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Real-time PPP Results From Global Orbit And Clock Corrections

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Several Open Source tools for GNSS real-time positioning and navigation have been developed in a cooperation between the Technical University Prague and the German Federal Agency for Cartography and Geodesy (BKG). Among them is the so-called BKG Ntrip Client (BNC), originally designed in 2006 for decoding and synchronising satellite observations to feed a real-time GNSS engine. Meanwhile the BNC program has been extended to support real-time Precise Point Positioning (PPP). When applying IGS ultra rapid orbits together with correctors for GNSS satellite clocks coming from the IGS network, the PPP feature of BNC allows real-time positioning with an accuracy better 20 cm in less than 15 minutes. BNC also provides real-time estimates of tropospheric zenith total delays to determine water vapour distribution in the atmosphere.

This paper focuses on a comparison of coordinates estimated with BNC in static and kinematic PPP mode with results from using the Bernese GPS software. It furthermore quantifies the advantage of using GLONASS in addition to GPS in real-time PPP. The promising outcome should enable a variety of applications in areas like GIS, navigation, and even monitoring of natural hazards.

Recording volume and position of the atmosphere's water vapour is demanding last not least because of possible rapid variations in time and space - which make the real-time estimation of tropospheric zenith total delay an interesting technique. A comparison of such delays determined in real-time via PPP, in near real-time, and in post-processing using the Bernese GPS software also indicates promising results.