



---

*Global Precipitation Measurement (GPM) mission*

***Precipitation Processing System***

**PMM Science Team Meeting**

**PPS and GPM Data Product Status**

**Erich Franz Stocker**

**GPM Deputy Project Scientist for Data**

NASA/GSFC Code 610.2

*[Erich.F.Stocker@nasa.gov](mailto:Erich.F.Stocker@nasa.gov)*



# Getting GPM Data Products



- For research products you should be registered either with
  - [registration.pps.eosdis.nasa.gov](http://registration.pps.eosdis.nasa.gov)
  - Or the EOSDIS GSFC DAAC
- For NRT products you should be registered with
  - [registration.pps.eosdis.nasa.gov](http://registration.pps.eosdis.nasa.gov)
  - During registration you should check box that you are interested in NRT
- **Registrations are necessary for IT security and system/product usage reporting**
- **Periodically messages are sent via email registered and if a message bounces the user will be removed from GPM data access**
- **No restrictions on either research or NRT data access**



# Product Version Information



- **PPS production system and NRT system has been in operational state since before launch in February 2014**
- **First public NRT and research L1 GMI swath products available in June 2014 at version V03**
- **First public NRT and research L2,L3 GMI products available in July 2014 at version V03**
- **March 2016 the radar L1/L2/L3 and combined L2/L3 were available at V04**
- **April 2016 GPM GMI GPROF available at V04 using apriori databases based on Ku and Combined GPM data**
- **By end of September 2016 all partner imager radiometer at GPROF V04 and MHS and ATMS sounders also at V04**
- **Radar and radiometer based latent heating products at V04 in April 2016 but only within the TRMM region**
- **IMERG currently still at a modified V03 in NRT (MHS GPROF still V03) but the final product not run in research production**



## End to End NRT Data Latency



- **GMI 1C and GPROF within 1 hour of start of data collection 90% of the time**
- **Combined within 3 hours of start of data collection 90% of the time**
- **GMI 1C and GPROF are available in 30 mins from start of data collection almost 40% of the time (estimated not calculated)**
- **NRT end to end latency reported monthly but it is really a mission level requirement**



# GPM NRT Latency Reports June-December 2014



Product	Expected Granules	Not Made	Made	Met Latency	Total Percent	Made Percent
GMI 1C	61632	862	60770	60421	98.04	99.43
GMI GPROF	61632	1287	60345	59941	97.26	99.43
Combined	10272	1319	8953	8838	86.04	98.72

Note: during this period there were spacecraft maneuvers as well as adjustments on the radar. As a result data not always available for processing



# GPM NRT Latency Reports January-December 2015



Product	Expected Granules	Not Made	Made	Met Latency	Total Percent	Made Percent
GMI 1C	105408	317	105091	104470	99.11	99.41
GMI GPROF	105408	447	104961	104287	98.94	99.41
Combined	17568	229	17339	17212	97.97	99.27

Note: If delta-v or other target maneuvers then a 1C is created but it contains missing values and GPROF can't be generated



# GPM NRT Latency Reports January-September 2016



Product	Expected Granules	Not Made	Made	Met Latency	Total Percent	Made Percent
GMI 1C	69984	610	69374	69181	98.85	99.72
GMI GPROF	69984	644	69340	69022	98.63	99.72
Combined	11664	331	11333	11206	96.07	98.88

Note: If delta-v or other target maneuvers then a 1C is created but it contains missing values and GPROF can't be generated



# GPM PPS Data Distribution



## GPM NRT Data Distribution

Year	Number Get	Volume (TB)
2014 Oct-Dec	6219629	15.71
2015 Jan-Dec	19436159	32.84
2016 Jan-Oct	24746174	41.30

## GPM Research Product Distribution

Year	Number Get	Volume (TB)
2014 Dec only	213666	11.99
2015 Jan-Dec	18952784	324.14
2016 Jan-Oct	29920950	462.49



