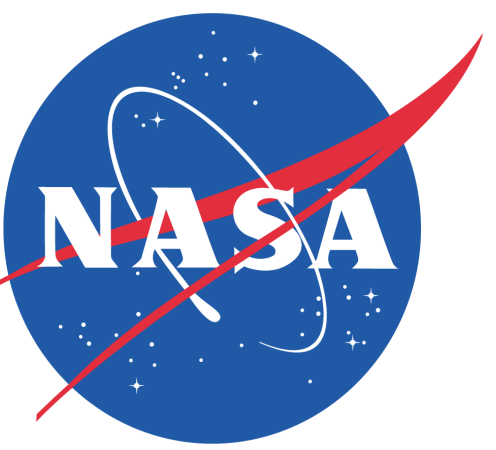# Global Precipitation Measurement (GPM) Mission Products and Services at the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC)

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

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GPM data and services are available at GES DISC

Introduction

On February 27, 2014, the NASA Global Precipitation Measurement (GPM) mission was launched to provide the next-generation global observations of rain and snow (http://pmm.nasa.gov/GPM). The GPM mission consists of an international network of satellites in which a GPM "Core Observatory" satellite carries both active and passive microwave instruments to measure precipitation and serve as a reference standard, to unify precipitation measurements from a constellation of other research and operational satellites. The NASA Goddard Earth Sciences (GES) Data and Information Services Center (DISC) hosts and distributes GPM data within the NASA Earth Observation System Data Information System (EOSDIS). The GES DISC is home to the data archive for the GPM predecessor, the Tropical Rainfall Measuring Mission (TRMM). Over the past 16 years, the GES DISC has served the scientific as well as other communities with TRMM data and user-friendly services.

During the GPM era, the GES DISC will continue to provide user-friendly data services and customer support to users around the world. GPM products currently and to-be available include the following:

- Level-1 GPM Microwave Imager (GMI) and partner radiometer products
- Level-2 Goddard Profiling Algorithm (GPROF) GMI and partner products
- Level-3 daily and monthly products
- Integrated Multi-satellitE Retrievals for GPM (IMERG) products (early, late, and final)

A dedicated Web portal (including user guides, etc.) has been developed for GPM data (http://disc.sci.gsfc.nasa.gov/gpm). Data services that are currently and to-be available include Google-like Mirador (http://mirador.gsfc.nasa.gov/) for data search and access; data access through various Web services (e.g., OPeNDAP, GDS, WMS, WCS); conversion into various formats (e.g., netCDF, HDF, KML (for Google Earth), ASCII); exploration, visualization, and statistical online analysis through Giovanni (http://giovanni.gsfc.nasa.gov); generation of value-added products; parameter and spatial subsetting; time aggregation; regridding; data version control and provenance; documentation; science support for proper data usage, FAQ, help desk; monitoring services (e.g. Current Conditions) for applications.

