 18.69	+40 33.1	6.341	6.732	-0.60	+0.1	21.0	109.1
Nov. 8	07 12.67	+40 34.1	6.242	6.787	-0.75	-0.1	21.0	119.7
Nov. 18	07 05.20	+40 32.8	6.160	6.842	-0.87	-0.6	21.0	130.4
Nov. 28	06 56.45	+40 27.3	6.102	6.898	-0.97	-1.2	21.0	141.1
Dec. 8	06 46.72	+40 15.7	6.073	6.953	-1.03	-1.9	21.0	151.4
Dec. 18	06 36.40	+39 56.7	6.076	7.009	-1.04	-2.7	21.1	160.1
Dec. 28	06 25.96	+39 29.8	6.115	7.065	-1.01	-3.4	21.1	163.8
Jan. 7	06 15.87	+38 55.3	6.191	7.121	-0.93	-4.1	21.2	159.6
Jan. 17	06 06.57	+38 14.5	6.303	7.177	-0.82	-4.5	21.3	150.8
Jan. 27	05 58.40	+37 29.0	6.447	7.233	-0.68	-4.8	21.4	140.5
Feb. 6	05 51.57	+36 41.0	6.619	7.290	-0.54	-4.9	21.5	129.8
Feb. 16	05 46.20	+35 52.3	6.815	7.346	-0.39	-4.8	21.6	119.1
Feb. 26	05 42.29	+35 04.5	7.028	7.403	-0.25	-4.6	21.7	108.6
Mar. 8	05 39.77	+34 18.7	7.252	7.459	-0.12	-4.3	21.8	98.2
Mar. 18	05 38.53	+33 35.8	7.482	7.516	-0.01	-4.0	21.9	88.1
Mar. 28	05 38.44	+32 55.9	7.712	7.573	+0.09	-3.7	22.0	78.3

Comet C/2013 G9 (Tenagra)

Epoch = 2016 July 31.0 TT
T = 2015 Jan. 15.21855 TT
Peri. = 205.06722
Node = 35.74616 2000.0
Incl. = 146.25330
q = 5.3395191 AU
e = 0.9999187

m1 = 5.8 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	10 24.39	-24 30.2	5.533	5.939	-0.97	-1.8	17.3	109.9
Jan. 13	10 14.72	-24 48.1	5.425	5.971	-1.09	-0.3	17.2	119.5
Jan. 23	10 03.81	-24 51.5	5.342	6.004	-1.18	+1.3	17.2	128.5
Feb. 2	09 52.03	-24 38.9	5.287	6.038	-1.22	+2.9	17.2	136.3
Feb. 12	09 39.82	-24 09.4	5.265	6.072	-1.21	+4.5	17.2	141.8
Feb. 22	09 27.71	-23 24.2	5.279	6.106	-1.15	+5.9	17.3	143.9
Mar. 3	09 16.20	-22 25.6	5.331	6.141	-1.05	+6.9	17.3	141.9
Mar. 13	09 05.72	-21 17.1	5.417	6.177	-0.91	+7.4	17.4	136.6
Mar. 23	08 56.58	-20 02.7	5.535	6.213	-0.76	+7.6	17.4	129.2
Apr. 2	08 48.95	-18 46.7	5.681	6.250	-0.61	+7.4	17.5	120.7
Apr. 12	08 42.86	-17 32.3	5.848	6.288	-0.46	+7.0	17.6	111.7
Apr. 22	08 38.28	-16 22.4	6.031	6.326	-0.32	+6.3	17.7	102.5
May 2	08 35.09	-15 18.9	6.223	6.364	-0.19	+5.6	17.8	93.5
May 12	08 33.15	-14 23.2	6.419	6.403	-0.08	+4.7	17.9	84.6
May 22	08 32.31	-13 35.9	6.613	6.442	+0.01	+3.9	18.0	75.9
June 1	08 32.38	-12 57.4	6.801	6.482	+0.08	+3.0	18.1	67.6
June 11	08 33.21	-12 27.4	6.978	6.523	+0.14	+2.1	18.2	59.6
June 21	08 34.65	-12 06.0	7.140	6.563	+0.19	+1.3	18.2	52.0
July 1	08 36.55	-11 52.6	7.284	6.605	+0.22	+0.6	18.3	45.0
July 11	08 38.79	-11 47.0	7.408	6.646	+0.24	-0.2	18.4	38.8
July 21	08 41.22	-11 48.5	7.510	6.688	+0.25	-0.8	18.4	33.7
July 31	08 43.74	-11 56.8	7.588	6.731	+0.25	-1.5	18.5	30.2
Aug. 10	08 46.23	-12 11.4	7.642	6.773	+0.23	-2.0	18.5	29.0
Aug. 20	08 48.56	-12 31.7	7.671	6.817	+0.21	-2.5	18.6	30.3
Aug. 30	08 50.65	-12 57.1	7.676	6.860	+0.17	-3.0	18.6	33.8
Sept. 9	08 52.36	-13 27.0	7.657	6.904	+0.12	-3.4	18.6	39.1
Sept.19	08 53.58	-14 00.9	7.616	6.948	+0.06	-3.7	18.6	45.5
Sept.29	08 54.20	-14 37.8	7.554	6.993	-0.01	-3.9	18.6	52.7
Oct. 9	08 54.10	-15 17.1	7.475	7.038	-0.09	-4.0	18.6	60.5
Oct. 19	08 53.17	-15 57.5	7.382	7.083	-0.19	-4.0	18.6	68.8
Oct. 29	08 51.30	-16 37.8	7.279	7.129	-0.29	-3.9	18.6	77.4
Nov. 8	08 48.41	-17 16.8	7.170	7.174	-0.40	-3.6	18.6	86.3
Nov. 18	08 44.42	-17 52.6	7.062	7.220	-0.51	-3.1	18.6	95.3
Nov. 28	08 39.33	-18 23.5	6.959	7.267	-0.62	-2.4	18.6	104.4
Dec. 8	08 33.15	-18 47.7	6.867	7.313	-0.72	-1.5	18.6	113.4
Dec. 18	08 26.00	-19 03.1	6.792	7.360	-0.80	-0.5	18.6	122.0
Dec. 28	08 18.04	-19 08.4	6.739	7.407	-0.85	+0.6	18.6	129.8
Jan. 7	08 09.52	-19 02.3	6.713	7.455	-0.88	+1.8	18.7	136.3
Jan. 17	08 00.75	-18 44.6	6.718	7.502	-0.87	+2.9	18.7	140.4
Jan. 27	07 52.04	-18 15.6	6.754	7.550	-0.83	+3.9	18.7	141.6
Feb. 6	07 43.73	-17 36.5	6.823	7.598	-0.76	+4.7	18.8	139.3
Feb. 16	07 36.08	-16 49.4	6.923	7.646	-0.68	+5.3	18.8	134.4
Feb. 26	07 29.33	-15 56.4	7.051	7.695	-0.57	+5.6	18.9	127.6
Mar. 8	07 23.61	-15 00.0	7.204	7.743	-0.46	+5.7	19.0	119.7
Mar. 18	07 19.00	-14 02.6	7.377	7.792	-0.35	+5.6	19.1	111.2
Mar. 28	07 15.49	-13 06.2	7.564	7.841	-0.24	+5.4	19.1	102.5

Comet C/2014 Q2 (Lovejoy)

Epoch = 2016 July 31.0 TT
T = 2015 Jan. 30.02893 TT
Peri. = 12.40405
Node = 94.98910 2000.0
Incl. = 80.28988
q = 1.2908546 AU
e = 0.9976725

m1 = 3.8 + 5 log(Delta) + 10.0 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	17 52.24	+20 06.4	5.035	4.400	+0.82	−0.7	13.5	45.4
Jan. 13	18 00.47	+19 59.2	5.101	4.497	+0.75	+0.5	13.7	47.6
Jan. 23	18 07.99	+20 03.7	5.150	4.593	+0.67	+1.5	13.8	50.9
Feb. 2	18 14.68	+20 18.9	5.183	4.689	+0.58	+2.5	13.9	55.0
Feb. 12	18 20.44	+20 43.6	5.201	4.784	+0.47	+3.3	14.0	59.9
Feb. 22	18 25.16	+21 16.4	5.206	4.878	+0.36	+4.0	14.1	65.4
Mar. 3	18 28.74	+21 56.0	5.198	4.972	+0.23	+4.5	14.2	71.4
Mar. 13	18 31.07	+22 40.7	5.182	5.065	+0.10	+4.8	14.3	77.8
Mar. 23	18 32.05	+23 28.4	5.159	5.158	−0.04	+4.9	14.3	84.4
Apr. 2	18 31.61	+24 17.0	5.133	5.250	−0.19	+4.7	14.4	91.2
Apr. 12	18 29.72	+25 04.1	5.108	5.342	−0.33	+4.3	14.5	98.1
Apr. 22	18 26.39	+25 46.8	5.088	5.433	−0.47	+3.5	14.5	104.9
May 2	18 21.68	+26 22.2	5.076	5.524	−0.59	+2.6	14.6	111.4
May 12	18 15.75	+26 47.8	5.076	5.614	−0.69	+1.3	14.7	117.4
May 22	18 08.84	+27 00.8	5.092	5.703	−0.76	−0.1	14.8	122.7
June 1	18 01.24	+26 59.5	5.127	5.792	−0.79	−1.7	14.8	126.8
June 11	17 53.32	+26 42.9	5.183	5.881	−0.79	−3.2	14.9	129.5
June 21	17 45.46	+26 11.0	5.262	5.969	−0.74	−4.6	15.0	130.3
July 1	17 38.02	+25 24.8	5.363	6.057	−0.67	−5.9	15.1	129.2
July 11	17 31.32	+24 26.2	5.488	6.144	−0.57	−6.9	15.3	126.3
July 21	17 25.58	+23 17.6	5.633	6.231	−0.46	−7.6	15.4	121.9
July 31	17 20.97	+22 01.8	5.798	6.317	−0.34	−8.0	15.5	116.5
Aug. 10	17 17.55	+20 41.4	5.980	6.403	−0.22	−8.2	15.6	110.3
Aug. 20	17 15.35	+19 19.2	6.175	6.488	−0.10	−8.2	15.8	103.6
Aug. 30	17 14.32	+17 57.3	6.380	6.573	+0.01	−8.0	15.9	96.6
Sept. 9	17 14.38	+16 37.5	6.591	6.658	+0.11	−7.6	16.0	89.4
Sept.19	17 15.45	+15 21.3	6.805	6.742	+0.20	−7.1	16.1	82.2
Sept.29	17 17.42	+14 09.8	7.017	6.825	+0.28	−6.6	16.3	74.9
Oct. 9	17 20.17	+13 03.9	7.225	6.909	+0.34	−6.0	16.4	67.8
Oct. 19	17 23.59	+12 04.2	7.424	6.992	+0.40	−5.3	16.5	60.7
Oct. 29	17 27.56	+11 11.2	7.613	7.074	+0.44	−4.6	16.6	54.0
Nov. 8	17 31.97	+10 25.1	7.787	7.157	+0.47	−3.9	16.7	47.6
Nov. 18	17 36.72	+09 46.0	7.944	7.238	+0.50	−3.2	16.8	41.9
Nov. 28	17 41.70	+09 14.0	8.083	7.320	+0.51	−2.5	16.9	37.0
Dec. 8	17 46.79	+08 49.1	8.201	7.401	+0.51	−1.8	17.0	33.6
Dec. 18	17 51.91	+08 31.1	8.298	7.482	+0.50	−1.1	17.0	32.0
Dec. 28	17 56.94	+08 19.8	8.373	7.562	+0.48	−0.5	17.1	32.5
Jan. 7	18 01.79	+08 15.0	8.425	7.642	+0.46	+0.1	17.2	35.2
Jan. 17	18 06.35	+08 16.3	8.455	7.722	+0.42	+0.7	17.2	39.5
Jan. 27	18 10.54	+08 23.1	8.464	7.801	+0.37	+1.2	17.3	45.2
Feb. 6	18 14.26	+08 35.1	8.454	7.880	+0.32	+1.6	17.3	51.6
Feb. 16	18 17.43	+08 51.6	8.427	7.959	+0.25	+2.0	17.3	58.7
Feb. 26	18 19.95	+09 11.8	8.385	8.038	+0.18	+2.3	17.4	66.3
Mar. 8	18 21.77	+09 34.9	8.331	8.116	+0.10	+2.5	17.4	74.1
Mar. 18	18 22.81	+10 00.0	8.270	8.194	+0.02	+2.6	17.4	82.2
Mar. 28	18 23.04	+10 26.0	8.204	8.271	−0.06	+2.6	17.5	90.4

Comet C/2014 G3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Feb. 2.54670 TT
Peri. = 148.02247
Node = 4.70284 2000.0
Incl. = 156.06979
q = 4.7004882 AU
e = 0.9128981

m1 = 8.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 19.69	-06 16.1	5.153	5.326	-0.61	+0.1	19.0	94.8
Jan. 13	12 13.55	-06 14.8	5.000	5.361	-0.78	+1.0	19.0	106.4
Jan. 23	12 05.79	-06 04.5	4.859	5.396	-0.93	+2.0	19.0	118.3
Feb. 2	11 56.45	-05 44.5	4.739	5.432	-1.08	+3.0	18.9	130.6
Feb. 12	11 45.69	-05 14.9	4.647	5.469	-1.19	+3.9	18.9	143.2
Feb. 22	11 33.84	-04 36.3	4.589	5.507	-1.25	+4.6	18.9	155.8
Mar. 3	11 21.34	-03 50.6	4.572	5.545	-1.26	+5.0	18.9	167.6
Mar. 13	11 08.71	-03 00.2	4.598	5.583	-1.22	+5.2	19.0	171.5
Mar. 23	10 56.52	-02 08.0	4.667	5.622	-1.13	+5.1	19.0	161.7
Apr. 2	10 45.24	-01 17.0	4.777	5.662	-1.00	+4.7	19.1	149.7
Apr. 12	10 35.23	-00 29.9	4.922	5.703	-0.85	+4.1	19.2	137.6
Apr. 22	10 26.73	+00 11.5	5.098	5.743	-0.69	+3.4	19.3	125.8
May 2	10 19.81	+00 45.9	5.295	5.785	-0.54	+2.7	19.4	114.4
May 12	10 14.45	+01 12.8	5.509	5.827	-0.39	+1.9	19.6	103.4
May 22	10 10.56	+01 32.2	5.730	5.869	-0.26	+1.2	19.7	92.9
June 1	10 07.98	+01 44.4	5.954	5.912	-0.14	+0.5	19.8	82.7
June 11	10 06.57	+01 49.7	6.173	5.955	-0.04	-0.1	19.9	72.9
June 21	10 06.15	+01 48.8	6.384	5.999	+0.04	-0.7	20.0	63.4
July 1	10 06.56	+01 42.3	6.581	6.043	+0.11	-1.2	20.1	54.2
July 11	10 07.64	+01 30.7	6.760	6.087	+0.16	-1.6	20.2	45.2
July 21	10 09.24	+01 14.6	6.919	6.132	+0.20	-2.0	20.3	36.5
July 31	10 11.23	+00 54.6	7.055	6.177	+0.23	-2.3	20.4	28.0
Aug. 10	10 13.48	+00 31.1	7.166	6.223	+0.24	-2.6	20.4	20.0
Aug. 20	10 15.88	+00 04.8	7.249	6.269	+0.24	-2.9	20.5	13.2
Aug. 30	10 18.29	-00 24.0	7.306	6.315	+0.23	-3.1	20.5	10.2
Sept. 9	10 20.62	-00 54.6	7.334	6.361	+0.21	-3.2	20.6	13.9
Sept.19	10 22.74	-01 26.5	7.335	6.408	+0.18	-3.3	20.6	21.1
Sept.29	10 24.55	-01 59.2	7.309	6.455	+0.14	-3.3	20.6	29.4
Oct. 9	10 25.92	-02 32.2	7.258	6.503	+0.08	-3.2	20.6	38.2
Oct. 19	10 26.74	-03 04.6	7.184	6.550	+0.01	-3.1	20.6	47.4
Oct. 29	10 26.88	-03 35.8	7.089	6.598	-0.07	-2.9	20.6	56.8
Nov. 8	10 26.23	-04 05.0	6.978	6.647	-0.16	-2.6	20.6	66.6
Nov. 18	10 24.67	-04 31.4	6.855	6.695	-0.26	-2.3	20.6	76.6
Nov. 28	10 22.11	-04 53.9	6.725	6.744	-0.37	-1.8	20.6	86.9
Dec. 8	10 18.45	-05 11.6	6.595	6.792	-0.48	-1.2	20.6	97.4
Dec. 18	10 13.67	-05 23.4	6.470	6.842	-0.59	-0.5	20.6	108.2
Dec. 28	10 07.78	-05 28.5	6.357	6.891	-0.69	+0.2	20.6	119.2
Jan. 7	10 00.84	-05 26.0	6.264	6.940	-0.78	+1.0	20.6	130.2
Jan. 17	09 53.04	-05 15.7	6.197	6.990	-0.85	+1.8	20.6	141.1
Jan. 27	09 44.58	-04 57.5	6.160	7.040	-0.88	+2.5	20.6	151.3
Feb. 6	09 35.77	-04 32.1	6.159	7.090	-0.88	+3.1	20.7	159.3
Feb. 16	09 26.94	-04 00.6	6.194	7.140	-0.85	+3.6	20.7	161.9
Feb. 26	09 18.42	-03 24.7	6.268	7.190	-0.79	+3.9	20.8	157.1
Mar. 8	09 10.51	-02 46.1	6.377	7.241	-0.71	+3.9	20.8	148.3
Mar. 18	09 03.45	-02 06.9	6.519	7.291	-0.61	+3.8	20.9	138.2
Mar. 28	08 57.40	-01 28.6	6.689	7.342	-0.49	+3.6	21.0	127.7

Comet 299P/Catalina-PANSTARRS

Epoch = 2016 July 31.0 TT
T = 2015 Feb. 23.66800 TT
Peri. = 323.58309 e = 0.2826857
Node = 271.67566 2000.0 a = 4.3772143 AU
Incl. = 10.47700 n = 0.10762356
q = 3.1398384 AU P = 9.16 years

m1 = 6.2 + 5 log(Delta) + 17.5 log(r(t-60))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	19 27.46	-18 50.9	4.472	3.506	+1.43	+4.5	18.7	9.4
Jan. 13	19 41.73	-18 05.6	4.507	3.526	+1.40	+5.0	18.8	3.9
Jan. 23	19 55.75	-17 15.6	4.525	3.547	+1.37	+5.4	18.8	5.8
Feb. 2	20 09.43	-16 21.3	4.527	3.569	+1.33	+5.8	18.9	11.9
Feb. 12	20 22.70	-15 23.1	4.512	3.591	+1.28	+6.1	18.9	18.6
Feb. 22	20 35.47	-14 21.7	4.482	3.613	+1.22	+6.4	18.9	25.3
Mar. 3	20 47.68	-13 17.8	4.435	3.635	+1.16	+6.6	19.0	32.2
Mar. 13	20 59.25	-12 12.0	4.374	3.657	+1.08	+6.7	19.0	39.1
Mar. 23	21 10.09	-11 05.0	4.299	3.680	+1.00	+6.7	19.0	46.2
Apr. 2	21 20.13	-09 57.8	4.212	3.703	+0.92	+6.7	19.0	53.3
Apr. 12	21 29.29	-08 51.1	4.114	3.726	+0.82	+6.5	19.0	60.7
Apr. 22	21 37.45	-07 45.9	4.006	3.749	+0.71	+6.3	19.0	68.1
May 2	21 44.53	-06 43.2	3.891	3.773	+0.59	+5.9	19.0	75.8
May 12	21 50.40	-05 43.8	3.772	3.797	+0.46	+5.5	18.9	83.7
May 22	21 54.96	-04 49.1	3.650	3.820	+0.31	+4.9	18.9	91.9
June 1	21 58.10	-03 60.0	3.530	3.844	+0.16	+4.2	18.9	100.4
June 11	21 59.72	-03 17.8	3.413	3.868	0.00	+3.4	18.9	109.2
June 21	21 59.75	-02 43.7	3.305	3.892	-0.16	+2.5	18.8	118.4
July 1	21 58.19	-02 18.6	3.208	3.916	-0.31	+1.5	18.8	127.9
July 11	21 55.10	-02 03.6	3.128	3.940	-0.44	+0.5	18.8	137.7
July 21	21 50.67	-01 58.8	3.068	3.964	-0.55	-0.5	18.8	147.7
July 31	21 45.19	-02 03.9	3.032	3.989	-0.61	-1.4	18.8	157.5
Aug. 10	21 39.06	-02 18.1	3.022	4.013	-0.63	-2.1	18.9	165.9
Aug. 20	21 32.79	-02 39.5	3.041	4.037	-0.59	-2.6	18.9	168.4
Aug. 30	21 26.86	-03 05.7	3.088	4.061	-0.51	-2.8	19.0	162.2
Sept. 9	21 21.75	-03 34.0	3.163	4.086	-0.39	-2.8	19.1	152.9
Sept.19	21 17.84	-04 01.9	3.264	4.110	-0.25	-2.5	19.2	142.9
Sept.29	21 15.35	-04 27.0	3.387	4.134	-0.09	-2.1	19.4	132.8
Oct. 9	21 14.42	-04 47.5	3.529	4.158	+0.07	-1.5	19.5	123.0
Oct. 19	21 15.08	-05 02.1	3.685	4.182	+0.22	-0.8	19.6	113.4
Oct. 29	21 17.24	-05 10.0	3.852	4.206	+0.36	-0.1	19.8	104.1
Nov. 8	21 20.80	-05 10.7	4.025	4.230	+0.48	+0.7	19.9	95.1
Nov. 18	21 25.61	-05 04.1	4.201	4.254	+0.59	+1.4	20.1	86.3
Nov. 28	21 31.52	-04 50.3	4.375	4.278	+0.68	+2.1	20.2	77.8
Dec. 8	21 38.36	-04 29.5	4.545	4.301	+0.76	+2.8	20.3	69.5
Dec. 18	21 45.97	-04 02.0	4.708	4.325	+0.83	+3.4	20.4	61.5
Dec. 28	21 54.23	-03 28.2	4.860	4.348	+0.88	+4.0	20.6	53.5
Jan. 7	22 02.98	-02 48.6	5.000	4.372	+0.91	+4.5	20.7	45.8
Jan. 17	22 12.12	-02 03.9	5.125	4.395	+0.94	+4.9	20.8	38.2
Jan. 27	22 21.54	-01 14.4	5.235	4.418	+0.96	+5.4	20.8	30.8
Feb. 6	22 31.13	-00 20.9	5.327	4.441	+0.97	+5.7	20.9	23.6
Feb. 16	22 40.81	+00 36.1	5.400	4.464	+0.97	+6.0	21.0	16.8
Feb. 26	22 50.50	+01 35.9	5.454	4.486	+0.96	+6.2	21.1	11.0
Mar. 8	23 00.12	+02 38.0	5.489	4.509	+0.95	+6.4	21.1	8.3
Mar. 18	23 09.59	+03 41.7	5.503	4.531	+0.93	+6.5	21.2	11.2
Mar. 28	23 18.86	+04 46.4	5.498	4.553	+0.90	+6.5	21.2	17.0

Comet C/2014 N3 (NEOWISE)

Epoch = 2016 July 31.0 TT
T = 2015 Mar. 13.04103 TT
Peri. = 353.53835
Node = 19.93197 2000.0
Incl. = 61.64302
q = 3.8815916 AU
e = 0.9988061

m1 = 6.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 29.80	+45 49.9	4.323	4.639	+0.19	−0.3	16.0	102.7
Jan. 13	00 31.74	+45 47.4	4.495	4.685	+0.37	+0.7	16.2	95.0
Jan. 23	00 35.44	+45 54.6	4.669	4.732	+0.52	+1.7	16.3	87.6
Feb. 2	00 40.66	+46 11.9	4.841	4.780	+0.65	+2.7	16.4	80.6
Feb. 12	00 47.17	+46 39.3	5.009	4.828	+0.76	+3.7	16.5	73.8
Feb. 22	00 54.78	+47 16.2	5.170	4.878	+0.85	+4.6	16.6	67.5
Mar. 3	01 03.33	+48 02.2	5.321	4.928	+0.94	+5.4	16.8	61.6
Mar. 13	01 12.69	+48 56.3	5.462	4.978	+1.01	+6.2	16.9	56.2
Mar. 23	01 22.75	+49 58.0	5.591	5.030	+1.07	+6.8	17.0	51.4
Apr. 2	01 33.41	+51 06.3	5.707	5.082	+1.12	+7.4	17.0	47.2
Apr. 12	01 44.60	+52 20.5	5.810	5.135	+1.17	+7.9	17.1	43.9
Apr. 22	01 56.26	+53 40.0	5.898	5.188	+1.21	+8.4	17.2	41.5
May 2	02 08.34	+55 04.0	5.973	5.242	+1.24	+8.8	17.3	40.1
May 12	02 20.78	+56 32.0	6.033	5.296	+1.28	+9.1	17.3	39.8
May 22	02 33.54	+58 03.4	6.080	5.351	+1.30	+9.4	17.4	40.6
June 1	02 46.58	+59 37.7	6.113	5.406	+1.33	+9.7	17.5	42.3
June 11	02 59.85	+61 14.7	6.134	5.462	+1.34	+9.9	17.5	44.9
June 21	03 13.28	+62 53.9	6.144	5.518	+1.35	+10.1	17.6	48.2
July 1	03 26.82	+64 34.9	6.143	5.575	+1.35	+10.3	17.6	52.0
July 11	03 40.36	+66 17.5	6.133	5.632	+1.34	+10.4	17.6	56.2
July 21	03 53.79	+68 01.5	6.116	5.689	+1.32	+10.5	17.7	60.8
July 31	04 06.97	+69 46.6	6.092	5.747	+1.27	+10.6	17.7	65.6
Aug. 10	04 19.66	+71 32.6	6.063	5.805	+1.19	+10.6	17.8	70.6
Aug. 20	04 31.56	+73 19.0	6.031	5.863	+1.07	+10.6	17.8	75.6
Aug. 30	04 42.26	+75 05.4	5.998	5.921	+0.88	+10.6	17.8	80.8
Sept. 9	04 51.09	+76 51.3	5.967	5.980	+0.60	+10.4	17.8	85.9
Sept.19	04 57.09	+78 35.7	5.938	6.039	+0.16	+10.1	17.9	91.0
Sept.29	04 58.74	+80 17.1	5.915	6.098	−0.52	+9.6	17.9	95.8
Oct. 9	04 53.50	+81 53.1	5.898	6.158	−1.60	+8.7	17.9	100.4
Oct. 19	04 37.48	+83 19.9	5.891	6.217	−3.22	+7.1	18.0	104.6
Oct. 29	04 05.28	+84 30.9	5.894	6.277	−5.19	+4.5	18.0	108.3
Nov. 8	03 13.41	+85 16.0	5.910	6.337	−6.33	+1.0	18.1	111.3
Nov. 18	02 10.14	+85 26.1	5.939	6.397	−5.49	−2.4	18.1	113.5
Nov. 28	01 15.20	+85 02.3	5.982	6.458	−3.52	−4.6	18.2	114.7
Dec. 8	00 40.00	+84 16.5	6.040	6.518	−1.74	−5.5	18.2	115.0
Dec. 18	00 22.55	+83 21.2	6.112	6.579	−0.52	−5.7	18.3	114.3
Dec. 28	00 17.40	+82 24.3	6.198	6.640	+0.30	−5.4	18.4	112.7
Jan. 7	00 20.38	+81 30.5	6.296	6.700	+0.84	−4.8	18.5	110.3
Jan. 17	00 28.80	+80 42.4	6.406	6.761	+1.23	−4.1	18.5	107.1
Jan. 27	00 41.08	+80 01.2	6.526	6.822	+1.52	−3.4	18.6	103.5
Feb. 6	00 56.26	+79 27.3	6.653	6.884	+1.75	−2.6	18.7	99.4
Feb. 16	01 13.73	+79 00.9	6.787	6.945	+1.94	−2.0	18.8	95.1
Feb. 26	01 33.16	+78 41.4	6.924	7.006	+2.12	−1.3	18.9	90.7
Mar. 8	01 54.33	+78 28.2	7.064	7.067	+2.28	−0.8	18.9	86.2
Mar. 18	02 17.09	+78 20.3	7.204	7.129	+2.43	−0.4	19.0	81.7
Mar. 28	02 41.38	+78 16.6	7.342	7.190	+2.58	−0.1	19.1	77.4

Comet 44P/Reinmuth

Epoch = 2016 July 31.0 TT
T = 2015 Mar. 24.00939 TT
Peri. = 58.24863 e = 0.4262586
Node = 286.45902 2000.0 a = 3.6922255 AU
Incl. = 5.89591 n = 0.13892223
q = 2.1183826 AU P = 7.09 years

m1 = 12.0 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 33.15	+24 01.6	2.151	2.928	+0.01	-2.8	17.2	134.8
Jan. 13	03 33.23	+23 33.7	2.299	2.970	+0.25	-1.8	17.4	124.6
Jan. 23	03 35.73	+23 15.6	2.462	3.012	+0.46	-0.9	17.5	114.9
Feb. 2	03 40.36	+23 06.6	2.635	3.054	+0.65	-0.1	17.7	105.8
Feb. 12	03 46.85	+23 05.3	2.815	3.096	+0.81	+0.5	17.9	97.1
Feb. 22	03 54.93	+23 10.1	2.998	3.138	+0.94	+0.9	18.1	88.9
Mar. 3	04 04.33	+23 19.1	3.181	3.180	+1.05	+1.2	18.3	81.0
Mar. 13	04 14.83	+23 30.7	3.362	3.222	+1.14	+1.3	18.4	73.4
Mar. 23	04 26.23	+23 43.6	3.538	3.264	+1.21	+1.3	18.6	66.1
Apr. 2	04 38.36	+23 56.2	3.708	3.305	+1.27	+1.1	18.7	59.0
Apr. 12	04 51.07	+24 07.6	3.869	3.346	+1.32	+0.9	18.9	52.0
Apr. 22	05 04.23	+24 17.0	4.019	3.387	+1.35	+0.6	19.0	45.3
May 2	05 17.70	+24 23.5	4.158	3.428	+1.37	+0.3	19.1	38.6
May 12	05 31.40	+24 26.6	4.283	3.468	+1.38	-0.1	19.2	32.0
May 22	05 45.22	+24 25.9	4.395	3.508	+1.38	-0.5	19.3	25.5
June 1	05 59.07	+24 21.3	4.491	3.548	+1.38	-0.9	19.4	19.1
June 11	06 12.87	+24 12.6	4.571	3.587	+1.37	-1.3	19.5	12.7
June 21	06 26.53	+23 59.8	4.635	3.626	+1.34	-1.7	19.5	6.3
July 1	06 39.98	+23 43.0	4.682	3.665	+1.32	-2.1	19.6	0.6
July 11	06 53.15	+23 22.5	4.711	3.703	+1.28	-2.4	19.6	6.7
July 21	07 05.95	+22 58.6	4.723	3.741	+1.24	-2.7	19.7	13.3
July 31	07 18.33	+22 31.6	4.717	3.779	+1.19	-3.0	19.7	20.0
Aug. 10	07 30.20	+22 02.0	4.693	3.816	+1.13	-3.1	19.7	26.8
Aug. 20	07 41.47	+21 30.5	4.653	3.852	+1.06	-3.3	19.7	33.7
Aug. 30	07 52.08	+20 57.7	4.596	3.888	+0.98	-3.3	19.7	40.8
Sept. 9	08 01.92	+20 24.3	4.524	3.924	+0.90	-3.3	19.7	48.1
Sept.19	08 10.89	+19 51.0	4.438	3.959	+0.80	-3.2	19.7	55.7
Sept.29	08 18.89	+19 18.8	4.339	3.994	+0.69	-3.0	19.7	63.5
Oct. 9	08 25.77	+18 48.5	4.229	4.029	+0.56	-2.7	19.7	71.7
Oct. 19	08 31.41	+18 21.2	4.112	4.063	+0.43	-2.3	19.6	80.2
Oct. 29	08 35.67	+17 57.8	3.990	4.096	+0.27	-1.9	19.6	89.1
Nov. 8	08 38.40	+17 39.1	3.867	4.129	+0.11	-1.3	19.6	98.4
Nov. 18	08 39.49	+17 26.1	3.747	4.162	-0.07	-0.7	19.5	108.1
Nov. 28	08 38.84	+17 19.1	3.634	4.194	-0.24	-0.1	19.5	118.4
Dec. 8	08 36.42	+17 18.5	3.535	4.225	-0.41	+0.5	19.4	129.0
Dec. 18	08 32.31	+17 23.8	3.454	4.257	-0.56	+1.0	19.4	140.2
Dec. 28	08 26.72	+17 34.3	3.396	4.287	-0.67	+1.4	19.4	151.7
Jan. 7	08 19.98	+17 48.4	3.366	4.317	-0.74	+1.6	19.4	163.4
Jan. 17	08 12.59	+18 04.6	3.366	4.347	-0.75	+1.6	19.4	175.1
Jan. 27	08 05.09	+18 21.0	3.398	4.376	-0.70	+1.5	19.5	172.3
Feb. 6	07 58.06	+18 36.1	3.463	4.405	-0.61	+1.3	19.5	160.6
Feb. 16	07 52.01	+18 48.8	3.557	4.433	-0.47	+1.0	19.6	149.1
Feb. 26	07 47.29	+18 58.4	3.677	4.461	-0.31	+0.6	19.7	137.9
Mar. 8	07 44.15	+19 04.5	3.819	4.488	-0.15	+0.3	19.8	127.1
Mar. 18	07 42.67	+19 07.1	3.978	4.515	+0.02	-0.1	19.9	116.8
Mar. 28	07 42.82	+19 06.0	4.149	4.542	+0.17	-0.5	20.0	106.9

Comet 88P/Howell

Epoch = 2016 July 31.0 TT
T = 2015 Apr. 6.22519 TT
Peri. = 235.88419 e = 0.5631285
Node = 56.69711 2000.0 a = 3.1083126 AU
Incl. = 4.38328 n = 0.17985273
q = 1.3579332 AU P = 5.48 years

m1 = 6.4 + 5 log(Delta) + 22.5 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	01 50.66	+10 37.0	2.368	2.826	+0.52	+4.1	17.3	107.7
Jan. 13	01 55.87	+11 17.9	2.564	2.885	+0.68	+4.7	17.7	98.9
Jan. 23	02 02.67	+12 05.2	2.764	2.943	+0.81	+5.2	18.1	90.6
Feb. 2	02 10.76	+12 57.0	2.965	3.001	+0.92	+5.5	18.5	82.6
Feb. 12	02 19.93	+13 51.8	3.163	3.057	+1.01	+5.7	18.8	74.8
Feb. 22	02 29.99	+14 48.3	3.357	3.112	+1.08	+5.7	19.2	67.3
Mar. 3	02 40.76	+15 45.3	3.543	3.167	+1.14	+5.7	19.5	60.1
Mar. 13	02 52.13	+16 41.9	3.720	3.220	+1.18	+5.5	19.8	52.9
Mar. 23	03 03.96	+17 37.1	3.886	3.273	+1.22	+5.3	20.1	46.0
Apr. 2	03 16.15	+18 30.4	4.039	3.324	+1.25	+5.1	20.4	39.1
Apr. 12	03 28.62	+19 21.0	4.179	3.375	+1.27	+4.8	20.6	32.3
Apr. 22	03 41.29	+20 08.5	4.303	3.424	+1.28	+4.4	20.8	25.6
May 2	03 54.07	+20 52.5	4.410	3.473	+1.28	+4.0	21.0	19.0
May 12	04 06.91	+21 32.8	4.500	3.520	+1.28	+3.6	21.3	12.4
May 22	04 19.71	+22 09.1	4.573	3.567	+1.27	+3.2	21.4	5.8
June 1	04 32.41	+22 41.4	4.627	3.613	+1.25	+2.8	21.6	1.1
June 11	04 44.94	+23 09.6	4.662	3.658	+1.23	+2.4	21.8	7.5
June 21	04 57.21	+23 33.8	4.678	3.701	+1.19	+2.0	21.9	14.2
July 1	05 09.15	+23 54.2	4.676	3.744	+1.15	+1.7	22.0	21.0
July 11	05 20.66	+24 11.1	4.655	3.786	+1.10	+1.4	22.2	27.9
July 21	05 31.65	+24 24.7	4.616	3.827	+1.04	+1.1	22.3	34.9
July 31	05 42.02	+24 35.5	4.561	3.868	+0.96	+0.9	22.4	42.1
Aug. 10	05 51.65	+24 44.1	4.489	3.907	+0.88	+0.7	22.4	49.5
Aug. 20	06 00.41	+24 50.8	4.403	3.946	+0.78	+0.6	22.5	57.1
Aug. 30	06 08.17	+24 56.4	4.304	3.983	+0.66	+0.5	22.6	65.0
Sept. 9	06 14.76	+25 01.5	4.194	4.020	+0.53	+0.5	22.6	73.2
Sept.19	06 20.03	+25 06.7	4.077	4.056	+0.38	+0.6	22.7	81.7
Sept.29	06 23.81	+25 12.7	3.955	4.091	+0.21	+0.7	22.7	90.7
Oct. 9	06 25.92	+25 19.9	3.832	4.125	+0.03	+0.9	22.7	100.0
Oct. 19	06 26.20	+25 28.5	3.713	4.158	-0.16	+1.0	22.8	109.9
Oct. 29	06 24.56	+25 38.5	3.602	4.190	-0.36	+1.1	22.8	120.2
Nov. 8	06 20.96	+25 49.4	3.505	4.222	-0.55	+1.1	22.8	131.0
Nov. 18	06 15.51	+26 00.1	3.428	4.253	-0.71	+1.0	22.8	142.3
Nov. 28	06 08.45	+26 09.7	3.375	4.283	-0.82	+0.7	22.9	153.9
Dec. 8	06 00.20	+26 16.9	3.350	4.312	-0.88	+0.4	23.0	165.8
Dec. 18	05 51.35	+26 20.7	3.358	4.340	-0.88	0.0	23.0	176.6
Dec. 28	05 42.55	+26 20.8	3.398	4.368	-0.81	-0.3	.	169.2
Jan. 7	05 34.43	+26 17.8	3.470	4.395	-0.69	-0.5	.	157.4
Jan. 17	05 27.56	+26 12.6	3.572	4.421	-0.53	-0.6	.	145.8
Jan. 27	05 22.28	+26 06.4	3.700	4.446	-0.35	-0.6	.	134.5
Feb. 6	05 18.82	+26 00.5	3.849	4.470	-0.16	-0.5	.	123.5
Feb. 16	05 17.23	+25 55.6	4.014	4.494	+0.02	-0.3	.	113.1
Feb. 26	05 17.43	+25 52.4	4.189	4.517	+0.19	-0.2	.	103.1
Mar. 8	05 19.31	+25 50.7	4.369	4.539	+0.34	0.0	.	93.5
Mar. 18	05 22.69	+25 50.6	4.551	4.560	+0.47	+0.1	.	84.3
Mar. 28	05 27.38	+25 51.4	4.729	4.581	+0.58	+0.1	.	75.4

Comet 174P/(60558) Echeclus

Epoch = 2016 July 31.0 TT
T = 2015 Apr. 21.64136 TT
Peri. = 162.85537 e = 0.4554082
Node = 173.33586 2000.0 a = 10.6800185 AU
Incl. = 4.34469 n = 0.02823879
q = 5.8162505 AU P = 34.90 years

H = 9.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	23 19.41	-04 42.1	6.259	5.945	+0.56	+3.2	17.8	67.0
Jan. 13	23 24.98	-04 09.8	6.412	5.955	+0.61	+3.6	17.9	58.3
Jan. 23	23 31.12	-03 33.6	6.553	5.965	+0.66	+4.0	17.9	49.8
Feb. 2	23 37.74	-02 54.0	6.679	5.976	+0.70	+4.2	17.9	41.4
Feb. 12	23 44.76	-02 11.7	6.789	5.987	+0.73	+4.4	17.9	33.2
Feb. 22	23 52.06	-01 27.3	6.880	5.998	+0.75	+4.6	17.8	25.0
Mar. 3	23 59.58	-00 41.5	6.951	6.010	+0.77	+4.7	17.8	17.0
Mar. 13	00 07.24	+00 05.2	7.001	6.022	+0.77	+4.7	17.7	9.1
Mar. 23	00 14.95	+00 52.0	7.031	6.034	+0.77	+4.7	17.6	1.4
Apr. 2	00 22.64	+01 38.5	7.039	6.047	+0.76	+4.6	17.7	6.7
Apr. 12	00 30.26	+02 24.2	7.026	6.060	+0.75	+4.4	17.8	14.4
Apr. 22	00 37.71	+03 08.3	6.992	6.073	+0.72	+4.2	17.9	22.2
May 2	00 44.94	+03 50.6	6.939	6.087	+0.69	+4.0	17.9	30.0
May 12	00 51.88	+04 30.3	6.868	6.101	+0.66	+3.7	18.0	37.8
May 22	00 58.44	+05 07.1	6.779	6.115	+0.61	+3.3	18.0	45.7
June 1	01 04.55	+05 40.5	6.676	6.130	+0.56	+3.0	18.0	53.7
June 11	01 10.14	+06 10.0	6.560	6.145	+0.50	+2.5	18.0	61.8
June 21	01 15.12	+06 35.2	6.433	6.160	+0.43	+2.0	18.0	70.0
July 1	01 19.41	+06 55.7	6.299	6.176	+0.35	+1.5	18.0	78.4
July 11	01 22.92	+07 11.1	6.160	6.191	+0.27	+1.0	17.9	87.1
July 21	01 25.59	+07 21.0	6.020	6.208	+0.18	+0.4	17.9	95.9
July 31	01 27.36	+07 25.3	5.883	6.224	+0.08	-0.2	17.8	105.0
Aug. 10	01 28.17	+07 23.8	5.753	6.241	-0.01	-0.7	17.8	114.4
Aug. 20	01 28.02	+07 16.6	5.634	6.257	-0.11	-1.3	17.7	124.1
Aug. 30	01 26.94	+07 03.9	5.530	6.275	-0.19	-1.8	17.6	134.1
Sept. 9	01 24.99	+06 46.4	5.447	6.292	-0.27	-2.2	17.5	144.3
Sept.19	01 22.31	+06 24.8	5.387	6.310	-0.32	-2.4	17.4	154.8
Sept.29	01 19.08	+06 00.3	5.353	6.328	-0.36	-2.6	17.3	165.4
Oct. 9	01 15.51	+05 34.5	5.349	6.346	-0.36	-2.6	17.2	175.7
Oct. 19	01 11.88	+05 09.0	5.376	6.364	-0.34	-2.4	17.2	172.4
Oct. 29	01 08.44	+04 45.4	5.432	6.383	-0.30	-2.0	17.4	161.7
Nov. 8	01 05.43	+04 25.1	5.518	6.402	-0.24	-1.6	17.5	150.9
Nov. 18	01 03.06	+04 09.6	5.630	6.421	-0.16	-1.0	17.6	140.2
Nov. 28	01 01.48	+03 59.6	5.765	6.440	-0.07	-0.4	17.8	129.7
Dec. 8	01 00.81	+03 55.7	5.919	6.460	+0.03	+0.2	17.9	119.4
Dec. 18	01 01.08	+03 58.1	6.087	6.480	+0.12	+0.8	18.0	109.3
Dec. 28	01 02.29	+04 06.6	6.265	6.500	+0.21	+1.4	18.0	99.5
Jan. 7	01 04.43	+04 20.8	6.448	6.520	+0.30	+1.9	18.1	89.9
Jan. 17	01 07.43	+04 40.2	6.630	6.540	+0.38	+2.4	18.2	80.5
Jan. 27	01 11.21	+05 04.2	6.809	6.561	+0.45	+2.8	18.2	71.4
Feb. 6	01 15.68	+05 32.1	6.980	6.582	+0.51	+3.1	18.3	62.4
Feb. 16	01 20.77	+06 03.2	7.140	6.603	+0.56	+3.4	18.3	53.7
Feb. 26	01 26.37	+06 36.8	7.285	6.624	+0.60	+3.5	18.3	45.1
Mar. 8	01 32.41	+07 12.1	7.415	6.646	+0.64	+3.6	18.3	36.7
Mar. 18	01 38.78	+07 48.6	7.525	6.667	+0.66	+3.7	18.3	28.5
Mar. 28	01 45.42	+08 25.6	7.616	6.689	+0.68	+3.7	18.2	20.3

Comet 113P/Spitaler

Epoch = 2016 July 31.0 TT
T = 2015 Apr. 24.45406 TT
Peri. = 50.19138 e = 0.4258176
Node = 14.36517 2000.0 a = 3.6903946 AU
Incl. = 5.77846 n = 0.13902563
q = 2.1189596 AU P = 7.09 years

m1 = 13.8 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	11 00.82	+12 33.7	2.170	2.796	-0.10	+1.3	19.9	120.1
Jan. 13	10 59.79	+12 46.3	2.098	2.838	-0.35	+2.5	19.9	130.5
Jan. 23	10 56.24	+13 11.0	2.043	2.879	-0.58	+3.3	19.9	141.5
Feb. 2	10 50.47	+13 44.5	2.009	2.921	-0.75	+3.8	20.0	153.0
Feb. 12	10 42.99	+14 22.3	2.000	2.963	-0.84	+3.7	20.0	164.6
Feb. 22	10 34.60	+14 59.0	2.020	3.005	-0.84	+3.1	20.1	174.0
Mar. 3	10 26.22	+15 29.7	2.069	3.048	-0.75	+2.1	20.2	168.7
Mar. 13	10 18.71	+15 50.7	2.147	3.090	-0.59	+0.9	20.4	157.6
Mar. 23	10 12.76	+16 00.0	2.252	3.132	-0.40	-0.3	20.5	146.5
Apr. 2	10 08.79	+15 57.3	2.379	3.174	-0.18	-1.4	20.7	135.9
Apr. 12	10 06.96	+15 43.2	2.525	3.215	+0.03	-2.4	20.9	125.8
Apr. 22	10 07.22	+15 19.0	2.685	3.257	+0.22	-3.3	21.1	116.3
May 2	10 09.40	+14 46.0	2.856	3.298	+0.39	-4.1	21.3	107.2
May 12	10 13.27	+14 05.3	3.034	3.340	+0.53	-4.7	21.4	98.7
May 22	10 18.58	+13 18.1	3.215	3.381	+0.65	-5.3	21.6	90.6
June 1	10 25.10	+12 25.2	3.397	3.421	+0.75	-5.8	21.8	82.8
June 11	10 32.61	+11 27.4	3.577	3.462	+0.83	-6.2	22.0	75.3
June 21	10 40.93	+10 25.4	3.753	3.502	+0.90	-6.6	22.1	68.0
July 1	10 49.89	+09 19.8	3.922	3.541	+0.95	-6.9	22.3	60.9
July 11	10 59.36	+08 11.2	4.083	3.581	+0.99	-7.1	22.4	54.0
July 21	11 09.24	+07 00.1	4.233	3.620	+1.02	-7.3	22.5	47.2
July 31	11 19.42	+05 47.0	4.371	3.658	+1.04	-7.5	22.6	40.4
Aug. 10	11 29.83	+04 32.4	4.497	3.697	+1.06	-7.6	22.7	33.7
Aug. 20	11 40.39	+03 16.9	4.607	3.735	+1.07	-7.6	22.8	27.0
Aug. 30	11 51.05	+02 00.8	4.702	3.772	+1.07	-7.6	22.9	20.3
Sept. 9	12 01.75	+00 44.7	4.781	3.809	+1.07	-7.6	23.0	13.6
Sept.19	12 12.44	-00 31.0	4.841	3.846	+1.06	-7.5	.	6.8
Sept.29	12 23.06	-01 45.7	4.884	3.882	+1.05	-7.3	.	0.7
Oct. 9	12 33.56	-02 58.9	4.907	3.918	+1.03	-7.1	.	7.0
Oct. 19	12 43.87	-04 10.2	4.911	3.953	+1.01	-6.9	.	14.1
Oct. 29	12 53.93	-05 19.0	4.897	3.988	+0.97	-6.6	.	21.3
Nov. 8	13 03.66	-06 24.9	4.863	4.022	+0.93	-6.2	.	28.7
Nov. 18	13 12.97	-07 27.3	4.812	4.056	+0.88	-5.8	.	36.2
Nov. 28	13 21.78	-08 25.6	4.743	4.090	+0.82	-5.4	.	43.9
Dec. 8	13 29.95	-09 19.5	4.658	4.123	+0.74	-4.9	.	51.8
Dec. 18	13 37.38	-10 08.3	4.559	4.155	+0.65	-4.3	.	60.0
Dec. 28	13 43.93	-10 51.5	4.448	4.187	+0.55	-3.7	.	68.4
Jan. 7	13 49.44	-11 28.7	4.328	4.219	+0.43	-3.1	.	77.1
Jan. 17	13 53.76	-11 59.2	4.201	4.250	+0.30	-2.3	.	86.2
Jan. 27	13 56.75	-12 22.7	4.073	4.281	+0.15	-1.6	.	95.5
Feb. 6	13 58.26	-12 38.4	3.946	4.311	0.00	-0.8	.	105.2
Feb. 16	13 58.21	-12 46.1	3.826	4.341	-0.16	+0.1	.	115.3
Feb. 26	13 56.57	-12 45.6	3.717	4.370	-0.32	+0.9	.	125.8
Mar. 8	13 53.36	-12 36.6	3.625	4.399	-0.46	+1.7	.	136.6
Mar. 18	13 48.77	-12 19.9	3.554	4.427	-0.57	+2.4	.	147.7
Mar. 28	13 43.06	-11 56.4	3.509	4.455	-0.64	+2.9	.	159.0

Comet C/2015 LC2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 May 1.91108 TT
Peri. = 341.86176
Node = 223.56638 2000.0
Incl. = 93.70840
q = 5.8912816 AU
e = 1.0013403

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	15 17.19	-13 17.0	6.706	6.143	+0.41	+4.3	18.6	51.5
Jan. 13	15 21.27	-12 34.4	6.580	6.163	+0.33	+4.9	18.6	60.9
Jan. 23	15 24.57	-11 45.5	6.442	6.184	+0.24	+5.6	18.6	70.5
Feb. 2	15 26.99	-10 49.7	6.295	6.205	+0.14	+6.3	18.5	80.3
Feb. 12	15 28.41	-09 46.7	6.145	6.228	+0.04	+7.0	18.5	90.2
Feb. 22	15 28.77	-08 36.2	5.996	6.251	-0.08	+7.8	18.4	100.4
Mar. 3	15 28.01	-07 18.5	5.855	6.274	-0.19	+8.4	18.4	110.7
Mar. 13	15 26.10	-05 54.2	5.727	6.299	-0.30	+9.0	18.4	121.1
Mar. 23	15 23.09	-04 24.3	5.619	6.324	-0.40	+9.4	18.4	131.5
Apr. 2	15 19.07	-02 50.7	5.534	6.349	-0.49	+9.5	18.3	141.7
Apr. 12	15 14.20	-01 15.4	5.479	6.376	-0.55	+9.4	18.3	151.2
Apr. 22	15 08.69	+00 18.8	5.455	6.402	-0.59	+9.0	18.3	158.8
May 2	15 02.82	+01 49.3	5.465	6.430	-0.60	+8.4	18.4	161.7
May 12	14 56.86	+03 13.5	5.510	6.458	-0.57	+7.6	18.4	158.1
May 22	14 51.11	+04 29.3	5.587	6.487	-0.53	+6.6	18.5	150.5
June 1	14 45.84	+05 35.2	5.694	6.516	-0.46	+5.5	18.5	141.3
June 11	14 41.25	+06 30.6	5.827	6.546	-0.37	+4.5	18.6	131.7
June 21	14 37.51	+07 15.5	5.981	6.576	-0.28	+3.5	18.7	122.0
July 1	14 34.71	+07 50.5	6.152	6.607	-0.18	+2.6	18.7	112.4
July 11	14 32.91	+08 16.6	6.335	6.638	-0.08	+1.8	18.8	103.0
July 21	14 32.10	+08 34.9	6.524	6.670	+0.01	+1.2	18.9	93.9
July 31	14 32.24	+08 47.0	6.714	6.703	+0.10	+0.7	19.0	85.0
Aug. 10	14 33.29	+08 54.0	6.901	6.736	+0.19	+0.3	19.1	76.4
Aug. 20	14 35.17	+08 57.4	7.081	6.769	+0.26	+0.1	19.2	68.1
Aug. 30	14 37.80	+08 58.4	7.251	6.803	+0.33	0.0	19.2	60.1
Sept. 9	14 41.09	+08 58.2	7.406	6.838	+0.39	0.0	19.3	52.4
Sept.19	14 44.97	+08 57.9	7.545	6.872	+0.44	+0.1	19.4	45.1
Sept.29	14 49.33	+08 58.5	7.665	6.908	+0.48	+0.3	19.4	38.4
Oct. 9	14 54.09	+09 01.1	7.764	6.944	+0.51	+0.5	19.5	32.6
Oct. 19	14 59.17	+09 06.6	7.842	6.980	+0.53	+0.9	19.5	28.2
Oct. 29	15 04.47	+09 15.8	7.896	7.016	+0.54	+1.4	19.5	26.0
Nov. 8	15 09.91	+09 29.5	7.927	7.053	+0.55	+1.9	19.6	26.4
Nov. 18	15 15.39	+09 48.6	7.935	7.091	+0.54	+2.5	19.6	29.4
Nov. 28	15 20.82	+10 13.6	7.921	7.129	+0.53	+3.2	19.6	34.3
Dec. 8	15 26.10	+10 45.4	7.886	7.167	+0.50	+3.9	19.6	40.6
Dec. 18	15 31.12	+11 24.3	7.833	7.205	+0.47	+4.7	19.6	47.6
Dec. 28	15 35.80	+12 10.8	7.762	7.244	+0.42	+5.4	19.6	55.1
Jan. 7	15 40.01	+13 05.2	7.678	7.283	+0.36	+6.2	19.6	62.9
Jan. 17	15 43.65	+14 07.5	7.584	7.323	+0.30	+7.0	19.6	71.0
Jan. 27	15 46.62	+15 17.5	7.484	7.363	+0.22	+7.7	19.6	79.2
Feb. 6	15 48.82	+16 34.7	7.382	7.403	+0.13	+8.3	19.6	87.4
Feb. 16	15 50.15	+17 58.2	7.282	7.444	+0.04	+8.9	19.6	95.6
Feb. 26	15 50.55	+19 26.7	7.190	7.485	-0.06	+9.2	19.6	103.6
Mar. 8	15 49.96	+20 58.6	7.109	7.526	-0.16	+9.3	19.6	111.3
Mar. 18	15 48.37	+22 31.6	7.044	7.568	-0.26	+9.2	19.6	118.4
Mar. 28	15 45.79	+24 03.4	6.997	7.609	-0.35	+8.8	19.6	124.6

Comet 308P/Lagerkvist-Carsenty

Epoch = 2016 July 31.0 TT
T = 2015 May 7.09082 TT
Peri. = 334.03095 e = 0.3626767
Node = 63.13090 2000.0 a = 6.6302720 AU
Incl. = 4.84848 n = 0.05773073
q = 4.2256268 AU P = 17.07 years

m1 = 0.2 + 5 log(Delta) + 25.0 log(r(t-90))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 49.00	+20 34.3	3.615	4.393	−0.16	+0.1	18.8	137.8
Jan. 13	03 47.37	+20 35.6	3.742	4.407	0.00	+0.6	18.9	127.2
Jan. 23	03 47.33	+20 41.3	3.886	4.421	+0.16	+1.0	19.0	117.0
Feb. 2	03 48.88	+20 51.3	4.042	4.436	+0.31	+1.4	19.1	107.3
Feb. 12	03 51.95	+21 05.4	4.207	4.451	+0.45	+1.8	19.2	97.9
Feb. 22	03 56.44	+21 23.0	4.375	4.466	+0.58	+2.0	19.4	88.9
Mar. 3	04 02.20	+21 43.3	4.543	4.482	+0.69	+2.2	19.5	80.2
Mar. 13	04 09.08	+22 05.6	4.708	4.499	+0.79	+2.3	19.6	71.8
Mar. 23	04 16.95	+22 29.0	4.867	4.515	+0.87	+2.4	19.7	63.8
Apr. 2	04 25.66	+22 52.6	5.016	4.532	+0.94	+2.3	19.8	55.9
Apr. 12	04 35.09	+23 15.9	5.155	4.550	+1.00	+2.2	19.9	48.3
Apr. 22	04 45.11	+23 38.1	5.281	4.568	+1.05	+2.1	20.0	40.8
May 2	04 55.61	+23 58.7	5.392	4.586	+1.09	+1.9	20.0	33.5
May 12	05 06.49	+24 17.3	5.488	4.605	+1.12	+1.6	20.1	26.4
May 22	05 17.64	+24 33.4	5.567	4.624	+1.13	+1.3	20.2	19.3
June 1	05 28.98	+24 46.9	5.629	4.643	+1.14	+1.1	20.2	12.3
June 11	05 40.41	+24 57.6	5.672	4.663	+1.14	+0.8	20.3	5.5
June 21	05 51.84	+25 05.5	5.698	4.683	+1.14	+0.5	20.3	2.4
July 1	06 03.19	+25 10.5	5.705	4.703	+1.12	+0.2	20.4	8.8
July 11	06 14.37	+25 12.9	5.694	4.723	+1.09	0.0	20.4	15.8
July 21	06 25.30	+25 12.8	5.665	4.744	+1.06	−0.2	20.5	22.8
July 31	06 35.87	+25 10.6	5.618	4.765	+1.01	−0.4	20.5	29.9
Aug. 10	06 46.01	+25 06.7	5.555	4.787	+0.96	−0.5	20.5	37.2
Aug. 20	06 55.60	+25 01.6	5.476	4.809	+0.90	−0.6	20.5	44.6
Aug. 30	07 04.56	+24 55.9	5.382	4.830	+0.82	−0.6	20.5	52.2
Sept. 9	07 12.77	+24 50.1	5.276	4.853	+0.73	−0.5	20.5	60.1
Sept.19	07 20.10	+24 45.1	5.159	4.875	+0.64	−0.4	20.5	68.1
Sept.29	07 26.45	+24 41.4	5.034	4.898	+0.52	−0.2	20.5	76.5
Oct. 9	07 31.68	+24 39.8	4.903	4.921	+0.40	+0.1	20.5	85.2
Oct. 19	07 35.68	+24 40.9	4.771	4.944	+0.26	+0.4	20.5	94.1
Oct. 29	07 38.33	+24 45.2	4.640	4.967	+0.12	+0.8	20.5	103.5
Nov. 8	07 39.53	+24 53.0	4.515	4.990	−0.03	+1.1	20.5	113.3
Nov. 18	07 39.24	+25 04.3	4.402	5.014	−0.18	+1.4	20.5	123.4
Nov. 28	07 37.47	+25 18.6	4.303	5.038	−0.31	+1.7	20.5	133.9
Dec. 8	07 34.33	+25 35.1	4.226	5.062	−0.43	+1.8	20.5	144.7
Dec. 18	07 30.01	+25 52.7	4.173	5.086	−0.52	+1.7	20.5	155.8
Dec. 28	07 24.82	+26 10.1	4.148	5.110	−0.57	+1.6	20.5	166.8
Jan. 7	07 19.16	+26 25.8	4.154	5.135	−0.57	+1.3	20.6	175.7
Jan. 17	07 13.49	+26 38.7	4.191	5.159	−0.52	+1.0	20.7	168.8
Jan. 27	07 08.24	+26 48.3	4.259	5.184	−0.44	+0.6	20.7	157.8
Feb. 6	07 03.83	+26 54.2	4.355	5.209	−0.33	+0.2	20.8	146.8
Feb. 16	07 00.55	+26 56.6	4.477	5.234	−0.20	−0.1	21.0	136.1
Feb. 26	06 58.59	+26 55.9	4.620	5.259	−0.05	−0.3	21.1	125.6
Mar. 8	06 58.06	+26 52.5	4.780	5.284	+0.09	−0.6	21.2	115.5
Mar. 18	06 58.94	+26 46.9	4.951	5.309	+0.22	−0.8	21.3	105.8
Mar. 28	07 01.17	+26 39.2	5.130	5.334	+0.35	−0.9	21.5	96.4

Comet C/2015 G2 (MASTER)

Epoch = 2016 July 31.0 TT
T = 2015 May 23.75218 TT
Peri. = 257.46514
Node = 110.06482 2000.0
Incl. = 147.56643
q = 0.7800917 AU
e = 1.0003025

m1 = 9.4 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 53.16	+38 30.7	2.509	3.449	-2.32	-0.1	16.8	160.1
Jan. 13	05 29.99	+38 29.5	2.689	3.564	-1.84	-2.1	17.1	148.4
Jan. 23	05 11.56	+38 08.4	2.907	3.677	-1.37	-3.0	17.4	135.8
Feb. 2	04 57.90	+37 38.4	3.153	3.789	-0.94	-3.1	17.7	123.7
Feb. 12	04 48.54	+37 07.3	3.420	3.900	-0.57	-2.8	18.0	112.1
Feb. 22	04 42.80	+36 39.7	3.699	4.010	-0.28	-2.2	18.3	101.2
Mar. 3	04 39.99	+36 17.6	3.983	4.118	-0.05	-1.6	18.5	90.8
Mar. 13	04 39.53	+36 01.5	4.266	4.226	+0.14	-1.0	18.8	81.0
Mar. 23	04 40.91	+35 51.3	4.542	4.332	+0.28	-0.5	19.1	71.6
Apr. 2	04 43.72	+35 46.5	4.808	4.437	+0.39	0.0	19.3	62.6
Apr. 12	04 47.65	+35 46.3	5.060	4.542	+0.48	+0.4	19.5	53.9
Apr. 22	04 52.41	+35 50.0	5.295	4.645	+0.54	+0.7	19.7	45.5
May 2	04 57.79	+35 57.1	5.509	4.748	+0.58	+1.0	19.9	37.4
May 12	05 03.60	+36 07.1	5.701	4.850	+0.61	+1.2	20.0	29.7
May 22	05 09.68	+36 19.6	5.869	4.950	+0.62	+1.5	20.2	22.7
June 1	05 15.87	+36 34.3	6.012	5.050	+0.62	+1.7	20.3	16.8
June 11	05 22.06	+36 51.1	6.130	5.150	+0.60	+1.9	20.5	13.8
June 21	05 28.10	+37 09.8	6.221	5.248	+0.58	+2.1	20.6	15.3
July 1	05 33.89	+37 30.7	6.287	5.346	+0.54	+2.3	20.7	20.3
July 11	05 39.29	+37 53.7	6.328	5.443	+0.49	+2.5	20.8	27.1
July 21	05 44.17	+38 18.9	6.344	5.539	+0.42	+2.8	20.8	34.7
July 31	05 48.41	+38 46.6	6.338	5.634	+0.34	+3.0	20.9	42.7
Aug. 10	05 51.86	+39 16.9	6.312	5.729	+0.25	+3.3	21.0	51.1
Aug. 20	05 54.36	+39 49.8	6.267	5.823	+0.14	+3.6	21.0	59.7
Aug. 30	05 55.76	+40 25.4	6.209	5.917	+0.01	+3.8	21.1	68.7
Sept. 9	05 55.90	+41 03.4	6.139	6.010	-0.13	+4.0	21.1	77.9
Sept.19	05 54.61	+41 43.2	6.064	6.102	-0.29	+4.1	21.2	87.5
Sept.29	05 51.75	+42 23.9	5.987	6.194	-0.45	+4.0	21.2	97.2
Oct. 9	05 47.22	+43 04.2	5.916	6.285	-0.62	+3.8	21.2	107.3
Oct. 19	05 40.98	+43 42.2	5.855	6.376	-0.79	+3.4	21.3	117.5
Oct. 29	05 33.08	+44 15.8	5.810	6.466	-0.94	+2.7	21.3	127.7
Nov. 8	05 23.72	+44 42.4	5.788	6.555	-1.05	+1.8	21.4	137.7
Nov. 18	05 13.24	+44 59.9	5.793	6.644	-1.12	+0.7	21.4	147.0
Nov. 28	05 02.09	+45 06.9	5.830	6.733	-1.13	-0.4	21.5	154.4
Dec. 8	04 50.82	+45 02.8	5.900	6.821	-1.08	-1.5	21.6	157.6
Dec. 18	04 40.00	+44 48.3	6.004	6.908	-0.99	-2.3	21.7	154.9
Dec. 28	04 30.11	+44 25.2	6.142	6.995	-0.86	-2.9	21.8	148.0
Jan. 7	04 21.55	+43 55.8	6.311	7.082	-0.70	-3.3	21.9	138.9
Jan. 17	04 14.53	+43 23.0	6.506	7.168	-0.54	-3.4	22.0	129.1
Jan. 27	04 09.14	+42 49.2	6.723	7.253	-0.38	-3.2	22.1	119.1
Feb. 6	04 05.37	+42 16.7	6.957	7.339	-0.22	-3.0	22.3	109.1
Feb. 16	04 03.13	+41 47.1	7.201	7.423	-0.09	-2.6	22.4	99.2
Feb. 26	04 02.27	+41 21.4	7.450	7.508	+0.04	-2.1	22.5	89.5
Mar. 8	04 02.64	+41 00.1	7.699	7.591	+0.14	-1.7	22.6	80.1
Mar. 18	04 04.06	+40 43.6	7.942	7.675	+0.23	-1.2	22.8	70.9
Mar. 28	04 06.37	+40 31.7	8.176	7.758	+0.30	-0.7	22.9	62.0

Comet 19P/Borrelly

Epoch = 2016 July 31.0 TT
T = 2015 May 28.93841 TT
Peri. = 353.48018 e = 0.6256372
Node = 75.31960 2000.0 a = 3.6012435 AU
Incl. = 30.37751 n = 0.14421995
q = 1.3481716 AU P = 6.83 years

m1 = 7.0 + 5 log(Delta) + 20.0 log(r(t-60))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	14 02.69	+20 38.8	2.539	2.604	+0.89	+3.8	15.8	82.7
Jan. 13	14 11.59	+21 17.2	2.490	2.674	+0.67	+5.5	16.0	89.8
Jan. 23	14 18.24	+22 12.0	2.440	2.743	+0.42	+6.9	16.2	97.2
Feb. 2	14 22.42	+23 21.4	2.393	2.812	+0.15	+8.1	16.5	104.9
Feb. 12	14 23.90	+24 42.1	2.351	2.880	-0.14	+8.7	16.7	112.7
Feb. 22	14 22.51	+26 09.1	2.319	2.946	-0.43	+8.7	16.9	120.5
Mar. 3	14 18.25	+27 35.8	2.300	3.012	-0.69	+7.9	17.1	127.9
Mar. 13	14 11.32	+28 54.4	2.300	3.077	-0.91	+6.2	17.4	134.3
Mar. 23	14 02.19	+29 56.4	2.320	3.141	-1.06	+3.9	17.6	139.0
Apr. 2	13 51.64	+30 35.0	2.364	3.204	-1.11	+1.1	17.8	141.2
Apr. 12	13 40.59	+30 45.8	2.432	3.267	-1.06	-1.8	18.1	140.3
Apr. 22	13 30.02	+30 28.1	2.524	3.328	-0.93	-4.4	18.4	136.7
May 2	13 20.74	+29 44.1	2.638	3.389	-0.75	-6.6	18.7	131.2
May 12	13 13.28	+28 38.3	2.773	3.448	-0.54	-8.3	19.0	124.6
May 22	13 07.92	+27 15.8	2.924	3.507	-0.32	-9.4	19.3	117.4
June 1	13 04.69	+25 41.6	3.089	3.564	-0.12	-10.2	19.6	109.9
June 11	13 03.46	+23 59.9	3.265	3.621	+0.06	-10.6	19.9	102.4
June 21	13 04.05	+22 14.1	3.447	3.677	+0.22	-10.7	20.1	95.0
July 1	13 06.22	+20 26.7	3.634	3.732	+0.35	-10.7	20.4	87.6
July 11	13 09.76	+18 39.4	3.821	3.787	+0.47	-10.6	20.7	80.4
July 21	13 14.45	+16 53.6	4.006	3.840	+0.57	-10.3	20.9	73.3
July 31	13 20.11	+15 10.2	4.187	3.892	+0.65	-10.0	21.1	66.3
Aug. 10	13 26.59	+13 29.8	4.361	3.944	+0.71	-9.7	21.4	59.5
Aug. 20	13 33.73	+11 52.9	4.525	3.995	+0.77	-9.3	21.6	52.7
Aug. 30	13 41.43	+10 19.9	4.678	4.045	+0.82	-8.9	21.8	46.1
Sept. 9	13 49.58	+08 51.3	4.819	4.094	+0.85	-8.4	22.0	39.6
Sept.19	13 58.09	+07 27.2	4.944	4.142	+0.88	-7.9	22.2	33.4
Sept.29	14 06.87	+06 08.1	5.052	4.189	+0.90	-7.4	22.3	27.5
Oct. 9	14 15.84	+04 54.2	5.143	4.236	+0.91	-6.8	22.5	22.3
Oct. 19	14 24.91	+03 45.7	5.215	4.282	+0.91	-6.3	22.6	18.4
Oct. 29	14 34.03	+02 43.1	5.268	4.327	+0.91	-5.7	22.7	16.9
Nov. 8	14 43.09	+01 46.5	5.299	4.371	+0.89	-5.0	22.9	18.5
Nov. 18	14 52.01	+00 56.3	5.311	4.415	+0.87	-4.4	23.0	22.6
Nov. 28	15 00.71	+00 12.7	5.301	4.458	+0.84	-3.7	.	28.3
Dec. 8	15 09.07	-00 24.1	5.272	4.500	+0.79	-3.0	.	34.9
Dec. 18	15 16.99	-00 53.9	5.223	4.541	+0.74	-2.3	.	42.1
Dec. 28	15 24.36	-01 16.5	5.156	4.581	+0.67	-1.5	.	49.6
Jan. 7	15 31.04	-01 32.0	5.074	4.621	+0.59	-0.8	.	57.6
Jan. 17	15 36.91	-01 40.2	4.977	4.660	+0.49	-0.1	.	65.8
Jan. 27	15 41.83	-01 41.4	4.869	4.698	+0.38	+0.6	.	74.2
Feb. 6	15 45.64	-01 35.9	4.754	4.736	+0.26	+1.2	.	83.0
Feb. 16	15 48.23	-01 24.2	4.634	4.773	+0.12	+1.7	.	92.1
Feb. 26	15 49.48	-01 06.8	4.515	4.809	-0.02	+2.2	.	101.4
Mar. 8	15 49.28	-00 44.9	4.401	4.845	-0.17	+2.5	.	110.9
Mar. 18	15 47.60	-00 19.7	4.296	4.880	-0.31	+2.7	.	120.7
Mar. 28	15 44.45	+00 07.2	4.207	4.914	-0.45	+2.7	.	130.5

Comet C/2014 W11 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 June 16.86217 TT
Peri. = 225.62056 e = 0.6481643
Node = 295.88266 2000.0 a = 9.7387349 AU
Incl. = 12.70185 n = 0.03243025
q = 3.4264346 AU P = 30.39 years

m1 = 1.0 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 47.71	-23 46.6	3.974	3.732	+0.84	-7.4	15.4	68.8
Jan. 13	13 56.07	-25 00.6	3.867	3.762	+0.71	-6.8	15.4	76.5
Jan. 23	14 03.19	-26 09.1	3.756	3.792	+0.57	-6.2	15.5	84.6
Feb. 2	14 08.91	-27 11.4	3.644	3.823	+0.41	-5.5	15.5	92.9
Feb. 12	14 13.05	-28 06.6	3.534	3.855	+0.24	-4.7	15.5	101.6
Feb. 22	14 15.45	-28 53.4	3.430	3.888	+0.06	-3.7	15.5	110.5
Mar. 3	14 16.07	-29 30.7	3.335	3.923	-0.12	-2.6	15.5	119.8
Mar. 13	14 14.88	-29 56.9	3.253	3.957	-0.28	-1.4	15.5	129.2
Mar. 23	14 12.05	-30 10.8	3.189	3.993	-0.42	-0.1	15.5	138.8
Apr. 2	14 07.87	-30 11.5	3.146	4.030	-0.51	+1.3	15.6	148.2
Apr. 12	14 02.74	-29 58.9	3.127	4.067	-0.55	+2.5	15.7	156.7
Apr. 22	13 57.21	-29 34.1	3.134	4.105	-0.54	+3.5	15.7	162.6
May 2	13 51.83	-28 59.6	3.170	4.143	-0.47	+4.1	15.9	162.8
May 12	13 47.11	-28 18.4	3.233	4.182	-0.36	+4.4	16.0	157.2
May 22	13 43.48	-27 34.5	3.322	4.222	-0.23	+4.3	16.1	149.0
June 1	13 41.19	-26 51.4	3.435	4.262	-0.08	+3.9	16.3	140.0
June 11	13 40.38	-26 12.1	3.570	4.303	+0.07	+3.3	16.4	130.9
June 21	13 41.09	-25 38.8	3.722	4.345	+0.22	+2.6	16.6	121.8
July 1	13 43.25	-25 12.9	3.888	4.386	+0.35	+1.8	16.8	113.0
July 11	13 46.78	-24 54.8	4.064	4.429	+0.48	+1.0	17.0	104.5
July 21	13 51.54	-24 44.8	4.247	4.471	+0.59	+0.3	17.1	96.1
July 31	13 57.39	-24 42.2	4.434	4.515	+0.68	-0.4	17.3	88.0
Aug. 10	14 04.23	-24 46.5	4.621	4.558	+0.77	-1.0	17.5	80.1
Aug. 20	14 11.90	-24 56.8	4.806	4.602	+0.84	-1.5	17.7	72.4
Aug. 30	14 20.31	-25 12.2	4.986	4.646	+0.90	-2.0	17.8	64.8
Sept. 9	14 29.34	-25 31.8	5.158	4.690	+0.96	-2.3	18.0	57.3
Sept.19	14 38.91	-25 54.8	5.320	4.735	+1.00	-2.6	18.1	49.9
Sept.29	14 48.92	-26 20.3	5.470	4.780	+1.04	-2.7	18.3	42.5
Oct. 9	14 59.29	-26 47.6	5.606	4.825	+1.06	-2.8	18.4	35.3
Oct. 19	15 09.94	-27 15.9	5.726	4.870	+1.08	-2.9	18.5	28.1
Oct. 29	15 20.78	-27 44.6	5.829	4.916	+1.10	-2.9	18.7	21.2
Nov. 8	15 31.74	-28 13.2	5.914	4.962	+1.10	-2.8	18.8	14.6
Nov. 18	15 42.72	-28 41.2	5.979	5.008	+1.09	-2.7	18.9	9.7
Nov. 28	15 53.64	-29 08.2	6.025	5.054	+1.08	-2.6	19.0	9.4
Dec. 8	16 04.41	-29 33.9	6.049	5.100	+1.05	-2.4	19.1	14.1
Dec. 18	16 14.92	-29 58.2	6.054	5.146	+1.02	-2.3	19.1	20.9
Dec. 28	16 25.08	-30 20.8	6.038	5.193	+0.97	-2.1	19.2	28.2
Jan. 7	16 34.77	-30 41.9	6.003	5.239	+0.91	-1.9	19.3	36.0
Jan. 17	16 43.86	-31 01.3	5.950	5.286	+0.84	-1.8	19.3	43.9
Jan. 27	16 52.25	-31 19.2	5.880	5.332	+0.76	-1.7	19.4	52.1
Feb. 6	16 59.81	-31 35.8	5.796	5.379	+0.66	-1.5	19.4	60.5
Feb. 16	17 06.41	-31 51.1	5.701	5.426	+0.55	-1.4	19.5	69.0
Feb. 26	17 11.92	-32 05.3	5.596	5.473	+0.43	-1.3	19.5	77.8
Mar. 8	17 16.23	-32 18.4	5.486	5.520	+0.30	-1.2	19.5	86.8
Mar. 18	17 19.24	-32 30.4	5.375	5.567	+0.16	-1.1	19.6	96.0
Mar. 28	17 20.88	-32 41.0	5.266	5.614	+0.02	-0.9	19.6	105.4

Comet P/2016 A2 (Christensen)

Epoch = 2016 July 31.0 TT
T = 2015 June 20.33486 TT
Peri. = 140.38902 e = 0.2737625
Node = 291.75169 2000.0 a = 4.7442715 AU
Incl. = 26.68316 n = 0.09537834
q = 3.4454679 AU P = 10.33 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	07 19.58	+26 03.9	2.594	3.572	−0.88	−4.5	19.6	172.8
Jan. 13	07 10.79	+25 18.9	2.606	3.585	−0.82	−4.8	19.6	173.3
Jan. 23	07 02.59	+24 30.7	2.649	3.598	−0.69	−5.0	19.7	161.9
Feb. 2	06 55.67	+23 40.7	2.722	3.612	−0.51	−5.0	19.7	150.4
Feb. 12	06 50.53	+22 50.8	2.821	3.626	−0.31	−4.9	19.8	139.2
Feb. 22	06 47.47	+22 02.2	2.942	3.640	−0.09	−4.6	20.0	128.4
Mar. 3	06 46.54	+21 15.9	3.081	3.655	+0.11	−4.4	20.1	118.2
Mar. 13	06 47.66	+20 31.9	3.232	3.671	+0.30	−4.2	20.2	108.5
Mar. 23	06 50.66	+19 50.0	3.392	3.687	+0.47	−4.1	20.4	99.3
Apr. 2	06 55.31	+19 09.3	3.555	3.703	+0.61	−4.0	20.5	90.6
Apr. 12	07 01.40	+18 29.1	3.719	3.720	+0.73	−4.1	20.6	82.3
Apr. 22	07 08.69	+17 48.6	3.881	3.737	+0.83	−4.2	20.7	74.4
May 2	07 16.98	+17 06.8	4.037	3.755	+0.91	−4.4	20.8	66.7
May 12	07 26.08	+16 23.0	4.185	3.772	+0.97	−4.6	21.0	59.4
May 22	07 35.83	+15 36.7	4.324	3.791	+1.02	−4.9	21.1	52.3
June 1	07 46.08	+14 47.4	4.453	3.809	+1.06	−5.3	21.2	45.4
June 11	07 56.70	+13 54.6	4.568	3.828	+1.09	−5.6	21.2	38.7
June 21	08 07.58	+12 58.3	4.670	3.847	+1.10	−6.0	21.3	32.1
July 1	08 18.61	+11 58.2	4.757	3.867	+1.11	−6.4	21.4	25.8
July 11	08 29.73	+10 54.2	4.828	3.886	+1.11	−6.8	21.5	19.7
July 21	08 40.84	+09 46.4	4.883	3.906	+1.10	−7.1	21.5	14.2
July 31	08 51.86	+08 35.0	4.922	3.926	+1.09	−7.5	21.6	10.0
Aug. 10	09 02.74	+07 19.9	4.944	3.947	+1.07	−7.8	21.6	9.3
Aug. 20	09 13.40	+06 01.5	4.948	3.967	+1.04	−8.2	21.6	12.6
Aug. 30	09 23.78	+04 39.9	4.936	3.988	+1.00	−8.4	21.7	18.0
Sept. 9	09 33.81	+03 15.5	4.907	4.009	+0.96	−8.7	21.7	24.2
Sept.19	09 43.41	+01 48.6	4.861	4.030	+0.91	−8.9	21.7	30.7
Sept.29	09 52.51	+00 19.7	4.800	4.052	+0.85	−9.1	21.7	37.5
Oct. 9	10 01.02	−01 11.0	4.724	4.073	+0.78	−9.2	21.7	44.6
Oct. 19	10 08.83	−02 42.7	4.634	4.095	+0.70	−9.2	21.7	51.9
Oct. 29	10 15.85	−04 14.9	4.533	4.117	+0.61	−9.2	21.7	59.4
Nov. 8	10 21.94	−05 46.8	4.421	4.138	+0.50	−9.1	21.7	67.1
Nov. 18	10 26.98	−07 17.6	4.302	4.160	+0.39	−8.9	21.7	75.2
Nov. 28	10 30.83	−08 46.2	4.178	4.183	+0.25	−8.5	21.6	83.5
Dec. 8	10 33.35	−10 11.2	4.053	4.205	+0.11	−8.0	21.6	92.0
Dec. 18	10 34.41	−11 31.1	3.929	4.227	−0.05	−7.3	21.6	100.9
Dec. 28	10 33.93	−12 44.0	3.812	4.249	−0.21	−6.4	21.5	109.9
Jan. 7	10 31.86	−13 47.8	3.705	4.272	−0.36	−5.2	21.5	119.2
Jan. 17	10 28.27	−14 40.3	3.613	4.294	−0.50	−3.9	21.5	128.4
Jan. 27	10 23.31	−15 19.4	3.541	4.316	−0.60	−2.4	21.5	137.3
Feb. 6	10 17.28	−15 43.7	3.491	4.339	−0.67	−0.9	21.5	145.4
Feb. 16	10 10.61	−15 52.5	3.467	4.361	−0.68	+0.6	21.5	151.5
Feb. 26	10 03.78	−15 46.6	3.471	4.384	−0.65	+1.9	21.5	154.1
Mar. 8	09 57.32	−15 27.9	3.504	4.406	−0.56	+2.8	21.6	152.2
Mar. 18	09 51.70	−14 59.5	3.564	4.429	−0.44	+3.4	21.7	146.6
Mar. 28	09 47.26	−14 25.1	3.649	4.451	−0.30	+3.7	21.7	139.0

Comet P/2015 R1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 June 25.69708 TT
Peri. = 300.50871 e = 0.6326651
Node = 48.51631 2000.0 a = 5.8939189 AU
Incl. = 22.66926 n = 0.06888075
q = 2.1650421 AU P = 14.31 years

m1 = 11.4 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	02 00.26	+14 22.0	2.249	2.760	+0.50	+8.7	19.8	111.2
Jan. 13	02 05.31	+15 49.1	2.429	2.813	+0.69	+8.7	20.1	102.6
Jan. 23	02 12.18	+17 15.9	2.616	2.866	+0.84	+8.6	20.3	94.5
Feb. 2	02 20.59	+18 41.6	2.807	2.920	+0.97	+8.4	20.6	86.7
Feb. 12	02 30.30	+20 06.0	2.998	2.975	+1.08	+8.2	20.9	79.2
Feb. 22	02 41.10	+21 28.5	3.187	3.031	+1.17	+8.0	21.1	72.0
Mar. 3	02 52.80	+22 48.5	3.372	3.087	+1.25	+7.7	21.4	65.0
Mar. 13	03 05.26	+24 05.8	3.551	3.144	+1.31	+7.4	21.6	58.2
Mar. 23	03 18.34	+25 19.7	3.723	3.201	+1.36	+7.0	21.8	51.6
Apr. 2	03 31.93	+26 30.0	3.885	3.258	+1.40	+6.6	22.0	45.1
Apr. 12	03 45.93	+27 36.3	4.037	3.315	+1.43	+6.2	22.2	38.8
Apr. 22	04 00.25	+28 38.3	4.177	3.373	+1.45	+5.8	22.4	32.5
May 2	04 14.79	+29 35.9	4.303	3.431	+1.47	+5.3	22.6	26.5
May 12	04 29.49	+30 29.1	4.415	3.488	+1.48	+4.9	22.8	20.7
May 22	04 44.25	+31 17.8	4.512	3.546	+1.47	+4.4	22.9	15.4
June 1	04 58.99	+32 02.2	4.594	3.604	+1.47	+4.0	.	11.2
June 11	05 13.65	+32 42.5	4.659	3.662	+1.45	+3.6	.	9.7
June 21	05 28.13	+33 19.0	4.708	3.720	+1.42	+3.3	.	12.0
July 1	05 42.34	+33 52.1	4.740	3.777	+1.39	+3.0	.	16.7
July 11	05 56.22	+34 22.4	4.755	3.835	+1.34	+2.8	.	22.4
July 21	06 09.65	+34 50.5	4.754	3.892	+1.29	+2.7	.	28.6
July 31	06 22.55	+35 17.1	4.736	3.950	+1.23	+2.6	.	35.1
Aug. 10	06 34.82	+35 43.1	4.703	4.007	+1.15	+2.6	.	41.9
Aug. 20	06 46.34	+36 09.5	4.656	4.063	+1.07	+2.8	.	48.9
Aug. 30	06 56.99	+36 37.0	4.595	4.120	+0.96	+3.0	.	56.2
Sept. 9	07 06.63	+37 06.8	4.522	4.176	+0.85	+3.3	.	63.8
Sept.19	07 15.12	+37 39.9	4.440	4.232	+0.72	+3.7	.	71.6
Sept.29	07 22.30	+38 17.0	4.351	4.288	+0.57	+4.2	.	79.8
Oct. 9	07 27.97	+38 59.0	4.257	4.343	+0.40	+4.7	.	88.3
Oct. 19	07 31.96	+39 45.9	4.163	4.399	+0.21	+5.2	.	97.1
Oct. 29	07 34.09	+40 37.7	4.073	4.453	+0.01	+5.6	.	106.2
Nov. 8	07 34.19	+41 33.4	3.991	4.508	-0.20	+5.8	.	115.6
Nov. 18	07 32.17	+42 31.1	3.921	4.562	-0.41	+5.7	.	125.1
Nov. 28	07 28.05	+43 28.1	3.869	4.616	-0.61	+5.3	.	134.7
Dec. 8	07 21.96	+44 21.0	3.839	4.670	-0.77	+4.5	.	143.7
Dec. 18	07 14.28	+45 06.1	3.835	4.723	-0.87	+3.4	.	151.5
Dec. 28	07 05.55	+45 40.2	3.859	4.776	-0.91	+2.1	.	156.4
Jan. 7	06 56.47	+46 01.1	3.913	4.829	-0.87	+0.7	.	156.2
Jan. 17	06 47.80	+46 08.3	3.996	4.881	-0.76	-0.5	.	151.1
Jan. 27	06 40.18	+46 03.0	4.108	4.933	-0.60	-1.6	.	143.3
Feb. 6	06 34.15	+45 47.4	4.244	4.984	-0.42	-2.3	.	134.4
Feb. 16	06 30.00	+45 24.1	4.402	5.036	-0.22	-2.8	.	125.1
Feb. 26	06 27.83	+44 56.0	4.576	5.086	-0.02	-3.1	.	115.8
Mar. 8	06 27.63	+44 25.2	4.763	5.137	+0.16	-3.2	.	106.7
Mar. 18	06 29.24	+43 53.5	4.958	5.187	+0.32	-3.2	.	97.7
Mar. 28	06 32.49	+43 21.9	5.157	5.237	+0.47	-3.1	.	89.1

Comet C/2014 Q1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 July 6.48818 TT
Peri. = 120.07492
Node = 8.74842 2000.0
Incl. = 43.10885
q = 0.3148835 AU
e = 0.9997062

m1 = 9.2 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	18 21.68	-56 40.2	3.993	3.227	+2.15	-2.4	16.0	34.2
Jan. 13	18 43.19	-57 04.1	4.092	3.355	+2.04	-2.4	16.2	36.7
Jan. 23	19 03.58	-57 27.9	4.174	3.480	+1.92	-2.5	16.4	40.2
Feb. 2	19 22.80	-57 53.2	4.239	3.603	+1.80	-2.8	16.5	44.5
Feb. 12	19 40.79	-58 21.7	4.289	3.725	+1.67	-3.3	16.6	49.6
Feb. 22	19 57.48	-58 54.9	4.323	3.844	+1.53	-3.9	16.8	55.1
Mar. 3	20 12.79	-59 34.2	4.345	3.962	+1.38	-4.7	16.9	61.1
Mar. 13	20 26.61	-60 20.9	4.356	4.079	+1.22	-5.5	17.0	67.4
Mar. 23	20 38.78	-61 16.0	4.358	4.194	+1.03	-6.4	17.1	74.0
Apr. 2	20 49.11	-62 20.0	4.353	4.307	+0.82	-7.3	17.2	80.7
Apr. 12	20 57.35	-63 33.3	4.346	4.419	+0.58	-8.2	17.2	87.6
Apr. 22	21 03.11	-64 55.2	4.339	4.530	+0.29	-8.9	17.3	94.5
May 2	21 05.96	-66 24.3	4.336	4.639	-0.07	-9.4	17.4	101.2
May 12	21 05.31	-67 58.3	4.341	4.748	-0.49	-9.5	17.5	107.8
May 22	21 00.45	-69 33.2	4.356	4.855	-0.97	-9.1	17.5	113.9
June 1	20 50.73	-71 03.9	4.386	4.961	-1.51	-8.0	17.6	119.3
June 11	20 35.63	-72 24.1	4.432	5.066	-2.03	-6.2	17.7	123.7
June 21	20 15.30	-73 26.5	4.498	5.170	-2.43	-3.8	17.8	126.7
July 1	19 50.97	-74 04.9	4.584	5.273	-2.59	-1.1	17.9	128.2
July 11	19 25.02	-74 15.6	4.691	5.375	-2.46	+1.7	18.0	127.8
July 21	19 00.44	-73 59.0	4.819	5.476	-2.08	+4.0	18.2	125.8
July 31	18 39.65	-73 19.4	4.967	5.577	-1.58	+5.6	18.3	122.3
Aug. 10	18 23.89	-72 23.1	5.133	5.676	-1.06	+6.6	18.4	117.7
Aug. 20	18 13.30	-71 16.6	5.315	5.775	-0.59	+7.1	18.5	112.3
Aug. 30	18 07.37	-70 05.3	5.510	5.873	-0.20	+7.2	18.7	106.3
Sept. 9	18 05.37	-68 53.1	5.714	5.970	+0.12	+7.0	18.8	99.9
Sept.19	18 06.56	-67 42.9	5.925	6.066	+0.37	+6.7	18.9	93.3
Sept.29	18 10.28	-66 36.1	6.140	6.162	+0.57	+6.2	19.1	86.6
Oct. 9	18 16.02	-65 33.8	6.354	6.257	+0.73	+5.7	19.2	79.9
Oct. 19	18 23.32	-64 36.4	6.566	6.351	+0.85	+5.2	19.3	73.3
Oct. 29	18 31.86	-63 44.0	6.771	6.445	+0.95	+4.7	19.4	66.8
Nov. 8	18 41.33	-62 56.5	6.967	6.538	+1.02	+4.3	19.5	60.6
Nov. 18	18 51.51	-62 13.9	7.152	6.630	+1.07	+3.8	19.6	54.7
Nov. 28	19 02.19	-61 36.1	7.323	6.722	+1.10	+3.3	19.7	49.3
Dec. 8	19 13.21	-61 02.8	7.478	6.813	+1.12	+2.9	19.8	44.7
Dec. 18	19 24.40	-60 34.2	7.615	6.904	+1.12	+2.4	19.9	41.1
Dec. 28	19 35.65	-60 10.2	7.734	6.994	+1.12	+1.9	20.0	38.7
Jan. 7	19 46.81	-59 50.9	7.833	7.083	+1.10	+1.4	20.0	37.9
Jan. 17	19 57.78	-59 36.5	7.912	7.172	+1.07	+0.9	20.1	38.8
Jan. 27	20 08.46	-59 27.3	7.972	7.261	+1.03	+0.4	20.2	41.3
Feb. 6	20 18.73	-59 23.5	8.012	7.348	+0.98	-0.2	20.2	45.1
Feb. 16	20 28.48	-59 25.5	8.034	7.436	+0.91	-0.8	20.3	49.9
Feb. 26	20 37.62	-59 33.6	8.040	7.523	+0.84	-1.4	20.3	55.4
Mar. 8	20 46.04	-59 48.0	8.031	7.609	+0.76	-2.1	20.3	61.6
Mar. 18	20 53.60	-60 08.8	8.011	7.695	+0.66	-2.7	20.4	68.1
Mar. 28	21 00.20	-60 36.3	7.981	7.781	+0.55	-3.4	20.4	74.9

Comet 162P/Siding Spring

Epoch = 2016 July 31.0 TT
T = 2015 July 12.03542 TT
Peri. = 356.50422 e = 0.5951026
Node = 31.18072 2000.0 a = 3.0586228 AU
Incl. = 27.79539 n = 0.18425327
q = 1.2384284 AU P = 5.35 years

H = 13.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	11 36.49	+48 05.1	1.565	2.217	−0.53	+11.8	17.2	119.1
Jan. 13	11 31.23	+50 03.3	1.566	2.289	−1.09	+10.6	17.2	126.1
Jan. 23	11 20.34	+51 49.7	1.583	2.359	−1.58	+7.9	17.2	132.2
Feb. 2	11 04.57	+53 08.6	1.618	2.429	−1.89	+3.8	17.2	136.5
Feb. 12	10 45.69	+53 46.1	1.674	2.497	−1.93	−1.0	17.3	138.2
Feb. 22	10 26.34	+53 35.7	1.752	2.565	−1.72	−5.5	17.5	136.9
Mar. 3	10 09.10	+52 40.4	1.852	2.632	−1.34	−9.1	17.7	133.2
Mar. 13	09 55.67	+51 09.5	1.973	2.697	−0.90	−11.5	17.9	127.6
Mar. 23	09 46.68	+49 14.7	2.112	2.762	−0.48	−12.8	18.2	121.1
Apr. 2	09 41.91	+47 06.4	2.266	2.825	−0.11	−13.4	18.4	114.1
Apr. 12	09 40.79	+44 51.9	2.432	2.888	+0.18	−13.6	18.6	106.9
Apr. 22	09 42.63	+42 36.4	2.607	2.949	+0.41	−13.4	18.8	99.8
May 2	09 46.78	+40 22.5	2.788	3.009	+0.59	−13.1	19.0	92.7
May 12	09 52.71	+38 11.6	2.972	3.068	+0.73	−12.7	19.2	85.8
May 22	10 00.01	+36 04.5	3.157	3.125	+0.83	−12.3	19.3	79.0
June 1	10 08.32	+34 01.3	3.340	3.182	+0.91	−12.0	19.5	72.3
June 11	10 17.39	+32 01.7	3.520	3.238	+0.96	−11.6	19.6	65.7
June 21	10 27.03	+30 05.9	3.693	3.292	+1.00	−11.2	19.7	59.3
July 1	10 37.06	+28 13.5	3.858	3.346	+1.03	−10.9	19.8	53.0
July 11	10 47.38	+26 24.4	4.013	3.398	+1.05	−10.6	19.8	46.7
July 21	10 57.88	+24 38.7	4.157	3.449	+1.06	−10.3	19.9	40.6
July 31	11 08.50	+22 56.1	4.287	3.499	+1.07	−9.9	19.9	34.6
Aug. 10	11 19.16	+21 17.0	4.403	3.548	+1.07	−9.6	19.9	28.8
Aug. 20	11 29.81	+19 41.3	4.503	3.596	+1.06	−9.2	19.9	23.3
Aug. 30	11 40.40	+18 09.2	4.587	3.643	+1.05	−8.8	19.9	18.5
Sept. 9	11 50.89	+16 41.0	4.653	3.690	+1.03	−8.4	19.9	15.1
Sept.19	12 01.23	+15 17.1	4.700	3.735	+1.01	−7.9	20.0	14.3
Sept.29	12 11.36	+13 57.7	4.728	3.779	+0.99	−7.4	20.0	16.6
Oct. 9	12 21.24	+12 43.3	4.736	3.822	+0.96	−6.9	20.1	21.1
Oct. 19	12 30.79	+11 34.4	4.725	3.864	+0.92	−6.3	20.2	26.9
Oct. 29	12 39.95	+10 31.4	4.695	3.905	+0.87	−5.6	20.3	33.4
Nov. 8	12 48.64	+09 34.9	4.646	3.945	+0.81	−4.9	20.3	40.4
Nov. 18	12 56.75	+08 45.5	4.580	3.984	+0.74	−4.2	20.4	47.8
Nov. 28	13 04.19	+08 03.8	4.498	4.022	+0.66	−3.3	20.4	55.5
Dec. 8	13 10.81	+07 30.4	4.401	4.060	+0.57	−2.5	20.4	63.6
Dec. 18	13 16.48	+07 05.8	4.292	4.096	+0.46	−1.5	20.4	72.0
Dec. 28	13 21.06	+06 50.5	4.175	4.131	+0.33	−0.6	20.4	80.7
Jan. 7	13 24.36	+06 44.8	4.052	4.166	+0.19	+0.4	20.3	89.8
Jan. 17	13 26.23	+06 48.8	3.928	4.200	+0.03	+1.3	20.3	99.2
Jan. 27	13 26.54	+07 02.3	3.808	4.232	−0.14	+2.2	20.2	109.0
Feb. 6	13 25.17	+07 24.5	3.696	4.264	−0.31	+2.9	20.1	119.2
Feb. 16	13 22.08	+07 53.9	3.597	4.295	−0.47	+3.4	20.0	129.6
Feb. 26	13 17.34	+08 28.3	3.518	4.325	−0.62	+3.7	19.9	140.2
Mar. 8	13 11.11	+09 05.1	3.463	4.355	−0.74	+3.6	19.8	150.6
Mar. 18	13 03.74	+09 40.7	3.436	4.383	−0.81	+3.1	19.7	159.8
Mar. 28	12 55.66	+10 11.8	3.439	4.411	−0.83	+2.3	19.6	165.1

Comet P/2015 D6 (Lemmon-PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 July 20.66119 TT
Peri. = 126.54715 e = 0.3674676
Node = 46.15951 2000.0 a = 7.2103454 AU
Incl. = 20.23485 n = 0.05090612
q = 4.5607771 AU P = 19.36 years

m1 = 7.2 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 51.93	+00 04.1	4.769	4.632	+0.52	-2.8	20.6	76.1
Jan. 13	13 57.14	-00 24.3	4.627	4.641	+0.41	-2.2	20.5	84.7
Jan. 23	14 01.24	-00 45.9	4.483	4.650	+0.29	-1.5	20.5	93.6
Feb. 2	14 04.12	-01 01.0	4.340	4.659	+0.15	-0.9	20.4	102.8
Feb. 12	14 05.67	-01 09.6	4.204	4.670	+0.01	-0.3	20.4	112.4
Feb. 22	14 05.81	-01 12.5	4.078	4.680	-0.13	+0.2	20.3	122.2
Mar. 3	14 04.55	-01 10.6	3.967	4.691	-0.26	+0.6	20.3	132.3
Mar. 13	14 01.93	-01 05.0	3.874	4.702	-0.38	+0.8	20.2	142.5
Mar. 23	13 58.12	-00 57.4	3.806	4.714	-0.47	+0.8	20.2	152.8
Apr. 2	13 53.39	-00 49.6	3.763	4.727	-0.53	+0.6	20.2	162.6
Apr. 12	13 48.06	-00 43.6	3.749	4.739	-0.55	+0.2	20.2	169.8
Apr. 22	13 42.54	-00 41.3	3.765	4.752	-0.53	-0.3	20.2	167.7
May 2	13 37.24	-00 44.2	3.811	4.766	-0.47	-0.9	20.3	159.1
May 12	13 32.52	-00 53.4	3.884	4.780	-0.38	-1.6	20.3	149.3
May 22	13 28.69	-01 09.6	3.982	4.794	-0.27	-2.3	20.4	139.2
June 1	13 25.96	-01 32.9	4.101	4.809	-0.15	-3.0	20.5	129.4
June 11	13 24.45	-02 03.0	4.238	4.824	-0.03	-3.6	20.6	119.8
June 21	13 24.19	-02 39.5	4.389	4.840	+0.10	-4.2	20.7	110.5
July 1	13 25.18	-03 21.6	4.549	4.855	+0.22	-4.7	20.8	101.5
July 11	13 27.34	-04 08.7	4.715	4.872	+0.33	-5.1	20.9	92.8
July 21	13 30.60	-05 00.0	4.882	4.888	+0.42	-5.5	21.0	84.4
July 31	13 34.84	-05 54.8	5.048	4.905	+0.51	-5.8	21.1	76.2
Aug. 10	13 39.99	-06 52.4	5.209	4.922	+0.59	-6.0	21.2	68.1
Aug. 20	13 45.92	-07 52.1	5.363	4.940	+0.66	-6.1	21.3	60.3
Aug. 30	13 52.54	-08 53.3	5.507	4.958	+0.72	-6.2	21.3	52.5
Sept. 9	13 59.77	-09 55.5	5.639	4.976	+0.77	-6.3	21.4	44.9
Sept.19	14 07.52	-10 58.2	5.757	4.994	+0.82	-6.3	21.5	37.3
Sept.29	14 15.69	-12 00.8	5.859	5.013	+0.85	-6.2	21.5	29.7
Oct. 9	14 24.23	-13 02.9	5.943	5.032	+0.88	-6.1	21.6	22.2
Oct. 19	14 33.03	-14 04.2	6.009	5.052	+0.90	-6.0	21.6	14.6
Oct. 29	14 42.03	-15 04.1	6.056	5.071	+0.91	-5.8	21.7	7.0
Nov. 8	14 51.15	-16 02.5	6.082	5.091	+0.91	-5.6	21.7	0.7
Nov. 18	15 00.29	-16 58.9	6.087	5.111	+0.91	-5.4	21.7	8.3
Nov. 28	15 09.37	-17 53.2	6.072	5.132	+0.89	-5.2	21.8	16.1
Dec. 8	15 18.30	-18 45.2	6.037	5.152	+0.87	-5.0	21.8	24.0
Dec. 18	15 26.97	-19 34.7	5.982	5.173	+0.83	-4.7	21.8	32.0
Dec. 28	15 35.27	-20 21.7	5.908	5.194	+0.78	-4.4	21.8	40.1
Jan. 7	15 43.08	-21 06.2	5.817	5.215	+0.72	-4.2	21.8	48.3
Jan. 17	15 50.28	-21 48.1	5.712	5.237	+0.65	-3.9	21.8	56.7
Jan. 27	15 56.74	-22 27.6	5.594	5.259	+0.56	-3.7	21.8	65.3
Feb. 6	16 02.33	-23 04.7	5.466	5.281	+0.46	-3.5	21.7	74.1
Feb. 16	16 06.90	-23 39.6	5.331	5.303	+0.34	-3.3	21.7	83.0
Feb. 26	16 10.34	-24 12.4	5.194	5.325	+0.22	-3.1	21.7	92.2
Mar. 8	16 12.52	-24 42.9	5.058	5.348	+0.09	-2.8	21.6	101.6
Mar. 18	16 13.37	-25 11.0	4.928	5.370	-0.05	-2.6	21.6	111.3
Mar. 28	16 12.85	-25 36.6	4.808	5.393	-0.19	-2.3	21.6	121.2

Comet P/2004 FY140 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2015 July 25.59467 TT
Peri. = 242.07622 e = 0.1702210
Node = 326.77445 2000.0 a = 4.8925307 AU
Incl. = 2.13689 n = 0.09107596
q = 4.0597192 AU P = 10.82 years

H = 14.0 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		V	Mot./PA ′ / °	Elong. °
Jan. 3	15 45.88	-21 44.4	4.767	4.099	-0.45	+1.4	21.1	15.3/104	42.7
Jan. 13	15 56.58	-22 19.6	4.661	4.104	-0.46	+1.3	21.1	14.3/103	50.4
Jan. 23	16 06.64	-22 50.9	4.542	4.109	-0.47	+1.2	21.1	13.1/103	58.2
Feb. 2	16 15.93	-23 18.4	4.414	4.115	-0.49	+1.2	21.0	11.7/102	66.1
Feb. 12	16 24.27	-23 42.1	4.276	4.120	-0.50	+1.1	21.0	10.1/102	74.3
Feb. 22	16 31.49	-24 02.3	4.134	4.126	-0.52	+1.0	20.9	8.3/102	82.7
Mar. 3	16 37.44	-24 19.2	3.988	4.133	-0.54	+1.0	20.9	6.3/103	91.4
Mar. 13	16 41.94	-24 32.9	3.844	4.139	-0.56	+0.9	20.8	4.1/105	100.3
Mar. 23	16 44.84	-24 43.4	3.704	4.146	-0.59	+0.9	20.7	1.8/115	109.6
Apr. 2	16 46.04	-24 50.9	3.573	4.153	-0.61	+1.0	20.6	0.9/241	119.2
Apr. 12	16 45.48	-24 55.0	3.455	4.160	-0.63	+1.0	20.5	3.1/269	129.1
Apr. 22	16 43.22	-24 55.6	3.353	4.168	-0.66	+1.1	20.3	5.2/273	139.4
May 2	16 39.42	-24 52.4	3.273	4.176	-0.68	+1.2	20.2	6.9/276	149.9
May 12	16 34.35	-24 45.2	3.217	4.184	-0.69	+1.3	20.0	8.1/277	160.7
May 22	16 28.45	-24 34.2	3.188	4.192	-0.70	+1.4	19.9	8.6/279	171.4
June 1	16 22.21	-24 20.0	3.188	4.200	-0.70	+1.5	19.8	8.4/281	176.0
June 11	16 16.18	-24 03.9	3.217	4.209	-0.69	+1.6	20.0	7.5/283	165.9
June 21	16 10.87	-23 47.3	3.274	4.218	-0.67	+1.7	20.2	6.0/285	155.2
July 1	16 06.67	-23 31.9	3.356	4.227	-0.65	+1.7	20.3	4.1/288	144.7
July 11	16 03.87	-23 19.0	3.461	4.236	-0.63	+1.7	20.5	1.9/299	134.5
July 21	16 02.65	-23 09.7	3.584	4.246	-0.60	+1.6	20.6	0.7/ 46	124.7
July 31	16 03.03	-23 04.7	3.722	4.256	-0.58	+1.6	20.7	2.7/ 89	115.3
Aug. 10	16 05.01	-23 03.9	3.871	4.265	-0.56	+1.5	20.9	4.8/ 94	106.1
Aug. 20	16 08.50	-23 07.2	4.027	4.276	-0.53	+1.4	21.0	6.8/ 96	97.3
Aug. 30	16 13.38	-23 14.1	4.186	4.286	-0.51	+1.2	21.1	8.5/ 97	88.8
Sept. 9	16 19.54	-23 23.8	4.345	4.296	-0.50	+1.1	21.1	10.1/ 97	80.5
Sept.19	16 26.82	-23 35.5	4.501	4.307	-0.48	+1.0	21.2	11.5/ 97	72.5
Sept.29	16 35.11	-23 48.5	4.651	4.318	-0.47	+0.9	21.2	12.6/ 97	64.6
Oct. 9	16 44.29	-24 01.9	4.793	4.329	-0.45	+0.7	21.3	13.7/ 96	56.9
Oct. 19	16 54.22	-24 14.8	4.924	4.340	-0.44	+0.6	21.3	14.5/ 95	49.3
Oct. 29	17 04.79	-24 26.8	5.042	4.351	-0.43	+0.5	21.3	15.2/ 94	41.7
Nov. 8	17 15.89	-24 37.0	5.146	4.362	-0.42	+0.4	21.3	15.7/ 94	34.2
Nov. 18	17 27.41	-24 45.0	5.233	4.374	-0.42	+0.2	21.3	16.1/ 93	26.8
Nov. 28	17 39.25	-24 50.4	5.304	4.385	-0.41	+0.1	21.2	16.4/ 91	19.4
Dec. 8	17 51.29	-24 52.8	5.356	4.397	-0.40	0.0	21.1	16.5/ 90	12.0
Dec. 18	18 03.44	-24 52.1	5.389	4.409	-0.40	-0.1	21.0	16.5/ 89	4.7
Dec. 28	18 15.59	-24 48.2	5.403	4.421	-0.40	-0.3	21.0	16.4/ 88	3.2
Jan. 7	18 27.63	-24 41.2	5.397	4.433	-0.39	-0.4	21.2	16.2/ 87	10.5
Jan. 17	18 39.46	-24 31.2	5.371	4.445	-0.39	-0.5	21.3	15.8/ 86	17.9
Jan. 27	18 50.98	-24 18.6	5.327	4.458	-0.39	-0.6	21.3	15.3/ 85	25.4
Feb. 6	19 02.07	-24 03.7	5.265	4.470	-0.39	-0.7	21.4	14.6/ 84	33.0
Feb. 16	19 12.64	-23 47.0	5.185	4.483	-0.39	-0.8	21.4	13.8/ 83	40.7
Feb. 26	19 22.58	-23 29.2	5.090	4.495	-0.39	-0.9	21.4	12.8/ 82	48.5
Mar. 8	19 31.77	-23 10.9	4.981	4.508	-0.39	-1.0	21.4	11.7/ 81	56.4
Mar. 18	19 40.11	-22 52.8	4.861	4.521	-0.40	-1.1	21.4	10.3/ 81	64.4
Mar. 28	19 47.48	-22 35.8	4.731	4.534	-0.40	-1.2	21.4	8.8/ 80	72.6

Comet 140P/Bowell-Skiff

Epoch = 2016 July 31.0 TT
T = 2015 Aug. 8.57231 TT
Peri. = 172.92759 e = 0.6916548
Node = 343.39008 2000.0 a = 6.4465998 AU
Incl. = 3.82111 n = 0.06021546
q = 1.9877781 AU P = 16.37 years

m1 = 9.6 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	15 15.93	-20 39.2	2.979	2.462	+1.66	-7.2	18.8	49.8
Jan. 13	15 32.52	-21 51.3	2.933	2.518	+1.54	-6.3	19.0	55.9
Jan. 23	15 47.94	-22 54.1	2.879	2.575	+1.41	-5.4	19.1	62.4
Feb. 2	16 02.00	-23 48.3	2.818	2.634	+1.25	-4.6	19.2	69.2
Feb. 12	16 14.48	-24 34.8	2.750	2.694	+1.07	-4.0	19.3	76.4
Feb. 22	16 25.14	-25 14.4	2.677	2.755	+0.86	-3.4	19.4	84.0
Mar. 3	16 33.76	-25 47.9	2.603	2.817	+0.63	-2.8	19.5	92.0
Mar. 13	16 40.10	-26 16.1	2.528	2.879	+0.39	-2.3	19.7	100.5
Mar. 23	16 43.95	-26 39.3	2.456	2.943	+0.12	-1.8	19.8	109.5
Apr. 2	16 45.19	-26 57.6	2.392	3.006	-0.14	-1.3	19.9	119.0
Apr. 12	16 43.80	-27 10.5	2.338	3.070	-0.39	-0.7	20.0	129.1
Apr. 22	16 39.93	-27 17.1	2.301	3.135	-0.60	0.0	20.1	139.6
May 2	16 33.96	-27 16.7	2.284	3.200	-0.75	+0.8	20.2	150.5
May 12	16 26.47	-27 08.6	2.291	3.264	-0.82	+1.5	20.4	161.5
May 22	16 18.26	-26 53.3	2.324	3.329	-0.81	+2.1	20.6	171.7
June 1	16 10.14	-26 32.5	2.386	3.394	-0.73	+2.4	20.8	172.5
June 11	16 02.87	-26 08.5	2.476	3.459	-0.58	+2.4	21.0	162.7
June 21	15 57.04	-25 44.2	2.593	3.524	-0.40	+2.2	21.2	152.2
July 1	15 53.00	-25 22.1	2.733	3.588	-0.21	+1.8	21.5	141.8
July 11	15 50.90	-25 04.1	2.895	3.653	-0.02	+1.3	21.8	131.9
July 21	15 50.73	-24 51.3	3.073	3.717	+0.17	+0.7	22.0	122.3
July 31	15 52.39	-24 43.9	3.265	3.781	+0.33	+0.2	22.3	113.2
Aug. 10	15 55.71	-24 41.8	3.467	3.845	+0.48	-0.3	22.5	104.3
Aug. 20	16 00.50	-24 44.3	3.674	3.909	+0.61	-0.6	22.8	95.8
Aug. 30	16 06.58	-24 50.6	3.885	3.972	+0.72	-0.9	23.0	87.6
Sept. 9	16 13.78	-24 59.8	4.095	4.035	+0.81	-1.1	.	79.5
Sept.19	16 21.92	-25 10.9	4.302	4.098	+0.89	-1.2	.	71.7
Sept.29	16 30.87	-25 23.2	4.503	4.161	+0.96	-1.3	.	63.9
Oct. 9	16 40.48	-25 35.8	4.695	4.223	+1.02	-1.2	.	56.3
Oct. 19	16 50.63	-25 48.0	4.876	4.285	+1.06	-1.1	.	48.7
Oct. 29	17 01.21	-25 59.2	5.045	4.346	+1.09	-1.0	.	41.1
Nov. 8	17 12.11	-26 09.0	5.198	4.407	+1.11	-0.8	.	33.6
Nov. 18	17 23.22	-26 16.9	5.335	4.468	+1.12	-0.6	.	26.1
Nov. 28	17 34.44	-26 22.8	5.453	4.529	+1.12	-0.4	.	18.6
Dec. 8	17 45.66	-26 26.4	5.551	4.589	+1.11	-0.1	.	11.1
Dec. 18	17 56.80	-26 27.7	5.629	4.648	+1.09	+0.1	.	4.3
Dec. 28	18 07.74	-26 26.8	5.685	4.708	+1.07	+0.3	.	5.6
Jan. 7	18 18.40	-26 23.9	5.720	4.766	+1.03	+0.5	.	12.9
Jan. 17	18 28.66	-26 19.2	5.733	4.825	+0.98	+0.6	.	20.6
Jan. 27	18 38.43	-26 13.2	5.726	4.883	+0.92	+0.7	.	28.5
Feb. 6	18 47.61	-26 06.2	5.698	4.941	+0.85	+0.7	.	36.6
Feb. 16	18 56.08	-25 58.7	5.651	4.998	+0.77	+0.7	.	44.8
Feb. 26	19 03.76	-25 51.4	5.588	5.055	+0.68	+0.7	.	53.1
Mar. 8	19 10.53	-25 44.8	5.509	5.112	+0.58	+0.5	.	61.6
Mar. 18	19 16.28	-25 39.5	5.419	5.168	+0.46	+0.4	.	70.2
Mar. 28	19 20.91	-25 35.9	5.320	5.224	+0.34	+0.1	.	79.1

Comet C/2015 F4 (Jacques)

