

# **Satellite Products and Dissemination: Visualization and Data Access**

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# Introduction

NASA National Aeronautics and Space Administration  
Goddard Earth Sciences Data and Information Services Center

Search DISC + 60  
+ Advanced Search

+ ATMOS COMPOSITION + HYDROLOGY + A-TRAIN + AIRS + HURRICANES + NEEPSI + PRECIPITATION

## GES DISC

Goddard Earth Sciences Data and Information Services Center  
Your source for earth science data and information

ABOUT US  
DATA HOLDINGS  
SERVICES

### Additional Features

- News
- Image Gallery
- Science Focus
- Technology Lab
- Publications
- Citing Our Data
- FAQ
- Science Team Portal (Restricted Access)

### REMOTE SENSING DATA

Make Selection

### OTHER PORTALS

Make Selection

### WHAT'S HOT

#### MERRA Meteorological Data Now Available from the GES DISC

The Modern Era Retrospective-analysis for Research and Applications (MERRA) data production is underway. Multi-year segments of the meteorological analyses from each of the 3 production streams are now available online at the GES DISC.  
[+ Read More](#)

#### Giovanni Air Quality Instance now available

A new Giovanni instance dedicated to air quality related data is now available. The instance includes global aerosol and cloud data from MODIS, global aerosol data from OMI, and the AIRNow Fine Particulate Matter (PM2.5) ground-based monitoring product for the continental United States.  
[+ Read More](#)

#### Hydrology DISC supports GLDAS data product

The new Hydrology DISC (HDISC) portal provides access and support for the Global Land Data Assimilation Systems (GLDAS).  
[+ Read More](#)

### Current Missions

- AIRS
- AURA
- SORCE
- TRMM

### EARTH MEASUREMENTS

- ATMOS COMPOSITION
- A-TRAIN DATA DEPOSIT
- HURRICANES
- HYDROLOGY
- OCEANS
- PRECIPITATION

### Giovanni Online Visualization and Analysis

### Mirador Data Access Made Simple

### LATEST NEWS

**01.06.09 - American Meteorological Society Short Course on Giovanni**  
At the Annual Meeting of the American Meteorological Society in Phoenix, Arizona, GES DISC staff are giving a one-day short course entitled "Online Visualization and Analysis of Atmospheric Processes Utilizing NASA Satellite Data in Giovanni", on Sunday, January 11, 2009.  
[+ Read More](#)

**01.06.09 - Giovanni for MERRA data is now available**  
Two new instances of Giovanni supporting the recently released Modern Era-Retrospective-analysis for Research and Applications (MERRA) data have been added to the Giovanni family.  
[+ Read More](#)

The Goddard Earth Sciences Data and Information Services Center (GES DISC) supports archive and distribution of hundreds of datasets for multiple satellite sensors, ground measurements, and models. These include Aqua AIRS, Aura HIRDLS/MLS/OMI, SORCE, TOMS, TOVS, TRMM, UARS, GLDAS and MERRA.

Services include Mirador search and order, Giovanni online data analysis and visualization, subsetting, and support for multiple interoperability standards (OPeNDAP, GDS, OGC WMS, netCDF, Google Earth).

Through these services, the GES DISC provides users multi-sensor and model visual comparisons and data access via a number of projects crossing multiple disciplines.



## Goal – Dissemination of YOTC Satellite Products

Our goal is to facilitate data usage as much as possible by providing a way the community can easily visualize and access the data. This means we want to provide:

- A user friendly, interactive interface to visualize the data to an efficient manner.
- Multiple output data formats to the user can use desired post-analysis software.
- Easy to use efficient data download methods.



## Goal – Dissemination of YOTC Satellite Products

### Satellite Products:

- TRMM precipitation, SST and related products, including latent heating profiles.
- ISCCP cloud product data set.
- AIRS profiles of temperature and water vapor, and associated cloud products.
- CloudSat profiles of liquid and ice water, cloud classification, cloud optical depth, surface precipitation flags/estimates, and profiles of radiative fluxes and heating rates.
- CALIPSO profiles of cloud presence, emissivity, and particle size, and associated radiative and geophysical properties (height, optical depth, extinction).
- AMSR-E and/or SSM/I surface wind speed, precipitable and cloud-liquid water, and rain rate.
- PEHRRP – high resolution precipitation products.
- GPS soundings of temperature and water vapor.
- CERES cloud properties, TOA and surface fluxes.
- MODIS cloud and aerosol products.
- MLS upper tropospheric profiles of water vapor, temperature and cloud ice.
- Scatterometer (QuikScat) ocean surface winds.

