

REFINEMENT OF THE FOCAT CATALOG IN THE DECLINATION ZONE FROM -10 TO -18 DEGREES

I. A. Dautov¹, M. I. Kibardina¹, D. D. Polozhentsev²,
A. D. Polozhentsev³, N. G. Rizvanov¹ and L. I. Yagudin²

¹*Engelhardt Astronomical Observatory, St. Observatorija,
Zelenodolsky rajon, Tatarstan 422526, Russian Federation*

²*Pulkovo Observatory, Russian Academy of Sciences,
St. Petersburg 196140, Russia*

³*Astronomical Institute, St. Petersburg State University,
Peterhof 198904, Russia*

Received July 21, 1996.

Key words: astrometry – databases

In 1978 the Pulkovo Observatory initiated southern sky observations (in the declination range from -8° to -20°) at the Zelenchuk station of the Engelhardt Astronomical Observatory with the aim of producing a catalog of positions of stars down to 10th or 11th magnitude, to be used in further refinement of the existing FOKAT catalog (Bystrov et al. 1989). Observations were performed using the Zeiss astrograph ($D = 40$ cm, $F = 2$ m) with a 4-fold overlap pattern. The opportunity of reducing these observations appeared only in 1994, thanks to the ISF grants RL 1000 and RL 1300.

The observations of the zone under study were made using 300×300 mm plates covering a $4^\circ \times 4^\circ$ field on the sky. The mean epoch of observations is 1979. The average star density within the sky zone studied is about one star per square degree. The method of astrometric reduction that we have used involves the determination of the coordinates of optical center and tangent points of the plates, and the coefficients of radial cubic distortion in both coordinates. The corresponding reduction formulas include 10 to 12 constants.

We used the spherical coordinates from the PPM catalog to calculate the standard coordinates by successive approximations (Rizvanov 1996). At the second stage, the right ascensions and declinations of the stars studied were determined using the SRS catalog

(J2000.0) to define the reference frame. The knowledge of the exact values of the coordinates of the optical center and the distortion parameters allowed the use of linear reduction formulas. Both stages of reduction in the new method allow for the effect of differential refraction and differential aberration (Rizvanov 1996).

The accuracy of our star coordinates was analyzed by comparing them with the positions given in the PPM catalog (Bastian et al. 1993). The mean deviation appeared to be close to zero for all plates and the rms deviation is about ± 0.15 arcsec.

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