

THE GLOBAL GOALS
For Sustainable Development

Space agency's perspective and program to avail analysis ready datasets

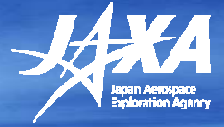
Dec 7, 2017

WGGI#4, NY

Chu Ishida

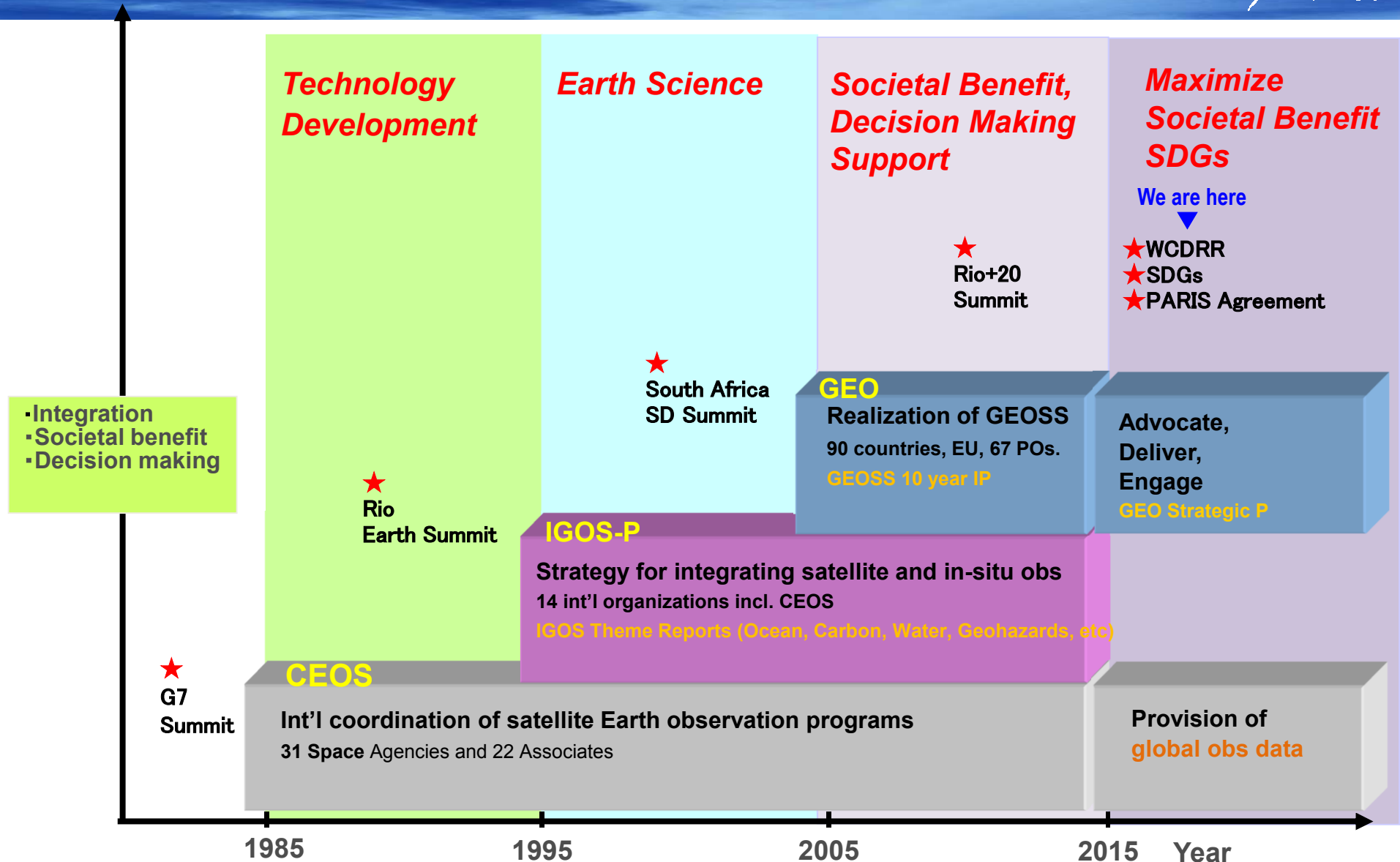
Japan Aerospace Exploration Agency

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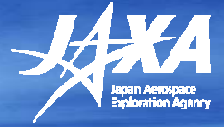
1. GEO and CEOS to support SDGs
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Evolution of Satellite Earth Observations



