Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03739, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03739
EGU General Assembly 2008

Subdaily Earth rotation observed by GPS and VLBI

P. Steigenberger (1), V. Tesmer (2), D. MacMillan (3), D. Thaller (4), M. Rothacher (4), M. Fritsche (5), A. Rülke (5) and R. Dietrich (5)

(1) Institut für Astronomische und Physikalische Geodäsie, TU München, Germany
(2) Deutsches Geodätisches Forschungsinstitut (DGFI), München, Germany
(3) NVI, Inc./Goddard Space Flight Center (GSFC), Greenbelt, USA
(4) GeoForschungsZentrum (GFZ), Potsdam, Germany
(5) Institut für Planetare Geodäsie, TU Dresden, Germany
(Email: steigenberger@bv.tum.de / Phone: ++49-89-289 231 93)

The space geodetic techniques GPS and VLBI allow for the highly accurate observation of subdaily changes in Earth rotation. These variations are mainly caused by ocean tides, smaller effects are attributed to the interaction of the atmosphere with the solid Earth. As the tidal periods are well known, models for the ocean tidal contribution to high-frequency Earth rotation variations can be estimated from space geodetic observations.

Long-time series of homogeneously reprocessed subdaily Earth rotation parameters (ERPs) computed by TU Munich/TU Dresden/GFZ Potsdam (13 years of GPS data), DGFI (23 years of VLBI data) and GSFC (27 years of VLBI data) provide the basis for the estimation of subdaily ERP models. The stability, precision and accuracy of these models are evaluated by comparisons of different estimation strategies and comparisons with other models. As the single-technique subdaily ERP models show a high level of consistency, a combined GPS/VLBI model can be computed that benefits from the strengths of both techniques.

GPS-derived subdaily ERP estimates suffer from systematic errors in orbit modeling introducing artifacts close to the satellite orbit period or its multiples. The analysis of the GPS and VLBI residual signals after subtracting the estimated ocean tidal amplitudes may help to answer the question which of the remaining signals is a technique-

specific artifact or a true geophysical signal detected by both techniques.