Accessing GPM Data

Mirador made data access simple. One can search GPM products by typing in "GPM GPROF" in a) and the search results are shown in b). One can also use the drill-down menus to find the data (see c) and d) below).
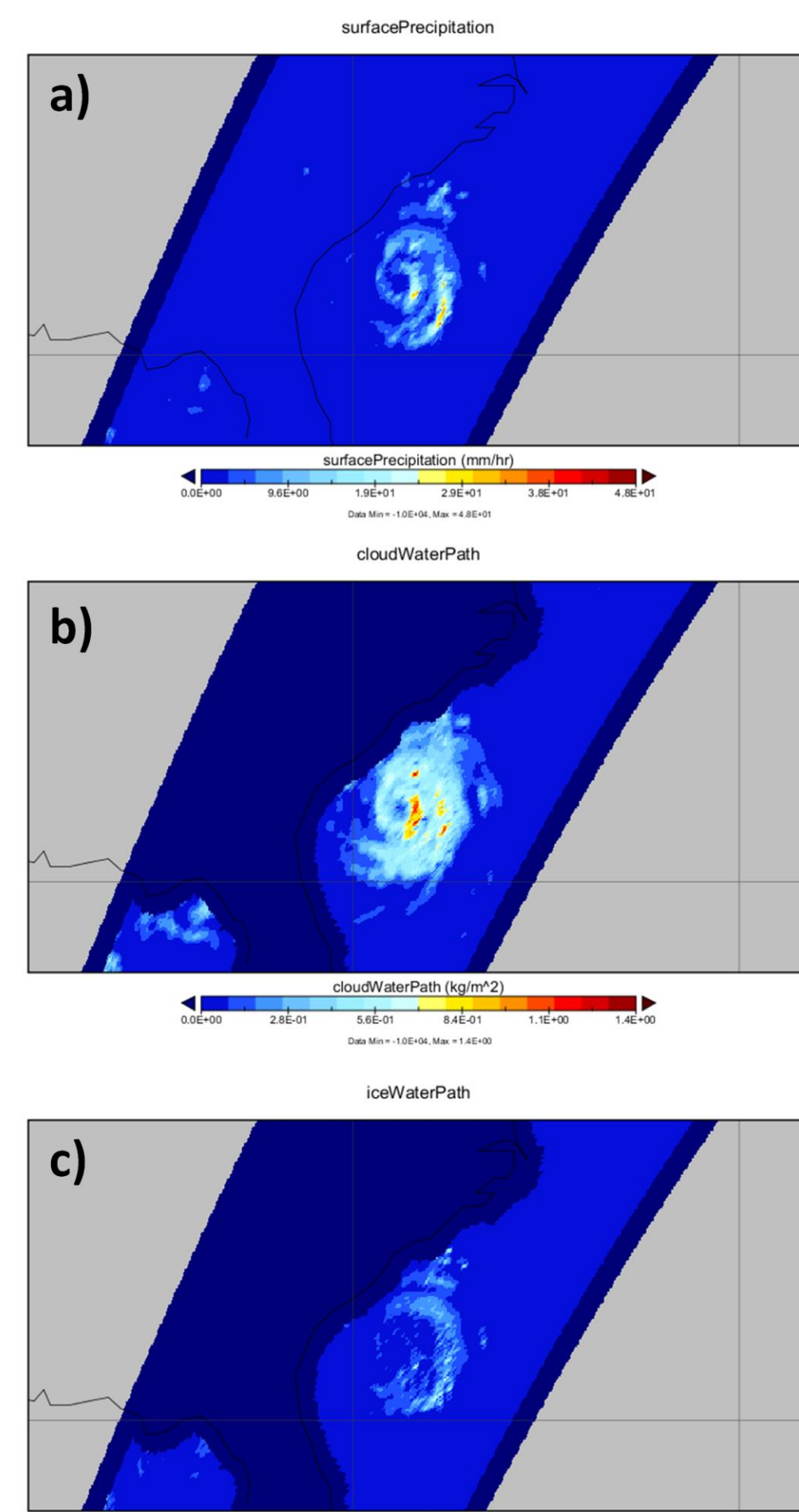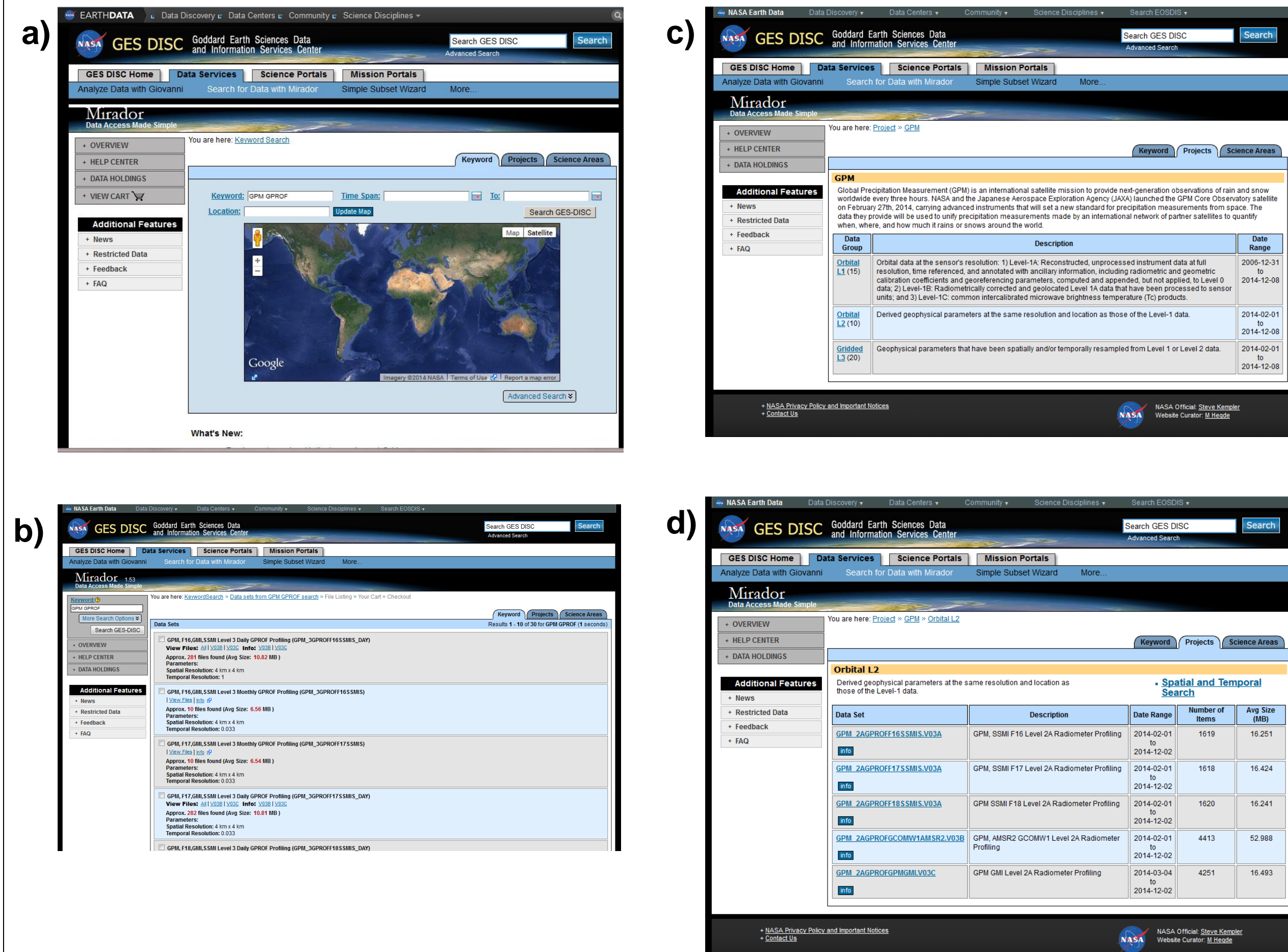
Parameters from the Level-2 GPROF-GMI product: (a) surface precipitation; (b) cloud water path; and (c) ice water path, showing Hurricane Arthur near the South Carolina and Georgia coasts on July 3, 2014.

