



Spatial verification of high resolution precipitation forecasts issued by an ensemble system.

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The verification of high-resolution ensemble systems requires to adapt the methods used for the evaluation of a forecast issued in terms of probability with the statistical verification techniques which are being developed for high-resolution model forecasts (1-10 km). In this work, a distributional method is presented for the spatial verification of the limited-area ensemble system COSMO-LEPS. The COSMO-LEPS system is a 16-member ensemble, running at 10 km of horizontal resolution, based on a downscaling of the EPS with the COSMO limited-area model. Verification focuses on intense precipitation, since the system was mainly designed to give probabilistic assistance in the forecast of severe weather, especially leading to flood events. Rainfall forecasts are compared against observed values on a dense raingauge network covering an area centered on the Alps. The method is based on an evaluation of the distribution of the forecasted values against the distribution of the observed values, over a set of boxes of selected size covering the verification domain. A number of parameters of the distributions are computed and compared over the defined boxes. In particular, the average, median, 90th percentile and maximum forecast value in a box are considered. The possibility of assessing the similarity between the two distributions by computing an index which carries the information contained in a number of parameters is also explored. In order to investigate the problem of the predictability of precipitation at different spatial scales, a comparison of predicted probabilities and observed frequencies over boxes of different sizes is also presented. Finally, the role played by the high-resolution integrations is investigated by comparing the COSMO-LEPS scores with the EPS ones, this methodology allowing to compare systems with different horizontal resolution by using boxes of appropriate size.