

JAXA Agency Report

Misako KACHI, JAXA

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Takuji KUBOTA, Makiko HASHIMOTO, and Osamu OCHIAI*

30-years anniversary on JAXA/EORC



(operating)

(operating)

(operating)



(operating)



(failed)

Water Cycle Variation

Disaster Response/Land

Climate Change

Precipitation

Greenhouse Gases

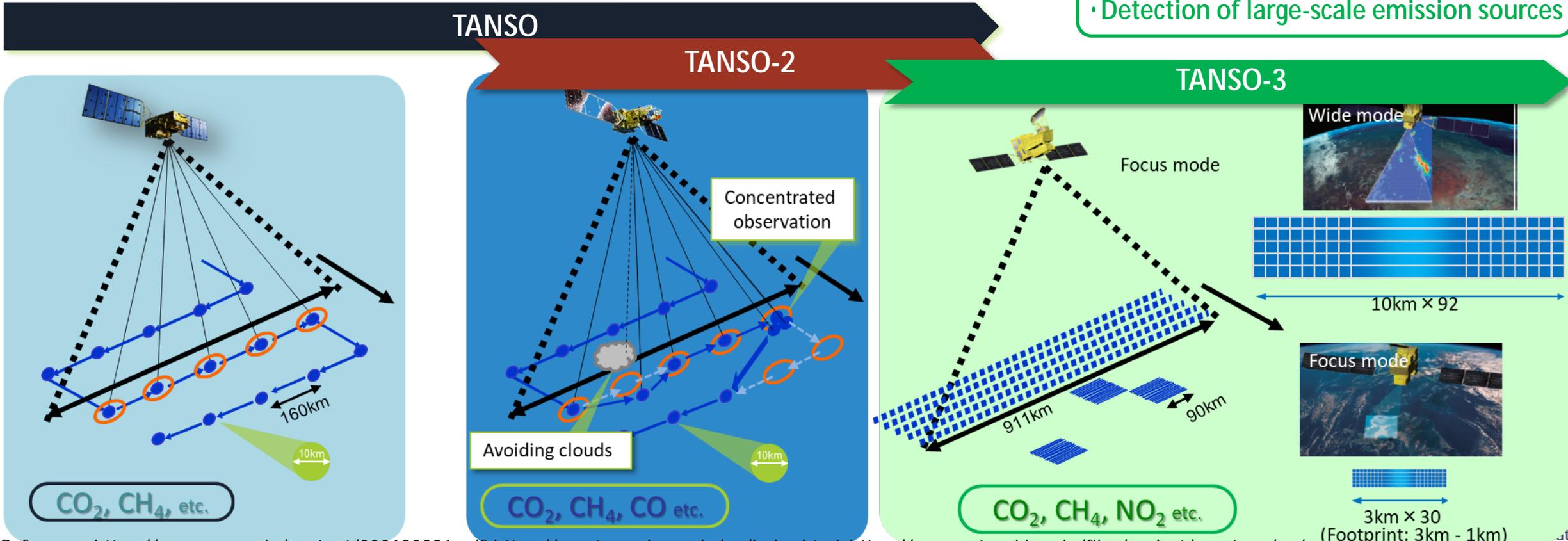


GHG Observation (TANSO) series and TANSO-3



Aims of TANSO-3

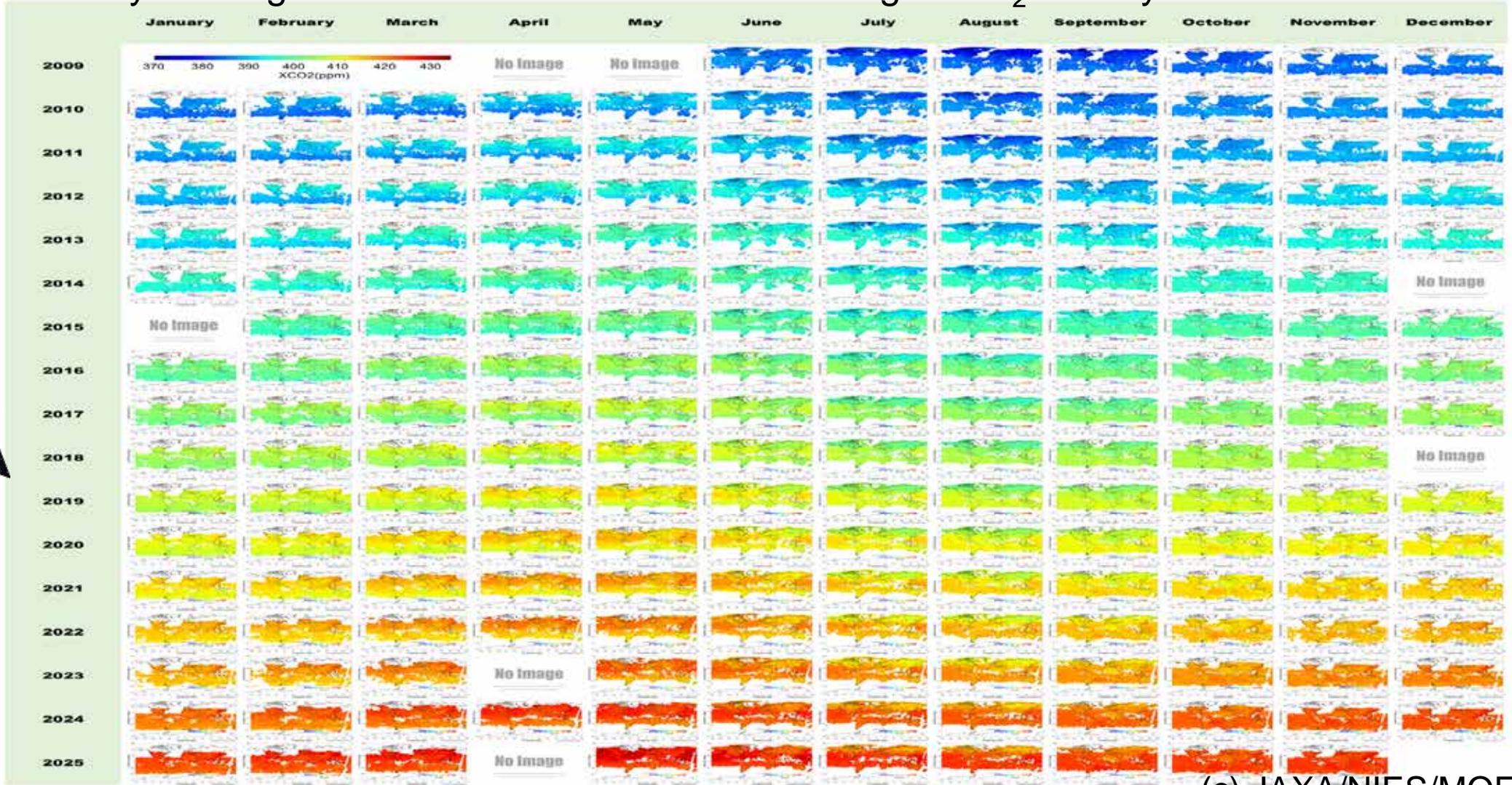
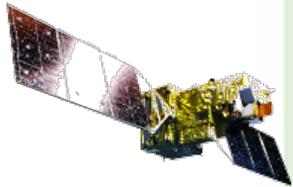
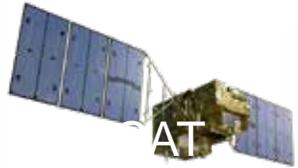
- Long-term monitoring of greenhouse gases (GHG) of entire earth
- Verification of human-induced GHG emissions by country
- Detection of large-scale emission sources



Reference: <https://www.env.go.jp/content/000130091.pdf>, <https://gosat-gw.nies.go.jp/en/index.html>, <https://www.satnavi.jaxa.jp/files/project/gosat-gw/en/>

