

Overview of Global Land Data Assimilation (GLDAS)

Runoff Data

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Learning Objectives

- Describe Global Land Data Assimilation System (GLDAS)
- Access GLDAS Runoff Data

Rationale: Why use GLDAS for Runoff?

- Surface Runoff cannot be measured directly
- Stream gauges can measure volume of water passing through a water channel or river and can provide estimate of runoff in the channel but **non-infiltrated surface runoff can only be calculated from water balance**
- Models such as GLDAS provide estimate of runoff along with other surface water components



Outline

- Land Data Assimilation System
- GLDAS Runoff Data

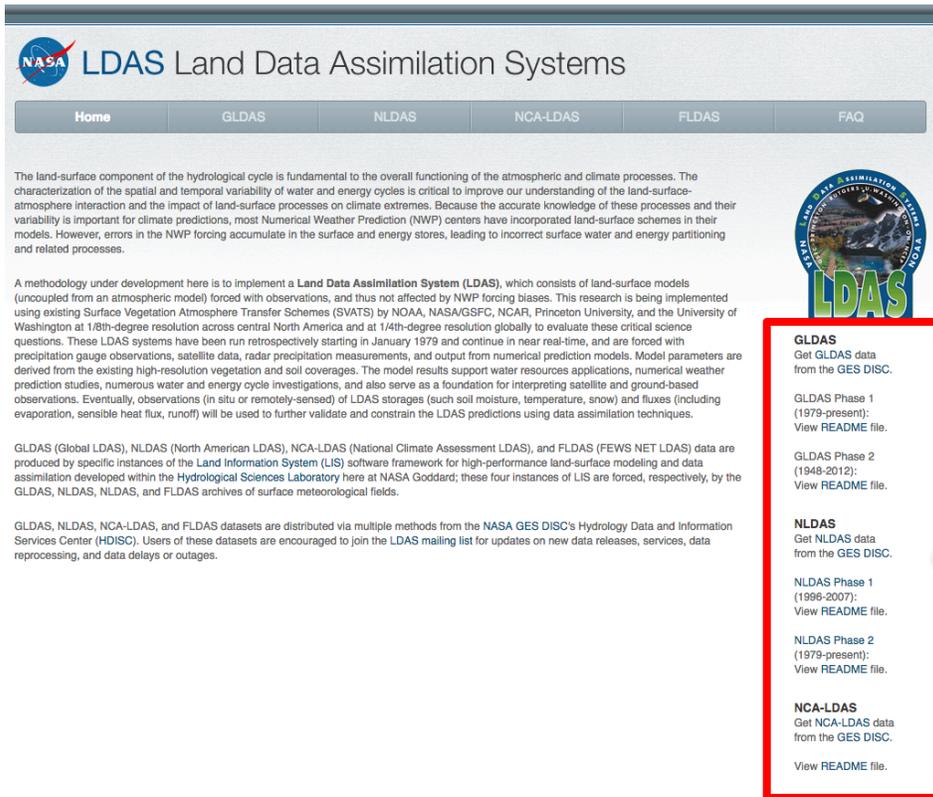




Land Data Assimilation System (GLDAS)

What is the Land Data Assimilation System?

- Integrates satellite and ground observations within sophisticated numerical models with water and energy balance
- <http://ldas.gsfc.nasa.gov>



The screenshot shows the NASA LDAS website. At the top, there is a NASA logo and the text "LDAS Land Data Assimilation Systems". Below this is a navigation bar with tabs for "Home", "GLDAS", "NLDAS", "NCA-LDAS", "FLDAS", and "FAQ". The main content area contains introductory text about the land-surface component of the hydrological cycle and the LDAS system. A red box highlights a sidebar menu with the following items:

- GLDAS**
Get GLDAS data from the HDISC.
- GLDAS Phase 1 (1979-present):
View README file.
- GLDAS Phase 2 (1948-2012):
View README file.
- NLDAS**
Get NLDAS data from the GES DISC.
- NLDAS Phase 1 (1996-2007):
View README file.
- NLDAS Phase 2 (1979-present):
View README file.
- NCA-LDAS**
Get NCA-LDAS data from the GES DISC.
View README file.

