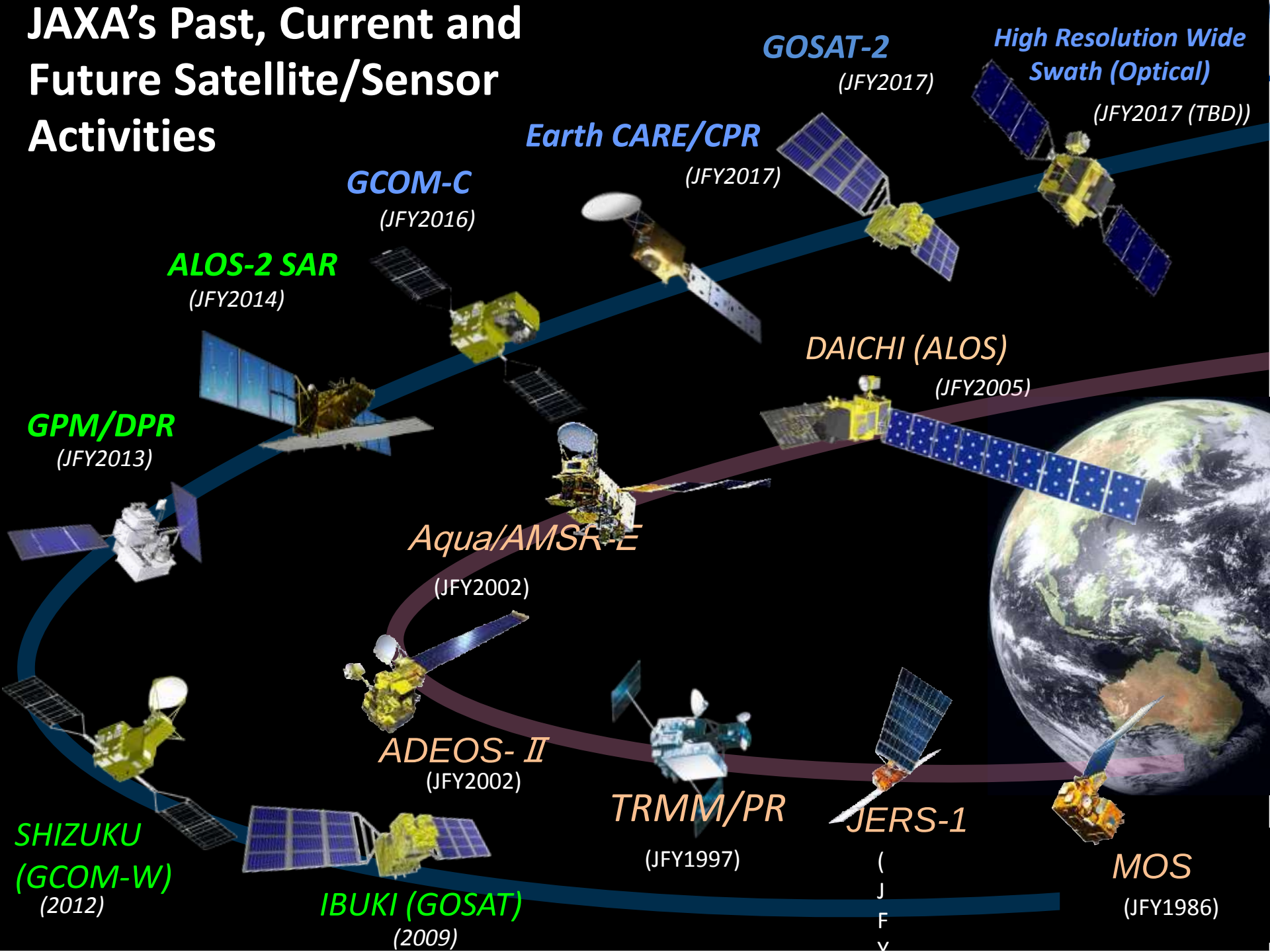
Space Agency Report
JAXA Activities for Earth Observation Satellites

November 2nd

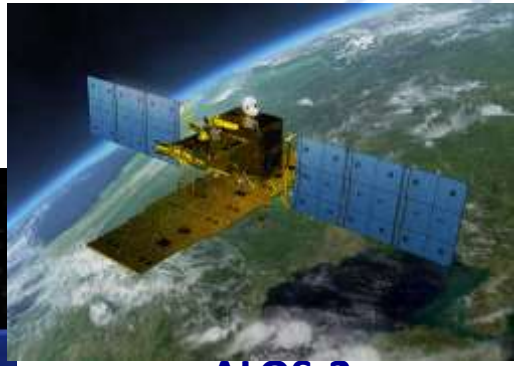
Japan Aerospace Exploration Agency
Space Technology Directorate I

Vice President, CEOS 2015 Chair
Shizuo Yamamoto

JAXA's Past, Current and Future Satellite/Sensor Activities

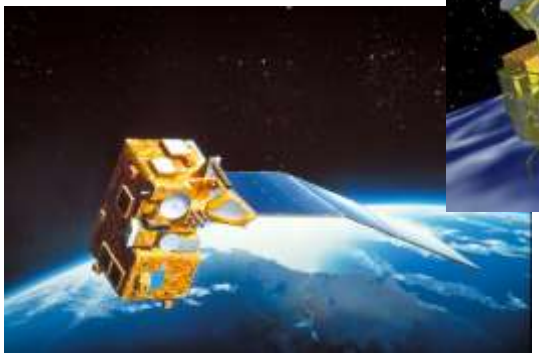


Mission Success



Satellite Loss on orbit

First Japan's EO satellite



Data Receiving/EOC

ALOS-2
2003-now-future

ADEOS –II
1990's-2003(Oct)

MOS-1
1980's

Provision of Value• benefit to Society

Technical Demonstration

1970's

Achievement of Technical Bases

Oct 2003

NASDA==========➔ JAXA ==========➔

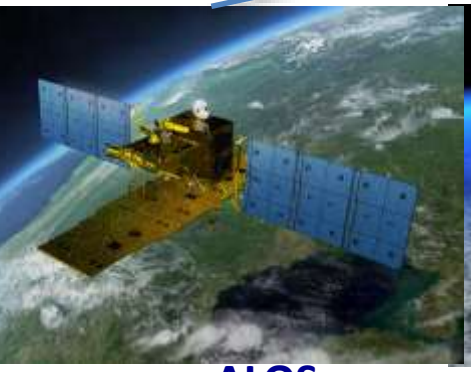
Data Applications of Earth Observation Satellites for 10 years

9 Societal Benefit Area agreed by GEO in 2005 summit

- Climate
- Water
- Disaster
- Weather
- Ecosystems
- Biodiversity
- Agriculture
- Energy
- Health

JAXA contribute to 3 Societal Benefit Area.

