

A satellite view of Earth from space, showing a curved horizon and a mix of blue oceans, white clouds, and brownish-yellow landmasses. The text is overlaid on this background.

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



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Earth Observation Research Center (EORC)
Japan Aerospace Exploration Agency (JAXA)

Satellite Product Categories



p Standard Product

- n Operational product that produced

p Near Real-time Product

- n 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.

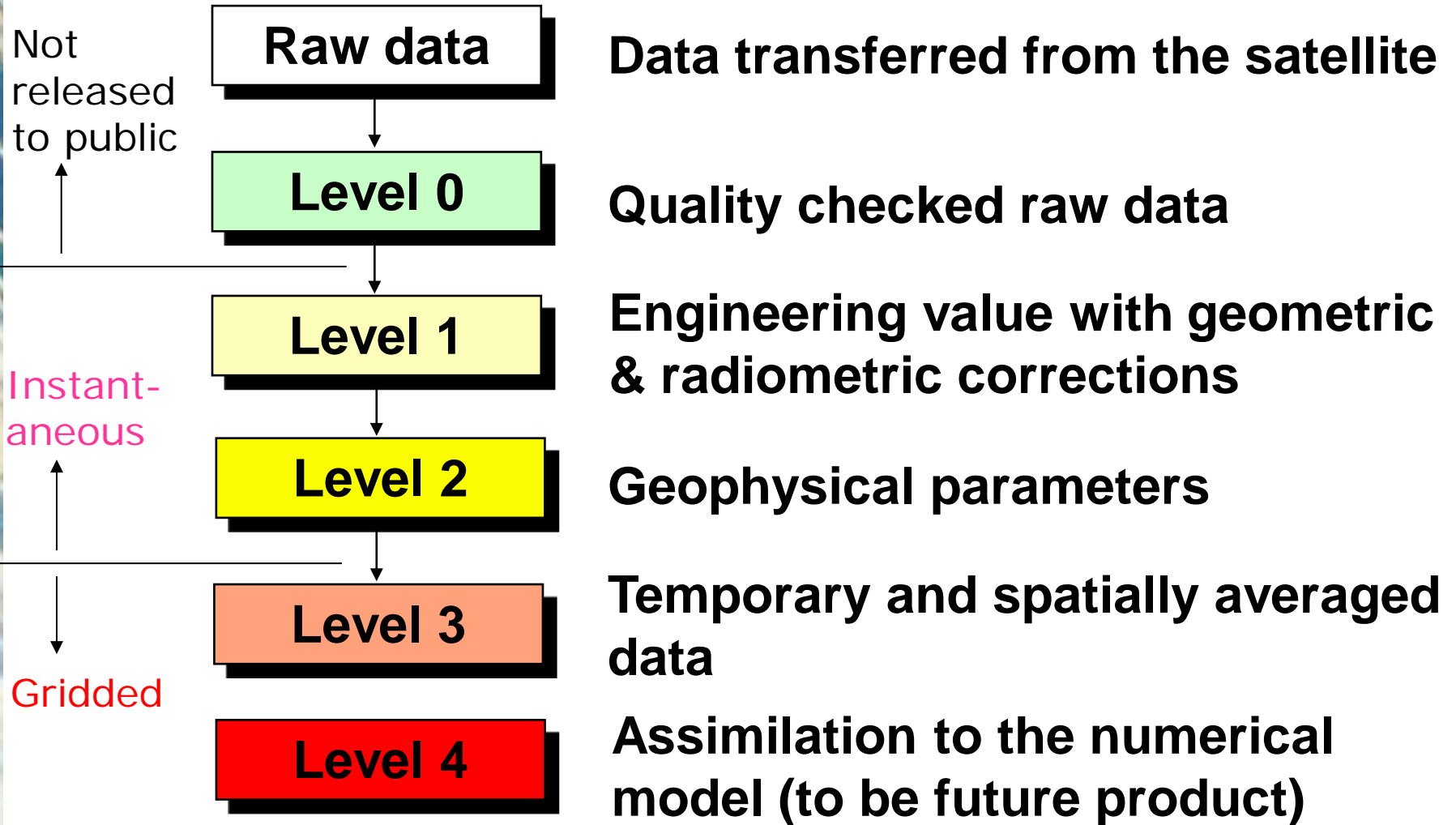
p Research Product

- n Product that uses research algorithm and is produced mainly for research objectives. Products are not produced operationally.

p Subset Product

- n Sub-set of specific region or area, produced from standard product.

Data Processing for Standard Products



Example:

AMSR2 Product Definition (1/2)



p L1A product

- n Process radiometric and geometric corrections to Level 0 product
- n Stores additional information (conversion coefficient of antenna temperature, etc.)

p L1B product

- n Same as Level 1A product but observation count is converted to Tb using radiometric correction coefficients.

p L1R product

- n Resample Level 1B product considering differences of resolution in each frequency. Correction of effect by altitude difference is also done.
- n Tb resampled to 6GHz, 10GHz, 23GHz, and 36GHz footprint, and original 89GHz are stored.

Example: AMSR2 Product Definition (2/2)



p L2 product

- n Geophysical parameters retrieved from Level 1B and/or 1R products.

p L3 product

- n Statistically merged product in daily or monthly basis calculated from Level 1B and 2 products.
- n 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.).
- n Statistical information is also included in monthly products.

p L4 product (discussed as research product)

- n 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.

The screenshot displays the main interface of the JAXA/EORC Tropical Cyclone Database. At the top, it features the JAXA and NiCT logos and the title "Tropical Cyclones JAXA/EORC Tropical Cyclone Database". Below this, there is a navigation bar with a "日本語" link. The main content area is titled "Search Tropical Cyclones" and includes a "Quick Search" section with a map of the Indian and Pacific Oceans. To the right, there is an "Extended Search" section with a "HELP" link and several search criteria: "Select Sensor" (with checkboxes for TRMM/PR/TMI/VIRS, Aqua/AMSR-E, and Midon II/AMSR), "Search Area/Plural Choice is possible" (with dropdown menus for "All Area", "North Western Pacific", "North Central Pacific", and "North Eastern Pacific"), and "Search Year/Month" (with dropdown menus for year and month). Below the search options, there is a "Monitoring" section with a "NEW" tag, featuring a "Rainfall 35 JST" image and an "Aqua/AMSR-E latest image BAVI" image. A "Documents" section at the bottom right lists "User's Guide" and "Links" to related resources like "Tropical Cyclones Related", "TRMM/Aqua/Midon II Related", "TRMM Website", and "AMSR/AMSR-E Website".

This screenshot shows the search results for Tropical Cyclone NARGIS(01B). The top section is titled "Typhoon search" and includes a search bar with "Area: North Indian Ocean" and "Year: 2008 01-2008 12". Below this, the cyclone's details are listed: "Tropical Cyclone NARGIS(01B)", "Track Chart (PDF, 300x500)", "Period: Apr 27, 2008 - May 03, 2008", "Region: North Indian Ocean", "Maximum Sustained Winds: 11.5kt (Category 4)", "Number of TRMM/PR/TMI/VIRS Observation: 7", "Number of Aqua/AMSR-E Observation: 7", and "Number of Midon II/AMSR Observation: 0". The main content area is divided into two columns. The left column shows "Observation Area" with a map, "PR 3D" with a 3D satellite image, "PR/VIRS Image" with a satellite image, "TMI/AMSR/AMSR-E Precipitation" with a precipitation map, and "Water Vapor" with a water vapor map. The right column shows "Date/Time: Apr 27, 2008 17:51(UTC)", "Satellite/Sensor: TRMM/PR, VIRS, TMI", "Orbit Number: 39536", "Lat/Lon: 0.62N-17.80N 80.40E-102.37E", and "Download" links. Below this, there is another set of images for "Aqua/AMSR-E" with "Date/Time: Apr 27, 2008 20:17(UTC)" and "Satellite/Sensor: Aqua/AMSR-E".

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

Tropical Cyclones TRMM Real-Time Monitoring

Top 日本語

Information Last up date : Oct 22, '08 10:02

Asia America Oceania

The TRMM real-time monitoring for tropical cyclones is now available. The coverage expands to the global area. (March 26, 2007)

Links

Tropical Cyclones Database

You can access to online archive of images, movies and data of tropical cyclones observed by TRMM/Aqua/Midori-II satellites.

