Geophysical Research Abstracts
Vol. 16, EGU2014-2137-1, 2014
EGU General Assembly 2014

Ray-traced Delays in the CONT11 VLBI campaign

Armin Hofmeister, Matthias Madzak, and Johannes Böhm
Department for Geodesy and Geoinformation, Vienna University of Technology, Austria

The influence of the troposphere on the observations is one of the major error sources in space geodetic applications such as Very Long Baseline Interferometry (VLBI) or Global Navigation Satellite Systems (GNSS).
Besides the common way of determining zenith delays and mapping them to the elevation angles, it is possible to use ray-tracing algorithms to directly determine the actual signal path and to calculate the specific slant delay for each observation separately.
The great advantage of this approach is the possibility of using real meteorological data along the exact ray path to determine the slant delay and through the continuous improvement of numerical weather models, which are used as data source, the ray-traced delays will steadily improve.
By developing and applying a new ray-tracer within the project RADIATE VLBI, which is funded by the Austrian Science Fund (FWF), we are going to enhance the processing of VLBI observations in order to improve geodetic parameters like station coordinates or Earth orientation parameters (EOP).
To determine the impact of ray-traced delays on the VLBI results, we compare solutions from VLBI processing when using the common estimation of the slant delays (determination via zenith delays and mapping functions) with the solutions obtained from utilizing our calculated ray-traced slant delays during the session analysis in terms of baseline length repeatabilities.
As data sets we use a numerical weather model from the European Centre for Medium-range Weather Forecasts (ECMWF) for ray-tracing and the IVS CONT11 campaign, which covers 15 days of continuous (24h) VLBI observations.