- Climate
- Water
- Disaster



ALOS
ALOS-2

GCOM-W/C
EC(CR)

TRMM（PR)
GPM(DPR)

CG Image by NASA

GOSAT-1/2/3

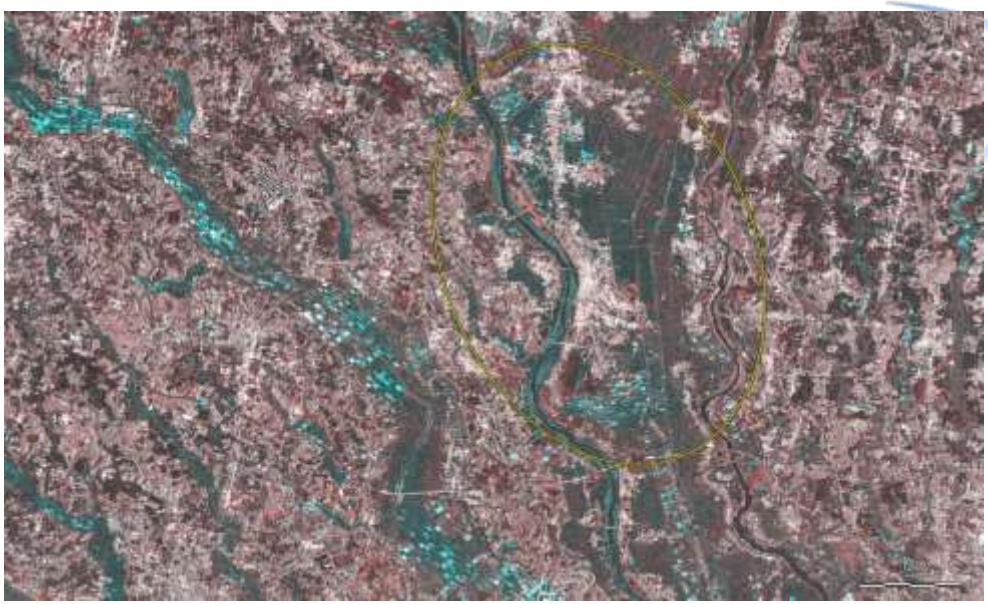
ALOS-2: Advanced Land Observing Satellite -2

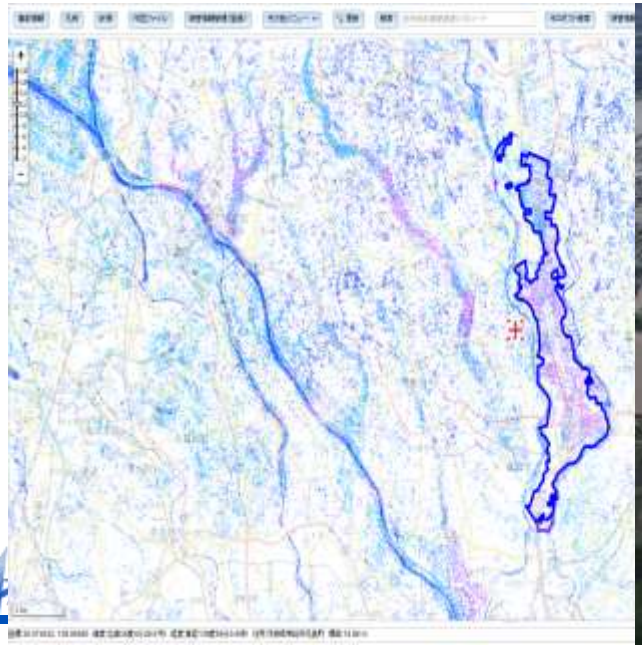
Characteristics of ALOS-2

- ❖ World's Top Continuous Observation
- ❖ Autonomous Precise Orbit Control
- ❖ Emergency Observation is possible after One hour of Setting up

Flood in Kinugwa-river and Observation by ALOS-2

- Emergency observation after one hour setting up
- Only means to grasp the situation of wide area in bad weather
- Assisting decision making for the dispatch request of drain pump vehicles





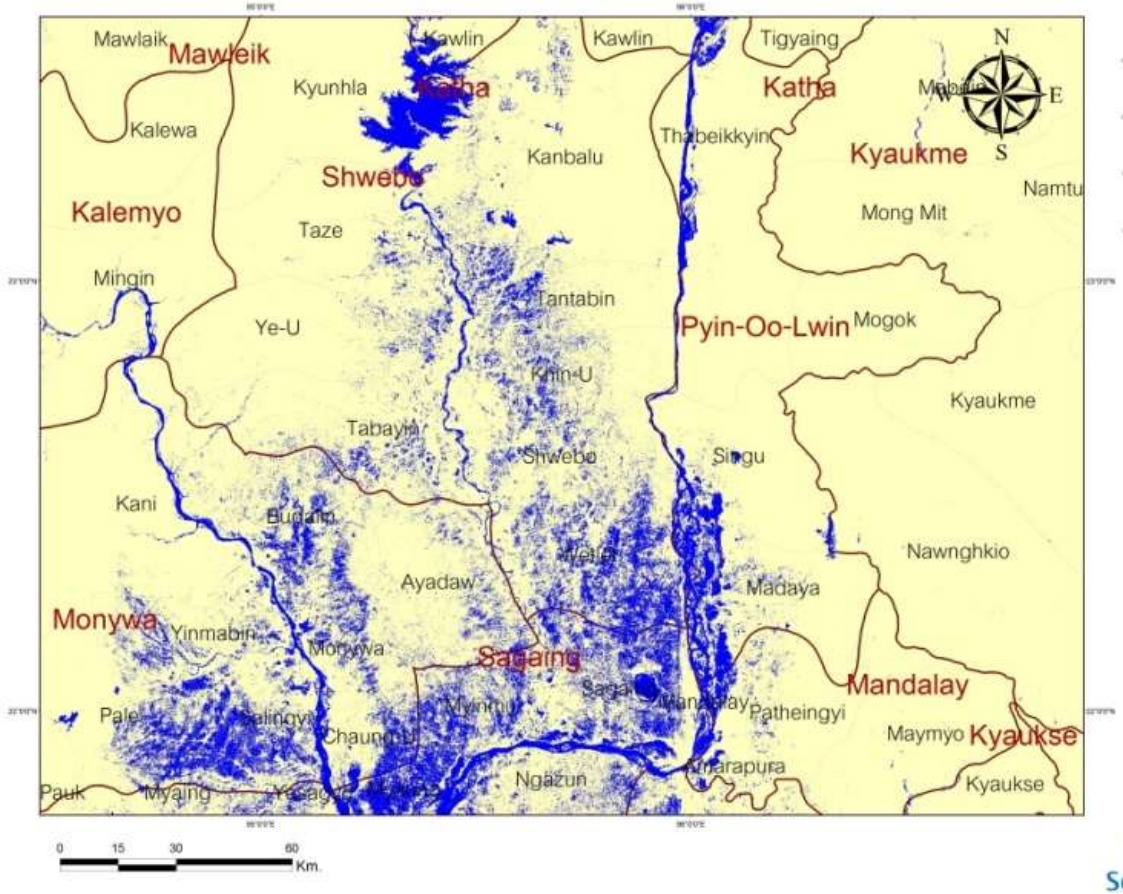
出典：関東地方整備局ホームページ

Sentinel Asia Triggered for Myanmar Flood 2015 July

SA promptly coordinated with Disaster Authorities and data products was shared among the authorities and used for listing flooded villages(incl. potential), also for response actions etc.

