

A prototype system for PPP kinematic positioning of Japanese GEONET stations

Kinematic GNSS time series have high time resolution (typically 1~30 sec) and useful when one would like to 1) discern crustal deformations caused by successive earthquakes, and 2) detect ongoing rapid crustal deformation associated with intensive volcanic activities, to name a few. Here we developed a prototype system for kinematic positioning of Japanese GEONET stations by the precise point positioning method. This prototype is designed to generate three types of solutions, namely, ultra-rapid, rapid and final solutions depending of their latencies. Each solution will be generated 6~12 hours, 2 days and 2 weeks after data acquisition, respectively. All solutions have time resolution of 30 seconds. We evaluated the precision of the solutions in terms of coordinate repeatability and found that that of the horizontal components is typically under 1 cm for every solutions. With the solutions we may expect to detect crustal deformations caused by an earthquake at a precision of ~5 mm. We also demonstrate that these solutions are useful in monitoring long-term (~ 1year) crustal deformations. Hence we may use these solutions to model sequential short- and long-term events like an earthquake and following postseismic deformation simultaneously.