

GLDAS-2 Land Surface Model Data and Data Services at NASA GES DISC

GLDAS-2 Land Surface Model Data and Data Services at NASA GES DISC
Hualan Rui(1,3), C. Loeser(1,3), W. Teng(1,3), G. Lei(1,3), L. Iredell(1,3), J. Wei(1), D. Meyer(1), H. Beaudoin(2,4), and M. Rodell(2)
(1)NASA/GSFC/GES DISC, (2)NASA/GSFC/HSL, (3)ADNET Systems, Inc., (4)ESSIC University of Maryland

Introduction
The goal of the NASA Global Land Data Assimilation System (GLDAS) is to generate optimal fields of land surface states and fluxes by integrating satellite and ground-based observational data products, using advanced land surface modeling and data assimilation techniques (Rodell et al., 2004). The GLDAS data sets currently archived at and distributed by the NASA Global Land Surface Data and Information Services Center (GLDISC, <http://glads.gsfc.nasa.gov>) in GLDAS Version 2 (GLDAS-2). It consists of a series of output fields from the coupled land-atmosphere (L2) and land-atmosphere-ocean (L3) models, including the GLDAS-2.1.2 Land Surface Model (LSM) and the GLDAS-2.1.2 Land Surface Model (LSM) and the GLDAS-2.1.2 Land Surface Model (LSM).

GLDAS-2 Variables and Soil Layers
GLDAS-2 provides continuous meteorological forcing variables and model output land surface fields. GLDAS-2 soil moisture and soil temperature data are available for several different soil layers. GLDAS-2 soil layers are used in the Land Surface Model.

GLDAS-2 Climatology and Anomaly
GLDAS-2.0 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.1 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.2 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.3 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.4 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.5 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.6 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.7 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.8 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.9 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.10 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.11 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.12 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.13 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.14 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.15 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.16 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.17 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.18 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.19 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.20 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.21 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.22 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.23 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.24 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.25 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.26 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.27 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.28 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.29 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.30 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.31 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.32 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.33 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.34 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.35 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.36 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.37 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.38 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.39 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.40 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.41 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.42 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.43 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.44 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.45 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.46 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.47 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.48 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.49 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.50 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.51 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.52 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.53 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.54 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.55 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.56 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.57 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.58 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.59 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.60 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.61 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.62 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.63 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.64 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.65 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.66 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.67 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.68 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.69 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.70 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.71 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.72 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.73 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.74 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.75 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.76 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.77 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.78 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.79 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.80 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.81 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.82 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.83 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.84 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.85 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.86 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.87 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.88 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.89 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.90 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.91 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.92 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.93 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.94 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.95 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.96 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.97 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.98 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.99 provides 67 years (1948 – 2014) of chronologically consistent global land surface data. GLDAS-2.100 provides 67 years (1948 – 2014) of chronologically consistent global land surface data.

GLDAS-2 Data Products
GLDAS-2 currently has 18 data products from the Catchment, 10-day, and 10-day Land Surface Model (LSM) at 0.25 degree and 1.0 degree spatial resolution, and 3 hourly daily and monthly temporal resolutions, as listed in Table 3.

Summary
GLDAS-2 has three components: GLDAS-2.0, GLDAS-2.1, and GLDAS-2.2. The main difference between them are the forcing data sets and temporal coverage. GLDAS-2.0 has 18 data products provided by Catchment P2.1, 10-day, and 10-day LSMs, and 10-day, and 1.0 degree spatial resolution, and 3 hourly daily and monthly temporal resolutions. GLDAS-2.1 is same to GLDAS-2.0, but uses the GLDAS-2.1.2 Land Surface Model (LSM) instead of the Catchment P2.1, 10-day, and 10-day LSMs. GLDAS-2.2 is same to GLDAS-2.1, but uses the GLDAS-2.2.1 Land Surface Model (LSM) instead of the Catchment P2.1, 10-day, and 10-day LSMs.

