



## **NWP simulations of three fog cases at Sofia and Plovdiv airports**

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Despite the continuous improvement of weather prediction fog diagnosis and forecasting remains a challenge with large economic losses for public services and in particular aviation where the cost of flight delays and re-scheduling is estimated to hundreds million euros per year. Today operational fog forecasting is mainly done with "in-house" developed tools. The aim of this work is to investigate the synergy between numerical simulations with Weather Research and Forecast (WRF) model and Global Navigation Satellite Systems (GNSS) tropospheric products in operational fog forecasting in Bulgaria. Three fog cases are selected for numerical weather prediction simulations with WRF model for two airports in Bulgaria - Sofia and Plovdiv. The first case is of a prolonged fog from 3 to 10 January 2014 registered at the Sofia airport, while the second and third cases are for the regional airport in Plovdiv from 1-3 January 2013 and 13-16 December 2014. Numerical simulations are conducted with two different vertical resolution set-ups of the model. The WRF model results are compared to the Metar observation from Sofia and Plovdiv, radiosonde profiles from Sofia and Integrated Water Vapour (IWV) from ground-based GNSS stations. Sofia and Plovdiv Stability Indexes (SSI and PSI) are calculated in addition. This work is a first step towards use of the products developed within the Interreg project "BalkanMed Real Time Severe weather Service" (BeRTISS, 2017-2019). BeRTISS will establish a pilot transnational severe weather service by exploiting GNSS tropospheric products to enhance the safety, the quality of life and environmental protection in the Balkan-Mediterranean region.