Geophysical Research Abstracts
Vol. 14, EGU2012-7781, 2012
EGU General Assembly 2012


# Effects of residual station motion signals on terrestrial pole coordinates

M. Bloßfeld, M. Seitz, and D. Angermann
Deutsches Geodätisches Forschungsinstitut (DGFI), Munich, Germany (blossfeld@dgfi.badw.de, +49 89 23031 1240)

According to the IERS Conventions 2010 [Petit and Luzum, 2010], the instantaneous station position is parameterized as a regularized position plus conventionally defined reduction terms. The station motion is approximated by a constant velocity. The modeled reduction terms describe the non-linear station movements which are caused, inter alia, by various geophysical effects (e.g. Earth tides, ocean loading). Errors or uncertainties in the used models and so far neglected effects (e.g. atmospheric and hydrologic loading) are in conflict with the linear station motion model and could therefore falsify consistently estimated parameters, in particular epoch parameters. Since the effect on the station network is systematic, the neglected station motions could propagate via a common rotation of the whole station network into the network orientation as the network orientation and the terrestrial pole coordinates are correlated by a factor 1.0 (complement parameters). Different from the linear approach, another possibility to parameterize the station movement is to estimate the station coordinates with a high temporal resolution (epoch reference frames). Thereby, the instantaneous station position is directly estimated.
Based on homogeneous data, the station coordinates and the Earth orientation parameters (EOP) are estimated in a combination of the space geodetic techniques GPS, SLR and VLBI. In this paper we study the effect of the different station parameterizations on the EOP. We compare epoch and multi-year reference frames for each individual technique and for the combined solution, respectively. As a result, we show that neglecting residual station motions with an annual period cause a systematic annual signal with a magnitude of about 0.5mm in the terrestrial pole coordinates.