



Improving the Cyprus Department of Meteorology Observational Network to support the INTERREG-Balkan Project BeRTISS

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A plethora of space based radio-navigation systems is available for precise positioning and navigation applications: the United States' Global Positioning System (GPS), the Russian Global Navigation System (GLONASS) and the European Union's GALILEO are global operational Global Navigation Satellite Systems (GNSS), while the regional Chinese BEIDU system will be globally deployed in 2020. The signal from the satellites received to the ground by permanent reference stations interferes with the ionosphere and the water vapour in the lower part of the atmosphere, the troposphere. Whilst the delays caused by the ionosphere can be eliminated using different frequencies, the tropospheric delays are frequency independent and need to be modelled appropriately. In this respect, the raw data gained from GNSS permanent reference stations contain valuable information concerning the water vapour in the troposphere; the signal is processed and analysed in order to estimate tropospheric products. With the knowledge of surface pressure and temperature, the Zenith Total Delay (ZTD) and Integrated Water Vapour (IWV) can be easily evaluated. The real time determination of the ZTD and IWV and the assimilation of these parameters into numerical weather prediction models has recently been proven to give a positive impact on the lower tropospheric humidity field and significant improvement for heavy summer rainfall.

Bertiss (BalkanMed real time severe weather service) is a European funded project (INTERREG BALKANS) whose main objective is to develop and establish a pilot transnational severe weather service by exploiting Global Navigation Satellite Systems (GNSS) tropospheric products to enhance the safety, the quality of life and environmental protection in the Balkan-Mediterranean region. The project aims to provide timely information and warning regarding severe weather events as well as long-term monitoring of weather and climate change in the region, through the mapping and visualization of water vapour (the most abundant greenhouse gas that accounts for ~70% of global warming and most critical meteorological parameter for accurate weather prediction).

The Cyprus Department of Meteorology, as a partner into the BeRTISS research program, will build, install and maintain seven new automatic weather stations installed at the same location as the existing GNSS ground stations network in Cyprus (the CYTOPO network), equipped with all the necessary sensors to support the BeRTISS research program with real-time meteorological data for modelling.