New Precipitation products (GPM, GCOM-W) and more

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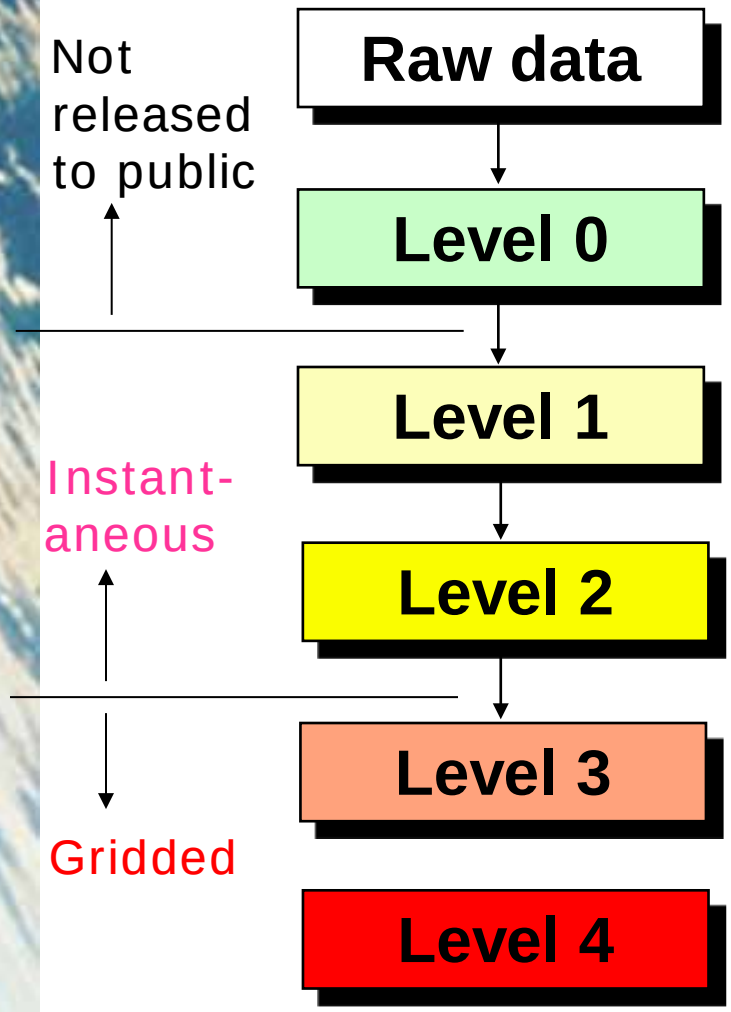
Satellite Product Categories

- Standard Product
  - Operational product that produced
- Near Real-time Product
  - Product that is released in near real-time in order to meet requirement for operational uses, such as numerical weather prediction. Products are released in near-real-time basis to operational agencies. Accuracy might be worse than standard product due to priority in data latency.
- Research Product
  - Product that uses research algorithm and is produced mainly for research objectives. Products are not produced operationally.
- Subset Product
  - Sub-set of specific region or area, produced from standard product.

Data Processing for Standard Products



Data transferred from the satellite

Quality checked raw data

Engineering value with geometric & radiometric corrections

Geophysical parameters

Temporary and spatially averaged data

Assimilation to the numerical model (to be future product)

Example: AMSR2 Product Definition (1/2)

- L1A product
  - Process radiometric and geometric corrections to Level 0 product
  - Stores additional information (conversion coefficient of antenna temperature, etc.)
- L1B product
  - Same as Level 1A product but observation count is converted to Tb using radiometric correction coefficients.
- L1R product
  - Resample Level 1B product considering differences of resolution in each frequency. Correction of effect by altitude difference is also done.
  - Tb resampled to 6GHz, 10GHz, 23GHz, and 36GHz footprint, and original 89GHz are stored.

Example: AMSR2 Product Definition (2/2)

- L2 product
  - Geophysical parameters retrieved from Level 1B and/or 1R products.
- L3 product
  - Statistically merged product in daily or monthly basis calculated from Level 1B and 2 products.
  - Global equal Latitude/Longitude grid in 0.25-degree (Low res.) and 0.1-degree (High res.), and polar stereo grid for Northern and Southern Hemisphere in 25-km (Low res.) and 10-km (High res.).
  - Statistical information is also included in monthly products.
- L4 product (discussed as research product)
  - Geophysical parameters that is output from numerical model with data assimilation of AMSR2 data

How to get data
http://www.eorc.jaxa.jp/

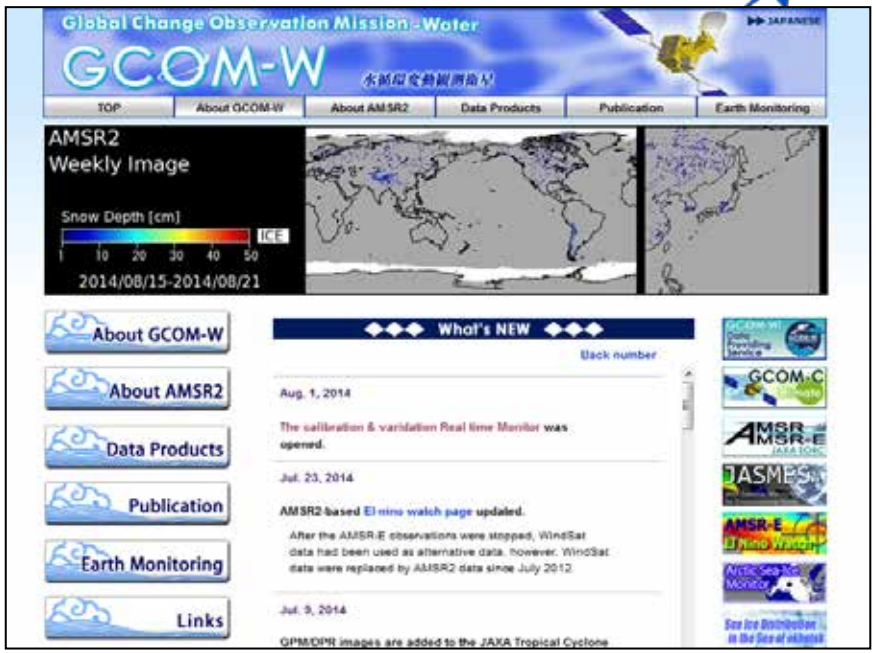
G-Portal [Standard Product]

GCOM-W1 data [Standard Product]

Research Project Sites [Research Product]

TRMM/GPM/AMSR-E/AMSR2 data/image access - Images, Research Products

Browse Images at EORC



TRMM Web site:
http://www.eorc.jaxa.jp/TRMM/

AMSR-E Web site:
http://sharaku.eorc.jaxa.jp/AMSR/

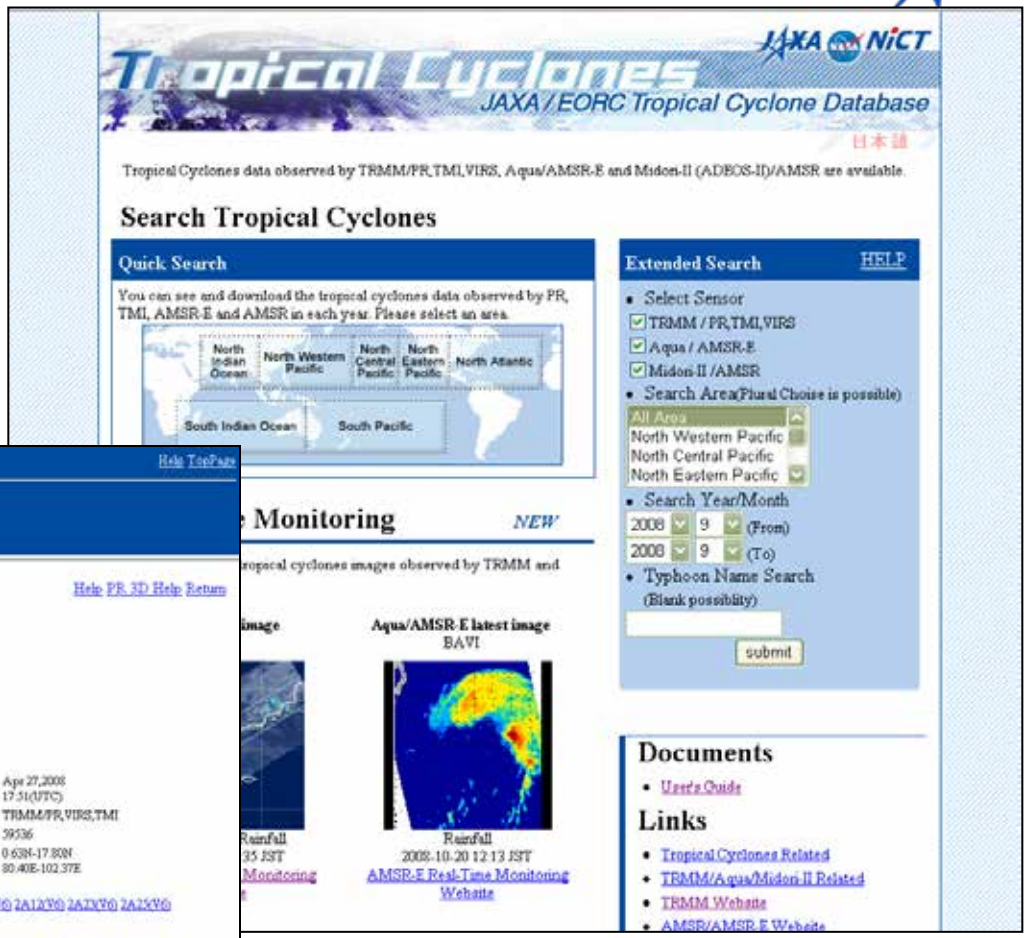
GPM Web site:
http://www.eorc.jaxa.jp/GPM/

GCOM-W1 Web site:
http://suzaku.eorc.jaxa.jp/GCOM_W/

Many browse images, tools, data descriptions and manuals are available from the EORC site.

