Satellite Sounder Products in NASA GES DISC & Services Supporting Their Applications

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2019 Joint Satellite Conference

Boston, MA

October 3, 2019

Outline

- Satellite Sounder Products in Goddard Earth Sciences Data and Information Services Center (GES DICS)

  TOVS Pathfinder, Aqua AIRS+AMSU, SNPP/JPSS CrIS+ATMS

- Unified Data Services in GES DISC

  Searching, Accessing, Subsetting, Downloading

- Sounder Product Application Services

  Giovanni: visualization/explore/analysis tool

  Application uses cases

  State of monthly surface air temperature from AIRS

Sounder Products in GES DISC

- Sounder Missions:

  TOVS Pathfinder: from TIROSN to NOAA-14, 1978 to 2002

  Aqua AIRS-only: September 2002 to present

  Aqua AIRS+AMSU: September 2002 to September 2016

  Many AMSU primary channels ceased in September 2016

  SNPP CrIS+ATMS: December 2011 to present

  JPSS-1 CrIS+ATMS: February 2018 to present

  JPSS-2 CrIS+ATMS: future

- Three Levels Products:

  Level1: granule/swath, radiance, brightness temperature

  Level 2: granule/swath, cloud-cleared radiance, retrieval

  Level 3: global gridded, daily, 8-day, monthly retrieval

- Versions:

  AIRS: version 6 now, version 7 coming

  SNPP and JPSS-1: L1 now, L2 and L3 coming

  (limited SNPP L2 and L3)

Sounder Products in GES DISC

- Primary (popularly-used) Retrieved Parameters:

  Dynamics: temperature and moisture

  Atmospheric Composition: CO, CH4, O3, CO2

  Cloud & Radiation: cloud fraction, cloud top pressure, OLR

- Secondary Retrieved/Derived Parameters:

  Precipitation: serving TRMM/GPM, GPCP

  Cloud Phase: cloud thermodynamics phase, ice cloud optical phase, ice cloud effective diameter, effective ice top temperature

  SO2 Index: brightness temperature differences

  Dust Score: based on brightness temperature differences

  PBL Height: derived from humidity profile

  Ammonia: community product

AIRS Near-Real Time (NRT) Products

- LANCE (Land, Atmosphere NRT Capability for EOS)

  Latency within 3 hours

  Aqua AIRS is one LANCE element

  Level 1 and Level 2 products

  7-day rolling archive

- AIRS NRT Imagery Product

  GIBS (Global Imagery Browse Services)

