Implementation of GLDAS in the NCEP Operational Global Climate and Weather Forecast Systems

Jesse Meng[ab], Helin Wei[ab], Rongqian Yang[ab], and Michael Ek[a]

[a] *Environmental Modeling Center, NOAA NCEP, USA, Jesse.Meng@noaa.gov,*
[b] *I.M. Systems Group, Inc., USA.*

This presentation introduces the preliminary results of the Global Land Data Assimilation System (GLDAS) implementation in the NCEP operational Climate Forecast System (CFS) for seasonal climate prediction [1] and the Global Forecast System (GFS) for mid-range weather prediction.

Accurate initialization of land surface states is critical in global climate and weather prediction systems because of their regulation of water and energy fluxes between the land surface and atmosphere over a variety of spatial and temporal scales. Since measurements of many land surface states are generally not available on global scales, traditional coupled land-atmosphere prediction systems rely on their land surface models to predict the land surface states and fluxes. It is widely acknowledged that bias in the land surface forcing predicted by the atmospheric model, particularly precipitation, may lead to nontrivial bias in predicted land surface states and fluxes.

In order to provide enhanced land surface states for operational prediction systems, the NCEP GLDAS is implemented using the NASA Land Information System (LIS). Global observed precipitation is used as direct forcing to drive GLDAS/LIS. Global observed snow cover and depth are used to constrain the predicted snow field. The NCEP GLDAS/LIS has been used in the CFS Reanalysis and Reforecast project (CFSRR) to provide land surface initial conditions to the reforecast experiments. The coupled CFSRR prediction and assimilation system was transitioned into NCEP operations for seasonal climate prediction (CFSv2). Meanwhile, GLDAS/LIS is also being tested as part of the development of the coupled NCEP GFS Data Assimilation System (GDAS), anticipating improving the GFS mid-range weather prediction.

References

[1] Meng, J., R. Yang, H. Wei, M. Ek, G. Gayno, P. Xie, K. Mitchell. "The Land Surface Analysis in the NCEP Climate Forecast System Reanalysis," *J. Hydrometeor*, vol. 13, pp. 1621–1630, October 2012.