

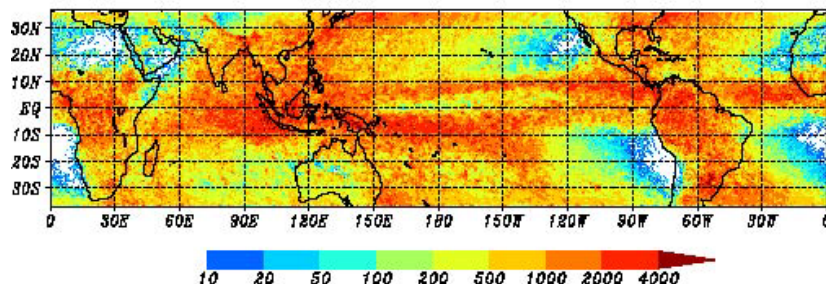
JAXA Report and Plans

- 1. Current EO Program**
- 2. Future EO Program**
- 3. Perspective of GPM**
- 4. Conclusion**

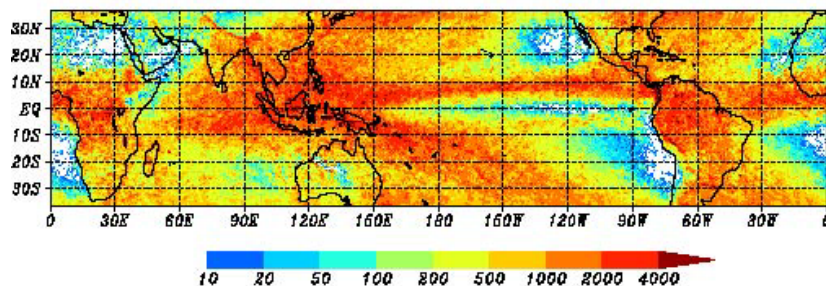
Tasuku Tanaka (JAXA/EORC)

Annual Rainfall in Tropics by PR/TRMM

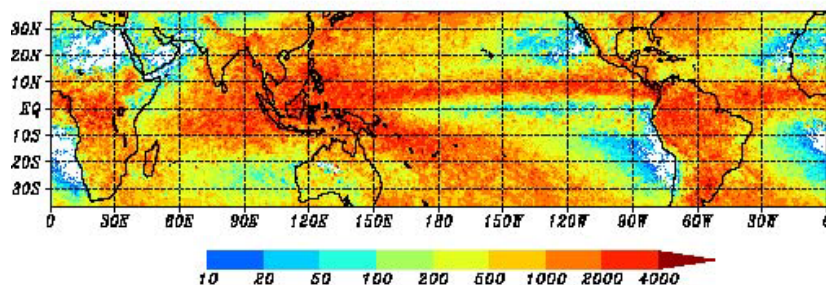
1998 PR Nearsurface (mm/year)



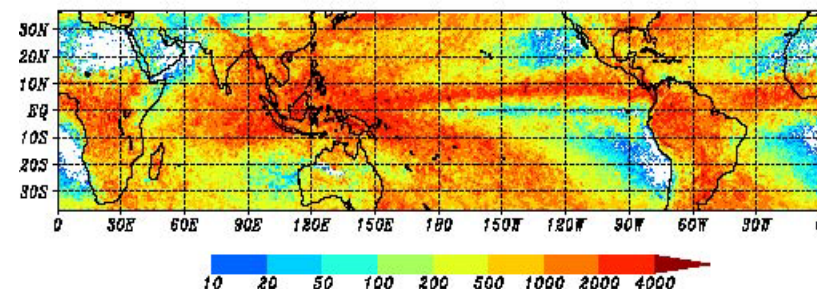
1999 PR Nearsurface (mm/year)



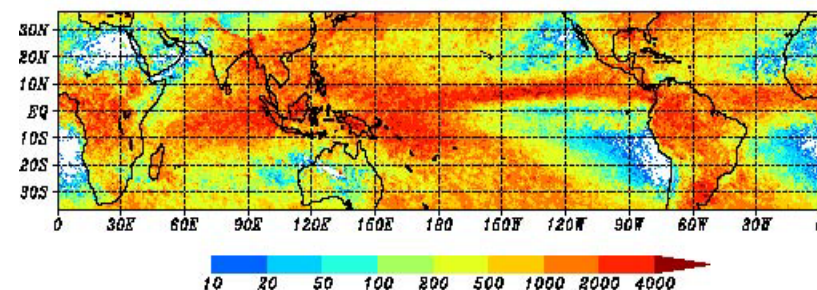
2000 PR Nearsurface (mm/year)



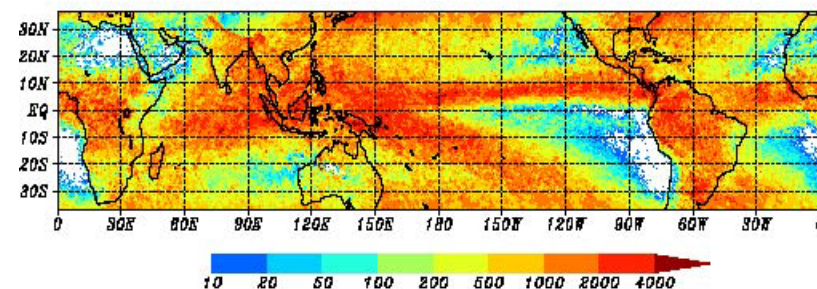
2001 PR Nearsurface (mm/year)