AMSR E Typhoon Real-Time Monitoring

Japanese version only.

Last Two Months

Asia America Oceania

Show All Typhoons Show Active Typhoons

Image

VIIRS Image TMI Image Observation Area

Asia 03B(THREE)

Satellite Obs.

- Date/Time : Oct 22, '08, 0335Z
- Lat/Lon : 18.4N 21.8E 44.7E-58.8E

Info. (Oct 22, '08, 0000Z)

- Pressure : 1014 hPa
- Winds : 130 kt

Earth Observation Research Center, Japan Aerospace Exploration Agency
 JAXA EORC ALL RIGHTS RESERVED.
 EORC Typhoon Database Secretariat

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.

JAXA EORC TRMM

TRMM Near-Real-Time Images

Display of selected browse image

>>Japanese

Date and time in UTC (Daily/Hourly) Sensor Parameters

2008 - 10 - 22 Daily PR&TMI&VIRS PR(Rain)&TMI(Rain)&VIRS(Cloud)

Submit

PR&TMI&VIRS [2008-Oct-22]

0.1 0.5 1.0 2.0 3.0 5.0 10.0 15.0 20.0 25.0 30.0 [mm/hr]

Display by Google Earth

Select parameters

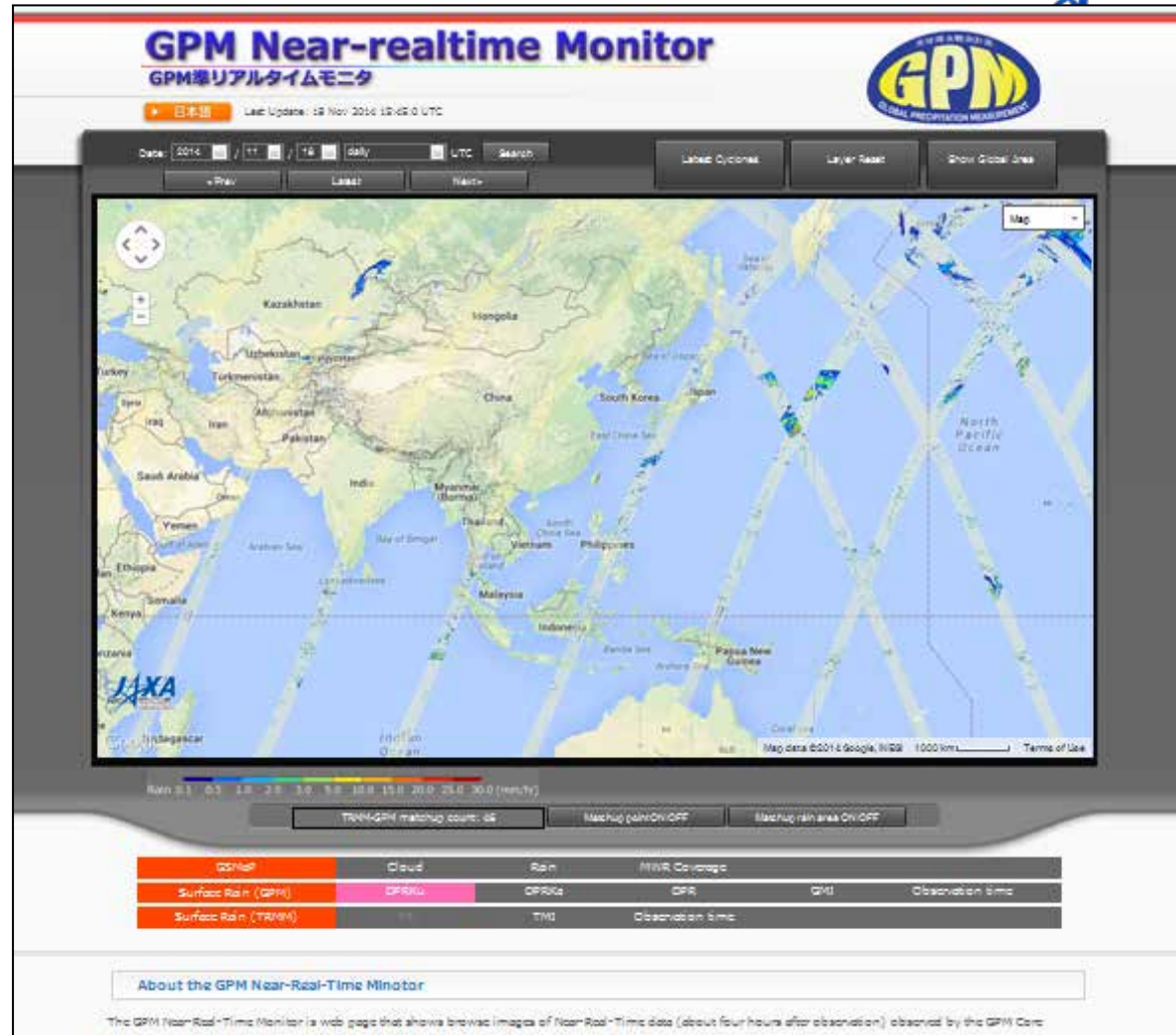
- PR estimated surface rain rate
- PR rain rate(2,4,6,8,10km)
- PR height of storm
- PR rain type flag

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

GPM Near-realtime Monitor



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



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

GPM Quick Look



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

GPM Quick Look
GPMクイックルック

日本語 Last Update: 19 Nov 2016 15:10 UTC

Date: 2016 / 11 / 11 Day UTC

Latest Cyclones Layer Rain Show Global Data

Rain 0.0 5.0 10.0 15.0 20.0 25.0 30.0 (mm/h)

TRMM-GPM matchup count: 0 Matchup color ON/OFF Matchup rain area ON/OFF

| OSMaP | Cloud | Rain | MWR Coverage | | |
|---------------------|-------|-------|------------------|-----|------------------|
| Surface Rain (GPM) | DPRKa | DPRKc | DPR | Q10 | Observation time |
| Surface Rain (TRMM) | | TRM | Observation time | | |

About the GPM Quick Look

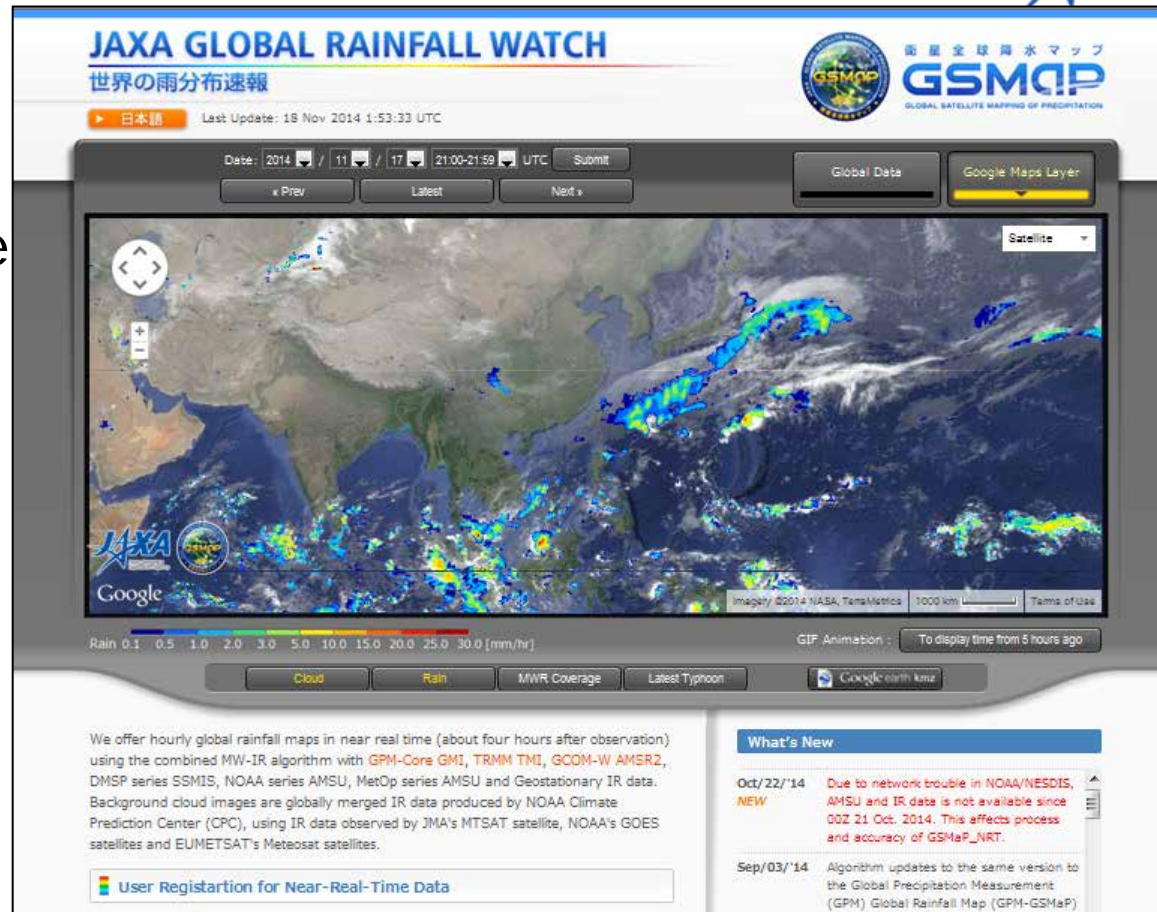
The GPM Quick Look is web page that shows browse images of standard data observed by the GPM Core Observatory, TRMM satellite, and GPM Global Rainfall Map (OSMaP) in layers of Google Maps.
You can look at not only the latest images but also display the past images by search.

