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Assesment of the performace of a multi-model multi-analysis limited area ensemble

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Performance of an ensemble of eight members, made up of three mesoscale models (BoLAM, MM5, RAMS), one of them (RAMS) used with two different setups, and two sets of boundary and initial conditions (ECMWF, NCEP), is discussed. The integration period ranges from the 15^{th} of October 2002 to the 15^{th} of April 2003 (183 days). The geographical area is between (34˚N,13.5W) and (54.5N, 24.5E) with spatial resolution of 0.25˚ (about 25 km). Maximum forecast time is 72 hours with steps of 6 hours. The forecast verification has been obtained comparing forecast with 2 meter temperature measured in 21 meteorological stations scattered across the Sardinian island, located in the Western Mediterranean sea. Four different post-processing techniques: the Bayesian Model Averaging (BMA), the Ensemble Model Output Statistics (EMOS), a variant called EMOS$^+$ and a dressing method, have been applied.

Since all the mentioned techniques allow to obtain an empirical probability distribution function of the forecast variable, the results have been analysed in terms of ranked probability score, coverage and width of the PDF confidence intervals. Results show that all the techniques calibrate the ensemble outcomes and that the BMA appears to give the more stable results across the various forecast times. Deterministic forecast obtained as expectation values for each calibration method, compared with those obtained using the ensemble mean and the Super-Ensemble technique, show good and quite similar performances for about all the methods. Although limited only to one parameter, this study shows that these techniques can be suitably applied in a operational context to post-process the outcomes of an ensemble where the members are traceable in time, giving an appreciable added value in terms of probabilistic forecast.