## GNSS tomography and assimilation case studies using the COST benchmark dataset

Authors: Gregor Möller1, Natalia Dymarska2, Witold Rohm2, Robert Weber1

1Department of Geodesy and Geoinformation, TU Wien, Austria

2Institute of Geodesy and Geoinformatics, Wroclaw University of Environmental and Life Sciences, Poland

On finding an optimised tomography solution for nowcasting applications a subset of 72 GNSS stations in East Germany and parts of Czech Republic has been selected out of the COST benchmark dataset for the period June 2013.

The tropospheric parameters as provided by the Geodetic Observatory Pecný (GOP) were utilised together with the ALADIN-CZ data to compute slant wet delays and a priori wet refractivity fields for the tomography approach.

In a first step, the atmosphere above the test domain was divided into 0.5° x 0.5° x 1 km sized voxels up to 10 km altitude. The slant wet delays were processed to obtain improved wet refractivity fields with a temporal resolution of one hour. Further, the improved wet refractivity fields were assimilated like radio occultation data into the Weather Research and Forecasting model (WRF) to highlight its impact on the forecast field. In order to assess the quality of wet refractivity assimilation, the forecasted vertical profiles (wind speed, temperature and relative humidity) were compared to radiosonde observations.

Within this presentation, first the input dataset and the initial atmospheric conditions are introduced. Second, the tomography settings with respect to nowcasting and the improved wet refractivity fields are shown and compared to ALADIN-CZ data. Third, the settings of assimilation and preliminary results of the assimilation test cases are presented. Therewith we aim to set an initial point for further discussions and activities within the COST tomography benchmark activities.