JAXA/EORC Tropical Cyclone Database

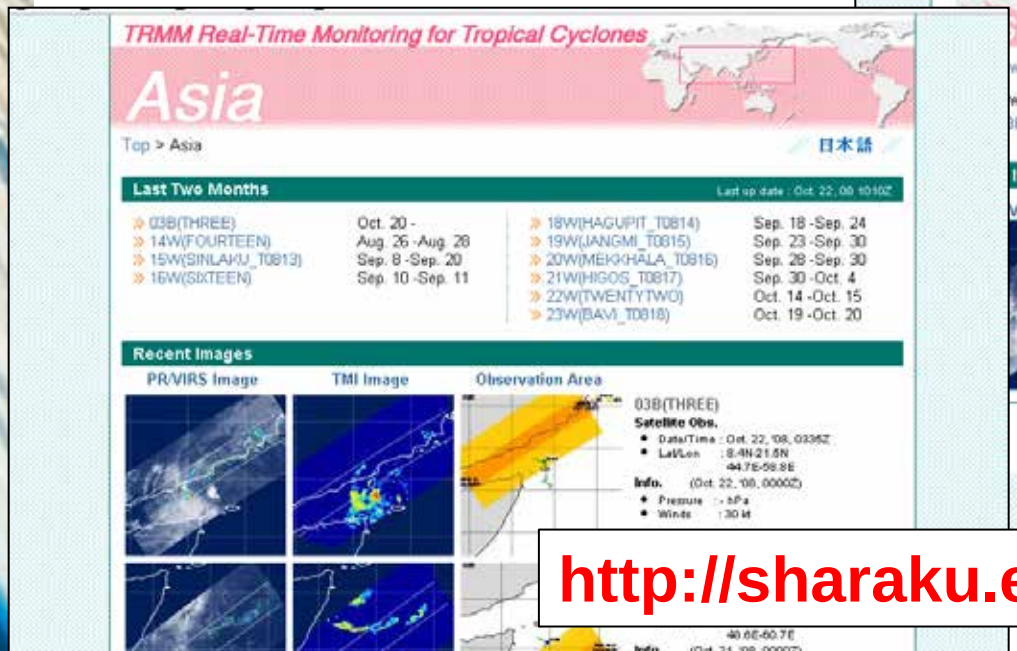
- Browse images, 3D movies and data of tropical cyclones observed by TRMM, AMSR-E, AMSR, AMSR2, GPM-Core are available.
- Updated 1-1.5 months after observation.



http://sharaku.eorc.jaxa.jp/TYP_DB/index_e.shtml

JAXA/EORC Tropical Cyclone Real-Time Monitoring

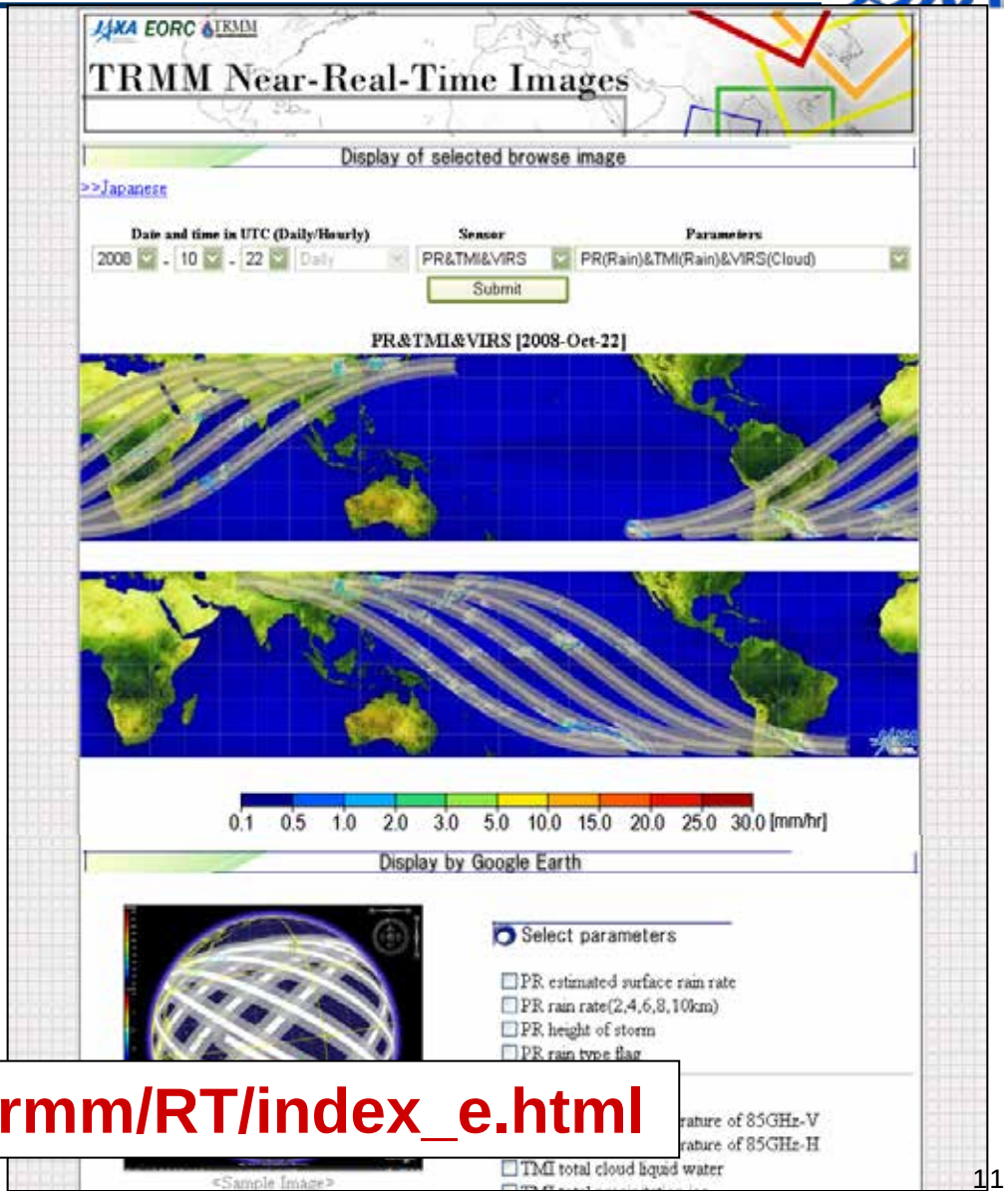
- Global regions (Asia, Americas, Oceania)
- Operating in near-real time (3-6 hours after observation)
- Browse images of TMI, AMSR2, GPM-Core and storm tracks are available



http://sharaku.eorc.jaxa.jp/TYPHOON_RT/

TRMM Near Real Time Images

- Operational from Feb. 2008
- Visualize TRMM near-real time data 3-6 hours after observation
- Easy browsing, easy selection of dates and parameters. Displaying user selected regions with zoom-up and down
- Overlaying multi-parameters.
- Displaying by Google Earth.