GHG observation from space by GOSAT and GOSAT-2

17-year long time dataset of total-column averaged CO₂ density since 2009



(c) JAXA/NIES/MOE

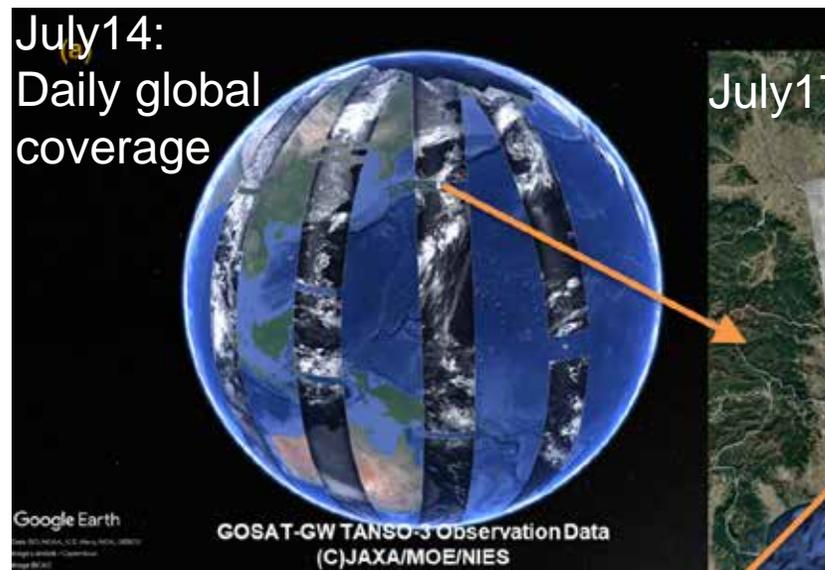
TANSO-3 first data acquisition

July 14-20, 2025: TANSO-3 acquired first spectral images

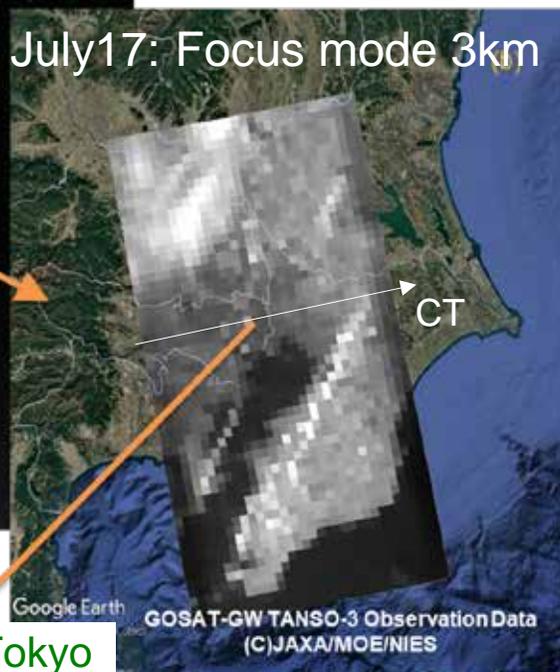
Wide mode: 10km-res with 910km-swath

Focus mode: 1, 2 or 3km-res with 90km-swath

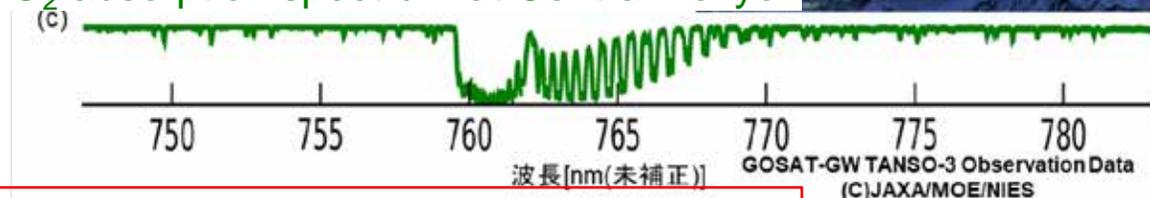
July 14:
Daily global coverage



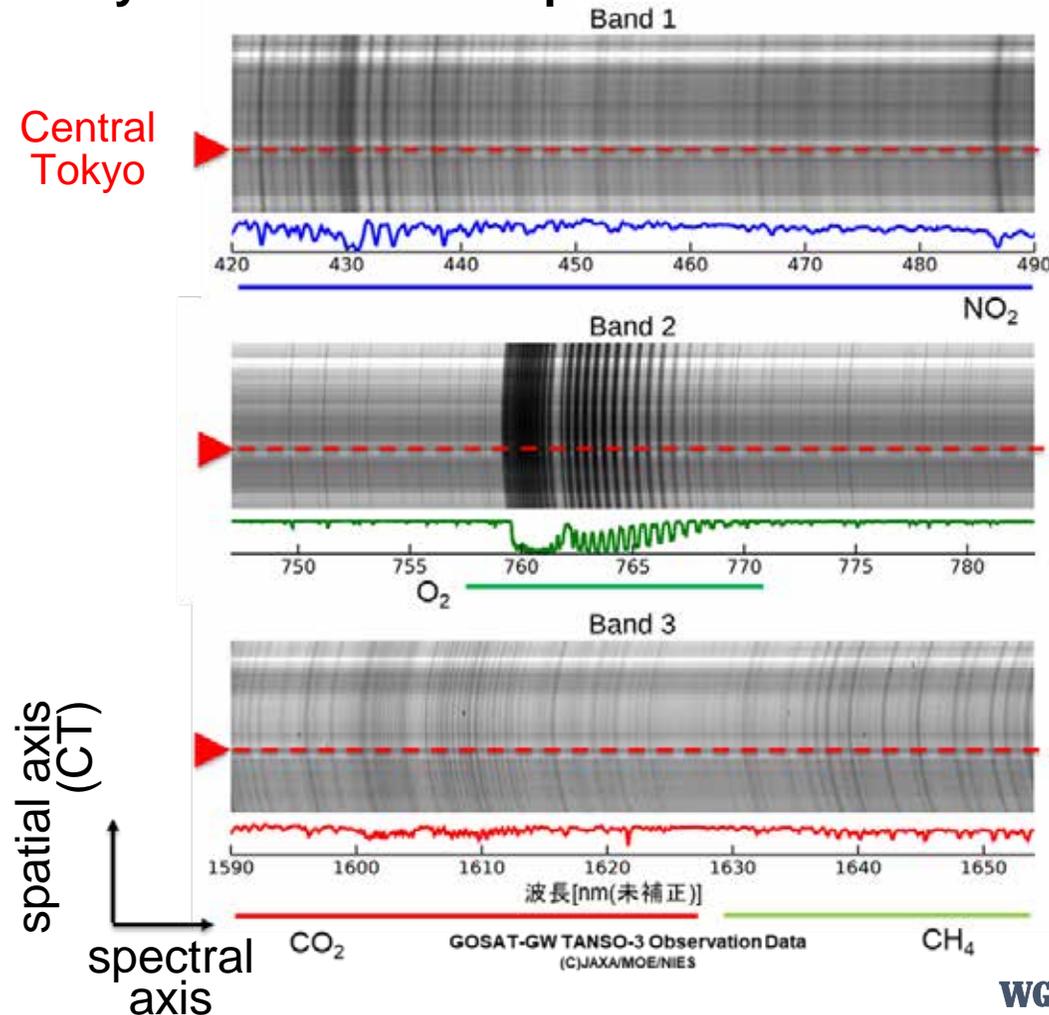
July 17: Focus mode 3km



O₂ absorption spectrum at Central Tokyo



July 17: Focus mode spectra over Greater Tokyo



Initial cal/val phase until April 2026

https://www.jaxa.jp/press/2025/08/20250808-1_j.html

Advanced Microwave Scanning Radiometer (AMSR) series and AMSR3



Aims of AMSR3

- Succeed AMSR series' observation of water-related parameters
- Respond to new user needs by hardware/software improvements



