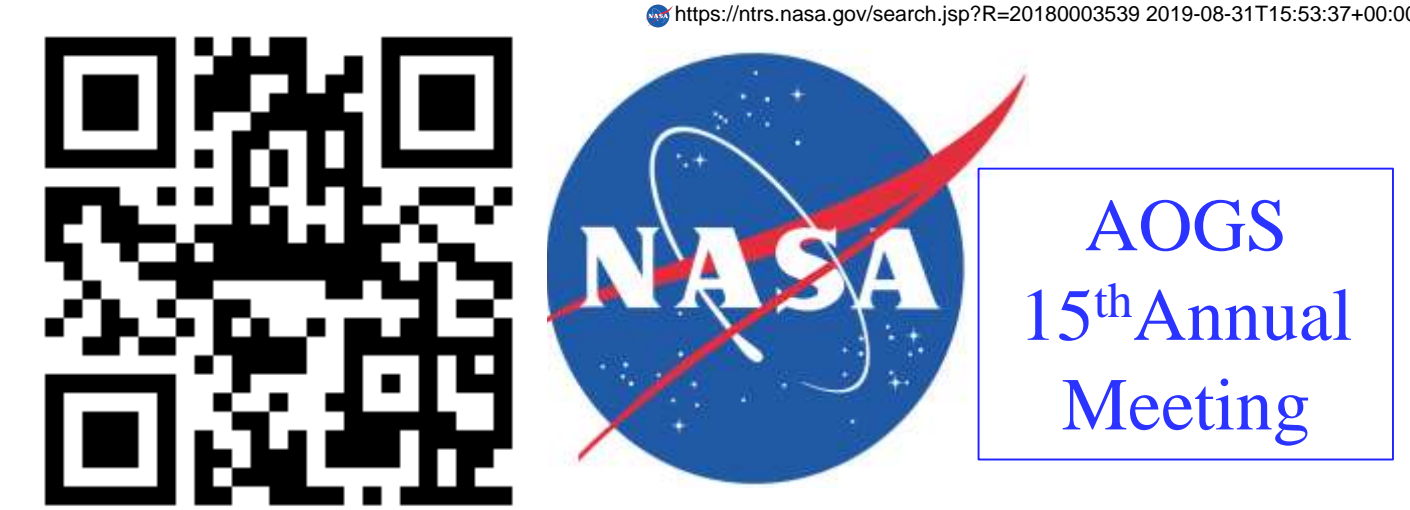


Improving Global Precipitation Product Access at the GES DISC



NASA/Goddard EARTH SCIENCES DATA and INFORMATION SERVICES CENTER (GES DISC)

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New Features and Highlights



Data Set and Service Updates:

- New GES DISC Web portal (see below)
- Web content migration (making things searchable and easier to find)
- GrADS Data Server (GDS) available for both IMERG and TMPA products
- THREDDS Data Server (Access: OPeNDAP, WCS, WMS, NetcdfSubset, NCML, UDDC, ISO; Viewers: Godiva2, NetCDF-Java ToolsUI, IDV)
- GPM V05 (available now); NOAA NCEP merged IR product (online now); GPCP-3 monthly product (coming soon); TRMM V8 (coming soon)
- Level-2 product subsetting (coming soon; OPeNDAP is available now)
- Datalist capability (released prototype – data for Hurricane study)
- TMPA and IMERG in YouTube (coming soon)

Giovanni:

- Seasonal (Interannual) Time Series with shapefile support. With this release, users can specify a shape as their selected region of interest. In addition, a combination of bounding box and shape is supported, provided that the intersection of the shape and bounding box is valid for the data type.
- Seasonal (Interannual) Time Series with Comma-Separated-Variable (CSV) download. This release supports CSV text download for the values shown in any interannual time-series plot.

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) has been actively and continually engaged in improving the access to and use of Global Precipitation Measurement (GPM), Tropical Precipitation Measuring Mission (TRMM), and other precipitation data, including the following new services and ongoing development activities:

- Updates on GPM products and data services
- New features in Giovanni
- Ongoing development activities
- Precipitation product and service outreach activities

This is the GPM Level 3 IMERG Final Monthly 10 x 10 km V03 (GPM_3IMERGM). The Integrated Multi-satellite Retrievals for GPM (IMERG) is the unified U.S. algorithm that provides the Day-1 multi-satellite precipitation product for the U.S. GPM team.

