

NCAR Contribution to A U.S. National Multi-Model Ensemble (NMME) ISI Prediction System

NCAR brought the latest version of the Community Earth System Model (version 1, CESM1) into the mix of models in the NMME effort. This new version uses our newest atmospheric model CAM5 and produces a coupled climate and ENSO that are generally as good or better than those of the Community Climate System Model version 4 (CCSM4). Compared to CCSM4, the new coupled model has a superior climate response with respect to low clouds in both the subtropical stratus regimes and the Arctic.

However, CESM1 has been run to date using a prognostic aerosol model that more than doubles its computational cost. We are currently evaluating a version of the new model using prescribed aerosols and expect it will be ready for integrations in summer 2012. Because of this NCAR has not been able to complete the hindcast integrations using the NCAR loosely-coupled ensemble Kalman filter assimilation method nor has it contributed to the current (Stage I) NMME operational utilization. The expectation is that this model will be included in the NMME in late 2012 or early 2013. The initialization method will utilize the Ensemble Kalman Filter Assimilation methods developed at NCAR using the Data Assimilation Research Testbed (DART) in conjunction with Jeff Anderson's team in CISL. This methodology has been used in our decadal prediction contributions to CMIP5.

During the course of this project, NCAR has setup and performed all the needed hindcast and forecast simulations and provide the requested fields to our collaborators. In addition, NCAR researchers have participated fully in research themes (i) and (ii). Specifically, i) we have begun to evaluate and optimize our system in hindcast mode, focusing on the optimal number of ensemble members, methodologies to recalibrate individual dynamical models, and accessing our forecasts across multiple time scales, i.e., beyond two weeks, and ii) we have begun investigation of the role of different ocean initial conditions in seasonal forecasts.

The completion of the calibration hindcasts for Seasonal to Interannual (SI) predictions and the maintenance of the data archive associated with the NCAR portion of this effort has been the responsibility of the Project Scientist I (Alicia Karspeck) that was partially supported on this project.