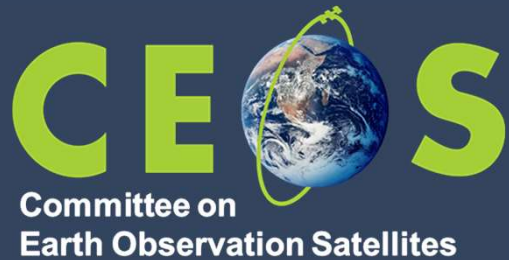


Agency Report JAXA



Dr. Makoto Natsuisaka
JAXA

Agenda Item 2.8

WGISS-61

16-20 March, 2026

Indian Institute of Remote Sensing, INDEA

FOUR THEMATIC STRATEGIC PRIORITIES



Strategic
Priorities

Societal Benefit



Disaster Resilience



Infrastructure Management



Climate Action



Safety and Security



Resource Management



Urban Development



Business

SP1

Global Water-related Disaster Risk and Resource Management

Strengthening global water-related disaster resilience and resource management through the space-based solutions for safer and more resilient society.

Challenges

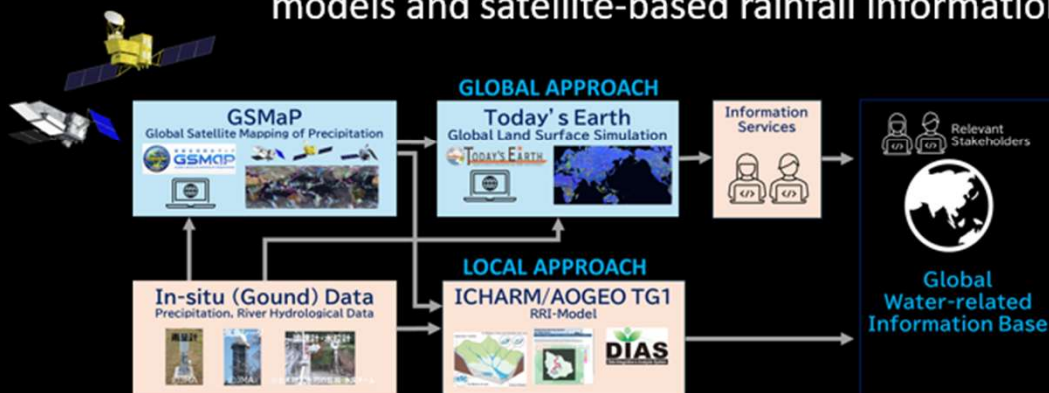
1.4 Billion
affected
(2000-2019)

Doubling of
Death
(in last 10years)

US\$155B in
Losses
(in last 50years)

Actions to resolve

Develop and deliver water-related solutions using high-resolution, borderless simulation models and satellite-based rainfall information



SP2

Understanding natural capital and utilizing satellite data for carbon credits

Establishing effective methods for assessing the natural capital of forests and rice paddies to support net zero targets and improve trust in carbon credits.

Challenges



Ensuring reliability and transparency of carbon credit

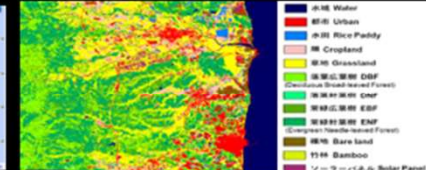
Actions to resolve

Develop and deliver water-related solutions using high-resolution, borderless simulation models and satellite-based rainfall information

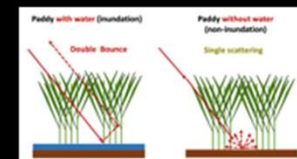
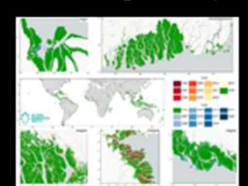
High-Resolution map of forest above-ground carbon storage



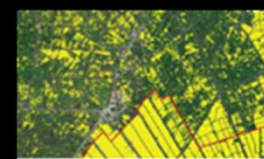
High-Resolution Land-Use and Land-Cover Map



Global Mangrove Map



Paddy field inundation and non-inundation monitoring



APRSAP/SAFE CH4Rice project

SP3 Maritime Observation



Strengthening capabilities for monitoring maritime conditions through satellite observation, while building cooperative relationships with surrounding countries

Challenges

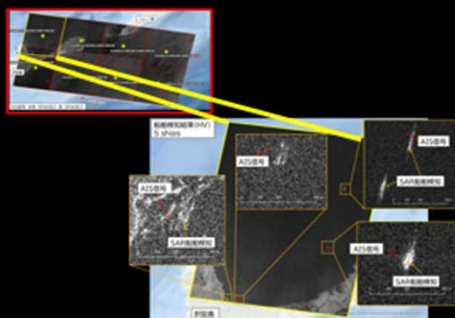


Enhancement of maritime observation capabilities across wide ocean areas through international cooperation

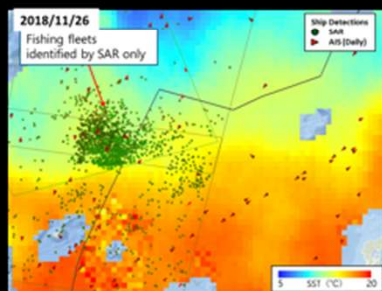
Actions to resolve

Strengthen capabilities for monitoring maritime activities and conditions through an extensive satellite observation network by public-private partnerships and promote international cooperation

Ship Detection



Ocean Environment Monitoring



ALOS-4
(L-band SAR and AIS)



SP4 Infrastructure and Disaster Management



Leveraging satellite-based geospatial data and infrastructure monitoring services, we aim to streamline land management, build a digital disaster management platform, and create globally competitive businesses.

