

PROFESSOR COMET REPORT

JULY 2010

Current status of the predominant comets for 2010

Comets	Designation (IAU-MPC)	Orbital Status	Magnitude (Visual)	Trend	Observation (Lat.)	Visibility Period
McNaught	2009 R1	C	~5	Fade	Conjunction	N/A
Tempel 2	10P	P	9	Steady	50°N - 80°S	Morning
Encke	2P	P	9.5	Bright	Poor Elongation	N/A
McNaught	2009 K5	C	10	Fading	55°N - 45°N	All Night
Wolf Harrington	43P	P	~10.5	Fading	Conjunction	N/A
Christensen	2006 W3	C	12	Fading	15°N - 90°S	Best Evening
Gunn	65P	P	12	Fading	35°N - 90°S	Best Morning
Wild 2	81P	P	12.5	Fading	45°N - 80°S	Evening
Hartley 2	103P	P	~13	Bright	55°N - 40°S	All Night
Schwassman Wachmann	29P	P	~13	Varies	Poor Elongation	N/A
Vales	2010 H2	C	13.5	Possibly Fading	40°N - 60°S	Evening

The **red designation** is assigned to all comets that are of 12th visual magnitude or brighter and are classified as the **major comets**. All remaining comets that are possibility at 12th visual magnitude or fainter are given the **blue designation** and are classified as the minor comets! The **green designation** is assigned to comets too far south to be seen in the continental United States. The **orange designation** is for comets 12th visual magnitude or brighter lost in the daytime glare!

Ephemeris data terminology:

Date: Month and Year using the standard Gregorian calendar.

TT: Terrestrial Time (Day of the Month) as a substitute for the astronomical Julian date.

RA(2000): Right Ascension based on the Epoch J2000 (longitudinal coordinate for the celestial sky) measured in hours and minutes.

Decl.: Declination as measured in degrees and arcminutes.

Delta: The distance from Earth measured in AUs (1 AU = 1 Astronomical Unit = 92 955 807 mi = 149 597 871 km as the mean distance between the Earth and Sun).

R: The solar distance as measured in AUs.

Elong: Solar elongation which is the angle of separation between the observed object and the Sun as measured across the night sky as measured in degrees.

Phase: Phase angle between the Sun, the celestial object, and the observer on the surface of the Earth. Also known as the Sun - Object - Observer angle.

m1: The visual magnitude of the celestial object as observed on the surface of the Earth at sea level.

m2: The nuclear magnitude which is the visual magnitude of the false nucleus within the coma as seen by an observer here on Earth at sea level.

A Synopsis of the Mid - Summer Comets

Currently there are only two comets brighter than 12th magnitude by visual observation that can be located in the Northern night sky. These comets are 10P/Tempel 2 and 2009/K5 McNaught and both are at visual magnitudes of 9 and 10 respectfully. The commonly known 2P/Encke which comes around every few years and is believed to be the original source of the Taurids meteor shower is visible strictly within the southern hemisphere this time around. Encke was last reported at visual magnitude 9.5 and has an unpredictable orbit due to the huge perturbations it receives from the Sun's gravitational influence as closes to within 0.33 AU of the Sun. This is close to the perihelion distance of Mercury to the Sun at 0.307 AU.

2009/R1 McNaught has turned out to be a big disappointment as all observations of the comet prior to being lost in the daytime glare of late dawn as failed to approach its maximum predicted visual magnitude of 4.7. The last reports of the comets visibility placed its brightness just around 5.0 for visual magnitude. It was predicted based on photometry models on its light curve to possibly reach mid 4th magnitude before being lost in the daytime glare. It is unlikely that the comet will reach any brighter magnitude now since it will be moving away from the Sun on its continuous journey into interstellar space. All other comets for the moment are between 12th to 18th visual magnitude and that is the stellar magnitude. If comet develops a coma or a haze of dust and ions around the nucleus, then the light will spread out and therefore the actual magnitude will make the comet dimmer. Example would be for a 12th visual magnitude comet to develop a coma and have its actual appearance make it appear to be off 14th magnitude or fainter.

