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LDAS Land Data Assimilation Systems

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The land-surface component of the hydrological cycle is fundamental to the overall functioning of the atmospheric and climate processes. The characterization of the spatial and temporal variability of water and energy cycles is critical to improve our understanding of the land-surface-atmosphere interaction and the impact of land-surface processes on climate extremes. Because the accurate knowledge of these processes and their variability is important for climate predictions, most Numerical Weather Prediction (NWP) centers have incorporated land-surface schemes in their models. However, errors in the NWP forcing accumulate in the surface and energy stores, leading to incorrect surface water and energy partitioning and related processes.

A methodology under development here is to implement a **Land Data Assimilation System (LDAS)**, which consists of land-surface models (uncoupled from an atmospheric model) forced with observations, and thus not affected by NWP forcing biases. This research is being implemented using existing Surface Vegetation Atmosphere Transfer Schemes (SVATS) by NOAA, NASA/GSFC, NCAR, Princeton University, and the University of Washington at 1/8th-degree resolution across central North America and at 1/4th-degree resolution globally to evaluate these critical science questions. These LDAS systems have been run retrospectively starting in January 1979 and continue in near real-time, and are forced with precipitation gauge observations, satellite data, radar precipitation measurements, and output from numerical prediction models. Model parameters are derived from the existing high-resolution vegetation and soil coverages. The model results support water resources applications, numerical weather prediction studies, numerous water and energy cycle investigations, and also serve as a foundation for interpreting satellite and ground-based observations. Eventually, observations (in situ or remotely-sensed) of LDAS storages (such soil moisture, temperature, snow) and fluxes (including evaporation, sensible heat flux, runoff) will be used to further validate and constrain the LDAS predictions using data assimilation techniques.

NLDAS (North American LDAS) and **GLDAS** (Global LDAS) data are produced by specific instances of the Land Information System (LIS) software framework for high-performance land-surface modeling and data assimilation developed within the Hydrological Sciences Laboratory here at NASA Goddard; these two instances of LIS are forced, respectively, by the NLDAS and GLDAS archives of surface meteorological fields.

Users of NLDAS and GLDAS datasets are encouraged to join the LDAS mailing list for updates on new data releases, new data services, data reprocessing, and data delays or outages.

GLDAS
Get GLDAS data:
via FTP; via GDS;
View README file.

NLDAS
Get NLDAS data:
via FTP; via GDS.

NLDAS Phase 1
(1996-2007)
View README file.

NLDAS Phase 2
(1979-present):
View README file.

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