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Title: Implementation of the NCEP operational GLDAS for the CFS land initialization
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Abstract:
The purpose of the NCEP Global Land Data Assimilation System (GLDAS) is to provide optimal land surface initialization for the Noah land surface model component of the coupled CFS/Noah operational and experimental forecasts. Accurate land surface initialization is critical in climate prediction systems because it defines the boundary conditions at the interface between land surface and atmosphere and it regulates water and energy fluxes across that interface over a variety of spatial and temporal scales. Since any given land model has its own inherent annual cycle climatology of soil moisture at each land grid point, one cannot "transplant" the absolute values of soil moisture based on cycling the soil moisture states of one land model into a different land model, or even the same land model but with a different configuration. The optimum land surface initial conditions for the coupled CFS/Noah must be generated by a long-term reanalysis execution of the Noah land surface model itself via GLDAS. Also, it is widely acknowledged that bias in the land surface forcing predicted by the companion atmospheric model, particularly precipitation, may lead to nontrivial bias in the predicted land surface states and fluxes. In order to provide enhanced land surface states for the prediction system initialization, global observed precipitation analysis is used in the NCEP GLDAS as direct forcing. Global observed snow cover and depth analysis is used to constrain the predicted snow fields. The NCEP GLDAS is implemented in the NCEP operations for land initialization for the operational CFSv2 seasonal climate prediction. Further enhancements of the NCEP GLDAS and CFS/Noah coupled prediction system upgrades are under development to improve forecast skill and understanding on the subseasonal to seasonal timescale.
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