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Development of an ensemble forecasting system for the short-range following different perturbation approaches.

Chiara Marsigli, Andrea Montani, and Tiziana Paccagnella
ARPA-SIMC, Bologna, Italy (cmarsigli@arpa.emr.it)

Short-range ensemble forecasting is nowadays among the operational practice of many Weather Centres.
At ARPA-SIMC, the operational ensemble COSMO-LEPS has been recently joined by the experimental COSMO-SREPS system, more tailored for the short-range. Both systems are based on the COSMO model and run at 7 km horizontal mesh-size, but are designed for different forecast ranges (day 3-5 and 1-2, respectively) and with different perturbation strategies. COSMO-LEPS performs a dynamical downscaling of the ECMWF EPS, while COSMO-SREPS receives initial and boundary conditions by a few state-of-the art operational deterministic runs (IFS, GME, GFS), following a multi-analysis multi-boundary approach. Both systems benefit of perturbations applied to the COSMO model itself.
In this work, the impact of the different perturbation strategies on short-range forecast skill is assessed, by performing a detailed intercomparison of the two systems for the first 2 forecast days. The relative importance of initial state and boundary perturbations and of model perturbation is also shown. The behaviour of the perturbations is studied and a verification of the systems performance is undertaken. The impact of combining the two different ensembles for the aim of short-range forecasting is also assessed, tackling the relative importance of ensemble population and member diversity.