CV Monocerotis –
a collection of Maximum Times and a revised Ephemeris

C. HOFFMEISTER (1934) from Sonneberg observatory in Germany discovered the variability of CV Monocerotis on patrol plates. AHNERT (1947) from the same observatory derived the first, photographic times of maximum light and ARP from Mount Wilson and Palomar observatories in California, USA, won the first set of precise, photoelectric observations (Arp, 1959, brightness arguments revised by Mitchell e.a., 1964). SZABADOS (1980) noted, that Arp's maximum time substantially deviated from all other times, that had accumulated until 1980, and suggested two period changes. I observed CV Monocerotis visually in the years 2003 and 2004 and derived a maximum time (see table in the appendix) 12 hours earlier than predicted with the ephemeris given by SZABADOS (1980) and adopted by the GCVS4 (2001). Negative O-C-values of maximum times won with unprecise methods should be taken seriously as, due to the asymmetric lightcurve, bad quality observations of cepheids generally scatter the opposite way to positive O-C-values.

The reason for the inadequate GCVS ephemeris seems to be Arp's puzzling set of photoelectric observations from 1959. Arp reports, for example, a time argument "JD2436632,2130", that is 1959MAR04, 17h UT. At this instant in California there is bright morning sunshine and the star field of CV Monocerotis is crossing the local meridian below the northern horizon. Analogous considerations apply to the complete data set Arp presented. The difference between the Greenwich and the California Standard Time Meridian is 120°, 8 hours or 0,33 days. I presume, that Arp erroneously took Local Standard Time for UT. This would perfectly explain the difference of about -0,3d between his observations and all other reported ones. I gave Arp's time of maximum the weight zero and derived a new linear ephemeris:

$$\begin{array}{lll} \text{JD(max)} = 2441046{,}67 + 5{,}37864 * E & & \text{(Meyer R., 2006JUL15, this paper)} \\ \pm \quad 4 \quad 2 & & \end{array}$$

The table in the appendix gives the times of maximum with my weights. Additionally I show the light curve of CV Monocerotis with the complete ASAS3 data set (figure 1) and an O-C-Diagram (figure 2). Both diagrams have been calculated with the new ephemeris given above. The lightcurve displays the typical, smooth and moderately asymmetric pattern of classical cepheids with periods between 3 and 6 days. Predictions with the new elements do not exactly meet the maximum of this lightcurve. This phenomenon calls for further precise observations and does not justify to cancel the revised elements given here. The O-C diagram shows no substantial change of period since the discovery in 1934. All photoelectric observations including Arp's and Szabados' reference of Arp's are marked red.

References:

Ahnert (1947):	Veröffentl. Sternw. Sonneberg 1, 118
Arp (1959):	Astrophys. Journ. 131, 322
GCVS4, Vol.I-III (2001):	Electron.Version see http://www.sai.msu.su/groups/cluster/gcvs/gcvs/
Hoffmeister (1934):	Astron.Nachr. 253, 195
Mitchell e.a. (1964):	Boletín Observ. Tonantzintla y Tacubaya (Puebla, Mexico) 3, 153
Szabados (1980):	Commun. Konkoly Observ. Hung. Acad. Sci., Budapest Nr. 76

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Figure 1, the lightcurve of CV Monocerotis:

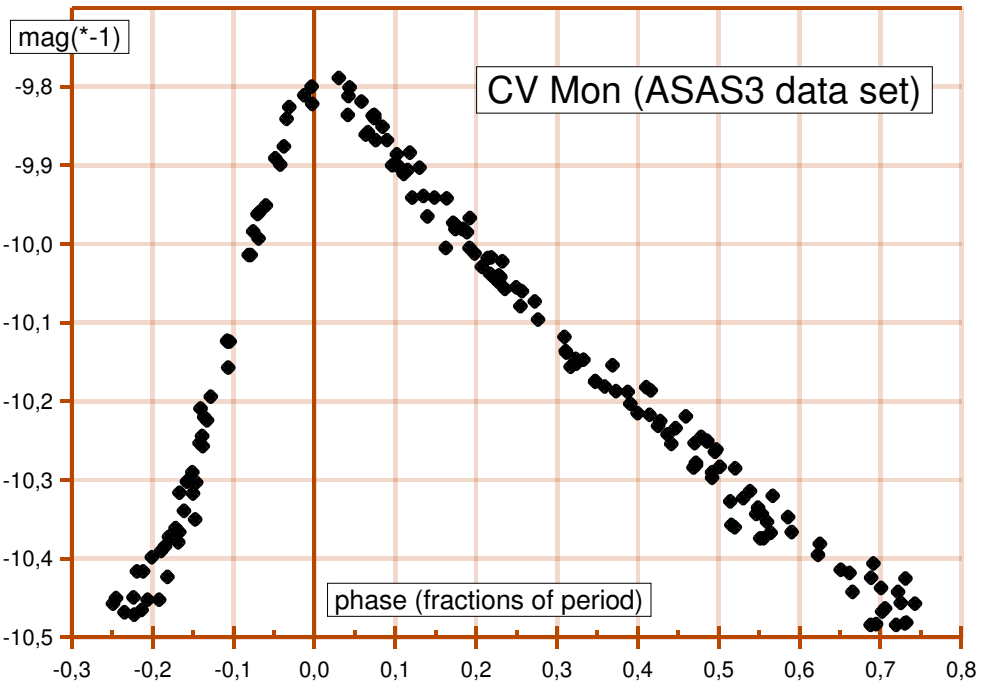
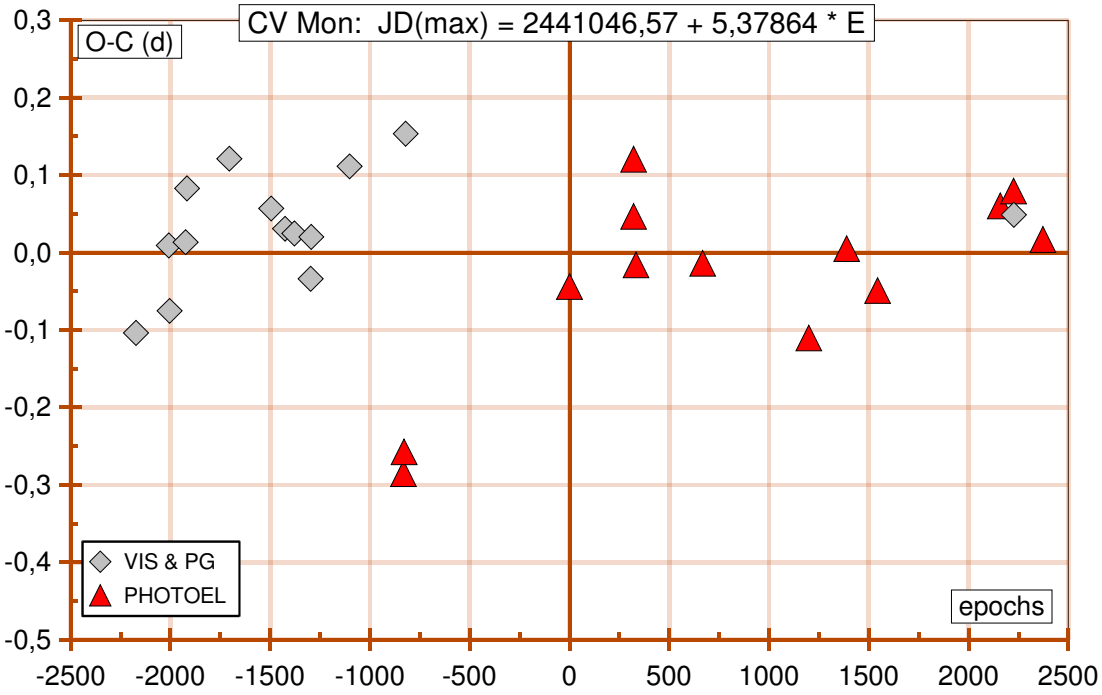