2002 PR Nearsurface (mm/year)



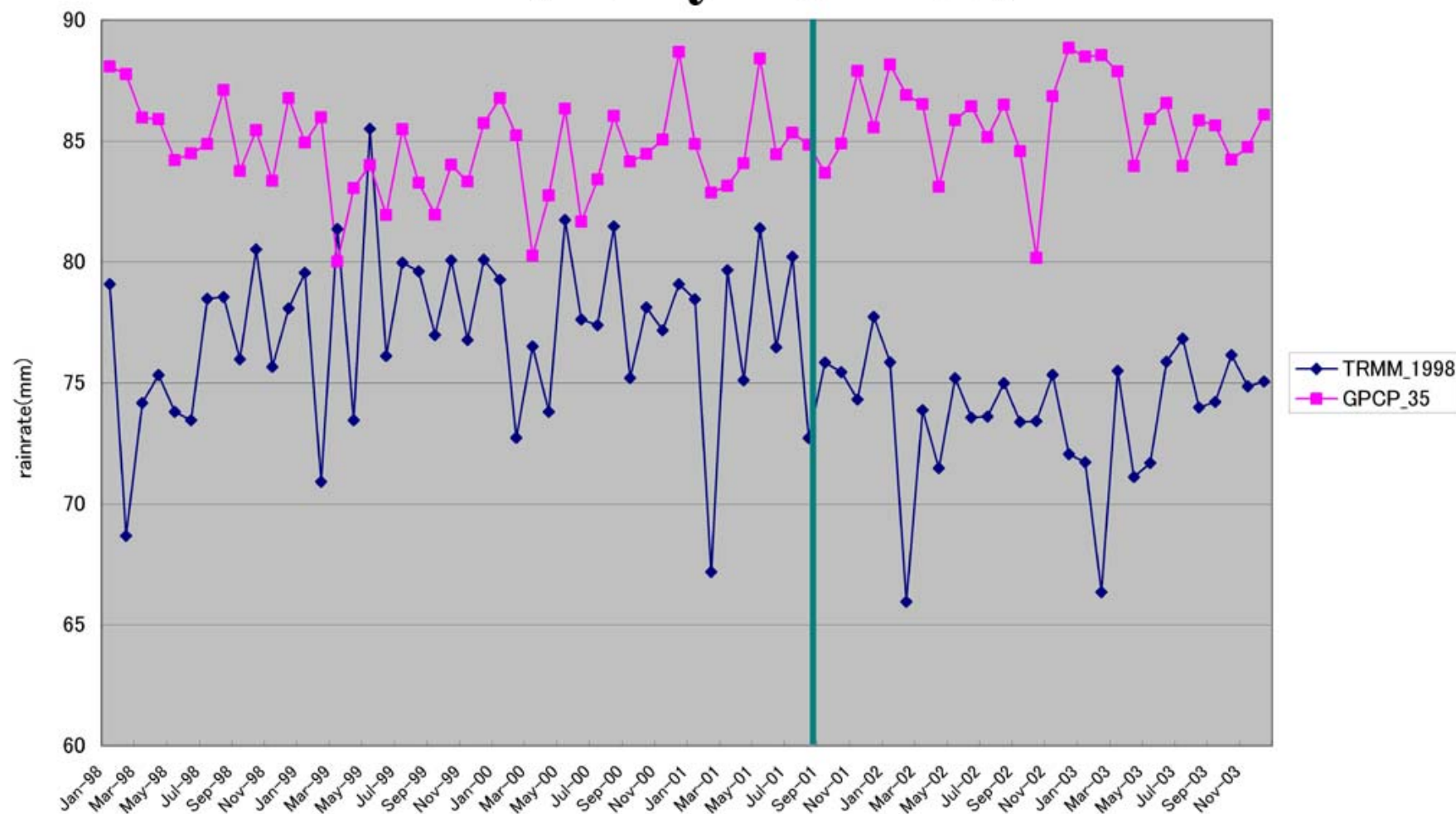
2003 PR Nearsurface (mm/year)



Yearly Rainfall in Tropics

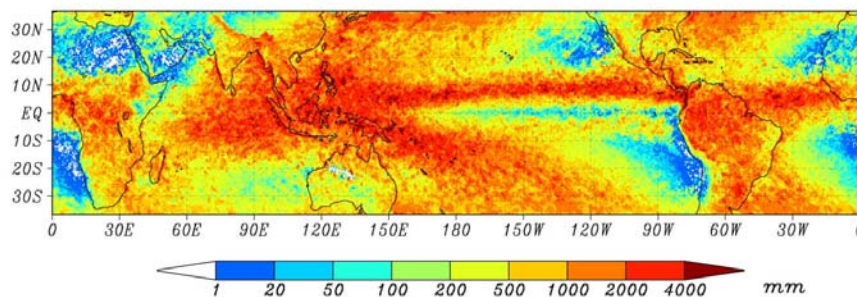
	PR/TRMM		GPCP	
Y1998	911.8mm	1.9mm	1027.7mm	6.5mm
Y1999	940.5mm	30.6mm	1003.7mm	-17.5mm
Y2000	930.2mm	20.3mm	1014.8mm	-6.4mm
Y2001	914.6mm	4.7mm	1020.0mm	-1.2mm
Y2002	878.7mm	-32.2mm	1029.1mm	7.9mm
Y2003	883.4mm	-26.5mm	1031.9mm	10.6mm
Ave.	909.9mm	25.0mm	1021.2mm	10.6mm

Monthly Rainrate

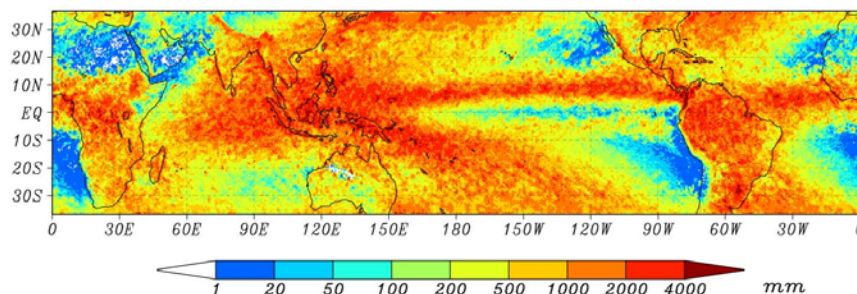


New PR Algorithm

2000 TRMM V6 nearsurface
average = 962.75 mm



2000 TRMM V5 nearsurface
average = 930.155 mm



DIFFERENCE TRMM V6 vs V5 (2000)
average = 32.5973 mm

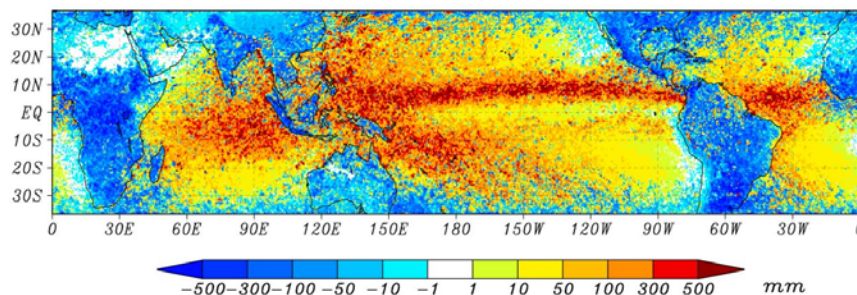


Image of GWC (1)

