GOSAT data analysis and Greenhouse gases Observing SATellite (GOSAT) mission

● **Responsible Representative**

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● **Abstract**

GOSAT continues its observations for 15-years beyond its 5-year mission, providing well-calibrated high spectral resolution data. The overall functions and performances are successful and no significant degradation of SNR and spectral resolution has been observed. Several anomalies were found onboard, but they have stabilized since. The Level 1 algorithms have been updated since launch in order to correct these anomalies.

Ref. URL: http://www.eorc.jaxa.jp/GOSAT/index.html

● **Reasons and benefits of using JAXA Supercomputer System**

GOSAT mission utilizes JSS3 as one of the GOSAT Mission Operation System which processes the observation data of GOSAT. When processing algorithm is updated, JSS3 reprocesses all data observed in the past. When we calibrate products, JSS3 processes all data in the past.　Also, JSS3 is used as a remote storage of all data required for its reprocessing.

● **Achievements of the Year**

(1)GOSAT TANSO-FTS Level-1 Reprocessing

We reprocessed 13 year TANSO-FTS data by utilizing JSS3 (25nodes) to verify an unknown event found in the L1 processing program. It took only 60 days by JSS3, although it had taken 3.3-year by conventional GOSAT L1 processing computers.

(2)Calibration and validation of GOSAT TANSO-CAI data

On-orbit sensor sensitivity change is evaluated from TANSO-CAI observation data. We expect to determine the CAI Band 1 radiometric calibration factor (or formula) by calculation of radiative transfer model using in-situ and

other satellite data. The CAI Band 1 has an important information of aerosol size distribution. Hence, Band 1 radiance is optimized to agree with calibrated radiances of Band 2 and Band 3. Calibration formula of Band 2 and Band 3 are obtained as three candidates. Thus, Band 1 calibration factor is determined by calculations in these three cases. Figure 1 shows a schematic flow of the CAI radiometric calibration method. Figure 2 shows the radiometric calibration factors.

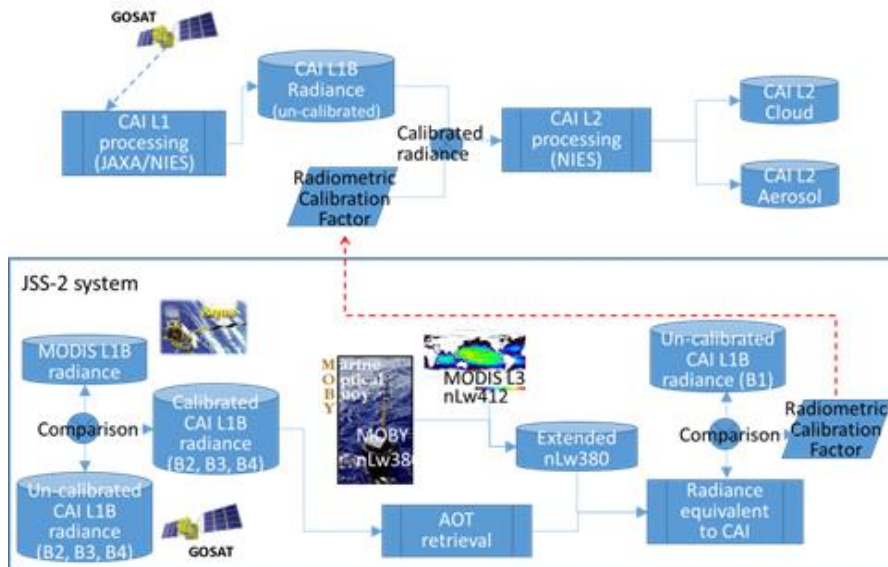Data period: June 2023 – November 2023 (every 4 months)

Fig. 1: GOSAT CAI processing flow (top) and radiometric calibration flow (bottom)
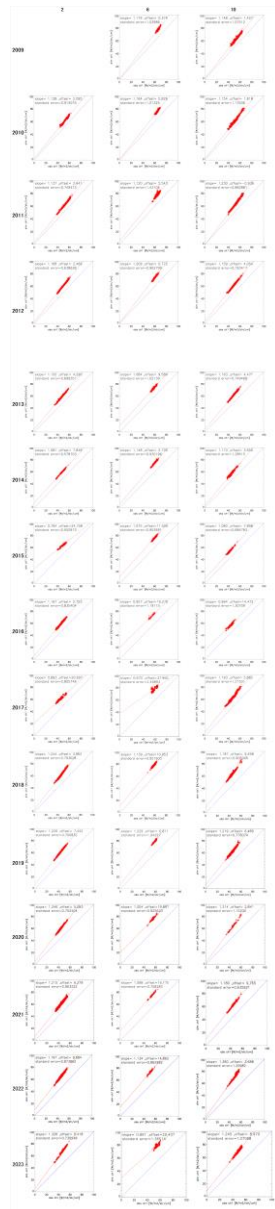
Fig. 2: CAI radiometric calibration factor by inter-satellite cross calibration method

- **Publications**

  N/A

- **Usage of JSS**

- **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	N/A
Number of Processes	1
Elapsed Time per Case	30 Minute(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources[*1](%): 0.09

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-ST	687,034.99	0.74
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2] (%)
/home	125.66	0.10
/data and /data2	419,840.00	2.59
/ssd	0.00	0.00

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2] (%)
J-SPACE	60.00	0.22

[*1]: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

[*2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage[2] (%)
ISV Software Licenses (Total)	0.00	0.00

[2]: Fraction of Usage：Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**