



NASA GES DISC's Data and Services

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NASA GES DISC

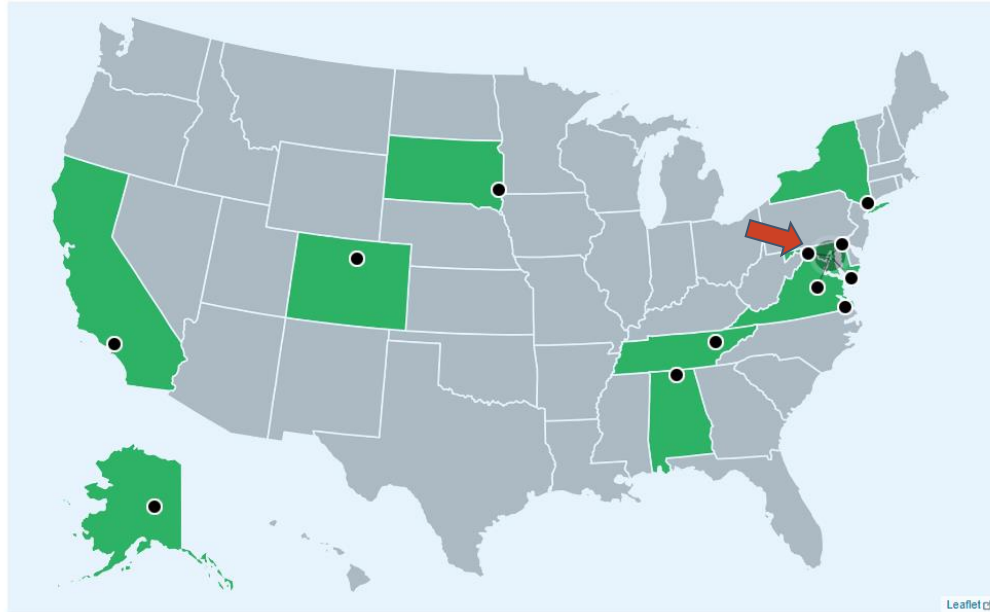
Department of Infrastructure Engineering

University of Melbourne

- Introduction to GES DISC (Distributed Active Archive Center- DAAC)
- Data Holding and Application areas
- Tools and services
- Resources for User



12 NASA Distributed Active Archive Centers (DAACs)





The GES DISC: Who We Are

The Goddard Earth Sciences Data and Information Services Center (GES DISC) is one of the 12 **NASA Distributed Active Archive Centers (DAACs)** that manages, archives and distributes data as part of NASA's Earth Observation Systems Data and Information System (EOSDIS). We provide the support for the **archive and distribution** of the data from a range of **satellite observations, models, ground measurements, and field campaigns**.

- Archives total volume > **3.4 Petabytes** consisting of >**150 million data files** covering >**3000 public and restricted collections**.
- Multi-disciplinary data holdings include observations and model data of:
 - atmospheric composition**
 - water/energy cycles**
 - climate variability**
- Through various available tools and services, the GES DISC provides users with **multi-sensor and model visual comparisons** and data access for a number of **projects spanning several disciplines**. <https://disc.gsfc.nasa.gov>



GESDISC



GES DISC data holdings

1400+ data collections being curated

Atmospheric composition missions:

- Nimbus 1-7* BUV, SBUV, TOMS
- Shuttle SBUV*
- UARS*
- Aqua AIRS
- Aura HIRDLS*, OMI, MLS
- ACOS*
- SNPP Sounder, OMPS
- JPSS-1 Sounder, OMPS
- OCO-2/3
- Copernicus Sentinel 5P
- TOVS Pathfinder*

Water cycle/precipitation missions:

- TRMM*
- GPM
- SMERGE
- TROPICS

* end-of-mission/project

Climate variability/solar missions:

- SORCE
- TCTE
- TSIS
- CAR

Model data:

- MERRA*/MERRA-2
- NLDAS, GLDAS, FLDAS, NCA-LDAS

Research-derived data:

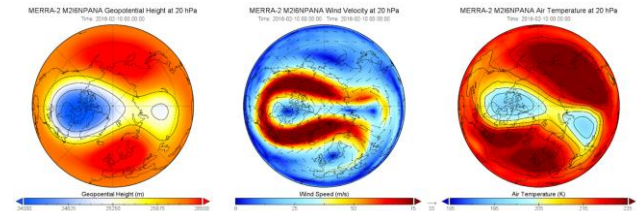
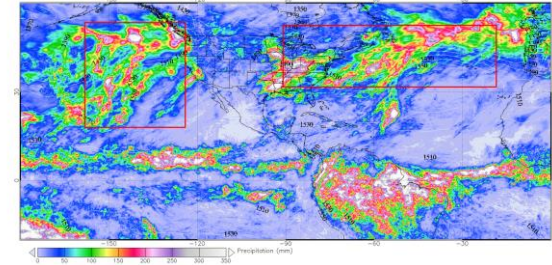
- MEaSUREs
- Carbon Monitoring System

Near-real time:

- AIRS
- MLS

Recent/future assigned missions:

