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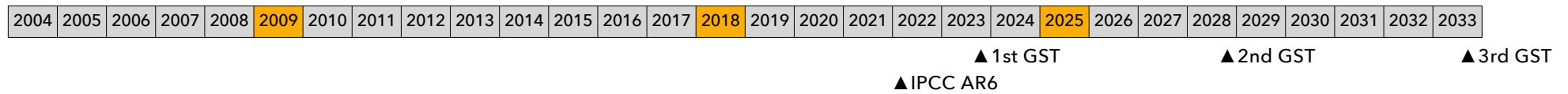
## Interface with users of GOSAT-GW TANSO-3 observation: observation requests, product downloads, and acquisition of information



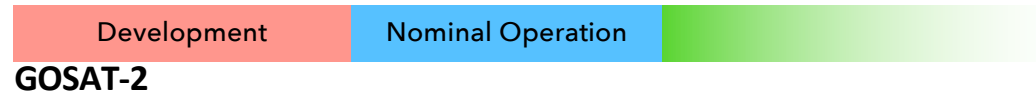
**Hisashi Yashiro**, Takafumi Sugita, Tazu Saeki, Yu Someya, Tamaki Fujinawa,  
Yukio Yoshida, Satoshi Kikuchi, Fumie Kawazoe, Akihide Kamei,  
Hiroshi Tanimoto, and Tsuneo Matsunaga

National Institute for Environmental Studies (**NIES**), Tsukuba, Japan

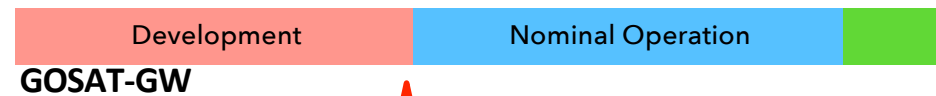
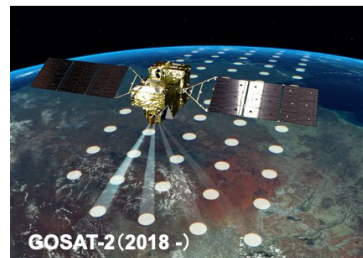
# Timeline of GOSAT series operations