GLDAS

Get **GLDAS** data from the **HDISC**:
via **FTP** (**GLDAS-1** and **GLDAS-2**);
via **GDS**.

GLDAS Phase 1
(1979-present)
View **README** file.

GLDAS Phase 2
(1948-2012)
View **README** file.

NLDAS

Get **NLDAS** data from the **HDISC**:
via **FTP**; via **GDS**.

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

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

FLDAS

Get **FLDAS** data from the **HDISC**:
via **FTP**; via the **GES DISC**;
View **README** file.



About GLDAS

<http://ldas.gsfc.nasa.gov/gldas/>

- Four land surface model versions: Noah, CLM2, Mosaic, and VIC

Inputs

- Rainfall: TRMM and multi-satellite based data
- Meteorological Data: global reanalysis and observation-based data from Princeton University
- Vegetation Mask, Land/Water Mask, Leaf Area Index: MODIS (GLDAS-2)
- Cloud and Snow (for surface radiation): NOAA and DMSP Satellites

Integrated Outputs

- Soil Moisture
- Evapotranspiration
- Surface/Sub-Surface Runoff
- Snow Water Equivalent



GLDAS Data Access

Model	Spatial/Temporal Resolution	Data Source
GLDAS (NOAH)	<ul style="list-style-type: none">• 1/4th – 1 degree (global)• 3 hour, monthly• 1948-2010	Giovanni http://giovanni.gsfc.nasa.gov/giovanni
NOAH (v2.1)	<ul style="list-style-type: none">• 2000 - present	
VIC	<ul style="list-style-type: none">• 1979 - present	

Original data files are in GRIB format



Search, Select, and Download Runoff Data from Giovanni

<http://giovanni.gsfc.nasa.gov/giovanni/>

The screenshot shows the Giovanni web interface with several key sections highlighted by red boxes and arrows:

- Select Plot:** A row of radio buttons for "Maps: Time Averaged Map", "Comparisons: Select...", "Vertical: Select...", "Time Series: Select...", and "Miscellaneous: Select...". An arrow points to this section with the text "Analysis & Plot Options".
- Select Date Range (UTC):** A date and time selection interface with a "Valid Range: 1948-01-01 to 2017-11-09" label. An arrow points to this section with the text "Temporal & Spatial Search".
- Select Region (Bounding Box or Shape):** A text input field for region selection with a "Format: West, South, East, North" label. An arrow points to this section with the text "Map & shapefile selection countries & U.S. states".
- Select Variables:** A list of variables under "Disciplines" and "Measurements" categories. A red box highlights the "Number of matching Variables: 0 of 1760" and "Total Variable(s) included in Plot: 0" status, with a "Keyword:" search field below it. An arrow points to this box with the text "Search data by keyword".
- Plot Data:** A large green button at the bottom right, highlighted by a red box. An arrow points to it with the text "Plot Data".



Runoff Data

Number of matching Variables: 10 of 1760 Total Variable(s) included in Plot: 0
 Please select at least 1 variable

