

Analysis of GEONET network data applying ITRF2014 reference frame and IGS14 antenna PCV model

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On the meeting of the Geodetic Society of Japan in 2016 fall, we have introduced the difference of coordinates of IGS fiducial sites in and around Japan from ITRF2008 to ITRF2014 coordinate system, as well as the preliminary result of the analysis of GEONET sites applying the ITRF2014 coordinate system. On the other hand, IGS switches reference frame from ITRF2008 to ITRF2014 starting GPS week 1934 (29th January 2017). Actually IGS adopts the reference frame IGS14 closely related to ITRF2014 (IGSMAIL-7399). At the same time IGS introduces a new SV and ground antenna model, IGS14. Mainly because of the SV antenna offset, scale differs by around 0.4 ppb by this revision. In addition, the revised calibrations for numerous ground antennas causes 10mm in height and 5mm in horizontal coordinates solutions (King, private communication).

Before IGS switched reference frame from ITRF2005 to ITRF2008 from 1632 GPS week (11th April 2011), as well as the SV and ground antenna PCV models from IGS05 to IGS08. At that time also mainly according to antenna PCV offset causes around 1 ppb scale and 3mm vertical and 1.2mm horizontal coordinates offset (IGSMAIL-6354). On the other hand, in the analysis of the GEONET network sites in Kanto-Tokai district applying GAMIT/GLOBK program, around 2ppb scale and around 2mm in height and 3mm in horizontal coordinates offset are detected (Shimada, 2011, 2012). The difference between the analysis of the global and the GEONET networks may be caused because GEONET adopts original antenna radome, and the PCV models of GEONET sites are determined by the original field test carried by GSI. Moreover, GSI determines only IGS05 PCV model, thus we determined ourselves GEONET sites IGS08 PCV model using the GEONET IGS05 PCV model and the difference between the IGS05 and IGS08 PCV models released by IGS.

In this paper, we present the scale and coordinates offsets of the GEONET network sites, determined applying the analysis of eight weeks GEONET network observation before and after 29th January 2017, when IGS switches reference frame to IGS14.

Keywords: ITRF2014, IGS14 PCV model, GEONET