

ITRF and its dependence on integrated global geodetic networks (*Invited*)

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Combination of space geodetic techniques is fundamental to realize a terrestrial reference system that is stable in origin, scale, and with sufficient coverage. The International Terrestrial Reference Frame (ITRF) based on such combination is heavily dependent on the configuration, precision and co-location of integrated global geodetic networks (VLBI, SLR, GPS, DORIS). Each one of these techniques contributes to one or more, but not to all ITRF defining parameters (origin, scale, orientation), and to the ITRF accessibility and densification. VLBI together with SLR contribute to the scale, the ITRF origin is solely defined by SLR, DORIS and GPS allow access to the ITRF through satellite precise orbit determination. GPS does not only contribute to the ITRF dissemination through IGS products, but also allows connecting the three other techniques together, permits an optimal orientation alignment of the successive ITRF solutions, and provides the most precise polar motion as part of the current ITRF combination. The paper main focus will be to examine the level of uncertainties of the transfer of the SLR origin and the average scale of VLBI and SLR to the GPS part of the ITRF, as a function of the number, quality and distribution of co-location sites. The ITRF2008 input data analysis and results as well as other simulations will be used to illustrate the discussion.

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