Epoch = 2016 July 31.0 TT
T = 2015 Aug. 10.84208 TT
Peri. = 36.33917
Node = 285.95105 2000.0
Incl. = 48.70831
q = 1.6437197 AU
e = 0.9856932

m1 = 10.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 40.54	+46 55.0	2.327	2.475	+2.88	+0.1	15.8	86.8
Jan. 13	23 09.32	+46 55.5	2.477	2.565	+2.81	0.0	16.1	83.8
Jan. 23	23 37.46	+46 55.9	2.637	2.656	+2.73	+0.1	16.3	80.3
Feb. 2	00 04.78	+46 56.4	2.807	2.747	+2.64	+0.1	16.6	76.4
Feb. 12	00 31.21	+46 57.5	2.983	2.840	+2.55	+0.2	16.9	72.1
Feb. 22	00 56.72	+46 59.4	3.165	2.933	+2.46	+0.3	17.2	67.5
Mar. 3	01 21.29	+47 01.9	3.349	3.026	+2.37	+0.3	17.4	62.7
Mar. 13	01 44.96	+47 05.0	3.534	3.120	+2.28	+0.3	17.7	57.8
Mar. 23	02 07.76	+47 08.4	3.716	3.214	+2.20	+0.3	17.9	52.8
Apr. 2	02 29.72	+47 11.9	3.895	3.307	+2.12	+0.3	18.1	47.8
Apr. 12	02 50.89	+47 15.1	4.066	3.401	+2.04	+0.3	18.4	42.9
Apr. 22	03 11.26	+47 17.8	4.229	3.495	+1.96	+0.2	18.6	38.2
May 2	03 30.85	+47 19.9	4.382	3.588	+1.88	+0.1	18.8	33.8
May 12	03 49.68	+47 21.2	4.522	3.682	+1.80	+0.1	18.9	30.0
May 22	04 07.71	+47 21.9	4.648	3.775	+1.72	0.0	19.1	27.1
June 1	04 24.95	+47 21.8	4.759	3.868	+1.64	−0.1	19.3	25.4
June 11	04 41.36	+47 21.2	4.854	3.960	+1.55	−0.1	19.4	25.3
June 21	04 56.90	+47 20.4	4.932	4.052	+1.46	−0.1	19.5	27.0
July 1	05 11.53	+47 19.6	4.992	4.144	+1.37	0.0	19.7	30.1
July 11	05 25.20	+47 19.3	5.035	4.236	+1.26	+0.1	19.8	34.4
July 21	05 37.83	+47 19.9	5.061	4.327	+1.15	+0.2	19.9	39.6
July 31	05 49.35	+47 21.9	5.069	4.417	+1.03	+0.4	20.0	45.5
Aug. 10	05 59.66	+47 25.7	5.060	4.508	+0.90	+0.6	20.1	52.0
Aug. 20	06 08.65	+47 31.7	5.037	4.598	+0.75	+0.9	20.1	58.9
Aug. 30	06 16.20	+47 40.4	5.001	4.687	+0.60	+1.1	20.2	66.3
Sept. 9	06 22.16	+47 51.8	4.954	4.776	+0.42	+1.4	20.3	74.1
Sept.19	06 26.37	+48 06.0	4.898	4.865	+0.23	+1.6	20.3	82.2
Sept.29	06 28.70	+48 22.4	4.838	4.953	+0.03	+1.8	20.4	90.7
Oct. 9	06 29.00	+48 40.2	4.778	5.041	−0.18	+1.8	20.4	99.6
Oct. 19	06 27.17	+48 57.8	4.721	5.128	−0.40	+1.5	20.5	108.7
Oct. 29	06 23.19	+49 13.2	4.674	5.215	−0.60	+1.1	20.5	118.1
Nov. 8	06 17.16	+49 23.8	4.640	5.302	−0.78	+0.3	20.6	127.5
Nov. 18	06 09.34	+49 26.9	4.626	5.388	−0.92	−0.7	20.6	136.8
Nov. 28	06 00.18	+49 20.0	4.635	5.474	−0.99	−1.9	20.7	145.2
Dec. 8	05 50.26	+49 01.4	4.672	5.560	−1.00	−3.1	20.8	151.8
Dec. 18	05 40.28	+48 30.7	4.738	5.645	−0.94	−4.2	20.9	154.9
Dec. 28	05 30.89	+47 48.8	4.836	5.729	−0.82	−5.1	21.0	152.9
Jan. 7	05 22.65	+46 58.1	4.964	5.813	−0.67	−5.7	21.1	147.0
Jan. 17	05 15.96	+46 01.5	5.120	5.897	−0.49	−5.9	21.3	138.9
Jan. 27	05 11.02	+45 02.1	5.302	5.981	−0.31	−5.9	21.4	129.8
Feb. 6	05 07.90	+44 02.7	5.505	6.064	−0.14	−5.7	21.5	120.4
Feb. 16	05 06.51	+43 05.4	5.724	6.147	+0.02	−5.4	21.7	110.9
Feb. 26	05 06.72	+42 11.8	5.955	6.229	+0.16	−4.9	21.8	101.5
Mar. 8	05 08.36	+41 22.6	6.192	6.311	+0.29	−4.4	22.0	92.3
Mar. 18	05 11.24	+40 38.1	6.432	6.393	+0.39	−4.0	22.1	83.3
Mar. 28	05 15.17	+39 58.3	6.669	6.474	+0.48	−3.5	22.2	74.5

Comet 67P/Churyumov-Gerasimenko

Epoch = 2016 July 31.0 TT
T = 2015 Aug. 13.23037 TT
Peri. = 12.84378 e = 0.6414645
Node = 50.08067 2000.0 a = 3.4647961 AU
Incl. = 7.04570 n = 0.15282259
q = 1.2422524 AU P = 6.45 years

m1 = 10.2 + 5 log(Delta) + 12.5 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 19.13	+07 23.1	1.615	2.035	+0.40	+0.4	14.0	100.2
Jan. 13	12 23.13	+07 26.8	1.571	2.112	+0.06	+2.4	14.2	109.4
Jan. 23	12 23.69	+07 50.8	1.531	2.189	−0.29	+4.2	14.3	119.4
Feb. 2	12 20.75	+08 33.1	1.500	2.266	−0.63	+5.6	14.5	130.3
Feb. 12	12 14.48	+09 29.5	1.485	2.342	−0.90	+6.3	14.7	141.8
Feb. 22	12 05.47	+10 32.9	1.491	2.417	−1.08	+6.2	14.9	153.6
Mar. 3	11 54.71	+11 34.9	1.521	2.491	−1.13	+5.2	15.2	164.7
Mar. 13	11 43.42	+12 27.3	1.580	2.565	−1.05	+3.7	15.4	170.1
Mar. 23	11 32.89	+13 03.8	1.668	2.638	−0.88	+1.8	15.8	163.3
Apr. 2	11 24.11	+13 22.0	1.782	2.710	−0.64	0.0	16.1	152.7
Apr. 12	11 17.66	+13 21.9	1.921	2.780	−0.39	−1.6	16.4	142.0
Apr. 22	11 13.78	+13 05.6	2.081	2.850	−0.14	−3.0	16.7	131.7
May 2	11 12.36	+12 35.8	2.256	2.919	+0.08	−4.1	17.1	122.1
May 12	11 13.17	+11 55.2	2.444	2.987	+0.27	−4.9	17.4	112.9
May 22	11 15.90	+11 05.9	2.641	3.053	+0.43	−5.6	17.7	104.3
June 1	11 20.22	+10 09.8	2.843	3.119	+0.57	−6.1	18.0	96.1
June 11	11 25.87	+09 08.4	3.048	3.183	+0.67	−6.6	18.3	88.3
June 21	11 32.60	+08 02.9	3.252	3.247	+0.76	−6.9	18.6	80.7
July 1	11 40.19	+06 54.2	3.453	3.309	+0.83	−7.1	18.8	73.4
July 11	11 48.48	+05 43.0	3.649	3.371	+0.88	−7.3	19.1	66.2
July 21	11 57.32	+04 30.2	3.838	3.431	+0.93	−7.4	19.3	59.2
July 31	12 06.60	+03 16.2	4.017	3.490	+0.96	−7.5	19.5	52.3
Aug. 10	12 16.22	+02 01.6	4.186	3.549	+0.99	−7.5	19.7	45.4
Aug. 20	12 26.11	+00 46.9	4.341	3.606	+1.01	−7.4	19.9	38.6
Aug. 30	12 36.18	−00 27.3	4.482	3.662	+1.02	−7.3	20.1	31.8
Sept. 9	12 46.39	−01 40.7	4.606	3.718	+1.03	−7.2	20.2	25.0
Sept.19	12 56.67	−02 52.7	4.714	3.772	+1.03	−7.0	20.4	18.1
Sept.29	13 06.96	−04 02.9	4.803	3.826	+1.03	−6.8	20.5	11.3
Oct. 9	13 17.21	−05 11.0	4.873	3.878	+1.01	−6.5	20.6	4.8
Oct. 19	13 27.35	−06 16.4	4.922	3.930	+1.00	−6.2	20.7	4.2
Oct. 29	13 37.33	−07 18.7	4.951	3.980	+0.97	−5.9	20.8	10.9
Nov. 8	13 47.06	−08 17.6	4.960	4.030	+0.94	−5.5	20.9	18.1
Nov. 18	13 56.47	−09 12.5	4.948	4.079	+0.90	−5.1	21.0	25.6
Nov. 28	14 05.46	−10 03.2	4.915	4.127	+0.85	−4.6	21.0	33.3
Dec. 8	14 13.92	−10 49.2	4.864	4.174	+0.78	−4.1	21.1	41.2
Dec. 18	14 21.75	−11 30.2	4.795	4.220	+0.71	−3.6	21.1	49.4
Dec. 28	14 28.81	−12 05.9	4.709	4.265	+0.62	−3.0	21.1	57.7
Jan. 7	14 34.96	−12 35.8	4.610	4.310	+0.51	−2.4	21.2	66.3
Jan. 17	14 40.05	−12 59.7	4.500	4.354	+0.39	−1.8	21.2	75.2
Jan. 27	14 43.95	−13 17.4	4.383	4.396	+0.25	−1.1	21.2	84.3
Feb. 6	14 46.48	−13 28.6	4.262	4.438	+0.11	−0.4	21.2	93.8
Feb. 16	14 47.54	−13 33.0	4.142	4.480	−0.05	+0.2	21.2	103.7
Feb. 26	14 47.04	−13 30.5	4.028	4.520	−0.21	+0.9	21.2	113.9
Mar. 8	14 44.93	−13 21.2	3.924	4.560	−0.36	+1.6	21.2	124.4
Mar. 18	14 41.28	−13 05.4	3.837	4.598	−0.50	+2.2	21.2	135.3
Mar. 28	14 36.24	−12 43.7	3.771	4.637	−0.62	+2.6	21.2	146.5

Comet C/2014 M1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Aug. 26.58103 TT
Peri. = 336.75632
Node = 234.67739 2000.0
Incl. = 160.17226
q = 5.5770097 AU
e = 1.0016141

m1 = 8.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	16 28.01	-24 39.2	6.458	5.656	+0.18	+1.2	19.6	32.7
Jan. 13	16 29.82	-24 27.6	6.354	5.669	+0.10	+1.3	19.6	42.5
Jan. 23	16 30.86	-24 14.4	6.228	5.682	+0.01	+1.5	19.5	52.5
Feb. 2	16 30.96	-23 58.9	6.082	5.696	-0.10	+1.8	19.5	62.6
Feb. 12	16 29.94	-23 40.5	5.921	5.712	-0.23	+2.2	19.4	73.0
Feb. 22	16 27.63	-23 18.6	5.751	5.728	-0.37	+2.6	19.4	83.7
Mar. 3	16 23.88	-22 52.3	5.578	5.745	-0.53	+3.2	19.3	94.7
Mar. 13	16 18.58	-22 20.7	5.409	5.762	-0.69	+3.8	19.3	106.0
Mar. 23	16 11.66	-21 42.9	5.251	5.781	-0.85	+4.5	19.2	117.6
Apr. 2	16 03.18	-20 58.3	5.112	5.800	-0.99	+5.2	19.2	129.6
Apr. 12	15 53.28	-20 06.5	4.999	5.821	-1.10	+5.9	19.1	141.8
Apr. 22	15 42.24	-19 07.7	4.919	5.842	-1.18	+6.5	19.1	154.4
May 2	15 30.45	-18 02.9	4.877	5.863	-1.21	+6.9	19.1	167.0
May 12	15 18.39	-16 54.0	4.876	5.886	-1.18	+7.0	19.1	178.7
May 22	15 06.57	-15 43.5	4.917	5.909	-1.11	+6.9	19.2	167.4
June 1	14 55.45	-14 34.2	5.000	5.934	-1.01	+6.5	19.2	154.9
June 11	14 45.38	-13 28.9	5.119	5.958	-0.87	+5.9	19.3	142.7
June 21	14 36.65	-12 29.5	5.270	5.984	-0.73	+5.2	19.4	130.8
July 1	14 29.36	-11 37.6	5.446	6.010	-0.58	+4.4	19.5	119.3
July 11	14 23.55	-10 53.8	5.641	6.037	-0.44	+3.6	19.6	108.2
July 21	14 19.18	-10 18.0	5.848	6.065	-0.30	+2.8	19.7	97.5
July 31	14 16.15	-09 50.0	6.060	6.093	-0.18	+2.1	19.8	87.1
Aug. 10	14 14.32	-09 28.8	6.270	6.122	-0.08	+1.5	19.9	77.0
Aug. 20	14 13.57	-09 13.7	6.474	6.152	+0.02	+1.0	19.9	67.2
Aug. 30	14 13.73	-09 03.7	6.665	6.183	+0.09	+0.6	20.0	57.6
Sept. 9	14 14.68	-08 57.7	6.841	6.213	+0.16	+0.3	20.1	48.1
Sept.19	14 16.27	-08 54.8	6.996	6.245	+0.21	+0.1	20.2	38.8
Sept.29	14 18.37	-08 54.1	7.129	6.277	+0.25	-0.1	20.2	29.6
Oct. 9	14 20.86	-08 54.7	7.235	6.310	+0.27	-0.1	20.3	20.6
Oct. 19	14 23.61	-08 55.7	7.315	6.343	+0.29	-0.1	20.3	11.9
Oct. 29	14 26.50	-08 56.3	7.365	6.377	+0.29	+0.1	20.4	5.5
Nov. 8	14 29.42	-08 55.7	7.386	6.412	+0.28	+0.3	20.4	9.6
Nov. 18	14 32.23	-08 53.2	7.378	6.446	+0.26	+0.5	20.4	18.2
Nov. 28	14 34.83	-08 47.9	7.342	6.482	+0.22	+0.9	20.4	27.4
Dec. 8	14 37.07	-08 39.3	7.278	6.518	+0.18	+1.3	20.5	36.9
Dec. 18	14 38.83	-08 26.5	7.191	6.554	+0.12	+1.8	20.4	46.6
Dec. 28	14 39.98	-08 09.0	7.082	6.591	+0.04	+2.3	20.4	56.6
Jan. 7	14 40.39	-07 46.0	6.956	6.629	-0.05	+2.9	20.4	66.7
Jan. 17	14 39.93	-07 17.1	6.818	6.667	-0.14	+3.5	20.4	77.1
Jan. 27	14 38.49	-06 41.8	6.673	6.705	-0.25	+4.2	20.4	87.7
Feb. 6	14 35.96	-05 59.8	6.527	6.744	-0.37	+4.9	20.4	98.5
Feb. 16	14 32.31	-05 11.2	6.388	6.783	-0.48	+5.5	20.3	109.6
Feb. 26	14 27.50	-04 16.4	6.261	6.823	-0.59	+6.0	20.3	120.9
Mar. 8	14 21.59	-03 16.1	6.155	6.863	-0.69	+6.4	20.3	132.3
Mar. 18	14 14.69	-02 11.7	6.075	6.903	-0.77	+6.7	20.3	143.8
Mar. 28	14 06.98	-01 05.0	6.027	6.944	-0.83	+6.7	20.3	154.9

Comet C/2015 GX (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Aug. 26.66776 TT
Peri. = 108.95942 e = 0.8781778
Node = 235.51573 2000.0 a = 16.1852782 AU
Incl. = 90.26161 n = 0.01513644
q = 1.9717262 AU P = 65.11 years

m1 = 10.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	01 27.15	+32 12.4	1.941	2.448	+0.84	-29.8	17.9	109.2
Jan. 13	01 35.54	+27 14.2	2.150	2.513	+0.91	-23.2	18.3	99.8
Jan. 23	01 44.67	+23 22.4	2.376	2.580	+0.96	-17.9	18.7	90.5
Feb. 2	01 54.31	+20 23.2	2.609	2.649	+1.00	-13.9	19.0	81.5
Feb. 12	02 04.34	+18 04.5	2.843	2.720	+1.03	-10.8	19.4	72.8
Feb. 22	02 14.64	+16 16.2	3.074	2.792	+1.05	-8.6	19.7	64.3
Mar. 3	02 25.13	+14 50.6	3.296	2.865	+1.06	-6.9	20.0	56.2
Mar. 13	02 35.74	+13 41.5	3.506	2.940	+1.07	-5.7	20.3	48.3
Mar. 23	02 46.41	+12 44.1	3.701	3.015	+1.07	-5.0	20.6	40.6
Apr. 2	02 57.07	+11 54.5	3.879	3.091	+1.06	-4.5	20.9	33.2
Apr. 12	03 07.69	+11 09.9	4.038	3.168	+1.05	-4.2	21.1	26.0
Apr. 22	03 18.19	+10 27.6	4.177	3.245	+1.03	-4.2	21.4	19.3
May 2	03 28.52	+09 45.6	4.294	3.323	+1.01	-4.3	21.6	13.7
May 12	03 38.64	+09 02.4	4.389	3.401	+0.98	-4.6	21.8	10.6
May 22	03 48.47	+08 16.3	4.462	3.479	+0.95	-5.0	22.0	12.2
June 1	03 57.94	+07 26.2	4.513	3.557	+0.91	-5.5	22.1	17.3
June 11	04 07.00	+06 30.8	4.542	3.636	+0.85	-6.2	22.3	23.8
June 21	04 15.54	+05 29.2	4.551	3.714	+0.79	-6.9	22.4	30.8
July 1	04 23.49	+04 20.4	4.541	3.793	+0.73	-7.7	22.6	38.1
July 11	04 30.74	+03 03.7	4.513	3.871	+0.64	-8.5	22.7	45.6
July 21	04 37.18	+01 38.2	4.470	3.950	+0.55	-9.5	22.8	53.4
July 31	04 42.69	+00 03.4	4.414	4.028	+0.44	-10.4	22.9	61.4
Aug. 10	04 47.13	-01 41.0	4.349	4.106	+0.32	-11.4	23.0	69.6
Aug. 20	04 50.36	-03 35.0	4.277	4.184	+0.19	-12.3	.	77.9
Aug. 30	04 52.25	-05 38.3	4.203	4.262	+0.04	-13.2	.	86.5
Sept. 9	04 52.63	-07 49.8	4.132	4.339	-0.12	-13.8	.	95.1
Sept.19	04 51.40	-10 07.6	4.068	4.417	-0.29	-14.1	.	103.8
Sept.29	04 48.48	-12 28.9	4.017	4.494	-0.46	-14.1	.	112.3
Oct. 9	04 43.85	-14 49.8	3.984	4.570	-0.62	-13.6	.	120.3
Oct. 19	04 37.61	-17 05.5	3.972	4.647	-0.76	-12.5	.	127.5
Oct. 29	04 29.97	-19 10.9	3.987	4.723	-0.87	-11.0	.	133.2
Nov. 8	04 21.27	-21 00.9	4.030	4.799	-0.93	-9.0	.	136.7
Nov. 18	04 11.98	-22 31.4	4.102	4.875	-0.94	-6.9	.	137.2
Nov. 28	04 02.62	-23 40.0	4.204	4.950	-0.89	-4.6	.	134.9
Dec. 8	03 53.73	-24 26.1	4.332	5.025	-0.80	-2.5	.	130.2
Dec. 18	03 45.77	-24 51.1	4.485	5.100	-0.67	-0.6	.	123.9
Dec. 28	03 39.07	-24 57.5	4.657	5.174	-0.52	+0.9	.	116.7
Jan. 7	03 33.85	-24 48.6	4.844	5.248	-0.37	+2.0	.	109.1
Jan. 17	03 30.19	-24 28.2	5.042	5.322	-0.21	+2.9	.	101.2
Jan. 27	03 28.06	-23 59.6	5.246	5.396	-0.07	+3.4	.	93.4
Feb. 6	03 27.40	-23 26.0	5.451	5.469	+0.07	+3.6	.	85.8
Feb. 16	03 28.07	-22 49.9	5.654	5.542	+0.18	+3.6	.	78.5
Feb. 26	03 29.91	-22 13.7	5.851	5.614	+0.29	+3.5	.	71.4
Mar. 8	03 32.79	-21 38.9	6.038	5.686	+0.37	+3.2	.	64.8
Mar. 18	03 36.53	-21 07.3	6.213	5.758	+0.45	+2.7	.	58.6
Mar. 28	03 41.01	-20 39.8	6.374	5.830	+0.51	+2.2	.	53.1

Comet C/2013 C2 (Tenagra)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 2.29482 TT
Peri. = 308.91313 e = 0.4317772
Node = 247.53138 2000.0 a = 16.0709913 AU
Incl. = 21.33664 n = 0.01529819
q = 9.1319037 AU P = 64.43 years

m1 = -1.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 28.17	-25 06.9	9.389	9.143	+0.24	-2.3	18.3	72.6
Jan. 13	13 30.56	-25 29.7	9.233	9.145	+0.17	-2.0	18.2	81.8
Jan. 23	13 32.26	-25 49.2	9.074	9.147	+0.10	-1.6	18.2	91.2
Feb. 2	13 33.22	-26 04.9	8.916	9.150	+0.02	-1.1	18.2	100.7
Feb. 12	13 33.42	-26 16.2	8.763	9.152	-0.05	-0.6	18.1	110.3
Feb. 22	13 32.90	-26 22.5	8.620	9.155	-0.12	-0.1	18.1	120.0
Mar. 3	13 31.68	-26 23.5	8.492	9.157	-0.18	+0.5	18.1	129.7
Mar. 13	13 29.86	-26 18.9	8.383	9.160	-0.23	+1.0	18.0	139.3
Mar. 23	13 27.56	-26 08.8	8.298	9.163	-0.26	+1.5	18.0	148.6
Apr. 2	13 24.91	-25 53.3	8.238	9.166	-0.28	+2.0	18.0	157.0
Apr. 12	13 22.10	-25 33.2	8.206	9.170	-0.28	+2.4	18.0	163.1
Apr. 22	13 19.29	-25 09.2	8.203	9.173	-0.26	+2.7	18.0	163.9
May 2	13 16.66	-24 42.4	8.229	9.177	-0.23	+2.8	18.0	158.9
May 12	13 14.37	-24 14.1	8.284	9.181	-0.18	+2.9	18.0	151.0
May 22	13 12.55	-23 45.5	8.364	9.184	-0.12	+2.8	18.1	142.1
June 1	13 11.30	-23 17.9	8.468	9.189	-0.06	+2.6	18.1	132.9
June 11	13 10.69	-22 52.2	8.592	9.193	+0.01	+2.3	18.1	123.6
June 21	13 10.76	-22 29.6	8.731	9.197	+0.08	+1.9	18.2	114.4
July 1	13 11.53	-22 10.5	8.883	9.202	+0.14	+1.5	18.2	105.2
July 11	13 12.97	-21 55.5	9.042	9.206	+0.21	+1.1	18.2	96.1
July 21	13 15.07	-21 44.8	9.204	9.211	+0.27	+0.6	18.3	87.2
July 31	13 17.78	-21 38.5	9.365	9.216	+0.33	+0.2	18.3	78.5
Aug. 10	13 21.06	-21 36.5	9.522	9.221	+0.38	-0.2	18.4	69.8
Aug. 20	13 24.85	-21 38.6	9.671	9.226	+0.42	-0.6	18.4	61.2
Aug. 30	13 29.08	-21 44.6	9.808	9.232	+0.46	-0.9	18.4	52.8
Sept. 9	13 33.70	-21 54.1	9.930	9.237	+0.49	-1.3	18.5	44.4
Sept.19	13 38.65	-22 06.7	10.035	9.243	+0.52	-1.5	18.5	36.2
Sept.29	13 43.85	-22 22.0	10.120	9.249	+0.54	-1.8	18.5	28.1
Oct. 9	13 49.26	-22 39.7	10.184	9.255	+0.55	-1.9	18.5	20.5
Oct. 19	13 54.78	-22 59.1	10.225	9.261	+0.56	-2.1	18.5	13.8
Oct. 29	14 00.36	-23 20.0	10.242	9.267	+0.56	-2.2	18.6	10.4
Nov. 8	14 05.93	-23 41.8	10.235	9.273	+0.55	-2.2	18.6	13.2
Nov. 18	14 11.39	-24 04.1	10.204	9.280	+0.53	-2.2	18.6	19.8
Nov. 28	14 16.70	-24 26.5	10.149	9.287	+0.50	-2.2	18.5	27.7
Dec. 8	14 21.74	-24 48.6	10.072	9.293	+0.47	-2.1	18.5	36.1
Dec. 18	14 26.46	-25 09.9	9.973	9.300	+0.43	-2.0	18.5	44.7
Dec. 28	14 30.76	-25 30.1	9.857	9.307	+0.38	-1.9	18.5	53.6
Jan. 7	14 34.56	-25 48.7	9.725	9.315	+0.32	-1.7	18.5	62.7
Jan. 17	14 37.79	-26 05.3	9.580	9.322	+0.26	-1.4	18.4	71.9
Jan. 27	14 40.37	-26 19.5	9.427	9.329	+0.19	-1.1	18.4	81.3
Feb. 6	14 42.26	-26 30.9	9.270	9.337	+0.11	-0.8	18.4	90.8
Feb. 16	14 43.40	-26 39.0	9.114	9.345	+0.04	-0.5	18.4	100.5
Feb. 26	14 43.79	-26 43.6	8.963	9.353	-0.04	-0.1	18.3	110.3
Mar. 8	14 43.42	-26 44.3	8.822	9.361	-0.11	+0.3	18.3	120.2
Mar. 18	14 42.35	-26 40.8	8.696	9.369	-0.17	+0.8	18.3	130.2
Mar. 28	14 40.65	-26 33.1	8.589	9.377	-0.22	+1.2	18.3	140.1

Comet C/2014 A4 (SONEAR)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 5.78522 TT
Peri. = 356.77576
Node = 29.73026 2000.0
Incl. = 121.36573
q = 4.1799138 AU
e = 1.0009322

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 06.26	+15 34.6	4.252	4.298	−0.28	+2.7	16.1	86.1
Jan. 13	00 03.44	+16 01.5	4.454	4.318	−0.13	+3.5	16.2	75.8
Jan. 23	00 02.18	+16 36.3	4.646	4.340	0.00	+4.2	16.3	66.0
Feb. 2	00 02.17	+17 18.5	4.826	4.363	+0.10	+4.9	16.4	56.7
Feb. 12	00 03.16	+18 07.8	4.988	4.388	+0.17	+5.6	16.5	47.9
Feb. 22	00 04.91	+19 03.6	5.130	4.414	+0.23	+6.2	16.6	39.6
Mar. 3	00 07.20	+20 05.5	5.249	4.441	+0.26	+6.8	16.7	32.1
Mar. 13	00 09.85	+21 13.2	5.344	4.470	+0.28	+7.3	16.7	25.8
Mar. 23	00 12.68	+22 26.2	5.413	4.500	+0.28	+7.8	16.8	21.4
Apr. 2	00 15.51	+23 44.4	5.456	4.531	+0.27	+8.3	16.8	20.2
Apr. 12	00 18.20	+25 07.3	5.474	4.563	+0.24	+8.7	16.9	22.5
Apr. 22	00 20.57	+26 34.8	5.467	4.597	+0.19	+9.2	16.9	27.3
May 2	00 22.46	+28 06.6	5.436	4.632	+0.12	+9.6	16.9	33.7
May 12	00 23.68	+29 42.4	5.385	4.668	+0.03	+9.9	16.9	40.8
May 22	00 24.02	+31 21.6	5.315	4.705	−0.07	+10.2	17.0	48.5
June 1	00 23.28	+33 03.8	5.228	4.743	−0.21	+10.4	17.0	56.4
June 11	00 21.19	+34 48.0	5.130	4.781	−0.37	+10.5	16.9	64.5
June 21	00 17.50	+36 32.6	5.023	4.821	−0.56	+10.3	16.9	72.8
July 1	00 11.94	+38 15.7	4.912	4.862	−0.77	+9.9	16.9	81.2
July 11	00 04.23	+39 54.4	4.803	4.904	−1.00	+9.0	16.9	89.7
July 21	23 54.18	+41 24.9	4.700	4.947	−1.24	+7.8	16.9	98.1
July 31	23 41.74	+42 42.4	4.609	4.990	−1.47	+5.9	16.9	106.3
Aug. 10	23 27.01	+43 41.9	4.536	5.035	−1.66	+3.6	16.9	114.0
Aug. 20	23 10.45	+44 18.2	4.486	5.080	−1.77	+1.0	16.9	120.9
Aug. 30	22 52.76	+44 27.8	4.462	5.126	−1.79	−1.9	16.9	126.4
Sept. 9	22 34.88	+44 09.2	4.468	5.172	−1.71	−4.5	17.0	129.9
Sept.19	22 17.80	+43 24.4	4.506	5.219	−1.54	−6.7	17.0	130.9
Sept.29	22 02.37	+42 17.7	4.575	5.267	−1.32	−8.2	17.1	129.3
Oct. 9	21 49.15	+40 55.6	4.674	5.316	−1.07	−9.0	17.2	125.5
Oct. 19	21 38.41	+39 25.3	4.799	5.365	−0.82	−9.2	17.3	119.9
Oct. 29	21 30.17	+37 53.3	4.946	5.414	−0.59	−8.8	17.4	113.2
Nov. 8	21 24.27	+36 25.1	5.110	5.465	−0.38	−8.0	17.5	105.9
Nov. 18	21 20.44	+35 04.8	5.286	5.515	−0.20	−7.0	17.6	98.2
Nov. 28	21 18.41	+33 55.3	5.469	5.567	−0.05	−5.7	17.7	90.6
Dec. 8	21 17.87	+32 58.1	5.653	5.618	+0.07	−4.4	17.9	83.0
Dec. 18	21 18.54	+32 14.1	5.834	5.670	+0.16	−3.1	18.0	75.7
Dec. 28	21 20.17	+31 43.4	6.007	5.723	+0.24	−1.7	18.1	68.7
Jan. 7	21 22.53	+31 26.0	6.168	5.776	+0.29	−0.5	18.2	62.2
Jan. 17	21 25.40	+31 21.4	6.316	5.830	+0.32	+0.7	18.3	56.4
Jan. 27	21 28.61	+31 28.8	6.446	5.883	+0.34	+1.9	18.3	51.5
Feb. 6	21 31.97	+31 47.7	6.558	5.938	+0.34	+2.9	18.4	47.6
Feb. 16	21 35.33	+32 17.1	6.649	5.992	+0.32	+3.9	18.5	45.0
Feb. 26	21 38.53	+32 56.3	6.721	6.047	+0.29	+4.8	18.6	44.0
Mar. 8	21 41.43	+33 44.4	6.771	6.102	+0.24	+5.6	18.6	44.4
Mar. 18	21 43.87	+34 40.5	6.802	6.158	+0.18	+6.3	18.7	46.4
Mar. 28	21 45.72	+35 43.6	6.814	6.213	+0.11	+6.9	18.7	49.6

Comet C/2014 W8 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 7.92654 TT
Peri. = 227.41231
Node = 224.93780 2000.0
Incl. = 42.20405
q = 5.0559908 AU
e = 0.9684708

m1 = 6.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 23.84	-20 30.7	4.378	5.132	-0.43	-1.4	19.9	136.1
Jan. 13	06 19.58	-20 44.2	4.416	5.145	-0.37	+0.2	19.9	133.8
Jan. 23	06 15.90	-20 41.8	4.474	5.160	-0.28	+1.6	19.9	129.8
Feb. 2	06 13.11	-20 25.6	4.552	5.175	-0.17	+2.8	20.0	124.6
Feb. 12	06 11.44	-19 58.1	4.646	5.192	-0.04	+3.6	20.1	118.6
Feb. 22	06 11.03	-19 22.3	4.755	5.209	+0.09	+4.1	20.1	112.2
Mar. 3	06 11.93	-18 41.3	4.874	5.228	+0.22	+4.4	20.2	105.6
Mar. 13	06 14.13	-17 57.8	5.001	5.247	+0.34	+4.4	20.3	98.9
Mar. 23	06 17.56	-17 14.3	5.134	5.268	+0.46	+4.1	20.4	92.2
Apr. 2	06 22.13	-16 32.8	5.268	5.289	+0.56	+3.8	20.5	85.7
Apr. 12	06 27.73	-15 55.0	5.403	5.311	+0.65	+3.3	20.5	79.4
Apr. 22	06 34.23	-15 22.2	5.535	5.335	+0.73	+2.7	20.6	73.3
May 2	06 41.50	-14 55.4	5.663	5.359	+0.79	+2.0	20.7	67.5
May 12	06 49.44	-14 35.3	5.785	5.384	+0.85	+1.3	20.8	61.9
May 22	06 57.91	-14 22.3	5.900	5.410	+0.89	+0.5	20.9	56.6
June 1	07 06.82	-14 16.9	6.006	5.436	+0.92	-0.2	20.9	51.7
June 11	07 16.06	-14 19.1	6.101	5.464	+0.95	-1.0	21.0	47.3
June 21	07 25.53	-14 29.1	6.186	5.492	+0.96	-1.8	21.1	43.4
July 1	07 35.14	-14 46.7	6.259	5.521	+0.97	-2.5	21.1	40.2
July 11	07 44.82	-15 11.8	6.320	5.551	+0.96	-3.2	21.2	37.7
July 21	07 54.46	-15 44.3	6.369	5.582	+0.95	-3.9	21.2	36.3
July 31	08 04.00	-16 23.7	6.404	5.613	+0.94	-4.6	21.3	35.9
Aug. 10	08 13.37	-17 09.9	6.427	5.646	+0.91	-5.2	21.3	36.6
Aug. 20	08 22.47	-18 02.3	6.436	5.678	+0.88	-5.8	21.4	38.5
Aug. 30	08 31.24	-19 00.5	6.432	5.712	+0.83	-6.3	21.4	41.3
Sept. 9	08 39.59	-20 04.0	6.415	5.746	+0.78	-6.8	21.4	44.9
Sept.19	08 47.43	-21 12.1	6.387	5.781	+0.73	-7.2	21.5	49.2
Sept.29	08 54.69	-22 24.1	6.347	5.817	+0.66	-7.5	21.5	54.1
Oct. 9	09 01.27	-23 39.1	6.297	5.853	+0.58	-7.7	21.5	59.5
Oct. 19	09 07.08	-24 56.2	6.238	5.890	+0.49	-7.8	21.5	65.2
Oct. 29	09 12.01	-26 14.2	6.172	5.927	+0.40	-7.8	21.5	71.2
Nov. 8	09 15.99	-27 31.8	6.100	5.965	+0.29	-7.5	21.6	77.5
Nov. 18	09 18.91	-28 47.3	6.025	6.003	+0.18	-7.2	21.6	84.0
Nov. 28	09 20.73	-29 59.0	5.949	6.042	+0.07	-6.6	21.6	90.7
Dec. 8	09 21.38	-31 05.0	5.876	6.082	-0.05	-5.8	21.6	97.4
Dec. 18	09 20.89	-32 03.0	5.808	6.122	-0.16	-4.8	21.6	104.1
Dec. 28	09 19.30	-32 51.1	5.748	6.163	-0.26	-3.6	21.6	110.6
Jan. 7	09 16.73	-33 27.2	5.699	6.204	-0.33	-2.2	21.7	116.8
Jan. 17	09 13.40	-33 49.6	5.664	6.245	-0.39	-0.8	21.7	122.3
Jan. 27	09 09.55	-33 57.3	5.645	6.287	-0.41	+0.7	21.7	127.0
Feb. 6	09 05.49	-33 50.0	5.646	6.329	-0.39	+2.2	21.8	130.4
Feb. 16	09 01.55	-33 28.3	5.667	6.372	-0.35	+3.5	21.8	132.2
Feb. 26	08 58.04	-32 53.7	5.708	6.416	-0.28	+4.5	21.9	132.2
Mar. 8	08 55.21	-32 08.4	5.771	6.459	-0.19	+5.3	22.0	130.4
Mar. 18	08 53.28	-31 15.1	5.855	6.503	-0.09	+5.8	22.0	127.1
Mar. 28	08 52.37	-30 16.8	5.957	6.547	+0.02	+6.1	22.1	122.5

Comet C/2015 J2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 8.91086 TT
Peri. = 203.69290
Node = 56.74702 2000.0
Incl. = 17.27921
q = 4.3205627 AU
e = 0.9831008

m1 = 10.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	18 36.13	-32 28.1	5.388	4.424	+1.44	-0.5	20.1	10.1
Jan. 13	18 50.50	-32 33.1	5.386	4.442	+1.42	-0.2	20.1	14.7
Jan. 23	19 04.67	-32 35.6	5.368	4.462	+1.39	0.0	20.1	20.8
Feb. 2	19 18.54	-32 36.0	5.334	4.483	+1.35	+0.1	20.2	27.5
Feb. 12	19 31.99	-32 35.2	5.285	4.505	+1.29	+0.1	20.2	34.4
Feb. 22	19 44.92	-32 33.9	5.221	4.529	+1.23	+0.1	20.1	41.5
Mar. 3	19 57.24	-32 32.9	5.146	4.554	+1.16	0.0	20.1	48.8
Mar. 13	20 08.84	-32 33.2	5.058	4.580	+1.08	-0.3	20.1	56.1
Mar. 23	20 19.61	-32 35.8	4.962	4.607	+0.98	-0.6	20.1	63.7
Apr. 2	20 29.45	-32 41.6	4.858	4.636	+0.88	-1.0	20.1	71.3
Apr. 12	20 38.26	-32 51.5	4.749	4.666	+0.77	-1.5	20.1	79.2
Apr. 22	20 45.93	-33 06.2	4.637	4.697	+0.64	-2.0	20.0	87.2
May 2	20 52.34	-33 26.4	4.526	4.729	+0.51	-2.6	20.0	95.4
May 12	20 57.41	-33 52.3	4.419	4.762	+0.36	-3.1	20.0	103.8
May 22	21 01.02	-34 23.8	4.319	4.796	+0.21	-3.6	20.0	112.4
June 1	21 03.14	-35 00.1	4.229	4.831	+0.06	-4.0	20.0	121.1
June 11	21 03.73	-35 40.1	4.153	4.867	-0.09	-4.2	20.0	129.9
June 21	21 02.83	-36 21.9	4.096	4.904	-0.22	-4.1	20.0	138.6
July 1	21 00.59	-37 03.1	4.059	4.942	-0.34	-3.8	20.0	146.9
July 11	20 57.19	-37 41.3	4.046	4.981	-0.42	-3.2	20.0	154.3
July 21	20 52.99	-38 13.6	4.058	5.021	-0.46	-2.4	20.0	159.1
July 31	20 48.37	-38 38.1	4.098	5.061	-0.46	-1.5	20.1	159.6
Aug. 10	20 43.76	-38 53.1	4.164	5.103	-0.41	-0.5	20.2	155.4
Aug. 20	20 39.61	-38 58.0	4.256	5.145	-0.33	+0.5	20.3	148.4
Aug. 30	20 36.28	-38 52.9	4.372	5.188	-0.22	+1.4	20.4	140.1
Sept. 9	20 34.06	-38 38.8	4.510	5.232	-0.09	+2.2	20.5	131.4
Sept.19	20 33.14	-38 16.7	4.667	5.276	+0.04	+2.9	20.6	122.6
Sept.29	20 33.59	-37 48.0	4.838	5.321	+0.18	+3.4	20.7	113.7
Oct. 9	20 35.41	-37 13.9	5.021	5.366	+0.31	+3.8	20.8	105.0
Oct. 19	20 38.53	-36 35.7	5.211	5.413	+0.43	+4.2	20.9	96.4
Oct. 29	20 42.84	-35 54.1	5.405	5.459	+0.54	+4.4	21.0	87.9
Nov. 8	20 48.23	-35 09.9	5.600	5.507	+0.63	+4.6	21.1	79.5
Nov. 18	20 54.53	-34 23.8	5.791	5.555	+0.71	+4.8	21.3	71.4
Nov. 28	21 01.62	-33 36.1	5.977	5.603	+0.77	+4.9	21.4	63.3
Dec. 8	21 09.34	-32 47.2	6.153	5.652	+0.82	+5.0	21.5	55.4
Dec. 18	21 17.58	-31 57.7	6.318	5.701	+0.86	+5.0	21.6	47.7
Dec. 28	21 26.19	-31 07.7	6.469	5.751	+0.89	+5.0	21.7	40.1
Jan. 7	21 35.08	-30 17.7	6.603	5.802	+0.91	+5.0	21.7	32.8
Jan. 17	21 44.13	-29 28.1	6.721	5.852	+0.91	+4.9	21.8	26.0
Jan. 27	21 53.25	-28 39.4	6.819	5.903	+0.91	+4.7	21.9	20.0
Feb. 6	22 02.36	-27 51.9	6.897	5.955	+0.90	+4.6	21.9	15.9
Feb. 16	22 11.36	-27 06.2	6.956	6.007	+0.88	+4.3	22.0	15.0
Feb. 26	22 20.19	-26 22.7	6.993	6.059	+0.86	+4.1	22.0	18.0
Mar. 8	22 28.77	-25 42.0	7.010	6.112	+0.83	+3.7	22.1	23.3
Mar. 18	22 37.02	-25 04.7	7.008	6.165	+0.79	+3.3	22.1	29.8
Mar. 28	22 44.89	-24 31.2	6.987	6.218	+0.74	+2.9	22.2	36.9

Comet P/2015 Q1 (Scotti)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 9.22269 TT
Peri. = 199.01674 e = 0.4892281
Node = 203.30196 2000.0 a = 3.4306413 AU
Incl. = 22.65070 n = 0.15511046
q = 1.7522752 AU P = 6.35 years

m1 = 12.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	05 54.09	-15 48.3	1.183	2.029	-0.52	+5.6	17.0	138.8
Jan. 13	05 48.93	-14 52.1	1.255	2.072	-0.25	+8.9	17.2	135.2
Jan. 23	05 46.45	-13 22.7	1.344	2.117	+0.04	+11.0	17.5	130.2
Feb. 2	05 46.87	-11 32.7	1.447	2.164	+0.33	+12.0	17.8	124.5
Feb. 12	05 50.13	-09 32.9	1.564	2.212	+0.58	+12.1	18.1	118.5
Feb. 22	05 55.98	-07 31.8	1.692	2.261	+0.81	+11.6	18.5	112.3
Mar. 3	06 04.04	-05 35.8	1.830	2.311	+0.99	+10.7	18.8	106.1
Mar. 13	06 13.95	-03 48.9	1.976	2.361	+1.14	+9.5	19.1	100.0
Mar. 23	06 25.37	-02 13.7	2.128	2.412	+1.26	+8.2	19.4	94.0
Apr. 2	06 37.99	-00 51.6	2.285	2.464	+1.35	+6.8	19.7	88.1
Apr. 12	06 51.53	+00 16.6	2.445	2.516	+1.43	+5.4	20.0	82.3
Apr. 22	07 05.78	+01 10.9	2.607	2.568	+1.47	+4.1	20.2	76.6
May 2	07 20.53	+01 51.5	2.769	2.620	+1.51	+2.8	20.5	71.0
May 12	07 35.63	+02 19.0	2.929	2.672	+1.53	+1.5	20.7	65.4
May 22	07 50.92	+02 34.1	3.087	2.724	+1.54	+0.4	21.0	59.9
June 1	08 06.31	+02 37.7	3.240	2.776	+1.54	-0.7	21.2	54.4
June 11	08 21.69	+02 30.6	3.387	2.827	+1.53	-1.7	21.4	49.0
June 21	08 36.99	+02 13.8	3.527	2.879	+1.52	-2.6	21.6	43.6
July 1	08 52.15	+01 48.1	3.659	2.929	+1.50	-3.4	21.8	38.3
July 11	09 07.11	+01 14.6	3.781	2.980	+1.47	-4.1	22.0	33.0
July 21	09 21.83	+00 34.0	3.891	3.030	+1.45	-4.7	22.2	27.8
July 31	09 36.28	-00 12.6	3.990	3.080	+1.42	-5.2	22.3	22.8
Aug. 10	09 50.44	-01 04.4	4.076	3.129	+1.38	-5.6	22.5	18.3
Aug. 20	10 04.25	-02 00.6	4.147	3.178	+1.35	-6.0	22.6	14.6
Aug. 30	10 17.70	-03 00.4	4.204	3.226	+1.31	-6.3	22.7	12.7
Sept. 9	10 30.77	-04 03.0	4.244	3.274	+1.26	-6.5	22.9	13.6
Sept.19	10 43.40	-05 07.5	4.268	3.321	+1.22	-6.6	23.0	17.0
Sept.29	10 55.58	-06 13.3	4.276	3.368	+1.17	-6.6	.	21.9
Oct. 9	11 07.23	-07 19.4	4.267	3.413	+1.11	-6.6	.	27.7
Oct. 19	11 18.30	-08 25.0	4.240	3.459	+1.04	-6.4	.	33.9
Oct. 29	11 28.73	-09 29.4	4.198	3.504	+0.97	-6.2	.	40.6
Nov. 8	11 38.42	-10 31.7	4.139	3.548	+0.88	-5.9	.	47.6
Nov. 18	11 47.27	-11 30.8	4.066	3.591	+0.79	-5.5	.	55.0
Nov. 28	11 55.17	-12 25.8	3.979	3.634	+0.68	-5.0	.	62.7
Dec. 8	12 01.96	-13 15.5	3.882	3.676	+0.55	-4.3	.	70.7
Dec. 18	12 07.51	-13 58.6	3.775	3.718	+0.42	-3.5	.	79.2
Dec. 28	12 11.66	-14 33.8	3.663	3.759	+0.26	-2.6	.	88.0
Jan. 7	12 14.25	-14 59.4	3.549	3.799	+0.09	-1.4	.	97.2
Jan. 17	12 15.17	-15 13.8	3.437	3.839	-0.08	-0.2	.	106.8
Jan. 27	12 14.34	-15 15.3	3.333	3.878	-0.26	+1.3	.	116.9
Feb. 6	12 11.77	-15 02.5	3.240	3.917	-0.42	+2.8	.	127.3
Feb. 16	12 07.61	-14 34.4	3.164	3.954	-0.55	+4.3	.	138.0
Feb. 26	12 02.10	-13 51.1	3.111	3.991	-0.64	+5.7	.	148.9
Mar. 8	11 55.68	-12 53.9	3.084	4.028	-0.68	+6.8	.	159.3
Mar. 18	11 48.85	-11 45.7	3.087	4.064	-0.67	+7.5	.	167.2
Mar. 28	11 42.17	-10 30.5	3.122	4.099	-0.60	+7.7	.	166.6

Comet C/2015 B1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 22.15866 TT
Peri. = 188.47704 e = 0.3773796
Node = 353.35605 2000.0 a = 9.5987700 AU
Incl. = 18.03935 n = 0.03314215
q = 5.9763900 AU P = 29.74 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 00.79	-11 57.0	6.029	5.993	+0.25	-4.0	20.1	83.2
Jan. 13	13 03.25	-12 36.6	5.871	5.996	+0.15	-3.5	20.0	92.6
Jan. 23	13 04.71	-13 11.2	5.715	6.000	+0.04	-2.9	20.0	102.2
Feb. 2	13 05.10	-13 40.3	5.565	6.004	-0.07	-2.3	19.9	112.0
Feb. 12	13 04.41	-14 03.4	5.426	6.008	-0.17	-1.7	19.9	122.0
Feb. 22	13 02.66	-14 20.2	5.303	6.013	-0.27	-1.0	19.8	132.2
Mar. 3	12 59.96	-14 30.4	5.200	6.018	-0.35	-0.4	19.8	142.6
Mar. 13	12 56.44	-14 34.2	5.121	6.023	-0.41	+0.2	19.7	152.9
Mar. 23	12 52.33	-14 32.2	5.069	6.028	-0.44	+0.7	19.7	162.8
Apr. 2	12 47.92	-14 25.2	5.046	6.034	-0.44	+1.1	19.7	170.5
Apr. 12	12 43.47	-14 14.6	5.053	6.040	-0.42	+1.3	19.7	168.9
Apr. 22	12 39.31	-14 01.9	5.090	6.046	-0.36	+1.3	19.7	160.4
May 2	12 35.68	-13 48.9	5.155	6.053	-0.29	+1.2	19.8	150.5
May 12	12 32.79	-13 37.3	5.246	6.060	-0.20	+0.9	19.8	140.5
May 22	12 30.81	-13 28.5	5.359	6.067	-0.10	+0.5	19.9	130.6
June 1	12 29.82	-13 23.6	5.490	6.075	0.00	0.0	19.9	121.0
June 11	12 29.85	-13 23.6	5.635	6.083	+0.10	-0.5	20.0	111.6
June 21	12 30.90	-13 28.9	5.790	6.091	+0.20	-1.1	20.1	102.4
July 1	12 32.91	-13 39.7	5.951	6.099	+0.29	-1.6	20.1	93.6
July 11	12 35.83	-13 56.1	6.113	6.108	+0.38	-2.2	20.2	84.9
July 21	12 39.59	-14 17.9	6.274	6.117	+0.45	-2.7	20.3	76.5
July 31	12 44.09	-14 44.8	6.429	6.126	+0.52	-3.2	20.3	68.2
Aug. 10	12 49.26	-15 16.3	6.576	6.135	+0.57	-3.6	20.4	60.2
Aug. 20	12 55.00	-15 52.1	6.712	6.145	+0.62	-4.0	20.4	52.2
Aug. 30	13 01.25	-16 31.6	6.835	6.155	+0.67	-4.3	20.5	44.4
Sept. 9	13 07.93	-17 14.5	6.943	6.165	+0.70	-4.6	20.5	36.8
Sept.19	13 14.96	-18 00.2	7.033	6.176	+0.73	-4.8	20.5	29.3
Sept.29	13 22.26	-18 48.3	7.104	6.187	+0.75	-5.0	20.6	22.0
Oct. 9	13 29.77	-19 38.3	7.155	6.198	+0.76	-5.1	20.6	15.4
Oct. 19	13 37.40	-20 29.7	7.185	6.209	+0.77	-5.2	20.6	10.5
Oct. 29	13 45.09	-21 22.2	7.195	6.220	+0.77	-5.3	20.6	10.5
Nov. 8	13 52.75	-22 15.4	7.182	6.232	+0.75	-5.3	20.6	15.4
Nov. 18	14 00.29	-23 08.8	7.148	6.244	+0.73	-5.3	20.6	22.2
Nov. 28	14 07.63	-24 02.1	7.094	6.257	+0.70	-5.3	20.6	29.7
Dec. 8	14 14.66	-24 54.9	7.020	6.269	+0.66	-5.2	20.6	37.6
Dec. 18	14 21.29	-25 47.0	6.928	6.282	+0.61	-5.1	20.6	45.8
Dec. 28	14 27.41	-26 37.9	6.820	6.295	+0.55	-4.9	20.6	54.2
Jan. 7	14 32.90	-27 27.4	6.698	6.308	+0.47	-4.8	20.5	62.7
Jan. 17	14 37.63	-28 15.0	6.566	6.321	+0.39	-4.5	20.5	71.4
Jan. 27	14 41.50	-29 00.4	6.426	6.335	+0.29	-4.3	20.5	80.3
Feb. 6	14 44.39	-29 42.9	6.282	6.349	+0.18	-3.9	20.4	89.4
Feb. 16	14 46.22	-30 22.1	6.139	6.363	+0.07	-3.5	20.4	98.7
Feb. 26	14 46.91	-30 57.3	6.001	6.377	-0.05	-3.0	20.3	108.1
Mar. 8	14 46.43	-31 27.7	5.871	6.392	-0.16	-2.5	20.3	117.6
Mar. 18	14 44.81	-31 52.5	5.756	6.407	-0.27	-1.8	20.3	127.2
Mar. 28	14 42.14	-32 10.9	5.658	6.422	-0.36	-1.1	20.2	136.8

Comet C/2015 YG1 (NEOWISE)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 29.07615 TT
Peri. = 102.79414 e = 0.8801690
Node = 350.50974 2000.0 a = 17.2978612 AU
Incl. = 57.33269 n = 0.01369984
q = 2.0728200 AU P = 71.94 years

m1 = 11.4 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 57.53	+35 48.2	1.917	2.329	-0.63	-3.7	16.5	102.0
Jan. 13	12 51.26	+35 11.4	1.845	2.380	-1.07	-3.1	16.5	110.9
Jan. 23	12 40.54	+34 40.3	1.781	2.435	-1.52	-3.5	16.5	120.7
Feb. 2	12 25.37	+34 04.8	1.732	2.492	-1.90	-5.1	16.6	131.1
Feb. 12	12 06.35	+33 13.6	1.705	2.553	-2.15	-7.7	16.6	141.5
Feb. 22	11 44.89	+31 56.2	1.708	2.615	-2.19	-10.8	16.7	150.7
Mar. 3	11 23.03	+30 08.5	1.745	2.680	-2.02	-13.4	16.9	155.8
Mar. 13	11 02.83	+27 54.2	1.818	2.747	-1.70	-15.2	17.1	154.0
Mar. 23	10 45.84	+25 22.3	1.928	2.815	-1.31	-15.8	17.3	146.8
Apr. 2	10 32.76	+22 44.0	2.069	2.884	-0.92	-15.7	17.6	137.3
Apr. 12	10 23.59	+20 07.3	2.237	2.955	-0.56	-15.0	17.9	127.4
Apr. 22	10 17.98	+17 37.3	2.426	3.027	-0.26	-14.1	18.1	117.7
May 2	10 15.38	+15 15.9	2.631	3.100	-0.01	-13.3	18.4	108.4
May 12	10 15.24	+13 03.1	2.846	3.174	+0.18	-12.5	18.7	99.5
May 22	10 17.09	+10 57.9	3.068	3.248	+0.34	-11.9	19.0	91.1
June 1	10 20.50	+08 59.2	3.292	3.323	+0.46	-11.4	19.2	83.0
June 11	10 25.14	+07 05.5	3.514	3.399	+0.56	-11.0	19.4	75.2
June 21	10 30.74	+05 15.7	3.732	3.475	+0.63	-10.7	19.7	67.6
July 1	10 37.08	+03 28.7	3.943	3.551	+0.69	-10.5	19.9	60.3
July 11	10 43.99	+01 43.9	4.145	3.627	+0.73	-10.3	20.1	53.1
July 21	10 51.32	+00 00.5	4.335	3.703	+0.76	-10.2	20.3	46.1
July 31	10 58.95	-01 42.0	4.511	3.780	+0.78	-10.2	20.4	39.2
Aug. 10	11 06.78	-03 23.9	4.673	3.857	+0.79	-10.2	20.6	32.5
Aug. 20	11 14.71	-05 05.5	4.818	3.933	+0.80	-10.1	20.8	26.0
Aug. 30	11 22.68	-06 46.9	4.945	4.010	+0.79	-10.2	20.9	19.9
Sept. 9	11 30.61	-08 28.5	5.053	4.087	+0.78	-10.2	21.0	14.7
Sept.19	11 38.41	-10 10.1	5.141	4.163	+0.76	-10.2	21.1	11.8
Sept.29	11 46.01	-11 51.8	5.210	4.240	+0.73	-10.2	21.3	13.0
Oct. 9	11 53.33	-13 33.7	5.257	4.316	+0.70	-10.2	21.4	17.6
Oct. 19	12 00.29	-15 15.6	5.285	4.392	+0.65	-10.2	21.4	23.9
Oct. 29	12 06.78	-16 57.4	5.292	4.468	+0.59	-10.2	21.5	30.8
Nov. 8	12 12.70	-18 39.0	5.280	4.544	+0.52	-10.1	21.6	38.2
Nov. 18	12 17.93	-20 20.0	5.251	4.619	+0.44	-10.0	21.6	46.0
Nov. 28	12 22.34	-22 00.1	5.206	4.695	+0.34	-9.9	21.7	54.0
Dec. 8	12 25.78	-23 38.7	5.148	4.770	+0.23	-9.6	21.7	62.3
Dec. 18	12 28.11	-25 15.2	5.079	4.845	+0.11	-9.3	21.8	70.8
Dec. 28	12 29.17	-26 48.5	5.003	4.920	-0.03	-8.9	21.8	79.5
Jan. 7	12 28.83	-28 17.3	4.923	4.994	-0.19	-8.3	21.8	88.4
Jan. 17	12 26.96	-29 39.9	4.845	5.068	-0.34	-7.5	21.9	97.5
Jan. 27	12 23.52	-30 54.5	4.773	5.142	-0.50	-6.4	21.9	106.6
Feb. 6	12 18.53	-31 58.6	4.711	5.216	-0.64	-5.2	21.9	115.7
Feb. 16	12 12.11	-32 50.2	4.666	5.289	-0.76	-3.7	22.0	124.6
Feb. 26	12 04.52	-33 27.2	4.640	5.362	-0.84	-2.1	22.0	132.8
Mar. 8	11 56.14	-33 48.5	4.638	5.435	-0.87	-0.5	22.1	139.9
Mar. 18	11 47.43	-33 53.9	4.662	5.507	-0.85	+0.9	22.1	145.0
Mar. 28	11 38.89	-33 44.7	4.714	5.579	-0.79	+2.2	22.2	147.2

Comet P/2015 W2 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2015 Sept. 30.73858 TT
Peri. = 117.57014 e = 0.6341575
Node = 294.25899 2000.0 a = 7.3198805 AU
Incl. = 11.60765 n = 0.04976776
q = 2.6779234 AU P = 19.80 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 13.44	+31 11.3	1.934	2.790	+0.02	-6.3	19.1	144.1
Jan. 13	04 13.66	+30 08.7	2.039	2.815	+0.27	-5.5	19.3	134.3
Jan. 23	04 16.41	+29 13.6	2.162	2.841	+0.51	-4.6	19.5	124.8
Feb. 2	04 21.50	+28 27.1	2.300	2.869	+0.72	-3.8	19.7	115.8
Feb. 12	04 28.70	+27 49.1	2.449	2.899	+0.90	-3.1	19.9	107.3
Feb. 22	04 37.72	+27 18.4	2.607	2.931	+1.05	-2.5	20.1	99.1
Mar. 3	04 48.26	+26 53.3	2.770	2.965	+1.18	-2.1	20.3	91.4
Mar. 13	05 00.05	+26 31.9	2.937	3.000	+1.28	-1.9	20.5	84.0
Mar. 23	05 12.87	+26 12.6	3.104	3.037	+1.36	-1.9	20.7	76.9
Apr. 2	05 26.47	+25 53.7	3.270	3.075	+1.42	-2.0	20.9	70.0
Apr. 12	05 40.70	+25 33.8	3.432	3.115	+1.47	-2.2	21.1	63.4
Apr. 22	05 55.37	+25 11.9	3.590	3.155	+1.50	-2.5	21.3	56.9
May 2	06 10.34	+24 47.1	3.741	3.197	+1.51	-2.8	21.4	50.6
May 12	06 25.48	+24 18.8	3.885	3.240	+1.52	-3.2	21.6	44.3
May 22	06 40.69	+23 46.6	4.020	3.284	+1.52	-3.6	21.8	38.2
June 1	06 55.86	+23 10.2	4.144	3.329	+1.51	-4.1	21.9	32.1
June 11	07 10.91	+22 29.5	4.257	3.375	+1.48	-4.5	22.1	26.1
June 21	07 25.76	+21 44.6	4.358	3.421	+1.46	-4.9	22.2	20.0
July 1	07 40.34	+20 55.8	4.446	3.468	+1.43	-5.3	22.3	14.0
July 11	07 54.61	+20 03.1	4.520	3.516	+1.39	-5.6	22.5	7.9
July 21	08 08.48	+19 07.1	4.580	3.564	+1.34	-5.9	22.6	2.0
July 31	08 21.93	+18 08.1	4.624	3.613	+1.30	-6.1	22.7	4.7
Aug. 10	08 34.90	+17 06.6	4.653	3.663	+1.24	-6.3	22.8	10.9
Aug. 20	08 47.34	+16 03.2	4.666	3.713	+1.19	-6.5	22.9	17.4
Aug. 30	08 59.19	+14 58.4	4.663	3.763	+1.12	-6.6	23.0	24.0
Sept. 9	09 10.41	+13 52.8	4.644	3.813	+1.05	-6.6	.	30.7
Sept.19	09 20.92	+12 47.1	4.610	3.864	+0.97	-6.5	.	37.7
Sept.29	09 30.66	+11 42.1	4.561	3.915	+0.89	-6.4	.	44.9
Oct. 9	09 39.54	+10 38.5	4.497	3.967	+0.79	-6.1	.	52.3
Oct. 19	09 47.47	+09 37.2	4.422	4.018	+0.69	-5.8	.	60.1
Oct. 29	09 54.36	+08 39.0	4.335	4.070	+0.57	-5.4	.	68.1
Nov. 8	10 00.10	+07 44.9	4.240	4.122	+0.45	-4.9	.	76.4
Nov. 18	10 04.55	+06 55.9	4.140	4.174	+0.31	-4.3	.	85.1
Nov. 28	10 07.63	+06 13.0	4.037	4.226	+0.16	-3.6	.	94.3
Dec. 8	10 09.23	+05 37.1	3.935	4.278	+0.01	-2.8	.	103.8
Dec. 18	10 09.28	+05 09.2	3.840	4.330	-0.15	-1.9	.	113.7
Dec. 28	10 07.79	+04 50.0	3.756	4.382	-0.30	-1.0	.	124.0
Jan. 7	10 04.82	+04 39.7	3.687	4.434	-0.43	-0.1	.	134.7
Jan. 17	10 00.55	+04 38.4	3.640	4.486	-0.53	+0.7	.	145.6
Jan. 27	09 55.27	+04 45.1	3.618	4.539	-0.59	+1.4	.	156.6
Feb. 6	09 49.35	+04 58.7	3.625	4.591	-0.61	+1.8	.	166.9
Feb. 16	09 43.27	+05 17.1	3.662	4.643	-0.58	+2.1	.	172.0
Feb. 26	09 37.46	+05 38.3	3.731	4.694	-0.51	+2.2	.	165.1
Mar. 8	09 32.34	+05 59.9	3.829	4.746	-0.41	+2.0	.	154.8
Mar. 18	09 28.25	+06 19.9	3.955	4.798	-0.29	+1.7	.	144.2
Mar. 28	09 25.39	+06 36.8	4.105	4.850	-0.15	+1.2	.	133.8

Comet 61P/Shajn-Schaldachh

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 2.17843 TT
Peri. = 221.93274 e = 0.4254517
Node = 163.01696 2000.0 a = 3.6795495 AU
Incl. = 6.00601 n = 0.13964073
q = 2.1140789 AU P = 7.06 years

m1 = 12.0 + 5 log(Delta) + 10.0 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	02 21.93	+05 47.6	1.652	2.230	+0.87	+7.0	16.4	113.1
Jan. 13	02 30.66	+06 57.6	1.783	2.254	+1.06	+7.7	16.6	105.4
Jan. 23	02 41.26	+08 14.2	1.921	2.281	+1.22	+8.0	16.8	98.3
Feb. 2	02 53.43	+09 34.1	2.064	2.310	+1.35	+8.1	17.0	91.4
Feb. 12	03 06.92	+10 54.6	2.211	2.340	+1.46	+7.9	17.2	84.9
Feb. 22	03 21.52	+12 13.7	2.358	2.372	+1.55	+7.6	17.3	78.7
Mar. 3	03 37.03	+13 29.3	2.506	2.405	+1.63	+7.1	17.5	72.7
Mar. 13	03 53.29	+14 40.0	2.653	2.439	+1.69	+6.4	17.7	66.8
Mar. 23	04 10.16	+15 44.5	2.798	2.475	+1.73	+5.7	17.9	61.1
Apr. 2	04 27.49	+16 41.8	2.939	2.512	+1.77	+4.9	18.0	55.5
Apr. 12	04 45.20	+17 31.1	3.075	2.550	+1.80	+4.1	18.2	50.0
Apr. 22	05 03.15	+18 11.9	3.206	2.588	+1.81	+3.2	18.3	44.6
May 2	05 21.25	+18 43.9	3.330	2.627	+1.82	+2.3	18.5	39.2
May 12	05 39.41	+19 06.8	3.446	2.667	+1.81	+1.4	18.6	33.9
May 22	05 57.53	+19 20.8	3.553	2.708	+1.80	+0.5	18.8	28.6
June 1	06 15.52	+19 25.9	3.651	2.748	+1.78	−0.3	18.9	23.3
June 11	06 33.33	+19 22.5	3.738	2.790	+1.75	−1.1	19.0	18.0
June 21	06 50.86	+19 11.0	3.814	2.831	+1.72	−1.9	19.1	12.7
July 1	07 08.05	+18 52.0	3.877	2.873	+1.68	−2.6	19.2	7.6
July 11	07 24.85	+18 25.9	3.929	2.915	+1.63	−3.2	19.3	3.7
July 21	07 41.20	+17 53.7	3.967	2.957	+1.58	−3.8	19.4	5.6
July 31	07 57.05	+17 15.9	3.991	2.999	+1.53	−4.2	19.5	10.7
Aug. 10	08 12.34	+16 33.4	4.001	3.041	+1.47	−4.6	19.5	16.3
Aug. 20	08 27.03	+15 47.1	3.997	3.083	+1.40	−4.9	19.6	22.2
Aug. 30	08 41.07	+14 57.8	3.978	3.125	+1.33	−5.1	19.6	28.3
Sept. 9	08 54.40	+14 06.7	3.944	3.167	+1.25	−5.2	19.7	34.6
Sept.19	09 06.95	+13 14.6	3.897	3.209	+1.17	−5.2	19.7	41.1
Sept.29	09 18.65	+12 22.7	3.836	3.251	+1.08	−5.1	19.7	47.9
Oct. 9	09 29.42	+11 32.1	3.762	3.292	+0.97	−4.8	19.8	55.0
Oct. 19	09 39.14	+10 44.2	3.677	3.333	+0.86	−4.4	19.8	62.3
Oct. 29	09 47.73	+10 00.0	3.581	3.374	+0.73	−3.9	19.8	70.1
Nov. 8	09 55.02	+09 21.2	3.478	3.415	+0.59	−3.2	19.8	78.1
Nov. 18	10 00.87	+08 49.1	3.369	3.455	+0.43	−2.4	19.8	86.7
Nov. 28	10 05.15	+08 25.3	3.258	3.495	+0.25	−1.4	19.7	95.6
Dec. 8	10 07.68	+08 11.0	3.149	3.535	+0.07	−0.3	19.7	105.1
Dec. 18	10 08.36	+08 07.6	3.045	3.575	−0.12	+0.8	19.7	115.0
Dec. 28	10 07.11	+08 15.7	2.952	3.614	−0.31	+2.0	19.7	125.5
Jan. 7	10 03.98	+08 35.6	2.875	3.652	−0.48	+3.1	19.7	136.6
Jan. 17	09 59.15	+09 06.3	2.819	3.690	−0.62	+4.0	19.7	148.0
Jan. 27	09 52.95	+09 45.8	2.789	3.728	−0.71	+4.5	19.7	159.8
Feb. 6	09 45.88	+10 31.3	2.788	3.766	−0.73	+4.8	19.8	171.5
Feb. 16	09 38.57	+11 19.0	2.817	3.803	−0.69	+4.6	19.8	175.2
Feb. 26	09 31.65	+12 05.3	2.879	3.839	−0.60	+4.2	19.9	163.8
Mar. 8	09 25.69	+12 47.0	2.969	3.875	−0.46	+3.5	20.0	152.3
Mar. 18	09 21.12	+13 21.8	3.086	3.911	−0.29	+2.7	20.2	141.1
Mar. 28	09 18.19	+13 48.5	3.226	3.946	−0.12	+1.8	20.3	130.4

Comet C/2013 V4 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 7.66237 TT
Peri. = 40.45649
Node = 55.62803 2000.0
Incl. = 67.85926
q = 5.1855162 AU
e = 1.0021371

m1 = 7.2 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 14.70	+74 40.8	4.650	5.227	-1.65	-2.4	15.9	121.2
Jan. 13	02 58.23	+74 16.8	4.726	5.237	-1.05	-3.1	16.0	116.4
Jan. 23	02 47.71	+73 45.7	4.816	5.249	-0.49	-3.1	16.0	110.9
Feb. 2	02 42.77	+73 14.3	4.916	5.261	0.00	-2.7	16.1	105.2
Feb. 12	02 42.73	+72 47.0	5.024	5.274	+0.42	-2.0	16.1	99.3
Feb. 22	02 46.90	+72 26.8	5.136	5.288	+0.77	-1.2	16.2	93.4
Mar. 3	02 54.65	+72 14.9	5.249	5.303	+1.09	-0.3	16.2	87.7
Mar. 13	03 05.55	+72 11.6	5.361	5.320	+1.38	+0.5	16.3	82.3
Mar. 23	03 19.31	+72 16.6	5.470	5.337	+1.64	+1.2	16.3	77.1
Apr. 2	03 35.72	+72 28.7	5.573	5.355	+1.90	+1.8	16.4	72.4
Apr. 12	03 54.71	+72 46.6	5.669	5.374	+2.15	+2.2	16.4	68.0
Apr. 22	04 16.24	+73 08.6	5.757	5.395	+2.41	+2.4	16.5	64.1
May 2	04 40.33	+73 32.9	5.837	5.416	+2.67	+2.4	16.5	60.7
May 12	05 06.98	+73 57.3	5.907	5.438	+2.91	+2.3	16.6	57.9
May 22	05 36.12	+74 19.8	5.968	5.461	+3.15	+1.8	16.6	55.6
June 1	06 07.60	+74 38.2	6.020	5.484	+3.35	+1.2	16.6	54.0
June 11	06 41.13	+74 50.4	6.062	5.509	+3.51	+0.4	16.7	52.9
June 21	07 16.18	+74 54.9	6.095	5.535	+3.60	-0.5	16.7	52.4
July 1	07 52.14	+74 50.2	6.120	5.561	+3.61	-1.4	16.7	52.6
July 11	08 28.28	+74 36.0	6.137	5.588	+3.56	-2.4	16.7	53.2
July 21	09 03.87	+74 12.3	6.147	5.616	+3.45	-3.2	16.8	54.4
July 31	09 38.33	+73 39.8	6.151	5.645	+3.29	-4.0	16.8	56.0
Aug. 10	10 11.26	+72 59.9	6.148	5.675	+3.11	-4.6	16.8	57.9
Aug. 20	10 42.39	+72 14.4	6.141	5.705	+2.93	-4.9	16.8	60.2
Aug. 30	11 11.68	+71 24.9	6.129	5.737	+2.75	-5.1	16.8	62.7
Sept. 9	11 39.15	+70 33.5	6.114	5.768	+2.57	-5.2	16.8	65.4
Sept.19	12 04.89	+69 42.0	6.097	5.801	+2.42	-5.0	16.9	68.3
Sept.29	12 29.05	+68 52.0	6.078	5.834	+2.27	-4.7	16.9	71.3
Oct. 9	12 51.74	+68 05.5	6.058	5.868	+2.13	-4.2	16.9	74.4
Oct. 19	13 13.07	+67 23.8	6.038	5.903	+2.01	-3.6	16.9	77.5
Oct. 29	13 33.13	+66 48.3	6.019	5.938	+1.88	-2.8	16.9	80.6
Nov. 8	13 51.97	+66 20.3	6.001	5.974	+1.76	-2.0	16.9	83.7
Nov. 18	14 09.59	+66 00.5	5.986	6.011	+1.64	-1.1	16.9	86.7
Nov. 28	14 25.99	+65 49.9	5.973	6.048	+1.51	-0.1	16.9	89.6
Dec. 8	14 41.10	+65 48.9	5.965	6.085	+1.37	+0.9	17.0	92.4
Dec. 18	14 54.82	+65 57.7	5.960	6.124	+1.22	+1.8	17.0	94.9
Dec. 28	15 07.00	+66 16.1	5.961	6.162	+1.05	+2.7	17.0	97.2
Jan. 7	15 17.45	+66 43.5	5.968	6.202	+0.85	+3.6	17.0	99.2
Jan. 17	15 25.93	+67 19.1	5.981	6.242	+0.62	+4.2	17.0	100.9
Jan. 27	15 32.17	+68 01.3	6.000	6.282	+0.37	+4.7	17.1	102.2
Feb. 6	15 35.83	+68 48.3	6.027	6.323	+0.07	+4.9	17.1	103.0
Feb. 16	15 36.57	+69 37.4	6.061	6.364	-0.25	+4.8	17.1	103.5
Feb. 26	15 34.08	+70 25.8	6.102	6.406	-0.60	+4.4	17.2	103.5
Mar. 8	15 28.13	+71 09.7	6.152	6.448	-0.94	+3.5	17.2	103.0
Mar. 18	15 18.74	+71 45.1	6.209	6.491	-1.25	+2.3	17.3	102.1
Mar. 28	15 06.25	+72 08.2	6.273	6.534	-1.48	+0.7	17.3	100.8

Comet 151P/Helin

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 7.99771 TT
Peri. = 216.24409 e = 0.5719447
Node = 143.15390 2000.0 a = 5.7786106 AU
Incl. = 4.71956 n = 0.07095270
q = 2.4735649 AU P = 13.89 years

m1 = 4.4 + 5 log(Delta) + 30.0 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 21.24	-02 23.4	2.518	2.575	+1.32	+9.1	18.3	82.1
Jan. 13	00 34.41	-00 52.1	2.662	2.599	+1.39	+9.5	18.5	75.6
Jan. 23	00 48.34	+00 43.0	2.806	2.624	+1.45	+9.7	18.7	69.3
Feb. 2	01 02.88	+02 20.2	2.948	2.652	+1.50	+9.8	18.9	63.1
Feb. 12	01 17.92	+03 58.0	3.087	2.682	+1.55	+9.7	19.1	57.1
Feb. 22	01 33.37	+05 35.2	3.222	2.714	+1.58	+9.5	19.3	51.2
Mar. 3	01 49.14	+07 10.4	3.351	2.747	+1.60	+9.2	19.5	45.4
Mar. 13	02 05.18	+08 42.6	3.474	2.783	+1.62	+8.8	19.7	39.7
Mar. 23	02 21.41	+10 10.9	3.589	2.819	+1.64	+8.3	19.9	34.1
Apr. 2	02 37.78	+11 34.4	3.696	2.857	+1.65	+7.8	20.1	28.5
Apr. 12	02 54.25	+12 52.4	3.794	2.897	+1.65	+7.2	20.3	22.9
Apr. 22	03 10.74	+14 04.3	3.881	2.937	+1.65	+6.5	20.5	17.4
May 2	03 27.21	+15 09.6	3.957	2.979	+1.64	+5.8	20.7	12.0
May 12	03 43.61	+16 08.1	4.022	3.021	+1.63	+5.1	20.9	6.8
May 22	03 59.87	+16 59.4	4.075	3.065	+1.60	+4.4	21.1	3.5
June 1	04 15.92	+17 43.4	4.115	3.110	+1.58	+3.7	21.3	6.5
June 11	04 31.69	+18 20.2	4.142	3.155	+1.54	+3.0	21.5	11.8
June 21	04 47.11	+18 49.9	4.156	3.201	+1.50	+2.3	21.7	17.4
July 1	05 02.10	+19 12.7	4.156	3.247	+1.45	+1.6	21.9	23.3
July 11	05 16.58	+19 29.0	4.143	3.294	+1.39	+1.0	22.1	29.4
July 21	05 30.44	+19 39.1	4.116	3.342	+1.32	+0.5	22.3	35.6
July 31	05 43.60	+19 43.8	4.076	3.390	+1.23	0.0	22.4	42.0
Aug. 10	05 55.94	+19 43.5	4.023	3.438	+1.14	-0.4	22.6	48.6
Aug. 20	06 07.34	+19 39.0	3.958	3.487	+1.04	-0.8	22.7	55.5
Aug. 30	06 17.70	+19 31.2	3.883	3.536	+0.92	-1.0	22.9	62.7
Sept. 9	06 26.85	+19 21.0	3.799	3.585	+0.78	-1.2	23.0	70.2
Sept.19	06 34.67	+19 09.4	3.707	3.635	+0.63	-1.2	.	78.1
Sept.29	06 41.00	+18 57.2	3.610	3.684	+0.47	-1.2	.	86.3
Oct. 9	06 45.68	+18 45.6	3.511	3.734	+0.29	-1.0	.	95.1
Oct. 19	06 48.59	+18 35.5	3.414	3.784	+0.10	-0.8	.	104.2
Oct. 29	06 49.61	+18 27.8	3.322	3.834	-0.09	-0.5	.	113.9
Nov. 8	06 48.68	+18 23.0	3.241	3.884	-0.28	-0.1	.	124.1
Nov. 18	06 45.88	+18 21.6	3.175	3.934	-0.45	+0.2	.	134.7
Nov. 28	06 41.36	+18 23.6	3.128	3.983	-0.59	+0.5	.	145.8
Dec. 8	06 35.46	+18 28.6	3.107	4.033	-0.68	+0.8	.	157.2
Dec. 18	06 28.66	+18 36.2	3.114	4.083	-0.71	+0.9	.	168.5
Dec. 28	06 21.52	+18 45.5	3.152	4.133	-0.69	+1.1	.	175.2
Jan. 7	06 14.67	+18 56.2	3.221	4.182	-0.60	+1.1	.	166.1
Jan. 17	06 08.67	+19 07.7	3.320	4.232	-0.47	+1.2	.	154.9
Jan. 27	06 03.92	+19 19.7	3.447	4.281	-0.32	+1.2	.	143.7
Feb. 6	06 00.74	+19 32.0	3.598	4.330	-0.15	+1.2	.	132.9
Feb. 16	05 59.23	+19 44.4	3.769	4.379	+0.02	+1.2	.	122.5
Feb. 26	05 59.41	+19 56.5	3.954	4.428	+0.18	+1.2	.	112.5
Mar. 8	06 01.19	+20 08.2	4.150	4.477	+0.32	+1.1	.	102.9
Mar. 18	06 04.44	+20 18.8	4.351	4.525	+0.45	+0.9	.	93.7
Mar. 28	06 08.98	+20 28.2	4.554	4.573	+0.57	+0.8	.	84.8

Comet P/2001 H5 (NEAT)

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 21.76942 TT
Peri. = 224.74248 e = 0.6000894
Node = 328.69117 2000.0 a = 6.0909876 AU
Incl. = 8.38135 n = 0.06556507
q = 2.4358505 AU P = 15.03 years

m1 = 4.6 + 5 log(Delta) + 30.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ °	Elong. °
Jan. 3	15 18.66	-24 54.1	3.058	2.514	-0.98	+4.0	19.0	26.5/110	48.3
Jan. 13	15 37.19	-26 19.3	2.985	2.536	-1.00	+3.5	19.1	25.1/109	54.1
Jan. 23	15 55.09	-27 36.0	2.907	2.561	-1.01	+2.9	19.2	23.6/108	60.0
Feb. 2	16 12.16	-28 44.4	2.823	2.588	-1.03	+2.4	19.2	21.8/107	66.2
Feb. 12	16 28.15	-29 45.2	2.736	2.617	-1.06	+1.8	19.3	19.7/107	72.6
Feb. 22	16 42.79	-30 39.1	2.646	2.648	-1.08	+1.3	19.4	17.4/107	79.4
Mar. 3	16 55.82	-31 27.2	2.553	2.682	-1.11	+0.8	19.5	14.8/108	86.5
Mar. 13	17 06.94	-32 10.4	2.461	2.717	-1.14	+0.4	19.6	11.9/110	93.9
Mar. 23	17 15.84	-32 49.4	2.371	2.754	-1.18	0.0	19.7	8.8/114	101.8
Apr. 2	17 22.26	-33 24.9	2.286	2.792	-1.22	-0.4	19.8	5.6/125	110.1
Apr. 12	17 25.95	-33 56.7	2.208	2.832	-1.28	-0.6	19.9	2.9/159	118.9
Apr. 22	17 26.80	-34 23.9	2.141	2.874	-1.33	-0.7	20.0	3.2/229	128.2
May 2	17 24.84	-34 44.9	2.090	2.916	-1.39	-0.7	20.1	5.7/257	137.8
May 12	17 20.34	-34 57.5	2.056	2.960	-1.44	-0.5	20.3	8.0/268	147.8
May 22	17 13.87	-34 59.5	2.045	3.005	-1.48	-0.2	20.5	9.4/275	157.5
June 1	17 06.24	-34 49.8	2.058	3.051	-1.49	+0.2	20.7	9.9/282	165.7
June 11	16 58.40	-34 28.6	2.098	3.098	-1.47	+0.7	20.9	9.3/289	167.8
June 21	16 51.31	-33 58.2	2.164	3.145	-1.43	+1.0	21.2	7.9/297	161.8
July 1	16 45.69	-33 22.0	2.256	3.194	-1.36	+1.3	21.5	6.0/310	152.8
July 11	16 42.04	-32 43.7	2.371	3.243	-1.28	+1.5	21.8	4.2/334	143.2
July 21	16 40.58	-32 06.5	2.507	3.292	-1.20	+1.5	22.1	3.5/ 16	133.8
July 31	16 41.32	-31 32.5	2.660	3.342	-1.12	+1.4	22.4	4.7/ 51	124.6
Aug. 10	16 44.14	-31 02.9	2.827	3.393	-1.04	+1.2	22.8	6.6/ 68	115.7
Aug. 20	16 48.85	-30 37.9	3.005	3.443	-0.96	+1.0	.	8.5/ 76	107.2
Aug. 30	16 55.20	-30 17.2	3.191	3.495	-0.90	+0.8	.	10.3/ 81	99.0
Sept. 9	17 03.00	-30 00.0	3.381	3.546	-0.83	+0.6	.	11.8/ 83	91.1
Sept.19	17 12.01	-29 45.4	3.573	3.598	-0.78	+0.4	.	13.1/ 85	83.3
Sept.29	17 22.04	-29 32.3	3.765	3.649	-0.72	+0.1	.	14.3/ 86	75.7
Oct. 9	17 32.93	-29 19.8	3.953	3.701	-0.68	-0.1	.	15.2/ 86	68.3
Oct. 19	17 44.51	-29 07.1	4.135	3.754	-0.64	-0.3	.	16.0/ 86	61.0
Oct. 29	17 56.62	-28 53.3	4.309	3.806	-0.60	-0.4	.	16.5/ 85	53.7
Nov. 8	18 09.15	-28 37.9	4.473	3.858	-0.56	-0.6	.	17.0/ 85	46.5
Nov. 18	18 21.97	-28 20.4	4.625	3.910	-0.53	-0.8	.	17.3/ 84	39.3
Nov. 28	18 34.95	-28 00.5	4.763	3.963	-0.50	-0.9	.	17.5/ 83	32.1
Dec. 8	18 48.00	-27 38.1	4.886	4.015	-0.47	-1.0	.	17.5/ 83	25.0
Dec. 18	19 01.01	-27 12.9	4.992	4.067	-0.44	-1.2	.	17.4/ 82	17.9
Dec. 28	19 13.89	-26 45.3	5.081	4.119	-0.42	-1.3	.	17.2/ 81	10.9
Jan. 7	19 26.55	-26 15.3	5.150	4.171	-0.39	-1.3	.	16.9/ 80	5.1
Jan. 17	19 38.88	-25 43.3	5.200	4.223	-0.37	-1.4	.	16.5/ 79	6.2
Jan. 27	19 50.82	-25 09.8	5.230	4.275	-0.36	-1.5	.	16.0/ 78	12.7
Feb. 6	20 02.28	-24 35.2	5.241	4.327	-0.34	-1.6	.	15.3/ 77	19.9
Feb. 16	20 13.17	-24 00.1	5.232	4.378	-0.32	-1.6	.	14.5/ 77	27.4
Feb. 26	20 23.43	-23 25.2	5.205	4.429	-0.31	-1.7	.	13.6/ 76	34.9
Mar. 8	20 32.96	-22 51.3	5.160	4.481	-0.30	-1.7	.	12.5/ 75	42.6
Mar. 18	20 41.68	-22 18.9	5.099	4.531	-0.29	-1.8	.	11.3/ 75	50.5
Mar. 28	20 49.52	-21 48.9	5.024	4.582	-0.28	-1.8	.	9.9/ 75	58.5

Comet 318P/McNaught-Hartley

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 22.41341 TT
Peri. = 313.20466 e = 0.6740862
Node = 35.72430 2000.0 a = 7.5112634 AU
Incl. = 17.86992 n = 0.04787784
q = 2.4480244 AU P = 20.59 years

m1 = 7.4 + 5 log(Delta) + 17.5 log(r(t+50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	23 40.92	-09 11.0	2.690	2.533	+1.37	+15.8	17.0	70.3
Jan. 13	23 54.62	-06 33.3	2.826	2.558	+1.42	+15.5	17.3	64.3
Jan. 23	00 08.82	-03 57.8	2.961	2.585	+1.46	+15.2	17.5	58.4
Feb. 2	00 23.40	-01 25.4	3.094	2.614	+1.49	+14.9	17.7	52.6
Feb. 12	00 38.30	+01 03.7	3.222	2.647	+1.51	+14.5	17.9	46.8
Feb. 22	00 53.45	+03 28.8	3.346	2.681	+1.53	+14.1	18.1	41.1
Mar. 3	01 08.78	+05 49.4	3.463	2.718	+1.55	+13.6	18.3	35.5
Mar. 13	01 24.27	+08 05.1	3.573	2.756	+1.56	+13.0	18.5	29.9
Mar. 23	01 39.87	+10 15.5	3.675	2.797	+1.57	+12.5	18.6	24.3
Apr. 2	01 55.54	+12 20.3	3.767	2.839	+1.57	+11.9	18.8	18.7
Apr. 12	02 11.26	+14 19.1	3.850	2.883	+1.57	+11.3	19.0	13.2
Apr. 22	02 26.97	+16 11.8	3.921	2.928	+1.57	+10.6	19.1	7.7
May 2	02 42.65	+17 58.1	3.981	2.975	+1.56	+10.0	19.3	2.9
May 12	02 58.25	+19 38.1	4.029	3.023	+1.55	+9.4	19.5	4.5
May 22	03 13.70	+21 11.6	4.065	3.073	+1.53	+8.7	19.6	9.9
June 1	03 28.96	+22 38.8	4.088	3.123	+1.50	+8.1	19.7	15.6
June 11	03 43.96	+23 60.0	4.097	3.174	+1.46	+7.5	19.9	21.5
June 21	03 58.61	+25 15.3	4.093	3.226	+1.42	+7.0	20.0	27.5
July 1	04 12.83	+26 25.2	4.077	3.279	+1.37	+6.5	20.1	33.6
July 11	04 26.51	+27 30.3	4.047	3.333	+1.30	+6.1	20.2	40.0
July 21	04 39.54	+28 31.0	4.005	3.387	+1.23	+5.7	20.3	46.5
July 31	04 51.80	+29 28.2	3.952	3.441	+1.13	+5.4	20.4	53.2
Aug. 10	05 03.13	+30 22.7	3.888	3.497	+1.02	+5.2	20.4	60.2
Aug. 20	05 13.37	+31 15.2	3.814	3.552	+0.90	+5.1	20.5	67.5
Aug. 30	05 22.35	+32 06.6	3.734	3.608	+0.75	+5.1	20.6	75.1
Sept. 9	05 29.86	+32 57.6	3.648	3.664	+0.58	+5.1	20.6	83.0
Sept.19	05 35.71	+33 48.9	3.559	3.721	+0.40	+5.2	20.7	91.4
Sept.29	05 39.68	+34 40.7	3.471	3.778	+0.19	+5.2	20.8	100.1
Oct. 9	05 41.57	+35 32.7	3.387	3.834	-0.03	+5.1	20.8	109.3
Oct. 19	05 41.26	+36 24.0	3.312	3.892	-0.26	+4.9	20.9	118.8
Oct. 29	05 38.70	+37 13.1	3.250	3.949	-0.47	+4.4	20.9	128.7
Nov. 8	05 33.96	+37 57.6	3.207	4.006	-0.66	+3.7	21.0	138.8
Nov. 18	05 27.35	+38 34.6	3.185	4.063	-0.80	+2.7	21.1	148.8
Nov. 28	05 19.38	+39 01.8	3.191	4.120	-0.87	+1.6	21.2	157.7
Dec. 8	05 10.73	+39 17.5	3.225	4.178	-0.85	+0.4	21.3	163.3
Dec. 18	05 02.19	+39 21.4	3.289	4.235	-0.77	-0.6	21.5	161.8
Dec. 28	04 54.47	+39 14.9	3.383	4.292	-0.63	-1.4	21.6	154.5
Jan. 7	04 48.20	+39 00.5	3.505	4.349	-0.44	-1.9	21.8	145.2
Jan. 17	04 43.76	+38 41.4	3.652	4.406	-0.24	-2.1	22.0	135.3
Jan. 27	04 41.31	+38 20.4	3.820	4.463	-0.04	-2.1	22.1	125.4
Feb. 6	04 40.89	+37 59.7	4.004	4.520	+0.15	-1.9	22.3	115.7
Feb. 16	04 42.37	+37 41.0	4.200	4.577	+0.32	-1.6	22.5	106.3
Feb. 26	04 45.58	+37 25.0	4.404	4.633	+0.48	-1.3	22.7	97.2
Mar. 8	04 50.33	+37 12.2	4.611	4.689	+0.61	-1.0	22.9	88.4
Mar. 18	04 56.40	+37 02.3	4.817	4.746	+0.72	-0.7	.	79.9
Mar. 28	05 03.60	+36 54.9	5.020	4.802	+0.81	-0.5	.	71.7

Comet 326P/Hill

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 22.52333 TT
Peri. = 278.80126 e = 0.3170579
Node = 99.81240 2000.0 a = 4.0698498 AU
Incl. = 2.47054 n = 0.12004290
q = 2.7794718 AU P = 8.21 years

m1 = 7.8 + 5 log(Delta) + 22.5 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	01 01.77	+03 57.6	2.567	2.811	+0.88	+6.5	19.9	93.9
Jan. 13	01 10.56	+05 02.9	2.709	2.820	+1.01	+7.2	20.0	86.2
Jan. 23	01 20.69	+06 14.4	2.852	2.830	+1.13	+7.6	20.1	78.8
Feb. 2	01 31.95	+07 30.4	2.992	2.842	+1.22	+7.9	20.3	71.7
Feb. 12	01 44.20	+08 49.4	3.130	2.854	+1.31	+8.0	20.4	64.9
Feb. 22	01 57.28	+10 09.8	3.261	2.868	+1.38	+8.1	20.5	58.3
Mar. 3	02 11.08	+11 30.4	3.386	2.882	+1.44	+8.0	20.7	51.9
Mar. 13	02 25.49	+12 49.9	3.504	2.897	+1.49	+7.7	20.8	45.6
Mar. 23	02 40.43	+14 07.3	3.612	2.914	+1.54	+7.4	20.9	39.6
Apr. 2	02 55.80	+15 21.6	3.711	2.931	+1.57	+7.0	21.0	33.6
Apr. 12	03 11.55	+16 31.8	3.799	2.949	+1.60	+6.5	21.1	27.7
Apr. 22	03 27.60	+17 37.2	3.877	2.968	+1.63	+6.0	21.2	21.9
May 2	03 43.87	+18 37.3	3.942	2.988	+1.64	+5.4	21.3	16.2
May 12	04 00.31	+19 31.3	3.996	3.008	+1.65	+4.8	21.4	10.5
May 22	04 16.84	+20 19.1	4.037	3.029	+1.65	+4.1	21.5	4.9
June 1	04 33.39	+21 00.1	4.065	3.051	+1.65	+3.4	21.5	1.3
June 11	04 49.88	+21 34.4	4.080	3.073	+1.63	+2.7	21.6	6.6
June 21	05 06.23	+22 01.8	4.082	3.096	+1.61	+2.1	21.7	12.3
July 1	05 22.35	+22 22.5	4.071	3.120	+1.58	+1.4	21.7	18.1
July 11	05 38.17	+22 36.7	4.046	3.144	+1.54	+0.8	21.8	24.0
July 21	05 53.58	+22 44.8	4.009	3.169	+1.49	+0.2	21.9	29.9
July 31	06 08.48	+22 47.2	3.958	3.194	+1.43	-0.3	21.9	36.0
Aug. 10	06 22.77	+22 44.7	3.896	3.219	+1.36	-0.7	21.9	42.3
Aug. 20	06 36.34	+22 37.9	3.821	3.245	+1.27	-1.0	22.0	48.8
Aug. 30	06 49.07	+22 27.8	3.736	3.272	+1.17	-1.2	22.0	55.5
Sept. 9	07 00.81	+22 15.3	3.640	3.298	+1.06	-1.4	22.0	62.5
Sept.19	07 11.43	+22 01.6	3.536	3.325	+0.93	-1.4	22.0	69.7
Sept.29	07 20.78	+21 47.9	3.426	3.352	+0.79	-1.2	22.1	77.4
Oct. 9	07 28.67	+21 35.5	3.310	3.380	+0.62	-1.0	22.1	85.4
Oct. 19	07 34.92	+21 25.6	3.193	3.407	+0.44	-0.6	22.1	93.8
Oct. 29	07 39.35	+21 19.4	3.077	3.435	+0.24	-0.1	22.1	102.7
Nov. 8	07 41.78	+21 18.0	2.965	3.463	+0.03	+0.4	22.1	112.2
Nov. 18	07 42.10	+21 22.0	2.863	3.491	-0.18	+1.0	22.1	122.2
Nov. 28	07 40.26	+21 31.6	2.774	3.519	-0.39	+1.5	22.1	132.7
Dec. 8	07 36.33	+21 46.1	2.704	3.548	-0.57	+1.8	22.1	143.8
Dec. 18	07 30.62	+22 04.3	2.658	3.576	-0.70	+2.0	22.1	155.3
Dec. 28	07 23.57	+22 24.4	2.639	3.604	-0.77	+2.0	22.2	167.2
Jan. 7	07 15.84	+22 44.2	2.650	3.633	-0.76	+1.8	22.3	179.1
Jan. 17	07 08.20	+23 02.0	2.691	3.661	-0.68	+1.5	22.4	168.8
Jan. 27	07 01.36	+23 16.8	2.763	3.690	-0.55	+1.1	22.5	157.1
Feb. 6	06 55.90	+23 28.0	2.862	3.718	-0.37	+0.8	22.7	145.6
Feb. 16	06 52.25	+23 35.7	2.986	3.747	-0.17	+0.4	22.9	134.7
Feb. 26	06 50.58	+23 40.1	3.129	3.775	+0.03	+0.2	23.0	124.2
Mar. 8	06 50.91	+23 41.7	3.286	3.804	+0.22	-0.1	.	114.3
Mar. 18	06 53.15	+23 40.6	3.455	3.832	+0.40	-0.4	.	104.8
Mar. 28	06 57.11	+23 36.8	3.629	3.860	+0.55	-0.7	.	95.8

Comet C/2015 X8 (NEOWISE)

Epoch = 2016 July 31.0 TT
T = 2015 Oct. 23.15050 TT
Peri. = 20.42299 e = 0.9395991
Node = 191.10599 2000.0 a = 19.7116897 AU
Incl. = 155.28117 n = 0.01126207
q = 1.1906038 AU P = 87.52 years

m1 = 12.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	10 38.28	+67 57.5	0.829	1.597	-28.16	+36.1	14.6	123.4
Jan. 13	05 56.69	+73 58.5	0.916	1.693	-13.58	-65.7	15.2	126.0
Jan. 23	03 40.85	+63 01.8	1.119	1.793	-3.34	-55.8	16.0	116.8
Feb. 2	03 07.44	+53 43.7	1.385	1.895	-0.98	-37.3	16.9	104.9
Feb. 12	02 57.59	+47 30.3	1.681	1.999	-0.15	-24.8	17.6	93.4
Feb. 22	02 56.05	+43 22.6	1.985	2.105	+0.23	-16.7	18.3	82.8
Mar. 3	02 58.31	+40 35.6	2.287	2.211	+0.43	-11.4	19.0	73.0
Mar. 13	03 02.63	+38 41.6	2.580	2.317	+0.55	-7.8	19.5	63.7
Mar. 23	03 08.13	+37 23.5	2.856	2.423	+0.62	-5.3	20.0	54.8
Apr. 2	03 14.33	+36 30.5	3.113	2.529	+0.66	-3.5	20.5	46.4
Apr. 12	03 20.95	+35 55.5	3.347	2.635	+0.68	-2.2	20.9	38.3
Apr. 22	03 27.74	+35 33.9	3.556	2.740	+0.68	-1.2	21.3	30.7
May 2	03 34.53	+35 22.2	3.738	2.845	+0.67	-0.4	21.7	23.7
May 12	03 41.21	+35 18.2	3.892	2.949	+0.64	+0.2	22.0	18.0
May 22	03 47.61	+35 20.1	4.018	3.052	+0.60	+0.7	22.3	15.1
June 1	03 53.62	+35 26.8	4.114	3.154	+0.55	+1.0	22.6	16.3
June 11	03 59.09	+35 37.2	4.182	3.256	+0.48	+1.4	22.8	21.2
June 21	04 03.87	+35 50.8	4.221	3.356	+0.39	+1.6	23.0	27.8
July 1	04 07.79	+36 07.0	4.234	3.456	+0.29	+1.8	.	35.4
July 11	04 10.68	+36 25.2	4.222	3.555	+0.16	+2.0	.	43.6
July 21	04 12.31	+36 45.0	4.187	3.654	+0.01	+2.1	.	52.2
July 31	04 12.46	+37 05.7	4.133	3.751	-0.16	+2.1	.	61.2
Aug. 10	04 10.87	+37 26.3	4.063	3.848	-0.36	+1.9	.	70.7
Aug. 20	04 07.26	+37 45.4	3.982	3.944	-0.58	+1.6	.	80.5
Aug. 30	04 01.42	+38 00.9	3.896	4.039	-0.83	+0.9	.	90.8
Sept. 9	03 53.13	+38 10.1	3.810	4.133	-1.08	-0.1	.	101.6
Sept.19	03 42.37	+38 09.3	3.734	4.226	-1.31	-1.5	.	112.9
Sept.29	03 29.29	+37 54.8	3.673	4.319	-1.50	-3.2	.	124.4
Oct. 9	03 14.31	+37 22.8	3.636	4.411	-1.62	-5.2	.	136.2
Oct. 19	02 58.16	+36 31.3	3.630	4.503	-1.64	-7.1	.	147.5
Oct. 29	02 41.74	+35 20.6	3.661	4.593	-1.57	-8.7	.	157.2
Nov. 8	02 26.03	+33 53.8	3.732	4.683	-1.42	-9.7	.	161.6
Nov. 18	02 11.84	+32 16.8	3.845	4.772	-1.21	-10.1	.	157.4
Nov. 28	01 59.72	+30 36.2	3.995	4.861	-0.98	-9.8	.	148.1
Dec. 8	01 49.93	+28 58.4	4.181	4.949	-0.74	-9.0	.	137.1
Dec. 18	01 42.51	+27 28.4	4.395	5.036	-0.52	-7.9	.	125.9
Dec. 28	01 37.31	+26 09.3	4.632	5.123	-0.32	-6.7	.	114.8
Jan. 7	01 34.10	+25 02.7	4.883	5.209	-0.15	-5.4	.	104.0
Jan. 17	01 32.62	+24 08.8	5.143	5.294	0.00	-4.2	.	93.5
Jan. 27	01 32.60	+23 27.1	5.404	5.379	+0.12	-3.1	.	83.3
Feb. 6	01 33.80	+22 56.4	5.662	5.463	+0.22	-2.1	.	73.4
Feb. 16	01 35.98	+22 35.6	5.910	5.546	+0.30	-1.2	.	63.9
Feb. 26	01 38.94	+22 23.3	6.146	5.630	+0.36	-0.5	.	54.6
Mar. 8	01 42.52	+22 18.1	6.363	5.712	+0.40	+0.1	.	45.5
Mar. 18	01 46.54	+22 18.9	6.561	5.794	+0.43	+0.6	.	36.7
Mar. 28	01 50.88	+22 24.6	6.736	5.875	+0.45	+1.0	.	28.2

Comet C/2015 X4 (Elenin)

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 3.50656 TT
Peri. = 176.33627 e = 0.8126634
Node = 262.63382 2000.0 a = 18.1172424 AU
Incl. = 29.49381 n = 0.01278103
q = 3.3940226 AU P = 77.11 years

m1 = 6.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 43.70	+17 12.7	2.479	3.432	−0.50	−7.6	16.6	163.1
Jan. 13	05 38.72	+15 56.8	2.546	3.445	−0.34	−6.6	16.7	151.9
Jan. 23	05 35.33	+14 50.4	2.640	3.461	−0.16	−5.6	16.8	141.0
Feb. 2	05 33.77	+13 54.1	2.756	3.478	+0.04	−4.6	16.9	130.5
Feb. 12	05 34.17	+13 07.8	2.890	3.497	+0.23	−3.8	17.1	120.6
Feb. 22	05 36.48	+12 30.0	3.038	3.518	+0.41	−3.1	17.2	111.2
Mar. 3	05 40.56	+11 59.1	3.195	3.541	+0.57	−2.6	17.4	102.3
Mar. 13	05 46.23	+11 33.2	3.358	3.566	+0.71	−2.3	17.5	93.8
Mar. 23	05 53.29	+11 10.2	3.524	3.592	+0.82	−2.2	17.7	85.8
Apr. 2	06 01.54	+10 48.6	3.689	3.620	+0.92	−2.2	17.8	78.2
Apr. 12	06 10.78	+10 26.6	3.851	3.649	+1.01	−2.4	18.0	70.9
Apr. 22	06 20.83	+10 03.0	4.009	3.680	+1.07	−2.6	18.1	64.0
May 2	06 31.53	+09 36.8	4.159	3.712	+1.12	−3.0	18.2	57.3
May 12	06 42.75	+09 07.0	4.302	3.746	+1.16	−3.4	18.4	50.8
May 22	06 54.34	+08 33.1	4.435	3.782	+1.19	−3.8	18.5	44.6
June 1	07 06.19	+07 54.7	4.557	3.818	+1.20	−4.3	18.6	38.7
June 11	07 18.20	+07 11.2	4.667	3.856	+1.21	−4.9	18.7	33.0
June 21	07 30.28	+06 22.7	4.765	3.895	+1.21	−5.4	18.8	27.7
July 1	07 42.33	+05 28.9	4.850	3.935	+1.20	−5.9	19.0	23.0
July 11	07 54.29	+04 30.0	4.921	3.976	+1.18	−6.4	19.1	19.3
July 21	08 06.08	+03 26.0	4.978	4.018	+1.15	−6.9	19.1	17.1
July 31	08 17.62	+02 17.1	5.021	4.061	+1.12	−7.4	19.2	17.0
Aug. 10	08 28.86	+01 03.5	5.049	4.105	+1.09	−7.8	19.3	19.2
Aug. 20	08 39.73	−00 14.5	5.062	4.150	+1.04	−8.2	19.4	23.1
Aug. 30	08 50.15	−01 36.4	5.060	4.196	+0.99	−8.6	19.5	28.0
Sept. 9	09 00.06	−03 02.1	5.045	4.242	+0.93	−8.9	19.5	33.6
Sept.19	09 09.38	−04 30.8	5.015	4.290	+0.86	−9.1	19.6	39.6
Sept.29	09 18.03	−06 02.1	4.973	4.338	+0.79	−9.3	19.6	46.1
Oct. 9	09 25.92	−07 35.5	4.918	4.386	+0.70	−9.4	19.7	52.8
Oct. 19	09 32.94	−09 10.0	4.853	4.436	+0.61	−9.5	19.7	59.8
Oct. 29	09 39.00	−10 44.8	4.779	4.486	+0.50	−9.4	19.8	67.0
Nov. 8	09 43.99	−12 18.8	4.698	4.536	+0.38	−9.2	19.8	74.6
Nov. 18	09 47.79	−13 50.8	4.613	4.587	+0.25	−8.8	19.8	82.3
Nov. 28	09 50.31	−15 19.1	4.527	4.638	+0.12	−8.3	19.9	90.3
Dec. 8	09 51.46	−16 42.0	4.442	4.690	−0.03	−7.5	19.9	98.5
Dec. 18	09 51.21	−17 57.4	4.363	4.742	−0.16	−6.6	19.9	106.8
Dec. 28	09 49.57	−19 02.9	4.294	4.795	−0.29	−5.4	20.0	115.1
Jan. 7	09 46.62	−19 56.4	4.238	4.848	−0.41	−3.9	20.0	123.3
Jan. 17	09 42.56	−20 35.9	4.199	4.901	−0.49	−2.4	20.1	131.0
Jan. 27	09 37.67	−20 60.0	4.181	4.955	−0.54	−0.8	20.1	137.8
Feb. 6	09 32.30	−21 08.0	4.186	5.009	−0.54	+0.7	20.2	143.0
Feb. 16	09 26.89	−21 00.6	4.216	5.063	−0.51	+2.1	20.3	145.7
Feb. 26	09 21.82	−20 39.5	4.272	5.118	−0.44	+3.2	20.4	145.3
Mar. 8	09 17.47	−20 07.4	4.354	5.172	−0.34	+4.0	20.5	142.0
Mar. 18	09 14.12	−19 27.7	4.460	5.227	−0.22	+4.4	20.6	136.6
Mar. 28	09 11.94	−18 43.6	4.587	5.282	−0.09	+4.5	20.8	129.8

Comet P/2008 Y2 (Gibbs)

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 5.91108 TT
Peri. = 162.31018 e = 0.5450268
Node = 330.85676 2000.0 a = 3.5806735 AU
Incl. = 7.28707 n = 0.14546449
q = 1.6291105 AU P = 6.78 years

m1 = 12.8 + 5 log(Delta) + 25.0 log(r(t-10))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ″ °	Elong. °
Jan. 3	13 11.60	-09 51.2	1.571	1.727	-1.45	+12.6	19.5	28.9/122	81.6
Jan. 13	13 28.22	-12 24.7	1.513	1.761	-1.48	+12.1	19.6	25.3/124	87.0
Jan. 23	13 42.67	-14 45.1	1.455	1.799	-1.53	+11.6	19.8	21.3/127	93.0
Feb. 2	13 54.59	-16 51.4	1.398	1.842	-1.60	+11.1	19.9	16.9/131	99.7
Feb. 12	14 03.51	-18 42.6	1.343	1.887	-1.69	+10.8	20.1	12.2/141	107.2
Feb. 22	14 09.00	-20 17.2	1.292	1.935	-1.80	+10.6	20.2	8.0/162	115.4
Mar. 3	14 10.74	-21 33.1	1.248	1.985	-1.92	+10.6	20.4	6.2/209	124.5
Mar. 13	14 08.60	-22 27.6	1.215	2.038	-2.06	+10.9	20.7	8.4/249	134.3
Mar. 23	14 02.91	-22 57.8	1.197	2.092	-2.17	+11.4	20.9	11.6/267	144.8
Apr. 2	13 54.50	-23 02.5	1.197	2.147	-2.24	+12.1	21.2	13.7/278	155.4
Apr. 12	13 44.65	-22 43.2	1.220	2.204	-2.25	+12.7	21.5	14.0/285	165.0
Apr. 22	13 34.93	-22 05.3	1.267	2.261	-2.18	+13.1	21.9	12.5/292	168.5
May 2	13 26.68	-21 17.5	1.339	2.319	-2.06	+13.0	22.3	9.6/300	162.2
May 12	13 20.78	-20 28.6	1.435	2.378	-1.91	+12.5	22.7	6.1/314	152.7
May 22	13 17.69	-19 46.0	1.551	2.437	-1.74	+11.8	.	3.2/352	142.9
June 1	13 17.36	-19 14.3	1.687	2.496	-1.58	+10.8	.	3.7/ 59	133.5
June 11	13 19.58	-18 55.3	1.837	2.555	-1.43	+9.8	.	6.4/ 85	124.6
June 21	13 24.04	-18 49.2	2.000	2.614	-1.29	+8.8	.	9.0/ 94	116.2
July 1	13 30.36	-18 54.9	2.173	2.673	-1.17	+7.9	.	11.3/ 98	108.3
July 11	13 38.26	-19 10.9	2.353	2.731	-1.07	+7.0	.	13.2/101	100.7
July 21	13 47.45	-19 35.5	2.537	2.790	-0.98	+6.3	.	14.8/103	93.5
July 31	13 57.71	-20 06.9	2.724	2.848	-0.91	+5.6	.	16.1/104	86.4
Aug. 10	14 08.87	-20 43.4	2.912	2.905	-0.84	+4.9	.	17.1/104	79.6
Aug. 20	14 20.77	-21 23.8	3.097	2.962	-0.78	+4.3	.	18.0/104	72.9
Aug. 30	14 33.30	-22 06.5	3.279	3.019	-0.73	+3.8	.	18.6/104	66.3
Sept. 9	14 46.36	-22 50.4	3.456	3.075	-0.69	+3.3	.	19.1/104	59.8
Sept.19	14 59.86	-23 34.6	3.625	3.130	-0.65	+2.9	.	19.5/104	53.3
Sept.29	15 13.73	-24 18.0	3.786	3.185	-0.61	+2.5	.	19.8/103	46.8
Oct. 9	15 27.90	-24 59.9	3.936	3.239	-0.58	+2.2	.	19.9/102	40.3
Oct. 19	15 42.29	-25 39.6	4.073	3.293	-0.55	+1.8	.	20.0/101	33.8
Oct. 29	15 56.84	-26 16.6	4.197	3.346	-0.52	+1.5	.	19.9/101	27.3
Nov. 8	16 11.48	-26 50.3	4.306	3.398	-0.50	+1.3	.	19.8/100	20.8
Nov. 18	16 26.14	-27 20.5	4.398	3.450	-0.48	+1.0	.	19.6/ 99	14.4
Nov. 28	16 40.73	-27 47.0	4.473	3.501	-0.46	+0.8	.	19.3/ 98	8.5
Dec. 8	16 55.17	-28 09.5	4.530	3.551	-0.44	+0.6	.	18.8/ 97	5.5
Dec. 18	17 09.37	-28 28.2	4.568	3.601	-0.42	+0.4	.	18.3/ 96	9.2
Dec. 28	17 23.24	-28 43.1	4.588	3.650	-0.41	+0.2	.	17.7/ 95	15.5
Jan. 7	17 36.66	-28 54.6	4.588	3.698	-0.39	0.0	.	16.9/ 94	22.4
Jan. 17	17 49.54	-29 03.0	4.569	3.745	-0.38	-0.1	.	16.0/ 93	29.6
Jan. 27	18 01.76	-29 08.8	4.532	3.792	-0.37	-0.3	.	15.0/ 92	37.0
Feb. 6	18 13.20	-29 12.7	4.478	3.838	-0.36	-0.4	.	13.8/ 92	44.6
Feb. 16	18 23.74	-29 15.4	4.408	3.884	-0.35	-0.5	.	12.4/ 92	52.3
Feb. 26	18 33.24	-29 17.5	4.325	3.929	-0.35	-0.6	.	10.9/ 92	60.2
Mar. 8	18 41.56	-29 20.0	4.229	3.973	-0.35	-0.7	.	9.1/ 93	68.4
Mar. 18	18 48.55	-29 23.5	4.125	4.016	-0.35	-0.8	.	7.2/ 94	76.8
Mar. 28	18 54.07	-29 28.7	4.014	4.059	-0.35	-0.9	.	5.1/ 99	85.5

Comet 214P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 12.68714 TT
Peri. = 190.24275 e = 0.4873105
Node = 348.26567 2000.0 a = 3.6115302 AU
Incl. = 15.20514 n = 0.14360422
q = 1.8515936 AU P = 6.86 years

m1 = 12.2 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 48.80	-23 38.0	2.286	1.906	+2.21	-15.8	19.6	55.3
Jan. 13	15 10.88	-26 16.2	2.223	1.928	+2.17	-14.8	19.6	59.9
Jan. 23	15 32.57	-28 44.0	2.159	1.954	+2.11	-13.7	19.7	64.7
Feb. 2	15 53.66	-31 01.5	2.093	1.983	+2.02	-12.8	19.7	69.9
Feb. 12	16 13.86	-33 09.1	2.025	2.014	+1.89	-11.9	19.8	75.3
Feb. 22	16 32.81	-35 07.9	1.956	2.049	+1.73	-11.1	19.9	81.0
Mar. 3	16 50.13	-36 59.2	1.887	2.086	+1.52	-10.6	20.0	87.0
Mar. 13	17 05.37	-38 44.8	1.818	2.125	+1.26	-10.1	20.0	93.5
Mar. 23	17 18.02	-40 25.8	1.751	2.166	+0.95	-9.7	20.1	100.4
Apr. 2	17 27.56	-42 03.1	1.688	2.209	+0.59	-9.3	20.2	107.8
Apr. 12	17 33.43	-43 36.6	1.631	2.253	+0.18	-8.7	20.3	115.6
Apr. 22	17 35.18	-45 03.7	1.582	2.299	-0.26	-7.6	20.4	123.8
May 2	17 32.61	-46 20.1	1.546	2.345	-0.68	-5.9	20.6	132.3
May 12	17 25.84	-47 19.2	1.525	2.393	-1.01	-3.5	20.7	140.6
May 22	17 15.71	-47 53.9	1.523	2.441	-1.20	-0.5	20.9	148.1
June 1	17 03.67	-47 59.1	1.541	2.490	-1.22	+2.5	21.1	153.5
June 11	16 51.51	-47 34.3	1.583	2.540	-1.05	+5.0	21.3	155.0
June 21	16 41.00	-46 44.1	1.649	2.590	-0.77	+6.7	21.6	151.9
July 1	16 33.31	-45 36.8	1.737	2.640	-0.43	+7.6	21.8	145.8
July 11	16 28.99	-44 21.2	1.846	2.691	-0.09	+7.6	22.1	138.2
July 21	16 28.09	-43 04.9	1.973	2.741	+0.22	+7.2	22.4	130.2
July 31	16 30.30	-41 52.7	2.116	2.791	+0.49	+6.6	22.7	122.1
Aug. 10	16 35.22	-40 47.2	2.272	2.842	+0.72	+5.8	.	114.2
Aug. 20	16 42.44	-39 49.3	2.437	2.892	+0.91	+5.1	.	106.5
Aug. 30	16 51.53	-38 58.3	2.610	2.942	+1.06	+4.5	.	99.0
Sept. 9	17 02.17	-38 13.4	2.788	2.992	+1.19	+4.0	.	91.7
Sept.19	17 14.06	-37 33.1	2.969	3.042	+1.29	+3.7	.	84.5
Sept.29	17 26.94	-36 56.1	3.149	3.091	+1.37	+3.5	.	77.5
Oct. 9	17 40.63	-36 21.0	3.327	3.141	+1.43	+3.4	.	70.6
Oct. 19	17 54.92	-35 46.8	3.501	3.189	+1.47	+3.5	.	63.8
Oct. 29	18 09.65	-35 12.2	3.669	3.238	+1.51	+3.6	.	57.1
Nov. 8	18 24.71	-34 36.7	3.828	3.285	+1.52	+3.7	.	50.3
Nov. 18	18 39.95	-33 59.5	3.977	3.333	+1.53	+3.9	.	43.7
Nov. 28	18 55.26	-33 20.4	4.114	3.380	+1.53	+4.1	.	37.1
Dec. 8	19 10.54	-32 38.9	4.238	3.426	+1.52	+4.4	.	30.5
Dec. 18	19 25.69	-31 55.3	4.347	3.472	+1.49	+4.6	.	24.1
Dec. 28	19 40.63	-31 09.4	4.440	3.518	+1.47	+4.8	.	17.9
Jan. 7	19 55.28	-30 21.6	4.516	3.563	+1.43	+4.9	.	12.5
Jan. 17	20 09.56	-29 32.3	4.574	3.607	+1.39	+5.0	.	9.3
Jan. 27	20 23.41	-28 41.8	4.614	3.651	+1.34	+5.1	.	10.7
Feb. 6	20 36.77	-27 50.9	4.635	3.694	+1.28	+5.1	.	15.5
Feb. 16	20 49.55	-27 00.1	4.637	3.737	+1.22	+5.0	.	21.7
Feb. 26	21 01.72	-26 10.1	4.622	3.779	+1.15	+4.8	.	28.3
Mar. 8	21 13.20	-25 21.8	4.588	3.821	+1.07	+4.6	.	35.3
Mar. 18	21 23.92	-24 35.8	4.537	3.862	+0.99	+4.3	.	42.5
Mar. 28	21 33.82	-23 53.2	4.471	3.903	+0.90	+3.8	.	49.8

