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AUGUST 1981 CRISIS OF V348 Sgr *

The variability of V348 Sgr was discovered independently by Woods (1926) and Schajn (1929) and the star was classified as an R CrB variable by Parenago (1931) on the basis of a first light curve. Hoffleit (1958), after re-examining the star for the period 1900-1954 on Harvard plates, concluded that it had indeed had an R CrB behavior during the period JD 2417500 - 2425000, but that, outside this interval, the observations suggested rather a semi-regular or even an irregular variable.

The star was reported to spend most of its time either near maximum or near minimum light. The total photographic magnitude range was 10.8 to fainter than 16.4. The transition between the magnitude extrema appeared to take place with relative rapidity. An interval of 30 to 60 days was usually necessary for the complete rise, but the decline was faster and difficult to catch. The time spent by V348 Sgr near maximum light varied from one maximum to another and the mean spacing between two returns to maximum varied between 150 and 250 days.

In this note, we are reporting observations covering what might be the first fairly well observed dramatic drop of brightness of this peculiar variable.

uvby photometric data were collected during an observing run in August 1981 at the 1m ESO telescope equipped with a standard one-channel photometer (Danks, 1981, Chap. II.C.1 and III.B.3). The four filters were measured sequentially and the integrations were repeated until reaching a satisfactory precision depending on the magnitude of the observed star. The comparison stars used

*Based on observations collected at the European Southern Observatory, La Silla, Chile.

for V348 Sgr were HD 174115, HD 176903, SAO 187099 and HD 172256 which turned out to be a Be variable (Heck and Manfroid, 1982a). The overall agreement of the observations with the international uvby standard system for the whole run (Heck and Manfroid, 1982b) was for V, b-y, m_1 , c_1 respectively: 0.011, 0.006, 0.008 and 0.009.

Table I
Observations in the uvby system

JD \odot 2.444.000 +	V	b-y	m_1	c_1
835.532	12.58	0.444	-0.102	0.069
835.553	12.60	0.406	0.007	-0.026
837.555	14.03	0.356	0.076	0.025
837.624	14.25	0.315	0.180	-0.150
837.659	14.29	0.380	0.118	-0.050
838.492	15.83	0.025	0.528	-0.391
838.520	15.97	0.151	0.314	-0.495
838.551	16.02	0.099	0.463	-0.780
838.559	16.20	-0.042	0.715	-1.072
838.586	16.11	-0.063	0.744	-0.804
838.613	16.36	0.000	0.557	-0.648
838.641	16.54	-0.261	0.784	-0.721
838.668	16.47	-0.197	0.836	-0.853
839.484	> 17			
839.688	> 17			
841.563	> 17			
842.543	> 17			
843.621	> 17			
844.621	> 17			
844.727	> 17			

The final absolute values are gathered in Table I and the V variation is reproduced in Figure 1. Between JD 2444839 and 2444844, an upper limit at V = 17 has been indicated because of the large errors obtained beyond this magnitude with the equipment. However the dashed line in Figure 1 represents the approximate evolution of the star during this time, on the basis of the estimated brightness in the photometer viewer (barely visible at the beginning, then becoming brighter).

Figure 1 also reproduces amateur estimations of the visual magnitude of V348 Sgr. These observations are due to F. Bateson (1981) in New-Zealand and to M. Verdenet (1981, 1982) in France. No attempt has been made to adjust these estimations to the V magnitude scale. They show a typical spread but the beginning of the fall has been clearly detected by both observers. They had of course to abandon once their instrumental limit had been reached.

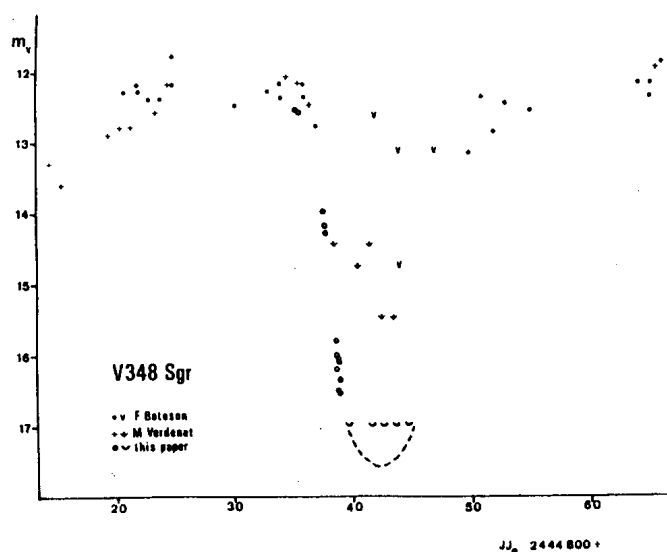


Figure 1

Clearly the descent of V348 Sgr from $m_V \approx 12.2$ to $m_V \approx 17.5(?)$ did not take more than 6 days. Due to the termination of the observing run at ESO, data are unfortunately lacking on the ascending branch, but less than 8 days have been necessary to reach $m_V \approx 13$ and the star was again "stable" at $m_V \approx 12.2$ after 22 days maximum. This is quite different from the characteristic times reported by Herbig (1958) on the basis of Hoffleit's work (1958) and recalled above.

A single observation we obtained at the 1m ESO telescope on JD 2444485 (Sept. 4, 1980) gave $V = 13.02$, $b-y = 0.462$, $m_1 = 0.127$ and $c_1 = -0.067$. All recent observations of V348 Sgr do not reveal a maximum brighter than $m_V \approx 12$ (see also e.g. Mattei, 1974, 1975 and 1981). Comparing this with the maximum at $m_{pg} = 10.6$, mentioned by Herbig (1958) and Hoffleit (1958) might indicate a general fading of the star during the recent decades or some imprecision in the original magnitude scale, although an appropriate reddening might reconcile both values.

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