EGU2020-17847
https://doi.org/10.5194/egusphere-egu2020-17847
EGU General Assembly 2020

Investigating triggering mechanisms for the large hailstorm event of July 10th, 2019 on the Adriatic Sea

Antonio Ricchi[1,2], Vincenzo mazzarella[1], Lorenzo Sangelantoni[1,2], Gianluca Redaelli[1,2], and Rossella Ferretti[1,2]

[1]CETEMPS, Center of Excellence, University of L'Aquila, Italy
[2]Dept. Of Physical and Chemical Sciences, University of L'Aquila, Italy

A severe weather events hit Italy on July 9-10, 2019 causing heavy damages by the falling of large-size hail. A trough from Northern Europe affected Italy and the Balkans advecting cold air on the Adriatic Sea. The intrusion of relatively cold and dry air on the Adriatic Sea, in a first stage through the "Bora jets" generated by the Dinaric Alps gave rise to a frontal structure on the ground, which rapidly moved from North to South Adriatic. The large thermal gradient (also with the sea surface), the interaction with the complex orography and the coastal zone, generated several storm structures along the eastern Italian coast. In particular, on 10 July 2019 between 8UTC and 12UTC a deep convective cell (probably a supercell) developed along the coast North of the city of Pescara, producing intense rainfall (accumulated rainfall reaching 130 mm/3h) and a violent hailstorm with hailstones larger than 10 cm in diameter. The storm quickly moved southward, evolving into a complex multicellular structure clearly visible by observing radar data. In this work the frontal dynamics and the genesis of the storm cell are investigated using the numerical model WRF (Weather Research and Forecasting system). Numerical experiments are carried out using a 1 km grid on Central Italy, initialized using the ECMWF dataset and the Sea Surface Temperature (SST) taken by MFS-CMEMS Copernicus dataset. The sensitivity study investigated both the impact of the initial conditions, the quality and the anomaly of the SST on the Adriatic basin in those days. Furthermore, in order to quantify the importance of the use of different microphysics, Planetary boundary Layer (PBL) and radiative schemes, several experiments are performed. The role of orography in the development and location of the convective cell is also investigated. Preliminary results show that initialization and SST played a fundamental role. In particular, the initialization several hours before the event, coupled with a detailed SST allows to correctly reproduce the atmospheric fields. The microphysics scheme turned out to play a key role for this event by showing a significant greater impact than the PBL, in terms of frontal genesis on both the synoptic and local scale.