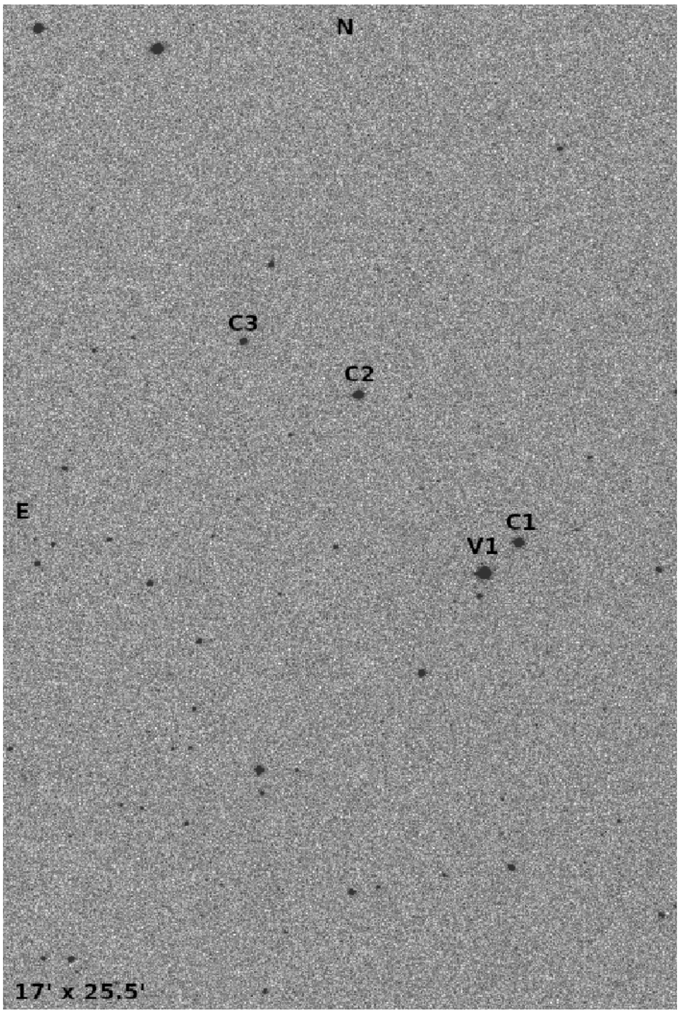

Figure 1: Finding chart of V2080 Cyg. The variable is marked as V1. Positions of the three comparison stars C1, C2 and C3 are also shown. The field of view is about 17.0'×25.5'. North is up, east is left.

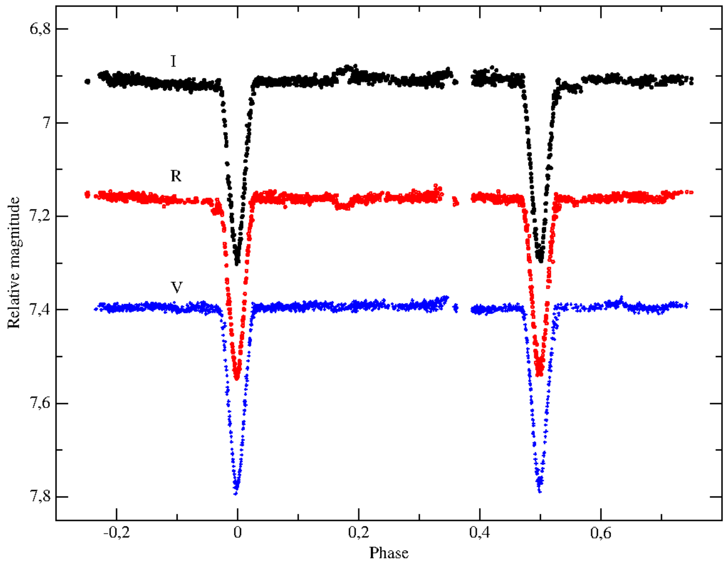

Figure 2: The observed light curves in the I, R and V band passes for V2080 Cyg.

