Geophysical Research Abstracts
Vol. 18, EGU2016-5514, 2016
EGU General Assembly 2016

A computationally efficient method for real-time uncalibrated phase delay estimation

Shoujian Zhang and Lei Zhao
China (shjzhang@sgg.whu.edu.cn)

Precise Point Positioning (PPP) with ambiguity resolution has been proven to be a powerful tool for many applications. Several different models can be applied to recover the integer characteristics of the undifferenced ambiguities of a single receiver. These models can be divided into two categories, i.e. the integer recovery clock (IRC) based model and the uncalibrated phase dealy (UPD) based model. Compared with the IRC-based model, the UPD-based model is relatively easier by operating on the float ambiguities station by station. However, the widely used UPD-based model has been proven to be not an optimal because the fractional operator can't guarantee the integer characteristics of the user ambiguities in theory. Therefore, in this contribution, a rigorous estimator is proposed to solve both the widelane (WL) and narrowlane (NL) UPDs by introducing independent ambiguity datums in both WL and NL equations. However, as the ambiguities will be treated as unknowns and should be fixed in the rigorous estimator, the computational burden will increase significantly. Furthermore, In order to update the UPDs solution quickly for real-time applications, a computationally efficient approach based on Kalman filter is further proposed for UPD estimation. In the Kalman filter, before the measurement update, all the continuous ambiguities that are already fixed at the last epoch will be removed from the equations, then the unknown parameters will be reduced greatly, thereby resulting quick measurement update for UPD estimation.