



IGS Activities for Improving its Contribution to ITRF

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By providing a dense global network and a highly resolved ERP time series, the IGS is a major contributor to the realization of the ITRF. Although the weekly repeatability is very good, the time series experience seasonal and other longer periodic effects, which originate not only from modeling problems but also from instrumental (e.g. multipath) and environmental (e.g. loading) effects. Those effects usually average out in the mean coordinates and velocities for ITRF realizations, but they are the main error sources in realizing the reference frame for daily applications.

Comparisons between station coordinate's weekly estimates and the recently adopted IGS realization of ITRF2005 (IGS05) indicate a noise level of about 3mm/6mm horizontally/vertically. Those statistics include medium-term (from week to year) periodic effects because the combination strategy filter them out. Assuming that the estimated ACs weekly consistency level (2mm/4mm) is a representative measure of the weekly solution noise level, this would suggest that medium-term periodic effects may account for up to about 50% of the estimated noise level (3mm/6mm).

The IGS is trying to improve its products by introducing new models and parameters. Since GPS week 1400 (Nov 2006) an important step is the use of absolute calibrated receiver antennas and compatibly adjusted satellite antenna offsets, both of which will improve the internal network consistency and scale stability.

The use of the various models and reference frame realizations throughout the IGS history has led to discontinuities in the IGS products, whereas the week 1400 changes will have an even larger effect, because the relative to absolute antenna phase center switch has introduced a discontinuity at all stations at the same time. Therefore, the

IGS has decided to reprocess all historic data using the best models. The reprocessed products will deliver a new quality for all long-term analyses. Homogenous results will not only include stations coordinates, but also the daily ERP parameters back to 1994. New orbits and clocks will allow users to generate within their own applications consistent time series using network or PPP strategies based on IGS products. The current rather inhomogeneous troposphere products, being most affected by all the past changes at the individual Analysis Centers, will most benefit from the reanalysis and will have smaller biases compared to other techniques. Although the reprocessing will be a big step forward for the IGS, one should note that all effects in the time series originating from data (e.g., multipath) and remaining modeling (e.g. orbit) problems will of course be visible in these new products too.