Giovanni allows online visualization and analysis without the need to download data and software. New functions, i.e., Quasi-Climatology Map, Seasonal Time Series, etc. have been added in the new Giovanni system, in addition to the existing functions.

★ IMERG is coming…

Below: Sample parameters of the IMERG Half-hourly product (3B-HHR.MS.MRG.3IMERG.20140601-S143000-E145959.0870.V01A.HDF5), showing the flooding rainfall in Midwest, USA
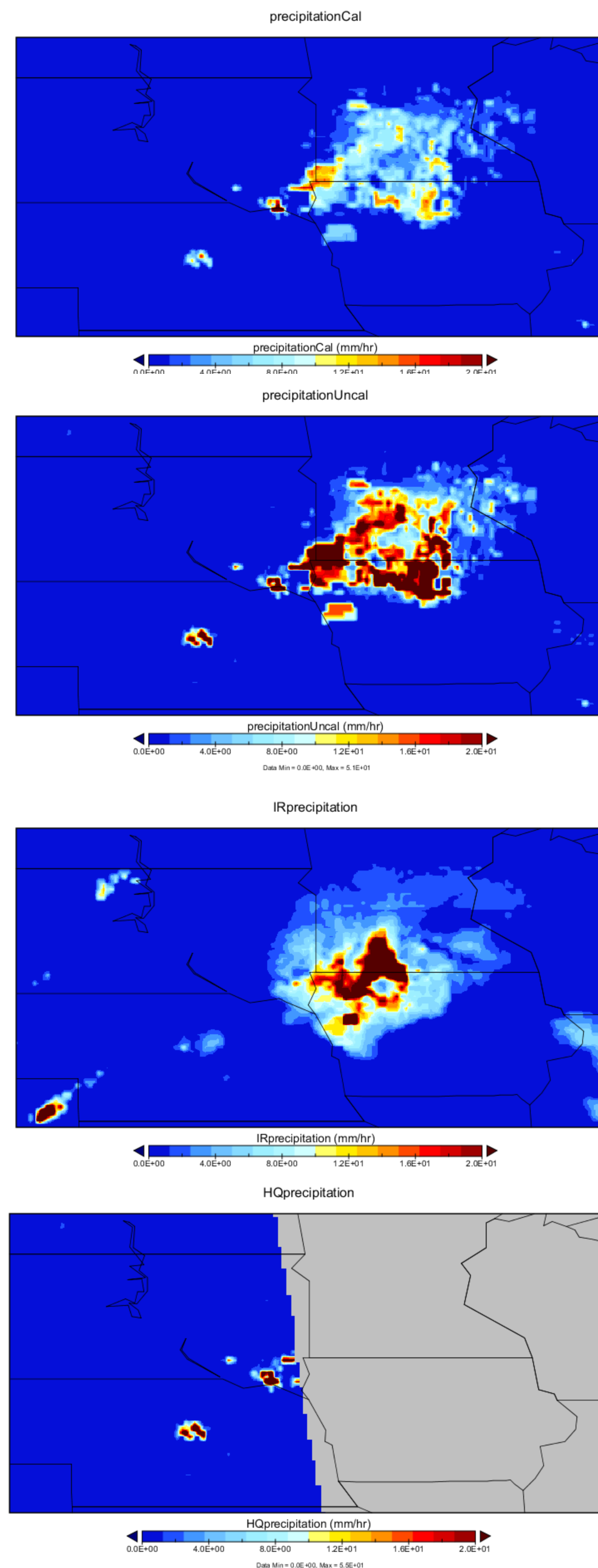
The Integrated Multi-satellitE Retrievals for GPM (IMERG) is the Day-1 U.S. multi-satellite algorithm for GPM, based on components from three prior multi-satellite algorithms from NASA (TRMM Multi-satellite Precipitation Analysis; TMPA), NOAA (CPC Morphing-Kalman Filter; CMORPH-KF), and University of California Irvine (Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks – Cloud Classification System; PERSIANN-CCS).

