

PRELIMINARY ANALYSIS OF ASTROLABE OBSERVATIONS AT MERATE
OBSERVATORY DURING THE PERIOD 1970 - 1977

L. Buffoni, F. Carta, F. Chlistovsky, A. Manara, F. Mazzoleni
Osservatorio Astronomico di Milano-Merate
Italia

ABSTRACT

Results of observations made with the Danjon astrolabe at Merate Observatory in the period from 1970 through 1976 were analyzed. The observational program and methods have been discussed previously (Buffoni et al., 1975a, b). The observational accuracy of the observations was compared with that of the Paris and San Fernando instruments. No substantial difference was found.

The mean residuals in zenith distance for stars in the program were analyzed for possible dependence on magnitude, spectral type, and azimuth. To investigate the effect of magnitude on mean residual the stars were divided into groups by half-magnitude. The mean of the mean residuals and its standard deviation were formed for each half-magnitude group. The standard deviation appears to be larger for brighter stars ($1.0 < m_v < 1.5$) and somewhat larger for faint stars ($6.0 < m_v < 6.5$). It is essentially constant for intermediate magnitudes. No correlations were found in a similar analysis for dependence of residuals on spectral type. A systematic trend appears in a correlation of residuals with azimuth. Those stars observed in azimuths between 0° and 90° and between 180° and 270° tend to be negative while those observed in the other quadrants tend to be positive.

After smoothing the observations in time and latitude using Vondrak's method, the systematic differences of each observer's results from the adopted curves were found. These personal equations may be as large as $0^{\circ}007$ in time and $0''04$ in latitude. Systematic differences in time and latitude for each group in the observing program were also calculated in this manner. These group corrections were also determined using the chain method (Guinot, 1958) to give two separate estimates for group corrections. In time the corrections may be as large as $0^{\circ}022$ and the two estimates may differ by as much as $0^{\circ}020$. In latitude the group corrections may be as large as $0''17$ and the two estimates may be different by as much as $0''13$.

Values of UT2 - TAI derived from the observations at Merate were compared with UT2 - TAI of the Bureau International de l'Heure (BIH). The derived values were computed using the polar coordinates given in BIH Circular D and were smoothed by Vondrak's method. A preliminary evaluation shows the existence of an annual component in the Merate observations from 1971 through 1973 which diminishes in 1974 and almost disappears in the following years.

REFERENCES

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