The precipitation estimates from the various precipitation-relevant satellite passive microwave (PMW) sensors comprising the GPM constellation are computed using the 2014 version of the Goddard Profiling Algorithm (GPROF2014), then gridded, intercalibrated to the GPM Combined Instrument product, and combined into half-hourly 10x10 km fields.

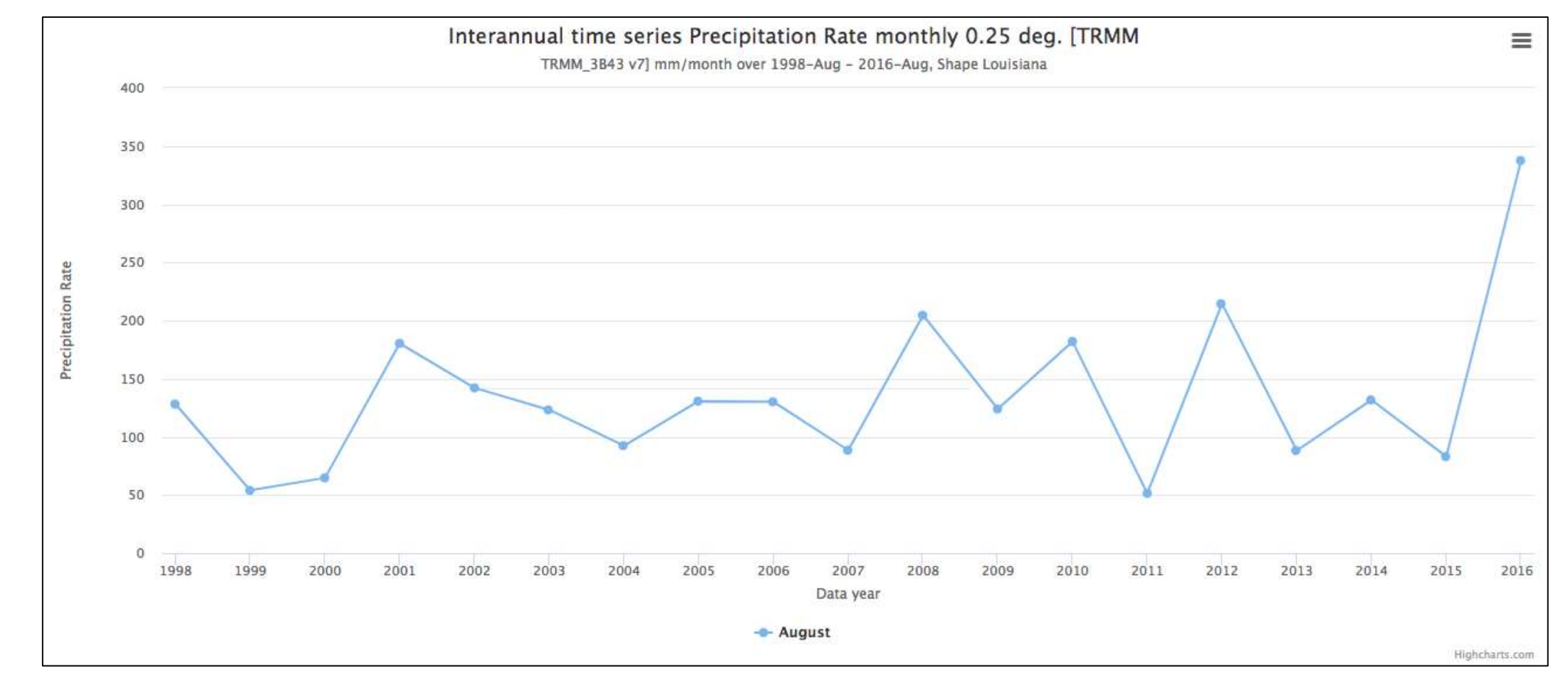
These are provided to both the Climate Prediction Center (CPC) Morphing-Kalman Filter (CMORPH-KF) Lagrangian time interpolation scheme and the Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks Cloud

Data Access:
 Online Archive
 Search+
 Simple Subset Wizard
 Giovanni
 OPeNDAP (DOOS)

Product Summary | Data Citation | Documentation

Shortname: GPM_3IMERGM
 Longname: GPM L3 IMERG Final 1 month 0.1 degree x 0.1 degree precipitation V03
 DOI: 10.5067/GPM/IMERGMONTHV03
 Version: 03
 Format: HDF-5
 Spatial Coverage: (-90.0 to 90.0; -180.0 to 180.0)
 Temporal Coverage: 2014-03-01 to Present
 File Size: 30 MB
 Data Resolution: Spatial: 0.1 degrees x 0.1 degrees, Temporal: 1 month

