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DK HYDRAE - A NEGLECTED ECLIPSING BINARY

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Abstract

Visual minima of DK Hya from 1976 to the present indicate a large period correction for this system. Three decades had passed since period analysis had been done for this star, and revised elements have been calculated.

The fourth edition of the *General Catalogue of Variable Stars* (Kholopov *et al.* 1985) (GCVS) lists DK Hydrae as type EB. The photographic magnitude range is given as 10.5 - 11.5 with a secondary minimum at 10.7. The elements given are:

$$JD_{(min)} = 2431178.216 + 0.521951\ E. \quad (1)$$

The photographic discovery of this variable was published by Hoffmeister in 1936. A list of minima observed in the mid 1940's by Tsesevich followed in 1954. His elements, which differ slightly from the GCVS are:

$$JD_{(min)} = 2431178.216 + 0.52196\ E. \quad (2)$$

Observations of DK Hydrae were first made at the Milwaukee Astronomical Society (MAS) Observatory in 1976. A large error with respect to equation (2) was found and in the search for the time of minimum, most phases of the orbit were observed. No trace of a secondary minimum was noted (see Figure 1).

A search of published data produced no other times of minimum other than those by Tsesevich. Due to the southern declination of this system, favorable observing opportunities were infrequent from our observing location. It took a number of years to show that this star is almost two cycles in error with respect to equation (1).

Several times of minima were later published by K. Locher (1983 a, b, c). These observations would fit the pattern if they were all secondary minima. However, as figure 1 shows, no secondary minima is visually observable. This discrepancy was discussed with M. Kohl, a colleague of K. Locher, at the AAVSO meeting in Brussels (1990). He reviewed this data with Locher, who had a low degree of confidence in his observations of DK Hydrae and dropped this star after one season. These times of minima are included for reference in Table 1, but were not used in the period calculations. Equation (3) was produced using all of the reliable minima observed since 1976:

$$JD_{(min)} = 2442843.718 + 0.5219207\ E. \quad (3)$$

This period would indicate that a small period change may have occurred since the Tsesevich observations were made. More observations are required to clarify the history of this neglected variable.

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Table 1. Times of Minima for DK Hydrae

JD (min)	Equ. (1)		Equ. (3)		N	Observer	Ref.
	E	O-C	E	O-C			
2431178.216	0	.000	-22351	-.052		V. Tsesevich	1954
2431179.264	2	.004	-22349	-.048		V. Tsesevich	1954
2431213.20	67	.013	-22284	-.04		V. Tsesevich	1954
2431224.16	88	.012	-22263	-.04		V. Tsesevich	1954
2431235.12	109	.011	-22242	-.04		V. Tsesevich	1954
2431562.377	736	.005	-21615	-.025		V. Tsesevich	1954
2442843.718	22351	-.624	0	.000	8	G. Samolyk	
2442843.722	22351	-.620	0	.004	9	G. Wedemayer	
2443176.702	22989	-.646	638	-.001	10	G. Samolyk	
2443190.790	23016	-.651	665	-.005	11	G. Samolyk	
2443538.914	23683	-.667	1332	-.002	14	G. Samolyk	
2443948.626	24468	-.687	2117	.002	10	G. Samolyk	
2444307.709	25156	-.706	2805	.003	9	G. Samolyk	
2444608.853	25733	-.728	3382	-.001	11	G. Samolyk	
2445021.694	26524	-.751	4173	.001	12	G. Samolyk	
2445325.710:	27106.5	-.771	4755.5	-.002	6	K. Locher	1983a
2445344.505:	27142.5	-.766	4791.5	.004	6	K. Locher	1983a
2445357.522:	27167.5	-.798	4816.5	-.027	6	K. Locher	1983a
2445368.503:	27188.5	-.778	4837.5	-.006	6	K. Locher	1983b
2445401.363:	27251.5	-.801	4900.5	-.027	5	K. Locher	1983b
2445402.399:	27253.5	-.809	4902.5	-.035	6	K.Locher	1983b
2445405.809	27260	-.791	4909	-.018	12	G. Samolyk	
2445436.360:	27318.5	-.774	4967.5	.001	6	K. Locher	1983c
2445437.399:	27320.5	-.779	4969.5	-.004	9	K. Locher	1983c
2447897.985:	32035	-.931	9684	-.013	15	G. Samolyk (descending leg)	
2447950.711	32136	-.922	9785	-.001	14	G. Samolyk	