- GeoCarb
- JPSS-2



polar vortex from MERRA-2



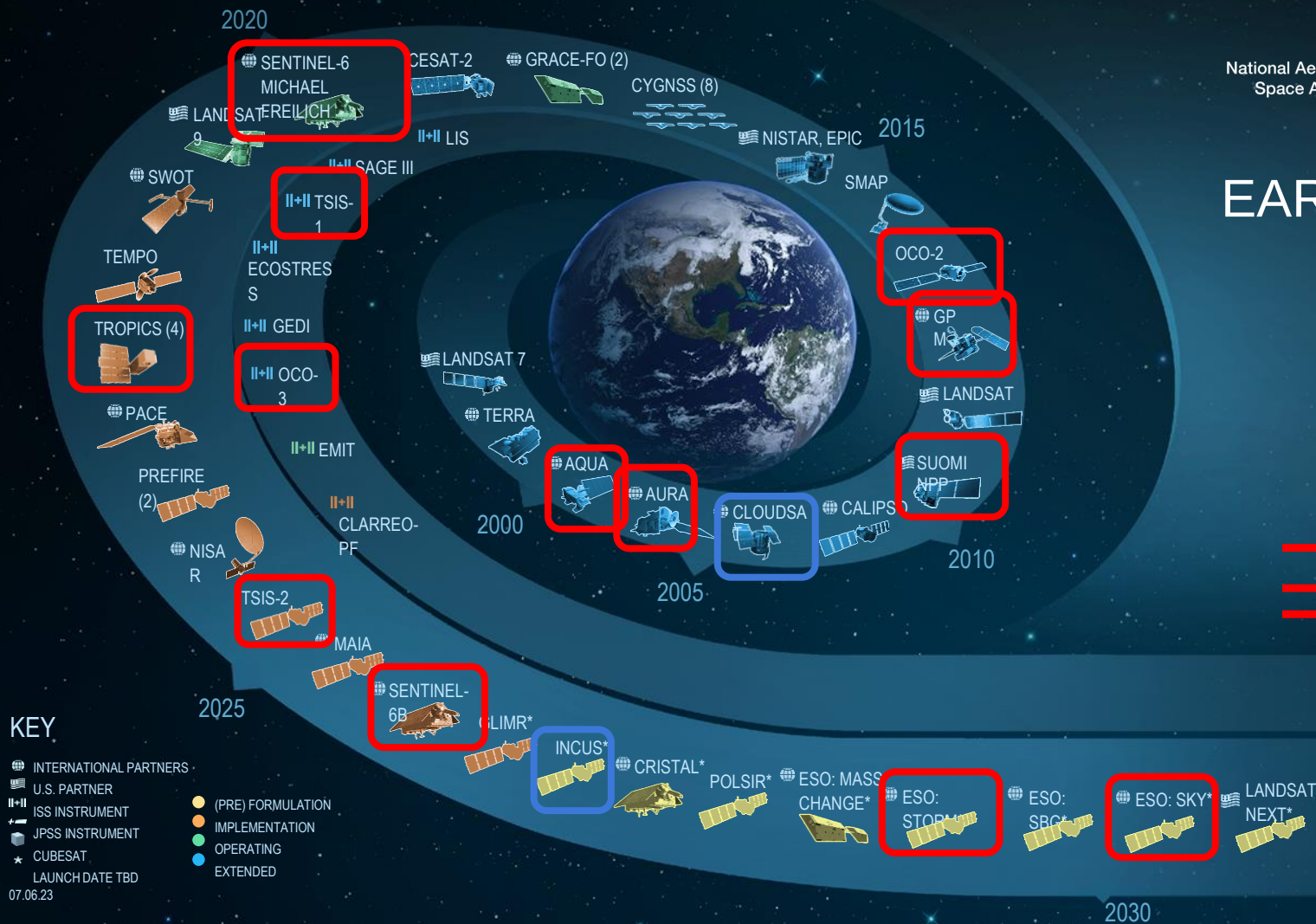
GESDISC

INVEST/CUBESATS

JPSS INSTRUMENTS

ISS INSTRUMENTS

MISSIONS



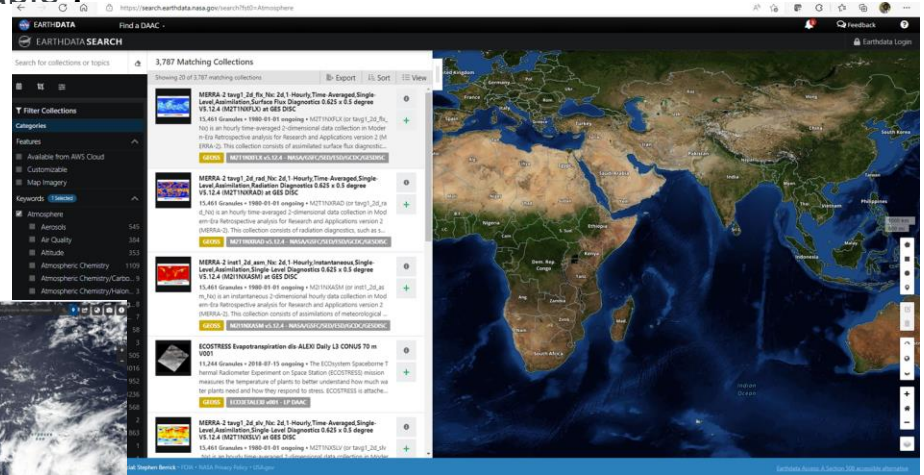


I need Data for my Research. Where do I get started?

All the NASA Earth Science data is publicly available!

- 1) Earthdata search
- 2) Worldview- visualization
- 3) [Data Pathfinders](#)
- 4) Individual Data Center (DAAC webpage)

Search By: Events, Layers and Data



[Earthdata Search \(nasa.gov\)](https://search.earthdata.nasa.gov)
<https://search.earthdata.nasa.gov/search>
[Source code](#)

NASA [Worldview](https://worldview.earthdata.nasa.gov/) <https://worldview.earthdata.nasa.gov/>



GESDISC

[Earthdata Search FAQ](https://www.earthdata.nasa.gov/faq)
<https://www.earthdata.nasa.gov/faq>

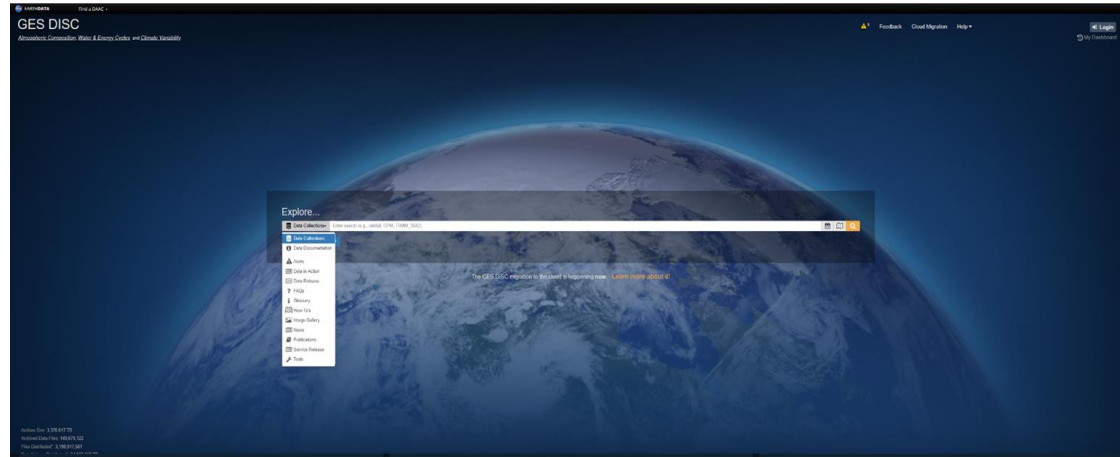


GES DISC- Home Page

[GES DISC](https://disc.gsfc.nasa.gov/)- <https://disc.gsfc.nasa.gov/>

We provide:

- Data and Documentation
- Tools and Services
- Publications
- Resources for users
 - News articles
 - Data-in- Action
 - How-To guides/Jupyter Notebooks
 - FAQs
 - Cloud resources



GESDISC



Keyword Search “Rainfall”

GES DISC Data Collections

Find a Data Collection

Atmospheric Composition, Water & Energy Cycles, and Climate Variability

Keyword Search

Refine your search

Want to focus your search?