Challenges

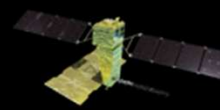


Disaster risk management/response and rapid damage assessment

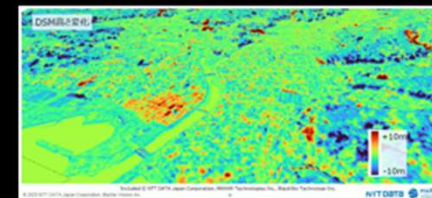
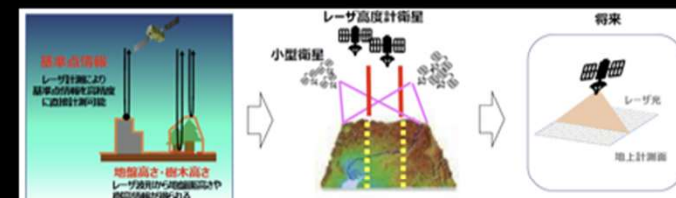
Actions to resolve

Enable and deliver high-precision 3D topographical information and infrastructure monitoring capabilities and services through satellite observation

ALOS-4
(L-band SAR and AIS)



Ground/infrastructure motion monitoring



Accurate 3D mapping with optical and LIDAR sensors

JAXA Earth Observation Missions



Satellites Operation(2010s~)
Addressing Societal Challenges



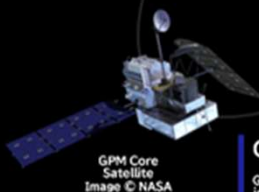


地球環境に役立つ観測衛星

EarthCARE

The Earth Cloud Aerosol and Radiation Explorer (EarthCARE) is a European-Japanese joint satellite mission. Its four sensors elucidate the movement of clouds and actions of aerosols, improving the accuracy of climate change forecasting. EarthCARE will be launched soon.

For Atmosphere

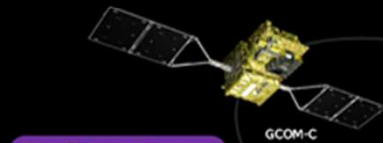


GPM Core Satellite
Image © NASA

GPM Core Satellite

Global Precipitation Measurement (GPM) Mission is the international joint mission to measure worldwide precipitation. The dual-frequency Precipitation Radar (DPR) of GPM Core Observatory was developed in Japan and contributes analysis of water cycle on the Earth.

For Precipitation



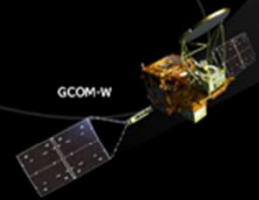
Global Change Observation Mission (GCOM)

For Climate Change

SHIKISAI (GCOM-C)

SHIKISAI (Global Change Observation Mission-Climate, GCOM-C) that equipped with the Second Generation Global Imager (SGLI), having multiband from near-ultraviolet to thermal infrared wavelengths and polarimetry, observes clouds, aerosols, ocean color, vegetation, snow, ice and surface temperatures for monitoring and understanding of the climate change.

For Water Cycle



GCOM-W

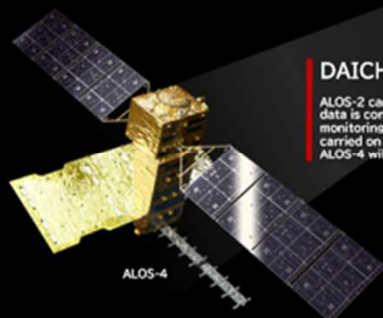
For Disaster Management & Land Monitoring



ALOS-2

DAICHI (ALOS) Series

ALOS-2 carries a synthetic aperture radar (SAR) instrument, and the data is contributing to a wide range of fields including disaster monitoring, agriculture, forest, and ocean. Optical sensors were also carried on ALOS (mission ended). The next generation SAR satellites, ALOS-4 will be launched soon.



ALOS-4

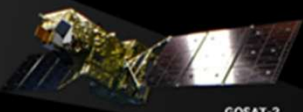
For Greenhouse Gases

IBUKI (GOSAT) Series

IBUKI (GOSAT) measures global distribution of carbon dioxide (CO₂) and methane (CH₄). JAXA processes data and provides the analytical results to the general public in cooperation with the Japan's National Institute for Environmental Studies and the Ministry of the Environment. The next generation satellite GOSAT-GW will be launched soon.



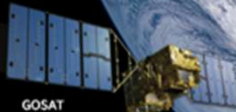
GOSAT-GW



GOSAT-2

SHIZUKU (GCOM-W) (AMSR Series)

SHIZUKU (GCOM-W) that equipped with the Advanced Microwave Scanning Radiometer 2 (AMSR2), observes a variety of water-related parameters, such as water vapor, rain, sea surface temperature & wind speed, sea ice, soil moisture and snow depth, for monitoring and understanding climate and water cycle variations. The next generation sensor, AMSR3 equipped in GOSAT-GW, will be launched soon.



GOSAT

JAXA's Earth Observation History



New Satellites Scheduled for Launch



More Details :



Earth Observation Satellites

Himawari-8 Image, 2022.03.18 11:10 (JST) © JAXA/JMA

JAXA also processes and distributes data from Himawari (a geostationary meteorological satellite operated by the Japan Meteorological Agency) and other countries' satellites.