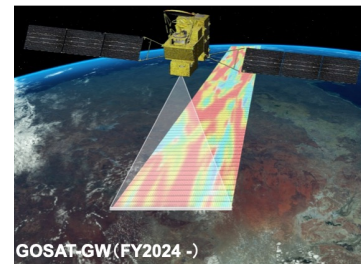
**GOSAT**



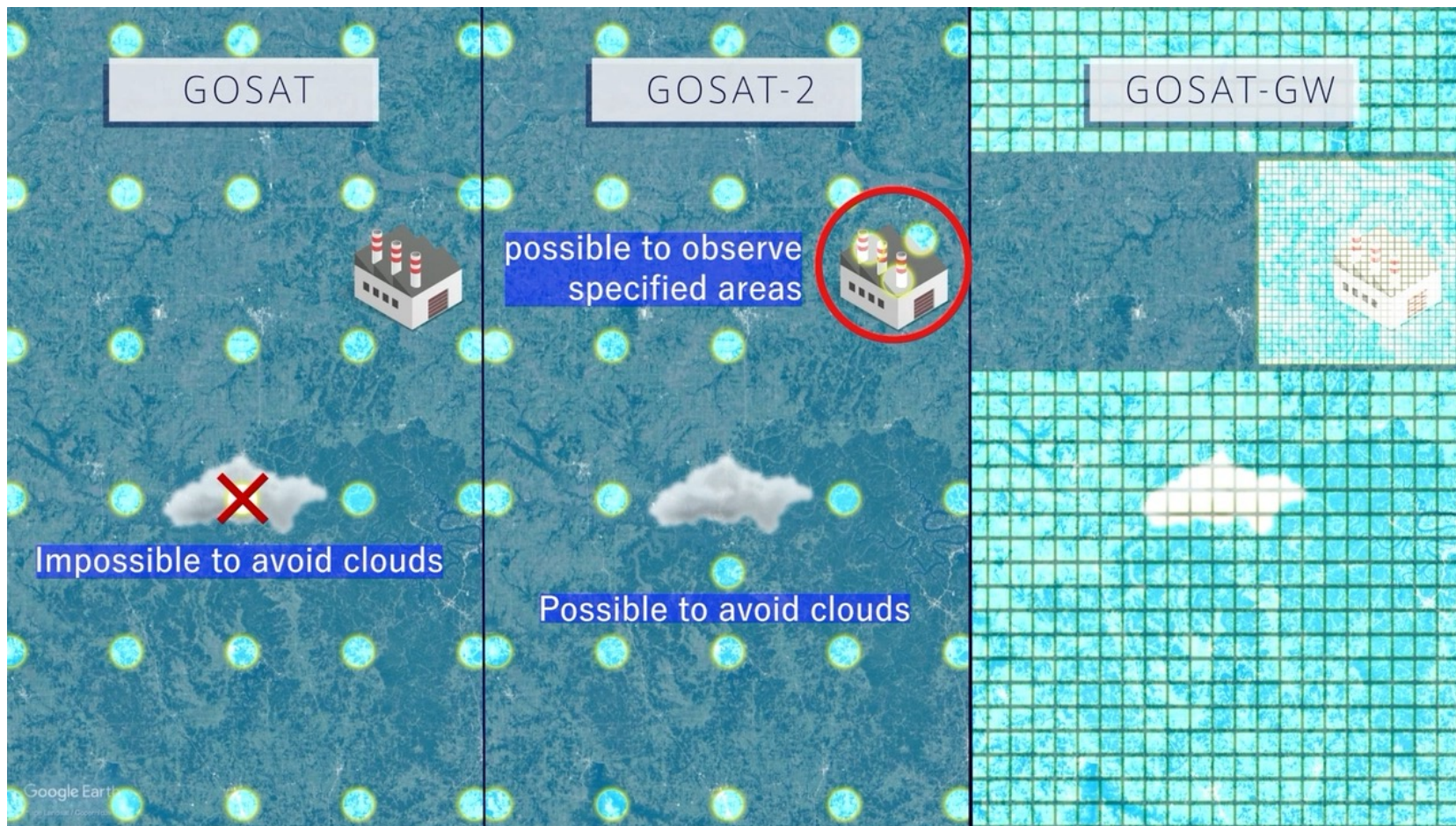
**GOSAT-2**



**GOSAT-GW**



**Planned launch date:  
June 24, 2025!**



# TANSO-3 Standard Products



- ◆ **Level 1B** (geolocated and calibrated spectral radiance)
  - ◆ **Wide-mode**: one file per cycle\*
  - ◆ **Focus-mode**: one file per scene\*
- ◆ **Level 2** (atmospheric products derived from the L1B)
  - ◆ **Wide-mode GHG**: one file per day\*  
(including full-physics XCO<sub>2</sub>, XCH<sub>4</sub>, proxy XCH<sub>4</sub>, and SIF)
  - ◆ **Wide-mode NO<sub>2</sub>**: one file per day\*
  - ◆ **Focus-mode GHG**: one file per scene\*
  - ◆ **Focus-mode NO<sub>2</sub>**: one file per scene\*
  - ◆ **Quick delivery products** are planned for **focus-mode GHG & NO<sub>2</sub>**