Sentinel Asia

FLOOD DETECTION BY ALOS-2/PALSAR-2
Myanmar, July 24,2015



MAP INFORMATION

This is possible water area include normal water extent, paddy field,flood area, or others.

Data Source:

Post-Disaster image
ALOS-2/ PALSAR-2
Acquired on 24 July 2015
Copyright: JAXA

Map Produced by:
The University of Tokyo and
Asian institute of Technology

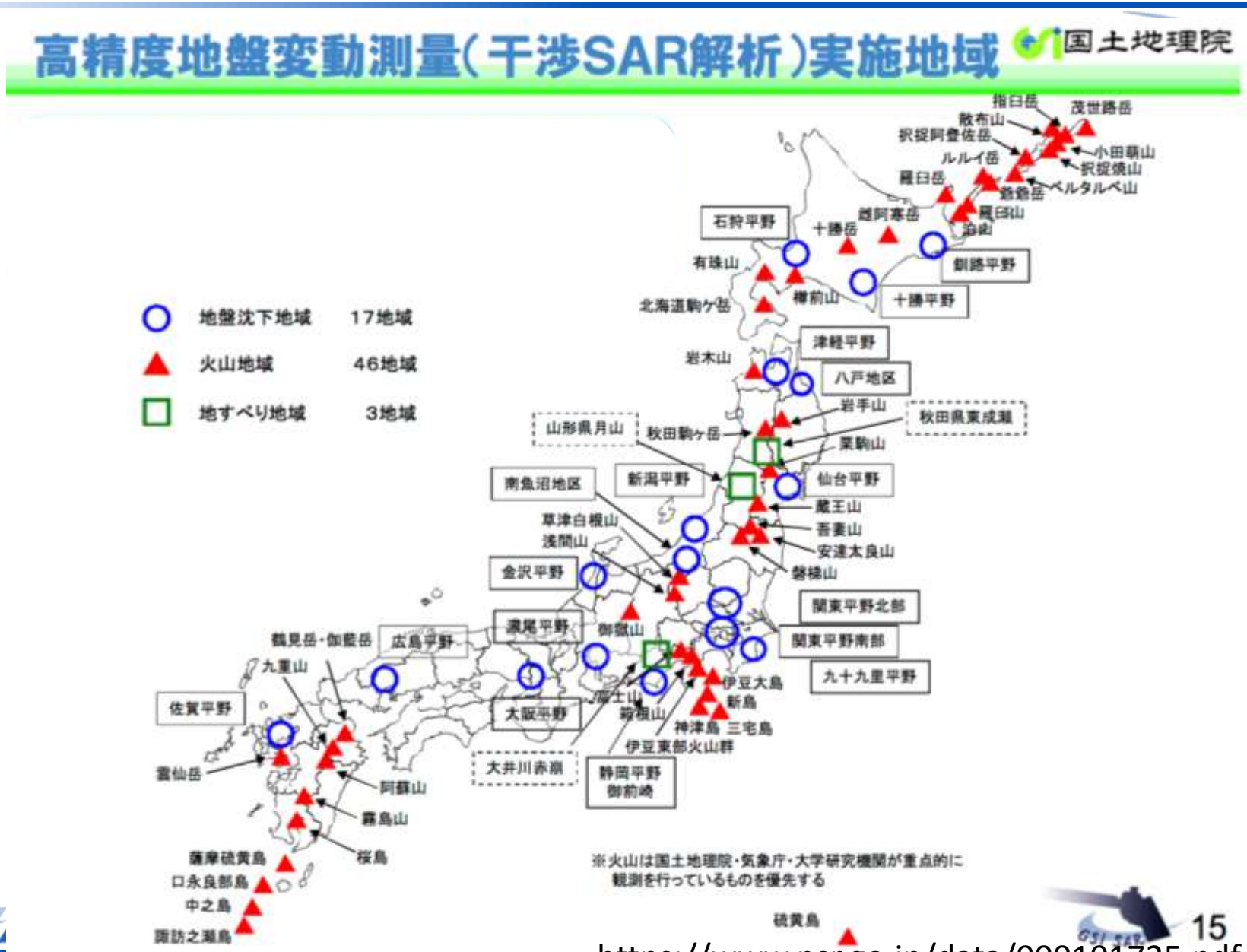
THE UNIVERSITY OF TOKYO

Sentinel Asia

JAXA

Letter from Relief&Resettlement Dept. Myanmar, Jul 29, 2015

Monitoring Active Volcanoes by ALOS-2 in Japan

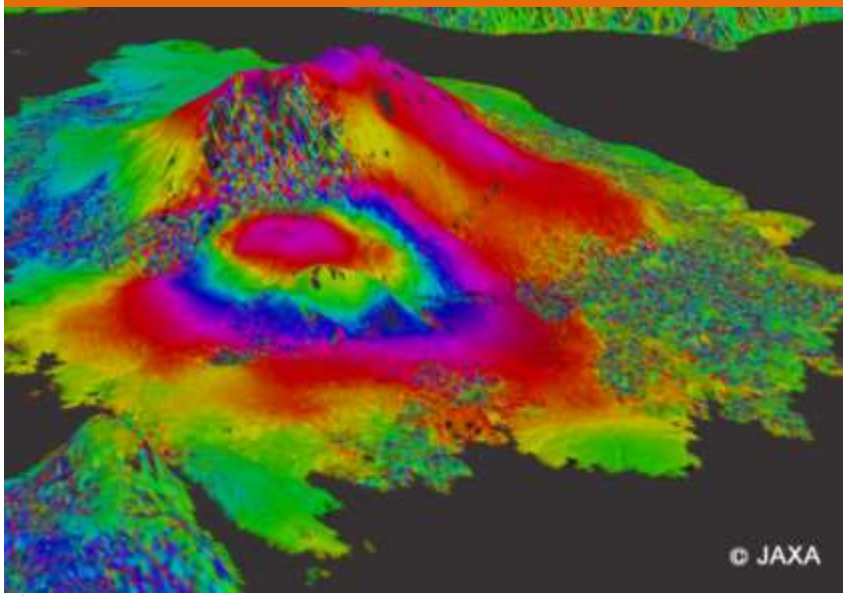


https://www.nsr.go.jp/data/000101725.pdf

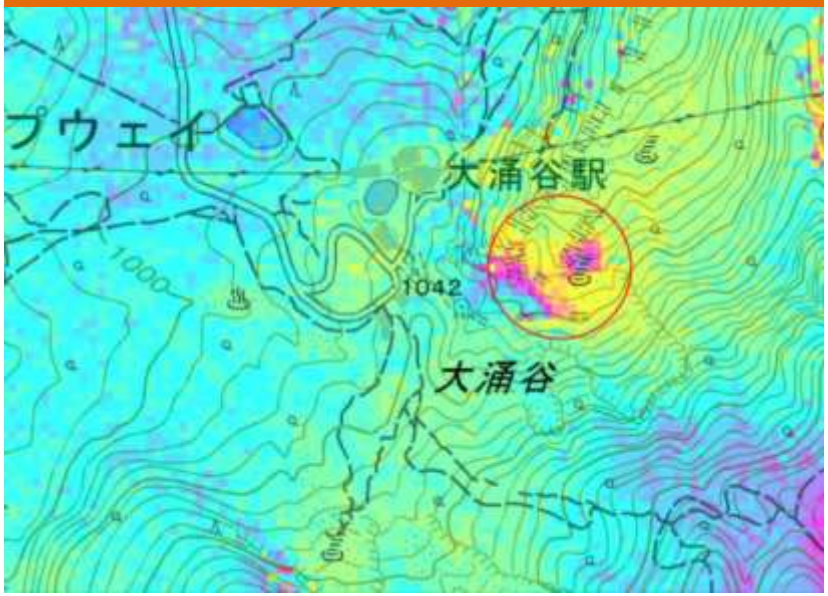
Disaster Risk Assessment at Local Level

ALOS-2 monitors eruption risk of Mt.Hakone and Mt.Sakurajima.
Satellite data is transformed to information by GSI and JMA's volcanic Eruption Prediction Liaison Council for decision making at local levels.