  Worldview, AIRS NRT ImageViewer

  Surface Air & Skin Temperature and Relativity Humidity

  Temperature and Relativity Humidity at 850, 700, 500hPa

  Total Cloud Fraction, Cloud Top Height, Dust Score

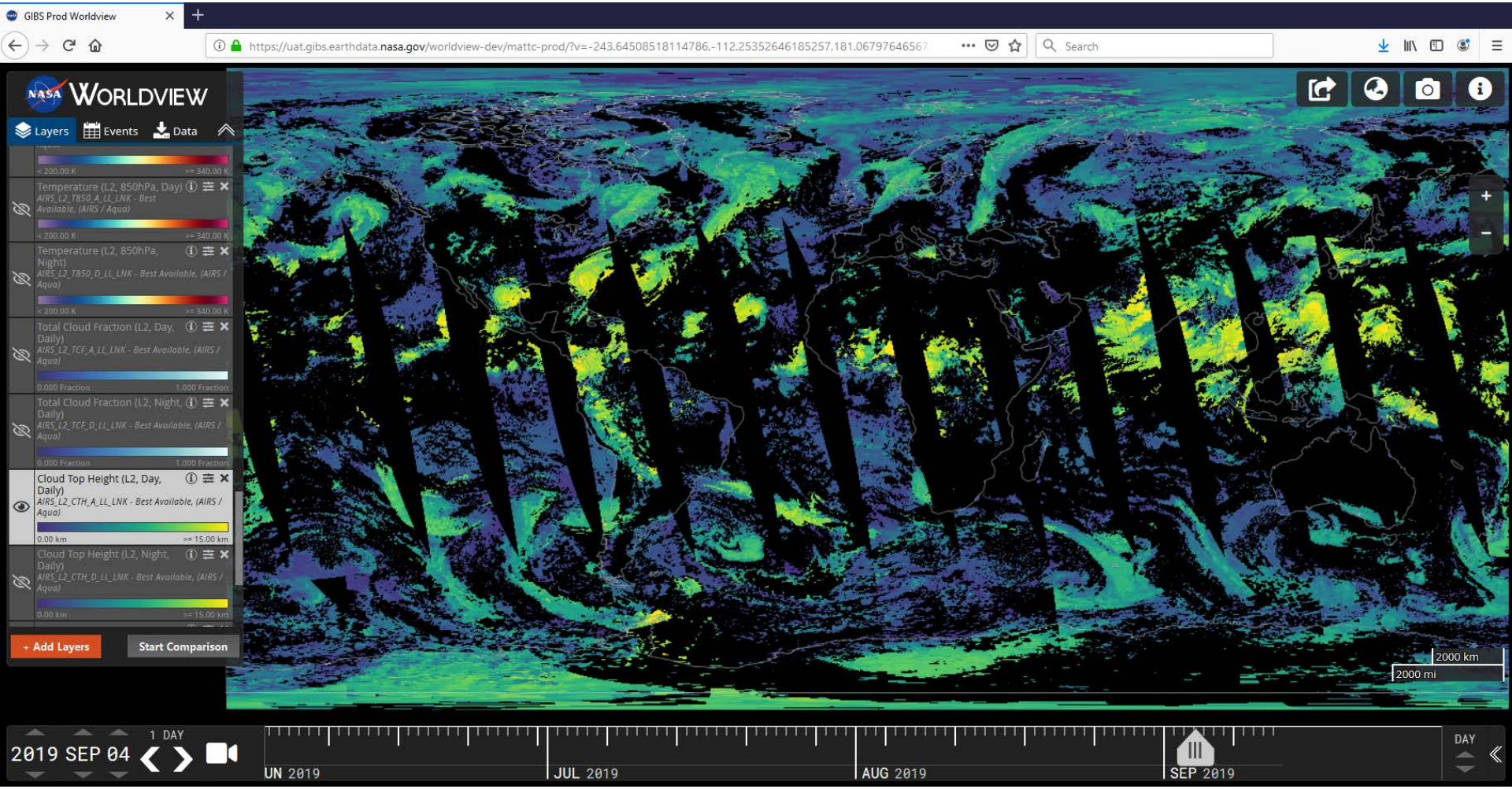
  CO at 500hPa, CH4 at 400hPa

  SO2 BT-Diff, SO2 from Prata Algorithm

AIS NRT Imagery on Worldview

https://worldview.earthdata.nasa.gov

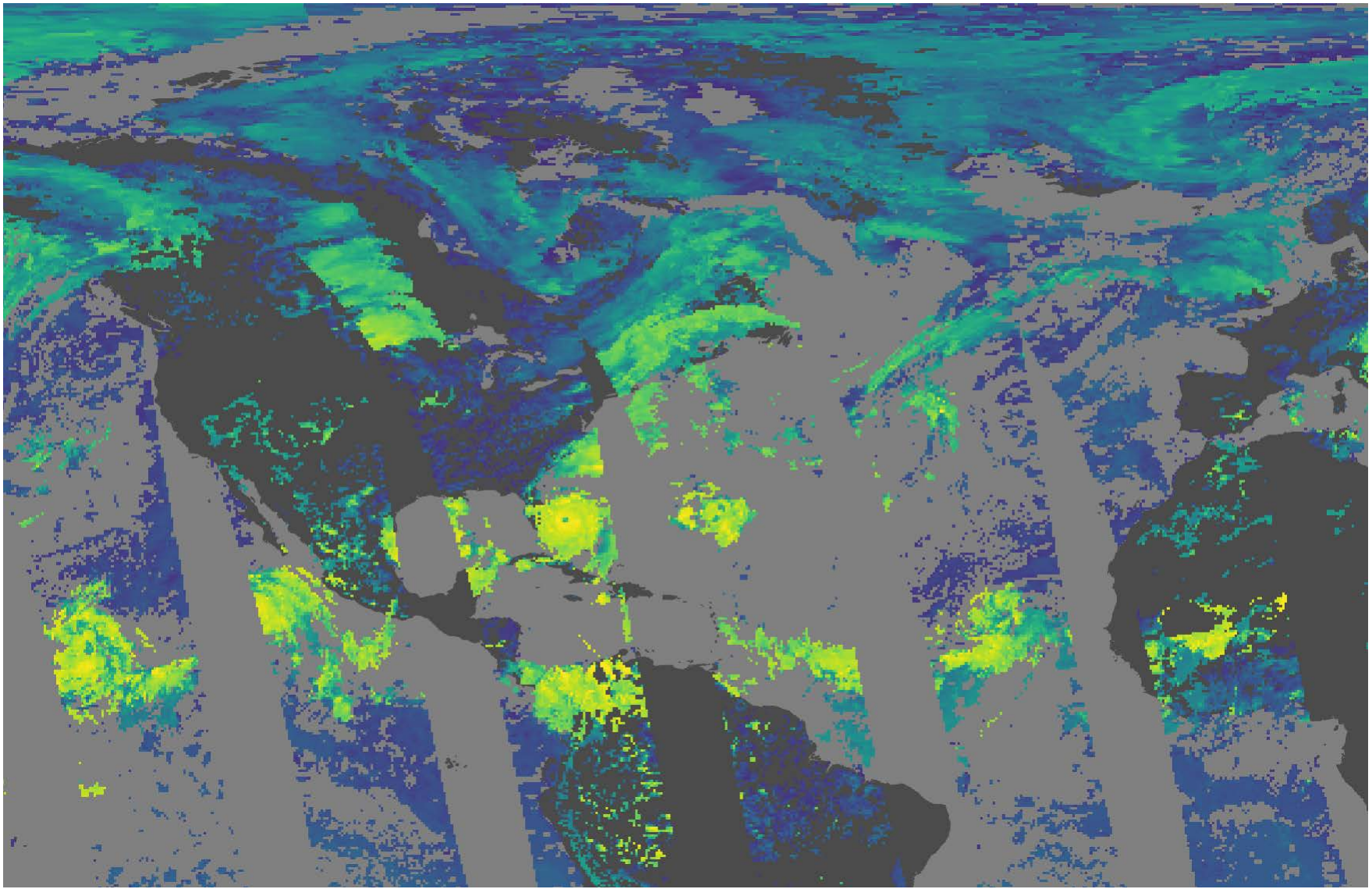
Cloud Top Height on September 4, 2019



AIS NRT Imagery on Worldview

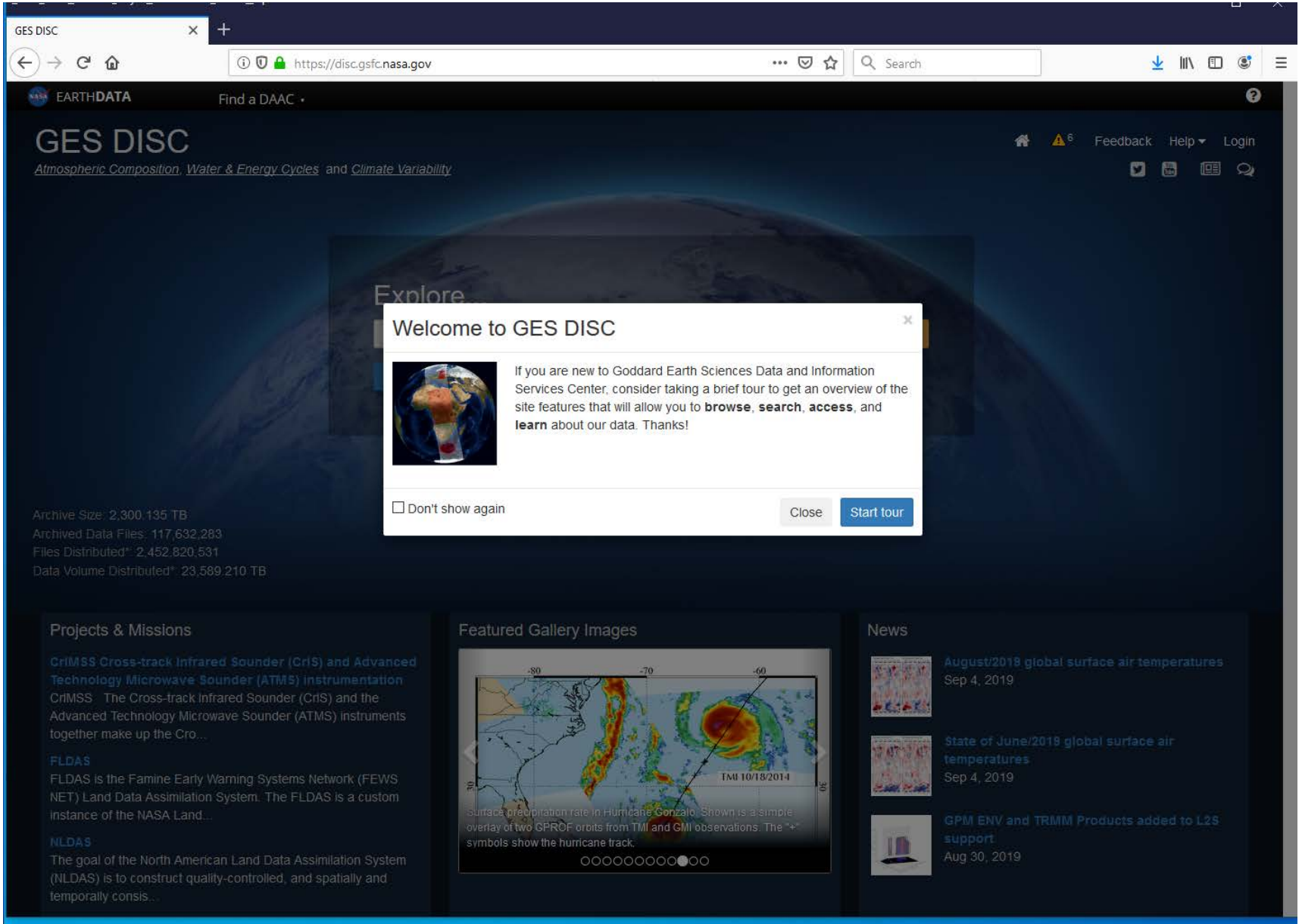
https://worldview.earthdata.nasa.gov

Saved snapshot image over North America: Hurricane Dorian

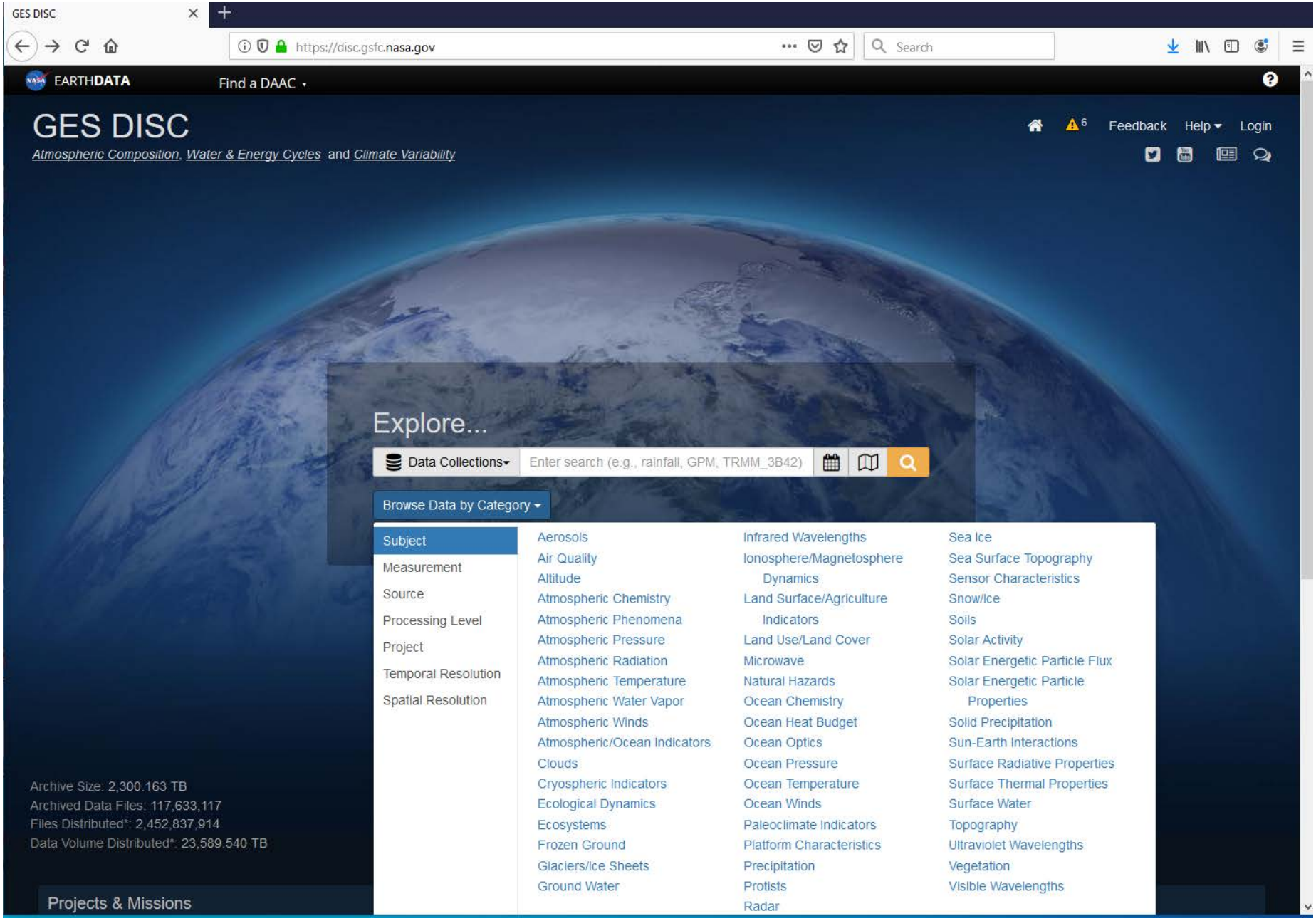


Unified Data Services Start from GES DISC Homepage

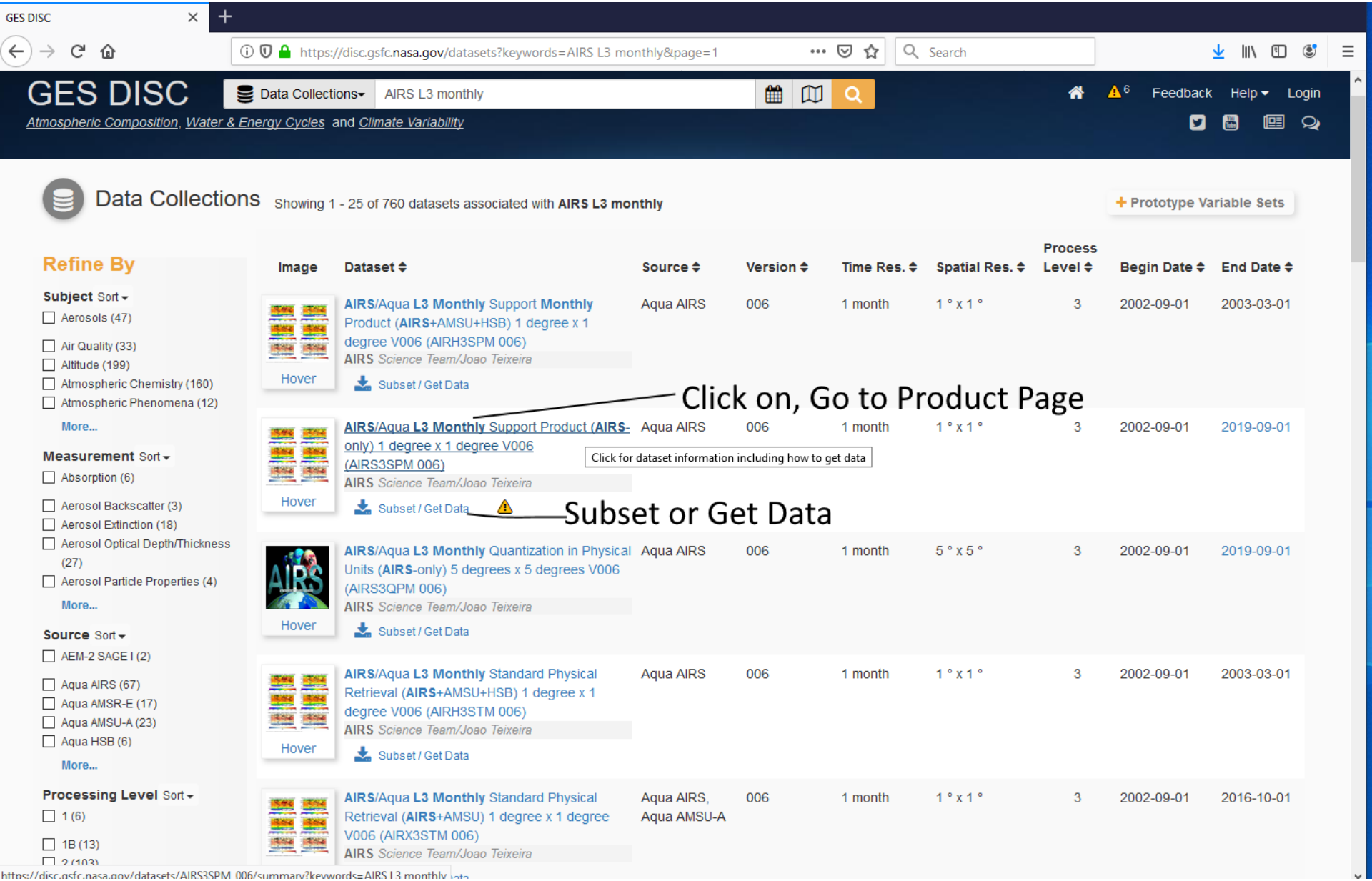
https://disc.gsfc.nasa.gov



Searching, Browsing, Accessing Data, Documentation, News, Tools...



Searching “AIRS L3 monthly” data



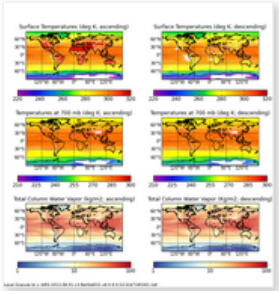
AIRS L3 monthly support product (AIRS-only) landing page

GES DISC

https://disc.gsfc.nasa.gov/datasets/AIRS3SPM_006/summary?keyword

Search

AIRS3SPM: AIRS/Aqua L3 Monthly Support Product (AIRS-only) 1 degree x 1 degree V006



View Full-size Image

The Atmospheric Infrared Sounder (AIRS) is a grating spectrometer (R = 1200) aboard the second Earth Observing System (EOS) polar-orbiting platform, EOS Aqua. In combination with the Advanced Microwave Sounding Unit (AMSU) and the Humidity Sounder for Brazil (HSB), AIRS constitutes an innovative atmospheric sounding group of visible, infrared, and microwave sensors. The L3 support products are similar to the L3 standard products but contain fields which are not fully validated, or are inputs or intermediary values. Because no quality control information is available for some of these fields, values from failed retrievals may be included.

