The Carina Spiral Feature — an investigation based on a complete magnitude-limited $uvby\beta$ sample

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Abstract. This contribution reflects a detailed overall survey of the Carina Spiral Feature based on $uvby\beta$ photometry of O- and B-type stars. New observations are combined with all data currently available, to collate a complete homogeneous magnitude-limited $uvby\beta$ database. A uniform procedure is applied to obtain the photometry-derived stellar parameters. A homogeneous distance scale is established to the most prominent young structures in the field and the distribution of the visual extinction is analyzed.

1. Introduction

The Carina Spiral Feature has been granted a special name (and continuously growing attention), because in this direction the interstellar absorption is small, and reveals along the line of sight an extremely large and impressive field of active stellar formation. Originally Becker (1956) and Bok (1956) stressed, that the impressive apparent concentration of young stars toward Carina is located at a very large distance (1 to 4 kpc). Graham & Lynga's (1965) objective prism survey revealed faint OB stars, as distant as 8-10 kpc. Bok (1970) presented the first working diagram about the structure of the field. After that time, both the field stars and the stars in groupings have been intensively studied.

The $uvby\beta$ photometry is capable of classifying large samples of stars in the presence of non-uniform and heavy interstellar absorption, and offers reliable calibrations in terms of stellar parameters. However, when investigating star-forming regions, we are dealing with extremely large distances at which a spatial separation of different structures is a complex experiment. This is especially difficult for fields stretched along the line of sight, such as the Carina Spiral Feature, where a projected overlap of different groupings with similar characteristics exists. In this context, the quantity, quality and completeness of the observational data and their interpretation play a critical role in gaining a satisfactory degree of understanding.

2. Approach and results

Recently, as part of an ongoing effort to improve the completeness of the existing $uvby\beta$ data base for the bright early type stars in selected star-forming regions
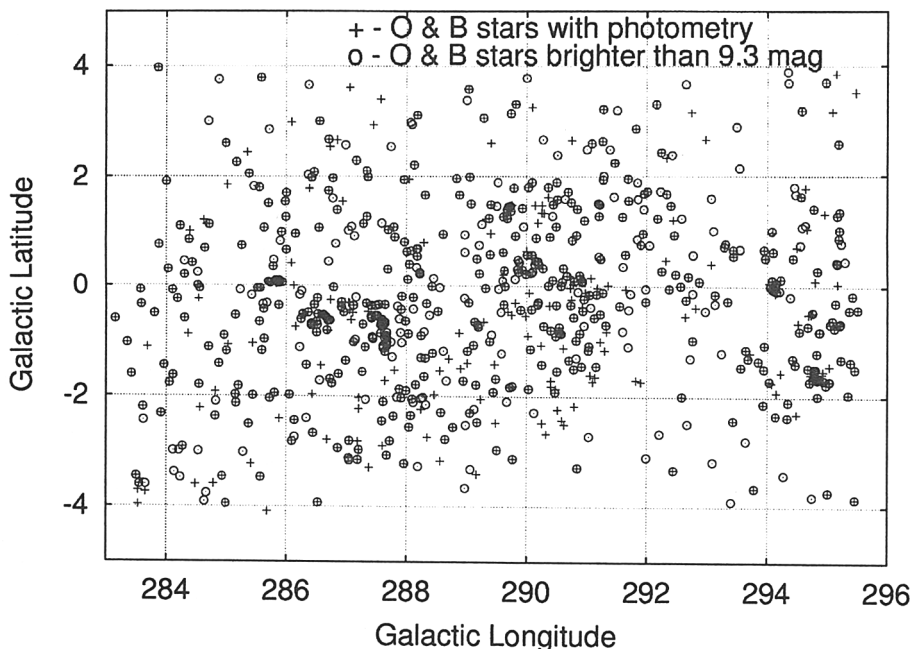
Figure 1.   The completeness of the sample.

of the Milky Way, new $uvby\beta$ photometry was obtained for the field of the Ca-
rina Spiral Feature (Kaltcheva, Olsen & Clausen 2000). These new observations
were carried out as complementary to the already existing data from the $uvby\beta$
compilation of Hauck & Mermilliod (1998). All existing observations were ho-
mogenized into one database. The sample stars plotted in Galactic coordinates
are shown in Figure 1. The present sample is fairly complete to about 9.3 mag,
but the completeness in the 9.3 - 10.0 magnitude range is far from satisfactory.
The collated data base allows an extensive and very detailed investigation of the
field, which will cast light on tasks of significant astronomical importance.

References

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