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Estimation of GPS satellite antenna *z*-offsets from reprocessed SINEX files

Ralf Schmid (1), Xavier Collilieux (2), Peter Steigenberger (3), and Urs Hugentobler (1)

(1) Forschungseinrichtung Satellitengeodäsie, Technische Universität München, Munich, Germany (schmid@bv.tum.de / 0049 (0)89 28923178), (2) Laboratoire de Recherche en Géodésie, Institut Géographique National, Paris, France (xavier.collilieux@ign.fr), (3) Institut für Astronomische und Physikalische Geodäsie, Technische Universität München, Munich, Germany (steigenberger@bv.tum.de)

Since November 2006 an absolute phase center correction model for GNSS satellite and receiver antennas has been used within the International GNSS Service (IGS). This model, called `igs05.atx`, comprises consistent phase center offset and variation values given in ANTEX format. Generally, these correction values have not been changed in the meantime. Solely values for new receiver antenna types or newly launched satellites have been added.

With view to the upcoming transition to ITRF2008, a general update of the IGS antenna phase center model is in progress that will be called `igs08.atx`. Therefore, reprocessed weekly SINEX files of several IGS analysis centers (ACs) will be analyzed to derive new GPS satellite antenna *z*-offsets. These values will be based on more data (16 instead of 11 years) and more ACs than the values currently used, and they will also cover the latest satellites launched in recent years. As selected station coordinates will be fixed to ITRF2008 when back-solving the SINEX files, the antenna model will be fully consistent with the corresponding terrestrial reference frame.

For the *z*-offsets contained in `igs05.atx` this is not the case. At the time those were estimated, the solutions could only be aligned to IGb00, an IGS realization of ITRF2000, but not to ITRF2005. Whereas *absolute* receiver antenna corrections were applied for these computations, the underlying reference frame was based on *relative* corrections, and the effect of radomes could not be considered. Moreover, an error in the mean vertical velocity of IGb00 caused a significant trend in the *z*-offset time series of all satellites. Thus, they could only be given for a specific epoch.

We will compare *z*-offset time series from the computations for `igs05.atx` and `igs08.atx` to demonstrate the reduction of trends and the improvement of the overall consistency. Resulting biases between individual ACs will highlight scale-related discrepancies, and the general agreement between the two phase center models will be of particular interest.

The transition to `igs08.atx` also provides the possibility to update the receiver antenna calibrations, as discontinuities in the time series of station coordinates cannot be prevented anyway. Thus, the percentage of IGS stations with state-of-the-art calibrations will improve to about 70%. On the other hand, about 20% of the stations will still be covered by uncalibrated radomes. We will analyze the distribution of stations with inadequately calibrated antennas and show which local ties could be negatively affected.