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Improving probabilistic forecast skill by calibrating site-specific and gridded ensemble forecasts

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While forecast ensembles allow for the design and usage of novel probabilistic forecast products, they still cannot capture all sources of uncertainty inherent to NWP forecasting. In particular they are often not calibrated, resulting in the fact that the probabilistic forecasts derived from ensembles are not statistically consistent with the corresponding observations. A number of statistical post-processing methods for the purpose of calibrating ensemble forecasts have been proposed over the last decade, with Bayesian Model Averaging and Ensemble Model Output Statistics (or Non-homogeneous Gaussian Regression) being among the most successful, as they can be applied to a variety of weather parameters.
At the Met Office, the calibration of probabilistic forecasts has received more and more attention over the last few years and several calibration techniques based on BMA and EMOS are being trialled and assessed for their benefit over the raw ensemble forecasts. Challenges arise when addressing weather parameters which by nature don't exhibit a normal distribution.
We present results for the calibration of site-specific and gridded forecasts, in the short- to medium-range, while highlighting the need for preserving the multivariate dependency structure inherent to the ensemble forecasts. We will also draw conclusions on the practicality of operational implementation and discuss the performance at individual sites.