AMSR3 products

AMSR Products

AMSR Products:

- SST
- Surface wind speed
- Sea ice
- Water vapor
- Snow depth
- Rainfall
- Soil Moisture

Understanding and anticipation of Water cycle

Operational utilization

New AMSR3 Products

New AMSR3 Products:

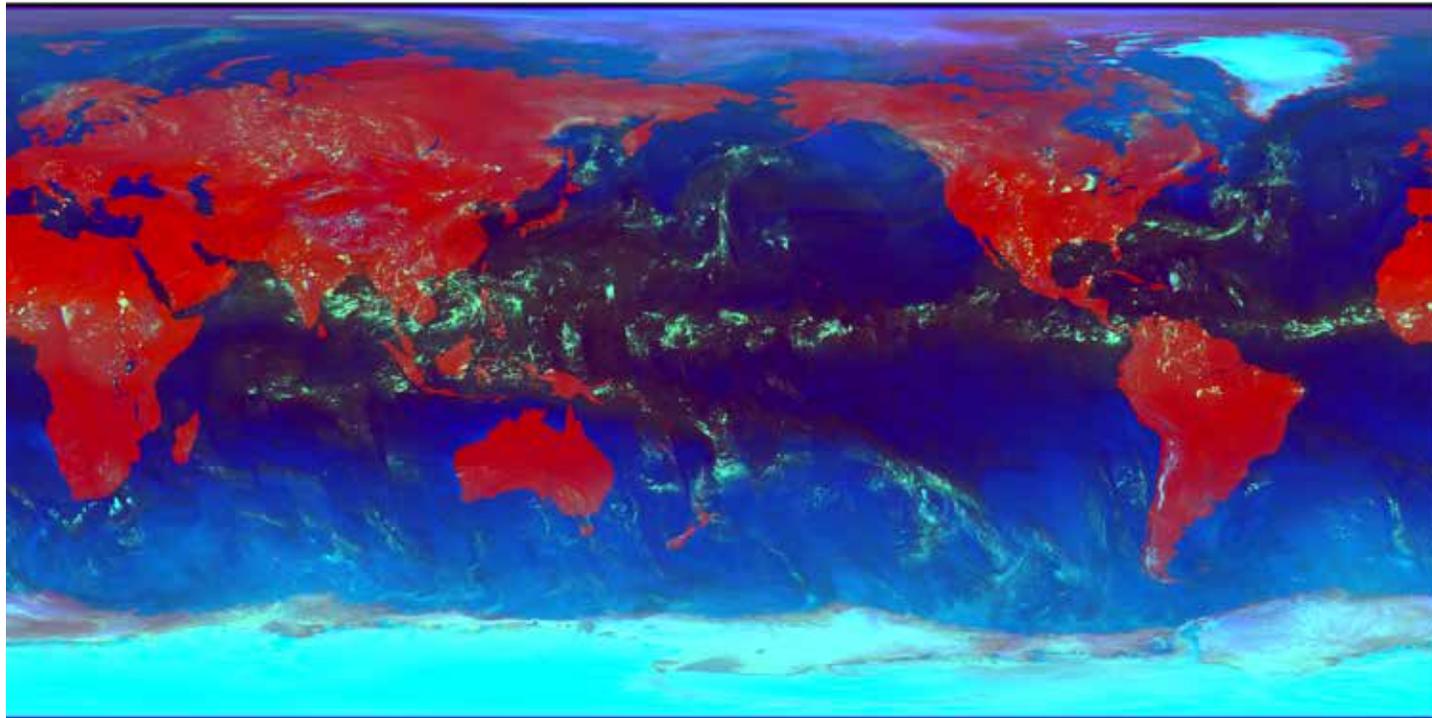
- Snowfall
- Water Vapor over land
- High-res. Sea ice concentration
- High-res. SST

Understanding and anticipation of Water cycle

Operational utilization

AMSR3 early observation results

AMSR3 is currently in calibration/validation phase for public data release (Ver.1.0) in Jul. 2026. Early data (Ver.0.1) has been provided to partner agencies in Nov. 2025.



AMSR3 RGB composite image using 18.7, 89.0, and 165.5 GHz V-Pol. TB to highlight cloud/precipitation area in light green (August 15 to 17, 2025, Ascending)

JAXA AEM

https://global.jaxa.jp/press/2025/09/20250905-1_e.html

AMSR3

2025/12/01 Descending

Sea Ice Concentration (V00B) 0 - 100[%]



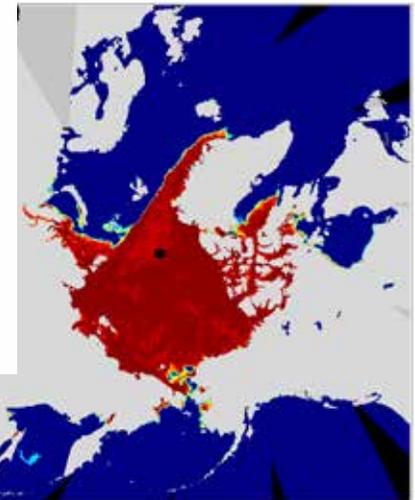
BEFORE TUNING

0 10 20 30 40 50 60 70 80 90 100[%]

Sea ice concentration on Dec. 1, 2025, Desc.

AMSR2

Sea Ice Concentration (V300) 0 - 100[%]



0 10 20 30 40 50 60 70 80 90 100[%]

JAXA EORC

The Joint CEOS-CGMS Working Group on Climate

Initial cal/val phase until June 2026

AMSR3 intercalibration activities are underway toward consistent Climate Data Record

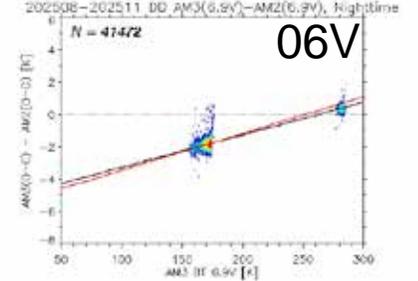
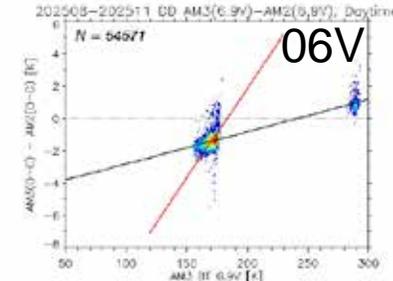
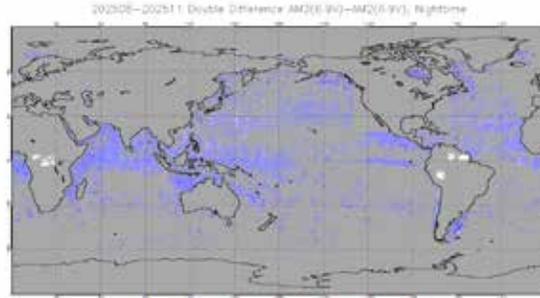
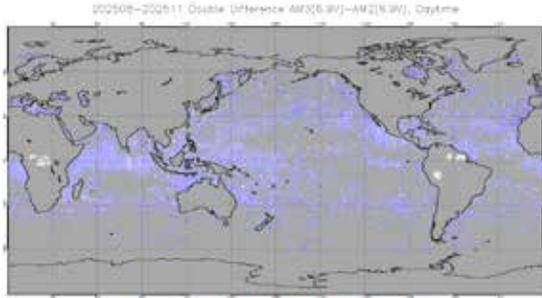
DD (AMSR3 – AMSR2) (Ascending)

(Descending)

