

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5489

Konkoly Observatory
Budapest
9 January 2004

HU ISSN 0374 – 0676

SIX NEW SOUTHERN CEPHEIDS

GREAVES, JOHN¹; WILS, PATRICK²; VAN CAUTEREN, PAUL^{2,3}

¹ Borrowdale Walk, Northampton, UK

² Vereniging Voor Sterrenkunde, Belgium; e-mail: patrick.wils@cronos.be

³ Beersel Hills Observatory, Laarheidestraat 166, B-1650 Beersel, Belgium, email: paulvancauteren@skynet.be

In this paper six previously unknown Cepheid variables are presented. These have been found using ASAS3 survey data (Pojmanski, 2002), in a number of selected regions of the Southern sky. The strips of sky we examined ranged from 6h to 16h RA and 20 degrees deep (ASAS3 already having examined 0^h to 6^h RA), centered roughly upon -60° declination, to include as much Milky Way as possible. Also a large part of the sky near -33° was searched, as well as a few smaller areas. Throughout this work, long period variables and eclipsing binaries were picked up easily enough, as did ASAS before, but we deliberately set out to look for objects that would expand the statistical base for astrophysically meaningful objects. We only looked at objects with large standard deviations, ignoring close doubles that ASAS3 cannot easily resolve, and dismissing areas where we clearly saw problems with the data. We therefore cannot ascertain that we found all the stars of a given type in the studied regions, within the survey's limiting magnitude.

Table 1 lists the details of the new Cepheid variables: identity, coordinates (from UCAC2, Zacharias, et al., 2003), Galactic latitude b , V magnitude range (from ASAS3), 2MASS $J - K_s$ colour, GCVS variability type, epoch of maximum (JD - 2450000) and period in days. The electronic version of IBVS also provides a link to the source of the data. Phase plots of the data are provided in Figs. 1 to 6. Table 2 contains Fourier parameters and their formal errors for these stars, such as defined by Morgan (2003).

Notes on individual stars:

GSC 7758-1126: The Galactic latitude suggests that this is a Population II object, however the proper motion is quite small. A determination of the metallicity or m_1 index via Strömgren photometry would be necessary to distinguish for certain between the δ Cepheid or W Virginis types. $B - V = 0.74 \pm 0.3$ from Tycho2 $B_T - V_T$ (Høg et al., 2000).

GSC 8693-0661: POSS survey plate images reveal this star appears extended, and is in fact a pair of stars approximately $5''$ apart in a mostly North-South orientation. ASAS3 will not resolve this pair, but the Northern star of the two appears to be several magnitudes fainter than the Southernmost star, and is thus likely beneath the ASAS3 threshold.

GSC 6771-1281: The Galactic latitude again suggests that this is a Population II object, however the proper motion is also quite small for this star. Preibisch et al. (1998)

give a K6 spectral type. Because its light curve more resembles W Vir itself, we classified it as a CWA type star, although with its period of less than 8 days it should be called a CWB star according to the GCVS definition. Since the shape of its light curve differs from most other Cepheids of its period (which is evident as well from a $\log(P) - \Phi_{21}$ plot, such as in Morgan, 2003), GSC 6771-1281 is possibly a first overtone pulsator (GCVS type DCEPS), but with a larger amplitude and longer period than most other stars of this type known in the Galaxy (Mantegazza and Poretti, 1992).

GSC 5676-0131: NSV 10400. This star is located in a highly reddened region. A $B - V$ value of $+1.57 \pm 0.08$ (at phase 0.94) was measured at Beersel Hills Observatory.

Table 1. New Cepheid variables

GSC	RA (J2000) Dec		b	V	$J - K_s$	Type	Epoch	Period
8606-0190	09 48 26.82	-58 01 05.4	-3.3	11.59-12.20	+0.81	DCEP	2655.9	4.151
6666-0796	11 53 01.96	-23 12 59.1	+37.7	12.37-13.21	+0.59	CWA	2640.1	15.55
7758-1126	12 38 03.82	-38 31 24.6	+24.3	11.83-12.52	+0.44	CWB	1885.1	4.321
8693-0661	15 05 46.46	-58 22 55.0	0.0	11.78-12.83	+1.09	DCEP	2437.2	16.71
6771-1281	15 22 16.27	-26 52 25.3	+25.0	11.74-12.40	+0.87	CWA:	2811.5	6.834
5676-0131	18 14 15.83	-09 20 20.6	+3.9	11.57-12.35	+0.94	DCEP	2415.9	5.121

Table 2. Fourier parameters for the new Cepheid variables.

