

Exploitation of Ground-Based GNSS for Meteorology and Climate Studies in Bulgaria/Southeast Europe

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SUMMARY

The Global Navigation Satellite Systems (GNSS), a new technology that revolutionised the navigation, is also proved to be an accurate atmospheric sensor of the most abundant greenhouse gas namely atmospheric water vapour. Application of GNSS in Meteorology is a well established research field in Europe and GNSS data from 1,800 stations are available for model validation and assimilation in the state-of-art models used for operational weather prediction by the National Meteorologic Services. Advances in GNSS data processing is making possible to also use the GNSS data for climatic trend analysis, an emerging new area of research both attractive and important. As a first step towards the application of GNSS for Meteorology and Climatic studies in Bulgaria/Southeast Europe the Sofia University Atmospheric Data Archive (SUADA) is developed. SUADA is a user friendly database and includes GNSS tropospheric products like Zenith Total Delay (ZTD) and derivatives like vertically Integrated Water Vapour (IWV) as well as observations from Radiosonde and surface atmospheric data. Archived in SUADA are: (1) GNSS tropospheric products (over 12 000 000 individual observations) and derivatives (over 55 000) from five GNSS processing strategies and 37 stations for the period 1997–2013 with temporal resolution from 5 min to 6 h and (2) Radiosonde IWV data (over 6000 observations) for station Sofia (1999–2012). In this work we will present also two applications of the SUADA data for study of long and short term variation of water vapour over Bulgaria.