**Wide-mode**: 911km swath, 10km footprint, no pointing

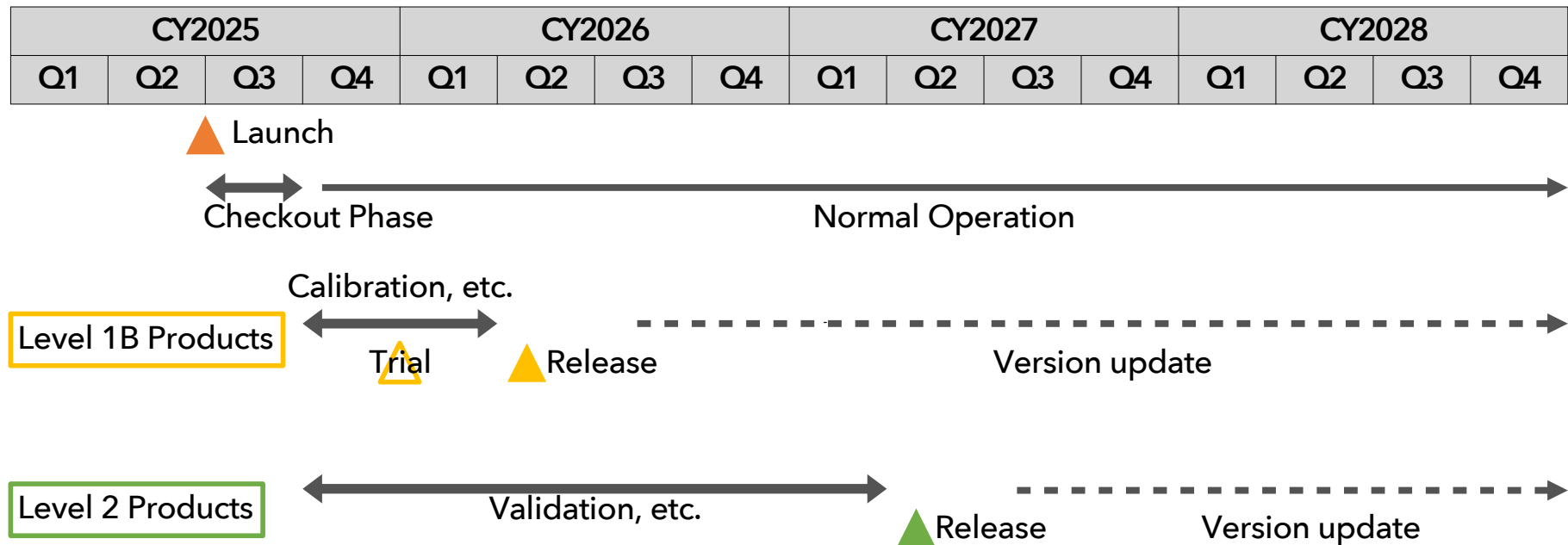
**Focus-mode**: 90km swath, 1-3km footprint, AT/CT pointing

\* One cycle means the orbital period between the descending point and the next descending point.

\* The scene corresponds to each pointing request. Daily data contains 14-15 cycles.

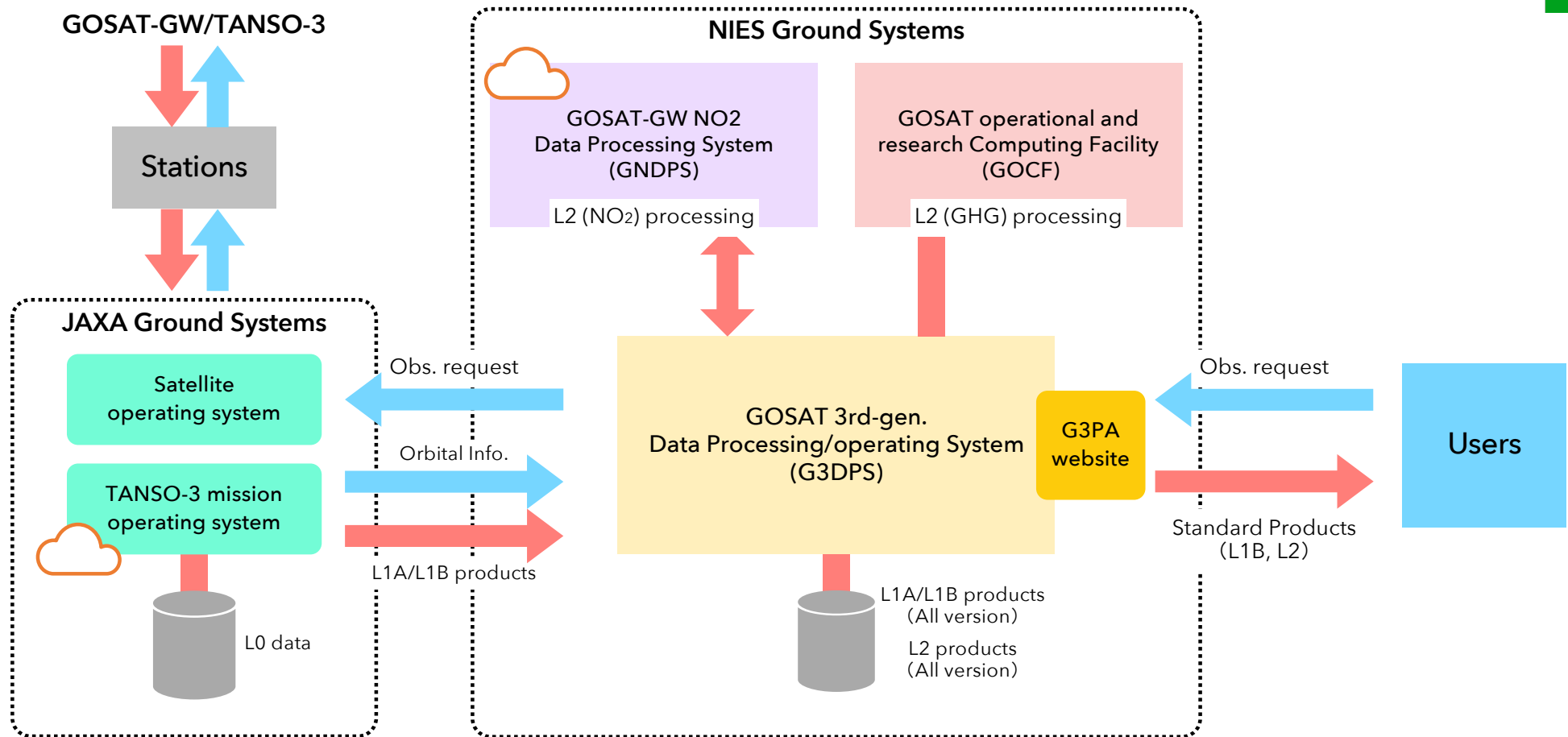
- Daytime data only
- File format: HDF5 (readable by NetCDF4 library)

