Geophysical Research Abstracts
Vol. 16, EGU2014-10020, 2014
EGU General Assembly 2014

Atmospheric turbulence models for space-geodetic applications

Sebastian Halsig (1), Thomas Artz (2), Judith Leek (3), and Axel Nothnagel (4)

(1) Institute of Geodesy and Geoinformation, University of Bonn, Germany (halsig@igg.uni-bonn.de), (2) Institute of Geodesy and Geoinformation, University of Bonn, Germany (artz@igg.uni-bonn.de), (3) Institute of Geodesy and Geoinformation, University of Bonn, Germany (leek@igg.uni-bonn.de), (4) Institute of Geodesy and Geoinformation, University of Bonn, Germany (nothnagel@igg.uni-bonn.de)

High rate tropospheric parameters obtained with observations from space-geodetic techniques, such as Global Navigation Satellite Systems (GNSS) or Very Long Baseline Interferometry (VLBI), represent valuable information in the field of meteorology. In particular, the water vapour content in the atmosphere, that is directly linked to the tropospheric delays derived from VLBI or GNSS, is of great interest.

Besides long periodic variations, micro-scale phenomena also affect geodetic observations and therefore the tropospheric parameters. Such turbulent processes can be best described stochastically. Therefore, different turbulence models based on the widely accepted Kolmogorov turbulence theory have been developed in the recent years.

In this study, this stochastic information is incorporated in the VLBI analysis to receive a more reliable stochastic model. Generally, the correlations between observations are not considered in the VLBI analysis leading to deficiencies in modeling the stochastic properties of the observations. Thus, formal errors are generally too optimistic. Now, the standard variance-covariance information from the VLBI correlation process is enhanced by the additional stochastic information derived from turbulence models.