http://sharaku.eorc.jaxa.jp/trmm/RT/index_e.html

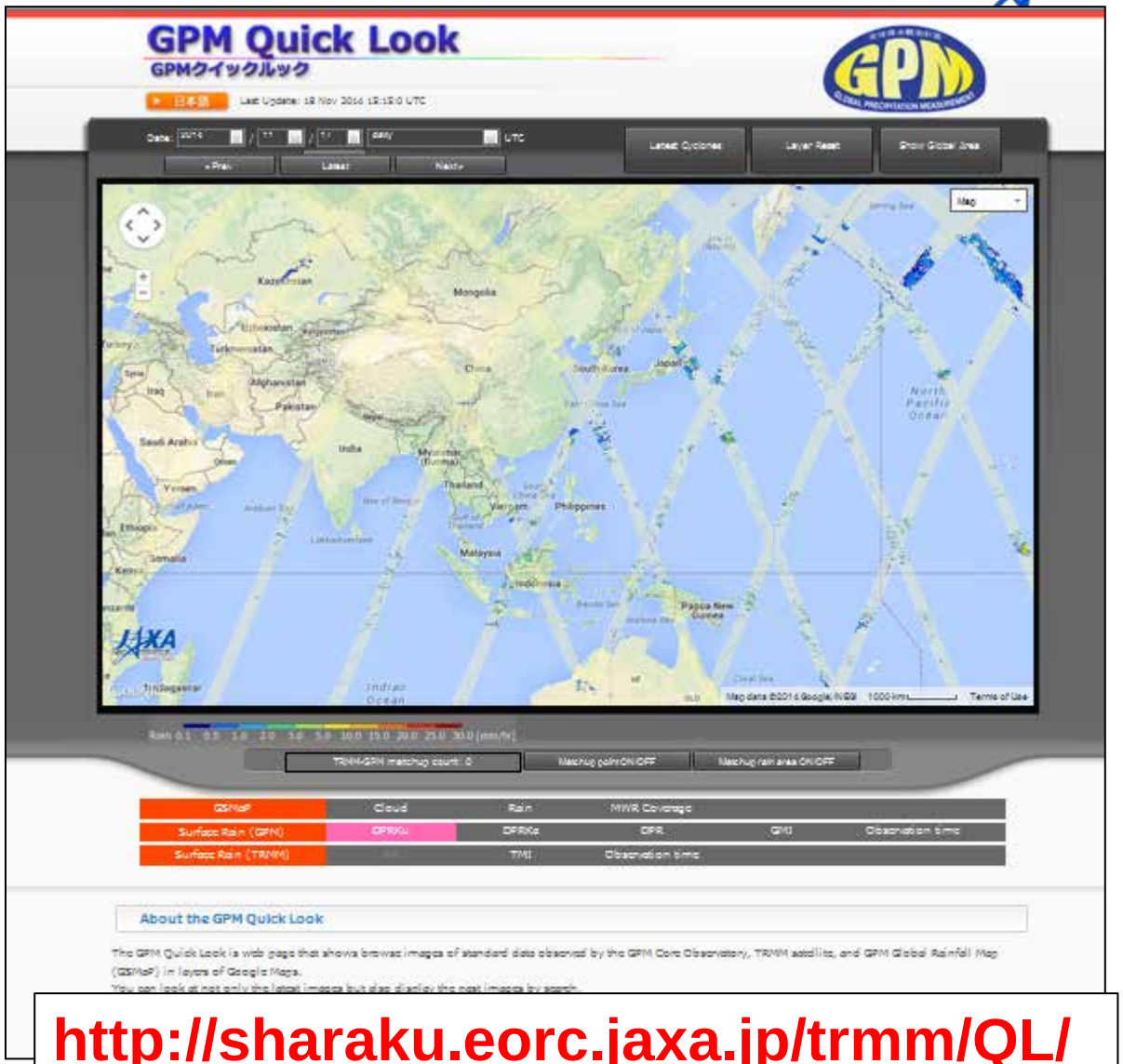
GPM Near-realtime Monitor

- Show browse images of GPM (DPR & GMI rain), TRMM (PR & TMI rain), and GSMaP NRT products on the same platform
- Operating in near-real-time basis
- Based on Google Maps

http://sharaku.eorc.jaxa.jp/trmm/RT3/

GPM Quick Look

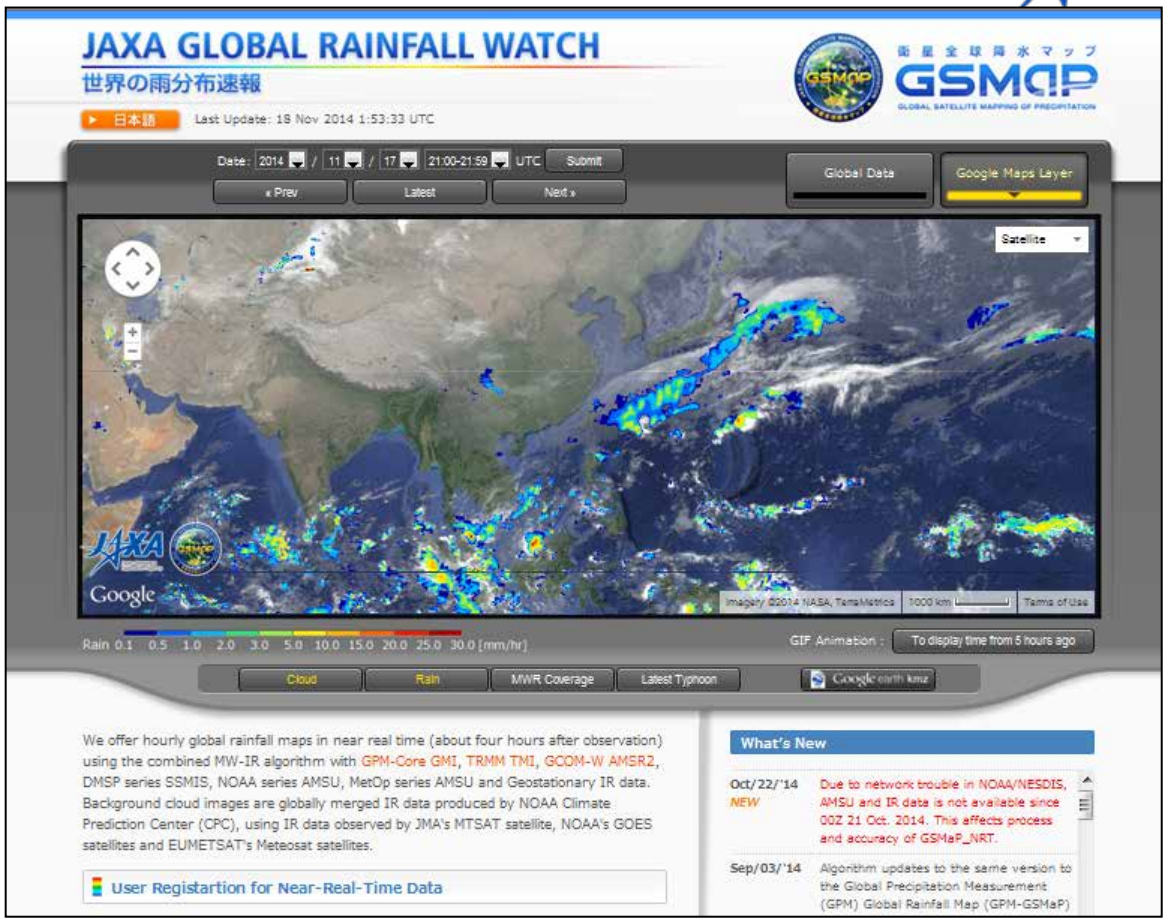
- Same as Near-realtime Monitor but for standard products
- Updated a few day after observation
- Based on Google Maps



http://sharaku.eorc.jaxa.jp/trmm/QL/

JAXA Global Rainfall Watch

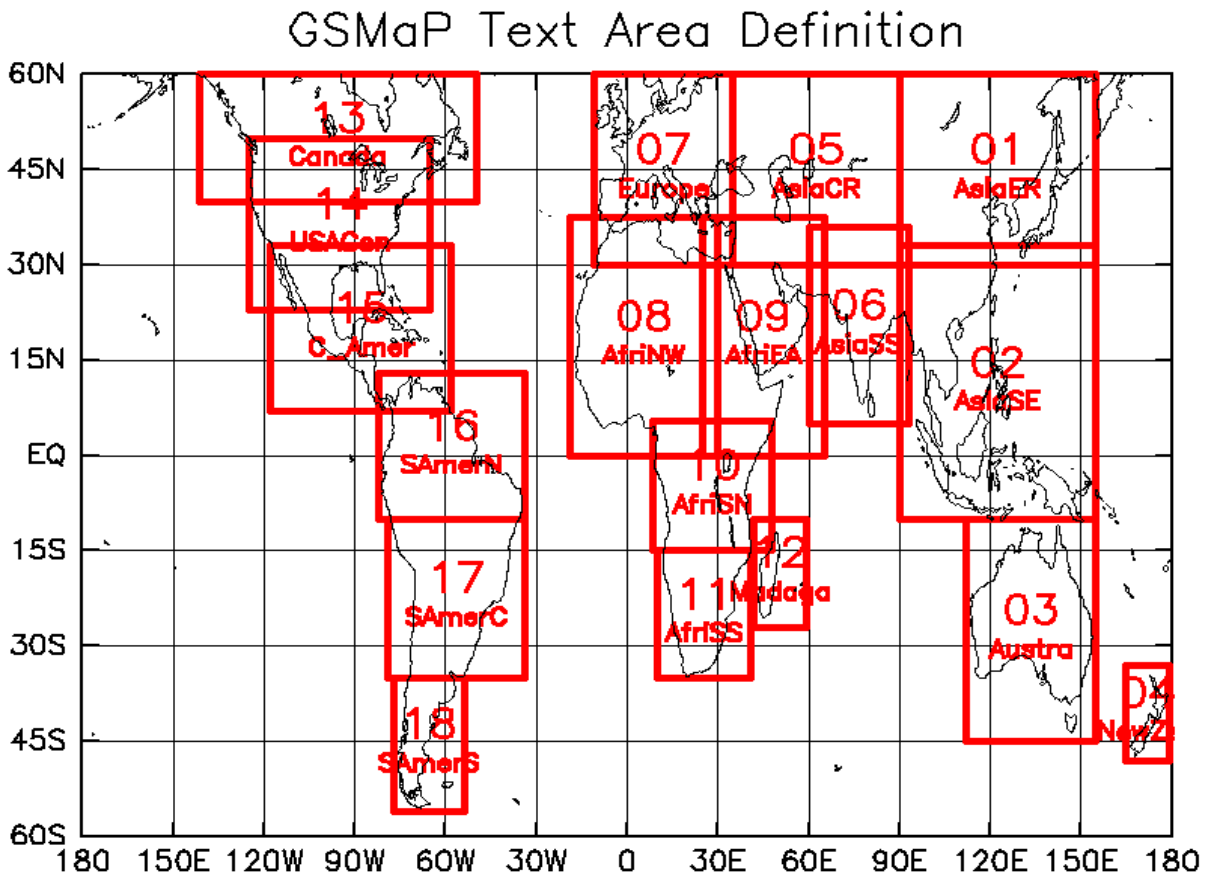
- Displaying GSMaP (global rainfall map) images
- Global mode & Google Maps mode (regional close-up) are now available
- Available 4-hr after observation
- Updated hourly
- Binary/text data is also available via ftp site after automatic registration
- Same as GPM-GSMaP product



