

Development of Rapid and Accurate GNSS Routine Analysis System of GEONET Data by PPP-AR

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The Geospatial Information Authority of Japan (GSI) routinely analyzes GNSS data obtained by Japanese nationwide GNSS array, called GEONET, and monitoring crustal deformation. The result is used as a part of fundamental data for evaluating earthquake activity or monitoring volcanic activity of Japan. However, even up-to-date GEONET routine analysis do not always have enough rapidness or time resolution.

To overcome these weak points, we focused on development of PPP-AR using GEONET data. PPP-AR can calculate position in every epoch with small calculation load, which means, time series of station position with high time resolution can be obtained more rapidly. In addition, in case of post-processing PPP-AR, the accuracy is comparable to static analysis.

We set the goal to stably obtain 24-hr. span time series of all GEONET station (about 1300) (1) with one-second interval, (2) with typical repeatability of about 1cm in horizontal component, and (3) within about two hours after GNSS observation.

Existing precise ephemeris and corrections for PPP-AR distributed by external bodies, such as IGS, are not frequent enough to satisfy our requirement. Therefore, we construct a prototype system that first estimates satellite orbit, clock and Fractional Code Bias (FCB), and then calculates time-series of coordinates for GEONET stations.

In this presentation, I will show overview of the prototype system, result of quality evaluation of satellite orbit and clock estimated, and present accuracy of time-series solution obtained by the prototype system.