# TANSO-3 Product release schedule





# NIES Ground System for GOSAT-GW



# G3PA website



## GOSAT-GW TANSO-3 Product Archive

News

Product Search ▾

Observation Request

Documents ▾

Support ▾

GOSAT-GW TANSO-3 Product Archive provides distribution services for TANSO-3 products observed by GOSAT-GW

### TANSO-3 product availability



From: 2021 ▾ 1 ▾ - To: 2023 ▾ 12 ▾

#### Latest news

2024-06-05	Maintenance	<a href="#">Announcement of network maintenance (June 16, 2024)</a>
2021-01-01	Observation	<a href="#">Important notice for the temporarily observation data stop of XXXX for the propriety decision of the GOSAT-GW maneuver operation</a>
2020-06-01	Website update	<a href="#">Notice of Website Update</a>
2020-03-01	Maintenance	<a href="#">Website Maintenance Notice YYYY-MM-DD</a>

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<https://product.gosat-gw.nies.go.jp/> (will open this year)

NIES

衛星観測センター  
Satellite Observation Center

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# G3PA website: Product Search & Download

**GOSAT-GW TANSO-3 Product Archive**

Home > Product search > Search & Download

**(1) News**  
**Product Search** (1)  
**Search & Download** (2)  
**Browser Search Method**  
Command Search Method  
About Data  
Observation Request  
Documents  
Support

**Search & Download**

Processing level  
☐ L1A  
☐ L1B  
☒ L2

Observation mode  
☒ Wide-mode  
☐ Fine-mode

Product (Mandatory)  
☒ GOSAT-GW TANSO-3 Wide-mode L2 GHG Product  
☒ GOSAT-GW TANSO-3 Wide-mode L2 NO2 Product

Search periods  
[Product Maintenance Status](#)  
From:  To:

Area specification  
☒ Not specified  
☐ Point  
☐ Rectangle

Version (Mandatory)  
☒ Current version  
☒ Previous version

Detail option

5000 km

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Downloading with Python scripts is also available.



# G3PA website: Observation Request

News

Product Search

Observation Request

Request Application

Request History

Application Method

Documents

Support

Observation request history search

Observation start date (Mandatory) 2024-02-26 ~ Observation end date (Mandatory) 2024-03-04

☐ Include wide-area observation

Search Clear search conditions

GOSAT-GW TANSO-3 Product Archive

Home > Observation Request > Request History

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Observation request history details

Observation request Request answer

Item name	Value
Adoption status	Adopt
Sensor start date / time	2024-02-26 03:16:42
Sensor start total orbit no.	1270
Sensor start path no.	25
Sensor start argument of latitude [deg]	35.796
Sensor end date / time	2024-02-26 03:17:09
Sensor end total orbit no.	1270
Sensor end path no.	25
Sensor end argument of latitude [deg]	37.483
Image center point(latitude) [deg]	36.418
Image center point(longitude) [deg]	147.863
Image center point(altitude) [m]	0
Sunglint occurrence results	-
Reason for rejection	-
Product quality warning	-