Comet 10P/Tempel

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 14.24217 TT
Peri. = 195.53540 e = 0.5373720
Node = 117.80138 2000.0 a = 3.0639752 AU
Incl. = 12.02895 n = 0.18377068
q = 1.4174807 AU P = 5.36 years

m1 = 8.8 + 5 log(Delta) + 17.5 log(r) (r<2.8AU)
H = 13.6 , G = 0.15 (r>2.8AU)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	Mag.	Elong. °
Jan. 3	21 46.55	-20 21.6	2.114	1.510	+3.24	+14.0	13.6	40.7
Jan. 13	22 18.95	-18 01.7	2.190	1.549	+3.08	+15.3	13.8	38.6
Jan. 23	22 49.70	-15 28.5	2.273	1.592	+2.91	+16.1	14.1	36.4
Feb. 2	23 18.85	-12 47.6	2.362	1.639	+2.77	+16.4	14.4	34.0
Feb. 12	23 46.51	-10 03.9	2.454	1.691	+2.63	+16.3	14.7	31.3
Feb. 22	00 12.83	-07 21.2	2.549	1.745	+2.51	+15.8	15.1	28.5
Mar. 3	00 37.96	-04 42.7	2.645	1.801	+2.41	+15.2	15.4	25.5
Mar. 13	01 02.06	-02 10.7	2.741	1.860	+2.32	+14.4	15.7	22.3
Mar. 23	01 25.24	+00 12.9	2.835	1.920	+2.24	+13.4	16.0	19.0
Apr. 2	01 47.60	+02 26.8	2.925	1.981	+2.17	+12.4	16.3	15.6
Apr. 12	02 09.26	+04 30.4	3.011	2.043	+2.10	+11.3	16.6	12.3
Apr. 22	02 30.25	+06 22.9	3.090	2.105	+2.04	+10.1	16.9	9.5
May 2	02 50.63	+08 04.2	3.161	2.168	+1.98	+9.0	17.2	8.0
May 12	03 10.42	+09 34.2	3.224	2.230	+1.92	+7.9	17.4	8.7
May 22	03 29.63	+10 52.9	3.276	2.293	+1.86	+6.8	17.7	11.4
June 1	03 48.24	+12 00.5	3.318	2.355	+1.80	+5.7	17.9	15.3
June 11	04 06.24	+12 57.4	3.348	2.417	+1.73	+4.7	18.1	19.8
June 21	04 23.57	+13 44.1	3.366	2.478	+1.66	+3.7	18.3	24.6
July 1	04 40.20	+14 21.1	3.370	2.539	+1.59	+2.8	18.5	29.8
July 11	04 56.05	+14 48.9	3.362	2.599	+1.50	+1.9	18.7	35.3
July 21	05 11.05	+15 08.3	3.340	2.658	+1.41	+1.2	18.8	41.0
July 31	05 25.10	+15 20.1	3.306	2.717	+1.30	+0.5	19.0	47.0
Aug. 10	05 38.11	+15 25.2	3.259	2.775	+1.18	-0.1	19.1	53.3
Aug. 20	05 49.93	+15 24.4	3.199	2.832	+1.05	-0.6	19.3	60.0
Aug. 30	06 00.44	+15 18.9	3.129	2.888	+0.90	-0.9	19.3	67.0
Sept. 9	06 09.46	+15 09.7	3.050	2.943	+0.74	-1.2	19.3	74.4
Sept.19	06 16.82	+14 58.1	2.963	2.997	+0.55	-1.3	19.3	82.2
Sept.29	06 22.32	+14 45.4	2.872	3.051	+0.34	-1.2	19.3	90.6
Oct. 9	06 25.76	+14 32.9	2.778	3.104	+0.12	-1.1	19.2	99.5
Oct. 19	06 26.95	+14 22.0	2.688	3.155	-0.12	-0.8	19.2	109.0
Oct. 29	06 25.76	+14 14.0	2.604	3.206	-0.36	-0.4	19.1	119.0
Nov. 8	06 22.14	+14 10.0	2.532	3.256	-0.59	+0.1	19.0	129.7
Nov. 18	06 16.23	+14 10.8	2.478	3.305	-0.79	+0.6	18.8	140.9
Nov. 28	06 08.37	+14 16.8	2.447	3.353	-0.92	+1.1	18.7	152.4
Dec. 8	05 59.13	+14 27.9	2.443	3.400	-0.98	+1.6	18.6	163.7
Dec. 18	05 49.29	+14 43.7	2.470	3.446	-0.96	+2.0	18.5	171.2
Dec. 28	05 39.69	+15 03.5	2.529	3.491	-0.86	+2.3	18.7	165.9
Jan. 7	05 31.13	+15 26.7	2.619	3.535	-0.69	+2.6	18.9	155.2
Jan. 17	05 24.22	+15 52.7	2.737	3.579	-0.49	+2.8	19.2	143.9
Jan. 27	05 19.32	+16 20.6	2.879	3.621	-0.27	+2.9	19.4	132.8
Feb. 6	05 16.58	+16 50.0	3.041	3.663	-0.06	+3.0	19.6	122.2
Feb. 16	05 15.98	+17 20.0	3.217	3.704	+0.14	+3.0	19.8	112.1
Feb. 26	05 17.37	+17 50.1	3.403	3.743	+0.32	+2.9	20.0	102.4
Mar. 8	05 20.56	+18 19.5	3.594	3.782	+0.47	+2.8	20.1	93.2
Mar. 18	05 25.30	+18 47.6	3.786	3.820	+0.61	+2.6	20.2	84.4
Mar. 28	05 31.40	+19 13.7	3.975	3.858	+0.72	+2.4	20.3	76.0

Comet C/2013 US10 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 15.71359 TT
Peri. = 340.36112
Node = 186.14591 2000.0
Incl. = 148.87871
q = 0.8230552 AU
e = 1.0002628

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 12.86	+21 51.7	0.863	1.205	-1.23	132.3	6.3	81.2
Jan. 13	14 00.51	+43 55.1	0.739	1.333	-5.28	153.6	6.3	100.5
Jan. 23	13 07.73	+69 31.2	0.751	1.465	-34.19	+69.3	6.6	114.5
Feb. 2	07 25.84	+81 03.9	0.906	1.598	-16.84	-61.3	7.3	115.3
Feb. 12	04 37.40	+70 50.8	1.151	1.732	-2.48	-48.5	8.1	108.0
Feb. 22	04 12.59	+62 45.6	1.439	1.866	-0.38	-31.8	8.8	98.7
Mar. 3	04 08.76	+57 27.1	1.744	1.999	+0.28	-21.3	9.5	89.5
Mar. 13	04 11.53	+53 54.1	2.053	2.130	+0.57	-14.6	10.0	80.6
Mar. 23	04 17.23	+51 28.1	2.357	2.260	+0.72	-10.2	10.5	72.1
Apr. 2	04 24.45	+49 46.2	2.650	2.388	+0.81	-7.1	11.0	64.0
Apr. 12	04 32.56	+48 34.9	2.928	2.515	+0.86	-4.9	11.3	56.3
Apr. 22	04 41.19	+47 45.4	3.189	2.640	+0.89	-3.3	11.7	48.9
May 2	04 50.07	+47 12.2	3.428	2.763	+0.90	-2.1	12.0	42.0
May 12	04 59.07	+46 51.4	3.645	2.885	+0.89	-1.1	12.3	35.6
May 22	05 08.01	+46 40.5	3.838	3.005	+0.88	-0.3	12.5	30.1
June 1	05 16.78	+46 37.9	4.005	3.124	+0.85	+0.5	12.7	25.9
June 11	05 25.28	+46 42.5	4.146	3.242	+0.81	+1.1	12.9	23.7
June 21	05 33.36	+46 53.7	4.260	3.358	+0.76	+1.7	13.1	24.0
July 1	05 40.92	+47 10.9	4.349	3.472	+0.69	+2.3	13.2	26.9
July 11	05 47.80	+47 34.4	4.411	3.586	+0.60	+3.0	13.4	31.7
July 21	05 53.84	+48 03.9	4.449	3.698	+0.50	+3.6	13.5	37.8
July 31	05 58.87	+48 39.8	4.463	3.809	+0.38	+4.2	13.6	44.7
Aug. 10	06 02.63	+49 22.3	4.457	3.919	+0.22	+4.9	13.7	52.3
Aug. 20	06 04.88	+50 11.3	4.432	4.028	+0.04	+5.5	13.8	60.3
Aug. 30	06 05.29	+51 06.7	4.392	4.135	-0.18	+6.1	13.8	68.8
Sept. 9	06 03.48	+52 07.7	4.341	4.242	-0.44	+6.5	13.9	77.7
Sept.19	05 59.06	+53 12.7	4.285	4.347	-0.75	+6.6	13.9	86.9
Sept.29	05 51.60	+54 19.0	4.227	4.452	-1.09	+6.3	14.0	96.4
Oct. 9	05 40.75	+55 22.3	4.176	4.556	-1.44	+5.5	14.0	106.1
Oct. 19	05 26.35	+56 16.9	4.137	4.658	-1.77	+3.9	14.1	115.9
Oct. 29	05 08.64	+56 55.9	4.116	4.760	-2.03	+1.7	14.2	125.3
Nov. 8	04 48.34	+57 12.8	4.121	4.861	-2.16	-1.0	14.2	134.0
Nov. 18	04 26.79	+57 02.8	4.155	4.962	-2.12	-3.8	14.3	140.9
Nov. 28	04 05.56	+56 25.0	4.223	5.061	-1.94	-6.2	14.4	144.8
Dec. 8	03 46.15	+55 22.7	4.325	5.160	-1.65	-8.0	14.5	144.6
Dec. 18	03 29.64	+54 02.5	4.462	5.257	-1.32	-9.0	14.7	140.4
Dec. 28	03 16.47	+52 32.2	4.630	5.355	-0.98	-9.3	14.8	133.5
Jan. 7	03 06.69	+50 59.3	4.826	5.451	-0.67	-8.9	14.9	125.1
Jan. 17	02 60.00	+49 29.9	5.044	5.547	-0.40	-8.2	15.1	116.0
Jan. 27	02 56.00	+48 07.9	5.279	5.642	-0.17	-7.2	15.2	106.7
Feb. 6	02 54.27	+46 55.6	5.525	5.736	+0.01	-6.1	15.4	97.4
Feb. 16	02 54.40	+45 54.2	5.776	5.830	+0.16	-5.1	15.6	88.2
Feb. 26	02 56.04	+45 03.7	6.028	5.923	+0.28	-4.0	15.7	79.2
Mar. 8	02 58.88	+44 23.7	6.273	6.015	+0.38	-3.0	15.8	70.5
Mar. 18	03 02.67	+43 53.4	6.510	6.107	+0.45	-2.2	16.0	62.1
Mar. 28	03 07.18	+43 31.7	6.733	6.199	+0.51	-1.4	16.1	54.0

Comet 230P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 18.13267 TT
Peri. = 308.96244 e = 0.5632509
Node = 112.38260 2000.0 a = 3.4012578 AU
Incl. = 14.64976 n = 0.15712480
q = 1.4854963 AU P = 6.27 years

m1 = 15.2 + 5 log(Delta) + 5.0 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 06.33	+09 48.3	0.625	1.562	+0.31	+26.8	15.0	151.7
Jan. 13	05 09.41	+14 16.6	0.689	1.597	+0.66	+23.5	15.3	144.7
Jan. 23	05 16.05	+18 11.3	0.772	1.637	+1.00	+19.5	15.5	137.1
Feb. 2	05 26.04	+21 26.5	0.871	1.681	+1.29	+15.6	15.8	129.7
Feb. 12	05 38.92	+24 02.3	0.984	1.730	+1.53	+12.0	16.1	122.7
Feb. 22	05 54.19	+26 02.0	1.110	1.782	+1.71	+8.8	16.4	116.1
Mar. 3	06 11.25	+27 29.7	1.246	1.837	+1.84	+6.0	16.7	109.8
Mar. 13	06 29.62	+28 29.3	1.392	1.894	+1.93	+3.5	17.0	103.8
Mar. 23	06 48.88	+29 04.5	1.545	1.953	+1.98	+1.4	17.3	98.1
Apr. 2	07 08.63	+29 18.5	1.705	2.014	+2.00	-0.4	17.6	92.5
Apr. 12	07 28.61	+29 14.0	1.869	2.076	+2.00	-2.0	17.9	87.1
Apr. 22	07 48.59	+28 53.7	2.037	2.138	+1.98	-3.4	18.1	81.8
May 2	08 08.38	+28 19.8	2.206	2.201	+1.95	-4.6	18.4	76.5
May 12	08 27.87	+27 34.3	2.376	2.265	+1.91	-5.5	18.6	71.3
May 22	08 46.98	+26 39.0	2.546	2.328	+1.87	-6.3	18.8	66.1
June 1	09 05.64	+25 35.5	2.713	2.392	+1.82	-7.0	19.0	61.0
June 11	09 23.85	+24 25.3	2.877	2.455	+1.77	-7.5	19.2	55.8
June 21	09 41.57	+23 09.8	3.036	2.518	+1.72	-8.0	19.4	50.7
July 1	09 58.81	+21 50.2	3.189	2.581	+1.68	-8.3	19.6	45.5
July 11	10 15.60	+20 27.5	3.335	2.643	+1.63	-8.5	19.7	40.4
July 21	10 31.94	+19 02.8	3.472	2.705	+1.59	-8.6	19.9	35.2
July 31	10 47.85	+17 36.9	3.599	2.766	+1.55	-8.6	20.0	30.0
Aug. 10	11 03.36	+16 10.9	3.715	2.827	+1.51	-8.5	20.1	24.8
Aug. 20	11 18.48	+14 45.4	3.819	2.887	+1.47	-8.4	20.2	19.8
Aug. 30	11 33.22	+13 21.3	3.909	2.946	+1.44	-8.2	20.3	15.1
Sept. 9	11 47.59	+11 59.3	3.986	3.005	+1.40	-7.9	20.4	11.4
Sept.19	12 01.59	+10 40.1	4.047	3.063	+1.36	-7.6	20.5	9.9
Sept.29	12 15.22	+09 24.6	4.093	3.120	+1.32	-7.1	20.6	11.9
Oct. 9	12 28.46	+08 13.4	4.122	3.176	+1.28	-6.6	20.6	16.3
Oct. 19	12 41.27	+07 07.3	4.135	3.231	+1.24	-6.0	20.7	21.8
Oct. 29	12 53.63	+06 07.0	4.131	3.286	+1.18	-5.4	20.7	27.9
Nov. 8	13 05.48	+05 13.4	4.110	3.340	+1.13	-4.6	20.7	34.4
Nov. 18	13 16.73	+04 27.1	4.073	3.393	+1.06	-3.8	20.8	41.2
Nov. 28	13 27.33	+03 49.0	4.021	3.445	+0.98	-2.9	20.8	48.4
Dec. 8	13 37.14	+03 19.8	3.954	3.497	+0.89	-2.0	20.8	55.8
Dec. 18	13 46.06	+03 00.2	3.875	3.547	+0.79	-0.9	20.8	63.5
Dec. 28	13 53.95	+02 50.9	3.785	3.597	+0.67	+0.2	20.7	71.6
Jan. 7	14 00.64	+02 52.4	3.687	3.646	+0.53	+1.3	20.7	79.9
Jan. 17	14 05.98	+03 05.1	3.585	3.694	+0.38	+2.4	20.7	88.6
Jan. 27	14 09.80	+03 29.0	3.481	3.742	+0.21	+3.5	20.7	97.7
Feb. 6	14 11.93	+04 03.7	3.380	3.788	+0.03	+4.5	20.6	107.1
Feb. 16	14 12.28	+04 48.3	3.286	3.834	-0.15	+5.3	20.6	116.8
Feb. 26	14 10.78	+05 40.9	3.205	3.879	-0.33	+5.8	20.6	126.7
Mar. 8	14 07.46	+06 39.1	3.141	3.923	-0.49	+6.0	20.6	136.7
Mar. 18	14 02.52	+07 39.1	3.100	3.967	-0.63	+5.8	20.5	146.4
Mar. 28	13 56.26	+08 37.0	3.083	4.010	-0.71	+5.1	20.6	154.9

Comet C/2015 V3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 24.51146 TT
Peri. = 0.76497
Node = 2.34013 2000.0
Incl. = 86.23774
q = 4.2358762 AU
e = 0.9952392

m1 = 9.4 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	23 13.85	+02 15.0	4.507	4.249	+0.19	+9.2	19.0	68.6
Jan. 13	23 15.72	+03 46.7	4.668	4.256	+0.29	+9.4	19.0	59.6
Jan. 23	23 18.57	+05 21.2	4.815	4.265	+0.36	+9.7	19.1	51.0
Feb. 2	23 22.22	+06 58.6	4.946	4.275	+0.43	+10.0	19.2	42.8
Feb. 12	23 26.49	+08 39.0	5.059	4.287	+0.47	+10.4	19.2	34.9
Feb. 22	23 31.21	+10 22.7	5.152	4.301	+0.50	+10.7	19.3	27.7
Mar. 3	23 36.25	+12 09.6	5.223	4.316	+0.52	+11.0	19.3	21.5
Mar. 13	23 41.47	+13 60.0	5.273	4.333	+0.53	+11.4	19.4	17.1
Mar. 23	23 46.75	+15 53.9	5.301	4.351	+0.52	+11.8	19.4	15.9
Apr. 2	23 51.97	+17 51.4	5.307	4.371	+0.50	+12.1	19.4	18.5
Apr. 12	23 57.00	+19 52.8	5.293	4.392	+0.47	+12.5	19.4	23.5
Apr. 22	00 01.72	+21 58.0	5.259	4.414	+0.43	+12.9	19.5	29.7
May 2	00 06.00	+24 07.1	5.207	4.438	+0.37	+13.3	19.5	36.6
May 12	00 09.68	+26 20.2	5.139	4.463	+0.29	+13.7	19.5	43.7
May 22	00 12.60	+28 37.1	5.057	4.490	+0.20	+14.1	19.4	51.0
June 1	00 14.58	+30 57.7	4.965	4.518	+0.08	+14.4	19.4	58.5
June 11	00 15.38	+33 21.2	4.864	4.547	−0.06	+14.6	19.4	66.0
June 21	00 14.77	+35 46.8	4.760	4.577	−0.23	+14.6	19.4	73.6
July 1	00 12.47	+38 12.8	4.654	4.609	−0.43	+14.4	19.4	81.2
July 11	00 08.19	+40 37.2	4.552	4.642	−0.65	+13.9	19.4	88.7
July 21	00 01.64	+42 56.4	4.457	4.675	−0.90	+13.0	19.3	96.1
July 31	23 52.62	+45 06.6	4.374	4.710	−1.16	+11.6	19.3	103.2
Aug. 10	23 41.01	+47 02.4	4.305	4.746	−1.40	+9.6	19.3	109.9
Aug. 20	23 26.99	+48 38.6	4.256	4.783	−1.60	+7.2	19.3	115.8
Aug. 30	23 11.00	+49 50.1	4.228	4.822	−1.71	+4.3	19.4	120.6
Sept. 9	22 53.86	+50 33.4	4.225	4.861	−1.72	+1.4	19.4	124.0
Sept.19	22 36.64	+50 47.7	4.247	4.900	−1.62	−1.2	19.4	125.6
Sept.29	22 20.39	+50 35.4	4.293	4.941	−1.43	−3.4	19.5	125.4
Oct. 9	22 06.06	+50 01.2	4.364	4.983	−1.18	−4.9	19.6	123.3
Oct. 19	21 54.22	+49 11.9	4.456	5.025	−0.91	−5.8	19.7	119.8
Oct. 29	21 45.10	+48 14.3	4.567	5.069	−0.64	−5.9	19.7	115.1
Nov. 8	21 38.69	+47 14.9	4.693	5.113	−0.39	−5.6	19.8	109.7
Nov. 18	21 34.77	+46 19.1	4.830	5.158	−0.17	−4.8	19.9	103.9
Nov. 28	21 33.05	+45 30.9	4.976	5.203	+0.02	−3.8	20.0	97.9
Dec. 8	21 33.21	+44 53.0	5.125	5.249	+0.17	−2.6	20.1	91.8
Dec. 18	21 34.94	+44 27.4	5.274	5.296	+0.30	−1.2	20.3	85.9
Dec. 28	21 37.94	+44 14.9	5.421	5.344	+0.40	+0.1	20.3	80.3
Jan. 7	21 41.96	+44 16.2	5.563	5.392	+0.48	+1.5	20.4	75.0
Jan. 17	21 46.76	+44 31.1	5.696	5.440	+0.54	+2.8	20.5	70.1
Jan. 27	21 52.15	+44 59.4	5.820	5.490	+0.58	+4.1	20.6	65.7
Feb. 6	21 57.93	+45 40.7	5.933	5.539	+0.60	+5.4	20.7	62.0
Feb. 16	22 03.95	+46 34.4	6.034	5.590	+0.61	+6.5	20.8	59.0
Feb. 26	22 10.04	+47 39.6	6.122	5.640	+0.60	+7.6	20.8	56.8
Mar. 8	22 16.06	+48 55.8	6.197	5.691	+0.58	+8.6	20.9	55.4
Mar. 18	22 21.85	+50 22.0	6.259	5.743	+0.54	+9.5	21.0	54.8
Mar. 28	22 27.26	+51 57.4	6.309	5.795	+0.48	+10.4	21.0	55.0

Comet 249P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2015 Nov. 26.69782 TT
Peri. = 65.60733 e = 0.8194364
Node = 239.17182 2000.0 a = 2.7632668 AU
Incl. = 8.39185 n = 0.21457042
q = 0.4989454 AU P = 4.59 years

H = 16.2 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	22 21.15	-07 01.8	1.046	0.904	+6.29	+31.9	18.2	52.8
Jan. 13	23 24.02	-01 42.9	1.132	1.051	+5.22	+27.4	18.5	59.1
Jan. 23	00 16.21	+02 51.3	1.266	1.195	+4.31	+22.2	18.9	62.7
Feb. 2	00 59.33	+06 32.9	1.432	1.334	+3.62	+17.6	19.2	63.8
Feb. 12	01 35.56	+09 29.1	1.620	1.467	+3.12	+14.1	19.6	63.1
Feb. 22	02 06.74	+11 50.0	1.820	1.596	+2.75	+11.4	19.9	61.0
Mar. 3	02 34.25	+13 43.8	2.026	1.719	+2.48	+9.3	20.2	57.9
Mar. 13	02 59.08	+15 16.6	2.234	1.838	+2.28	+7.6	20.4	54.1
Mar. 23	03 21.89	+16 32.6	2.440	1.952	+2.13	+6.2	20.7	49.8
Apr. 2	03 43.15	+17 34.7	2.641	2.062	+2.00	+5.0	20.9	45.1
Apr. 12	04 03.19	+18 24.9	2.835	2.168	+1.90	+4.0	21.1	40.2
Apr. 22	04 22.23	+19 04.7	3.020	2.270	+1.82	+3.0	21.2	35.0
May 2	04 40.40	+19 35.2	3.193	2.369	+1.74	+2.2	21.3	29.6
May 12	04 57.83	+19 57.2	3.353	2.465	+1.67	+1.4	21.4	24.1
May 22	05 14.56	+20 11.5	3.498	2.558	+1.61	+0.7	21.5	18.4
June 1	05 30.63	+20 18.6	3.627	2.648	+1.54	+0.1	21.5	12.7
June 11	05 46.07	+20 19.2	3.739	2.735	+1.48	-0.5	21.5	7.1
June 21	06 00.86	+20 13.8	3.833	2.819	+1.41	-1.1	21.5	3.2
July 1	06 15.00	+20 02.9	3.908	2.901	+1.35	-1.6	21.7	6.7
July 11	06 28.46	+19 47.1	3.964	2.980	+1.27	-2.0	21.9	12.7
July 21	06 41.21	+19 27.0	4.000	3.057	+1.20	-2.4	22.1	19.1
July 31	06 53.19	+19 03.2	4.016	3.132	+1.12	-2.7	22.3	25.7
Aug. 10	07 04.35	+18 36.2	4.013	3.205	+1.03	-2.9	22.4	32.5
Aug. 20	07 14.61	+18 06.9	3.991	3.276	+0.93	-3.1	22.5	39.6
Aug. 30	07 23.89	+17 35.8	3.951	3.344	+0.82	-3.2	22.6	47.0
Sept. 9	07 32.08	+17 03.7	3.894	3.411	+0.70	-3.2	22.6	54.6
Sept.19	07 39.06	+16 31.6	3.822	3.476	+0.56	-3.1	22.6	62.6
Sept.29	07 44.69	+16 00.2	3.737	3.539	+0.41	-3.0	22.7	70.9
Oct. 9	07 48.80	+15 30.6	3.643	3.601	+0.24	-2.7	22.7	79.7
Oct. 19	07 51.24	+15 03.8	3.542	3.660	+0.06	-2.3	22.6	88.9
Oct. 29	07 51.85	+14 40.6	3.438	3.718	-0.14	-1.8	22.6	98.6
Nov. 8	07 50.47	+14 22.2	3.337	3.774	-0.34	-1.3	22.5	108.8
Nov. 18	07 47.03	+14 09.1	3.244	3.829	-0.55	-0.7	22.4	119.5
Nov. 28	07 41.55	+14 01.9	3.166	3.882	-0.74	-0.1	22.3	130.8
Dec. 8	07 34.16	+14 00.7	3.107	3.934	-0.89	+0.4	22.2	142.4
Dec. 18	07 25.25	+14 05.2	3.075	3.984	-0.99	+0.9	22.1	154.3
Dec. 28	07 15.31	+14 14.4	3.073	4.033	-1.03	+1.3	22.0	165.6
Jan. 7	07 05.01	+14 27.4	3.105	4.081	-0.99	+1.5	21.9	171.9
Jan. 17	06 55.09	+14 42.9	3.171	4.127	-0.89	+1.7	22.1	164.4
Jan. 27	06 46.16	+14 59.8	3.269	4.171	-0.74	+1.7	22.4	153.1
Feb. 6	06 38.74	+15 17.3	3.397	4.215	-0.56	+1.7	22.6	141.6
Feb. 16	06 33.13	+15 34.6	3.550	4.257	-0.37	+1.7	22.8	130.3
Feb. 26	06 29.45	+15 51.3	3.722	4.297	-0.18	+1.5	22.9	119.5
Mar. 8	06 27.68	+16 06.7	3.908	4.337	0.00	+1.4	.	109.2
Mar. 18	06 27.69	+16 20.7	4.103	4.375	+0.16	+1.2	.	99.3
Mar. 28	06 29.32	+16 32.6	4.301	4.412	+0.30	+1.0	.	89.8

Comet 329P/LINEAR-Catalina

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 5.59598 TT
Peri. = 342.41373 e = 0.6799282
Node = 88.76102 2000.0 a = 5.1855490 AU
Incl. = 21.45879 n = 0.08346645
q = 1.6597480 AU P = 11.81 years

m1 = 12.0 + 5 log(Delta) + 20.0 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	04 35.03	+21 20.7	0.770	1.689	+0.17	+26.3	15.9	148.5
Jan. 13	04 36.76	+25 43.5	0.843	1.712	+0.61	+22.0	16.0	139.2
Jan. 23	04 42.86	+29 23.9	0.933	1.742	+1.02	+17.9	16.3	130.6
Feb. 2	04 53.08	+32 22.6	1.039	1.778	+1.38	+14.0	16.5	122.8
Feb. 12	05 06.91	+34 42.8	1.157	1.819	+1.68	+10.6	16.9	115.8
Feb. 22	05 23.76	+36 29.0	1.286	1.865	+1.92	+7.6	17.2	109.4
Mar. 3	05 42.92	+37 44.9	1.424	1.915	+2.09	+4.9	17.6	103.5
Mar. 13	06 03.79	+38 33.8	1.569	1.968	+2.20	+2.5	18.0	97.9
Mar. 23	06 25.79	+38 58.5	1.720	2.025	+2.26	+0.3	18.4	92.5
Apr. 2	06 48.41	+39 01.7	1.875	2.085	+2.28	-1.6	18.8	87.4
Apr. 12	07 11.26	+38 45.7	2.035	2.147	+2.27	-3.3	19.2	82.4
Apr. 22	07 34.01	+38 13.2	2.198	2.211	+2.24	-4.7	19.6	77.5
May 2	07 56.38	+37 26.3	2.363	2.276	+2.19	-5.9	20.0	72.7
May 12	08 18.24	+36 27.1	2.528	2.343	+2.12	-6.9	20.4	67.9
May 22	08 39.46	+35 18.0	2.692	2.410	+2.05	-7.7	20.8	63.1
June 1	08 59.96	+34 00.7	2.855	2.479	+1.98	-8.4	21.2	58.4
June 11	09 19.76	+32 37.0	3.015	2.548	+1.91	-8.8	21.5	53.6
June 21	09 38.83	+31 08.5	3.171	2.618	+1.84	-9.2	21.9	48.9
July 1	09 57.20	+29 36.6	3.322	2.687	+1.77	-9.4	22.2	44.2
July 11	10 14.91	+28 02.6	3.466	2.757	+1.71	-9.5	22.6	39.4
July 21	10 32.00	+26 27.7	3.602	2.827	+1.65	-9.5	22.9	34.7
July 31	10 48.49	+24 52.8	3.730	2.897	+1.59	-9.4	.	30.1
Aug. 10	11 04.44	+23 19.0	3.847	2.967	+1.54	-9.2	.	25.7
Aug. 20	11 19.86	+21 47.2	3.954	3.037	+1.49	-8.9	.	21.7
Aug. 30	11 34.79	+20 18.0	4.047	3.106	+1.45	-8.6	.	18.5
Sept. 9	11 49.25	+18 52.5	4.128	3.175	+1.40	-8.1	.	16.5
Sept.19	12 03.24	+17 31.3	4.194	3.244	+1.35	-7.6	.	16.6
Sept.29	12 16.77	+16 15.1	4.246	3.312	+1.31	-7.0	.	18.7
Oct. 9	12 29.82	+15 04.8	4.282	3.380	+1.25	-6.4	.	22.5
Oct. 19	12 42.36	+14 01.1	4.301	3.448	+1.20	-5.6	.	27.4
Oct. 29	12 54.37	+13 04.6	4.306	3.515	+1.14	-4.8	.	33.0
Nov. 8	13 05.78	+12 16.3	4.294	3.581	+1.07	-4.0	.	39.2
Nov. 18	13 16.53	+11 36.7	4.267	3.647	+1.00	-3.0	.	45.8
Nov. 28	13 26.54	+11 06.7	4.225	3.713	+0.92	-2.0	.	52.8
Dec. 8	13 35.70	+10 46.8	4.171	3.778	+0.82	-0.9	.	60.1
Dec. 18	13 43.89	+10 37.6	4.105	3.842	+0.71	+0.2	.	67.8
Dec. 28	13 51.00	+10 39.5	4.030	3.906	+0.59	+1.3	.	75.7
Jan. 7	13 56.86	+10 52.7	3.949	3.969	+0.45	+2.4	.	84.0
Jan. 17	14 01.33	+11 17.0	3.865	4.032	+0.30	+3.5	.	92.6
Jan. 27	14 04.29	+11 51.8	3.782	4.094	+0.13	+4.4	.	101.5
Feb. 6	14 05.59	+12 36.0	3.704	4.155	-0.04	+5.2	.	110.6
Feb. 16	14 05.19	+13 27.5	3.636	4.216	-0.21	+5.6	.	119.9
Feb. 26	14 03.07	+14 23.6	3.583	4.277	-0.37	+5.7	.	129.1
Mar. 8	13 59.34	+15 21.0	3.548	4.337	-0.51	+5.4	.	138.0
Mar. 18	13 54.20	+16 15.4	3.537	4.396	-0.62	+4.8	.	145.9
Mar. 28	13 48.00	+17 02.9	3.551	4.455	-0.68	+3.7	.	151.7

Comet C/2014 S2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 9.87644 TT
Peri. = 87.83236
Node = 8.11908 2000.0
Incl. = 64.67575
q = 2.1008381 AU
e = 0.9881962

m1 = 4.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	16 56.58	+61 59.7	1.914	2.120	-0.08	+3.8	10.3	88.0
Jan. 13	16 55.82	+62 37.4	1.900	2.139	-0.54	+7.8	10.3	90.0
Jan. 23	16 50.43	+63 55.9	1.882	2.164	-1.23	+11.2	10.4	92.7
Feb. 2	16 38.13	+65 47.8	1.861	2.195	-2.27	+13.2	10.5	96.0
Feb. 12	16 15.42	+67 59.5	1.843	2.232	-3.77	+12.5	10.6	99.6
Feb. 22	15 37.75	+70 04.1	1.831	2.273	-5.50	+7.4	10.7	103.4
Mar. 3	14 42.71	+71 18.2	1.832	2.320	-6.57	-2.6	10.8	106.7
Mar. 13	13 36.99	+70 51.9	1.850	2.371	-6.01	-14.8	11.0	109.2
Mar. 23	12 36.92	+68 24.4	1.891	2.425	-4.37	-24.3	11.2	110.4
Apr. 2	11 53.27	+64 21.0	1.957	2.484	-2.76	-29.7	11.4	110.0
Apr. 12	11 25.63	+59 23.5	2.050	2.546	-1.60	-31.7	11.6	108.0
Apr. 22	11 09.67	+54 06.7	2.170	2.611	-0.82	-31.4	11.9	104.6
May 2	11 01.45	+48 52.6	2.313	2.678	-0.31	-29.9	12.2	100.0
May 12	10 58.35	+43 53.4	2.476	2.748	+0.03	-27.9	12.6	94.6
May 22	10 58.69	+39 14.6	2.656	2.819	+0.27	-25.7	12.9	88.6
June 1	11 01.38	+34 57.8	2.847	2.893	+0.43	-23.6	13.2	82.4
June 11	11 05.72	+31 02.2	3.047	2.968	+0.55	-21.6	13.5	75.9
June 21	11 11.24	+27 26.1	3.250	3.044	+0.64	-19.9	13.8	69.3
July 1	11 17.60	+24 07.4	3.454	3.122	+0.70	-18.4	14.1	62.7
July 11	11 24.58	+21 03.9	3.655	3.200	+0.74	-17.0	14.4	56.0
July 21	11 32.00	+18 13.5	3.850	3.280	+0.77	-15.9	14.7	49.3
July 31	11 39.71	+15 34.5	4.037	3.360	+0.79	-14.9	14.9	42.6
Aug. 10	11 47.63	+13 05.5	4.212	3.441	+0.80	-14.0	15.2	35.8
Aug. 20	11 55.66	+10 45.1	4.374	3.523	+0.81	-13.3	15.4	29.0
Aug. 30	12 03.72	+08 32.5	4.520	3.605	+0.80	-12.6	15.6	22.1
Sept. 9	12 11.76	+06 26.6	4.649	3.687	+0.79	-12.0	15.8	15.3
Sept.19	12 19.68	+04 27.0	4.759	3.769	+0.78	-11.4	16.0	8.9
Sept.29	12 27.44	+02 33.0	4.849	3.852	+0.75	-10.9	16.2	5.1
Oct. 9	12 34.95	+00 44.3	4.918	3.935	+0.72	-10.4	16.4	9.2
Oct. 19	12 42.14	-00 59.4	4.966	4.018	+0.68	-9.9	16.5	16.1
Oct. 29	12 48.93	-02 38.4	4.992	4.101	+0.63	-9.4	16.7	23.6
Nov. 8	12 55.21	-04 12.7	4.997	4.184	+0.57	-9.0	16.8	31.5
Nov. 18	13 00.88	-05 42.5	4.982	4.268	+0.49	-8.5	16.9	39.6
Nov. 28	13 05.82	-07 07.8	4.948	4.351	+0.41	-8.1	17.1	48.1
Dec. 8	13 09.90	-08 28.4	4.896	4.434	+0.31	-7.6	17.2	56.8
Dec. 18	13 12.98	-09 44.3	4.831	4.517	+0.19	-7.1	17.2	65.8
Dec. 28	13 14.93	-10 55.1	4.754	4.600	+0.07	-6.5	17.3	75.1
Jan. 7	13 15.58	-12 00.4	4.670	4.682	-0.07	-5.9	17.4	84.7
Jan. 17	13 14.84	-12 59.8	4.584	4.765	-0.22	-5.3	17.5	94.6
Jan. 27	13 12.60	-13 52.6	4.500	4.847	-0.38	-4.5	17.5	104.9
Feb. 6	13 08.83	-14 37.9	4.424	4.930	-0.52	-3.7	17.6	115.5
Feb. 16	13 03.59	-15 15.1	4.363	5.012	-0.66	-2.8	17.7	126.4
Feb. 26	12 57.03	-15 43.3	4.321	5.094	-0.76	-1.9	17.8	137.4
Mar. 8	12 49.41	-16 02.4	4.305	5.175	-0.83	-1.0	17.9	148.3
Mar. 18	12 41.10	-16 12.4	4.317	5.257	-0.86	-0.2	18.0	158.7
Mar. 28	12 32.53	-16 14.2	4.362	5.338	-0.84	+0.5	18.1	166.6

Comet 204P/LINEAR-NEAT

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 11.63747 TT
Peri. = 355.10163 e = 0.4725240
Node = 109.05174 2000.0 a = 3.6577272 AU
Incl. = 6.58740 n = 0.14089225
q = 1.9293633 AU P = 7.00 years

m1 = 12.2 + 5 log(Delta) + 17.5 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	08 35.19	+19 49.8	1.000	1.939	−0.39	+7.8	17.3	155.7
Jan. 13	08 31.28	+21 07.5	0.978	1.949	−0.56	+8.1	17.2	166.9
Jan. 23	08 25.70	+22 28.0	0.979	1.963	−0.57	+7.3	17.2	176.6
Feb. 2	08 19.96	+23 41.3	1.004	1.980	−0.44	+5.8	17.2	168.7
Feb. 12	08 15.54	+24 39.5	1.052	2.000	−0.19	+3.9	17.3	157.6
Feb. 22	08 13.64	+25 18.3	1.121	2.024	+0.12	+1.9	17.5	147.0
Mar. 3	08 14.81	+25 37.5	1.208	2.050	+0.43	+0.1	17.7	137.3
Mar. 13	08 19.12	+25 38.2	1.312	2.079	+0.72	−1.6	17.9	128.3
Mar. 23	08 26.31	+25 22.4	1.428	2.111	+0.96	−3.0	18.2	120.0
Apr. 2	08 35.90	+24 52.4	1.554	2.145	+1.15	−4.3	18.4	112.4
Apr. 12	08 47.42	+24 09.7	1.690	2.181	+1.30	−5.4	18.7	105.4
Apr. 22	09 00.41	+23 15.8	1.831	2.219	+1.41	−6.4	19.0	98.7
May 2	09 14.47	+22 12.2	1.978	2.259	+1.48	−7.2	19.2	92.5
May 12	09 29.28	+20 59.9	2.128	2.300	+1.53	−8.0	19.5	86.5
May 22	09 44.60	+19 40.3	2.281	2.342	+1.56	−8.6	19.8	80.7
June 1	10 00.21	+18 14.3	2.435	2.386	+1.58	−9.1	20.1	75.2
June 11	10 15.99	+16 43.1	2.589	2.430	+1.58	−9.5	20.3	69.7
June 21	10 31.82	+15 07.6	2.741	2.476	+1.58	−9.9	20.6	64.3
July 1	10 47.63	+13 28.9	2.891	2.522	+1.57	−10.1	20.8	59.0
July 11	11 03.37	+11 47.8	3.037	2.569	+1.56	−10.3	21.1	53.7
July 21	11 19.01	+10 05.3	3.178	2.616	+1.55	−10.3	21.3	48.4
July 31	11 34.53	+08 22.0	3.313	2.663	+1.54	−10.3	21.6	43.1
Aug. 10	11 49.92	+06 38.8	3.441	2.711	+1.53	−10.2	21.8	37.8
Aug. 20	12 05.17	+04 56.4	3.560	2.759	+1.51	−10.1	22.0	32.4
Aug. 30	12 20.28	+03 15.4	3.670	2.808	+1.50	−9.9	22.2	27.0
Sept. 9	12 35.25	+01 36.5	3.769	2.856	+1.48	−9.6	22.4	21.5
Sept.19	12 50.07	+00 00.4	3.856	2.904	+1.47	−9.3	22.6	16.0
Sept.29	13 04.72	−01 32.4	3.931	2.952	+1.45	−8.9	22.8	10.7
Oct. 9	13 19.20	−03 01.3	3.991	3.000	+1.43	−8.4	22.9	6.1
Oct. 19	13 33.48	−04 25.7	4.038	3.048	+1.40	−8.0	.	5.6
Oct. 29	13 47.52	−05 45.3	4.069	3.095	+1.38	−7.4	.	10.1
Nov. 8	14 01.28	−06 59.4	4.084	3.143	+1.34	−6.8	.	15.9
Nov. 18	14 14.70	−08 07.6	4.083	3.190	+1.30	−6.2	.	22.2
Nov. 28	14 27.72	−09 09.5	4.066	3.237	+1.25	−5.5	.	28.8
Dec. 8	14 40.25	−10 04.9	4.033	3.283	+1.19	−4.8	.	35.6
Dec. 18	14 52.18	−10 53.3	3.985	3.329	+1.12	−4.1	.	42.7
Dec. 28	15 03.41	−11 34.6	3.923	3.375	+1.04	−3.4	.	49.9
Jan. 7	15 13.79	−12 08.6	3.847	3.420	+0.94	−2.7	.	57.5
Jan. 17	15 23.18	−12 35.3	3.759	3.465	+0.82	−1.9	.	65.3
Jan. 27	15 31.42	−12 54.7	3.662	3.509	+0.69	−1.2	.	73.4
Feb. 6	15 38.33	−13 06.8	3.557	3.553	+0.54	−0.5	.	81.8
Feb. 16	15 43.72	−13 11.9	3.449	3.597	+0.37	+0.2	.	90.5
Feb. 26	15 47.44	−13 10.2	3.340	3.639	+0.19	+0.8	.	99.7
Mar. 8	15 49.32	−13 02.0	3.234	3.682	0.00	+1.4	.	109.2
Mar. 18	15 49.28	−12 48.0	3.136	3.724	−0.20	+1.9	.	119.1
Mar. 28	15 47.29	−12 28.8	3.051	3.765	−0.38	+2.3	.	129.5

Comet 327P/Van Ness

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 12.40776 TT
Peri. = 185.08465 e = 0.5624428
Node = 173.96260 2000.0 a = 3.5659235 AU
Incl. = 36.21463 n = 0.14636797
q = 1.5602955 AU P = 6.73 years

m1 = 12.4 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	22 50.85	-17 06.9	1.895	1.576	+2.92	+1.8	17.7	56.2
Jan. 13	23 20.09	-16 49.0	1.977	1.594	+2.88	+3.9	17.9	53.1
Jan. 23	23 48.94	-16 10.0	2.061	1.618	+2.83	+5.6	18.1	50.2
Feb. 2	00 17.28	-15 14.1	2.145	1.647	+2.78	+6.9	18.4	47.5
Feb. 12	00 45.08	-14 05.4	2.229	1.682	+2.72	+7.8	18.7	45.0
Feb. 22	01 12.31	-12 47.9	2.313	1.722	+2.67	+8.3	18.9	42.7
Mar. 3	01 38.96	-11 25.2	2.398	1.765	+2.61	+8.4	19.2	40.5
Mar. 13	02 05.07	-10 00.7	2.483	1.813	+2.56	+8.3	19.5	38.4
Mar. 23	02 30.62	-08 37.5	2.568	1.863	+2.50	+7.9	19.9	36.5
Apr. 2	02 55.62	-07 18.2	2.653	1.916	+2.45	+7.3	20.2	34.6
Apr. 12	03 20.10	-06 05.0	2.737	1.971	+2.39	+6.5	20.5	32.8
Apr. 22	03 44.01	-04 59.9	2.821	2.028	+2.33	+5.6	20.8	31.1
May 2	04 07.36	-04 04.0	2.904	2.087	+2.28	+4.5	21.1	29.6
May 12	04 30.13	-03 18.5	2.984	2.147	+2.21	+3.4	21.4	28.1
May 22	04 52.27	-02 44.1	3.062	2.207	+2.15	+2.3	21.7	26.9
June 1	05 13.76	-02 21.1	3.135	2.268	+2.08	+1.2	22.0	26.0
June 11	05 34.57	-02 09.5	3.204	2.330	+2.01	0.0	22.3	25.6
June 21	05 54.65	-02 09.1	3.267	2.392	+1.93	-1.0	22.5	25.6
July 1	06 13.98	-02 19.6	3.324	2.454	+1.85	-2.1	22.8	26.3
July 11	06 32.52	-02 40.5	3.373	2.516	+1.77	-3.1	.	27.6
July 21	06 50.23	-03 11.0	3.413	2.577	+1.69	-4.0	.	29.5
July 31	07 07.08	-03 50.5	3.443	2.639	+1.60	-4.8	.	32.1
Aug. 10	07 23.03	-04 38.3	3.463	2.700	+1.50	-5.5	.	35.3
Aug. 20	07 38.03	-05 33.4	3.472	2.761	+1.40	-6.2	.	39.1
Aug. 30	07 52.04	-06 35.0	3.470	2.821	+1.29	-6.7	.	43.3
Sept. 9	08 04.98	-07 42.2	3.456	2.881	+1.18	-7.2	.	48.0
Sept.19	08 16.78	-08 54.0	3.430	2.941	+1.06	-7.5	.	53.2
Sept.29	08 27.35	-10 09.2	3.393	2.999	+0.92	-7.7	.	58.8
Oct. 9	08 36.59	-11 26.6	3.346	3.057	+0.78	-7.8	.	64.8
Oct. 19	08 44.36	-12 44.8	3.289	3.115	+0.62	-7.7	.	71.2
Oct. 29	08 50.52	-14 02.0	3.225	3.172	+0.44	-7.4	.	78.1
Nov. 8	08 54.91	-15 16.2	3.154	3.228	+0.25	-6.8	.	85.3
Nov. 18	08 57.40	-16 24.6	3.081	3.283	+0.05	-6.0	.	92.9
Nov. 28	08 57.85	-17 24.3	3.007	3.338	-0.17	-4.7	.	100.9
Dec. 8	08 56.19	-18 11.7	2.938	3.392	-0.37	-3.1	.	109.2
Dec. 18	08 52.47	-18 42.7	2.877	3.445	-0.56	-1.1	.	117.6
Dec. 28	08 46.88	-18 53.7	2.829	3.498	-0.71	+1.2	.	125.9
Jan. 7	08 39.77	-18 41.5	2.799	3.550	-0.81	+3.7	.	133.7
Jan. 17	08 31.72	-18 04.6	2.790	3.601	-0.83	+6.1	.	140.1
Jan. 27	08 23.38	-17 03.7	2.806	3.651	-0.79	+8.2	.	144.2
Feb. 6	08 15.47	-15 41.9	2.850	3.701	-0.69	+9.7	.	145.0
Feb. 16	08 08.60	-14 04.4	2.921	3.750	-0.54	+10.7	.	142.1
Feb. 26	08 03.25	-12 17.7	3.018	3.798	-0.36	+11.0	.	136.5
Mar. 8	07 59.67	-10 27.8	3.139	3.845	-0.17	+10.7	.	129.3
Mar. 18	07 57.98	-08 40.4	3.280	3.892	+0.01	+10.1	.	121.3
Mar. 28	07 58.11	-06 59.4	3.439	3.938	+0.18	+9.2	.	113.0

Comet 180P/NEAT

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 12.62379 TT
Peri. = 94.86142 e = 0.3547431
Node = 84.56926 2000.0 a = 3.8578290 AU
Incl. = 16.87169 n = 0.13007373
q = 2.4892908 AU P = 7.58 years

m1 = 1.4 + 5 log(Delta) + 35.0 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	14 11.11	+03 41.4	2.592	2.493	+1.41	-4.0	17.3	73.2
Jan. 13	14 25.18	+03 01.0	2.482	2.498	+1.28	-2.9	17.2	79.5
Jan. 23	14 38.03	+02 31.9	2.370	2.504	+1.14	-1.8	17.2	86.1
Feb. 2	14 49.42	+02 14.3	2.259	2.511	+0.96	-0.6	17.1	93.0
Feb. 12	14 59.05	+02 08.0	2.150	2.521	+0.76	+0.4	17.0	100.3
Feb. 22	15 06.64	+02 12.1	2.045	2.532	+0.53	+1.3	17.0	108.0
Mar. 3	15 11.90	+02 25.1	1.947	2.544	+0.27	+2.0	16.9	116.1
Mar. 13	15 14.57	+02 44.6	1.859	2.558	-0.01	+2.3	16.9	124.7
Mar. 23	15 14.51	+03 07.2	1.783	2.574	-0.27	+2.1	16.9	133.6
Apr. 2	15 11.77	+03 28.4	1.724	2.590	-0.52	+1.5	16.9	142.6
Apr. 12	15 06.60	+03 43.3	1.685	2.608	-0.70	+0.3	16.9	151.2
Apr. 22	14 59.60	+03 46.5	1.668	2.628	-0.80	-1.2	17.0	158.2
May 2	14 51.61	+03 34.1	1.676	2.648	-0.80	-3.0	17.1	160.7
May 12	14 43.60	+03 03.9	1.709	2.670	-0.71	-4.8	17.2	157.3
May 22	14 36.49	+02 15.7	1.767	2.693	-0.55	-6.4	17.4	150.1
June 1	14 31.00	+01 11.7	1.848	2.717	-0.34	-7.7	17.7	141.6
June 11	14 27.57	-00 05.1	1.949	2.742	-0.12	-8.6	17.9	132.7
June 21	14 26.38	-01 31.5	2.067	2.767	+0.10	-9.3	18.2	124.0
July 1	14 27.40	-03 04.4	2.199	2.794	+0.31	-9.7	18.4	115.7
July 11	14 30.50	-04 41.1	2.342	2.821	+0.50	-9.9	18.7	107.6
July 21	14 35.49	-06 19.6	2.492	2.849	+0.66	-9.9	19.0	100.0
July 31	14 42.13	-07 58.3	2.647	2.878	+0.81	-9.8	19.3	92.6
Aug. 10	14 50.24	-09 35.9	2.806	2.908	+0.94	-9.5	19.6	85.5
Aug. 20	14 59.62	-11 11.4	2.965	2.937	+1.05	-9.2	19.8	78.6
Aug. 30	15 10.10	-12 43.8	3.123	2.968	+1.15	-8.9	20.1	71.9
Sept. 9	15 21.56	-14 12.6	3.277	2.999	+1.23	-8.4	20.4	65.3
Sept.19	15 33.85	-15 37.1	3.427	3.030	+1.30	-8.0	20.6	58.7
Sept.29	15 46.87	-16 56.6	3.570	3.062	+1.37	-7.4	20.9	52.3
Oct. 9	16 00.52	-18 10.9	3.705	3.094	+1.42	-6.8	21.1	45.9
Oct. 19	16 14.70	-19 19.4	3.830	3.126	+1.46	-6.2	21.3	39.5
Oct. 29	16 29.33	-20 21.8	3.944	3.159	+1.50	-5.6	21.5	33.1
Nov. 8	16 44.31	-21 17.8	4.046	3.191	+1.52	-5.0	21.8	26.6
Nov. 18	16 59.56	-22 07.4	4.134	3.224	+1.54	-4.3	22.0	20.2
Nov. 28	17 14.97	-22 50.5	4.207	3.257	+1.55	-3.7	22.2	13.7
Dec. 8	17 30.47	-23 27.0	4.265	3.290	+1.55	-3.0	22.3	7.1
Dec. 18	17 45.94	-23 57.3	4.307	3.323	+1.54	-2.4	22.5	0.8
Dec. 28	18 01.31	-24 21.6	4.333	3.357	+1.51	-1.9	22.7	6.2
Jan. 7	18 16.45	-24 40.5	4.341	3.390	+1.48	-1.4	22.8	13.0
Jan. 17	18 31.27	-24 54.4	4.332	3.423	+1.44	-1.0	23.0	19.8
Jan. 27	18 45.67	-25 04.1	4.307	3.456	+1.39	-0.6	.	26.7
Feb. 6	18 59.54	-25 10.6	4.266	3.489	+1.32	-0.4	.	33.8
Feb. 16	19 12.77	-25 14.7	4.209	3.522	+1.25	-0.3	.	40.9
Feb. 26	19 25.26	-25 17.6	4.138	3.555	+1.16	-0.3	.	48.2
Mar. 8	19 36.88	-25 20.6	4.054	3.588	+1.06	-0.4	.	55.6
Mar. 18	19 47.53	-25 24.7	3.958	3.621	+0.95	-0.7	.	63.2
Mar. 28	19 57.08	-25 31.5	3.853	3.653	+0.83	-1.1	.	71.1

Comet C/2015 X2 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 21.02145 TT
Peri. = 42.14364 e = 0.8611314
Node = 100.98049 2000.0 a = 13.6863431 AU
Incl. = 72.37096 n = 0.01946583
q = 1.9006033 AU P = 50.63 years

m1 = 15.6 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 34.54	+65 53.4	1.456	1.907	+7.62	+10.4	19.2	101.0
Jan. 13	15 50.70	+67 37.3	1.513	1.919	+6.73	+1.4	19.3	98.3
Jan. 23	16 58.03	+67 51.4	1.590	1.938	+5.29	-2.9	19.5	94.8
Feb. 2	17 50.90	+67 21.9	1.679	1.964	+3.91	-3.6	19.7	91.2
Feb. 12	18 29.96	+66 45.9	1.772	1.996	+2.78	-2.3	19.8	87.9
Feb. 22	18 57.79	+66 22.6	1.863	2.034	+1.89	-0.3	20.0	85.1
Mar. 3	19 16.74	+66 19.3	1.949	2.077	+1.14	+1.8	20.2	83.0
Mar. 13	19 28.13	+66 36.9	2.027	2.125	+0.43	+3.5	20.4	81.7
Mar. 23	19 32.46	+67 11.8	2.095	2.177	-0.28	+4.6	20.6	81.2
Apr. 2	19 29.67	+67 58.1	2.153	2.233	-1.04	+4.9	20.8	81.3
Apr. 12	19 19.26	+68 47.0	2.202	2.292	-1.84	+3.9	20.9	82.2
Apr. 22	19 00.82	+69 26.1	2.244	2.355	-2.59	+1.5	21.1	83.6
May 2	18 34.89	+69 40.7	2.280	2.420	-3.13	-2.6	21.2	85.5
May 12	18 03.64	+69 15.2	2.315	2.488	-3.25	-7.8	21.4	87.7
May 22	17 31.11	+67 57.7	2.350	2.557	-2.95	-13.3	21.5	89.9
June 1	17 01.56	+65 44.7	2.389	2.629	-2.39	-18.3	21.7	92.1
June 11	16 37.69	+62 41.3	2.436	2.702	-1.74	-22.4	21.8	93.9
June 21	16 20.29	+58 57.6	2.494	2.776	-1.15	-25.2	22.0	95.1
July 1	16 08.77	+54 45.9	2.566	2.851	-0.67	-26.8	22.2	95.6
July 11	16 02.11	+50 17.8	2.653	2.927	-0.28	-27.4	22.4	95.2
July 21	15 59.31	+45 43.7	2.757	3.004	+0.02	-27.2	22.6	94.0
July 31	15 59.49	+41 12.0	2.877	3.081	+0.25	-26.3	22.8	91.8
Aug. 10	16 01.98	+36 49.2	3.013	3.159	+0.43	-24.9	23.0	88.8
Aug. 20	16 06.28	+32 40.1	3.162	3.237	+0.57	-23.2	.	85.1
Aug. 30	16 11.98	+28 47.7	3.323	3.315	+0.68	-21.4	.	80.8
Sept. 9	16 18.80	+25 13.7	3.492	3.394	+0.77	-19.5	.	76.1
Sept.19	16 26.49	+21 58.9	3.668	3.473	+0.84	-17.6	.	71.0
Sept.29	16 34.86	+19 03.2	3.846	3.551	+0.89	-15.7	.	65.6
Oct. 9	16 43.76	+16 26.2	4.023	3.630	+0.93	-13.9	.	60.1
Oct. 19	16 53.07	+14 07.1	4.197	3.709	+0.96	-12.2	.	54.5
Oct. 29	17 02.65	+12 05.0	4.364	3.787	+0.98	-10.6	.	49.0
Nov. 8	17 12.40	+10 19.0	4.522	3.866	+0.98	-9.1	.	43.7
Nov. 18	17 22.23	+08 48.0	4.667	3.944	+0.98	-7.7	.	38.7
Nov. 28	17 32.03	+07 30.9	4.799	4.022	+0.97	-6.4	.	34.3
Dec. 8	17 41.72	+06 26.9	4.914	4.100	+0.95	-5.2	.	30.9
Dec. 18	17 51.19	+05 34.9	5.011	4.178	+0.92	-4.1	.	29.0
Dec. 28	18 00.36	+04 54.0	5.089	4.255	+0.88	-3.1	.	29.0
Jan. 7	18 09.11	+04 23.3	5.146	4.332	+0.82	-2.2	.	30.9
Jan. 17	18 17.36	+04 01.7	5.184	4.409	+0.76	-1.3	.	34.6
Jan. 27	18 25.00	+03 48.3	5.201	4.486	+0.69	-0.6	.	39.5
Feb. 6	18 31.93	+03 42.0	5.198	4.562	+0.61	0.0	.	45.5
Feb. 16	18 38.03	+03 41.9	5.177	4.638	+0.52	+0.5	.	52.2
Feb. 26	18 43.21	+03 46.7	5.139	4.713	+0.41	+0.9	.	59.4
Mar. 8	18 47.34	+03 55.3	5.087	4.788	+0.30	+1.1	.	67.1
Mar. 18	18 50.33	+04 06.4	5.023	4.863	+0.18	+1.2	.	75.1
Mar. 28	18 52.08	+04 18.5	4.951	4.938	+0.04	+1.2	.	83.5

Comet 328P/LONEOS-Tucker

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 24.09112 TT
Peri. = 30.60340 e = 0.5510814
Node = 341.59961 2000.0 a = 4.2023447 AU
Incl. = 17.64917 n = 0.11441068
q = 1.8865107 AU P = 8.61 years

m1 = 12.2 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 57.62	+03 18.5	2.072	1.889	+2.02	+17.1	18.6	65.5
Jan. 13	23 17.81	+06 09.9	2.162	1.896	+2.09	+17.2	18.7	61.2
Jan. 23	23 38.67	+09 01.7	2.252	1.907	+2.15	+17.1	18.9	57.2
Feb. 2	00 00.12	+11 52.4	2.342	1.922	+2.20	+16.8	19.0	53.3
Feb. 12	00 22.14	+14 40.2	2.433	1.942	+2.25	+16.3	19.2	49.4
Feb. 22	00 44.67	+17 23.4	2.524	1.966	+2.30	+15.7	19.3	45.7
Mar. 3	01 07.69	+19 60.0	2.615	1.993	+2.35	+14.8	19.5	42.1
Mar. 13	01 31.19	+22 28.4	2.706	2.024	+2.39	+13.9	19.7	38.5
Mar. 23	01 55.11	+24 46.9	2.796	2.059	+2.43	+12.7	19.9	34.9
Apr. 2	02 19.40	+26 54.1	2.884	2.096	+2.46	+11.5	20.1	31.3
Apr. 12	02 44.03	+28 48.8	2.971	2.136	+2.49	+10.1	20.3	27.8
Apr. 22	03 08.89	+30 30.1	3.054	2.178	+2.50	+8.7	20.5	24.3
May 2	03 33.89	+31 57.1	3.134	2.222	+2.50	+7.3	20.7	21.0
May 12	03 58.91	+33 09.6	3.209	2.268	+2.49	+5.8	21.0	17.8
May 22	04 23.81	+34 07.6	3.279	2.316	+2.46	+4.4	21.2	15.1
June 1	04 48.45	+34 51.3	3.342	2.366	+2.42	+3.0	21.4	13.1
June 11	05 12.69	+35 21.4	3.399	2.416	+2.37	+1.7	21.6	12.3
June 21	05 36.37	+35 38.8	3.447	2.468	+2.30	+0.6	21.8	13.2
July 1	05 59.38	+35 44.5	3.486	2.521	+2.22	-0.5	21.9	15.5
July 11	06 21.59	+35 39.8	3.515	2.574	+2.13	-1.4	22.1	18.9
July 21	06 42.89	+35 26.3	3.533	2.628	+2.03	-2.1	22.3	23.0
July 31	07 03.21	+35 05.4	3.541	2.682	+1.93	-2.7	22.4	27.5
Aug. 10	07 22.47	+34 38.8	3.537	2.737	+1.81	-3.1	22.6	32.5
Aug. 20	07 40.59	+34 08.2	3.521	2.792	+1.69	-3.3	22.7	37.9
Aug. 30	07 57.53	+33 35.1	3.493	2.848	+1.57	-3.4	22.9	43.6
Sept. 9	08 13.21	+33 01.4	3.453	2.903	+1.43	-3.3	23.0	49.6
Sept.19	08 27.56	+32 28.7	3.401	2.958	+1.29	-3.0	.	56.0
Sept.29	08 40.49	+31 58.6	3.339	3.014	+1.14	-2.6	.	62.7
Oct. 9	08 51.89	+31 32.9	3.267	3.069	+0.97	-2.0	.	69.8
Oct. 19	09 01.63	+31 13.1	3.187	3.124	+0.79	-1.3	.	77.4
Oct. 29	09 09.57	+31 00.5	3.102	3.179	+0.59	-0.4	.	85.4
Nov. 8	09 15.50	+30 56.3	3.013	3.234	+0.37	+0.5	.	93.8
Nov. 18	09 19.25	+31 01.1	2.925	3.288	+0.14	+1.4	.	102.8
Nov. 28	09 20.63	+31 14.9	2.841	3.343	-0.11	+2.2	.	112.3
Dec. 8	09 19.48	+31 36.6	2.766	3.396	-0.37	+2.7	.	122.3
Dec. 18	09 15.80	+32 03.8	2.706	3.450	-0.61	+2.9	.	132.7
Dec. 28	09 09.71	+32 33.0	2.664	3.503	-0.81	+2.7	.	143.3
Jan. 7	09 01.58	+32 59.6	2.647	3.556	-0.95	+1.9	.	153.7
Jan. 17	08 52.06	+33 18.9	2.658	3.608	-1.01	+0.9	.	162.3
Jan. 27	08 41.97	+33 27.4	2.699	3.660	-0.97	-0.4	.	165.0
Feb. 6	08 32.24	+33 23.1	2.771	3.711	-0.86	-1.7	.	159.5
Feb. 16	08 23.68	+33 06.2	2.873	3.762	-0.68	-2.8	.	150.2
Feb. 26	08 16.88	+32 38.4	3.001	3.812	-0.47	-3.6	.	140.0
Mar. 8	08 12.19	+32 02.1	3.151	3.862	-0.25	-4.2	.	129.8
Mar. 18	08 09.70	+31 19.8	3.320	3.912	-0.04	-4.6	.	119.9
Mar. 28	08 09.32	+30 33.7	3.503	3.961	+0.15	-4.9	.	110.3

Comet P/2014 W4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2015 Dec. 30.00647 TT
Peri. = 67.48059 e = 0.3532052
Node = 33.34913 2000.0 a = 6.5883407 AU
Incl. = 15.27431 n = 0.05828275
q = 4.2613045 AU P = 16.91 years

m1 = 6.8 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 51.98	+41 16.1	3.317	4.261	−0.70	+1.1	18.8	161.6
Jan. 13	06 44.97	+41 26.6	3.336	4.262	−0.63	−0.1	18.9	157.6
Jan. 23	06 38.64	+41 25.6	3.384	4.263	−0.50	−1.1	18.9	149.7
Feb. 2	06 33.60	+41 14.3	3.457	4.265	−0.33	−2.0	18.9	140.6
Feb. 12	06 30.28	+40 54.6	3.554	4.267	−0.13	−2.6	19.0	131.0
Feb. 22	06 28.94	+40 28.8	3.668	4.270	+0.07	−3.0	19.1	121.5
Mar. 3	06 29.65	+39 59.2	3.798	4.273	+0.27	−3.2	19.2	112.3
Mar. 13	06 32.33	+39 27.2	3.937	4.277	+0.45	−3.3	19.2	103.3
Mar. 23	06 36.85	+38 54.0	4.083	4.282	+0.61	−3.4	19.3	94.7
Apr. 2	06 42.99	+38 20.1	4.232	4.287	+0.76	−3.4	19.4	86.4
Apr. 12	06 50.55	+37 45.6	4.380	4.292	+0.88	−3.5	19.5	78.4
Apr. 22	06 59.32	+37 10.5	4.524	4.298	+0.98	−3.6	19.6	70.7
May 2	07 09.09	+36 34.6	4.663	4.305	+1.06	−3.7	19.7	63.3
May 12	07 19.70	+35 57.5	4.793	4.312	+1.13	−3.8	19.7	56.1
May 22	07 30.95	+35 19.2	4.913	4.320	+1.18	−4.0	19.8	49.2
June 1	07 42.72	+34 39.2	5.022	4.328	+1.21	−4.2	19.8	42.5
June 11	07 54.86	+33 57.6	5.118	4.337	+1.24	−4.3	19.9	35.9
June 21	08 07.26	+33 14.3	5.200	4.347	+1.26	−4.5	20.0	29.7
July 1	08 19.81	+32 29.4	5.268	4.357	+1.26	−4.6	20.0	23.8
July 11	08 32.43	+31 42.9	5.320	4.367	+1.26	−4.8	20.0	18.4
July 21	08 45.03	+30 55.2	5.356	4.378	+1.25	−4.9	20.1	14.2
July 31	08 57.53	+30 06.6	5.375	4.389	+1.23	−4.9	20.1	12.4
Aug. 10	09 09.87	+29 17.6	5.378	4.401	+1.21	−4.9	20.1	13.9
Aug. 20	09 21.97	+28 28.5	5.364	4.413	+1.18	−4.8	20.1	18.0
Aug. 30	09 33.78	+27 40.1	5.334	4.426	+1.15	−4.7	20.1	23.5
Sept. 9	09 45.23	+26 53.0	5.287	4.440	+1.10	−4.5	20.1	29.6
Sept.19	09 56.26	+26 07.9	5.225	4.453	+1.05	−4.2	20.1	36.1
Sept.29	10 06.78	+25 25.6	5.147	4.467	+0.99	−3.9	20.1	43.0
Oct. 9	10 16.73	+24 47.0	5.056	4.482	+0.93	−3.4	20.1	50.1
Oct. 19	10 26.00	+24 13.0	4.952	4.497	+0.85	−2.9	20.1	57.5
Oct. 29	10 34.52	+23 44.4	4.838	4.512	+0.76	−2.2	20.0	65.2
Nov. 8	10 42.15	+23 22.3	4.714	4.528	+0.66	−1.5	20.0	73.2
Nov. 18	10 48.79	+23 07.4	4.585	4.544	+0.55	−0.7	20.0	81.4
Nov. 28	10 54.31	+23 00.5	4.453	4.561	+0.43	+0.1	19.9	90.0
Dec. 8	10 58.56	+23 01.9	4.321	4.578	+0.29	+1.0	19.9	98.9
Dec. 18	11 01.44	+23 11.9	4.193	4.595	+0.14	+1.8	19.8	108.1
Dec. 28	11 02.83	+23 29.9	4.074	4.613	−0.02	+2.5	19.8	117.6
Jan. 7	11 02.68	+23 55.0	3.968	4.631	−0.17	+3.0	19.8	127.4
Jan. 17	11 00.98	+24 25.2	3.879	4.649	−0.31	+3.3	19.8	137.2
Jan. 27	10 57.85	+24 58.0	3.812	4.668	−0.44	+3.2	19.7	146.9
Feb. 6	10 53.48	+25 30.3	3.771	4.687	−0.53	+2.8	19.7	155.7
Feb. 16	10 48.23	+25 58.8	3.757	4.706	−0.57	+2.2	19.8	162.0
Feb. 26	10 42.51	+26 20.4	3.773	4.726	−0.57	+1.2	19.8	162.4
Mar. 8	10 36.79	+26 32.7	3.818	4.746	−0.52	+0.2	19.9	156.7
Mar. 18	10 31.56	+26 34.3	3.891	4.766	−0.44	−0.9	19.9	148.2
Mar. 28	10 27.18	+26 25.1	3.990	4.787	−0.32	−2.0	20.0	138.9

Comet 116P/Wild

Epoch = 2016 July 31.0 TT
T = 2016 Jan. 11.52470 TT
Peri. = 173.31379 e = 0.3722057
Node = 20.98943 2000.0 a = 3.4838002 AU
Incl. = 3.60852 n = 0.15157383
q = 2.1871099 AU P = 6.50 years

m1 = 6.8 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 13.82	-12 51.0	2.390	2.188	+1.76	-9.9	14.6	66.2
Jan. 13	14 31.38	-14 30.3	2.284	2.187	+1.68	-9.1	14.5	71.9
Jan. 23	14 48.21	-16 01.2	2.175	2.189	+1.59	-8.2	14.4	77.7
Feb. 2	15 04.06	-17 23.5	2.067	2.192	+1.46	-7.3	14.3	83.8
Feb. 12	15 18.66	-18 37.0	1.959	2.198	+1.30	-6.5	14.2	90.3
Feb. 22	15 31.65	-19 41.7	1.853	2.207	+1.10	-5.6	14.2	97.2
Mar. 3	15 42.68	-20 38.0	1.751	2.217	+0.87	-4.8	14.1	104.5
Mar. 13	15 51.33	-21 26.3	1.654	2.230	+0.59	-4.0	14.0	112.3
Mar. 23	15 57.23	-22 06.8	1.565	2.244	+0.28	-3.3	13.9	120.8
Apr. 2	16 00.06	-22 39.5	1.486	2.261	-0.04	-2.4	13.9	129.9
Apr. 12	15 59.65	-23 04.0	1.421	2.280	-0.35	-1.5	13.8	139.7
Apr. 22	15 56.16	-23 19.5	1.373	2.300	-0.61	-0.6	13.8	150.2
May 2	15 50.10	-23 25.4	1.345	2.322	-0.77	+0.3	13.8	161.1
May 12	15 42.38	-23 22.0	1.341	2.346	-0.81	+1.1	13.9	172.0
May 22	15 34.25	-23 11.2	1.361	2.371	-0.73	+1.5	14.0	174.2
June 1	15 26.94	-22 56.5	1.406	2.397	-0.55	+1.5	14.2	163.9
June 11	15 21.44	-22 42.0	1.475	2.425	-0.30	+1.0	14.4	153.3
June 21	15 18.41	-22 31.6	1.565	2.454	-0.03	+0.4	14.6	143.1
July 1	15 18.06	-22 27.7	1.672	2.484	+0.23	-0.4	14.8	133.5
July 11	15 20.38	-22 31.3	1.795	2.515	+0.48	-1.1	15.1	124.6
July 21	15 25.16	-22 42.4	1.931	2.548	+0.70	-1.7	15.3	116.2
July 31	15 32.12	-22 59.8	2.075	2.580	+0.89	-2.2	15.6	108.3
Aug. 10	15 40.98	-23 22.0	2.227	2.614	+1.05	-2.6	15.8	100.8
Aug. 20	15 51.47	-23 47.6	2.384	2.648	+1.19	-2.7	16.1	93.6
Aug. 30	16 03.34	-24 14.7	2.544	2.683	+1.31	-2.7	16.3	86.7
Sept. 9	16 16.39	-24 41.8	2.704	2.718	+1.40	-2.6	16.6	80.1
Sept.19	16 30.43	-25 07.7	2.864	2.754	+1.49	-2.3	16.8	73.6
Sept.29	16 45.28	-25 30.9	3.022	2.790	+1.55	-2.0	17.0	67.2
Oct. 9	17 00.82	-25 50.5	3.175	2.826	+1.61	-1.5	17.2	60.8
Oct. 19	17 16.91	-26 05.5	3.323	2.863	+1.65	-1.0	17.4	54.6
Oct. 29	17 33.40	-26 15.3	3.463	2.899	+1.68	-0.4	17.6	48.3
Nov. 8	17 50.20	-26 19.3	3.595	2.936	+1.70	+0.2	17.8	42.1
Nov. 18	18 07.19	-26 17.1	3.717	2.973	+1.71	+0.8	17.9	35.9
Nov. 28	18 24.25	-26 08.7	3.828	3.010	+1.70	+1.5	18.1	29.6
Dec. 8	18 41.29	-25 53.9	3.926	3.047	+1.69	+2.1	18.2	23.4
Dec. 18	18 58.21	-25 33.0	4.011	3.084	+1.67	+2.7	18.4	17.1
Dec. 28	19 14.91	-25 06.2	4.081	3.121	+1.64	+3.2	18.5	10.8
Jan. 7	19 31.32	-24 34.1	4.136	3.158	+1.60	+3.7	18.6	4.9
Jan. 17	19 47.34	-23 57.1	4.175	3.194	+1.56	+4.1	18.7	3.7
Jan. 27	20 02.92	-23 16.0	4.198	3.230	+1.51	+4.4	18.8	9.4
Feb. 6	20 17.97	-22 31.5	4.204	3.267	+1.45	+4.7	18.9	15.8
Feb. 16	20 32.43	-21 44.5	4.194	3.303	+1.38	+4.9	19.0	22.4
Feb. 26	20 46.24	-20 55.9	4.168	3.338	+1.31	+4.9	19.1	29.1
Mar. 8	20 59.34	-20 06.7	4.127	3.374	+1.23	+4.9	19.1	36.0
Mar. 18	21 11.65	-19 17.8	4.070	3.409	+1.15	+4.7	19.2	42.9
Mar. 28	21 23.10	-18 30.4	4.000	3.444	+1.05	+4.5	19.2	50.0

Comet C/2014 Y1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Jan. 17.58720 TT
Peri. = 182.26575
Node = 19.47184 2000.0
Incl. = 14.92858
q = 2.2421223 AU
e = 1.0016312

m1 = 12.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 26.65	-13 35.6	2.516	2.248	+1.88	-14.9	17.5	63.0
Jan. 13	14 45.41	-16 04.3	2.414	2.243	+1.83	-14.4	17.4	68.2
Jan. 23	15 03.70	-18 28.2	2.315	2.243	+1.76	-13.9	17.3	73.5
Feb. 2	15 21.33	-20 46.9	2.218	2.249	+1.67	-13.4	17.3	79.0
Feb. 12	15 38.02	-23 00.5	2.125	2.261	+1.54	-12.9	17.2	84.9
Feb. 22	15 53.43	-25 09.1	2.035	2.279	+1.38	-12.4	17.1	91.0
Mar. 3	16 07.24	-27 13.2	1.951	2.302	+1.18	-12.0	17.1	97.6
Mar. 13	16 19.04	-29 13.3	1.873	2.330	+0.94	-11.6	17.0	104.5
Mar. 23	16 28.42	-31 09.4	1.803	2.364	+0.66	-11.2	17.0	112.0
Apr. 2	16 35.02	-33 01.0	1.742	2.402	+0.35	-10.6	17.0	119.9
Apr. 12	16 38.55	-34 46.6	1.694	2.445	+0.04	-9.7	17.0	128.2
Apr. 22	16 38.90	-36 23.2	1.661	2.492	-0.26	-8.4	17.1	136.9
May 2	16 36.28	-37 46.8	1.647	2.542	-0.51	-6.6	17.1	145.5
May 12	16 31.22	-38 53.1	1.652	2.596	-0.66	-4.6	17.2	153.6
May 22	16 24.67	-39 39.1	1.681	2.654	-0.69	-2.5	17.4	159.8
June 1	16 17.76	-40 03.9	1.733	2.714	-0.61	-0.6	17.5	161.6
June 11	16 11.63	-40 09.7	1.810	2.777	-0.44	+0.9	17.7	158.0
June 21	16 07.20	-40 00.9	1.909	2.842	-0.22	+1.8	17.9	151.2
July 1	16 04.99	-39 42.8	2.031	2.910	+0.02	+2.3	18.2	143.2
July 11	16 05.23	-39 20.0	2.172	2.979	+0.26	+2.4	18.4	135.0
July 21	16 07.87	-38 56.3	2.330	3.050	+0.48	+2.2	18.7	126.8
July 31	16 12.71	-38 34.0	2.503	3.122	+0.68	+2.0	18.9	118.9
Aug. 10	16 19.49	-38 14.1	2.688	3.196	+0.85	+1.7	19.2	111.1
Aug. 20	16 27.95	-37 57.0	2.883	3.271	+0.99	+1.5	19.4	103.6
Aug. 30	16 37.81	-37 42.4	3.084	3.347	+1.10	+1.3	19.7	96.2
Sept. 9	16 48.84	-37 29.7	3.290	3.424	+1.20	+1.2	19.9	89.0
Sept.19	17 00.83	-37 18.1	3.499	3.502	+1.28	+1.1	20.2	81.9
Sept.29	17 13.58	-37 07.0	3.708	3.580	+1.34	+1.1	20.4	74.9
Oct. 9	17 26.95	-36 55.6	3.914	3.659	+1.38	+1.2	20.6	68.0
Oct. 19	17 40.76	-36 43.4	4.116	3.738	+1.41	+1.4	20.8	61.1
Oct. 29	17 54.90	-36 29.8	4.312	3.818	+1.43	+1.5	21.0	54.3
Nov. 8	18 09.24	-36 14.4	4.499	3.899	+1.44	+1.7	21.2	47.5
Nov. 18	18 23.67	-35 57.2	4.675	3.979	+1.44	+1.9	21.3	40.7
Nov. 28	18 38.09	-35 37.9	4.839	4.060	+1.43	+2.1	21.5	34.1
Dec. 8	18 52.40	-35 16.6	4.989	4.141	+1.41	+2.3	21.7	27.5
Dec. 18	19 06.50	-34 53.7	5.123	4.222	+1.38	+2.4	21.8	21.4
Dec. 28	19 20.32	-34 29.2	5.240	4.303	+1.35	+2.6	21.9	16.0
Jan. 7	19 33.78	-34 03.7	5.339	4.384	+1.30	+2.6	22.1	12.6
Jan. 17	19 46.78	-33 37.6	5.419	4.466	+1.25	+2.6	22.2	13.0
Jan. 27	19 59.28	-33 11.5	5.480	4.547	+1.19	+2.5	22.3	17.0
Feb. 6	20 11.19	-32 46.1	5.521	4.628	+1.13	+2.4	22.4	22.9
Feb. 16	20 22.44	-32 22.1	5.543	4.710	+1.05	+2.2	22.5	29.6
Feb. 26	20 32.98	-32 00.2	5.547	4.791	+0.97	+1.9	22.5	36.8
Mar. 8	20 42.71	-31 41.2	5.534	4.872	+0.89	+1.5	22.6	44.2
Mar. 18	20 51.58	-31 25.8	5.504	4.953	+0.79	+1.1	22.7	52.0
Mar. 28	20 59.50	-31 14.7	5.460	5.034	+0.69	+0.6	22.7	59.9

Comet P/2015 P4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Jan. 19.00704 TT
Peri. = 280.81627 e = 0.5839723
Node = 104.74155 2000.0 a = 6.0694564 AU
Incl. = 8.71403 n = 0.06591426
q = 2.5250620 AU P = 14.95 years

m1 = 11.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 07.06	-08 32.1	2.569	2.529	+1.35	+11.6	19.7	76.5
Jan. 13	00 20.52	-06 36.6	2.682	2.526	+1.44	+11.9	19.8	70.3
Jan. 23	00 34.89	-04 37.1	2.792	2.525	+1.51	+12.2	19.9	64.3
Feb. 2	00 50.03	-02 35.2	2.900	2.528	+1.58	+12.3	20.0	58.4
Feb. 12	01 05.82	-00 32.4	3.004	2.533	+1.63	+12.2	20.0	52.8
Feb. 22	01 22.16	+01 29.9	3.105	2.541	+1.68	+12.1	20.1	47.3
Mar. 3	01 38.97	+03 30.4	3.200	2.551	+1.72	+11.7	20.2	42.0
Mar. 13	01 56.19	+05 27.9	3.291	2.564	+1.76	+11.3	20.3	36.8
Mar. 23	02 13.75	+07 21.1	3.375	2.580	+1.78	+10.8	20.4	31.6
Apr. 2	02 31.59	+09 09.0	3.453	2.598	+1.81	+10.2	20.5	26.6
Apr. 12	02 49.67	+10 50.7	3.524	2.618	+1.83	+9.5	20.6	21.6
Apr. 22	03 07.92	+12 25.3	3.588	2.641	+1.84	+8.7	20.7	16.7
May 2	03 26.29	+13 52.1	3.643	2.665	+1.84	+7.9	20.8	11.9
May 12	03 44.73	+15 10.6	3.691	2.692	+1.84	+7.0	20.9	7.4
May 22	04 03.16	+16 20.4	3.729	2.721	+1.83	+6.1	21.0	4.4
June 1	04 21.51	+17 21.2	3.759	2.752	+1.82	+5.2	21.1	5.9
June 11	04 39.71	+18 13.1	3.778	2.784	+1.80	+4.3	21.2	10.1
June 21	04 57.66	+18 56.0	3.788	2.819	+1.76	+3.4	21.2	15.0
July 1	05 15.28	+19 30.2	3.787	2.854	+1.72	+2.6	21.3	20.2
July 11	05 32.48	+19 56.3	3.775	2.891	+1.67	+1.8	21.4	25.6
July 21	05 49.16	+20 14.7	3.752	2.930	+1.61	+1.1	21.5	31.1
July 31	06 05.22	+20 26.1	3.719	2.970	+1.53	+0.5	21.5	36.9
Aug. 10	06 20.55	+20 31.6	3.674	3.011	+1.45	0.0	21.6	42.8
Aug. 20	06 35.04	+20 32.0	3.619	3.053	+1.35	-0.3	21.7	49.0
Aug. 30	06 48.57	+20 28.6	3.554	3.096	+1.24	-0.6	21.7	55.5
Sept. 9	07 01.01	+20 22.6	3.480	3.140	+1.12	-0.7	21.8	62.3
Sept.19	07 12.22	+20 15.3	3.397	3.185	+0.98	-0.7	21.8	69.4
Sept.29	07 22.05	+20 08.2	3.307	3.230	+0.83	-0.5	21.8	76.8
Oct. 9	07 30.33	+20 02.8	3.213	3.276	+0.66	-0.2	21.9	84.7
Oct. 19	07 36.90	+20 00.7	3.117	3.323	+0.47	+0.2	21.9	93.1
Oct. 29	07 41.58	+20 03.0	3.021	3.371	+0.26	+0.8	21.9	102.0
Nov. 8	07 44.23	+20 11.1	2.930	3.418	+0.05	+1.4	21.9	111.4
Nov. 18	07 44.73	+20 25.6	2.847	3.467	-0.16	+2.1	22.0	121.4
Nov. 28	07 43.09	+20 46.6	2.778	3.515	-0.37	+2.7	22.0	132.0
Dec. 8	07 39.41	+21 13.4	2.728	3.564	-0.54	+3.1	22.1	143.0
Dec. 18	07 33.99	+21 44.4	2.700	3.613	-0.67	+3.3	22.2	154.5
Dec. 28	07 27.30	+22 17.4	2.700	3.663	-0.73	+3.3	22.3	166.3
Jan. 7	07 20.00	+22 50.1	2.730	3.713	-0.72	+3.0	22.5	178.1
Jan. 17	07 12.80	+23 20.2	2.790	3.763	-0.64	+2.6	22.6	169.8
Jan. 27	07 06.37	+23 46.3	2.881	3.813	-0.51	+2.1	22.8	158.1
Feb. 6	07 01.27	+24 07.7	3.000	3.863	-0.34	+1.7	23.0	146.8
Feb. 16	06 57.88	+24 24.3	3.143	3.913	-0.15	+1.2	.	135.9
Feb. 26	06 56.35	+24 36.4	3.306	3.963	+0.04	+0.8	.	125.4
Mar. 8	06 56.70	+24 44.5	3.485	4.013	+0.21	+0.4	.	115.5
Mar. 18	06 58.84	+24 48.9	3.675	4.063	+0.38	+0.1	.	106.0
Mar. 28	07 02.59	+24 49.9	3.872	4.114	+0.52	-0.2	.	96.9

Comet 211P/Hill

Epoch = 2016 July 31.0 TT
T = 2016 Jan. 27.35441 TT
Peri. = 4.44734 e = 0.3398409
Node = 117.25668 2000.0 a = 3.5603829 AU
Incl. = 18.88261 n = 0.14670976
q = 2.3504192 AU P = 6.72 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	08 18.52	+17 49.9	1.411	2.356	−0.63	+12.5	17.3	159.0
Jan. 13	08 12.24	+19 54.9	1.376	2.352	−0.74	+13.0	17.3	171.1
Jan. 23	08 04.82	+22 05.4	1.368	2.351	−0.73	+12.5	17.2	176.1
Feb. 2	07 57.52	+24 10.5	1.388	2.351	−0.59	+11.1	17.3	163.9
Feb. 12	07 51.60	+26 01.4	1.435	2.353	−0.35	+9.1	17.4	152.1
Feb. 22	07 48.11	+27 32.8	1.505	2.356	−0.05	+7.0	17.5	140.9
Mar. 3	07 47.63	+28 42.9	1.594	2.362	+0.27	+5.0	17.6	130.6
Mar. 13	07 50.32	+29 32.5	1.698	2.369	+0.57	+3.1	17.8	121.0
Mar. 23	07 56.06	+30 03.2	1.814	2.378	+0.84	+1.4	17.9	112.3
Apr. 2	08 04.49	+30 17.1	1.938	2.389	+1.07	−0.1	18.1	104.3
Apr. 12	08 15.20	+30 15.6	2.066	2.401	+1.26	−1.5	18.3	96.8
Apr. 22	08 27.79	+30 00.3	2.198	2.415	+1.40	−2.8	18.5	89.9
May 2	08 41.83	+29 32.2	2.331	2.431	+1.52	−4.0	18.6	83.4
May 12	08 57.00	+28 52.3	2.463	2.448	+1.60	−5.1	18.8	77.3
May 22	09 12.99	+28 01.7	2.594	2.466	+1.66	−6.0	19.0	71.5
June 1	09 29.54	+27 01.5	2.721	2.486	+1.69	−6.9	19.1	65.9
June 11	09 46.48	+25 52.5	2.846	2.507	+1.72	−7.7	19.3	60.5
June 21	10 03.64	+24 36.0	2.965	2.529	+1.73	−8.3	19.4	55.3
July 1	10 20.89	+23 13.0	3.080	2.553	+1.73	−8.9	19.5	50.3
July 11	10 38.17	+21 44.5	3.189	2.577	+1.72	−9.3	19.7	45.3
July 21	10 55.40	+20 11.7	3.291	2.603	+1.71	−9.6	19.8	40.5
July 31	11 12.53	+18 35.7	3.385	2.629	+1.70	−9.8	19.9	35.7
Aug. 10	11 29.55	+16 57.5	3.472	2.656	+1.69	−9.9	20.1	31.1
Aug. 20	11 46.43	+15 18.3	3.551	2.684	+1.67	−9.9	20.2	26.6
Aug. 30	12 03.16	+13 39.1	3.620	2.713	+1.66	−9.8	20.3	22.3
Sept. 9	12 19.74	+12 00.9	3.679	2.742	+1.64	−9.6	20.4	18.4
Sept.19	12 36.15	+10 24.8	3.728	2.772	+1.62	−9.3	20.5	15.3
Sept.29	12 52.40	+08 51.6	3.766	2.802	+1.61	−8.9	20.6	13.5
Oct. 9	13 08.46	+07 22.4	3.793	2.833	+1.59	−8.4	20.7	13.8
Oct. 19	13 24.31	+05 58.1	3.808	2.865	+1.56	−7.9	20.8	16.2
Oct. 29	13 39.93	+04 39.5	3.810	2.896	+1.53	−7.2	20.8	20.0
Nov. 8	13 55.28	+03 27.6	3.800	2.928	+1.50	−6.5	20.9	24.6
Nov. 18	14 10.29	+02 23.0	3.777	2.961	+1.46	−5.6	21.0	29.8
Nov. 28	14 24.92	+01 26.6	3.741	2.993	+1.42	−4.8	21.0	35.5
Dec. 8	14 39.08	+00 39.1	3.693	3.026	+1.36	−3.8	21.0	41.4
Dec. 18	14 52.67	+00 01.0	3.634	3.058	+1.29	−2.8	21.1	47.6
Dec. 28	15 05.57	−00 27.3	3.563	3.091	+1.21	−1.8	21.1	54.1
Jan. 7	15 17.66	−00 45.3	3.482	3.124	+1.11	−0.8	21.1	60.9
Jan. 17	15 28.77	−00 52.9	3.392	3.157	+1.00	+0.3	21.1	67.9
Jan. 27	15 38.75	−00 50.0	3.295	3.190	+0.87	+1.3	21.1	75.2
Feb. 6	15 47.40	−00 36.8	3.194	3.223	+0.71	+2.3	21.1	82.9
Feb. 16	15 54.55	−00 13.9	3.089	3.256	+0.54	+3.2	21.1	90.8
Feb. 26	15 59.99	+00 17.8	2.985	3.289	+0.35	+3.9	21.1	99.0
Mar. 8	16 03.54	+00 57.2	2.885	3.321	+0.15	+4.5	21.1	107.5
Mar. 18	16 05.07	+01 42.2	2.792	3.354	−0.06	+4.8	21.1	116.3
Mar. 28	16 04.49	+02 30.3	2.710	3.386	−0.27	+4.8	21.1	125.3

Comet 50P/Arend

Epoch = 2016 July 31.0 TT
T = 2016 Feb. 8.18677 TT
Peri. = 49.22297 e = 0.5301383
Node = 355.17591 2000.0 a = 4.0838383 AU
Incl. = 19.13921 n = 0.11942666
q = 1.9188392 AU P = 8.25 years

m1 = 13.0 + 5 log(Delta) + 10.0 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	23 31.83	+08 04.8	1.949	1.946	+1.70	+15.6	17.6	75.2
Jan. 13	23 48.87	+10 40.4	2.032	1.933	+1.85	+15.9	17.6	70.1
Jan. 23	00 07.33	+13 19.3	2.113	1.924	+1.98	+16.0	17.7	65.4
Feb. 2	00 27.08	+15 59.8	2.193	1.920	+2.10	+16.0	17.7	61.0
Feb. 12	00 48.07	+18 39.7	2.272	1.919	+2.22	+15.7	17.7	56.8
Feb. 22	01 10.24	+21 17.0	2.350	1.923	+2.33	+15.2	17.7	52.9
Mar. 3	01 33.53	+23 49.0	2.427	1.931	+2.44	+14.4	17.8	49.2
Mar. 13	01 57.92	+26 13.3	2.504	1.943	+2.54	+13.4	17.8	45.6
Mar. 23	02 23.34	+28 27.3	2.581	1.959	+2.64	+12.1	17.9	42.1
Apr. 2	02 49.70	+30 28.4	2.657	1.979	+2.72	+10.6	18.0	38.8
Apr. 12	03 16.90	+32 14.5	2.733	2.003	+2.79	+8.9	18.0	35.5
Apr. 22	03 44.77	+33 43.7	2.808	2.030	+2.83	+7.1	18.1	32.2
May 2	04 13.10	+34 54.4	2.882	2.060	+2.86	+5.2	18.2	29.0
May 12	04 41.67	+35 46.0	2.955	2.093	+2.85	+3.2	18.3	25.8
May 22	05 10.18	+36 18.2	3.026	2.129	+2.82	+1.3	18.4	22.7
June 1	05 38.38	+36 31.3	3.095	2.167	+2.76	−0.5	18.5	19.7
June 11	06 06.02	+36 26.5	3.159	2.208	+2.69	−2.1	18.6	16.9
June 21	06 32.88	+36 05.1	3.219	2.251	+2.59	−3.6	18.7	14.6
July 1	06 58.77	+35 29.0	3.274	2.295	+2.48	−4.9	18.8	13.0
July 11	07 23.58	+34 40.1	3.323	2.341	+2.36	−5.9	18.9	12.6
July 21	07 47.22	+33 40.7	3.364	2.388	+2.24	−6.8	19.0	13.6
July 31	08 09.65	+32 32.8	3.397	2.437	+2.12	−7.4	19.1	16.0
Aug. 10	08 30.86	+31 18.5	3.420	2.486	+2.00	−7.9	19.2	19.3
Aug. 20	08 50.84	+29 59.7	3.434	2.537	+1.88	−8.1	19.3	23.4
Aug. 30	09 09.63	+28 38.2	3.436	2.588	+1.76	−8.2	19.4	27.9
Sept. 9	09 27.24	+27 15.7	3.428	2.640	+1.64	−8.2	19.5	32.9
Sept.19	09 43.66	+25 54.0	3.408	2.692	+1.53	−8.0	19.5	38.3
Sept.29	09 58.91	+24 34.3	3.375	2.745	+1.40	−7.6	19.6	44.0
Oct. 9	10 12.96	+23 18.4	3.331	2.797	+1.28	−7.1	19.7	50.1
Oct. 19	10 25.76	+22 07.5	3.276	2.851	+1.15	−6.5	19.7	56.5
Oct. 29	10 37.26	+21 02.9	3.210	2.904	+1.01	−5.7	19.7	63.4
Nov. 8	10 47.35	+20 06.2	3.134	2.957	+0.86	−4.8	19.8	70.6
Nov. 18	10 55.90	+19 18.4	3.051	3.010	+0.69	−3.8	19.8	78.3
Nov. 28	11 02.78	+18 40.7	2.961	3.063	+0.50	−2.7	19.8	86.5
Dec. 8	11 07.78	+18 14.1	2.870	3.116	+0.30	−1.5	19.8	95.1
Dec. 18	11 10.74	+17 59.2	2.779	3.169	+0.07	−0.3	19.8	104.3
Dec. 28	11 11.49	+17 55.9	2.692	3.222	−0.16	+0.8	19.9	114.1
Jan. 7	11 09.90	+18 03.4	2.616	3.274	−0.39	+1.6	19.9	124.4
Jan. 17	11 06.01	+18 19.7	2.555	3.326	−0.60	+2.2	19.9	135.2
Jan. 27	10 59.96	+18 41.9	2.514	3.378	−0.78	+2.4	19.9	146.3
Feb. 6	10 52.15	+19 05.8	2.498	3.429	−0.89	+2.1	20.0	157.4
Feb. 16	10 43.20	+19 27.0	2.510	3.480	−0.93	+1.4	20.1	167.0
Feb. 26	10 33.86	+19 41.4	2.554	3.531	−0.89	+0.5	20.2	169.1
Mar. 8	10 24.96	+19 46.2	2.628	3.581	−0.78	−0.6	20.3	161.1
Mar. 18	10 17.18	+19 40.1	2.731	3.631	−0.62	−1.7	20.5	150.6
Mar. 28	10 11.03	+19 23.3	2.860	3.680	−0.42	−2.6	20.6	139.9

Comet 147P/Kushida-Muramatsu

Epoch = 2016 July 31.0 TT
T = 2016 Feb. 27.95565 TT
Peri. = 347.10277 e = 0.2772083
Node = 93.72361 2000.0 a = 3.7999356 AU
Incl. = 2.36762 n = 0.13305761
q = 2.7465619 AU P = 7.41 years

H = 15.6 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	03 16.89	+16 41.2	2.032	2.763	+0.10	+1.6	20.2	129.4
Jan. 13	03 17.87	+16 56.8	2.137	2.758	+0.35	+2.4	20.4	119.5
Jan. 23	03 21.38	+17 21.3	2.253	2.754	+0.58	+3.2	20.5	110.3
Feb. 2	03 27.21	+17 53.1	2.377	2.750	+0.79	+3.7	20.7	101.6
Feb. 12	03 35.13	+18 30.5	2.506	2.748	+0.98	+4.1	20.8	93.4
Feb. 22	03 44.92	+19 11.6	2.637	2.747	+1.14	+4.3	20.9	85.8
Mar. 3	03 56.32	+19 54.4	2.767	2.747	+1.28	+4.3	21.0	78.5
Mar. 13	04 09.13	+20 37.3	2.895	2.748	+1.40	+4.1	21.1	71.6
Mar. 23	04 23.14	+21 18.4	3.019	2.750	+1.50	+3.8	21.2	65.0
Apr. 2	04 38.17	+21 56.4	3.138	2.753	+1.59	+3.4	21.2	58.6
Apr. 12	04 54.08	+22 29.9	3.250	2.757	+1.66	+2.8	21.3	52.5
Apr. 22	05 10.71	+22 57.9	3.355	2.762	+1.72	+2.1	21.3	46.6
May 2	05 27.91	+23 19.4	3.452	2.769	+1.77	+1.4	21.3	40.8
May 12	05 45.57	+23 33.7	3.540	2.776	+1.80	+0.7	21.3	35.2
May 22	06 03.56	+23 40.4	3.618	2.784	+1.82	−0.1	21.3	29.7
June 1	06 21.77	+23 39.1	3.687	2.794	+1.83	−0.9	21.3	24.3
June 11	06 40.09	+23 29.7	3.745	2.804	+1.83	−1.7	21.2	18.9
June 21	06 58.41	+23 12.2	3.793	2.815	+1.82	−2.5	21.2	13.6
July 1	07 16.65	+22 46.9	3.830	2.828	+1.81	−3.3	21.1	8.3
July 11	07 34.72	+22 14.1	3.855	2.841	+1.78	−4.0	21.0	3.0
July 21	07 52.54	+21 34.3	3.869	2.855	+1.75	−4.6	21.0	2.5
July 31	08 10.04	+20 48.2	3.871	2.869	+1.71	−5.2	21.1	7.9
Aug. 10	08 27.17	+19 56.5	3.862	2.885	+1.67	−5.6	21.2	13.3
Aug. 20	08 43.85	+19 00.1	3.840	2.901	+1.62	−6.0	21.3	18.9
Aug. 30	09 00.04	+17 59.7	3.806	2.918	+1.56	−6.3	21.4	24.6
Sept. 9	09 15.69	+16 56.5	3.760	2.936	+1.50	−6.5	21.5	30.4
Sept.19	09 30.72	+15 51.4	3.703	2.955	+1.44	−6.6	21.5	36.4
Sept.29	09 45.09	+14 45.7	3.634	2.974	+1.36	−6.5	21.5	42.5
Oct. 9	09 58.72	+13 40.5	3.554	2.993	+1.28	−6.3	21.6	48.9
Oct. 19	10 11.53	+12 37.1	3.464	3.014	+1.19	−6.0	21.6	55.5
Oct. 29	10 23.43	+11 36.8	3.364	3.034	+1.09	−5.6	21.5	62.4
Nov. 8	10 34.30	+10 41.1	3.257	3.056	+0.97	−5.0	21.5	69.6
Nov. 18	10 43.99	+09 51.5	3.143	3.077	+0.84	−4.2	21.5	77.1
Nov. 28	10 52.37	+09 09.5	3.025	3.100	+0.69	−3.3	21.4	85.0
Dec. 8	10 59.24	+08 36.7	2.905	3.122	+0.52	−2.2	21.3	93.4
Dec. 18	11 04.43	+08 14.6	2.786	3.145	+0.33	−1.0	21.2	102.2
Dec. 28	11 07.75	+08 04.4	2.672	3.168	+0.13	+0.3	21.1	111.6
Jan. 7	11 09.04	+08 07.1	2.566	3.192	−0.08	+1.6	21.0	121.5
Jan. 17	11 08.23	+08 22.7	2.474	3.216	−0.29	+2.8	20.9	131.9
Jan. 27	11 05.38	+08 50.4	2.400	3.240	−0.47	+3.8	20.7	142.9
Feb. 6	11 00.68	+09 28.0	2.348	3.265	−0.61	+4.4	20.6	154.3
Feb. 16	10 54.59	+10 12.0	2.322	3.289	−0.69	+4.6	20.4	165.9
Feb. 26	10 47.70	+10 57.8	2.325	3.314	−0.70	+4.3	20.2	176.4
Mar. 8	10 40.73	+11 40.8	2.358	3.339	−0.63	+3.6	20.4	169.5
Mar. 18	10 34.41	+12 16.8	2.420	3.364	−0.51	+2.6	20.6	158.1
Mar. 28	10 29.32	+12 42.9	2.509	3.389	−0.34	+1.5	20.9	146.9

Comet 194P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 2.45146 TT
Peri. = 130.70446 e = 0.5756611
Node = 351.99375 2000.0 a = 4.0006118 AU
Incl. = 11.13763 n = 0.12317270
q = 1.6976152 AU P = 8.00 years

m1 = 13.0 + 5 log(Delta) + 17.5 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 55.04	+45 27.2	0.889	1.797	−0.23	−6.7	17.8	147.4
Jan. 13	04 52.77	+44 20.3	0.899	1.768	+0.31	−8.6	17.7	139.7
Jan. 23	04 55.87	+42 54.1	0.924	1.743	+0.85	−9.6	17.6	131.9
Feb. 2	05 04.38	+41 17.8	0.961	1.723	+1.33	−10.1	17.5	124.5
Feb. 12	05 17.72	+39 36.5	1.009	1.709	+1.74	−10.4	17.5	117.8
Feb. 22	05 35.08	+37 52.2	1.066	1.700	+2.04	−10.8	17.5	111.6
Mar. 3	05 55.46	+36 04.3	1.131	1.698	+2.25	−11.3	17.5	106.0
Mar. 13	06 18.01	+34 11.3	1.204	1.701	+2.39	−11.9	17.5	101.0
Mar. 23	06 41.95	+32 11.8	1.284	1.710	+2.46	−12.7	17.6	96.3
Apr. 2	07 06.59	+30 05.1	1.371	1.725	+2.49	−13.4	17.7	92.0
Apr. 12	07 31.45	+27 51.1	1.465	1.745	+2.47	−14.1	17.9	87.9
Apr. 22	07 56.15	+25 30.2	1.566	1.771	+2.42	−14.7	18.0	84.0
May 2	08 20.39	+23 03.6	1.673	1.801	+2.36	−15.1	18.2	80.2
May 12	08 44.04	+20 32.4	1.787	1.836	+2.30	−15.4	18.4	76.5
May 22	09 07.00	+17 58.1	1.906	1.874	+2.22	−15.6	18.6	72.8
June 1	09 29.22	+15 22.0	2.030	1.917	+2.15	−15.7	18.9	69.0
June 11	09 50.74	+12 45.2	2.157	1.962	+2.08	−15.6	19.1	65.2
June 21	10 11.58	+10 08.8	2.288	2.010	+2.02	−15.5	19.4	61.4
July 1	10 31.79	+07 33.7	2.422	2.061	+1.96	−15.3	19.7	57.4
July 11	10 51.43	+05 00.7	2.556	2.114	+1.91	−15.0	20.0	53.4
July 21	11 10.57	+02 30.3	2.690	2.169	+1.87	−14.7	20.3	49.3
July 31	11 29.25	+00 03.2	2.823	2.225	+1.83	−14.3	20.6	45.0
Aug. 10	11 47.55	−02 20.3	2.954	2.282	+1.80	−13.9	20.8	40.6
Aug. 20	12 05.50	−04 39.7	3.080	2.340	+1.77	−13.5	21.1	36.1
Aug. 30	12 23.16	−06 54.7	3.202	2.399	+1.74	−13.0	21.4	31.5
Sept. 9	12 40.57	−09 05.1	3.316	2.459	+1.72	−12.5	21.7	26.7
Sept.19	12 57.74	−11 10.5	3.423	2.519	+1.70	−12.0	21.9	21.8
Sept.29	13 14.71	−13 10.7	3.521	2.579	+1.68	−11.5	22.2	16.9
Oct. 9	13 31.49	−15 05.5	3.608	2.639	+1.66	−10.9	22.4	12.0
Oct. 19	13 48.05	−16 54.7	3.684	2.700	+1.64	−10.3	22.7	7.6
Oct. 29	14 04.41	−18 38.1	3.747	2.760	+1.61	−9.8	22.9	5.7
Nov. 8	14 20.53	−20 15.7	3.797	2.821	+1.58	−9.2	.	8.6
Nov. 18	14 36.35	−21 47.3	3.832	2.881	+1.55	−8.6	.	13.8
Nov. 28	14 51.83	−23 13.0	3.852	2.941	+1.51	−8.0	.	19.6
Dec. 8	15 06.89	−24 32.9	3.856	3.001	+1.45	−7.4	.	25.8
Dec. 18	15 21.44	−25 47.0	3.846	3.060	+1.39	−6.9	.	32.3
Dec. 28	15 35.37	−26 55.9	3.820	3.119	+1.32	−6.4	.	39.1
Jan. 7	15 48.54	−27 59.7	3.779	3.177	+1.23	−5.9	.	46.1
Jan. 17	16 00.81	−28 58.9	3.725	3.235	+1.12	−5.5	.	53.3
Jan. 27	16 12.01	−29 54.1	3.659	3.293	+0.99	−5.2	.	60.8
Feb. 6	16 21.95	−30 45.9	3.581	3.350	+0.85	−4.9	.	68.6
Feb. 16	16 30.43	−31 34.7	3.495	3.406	+0.68	−4.6	.	76.7
Feb. 26	16 37.24	−32 20.9	3.404	3.462	+0.49	−4.4	.	85.1
Mar. 8	16 42.13	−33 04.8	3.309	3.517	+0.28	−4.1	.	93.8
Mar. 18	16 44.93	−33 46.2	3.216	3.572	+0.05	−3.8	.	102.9
Mar. 28	16 45.45	−34 24.3	3.127	3.626	−0.19	−3.4	.	112.4

Comet P/2015 TO19 (Lemmon-PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 6.91551 TT
Peri. = 89.27045 e = 0.3585893
Node = 321.64507 2000.0 a = 4.5613229 AU
Incl. = 6.49999 n = 0.10117375
q = 2.9256813 AU P = 9.74 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 50.86	+12 53.4	2.700	2.951	+0.86	+3.6	20.2	94.9
Jan. 13	00 59.45	+13 29.3	2.828	2.944	+1.01	+4.5	20.3	86.9
Jan. 23	01 09.50	+14 14.3	2.956	2.938	+1.13	+5.2	20.4	79.3
Feb. 2	01 20.82	+15 06.7	3.082	2.933	+1.24	+5.8	20.5	72.1
Feb. 12	01 33.25	+16 04.9	3.204	2.929	+1.34	+6.3	20.5	65.2
Feb. 22	01 46.65	+17 07.5	3.320	2.927	+1.42	+6.5	20.6	58.5
Mar. 3	02 00.90	+18 12.8	3.429	2.926	+1.50	+6.7	20.7	52.0
Mar. 13	02 15.90	+19 19.3	3.531	2.926	+1.57	+6.6	20.7	45.8
Mar. 23	02 31.55	+20 25.8	3.623	2.927	+1.62	+6.5	20.8	39.8
Apr. 2	02 47.77	+21 30.8	3.706	2.930	+1.67	+6.3	20.8	33.9
Apr. 12	03 04.51	+22 33.3	3.779	2.934	+1.72	+5.9	20.9	28.1
Apr. 22	03 21.67	+23 32.2	3.842	2.939	+1.75	+5.4	20.9	22.5
May 2	03 39.19	+24 26.5	3.893	2.945	+1.78	+4.9	21.0	17.1
May 12	03 57.00	+25 15.4	3.934	2.952	+1.80	+4.3	21.0	11.8
May 22	04 15.01	+25 58.3	3.963	2.961	+1.81	+3.6	21.1	7.1
June 1	04 33.16	+26 34.6	3.981	2.971	+1.82	+2.9	21.1	4.6
June 11	04 51.35	+27 03.9	3.987	2.982	+1.81	+2.2	21.1	7.2
June 21	05 09.49	+27 26.1	3.981	2.994	+1.80	+1.5	21.1	11.9
July 1	05 27.48	+27 41.0	3.963	3.007	+1.77	+0.8	21.2	17.2
July 11	05 45.23	+27 48.9	3.934	3.021	+1.74	+0.1	21.2	22.6
July 21	06 02.61	+27 50.0	3.894	3.036	+1.69	-0.5	21.2	28.2
July 31	06 19.54	+27 44.8	3.842	3.052	+1.64	-1.1	21.2	33.9
Aug. 10	06 35.90	+27 33.9	3.779	3.070	+1.57	-1.6	21.2	39.8
Aug. 20	06 51.57	+27 18.1	3.706	3.088	+1.49	-2.0	21.2	45.9
Aug. 30	07 06.43	+26 58.4	3.622	3.107	+1.39	-2.3	21.2	52.2
Sept. 9	07 20.36	+26 35.8	3.529	3.126	+1.28	-2.4	21.2	58.7
Sept.19	07 33.20	+26 11.4	3.428	3.147	+1.16	-2.5	21.1	65.5
Sept.29	07 44.83	+25 46.7	3.320	3.169	+1.02	-2.4	21.1	72.6
Oct. 9	07 55.06	+25 22.8	3.207	3.191	+0.87	-2.2	21.1	80.1
Oct. 19	08 03.71	+25 01.3	3.091	3.214	+0.69	-1.8	21.1	88.0
Oct. 29	08 10.60	+24 43.4	2.974	3.237	+0.49	-1.3	21.0	96.3
Nov. 8	08 15.53	+24 30.4	2.859	3.261	+0.28	-0.7	21.0	105.1
Nov. 18	08 18.32	+24 22.9	2.750	3.286	+0.05	-0.2	20.9	114.5
Nov. 28	08 18.83	+24 21.3	2.652	3.312	-0.18	+0.4	20.9	124.5
Dec. 8	08 17.03	+24 25.2	2.568	3.337	-0.40	+0.8	20.9	135.0
Dec. 18	08 13.03	+24 33.3	2.503	3.364	-0.59	+1.0	20.9	146.0
Dec. 28	08 07.15	+24 43.5	2.462	3.391	-0.72	+1.0	20.9	157.4
Jan. 7	07 59.94	+24 53.3	2.448	3.418	-0.78	+0.7	21.0	168.8
Jan. 17	07 52.14	+25 00.2	2.464	3.446	-0.76	+0.2	21.0	175.7
Jan. 27	07 44.56	+25 02.4	2.510	3.474	-0.66	-0.3	21.1	166.1
Feb. 6	07 37.97	+24 59.3	2.585	3.503	-0.50	-0.8	21.2	154.7
Feb. 16	07 32.97	+24 50.9	2.687	3.531	-0.31	-1.3	21.4	143.6
Feb. 26	07 29.90	+24 37.8	2.811	3.561	-0.10	-1.7	21.5	133.0
Mar. 8	07 28.93	+24 20.9	2.954	3.590	+0.11	-2.0	21.7	122.8
Mar. 18	07 30.01	+24 00.7	3.111	3.620	+0.30	-2.3	21.8	113.1
Mar. 28	07 32.99	+23 37.7	3.278	3.649	+0.47	-2.6	22.0	103.9

Comet C/2014 W2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 10.50303 TT
Peri. = 85.01629
Node = 69.96305 2000.0
Incl. = 81.99854
q = 2.6702323 AU
e = 0.9982739

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	19 29.96	+72 08.7	2.493	2.763	+1.83	−16.5	13.2	95.3
Jan. 13	19 48.24	+69 23.6	2.537	2.738	+1.43	−12.6	13.2	91.1
Jan. 23	20 02.58	+67 17.7	2.584	2.716	+1.15	−8.8	13.2	87.0
Feb. 2	20 14.09	+65 50.2	2.629	2.699	+0.91	−5.1	13.2	83.4
Feb. 12	20 23.18	+64 59.4	2.669	2.686	+0.66	−1.7	13.2	80.3
Feb. 22	20 29.83	+64 42.6	2.702	2.677	+0.40	+1.4	13.2	78.0
Mar. 3	20 33.79	+64 56.8	2.724	2.671	+0.07	+4.2	13.2	76.4
Mar. 13	20 34.52	+65 38.7	2.736	2.670	−0.35	+6.5	13.3	75.7
Mar. 23	20 31.06	+66 44.1	2.737	2.673	−0.90	+8.3	13.3	75.8
Apr. 2	20 22.07	+68 07.1	2.729	2.681	−1.65	+9.2	13.3	76.6
Apr. 12	20 05.56	+69 39.4	2.713	2.692	−2.64	+8.8	13.3	78.1
Apr. 22	19 39.11	+71 07.0	2.692	2.707	−3.81	+6.2	13.3	80.1
May 2	19 00.98	+72 09.4	2.669	2.726	−4.84	+1.0	13.3	82.4
May 12	18 12.55	+72 19.5	2.649	2.750	−5.17	−6.6	13.3	84.9
May 22	17 20.85	+71 13.5	2.635	2.776	−4.58	−14.9	13.3	87.2
June 1	16 35.07	+68 44.9	2.631	2.806	−3.48	−22.0	13.4	89.2
June 11	16 00.32	+65 05.0	2.642	2.840	−2.37	−27.1	13.4	90.6
June 21	15 36.59	+60 33.8	2.671	2.877	−1.50	−30.3	13.5	91.1
July 1	15 21.64	+55 31.1	2.721	2.917	−0.85	−31.8	13.6	90.7
July 11	15 13.12	+50 13.4	2.792	2.960	−0.39	−32.0	13.7	89.3
July 21	15 09.22	+44 53.7	2.885	3.005	−0.06	−31.2	13.9	86.8
July 31	15 08.65	+39 42.0	2.998	3.053	+0.19	−29.7	14.0	83.4
Aug. 10	15 10.52	+34 44.9	3.128	3.104	+0.37	−27.8	14.2	79.3
Aug. 20	15 14.20	+30 06.7	3.272	3.156	+0.51	−25.7	14.4	74.5
Aug. 30	15 19.25	+25 49.6	3.426	3.211	+0.61	−23.5	14.5	69.3
Sept. 9	15 25.37	+21 54.2	3.587	3.268	+0.69	−21.4	14.7	63.7
Sept.19	15 32.28	+18 20.3	3.749	3.326	+0.75	−19.3	14.9	57.9
Sept.29	15 39.82	+15 06.8	3.911	3.386	+0.80	−17.4	15.1	51.9
Oct. 9	15 47.83	+12 12.6	4.066	3.447	+0.83	−15.6	15.2	45.9
Oct. 19	15 56.16	+09 36.2	4.213	3.510	+0.86	−14.0	15.4	40.1
Oct. 29	16 04.72	+07 16.3	4.349	3.574	+0.87	−12.5	15.5	34.4
Nov. 8	16 13.39	+05 11.4	4.470	3.639	+0.87	−11.1	15.7	29.4
Nov. 18	16 22.06	+03 20.3	4.574	3.706	+0.86	−9.8	15.8	25.5
Nov. 28	16 30.64	+01 41.9	4.659	3.773	+0.84	−8.7	15.9	23.3
Dec. 8	16 39.02	+00 14.9	4.724	3.841	+0.81	−7.7	16.0	23.5
Dec. 18	16 47.08	−01 01.7	4.768	3.910	+0.76	−6.7	16.1	26.2
Dec. 28	16 54.72	−02 09.0	4.790	3.979	+0.71	−5.9	16.2	30.9
Jan. 7	17 01.80	−03 08.0	4.791	4.049	+0.64	−5.2	16.3	37.0
Jan. 17	17 08.20	−03 59.8	4.771	4.120	+0.56	−4.6	16.3	44.0
Jan. 27	17 13.78	−04 45.3	4.732	4.191	+0.46	−4.0	16.4	51.6
Feb. 6	17 18.40	−05 25.8	4.675	4.263	+0.35	−3.6	16.4	59.7
Feb. 16	17 21.91	−06 02.2	4.603	4.335	+0.22	−3.4	16.5	68.2
Feb. 26	17 24.16	−06 35.8	4.520	4.408	+0.08	−3.2	16.5	77.2
Mar. 8	17 25.00	−07 07.8	4.429	4.481	−0.07	−3.1	16.5	86.5
Mar. 18	17 24.30	−07 39.2	4.336	4.554	−0.23	−3.2	16.6	96.3
Mar. 28	17 21.98	−08 11.2	4.245	4.627	−0.40	−3.3	16.6	106.4

