Accuracy of GPS velocities from repeated GPS surveys: results from a denser network and verification by continuous GPS

Simge Tekic (1), D. Ugur Sanli (2), and Ersoy Arslan (1)

(1) Istanbul Technical University, Dept. of Geomatics Engineering, Istanbul, Turkey (simgetekic@gmail.com, arslanersoy@itu.edu.tr), (2) Yildiz Technical University, Dept. of Geomatic Engineering, Istanbul, Turkey (usanli@yildiz.edu.tr)

The quality of GPS velocities derived from repeated (campaign) GPS surveys is under investigation today because we still need them due to various constraints affecting the design of geophysical experiments. On this basis, the IGS network developed for scientific purposes play a great role for the assessment of the solutions of GPS campaigns. With about 20 years of contunious GPS data and positioning solutions, today the time series of the IGS network serve as a large population for statistical analysis. From this population it is possible to make random samples of repeated GPS surveys. Thus, the sisgnificancy of the velocities derived from repeated GPS surveys can be investigated using statistical hypothesis testing. Generating repeated GPS surveys from the population and then processing the data using the PPP module of NASA JPL's GIPSY/OASIS II, we tried to quantify the velocities derived from these surveys. Previously the significance of the velocities derived from repeated GPS measurements of 8-12 h sessions were tested against those of the repeated surveys derived from 24 h sessions. However, the sampling for the vertical component was very poor. Here we use a larger sample and repeat the same experiment. In addition, we compare monthly sampled 24 h campain solutions with JPL continuous time series. The significance of the repeated measurement velocity estimated is tested against the velocity derived from continuous JPL time series. Here, the velocity and its error estimated from continuous GPS time series are taken as the population parameters.