Processes based attributions to CFSv2 systematic errors in surface temperature forecasts

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Abstract

We have made preliminary analysis of systematic errors in CFSv2 surface temperature forecasts between January 1 and January 30, 2012. The objective of this study is to explore the feasibility of attributing systematic errors of CFSv2 surface temperature forecasts as a function of forecast lead time to individual modeled physical and dynamical processes in the CFSv2 system. The decomposition is achieved with the coupled atmosphere-surface climate feedback-responses analysis method (CFRAM), whose formulation utilizes local energy balance of atmosphere-surface layers and linearization of radiative energy perturbation. The property that these partial temperature biases coming from individual modeled physical and dynamical processes add up to total temperature biases enables us to quantify contributions to the systematic error from various thermodynamic and dynamical processes in CFSv2 model over a specific region (say US) in terms of both amplitude and spatial pattern.