Comet 252P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 15.26532 TT
Peri. = 343.31443 e = 0.6730506
Node = 190.94756 2000.0 a = 3.0467118 AU
Incl. = 10.42217 n = 0.18533481
q = 0.9961206 AU P = 5.32 years

m1 = 18.6 + 5 log(Delta) + 7.5 log(r(t-60))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 35.47	-10 04.8	0.459	1.391	-1.08	-22.7	19.0	146.8
Jan. 13	06 24.65	-13 51.5	0.388	1.307	-1.20	-21.0	18.5	140.5
Jan. 23	06 12.62	-17 21.8	0.328	1.228	-1.13	-19.1	18.0	131.9
Feb. 2	06 01.30	-20 33.2	0.274	1.156	-0.89	-18.6	17.4	122.4
Feb. 12	05 52.43	-23 39.1	0.223	1.093	-0.51	-22.6	16.8	113.0
Feb. 22	05 47.30	-27 24.8	0.170	1.044	-0.13	-38.6	16.0	104.3
Mar. 3	05 46.04	-33 51.3	0.116	1.011	+0.54	103.3	15.0	96.5
Mar. 13	05 51.45	-51 03.9	0.063	0.997	+68.68	-47.7	13.5	90.6
Mar. 23	17 18.28	-59 01.2	0.037	1.002	+1.56	295.2	12.1	97.4
Apr. 2	17 33.85	-09 49.6	0.078	1.027	-0.18	+72.2	13.5	108.5
Apr. 12	17 32.08	+02 12.1	0.133	1.069	-0.62	+27.6	14.5	116.9
Apr. 22	17 25.89	+06 48.2	0.190	1.126	-0.92	+11.4	15.1	125.3
May 2	17 16.68	+08 42.4	0.249	1.194	-1.10	+2.1	15.6	133.8
May 12	17 05.72	+09 03.5	0.312	1.270	-1.08	-4.4	16.1	141.7
May 22	16 54.88	+08 19.1	0.383	1.352	-0.92	-8.9	16.5	147.8
June 1	16 45.69	+06 49.9	0.464	1.438	-0.66	-11.7	17.0	151.0
June 11	16 39.12	+04 52.8	0.558	1.526	-0.34	-13.1	17.6	150.5
June 21	16 35.68	+02 42.1	0.666	1.615	-0.04	-13.3	18.1	146.9
July 1	16 35.29	+00 28.8	0.788	1.705	+0.24	-13.0	18.7	141.4
July 11	16 37.68	-01 40.8	0.924	1.794	+0.48	-12.2	19.2	135.2
July 21	16 42.50	-03 42.5	1.073	1.883	+0.68	-11.2	19.7	128.6
July 31	16 49.33	-05 34.1	1.235	1.971	+0.85	-10.1	20.2	122.0
Aug. 10	16 57.84	-07 14.9	1.408	2.058	+0.99	-8.9	20.7	115.4
Aug. 20	17 07.75	-08 44.3	1.590	2.143	+1.10	-7.8	21.2	108.9
Aug. 30	17 18.78	-10 02.4	1.779	2.227	+1.20	-6.7	21.6	102.4
Sept. 9	17 30.73	-11 09.4	1.975	2.309	+1.27	-5.6	22.0	96.0
Sept.19	17 43.44	-12 05.6	2.175	2.390	+1.33	-4.6	22.3	89.6
Sept.29	17 56.73	-12 51.3	2.378	2.469	+1.38	-3.6	22.7	83.3
Oct. 9	18 10.49	-13 26.9	2.581	2.547	+1.41	-2.6	23.0	76.9
Oct. 19	18 24.60	-13 52.6	2.781	2.623	+1.43	-1.6	.	70.5
Oct. 29	18 38.95	-14 08.9	2.979	2.698	+1.45	-0.7	.	64.1
Nov. 8	18 53.46	-14 16.1	3.170	2.771	+1.46	+0.1	.	57.7
Nov. 18	19 08.03	-14 14.8	3.354	2.842	+1.45	+0.9	.	51.3
Nov. 28	19 22.57	-14 05.4	3.528	2.912	+1.45	+1.7	.	44.8
Dec. 8	19 37.04	-13 48.3	3.691	2.981	+1.43	+2.4	.	38.3
Dec. 18	19 51.33	-13 24.3	3.840	3.048	+1.41	+3.0	.	31.8
Dec. 28	20 05.41	-12 53.9	3.974	3.113	+1.38	+3.6	.	25.3
Jan. 7	20 19.21	-12 17.8	4.092	3.178	+1.34	+4.1	.	18.9
Jan. 17	20 32.65	-11 36.7	4.192	3.240	+1.31	+4.5	.	12.8
Jan. 27	20 45.71	-10 51.2	4.274	3.302	+1.26	+4.9	.	7.9
Feb. 6	20 58.32	-10 02.1	4.337	3.362	+1.21	+5.2	.	7.5
Feb. 16	21 10.42	-09 10.2	4.380	3.421	+1.16	+5.4	.	12.1
Feb. 26	21 21.97	-08 16.3	4.404	3.478	+1.09	+5.5	.	18.4
Mar. 8	21 32.91	-07 21.2	4.408	3.534	+1.03	+5.6	.	25.1
Mar. 18	21 43.18	-06 25.6	4.393	3.589	+0.95	+5.5	.	32.1

Comet P/2010 V1-B (Ikeya-Murakami)

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 17.26532 TT
Peri. = 152.44710 e = 0.4903546
Node = 3.78317 2000.0 a = 3.0863612 AU
Incl. = 9.38732 n = 0.18177491
q = 1.5729498 AU P = 5.42 years

m1 = 16.2 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	09 12.11	+36 03.9	0.813	1.722	-0.04	+3.6	19.3	146.9
Jan. 13	09 11.70	+36 40.0	0.746	1.687	-0.43	+1.6	19.0	154.2
Jan. 23	09 07.39	+36 56.1	0.697	1.656	-0.69	-1.8	18.7	159.6
Feb. 2	09 00.50	+36 38.1	0.666	1.629	-0.73	-6.2	18.5	160.5
Feb. 12	08 53.17	+35 35.7	0.654	1.607	-0.52	-10.8	18.4	156.1
Feb. 22	08 47.94	+33 47.9	0.659	1.590	-0.14	-14.5	18.3	148.9
Mar. 3	08 46.54	+31 23.1	0.680	1.579	+0.31	-17.0	18.3	141.1
Mar. 13	08 49.67	+28 32.8	0.714	1.573	+0.75	-18.5	18.4	133.5
Mar. 23	08 57.21	+25 27.9	0.761	1.574	+1.12	-19.2	18.6	126.6
Apr. 2	09 08.42	+22 16.2	0.819	1.580	+1.41	-19.4	18.7	120.3
Apr. 12	09 22.49	+19 02.5	0.887	1.592	+1.62	-19.3	19.0	114.7
Apr. 22	09 38.68	+15 49.6	0.964	1.610	+1.76	-19.0	19.2	109.7
May 2	09 56.33	+12 39.1	1.049	1.632	+1.86	-18.7	19.5	105.0
May 12	10 14.96	+09 32.1	1.142	1.660	+1.93	-18.3	19.8	100.7
May 22	10 34.23	+06 29.2	1.244	1.692	+1.96	-17.8	20.1	96.6
June 1	10 53.86	+03 31.3	1.352	1.728	+1.98	-17.3	20.4	92.7
June 11	11 13.71	+00 38.7	1.467	1.767	+2.00	-16.7	20.7	88.8
June 21	11 33.66	-02 08.2	1.589	1.810	+2.00	-16.1	21.1	85.0
July 1	11 53.65	-04 48.8	1.716	1.855	+2.00	-15.4	21.4	81.1
July 11	12 13.67	-07 22.9	1.849	1.903	+2.00	-14.7	21.7	77.2
July 21	12 33.68	-09 50.2	1.985	1.952	+2.00	-14.0	22.0	73.3
July 31	12 53.70	-12 10.2	2.124	2.003	+2.00	-13.3	22.4	69.2
Aug. 10	13 13.75	-14 22.9	2.266	2.055	+2.01	-12.5	22.7	65.0
Aug. 20	13 33.83	-16 27.9	2.409	2.108	+2.01	-11.7	23.0	60.8
Aug. 30	13 53.95	-18 24.8	2.551	2.162	+2.02	-10.9	.	56.4
Sept. 9	14 14.15	-20 13.5	2.693	2.217	+2.03	-10.0	.	51.9
Sept.19	14 34.40	-21 53.7	2.831	2.272	+2.03	-9.1	.	47.2
Sept.29	14 54.71	-23 25.0	2.966	2.327	+2.04	-8.2	.	42.4
Oct. 9	15 15.07	-24 47.4	3.095	2.382	+2.04	-7.3	.	37.6
Oct. 19	15 35.45	-26 00.6	3.217	2.437	+2.04	-6.4	.	32.5
Oct. 29	15 55.80	-27 04.6	3.331	2.492	+2.03	-5.5	.	27.4
Nov. 8	16 16.09	-27 59.3	3.435	2.546	+2.02	-4.6	.	22.3
Nov. 18	16 36.24	-28 44.9	3.529	2.600	+2.00	-3.7	.	17.1
Nov. 28	16 56.20	-29 21.4	3.611	2.654	+1.97	-2.8	.	12.1
Dec. 8	17 15.87	-29 49.3	3.679	2.707	+1.93	-2.0	.	8.0
Dec. 18	17 35.18	-30 08.9	3.734	2.760	+1.89	-1.2	.	7.0
Dec. 28	17 54.03	-30 21.0	3.774	2.812	+1.83	-0.5	.	10.4
Jan. 7	18 12.35	-30 26.2	3.799	2.864	+1.77	+0.1	.	15.6
Jan. 17	18 30.01	-30 25.4	3.808	2.915	+1.69	+0.6	.	21.5
Jan. 27	18 46.96	-30 19.7	3.801	2.965	+1.61	+1.0	.	27.7
Feb. 6	19 03.08	-30 10.0	3.779	3.014	+1.52	+1.2	.	34.2
Feb. 16	19 18.28	-29 57.7	3.741	3.063	+1.42	+1.4	.	40.8
Feb. 26	19 32.47	-29 44.0	3.690	3.111	+1.31	+1.4	.	47.7
Mar. 8	19 45.55	-29 30.3	3.625	3.158	+1.19	+1.2	.	54.8
Mar. 18	19 57.40	-29 17.9	3.548	3.205	+1.05	+1.0	.	62.1
Mar. 28	20 07.91	-29 08.3	3.461	3.250	+0.90	+0.5	.	69.6

Comet P/2010 V1-A (Ikeya-Murakami)

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 17.27669 TT
Peri. = 152.44102 e = 0.4903719
Node = 3.78305 2000.0 a = 3.0863820 AU
Incl. = 9.38706 n = 0.18177308
q = 1.5729070 AU P = 5.42 years

m1 = 16.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	09 11.99	+36 04.6	0.813	1.722	-0.04	+3.6	19.1	146.9
Jan. 13	09 11.56	+36 40.7	0.746	1.687	-0.43	+1.6	18.8	154.2
Jan. 23	09 07.24	+36 56.9	0.697	1.656	-0.69	-1.8	18.5	159.6
Feb. 2	09 00.34	+36 38.8	0.666	1.629	-0.73	-6.2	18.3	160.4
Feb. 12	08 53.02	+35 36.4	0.654	1.607	-0.52	-10.8	18.2	156.0
Feb. 22	08 47.79	+33 48.6	0.659	1.590	-0.14	-14.5	18.1	148.9
Mar. 3	08 46.40	+31 23.7	0.680	1.579	+0.32	-17.0	18.1	141.1
Mar. 13	08 49.56	+28 33.4	0.714	1.573	+0.76	-18.5	18.2	133.5
Mar. 23	08 57.11	+25 28.4	0.762	1.574	+1.12	-19.2	18.4	126.5
Apr. 2	09 08.33	+22 16.8	0.819	1.580	+1.41	-19.4	18.5	120.3
Apr. 12	09 22.41	+19 03.1	0.887	1.592	+1.62	-19.3	18.8	114.7
Apr. 22	09 38.61	+15 50.1	0.964	1.610	+1.77	-19.0	19.0	109.6
May 2	09 56.27	+12 39.6	1.049	1.632	+1.86	-18.7	19.3	105.0
May 12	10 14.90	+09 32.5	1.143	1.660	+1.93	-18.3	19.6	100.7
May 22	10 34.18	+06 29.7	1.244	1.692	+1.96	-17.8	19.9	96.6
June 1	10 53.81	+03 31.7	1.352	1.728	+1.99	-17.3	20.2	92.7
June 11	11 13.67	+00 39.1	1.468	1.767	+2.00	-16.7	20.5	88.8
June 21	11 33.63	-02 07.8	1.589	1.810	+2.00	-16.1	20.9	85.0
July 1	11 53.62	-04 48.4	1.716	1.855	+2.00	-15.4	21.2	81.1
July 11	12 13.64	-07 22.6	1.849	1.903	+2.00	-14.7	21.5	77.2
July 21	12 33.65	-09 49.9	1.985	1.952	+2.00	-14.0	21.8	73.2
July 31	12 53.67	-12 10.0	2.125	2.003	+2.00	-13.3	22.2	69.2
Aug. 10	13 13.72	-14 22.7	2.266	2.055	+2.01	-12.5	22.5	65.0
Aug. 20	13 33.80	-16 27.7	2.409	2.108	+2.01	-11.7	22.8	60.8
Aug. 30	13 53.93	-18 24.6	2.552	2.162	+2.02	-10.9	.	56.4
Sept. 9	14 14.12	-20 13.3	2.693	2.217	+2.03	-10.0	.	51.8
Sept.19	14 34.38	-21 53.5	2.831	2.272	+2.03	-9.1	.	47.2
Sept.29	14 54.69	-23 24.9	2.966	2.327	+2.04	-8.2	.	42.4
Oct. 9	15 15.05	-24 47.3	3.095	2.382	+2.04	-7.3	.	37.5
Oct. 19	15 35.43	-26 00.5	3.217	2.437	+2.04	-6.4	.	32.5
Oct. 29	15 55.78	-27 04.5	3.331	2.492	+2.03	-5.5	.	27.4
Nov. 8	16 16.07	-27 59.3	3.435	2.546	+2.02	-4.6	.	22.2
Nov. 18	16 36.22	-28 44.8	3.529	2.600	+2.00	-3.7	.	17.1
Nov. 28	16 56.18	-29 21.3	3.611	2.654	+1.97	-2.8	.	12.1
Dec. 8	17 15.85	-29 49.2	3.679	2.707	+1.93	-2.0	.	8.0
Dec. 18	17 35.16	-30 08.9	3.734	2.760	+1.89	-1.2	.	7.0
Dec. 28	17 54.01	-30 21.0	3.774	2.812	+1.83	-0.5	.	10.4
Jan. 7	18 12.32	-30 26.2	3.799	2.864	+1.77	+0.1	.	15.6
Jan. 17	18 29.99	-30 25.4	3.808	2.915	+1.69	+0.6	.	21.5
Jan. 27	18 46.94	-30 19.7	3.801	2.965	+1.61	+1.0	.	27.7
Feb. 6	19 03.06	-30 10.1	3.779	3.014	+1.52	+1.2	.	34.2
Feb. 16	19 18.26	-29 57.8	3.741	3.063	+1.42	+1.4	.	40.8
Feb. 26	19 32.45	-29 44.1	3.690	3.111	+1.31	+1.4	.	47.7
Mar. 8	19 45.53	-29 30.4	3.625	3.158	+1.19	+1.2	.	54.8
Mar. 18	19 57.38	-29 18.0	3.548	3.205	+1.05	+1.0	.	62.1
Mar. 28	20 07.89	-29 08.4	3.460	3.250	+0.90	+0.5	.	69.6

Comet 104P/Kowal

Epoch = 2016 July 31.0 TT
T = 2016 Mar. 28.15829 TT
Peri. = 200.66755 e = 0.6385655
Node = 235.42984 2000.0 a = 3.2627693 AU
Incl. = 10.25415 n = 0.16723398
q = 1.1792774 AU P = 5.89 years

m1 = 13.2 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 24.86	-03 13.2	1.903	1.566	+2.39	+8.9	17.5	55.2
Jan. 13	22 48.80	-01 44.5	1.900	1.494	+2.59	+10.4	17.2	51.1
Jan. 23	23 14.70	-00 00.1	1.891	1.426	+2.79	+11.8	16.9	47.6
Feb. 2	23 42.56	+01 58.0	1.877	1.363	+2.99	+12.9	16.6	44.6
Feb. 12	00 12.44	+04 07.4	1.860	1.307	+3.19	+13.7	16.3	42.1
Feb. 22	00 44.38	+06 24.4	1.841	1.259	+3.40	+13.9	16.0	40.2
Mar. 3	01 18.40	+08 43.9	1.825	1.221	+3.61	+13.6	15.8	38.8
Mar. 13	01 54.47	+10 59.9	1.812	1.195	+3.80	+12.6	15.6	37.9
Mar. 23	02 32.42	+13 05.5	1.806	1.181	+3.95	+10.8	15.6	37.4
Apr. 2	03 11.94	+14 53.3	1.809	1.181	+4.06	+8.4	15.6	37.3
Apr. 12	03 52.57	+16 16.8	1.824	1.194	+4.11	+5.4	15.7	37.4
Apr. 22	04 33.67	+17 11.1	1.852	1.220	+4.08	+2.2	15.8	37.5
May 2	05 14.50	+17 33.5	1.895	1.258	+3.99	-0.9	16.1	37.7
May 12	05 54.39	+17 24.2	1.951	1.305	+3.83	-3.8	16.4	37.6
May 22	06 32.73	+16 45.8	2.021	1.361	+3.64	-6.3	16.7	37.2
June 1	07 09.08	+15 42.6	2.104	1.424	+3.42	-8.3	17.1	36.6
June 11	07 43.26	+14 19.3	2.198	1.492	+3.19	-9.8	17.5	35.5
June 21	08 15.19	+12 41.1	2.300	1.564	+2.98	-10.9	17.9	33.9
July 1	08 44.95	+10 52.2	2.409	1.638	+2.77	-11.6	18.3	32.0
July 11	09 12.70	+08 56.4	2.523	1.715	+2.59	-12.0	18.7	29.7
July 21	09 38.60	+06 56.5	2.638	1.793	+2.43	-12.2	19.1	27.0
July 31	10 02.87	+04 54.9	2.754	1.872	+2.28	-12.2	19.5	23.9
Aug. 10	10 25.71	+02 53.2	2.867	1.951	+2.16	-12.0	19.8	20.5
Aug. 20	10 47.27	+00 52.7	2.976	2.030	+2.05	-11.8	20.2	16.9
Aug. 30	11 07.72	-01 05.6	3.079	2.108	+1.95	-11.5	20.5	13.1
Sept. 9	11 27.19	-03 01.0	3.174	2.186	+1.86	-11.2	20.8	9.3
Sept.19	11 45.78	-04 52.7	3.259	2.264	+1.78	-10.8	21.1	6.4
Sept.29	12 03.58	-06 40.4	3.333	2.340	+1.71	-10.3	21.4	6.3
Oct. 9	12 20.63	-08 23.6	3.394	2.416	+1.63	-9.8	21.6	9.7
Oct. 19	12 36.98	-10 01.9	3.442	2.490	+1.57	-9.3	21.8	14.5
Oct. 29	12 52.64	-11 34.9	3.475	2.564	+1.50	-8.7	22.0	19.9
Nov. 8	13 07.60	-13 02.4	3.493	2.636	+1.42	-8.2	22.2	25.8
Nov. 18	13 21.82	-14 24.0	3.495	2.707	+1.34	-7.5	22.4	32.0
Nov. 28	13 35.24	-15 39.3	3.481	2.777	+1.25	-6.9	22.6	38.5
Dec. 8	13 47.78	-16 48.2	3.451	2.846	+1.15	-6.2	22.7	45.3
Dec. 18	13 59.33	-17 50.2	3.407	2.914	+1.04	-5.5	22.8	52.5
Dec. 28	14 09.75	-18 45.2	3.348	2.980	+0.91	-4.8	22.9	60.0
Jan. 7	14 18.87	-19 32.8	3.278	3.046	+0.76	-4.0	23.0	67.8
Jan. 17	14 26.52	-20 12.5	3.197	3.110	+0.60	-3.1	.	76.0
Jan. 27	14 32.49	-20 43.9	3.109	3.173	+0.41	-2.2	.	84.7
Feb. 6	14 36.57	-21 06.4	3.017	3.235	+0.20	-1.3	.	93.8
Feb. 16	14 38.58	-21 19.0	2.925	3.296	-0.02	-0.2	.	103.3
Feb. 26	14 38.38	-21 21.0	2.837	3.355	-0.25	+1.0	.	113.4
Mar. 8	14 35.90	-21 11.4	2.759	3.414	-0.46	+2.2	.	123.9
Mar. 18	14 31.27	-20 49.4	2.696	3.471	-0.65	+3.4	.	135.0
Mar. 28	14 24.75	-20 15.0	2.653	3.528	-0.79	+4.6	.	146.4

Comet 100P/Hartley

Epoch = 2016 July 31.0 TT
T = 2016 Apr. 2.03292 TT
Peri. = 181.86588 e = 0.4134105
Node = 37.72503 2000.0 a = 3.4275808 AU
Incl. = 25.58941 n = 0.15531826
q = 2.0105829 AU P = 6.35 years

m1 = 9.2 + 5 log(Delta) + 25.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 20.83	-00 14.4	2.264	2.127	+1.62	-13.0	19.2	69.4
Jan. 13	14 36.99	-02 24.4	2.137	2.104	+1.55	-12.9	18.9	74.7
Jan. 23	14 52.45	-04 33.4	2.008	2.082	+1.46	-12.9	18.7	80.3
Feb. 2	15 07.01	-06 42.6	1.880	2.064	+1.34	-13.1	18.4	86.2
Feb. 12	15 20.41	-08 53.7	1.754	2.048	+1.19	-13.5	18.2	92.4
Feb. 22	15 32.31	-11 08.8	1.630	2.035	+1.00	-14.2	18.0	99.0
Mar. 3	15 42.34	-13 30.8	1.512	2.024	+0.77	-15.2	17.8	106.1
Mar. 13	15 50.01	-16 02.5	1.400	2.017	+0.47	-16.4	17.5	113.7
Mar. 23	15 54.75	-18 46.7	1.297	2.012	+0.13	-17.8	17.4	122.0
Apr. 2	15 56.03	-21 44.8	1.208	2.011	-0.27	-19.0	17.2	131.0
Apr. 12	15 53.29	-24 55.1	1.134	2.012	-0.70	-19.6	17.1	140.6
Apr. 22	15 46.32	-28 11.3	1.080	2.017	-1.09	-19.1	17.0	150.4
May 2	15 35.46	-31 22.0	1.050	2.024	-1.36	-17.1	17.0	159.2
May 12	15 21.83	-34 12.9	1.045	2.034	-1.44	-14.0	17.0	163.9
May 22	15 07.41	-36 32.8	1.065	2.048	-1.30	-10.5	17.1	160.7
June 1	14 54.40	-38 17.9	1.109	2.064	-0.97	-7.5	17.3	152.8
June 11	14 44.67	-39 32.6	1.175	2.082	-0.54	-5.3	17.5	143.8
June 21	14 39.30	-40 25.7	1.258	2.103	-0.08	-4.1	17.8	135.0
July 1	14 38.51	-41 06.2	1.356	2.127	+0.36	-3.4	18.1	126.8
July 11	14 42.10	-41 40.6	1.465	2.152	+0.75	-3.2	18.4	119.2
July 21	14 49.58	-42 13.0	1.583	2.180	+1.08	-3.2	18.7	112.2
July 31	15 00.41	-42 44.8	1.708	2.210	+1.37	-3.1	19.0	105.7
Aug. 10	15 14.10	-43 16.0	1.838	2.241	+1.61	-3.0	19.3	99.5
Aug. 20	15 30.21	-43 45.9	1.971	2.274	+1.81	-2.7	19.6	93.7
Aug. 30	15 48.34	-44 13.0	2.108	2.308	+1.98	-2.3	19.9	88.2
Sept. 9	16 08.19	-44 35.8	2.246	2.344	+2.12	-1.7	20.2	82.8
Sept.19	16 29.42	-44 52.7	2.385	2.380	+2.23	-1.0	20.5	77.6
Sept.29	16 51.75	-45 02.2	2.523	2.418	+2.32	-0.1	20.8	72.5
Oct. 9	17 14.91	-45 03.2	2.661	2.457	+2.37	+0.8	21.1	67.4
Oct. 19	17 38.61	-44 54.8	2.796	2.496	+2.40	+1.8	21.4	62.4
Oct. 29	18 02.62	-44 36.5	2.929	2.536	+2.41	+2.8	21.6	57.4
Nov. 8	18 26.70	-44 08.1	3.058	2.577	+2.39	+3.8	21.9	52.5
Nov. 18	18 50.61	-43 29.8	3.181	2.618	+2.36	+4.8	22.2	47.6
Nov. 28	19 14.19	-42 42.0	3.299	2.659	+2.31	+5.6	22.4	42.7
Dec. 8	19 37.29	-41 45.7	3.409	2.701	+2.25	+6.4	22.7	37.9
Dec. 18	19 59.78	-40 41.7	3.511	2.743	+2.18	+7.1	22.9	33.3
Dec. 28	20 21.58	-39 31.1	3.605	2.785	+2.11	+7.6	.	29.0
Jan. 7	20 42.63	-38 15.2	3.688	2.827	+2.03	+8.0	.	25.0
Jan. 17	21 02.89	-36 55.3	3.760	2.870	+1.95	+8.3	.	21.8
Jan. 27	21 22.35	-35 32.6	3.820	2.912	+1.87	+8.4	.	19.7
Feb. 6	21 41.02	-34 08.6	3.868	2.954	+1.79	+8.4	.	19.1
Feb. 16	21 58.88	-32 44.3	3.902	2.996	+1.71	+8.3	.	20.3
Feb. 26	22 15.95	-31 21.2	3.924	3.037	+1.63	+8.1	.	23.0
Mar. 8	22 32.23	-30 00.3	3.932	3.079	+1.55	+7.7	.	26.8
Mar. 18	22 47.73	-28 42.8	3.926	3.120	+1.47	+7.3	.	31.4
Mar. 28	23 02.45	-27 29.8	3.907	3.161	+1.39	+6.7	.	36.5

Comet P/2007 VA85 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2016 Apr. 3.89241 TT
Peri. = 26.14721 e = 0.7360601
Node = 115.56671 2000.0 a = 4.2250971 AU
Incl. = 131.87698 n = 0.11348776
q = 1.1151717 AU P = 8.68 years

m1 = 15.8 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	11 52.82	-44 52.2	1.435	1.648	-2.68	-13.9	18.2	83.7
Jan. 13	11 26.03	-47 11.0	1.148	1.561	-5.52	-10.5	17.5	93.8
Jan. 23	10 30.80	-48 56.0	0.871	1.476	-10.53	+18.3	16.8	105.3
Feb. 2	08 45.51	-45 52.5	0.639	1.396	-13.17	106.1	15.9	117.0
Feb. 12	06 33.80	-28 11.9	0.527	1.322	-8.87	150.7	15.3	118.4
Feb. 22	05 05.14	-03 05.1	0.608	1.256	-4.66	+98.0	15.5	101.0
Mar. 3	04 18.50	+13 14.8	0.816	1.200	-2.56	+54.7	16.0	82.5
Mar. 13	03 52.88	+22 21.7	1.065	1.156	-1.56	+33.7	16.4	68.2
Mar. 23	03 37.31	+27 59.1	1.313	1.127	-1.05	+23.5	16.8	56.5
Apr. 2	03 26.86	+31 54.0	1.540	1.115	-0.76	+18.1	17.1	46.3
Apr. 12	03 19.24	+34 54.8	1.737	1.121	-0.60	+15.1	17.4	37.4
Apr. 22	03 13.23	+37 26.2	1.895	1.143	-0.51	+13.6	17.6	30.1
May 2	03 08.11	+39 42.2	2.012	1.181	-0.47	+13.0	17.9	25.2
May 12	03 03.37	+41 52.5	2.087	1.233	-0.49	+13.1	18.1	23.9
May 22	02 58.42	+44 03.9	2.120	1.296	-0.58	+13.8	18.3	26.5
June 1	02 52.60	+46 21.9	2.115	1.367	-0.77	+14.9	18.4	32.1
June 11	02 44.94	+48 51.2	2.075	1.445	-1.09	+16.4	18.6	39.6
June 21	02 34.01	+51 34.7	2.007	1.528	-1.64	+17.8	18.7	48.1
July 1	02 17.59	+54 33.0	1.916	1.614	-2.54	+18.7	18.8	57.4
July 11	01 52.14	+57 39.8	1.810	1.703	-3.96	+17.3	18.8	67.5
July 21	01 12.54	+60 32.6	1.701	1.793	-5.85	+10.6	18.9	78.1
July 31	00 14.01	+62 18.6	1.600	1.884	-7.39	-4.6	18.9	89.3
Aug. 10	23 00.13	+61 32.6	1.522	1.975	-7.12	-25.8	18.9	100.4
Aug. 20	21 48.91	+57 14.7	1.484	2.066	-5.30	-43.4	19.0	110.3
Aug. 30	20 55.86	+50 00.9	1.498	2.156	-3.39	-51.3	19.2	117.2
Sept. 9	20 21.97	+41 28.1	1.572	2.246	-2.00	-50.3	19.4	119.5
Sept.19	20 01.99	+33 05.1	1.701	2.335	-1.09	-44.4	19.7	117.0
Sept.29	19 51.09	+25 41.3	1.876	2.423	-0.49	-36.9	20.0	111.0
Oct. 9	19 46.15	+19 32.4	2.085	2.510	-0.10	-29.7	20.4	103.3
Oct. 19	19 45.18	+14 35.0	2.316	2.596	+0.18	-23.6	20.7	94.8
Oct. 29	19 46.93	+10 38.8	2.559	2.680	+0.37	-18.6	21.1	86.0
Nov. 8	19 50.61	+07 32.5	2.807	2.764	+0.50	-14.6	21.4	77.3
Nov. 18	19 55.64	+05 06.5	3.052	2.847	+0.60	-11.4	21.6	68.8
Nov. 28	20 01.64	+03 12.6	3.288	2.928	+0.67	-8.8	21.9	60.3
Dec. 8	20 08.32	+01 44.7	3.512	3.008	+0.71	-6.7	22.1	52.1
Dec. 18	20 15.43	+00 37.9	3.719	3.087	+0.74	-5.0	22.3	44.0
Dec. 28	20 22.81	-00 11.7	3.905	3.165	+0.75	-3.6	22.5	36.2
Jan. 7	20 30.28	-00 47.2	4.069	3.242	+0.74	-2.4	22.7	28.8
Jan. 17	20 37.72	-01 11.2	4.208	3.317	+0.73	-1.5	22.8	22.2
Jan. 27	20 44.99	-01 25.8	4.320	3.392	+0.70	-0.7	23.0	17.2
Feb. 6	20 51.99	-01 32.8	4.405	3.465	+0.66	-0.1	.	15.6
Feb. 16	20 58.60	-01 34.0	4.462	3.538	+0.61	+0.3	.	18.3
Feb. 26	21 04.71	-01 30.7	4.492	3.609	+0.55	+0.6	.	23.9
Mar. 8	21 10.19	-01 24.5	4.494	3.679	+0.47	+0.8	.	31.0
Mar. 18	21 14.92	-01 16.8	4.471	3.748	+0.39	+0.8	.	38.8
Mar. 28	21 18.79	-01 08.9	4.424	3.816	+0.28	+0.7	.	47.1

Comet 190P/Mueller

Epoch = 2016 July 31.0 TT
T = 2016 Apr. 7.86507 TT
Peri. = 50.42040 e = 0.5207024
Node = 335.54988 2000.0 a = 4.2420071 AU
Incl. = 2.17262 n = 0.11280984
q = 2.0331838 AU P = 8.74 years

m1 = 13.8 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 02.82	-11 35.0	2.745	2.194	+1.93	+11.4	19.4	46.9
Jan. 13	22 22.14	-09 41.1	2.795	2.164	+1.99	+12.3	19.4	41.8
Jan. 23	22 41.99	-07 38.6	2.839	2.136	+2.03	+13.0	19.4	36.9
Feb. 2	23 02.29	-05 28.6	2.878	2.112	+2.07	+13.6	19.3	32.3
Feb. 12	23 23.01	-03 12.3	2.912	2.090	+2.11	+14.1	19.3	27.8
Feb. 22	23 44.08	-00 51.2	2.941	2.072	+2.14	+14.4	19.3	23.5
Mar. 3	00 05.49	+01 32.9	2.967	2.057	+2.17	+14.6	19.3	19.3
Mar. 13	00 27.24	+03 58.5	2.988	2.046	+2.21	+14.5	19.3	15.2
Mar. 23	00 49.29	+06 23.5	3.006	2.038	+2.24	+14.3	19.3	11.3
Apr. 2	01 11.66	+08 46.2	3.021	2.034	+2.27	+13.8	19.3	7.5
Apr. 12	01 34.35	+11 04.6	3.033	2.033	+2.30	+13.2	19.3	3.8
Apr. 22	01 57.33	+13 16.9	3.042	2.037	+2.32	+12.4	19.3	1.2
May 2	02 20.58	+15 21.2	3.048	2.044	+2.35	+11.5	19.3	4.1
May 12	02 44.06	+17 16.0	3.051	2.055	+2.36	+10.4	19.3	7.7
May 22	03 07.71	+18 59.9	3.051	2.069	+2.37	+9.2	19.4	11.4
June 1	03 31.45	+20 31.7	3.048	2.087	+2.37	+7.9	19.4	15.2
June 11	03 55.19	+21 50.6	3.041	2.108	+2.36	+6.5	19.5	19.1
June 21	04 18.80	+22 56.0	3.029	2.132	+2.33	+5.2	19.5	23.1
July 1	04 42.14	+23 47.7	3.013	2.159	+2.29	+3.8	19.5	27.2
July 11	05 05.08	+24 26.1	2.991	2.188	+2.24	+2.5	19.6	31.4
July 21	05 27.45	+24 51.5	2.963	2.221	+2.17	+1.3	19.6	35.9
July 31	05 49.11	+25 04.9	2.929	2.255	+2.08	+0.3	19.7	40.5
Aug. 10	06 09.89	+25 07.5	2.888	2.292	+1.97	-0.7	19.7	45.4
Aug. 20	06 29.64	+25 00.8	2.840	2.331	+1.86	-1.4	19.7	50.5
Aug. 30	06 48.21	+24 46.3	2.785	2.371	+1.72	-2.0	19.8	55.9
Sept. 9	07 05.45	+24 26.0	2.723	2.413	+1.57	-2.4	19.8	61.7
Sept.19	07 21.20	+24 01.7	2.654	2.457	+1.41	-2.6	19.8	67.8
Sept.29	07 35.31	+23 35.5	2.579	2.502	+1.23	-2.6	19.8	74.3
Oct. 9	07 47.57	+23 09.6	2.499	2.548	+1.02	-2.4	19.9	81.3
Oct. 19	07 57.80	+22 46.1	2.416	2.595	+0.80	-1.9	19.9	88.8
Oct. 29	08 05.79	+22 26.9	2.332	2.642	+0.55	-1.3	19.9	96.9
Nov. 8	08 11.29	+22 13.9	2.249	2.691	+0.28	-0.5	19.9	105.6
Nov. 18	08 14.13	+22 08.4	2.171	2.740	0.00	+0.3	19.9	115.0
Nov. 28	08 14.16	+22 11.1	2.103	2.790	-0.28	+1.0	19.9	125.1
Dec. 8	08 11.37	+22 21.5	2.048	2.840	-0.54	+1.6	19.9	135.9
Dec. 18	08 05.99	+22 38.0	2.013	2.890	-0.75	+2.0	19.9	147.3
Dec. 28	07 58.51	+22 57.9	2.000	2.941	-0.88	+2.0	20.0	159.2
Jan. 7	07 49.71	+23 17.8	2.016	2.991	-0.91	+1.7	20.1	171.3
Jan. 17	07 40.61	+23 34.8	2.061	3.042	-0.84	+1.2	20.2	175.6
Jan. 27	07 32.18	+23 46.7	2.135	3.093	-0.69	+0.6	20.4	163.9
Feb. 6	07 25.28	+23 52.9	2.238	3.144	-0.48	+0.1	20.5	152.2
Feb. 16	07 20.48	+23 53.6	2.366	3.195	-0.25	-0.4	20.7	141.0
Feb. 26	07 18.01	+23 49.5	2.515	3.246	-0.01	-0.8	20.9	130.4
Mar. 8	07 17.89	+23 41.4	2.681	3.296	+0.21	-1.2	21.1	120.4
Mar. 18	07 19.96	+23 29.7	2.860	3.347	+0.40	-1.5	21.3	110.9
Mar. 28	07 23.96	+23 14.8	3.047	3.397	+0.57	-1.8	21.5	102.0

Comet C/2013 X1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Apr. 20.72397 TT
Peri. = 164.45862
Node = 130.95647 2000.0
Incl. = 163.23134
q = 1.3142759 AU
e = 1.0009894

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 03.18	+20 53.6	1.825	2.038	-1.21	-23.5	10.0	87.7
Jan. 13	23 51.12	+16 58.6	1.969	1.938	-0.76	-18.5	9.9	73.6
Jan. 23	23 43.56	+13 54.0	2.108	1.840	-0.45	-14.5	9.9	60.7
Feb. 2	23 39.03	+11 29.1	2.231	1.746	-0.25	-11.5	9.8	48.7
Feb. 12	23 36.53	+09 33.7	2.329	1.657	-0.12	-9.4	9.6	37.4
Feb. 22	23 35.32	+07 59.3	2.394	1.575	-0.05	-8.1	9.5	26.7
Mar. 3	23 34.86	+06 38.4	2.423	1.500	-0.01	-7.3	9.3	16.6
Mar. 13	23 34.77	+05 25.3	2.411	1.435	-0.01	-7.1	9.1	8.4
Mar. 23	23 34.68	+04 14.4	2.357	1.383	-0.04	-7.4	8.9	9.3
Apr. 2	23 34.31	+03 00.2	2.259	1.344	-0.10	-8.3	8.7	17.9
Apr. 12	23 33.33	+01 36.8	2.118	1.321	-0.20	-10.1	8.4	28.1
Apr. 22	23 31.29	-00 04.2	1.937	1.314	-0.38	-13.1	8.2	38.8
May 2	23 27.52	-02 15.4	1.721	1.325	-0.68	-18.3	8.0	50.2
May 12	23 20.75	-05 18.5	1.477	1.352	-1.24	-27.6	7.8	62.6
May 22	23 08.38	-09 54.0	1.217	1.395	-2.39	-44.6	7.5	76.9
June 1	22 44.52	-17 20.1	0.959	1.451	-5.10	-73.7	7.1	94.6
June 11	21 53.55	-29 37.5	0.741	1.518	-11.55	-91.6	6.8	118.7
June 21	19 58.08	-44 53.1	0.641	1.595	-16.78	-21.8	6.7	147.7
July 1	17 10.29	-48 31.3	0.724	1.679	-9.94	+37.6	7.2	148.9
July 11	15 30.85	-42 15.3	0.950	1.769	-4.25	+33.8	8.0	128.2
July 21	14 48.36	-36 37.6	1.240	1.864	-1.89	+21.9	8.8	111.0
July 31	14 29.42	-32 58.6	1.555	1.963	-0.84	+13.6	9.5	97.4
Aug. 10	14 21.06	-30 42.4	1.874	2.064	-0.29	+8.3	10.1	85.8
Aug. 20	14 18.18	-29 19.0	2.188	2.167	+0.03	+4.9	10.7	75.4
Aug. 30	14 18.45	-28 30.0	2.490	2.271	+0.22	+2.6	11.1	65.8
Sept. 9	14 20.70	-28 04.5	2.775	2.376	+0.35	+0.9	11.6	56.7
Sept.19	14 24.21	-27 55.4	3.040	2.482	+0.43	-0.3	12.0	48.0
Sept.29	14 28.55	-27 58.3	3.281	2.588	+0.49	-1.2	12.3	39.5
Oct. 9	14 33.41	-28 10.2	3.497	2.694	+0.51	-1.9	12.6	31.4
Oct. 19	14 38.55	-28 28.9	3.684	2.800	+0.52	-2.4	12.9	23.7
Oct. 29	14 43.78	-28 52.7	3.842	2.906	+0.51	-2.8	13.2	16.9
Nov. 8	14 48.91	-29 20.7	3.970	3.012	+0.49	-3.1	13.4	12.8
Nov. 18	14 53.77	-29 51.9	4.067	3.117	+0.44	-3.4	13.6	14.0
Nov. 28	14 58.18	-30 25.6	4.133	3.221	+0.38	-3.6	13.8	19.8
Dec. 8	15 01.94	-31 01.1	4.169	3.326	+0.29	-3.7	13.9	27.4
Dec. 18	15 04.84	-31 38.0	4.176	3.429	+0.18	-3.8	14.1	36.0
Dec. 28	15 06.66	-32 15.6	4.158	3.532	+0.05	-3.8	14.2	45.0
Jan. 7	15 07.13	-32 53.2	4.116	3.634	-0.12	-3.7	14.3	54.5
Jan. 17	15 05.96	-33 29.7	4.054	3.736	-0.31	-3.4	14.4	64.4
Jan. 27	15 02.90	-34 03.8	3.978	3.837	-0.53	-2.9	14.4	74.7
Feb. 6	14 57.64	-34 33.2	3.894	3.938	-0.76	-2.2	14.5	85.3
Feb. 16	14 49.99	-34 55.3	3.807	4.038	-1.01	-1.1	14.6	96.3
Feb. 26	14 39.85	-35 06.5	3.726	4.137	-1.25	+0.4	14.6	107.7
Mar. 8	14 27.31	-35 02.9	3.659	4.235	-1.46	+2.2	14.7	119.4
Mar. 18	14 12.75	-34 40.8	3.613	4.333	-1.59	+4.3	14.8	131.1
Mar. 28	13 56.81	-33 57.6	3.597	4.431	-1.64	+6.4	14.8	142.5

Comet 53P/Van Biesbroeck

Epoch = 2016 July 31.0 TT
T = 2016 Apr. 29.93692 TT
Peri. = 134.19798 e = 0.5516768
Node = 148.92295 2000.0 a = 5.4137506 AU
Incl. = 6.60838 n = 0.07824502
q = 2.4271100 AU P = 12.60 years

m1 = 8.0 + 5 log(Delta) + 12.5 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	17 02.00	-17 48.4	3.456	2.609	+2.01	-2.2	16.2	26.1
Jan. 13	17 22.10	-18 10.2	3.369	2.581	+2.02	-1.2	16.1	31.4
Jan. 23	17 42.29	-18 22.0	3.275	2.555	+2.02	-0.1	16.0	36.7
Feb. 2	18 02.45	-18 23.5	3.176	2.531	+2.00	+0.9	15.8	42.0
Feb. 12	18 22.44	-18 14.9	3.071	2.509	+1.97	+1.8	15.7	47.3
Feb. 22	18 42.10	-17 56.7	2.962	2.490	+1.92	+2.7	15.6	52.7
Mar. 3	19 01.32	-17 29.7	2.849	2.473	+1.86	+3.5	15.4	58.1
Mar. 13	19 19.92	-16 54.9	2.734	2.459	+1.78	+4.1	15.3	63.6
Mar. 23	19 37.76	-16 13.7	2.617	2.447	+1.69	+4.6	15.1	69.2
Apr. 2	19 54.68	-15 27.8	2.500	2.438	+1.58	+4.9	15.0	74.9
Apr. 12	20 10.53	-14 38.9	2.382	2.432	+1.46	+5.0	14.8	80.7
Apr. 22	20 25.12	-13 49.4	2.266	2.428	+1.32	+4.8	14.7	86.8
May 2	20 38.29	-13 01.4	2.152	2.427	+1.15	+4.4	14.5	93.2
May 12	20 49.82	-12 17.5	2.041	2.429	+0.97	+3.7	14.4	100.0
May 22	20 59.50	-11 40.5	1.935	2.434	+0.76	+2.7	14.3	107.1
June 1	21 07.14	-11 13.1	1.836	2.441	+0.54	+1.5	14.1	114.7
June 11	21 12.52	-10 57.8	1.746	2.451	+0.30	+0.1	14.0	122.9
June 21	21 15.51	-10 56.9	1.668	2.464	+0.06	-1.5	13.9	131.7
July 1	21 16.09	-11 11.6	1.604	2.480	-0.17	-3.0	13.8	141.2
July 11	21 14.40	-11 41.7	1.558	2.497	-0.35	-4.4	13.8	151.2
July 21	21 10.85	-12 25.2	1.533	2.518	-0.48	-5.3	13.8	161.7
July 31	21 06.08	-13 18.2	1.531	2.540	-0.52	-5.7	13.8	172.3
Aug. 10	21 00.92	-14 15.4	1.554	2.565	-0.46	-5.6	13.9	175.2
Aug. 20	20 56.28	-15 11.0	1.602	2.592	-0.34	-4.9	14.0	164.9
Aug. 30	20 52.92	-16 00.2	1.674	2.621	-0.15	-3.9	14.1	154.3
Sept. 9	20 51.42	-16 39.6	1.769	2.652	+0.07	-2.8	14.3	144.1
Sept.19	20 52.08	-17 07.2	1.883	2.684	+0.28	-1.5	14.4	134.4
Sept.29	20 54.92	-17 22.5	2.014	2.718	+0.49	-0.3	14.6	125.2
Oct. 9	20 59.85	-17 25.5	2.159	2.754	+0.68	+0.9	14.8	116.5
Oct. 19	21 06.65	-17 16.9	2.315	2.791	+0.84	+1.9	15.1	108.2
Oct. 29	21 15.04	-16 57.4	2.479	2.830	+0.97	+3.0	15.3	100.2
Nov. 8	21 24.78	-16 27.9	2.649	2.869	+1.08	+3.9	15.5	92.6
Nov. 18	21 35.60	-15 49.3	2.821	2.910	+1.17	+4.7	15.7	85.2
Nov. 28	21 47.26	-15 02.5	2.995	2.952	+1.23	+5.4	15.9	78.0
Dec. 8	21 59.59	-14 08.3	3.167	2.995	+1.28	+6.0	16.1	71.0
Dec. 18	22 12.41	-13 07.9	3.337	3.039	+1.32	+6.6	16.3	64.1
Dec. 28	22 25.58	-12 02.1	3.501	3.083	+1.34	+7.0	16.4	57.3
Jan. 7	22 38.98	-10 51.7	3.658	3.128	+1.35	+7.4	16.6	50.6
Jan. 17	22 52.51	-09 37.8	3.807	3.174	+1.36	+7.7	16.8	44.0
Jan. 27	23 06.10	-08 21.3	3.946	3.220	+1.36	+7.8	16.9	37.4
Feb. 6	23 19.68	-07 02.9	4.073	3.267	+1.35	+7.9	17.1	30.9
Feb. 16	23 33.18	-05 43.7	4.188	3.314	+1.34	+7.9	17.2	24.4
Feb. 26	23 46.58	-04 24.3	4.289	3.362	+1.32	+7.9	17.4	18.0
Mar. 8	23 59.81	-03 05.6	4.375	3.409	+1.30	+7.7	17.5	11.7
Mar. 18	00 12.84	-01 48.4	4.447	3.458	+1.28	+7.5	17.6	5.7
Mar. 28	00 25.64	-00 33.2	4.502	3.506	+1.25	+7.2	17.7	3.4

Comet C/2015 D3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 May 1.28599 TT
Peri. = 2.87973
Node = 156.97993 2000.0
Incl. = 128.50736
q = 8.1487729 AU
e = 1.0023066

m1 = 5.8 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	11 02.41	+02 19.2	7.703	8.180	−0.33	+4.9	19.4	115.9
Jan. 13	10 59.08	+03 08.1	7.544	8.175	−0.42	+5.6	19.3	127.2
Jan. 23	10 54.93	+04 03.7	7.406	8.171	−0.49	+6.1	19.3	138.7
Feb. 2	10 50.05	+05 05.2	7.296	8.167	−0.55	+6.6	19.2	150.3
Feb. 12	10 44.60	+06 11.2	7.218	8.163	−0.58	+6.9	19.2	162.1
Feb. 22	10 38.77	+07 20.2	7.175	8.159	−0.60	+7.0	19.2	174.0
Mar. 3	10 32.78	+08 30.1	7.170	8.157	−0.59	+6.9	19.2	174.0
Mar. 13	10 26.87	+09 39.1	7.202	8.154	−0.56	+6.6	19.2	162.3
Mar. 23	10 21.28	+10 45.2	7.269	8.152	−0.51	+6.2	19.2	150.6
Apr. 2	10 16.21	+11 46.9	7.368	8.151	−0.44	+5.6	19.2	139.2
Apr. 12	10 11.80	+12 43.2	7.494	8.150	−0.36	+5.0	19.3	128.0
Apr. 22	10 08.19	+13 33.3	7.641	8.149	−0.28	+4.4	19.3	117.1
May 2	10 05.43	+14 17.1	7.805	8.149	−0.19	+3.8	19.4	106.5
May 12	10 03.55	+14 54.6	7.978	8.149	−0.10	+3.2	19.4	96.2
May 22	10 02.51	+15 26.3	8.154	8.150	−0.02	+2.6	19.5	86.2
June 1	10 02.29	+15 52.5	8.330	8.151	+0.05	+2.1	19.5	76.4
June 11	10 02.81	+16 13.9	8.498	8.152	+0.12	+1.7	19.6	66.8
June 21	10 04.00	+16 31.1	8.655	8.155	+0.18	+1.4	19.6	57.5
July 1	10 05.78	+16 44.9	8.797	8.157	+0.23	+1.1	19.6	48.4
July 11	10 08.06	+16 55.9	8.920	8.160	+0.27	+0.9	19.7	39.4
July 21	10 10.75	+17 04.7	9.022	8.163	+0.30	+0.7	19.7	30.6
July 31	10 13.77	+17 12.2	9.100	8.167	+0.33	+0.7	19.7	21.9
Aug. 10	10 17.03	+17 18.9	9.152	8.171	+0.34	+0.7	19.7	13.8
Aug. 20	10 20.44	+17 25.6	9.178	8.176	+0.35	+0.7	19.7	7.4
Aug. 30	10 23.91	+17 33.0	9.177	8.181	+0.35	+0.9	19.7	8.9
Sept. 9	10 27.38	+17 41.8	9.149	8.187	+0.34	+1.1	19.7	16.2
Sept.19	10 30.73	+17 52.8	9.094	8.193	+0.32	+1.4	19.7	24.7
Sept.29	10 33.89	+18 06.6	9.014	8.199	+0.29	+1.8	19.7	33.6
Oct. 9	10 36.77	+18 24.2	8.911	8.206	+0.25	+2.2	19.7	42.8
Oct. 19	10 39.26	+18 46.2	8.787	8.213	+0.20	+2.7	19.7	52.1
Oct. 29	10 41.26	+19 13.4	8.646	8.221	+0.14	+3.3	19.6	61.7
Nov. 8	10 42.69	+19 46.5	8.491	8.229	+0.07	+3.9	19.6	71.5
Nov. 18	10 43.43	+20 26.0	8.327	8.238	0.00	+4.6	19.6	81.4
Nov. 28	10 43.38	+21 12.2	8.160	8.247	−0.09	+5.3	19.5	91.6
Dec. 8	10 42.47	+22 05.3	7.994	8.257	−0.19	+6.0	19.5	102.1
Dec. 18	10 40.62	+23 05.0	7.838	8.266	−0.28	+6.5	19.4	112.6
Dec. 28	10 37.79	+24 10.4	7.695	8.277	−0.38	+7.0	19.4	123.3
Jan. 7	10 33.98	+25 20.5	7.574	8.288	−0.47	+7.3	19.4	134.0
Jan. 17	10 29.24	+26 33.4	7.479	8.299	−0.56	+7.4	19.4	144.5
Jan. 27	10 23.67	+27 47.0	7.414	8.310	−0.62	+7.2	19.3	154.0
Feb. 6	10 17.44	+28 59.0	7.384	8.322	−0.67	+6.8	19.3	161.0
Feb. 16	10 10.79	+30 07.1	7.389	8.335	−0.68	+6.2	19.4	162.1
Feb. 26	10 03.97	+31 09.2	7.430	8.347	−0.67	+5.5	19.4	156.4
Mar. 8	09 57.27	+32 03.9	7.506	8.361	−0.63	+4.6	19.4	147.6
Mar. 18	09 50.95	+32 50.2	7.612	8.374	−0.57	+3.8	19.4	137.6
Mar. 28	09 45.26	+33 28.1	7.745	8.388	−0.49	+3.0	19.5	127.4

Comet C/2015 B2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 May 6.57984 TT
Peri. = 284.76989
Node = 341.90248 2000.0
Incl. = 105.08783
q = 3.3696062 AU
e = 1.0005474

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 36.88	-63 58.6	3.374	3.564	-4.51	-0.7	16.6	93.1
Jan. 13	05 51.81	-64 05.5	3.363	3.535	-4.16	+7.0	16.5	91.9
Jan. 23	05 10.25	-62 55.2	3.374	3.508	-3.38	+12.9	16.5	89.6
Feb. 2	04 36.43	-60 46.2	3.406	3.484	-2.51	+16.5	16.5	86.3
Feb. 12	04 11.31	-58 01.5	3.452	3.461	-1.75	+18.0	16.5	82.3
Feb. 22	03 53.81	-55 01.5	3.510	3.441	-1.15	+18.1	16.5	77.9
Mar. 3	03 42.27	-52 00.7	3.573	3.423	-0.71	+17.3	16.5	73.3
Mar. 13	03 35.18	-49 08.2	3.637	3.408	-0.38	+15.8	16.5	68.9
Mar. 23	03 31.34	-46 29.7	3.697	3.395	-0.15	+14.1	16.5	64.8
Apr. 2	03 29.83	-44 08.2	3.749	3.385	+0.02	+12.3	16.6	61.3
Apr. 12	03 30.01	-42 05.5	3.790	3.377	+0.13	+10.3	16.6	58.6
Apr. 22	03 31.35	-40 22.3	3.818	3.372	+0.21	+8.3	16.6	56.7
May 2	03 33.45	-38 59.1	3.830	3.370	+0.25	+6.3	16.6	55.9
May 12	03 35.98	-37 56.1	3.825	3.370	+0.27	+4.3	16.6	56.3
May 22	03 38.64	-37 13.5	3.802	3.373	+0.25	+2.2	16.6	57.7
June 1	03 41.15	-36 51.5	3.763	3.378	+0.21	+0.1	16.6	60.3
June 11	03 43.24	-36 50.6	3.707	3.386	+0.14	-2.1	16.5	63.9
June 21	03 44.60	-37 11.1	3.636	3.396	+0.03	-4.2	16.5	68.4
July 1	03 44.88	-37 53.4	3.553	3.409	-0.12	-6.4	16.5	73.7
July 11	03 43.67	-38 57.7	3.460	3.425	-0.32	-8.6	16.4	79.6
July 21	03 40.46	-40 23.3	3.361	3.443	-0.58	-10.5	16.4	86.0
July 31	03 34.65	-42 08.7	3.262	3.463	-0.92	-12.1	16.4	92.8
Aug. 10	03 25.48	-44 10.2	3.166	3.486	-1.33	-13.1	16.3	99.8
Aug. 20	03 12.15	-46 20.9	3.082	3.511	-1.82	-12.9	16.3	106.8
Aug. 30	02 53.90	-48 30.0	3.015	3.538	-2.36	-11.3	16.3	113.2
Sept. 9	02 30.33	-50 22.6	2.973	3.567	-2.84	-7.8	16.3	118.7
Sept.19	02 01.94	-51 40.9	2.960	3.598	-3.15	-2.8	16.3	122.3
Sept.29	01 30.48	-52 09.3	2.980	3.632	-3.17	+2.9	16.4	123.6
Oct. 9	00 58.80	-51 40.1	3.037	3.667	-2.89	+8.4	16.5	122.1
Oct. 19	00 29.86	-50 16.5	3.129	3.704	-2.43	+12.6	16.6	118.1
Oct. 29	00 05.61	-48 10.7	3.254	3.743	-1.89	+15.3	16.7	112.1
Nov. 8	23 46.72	-45 37.6	3.406	3.783	-1.38	+16.6	16.8	104.9
Nov. 18	23 32.92	-42 51.3	3.580	3.825	-0.95	+17.0	17.0	96.8
Nov. 28	23 23.45	-40 01.5	3.768	3.869	-0.59	+16.7	17.2	88.4
Dec. 8	23 17.52	-37 14.8	3.966	3.914	-0.31	+16.0	17.3	79.8
Dec. 18	23 14.37	-34 34.7	4.166	3.961	-0.10	+15.2	17.5	71.2
Dec. 28	23 13.37	-32 02.9	4.364	4.009	+0.07	+14.3	17.6	62.7
Jan. 7	23 14.03	-29 39.9	4.554	4.058	+0.19	+13.4	17.8	54.2
Jan. 17	23 15.92	-27 25.7	4.731	4.108	+0.28	+12.6	17.9	45.9
Jan. 27	23 18.74	-25 19.8	4.893	4.160	+0.35	+11.8	18.0	37.8
Feb. 6	23 22.21	-23 21.7	5.036	4.212	+0.39	+11.1	18.2	30.1
Feb. 16	23 26.11	-21 31.0	5.158	4.266	+0.42	+10.4	18.3	22.9
Feb. 26	23 30.27	-19 47.1	5.257	4.320	+0.43	+9.7	18.4	17.1
Mar. 8	23 34.52	-18 09.7	5.331	4.375	+0.42	+9.1	18.4	14.1
Mar. 18	23 38.71	-16 38.6	5.381	4.432	+0.40	+8.5	18.5	15.8
Mar. 28	23 42.73	-15 13.3	5.405	4.489	+0.37	+7.9	18.6	21.1

Comet 77P/Longmore

Epoch = 2016 July 31.0 TT
T = 2016 May 13.63954 TT
Peri. = 196.72529 e = 0.3535455
Node = 14.80374 2000.0 a = 3.6162234 AU
Incl. = 24.34625 n = 0.14332475
q = 2.3377239 AU P = 6.88 years

m1 = 7.4 + 5 log(Delta) + 17.5 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	13 16.16	+02 47.1	2.372	2.493	+0.95	-10.0	16.6	85.4
Jan. 13	13 25.63	+01 07.4	2.223	2.472	+0.79	-9.7	16.4	92.6
Jan. 23	13 33.50	-00 29.1	2.077	2.452	+0.59	-9.4	16.1	100.2
Feb. 2	13 39.43	-02 02.9	1.935	2.433	+0.36	-9.2	15.9	108.4
Feb. 12	13 43.03	-03 34.5	1.801	2.416	+0.09	-9.0	15.7	117.1
Feb. 22	13 43.91	-05 04.4	1.677	2.400	-0.21	-8.9	15.5	126.5
Mar. 3	13 41.77	-06 33.2	1.567	2.386	-0.53	-8.8	15.3	136.5
Mar. 13	13 36.42	-08 00.7	1.476	2.374	-0.83	-8.6	15.1	147.3
Mar. 23	13 28.09	-09 26.3	1.406	2.363	-1.07	-8.2	14.9	158.7
Apr. 2	13 17.41	-10 48.5	1.363	2.354	-1.19	-7.7	14.8	170.2
Apr. 12	13 05.50	-12 05.6	1.347	2.347	-1.17	-7.1	14.7	174.6
Apr. 22	12 53.81	-13 17.0	1.360	2.342	-1.01	-6.6	14.7	163.9
May 2	12 43.69	-14 23.5	1.398	2.339	-0.75	-6.4	14.7	152.5
May 12	12 36.16	-15 27.1	1.460	2.338	-0.44	-6.3	14.8	141.7
May 22	12 31.80	-16 30.5	1.540	2.338	-0.11	-6.6	14.8	131.6
June 1	12 30.68	-17 36.2	1.635	2.341	+0.20	-7.0	15.0	122.4
June 11	12 32.67	-18 45.8	1.742	2.345	+0.48	-7.5	15.1	113.9
June 21	12 37.47	-20 00.5	1.856	2.352	+0.72	-8.0	15.2	106.2
July 1	12 44.71	-21 20.2	1.976	2.360	+0.94	-8.4	15.3	99.1
July 11	12 54.12	-22 44.7	2.098	2.370	+1.13	-8.9	15.5	92.4
July 21	13 05.40	-24 13.4	2.222	2.382	+1.29	-9.2	15.6	86.2
July 31	13 18.31	-25 45.1	2.347	2.395	+1.44	-9.4	15.7	80.3
Aug. 10	13 32.71	-27 19.0	2.470	2.410	+1.57	-9.5	15.9	74.7
Aug. 20	13 48.43	-28 53.7	2.591	2.427	+1.69	-9.4	16.0	69.4
Aug. 30	14 05.36	-30 27.8	2.710	2.445	+1.81	-9.2	16.1	64.2
Sept. 9	14 23.44	-32 00.1	2.825	2.465	+1.91	-8.9	16.3	59.1
Sept.19	14 42.57	-33 29.1	2.936	2.486	+2.01	-8.4	16.4	54.2
Sept.29	15 02.68	-34 53.5	3.042	2.508	+2.10	-7.8	16.5	49.4
Oct. 9	15 23.71	-36 11.9	3.143	2.532	+2.19	-7.1	16.6	44.7
Oct. 19	15 45.56	-37 23.1	3.237	2.557	+2.26	-6.3	16.7	40.1
Oct. 29	16 08.14	-38 25.7	3.325	2.583	+2.32	-5.3	16.9	35.6
Nov. 8	16 31.34	-39 19.0	3.406	2.609	+2.37	-4.3	17.0	31.2
Nov. 18	16 54.99	-40 02.0	3.478	2.637	+2.40	-3.2	17.1	27.1
Nov. 28	17 18.96	-40 34.2	3.542	2.666	+2.41	-2.1	17.2	23.4
Dec. 8	17 43.06	-40 55.5	3.597	2.695	+2.40	-1.0	17.3	20.4
Dec. 18	18 07.11	-41 05.8	3.641	2.725	+2.38	0.0	17.4	18.4
Dec. 28	18 30.93	-41 05.8	3.676	2.756	+2.34	+1.0	17.5	17.8
Jan. 7	18 54.35	-40 56.1	3.699	2.787	+2.28	+1.8	17.6	18.9
Jan. 17	19 17.20	-40 37.8	3.712	2.819	+2.22	+2.6	17.7	21.4
Jan. 27	19 39.35	-40 12.1	3.713	2.851	+2.13	+3.2	17.8	25.0
Feb. 6	20 00.69	-39 40.5	3.703	2.884	+2.04	+3.6	17.9	29.4
Feb. 16	20 21.11	-39 04.8	3.681	2.917	+1.94	+3.8	17.9	34.2
Feb. 26	20 40.54	-38 26.4	3.648	2.950	+1.84	+3.9	18.0	39.4
Mar. 8	20 58.92	-37 47.3	3.604	2.984	+1.73	+3.8	18.1	44.9
Mar. 18	21 16.18	-37 09.2	3.550	3.018	+1.61	+3.5	18.1	50.6
Mar. 28	21 32.29	-36 33.8	3.486	3.052	+1.49	+3.1	18.2	56.6

Comet C/2015 Y1 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2016 May 15.17008 TT
Peri. = 24.70717
Node = 135.77480 2000.0
Incl. = 71.21615
q = 2.5141280 AU
e = 0.9914615

m1 = 11.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 14.29	-07 59.9	2.123	2.888	-0.71	+18.9	17.4	133.3
Jan. 13	09 07.17	-04 51.3	1.974	2.838	-0.94	+24.0	17.2	145.2
Jan. 23	08 57.81	-00 51.2	1.857	2.791	-1.10	+28.6	17.0	157.2
Feb. 2	08 46.82	+03 55.1	1.779	2.747	-1.17	+31.7	16.8	166.5
Feb. 12	08 35.15	+09 12.4	1.745	2.706	-1.11	+32.5	16.7	163.6
Feb. 22	08 24.01	+14 37.7	1.755	2.668	-0.95	+31.0	16.7	151.9
Mar. 3	08 14.54	+19 47.9	1.806	2.635	-0.69	+27.9	16.7	138.8
Mar. 13	08 07.62	+24 26.8	1.892	2.605	-0.38	+24.0	16.7	126.1
Mar. 23	08 03.82	+28 27.3	2.003	2.579	-0.05	+20.2	16.8	114.3
Apr. 2	08 03.31	+31 49.7	2.130	2.557	+0.27	+16.8	16.9	103.6
Apr. 12	08 06.03	+34 38.0	2.266	2.540	+0.58	+13.9	17.0	93.9
Apr. 22	08 11.79	+36 57.3	2.405	2.527	+0.85	+11.5	17.1	85.1
May 2	08 20.30	+38 52.4	2.543	2.518	+1.10	+9.5	17.2	77.1
May 12	08 31.29	+40 27.3	2.675	2.514	+1.32	+7.8	17.3	70.0
May 22	08 44.49	+41 45.2	2.798	2.515	+1.51	+6.3	17.4	63.5
June 1	08 59.63	+42 48.2	2.912	2.521	+1.69	+5.0	17.5	57.7
June 11	09 16.52	+43 38.0	3.014	2.531	+1.84	+3.8	17.6	52.7
June 21	09 34.95	+44 15.9	3.105	2.545	+1.98	+2.7	17.7	48.4
July 1	09 54.72	+44 42.8	3.183	2.564	+2.10	+1.7	17.8	44.8
July 11	10 15.71	+44 59.4	3.250	2.588	+2.20	+0.7	17.9	42.1
July 21	10 37.74	+45 06.4	3.306	2.615	+2.29	-0.2	18.0	40.3
July 31	11 00.66	+45 04.3	3.351	2.646	+2.37	-1.1	18.1	39.4
Aug. 10	11 24.36	+44 53.7	3.388	2.681	+2.43	-1.8	18.1	39.3
Aug. 20	11 48.68	+44 35.5	3.417	2.720	+2.48	-2.5	18.2	40.0
Aug. 30	12 13.50	+44 10.2	3.440	2.762	+2.52	-3.1	18.3	41.2
Sept. 9	12 38.68	+43 38.9	3.459	2.807	+2.54	-3.6	18.4	43.0
Sept.19	13 04.08	+43 02.9	3.475	2.856	+2.55	-4.0	18.5	45.0
Sept.29	13 29.56	+42 23.3	3.491	2.907	+2.54	-4.2	18.5	47.3
Oct. 9	13 55.00	+41 41.7	3.507	2.960	+2.52	-4.2	18.6	49.7
Oct. 19	14 20.24	+40 59.9	3.525	3.016	+2.49	-4.0	18.7	52.0
Oct. 29	14 45.15	+40 19.5	3.546	3.074	+2.44	-3.7	18.8	54.3
Nov. 8	15 09.60	+39 42.5	3.571	3.133	+2.38	-3.2	18.9	56.4
Nov. 18	15 33.43	+39 10.5	3.600	3.195	+2.31	-2.5	19.0	58.4
Nov. 28	15 56.53	+38 45.2	3.634	3.258	+2.22	-1.7	19.1	60.2
Dec. 8	16 18.78	+38 28.1	3.671	3.323	+2.13	-0.8	19.2	61.9
Dec. 18	16 40.03	+38 20.2	3.712	3.389	+2.02	+0.2	19.3	63.5
Dec. 28	17 00.20	+38 22.3	3.756	3.457	+1.90	+1.3	19.5	65.0
Jan. 7	17 19.17	+38 35.0	3.800	3.525	+1.77	+2.3	19.6	66.5
Jan. 17	17 36.85	+38 58.3	3.846	3.595	+1.63	+3.4	19.7	68.0
Jan. 27	17 53.13	+39 32.0	3.891	3.665	+1.48	+4.4	19.8	69.6
Feb. 6	18 07.93	+40 15.5	3.934	3.737	+1.32	+5.2	19.9	71.3
Feb. 16	18 21.13	+41 08.0	3.975	3.809	+1.15	+6.0	20.0	73.2
Feb. 26	18 32.65	+42 08.2	4.012	3.881	+0.97	+6.6	20.1	75.3
Mar. 8	18 42.35	+43 14.6	4.047	3.954	+0.78	+7.1	20.2	77.6
Mar. 18	18 50.11	+44 25.5	4.077	4.028	+0.57	+7.3	20.3	80.1
Mar. 28	18 55.83	+45 38.6	4.105	4.102	+0.35	+7.3	20.4	82.8

Comet C/2015 W1 (Gibbs)

Epoch = 2016 July 31.0 TT
T = 2016 May 17.21191 TT
Peri. = 48.11974
Node = 114.31396 2000.0
Incl. = 87.31408
q = 2.2318699 AU
e = 1.0010953

m1 = 11.6 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	08 11.69	+17 51.6	1.759	2.706	−1.86	+33.3	17.1	160.5
Jan. 13	07 53.13	+23 24.4	1.664	2.645	−2.23	+34.9	16.9	175.5
Jan. 23	07 30.85	+29 13.1	1.623	2.588	−2.44	+33.0	16.8	165.7
Feb. 2	07 06.47	+34 43.1	1.636	2.533	−2.41	+28.4	16.7	149.3
Feb. 12	06 42.36	+39 27.3	1.696	2.482	−2.14	+22.9	16.7	133.7
Feb. 22	06 20.92	+43 16.6	1.792	2.435	−1.71	+18.1	16.7	119.4
Mar. 3	06 03.80	+46 17.7	1.912	2.392	−1.21	+14.6	16.8	106.6
Mar. 13	05 51.74	+48 43.7	2.044	2.354	−0.70	+12.4	16.9	95.3
Mar. 23	05 44.77	+50 47.8	2.178	2.320	−0.23	+11.2	16.9	85.3
Apr. 2	05 42.48	+52 39.8	2.308	2.292	+0.20	+10.7	17.0	76.5
Apr. 12	05 44.48	+54 26.3	2.429	2.268	+0.59	+10.5	17.1	68.8
Apr. 22	05 50.39	+56 11.7	2.536	2.251	+0.96	+10.7	17.1	62.2
May 2	05 59.98	+57 58.2	2.628	2.239	+1.33	+10.9	17.2	56.7
May 12	06 13.27	+59 47.1	2.702	2.233	+1.72	+11.1	17.2	52.3
May 22	06 30.45	+61 38.4	2.760	2.233	+2.15	+11.3	17.3	49.1
June 1	06 51.97	+63 31.2	2.800	2.238	+2.66	+11.2	17.3	47.2
June 11	07 18.62	+65 22.9	2.824	2.250	+3.28	+10.6	17.4	46.6
June 21	07 51.39	+67 09.3	2.834	2.267	+4.01	+9.4	17.4	47.1
July 1	08 31.47	+68 43.0	2.832	2.290	+4.82	+7.0	17.5	48.6
July 11	09 19.69	+69 53.4	2.822	2.319	+5.58	+3.3	17.5	50.9
July 21	10 15.53	+70 26.7	2.806	2.352	+6.06	−1.8	17.6	53.7
July 31	11 16.12	+70 08.9	2.789	2.391	+6.05	−7.7	17.6	56.9
Aug. 10	12 16.62	+68 51.8	2.776	2.433	+5.58	−13.5	17.7	60.0
Aug. 20	13 12.43	+66 36.8	2.769	2.480	+4.88	−18.4	17.8	63.0
Aug. 30	14 01.21	+63 33.2	2.774	2.531	+4.17	−21.9	17.8	65.6
Sept. 9	14 42.87	+59 54.3	2.794	2.585	+3.55	−24.0	18.0	67.7
Sept.19	15 18.42	+55 54.1	2.831	2.643	+3.07	−24.9	18.1	69.0
Sept.29	15 49.10	+51 45.0	2.886	2.703	+2.69	−24.7	18.2	69.5
Oct. 9	16 16.03	+47 37.8	2.960	2.766	+2.40	−23.7	18.4	69.2
Oct. 19	16 40.04	+43 41.2	3.050	2.832	+2.17	−22.0	18.5	68.0
Oct. 29	17 01.77	+40 01.3	3.155	2.899	+1.99	−19.9	18.7	66.2
Nov. 8	17 21.68	+36 42.4	3.271	2.969	+1.84	−17.6	18.9	63.7
Nov. 18	17 40.08	+33 46.7	3.395	3.040	+1.71	−15.2	19.1	60.9
Nov. 28	17 57.19	+31 14.9	3.524	3.113	+1.60	−12.8	19.3	57.9
Dec. 8	18 13.16	+29 06.9	3.652	3.187	+1.49	−10.5	19.4	54.8
Dec. 18	18 28.09	+27 21.6	3.777	3.262	+1.39	−8.4	19.6	51.9
Dec. 28	18 42.04	+25 57.5	3.894	3.338	+1.30	−6.5	19.8	49.4
Jan. 7	18 55.03	+24 53.0	4.002	3.415	+1.20	−4.7	19.9	47.5
Jan. 17	19 07.05	+24 06.2	4.098	3.493	+1.11	−3.1	20.1	46.4
Jan. 27	19 18.10	+23 35.3	4.180	3.572	+1.00	−1.7	20.2	46.4
Feb. 6	19 28.14	+23 18.5	4.246	3.651	+0.90	−0.5	20.4	47.4
Feb. 16	19 37.11	+23 14.0	4.295	3.731	+0.78	+0.6	20.5	49.6
Feb. 26	19 44.96	+23 20.0	4.327	3.811	+0.66	+1.5	20.6	52.8
Mar. 8	19 51.59	+23 34.7	4.343	3.891	+0.53	+2.2	20.7	56.9
Mar. 18	19 56.91	+23 56.3	4.344	3.972	+0.39	+2.6	20.8	61.8
Mar. 28	20 00.84	+24 22.7	4.330	4.053	+0.24	+2.9	20.9	67.4

Comet 224P/LINEAR-NEAT

Epoch = 2016 July 31.0 TT
T = 2016 May 24.61635 TT
Peri. = 16.32264 e = 0.4158626
Node = 40.47537 2000.0 a = 3.4124204 AU
Incl. = 13.42616 n = 0.15635446
q = 1.9933224 AU P = 6.30 years

m1 = 14.4 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	23 01.64	-13 59.4	2.604	2.271	+1.53	+14.7	21.8	59.6
Jan. 13	23 16.96	-11 32.1	2.672	2.237	+1.62	+15.2	21.8	53.9
Jan. 23	23 33.12	-08 59.7	2.733	2.205	+1.69	+15.7	21.7	48.3
Feb. 2	23 50.01	-06 22.9	2.788	2.174	+1.76	+16.0	21.7	43.1
Feb. 12	00 07.58	-03 42.4	2.836	2.146	+1.82	+16.3	21.6	38.0
Feb. 22	00 25.78	-00 59.3	2.877	2.119	+1.88	+16.5	21.6	33.1
Mar. 3	00 44.57	+01 45.2	2.912	2.094	+1.94	+16.5	21.5	28.4
Mar. 13	01 03.97	+04 30.1	2.941	2.072	+2.00	+16.4	21.5	23.9
Mar. 23	01 23.98	+07 13.8	2.964	2.052	+2.06	+16.1	21.4	19.6
Apr. 2	01 44.60	+09 55.1	2.982	2.035	+2.13	+15.7	21.4	15.4
Apr. 12	02 05.88	+12 32.4	2.994	2.021	+2.19	+15.2	21.4	11.3
Apr. 22	02 27.81	+15 04.0	3.002	2.010	+2.26	+14.4	21.3	7.4
May 2	02 50.41	+17 28.2	3.006	2.001	+2.33	+13.5	21.3	3.7
May 12	03 13.70	+19 43.6	3.005	1.996	+2.39	+12.5	21.3	1.7
May 22	03 37.64	+21 48.4	3.001	1.993	+2.46	+11.3	21.3	4.5
June 1	04 02.19	+23 41.0	2.993	1.994	+2.51	+9.9	21.3	8.1
June 11	04 27.29	+25 20.3	2.982	1.998	+2.55	+8.5	21.3	11.7
June 21	04 52.82	+26 45.0	2.966	2.005	+2.58	+6.9	21.3	15.4
July 1	05 18.67	+27 54.3	2.948	2.015	+2.60	+5.4	21.3	19.1
July 11	05 44.66	+28 48.0	2.925	2.028	+2.59	+3.8	21.3	22.9
July 21	06 10.61	+29 26.1	2.899	2.043	+2.57	+2.3	21.4	26.8
July 31	06 36.34	+29 49.1	2.868	2.061	+2.53	+0.9	21.4	30.7
Aug. 10	07 01.64	+29 58.1	2.832	2.082	+2.47	-0.4	21.4	34.8
Aug. 20	07 26.31	+29 54.6	2.792	2.106	+2.39	-1.4	21.5	39.1
Aug. 30	07 50.22	+29 40.2	2.747	2.131	+2.30	-2.3	21.5	43.5
Sept. 9	08 13.18	+29 17.4	2.696	2.159	+2.19	-2.9	21.6	48.2
Sept.19	08 35.05	+28 48.3	2.640	2.189	+2.07	-3.3	21.6	53.1
Sept.29	08 55.74	+28 15.7	2.578	2.220	+1.94	-3.3	21.7	58.2
Oct. 9	09 15.10	+27 42.3	2.510	2.253	+1.79	-3.1	21.7	63.7
Oct. 19	09 33.01	+27 10.9	2.437	2.288	+1.63	-2.7	21.7	69.5
Oct. 29	09 49.35	+26 44.3	2.360	2.323	+1.46	-1.9	21.8	75.7
Nov. 8	10 03.95	+26 25.3	2.279	2.361	+1.27	-0.9	21.8	82.3
Nov. 18	10 16.61	+26 16.5	2.196	2.399	+1.05	+0.4	21.8	89.4
Nov. 28	10 27.11	+26 20.4	2.112	2.438	+0.81	+1.8	21.8	97.0
Dec. 8	10 35.16	+26 38.8	2.031	2.477	+0.53	+3.4	21.8	105.1
Dec. 18	10 40.48	+27 12.4	1.954	2.518	+0.23	+4.8	21.9	113.8
Dec. 28	10 42.81	+28 00.6	1.886	2.559	-0.09	+6.0	21.9	123.0
Jan. 7	10 41.93	+29 00.5	1.831	2.600	-0.41	+6.6	21.9	132.7
Jan. 17	10 37.88	+30 06.5	1.794	2.642	-0.69	+6.4	22.0	142.4
Jan. 27	10 30.95	+31 10.9	1.778	2.684	-0.91	+5.4	22.1	151.5
Feb. 6	10 21.87	+32 04.7	1.786	2.727	-1.01	+3.5	22.2	158.2
Feb. 16	10 11.74	+32 40.1	1.822	2.769	-0.99	+1.3	22.3	159.5
Feb. 26	10 01.79	+32 52.7	1.885	2.812	-0.86	-1.1	22.5	154.7
Mar. 8	09 53.19	+32 41.7	1.973	2.854	-0.64	-3.2	22.7	146.5
Mar. 18	09 46.77	+32 09.6	2.085	2.897	-0.39	-4.9	22.9	137.4
Mar. 28	09 42.89	+31 20.8	2.216	2.939	-0.13	-6.1	.	128.2

Comet C/2011 KP36 (Spacewatch)

Epoch = 2016 July 31.0 TT
T = 2016 May 26.84871 TT
Peri. = 180.59180
Node = 173.40033 2000.0
Incl. = 18.98679
q = 4.8832831 AU
e = 0.8728631

m1 = 6.2 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	21 56.62	-07 17.5	5.612	4.995	+0.92	+2.4	15.2	47.1
Jan. 13	22 05.80	-06 53.9	5.703	4.980	+0.96	+2.9	15.2	39.2
Jan. 23	22 15.38	-06 25.3	5.779	4.967	+0.99	+3.3	15.2	31.5
Feb. 2	22 25.27	-05 52.4	5.839	4.954	+1.01	+3.7	15.2	23.8
Feb. 12	22 35.38	-05 15.8	5.882	4.942	+1.03	+3.9	15.3	16.3
Feb. 22	22 45.63	-04 36.4	5.906	4.932	+1.03	+4.2	15.3	9.0
Mar. 3	22 55.95	-03 54.8	5.912	4.922	+1.03	+4.3	15.2	2.9
Mar. 13	23 06.27	-03 11.7	5.899	4.914	+1.02	+4.4	15.2	6.7
Mar. 23	23 16.51	-02 28.1	5.869	4.906	+1.01	+4.4	15.2	13.7
Apr. 2	23 26.61	-01 44.5	5.821	4.900	+0.99	+4.3	15.2	20.9
Apr. 12	23 36.51	-01 02.0	5.755	4.894	+0.96	+4.1	15.2	28.1
Apr. 22	23 46.14	-00 21.1	5.674	4.890	+0.93	+3.8	15.1	35.4
May 2	23 55.43	+00 17.2	5.579	4.887	+0.89	+3.5	15.1	42.7
May 12	00 04.32	+00 52.2	5.470	4.884	+0.84	+3.1	15.1	50.1
May 22	00 12.72	+01 23.0	5.350	4.883	+0.78	+2.6	15.0	57.6
June 1	00 20.56	+01 48.9	5.220	4.883	+0.72	+2.0	15.0	65.3
June 11	00 27.74	+02 09.1	5.083	4.885	+0.64	+1.4	14.9	73.1
June 21	00 34.17	+02 22.8	4.941	4.887	+0.56	+0.6	14.8	81.0
July 1	00 39.77	+02 29.2	4.796	4.890	+0.47	-0.1	14.8	89.3
July 11	00 44.42	+02 27.8	4.653	4.894	+0.36	-1.0	14.7	97.7
July 21	00 48.05	+02 18.0	4.514	4.900	+0.25	-1.8	14.6	106.5
July 31	00 50.58	+01 59.5	4.382	4.906	+0.14	-2.7	14.6	115.5
Aug. 10	00 51.98	+01 32.3	4.262	4.914	+0.03	-3.5	14.5	124.9
Aug. 20	00 52.24	+00 57.1	4.158	4.922	-0.08	-4.2	14.5	134.6
Aug. 30	00 51.44	+00 14.7	4.074	4.932	-0.18	-4.8	14.4	144.6
Sept. 9	00 49.69	-00 33.2	4.013	4.943	-0.25	-5.1	14.4	154.8
Sept.19	00 47.20	-01 24.2	3.978	4.954	-0.30	-5.2	14.4	164.8
Sept.29	00 44.25	-02 15.9	3.972	4.967	-0.31	-4.9	14.4	172.8
Oct. 9	00 41.14	-03 05.3	3.995	4.981	-0.29	-4.4	14.4	169.7
Oct. 19	00 38.22	-03 49.7	4.047	4.996	-0.24	-3.7	14.5	160.1
Oct. 29	00 35.78	-04 26.8	4.128	5.011	-0.17	-2.8	14.5	149.8
Nov. 8	00 34.10	-04 55.0	4.234	5.028	-0.07	-1.8	14.6	139.4
Nov. 18	00 33.38	-05 13.5	4.362	5.046	+0.03	-0.8	14.7	129.3
Nov. 28	00 33.71	-05 21.9	4.508	5.064	+0.15	+0.1	14.8	119.3
Dec. 8	00 35.17	-05 20.6	4.667	5.084	+0.26	+1.0	14.8	109.6
Dec. 18	00 37.75	-05 10.5	4.837	5.104	+0.36	+1.8	14.9	100.2
Dec. 28	00 41.38	-04 52.3	5.011	5.126	+0.46	+2.5	15.0	91.1
Jan. 7	00 45.99	-04 27.3	5.187	5.148	+0.55	+3.1	15.1	82.3
Jan. 17	00 51.50	-03 56.6	5.361	5.171	+0.63	+3.5	15.2	73.7
Jan. 27	00 57.78	-03 21.3	5.529	5.195	+0.70	+3.9	15.3	65.3
Feb. 6	01 04.75	-02 42.4	5.688	5.220	+0.75	+4.1	15.4	57.2
Feb. 16	01 12.29	-02 01.2	5.837	5.245	+0.80	+4.3	15.4	49.2
Feb. 26	01 20.31	-01 18.4	5.972	5.272	+0.84	+4.3	15.5	41.5
Mar. 8	01 28.73	-00 35.0	6.092	5.299	+0.87	+4.3	15.6	34.0
Mar. 18	01 37.44	+00 08.2	6.196	5.327	+0.89	+4.2	15.6	26.8
Mar. 28	01 46.39	+00 50.4	6.282	5.355	+0.91	+4.1	15.7	20.0

Comet P/2007 R3 (Gibbs)

Epoch = 2016 July 31.0 TT
T = 2016 May 27.40669 TT
Peri. = 312.18618 e = 0.4139115
Node = 30.06819 2000.0 a = 4.3010835 AU
Incl. = 3.79332 n = 0.11049363
q = 2.5208156 AU P = 8.92 years

m1 = 9.4 + 5 log(Delta) + 20.0 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ / °	Elong. °
Jan. 3	19 56.24	-23 37.5	3.650	2.711	-0.79	-2.1	21.3	27.2/ 79	14.9
Jan. 13	20 15.52	-22 38.9	3.653	2.687	-0.79	-2.5	21.2	27.7/ 77	9.4
Jan. 23	20 34.86	-21 31.9	3.645	2.665	-0.79	-3.0	21.1	28.1/ 75	4.4
Feb. 2	20 54.15	-20 16.9	3.627	2.644	-0.79	-3.4	21.0	28.3/ 74	3.4
Feb. 12	21 13.33	-18 54.6	3.598	2.624	-0.80	-3.7	20.9	28.5/ 73	7.9
Feb. 22	21 32.33	-17 25.6	3.560	2.606	-0.80	-4.1	20.8	28.6/ 71	13.1
Mar. 3	21 51.09	-15 50.9	3.512	2.589	-0.80	-4.5	20.7	28.6/ 70	18.3
Mar. 13	22 09.58	-14 11.3	3.456	2.575	-0.80	-4.8	20.6	28.4/ 69	23.4
Mar. 23	22 27.74	-12 28.1	3.392	2.561	-0.80	-5.1	20.5	28.2/ 68	28.6
Apr. 2	22 45.55	-10 42.2	3.320	2.550	-0.81	-5.4	20.4	27.9/ 68	33.8
Apr. 12	23 02.98	-08 54.8	3.241	2.541	-0.82	-5.7	20.3	27.5/ 67	38.9
Apr. 22	23 19.99	-07 07.0	3.156	2.533	-0.82	-6.0	20.2	26.9/ 67	44.1
May 2	23 36.55	-05 20.0	3.065	2.527	-0.83	-6.2	20.0	26.2/ 67	49.3
May 12	23 52.60	-03 34.9	2.969	2.523	-0.85	-6.4	19.9	25.3/ 66	54.6
May 22	00 08.09	-01 52.9	2.869	2.521	-0.86	-6.6	19.8	24.3/ 66	60.0
June 1	00 22.93	-00 15.0	2.765	2.521	-0.88	-6.8	19.7	23.1/ 66	65.6
June 11	00 37.03	+01 17.6	2.658	2.523	-0.91	-7.0	19.6	21.6/ 66	71.3
June 21	00 50.25	+02 43.8	2.549	2.527	-0.93	-7.2	19.5	19.9/ 67	77.2
July 1	01 02.44	+04 02.7	2.438	2.532	-0.97	-7.4	19.4	17.9/ 67	83.4
July 11	01 13.41	+05 13.3	2.328	2.540	-1.01	-7.6	19.3	15.5/ 67	90.0
July 21	01 22.93	+06 14.5	2.218	2.549	-1.05	-7.8	19.2	12.7/ 66	96.9
July 31	01 30.77	+07 05.5	2.112	2.560	-1.11	-8.1	19.1	9.6/ 65	104.4
Aug. 10	01 36.63	+07 45.4	2.011	2.573	-1.17	-8.5	19.0	6.1/ 63	112.3
Aug. 20	01 40.29	+08 13.5	1.918	2.588	-1.23	-8.9	18.9	2.5/ 49	120.9
Aug. 30	01 41.54	+08 29.4	1.836	2.604	-1.30	-9.3	18.8	1.8/282	130.2
Sept. 9	01 40.32	+08 33.1	1.769	2.622	-1.37	-9.7	18.8	5.3/262	140.1
Sept.19	01 36.79	+08 25.6	1.720	2.642	-1.43	-10.1	18.7	8.3/258	150.7
Sept.29	01 31.34	+08 08.8	1.693	2.663	-1.47	-10.4	18.8	10.2/257	161.9
Oct. 9	01 24.68	+07 46.0	1.691	2.685	-1.48	-10.6	18.8	10.7/257	173.4
Oct. 19	01 17.70	+07 21.7	1.716	2.709	-1.46	-10.5	18.9	9.7/258	174.8
Oct. 29	01 11.32	+07 00.7	1.768	2.734	-1.42	-10.3	19.0	7.6/260	163.3
Nov. 8	01 06.32	+06 47.0	1.846	2.760	-1.35	-9.9	19.2	4.6/266	152.1
Nov. 18	01 03.26	+06 43.7	1.947	2.788	-1.27	-9.3	19.4	1.6/303	141.3
Nov. 28	01 02.39	+06 52.2	2.068	2.816	-1.19	-8.7	19.6	2.9/ 44	131.1
Dec. 8	01 03.74	+07 12.7	2.206	2.846	-1.11	-8.1	19.8	6.0/ 58	121.4
Dec. 18	01 07.19	+07 44.4	2.356	2.876	-1.03	-7.5	20.0	8.9/ 62	112.2
Dec. 28	01 12.52	+08 25.9	2.516	2.907	-0.96	-7.0	20.2	11.5/ 64	103.5
Jan. 7	01 19.53	+09 15.8	2.682	2.939	-0.90	-6.4	20.4	13.7/ 65	95.2
Jan. 17	01 27.96	+10 12.4	2.851	2.972	-0.84	-5.9	20.7	15.5/ 66	87.3
Jan. 27	01 37.60	+11 14.0	3.021	3.005	-0.79	-5.5	20.9	17.0/ 67	79.7
Feb. 6	01 48.26	+12 19.4	3.189	3.039	-0.75	-5.0	21.1	18.2/ 68	72.4
Feb. 16	01 59.79	+13 26.9	3.353	3.074	-0.71	-4.6	21.3	19.1/ 69	65.3
Feb. 26	02 12.03	+14 35.4	3.511	3.109	-0.68	-4.3	21.5	19.8/ 69	58.4
Mar. 8	02 24.87	+15 43.9	3.662	3.144	-0.65	-3.9	21.7	20.3/ 70	51.7
Mar. 18	02 38.21	+16 51.1	3.803	3.180	-0.63	-3.6	21.9	20.7/ 71	45.1
Mar. 28	02 51.95	+17 56.4	3.935	3.216	-0.61	-3.3	22.0	21.0/ 72	38.6

Comet 216P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 May 31.13692 TT
Peri. = 151.58512 e = 0.4455771
Node = 359.87342 2000.0 a = 3.8774136 AU
Incl. = 9.04805 n = 0.12908949
q = 2.1497269 AU P = 7.64 years

m1 = 10.2 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 43.84	+37 57.0	1.470	2.433	-0.99	-0.5	18.8	164.9
Jan. 13	06 33.95	+37 52.3	1.455	2.399	-0.85	-2.5	18.6	159.1
Jan. 23	06 25.48	+37 27.6	1.465	2.368	-0.57	-4.1	18.5	149.8
Feb. 2	06 19.76	+36 46.5	1.497	2.337	-0.22	-5.2	18.5	139.8
Feb. 12	06 17.59	+35 54.4	1.547	2.309	+0.17	-5.8	18.4	130.0
Feb. 22	06 19.26	+34 56.0	1.613	2.283	+0.53	-6.1	18.4	120.8
Mar. 3	06 24.59	+33 54.5	1.689	2.258	+0.86	-6.3	18.4	112.2
Mar. 13	06 33.20	+32 51.1	1.773	2.236	+1.14	-6.5	18.4	104.2
Mar. 23	06 44.65	+31 45.7	1.863	2.216	+1.38	-6.8	18.5	96.9
Apr. 2	06 58.41	+30 37.4	1.955	2.199	+1.56	-7.3	18.5	90.2
Apr. 12	07 14.04	+29 24.7	2.049	2.184	+1.71	-7.8	18.5	83.9
Apr. 22	07 31.14	+28 06.3	2.143	2.171	+1.82	-8.5	18.6	78.1
May 2	07 49.33	+26 41.2	2.237	2.162	+1.90	-9.3	18.6	72.6
May 12	08 08.33	+25 08.4	2.330	2.155	+1.95	-10.1	18.7	67.5
May 22	08 27.86	+23 27.7	2.421	2.151	+1.99	-10.9	18.8	62.5
June 1	08 47.72	+21 38.9	2.511	2.150	+2.00	-11.7	18.8	57.8
June 11	09 07.74	+19 42.3	2.598	2.151	+2.01	-12.4	18.9	53.3
June 21	09 27.79	+17 38.6	2.683	2.156	+2.00	-13.0	19.0	48.9
July 1	09 47.78	+15 28.4	2.766	2.163	+1.99	-13.6	19.1	44.6
July 11	10 07.66	+13 12.6	2.846	2.173	+1.97	-14.0	19.2	40.4
July 21	10 27.37	+10 52.3	2.923	2.186	+1.95	-14.4	19.3	36.1
July 31	10 46.90	+08 28.6	2.996	2.201	+1.94	-14.6	19.4	31.9
Aug. 10	11 06.25	+06 02.5	3.066	2.219	+1.92	-14.7	19.6	27.7
Aug. 20	11 25.42	+03 35.2	3.131	2.240	+1.90	-14.7	19.7	23.5
Aug. 30	11 44.42	+01 07.8	3.192	2.262	+1.89	-14.7	19.8	19.2
Sept. 9	12 03.28	-01 18.7	3.246	2.287	+1.87	-14.5	19.9	14.8
Sept.19	12 22.00	-03 43.2	3.295	2.314	+1.86	-14.2	20.1	10.3
Sept.29	12 40.60	-06 04.9	3.337	2.342	+1.85	-13.8	20.2	5.9
Oct. 9	12 59.09	-08 22.9	3.371	2.373	+1.84	-13.3	20.3	2.1
Oct. 19	13 17.46	-10 36.2	3.396	2.405	+1.83	-12.8	20.5	4.5
Oct. 29	13 35.72	-12 44.2	3.413	2.438	+1.81	-12.2	20.6	9.3
Nov. 8	13 53.84	-14 46.3	3.421	2.473	+1.79	-11.6	20.7	14.4
Nov. 18	14 11.77	-16 41.8	3.418	2.509	+1.77	-10.9	20.9	19.7
Nov. 28	14 29.49	-18 30.4	3.404	2.547	+1.74	-10.1	21.0	25.2
Dec. 8	14 46.90	-20 11.8	3.380	2.585	+1.70	-9.4	21.1	30.9
Dec. 18	15 03.91	-21 45.8	3.345	2.624	+1.65	-8.7	21.2	36.8
Dec. 28	15 20.44	-23 12.4	3.299	2.664	+1.59	-7.9	21.3	42.9
Jan. 7	15 36.32	-24 31.9	3.242	2.705	+1.51	-7.3	21.4	49.2
Jan. 17	15 51.41	-25 44.6	3.176	2.746	+1.41	-6.6	21.5	55.8
Jan. 27	16 05.54	-26 51.1	3.100	2.788	+1.29	-6.1	21.6	62.6
Feb. 6	16 18.49	-27 52.0	3.017	2.830	+1.15	-5.6	21.6	69.7
Feb. 16	16 30.03	-28 48.1	2.927	2.873	+0.99	-5.2	21.7	77.1
Feb. 26	16 39.93	-29 40.2	2.833	2.916	+0.80	-4.9	21.8	84.8
Mar. 8	16 47.91	-30 29.0	2.736	2.959	+0.58	-4.6	21.8	93.0
Mar. 18	16 53.72	-31 15.0	2.641	3.002	+0.34	-4.3	21.9	101.5
Mar. 28	16 57.11	-31 58.2	2.549	3.045	+0.08	-4.0	21.9	110.5

Comet 136P/Mueller

Epoch = 2016 July 31.0 TT
T = 2016 May 31.17128 TT
Peri. = 225.16407 e = 0.2912274
Node = 137.45194 2000.0 a = 4.2031777 AU
Incl. = 9.41570 n = 0.11437667
q = 2.9790972 AU P = 8.62 years

m1 = 4.2 + 5 log(Delta) + 25.0 log(r(t-160))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	21 29.77	-16 39.6	3.802	3.083	+1.49	+5.9	20.3	37.7
Jan. 13	21 44.68	-15 40.2	3.869	3.070	+1.52	+6.5	20.3	31.2
Jan. 23	21 59.87	-14 35.1	3.922	3.058	+1.54	+7.0	20.2	24.9
Feb. 2	22 15.25	-13 25.1	3.963	3.046	+1.55	+7.4	20.2	18.7
Feb. 12	22 30.76	-12 10.8	3.991	3.036	+1.56	+7.8	20.1	12.7
Feb. 22	22 46.33	-10 53.1	4.005	3.026	+1.56	+8.0	20.1	6.9
Mar. 3	23 01.90	-09 32.9	4.007	3.017	+1.55	+8.2	20.0	3.1
Mar. 13	23 17.44	-08 11.1	3.995	3.009	+1.55	+8.3	19.9	6.5
Mar. 23	23 32.90	-06 48.5	3.970	3.002	+1.53	+8.2	19.9	12.0
Apr. 2	23 48.25	-05 26.2	3.933	2.996	+1.52	+8.1	19.8	17.7
Apr. 12	00 03.46	-04 05.0	3.884	2.991	+1.50	+7.9	19.7	23.5
Apr. 22	00 18.48	-02 46.0	3.823	2.987	+1.48	+7.6	19.6	29.2
May 2	00 33.27	-01 30.0	3.752	2.983	+1.45	+7.2	19.5	35.0
May 12	00 47.80	-00 17.9	3.671	2.981	+1.42	+6.7	19.4	40.9
May 22	01 01.99	+00 49.2	3.580	2.980	+1.38	+6.1	19.3	46.8
June 1	01 15.79	+01 50.6	3.482	2.979	+1.33	+5.5	19.2	52.7
June 11	01 29.11	+02 45.3	3.375	2.980	+1.27	+4.7	19.1	58.9
June 21	01 41.84	+03 32.5	3.263	2.981	+1.20	+3.9	18.9	65.1
July 1	01 53.87	+04 11.3	3.145	2.984	+1.12	+3.0	18.8	71.6
July 11	02 05.04	+04 40.9	3.023	2.987	+1.01	+2.0	18.7	78.3
July 21	02 15.18	+05 00.7	2.900	2.992	+0.89	+0.9	18.6	85.2
July 31	02 24.11	+05 10.0	2.775	2.997	+0.75	-0.2	18.4	92.5
Aug. 10	02 31.61	+05 08.3	2.653	3.003	+0.58	-1.3	18.3	100.2
Aug. 20	02 37.46	+04 55.6	2.535	3.010	+0.40	-2.4	18.2	108.3
Aug. 30	02 41.44	+04 31.9	2.424	3.019	+0.19	-3.4	18.1	116.9
Sept. 9	02 43.37	+03 58.0	2.324	3.028	-0.02	-4.2	17.9	126.0
Sept.19	02 43.17	+03 15.6	2.238	3.037	-0.23	-4.8	17.8	135.5
Sept.29	02 40.88	+02 27.2	2.170	3.048	-0.42	-5.1	17.8	145.4
Oct. 9	02 36.73	+01 36.5	2.125	3.060	-0.56	-4.8	17.7	155.1
Oct. 19	02 31.17	+00 48.1	2.104	3.072	-0.63	-4.1	17.7	163.4
Oct. 29	02 24.84	+00 06.8	2.111	3.085	-0.64	-3.0	17.7	166.4
Nov. 8	02 18.49	-00 23.1	2.146	3.099	-0.56	-1.5	17.7	161.0
Nov. 18	02 12.86	-00 38.4	2.207	3.114	-0.43	+0.1	17.8	151.9
Nov. 28	02 08.54	-00 37.8	2.293	3.129	-0.26	+1.6	17.9	141.9
Dec. 8	02 05.95	-00 21.7	2.401	3.145	-0.06	+3.0	18.0	131.9
Dec. 18	02 05.30	+00 08.6	2.526	3.162	+0.13	+4.2	18.1	122.2
Dec. 28	02 06.61	+00 51.0	2.666	3.180	+0.32	+5.2	18.2	112.9
Jan. 7	02 09.81	+01 43.2	2.815	3.198	+0.49	+6.0	18.4	104.0
Jan. 17	02 14.73	+02 42.8	2.970	3.216	+0.65	+6.5	18.5	95.5
Jan. 27	02 21.19	+03 47.7	3.128	3.235	+0.78	+6.8	18.6	87.3
Feb. 6	02 29.01	+04 56.1	3.287	3.255	+0.90	+7.0	18.8	79.5
Feb. 16	02 37.99	+06 06.3	3.443	3.275	+1.00	+7.1	18.9	72.0
Feb. 26	02 47.97	+07 17.0	3.594	3.296	+1.08	+7.0	19.0	64.8
Mar. 8	02 58.82	+08 26.8	3.739	3.317	+1.16	+6.8	19.2	57.7
Mar. 18	03 10.38	+09 34.7	3.875	3.339	+1.22	+6.5	19.3	50.9
Mar. 28	03 22.56	+10 39.8	4.002	3.361	+1.27	+6.2	19.4	44.3

Comet 157P/Tritton

Epoch = 2016 July 31.0 TT
T = 2016 June 10.36302 TT
Peri. = 148.89268 e = 0.6015427
Node = 299.99961 2000.0 a = 3.4083552 AU
Incl. = 7.28495 n = 0.15663428
q = 1.3580840 AU P = 6.29 years

m1 = 14.2 + 5 log(Delta) + 10.0 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 28.56	-03 50.2	2.545	2.152	+1.60	+9.2	20.0	55.8
Jan. 13	22 44.55	-02 18.6	2.574	2.082	+1.73	+10.3	19.9	49.9
Jan. 23	23 01.86	-00 35.5	2.593	2.012	+1.86	+11.4	19.7	44.5
Feb. 2	23 20.44	+01 18.3	2.601	1.943	+1.99	+12.4	19.6	39.4
Feb. 12	23 40.30	+03 22.2	2.600	1.874	+2.12	+13.3	19.5	34.7
Feb. 22	00 01.45	+05 35.0	2.590	1.807	+2.25	+14.0	19.3	30.4
Mar. 3	00 23.97	+07 55.1	2.573	1.742	+2.40	+14.6	19.1	26.4
Mar. 13	00 47.95	+10 20.7	2.550	1.680	+2.56	+14.8	19.0	22.9
Mar. 23	01 13.52	+12 49.2	2.523	1.620	+2.73	+14.8	18.8	19.8
Apr. 2	01 40.79	+15 17.2	2.493	1.565	+2.91	+14.4	18.6	17.0
Apr. 12	02 09.90	+17 40.7	2.463	1.514	+3.10	+13.4	18.4	14.6
Apr. 22	02 40.93	+19 54.9	2.433	1.469	+3.30	+11.9	18.2	12.6
May 2	03 13.90	+21 54.1	2.407	1.430	+3.48	+9.8	18.1	10.8
May 12	03 48.70	+23 32.4	2.386	1.399	+3.64	+7.2	17.9	9.3
May 22	04 25.05	+24 44.0	2.371	1.376	+3.75	+4.0	17.7	8.0
June 1	05 02.52	+25 24.0	2.364	1.362	+3.80	+0.5	17.6	6.8
June 11	05 40.53	+25 29.4	2.365	1.358	+3.79	-3.0	17.5	5.7
June 21	06 18.40	+24 59.2	2.374	1.364	+3.71	-6.4	17.5	4.6
July 1	06 55.51	+23 54.9	2.392	1.378	+3.58	-9.5	17.4	3.5
July 11	07 31.31	+22 20.2	2.418	1.402	+3.41	-12.0	17.4	2.2
July 21	08 05.44	+20 20.0	2.450	1.434	+3.23	-14.0	17.5	0.8
July 31	08 37.69	+18 00.1	2.489	1.474	+3.03	-15.4	17.6	1.0
Aug. 10	09 08.03	+15 26.1	2.531	1.520	+2.85	-16.3	17.7	2.9
Aug. 20	09 36.48	+12 43.0	2.577	1.571	+2.67	-16.8	17.8	5.1
Aug. 30	10 03.19	+09 55.1	2.623	1.628	+2.51	-16.9	18.0	7.7
Sept. 9	10 28.30	+07 06.1	2.667	1.688	+2.36	-16.7	18.1	10.6
Sept.19	10 51.93	+04 18.6	2.709	1.750	+2.23	-16.4	18.3	13.9
Sept.29	11 14.26	+01 34.8	2.746	1.816	+2.11	-15.9	18.5	17.4
Oct. 9	11 35.39	-01 03.8	2.777	1.883	+2.00	-15.2	18.7	21.4
Oct. 19	11 55.41	-03 35.9	2.800	1.951	+1.90	-14.5	18.9	25.7
Oct. 29	12 14.39	-06 00.9	2.815	2.020	+1.80	-13.7	19.0	30.3
Nov. 8	12 32.36	-08 17.9	2.819	2.090	+1.69	-12.9	19.2	35.3
Nov. 18	12 49.30	-10 26.7	2.812	2.160	+1.59	-12.0	19.3	40.7
Nov. 28	13 05.21	-12 27.0	2.794	2.230	+1.48	-11.1	19.5	46.4
Dec. 8	13 19.99	-14 18.4	2.764	2.300	+1.35	-10.3	19.6	52.5
Dec. 18	13 33.53	-16 00.9	2.723	2.370	+1.22	-9.4	19.7	58.9
Dec. 28	13 45.71	-17 34.5	2.672	2.439	+1.06	-8.4	19.8	65.8
Jan. 7	13 56.31	-18 58.8	2.612	2.508	+0.88	-7.5	19.9	73.1
Jan. 17	14 05.13	-20 13.6	2.543	2.576	+0.68	-6.5	20.0	80.8
Jan. 27	14 11.92	-21 18.6	2.470	2.644	+0.45	-5.4	20.0	89.0
Feb. 6	14 16.41	-22 13.0	2.394	2.710	+0.20	-4.3	20.1	97.8
Feb. 16	14 18.37	-22 55.7	2.320	2.776	-0.07	-3.0	20.1	107.1
Feb. 26	14 17.64	-23 25.3	2.251	2.841	-0.35	-1.5	20.2	117.0
Mar. 8	14 14.19	-23 40.0	2.193	2.905	-0.60	+0.2	20.2	127.5
Mar. 18	14 08.21	-23 38.3	2.150	2.969	-0.81	+1.9	20.3	138.4
Mar. 28	14 00.15	-23 19.1	2.128	3.031	-0.94	+3.6	20.4	149.5

Comet 202P/Scotti

Epoch = 2016 July 31.0 TT
T = 2016 June 11.01112 TT
Peri. = 255.73781 e = 0.3319801
Node = 194.52804 2000.0 a = 3.7698329 AU
Incl. = 2.18824 n = 0.13465452
q = 2.5183234 AU P = 7.32 years

m1 = 13.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	01 39.23	+08 49.6	2.285	2.703	+0.66	+3.6	19.3	104.4
Jan. 13	01 45.79	+09 26.0	2.395	2.682	+0.85	+4.7	19.4	95.9
Jan. 23	01 54.30	+10 12.7	2.508	2.662	+1.02	+5.5	19.4	88.0
Feb. 2	02 04.52	+11 07.7	2.620	2.643	+1.18	+6.1	19.5	80.5
Feb. 12	02 16.28	+12 08.8	2.730	2.625	+1.31	+6.5	19.6	73.4
Feb. 22	02 29.40	+13 14.0	2.836	2.609	+1.43	+6.7	19.6	66.7
Mar. 3	02 43.71	+14 21.3	2.937	2.594	+1.54	+6.8	19.7	60.3
Mar. 13	02 59.09	+15 28.9	3.032	2.580	+1.63	+6.6	19.7	54.2
Mar. 23	03 15.42	+16 35.2	3.119	2.567	+1.72	+6.3	19.8	48.3
Apr. 2	03 32.59	+17 38.4	3.199	2.556	+1.79	+5.9	19.8	42.7
Apr. 12	03 50.53	+18 37.3	3.271	2.546	+1.86	+5.3	19.8	37.2
Apr. 22	04 09.12	+19 30.4	3.334	2.538	+1.92	+4.6	19.9	31.9
May 2	04 28.28	+20 16.5	3.389	2.531	+1.96	+3.8	19.9	26.8
May 12	04 47.93	+20 54.7	3.436	2.525	+2.00	+2.9	19.9	21.8
May 22	05 07.95	+21 24.0	3.473	2.521	+2.03	+2.0	19.9	16.8
June 1	05 28.25	+21 43.9	3.502	2.519	+2.05	+1.0	19.9	12.0
June 11	05 48.74	+21 53.8	3.522	2.518	+2.06	0.0	19.9	7.3
June 21	06 09.29	+21 53.5	3.534	2.519	+2.05	−1.1	20.0	2.8
July 1	06 29.82	+21 43.0	3.536	2.521	+2.04	−2.1	20.0	2.9
July 11	06 50.21	+21 22.4	3.530	2.525	+2.02	−3.0	20.0	7.4
July 21	07 10.36	+20 52.2	3.515	2.531	+1.98	−3.9	20.0	12.1
July 31	07 30.19	+20 12.7	3.491	2.538	+1.94	−4.8	20.0	17.0
Aug. 10	07 49.61	+19 24.9	3.458	2.546	+1.89	−5.5	20.0	21.9
Aug. 20	08 08.53	+18 29.6	3.416	2.556	+1.84	−6.2	19.9	26.9
Aug. 30	08 26.89	+17 27.7	3.366	2.567	+1.77	−6.7	19.9	32.1
Sept. 9	08 44.62	+16 20.5	3.306	2.580	+1.70	−7.1	19.9	37.4
Sept.19	09 01.63	+15 09.2	3.238	2.593	+1.62	−7.4	19.9	42.8
Sept.29	09 17.86	+13 55.1	3.162	2.609	+1.54	−7.5	19.9	48.5
Oct. 9	09 33.24	+12 39.7	3.078	2.625	+1.44	−7.5	19.8	54.4
Oct. 19	09 47.65	+11 24.4	2.986	2.643	+1.34	−7.4	19.8	60.6
Oct. 29	10 01.01	+10 10.8	2.887	2.662	+1.22	−7.0	19.8	67.0
Nov. 8	10 13.17	+09 00.7	2.783	2.681	+1.08	−6.5	19.7	73.8
Nov. 18	10 23.99	+07 55.8	2.675	2.702	+0.93	−5.8	19.7	81.0
Nov. 28	10 33.30	+06 58.0	2.564	2.724	+0.76	−4.9	19.6	88.6
Dec. 8	10 40.87	+06 09.4	2.453	2.747	+0.57	−3.8	19.5	96.7
Dec. 18	10 46.53	+05 31.9	2.344	2.771	+0.35	−2.5	19.5	105.3
Dec. 28	10 50.05	+05 07.3	2.240	2.795	+0.12	−1.0	19.4	114.5
Jan. 7	10 51.26	+04 57.2	2.146	2.821	−0.11	+0.5	19.4	124.3
Jan. 17	10 50.13	+05 02.5	2.066	2.847	−0.34	+2.0	19.3	134.8
Jan. 27	10 46.75	+05 22.9	2.004	2.873	−0.53	+3.4	19.3	145.9
Feb. 6	10 41.45	+05 56.5	1.965	2.900	−0.66	+4.3	19.3	157.4
Feb. 16	10 34.82	+06 39.8	1.952	2.928	−0.72	+4.8	19.3	169.2
Feb. 26	10 27.64	+07 27.9	1.967	2.956	−0.69	+4.7	19.4	177.5
Mar. 8	10 20.76	+08 15.4	2.011	2.985	−0.58	+4.2	19.5	166.5
Mar. 18	10 14.98	+08 57.3	2.083	3.014	−0.41	+3.3	19.6	155.0
Mar. 28	10 10.86	+09 30.1	2.179	3.044	−0.21	+2.2	19.7	144.0

Comet P/2011 A2 (Scotti)

