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# Studying the role of initial condition and physics perturbation in the ensemble prediction of recent flood events over Italy

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COSMO-IT-EPS is a convection-permitting ensemble currently under development in Italy, based on the COSMO model, running with an horizontal resolution of 2.8 km and 10 members.
The impact of initial condition (IC) perturbation is addressed by comparing three different approaches for initialising the ensemble: interpolating the ICs of the first 10 members of a mesoscale ensemble (COSMO-LEPS), interpolating the ICs of the first 10 members of ECMWF ENS and using 10 perturbed analyses obtained with a LETKF.
Physics perturbations based on the SPPT scheme are also applied to the ensemble runs, which are then compared with runs performed without any physics perturbations and with runs where parameter perturbations are applied.
The role of the different perturbations is studied over a period of autumn 2014 which included few severe flood events over Italy, and the most relevant cases are examined in detail. The purpose is to show the impact of the different perturbations on the probabilistic forecast of the high-impact weather events. In particular, it is analysed which kind of features are improved in the forecast thanks to the perturbations applied to the 2.8 km ensemble runs, with respect to what is already obtained with a coarser resolution probabilistic forecast.