

## Greenhouse gases Observing SATellite-2 (GOSAT-2) Project

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Subject Category: Space Technology

URL: <https://www.jss.jaxa.jp/en/ar/e2021/18339/>

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### ● Abstract

GOSAT-2 project retrieve and estimate the global concentration distribution of major greenhouse gases including the sources and natural absorbers with high level of accuracy to contribute to environmental administration as follows.

- Improved precision of climate change predictions
- Early detection of changes in the Earth system
- Better understanding of emission reduction level of the anthropogenic greenhouse gases and changing natural sink
- Contribution to air pollution monitoring policies

Also, GOSAT-2 project researches and develops new earth observation technologies required for future earth observing satellites.

Ref. URL: <http://global.jaxa.jp/projects/sat/gosat2/>

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

GOSAT-2 project utilizes JSS2 as one of the GOSAT-2 Mission Operation System which processes the observation data of GOSAT-2. When processing algorithm is updated, JSS2 reprocesses all data observed in the past. Also, JSS2 is used as a remote storage of all data required for its reprocessing.

As the reprocessing targets of GOSAT-2 products extends to all data observed in the past, more computer resources (core, memory, storage, etc.) are required than in the real-time processing.

It is necessary to use JSS2 to shorten the reprocessing time and to provide the reprocessing products to GOSAT-2 users in a more timely manner.

● **Achievements of the Year**

We have been transmitting L0 data from the GOSAT-2 Mission Operation System to JSS3 in preparation for reprocessing of L1 products on JSS3 since observation by TANSO FTS-2 and TANSO-CAI-2 started.

In FY2021, we have updated the L1 processing algorithm for TANSO-FTS-2 three times and TANSO-CAI-2 one time and reprocessed the past observation data on JSS3 each time.

The version-up history of GOSAT-2 TANSO-FTS-2 L1 product is shown below.

- Version 201.201 : Aug..2021 [L1A/B] Change in TIR calibration formula (non-linearity correction in spectral domain) [L1B] Change in TIR scan mirror reflectance calculation formula

- Version 202.202 : Nov.2021 [L1A] No change other than the version number increment [L1B] Update of the non-linearity correction for TIR/the scan mirror reflectance for TIR/the radiance conversion factor for SWIR Prototype version

- Version 210.210 : Jan.2022 [L1A/B] Adjustment for the ZPD position misalignment Correction for the discontinuous data of the satellite location

The version-up history of GOSAT-2 TANSO-CAI-2 L1A product is shown below.

- Version 103.103 : Jan.2022 Change in quality evaluation for only either forward or backward looking scenes

The FTS-2 L1A/B and CAI-2 L1A product has been available to general users from "GOSAT-2 Product Archive" (<https://prdct.gosat-2.nies.go.jp/en/index.html>) since July 2019.

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	5 Minute(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources\*<sup>1</sup>(%): 0.01

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage* <sup>2</sup> (%)
TOKI-SORA	0.00	0.00
TOKI-ST	88,271.98	0.11
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* <sup>2</sup> (%)
/home	175.76	0.17
/data and /data2	205,457.62	2.20
/ssd	757.62	0.20

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* <sup>2</sup> (%)
J-SPACE	170.43	1.15

\*<sup>1</sup>: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

\*<sup>2</sup>: 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.