Epoch = 2016 July 31.0 TT
T = 2016 June 13.96377 TT
Peri. = 94.64760 e = 0.4999100
Node = 54.67402 2000.0 a = 3.1052067 AU
Incl. = 4.47536 n = 0.18012264
q = 1.5528828 AU P = 5.47 years

m1 = 15.4 + 5 log(Delta) + 15.0 log(r(t-100))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	02 56.47	+18 32.8	1.424	2.147	-1.44	-8.9	22.6	1.7/ 7	125.3
Jan. 13	02 56.62	+18 49.5	1.475	2.092	-1.35	-8.5	22.6	6.3/ 61	115.2
Jan. 23	03 00.55	+19 19.9	1.533	2.038	-1.29	-8.1	22.5	11.4/ 68	106.0
Feb. 2	03 08.02	+20 02.4	1.594	1.984	-1.25	-7.7	22.5	16.0/ 71	97.8
Feb. 12	03 18.79	+20 54.6	1.656	1.932	-1.24	-7.3	22.4	20.2/ 72	90.3
Feb. 22	03 32.59	+21 53.4	1.715	1.882	-1.25	-6.8	22.4	23.8/ 74	83.6
Mar. 3	03 49.16	+22 55.4	1.771	1.833	-1.28	-6.3	22.3	27.1/ 76	77.5
Mar. 13	04 08.30	+23 56.9	1.823	1.787	-1.32	-5.8	22.2	30.0/ 78	72.0
Mar. 23	04 29.83	+24 54.0	1.870	1.744	-1.38	-5.1	22.1	32.5/ 80	67.1
Apr. 2	04 53.55	+25 42.9	1.913	1.704	-1.45	-4.3	22.0	34.9/ 83	62.6
Apr. 12	05 19.28	+26 19.7	1.953	1.667	-1.51	-3.3	21.8	37.0/ 85	58.6
Apr. 22	05 46.77	+26 40.5	1.989	1.635	-1.58	-2.2	21.7	38.8/ 88	55.0
May 2	06 15.72	+26 41.9	2.023	1.608	-1.64	-0.9	21.6	40.4/ 91	51.8
May 12	06 45.81	+26 21.2	2.056	1.586	-1.69	+0.5	21.4	41.8/ 94	48.9
May 22	07 16.66	+25 36.7	2.089	1.569	-1.71	+2.0	21.3	43.0/ 98	46.2
June 1	07 47.86	+24 27.5	2.123	1.558	-1.72	+3.5	21.2	43.9/101	43.8
June 11	08 19.06	+22 54.2	2.159	1.553	-1.71	+4.9	21.0	44.5/104	41.6
June 21	08 49.94	+20 58.3	2.199	1.554	-1.68	+6.2	20.9	44.8/106	39.4
July 1	09 20.23	+18 42.6	2.242	1.562	-1.63	+7.3	20.8	44.9/109	37.4
July 11	09 49.78	+16 10.3	2.290	1.575	-1.57	+8.2	20.7	44.8/111	35.3
July 21	10 18.49	+13 25.3	2.343	1.594	-1.51	+8.9	20.6	44.4/112	33.3
July 31	10 46.33	+10 31.5	2.400	1.618	-1.44	+9.3	20.5	43.8/114	31.1
Aug. 10	11 13.33	+07 32.6	2.461	1.648	-1.38	+9.5	20.4	43.1/114	28.8
Aug. 20	11 39.54	+04 32.1	2.526	1.682	-1.31	+9.4	20.4	42.2/115	26.4
Aug. 30	12 05.03	+01 33.2	2.594	1.719	-1.25	+9.2	20.4	41.2/115	23.8
Sept. 9	12 29.91	-01 21.5	2.664	1.761	-1.20	+8.8	20.4	40.1/115	21.0
Sept.19	12 54.22	-04 09.7	2.735	1.805	-1.14	+8.3	20.5	39.0/114	17.9
Sept.29	13 18.06	-06 49.6	2.804	1.852	-1.09	+7.8	20.5	37.9/114	14.6
Oct. 9	13 41.49	-09 19.9	2.872	1.902	-1.05	+7.2	20.6	36.7/113	11.1
Oct. 19	14 04.53	-11 39.3	2.937	1.953	-1.00	+6.5	20.7	35.6/112	7.3
Oct. 29	14 27.23	-13 47.2	2.996	2.006	-0.96	+5.9	20.8	34.4/110	3.3
Nov. 8	14 49.59	-15 43.0	3.050	2.059	-0.92	+5.2	21.0	33.3/109	1.2
Nov. 18	15 11.58	-17 26.4	3.096	2.114	-0.89	+4.6	21.1	32.1/107	5.6
Nov. 28	15 33.17	-18 57.3	3.133	2.170	-0.85	+4.0	21.3	30.9/106	10.4
Dec. 8	15 54.32	-20 15.8	3.160	2.226	-0.82	+3.5	21.4	29.7/104	15.4
Dec. 18	16 14.94	-21 22.4	3.177	2.282	-0.79	+3.0	21.6	28.4/102	20.6
Dec. 28	16 34.94	-22 17.7	3.181	2.338	-0.76	+2.5	21.8	27.1/100	26.1
Jan. 7	16 54.24	-23 02.3	3.174	2.395	-0.73	+2.1	21.9	25.7/ 99	31.7
Jan. 17	17 12.70	-23 37.1	3.155	2.451	-0.71	+1.7	22.1	24.2/ 97	37.7
Jan. 27	17 30.22	-24 03.5	3.123	2.507	-0.68	+1.4	22.2	22.6/ 96	43.8
Feb. 6	17 46.65	-24 22.5	3.079	2.562	-0.66	+1.0	22.4	20.8/ 94	50.2
Feb. 16	18 01.86	-24 35.6	3.024	2.617	-0.65	+0.8	22.5	18.9/ 93	56.9
Feb. 26	18 15.70	-24 44.4	2.958	2.672	-0.64	+0.5	22.6	16.7/ 93	63.8
Mar. 8	18 27.99	-24 50.5	2.882	2.726	-0.63	+0.3	22.7	14.4/ 93	71.0
Mar. 18	18 38.56	-24 55.4	2.800	2.780	-0.63	+0.2	22.8	11.8/ 93	78.6
Mar. 28	18 47.23	-25 00.7	2.712	2.833	-0.64	0.0	22.9	8.9/ 95	86.6

Comet 118P/Shoemaker-Levy

Epoch = 2016 July 31.0 TT
T = 2016 June 16.97550 TT
Peri. = 302.33919 e = 0.4280925
Node = 151.72685 2000.0 a = 3.4622197 AU
Incl. = 8.51429 n = 0.15299321
q = 1.9800694 AU P = 6.44 years

m1 = 8.2 + 5 log(Delta) + 17.5 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 37.69	-04 26.7	2.226	2.356	+1.10	+8.3	16.8	85.1
Jan. 13	00 48.66	-03 03.2	2.311	2.318	+1.26	+9.3	16.8	78.1
Jan. 23	01 01.30	-01 30.7	2.393	2.281	+1.41	+10.0	16.7	71.5
Feb. 2	01 15.42	+00 09.0	2.470	2.245	+1.55	+10.5	16.7	65.3
Feb. 12	01 30.89	+01 54.0	2.542	2.211	+1.67	+10.8	16.6	59.5
Feb. 22	01 47.57	+03 42.3	2.607	2.179	+1.78	+11.0	16.5	54.0
Mar. 3	02 05.37	+05 32.1	2.667	2.148	+1.89	+11.0	16.5	48.9
Mar. 13	02 24.23	+07 21.6	2.720	2.120	+1.99	+10.7	16.4	44.0
Mar. 23	02 44.09	+09 08.9	2.767	2.094	+2.08	+10.3	16.3	39.3
Apr. 2	03 04.88	+10 52.0	2.809	2.070	+2.17	+9.7	16.3	34.9
Apr. 12	03 26.57	+12 29.2	2.845	2.048	+2.25	+8.9	16.2	30.7
Apr. 22	03 49.09	+13 58.5	2.877	2.030	+2.33	+8.0	16.1	26.7
May 2	04 12.36	+15 18.1	2.904	2.014	+2.40	+6.8	16.0	22.9
May 12	04 36.32	+16 26.5	2.927	2.001	+2.45	+5.6	16.0	19.2
May 22	05 00.85	+17 22.2	2.947	1.991	+2.50	+4.2	15.9	15.6
June 1	05 25.82	+18 04.1	2.964	1.984	+2.53	+2.7	15.9	12.2
June 11	05 51.12	+18 31.1	2.977	1.981	+2.54	+1.2	15.8	9.0
June 21	06 16.57	+18 43.0	2.988	1.980	+2.55	-0.3	15.8	6.2
July 1	06 42.02	+18 39.6	2.995	1.983	+2.53	-1.8	15.8	4.5
July 11	07 07.33	+18 21.3	3.000	1.989	+2.50	-3.3	15.8	5.1
July 21	07 32.34	+17 48.8	3.001	1.999	+2.46	-4.6	15.8	7.5
July 31	07 56.93	+17 03.1	2.999	2.011	+2.41	-5.7	15.8	10.7
Aug. 10	08 20.99	+16 05.7	2.993	2.026	+2.34	-6.8	15.8	14.2
Aug. 20	08 44.44	+14 58.2	2.983	2.044	+2.28	-7.6	15.8	17.9
Aug. 30	09 07.21	+13 42.2	2.968	2.065	+2.20	-8.3	15.9	21.8
Sept. 9	09 29.25	+12 19.7	2.948	2.089	+2.13	-8.7	15.9	25.9
Sept.19	09 50.52	+10 52.5	2.921	2.114	+2.05	-9.0	16.0	30.2
Sept.29	10 11.00	+09 22.4	2.888	2.143	+1.97	-9.1	16.0	34.7
Oct. 9	10 30.65	+07 51.5	2.848	2.173	+1.88	-9.0	16.1	39.5
Oct. 19	10 49.44	+06 21.6	2.802	2.205	+1.79	-8.7	16.1	44.5
Oct. 29	11 07.34	+04 54.4	2.747	2.238	+1.69	-8.3	16.2	49.8
Nov. 8	11 24.28	+03 31.8	2.685	2.274	+1.59	-7.6	16.2	55.4
Nov. 18	11 40.17	+02 15.6	2.616	2.310	+1.48	-6.8	16.3	61.3
Nov. 28	11 54.93	+01 07.5	2.540	2.348	+1.35	-5.8	16.3	67.6
Dec. 8	12 08.39	+00 09.4	2.459	2.387	+1.20	-4.6	16.4	74.2
Dec. 18	12 20.40	-00 37.0	2.372	2.427	+1.04	-3.3	16.4	81.3
Dec. 28	12 30.75	-01 10.1	2.282	2.468	+0.85	-1.8	16.5	88.9
Jan. 7	12 39.20	-01 27.9	2.191	2.510	+0.63	-0.1	16.5	97.1
Jan. 17	12 45.52	-01 29.2	2.102	2.552	+0.40	+1.6	16.6	105.8
Jan. 27	12 49.48	-01 12.9	2.019	2.594	+0.14	+3.4	16.6	115.1
Feb. 6	12 50.87	-00 38.5	1.944	2.637	-0.12	+5.1	16.6	125.1
Feb. 16	12 49.69	+00 12.8	1.883	2.681	-0.36	+6.6	16.7	135.7
Feb. 26	12 46.05	+01 18.4	1.841	2.724	-0.57	+7.5	16.8	146.8
Mar. 8	12 40.36	+02 33.5	1.822	2.768	-0.70	+7.8	16.9	158.2
Mar. 18	12 33.31	+03 51.4	1.828	2.812	-0.76	+7.3	17.0	168.9
Mar. 28	12 25.74	+05 04.8	1.864	2.855	-0.72	+6.2	17.2	172.0

Comet C/2015 T4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 June 18.94657 TT
Peri. = 270.13741
Node = 251.79099 2000.0
Incl. = 87.92120
q = 2.2964040 AU
e = 0.9737752

m1 = 10.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 18.52	-24 21.7	2.323	2.940	-1.38	-10.0	16.7	119.9
Jan. 13	04 04.70	-26 01.2	2.384	2.876	-1.11	-6.6	16.7	110.2
Jan. 23	03 53.61	-27 07.6	2.458	2.813	-0.80	-4.1	16.6	100.8
Feb. 2	03 45.59	-27 48.9	2.539	2.753	-0.49	-2.4	16.6	91.9
Feb. 12	03 40.68	-28 13.1	2.619	2.696	-0.19	-1.5	16.6	83.7
Feb. 22	03 38.74	-28 27.7	2.692	2.641	+0.08	-1.1	16.6	76.4
Mar. 3	03 39.50	-28 38.6	2.755	2.589	+0.32	-1.2	16.5	70.0
Mar. 13	03 42.71	-28 50.7	2.804	2.541	+0.54	-1.7	16.5	64.6
Mar. 23	03 48.16	-29 07.9	2.836	2.496	+0.75	-2.6	16.4	60.2
Apr. 2	03 55.65	-29 33.7	2.851	2.455	+0.94	-3.7	16.4	57.1
Apr. 12	04 05.07	-30 10.8	2.848	2.418	+1.13	-5.1	16.3	55.1
Apr. 22	04 16.37	-31 02.0	2.829	2.386	+1.32	-6.8	16.2	54.3
May 2	04 29.56	-32 09.6	2.794	2.358	+1.52	-8.6	16.2	54.6
May 12	04 44.77	-33 35.9	2.747	2.335	+1.74	-10.7	16.1	55.9
May 22	05 02.16	-35 22.8	2.691	2.318	+1.99	-12.9	16.0	57.9
June 1	05 22.03	-37 31.3	2.628	2.305	+2.28	-15.0	15.9	60.5
June 11	05 44.80	-40 01.4	2.565	2.298	+2.62	-17.0	15.9	63.4
June 21	06 10.98	-42 51.1	2.507	2.297	+3.03	-18.4	15.8	66.3
July 1	06 41.23	-45 55.1	2.459	2.300	+3.50	-19.0	15.8	69.0
July 11	07 16.26	-49 04.6	2.427	2.310	+4.03	-18.2	15.8	71.2
July 21	07 56.58	-52 06.6	2.416	2.324	+4.57	-15.9	15.8	72.6
July 31	08 42.28	-54 45.2	2.430	2.344	+5.02	-12.0	15.8	73.0
Aug. 10	09 32.45	-56 45.4	2.470	2.369	+5.25	-7.1	15.9	72.4
Aug. 20	10 24.97	-57 56.8	2.536	2.398	+5.21	-2.1	16.0	70.6
Aug. 30	11 17.03	-58 17.9	2.626	2.433	+4.90	+2.2	16.2	67.9
Sept. 9	12 06.00	-57 55.9	2.736	2.471	+4.43	+5.3	16.3	64.2
Sept.19	12 50.30	-57 02.7	2.862	2.514	+3.92	+7.3	16.5	59.9
Sept.29	13 29.51	-55 50.0	2.997	2.560	+3.45	+8.2	16.7	55.1
Oct. 9	14 03.97	-54 27.8	3.138	2.610	+3.03	+8.5	16.8	50.0
Oct. 19	14 34.28	-53 02.6	3.278	2.663	+2.68	+8.4	17.0	44.7
Oct. 29	15 01.12	-51 38.3	3.413	2.719	+2.40	+8.1	17.2	39.4
Nov. 8	15 25.09	-50 17.3	3.539	2.777	+2.15	+7.7	17.4	34.3
Nov. 18	15 46.62	-49 00.4	3.652	2.839	+1.95	+7.3	17.5	29.9
Nov. 28	16 06.09	-47 47.8	3.750	2.902	+1.76	+6.9	17.7	26.6
Dec. 8	16 23.72	-46 39.3	3.830	2.967	+1.59	+6.5	17.8	25.0
Dec. 18	16 39.66	-45 34.5	3.890	3.034	+1.44	+6.2	18.0	25.7
Dec. 28	16 54.02	-44 32.9	3.929	3.102	+1.28	+5.9	18.1	28.7
Jan. 7	17 06.83	-43 34.3	3.947	3.172	+1.12	+5.6	18.2	33.4
Jan. 17	17 18.06	-42 38.1	3.943	3.244	+0.96	+5.4	18.3	39.4
Jan. 27	17 27.68	-41 43.8	3.918	3.316	+0.79	+5.3	18.4	46.4
Feb. 6	17 35.57	-40 51.0	3.873	3.389	+0.61	+5.2	18.4	54.0
Feb. 16	17 41.62	-39 59.0	3.811	3.464	+0.41	+5.2	18.5	62.3
Feb. 26	17 45.70	-39 07.3	3.735	3.539	+0.19	+5.2	18.5	71.0
Mar. 8	17 47.62	-38 14.8	3.648	3.614	-0.04	+5.5	18.6	80.2
Mar. 18	17 47.25	-37 20.2	3.555	3.691	-0.28	+5.8	18.6	90.0
Mar. 28	17 44.48	-36 21.9	3.460	3.767	-0.52	+6.4	18.7	100.2

Comet 146P/Shoemaker-LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 June 30.14386 TT
Peri. = 316.98207 e = 0.6460143
Node = 53.45368 2000.0 a = 4.0400550 AU
Incl. = 23.07300 n = 0.12137330
q = 1.4301217 AU P = 8.12 years

m1 = 15.8 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	18 42.08	-34 48.2	3.321	2.368	+2.45	0.0	21.2	12.1
Jan. 13	19 06.56	-34 48.0	3.235	2.296	+2.55	+1.3	21.1	14.6
Jan. 23	19 32.10	-34 34.9	3.139	2.224	+2.65	+2.8	20.9	18.0
Feb. 2	19 58.62	-34 07.4	3.036	2.152	+2.74	+4.4	20.7	21.8
Feb. 12	20 26.03	-33 23.7	2.927	2.080	+2.82	+6.1	20.5	25.5
Feb. 22	20 54.21	-32 22.7	2.815	2.010	+2.88	+8.0	20.3	29.2
Mar. 3	21 23.03	-31 02.9	2.702	1.941	+2.93	+10.0	20.1	32.5
Mar. 13	21 52.37	-29 23.4	2.590	1.873	+2.97	+12.0	19.9	35.6
Mar. 23	22 22.07	-27 23.6	2.480	1.808	+3.00	+14.0	19.7	38.4
Apr. 2	22 52.03	-25 03.4	2.376	1.746	+3.01	+16.0	19.5	40.8
Apr. 12	23 22.12	-22 23.4	2.278	1.686	+3.01	+17.8	19.3	42.8
Apr. 22	23 52.21	-19 24.9	2.188	1.631	+3.00	+19.5	19.1	44.5
May 2	00 22.23	-16 10.0	2.107	1.581	+2.99	+20.8	18.9	45.9
May 12	00 52.08	-12 41.7	2.036	1.537	+2.96	+21.8	18.7	47.1
May 22	01 21.69	-09 03.6	1.974	1.499	+2.93	+22.4	18.6	48.0
June 1	01 51.02	-05 20.0	1.922	1.469	+2.90	+22.5	18.5	48.9
June 11	02 20.04	-01 35.1	1.878	1.447	+2.87	+22.2	18.4	49.8
June 21	02 48.69	+02 06.8	1.841	1.434	+2.83	+21.5	18.3	50.8
July 1	03 16.97	+05 41.8	1.810	1.430	+2.78	+20.5	18.3	52.0
July 11	03 44.80	+09 06.9	1.784	1.436	+2.73	+19.3	18.2	53.6
July 21	04 12.12	+12 19.7	1.759	1.450	+2.67	+17.9	18.2	55.5
July 31	04 38.83	+15 19.1	1.735	1.474	+2.60	+16.6	18.3	57.9
Aug. 10	05 04.79	+18 04.8	1.711	1.505	+2.50	+15.3	18.3	60.8
Aug. 20	05 29.82	+20 37.7	1.685	1.544	+2.39	+14.2	18.3	64.3
Aug. 30	05 53.72	+22 59.7	1.657	1.589	+2.25	+13.4	18.4	68.3
Sept. 9	06 16.23	+25 13.3	1.625	1.640	+2.08	+12.9	18.5	72.9
Sept.19	06 37.06	+27 22.2	1.590	1.696	+1.88	+12.8	18.5	78.0
Sept.29	06 55.89	+29 30.2	1.553	1.756	+1.64	+13.1	18.6	83.9
Oct. 9	07 12.32	+31 41.7	1.514	1.819	+1.36	+13.9	18.6	90.4
Oct. 19	07 25.89	+34 00.4	1.474	1.885	+1.02	+14.9	18.7	97.6
Oct. 29	07 36.07	+36 29.2	1.437	1.952	+0.62	+16.0	18.8	105.5
Nov. 8	07 42.24	+39 09.0	1.405	2.022	+0.15	+16.8	18.8	114.0
Nov. 18	07 43.78	+41 56.6	1.383	2.092	-0.36	+16.8	18.9	123.0
Nov. 28	07 40.20	+44 44.7	1.374	2.164	-0.88	+15.6	19.0	132.2
Dec. 8	07 31.38	+47 20.8	1.383	2.236	-1.33	+12.9	19.1	141.0
Dec. 18	07 18.11	+49 29.7	1.414	2.308	-1.60	+9.0	19.3	148.0
Dec. 28	07 02.09	+50 59.2	1.470	2.381	-1.63	+4.5	19.5	151.5
Jan. 7	06 45.83	+51 44.0	1.550	2.453	-1.40	+0.4	19.7	150.2
Jan. 17	06 31.85	+51 48.2	1.656	2.525	-1.01	-2.7	19.9	145.0
Jan. 27	06 21.74	+51 21.6	1.783	2.597	-0.56	-4.6	20.2	137.7
Feb. 6	06 16.16	+50 35.6	1.930	2.668	-0.12	-5.6	20.4	129.6
Feb. 16	06 14.92	+49 39.4	2.093	2.739	+0.25	-6.0	20.7	121.3
Feb. 26	06 17.46	+48 39.3	2.268	2.810	+0.57	-6.1	20.9	113.2
Mar. 8	06 23.11	+47 38.6	2.453	2.880	+0.81	-6.0	21.2	105.4
Mar. 18	06 31.23	+46 39.0	2.644	2.949	+1.00	-5.8	21.4	97.8
Mar. 28	06 41.24	+45 40.9	2.839	3.017	+1.15	-5.7	21.7	90.5

Comet 207P/NEAT

Epoch = 2016 July 31.0 TT
T = 2016 July 1.28586 TT
Peri. = 271.28723 e = 0.7581985
Node = 200.54416 2000.0 a = 3.8769553 AU
Incl. = 10.16082 n = 0.12911238
q = 0.9374536 AU P = 7.63 years

m1 = 16.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 29.48	-05 34.9	2.896	2.471	+1.27	+4.8	22.2	55.3
Jan. 13	22 42.23	-04 47.3	2.917	2.379	+1.41	+5.9	22.1	48.3
Jan. 23	22 56.34	-03 48.7	2.924	2.286	+1.54	+6.9	21.9	41.8
Feb. 2	23 11.74	-02 39.7	2.915	2.190	+1.67	+7.9	21.7	35.6
Feb. 12	23 28.44	-01 20.7	2.892	2.093	+1.80	+8.8	21.5	29.8
Feb. 22	23 46.44	+00 07.8	2.854	1.995	+1.94	+9.7	21.3	24.4
Mar. 3	00 05.83	+01 45.0	2.802	1.896	+2.09	+10.5	21.0	19.4
Mar. 13	00 26.74	+03 30.4	2.737	1.795	+2.26	+11.2	20.7	14.9
Mar. 23	00 49.32	+05 22.9	2.662	1.694	+2.45	+11.8	20.4	10.9
Apr. 2	01 13.82	+07 21.1	2.579	1.592	+2.67	+12.2	20.1	7.4
Apr. 12	01 40.54	+09 23.3	2.488	1.491	+2.93	+12.3	19.7	4.5
Apr. 22	02 09.81	+11 26.6	2.395	1.392	+3.22	+12.1	19.3	2.6
May 2	02 42.00	+13 27.1	2.301	1.295	+3.55	+11.2	18.9	2.2
May 12	03 17.51	+15 19.2	2.211	1.203	+3.91	+9.6	18.5	2.8
May 22	03 56.57	+16 55.5	2.127	1.118	+4.27	+7.1	18.1	3.5
June 1	04 39.25	+18 06.9	2.055	1.045	+4.60	+3.7	17.8	4.0
June 11	05 25.21	+18 43.5	1.997	0.988	+4.84	-0.7	17.4	4.7
June 21	06 13.63	+18 36.9	1.956	0.951	+4.96	-5.4	17.2	5.9
July 1	07 03.25	+17 42.8	1.936	0.937	+4.93	-10.0	17.2	7.5
July 11	07 52.56	+16 02.9	1.937	0.949	+4.76	-13.8	17.2	9.4
July 21	08 40.17	+13 45.0	1.961	0.985	+4.49	-16.4	17.4	11.3
July 31	09 25.10	+11 00.7	2.007	1.042	+4.18	-17.8	17.7	12.8
Aug. 10	10 06.85	+08 02.3	2.072	1.114	+3.84	-18.2	18.1	13.7
Aug. 20	10 45.30	+05 00.6	2.154	1.197	+3.53	-17.7	18.4	13.9
Aug. 30	11 20.62	+02 03.4	2.249	1.289	+3.25	-16.8	18.9	13.5
Sept. 9	11 53.12	-00 44.1	2.353	1.386	+3.00	-15.5	19.3	12.3
Sept.19	12 23.14	-03 18.9	2.462	1.485	+2.79	-14.1	19.7	10.4
Sept.29	12 51.01	-05 39.8	2.573	1.586	+2.60	-12.7	20.1	7.9
Oct. 9	13 17.04	-07 46.3	2.681	1.688	+2.44	-11.2	20.4	4.8
Oct. 19	13 41.46	-09 38.6	2.785	1.789	+2.30	-9.8	20.8	1.5
Oct. 29	14 04.46	-11 17.0	2.881	1.890	+2.17	-8.5	21.1	3.1
Nov. 8	14 26.20	-12 42.2	2.967	1.989	+2.06	-7.3	21.3	7.6
Nov. 18	14 46.77	-13 54.7	3.042	2.088	+1.95	-6.0	21.6	12.5
Nov. 28	15 06.22	-14 55.2	3.103	2.184	+1.84	-4.9	21.9	17.8
Dec. 8	15 24.58	-15 44.2	3.149	2.280	+1.72	-3.8	22.1	23.5
Dec. 18	15 41.83	-16 22.3	3.181	2.374	+1.61	-2.8	22.3	29.4
Dec. 28	15 57.94	-16 50.2	3.196	2.466	+1.49	-1.8	22.4	35.7
Jan. 7	16 12.84	-17 08.4	3.195	2.556	+1.36	-0.9	22.6	42.4
Jan. 17	16 26.43	-17 17.7	3.179	2.645	+1.22	-0.1	22.7	49.3
Jan. 27	16 38.61	-17 18.7	3.148	2.733	+1.06	+0.7	22.9	56.6
Feb. 6	16 49.24	-17 12.0	3.104	2.818	+0.89	+1.4	23.0	64.2
Feb. 16	16 58.16	-16 58.4	3.048	2.903	+0.71	+2.0	23.0	72.2
Feb. 26	17 05.23	-16 38.7	2.983	2.985	+0.50	+2.5	.	80.6
Mar. 8	17 10.27	-16 13.6	2.912	3.067	+0.28	+3.0	.	89.4
Mar. 18	17 13.11	-15 43.8	2.839	3.146	+0.05	+3.4	.	98.6
Mar. 28	17 13.66	-15 10.2	2.768	3.225	-0.18	+3.7	.	108.4

Comet 208P/McMillan

Epoch = 2016 July 31.0 TT
T = 2016 July 1.75462 TT
Peri. = 310.51032 e = 0.3721549
Node = 36.41464 2000.0 a = 4.0528833 AU
Incl. = 4.40756 n = 0.12079750
q = 2.5445829 AU P = 8.16 years

m1 = 8.2 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	19 47.48	-24 27.4	3.747	2.797	+1.88	+5.2	20.0	12.9
Jan. 13	20 06.27	-23 35.7	3.745	2.772	+1.88	+6.0	19.9	7.5
Jan. 23	20 25.12	-22 36.0	3.730	2.748	+1.88	+6.7	19.8	3.4
Feb. 2	20 43.94	-21 28.8	3.704	2.725	+1.87	+7.4	19.8	5.7
Feb. 12	21 02.66	-20 14.5	3.667	2.703	+1.85	+8.1	19.7	10.7
Feb. 22	21 21.21	-18 53.9	3.619	2.683	+1.83	+8.6	19.6	16.1
Mar. 3	21 39.52	-17 27.7	3.561	2.663	+1.80	+9.1	19.5	21.5
Mar. 13	21 57.56	-15 56.8	3.494	2.645	+1.77	+9.5	19.4	26.8
Mar. 23	22 15.27	-14 22.3	3.418	2.628	+1.74	+9.7	19.3	32.2
Apr. 2	22 32.63	-12 45.0	3.334	2.613	+1.70	+9.9	19.2	37.5
Apr. 12	22 49.59	-11 06.2	3.243	2.599	+1.65	+9.9	19.1	42.9
Apr. 22	23 06.10	-09 26.8	3.145	2.587	+1.60	+9.9	18.9	48.2
May 2	23 22.14	-07 48.1	3.042	2.576	+1.55	+9.7	18.8	53.6
May 12	23 37.64	-06 11.2	2.934	2.566	+1.49	+9.4	18.7	59.1
May 22	23 52.52	-04 37.3	2.822	2.559	+1.42	+9.0	18.6	64.7
June 1	00 06.72	-03 07.4	2.706	2.553	+1.34	+8.5	18.5	70.5
June 11	00 20.11	-01 42.9	2.589	2.548	+1.24	+7.8	18.4	76.4
June 21	00 32.54	-00 24.8	2.470	2.546	+1.13	+7.0	18.3	82.5
July 1	00 43.87	+00 45.7	2.351	2.545	+1.00	+6.2	18.2	89.0
July 11	00 53.87	+01 47.3	2.233	2.545	+0.84	+5.2	18.1	95.8
July 21	01 02.31	+02 39.1	2.118	2.548	+0.66	+4.1	18.0	103.0
July 31	01 08.94	+03 20.0	2.009	2.552	+0.45	+2.9	17.9	110.8
Aug. 10	01 13.48	+03 49.0	1.906	2.558	+0.22	+1.7	17.8	119.1
Aug. 20	01 15.72	+04 05.7	1.814	2.565	-0.02	+0.4	17.7	128.1
Aug. 30	01 15.52	+04 10.1	1.736	2.574	-0.26	-0.7	17.6	137.7
Sept. 9	01 12.91	+04 03.1	1.675	2.585	-0.47	-1.6	17.6	148.0
Sept.19	01 08.20	+03 46.7	1.635	2.597	-0.62	-2.2	17.6	158.9
Sept.29	01 01.96	+03 24.6	1.618	2.611	-0.69	-2.3	17.6	170.0
Oct. 9	00 55.02	+03 01.1	1.628	2.626	-0.67	-2.0	17.6	176.6
Oct. 19	00 48.35	+02 41.5	1.665	2.642	-0.55	-1.1	17.7	166.2
Oct. 29	00 42.81	+02 30.0	1.727	2.660	-0.37	0.0	17.9	155.0
Nov. 8	00 39.07	+02 29.8	1.813	2.680	-0.15	+1.3	18.1	144.1
Nov. 18	00 37.53	+02 42.4	1.920	2.700	+0.07	+2.5	18.2	133.8
Nov. 28	00 38.27	+03 07.9	2.044	2.722	+0.30	+3.8	18.4	124.1
Dec. 8	00 41.23	+03 45.5	2.181	2.745	+0.50	+4.8	18.7	114.9
Dec. 18	00 46.23	+04 33.8	2.329	2.769	+0.68	+5.7	18.9	106.1
Dec. 28	00 53.01	+05 31.2	2.483	2.793	+0.83	+6.5	19.1	97.9
Jan. 7	01 01.34	+06 36.0	2.642	2.819	+0.96	+7.1	19.3	90.0
Jan. 17	01 10.98	+07 46.6	2.802	2.846	+1.07	+7.5	19.5	82.5
Jan. 27	01 21.73	+09 01.5	2.962	2.874	+1.17	+7.8	19.7	75.3
Feb. 6	01 33.42	+10 19.3	3.119	2.902	+1.25	+7.9	19.9	68.3
Feb. 16	01 45.89	+11 38.5	3.271	2.931	+1.31	+8.0	20.1	61.5
Feb. 26	01 59.02	+12 58.1	3.417	2.961	+1.37	+7.9	20.3	54.9
Mar. 8	02 12.71	+14 17.0	3.556	2.991	+1.41	+7.7	20.5	48.4
Mar. 18	02 26.86	+15 34.1	3.686	3.022	+1.45	+7.5	20.6	42.1
Mar. 28	02 41.38	+16 48.8	3.805	3.053	+1.48	+7.1	20.8	35.9

Comet P/2010 N1 (WISE)

Epoch = 2016 July 31.0 TT
T = 2016 July 13.82393 TT
Peri. = 160.85154 e = 0.4965897
Node = 106.10280 2000.0 a = 3.2874607 AU
Incl. = 15.36391 n = 0.16535343
q = 1.6549416 AU P = 5.96 years

m1 = 17.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	14 01.00	+03 17.3	2.406	2.357	-1.11	+7.3	22.8	25.0/ 98	75.3
Jan. 13	14 17.54	+02 43.5	2.240	2.304	-1.21	+8.0	22.6	24.5/ 95	81.2
Jan. 23	14 33.85	+02 21.0	2.075	2.250	-1.33	+8.9	22.3	23.9/ 92	87.0
Feb. 2	14 49.78	+02 10.9	1.915	2.197	-1.46	+9.8	22.0	23.0/ 89	92.9
Feb. 12	15 05.12	+02 14.2	1.759	2.145	-1.62	+10.9	21.7	21.8/ 85	98.8
Feb. 22	15 19.62	+02 31.2	1.610	2.094	-1.80	+12.1	21.4	20.3/ 81	104.8
Mar. 3	15 33.00	+03 01.8	1.469	2.044	-2.00	+13.5	21.1	18.3/ 76	110.9
Mar. 13	15 44.88	+03 45.1	1.336	1.996	-2.25	+15.0	20.8	15.8/ 70	117.1
Mar. 23	15 54.86	+04 38.3	1.214	1.950	-2.52	+16.7	20.5	12.9/ 63	123.4
Apr. 2	16 02.51	+05 37.3	1.104	1.905	-2.84	+18.4	20.2	9.3/ 51	129.8
Apr. 12	16 07.39	+06 35.4	1.006	1.863	-3.19	+20.0	19.9	5.5/ 30	136.2
Apr. 22	16 09.21	+07 23.0	0.922	1.824	-3.55	+21.4	19.6	3.2/323	142.3
May 2	16 07.91	+07 48.4	0.853	1.788	-3.90	+22.3	19.4	6.2/261	147.8
May 12	16 03.82	+07 38.2	0.800	1.756	-4.19	+22.7	19.2	10.5/237	151.7
May 22	15 57.90	+06 41.0	0.763	1.727	-4.37	+22.6	19.0	14.6/221	152.9
June 1	15 51.51	+04 50.9	0.744	1.703	-4.41	+22.5	18.9	17.9/206	150.9
June 11	15 46.21	+02 10.1	0.742	1.683	-4.31	+22.4	18.8	20.6/192	146.3
June 21	15 43.46	-01 11.5	0.756	1.669	-4.12	+22.7	18.8	22.8/177	140.3
July 1	15 44.16	-04 58.9	0.785	1.659	-3.87	+23.0	18.9	24.8/164	133.7
July 11	15 48.75	-08 56.8	0.828	1.655	-3.62	+23.1	19.0	26.7/152	127.3
July 21	15 57.26	-12 52.0	0.884	1.656	-3.39	+22.8	19.1	28.4/142	121.2
July 31	16 09.43	-16 34.3	0.951	1.663	-3.19	+21.9	19.3	29.9/133	115.4
Aug. 10	16 24.90	-19 56.9	1.029	1.675	-3.03	+20.6	19.5	31.2/126	110.1
Aug. 20	16 43.27	-22 55.0	1.116	1.691	-2.88	+18.7	19.7	32.2/119	105.2
Aug. 30	17 04.03	-25 25.7	1.211	1.713	-2.76	+16.6	20.0	32.9/113	100.5
Sept. 9	17 26.78	-27 27.6	1.315	1.739	-2.64	+14.3	20.2	33.4/108	96.1
Sept.19	17 51.04	-29 00.3	1.426	1.769	-2.52	+11.9	20.4	33.6/102	91.8
Sept.29	18 16.32	-30 04.1	1.543	1.803	-2.39	+9.5	20.7	33.7/ 98	87.5
Oct. 9	18 42.22	-30 40.2	1.667	1.841	-2.26	+7.3	21.0	33.7/ 93	83.3
Oct. 19	19 08.33	-30 50.4	1.796	1.881	-2.12	+5.3	21.2	33.5/ 89	79.1
Oct. 29	19 34.30	-30 37.0	1.929	1.924	-1.98	+3.5	21.5	33.3/ 86	74.8
Nov. 8	19 59.89	-30 02.6	2.065	1.969	-1.83	+2.0	21.7	33.0/ 82	70.5
Nov. 18	20 24.87	-29 10.0	2.204	2.017	-1.69	+0.7	22.0	32.6/ 79	66.1
Nov. 28	20 49.10	-28 01.9	2.344	2.066	-1.55	-0.4	22.2	32.2/ 77	61.6
Dec. 8	21 12.54	-26 41.0	2.485	2.116	-1.42	-1.2	22.4	31.8/ 75	57.0
Dec. 18	21 35.13	-25 10.0	2.624	2.168	-1.30	-1.9	22.7	31.3/ 73	52.4
Dec. 28	21 56.88	-23 31.1	2.761	2.220	-1.19	-2.3	22.9	30.8/ 71	47.6
Jan. 7	22 17.84	-21 46.4	2.894	2.273	-1.09	-2.7	.	30.3/ 70	42.8
Jan. 17	22 38.02	-19 58.0	3.022	2.327	-1.00	-2.9	.	29.7/ 69	38.0
Jan. 27	22 57.50	-18 07.4	3.143	2.381	-0.92	-3.1	.	29.2/ 68	33.2
Feb. 6	23 16.32	-16 16.2	3.258	2.435	-0.85	-3.2	.	28.5/ 68	28.3
Feb. 16	23 34.52	-14 25.8	3.363	2.489	-0.79	-3.2	.	27.9/ 68	23.6
Feb. 26	23 52.16	-12 37.2	3.459	2.543	-0.73	-3.2	.	27.3/ 68	19.0
Mar. 8	00 09.26	-10 51.5	3.544	2.598	-0.68	-3.1	.	26.5/ 68	15.0
Mar. 18	00 25.86	-09 09.7	3.617	2.651	-0.64	-3.1	.	25.8/ 68	12.0
Mar. 28	00 41.99	-07 32.6	3.678	2.705	-0.60	-3.0	.	25.1/ 69	11.1

Comet 279P/La Sagra

Epoch = 2016 July 31.0 TT
T = 2016 July 14.54950 TT
Peri. = 5.87678 e = 0.3970206
Node = 346.25018 2000.0 a = 3.5809023 AU
Incl. = 5.04640 n = 0.14545055
q = 2.1592103 AU P = 6.78 years

H = 16.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	19 15.82	-25 23.4	3.533	2.557	+2.07	+4.8	21.4	6.1
Jan. 13	19 36.47	-24 35.2	3.504	2.523	+2.08	+5.8	21.3	3.0
Jan. 23	19 57.24	-23 36.7	3.465	2.489	+2.08	+6.9	21.3	6.2
Feb. 2	20 18.03	-22 28.2	3.416	2.456	+2.07	+7.8	21.4	11.1
Feb. 12	20 38.77	-21 09.9	3.357	2.424	+2.06	+8.8	21.4	16.1
Feb. 22	20 59.36	-19 42.3	3.290	2.394	+2.04	+9.6	21.5	21.1
Mar. 3	21 19.75	-18 06.2	3.216	2.365	+2.02	+10.4	21.5	26.0
Mar. 13	21 39.91	-16 22.3	3.135	2.337	+1.99	+11.1	21.5	30.9
Mar. 23	21 59.77	-14 31.5	3.047	2.311	+1.96	+11.7	21.5	35.7
Apr. 2	22 19.32	-12 35.0	2.955	2.287	+1.92	+12.1	21.4	40.4
Apr. 12	22 38.53	-10 33.7	2.858	2.265	+1.88	+12.5	21.4	45.1
Apr. 22	22 57.37	-08 28.9	2.758	2.244	+1.85	+12.7	21.4	49.8
May 2	23 15.83	-06 21.7	2.655	2.225	+1.80	+12.8	21.3	54.5
May 12	23 33.87	-04 13.4	2.550	2.209	+1.76	+12.8	21.3	59.2
May 22	23 51.42	-02 05.3	2.443	2.195	+1.70	+12.7	21.2	63.9
June 1	00 08.46	+00 01.4	2.335	2.183	+1.64	+12.4	21.1	68.8
June 11	00 24.87	+02 05.4	2.227	2.173	+1.57	+12.0	21.0	73.8
June 21	00 40.53	+04 05.5	2.118	2.166	+1.48	+11.5	20.9	78.9
July 1	00 55.32	+06 00.5	2.011	2.162	+1.37	+10.9	20.8	84.3
July 11	01 09.02	+07 49.1	1.905	2.159	+1.24	+10.1	20.7	90.0
July 21	01 21.38	+09 30.3	1.801	2.160	+1.07	+9.3	20.6	96.1
July 31	01 32.12	+11 02.8	1.701	2.163	+0.88	+8.3	20.4	102.6
Aug. 10	01 40.87	+12 25.3	1.605	2.168	+0.64	+7.1	20.3	109.7
Aug. 20	01 47.28	+13 36.7	1.516	2.176	+0.37	+5.9	20.1	117.4
Aug. 30	01 51.00	+14 35.3	1.436	2.186	+0.07	+4.4	19.9	125.8
Sept. 9	01 51.75	+15 19.5	1.368	2.199	-0.22	+2.8	19.8	135.0
Sept.19	01 49.51	+15 47.9	1.314	2.214	-0.49	+1.2	19.6	145.0
Sept.29	01 44.58	+15 59.5	1.280	2.231	-0.69	-0.4	19.4	155.6
Oct. 9	01 37.68	+15 55.1	1.267	2.250	-0.77	-1.7	19.1	166.4
Oct. 19	01 29.96	+15 37.9	1.278	2.271	-0.73	-2.5	19.0	174.2
Oct. 29	01 22.65	+15 13.4	1.314	2.294	-0.57	-2.5	19.2	167.5
Nov. 8	01 16.91	+14 48.2	1.375	2.319	-0.34	-2.0	19.6	156.8
Nov. 18	01 13.52	+14 28.7	1.459	2.345	-0.07	-1.0	19.9	146.1
Nov. 28	01 12.84	+14 19.1	1.563	2.373	+0.21	+0.3	20.1	135.9
Dec. 8	01 14.90	+14 21.7	1.684	2.403	+0.46	+1.5	20.4	126.4
Dec. 18	01 19.50	+14 37.0	1.818	2.433	+0.68	+2.7	20.7	117.4
Dec. 28	01 26.34	+15 04.1	1.963	2.465	+0.88	+3.7	20.9	109.0
Jan. 7	01 35.11	+15 41.3	2.116	2.498	+1.04	+4.5	21.1	101.1
Jan. 17	01 45.51	+16 26.8	2.274	2.532	+1.17	+5.2	21.3	93.5
Jan. 27	01 57.26	+17 18.4	2.435	2.567	+1.29	+5.6	21.5	86.3
Feb. 6	02 10.15	+18 14.5	2.597	2.603	+1.38	+5.9	21.6	79.4
Feb. 16	02 23.98	+19 13.0	2.758	2.639	+1.46	+5.9	21.7	72.8
Feb. 26	02 38.59	+20 12.4	2.916	2.676	+1.53	+5.9	21.9	66.3
Mar. 8	02 53.86	+21 11.2	3.071	2.714	+1.58	+5.7	22.0	60.0
Mar. 18	03 09.65	+22 08.1	3.219	2.752	+1.62	+5.4	22.0	53.8
Mar. 28	03 25.89	+23 02.1	3.361	2.790	+1.66	+5.0	22.1	47.8

Comet 56P/Slaughter-Burnham

Epoch = 2016 July 31.0 TT
T = 2016 July 18.43885 TT
Peri. = 44.21966 e = 0.5066473
Node = 345.98547 2000.0 a = 5.0848780 AU
Incl. = 8.14781 n = 0.08595740
q = 2.5086383 AU P = 11.47 years

m1 = 8.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	21 43.82	-14 51.2	3.579	2.915	+1.45	+9.4	18.3	41.4
Jan. 13	21 58.34	-13 17.7	3.628	2.879	+1.50	+10.0	18.3	35.1
Jan. 23	22 13.34	-11 38.1	3.666	2.845	+1.54	+10.5	18.2	28.9
Feb. 2	22 28.74	-09 53.0	3.692	2.811	+1.57	+11.0	18.2	22.9
Feb. 12	22 44.46	-08 02.5	3.707	2.779	+1.60	+11.5	18.1	17.1
Feb. 22	23 00.46	-06 07.4	3.711	2.748	+1.62	+11.9	18.0	11.4
Mar. 3	23 16.67	-04 08.3	3.703	2.719	+1.64	+12.3	18.0	5.8
Mar. 13	23 33.09	-02 05.8	3.685	2.691	+1.66	+12.5	17.9	0.8
Mar. 23	23 49.67	-00 00.7	3.656	2.665	+1.67	+12.7	17.8	5.0
Apr. 2	00 06.40	+02 06.2	3.618	2.640	+1.69	+12.8	17.7	10.2
Apr. 12	00 23.28	+04 14.2	3.571	2.618	+1.70	+12.8	17.6	15.4
Apr. 22	00 40.28	+06 22.3	3.515	2.597	+1.71	+12.7	17.5	20.4
May 2	00 57.39	+08 29.7	3.452	2.578	+1.72	+12.6	17.5	25.4
May 12	01 14.62	+10 35.6	3.382	2.562	+1.73	+12.3	17.4	30.4
May 22	01 31.92	+12 39.1	3.306	2.547	+1.74	+12.0	17.3	35.3
June 1	01 49.28	+14 39.3	3.223	2.535	+1.74	+11.6	17.2	40.2
June 11	02 06.64	+16 35.6	3.136	2.525	+1.73	+11.2	17.1	45.2
June 21	02 23.94	+18 27.2	3.043	2.518	+1.72	+10.6	17.0	50.2
July 1	02 41.11	+20 13.5	2.947	2.512	+1.69	+10.1	16.9	55.4
July 11	02 58.03	+21 54.1	2.846	2.509	+1.65	+9.4	16.9	60.6
July 21	03 14.56	+23 28.5	2.743	2.509	+1.60	+8.8	16.8	66.0
July 31	03 30.55	+24 56.8	2.638	2.511	+1.52	+8.2	16.7	71.7
Aug. 10	03 45.76	+26 18.8	2.530	2.515	+1.42	+7.6	16.6	77.6
Aug. 20	03 59.96	+27 34.9	2.422	2.521	+1.29	+7.1	16.5	83.7
Aug. 30	04 12.87	+28 45.4	2.314	2.530	+1.13	+6.5	16.5	90.3
Sept. 9	04 24.12	+29 50.7	2.209	2.541	+0.93	+6.1	16.4	97.3
Sept.19	04 33.38	+30 51.3	2.107	2.555	+0.69	+5.6	16.3	104.8
Sept.29	04 40.26	+31 47.4	2.010	2.570	+0.41	+5.1	16.3	112.8
Oct. 9	04 44.41	+32 38.2	1.923	2.588	+0.12	+4.4	16.2	121.4
Oct. 19	04 45.58	+33 22.7	1.847	2.607	-0.19	+3.6	16.2	130.6
Oct. 29	04 43.70	+33 58.5	1.787	2.629	-0.47	+2.4	16.2	140.4
Nov. 8	04 39.02	+34 22.7	1.746	2.653	-0.68	+1.0	16.2	150.4
Nov. 18	04 32.21	+34 32.5	1.728	2.678	-0.80	-0.6	16.2	160.0
Nov. 28	04 24.25	+34 26.6	1.735	2.705	-0.79	-2.0	16.3	166.7
Dec. 8	04 16.36	+34 06.2	1.770	2.733	-0.66	-3.1	16.4	165.2
Dec. 18	04 09.74	+33 35.2	1.831	2.764	-0.45	-3.7	16.5	157.0
Dec. 28	04 05.20	+32 58.5	1.917	2.795	-0.19	-3.7	16.7	147.2
Jan. 7	04 03.27	+32 21.3	2.026	2.828	+0.08	-3.4	16.9	137.2
Jan. 17	04 04.05	+31 47.6	2.154	2.862	+0.34	-2.8	17.1	127.6
Jan. 27	04 07.43	+31 19.3	2.297	2.897	+0.57	-2.2	17.3	118.3
Feb. 6	04 13.17	+30 57.3	2.453	2.934	+0.78	-1.6	17.6	109.5
Feb. 16	04 20.96	+30 41.1	2.617	2.971	+0.95	-1.2	17.8	101.2
Feb. 26	04 30.48	+30 29.6	2.786	3.009	+1.10	-0.8	18.0	93.2
Mar. 8	04 41.46	+30 21.4	2.959	3.048	+1.22	-0.6	18.2	85.6
Mar. 18	04 53.61	+30 15.1	3.131	3.088	+1.31	-0.6	18.4	78.3
Mar. 28	05 06.72	+30 09.3	3.302	3.129	+1.39	-0.7	18.6	71.3

Comet 81P/Wild

Epoch = 2016 July 31.0 TT
T = 2016 July 20.30921 TT
Peri. = 41.69874 e = 0.5383863
Node = 136.12430 2000.0 a = 3.4491323 AU
Incl. = 3.23883 n = 0.15386481
q = 1.5921667 AU P = 6.41 years

m1 = 7.6 + 5 log(Delta) + 15.0 log(r(t+10))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 20.94	+19 14.8	1.478	2.420	−0.93	+0.6	14.0	158.6
Jan. 13	05 11.68	+19 20.9	1.478	2.361	−0.66	+1.1	13.9	146.4
Jan. 23	05 05.06	+19 32.0	1.500	2.302	−0.33	+1.7	13.7	134.8
Feb. 2	05 01.79	+19 48.8	1.539	2.243	+0.04	+2.2	13.6	123.9
Feb. 12	05 02.19	+20 11.3	1.590	2.185	+0.41	+2.7	13.5	113.9
Feb. 22	05 06.30	+20 38.3	1.648	2.128	+0.76	+3.0	13.4	104.9
Mar. 3	05 13.88	+21 08.1	1.709	2.072	+1.08	+3.0	13.3	96.6
Mar. 13	05 24.68	+21 38.3	1.769	2.017	+1.37	+2.8	13.2	89.2
Mar. 23	05 38.41	+22 06.2	1.828	1.963	+1.63	+2.3	13.1	82.4
Apr. 2	05 54.75	+22 28.9	1.883	1.912	+1.87	+1.5	13.0	76.3
Apr. 12	06 13.44	+22 43.7	1.934	1.863	+2.08	+0.4	12.9	70.8
Apr. 22	06 34.20	+22 47.7	1.980	1.816	+2.26	−0.9	12.8	65.8
May 2	06 56.77	+22 38.4	2.021	1.773	+2.41	−2.5	12.7	61.3
May 12	07 20.90	+22 13.6	2.058	1.733	+2.54	−4.2	12.6	57.2
May 22	07 46.31	+21 31.4	2.092	1.697	+2.64	−6.1	12.5	53.5
June 1	08 12.72	+20 30.6	2.123	1.666	+2.72	−8.0	12.5	50.1
June 11	08 39.90	+19 10.5	2.153	1.640	+2.77	−9.9	12.4	47.1
June 21	09 07.58	+17 31.5	2.182	1.619	+2.80	−11.7	12.4	44.3
July 1	09 35.54	+15 34.4	2.212	1.604	+2.81	−13.3	12.4	41.8
July 11	10 03.61	+13 20.9	2.245	1.595	+2.80	−14.7	12.4	39.4
July 21	10 31.64	+10 53.4	2.280	1.592	+2.79	−15.8	12.4	37.1
July 31	10 59.52	+08 15.0	2.318	1.596	+2.77	−16.6	12.5	34.9
Aug. 10	11 27.20	+05 28.9	2.361	1.606	+2.74	−17.0	12.6	32.8
Aug. 20	11 54.62	+02 38.5	2.408	1.621	+2.72	−17.1	12.7	30.6
Aug. 30	12 21.80	−00 12.5	2.460	1.643	+2.69	−16.8	12.9	28.3
Sept. 9	12 48.73	−03 00.9	2.516	1.670	+2.67	−16.3	13.1	25.9
Sept.19	13 15.41	−05 43.5	2.576	1.702	+2.65	−15.4	13.3	23.4
Sept.29	13 41.86	−08 17.7	2.639	1.738	+2.62	−14.3	13.5	20.7
Oct. 9	14 08.09	−10 41.2	2.703	1.778	+2.60	−13.1	13.7	17.7
Oct. 19	14 34.07	−12 52.1	2.769	1.822	+2.57	−11.7	13.9	14.6
Oct. 29	14 59.79	−14 49.0	2.833	1.869	+2.54	−10.2	14.1	11.2
Nov. 8	15 25.19	−16 31.0	2.896	1.919	+2.50	−8.7	14.3	7.6
Nov. 18	15 50.22	−17 57.6	2.955	1.971	+2.46	−7.1	14.5	4.0
Nov. 28	16 14.81	−19 08.7	3.010	2.024	+2.41	−5.6	14.8	2.2
Dec. 8	16 38.86	−20 04.4	3.058	2.079	+2.34	−4.1	15.0	5.5
Dec. 18	17 02.28	−20 45.4	3.098	2.136	+2.27	−2.7	15.2	9.9
Dec. 28	17 24.98	−21 12.6	3.130	2.193	+2.19	−1.4	15.4	14.7
Jan. 7	17 46.85	−21 26.9	3.152	2.251	+2.09	−0.3	15.5	19.8
Jan. 17	18 07.80	−21 29.7	3.163	2.310	+1.99	+0.7	15.7	25.1
Jan. 27	18 27.73	−21 22.5	3.163	2.369	+1.88	+1.6	15.9	30.6
Feb. 6	18 46.57	−21 06.7	3.151	2.428	+1.76	+2.3	16.0	36.3
Feb. 16	19 04.21	−20 44.0	3.127	2.487	+1.64	+2.8	16.2	42.3
Feb. 26	19 20.60	−20 16.1	3.092	2.546	+1.50	+3.1	16.3	48.5
Mar. 8	19 35.62	−19 44.8	3.045	2.605	+1.36	+3.3	16.4	55.0
Mar. 18	19 49.20	−19 11.7	2.988	2.664	+1.20	+3.3	16.5	61.7
Mar. 28	20 01.23	−18 38.6	2.921	2.722	+1.04	+3.1	16.6	68.7

Comet 150P/LONEOS

Epoch = 2016 July 31.0 TT
T = 2016 July 24.93779 TT
Peri. = 245.67836 e = 0.5469556
Node = 272.42670 2000.0 a = 3.8841749 AU
Incl. = 18.50614 n = 0.12875257
q = 1.7597037 AU P = 7.66 years

H = 14.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	03 55.38	+28 11.3	1.695	2.530	−0.38	−10.1	18.4	140.2
Jan. 13	03 51.62	+26 29.9	1.732	2.474	−0.03	−9.1	18.5	129.2
Jan. 23	03 51.28	+24 58.8	1.786	2.418	+0.30	−7.8	18.6	118.7
Feb. 2	03 54.28	+23 41.1	1.850	2.363	+0.61	−6.4	18.7	109.1
Feb. 12	04 00.40	+22 37.4	1.921	2.309	+0.89	−5.1	18.8	100.1
Feb. 22	04 09.35	+21 46.0	1.995	2.255	+1.14	−4.2	18.8	91.9
Mar. 3	04 20.78	+21 04.5	2.068	2.203	+1.36	−3.5	18.9	84.3
Mar. 13	04 34.43	+20 29.6	2.138	2.152	+1.56	−3.1	18.9	77.4
Mar. 23	04 50.02	+19 58.1	2.205	2.103	+1.73	−3.1	18.9	71.0
Apr. 2	05 07.32	+19 26.8	2.265	2.056	+1.88	−3.4	18.9	65.2
Apr. 12	05 26.13	+18 52.7	2.320	2.012	+2.01	−4.0	18.9	59.8
Apr. 22	05 46.25	+18 13.2	2.369	1.969	+2.13	−4.7	18.9	54.8
May 2	06 07.50	+17 25.8	2.412	1.930	+2.22	−5.7	18.9	50.3
May 12	06 29.74	+16 28.6	2.449	1.894	+2.31	−6.9	18.8	46.1
May 22	06 52.80	+15 19.9	2.482	1.862	+2.37	−8.1	18.8	42.3
June 1	07 16.51	+13 58.6	2.510	1.833	+2.42	−9.5	18.7	38.8
June 11	07 40.76	+12 24.1	2.536	1.809	+2.46	−10.8	18.7	35.6
June 21	08 05.40	+10 36.2	2.559	1.789	+2.49	−12.1	18.6	32.7
July 1	08 30.31	+08 35.3	2.581	1.775	+2.51	−13.3	18.6	30.0
July 11	08 55.42	+06 22.3	2.603	1.765	+2.52	−14.4	18.6	27.5
July 21	09 20.62	+03 58.6	2.625	1.760	+2.52	−15.3	18.5	25.2
July 31	09 45.86	+01 25.9	2.649	1.761	+2.53	−16.0	18.5	23.1
Aug. 10	10 11.11	−01 13.7	2.675	1.766	+2.52	−16.4	18.5	21.0
Aug. 20	10 36.33	−03 57.7	2.703	1.777	+2.52	−16.6	18.5	19.0
Aug. 30	11 01.50	−06 43.7	2.733	1.793	+2.51	−16.6	18.5	17.1
Sept. 9	11 26.62	−09 29.3	2.765	1.814	+2.51	−16.3	18.5	15.4
Sept.19	11 51.69	−12 11.9	2.799	1.839	+2.50	−15.7	18.5	13.8
Sept.29	12 16.69	−14 49.2	2.834	1.868	+2.49	−15.0	18.5	12.5
Oct. 9	12 41.63	−17 19.2	2.868	1.901	+2.48	−14.1	18.6	11.8
Oct. 19	13 06.47	−19 40.1	2.901	1.938	+2.47	−13.0	18.6	12.0
Oct. 29	13 31.19	−21 50.2	2.932	1.978	+2.45	−11.8	18.7	13.2
Nov. 8	13 55.74	−23 48.6	2.959	2.021	+2.43	−10.6	18.8	15.3
Nov. 18	14 20.03	−25 34.1	2.982	2.066	+2.40	−9.2	18.9	18.2
Nov. 28	14 43.99	−27 06.2	2.998	2.114	+2.35	−7.9	19.1	21.8
Dec. 8	15 07.50	−28 24.9	3.006	2.163	+2.29	−6.5	19.2	25.9
Dec. 18	15 30.42	−29 30.0	3.007	2.214	+2.22	−5.2	19.3	30.3
Dec. 28	15 52.61	−30 22.1	2.998	2.266	+2.13	−4.0	19.4	35.2
Jan. 7	16 13.91	−31 01.8	2.979	2.320	+2.02	−2.8	19.5	40.5
Jan. 17	16 34.13	−31 29.9	2.950	2.375	+1.90	−1.8	19.5	46.0
Jan. 27	16 53.11	−31 47.6	2.910	2.430	+1.75	−0.9	19.6	51.9
Feb. 6	17 10.66	−31 56.3	2.860	2.486	+1.59	−0.1	19.6	58.2
Feb. 16	17 26.58	−31 57.2	2.801	2.542	+1.41	+0.5	19.7	64.7
Feb. 26	17 40.69	−31 51.7	2.734	2.599	+1.21	+1.0	19.7	71.7
Mar. 8	17 52.77	−31 41.3	2.659	2.656	+0.98	+1.4	19.7	79.0
Mar. 18	18 02.61	−31 27.2	2.579	2.713	+0.74	+1.7	19.7	86.8
Mar. 28	18 10.00	−31 10.3	2.497	2.770	+0.47	+1.9	19.6	95.1

Comet P/2009 K1 (Gibbs)

Epoch = 2016 July 31.0 TT
T = 2016 July 24.93785 TT
Peri. = 27.43230 e = 0.6371139
Node = 172.77095 2000.0 a = 3.6919152 AU
Incl. = 5.74395 n = 0.13893975
q = 1.3397447 AU P = 7.09 years

m1 = 9.8 + 5 log(Delta) + 40.0 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	06 27.66	+14 14.3	1.540	2.513	-1.51	+1.5	.	16.9/275	169.7
Jan. 13	06 16.05	+14 27.1	1.493	2.440	-1.49	+1.3	.	15.7/278	159.9
Jan. 23	06 05.36	+14 47.6	1.474	2.367	-1.43	+1.0	.	12.6/283	148.1
Feb. 2	05 56.85	+15 15.0	1.478	2.293	-1.35	+0.7	.	8.4/293	136.3
Feb. 12	05 51.47	+15 48.0	1.500	2.220	-1.27	+0.4	.	4.4/327	125.1
Feb. 22	05 49.77	+16 25.0	1.534	2.146	-1.19	+0.1	.	5.0/ 38	114.8
Mar. 3	05 51.87	+17 04.2	1.576	2.072	-1.14	-0.1	.	9.2/ 65	105.3
Mar. 13	05 57.71	+17 43.4	1.620	1.998	-1.10	-0.3	.	13.8/ 74	96.8
Mar. 23	06 07.06	+18 20.3	1.663	1.926	-1.10	-0.3	.	18.2/ 79	89.1
Apr. 2	06 19.65	+18 52.4	1.702	1.854	-1.11	-0.3	.	22.2/ 83	82.2
Apr. 12	06 35.23	+19 16.9	1.737	1.784	-1.14	-0.2	.	26.0/ 86	76.1
Apr. 22	06 53.55	+19 31.2	1.765	1.716	-1.20	0.0	.	29.4/ 89	70.6
May 2	07 14.37	+19 32.5	1.786	1.651	-1.26	+0.4	22.4	32.7/ 92	65.7
May 12	07 37.48	+19 18.1	1.801	1.590	-1.34	+0.9	21.8	35.9/ 94	61.5
May 22	08 02.67	+18 45.4	1.810	1.533	-1.43	+1.6	21.1	38.8/ 97	57.8
June 1	08 29.69	+17 52.2	1.815	1.481	-1.52	+2.4	20.5	41.7/ 99	54.6
June 11	08 58.33	+16 36.7	1.818	1.436	-1.62	+3.4	19.8	44.4/102	52.0
June 21	09 28.32	+14 58.1	1.819	1.398	-1.71	+4.5	19.1	46.9/104	49.8
July 1	09 59.40	+12 56.5	1.821	1.369	-1.79	+5.7	18.5	49.1/106	48.1
July 11	10 31.36	+10 33.3	1.826	1.350	-1.86	+6.8	17.9	50.9/108	46.7
July 21	11 03.92	+07 51.4	1.837	1.341	-1.91	+7.8	17.4	52.2/109	45.6
July 31	11 36.89	+04 54.9	1.855	1.342	-1.95	+8.5	17.0	53.1/110	44.8
Aug. 10	12 10.08	+01 49.1	1.883	1.353	-1.97	+9.0	16.6	53.3/111	44.1
Aug. 20	12 43.31	-01 19.8	1.921	1.375	-1.97	+9.1	16.4	53.0/111	43.4
Aug. 30	13 16.45	-04 25.7	1.971	1.406	-1.96	+8.8	16.4	52.2/110	42.6
Sept. 9	13 49.36	-07 22.6	2.033	1.445	-1.92	+8.2	16.4	50.9/109	41.6
Sept.19	14 21.91	-10 05.6	2.106	1.491	-1.87	+7.4	16.7	49.3/108	40.4
Sept.29	14 53.97	-12 30.7	2.190	1.544	-1.81	+6.3	17.0	47.6/106	38.9
Oct. 9	15 25.44	-14 35.4	2.283	1.602	-1.73	+5.2	17.5	45.6/104	37.0
Oct. 19	15 56.18	-16 18.2	2.383	1.664	-1.64	+4.0	18.1	43.7/102	34.7
Oct. 29	16 26.09	-17 39.0	2.489	1.730	-1.54	+2.9	18.7	41.7/ 99	32.1
Nov. 8	16 55.08	-18 38.2	2.599	1.798	-1.44	+1.9	19.4	39.8/ 97	29.1
Nov. 18	17 23.04	-19 16.9	2.710	1.869	-1.34	+1.0	20.2	38.1/ 94	25.7
Nov. 28	17 49.92	-19 36.9	2.820	1.941	-1.23	+0.3	20.9	36.4/ 92	22.0
Dec. 8	18 15.67	-19 39.9	2.927	2.014	-1.13	-0.3	21.7	34.8/ 89	18.0
Dec. 18	18 40.25	-19 27.9	3.030	2.087	-1.04	-0.8	22.4	33.2/ 87	13.7
Dec. 28	19 03.66	-19 02.9	3.126	2.161	-0.95	-1.2	.	31.8/ 84	9.3
Jan. 7	19 25.90	-18 26.8	3.213	2.235	-0.87	-1.4	.	30.4/ 82	5.1
Jan. 17	19 46.97	-17 41.5	3.290	2.309	-0.79	-1.6	.	29.0/ 80	3.7
Jan. 27	20 06.90	-16 48.7	3.355	2.383	-0.73	-1.7	.	27.7/ 78	7.5
Feb. 6	20 25.69	-15 50.3	3.408	2.456	-0.67	-1.8	.	26.3/ 77	12.7
Feb. 16	20 43.37	-14 47.6	3.448	2.528	-0.62	-1.8	.	25.0/ 75	18.3
Feb. 26	20 59.94	-13 42.2	3.473	2.600	-0.57	-1.8	.	23.6/ 74	24.1
Mar. 8	21 15.42	-12 35.4	3.483	2.672	-0.53	-1.8	.	22.1/ 73	30.1
Mar. 18	21 29.79	-11 28.6	3.480	2.742	-0.50	-1.7	.	20.6/ 72	36.4
Mar. 28	21 43.05	-10 23.0	3.461	2.812	-0.47	-1.7	.	19.0/ 71	42.8

Comet C/2015 X7 (ATLAS)

Epoch = 2016 July 31.0 TT
T = 2016 July 30.45374 TT
Peri. = 348.55912
Node = 139.87545 2000.0
Incl. = 57.58693
q = 3.6826790 AU
e = 1.0031424

m1 = 8.6 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	06 57.52	-28 10.6	3.438	4.127	-0.64	+8.3	17.4	128.9
Jan. 13	06 51.09	-26 47.5	3.381	4.088	-0.60	+10.9	17.4	130.4
Jan. 23	06 45.09	-24 58.3	3.347	4.051	-0.51	+13.2	17.3	130.0
Feb. 2	06 40.03	-22 46.1	3.337	4.015	-0.37	+15.0	17.3	127.6
Feb. 12	06 36.32	-20 15.9	3.351	3.981	-0.20	+16.2	17.2	123.4
Feb. 22	06 34.27	-17 33.7	3.386	3.948	-0.03	+16.8	17.2	118.0
Mar. 3	06 34.00	-14 45.7	3.442	3.917	+0.15	+16.8	17.2	111.6
Mar. 13	06 35.52	-11 57.4	3.516	3.888	+0.32	+16.4	17.2	104.7
Mar. 23	06 38.77	-09 13.7	3.603	3.860	+0.48	+15.6	17.2	97.4
Apr. 2	06 43.60	-06 37.9	3.702	3.835	+0.63	+14.5	17.3	90.0
Apr. 12	06 49.88	-04 12.6	3.808	3.811	+0.75	+13.3	17.3	82.6
Apr. 22	06 57.43	-01 59.1	3.918	3.789	+0.86	+12.1	17.4	75.3
May 2	07 06.08	+00 01.9	4.029	3.769	+0.96	+10.8	17.4	68.0
May 12	07 15.68	+01 50.1	4.138	3.751	+1.04	+9.6	17.4	60.9
May 22	07 26.07	+03 25.9	4.242	3.735	+1.11	+8.4	17.5	53.8
June 1	07 37.12	+04 49.8	4.339	3.721	+1.16	+7.3	17.5	46.9
June 11	07 48.72	+06 02.5	4.428	3.709	+1.20	+6.2	17.5	40.1
June 21	08 00.74	+07 04.9	4.505	3.700	+1.24	+5.3	17.6	33.4
July 1	08 13.09	+07 57.9	4.571	3.692	+1.26	+4.5	17.6	26.8
July 11	08 25.69	+08 42.5	4.623	3.687	+1.27	+3.7	17.6	20.4
July 21	08 38.44	+09 19.8	4.660	3.684	+1.28	+3.1	17.6	14.2
July 31	08 51.27	+09 51.0	4.683	3.683	+1.28	+2.6	17.6	8.7
Aug. 10	09 04.12	+10 17.1	4.689	3.684	+1.28	+2.2	17.6	6.6
Aug. 20	09 16.91	+10 39.4	4.679	3.687	+1.27	+2.0	17.6	10.1
Aug. 30	09 29.59	+10 59.3	4.653	3.693	+1.25	+1.9	17.6	16.0
Sept. 9	09 42.10	+11 18.1	4.610	3.701	+1.23	+1.9	17.6	22.6
Sept.19	09 54.36	+11 37.3	4.551	3.710	+1.20	+2.1	17.6	29.5
Sept.29	10 06.31	+11 58.5	4.477	3.722	+1.16	+2.5	17.6	36.7
Oct. 9	10 17.88	+12 23.4	4.389	3.737	+1.11	+3.0	17.5	44.1
Oct. 19	10 28.97	+12 53.9	4.288	3.753	+1.05	+3.8	17.5	51.7
Oct. 29	10 39.51	+13 31.9	4.176	3.771	+0.99	+4.8	17.5	59.5
Nov. 8	10 49.38	+14 19.5	4.055	3.791	+0.91	+5.9	17.4	67.7
Nov. 18	10 58.45	+15 18.7	3.929	3.813	+0.81	+7.3	17.4	76.1
Nov. 28	11 06.59	+16 31.6	3.799	3.837	+0.71	+8.8	17.3	84.8
Dec. 8	11 13.64	+17 59.8	3.671	3.863	+0.58	+10.5	17.3	93.8
Dec. 18	11 19.45	+19 44.6	3.549	3.891	+0.44	+12.2	17.3	103.0
Dec. 28	11 23.83	+21 46.1	3.437	3.920	+0.28	+13.7	17.2	112.5
Jan. 7	11 26.63	+24 03.4	3.341	3.951	+0.11	+15.0	17.2	122.0
Jan. 17	11 27.75	+26 33.5	3.265	3.984	-0.06	+15.8	17.2	131.4
Jan. 27	11 27.13	+29 11.7	3.214	4.019	-0.23	+16.0	17.2	140.0
Feb. 6	11 24.83	+31 51.3	3.191	4.055	-0.37	+15.4	17.2	147.1
Feb. 16	11 21.09	+34 24.9	3.200	4.092	-0.48	+14.0	17.2	151.0
Feb. 26	11 16.26	+36 44.9	3.239	4.131	-0.54	+12.0	17.3	150.6
Mar. 8	11 10.87	+38 45.3	3.309	4.171	-0.54	+9.7	17.4	146.2
Mar. 18	11 05.51	+40 22.2	3.407	4.212	-0.48	+7.2	17.5	139.4
Mar. 28	11 00.76	+41 34.6	3.528	4.255	-0.36	+4.9	17.6	131.4

Comet 9P/Tempel

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 2.58237 TT
Peri. = 179.20623 e = 0.5095870
Node = 68.74950 2000.0 a = 3.1453881 AU
Incl. = 10.47400 n = 0.17668217
q = 1.5425392 AU P = 5.58 years

m1 = 8.4 + 5 log(Delta) + 17.5 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 06.66	+13 16.7	1.985	2.436	+0.88	+0.5	17.0	105.2
Jan. 13	12 15.45	+13 21.6	1.814	2.379	+0.70	+2.2	16.6	113.1
Jan. 23	12 22.49	+13 43.5	1.652	2.322	+0.49	+4.0	16.3	121.4
Feb. 2	12 27.39	+14 23.2	1.502	2.264	+0.23	+5.8	15.9	130.0
Feb. 12	12 29.68	+15 20.9	1.366	2.207	-0.07	+7.3	15.5	138.8
Feb. 22	12 29.00	+16 33.6	1.248	2.150	-0.38	+8.1	15.1	147.7
Mar. 3	12 25.17	+17 54.9	1.150	2.094	-0.68	+7.9	14.7	155.6
Mar. 13	12 18.34	+19 14.2	1.075	2.038	-0.90	+6.3	14.4	160.3
Mar. 23	12 09.30	+20 17.7	1.022	1.983	-0.99	+3.4	14.1	158.7
Apr. 2	11 59.40	+20 52.0	0.991	1.930	-0.91	-0.4	13.8	151.8
Apr. 12	11 50.29	+20 47.6	0.979	1.879	-0.67	-4.6	13.6	142.8
Apr. 22	11 43.58	+20 01.4	0.985	1.829	-0.33	-8.5	13.4	133.6
May 2	11 40.32	+18 36.1	1.003	1.782	+0.07	-11.9	13.2	124.7
May 12	11 40.98	+16 37.0	1.031	1.737	+0.46	-14.7	13.1	116.7
May 22	11 45.55	+14 10.3	1.065	1.696	+0.82	-16.9	12.9	109.5
June 1	11 53.70	+11 21.3	1.103	1.659	+1.14	-18.7	12.8	103.1
June 11	12 05.06	+08 14.2	1.145	1.626	+1.42	-20.1	12.7	97.5
June 21	12 19.23	+04 52.9	1.188	1.598	+1.66	-21.2	12.6	92.6
July 1	12 35.84	+01 21.0	1.234	1.576	+1.88	-21.9	12.6	88.3
July 11	12 54.66	-02 17.9	1.281	1.559	+2.08	-22.2	12.5	84.6
July 21	13 15.46	-05 59.9	1.332	1.548	+2.26	-22.1	12.5	81.2
July 31	13 38.10	-09 40.6	1.387	1.543	+2.44	-21.5	12.5	78.3
Aug. 10	14 02.49	-13 15.4	1.446	1.544	+2.60	-20.4	12.5	75.5
Aug. 20	14 28.52	-16 39.6	1.510	1.552	+2.76	-18.9	12.6	73.0
Aug. 30	14 56.08	-19 48.2	1.580	1.566	+2.90	-16.9	12.7	70.6
Sept. 9	15 25.03	-22 36.8	1.656	1.586	+3.01	-14.5	12.8	68.2
Sept.19	15 55.16	-25 01.6	1.739	1.611	+3.10	-11.8	13.0	65.7
Sept.29	16 26.19	-26 59.6	1.828	1.642	+3.16	-8.9	13.2	63.2
Oct. 9	16 57.82	-28 28.8	1.924	1.677	+3.18	-6.0	13.4	60.6
Oct. 19	17 29.64	-29 28.8	2.026	1.716	+3.16	-3.1	13.7	57.8
Oct. 29	18 01.27	-29 60.0	2.133	1.758	+3.11	-0.4	14.0	54.8
Nov. 8	18 32.37	-30 04.0	2.244	1.804	+3.02	+2.1	14.3	51.6
Nov. 18	19 02.60	-29 43.4	2.359	1.853	+2.91	+4.2	14.6	48.2
Nov. 28	19 31.75	-29 01.2	2.475	1.903	+2.79	+6.1	14.9	44.6
Dec. 8	19 59.67	-28 00.4	2.592	1.956	+2.66	+7.6	15.2	40.8
Dec. 18	20 26.29	-26 44.5	2.709	2.010	+2.53	+8.8	15.5	36.8
Dec. 28	20 51.59	-25 16.5	2.823	2.065	+2.40	+9.7	15.8	32.7
Jan. 7	21 15.62	-23 39.1	2.934	2.121	+2.28	+10.4	16.0	28.4
Jan. 17	21 38.43	-21 55.1	3.039	2.177	+2.17	+10.9	16.3	24.0
Jan. 27	22 00.10	-20 06.6	3.138	2.234	+2.06	+11.1	16.6	19.5
Feb. 6	22 20.73	-18 15.4	3.229	2.292	+1.96	+11.2	16.9	15.1
Feb. 16	22 40.37	-16 23.4	3.311	2.349	+1.88	+11.1	17.1	11.0
Feb. 26	22 59.13	-14 32.0	3.383	2.407	+1.79	+11.0	17.3	8.0
Mar. 8	23 17.05	-12 42.3	3.444	2.464	+1.71	+10.7	17.6	7.8
Mar. 18	23 34.19	-10 55.6	3.492	2.521	+1.64	+10.3	17.8	10.6
Mar. 28	23 50.60	-09 12.6	3.528	2.577	+1.57	+9.8	18.0	15.1

Comet C/2014 R3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 7.89532 TT
Peri. = 113.40125
Node = 334.11202 2000.0
Incl. = 90.83741
q = 7.2753525 AU
e = 0.9998931

m1 = 5.4 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	17 08.99	+61 15.6	7.398	7.407	+0.45	+4.7	18.4	86.7
Jan. 13	17 13.50	+62 02.7	7.358	7.395	+0.37	+5.9	18.4	88.3
Jan. 23	17 17.18	+63 01.8	7.319	7.384	+0.25	+7.0	18.4	89.9
Feb. 2	17 19.73	+64 11.9	7.282	7.373	+0.10	+8.0	18.4	91.4
Feb. 12	17 20.74	+65 31.7	7.249	7.363	-0.10	+8.7	18.4	92.8
Feb. 22	17 19.72	+66 58.9	7.221	7.354	-0.36	+9.2	18.4	93.8
Mar. 3	17 16.08	+68 31.0	7.200	7.345	-0.70	+9.4	18.3	94.5
Mar. 13	17 09.11	+70 04.8	7.186	7.336	-1.11	+9.1	18.3	94.8
Mar. 23	16 58.00	+71 35.9	7.181	7.328	-1.60	+8.3	18.3	94.6
Apr. 2	16 41.99	+72 59.2	7.185	7.321	-2.14	+6.9	18.3	93.9
Apr. 12	16 20.58	+74 08.6	7.198	7.314	-2.65	+4.9	18.3	92.7
Apr. 22	15 54.04	+74 57.7	7.220	7.308	-3.02	+2.3	18.3	91.1
May 2	15 23.86	+75 20.9	7.250	7.302	-3.12	-0.6	18.3	89.0
May 12	14 52.66	+75 15.2	7.288	7.297	-2.92	-3.4	18.3	86.5
May 22	14 23.47	+74 41.4	7.332	7.292	-2.50	-5.8	18.4	83.8
June 1	13 58.48	+73 43.4	7.381	7.288	-1.98	-7.7	18.4	80.8
June 11	13 38.64	+72 26.8	7.434	7.285	-1.48	-8.9	18.4	77.7
June 21	13 23.87	+70 57.6	7.488	7.282	-1.03	-9.7	18.4	74.5
July 1	13 13.52	+69 20.7	7.542	7.279	-0.67	-10.1	18.4	71.3
July 11	13 06.83	+67 40.1	7.593	7.278	-0.38	-10.1	18.4	68.2
July 21	13 03.04	+65 59.2	7.641	7.276	-0.15	-9.9	18.4	65.4
July 31	13 01.53	+64 20.2	7.683	7.276	+0.03	-9.5	18.4	62.8
Aug. 10	13 01.81	+62 45.0	7.717	7.275	+0.16	-9.0	18.5	60.7
Aug. 20	13 03.45	+61 15.1	7.742	7.276	+0.27	-8.3	18.5	59.2
Aug. 30	13 06.13	+59 51.8	7.757	7.277	+0.35	-7.6	18.5	58.2
Sept. 9	13 09.61	+58 36.0	7.761	7.278	+0.40	-6.7	18.5	58.0
Sept.19	13 13.63	+57 28.6	7.753	7.280	+0.44	-5.8	18.5	58.6
Sept.29	13 18.04	+56 30.4	7.732	7.283	+0.46	-4.8	18.5	60.0
Oct. 9	13 22.64	+55 42.1	7.699	7.286	+0.46	-3.8	18.5	62.2
Oct. 19	13 27.28	+55 04.3	7.654	7.290	+0.45	-2.7	18.4	65.1
Oct. 29	13 31.81	+54 37.4	7.597	7.294	+0.42	-1.5	18.4	68.6
Nov. 8	13 36.05	+54 22.0	7.530	7.299	+0.38	-0.4	18.4	72.8
Nov. 18	13 39.83	+54 18.3	7.454	7.304	+0.31	+0.8	18.4	77.5
Nov. 28	13 42.98	+54 26.3	7.373	7.310	+0.23	+1.9	18.4	82.5
Dec. 8	13 45.29	+54 45.7	7.287	7.317	+0.12	+3.0	18.4	87.9
Dec. 18	13 46.52	+55 15.9	7.200	7.324	-0.01	+4.0	18.3	93.4
Dec. 28	13 46.45	+55 55.8	7.115	7.331	-0.16	+4.8	18.3	98.9
Jan. 7	13 44.80	+56 43.8	7.035	7.340	-0.35	+5.3	18.3	104.3
Jan. 17	13 41.33	+57 37.3	6.964	7.348	-0.55	+5.6	18.3	109.3
Jan. 27	13 35.80	+58 33.3	6.905	7.357	-0.77	+5.5	18.3	113.8
Feb. 6	13 28.06	+59 28.1	6.862	7.367	-1.00	+4.9	18.3	117.4
Feb. 16	13 18.09	+60 17.4	6.836	7.377	-1.20	+3.9	18.3	119.8
Feb. 26	13 06.04	+60 56.9	6.830	7.388	-1.37	+2.6	18.3	121.0
Mar. 8	12 52.32	+61 22.4	6.844	7.400	-1.47	+0.9	18.3	120.7
Mar. 18	12 37.59	+61 31.0	6.879	7.411	-1.50	-1.0	18.3	118.9
Mar. 28	12 22.64	+61 20.8	6.935	7.424	-1.43	-2.9	18.3	115.8

Comet 225P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 16.95666 TT
Peri. = 3.92395 e = 0.6376013
Node = 14.18200 2000.0 a = 3.6548186 AU
Incl. = 21.33506 n = 0.14106047
q = 1.3245015 AU P = 6.99 years

H = 18.0 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	V	Elong. °
Jan. 3	18 15.94	-38 39.6	3.598	2.676	+2.25	+0.5	.	17.5
Jan. 13	18 38.44	-38 34.6	3.500	2.605	+2.32	+1.4	.	20.8
Jan. 23	19 01.64	-38 20.1	3.391	2.533	+2.38	+2.5	.	24.9
Feb. 2	19 25.46	-37 55.1	3.272	2.460	+2.44	+3.7	.	29.2
Feb. 12	19 49.82	-37 18.6	3.144	2.386	+2.48	+4.9	.	33.7
Feb. 22	20 14.60	-36 29.6	3.009	2.312	+2.51	+6.2	.	38.1
Mar. 3	20 39.75	-35 27.3	2.869	2.238	+2.54	+7.6	23.0	42.3
Mar. 13	21 05.19	-34 10.9	2.725	2.164	+2.57	+9.1	22.8	46.4
Mar. 23	21 30.85	-32 39.5	2.580	2.089	+2.58	+10.7	22.7	50.3
Apr. 2	21 56.68	-30 52.5	2.434	2.015	+2.60	+12.4	22.6	53.9
Apr. 12	22 22.65	-28 48.9	2.290	1.941	+2.61	+14.1	22.4	57.3
Apr. 22	22 48.74	-26 28.1	2.149	1.869	+2.62	+15.9	22.3	60.4
May 2	23 14.95	-23 49.1	2.013	1.797	+2.63	+17.8	22.1	63.1
May 12	23 41.30	-20 51.1	1.882	1.728	+2.65	+19.8	21.9	65.5
May 22	00 07.79	-17 33.4	1.758	1.661	+2.67	+21.8	21.7	67.6
June 1	00 34.50	-13 55.3	1.643	1.598	+2.70	+23.9	21.6	69.3
June 11	01 01.47	-09 56.5	1.536	1.538	+2.73	+25.9	21.4	70.8
June 21	01 28.78	-05 37.5	1.440	1.484	+2.78	+27.8	21.2	72.0
July 1	01 56.55	-00 59.5	1.353	1.436	+2.83	+29.5	21.1	73.0
July 11	02 24.88	+03 55.1	1.277	1.395	+2.90	+30.7	21.0	73.9
July 21	02 53.89	+09 02.2	1.212	1.363	+2.98	+31.4	20.8	74.8
July 31	03 23.71	+14 16.2	1.158	1.340	+3.07	+31.4	20.7	75.8
Aug. 10	03 54.37	+19 29.7	1.114	1.327	+3.15	+30.5	20.7	77.0
Aug. 20	04 25.85	+24 34.8	1.080	1.325	+3.21	+28.9	20.6	78.5
Aug. 30	04 57.99	+29 23.9	1.055	1.334	+3.24	+26.7	20.6	80.5
Sept. 9	05 30.36	+33 51.0	1.036	1.353	+3.20	+24.2	20.5	82.9
Sept.19	06 02.39	+37 52.8	1.023	1.381	+3.09	+21.7	20.5	85.9
Sept.29	06 33.27	+41 29.6	1.013	1.419	+2.87	+19.5	20.5	89.5
Oct. 9	07 02.00	+44 44.8	1.007	1.464	+2.55	+17.9	20.5	93.8
Oct. 19	07 27.50	+47 43.6	1.002	1.516	+2.11	+16.9	20.5	98.7
Oct. 29	07 48.64	+50 32.2	0.999	1.574	+1.55	+16.3	20.5	104.3
Nov. 8	08 04.11	+53 15.0	1.000	1.636	+0.85	+15.7	20.5	110.5
Nov. 18	08 12.65	+55 52.1	1.005	1.701	+0.04	+14.6	20.5	117.2
Nov. 28	08 13.02	+58 18.4	1.018	1.770	-0.86	+12.2	20.5	124.0
Dec. 8	08 04.47	+60 20.8	1.040	1.841	-1.66	+8.1	20.5	130.6
Dec. 18	07 47.85	+61 41.6	1.077	1.913	-2.16	+2.4	20.6	136.3
Dec. 28	07 26.24	+62 05.9	1.130	1.986	-2.17	-3.7	20.7	139.9
Jan. 7	07 04.51	+61 29.3	1.201	2.060	-1.74	-8.8	20.9	140.9
Jan. 17	06 47.07	+60 01.8	1.292	2.134	-1.12	-12.0	21.1	138.9
Jan. 27	06 35.91	+58 01.3	1.403	2.209	-0.48	-13.6	21.4	134.6
Feb. 6	06 31.11	+55 44.9	1.532	2.283	+0.05	-14.0	21.7	128.9
Feb. 16	06 31.66	+53 25.4	1.676	2.357	+0.47	-13.6	22.0	122.3
Feb. 26	06 36.31	+51 09.7	1.835	2.431	+0.77	-12.9	22.3	115.4
Mar. 8	06 44.05	+49 01.1	2.006	2.504	+0.99	-12.1	22.6	108.5
Mar. 18	06 54.00	+47 00.4	2.185	2.576	+1.15	-11.3	22.8	101.6
Mar. 28	07 05.51	+45 07.1	2.371	2.648	+1.26	-10.7	.	94.8

Comet 43P/Wolf-Harrington

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 19.69354 TT
Peri. = 191.59724 e = 0.5945299
Node = 249.83317 2000.0 a = 3.3490524 AU
Incl. = 15.96511 n = 0.16081300
q = 1.3579406 AU P = 6.13 years

m1 = 8.0 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	21 14.29	-02 49.3	3.301	2.625	+1.51	+5.4	17.9	40.0
Jan. 13	21 29.40	-01 55.4	3.312	2.558	+1.59	+6.4	17.7	34.1
Jan. 23	21 45.34	-00 50.9	3.311	2.491	+1.67	+7.5	17.5	28.5
Feb. 2	22 02.05	+00 23.8	3.295	2.422	+1.75	+8.5	17.3	23.4
Feb. 12	22 19.51	+01 48.3	3.267	2.354	+1.82	+9.4	17.1	18.7
Feb. 22	22 37.70	+03 22.1	3.227	2.285	+1.89	+10.2	16.8	14.8
Mar. 3	22 56.65	+05 04.5	3.176	2.215	+1.98	+11.0	16.6	11.9
Mar. 13	23 16.41	+06 54.5	3.115	2.146	+2.06	+11.7	16.3	10.7
Mar. 23	23 37.03	+08 51.3	3.045	2.077	+2.16	+12.2	16.0	11.2
Apr. 2	23 58.62	+10 53.4	2.968	2.007	+2.27	+12.6	15.7	13.1
Apr. 12	00 21.31	+12 59.3	2.885	1.939	+2.39	+12.8	15.3	15.6
Apr. 22	00 45.21	+15 06.8	2.799	1.871	+2.53	+12.7	15.0	18.3
May 2	01 10.50	+17 13.5	2.710	1.805	+2.68	+12.3	14.7	20.9
May 12	01 37.35	+19 16.3	2.620	1.740	+2.85	+11.5	14.3	23.4
May 22	02 05.88	+21 11.3	2.532	1.678	+3.03	+10.3	14.0	25.7
June 1	02 36.21	+22 53.9	2.446	1.619	+3.22	+8.5	13.6	27.8
June 11	03 08.38	+24 19.1	2.365	1.564	+3.39	+6.2	13.3	29.6
June 21	03 42.30	+25 21.2	2.289	1.514	+3.54	+3.4	12.9	31.2
July 1	04 17.74	+25 55.0	2.220	1.469	+3.66	+0.1	12.7	32.6
July 11	04 54.31	+25 55.6	2.158	1.430	+3.71	-3.6	12.4	33.8
July 21	05 31.44	+25 19.9	2.105	1.399	+3.71	-7.3	12.2	35.0
July 31	06 08.53	+24 06.9	2.060	1.376	+3.64	-10.9	12.0	36.1
Aug. 10	06 44.95	+22 17.9	2.024	1.362	+3.52	-14.1	11.9	37.2
Aug. 20	07 20.19	+19 56.5	1.996	1.358	+3.37	-16.9	11.8	38.4
Aug. 30	07 53.87	+17 07.9	1.976	1.363	+3.19	-18.9	11.8	39.8
Sept. 9	08 25.75	+13 58.6	1.961	1.377	+3.00	-20.4	11.9	41.4
Sept.19	08 55.74	+10 34.9	1.951	1.401	+2.81	-21.2	12.0	43.3
Sept.29	09 23.83	+07 02.9	1.943	1.432	+2.62	-21.5	12.2	45.5
Oct. 9	09 50.06	+03 28.0	1.937	1.471	+2.44	-21.3	12.4	48.1
Oct. 19	10 14.48	-00 05.3	1.931	1.516	+2.27	-20.8	12.6	51.0
Oct. 29	10 37.18	-03 33.8	1.922	1.567	+2.10	-20.1	12.8	54.4
Nov. 8	10 58.15	-06 54.7	1.910	1.623	+1.92	-19.1	13.1	58.2
Nov. 18	11 17.39	-10 06.0	1.893	1.682	+1.75	-18.0	13.3	62.4
Nov. 28	11 34.85	-13 06.5	1.871	1.744	+1.55	-16.8	13.6	67.2
Dec. 8	11 50.39	-15 54.8	1.842	1.809	+1.34	-15.5	13.8	72.5
Dec. 18	12 03.83	-18 29.8	1.808	1.875	+1.11	-14.1	14.1	78.3
Dec. 28	12 14.94	-20 50.6	1.768	1.943	+0.85	-12.5	14.3	84.8
Jan. 7	12 23.41	-22 55.4	1.724	2.011	+0.55	-10.7	14.5	91.8
Jan. 17	12 28.93	-24 42.0	1.678	2.081	+0.23	-8.5	14.7	99.5
Jan. 27	12 31.22	-26 07.4	1.633	2.150	-0.11	-6.0	14.9	107.8
Feb. 6	12 30.07	-27 07.3	1.593	2.220	-0.45	-3.0	15.1	116.8
Feb. 16	12 25.59	-27 37.0	1.561	2.289	-0.74	+0.4	15.3	126.3
Feb. 26	12 18.20	-27 32.6	1.543	2.358	-0.94	+4.1	15.5	136.0
Mar. 8	12 08.80	-26 52.0	1.543	2.426	-1.02	+7.4	15.7	145.5
Mar. 18	11 58.61	-25 38.1	1.565	2.495	-0.97	+10.0	15.9	153.2
Mar. 28	11 48.94	-23 58.1	1.613	2.562	-0.81	+11.5	16.2	157.0

Comet 33P/Daniel

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 22.46251 TT
Peri. = 19.06930 e = 0.4630508
Node = 66.49093 2000.0 a = 4.0231299 AU
Incl. = 22.39425 n = 0.12214002
q = 2.1602164 AU P = 8.07 years

m1 = 13.2 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 06.70	-17 59.6	2.901	2.780	+0.91	+14.2	18.8	73.2
Jan. 13	00 15.84	-15 37.7	2.982	2.738	+1.04	+14.5	18.9	66.3
Jan. 23	00 26.29	-13 12.6	3.056	2.696	+1.16	+14.8	18.9	59.6
Feb. 2	00 37.85	-10 45.0	3.124	2.655	+1.26	+14.9	18.9	53.3
Feb. 12	00 50.42	-08 15.9	3.183	2.614	+1.35	+15.0	18.8	47.2
Feb. 22	01 03.87	-05 45.8	3.234	2.575	+1.43	+15.0	18.8	41.3
Mar. 3	01 18.13	-03 15.6	3.276	2.536	+1.50	+15.0	18.8	35.6
Mar. 13	01 33.13	-00 45.7	3.309	2.499	+1.57	+14.9	18.8	30.1
Mar. 23	01 48.82	+01 43.0	3.331	2.463	+1.64	+14.7	18.7	24.8
Apr. 2	02 05.19	+04 09.8	3.345	2.428	+1.70	+14.4	18.7	19.8
Apr. 12	02 22.22	+06 34.1	3.349	2.395	+1.77	+14.1	18.7	15.0
Apr. 22	02 39.88	+08 54.9	3.345	2.363	+1.83	+13.7	18.6	10.4
May 2	02 58.19	+11 11.6	3.332	2.334	+1.90	+13.2	18.6	6.6
May 12	03 17.15	+13 23.3	3.311	2.306	+1.96	+12.6	18.5	4.7
May 22	03 36.74	+15 29.2	3.282	2.280	+2.02	+11.9	18.5	6.7
June 1	03 56.98	+17 28.5	3.247	2.256	+2.09	+11.2	18.4	10.4
June 11	04 17.83	+19 20.3	3.204	2.235	+2.15	+10.4	18.3	14.4
June 21	04 39.29	+21 03.9	3.155	2.216	+2.20	+9.5	18.3	18.6
July 1	05 01.30	+22 38.7	3.101	2.200	+2.25	+8.5	18.2	22.9
July 11	05 23.83	+24 04.1	3.041	2.186	+2.30	+7.6	18.2	27.2
July 21	05 46.79	+25 19.8	2.976	2.176	+2.33	+6.6	18.1	31.5
July 31	06 10.10	+26 25.6	2.907	2.168	+2.35	+5.6	18.0	35.8
Aug. 10	06 33.65	+27 21.7	2.834	2.163	+2.36	+4.7	18.0	40.3
Aug. 20	06 57.30	+28 08.6	2.758	2.160	+2.36	+3.8	17.9	44.8
Aug. 30	07 20.92	+28 47.0	2.678	2.161	+2.34	+3.1	17.8	49.4
Sept. 9	07 44.36	+29 18.2	2.595	2.165	+2.31	+2.6	17.8	54.1
Sept.19	08 07.44	+29 43.9	2.510	2.171	+2.26	+2.2	17.7	59.0
Sept.29	08 30.01	+30 06.0	2.423	2.181	+2.19	+2.1	17.7	64.1
Oct. 9	08 51.87	+30 27.1	2.334	2.193	+2.10	+2.3	17.6	69.4
Oct. 19	09 12.85	+30 49.8	2.245	2.208	+1.99	+2.7	17.5	75.0
Oct. 29	09 32.74	+31 17.1	2.156	2.225	+1.86	+3.5	17.5	80.8
Nov. 8	09 51.30	+31 52.3	2.069	2.246	+1.70	+4.6	17.4	86.9
Nov. 18	10 08.27	+32 38.4	1.983	2.268	+1.51	+6.0	17.4	93.4
Nov. 28	10 23.36	+33 38.1	1.902	2.293	+1.28	+7.5	17.3	100.2
Dec. 8	10 36.18	+34 53.5	1.827	2.320	+1.02	+9.2	17.2	107.3
Dec. 18	10 46.36	+36 25.0	1.760	2.348	+0.71	+10.6	17.2	114.7
Dec. 28	10 53.45	+38 11.2	1.704	2.379	+0.36	+11.6	17.2	122.3
Jan. 7	10 57.04	+40 07.4	1.662	2.412	-0.02	+11.8	17.2	129.7
Jan. 17	10 56.88	+42 05.8	1.636	2.446	-0.39	+11.0	17.2	136.5
Jan. 27	10 53.00	+43 55.6	1.630	2.481	-0.71	+8.9	17.2	142.0
Feb. 6	10 45.93	+45 24.9	1.645	2.518	-0.92	+5.8	17.3	145.1
Feb. 16	10 36.76	+46 23.1	1.682	2.556	-0.98	+2.1	17.4	145.1
Feb. 26	10 26.98	+46 44.5	1.742	2.595	-0.88	-1.6	17.5	142.0
Mar. 8	10 18.14	+46 28.5	1.822	2.635	-0.67	-4.9	17.7	136.8
Mar. 18	10 11.44	+45 39.5	1.921	2.676	-0.39	-7.5	17.8	130.4
Mar. 28	10 07.51	+44 24.5	2.037	2.717	-0.10	-9.4	18.0	123.4

Comet C/2015 V4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 26.39634 TT
Peri. = 306.71259 e = 0.7048637
Node = 179.91907 2000.0 a = 18.5148045 AU
Incl. = 60.74931 n = 0.01237159
q = 5.4643909 AU P = 79.67 years

m1 = 4.4 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	07 10.45	-45 23.7	5.219	5.655	-0.51	+1.6	19.3	111.6
Jan. 13	07 05.31	-45 07.3	5.183	5.639	-0.49	+3.6	19.2	112.9
Jan. 23	07 00.42	-44 31.3	5.160	5.625	-0.42	+5.4	19.2	113.4
Feb. 2	06 56.21	-43 37.1	5.150	5.610	-0.32	+7.1	19.2	113.1
Feb. 12	06 53.02	-42 26.6	5.154	5.597	-0.19	+8.4	19.2	111.8
Feb. 22	06 51.12	-41 02.7	5.171	5.584	-0.05	+9.4	19.2	109.8
Mar. 3	06 50.63	-39 28.9	5.201	5.572	+0.10	+10.0	19.2	107.0
Mar. 13	06 51.61	-37 48.5	5.242	5.560	+0.24	+10.3	19.2	103.6
Mar. 23	06 54.04	-36 05.1	5.295	5.549	+0.38	+10.3	19.2	99.6
Apr. 2	06 57.80	-34 21.7	5.357	5.539	+0.50	+10.1	19.2	95.2
Apr. 12	07 02.79	-32 41.0	5.427	5.529	+0.61	+9.6	19.2	90.6
Apr. 22	07 08.88	-31 05.2	5.503	5.520	+0.70	+8.9	19.2	85.7
May 2	07 15.91	-29 36.1	5.583	5.511	+0.78	+8.1	19.3	80.7
May 12	07 23.76	-28 14.9	5.666	5.504	+0.85	+7.2	19.3	75.7
May 22	07 32.27	-27 02.6	5.749	5.497	+0.91	+6.3	19.3	70.6
June 1	07 41.33	-25 59.8	5.830	5.490	+0.95	+5.3	19.3	65.7
June 11	07 50.82	-25 06.7	5.908	5.485	+0.98	+4.3	19.3	60.8
June 21	08 00.64	-24 23.5	5.980	5.480	+1.00	+3.3	19.4	56.2
July 1	08 10.67	-23 50.0	6.046	5.475	+1.02	+2.4	19.4	51.8
July 11	08 20.85	-23 26.0	6.104	5.472	+1.02	+1.5	19.4	47.7
July 21	08 31.06	-23 11.1	6.151	5.469	+1.02	+0.6	19.4	44.2
July 31	08 41.25	-23 04.7	6.188	5.467	+1.01	-0.2	19.4	41.3
Aug. 10	08 51.34	-23 06.5	6.212	5.465	+0.99	-0.9	19.4	39.3
Aug. 20	09 01.23	-23 15.7	6.223	5.465	+0.96	-1.6	19.4	38.3
Aug. 30	09 10.88	-23 31.6	6.220	5.464	+0.93	-2.2	19.4	38.4
Sept. 9	09 20.19	-23 53.6	6.202	5.465	+0.89	-2.7	19.4	39.7
Sept.19	09 29.10	-24 20.9	6.170	5.466	+0.84	-3.2	19.4	42.1
Sept.29	09 37.52	-24 52.7	6.122	5.468	+0.78	-3.5	19.4	45.6
Oct. 9	09 45.36	-25 27.9	6.060	5.471	+0.72	-3.8	19.4	49.9
Oct. 19	09 52.53	-26 05.7	5.984	5.474	+0.64	-3.9	19.4	55.0
Oct. 29	09 58.93	-26 44.8	5.895	5.478	+0.55	-3.9	19.3	60.7
Nov. 8	10 04.47	-27 24.0	5.795	5.483	+0.46	-3.8	19.3	67.0
Nov. 18	10 09.03	-28 01.8	5.684	5.489	+0.35	-3.5	19.3	73.7
Nov. 28	10 12.52	-28 36.6	5.566	5.495	+0.23	-3.0	19.2	80.8
Dec. 8	10 14.84	-29 06.4	5.444	5.502	+0.11	-2.3	19.2	88.2
Dec. 18	10 15.94	-29 29.2	5.320	5.509	-0.02	-1.4	19.1	95.9
Dec. 28	10 15.79	-29 42.8	5.199	5.517	-0.14	-0.2	19.1	103.9
Jan. 7	10 14.41	-29 44.8	5.084	5.526	-0.25	+1.2	19.1	111.9
Jan. 17	10 11.92	-29 33.1	4.979	5.536	-0.34	+2.7	19.0	119.9
Jan. 27	10 08.50	-29 06.1	4.890	5.546	-0.41	+4.4	19.0	127.6
Feb. 6	10 04.40	-28 22.5	4.820	5.557	-0.44	+6.0	19.0	134.5
Feb. 16	09 59.96	-27 22.4	4.773	5.568	-0.44	+7.5	19.0	140.2
Feb. 26	09 55.52	-26 07.0	4.751	5.580	-0.41	+8.8	19.0	143.7
Mar. 8	09 51.45	-24 38.7	4.757	5.593	-0.34	+9.8	19.0	144.3
Mar. 18	09 48.06	-23 00.7	4.791	5.606	-0.25	+10.4	19.0	141.8
Mar. 28	09 45.57	-21 17.0	4.852	5.620	-0.14	+10.5	19.1	136.7

Comet C/2015 TQ209 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 27.57520 TT
Peri. = 281.51018
Node = 224.08351 2000.0
Incl. = 11.39376
q = 1.4129213 AU
e = 0.9990757

m1 = 10.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	01 52.95	+11 03.6	2.928	3.369	+0.13	-1.2	17.6	108.4
Jan. 13	01 54.28	+10 51.5	2.976	3.268	+0.34	0.0	17.5	98.4
Jan. 23	01 57.69	+10 51.4	3.027	3.167	+0.54	+1.1	17.4	89.0
Feb. 2	02 03.09	+11 02.5	3.076	3.065	+0.73	+2.1	17.3	80.1
Feb. 12	02 10.38	+11 23.6	3.118	2.963	+0.91	+3.0	17.2	71.8
Feb. 22	02 19.47	+11 53.2	3.153	2.861	+1.08	+3.6	17.1	64.0
Mar. 3	02 30.25	+12 29.7	3.176	2.758	+1.24	+4.2	16.9	56.7
Mar. 13	02 42.67	+13 11.4	3.188	2.656	+1.40	+4.5	16.8	49.8
Mar. 23	02 56.66	+13 56.7	3.186	2.554	+1.55	+4.7	16.6	43.3
Apr. 2	03 12.21	+14 43.8	3.172	2.453	+1.71	+4.7	16.4	37.3
Apr. 12	03 29.32	+15 30.8	3.145	2.352	+1.87	+4.5	16.2	31.7
Apr. 22	03 48.00	+16 15.7	3.106	2.253	+2.03	+4.1	16.0	26.6
May 2	04 08.29	+16 56.4	3.057	2.155	+2.20	+3.4	15.8	21.9
May 12	04 30.25	+17 30.4	2.998	2.058	+2.36	+2.5	15.5	17.6
May 22	04 53.89	+17 55.2	2.932	1.965	+2.54	+1.3	15.3	13.9
June 1	05 19.25	+18 07.8	2.861	1.875	+2.71	-0.3	15.0	10.8
June 11	05 46.33	+18 05.2	2.788	1.789	+2.87	-2.1	14.8	8.3
June 21	06 15.05	+17 44.4	2.713	1.709	+3.03	-4.2	14.5	6.8
July 1	06 45.33	+17 02.6	2.642	1.635	+3.16	-6.5	14.2	6.2
July 11	07 16.97	+15 57.4	2.576	1.569	+3.28	-9.0	14.0	6.3
July 21	07 49.72	+14 27.7	2.517	1.513	+3.36	-11.4	13.8	6.7
July 31	08 23.28	+12 33.4	2.469	1.468	+3.40	-13.7	13.6	7.2
Aug. 10	08 57.30	+10 16.4	2.434	1.436	+3.41	-15.6	13.5	7.7
Aug. 20	09 31.42	+07 40.2	2.412	1.417	+3.39	-17.0	13.4	8.0
Aug. 30	10 05.33	+04 49.8	2.405	1.413	+3.34	-17.9	13.4	8.3
Sept. 9	10 38.73	+01 51.3	2.412	1.424	+3.27	-18.0	13.4	8.6
Sept.19	11 11.38	-01 09.0	2.433	1.449	+3.17	-17.6	13.5	9.1
Sept.29	11 43.12	-04 05.4	2.465	1.488	+3.07	-16.8	13.7	9.9
Oct. 9	12 13.83	-06 53.0	2.506	1.539	+2.96	-15.5	13.9	11.1
Oct. 19	12 43.39	-09 27.9	2.555	1.600	+2.84	-14.0	14.1	12.9
Oct. 29	13 11.76	-11 47.8	2.607	1.669	+2.71	-12.3	14.3	15.2
Nov. 8	13 38.89	-13 51.1	2.661	1.747	+2.58	-10.6	14.5	18.1
Nov. 18	14 04.72	-15 37.4	2.712	1.830	+2.45	-8.9	14.8	21.6
Nov. 28	14 29.24	-17 06.7	2.760	1.918	+2.31	-7.3	15.0	25.6
Dec. 8	14 52.36	-18 19.6	2.801	2.010	+2.17	-5.7	15.3	30.1
Dec. 18	15 14.04	-19 16.9	2.833	2.104	+2.02	-4.3	15.5	35.0
Dec. 28	15 34.22	-19 60.0	2.856	2.202	+1.86	-3.0	15.7	40.4
Jan. 7	15 52.79	-20 29.8	2.868	2.300	+1.69	-1.8	15.9	46.2
Jan. 17	16 09.67	-20 47.8	2.869	2.401	+1.51	-0.7	16.1	52.5
Jan. 27	16 24.76	-20 55.2	2.859	2.502	+1.32	+0.2	16.3	59.2
Feb. 6	16 37.92	-20 53.3	2.838	2.603	+1.11	+1.0	16.4	66.3
Feb. 16	16 49.03	-20 43.3	2.808	2.705	+0.89	+1.7	16.6	73.8
Feb. 26	16 57.97	-20 26.4	2.771	2.808	+0.66	+2.3	16.7	81.9
Mar. 8	17 04.59	-20 03.6	2.729	2.910	+0.42	+2.8	16.8	90.4
Mar. 18	17 08.79	-19 35.9	2.685	3.012	+0.17	+3.2	16.9	99.4
Mar. 28	17 10.52	-19 04.3	2.643	3.114	-0.08	+3.5	17.0	108.9

Comet 330P/Catalina

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 29.95624 TT
Peri. = 186.94254 e = 0.5506158
Node = 294.37545 2000.0 a = 6.5712502 AU
Incl. = 15.56491 n = 0.05851027
q = 2.9530160 AU P = 16.85 years

m1 = 8.6 + 5 log(Delta) + 15.0 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	03 29.87	+33 39.8	2.662	3.427	-0.07	-6.2	19.0	134.8
Jan. 13	03 29.16	+32 38.1	2.732	3.392	+0.17	-5.6	18.9	124.9
Jan. 23	03 30.83	+31 42.5	2.817	3.358	+0.40	-4.8	18.9	115.3
Feb. 2	03 34.80	+30 54.6	2.914	3.326	+0.61	-4.0	18.9	106.1
Feb. 12	03 40.90	+30 15.1	3.019	3.294	+0.80	-3.2	19.0	97.3
Feb. 22	03 48.94	+29 43.6	3.127	3.263	+0.97	-2.5	19.0	89.0
Mar. 3	03 58.69	+29 18.9	3.236	3.234	+1.13	-1.9	19.0	81.0
Mar. 13	04 09.95	+28 59.4	3.343	3.205	+1.26	-1.6	19.0	73.5
Mar. 23	04 22.52	+28 43.6	3.446	3.178	+1.37	-1.4	19.0	66.2
Apr. 2	04 36.21	+28 29.6	3.543	3.152	+1.47	-1.4	19.0	59.3
Apr. 12	04 50.87	+28 15.8	3.632	3.128	+1.55	-1.5	19.0	52.7
Apr. 22	05 06.36	+28 00.6	3.713	3.104	+1.62	-1.8	19.0	46.3
May 2	05 22.51	+27 42.7	3.785	3.083	+1.67	-2.2	19.0	40.1
May 12	05 39.21	+27 20.8	3.846	3.063	+1.71	-2.7	19.0	34.1
May 22	05 56.33	+26 53.9	3.898	3.044	+1.74	-3.3	18.9	28.3
June 1	06 13.74	+26 21.2	3.939	3.027	+1.76	-3.9	18.9	22.6
June 11	06 31.36	+25 42.2	3.969	3.012	+1.77	-4.6	18.9	17.0
June 21	06 49.06	+24 56.2	3.987	2.998	+1.77	-5.3	18.9	11.4
July 1	07 06.74	+24 03.2	3.996	2.986	+1.76	-6.0	18.8	6.0
July 11	07 24.33	+23 03.0	3.993	2.976	+1.74	-6.7	18.8	1.1
July 21	07 41.73	+21 55.7	3.979	2.968	+1.71	-7.4	18.8	5.0
July 31	07 58.87	+20 41.6	3.954	2.961	+1.68	-8.1	18.7	10.4
Aug. 10	08 15.68	+19 20.9	3.919	2.957	+1.64	-8.7	18.7	15.8
Aug. 20	08 32.08	+17 54.1	3.874	2.954	+1.59	-9.2	18.6	21.3
Aug. 30	08 48.02	+16 21.9	3.818	2.953	+1.54	-9.7	18.6	26.9
Sept. 9	09 03.44	+14 44.7	3.752	2.954	+1.48	-10.1	18.5	32.6
Sept.19	09 18.27	+13 03.4	3.677	2.957	+1.42	-10.5	18.5	38.4
Sept.29	09 32.44	+11 18.6	3.593	2.961	+1.34	-10.7	18.4	44.4
Oct. 9	09 45.87	+09 31.3	3.501	2.968	+1.26	-10.9	18.4	50.5
Oct. 19	09 58.48	+07 42.3	3.401	2.976	+1.17	-11.0	18.3	56.9
Oct. 29	10 10.16	+05 52.5	3.294	2.986	+1.06	-10.9	18.3	63.5
Nov. 8	10 20.79	+04 03.1	3.182	2.998	+0.94	-10.8	18.2	70.4
Nov. 18	10 30.23	+02 15.1	3.067	3.012	+0.81	-10.5	18.1	77.5
Nov. 28	10 38.32	+00 29.8	2.948	3.027	+0.66	-10.1	18.1	85.0
Dec. 8	10 44.88	-01 11.4	2.830	3.044	+0.48	-9.5	18.0	92.9
Dec. 18	10 49.72	-02 46.8	2.715	3.063	+0.30	-8.8	18.0	101.2
Dec. 28	10 52.68	-04 14.6	2.606	3.083	+0.09	-7.8	17.9	109.9
Jan. 7	10 53.61	-05 32.6	2.505	3.105	-0.11	-6.6	17.8	119.1
Jan. 17	10 52.48	-06 38.5	2.418	3.128	-0.31	-5.2	17.8	128.6
Jan. 27	10 49.37	-07 30.3	2.348	3.152	-0.48	-3.6	17.8	138.4
Feb. 6	10 44.55	-08 06.1	2.298	3.178	-0.60	-1.9	17.8	148.0
Feb. 16	10 38.50	-08 25.3	2.273	3.205	-0.66	-0.3	17.8	156.8
Feb. 26	10 31.87	-08 28.6	2.275	3.234	-0.65	+1.0	17.9	162.7
Mar. 8	10 25.38	-08 18.5	2.305	3.263	-0.56	+2.0	17.9	162.1
Mar. 18	10 19.74	-07 58.8	2.361	3.294	-0.43	+2.5	18.1	155.7
Mar. 28	10 15.47	-07 34.0	2.444	3.326	-0.25	+2.5	18.2	147.0

Comet 144P/Kushida

Epoch = 2016 July 31.0 TT
T = 2016 Aug. 30.96902 TT
Peri. = 216.15038 e = 0.6288623
Node = 245.48967 2000.0 a = 3.8568817 AU
Incl. = 4.11496 n = 0.13012166
q = 1.4314342 AU P = 7.57 years

m1 = 4.8 + 5 log(Delta) + 40.0 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	22 38.87	-04 56.0	3.179	2.780	+1.18	+6.1	.	57.7
Jan. 13	22 50.70	-03 55.4	3.227	2.711	+1.29	+7.0	.	50.6
Jan. 23	23 03.65	-02 45.7	3.262	2.642	+1.39	+7.8	.	43.9
Feb. 2	23 17.59	-01 27.5	3.284	2.572	+1.49	+8.6	.	37.4
Feb. 12	23 32.49	-00 01.4	3.292	2.502	+1.58	+9.3	.	31.3
Feb. 22	23 48.28	+01 31.8	3.287	2.431	+1.67	+10.0	.	25.5
Mar. 3	00 04.96	+03 11.3	3.268	2.361	+1.76	+10.5	.	19.9
Mar. 13	00 22.53	+04 56.4	3.237	2.290	+1.85	+11.0	.	14.7
Mar. 23	00 41.04	+06 46.0	3.195	2.219	+1.95	+11.3	.	9.8
Apr. 2	01 00.53	+08 39.0	3.142	2.149	+2.06	+11.5	22.7	5.2
Apr. 12	01 21.08	+10 34.2	3.080	2.079	+2.17	+11.6	22.2	1.9
Apr. 22	01 42.79	+12 30.0	3.011	2.010	+2.30	+11.5	21.6	4.1
May 2	02 05.76	+14 24.6	2.936	1.942	+2.44	+11.1	21.0	7.7
May 12	02 30.12	+16 15.8	2.856	1.875	+2.58	+10.5	20.4	11.2
May 22	02 55.97	+18 00.9	2.775	1.811	+2.74	+9.6	19.7	14.3
June 1	03 23.40	+19 36.8	2.692	1.750	+2.91	+8.3	19.1	17.2
June 11	03 52.48	+20 60.0	2.611	1.691	+3.07	+6.6	18.4	19.8
June 21	04 23.18	+22 06.4	2.532	1.637	+3.22	+4.6	17.7	22.2
July 1	04 55.40	+22 52.1	2.458	1.587	+3.35	+2.1	17.1	24.2
July 11	05 28.92	+23 13.2	2.390	1.543	+3.45	-0.7	16.4	26.0
July 21	06 03.41	+23 06.6	2.329	1.505	+3.50	-3.6	15.8	27.7
July 31	06 38.46	+22 30.3	2.276	1.474	+3.51	-6.6	15.1	29.1
Aug. 10	07 13.56	+21 24.1	2.230	1.451	+3.47	-9.5	14.6	30.5
Aug. 20	07 48.25	+19 49.2	2.193	1.437	+3.39	-12.0	14.0	31.9
Aug. 30	08 22.11	+17 48.8	2.164	1.431	+3.27	-14.1	13.6	33.3
Sept. 9	08 54.81	+15 27.4	2.142	1.435	+3.13	-15.7	13.2	34.8
Sept.19	09 26.13	+12 50.1	2.126	1.448	+2.98	-16.8	12.9	36.5
Sept.29	09 55.96	+10 02.4	2.114	1.469	+2.83	-17.3	12.7	38.5
Oct. 9	10 24.23	+07 09.4	2.105	1.498	+2.67	-17.4	12.6	40.8
Oct. 19	10 50.95	+04 15.8	2.097	1.535	+2.52	-17.0	12.7	43.4
Oct. 29	11 16.16	+01 25.6	2.088	1.578	+2.37	-16.4	12.8	46.5
Nov. 8	11 39.85	-01 18.0	2.076	1.627	+2.22	-15.4	13.1	50.0
Nov. 18	12 02.03	-03 52.4	2.061	1.680	+2.07	-14.3	13.4	53.9
Nov. 28	12 22.70	-06 15.9	2.040	1.738	+1.91	-13.1	13.8	58.3
Dec. 8	12 41.77	-08 26.9	2.013	1.799	+1.74	-11.7	14.2	63.2
Dec. 18	12 59.13	-10 24.4	1.979	1.863	+1.55	-10.3	14.7	68.7
Dec. 28	13 14.64	-12 07.6	1.939	1.929	+1.34	-8.8	15.3	74.7
Jan. 7	13 28.07	-13 36.0	1.893	1.996	+1.11	-7.3	15.8	81.3
Jan. 17	13 39.17	-14 48.8	1.842	2.065	+0.85	-5.7	16.3	88.5
Jan. 27	13 47.68	-15 45.4	1.788	2.135	+0.56	-4.0	16.9	96.4
Feb. 6	13 53.27	-16 25.0	1.734	2.205	+0.25	-2.1	17.4	105.0
Feb. 16	13 55.73	-16 46.5	1.682	2.276	-0.08	-0.2	17.9	114.4
Feb. 26	13 54.93	-16 48.9	1.638	2.347	-0.40	+1.7	18.5	124.6
Mar. 8	13 50.95	-16 31.4	1.607	2.417	-0.67	+3.7	19.0	135.5
Mar. 18	13 44.26	-15 54.7	1.593	2.488	-0.86	+5.3	19.5	147.1
Mar. 28	13 35.61	-15 01.4	1.601	2.558	-0.95	+6.5	20.1	159.1

