



Systematic errors of mapping functions which are based on the VMF1 concept

Florian Zus (1), Galina Dick (1), Jan Dousa (2), and Jens Wickert (1)

(1) GFZ Potsdam, Potsdam, Germany (zusflo@gfz-potsdam.de), (2) Research Institute of Geodesy Topography and Cartography, Geodetic Observatory Pecny (GOP), Czech Republic (jan.dousa@pecny.cz)

Precise GNSS positioning requires an accurate Mapping Function (MF) to model the tropospheric delay. To date the most accurate MF is the Vienna Mapping Function 1 (VMF1). It utilizes data from a numerical weather model which is known for high predictive skill (Integrated Forecast System of the European Centre of Medium range Weather Forecast). Still, the VMF1, or any other MF which is based on the VMF1 concept, is a parameterized mapping approach and this means that it is tuned for specific elevation angles, station and orbital altitudes. In this study we analyse the systematic errors caused by such tuning on a global scale. We find that in particular the parameterization of the station altitude dependency is a major concern regarding airborne applications. For the moment we do not provide an improved parameterized mapping approach to mitigate systematic errors but instead we propose a rapid direct and therefore error-free mapping approach; the so-called Potsdam Mapping Factors (PMFs).