



Assessment of ionospheric and tropospheric corrections for PPP-RTK

Paulo de Oliveira (1,2,3), François Fund (1), Laurent Morel (2), João Monico (3), Stéphane Durand (2), and Frédéric Durand (2)

(1) Geodata-Diffusion, Villebon-sur-Yvette, France (paulo.deoliveira;francois.fund@geodata-diffusion.fr), (2) ESGT/Cnam, Le Mans, France (laurent.morel; stephane.durand; frederic.durand@esgt.cnam.fr), (3) FCT/Unesp, Presidente Prudente, Brazil (galera@fct.unesp.br)

The PPP-RTK is a state of art GNSS (Global Navigation Satellite System) technique employed to determine accurate positions in real-time. To perform the PPP-RTK it is necessary to accomplish the SSR (State Space Representation) of the spatially correlated errors affecting the GNSS observables, such as the tropospheric delay and the ionospheric effect. Using GNSS data of local or regional GNSS active networks, it is possible to determine quite well the atmospheric errors for any position in the network coverage area, by modeling these effects or biases. This work presents the results of tropospheric and ionospheric modeling employed to obtain the respective corrections. The region in the study is France and the Orphéon GNSS active network is used to generate the atmospheric corrections. The CNES (Centre National d'Etudes Spatiales) satellite orbit products are used to perform ambiguity fixing in GNSS processing. Two atmospheric modeling approaches are considered: 1) generation of a priori correction by coefficients estimated using the GNSS network and 2) the use of interpolated ionospheric and tropospheric effects from the closest reference stations to the user's location, as suggested in the second stage of RTCM (Ratio Technical Commission for Maritime) messages development. Finally, the atmospheric corrections are introduced in PPP-RTK as a priori values to allow improvements in ambiguity fixing and to reduce its convergence time. The discussion emphasizes the positive and the negative points of each solution or even the associated use of them.