Comet 226P/Pigott-LINEAR-Kowalski

Epoch = 2016 July 31.0 TT
T = 2016 Sept. 5.12396 TT
Peri. = 341.12622 e = 0.5288968
Node = 54.00648 2000.0 a = 3.7706331 AU
Incl. = 44.00340 n = 0.13461166
q = 1.7763573 AU P = 7.32 years

m1 = 7.8 + 5 log(Delta) + 25.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	20 05.88	-51 32.8	3.532	2.748	+2.72	+5.8	21.5	32.0
Jan. 13	20 33.11	-50 34.5	3.487	2.693	+2.75	+7.1	21.3	31.1
Jan. 23	21 00.57	-49 23.7	3.433	2.638	+2.75	+8.4	21.0	30.9
Feb. 2	21 28.03	-47 59.8	3.371	2.583	+2.73	+9.7	20.7	31.5
Feb. 12	21 55.31	-46 22.9	3.304	2.528	+2.69	+10.9	20.5	32.5
Feb. 22	22 22.23	-44 33.5	3.230	2.473	+2.64	+12.1	20.2	34.0
Mar. 3	22 48.68	-42 32.2	3.154	2.419	+2.59	+13.2	19.9	35.7
Mar. 13	23 14.58	-40 20.1	3.074	2.366	+2.53	+14.2	19.6	37.6
Mar. 23	23 39.87	-37 58.4	2.993	2.313	+2.47	+15.0	19.3	39.6
Apr. 2	00 04.53	-35 28.6	2.910	2.262	+2.40	+15.6	19.0	41.5
Apr. 12	00 28.56	-32 52.2	2.828	2.211	+2.34	+16.1	18.7	43.5
Apr. 22	00 51.94	-30 10.9	2.746	2.162	+2.28	+16.5	18.4	45.4
May 2	01 14.71	-27 26.2	2.665	2.115	+2.22	+16.7	18.1	47.3
May 12	01 36.87	-24 39.7	2.583	2.069	+2.15	+16.7	17.8	49.2
May 22	01 58.42	-21 52.7	2.502	2.026	+2.10	+16.6	17.5	51.1
June 1	02 19.37	-19 06.4	2.421	1.985	+2.04	+16.5	17.2	53.1
June 11	02 39.74	-16 21.8	2.338	1.947	+1.97	+16.3	16.9	55.2
June 21	02 59.48	-13 39.2	2.254	1.912	+1.91	+16.1	16.6	57.5
July 1	03 18.61	-10 58.7	2.168	1.880	+1.85	+15.9	16.3	60.1
July 11	03 37.07	-08 19.9	2.079	1.852	+1.77	+15.8	16.1	62.9
July 21	03 54.82	-05 41.8	1.986	1.828	+1.70	+15.9	15.8	66.1
July 31	04 11.80	-03 02.7	1.889	1.808	+1.61	+16.3	15.6	69.7
Aug. 10	04 27.89	-00 20.2	1.789	1.793	+1.51	+16.9	15.4	73.8
Aug. 20	04 42.96	+02 29.2	1.686	1.783	+1.39	+18.1	15.2	78.4
Aug. 30	04 56.83	+05 29.7	1.580	1.777	+1.24	+19.7	15.0	83.6
Sept. 9	05 09.20	+08 47.0	1.473	1.777	+1.05	+22.1	14.9	89.5
Sept.19	05 19.70	+12 28.2	1.367	1.781	+0.81	+25.3	14.7	96.2
Sept.29	05 27.81	+16 41.1	1.265	1.790	+0.50	+29.2	14.6	103.7
Oct. 9	05 32.78	+21 33.4	1.172	1.804	+0.08	+33.6	14.6	112.2
Oct. 19	05 33.63	+27 09.3	1.092	1.823	-0.45	+37.6	14.5	121.6
Oct. 29	05 29.09	+33 24.9	1.031	1.846	-1.14	+39.5	14.5	131.5
Nov. 8	05 17.73	+40 00.2	0.997	1.873	-1.91	+37.8	14.6	140.9
Nov. 18	04 58.67	+46 18.2	0.993	1.904	-2.61	+31.6	14.8	147.8
Nov. 28	04 32.53	+51 34.4	1.022	1.938	-2.98	+22.4	15.0	149.6
Dec. 8	04 02.74	+55 18.1	1.082	1.976	-2.79	+13.1	15.4	145.7
Dec. 18	03 34.87	+57 29.2	1.169	2.016	-2.12	+6.2	15.8	138.8
Dec. 28	03 13.64	+58 31.5	1.277	2.059	-1.25	+2.3	16.2	130.9
Jan. 7	03 01.17	+58 54.7	1.400	2.104	-0.40	+0.7	16.6	123.0
Jan. 17	02 57.18	+59 01.9	1.534	2.151	+0.32	+0.4	17.0	115.6
Jan. 27	03 00.43	+59 05.7	1.676	2.200	+0.92	+0.6	17.5	108.7
Feb. 6	03 09.62	+59 11.8	1.823	2.250	+1.40	+1.0	17.9	102.3
Feb. 16	03 23.58	+59 21.6	1.972	2.301	+1.79	+1.2	18.3	96.4
Feb. 26	03 41.44	+59 33.5	2.122	2.354	+2.11	+1.2	18.7	90.8
Mar. 8	04 02.52	+59 45.4	2.272	2.407	+2.37	+0.9	19.1	85.5
Mar. 18	04 26.19	+59 54.4	2.420	2.461	+2.57	+0.3	19.5	80.6
Mar. 28	04 51.94	+59 57.8	2.566	2.515	+2.73	-0.5	19.9	75.9

Comet 212P/NEAT

Epoch = 2016 July 31.0 TT
T = 2016 Sept. 10.41312 TT
Peri. = 15.08059 e = 0.5800967
Node = 98.88612 2000.0 a = 3.9165051 AU
Incl. = 22.42803 n = 0.12716162
q = 1.6445534 AU P = 7.75 years

m1 = 14.8 + 5 log(Delta) + 17.5 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	00 19.97	-21 22.7	2.907	2.817	+0.81	+12.4	.	75.0
Jan. 13	00 28.02	-19 19.0	2.969	2.756	+0.96	+12.9	.	68.0
Jan. 23	00 37.63	-17 10.0	3.024	2.694	+1.10	+13.3	.	61.3
Feb. 2	00 48.60	-14 56.8	3.071	2.632	+1.22	+13.7	.	55.0
Feb. 12	01 00.81	-12 40.1	3.108	2.570	+1.33	+13.9	.	48.9
Feb. 22	01 14.15	-10 20.8	3.136	2.508	+1.44	+14.1	.	43.2
Mar. 3	01 28.52	-07 59.7	3.153	2.447	+1.54	+14.2	.	37.8
Mar. 13	01 43.88	-05 37.3	3.160	2.385	+1.63	+14.3	.	32.8
Mar. 23	02 00.18	-03 14.5	3.157	2.324	+1.72	+14.3	.	28.0
Apr. 2	02 17.41	-00 51.9	3.145	2.264	+1.82	+14.1	.	23.6
Apr. 12	02 35.58	+01 29.5	3.124	2.205	+1.91	+13.9	.	19.6
Apr. 22	02 54.69	+03 48.8	3.095	2.146	+2.01	+13.6	.	16.0
May 2	03 14.77	+06 05.0	3.059	2.089	+2.11	+13.2	.	13.0
May 12	03 35.86	+08 17.0	3.017	2.034	+2.21	+12.6	.	10.9
May 22	03 57.98	+10 23.5	2.970	1.981	+2.32	+12.0	.	10.0
June 1	04 21.16	+12 23.1	2.919	1.930	+2.43	+11.1	22.9	10.3
June 11	04 45.43	+14 14.3	2.865	1.882	+2.54	+10.1	22.7	11.7
June 21	05 10.79	+15 55.5	2.808	1.837	+2.64	+8.9	22.4	13.7
July 1	05 37.21	+17 25.0	2.751	1.795	+2.75	+7.6	22.2	15.9
July 11	06 04.67	+18 41.2	2.693	1.758	+2.84	+6.1	21.9	18.4
July 21	06 33.05	+19 42.6	2.636	1.725	+2.92	+4.5	21.7	20.9
July 31	07 02.26	+20 28.1	2.579	1.698	+2.99	+2.9	21.5	23.5
Aug. 10	07 32.13	+20 56.6	2.525	1.675	+3.03	+1.1	21.3	26.2
Aug. 20	08 02.45	+21 08.0	2.472	1.659	+3.06	-0.6	21.1	28.8
Aug. 30	08 33.01	+21 02.4	2.422	1.649	+3.06	-2.2	20.9	31.6
Sept. 9	09 03.59	+20 40.8	2.374	1.645	+3.04	-3.6	20.7	34.4
Sept.19	09 33.94	+20 05.0	2.330	1.647	+2.99	-4.8	20.6	37.3
Sept.29	10 03.87	+19 17.2	2.287	1.655	+2.93	-5.7	20.4	40.3
Oct. 9	10 33.16	+18 20.3	2.247	1.670	+2.85	-6.3	20.4	43.5
Oct. 19	11 01.64	+17 17.7	2.208	1.691	+2.75	-6.5	20.3	46.8
Oct. 29	11 29.19	+16 12.9	2.171	1.717	+2.65	-6.3	20.3	50.3
Nov. 8	11 55.66	+15 09.4	2.134	1.748	+2.53	-5.9	20.3	54.1
Nov. 18	12 20.93	+14 10.7	2.097	1.784	+2.40	-5.1	20.3	58.1
Nov. 28	12 44.89	+13 20.1	2.059	1.824	+2.25	-4.0	20.4	62.4
Dec. 8	13 07.39	+12 40.5	2.020	1.868	+2.09	-2.6	20.4	67.0
Dec. 18	13 28.30	+12 14.3	1.978	1.916	+1.91	-1.1	20.5	71.9
Dec. 28	13 47.44	+12 03.5	1.935	1.966	+1.72	+0.6	20.6	77.2
Jan. 7	14 04.59	+12 09.6	1.890	2.019	+1.49	+2.4	20.8	82.8
Jan. 17	14 19.53	+12 33.4	1.844	2.073	+1.25	+4.1	20.9	88.9
Jan. 27	14 31.99	+13 14.9	1.797	2.130	+0.97	+5.8	21.0	95.5
Feb. 6	14 41.67	+14 13.1	1.752	2.188	+0.66	+7.2	21.2	102.4
Feb. 16	14 48.31	+15 25.4	1.711	2.247	+0.33	+8.3	21.3	109.8
Feb. 26	14 51.65	+16 47.9	1.677	2.307	-0.01	+8.7	21.5	117.4
Mar. 8	14 51.55	+18 14.5	1.652	2.368	-0.34	+8.3	21.6	125.2
Mar. 18	14 48.13	+19 37.0	1.641	2.429	-0.64	+6.9	21.8	132.7
Mar. 28	14 41.75	+20 46.5	1.647	2.491	-0.86	+4.7	22.0	139.3

Comet C/2015 H2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Sept. 13.29309 TT
Peri. = 287.91614
Node = 350.69100 2000.0
Incl. = 33.70482
q = 4.9667008 AU
e = 1.0033522

m1 = 7.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	16 18.62	-50 24.4	6.048	5.337	+1.43	-5.6	18.2	40.4
Jan. 13	16 32.90	-51 20.0	5.946	5.310	+1.41	-5.6	18.1	46.0
Jan. 23	16 47.03	-52 16.1	5.832	5.284	+1.38	-5.7	18.1	52.0
Feb. 2	17 00.87	-53 12.7	5.708	5.258	+1.34	-5.7	18.0	58.3
Feb. 12	17 14.25	-54 09.8	5.576	5.234	+1.27	-5.8	17.9	64.8
Feb. 22	17 26.98	-55 07.7	5.438	5.210	+1.19	-5.9	17.8	71.5
Mar. 3	17 38.88	-56 06.4	5.296	5.187	+1.08	-6.0	17.8	78.4
Mar. 13	17 49.71	-57 06.1	5.152	5.166	+0.95	-6.1	17.7	85.3
Mar. 23	17 59.24	-58 06.7	5.009	5.145	+0.80	-6.1	17.6	92.2
Apr. 2	18 07.21	-59 07.8	4.871	5.126	+0.61	-6.1	17.5	99.2
Apr. 12	18 13.34	-60 08.8	4.738	5.107	+0.41	-6.0	17.5	106.1
Apr. 22	18 17.39	-61 08.4	4.615	5.090	+0.18	-5.7	17.4	112.9
May 2	18 19.16	-62 05.0	4.503	5.074	-0.07	-5.1	17.3	119.4
May 12	18 18.48	-62 56.2	4.405	5.059	-0.31	-4.3	17.3	125.4
May 22	18 15.43	-63 39.0	4.325	5.045	-0.52	-3.1	17.2	130.8
June 1	18 10.24	-64 10.5	4.262	5.032	-0.68	-1.7	17.2	135.1
June 11	18 03.43	-64 27.8	4.220	5.020	-0.76	-0.1	17.1	137.9
June 21	17 55.79	-64 29.1	4.198	5.009	-0.76	+1.5	17.1	138.9
July 1	17 48.23	-64 13.7	4.198	5.000	-0.66	+3.1	17.1	138.0
July 11	17 41.63	-63 42.3	4.219	4.992	-0.49	+4.5	17.1	135.2
July 21	17 36.73	-62 57.2	4.260	4.984	-0.27	+5.6	17.1	130.9
July 31	17 34.00	-62 01.1	4.320	4.979	-0.04	+6.4	17.1	125.5
Aug. 10	17 33.63	-60 57.2	4.396	4.974	+0.20	+6.9	17.2	119.5
Aug. 20	17 35.63	-59 48.4	4.487	4.970	+0.42	+7.1	17.2	113.0
Aug. 30	17 39.84	-58 37.0	4.591	4.968	+0.62	+7.2	17.3	106.2
Sept. 9	17 46.07	-57 24.8	4.704	4.967	+0.80	+7.2	17.3	99.3
Sept.19	17 54.04	-56 12.9	4.824	4.967	+0.95	+7.1	17.4	92.3
Sept.29	18 03.50	-55 02.0	4.948	4.968	+1.07	+7.0	17.4	85.4
Oct. 9	18 14.22	-53 52.4	5.074	4.971	+1.17	+6.8	17.5	78.4
Oct. 19	18 25.95	-52 44.0	5.199	4.974	+1.25	+6.7	17.5	71.5
Oct. 29	18 38.50	-51 36.7	5.321	4.979	+1.32	+6.6	17.6	64.8
Nov. 8	18 51.68	-50 30.3	5.437	4.985	+1.36	+6.6	17.7	58.1
Nov. 18	19 05.31	-49 24.5	5.546	4.993	+1.39	+6.5	17.7	51.6
Nov. 28	19 19.24	-48 19.1	5.646	5.001	+1.41	+6.5	17.7	45.3
Dec. 8	19 33.34	-47 13.9	5.734	5.011	+1.41	+6.5	17.8	39.3
Dec. 18	19 47.48	-46 09.0	5.810	5.021	+1.41	+6.5	17.8	33.7
Dec. 28	20 01.54	-45 04.3	5.872	5.033	+1.39	+6.4	17.9	28.9
Jan. 7	20 15.43	-44 00.1	5.918	5.046	+1.36	+6.3	17.9	25.2
Jan. 17	20 29.05	-42 56.6	5.950	5.061	+1.33	+6.2	17.9	23.2
Jan. 27	20 42.33	-41 54.2	5.964	5.076	+1.29	+6.1	17.9	23.4
Feb. 6	20 55.20	-40 53.3	5.963	5.092	+1.24	+5.9	17.9	25.7
Feb. 16	21 07.57	-39 54.4	5.945	5.110	+1.18	+5.6	18.0	29.6
Feb. 26	21 19.38	-38 58.0	5.911	5.128	+1.12	+5.3	18.0	34.7
Mar. 8	21 30.58	-38 04.8	5.862	5.148	+1.05	+4.9	18.0	40.5
Mar. 18	21 41.09	-37 15.3	5.798	5.169	+0.98	+4.5	18.0	46.9
Mar. 28	21 50.84	-36 30.1	5.721	5.190	+0.89	+4.0	17.9	53.5

Comet 314P/Montani

Epoch = 2016 July 31.0 TT
T = 2016 Oct. 7.78919 TT
Peri. = 213.73118 e = 0.4169143
Node = 267.70427 2000.0 a = 7.2609941 AU
Incl. = 3.97860 n = 0.05037441
q = 4.2337818 AU P = 19.57 years

m1 = 9.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 20.11	+23 19.8	3.555	4.487	−0.45	−1.1	18.5	159.0
Jan. 13	05 15.65	+23 08.9	3.607	4.470	−0.32	−1.0	18.5	147.8
Jan. 23	05 12.45	+22 59.1	3.684	4.454	−0.17	−0.8	18.5	136.9
Feb. 2	05 10.76	+22 51.2	3.782	4.438	−0.01	−0.6	18.6	126.3
Feb. 12	05 10.69	+22 45.5	3.897	4.422	+0.16	−0.3	18.6	116.2
Feb. 22	05 12.29	+22 42.1	4.024	4.407	+0.32	−0.1	18.7	106.4
Mar. 3	05 15.48	+22 40.7	4.159	4.393	+0.47	0.0	18.7	97.1
Mar. 13	05 20.17	+22 40.9	4.296	4.379	+0.61	+0.1	18.8	88.2
Mar. 23	05 26.22	+22 42.0	4.434	4.366	+0.73	+0.1	18.8	79.6
Apr. 2	05 33.48	+22 43.2	4.567	4.353	+0.83	+0.1	18.9	71.4
Apr. 12	05 41.80	+22 43.9	4.695	4.341	+0.92	−0.1	18.9	63.5
Apr. 22	05 51.04	+22 43.2	4.813	4.330	+1.00	−0.3	19.0	55.9
May 2	06 01.06	+22 40.6	4.921	4.319	+1.07	−0.5	19.0	48.4
May 12	06 11.72	+22 35.4	5.017	4.309	+1.12	−0.8	19.0	41.2
May 22	06 22.91	+22 27.2	5.099	4.299	+1.16	−1.2	19.1	34.2
June 1	06 34.52	+22 15.6	5.166	4.290	+1.19	−1.5	19.1	27.3
June 11	06 46.44	+22 00.4	5.218	4.282	+1.21	−1.9	19.1	20.5
June 21	06 58.57	+21 41.3	5.254	4.274	+1.23	−2.3	19.1	13.8
July 1	07 10.83	+21 18.4	5.274	4.267	+1.23	−2.7	19.1	7.2
July 11	07 23.12	+20 51.6	5.277	4.261	+1.22	−3.1	19.1	1.3
July 21	07 35.37	+20 21.0	5.264	4.255	+1.21	−3.4	19.1	6.3
July 31	07 47.48	+19 47.0	5.234	4.250	+1.19	−3.7	19.1	12.9
Aug. 10	07 59.40	+19 09.7	5.187	4.246	+1.16	−4.0	19.1	19.6
Aug. 20	08 11.02	+18 29.6	5.125	4.242	+1.13	−4.2	19.0	26.3
Aug. 30	08 22.27	+17 47.2	5.047	4.239	+1.08	−4.4	19.0	33.2
Sept. 9	08 33.08	+17 03.1	4.955	4.237	+1.03	−4.5	18.9	40.2
Sept.19	08 43.34	+16 17.9	4.850	4.235	+0.96	−4.6	18.9	47.4
Sept.29	08 52.96	+15 32.4	4.733	4.234	+0.89	−4.5	18.8	54.7
Oct. 9	09 01.84	+14 47.3	4.604	4.234	+0.80	−4.4	18.8	62.3
Oct. 19	09 09.86	+14 03.7	4.467	4.234	+0.70	−4.1	18.7	70.2
Oct. 29	09 16.91	+13 22.5	4.324	4.235	+0.59	−3.8	18.6	78.3
Nov. 8	09 22.85	+12 44.7	4.177	4.237	+0.47	−3.3	18.6	86.7
Nov. 18	09 27.55	+12 11.6	4.029	4.240	+0.33	−2.8	18.5	95.5
Nov. 28	09 30.89	+11 44.0	3.884	4.243	+0.19	−2.1	18.4	104.7
Dec. 8	09 32.76	+11 22.9	3.746	4.247	+0.03	−1.4	18.3	114.2
Dec. 18	09 33.11	+11 09.2	3.619	4.251	−0.12	−0.6	18.3	124.2
Dec. 28	09 31.93	+11 03.2	3.508	4.256	−0.26	+0.2	18.2	134.6
Jan. 7	09 29.32	+11 04.9	3.416	4.262	−0.38	+0.9	18.2	145.4
Jan. 17	09 25.49	+11 13.5	3.349	4.269	−0.47	+1.4	18.1	156.4
Jan. 27	09 20.77	+11 27.8	3.309	4.276	−0.52	+1.8	18.1	167.4
Feb. 6	09 15.58	+11 46.0	3.300	4.284	−0.51	+2.0	18.1	176.0
Feb. 16	09 10.43	+12 05.8	3.320	4.292	−0.46	+1.9	18.1	168.4
Feb. 26	09 05.79	+12 25.3	3.370	4.301	−0.37	+1.7	18.2	157.5
Mar. 8	09 02.08	+12 42.4	3.447	4.311	−0.25	+1.3	18.2	146.7
Mar. 18	08 59.62	+12 55.7	3.549	4.322	−0.10	+0.8	18.3	136.1
Mar. 28	08 58.57	+13 04.1	3.670	4.333	+0.05	+0.3	18.4	126.0

Comet 237P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2016 Oct. 11.66705 TT
Peri. = 25.03584 e = 0.4344614
Node = 245.43376 2000.0 a = 3.5096794 AU
Incl. = 14.02289 n = 0.14990044
q = 1.9848592 AU P = 6.58 years

m1 = 13.8 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 56.21	-19 57.9	2.842	2.863	+0.96	-8.5	20.6	81.3
Jan. 13	13 05.76	-21 22.7	2.666	2.819	+0.84	-7.9	20.4	88.6
Jan. 23	13 14.18	-22 41.8	2.490	2.775	+0.70	-7.2	20.2	96.2
Feb. 2	13 21.19	-23 53.7	2.318	2.731	+0.53	-6.2	20.0	104.1
Feb. 12	13 26.48	-24 56.0	2.152	2.687	+0.33	-5.0	19.8	112.3
Feb. 22	13 29.73	-25 45.7	1.995	2.643	+0.10	-3.4	19.5	120.9
Mar. 3	13 30.69	-26 19.5	1.850	2.600	-0.15	-1.4	19.3	129.9
Mar. 13	13 29.17	-26 33.1	1.719	2.557	-0.39	+1.1	19.1	139.3
Mar. 23	13 25.26	-26 22.2	1.608	2.514	-0.59	+3.8	18.8	148.8
Apr. 2	13 19.35	-25 43.9	1.518	2.472	-0.72	+6.7	18.6	157.7
Apr. 12	13 12.19	-24 37.2	1.452	2.431	-0.73	+9.1	18.5	163.9
Apr. 22	13 04.87	-23 06.0	1.411	2.391	-0.63	+10.8	18.3	163.0
May 2	12 58.53	-21 18.1	1.396	2.352	-0.44	+11.4	18.2	155.8
May 12	12 54.18	-19 24.1	1.403	2.313	-0.17	+10.9	18.2	146.4
May 22	12 52.50	-17 35.1	1.431	2.277	+0.13	+9.5	18.2	136.7
June 1	12 53.78	-15 59.8	1.476	2.241	+0.43	+7.7	18.2	127.3
June 11	12 58.03	-14 43.3	1.535	2.207	+0.71	+5.5	18.2	118.5
June 21	13 05.09	-13 47.9	1.602	2.175	+0.96	+3.5	18.2	110.3
July 1	13 14.67	-13 13.1	1.677	2.145	+1.18	+1.6	18.2	102.8
July 11	13 26.51	-12 57.3	1.756	2.117	+1.38	-0.1	18.3	95.9
July 21	13 40.32	-12 57.9	1.837	2.091	+1.55	-1.4	18.3	89.5
July 31	13 55.85	-13 11.7	1.919	2.068	+1.71	-2.4	18.4	83.6
Aug. 10	14 12.93	-13 35.9	2.001	2.047	+1.84	-3.1	18.4	78.0
Aug. 20	14 31.38	-14 07.1	2.083	2.029	+1.97	-3.5	18.5	72.8
Aug. 30	14 51.03	-14 42.5	2.163	2.014	+2.08	-3.7	18.5	67.9
Sept. 9	15 11.78	-15 19.2	2.243	2.002	+2.17	-3.5	18.6	63.2
Sept.19	15 33.50	-15 54.3	2.320	1.993	+2.26	-3.1	18.6	58.7
Sept.29	15 56.06	-16 25.4	2.396	1.987	+2.33	-2.5	18.7	54.4
Oct. 9	16 19.37	-16 50.1	2.471	1.985	+2.39	-1.6	18.7	50.2
Oct. 19	16 43.26	-17 06.4	2.543	1.986	+2.43	-0.6	18.8	46.0
Oct. 29	17 07.61	-17 12.5	2.614	1.990	+2.47	+0.5	18.9	42.0
Nov. 8	17 32.27	-17 07.0	2.683	1.997	+2.48	+1.8	18.9	38.0
Nov. 18	17 57.07	-16 48.9	2.749	2.007	+2.48	+3.1	19.0	34.0
Nov. 28	18 21.88	-16 17.8	2.813	2.021	+2.47	+4.4	19.1	30.1
Dec. 8	18 46.53	-15 33.4	2.874	2.037	+2.44	+5.7	19.2	26.2
Dec. 18	19 10.89	-14 36.1	2.932	2.056	+2.40	+7.0	19.3	22.4
Dec. 28	19 34.84	-13 26.6	2.987	2.078	+2.34	+8.1	19.4	18.6
Jan. 7	19 58.29	-12 05.8	3.037	2.103	+2.28	+9.1	19.4	15.1
Jan. 17	20 21.14	-10 34.8	3.082	2.130	+2.22	+10.0	19.5	11.9
Jan. 27	20 43.35	-08 55.0	3.123	2.159	+2.15	+10.7	19.6	9.7
Feb. 6	21 04.87	-07 07.9	3.158	2.190	+2.08	+11.3	19.7	9.2
Feb. 16	21 25.68	-05 14.8	3.186	2.223	+2.01	+11.7	19.8	10.7
Feb. 26	21 45.78	-03 17.3	3.207	2.257	+1.94	+12.1	19.9	13.7
Mar. 8	22 05.16	-01 16.8	3.221	2.293	+1.87	+12.2	19.9	17.5
Mar. 18	22 23.81	+00 45.5	3.227	2.331	+1.79	+12.3	20.0	21.7
Mar. 28	22 41.75	+02 48.3	3.224	2.370	+1.72	+12.2	20.1	26.2

Comet 238P/Read

Epoch = 2016 July 31.0 TT
T = 2016 Oct. 22.98564 TT
Peri. = 324.95896 e = 0.2524956
Node = 51.65351 2000.0 a = 3.1654172 AU
Incl. = 1.26467 n = 0.17500789
q = 2.3661633 AU P = 5.63 years

m1 = 7.8 + 5 log(Delta) + 30.0 log(r(t-120))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	19 43.85	-22 10.5	3.775	2.821	+1.78	+4.7	.	12.1
Jan. 13	20 01.61	-21 23.6	3.773	2.797	+1.78	+5.4	.	6.2
Jan. 23	20 19.46	-20 29.2	3.756	2.772	+1.79	+6.2	.	0.9
Feb. 2	20 37.31	-19 27.7	3.727	2.748	+1.78	+6.8	.	5.7
Feb. 12	20 55.10	-18 19.4	3.685	2.725	+1.77	+7.4	.	11.4
Feb. 22	21 12.76	-17 05.0	3.630	2.701	+1.75	+8.0	.	17.1
Mar. 3	21 30.24	-15 45.1	3.564	2.678	+1.73	+8.5	.	22.8
Mar. 13	21 47.49	-14 20.5	3.487	2.655	+1.70	+8.8	.	28.4
Mar. 23	22 04.47	-12 52.1	3.400	2.633	+1.67	+9.1	.	34.0
Apr. 2	22 21.15	-11 20.7	3.304	2.612	+1.63	+9.3	.	39.5
Apr. 12	22 37.49	-09 47.3	3.200	2.591	+1.60	+9.4	.	45.0
Apr. 22	22 53.44	-08 12.9	3.089	2.570	+1.55	+9.4	.	50.6
May 2	23 08.99	-06 38.5	2.971	2.550	+1.51	+9.3	.	56.1
May 12	23 24.06	-05 05.2	2.848	2.531	+1.45	+9.1	.	61.7
May 22	23 38.58	-03 34.2	2.721	2.513	+1.39	+8.8	.	67.4
June 1	23 52.49	-02 06.5	2.591	2.496	+1.32	+8.3	23.0	73.3
June 11	00 05.66	-00 43.6	2.459	2.479	+1.23	+7.7	22.8	79.3
June 21	00 17.95	+00 33.4	2.326	2.464	+1.12	+7.0	22.6	85.5
July 1	00 29.20	+01 43.1	2.193	2.449	+1.00	+6.1	22.3	92.0
July 11	00 39.17	+02 44.1	2.063	2.436	+0.85	+5.1	22.1	98.8
July 21	00 47.63	+03 34.7	1.937	2.423	+0.67	+3.9	21.8	106.1
July 31	00 54.28	+04 13.6	1.816	2.412	+0.45	+2.6	21.6	113.9
Aug. 10	00 58.81	+04 39.2	1.703	2.402	+0.21	+1.1	21.4	122.2
Aug. 20	01 00.96	+04 50.4	1.602	2.393	-0.04	-0.4	21.1	131.3
Aug. 30	01 00.54	+04 46.4	1.514	2.385	-0.30	-1.9	20.9	141.0
Sept. 9	00 57.56	+04 27.8	1.445	2.379	-0.52	-3.1	20.7	151.5
Sept.19	00 52.36	+03 57.0	1.396	2.374	-0.68	-3.9	20.5	162.6
Sept.29	00 45.60	+03 18.0	1.371	2.370	-0.73	-4.1	20.4	174.1
Oct. 9	00 38.25	+02 37.1	1.372	2.367	-0.68	-3.6	20.3	173.8
Oct. 19	00 31.47	+02 01.2	1.398	2.366	-0.52	-2.5	20.3	162.2
Oct. 29	00 26.23	+01 36.2	1.449	2.366	-0.30	-1.0	20.3	150.9
Nov. 8	00 23.25	+01 26.2	1.521	2.368	-0.04	+0.7	20.3	140.1
Nov. 18	00 22.89	+01 33.1	1.611	2.371	+0.23	+2.4	20.4	130.0
Nov. 28	00 25.18	+01 56.6	1.716	2.375	+0.48	+3.9	20.4	120.6
Dec. 8	00 29.99	+02 35.6	1.831	2.380	+0.70	+5.2	20.5	111.8
Dec. 18	00 37.03	+03 28.1	1.955	2.387	+0.90	+6.4	20.6	103.6
Dec. 28	00 46.02	+04 31.8	2.085	2.395	+1.07	+7.3	20.7	95.9
Jan. 7	00 56.69	+05 44.7	2.217	2.404	+1.21	+8.0	20.8	88.6
Jan. 17	01 08.76	+07 04.5	2.351	2.414	+1.33	+8.5	20.9	81.7
Jan. 27	01 22.03	+08 29.3	2.484	2.426	+1.43	+8.8	21.0	75.1
Feb. 6	01 36.32	+09 57.2	2.615	2.439	+1.52	+8.9	21.1	68.8
Feb. 16	01 51.48	+11 26.5	2.743	2.452	+1.59	+8.9	21.2	62.7
Feb. 26	02 07.39	+12 55.7	2.866	2.467	+1.66	+8.8	21.3	56.8
Mar. 8	02 23.96	+14 23.2	2.984	2.483	+1.71	+8.5	21.4	51.0
Mar. 18	02 41.07	+15 47.8	3.095	2.499	+1.76	+8.0	21.5	45.4
Mar. 28	02 58.68	+17 08.2	3.199	2.517	+1.80	+7.5	21.6	39.9

Comet 94P/Russell

Epoch = 2016 July 31.0 TT
T = 2016 Oct. 27.70116 TT
Peri. = 92.77887 e = 0.3646994
Node = 70.88623 2000.0 a = 3.5101017 AU
Incl. = 6.18564 n = 0.14987339
q = 2.2299697 AU P = 6.58 years

m1 = 11.6 + 5 log(Delta) + 12.5 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 27.10	+23 01.5	2.065	2.938	−0.53	+0.3	19.2	146.9
Jan. 13	04 21.76	+23 04.4	2.118	2.902	−0.27	+0.7	19.2	135.5
Jan. 23	04 19.04	+23 11.3	2.190	2.867	+0.01	+1.2	19.2	124.7
Feb. 2	04 19.11	+23 23.0	2.276	2.832	+0.28	+1.7	19.2	114.6
Feb. 12	04 21.93	+23 39.6	2.371	2.797	+0.54	+2.1	19.3	105.2
Feb. 22	04 27.35	+24 00.5	2.472	2.762	+0.78	+2.4	19.3	96.4
Mar. 3	04 35.13	+24 24.5	2.574	2.727	+0.99	+2.6	19.3	88.1
Mar. 13	04 45.04	+24 50.1	2.674	2.694	+1.18	+2.6	19.3	80.4
Mar. 23	04 56.85	+25 15.7	2.772	2.660	+1.35	+2.4	19.3	73.2
Apr. 2	05 10.32	+25 39.6	2.863	2.628	+1.50	+2.1	19.3	66.4
Apr. 12	05 25.27	+26 00.3	2.948	2.596	+1.62	+1.6	19.3	59.9
Apr. 22	05 41.52	+26 16.1	3.026	2.564	+1.74	+1.0	19.3	53.8
May 2	05 58.87	+26 25.7	3.095	2.534	+1.83	+0.2	19.3	48.0
May 12	06 17.20	+26 27.8	3.155	2.504	+1.91	−0.6	19.3	42.5
May 22	06 36.34	+26 21.4	3.206	2.476	+1.98	−1.6	19.2	37.1
June 1	06 56.13	+26 05.6	3.248	2.448	+2.03	−2.6	19.2	32.0
June 11	07 16.47	+25 39.8	3.281	2.422	+2.07	−3.6	19.2	27.1
June 21	07 37.20	+25 03.6	3.306	2.397	+2.10	−4.7	19.1	22.4
July 1	07 58.22	+24 16.7	3.322	2.374	+2.12	−5.7	19.1	17.8
July 11	08 19.41	+23 19.3	3.329	2.352	+2.13	−6.8	19.0	13.3
July 21	08 40.67	+22 11.6	3.329	2.331	+2.13	−7.8	19.0	9.1
July 31	09 01.93	+20 54.0	3.321	2.312	+2.12	−8.7	18.9	5.5
Aug. 10	09 23.11	+19 27.2	3.306	2.295	+2.11	−9.5	18.8	4.0
Aug. 20	09 44.17	+17 52.1	3.283	2.280	+2.09	−10.2	18.8	6.3
Aug. 30	10 05.05	+16 09.6	3.254	2.267	+2.07	−10.9	18.7	10.1
Sept. 9	10 25.75	+14 20.8	3.218	2.255	+2.05	−11.4	18.6	14.2
Sept.19	10 46.21	+12 27.1	3.176	2.246	+2.02	−11.7	18.6	18.5
Sept.29	11 06.45	+10 29.6	3.128	2.239	+2.00	−12.0	18.5	22.8
Oct. 9	11 26.44	+08 29.8	3.074	2.234	+1.97	−12.1	18.5	27.3
Oct. 19	11 46.15	+06 29.1	3.014	2.231	+1.94	−12.0	18.4	31.9
Oct. 29	12 05.60	+04 28.9	2.948	2.230	+1.91	−11.8	18.3	36.5
Nov. 8	12 24.73	+02 30.7	2.877	2.231	+1.88	−11.5	18.3	41.3
Nov. 18	12 43.50	+00 36.0	2.801	2.235	+1.84	−11.0	18.2	46.3
Nov. 28	13 01.86	−01 13.9	2.719	2.241	+1.79	−10.4	18.1	51.4
Dec. 8	13 19.72	−02 57.7	2.633	2.248	+1.73	−9.6	18.1	56.7
Dec. 18	13 36.98	−04 34.1	2.542	2.258	+1.65	−8.8	18.0	62.2
Dec. 28	13 53.51	−06 02.1	2.447	2.270	+1.56	−7.9	17.9	68.0
Jan. 7	14 09.12	−07 20.9	2.349	2.284	+1.45	−6.9	17.9	74.1
Jan. 17	14 23.60	−08 29.6	2.248	2.300	+1.31	−5.8	17.8	80.5
Jan. 27	14 36.72	−09 27.9	2.146	2.317	+1.15	−4.8	17.7	87.2
Feb. 6	14 48.17	−10 15.5	2.044	2.336	+0.95	−3.7	17.6	94.4
Feb. 16	14 57.66	−10 52.3	1.944	2.357	+0.72	−2.6	17.6	102.0
Feb. 26	15 04.85	−11 18.7	1.848	2.380	+0.46	−1.6	17.5	110.2
Mar. 8	15 09.41	−11 34.9	1.759	2.404	+0.17	−0.7	17.4	119.1
Mar. 18	15 11.14	−11 42.0	1.681	2.429	−0.12	+0.1	17.4	128.5
Mar. 28	15 09.94	−11 40.8	1.616	2.455	−0.40	+0.8	17.3	138.6

Comet P/2005 S3 (Read)

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 1.79040 TT
Peri. = 140.61083 e = 0.4219948
Node = 273.18480 2000.0 a = 4.8799471 AU
Incl. = 3.48917 n = 0.09142846
q = 2.8206348 AU P = 10.78 years

m1 = 2.6 + 5 log(Delta) + 30.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	22 21.88	-07 03.2	3.920	3.419	-0.49	-3.1	21.6	17.8/ 70	53.0
Jan. 13	22 33.11	-06 01.4	3.999	3.386	-0.49	-3.1	21.5	19.0/ 69	45.7
Jan. 23	22 45.00	-04 53.4	4.064	3.354	-0.49	-3.2	21.4	20.0/ 69	38.8
Feb. 2	22 57.44	-03 39.9	4.117	3.322	-0.50	-3.2	21.3	20.9/ 68	32.0
Feb. 12	23 10.34	-02 21.4	4.156	3.291	-0.50	-3.3	21.2	21.6/ 68	25.3
Feb. 22	23 23.64	-00 58.7	4.180	3.260	-0.51	-3.4	21.1	22.2/ 67	18.9
Mar. 3	23 37.25	+00 27.6	4.190	3.230	-0.52	-3.4	21.0	22.7/ 67	12.6
Mar. 13	23 51.15	+01 56.7	4.186	3.201	-0.54	-3.5	20.9	23.0/ 67	6.7
Mar. 23	00 05.26	+03 27.9	4.167	3.172	-0.55	-3.5	20.7	23.3/ 67	2.7
Apr. 2	00 19.57	+05 00.4	4.135	3.144	-0.57	-3.6	20.6	23.5/ 67	6.5
Apr. 12	00 34.04	+06 33.5	4.090	3.117	-0.58	-3.6	20.5	23.6/ 67	12.2
Apr. 22	00 48.63	+08 06.4	4.032	3.091	-0.60	-3.6	20.3	23.6/ 67	17.9
May 2	01 03.32	+09 38.5	3.962	3.066	-0.63	-3.7	20.2	23.6/ 67	23.7
May 12	01 18.07	+11 08.9	3.881	3.042	-0.65	-3.7	20.0	23.4/ 68	29.4
May 22	01 32.83	+12 37.0	3.790	3.018	-0.68	-3.6	19.9	23.1/ 68	35.1
June 1	01 47.56	+14 02.1	3.689	2.996	-0.71	-3.6	19.7	22.8/ 69	40.8
June 11	02 02.21	+15 23.5	3.580	2.975	-0.74	-3.5	19.6	22.3/ 69	46.6
June 21	02 16.69	+16 40.6	3.463	2.955	-0.77	-3.5	19.4	21.6/ 70	52.4
July 1	02 30.92	+17 52.8	3.340	2.937	-0.81	-3.4	19.3	20.8/ 71	58.3
July 11	02 44.78	+18 59.7	3.211	2.919	-0.85	-3.3	19.1	19.8/ 72	64.4
July 21	02 58.13	+20 00.8	3.078	2.903	-0.90	-3.2	18.9	18.7/ 72	70.6
July 31	03 10.81	+20 55.7	2.941	2.888	-0.95	-3.0	18.8	17.2/ 73	77.0
Aug. 10	03 22.62	+21 44.1	2.803	2.875	-1.01	-2.9	18.6	15.5/ 74	83.7
Aug. 20	03 33.33	+22 25.8	2.665	2.863	-1.07	-2.8	18.4	13.4/ 74	90.7
Aug. 30	03 42.67	+23 00.6	2.528	2.852	-1.13	-2.7	18.3	11.0/ 75	98.1
Sept. 9	03 50.36	+23 28.4	2.396	2.843	-1.20	-2.6	18.1	8.2/ 75	106.0
Sept.19	03 56.11	+23 48.9	2.270	2.836	-1.28	-2.6	18.0	5.0/ 75	114.4
Sept.29	03 59.65	+24 01.7	2.153	2.830	-1.36	-2.7	17.8	1.6/ 73	123.3
Oct. 9	04 00.78	+24 06.2	2.049	2.825	-1.44	-2.8	17.7	1.9/257	132.8
Oct. 19	03 59.46	+24 02.1	1.962	2.822	-1.52	-3.0	17.6	5.1/255	143.0
Oct. 29	03 55.86	+23 48.8	1.895	2.821	-1.58	-3.3	17.5	7.8/254	153.8
Nov. 8	03 50.44	+23 26.7	1.853	2.821	-1.62	-3.7	17.5	9.4/252	164.9
Nov. 18	03 43.97	+22 57.2	1.836	2.823	-1.63	-4.0	17.4	9.8/250	175.6
Nov. 28	03 37.37	+22 23.2	1.848	2.826	-1.61	-4.2	17.5	8.7/247	170.9
Dec. 8	03 31.59	+21 48.4	1.887	2.831	-1.56	-4.3	17.5	6.6/242	159.6
Dec. 18	03 27.45	+21 17.1	1.951	2.837	-1.49	-4.3	17.6	3.7/229	148.5
Dec. 28	03 25.43	+20 52.4	2.039	2.845	-1.41	-4.1	17.8	1.7/162	137.8
Jan. 7	03 25.80	+20 36.6	2.146	2.855	-1.33	-3.8	17.9	3.9/ 99	127.6
Jan. 17	03 28.58	+20 30.2	2.268	2.866	-1.25	-3.5	18.1	7.1/ 88	118.1
Jan. 27	03 33.61	+20 32.5	2.402	2.878	-1.18	-3.2	18.3	10.0/ 84	109.0
Feb. 6	03 40.70	+20 42.4	2.544	2.892	-1.11	-2.8	18.5	12.6/ 82	100.6
Feb. 16	03 49.59	+20 58.2	2.691	2.907	-1.05	-2.4	18.7	14.7/ 82	92.5
Feb. 26	04 00.04	+21 17.7	2.840	2.923	-1.00	-2.0	18.8	16.6/ 82	84.9
Mar. 8	04 11.82	+21 39.4	2.989	2.941	-0.95	-1.7	19.0	18.1/ 82	77.6
Mar. 18	04 24.73	+22 01.4	3.136	2.960	-0.91	-1.3	19.2	19.3/ 83	70.7
Mar. 28	04 38.57	+22 22.1	3.280	2.980	-0.88	-1.0	19.4	20.3/ 84	64.0

Comet 288P/(300163) Spacewatch

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 8.29214 TT
Peri. = 281.06558 e = 0.2010767
Node = 83.19050 2000.0 a = 3.0491434 AU
Incl. = 3.24001 n = 0.18511316
q = 2.4360317 AU P = 5.32 years

H = 16.6 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	19 01.64	-23 34.6	3.803	2.821	+1.83	+2.6	21.9	2.5
Jan. 13	19 19.94	-23 08.8	3.782	2.801	+1.83	+3.3	21.9	3.8
Jan. 23	19 38.26	-22 35.4	3.747	2.781	+1.82	+4.1	22.0	9.7
Feb. 2	19 56.51	-21 54.5	3.699	2.762	+1.81	+4.8	22.1	15.5
Feb. 12	20 14.60	-21 06.8	3.638	2.743	+1.79	+5.4	22.1	21.4
Feb. 22	20 32.46	-20 12.8	3.566	2.724	+1.76	+5.9	22.2	27.2
Mar. 3	20 50.02	-19 13.4	3.482	2.705	+1.72	+6.4	22.2	33.0
Mar. 13	21 07.22	-18 09.4	3.389	2.687	+1.68	+6.8	22.2	38.8
Mar. 23	21 23.98	-17 01.7	3.286	2.669	+1.63	+7.0	22.2	44.6
Apr. 2	21 40.26	-15 51.6	3.174	2.651	+1.57	+7.2	22.1	50.4
Apr. 12	21 56.00	-14 40.1	3.056	2.634	+1.51	+7.2	22.1	56.2
Apr. 22	22 11.13	-13 28.5	2.931	2.618	+1.44	+7.0	22.0	62.2
May 2	22 25.57	-12 18.2	2.802	2.601	+1.37	+6.8	21.9	68.2
May 12	22 39.23	-11 10.5	2.669	2.586	+1.28	+6.3	21.9	74.3
May 22	22 52.00	-10 07.0	2.533	2.571	+1.18	+5.8	21.8	80.7
June 1	23 03.75	-09 09.4	2.397	2.556	+1.06	+5.0	21.6	87.2
June 11	23 14.30	-08 19.3	2.261	2.543	+0.92	+4.1	21.5	94.0
June 21	23 23.47	-07 38.7	2.127	2.530	+0.75	+2.9	21.4	101.2
July 1	23 31.01	-07 09.3	1.998	2.517	+0.56	+1.6	21.2	108.8
July 11	23 36.66	-06 52.9	1.876	2.506	+0.35	+0.2	21.0	116.9
July 21	23 40.16	-06 51.0	1.763	2.495	+0.11	-1.3	20.8	125.6
July 31	23 41.30	-07 04.4	1.662	2.485	-0.14	-2.8	20.6	134.9
Aug. 10	23 39.93	-07 32.7	1.577	2.476	-0.38	-4.1	20.3	144.9
Aug. 20	23 36.18	-08 13.5	1.512	2.468	-0.58	-4.9	20.1	155.4
Aug. 30	23 30.40	-09 02.6	1.468	2.460	-0.71	-5.1	19.8	166.1
Sept. 9	23 23.29	-09 53.6	1.450	2.454	-0.74	-4.6	19.6	174.4
Sept.19	23 15.87	-10 39.3	1.457	2.449	-0.67	-3.4	19.8	168.1
Sept.29	23 09.17	-11 13.4	1.489	2.444	-0.50	-1.8	20.0	157.3
Oct. 9	23 04.14	-11 31.3	1.545	2.441	-0.27	0.0	20.2	146.4
Oct. 19	23 01.41	-11 31.1	1.621	2.438	-0.01	+1.8	20.5	136.1
Oct. 29	23 01.26	-11 12.9	1.714	2.437	+0.25	+3.5	20.7	126.3
Nov. 8	23 03.72	-10 38.0	1.820	2.436	+0.49	+5.0	20.9	117.1
Nov. 18	23 08.62	-09 48.2	1.936	2.437	+0.70	+6.3	21.0	108.5
Nov. 28	23 15.66	-08 45.5	2.058	2.438	+0.89	+7.4	21.2	100.4
Dec. 8	23 24.57	-07 31.7	2.185	2.440	+1.05	+8.3	21.4	92.8
Dec. 18	23 35.04	-06 08.6	2.314	2.444	+1.18	+9.1	21.5	85.6
Dec. 28	23 46.81	-04 37.8	2.443	2.448	+1.29	+9.7	21.6	78.7
Jan. 7	23 59.67	-03 00.7	2.570	2.454	+1.38	+10.2	21.7	72.1
Jan. 17	00 13.43	-01 18.9	2.695	2.460	+1.45	+10.5	21.8	65.8
Jan. 27	00 27.94	+00 26.5	2.815	2.467	+1.52	+10.8	21.8	59.6
Feb. 6	00 43.09	+02 14.1	2.929	2.475	+1.57	+10.9	21.9	53.7
Feb. 16	00 58.78	+04 02.7	3.037	2.485	+1.62	+10.8	21.9	47.9
Feb. 26	01 14.93	+05 51.2	3.138	2.494	+1.66	+10.7	21.9	42.2
Mar. 8	01 31.50	+07 38.3	3.230	2.505	+1.69	+10.5	21.9	36.7
Mar. 18	01 48.41	+09 23.0	3.314	2.517	+1.72	+10.1	21.9	31.2
Mar. 28	02 05.65	+11 04.4	3.389	2.529	+1.75	+9.7	21.9	25.9

Comet P/2010 A2 (LINEAR)

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 9.21113 TT
Peri. = 132.88976 e = 0.1245510
Node = 320.22158 2000.0 a = 2.2906389 AU
Incl. = 5.25698 n = 0.28429494
q = 2.0053375 AU P = 3.47 years

H = 21.0 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	22 10.82	-08 55.7	2.830	2.318	-0.74	-5.5	.	26.5/ 68	49.7
Jan. 13	22 27.31	-07 14.8	2.909	2.304	-0.73	-5.5	.	27.4/ 67	43.9
Jan. 23	22 44.23	-05 27.7	2.979	2.290	-0.72	-5.5	.	28.2/ 67	38.3
Feb. 2	23 01.52	-03 35.0	3.040	2.276	-0.72	-5.6	.	28.9/ 66	32.9
Feb. 12	23 19.14	-01 37.6	3.090	2.262	-0.72	-5.6	.	29.5/ 66	27.6
Feb. 22	23 37.05	+00 23.6	3.129	2.248	-0.72	-5.6	.	30.0/ 65	22.5
Mar. 3	23 55.24	+02 27.7	3.159	2.233	-0.73	-5.6	.	30.4/ 65	17.5
Mar. 13	00 13.72	+04 33.8	3.178	2.219	-0.74	-5.6	.	30.8/ 65	12.7
Mar. 23	00 32.49	+06 40.7	3.187	2.205	-0.75	-5.6	.	31.1/ 66	8.1
Apr. 2	00 51.57	+08 47.4	3.187	2.191	-0.77	-5.5	.	31.3/ 66	4.1
Apr. 12	01 10.98	+10 52.8	3.177	2.177	-0.79	-5.4	.	31.5/ 67	3.6
Apr. 22	01 30.75	+12 55.8	3.158	2.164	-0.82	-5.2	.	31.7/ 67	7.1
May 2	01 50.89	+14 55.3	3.130	2.151	-0.85	-5.0	.	31.8/ 68	11.2
May 12	02 11.44	+16 50.1	3.094	2.138	-0.88	-4.8	.	31.9/ 69	15.5
May 22	02 32.40	+18 38.9	3.050	2.125	-0.91	-4.5	.	31.9/ 71	19.7
June 1	02 53.78	+20 20.7	2.999	2.113	-0.95	-4.2	.	31.9/ 72	24.0
June 11	03 15.57	+21 54.4	2.940	2.101	-0.99	-3.8	.	31.8/ 74	28.2
June 21	03 37.72	+23 18.9	2.876	2.090	-1.03	-3.3	.	31.7/ 75	32.4
July 1	04 00.22	+24 33.1	2.805	2.079	-1.08	-2.8	.	31.6/ 77	36.6
July 11	04 22.98	+25 36.3	2.728	2.069	-1.12	-2.2	.	31.3/ 79	40.9
July 21	04 45.89	+26 27.9	2.646	2.059	-1.16	-1.5	.	31.0/ 81	45.2
July 31	05 08.86	+27 07.2	2.558	2.050	-1.21	-0.8	.	30.6/ 84	49.5
Aug. 10	05 31.72	+27 34.4	2.467	2.042	-1.25	0.0	.	30.0/ 86	54.0
Aug. 20	05 54.31	+27 49.3	2.371	2.035	-1.29	+0.8	.	29.4/ 88	58.5
Aug. 30	06 16.47	+27 52.7	2.271	2.028	-1.33	+1.7	.	28.5/ 90	63.3
Sept. 9	06 37.97	+27 45.3	2.168	2.022	-1.37	+2.6	.	27.5/ 92	68.2
Sept.19	06 58.60	+27 28.4	2.062	2.017	-1.42	+3.5	.	26.2/ 94	73.3
Sept.29	07 18.14	+27 03.7	1.953	2.013	-1.46	+4.5	.	24.5/ 96	78.7
Oct. 9	07 36.33	+26 33.1	1.844	2.010	-1.52	+5.5	.	22.5/ 98	84.4
Oct. 19	07 52.88	+25 58.8	1.733	2.007	-1.59	+6.6	25.0	20.1/ 99	90.5
Oct. 29	08 07.48	+25 23.6	1.624	2.006	-1.68	+7.7	24.8	17.0/101	97.1
Nov. 8	08 19.75	+24 50.2	1.516	2.005	-1.78	+8.8	24.7	13.3/102	104.3
Nov. 18	08 29.26	+24 21.4	1.413	2.006	-1.91	+9.9	24.5	8.9/104	112.1
Nov. 28	08 35.57	+23 59.6	1.316	2.007	-2.07	+11.1	24.3	3.8/110	120.6
Dec. 8	08 38.18	+23 46.8	1.228	2.009	-2.26	+12.1	24.0	1.9/259	130.1
Dec. 18	08 36.79	+23 43.0	1.153	2.012	-2.47	+12.9	23.8	7.5/273	140.5
Dec. 28	08 31.35	+23 46.4	1.095	2.016	-2.67	+13.3	23.5	12.3/273	151.8
Jan. 7	08 22.40	+23 52.6	1.058	2.021	-2.84	+13.2	23.2	15.3/272	163.8
Jan. 17	08 11.21	+23 55.8	1.045	2.027	-2.92	+12.5	22.9	16.0/269	175.2
Jan. 27	07 59.58	+23 51.1	1.057	2.033	-2.90	+11.5	23.1	14.0/264	169.7
Feb. 6	07 49.47	+23 36.4	1.094	2.040	-2.78	+10.3	23.4	10.0/257	157.7
Feb. 16	07 42.38	+23 12.5	1.153	2.048	-2.59	+9.3	23.7	5.5/236	146.1
Feb. 26	07 39.06	+22 41.4	1.231	2.057	-2.37	+8.5	24.0	3.7/167	135.4
Mar. 8	07 39.64	+22 05.1	1.324	2.066	-2.14	+7.9	24.3	7.1/125	125.6
Mar. 18	07 43.82	+21 24.5	1.429	2.076	-1.94	+7.5	24.5	11.1/114	116.7
Mar. 28	07 51.06	+20 39.7	1.542	2.087	-1.76	+7.2	24.8	14.6/109	108.6

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

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 9.95244 TT
Peri. = 307.16624 e = 0.6282029
Node = 66.53123 2000.0 a = 3.4618229 AU
Incl. = 4.94122 n = 0.15301951
q = 1.2870957 AU P = 6.44 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	17 04.70	-23 04.1	4.084	3.216	-0.51	+1.2	20.6	20.6/ 97	24.5
Jan. 13	17 19.56	-23 27.0	3.952	3.153	-0.55	+1.1	20.5	20.7/ 96	31.3
Jan. 23	17 34.57	-23 45.3	3.805	3.089	-0.60	+1.0	20.3	20.8/ 94	38.0
Feb. 2	17 49.68	-23 58.8	3.645	3.025	-0.65	+0.8	20.1	20.7/ 93	44.7
Feb. 12	18 04.79	-24 07.7	3.473	2.959	-0.71	+0.6	19.9	20.5/ 92	51.4
Feb. 22	18 19.80	-24 12.0	3.291	2.893	-0.78	+0.3	19.7	20.3/ 91	58.1
Mar. 3	18 34.63	-24 12.3	3.102	2.825	-0.85	+0.1	19.5	19.9/ 90	64.7
Mar. 13	18 49.17	-24 09.2	2.907	2.756	-0.94	-0.3	19.2	19.4/ 89	71.4
Mar. 23	19 03.31	-24 03.2	2.708	2.687	-1.03	-0.7	19.0	18.7/ 88	78.1
Apr. 2	19 16.93	-23 55.6	2.508	2.617	-1.14	-1.1	18.7	17.8/ 88	84.9
Apr. 12	19 29.89	-23 47.5	2.308	2.545	-1.27	-1.7	18.4	16.7/ 88	91.8
Apr. 22	19 42.02	-23 40.5	2.111	2.473	-1.43	-2.3	18.1	15.3/ 89	98.8
May 2	19 53.14	-23 36.3	1.918	2.401	-1.60	-3.0	17.7	13.5/ 91	106.0
May 12	20 03.00	-23 37.4	1.732	2.327	-1.82	-3.8	17.4	11.4/ 95	113.5
May 22	20 11.31	-23 46.1	1.555	2.253	-2.07	-4.7	17.0	9.0/103	121.2
June 1	20 17.74	-24 05.2	1.389	2.179	-2.37	-5.7	16.6	6.5/120	129.4
June 11	20 21.86	-24 37.7	1.236	2.104	-2.72	-6.7	16.2	5.1/159	138.1
June 21	20 23.23	-25 25.6	1.099	2.030	-3.13	-7.5	15.8	6.8/200	147.3
July 1	20 21.48	-26 29.6	0.979	1.955	-3.58	-8.0	15.4	10.3/221	156.9
July 11	20 16.38	-27 47.4	0.878	1.881	-4.05	-7.8	15.0	13.7/231	166.4
July 21	20 08.26	-29 12.5	0.798	1.808	-4.47	-6.6	14.6	15.5/237	171.2
July 31	19 58.12	-30 34.7	0.738	1.737	-4.77	-4.4	14.2	14.9/242	164.2
Aug. 10	19 47.78	-31 42.3	0.698	1.668	-4.89	-1.6	13.9	11.2/246	153.5
Aug. 20	19 39.65	-32 26.6	0.674	1.601	-4.84	+1.1	13.7	5.1/250	142.7
Aug. 30	19 35.85	-32 44.1	0.663	1.538	-4.66	+2.9	13.5	2.7/ 70	132.6
Sept. 9	19 37.89	-32 34.8	0.661	1.479	-4.44	+3.5	13.3	11.3/ 72	123.6
Sept.19	19 46.38	-31 59.3	0.664	1.427	-4.25	+2.8	13.2	19.9/ 73	116.0
Sept.29	20 01.12	-30 56.4	0.671	1.381	-4.12	+1.0	13.0	28.2/ 72	109.7
Oct. 9	20 21.59	-29 22.5	0.679	1.343	-4.05	-2.0	12.9	35.8/ 70	104.7
Oct. 19	20 46.87	-27 13.2	0.689	1.314	-4.02	-5.9	12.9	42.6/ 68	100.9
Oct. 29	21 15.87	-24 24.9	0.703	1.295	-4.01	-10.4	12.9	48.5/ 66	98.1
Nov. 8	21 47.53	-20 56.8	0.722	1.287	-3.98	-15.3	12.9	53.0/ 64	96.2
Nov. 18	22 20.73	-16 52.9	0.748	1.291	-3.92	-19.8	13.0	56.0/ 62	95.0
Nov. 28	22 54.52	-12 22.0	0.785	1.305	-3.83	-23.4	13.1	57.4/ 61	94.2
Dec. 8	23 28.22	-07 36.5	0.834	1.330	-3.69	-25.7	13.3	57.1/ 60	93.6
Dec. 18	00 01.31	-02 50.1	0.897	1.365	-3.51	-26.3	13.6	55.5/ 60	92.9
Dec. 28	00 33.49	+01 45.0	0.975	1.408	-3.32	-25.6	13.9	53.2/ 61	91.9
Jan. 7	01 04.67	+06 00.1	1.067	1.458	-3.11	-23.7	14.3	50.3/ 62	90.6
Jan. 17	01 34.82	+09 49.8	1.174	1.514	-2.90	-21.2	14.7	47.4/ 64	88.7
Jan. 27	02 03.97	+13 11.9	1.293	1.576	-2.69	-18.4	15.0	44.6/ 66	86.4
Feb. 6	02 32.23	+16 06.4	1.425	1.641	-2.48	-15.6	15.4	41.9/ 68	83.7
Feb. 16	02 59.64	+18 34.5	1.567	1.710	-2.29	-12.9	15.8	39.6/ 71	80.6
Feb. 26	03 26.27	+20 38.0	1.718	1.780	-2.10	-10.5	16.2	37.6/ 73	77.1
Mar. 8	03 52.20	+22 18.9	1.875	1.853	-1.93	-8.3	16.5	35.7/ 76	73.3
Mar. 18	04 17.42	+23 39.1	2.038	1.926	-1.77	-6.5	16.9	34.1/ 78	69.3
Mar. 28	04 41.97	+24 40.6	2.204	2.000	-1.62	-4.9	17.2	32.8/ 81	65.1

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

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 11.20383 TT
Peri. = 307.16703 e = 0.6282729
Node = 66.52849 2000.0 a = 3.4619397 AU
Incl. = 4.94036 n = 0.15301177
q = 1.2868968 AU P = 6.44 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	17 04.03	-23 02.5	4.091	3.224	-0.51	+1.2	20.6	20.5/ 97	24.7
Jan. 13	17 18.84	-23 25.6	3.958	3.161	-0.55	+1.1	20.5	20.6/ 96	31.4
Jan. 23	17 33.79	-23 44.0	3.811	3.098	-0.59	+1.0	20.3	20.7/ 95	38.2
Feb. 2	17 48.83	-23 57.8	3.650	3.033	-0.65	+0.8	20.1	20.6/ 93	44.9
Feb. 12	18 03.86	-24 06.9	3.478	2.968	-0.71	+0.6	19.9	20.4/ 92	51.6
Feb. 22	18 18.79	-24 11.6	3.296	2.901	-0.77	+0.4	19.7	20.2/ 91	58.3
Mar. 3	18 33.52	-24 12.3	3.107	2.834	-0.85	+0.1	19.5	19.8/ 90	65.0
Mar. 13	18 47.96	-24 09.5	2.911	2.765	-0.93	-0.3	19.2	19.2/ 89	71.7
Mar. 23	19 01.97	-24 04.1	2.712	2.696	-1.03	-0.6	19.0	18.5/ 88	78.5
Apr. 2	19 15.45	-23 57.1	2.512	2.626	-1.14	-1.1	18.7	17.6/ 88	85.3
Apr. 12	19 28.25	-23 49.6	2.311	2.554	-1.27	-1.6	18.4	16.4/ 88	92.2
Apr. 22	19 40.18	-23 43.4	2.114	2.482	-1.42	-2.2	18.1	15.0/ 89	99.2
May 2	19 51.08	-23 40.2	1.921	2.410	-1.60	-2.9	17.7	13.2/ 91	106.5
May 12	20 00.66	-23 42.3	1.735	2.336	-1.81	-3.7	17.4	11.0/ 96	114.0
May 22	20 08.65	-23 52.1	1.559	2.262	-2.06	-4.6	17.0	8.5/104	121.8
June 1	20 14.70	-24 12.5	1.393	2.188	-2.36	-5.5	16.6	6.0/124	130.1
June 11	20 18.36	-24 46.2	1.240	2.114	-2.71	-6.4	16.2	5.0/167	138.9
June 21	20 19.22	-25 35.2	1.104	2.039	-3.11	-7.1	15.8	7.2/206	148.2
July 1	20 16.89	-26 39.8	0.985	1.964	-3.55	-7.5	15.4	10.8/224	157.9
July 11	20 11.20	-27 57.3	0.885	1.891	-3.99	-7.1	15.0	14.1/233	167.4
July 21	20 02.54	-29 20.9	0.807	1.818	-4.38	-5.8	14.6	15.8/239	171.1
July 31	19 52.01	-30 40.2	0.749	1.746	-4.64	-3.5	14.3	14.9/244	163.3
Aug. 10	19 41.52	-31 44.2	0.711	1.676	-4.73	-0.7	14.0	11.0/248	152.4
Aug. 20	19 33.47	-32 25.2	0.689	1.609	-4.65	+1.8	13.8	4.8/251	141.5
Aug. 30	19 29.90	-32 40.4	0.680	1.546	-4.46	+3.4	13.6	3.1/ 71	131.4
Sept. 9	19 32.22	-32 30.4	0.679	1.486	-4.25	+3.9	13.4	11.6/ 73	122.5
Sept.19	19 40.96	-31 55.8	0.683	1.433	-4.06	+3.2	13.2	20.0/ 73	114.9
Sept.29	19 55.88	-30 55.3	0.690	1.386	-3.94	+1.3	13.1	28.1/ 73	108.6
Oct. 9	20 16.44	-29 25.1	0.698	1.347	-3.88	-1.5	13.0	35.7/ 71	103.6
Oct. 19	20 41.77	-27 20.7	0.709	1.317	-3.87	-5.3	12.9	42.4/ 69	99.7
Oct. 29	21 10.80	-24 38.1	0.722	1.297	-3.86	-9.7	12.9	48.2/ 67	96.9
Nov. 8	21 42.50	-21 16.0	0.741	1.287	-3.85	-14.4	12.9	52.8/ 65	95.0
Nov. 18	22 15.79	-17 17.7	0.766	1.289	-3.81	-18.8	13.0	55.9/ 63	93.7
Nov. 28	22 49.71	-12 51.3	0.801	1.303	-3.73	-22.5	13.2	57.4/ 61	92.9
Dec. 8	23 23.60	-08 08.6	0.849	1.326	-3.61	-24.9	13.4	57.3/ 61	92.3
Dec. 18	23 56.91	-03 22.9	0.910	1.360	-3.45	-25.7	13.6	55.9/ 61	91.7
Dec. 28	00 29.34	+01 13.2	0.986	1.402	-3.27	-25.2	13.9	53.7/ 61	90.8
Jan. 7	01 00.79	+05 30.6	1.076	1.451	-3.07	-23.5	14.3	50.9/ 62	89.5
Jan. 17	01 31.21	+09 23.5	1.181	1.507	-2.87	-21.1	14.6	47.9/ 64	87.7
Jan. 27	02 00.63	+12 49.1	1.299	1.568	-2.67	-18.4	15.0	45.1/ 66	85.5
Feb. 6	02 29.15	+15 47.1	1.429	1.633	-2.47	-15.7	15.4	42.5/ 68	82.9
Feb. 16	02 56.81	+18 18.6	1.570	1.701	-2.28	-13.0	15.8	40.1/ 71	79.8
Feb. 26	03 23.67	+20 25.0	1.719	1.771	-2.10	-10.6	16.2	38.0/ 73	76.4
Mar. 8	03 49.82	+22 08.6	1.876	1.843	-1.93	-8.4	16.5	36.1/ 76	72.7
Mar. 18	04 15.24	+23 31.1	2.038	1.917	-1.77	-6.6	16.9	34.5/ 78	68.8
Mar. 28	04 39.98	+24 34.6	2.203	1.991	-1.62	-5.0	17.2	33.0/ 81	64.6

Comet P/2008 T1 (Boattini)

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 18.30599 TT
Peri. = 35.81301 e = 0.2792910
Node = 291.72770 2000.0 a = 4.2499665 AU
Incl. = 2.07851 n = 0.11249308
q = 3.0629891 AU P = 8.76 years

m1 = 7.8 + 5 log(Delta) + 12.5 log(r(t-100))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ °	Elong. °
Jan. 3	17 58.79	-24 08.3	4.410	3.454	-0.57	-0.2	18.1	21.1/ 90	12.1
Jan. 13	18 14.19	-24 03.6	4.350	3.433	-0.58	-0.5	18.0	21.0/ 88	18.8
Jan. 23	18 29.48	-23 53.5	4.275	3.412	-0.59	-0.7	18.0	20.8/ 86	25.4
Feb. 2	18 44.56	-23 38.0	4.186	3.392	-0.61	-0.9	17.9	20.4/ 85	32.1
Feb. 12	18 59.31	-23 17.6	4.083	3.372	-0.62	-1.2	17.8	19.9/ 84	38.9
Feb. 22	19 13.63	-22 52.7	3.968	3.353	-0.64	-1.4	17.7	19.3/ 82	45.7
Mar. 3	19 27.39	-22 24.0	3.843	3.333	-0.66	-1.7	17.6	18.5/ 81	52.5
Mar. 13	19 40.49	-21 52.3	3.708	3.315	-0.68	-2.0	17.5	17.5/ 79	59.4
Mar. 23	19 52.80	-21 18.5	3.566	3.297	-0.70	-2.2	17.4	16.3/ 78	66.5
Apr. 2	20 04.18	-20 43.7	3.418	3.279	-0.73	-2.5	17.2	14.9/ 77	73.6
Apr. 12	20 14.50	-20 09.0	3.265	3.262	-0.76	-2.8	17.1	13.3/ 76	81.0
Apr. 22	20 23.60	-19 35.6	3.111	3.245	-0.79	-3.1	17.0	11.4/ 75	88.5
May 2	20 31.33	-19 04.9	2.958	3.229	-0.83	-3.4	16.8	9.2/ 73	96.4
May 12	20 37.50	-18 38.1	2.808	3.214	-0.87	-3.7	16.7	6.7/ 71	104.5
May 22	20 41.93	-18 16.7	2.664	3.199	-0.92	-4.0	16.5	3.9/ 68	113.1
June 1	20 44.48	-18 01.5	2.530	3.185	-0.97	-4.3	16.4	1.1/ 44	122.0
June 11	20 45.02	-17 53.6	2.407	3.172	-1.03	-4.5	16.2	2.2/272	131.4
June 21	20 43.51	-17 53.0	2.301	3.159	-1.08	-4.7	16.1	5.0/263	141.3
July 1	20 40.06	-17 59.3	2.215	3.147	-1.13	-4.9	16.0	7.4/260	151.7
July 11	20 34.94	-18 11.4	2.152	3.136	-1.17	-4.9	15.9	9.1/260	162.4
July 21	20 28.66	-18 27.0	2.114	3.125	-1.20	-4.9	15.8	9.8/260	173.4
July 31	20 21.86	-18 43.8	2.103	3.116	-1.21	-4.7	15.8	9.4/260	175.3
Aug. 10	20 15.31	-18 59.5	2.119	3.107	-1.20	-4.5	15.8	8.0/261	164.2
Aug. 20	20 09.77	-19 11.8	2.161	3.098	-1.17	-4.3	15.8	5.6/262	153.2
Aug. 30	20 05.82	-19 19.6	2.227	3.091	-1.13	-4.0	15.9	2.8/265	142.7
Sept. 9	20 03.88	-19 22.0	2.313	3.085	-1.08	-3.8	15.9	0.5/ 47	132.5
Sept.19	20 04.14	-19 18.5	2.416	3.079	-1.02	-3.6	16.0	3.6/ 75	122.9
Sept.29	20 06.60	-19 09.1	2.532	3.074	-0.97	-3.5	16.1	6.6/ 77	113.7
Oct. 9	20 11.15	-18 53.5	2.657	3.070	-0.92	-3.4	16.1	9.4/ 77	104.9
Oct. 19	20 17.62	-18 31.6	2.789	3.067	-0.87	-3.4	16.2	11.9/ 77	96.6
Oct. 29	20 25.75	-18 03.2	2.923	3.065	-0.83	-3.4	16.3	14.1/ 76	88.6
Nov. 8	20 35.34	-17 28.1	3.059	3.063	-0.79	-3.4	16.4	16.0/ 75	81.0
Nov. 18	20 46.14	-16 46.3	3.192	3.063	-0.76	-3.4	16.5	17.7/ 74	73.6
Nov. 28	20 57.94	-15 57.8	3.322	3.063	-0.73	-3.4	16.5	19.1/ 74	66.4
Dec. 8	21 10.55	-15 02.6	3.446	3.065	-0.70	-3.5	16.6	20.2/ 73	59.5
Dec. 18	21 23.81	-14 01.1	3.562	3.067	-0.67	-3.5	16.7	21.2/ 72	52.7
Dec. 28	21 37.55	-12 53.4	3.670	3.070	-0.65	-3.6	16.7	21.9/ 71	46.0
Jan. 7	21 51.67	-11 40.2	3.769	3.074	-0.63	-3.6	16.8	22.6/ 70	39.5
Jan. 17	22 06.04	-10 21.9	3.856	3.079	-0.61	-3.7	16.8	23.0/ 69	33.0
Jan. 27	22 20.57	-08 59.1	3.932	3.084	-0.60	-3.7	16.9	23.4/ 69	26.7
Feb. 6	22 35.20	-07 32.4	3.995	3.091	-0.59	-3.7	16.9	23.6/ 68	20.5
Feb. 16	22 49.84	-06 02.8	4.046	3.098	-0.58	-3.8	16.9	23.7/ 67	14.3
Feb. 26	23 04.46	-04 30.8	4.083	3.106	-0.57	-3.8	16.9	23.7/ 67	8.2
Mar. 8	23 19.00	-02 57.2	4.106	3.115	-0.56	-3.8	16.9	23.6/ 66	2.4
Mar. 18	23 33.41	-01 22.8	4.116	3.125	-0.55	-3.7	17.0	23.4/ 66	4.2
Mar. 28	23 47.67	+00 11.6	4.113	3.135	-0.55	-3.7	17.0	23.1/ 66	10.1

Comet P/2008 J3 (McNaught)

Epoch = 2016 July 31.0 TT
T = 2016 Nov. 22.91557 TT
Peri. = 4.56742 e = 0.4105806
Node = 9.81017 2000.0 a = 3.9054517 AU
Incl. = 25.35077 n = 0.12770184
q = 2.3019490 AU P = 7.72 years

m1 = 9.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ °	Elong. °
Jan. 3	19 27.43	-41 21.6	4.067	3.161	-0.71	-2.1	20.1	23.2/ 79	19.9
Jan. 13	19 47.36	-40 30.3	4.035	3.122	-0.71	-2.6	20.0	23.5/ 78	19.0
Jan. 23	20 07.24	-39 33.2	3.989	3.083	-0.71	-3.2	19.9	23.8/ 76	20.0
Feb. 2	20 26.98	-38 30.6	3.931	3.044	-0.71	-3.8	19.8	24.0/ 75	22.5
Feb. 12	20 46.49	-37 22.7	3.860	3.005	-0.71	-4.4	19.7	24.2/ 74	26.1
Feb. 22	21 05.67	-36 10.3	3.778	2.967	-0.71	-5.0	19.6	24.2/ 73	30.4
Mar. 3	21 24.46	-34 53.7	3.685	2.929	-0.71	-5.6	19.4	24.1/ 72	35.1
Mar. 13	21 42.81	-33 34.0	3.582	2.892	-0.71	-6.3	19.3	23.9/ 71	40.0
Mar. 23	22 00.65	-32 11.8	3.470	2.854	-0.71	-6.9	19.1	23.7/ 70	45.0
Apr. 2	22 17.95	-30 48.1	3.350	2.818	-0.71	-7.6	19.0	23.3/ 70	50.2
Apr. 12	22 34.66	-29 23.9	3.224	2.782	-0.71	-8.3	18.8	22.7/ 69	55.5
Apr. 22	22 50.71	-28 00.2	3.092	2.746	-0.72	-9.1	18.6	22.0/ 69	60.9
May 2	23 06.06	-26 37.8	2.954	2.711	-0.73	-9.9	18.5	21.2/ 69	66.3
May 12	23 20.62	-25 18.0	2.813	2.677	-0.74	-10.7	18.3	20.1/ 68	71.9
May 22	23 34.29	-24 01.7	2.670	2.644	-0.76	-11.7	18.1	18.9/ 68	77.6
June 1	23 46.95	-22 49.8	2.525	2.612	-0.78	-12.6	17.9	17.3/ 68	83.5
June 11	23 58.44	-21 43.3	2.379	2.581	-0.81	-13.7	17.7	15.4/ 67	89.7
June 21	00 08.55	-20 42.8	2.235	2.551	-0.86	-14.8	17.4	13.1/ 66	96.1
July 1	00 17.04	-19 49.0	2.094	2.523	-0.91	-16.1	17.2	10.4/ 64	102.9
July 11	00 23.61	-19 02.2	1.957	2.495	-0.97	-17.4	17.0	7.3/ 57	110.1
July 21	00 27.92	-18 21.7	1.827	2.469	-1.05	-18.8	16.8	4.3/ 34	117.8
July 31	00 29.60	-17 46.5	1.706	2.445	-1.14	-20.2	16.6	3.7/330	126.0
Aug. 10	00 28.33	-17 14.4	1.598	2.422	-1.24	-21.6	16.4	7.1/297	134.9
Aug. 20	00 23.91	-16 41.4	1.505	2.401	-1.34	-22.8	16.2	11.4/289	144.4
Aug. 30	00 16.44	-16 02.9	1.433	2.382	-1.44	-23.7	16.0	15.3/289	154.1
Sept. 9	00 06.39	-15 13.1	1.383	2.365	-1.51	-24.3	15.9	18.1/291	163.1
Sept.19	23 54.78	-14 07.4	1.359	2.349	-1.53	-24.4	15.8	19.2/295	167.2
Sept.29	23 42.95	-12 43.8	1.363	2.336	-1.52	-24.1	15.8	18.6/303	162.0
Oct. 9	23 32.31	-11 03.2	1.393	2.325	-1.45	-23.4	15.8	16.7/313	152.4
Oct. 19	23 24.03	-09 09.0	1.448	2.316	-1.36	-22.5	15.9	14.6/328	142.1
Oct. 29	23 18.76	-07 05.5	1.524	2.309	-1.25	-21.5	16.0	13.3/347	131.9
Nov. 8	23 16.72	-04 56.3	1.617	2.305	-1.15	-20.5	16.1	13.4/ 7	122.3
Nov. 18	23 17.79	-02 43.6	1.724	2.302	-1.05	-19.4	16.2	14.7/ 23	113.4
Nov. 28	23 21.67	-00 28.9	1.840	2.302	-0.97	-18.4	16.4	16.6/ 35	105.0
Dec. 8	23 27.99	+01 47.3	1.963	2.305	-0.90	-17.4	16.5	18.6/ 42	97.2
Dec. 18	23 36.40	+04 04.8	2.090	2.309	-0.84	-16.5	16.7	20.5/ 47	89.9
Dec. 28	23 46.55	+06 23.3	2.219	2.316	-0.80	-15.6	16.8	22.2/ 51	83.1
Jan. 7	23 58.20	+08 42.8	2.347	2.325	-0.76	-14.8	16.9	23.7/ 53	76.6
Jan. 17	00 11.10	+11 03.0	2.475	2.336	-0.74	-14.0	17.1	24.9/ 55	70.4
Jan. 27	00 25.10	+13 23.4	2.599	2.350	-0.73	-13.3	17.2	25.8/ 57	64.5
Feb. 6	00 40.05	+15 43.6	2.719	2.365	-0.72	-12.6	17.4	26.6/ 58	58.9
Feb. 16	00 55.85	+18 02.7	2.835	2.382	-0.72	-11.9	17.5	27.2/ 59	53.4
Feb. 26	01 12.42	+20 20.1	2.945	2.402	-0.72	-11.2	17.7	27.7/ 60	48.2
Mar. 8	01 29.72	+22 35.0	3.049	2.423	-0.73	-10.5	17.8	28.0/ 61	43.2
Mar. 18	01 47.69	+24 46.4	3.146	2.445	-0.74	-9.9	17.9	28.2/ 62	38.4
Mar. 28	02 06.30	+26 53.3	3.236	2.470	-0.75	-9.2	18.0	28.2/ 63	33.8

Comet 315P/LONEOS

Epoch = 2016 July 31.0 TT
T = 2016 Dec. 6.81715 TT
Peri. = 67.18388 e = 0.5171452
Node = 69.55305 2000.0 a = 5.0127929 AU
Incl. = 17.91521 n = 0.08781818
q = 2.4204511 AU P = 11.22 years

m1 = 4.6 + 5 log(Delta) + 22.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	02 34.92	+08 52.8	2.913	3.475	−0.03	+4.9	19.1	117.2
Jan. 13	02 34.63	+09 41.9	3.005	3.429	+0.17	+5.7	19.0	107.3
Jan. 23	02 36.38	+10 38.6	3.104	3.383	+0.37	+6.3	19.0	97.9
Feb. 2	02 40.06	+11 41.7	3.207	3.337	+0.55	+6.8	18.9	88.9
Feb. 12	02 45.55	+12 50.0	3.308	3.292	+0.71	+7.2	18.8	80.4
Feb. 22	02 52.69	+14 02.3	3.406	3.247	+0.86	+7.5	18.8	72.4
Mar. 3	03 01.34	+15 17.3	3.498	3.202	+1.00	+7.7	18.7	64.7
Mar. 13	03 11.37	+16 34.0	3.581	3.158	+1.13	+7.7	18.6	57.3
Mar. 23	03 22.65	+17 51.2	3.654	3.114	+1.24	+7.7	18.5	50.3
Apr. 2	03 35.08	+19 07.9	3.716	3.071	+1.35	+7.5	18.4	43.6
Apr. 12	03 48.57	+20 23.1	3.766	3.028	+1.45	+7.3	18.3	37.1
Apr. 22	04 03.05	+21 36.0	3.803	2.986	+1.54	+7.0	18.2	30.9
May 2	04 18.44	+22 45.6	3.828	2.945	+1.63	+6.5	18.1	24.9
May 12	04 34.70	+23 51.0	3.840	2.904	+1.71	+6.0	17.9	19.2
May 22	04 51.75	+24 51.4	3.839	2.865	+1.78	+5.5	17.8	13.6
June 1	05 09.55	+25 46.1	3.826	2.827	+1.85	+4.8	17.7	8.4
June 11	05 28.04	+26 34.4	3.801	2.789	+1.91	+4.1	17.5	4.2
June 21	05 47.15	+27 15.6	3.765	2.753	+1.97	+3.4	17.4	4.7
July 1	06 06.82	+27 49.3	3.718	2.718	+2.02	+2.6	17.2	9.0
July 11	06 26.97	+28 15.0	3.661	2.685	+2.05	+1.8	17.1	13.8
July 21	06 47.51	+28 32.6	3.595	2.653	+2.09	+0.9	16.9	18.8
July 31	07 08.38	+28 42.0	3.520	2.623	+2.11	+0.1	16.8	23.7
Aug. 10	07 29.46	+28 43.3	3.438	2.594	+2.12	−0.6	16.6	28.7
Aug. 20	07 50.66	+28 36.8	3.348	2.568	+2.12	−1.4	16.4	33.7
Aug. 30	08 11.89	+28 23.2	3.252	2.543	+2.12	−2.0	16.3	38.6
Sept. 9	08 33.05	+28 03.3	3.151	2.520	+2.10	−2.5	16.1	43.7
Sept.19	08 54.01	+27 38.2	3.045	2.499	+2.07	−2.9	16.0	48.8
Sept.29	09 14.70	+27 09.3	2.935	2.481	+2.03	−3.1	15.8	53.9
Oct. 9	09 35.00	+26 38.2	2.822	2.465	+1.98	−3.1	15.7	59.2
Oct. 19	09 54.80	+26 06.8	2.707	2.451	+1.92	−3.0	15.5	64.6
Oct. 29	10 13.98	+25 37.1	2.590	2.440	+1.84	−2.6	15.4	70.2
Nov. 8	10 32.39	+25 11.4	2.473	2.431	+1.75	−1.9	15.2	76.0
Nov. 18	10 49.87	+24 52.3	2.357	2.425	+1.64	−1.0	15.1	82.0
Nov. 28	11 06.25	+24 42.0	2.243	2.421	+1.50	+0.1	15.0	88.2
Dec. 8	11 21.29	+24 43.1	2.131	2.420	+1.34	+1.4	14.9	94.7
Dec. 18	11 34.72	+24 57.5	2.025	2.422	+1.15	+2.9	14.8	101.5
Dec. 28	11 46.24	+25 26.8	1.925	2.426	+0.93	+4.5	14.7	108.7
Jan. 7	11 55.50	+26 11.5	1.834	2.433	+0.67	+5.9	14.6	116.1
Jan. 17	12 02.16	+27 10.3	1.754	2.442	+0.38	+7.0	14.5	123.8
Jan. 27	12 05.93	+28 20.1	1.688	2.454	+0.07	+7.5	14.5	131.6
Feb. 6	12 06.62	+29 34.7	1.638	2.469	−0.23	+7.1	14.5	139.0
Feb. 16	12 04.33	+30 45.8	1.607	2.485	−0.49	+5.8	14.5	145.6
Feb. 26	11 59.48	+31 43.8	1.597	2.504	−0.66	+3.5	14.6	150.0
Mar. 8	11 52.88	+32 19.1	1.610	2.525	−0.72	+0.6	14.7	151.2
Mar. 18	11 45.64	+32 25.5	1.646	2.548	−0.67	−2.5	14.8	148.6
Mar. 28	11 38.90	+32 00.7	1.703	2.574	−0.53	−5.4	15.0	143.3

Comet C/2014 OE4 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2016 Dec. 10.65726 TT
Peri. = 65.73405
Node = 240.40253 2000.0
Incl. = 81.35049
q = 6.2444208 AU
e = 0.9993016

m1 = 3.6 + 5 log(Delta) + 12.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	16 58.27	+09 42.1	7.358	6.670	+0.59	+5.6	18.2	42.8
Jan. 13	17 04.16	+10 37.9	7.249	6.647	+0.55	+6.5	18.2	49.1
Jan. 23	17 09.70	+11 42.4	7.125	6.624	+0.51	+7.3	18.1	55.9
Feb. 2	17 14.80	+12 55.8	6.990	6.601	+0.45	+8.2	18.1	63.0
Feb. 12	17 19.34	+14 18.1	6.847	6.580	+0.38	+9.1	18.0	70.3
Feb. 22	17 23.18	+15 48.8	6.700	6.559	+0.30	+9.9	17.9	77.6
Mar. 3	17 26.22	+17 27.4	6.552	6.538	+0.21	+10.5	17.9	84.9
Mar. 13	17 28.35	+19 12.8	6.407	6.518	+0.11	+11.1	17.8	92.0
Mar. 23	17 29.45	+21 03.6	6.269	6.499	0.00	+11.4	17.7	98.9
Apr. 2	17 29.46	+22 57.8	6.142	6.481	−0.12	+11.5	17.7	105.5
Apr. 12	17 28.30	+24 53.1	6.029	6.463	−0.23	+11.4	17.6	111.4
Apr. 22	17 25.96	+26 46.7	5.933	6.445	−0.35	+10.9	17.6	116.5
May 2	17 22.48	+28 35.5	5.856	6.429	−0.45	+10.1	17.5	120.6
May 12	17 17.96	+30 16.4	5.801	6.413	−0.54	+9.0	17.5	123.4
May 22	17 12.56	+31 46.4	5.767	6.398	−0.60	+7.7	17.5	124.7
June 1	17 06.55	+33 03.2	5.755	6.383	−0.64	+6.2	17.5	124.4
June 11	17 00.19	+34 04.9	5.763	6.369	−0.63	+4.6	17.5	122.7
June 21	16 53.85	+34 50.7	5.791	6.356	−0.60	+3.0	17.5	119.7
July 1	16 47.84	+35 21.0	5.836	6.344	−0.54	+1.6	17.5	115.7
July 11	16 42.47	+35 36.6	5.895	6.332	−0.45	+0.3	17.5	111.0
July 21	16 38.00	+35 39.4	5.966	6.321	−0.34	−0.8	17.5	105.9
July 31	16 34.60	+35 31.4	6.045	6.311	−0.22	−1.6	17.5	100.6
Aug. 10	16 32.41	+35 15.1	6.129	6.301	−0.09	−2.2	17.5	95.1
Aug. 20	16 31.48	+34 53.0	6.216	6.292	+0.03	−2.6	17.6	89.7
Aug. 30	16 31.80	+34 27.4	6.302	6.284	+0.15	−2.7	17.6	84.4
Sept. 9	16 33.34	+34 00.6	6.384	6.277	+0.27	−2.6	17.6	79.4
Sept.19	16 36.04	+33 34.5	6.462	6.270	+0.38	−2.4	17.6	74.6
Sept.29	16 39.82	+33 10.8	6.532	6.264	+0.48	−2.0	17.6	70.2
Oct. 9	16 44.59	+32 51.2	6.593	6.259	+0.57	−1.4	17.7	66.3
Oct. 19	16 50.25	+32 37.2	6.645	6.255	+0.64	−0.7	17.7	62.9
Oct. 29	16 56.69	+32 29.7	6.685	6.251	+0.71	0.0	17.7	60.2
Nov. 8	17 03.83	+32 30.0	6.714	6.248	+0.77	+0.9	17.7	58.2
Nov. 18	17 11.55	+32 39.0	6.732	6.246	+0.82	+1.8	17.7	56.9
Nov. 28	17 19.77	+32 57.5	6.738	6.245	+0.86	+2.9	17.7	56.3
Dec. 8	17 28.37	+33 26.1	6.733	6.244	+0.89	+3.9	17.7	56.6
Dec. 18	17 37.25	+34 05.2	6.718	6.245	+0.91	+5.0	17.7	57.5
Dec. 28	17 46.31	+34 55.3	6.694	6.246	+0.91	+6.1	17.7	59.0
Jan. 7	17 55.44	+35 56.5	6.663	6.247	+0.91	+7.2	17.7	61.1
Jan. 17	18 04.52	+37 08.6	6.625	6.250	+0.89	+8.3	17.7	63.6
Jan. 27	18 13.46	+38 31.4	6.583	6.253	+0.87	+9.3	17.6	66.3
Feb. 6	18 22.11	+40 04.5	6.539	6.257	+0.82	+10.2	17.6	69.2
Feb. 16	18 30.35	+41 47.0	6.493	6.262	+0.77	+11.1	17.6	72.2
Feb. 26	18 38.05	+43 37.8	6.448	6.267	+0.70	+11.8	17.6	75.1
Mar. 8	18 45.06	+45 35.8	6.405	6.273	+0.62	+12.3	17.6	77.9
Mar. 18	18 51.23	+47 39.3	6.366	6.280	+0.52	+12.7	17.6	80.6
Mar. 28	18 56.39	+49 46.5	6.331	6.288	+0.40	+12.9	17.6	83.0

Comet 89P/Russell

Epoch = 2016 July 31.0 TT
T = 2016 Dec. 14.67067 TT
Peri. = 250.14286 e = 0.4080084
Node = 41.44516 2000.0 a = 3.7509291 AU
Incl. = 12.07655 n = 0.13567374
q = 2.2205185 AU P = 7.26 years

m1 = 8.4 + 5 log(Delta) + 20.0 log(r(t-50))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	14 17.96	-09 12.1	3.460	3.198	+1.03	-6.1	21.7	66.6
Jan. 13	14 28.22	-10 13.4	3.285	3.159	+0.95	-5.6	21.5	74.0
Jan. 23	14 37.69	-11 09.8	3.106	3.119	+0.85	-5.1	21.3	81.6
Feb. 2	14 46.19	-12 01.1	2.926	3.079	+0.73	-4.6	21.0	89.5
Feb. 12	14 53.46	-12 47.3	2.745	3.040	+0.58	-4.1	20.8	97.7
Feb. 22	14 59.22	-13 28.4	2.569	3.000	+0.40	-3.6	20.5	106.3
Mar. 3	15 03.21	-14 04.3	2.399	2.961	+0.19	-3.1	20.3	115.2
Mar. 13	15 05.13	-14 35.2	2.240	2.922	-0.04	-2.6	20.0	124.6
Mar. 23	15 04.74	-15 01.0	2.095	2.883	-0.28	-2.1	19.8	134.5
Apr. 2	15 01.92	-15 21.9	1.967	2.844	-0.52	-1.6	19.5	145.0
Apr. 12	14 56.71	-15 38.1	1.860	2.806	-0.73	-1.2	19.3	156.0
Apr. 22	14 49.45	-15 49.9	1.778	2.768	-0.87	-0.8	19.1	167.4
May 2	14 40.78	-15 58.3	1.723	2.730	-0.92	-0.7	18.9	179.0
May 12	14 31.61	-16 05.1	1.695	2.694	-0.86	-0.8	18.7	169.1
May 22	14 23.00	-16 13.0	1.693	2.657	-0.71	-1.2	18.6	157.6
June 1	14 15.87	-16 24.7	1.717	2.622	-0.49	-1.8	18.5	146.4
June 11	14 10.96	-16 43.1	1.761	2.587	-0.23	-2.7	18.5	135.8
June 21	14 08.69	-17 10.0	1.821	2.554	+0.05	-3.6	18.4	125.9
July 1	14 09.20	-17 46.3	1.895	2.521	+0.33	-4.6	18.4	116.7
July 11	14 12.45	-18 32.2	1.978	2.490	+0.59	-5.5	18.4	108.2
July 21	14 18.30	-19 26.7	2.066	2.459	+0.82	-6.2	18.3	100.3
July 31	14 26.54	-20 28.7	2.157	2.430	+1.04	-6.8	18.3	92.9
Aug. 10	14 36.98	-21 36.7	2.249	2.403	+1.25	-7.2	18.3	86.1
Aug. 20	14 49.44	-22 48.8	2.341	2.377	+1.43	-7.4	18.3	79.6
Aug. 30	15 03.73	-24 03.1	2.430	2.353	+1.60	-7.5	18.3	73.6
Sept. 9	15 19.76	-25 17.7	2.516	2.330	+1.76	-7.3	18.2	67.8
Sept.19	15 37.37	-26 30.4	2.599	2.309	+1.91	-6.9	18.2	62.3
Sept.29	15 56.46	-27 39.2	2.677	2.290	+2.05	-6.3	18.2	57.0
Oct. 9	16 16.93	-28 41.9	2.751	2.274	+2.17	-5.5	18.1	51.9
Oct. 19	16 38.66	-29 36.6	2.819	2.259	+2.28	-4.5	18.1	46.9
Oct. 29	17 01.49	-30 21.3	2.883	2.247	+2.38	-3.3	18.0	42.1
Nov. 8	17 25.30	-30 54.1	2.942	2.237	+2.46	-2.0	18.0	37.4
Nov. 18	17 49.87	-31 13.7	2.995	2.229	+2.51	-0.5	18.0	32.8
Nov. 28	18 15.02	-31 18.8	3.043	2.224	+2.55	+1.0	18.0	28.3
Dec. 8	18 40.53	-31 08.8	3.085	2.221	+2.56	+2.5	17.9	24.0
Dec. 18	19 06.17	-30 43.5	3.122	2.221	+2.56	+4.0	17.9	19.7
Dec. 28	19 31.72	-30 03.0	3.153	2.223	+2.53	+5.5	17.9	15.7
Jan. 7	19 57.01	-29 08.1	3.179	2.227	+2.48	+6.8	17.9	12.1
Jan. 17	20 21.84	-27 59.9	3.199	2.234	+2.43	+8.0	17.9	9.4
Jan. 27	20 46.09	-26 39.8	3.213	2.243	+2.36	+9.0	17.9	8.4
Feb. 6	21 09.67	-25 09.6	3.221	2.255	+2.28	+9.9	17.9	9.7
Feb. 16	21 32.49	-23 30.9	3.222	2.269	+2.20	+10.5	17.9	12.6
Feb. 26	21 54.53	-21 45.7	3.218	2.285	+2.12	+11.0	17.9	16.4
Mar. 8	22 15.76	-19 55.8	3.206	2.303	+2.04	+11.3	17.9	20.5
Mar. 18	22 36.17	-18 03.2	3.187	2.323	+1.96	+11.4	17.9	24.9
Mar. 28	22 55.77	-16 09.4	3.162	2.345	+1.88	+11.3	18.0	29.5

Comet 45P/Honda-Mrkos-Pajdusakova

Epoch = 2016 July 31.0 TT
T = 2016 Dec. 31.45625 TT
Peri. = 326.27122 e = 0.8239403
Node = 89.00815 2000.0 a = 3.0246348 AU
Incl. = 4.24967 n = 0.18736767
q = 0.5325163 AU P = 5.26 years

m1 = 14.0 + 5 log(Delta) + 20.0 log(r(t-10))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	17 31.80	-22 40.9	4.876	3.954	+1.08	-0.8	.	18.3
Jan. 13	17 42.65	-22 48.7	4.756	3.896	+1.08	-0.5	.	26.0
Jan. 23	17 53.40	-22 53.7	4.615	3.836	+1.06	-0.2	.	33.7
Feb. 2	18 03.97	-22 55.9	4.456	3.774	+1.02	0.0	.	41.4
Feb. 12	18 14.21	-22 55.6	4.280	3.711	+0.98	+0.2	.	49.2
Feb. 22	18 24.00	-22 53.1	4.089	3.647	+0.92	+0.4	.	57.0
Mar. 3	18 33.20	-22 49.0	3.885	3.580	+0.84	+0.5	.	65.0
Mar. 13	18 41.63	-22 43.8	3.671	3.512	+0.75	+0.5	.	73.0
Mar. 23	18 49.09	-22 38.3	3.450	3.443	+0.63	+0.5	.	81.3
Apr. 2	18 55.39	-22 33.4	3.225	3.371	+0.49	+0.3	.	89.7
Apr. 12	19 00.26	-22 30.1	2.999	3.298	+0.31	+0.1	.	98.4
Apr. 22	19 03.40	-22 29.5	2.775	3.222	+0.11	-0.3	.	107.5
May 2	19 04.48	-22 32.6	2.557	3.145	-0.14	-0.8	.	116.9
May 12	19 03.13	-22 40.3	2.350	3.066	-0.42	-1.3	.	126.9
May 22	18 58.96	-22 53.1	2.158	2.984	-0.73	-1.7	.	137.6
June 1	18 51.68	-23 10.5	1.985	2.901	-1.05	-2.1	.	148.9
June 11	18 41.13	-23 31.0	1.835	2.815	-1.36	-2.1	.	160.9
June 21	18 27.55	-23 52.0	1.714	2.726	-1.59	-1.8	.	173.5
July 1	18 11.64	-24 09.9	1.623	2.635	-1.70	-1.2	.	173.2
July 11	17 54.60	-24 21.6	1.563	2.541	-1.66	-0.5	.	159.8
July 21	17 38.05	-24 26.2	1.532	2.445	-1.46	+0.1	23.0	146.5
July 31	17 23.50	-24 25.1	1.526	2.345	-1.14	+0.3	22.7	133.7
Aug. 10	17 12.14	-24 21.6	1.539	2.242	-0.75	+0.2	22.3	121.5
Aug. 20	17 04.65	-24 19.3	1.564	2.136	-0.35	-0.1	22.0	110.2
Aug. 30	17 01.20	-24 20.7	1.594	2.027	+0.05	-0.6	21.6	99.8
Sept. 9	17 01.74	-24 27.0	1.622	1.913	+0.43	-1.1	21.2	90.2
Sept.19	17 06.05	-24 38.1	1.644	1.796	+0.79	-1.5	20.7	81.5
Sept.29	17 13.90	-24 52.8	1.656	1.674	+1.12	-1.6	20.2	73.5
Oct. 9	17 25.14	-25 09.2	1.652	1.548	+1.45	-1.5	19.6	66.2
Oct. 19	17 39.66	-25 24.6	1.631	1.418	+1.78	-1.1	18.9	59.6
Oct. 29	17 57.45	-25 35.9	1.590	1.282	+2.12	-0.3	18.0	53.7
Nov. 8	18 18.65	-25 38.9	1.527	1.143	+2.47	+1.1	17.1	48.5
Nov. 18	18 43.40	-25 28.0	1.438	1.000	+2.85	+3.2	16.0	44.0
Nov. 28	19 11.86	-24 56.1	1.322	0.857	+3.20	+6.2	14.6	40.4
Dec. 8	19 43.91	-23 54.1	1.176	0.720	+3.42	+10.1	13.0	37.6
Dec. 18	20 18.10	-22 13.1	0.996	0.604	+3.17	+14.0	11.1	35.5
Dec. 28	20 49.84	-19 53.0	0.787	0.538	+2.05	+16.3	9.1	33.0
Jan. 7	21 10.31	-17 10.5	0.572	0.550	+0.15	+18.4	7.4	28.2
Jan. 17	21 11.79	-14 06.2	0.383	0.636	-2.39	+30.1	6.7	19.4
Jan. 27	20 47.86	-09 05.0	0.229	0.761	-8.95	+91.7	6.9	9.8
Feb. 6	19 18.41	+06 12.4	0.110	0.901	-32.20	168.5	6.8	36.9
Feb. 16	13 56.40	+34 17.1	0.100	1.044	-14.78	-34.6	8.1	121.9
Feb. 26	11 28.56	+28 30.7	0.210	1.186	-3.81	-24.0	11.0	156.8
Mar. 8	10 50.43	+24 31.1	0.348	1.325	-1.42	-15.0	13.2	159.7
Mar. 18	10 36.26	+22 01.4	0.502	1.458	-0.48	-11.4	14.9	152.4
Mar. 28	10 31.44	+20 07.0	0.670	1.587	+0.03	-9.9	16.4	143.6

Comet 128P-B/Shoemaker-Holt

Epoch = 2016 July 31.0 TT
T = 2017 Jan. 10.78957 TT
Peri. = 210.58143 e = 0.3213150
Node = 214.29183 2000.0 a = 4.5025900 AU
Incl. = 4.36432 n = 0.10315979
q = 3.0558403 AU P = 9.55 years

m1 = 5.0 + 5 log(Delta) + 22.5 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	22 47.63	-04 58.1	4.035	3.639	+0.99	+5.1	20.9	59.7
Jan. 13	22 57.50	-04 07.3	4.133	3.613	+1.06	+5.7	20.8	52.1
Jan. 23	23 08.08	-03 10.4	4.220	3.587	+1.12	+6.2	20.8	44.7
Feb. 2	23 19.27	-02 08.1	4.293	3.562	+1.17	+6.7	20.8	37.5
Feb. 12	23 30.96	-01 01.1	4.352	3.537	+1.21	+7.1	20.7	30.5
Feb. 22	23 43.07	+00 09.8	4.396	3.513	+1.25	+7.4	20.7	23.7
Mar. 3	23 55.53	+01 23.7	4.425	3.489	+1.27	+7.6	20.6	17.0
Mar. 13	00 08.28	+02 39.9	4.438	3.465	+1.30	+7.8	20.6	10.5
Mar. 23	00 21.26	+03 57.6	4.435	3.441	+1.32	+7.8	20.5	4.2
Apr. 2	00 34.41	+05 16.1	4.417	3.419	+1.33	+7.9	20.4	2.9
Apr. 12	00 47.71	+06 34.6	4.383	3.396	+1.34	+7.8	20.4	8.9
Apr. 22	01 01.09	+07 52.4	4.335	3.374	+1.34	+7.6	20.3	15.0
May 2	01 14.53	+09 08.7	4.273	3.353	+1.34	+7.4	20.2	21.2
May 12	01 27.98	+10 22.9	4.197	3.332	+1.34	+7.1	20.1	27.3
May 22	01 41.37	+11 34.4	4.109	3.311	+1.33	+6.8	20.0	33.4
June 1	01 54.66	+12 42.4	4.009	3.291	+1.31	+6.4	19.8	39.6
June 11	02 07.77	+13 46.4	3.898	3.272	+1.29	+5.9	19.7	45.8
June 21	02 20.62	+14 45.8	3.778	3.254	+1.25	+5.4	19.6	52.1
July 1	02 33.12	+15 40.0	3.649	3.236	+1.20	+4.9	19.5	58.5
July 11	02 45.14	+16 28.6	3.513	3.219	+1.14	+4.2	19.3	65.0
July 21	02 56.54	+17 11.1	3.372	3.202	+1.06	+3.6	19.2	71.7
July 31	03 07.17	+17 47.1	3.226	3.187	+0.97	+2.9	19.0	78.7
Aug. 10	03 16.83	+18 16.3	3.078	3.172	+0.85	+2.2	18.9	85.9
Aug. 20	03 25.30	+18 38.2	2.930	3.158	+0.71	+1.4	18.7	93.5
Aug. 30	03 32.36	+18 52.6	2.784	3.144	+0.54	+0.7	18.5	101.5
Sept. 9	03 37.75	+18 59.2	2.643	3.132	+0.35	-0.1	18.4	109.9
Sept.19	03 41.25	+18 57.8	2.509	3.120	+0.14	-1.0	18.2	118.8
Sept.29	03 42.68	+18 48.3	2.388	3.110	-0.08	-1.8	18.1	128.3
Oct. 9	03 41.92	+18 30.6	2.281	3.100	-0.29	-2.5	17.9	138.4
Oct. 19	03 39.07	+18 05.3	2.194	3.091	-0.47	-3.2	17.8	149.0
Oct. 29	03 34.40	+17 33.3	2.130	3.083	-0.60	-3.7	17.7	160.2
Nov. 8	03 28.41	+16 56.6	2.093	3.076	-0.66	-3.8	17.7	171.6
Nov. 18	03 21.85	+16 18.2	2.084	3.071	-0.63	-3.6	17.6	175.9
Nov. 28	03 15.53	+15 41.7	2.103	3.066	-0.53	-3.1	17.6	164.6
Dec. 8	03 10.22	+15 10.8	2.151	3.062	-0.37	-2.2	17.6	153.1
Dec. 18	03 06.56	+14 48.4	2.223	3.059	-0.16	-1.2	17.7	142.0
Dec. 28	03 04.91	+14 36.3	2.316	3.057	+0.05	-0.1	17.8	131.4
Jan. 7	03 05.46	+14 35.1	2.427	3.056	+0.27	+0.9	17.9	121.4
Jan. 17	03 08.19	+14 44.2	2.550	3.056	+0.48	+1.8	18.0	111.9
Jan. 27	03 12.97	+15 02.3	2.683	3.057	+0.67	+2.6	18.1	102.9
Feb. 6	03 19.64	+15 27.9	2.821	3.059	+0.83	+3.1	18.2	94.4
Feb. 16	03 27.98	+15 58.9	2.962	3.062	+0.98	+3.5	18.3	86.4
Feb. 26	03 37.78	+16 33.5	3.102	3.067	+1.11	+3.7	18.4	78.8
Mar. 8	03 48.87	+17 10.1	3.240	3.072	+1.22	+3.7	18.5	71.5
Mar. 18	04 01.05	+17 46.8	3.373	3.078	+1.31	+3.6	18.6	64.5
Mar. 28	04 14.16	+18 22.4	3.500	3.085	+1.39	+3.3	18.7	57.7

Comet P/2013 YG46 (Spacewatch)

Epoch = 2016 July 31.0 TT
T = 2017 Jan. 28.78510 TT
Peri. = 242.29093 e = 0.4539049
Node = 48.92812 2000.0 a = 3.2764795 AU
Incl. = 7.85799 n = 0.16618541
q = 1.7892694 AU P = 5.93 years

H = 16.0 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		V	Mot./PA ′/°	Elong. °
Jan. 3	12 50.79	+01 58.0	3.141	3.305	−0.59	+4.9	22.0	8.8/104	90.9
Jan. 13	12 56.47	+01 36.0	2.952	3.262	−0.64	+5.3	21.8	6.4/100	99.6
Jan. 23	13 00.66	+01 24.4	2.767	3.219	−0.69	+5.7	21.6	3.7/ 91	108.6
Feb. 2	13 03.12	+01 24.0	2.589	3.175	−0.75	+6.1	21.4	1.3/ 31	118.1
Feb. 12	13 03.58	+01 35.4	2.424	3.130	−0.81	+6.5	21.2	3.4/312	128.0
Feb. 22	13 01.88	+01 58.4	2.274	3.085	−0.86	+7.0	21.0	6.8/299	138.5
Mar. 3	12 57.95	+02 31.7	2.144	3.039	−0.92	+7.4	20.7	9.9/294	149.3
Mar. 13	12 51.90	+03 12.7	2.038	2.993	−0.96	+7.7	20.4	12.4/291	160.3
Mar. 23	12 44.15	+03 57.4	1.960	2.946	−0.99	+7.8	20.1	13.9/288	170.0
Apr. 2	12 35.33	+04 40.3	1.910	2.899	−1.00	+7.8	20.0	13.9/285	170.1
Apr. 12	12 26.32	+05 15.9	1.888	2.852	−0.98	+7.7	20.2	12.6/281	160.2
Apr. 22	12 18.04	+05 39.1	1.894	2.804	−0.95	+7.5	20.3	10.1/274	149.1
May 2	12 11.30	+05 46.8	1.923	2.756	−0.90	+7.3	20.4	7.0/262	138.1
May 12	12 06.68	+05 37.5	1.971	2.708	−0.85	+7.0	20.5	4.2/231	127.6
May 22	12 04.49	+05 11.3	2.034	2.660	−0.81	+6.8	20.7	4.2/174	117.7
June 1	12 04.79	+04 29.4	2.106	2.612	−0.76	+6.6	20.8	6.9/144	108.5
June 11	12 07.51	+03 33.3	2.184	2.563	−0.73	+6.5	20.8	10.1/133	100.0
June 21	12 12.49	+02 24.5	2.264	2.515	−0.71	+6.4	20.9	13.2/127	92.1
July 1	12 19.50	+01 04.8	2.344	2.467	−0.69	+6.4	20.9	16.0/124	84.7
July 11	12 28.37	−00 24.7	2.421	2.419	−0.68	+6.4	21.0	18.6/122	77.8
July 21	12 38.90	−02 02.6	2.493	2.371	−0.68	+6.5	21.0	20.9/120	71.3
July 31	12 50.95	−03 47.6	2.559	2.324	−0.69	+6.5	21.0	23.0/119	65.2
Aug. 10	13 04.42	−05 38.6	2.620	2.278	−0.71	+6.6	21.0	24.9/118	59.4
Aug. 20	13 19.21	−07 34.5	2.672	2.232	−0.73	+6.7	20.9	26.7/117	54.0
Aug. 30	13 35.28	−09 34.0	2.718	2.188	−0.76	+6.7	20.9	28.3/116	48.7
Sept. 9	13 52.61	−11 35.7	2.756	2.144	−0.80	+6.8	20.8	29.8/115	43.7
Sept.19	14 11.20	−13 38.1	2.786	2.102	−0.84	+6.7	20.8	31.3/113	39.0
Sept.29	14 31.05	−15 39.5	2.810	2.062	−0.89	+6.7	20.7	32.6/112	34.4
Oct. 9	14 52.20	−17 38.1	2.826	2.023	−0.95	+6.5	20.6	33.9/110	30.0
Oct. 19	15 14.65	−19 31.6	2.837	1.987	−1.01	+6.2	20.5	35.1/109	25.7
Oct. 29	15 38.43	−21 17.9	2.841	1.953	−1.07	+5.9	20.4	36.2/107	21.6
Nov. 8	16 03.53	−22 54.3	2.841	1.921	−1.14	+5.4	20.3	37.2/104	17.7
Nov. 18	16 29.90	−24 18.3	2.837	1.892	−1.21	+4.8	20.2	38.1/102	13.9
Nov. 28	16 57.45	−25 27.1	2.829	1.866	−1.27	+4.0	20.1	38.9/ 99	10.3
Dec. 8	17 26.05	−26 18.4	2.818	1.844	−1.33	+3.1	19.9	39.6/ 96	7.0
Dec. 18	17 55.49	−26 50.1	2.805	1.825	−1.38	+2.0	19.8	40.2/ 93	4.4
Dec. 28	18 25.52	−27 00.5	2.790	1.810	−1.41	+0.9	19.8	40.6/ 90	3.8
Jan. 7	18 55.84	−26 48.9	2.775	1.799	−1.43	−0.3	19.8	40.8/ 87	5.8
Jan. 17	19 26.15	−26 15.2	2.759	1.792	−1.43	−1.5	19.9	40.9/ 84	8.7
Jan. 27	19 56.16	−25 20.2	2.742	1.789	−1.41	−2.6	19.9	40.8/ 81	11.8
Feb. 6	20 25.61	−24 05.7	2.725	1.791	−1.39	−3.7	20.0	40.5/ 78	15.0
Feb. 16	20 54.27	−22 33.8	2.708	1.796	−1.35	−4.7	20.1	40.1/ 76	18.2
Feb. 26	21 22.01	−20 47.4	2.690	1.806	−1.30	−5.5	20.1	39.5/ 74	21.5
Mar. 8	21 48.72	−18 49.5	2.671	1.819	−1.24	−6.2	20.2	38.7/ 72	24.9
Mar. 18	22 14.34	−16 43.2	2.651	1.837	−1.19	−6.7	20.3	37.8/ 70	28.3
Mar. 28	22 38.89	−14 31.4	2.629	1.858	−1.13	−7.1	20.3	36.8/ 69	31.9

Comet P/2003 SQ215 (NEAT-LONEOS)