Surface deformation of Mt. Sakurajima
Jan 14, 2015 – Aug 8, 2015
Max 16 cm surface rise was monitored.

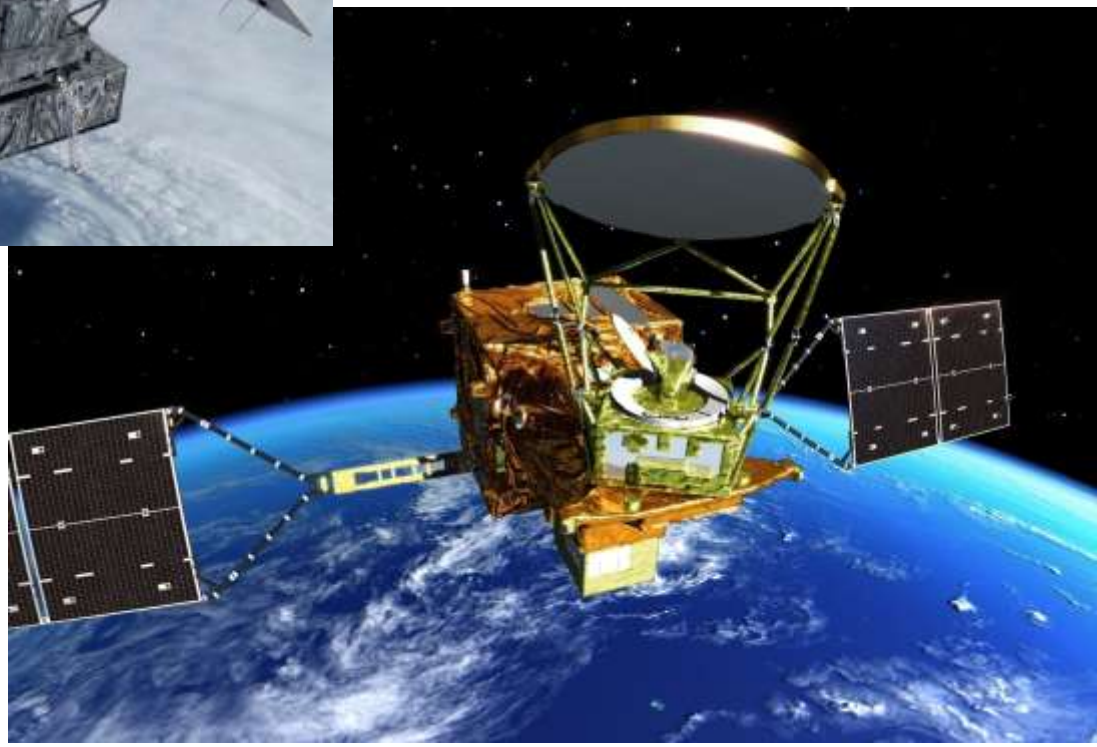


Surface deformation of Mt. Hakone
April 17, 2015 – May 15, 2015
Max 12 cm shift was monitored



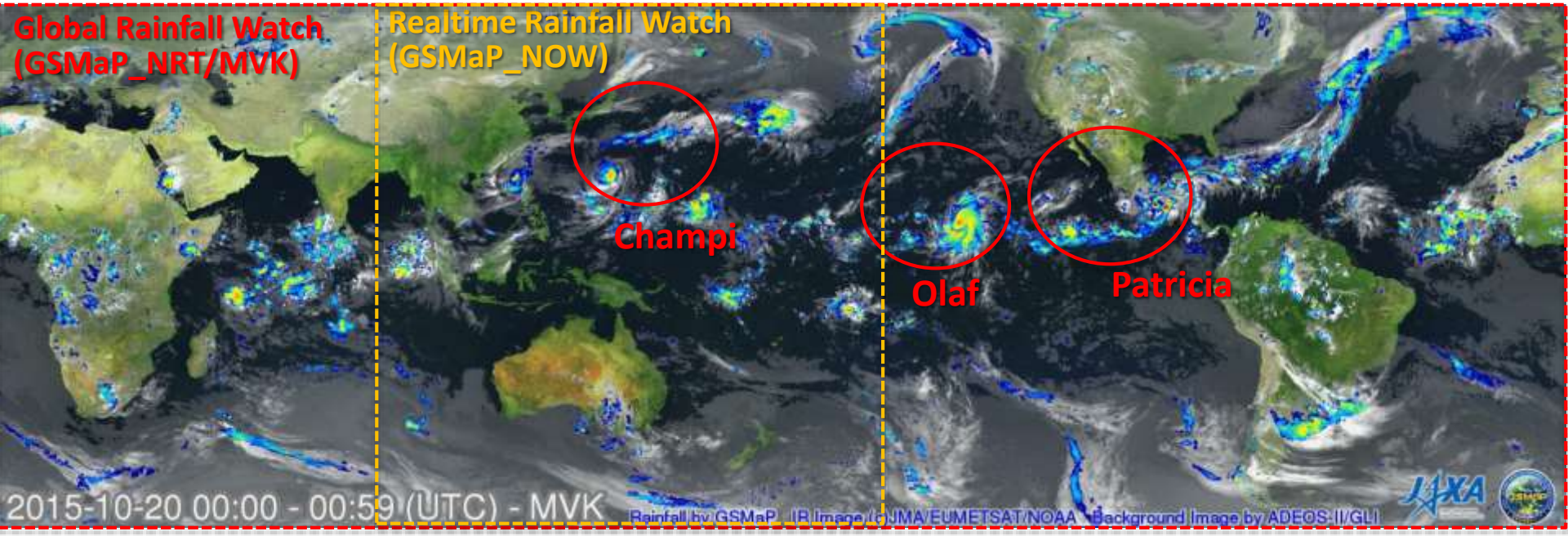
GPM and GCOM-W

CG Image by NASA



JAXA's Contribution to Forecasting

"GSMaP_NOW" over "Himawari-8" area start just now!
Global Satellite Mapping of Precipitation (GSMaP)



GSMaP (Global) observed Hurricane Patricia and Olaf, and Typhoon Champi: 20-24 Oct. 2015, hourly animation

