

Statistical post-processing of dual resolution ensemble forecasts

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The more accurate prediction of various weather quantities is the main incentive for continuous research in all major weather prediction centres. In recent years, they complement the single-valued point forecast obtained by numerical weather prediction models by providing the forecast ensembles of different weather quantities, which are obtained from multiple runs of these models with various initial conditions and model parameterizations. One of these organisations, the European Centre for Medium-Range Weather Forecasts (ECMWF) produces operational ensemble-based analyses and predictions that describe the range of possible scenarios and their likelihood of occurrence. According to its strategic plans till 2025, ECMWF wants to improve the resolution of ensemble forecasts from 18 km to a 5 km grid which requires a substantial increase of computation resources. Beside aiming at bettering predictive performance, researchers at ECMWF experiment with a mixture of high and low resolution ensemble forecasts to determine the optimal combination on a fix computational cost.

In our research in the past year we performed statistical post-processing on the dual resolution global ensemble temperature forecast data provided by ECMWF. We applied the ensemble model output statistics (EMOS; Gneiting et al., 2005) as our approach for statistical calibration. As high resolution we consider the 50-member operational TCo639 ensemble of the ECMWF (18 km resolution) together with the 200-member TCo399 ensemble having a horizontal resolution of 29 km. Tests with local and semi-local (Lerch and Baran, 2017) EMOS post-processing support the existence of a superior combination of high- and low resolution forecasts, however, statistical calibration reduces the differences in verification scores.

References

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