Keywords to your search (e.g., surface precipitation)

Dataset #	Source #	Version #	Time Res. #	Spatial Res. #	Process Level #	Begin Date #	End Date #
TRMM (TMPA) Rainfall Estimate L3 1 month 0.25 degree x 0.25 degree V7 (TRMM_3B43 7)	Models TMPA	7	1 month	0.25° x 0.25°	3	1998-01-01	2019-12-31
TRMM (TMPA) Precipitation L3 1 day 0.25 degree x 0.25 degree V7 (TRMM_3B42_Daily 7)	Models TMPA	7	1 day	0.25° x 0.25°	3	1998-01-01	2019-12-31
GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 (GPM_3IMERGHH 06)	Models IMERG	06	1 day	0.1° x 0.1°	3	2000-08-01	2021-08-30
TRMM (TMPA) Rainfall Estimate L3 3 hour 0.25 degree x 0.25 degree V7 (TRMM_3B42 7)	Models TMPA	7	3 hours	0.25° x 0.25°	3	1997-12-31	2019-12-31
GPM IMERG Final Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHH 06)	Models IMERG	06	30 minutes	0.1° x 0.1°	3	2000-08-01	2021-09-30
TRMM (TMPA-RT) Near Real-Time Precipitation L3 1 day 0.25 degree x 0.25 degree V7 (TRMM_3B42RT_Daily 7)	Models TMPA	7	1 day	0.25° x 0.25°	3	2000-03-01	2020-01-01
MERRA-2 (avg1_hr_Bx_Nx) 2d 1-hourly Time-Averaged Single-Level Assesment Surface Flux Diagnostics V5.12.4 (M2T1HX1X 5.12.4)	The second Modern-Era Retrospective analysis for Research and Applications NOT APPLICABLE	5.12.4	1 hour	0.5° x 0.625°	4	1980-01-01	2022-04-30

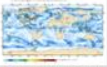


Dataset and Documentation

Back to search results

Global Precipitation Measurement

GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 (GPM_3IMERGDF)



View Full-Size Image

The Integrated Multi-satellite Retrievals for GPM (IMERG) is the unified U.S. algorithm that provides the multi-satellite precipitation product for the U.S. GPM team. Version 06 is the current version of the data set. Older versions will no longer be available and have been superseded by Version 06.

This dataset is the GPM Level 3 IMERG "Final" Daily 10 x 10 km (GPM_3IMERGDF) derived from the half-hourly GPM_3IMERGHH. The derived result represents the final estimate of the Daily accumulated precipitation. The dataset is produced at the NASA Goddard Earth Sciences (GES) Data and Information Services Center (DISC) by simply summing the valid precipitation retrievals for the day in GPM_3IMERGHH and giving the result in (mm).

The latency of the derived "Final" Daily product depends on the delivery of the IMERG "Final" Half-Hourly produ... [more](#)

Product Summary

Data Citation

Documentation

References

Data Calendar

Shortname: GPM_3IMERGDF

Longname: GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06

DOL: 10.5067/GPM/IMERGDF-DAY06

Version: 06

Format: netCDF

Spatial Coverage: -180 0 -90 0 180 0 90 0

Temporal Coverage: 2000-06-01 to 2021-06-30

File Size: 12 MB per file

Data Resolution

Spatial: 0.1° x 0.1°

Temporal: 1 day

Science Focus Areas

Atmospheric Composition

Water & Energy Cycles

Climate Variability

Tools

GISSnet

Data Tools for Hydrology

DOViz

AMS MNT Views

DISC Web Map Service

OPENCOP and GES

News

General

Data Release

Service Release

Alerts

Resources

Earthdata Forum

How To

Data in Action

Publications

Glossary

FAQ

Gallery

About Us

Who We Are

Citing Our Data

Contact Us

User Working Group

Site Version: v1.6.4.5 | NASA Official: Lang Pham | Web Curator: M. Heagle | Web Privacy Policy

Data access methods

Data Access

[Online Archive](#)

[Earthdata Search](#)

[Overviews](#)

[Web Services](#)

[Subset / Get Data](#)

Documentation, Publication, Product Summary

[GES DISC Dataset: GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 \(GPM_3IMERGDF 06\)](#)

GESDISC



Linking Data to Journal Publications

Enabling Open Science

Global Precipitation Measurement

GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 (GPM_3IMERGDF)

 The Integrated Multi-satellite Retrievals for GPM (IMERG) is the unified U.S. algorithm that provides the multi-satellite precipitation product for the U.S. GPM team. Version 06 is the current version of the data set. Older versions will no longer be available and have been superseded by Version 06. This dataset is the GPM Level 3 IMERG "Final" Daily 15 x 15 km (GPM_3IMERGDF) derived from the half-hourly GPM_3IMERGHH. The derived result represents the final estimate of the Daily accumulated precipitation. The dataset is produced at the NASA Goddard Earth Sciences (GES) Data and Information Services Center (DISC) by simply summing the valid precipitation retrievals for the day in GPM_3IMERGHH and giving the result in mm. The latency of the derived "Final" Daily product depends on the delivery of the IMERG "Final" Half-Hourly prod...[more](#)

[View Full-page Image](#)

[Data Access](#)

- [Online Archive](#)
- [Earthdata Search](#)
- [Oroquest](#)
- [Web Services](#)
- [Subset / Get Data](#)

[Download as Raster](#)

[Product Summary](#) [Data Citation](#) [Documentation](#) [References](#) [Data Calendar](#)

Data Collection References

2020

GLOBAL PRECIPITATION MEASUREMENT PRECIPITATION PROCESSING SYSTEM: File Specification. 2020. URL: <https://ghrsws2.gpm.nasa.gov/pub/GPM/impwpc/Filespec/GPM.pdf>

[Related Data Collections \(221\)](#)

2011

Joyce, Robert J., Xie, Pingqiang. 2011. Kalman Filter-Based CMORPH. J. Hydrometeorol., Vol. 12, No. 6, pp. 1547-1563. DOI: 10.1175/JHM-D-11-022.1 ISSN: 1525-755X, 1525-7541

[Related Data Collections \(7\)](#)

2004

Hong, Yang, Hsu, Kuo Lin, Sonosekhan, Sonosekhan, Chai, Xiangqiang. 2004. Precipitation Estimation from Remotely Sensed Imagery Using an Artificial Neural Network Cloud Classification System. J. Appl. Meteor., Vol. 43, No. 12, pp. 1834-1863. DOI: 10.1175/JAM2173.1 ISSN: 0894-6763

[Related Data Collections \(7\)](#)

Related Publications

Disclaimer: The majority of publications using GES DISC data do NOT include the data version of. As such, publications below may not use the most recent processing version of the data.

2022

Heuvelink, Aesthianika, Lou, Yueshi. 2022. Influence of major typhoons on ocean, atmosphere and air quality of Northwest Pacific during August 2020. Atmospheric Environment, Vol. 271, pp. 118623. DOI: 10.1016/j.atmosenv.2021.118623. ISSN: 1362-2310

[Related Data Collections \(4\)](#)

2021

Chen, Yongzhe, Feng, Xiaomeng, Fu, Bojie. 2021. An improved global remote-sensing-based surface soil moisture (RSSSM) dataset covering 2003-2018. Vol. 13, No. 1, pp. 1-31. DOI: 10.5194/essd-13-1-2021. ISSN: 1866-3508

[Related Data Collections \(1\)](#)

[GES DISC Dataset: GPM IMERG Final Precipitation L3 1 day 0.1 degree x 0.1 degree V06 \(GPM_3IMERGDF 06\)](#)



Studying the Flood Modes

What characteristics of the data, and which variables, are useful for studying each of the flood modes?





