High-resolution numerical forecast of an hailstorm event in the Po Valley: sensitivity analysis to microphysical parameterization using COSMO-MODEL and MM5

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High resolution numerical forecast of severe weather has received an increasing attention in the hydro-meteorological community. In this work two non hydrostatic models, COSMO-LAMI and MM5,have been used to simulate, at fine resolution (3 and 1 km), a severe hailstorm event occured on May 20, 2003 in the Po Valley area(Italy). Two C-band radars simultaneously measured that event from two different locations, S.Pietro Capofiume and Gattatico, revealing strongly localized convective cells. The mesoscale models have been run in the same physical and numerical configuration and particular attention has been paid to the study of convective processes uncertainty due to variations in graupel and hail related particle parameters. Several sensitivity tests have been carried out using different microphysical hail and graupel setting (intercept parameter, mass-size relationship, velocity size relationship) to the aim of investigating the different hydrometeors production processes and to compare them with the available radar data and hydrometeors classification from the dual-polarized weather radars. Finally, further comparison have been performed with pluviometric network and the analysis of the results for this case study will be presented and discussed.