

ASTEROID LIGHTCURVE ANALYSIS AT THE PALMER DIVIDE OBSERVATORY – FEBRUARY-MARCH 2006

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Lightcurves for 15 asteroids were obtained at the Palmer Divide Observatory from February through mid-March 2006: 353 Ruperto-Carola, 486 Cremona, 535 Montague, 1319 Disa, 1326 Losaka, 1396 Outeniqua, 1653 Yakhontovia, 1854 Skvortsov, 1889 Pakhmutova, 2288 Karolinum, 2725 David Bender, 4490 Bamberg, (6159) 1991 YH, (6393) 1990 HM1, and 6859 Datemasumune.

Observations of 15 asteroids were made at the Palmer Divide Observatory in February to mid-March 2006. One of three telescopes/camera combinations was used: 0.5m Ritchey-Chretien/FLI IMG-1001E, 0.35m SCT/FLI IMG-1001E, or 0.35m SCT/ST-9E. The scale for each was about 2.5 arcseconds/pixel. Exposure times were 120–240s, all unguided. The operating temperature for the FLI cameras was –30°C while the ST-9E was run between –15° to –30°C, depending on ambient conditions.

When selecting targets, first priority was given to members of the Hungaria group, those being part of an ongoing study at the Palmer Divide Observatory. When no suitable Hungarias were available, other targets were chosen by comparing the list of known lightcurve periods maintained by Harris and Warner (Harris 2006) against a list of well placed asteroids. Asteroids were often selected with the intent of removing the observational biases against faint objects (due to size and/or distance) as well as those with lightcurves of small amplitudes, long periods, or a complex nature. All images were measured using MPO Canopus, which employs differential aperture photometry to determine the values used for analysis. The period analysis was also done within

Canopus using the Fourier analysis algorithm developed by Harris (1989).

The results are summarized in the table below. The individual plots are presented afterwards. The data and curves are presented without comment except when additional details are warranted. Column 3 gives the full range of dates of observations while column 4 gives the number of data points used in the analysis. Column 5 is the range of phase angles over the full date range. If there are three values in the column, this means the phase angle reached a minimum with the middle value being the minimum. Columns 6 and 7 give the range of values (or average if the range was relatively small) for the Phase Angle Bisector (PAB) longitude and latitude respectively. Columns 8 and 10 give the period and amplitude of the curve while columns 9 and 11 give the respective errors in hour and magnitudes.