Keyword : Search Clear

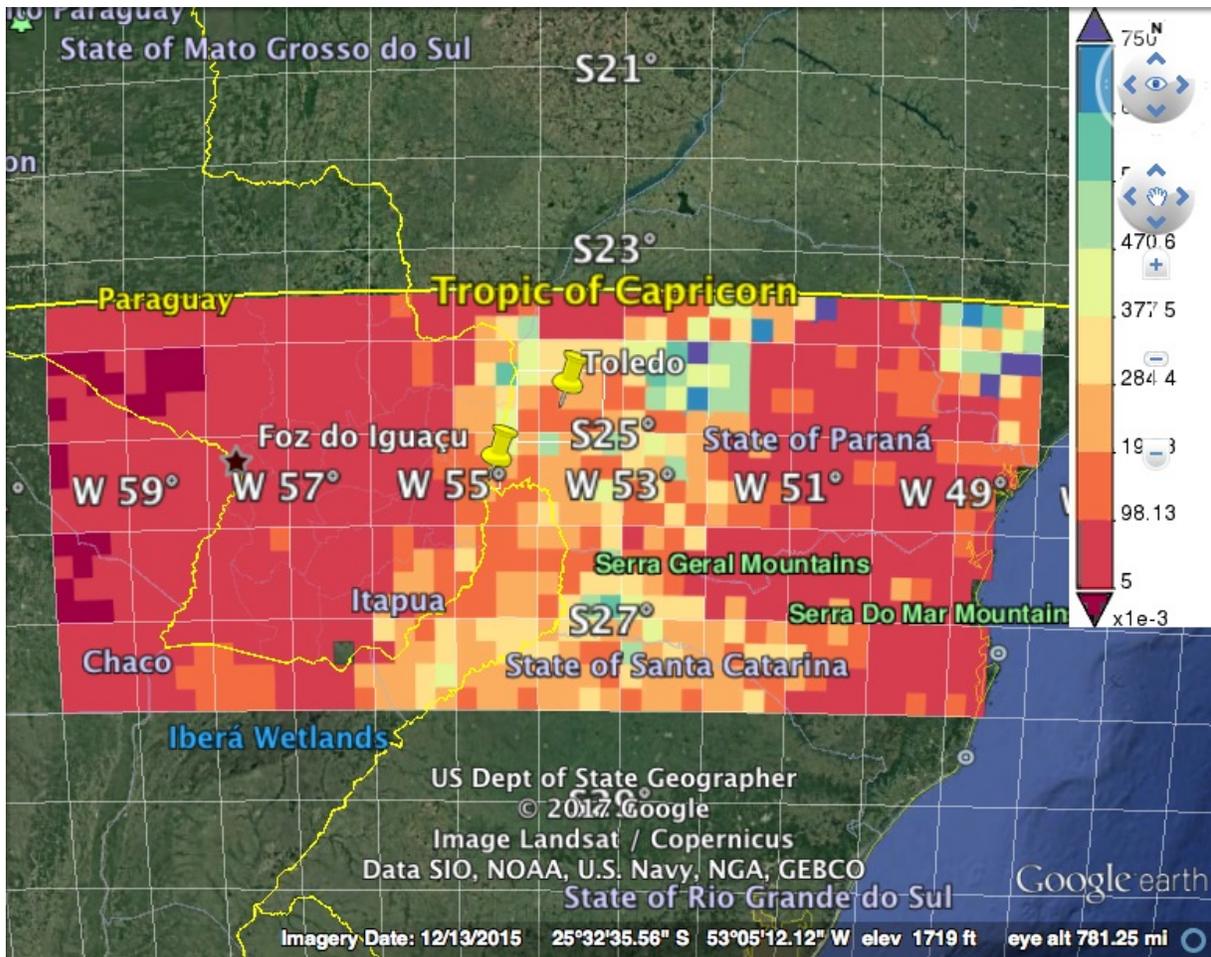
	Variable	Source	Temp.Res.	Spat.Res.	Begin Date	End Date	Units
<input type="checkbox"/>	Baseflow-groundwater runoff (GLDAS_NOAH10_M.v2.0)	GLDAS Model	Monthly	1 °	1948-01-01	2010-12-31	kg m-2
<input type="checkbox"/>	Storm surface runoff (GLDAS_NOAH10_M.v2.0)	GLDAS Model	Monthly	1 °	1948-01-01	2010-12-31	kg m-2
<input type="checkbox"/>	Storm surface runoff (GLDAS_NOAH025_M.v2.0)	GLDAS Model	Monthly	0.25 °	1948-01-01	2010-12-31	kg m-2
<input type="checkbox"/>	Baseflow-groundwater runoff (GLDAS_NOAH025_M.v2.0)	GLDAS Model	Monthly	0.25 °	1948-01-01	2010-12-31	kg m-2
<input type="checkbox"/>	Storm surface runoff (GLDAS_NOAH025_M.v2.1)	GLDAS Model	Monthly	0.25 °	2000-01-01	2017-09-30	kg m-2
<input type="checkbox"/>	Baseflow-groundwater runoff (GLDAS_NOAH025_M.v2.1)	GLDAS Model	Monthly	0.25 °	2000-01-01	2017-09-30	kg m-2
<input type="checkbox"/>	Storm surface runoff (GLDAS_NOAH10_M.v2.1)	GLDAS Model	Monthly	1 °	2000-01-01	2017-09-30	kg m-2
<input type="checkbox"/>	Baseflow-groundwater runoff (GLDAS_NOAH10_M.v2.1)	GLDAS Model	Monthly	1 °	2000-01-01	2017-09-30	kg m-2
<input type="checkbox"/>	Baseflow-groundwater runoff (GLDAS_NOAH025_3H.v2.0)	GLDAS Model	3-hourly	0.25 °	1948-01-01	2010-12-31	kg m-2
<input type="checkbox"/>	Storm surface runoff (GLDAS_NOAH025_3H.v2.0)	GLDAS Model	3-hourly	0.25 °	1948-01-01	2010-12-31	kg m-2