Observation request history list

Cancel observation requests (for selected) Clear all filters Export to KMZ

Map display	Select	Application status	Observation request ID	Observation start date / time	Observation end date / time	Observation point name	Latitude [deg]	Longitude
<input type="checkbox"/>	<input type="checkbox"/>	Planning	20240226NO1F150003	2024-02-26 03:16:42	2024-02-26 03:17:09	PointA	36.418	-
<input type="checkbox"/>	<input type="checkbox"/>	Canceled	20240227NO1F250003	2024-02-27 00:02:22	2024-02-27 00:02:28	PointH	-74.649	-
<input type="checkbox"/>	<input type="checkbox"/>	Canceled	20240229NO1F150003	2024-02-29 03:16:45	2024-02-29 03:17:12	PointA	36.418	-
<input type="checkbox"/>	<input type="checkbox"/>	Canceled	20240301NO1F250003	2024-03-01 00:02:25	2024-03-01 00:02:31	PointH	-74.649	-
<input type="checkbox"/>	<input type="checkbox"/>	Canceled	20240303NO1F150003	2024-03-03 03:16:48	2024-03-03 03:17:15	PointA	36.418	-
<input type="checkbox"/>	<input type="checkbox"/>	Planning	20240304NO1F250002	2024-03-04 00:02:28	2024-03-04 00:02:34	PointH	-74.649	-

Display 1-6 items / Total 6 items (0 selected) Number of lines All 1

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# Facility and Algorithm for GHG retrieval processing



## GOSAT operational/research Computing Facility (GOCF)

- 200TFLOPS, CPU-only
- 1PByte SSD Lustre
- Infiniband HDR
- Planned to expand

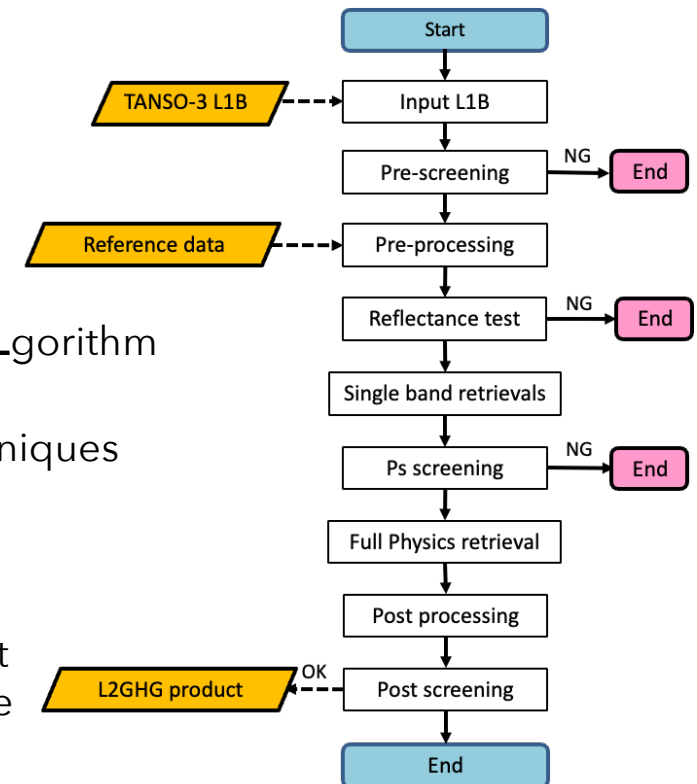


Located on the room of Center for Computational Sciences, Tsukuba University



## GOSAT Retrieval ALgorithm (GORAL)

- Gas retrieval techniques
  - Full Physics
  - Proxy Method
- Cloud screenings
  - Reflectance Test
  - Surface Pressure



