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Analysis and simulations of the 4 July 2007 large hailstorm in NE Italy

Agostino (Tino) Manzato (1), Valentino Riva (2), Mario Marcello Miglietta (3), and Sante Laviola (4)

(1) OSMER, ARPA Friuli Venezia Giulia, Visco (UD), Italy (agostino.manzato@osmer.fvg.it), (2) Dept. Environmental Sciences, Udine University, Udine, Italy (riva.valentino@spes.uniud.it), (3) ISAC, CNR, Lecce, Italy (m.miglietta@isac.cnr.it), (4) IASC, CNR, Bologna, Italy (s.laviola@isac.cnr.it)

In Friuli Venezia Giulia region (NE Italy) a hailpad network is operated since 1988. The largest hailstorm ever registered was that of 4 July 2007, when 116 hailpads were hit by hail. More than a single hailstorm was reported between 10:00 and 17:00 UTC of that day. The distribution of hailstone density, radius and flux of kinetic energy have been computed for two cases: considering all the hit hailpads of the day and only those during the single most hail-producing storm, that occurred between 12:00 and 14:00 UTC, with about 76 hit hailpads.
Maps of hit hailpads and corresponding radar VMI have been co-located and showed that this particularly intense hailstorms can be divided in three different phases. The first phase (characterized by a circular maximum VMI and associated to the maximum production of negative cloud-to-ground lightnings at about 12:35 UTC) exhibits the largest hailstone diameters and kinetic energies, the second phase (elongate cell) has the lowest diameter and kinetic energy, while the third phase showed intermediate characteristics.
The case study has also been analyzed with numerical simulations performed with the WRF model. A strong sensitivity is found to the initial time for the simulations (forced with ECMWF analysis/forecasts), in particular for what concerns the southward extension of the frontal system associated with the triggering of the hailstorm.
The hailstorm has been also studied by satellite view using a new microwave-based prototype algorithm for hail detection. Since microwaves particularly sense large-sized ice aggregates, the investigation has been reinforced by the MicroWave Cloud Classification method, which gives information on cloud type in terms of stratification and convection and their altitudes.
Finally, the MSG observations could be used to analyze the evolution of the hailstorm during its maximum as detected by the hailpad network.