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POSSIBLE LIGHT VARIATION OF COMPARISON STAR FOR

BY Dra : BD + 51^o2410

The constancy of comparison stars is crucial in photoelectric photometry. In order to achieve acceptable level of transformation into the international systems it is necessary to choose comparison stars of about the same spectral types as those of the variables. In the case of red stars this causes a considerable problem since very many of the comparison stars are candidates for some kind of light variation.

The particular star that is dealt with here is C1 = BD+51^o2410 = HD 172468 (K2) = SAO 31077. When observing BY Dra, most observers use two comparison stars, the second being C2 = BD + 51^o2408 = HD 172268 (K5) = SAO 31070. Although no detailed investigation has been made to determine the constancy of these stars over a long time-scale, papers on BY Dra have already mentioned some problems with its comparisons.

The first to deal with the problem was Vogt (1981). Vogt compared his observations of C1 with those obtained in 1973 (Vogt, 1975) and found some discrepancy. He mentioned that "this disparity may well be due to real variations of one or both comparison stars."

In the same year Melkonian et al. (1981) reached the same conclusion. These authors found some variations in the observations made for C1 and C2 in the second half of 1975 (see Figure 1 in Melkonian et al., 1981) and mentioned that possibly C1 is responsible.

If we wish to know whether these small variations are real or not, so that we may avoid the problems which arise when we transform the data obtained in different places into the same system, we considered it necessary to have observations using the same telescope and equipment for a given series of observations.

Figure 1 a

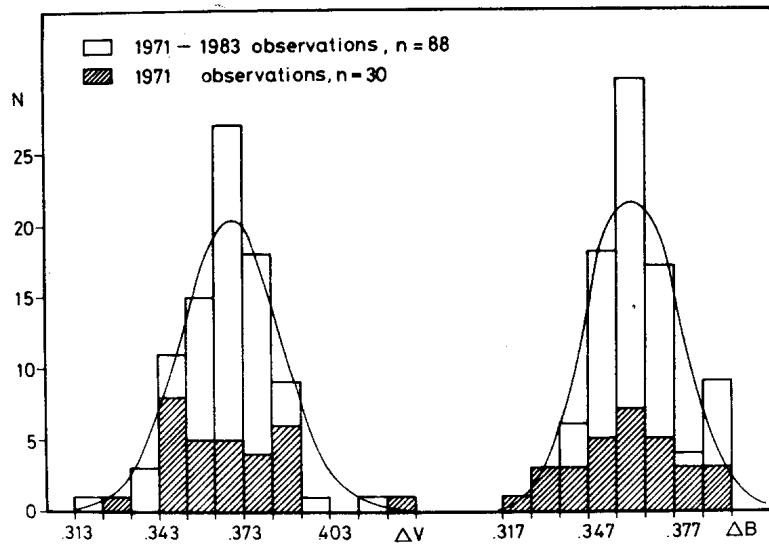
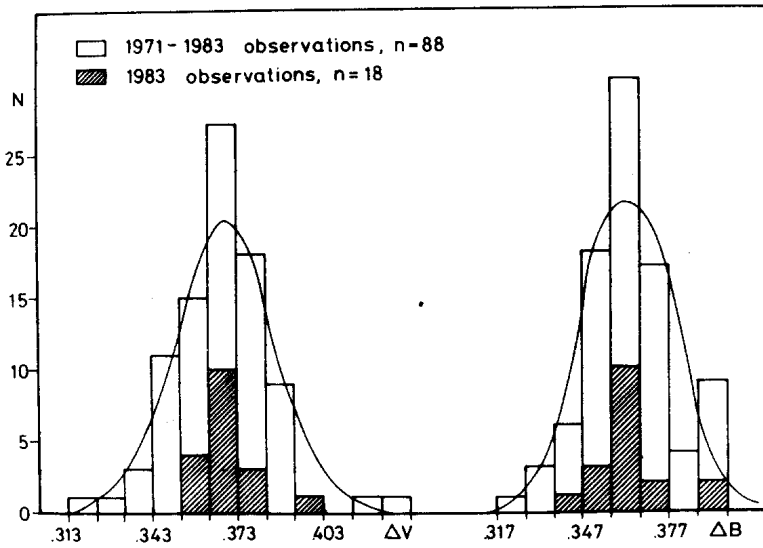


Figure 1 b

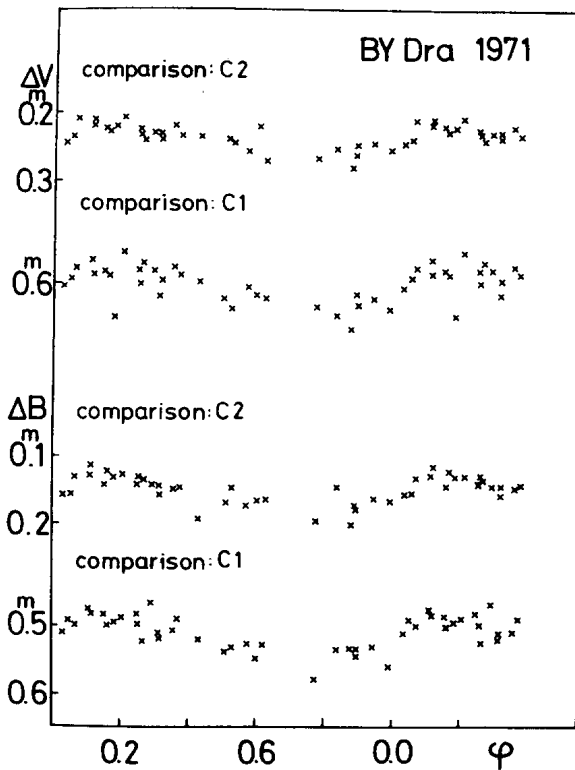


Our measurements for these stars made at Konkoly Observatory with the 60 cm telescope in 1971 and with the 50 cm telescope in 1983 give a possibility to investigate this problem.

In Figure 1 the distributions of the measured magnitudes (ΔV , ΔB) are displayed. The blank area represents all the observations made between 1971 and 1983, the hatched area shows the observations made in 1971 (upper panel) and in 1983 (lower panel). Although there were fewer observations in 1983 than in 1971 their distributions is much nearer to Gaussian one.

Chugainov (1973, 1974) made several observations for the α stars. The histogram of all his observations again shows Gaussian distribution (with smaller standard deviation than ours), but the distribution of his 1971 observations is far from that.

Figure 2



The question is : Which of these comparison stars is variable ? When we plot the light curves for BY Dra itself with respect to C1 and C2 separately, it can be seen that the scatter is higher when using C1 as comparison star in the year 1971 (Figure 2) whereas in 1983 no difference between the light curves calculated with C1 and C2 can be found.

Since C1 is of the spectral type K2 ($B-V=1.285$, Vogt, 1975) it may show some kind of activity.

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