Impact of Different Phase Center Correction Values on Geodetic Parameters: A Standardized Simulation Approach

Johannes Kröger, Tobias Kersten, Yannick Breva, Mareike Brekenkamp, and Steffen Schön

Leibniz Universität Hannover, Institut für Erdmessung, Hannover, Germany (kroeger@ife.uni-hannover.de)

For highly precise and accurate positioning and navigation solutions with GNSS, it is mandatory to take all error sources – including phase center corrections (PCC) – adequately into account. These corrections are provided by different calibration facilities and are published in the official IGS antenna exchange format (ANTEX) file for several geodetic antennas.

Currently, the IGS antenna working group (AWG) is discussing which metrics should be used as a basis for accepting new calibration facilities as an official IGS calibration facility. To this end, requirements have to be set for comparing different sets of PCC for the same type of antenna.

Mostly, characteristic values of difference patterns (dPCC) are analysed, e.g. maximum deviations, RMS of dPCC, or percentage of dPCC values that are smaller than 1 mm. For users and station providers, however, it is most interesting to investigate the impact of dPCC on geodetic parameters, e.g. topocentric coordinate deviations and troposphere estimates. Since the impact is not only depending on the antenna in use and the station's location but also on the applied processing strategies, a standardized comparison strategy is needed.

In this contribution, we present the impact of different PCC values on geodetic parameters using a standardized simulation approach. We show results for several globally distributed stations using different processing strategies and their respective impact on the geodetic parameters. This includes the application of different elevation cut-off angles, observation weightings w.r.t satellite coverages and elevation angles as well as use of different frequencies and linear combinations. The obtained results are analysed in detail, repeated behaviours are grouped and compared to widely used characteristic values of dPCC. Thus, an overall conclusion of the similarity of different PCC models can not only be drawn on the pattern level, but also their impact on geodetic parameters can be assessed.