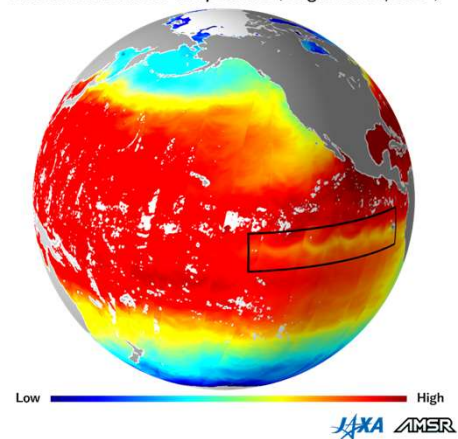
New Release : GOSAT-GW



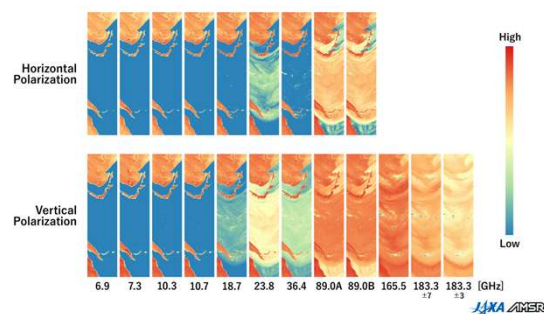
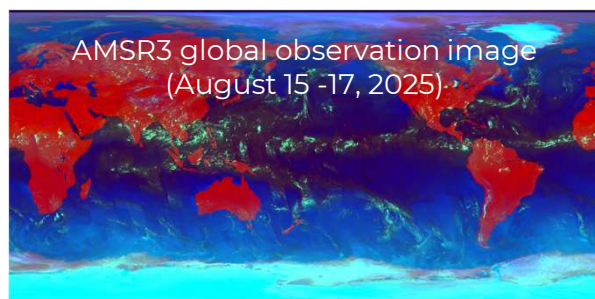
AMSR3 : Advanced Microwave Scanning Radiometer3

TANSO-3 : Total Anthropogenic and Natural emissions mapping SpectrOmeter-3

AMSR3 Sea Surface Temperature (August 15-17, 2025)



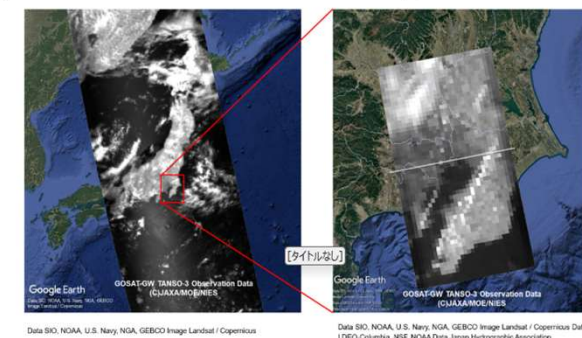
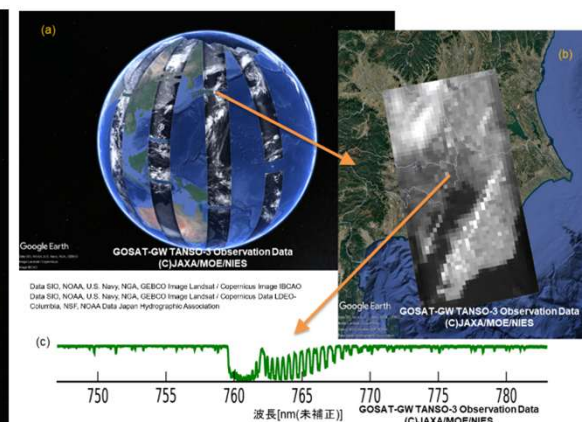
AMSR3 Sea Surface Temperature (August 15-17, 2025)



Observation around Japan by 21 channels equipped by AMSR3 (August 16, 2025)



TANSO-3 Observation Data (July 14-16, 2025)



TANSO-3 Observation Data (July 20, 2025)



New Satellite : LiDAR Altimeter Satellite



A new satellite “LiDAR Altimeter Satellite” is under development.

Global Geodetic Reference Points

The satellite generates global geodetic reference points defined as 3D coordinates with vertical accuracy on the order of several tens of centimeters.

Digital Surface Model Correction

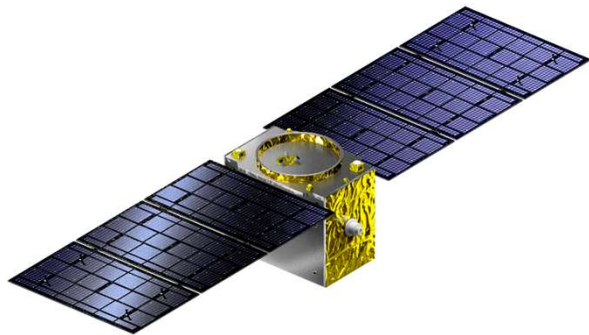
Generated reference points help correct digital surface models for improved geospatial analysis.

Full waveform LiDAR and auxiliary 2D imager

The payload of the satellite, the LiDAR Altimeter and Imager System

300-kg-class satellite

The satellite is a 300-kg-class satellite designed to operate for two years in very low Earth orbit (VLEO) based on the flight heritage from JAXA’s previous mission, SLATS.



