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The role of limited area ensemble prediction models in a hydrometeorological chain

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Forecasting the probability of occurrence of severe, localized, precipitation events requires high resolutions both in space and in time, and requires the construction of a meteo-hydrological forecasting chain to reach the necessary small scales. Large-scale ensemble prediction systems represent the first step by providing forecast scenarios down to a resolution of currently about 50 Km. High-resolution, non-hydrostatic, limited area ensemble prediction systems, provide a dynamically based forecast, by extending these scenarios to smaller scales. The commonly still insufficient resolution of both types of models can be further extended by means of stochastic downscaling techniques, which could be, in principle, be applied directly to the large scale model. What is the role and benefit provided by the local area model in such a chain? In this work we explore this issue and compare, for a selected number of case studies, ensemble forecasts obtained by the COSMO-LEPS limited area prediction system and by the ECMWF ensemble prediction systems, using the RainFARM precipitation downscaling technique. A dense network of raingauges is used for verification.