Seasonal Flooding

Temporal resolution

Monthly, Daily

Areal coverage

*Regional to
continental scale*

Time period

Annual to decadal

Source	Product Name	Variable name	Resolution	Coverage
MERRA-2	M2SMNXEDI	Extreme precipitation indices for flood (RX5Day, RX1Day, R99p, R95p, R90p, CWD)	Monthly, 0.625x0.5 deg	1980.01 - global
MERRA-2	M2TMNXFLX	Total precipitation (PRECTOTCORR)	Monthly, 0.625x0.5 deg	1980.01 - global
IMERG	GPM_3IMERGM	precipitation, randomError	Monthly, 0.1 deg.	2000.06 - Global
GPCP	GPCPMON	combined satellite-gauge precipitation, combined satellite-gauge precipitation random error	Monthly, 0.5 deg.	1983.01 - Global
NLDAS	NLDAS_NOAH0125_M_2.0	Frozen precipitation, Liquid precipitation (rainfall), Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths), Root zone soil moisture, Potential Evapotranspiration, Evaporation, Streamflow	Monthly, 0.125 deg.	1979.01 – North America
NLDAS	NLDAS_MOS0125_M_2.0	Frozen precipitation, Liquid precipitation, Total evapotranspiration, Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths), Transpiration, Evaporation, Streamflow	Monthly, 0.125 deg.	1979.01 – North America
NLDAS	NLDAS_VIC0125_M_2.0	Frozen precipitation, liquid precipitation, Total evapotranspiration, Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths), Root zone soil moisture, Transpiration, Streamflow	Monthly, 0.125 deg	1979.01 – North America
GLDAS	GLDAS_CLSM10_M_2.1	Total precipitation rate, Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Root zone soil moisture, Surface soil moisture, Transpiration	Monthly, 1.0 degree	2000.01 - Global
GLDAS	GLDAS_NOAH025_M_2.1 GLDAS_NOAH10_M_2.1	Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Soil moisture (various depths), Evaporation, Transpiration, Total precipitation rate, Root zone soil moisture	Monthly, 0.25 degree, 1.0 degree	2000.01 - Global
GLDAS	GLDAS_VIC10_M_2.1	Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Soil moisture (various depths), Transpiration, Evaporation, Root zone soil moisture, Total precipitation rate	Monthly, 1.0 degree	2000.01 - Global



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Coastal Flooding

Temporal resolution

Daily

Areal coverage:

Regional to local scale

Time period:

Annual, monthly

(annual / decadal for trend analysis)

Source	Product Name	Variable name	Resolution	Coverage
MERRA-2	M2SDNXSLV	Maximum precipitation rate during the period (TPRECMAX)	Daily, 0.625x0.5 deg	1980.01 - global
IMERG	GPM_3IMERGDF	precipitationCal, randomError	Daily, 0.1 deg	2000.06- global
IMERG	GPM_3IMERGDE	precipitationCal, randomError	Daily, 0.1 deg.	2000.06 - Global
IMERG	GPM_3IMERGDL	precipitationCal, randomError	Daily, 0.1 deg	2000.06 - Global
GPCP	GPCPDAY	combined satellite-gauge precipitation, combined satellite-gauge precipitation random error	Daily, 0.5 deg.	1983.01 - Global
GLDAS	GLDAS_CLSM025_DA1_D_2.2	Evaporation, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Soil moisture, Transpiration	Daily, 0.25 degree	2000.01 - Global



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Flash Flooding

Temporal resolution:

Daily, 3-hourly, hourly

Areal coverage:

Watershed and local scale

Time period:

*Monthly, daily
(annual/decadal for trend analysis)*

Source	Product Name	Variable name	Resolution	Coverage
MERRA-2	M2T1NXFLX	Total precipitation (PRECTOTCORR)	Hourly,.625x 0.5 deg	1980.01 - global
IMERG	GPM_3IMERGHH	precipitationCal, randomError	Half-hourly, 0.1 deg.	2000.06 - Global
IMERG	GPM_3IMERGHHE	precipitationCal, randomError	Half-hourly, 0.1 deg.	2000.06 - Global
IMERG	GPM_3IMERGHHL	precipitationCal, randomError	Half-hourly, 0.1 deg	2000.06 - Global
NLDAS	NLDAS_NOAH0125_H_2.0	Frozen precipitation, Liquid precipitation (rainfall), Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths), Root zone soil moisture, Potential Evapotranspiration, Evaporation, Streamflow	Hourly, 0.125 deg.	1979.01 – North America
NLDAS	NLDAS_MOS0125_H_2.0	Frozen precipitation, Liquid precipitation, Total evapotranspiration, Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths),Transpiration, Evaporation, Streamflow	Hourly, 0.125 deg.	1979.01 – North America
NLDAS	NLDAS_VIC0125_H_2.0	Frozen precipitation, liquid precipitation, Total evapotranspiration, Surface runoff, Subsurface runoff, Snowmelt, Snow depth, Soil moisture (various depths), Root zone soil moisture, Transpiration, Streamflow	Hourly, 0.125 deg	1979.01 – North America
GLDAS	GLDAS_CLSM10_3H_2.1	Total precipitation rate, Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Root zone soil moisture, Surface soil moisture, Transpiration	3-Hourly, 1.0 degree	2000.01 - Global
GLDAS	GLDAS_NOAH025_3H_2.1 GLDAS_NOAH10_3H_2.1	Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Soil moisture (various depths), Evaporation, Transpiration, Total precipitation rate, Root zone soil moisture	3-Hourly, 0.25 degree, 1.0 degree	2000.01 - Global
GLDAS	GLDAS_VIC10_3H_2.1	Snow precipitation rate, Rain precipitation rate, Evapotranspiration, Storm surface runoff, Baseflow-groundwater runoff, Snow melt, Snow depth, Soil moisture (various depths), Transpiration, Evaporation, Root zone soil moisture, Total precipitation rate	3-Hourly, 1.0 degree	2000.01 - Global



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Data Access
Methods:
https, subsetting
services



GESDISC



GIS Service

- Image Service : [GES DISC ArcGIS Enterprise](#)
 - IMERG Early and Final Image services
 - Access to a large amount of data without the user needing to store and process the data
 - Quickly open, view, and analyze data
 - Temporal Span- June 1, 2000-Present
- Themed web maps, web apps and story maps from [Earthdata GIS data pathfinder](#)
 - [Drought](#)
 - [Monitoring Flood](#)
 - [Observing Tropical Storms](#)
 - [Cyclone Amphan \(arcgis.com\)](#)
 - [Post Assessment of Hurricane Dorian in the Bahamas](#)
 - Water Levels in reservoir
 - [Lake Victoria Rising Water Levels - Overview](#)



Home Gallery Map Scene Groups Content Organization

GES DISC ArcGIS Enterprise

Featured Maps and Apps

GPM IMERG Early Precipitation Rate Web Map

GPM IMERG Early Precipitation Rate

GPM IMERG Early Precipitation Rate (WMS)

GPM IMERG Early Precipitation Rate Web App

Welcome to the Goddard Earth Science Data and Information Services Center GIS home page! Currently we offer content for the Integrated Multi-satellite Retrievals for Global Precipitation Measurement (IMERG) Early product. Feel free to browse the gallery or content tabs or follow the links below directly to the services and web maps we provide.