- **Rapidly changing precipitation phenomena need frequent observations.**
- **Global rainfall map merging GPM Core Observatory, polar orbiting microwave radiometer/sounders, and geostationary infrared radiometers.**

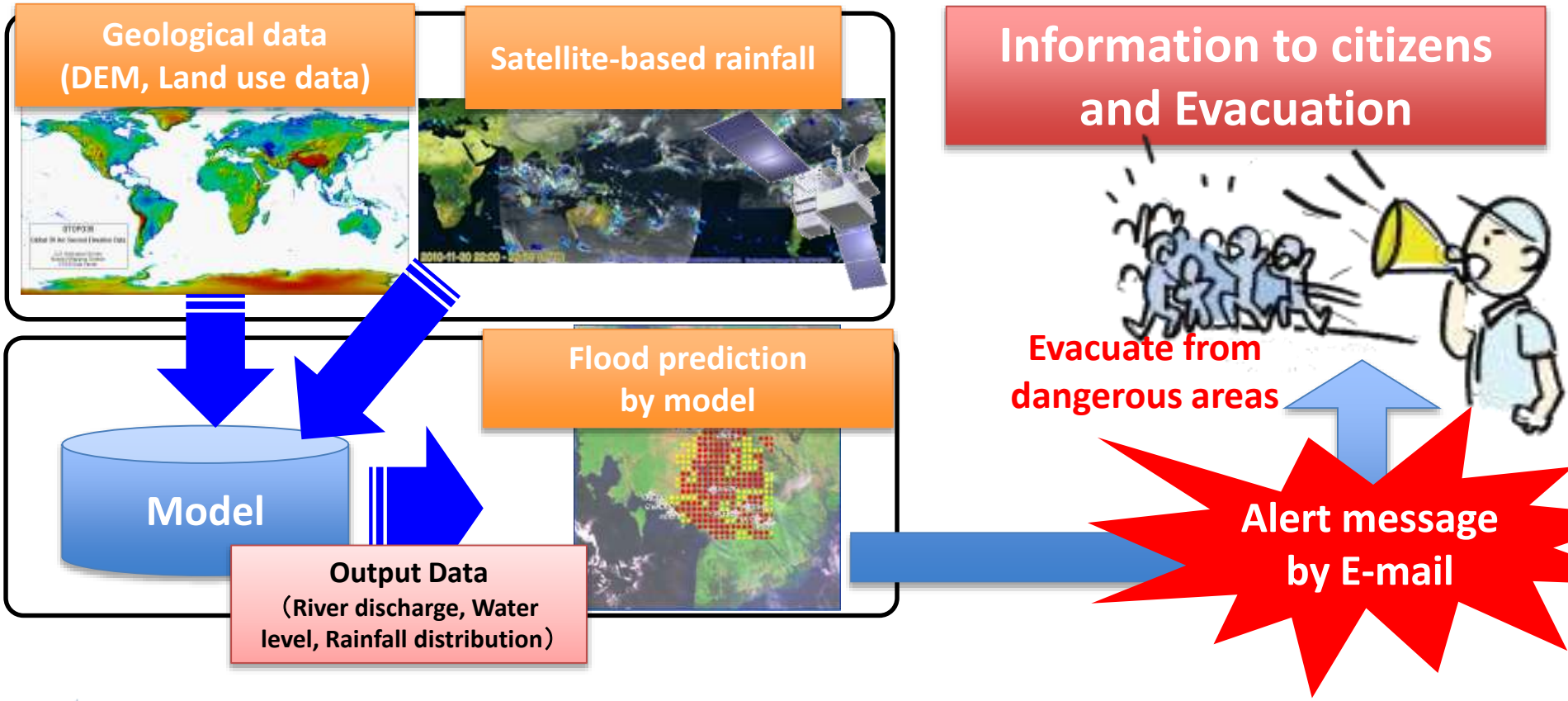
JAXA Global Rainfall Watch (4-hr delay) : http://sharaku.eorc.jaxa.jp/GSMaP
JAXA Realtime Rainfall Watch (Himawari-area): http://sharaku.eorc.jaxa.jp/GSMaP_NOW

Flood Early Warning System

UNESCO Pakistan flood project (2012-14)

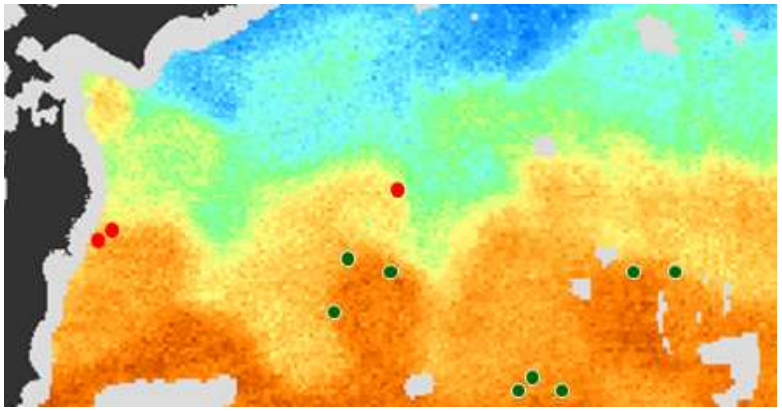
"Strategic Strengthening of Flood Warning and Management Capacity"

Agencies involved: UNESCO, PMD, SUPARCO, ICHARM, JAXA

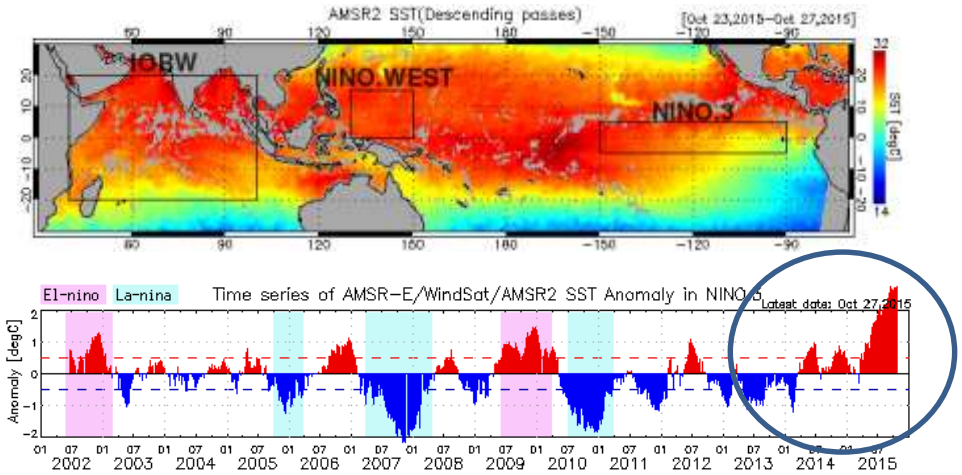


Applications

Observing the Sea Surface Temperature and using these data to save fuel for fishing boats



