

Abstract Details

Session title: JG05 - Posters - Remote Sensing and Modelling of the Atmosphere (IAG, IAGA, IAMAS, IAVCEI)

Session type: Poster Session

Symposium: JG05

Presentation number: JG05 p-355

★ Abstract title:

Application of Turbulence Theory in GNSS Tomography for Computing Wet refractivity Variance-Covariance Matrix

W. Rohm¹, Z. Adavi², R. Weber².

¹Wroclaw University of Environmental and Life Sciences, Institute of Geodesy and Geoinformatics, Wroclaw, Poland.

²Vienna University of Technology, Department of Geodesy and Geoinformation, Vienna, Austria.

Currently, Global Navigation Satellite Systems (GNSS) has been recognized as an effective tool in atmosphere studies. This is because various atmospheric layers, particularly troposphere, are swept by the signals of these positioning systems.

One of the most popular methods for modeling weather parameters using GNSS is Tomography. In this method, the troposphere is discretized into a finite number of voxels and then unknown parameters are estimated using inversion methods. Here, we apply atmospheric turbulence theory for calculating the Variance-Covariance matrix of Tropospheric Wet Refractivity.

In this study, two different scale events have been considered for examining the effect of atmospheric condition. The cases include large scale and mesoscale storms events. It helps us to investigate the uncertainty that purely turbulent nature of atmosphere brings to the tomographic solution. These schemes have been analyzed in a network of GPS reference stations in Poland for DoYs 133-136 and DoYs 192-194 in the year 2014, respectively. The accuracy of the developed model is investigated by deploying radiosonde measurements and Slant Wet Delay (SWD) which is estimated by Numerical Weather Model (NWM), as well.