GPM IMERG Early Web map

Image Service Landing Page

Direct Image Service Link

Monitoring Drought using NASA Earth Observation Data

August 28, 2021

Drought is a period when precipitation levels are below normal, resulting in water-related problems, such as reduced soil moisture and groundwater. This reduction in water availability is detrimental to vegetation health, contributing to general evaporative stress in plants and a lack of water for irrigation. This in turn leads to slowed crop growth, severe crop damage and possibly food insecurity. Drought can also cause a general water shortage needed for human health, energy production, and many other aspects of society.

Evaporative stress, precipitation, soil moisture, plant greenness, changes in vegetation, and population layers are all available in the app in Figure 1. Analysis of these datasets provides a means to monitor in near real time the conditions that lead up to and result from drought, as well as how humans may be affected. The layers in the Drought Web App are NASA global datasets; more detailed descriptions of each layer are provided below.

Drought Web App with ArcGIS mobile

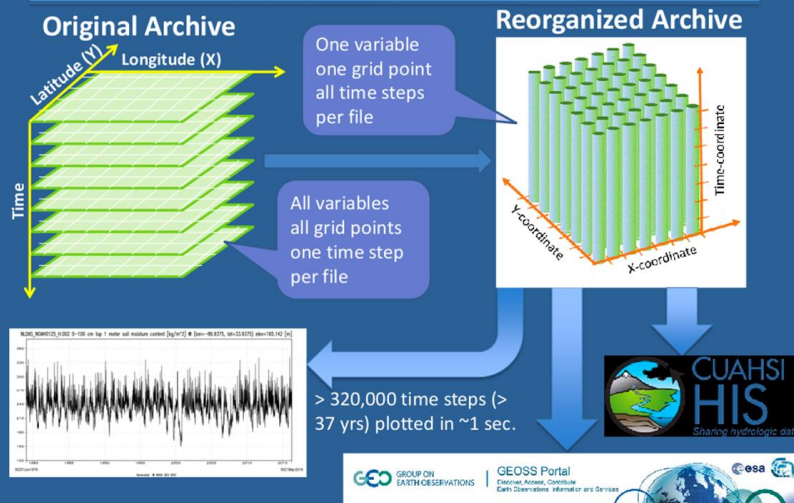


GESDISC



Hydrology Data Rods / Single Point Time Series

Data Rods: Reorganizing Data for Optimal Access



GLDAS Noah Land Surface Model L4 3 hourly 0.25 x 0.25 degree V2.1 (GLDAS_NOAH025_3H)

*GLDAS version 2.1 data products have been reprocessed (as of January 31, 2020). After consultation with the GLDAS scientist and data producer, we are temporarily maintaining the access to the existing GLDAS_NOAH025_3H_2.1 data rods files. Once the data rods files for the reprocessed GLDAS version 2.1 have been generated, they will replace these existing files. In the interim, please be aware that, though these GLDAS version 2.1 data rods files were derived from the pre-reprocessed GLDAS 2.1 data, the data accessible via the [GLDAS 2.1 landing page](#) are of the recently reprocessed GLDAS 2.1 version.

**** UPDATE (4/22/20, Earth Day) -** We have begun regenerating the data rods files for the reprocessed GLDAS version 2.1. We expect this process to take 1-2 months and will update this message when all the data rods files have been regenerated.

***** UPDATE (5/18/20) -** We have finished regenerating the GLDAS 2.1 data rods to use the reprocessed GLDAS 2.1 data. All GLDAS 2.1 access points at the GES DISC are now providing the same version.

Qsb_acc	Baseflow-groundwater runoff	kg/m ²	plot	asc2
Rainf_f_tavg	Total precipitation rate	kg/m ² /s	plot	asc2
Rainf_tavg	Rain precipitation rate	kg/m ² /s	plot	asc2
RootMoist_inst	Root zone soil moisture	kg/m ²	plot	asc2
Snowf_tavg	Snow precipitation rate	kg/m ² /s	plot	asc2
SoilMoi0_10cm_inst	Soil moisture content (0-10 cm underground)	kg/m ²	plot	asc2
SoilMoi10_40cm_inst	Soil moisture content (10-40 cm underground)	kg/m ²	plot	asc2
SoilMoi40_100cm_inst	Soil moisture content (40-100 cm underground)	kg/m ²	plot	asc2
SoilMoi100_200cm_inst	Soil moisture content (100-200 cm)	kg/m ²	plot	asc2

API (specify time, location, variables)



Extract time series (ASCII)



Data Analysis (matplotlib, pandas)

GIOVANNI The Bridge Between Data and Science v 4.37

Feedback Help Log out (jimacker)

Removal of Product LPRM_AMSRE_D_RZSM3_001 on June 27, 2022 ... [1 of 1 messages] [Read More](#)

Select Plot
Time Averaged Map

Select Date Range (UTC)
YYYY - MM - dd 00 : 00 to YYYY - MM - dd 23 : 59
Valid Range: 1948-01-01 to 2022-06-02

Select Region (Bounding Box or Shape)
-180, -90, 180, 90

Select Variables
▼ Observations
☐ Model (1878)
☐ Observation (951)
▼ Disciplines
☐ Aerosols (295)
☐ Atmospheric Chemistry (281)
☐ Atmospheric Dynamics (948)
☐ Cryosphere (25)
☐ Hydrology (1105)
☐ Ocean Biology (167)
☐ Oceanography (204)
☐ Water and Energy Cycle (1269)
► Measurements
► Platform / Instrument
► Spatial Resolutions

Number of matching Variables: 0 of 2829 Total Variable(s) included in Plot: 0

Keyword :

Visualization Selection

Time Period Selection

Region-of-Interest Selection

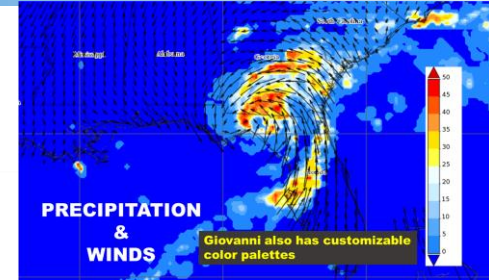
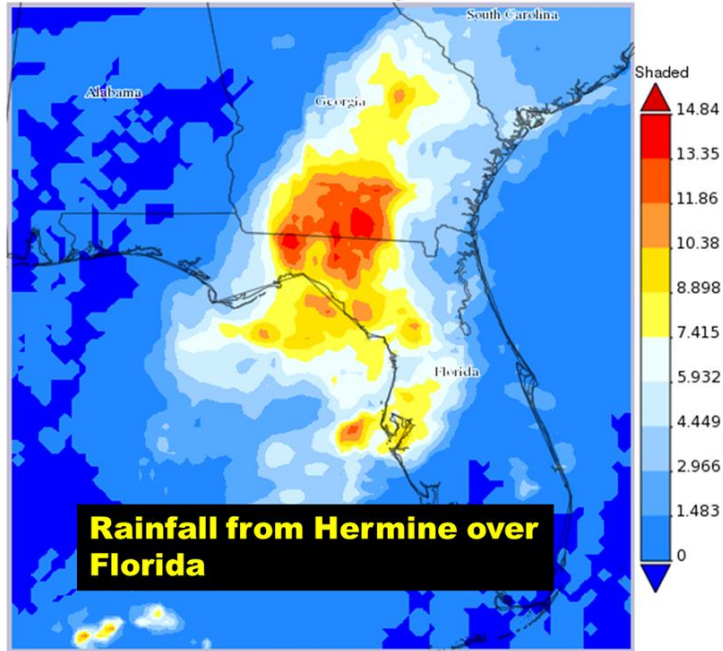
Faceted Search

