

## UPDATED ELEMENTS FOR V COMAE BERENICES

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### Abstract

Parabolic elements are determined for the RR Lyrae star, V Comae Berenices, implying that the period increases at a rate of 0.15 day per million years.

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Kholopov *et al.* (1985) listed elements for V Com which I adopted for plotting my light curves and O-C graph:

$$JD_{(\max)} = 2440683.940 + 0.46914575 E. \quad (1)$$

The elements were updated by combining observations from Hoffmeister (1923), Kukarkin (1933), and the Harvard College Observatory plate collection with observations from plates taken more recently at the Maria Mitchell Observatory. 320 observations were of quality acceptable for this analysis.

To update the elements, I made an O-C graph by a method in which each point represents a single observation (Holliman 1986a). This was accomplished by first representing the light curve (magnitude vs. phase) by a Fourier series which peaks at phase zero. The equation is solved by successive approximations for the two possible phases corresponding to an individual observed magnitude. These represent the ascending and descending sides of the cycle. The computer selects one calculated phase for each observation creating the most self-consistent set of calculated phases possible for the O-C plot.

The resulting O-C diagram is shown in Figure 1 with a parabola fitted to the data by least squares. The new heliocentric elements are:

$$JD_{(\max)} = 2430919.185 + 0.46914189 E + 9.64 \times 10^{-11} E^2. \quad (2)$$

$\pm 0.002 \quad \pm 0.00000007 \quad \pm 0.42 \times 10^{-11}$

This precision is possible because some observations are dated as far back as 1896 and because there are few gaps in the data. These elements imply a rate of change of period equal to  $0.150 \pm 0.006$  day per million years.

More observations are needed to verify that the O-C graph continues to suggest a parabola. It has not been ruled out that V Com's period may have increased since the turn of the century and has recently leveled off.

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### REFERENCES

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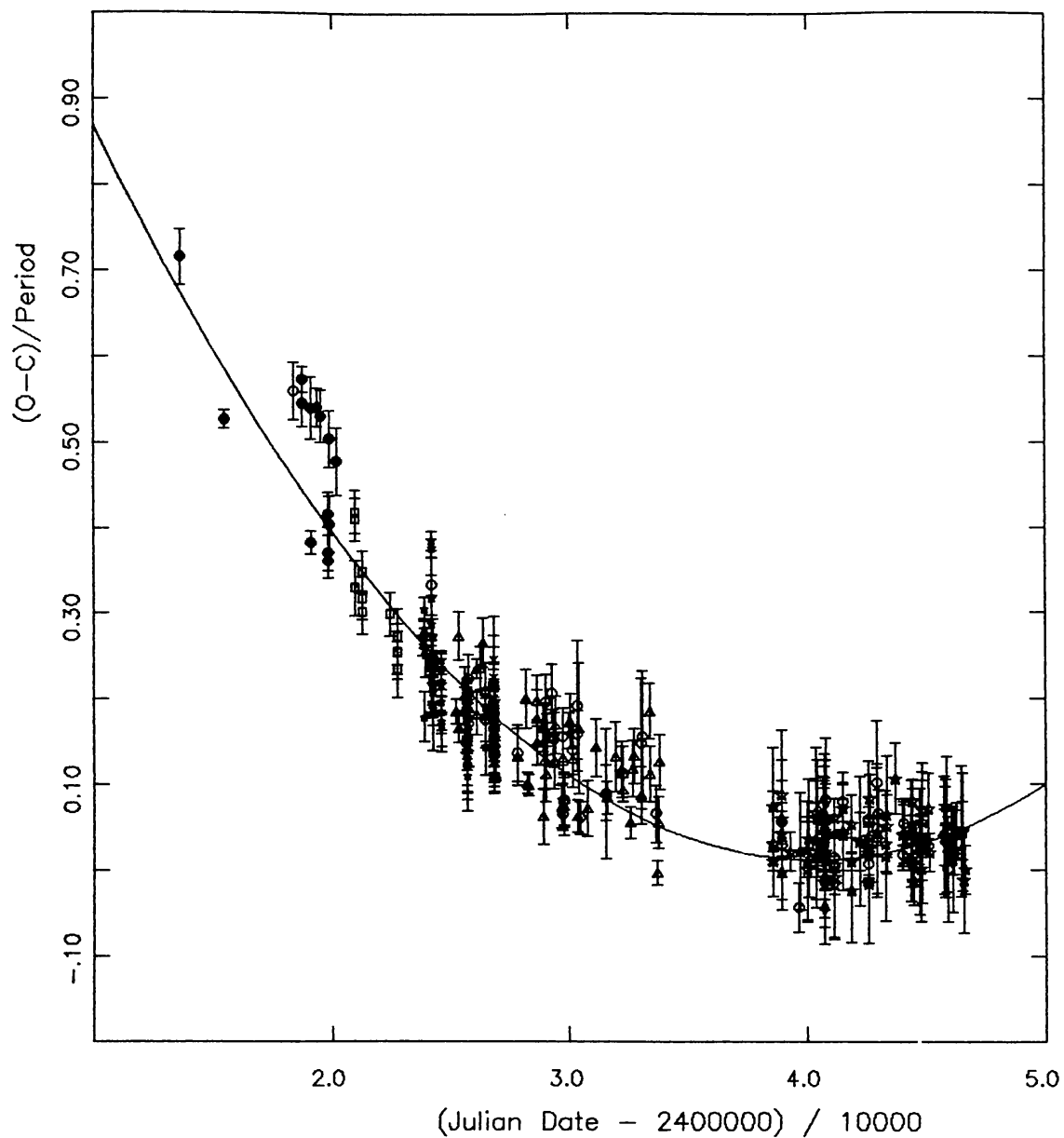


Figure 1. O-C plot for V Com with each point representing a single observation. Open circles are uncertain data, while all other symbols denote different sources for the observations. O-C is given in fraction of the period.