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Boundary conditions for a convection-permitting ensemble: comparison of two different approaches

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The current resolution of operational global models makes possible to drive convection-permitting Limited Area Model (LAM) simulations directly, omitting the intermediate step with a coarser resolution LAM.
Though the resolution of global ensemble systems is generally lower than that of the deterministic ones, it is interesting to consider this opportunity also in the field of ensemble forecasting.
The aim of this work is to investigate the effect of this choice for driving a convection-permitting ensemble (2.8 km horizontal resolution) based on the COSMO model running over Italy. The impact of the direct nesting in the ECMWF global ensemble is compared to a two-step nesting, which makes use of a LAM ensemble system with parametrised convection.
The analysis focuses on intense autumn precipitation events occurred during the first Special Observation Period of the Hymex Project (www.hymex.org).
Results show that differences between pairs of members following different nesting approaches are generally smaller than the ensemble error, computed with respect to analysis. The relation between spread and error is even improved by adopting the direct nesting approach.
In terms of precipitation, it is found that the forecast issued by members with different nesting apporoaches generally have a differences at spatial scales up to about 180 km, hence not negligible. Nevertheless, the skill of the precipitation forecasts, evaluated by means of an objective verification over the whole period, is comparable between the two approaches.
It is concluded that the overall quality of the 2.8 km ensemble for the specific application is not deteriorated by the provision of lower resolution lateral boundary conditions directly from the global ensemble.