Keyword Search

 Responsible NASA Official: [Angela Li](#)
Web Curator: [M. Hegde](#)

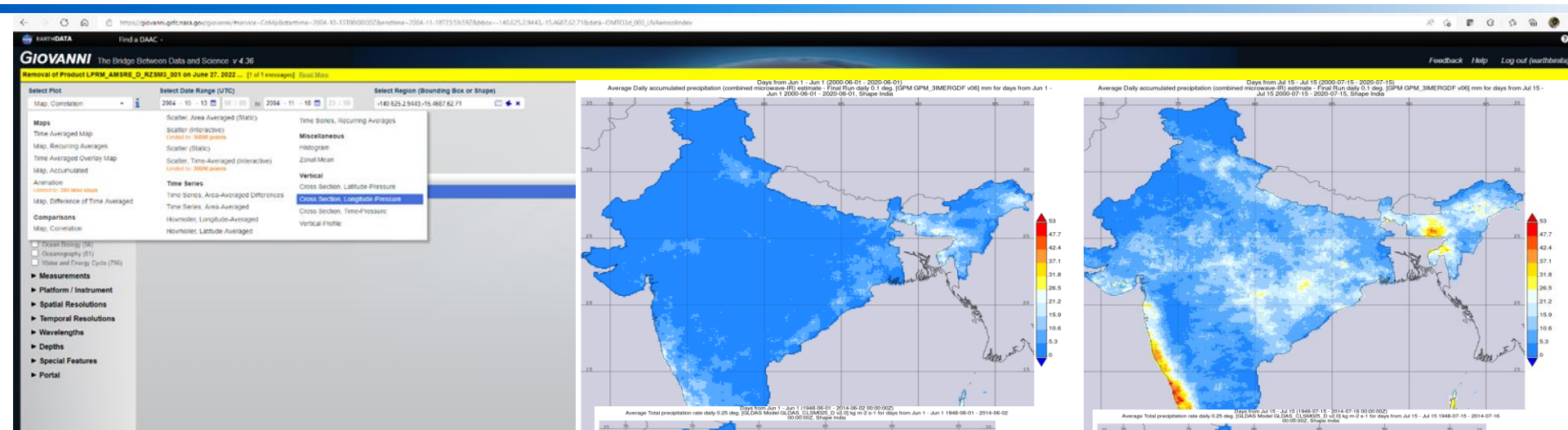
Privacy Powered By ▲ Contact Us

Natural Events





Giovanni- Recurring Time average map and time series



Indian Monsoon Season - Avg. onset date (T.N. Krishnamurti) [monsoon](#) | [meteorology](#) | [Britannica](#)

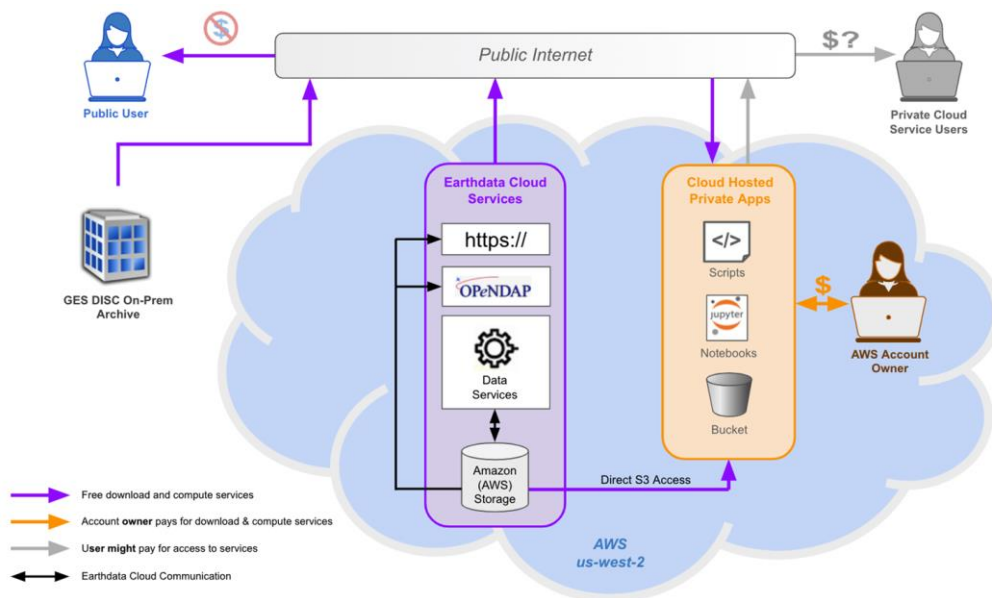
- GLDAS Total precipitation rate (1948 - 2014)
- IMERG Final (2000 - 2020)



GESDISC



Access Data in the Cloud



[GES DISC Documentation: Migrating to the Cloud](#)

How-To

How-To's related to the Earthdata Cloud and the GES DISC are highlighted below.

Getting Set Up

How to Generate Earthdata Prerequisite Files

Overview:

This guide demonstrates how to generate three Earthdata prerequisite files (.netrc, .urs_cookies, .dodsrc) needed to access the GES DISC archives through Python. It uses native Python libraries to generate the files in either Windows/macOS/Linux environments and to place them in their appropriate folders.

How to Retrieve Temporary S3 Credentials for the GES DISC Cloud Archive

[Download the companion Jupyter Notebook](#)

Overview:

This notebook demonstrates how to retrieve GES DISC-specific S3 credentials required for accessing Earthdata directly in the cloud.

Find Cloud-Enabled Data

How To Obtain a List of S3 URLs for a GES DISC Collection Using the GES DISC Website

Overview:

These instructions outline the steps to obtain a list of S3 URLs from a GES DISC collection using the Earthdata Search webpage. Knowing the S3 URL is required to access GES DISC data from the Earthdata Cloud using direct S3 access.

How To Obtain a List of S3 URLs for a GES DISC Collection using Earthdata Search

Overview:

These instructions outline the steps to obtain a list of S3 URLs from a GES DISC collection using the Earthdata Search webpage. Knowing the S3 URL is required to access GES DISC data from the Earthdata Cloud using direct S3 access.

