Abstract:
The IAG (International Association of Geodesy) and the IERS (International Earth Rotation and Reference Systems Service) Joint Working Group (JWG) on “Modeling environmental loading effects for reference frame realizations” currently investigates the effect of correcting station positions for non-linear loading displacements on the realization of the International Terrestrial Reference System (ITRS). Another IAG/IERS JWG works on strategies for the frequent realization of single-technique and combined short-term reference frames, which are called epoch reference frames (ERFs). Both approaches are able to resolve the lack of parametrization which occurs when only taking linear velocities of geodetic observation sites into account (conventional parametrization). ERFs can account for any non-linear station motion (periodic signals, abrupt position changes, non-linear regional deformations, instrumental-related motions, etc.) on a regional as well as on a global basis. In this study, combined ERFs using the geodetic space techniques GPS, VLBI, SLR with different temporal resolutions (7-, 14- and 28-day) are compared to
conventional multi-year/long-term realizations of the ITRS w.r.t. the datum stability and the ability to sample non-linear station motions. The 7-/14-day ERFs are able to monitor short-term station motions but the realization of the datum is not as stable as for the long-term reference frames. The 28-day ERFs have a more stable datum but are only able to monitor very slow long-term motions such as post-seismic deformations.

Stichworte: Epoch reference frame; ERF; ITRF; MRF; Non-linear station motions

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