Hualan Rui(1,3), C. Loeser(1,3), W. Teng(1,3), G. Lei(1,3), L. Iredell(1,3), J. Wei(1), D. Meyer(1), H. Beaudoin(2,4), and M. Rodell(2)

(1)NASA/GSFC/GES DISC, (2)NASA/GSFC/HSL, (3)ADNET Systems, Inc., (4)ESSIC University of Maryland



PRESENTED AT:



INTRODUCTION

The goal of the NASA Global Land Data Assimilation System (GLDAS, <https://ldas.gsfc.nasa.gov/gldas>) (<https://ldas.gsfc.nasa.gov/gldas>) is to generate optimal fields of land surface states and fluxes by ingesting satellite- and ground-based observational data products, using advanced land surface modeling and data assimilation techniques (Rodell et al., 2004). The GLDAS data sets currently archived at, and distributed by, the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC, <https://disc.gsfc.nasa.gov/> (<https://disc.gsfc.nasa.gov/>)) is GLDAS Version 2 (GLDAS-2). It contains a series of output fields from the upgraded Noah-3.6, Catchment-F2.5, and VIC-4.1.2 Land Surface Models (LSMs) in the Land Information System (LIS-V7, <https://lis.gsfc.nasa.gov/> (<https://lis.gsfc.nasa.gov/>)).

GLDAS-2 has three components: GLDAS-2.0, GLDAS-2.1, and GLDAS-2.2. The main differences between them are the meteorological forcing data sets and temporal coverages (Table 1).

Component	Meteorological Forcing Data	Temporal Coverage
GLDAS-2.0	Global meteorological forcing dataset v2.2 from Princeton University	Jan 1948 – Dec 2014
GLDAS-2.1	Combined forcing data, including the GPCP v1.3	Jan 2000 – Present
GLDAS-2.2	Meteorological analysis fields from the operational Medium-Range Weather Forecasts (ECMWF) -Integrated Forecasting System (IFS)	Feb 2003 – Present

Table 1. GLDAS-2 meteorological forcing data sets and their respective temporal coverages.

GLDAS-2 DATA PRODUCTS

GLDAS-2 currently has 18 data products from the Catchment, Noah, and VIC Land Surface Models (LSMs), at 0.25-degree and 1.0-degree spatial resolutions, and 3-hourly, daily, and monthly temporal resolutions, as listed in Table 2.

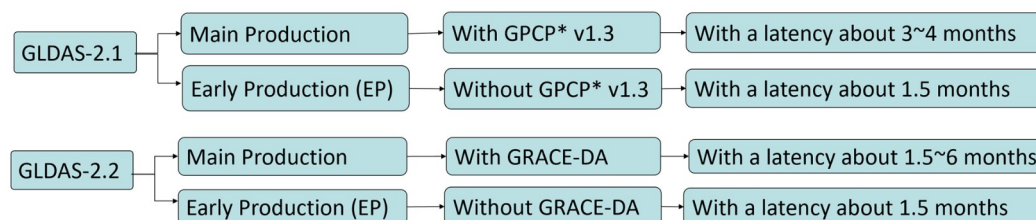
Component	LSM	Temporal Resolution	Spatial Resolution	Update
GLDAS-2.0	CLSM-F2.5	Daily	0.25° x 0.25°	New to GLDAS, released in Mar 2018
		3-hourly	1.0° x 1.0°	New to GLDAS, released in Oct 2020
		Monthly		
	Noah-3.6	3-hourly	0.25° x 0.25°	Reprocessed in Nov 2019 and date range extended from Dec 2012 to Dec 2014
		Monthly		
		3-hourly	1.0° x 1.0°	
	VIC-4.1.2	3-hourly		1.0° x 1.0°
		Monthly		
GLDAS-2.1	CLSM-F2.5	3-hourly	1.0° x 1.0°	New to GLDAS, released in Oct 2020
		Monthly		
	Noah-3.6	3-hourly	0.25° x 0.25°	Reprocessed in Jan 2020, to replace GLDAS-001 Noah products
		Monthly		
		3-hourly	1.0° x 1.0°	
	VIC-4.1.2	3-hourly		1.0° x 1.0°
		Monthly		
GLDAS-2.2	CLSM-F2.5	Daily	0.25° x 0.25°	New to GLDAS, released in Feb 2020

Table 2. GLDAS -2 data products listed by land surface model, temporal resolution, and spatial resolution.

What is New

- GLDAS-2.2 uses data assimilation (DA), whereas GLDAS-2.0 and GLDAS-2.1 are “open-loop” (i.e., no data assimilation). The current GLDAS-2.2 product includes Gravity Recovery and Climate Experiment (GRACE) and GRACE Follow On (GRACE-FO) Data Assimilation.
- All GLDAS-2 Noah model products were reprocessed with upgraded model and upgraded forcing data.
- All 3-hourly and monthly GLDAS-2 products were post-processed in Oct 2020 to mask out the data over inland water, for all the model output variables (the forcing variables remained unchanged).
- All GLDAS CLSM data products are new to the GLDAS-2 data collections.

