Geophysical Research Abstracts
Vol. 12, EGU2010-1785, 2010
EGU General Assembly 2010

Test of the Use of Regional Networks for OPUS Processing

Neil D. Weston and Jim R. Ray
NOAA, NOS, Silver Spring, United States (neil.d.weston@noaa.gov)

We investigate the performance of two processing methodologies for the Online Positioning User Service (OPUS), a web-based tool to process GPS data offered by the National Geodetic Survey, NOAA. The current operational implementation of OPUS (OPUS-S) uses reference station data from the U.S. National CORS Network and fixed IGS ephemerides to compute independent, double-differenced baseline solutions between the unknown and three neighboring CORS reference stations. All computations use relative antenna patterns, phase ambiguity integer fixing, relative troposphere modeling (GPT and GMF *a priori* models), and are performed in the ITRF2000 (IGb00) reference frame. The most accurate IGS orbits available at the time of processing are used. Although the three baselines are not strictly independent because of local biases, such as multipath at the rover, the solutions are analyzed to identify problems with any of the baselines before they are averaged to obtain a final set of coordinates and uncertainties.

A new OPUS processing methodology has been tested using a network approach (OPUS-Net). Otherwise the analysis models and weighted least squares adjustment method are unchanged, except that models for absolute antenna patterns and ocean tide loading are also implemented. The network consists of a rover, three nearby CORS reference stations, and up to 10 reference stations from the global IGS network (IGS05). The multipliers for the *a priori* weights for the CORS and IGS reference station monument sigmas (meters) in the adjustment are 0.1 and 1000.0 respectively, mainly because the coordinates and velocities for the IGS05 stations are much more precisely known and monitored.

To evaluate the positioning performance of the two OPUS approaches, GPS reference station data from three CORS stations (azco, brew, p036) were used as rovers. Approximately 360 daily datasets from each of the three stations collected in 2008 were submitted to each OPUS version for processing. The initial results from this preliminary study show that the scatter of daily OPUS-S positions for each of the three test stations are comparatively high due to inhomogenous solution quality with some days being particularly weak. On the other hand, the scatters of daily OPUS-Net positions are significantly better in the north and east components, but sometimes only slightly different in the height. The variable performance for the up component could be due to limitations of the tropo modeling or the 3-D ocean tide loading. With respect to the performance from OPUS-Net, the mean coordinates for the three stations are in excellent agreement with the mean IGS weekly combined SINEX results and could indicate that the network approach may be a viable option to pursue operationally in the near future.