

Development of the New GEONET Analysis Strategy

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Geospatial Information Authority of Japan (GSI) has been operating GEONET (GNSS Earth Observation Network System) since 1996. Daily coordinates of GNSS- based control stations are estimated to monitor crustal deformations throughout Japan. The analysis strategy for daily coordinates of GEONET stations was updated five times so far. The latest fifth generation analysis strategy was developed in 2020. Daily coordinates have been estimated in parallel with the 4th generation analysis strategy which has been in operation since 2009. The main improvements from the previous analysis strategy are: 1. Updating the reference frame, 2. GNSS and GLONASS integration, 3. Improvement of the troposphere model, 4. Implementation of more stable fix-point analysis method for the daily coordinate estimation of the reference station (TSUKUBA1).

The fifth generation analysis strategy is divided into two parts; the "fix-point analysis" and that the "all-point analysis". The "fix-point analysis" estimates the daily coordinates of the "Tsukuba-1" with respect to IGS (International GNSS Service) sites around the world. Based on the coordinates of the ITRF2014 model as the initial position, the coordinates are estimated by using constraint conditions referred to as No-Net-Translation. We estimated the coordinates of TSUKUBA1 since 1996 by using this analysis condition, but the stability of the coordinates decreased as going back to the past. For this reason, we analyzed the past data using the coordinates of the IGS repro2, which is the products of the IGS second reanalysis campaign from 1994 to 2015 based on ITRF2008. We used the coordinates of the IGS repro2 as the initial coordinates, and estimated the coordinates of TSUKUBA1.

The "all-point analysis" which estimates daily coordinates of each GEONET site based on the estimated coordinates of TSUKUBA1. The "all-point analysis" estimates three types of daily coordinates; GPS based solution, GLONASS based solution, and the coordinates based on the combination of the both systems. The accuracy of all the "all-point analysis" products was evaluated. In this talk, we will report on the stability of the "fix-point analysis" and the results of the verification of accuracy for the "all-point-analysis".

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