



Hailstorm forecasting based on stability indices derived from radio-sounding profiles

Sabina Stefan (1), Nicu Barbu (1,2), and Florica Toanca (3)

(1) University of Bucharest, Faculty of Physics, Atmospheric Physics, BUCHAREST, Romania (sabina_stefan@yahoo.com),

(2) Romanian Air Traffic Services Administration, 10 Ion Ionescu de la Brad Str., Bucharest, Romania, RO071952, (3) National Institute of R&D for Optoelectronics, Laser Remote Sensing, Magurele, Romania

Hail forecasting is a difficult task due to their small spatiotemporal scales. Over the last decades, there are many thermodynamic stability indices developed in order to improve hailstorms forecasting. These indices provide a simplified representation of different thermodynamic situations. Stability indices (e.g. Convective Available Potential Energy – CAPE, Convective Inhibition - CIN, Showalter Index – SI, etc) are calculated from vertical profiles retrieved by radio-soundings at Bucharest-Afumati site. Radio-sounding profiles have limited spatial representativeness and are usually available only twice a day. Radio-sounding profiles retrieved by HATPRO Microwave Radiometer can be used to overcome these drawbacks, providing vertical profiles with higher temporal resolution. Microwave radiometer (located at Bucharest-Magurele) is a remote sensing instrument based on passive microwave detection in the 22.335 to 31.4 GHz and 51 to 58 GHz bands to obtain vertical profiles of temperature and relative humidity up to 10 km. The stability indices were calculated from vertical profiles at 12UTC for the days when hail was observed at synoptic station located in southern part of Romania for the 2014 and 2015 convective seasons (from May to September). The preliminary results indicate that this approach can be used in operational forecasting. Combinations between these indices and synoptic and mesoscale analysis significantly improve the hailstorms forecast. More hail events are needed for a better understanding of the convective clouds initiation and hail formation.

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