Geophysical Research Abstracts
Vol. 12, EGU2010-8783, 2010
EGU General Assembly 2010
© Author(s) 2010

Tying the terrestrial reference frame of EOP measured by optical astrometry to ITRF

Jan Vondrák and Cyril Ron
Astronomical Institute, Galaxies and Planetary Systems, Prague, Czech Republic (vondrak@ig.cas.cz, +420 272769023)

Optical astrometry was, for most of the 20th century, the only technique measuring the Earth Orientation Parameters (EOP). We collected and re-analyzed these data using a unique celestial reference frame. It was realized first by the Hipparcos Catalogue, and then by a group of our own Earth Orientation Catalogs (EOC). The latter were obtained by combining Hipparcos/Tycho data with older ground-based observations, in order to improve the proper motions, and in some cases also to derive non-linear motions of a great proportion of the stars, observed in the programs of monitoring Earth orientation. On the other hand, the underlying terrestrial reference frame is rather arbitrarily realized by adopted geographic coordinates (latitudes, longitudes) of participating stations. In addition, we tied the system to the plate motion model NUVEL-1A by correcting the observations for the linear motions of the stations computed for that model. Small coordinate corrections and drifts of individual stations with respect to individual plates are estimated in the solution. We also suppose that each station can have apparent seasonal changes of geographic coordinates due to anomalous refraction. We apply 18 constraints to remove singularity of the solution. Thus, the terrestrial reference frame of the optical solution can deviate from ITRF by a constant, linear drift and seasonal (annual, semi-annual) changes, in all three axes. To estimate these deviations, we compare our "optical" EOP series with the ones provided by space techniques in the common interval of observations. The deviations found are then applied to our EOP solution to refer it more precisely to ITRF.