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**PHOTOMETRIC OBSERVATIONS OF THE PRIMARY MINIMUM
OF THE ACTIVE ALGOL BINARY RZ CASSIOPEIAE**

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The active Algol binary RZ Cas has been well-known for its irregular period variations and also for the unusual changes of the shape of light curves at the bottom part of the primary minimum. Concerning the period variation, Hegedüs *et al.* (1992) proposed a possibility of the light-time effect and the apsidal motion, but Kiss *et al.* (1995) denied it according to their photometric observations. Narusawa *et al.* (1994) suggested the similarity of activities between the RZ Cas and RS CVn stars. Light changes within the primary minimum normally provides light curves of the partial-eclipse type. However, some observers have reported that occasionally flat bottom (which resembles a total eclipse) appeared at the primary minimum (e.g., Nakamura *et al.* 1991, Hegedüs *et al.* 1992, Narusawa *et al.* 1994 and Dumont 1995). The cause of this phenomenon and its relation to the period variation have not yet been made clear.

Some systematic photometry of RZ Cas was planned and carried out at various places in Japan to monitor its photometric behaviour. Here the results of the observations performed at five places in Japan from January 1995 to December 1996 are reported. The photoelectric photometry with PMT was made at three observatories and the CCD photometry was done at two observatories as listed in Table 1. At all the places the *V* or *R* colour filter similar to the standard Johnson-Kron-Cousins system was used. HR 791 was employed as the comparison for the photoelectric observations, which is the same star as was used by Narusawa *et al.* (1994). Two nearby stars, GSC 4317-1437 and GSC 4317-1578, were chosen as the comparison and check stars for the CCD observations, which were previously used by Narusawa & Okyudo (1993).

The estimated moments and the shapes of the light curves of the primary minima are given in Table 2. The *E* and *O*–*C* values were calculated from the following ephemeris in Narusawa *et al.* (1994).

$$MinI = HJD\ 2448960.2122 + 1^d1952572 \times E \quad (1)$$

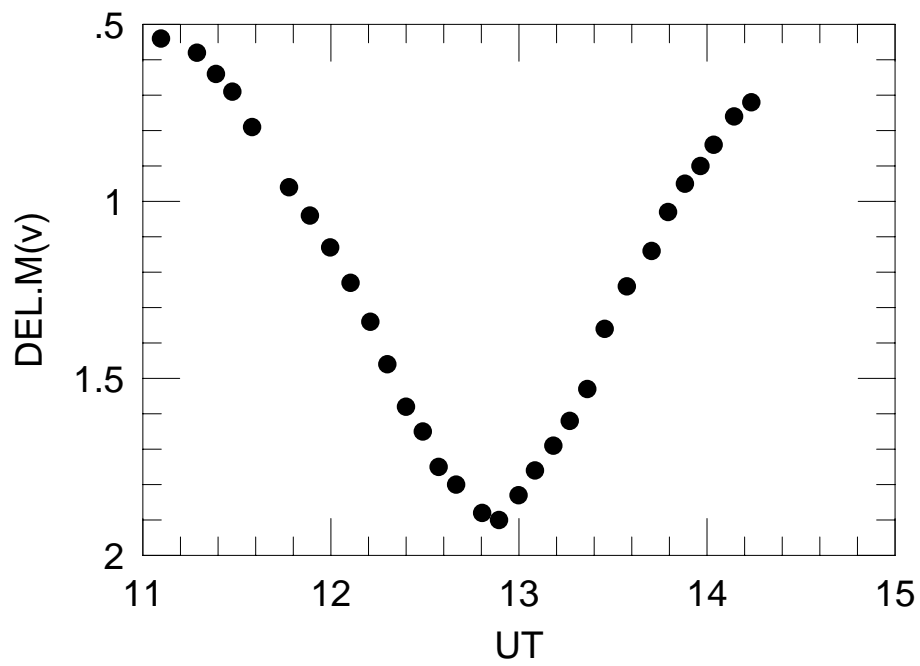


Figure 1. Light curve at the primary minimum of 21 Oct. 1995 (HJD 2450012) observed by Nagai

