

Three-year results of the Global Precipitation Measurement (GPM) mission in Japan

*Riko Oki¹, Takuji Kubota¹, Kinji Furukawa¹, Yuki Kaneko¹, Moeka Yamaji¹, Toshio Iguchi², Yukari Takayabu³

1. Japan Aerospace Exploration Agency, 2. NICT, 3. The University of Tokyo

The Global Precipitation Measurement (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 develops the DPR Level 1 algorithm, and the NASA-JAXA Joint Algorithm Team develops the DPR Level 2 and DPR-GMI combined Level2 algorithms. The Japan Meteorological Agency (JMA) started the DPR assimilation in the meso-scale Numerical Weather Prediction (NWP) system on March 24 2016. This was regarded as the world 's first "operational" assimilation of spaceborne radar data in the NWP system of meteorological agencies.

JAXA also develops the Global Satellite Mapping of Precipitation (GSMaP), as national product to distribute hourly and 0.1-degree horizontal resolution rainfall map. The GSMaP near-real-time version (GSMaP_NRT) product is available 4-hour after observation through the "JAXA Global Rainfall Watch" web site (<http://sharaku.eorc.jaxa.jp/GSMaP>) since 2008. The GSMaP_NRT product gives higher priority to data latency than accuracy, and has been used by various users for various purposes, such as rainfall monitoring, flood alert and warning, drought monitoring, crop yield forecast, and agricultural insurance. There is, however, a requirement for shortening of data latency time from GSMaP users. To reduce data latency, JAXA has developed the GSMaP real-time version (GSMaP_NOW) product for observation area of the geostationary satellite Himawari-8 operated by the Japan Meteorological Agency (JMA). GSMaP_NOW product was released to public in November 2, 2015 through the "JAXA Real-time Rainfall Watch" web site (http://sharaku.eorc.jaxa.jp/GSMaP_NOW/).

All GPM standard products and the GPM-GSMaP product have been released to the public since September 2014 as Version 03. The GPM products can be downloaded via the internet through the JAXA G-Portal (<https://www.gportal.jaxa.jp>). The DPR, the GMI, and the DPR-GMI combined algorithms will be updated in April 2017 and the latent heating product will be released in June 2017 as Version 04. New calibration factors will be applied for both Ku and Ka-band radars. As its results, values of Z factor will increase, but estimated value of rain intensity does not necessarily increase. Also calibration factors of TRMM/PR will be re-examined to have consistency between DPR/Ku. Furthermore, the GPM-GSMaP algorithms were updated and the GPM-GSMaP Version 04 products have been provided since Jan. 2017.

Keywords: GPM, Satellite Remote Sensing, Precipitation