



Developments and applications of the Global Satellite Mapping of Precipitation (GSMaP) for the Global Precipitation Measurement (GPM)

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The Global Satellite Mapping of Precipitation (GSMaP) is a global rainfall map based on a blended Microwave-Infrared product and has been developed in Japan for the Global Precipitation Measurement (GPM) mission. To fulfill gaps of passive microwave observations, we developed a method to interpolate observations between each microwave imager by utilizing information from the Infrared imagers on board the geostationary satellites, and achieved production of an hourly global rainfall map in 0.1-degree latitude/longitude grid. The latest GSMaP version 6 product was released in September 2014 to the public as one of Japanese GPM products after the launch of the GPM Core Observatory, which is Japan and U.S. joint mission and carrying both the Dual-frequency Precipitation Radar (DPR) and GPM Microwave Imager (GMI), in February 2014. In the next version (version 7), which is scheduled to be released in the summer 2016, we plan to apply databases produced from DPR instead of those from PR, and to introduce snow retrieval algorithm for the passive microwave instruments that have higher frequency channels.

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. To assure near-real-time data availability, the GSMaP_NRT system simplified part of the algorithm and its processing procedure. Therefore, the GSMaP_NRT product gives higher priority to data latency than accuracy.

Since its data release, GSMaP_NRT data 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 are, however, several requirements from users for GSMaP improvements not only for accuracy but also specification. Among those requests for data specification, the most popular ones are shortening of data latency time and higher horizontal resolution. To reduce data latency, JAXA has developed the GSMaP realtime version (GSMaP_NOW) product for observation area of the geostationary satellite Himawari-8 operated by the Japan Meteorological Agency (JMA). GSMaP_NOW product uses satellite data that is available within 0.5-hour, including GMI, AMSR2 direct receiving data, AMSU direct receiving data and Himawari-8, to produce GSMaP at 0.5-hr before. Then, we are applying 0.5-hour forward extrapolation for future direction by cloud motion vector to produce GSMaP at current hour (GSMaP_NOW) over Himawari-8 observed area. GSMaP_NOW and other GSMaP products are validated by comparing with ground observation over Japan in daily and 0.25-degree grid basis. Results showed that accuracy of GSMaP_NOW is almost equivalent or slightly worse than GSMaP_NRT for the period from October 2015 to December 2015. GSMaP_NOW product was released to public in November 2, 2015 through the “JAXA Realtime Rainfall Watch” web site (http://sharaku.eorc.jaxa.jp/GSMaP_NOW/).