A variety of data access methods are available for users at different levels and needs

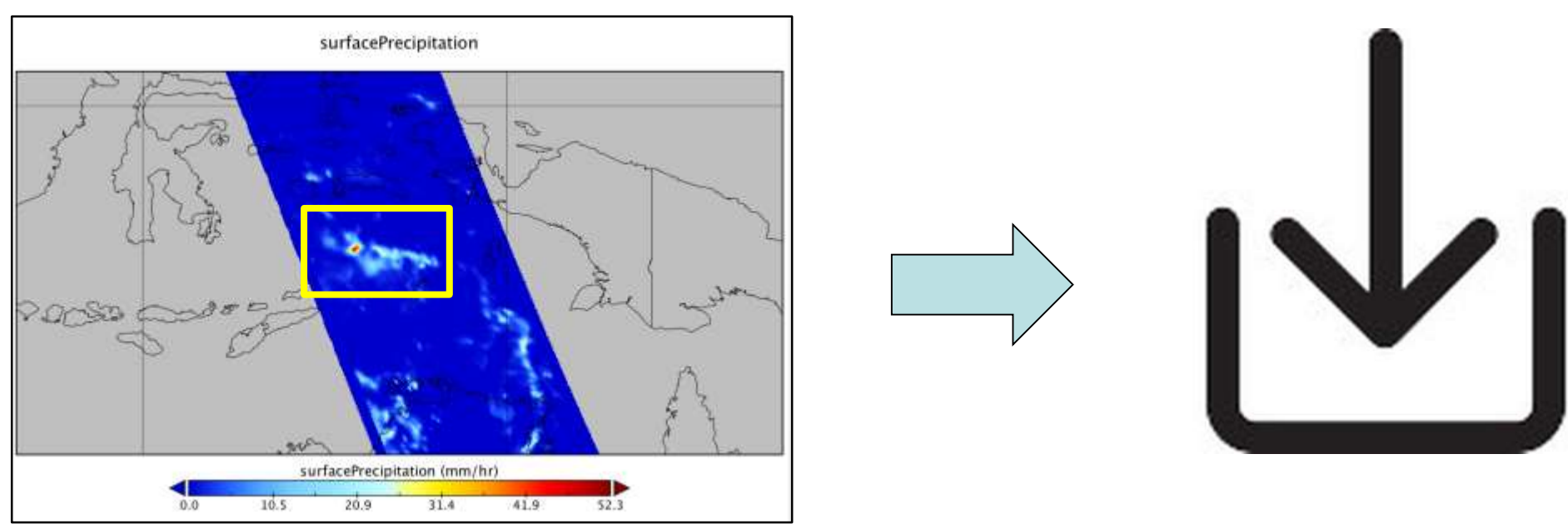
The data set landing page provides a one-stop shop for data services and information. Data set-related services are accessible at the top right. The three tabs provide information on product summary, data citation, and documentation.

A screenshot of Godiva2, showing a map of the IMERG monthly product. THREDDS Data Server supports interoperability through OPeNDAP, WCS, WMS, NetcdfSubset, NCML, UDDC, ISO, as well as viewers (Godiva2, NetCDF-Java ToolsUI, and IDV).

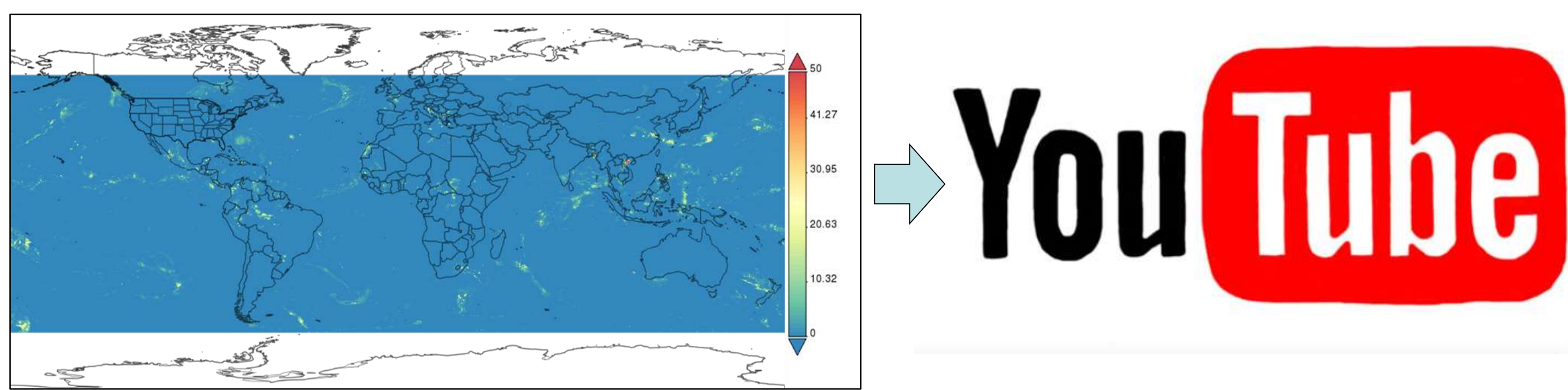
Above: The GES DISC Web portal has been completely redesigned to facilitate data and information discovery and access. Left: Project and mission information; featured gallery images; news; science focus areas; tools; and resources.