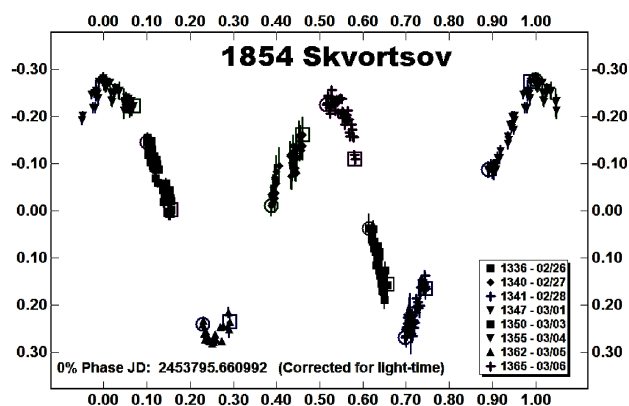
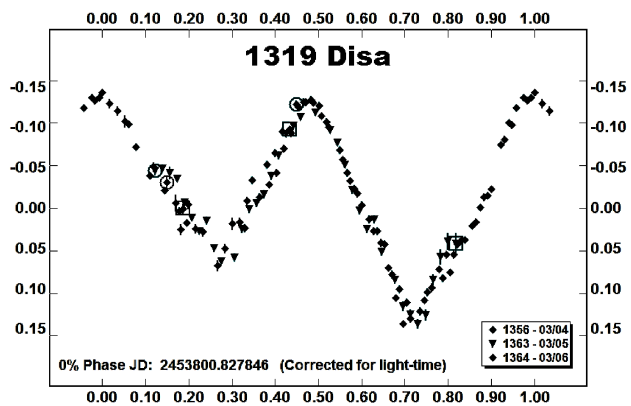
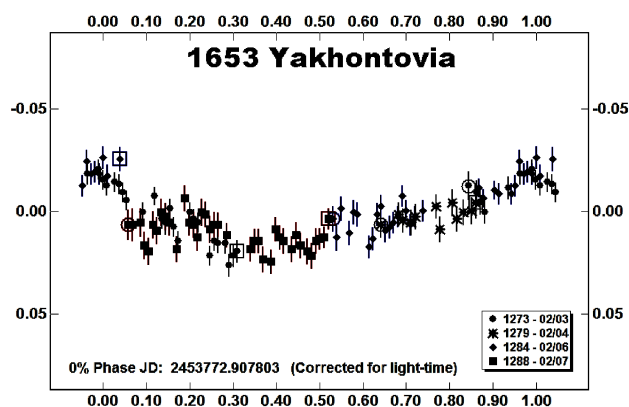
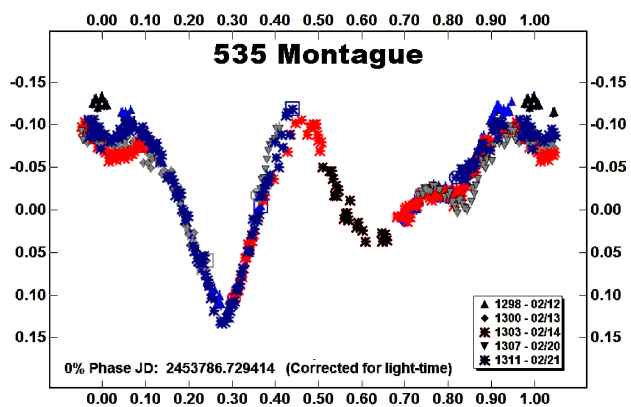
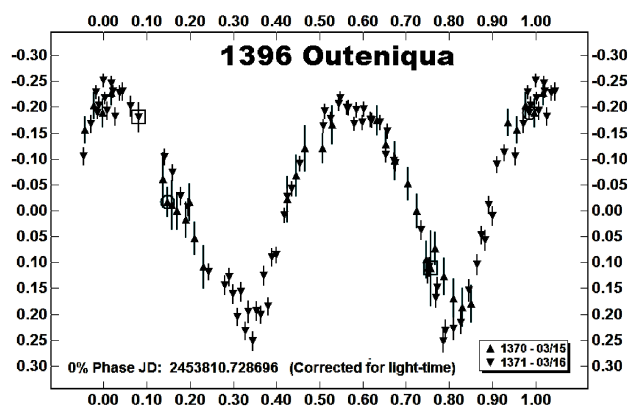
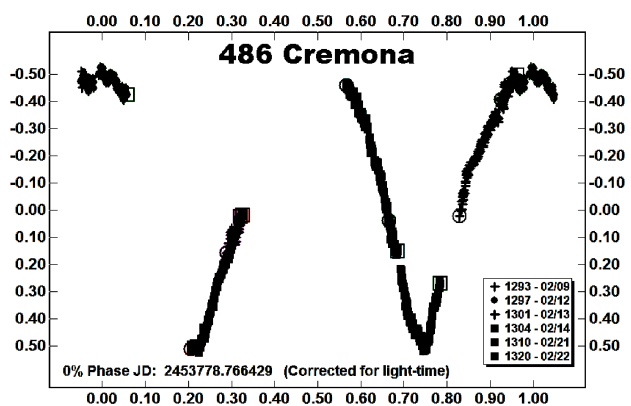
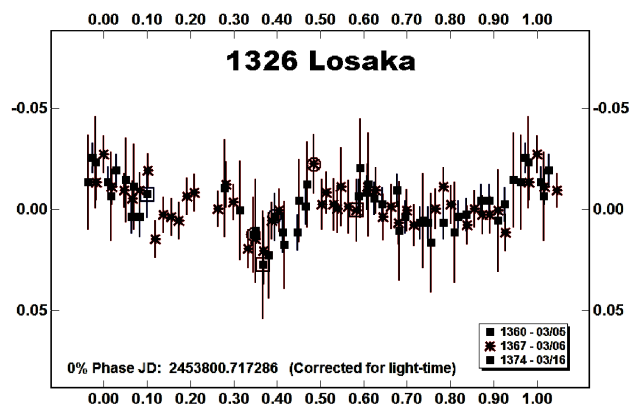
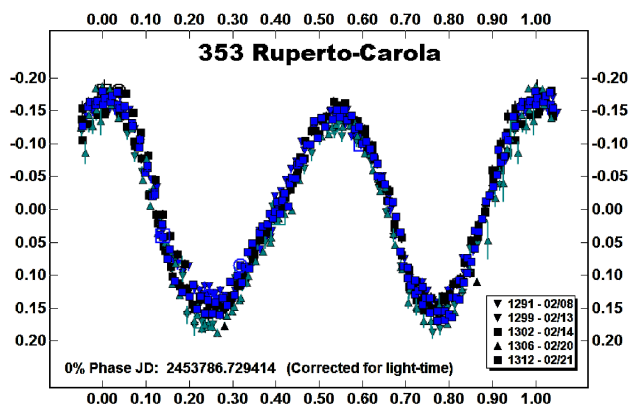
486 Cremona. Wisniewski (1997) reported an amplitude of 0.02 mag but no period.