GLDAS-2 production streams and the data latencies



*GPCP: Global Precipitation Climatology Project

GLDAS-2 VARIABLES AND SOIL LAYERS

GLDAS-2 products contain meteorological forcing variables and model output land surface fields.

GLDAS-2 soil moisture and soil temperature data are available for several different soil layers.

GLDAS-2 soil layers vary with Land Surface Model.

Table 3

Table 4

Type	Variable	Unit	LSM	M/T	Soil Layer
Meteorological Forcing	Wind speed	m/s	CLSM-F2.5	SoilMoi	Surface (0-2 cm)
	Total precipitation rate	kg/m ² /s			Rootzone (0 -100 cm)
	Near surface air temperature	K			Profile (varies)
	Near surface specific humidity	kg/kg		SoiTMP	0-10 cm
	Surface pressure	Pa			10-29 cm
	Downward short-wave radiation flux	W/m ²			29-68 cm
	Downward long-wave radiation flux	W/m ²			68-144 cm
Land Surface Model (LSM) Output	Energy Balance	Net short-wave radiation flux			144-295 cm
		Net long-wave radiation flux			295-1295 cm
		Latent heat flux		Noah-3.6	SoilMoi
		Sensible heat flux			0-10 cm
		Ground heat flux			10-40 cm
	Water Balance	Rain rate			40-100 cm
		Snow rate			100-200 cm
		Evaporation		VIC-4.1.2	SoilMoi
		Transpiration			0-30 cm
		Evapotranspiration			VIC soil layer 2
		Surface runoff			VIC soil layer 3
		Baseflow runoff		VIC-4.1.2	SoiTMP
		Snow melt			0-30 cm
	State	Surface temperature			VIC soil layer 2
		Albedo			VIC soil layer 3
		Snow depth water equivalent			
		Soil moisture			
		Soil temperature			
		Terrestrial Water Storage (TWS)			
		Ground Water Storage (GWS)			

Table 3. GLDAS-2 variables (left)

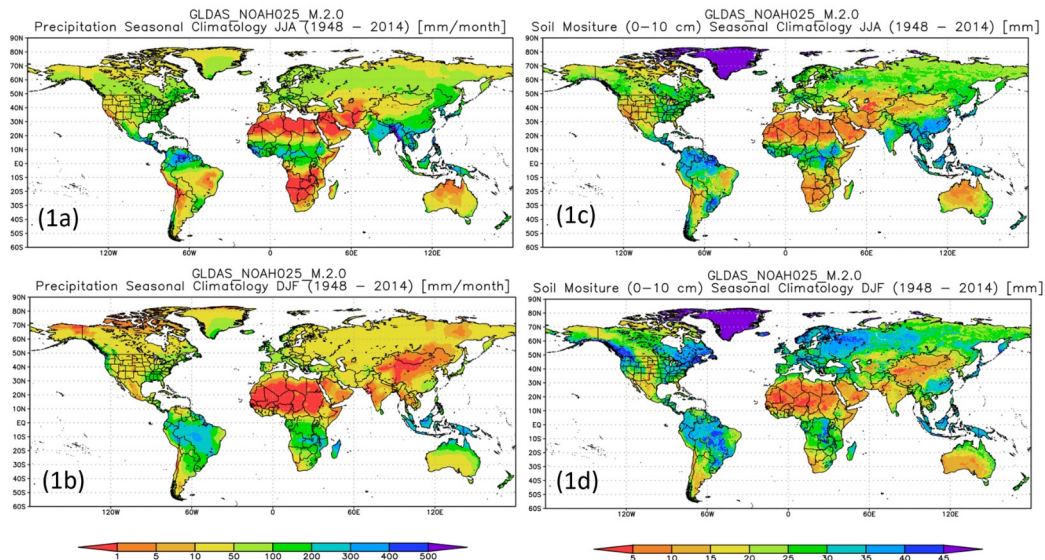
Table 4. GLDAS soil layers (right)

- TWS is available in all CLSM products.
- GWS is available in GLDAS-2.0 and GLDAS-2.2 daily CLSM products.
- All forcing and forcing-related variables are excluded in GLDAS-2.2 Catchment-LSM, due to a data agreement with ECMWF*.