GSC	R_{21}	$\bar{\Phi}_{21}$	R_{31}	$\bar{\Phi}_{31}$
8606-0190	0.35 ± 0.02	4.32 ± 0.07	0.12 ± 0.02	2.52 ± 0.09
6666-0796	0.11 ± 0.02	1.10 ± 0.13	0.10 ± 0.02	1.81 ± 0.08
7758-1126	0.36 ± 0.02	4.10 ± 0.06	0.18 ± 0.02	2.27 ± 0.11
8693-0661	0.29 ± 0.02	4.18 ± 0.08	0.19 ± 0.02	2.10 ± 0.10
6771-1281	0.17 ± 0.02	0.29 ± 0.11	0.04 ± 0.02	0.27 ± 0.40
5676-0131	0.34 ± 0.01	4.52 ± 0.04	0.15 ± 0.01	2.62 ± 0.06

Acknowledgements: This research has utilised the ASAS3 public photometry catalogue. It made use of data products from the Two Micron All Sky Survey, which is a joint project of the University of Massachusetts and the Infrared Processing and Analysis Center/California Institute of Technology, funded by the National Aeronautics and Space Administration and the National Science Foundation. Use has been made as well of the SIMBAD and VizieR databases operated at the *Centre de Données Astronomiques (Strasbourg)* in France and the Guide 8 astronomical software package (<http://www.projectpluto.com>). P. Van Cauteren is grateful to the Royal Observatory of Belgium for putting at his disposal material acquired by project G.0178.02 from the Fund for Scientific Research (FWO) - Flanders (Belgium).

References:

- Høg, E., Fabricius, C., Makarov, V.V., Urban, S., Corbin, T., Wycoff, G., Bastian, U., Schwekendiek, P., Wicenec, A., 2000, *A&A*, **355**, L27
- Mantegazza, L., Poretti, E., 1992, *A&A*, **261**, 137
- Morgan, S.M., 2003, *PASP*, **115**, 1250 (<http://nitro9.earth.uni.edu/fourier/>)
- Pojmanski, G., 2002, *Acta Astronomica*, **52**, 397
- Preibisch, T., Guenther, E., Zinnecker, H., Sterzik, M., Frink, S., Roeser, S., 1998, *A&A*, **333**, 619
- Zacharias, N., Urban, S., et al., 2003, *Second US Naval Observatory CCD Astrograph Catalog (UCAC2)*, in preparation