Data Access

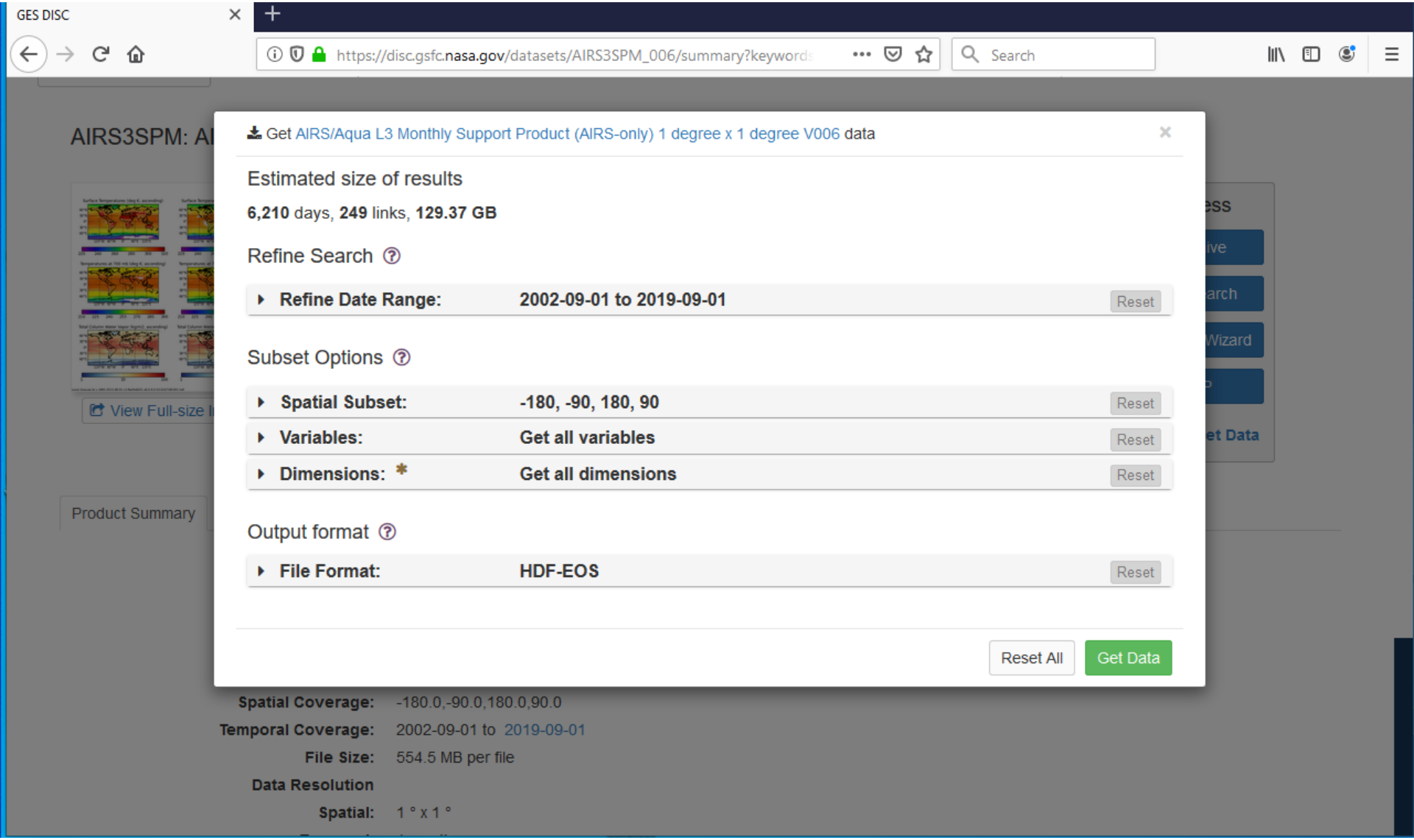
- Online Archive
- Earthdata Search
- Simple Subset Wizard
- OPENDAP
- Subset / Get Data

Subset and download the data for this collection

Product Summary | Data Citation | Documentation

Shortname:	AIRS3SPM
Longname:	AIRS/Aqua L3 Monthly Support Product (AIRS-only) 1 degree x 1 degree V006
DOI:	doi:10.5067/Aqua/AIRS/DATA324
Version:	006
Format:	HDF-EOS
Spatial Coverage:	-180.0,-90.0,180.0,90.0
Temporal Coverage:	2002-09-01 to 2019-09-01
File Size:	554.5 MB per file
Data Resolution	
Spatial:	1 ° x 1 °
Temporal:	1 month

Subset / Get Data

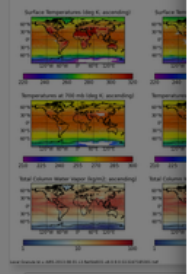


GES DISC

https://disc.gsfc.nasa.gov/datasets/AIRS3SPM_006/summary?keyword

Search

AIRS3SPM: A



View Full-size

Product Summary

Refine Search

Refine Date Range: 2002-09-01 to 2019-09-01 Reset

From: 2002-09-01

To: 2019-09-01

Available Range: 2002-09-01 to 2019-09-01

Default Range

September 2002

Sun	Mon	Tue	Wed	Thu	Fri	Sat
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	01	02	03	04	05
06	07	08	09	10	11	12

September 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	01	02	03	04	05
06	07	08	09	10	11	12

Subset Options

Spatial Subset: -180, -90, 180, 90 Reset

-180,-90,180,90

Default Range

Available Range: -180, -90, 180, 90 **Cursor Coordinates:** 33.762, 143.789

NASA Official: Long Pha
Web Curator: M. Hegde

Web Privacy Policy

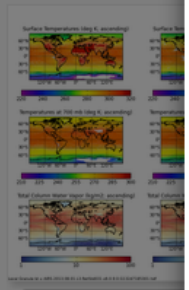
About Us
Who We Are
Using Our Data
Contact Us
User Working Group

GES DISC

https://disc.gsfc.nasa.gov/datasets/AIRS3SPM_006/summary?keywords

Search

AIRS3SPM: A



View Full-size

Product Summary

Estimated size of results

6,210 days, **249** links, **129.37 GB**

Refine Search

Refine Date Range: **2002-09-01 to 2019-09-01** Reset

Subset Options

Spatial Subset: **-180, -90, 180, 90** Reset

Variables: Get all variables Reset

NOTE: By default, **ALL** variables are sent in the subset request.

Expand Tree

- Ancillary and Derived Variables
- Cirrus Cloud Variables
- CO Variables
- Dust and SO2 flags from radiances
- location
- Methane Variables
- Moisture and Precipitation Variables
- Ozone Variables
- Radiation Variables
- Temperature Variables

