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Evaluation of real-time PPP performance with IGS real-time precise ephemerides

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PPP (precise point positioning) is a precise positioning technique by using carrier-phase observables of GNSS satellite signals. Compared to general baseline analysis, PPP has a merit that it does not need any reference station. Conventionally, PPP is utilized in post-processing mode which needs precise ephemeris provided by IGS (International GNSS service). IGS had been have the activity to provide its products in real-time as RTPP (real-time pilot project) since about 10 years ago. The RTPP already started to broadcast the real-time ephemeris products via Internet with RTCM ver.3 SSR (state space representation) format and NTRIP (Networked Transport of RTCM via Internet Protocol). The ephemerides contain not only for GPS but also for GLONASS. The performance of PPP much depends on the quality of used ephemerides and has not been well evaluated. In this study, we continuously collected IGS real-time ephemeris via Internet for about half year and evaluated real-time PPP performance with such IGS real-time products. For the experiment, we used RTKLIB version 2.4.0 which provides real-time and post-processing PPP modes. The evaluation results include accuracy of solutions, convergence time, comparison between with GPS only and with GPS/GLONASS.

Keywords: Precise Point Positioning, IGS, precise ephemeris, real-time