



Can multimodel ensembles improve medium range precipitation forecasts?

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Ensemble forecasts aim to improve decision-making by predicting the full distribution of possible outcomes. Forecasts from a single ensemble may suffer from systematic errors due to the model and assimilation processes used. By combining results from multiple ensembles which have different systematic errors and are more skilful in different situations, it should be possible to produce a composite forecast superior to that from any individual ensemble. The value of ensemble combination has been demonstrated by several authors for variables such as surface temperature, but there has been relatively little investigation of the potential benefit for the key forecast variable of precipitation. This work uses a subset of the TIGGE dataset to investigate the benefit of multimodel ensembles over single ensembles for medium range forecasts of precipitation. Early results verifying raw output against short range control forecasts show noticeable benefit across a range of score measures and thresholds, particularly for the reliability component of the Brier Skill Score. We plan to extend this verification to radar- and gauge-based observations, examining the nature and independence of the forecast errors to understand how multimodel combination might be beneficial. Further work would consider appropriate methods of calibration, along with the question of whether the multimodel advantage survives against calibrated single ensembles.