**Introduction**

GLDAS Version 2 (GLDAS-2) Data

- GLDAS-2 Noah Experiment 1-monthly and 3-hourly 1° x 1° data sets (1948-2008) have been released by the public via the NASA GIS DISC.
- While GLDAS-2 data are becoming available incrementally, more than 30 years (Jan. 1979-present) of GLDAS Version 1 (GLDAS-1) data, simulated by CLM, Noah, VIC, and VIC models, remain publicly available and are still growing.

**GLDAS Basic Characteristics**

- **Content**: Water and energy budget data
- **Spatial resolution**: 0.25° and 1.0°
- **Temporal resolution**: 3-hourly and monthly
- **Data format**: GLADIS server (GSDF)
- **Visualization and analysis**: FTP downloading
- **Portal**: Giovanni

**Four ways to access the data**
- **Mirodir search and download**
- **Parameter and spatial subsetting**
- **NetCDF conversion**
- **GrADS Data Server (GSDF)**
- **Visualization and analysis**: Visualizing and analyzing
- **Parameter and spatial subsetting**: Data sets are derived from satellite measurements and atmospheric analyses
- **Output format**: GLDAS Binary (GRIB)
- **Elevation definition**: High TOPO 30
- **Vegetation definition**: University of Maryland, 1 km

**Hydrology Data Holdings Portal**

The portal lists all GLDAS and NLDAS data sets along with links for accessing the data via Mirodir, GSDF, ftp, Giovanni, and README document.

**Updates to Each GLDAS-2 Land Surface Models**

- **Model - resolution**: Noah 3° x 3°, Version 2.7
- **Version 3.3**: Updated model parameters that specify the initial soil temperature
- **CLM 3° x 3°**: Version 3.5
- **Used MODIS-based parameter data sets, stand alone**
- **VIC 1° x 1°**: Water balance mode
- **Includes all variables**
- **Mosaic 1° x 1°**: Mosaic (GFSIC)
- **Catchment 1° x 1°**: Catchment
- **NOAH 0.25° x 0.25°**: Version 2.7, Snow DA, direct insertion
- **Forward-looking**
- **Updated bottom temperature**

**What's New about GLDAS-2 Data**

- **Recent updates of Princeton Forcing Data**
  - Princeton Forcing Data set (Sheffield et al., 2006) provides near-surface meteorological data for driving land surface models and other terrestrial modeling systems. Since its creation in 2006, the set has been improved and updated several times. The latest update includes correction in Downward Shortwave Radiation, Humidity, and Temperature fields.
  - GLDAS-2 data will be generated by using:
    - Updated models (Noah, Catchment, CLM, and VIC)
    - Updated land cover, land mask, and other vegetation maps based on MODIS data
    - Experiment 1 (1948 – present): Updated Princeton Forcing Data
    - Experiment 2 (2001 – present): Observation-based forcing data

- **GLDAS-2 NOAA Model Data**
  - Combined GLDAS-2 Noah model (v2.71) Experiment 1 Data (1° x 1° monthly and 3-hourly) will be updated by regenerating the data with updated Noah model (Noah3.3), the updated Princeton Forcing Data, and the updated land surface parameters.

- **GLDAS-2 Catchment Model Data**
  - Catchment model was developed by Randy Koster et al at GSDF (the same group who developed Noah). 1° x 1° monthly and 3-hourly Experiment 1 Data are coming soon in summer 2012.

- **GLDAS-2 VIC Model Data**
  - VIC model data contain 20 variable fields.
  - However, unlike most LSMS, the soil water prognostic variables are not strictly associated with soil layers.
  - GLDAS-2 CLM and VIC Model data will also be forthcoming.

**Improvements in GLDAS-2 Data**

- In GLDAS-1, source of forcing data was changed several times during the 30-year data record. As a result, GLDAS-1 model output data show some discontinuities corresponding to dates of forcing data changes.
- GLDAS-2, using the improved forcing data from Princeton, has generated 61 years of improved and climatologically consistent data, using updated LSMS.
- The real-time daily time series of Total Precipitation (rainfall + snowfall, right-upper) and Surface Incident Shortwave Radiation (right-middle) show 61-year temporally consistent data.
- Global mean temperature of Global mean temperature of Global mean temperature of Total ET (right-lower) shows the improvement of the 61-year consistent and annual cycle.
- Other variables (not shown here) of GLDAS-2 model outputs also show improved data consistency.

**GLDAS 25-year Data**

- GLDAS data are 0.125° x 0.125° hour-by-hour data. Monthly data will be coming soon.
- NLDAS Phase 2 (NLDAS-2) Noah model data have been released to public recently.
- NLDAS data from SAC and VIC will also become available soon.
- All NLDAS data are accessible via Giovanni NLDAS Hourly Portal.

**Summary**

- To date, GLDAS and NLDAS have generated more than 60 years (1948 – present) and 30 years (1979 – present) of data, respectively. These quality-controlled, spatially and temporally consistent terrestrial hydrological data could play an important role in characterizing the spatial and temporal variability of water and energy cycles and supporting climate research.
- All data are accessible at NASA GLDAS Hydrology Data Holdings via Mirodir, ftp, GSDF, or Giovanni (http://gdata1.sci.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=GLDAS2_NLDAS).
- Giovanni GLDAS-2 NLDAS portals provide additional access and use of the data. The portals provide a simple and intuitive way to visualize, analyze, and access the data without having to download the data.
- GLDAS-2 Experiment 1 data (1948-2008) will be generated by using updated Princeton Forcing Data, updated LSMS, and updated land surface data. Current existing GLDAS-2 Experiment 1 Noah data will be regenerated.
- GLDAS-2 Experiment 2 data (2001 – present) will be generated by using observed based forcing data, with a latency of around a month.

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**NLDAS is a collaboration project among several groups (NOAA/NCEP/EMC, NASA/GSFC, Princeton University, University of North Dakota, NOAA/DOH, and NOAA/NCEP/CFP) and is part of the project of NOAA/MAPP.**

**References**