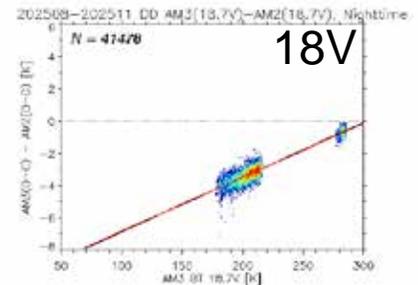
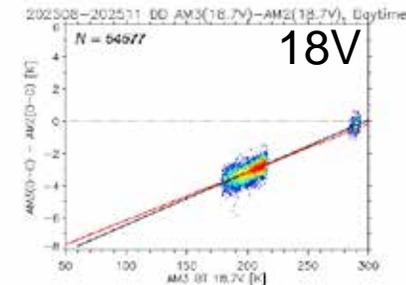
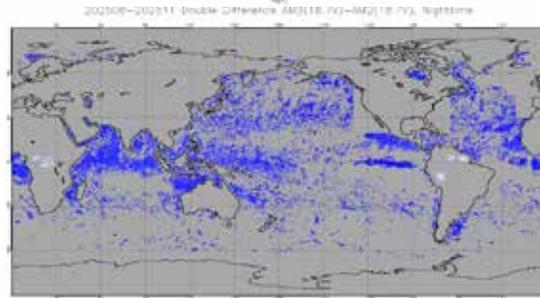
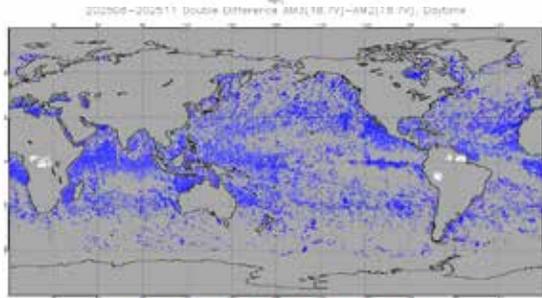
Conversion Coef. (Asc)

(Desc)

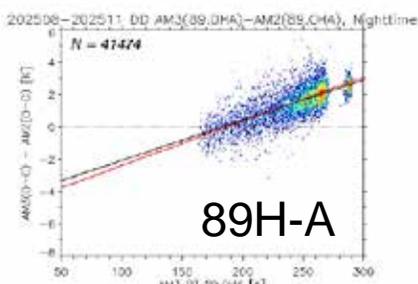
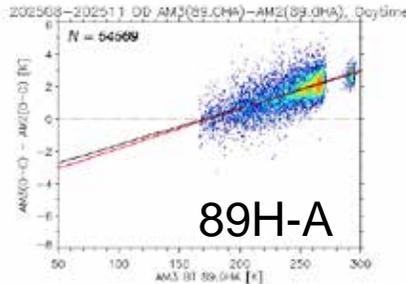
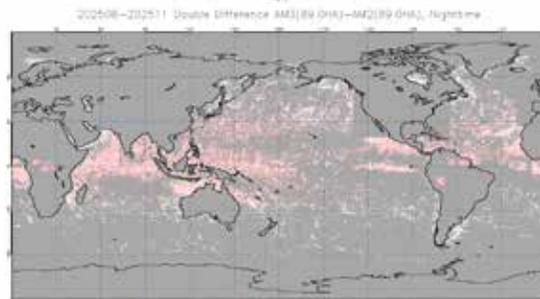
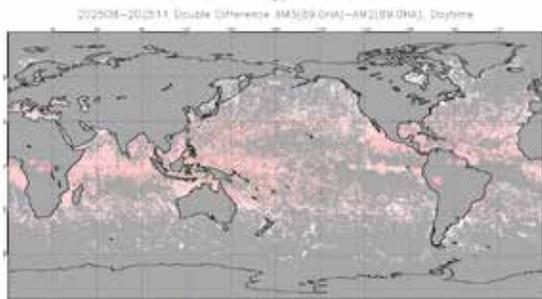
06V



18V



89H-A



Early cross-calibration of AMSR3 Ver.0.1 with AMSR2 (6-89 GHz) and GMI (10-183 GHz) has been conducted using the double difference method.

$$Tb_{AMSR3toAMSR2}[K] = Tb_{AMSR3}[K] - \Delta Cal [K]$$

$$\Delta Cal [K] = Tb_{AMSR3}[K] \times slope + intercept$$

* $Tb_{AMSR3toAMSR2}$: Tb_{AMSR3} Calibrated to Tb_{AMSR2}

ALOS-4 and new L-band SAR (PALSAR-3) launched in 2024



- ü Successfully observed over a **200 km swath width with 3 m resolution**. PALSAR-3 can observe 4 times wider than the 50 km swath of PALSAR-2.
- ü Extend **designed mission life to >7-year**
- ü Use of the **new Ka-band data transmission** enabling observations of large volumes of dual-polarization data.

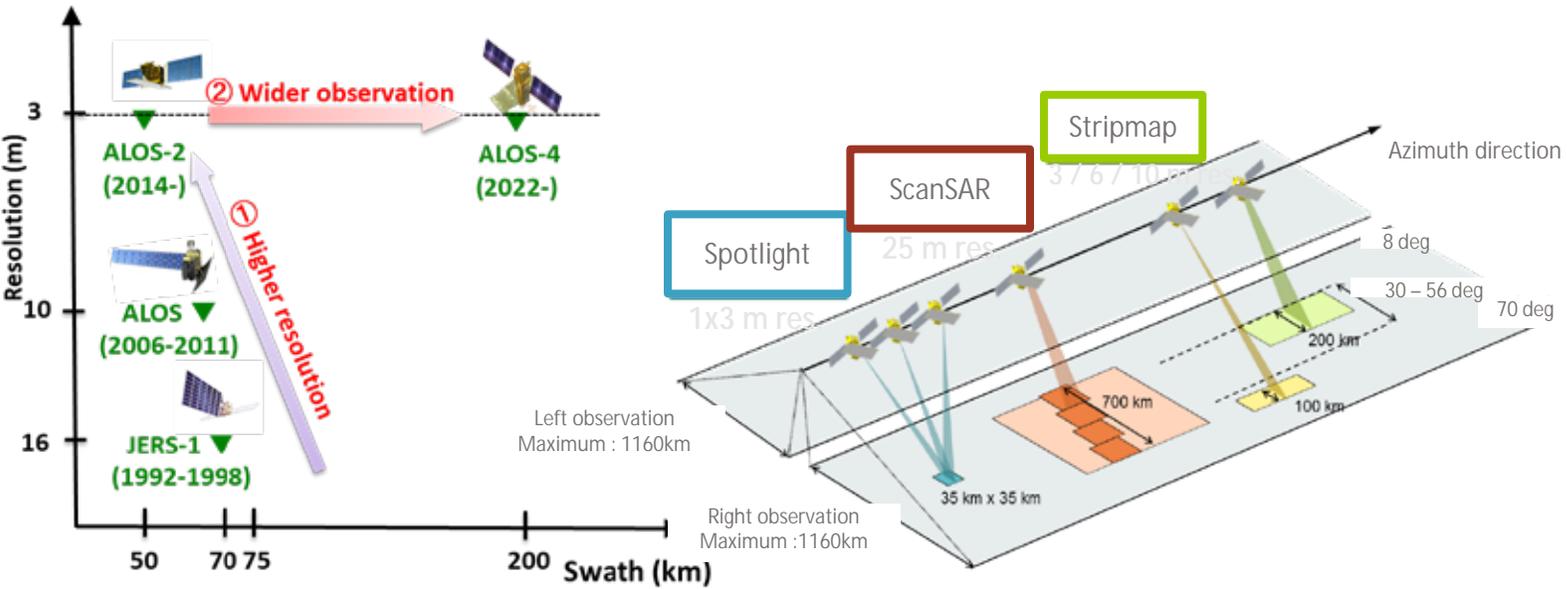


Swath width of PALSAR-3/-2

Modes	PALSAR-3 (ALOS-4)	PALSAR-2 (ALOS-2)
Stripmap (res. 3 / 6 / 10 m)	100-200 km	30-70 km
ScanSAR (res. 25m*)	700 km	350-490 km
Spotlight (res. 1 x 3 m)	35km x 35km	25km x 25km