# Example of Part of Monthly Report



## January - December 2015 Monthly NRT Data Product Report

---

/data/imerg/early	6811344	2.35 TB
/data/GPROF/GMI	3087368	894.26 GB
/data/imerg/gis	2554820	1.28 TB
/data/GMI1B	1992758	6.71 TB
/data/1C/GMI	1364917	2.08 TB
/data/1CR	1231133	1.76 TB
/data/imerg/late	1026244	2.54 TB
/data/GPROF/MHS	541695	233.16 GB
/data/GPROF/SSMIS	385227	716.86 GB
/data/GPROF/AMSR2	120517	771.37 GB
/data/GPROF/TMI	82499	78.49 GB
/data/radar/DprL2	79131	9.57 TB
/data/1C/SSMIS	39439	889.42 GB
/data/1C/MHS	25144	79.16 GB
/data/GPROF/SAPHIR	24668	49.45 GB
/data/combine	21839	508.06 GB
/data/radar/KuL2	13206	860.40 GB
/data/radar/KaL2	12076	708.69 GB
/data/1C/AMSR2	10371	810.29 GB
/data/1C/ATMS	8585	56.82 GB
/data/1C/TMI	1696	20.48 GB
/data/1C/SAPHIR	1482	16.31 GB
/data/GPROF/ATMS	0	0.00 bytes
<hr/>		
TOTAL :	19436159	32.84 TB



# GPM NRT Data Production Distribution



- **GPM data products are only available via the ftp protocol to registered users of the NRT subsystem**
- **When registering for GPM/TRMM, users select whether they will be accessing NRT data**
- **Data is available to users as soon as it is created by the NRT subsystem**
- **No query interface provided to NRT data**
- **No subsetting of NRT data is automatically available**
- **By contacting [erich.f.stocker@nasa.gov](mailto:erich.f.stocker@nasa.gov) can request that subsets of NRT data be made available (via ftp) over user specified geographical areas of interest.**



# Research Product Order Service through STORM



- **STORM provides search and order as well as data browse capability**
- **STORM provides single order creation**
- **STORM support standing order creation (as data produced user informed and scripts provided)**
- **TRMM data as well as GPM data available via STORM**
- **For both types of orders:**
  - Subsets based on geographical area of interest (L1 – L3 products)
  - Subsets based on data product parameters of interest (e.g. surface precipitation) (L1 – L3)
- **Increasing number of users are subsetting their data orders**
- **All research data (including previous versions) always on line and can be retrieved via ftp by registered users**
  - Previous versions are not visible in the STORM query interface.
  - Previous versions must be retrieved via ftp



# PPS Extra Products



- **TMPA is still being produced as NRT and research products**
- **NRT**
  - GIS version of early and late IMERG available (TIFF plus world file)
  - The GIS version also has accumulations: at various time intervals
    - Early: 3 hourly, 1 day
    - Late: 3 hourly, 1 day, 3 day and 7 day
- **Research**
  - GIS version of the final IMERG (TIFF plus world file)
    - Accumulations: 3 hourly, 1 day, 3 day and 7 day
  - Gridded Text products ( 1 hour .25 deg x .25 deg in daily zipped files)
    - Contain surface precipitation information
    - Core: GMI, KU, DPR, Combined
    - Imagers: GMI, AMSR2, F16, F17, F18, F19 (currently placeholder for F20)
    - Sounders: MHS-NOAA18, MHS-NOAA19, MHS-MetopA, MHS-MetopB, Saphir, ATMS (not currently being produced because of version mix)



# Investigator Provided



- **Precipitation Features products**
  - Partnership between PPS, Univ of Utah, TAMU-CC
  - Supported by TAMU-CC
  - L1 and L2 products
- **Cloudsat/GPM matchup (radar and GMI)**
  - Provided by Joe Turk at JPL
  - ATBD online at [pps.gsfc.nasa.gov](http://pps.gsfc.nasa.gov)
  - Searchable via the STORM interface
  - Always available online via ftp
  - New products (new versions) when provided by investigator
  - Version numbers pertain to the coincident product version
  - Has proven to be a very popular product