Above: Sample of interannual time series of 3B43 for a record-breaking rainfall in the state of Louisiana in August 2016. Shapefiles currently available in Giovanni: countries, U.S. states, land/sea masks, and major watersheds around the world.

Ongoing Development Activities



Level-2 GPM and TRMM product subsetting (spatial: areal and point). Subsetting through OPeNDAP is available now.



Making a whole data set collection (e.g., IMERG, TMPA 3B42) available on YouTube videos. Users can access animations of product collections without downloading data and software. Links will be included for accessing original data.

GPM and TRMM Data Service Outreach Activities

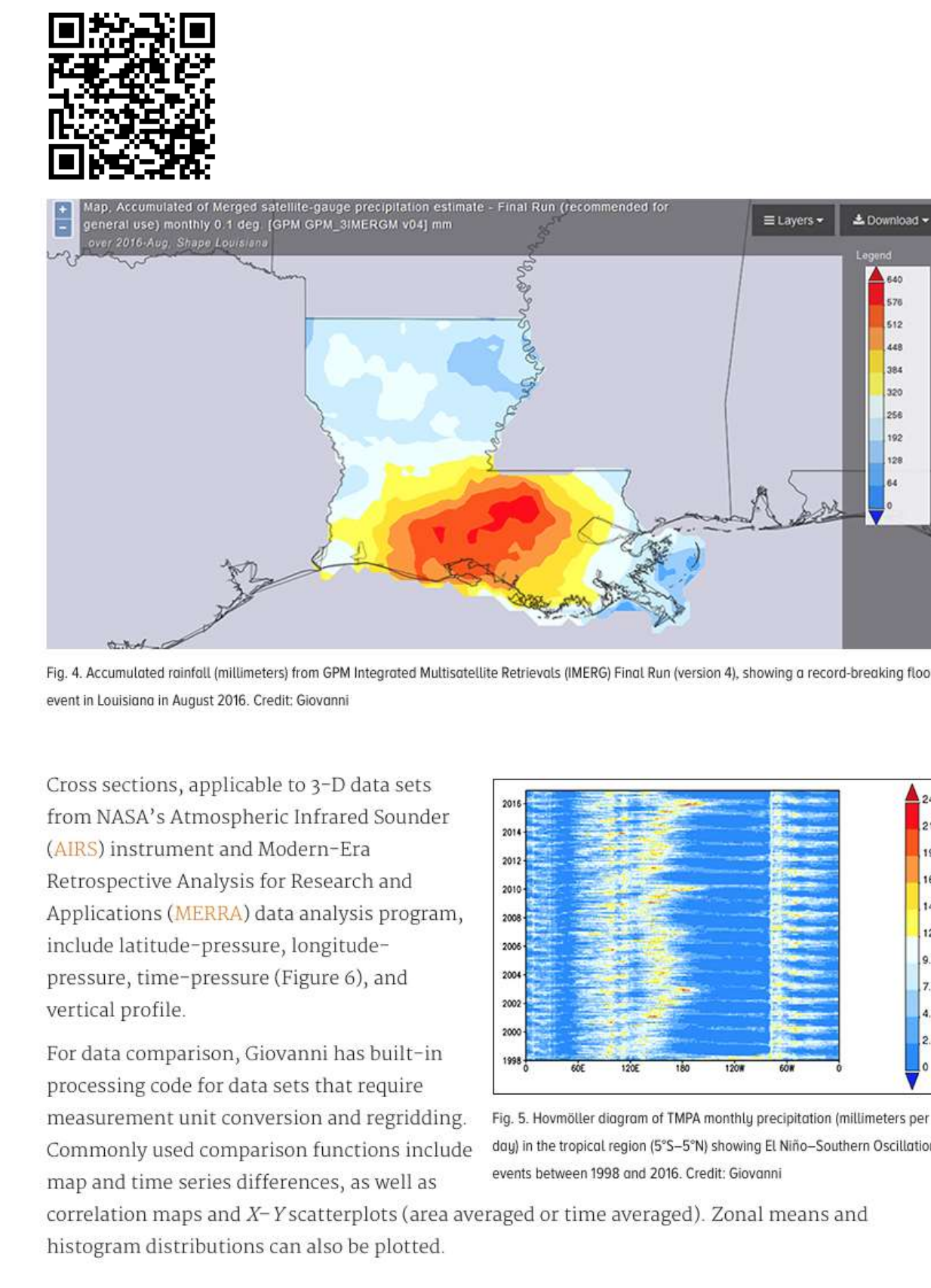
- GES DISC news, Twitter, user forum, GPM product and service training webinars, Giovanni workshops
- EOS article on Giovanni with IMERG and TMPA as examples. GPM products and services at the GES DISC in the BAMS (March 2017 issue)
- Posters and talks at AGU Fall Meetings, AMS Annual Meetings, and other conferences