# GHG Retrieval simulations

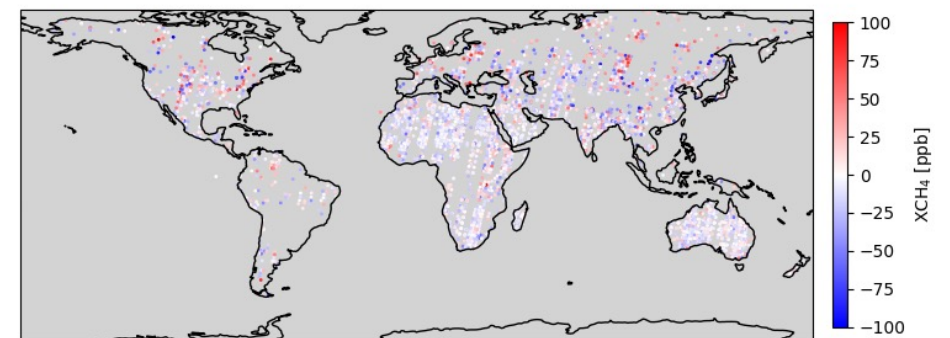
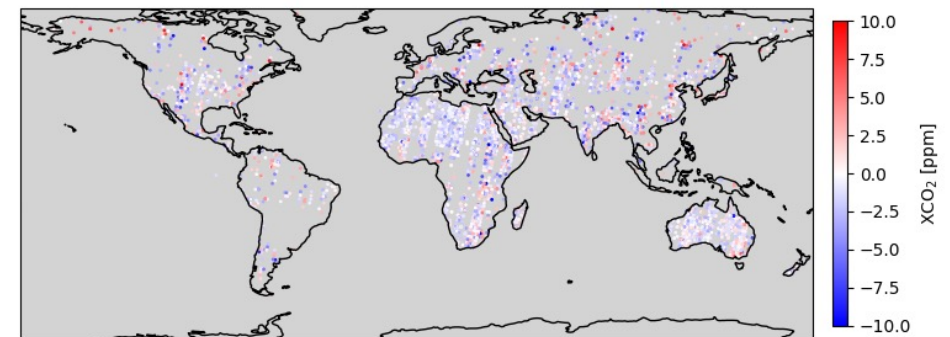
- Retrieval simulations for the focus mode were performed using the ILSF and measurement noise obtained from the TANSO-3 engineering model
- Measured spectra is simulated based on the GOSAT-2 retrieval results, including GHG concentrations, other atmospheric and surface states

Number of points: about 4700

a priori: same as GOSAT-2 retrievals

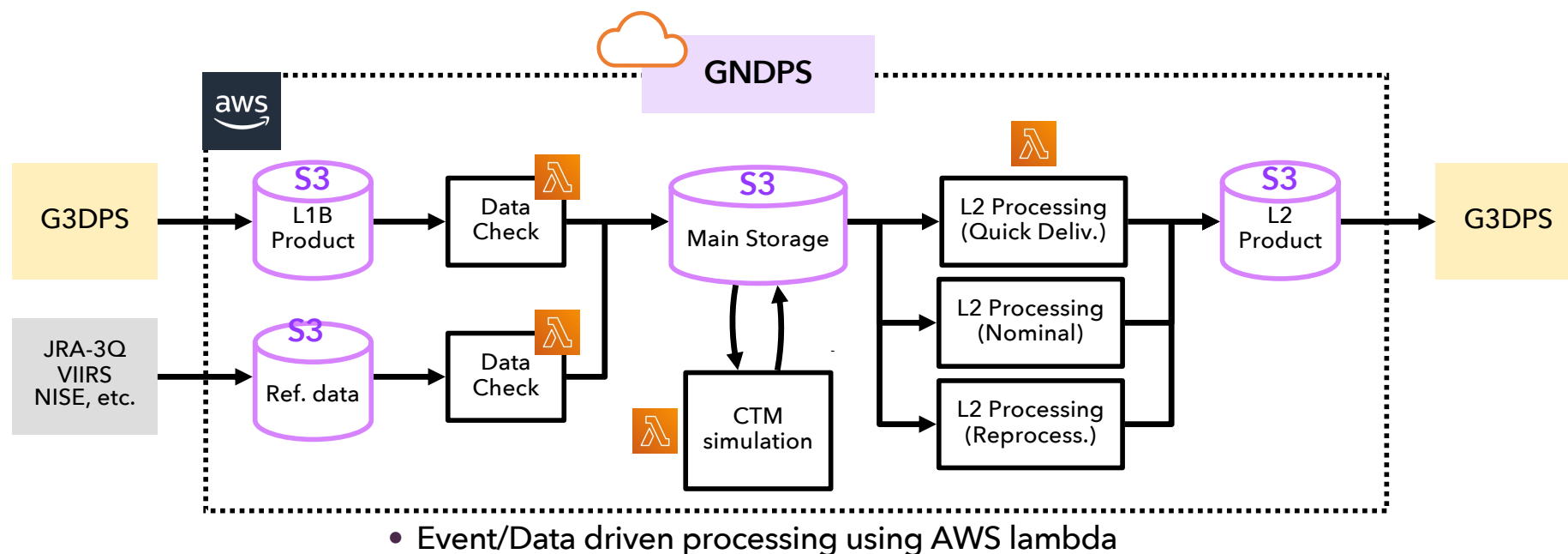
Covariance settings for CO<sub>2</sub> and CH<sub>4</sub> : three times larger than GOSAT-2