\*TRMM, AIRS, CloudSat, Calipso, MODIS, MLS and QuikScat are currently at the GES DISC as either the primary or secondary archive

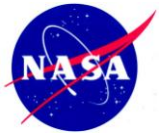


# What is Giovanni?

**G**iovanni is a Web-based application developed by the GES DISC that provides a simple and easy way to visualize, analyze, and access vast amounts of Earth science remote sensing and model data.

**O**nly a Web browser is needed. There is no need to learn data formats, programming, or download large amounts of data.

**V**isualizations for data include latitude-longitude maps, time series diagrams, latitude-time and longitude-time Hovmöller diagrams, and animations. New visualizations will be introduced over time.

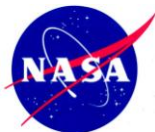


# What is currently in Giovanni?

**Giovanni** is comprised of a number of interfaces, called instances, each tailored to meet the needs of different Earth science research communities.

**24 instances grouped under the following four disciplines:**

- Atmospheric Instances
- Environmental Instances
- Ocean Instances
- Hydrology Instances



# Giovanni Instance List

###	Instance	Title: Subtitle
1	<a href="#">aerosol_daily</a>	Daily Aerosol Optical Thickness Measurement and Model Comparison:Beta Version
2	<a href="#">aerosol_monthly</a>	Monthly MODIS-GOCART Aerosol Optical Thickness Intercomparison:Beta Version
3	<a href="#">Air_Quality</a>	Giovanni Air Quality :EPA AIRNOW PM2.5
4	<a href="#">AIRS_Level3Daily</a>	AIRS Online Visualization and Analysis:AIRS Global 1.0° x 1.0° Daily Level-3 Products
5	<a href="#">AIRS_Level3Month</a>	AIRS Online Visualization and Analysis:AIRS Global 1.0° x 1.0° Monthly Level-3 Products
6	<a href="#">atrain</a>	A-Train Along CloudSat Track Instance:CloudSat
7	<a href="#">hirdls</a>	HIRDLS/Aura Online Visualization and Analysis System:Level 2 Vertical Profiles
8	<a href="#">MERRA_MONTH_2D</a>	MERRA Monthly 2D Data Collections:
9	<a href="#">MERRA_MONTH_3D</a>	MERRA Monthly 3D Data Collections:
10	<a href="#">MISR_Daily_L3</a>	MISR Daily Level-3 Data:Daily Global 0.5 x 0.5 Degree Aerosol Product
11	<a href="#">MISR_Monthly_L3</a>	MISR Monthly Level-3 Data:Monthly Global 0.5 x 0.5 Degree Aerosol Product
12	<a href="#">mls</a>	MLS/Aura Online Visualization and Analysis System:Version 2.2 Vertical Profiles
13	<a href="#">MODIS_DAILY_L3</a>	MODIS Terra and Aqua Daily Level-3 Data:Atmosphere Daily Global 1X1 Degree Products
14	<a href="#">MODIS_MONTHLY_L3</a>	MODIS Terra and Aqua Monthly Level-3 Data:Atmosphere Monthly Global 1X1 Degree Products
15	<a href="#">neespi</a>	NEESPI Experimental Instance:Northern Eurasia Earth Science Partnership Initiative Monthly Products
16	<a href="#">neespi_daily</a>	NEESPI Experimental Instance:Northern Eurasia Earth Science Partnership Initiative Daily Products
17	<a href="#">ocean_model</a>	Ocean Color Radiometry Online Visualization and Analysis:NOBM Assimilated Monthly Global Products
18	<a href="#">ocean_model_day</a>	Ocean Color Radiometry Online Visualization and Analysis:NOBM Assimilated Daily Global Products
19	<a href="#">ocean_month</a>	Ocean Color Radiometry Online Visualization and Analysis:Global Monthly Products
20	<a href="#">omi</a>	OMI/Aura L3 Online Visualization and Analysis:Daily Level 3 Global Gridded Products
21	<a href="#">omil2g</a>	OMI/Aura L2G Online Visualization and Analysis:«BETA» Daily Level 2G Global Binned Products «BETA»
22	<a href="#">toms</a>	TOMS Online Visualization and Analysis:Daily Level 3 Global Gridded Products
23	<a href="#">TRMM_3-Hourly</a>	TRMM Online Visualization and Analysis System (TOVAS):3-hourly TRMM and Other Rainfall Estimate (3B42 V6)
24	<a href="#">TRMM_Monthly</a>	TRMM Online Visualization and Analysis System (TOVAS):TRMM Level-3 Monthly Products.



