

Seasonal Forecasts of Precipitation Anomalies for North American and Asian Monsoons

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In this paper we examine several types of model-generated data sets to address the question of seasonal prediction of the Asian and the North American monsoon systems. In this context we have used seasonal climate forecast data sets from atmospheric and coupled (atmosphere-ocean) models. The main question we ask is if there is any useful skill in predicting seasonal anomalies (beyond those of climatology). The methodology for prediction is the 'FSU Superensemble', which is applied here to the anomalies of the predicted multimodel data sets and the observed (analysis) fields. In this study a number of model-based data sets are used to construct the ensemble mean and the 'FSU Superensemble'. The skills of seasonal forecasts are evaluated using three different types of parameters: anomaly correlations, root mean square errors and the Brier skill score. The last of these is posed as a very conservative probabilistic skill measure in order to provide a rather stringent test on the merits of the anomaly forecasts.

Our study addresses the seasonal precipitation forecast skill for the Asian and North American monsoon systems. We note that the superensemble based anomaly forecasts have somewhat higher skill compared to the ensemble mean of member models, individually bias removed ensemble mean of the member models, the climatology and the member models that are being used in this exercise.

The skill of forecasts from the superensemble come partly from the forecast performance of multimodels and partly from the training component built into this system that is based on past collective performance of these multimodels. We have separated these components to assess the improvements of the superensemble.

Though skill of the forecasts from the superensemble is found to be higher than that of the ensemble mean and has shown some usefulness over the climatology, the issue of forecasting a season in advance in quantitative terms still remains a challenge and demands further advancement in climate modeling studies.