How To Obtain a List of S3 URLs for a GES DISC Collection using the CMR API

Overview:

These instructions outline the steps to obtain a list of S3 URLs from a GES DISC collection using the CMR API. Knowing the S3 URL is required to access GES DISC data from the Earthdata Cloud using direct S3 access.

Access Cloud-Enabled Data

How to Directly Access MERRA-2 Data from an S3 Bucket with Python from a Cloud Environment

[Download the companion Jupyter Notebook](#)

Overview:

This notebook demonstrates how to access and plot a Modern-Era Retrospective analysis for Research and Applications (MERRA-2) M2TNGSLV512.4 file hosted in the GES DISC AWS S3 bucket. It demonstrates how to access an S3 bucket with the S3FS library and then plot sea-level pressure contours of a single file with Cartopy and Matplotlib.



How-To guides (Jupyter Notebooks)

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GES DISC Tutorials

A place to find tutorials on how to use GES DISC tools, services, and data. Most tutorials in this repository take the form of python notebooks. Jupyter notebooks, and is used extensively by the GES DISC team.

Notebook	Summary
How to find the max precipitation value of a Region of Interest (ROI) using an ArcGIS image service (Jupyter Notebook)	There are multiple ways to work with GIS data.

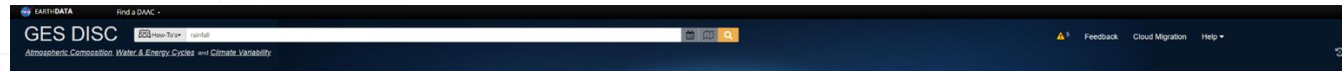
Published on NASA GitHub

[nasa/gesdisc-tutorials \(github.com\)](https://github.com/nasa/gesdisc-tutorials)

<https://doi.org/10.5281/zenodo.8205655>

Working in the cloud

[gesdisc-tutorials/cloud-tutorials](https://gesdisc-tutorials.cloud-tutorials.com)



Back to Home

How to find the max precipitation value of a Region of Interest (ROI) using an ArcGIS image service (Jupyter Notebook)

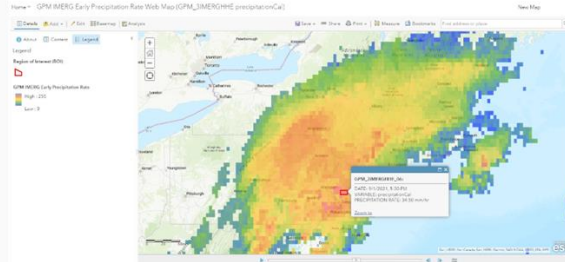
Download the companion Jupyter Notebook

Overview:

The goal of this tutorial is to inform the user on how to find the maximum precipitation rate (mm/hr) using an ArcGIS image service as data input, via a Jupyter Notebook (JN) for a defined Region of Interest (ROI). The ArcGIS image service used in the notebook is the "GPM_3IMERGHH_06 (mapserver)" ArcGIS REST service (Huffman et al., 2016).

Example:

For this example, we are using "GPM 3IMERG Early Precipitation Rate" data as the input to find the max precipitation value of a ROI for a specific time range. The NASA GES DISC ArcGIS Enterprise landing page hosts the mapping interfaces of this data through a web map, web app, Web Mapping Service (WMS), and direct image service link. Hurricane Ida is the weather event determining the time and place for the analysis. The current date and time, and geographic ranges are specifically set in the JN for a ~115 sqkm area in Marvelle, NJ, USA, during the heavy rainfall impacts on the Northeast United States from Hurricane Ida remnants between August 29th, 2021, at 12:00 AM EST and September 3rd, 2021, at 12:00 AM EST, using the GPM_3IMERGHH_06 ArcGIS Image Service as the data source. However, any date and time ranges can be applied by editing the JN code included in this documentation. See Figure 1 below for a visualization of the GPM 3IMERG Web Map when Hurricane Ida's heavy rainfall impacts pass over the ROI on September 1st, 2021, at 5:30 PM EST, at a precipitation rate of 34.50 mm/hr (Huffman et al., 2016), causing major flash flooding in the area.

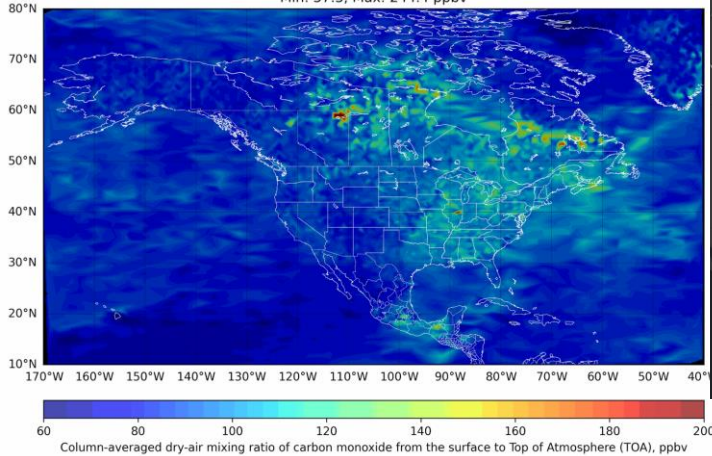


[GES DISC How-To's: How to find the max precipitation value of a Region of Interest \(ROI\) using an ArcGIS image service \(Jupyter Notebook\)](#)

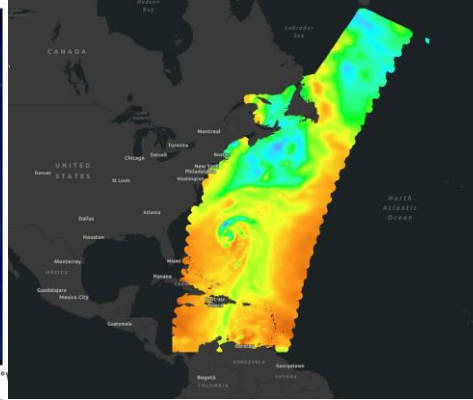


Use Cases- Event specific

TROPES - CrIS JPSS-1 - Carbon Monoxide Column (XCO) - 01-Jun-2023
Min: 57.3, Max: 244.4 ppbv