*single look

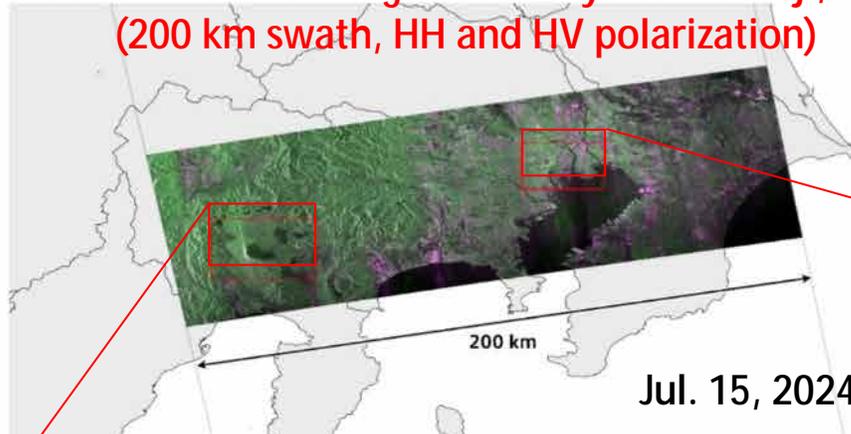
The Joint CEOS-CGMS Working Group on Climate



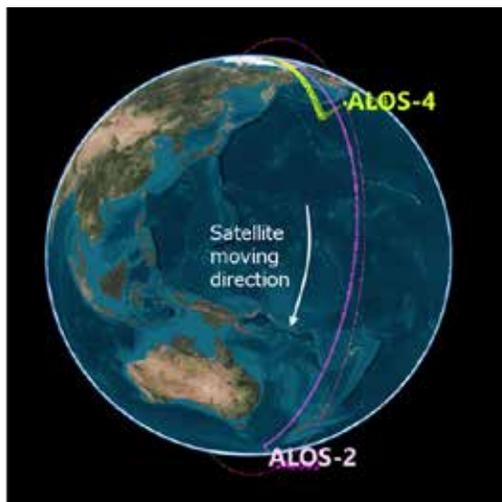
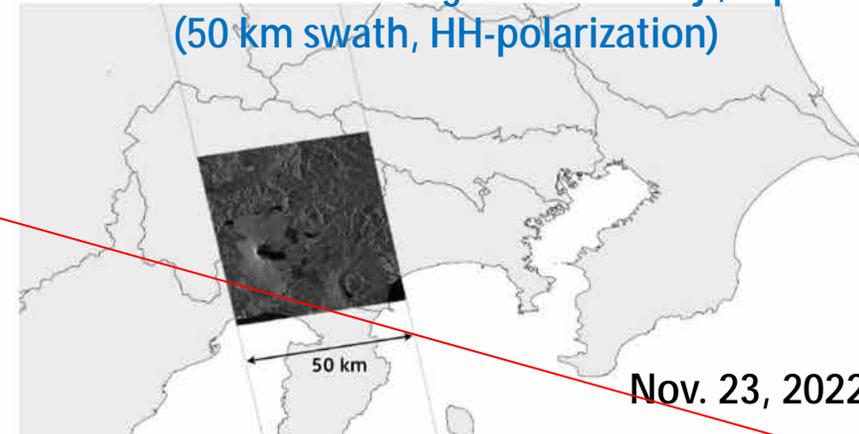
First image from the PALSAR-3

- The first PALSAR-3 observation was conducted during July 15 to 17, 2024.
- ALOS-4 flies on the same reference orbit as ALOS-2, enabling combined observations and data analysis by both.

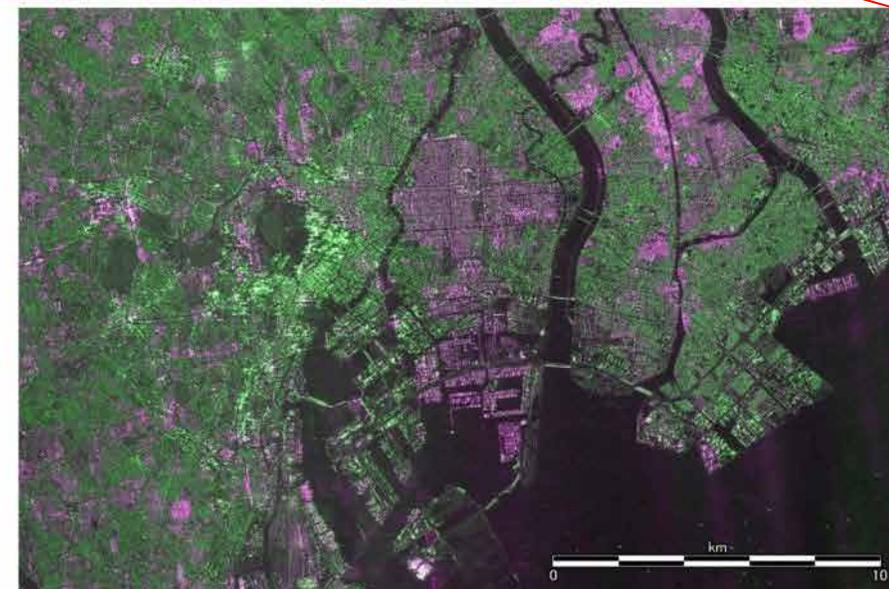
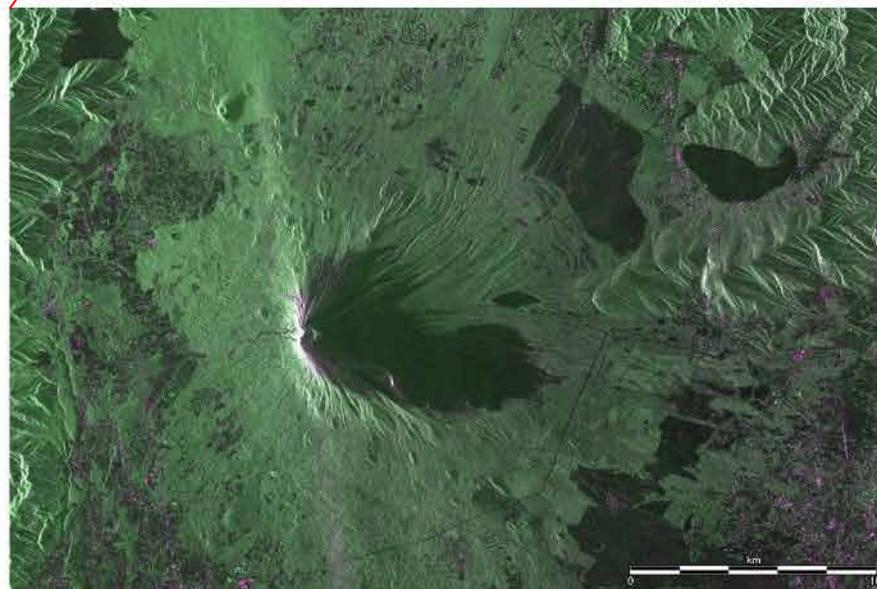
ALOS-4/PALSAR-3 image over Tokyo to Mt. Fuji, Japan
(200 km swath, HH and HV polarization)



ALOS-2/PALSAR-2 image over Mt. Fuji, Japan
(50 km swath, HH-polarization)