http://sharaku.eorc.jaxa.jp/GSMaP/

Area Definition in Text Format

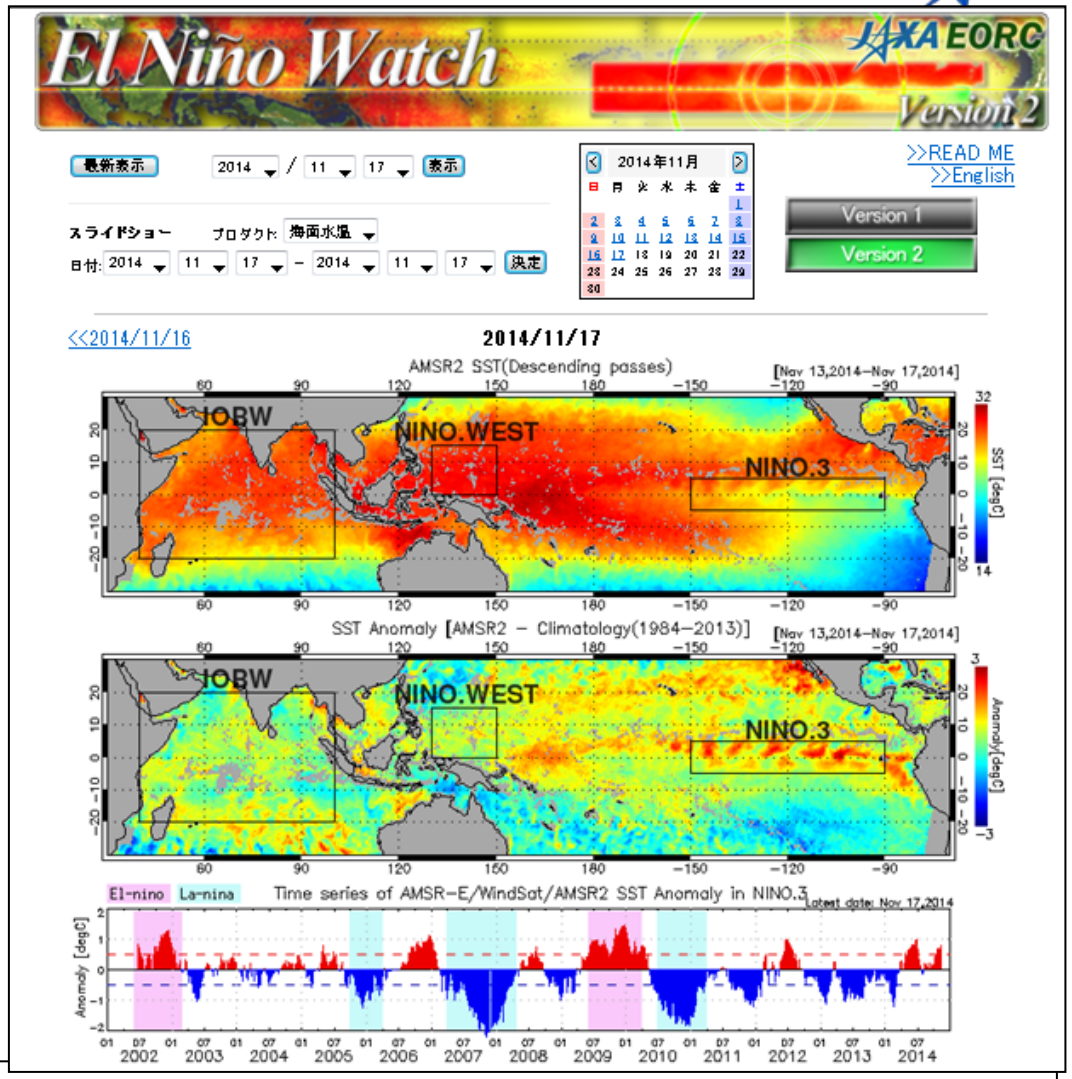
- 18 areas over land are defined.
- Text files are stored in CSV format. Unit is [mm/hr].
- Data with missing value are omitted.
- All text files are archived with compressed using “zip”.



This data format can be used by the ArcGIS (ESRI ArcMap 10.0).

El Niño Watch

- Daily monitoring of sea surface temperature (SST) by AMSR-E, Windsat, and AMS2 and their anomalies from climatology (30-yr average) over the tropical Pacific region
- Images have archived since June 2002.
- Succeeded by AMSR2 since July 2012.



http://sharaku.eorc.jaxa.jp/cgi-bin/amsr/elni2/elni2.cgi?lang=e

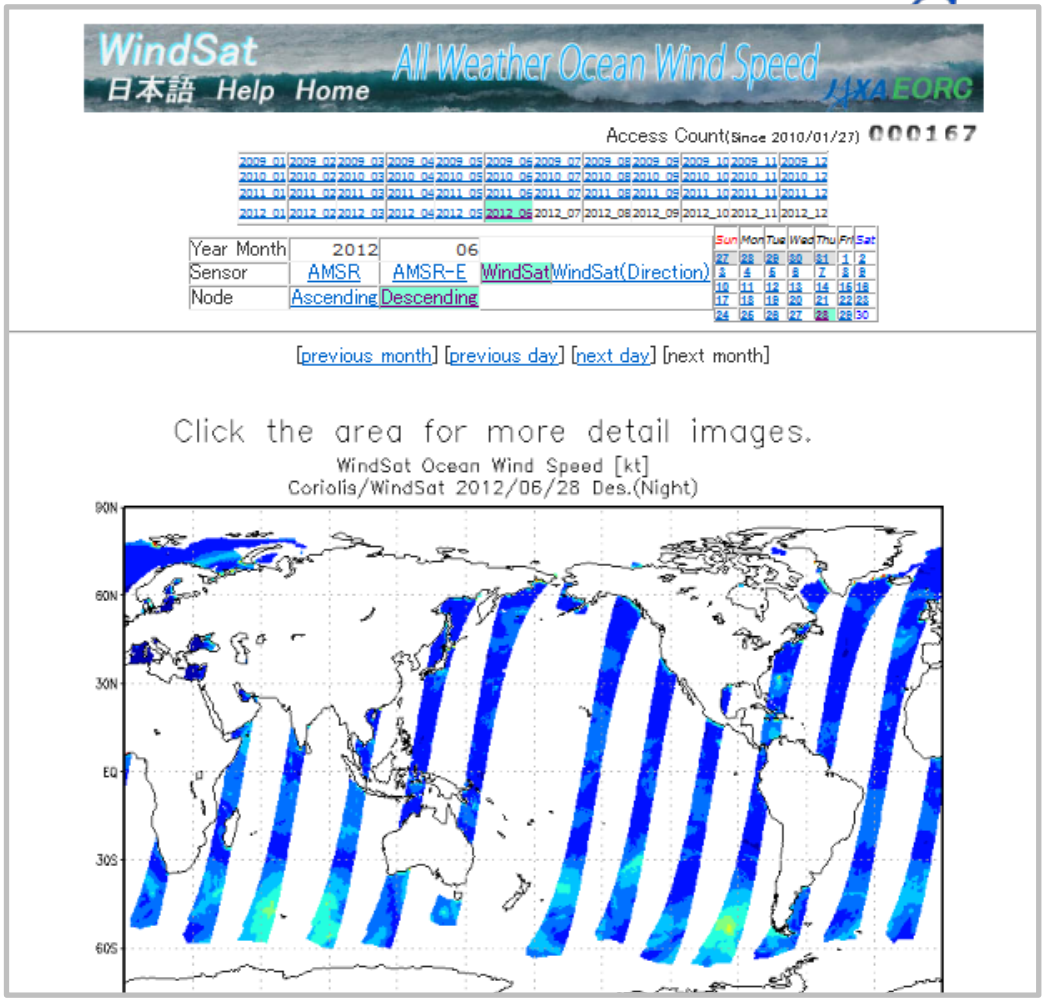
Arctic Sea-Ice Monitor

- Daily monitoring of Arctic sea-ice concentration by AMSR-E, Windsat and AMSR2
- Succeeded by AMSR2 since Jul. 2012
- Images have archived since June 2002.
- Collaboration with International Arctic Research Center (IARC)

http://www.ijis.iarc.uaf.edu/cgi-bin/seaice-monitor.cgi?lang=e

All-weather Ocean Wind Speed

- Daily monitoring of all-weather wind speed (research basis) by AMSR-E, and Windsat.
- Images have archived since 2002 for AMSR-E, and 2009 for Windsat. Will be succeeded by AMSR2 soon.

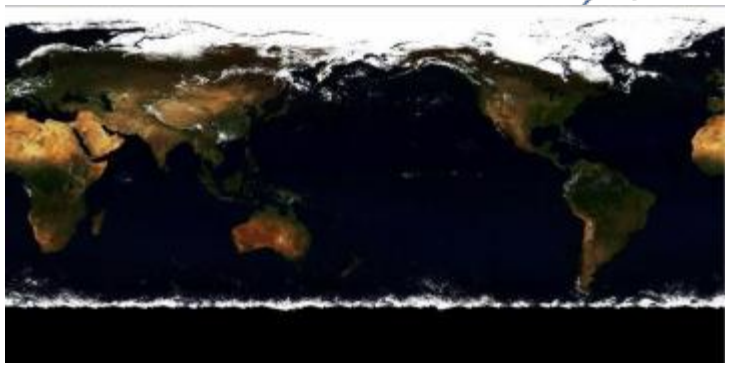


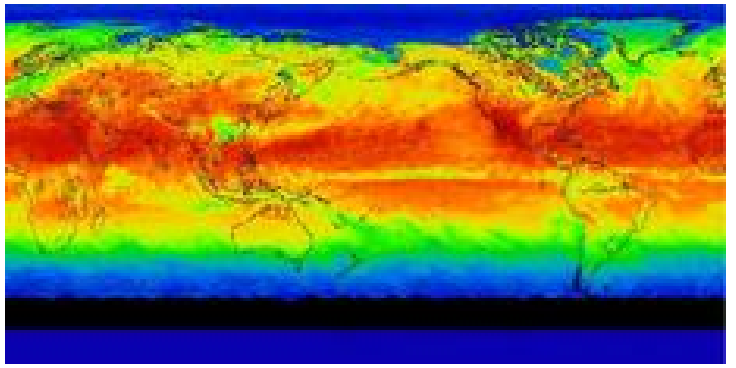
http://sharaku.eorc.jaxa.jp/cgi-bin/amsr/windsat_wind_Ver4/ocean_wind.cgi?&LANG=0

JASMES

JAXA Satellite Monitoring for Environmental Study

- Environmental monitoring by MODIS and MWRs derived geophysical parameters, as a preparatory activity for GCOM project.
- Currently available parameters are RGB Images, Photosynthetically Active Radiation (PAR), Snow Cover Extent, Water Stress Trend, Wild Fire, Cloud Cover Rate. Recently introduced daily Water parameters, and Long-term Sea Ice Concentration.
- Images, binary data, and trend curves for monthly/twice-a-month/daily statistics over globe and around Japan.

