

## Recent Progresses of the Global Precipitation Measurement (GPM) Mission in Japan

Takuji Kubota <sup>1</sup>, Kazumasa Aonashi <sup>1,2</sup>, Nobuhiro Takahashi <sup>3</sup>  
and Yukari N. Takayabu <sup>4</sup>

<sup>1</sup> *Earth Observation Research Center, Japan Aerospace Exploration Agency*

<sup>2</sup> *Graduate School of Science, Kyoto University*

<sup>3</sup> *Institute for Space-Earth Environmental Research, Nagoya University*

<sup>4</sup> *Atmosphere and Ocean Research Institute, The University of Tokyo,*

This paper summarizes progresses of Global Precipitation Measurement (GPM) Mission in Japan since 9th IPWG Workshop (held in November 2018).

The GPM mission is an international collaboration to achieve highly accurate and highly frequent global precipitation observations. The GPM mission consists of the GPM Core Observatory jointly developed by U.S. and Japan and Constellation Satellites that carry microwave radiometers and provided by the GPM partner agencies. The GPM Core Observatory, launched on February 2014, carries the Dual-frequency Precipitation Radar (DPR) by the Japan Aerospace Exploration Agency (JAXA) and the National Institute of Information and Communications Technology (NICT).

JAXA and NASA started to release the GPM/DPR Standard product (Version 07) in December 2021. This Version 07 is the first product to respond to the KaPR scan pattern changes implemented on May 21, 2018. This change in scan pattern allows for a more accurate precipitation estimation method based on two types of precipitation information, Ku-band Precipitation radar (KuPR) and KaPR, to be applied to the entire observation swath.

JAXA also develops the Global Satellite Mapping of Precipitation (GSMaP), to distribute hourly and 0.1-degree horizontal resolution rainfall map through the “JAXA Global Rainfall Watch” website (<https://sharaku.eorc.jaxa.jp/GSMaP/index.htm>). The GSMaP near-real-time version (GSMaP\_NRT) product provides global rainfall map in 4-hour after observation, and an improved version of GSMaP near-real-time gauge-adjusted (GSMaP\_Gauge\_NRT) product has been published since Dec. 2018. The JAXA released the GPM-GSMaP V05 (algorithm version 8) in December 2021. In the GPM-GSMaP V05, the passive microwave (PMW) algorithm was improved in terms of retrievals extended to the pole-to-pole, updates of databases for the PMW retrievals, and heavy Orographic Rainfall Retrievals. Normalization module for PMW retrievals (Yamamoto and Kubota 2020) was implemented newly. A histogram matching method by Hirose et al. (2022) was implemented in the PMW-IR Combined algorithm. In the Gauge-adjustment algorithm based upon Mega et al. (2019), artificial patterns appeared in V04 were mitigated in V05.