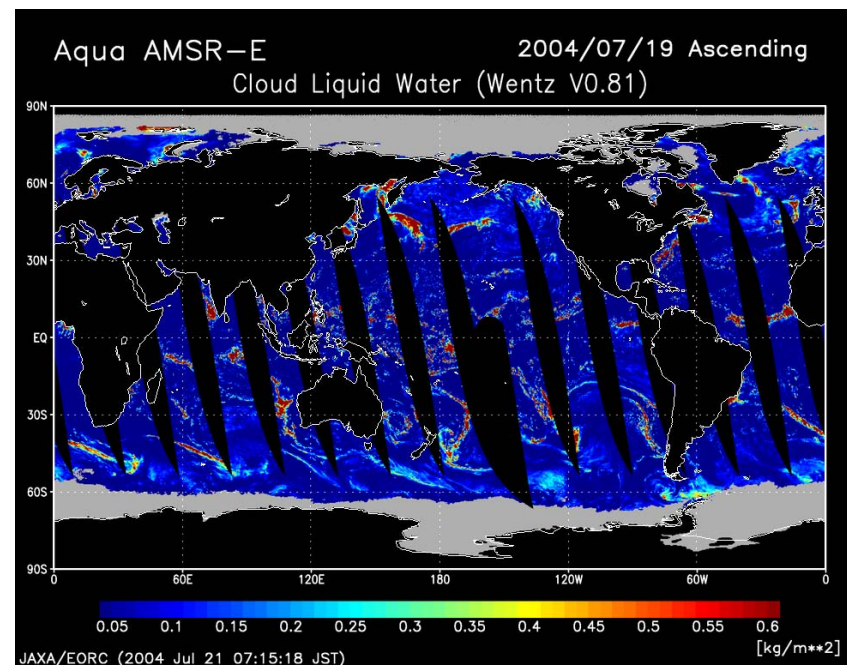
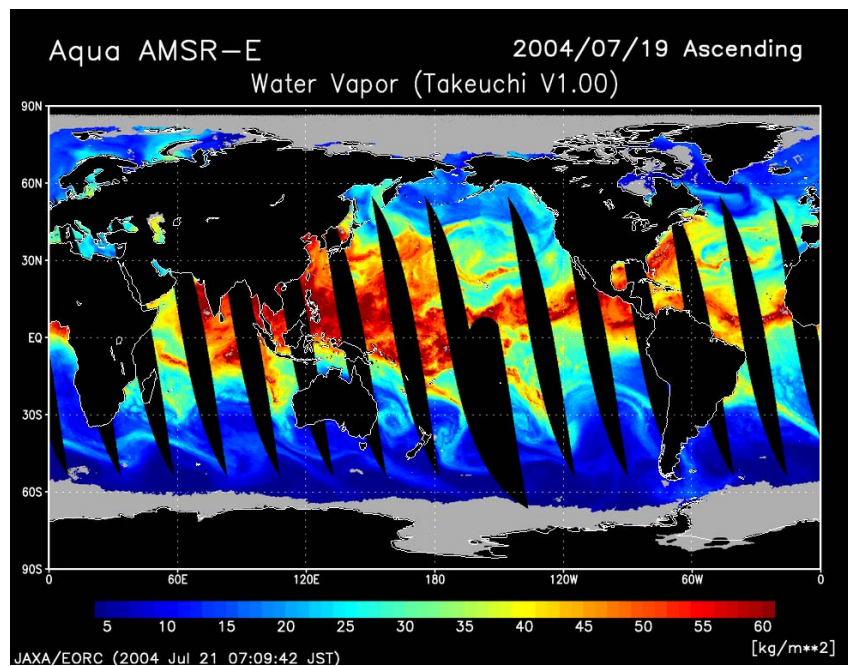


Image of GWC (3)