CEOS: Committee on Earth Observation Satellites
 IGOS-P: Integrated Global Observation Strategy-Partnership
 GEO: (Intergovernmental) Group on Earth Observation

GEO and CEOS to support SDGs



- CEOS and GEO evolved responding to international requirements and have defined roles of EO in major international agreements.
- GEO and CEOS have attached their highest priority to contributing to SDGs.
- GEO set up EO4SDG initiative and CEOS initiated CEOS Ad-Hoc Team for SDGs for planning and coordinating concrete activities.
- Role of geospatial information and EO for SDGs is defined as contribution to SDG Indicators. But, how EO can contribute to which indicators has not been defined yet.



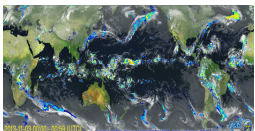



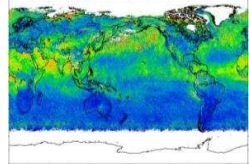


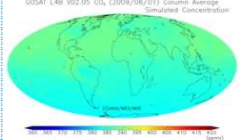

JAXA's Data Distribution Plan



JAXA recently changed its data distribution plan responding government policy change.

Satellite/ Sensor		Before	NOW
MOS/JERS/ADEOS/ADEOS-2/ AMSR-E/TRMM		○	○
GOSAT		○	○
GCOM-W and GCOM-C		○	○
GPM		○	○
ALOS	AVNIR-2	—	○
	PALSAR(10m)	—	○
	DSM (30m)	○	○
	Forest map / mosaic (25m)	○	○
ALOS-2	ScanSAR (100m)	—	○
	Fine mode (10m)	—	—

Examples of JAXA Global/Regional Datasets

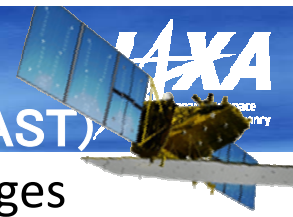
Product	Content	Details	Sources	Related SDGs
Forest/ Non-forest global map 	Forest/Non forest map using L-band SAR data	50/25m resolution Every year 1993-1998, 2007-2010, 2015-2016	JERS-1 ALOS ALOS-2	Goal 15 Life on land 
GSMaP 	Global precipitation map by DPR and MWRs	Rainfall rate (mm/hour) Global (60N-60S) 0.1deg grid 1992-present, hourly	DPR/GPM GCOM-W Himawari-8	Goal 6 Water and sanitation 
DEM 	ALOS World 3D Digital Surface Model	30m resolution 5m high accuracy	ALOS	Goal 11 Sustainable city 
Aerosol 	Aerosol distribution data by Himawari-8	Full-disk 5km, 2km grid Aug 2016-present 10 min, hourly	Himawari-8	Goal 3 Health Goal 11 Sustainable city  
CO2, CH4 	CO2 and CH4 concentration	Global 2009-present https://data2.gosat.nies.go.jp/index_en.html	GOSAT	Goal 13 Climate change 



Forest Monitoring

JICA-JAXA Forest Early Warning System in the Tropics (JJ-FAST)

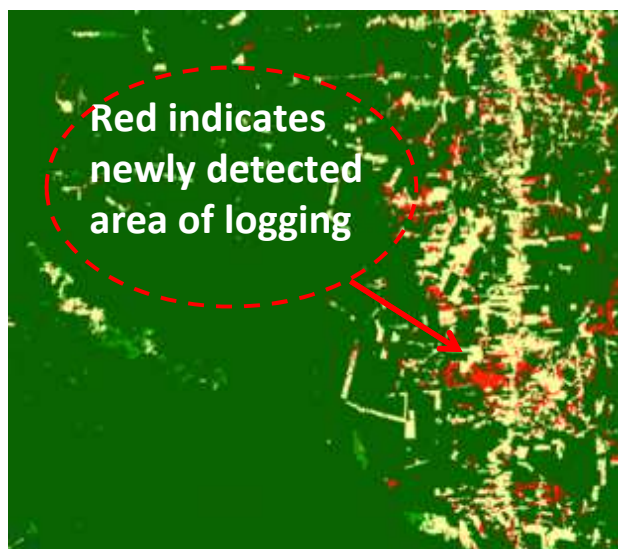
Satellite radar capability for detecting and monitoring forest changes