Dimensions: * **Get all dimensions** Reset

Output format

File Format: HDF-EOS Reset

- ASCII
- HDF-EOS (Default)
- NetCDF
- NetCDF4

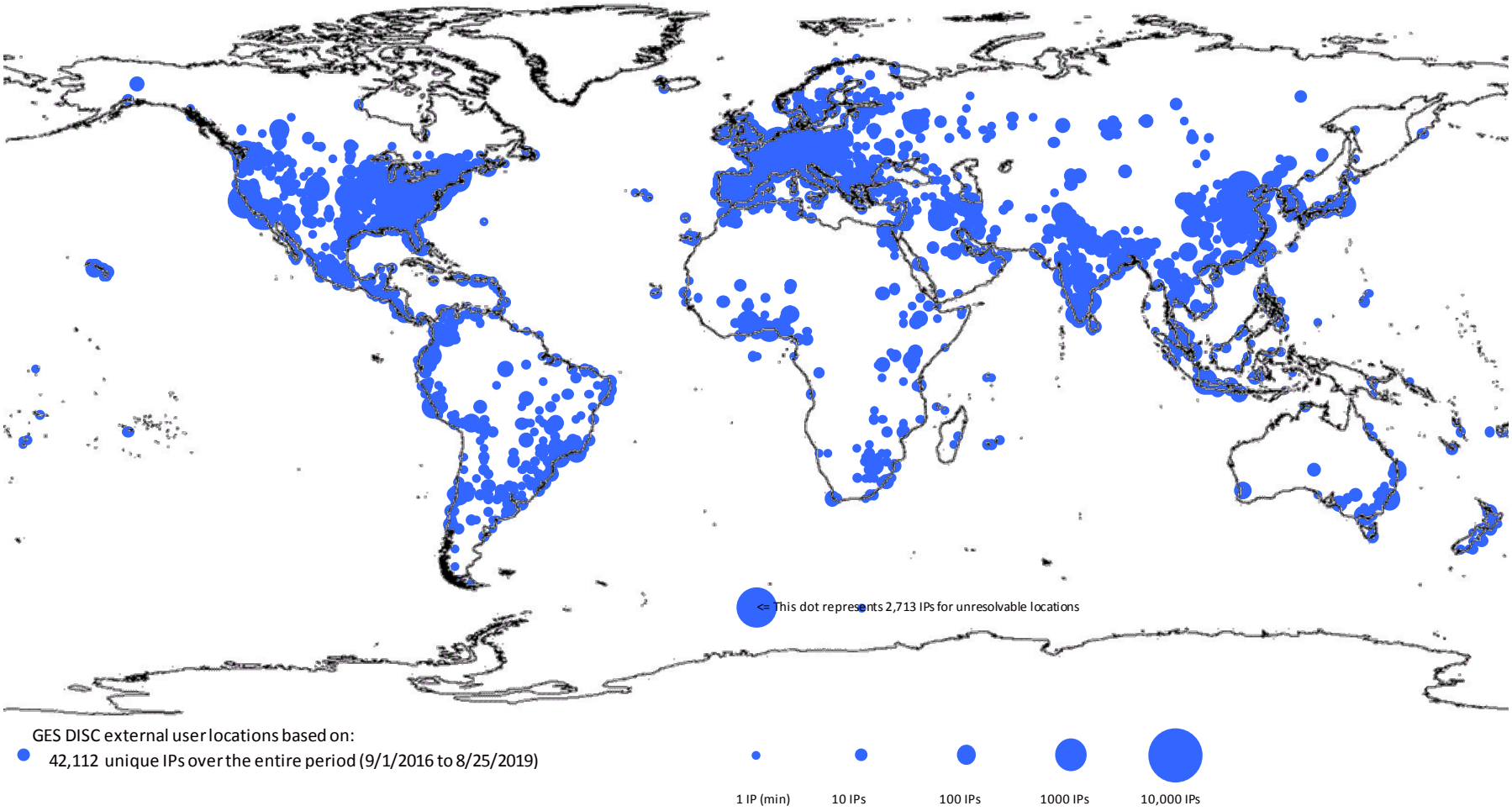
Reset All Get Data

NASA Official: Long Pha
Web Curator: M. Hegde

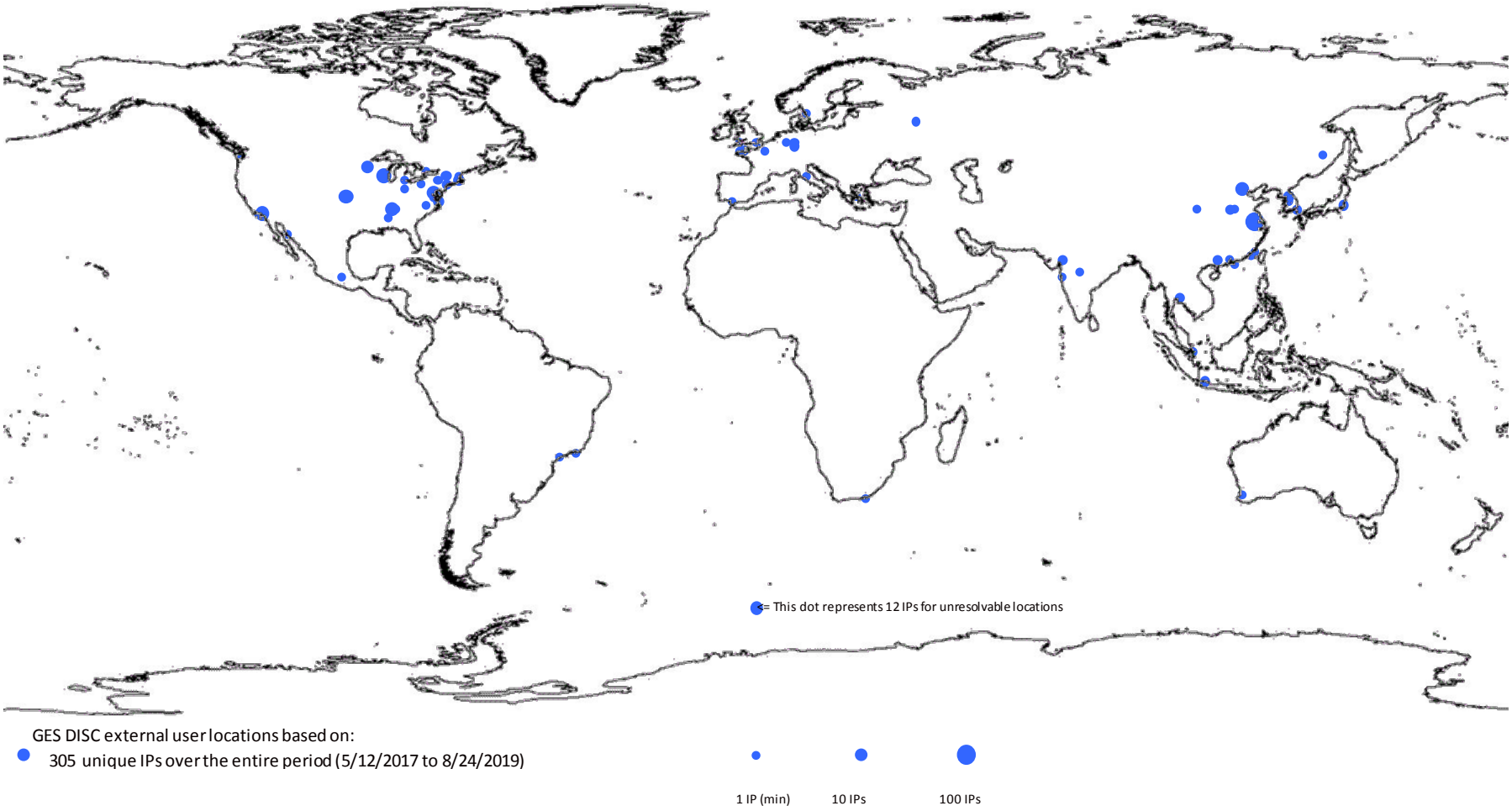
Web Privacy Policy

OPeNDAP and GDS

Worldwide AIRS Data Users/Unique IPs from Sept 2016 to August 2019



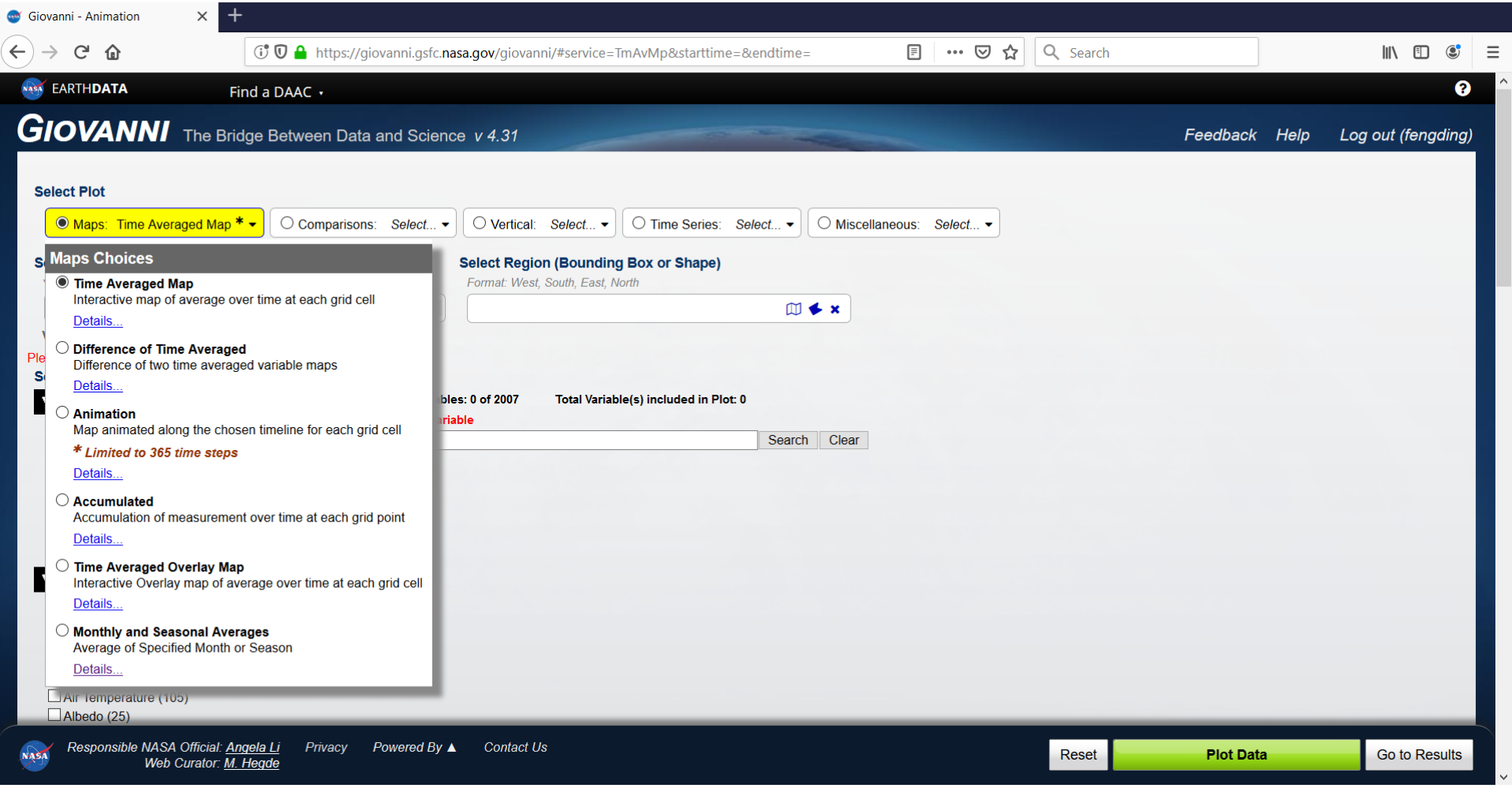
Worldwide SNPP+JPSS-1 Data Users/Unique IPs from May 2017 to August 2019



Giovanni: Exploring/Visualizing/Analyzing Tool