# YOTC Prototype

Users simply make selection criteria:

Spatial Area

Parameters

Time Range

Visualization

Vertical Levels for 3D

Year of Tropical Convection  
Alpha prototype

Home Remove All

Giovanni for Year of Tropical Convection

Select:

Spatial

Coordinates: 162.77344, 87.53806



Area of Interest: West: -180 North: 50 South: -50 East: 180 Update Map

Vertical Profile

Select a vertical profile to use. The vertical profile is only available unless a 3D parameter is selected. In order to enable this option (and populate the list below), select a 3D parameter. 3D parameters have a vertical dimension and are labeled with a '3D' in the Parameters section. Note: Selected 3D parameters must have the same vertical (i.e., vertical dimension) units in order to enable the vertical level menu.

Upper Level: [dropdown]  
Lower Level: [dropdown]

Parameters

Display:  Data Product  Parameter Parameters with > 2 Dimensions

Atmosphere

Parameter	Data Product Info
<input type="checkbox"/> Clouds(2000-01-2009-07-08)	
<input type="checkbox"/> Cloud Reflectance (QA-w)	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity Day	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity Night	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud fraction ascending (CloudFrc_A)	AIRV3STD.005 Aqua - AIRS standard 2002/08/31 - 2009/07/07
<input type="checkbox"/> Cloud Fraction Descending (CloudFrc_D)	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Aerosols(1978-11-01 - 2009-07-08)	
<input type="checkbox"/> Absorbing Aerosol Optical Thickness	OMAEROe 003 Aura OMI 2004/10/01 - 2009/07/08
<input type="checkbox"/> Aerosol Optical Depth at 550 nm	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Aerosol Optical Thickness	OMAEROe 003 Aura OMI 2004/10/01 - 2009/07/08
<input type="checkbox"/> Aerosol R_eff - Ocean (QA-w)	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Aerosol Single Scattering Albedo	OMAEROe 003 Aura OMI 2004/10/01 - 2009/07/08

Ocean

Parameter	Data Product Info
<input type="checkbox"/> Temperature(1978-11-01 - 2009-07-08)	
<input type="checkbox"/> Clear-sky outgoing long-wave radiation ascending (CIOLR_A)	AIRV3STD.005 Aqua - AIRS standard 2002/08/31 - 2009/07/07
<input type="checkbox"/> Clear-sky outgoing long-wave radiation flux ascending (CIOLR_D)	AIRV3STD.005 Aqua - AIRS standard 2002/08/31 - 2009/07/07
<input type="checkbox"/> Cloud Top Pressure (Day and Night)	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Top Pressure (Day only)	MOD08_D3.005 MODIS-Terra Ver. 5 2000/02/24 - 2009/07/08

Time Range

Begin Date Year: 2000 Month: Jul Day: 8 (Date Begin: 01 Nov 1978)  
End Date Year: 2009 Month: Jul Day: 8 (Date End: 08 Jul 2009)

Search Visualization: [button] [button]

Lat-Lon map, Time-average [button] [button]

Visualization [button] [button]

Responsible NASA Official: clevin.krempler@nasa.gov  
Web Curator: Anthony Drake: web-contact-disc@listserv.gsfc.nasa.gov  
+ Privacy Policy and Important Notices