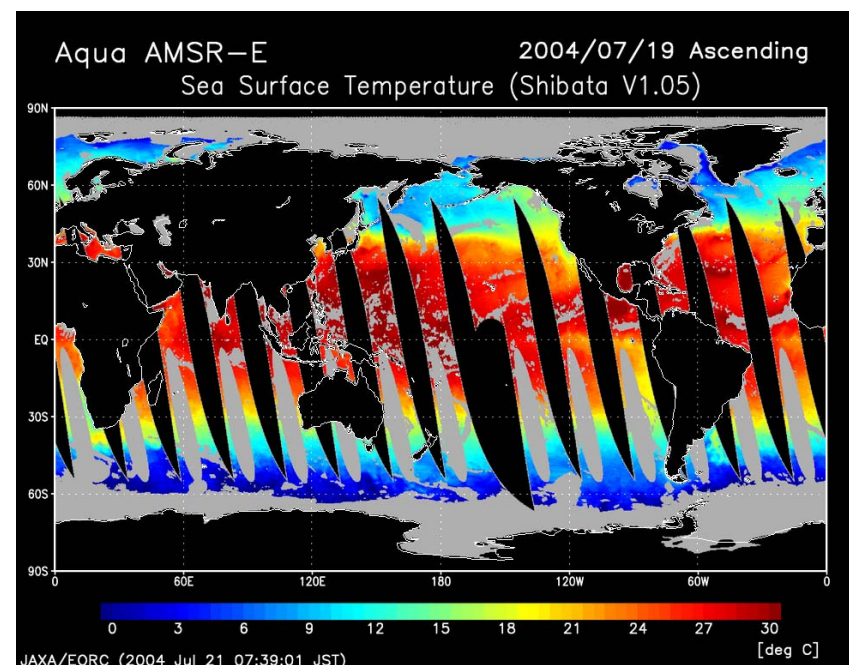
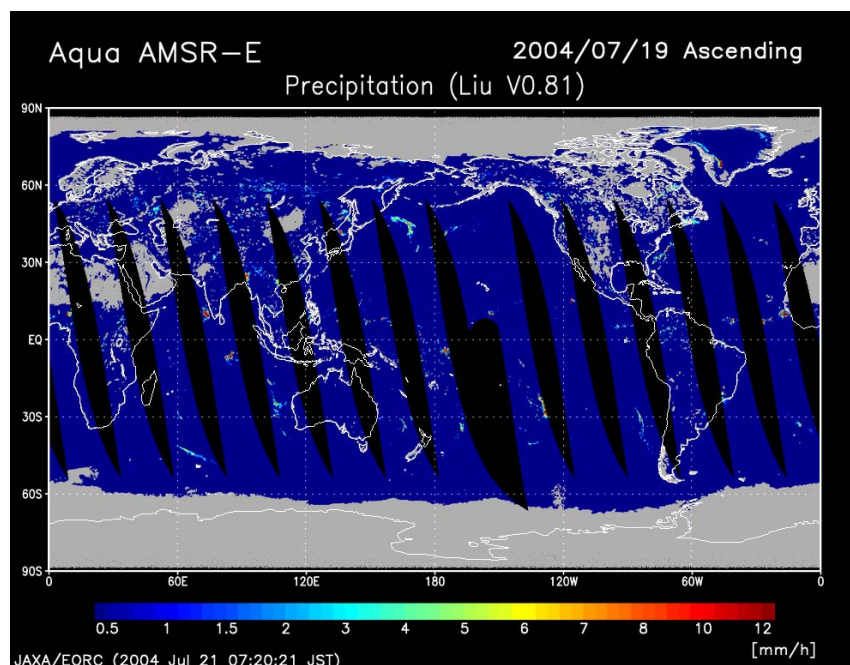
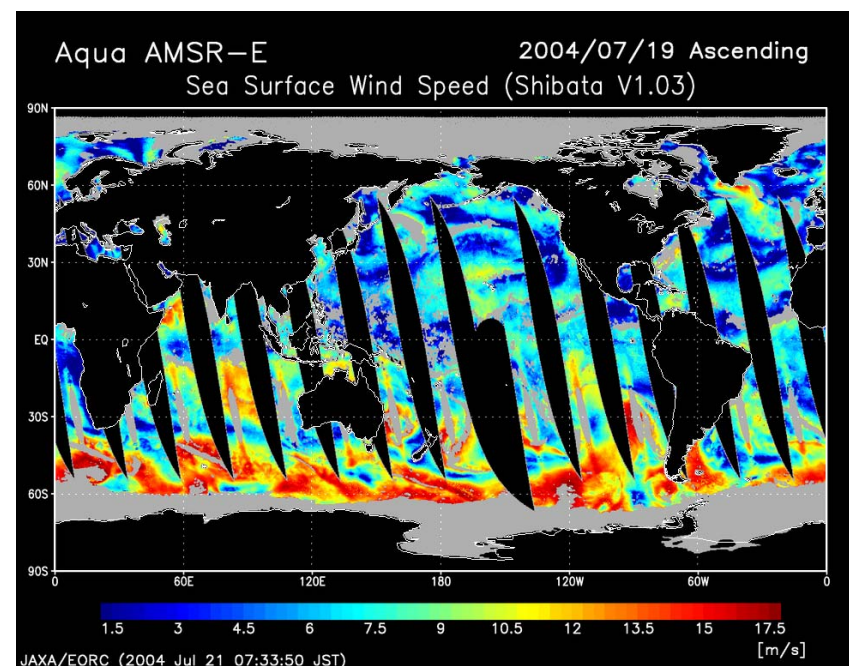
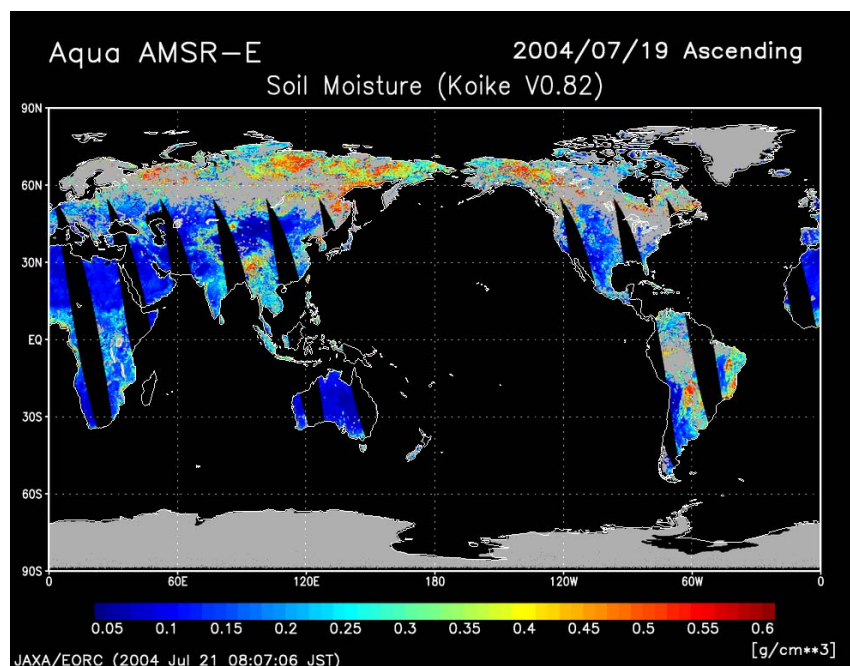


Image of GWC (5)



EO Satellite Road Map

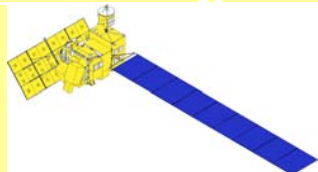
Feb. 28, 2005

2002~2006

2007~2011

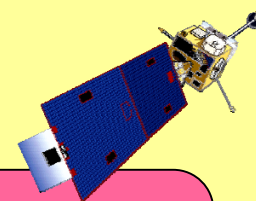
2012~2017

Measuring land & sea surface



ALOS

Optical triplet mode, High resolution
sensor;
Global mapping) : 2.5m
5m
PALSAR (L-band Synthetic Aperture Radar;
Land information, Disaster monitoring) :
10m
AVNIR-2 (Visible & Near Infrared Radiometer:
Disaster monitoring etc.) :
10m



ALOS F/O

Geostationary high res optical sensor:
10m
High resolution optical sensor: 0.5m
Multiple polarization*
Multiple wavelength SAR: 10m

To Operational
Land
Observations

Global monitoring of the Earth's environment



ADEOS-II

ILAS-II: Infrared spectrometer
GLI : Visible & Infrared Imager
AMSR : Microwave Radiometer

GOSAT

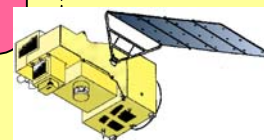
GHG and Cloud sensor

GCOM

SGLI :
Visible Land Infrared Imager
AMSR F/O :
Microwave radiometer

To continuous
Global Climate
Change Observations

To continuous
GHG Observations



Global Water Cycle Observation

TRMM

Precipitation Radar : 5Km,
Rain rate: 0.7mm/h
TMI Microwave Radiometer:
(NASA)

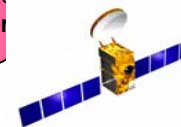
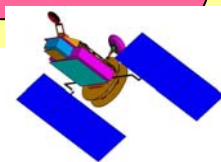
GPM

DPR: Dual Frequency
Precipitation Radar

EarthCARE

CPR: Cloud Profile Radar
FTS: Fourier Transform
Spectrometer etc.

To continuous
Water Cycle
Observations



EORC T. T.