# NRT Viewer



- **View NRT L1C GMI,**
- **GMI GPROF,**
- **L2 DPR**
- **L3 IMERG-early**
- **Combined is in the queue to be added**



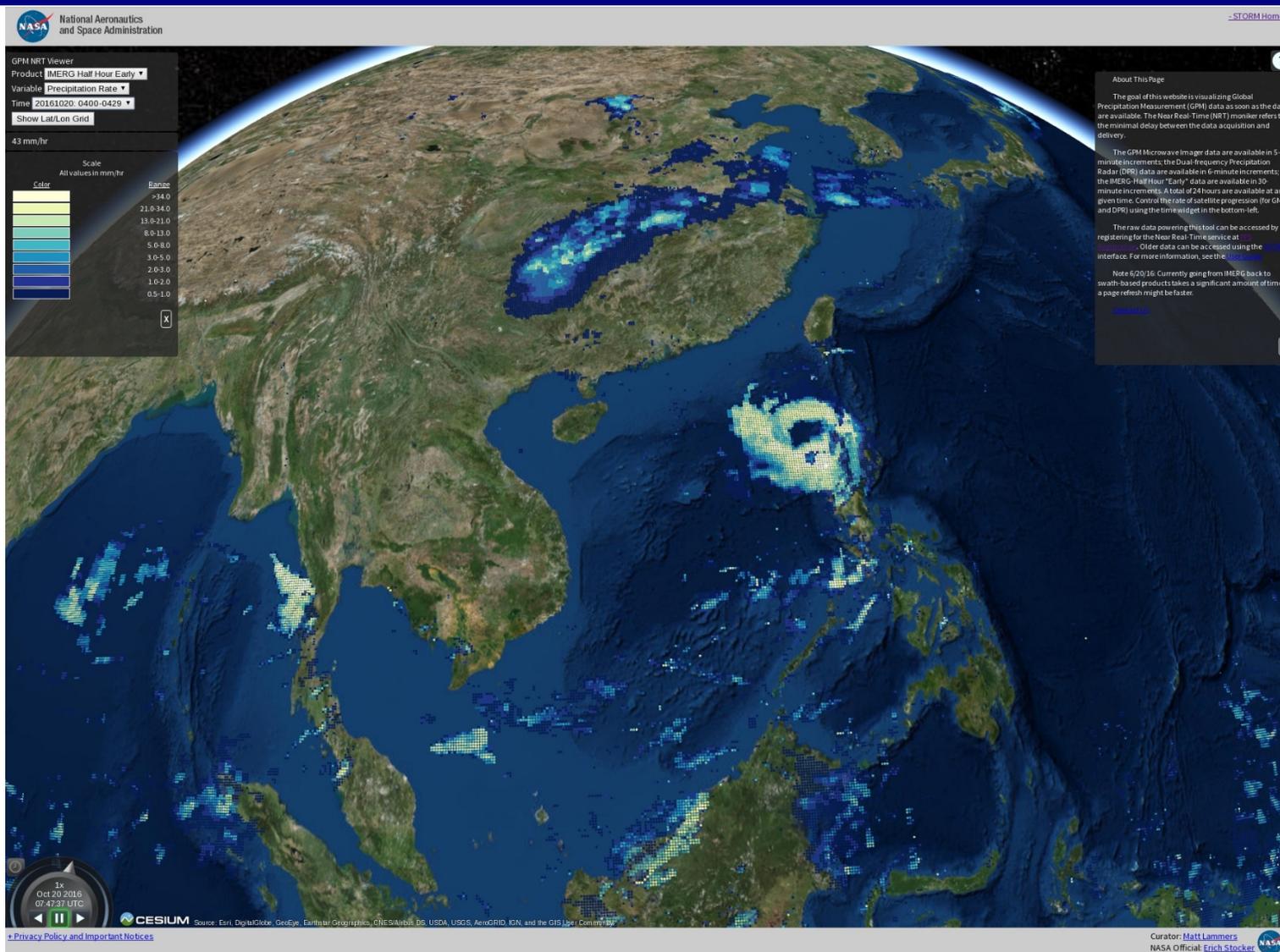
# Future Reprocessing



- **GPM Version 5**
  - L1 GMI and DPR calibration changes
  - GPROF retrieval improvements: GMI, partner imagers and sounders. Content changes
  - L2 radar retrieval improvements
  - L2 combined retrieval improvements
  - Expansion of LH products
- **TRMM V8**
  - Upon completion the TRMM data suite will be part of the GPM V05
  - Use GPM V05 algorithms for PR, TMI, combined and latent heating
  - Eliminate TMPA and reprocess using V05 IMERG back to 2000 (1998) through the current period of GPM
  - Uses GPM file naming convention
  - Uses GPM file formatting
  - Produced only in HDF5
  - V7 remains online as does V6