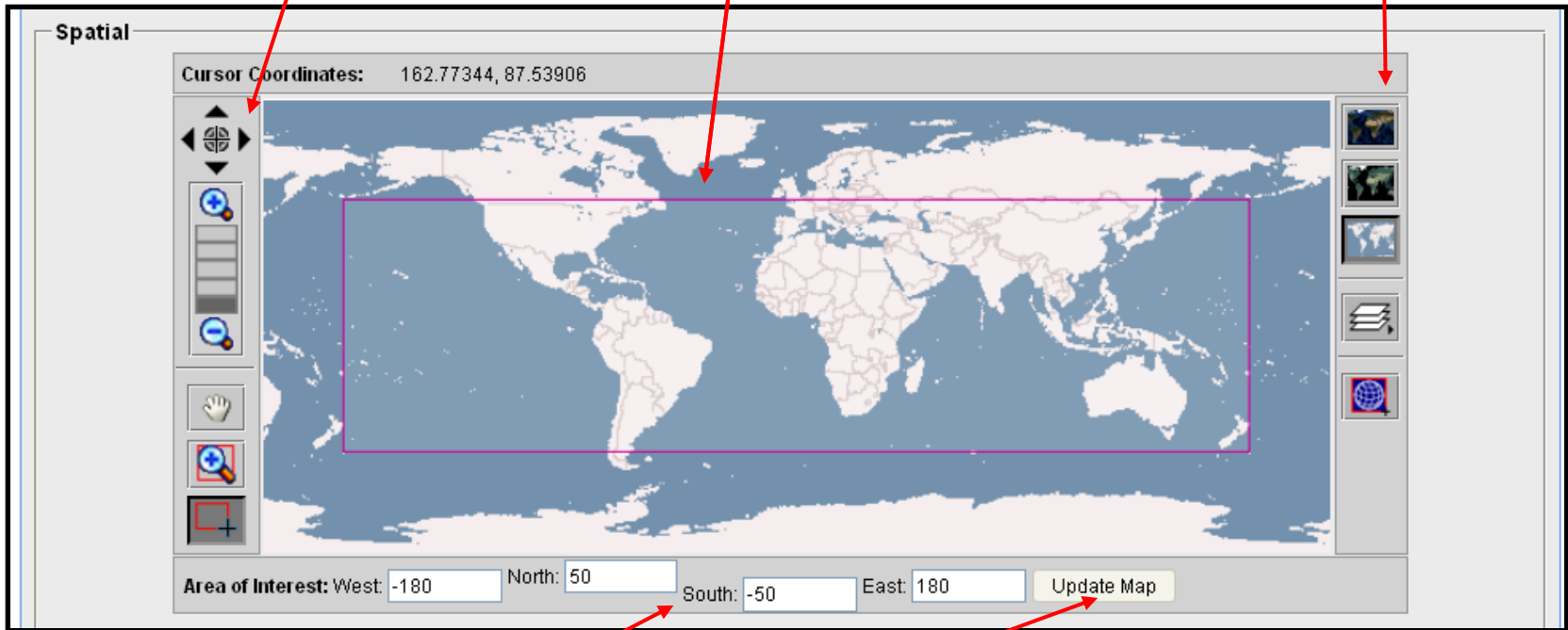


# Spatial Selection

**Panning  
and Zoom**

**Click and drag**

**Click to select a map layer**



**Type latitude and longitude coordinates and click Update button**



# Parameter Selection

Select to display more product information

**Parameters**

Display:  Data Product Info  Units  Parameters with > 2 Dimen:

**Atmosphere**

Clouds(2000/02/24 - 2009/07/08)

Parameter	Data	Product Info	
<input type="checkbox"/> Cirrus Reflectance (QA-w)	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity Day	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Effective Emissivity Night	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud fraction ascending (CloudFrc_A)	AIR3STD.005	Aqua - AIRS standard	2002/08/31 - 2009/07/07
<input type="checkbox"/> Cloud Fraction (Day and Night)	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08

Aerosols(1978/11/01 - 2009/07/08)

Parameter	Data	Product Info	
<input type="checkbox"/> Absorbing Aerosol Optical Thickness	OMAEROe.003	Aura OMI	2004/10/01 - 2009/07/08
<input checked="" type="checkbox"/> Aerosol Optical Depth at 550 nm	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Aerosol Optical Thickness	OMAEROe.003	Aura OMI	2004/10/01 - 2009/07/08
<input type="checkbox"/> Aerosol R_eff - Ocean (QA-w)	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Aerosol Single Scattering Albedo	OMAEROe.003	Aura OMI	2004/10/01 - 2009/07/08
<input type="checkbox"/> Aerosol Small Mode Fraction Ocean	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08

Temperature(1978/11/01 - 2009/07/08)

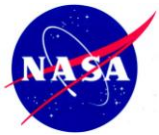
Parameter	Data	Product Info	
<input type="checkbox"/> Clear-sky outgoing long-wave radiation flux_ascending (ClrOLR_A)	AIR3STD.005	Aqua - AIRS standard	2002/08/31 - 2009/07/07
<input type="checkbox"/> Clear-sky outgoing long-wave radiation flux_descending (ClrOLR_D)	AIR3STD.005	Aqua - AIRS standard	2002/08/31 - 2009/07/07
<input type="checkbox"/> Cloud Top Pressure (Day and Night)	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08
<input type="checkbox"/> Cloud Top Pressure (Day only)	MOD08_D3.005	MODIS-Terra Ver. 5	2000/02/24 - 2009/07/08