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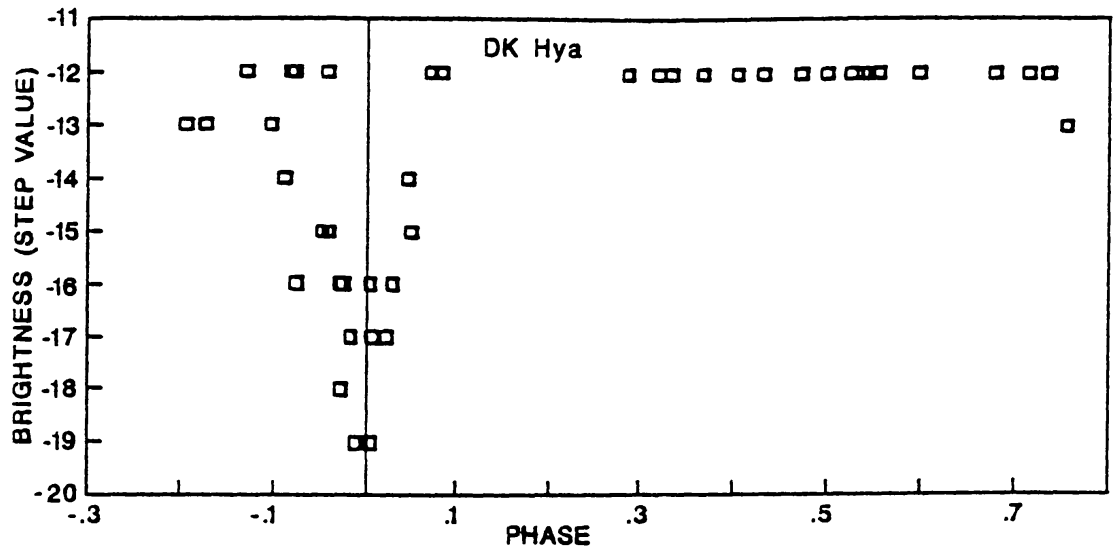

Figure 1. Visual observations of DK Hydrae made in 197[illegible] plotted according to phase using equation (1). As expected, the secondary minimum was not observable visually. Observations by G. Wedemayer, MAS Observatory.

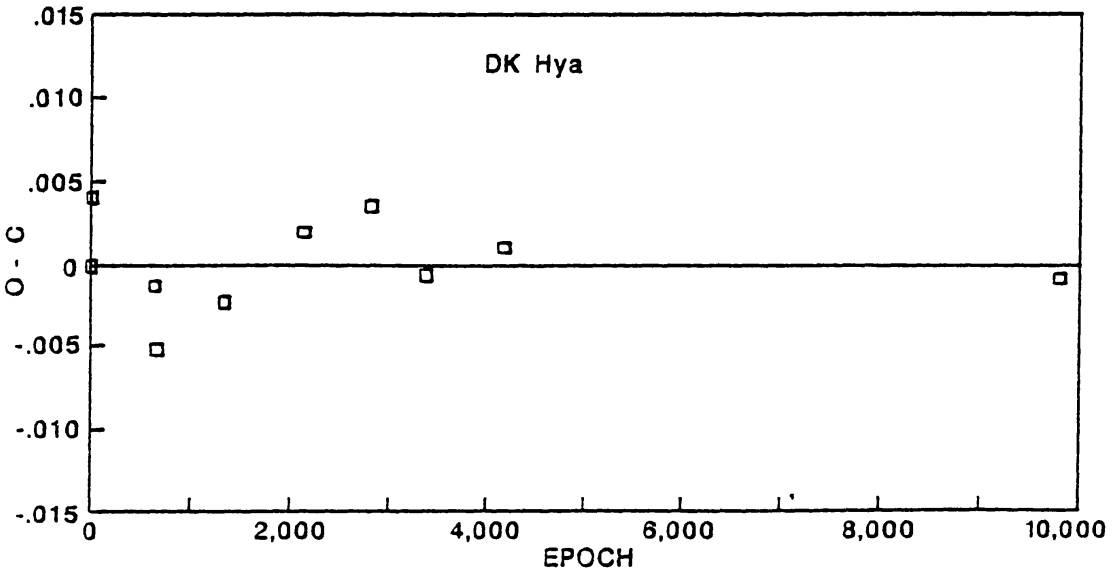

Figure 2. O-C plot for the times of minima used to calculate equation (3).

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