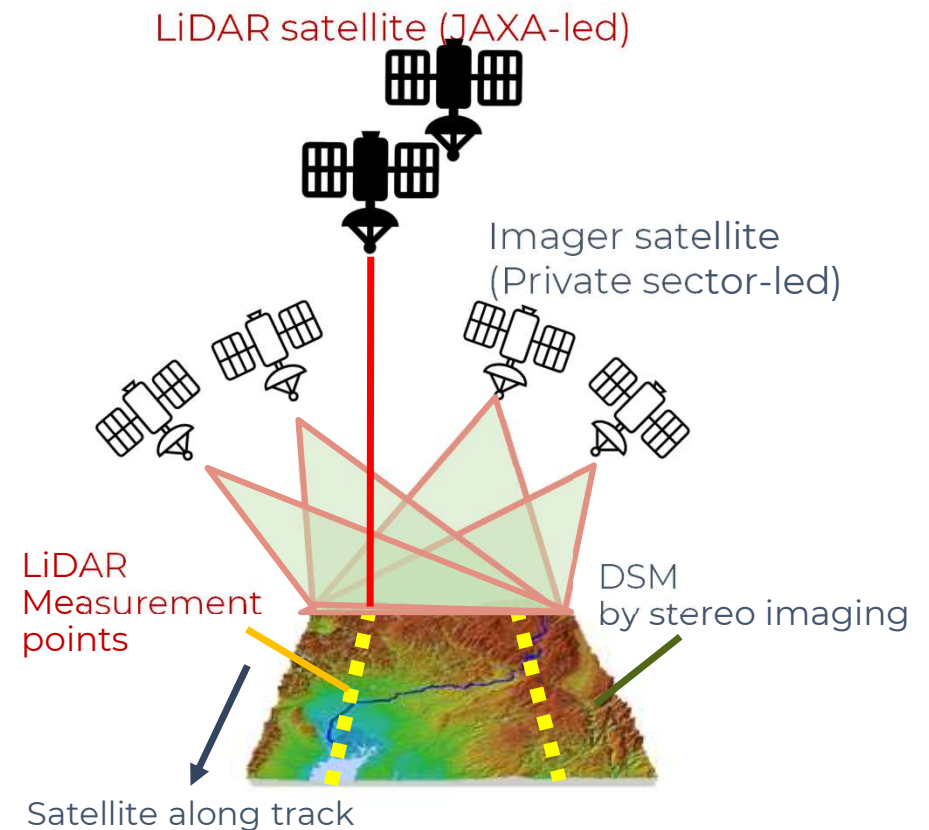
@Orbital Lasers



New Satellite : LiDAR Altimeter Satellite

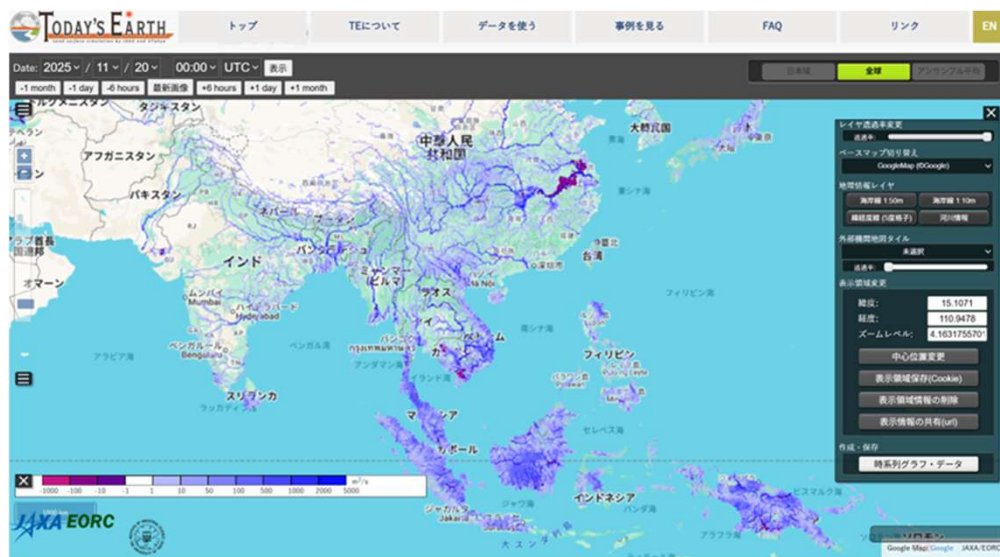


- “LiDAR Altimeter Satellite” is a part of Optical Observation Satellite Project Concept through Public-Private Partnership.
- The mission generate highly accurate 3D topographic information by integrating stereo image measured by imager satellite led by private sectors and LiDAR data measured by LiDAR satellite led by JAXA.



