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Verification of decadal forecasts: results from the GFDL coupled model experiments

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Decadal climate variations can result from changes in both natural and human-induced perturbations of climate forcing. Decadal predictability should thus be investigated as a joint initial-boundary value problem. Initial assessment of the decadal predictability in the GFDL CM2.1 coupled model is presented here as part of the CMIP5 decadal prediction experiments. The impact of using observations to initialize the forecasts is investigated and discussed. Prediction skills from initialized experiments are compared to non-initialized forced simulations and to initial value experiments. We present results of upper ocean heat content in regions of high potential predictability like the North Atlantic Ocean. Decadal predictions and decadal potential predictability of the Atlantic Meridional Overturning Circulation are also shown and their reliability is discussed. Our results suggest that verification of decadal predictions remains a considerable challenge given the lack of long-term observations particularly in the deep ocean. However initialized climate predictions do provide useful insights for a better understanding of the mechanisms of decadal variability at the process level. They also help characterizing and attributing coupled models deficiencies, which is important to reduce future predictions uncertainties.