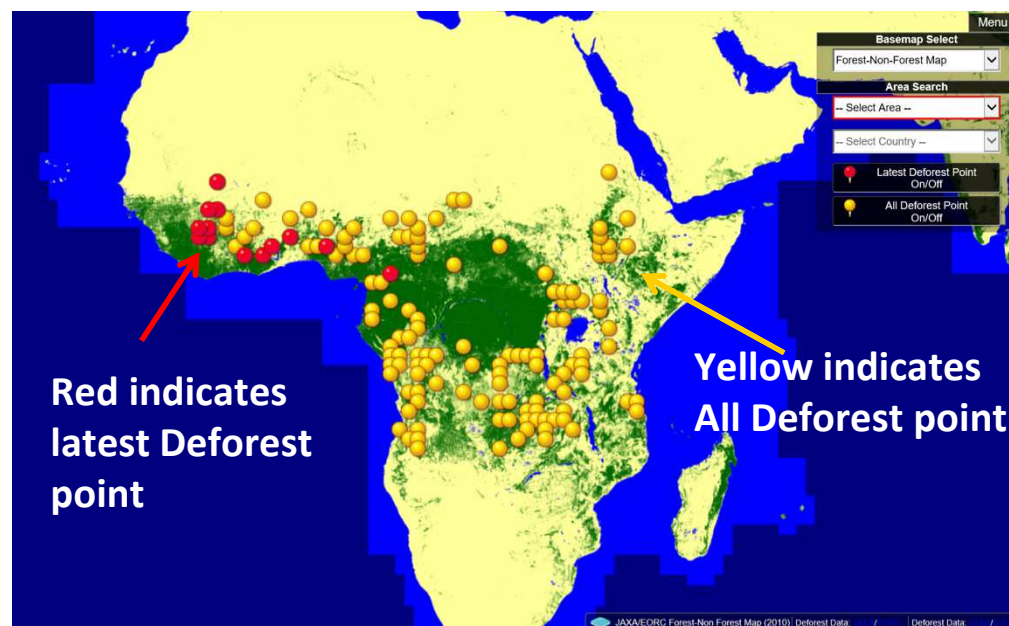
ALOS-2

15.2.1 Progress toward sustainable forest management

JICA-JAXA **Forest Early Warning System in the Tropics (JJ-FAST)** service started from November 2016. Logging area information analyzed by ALOS-2 is provided for authorities and governments. It is accessible by anyone with PCs or mobile devices.



Detection of logging area (Brazil)



Red indicates latest Deforest point

Yellow indicates All Deforest point

Currently the information of Amazon area, Central & Southern Africa are available. The target area will be expanded to 77 countries in tropical areas in early 2018.

