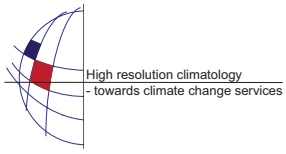
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-587, 2010
10th EMS / 8th ECAC



27 May 2009 deep convection event: polarimetric radar analysis and comparison with COSMO-I2 microphysical fields

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On the afternoon of May 27th, 2009 a severe storm hit the city of Parma and its surroundings, causing widespread damages due to strong winds, hail and heavy downpours.
In the first part of the work, a volumetric analysis of this deep convective system was carried out by using ARPA-SIMC Polarimetric-Doppler radar data, focusing on the microphysical and dynamical structure and wind pattern. Microphysical properties are obtained by using an hydrometeor classification scheme developed at the National Severe Storms Laboratory (NSSL) and extended from S-band to C-band radar data.
In the second part of the work, radar information is compared with NWP model forecasts. First, the polarimetric radar information is compared with the microphysical fields forecasted by the COSMO-I2 model during all the storm evolution. COSMO-I2 is the operational high resolution meteorological limited-area model used by ARPA-SIMC with a spatial resolution of about 2.8 km. Its microphysical scheme includes 5 hydrometeors, for which the prognostic equations are solved: cloud ice, cloud water, rain, snow, graupel (specific contents in kg/kg). The comparison is carried out analysing both vertical hydrometeor profiles and horizontal distribution of rainfall pattern evolution.
Then the radar polarimetric information is compared with the microphysical fields forecasted by an ensemble of COSMO integrations, run at 2.8 km of horizontal resolution. In this experimental ensemble, the values of some selected parameters of the COSMO microphysics scheme are changed with respect to their operational configuration. The extent to which these changes are able to affect the vertical variability of the hydrometeor species is assessed with respect to radar microphysical observation.