Development and Application of Land Data Assimilation Systems (LDAS) in NCEP Operations

Youlong Xia, Michael Ek, Jesse Meng, Rongqian Yang, Jiarui Dong, and Helin Wei
Environmental Modeling Center (EMC), National Centers for Environmental Prediction (NCEP), National Oceanic and Atmospheric Administration (NOAA), Camp Springs, Maryland, United States (youlong.xia@noaa.gov)

The NCEP/EMC LDAS team has collaborated with its partners in developing two LDAS systems: the North American Land Data Assimilation System (NLDAS, www.emc.ncep.noaa.gov/mmb/nldas) and the Global Land Data Assimilation System (GLDAS). The purpose of NLDAS is to provide initial states to regional numerical models to enhance regional weather and climate prediction skills and to support the U.S. National Integrated Drought Information System (NIDIS) such as U.S. drought monitor (drought.gov), the NCEP monthly drought briefing (www.cpc.noaa.gov/products/Drought), and NCEP seasonal drought outlook (www.cpc.noaa.gov/products/expert_assessment/seasonal_drought.html). NLDAS, an uncoupled system, uses the NCEP North American Regional Reanalysis (NARR) and observed gauge precipitation as surface forcing to drive four land surface models, including the NCEP Noah land surface model, to produce a 29-year (1979-2007) retrospective and more than 3-year (2008-present) real-time hydrometeorological products to support the NIDIS and other users. We suggest development directions of the next generation NLDAS at NCEP. The purpose of GLDAS is to provide optimal initial states to the NCEP Climate Forecast System (CFS) to improve global climate simulation and prediction and generate new hydrometeorological reanalysis products to support users. GLDAS, a semi-coupled system, uses the NCEP CFS global reanalysis products and hybrid precipitation (i.e. gauge, satellite, model) as surface forcing to run the NCEP Noah land surface model in the operational CFS. GLDAS is included as a part of the recent CFS reanalysis (1979-present, cfs.ncep.noaa.gov/cfsr).