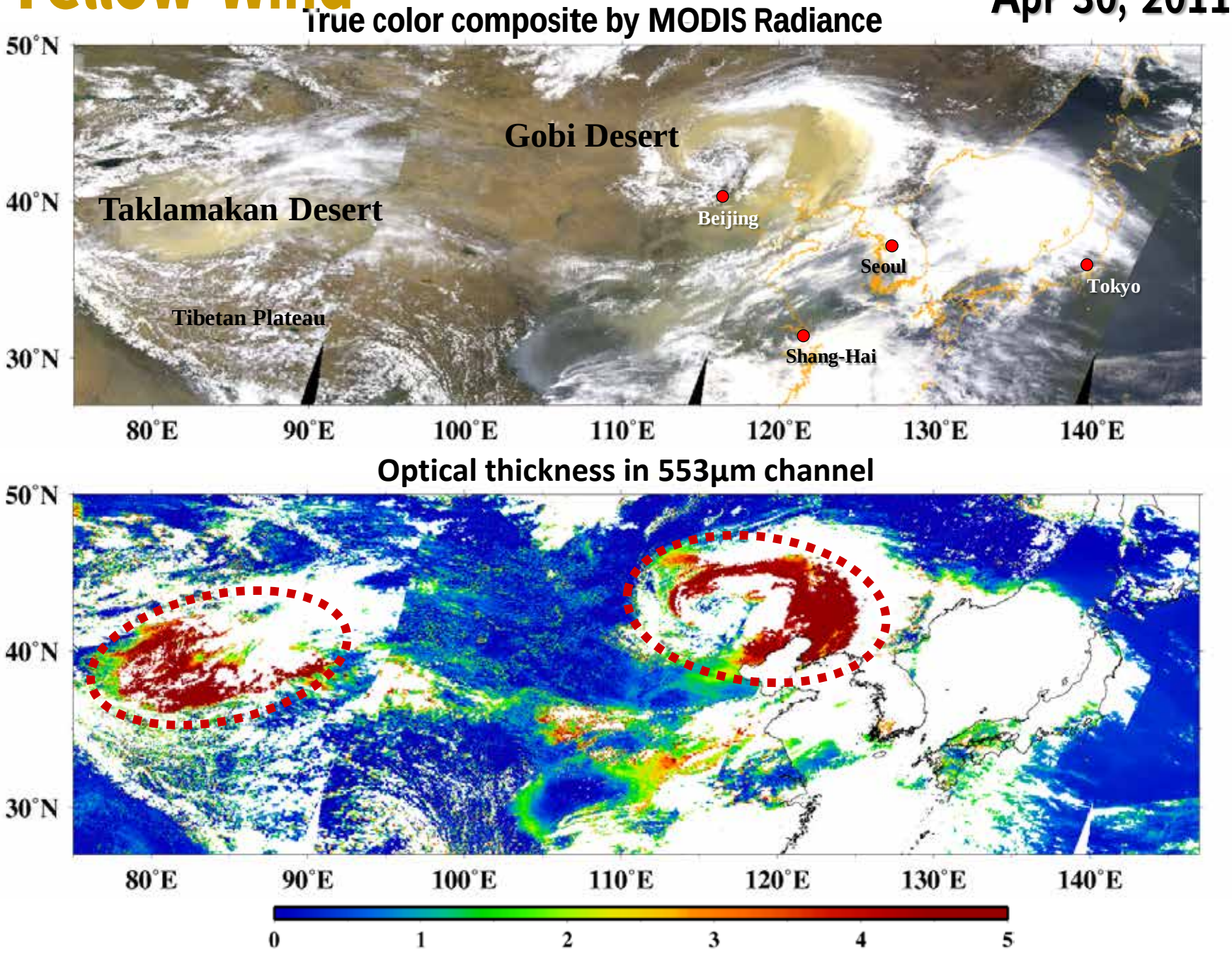




http://kuroshio.eorc.jaxa.jp/JASMES/index.html

Yellow Wind

Apr 30, 2011



Wild Fire

In Alaska

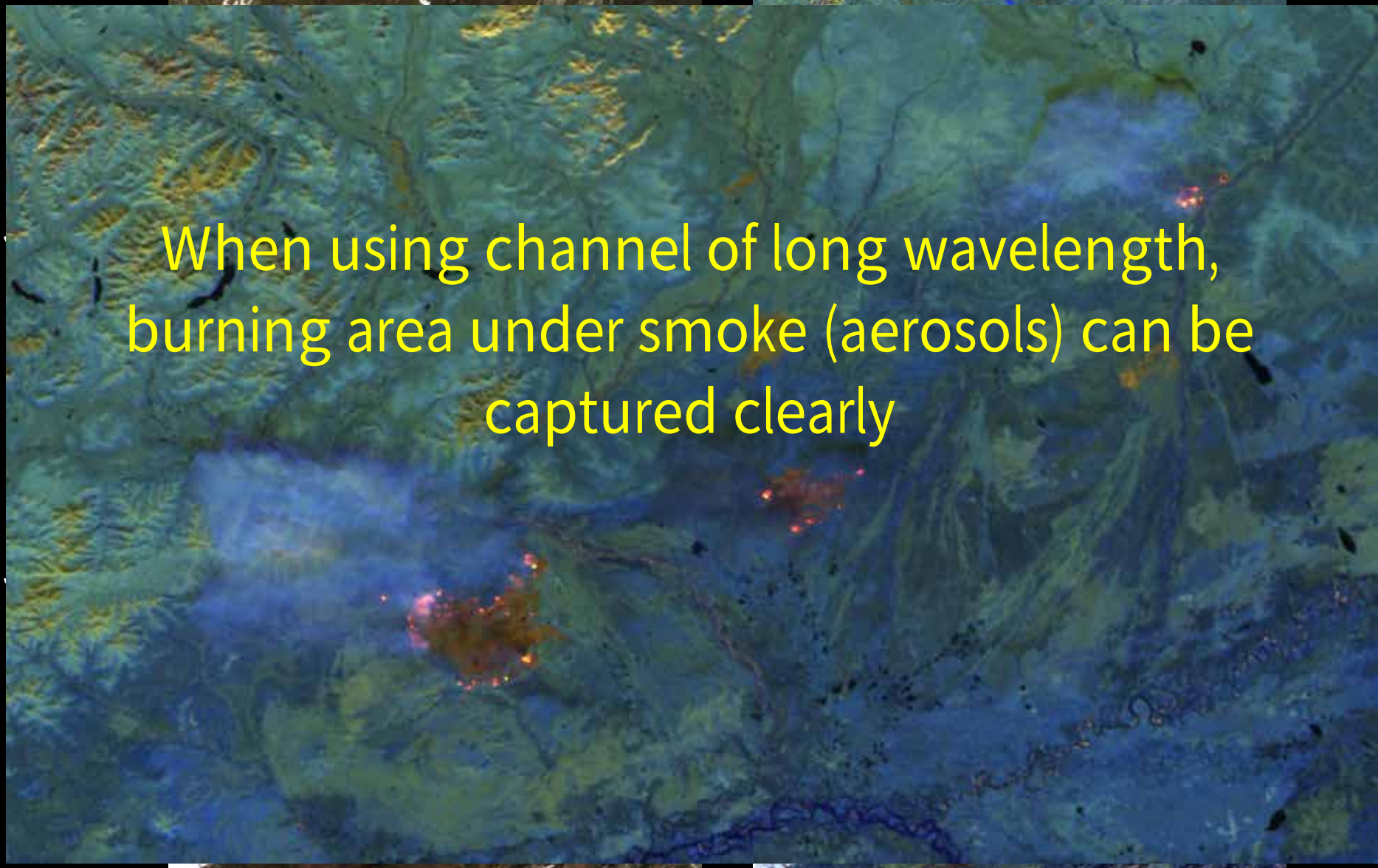
Not only burned areas but also “burning” areas can be captured clearly