Giovanni: The Bridge Between Data and Science

Using satellite remote sensing data sets can be a daunting task. Giovanni, a Web-based tool, facilitates access, visualization, and exploration for many of NASA's Earth science data sets.

Cross sections, applicable to 3-D data sets from NASA's Atmospheric Infrared Sounder (AIRS) instrument and Modern-Era Retrospective Analysis for Research and Applications (MERRA-2) data analysis program, include latitude-pressure, longitude-pressure, time-pressure (Figure 6), and vertical profile.

For data comparison, Giovanni has built-in processing code for data sets that require measurement unit conversion and regridding. Commonly used comparison functions include map and time series differences, as well as correlation maps and X-Y scatterplots (area averaged or time averaged). Zonal means and histogram distributions can also be plotted.



GLOBAL PRECIPITATION MEASUREMENT MISSION PRODUCTS AND SERVICES AT THE NASA GES DISC

Z. LIU, D. OSTRENGA, B. VOLLMER, B. DESHONG, K. MACFARLANE, M. GREENE, AND S. KEYSER

redesigned to accommodate changes in data structure, format, data volume, new technology, etc. Therefore, it is necessary to develop an overview document that guides users in locating datasets of interest and services that are suitable for their research and applications. Recognizing a very diverse user community consisting of users from different disciplines, backgrounds, and countries with different levels of data downloading capabilities and Internet connectivity, the GES DISC has developed data services to facilitate GPM data access and exploration.

GPM DATA PRODUCTS. GPM data products at the GES DISC are organized and archived based on three product levels defined by the NASA Earth Observing System Data and Information System (EOSDIS): Level 1, Level 2, and Level 3. In some satellite missions, Level 1 products are subdivided into two categories: Level 1A and Level 1B. Level 1A is defined as, "Reconstructed, unprocessed instrument data at sensor's full resolution, time-ordered, and annotated with ancillary information, including acquisition and geometric calibration coefficients and georeferencing parameters (e.g., platform ephemeris computed and appended but not applied to Level 0 data)." For Level 1B, it is defined as, "Level 1A data that has been processed to sensor units (not all instruments have Level 1B source data)." For GPM, an additional Level 1 category, Level 1C, has been added for common, intercalibrated microwave brightness temperature (T_B) products from GPM constellation satellites, which is necessary to ensure no systematic differences for multi-sensor and multi-satellite precipitation retrieval algorithms such as GPM 5A2G2C.

Table 1 lists GPM Level 1 datasets. Besides Level 1 datasets from the GPM Microwave Imager (GMI) and the Dual-Frequency Precipitation Radar (DFPR) onboard the GPM core satellite, there are Level 1 datasets from other satellites in the GPM constellation. There is only one Level 1A dataset containing GMI resampled radar satellite data. There are 2 Level 1B datasets (1 from GMI and 2 from DFPR). The remaining datasets and Level 1C are described above. Figure 1a is

Social Media

Earthdata User Forum
<https://wiki.earthdata.nasa.gov/display/forums/GES+DISC+Info+Forum>

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NASA Giovanni @NASA_Giovanni · Sep 14
 Here's a Giovanni view of #HurricaneIrma using GPM IMERG data in Giovanni. Try your skills! [giovanni.gsfc.nasa.gov](https://www.giovanni.gsfc.nasa.gov) @NASAFrain

The Giovanni Image Hall of Fame, 3rd Class Now Is The Time!