Check to select a group of parameters

Check to select a parameter

Click to show parameter description

Click to hide the parameter group



# Vertical Selection

**Vertical Profile**

Select a vertical profile range. The range selection is disabled unless a qualifying parameter is selected. In order to enable this option (and populate the list with values), select a 3D parameter. 3D parameters have at least three dimensions and are labeled with a '(3D)' in the 'Parameters' section.

**NOTE:** Selected 3D parameters **must** have the same **vertical** (i.e., 3rd dimension) units in order to enable the vertical level menu.

Upper Level  hPa

Lower Level  hPa

**Temporal**

Begin Date Year  Month  (Date Begin: Aug 2002)

End Date Year  Month  (Date End: Dec 2008)

Select Visualization

[Visualization Help](#)

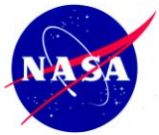
Generate Visualization

Resp...  
Web...  
NASA Official: [Steven.J.Kempler@nasa.gov](mailto:Steven.J.Kempler@nasa.gov) [+ Contact Us](#)  
[Stephen W Berrick <web-contact-disc@listserv.gsfc.nasa.gov>](mailto:Stephen.W.Berrick@listserv.gsfc.nasa.gov)

**Vertical Level List:**

- 1000
- 925
- 850
- 700
- 600
- 500
- 400
- 300
- 250
- 200
- 150
- 100
- 70
- 50
- 30
- 20
- 15

**Click to select a vertical level**



# Temporal and Visualization Selection

Temporal

Begin Date	Year	2009	Month	Jul	Day	8	(Date Begin: 01 Nov 1978)
End Date	Year	2009	Month	Jul	Day	8	(Date End: 08 Jul 2009)

Dropdown menus for Date and Time selections.

Animation  
Cross Map, Latitude-Pressure  
Cross Map, Longitude-Pressure  
Cross Map, Time-Pressure  
Latitude-Time Hovmoller Diagram  
Longitude-Time Hovmoller Diagram  
**Lat-Lon map, Time-averaged**  
Correlation map  
Lat-Lon map of time-averaged differences  
Scatter plot  
Scatter plot, Time-averaged  
Time series  
Time series, Area-averaged differences  
Vertical Profile

Month Feb (Date Beginning: 2008)  
Month Feb (Date End: Dec 2008)

Lat-Lon map, Time-averaged

Visualization Help

Generate Visualization Reset

Responsible NASA Official: [Steven.J.Kempler@nasa.gov](mailto:Steven.J.Kempler@nasa.gov)  
Web Curator: [Stephen.W.Berrick@nasa.gov](mailto:Stephen.W.Berrick@nasa.gov)

+ [Privacy Policy and Important Notices](#)

Click to select a Visualization (also referred to as Analytical Function). "Lat-Lon Map, Time-averaged" is the common default option.

Click to display the description of the selected Visualization (Analytical Function).