R:661, G:542, B;462nm

R:1640, G:824, B;542nm

R:2200, G:1640, B;824nm

GLI Jul. 18, 2003



Sep 7

R:661, G:542, B;462nm

R:2200, G:1640, B;824nm

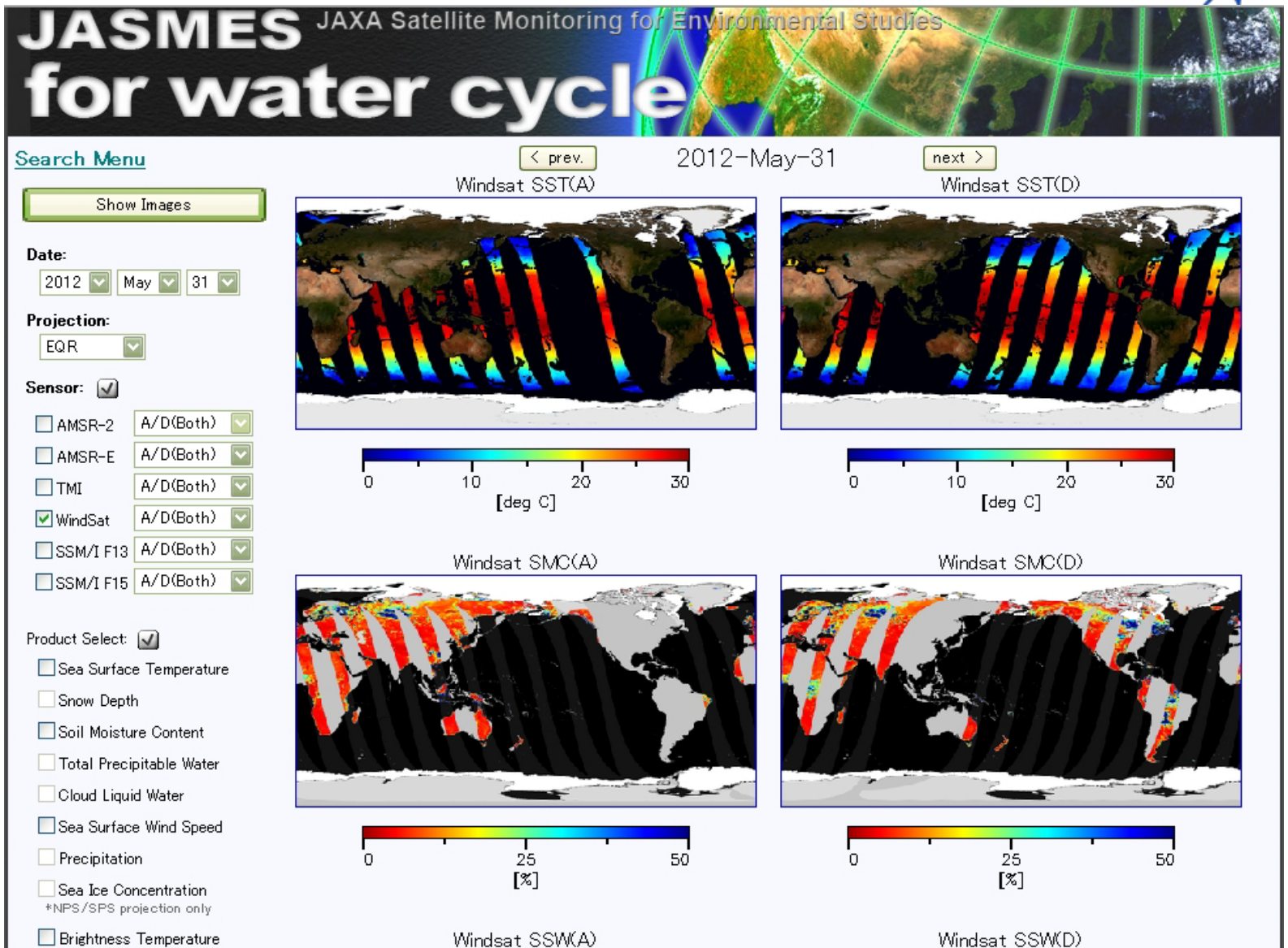
AMSR2 Browse Web Site (JASMES for water cycle)

- Monitoring daily browse images of AMSR2 standard products (TB and GEO)
- Updating near-real-time basis (using NRT swath data) and daily (using L3 standard products)
- Operating as daily version of JASMES web site
- Scaling up/down, select region, comparison of parameters and/or instruments
- Browse images of test products, which applies AMSR2 algorithm to other MWR instruments (AMSR-E, TMI, Windsat, SSM/I etc.,) are also available.

http://kuroshio.eorc.jaxa.jp/JASMES/WC.html

JASMES for water cycle

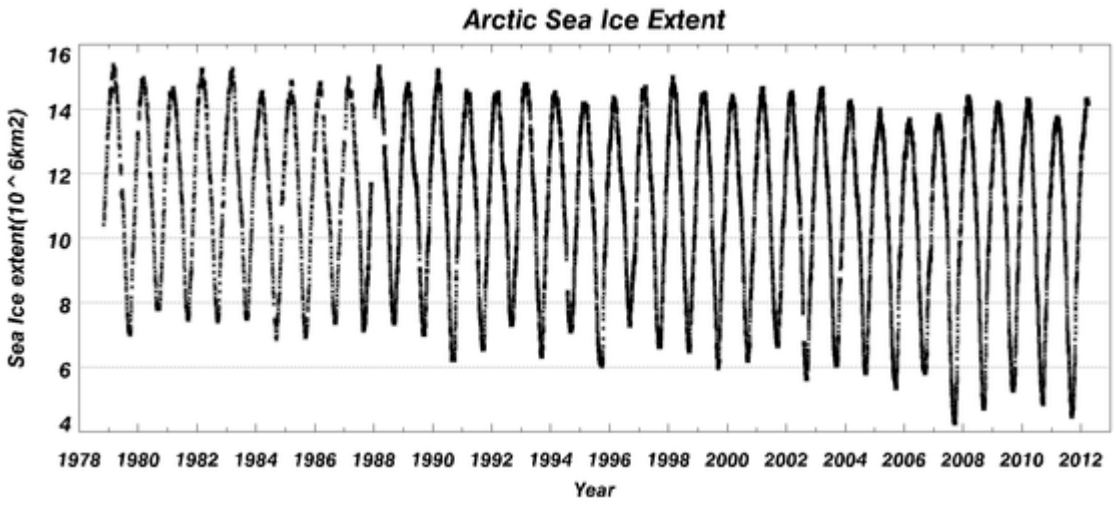
http://kuroshio.eorc.jaxa.jp/JASMES/WC.html

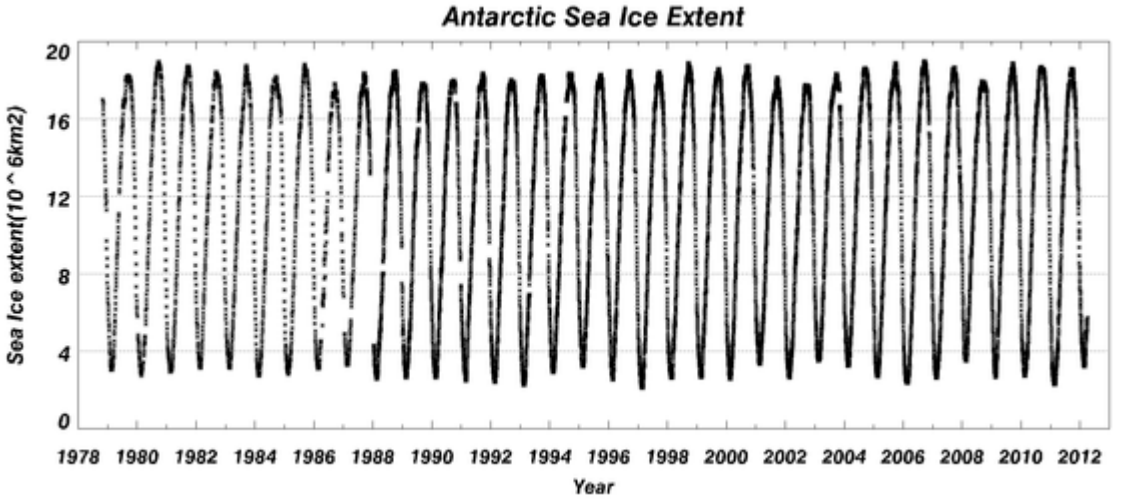


JASMES Climate: Sea Ice Concentration

http://kuroshio.eorc.jaxa.jp/JASMES/climate/

- Sea Ice Concentration (binary) and Sea Ice Extent (text)
- Period: Nov. 1, 1978 - Mar. 31, 2012
  - SMMR: Jan. 1980 - Jul. 1987
  - SSM/I: Aug. 1987 - May 2002
  - AMSR-E: Jun. 2002 - Oct. 2011
  - Windsat: Oct. 2011 – Jul. 2012
  - AMSR2: Jul. 2012 - present
- Horizontal Res.: 25km for SMMR & SSM/I, 12.5km for others.
- Registration needed to use data.

