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Preliminary results of real-time PPP-RTK positioning algorithm development for moving platforms and its performance validation

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Real-time PPP-RTK positioning algorithms were developed for the purpose of getting precise coordinates of moving platforms. In this implementation, corrections for the satellite orbit and satellite clock were taken from the IGS-RTS products while the ionospheric delay was removed through ionosphere-free combination and the tropospheric delay was either taken care of using the Global Pressure and Temperature (GPT) model or estimated as a stochastic parameter. To improve the convergence speed, all the available GPS and GLONASS measurements were used and Extended Kalman Filter parameters were optimized. To validate our algorithms, we collected the GPS and GLONASS data from a geodetic-quality receiver installed on a roof of a moving vehicle in an open-sky environment and used IGS final products of satellite orbits and clock offsets. The horizontal positioning error got less than 10 cm within 5 minutes, and the error stayed below 10 cm even after the vehicle start moving. When the IGS-RTS product and the GPT model were used instead of the IGS precise product, the positioning accuracy of the moving vehicle was maintained at better than 20 cm once convergence was achieved at around 6 minutes.