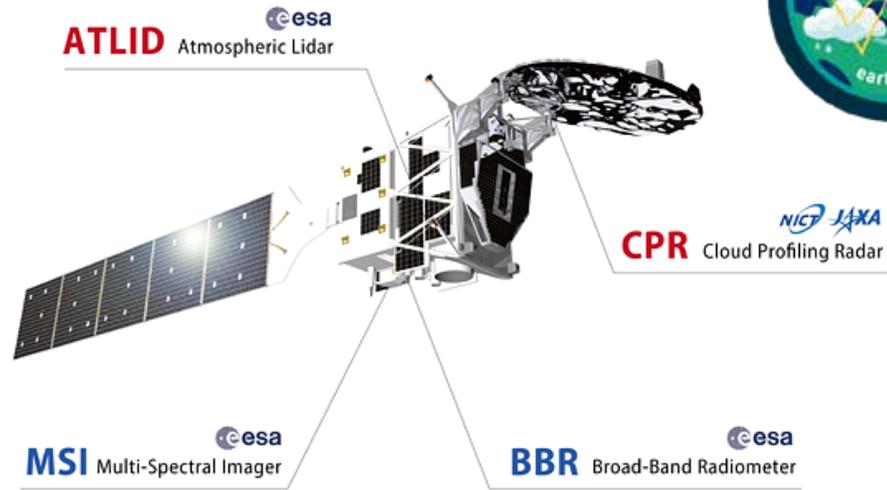
- **PALSAR-3 product was released in April 2025**



Close-up around Mt. Fuji (left) and Tokyo metropolitan area (right)

ESA-JAXA Earth Cloud Aerosol and Radiation Explorer (EarthCARE)

Cloud and aerosol continue to contribute the **two largest source of uncertainty in the current climate projections**, and accurate information on vertical cloud and aerosol layers is necessary. EarthCARE is an ESA Earth Explorer jointly developed and operated by ESA and JAXA to observe cloud, aerosol and radiation (Illingworth et al. 2015, Wehr et al. 2023).



(c) ESA - S. Corvaja

Observation Instruments on EarthCARE

- CPR** Cloud Profiling Radar
- ATLID** Atmospheric Lidar
- MSI** Multi-Spectral Imager
- BBR** Broadband Radiometer



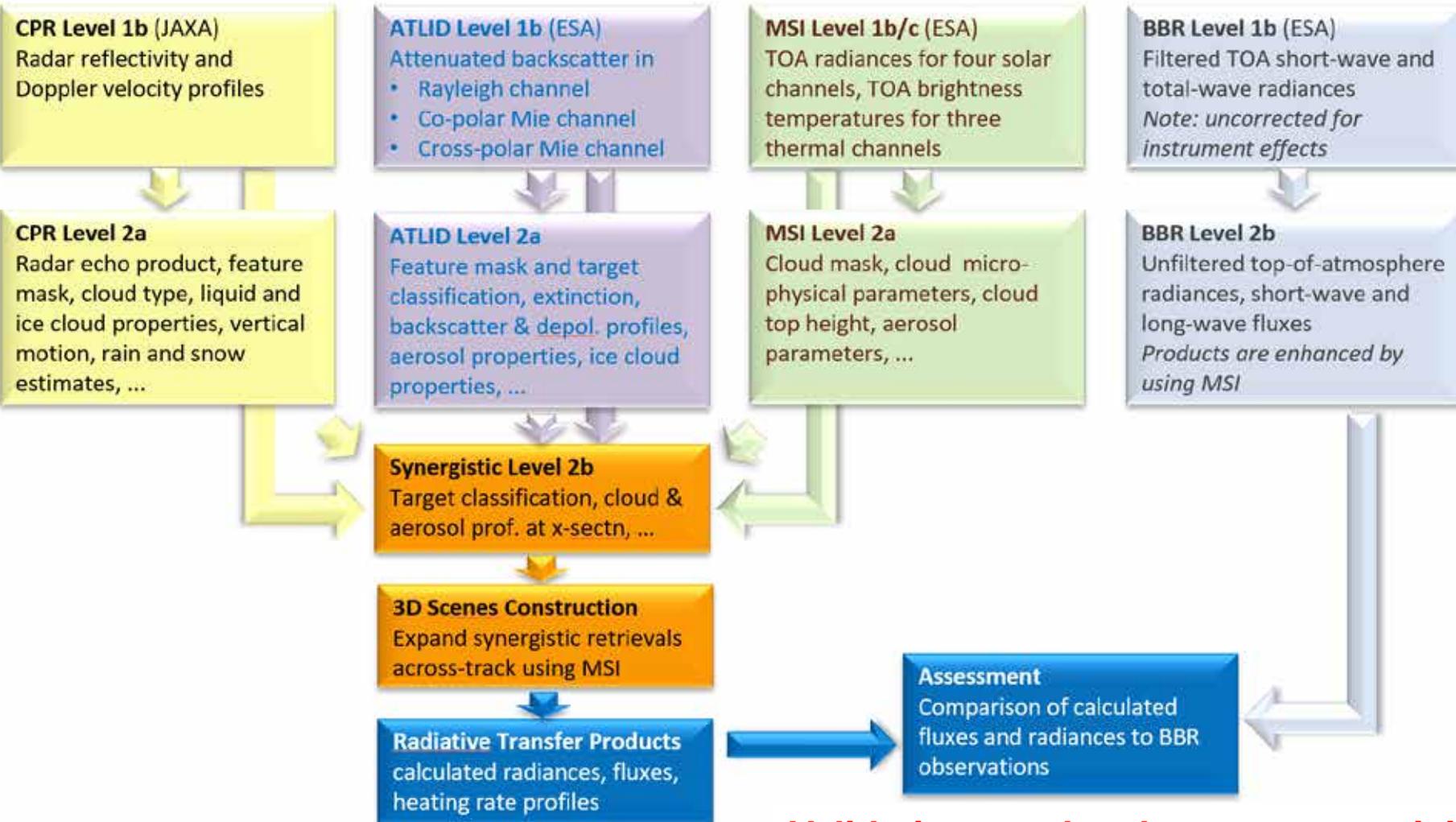
Synergetic Observation by 4 sensors



Spacecraft deployment (SpaceX/ESA)

The EarthCARE satellite was launched on 29 May 2024 at 00:20 CEST aboard a Falcon 9 rocket from the Vandenberg Space Force Base in California, US.

EarthCARE products and release status



Level 1: Calibrated Instrument Data
(Published 14/01/2025)

Level 2a: Single sensor Products
(Published 17/03/2025)

Level 2b: two-sensor synergy Products
(Published 17/03/2025)

Level 2b: three- and four-sensor synergy Products
(Planned release: 01/12/2025)

Validation results show very promising early product quality and offering significant scientific opportunities.

(Eisinger et al. 2024, AMT)

EarthCARE-GPM coincidence dataset

Compiles orbit-crossing cases between EarthCARE and GPM within ± 15 minutes.

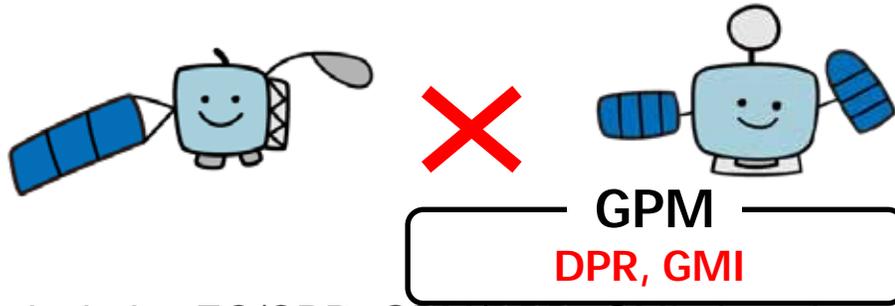
Now, publicly available with the Data DOI on the JAXA website!