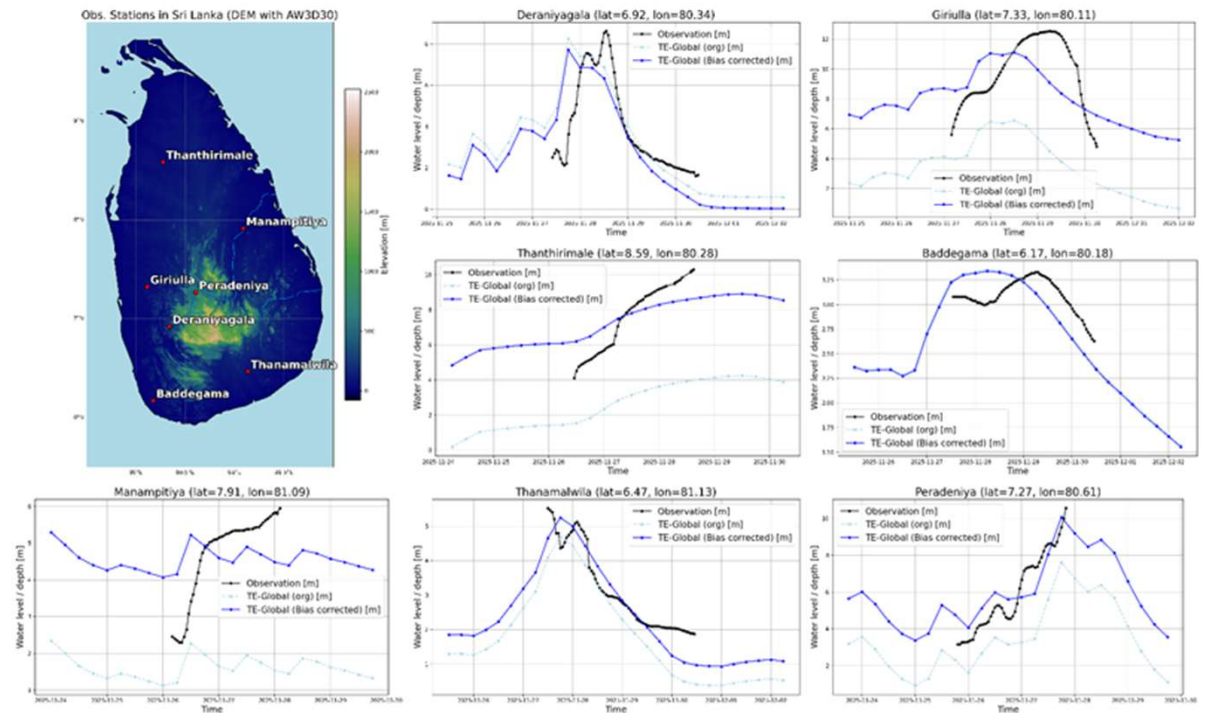
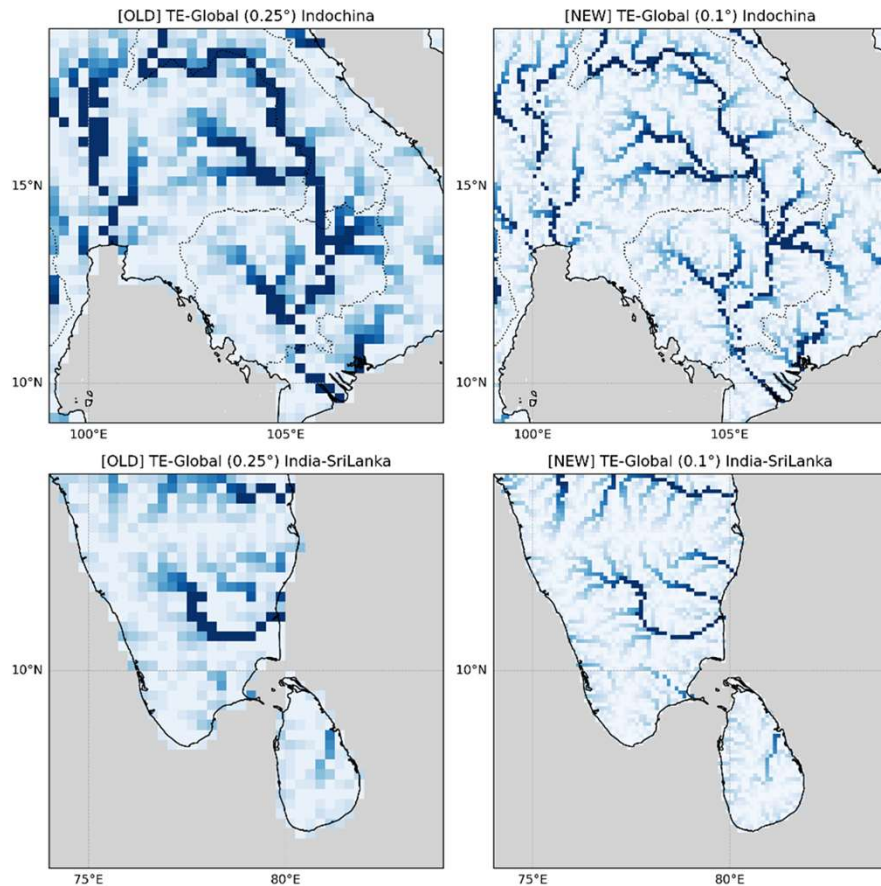


Today's Earth Update



	Old TE-Global	New TE-Global
Spatial Resolution (Latitude Longitude)	Land: 0.5 degree (approximately 50km) River: 0.25 degree (approximately 25km)	0.1 degree (approximately 10km)
Time Resolution	3 hours	6 hours
Update Frequency	3 hours	6 hours
Prediction Time	No (released 3 days later)	5 days in advance

- **Today's Earth (TE)**, an application which can predict variables related to "Terrestrial Hydrological Cycle" (Total Discharge, River Depth, Flood Depth, Flood Fraction, Soil Moisture, Latent Heat Flux, Snow Amount, Precipitation, Surface Temperature) based on the satellites was updated in Mar. 2026.
- TE-global and TE-Japan are available.
https://www.eorc.jaxa.jp/water/map/index_j.html?area=global



- Verification at the flood in Sri Lanka on 28 Nov. 2025.
- Successfully simulated “rapid increase in water level”



JAXA Earth API Update



- A very simple API for retrieving satellite data, available in both **Python** and **JavaScript**.
- Based on **Cloud Optimized GeoTIFF (COG)** and **SpatioTemporal Asset Catalogs (STAC)**.
- Provides over 90 types of JAXA datasets.
- **Free to use**, with **no user registration**!