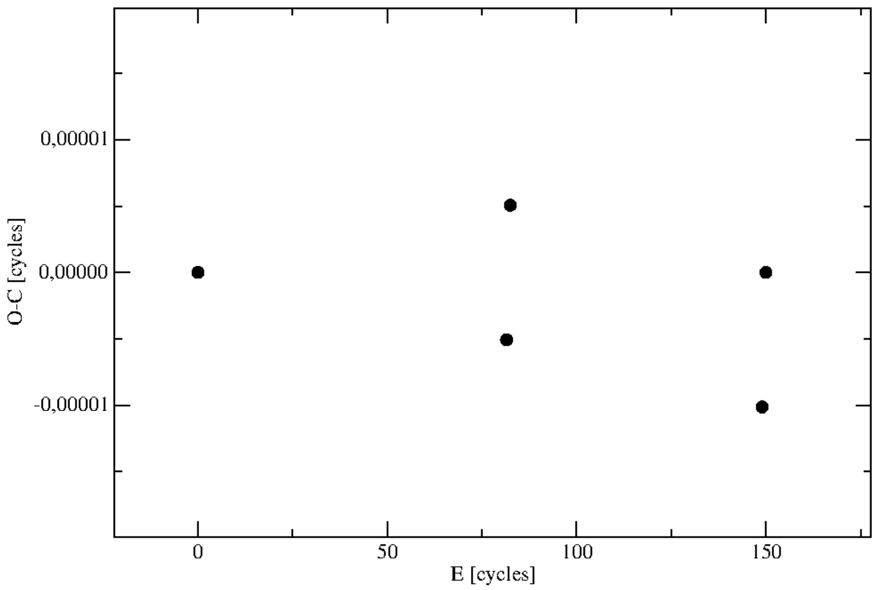

Figure 3: The $O-C$ diagram for the moments of eclipses observed in V2080 Cyg during our 2009-2011 campaign.

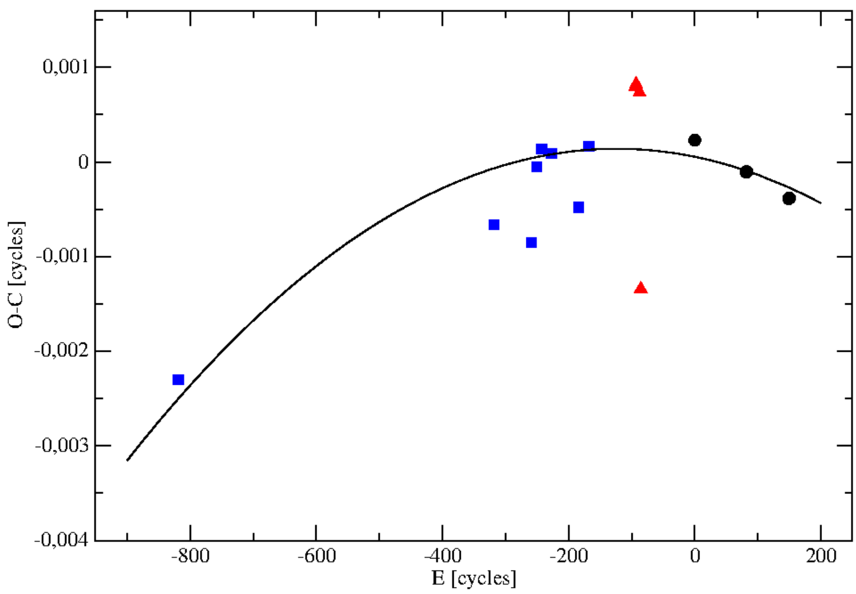

Figure 4: The $O-C$ diagram for the moments of eclipses in V2080 Cyg based on data collected between 1998 and 2011. Black circles represent our dataset, data taken from the SuperWASP are shown with red triangles, and blue squares correspond to data provided by İbanoğlu et al. (2008).

Table 1: The journal of the CCD observations of V2080 Cyg.

Year	Start date	End date	Number of nights	Exposure time [sec]	Number of frames	Filter
2009	September 7	November 21	19	10	6306	V
				8	7248	I
				6	9550	R
2010	October 17	October 31	5	10	1726	V
				8	2141	I
				6	3012	R
2011	May 23	October 1	17	10	5515	V
				8	6888	I
				6	8313	R
Total:	-	-	41	-	50699	-

1 Photometry

1.1 Observations and data reduction

Observations of V2080 Cyg were obtained during 41 nights from 2009 September 7 to 2011 October 1 at the Poznań Astronomical observatory located in Poland. For observations we used a 200 mm, F/4.5 Newton reflector, equipped with a SBIG ST-7 XME camera and a set of Bessel BVRI filters. The camera provided a $17.0' \times 25.5'$ field of view.

All observations were carried out in the V, I and R filters with the exposure times 10, 8, and 6 seconds, respectively. In total, we gathered 108.59 hours and obtained 50699 exposures of V2080 Cyg. Table 1 presents a full journal of our CCD observations.