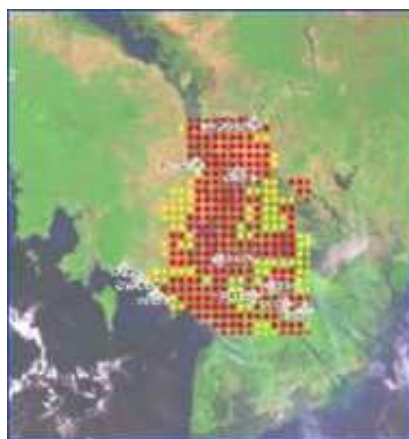
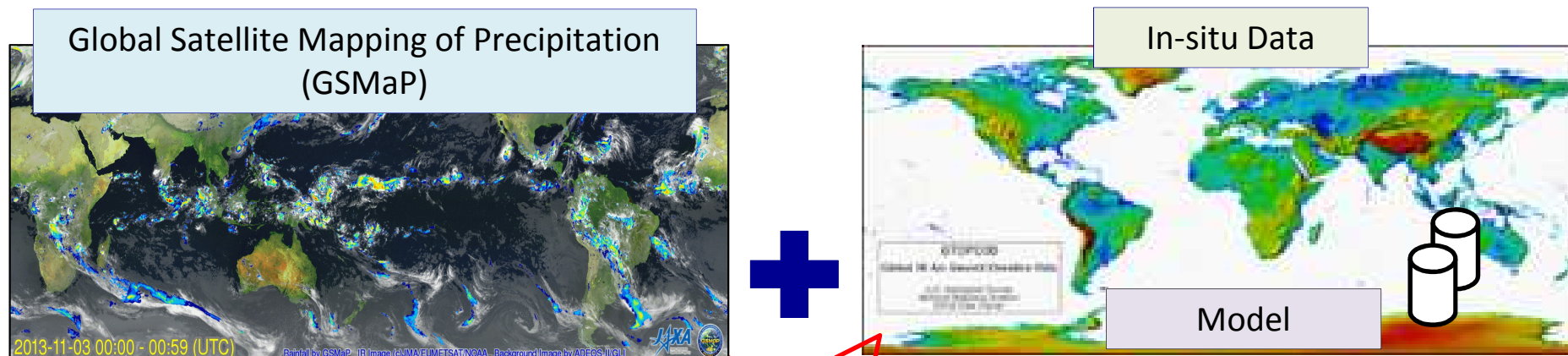
JJ-Fast data download:

<http://www.eorc.jaxa.jp/jjfast/>

Integrated Water Resource Management: Reduce Flood Damage

6.5.1 Degree of integrated water resource management (0-100)

Satellite data and in-situ data are merged to predict flood of lower river region several days before.



Warning Message



Global satellite data is effective to grasp the situation on water rising of International cross-border rivers.
In Bangladesh, flood forecasting made it possible to take measures for crops in advance of damages. The farmers have a few days for harvest until flood at upper river flows down to lower areas and causes damage to the crops.