https://giovanni.gsfc.nasa.gov/

Maps: Time-Averaged Maps, Difference of Time-Averaged, Animation, Accumulated, Time Averaged Overlay Map, Monthly and Seasonal Averages

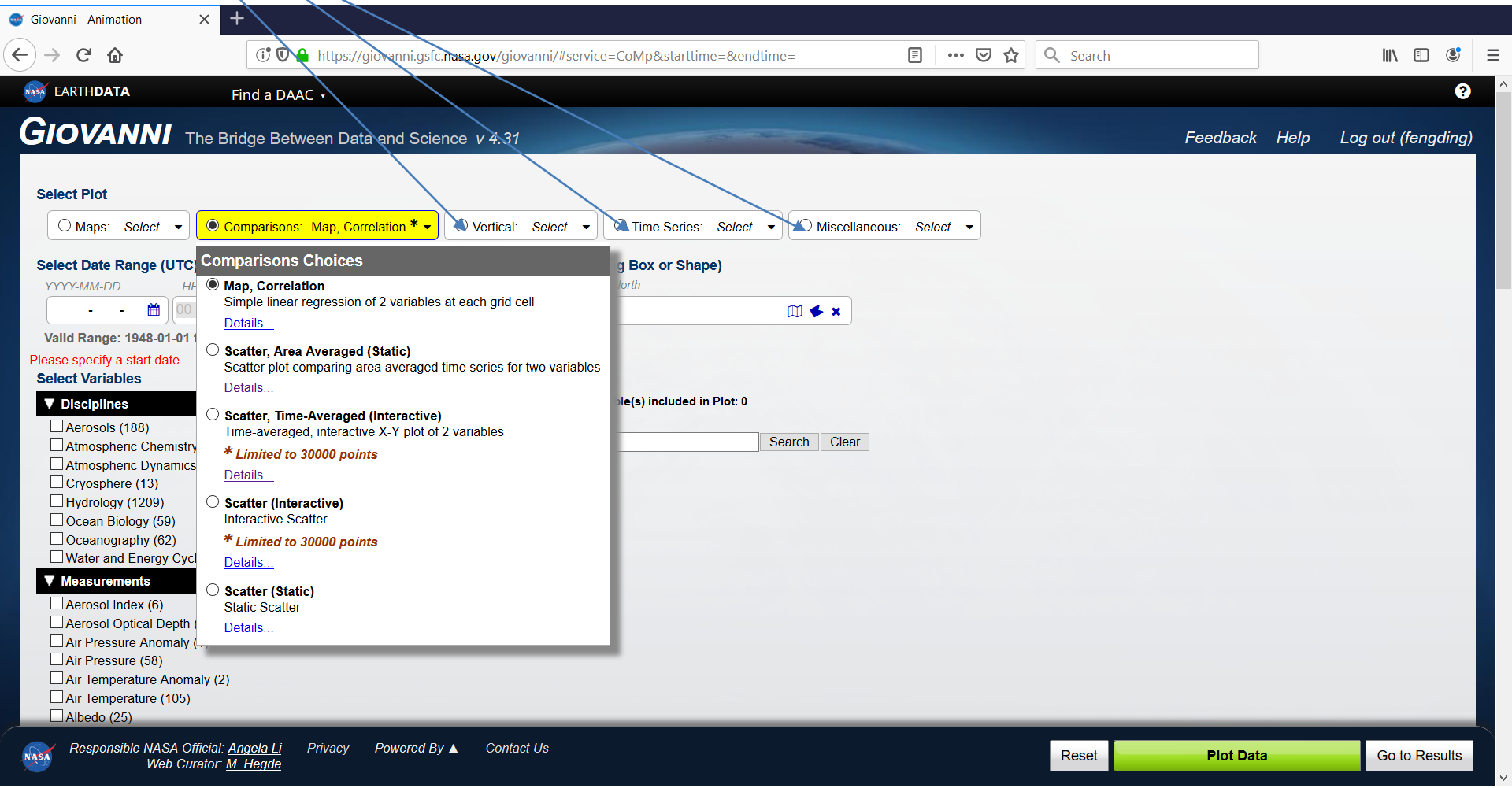


Comparisons: Correlation Map, Area/Time-Averaged Scatter Plot (Static/Interactive), Scatter Plot (Static and Interactive)

Vertical : Cross Section (Latitude/ Longitude/Time – Pressure), Vertical Profile

Time Series: Hovmoller (Latitude/Longitude-Averaged), Area-Averaged, Area-Averaged Difference, Interannual Seasonal/Monthly