<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

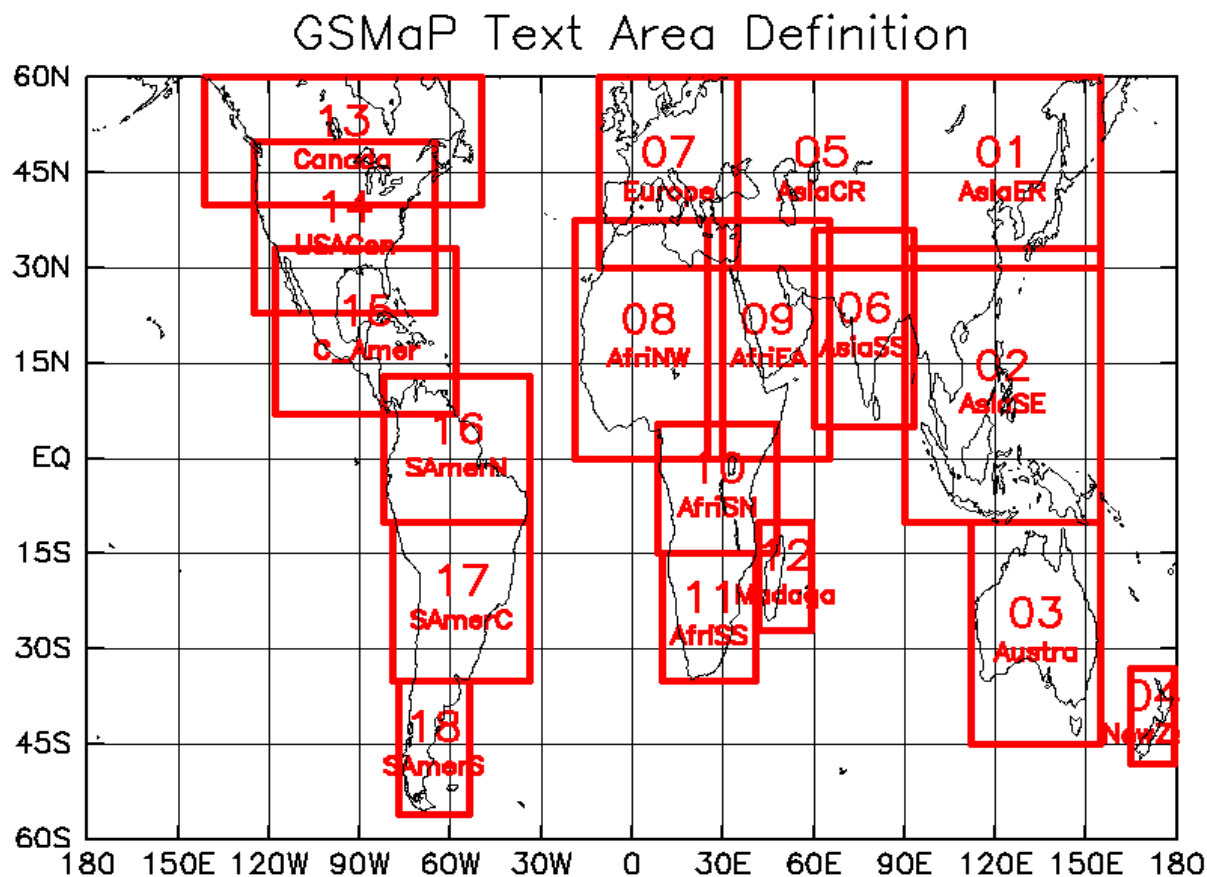


<http://sharaku.eorc.jaxa.jp/GSMaP/>

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).

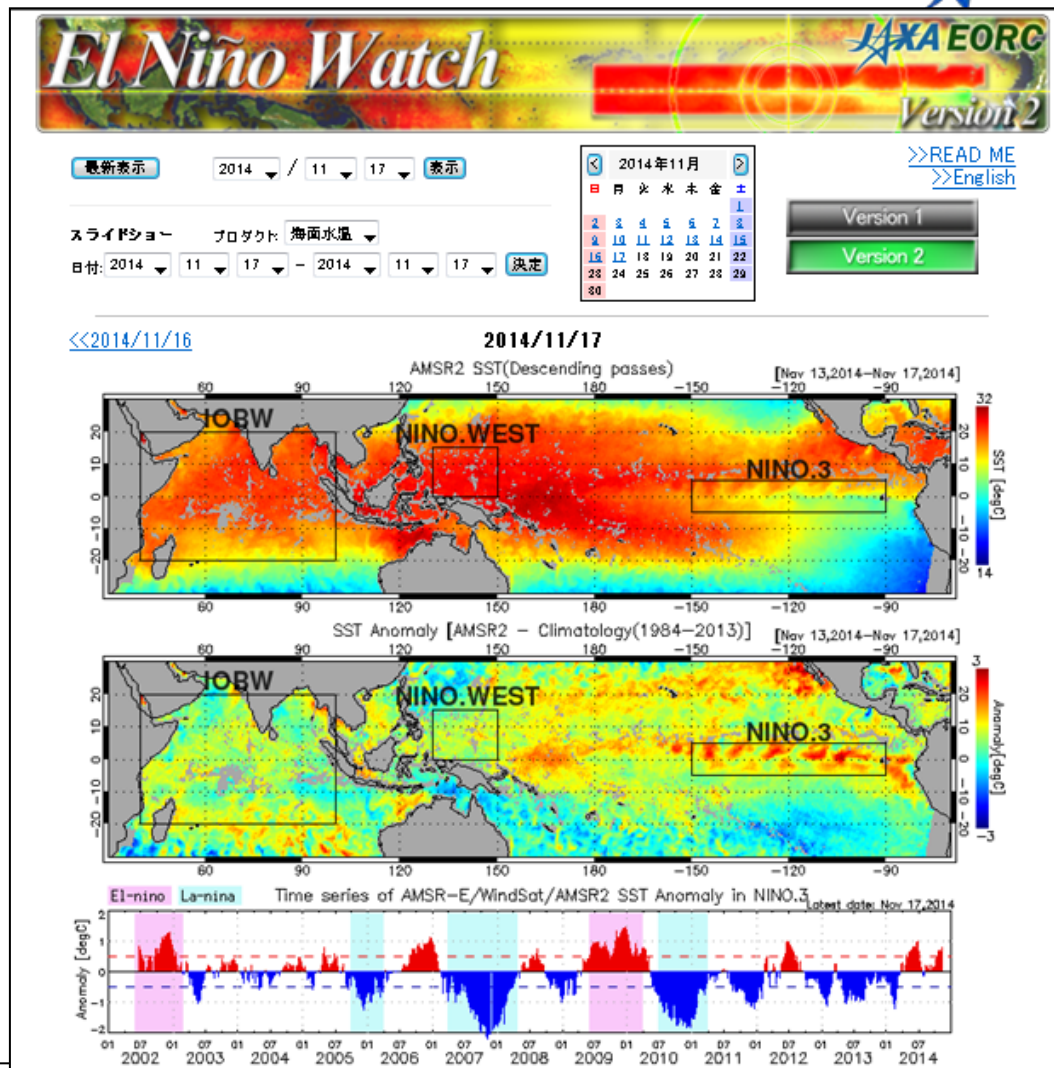
El Niño Watch



▷ 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)

