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HyMeX IOP2b: observations and numerical simulations of a supercell over the Friuli-Venezia Giulia region (northeastern Italy)

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An analysis is presented here of severe convection affecting the Friuli-Venezia Giulia region (FVG, northeastern Italy) during Intensive Observation Period 2b (IOP2b) in the first Special Observation Period (SOP1) of the HyMeX campaign. This work focuses on the morning of September 12, 2012, during the first of three severe convection episodes that affected the region during IOP2b. In the first episode, a supercell, which produced hail and severe damage to trees and buildings, was observed on the plain of FVG.
The same day has been analyzed already by previous studies, but here the available observations were analyzed together with new WRF model simulations, in order to identify the mechanisms responsible for the severe convection. The WRF model was used in a one-way nesting configuration, using three nested domains with grid spacing respectively of 9, 3, and 1 km.
First, the predictability of the event was analyzed. Six different simulations were performed starting at three different initial times, using respectively the ECMWF and the GFS analysis/forecasts as initial/boundary conditions. A large spread was observed among the simulations. Only a few simulations were able to reproduce intense rainfall on the plain of FVG during the morning, although with significant differences in the rainfall distribution among them. Second, it was found that in this case the GFS-initialized run starting at 12 UTC, 11 September 2012 best reproduces the observed elongation toward Slovenia of the intense rainfall maximum. The characteristics of the cell are consistent with those expected for a supercell and its simulated evolution near the Adriatic coast agrees well with the observations. Finally, the simulated evolution of some relevant instability parameters over the FVG plain and offshore (over the northern Adriatic Sea) is analyzed, finding that during this event the potential instability varies a lot even in small space and time intervals.