Parameters in the half-hourly products:
- precipitationCal
- randomError
- precipitationUncal
- HQprecipitation
- HQprecipSource
- HQobservatioTime
- IRprecipitation
- IRkalmanFilterWeight
- probabilityLiquidPrecipitation
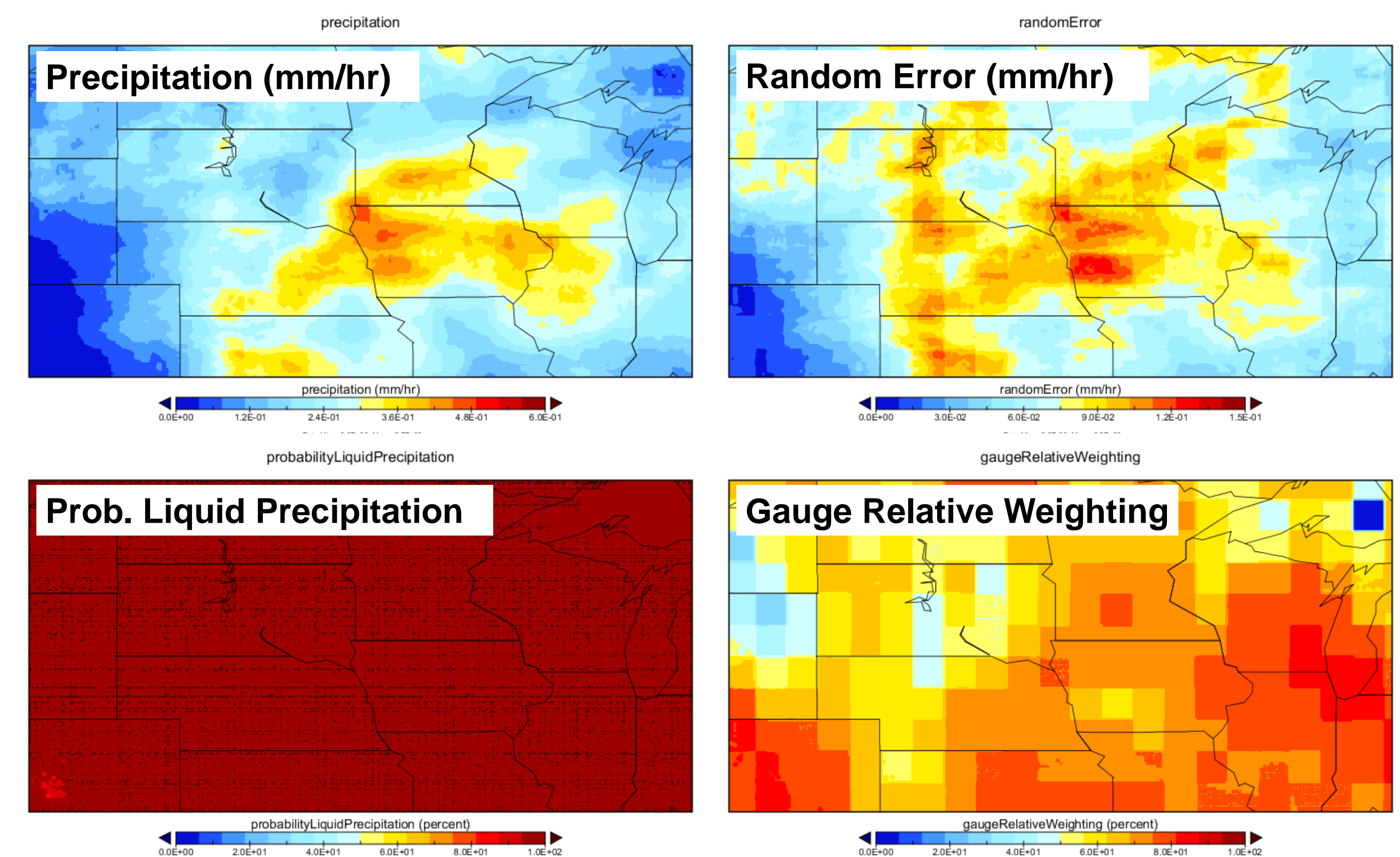
Parameters in the monthly product:
- Precipitation
- randomError
- gaugeRelativeWeighting
- probabilityLiquidPrecipitation

IMERG data will be in Giovanni for online visualization and analysis

Further Readings:

The IMERG Algorithm Theoretical Basis Document (ATBD):
http://pps.gsfc.nasa.gov/Documents/IMERG_ATBD_V4.pdf .