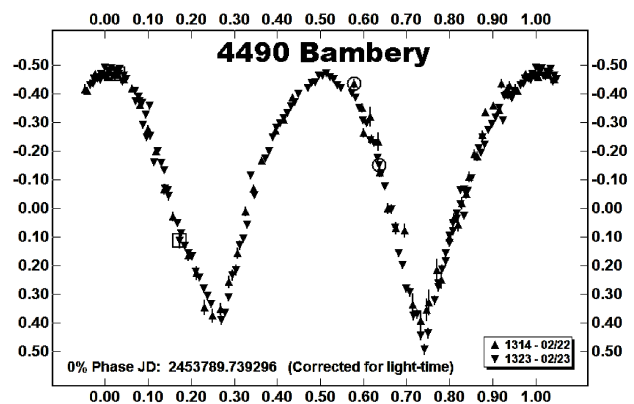
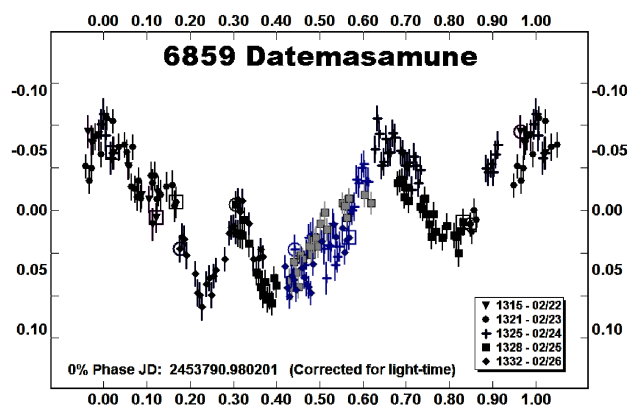
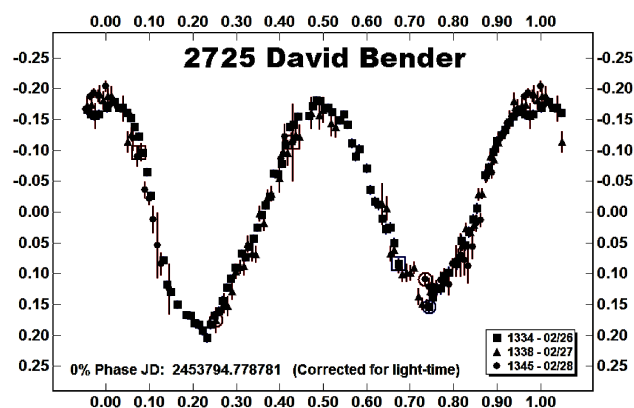
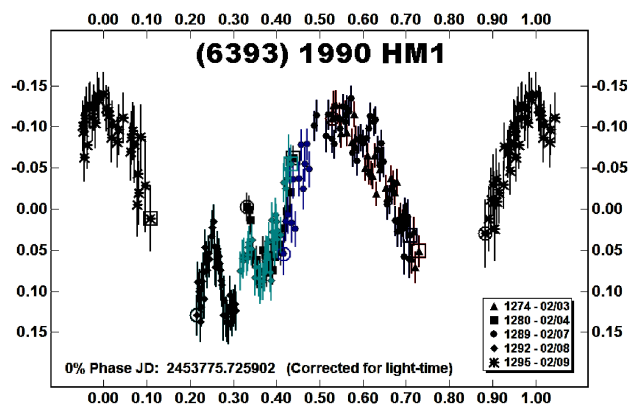
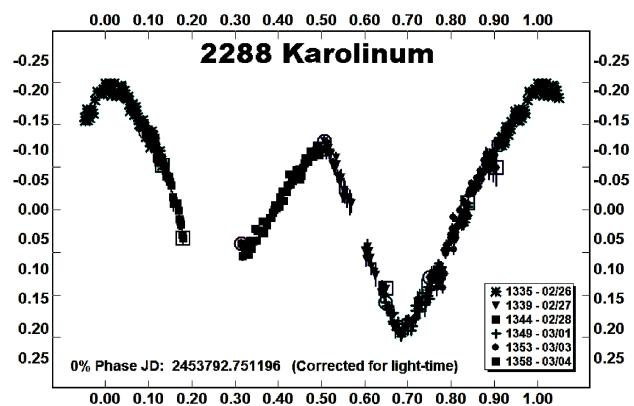
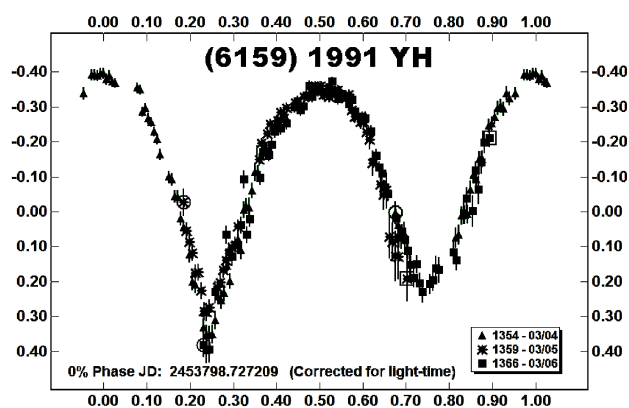
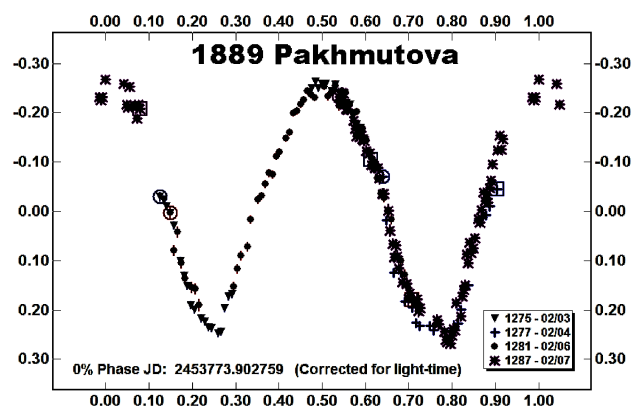
535 Montague. Koff (2001) previously reported a period of 10.28h and an amplitude of 0.20mag.