●:マグロ漁場 ●:カツオ漁場 ©漁業情報サービスセンター



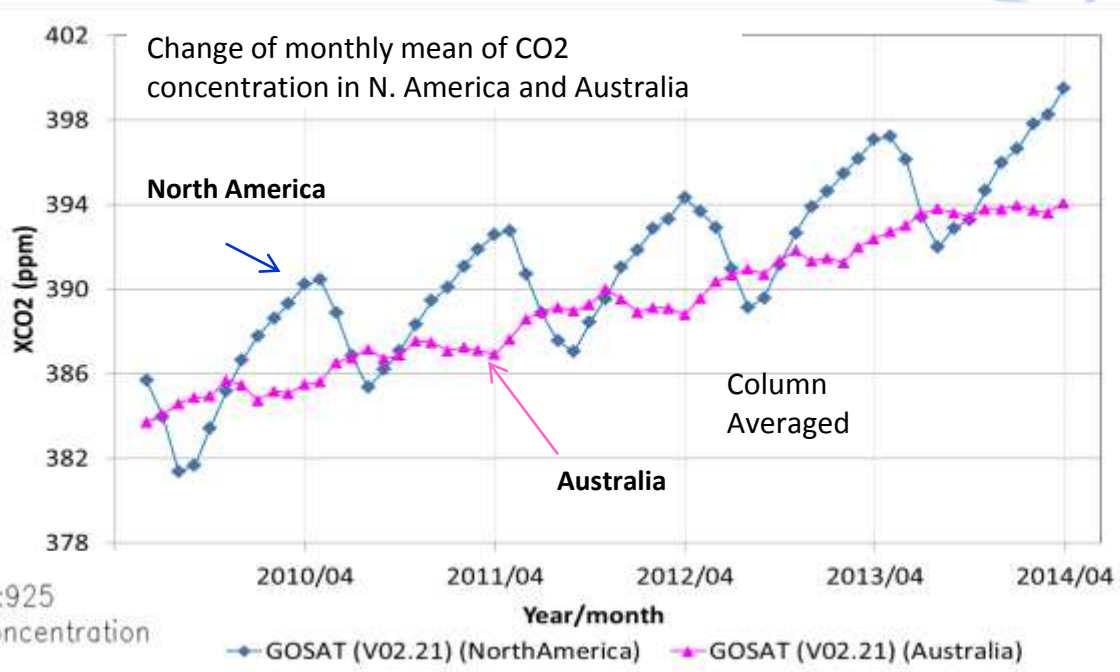
Detecting El Nino by monitoring SST

Monitoring the change of Arctic Sea Ice
And ship detection in the Northern Sea

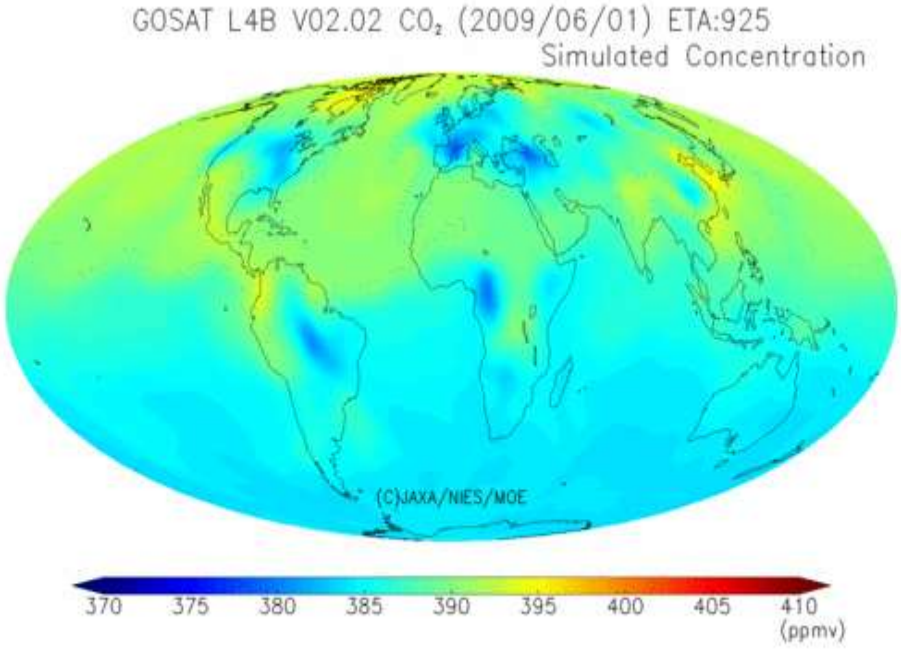
GOSAT: Greenhouse Gases Observing Satellite

- Monitoring global distribution of Greenhouse Gases (CO_2, CH_4) from space.
- Joint project by JAXA, NIES, and MOE.
- Launch: 23 January 2009 by H2A launch vehicle

CO_2 Concentrations by GOSAT



Dr. Yokota (NIES)