The technical document (not finalized):
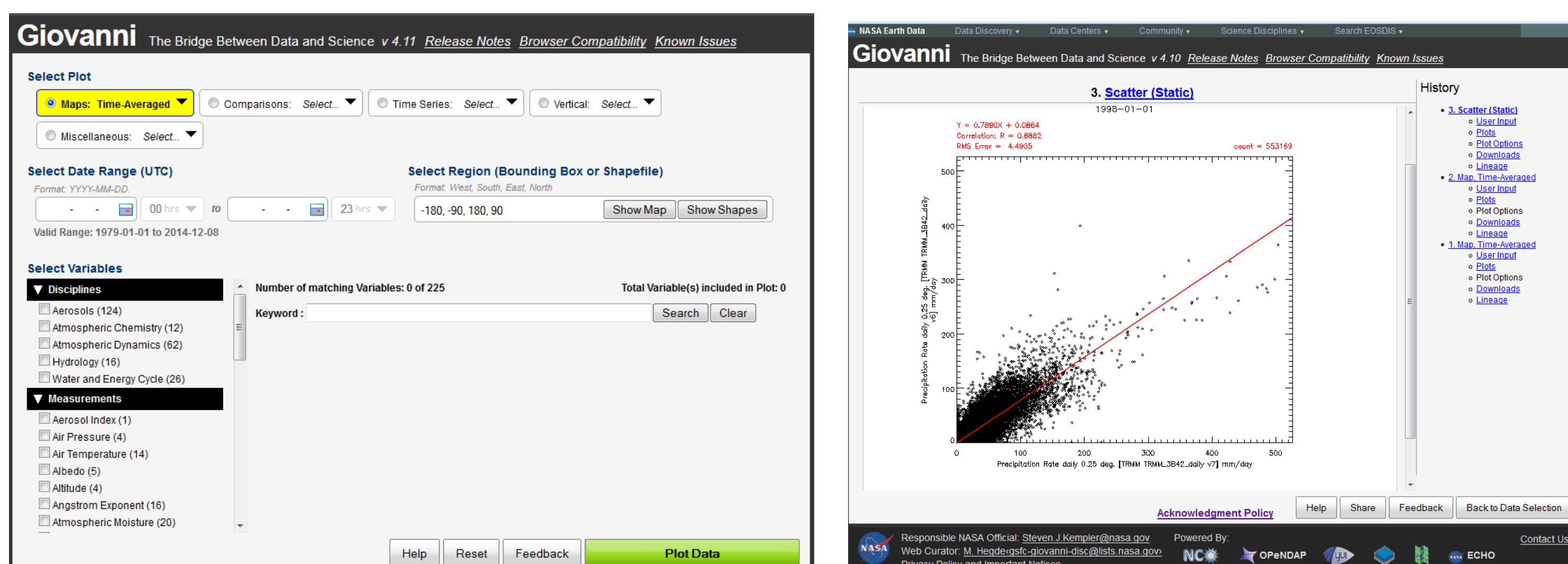*ftp://meso.gsfc.nasa.gov/agnes/huffman/IMERG_doc_draft4.pdf*

