BM Persei: Period change and a new ephemeris

Soviet astronomer St. Belyawskij discovered the variability of the classical cepheid BM Persei on plates in Simeis observatory, USSR, and reported in 1935 (Belyawskij, 1935). The ephemeris of the GCVS 2001 goes back to a publication of the German amateur astronomer Max Beyer, who followed this rather weak variable star in the 1940ies and 1950ies with a professional telescope of Hamburg observatory in Bergedorf. Beyer collected several hundred visual estimates, derived 4 normal maximum times and an ephemeris and reported in 1963 (Beyer, 1963).

The GCVS 2001 lists a brightness variation of BM Persei between 9.65mag(V) and 11.02mag(V) and a long period of almost 23 days. The lightcurve of BM Persei is one of the most asymmetric of all cepheids and at maximum brightness develops a sharp point. I won 158 visual brightness estimates of BM Persei between 2004JUL20 and 2006MAR23 on a traditional Argelander step scale. Probably due to the late spectral type of the variable (K5) the reported magnitudes of my 5 comparison stars are not plausible and I decided to project my step values into the GCVS brightness range given above. With a linear fit to adequate parts of the data set I find the maximum time

JD2453460.6 (geocentric, this paper)
± 2

At the end of the paper I give a table of further reported maximum times of BM Persei. Since about 1980 instants of maximum brightness increasingly drift away from the predictions of Max Beyer's ephemeris to positive O-C-values. My new maximum appeared 3.3 days later than calculated. A linear fit to all maximum times since 1982 with weights given in the table yields the following revised ephemeris:

JD(max) = 2445263.6 + 22.962 * E (this paper)
± 6 2

The following diagrams are based on these new elements. Figure 1 shows two photoelectric lightcurves (Berdnikov, 3 loci) and my recent visual lightcurve phased into one normal epoch. The brightness values are differential magnitudes, which means, that I left the range of values of each set unchanged and moved the zero points to arbitrary places. The O-C-diagram (figure 2) shows maximum times since discovery and clearly demonstrates, that the period of BM Persei became longer. The scanty data set does not allow to definitely decide, whether this period change is continuous or abrupt.

Figure 1:

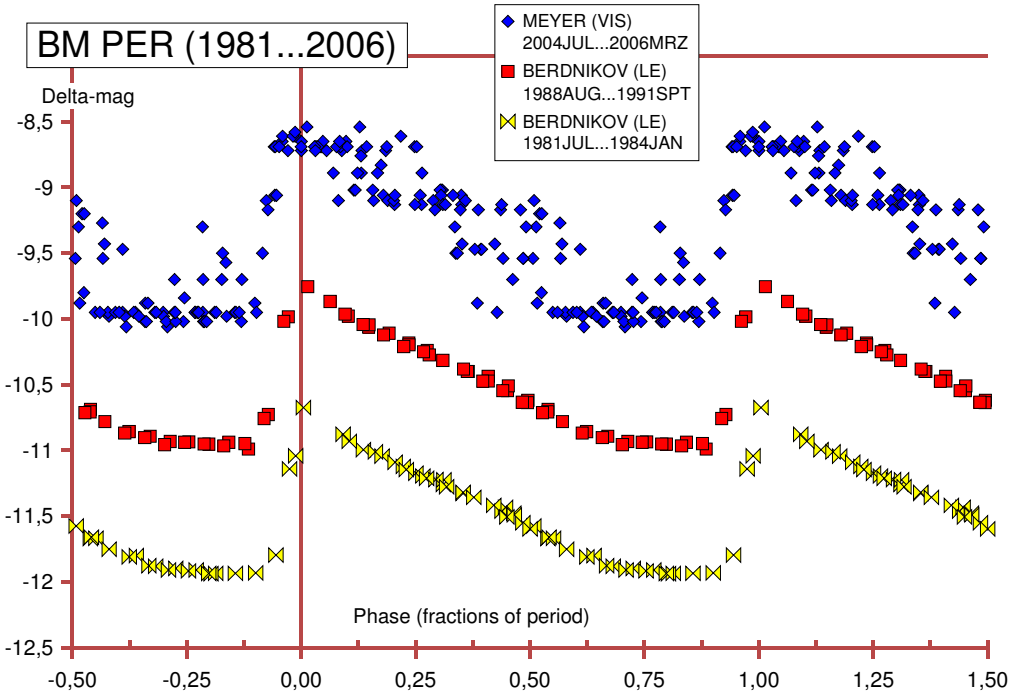
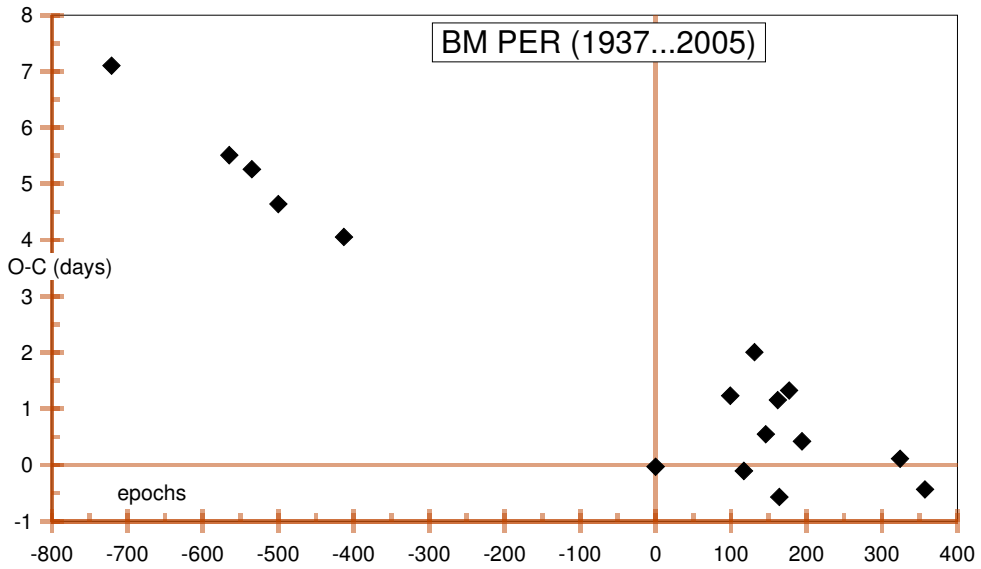