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

Partners



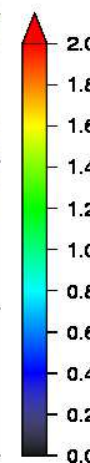
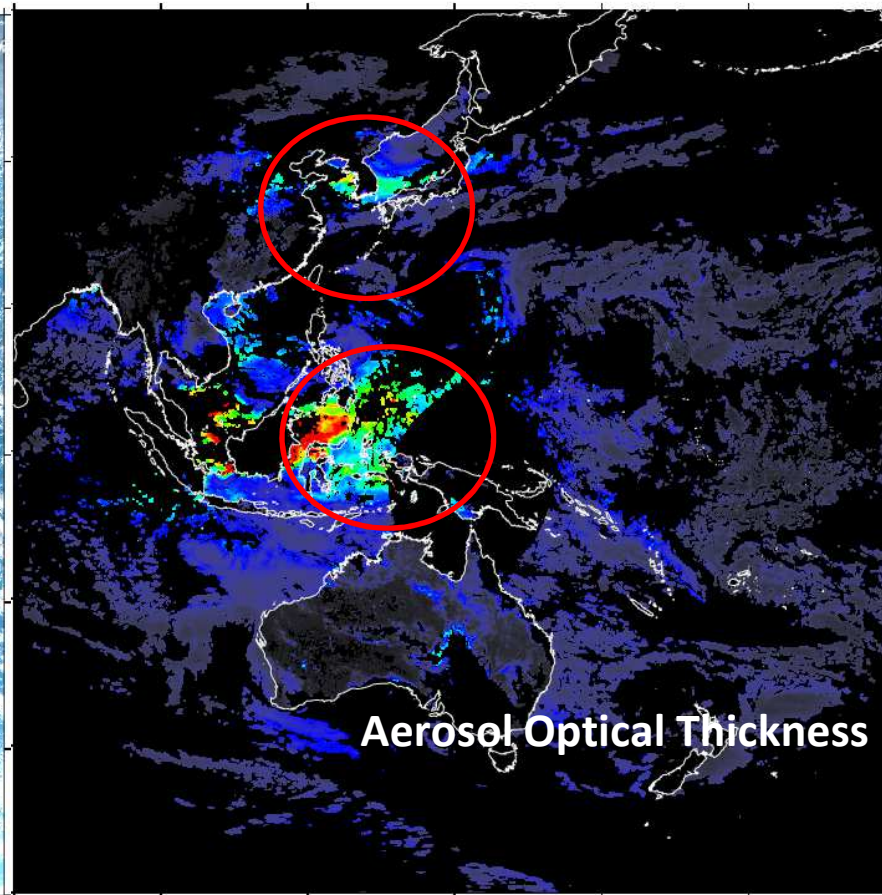
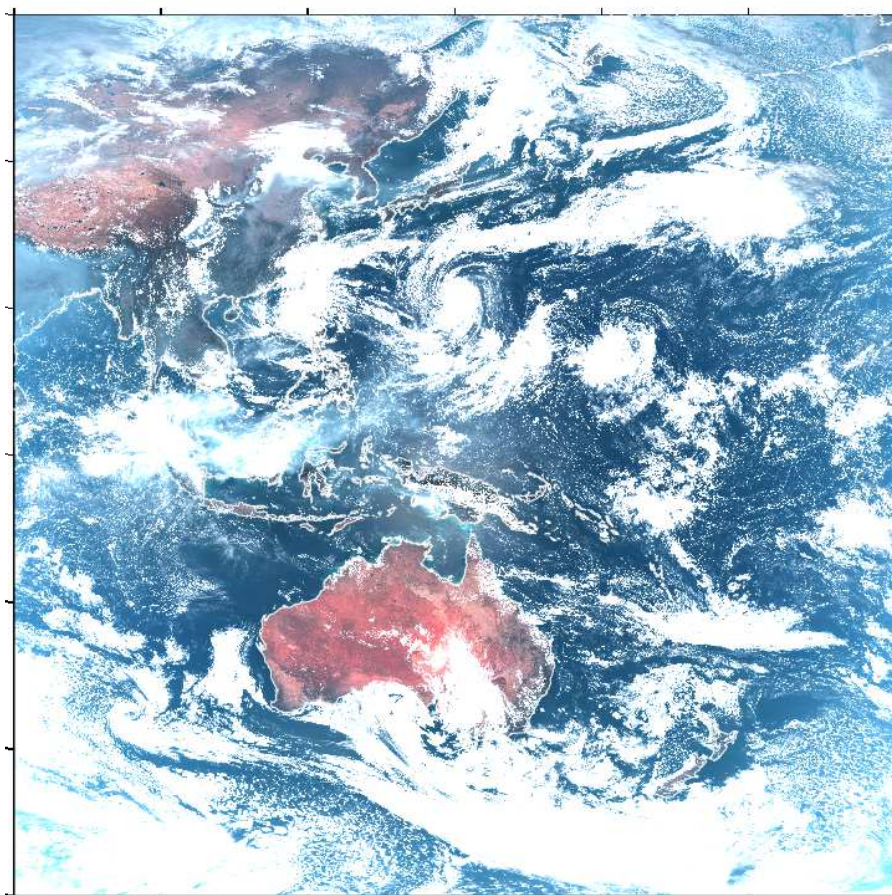
Aerosol Monitoring by Himawari-8

3.9.1

Mortality rate attributed to household and ambient air pollution

11.6.2

Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)



