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PHOTOMETRIC OBSERVATIONS OF R CrB FOLLOWING THE 1983 MINIMUM

R CrB is the prototype of one of the most interesting classes of variables. It is subject to abrupt declines in brightness followed by a slower recovery, often accompanied by fluctuations. Photometric UBVRI-observations during one of these minima were obtained at an altitude of 3100 m Terscol Peak (the Caucasus) with the 0.5 m reflector using an automatic single-channel photometer in 1983-1984. These data of R CrB are listed in Table 2, and are plotted against Julian Date in Fig. 1. Our magnitudes are accurate to $0^m.01$ - $0^m.02$ and the colour indices to $0^m.01$ - $0^m.04$, except at the deep minimum phase, where the observational errors are larger because the variable was observed at low altitude and was close to the limiting magnitude for the 50-cm telescope photometry. The magnitudes and colours of the comparison stars, determined by means of comparison with Johnson's standard stars γ and δ CrB, are given in Table 1.

The observations of R CrB enable us to compare the colour curves of the present decline with other declines of R CrB. As seen from Fig. 1, in the 1983 minimum all colour curves show a redward trend after the star begins to decline in V (this reddening totals $0^m.25$ in U-B, $0^m.4$ in B-V, $0^m.5$ in V-R and by $0^m.35$ in R-I). As the brightness continues to fall toward minimum, however, the colour curves show a blueward trend, as they usually do. On the rising branch, after the variable has recovered by 2^m it has become redder again. On the rising branch, the availability of the reddening is a peculiarity of the R CrB minima. The distinctive feature of the 1983 minimum was an appreciable reddening occurred at visible wavelengths on the descending branch of the light curve when R CrB had faded by $\Delta m_v = 3^m.5$.

As seen from Fig. 1, during brightness oscillations, having amplitudes larger than ordinary ones, occurred at the rising branch, both in the first part (when m_v had recovered to $11^m.5$) and near the end ($m_v = 6^m.5$), the amplitude of the oscillation in the U-B index was significantly larger than it was when the star was fluctuating while in its normal bright state.

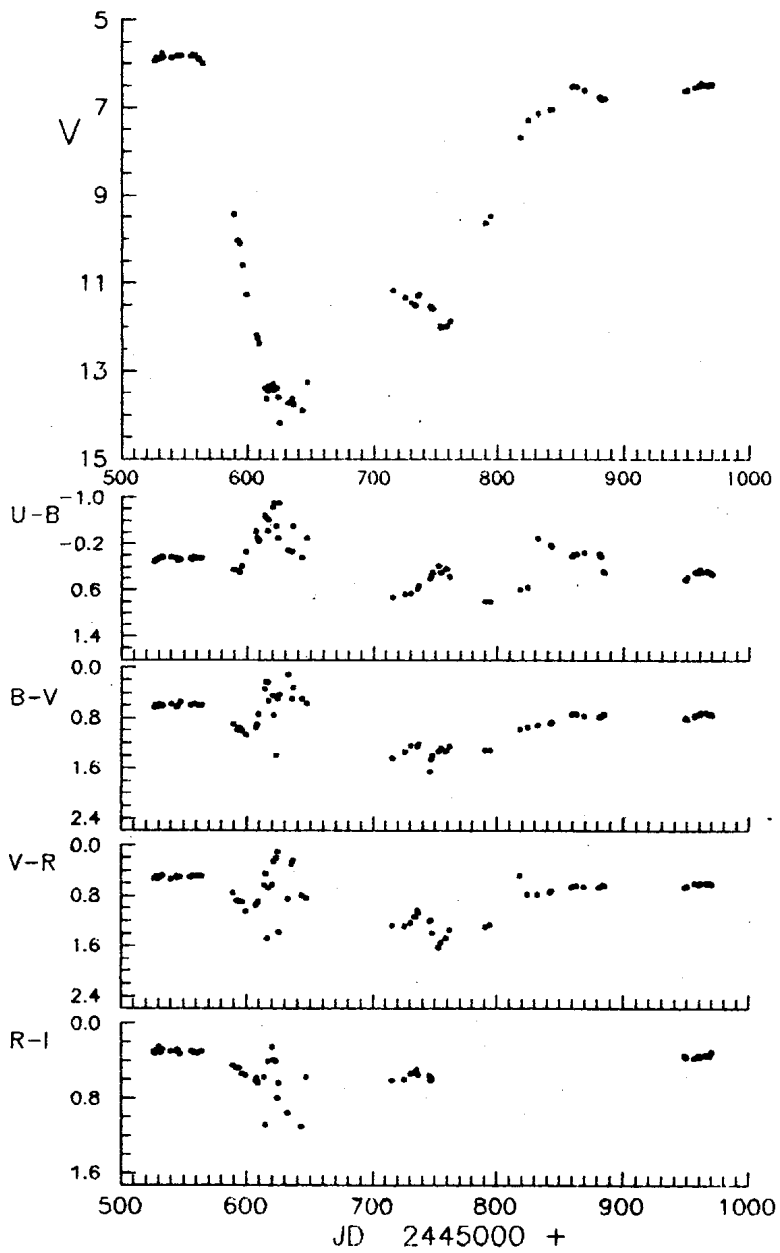


Fig. 1.

