Recent progress in Global Satellite Mapping of Precipitation (GSMaP) product

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The Global Precipitation Measurement (GPM) mission is an international collaboration to achieve highly accurate and highly frequent global precipitation observations. As one of Japanese GPM products, Global Satellite Mapping of Precipitation (GSMaP) product has been provided by Japan Aerospace Exploration Agency (JAXA) to distribute hourly global precipitation map with 0.1x0.1 deg. lat/lon grid. The GSMaP products are composed of “standard product”, “near-real-time product”, “real-time product”, and “reanalysis product”. The standard products are processed 3 days after observation, and the near-real-time products are processed 4 hours after observation. In addition, the real-time version, GSMaP_NOW has been provided by the JAXA over the geostationary satellite “Himawari-8” region since Nov. 2015.
Recently, the GSMaP algorithms were majorly updated on September 2014 and January 2017.
Major improvements on September 2014 are following. 1) Improvements in microwave imager algorithm based on AMSR2 precipitation standard algorithm, including new land algorithm, new coast detection scheme; 2) Development of orographic rainfall correction method for warm rainfall in coastal areas; 3) Update of database, including rainfall detection over land and land surface emission database; 4) Development of microwave sounder algorithm over the land; and 5) Development of gauge-calibrated GSMaP algorithm. In addition to those improvements in the algorithms, a number of input passive microwave imagers and/or sounders was increased using the GMI and the GPM Constellation Satellites.
Major improvements on January 2017 are following. 1) Improvement of the GSMaP algorithm using GPM/DPR observations as its database; 2) Implementation of a snowfall estimation method in the GMI & SSMIS data, based upon Liu and Seto (2013) and Sims and Liu (2015) and a screening method using NOAA multisensor snow/ice cover maps in all sensors; 3) Improvement of the gauge-correction method in both near-real-time and standard products; 4) Improvement of the orographic rain correction method; 5) Improvement of a weak rain detection method over the ocean by considering cloud liquid water.
The current paper describes overviews of the GSMaP products and recent progress of the GSMaP product.

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