

Earth observation satellite data processing for GPM/DPR

Report Number : R17ER0200

Subject Category : Space Technology

URL : <https://www.jss.jaxa.jp/ar/e2017/4456/>

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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.

<http://global.jaxa.jp/projects/sat/gpm/index.html>

● Reasons for using of 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

Version 8 of TRMM's data processing algorithm which contained 2 improvement has been released. one is the continuity of between data of TRMM satellite operated for 17 years from 1997 to 2015 and data of GPM satellite, another is unification of product format. In JFY 2017, we conducted reprocessing of TRMM's Level 1 product which is received power of precipitation radar for 17 years using supercomputer(JSS2). By shortening the processing time, it was possible to release the product from the release of the algorithm to the release of the product in a short period of about 2 months including the preparation period. Higher order processing after Level 2 which is a physical quantity conversion of precipitation radar will be implemented in fiscal 2018.

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

period of reprocessing : 1997/12/8 - 2015/4/1

CPU usage time : Approx. 44.1 hours

Number of products : L1B : 98,827 products

Total Output Product Capacity : L1B: 11.38TB

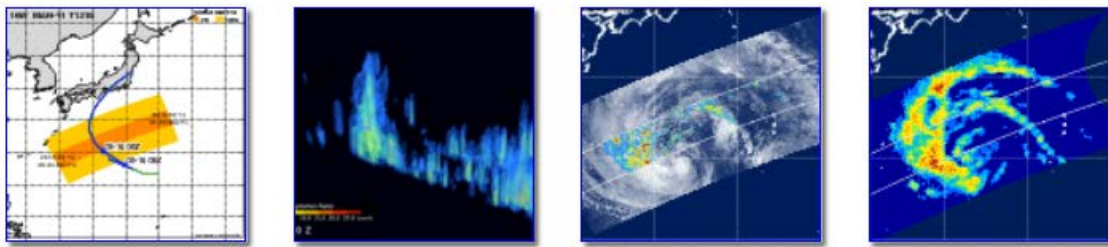


Fig.1 TRMM data of tropical - storm MAN-YI(16 W)(typhoon 18)(2013/09/12 - 2013/09/16)

● Publications

N/A

● Usage of JSS2

● Computational Information

Parallelization Methods	N/A
Thread Parallelization Methods	N/A
Number of Processes	1
Elapsed Time per Case	44.10 hours

● Resources Used

Fraction of Usage in Total Resources*1 (%): 0.13

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	0.00	0.00
SORA-PP	69,219.68	0.87
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	077.88	0.05
/data	116,699.27	2.16
/ltmp	9,505.21	0.72

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	3.61	0.16

*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