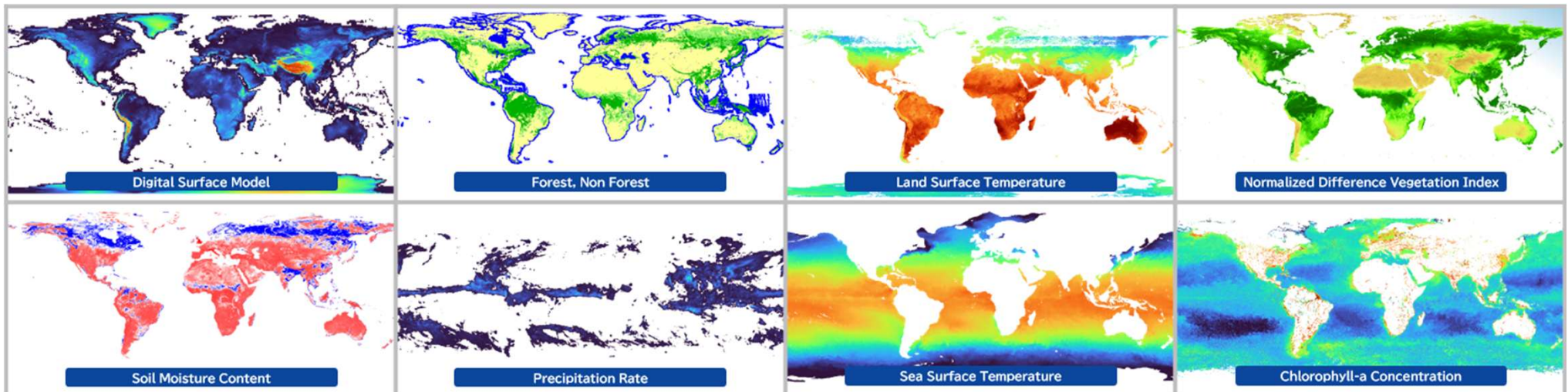
```
import * as je from "../jasa.earth.esm.js";

const data = await je.getData({
  collection: "https://.../AW3D30.v3.2_global/collection.json",
  catalog: "2021-02/catalog.json",
  band: "DSM",
  width: 1000,
  height: 500,
  bbox: [-180,-90,180,90],
});

const cmap = new je.image.ColorMap(0,6000,"jet");
document.body.appendChild(je.image.createImage(data,cmap).getCanvas());
```

Just a few lines!

Example of API (JavaScript) to display global topographic data in a browser



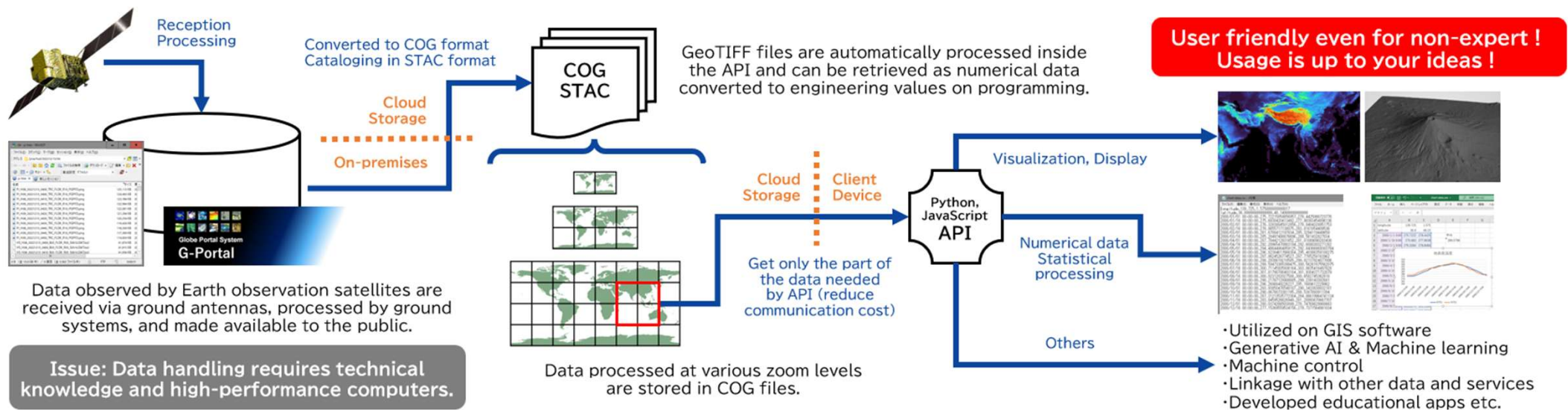
Main datasets available through API (More datasets are available, see the website)



JAXA Earth API Update



- JAXA's data available via the G-Portal are **converted into the COG/STAC format**.
- COG/STAC files are **stored on simple cloud storage for public access**.
- API module (Python or JavaScript) in user's code executes the data retrieval method and data are loaded **as an array of numerical values**.
- Users can **freely process these numerical values** - such as generating images or performing statistical analysis - using general purpose programming.





