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Predictability of thunderstorm events with a convection-permitting ensemble

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In Italy it is now operational a convection-permitting ensemble based on the COSMO model, run at a resolution of 2.2 km. The system was developed with the aim of providing probabilistic information in the context of operational forecast of mescoscale phenomena and in particular of severe weather.
Different uncertainty sources are included in the ensemble design: perturbed Initial Condition are derived from a LETKF-based data assimilation at the km scale, perturbed Boundary Condition are assigned from a coarser-resolution ensemble and the COSMO model is perturbed by varying the values assigned to a set of parameters of the physics schemes.
The predictability of severe weather phenomena (with focus on thunderstorms) over Italy is here studied, addressing the effect of the selected perturbation strategy.
In particular, it is shown and discussed the role of the Initial Condition perturbations for high resolution precipitation forecast at the very short range, and the role of physics perturbation in affecting the onset and evolution of the precipitation systems. An analysis of events where the predictability proved to be low is also presented.
An objective verification over a summer period of three weeks is performed, by comparing hourly precipitation against radar-estimated precipitation corrected with raingauge data. Attention is paid also to the occurrence of false alarms, which is a crucial element in the operational forecasting practice.