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Characterization of rainfall C-band radar response and dual-polarized measurement

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In the last few years, the polarimetric upgrading of weather radars has allowed to improve considerably the accuracy related to the estimation of precipitation rate intensity and to the hydrometeors classification, mainly in deep convective events. Recently, the need to deepen the analyses on such issues has been tackled by means of the development of modelling chains composed by high resolution numerical weather prediction models able to generate atmospheric scenarios with desired characteristics and radar simulation modules feeded with the 3-D output fields of the aforementioned atmospheric models. This work focuses primarily on the evaluation of the effects of different microphysical parameterizations embedded into two atmospheric limited area model (COSMO-MODEL and MM5) on the simulated co-polar and differential reflectivity datasets computed by a radar simulation software (RSM). Since the latter is able to provide C-band polarimetric signatures of different hydrometeors, a second important task is constituted by the intercomparison of both simulated and the available observed reflectivity fields so as to assess the reliability of both models in reproducing deep convective weather conditions with a particular attention on the dynamics of the precipitation processes. Particularly, a severe event occurred over Northern Italy on 20/05/2003 has been simulated through the above mentioned numerical models and results concerning the polarimetric RSM measurements will be presented and discussed.