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## SUGAC: Sofia University GNSS Analysis Center

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### Sofia University GNSS Analysis Center (SUGAC)

The Sofia University GNSS Analysis Centre (SUGAC, suada.phys.uni-sofia.bg) is a new analysis centre established via collaboration between the Department of Meteorology and Geophysics of Sofia University, the IPOS - BuliPOS GNSS network in Bulgaria and the University of Luxembourg. In April 2014, the first processing campaign took place. One year GNSS data from 7 stations of the BuliPOS network are processed in collaboration with the University of Luxembourg. Tropospheric products (Zenith Total Delay and gradients) with 5 min temporal resolution are obtained using the NAPEOS software, developed by ESA. The tropospheric products from this campaign will be used for validation of the Weather Research and Forecasting (WRF) model as well as for case studies during intense precipitation events and fog. In this work the WRF model validation for Bulgaria will be presented. Future work will be the establishment of autonomous near real-time processing of the regional ground-based GNSS network in Southeast Europe in support of the EUMETNET E-GVAP and COST ES1206 "Advanced Global Navigation Satellite Systems for Severe Weather Events and Climate" projects.



Figure 1: Map of the SUGAC ground-based GNSS network

### SUGAC ground-based GNSS network

The SUGAC ground-based GNSS network consists of 7 stations (shown in figure 1) of the Bulgarian BuliPOS network, namely Varna (VARN), Burgas (BURG), Shumen (SHUM), Stara Zagora (STAR), Lovech (LOVE), Rozhen peak (ROZH) and Montana (MONT). The stations are chosen to be representative for the different climatic regions of Bulgaria: coastal - low-altitude stations Varna (59m asl) and Burgas (72m asl); continental - Shumen, Lovech, Stara Zagora and Montana; mountain - the high-altitude station at Rozhen peak (1779m asl). The first processing campaign used data from January to December 2013.

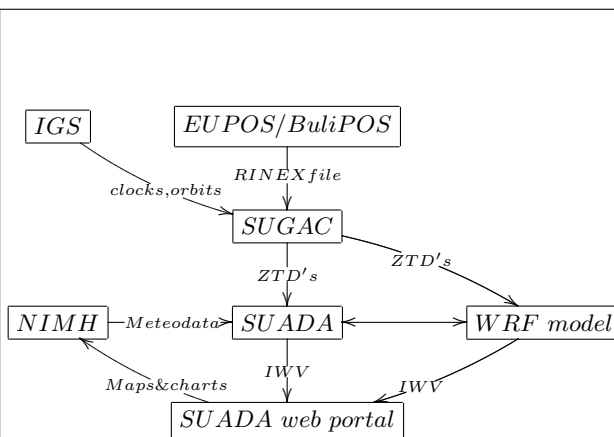


Figure 2: EUPOS - SUGAC - SUADA data transfer

### SUGAC data applications

The SUGAC is intended to interact closely with the Sofia University Atmospheric Data Archive (SUADA). GNSS RINEX files are obtained from the EUPOS European network. Clock and orbit files are received from the IGS. The data is processed specifically for tropospheric products. The initial analysis of the tropospheric data sets showed the expected differences in Zenith Total Delays (ZTD's) between low-altitude and high-altitude stations. The processed tropospheric products - ZTDs have already been fed to the SUADA database and will be assimilated into the regional numerical weather prediction model WRF, which is also part of the SUADA project. Currently the surface observation meteorological data is from the National Institute of Meteorology and Hydrology (NIMH) at the Bulgarian Academy of Sciences. The calculated Integrated Water Vapour (IWV) data is subsequently used for analysis of severe weather events and climate. The generated tropospheric products are available on the SUADA web portal.

### SUGAC outlook and plans

The tropospheric products generated during the scientific mission in the University of Luxembourg will be used for comparison with the WRF for Bulgaria. Future work will be the establishment of autonomous near real-time processing of the regional ground-based GNSS network in Southeast Europe in support of the EUMETNET E-GVAP and COST ES1206 projects. In the future ionospheric Total Electron Content (TEC) will also be considered for processing.

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