# Results Page – Visualization Result (example total column Cloud liquid water and total column water vapor)

Results Navigation Tabs

Year of Tropical Convection  
Alpha prototype

Home

Results #1

Remove All

Visualization Results

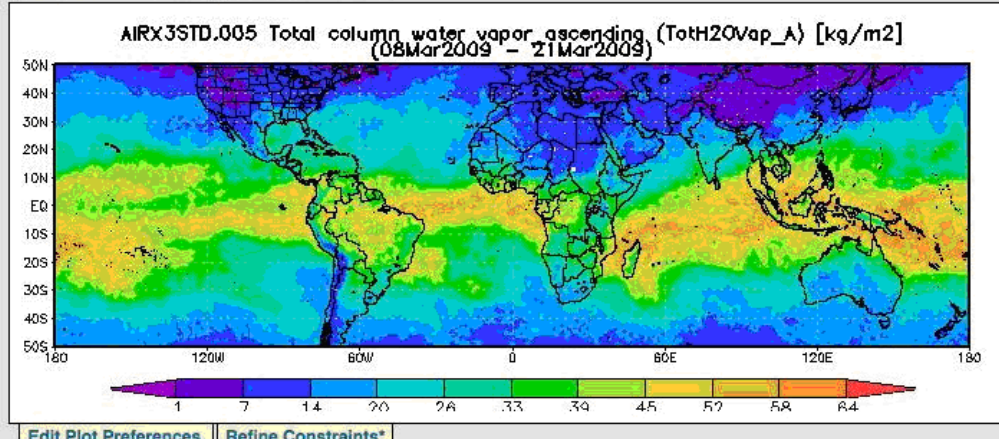
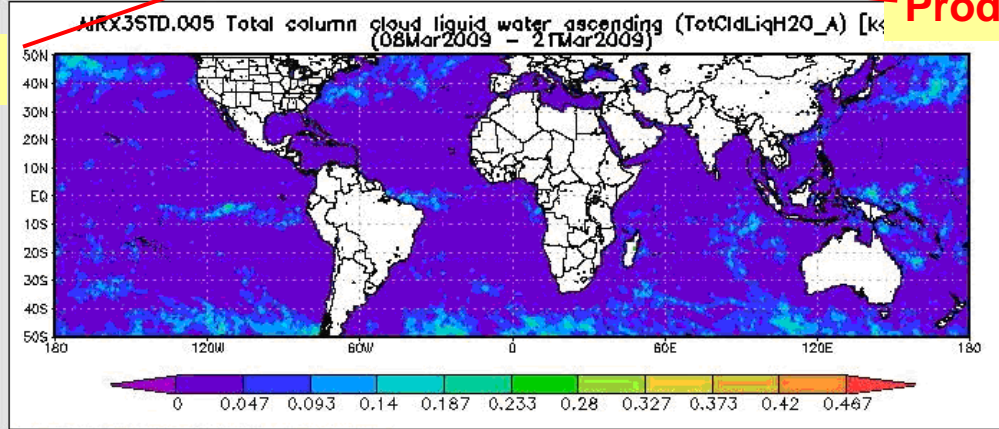
Download Data

Product Lineage

Acknowledgment Policy

Product Lineage

Download Data





# Results Page – Download Data

Home | Result #1 | Results #2 | Remove All

Visualization Results | **Download Data** | Product Lineage | Acknowledgment Policy

Giovanni processing stages. For simplicity purposes, only the initial retrieval stages are shown. Output data formats are HDF, NetCDF(NCD), ASCII, and KMZ. To **download multiple files** at once, select the desired files and then click 'Download in Batch'. **Note:** that 'n/a' means that a file size or other column value is not available; 'saa' means that a file is exactly the same as the previous one in the list. Also, not all services and data products support all download file formats.

**Download Giovanni input data**

**Download multiple files**

**Group check boxes**

**Image icons for single file download**

**Results data**

**KMZ files for Google Earth**

Data Product	Start Time	File Size (b)	HDF	NCD	ASC
MOD08_M3.005 (Optical_Depth_Land_And_Ocean_Mean_Mean)	2008-06-01T00:00:00Z	149396	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
MOD08_M3.005 (Optical_Depth_Land_And_Ocean_Mean_Mean)	2008-07-01T00:00:00Z	157053	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MOD08_M3.005 (Optical_Depth_Land_And_Ocean_Mean_Mean)	2008-07-01T00:00:00Z	156693	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MYD08_M3.005 (Optical_Depth_Land_And_Ocean_Mean_Mean)	2008-06-01T00:00:00Z	264016	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MYD08_M3.005 (Optical_Depth_Land_And_Ocean_Mean_Mean)	2008-06-01T00:00:00Z	264016	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Download in Batch

Download Files

HDF  NCD  ASC

Download in Batch

Download Files

KMZ

Output data format: hdf, netCDF, ascii  
 Output image format: gif, png, KMZ



# Results Page – Product Lineage

Home Result #1 Results #2

Visualization Results Download Data **Product Lineage** Acknowledgment Policy

Browse the processing details of the *Lat-Lon map, Time-averaged* visualization service.

