A REVISION OF THE ELEMENTS FOR EL COMAE BERENICES

Laura M. Woodney
Maria Mitchell Observatory
Nantucket, MA 02554

Abstract

Photographic plates of the RR Lyrae star, EL Comae Berenices from the collection of the Maria Mitchell Observatory were examined for the years 1964 to 1991. New elements calculated are:

$$JD_{max} = 2443772.460 + 0.5228396 \ E.$$
$$\pm 0.007 \quad \pm 0.0000014$$

1. Introduction

EL Comae Berenices is a RR Lyrae star, subclass ab. In the past there has been some question as to whether the period was 0.343329 day, as was published in the *General Catalogue of Variable Stars* (Kholopov *et al.* 1985)(GCVS), or 0.52362 day, as was found to fit the data from the Maria Mitchell Observatory (MMO) plates (Henry 1972). The 0.52362 day period was adopted after the 0.343329 day period was shown by Wheatley (1982) to have the characteristics of a spurious period. This longer period continues to work well with the MMO data.

In 1988 an epoch was determined for EL Com and a refinement of the 0.52362 day period was made by Burger (1989). The refinement of the period was made through an O-C analysis. The elements she used for C were published as

$$JD_{max} = 2443738.118 + 0.52285 \ E. \tag{1}$$

However, unpublished data at the MMO indicate that these elements are not the ones that Burger actually used. The correct elements for C should have been

$$JD_{max} = 2444738.118 + 0.52285 \ E. \tag{2}$$

2. Result

The elements in equation 2 have been used for C in the new O-C diagram, Figure 1. Burger's refinement of the period was based on the interval from 1979 to 1988. This interval has now been expanded to cover the entire MMO plate collection of the field.

The points on the O-C diagram for the interval 1979 to 1988 have not been changed from Burger's work. Each point represents one year, with 1983 being omitted because of a lack of data. In the intervals which were added, 1964-1978 and 1989-1991, each point represents a two year interval. This was done in order to have enough data points in each set to create a good light curve.

The exception to this is the last point, which represents only 1991, and is determined from fewer data points than the rest. The method used for finding the O-C points and the error bars was a non-linear least-squares fitting program (Belserene 1986).

The method of least-squares was used to determine the best fit line through the points. There is very little difference between the line found using the entire interval

and the line found by Burger.

The slope and intercept of the line were used to determine new elements for the star. These are:

$$JD_{max} = 2443772.460 + 0.5228396\ E.$$
$$\pm 0.007 \quad \pm 0.0000014$$

(3)

There was no evidence for a changing period. .

3. Acknowledgements

References

Belserene, E. P. 1986, *J. Amer. Assoc. Var. Star Obs.*, **15**, 243.
Burger, J. H. 1989, *J. Amer. Assoc. Var. Star Obs.*, **18**, 43.
Henry, D. J. 1972, *J. Amer. Assoc. Var. Star Obs.*, **1**, 29.
Kholopov, P. N. *et al.* 1985, *General Catalogue of Variable Stars,* Fourth Edition, Moscow.
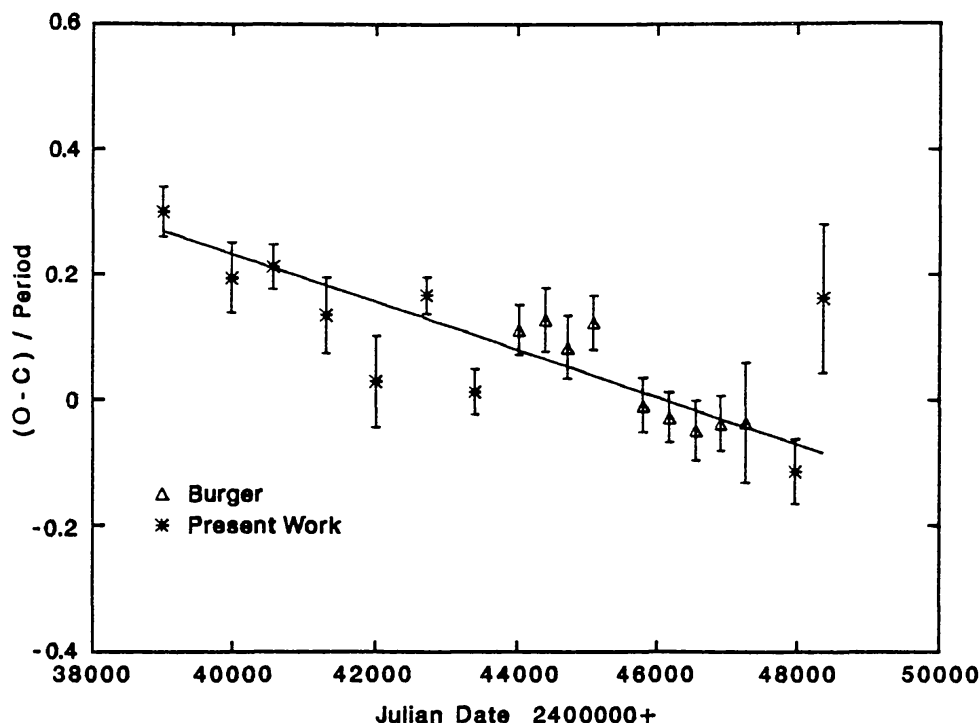Wheatley, J. 1982, *J. Amer. Assoc. Var. Star Obs.*, **11**, 17.

Figure 1. O-C diagram for EL Comae Berenices. Points marked by asterisks are new work and represent two year intervals; the last point, however, represents only 1991. Points marked by triangles are from Burger's calculations (1989) and all represent one year intervals. The line is a least squares fit and was used to determine the revised elements.