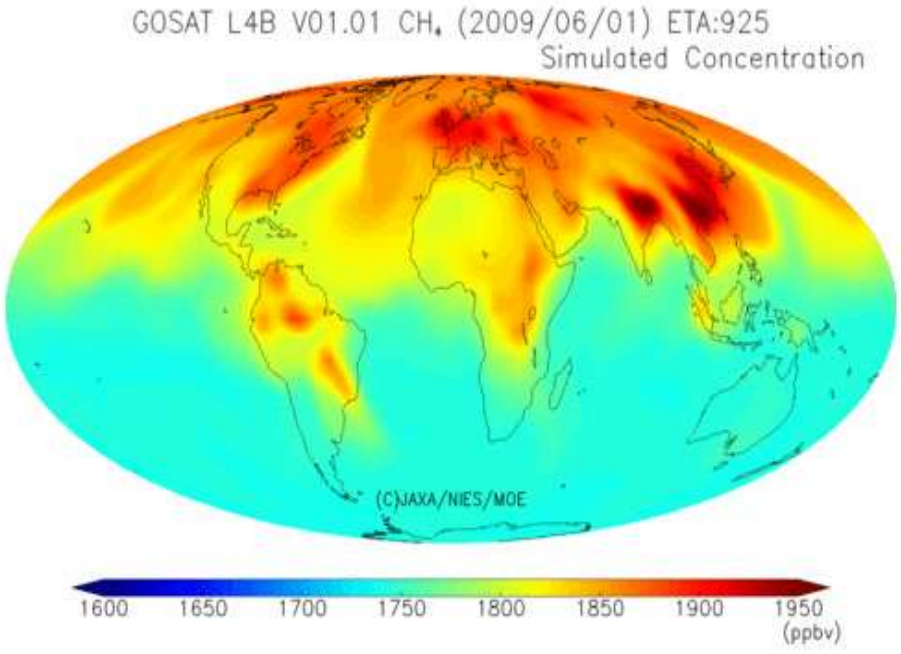


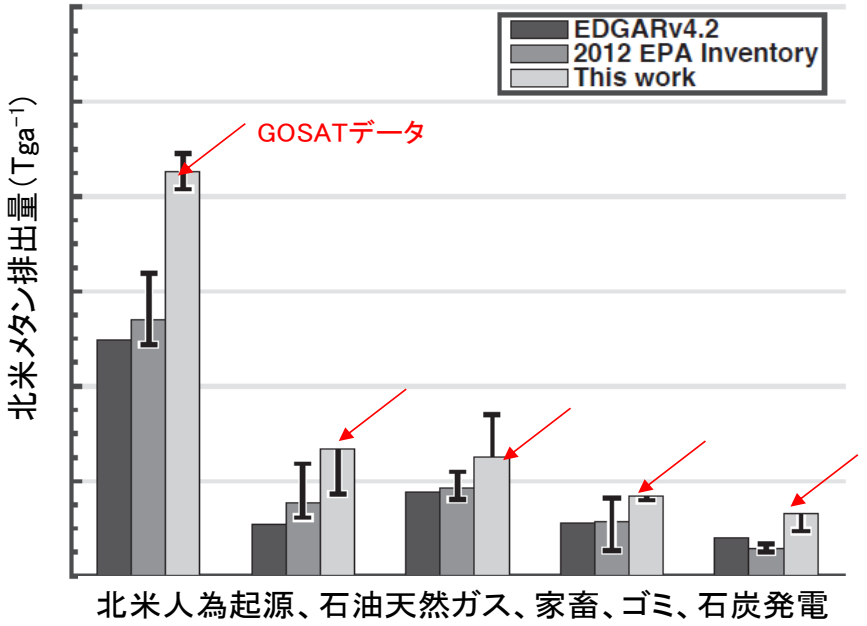
Animation of daily mean of CO2 concentration
(June 2009 - May 2011, at 800 m altitude)

(c) MOE/NIES/JAXA

Estimating CH4 methane emissions by GOSAT

- **GOSAT observation data of methane concentration was used for verification of North American methane emission adopted by IPCC (released by the report of Harvard University group in the journal "Atmospheric Chemistry and Physics"). The research revealed the emission estimate was underestimated. The usefulness of GOSAT observation data is shown.**





GOSAT CH_4 observation data showed that the existing EPA Inventory is underestimated (By Dr. Turner/Harvard University)

Animation of daily mean of CH4 concentration
(June 2009 - May 2011, at 800 m altitude)

(c) MOE/NIES/JAXA

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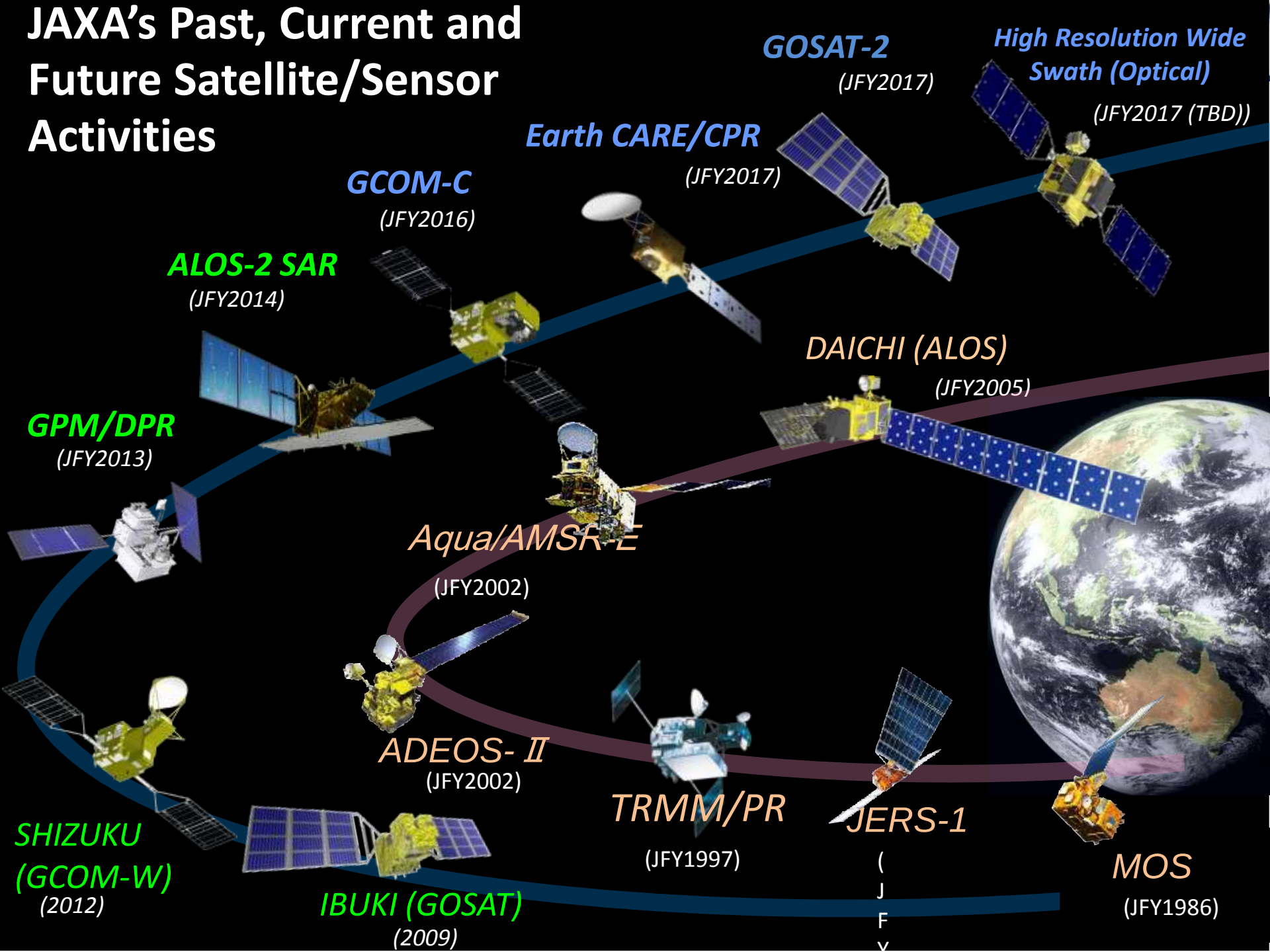
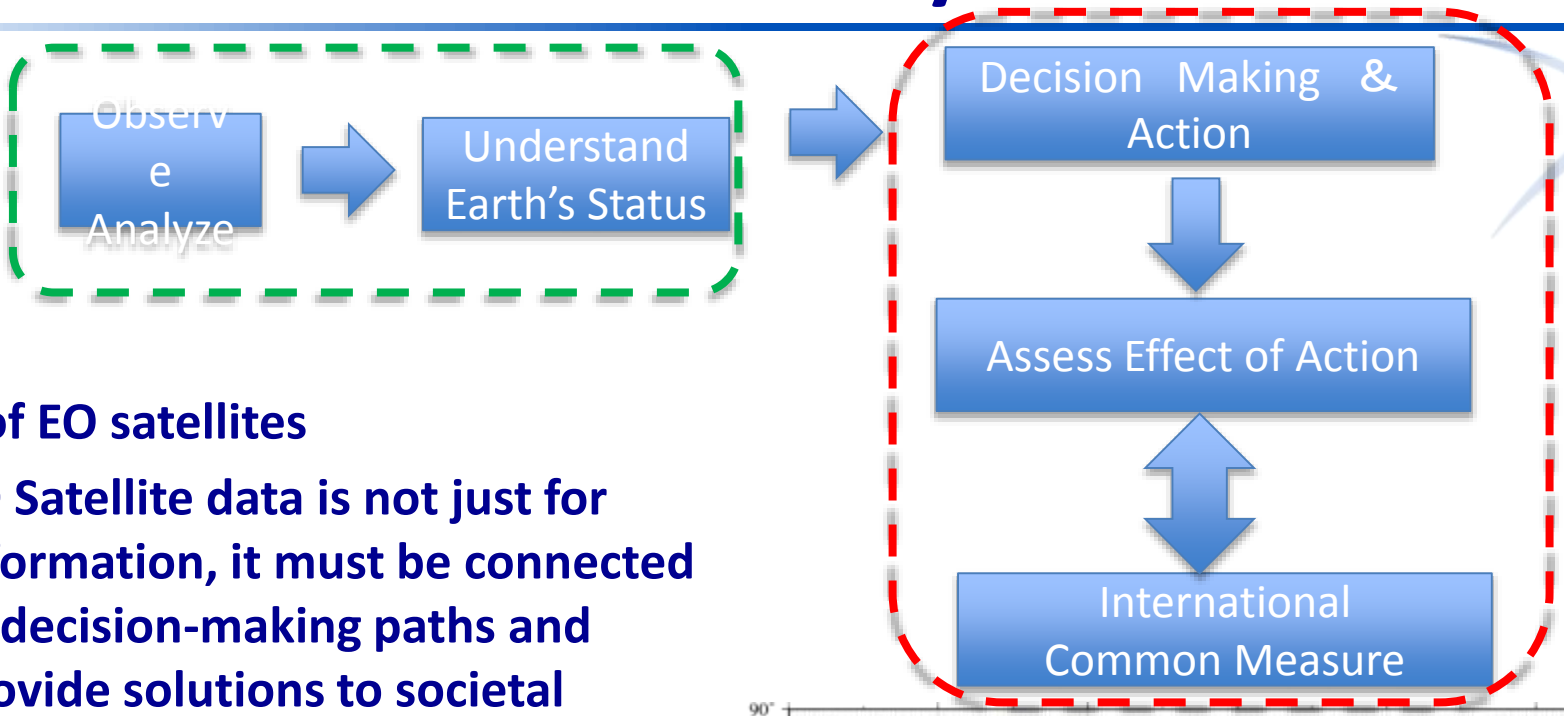
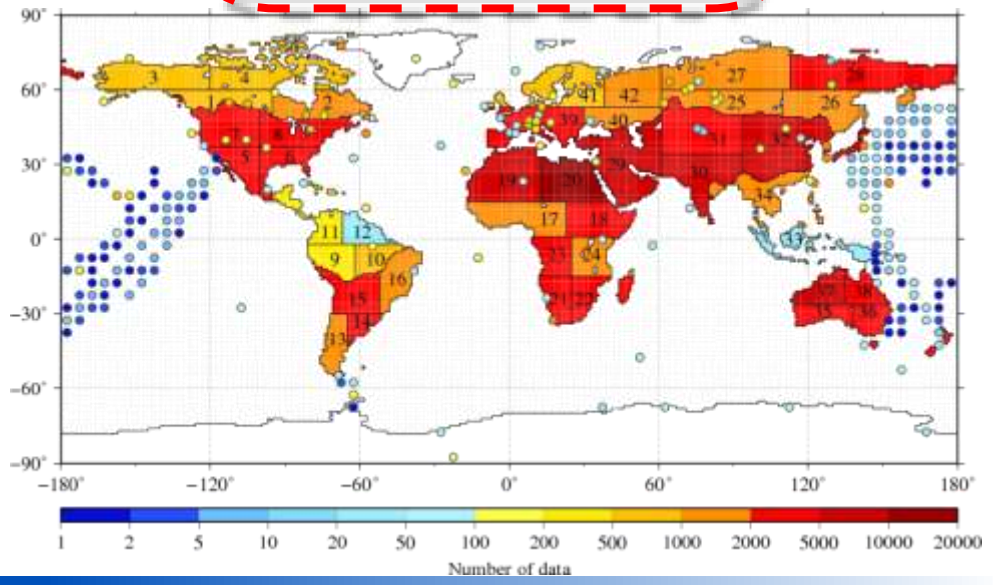


