Generation of igs05.atx - status quo

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The switch to the new absolute antenna phase center correction model is expected to benefit several global GPS parameters such as troposphere, orbits or the terrestrial scale. The latest model named igs05_1365.atx (1365: GPS week of the last file modification) consists of 213 different data sets containing correction values for 59 individual transmitting antennas (44 GPS and 15 GLONASS satellites) and for 154 tracking antenna types.

For only 42 of the latter, absolute robot calibration results from the company Geo++ including both zenithal and azimuthal phase center variations (PCVs) are available. However, these 42 antennas include a great many of those types dominating the IGS network. In order to complete the set of phase center corrections, relative field calibrations from the National Geodetic Survey (NGS) had to be converted to absolute corrections by adding the difference between the absolute and the relative values for the reference antenna AOAD/M_T. Unfortunately, the converted NGS PCVs are both limited to 10° elevation and to zenithal corrections. The 154 different receiver antenna types also include 48 antenna/radome combinations whose influence has been ignored within the IGS so far. Recent tests at Fortaleza where the removal of the radome caused an apparent height change of about 18 mm (J. Ray, IGSSTATION-860) have demonstrated the importance of considering the radome effect. Unfortunately, calibrations are only available for about one third of the antenna/radome combinations existing within the IGS network.

The tracking antenna information mentioned above had to be fixed in order to derive phase center corrections for the transmitting antennas on board the satellites. Due to problems with eclipse seasons and correlations with orbit parameters, long time series are essential to get PCVs and *z*-offsets of reasonable quality. Therefore, GFZ and TUM reprocessed 10 years of IGS data using completely independent software packages to generate a consistent set of GPS satellite antenna corrections. As the *z*-offsets showed a significant trend of about 2 cm/a caused by the error in the mean vertical velocity of IGb00, they were all referenced to the epoch 2000.0. Finally, CODE reprocessed about one year of data to derive consistent corrections for the GLONASS (and GPS) satellites on the basis of a combined GPS/GLONASS analysis.