Miscellaneous: Zonal Mean, Histogram



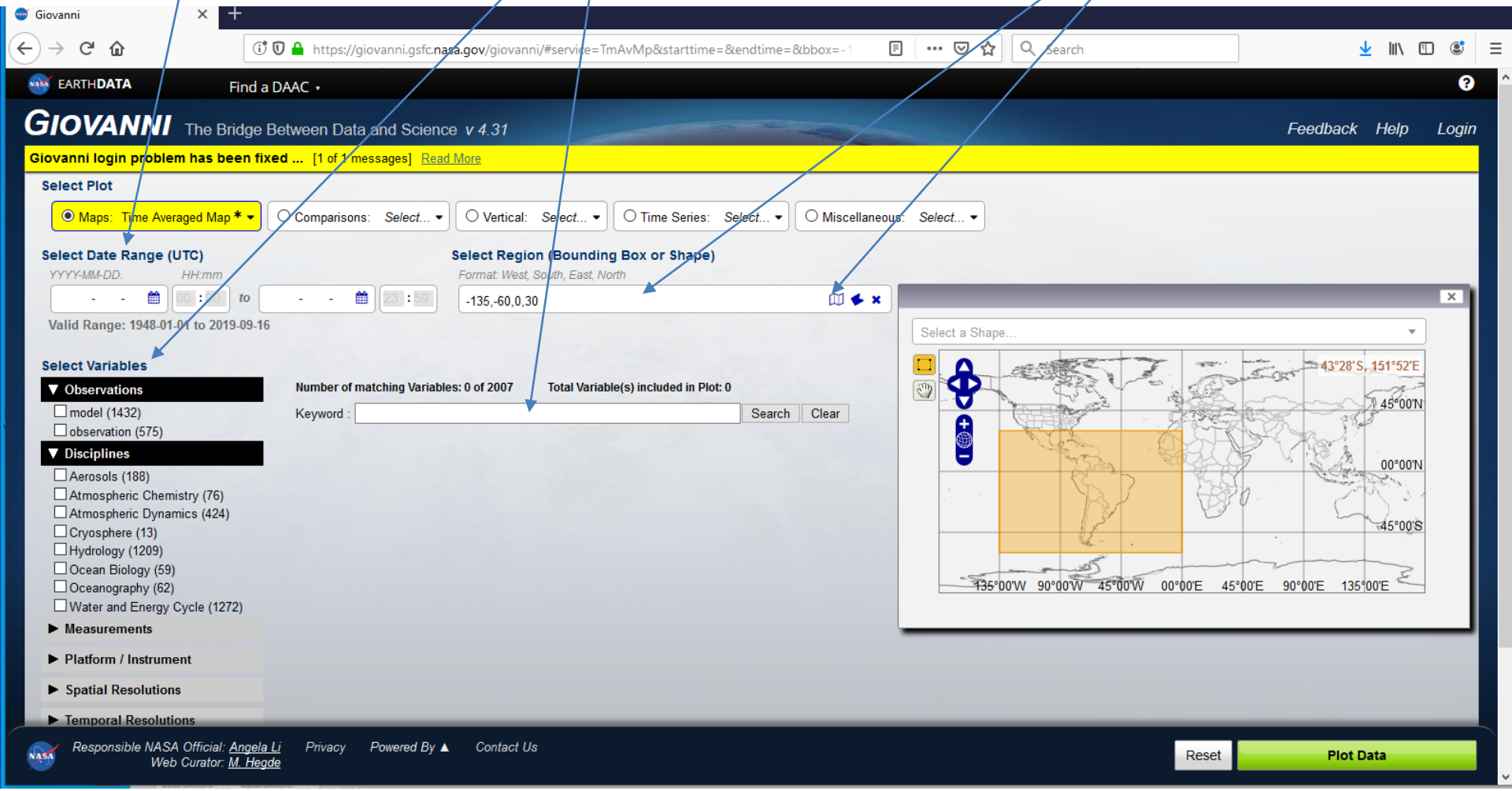
Giovanni: Exploring/Visualizing/Analyzing Tool

https://giovanni.gsfc.nasa.gov/

Date Range
Type or Use Calendar

Variable
Search Keyword and/or Use Filter

Region
Type or Draw Bounding Box



Giovanni: Exploring/Visualizing/Analyzing Tool

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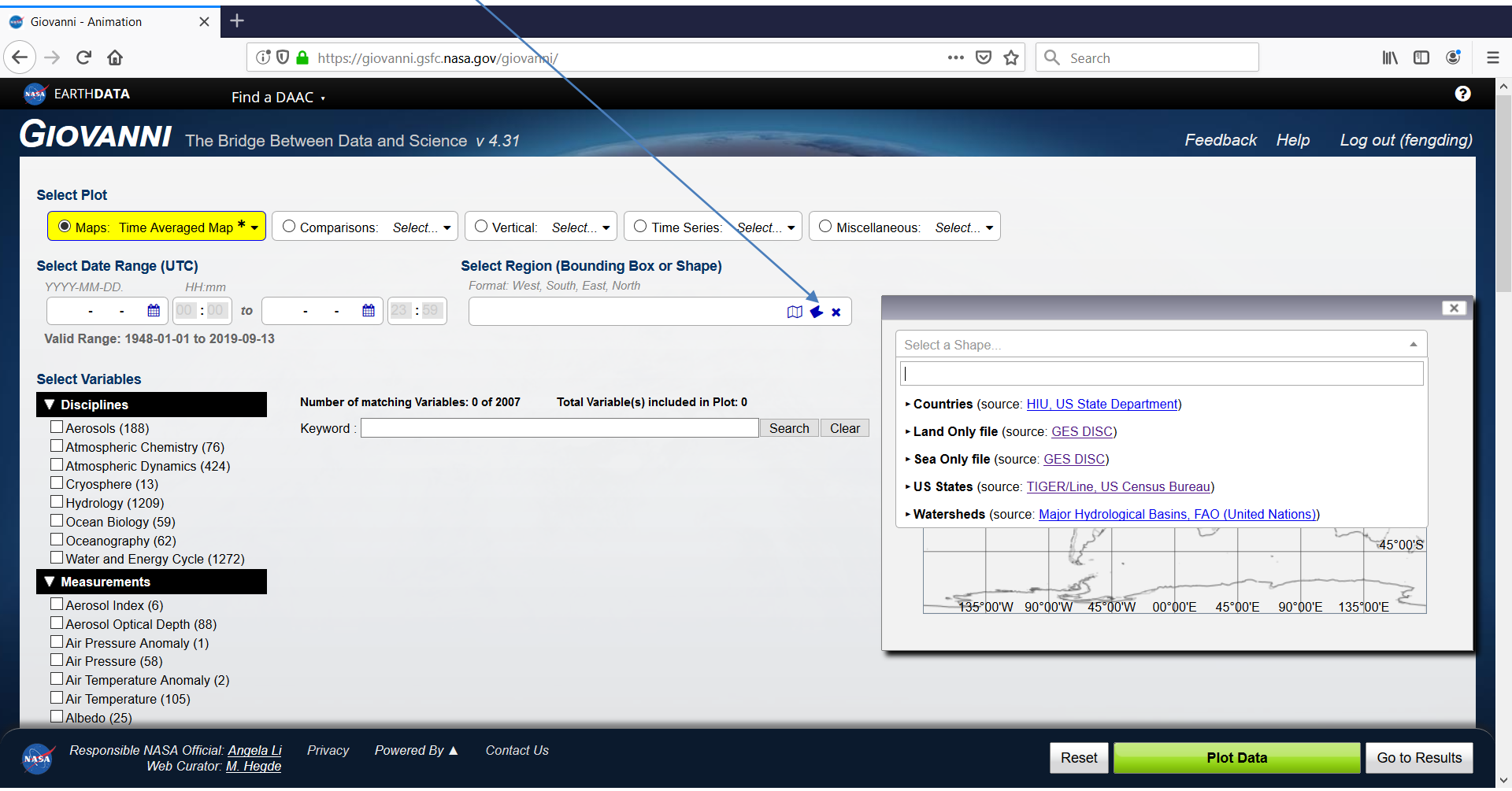
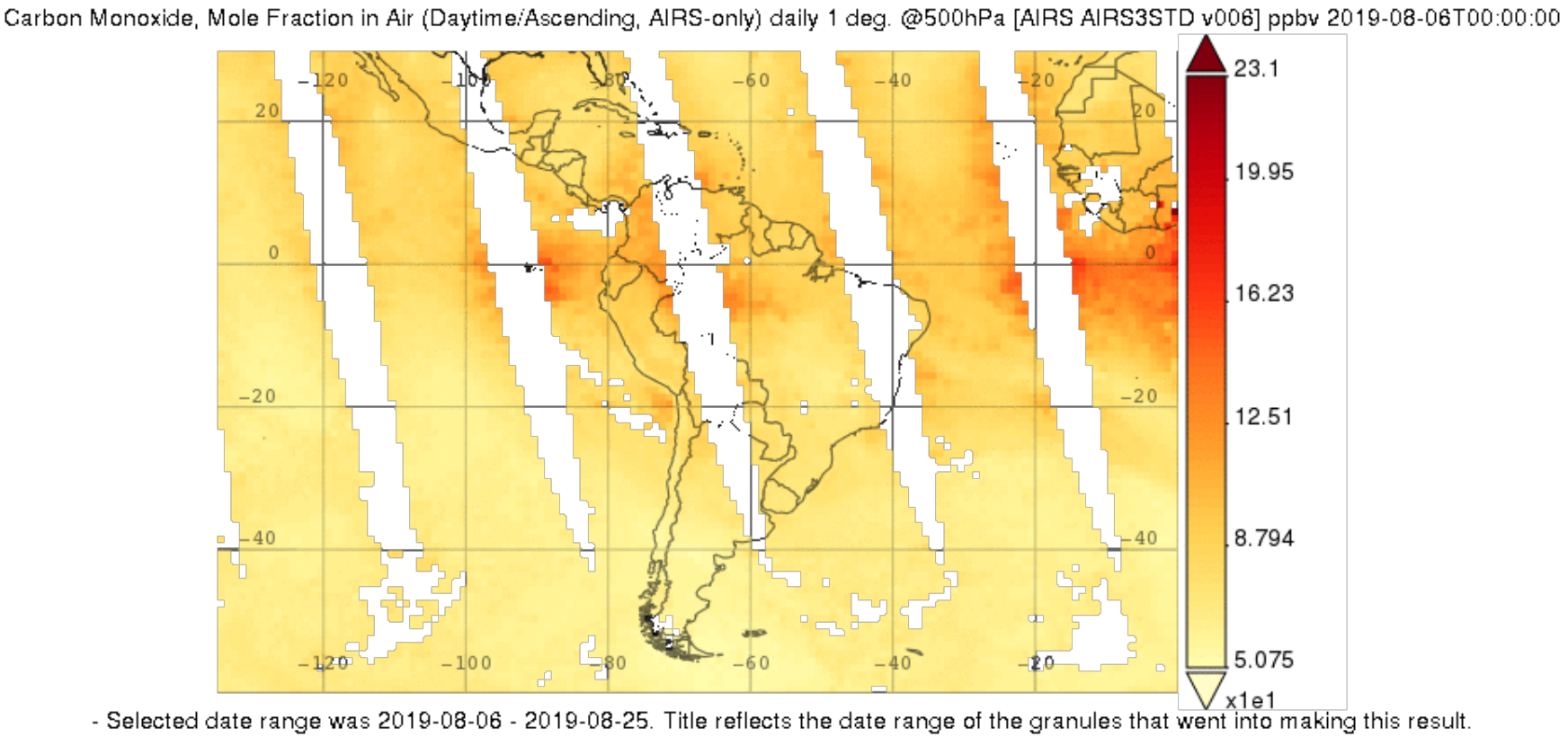
Region: Select Shape - *Countries, Land/Sea, US States, Watersheds*