The screenshot displays the 'IARC-JAXA Information System' interface for the 'Arctic Sea-Ice Monitor by AMSR-E'. The page features a navigation menu with links for Home, Welcome, News, Research, Facilities, Data, For Users, and Links. The main content area includes a 'Latest image' section with a 'Calendar' dropdown set to 'Oct 2008' and a 'Display' button. Below this is a calendar for '2008/10' with a '[CATALOG]' link. A 'Slide show' section offers a 'Oct 2008 (3.10MB)' link. The 'Date' section has 'Start' and 'End' dropdowns set to 'Oct 1 2008' and 'Oct 31 2008' respectively, with a 'Submit' button. The central focus is a map of the Arctic region showing sea ice concentration data for 'Oct 21, 2008'. The map is titled 'AMSR-E Sea Ice Concentration' and includes a 'Click the image to enlarge' instruction. The footer contains 'Powered by: AMSR-E Sea-Ice Monitor' and 'Links: AMSR/AMSR-E Science Earth Observation Research Center (EORC/JAXA)'.

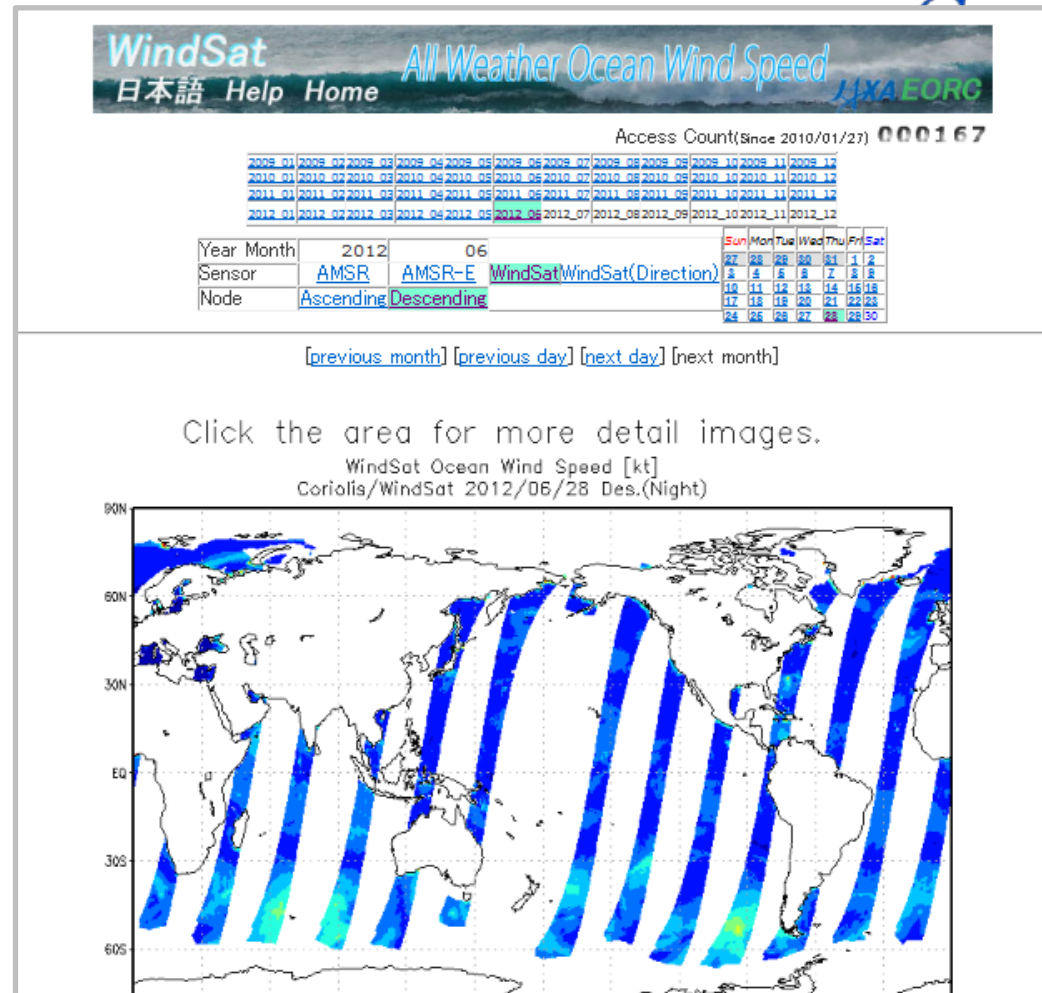
<http://www.ijis.iarc.uaf.edu/cgi-bin/seaice-monitor.cgi?lang=e>

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.

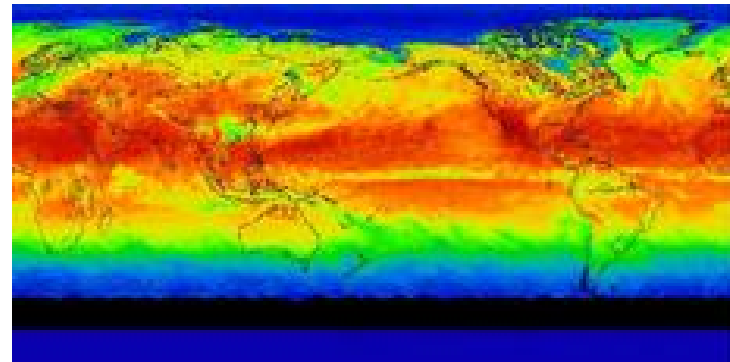
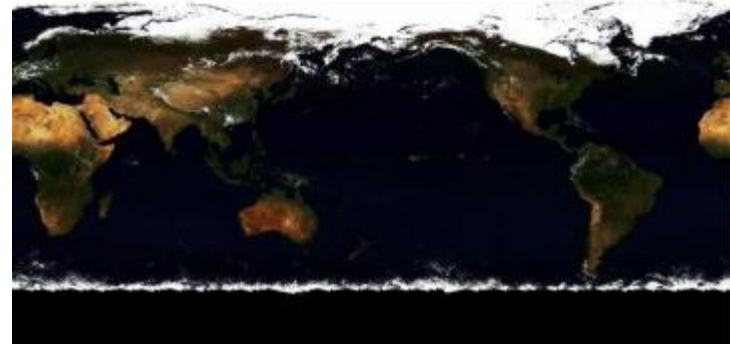


http://sharaku.eorc.jaxa.jp/cgi-bin/amr/windsat_wind_Ver4/ocean_wind.cgi?&LANG=0

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.