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 2.35449 TT
Peri. = 137.54633 e = 0.5839445
Node = 257.24154 2000.0 a = 5.4804893 AU
Incl. = 5.58202 n = 0.07682014
q = 2.2801877 AU P = 12.83 years

m1 = 8.6 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ °	Elong. °
Jan. 3	19 46.92	-18 08.7	4.789	3.841	-0.40	-1.5	.	18.4/ 79	13.9
Jan. 13	19 59.51	-17 31.1	4.762	3.788	-0.41	-1.6	.	18.9/ 77	7.1
Jan. 23	20 12.35	-16 48.3	4.718	3.736	-0.43	-1.8	.	19.3/ 76	3.1
Feb. 2	20 25.34	-16 00.4	4.656	3.683	-0.44	-1.9	.	19.6/ 75	8.2
Feb. 12	20 38.41	-15 07.4	4.576	3.630	-0.46	-2.1	.	19.8/ 74	14.8
Feb. 22	20 51.47	-14 09.8	4.479	3.577	-0.48	-2.3	22.9	19.9/ 72	21.5
Mar. 3	21 04.46	-13 07.8	4.367	3.524	-0.50	-2.6	22.7	19.9/ 71	28.1
Mar. 13	21 17.31	-12 01.8	4.241	3.472	-0.53	-2.8	22.5	19.8/ 70	34.8
Mar. 23	21 29.95	-10 52.4	4.102	3.419	-0.55	-3.0	22.3	19.6/ 69	41.4
Apr. 2	21 42.31	-09 39.9	3.952	3.366	-0.58	-3.3	22.1	19.3/ 67	48.0
Apr. 12	21 54.33	-08 25.1	3.793	3.314	-0.62	-3.6	21.9	18.9/ 66	54.6
Apr. 22	22 05.93	-07 08.7	3.625	3.262	-0.65	-3.9	21.7	18.3/ 65	61.2
May 2	22 17.03	-05 51.3	3.451	3.210	-0.69	-4.2	21.4	17.5/ 64	67.9
May 12	22 27.54	-04 33.7	3.273	3.159	-0.74	-4.6	21.2	16.6/ 62	74.6
May 22	22 37.34	-03 17.0	3.092	3.108	-0.79	-5.0	20.9	15.4/ 61	81.5
June 1	22 46.31	-02 02.1	2.911	3.057	-0.85	-5.4	20.6	14.0/ 59	88.5
June 11	22 54.30	-00 50.2	2.731	3.007	-0.92	-5.8	20.3	12.3/ 57	95.7
June 21	23 01.14	+00 17.2	2.556	2.958	-1.00	-6.3	20.1	10.3/ 53	103.2
July 1	23 06.63	+01 18.7	2.386	2.909	-1.08	-6.8	19.8	8.0/ 48	111.0
July 11	23 10.56	+02 12.3	2.225	2.862	-1.17	-7.4	19.5	5.4/ 37	119.2
July 21	23 12.73	+02 55.9	2.075	2.815	-1.27	-8.0	19.2	3.2/ 7	127.8
July 31	23 13.00	+03 27.7	1.940	2.769	-1.37	-8.7	18.9	3.1/305	136.9
Aug. 10	23 11.29	+03 45.3	1.822	2.725	-1.46	-9.4	18.6	5.3/272	146.4
Aug. 20	23 07.75	+03 47.6	1.725	2.681	-1.55	-10.0	18.4	7.6/260	156.2
Aug. 30	23 02.72	+03 34.3	1.650	2.640	-1.61	-10.6	18.1	9.3/253	165.6
Sept. 9	22 56.81	+03 07.0	1.600	2.599	-1.65	-11.0	17.9	9.6/247	170.9
Sept.19	22 50.88	+02 29.7	1.576	2.561	-1.65	-11.1	17.8	8.7/241	165.6
Sept.29	22 45.82	+01 47.5	1.576	2.524	-1.62	-11.0	17.6	6.5/231	155.9
Oct. 9	22 42.45	+01 06.8	1.600	2.490	-1.57	-10.6	17.5	3.7/206	145.7
Oct. 19	22 41.37	+00 33.1	1.644	2.457	-1.51	-10.2	17.5	3.2/135	135.7
Oct. 29	22 42.89	+00 10.8	1.705	2.427	-1.44	-9.6	17.5	6.3/ 97	126.1
Nov. 8	22 47.07	+00 02.6	1.779	2.399	-1.38	-9.1	17.5	10.1/ 86	117.2
Nov. 18	22 53.80	+00 09.8	1.863	2.374	-1.32	-8.6	17.5	13.7/ 80	108.8
Nov. 28	23 02.84	+00 32.5	1.954	2.352	-1.27	-8.2	17.5	17.1/ 77	101.0
Dec. 8	23 13.93	+01 10.1	2.050	2.332	-1.23	-7.8	17.5	19.9/ 75	93.8
Dec. 18	23 26.78	+02 01.4	2.149	2.315	-1.19	-7.4	17.6	22.4/ 73	86.9
Dec. 28	23 41.12	+03 04.9	2.250	2.302	-1.17	-7.1	17.6	24.5/ 72	80.5
Jan. 7	23 56.75	+04 18.8	2.352	2.292	-1.15	-6.8	17.7	26.3/ 72	74.4
Jan. 17	00 13.45	+05 41.2	2.452	2.285	-1.13	-6.5	17.7	27.7/ 71	68.6
Jan. 27	00 31.05	+07 10.2	2.552	2.281	-1.11	-6.2	17.8	28.9/ 71	63.0
Feb. 6	00 49.44	+08 43.8	2.650	2.280	-1.10	-5.8	17.9	29.8/ 71	57.7
Feb. 16	01 08.49	+10 19.8	2.746	2.283	-1.09	-5.5	18.0	30.5/ 71	52.5
Feb. 26	01 28.12	+11 56.4	2.839	2.289	-1.08	-5.1	18.1	30.9/ 72	47.5
Mar. 8	01 48.25	+13 31.6	2.929	2.299	-1.07	-4.7	18.2	31.2/ 72	42.6
Mar. 18	02 08.79	+15 03.6	3.015	2.311	-1.06	-4.2	18.3	31.4/ 73	37.9
Mar. 28	02 29.69	+16 30.8	3.098	2.327	-1.05	-3.7	18.4	31.4/ 74	33.2

Comet P/2006 G1 (McNaught)

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 3.09036 TT
Peri. = 308.44441 e = 0.4466415
Node = 298.27850 2000.0 a = 5.0268591 AU
Incl. = 17.84191 n = 0.08744984
q = 2.7816552 AU P = 11.27 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ / °	Elong. °
Jan. 3	11 33.91	-12 44.5	3.436	3.769	-0.57	+5.3	21.3	7.5/165	102.2
Jan. 13	11 35.21	-13 56.9	3.261	3.731	-0.60	+5.6	21.1	6.5/185	111.2
Jan. 23	11 34.82	-15 01.5	3.096	3.693	-0.64	+6.0	21.0	6.3/210	120.4
Feb. 2	11 32.66	-15 56.1	2.946	3.656	-0.68	+6.3	20.8	7.0/233	129.8
Feb. 12	11 28.76	-16 38.3	2.814	3.619	-0.71	+6.8	20.6	8.3/251	139.1
Feb. 22	11 23.31	-17 05.7	2.705	3.582	-0.73	+7.2	20.5	9.5/263	148.0
Mar. 3	11 16.70	-17 16.9	2.620	3.545	-0.75	+7.5	20.3	10.4/273	155.4
Mar. 13	11 09.46	-17 11.8	2.563	3.509	-0.75	+7.8	20.2	10.5/281	159.1
Mar. 23	11 02.27	-16 51.9	2.533	3.473	-0.74	+8.0	20.1	9.8/288	157.1
Apr. 2	10 55.82	-16 20.7	2.531	3.437	-0.72	+8.1	20.1	8.3/297	150.7
Apr. 12	10 50.68	-15 42.6	2.553	3.402	-0.70	+8.0	20.0	6.3/309	142.3
Apr. 22	10 47.31	-15 02.7	2.598	3.367	-0.67	+7.8	20.0	4.2/332	133.3
May 2	10 45.92	-14 25.6	2.660	3.333	-0.65	+7.6	20.0	3.2/ 18	124.2
May 12	10 46.60	-13 54.9	2.737	3.300	-0.62	+7.3	20.0	4.5/ 61	115.4
May 22	10 49.31	-13 33.3	2.824	3.267	-0.60	+7.0	20.0	6.8/ 81	107.0
June 1	10 53.89	-13 22.3	2.918	3.234	-0.59	+6.6	20.0	9.2/ 90	98.9
June 11	11 00.19	-13 22.5	3.015	3.202	-0.58	+6.3	20.0	11.5/ 96	91.3
June 21	11 08.03	-13 34.3	3.112	3.171	-0.57	+6.1	20.0	13.6/100	84.0
July 1	11 17.24	-13 57.1	3.208	3.141	-0.57	+5.8	20.0	15.5/103	77.1
July 11	11 27.66	-14 30.4	3.301	3.112	-0.58	+5.6	20.0	17.2/105	70.5
July 21	11 39.15	-15 13.4	3.388	3.083	-0.58	+5.3	20.0	18.7/106	64.1
July 31	11 51.61	-16 05.1	3.470	3.056	-0.59	+5.1	20.0	20.1/108	58.0
Aug. 10	12 04.95	-17 04.5	3.544	3.030	-0.61	+4.9	20.0	21.3/109	52.1
Aug. 20	12 19.08	-18 10.5	3.611	3.004	-0.62	+4.7	20.0	22.3/109	46.4
Aug. 30	12 33.95	-19 22.1	3.668	2.980	-0.64	+4.5	19.9	23.2/110	40.9
Sept. 9	12 49.53	-20 38.1	3.717	2.957	-0.66	+4.3	19.9	24.0/110	35.6
Sept.19	13 05.77	-21 57.2	3.756	2.935	-0.68	+4.1	19.9	24.7/110	30.4
Sept.29	13 22.64	-23 18.3	3.786	2.914	-0.70	+3.8	19.9	25.3/110	25.5
Oct. 9	13 40.14	-24 40.2	3.806	2.895	-0.73	+3.5	19.8	25.8/109	20.9
Oct. 19	13 58.21	-26 01.5	3.815	2.877	-0.76	+3.2	19.8	26.2/109	16.9
Oct. 29	14 16.86	-27 20.9	3.814	2.860	-0.78	+2.8	19.8	26.5/108	13.9
Nov. 8	14 36.03	-28 37.3	3.803	2.845	-0.81	+2.4	19.7	26.7/107	12.7
Nov. 18	14 55.67	-29 49.4	3.782	2.832	-0.84	+2.0	19.7	26.8/106	13.7
Nov. 28	15 15.74	-30 56.0	3.751	2.820	-0.87	+1.5	19.6	26.8/104	16.6
Dec. 8	15 36.14	-31 56.0	3.709	2.809	-0.89	+1.0	19.6	26.7/103	20.7
Dec. 18	15 56.77	-32 48.5	3.658	2.800	-0.92	+0.4	19.5	26.4/101	25.3
Dec. 28	16 17.52	-33 32.8	3.598	2.793	-0.94	-0.2	19.5	26.0/ 99	30.3
Jan. 7	16 38.22	-34 08.3	3.528	2.788	-0.96	-0.8	19.4	25.5/ 97	35.6
Jan. 17	16 58.72	-34 34.8	3.449	2.784	-0.97	-1.5	19.4	24.9/ 95	41.1
Jan. 27	17 18.85	-34 52.2	3.362	2.782	-0.98	-2.2	19.3	24.0/ 93	46.8
Feb. 6	17 38.39	-35 01.0	3.268	2.782	-0.99	-2.9	19.2	23.0/ 92	52.6
Feb. 16	17 57.16	-35 01.6	3.167	2.783	-1.00	-3.5	19.2	21.9/ 90	58.6
Feb. 26	18 14.94	-34 55.0	3.060	2.786	-1.01	-4.2	19.1	20.4/ 88	64.8
Mar. 8	18 31.51	-34 42.2	2.948	2.791	-1.01	-4.9	19.0	18.8/ 86	71.2
Mar. 18	18 46.67	-34 24.4	2.833	2.797	-1.02	-5.6	19.0	16.9/ 84	77.8
Mar. 28	19 00.18	-34 02.8	2.716	2.805	-1.03	-6.2	18.9	14.7/ 81	84.7

Comet P/2007 T6 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 15.43755 TT
Peri. = 335.89362 e = 0.5039711
Node = 102.51758 2000.0 a = 4.4770766 AU
Incl. = 22.18165 n = 0.10404286
q = 2.2207594 AU P = 9.47 years

m1 = 9.4 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	22 09.70	-27 43.6	4.326	3.694	-0.45	-0.5	22.5	16.5/ 67	44.8
Jan. 13	22 21.02	-26 36.3	4.371	3.647	-0.45	-0.7	22.4	17.6/ 67	38.0
Jan. 23	22 32.99	-25 26.2	4.400	3.600	-0.45	-1.0	22.4	18.5/ 68	31.7
Feb. 2	22 45.50	-24 13.7	4.414	3.553	-0.46	-1.2	22.3	19.3/ 68	25.8
Feb. 12	22 58.46	-22 59.3	4.411	3.506	-0.47	-1.5	22.2	20.0/ 68	20.8
Feb. 22	23 11.80	-21 43.6	4.392	3.459	-0.48	-1.7	22.0	20.6/ 69	17.0
Mar. 3	23 25.44	-20 27.1	4.357	3.411	-0.49	-2.0	21.9	21.1/ 69	15.4
Mar. 13	23 39.34	-19 10.3	4.306	3.364	-0.51	-2.2	21.8	21.5/ 70	16.3
Mar. 23	23 53.44	-17 54.1	4.240	3.316	-0.52	-2.5	21.6	21.8/ 70	19.3
Apr. 2	00 07.72	-16 39.0	4.161	3.269	-0.54	-2.8	21.5	22.0/ 71	23.5
Apr. 12	00 22.14	-15 25.8	4.068	3.222	-0.56	-3.1	21.3	22.2/ 72	28.4
Apr. 22	00 36.66	-14 15.2	3.964	3.174	-0.58	-3.4	21.2	22.3/ 73	33.5
May 2	00 51.25	-13 08.0	3.849	3.127	-0.60	-3.7	21.0	22.3/ 74	38.8
May 12	01 05.89	-12 05.1	3.724	3.080	-0.63	-4.1	20.8	22.3/ 75	44.1
May 22	01 20.52	-11 07.3	3.591	3.034	-0.66	-4.4	20.6	22.1/ 77	49.5
June 1	01 35.11	-10 15.5	3.452	2.987	-0.69	-4.8	20.4	21.9/ 78	55.0
June 11	01 49.60	-09 30.7	3.307	2.941	-0.73	-5.2	20.2	21.5/ 80	60.4
June 21	02 03.91	-08 53.7	3.157	2.896	-0.77	-5.6	20.0	21.0/ 83	66.0
July 1	02 17.95	-08 25.5	3.005	2.851	-0.82	-6.1	19.8	20.4/ 85	71.5
July 11	02 31.61	-08 07.0	2.851	2.807	-0.87	-6.6	19.5	19.5/ 88	77.2
July 21	02 44.75	-07 58.8	2.697	2.763	-0.92	-7.2	19.3	18.5/ 91	83.0
July 31	02 57.19	-08 01.7	2.544	2.720	-0.99	-7.8	19.0	17.2/ 95	88.9
Aug. 10	03 08.73	-08 16.1	2.394	2.679	-1.06	-8.5	18.8	15.6/100	94.9
Aug. 20	03 19.11	-08 41.9	2.248	2.638	-1.14	-9.2	18.5	13.7/106	101.2
Aug. 30	03 28.05	-09 18.5	2.108	2.598	-1.23	-10.0	18.3	11.6/114	107.6
Sept. 9	03 35.22	-10 04.7	1.975	2.560	-1.33	-10.8	18.0	9.2/126	114.3
Sept.19	03 40.28	-10 57.8	1.852	2.523	-1.44	-11.6	17.8	6.8/145	121.2
Sept.29	03 42.92	-11 53.8	1.740	2.487	-1.55	-12.3	17.5	5.3/180	128.1
Oct. 9	03 42.89	-12 47.0	1.643	2.453	-1.67	-12.9	17.3	5.8/223	135.0
Oct. 19	03 40.15	-13 29.6	1.563	2.421	-1.78	-13.3	17.1	8.0/253	141.2
Oct. 29	03 34.92	-13 52.9	1.501	2.391	-1.86	-13.5	16.9	10.4/272	146.1
Nov. 8	03 27.80	-13 48.1	1.461	2.363	-1.92	-13.4	16.8	12.4/288	148.5
Nov. 18	03 19.77	-13 08.8	1.442	2.337	-1.92	-13.2	16.6	13.7/303	147.4
Nov. 28	03 11.97	-11 52.8	1.446	2.313	-1.88	-12.9	16.6	14.5/319	143.3
Dec. 8	03 05.55	-10 02.2	1.471	2.292	-1.81	-12.6	16.5	15.2/336	137.0
Dec. 18	03 01.40	-07 43.3	1.516	2.273	-1.71	-12.4	16.5	16.1/352	129.6
Dec. 28	02 60.00	-05 04.0	1.578	2.257	-1.61	-12.3	16.6	17.3/ 8	121.9
Jan. 7	03 01.54	-02 12.2	1.654	2.244	-1.50	-12.2	16.6	18.9/ 20	114.2
Jan. 17	03 05.95	+00 45.3	1.742	2.234	-1.42	-12.1	16.7	20.7/ 31	106.7
Jan. 27	03 13.02	+03 43.1	1.840	2.226	-1.34	-11.9	16.8	22.4/ 39	99.6
Feb. 6	03 22.49	+06 37.4	1.944	2.222	-1.28	-11.6	16.9	24.0/ 46	92.8
Feb. 16	03 34.09	+09 25.0	2.054	2.221	-1.23	-11.3	17.0	25.4/ 51	86.3
Feb. 26	03 47.56	+12 03.9	2.167	2.222	-1.19	-10.8	17.1	26.6/ 56	80.1
Mar. 8	04 02.69	+14 32.3	2.281	2.227	-1.16	-10.3	17.3	27.5/ 60	74.2
Mar. 18	04 19.24	+16 48.8	2.397	2.235	-1.14	-9.7	17.4	28.3/ 63	68.6
Mar. 28	04 37.03	+18 52.6	2.512	2.245	-1.13	-9.1	17.5	28.8/ 67	63.2

Comet 188P/LINEAR-Mueller

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 17.22967 TT
Peri. = 26.83271 e = 0.4149070
Node = 358.98635 2000.0 a = 4.3822662 AU
Incl. = 10.51133 n = 0.10743751
q = 2.5640333 AU P = 9.17 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	19 44.01	-28 51.0	4.589	3.639	+1.45	+4.5	19.7	13.2
Jan. 13	19 58.54	-28 05.8	4.572	3.602	+1.46	+4.9	19.7	8.4
Jan. 23	20 13.18	-27 16.7	4.537	3.564	+1.47	+5.3	19.6	7.7
Feb. 2	20 27.85	-26 23.9	4.486	3.527	+1.46	+5.6	19.5	11.8
Feb. 12	20 42.46	-25 27.6	4.418	3.490	+1.45	+5.9	19.5	17.6
Feb. 22	20 56.92	-24 28.3	4.334	3.452	+1.43	+6.2	19.4	23.8
Mar. 3	21 11.18	-23 26.4	4.236	3.415	+1.40	+6.4	19.3	30.1
Mar. 13	21 25.15	-22 22.5	4.124	3.378	+1.36	+6.5	19.2	36.6
Mar. 23	21 38.77	-21 17.1	4.000	3.341	+1.32	+6.6	19.0	43.0
Apr. 2	21 51.98	-20 11.1	3.865	3.305	+1.27	+6.6	18.9	49.5
Apr. 12	22 04.70	-19 05.1	3.720	3.269	+1.21	+6.5	18.8	56.1
Apr. 22	22 16.84	-18 00.2	3.568	3.233	+1.15	+6.3	18.7	62.7
May 2	22 28.33	-16 57.0	3.409	3.197	+1.07	+6.0	18.5	69.4
May 12	22 39.05	-15 56.7	3.246	3.162	+0.98	+5.6	18.4	76.3
May 22	22 48.89	-15 00.3	3.080	3.127	+0.88	+5.2	18.2	83.3
June 1	22 57.70	-14 08.7	2.913	3.093	+0.76	+4.6	18.0	90.5
June 11	23 05.31	-13 23.1	2.748	3.059	+0.62	+3.9	17.9	98.0
June 21	23 11.52	-12 44.6	2.586	3.026	+0.46	+3.1	17.7	105.8
July 1	23 16.14	-12 14.0	2.431	2.993	+0.28	+2.2	17.5	114.1
July 11	23 18.93	-11 52.2	2.285	2.961	+0.08	+1.3	17.3	122.7
July 21	23 19.70	-11 39.3	2.152	2.930	-0.14	+0.4	17.1	131.9
July 31	23 18.33	-11 34.9	2.035	2.900	-0.35	-0.3	17.0	141.6
Aug. 10	23 14.81	-11 37.8	1.937	2.871	-0.54	-0.7	16.8	151.9
Aug. 20	23 09.37	-11 45.3	1.861	2.842	-0.69	-0.9	16.7	162.4
Aug. 30	23 02.47	-11 54.0	1.811	2.815	-0.76	-0.6	16.6	172.5
Sept. 9	22 54.84	-11 59.7	1.787	2.788	-0.75	+0.1	16.5	172.3
Sept.19	22 47.37	-11 58.5	1.790	2.763	-0.64	+1.1	16.5	162.0
Sept.29	22 40.94	-11 47.5	1.819	2.739	-0.46	+2.3	16.5	151.1
Oct. 9	22 36.30	-11 25.0	1.871	2.716	-0.24	+3.5	16.5	140.4
Oct. 19	22 33.93	-10 50.5	1.942	2.695	+0.01	+4.6	16.5	130.3
Oct. 29	22 34.01	-10 04.2	2.029	2.675	+0.25	+5.7	16.6	120.6
Nov. 8	22 36.56	-09 07.0	2.128	2.657	+0.49	+6.7	16.7	111.5
Nov. 18	22 41.41	-07 59.7	2.235	2.640	+0.69	+7.7	16.8	103.0
Nov. 28	22 48.32	-06 43.1	2.348	2.624	+0.87	+8.5	16.8	95.0
Dec. 8	22 57.03	-05 18.1	2.463	2.611	+1.03	+9.3	16.9	87.4
Dec. 18	23 07.29	-03 45.5	2.579	2.599	+1.16	+9.9	17.0	80.2
Dec. 28	23 18.86	-02 06.1	2.694	2.588	+1.27	+10.5	17.1	73.3
Jan. 7	23 31.55	-00 20.7	2.805	2.580	+1.36	+11.0	17.2	66.7
Jan. 17	23 45.18	+01 29.7	2.913	2.573	+1.44	+11.4	17.2	60.4
Jan. 27	23 59.61	+03 24.2	3.015	2.568	+1.51	+11.8	17.3	54.3
Feb. 6	00 14.74	+05 21.7	3.111	2.565	+1.57	+12.0	17.4	48.5
Feb. 16	00 30.47	+07 21.4	3.200	2.564	+1.63	+12.1	17.4	42.8
Feb. 26	00 46.73	+09 22.0	3.282	2.565	+1.67	+12.1	17.5	37.2
Mar. 8	01 03.48	+11 22.5	3.356	2.567	+1.72	+11.9	17.5	31.9
Mar. 18	01 20.65	+13 21.9	3.422	2.572	+1.76	+11.7	17.6	26.6
Mar. 28	01 38.23	+15 19.1	3.480	2.578	+1.80	+11.4	17.6	21.6

Comet 219P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 20.65841 TT
Peri. = 107.41482 e = 0.3523585
Node = 231.02844 2000.0 a = 3.6520238 AU
Incl. = 11.52878 n = 0.14122243
q = 2.3652022 AU P = 6.98 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	16 26.72	-20 22.6	4.167	3.392	+1.39	-1.2	20.7	33.6
Jan. 13	16 40.66	-20 34.6	4.044	3.358	+1.37	-0.6	20.6	40.6
Jan. 23	16 54.35	-20 40.3	3.909	3.325	+1.33	+0.1	20.4	47.5
Feb. 2	17 07.67	-20 39.4	3.762	3.291	+1.28	+0.7	20.2	54.6
Feb. 12	17 20.47	-20 31.9	3.606	3.257	+1.21	+1.4	20.0	61.8
Feb. 22	17 32.58	-20 17.9	3.442	3.223	+1.13	+2.1	19.8	69.0
Mar. 3	17 43.85	-19 57.4	3.273	3.189	+1.02	+2.7	19.6	76.4
Mar. 13	17 54.08	-19 30.7	3.100	3.155	+0.90	+3.2	19.4	84.0
Mar. 23	18 03.05	-18 58.2	2.926	3.122	+0.75	+3.8	19.2	91.8
Apr. 2	18 10.58	-18 20.5	2.755	3.088	+0.58	+4.2	19.0	99.9
Apr. 12	18 16.40	-17 38.1	2.588	3.054	+0.39	+4.6	18.8	108.3
Apr. 22	18 20.30	-16 51.9	2.429	3.021	+0.18	+4.9	18.5	117.0
May 2	18 22.09	-16 02.8	2.280	2.987	-0.05	+5.1	18.3	126.1
May 12	18 21.61	-15 12.0	2.147	2.954	-0.28	+5.1	18.1	135.6
May 22	18 18.85	-14 20.9	2.031	2.921	-0.49	+5.0	17.9	145.4
June 1	18 13.99	-13 31.3	1.936	2.889	-0.66	+4.6	17.6	155.3
June 11	18 07.39	-12 45.2	1.866	2.857	-0.77	+4.0	17.5	164.3
June 21	17 59.73	-12 05.1	1.822	2.825	-0.79	+3.2	17.3	168.6
July 1	17 51.83	-11 32.9	1.804	2.794	-0.72	+2.2	17.2	163.6
July 11	17 44.60	-11 10.4	1.812	2.763	-0.57	+1.2	17.1	154.3
July 21	17 38.85	-10 58.3	1.843	2.733	-0.37	+0.2	17.1	144.3
July 31	17 35.19	-10 56.2	1.895	2.704	-0.12	-0.7	17.0	134.4
Aug. 10	17 33.97	-11 02.9	1.963	2.676	+0.14	-1.4	17.0	125.0
Aug. 20	17 35.35	-11 16.5	2.043	2.648	+0.39	-1.8	17.0	116.0
Aug. 30	17 39.26	-11 34.6	2.133	2.621	+0.63	-2.0	17.0	107.6
Sept. 9	17 45.59	-11 55.1	2.228	2.595	+0.85	-2.0	17.0	99.7
Sept.19	17 54.12	-12 15.5	2.327	2.570	+1.05	-1.8	17.0	92.2
Sept.29	18 04.63	-12 33.8	2.426	2.546	+1.23	-1.4	17.0	85.2
Oct. 9	18 16.90	-12 47.9	2.525	2.524	+1.38	-0.8	17.1	78.5
Oct. 19	18 30.71	-12 56.3	2.622	2.502	+1.51	-0.1	17.1	72.1
Oct. 29	18 45.85	-12 57.3	2.715	2.482	+1.63	+0.7	17.1	66.0
Nov. 8	19 02.13	-12 49.9	2.803	2.463	+1.72	+1.7	17.1	60.1
Nov. 18	19 19.35	-12 33.1	2.886	2.446	+1.80	+2.7	17.1	54.4
Nov. 28	19 37.35	-12 06.3	2.964	2.430	+1.86	+3.7	17.1	48.8
Dec. 8	19 55.97	-11 28.9	3.034	2.416	+1.91	+4.8	17.1	43.4
Dec. 18	20 15.06	-10 41.0	3.099	2.404	+1.94	+5.8	17.1	38.2
Dec. 28	20 34.49	-09 42.7	3.156	2.393	+1.97	+6.8	17.1	33.1
Jan. 7	20 54.15	-08 34.4	3.205	2.384	+1.98	+7.8	17.1	28.1
Jan. 17	21 13.93	-07 16.7	3.248	2.376	+1.98	+8.6	17.1	23.3
Jan. 27	21 33.75	-05 50.6	3.283	2.371	+1.98	+9.4	17.1	18.7
Feb. 6	21 53.56	-04 17.0	3.310	2.367	+1.97	+10.0	17.1	14.3
Feb. 16	22 13.28	-02 37.0	3.330	2.365	+1.96	+10.5	17.1	10.5
Feb. 26	22 32.90	-00 52.0	3.342	2.365	+1.95	+10.9	17.1	8.0
Mar. 8	22 52.37	+00 57.0	3.346	2.367	+1.93	+11.1	17.1	8.0
Mar. 18	23 11.68	+02 48.3	3.343	2.371	+1.91	+11.3	17.1	10.4
Mar. 28	23 30.81	+04 40.9	3.333	2.377	+1.89	+11.2	17.1	14.1

Comet 18D/Perrine-Mrkos [Orbit 2]

Epoch = 2016 July 31.0 TT
T = 2017 Feb. 26.23114 TT
Peri. = 157.02626 e = 0.5838333
Node = 237.95749 2000.0 a = 3.9557081 AU
Incl. = 16.87607 n = 0.12527595
q = 1.6462340 AU P = 7.87 years

m1 = 11.5 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	18 14.65	-15 49.9	4.755	3.795	-0.36	-1.3	.	18.0/ 84	11.2
Jan. 13	18 27.00	-15 28.7	4.670	3.743	-0.38	-1.4	.	18.1/ 82	17.3
Jan. 23	18 39.38	-15 01.3	4.567	3.689	-0.40	-1.5	.	18.2/ 80	23.9
Feb. 2	18 51.71	-14 27.6	4.447	3.635	-0.42	-1.7	.	18.1/ 78	30.8
Feb. 12	19 03.87	-13 47.4	4.310	3.580	-0.45	-1.8	.	18.0/ 75	37.7
Feb. 22	19 15.77	-13 00.9	4.159	3.525	-0.48	-2.0	.	17.7/ 73	44.6
Mar. 3	19 27.31	-12 08.1	3.996	3.469	-0.51	-2.3	.	17.3/ 70	51.6
Mar. 13	19 38.38	-11 09.1	3.822	3.412	-0.54	-2.5	.	16.7/ 67	58.7
Mar. 23	19 48.85	-10 04.2	3.639	3.355	-0.58	-2.8	.	16.1/ 64	65.8
Apr. 2	19 58.60	-08 53.7	3.450	3.297	-0.62	-3.0	.	15.2/ 60	72.9
Apr. 12	20 07.51	-07 38.0	3.256	3.239	-0.67	-3.4	.	14.2/ 56	80.1
Apr. 22	20 15.39	-06 17.6	3.061	3.180	-0.72	-3.7	.	13.1/ 50	87.5
May 2	20 22.09	-04 53.3	2.867	3.121	-0.78	-4.1	.	11.8/ 42	95.0
May 12	20 27.39	-03 26.0	2.676	3.061	-0.85	-4.6	.	10.5/ 32	102.7
May 22	20 31.10	-01 56.9	2.492	3.000	-0.92	-5.1	23.0	9.4/ 18	110.5
June 1	20 32.98	-00 27.8	2.316	2.939	-1.00	-5.6	22.7	8.7/358	118.6
June 11	20 32.82	+00 59.0	2.152	2.878	-1.09	-6.2	22.3	8.9/337	126.8
June 21	20 30.46	+02 20.5	2.004	2.817	-1.18	-6.9	22.0	10.0/316	135.1
July 1	20 25.88	+03 32.6	1.874	2.755	-1.26	-7.7	21.7	11.6/300	143.0
July 11	20 19.22	+04 31.0	1.765	2.693	-1.33	-8.5	21.3	13.0/288	149.9
July 21	20 10.92	+05 11.3	1.678	2.631	-1.37	-9.2	21.0	13.9/278	154.3
July 31	20 01.70	+05 29.9	1.616	2.568	-1.39	-9.9	20.7	13.7/268	154.3
Aug. 10	19 52.53	+05 25.7	1.578	2.506	-1.37	-10.3	20.5	12.3/258	149.8
Aug. 20	19 44.49	+05 00.0	1.562	2.444	-1.33	-10.5	20.2	9.9/245	142.6
Aug. 30	19 38.49	+04 17.2	1.566	2.383	-1.27	-10.4	20.0	7.3/222	134.2
Sept. 9	19 35.25	+03 22.6	1.586	2.322	-1.21	-10.1	19.8	6.0/181	125.6
Sept.19	19 35.18	+02 22.7	1.619	2.261	-1.16	-9.5	19.6	7.7/141	117.1
Sept.29	19 38.37	+01 22.9	1.660	2.202	-1.11	-8.9	19.5	11.1/120	109.1
Oct. 9	19 44.78	+00 28.0	1.707	2.143	-1.09	-8.3	19.3	14.9/108	101.5
Oct. 19	19 54.22	-00 18.3	1.757	2.086	-1.07	-7.7	19.1	18.7/101	94.5
Oct. 29	20 06.43	-00 53.3	1.807	2.031	-1.08	-7.1	18.9	22.2/ 96	88.0
Nov. 8	20 21.18	-01 14.9	1.856	1.978	-1.10	-6.7	18.8	25.5/ 92	82.0
Nov. 18	20 38.19	-01 21.6	1.903	1.927	-1.13	-6.3	18.6	28.5/ 88	76.4
Nov. 28	20 57.20	-01 12.6	1.949	1.879	-1.17	-6.0	18.4	31.3/ 85	71.2
Dec. 8	21 18.00	-00 47.6	1.992	1.834	-1.21	-5.7	18.3	33.8/ 83	66.4
Dec. 18	21 40.36	-00 06.6	2.033	1.793	-1.27	-5.5	18.1	36.0/ 81	61.9
Dec. 28	22 04.06	+00 49.6	2.072	1.756	-1.32	-5.4	18.0	38.0/ 79	57.7
Jan. 7	22 28.95	+01 59.6	2.111	1.724	-1.37	-5.2	17.9	39.6/ 78	53.8
Jan. 17	22 54.83	+03 21.6	2.150	1.697	-1.42	-5.0	17.8	41.0/ 77	50.1
Jan. 27	23 21.56	+04 53.3	2.190	1.675	-1.47	-4.7	17.7	42.2/ 76	46.7
Feb. 6	23 49.02	+06 31.7	2.231	1.659	-1.51	-4.4	17.6	42.9/ 76	43.4
Feb. 16	00 17.07	+08 13.7	2.275	1.650	-1.55	-3.9	17.6	43.5/ 76	40.3
Feb. 26	00 45.59	+09 56.0	2.321	1.646	-1.57	-3.4	17.7	43.7/ 76	37.3
Mar. 8	01 14.48	+11 35.3	2.371	1.649	-1.58	-2.7	17.7	43.7/ 77	34.3
Mar. 18	01 43.59	+13 08.4	2.424	1.659	-1.58	-2.0	17.8	43.4/ 78	31.5
Mar. 28	02 12.83	+14 32.3	2.480	1.674	-1.57	-1.2	17.9	42.9/ 79	28.7

Comet 93P/Lovas

Epoch = 2016 July 31.0 TT
T = 2017 Mar. 1.46196 TT
Peri. = 74.90352 e = 0.6127037
Node = 339.62805 2000.0 a = 4.3896056 AU
Incl. = 12.20515 n = 0.10716817
q = 1.7000780 AU P = 9.20 years

m1 = 11.0 + 5 log(Delta) + 12.5 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	19 44.41	-28 13.6	4.872	3.920	+1.26	+4.3	22.0	13.1
Jan. 13	19 57.05	-27 30.8	4.837	3.865	+1.28	+4.6	21.9	7.7
Jan. 23	20 09.89	-26 45.0	4.782	3.808	+1.30	+4.9	21.8	7.3
Feb. 2	20 22.85	-25 56.2	4.709	3.751	+1.30	+5.2	21.7	12.2
Feb. 12	20 35.84	-25 04.5	4.616	3.694	+1.29	+5.4	21.6	18.6
Feb. 22	20 48.78	-24 10.2	4.506	3.636	+1.28	+5.7	21.4	25.2
Mar. 3	21 01.59	-23 13.5	4.379	3.577	+1.26	+5.9	21.3	32.0
Mar. 13	21 14.21	-22 14.9	4.237	3.518	+1.23	+6.0	21.1	38.8
Mar. 23	21 26.55	-21 14.8	4.082	3.459	+1.20	+6.1	21.0	45.6
Apr. 2	21 38.56	-20 13.8	3.915	3.398	+1.16	+6.1	20.8	52.4
Apr. 12	21 50.14	-19 12.4	3.737	3.338	+1.11	+6.1	20.6	59.3
Apr. 22	22 01.21	-18 11.3	3.551	3.277	+1.05	+6.0	20.4	66.2
May 2	22 11.68	-17 11.2	3.359	3.215	+0.97	+5.8	20.2	73.2
May 12	22 21.42	-16 13.0	3.163	3.153	+0.89	+5.5	19.9	80.3
May 22	22 30.32	-15 17.6	2.964	3.091	+0.79	+5.2	19.7	87.5
June 1	22 38.20	-14 25.7	2.766	3.028	+0.67	+4.7	19.4	95.0
June 11	22 44.86	-13 38.6	2.571	2.965	+0.52	+4.1	19.2	102.7
June 21	22 50.08	-12 57.1	2.381	2.902	+0.35	+3.5	18.9	110.8
July 1	22 53.61	-12 22.3	2.199	2.838	+0.15	+2.7	18.6	119.3
July 11	22 55.13	-11 54.9	2.028	2.774	-0.07	+2.0	18.3	128.3
July 21	22 54.40	-11 35.3	1.871	2.711	-0.32	+1.2	18.0	137.8
July 31	22 51.21	-11 23.3	1.731	2.647	-0.57	+0.6	17.7	148.0
Aug. 10	22 45.51	-11 17.7	1.612	2.584	-0.79	+0.2	17.5	158.8
Aug. 20	22 37.56	-11 16.1	1.518	2.521	-0.96	+0.1	17.2	170.1
Aug. 30	22 27.98	-11 14.7	1.449	2.458	-1.02	+0.5	17.0	177.3
Sept. 9	22 17.75	-11 09.4	1.407	2.396	-0.96	+1.3	16.8	165.7
Sept.19	22 08.14	-10 56.2	1.390	2.334	-0.78	+2.4	16.6	153.9
Sept.29	22 00.34	-10 32.2	1.396	2.274	-0.51	+3.6	16.5	142.4
Oct. 9	21 55.28	-09 55.9	1.422	2.214	-0.18	+4.9	16.4	131.6
Oct. 19	21 53.53	-09 06.7	1.461	2.156	+0.17	+6.2	16.3	121.5
Oct. 29	21 55.21	-08 04.7	1.512	2.100	+0.50	+7.5	16.2	112.3
Nov. 8	22 00.24	-06 49.7	1.568	2.046	+0.81	+8.8	16.1	103.9
Nov. 18	22 08.34	-05 22.0	1.628	1.994	+1.08	+10.0	16.1	96.3
Nov. 28	22 19.19	-03 41.7	1.688	1.946	+1.33	+11.3	16.0	89.3
Dec. 8	22 32.49	-01 48.7	1.748	1.900	+1.54	+12.5	16.0	83.0
Dec. 18	22 47.94	+00 16.3	1.806	1.858	+1.74	+13.6	15.9	77.3
Dec. 28	23 05.29	+02 32.6	1.862	1.820	+1.91	+14.6	15.8	72.1
Jan. 7	23 24.37	+04 59.0	1.916	1.786	+2.07	+15.5	15.8	67.4
Jan. 17	23 45.02	+07 33.8	1.969	1.758	+2.21	+16.1	15.7	63.1
Jan. 27	00 07.15	+10 14.7	2.020	1.735	+2.35	+16.4	15.7	59.1
Feb. 6	00 30.68	+12 59.1	2.071	1.717	+2.49	+16.4	15.6	55.5
Feb. 16	00 55.55	+15 43.6	2.122	1.706	+2.62	+16.1	15.6	52.2
Feb. 26	01 21.73	+18 24.5	2.176	1.700	+2.74	+15.4	15.6	49.1
Mar. 8	01 49.14	+20 58.0	2.231	1.701	+2.86	+14.2	15.6	46.1
Mar. 18	02 17.70	+23 20.1	2.290	1.709	+2.96	+12.7	15.7	43.3
Mar. 28	02 47.27	+25 26.9	2.352	1.722	+3.04	+10.8	15.7	40.6

Comet 2P/Encke

Epoch = 2016 July 31.0 TT
T = 2017 Mar. 9.97551 TT
Peri. = 186.55061 e = 0.8482923
Node = 334.56361 2000.0 a = 2.2149561 AU
Incl. = 11.77903 n = 0.29898981
q = 0.3360259 AU P = 3.30 years

H = 14.4 , G = 0.15 (r>2.0AU)
m1 = 13.6 + 5 log(Delta) + 12.5 log(r(t+10)) (r<2.0AU)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	Mag.	Elong. °
Jan. 3	22 30.76	-06 29.9	4.350	3.874	+0.67	+4.1	21.3	55.2
Jan. 13	22 37.47	-05 49.3	4.452	3.847	+0.74	+4.6	21.2	46.8
Jan. 23	22 44.90	-05 03.2	4.536	3.818	+0.80	+5.1	21.2	38.7
Feb. 2	22 52.91	-04 12.3	4.601	3.787	+0.85	+5.5	21.2	30.7
Feb. 12	23 01.39	-03 17.1	4.644	3.755	+0.88	+5.9	21.1	22.9
Feb. 22	23 10.24	-02 18.3	4.666	3.721	+0.91	+6.2	21.0	15.3
Mar. 3	23 19.35	-01 16.3	4.664	3.685	+0.93	+6.5	20.8	8.1
Mar. 13	23 28.67	-00 11.7	4.640	3.648	+0.94	+6.7	20.7	2.9
Mar. 23	23 38.09	+00 54.9	4.593	3.608	+0.95	+6.8	20.7	7.8
Apr. 2	23 47.57	+02 03.1	4.524	3.567	+0.95	+6.9	20.8	14.8
Apr. 12	23 57.02	+03 12.4	4.434	3.524	+0.94	+7.0	20.8	21.9
Apr. 22	00 06.39	+04 22.3	4.323	3.478	+0.92	+7.0	20.9	29.0
May 2	00 15.60	+05 32.4	4.193	3.431	+0.90	+7.0	20.8	36.2
May 12	00 24.58	+06 42.2	4.045	3.382	+0.87	+6.9	20.8	43.3
May 22	00 33.24	+07 51.4	3.881	3.330	+0.82	+6.8	20.7	50.5
June 1	00 41.47	+08 59.4	3.704	3.277	+0.77	+6.6	20.7	57.8
June 11	00 49.17	+10 05.8	3.514	3.221	+0.70	+6.4	20.6	65.1
June 21	00 56.16	+11 10.1	3.314	3.163	+0.61	+6.2	20.4	72.7
July 1	01 02.28	+12 11.6	3.106	3.102	+0.50	+5.8	20.3	80.4
July 11	01 07.29	+13 09.7	2.893	3.039	+0.36	+5.4	20.1	88.4
July 21	01 10.89	+14 03.3	2.679	2.974	+0.19	+4.8	19.9	96.7
July 31	01 12.75	+14 51.1	2.465	2.906	-0.03	+4.0	19.7	105.5
Aug. 10	01 12.42	+15 31.3	2.257	2.835	-0.30	+3.0	19.4	114.8
Aug. 20	01 09.42	+16 01.3	2.057	2.761	-0.62	+1.6	19.1	124.7
Aug. 30	01 03.26	+16 17.7	1.871	2.684	-0.98	-0.2	18.8	135.3
Sept. 9	00 53.51	+16 15.5	1.704	2.604	-1.35	-2.6	18.4	146.6
Sept.19	00 40.04	+15 49.9	1.561	2.521	-1.68	-5.3	18.0	158.2
Sept.29	00 23.22	+14 56.6	1.447	2.434	-1.91	-8.2	17.6	167.5
Oct. 9	00 04.16	+13 34.9	1.365	2.344	-1.95	-10.4	17.4	164.7
Oct. 19	23 44.64	+11 51.0	1.317	2.249	-1.80	-11.5	17.5	152.7
Oct. 29	23 26.64	+09 56.3	1.300	2.151	-1.48	-11.1	17.6	139.0
Nov. 8	23 11.82	+08 05.0	1.307	2.047	-1.07	-9.6	17.6	125.4
Nov. 18	23 01.12	+06 29.1	1.331	1.939	-0.63	-7.4	17.5	112.6
Nov. 28	22 54.77	+05 15.3	1.361	1.826	-0.22	-4.9	17.2	100.9
Dec. 8	22 52.60	+04 26.5	1.391	1.706	+0.16	-2.4	16.8	90.1
Dec. 18	22 54.19	+04 02.6	1.413	1.580	+0.49	-0.1	16.4	80.3
Dec. 28	22 59.08	+04 02.0	1.421	1.447	+0.78	+2.0	15.8	71.4
Jan. 7	23 06.89	+04 22.4	1.410	1.306	+1.04	+3.9	15.1	63.2
Jan. 17	23 17.26	+05 01.2	1.374	1.156	+1.26	+5.3	14.3	55.8
Jan. 27	23 29.90	+05 54.1	1.308	0.995	+1.45	+5.9	13.1	49.0
Feb. 6	23 44.35	+06 53.1	1.208	0.824	+1.48	+4.3	11.6	42.6
Feb. 16	23 59.18	+07 35.6	1.065	0.642	+0.93	-5.4	9.5	36.2
Feb. 26	00 08.44	+06 42.0	0.874	0.461	-2.05	-43.4	7.5	27.7
Mar. 8	23 47.92	-00 32.3	0.682	0.340	-5.40	-74.8	7.8	9.7
Mar. 18	22 53.88	-13 00.4	0.698	0.399	-2.08	-27.3	9.8	18.4
Mar. 28	22 33.09	-17 33.5	0.851	0.569	+0.06	-3.9	11.7	34.7

Comet 176P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2017 Mar. 12.29512 TT
Peri. = 35.38765 e = 0.1927678
Node = 345.97907 2000.0 a = 3.1957144 AU
Incl. = 0.23470 n = 0.17252504
q = 2.5796836 AU P = 5.71 years

H = 15.2 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	18 59.47	-22 53.6	4.135	3.152	+1.62	+2.6	20.9	1.9
Jan. 13	19 15.68	-22 27.3	4.113	3.133	+1.62	+3.2	20.9	4.6
Jan. 23	19 31.86	-21 54.9	4.075	3.115	+1.61	+3.8	21.1	11.0
Feb. 2	19 47.93	-21 16.6	4.022	3.096	+1.59	+4.4	21.1	17.3
Feb. 12	20 03.81	-20 32.9	3.955	3.077	+1.56	+4.9	21.2	23.7
Feb. 22	20 19.40	-19 44.2	3.874	3.058	+1.52	+5.3	21.2	30.0
Mar. 3	20 34.64	-18 51.3	3.780	3.039	+1.48	+5.6	21.2	36.4
Mar. 13	20 49.45	-17 54.9	3.674	3.020	+1.43	+5.9	21.2	42.7
Mar. 23	21 03.73	-16 55.9	3.557	3.001	+1.37	+6.1	21.2	49.1
Apr. 2	21 17.43	-15 55.3	3.431	2.983	+1.30	+6.1	21.1	55.6
Apr. 12	21 30.45	-14 54.1	3.297	2.964	+1.22	+6.1	21.1	62.1
Apr. 22	21 42.70	-13 53.5	3.156	2.946	+1.14	+5.9	21.0	68.8
May 2	21 54.07	-12 54.7	3.011	2.927	+1.04	+5.6	20.9	75.6
May 12	22 04.44	-11 59.1	2.862	2.909	+0.92	+5.1	20.8	82.6
May 22	22 13.64	-11 08.2	2.712	2.891	+0.79	+4.5	20.7	89.8
June 1	22 21.53	-10 23.5	2.563	2.874	+0.64	+3.7	20.6	97.3
June 11	22 27.90	-09 46.8	2.417	2.856	+0.46	+2.7	20.4	105.2
June 21	22 32.53	-09 19.5	2.276	2.839	+0.27	+1.6	20.2	113.5
July 1	22 35.23	-09 03.4	2.144	2.822	+0.06	+0.4	20.0	122.3
July 11	22 35.81	-08 59.8	2.024	2.805	-0.16	-0.9	19.8	131.7
July 21	22 34.18	-09 09.1	1.920	2.789	-0.38	-2.2	19.6	141.7
July 31	22 30.39	-09 30.8	1.835	2.774	-0.57	-3.2	19.4	152.2
Aug. 10	22 24.71	-10 03.2	1.772	2.758	-0.70	-3.9	19.1	163.3
Aug. 20	22 17.70	-10 42.4	1.734	2.743	-0.76	-4.1	18.8	174.8
Aug. 30	22 10.15	-11 23.9	1.723	2.729	-0.72	-3.8	18.8	173.6
Sept. 9	22 02.95	-12 02.3	1.739	2.715	-0.59	-3.1	19.1	162.0
Sept.19	21 57.02	-12 33.2	1.780	2.702	-0.40	-2.0	19.3	150.8
Sept.29	21 53.03	-12 53.3	1.844	2.689	-0.16	-0.8	19.5	139.9
Oct. 9	21 51.39	-13 00.8	1.926	2.677	+0.09	+0.5	19.7	129.7
Oct. 19	21 52.27	-12 55.3	2.023	2.665	+0.33	+1.8	19.8	120.0
Oct. 29	21 55.58	-12 37.0	2.132	2.654	+0.56	+3.1	20.0	110.9
Nov. 8	22 01.16	-12 06.5	2.248	2.644	+0.76	+4.2	20.1	102.3
Nov. 18	22 08.73	-11 24.4	2.369	2.634	+0.93	+5.3	20.2	94.3
Nov. 28	22 18.02	-10 31.8	2.492	2.625	+1.08	+6.2	20.3	86.6
Dec. 8	22 28.77	-09 29.4	2.614	2.617	+1.20	+7.1	20.4	79.3
Dec. 18	22 40.73	-08 18.2	2.734	2.610	+1.30	+7.9	20.5	72.3
Dec. 28	22 53.70	-06 59.1	2.850	2.603	+1.38	+8.6	20.6	65.6
Jan. 7	23 07.51	-05 33.0	2.961	2.597	+1.45	+9.2	20.6	59.1
Jan. 17	23 21.99	-04 00.9	3.065	2.592	+1.50	+9.7	20.6	52.9
Jan. 27	23 37.04	-02 23.9	3.161	2.588	+1.55	+10.1	20.6	46.8
Feb. 6	23 52.57	-00 42.9	3.249	2.585	+1.59	+10.4	20.6	40.9
Feb. 16	00 08.48	+01 01.0	3.327	2.582	+1.63	+10.6	20.6	35.1
Feb. 26	00 24.75	+02 46.6	3.397	2.581	+1.66	+10.6	20.6	29.4
Mar. 8	00 41.31	+04 33.1	3.456	2.580	+1.68	+10.6	20.6	23.9
Mar. 18	00 58.13	+06 19.3	3.504	2.580	+1.71	+10.5	20.5	18.5
Mar. 28	01 15.19	+08 04.2	3.543	2.581	+1.73	+10.3	20.4	13.1

Comet 172P/Yeung

Epoch = 2016 July 31.0 TT
T = 2017 Mar. 12.62443 TT
Peri. = 209.05127 e = 0.2082436
Node = 30.88950 2000.0 a = 4.2147301 AU
Incl. = 11.23423 n = 0.11390674
q = 3.3370395 AU P = 8.65 years

H = 14.0 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	12 30.34	+05 24.8	3.527	3.774	+0.37	-1.6	20.5	96.9
Jan. 13	12 34.00	+05 09.0	3.364	3.757	+0.21	-0.6	20.3	106.1
Jan. 23	12 36.08	+05 02.6	3.208	3.740	+0.04	+0.3	20.2	115.6
Feb. 2	12 36.47	+05 05.6	3.063	3.724	-0.14	+1.2	20.0	125.6
Feb. 12	12 35.07	+05 17.5	2.935	3.707	-0.31	+1.9	19.9	135.9
Feb. 22	12 31.93	+05 36.7	2.826	3.691	-0.47	+2.4	19.7	146.5
Mar. 3	12 27.21	+06 00.9	2.741	3.675	-0.60	+2.6	19.5	157.3
Mar. 13	12 21.25	+06 27.1	2.683	3.660	-0.67	+2.4	19.3	167.5
Mar. 23	12 14.56	+06 51.6	2.655	3.644	-0.68	+1.9	19.2	172.0
Apr. 2	12 07.73	+07 10.8	2.656	3.629	-0.64	+1.1	19.3	164.6
Apr. 12	12 01.38	+07 21.8	2.685	3.614	-0.53	+0.1	19.5	154.2
Apr. 22	11 56.06	+07 22.4	2.741	3.599	-0.39	-1.1	19.6	143.6
May 2	11 52.16	+07 11.8	2.818	3.585	-0.22	-2.2	19.7	133.3
May 12	11 49.93	+06 49.9	2.915	3.571	-0.05	-3.3	19.9	123.3
May 22	11 49.47	+06 17.3	3.025	3.557	+0.13	-4.2	20.0	113.9
June 1	11 50.74	+05 35.0	3.145	3.543	+0.29	-5.1	20.1	104.9
June 11	11 53.64	+04 43.9	3.270	3.530	+0.44	-5.9	20.2	96.4
June 21	11 58.03	+03 45.1	3.399	3.517	+0.57	-6.5	20.3	88.2
July 1	12 03.76	+02 39.8	3.527	3.505	+0.69	-7.1	20.3	80.4
July 11	12 10.67	+01 28.8	3.652	3.493	+0.79	-7.6	20.4	73.0
July 21	12 18.62	+00 12.9	3.772	3.481	+0.89	-8.0	20.4	65.8
July 31	12 27.48	-01 07.0	3.886	3.470	+0.97	-8.3	20.5	58.8
Aug. 10	12 37.13	-02 30.2	3.990	3.459	+1.04	-8.6	20.5	52.0
Aug. 20	12 47.49	-03 56.1	4.084	3.448	+1.10	-8.8	20.5	45.3
Aug. 30	12 58.46	-05 24.0	4.167	3.438	+1.15	-8.9	20.5	38.7
Sept. 9	13 09.99	-06 53.2	4.238	3.428	+1.20	-9.0	20.4	32.2
Sept.19	13 22.00	-08 23.1	4.295	3.419	+1.24	-9.0	20.4	25.8
Sept.29	13 34.44	-09 53.2	4.338	3.410	+1.28	-9.0	20.3	19.4
Oct. 9	13 47.27	-11 22.7	4.367	3.402	+1.32	-8.8	20.2	13.1
Oct. 19	14 00.43	-12 51.2	4.381	3.394	+1.34	-8.7	20.1	6.7
Oct. 29	14 13.87	-14 18.0	4.379	3.386	+1.37	-8.5	19.9	0.9
Nov. 8	14 27.54	-15 42.7	4.362	3.379	+1.38	-8.2	20.1	6.2
Nov. 18	14 41.38	-17 04.6	4.330	3.373	+1.39	-7.9	20.2	12.7
Nov. 28	14 55.33	-18 23.5	4.283	3.367	+1.40	-7.5	20.2	19.2
Dec. 8	15 09.30	-19 38.9	4.220	3.362	+1.39	-7.2	20.3	25.9
Dec. 18	15 23.21	-20 50.6	4.144	3.357	+1.38	-6.8	20.3	32.6
Dec. 28	15 36.97	-21 58.3	4.054	3.352	+1.35	-6.4	20.3	39.4
Jan. 7	15 50.44	-23 02.0	3.952	3.349	+1.31	-6.0	20.3	46.3
Jan. 17	16 03.50	-24 01.9	3.838	3.345	+1.25	-5.6	20.3	53.3
Jan. 27	16 16.00	-24 58.1	3.715	3.343	+1.18	-5.3	20.3	60.5
Feb. 6	16 27.77	-25 50.9	3.584	3.340	+1.08	-5.0	20.3	67.9
Feb. 16	16 38.61	-26 41.0	3.447	3.339	+0.97	-4.8	20.2	75.5
Feb. 26	16 48.33	-27 28.9	3.306	3.338	+0.84	-4.6	20.1	83.3
Mar. 8	16 56.69	-28 15.2	3.163	3.337	+0.68	-4.5	20.0	91.3
Mar. 18	17 03.45	-29 00.5	3.022	3.337	+0.49	-4.5	19.9	99.7
Mar. 28	17 08.37	-29 45.1	2.886	3.338	+0.28	-4.4	19.8	108.4

Comet 73P-C/Schwassmann-Wachmann

Epoch = 2016 July 31.0 TT
T = 2017 Mar. 16.76991 TT
Peri. = 199.38911 e = 0.6856226
Node = 69.67864 2000.0 a = 3.0914611 AU
Incl. = 11.23677 n = 0.18132530
q = 0.9718855 AU P = 5.44 years

m1 = 11.6 + 5 log(Delta) + 12.5 log(r(t+15))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	08 40.88	+29 52.5	3.081	3.992	-0.88	+5.2	21.5	154.6
Jan. 13	08 32.09	+30 44.1	2.988	3.944	-1.00	+4.7	21.3	164.3
Jan. 23	08 22.05	+31 30.8	2.927	3.895	-1.06	+3.8	21.2	168.1
Feb. 2	08 11.50	+32 08.6	2.898	3.845	-1.02	+2.6	21.1	161.5
Feb. 12	08 01.27	+32 34.6	2.901	3.794	-0.91	+1.4	21.0	151.0
Feb. 22	07 52.21	+32 48.1	2.932	3.742	-0.72	+0.2	21.0	139.8
Mar. 3	07 44.96	+32 50.0	2.987	3.689	-0.50	-0.8	20.9	128.7
Mar. 13	07 39.95	+32 41.9	3.060	3.634	-0.26	-1.6	20.9	118.0
Mar. 23	07 37.36	+32 26.1	3.145	3.579	-0.02	-2.2	20.9	107.8
Apr. 2	07 37.18	+32 04.4	3.238	3.522	+0.21	-2.6	20.8	98.2
Apr. 12	07 39.27	+31 38.2	3.333	3.463	+0.42	-3.0	20.8	89.0
Apr. 22	07 43.45	+31 08.3	3.425	3.404	+0.60	-3.3	20.8	80.3
May 2	07 49.46	+30 35.2	3.512	3.343	+0.76	-3.6	20.7	72.1
May 12	07 57.10	+29 58.8	3.590	3.281	+0.90	-4.0	20.7	64.3
May 22	08 06.15	+29 19.0	3.657	3.217	+1.03	-4.3	20.6	56.8
June 1	08 16.41	+28 35.6	3.711	3.152	+1.13	-4.7	20.5	49.7
June 11	08 27.74	+27 48.1	3.751	3.085	+1.22	-5.2	20.4	42.9
June 21	08 39.98	+26 56.3	3.775	3.017	+1.30	-5.7	20.3	36.4
July 1	08 53.03	+25 59.8	3.783	2.948	+1.38	-6.2	20.2	30.1
July 11	09 06.79	+24 58.2	3.774	2.877	+1.44	-6.7	20.0	24.2
July 21	09 21.17	+23 51.4	3.749	2.805	+1.50	-7.2	19.8	18.6
July 31	09 36.14	+22 39.1	3.707	2.731	+1.55	-7.8	19.7	13.5
Aug. 10	09 51.65	+21 20.9	3.650	2.655	+1.60	-8.4	19.5	9.5
Aug. 20	10 07.67	+19 56.9	3.576	2.578	+1.65	-9.0	19.3	7.9
Aug. 30	10 24.22	+18 26.7	3.488	2.499	+1.71	-9.6	19.0	9.7
Sept. 9	10 41.31	+16 50.3	3.386	2.418	+1.76	-10.3	18.8	13.5
Sept.19	10 58.95	+15 07.4	3.271	2.336	+1.83	-11.0	18.5	17.9
Sept.29	11 17.23	+13 17.9	3.145	2.252	+1.90	-11.6	18.2	22.5
Oct. 9	11 36.22	+11 21.5	3.009	2.167	+1.98	-12.3	17.9	27.0
Oct. 19	11 56.02	+09 18.1	2.864	2.080	+2.08	-13.1	17.5	31.4
Oct. 29	12 16.77	+07 07.3	2.714	1.992	+2.19	-13.8	17.1	35.6
Nov. 8	12 38.67	+04 48.9	2.559	1.902	+2.33	-14.6	16.7	39.5
Nov. 18	13 01.93	+02 22.5	2.402	1.811	+2.49	-15.5	16.3	43.2
Nov. 28	13 26.85	-00 12.1	2.245	1.720	+2.69	-16.3	15.8	46.4
Dec. 8	13 53.78	-02 54.9	2.092	1.628	+2.94	-17.0	15.4	49.1
Dec. 18	14 23.15	-05 45.1	1.945	1.536	+3.23	-17.6	14.9	51.3
Dec. 28	14 55.48	-08 41.1	1.808	1.445	+3.58	-17.8	14.4	52.8
Jan. 7	15 31.29	-11 39.1	1.684	1.355	+3.98	-17.3	13.8	53.6
Jan. 17	16 11.08	-14 32.4	1.577	1.270	+4.41	-15.8	13.4	53.6
Jan. 27	16 55.18	-17 10.6	1.491	1.189	+4.82	-12.9	12.9	52.7
Feb. 6	17 43.39	-19 19.4	1.428	1.117	+5.15	-8.4	12.5	51.2
Feb. 16	18 34.89	-20 43.3	1.391	1.055	+5.32	-2.7	12.3	49.1
Feb. 26	19 28.10	-21 10.0	1.381	1.009	+5.28	+3.5	12.2	46.9
Mar. 8	20 20.91	-20 35.2	1.394	0.980	+5.05	+9.1	12.2	44.7
Mar. 18	21 11.40	-19 04.7	1.427	0.972	+4.68	+13.3	12.4	42.9
Mar. 28	21 58.24	-16 51.6	1.475	0.985	+4.25	+15.9	12.7	41.6

Comet 41P/Tuttle-Giacobini-Kresak

Epoch = 2016 July 31.0 TT
T = 2017 Apr. 12.23182 TT
Peri. = 62.12403 e = 0.6610326
Node = 141.08777 2000.0 a = 3.0832472 AU
Incl. = 9.22807 n = 0.18205036
q = 1.0451203 AU P = 5.41 years

m1 = 11.6 + 5 log(Delta) + 25.0 log(r) (r<1.5AU)
m1 = 13.4 + 5 log(Delta) + 15.0 log(r) (r>1.5AU)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	02 48.21	+04 56.9	3.477	4.043	−0.22	+1.7	.	118.8
Jan. 13	02 46.06	+05 13.7	3.578	3.999	−0.04	+2.5	.	108.4
Jan. 23	02 45.69	+05 39.2	3.688	3.954	+0.14	+3.3	.	98.5
Feb. 2	02 47.05	+06 12.0	3.800	3.908	+0.30	+3.9	.	88.9
Feb. 12	02 50.01	+06 50.6	3.911	3.861	+0.44	+4.3	.	79.8
Feb. 22	02 54.45	+07 33.9	4.016	3.812	+0.58	+4.7	.	71.1
Mar. 3	03 00.21	+08 20.4	4.112	3.763	+0.70	+4.9	.	62.7
Mar. 13	03 07.18	+09 09.1	4.197	3.712	+0.80	+5.0	.	54.7
Mar. 23	03 15.20	+09 58.9	4.267	3.661	+0.90	+5.0	.	47.0
Apr. 2	03 24.17	+10 48.8	4.321	3.608	+0.98	+4.9	.	39.6
Apr. 12	03 34.00	+11 38.0	4.358	3.554	+1.06	+4.8	.	32.5
Apr. 22	03 44.57	+12 25.7	4.378	3.498	+1.13	+4.5	.	25.6
May 2	03 55.82	+13 11.0	4.378	3.442	+1.19	+4.2	.	19.1
May 12	04 07.69	+13 53.5	4.361	3.384	+1.24	+3.9	.	13.1
May 22	04 20.10	+14 32.5	4.324	3.325	+1.29	+3.5	.	8.2
June 1	04 33.00	+15 07.4	4.269	3.265	+1.33	+3.0	.	7.0
June 11	04 46.34	+15 37.8	4.196	3.203	+1.37	+2.5	.	10.5
June 21	05 00.07	+16 03.1	4.106	3.141	+1.41	+2.0	.	15.8
July 1	05 14.14	+16 23.0	4.000	3.076	+1.44	+1.4	.	21.4
July 11	05 28.51	+16 37.0	3.878	3.011	+1.46	+0.8	.	27.3
July 21	05 43.12	+16 44.9	3.742	2.944	+1.48	+0.2	.	33.1
July 31	05 57.93	+16 46.5	3.593	2.875	+1.50	−0.5	.	39.0
Aug. 10	06 12.90	+16 41.4	3.431	2.806	+1.50	−1.2	.	44.9
Aug. 20	06 27.94	+16 29.5	3.260	2.734	+1.51	−1.9	.	50.8
Aug. 30	06 43.04	+16 10.9	3.079	2.662	+1.51	−2.5	.	56.7
Sept. 9	06 58.11	+15 45.6	2.890	2.588	+1.50	−3.2	.	62.7
Sept.19	07 13.09	+15 13.7	2.696	2.512	+1.48	−3.8	.	68.7
Sept.29	07 27.92	+14 35.5	2.498	2.435	+1.46	−4.4	.	74.8
Oct. 9	07 42.51	+13 51.5	2.298	2.356	+1.43	−4.9	22.7	80.9
Oct. 19	07 56.79	+13 02.4	2.097	2.277	+1.39	−5.3	22.1	87.2
Oct. 29	08 10.66	+12 09.1	1.897	2.195	+1.33	−5.6	21.5	93.6
Nov. 8	08 24.01	+11 12.9	1.701	2.113	+1.27	−5.7	20.9	100.1
Nov. 18	08 36.72	+10 15.7	1.510	2.029	+1.19	−5.6	20.2	106.8
Nov. 28	08 48.66	+09 19.6	1.325	1.944	+1.10	−5.1	19.4	113.7
Dec. 8	08 59.63	+08 28.4	1.150	1.859	+0.99	−4.2	18.6	120.9
Dec. 18	09 09.49	+07 46.5	0.986	1.773	+0.85	−2.6	17.8	128.4
Dec. 28	09 18.04	+07 20.7	0.833	1.687	+0.70	0.0	16.9	136.2
Jan. 7	09 25.08	+07 20.4	0.694	1.601	+0.55	+3.9	15.9	144.7
Jan. 17	09 30.59	+07 59.0	0.570	1.516	+0.41	+9.6	14.9	153.7
Jan. 27	09 34.69	+09 35.3	0.461	1.433	+0.33	+18.0	14.1	163.5
Feb. 6	09 38.03	+12 35.3	0.368	1.353	+0.42	+29.7	13.2	174.3
Feb. 16	09 42.25	+17 32.5	0.291	1.277	+0.83	+45.6	12.3	173.6
Feb. 26	09 50.58	+25 08.6	0.229	1.208	+1.96	+65.1	11.4	160.4
Mar. 8	10 10.16	+35 59.5	0.183	1.148	+4.80	+82.2	10.6	145.7
Mar. 18	10 58.17	+49 41.2	0.153	1.100	+11.60	+71.3	9.9	130.1
Mar. 28	12 54.22	+61 33.9	0.140	1.066	+17.19	−1.6	9.5	115.3

Comet 103P/Hartley

Epoch = 2016 July 31.0 TT
T = 2017 Apr. 20.51132 TT
Peri. = 181.30849 e = 0.6934416
Node = 219.72723 2000.0 a = 3.4769245 AU
Incl. = 13.59384 n = 0.15202366
q = 1.0658804 AU P = 6.48 years

m1 = 11.4 + 5 log(Delta) + 15.0 log(r(t-30))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	17 14.11	-16 36.8	5.162	4.280	+1.01	+0.2	.	23.7
Jan. 13	17 24.20	-16 35.2	5.040	4.230	+0.99	+0.6	.	31.3
Jan. 23	17 34.07	-16 28.9	4.899	4.180	+0.96	+1.1	.	38.9
Feb. 2	17 43.62	-16 17.9	4.741	4.129	+0.91	+1.6	.	46.7
Feb. 12	17 52.72	-16 02.1	4.568	4.076	+0.85	+2.1	.	54.6
Feb. 22	18 01.21	-15 41.6	4.382	4.023	+0.77	+2.5	.	62.5
Mar. 3	18 08.96	-15 16.6	4.185	3.968	+0.68	+2.9	.	70.6
Mar. 13	18 15.78	-14 47.2	3.981	3.913	+0.57	+3.3	.	78.9
Mar. 23	18 21.51	-14 14.0	3.772	3.857	+0.44	+3.7	.	87.3
Apr. 2	18 25.95	-13 37.2	3.563	3.799	+0.29	+4.0	.	96.0
Apr. 12	18 28.90	-12 57.5	3.355	3.741	+0.12	+4.2	22.9	104.9
Apr. 22	18 30.14	-12 15.5	3.154	3.681	-0.06	+4.3	22.7	114.1
May 2	18 29.51	-11 32.3	2.964	3.620	-0.27	+4.3	22.5	123.6
May 12	18 26.84	-10 48.8	2.788	3.558	-0.47	+4.2	22.2	133.4
May 22	18 22.10	-10 06.5	2.630	3.495	-0.67	+4.0	22.0	143.4
June 1	18 15.37	-09 27.0	2.496	3.431	-0.85	+3.5	21.8	153.1
June 11	18 06.91	-08 52.1	2.387	3.366	-0.97	+2.8	21.6	161.5
June 21	17 57.25	-08 23.9	2.307	3.299	-1.02	+2.0	21.4	165.0
July 1	17 47.06	-08 04.1	2.256	3.231	-0.99	+1.0	21.2	160.2
July 11	17 37.17	-07 53.9	2.234	3.162	-0.88	0.0	21.1	151.1
July 21	17 28.37	-07 53.8	2.237	3.092	-0.71	-1.0	20.9	140.8
July 31	17 21.32	-08 03.4	2.262	3.020	-0.48	-1.8	20.8	130.3
Aug. 10	17 16.48	-08 21.7	2.304	2.947	-0.24	-2.5	20.7	120.2
Aug. 20	17 14.12	-08 47.0	2.358	2.873	+0.02	-3.1	20.6	110.5
Aug. 30	17 14.30	-09 17.5	2.419	2.797	+0.27	-3.4	20.5	101.2
Sept. 9	17 16.99	-09 51.4	2.483	2.720	+0.51	-3.5	20.4	92.5
Sept.19	17 22.08	-10 26.5	2.545	2.642	+0.73	-3.5	20.3	84.3
Sept.29	17 29.41	-11 01.3	2.602	2.562	+0.94	-3.3	20.2	76.6
Oct. 9	17 38.85	-11 33.8	2.652	2.481	+1.14	-2.9	20.0	69.3
Oct. 19	17 50.26	-12 02.5	2.693	2.399	+1.32	-2.3	19.9	62.4
Oct. 29	18 03.50	-12 25.7	2.722	2.315	+1.50	-1.6	19.7	55.8
Nov. 8	18 18.50	-12 41.8	2.740	2.230	+1.66	-0.7	19.5	49.7
Nov. 18	18 35.15	-12 49.3	2.745	2.145	+1.82	+0.3	19.3	43.9
Nov. 28	18 53.39	-12 46.5	2.737	2.058	+1.98	+1.5	19.1	38.4
Dec. 8	19 13.19	-12 31.9	2.717	1.970	+2.13	+2.8	18.8	33.3
Dec. 18	19 34.49	-12 04.0	2.685	1.881	+2.28	+4.3	18.5	28.6
Dec. 28	19 57.29	-11 21.2	2.642	1.793	+2.43	+5.9	18.2	24.4
Jan. 7	20 21.60	-10 22.3	2.590	1.704	+2.58	+7.6	17.9	20.5
Jan. 17	20 47.44	-09 06.2	2.530	1.616	+2.74	+9.4	17.5	17.1
Jan. 27	21 14.85	-07 31.9	2.464	1.529	+2.91	+11.3	17.2	14.2
Feb. 6	21 43.91	-05 39.3	2.396	1.445	+3.08	+13.1	16.8	11.8
Feb. 16	22 14.69	-03 28.8	2.327	1.364	+3.26	+14.7	16.4	9.9
Feb. 26	22 47.32	-01 01.9	2.260	1.288	+3.46	+16.0	15.9	8.3
Mar. 8	23 21.88	+01 38.3	2.199	1.220	+3.66	+16.9	15.5	6.9
Mar. 18	23 58.43	+04 27.1	2.146	1.161	+3.85	+17.1	15.1	5.9
Mar. 28	00 36.98	+07 17.9	2.105	1.114	+4.04	+16.5	14.7	5.1

Comet P/2016 A3 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2017 May 2.61779 TT
Peri. = 340.16794 e = 0.3730323
Node = 187.73398 2000.0 a = 7.6449221 AU
Incl. = 8.60953 n = 0.04662775
q = 4.7931192 AU P = 21.14 years

m1 = 6.0 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	08 08.07	+10 10.4	4.382	5.305	−0.45	+1.2	20.1	157.7
Jan. 13	08 03.58	+10 22.3	4.324	5.286	−0.48	+1.7	20.0	166.8
Jan. 23	07 58.81	+10 38.9	4.295	5.267	−0.47	+2.0	20.0	169.9
Feb. 2	07 54.13	+10 59.2	4.298	5.249	−0.42	+2.3	20.0	163.1
Feb. 12	07 49.91	+11 21.8	4.331	5.231	−0.34	+2.4	20.0	153.2
Feb. 22	07 46.48	+11 45.4	4.390	5.213	−0.24	+2.3	20.0	142.8
Mar. 3	07 44.11	+12 08.6	4.474	5.195	−0.12	+2.2	20.0	132.5
Mar. 13	07 42.94	+12 30.2	4.577	5.178	+0.01	+1.9	20.0	122.3
Mar. 23	07 43.09	+12 49.4	4.696	5.161	+0.15	+1.6	20.0	112.5
Apr. 2	07 44.54	+13 05.4	4.825	5.144	+0.27	+1.2	20.1	103.1
Apr. 12	07 47.26	+13 17.6	4.960	5.127	+0.39	+0.8	20.1	94.0
Apr. 22	07 51.17	+13 25.6	5.097	5.111	+0.50	+0.4	20.2	85.2
May 2	07 56.15	+13 29.1	5.232	5.096	+0.59	−0.1	20.2	76.7
May 12	08 02.09	+13 28.1	5.362	5.080	+0.68	−0.6	20.2	68.5
May 22	08 08.86	+13 22.2	5.485	5.065	+0.75	−1.1	20.3	60.6
June 1	08 16.35	+13 11.7	5.597	5.050	+0.81	−1.5	20.3	52.9
June 11	08 24.43	+12 56.5	5.698	5.036	+0.86	−2.0	20.3	45.3
June 21	08 33.01	+12 36.8	5.784	5.022	+0.90	−2.4	20.3	38.0
July 1	08 41.99	+12 12.7	5.855	5.008	+0.93	−2.8	20.3	30.8
July 11	08 51.27	+11 44.4	5.909	4.995	+0.95	−3.2	20.3	23.7
July 21	09 00.76	+11 12.2	5.946	4.982	+0.96	−3.6	20.3	16.8
July 31	09 10.39	+10 36.5	5.965	4.969	+0.97	−3.9	20.3	10.3
Aug. 10	09 20.08	+09 57.5	5.965	4.957	+0.97	−4.2	20.3	5.6
Aug. 20	09 29.77	+09 15.8	5.947	4.945	+0.96	−4.4	20.3	7.5
Aug. 30	09 39.37	+08 31.8	5.910	4.934	+0.94	−4.6	20.3	13.6
Sept. 9	09 48.81	+07 46.0	5.855	4.923	+0.92	−4.7	20.2	20.4
Sept.19	09 58.03	+06 59.1	5.781	4.913	+0.89	−4.8	20.2	27.5
Sept.29	10 06.95	+06 11.5	5.691	4.902	+0.85	−4.7	20.1	34.8
Oct. 9	10 15.49	+05 24.1	5.585	4.893	+0.81	−4.6	20.1	42.3
Oct. 19	10 23.56	+04 37.6	5.463	4.883	+0.75	−4.5	20.0	50.0
Oct. 29	10 31.07	+03 52.8	5.329	4.875	+0.68	−4.2	20.0	57.9
Nov. 8	10 37.91	+03 10.7	5.184	4.866	+0.61	−3.9	19.9	66.0
Nov. 18	10 43.97	+02 32.2	5.030	4.858	+0.52	−3.4	19.8	74.4
Nov. 28	10 49.16	+01 58.3	4.870	4.851	+0.42	−2.8	19.7	83.1
Dec. 8	10 53.34	+01 30.1	4.708	4.844	+0.31	−2.1	19.6	92.0
Dec. 18	10 56.42	+01 08.7	4.547	4.837	+0.19	−1.4	19.6	101.3
Dec. 28	10 58.30	+00 55.1	4.392	4.831	+0.06	−0.5	19.5	110.9
Jan. 7	10 58.92	+00 50.0	4.246	4.825	−0.06	+0.4	19.4	120.9
Jan. 17	10 58.29	+00 54.0	4.115	4.820	−0.18	+1.3	19.3	131.2
Jan. 27	10 56.46	+01 07.2	4.003	4.815	−0.29	+2.2	19.3	141.8
Feb. 6	10 53.57	+01 29.1	3.914	4.811	−0.37	+2.9	19.2	152.6
Feb. 16	10 49.88	+01 58.5	3.852	4.807	−0.42	+3.5	19.2	163.4
Feb. 26	10 45.70	+02 33.5	3.819	4.803	−0.43	+3.8	19.1	173.3
Mar. 8	10 41.40	+03 11.8	3.816	4.801	−0.40	+3.9	19.1	171.8
Mar. 18	10 37.37	+03 50.5	3.844	4.798	−0.34	+3.7	19.1	161.6
Mar. 28	10 33.96	+04 27.2	3.899	4.796	−0.25	+3.2	19.2	150.9

Comet 255P/Levy

Epoch = 2016 July 31.0 TT
T = 2017 May 3.70156 TT
Peri. = 179.71012 e = 0.6679346
Node = 279.71458 2000.0 a = 3.0392968 AU
Incl. = 18.25487 n = 0.18601348
q = 1.0092453 AU P = 5.30 years

m1 = 16.8 + 5 log(Delta) + 30.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	20 07.19	-13 21.3	5.045	4.137	+0.98	+3.8	.	20.4
Jan. 13	20 17.00	-12 43.0	5.046	4.096	+1.00	+4.3	.	13.4
Jan. 23	20 27.03	-11 59.8	5.026	4.053	+1.01	+4.8	.	8.0
Feb. 2	20 37.18	-11 12.0	4.984	4.010	+1.02	+5.2	.	8.0
Feb. 12	20 47.36	-10 19.7	4.920	3.966	+1.01	+5.7	.	13.2
Feb. 22	20 57.48	-09 23.2	4.836	3.920	+1.00	+6.1	.	19.9
Mar. 3	21 07.45	-08 22.6	4.731	3.874	+0.97	+6.4	.	26.9
Mar. 13	21 17.19	-07 18.3	4.609	3.826	+0.94	+6.8	.	34.1
Mar. 23	21 26.60	-06 10.8	4.469	3.777	+0.90	+7.1	.	41.3
Apr. 2	21 35.61	-05 00.3	4.313	3.727	+0.85	+7.3	.	48.5
Apr. 12	21 44.10	-03 47.2	4.144	3.676	+0.79	+7.5	.	55.8
Apr. 22	21 51.97	-02 32.2	3.963	3.624	+0.71	+7.7	.	63.2
May 2	21 59.10	-01 15.6	3.774	3.570	+0.62	+7.7	.	70.7
May 12	22 05.35	+00 01.9	3.577	3.515	+0.52	+7.8	.	78.3
May 22	22 10.54	+01 19.5	3.377	3.459	+0.40	+7.7	.	86.1
June 1	22 14.51	+02 36.4	3.175	3.402	+0.25	+7.5	.	94.1
June 11	22 17.03	+03 51.4	2.976	3.343	+0.08	+7.2	.	102.4
June 21	22 17.86	+05 03.0	2.781	3.283	-0.11	+6.6	.	110.9
July 1	22 16.79	+06 09.2	2.595	3.222	-0.32	+5.8	.	119.7
July 11	22 13.58	+07 07.7	2.422	3.160	-0.55	+4.8	.	128.8
July 21	22 08.11	+07 55.2	2.265	3.096	-0.77	+3.3	.	138.0
July 31	22 00.41	+08 28.7	2.128	3.030	-0.97	+1.6	.	146.9
Aug. 10	21 50.70	+08 44.6	2.016	2.963	-1.11	-0.4	.	154.5
Aug. 20	21 39.58	+08 41.0	1.930	2.895	-1.17	-2.3	.	158.4
Aug. 30	21 27.88	+08 17.5	1.873	2.825	-1.13	-4.1	.	156.1
Sept. 9	21 16.63	+07 36.6	1.842	2.754	-0.98	-5.3	.	148.8
Sept.19	21 06.87	+06 43.2	1.838	2.681	-0.75	-6.0	.	139.4
Sept.29	20 59.40	+05 43.6	1.854	2.607	-0.46	-5.9	.	129.3
Oct. 9	20 54.77	+04 44.3	1.887	2.531	-0.16	-5.4	.	119.3
Oct. 19	20 53.21	+03 50.7	1.931	2.454	+0.15	-4.4	.	109.7
Oct. 29	20 54.71	+03 06.8	1.981	2.375	+0.44	-3.1	.	100.7
Nov. 8	20 59.14	+02 35.6	2.033	2.294	+0.71	-1.7	.	92.1
Nov. 18	21 06.27	+02 18.8	2.082	2.212	+0.96	-0.2	.	84.2
Nov. 28	21 15.86	+02 17.2	2.125	2.129	+1.19	+1.4	.	76.8
Dec. 8	21 27.72	+02 31.7	2.160	2.044	+1.39	+3.1	.	70.0
Dec. 18	21 41.67	+03 02.3	2.186	1.958	+1.59	+4.7	.	63.6
Dec. 28	21 57.58	+03 49.0	2.200	1.871	+1.78	+6.3	.	57.8
Jan. 7	22 15.38	+04 51.8	2.204	1.783	+1.97	+7.8	.	52.4
Jan. 17	22 35.05	+06 10.0	2.195	1.695	+2.16	+9.3	.	47.6
Jan. 27	22 56.65	+07 42.7	2.176	1.606	+2.36	+10.6	.	43.2
Feb. 6	23 20.29	+09 28.8	2.147	1.518	+2.59	+11.7	24.7	39.3
Feb. 16	23 46.15	+11 26.1	2.109	1.432	+2.83	+12.5	23.9	35.9
Feb. 26	00 14.47	+13 31.5	2.064	1.348	+3.11	+12.9	22.3	33.1
Mar. 8	00 45.54	+15 40.5	2.015	1.268	+3.41	+12.6	21.4	30.7
Mar. 18	01 19.65	+17 46.6	1.964	1.194	+3.74	+11.5	20.6	29.0
Mar. 28	01 57.03	+19 41.2	1.913	1.129	+4.07	+9.3	19.8	27.7

Comet P/2001 F1 = 2016 A4 (NEAT)

Epoch = 2016 July 31.0 TT
T = 2017 May 5.39343 TT
Peri. = 80.47953 e = 0.3582859
Node = 92.69430 2000.0 a = 6.5209529 AU
Incl. = 19.06032 n = 0.05918852
q = 4.1845874 AU P = 16.65 years

m1 = 5.0 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	07 56.54	+29 17.9	3.856	4.809	−0.57	+4.2	19.9	164.0
Jan. 13	07 50.79	+30 00.0	3.813	4.787	−0.60	+3.8	19.8	170.9
Jan. 23	07 44.75	+30 37.8	3.801	4.765	−0.58	+3.2	19.8	166.8
Feb. 2	07 38.94	+31 09.4	3.820	4.743	−0.51	+2.5	19.7	157.0
Feb. 12	07 33.85	+31 33.9	3.868	4.722	−0.39	+1.7	19.7	146.4
Feb. 22	07 29.92	+31 51.1	3.941	4.701	−0.25	+1.0	19.7	135.8
Mar. 3	07 27.45	+32 01.5	4.035	4.680	−0.08	+0.4	19.8	125.4
Mar. 13	07 26.62	+32 05.8	4.145	4.659	+0.09	−0.1	19.8	115.5
Mar. 23	07 27.48	+32 04.8	4.266	4.639	+0.25	−0.5	19.8	105.9
Apr. 2	07 30.00	+31 59.4	4.395	4.619	+0.41	−0.9	19.8	96.7
Apr. 12	07 34.06	+31 50.0	4.526	4.599	+0.55	−1.3	19.9	87.9
Apr. 22	07 39.55	+31 37.3	4.657	4.580	+0.67	−1.6	19.9	79.4
May 2	07 46.29	+31 21.3	4.783	4.561	+0.78	−1.9	19.9	71.3
May 12	07 54.13	+31 02.2	4.902	4.542	+0.88	−2.2	20.0	63.5
May 22	08 02.92	+30 40.2	5.012	4.524	+0.96	−2.5	20.0	56.0
June 1	08 12.49	+30 15.3	5.110	4.506	+1.02	−2.8	20.0	48.7
June 11	08 22.73	+29 47.6	5.196	4.489	+1.08	−3.0	20.0	41.7
June 21	08 33.51	+29 17.2	5.267	4.472	+1.12	−3.3	20.0	34.9
July 1	08 44.72	+28 44.3	5.324	4.455	+1.15	−3.5	20.0	28.3
July 11	08 56.26	+28 09.1	5.364	4.439	+1.18	−3.7	20.0	22.2
July 21	09 08.03	+27 31.8	5.387	4.423	+1.19	−3.9	20.0	16.6
July 31	09 19.96	+26 52.9	5.394	4.407	+1.20	−4.0	19.9	12.3
Aug. 10	09 31.97	+26 12.7	5.383	4.392	+1.20	−4.1	19.9	11.0
Aug. 20	09 44.00	+25 31.9	5.356	4.378	+1.20	−4.1	19.9	13.5
Aug. 30	09 55.97	+24 51.0	5.311	4.364	+1.19	−4.0	19.8	18.3
Sept. 9	10 07.83	+24 10.7	5.250	4.350	+1.17	−3.9	19.8	24.1
Sept.19	10 19.50	+23 31.8	5.173	4.337	+1.14	−3.7	19.7	30.5
Sept.29	10 30.93	+22 55.1	5.081	4.324	+1.11	−3.3	19.7	37.1
Oct. 9	10 42.03	+22 21.6	4.975	4.312	+1.07	−2.9	19.6	44.0
Oct. 19	10 52.73	+21 52.3	4.856	4.301	+1.02	−2.4	19.5	51.1
Oct. 29	11 02.94	+21 28.3	4.725	4.289	+0.96	−1.8	19.4	58.4
Nov. 8	11 12.56	+21 10.7	4.586	4.279	+0.89	−1.0	19.4	66.0
Nov. 18	11 21.48	+21 00.7	4.439	4.269	+0.81	−0.1	19.3	73.7
Nov. 28	11 29.56	+20 59.4	4.287	4.259	+0.71	+0.8	19.2	81.8
Dec. 8	11 36.67	+21 07.7	4.134	4.250	+0.60	+1.9	19.1	90.0
Dec. 18	11 42.66	+21 26.3	3.982	4.242	+0.47	+2.9	19.0	98.6
Dec. 28	11 47.37	+21 55.7	3.835	4.234	+0.33	+4.0	18.9	107.3
Jan. 7	11 50.65	+22 35.5	3.697	4.227	+0.17	+4.9	18.8	116.3
Jan. 17	11 52.40	+23 24.6	3.573	4.220	+0.01	+5.6	18.7	125.4
Jan. 27	11 52.52	+24 21.1	3.465	4.214	−0.15	+6.1	18.6	134.5
Feb. 6	11 51.04	+25 21.8	3.378	4.208	−0.29	+6.1	18.6	143.1
Feb. 16	11 48.10	+26 22.6	3.314	4.203	−0.41	+5.6	18.5	150.6
Feb. 26	11 43.96	+27 19.0	3.277	4.199	−0.50	+4.7	18.5	155.5
Mar. 8	11 39.00	+28 06.3	3.268	4.195	−0.53	+3.4	18.5	156.1
Mar. 18	11 33.74	+28 40.7	3.286	4.192	−0.50	+1.9	18.5	152.1
Mar. 28	11 28.70	+28 59.7	3.330	4.189	−0.43	+0.3	18.5	145.2

Comet C/2015 T2 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2017 May 20.82662 TT
Peri. = 30.77426
Node = 51.05964 2000.0
Incl. = 124.52467
q = 6.9354453 AU
e = 0.9984874

m1 = 7.2 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 07.49	+12 46.2	7.043	7.663	−0.51	+1.9	20.3	126.1
Jan. 13	03 02.35	+13 05.1	7.171	7.637	−0.41	+2.2	20.3	114.8
Jan. 23	02 58.23	+13 27.0	7.314	7.610	−0.31	+2.5	20.3	103.8
Feb. 2	02 55.15	+13 51.8	7.467	7.584	−0.21	+2.8	20.4	93.1
Feb. 12	02 53.08	+14 19.5	7.622	7.558	−0.11	+3.0	20.4	82.6
Feb. 22	02 51.97	+14 49.9	7.773	7.533	−0.03	+3.3	20.4	72.4
Mar. 3	02 51.71	+15 22.6	7.915	7.509	+0.05	+3.5	20.4	62.5
Mar. 13	02 52.22	+15 57.5	8.044	7.484	+0.12	+3.7	20.5	52.7
Mar. 23	02 53.38	+16 34.2	8.155	7.460	+0.17	+3.8	20.5	43.2
Apr. 2	02 55.09	+17 12.3	8.245	7.437	+0.21	+3.9	20.5	33.9
Apr. 12	02 57.23	+17 51.7	8.312	7.414	+0.25	+4.0	20.5	24.8
Apr. 22	02 59.70	+18 32.2	8.354	7.392	+0.27	+4.1	20.5	15.8
May 2	03 02.38	+19 13.4	8.369	7.370	+0.28	+4.2	20.5	7.1
May 12	03 05.18	+19 55.2	8.357	7.348	+0.28	+4.2	20.5	3.2
May 22	03 07.97	+20 37.5	8.317	7.327	+0.27	+4.3	20.4	11.2
June 1	03 10.67	+21 20.1	8.252	7.307	+0.25	+4.3	20.4	19.9
June 11	03 13.15	+22 03.0	8.161	7.287	+0.21	+4.3	20.4	28.7
June 21	03 15.29	+22 46.0	8.046	7.267	+0.17	+4.3	20.3	37.6
July 1	03 16.99	+23 29.1	7.910	7.248	+0.11	+4.3	20.3	46.5
July 11	03 18.11	+24 12.1	7.755	7.230	+0.04	+4.3	20.2	55.6
July 21	03 18.52	+24 54.8	7.585	7.212	−0.04	+4.2	20.2	64.8
July 31	03 18.09	+25 37.2	7.403	7.194	−0.14	+4.2	20.1	74.3
Aug. 10	03 16.69	+26 18.7	7.214	7.177	−0.25	+4.0	20.1	83.9
Aug. 20	03 14.17	+26 58.8	7.023	7.161	−0.37	+3.8	20.0	93.8
Aug. 30	03 10.45	+27 37.0	6.835	7.145	−0.50	+3.5	19.9	103.9
Sept. 9	03 05.44	+28 12.2	6.656	7.130	−0.63	+3.1	19.8	114.3
Sept.19	02 59.11	+28 43.3	6.493	7.115	−0.76	+2.6	19.8	124.9
Sept.29	02 51.52	+29 09.2	6.351	7.101	−0.87	+1.9	19.7	135.6
Oct. 9	02 42.80	+29 28.5	6.235	7.087	−0.96	+1.2	19.7	146.2
Oct. 19	02 33.21	+29 40.5	6.152	7.074	−1.01	+0.4	19.6	156.2
Oct. 29	02 23.06	+29 44.5	6.103	7.062	−1.03	−0.4	19.6	163.6
Nov. 8	02 12.77	+29 40.9	6.092	7.050	−1.00	−1.0	19.6	163.9
Nov. 18	02 02.75	+29 30.7	6.119	7.038	−0.94	−1.5	19.6	156.9
Nov. 28	01 53.38	+29 15.6	6.181	7.027	−0.84	−1.8	19.6	146.9
Dec. 8	01 44.97	+28 57.8	6.275	7.017	−0.72	−1.8	19.6	136.1
Dec. 18	01 37.76	+28 39.7	6.396	7.008	−0.59	−1.6	19.7	125.1
Dec. 28	01 31.85	+28 23.4	6.538	6.999	−0.46	−1.3	19.7	114.2
Jan. 7	01 27.28	+28 10.6	6.695	6.990	−0.33	−0.8	19.8	103.5
Jan. 17	01 24.00	+28 02.7	6.860	6.982	−0.21	−0.2	19.8	93.1
Jan. 27	01 21.91	+28 00.4	7.027	6.975	−0.10	+0.4	19.9	83.0
Feb. 6	01 20.91	+28 04.4	7.190	6.968	−0.01	+1.0	19.9	73.2
Feb. 16	01 20.85	+28 14.8	7.343	6.962	+0.07	+1.7	20.0	63.7
Feb. 26	01 21.58	+28 31.4	7.483	6.957	+0.14	+2.3	20.0	54.6
Mar. 8	01 22.97	+28 54.0	7.605	6.952	+0.19	+2.8	20.0	46.0
Mar. 18	01 24.87	+29 22.3	7.706	6.948	+0.23	+3.4	20.1	37.9
Mar. 28	01 27.16	+29 56.0	7.785	6.944	+0.25	+3.9	20.1	30.6

Comet 234P/LINEAR

Epoch = 2016 July 31.0 TT
T = 2017 June 1.94891 TT
Peri. = 358.14350 e = 0.2523983
Node = 179.72290 2000.0 a = 3.8091626 AU
Incl. = 11.52633 n = 0.13257444
q = 2.8477364 AU P = 7.43 years

m1 = 10.2 + 5 log(Delta) + 10.0 log(r(t-90))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 52.04	+07 28.7	2.821	3.688	−0.50	+1.3	18.3	147.5
Jan. 13	04 47.06	+07 41.3	2.882	3.665	−0.33	+2.1	18.4	137.2
Jan. 23	04 43.77	+08 02.6	2.964	3.642	−0.14	+2.9	18.4	127.0
Feb. 2	04 42.38	+08 31.1	3.063	3.619	+0.06	+3.4	18.5	117.1
Feb. 12	04 42.95	+09 05.1	3.174	3.596	+0.25	+3.8	18.5	107.5
Feb. 22	04 45.44	+09 42.9	3.292	3.573	+0.43	+4.0	18.6	98.4
Mar. 3	04 49.73	+10 22.6	3.414	3.550	+0.59	+4.0	18.6	89.7
Mar. 13	04 55.67	+11 02.8	3.535	3.527	+0.74	+3.9	18.7	81.4
Mar. 23	05 03.09	+11 42.0	3.654	3.504	+0.87	+3.7	18.7	73.6
Apr. 2	05 11.82	+12 19.0	3.766	3.481	+0.99	+3.4	18.7	66.0
Apr. 12	05 21.70	+12 52.9	3.870	3.459	+1.09	+3.0	18.8	58.8
Apr. 22	05 32.58	+13 22.7	3.965	3.436	+1.17	+2.5	18.8	51.8
May 2	05 44.32	+13 47.6	4.048	3.413	+1.25	+1.9	18.8	45.2
May 12	05 56.80	+14 07.0	4.120	3.391	+1.31	+1.3	18.8	38.7
May 22	06 09.90	+14 20.4	4.178	3.368	+1.36	+0.7	18.8	32.5
June 1	06 23.51	+14 27.5	4.223	3.346	+1.40	0.0	18.8	26.5
June 11	06 37.54	+14 27.9	4.254	3.324	+1.43	−0.6	18.8	20.7
June 21	06 51.88	+14 21.4	4.271	3.302	+1.46	−1.3	18.8	15.4
July 1	07 06.46	+14 08.1	4.273	3.280	+1.47	−2.0	18.8	10.8
July 11	07 21.20	+13 47.9	4.261	3.259	+1.48	−2.7	18.7	8.3
July 21	07 36.02	+13 20.9	4.235	3.238	+1.48	−3.3	18.7	9.5
July 31	07 50.83	+12 47.4	4.195	3.217	+1.48	−4.0	18.6	13.4
Aug. 10	08 05.59	+12 07.7	4.142	3.196	+1.46	−4.5	18.6	18.4
Aug. 20	08 20.20	+11 22.2	4.075	3.176	+1.44	−5.1	18.5	23.8
Aug. 30	08 34.61	+10 31.5	3.995	3.156	+1.41	−5.5	18.5	29.5
Sept. 9	08 48.75	+09 36.2	3.903	3.136	+1.38	−5.9	18.4	35.3
Sept.19	09 02.54	+08 37.0	3.800	3.117	+1.34	−6.2	18.3	41.4
Sept.29	09 15.90	+07 34.7	3.686	3.099	+1.29	−6.4	18.2	47.5
Oct. 9	09 28.75	+06 30.4	3.562	3.080	+1.22	−6.5	18.1	53.9
Oct. 19	09 40.99	+05 25.2	3.429	3.063	+1.15	−6.5	18.0	60.4
Oct. 29	09 52.51	+04 20.3	3.289	3.046	+1.07	−6.3	17.9	67.2
Nov. 8	10 03.17	+03 17.1	3.143	3.029	+0.97	−6.0	17.7	74.3
Nov. 18	10 12.82	+02 17.4	2.994	3.013	+0.85	−5.5	17.6	81.6
Nov. 28	10 21.30	+01 22.8	2.842	2.997	+0.71	−4.7	17.5	89.3
Dec. 8	10 28.39	+00 35.6	2.691	2.983	+0.55	−3.7	17.3	97.4
Dec. 18	10 33.91	−00 01.9	2.543	2.968	+0.37	−2.5	17.2	106.0
Dec. 28	10 37.64	−00 27.2	2.402	2.955	+0.18	−1.1	17.0	115.0
Jan. 7	10 39.39	−00 37.8	2.271	2.942	−0.03	+0.6	16.9	124.6
Jan. 17	10 39.09	−00 31.5	2.154	2.930	−0.23	+2.5	16.7	134.7
Jan. 27	10 36.74	−00 06.8	2.055	2.919	−0.42	+4.3	16.6	145.3
Feb. 6	10 32.58	+00 36.4	1.978	2.908	−0.55	+6.0	16.5	156.3
Feb. 16	10 27.10	+01 35.9	1.927	2.898	−0.61	+7.2	16.4	167.0
Feb. 26	10 20.95	+02 47.6	1.904	2.889	−0.60	+7.8	16.4	172.9
Mar. 8	10 14.96	+04 05.3	1.910	2.881	−0.50	+7.7	16.4	165.4
Mar. 18	10 09.93	+05 22.2	1.943	2.874	−0.34	+7.0	16.4	154.6
Mar. 28	10 06.50	+06 32.2	2.001	2.868	−0.14	+5.9	16.4	143.8

Comet 47P/Ashbrook-Jackson

Epoch = 2016 July 31.0 TT
T = 2017 June 10.33202 TT
Peri. = 357.70572 e = 0.3168282
Node = 356.97342 2000.0 a = 4.1249339 AU
Incl. = 13.03086 n = 0.11764639
q = 2.8180385 AU P = 8.38 years

m1 = 3.8 + 5 log(Delta) + 22.5 log(r(t+20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	17 19.13	-33 31.8	4.775	3.888	+1.44	-2.0	20.3	22.8
Jan. 13	17 33.48	-33 52.2	4.686	3.860	+1.42	-1.8	20.2	29.4
Jan. 23	17 47.70	-34 10.4	4.581	3.832	+1.40	-1.6	20.1	36.2
Feb. 2	18 01.66	-34 26.5	4.462	3.803	+1.36	-1.5	20.0	43.1
Feb. 12	18 15.24	-34 41.1	4.330	3.775	+1.31	-1.3	19.8	50.2
Feb. 22	18 28.29	-34 54.6	4.185	3.747	+1.24	-1.3	19.7	57.4
Mar. 3	18 40.68	-35 07.7	4.032	3.719	+1.16	-1.4	19.5	64.7
Mar. 13	18 52.24	-35 21.4	3.871	3.690	+1.06	-1.5	19.3	72.2
Mar. 23	19 02.80	-35 36.5	3.705	3.662	+0.94	-1.7	19.2	79.8
Apr. 2	19 12.18	-35 54.0	3.536	3.634	+0.80	-2.1	19.0	87.6
Apr. 12	19 20.16	-36 14.8	3.367	3.606	+0.64	-2.5	18.8	95.6
Apr. 22	19 26.53	-36 39.6	3.202	3.577	+0.45	-2.9	18.6	103.8
May 2	19 31.05	-37 08.8	3.042	3.549	+0.24	-3.3	18.4	112.3
May 12	19 33.49	-37 42.2	2.892	3.521	+0.02	-3.7	18.3	121.1
May 22	19 33.66	-38 18.8	2.755	3.494	-0.22	-3.8	18.1	130.1
June 1	19 31.46	-38 56.5	2.634	3.466	-0.45	-3.6	17.9	139.2
June 11	19 26.91	-39 32.2	2.534	3.438	-0.66	-3.0	17.7	148.1
June 21	19 20.30	-40 01.9	2.457	3.411	-0.82	-2.0	17.6	156.2
July 1	19 12.13	-40 21.4	2.404	3.384	-0.89	-0.6	17.5	161.5
July 11	19 03.19	-40 27.5	2.379	3.357	-0.87	+0.9	17.4	161.2
July 21	18 54.45	-40 18.6	2.380	3.331	-0.76	+2.3	17.3	155.5
July 31	18 46.80	-39 55.2	2.406	3.304	-0.58	+3.6	17.2	147.1
Aug. 10	18 41.03	-39 19.6	2.455	3.279	-0.34	+4.5	17.2	138.0
Aug. 20	18 37.63	-38 35.0	2.523	3.253	-0.08	+5.0	17.2	128.7
Aug. 30	18 36.82	-37 44.6	2.607	3.228	+0.18	+5.4	17.2	119.6
Sept. 9	18 38.61	-36 50.9	2.704	3.203	+0.42	+5.5	17.2	110.8
Sept.19	18 42.86	-35 55.6	2.810	3.179	+0.65	+5.6	17.2	102.3
Sept.29	18 49.32	-34 59.4	2.920	3.155	+0.84	+5.7	17.2	94.2
Oct. 9	18 57.76	-34 02.4	3.033	3.132	+1.01	+5.8	17.2	86.3
Oct. 19	19 07.89	-33 04.1	3.145	3.109	+1.16	+6.0	17.2	78.8
Oct. 29	19 19.46	-32 03.9	3.255	3.087	+1.28	+6.3	17.2	71.5
Nov. 8	19 32.23	-31 01.0	3.360	3.066	+1.37	+6.6	17.2	64.4
Nov. 18	19 45.98	-29 54.8	3.458	3.045	+1.45	+7.0	17.2	57.6
Nov. 28	20 00.51	-28 44.6	3.548	3.025	+1.51	+7.5	17.2	50.9
Dec. 8	20 15.66	-27 29.8	3.630	3.005	+1.56	+8.0	17.2	44.4
Dec. 18	20 31.25	-26 10.2	3.700	2.987	+1.59	+8.5	17.2	38.0
Dec. 28	20 47.17	-24 45.6	3.760	2.969	+1.61	+9.0	17.2	31.7
Jan. 7	21 03.30	-23 15.9	3.808	2.952	+1.62	+9.5	17.2	25.6
Jan. 17	21 19.52	-21 41.3	3.844	2.936	+1.62	+9.9	17.1	19.6
Jan. 27	21 35.76	-20 02.1	3.867	2.921	+1.62	+10.3	17.1	13.8
Feb. 6	21 51.95	-18 18.6	3.878	2.906	+1.61	+10.7	17.1	8.4
Feb. 16	22 08.03	-16 31.5	3.876	2.893	+1.59	+11.0	17.0	4.8
Feb. 26	22 23.96	-14 41.1	3.862	2.881	+1.57	+11.3	17.0	6.6
Mar. 8	22 39.70	-12 48.2	3.836	2.870	+1.55	+11.5	17.0	11.4
Mar. 18	22 55.20	-10 53.3	3.797	2.859	+1.52	+11.6	16.9	16.8
Mar. 28	23 10.44	-08 57.2	3.748	2.850	+1.50	+11.7	16.9	22.4

Comet C/2015 V2 (Johnson)

Epoch = 2016 July 31.0 TT
T = 2017 June 12.34633 TT
Peri. = 164.89728
Node = 69.85807 2000.0
Incl. = 49.87686
q = 1.6368898 AU
e = 1.0016289

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	07 51.97	+62 43.9	5.192	5.968	-1.19	+4.6	16.3	138.9
Jan. 13	07 40.08	+63 30.3	5.114	5.883	-1.28	+3.0	16.2	138.1
Jan. 23	07 27.27	+64 00.0	5.061	5.797	-1.27	+1.2	16.2	134.9
Feb. 2	07 14.58	+64 12.0	5.032	5.711	-1.15	-0.5	16.1	129.6
Feb. 12	07 03.07	+64 07.0	5.024	5.625	-0.94	-2.0	16.0	123.2
Feb. 22	06 53.64	+63 47.3	5.034	5.538	-0.68	-3.1	15.9	115.9
Mar. 3	06 46.86	+63 16.4	5.058	5.451	-0.39	-3.9	15.9	108.3
Mar. 13	06 42.99	+62 37.7	5.091	5.364	-0.10	-4.3	15.8	100.6
Mar. 23	06 42.03	+61 54.6	5.130	5.276	+0.18	-4.5	15.8	92.9
Apr. 2	06 43.81	+61 09.4	5.170	5.187	+0.43	-4.5	15.7	85.4
Apr. 12	06 48.08	+60 24.0	5.208	5.099	+0.65	-4.5	15.7	78.2
Apr. 22	06 54.58	+59 39.4	5.240	5.010	+0.84	-4.3	15.6	71.3
May 2	07 03.02	+58 56.0	5.264	4.920	+1.02	-4.2	15.5	64.8
May 12	07 13.17	+58 14.1	5.278	4.830	+1.16	-4.1	15.5	58.6
May 22	07 24.81	+57 33.5	5.280	4.740	+1.29	-4.0	15.4	53.0
June 1	07 37.72	+56 53.8	5.268	4.649	+1.40	-3.9	15.3	47.9
June 11	07 51.76	+56 14.7	5.241	4.558	+1.50	-3.9	15.2	43.5
June 21	08 06.78	+55 35.8	5.199	4.466	+1.59	-3.9	15.1	39.8
July 1	08 22.65	+54 56.7	5.143	4.374	+1.66	-4.0	15.0	37.0
July 11	08 39.27	+54 17.1	5.071	4.282	+1.73	-4.0	14.8	35.3
July 21	08 56.54	+53 36.8	4.984	4.189	+1.78	-4.1	14.7	34.7
July 31	09 14.39	+52 55.4	4.883	4.096	+1.84	-4.2	14.6	35.2
Aug. 10	09 32.76	+52 13.1	4.769	4.003	+1.88	-4.3	14.4	36.7
Aug. 20	09 51.58	+51 29.8	4.642	3.909	+1.92	-4.4	14.3	39.1
Aug. 30	10 10.83	+50 45.6	4.504	3.815	+1.96	-4.5	14.1	42.0
Sept. 9	10 30.47	+50 01.0	4.357	3.720	+2.00	-4.5	13.9	45.5
Sept.19	10 50.47	+49 16.2	4.201	3.626	+2.03	-4.5	13.7	49.3
Sept.29	11 10.82	+48 31.6	4.038	3.531	+2.07	-4.4	13.5	53.2
Oct. 9	11 31.50	+47 48.0	3.870	3.436	+2.10	-4.2	13.3	57.4
Oct. 19	11 52.49	+47 05.9	3.699	3.341	+2.13	-4.0	13.1	61.5
Oct. 29	12 13.77	+46 26.1	3.526	3.245	+2.15	-3.7	12.8	65.7
Nov. 8	12 35.32	+45 49.4	3.353	3.150	+2.18	-3.3	12.6	69.8
Nov. 18	12 57.08	+45 16.7	3.182	3.055	+2.19	-2.8	12.4	73.7
Nov. 28	13 19.00	+44 48.8	3.013	2.960	+2.20	-2.2	12.1	77.5
Dec. 8	13 40.98	+44 26.8	2.849	2.866	+2.19	-1.6	11.8	81.0
Dec. 18	14 02.89	+44 11.2	2.691	2.772	+2.17	-0.8	11.6	84.3
Dec. 28	14 24.56	+44 02.9	2.538	2.679	+2.12	0.0	11.3	87.3
Jan. 7	14 45.77	+44 02.5	2.391	2.587	+2.05	+0.8	11.0	90.1
Jan. 17	15 06.26	+44 10.0	2.251	2.495	+1.94	+1.6	10.7	92.5
Jan. 27	15 25.69	+44 25.7	2.116	2.406	+1.80	+2.4	10.4	94.7
Feb. 6	15 43.66	+44 49.3	1.987	2.318	+1.61	+3.0	10.1	96.6
Feb. 16	15 59.71	+45 19.5	1.862	2.233	+1.36	+3.5	9.8	98.5
Feb. 26	16 13.31	+45 54.8	1.740	2.150	+1.04	+3.7	9.5	100.3
Mar. 8	16 23.75	+46 32.3	1.620	2.070	+0.66	+3.5	9.2	102.2
Mar. 18	16 30.32	+47 06.9	1.502	1.995	+0.18	+2.4	8.9	104.2
Mar. 28	16 32.14	+47 31.4	1.385	1.925	-0.38	+0.2	8.6	106.6

Comet 227P/Catalina-LINEAR

Epoch = 2016 July 31.0 TT
T = 2017 June 22.12832 TT
Peri. = 90.23929 e = 0.5012412
Node = 49.80005 2000.0 a = 3.5850986 AU
Incl. = 6.52678 n = 0.14519525
q = 1.7880995 AU P = 6.79 years

H = 16.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	V	Elong. °
Jan. 3	23 45.32	-06 10.3	4.253	4.066	+0.57	+5.2	.	72.4
Jan. 13	23 51.05	-05 18.7	4.361	4.027	+0.67	+5.7	.	63.9
Jan. 23	23 57.79	-04 21.7	4.459	3.987	+0.76	+6.2	.	55.7
Feb. 2	00 05.41	-03 20.0	4.543	3.947	+0.84	+6.6	.	47.7
Feb. 12	00 13.80	-02 14.4	4.612	3.906	+0.90	+6.9	.	39.9
Feb. 22	00 22.85	-01 05.6	4.664	3.865	+0.96	+7.1	.	32.4
Mar. 3	00 32.46	+00 05.6	4.698	3.823	+1.01	+7.3	.	25.1
Mar. 13	00 42.55	+01 18.7	4.714	3.780	+1.05	+7.4	.	17.9
Mar. 23	00 53.06	+02 33.0	4.710	3.737	+1.08	+7.5	22.9	11.0
Apr. 2	01 03.91	+03 47.9	4.689	3.693	+1.11	+7.5	22.8	4.6
Apr. 12	01 15.05	+05 02.8	4.648	3.649	+1.14	+7.4	22.7	4.1
Apr. 22	01 26.43	+06 17.3	4.589	3.604	+1.16	+7.3	22.8	10.1
May 2	01 38.00	+07 30.8	4.513	3.558	+1.17	+7.2	22.8	16.5
May 12	01 49.72	+08 42.8	4.419	3.512	+1.18	+7.0	22.8	23.0
May 22	02 01.53	+09 52.9	4.311	3.465	+1.18	+6.8	22.8	29.5
June 1	02 13.38	+11 00.7	4.187	3.418	+1.18	+6.5	22.8	35.9
June 11	02 25.21	+12 05.7	4.050	3.370	+1.17	+6.2	22.8	42.4
June 21	02 36.95	+13 07.5	3.901	3.322	+1.16	+5.8	22.7	48.9
July 1	02 48.52	+14 06.0	3.741	3.273	+1.13	+5.5	22.7	55.4
July 11	02 59.83	+15 00.7	3.572	3.223	+1.09	+5.1	22.6	62.1
July 21	03 10.74	+15 51.4	3.396	3.174	+1.04	+4.7	22.5	68.8
July 31	03 21.14	+16 38.0	3.214	3.123	+0.97	+4.2	22.4	75.8
Aug. 10	03 30.82	+17 20.4	3.028	3.073	+0.88	+3.8	22.2	82.9
Aug. 20	03 39.59	+17 58.5	2.841	3.021	+0.76	+3.4	22.1	90.4
Aug. 30	03 47.22	+18 32.3	2.654	2.970	+0.62	+3.0	21.9	98.1
Sept. 9	03 53.39	+19 01.9	2.471	2.918	+0.44	+2.5	21.7	106.3
Sept.19	03 57.79	+19 27.4	2.295	2.866	+0.23	+2.1	21.4	114.9
Sept.29	04 00.08	+19 48.8	2.127	2.814	-0.02	+1.7	21.2	124.1
Oct. 9	03 59.92	+20 05.9	1.973	2.761	-0.28	+1.2	20.9	133.9
Oct. 19	03 57.08	+20 18.3	1.836	2.709	-0.55	+0.7	20.6	144.4
Oct. 29	03 51.54	+20 25.6	1.719	2.656	-0.80	+0.2	20.3	155.6
Nov. 8	03 43.55	+20 27.2	1.627	2.603	-0.97	-0.4	19.9	167.5
Nov. 18	03 33.85	+20 23.6	1.563	2.551	-1.03	-0.7	19.5	178.8
Nov. 28	03 23.52	+20 16.2	1.526	2.499	-0.97	-0.8	19.7	167.6
Dec. 8	03 13.86	+20 08.0	1.517	2.447	-0.77	-0.5	19.9	155.3
Dec. 18	03 06.13	+20 03.4	1.533	2.396	-0.49	+0.3	20.0	143.4
Dec. 28	03 01.22	+20 06.0	1.569	2.345	-0.16	+1.3	20.2	132.1
Jan. 7	02 59.64	+20 18.7	1.621	2.295	+0.19	+2.4	20.3	121.6
Jan. 17	03 01.54	+20 42.8	1.684	2.246	+0.53	+3.5	20.4	112.0
Jan. 27	03 06.81	+21 17.6	1.754	2.198	+0.84	+4.4	20.5	103.2
Feb. 6	03 15.25	+22 01.8	1.826	2.152	+1.13	+5.1	20.6	95.1
Feb. 16	03 26.59	+22 53.2	1.899	2.107	+1.40	+5.6	20.7	87.8
Feb. 26	03 40.56	+23 48.8	1.971	2.064	+1.64	+5.7	20.7	81.1
Mar. 8	03 56.97	+24 45.9	2.039	2.023	+1.86	+5.5	20.7	74.9
Mar. 18	04 15.57	+25 41.3	2.104	1.984	+2.06	+5.0	20.7	69.3
Mar. 28	04 36.18	+26 31.7	2.165	1.948	+2.24	+4.2	20.8	64.1

Comet P/2000 S1 (Skiff)