# NRT Viewer IMERG-Early

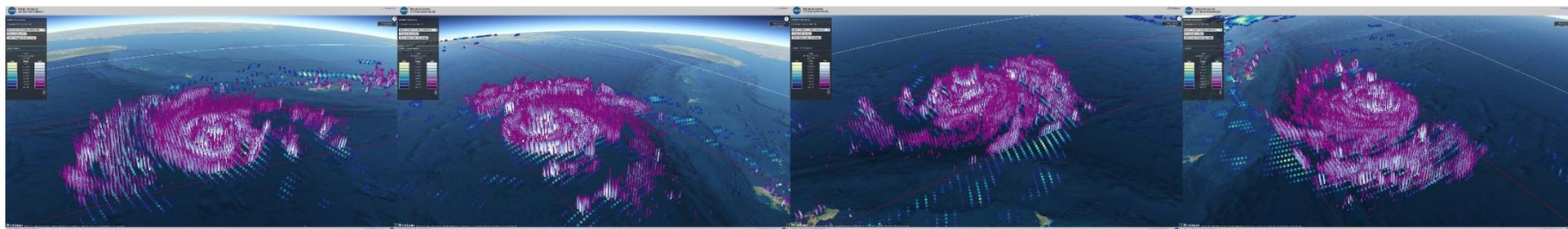




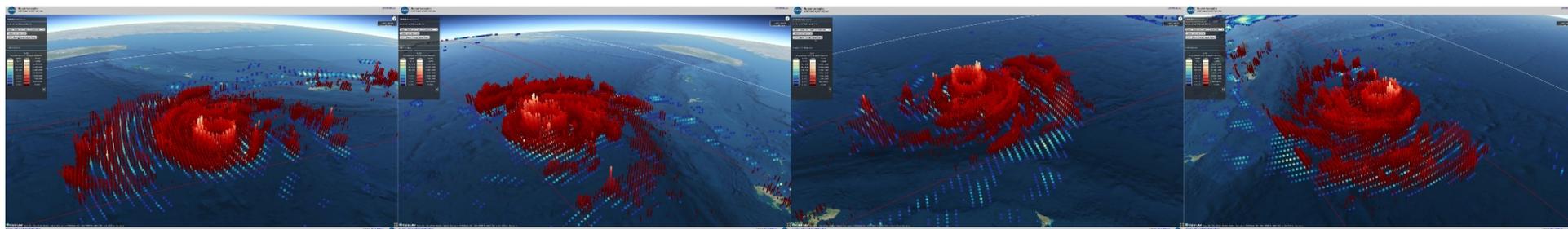