Mode		Bias	Std
Focus (3km)	XCO <sub>2</sub> (ppm)	-0.56	2.65
	XCH <sub>4</sub> (ppb)	-2.5	24.4
Focus (1km)	XCO <sub>2</sub> (ppm)	-0.96	3.91
	XCH <sub>4</sub> (ppb)	-2.7	35.2

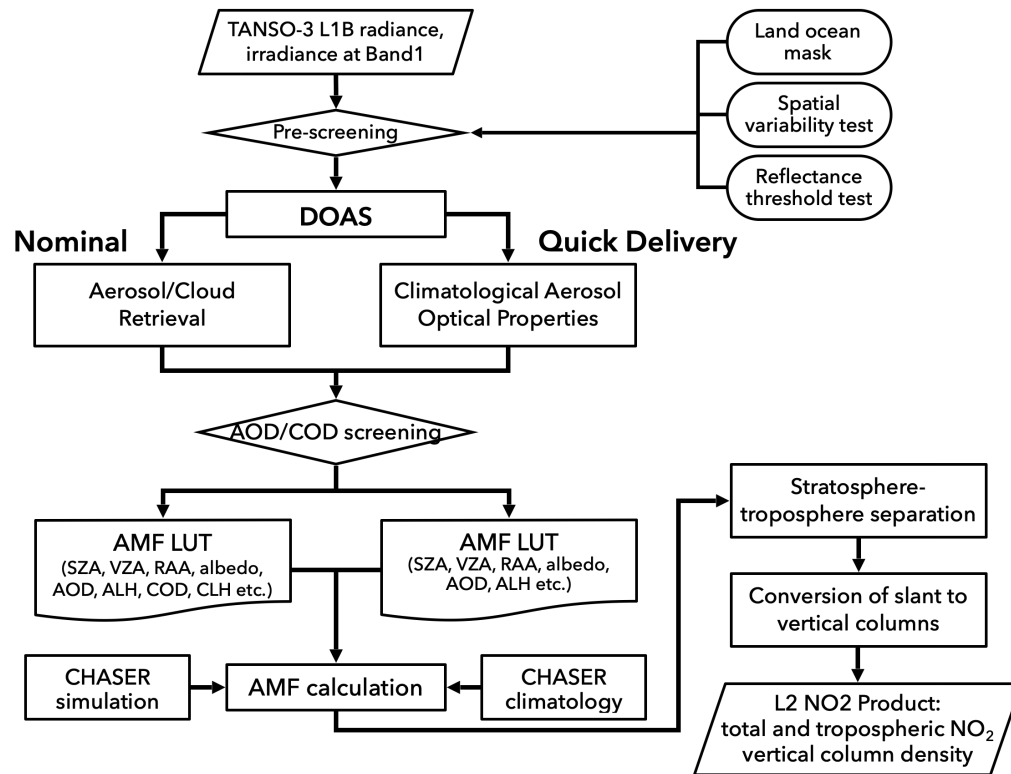


Differences in the retrieved and true XCO<sub>2</sub> and XCH<sub>4</sub>

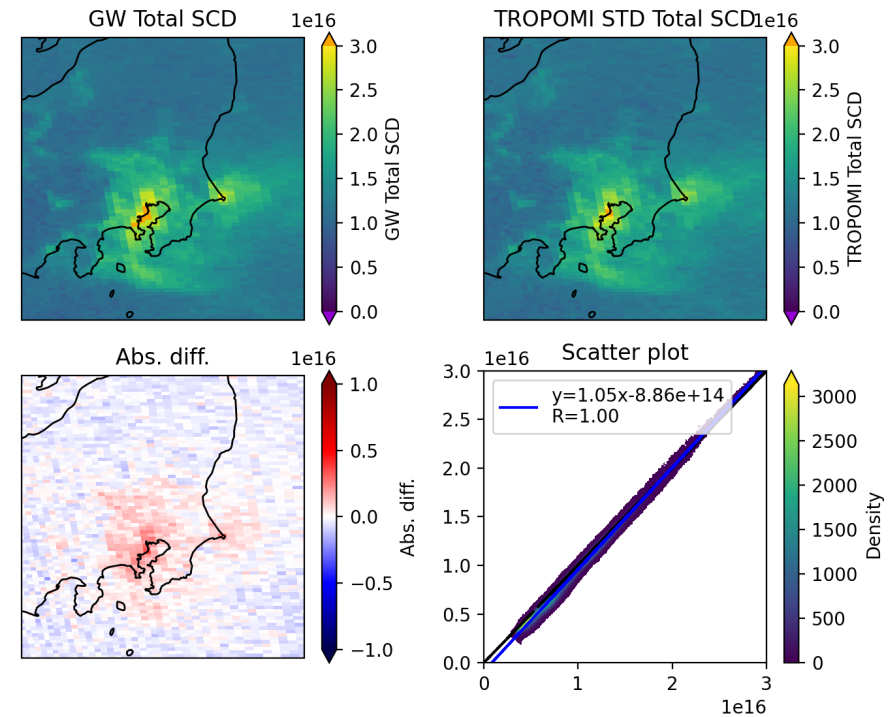
# Facility and Algorithm for NO<sub>2</sub> retrieval processing (1)



# Facility and Algorithm for NO<sub>2</sub> retrieval processing (2)



Verification results using the TROPOMI data  
Total NO<sub>2</sub> SCD

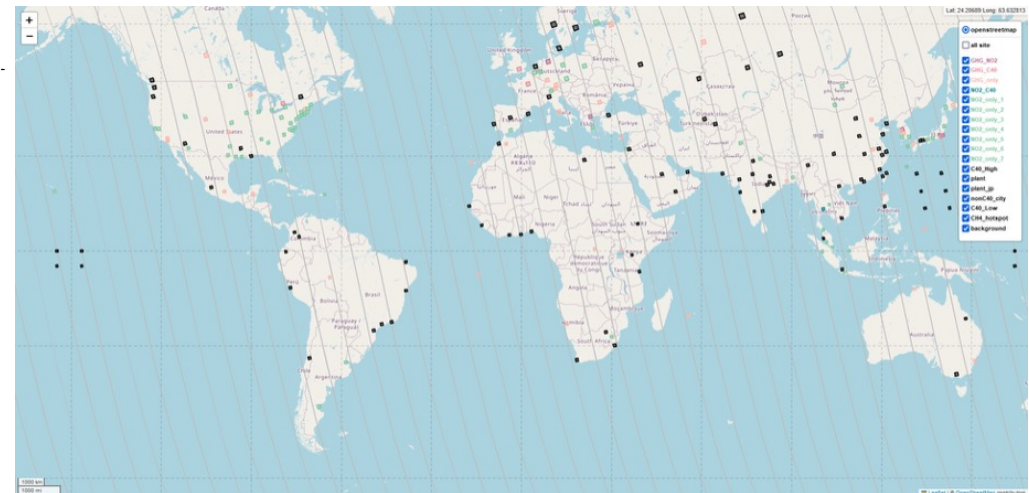




# Handling Policy of Observation Requests



- ◆ **Pointing resource for the focus-mode observation is limited**
  - ◆ As a rough guide, 25~35 times per day
  - ◆ By referring to the NWP, we will save the pointing resources
- ◆ **Priority Order of Observation Requests**  
(Please see <https://gosat-gw.nies.go.jp/en/request.html>)
  - ◆ Calibration and Validation
  - ◆ Observations to support policy led by the Japanese government (e.g., MOE): Megacities, point sources, etc.
  - ◆ Observations based on the NIES's research plan
  - ◆ For academic research purposes, requests from the foreign governments, requests from the private companies





NIES Official website:  
<https://gosat-gw.nies.go.jp/en/>