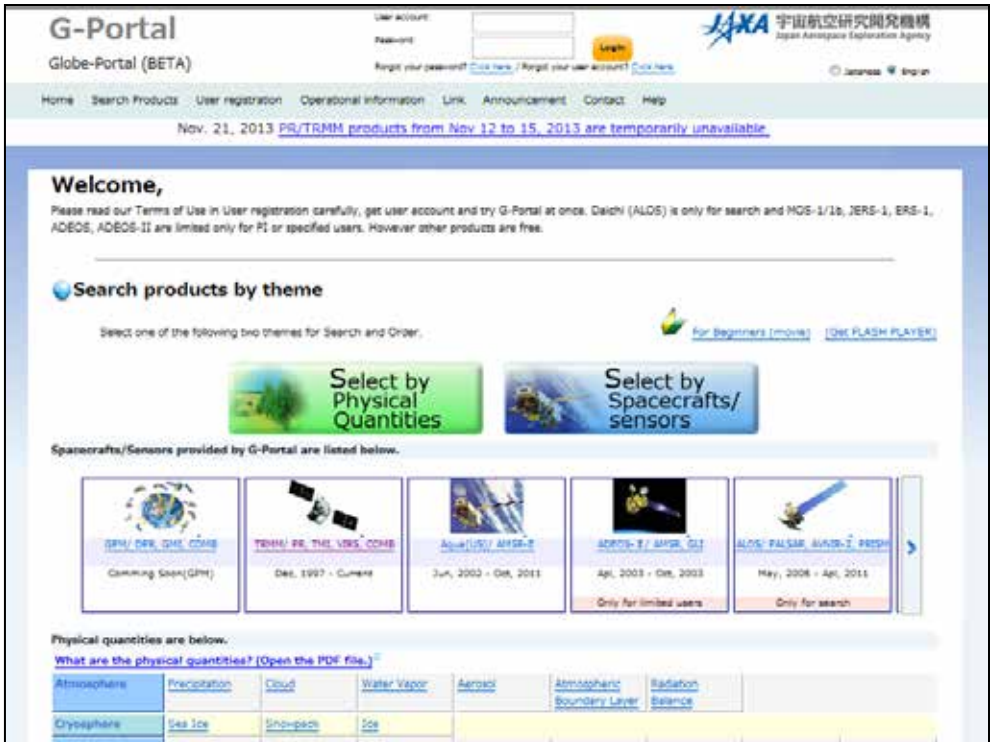




TRMM/GPM/AMSR-E/AMSR2 data/image access - Standard products

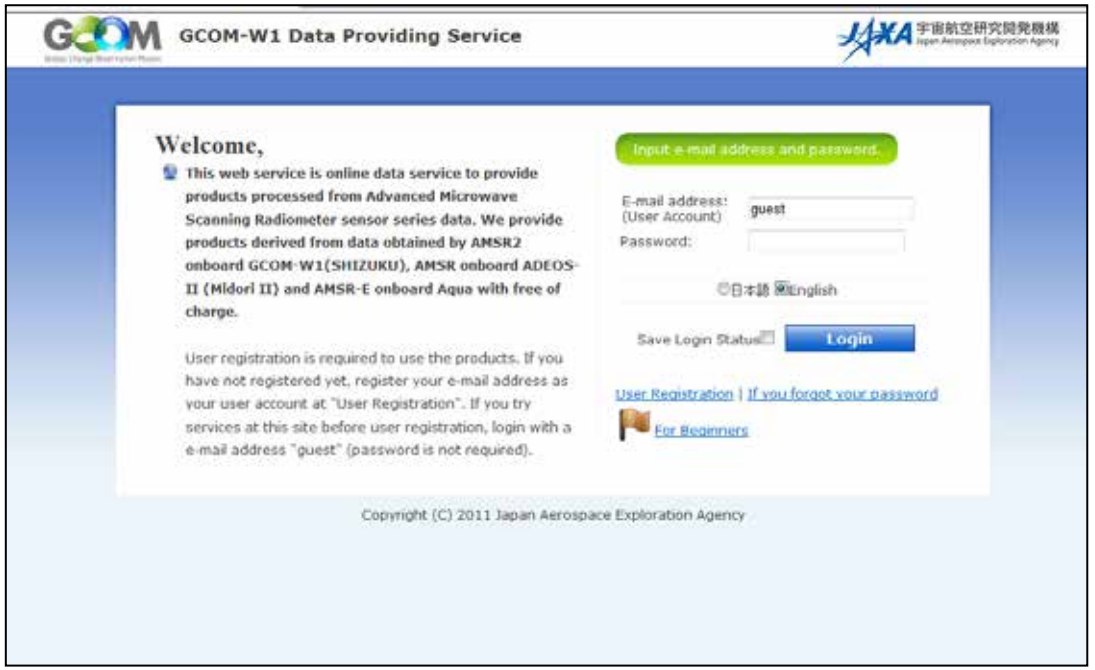
GPM data download from JAXA

- GPM and TRMM data is available from the JAXA G-Portal web site (Data portal for JAXA Earth observation satellites)
  - https://www.gportal.jaxa.jp/
  - Simple registration
  - Search & download data easily
  - SFTP for automatic download
- GSMaP binary/text is also available at JAXA Global Rainfall Watch



GCOM-W and AMSR-E data download

- GCOM-W, AMSR-E and AMSR data is available from the GCOM-W1 Data Providing Service System (DPSS) web site
  - https://gcom-w1.jaxa.jp/
  - Format transfer of product files from HDF5(4)
    - GeoTIFF, TIFF
    - netCDF
    - HDF5
  - Available by sftp for heavy users



AMSR2 Data User's Manual

- AMSR2 Data User's Manual in PDF document
  - Available in English covering L1 and L2
  - Sample programs are also available
  - http://suzaku.eorc.jaxa.jp/GCOM_W/data/data_w_use.html

How to read GPM data

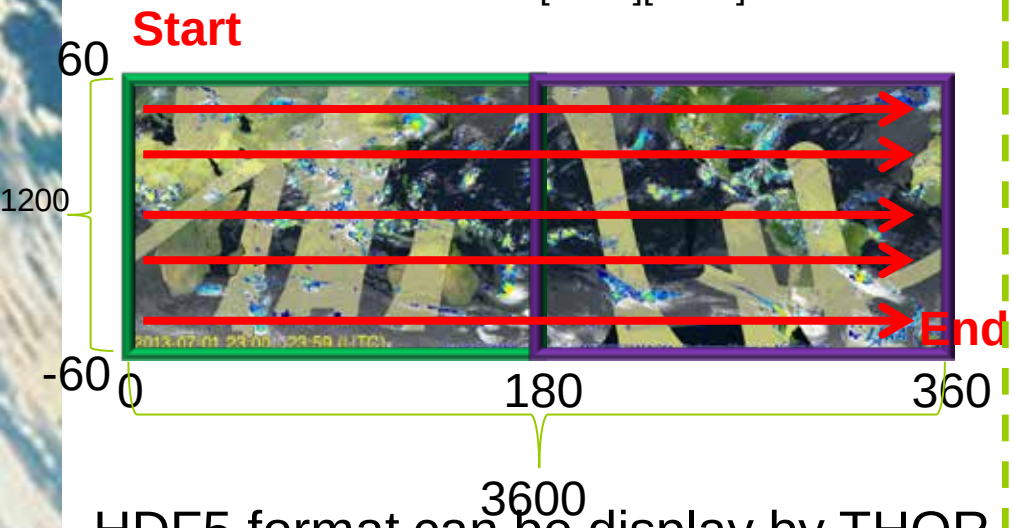
About the format

- Format of the GPM products are HDF5
  - Level 3 products are also available in text format
  - The TRMM products are HDF4
  - GSMaP product will be distributed in the same format from same server as current ones for users' convenience
- The GPM Products can be read using following software
  - GPM Toolkit (TKIO) provided by NASA/GSFC/PPS
  - Command line software that is included in HDF5 library (h5dump, etc.)
  - Software that can read the HDF5 format
    - http://www.hdfgroup.org/products/hdf5_tools/
- Data viewer
  - THOR provided by NASA/GSFC/PPS
  - Software that can display the HDF5 format
    - http://www.hdfgroup.org/products/hdf5_tools/

GSMaP Data

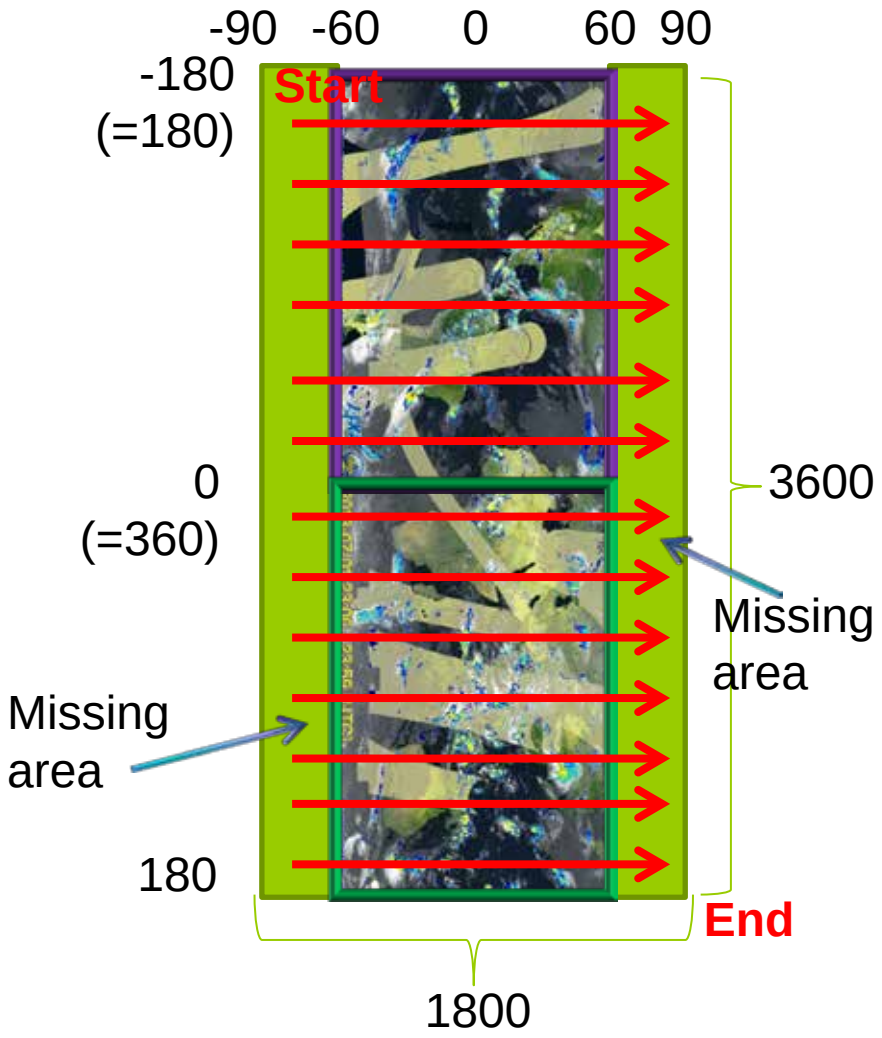
Binary product (current GSMaP)

Data structure：[1200][3600]



HDF5 product

Data structure：[3600][1800]



