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Validation of wind profiles generated by Dopler Weather radar as a tool for diagnostic of wind conditions in Sofia Airport approach zone

Rosen Penchev (1), Elisaveta Peneva (2), Orlin Gueorguiev (3), and Ekaterina Batchvarova (3)

(1) Bulgarian Air Trafic Services Authority,1 Brussels Blvd., Sofia, Bulgaria e-mail: rosen_penchev@digicom.bg, (2) Department of Meteorology and Geophysics, Faculty of Physics, Sofia University “St. Kliment Ohridski”, 5 James Bourchier Blvd., BG-1164 Sofia, Bulgaria e-mail: elfa@phys.uni-sofia.bg, (3) National Institute of Meteorology and Hydrology, Bulgarian Academy of Sciences, Sofia, Bulgaria

Sofia Airport is located in the lowest part of the Sofia Valley that is surrounded by mountains. This disturbs the air flow in the lower troposphere, thus forming mountain waves, rotors, wind shear and strong turbulence. In airport approach zone this hazards could compromise flight safety. The Doppler meteorological radar Gematronic C360 operating at Sofia airport is a useful tool for finding and tracking disturbances in the wind field. The radar identifies the hydrometeors in the air and the special algorithm VVP (Volume Velocity Processing) calculates the wind on different vertical levels using the hydrometeors displacement. The output is a product which gives the horizontal wind speed and direction in the vertical column above the radar location with about 200 m vertical resolution. The present study aims to check the comparability of the wind data received by Dopler weather radar with the aerological sounding data. The meteorological balloon sonde is launched every day at 1200UTC and typical vertical resolution for wind is about 20 m. The period of comparison is one year. Due to irregularity of radar data and difference in heights where parameters are measured, the procedure of synchronization of data is applied. The verification of wind speed and direction are made for each available level. Special attention is paid to levels in PBL and up to 3000 m. In order to assess the data statistical characteristics such as bias, RMSE, correlation indexes are calculated. The results present good positive correlation between two sources of data and confirm that the temporally high resolution radar data could be successfully used from weather forecasters in analysis of weather situation.