- Available from GLDAS Noah v2.1
- Storm surface runoff is available at monthly and hourly time scales, at 0.25° and 1° resolution

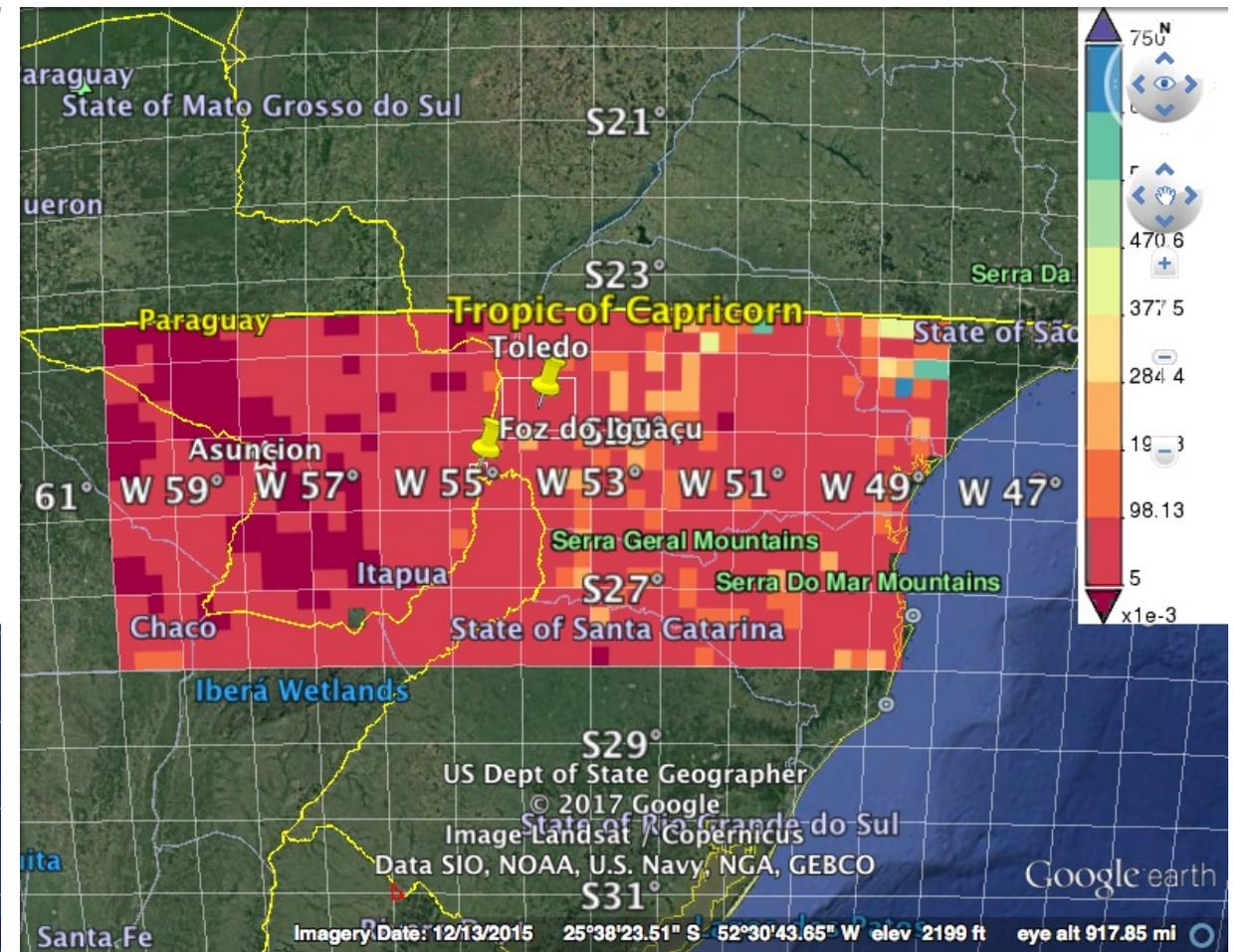


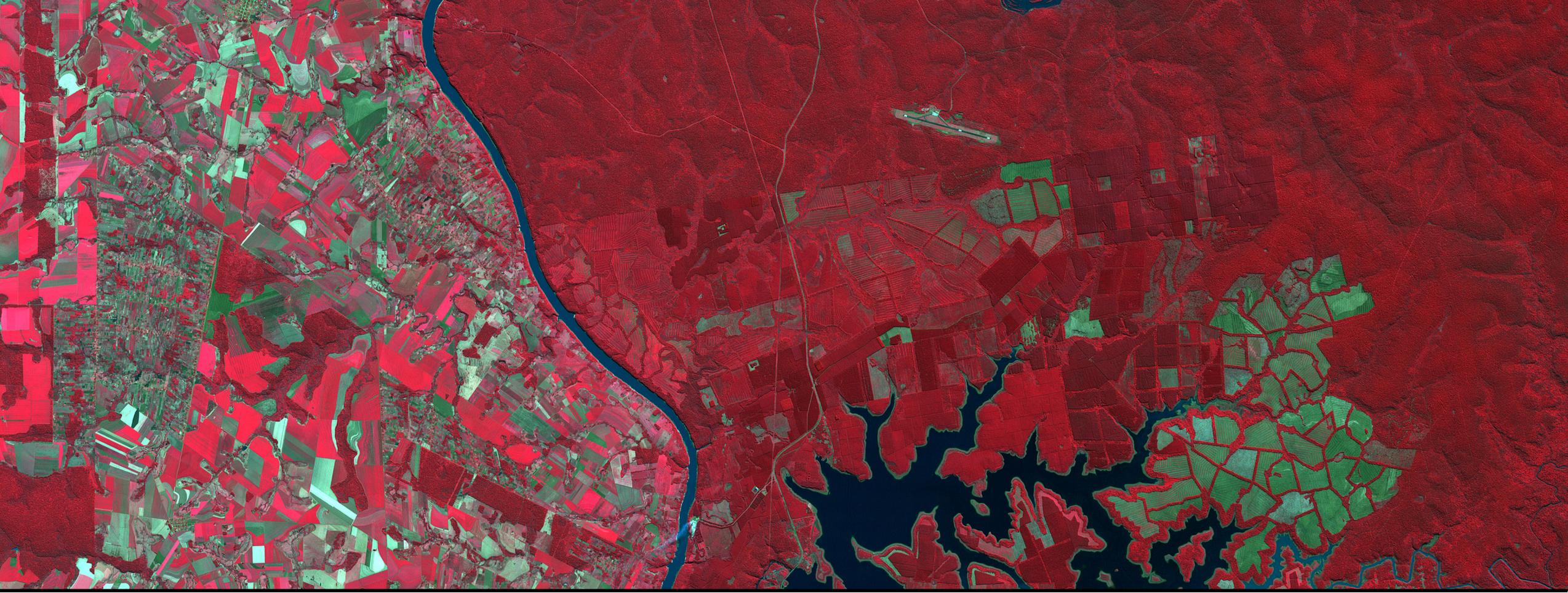
Runoff Over Parana

DJF 2016



DJF 2017





Next: Download Seasonal
Runoff Using Giovanni