Figure 2, the O-C-Diagram of CV Monocerotis:



Appendix:

Times of maximum light of CV Monocerotis

JD	meth. observ.	remark	weight	observer	referring author	reference
2429364,06	PP		1	WACHMANN		AHSB 7, 213
2430246,27	PP		1	TEPLITSKAYA	WACHMANN	AHSB 7, 213
2430267,70	PP		1	AHNERT		VSS 1, 118
2430698,08	PP		1	WACHMANN		AHSB 7, 213
2430735,80	PP		1	AHNERT		VSS 1, 118
2431876,11	PP		1	WACHMANN		AHSB 7, 213
2433005,56	PP		1	WACHMANN		AHSB 7, 213
2433376,66	PP	LM	10	FILATOV		BATSD 30, 67
2433629,45	PP		1	FILATOV		BATSD 30, 67
2434070,44	PP	LM	10	WACHMANN		AHSB 7, 213
2434086,63	PP		1	WACHMANN		AHSB 7, 213
2435119,42	PP		1	WACHMANN		AHSB 7, 213
2436571,256	LC		0	ARP	SZABADOS	KONK Nr.76
2436587,420	LC	LM	0	ARP	MITCHELL EA	BOTT 3, 153
2436630,86	PP		1	WACHMANN		AHSB 7, 213
2441046,526	LC	LM	100	PEL		AAPS 24, 413
2442773,160	LC		100	SZABADOS		KONK Nr.76
2442773,234	LC	LM	100	SZABADOS		KONK Nr.76
2442837,641	LC		100	TURNER	SZABADOS	KONK Nr.76
2444634,109	LC	LM	100	MOFFETT&BARNES		APJS 55, 389
2447495,449	LC	LM	100	SZABADOS		KONK Nr.96
				BERDNIKOV		AAPT 2, 31
				BERDNIKOV		PISM 18, 325
2448517,506	LC	LM	100	TYCHO/HIPPARCOS		HIP 31624
2449351,141	LC	LM	100	BERDNIKOV		PISM 19, 210
				BERDNIKOV EA		PISM 21 Nr.5
				BERDNIKOV EA		PISM 21, 803
2452659,114	LC	LM	100	ASAS3		(2006MAI29)
2453019,502	LC	LM	100	ASAS3		(2006MAI29)
2453024,85	VS	LM	10	MEYER R		BAVM Nr. 171
2453804,721	LC	LM	100	ASAS3		(2006MAI29)

Key:

methods of observation: LC = photoelectrical/CCD PP = photographic VS = visual
remark LM means, that I (present paper) won own maximum times from single observations reported in the literature

AAPT = Astronomical and Astrophysical Transactions
AHSB = Astronomische Abhandlungen der Hamburger Sternwarte in Bergedorf, D
APJS = Astrophysical Journal Supplement Series
BATSD = Bull. Astron./Astrophys. Observ./Inst. Acad. Sci., Stalinabad=Dushanbe, Tadjik SSR
BAVM = BAV-Mitteilungen, Berlin, D
BOTT = Boletín de los Observatorios de Tonantzintla y Tacubaya, Puebla, Mexico
HIP = Hipparcos Catalogue
KONK = Commun. Konkoly Observatory Hungar.Acad.Sci., Budapest, H
PISM = Pisma Astronomitsky Zhurnal, USSR/RUS
VSS = Veröffentlichungen der Sternwarte Sonneberg, D