Multi-satellite Global Satellite Mapping of Precipitation (GSMaP)
- Design and Products -

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Estimation of the global distribution of precipitation with high accuracy and resolution has long been one of the major scientific goals. Precipitation map on a global basis is important for modeling of the water cycle, maintaining the ecosystem environment, agricultural production, improvements of weather forecast precision, flood warning, and so on. GSMaP (Global Satellite Mapping of Precipitation) is a project aiming (1) to produce high-precision and high-resolution global precipitation map using satellite-borne microwave radiometer data, (2) to develop reliable microwave radiometer algorithms, and (3) to establish precipitation map techniques using multi-satellite data for GPM.

The GSMaP_MVK system, short for Global Satellite Mapping of Precipitation using Moving Vector and Kalman fiilter, uses a Kalman filter model to estimate precipitation rate at each 0.1 degree with 1-hour resolution on a global basis. One of the example of the GSMaP_MVK is shown in Figure 1. The input data sets are precipitation rates retrieved from the microwave radiometers and infrared images to compute the moving vector fields. Based on the moving vector fields calculated from successive IR images, precipitation fields are propagated and refined on the Kalman filter model, which uses the relationship between infrared brightness temperature and surface precipitation rate. This Kalman filter–based method shows better performance than the moving vector–only method, and the GSMaP_MVK system shows a comparable score compared with other high-resolution precipitation systems. In addion to the GSMaP_MVK product, gauge adjusted GSMaP_MVK product has been developed and opened to the public recently. In this presentation, overview of the GSMaP algorithms is given firstly particularly on GSMaP_MVK and GSMaP_Gauge, and then some evaluation results are showed on the comparison with radar-rain gauge network around Japan main island.
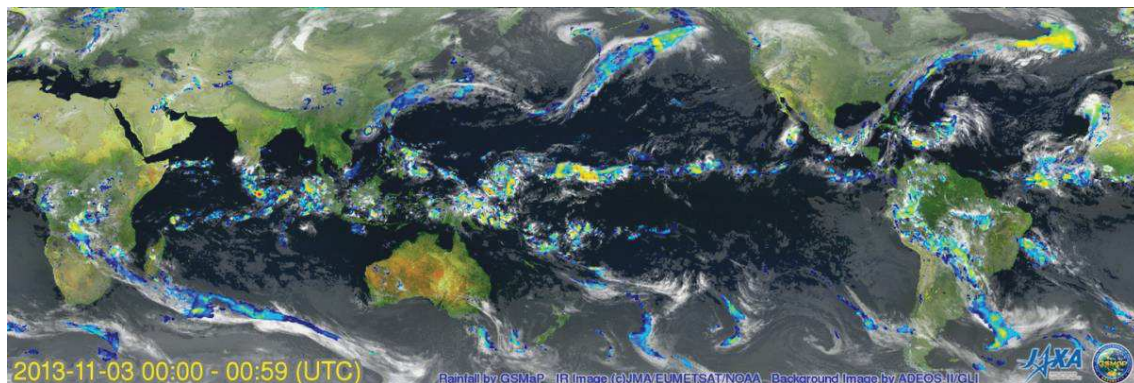

Figure 1. One of example of the GSMaP_MVK product showing the global precipitation distribution with 0.1 degree/1 hour resolution at 0:00 on November 3rd in 2013.

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