JAXA Earth API Update



- The API is **compatible with a wide range of environments and web services.**

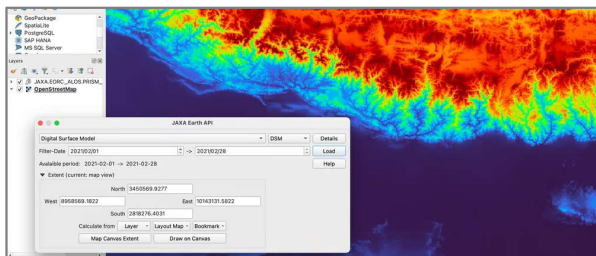
```
# Precipitation Rate (Daily)
# https://data.earth.jaxa.jp/en/datasets/#/id/JAXA_EDRC_GSMaP_standard.Gauge.802-232.v6_daily
rain = je_get(
    collection="JAXA_EDRC_GSMaP_standard.Gauge.802-232.v6_daily",
    band="PRECIP",
    ppu=ppu, bbox=bbox,
    sdate=2024, 4, 1, # start date (year, month, day)
    edate=2024, 4, 3 # end date (year, month, day) (inclusive)
)
rain.shape

# Shortwave Radiation (Daily)
# https://data.earth.jaxa.jp/en/datasets/#/id/JAXA_JSMES_Aqua.MODIS_swr.v811_global_daily
radiation = je_get(
    collection="JAXA_JSMES_Aqua.MODIS_swr.v811_global_daily",
    band="swr",
    ppu=ppu, bbox=bbox,
    sdate=2024, 4, 1, # start date (year, month, day)
    edate=2024, 4, 3 # end date (year, month, day) (inclusive)
)
radiation.shape

plt.imshow(rain[0])
plt.colorbar()

<matplotlib.colorbar.Colorbar at 0x7b8ef81ef550>
```

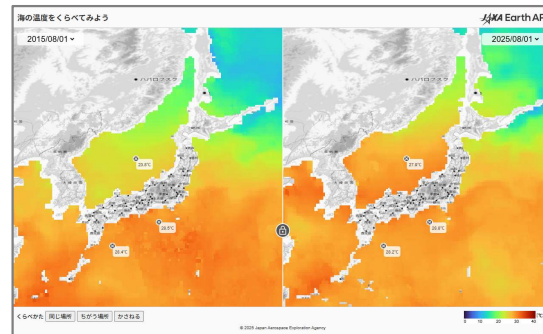
On the Google Colaboratory
(for Python)



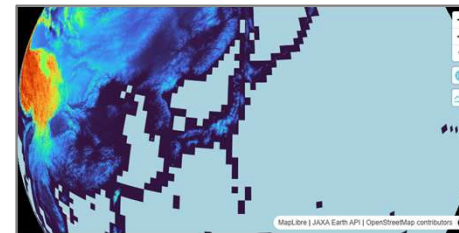
On the QGIS



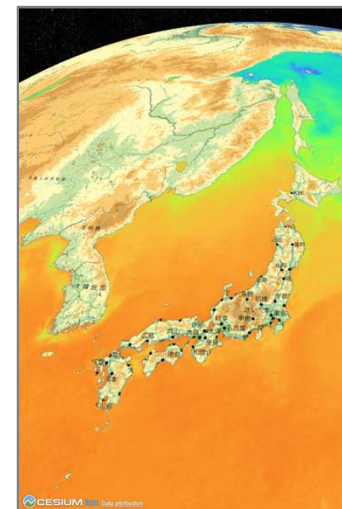
Create Web Apps



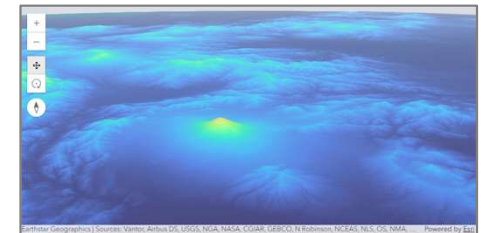
On the OpenLayers



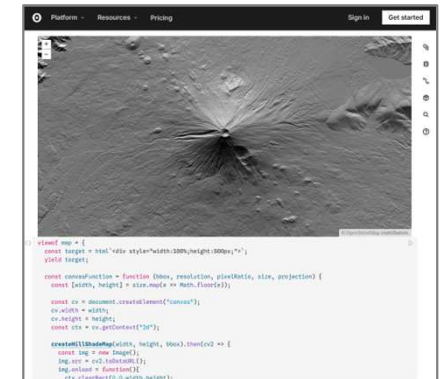
On the MapLibre



On the Cesium



On the ArcGIS



On the Observable
(Online JavaScript runtime env.)



JAXA Earth API Update

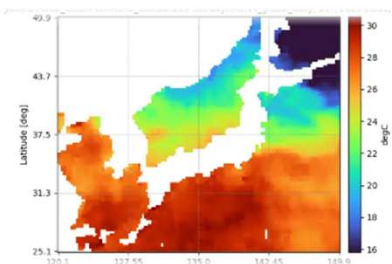


Hot Topics!

How did sea surface temperatures around Japan change between September 1, 2015 and September 1, 2025?

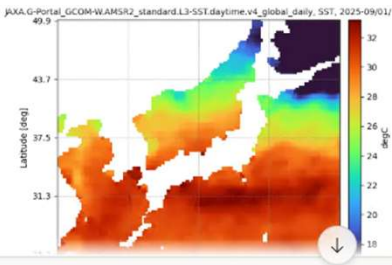
I'll display the sea surface temperature data around Japan for September 1, 2015 and September 1, 2025 to compare the changes in this region.

show_images



Now let me get the September 1, 2025 data for the same region:

show_images



Example execution using
Claude Desktop and MCP

- **MCP** and **Agent Skills** sample codes have been published!
- Generative AI **can automatically retrieve satellite data (values & images)** through MCP.
- Agent Skills enable the generative AI to **automatically generate and execute the required code** to obtain the data!
- The generative AI then **provides explanations for human users** based on the data it retrieves.

