



## **A Combined Sub-daily Earth Rotation Model from GPS and VLBI Observations**

Thomas Artz (1), Lisa Bernhard (1), Axel Nothnagel (1), Peter Steigernberger (2), and Sarah Tesmer (1)

(1) Universität Bonn, Institut für Geodäsie und Geoinformation, Bonn, Germany, (2) Technische Universität München, Institut für Astronomische und Physikalische Geodäsie, Munich, Germany

A combination procedure of Earth Orientation Parameters (EOPs) from Global Positioning System (GPS) and Very Long Baseline Interferometry (VLBI) observations is applied on the basis of homogeneous normal equation systems. The emphasis and purpose of the combination is the determination of a model for sub-daily variations of the Earth Rotation Parameters (ERP). As daily ERPs as well as fortnightly nutation corrections are estimated simultaneously, the entire transformation between the celestial and the terrestrial reference frame is determined rigorously with observations of both techniques.

The combined tidal polar motion (PM) and dUT1 model is predominantly determined from the GPS observations. However, the setup benefits from the fact that VLBI delivers nutation and dUT1 estimates at the same time. Due to the combination procedure, it is warranted that the strengths of both techniques are preserved. Overall, the combined tidal model for the first time completely comprises the geometrical benefits of VLBI and GPS observations. In terms of root mean squared amplitude differences it agrees to other empirical single-technique tidal models below  $4 \mu\text{as}$  in polar motion and  $0.25 \mu\text{s}$  in dUT1.