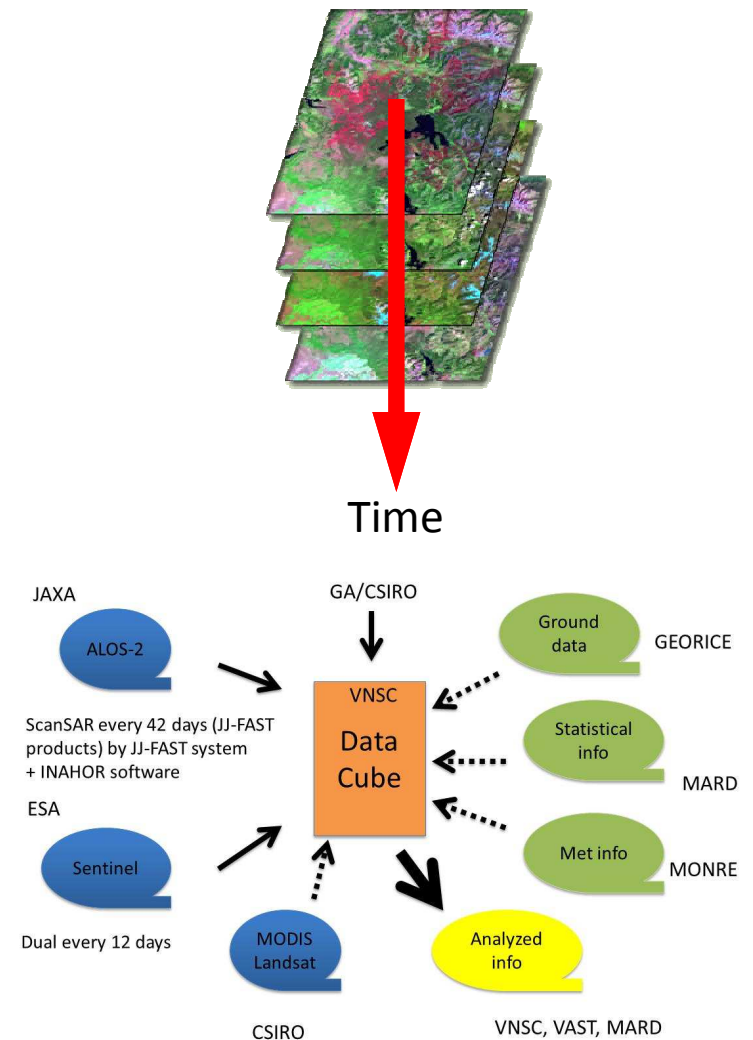
- Aerosol algorithms developed for JAXA LEO missions (GCOM-C, EarthCARE, GOSAT-2) was applied to Himawari-8

Himawari-8 data download:

<http://www.eorc.jaxa.jp/ptree/index.html>

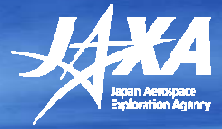
CEOS Data Cube

- Data Cube is time-series multi-dimensional (space, time, data type) stack of spatially aligned pixels ready for analysis.
- Proven concept of Australia and quickly supported by CEOS
- Open source software approach allows free access, promotes expanded contributions, and increases data usage.
- Unique features: exploits time series, increases data interoperability, and supports many new applications.
- Data Cube projects have been implemented;
 - Australia
 - Kenya
 - Colombia
 - Vietnam
- JAXA agreed to provide ALOS-2 ScanSAR data to Vietnam Data Cube for Asia Rice project.



Vietnam Data Cube starting from GEOSS-AP (Hanoi, September) by VNSC/VAST with CEOS

CEOS Analysis Ready Data



- CEOS is promoting development of CEOS Analysis Ready Data.
- CEOS Analysis Ready Data for Land (CARD4L), are satellite data that have been processed to a minimum set of requirements and organized into a form that allows immediate analysis with a minimum of additional user effort, and, interoperability both through time and with other datasets
- CARD4L Specification framework presented at SIT-32, April in Paris. The framework includes:
 - The CARD4L Definition - complete
 - Product Family Specifications (PFS) have been developed for: surface reflectance; radar backscatter; land surface temperature
 - Product Alignment Assessments (PAA).- to be developed. PAAs will allow data providers to assess how well their products align with the CARD4L specifications
- CEOS Moderate Resolution Sensor Interoperability (MRI) Initiative produced the framework paper for moderate (10-100m) resolution interoperability to facilitate the creation and use of multi-sensor data streams.
- Beyond CARD4L, CARD for Ocean and CARD for Atmosphere will be explored.

- **Data continuity**

- SDGs require long time series and continuity of data, while some R&D satellite missions are one time or short.
- US and Europe have committed to continuity of Landsat and Sentinel satellite missions till 2030 to support SDGs.

- **Satellite data complement in-situ measurement**

- Satellite data needs to be calibrated and validated, complementing in-situ measurement.

- **Data are large and complex**

- It require considerable knowledge, expertise and resources to process, analyze and utilize the huge volume of satellite data.
- Space agencies are promoting development of ARD (Analysis Ready Data) through CEOS.

- **EO does not deliver any statistical Indicators by default**

- EO provides some spatial, spectral and temporal information which can then be related to Indicators.
- It is important for Custodian agencies and NSOs to identify the best methodology and data for statistical applications. GEO and CEOS are willing to collaborate..