Geophysical Research Abstracts
Vol. 14, EGU2012-3181, 2012
EGU General Assembly 2012

IGS preparations for the next reprocessing and ITRF

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The International GNSS Service (IGS) is preparing for a second reanalysis of the full history of data collected by the global network using the latest models and methodologies. This effort is designed to obtain improved, consistent satellite orbits, station and satellite clocks, Earth orientation parameters (EOPs) and terrestrial frame products using the current IGS framework, IGS08/igs08.atx. It follows a successful first reprocessing campaign, which provided the IGS input to ITRF2008. Likewise, this second campaign (repro2) should provide the IGS contribution to the next ITRF. We will discuss the analysis standards adopted for repro2, including treatment of and mitigation against non-tidal loading effects, and improvements expected with respect to the first reprocessing campaign.

International Earth Rotation and Reference Systems Service (IERS) Conventions of 2010 are expected to be implemented. Though, no improvements in the diurnal and semidiurnal EOP tide models will be made, so associated errors will remain.

Adoption of new orbital force models and consistent handling of satellite attitude changes are expected to improve IGS clock and orbit products. A priori Earth-reflected radiation pressure models should nearly eliminate the $\sim$2.5 cm orbit radial bias previously observed using laser ranging methods. Also, a priori modeling of radiation forces exerted in signal transmission should improve the orbit products. And use of consistent satellite attitude models should help with satellite clock estimation during Earth and Moon eclipses.

Improvements of the terrestrial frame products are expected from, for example, the inclusion of second order ionospheric corrections and also the a priori modeling of Earth-reflected radiation pressure. Because of remaining unmodeled orbital forces, systematic errors will however likely continue to affect the origin of the repro2 frames and prevent a contribution of GNSS to the origin of the next ITRF. On the other hand, the planned inclusion of satellite phase center offsets in the long-term stacking of the repro2 frames could help in defining the scale rate of the next ITRF.