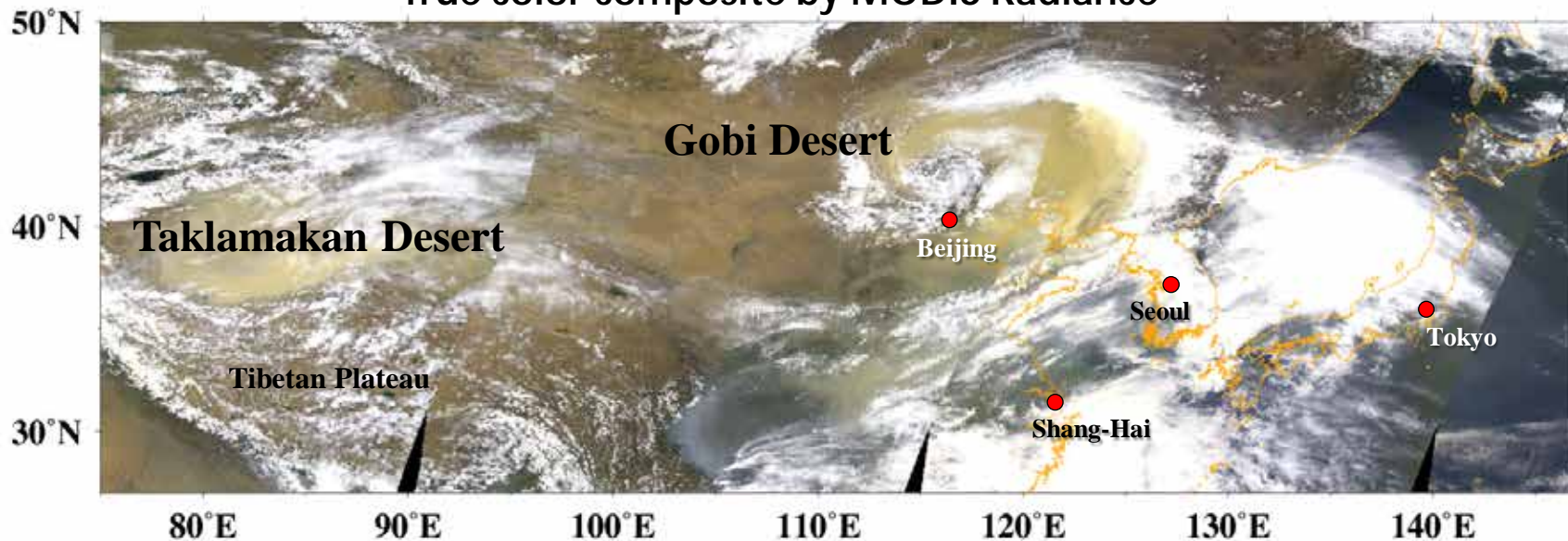


<http://kuroshio.eorc.jaxa.jp/JASMES/index.html>

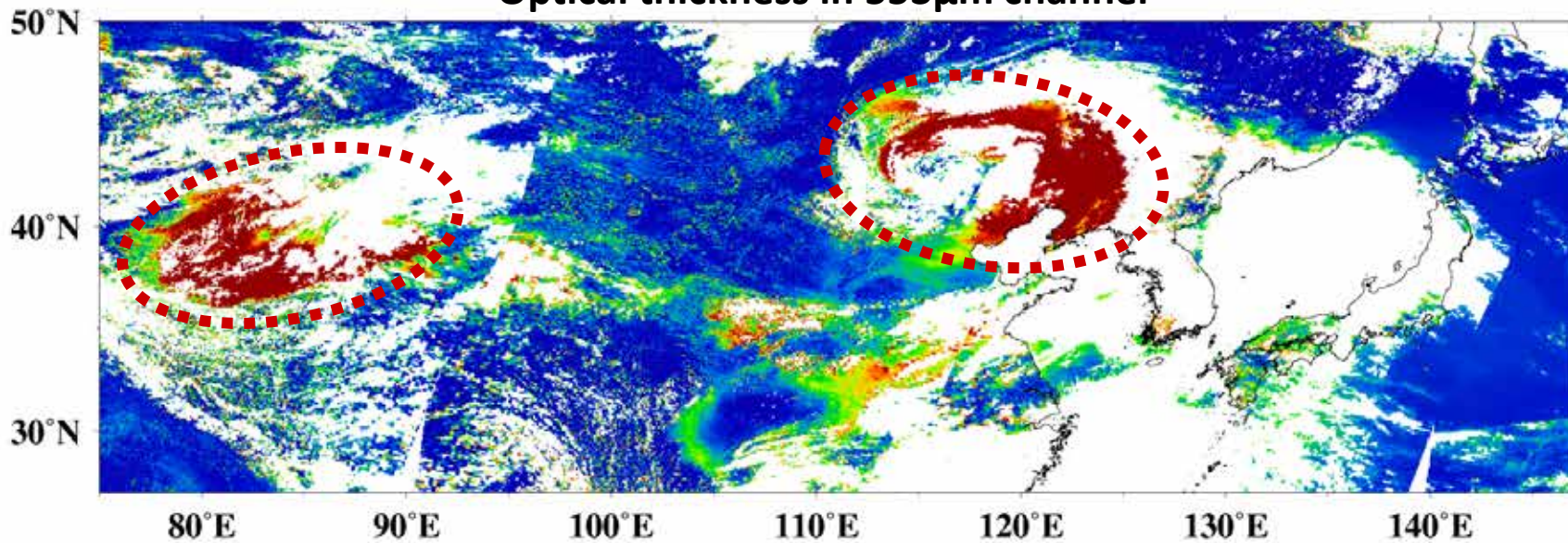
Yellow Wind

Apr 30, 2011

True color composite by MODIS Radiance



Optical thickness in 553 μ m channel



Wild Fire

In Alaska

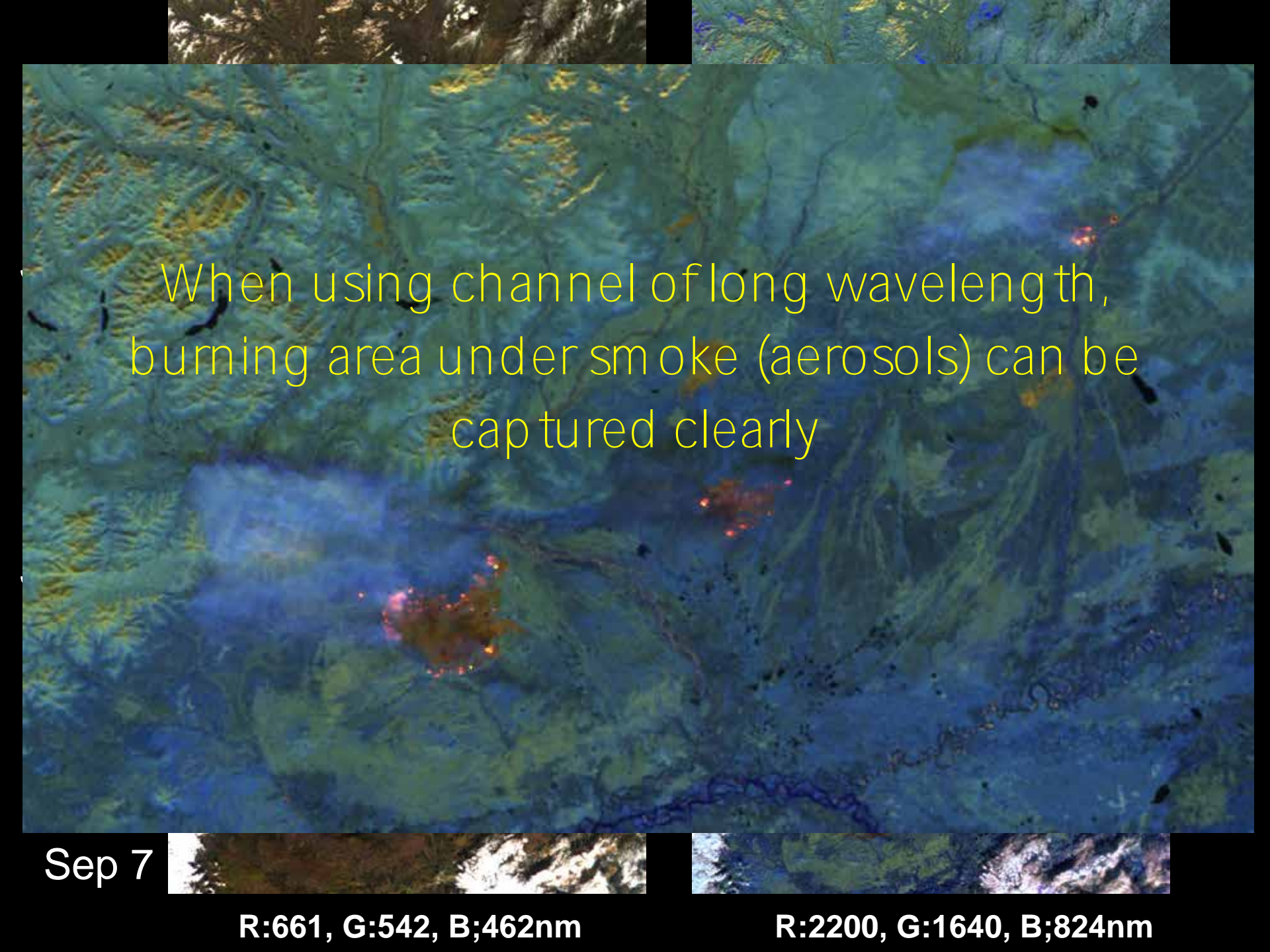
Not only burned areas but also "burning" areas
can be captured clearly

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

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

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

GLI Jul. 18, 2003

An aerial satellite image showing a large forest fire. The fire is visible as bright red and orange patches, with thick plumes of white smoke rising from the burning areas. The surrounding forest is shown in shades of green and blue. The text is overlaid in yellow on the central part of the image.

