

APPLICATION OF GSC CATALOGUE TO MINOR PLANETS PLATE REDUCTION

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Abstract. An automatic reduction process is applied to observations of minor planets obtained at Valencia Observatory, using PPM and GSC catalogues. Systematic corrections of GSC, obtained by the same authors in a previous study, are also considered. The comparison of results is done by the statistical analysis of several parameters. Preliminary conclusions about the improvement obtained using corrected GSC are included.

1. Introduction

The astrometrical properties of the GSC (Guide Star Catalog) were largely studied by different authors (Russel et al, 1990; Taff et al. 1990; Lasker et al, 1990; etc.)

In a previous study, we proposed (Lopez et al., 1994) a plate analysis of the GSC systematic errors by means of its comparison with another catalogue, the PPM, whose mean precision for astrometric reductions ($0.2''$ for positions and $0.003''/\text{year}$ for proper motions) is high.

In particular, we described two kinds of errors (Lopez et al, 1995), due to the transformation into the FK5 system and to star position on GSC photographic plates. We concluded that, including corrections to these er-

rors, the GSC was suitable to be used as a reference catalogue with a level of accuracy of about 0.4".

In this paper, we use PPM and both the standard and the corrected versions of GSC in an automatic reduction process of 267 plates with 647 exposures of minor planets observations done at Valencia Observatory from January 1985 to February 1995.

2. Results

The statistical analysis of the results obtained with standard GSC (S) and corrected GSC (C) plates vs. the PPM ones gives the following results.

1. (O-C) star residuals in RA and Dec. show similar mean values less than 1" with mean square errors (m.s.e) in the order of 0.1".
2. Due to the great differences between the northern and the southern part of the GSC, minor planet differences in R.A. and Dec. are analyzed separately for positive and negative declinations.
3. Differences GSC (C) – PPM for positive declinations are about 0.1". The improvement of GSC (C) vs. GSC (S) positions is also in the order of 0.1".
4. For negative declinations a similar result is obtained, but the differences GSC (C) – PPM remain great (about 0.2").
5. Our comparison of PPM and GSC is limited to low magnitude stars, affected of high magnitude errors. Nevertheless, we consider that results with corrected GSC are better than those obtained with the standard GSC and are similar to those got with PPM.

Acknowledgements

The authors wish to thank the Conselleria de Educacion y Ciencia of the Generalitat Valenciana for financial support of this work.

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