# NRT Event Viewer-3D Globe



## Precipitation

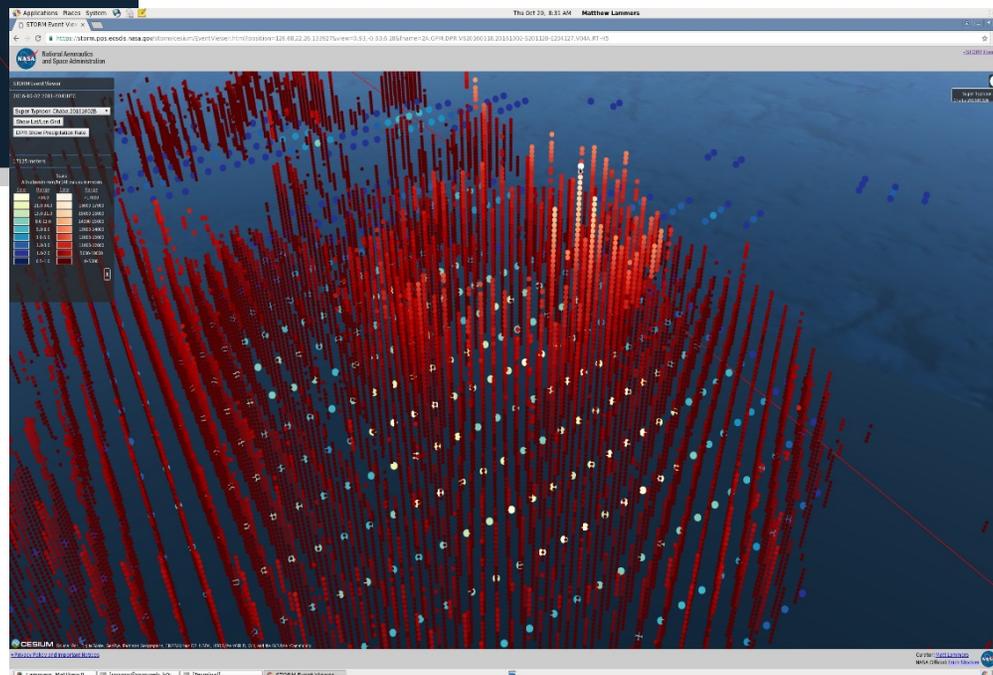
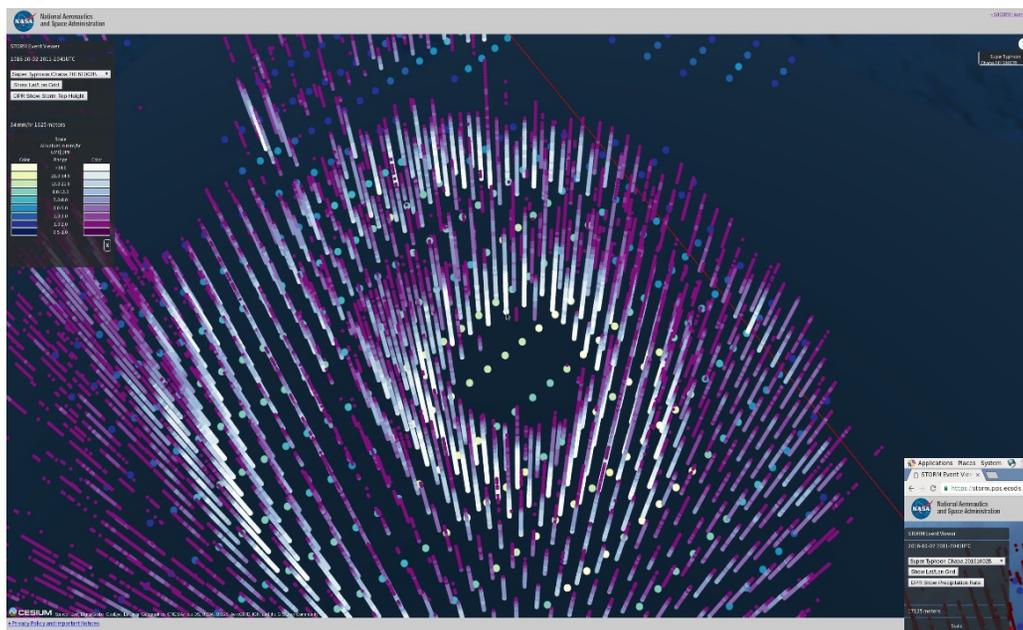