<https://doi.org/10.57746/EO.01ka7xakvwj6pcthxkvgt0vr0y>

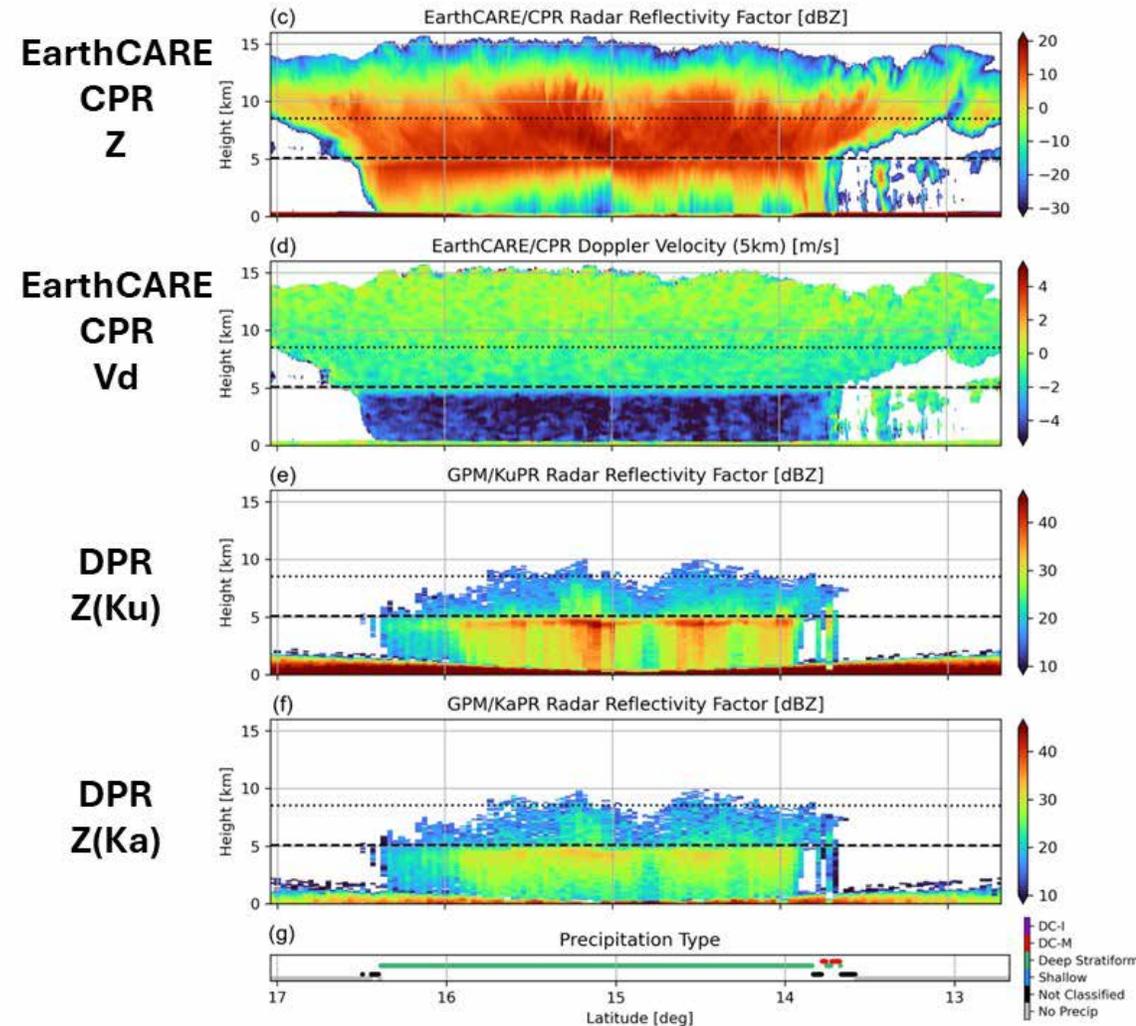
Extracts data within the coincident sections while preserving the original data structure as it is.

Dataset for more than 1-year since Aug 2024 (**>3000 cases**), and more in the future.

EarthCARE
CPR, ATLID, MSI, BBR

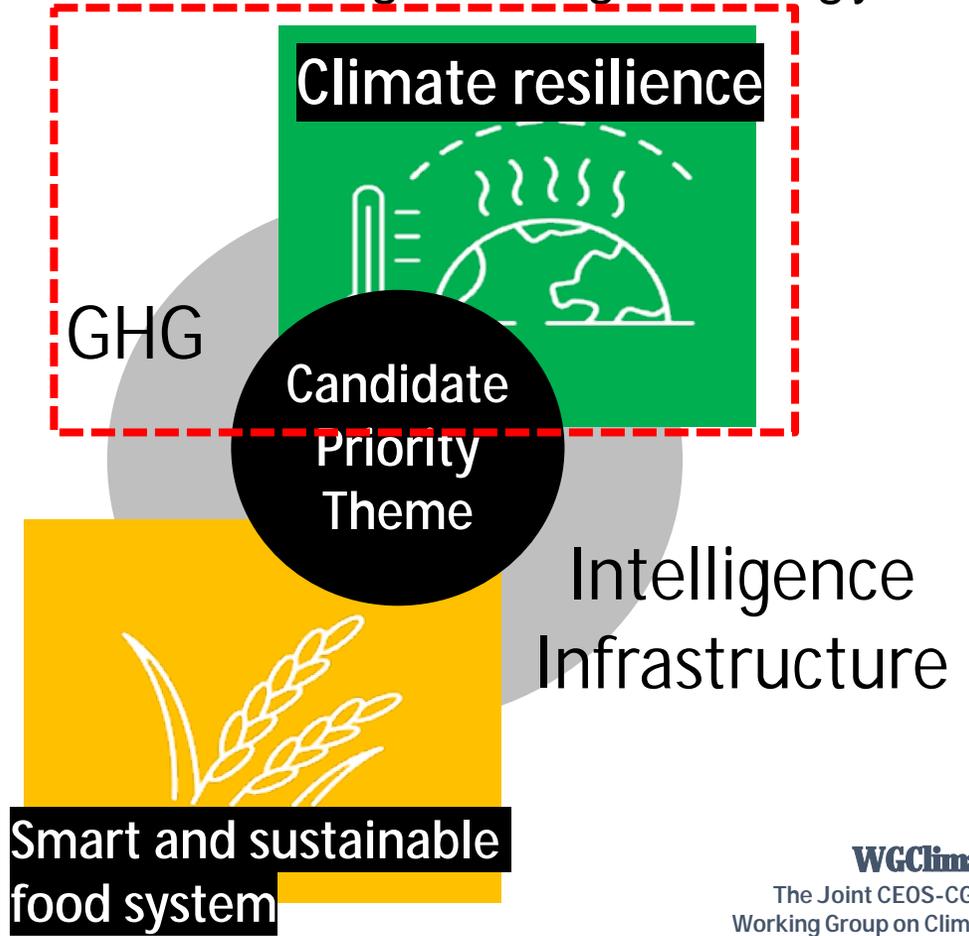
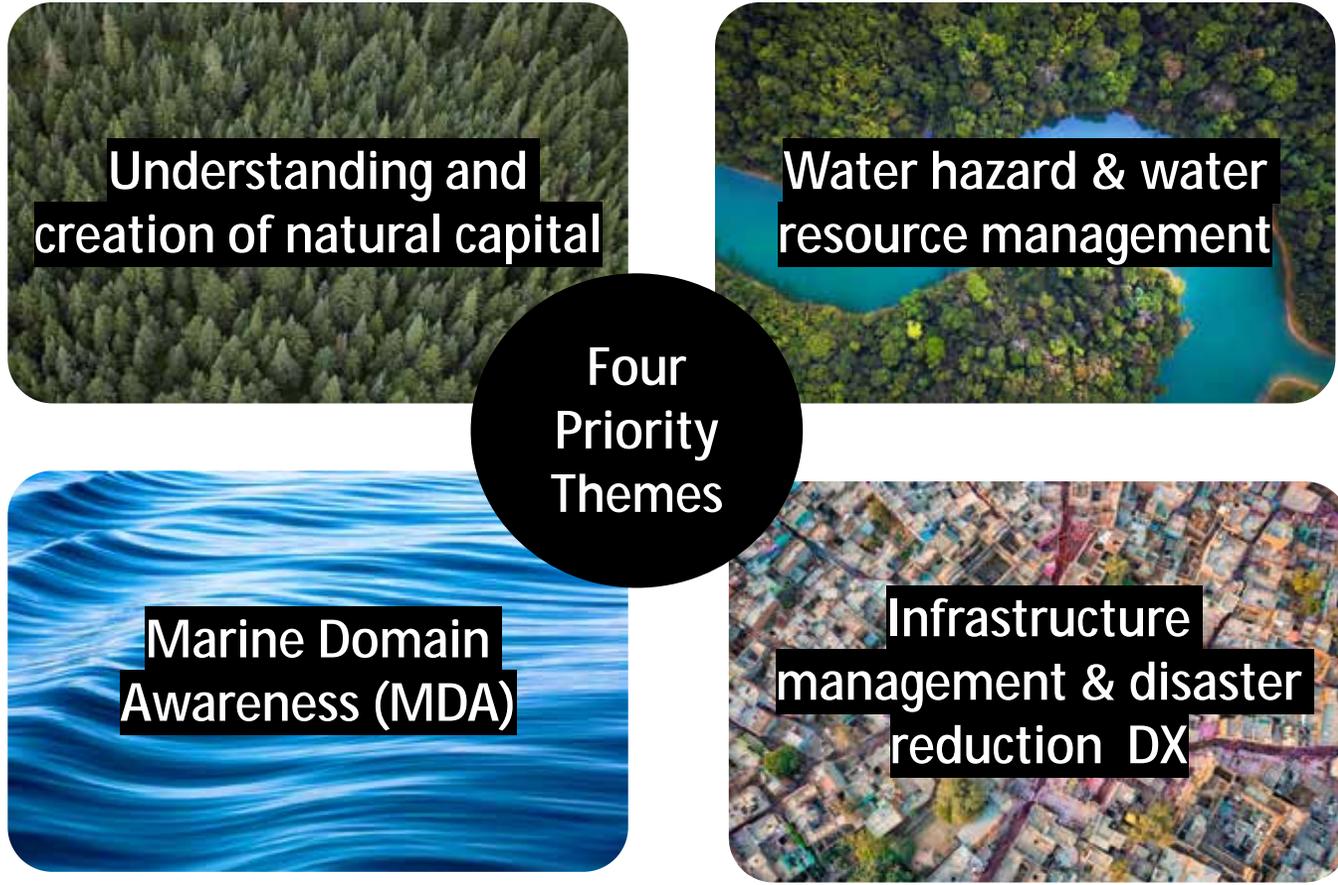