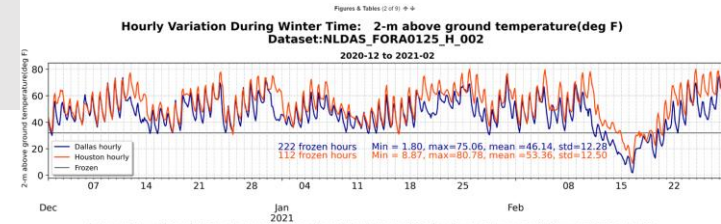
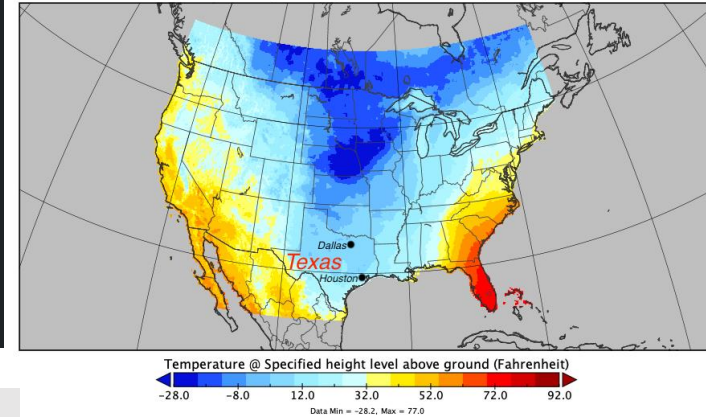
[June 2023 Canada wildfire air pollution event afflicts the United States](#)



[Hurricane Fiona Progression Webmap \(9/14/2022-9/24/2022\) using TROPICS Pathfinder data](#)

Monthly assessment of anomalies and extremes in global surface air temperatures and precipitation in [July/2023](#)

Air Temperature at 2-meter from NLDAS-2 2021-02-16 1:00 AM (Central Time)
NLDAS_FORA0125_H.A20210216.0700.002.grb



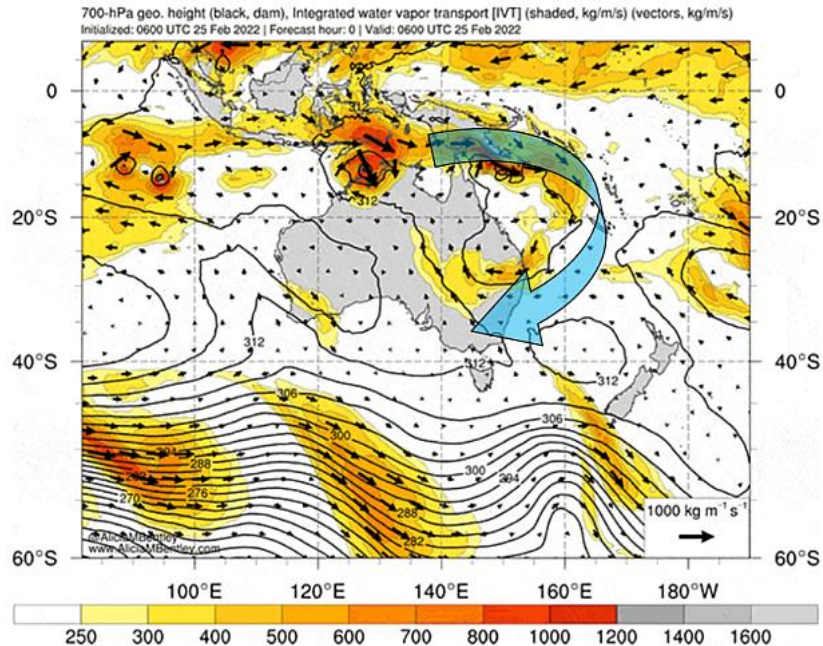
[Extremely cold Texas in February 2021 - one of the coldest Februaries in four decades: The story told with NLDAS-2 data](#)



GESDISC



Use Case- Brisbane, Australia flooding, February 2022



In February 2022, atmospheric circulation caused an air mass laden with a large amount of water vapor to move from over the warm ocean waters north of Australia to the eastern coast, as shown by the blue arrow. This circulation caused a “train” of storms dropping heavy rainfall to move over Brisbane, Australia for several days. The massive rainfall created extraordinary flash floods in and near Brisbane. Following this event, the train of storms eased to the south, causing flooding rainfall in Sydney and environs.

Darker orange and red indicates higher amounts of water vapor.

Forecast map of integrated water vapor transport for February 25, created by Alicia Bentley. From the GES DISC News article ["Precipitation data provides a detailed view of extraordinary rainfall event in Australia"](#)



GESDISC

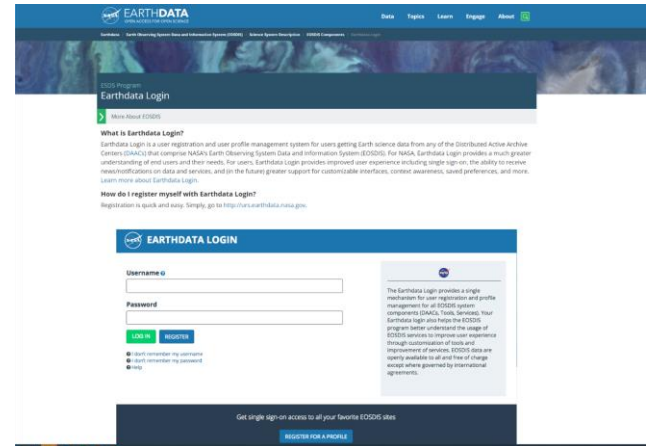


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Additional Resources

- *Alaska Satellite Facility (ASF) DAAC* <https://asf.alaska.edu/>
 - Synthetic Aperture Radar (SAR)
- *Atmospheric Science Data Center (ASDC)* <https://asdc.larc.nasa.gov/>
 - Radiation budget, clouds, aerosols, and tropospheric composition
- *Crustal Dynamics Data Information System (CDDIS)* <https://cddis.nasa.gov/>
 - Space geodesy
- *Global Hydrometry Resource Center (GHRC) DAAC* <https://ghrc.nsstc.nasa.gov/home>
 - Lightning, tropical cyclones, and storm-induced hazards
- *Goddard Earth Sciences Data and Information Services Center (GES DISC)* <https://disc.gsfc.nasa.gov/>
 - Atmospheric composition, atmospheric dynamics, global precipitation, solar irradiance:
- *Land Processes DAAC (LP DAAC)* <https://lpdaac.usgs.gov/>
 - Land cover, surface reflectance, radiance, temperature, topography, vegetation indices
- *Level 1 and Atmosphere Archive and Distribution System (LAADS) DAAC* <https://ladsweb.nascom.nasa.gov>
 - MODIS Level 1 and atmosphere products
- *National Snow and Ice Data Center (NSIDC) DAAC* <https://nsidc.org/daac>
 - Snow, sea ice, glaciers, ice sheets, ice shelves, frozen ground, soil moisture, cryosphere, climate interactions
- *Oak Ridge National Laboratory (ORNL) DAAC* <https://daac.ornl.gov/>
 - Snow, sea ice, glaciers, ice sheets, ice shelves, frozen ground, soil moisture, cryosphere, climate interactions
- *Ocean Biology DAAC (OB.DAAC)* <https://oceancolor.gsfc.nasa.gov/>
 - Ocean color, sea surface temperature, sea surface salinity
- *Physical Oceanography DAAC (PO.DAAC)* <https://podaac.jpl.nasa.gov/>
 - Gravity, ocean winds, sea surface temperature, ocean surface topography, sea surface salinity, circulation
- *Socioeconomic Data and Applications Center (SEDAC)* <https://sedac.ciesin.columbia.edu/>
 - Human interactions in the environment





Questions ?