Effects of non-modeled signal biases in multi-GNSS Precise Point Positioning

J. Hefty and L. Gerhatova

Slovak University of Technology, Department of Theoretical Geodesy, Bratislava, Slovakia (jan.hefty@stuba.sk)

Precise Point Positioning (PPP) which is based on processing of un-differenced GNSS phase and code observations using the precise satellites orbits and satellites clocks is suitable for autonomous high quality geocentric coordinate determination without necessity of terrestrial reference sites. Increase of number of broadcasted GNSS signals and the combination of more satellite systems in common adjustment model emphasize the importance of consideration of intra-system and inter-system biases. The complexity of proper bias modeling is underlined by the fact that their origins are both in satellites and receivers. Part of the GNSS signal delays (e.g. system-specific satellite clock offsets, differential code biases, etc.) which are included in global network solution products is modeling predominantly the satellite dependent biases. The multi-GNSS receiver's biases could be evaluated within the individual site processing of un-differenced code and phase observations by addition of set of parameters related to receiver dependent inter-system, inter-code and inter-channel biases. In the paper are presented results of PPP-based estimates of GPS, GLONASS and GIOVE-B inter-system and intra-system biases for several sites with different GNSS instrumentation. Besides the biases estimated as constant parameters during the processed sessions, also the time evolution of the receiver-related biases is considered. All the procedures are examined by using the software package ABSOLUTE developed for the PPP multi-GNSS processing at the Slovak University of Technology in Bratislava.