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The application of LEPS technique for Quantitative Precipitation Forecast (QPF) in Southern Italy

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Abstract. This paper reports preliminary results of a Limited area model Ensemble Prediction System (LEPS), based on RAMS, for eight case studies of moderate-intense precipitation over Calabria, the southernmost tip of the Italian peninsula. LEPS aims to transfer the benefits of a probabilistic forecast from global to regional scales in countries where local orographic forcing is a key factor to force convection. To accomplish this task and to limit computational time, in order to implement LEPS operational, we perform a cluster analysis of ECMWF-EPS runs. Starting from the 51 members that forms the ECMWF-EPS we generate five clusters. For each cluster a representative member is selected and used to provide initial and dynamic boundary conditions to RAMS, whose integrations generate LEPS. RAMS runs have 12 km horizontal resolution. Hereafter this ensemble will be referred also as LEPS_12L30. To analyze the impact of enhanced horizontal resolution on quantitative precipitation forecast, LEPS_12L30 forecasts are compared to a lower resolution ensemble, based on RAMS that has 50 km horizontal resolution and 51 members, nested in each ECMWF-EPS member. Hereafter this ensemble will be also referred as LEPS_50L30. LEPS_12L30 and LEPS_50L30 results were compared subjectively for all case studies but, for brevity, results are reported for two "representative" cases only. Subjective analysis is based on ensemble-mean precipitation and probability maps. Moreover, a short summary of objective scores. Maps and scores are evaluated against reports of Calabria regional raingauges network. Results show better LEPS_12L30 performance compared to LEPS_50L30. This is obtained for all case studies selected and strongly suggests the importance of the enhanced horizontal resolution, compared to ensemble population, for Calabria, at least for set-ups and case studies selected in this work.

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