

## Earth observation satellite data processing for GPM/DPR

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### ● Abstract

In recent years, worldwide interest has been increasing about the necessity of grasping the global environmental change. To deal with such problems, various approaches using observation technology from space have been carried out by satellites.

Global Precipitation Measurement (GPM) mission, as follow-on and expansion of Tropical Rainfall Measurement Mission (TRMM) satellite, is an international mission to achieve highly accurate and frequent global rainfall observation. It is carried with multiple satellite, GPM core satellite with Dual-frequency Precipitation Radar (DPR) jointly developed by JAXA and NICT, and with GPM Microwave Imager (GMI) developed by NASA, and another constellation satellites with Microwave Imager.

In addition, accumulation of long-term data is important to understand long-term climate change on a global scale. It is important to be able to use the data of the TRMM satellite operated from 1997 to 2015 as well as the data of the GPM satellite.

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

### ● Reasons for using JSS2

Processing of earth observation data includes “routine processing” performed routinely and “re-processing” performed once a year or so for several year data. The purpose of re-processing is to correspond with version-up of computing model and algorithm performed periodically. The amount of observation data grows year by year. Then, we need more and more time to complete reprocessing of all archived observation data. By using supercomputers, the calculation time is greatly shortened, and it is possible to provide products quickly to users.

● **Achievements of the Year**

Algorithm version 6 of TRMM and GPM data processing Level 2, 3 and SLH algorithm has been released. TRMM satellite has operated for 17 years from 1997 to 2015 and GPM satellite has been operating from 2014. In this fiscal year, we conducted reprocessing of TRMM and GPM Level 2,3 and SLH, created the past dataset for 20 years using the supercomputer (JSS2). By shortening the processing time, it was possible to complete the TRMM data processing from the release of the algorithm in a short period of about 2 months. GPM data processing is conducting. The generated products are not used only for research, but also for general users. The reprocessing of GSMaP which shows global precipitation mapping by using JSS2 will be implemented in fiscal 2019.

The period of TRMM reprocessing done in JSS 2 is as follows.

period of reprocessing: 1998/12/8 - 2015/4/1

CPU usage time: Approx. 31,383.2 hours

Number of output files: 520,748 files

Total output file capacity: 211.4 TB

The period of GPM reprocessing done in JSS 2 is as follows. (1 March 2019)

period of reprocessing: 2014/3/8 - 2018/9/30

CPU usage time: Approx. 19,243.3 hours

Number of output files: 316,834 files

Total output file capacity: 148.3 TB

● **Publications**

N/A

● **Usage of JSS2**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	10 - 12
Elapsed Time per Case	19.4 Minute (s)

● **Resources Used**

Fraction of Usage in Total Resources\*1 (%): 0.38

## Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	0.00	0.00
SORA-PP	306,048.63	2.45
SORA-LM	16,948.64	7.90
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	128.86	0.13
/data	263,807.24	4.66
/ltmp	18,215.22	1.56

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	23.59	0.83

\*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.