When using channel of long wavelength,
burning area under smoke (aerosols) can be
captured clearly

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 JAXA Satellite Monitoring for Environmental Studies
for water cycle

Search Menu

Show Images

Date: 2012 May 31

Projection: EQR

Sensor: WindSat

AMSR-2 A/D(Both)

AMSR-E A/D(Both)

TMI A/D(Both)

SSM/I F13 A/D(Both)

SSM/I F15 A/D(Both)

Product Select:

Sea Surface Temperature

Snow Depth

Soil Moisture Content

Total Precipitable Water

Cloud Liquid Water

Sea Surface Wind Speed

Precipitation

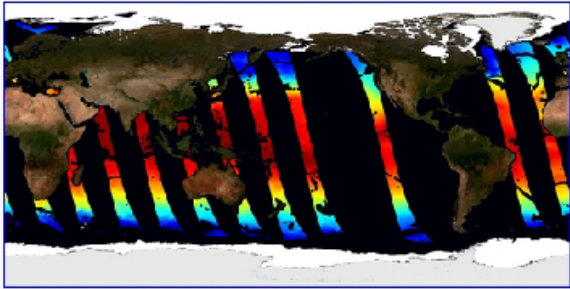
Sea Ice Concentration

*NPS/SPS projection only

Brightness Temperature

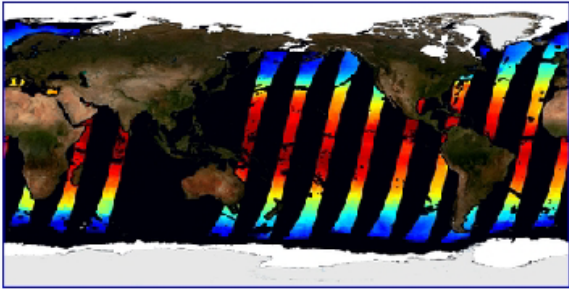
< prev. 2012-May-31 next >

Windsat SST(A)



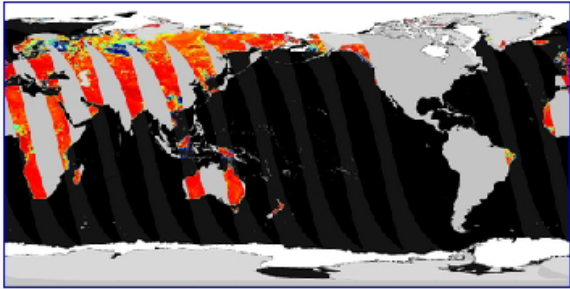
[deg C]

Windsat SST(D)



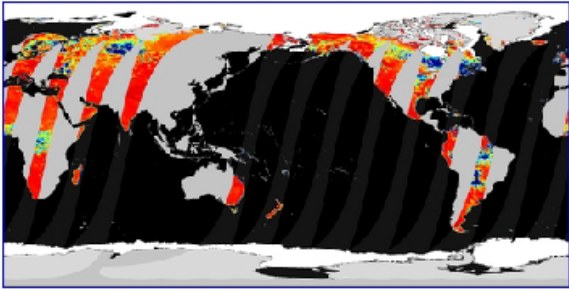
[deg C]

Windsat SMC(A)



[%]

Windsat SMC(D)



[%]

Windsat SSW(A)

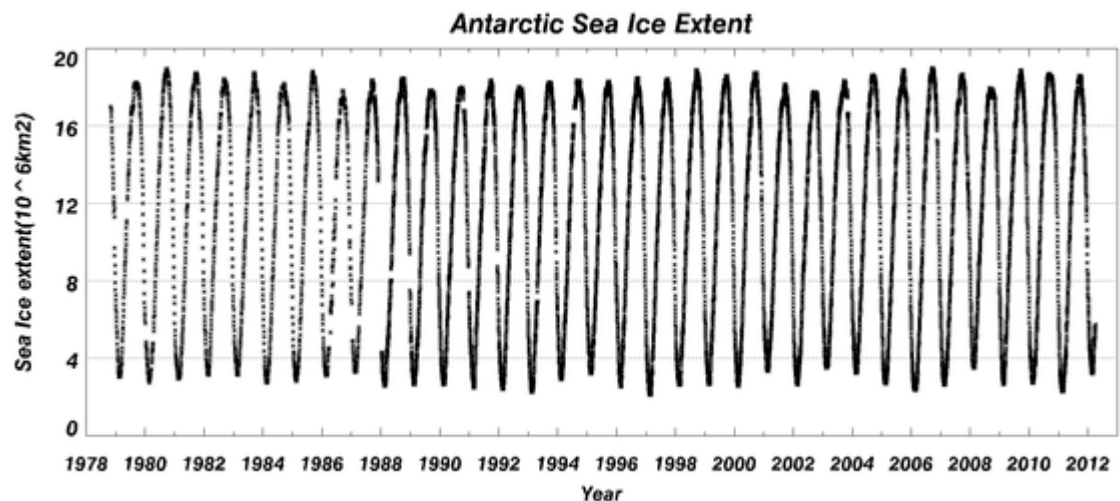
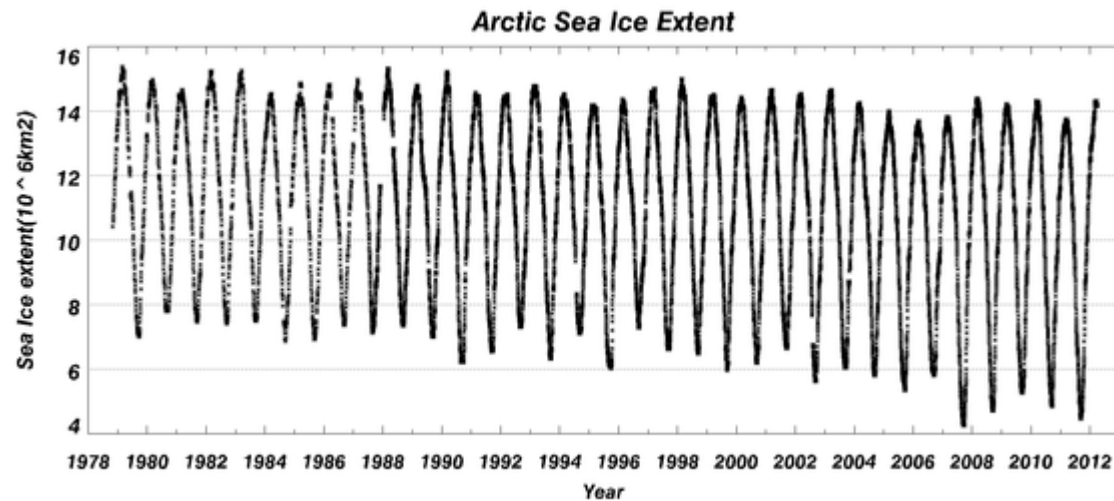
Windsat SSW(D)

