

ASTEROID LIGHTCURVE ANALYSIS AT THE VIA CAPOTE OBSERVATORY: 2010 FEBRUARY-MAY

James W. Brinsfield
Via Capote Observatory
5180 Via Capote, Thousand Oaks, CA 91320
jbrinsfi@viacapotesky.com

(Received: 6 June)

Photometric data for eight asteroids were obtained at the Via Capote Observatory from 2010 February through May. Synodic periods from the resulting lightcurves were found for: 1845 Helewalda (7.4 h); 2090 Mizuho (5.47 h); 2297 Daghestan (7.75 h); 2881 Meiden (3.48 h); 4569 Baerbel (2.737 h); 5691 Fredwatson (106.25 h); 11100 Lai (> 5 hrs); and (22295) 1989 SZ9 (3.80 h). Several of these targets had no previously published photometric lightcurve data.

CCD photometric observations were made of eight asteroids from 2010 February through May to determine the synodic rotation periods. Observations at the Via Capote Observatory in southern California were made using a Meade LX200 0.36-m Schmidt-Cassegrain (SCT) working at f/10. The CCD imager was an Apogee Alta U6 with a 1024x1024 array of 24-micron pixels. All observations were made unfiltered at 1x binning yielding an image scale of 1.44" per pixel. All images were dark, flat field, and bias corrected. Images were measured using *MPO Canopus* (Bdw Publishing) with a differential photometry technique. Comparison stars were chosen and linked using the "Comp Star Selection" tool embedded within the *Canopus* analysis package. The data were light-time corrected. Period analysis was also done with *Canopus*, which implements the Fourier analysis algorithm developed by Harris (Harris et al., 1989). Most target selections were made using the Collaborative Asteroid Lightcurve Link (CALL) web-site (Warner, 2010) and "Lightcurve Opportunities" articles from the *Minor Planet Bulletin*. Priority was given to asteroids that did not have a published rotation period.

The results are summarized in the table below. Individual lightcurve plots along with additional comments, as required, are also presented. The reference phase angle (α) listed on the plots is for the first session in the data set.

1845 Helewalda. The low declination of this target limited the number of usable sessions that could be obtained and so only partial coverage was achieved. The results of this study agree well with those of DeGraff (2001) and Carbo (2009). There was an interesting feature at phase 0.28 where the maxima exhibited a dip.

This was also apparently observed by the Carbo group.

2297 Daghestan. Behrend (2010) reported a provisional period of 7.7 h with an amplitude of 0.37 mag. These compare to 7.75 h and 0.24 mag found in this study.

2881 Meiden. Toward the end of this campaign, the object faded to near the practical magnitude limit for the system and so the resultant data on these later sessions became rather noisy.

11100 Lai. Coincidentally, this object was in the field of view for the April 8 observing session for 2297 Daghestan and was at or near a very favorable opposition. Despite the favorable apparition, the target was near the practical magnitude limit for the system and the study was abandoned after two additional dedicated sessions were completed. The April 16 session suggests the period to be something greater than 5 hours.

References

- Behrend, R. (2010). Observatoire de Geneve web site: http://obswww.unige.ch/~behrend/page_cou.html
- Carbo, L., Green, D., Kragh, K., Krotz, J., Meiers, A., Patino, B., Pligge, Z., Shaffer, N., and Dittion, R. (2009). *Minor Planet Bul.* **36**, 152-157.
- DeGraff, D.R. and Kern, J.S. (2001) *Bul. Amer. Astron. Soc.* **33**, 1403.
- Harris, A.W., Young, J.W., Bowell, E., Martin, L.J., Millis, R.L., Poutanen, M., Scaltriti, F., Zappala, V., Schober, H.J., Debehogne, H., and Zeigler, K.W. (1989). "Photoelectric Observations of Asteroids 3, 24, 60, 261, and 863." *Icarus* **77**, 171-186.
- Warner, B.D. (2010) CALL web site. <http://www.MinorPlanetObserver.com/astlc/default.htm>

#	Name	Date Range (mm/dd) 2010	Data Points	Phase	L _{PAB}	B _{PAB}	Per(h)	PE	Amp (mag)	AE
1845	Helewalda	02/16-02/18	167	2.1,1.3	152	+2	7.4	0.1	0.28	0.04
2090	Mizuho	02/17-02/18	129	1.2	152	+2	5.47	0.01	0.30	0.05
2297	Daghestan	04/08-04/24	269	1.0,0.7,5.9	200	+2	7.75	0.01	0.24	0.05
2881	Meiden	02/11-04/27	323	7.6,31.1	141	-3	3.48	0.01	0.18	0.08
4569	Baerbel	04/25-05/01	192	6.4,9.2	202	+0	2.737	0.001	0.24	0.05
5691	Fredwatson	04/09-05/15	714	15.1,27.1	176	+7	106.25	0.02	>1.2	
11100	Lai	04/08-04/16	185	1.4,1.0,4.0	200	+2	> 5	0.5	>0.15	
(22295)	1989 SZ9	04/02-04/07	385	6.3,9.3	182	-1	3.80	0.01	0.04	0.02

Table I. Observation circumstances. The phase column gives the phase angle at the beginning and end of the data set. When three numbers are given, the middle value is the minimum phase angle observed. The two PAB columns give the approximate longitude and latitude of the phase angle bisector.

