18–22 September 2017, Pula, Croatia
ECSS2017-176
© Author(s) 2017. CC Attribution 3.0 License.

Supercell structures developed over Serbia associated to severe weather events in western Romania – a conceptual approach

Octavian Paul Bugeac (1,2), Sabina Stefan (1), and Goran Mihajlovic (3)

(1) University of Bucharest, Faculty of Physics, 405 Atomiştilor, CP MG - 11, 077125, Physics Platform - Magurele, Bucharest-Magurele, Romania, (2) Romanian Air Traffic Sevices Administration, 10 Ion Ionescu de la Brad, 013813, Bucharest, Romania (paul.bugeac@gmail.com), (3) Republic Hydrometeorological Service of Serbia – 66 Kneza Viseslava, 11000, Belgrade, Serbia

Extreme weather events associated to supercell structures were not very frequently reported in south-eastern Europe. However, in recent years, due to the increased variety of remote-sensing data, more and more studies in the region were focused on extreme events associated to supercells. Even so, an exhaustive method for forecasting tornadoes or mesocyclones based only on dynamic models could not be established and, in this context, conceptual models based on understanding the dynamics of development, topography and the latest satellite and radar information available, can be the most useful tools for nowcasting these phenomena.
Therefore, the objective of the study is to propose a conceptual model that might be used in extreme weather nowcasting based on the analysis of two severe weather events (10-th of June 2009 and 20-th of June 2016) and the results of other case studies on mesocyclones in the area.
In order to identify the potential of mesocyclone development is needed not only a thorough analysis of the forecast data but also the integration of satellite and radar information in near real-time. In this respect, we analyzed the observation data (SYNOP), multispectral satellite imagery, radar information and local area models from Serbia and Romania for the specific cases which were triggered in Serbia and caused strong winds, heavy precipitation and large hail over western part of Romania. We also used the results of some studies in the region related to tornadoes and mesocyclones in Romania, Serbia, Italy and Greece, each of them revealing the influence and importance of topography in initiating deep convection and its role in achieving another fundamental ingredient in supercell development namely wind shear at low levels.
The two violent cases studied in this work are showing some common characteristics, namely a relatively small genesis area with similar convection triggering and wind shear aloft, deep convection with overshooting tops, sequences of secondary cells aligned in Serbia, some of them with rotational signatures, and extreme weather events over western Romania.
Finally, our study emphasizes the importance of development of a conceptual model dedicated to this kind of events and proposes an approach on this theme.