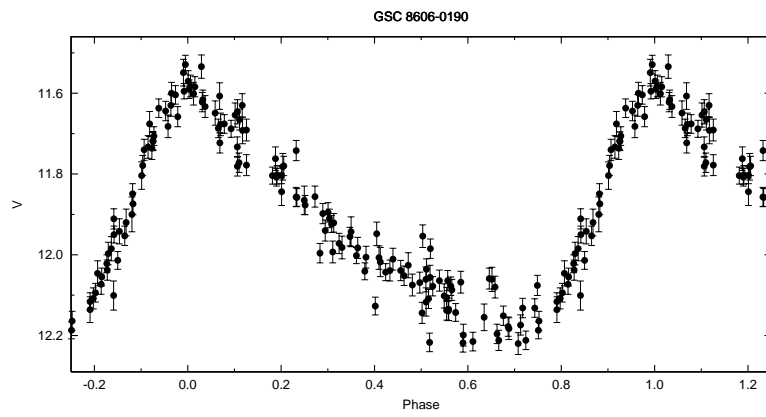


Figure 1. ASAS3 phased light curve for GSC 8606-0190

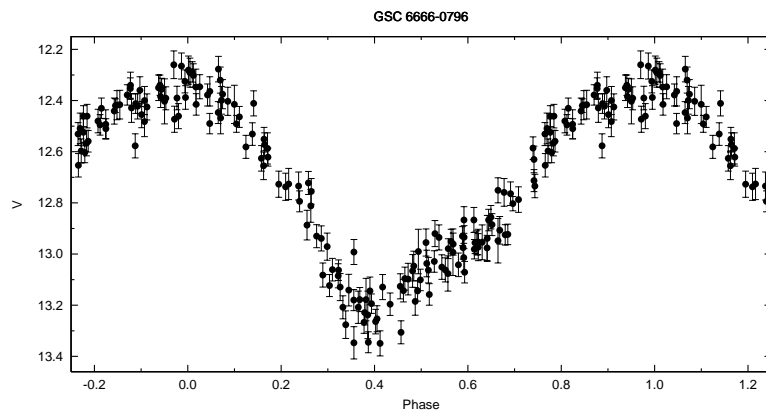


Figure 2. ASAS3 phased light curve for GSC 6666-0796

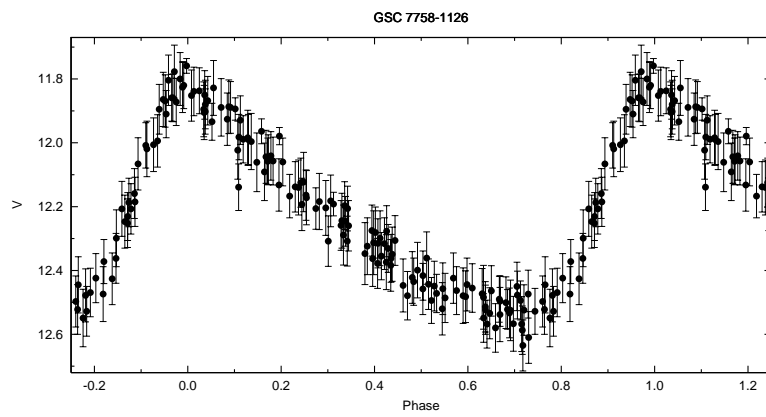


Figure 3. ASAS3 phased light curve for GSC 7758-1126

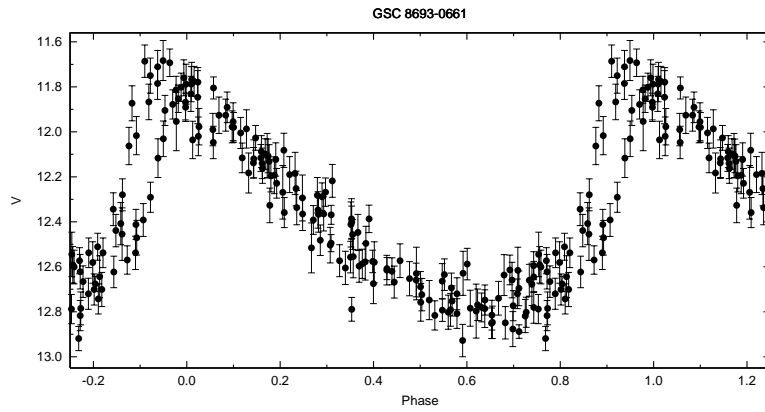


Figure 4. ASAS3 phased light curve for GSC 8693-0661

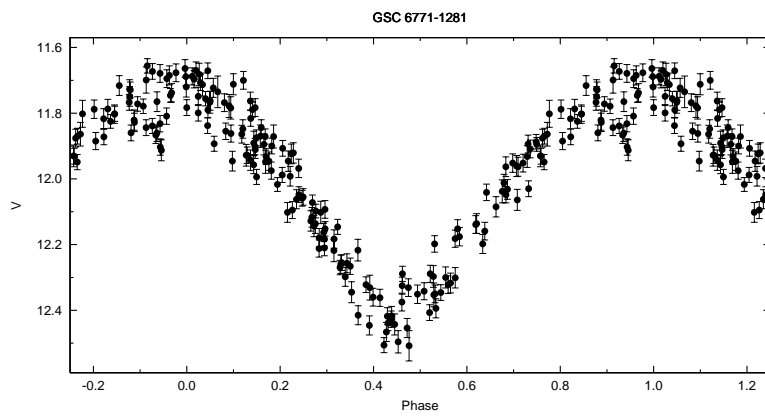


Figure 5. ASAS3 phased light curve for GSC 6771-1281

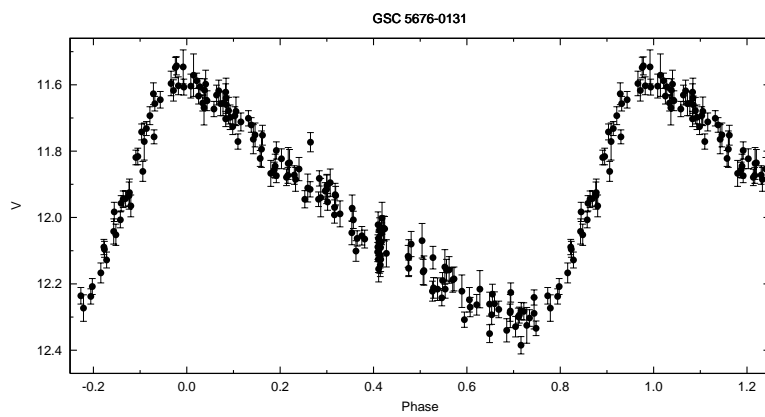


Figure 6. ASAS3 phased light curve for GSC 5676-0131 = NSV 10400

ERRATUM FOR IBVS 5489

Geert Hoogeveen reported the following error:

IBVS No.	item	printed	correct
5489	identifier	GSC 7758-1126	GSC 7758-1162