



The impact of non-tidal atmospheric pressure loading on global reference frames

Mathis Bloßfeld (1), Ole Roggenbuck (2), Manuela Seitz (1), Detlef Angermann (1), and Daniela Thaller (2)

(1) Deutsches Geodätisches Forschungsinstitut an der Technischen Universität München (DGFI-TUM), Munich, Germany, (2) Bundesamt für Kartographie und Geodäsie (BKG), Frankfurt, Germany

The most recent realization of the ITRS, the ITRF2014, will account for non-tidal atmospheric loading corrections applied at the normal equation or the parameter (solution) level. In its function as one of the three contributing ITRS Combination Centers, DGFI-TUM investigates the methodology to apply these corrections at the normal equation level. In this paper, the derived procedure is presented in detail and the following four global SLR-only TRF solutions are compared with each other:

- (1) conventional SLR-only TRF without non-tidal loading corrections,
- (2) SLR-only TRF corrected for the displacement due to non-tidal atmospheric pressure loading at the observation equation level,
- (3) SLR-only TRF corrected for the displacement due to non-tidal atmospheric pressure loading at the normal equation level,
- (4) SLR-only TRF corrected for the displacement and gravitational effect due to non-tidal atmospheric pressure loading at the observation level.

The four solutions are compared w.r.t. the time series of epoch-wise estimated station coordinates, the station coordinate offsets at a reference epoch, the velocities, the commonly adjusted EOPs and the formal errors. The results allow to study the impact of the different methodologies to account for the non-tidal atmospheric pressure loading correction on global TRF solutions. Finally, the presented SLR case study is summarized and the obtained findings are interpreted in the framework of the current ITRF2014 computation.