JASMES Climate: Sea Ice Concentration

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



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



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

GPM data download from JAXA



p GPM and TRMM data is available from the JAXA G-Portal web site (Data portal for JAXA Earth observation satellites)

n <https://www.gportal.jaxa.jp/>

n Simple registration

n Search & download data easily

n SFTP for automatic download

p GSMP binary/text is also available at JAXA Global Rainfall Watch

The screenshot shows the JAXA G-Portal website. At the top, there is a header with the JAXA logo and the text 'G-Portal Globe-Portal (BETA)'. Below the header, there is a navigation menu with links for Home, Search Products, User registration, Operational information, Link, Announcement, Contact, and Help. A date notice indicates that PR/TRMM products from Nov 12 to 15, 2013 are temporarily unavailable. The main content area features a 'Welcome' message and a 'Search products by theme' section. This section offers two search options: 'Select by Physical Quantities' and 'Select by Spacecrafts/sensors'. Below these options, there is a list of spacecraft/sensors provided by G-Portal, including GPM, TRMM, Aqua, ADEOS-2, and ALOS. At the bottom, there is a section for 'Physical quantities are below' with a table listing various physical quantities and their corresponding data sources.

| Atmosphere | Precipitation | Cloud | Water Vapor | Aerosol | Atmospheric Boundary Layer | Radiation Balance |
|------------|---------------|----------|-------------|---------|----------------------------|-------------------|
| Cryosphere | Sea Ice | Snowpack | Sea | | | |

GCOM-W and AMSR-E data download



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

The screenshot shows the login page for the GCOM-W1 Data Providing Service. The page has a blue header with the GCOM logo and the text "GCOM-W1 Data Providing Service". On the right side of the header is the JAXA logo and the text "宇宙航空研究開発機構 Japan Aerospace Exploration Agency". The main content area is white and contains a "Welcome" message, a login form, and a "For Beginners" link. The login form has a green button that says "Input a mail address and password." Below this are two input fields: "E-mail address: (User Account)" with the text "guest" and "Password:". There are also links for "日本語", "English", "Save Login Status", and "Login". At the bottom of the page, it says "Copyright (C) 2011 Japan Aerospace Exploration Agency".

AMSR2 Data User's Manual



p AMSR2 Data User's Manual in PDF document

n Available in English covering L1 and L2

n Sample programs are also available

n http://suzaku.eorc.jaxa.jp/GCOM_W/data/data_w_use.html

A screenshot of the GCOM-W1 Data Products website. The page has a blue header with the text 'Global Change Observation Mission 1st-Water' and 'GCOM-W1 水循環変動観測衛星'. Below the header is a navigation menu with links for 'TOP', 'About GCOM-W', 'About AMSR2', 'Data Products', 'Publication', and 'Earth Monitoring'. The main content area is titled 'Data Products' and features a sidebar with a menu of links: 'Product', 'Format', 'Sample Data', 'Retrieval Algorithm', 'Calibration & Validation', 'Data Providing Service', and 'Data Use'. The 'Data Use' link is highlighted. The main content area contains a section titled '[Data Use]' with several links: 'Data Users' Manual for AMSR2 (2nd ed., PDF file / 1.2MB)', 'Sample programs (Tar file compressed with gzip / 39kB)', 'AMSR2 Product I/O Toolkit (AMTK)', 'GCOM-W1 "Shizuku" Data Users Handbook', and 'GCOM-W1 User Tool'. The page also includes a 'JAPANESE' link in the top right corner.

How to read GPM data

About the format



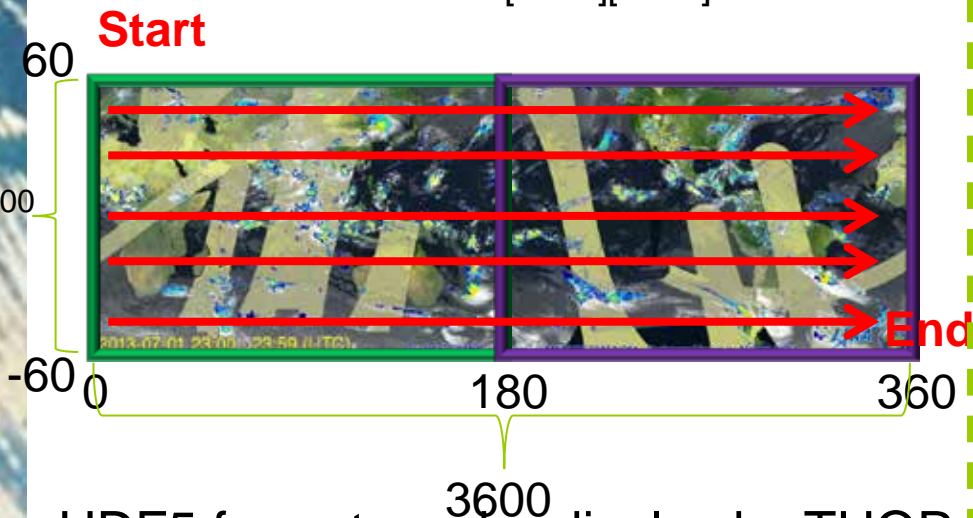
- ⌘ Format of the GPM products are HDF5
 - ⌘ Level 3 products are also available in text format
 - ⌘ The TRMM products are HDF4
 - ⌘ GSMP product will be distributed in the same format from same server as current ones for users' convenience
- ⌘ The GPM Products can be read using following software
 - ⌘ 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]

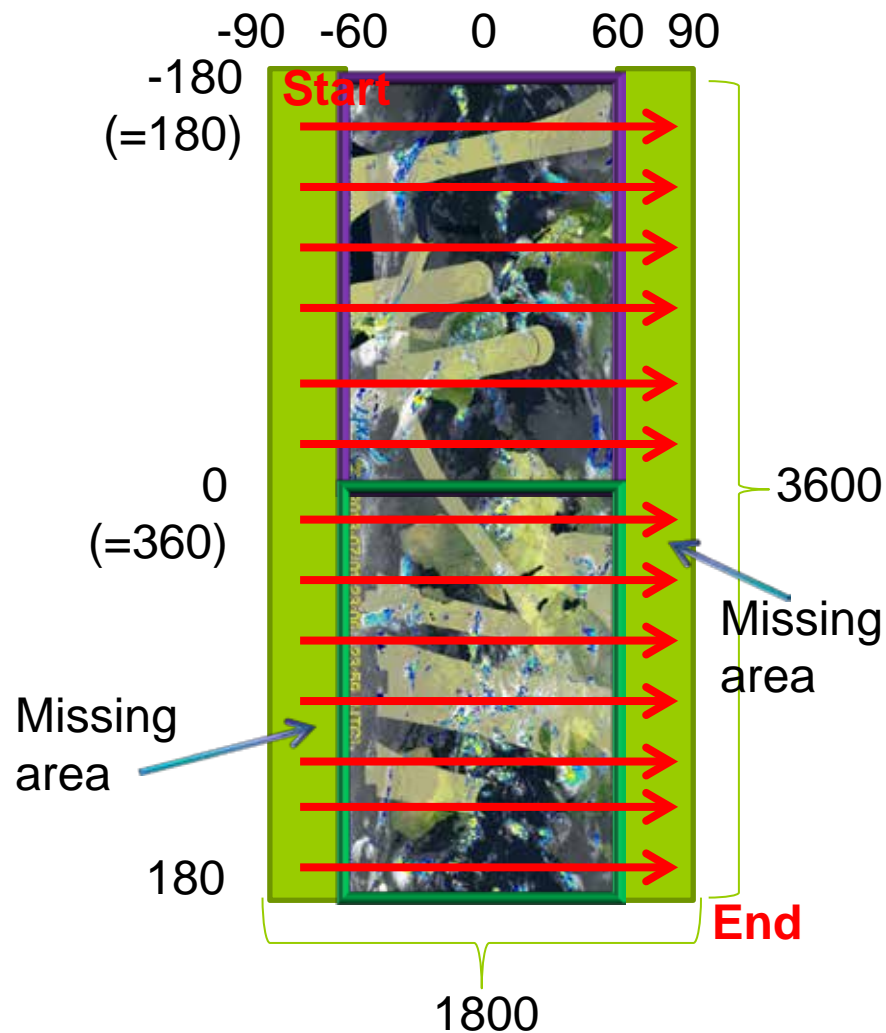


HDF5 format can be display by THOR,
and structure of data array is
transposed from that of current binary
product.

