1 Summary

The ITRF2014 is an improved realization of the International Terrestrial Reference System (ITRS) and is demonstrated to be of higher quality than the past ITRF versions. It involves two main innovations dealing with the modeling of station non-linear motions, namely seasonal (annual and semi-annual) signals present in the time series of station positions and post-seismic deformations for 124 sites that were subject to major earthquakes. It is achieved through a two-step procedure: (1) stacking the time series of station positions and Earth Orientation Parameters (EOPs) provided by the four IERS Technique Centers (TC); (2) combining the long-term solutions as obtained in step 1, together with local ties in co-location sites. The two-step procedure makes use of full variance-covariance information provided in SINEX format. The TC solutions incorporated in the ITRF2014 combination are free from any external constraints, thus preserving the actual space geodesy estimates of station positions and EOPs. The ITRF2014 origin is defined in such a way that it has zero translations and translation rates with respect to the mean Earth center of mass, as defined by the SLR station positions time series. Its scale is defined by zero scale factor and zero scale rate with respect to the mean of VLBI and SLR long-term solutions as obtained by stacking their respective time series. The ITRF2014 orientation (at epoch 2010.0) and its rate are aligned to the ITRF2008 using 127 stations of high geodetic quality.

The ITRF2014 includes the positions and velocities of 1499 stations located at 975 sites. Figure 1 shows the coverage of these sites, underlying the co-located space geodesy techniques.

This technical note describes the main ITRF2014 products: station positions and velocities, the post fit residuals of the least squares adjustment as well as the transformation parameters between ITRF2014 and ITRF2008. The main technical procedure used to generate the ITRF2014, a thorough discussion of its quality as well as most important geodetic and geophysical results were published in Altamimi et al. [2016], appended to this Technical Note.