Advanced Land Observing Satellite (ALOS)

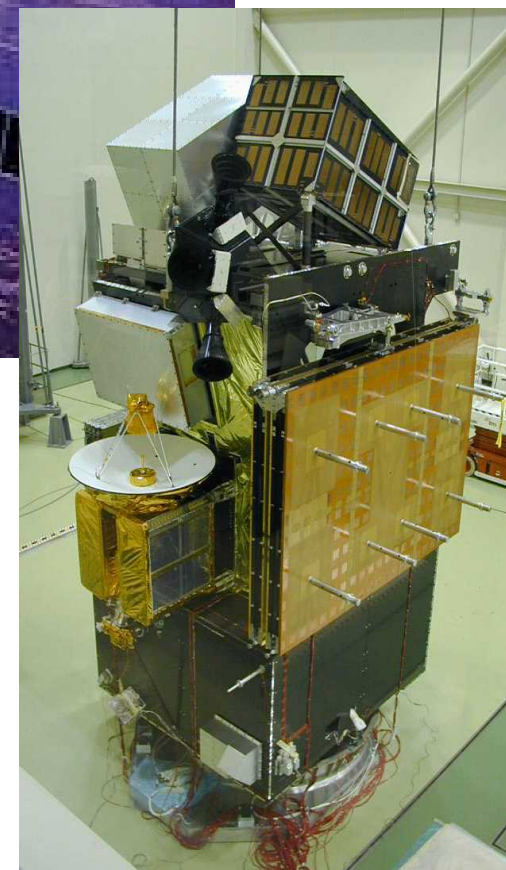
Main Characteristics

Mass	3.9 tons
Orbit	Sun-synchronous Subrecurrent
	Altitude 800km
Launch target	FY 2004
Mission life	5 years



Observing Sensors

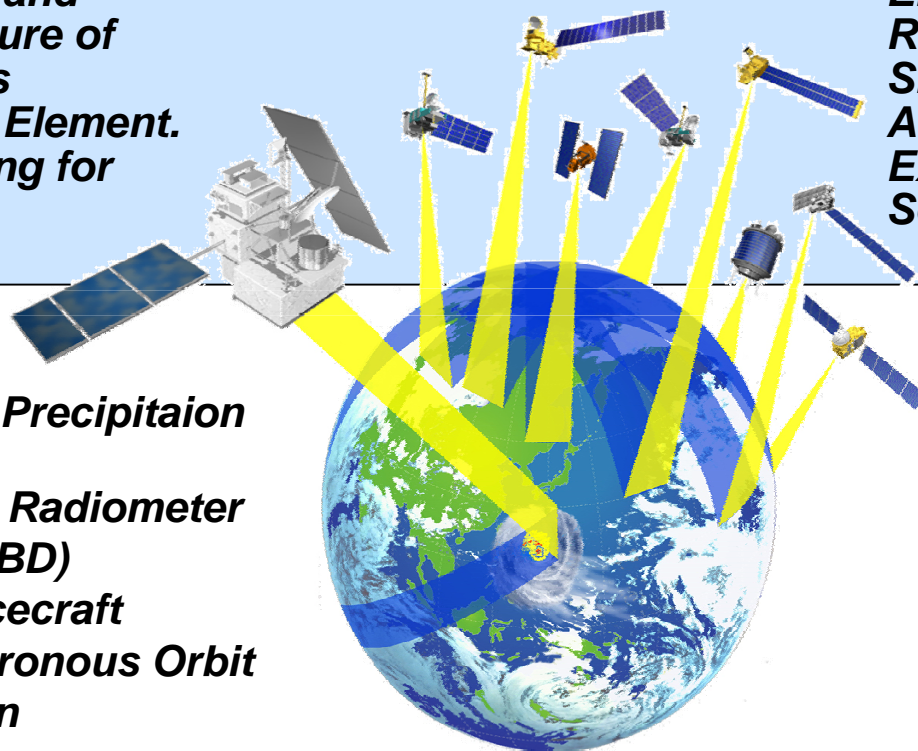
Panchromatic Remote sensing Instrument for Stereo Mapping
(PRISM)
Advanced Visible and Near Infrared Radiometer type 2
(AVNIR-2)
Phased Array type L-band Synthetic Aperture Radar
(PALSAR)



GPM Reference Concept

OBJECTIVE: Understand the Horizontal and Vertical Structure of Rainfall and Its Microphysical Element. Provide Training for Constellation Radiometers.

OBJECTIVE: Provide Enough Sampling to Reduce Uncertainty in Short-term Rainfall Accumulations. Extend Scientific and Societal Applications.



Core Satellite

- Dual-frequency Precipitation Radar
- Multi-frequency Radiometer
- H2-A Launch (TBD)
- TRMM-like Spacecraft
- Non-Sun Synchronous Orbit
- ~65° Inclination
- ~400 km Altitude
- ~5 km Horizontal Resolution
- 250 m / 500m Vertical Resolution

Precipitation Validation Sites

- Global Ground Based Rain Measurement

Constellation Satellites

- Small Satellites with Microwave Radiometers
- Aggregate Revisit Time, 3 Hour goal
- Sun-Synchronous Polar Orbits
- ~600 km Altitude

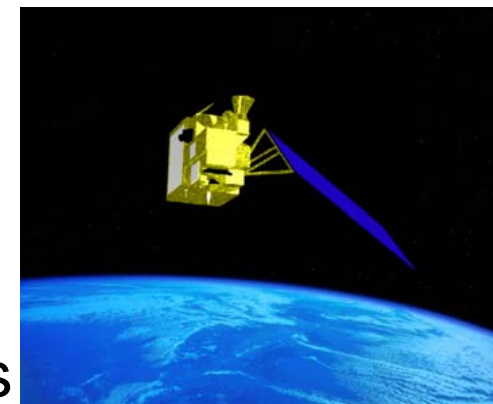
Global Precipitation Processing Center

- Capable of Producing Global Precipitation Data Products as Defined by GPM Partners

GOSAT: Greenhouse gas Observing SATellite

Objectives:

- observation of spatial & temporal variations of greenhouse gases; mainly CO₂, plus CH₄, CO and O₃
- to validate global circulation models
- to infer geographical (global) distributions of sources/sinks of greenhouse gases



Requirements for atmospheric CO₂ measurement:

- accuracy CO₂ 1% or 1 ppmv

Launch in 2008

Mass: Approx. 1650kg

Power: 3.3kw - EOL

Designed Life: 5years

Orbit: Altitude 666km

Sun-Synchronous Orbit

Orbit Inclination 98deg.