Giovanni Application: 2019 Amazon Fire
AIRS Ascending/Daytime CO at 500hPa Animation, Aug 6 to 25, 2019



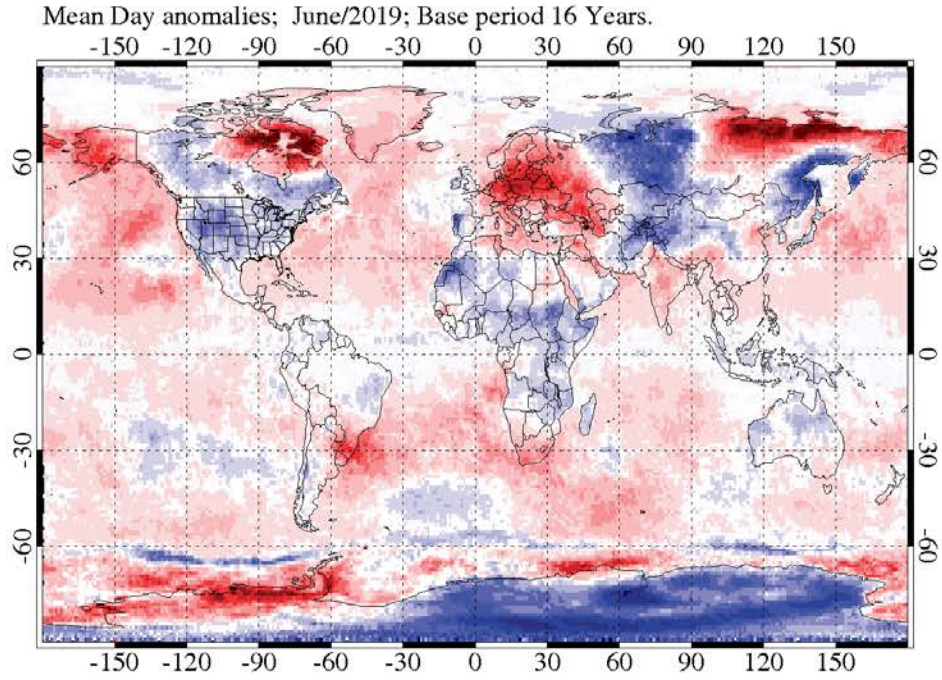
Giovanni Application: Hottest July in 2019
AIRS Global Averaged Surface Temperature, July, 2003 to 2019

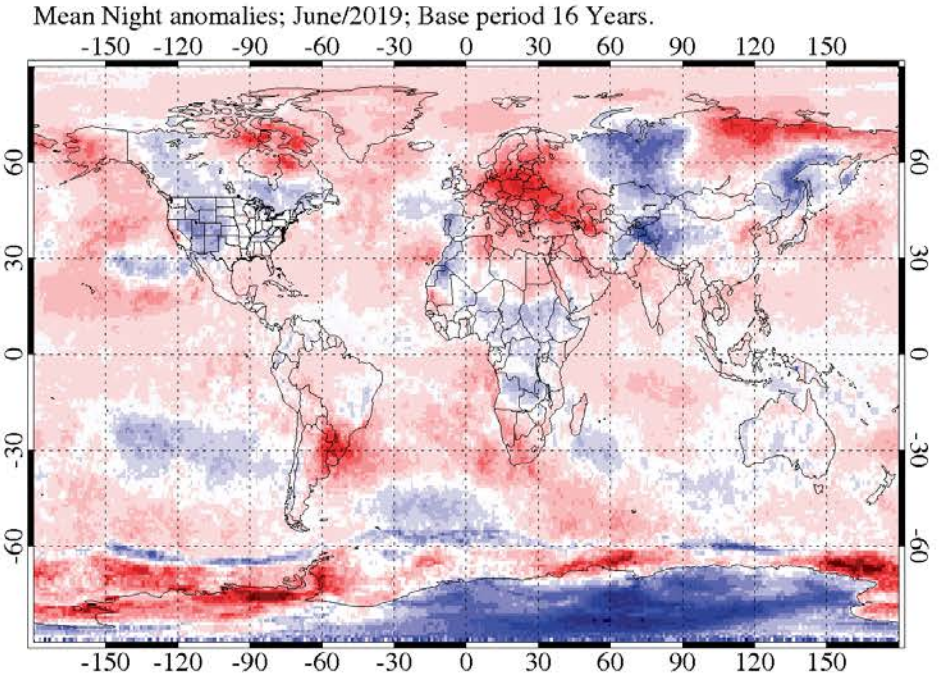
GES DISC Newsletter

Monthly State of Global Surface Air Temperature from AIRS

Publishing started from June 2019, *Andrey Savtchenko*
https://disc.gsfc.nasa.gov/information/news?title=State%20of%20June%2F2019%20global%20surface%20air%20temperatures

Mean Daytime/Nighttime anomalies, based on 16 years of AIRS data
Daytime/Nighttime increase of frequency of occurrence of the warmest/coldest 10% temperatures





Acknowledgement

- GES DISC Operation and Engineering Team
- Sounder Science Team at NASA/JPL

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