

## Effects of non-tidal loading applied in VLBI reference frames

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**Abstract.** Up to the latest (2020) realization of the International Terrestrial Reference System (ITRS), the contributions by the geodetic space techniques have not been corrected for non-tidal loading (NTL) effects on the observation sites or the satellite orbits. Although such corrections are not yet part of the Conventions of the International Earth Rotation and Reference Systems Service (IERS) either, many studies have nevertheless shown their benefit for the estimation of geodetic parameters by the distinct techniques. Hence, the two latest ITRS realizations by DGFI-TUM, DTRF2014 and DTRF2020, have been corrected for site displacements generated by NTL at the normal equation level, i.e., the single techniques' normal equations have been modified before they were combined. Furthermore, with the Very Long Baseline Interferometry (VLBI) technique, the operational analyses for the International VLBI Service for Geodesy and Astrometry (IVS) at least contain antenna site corrections w.r.t. the atmospheric component of NTL. In this presentation, we discuss the application of site displacements driven by all three common NTL components (atmospheric, oceanic, hydrological) at the observation level in the realization of a VLBI-only reference frame. We make use of the same NTL data as applied for the DTRF2020, but the observation and normal equations with and without NTL corrections are based on our own VLBI solutions rather than the IVS combined solution for the ITRS 2020 realization. Next to the impact on station position offsets and velocities, we will also focus on periodic signals in jointly estimated Earth orientation and Helmert transformation parameters.