Currently includes EC/CPR, GPM/DPR, GMI, though we plan to expand to **all EarthCARE L2 products** in the future.



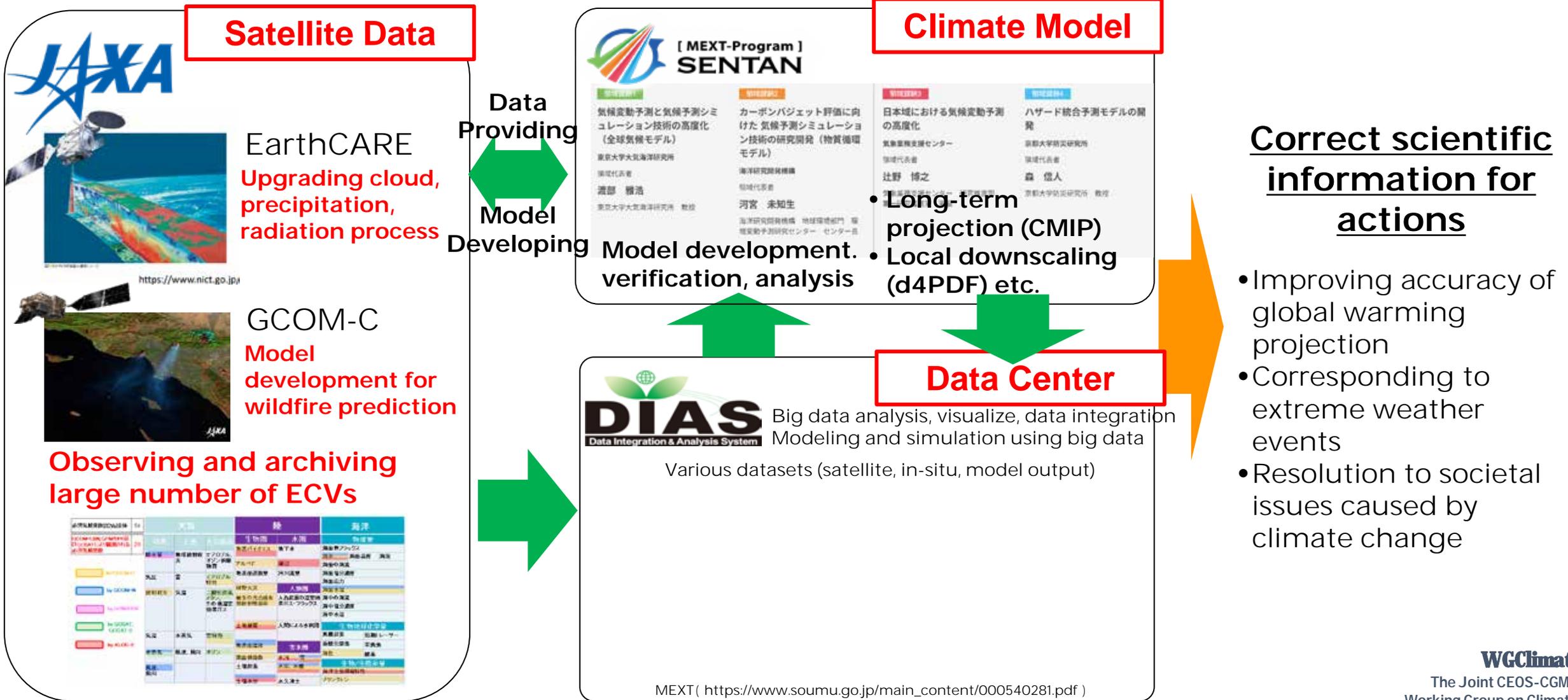
New Strategic Programs in EO for JFY 2025-2032

It is described in the latest JAXA 5th mid-to-long term targets (JFY2025-2032) that “Priority Themes” should be established to obtain specific “return” (benefits) by deepening collaboration with partner agencies and defining driving strategy.



- ❖ Enhancing JAXA's role in actions against the Climate Change under collaboration with domestic and international partners;
 - ❖ Providing “correct” scientific information basis for actions.
 - ❖ Utilizing satellite data in early warning and future prediction including operational monitoring, etc.
 - ❖ Playing cross-cutting role effectively-utilizing wide-spread and intersectional capability of satellite data.
 - ❖ Expecting to collaborate with domestic institutes and local governments for “Adaptation”, which is one of important elements in “Climate Resilience” Theme.
 - ❖ Seeking possible international collaboration with WGClimate and space/meteorological agencies.

Example of collaboration with domestic climate model community and data center



- ❖ JAXA operates satellites/instruments used in climate change monitoring/study, disaster mitigation, weather forecast, agriculture, fishery, MDA, land use change, etc.
- ❖ Status and latest activities of recently launched missions, GOSAT-GW (2025), ALOS-4 (2024) and EarthCARE (2024), were introduced.
- ❖ New strategic program has been launched to define priority themes : “Climate Resilience” is one of candidates.
 - Collaboration with domestic climate model development program (SENTAN) and data center (DIAS) is underway.
 - Also seeking possible international collaboration.