Key Changes Over the 10-Year Period:

Southern Waters (East China Sea & South of Japan):

- 2015: Temperatures around 28-30°C (red/dark red)
- 2025: Similar temperatures around 28-30°C (red/dark red), but with a slightly larger extent of the warmest waters
- The warm Kuroshio Current appears similarly strong in both years

Central Japanese Waters (Pacific Coast):

- 2015: Mix of orange-red (26-28°C) waters
- 2025: Appears slightly warmer with more extensive orange-red zones and deeper penetration of warm water northward

Sea of Japan:

- 2015: Strong temperature gradient from warm south (24-26°C, yellow-orange) to cooler north (18-22°C, green-cyan)
- 2025: **Noticeably warmer overall**, with yellow-orange colors (24-26°C) extending further north
- The cooler northern waters appear reduced extent

* AI output is the original text. It may contain errors. Not verified by researchers. *

Consortium for Satellite Earth Observation (CONSEO)

- Platform for Industry-Academia-Government Partnership –

Gathering players from industry, academia and government, the Consortium will **envisage the future** of Satellite Earth Observation and **realize** it through **co-creation**.

About CONSEO

Consortium of industry, academia and government about Satellite Earth Observation in Japan (>270 members)

1. Recommendations of strategy of Earth observation to the government
2. Promotion of co-creation and partnerships
3. Outreach activities to the public

320+ entities





CONSEO Update



Corporate/Organization Member

321 entities

Private sector/Municipality/Research institute etc.

Expert Member

51 persons

Individual membership

Observer (Ministries)

15 entities

Ministries/Agencies, etc.



(As of 9 October 2025)



PID Updates



<https://earth.jaxa.jp/doi/en/>

➤ **Standard Products**

"Standard" products is that JAXA guarantees its accuracy to and permanently stores and provides from the Earth observation satellite data provision system, G-Portal. "Near real-time" products which are ones aiming at quick report rather than its accuracy are out of focus because they will be deleted after a certain period.

The DOI numbers given to the products can be checked in [the list of DOI numbers -Standard Products](#).

EarthCARE L2b (ACM_CLP, ALL_RAD) were newly added in Dec. 2025.

➤ **Research Products**

"Research" products are provided by the Earth Observation Research Center (EORC) and consist of products under research such as algorithms.

The DOI numbers given to the products can be checked in [the list of DOI numbers -Research Products](#).

EarthCARE-GPM was newly added in Nov. 2025.



Numbers of Data Provisions



Satellite	JFY2012	JFY2013	JFY2014	JFY2015	JFY2016	JFY2017	JFY2018	JFY2019	JFY2020	JFY2021	JFY2022	JFY2023	JFY2024
MOS-1/MOS-1b	0	0	0	0	2	0	20	9	6	4	6	12	6
JERS-1	575	722	280	2,655	48,367	85,584	14,937	2,690	9,413	625	640, 639	456,648	51,170
ADEOS	0	0	19	710	31	2	10	12	33	48	18	53	24
TRMM	564,258	109,632	161,811	359,374	316,250	377,039	472,743	200,115	937	189,989	225,067	244,955	535,924
Aqua	1,934,217	1,643,585	5,582,670	3,424,642	3,540,226	3,744,344	2,286,678	1,110,230	1,452,202	4,468,052	1,352,289	1,297,549	2,916,505
ADEOS-II	138,407	2,322	18,978	82,408	447,864	633,192	49,970	30,479	213	30	112	509	27,353
MODIS	37,947	45,539	3,264	24,188	32,528	34,223	48,052	17,306	2,651	476	1,648	36	1,278
ALOS	36,469	29,534	36,057	21,567	18,061	12,785	11	6,518	4,335	1,671	917	82	97
ALOS-2	-	-	6,593	8,489	10,944	11,732	12,639	13,698	12,317	11,789	12,402	11,652	11,632
ALOS-4	-	-	-	-	-	-	-	-	-	-	-	-	0
GOSAT	5,592,234	9,314,801	1,371,196	18,094,443	5,162,207	2,404,810	11,154,884	14,234,370	15,954,019	16,356,657	2,590, 036	10,669,145	2,628,450
GOSAT- 2							31,129	366,681	945,752	1,474,972	27,510,943	1,168,141	1,286,997
GCOM-W	382,164	3,379,886	4,007,717	6,153,648	6,935,100	9,381,174	4,597,307	13,737,449	14,219,029	15,585,063	16,937,422	26,701,621	29,013,505
GPM	-	-	451,347	881,709	3,318,336	2,388,078	765,718	1,505,856	1,197,463	1,170,492	1,772,789	2,019,112	4,916,912
GCOM-C	-	-	-	-	-	-	245,023	19,285,587	17,607,337	19,477,938	27,510,943	17,016,486	19,182,590
EathCARE/CPR	-	-	-	-	-	-	-	-	-	-	-	-	216,512
Total	8,686,271	14,526,021	11,639,932	29,053,833	19,829,916	19,072,963	19,679,121	50,511,000	51,405,707	58,737,806	75,324,556	59,586,001	60,788,955