Geophysical Research Abstracts
Vol. 14, EGU2012-2983, 2012
EGU General Assembly 2012
© Author(s) 2012

High-accuracy Subdaily ERPs from the IGS

J. R. Ray and J. Griffiths
NOAA/National Geodetic Survey, Silver Spring, MD, USA (jim.ray@noaa.gov)

Since November 2000 the International GNSS Service (IGS) has published Ultra-rapid (IGU) products for near real-time (RT) and true real-time applications. They include satellite orbits and clocks, as well as Earth rotation parameters (ERPs) for a sliding 48-hr period. The first day of each update is based on the most recent GPS and GLONASS observational data from the IGS hourly tracking network. At the time of release, these observed products have an initial latency of 3 hr. The second day of each update consists of predictions. So the predictions between about 3 and 9 hr into the second half are relevant for true RT uses. Originally updated twice daily, the IGU products since April 2004 have been issued every 6 hr, at 3, 9, 15, and 21 UTC. Up to seven Analysis Centers (ACs) contribute to the IGU combinations.

Two sets of ERPs are published with each IGU update, observed values at the middle epoch of the first half and predicted values at the middle epoch of the second half. The latency of the near RT ERPs is 15 hr while the predicted ERPs, based on projections of each AC's most recent determinations, are issued 9 hr ahead of their reference epoch. While IGU ERPs are issued every 6 hr, each set represents an integrated estimate over the surrounding 24 hr. So successive values are temporally correlated with about 75% of the data being common; this fact should be taken into account in user assimilations.

To evaluate the accuracy of these near RT and predicted ERPs, they have been compared to the IGS Final ERPs, available about 11 to 17 d after data collection. The IGU products improved dramatically in the earlier years but since about 2008.0 the performance has been stable and excellent. During the last three years, RMS differences for the observed IGU ERPs have been about 0.036 mas and 0.0101 ms for each polar motion component and LOD respectively. (The internal precision of the reference IGS ERPs over the same period is about 0.016 mas for polar motion and 0.0036 ms for LOD.)

The IGU ERP predictions were not intended to supplant dedicated EOP prediction services, but it is nonetheless interesting to examine their performance too. During the last three years, RMS differences compared to IGS Final ERPs have been 0.270 mas, 0.200 mas, and 0.048 ms for PMx, PMy, and LOD respectively. The 1-d errors of other EOP prediction services tend to be significantly higher because they must rely on obervations with greater latency. This suggests that the IGU ERPs could greatly benefit the prediction services if they assimilated both the observed and predicted ERPs with more frequent updates. The observed ERPs should also enable studies of subdaily EOP excitation.