Research of Precipitation Measuring Mission

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Abstract

Calculation of the global rainfall map derived from Tropical Rainfall Measuring Mission (TRMM) and the Global Precipitation Measurement (GPM) during a period from Decemebr 1997 to March 2023 using the latest GSMaP standard algorithm (V08) and GSMaP Gauge NRT V8 algorithm.

Ref. URL: https://www.eorc.jaxa.jp/GPM/en/index.html

Reasons and benefits of using JAXA Supercomputer System

The JSS3 is necessary for calculation of the long-term data which consists of multiple satellites and sensors for the precipitation measurement with earlier computational times for algorithm evaluations, improvements, and long-term production. Because of the complexity of the processing algorithms, strict business progress management, emergency response, detailed user response by the operation side, etc. are required. When we do not use the JSS3, it can be said that reprocessing in a short period cannot be achieved.

Achievements of the Year

The GSMaP has multi-satellite global precipitation map under the Global Precipitation Measurement (GPM) Mission, by using Dual-frequency Precipitation Radar (DPR) onboard GPM core satellites, other GPM constellation satellites, and Geostationary satellites. The GSMaP is developed by JAXA and the product is used worldwide.In FY2021, products using the latest GSMaP algorithm (V8) for the satellite observation period after 2000 was released and the latest algorithm is used for the real time operation.

In this fiscal year, GSMaP long-term processing using JSS3 was conducted for the observation period from December 1997 to February 2000, using a new cloud motion vector estimated by the GridSat cloud information.This was the first try for processing the GSMaP standard products for the period (Fig. 1). Also, we conducted a long-term period processing for GSMaP gauge near real time(GSMaP Gauge NRT v8) product from Decemer 1997 to December 2023 with the latest GSMaP algorithm. As a preliminaly results, the overestimated

precipitation that occurred in the previous version over land at 50 degrees North to 60 degrees North in the April 2015 was improved. For releasing a new period of the GSMaP standard products and GSMaP Gauge NRT v8 products, JSS3 accerelated development cycle because it had processing time short.

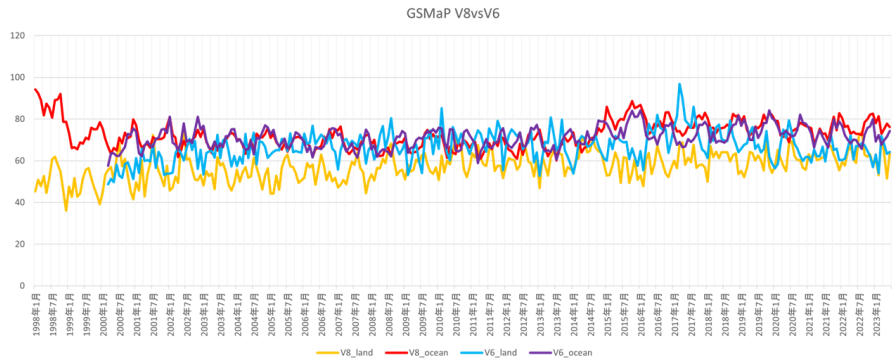

Fig. 1: Time diagram of monthly precipitation for GSMaP v8 and v6

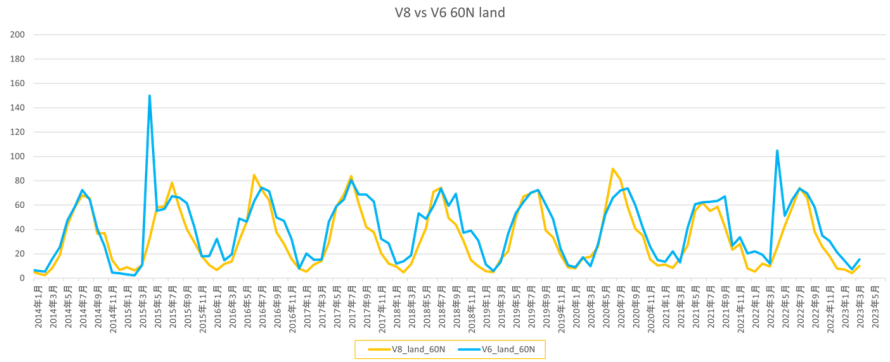

Fig. 2: Time diagram of zonal precipitation mean from 50 degrees North to 60 degrees North over land for GSMaP Gauge NRT v8 and GSMaP Gauge NRT v6

Publications

- Peer-reviewed papers

M. Yamaji and T. Kubota, 2023; Accuracy Assessment of Global Satellite Mapping of Precipitation (GSMaP) by Small Precipitation Radar Constellation, JESA,1, ID: 61, https://doi.org/10.57350/jesa.61.

- Invited Presentations

Takuji Kubota, Munehisa K. Yamamoto, and Moeka Yamaji, Reprocessing of Global Satellite Mapping of Precipitation (GSMaP) Product, AOGS 2023, Singapre

July 2023

- Oral Presentations

Takuji kubota, Moeka Yamaji, Kosuke Yamamoto, Nobuhiro Takahashi and Yukari N. Takayabu, Global Precipitation Measurement (GPM) mission in Japan and future Japanese Precipitation Measuring Mission (PMM), AOGS 2023, Singapre

July 2023

- Poster Presentations

T. Kubota, K. Yamamoto, Y. Kaneko, T. Tanaka, T. Masaki, T. Higashiuwatoko, G. Kikuchi, M. Ito, Product validations of the spaceborne precipitation radar at Kumamoto in a field campaign for "Senjo-kousuitai", JpGU2023, Chiba, Japan, May 2023

Usage of JSS

Computational Information

Process Parallelization Methods	N/A
Thread Parallelization Methods	N/A
Number of Processes	1
Elapsed Time per Case	24 Hour(s)

JSS3 Resources Used

Fraction of Usage in Total Resources[*1](%): 0.02

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-ST	147,230.31	0.16
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	26.67	0.02
/data and /data2	90,353.33	0.56
/ssd	0.00	0.00

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	51.29	0.18

*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.