Epoch = 2016 July 31.0 TT
T = 2017 June 24.87599 TT
Peri. = 309.09629 e = 0.6170768
Node = 28.15978 2000.0 a = 6.6229826 AU
Incl. = 21.01846 n = 0.05782607
q = 2.5360937 AU P = 17.04 years

m1 = 5.4 + 5 log(Delta) + 22.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ / °	Elong. °
Jan. 3	15 48.07	-28 12.7	5.430	4.738	-0.33	+2.4	.	13.2/114	41.4
Jan. 13	15 57.28	-29 04.7	5.268	4.687	-0.36	+2.4	.	12.6/115	49.3
Jan. 23	16 06.07	-29 56.5	5.092	4.635	-0.39	+2.4	.	11.9/116	57.4
Feb. 2	16 14.31	-30 48.4	4.904	4.584	-0.42	+2.5	.	11.0/119	65.5
Feb. 12	16 21.83	-31 40.6	4.708	4.532	-0.45	+2.5	.	9.9/123	73.8
Feb. 22	16 28.43	-32 33.2	4.506	4.480	-0.48	+2.6	.	8.7/128	82.2
Mar. 3	16 33.94	-33 26.6	4.302	4.428	-0.52	+2.7	.	7.5/136	90.8
Mar. 13	16 38.12	-34 20.7	4.099	4.376	-0.56	+2.8	22.9	6.4/149	99.6
Mar. 23	16 40.78	-35 15.4	3.902	4.324	-0.60	+2.9	22.7	5.6/168	108.6
Apr. 2	16 41.70	-36 10.1	3.714	4.272	-0.64	+3.1	22.4	5.5/192	117.7
Apr. 12	16 40.72	-37 03.8	3.539	4.219	-0.68	+3.4	22.2	6.2/215	127.1
Apr. 22	16 37.74	-37 54.8	3.381	4.167	-0.72	+3.7	22.0	7.4/231	136.4
May 2	16 32.80	-38 40.8	3.243	4.114	-0.75	+4.0	21.8	8.7/243	145.6
May 12	16 26.08	-39 19.3	3.130	4.062	-0.77	+4.4	21.6	9.7/252	154.0
May 22	16 18.03	-39 47.7	3.043	4.010	-0.78	+4.8	21.4	10.3/260	160.0
June 1	16 09.22	-40 04.5	2.984	3.957	-0.77	+5.1	21.2	10.1/267	161.1
June 11	16 00.41	-40 09.1	2.953	3.905	-0.75	+5.4	21.1	9.2/273	156.4
June 21	15 52.38	-40 03.0	2.949	3.853	-0.72	+5.6	20.9	7.7/280	148.6
July 1	15 45.78	-39 48.8	2.969	3.801	-0.69	+5.7	20.8	5.7/289	139.6
July 11	15 41.13	-39 29.8	3.010	3.749	-0.65	+5.7	20.7	3.4/306	130.4
July 21	15 38.72	-39 09.6	3.067	3.697	-0.63	+5.6	20.6	1.9/358	121.2
July 31	15 38.68	-38 51.1	3.138	3.646	-0.60	+5.4	20.5	3.1/ 61	112.3
Aug. 10	15 40.99	-38 36.1	3.218	3.594	-0.59	+5.2	20.4	5.5/ 80	103.7
Aug. 20	15 45.56	-38 26.1	3.302	3.544	-0.58	+4.9	20.4	7.9/ 87	95.4
Aug. 30	15 52.25	-38 21.3	3.389	3.493	-0.58	+4.7	20.3	10.2/ 91	87.5
Sept. 9	16 00.92	-38 21.4	3.474	3.443	-0.59	+4.4	20.2	12.3/ 93	79.9
Sept.19	16 11.41	-38 25.7	3.555	3.393	-0.61	+4.1	20.1	14.3/ 94	72.6
Sept.29	16 23.58	-38 33.0	3.631	3.344	-0.63	+3.7	20.0	16.1/ 94	65.6
Oct. 9	16 37.30	-38 42.1	3.699	3.296	-0.65	+3.4	19.9	17.7/ 94	58.9
Oct. 19	16 52.43	-38 51.6	3.758	3.248	-0.68	+3.0	19.8	19.2/ 94	52.4
Oct. 29	17 08.87	-38 59.9	3.807	3.201	-0.70	+2.6	19.7	20.5/ 93	46.2
Nov. 8	17 26.50	-39 05.7	3.846	3.155	-0.74	+2.2	19.6	21.7/ 92	40.2
Nov. 18	17 45.17	-39 07.4	3.873	3.110	-0.77	+1.7	19.4	22.8/ 91	34.6
Nov. 28	18 04.78	-39 03.7	3.888	3.065	-0.80	+1.2	19.3	23.8/ 89	29.2
Dec. 8	18 25.17	-38 53.5	3.892	3.022	-0.83	+0.6	19.2	24.7/ 88	24.4
Dec. 18	18 46.20	-38 35.8	3.884	2.980	-0.85	0.0	19.0	25.4/ 86	20.2
Dec. 28	19 07.71	-38 09.7	3.864	2.939	-0.88	-0.7	18.9	26.1/ 84	17.1
Jan. 7	19 29.56	-37 34.9	3.834	2.899	-0.89	-1.3	18.7	26.7/ 82	15.6
Jan. 17	19 51.58	-36 50.9	3.793	2.861	-0.91	-2.1	18.6	27.1/ 80	16.1
Jan. 27	20 13.63	-35 57.8	3.743	2.825	-0.92	-2.8	18.4	27.5/ 79	18.2
Feb. 6	20 35.57	-34 56.0	3.684	2.790	-0.92	-3.6	18.3	27.8/ 77	21.5
Feb. 16	20 57.28	-33 45.9	3.616	2.757	-0.92	-4.3	18.1	28.0/ 75	25.4
Feb. 26	21 18.67	-32 28.3	3.541	2.726	-0.92	-5.1	17.9	28.0/ 74	29.7
Mar. 8	21 39.64	-31 04.2	3.460	2.696	-0.92	-5.8	17.8	28.0/ 73	34.2
Mar. 18	22 00.12	-29 34.7	3.372	2.669	-0.91	-6.6	17.6	27.8/ 72	38.7
Mar. 28	22 20.04	-28 01.0	3.280	2.645	-0.90	-7.3	17.5	27.5/ 71	43.4

Comet 71P/Clark

Epoch = 2016 July 31.0 TT
T = 2017 June 30.35568 TT
Peri. = 208.93410 e = 0.4947299
Node = 59.47628 2000.0 a = 3.1376978 AU
Incl. = 9.44265 n = 0.17733212
q = 1.5853849 AU P = 5.56 years

m1 = 10.4 + 5 log(Delta) + 15.0 log(r(t-40))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 11.29	+27 47.7	3.065	3.934	−0.68	+5.0	22.0	148.1
Jan. 13	09 04.45	+28 38.0	2.968	3.901	−0.83	+4.8	21.8	158.6
Jan. 23	08 56.15	+29 26.3	2.902	3.867	−0.91	+4.2	21.7	166.9
Feb. 2	08 47.00	+30 08.3	2.866	3.832	−0.93	+3.2	21.7	166.7
Feb. 12	08 37.74	+30 40.4	2.863	3.796	−0.86	+2.0	21.6	158.1
Feb. 22	08 29.19	+31 00.5	2.888	3.760	−0.72	+0.8	21.6	147.5
Mar. 3	08 22.03	+31 08.1	2.940	3.723	−0.53	−0.4	21.6	136.6
Mar. 13	08 16.77	+31 04.2	3.013	3.685	−0.31	−1.4	21.5	126.0
Mar. 23	08 13.72	+30 50.4	3.102	3.646	−0.08	−2.2	21.5	115.7
Apr. 2	08 12.92	+30 28.5	3.202	3.607	+0.14	−2.8	21.6	106.0
Apr. 12	08 14.32	+30 00.2	3.308	3.567	+0.34	−3.4	21.6	96.7
Apr. 22	08 17.76	+29 26.4	3.416	3.526	+0.52	−3.8	21.6	87.9
May 2	08 23.00	+28 48.0	3.522	3.484	+0.68	−4.3	21.6	79.6
May 12	08 29.85	+28 05.2	3.623	3.441	+0.82	−4.7	21.6	71.6
May 22	08 38.07	+27 18.4	3.716	3.398	+0.94	−5.1	21.5	64.1
June 1	08 47.46	+26 27.5	3.800	3.354	+1.04	−5.5	21.5	56.8
June 11	08 57.85	+25 32.5	3.871	3.309	+1.12	−5.9	21.5	49.9
June 21	09 09.09	+24 33.2	3.930	3.263	+1.19	−6.3	21.4	43.1
July 1	09 21.03	+23 29.8	3.975	3.217	+1.25	−6.8	21.4	36.7
July 11	09 33.58	+22 22.0	4.004	3.170	+1.31	−7.2	21.3	30.4
July 21	09 46.63	+21 10.1	4.019	3.122	+1.35	−7.6	21.2	24.4
July 31	10 00.12	+19 54.0	4.018	3.073	+1.39	−8.0	21.1	18.6
Aug. 10	10 13.97	+18 33.8	4.002	3.024	+1.42	−8.4	21.0	13.2
Aug. 20	10 28.15	+17 09.8	3.970	2.974	+1.45	−8.8	20.9	8.8
Aug. 30	10 42.61	+15 42.3	3.923	2.923	+1.47	−9.1	20.8	7.0
Sept. 9	10 57.33	+14 11.4	3.860	2.872	+1.49	−9.4	20.6	9.4
Sept.19	11 12.28	+12 37.7	3.784	2.820	+1.52	−9.6	20.5	14.0
Sept.29	11 27.45	+11 01.5	3.694	2.767	+1.54	−9.8	20.3	19.1
Oct. 9	11 42.84	+09 23.2	3.591	2.714	+1.56	−10.0	20.2	24.5
Oct. 19	11 58.43	+07 43.4	3.476	2.660	+1.58	−10.1	20.0	30.0
Oct. 29	12 14.22	+06 02.6	3.350	2.606	+1.60	−10.1	19.8	35.5
Nov. 8	12 30.22	+04 21.5	3.214	2.551	+1.62	−10.1	19.6	41.1
Nov. 18	12 46.41	+02 40.8	3.069	2.497	+1.64	−10.0	19.3	46.6
Nov. 28	13 02.79	+01 01.0	2.918	2.441	+1.66	−9.8	19.1	52.2
Dec. 8	13 19.35	−00 37.1	2.760	2.386	+1.67	−9.6	18.8	57.8
Dec. 18	13 36.07	−02 12.8	2.598	2.331	+1.68	−9.3	18.6	63.4
Dec. 28	13 52.91	−03 45.5	2.434	2.276	+1.69	−8.9	18.3	69.1
Jan. 7	14 09.84	−05 14.5	2.268	2.221	+1.69	−8.5	18.0	74.7
Jan. 17	14 26.78	−06 39.3	2.102	2.166	+1.69	−8.0	17.7	80.3
Jan. 27	14 43.67	−07 59.8	1.938	2.112	+1.67	−7.6	17.3	86.0
Feb. 6	15 00.37	−09 15.6	1.777	2.059	+1.64	−7.2	17.0	91.8
Feb. 16	15 16.75	−10 27.2	1.621	2.007	+1.59	−6.8	16.6	97.6
Feb. 26	15 32.61	−11 35.2	1.471	1.956	+1.51	−6.6	16.3	103.5
Mar. 8	15 47.71	−12 40.8	1.328	1.907	+1.40	−6.5	15.9	109.7
Mar. 18	16 01.75	−13 46.1	1.194	1.860	+1.26	−6.8	15.5	116.0
Mar. 28	16 14.37	−14 53.9	1.070	1.815	+1.07	−7.4	15.1	122.7

Comet 18D/Perrine-Mrkos [Orbit 3]

Epoch = 2016 July 31.0 TT
T = 2017 July 22.13392 TT
Peri. = 153.47775 e = 0.5724913
Node = 237.44540 2000.0 a = 4.1088834 AU
Incl. = 15.23022 n = 0.11833640
q = 1.7565834 AU P = 8.33 years

m1 = 11.5 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	17 27.19	-18 41.1	5.402	4.492	-0.29	-0.7	.	14.6/ 88	20.1
Jan. 13	17 37.45	-18 35.1	5.294	4.447	-0.31	-0.8	.	14.3/ 86	27.7
Jan. 23	17 47.51	-18 25.0	5.167	4.403	-0.32	-0.9	.	14.0/ 84	35.5
Feb. 2	17 57.26	-18 10.6	5.023	4.357	-0.34	-1.0	.	13.4/ 82	43.2
Feb. 12	18 06.58	-17 51.9	4.862	4.312	-0.35	-1.1	.	12.7/ 80	51.1
Feb. 22	18 15.32	-17 29.2	4.688	4.265	-0.37	-1.2	.	11.8/ 77	59.1
Mar. 3	18 23.37	-17 02.6	4.503	4.218	-0.40	-1.3	.	10.8/ 74	67.1
Mar. 13	18 30.56	-16 32.5	4.310	4.171	-0.42	-1.4	.	9.5/ 70	75.4
Mar. 23	18 36.74	-15 59.1	4.111	4.122	-0.44	-1.6	.	8.1/ 64	83.7
Apr. 2	18 41.75	-15 23.0	3.910	4.074	-0.47	-1.7	.	6.5/ 54	92.3
Apr. 12	18 45.41	-14 44.8	3.710	4.024	-0.50	-1.9	.	5.0/ 38	101.1
Apr. 22	18 47.56	-14 05.1	3.515	3.975	-0.53	-2.1	.	4.1/ 10	110.2
May 2	18 48.06	-13 24.8	3.329	3.924	-0.56	-2.2	.	4.4/335	119.5
May 12	18 46.78	-12 44.6	3.155	3.873	-0.59	-2.4	.	6.0/311	129.1
May 22	18 43.69	-12 05.7	2.999	3.822	-0.62	-2.5	.	8.0/297	139.0
June 1	18 38.86	-11 29.2	2.864	3.769	-0.65	-2.7	.	9.9/289	148.9
June 11	18 32.49	-10 56.4	2.754	3.717	-0.66	-2.8	.	11.4/284	158.4
June 21	18 24.97	-10 28.6	2.670	3.664	-0.67	-2.9	.	12.2/280	165.7
July 1	18 16.81	-10 06.8	2.616	3.610	-0.67	-2.9	.	12.2/277	165.8
July 11	18 08.64	-09 51.9	2.590	3.555	-0.66	-3.0	.	11.1/274	158.6
July 21	18 01.15	-09 44.3	2.591	3.501	-0.64	-3.0	.	9.2/270	148.9
July 31	17 54.90	-09 43.9	2.616	3.445	-0.61	-2.9	.	6.7/265	138.8
Aug. 10	17 50.36	-09 50.1	2.663	3.389	-0.59	-2.8	.	3.9/253	128.7
Aug. 20	17 47.82	-10 01.6	2.725	3.333	-0.56	-2.7	.	1.7/201	118.9
Aug. 30	17 47.42	-10 17.1	2.799	3.276	-0.54	-2.6	.	3.2/125	109.5
Sept. 9	17 49.18	-10 35.1	2.880	3.219	-0.52	-2.5	.	6.0/108	100.5
Sept.19	17 53.02	-10 54.0	2.964	3.162	-0.51	-2.4	.	8.7/102	91.9
Sept.29	17 58.82	-11 12.1	3.048	3.104	-0.51	-2.3	.	11.3/ 98	83.8
Oct. 9	18 06.45	-11 28.1	3.128	3.045	-0.51	-2.3	.	13.7/ 95	76.0
Oct. 19	18 15.74	-11 40.5	3.202	2.987	-0.51	-2.2	.	15.9/ 93	68.6
Oct. 29	18 26.54	-11 48.0	3.269	2.928	-0.52	-2.2	.	17.9/ 91	61.5
Nov. 8	18 38.71	-11 49.5	3.325	2.869	-0.53	-2.3	.	19.7/ 89	54.7
Nov. 18	18 52.10	-11 43.7	3.371	2.810	-0.55	-2.3	.	21.3/ 87	48.1
Nov. 28	19 06.59	-11 29.9	3.405	2.750	-0.57	-2.4	22.9	22.9/ 85	41.9
Dec. 8	19 22.06	-11 07.0	3.427	2.691	-0.60	-2.5	22.8	24.3/ 83	35.9
Dec. 18	19 38.40	-10 34.4	3.436	2.632	-0.62	-2.7	22.6	25.6/ 81	30.2
Dec. 28	19 55.51	-09 51.6	3.432	2.573	-0.65	-2.9	22.4	26.9/ 79	24.8
Jan. 7	20 13.31	-08 58.1	3.417	2.515	-0.69	-3.1	22.2	28.0/ 77	19.9
Jan. 17	20 31.70	-07 53.8	3.390	2.456	-0.72	-3.3	22.0	29.2/ 75	15.6
Jan. 27	20 50.64	-06 38.4	3.352	2.399	-0.76	-3.6	21.7	30.3/ 74	12.3
Feb. 6	21 10.08	-05 12.3	3.304	2.342	-0.80	-3.8	21.5	31.3/ 72	10.7
Feb. 16	21 29.98	-03 35.6	3.247	2.286	-0.85	-4.1	21.2	32.3/ 71	11.2
Feb. 26	21 50.32	-01 49.0	3.183	2.232	-0.90	-4.4	21.0	33.3/ 70	13.4
Mar. 8	22 11.11	+00 06.9	3.113	2.179	-0.95	-4.6	20.7	34.2/ 69	16.4
Mar. 18	22 32.34	+02 11.1	3.037	2.127	-1.01	-4.8	20.5	35.1/ 68	19.7
Mar. 28	22 54.07	+04 22.2	2.958	2.078	-1.07	-5.0	20.2	35.9/ 67	23.2

Comet 30P/Reinmuth

Epoch = 2016 July 31.0 TT
T = 2017 Aug. 19.10884 TT
Peri. = 13.25858 e = 0.5022161
Node = 119.71118 2000.0 a = 3.7704430 AU
Incl. = 8.12847 n = 0.13462184
q = 1.8768658 AU P = 7.32 years

m1 = 9.8 + 5 log(Delta) + 15.0 log(r(t-20))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	23 20.95	-11 15.1	4.661	4.338	+0.63	+4.9	22.8	65.0
Jan. 13	23 27.26	-10 26.2	4.763	4.301	+0.72	+5.3	22.8	56.6
Jan. 23	23 34.43	-09 32.9	4.851	4.263	+0.79	+5.7	22.8	48.5
Feb. 2	23 42.34	-08 35.9	4.924	4.225	+0.85	+6.0	22.8	40.6
Feb. 12	23 50.87	-07 35.9	4.980	4.186	+0.91	+6.2	22.7	32.9
Feb. 22	23 59.93	-06 33.7	5.017	4.146	+0.95	+6.4	22.7	25.5
Mar. 3	00 09.43	-05 29.9	5.036	4.107	+0.99	+6.5	22.6	18.3
Mar. 13	00 19.28	-04 25.1	5.035	4.066	+1.01	+6.5	22.6	11.7
Mar. 23	00 29.43	-03 20.1	5.013	4.025	+1.04	+6.5	22.5	6.6
Apr. 2	00 39.79	-02 15.4	4.973	3.983	+1.05	+6.4	22.4	7.3
Apr. 12	00 50.31	-01 11.6	4.913	3.941	+1.06	+6.2	22.3	12.7
Apr. 22	01 00.94	-00 09.3	4.835	3.899	+1.07	+6.0	22.2	19.1
May 2	01 11.61	+00 50.8	4.739	3.856	+1.07	+5.7	22.1	25.7
May 12	01 22.27	+01 48.1	4.627	3.812	+1.06	+5.4	22.0	32.4
May 22	01 32.86	+02 42.1	4.499	3.768	+1.04	+5.0	21.9	39.1
June 1	01 43.29	+03 32.2	4.357	3.723	+1.02	+4.5	21.7	45.9
June 11	01 53.51	+04 17.7	4.203	3.677	+0.99	+4.0	21.6	52.7
June 21	02 03.41	+04 57.9	4.038	3.632	+0.95	+3.4	21.4	59.6
July 1	02 12.88	+05 32.3	3.864	3.585	+0.89	+2.8	21.2	66.7
July 11	02 21.81	+06 00.1	3.683	3.538	+0.82	+2.1	21.0	73.9
July 21	02 30.04	+06 20.8	3.497	3.491	+0.74	+1.3	20.8	81.3
July 31	02 37.41	+06 33.6	3.309	3.443	+0.63	+0.4	20.6	88.9
Aug. 10	02 43.71	+06 38.0	3.121	3.395	+0.50	-0.5	20.4	96.9
Aug. 20	02 48.71	+06 33.4	2.935	3.347	+0.35	-1.4	20.2	105.2
Aug. 30	02 52.19	+06 19.3	2.756	3.297	+0.17	-2.4	20.0	113.9
Sept. 9	02 53.90	+05 55.8	2.587	3.248	-0.03	-3.3	19.7	123.1
Sept.19	02 53.63	+05 23.0	2.430	3.198	-0.24	-4.1	19.5	132.7
Sept.29	02 51.26	+04 42.3	2.292	3.148	-0.45	-4.7	19.3	142.7
Oct. 9	02 46.78	+03 55.6	2.174	3.098	-0.63	-4.9	19.1	153.0
Oct. 19	02 40.45	+03 06.3	2.082	3.047	-0.77	-4.7	18.9	162.5
Oct. 29	02 32.73	+02 19.0	2.017	2.996	-0.84	-4.0	18.7	167.9
Nov. 8	02 24.36	+01 38.7	1.981	2.945	-0.81	-2.8	18.5	163.5
Nov. 18	02 16.23	+01 10.5	1.974	2.893	-0.71	-1.3	18.4	153.8
Nov. 28	02 09.18	+00 57.8	1.992	2.842	-0.52	+0.5	18.3	142.9
Dec. 8	02 03.94	+01 02.7	2.032	2.790	-0.29	+2.3	18.3	132.2
Dec. 18	02 01.00	+01 25.2	2.090	2.739	-0.04	+3.9	18.2	121.8
Dec. 28	02 00.55	+02 04.1	2.160	2.688	+0.21	+5.3	18.2	112.0
Jan. 7	02 02.66	+02 57.4	2.238	2.637	+0.45	+6.5	18.1	102.8
Jan. 17	02 07.21	+04 02.9	2.321	2.586	+0.68	+7.5	18.1	94.2
Jan. 27	02 14.03	+05 18.2	2.404	2.535	+0.89	+8.3	18.0	86.1
Feb. 6	02 22.94	+06 41.0	2.485	2.486	+1.08	+8.8	18.0	78.6
Feb. 16	02 33.76	+08 09.3	2.561	2.436	+1.26	+9.2	17.9	71.6
Feb. 26	02 46.32	+09 41.0	2.632	2.388	+1.42	+9.3	17.8	64.9
Mar. 8	03 00.50	+11 14.5	2.696	2.340	+1.57	+9.3	17.8	58.7
Mar. 18	03 16.16	+12 47.7	2.753	2.294	+1.71	+9.1	17.7	52.9
Mar. 28	03 33.24	+14 18.9	2.801	2.249	+1.84	+8.7	17.6	47.4

Comet C/2014 B1 (Schwartz)

Epoch = 2016 July 31.0 TT
T = 2017 Sept. 9.27805 TT
Peri. = 345.78057
Node = 161.39987 2000.0
Incl. = 28.36729
q = 9.5574485 AU
e = 1.0047781

m1 = 2.0 + 5 log(Delta) + 10.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	08 10.90	-00 50.7	9.291	10.149	-0.23	+1.1	16.9	149.3
Jan. 13	08 08.61	-00 39.3	9.223	10.131	-0.24	+1.6	16.9	156.2
Jan. 23	08 06.20	-00 23.4	9.184	10.113	-0.24	+2.0	16.9	159.7
Feb. 2	08 03.80	-00 03.5	9.174	10.095	-0.22	+2.3	16.9	158.1
Feb. 12	08 01.58	+00 19.8	9.193	10.077	-0.19	+2.6	16.9	152.2
Feb. 22	07 59.69	+00 45.5	9.241	10.060	-0.15	+2.7	16.9	144.2
Mar. 3	07 58.22	+01 12.9	9.313	10.043	-0.09	+2.8	16.9	135.4
Mar. 13	07 57.29	+01 40.8	9.408	10.026	-0.03	+2.8	16.9	126.1
Mar. 23	07 56.97	+02 08.6	9.520	10.010	+0.03	+2.7	16.9	116.8
Apr. 2	07 57.27	+02 35.3	9.647	9.993	+0.10	+2.5	16.9	107.5
Apr. 12	07 58.23	+03 00.2	9.782	9.977	+0.16	+2.3	16.9	98.4
Apr. 22	07 59.83	+03 22.8	9.922	9.962	+0.22	+2.0	17.0	89.3
May 2	08 02.03	+03 42.7	10.063	9.946	+0.28	+1.7	17.0	80.5
May 12	08 04.79	+03 59.5	10.200	9.931	+0.33	+1.4	17.0	71.8
May 22	08 08.07	+04 13.1	10.330	9.916	+0.37	+1.0	17.0	63.3
June 1	08 11.80	+04 23.3	10.449	9.902	+0.41	+0.7	17.1	55.0
June 11	08 15.93	+04 30.0	10.554	9.887	+0.44	+0.3	17.1	46.8
June 21	08 20.37	+04 33.5	10.644	9.873	+0.47	0.0	17.1	38.9
July 1	08 25.07	+04 33.6	10.714	9.860	+0.49	-0.3	17.1	31.3
July 11	08 29.97	+04 30.7	10.765	9.846	+0.50	-0.6	17.1	24.1
July 21	08 34.99	+04 25.0	10.795	9.833	+0.51	-0.8	17.1	17.9
July 31	08 40.08	+04 16.5	10.802	9.820	+0.51	-1.1	17.1	14.0
Aug. 10	08 45.17	+04 05.8	10.786	9.807	+0.50	-1.3	17.1	14.3
Aug. 20	08 50.18	+03 53.0	10.748	9.795	+0.49	-1.4	17.1	18.7
Aug. 30	08 55.07	+03 38.6	10.687	9.783	+0.47	-1.6	17.0	25.2
Sept. 9	08 59.76	+03 23.0	10.605	9.772	+0.44	-1.6	17.0	32.6
Sept.19	09 04.19	+03 06.6	10.502	9.760	+0.41	-1.7	17.0	40.5
Sept.29	09 08.29	+02 50.0	10.380	9.749	+0.37	-1.6	17.0	48.7
Oct. 9	09 12.00	+02 33.6	10.242	9.738	+0.33	-1.6	16.9	57.2
Oct. 19	09 15.26	+02 18.1	10.091	9.728	+0.27	-1.4	16.9	66.0
Oct. 29	09 18.01	+02 04.0	9.929	9.718	+0.22	-1.2	16.9	74.9
Nov. 8	09 20.19	+01 51.9	9.760	9.708	+0.16	-0.9	16.8	84.1
Nov. 18	09 21.77	+01 42.5	9.588	9.698	+0.09	-0.6	16.8	93.5
Nov. 28	09 22.71	+01 36.4	9.418	9.689	+0.03	-0.2	16.7	103.0
Dec. 8	09 23.00	+01 34.1	9.255	9.680	-0.03	+0.2	16.7	112.8
Dec. 18	09 22.67	+01 36.0	9.104	9.671	-0.09	+0.6	16.7	122.7
Dec. 28	09 21.73	+01 42.4	8.968	9.663	-0.15	+1.1	16.6	132.7
Jan. 7	09 20.27	+01 53.4	8.854	9.655	-0.19	+1.6	16.6	142.7
Jan. 17	09 18.39	+02 09.0	8.764	9.647	-0.22	+2.0	16.6	152.5
Jan. 27	09 16.21	+02 28.6	8.701	9.640	-0.23	+2.3	16.5	161.4
Feb. 6	09 13.87	+02 51.9	8.669	9.633	-0.23	+2.6	16.5	167.1
Feb. 16	09 11.54	+03 17.8	8.667	9.626	-0.22	+2.8	16.5	165.4
Feb. 26	09 09.37	+03 45.6	8.695	9.619	-0.19	+2.9	16.5	157.9
Mar. 8	09 07.50	+04 14.2	8.752	9.613	-0.14	+2.8	16.5	148.6
Mar. 18	09 06.07	+04 42.6	8.836	9.607	-0.09	+2.7	16.6	138.9
Mar. 28	09 05.17	+05 09.9	8.942	9.602	-0.03	+2.5	16.6	129.0

Comet P/2010 H2 (Vales)

Epoch = 2016 July 31.0 TT
T = 2017 Sept. 16.97148 TT
Peri. = 129.65461 e = 0.1936491
Node = 64.29692 2000.0 a = 3.8410532 AU
Incl. = 14.26199 n = 0.13092681
q = 3.0972367 AU P = 7.53 years

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ / °	Elong. °
Jan. 3	05 38.42	+31 32.2	2.930	3.875	−0.74	−2.8	21.2	9.5/276	161.7
Jan. 13	05 31.04	+31 41.0	2.971	3.859	−0.72	−2.9	21.2	7.5/273	150.7
Jan. 23	05 25.19	+31 44.7	3.039	3.842	−0.69	−3.0	21.2	5.0/271	139.6
Feb. 2	05 21.29	+31 45.0	3.129	3.825	−0.66	−3.0	21.2	2.2/267	128.8
Feb. 12	05 19.55	+31 43.7	3.237	3.807	−0.64	−2.9	21.3	0.6/104	118.5
Feb. 22	05 20.05	+31 42.2	3.357	3.790	−0.61	−2.8	21.3	3.3/ 92	108.6
Mar. 3	05 22.67	+31 41.2	3.485	3.773	−0.59	−2.6	21.4	5.9/ 90	99.3
Mar. 13	05 27.27	+31 40.9	3.616	3.756	−0.57	−2.4	21.4	8.2/ 89	90.3
Mar. 23	05 33.66	+31 41.4	3.747	3.739	−0.55	−2.3	21.5	10.2/ 89	81.9
Apr. 2	05 41.61	+31 42.0	3.875	3.721	−0.54	−2.1	21.5	11.9/ 89	73.8
Apr. 12	05 50.95	+31 42.2	3.996	3.704	−0.54	−1.8	21.5	13.4/ 90	66.0
Apr. 22	06 01.48	+31 41.4	4.109	3.687	−0.53	−1.6	21.6	14.7/ 90	58.6
May 2	06 13.01	+31 38.8	4.211	3.669	−0.53	−1.4	21.6	15.8/ 91	51.5
May 12	06 25.41	+31 33.9	4.302	3.652	−0.53	−1.2	21.6	16.8/ 92	44.6
May 22	06 38.51	+31 26.2	4.379	3.635	−0.53	−1.0	21.6	17.6/ 93	38.0
June 1	06 52.20	+31 15.1	4.443	3.618	−0.53	−0.7	21.6	18.2/ 94	31.5
June 11	07 06.35	+31 00.4	4.491	3.600	−0.53	−0.5	21.6	18.8/ 95	25.4
June 21	07 20.86	+30 41.9	4.525	3.583	−0.53	−0.2	21.6	19.2/ 96	19.5
July 1	07 35.62	+30 19.6	4.543	3.566	−0.53	0.0	21.6	19.6/ 97	14.2
July 11	07 50.56	+29 53.5	4.546	3.549	−0.54	+0.2	21.5	19.8/ 98	10.1
July 21	08 05.57	+29 23.7	4.532	3.532	−0.54	+0.5	21.5	20.0/ 99	9.0
July 31	08 20.59	+28 50.7	4.504	3.516	−0.55	+0.7	21.5	20.0/ 99	11.6
Aug. 10	08 35.55	+28 14.7	4.460	3.499	−0.55	+1.0	21.4	20.0/100	16.3
Aug. 20	08 50.37	+27 36.5	4.401	3.482	−0.56	+1.3	21.3	19.9/101	21.8
Aug. 30	09 04.99	+26 56.5	4.328	3.466	−0.56	+1.5	21.3	19.7/101	27.7
Sept. 9	09 19.34	+26 15.7	4.241	3.450	−0.57	+1.8	21.2	19.3/101	33.8
Sept.19	09 33.35	+25 34.9	4.141	3.434	−0.58	+2.1	21.1	18.9/101	40.1
Sept.29	09 46.96	+24 55.2	4.030	3.418	−0.59	+2.3	21.0	18.3/101	46.5
Oct. 9	10 00.08	+24 17.8	3.907	3.402	−0.60	+2.6	20.9	17.5/101	53.1
Oct. 19	10 12.61	+23 43.9	3.774	3.387	−0.62	+2.9	20.8	16.6/ 99	60.0
Oct. 29	10 24.47	+23 14.9	3.633	3.372	−0.63	+3.2	20.7	15.4/ 98	67.0
Nov. 8	10 35.51	+22 52.4	3.486	3.357	−0.65	+3.6	20.6	14.0/ 95	74.3
Nov. 18	10 45.59	+22 37.9	3.335	3.342	−0.68	+3.9	20.5	12.4/ 92	81.9
Nov. 28	10 54.56	+22 33.1	3.182	3.328	−0.71	+4.3	20.3	10.6/ 86	89.8
Dec. 8	11 02.20	+22 39.2	3.030	3.314	−0.74	+4.7	20.2	8.6/ 77	98.0
Dec. 18	11 08.30	+22 57.6	2.882	3.300	−0.78	+5.1	20.1	6.7/ 62	106.6
Dec. 28	11 12.63	+23 28.7	2.742	3.287	−0.83	+5.5	19.9	5.4/ 36	115.5
Jan. 7	11 14.97	+24 12.2	2.613	3.274	−0.88	+5.8	19.8	5.4/ 3	124.7
Jan. 17	11 15.15	+25 06.5	2.499	3.261	−0.93	+6.1	19.7	6.8/336	134.1
Jan. 27	11 13.09	+26 08.3	2.405	3.249	−0.98	+6.3	19.6	8.5/319	143.4
Feb. 6	11 08.90	+27 12.4	2.333	3.237	−1.03	+6.4	19.5	10.0/307	151.9
Feb. 16	11 02.92	+28 12.5	2.287	3.225	−1.07	+6.3	19.4	10.7/298	158.1
Feb. 26	10 55.73	+29 01.8	2.269	3.214	−1.09	+6.1	19.4	10.5/289	159.3
Mar. 8	10 48.13	+29 34.7	2.278	3.203	−1.09	+5.8	19.4	9.4/278	154.7
Mar. 18	10 40.99	+29 47.5	2.313	3.193	−1.08	+5.4	19.4	7.8/264	146.9
Mar. 28	10 35.07	+29 39.5	2.371	3.183	−1.04	+5.0	19.4	6.0/243	137.9

Comet 213P/Van Ness

Epoch = 2016 July 31.0 TT
T = 2017 Sept. 24.16451 TT
Peri. = 5.40306 e = 0.4075765
Node = 311.36770 2000.0 a = 3.3501227 AU
Incl. = 10.37942 n = 0.16073595
q = 1.9846914 AU P = 6.13 years

m1 = 7.2 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	12 26.59	-11 12.6	3.916	4.059	+0.25	-4.6	20.8	91.2
Jan. 13	12 29.07	-11 58.4	3.735	4.031	+0.10	-3.8	20.7	100.5
Jan. 23	12 30.04	-12 36.6	3.558	4.003	-0.07	-2.9	20.5	110.0
Feb. 2	12 29.37	-13 05.9	3.390	3.975	-0.24	-1.9	20.3	120.0
Feb. 12	12 26.97	-13 24.8	3.236	3.946	-0.41	-0.7	20.2	130.2
Feb. 22	12 22.88	-13 31.9	3.100	3.916	-0.56	+0.5	20.0	140.8
Mar. 3	12 17.26	-13 26.5	2.987	3.886	-0.68	+1.8	19.9	151.4
Mar. 13	12 10.42	-13 08.4	2.900	3.856	-0.75	+2.9	19.8	161.4
Mar. 23	12 02.87	-12 39.0	2.843	3.825	-0.77	+3.8	19.7	168.3
Apr. 2	11 55.20	-12 00.7	2.816	3.793	-0.72	+4.4	19.6	165.6
Apr. 12	11 48.02	-11 17.0	2.819	3.761	-0.61	+4.5	19.5	156.6
Apr. 22	11 41.90	-10 32.4	2.850	3.728	-0.46	+4.2	19.5	146.2
May 2	11 37.25	-09 50.8	2.905	3.694	-0.29	+3.5	19.4	135.8
May 12	11 34.34	-09 15.5	2.979	3.660	-0.11	+2.6	19.4	125.6
May 22	11 33.27	-08 49.1	3.069	3.626	+0.07	+1.6	19.4	115.8
June 1	11 34.02	-08 33.0	3.170	3.591	+0.25	+0.5	19.4	106.5
June 11	11 36.51	-08 27.7	3.276	3.556	+0.41	-0.6	19.4	97.6
June 21	11 40.59	-08 33.5	3.385	3.520	+0.55	-1.6	19.4	89.2
July 1	11 46.12	-08 49.7	3.492	3.483	+0.68	-2.6	19.4	81.1
July 11	11 52.94	-09 15.8	3.596	3.447	+0.80	-3.5	19.4	73.4
July 21	12 00.92	-09 51.0	3.693	3.409	+0.90	-4.3	19.4	66.0
July 31	12 09.92	-10 34.5	3.781	3.371	+0.99	-5.1	19.3	58.9
Aug. 10	12 19.85	-11 25.4	3.859	3.333	+1.08	-5.7	19.3	52.0
Aug. 20	12 30.61	-12 22.8	3.926	3.294	+1.15	-6.3	19.2	45.4
Aug. 30	12 42.12	-13 25.9	3.979	3.255	+1.22	-6.8	19.2	38.9
Sept. 9	12 54.35	-14 33.8	4.019	3.216	+1.29	-7.2	19.1	32.6
Sept.19	13 07.23	-15 45.6	4.044	3.176	+1.35	-7.5	19.0	26.4
Sept.29	13 20.73	-17 00.6	4.054	3.136	+1.41	-7.7	18.9	20.5
Oct. 9	13 34.83	-18 17.9	4.049	3.095	+1.47	-7.9	18.8	14.9
Oct. 19	13 49.50	-19 36.6	4.029	3.054	+1.52	-7.9	18.7	10.2
Oct. 29	14 04.72	-20 55.8	3.994	3.013	+1.58	-7.9	18.6	7.8
Nov. 8	14 20.48	-22 14.8	3.944	2.972	+1.63	-7.8	18.5	9.6
Nov. 18	14 36.76	-23 32.6	3.879	2.930	+1.68	-7.6	18.3	14.0
Nov. 28	14 53.53	-24 48.3	3.801	2.888	+1.72	-7.3	18.2	19.3
Dec. 8	15 10.76	-26 01.0	3.709	2.846	+1.77	-6.9	18.0	25.0
Dec. 18	15 28.42	-27 10.1	3.605	2.804	+1.80	-6.4	17.8	30.7
Dec. 28	15 46.46	-28 14.6	3.490	2.762	+1.84	-5.9	17.6	36.6
Jan. 7	16 04.81	-29 13.8	3.364	2.721	+1.86	-5.3	17.4	42.4
Jan. 17	16 23.39	-30 07.2	3.230	2.679	+1.87	-4.7	17.2	48.3
Jan. 27	16 42.12	-30 54.2	3.088	2.637	+1.87	-4.0	17.0	54.3
Feb. 6	17 00.85	-31 34.6	2.940	2.596	+1.86	-3.4	16.8	60.3
Feb. 16	17 19.45	-32 08.1	2.787	2.555	+1.83	-2.7	16.6	66.3
Feb. 26	17 37.78	-32 34.9	2.631	2.514	+1.78	-2.0	16.3	72.3
Mar. 8	17 55.63	-32 55.2	2.473	2.474	+1.72	-1.4	16.1	78.5
Mar. 18	18 12.80	-33 09.6	2.316	2.435	+1.62	-0.9	15.8	84.7
Mar. 28	18 29.05	-33 18.7	2.159	2.396	+1.50	-0.5	15.5	91.1

Comet 18D/Perrine-Mrkos [Orbit 1]

Epoch = 2016 July 31.0 TT
T = 2017 Oct. 11.20430 TT
Peri. = 152.16985 e = 0.5727780
Node = 236.76810 2000.0 a = 4.1952072 AU
Incl. = 13.34749 n = 0.11470278
q = 1.7922848 AU P = 8.59 years

m1 = 11.5 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	17 02.75	-19 50.0	5.720	4.850	-0.27	-0.4	.	13.1/ 91	25.4
Jan. 13	17 12.02	-19 51.4	5.600	4.810	-0.28	-0.5	.	12.7/ 89	33.4
Jan. 23	17 20.99	-19 49.4	5.462	4.769	-0.29	-0.5	.	12.1/ 88	41.5
Feb. 2	17 29.54	-19 44.0	5.306	4.728	-0.30	-0.6	.	11.3/ 86	49.6
Feb. 12	17 37.54	-19 35.1	5.136	4.686	-0.32	-0.7	.	10.4/ 84	57.9
Feb. 22	17 44.84	-19 22.9	4.953	4.643	-0.33	-0.7	.	9.3/ 81	66.2
Mar. 3	17 51.31	-19 07.5	4.761	4.600	-0.35	-0.8	.	8.0/ 77	74.7
Mar. 13	17 56.79	-18 49.4	4.563	4.557	-0.37	-0.9	.	6.5/ 72	83.4
Mar. 23	18 01.11	-18 28.7	4.362	4.513	-0.39	-1.0	.	4.9/ 62	92.3
Apr. 2	18 04.14	-18 05.8	4.161	4.468	-0.41	-1.1	.	3.3/ 42	101.4
Apr. 12	18 05.71	-17 41.2	3.966	4.423	-0.44	-1.2	.	2.6/ 0	110.8
Apr. 22	18 05.72	-17 15.3	3.780	4.377	-0.46	-1.3	.	3.6/319	120.5
May 2	18 04.08	-16 48.6	3.608	4.331	-0.48	-1.3	.	5.5/300	130.5
May 12	18 00.79	-16 21.4	3.454	4.284	-0.50	-1.4	.	7.5/291	140.7
May 22	17 55.95	-15 54.5	3.322	4.237	-0.51	-1.4	.	9.3/286	151.2
June 1	17 49.80	-15 28.5	3.215	4.189	-0.52	-1.5	.	10.6/283	161.5
June 11	17 42.67	-15 04.1	3.137	4.140	-0.53	-1.5	.	11.2/281	170.1
June 21	17 35.07	-14 42.3	3.088	4.091	-0.52	-1.5	.	11.1/279	169.6
July 1	17 27.53	-14 23.8	3.069	4.042	-0.51	-1.5	.	10.2/278	160.6
July 11	17 20.60	-14 09.6	3.078	3.992	-0.50	-1.4	.	8.5/276	150.2
July 21	17 14.79	-14 00.2	3.112	3.941	-0.48	-1.4	.	6.3/274	139.6
July 31	17 10.45	-13 55.8	3.167	3.890	-0.46	-1.4	.	3.8/269	129.3
Aug. 10	17 07.84	-13 56.4	3.240	3.838	-0.44	-1.3	.	1.2/246	119.2
Aug. 20	17 07.08	-14 01.5	3.325	3.786	-0.43	-1.3	.	1.8/119	109.6
Aug. 30	17 08.17	-14 10.2	3.417	3.733	-0.41	-1.3	.	4.4/105	100.3
Sept. 9	17 11.08	-14 21.6	3.513	3.680	-0.40	-1.2	.	6.8/101	91.5
Sept.19	17 15.70	-14 34.6	3.609	3.626	-0.40	-1.2	.	9.1/ 99	83.0
Sept.29	17 21.90	-14 48.0	3.701	3.572	-0.40	-1.2	.	11.2/ 97	74.8
Oct. 9	17 29.58	-15 00.6	3.786	3.517	-0.40	-1.2	.	13.1/ 95	66.9
Oct. 19	17 38.58	-15 11.5	3.862	3.462	-0.40	-1.2	.	14.8/ 93	59.3
Oct. 29	17 48.77	-15 19.4	3.927	3.406	-0.41	-1.2	.	16.3/ 92	52.0
Nov. 8	18 00.06	-15 23.3	3.979	3.350	-0.42	-1.3	25.0	17.7/ 90	44.8
Nov. 18	18 12.29	-15 22.3	4.017	3.293	-0.44	-1.3	24.9	18.9/ 88	37.9
Nov. 28	18 25.38	-15 15.6	4.040	3.236	-0.45	-1.4	24.7	20.1/ 87	31.2
Dec. 8	18 39.21	-15 02.3	4.047	3.179	-0.47	-1.6	24.6	21.1/ 85	24.7
Dec. 18	18 53.69	-14 41.9	4.037	3.121	-0.49	-1.7	24.4	22.0/ 83	18.7
Dec. 28	19 08.72	-14 13.6	4.012	3.063	-0.52	-1.9	24.2	22.8/ 81	13.2
Jan. 7	19 24.21	-13 37.1	3.971	3.005	-0.54	-2.0	24.1	23.6/ 79	9.2
Jan. 17	19 40.08	-12 52.0	3.915	2.946	-0.57	-2.3	23.8	24.3/ 78	8.7
Jan. 27	19 56.26	-11 58.1	3.844	2.888	-0.60	-2.5	23.6	24.9/ 76	11.9
Feb. 6	20 12.68	-10 55.2	3.760	2.829	-0.63	-2.8	23.4	25.5/ 74	16.7
Feb. 16	20 29.27	-09 43.4	3.663	2.771	-0.67	-3.0	23.2	26.1/ 72	21.9
Feb. 26	20 46.01	-08 22.6	3.554	2.712	-0.71	-3.3	23.2	26.6/ 71	27.2
Mar. 8	21 02.84	-06 53.0	3.436	2.653	-0.75	-3.7	22.7	27.0/ 69	32.5
Mar. 18	21 19.74	-05 15.0	3.309	2.595	-0.80	-4.0	22.4	27.5/ 67	37.8
Mar. 28	21 36.69	-03 28.7	3.175	2.537	-0.85	-4.4	22.1	27.9/ 66	43.0

Comet 65P/Gunn

Epoch = 2016 July 31.0 TT
T = 2017 Oct. 15.42839 TT
Peri. = 213.22857 e = 0.2513996
Node = 62.06345 2000.0 a = 3.8887819 AU
Incl. = 9.17531 n = 0.12852384
q = 2.9111437 AU P = 7.67 years

m1 = 4.4 + 5 log(Delta) + 17.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	12 05.32	+10 13.2	3.665	4.025	+0.21	+1.0	17.8	104.5
Jan. 13	12 07.47	+10 23.4	3.501	4.004	+0.05	+2.0	17.7	114.0
Jan. 23	12 08.02	+10 43.9	3.348	3.982	−0.11	+3.0	17.5	124.0
Feb. 2	12 06.89	+11 13.8	3.210	3.961	−0.28	+3.8	17.4	134.2
Feb. 12	12 04.07	+11 51.5	3.092	3.939	−0.44	+4.3	17.3	144.7
Feb. 22	11 59.70	+12 34.3	2.999	3.918	−0.56	+4.4	17.2	155.1
Mar. 3	11 54.07	+13 18.5	2.932	3.896	−0.65	+4.2	17.1	164.3
Mar. 13	11 47.59	+14 00.2	2.895	3.874	−0.68	+3.5	17.0	168.3
Mar. 23	11 40.82	+14 35.0	2.888	3.852	−0.65	+2.5	17.0	162.9
Apr. 2	11 34.36	+14 59.8	2.910	3.830	−0.56	+1.3	16.9	153.3
Apr. 12	11 28.74	+15 12.3	2.958	3.807	−0.43	−0.1	16.9	143.1
Apr. 22	11 24.40	+15 11.7	3.029	3.785	−0.28	−1.4	16.9	132.8
May 2	11 21.63	+14 58.2	3.119	3.763	−0.11	−2.6	16.9	122.9
May 12	11 20.55	+14 32.6	3.223	3.740	+0.06	−3.6	17.0	113.4
May 22	11 21.18	+13 56.3	3.336	3.718	+0.23	−4.6	17.0	104.3
June 1	11 23.44	+13 10.7	3.455	3.695	+0.38	−5.4	17.0	95.6
June 11	11 27.21	+12 16.9	3.576	3.672	+0.51	−6.1	17.1	87.4
June 21	11 32.34	+11 16.1	3.696	3.650	+0.63	−6.7	17.1	79.4
July 1	11 38.67	+10 09.4	3.813	3.627	+0.74	−7.2	17.1	71.8
July 11	11 46.06	+08 57.6	3.923	3.604	+0.83	−7.6	17.1	64.5
July 21	11 54.37	+07 41.6	4.025	3.582	+0.91	−8.0	17.1	57.4
July 31	12 03.48	+06 21.9	4.117	3.559	+0.98	−8.3	17.1	50.5
Aug. 10	12 13.30	+04 59.3	4.198	3.537	+1.04	−8.5	17.1	43.8
Aug. 20	12 23.74	+03 34.3	4.266	3.514	+1.10	−8.7	17.1	37.2
Aug. 30	12 34.71	+02 07.6	4.321	3.492	+1.15	−8.8	17.1	30.7
Sept. 9	12 46.16	+00 39.7	4.362	3.470	+1.19	−8.8	17.1	24.4
Sept.19	12 58.02	−00 48.8	4.388	3.447	+1.22	−8.8	17.0	18.1
Sept.29	13 10.25	−02 17.3	4.399	3.425	+1.26	−8.8	17.0	12.0
Oct. 9	13 22.81	−03 45.2	4.394	3.404	+1.28	−8.7	16.9	6.5
Oct. 19	13 35.64	−05 11.9	4.373	3.382	+1.31	−8.5	16.9	4.8
Oct. 29	13 48.69	−06 36.9	4.337	3.360	+1.32	−8.3	16.8	9.2
Nov. 8	14 01.92	−07 59.5	4.285	3.339	+1.33	−8.0	16.7	15.2
Nov. 18	14 15.27	−09 19.1	4.218	3.318	+1.34	−7.6	16.6	21.5
Nov. 28	14 28.68	−10 35.4	4.137	3.298	+1.34	−7.2	16.6	27.9
Dec. 8	14 42.07	−11 47.6	4.041	3.277	+1.33	−6.8	16.5	34.5
Dec. 18	14 55.34	−12 55.5	3.932	3.257	+1.31	−6.3	16.3	41.2
Dec. 28	15 08.41	−13 58.6	3.812	3.237	+1.27	−5.8	16.2	48.0
Jan. 7	15 21.15	−14 56.7	3.681	3.218	+1.23	−5.3	16.1	54.9
Jan. 17	15 33.42	−15 49.7	3.540	3.199	+1.17	−4.8	16.0	62.0
Jan. 27	15 45.08	−16 37.6	3.393	3.180	+1.08	−4.3	15.8	69.2
Feb. 6	15 55.92	−17 20.4	3.240	3.162	+0.98	−3.8	15.7	76.7
Feb. 16	16 05.76	−17 58.5	3.083	3.144	+0.86	−3.4	15.6	84.4
Feb. 26	16 14.36	−18 32.3	2.926	3.126	+0.71	−3.0	15.4	92.3
Mar. 8	16 21.48	−19 02.2	2.770	3.110	+0.54	−2.7	15.2	100.6
Mar. 18	16 26.87	−19 28.8	2.619	3.093	+0.34	−2.4	15.1	109.2
Mar. 28	16 30.29	−19 52.7	2.476	3.078	+0.12	−2.2	14.9	118.3

Comet 183P/Korlevic-Juric

Epoch = 2016 July 31.0 TT
T = 2017 Nov. 10.53306 TT
Peri. = 161.14126 e = 0.1366816
Node = 5.84400 2000.0 a = 4.4861866 AU
Incl. = 18.75400 n = 0.10372611
q = 3.8730074 AU P = 9.50 years

m1 = 4.0 + 5 log(Delta) + 20.0 log(r(t-300))

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	04 36.50	+44 58.3	3.517	4.358	−0.55	−3.4	20.1	144.8
Jan. 13	04 30.96	+44 24.4	3.586	4.347	−0.34	−3.8	20.2	136.0
Jan. 23	04 27.51	+43 46.0	3.675	4.336	−0.12	−4.0	20.2	126.7
Feb. 2	04 26.30	+43 06.4	3.782	4.325	+0.10	−3.8	20.2	117.4
Feb. 12	04 27.30	+42 28.4	3.902	4.314	+0.31	−3.5	20.3	108.2
Feb. 22	04 30.39	+41 53.6	4.031	4.302	+0.50	−3.1	20.3	99.3
Mar. 3	04 35.39	+41 23.0	4.164	4.291	+0.67	−2.6	20.4	90.7
Mar. 13	04 42.08	+40 56.6	4.297	4.280	+0.82	−2.2	20.4	82.4
Mar. 23	04 50.25	+40 34.3	4.428	4.270	+0.95	−1.9	20.5	74.4
Apr. 2	04 59.70	+40 15.3	4.553	4.259	+1.06	−1.6	20.5	66.7
Apr. 12	05 10.25	+39 58.9	4.671	4.248	+1.15	−1.5	20.6	59.3
Apr. 22	05 21.74	+39 44.2	4.778	4.237	+1.23	−1.4	20.6	52.2
May 2	05 33.99	+39 30.5	4.873	4.226	+1.29	−1.4	20.6	45.4
May 12	05 46.88	+39 17.0	4.955	4.216	+1.34	−1.4	20.6	38.8
May 22	06 00.28	+39 03.0	5.023	4.205	+1.38	−1.5	20.6	32.6
June 1	06 14.07	+38 48.0	5.075	4.195	+1.41	−1.6	20.6	26.7
June 11	06 28.14	+38 31.6	5.112	4.184	+1.43	−1.8	20.6	21.5
June 21	06 42.40	+38 13.6	5.132	4.174	+1.43	−2.0	20.6	17.4
July 1	06 56.73	+37 53.8	5.136	4.164	+1.43	−2.2	20.6	15.2
July 11	07 11.06	+37 32.2	5.124	4.154	+1.42	−2.3	20.6	15.6
July 21	07 25.30	+37 09.0	5.094	4.144	+1.41	−2.5	20.5	18.5
July 31	07 39.35	+36 44.5	5.049	4.134	+1.38	−2.5	20.5	23.0
Aug. 10	07 53.14	+36 19.1	4.988	4.124	+1.34	−2.6	20.5	28.4
Aug. 20	08 06.58	+35 53.3	4.911	4.114	+1.30	−2.6	20.4	34.3
Aug. 30	08 19.58	+35 27.8	4.820	4.105	+1.25	−2.4	20.3	40.5
Sept. 9	08 32.06	+35 03.4	4.715	4.095	+1.18	−2.2	20.3	47.0
Sept.19	08 43.91	+34 41.0	4.597	4.086	+1.11	−1.9	20.2	53.8
Sept.29	08 55.03	+34 21.5	4.469	4.077	+1.03	−1.5	20.1	60.9
Oct. 9	09 05.30	+34 06.0	4.331	4.068	+0.93	−1.0	20.0	68.2
Oct. 19	09 14.57	+33 55.7	4.186	4.059	+0.81	−0.4	19.9	75.8
Oct. 29	09 22.70	+33 51.5	4.037	4.050	+0.68	+0.3	19.8	83.7
Nov. 8	09 29.51	+33 54.4	3.885	4.042	+0.53	+1.1	19.7	91.9
Nov. 18	09 34.81	+34 05.2	3.734	4.033	+0.36	+1.9	19.6	100.5
Nov. 28	09 38.41	+34 23.9	3.589	4.025	+0.17	+2.6	19.5	109.4
Dec. 8	09 40.11	+34 50.3	3.452	4.017	−0.03	+3.3	19.4	118.6
Dec. 18	09 39.78	+35 23.0	3.328	4.009	−0.24	+3.7	19.3	128.0
Dec. 28	09 37.34	+35 59.5	3.222	4.001	−0.45	+3.7	19.2	137.4
Jan. 7	09 32.85	+36 36.4	3.137	3.994	−0.63	+3.3	19.1	146.5
Jan. 17	09 26.60	+37 09.1	3.077	3.986	−0.76	+2.4	19.0	154.3
Jan. 27	09 19.04	+37 33.3	3.045	3.979	−0.82	+1.2	19.0	158.9
Feb. 6	09 10.84	+37 45.0	3.041	3.972	−0.81	−0.3	19.0	157.9
Feb. 16	09 02.78	+37 41.9	3.067	3.966	−0.72	−1.8	19.0	151.9
Feb. 26	08 55.59	+37 23.7	3.119	3.959	−0.57	−3.2	19.0	143.5
Mar. 8	08 49.88	+36 51.5	3.196	3.953	−0.38	−4.4	19.0	134.2
Mar. 18	08 46.06	+36 07.5	3.293	3.947	−0.18	−5.3	19.1	124.8
Mar. 28	08 44.27	+35 14.3	3.406	3.941	+0.03	−6.0	19.1	115.6

Comet C/2016 A1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2017 Dec. 7.67757 TT
Peri. = 9.20624
Node = 128.38836 2000.0
Incl. = 121.03732
q = 5.4712429 AU
e = 0.9205446

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	10 08.13	-37 26.2	6.993	7.293	-0.60	+0.4	18.5	104.0
Jan. 13	10 02.08	-37 22.5	6.830	7.250	-0.70	+1.7	18.4	111.6
Jan. 23	09 55.06	-37 05.5	6.682	7.207	-0.78	+3.2	18.3	118.8
Feb. 2	09 47.31	-36 33.6	6.552	7.165	-0.82	+4.8	18.2	125.2
Feb. 12	09 39.14	-35 45.7	6.446	7.123	-0.82	+6.4	18.2	130.2
Feb. 22	09 30.92	-34 41.7	6.365	7.081	-0.79	+7.9	18.1	133.4
Mar. 3	09 23.04	-33 23.0	6.313	7.040	-0.72	+9.1	18.1	134.2
Mar. 13	09 15.81	-31 51.8	6.290	6.999	-0.63	+10.1	18.0	132.4
Mar. 23	09 09.53	-30 11.1	6.296	6.958	-0.52	+10.6	18.0	128.3
Apr. 2	09 04.35	-28 24.7	6.327	6.917	-0.40	+10.9	18.0	122.6
Apr. 12	09 00.38	-26 36.0	6.383	6.877	-0.27	+10.8	18.0	115.7
Apr. 22	08 57.65	-24 48.4	6.458	6.837	-0.15	+10.4	18.0	108.1
May 2	08 56.11	-23 04.9	6.548	6.798	-0.04	+9.7	18.0	100.1
May 12	08 55.67	-21 27.4	6.648	6.759	+0.06	+9.0	18.0	92.0
May 22	08 56.25	-19 57.6	6.753	6.720	+0.15	+8.1	18.0	83.8
June 1	08 57.72	-18 36.5	6.860	6.682	+0.22	+7.2	18.0	75.7
June 11	08 59.95	-17 24.5	6.962	6.643	+0.29	+6.3	18.0	67.7
June 21	09 02.83	-16 21.7	7.056	6.606	+0.34	+5.4	18.0	60.0
July 1	09 06.23	-15 28.0	7.138	6.569	+0.38	+4.5	18.0	52.5
July 11	09 10.04	-14 43.0	7.206	6.532	+0.41	+3.7	18.0	45.4
July 21	09 14.16	-14 06.3	7.255	6.495	+0.43	+2.9	18.0	38.8
July 31	09 18.48	-13 37.1	7.285	6.459	+0.44	+2.2	18.0	33.2
Aug. 10	09 22.91	-13 14.9	7.293	6.424	+0.44	+1.6	18.0	28.8
Aug. 20	09 27.34	-12 58.9	7.278	6.389	+0.43	+1.1	18.0	26.5
Aug. 30	09 31.67	-12 48.3	7.239	6.354	+0.41	+0.6	17.9	26.8
Sept. 9	09 35.81	-12 42.4	7.176	6.320	+0.38	+0.2	17.9	29.6
Sept.19	09 39.65	-12 40.1	7.089	6.286	+0.34	-0.1	17.8	34.5
Sept.29	09 43.09	-12 40.7	6.978	6.253	+0.29	-0.2	17.8	40.7
Oct. 9	09 46.00	-12 43.0	6.846	6.220	+0.23	-0.3	17.7	47.9
Oct. 19	09 48.27	-12 45.9	6.694	6.188	+0.15	-0.2	17.6	55.7
Oct. 29	09 49.78	-12 48.1	6.526	6.157	+0.06	0.0	17.6	64.1
Nov. 8	09 50.38	-12 48.2	6.343	6.126	-0.04	+0.4	17.5	72.9
Nov. 18	09 49.96	-12 44.5	6.151	6.095	-0.16	+0.9	17.4	82.2
Nov. 28	09 48.40	-12 35.2	5.954	6.065	-0.28	+1.7	17.3	91.8
Dec. 8	09 45.60	-12 18.3	5.758	6.036	-0.41	+2.6	17.2	101.8
Dec. 18	09 41.49	-11 51.9	5.569	6.007	-0.54	+3.8	17.1	112.0
Dec. 28	09 36.09	-11 14.1	5.393	5.979	-0.66	+5.1	17.0	122.5
Jan. 7	09 29.46	-10 23.2	5.237	5.952	-0.77	+6.5	16.9	133.0
Jan. 17	09 21.79	-09 18.4	5.108	5.925	-0.84	+7.9	16.9	143.2
Jan. 27	09 13.34	-07 59.7	5.011	5.899	-0.89	+9.1	16.8	152.1
Feb. 6	09 04.47	-06 28.5	4.950	5.873	-0.89	+10.1	16.8	157.6
Feb. 16	08 55.59	-04 47.2	4.927	5.848	-0.85	+10.8	16.7	156.9
Feb. 26	08 47.11	-02 59.2	4.943	5.824	-0.77	+11.1	16.7	150.4
Mar. 8	08 39.39	-01 08.3	4.996	5.801	-0.67	+11.0	16.7	141.0
Mar. 18	08 32.73	+00 41.6	5.081	5.778	-0.54	+10.6	16.7	130.6
Mar. 28	08 27.31	+02 27.6	5.193	5.756	-0.41	+10.0	16.8	119.9

Comet C/2015 V1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2017 Dec. 18.32483 TT
Peri. = 179.71351
Node = 197.19899 2000.0
Incl. = 139.23046
q = 4.2651159 AU
e = 0.9992309

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	05 58.33	+68 46.4	6.352	7.065	-2.33	-3.1	19.1	133.4
Jan. 13	05 35.03	+68 15.4	6.336	7.007	-2.06	-5.2	19.1	129.8
Jan. 23	05 14.42	+67 23.4	6.348	6.950	-1.70	-6.8	19.0	124.3
Feb. 2	04 57.42	+66 15.8	6.384	6.892	-1.31	-7.7	19.0	117.3
Feb. 12	04 44.33	+64 58.6	6.442	6.835	-0.94	-8.1	19.0	109.5
Feb. 22	04 34.94	+63 37.5	6.515	6.778	-0.61	-8.0	19.0	101.3
Mar. 3	04 28.80	+62 17.0	6.598	6.722	-0.34	-7.7	19.0	92.9
Mar. 13	04 25.41	+61 00.3	6.686	6.665	-0.11	-7.1	19.0	84.5
Mar. 23	04 24.27	+59 49.8	6.775	6.609	+0.07	-6.3	19.0	76.2
Apr. 2	04 24.93	+58 46.5	6.857	6.552	+0.21	-5.5	18.9	68.2
Apr. 12	04 27.04	+57 51.0	6.931	6.496	+0.32	-4.7	18.9	60.5
Apr. 22	04 30.27	+57 03.7	6.991	6.441	+0.41	-4.0	18.9	53.3
May 2	04 34.35	+56 24.2	7.035	6.385	+0.47	-3.2	18.9	46.6
May 12	04 39.07	+55 52.3	7.059	6.330	+0.51	-2.5	18.9	40.9
May 22	04 44.20	+55 27.7	7.063	6.275	+0.54	-1.8	18.8	36.2
June 1	04 49.57	+55 09.9	7.043	6.220	+0.54	-1.1	18.8	33.2
June 11	04 55.01	+54 58.8	7.001	6.165	+0.53	-0.5	18.7	32.2
June 21	05 00.35	+54 54.1	6.935	6.111	+0.51	+0.1	18.7	33.3
July 1	05 05.41	+54 55.4	6.845	6.057	+0.46	+0.7	18.6	36.4
July 11	05 10.03	+55 02.8	6.733	6.004	+0.39	+1.3	18.5	41.1
July 21	05 13.97	+55 16.2	6.599	5.950	+0.31	+1.9	18.4	46.9
July 31	05 17.04	+55 35.4	6.445	5.898	+0.19	+2.5	18.4	53.5
Aug. 10	05 18.94	+56 00.3	6.274	5.845	+0.04	+3.0	18.3	60.7
Aug. 20	05 19.36	+56 30.6	6.088	5.793	-0.14	+3.5	18.2	68.4
Aug. 30	05 17.96	+57 05.5	5.892	5.741	-0.37	+3.8	18.0	76.5
Sept. 9	05 14.29	+57 44.0	5.689	5.690	-0.64	+4.0	17.9	85.0
Sept.19	05 07.91	+58 23.8	5.484	5.639	-0.95	+3.8	17.8	93.7
Sept.29	04 58.36	+59 01.9	5.283	5.589	-1.31	+3.1	17.7	102.7
Oct. 9	04 45.29	+59 33.3	5.091	5.539	-1.67	+1.9	17.6	111.8
Oct. 19	04 28.62	+59 52.0	4.915	5.490	-1.99	-0.1	17.5	120.7
Oct. 29	04 08.72	+59 50.6	4.761	5.441	-2.22	-2.8	17.3	129.0
Nov. 8	03 46.56	+59 22.5	4.635	5.393	-2.29	-5.9	17.2	136.1
Nov. 18	03 23.68	+58 23.1	4.543	5.345	-2.19	-9.1	17.2	140.8
Nov. 28	03 01.77	+56 52.4	4.487	5.298	-1.95	-11.8	17.1	141.9
Dec. 8	02 42.26	+54 54.5	4.469	5.252	-1.62	-13.7	17.1	138.9
Dec. 18	02 26.04	+52 37.6	4.489	5.206	-1.27	-14.7	17.0	132.7
Dec. 28	02 13.38	+50 11.0	4.542	5.161	-0.92	-14.8	17.0	124.4
Jan. 7	02 04.13	+47 43.4	4.624	5.117	-0.62	-14.1	17.0	114.9
Jan. 17	01 57.92	+45 22.1	4.728	5.074	-0.36	-13.0	17.0	105.1
Jan. 27	01 54.28	+43 11.7	4.848	5.031	-0.15	-11.7	17.0	95.0
Feb. 6	01 52.79	+41 14.9	4.976	4.989	+0.02	-10.2	17.1	85.1
Feb. 16	01 53.01	+39 32.8	5.105	4.948	+0.16	-8.8	17.1	75.3
Feb. 26	01 54.60	+38 05.2	5.229	4.908	+0.27	-7.4	17.1	65.8
Mar. 8	01 57.28	+36 51.3	5.343	4.869	+0.35	-6.2	17.1	56.6
Mar. 18	02 00.79	+35 49.7	5.442	4.830	+0.41	-5.1	17.1	47.8
Mar. 28	02 04.90	+34 59.1	5.523	4.793	+0.45	-4.1	17.1	39.4

Comet C/2015 X5 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2018 Jan. 1.68173 TT
Peri. = 27.75402
Node = 122.35172 2000.0
Incl. = 124.18559
q = 6.8051960 AU
e = 0.9910050

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 03.46	-04 12.7	7.517	8.272	-0.54	+3.9	20.4	137.9
Jan. 13	08 58.06	-03 33.8	7.389	8.237	-0.59	+4.6	20.3	147.6
Jan. 23	08 52.19	-02 47.4	7.293	8.202	-0.61	+5.3	20.3	156.0
Feb. 2	08 46.06	-01 54.5	7.231	8.167	-0.61	+5.8	20.2	160.7
Feb. 12	08 39.92	-00 56.0	7.203	8.133	-0.59	+6.2	20.2	159.0
Feb. 22	08 34.00	+00 06.3	7.211	8.099	-0.55	+6.4	20.2	152.1
Mar. 3	08 28.54	+01 10.8	7.252	8.065	-0.48	+6.5	20.2	142.8
Mar. 13	08 23.71	+02 15.7	7.323	8.031	-0.40	+6.4	20.2	132.7
Mar. 23	08 19.66	+03 19.5	7.419	7.998	-0.32	+6.1	20.2	122.4
Apr. 2	08 16.48	+04 20.7	7.535	7.965	-0.23	+5.8	20.2	112.1
Apr. 12	08 14.20	+05 18.4	7.665	7.932	-0.14	+5.4	20.2	101.9
Apr. 22	08 12.83	+06 12.0	7.803	7.900	-0.05	+4.9	20.2	91.9
May 2	08 12.34	+07 00.9	7.943	7.868	+0.03	+4.4	20.3	82.1
May 12	08 12.65	+07 45.0	8.080	7.837	+0.10	+3.9	20.3	72.6
May 22	08 13.70	+08 24.4	8.210	7.806	+0.17	+3.5	20.3	63.2
June 1	08 15.40	+08 59.3	8.327	7.775	+0.23	+3.1	20.3	54.0
June 11	08 17.66	+09 29.8	8.428	7.744	+0.27	+2.7	20.3	45.1
June 21	08 20.38	+09 56.4	8.510	7.714	+0.31	+2.3	20.3	36.3
July 1	08 23.47	+10 19.4	8.571	7.684	+0.34	+2.0	20.3	27.6
July 11	08 26.85	+10 39.4	8.607	7.655	+0.36	+1.7	20.3	19.3
July 21	08 30.41	+10 56.8	8.618	7.626	+0.37	+1.5	20.3	11.7
July 31	08 34.07	+11 12.1	8.603	7.598	+0.37	+1.4	20.3	7.3
Aug. 10	08 37.74	+11 25.9	8.562	7.569	+0.36	+1.3	20.3	11.1
Aug. 20	08 41.32	+11 38.9	8.493	7.542	+0.34	+1.3	20.2	18.6
Aug. 30	08 44.72	+11 51.7	8.399	7.514	+0.31	+1.3	20.2	27.1
Sept. 9	08 47.84	+12 05.0	8.281	7.487	+0.27	+1.5	20.1	35.8
Sept.19	08 50.58	+12 19.6	8.139	7.461	+0.23	+1.7	20.1	44.8
Sept.29	08 52.83	+12 36.2	7.978	7.435	+0.17	+2.0	20.0	54.1
Oct. 9	08 54.49	+12 55.8	7.799	7.409	+0.09	+2.3	20.0	63.6
Oct. 19	08 55.44	+13 19.1	7.608	7.384	+0.01	+2.8	19.9	73.3
Oct. 29	08 55.56	+13 47.1	7.408	7.359	-0.08	+3.3	19.8	83.4
Nov. 8	08 54.76	+14 20.5	7.204	7.335	-0.18	+3.9	19.7	93.7
Nov. 18	08 52.93	+14 59.8	7.003	7.311	-0.29	+4.6	19.7	104.4
Nov. 28	08 50.01	+15 45.4	6.811	7.288	-0.41	+5.2	19.6	115.4
Dec. 8	08 45.95	+16 37.5	6.634	7.265	-0.52	+5.8	19.5	126.7
Dec. 18	08 40.77	+17 35.4	6.479	7.243	-0.62	+6.3	19.5	138.3
Dec. 28	08 34.57	+18 38.2	6.351	7.221	-0.71	+6.6	19.4	150.2
Jan. 7	08 27.48	+19 44.4	6.257	7.199	-0.77	+6.8	19.4	162.2
Jan. 17	08 19.77	+20 52.2	6.199	7.179	-0.81	+6.7	19.3	174.3
Jan. 27	08 11.72	+21 59.5	6.180	7.158	-0.80	+6.5	19.3	173.0
Feb. 6	08 03.67	+23 04.3	6.199	7.138	-0.77	+6.1	19.3	160.9
Feb. 16	07 55.97	+24 05.0	6.255	7.119	-0.70	+5.6	19.3	148.9
Feb. 26	07 48.93	+25 00.7	6.343	7.100	-0.61	+5.0	19.3	137.1
Mar. 8	07 42.79	+25 50.8	6.459	7.082	-0.51	+4.4	19.4	125.5
Mar. 18	07 37.73	+26 35.2	6.596	7.064	-0.39	+3.9	19.4	114.4
Mar. 28	07 33.83	+27 14.5	6.747	7.047	-0.27	+3.5	19.4	103.5

Comet 74P/Smirnova-Chernykh

Epoch = 2016 July 31.0 TT
T = 2018 Jan. 25.54746 TT
Peri. = 86.94348 e = 0.1491961
Node = 77.05567 2000.0 a = 4.1578891 AU
Incl. = 6.65350 n = 0.11625047
q = 3.5375483 AU P = 8.48 years

m1 = 5.6 + 5 log(Delta) + 15.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 08.19	+15 07.6	3.559	4.224	−0.12	+0.9	17.7	127.0
Jan. 13	03 07.01	+15 16.9	3.679	4.211	+0.05	+1.6	17.8	116.6
Jan. 23	03 07.53	+15 32.7	3.811	4.199	+0.21	+2.2	17.9	106.6
Feb. 2	03 09.68	+15 54.4	3.950	4.187	+0.37	+2.7	17.9	97.0
Feb. 12	03 13.35	+16 21.2	4.092	4.174	+0.51	+3.1	18.0	87.9
Feb. 22	03 18.44	+16 52.4	4.234	4.162	+0.63	+3.4	18.0	79.1
Mar. 3	03 24.77	+17 26.8	4.370	4.149	+0.75	+3.7	18.1	70.7
Mar. 13	03 32.23	+18 03.4	4.500	4.136	+0.84	+3.8	18.1	62.5
Mar. 23	03 40.67	+18 41.4	4.619	4.124	+0.93	+3.8	18.2	54.7
Apr. 2	03 49.96	+19 19.8	4.726	4.111	+1.00	+3.8	18.2	47.1
Apr. 12	03 60.00	+19 57.8	4.820	4.098	+1.07	+3.7	18.2	39.7
Apr. 22	04 10.67	+20 34.6	4.898	4.086	+1.12	+3.5	18.2	32.5
May 2	04 21.87	+21 09.7	4.960	4.073	+1.16	+3.3	18.2	25.4
May 12	04 33.52	+21 42.5	5.005	4.060	+1.20	+3.0	18.2	18.5
May 22	04 45.52	+22 12.5	5.034	4.047	+1.23	+2.7	18.2	11.7
June 1	04 57.79	+22 39.4	5.044	4.035	+1.25	+2.3	18.2	5.0
June 11	05 10.25	+23 02.8	5.037	4.022	+1.26	+2.0	18.2	1.7
June 21	05 22.81	+23 22.7	5.012	4.009	+1.26	+1.6	18.1	8.4
July 1	05 35.40	+23 39.0	4.970	3.997	+1.25	+1.3	18.1	15.0
July 11	05 47.92	+23 51.7	4.911	3.984	+1.24	+0.9	18.1	21.7
July 21	06 00.28	+24 00.9	4.836	3.971	+1.21	+0.6	18.0	28.4
July 31	06 12.40	+24 06.9	4.745	3.959	+1.18	+0.3	17.9	35.2
Aug. 10	06 24.16	+24 10.1	4.640	3.946	+1.13	+0.1	17.9	42.1
Aug. 20	06 35.46	+24 10.9	4.521	3.934	+1.07	−0.1	17.8	49.1
Aug. 30	06 46.18	+24 10.0	4.391	3.922	+1.00	−0.2	17.7	56.3
Sept. 9	06 56.19	+24 08.1	4.249	3.909	+0.91	−0.2	17.6	63.7
Sept.19	07 05.33	+24 06.1	4.100	3.897	+0.81	−0.1	17.5	71.4
Sept.29	07 13.47	+24 04.9	3.944	3.885	+0.69	+0.1	17.4	79.3
Oct. 9	07 20.40	+24 05.5	3.784	3.873	+0.56	+0.3	17.3	87.6
Oct. 19	07 25.96	+24 08.9	3.623	3.861	+0.40	+0.7	17.2	96.3
Oct. 29	07 29.96	+24 16.1	3.465	3.849	+0.22	+1.2	17.1	105.3
Nov. 8	07 32.20	+24 27.9	3.314	3.837	+0.03	+1.7	17.0	114.9
Nov. 18	07 32.54	+24 44.6	3.174	3.826	−0.16	+2.1	16.8	124.9
Nov. 28	07 30.92	+25 06.0	3.049	3.814	−0.36	+2.5	16.7	135.3
Dec. 8	07 27.35	+25 31.3	2.944	3.803	−0.53	+2.7	16.6	146.3
Dec. 18	07 22.05	+25 58.7	2.864	3.792	−0.66	+2.8	16.6	157.5
Dec. 28	07 15.42	+26 26.2	2.811	3.781	−0.74	+2.5	16.5	168.8
Jan. 7	07 08.02	+26 51.4	2.789	3.770	−0.74	+2.1	16.5	175.4
Jan. 17	07 00.60	+27 12.4	2.797	3.759	−0.67	+1.6	16.5	165.9
Jan. 27	06 53.86	+27 28.2	2.835	3.748	−0.54	+1.0	16.5	154.6
Feb. 6	06 48.43	+27 38.4	2.900	3.738	−0.36	+0.5	16.5	143.3
Feb. 16	06 44.79	+27 43.7	2.989	3.728	−0.16	+0.1	16.5	132.5
Feb. 26	06 43.18	+27 44.7	3.096	3.718	+0.05	−0.2	16.6	122.1
Mar. 8	06 43.69	+27 42.2	3.217	3.708	+0.26	−0.5	16.7	112.2
Mar. 18	06 46.24	+27 36.8	3.347	3.698	+0.45	−0.8	16.7	102.9
Mar. 28	06 50.69	+27 28.7	3.483	3.689	+0.62	−1.1	16.8	94.0

Comet C/2015 O1 (PANSTARRS)

Epoch = 2016 July 31.0 TT
T = 2018 Feb. 18.95323 TT
Peri. = 89.55368
Node = 299.85056 2000.0
Incl. = 127.21615
q = 3.7310675 AU
e = 1.0000548

m1 = 7.0 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	19 58.95	-20 31.7	8.328	7.387	+0.35	+3.1	18.1	15.9
Jan. 13	20 02.42	-20 00.3	8.300	7.324	+0.36	+3.2	18.1	6.6
Jan. 23	20 06.01	-19 28.0	8.244	7.261	+0.36	+3.3	18.0	2.8
Feb. 2	20 09.59	-18 54.8	8.159	7.198	+0.35	+3.4	18.0	11.9
Feb. 12	20 13.05	-18 20.8	8.047	7.135	+0.32	+3.5	17.9	21.1
Feb. 22	20 16.26	-17 46.3	7.908	7.072	+0.29	+3.5	17.9	30.4
Mar. 3	20 19.12	-17 11.3	7.744	7.009	+0.24	+3.5	17.8	39.6
Mar. 13	20 21.49	-16 36.2	7.559	6.946	+0.18	+3.5	17.7	48.9
Mar. 23	20 23.26	-16 01.1	7.354	6.884	+0.10	+3.5	17.6	58.3
Apr. 2	20 24.30	-15 26.2	7.135	6.821	+0.02	+3.4	17.5	67.8
Apr. 12	20 24.49	-14 52.0	6.904	6.758	-0.08	+3.3	17.4	77.5
Apr. 22	20 23.69	-14 18.5	6.667	6.696	-0.19	+3.2	17.3	87.3
May 2	20 21.81	-13 46.1	6.429	6.633	-0.31	+3.1	17.2	97.3
May 12	20 18.73	-13 15.1	6.196	6.571	-0.43	+3.0	17.1	107.5
May 22	20 14.39	-12 45.5	5.972	6.508	-0.56	+2.8	17.0	118.0
June 1	20 08.75	-12 17.7	5.764	6.446	-0.69	+2.6	16.9	128.6
June 11	20 01.84	-11 51.8	5.578	6.384	-0.81	+2.4	16.8	139.4
June 21	19 53.77	-11 27.8	5.419	6.322	-0.90	+2.2	16.7	150.3
July 1	19 44.73	-11 05.8	5.292	6.260	-0.97	+2.0	16.6	160.6
July 11	19 35.01	-10 45.8	5.200	6.198	-1.00	+1.8	16.5	168.2
July 21	19 24.97	-10 27.8	5.144	6.137	-1.00	+1.6	16.5	166.6
July 31	19 14.99	-10 11.6	5.125	6.075	-0.95	+1.4	16.4	157.5
Aug. 10	19 05.47	-09 57.3	5.141	6.014	-0.87	+1.3	16.4	146.7
Aug. 20	18 56.77	-09 44.7	5.188	5.953	-0.76	+1.1	16.4	135.6
Aug. 30	18 49.16	-09 33.4	5.261	5.892	-0.63	+1.0	16.4	124.5
Sept. 9	18 42.81	-09 23.1	5.355	5.832	-0.50	+1.0	16.4	113.6
Sept.19	18 37.84	-09 13.4	5.462	5.771	-0.36	+1.0	16.4	103.0
Sept.29	18 34.25	-09 03.7	5.578	5.711	-0.23	+1.0	16.4	92.6
Oct. 9	18 32.00	-08 53.4	5.694	5.651	-0.10	+1.1	16.4	82.5
Oct. 19	18 31.00	-08 41.9	5.807	5.592	+0.01	+1.3	16.4	72.7
Oct. 29	18 31.13	-08 28.6	5.909	5.533	+0.11	+1.6	16.4	63.2
Nov. 8	18 32.27	-08 12.8	5.998	5.474	+0.20	+1.9	16.4	54.0
Nov. 18	18 34.27	-07 54.0	6.068	5.415	+0.27	+2.2	16.4	45.1
Nov. 28	18 36.98	-07 31.6	6.117	5.357	+0.33	+2.7	16.4	36.6
Dec. 8	18 40.26	-07 05.0	6.141	5.300	+0.37	+3.1	16.4	28.8
Dec. 18	18 43.97	-06 33.6	6.140	5.242	+0.40	+3.7	16.3	22.2
Dec. 28	18 47.96	-05 57.0	6.112	5.186	+0.41	+4.2	16.3	18.0
Jan. 7	18 52.09	-05 14.6	6.056	5.129	+0.41	+4.9	16.2	17.8
Jan. 17	18 56.21	-04 26.0	5.974	5.073	+0.40	+5.5	16.2	21.8
Jan. 27	19 00.17	-03 30.7	5.865	5.018	+0.36	+6.3	16.1	28.2
Feb. 6	19 03.82	-02 28.1	5.731	4.963	+0.32	+7.0	16.0	35.7
Feb. 16	19 06.99	-01 18.0	5.575	4.909	+0.25	+7.8	15.9	43.8
Feb. 26	19 09.51	+00 00.3	5.399	4.856	+0.17	+8.7	15.8	52.2
Mar. 8	19 11.19	+01 27.2	5.207	4.803	+0.06	+9.6	15.7	60.9
Mar. 18	19 11.82	+03 02.9	5.004	4.751	-0.06	+10.5	15.6	69.7
Mar. 28	19 11.18	+04 47.8	4.792	4.700	-0.22	+11.4	15.4	78.7

Comet P/2006 F1 (Kowalski)

Epoch = 2016 July 31.0 TT
T = 2018 Mar. 14.18995 TT
Peri. = 186.04611 e = 0.1198217
Node = 124.74939 2000.0 a = 4.6683833 AU
Incl. = 21.28106 n = 0.09771344
q = 4.1090097 AU P = 10.09 years

m1 = 1.0 + 5 log(Delta) + 25.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′/°	Elong. °
Jan. 3	15 28.44	+00 48.6	5.119	4.621	−0.34	+1.9	21.2	12.3/ 92	54.7
Jan. 13	15 36.67	+00 44.6	4.986	4.611	−0.35	+1.9	21.1	11.3/ 88	62.3
Jan. 23	15 44.21	+00 48.4	4.844	4.602	−0.36	+2.0	21.0	10.2/ 83	70.0
Feb. 2	15 50.94	+00 59.9	4.696	4.592	−0.37	+2.1	20.9	8.8/ 78	77.9
Feb. 12	15 56.70	+01 19.0	4.542	4.582	−0.38	+2.1	20.8	7.4/ 69	86.1
Feb. 22	16 01.34	+01 45.0	4.389	4.573	−0.40	+2.2	20.7	6.0/ 58	94.4
Mar. 3	16 04.74	+02 17.3	4.237	4.563	−0.41	+2.3	20.6	4.8/ 39	103.0
Mar. 13	16 06.77	+02 54.6	4.093	4.554	−0.43	+2.4	20.5	4.2/ 12	111.6
Mar. 23	16 07.35	+03 35.4	3.958	4.544	−0.44	+2.5	20.4	4.4/343	120.4
Apr. 2	16 06.47	+04 17.6	3.838	4.535	−0.46	+2.6	20.3	5.4/320	129.1
Apr. 12	16 04.14	+04 58.8	3.735	4.525	−0.47	+2.6	20.3	6.6/305	137.5
Apr. 22	16 00.52	+05 36.0	3.655	4.516	−0.49	+2.7	20.2	7.6/294	145.1
May 2	15 55.85	+06 06.5	3.598	4.506	−0.49	+2.7	20.1	8.3/285	151.0
May 12	15 50.44	+06 27.5	3.567	4.497	−0.50	+2.7	20.1	8.6/276	154.0
May 22	15 44.72	+06 37.1	3.563	4.487	−0.50	+2.6	20.1	8.4/268	152.9
June 1	15 39.11	+06 34.0	3.585	4.478	−0.49	+2.6	20.0	7.8/258	148.1
June 11	15 34.02	+06 18.0	3.632	4.469	−0.48	+2.5	20.1	6.9/246	141.2
June 21	15 29.81	+05 49.7	3.701	4.459	−0.47	+2.5	20.1	6.0/230	133.2
July 1	15 26.74	+05 10.5	3.790	4.450	−0.46	+2.4	20.1	5.5/209	124.9
July 11	15 24.97	+04 22.1	3.895	4.441	−0.44	+2.4	20.1	5.6/186	116.4
July 21	15 24.59	+03 26.4	4.012	4.432	−0.43	+2.3	20.2	6.3/166	107.9
July 31	15 25.61	+02 25.3	4.138	4.423	−0.41	+2.3	20.2	7.4/151	99.7
Aug. 10	15 27.98	+01 20.6	4.268	4.414	−0.40	+2.3	20.3	8.6/141	91.5
Aug. 20	15 31.64	+00 13.7	4.401	4.405	−0.39	+2.2	20.3	9.9/133	83.6
Aug. 30	15 36.47	−00 53.9	4.531	4.396	−0.38	+2.2	20.4	11.1/127	75.9
Sept. 9	15 42.39	−02 01.2	4.658	4.387	−0.37	+2.2	20.4	12.3/123	68.3
Sept.19	15 49.29	−03 07.0	4.778	4.378	−0.36	+2.1	20.4	13.3/119	60.9
Sept.29	15 57.06	−04 10.7	4.888	4.370	−0.36	+2.1	20.5	14.1/115	53.6
Oct. 9	16 05.61	−05 11.4	4.988	4.361	−0.35	+2.1	20.5	14.9/113	46.5
Oct. 19	16 14.83	−06 08.4	5.074	4.353	−0.35	+2.0	20.5	15.5/110	39.6
Oct. 29	16 24.63	−07 01.3	5.146	4.344	−0.35	+2.0	20.5	16.0/108	32.8
Nov. 8	16 34.92	−07 49.6	5.202	4.336	−0.35	+2.0	20.5	16.4/105	26.3
Nov. 18	16 45.59	−08 32.8	5.241	4.328	−0.35	+1.9	20.5	16.7/103	20.3
Nov. 28	16 56.56	−09 10.7	5.262	4.319	−0.35	+1.9	20.5	16.8/101	15.5
Dec. 8	17 07.74	−09 42.9	5.265	4.311	−0.36	+1.9	20.5	16.9/ 99	13.1
Dec. 18	17 19.01	−10 09.5	5.249	4.304	−0.36	+1.8	20.4	16.8/ 97	14.5
Dec. 28	17 30.29	−10 30.3	5.215	4.296	−0.37	+1.8	20.4	16.6/ 95	18.8
Jan. 7	17 41.47	−10 45.4	5.163	4.288	−0.37	+1.8	20.4	16.2/ 94	24.6
Jan. 17	17 52.44	−10 55.0	5.092	4.281	−0.38	+1.8	20.3	15.7/ 92	31.1
Jan. 27	18 03.09	−10 59.4	5.006	4.273	−0.39	+1.8	20.3	15.0/ 90	38.0
Feb. 6	18 13.31	−10 59.0	4.903	4.266	−0.39	+1.8	20.2	14.2/ 88	45.2
Feb. 16	18 22.97	−10 54.3	4.787	4.259	−0.40	+1.8	20.1	13.3/ 87	52.5
Feb. 26	18 31.96	−10 46.1	4.658	4.252	−0.42	+1.8	20.1	12.1/ 85	60.1
Mar. 8	18 40.15	−10 35.1	4.518	4.245	−0.43	+1.8	20.0	10.8/ 83	67.8
Mar. 18	18 47.39	−10 22.2	4.371	4.238	−0.44	+1.8	19.9	9.2/ 82	75.8
Mar. 28	18 53.58	−10 08.5	4.219	4.231	−0.46	+1.8	19.8	7.5/ 80	83.9

Comet C/2015 XY1 (Lemmon)

Epoch = 2016 July 31.0 TT
T = 2018 Apr. 27.65288 TT
Peri. = 196.35555
Node = 281.54931 2000.0
Incl. = 148.89125
q = 7.9203168 AU
e = 1.0183286

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

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	09 18.17	+33 23.4	8.606	9.439	-0.69	+2.4	19.4	146.2
Jan. 13	09 11.23	+33 47.0	8.503	9.407	-0.75	+2.0	19.4	155.6
Jan. 23	09 03.70	+34 07.5	8.433	9.375	-0.79	+1.6	19.3	162.3
Feb. 2	08 55.85	+34 23.4	8.398	9.344	-0.79	+1.0	19.3	162.7
Feb. 12	08 47.92	+34 33.8	8.400	9.312	-0.77	+0.4	19.3	156.4
Feb. 22	08 40.23	+34 38.1	8.435	9.281	-0.72	-0.2	19.3	147.2
Mar. 3	08 33.03	+34 36.3	8.501	9.251	-0.65	-0.7	19.3	137.0
Mar. 13	08 26.54	+34 28.9	8.594	9.220	-0.56	-1.3	19.3	126.5
Mar. 23	08 20.92	+34 16.4	8.709	9.190	-0.47	-1.7	19.3	116.0
Apr. 2	08 16.26	+33 59.7	8.840	9.160	-0.37	-2.0	19.4	105.6
Apr. 12	08 12.61	+33 39.8	8.980	9.130	-0.27	-2.2	19.4	95.4
Apr. 22	08 09.95	+33 17.6	9.125	9.101	-0.17	-2.4	19.4	85.5
May 2	08 08.24	+32 53.7	9.268	9.072	-0.08	-2.5	19.4	75.7
May 12	08 07.39	+32 28.8	9.404	9.043	-0.01	-2.5	19.4	66.2
May 22	08 07.32	+32 03.4	9.528	9.014	+0.06	-2.5	19.4	56.8
June 1	08 07.92	+31 37.9	9.637	8.986	+0.12	-2.5	19.5	47.7
June 11	08 09.09	+31 12.7	9.727	8.958	+0.16	-2.5	19.5	38.7
June 21	08 10.72	+30 47.9	9.795	8.930	+0.20	-2.4	19.5	30.0
July 1	08 12.70	+30 23.9	9.839	8.902	+0.22	-2.3	19.5	21.7
July 11	08 14.92	+30 00.7	9.857	8.875	+0.24	-2.2	19.5	14.3
July 21	08 17.29	+29 38.7	9.848	8.848	+0.24	-2.1	19.4	9.8
July 31	08 19.70	+29 18.0	9.812	8.822	+0.24	-1.9	19.4	12.1
Aug. 10	08 22.05	+28 58.9	9.748	8.795	+0.22	-1.7	19.4	18.9
Aug. 20	08 24.23	+28 41.5	9.658	8.769	+0.19	-1.5	19.4	27.1
Aug. 30	08 26.15	+28 26.2	9.542	8.744	+0.15	-1.3	19.3	35.8
Sept. 9	08 27.69	+28 13.1	9.404	8.718	+0.11	-1.1	19.3	44.8
Sept.19	08 28.74	+28 02.5	9.245	8.693	+0.05	-0.8	19.2	54.1
Sept.29	08 29.20	+27 54.6	9.068	8.669	-0.03	-0.5	19.2	63.6
Oct. 9	08 28.95	+27 49.6	8.878	8.644	-0.11	-0.2	19.1	73.3
Oct. 19	08 27.87	+27 47.6	8.679	8.620	-0.20	+0.1	19.0	83.3
Oct. 29	08 25.87	+27 48.5	8.476	8.597	-0.30	+0.4	19.0	93.6
Nov. 8	08 22.87	+27 52.1	8.276	8.573	-0.41	+0.6	18.9	104.2
Nov. 18	08 18.80	+27 58.0	8.085	8.550	-0.52	+0.8	18.9	115.0
Nov. 28	08 13.64	+28 05.6	7.908	8.528	-0.62	+0.8	18.8	126.2
Dec. 8	08 07.44	+28 13.8	7.753	8.505	-0.71	+0.8	18.7	137.5
Dec. 18	08 00.29	+28 21.7	7.625	8.484	-0.79	+0.6	18.7	149.0
Dec. 28	07 52.37	+28 28.1	7.529	8.462	-0.85	+0.4	18.7	160.4
Jan. 7	07 43.92	+28 31.9	7.469	8.441	-0.87	0.0	18.6	170.6
Jan. 17	07 35.23	+28 32.3	7.447	8.420	-0.86	-0.4	18.6	171.0
Jan. 27	07 26.63	+28 28.8	7.463	8.400	-0.82	-0.8	18.6	161.0
Feb. 6	07 18.42	+28 21.2	7.514	8.380	-0.75	-1.1	18.6	149.6
Feb. 16	07 10.89	+28 10.0	7.599	8.360	-0.67	-1.4	18.6	138.1
Feb. 26	07 04.23	+27 55.6	7.711	8.341	-0.56	-1.7	18.6	126.7
Mar. 8	06 58.60	+27 38.8	7.846	8.322	-0.45	-1.9	18.7	115.5
Mar. 18	06 54.06	+27 20.2	7.996	8.303	-0.34	-2.0	18.7	104.6
Mar. 28	06 50.62	+27 00.5	8.155	8.285	-0.24	-2.0	18.7	94.0

Comet 143P/Kowal-Mrkos

Epoch = 2016 July 31.0 TT
T = 2018 May 7.38888 TT
Peri. = 320.85156 e = 0.4100148
Node = 245.30763 2000.0 a = 4.2938187 AU
Incl. = 4.69500 n = 0.11077417
q = 2.5332895 AU P = 8.90 years

H = 13.4 , G = 0.15

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	V	Elong. °
Jan. 3	04 05.46	+20 20.6	4.256	5.063	-0.36	-1.4	20.6	141.5
Jan. 13	04 01.85	+20 07.1	4.343	5.036	-0.22	-0.9	20.7	130.4
Jan. 23	03 59.64	+19 57.6	4.449	5.010	-0.07	-0.5	20.8	119.7
Feb. 2	03 58.91	+19 52.6	4.569	4.983	+0.08	-0.1	20.9	109.4
Feb. 12	03 59.67	+19 52.1	4.698	4.956	+0.22	+0.4	20.9	99.4
Feb. 22	04 01.85	+19 55.8	4.831	4.929	+0.35	+0.7	21.0	89.8
Mar. 3	04 05.36	+20 03.2	4.964	4.901	+0.47	+1.0	21.0	80.6
Mar. 13	04 10.08	+20 13.6	5.092	4.873	+0.58	+1.3	21.1	71.7
Mar. 23	04 15.88	+20 26.3	5.212	4.844	+0.68	+1.4	21.1	63.1
Apr. 2	04 22.65	+20 40.4	5.321	4.815	+0.76	+1.5	21.1	54.9
Apr. 12	04 30.25	+20 55.2	5.416	4.786	+0.83	+1.5	21.1	46.8
Apr. 22	04 38.58	+21 10.0	5.495	4.757	+0.89	+1.4	21.0	39.0
May 2	04 47.52	+21 24.2	5.558	4.727	+0.95	+1.3	21.0	31.4
May 12	04 56.98	+21 37.0	5.602	4.697	+0.99	+1.1	20.9	23.9
May 22	05 06.85	+21 48.2	5.627	4.666	+1.02	+0.9	20.8	16.6
June 1	05 17.05	+21 57.1	5.633	4.635	+1.04	+0.6	20.7	9.4
June 11	05 27.50	+22 03.5	5.619	4.604	+1.06	+0.4	20.6	2.5
June 21	05 38.09	+22 07.1	5.584	4.573	+1.07	+0.1	20.6	5.1
July 1	05 48.75	+22 07.7	5.531	4.541	+1.06	-0.2	20.7	12.0
July 11	05 59.39	+22 05.3	5.458	4.509	+1.05	-0.6	20.7	19.1
July 21	06 09.92	+21 59.8	5.366	4.477	+1.03	-0.9	20.8	26.2
July 31	06 20.25	+21 51.3	5.257	4.444	+1.00	-1.1	20.8	33.3
Aug. 10	06 30.27	+21 40.0	5.132	4.411	+0.96	-1.4	20.8	40.6
Aug. 20	06 39.89	+21 26.0	4.991	4.378	+0.91	-1.6	20.7	47.9
Aug. 30	06 48.99	+21 09.9	4.837	4.345	+0.84	-1.8	20.7	55.4
Sept. 9	06 57.44	+20 52.0	4.671	4.311	+0.77	-1.9	20.6	63.1
Sept.19	07 05.10	+20 32.8	4.496	4.277	+0.67	-2.0	20.6	71.0
Sept.29	07 11.82	+20 13.1	4.314	4.243	+0.56	-2.0	20.5	79.2
Oct. 9	07 17.44	+19 53.5	4.128	4.208	+0.43	-1.9	20.4	87.7
Oct. 19	07 21.77	+19 34.8	3.940	4.173	+0.29	-1.7	20.3	96.6
Oct. 29	07 24.66	+19 17.7	3.756	4.138	+0.13	-1.5	20.1	105.8
Nov. 8	07 25.93	+19 03.2	3.578	4.103	-0.05	-1.1	20.0	115.5
Nov. 18	07 25.45	+18 51.7	3.412	4.067	-0.23	-0.8	19.8	125.6
Nov. 28	07 23.16	+18 43.7	3.261	4.032	-0.41	-0.4	19.6	136.2
Dec. 8	07 19.10	+18 39.3	3.132	3.996	-0.56	-0.1	19.4	147.2
Dec. 18	07 13.47	+18 38.3	3.027	3.959	-0.68	+0.2	19.2	158.5
Dec. 28	07 06.63	+18 40.2	2.951	3.923	-0.75	+0.4	19.0	169.9
Jan. 7	06 59.11	+18 44.0	2.906	3.887	-0.75	+0.5	18.8	175.2
Jan. 17	06 51.57	+18 49.1	2.892	3.850	-0.69	+0.6	19.0	164.9
Jan. 27	06 44.66	+18 54.8	2.908	3.813	-0.57	+0.6	19.1	153.3
Feb. 6	06 38.99	+19 00.6	2.951	3.776	-0.40	+0.6	19.3	141.9
Feb. 16	06 35.00	+19 06.3	3.017	3.739	-0.21	+0.5	19.4	130.9
Feb. 26	06 32.95	+19 11.5	3.101	3.702	0.00	+0.4	19.5	120.4
Mar. 8	06 32.95	+19 15.9	3.199	3.665	+0.20	+0.3	19.6	110.4
Mar. 18	06 34.97	+19 19.1	3.305	3.628	+0.39	+0.1	19.6	100.9
Mar. 28	06 38.89	+19 20.5	3.415	3.590	+0.57	-0.1	19.7	91.9

Comet P/2011 CR42 (Catalina)

Epoch = 2016 July 31.0 TT
T = 2018 June 23.32065 TT
Peri. = 173.27444 e = 0.2807541
Node = 58.72848 2000.0 a = 3.5056791 AU
Incl. = 8.46417 n = 0.15015709
q = 2.5214453 AU P = 6.56 years

m1 = 11.8 + 5 log(Delta) + 20.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Variation for T=+1 day		m1	Mot./PA ′ / °	Elong. °
Jan. 3	04 40.12	+25 50.3	3.430	4.310	−0.50	−2.0	.	7.3/265	150.1
Jan. 13	04 34.72	+25 44.2	3.509	4.297	−0.48	−2.0	.	5.0/264	138.7
Jan. 23	04 31.01	+25 39.2	3.611	4.285	−0.46	−2.0	.	2.6/264	127.7
Feb. 2	04 29.14	+25 36.5	3.731	4.272	−0.44	−1.9	.	0.0/332	117.2
Feb. 12	04 29.13	+25 36.7	3.863	4.258	−0.42	−1.9	.	2.5/ 82	107.1
Feb. 22	04 30.92	+25 40.2	4.002	4.244	−0.41	−1.8	.	4.7/ 82	97.4
Mar. 3	04 34.39	+25 46.8	4.144	4.230	−0.40	−1.7	.	6.8/ 82	88.2
Mar. 13	04 39.38	+25 56.0	4.285	4.215	−0.39	−1.6	.	8.6/ 82	79.3
Mar. 23	04 45.73	+26 07.2	4.421	4.200	−0.38	−1.5	.	10.2/ 83	70.8
Apr. 2	04 53.27	+26 19.6	4.549	4.185	−0.37	−1.4	.	11.6/ 83	62.7
Apr. 12	05 01.84	+26 32.5	4.666	4.169	−0.37	−1.3	.	12.8/ 84	54.8
Apr. 22	05 11.31	+26 45.3	4.770	4.153	−0.37	−1.1	.	13.7/ 84	47.2
May 2	05 21.54	+26 57.1	4.860	4.136	−0.37	−1.0	.	14.6/ 85	39.8
May 12	05 32.41	+27 07.6	4.934	4.119	−0.37	−0.9	.	15.2/ 86	32.6
May 22	05 43.80	+27 16.1	4.992	4.102	−0.37	−0.8	.	15.8/ 87	25.6
June 1	05 55.62	+27 22.4	5.031	4.084	−0.38	−0.7	.	16.2/ 88	18.7
June 11	06 07.77	+27 26.0	5.053	4.066	−0.38	−0.5	.	16.5/ 89	12.1
June 21	06 20.15	+27 26.9	5.056	4.047	−0.39	−0.4	.	16.7/ 90	6.2
July 1	06 32.68	+27 24.9	5.041	4.029	−0.39	−0.3	.	16.8/ 91	4.7
July 11	06 45.28	+27 20.1	5.007	4.009	−0.40	−0.1	.	16.8/ 92	9.8
July 21	06 57.85	+27 12.6	4.956	3.990	−0.41	0.0	.	16.7/ 93	16.2
July 31	07 10.32	+27 02.7	4.886	3.970	−0.42	+0.1	.	16.5/ 93	22.8
Aug. 10	07 22.59	+26 50.8	4.800	3.950	−0.43	+0.3	.	16.1/ 94	29.5
Aug. 20	07 34.57	+26 37.3	4.698	3.929	−0.44	+0.4	.	15.7/ 95	36.4
Aug. 30	07 46.18	+26 22.9	4.580	3.908	−0.45	+0.6	.	15.0/ 95	43.4
Sept. 9	07 57.31	+26 08.3	4.449	3.887	−0.47	+0.8	.	14.3/ 95	50.5
Sept.19	08 07.84	+25 54.4	4.305	3.865	−0.49	+0.9	.	13.3/ 95	57.8
Sept.29	08 17.65	+25 42.2	4.151	3.843	−0.50	+1.1	.	12.1/ 94	65.4
Oct. 9	08 26.59	+25 32.8	3.988	3.821	−0.53	+1.3	.	10.7/ 92	73.2
Oct. 19	08 34.51	+25 27.5	3.819	3.798	−0.55	+1.5	.	9.1/ 90	81.3
Oct. 29	08 41.23	+25 27.5	3.647	3.776	−0.58	+1.6	.	7.2/ 84	89.7
Nov. 8	08 46.54	+25 34.0	3.475	3.752	−0.61	+1.8	.	5.2/ 74	98.5
Nov. 18	08 50.24	+25 48.2	3.307	3.729	−0.65	+2.0	.	3.4/ 48	107.7
Nov. 28	08 52.12	+26 10.7	3.146	3.705	−0.69	+2.1	.	3.1/357	117.4
Dec. 8	08 51.99	+26 41.6	2.997	3.681	−0.73	+2.2	.	4.9/322	127.5
Dec. 18	08 49.75	+27 19.9	2.866	3.657	−0.77	+2.3	.	7.2/307	138.0
Dec. 28	08 45.41	+28 03.6	2.755	3.632	−0.81	+2.3	.	9.4/299	148.8
Jan. 7	08 39.16	+28 49.3	2.670	3.607	−0.84	+2.2	.	11.0/294	159.4
Jan. 17	08 31.45	+29 33.0	2.614	3.582	−0.86	+2.0	25.0	11.7/289	168.0
Jan. 27	08 22.93	+30 10.4	2.588	3.557	−0.87	+1.7	24.9	11.3/285	167.9
Feb. 6	08 14.44	+30 38.1	2.593	3.532	−0.87	+1.5	24.8	10.0/280	159.1
Feb. 16	08 06.81	+30 54.2	2.626	3.506	−0.85	+1.2	24.8	7.8/274	148.4
Feb. 26	08 00.75	+30 58.7	2.684	3.480	−0.82	+1.0	24.8	5.2/263	137.6
Mar. 8	07 56.75	+30 52.5	2.763	3.454	−0.78	+0.9	24.8	2.6/235	127.1
Mar. 18	07 55.07	+30 37.3	2.858	3.428	−0.75	+0.8	24.8	2.4/159	117.1
Mar. 28	07 55.73	+30 14.7	2.965	3.401	−0.71	+0.8	24.8	4.7/127	107.5

Comet C/2010 U3 (Boattini)

Epoch = 2016 July 31.0 TT
T = 2019 Feb. 25.45190 TT
Peri. = 88.04081
Node = 43.06539 2000.0
Incl. = 55.50633
q = 8.4468818 AU
e = 1.0019905

m1 = 8.0 + 5 log(Delta) + 5.0 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° ′	Delta	r	Daily motion m	′	m1	Elong. °
Jan. 3	03 12.76	+47 33.3	10.091	10.754	−0.25	−1.1	18.2	130.3
Jan. 13	03 10.31	+47 22.4	10.170	10.719	−0.15	−1.1	18.2	121.7
Jan. 23	03 08.77	+47 11.3	10.265	10.685	−0.06	−1.0	18.2	112.8
Feb. 2	03 08.17	+47 01.1	10.371	10.651	+0.03	−0.8	18.2	103.9
Feb. 12	03 08.52	+46 52.8	10.485	10.617	+0.13	−0.6	18.2	95.0
Feb. 22	03 09.78	+46 47.3	10.601	10.584	+0.21	−0.2	18.2	86.3
Mar. 3	03 11.89	+46 45.1	10.715	10.550	+0.29	+0.1	18.3	77.8
Mar. 13	03 14.78	+46 46.4	10.824	10.517	+0.36	+0.5	18.3	69.5
Mar. 23	03 18.39	+46 51.6	10.922	10.483	+0.42	+0.9	18.3	61.5
Apr. 2	03 22.61	+47 00.7	11.008	10.450	+0.48	+1.3	18.3	53.9
Apr. 12	03 27.36	+47 13.7	11.078	10.417	+0.52	+1.7	18.3	46.8
Apr. 22	03 32.57	+47 30.4	11.131	10.385	+0.56	+2.0	18.3	40.3
May 2	03 38.14	+47 50.7	11.164	10.352	+0.59	+2.4	18.3	34.8
May 12	03 44.00	+48 14.4	11.176	10.320	+0.61	+2.7	18.3	30.6
May 22	03 50.05	+48 41.4	11.167	10.287	+0.62	+3.0	18.3	28.3
June 1	03 56.22	+49 11.4	11.137	10.255	+0.62	+3.3	18.3	28.3
June 11	04 02.43	+49 44.4	11.086	10.224	+0.61	+3.6	18.3	30.5
June 21	04 08.57	+50 20.3	11.014	10.192	+0.60	+3.8	18.3	34.4
July 1	04 14.56	+50 58.8	10.923	10.160	+0.57	+4.1	18.2	39.6
July 11	04 20.31	+51 39.8	10.813	10.129	+0.54	+4.4	18.2	45.7
July 21	04 25.71	+52 23.3	10.688	10.098	+0.49	+4.6	18.2	52.3
July 31	04 30.65	+53 09.1	10.549	10.067	+0.44	+4.8	18.1	59.2
Aug. 10	04 35.01	+53 57.0	10.398	10.037	+0.37	+5.0	18.1	66.5
Aug. 20	04 38.66	+54 46.8	10.239	10.006	+0.28	+5.1	18.1	73.9
Aug. 30	04 41.48	+55 37.9	10.074	9.976	+0.18	+5.2	18.0	81.6
Sept. 9	04 43.32	+56 30.0	9.907	9.946	+0.07	+5.2	18.0	89.3
Sept.19	04 44.07	+57 22.2	9.742	9.916	−0.05	+5.1	17.9	97.0
Sept.29	04 43.59	+58 13.7	9.583	9.886	−0.18	+5.0	17.9	104.8
Oct. 9	04 41.82	+59 03.3	9.433	9.857	−0.31	+4.6	17.8	112.4
Oct. 19	04 38.71	+59 49.6	9.296	9.827	−0.44	+4.2	17.8	119.7
Oct. 29	04 34.31	+60 31.1	9.176	9.798	−0.56	+3.5	17.8	126.4
Nov. 8	04 28.74	+61 06.4	9.075	9.770	−0.65	+2.8	17.7	132.3
Nov. 18	04 22.25	+61 34.1	8.997	9.741	−0.71	+1.9	17.7	136.8
Nov. 28	04 15.17	+61 53.4	8.942	9.713	−0.73	+1.0	17.7	139.4
Dec. 8	04 07.92	+62 03.8	8.913	9.685	−0.70	+0.2	17.7	139.7
Dec. 18	04 00.94	+62 05.7	8.908	9.657	−0.63	−0.6	17.7	137.5
Dec. 28	03 54.64	+62 00.0	8.927	9.629	−0.53	−1.2	17.7	133.4
Jan. 7	03 49.38	+61 48.2	8.968	9.602	−0.40	−1.6	17.7	127.8
Jan. 17	03 45.43	+61 32.0	9.028	9.575	−0.25	−1.9	17.7	121.2
Jan. 27	03 42.92	+61 13.4	9.105	9.548	−0.10	−1.9	17.7	114.0
Feb. 6	03 41.93	+60 54.0	9.194	9.521	+0.05	−1.8	17.7	106.5
Feb. 16	03 42.43	+60 35.6	9.291	9.495	+0.19	−1.6	17.7	98.9
Feb. 26	03 44.37	+60 19.3	9.394	9.469	+0.33	−1.3	17.7	91.3
Mar. 8	03 47.64	+60 06.0	9.497	9.443	+0.45	−1.0	17.8	83.9
Mar. 18	03 52.12	+59 56.5	9.597	9.417	+0.56	−0.5	17.8	76.6
Mar. 28	03 57.70	+59 51.0	9.692	9.392	+0.66	−0.1	17.8	69.7

Comet 29P/Schwassmann-Wachmann

Epoch = 2016 July 31.0 TT
T = 2019 Mar. 24.78480 TT
Peri. = 48.98287 e = 0.0416448
Node = 312.40938 2000.0 a = 6.0151505 AU
Incl. = 9.37656 n = 0.06680890
q = 5.7646508 AU P = 14.75 years

m1 = 4.0 + 5 log(Delta) + 7.5 log(r)

0h TT 2016/17	R.A.(2000) h m	Decl. ° '	Delta	r	Daily motion m	'	m1	Elong. °
Jan. 3	18 40.06	-27 39.8	6.954	5.976	+0.90	+1.3	14.0	5.4
Jan. 13	18 49.07	-27 26.5	6.932	5.973	+0.88	+1.4	14.0	11.9
Jan. 23	18 57.92	-27 12.4	6.887	5.970	+0.86	+1.5	14.0	19.8
Feb. 2	19 06.51	-26 57.6	6.821	5.967	+0.82	+1.5	14.0	27.8
Feb. 12	19 14.73	-26 42.4	6.734	5.964	+0.78	+1.5	14.0	36.0
Feb. 22	19 22.49	-26 27.2	6.629	5.961	+0.72	+1.5	13.9	44.3
Mar. 3	19 29.68	-26 12.4	6.507	5.959	+0.65	+1.4	13.9	52.7
Mar. 13	19 36.20	-25 58.4	6.371	5.956	+0.57	+1.3	13.8	61.2
Mar. 23	19 41.94	-25 45.7	6.224	5.953	+0.49	+1.1	13.8	69.8
Apr. 2	19 46.82	-25 34.8	6.068	5.950	+0.39	+0.9	13.7	78.5
Apr. 12	19 50.73	-25 26.0	5.907	5.947	+0.29	+0.6	13.7	87.4
Apr. 22	19 53.58	-25 19.7	5.746	5.944	+0.17	+0.4	13.6	96.5
May 2	19 55.30	-25 16.1	5.587	5.941	+0.05	+0.1	13.5	105.8
May 12	19 55.85	-25 15.3	5.436	5.939	-0.07	-0.2	13.5	115.3
May 22	19 55.19	-25 17.1	5.296	5.936	-0.18	-0.4	13.4	125.1
June 1	19 53.36	-25 21.1	5.172	5.933	-0.29	-0.6	13.4	135.1
June 11	19 50.44	-25 26.7	5.068	5.930	-0.39	-0.6	13.3	145.2
June 21	19 46.58	-25 33.0	4.987	5.927	-0.46	-0.6	13.3	155.5
July 1	19 42.01	-25 39.2	4.934	5.925	-0.50	-0.5	13.3	165.8
July 11	19 36.99	-25 44.2	4.908	5.922	-0.51	-0.3	13.2	175.0
July 21	19 31.86	-25 47.4	4.913	5.919	-0.49	-0.1	13.2	171.2
July 31	19 26.94	-25 48.1	4.947	5.916	-0.44	+0.2	13.3	161.1
Aug. 10	19 22.56	-25 46.2	5.008	5.914	-0.36	+0.5	13.3	150.8
Aug. 20	19 18.99	-25 41.5	5.096	5.911	-0.26	+0.7	13.3	140.5
Aug. 30	19 16.43	-25 34.3	5.205	5.908	-0.14	+1.0	13.4	130.3
Sept. 9	19 15.02	-25 24.7	5.332	5.906	-0.02	+1.2	13.4	120.3
Sept.19	19 14.83	-25 13.1	5.474	5.903	+0.10	+1.3	13.5	110.6
Sept.29	19 15.85	-24 59.7	5.625	5.900	+0.22	+1.5	13.5	101.1
Oct. 9	19 18.06	-24 44.5	5.782	5.898	+0.33	+1.7	13.6	91.8
Oct. 19	19 21.39	-24 27.6	5.939	5.895	+0.43	+1.9	13.6	82.7
Oct. 29	19 25.72	-24 09.1	6.093	5.892	+0.52	+2.0	13.7	73.7
Nov. 8	19 30.97	-23 48.7	6.240	5.890	+0.60	+2.2	13.8	65.0
Nov. 18	19 37.00	-23 26.5	6.378	5.887	+0.67	+2.4	13.8	56.3
Nov. 28	19 43.70	-23 02.4	6.502	5.885	+0.73	+2.6	13.8	47.8
Dec. 8	19 50.97	-22 36.3	6.610	5.882	+0.77	+2.8	13.9	39.4
Dec. 18	19 58.67	-22 08.1	6.700	5.880	+0.80	+3.0	13.9	31.1
Dec. 28	20 06.70	-21 38.0	6.771	5.877	+0.83	+3.2	13.9	22.8
Jan. 7	20 14.95	-21 06.0	6.821	5.875	+0.84	+3.4	13.9	14.6
Jan. 17	20 23.32	-20 32.4	6.848	5.872	+0.84	+3.5	13.9	6.5
Jan. 27	20 31.71	-19 57.3	6.854	5.870	+0.83	+3.6	13.9	2.0
Feb. 6	20 40.03	-19 21.0	6.836	5.867	+0.81	+3.7	13.9	9.9
Feb. 16	20 48.17	-18 44.0	6.797	5.865	+0.79	+3.7	13.9	17.9
Feb. 26	20 56.07	-18 06.6	6.736	5.862	+0.76	+3.7	13.9	26.0
Mar. 8	21 03.63	-17 29.3	6.655	5.860	+0.71	+3.7	13.9	34.1
Mar. 18	21 10.75	-16 52.6	6.555	5.858	+0.66	+3.6	13.8	42.3
Mar. 28	21 17.37	-16 17.0	6.439	5.855	+0.60	+3.4	13.8	50.5

彗星年表　２０１６

編集委員会

門　田　健　一
○佐　藤　裕　久
下　元　繁　男
関　　勉
中　村　彰　正

（五十音順・敬称略）
○印は編集長

彗星年表　2016　web 版

2016 年 2 月 1 日　発行

発行者　彗星年表編集委員会

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web site: http://www.comet-web.net/~chb/chb.html