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Sensitivity of forecast skill to the parameterization of convection in limited-area ensemble mode

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The parameterization of convection in limited-area models is an important source of uncertainty as regards the spatio-temporal forecast of precipitation. The development and implementation of ensemble systems with different convection schemes provides an opportunity to upgrade state-of-the-art probabilistic systems at the convection-parameterized scale. As for the limited-area model COSMO, the sensitivity of the forecast skill to the use of different convection schemes is assessed by performing different sets of experiments.
For one case of heavy precipitation over Italy, the performance of COSMO-B (COSMO model run with the Bechtold scheme) and COSMO-T (COSMO model run with the Tiedtke scheme) is investigated in deterministic mode, with particular attention to the types of forecast errors (e.g. location, timing, intensity) provided by the different convection schemes in terms of total precipitation.
In addition to this, a 10-member ensemble has been run for approximately 2 months with the Bechtold scheme, using the same initial and boundary conditions as members 1-10 of the operational COSMO-LEPS ensemble system (which has 20 members, all run with the Tiedtke scheme). The performance of these members is assessed and compared to that of the 10-member ensemble provided by members 1-10 of COSMO-LEPS; in particular the spread/skill relation of the two 10-member ensembles in terms of total precipitation is evaluated.
Finally, a new 20-member ensemble system (which has 10 members run with Bechtold plus 10 members run with Tiedtke) is compared to COSMO-LEPS over the 2-month period.
In this approach the use of the Bechtold scheme is proposed as a perturbation for the COSMO-LEPS ensemble, relatively to how uncertainties in the model representation of the cumulus convection can be described and quantified.