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Some new findings with respect to the ITRF2014 scale inconsistencies

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It is well known that the ITRF2014 shows some inconsistencies between the space-geodetic techniques with respect to its scale realization. It seems that the scale of the SLR and VLBI techniques deviate each other at the level of 1.37 ppb (8.8 mm), and shows a small drift of about 0.2 ppb/a (0.13 mm/a). There is a lot of speculation regarding the reasons that lead to this bias, however the explanation for this kind of inconsistency is not explicitly given. The two other TRF realizations by DGFI-TUM and JPL show different behaviour. As there are only very few SLR-VLBI co-location sites, the investigations regarding the scale differences are problematic. With the present study, we investigate the results, using the published coordinates, velocities and their associated covariance matrices of the official ITRF2014 final solution. The results amalgamate and indicate the origin of the differences of the scale realizations between the two techniques (SLR and VLBI). We follow an alternative estimation approach, which allows the quantification of the dependency among the spatial and dynamic Helmert parameters. Additionally, we estimate the reference system effect (for all the spatial and dynamic Helmert transformation parameters) of the ITRF2014 which fullfils the GGOS standards (1 mm/a for the coordinates and 0.1 mm/a for the velocities, respectively).