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Using analysis corrections as a representation of model error

The presented work will illustrate the impact of analysis correction-based additive inflation (ACAI) applied to the global atmosphere in an uncoupled (NAVGEM) and coupled (Navy ESPC) model. ACAI uses analysis corrections from the NAVDAS-AR data assimilation system as a representation of model error. The seasonal mean analysis corrections are shown to match well with observational estimates of model bias and are applied as a tendency term during the model integration to address model bias. Additionally, during ensemble forecasts, randomly sampled analysis corrections are added to the mean correction as a representation of model uncertainty. Testing ACAI in both deterministic and ensemble settings has been shown to improve ensemble spread-skill and reduce model bias and RMSE. Results are presented from both stand-alone NAVGEM and Navy ESPC ensemble forecast systems evaluating the impact of ACAI on a large suite of metrics. We also evaluate the impact of the different components of ACAI independently and find that the random component of the perturbations can be as effective at correcting model bias as the mean term.

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