

## A New View of Forecast Skill: Bounding Boxes from the DEMETER Ensemble Seasonal Forecasts

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### Abstract

Insight into the likely weather several months in advance would be of great economic and societal value. The DEMETER project has made systematic multi-model, multi-initial-condition simulations of the global weather as observed over the last 40 years; transforming these model simulations into forecasts is non-trivial. One approach is to extract merely a best first guess, a single forecast designed to minimize, say, the root-mean-square forecast error. A second approach would be to construct a full probability forecast. This paper explores a third option, namely to see how often this collection of simulations can be said to *capture* the target values, in the sense that the target lies within the bounding box of the forecasts. The DEMETER forecast system is shown to often capture the two meter temperature target in this sense over continental areas at lead times up to six months; in particular this target is captured over 95% of the time at over a third of the grid points and maintain a bounding box range less than that of the local climatology. Such information is of immediate value from a user's perspective. Open foundational issues in translating a set of multi-model multi-initial-condition simulations into a forecast are discussed, in particular those involving "bias correction".

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