1326 Losaka. The low amplitude of the lightcurve, only 0.03 mag, makes the solution somewhat uncertain. No other solution seemed to fit well enough to consider.

1653 Yakhontovia. The low amplitude again makes the solution uncertain, especially since the period of 15.41h assumes a monomodal curve. This might indicate the asteroid was viewed pole-on during this apparition. Assuming a bimodal curve, a period search was made between 29 and 32 hours. The resulting plots for the periods of 29.3 or 30.6h were not sufficiently convincing to adopt either solution as being an acceptable alternative. However, they do remain a possibility.

#	Name	Date Range (mm/dd) 2006	Data Pts	Phase	L _{PAB}	B _{PAB}	Per (h)	PE	Amp (m)	AE
353	Ruperto-Carola	02/08–21	581	10.4–16.1	121.6–123.1	3.4	2.73898	0.00004	0.32	0.02
486	Cremona	02/09–22	678	10.5–16.2	121.9	8.2	65.90	0.05	1.0	0.02
535	Montague	02/12–21	561	14.3–17.2	112.6	4.7	10.2482	0.0008	0.25	0.02
1319	Disa	03/04–06	127	7.2–8.1	147.7	–3.4	7.080	0.003	0.26	0.02
1326	Losaka	03/05–16	91	8.4–11.4	147.9	15.2	6.90	0.01	0.03	0.01
1396	Outeniqua	03/15–16	103	12.7–13.2	149.5	2.3	3.081	0.002	0.44	0.03
1653	Yakhontovia	02/02–07	112	4.9–7.3	123.4	–0.1	15.41	0.05	0.03	0.01
1854	Skvortsov	02/26–03/06	276	5.6–9.4	147.8	–4.0	78.5	0.2	0.56	0.02
1889	Pakhmutova	02/03–07	196	8.6–9.7	119.7	15.3	17.490	0.004	0.50	0.02
2288	Karolinum	02/26–03/04	401	10.1–11.6	146.3	18.3	42.16	0.04	0.40	0.02
2725	David Bender	02/26–28	196	10.1–10.5	142.5	19.5	9.956	0.005	0.37	0.02
4490	Bamberg	02/22–23	192	13.5–13.2	165.4	18.0	5.815	0.003	0.90	0.03
6159	1991 YH	03/04–06	206	8.6–9.5	149.9	7.8	10.639	0.005	0.78	0.03
6393	1990 HM1	02/03–09	232	6.2–8.1	123.4	10.4	32.70	0.06	0.24	0.02
6859	Datemasumune	02/22–26	201	9.2–7.0	165.2	4.4–5.4	12.95	0.03	0.12	0.03





References

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