

Results from the CFSv2 CMIP5 Decadal Forecasts

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An overview of the decadal forecasts made as part of CMIP5 with the CFSv2 (Coupled Forecast System version 2) model developed by NCEP is presented. Several sets of forecasts have been made using full field initialization and taking the ocean initial conditions from two separate ocean analyses (NEMOVAR 1960-present and CFSR 1980-present). The NEMOVAR cases were carried out by COLA scientists, and the CFSR cases by NCEP scientists. Several sets of forecasts with different specifications of the external forcing have been carried out for the NEMOVAR cases, including: with volcanic aerosols and greenhouse gas (ghg) forcing, with ghg but no volcanic forcing, and with no ghg or volcanic forcing. The CFSR forecasts were include ghg and volcanic forcing. Model biases in all cases are small in the tropics, but substantial in midlatitudes and especially in high latitudes. The forecast skills were evaluated after removing the mean biases. All of the sets of forecasts had substantial skill in predicting year 2-5 and year 6-9 surface temperature anomalies. However, significant differences in skill between the various forecasts sets were difficult to detect. The model skill is higher than that of persistence forecasts, but the confidence of this result is not high. There was no substantial difference in the year 2-5 or year 6-9 forecast skills found by NEMOVAR initialization of ensemble forecasts every five years and that found from single forecasts initialized every year. The sources of the predictability of the decadal forecasts were examined by comprehensive diagnoses of the ocean heat budget.

An extended set of NEMOVAR forecasts was carried to three years lead time to examine the multiyear ENSO predictability. A significant return of skill was found during winter of the second year.