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Development of user-oriented ensemble products based on COSMO-LEPS: recent upgrades at Arpae-SIMC

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COSMO-LEPS is the limited-area ensemble prediction system of COSMO (Consortium for Small-Scale Modelling). The system has been running since 2002 and was the first mesoscale ensemble system to be implemented on an operational basis in Europe.
COSMO-LEPS, implemented and maintained by Arpae-SIMC, the HydroMeteoClimate Service of Emilia-Romagna Region in Bologna (Italy), runs at ECMWF as a member-state time-critical application and provides operational ensemble forecasts twice a day at 7 km of horizontal resolution, 40 vertical levels, over Central and Southern Europe in the short and medium range (up to day 5). Products are disseminated to the COSMO countries and are also used to support several initiatives, among which the generation of probabilistic flood forecast by the European Flood Awareness System.
In this contribution, we will show the most recent developments of the system in terms of product generation to assist the activities of Civil Protection Agencies for the generation of alerts. Particular attention will be paid to the visual representation of probabilistic products for wind, precipitation and fog forecasting.
The planned upgrades, including a multi-physics approach for the representation of moist convection and an increase in horizontal resolution of the system to 5 km, will be also presented. The benefits of these ameliorations on the probabilistic prediction of surface fields at high spatial and temporal detail will be quantified over a 2-month verification period as well as for individual case studies of high-impact weather over Northern Italy.
Finally, the blending of COSMO-LEPS products with those of the recently-developed convection-permitting ensemble system COSMO-I2-EPS will be discussed.