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A combined GPS/GLONASS global solution for the determination of diurnal and semi-diurnal Earth rotation variations

S. Englich, R. Weber, and H. Schuh

Institute of Geodesy and Geophysics, Vienna University of Technology, Vienna, Austria (sigrid.englich@tuwien.ac.at, +431 58801 12896)

Due to the global distribution of the IGS stations and the availability of continuous tracking data, GNSS observation data is very well suited for the investigation of high-frequency variations of the Earth rotation parameters (ERP). The majority of obtainable observations stems from the GPS system, but the number of stations equipped with combined GPS/GLONASS receivers is steadily increasing. One drawback in GPS only studies is that the orbital period of the GPS satellites is in a deep 2:1 resonance with Earth rotation. Consequently orbital errors which propagate to the ERP estimation limit the accurate determination of ERP variations in this frequency band (K1, K2). The purpose of this study is to make use of the rising availability of globally distributed GLONASS data for investigating the benefits of a combined GPS/GLONASS approach for the examination of diurnal and semi-diurnal Earth rotation variations. The observation data of 2008 from more than 120 IGS sites, of which around one third track GPS as well as GLONASS satellites, was chosen for analysis. We compared coordinate repeatabilities, ERP, and subsequently derived tidal variations calculated from a GPS stand-alone and a combined GPS/GLONASS solution.