EarthCARE

**Equal partnership cooperation between ESA and Japan
Report for assessment jointly developed and submitted to
Granada meeting in October for selection for phase-A study 2001-2003.**

- **Mission**

- Vertical profile of clouds, aerosol
- Interaction between clouds and aerosol
- Cloud stability and precipitation

- **Orbit**

- Sun synchronous
- Equator crossing time 13:30
- Altitude 380km

- **Instrument**

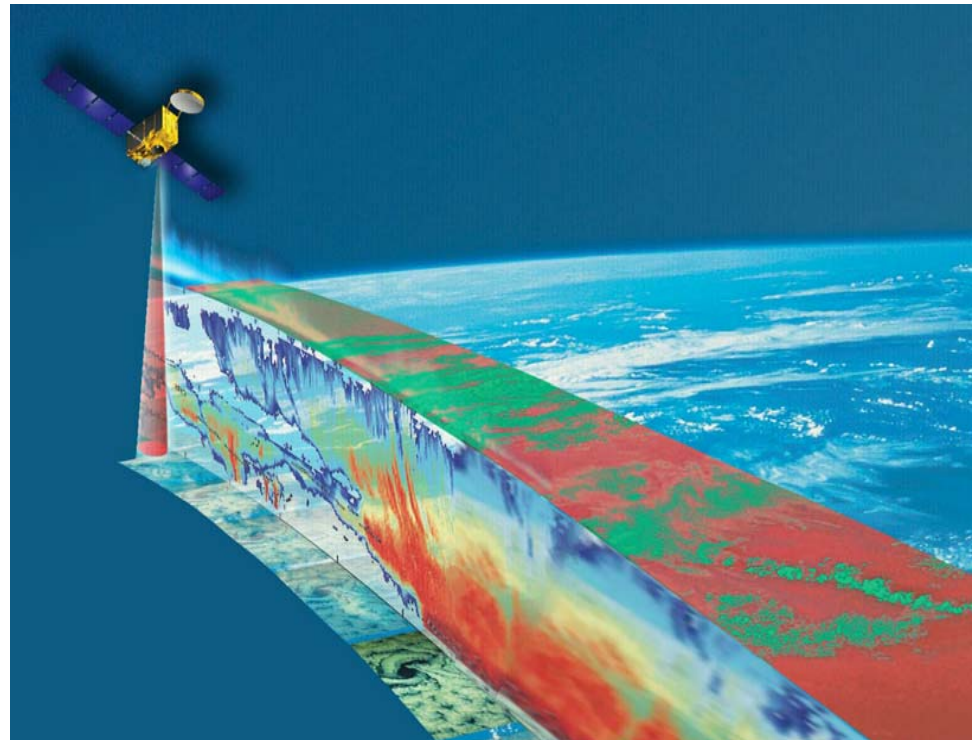
- CPR (cloud Profile Radar)
- LIDAR
- MSI (Multi-Spectral Imager)
- BBR (Broad Band Radiometer)
- FTS (Fourier Transform Spectrometer)

- **Proposed task sharing**

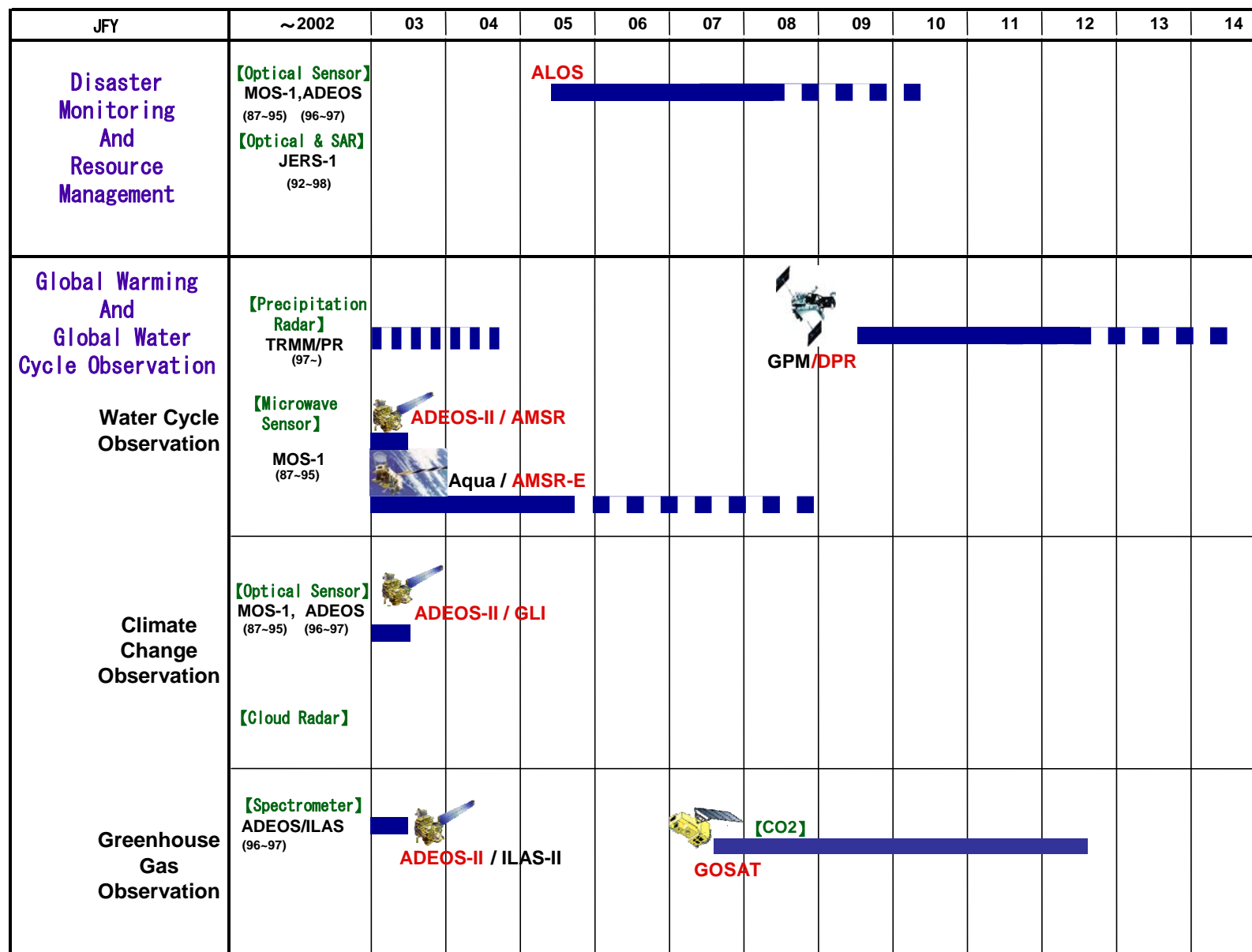
- NASDA (CPR, FTS, Launch)
- ESA (LIDAR, MSI, BBR, Spacecraft)