Table 1. Comparison stars

Star	V	U-B	B-V	V-R	R-I
BD +28 ^o 2475	7 ^m .45	0 ^m .03	0 ^m .47	0 ^m .43	0 ^m .28
BD +28 ^o 2469	8.09	0.11	0.62	0.52	0.37
(anonymous) $\alpha=15^{\text{h}}47^{\text{m}}.7$ $\delta=28^{\circ}16$	12.25	0.19	0.71	0.58	0.33

Table 2. Observations of R CrB

JD	V	U-B	B-V	V-R	R-I
2445000+					
526.38	5 ^m .94	0 ^m .11	0 ^m .63	0 ^m .53	0 ^m .31
527.36	5.88	0.10	0.60	0.52	0.32
528.36	5.87	0.09	0.62	0.50	0.29
529.34	5.87	0.07	0.60	0.53	0.30
530.40	5.89	0.06	0.59	0.53	0.25
532.43	5.77	0.04	0.61	0.49	0.31
533.45	5.85	0.04	0.60	0.49	0.28
540.33	5.86	0.04	0.58	0.54	0.30
544.38	5.82	0.06	0.63	0.50	0.30
545.37	5.82	0.10	0.62	0.52	0.28
547.34	5.82	0.08	0.55	0.51	0.33
555.29	5.83	0.06	0.60	0.51	-
556.34	5.80	0.08	0.59	0.50	0.30
558.33	5.81	0.04	0.58	0.50	0.31
561.34	5.89	0.06	0.60	0.49	0.32
564.35	6.00	0.06	0.60	0.50	0.30
589.35	9.43	0.25	0.90	0.76	0.45
592.33	10.04	0.26	1.00	0.88	0.48
594.32	10.11	0.30	0.97	0.89	0.48
596.33	10.61	0.18	1.01	0.90	0.54
599.32	11.27	-0.06	1.07	1.05	0.55
607.33	12.18	-0.41	0.96	0.96	0.61

Table 2 (continued)

JD 2445000 +	V	U-B	B-V	V-R	R-I	JD 2445000 +	V	U-B	B-V	V-R
608.32	12 ^m .26	-0 ^m .30	0 ^m .90	0 ^m .93	0 ^m .58	761.54	11 ^m .88	0 ^m .38	1 ^m .26	1 ^m .35
609.25	12.40	-0.24	0.75	0.89	0.64	790.48	9.65	0.80	1.32	1.30
614.21	13.40	-0.68	0.34	0.63	0.57	794.42	9.49	0.81	1.32	1.27
615.20	13.63	-0.65	0.23	0.46	1.08	818.51	7.70	0.60	0.99	0.49
616.38	13.47	-0.42	0.24	1.49	-	824.56	7.30	0.56	0.96	0.79
617.21	13.35	-0.62	0.53	0.68	0.40	832.51	7.15	-0.29	0.92	0.79
620.13	13.30	-0.84	0.45	0.62	0.25	842.42	7.07	-0.17	0.88	0.75
621.20	13.45	-0.91	0.76	0.26	0.39	843.43	7.06	-0.15	0.87	0.73
623.21	13.40	-0.50	1.40	0.20	0.40	859.49	6.54	0.02	0.75	0.67
624.20	13.60	-0.30	0.50	0.10	0.80	860.49	6.52	-0.01	0.74	0.65
625.20	14.19	-0.91	0.43	1.38	0.64	863.48	6.54	-0.02	0.75	0.64
632.21	13.73	-0.09	0.11	0.85	0.96	869.42	6.62	-0.05	0.78	0.66
635.21	13.63	-0.70	0.50	0.30	-	881.38	6.78	-0.03	0.79	0.67
636.21	13.77	-0.50	0.32	0.25	-	882.27	6.82	0.02	0.79	0.66
643.17	13.90	0.05	0.50	0.80	1.10	884.42	6.82	0.28	0.75	0.63
647.17	13.26	-0.30	0.57	0.84	0.57	885.37	6.81	0.30	0.75	0.64
715.60	11.18	0.72	1.45	1.28	0.61	948.29	6.64	0.42	0.81	0.67
725.58	11.35	0.67	1.34	1.29	0.60	949.29	6.63	0.43	0.80	0.66
730.58	11.46	0.66	1.25	1.24	0.54	950.24	6.61	0.38	0.82	0.65
733.58	11.51	-	1.27	1.14	0.53	956.25	6.55	0.29	0.77	0.60
735.60	11.31	0.59	1.26	1.04	0.50	959.27	6.50	0.30	0.74	0.62
736.56	11.27	0.53	1.23	1.07	0.55	960.24	6.52	0.24	0.75	0.61
745.56	11.54	0.40	1.66	1.21	0.56	961.24	6.47	0.28	0.72	0.60
746.60	11.58	0.35	1.47	1.20	0.61	965.23	6.50	0.28	0.72	0.60
747.57	11.60	0.30	1.40	1.40	0.59	966.22	6.52	0.27	0.74	0.61
752.57	11.99	0.18	1.33	1.62	-	968.23	6.49	0.29	0.75	0.60
754.49	12.03	0.30	1.29	1.55	-	969.23	6.50	0.32	0.74	0.61
758.47	12.00	0.23	1.33	1.49	-	970.22	6.49	0.34	0.76	0.62