*ECMWF: European Centre for Medium-Range Weather Forecasts

GLDAS-2 CLIMATOLOGY AND ANOMALY

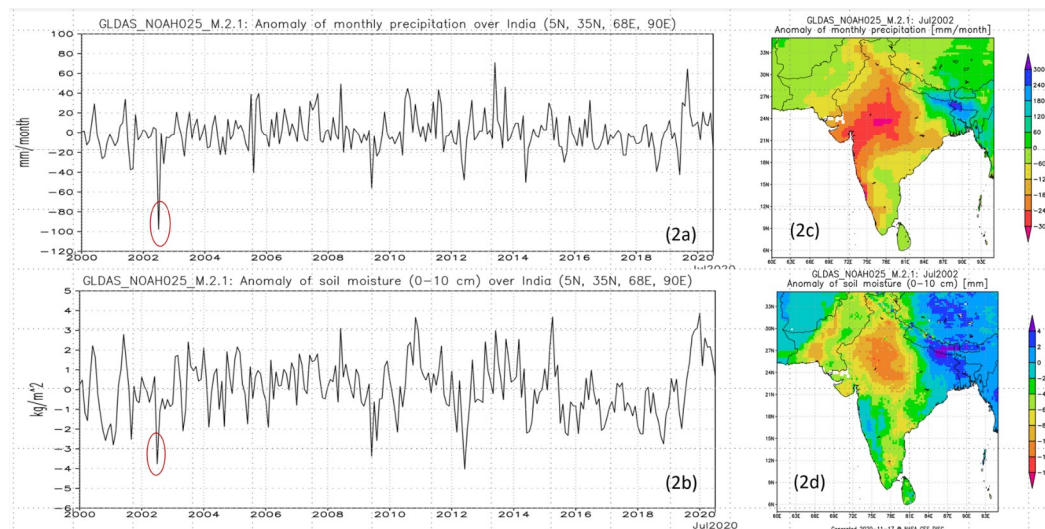
GLDAS-2.0 provides 67 years (1948 – 2014) of climatologically consistent global land surface data



Figs 1a & 1b. GLDAS-2.0 precipitation seasonal climatology (1948 - 2014) of June, July, and August (JJA, 1a) and December, January, and February (DJF, 1b).

Figs 1c & 1d. GLDAS-2.0 soil moisture (0-10 cm) seasonal climatology (1948 - 2014) of June, July, and August (JJA, 1c) and December, January, and February (DJF, 1d).

Indian drought of 2002 viewed by GLDAS-2.1 global precipitation and soil moisture anomalies



Figs 2a & 2b. Time series of GLDAS-2.1 monthly precipitation anomaly (2a) and soil moisture (0 – 10cm) anomaly (2b) over India (5N, 35N, 68E, 95E) from January 2000 to July 2020, with a maximum negative anomaly in July 2002.

Figs 2c & 2d. Occurrence of a major drought over India is shown in GLDAS-2.1 as large negative anomalies of precipitation (2c) and soil moisture (2d) in July 2002.

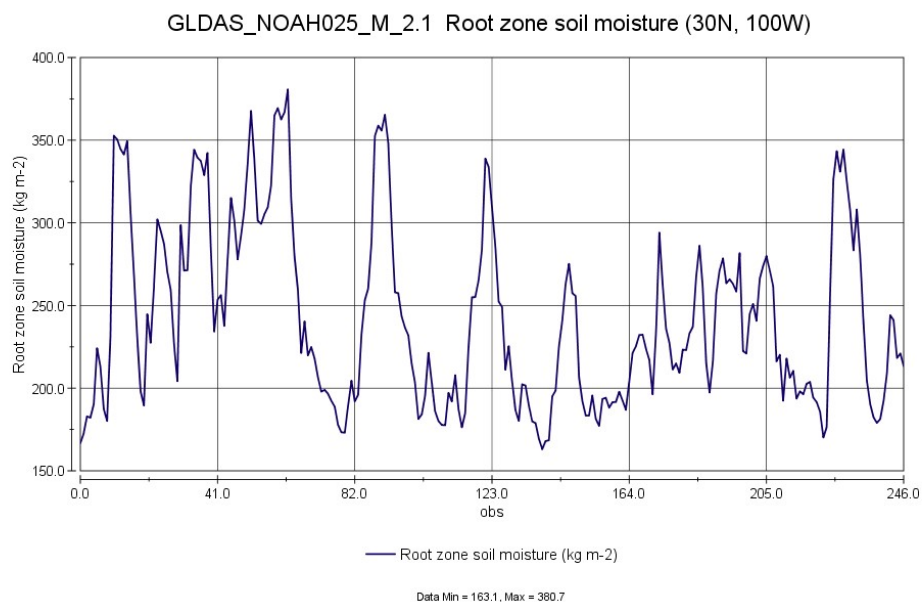
GLDAS-2 DATA SERVICES

[NEW] GLDAS-2 Data Time-aggregation in THREDDS Data Server (TDS)