Below: Sample parameters of the IMERG monthly product (3B-MO.MS.MRG.3IMERG.20140601-S000000-E235959.06.V01A.HDF5) – the flood of June 2014 in Midwest, USA
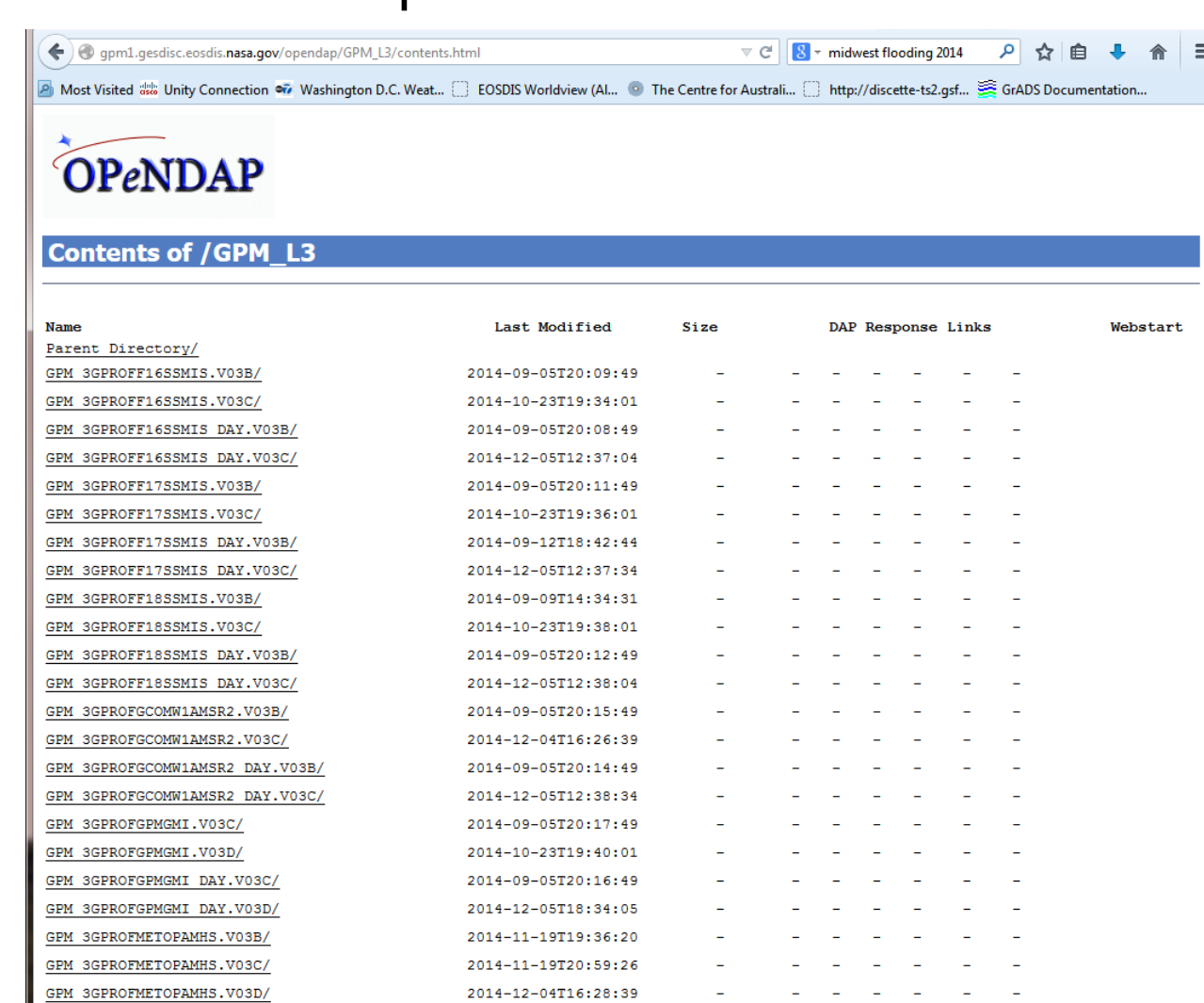

OPeNDAP provides program-level access to GPM data products.

THREDDS provides more access methods to GPM data.

Summary:

GPM Data are available at NASA GES DISC via the following methods:

- Mirador (searching, subsetting, format conversion, etc.). URL: http://mirador.gsfc.nasa.gov/
- Giovanni (Online visualization and analysis). URL: http://disc.sci.gsfc.nasa.gov/giovanni
- OPeNDAP: http://gpm1.gesdisc.eosdis.nasa.gov/opendap/
- THREDDS: http://gpm1.gesdisc.eosdis.nasa.gov/thredds/catalog.html
- Help Desk: gsfc-help-disc@lists.nasa.gov