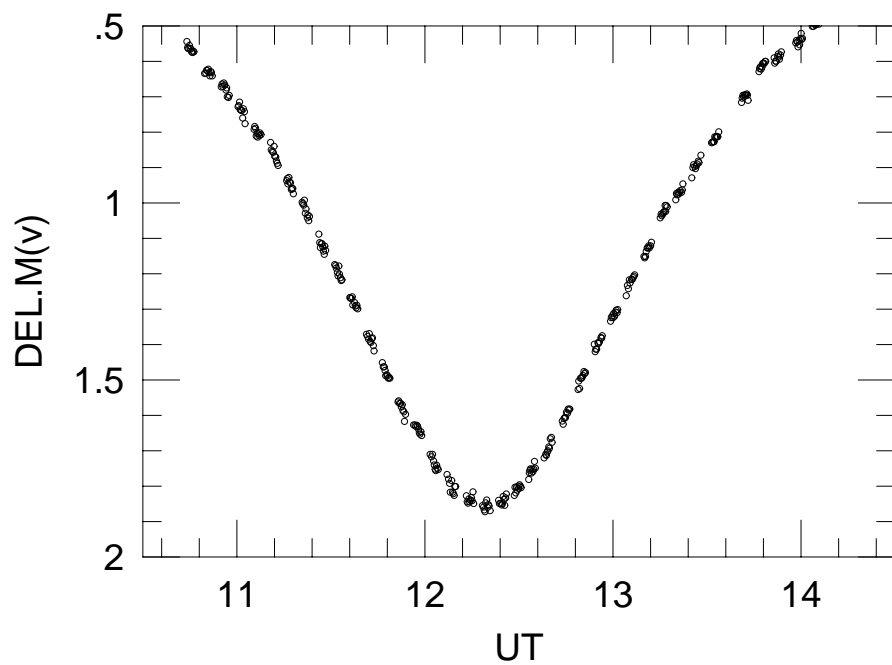


Figure 2. Light curve at the primary minimum of 27 Oct. 1995 (HJD 2450018) observed by Arai

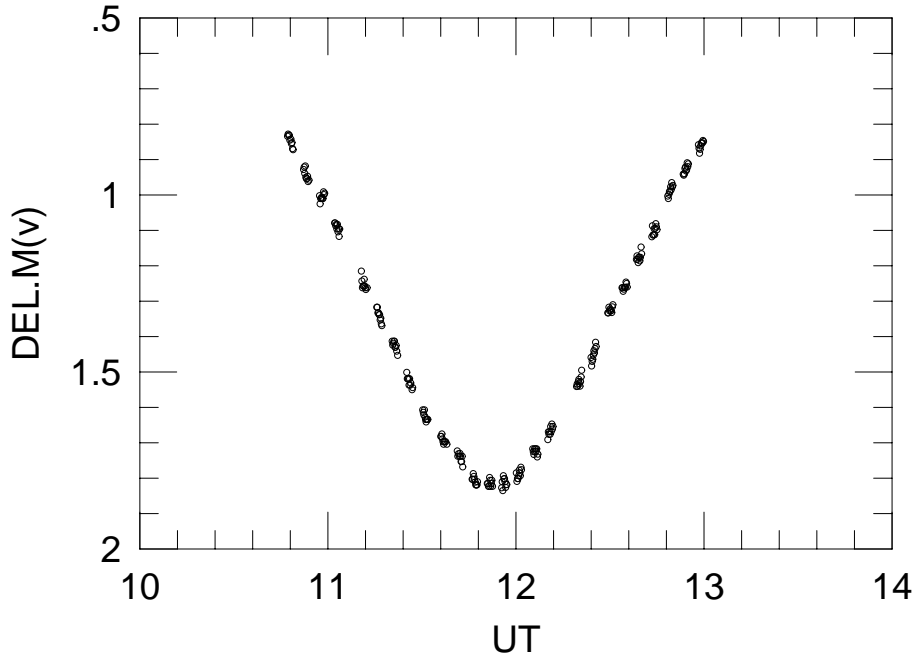


Figure 3. Light curve at the primary minimum of 21 Dec. 1995 (HJD 2450073) observed by Arai

Table 1: Observational instruments

Observer	Telescope(I)	Camera/Detector
Ohmori	40cm Cs [†]	PMT (Hamamatsu 1P21)
Arai	28cm SC	PMT (Hamamatsu R1414)
Fujii	28cm SC	CCD (SBIG ST6)
Nagai	20cm SC	PMT (Hamamatsu R647-04)
Yasuda	60cm Cs*	CCD (SBIG ST6)

(I) Cs:Cassegrain reflector, SC:Schmidt Cassegrain telescope
[†]:Science Museum of Kawasaki City
 *:Nishi-Harima Astronomical Observatory

A probable orbital-period change occurred during the period HJD 2448220 and HJD 2448581 (Narusawa *et al.* 1994). The ephemeris (1) was derived with the observed times after HJD 2448581. The O–C values in Table 2 indicate no apparent period change and the orbital period has been surely constant from HJD 2448581 to HJD 2450446 (about 5 years).

Some of the observed light curves are shown in Figures 1-3. As seen in Table 2, we did not observe the flat bottom in the primary minimum during our observations. It is necessary to continue the photometric observations to clarify the relation between period changes and light curve variations.

Table 2: Estimated times and shapes of the observed primary minima

HJD 2400000+	E(I)	O–C(I) (day)	Filter	Shape(II)	Observer
49723.9824	639	+0.0008	V	P	Arai
49723.983	639	+0.001	V	–	Ohmori
49743.106	655	+0.000	V	–	Ohmori
49988.136	860	+0.003	V	–	Yasuda
49994.1123	865	+0.0026	R	P	Fujii
50012.0401	880	+0.0016	V	P	Nagai
50018.0157	885	+0.0009	V	P	Arai
50023.9920	890	+0.0009	V	P	Arai
50023.9931	890	+0.0020	R	–	Fujii
50031.1652	896	+0.0025	R	–	Fujii
50072.9967	931	+0.0000	V	–	Arai
50078.9728	936	–0.0001	V	P	Arai
50445.921	1243	+0.004	V	–	Nagai

(I) The E and O–C values are calculated from the ephemeris (1)

(II) P:Partial, –:Uncertain

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