

Exploitation of ground-based Global Navigation Satellite Systems (GNSS) for Meteorology and Climate studies in Bulgaria/Southeast Europe

Dr Guergana Guerova, Marie Curie Fellow, Department of Meteorology and Geophysics, Sofia University, Sofia, Bulgaria
guerova@phys.uni-sofia.bg

The Global Navigation Satellite Systems (GNSS), a new technology that revolutionised the navigation, is becoming an indispensable part of our daily life with millions of chips installed in portable car navigation devices and mobile phones. Beside the numerous civilian and commercial applications, GNSS proved to be an accurate 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 1,200 stations are available for model validation and assimilation in state-of-the-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 that is both attractive and important.

This work is a first step towards application of GNSS for Meteorology and Climatic studies in Bulgaria and Southeast Europe. It is expected to foster national links that will lead to integration of the GNSS data from Bulgaria in the European data exchange within EUMETNET – EGVAP project. A user friendly water vapour database will be developed and used for (1) cross-validation of ground-based and satellite observations and derivation of systematic biases, (2) validation of numerical models used for research and weather prediction, (3) study of water vapour distribution in Bulgaria and Southeast Europe, (4) detection of long term trends in water vapour and links to heat waves, droughts and changes in the pathway of the Atlantic Cyclones, and (5) studies of accuracy of state-of-the-art climate models for Bulgaria and Southeast Europe.