Summary



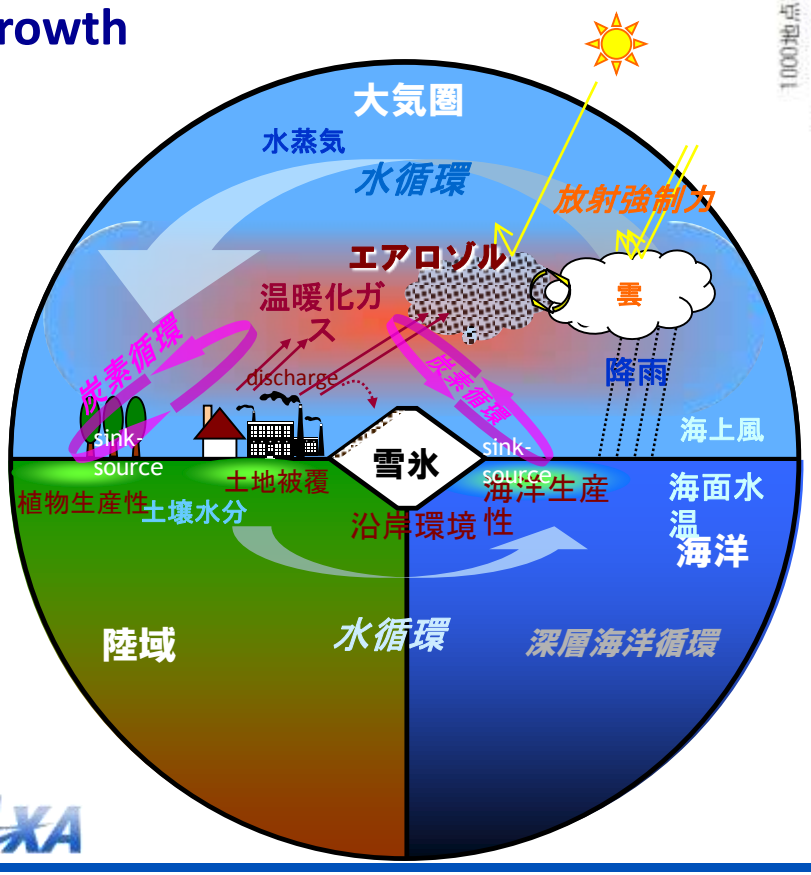
Role of EO satellites

- EO Satellite data is not just for information, it must be connected to decision-making paths and provide solutions to societal challenges.
- Frequent, wide area capability of satellites provides mankind with unique perspectives and information solutions.



Summary

- Emergence of global social problems
  - + Many extreme climate events caused by global warming
  - + Resource depletion & environmental destruction by rapid population growth



- Global change caused by complex interactions.
- Satellites can observe wide areas repeatedly.
- It's important that international frameworks address global problems by combining products, models and simulations generated by satellite data and in-situ data.