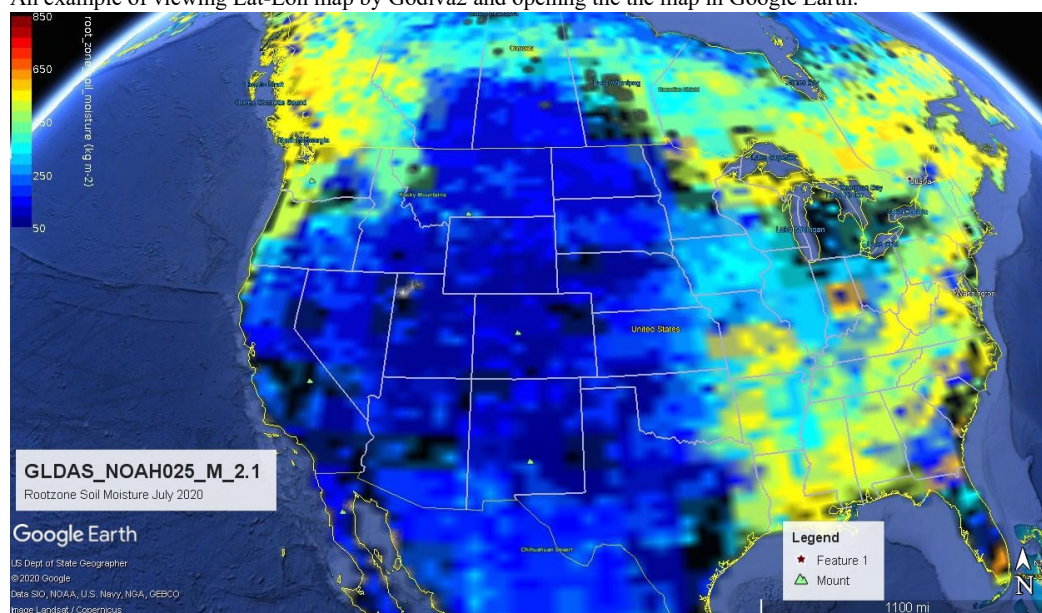
(https://hydro1.gesdisc.eosdis.nasa.gov/thredds/catalog/GLDAS_aggregation/catalog.html)

- 3-hourly data: Aggregated to one NetCDF Markup Language (NcML) file per year per product
- Monthly data: Aggregated to one NcML file per product
- **NetcdfSubset** provides two subsetting options:
 - NCSS for Grids : Subset over a bounding box
 - Grid as Point Data set: Subset to a single point time series
- **Godiva2** (browser-based):
 - View Lat-Lon map
 - Download the image in KMZ then open in Google Earth

An example of the spatial subsetting to a single grid point time series, plotted by Panoply.



An example of viewing Lat-Lon map by Godiva2 and opening the the map in Google Earth.



GLDAS Data Product Landing Pages (<https://disc.gsfc.nasa.gov>)

/datasets?keywords=GLDAS) list all the GLDAS-2 products, along with their available data services

- **HTTPS** (<https://hydro1.gesdisc.eosdis.nasa.gov/data/GLDAS/>): A server that enables users to navigate by data product & date/time and download the data via HTTPS.
- **EarthData Search** (<https://search.earthdata.nasa.gov/search?q=GLDAS>): A search system providing the only means for data discovery, filtering, visualization, and access across all of NASA's Earth science data holdings.
- **Subset & Regrid** (<https://disc.gsfc.nasa.gov/datasets?keywords=GLDAS>): A Web server providing subsetting and regridding services and allowing users to download data in various data formats.
- **OPeNDAP** (<https://hydro1.gesdisc.eosdis.nasa.gov/opepdap/GLDAS/contents.html>): A framework that simplifies all aspects of scientific data networking and provides subsetting service and downloading in various formats.
- **GrADS Data Server (GDS)** (<https://hydro1.gesdisc.eosdis.nasa.gov/dods/>): A data server that provides subsetting and analysis services across the Internet.
- **THREDDS Data Server (TDS)** (<https://hydro1.gesdisc.eosdis.nasa.gov/thredds/catalog/GLDAS/catalog.html>): A Web server that provides metadata and data access for scientific data sets, using OPeNDAP, OGC WMS and WCS, HTTPS, and other remote data access protocols.
- **Giovanni** (https://giovanni.gsfc.nasa.gov/giovanni/#service=TmAvMp&starttime=&endtime=&dataKeyword=GLDAS_NOAH025_M_2.1): A Web-based tool enabling users to interactively visualize and analyze data.
- **Data Rods** (<https://disc.gsfc.nasa.gov/information/tools?title=Hydrology%20Data%20Rods>): A Web service that provides access to view and download long time series of a single grid data point.