We determined relative unfiltered magnitudes of V2080 Cyg by taking the difference between the magnitude of the object and the mean magnitude of the three comparison stars. In Fig. 1 the map of a region is displayed with V2080 Cyg marked as V1 and the comparison stars as C1, C2 and C3, respectively. The equatorial coordinates and the brightness of comparison stars C1 (RA= $19^h26^m41^s.246$, Dec= $+50^o09^{'}18^{"}.274$, 8.56 mag in V filter), C2 (RA=$19^h27^m00^s.870$, Dec=$+50^o14^{'}04^{"}.884$, 8.98 mag in V filter), and C3 (RA=$19^h27^m16^s.991$, Dec=$+50^o16^{'}10^{"}.986$, 10.08 mag in V filter) were taken from the Tycho-2 Catalogue (Høg et al. 2000).

CCD frames were reduced with the *STARLINK* package. Corrections for bias, dark current and flat-field were applied and the aperture photometry was conducted.

In Fig. 2 we present the resulting light curves of V2080 Cyg in I, R and V filters. We used the value 4.9335 days as an orbital period to phase the data.

1.2 $O-C$ Diagrams for eclipses

To check the stability of the orbital period and determine its value, the $O-C$ analysis was conducted. First, we used the timings of 5 eclipses from our 2009-2011 observing season and the following ephemeris of the minima was derived:

$$\mathrm{HJD_{min}} = 2455094.3114(2) + 4.933550(2) \times E, \tag{1}$$

which gives the orbital period of $P_{orb1} = 4.933550(2)$ days. The resulting $O-C$ diagram for the moments of minima is shown in Fig. 3.

To obtain the best possible value of the orbital period we combined our 5 timings of eclipses from September 2009 - September 2011 observations, the SuperWASP[1] June-July 2008 dataset, and the date presented in İbanoğlu et al. (2008). Based on this, we calculated the following ephemeris of the minima:

$$\mathrm{HJD_{min}} = 2455094.31027(9) + 4.9335701(4) \times E, \tag{2}$$

and this corresponds to the orbital period of $P_{orb2} = 4.933701(4)$ days. In Fig. 4 we show the resulting $O - C$ diagram for the moments of eclipses for 1998-2011 time span.

In Table 2 we present the timings of eclipses with errors, cycle numbers E and $O - C$ values. As Type I and II are marked the primary and the secondary eclipses observed in V2080 Cyg, respectively.

The decreasing trend of the orbital period shown in Fig. 4 was confirmed by calculations of the second-order polynomial fit to the moments of minima. The following ephemeris was obtained:

$$\mathrm{HJD_{min}} = 2455094.31054(9) + 4.9335634(6) \times E - 2.7(2) \times 10^{-8} \times E^2. \tag{3}$$

In Fig. 4 the solid line corresponds to the ephemeris given by Eq. 3.

After this investigation, we suggest that the orbital period might have not been stable between August 1998 and September 2011 and it can be described by a decreasing trend with a rate of $\dot{P} = -2.7(2) \times 10^{-8}$. It should be noted that the observed change in the orbital period, presented in Fig. 4, was calculated based on the only one point of data from 1998 given by İbanoğlu et al. (2008). Hence, this time span of observations and the amount of available data are insufficient for any conclusive statement pertaining to the changes in the orbital period of V2080 Cyg.

References

[1] E. Høg et al., 2000, *A&A*, 355, L27-L30

[2] C. İbanoğlu et al., 2008, *MNRAS*, 384, 331-342

[1] https://wasp.cerit-sc.cz

Table 2: Times of minima in the light curves of V2080 Cyg observed from August 1998 until September 2011.

E	$\mathrm{HJD_{min}} - 2450000$	Error	$O-C$ [cycles]	Type	Reference
-819	1053.7050	-	-0.00230221	II	İbanoğlu et al. (2008)
-318	3525.4317	0.0008	-0.00066447	II	İbanoğlu et al. (2008)
-259	3816.5114	0.0006	-0.00085417	II	İbanoğlu et al. (2008)
-250.5	3858.4507	0.0003	-0.00005269	I	İbanoğlu et al. (2008)
-243	3895.4534	0.0001	0.00013467	II	İbanoğlu et al. (2008)
-227	3974.3903	0.0006	0.00089732	II	İbanoğlu et al. (2008)
-184	4186.5310	0.0003	-0.00048071	II	İbanoğlu et al. (2008)
-168	4265.4713	0.0006	0.00016353	II	İbanoğlu et al. (2008)
-94	4630.5586	0.0005	0.00079444	II	SuperWASP
-93	4635.4923	0.0008	0.00082077	II	SuperWASP
-87.5	4662.6265	0.0005	0.00073248	I	SuperWASP
-85.5	4672.4834	0.0006	-0.00134313	I	SuperWASP
0	5094.3114	0.0002	0.00022904	II	This work
81.5	5496.3957	0.0002	-0.00010807	I	This work
82.5	5501.3293	0.0003	-0.00010201	I	This work
149	5829.4103	0.0003	-0.00038814	II	This work
150	5834.3439	0.0004	-0.00038208	II	This work