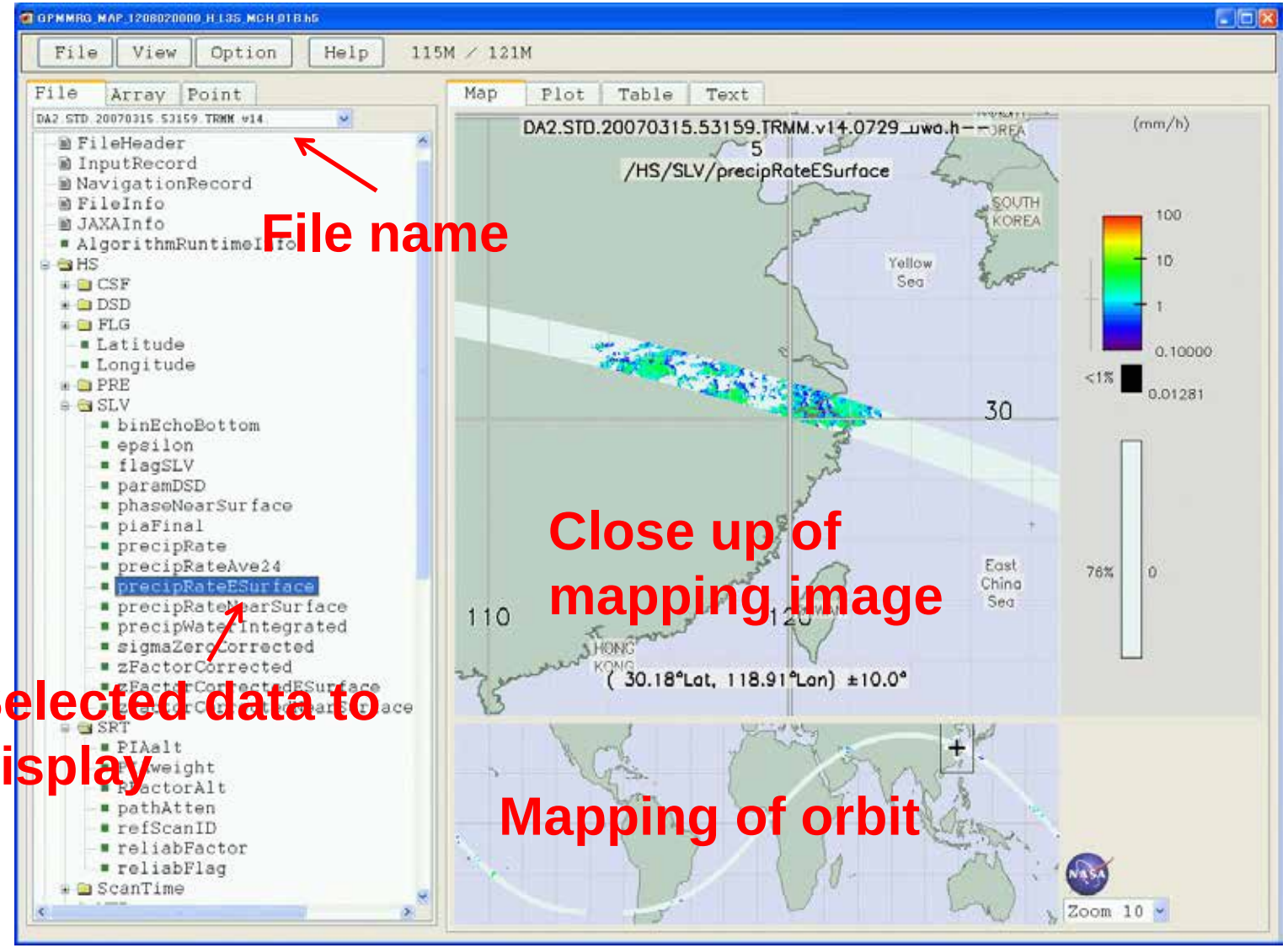
HDF5 format can be display by THOR, and structure of data array is transposed from that of current binary product.

We also distribute binary/text products of GSMaP from JAXA Global Rainfall Watchfor user's convenience.

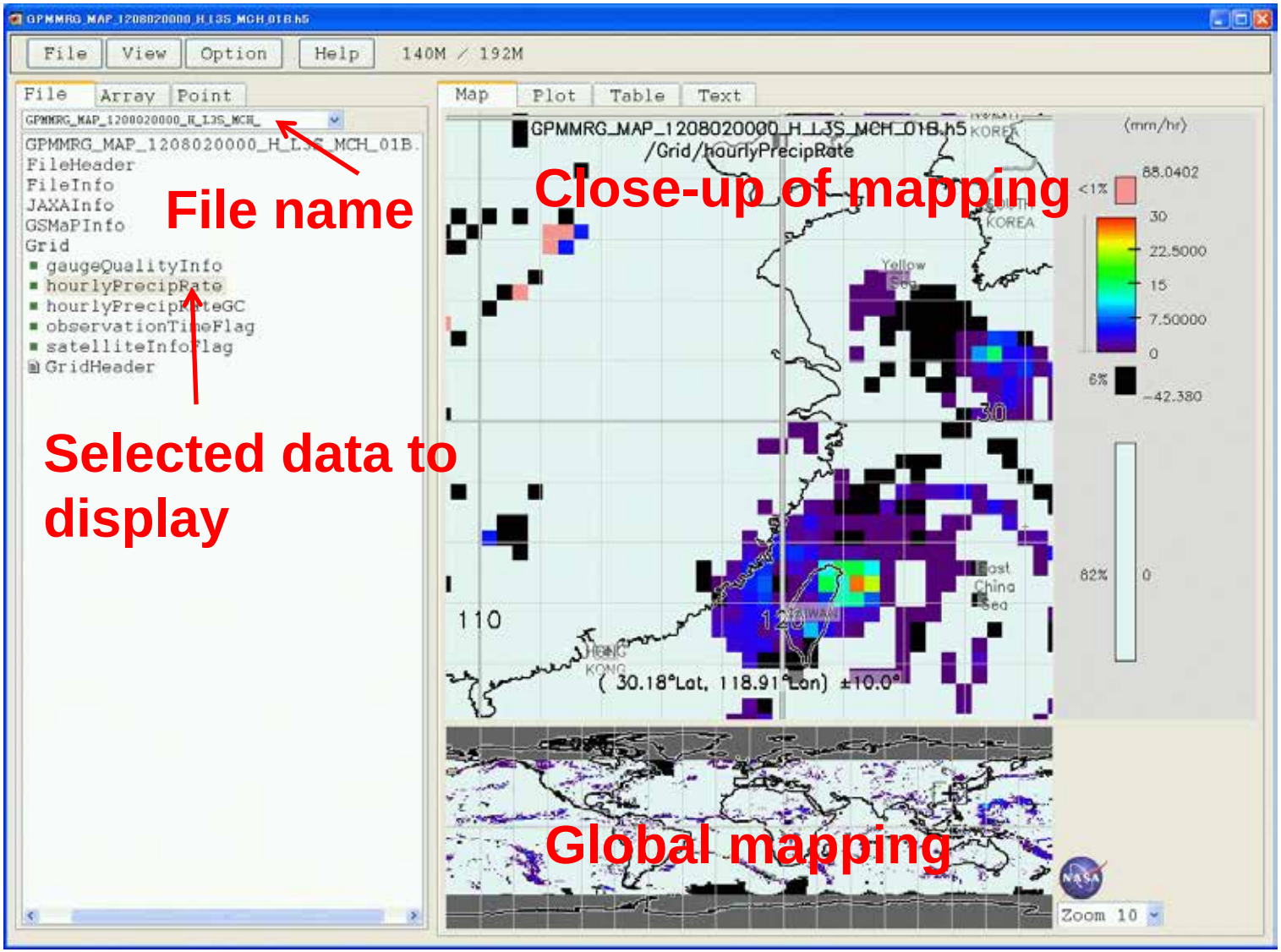
Visualization tool for the GPM Data: THOR

- Tool for High-Resolution Observation Review
- Data viewer in IDL base for TRMM and GPM data
  - Developed by NASA/GSFC/PPS
  - Successor of the TRMM Orbit Viewer
  - Can be used in Linux, Macintosh, and Windows
- URL
  - ftp://pps.gsfc.nasa.gov/pub/THOR/version_2/
- Latest version is version 2.1 (as of 19 Aug. 2013)
  - THOR_2.1_linux.zip
  - THOR_2.1_mac.zip
  - THOR_2.1_winXP.zip

Display by THOR (DPR Ka)



Display by THOR (GSMaP)



GPM Toolkit (TKIO)

- Science Algorithm Input/Output Toolkit
- Toolkit for read and write the GPM and TRMM (V6, V7) products by using Fortran and C languages
  - Developed by NASA/GSFC/PPS
  - Successor of PPS toolkit for TRMM
  - Can handle both HDF4 and HDF5 format
  - Currently under development. Might be updated by public release of GPM data
- URL
  - ftp://pps.gsfc.nasa.gov/pub/PPStoolkit/GPM/

English version of documents

- THOR/TKIO documents is also available from NASA/PPS web/ftp sites, and HDF from HDF group web site.
- THOR
  - http://pps.gsfc.nasa.gov/thorrelease.html
- TKIO
  - ftp://pps.gsfc.nasa.gov/pub/PPStoolkit/GPM/
    - TKIOv9.00CVersion.doc
    - TKIOv9.00CVersion.pdf
    - TKIOv9.00FORTRANVersion.doc
    - TKIOv9.00FORTRANVersion.pdf
- HDF (HDF4/HDF5)
  - http://www.hdfgroup.org/

Summary

- TRMM/AMSR-E/AMSR2 data/image access
  - TRMM standard product is available via https://www.gportal.jaxa.jp/
  - GCOM-W1 data distribution system has been distributed AMSR2 data along with AMSR/AMSR-E data. https://gcom-w1.jaxa.jp/
  - Project info., browse images & research products are available
    - TRMM http://www.eorc.jaxa.jp/TRMM/
    - AMSR/AMSR-E http://sharaku.eorc.jaxa.jp/AMSR/
    - JASMES http://kuroshio.eorc.jaxa.jp/JASMES/
    - GCOM-W http://suzaku.eroc.jaxa.jp/GCOM_W/
    - GPM http://www.eorc.jaxa.jp/GPM/