An evaluation of the Decadal Climate Prediction Experiments by the BCC_CSM Model

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Retrospective decadal hindcasts were undertaken using the Beijing Climate System Model (BCC_CSM) as part of Coupled Model Intercomparison Project 6. The hindcasts were anomaly initialized by nudging the oceanic temperature and salinity from the monthly Simple Ocean Data Assimilation (SODA). Each forecast consists of an 8-member ensemble integrated over a 10-year period. Ensemble forecasts were evaluated using observations, and compared to an ensemble of uninitialized simulations (NoINT) which are subject to identical twentieth century historical radiative forcings. The results show that the warming trend of global mean SST simulated by the Decadal forecast is closer to the observation than that in the NoINT runs. The Decadal forecasts show high SST prediction skills over broad regions of Atlantic, western tropical Pacific and tropical Indian Oceans. The initialization increases the skill in forecasting the Pacific Decadal Oscillation (PDO) index for almost a decade compared to the NoINT runs, while reduces the skill in predicting the Atlantic Multidecadal Oscillation (AMO) index. Some features of the ocean state estimates used for initialization and their impact on the forecasts are discussed.

Keywords: Decadal prediction, BCC_CSM model, Anomaly initialization