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

HDF5 product

Data structure: [3600][1800]

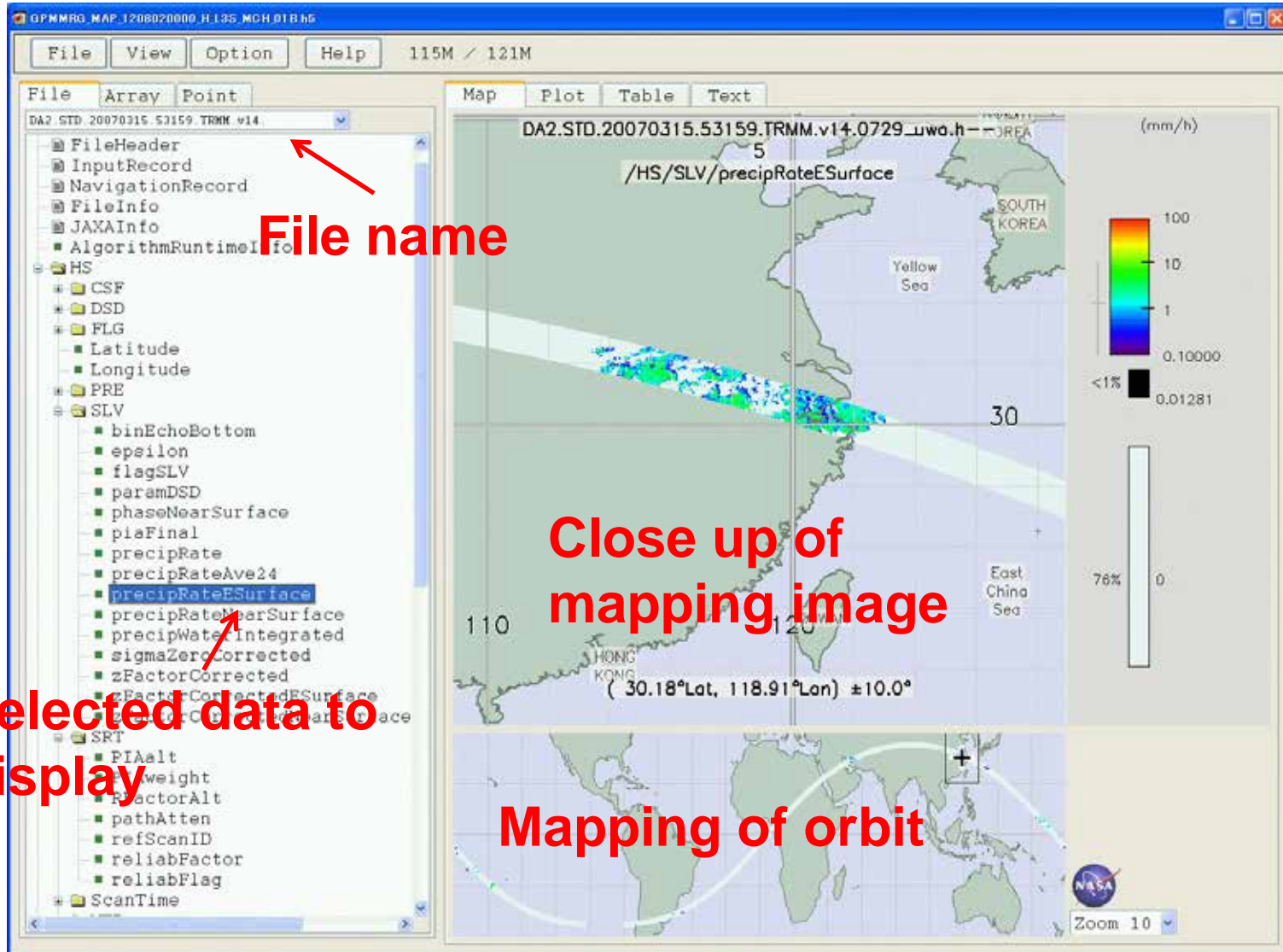


Visualization tool for the GPM Data: THOR



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

Display by THOR (DPR Ka)



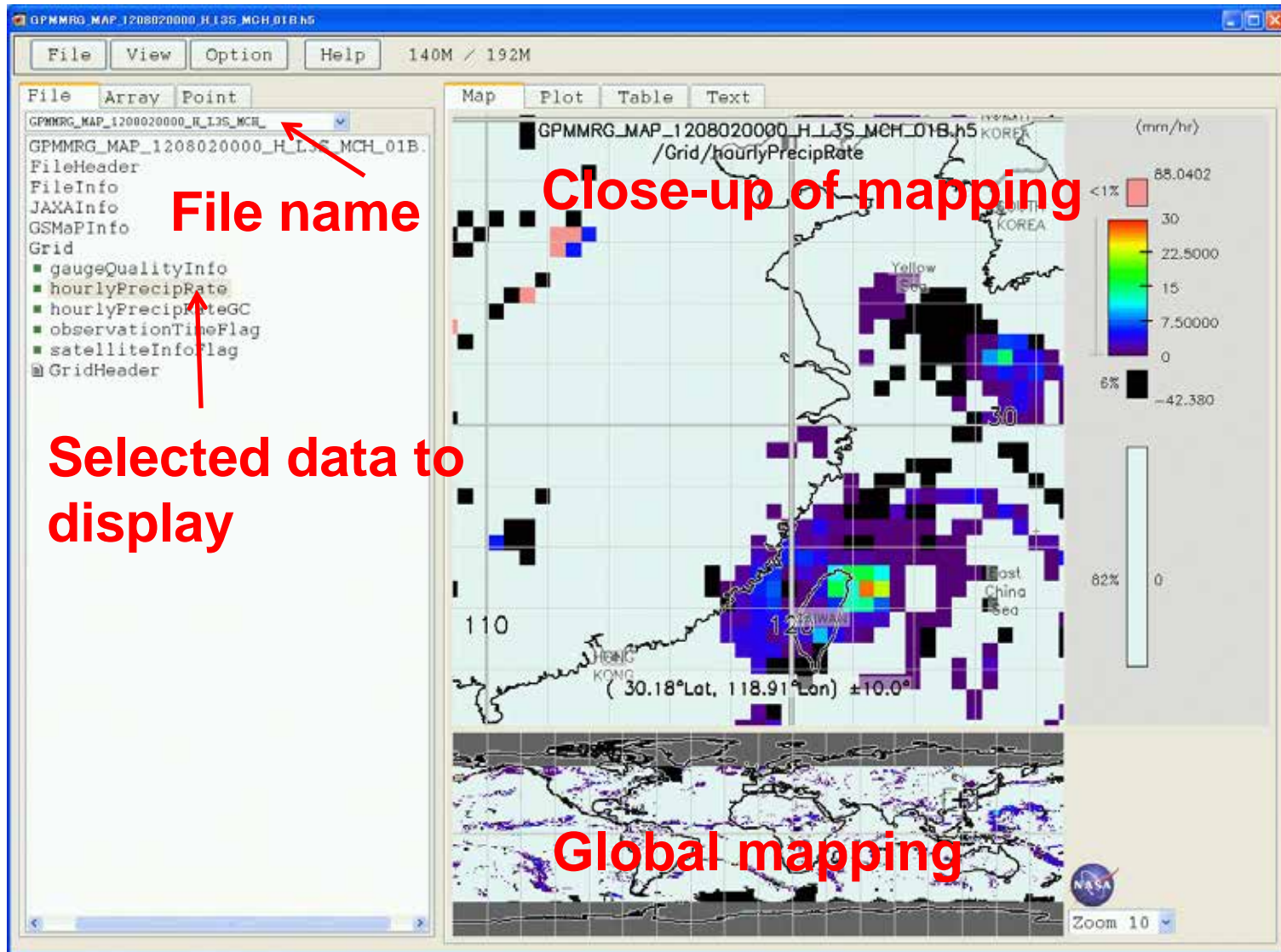
File name

Close up of mapping image

Selected data to display

Mapping of orbit

Display by THOR (GSMaP)



GPM Toolkit (TKIO)



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



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