- **Launch target**

- TBD

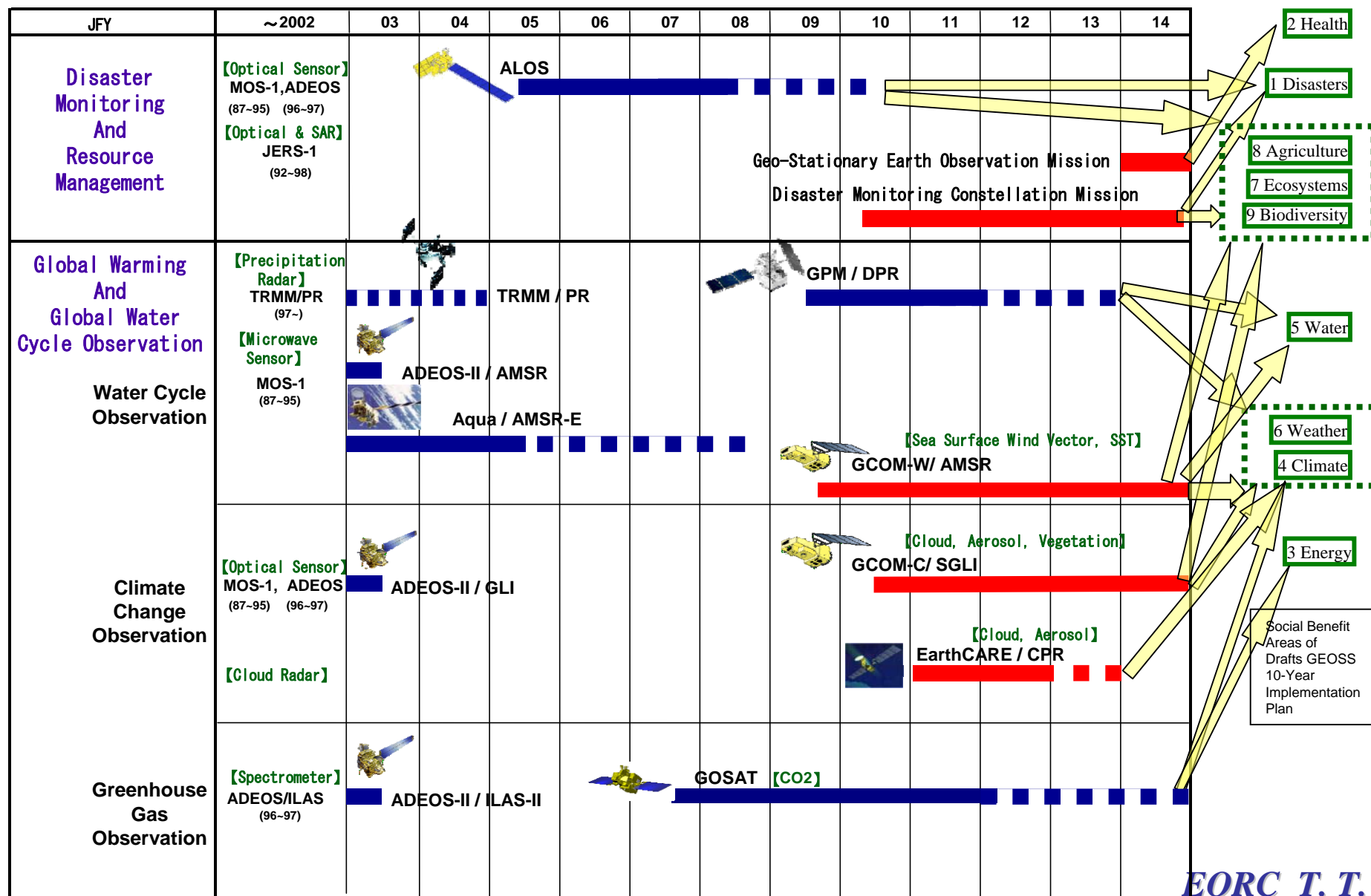


Future Program



Legend Symbol

 Approved Project
 After Operation Period



Perspective for GPM

TRMM's Experience for Operational Purposes

- 1. Monitoring and predicting the future behavior of tropical cyclones.**
- 2. Estimating rainfall.**
- 3. Predicting weather.**
- 4. Monitoring of climate variability (precipitation and sea surface temperature).**

The effect of TRMM data on operational applications has not been widely quantified because the data record is too short for meaningful statistical analysis. Further, the socioeconomic effects on end-users of improved forecasts have not been quantified.

Excerpt from "Assessment of the Benefits of Extending the Tropical Rainfall Measuring Mission: A Perspective from the Research and Operations Communities" (Interim Report, National Research Council of the National Academies of USA)

Typhoon TOKAGE(27W) T0423

[Track Chart \(JPEG, 500x500, 75KB\)](#)

