Geophysical Research Abstracts
Vol. 17, EGU2015-605, 2015
EGU General Assembly 2015

Accuracy of GIPSY PPP from a denser network

Adem Gokhan Hayal (1) and Dogan Ugur Sanli (2)

(1) YILDIZ TECHNICAL UNIVERSITY, NATURAL AND APPLIED SCIENCES, DEPARTMENT OF GEOMATIC ENGINEERING, ISTANBUL, Turkey (ahayal@yildiz.edu.tr), (2) YILDIZ TECHNICAL UNIVERSITY, DEPARTMENT OF GEOMATIC ENGINEERING, ISTANBUL, Turkey (usanli@yildiz.edu.tr)

Researchers need to know about the accuracy of GPS for the planning of their field survey and hence to obtain reliable positions as well as deformation rates. Geophysical applications such as monitoring of development of a fault creep or of crustal motion for global sea level rise studies necessitate the use of continuous GPS whereas applications such as determining co-seismic displacements where permanent GPS sites are sparsely scattered require the employment of episodic campaigns. Recently, real time applications of GPS in relation to the early prediction of earthquakes and tsunamis are in concern. Studying the static positioning accuracy of GPS has been of interest to researchers for more than a decade now. Various software packages and modeling strategies have been tested so far. Relative positioning accuracy was compared with PPP accuracy. For relative positioning, observing session duration and network geometry of reference stations appear to be the dominant factors on GPS accuracy whereas observing session duration seems to be the only factor influencing the PPP accuracy. We believe that latest developments concerning the accuracy of static GPS from well-established software will form a basis for the quality of GPS field works mentioned above especially for real time applications which are referred to more frequently nowadays. To assess the GPS accuracy, conventionally some 10 to 30 regionally or globally scattered networks of GPS stations are used. In this study, we enlarge the size of GPS network up to 70 globally scattered IGS stations to observe the changes on our previous accuracy modeling which employed only 13 stations. We use the latest version 6.3 of GIPSY/OASIS II software and download the data from SOPAC archives. Noting the effect of the ionosphere on our previous accuracy modeling, here we selected the GPS days through which the k-index values are lower than 4. This enabled us to extend the interval of observing session duration used for the modeling from 6-24 h to 3-24 h. Furthermore, the modeling has been improved by about 25%, 12%, and 24% for the GPS baseline components of north, east and vertical respectively.