**Data Fetching**  
Fetched data file(s) using and temporal constraints of 2008-11-01T00:00:00Z to 2008-11-30T00:00:00Z , then extracted parameter(s): Aerosol Opti

**Parameter Masking**  
No masking was performed, as specified by the inputs.

**Grid Subsetter**  
Extracted spatial subset of each parameter in previous step using spatial constraint of South: -90 North: 90 East: 180 West: -180

**Time Averaging**  
Averaged all parameters at each grid point over a time period of 2008-11-01T00:00:00Z to 2008-11-30T00:00:00Z

**Dimension Averaging**  
Averaged parameter(s) over the selected spstial area of South: -90 North: 90 East: 180 West: -180 for collapse with area averaging method: Area V

**Two Dimensional Map Plot**  
Generated image(s) with options:  
Map Projection = latlon  
Smooth Type = 3

**Lineage page shows product information and describes data processing steps.**

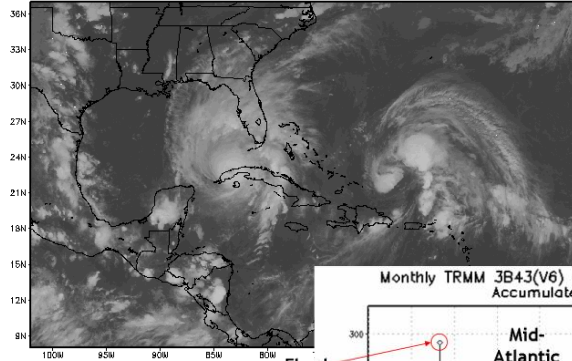
Responsible NASA Official: [Steven.J.Kempler@nasa.gov](mailto:Steven.J.Kempler@nasa.gov)  
Web Curator: [Stephen W Berrick <web-contact-disc@listserv.gsfc.nasa.gov>](mailto:Stephen W Berrick <web-contact-disc@listserv.gsfc.nasa.gov>)

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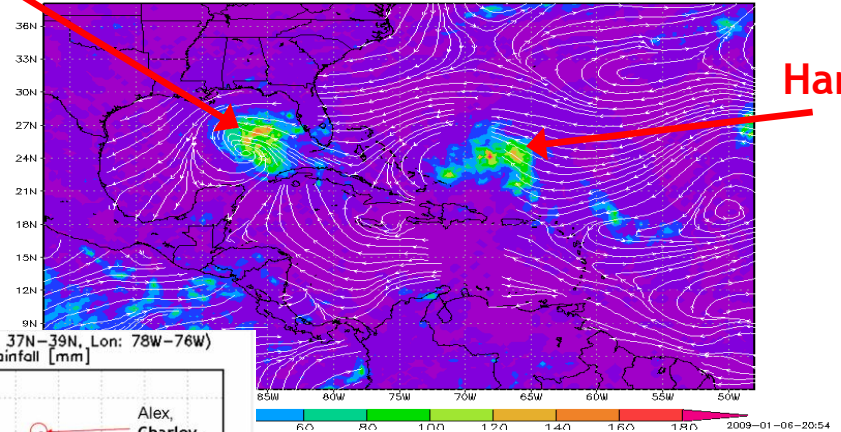
# Examples

Global Merged IR (00min00Z31AUG2008)  
Created by NASA Goddard GES DISC



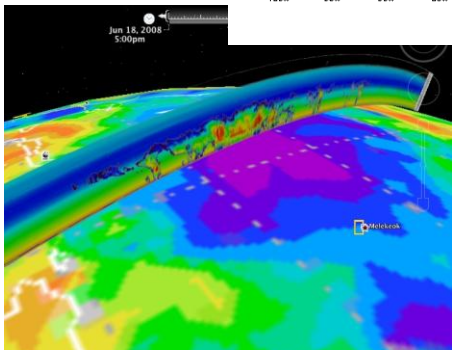
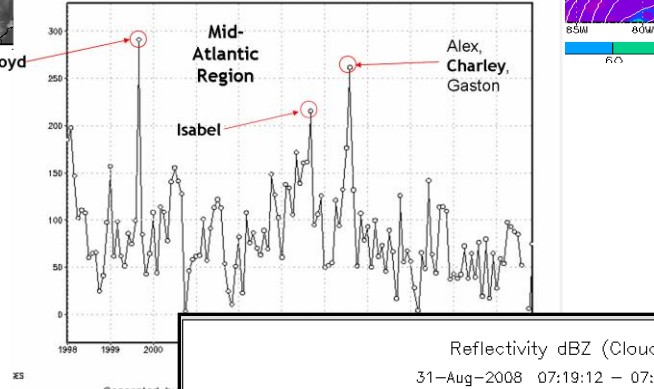
Gustav