Period : 12 Oct. 2004 - 20 Oct. 2004

Region : North Western Pacific

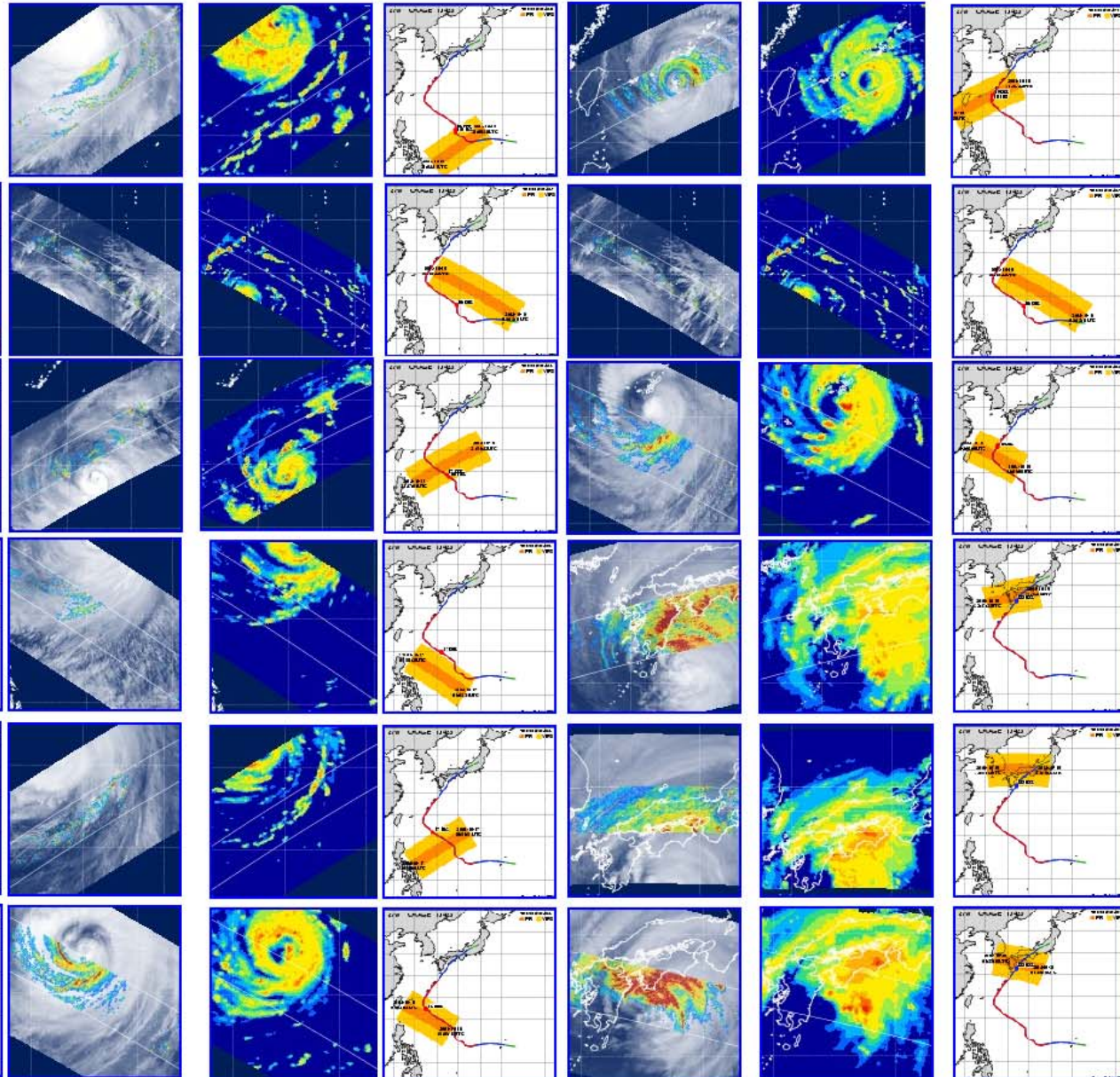
Maximum Sustained Winds : 125kt (Category 4)

Number of TRMM Observation : 16

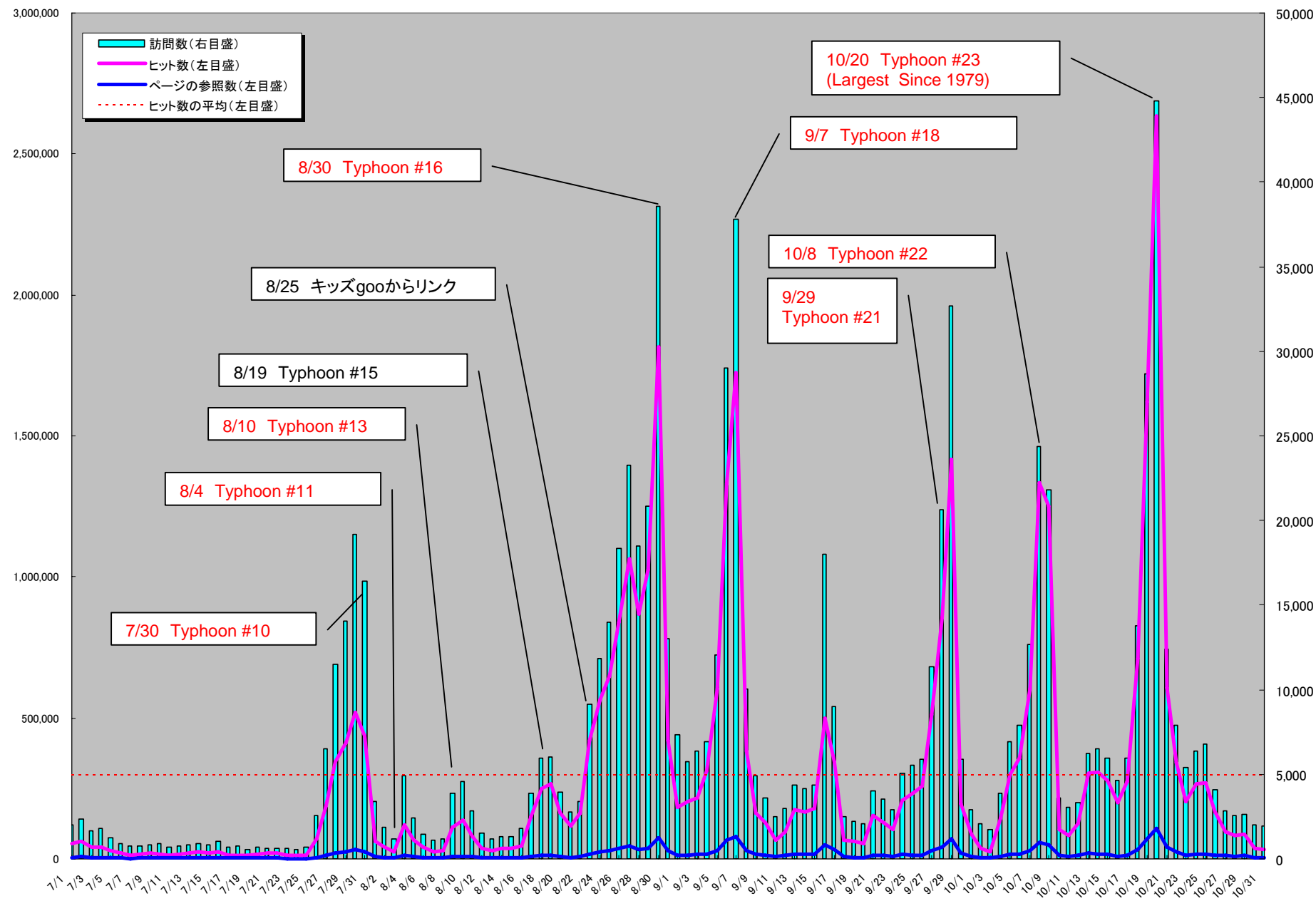
PR/VIRS Image

TMI Image

Observation Area



TRMM台風ホームページのアクセス状況(2004.7~2004.10)



Conclusion

JAXA/EORC is disclosing AMSR-E and TRMM data through Homepage.

It is the urgent imperative for JAXA to reestablish the lost credibility for space technology.

JAXA's EO main themes are reserved without major changes.

High Spatial Resolution for Surface Monitor

High Spectral Resolution for Global Change

Micro Wave Observation for Global Water Cycle

GPM is the main Water Cycle Observation Satellite

(Year 2010: Plan for Launch)