SUMMARY

- GLDAS-2 has three components: GLDAS-2.0, GLDAS-2.1, and GLDAS-2.2. The main differences between them are the forcing data sets and temporal coverages.
- GLDAS-2 has 18 main products simulated by Catchment-F2.5, Noah-3.6, and VIC-4.1.2 LSMs, at 0.25-degree and 1.0-degree spatial resolutions, and 3-hourly, daily, and monthly temporal resolutions.
- GLDAS-2.2 is new to GLDAS-2, and uses data assimilation (DA, currently GRACE-DA), whereas the GLDAS-2.0 and GLDAS-2.1 are “open-loop” (i.e., no data assimilation).
- GLDAS-2 Noah model products were reprocessed with upgraded model and upgraded forcing data; CLSM and VIC products are new to GLDAS-2.
- All 3-hourly and monthly GLDAS-2 products were post-processed in Oct 2020 to mask out the invalid model data over inland water.
- GLDAS-2 data are archived at the GES DISC and can be accessed through multiple methods from the Data Product Landing pages <https://disc.gsfc.nasa.gov/datasets?keywords=GLDAS> (<https://disc.gsfc.nasa.gov/datasets?keywords=GLDAS>).

AUTHOR INFORMATION

Hualan Rui^{1,3}, C. Loeser^{1,3}, W. Teng^{1,3}, G. Lei^{1,3}, L. Iredell^{1,3}, J. Wei¹, D. Meyer¹, H. Beaudoin^{2,4}, and M. Rodell²

¹NASA/GSFC/GES DISC, ²NASA/GSFC/HSL, ³ADNET Systems, Inc., ⁴ESSIC University of Maryland

Hualan.Rui@nasa.gov

ABSTRACT

The goal of the NASA Global Land Data Assimilation System (GLDAS, <https://ldas.gsfc.nasa.gov/gldas> (<https://ldas.gsfc.nasa.gov/gldas>)) is to generate optimal fields of land surface states and fluxes by ingesting satellite- and ground-based observational data products, using advanced land surface modeling and data assimilation techniques (Rodell et al., 2004). The GLDAS dataset currently archived at and distributed by the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC, <https://disc.gsfc.nasa.gov/> (<https://disc.gsfc.nasa.gov/>)) is GLDAS Version 2 (GLDAS-2). It contains a series of output fields from the upgraded Noah-3.6, Catchment-F2.5, and VIC-4.1.2 Land Surface Models (LSMs) in the Land Information System (LIS-V7, <https://lis.gsfc.nasa.gov/> (<https://lis.gsfc.nasa.gov/>)). GLDAS-2 has three components: GLDAS-2.0, GLDAS-2.1, and GLDAS-2.2. GLDAS-2.0 is forced entirely with the upgraded Princeton Meteorological Forcing V2.2 Dataset and provides a temporally consistent series from 1948 through 2014. GLDAS-2.1 is forced with a combination of model and observation data, with data spanning from 2000 to the present. The GLDAS-2.2 product suite uses data assimilation (DA), whereas the GLDAS-2.0 and GLDAS-2.1 products are "open-loop" (i.e., no data assimilation). The choice of forcing data, as well as DA observation source, variable, and scheme, varies for different GLDAS-2.2 products. The currently available GLDAS-2.2 data contain a daily 0.25-degree output from the Catchment-F2.5 LSM in LIS-V7. The data are forced with the meteorological analysis fields from the operational European Centre for Medium-Range Weather Forecasts Integrated Forecasting System (ECMWF-IFS) and assimilated with GRACE and GRACE-FO data, ranging from February 1, 2003 to the present. The current GLDAS-2.0 and 2.1 Noah LSM data were reprocessed in November 2019 and January 2020 respectively and their data from Catchment and VIC LSMs are new to the GLDAS-2 collection. This presentation provides a summary of the GLDAS-2 data products, their land surface fields, and their related data services at the GES DISC; and a description of the major GLDAS-2 climatological characteristics as well as the intercomparison with the data of the previous version.