Figure 2:



References:

Belyawskij	Nishni-Novgorod Variable Stars (=VS, Peremenniye Zvezdy), Nr. 47 (1935) also: Pulkovo Observatory Circular Nr. 15
Berdnikov	Astron.&Astrophys.Transact.Ser., Vol. 2, 43
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Berdnikov	Peremenniye Zvezdy, Vol. 22, 369
Beyer	Astron.Nachr. Vol. 287, 109 (1963)
GCVS	electronical version: http://www.sai.msu.su/groups/cluster/gcvs/gcvs/ (2001)

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Reported maximum times of BM Persei:

JD	Observer	Reference (referring author)	method	remark	weight
2428715,1	KUKARKIN	AN_287_109 (BEYER)	VIS		
2432295,58	BEYER	AN_287_109	VIS		
2432984,19	BEYER	AN_287_109	VIS		
2433787,24	BEYER	AN_287_109	VIS		
2435784,35	BEYER	AN_287_109	VIS		
2445263,57	BERDNIKOV	(LOC.CIT.)	LE	LMAM	100
2447538,07	KRIEBEL	BAVM_52 (HUEBSCHER_EA)	VIS		1
2447950,05	BERDNIKOV	(LOC.CIT.)	LE	LMAM	100
2448273,63	KRIEBEL	BAVM_59 (HUEBSCHER_EA)	VIS		1
2448616,6	KRIEBEL	BAVM_60 (HUEBSCHER_EA)	VIS		1
2448984,6	KRIEBEL	BAVM_62 (HUEBSCHER_EA)	VIS		1
2449028,8	THOMAS	BAVM_68 (HUEBSCHER_EA)	VIS		1
2449329,2	KRIEBEL	BAVM_68 (HUEBSCHER_EA)	VIS		1
2449718,65	KRIEBEL	BAVM_79 (HUEBSCHER_EA)	VIS		1
2452703,4	MEYER	BAVM_157 (HUEBSCHER_EA)	VIS		1
2453460,6	MEYER	THIS PAPER	VIS		1

AN = Astron.Nachr.; BAVM = BAV-Mitteilungen (Berlin); VIS = visual; LE = photoelectrical; LMAM = maximum time calculated by the author of the present paper from single observations given in the reference.
