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Limited-area ensemble activities at the Hydro-Meteorological service ARPA-SIMC: the COSMO-LEPS system

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This contribution shows the most relevant results obtained after six years of operational activity carried out by ARPA-SIM in the field of limited-area ensemble forecasting.
It is presented the main features of COSMO-LEPS, the limited-area ensemble prediction system based on the non-hydrostatic COSMO-model and developed within the COSMO consortium. This system aims at improving upon the early and medium-range predictability of extreme and localized weather events, especially when orographic and
mesoscale-related processes play a crucial role.
The present status of COSMO-LEPS, based on 16 integrations of the non-hydrostatic COSMO-model (10 km of horizontal resolution, 40 vertical levels, 132 hours of forecast range) and running as a “time-critical application” at ECMWF, is illustrated with the different upgrades which took place in the past years. The impacts of increasing the ensemble size and the vertical resolution of the model integrations are assessed.
Verification results are shown in terms of both seasonal and monthly scores from December 2002 onwards; for some
seasons, the skill the system is also compared to that of ECMWF EPS.
In addition to this, the performance of COSMO-LEPS is investigated for cases of particular interest over Europe. The attention is mainly focused on the probabilistic prediction of total precipitation, so as to assess the possibility to issue weather alerts on the basis of COSMO-LEPS products.
Finally, the future developments of the system are outlined with emphasis on the development of TIGGE-LAM targeted products, on the implementation of a 7km-grid COSMO-LEPS and on modifications of the methodology which could make the system more performing.