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NRT Atmospheric Water Vapour Retrieval on the Area of Poland at IGG WUELS AC

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Global Navigation Satellite Systems (GNSS) are designed for positioning, navigation and amongst other possible applications it can also be used to derive information about the state of the atmosphere. Continuous observations from GNSS receivers provide an excellent tool for studying the neutral atmosphere, currently in near real-time.
The Near Real-Time (NRT) neutral atmosphere and water vapour distribution models are currently obtained with high resolution from Ground Base Augmentation Systems (GBAS), where reference stations are equipped with GNSS and meteorological sensors. The Poland territory is covered by dense network of GNSS stations in the frame of GBAS system called ASG-EUPOS (www.asgeupos.pl). This system was established in year 2008 by the Head Office of Geodesy and Cartography in the frame of the EUPOS project (www.eupos.org) for providing positioning services. The GNSS data are available from 130 reference stations located in Poland and neighbour countries. The ground meteorological observations in the area of Poland and neighbour countries are available from ASG-EUPOS stations included in EUREF Permanent Network (EPN) stations, airports meteorological stations (METAR messages stations), and stations managed by national Institute of Meteorology and Water Management (SYNOP messages stations). Institute of Geodesy and Geoinformatics (IGG) of Wroclaw University of Environmental and Life Sciences had created permanent NRT service of ZTD (Zenith Total Delay) estimation for the area of Poland from GPS observations called IGGHZG. The first part of the paper presents the methodology of NRT GNSS data processing for ASG-EUPOS stations for ZTD estimation and its comparison to the results coming from EPN ACs and Military University of Technology in Warsaw AC (MUT AC). Second part covers the procedure of IWV (atmospheric Integrated Water Vapour content) estimation at IGG from IGGHZG product and ZHD (Zenith Hydrostatic Delay) derived from Saastamoinen formula (1972) and meteorological observations from ASG-EUPOS stations, SYNOP (synoptic stations network) and METAR (airport meteorological stations). Paper presents comparison of IWV with the results from NWP (Numerical Weather Prediction) models HIRLAM (via EGVAPII – http://egvap.dmi.dk) and COAMPS (via MUT AC) as well.