(31 August 2008)  
Shaded-3B42(mm) Streamline-QuikSCAT



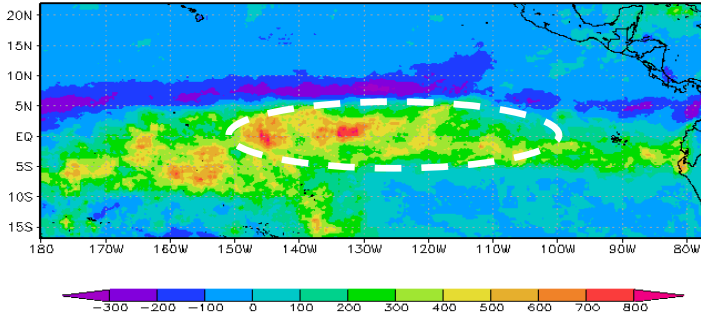
Hanna

Monthly TRMM 3B43(V6) (Lat: 37N-39N, Lon: 78W-76W)  
Accumulated Rainfall [mm]



Anomaly - Jan. 1998

Monthly TRMM 3B43(V6) (Jan1998)  
Rainfall Anomaly [mm]  
Baseline: TRMM 3B43 V6 Rainfall Climatology

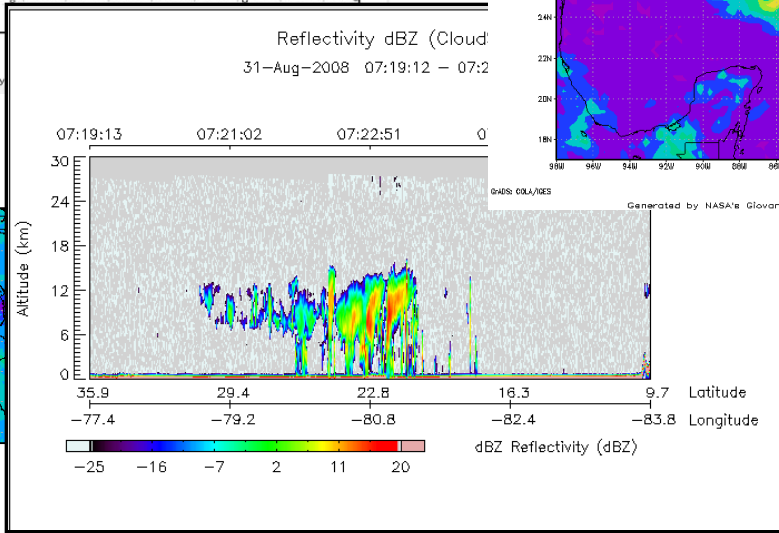


GRADS COLA/NOES

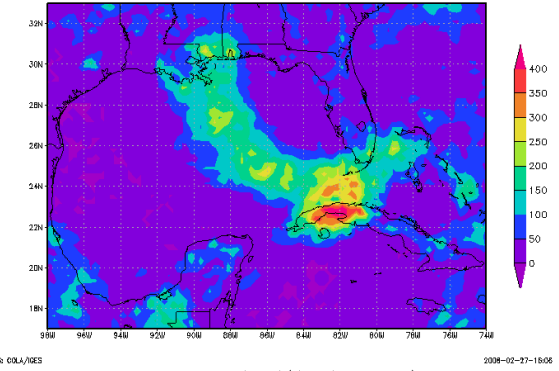
Generated by NASA's Giovanni (giovanni.gsfc.nasa.gov)

2009-01-06-19:10

Reflectivity dBZ (Cloud)  
31-Aug-2008 07:19:12 - 07:2

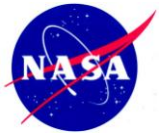


3-hourly TMPA-RT 03Z23Aug2005-03Z31Aug2005  
Accumulated Rainfall [mm]



2009-02-27-18:06





# How to Proceed

## A. Requirements to proceed:

- Identify, define, prioritize the parameters to be included
- Determine cache and server requirements
- If data is to remain external, ensure data access is available through OPeNDAP (locally archived data is not an issue)
- Identify any new functionality requirements to display the data

## B. Available Resources



## **Questions???**

### **GES DISC**

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

### **Giovanni**

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

**Gregory Leptoukh: [Gregory.G.Leptoukh@nasa.gov](mailto:Gregory.G.Leptoukh@nasa.gov)**

**Dana Ostrenga: [Dana.Ostrenga@nasa.gov](mailto:Dana.Ostrenga@nasa.gov)**