## Storm Height





# NRT Event Viewer-Zoom Feature





# Assist in Ordering-Example Combined



NASA National Aeronautics and Space Administration

STORM Virtual Globe

GPM-DPRGM1 CMB  
2014-10-16 1240:14:13UTC  
Minute Range: 50-65

0 93

Show MS

Show Lat/Long Grid

2 mm/hr 6000 meters

Scale

All values in mm/hr

Color	Range
Yellow	>34.0
Light Green	21.0-34.0
Green	13.0-21.0
Teal	8.0-13.0
Blue-Teal	5.0-8.0
Blue	3.0-5.0
Dark Blue	2.0-3.0
Very Dark Blue	1.0-2.0

Curator: [Matt Lammers](#)  
NASA Official: [Erich Stocker](#)

STORM Virtual Globe places raw precipitation data at your fingertips, displaying each data point from the selected product on a three-dimensional globe viewer. If not using IMERG or MAGRIP-DAT, you can drag the slider to change the currently visible interval to any place on the granule, with an orange box providing a visual aid to show where the interval will appear. Once the data is displayed, mouse over the data points to see the raw values in the space above the scale.

Radar data adds the ability to see data not just on a globe, but above it. When the DPR or CMB product is chosen, precipitation rate values appear above the globe's surface. This allows three-dimensional representation of storms. Mousing over these points displays not only the precipitation rate in mm/hr, but also the altitude.

Want to see other products in STORM Virtual Globe? Have questions about the technology behind it?

CESIUM © Analytical Graphics, Inc. © CGIAR/CSI. Produced using Copernicus data and information funded by the European Union - EU/DEM layers • Source: Earth DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Privacy Policy and Important Notices



# Thor Online



## THORonline HDF5 browser

File Array Point

- precip1stTertial
- precip2ndTertial
- probabilityOfPrecip
- profileNumber
- profileScale
- qualityFlag
- rainWaterPath
- retrievalType
- snowCoverIndex
- spare
- spareIndex
- sunGlintAngle
- surfacePrecipitation**
- surfaceSkinTempIndex
- surfaceTypeIndex
- temp2mIndex
- totalColumnWaterVaporIndex
- SwathHeader

2A.GPM.GMI.GPROF2014v2-D.--  
20161018-S013715-E030949.--  
014989.V04A.HDF5  
/S1/surfacePrecipitation

Typhoon Haima  
18 Oct 2016

(mm/hr)

76.0477  
57.0376  
38.0274  
19.0172  
0.00704

18% -9999 missing

16  
14  
130  
132

Server Up Alg: gpm.2AGPROFGMI File: 2A.GPM.E030949.014989.V04A.HDF5

### STORM Data Ordering System

Left click on the header to sort columns. Right click to view additional info

Select	Algorithm	Download / View	Start Time
<input type="checkbox"/>	2AGPROF	THOR	2016-10-17 22:32:04
<input type="checkbox"/>	2AGPROF	THOR	2016-10-18 00:04:39
<input checked="" type="checkbox"/>	2AGPROF	THOR	2016-10-18 01:37:15
<input type="checkbox"/>	2AGPROF	THOR	2016-10-18 03:09:50
<input type="checkbox"/>	2AGPROF	THOR	2016-10-18 04:42:25
<input type="checkbox"/>	2AGPROF	THOR	2016-10-18 06:15:01



# IMERG GIS Viewer



Realtime IMERG browser based on the Cesium virtual globe