C/2009 K5 (McNaught)

K5 McNaught is currently reported at a visual magnitude of 9.5, so it is about 2.5 magnitudes brighter than what the MPC predicted for this comet based on previous observations and analysis of photometry data. It will remain observable at visual (stellar) magnitudes of brighter than 13 well into late August. Only visual reports of the coma have been verified at a size of 4' or 4 arcminutes making it about $56 \frac{1}{4}$ times smaller than a full moon with a DC (degree of condensation) of 4 or 5 making it moderately diffuse. However, there are no recent reports of an ion or dust tail having been seen and its solar distance has been increasing since 29 April 2010. Unless there is an unexpected outburst on its nonstop permanent trajectory into interstellar space, the comet will continue to fade with only the coma being visible.

As of 26 July 2010 K5 McNaught is located between the northern regions of Lynx and Ursa Major. The comet is at a solar elongation of 38° , so given the current position of both constellations it will be very low in the night sky for the duration of the summer. K5 is in non conspicuous part of the night sky being so high above the plane of the Milky Way and the ecliptic. One can catch the comet on the evening of the 27 July heading SE and flying to within 0.362° to the NE of the star HD 64347 with a visual magnitude of 6.72. The star has a spectral classification of A2IV making it a very hot, white sub - giant as the comet travels in a NW to SE direction. The comet will pass by a series of inconspicuous mid 6th to mid 8th magnitude stars for most of August as it progresses in its SE direction towards the central region of Lynx.

Starting on 6 September the comet will begin its retrograde motion around the star 27 Lyncis an A2V type star with a visual magnitude of 4.84 as the comet will move into S then SW direction around the star. Expect the comet to be $\sim 1.65^\circ$ to the east of 27 Lyncis during the daytime of 7 September and then 0.636° to the South of 27 Lyncis in the hours before daybreak of 29 September. The comet will then head due west for most of October heading towards the western region of Lynx and will continue to stay in Lynx well into November. K5 McNaught will have faded to at least 12th magnitude by the beginning of its retrograde motion around 27 Lyncis and reach 14th magnitude as skims through western lynx north of galaxy cluster Abell 569 during the period of 31 October until 11 November.

IAU MPC Ephemeris data for C/2009 K5:

Date	TT	RA (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2010 07 23		07 54.08	+57 33.3	2.549	1.849	37.5	19.5	12.2	
2010 07 28		07 58.13	+56 32.2	2.588	1.892	37.9	19.2	12.3	
2010 08 02		08 01.75	+55 37.2	2.622	1.937	38.7	19.1	12.5	
2010 08 07		08 04.97	+54 47.8	2.648	1.983	40.1	19.2	12.6	
2010 08 12		08 07.78	+54 03.7	2.668	2.029	41.8	19.5	12.7	
2010 08 17		08 10.17	+53 24.7	2.681	2.076	44.0	19.8	12.8	
2010 08 22		08 12.12	+52 50.5	2.688	2.124	46.6	20.2	12.9	
2010 08 27		08 13.60	+52 21.0	2.689	2.172	49.4	20.7	13.0	
2010 09 01		08 14.59	+51 56.0	2.684	2.221	52.6	21.2	13.1	
2010 09 06		08 15.04	+51 35.3	2.673	2.270	56.1	21.6	13.2	
2010 09 11		08 14.90	+51 18.9	2.656	2.319	59.8	22.0	13.3	
2010 09 16		08 14.09	+51 06.6	2.635	2.369	63.8	22.4	13.3	
2010 09 21		08 12.55	+50 58.1	2.609	2.419	68.0	22.6	13.4	
2010 09 26		08 10.21	+50 53.4	2.580	2.470	72.4	22.8	13.5	
2010 10 01		08 06.97	+50 51.9	2.548	2.520	77.1	22.8	13.5	

10P/Tempel 2

Tempel 2 has brightened rapidly and reached a maximum brightness of 8.5 visual magnitude back on 18 July and has been reported as bright as 9th magnitude for most of July. 10P is expected to remain within the visual magnitude range of 9 - 10 for the rest of summer and well into autumn. The coma has been reported with a DC of 3 making it quite diffuse and a very long, thin dust tail which has been photography estimated to be an unbelievable 20° in length! The coma has been reported to be up to 8 arcminutes in size and the false nucleus has been reported visible in telescopes with a visual magnitude up to 12.3! This comet is currently located in western region of Cetus located between Deneb Kaitos (Iota Ceti) and Deneb Algenubi (Eta Ceti) moving eastward towards Eta Ceti.

Tempel 2 can be located near the star 21 Ceti just to its west on the late evening of 26 July and the just to its east the early evening of 27 July. Its present distance from the Earth is around 0.68 AU and has a solar distance of 1.44 AU with a solar elongation of 115°. The comet will approach a trio of stars to the west of Deneb Algenubi the early evening of 2 August. This trio of stars is known as 27, 28, and 30 Ceti with the comet grazing just to the NE of 28 Ceti and moving ESE heading towards 30 Ceti. 10P can be seen the evening of the 3 August between 30 Ceti to its NW and Deneb Algenubi to its south. If you are able to see the tail under very dark skies it should look a very thin, penciled in grayish line scribbled below the trio of stars. Tempel 2 will be very near the star HD 8121 (a type K1III of visual magnitude 6.15) during the period of overnight hours of 11 August to the early evening of 12 August. The comet will make a near occultation of the star as the false nucleus will graze just by an extremely thin margin of ½ arcminute within the coma, but sadly this during the daytime hours before noon of 11 August!

Tempel 2 will move in a SE direction passing south of SAO 147824 or HD 8972 an A5 class star of visual magnitude 6.91 the night of 16/17 August. HD 8972 forms a triangle of stars located halfway in a NW to SE line between Deneb Algenubi and Tau Ceti. The two other stars located in the triangle are 47 Ceti and HD 9118 of visual magnitudes 5.66 and 7.17 respectfully with HD 8972 being the apex of the triangle! The comet will take a southerly path during the last week of August and should be 0.627° east of 50 Lyncis the morning hours of 30 August before sunrise. 30 Lyncis is an interesting star a K2III Barium - Cyanide, Orange Giant with a visual magnitude of 5.42. The comet all this time is predicted to be still brighter than either 9th or 10th magnitude. Yet as it continues to distance itself from the Sun its distance with Earth should put at a perigee of 0.651 AU during the night of 27/28 August with a solar elongation of 133° ! The comet will be halfway between Tau Ceti and 50 Ceti the night of September 1-2, 2010.

IAU MPC Ephemeris data for 10P/Tempel 2:

Date	TT	RA(2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2010 08 02		01 04.50	-09 34.8	0.674	1.453	117.3	38.3	8.2	16.0
2010 08 07		01 13.35	-10 24.4	0.665	1.465	120.0	36.9	8.3	15.9
2010 08 12		01 21.02	-11 19.4	0.659	1.478	122.8	35.2	8.3	15.9
2010 08 17		01 27.41	-12 18.7	0.654	1.493	125.8	33.4	8.4	15.8
2010 08 22		01 32.49	-13 21.0	0.651	1.509	129.0	31.4	8.5	15.8
2010 08 27		01 36.22	-14 25.0	0.651	1.527	132.4	29.3	8.7	15.8
2010 09 01		01 38.61	-15 28.9	0.653	1.546	135.8	27.1	8.8	15.7
2010 09 06		01 39.66	-16 31.0	0.658	1.567	139.3	24.8	9.0	15.7
2010 09 11		01 39.45	-17 29.0	0.666	1.588	142.7	22.6	9.1	15.7
2010 09 16		01 38.11	-18 20.8	0.677	1.611	145.9	20.5	9.3	15.7
2010 09 21		01 35.82	-19 04.3	0.691	1.635	148.7	18.6	9.5	15.7
2010 09 26		01 32.78	-19 38.1	0.710	1.660	151.0	17.0	9.8	15.8
2010 10 01		01 29.21	-20 00.9	0.732	1.685	152.5	15.9	10.0	15.8