

River Basin Precipitation Database based on the GSMAp

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River basin precipitation database was developed based on the satellite observed precipitation map GSMAp. Because the observation network of ground rain gauges is limited, so homogeneous data by satellite observation is required. Particularly it is useful for water resource development in developing countries with few ground observations.

1. Data and Method

Satellite observed precipitation data TRMM3B43 monthly precipitation and GSMAp (Global Satellite Mapping of Precipitaion by JAXA) data from 1998 to present were used. Spatial resolution of these precipitation data was 0.25 degrees. SRTM Hydrosheds data were also used as basin boundary. Hydrosheds data were divided into 12 levels of river basin scale. Precipitaion data were averaged within the basin using GIS, and stored in the database.

GSMAp daily precipitation data were accumulated for one month, and bias correction of GSMAp monthly accumulated data were performed for TRMM3B43 monthly precipitation. This bias correction coefficient was used for daily precipitation correction of GSMAp.

The outline of river basin precipitation database is as follows.

Area : World wide (0-360 lon., 50N-50S lat.)

Period: 1998 - present (monthly precipitation), 2000 –present (daily precipitation)

Time interval : monthly or daily

Space resolution : 0.25 degrees (TRMM3B43), 0.1 degrees (GSMAp), 15 arcsec. (Hydrosheds basin boundary)

2. Result

Fig.1 shows monthly river basin precipitation near the Batanghari River Basin in Sumatra. In these figures, watersheds level 12 (finest) were used. Sumatra has a rainy and dry season due to tropical monsoon climate. There is a lot of rainfall in the rainy season from November to April. In contrast, there is less rainfall in the dry season from May to October. Daily river basin precipitation is also available in this watersheds level.

Corrected daily precipitation data from GSMAp were compared with some ground rain gauge data in the southeast Asia. At Kota Bharu in Malaysia, GSMAp data had good correlation with ground data with a correlation coefficient of 0.93 and there were few bias errors.

3. Conclusion

River basin precipitation database was developed based on the satellite observed precipitation map GSMAp. Satellite based observation has homogeneous quality, so this data can compensate for ground data heterogeneity. Bias data correction method by using TRMM3B43 is effective to improve GSMAp accuracy.

We will discuss more detailed verification results and its practical applications in the session.

Keywords: River basin precipitation, GSMap, TRMM, Bias correction

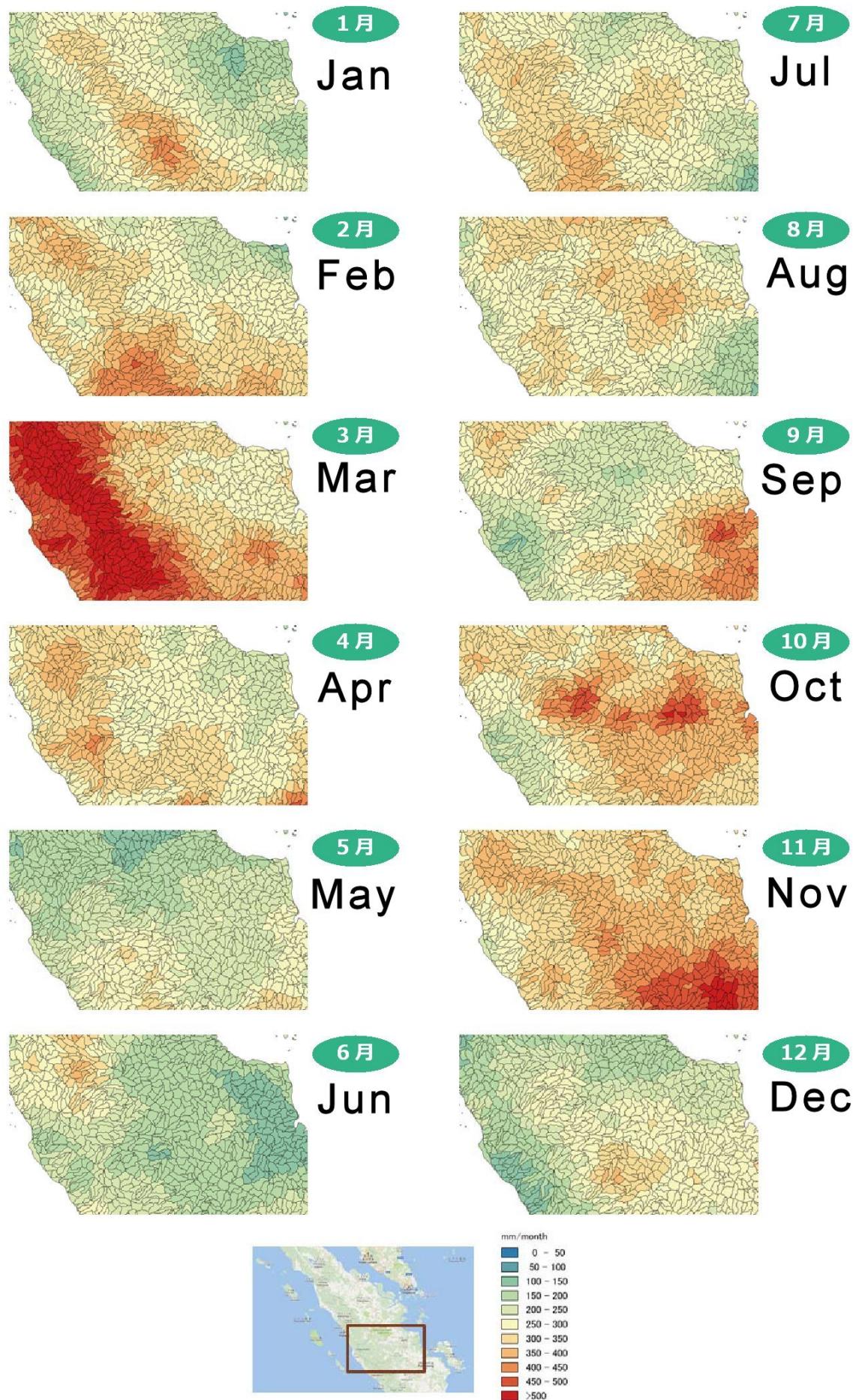


Fig.1 Monthly precipitation near the Batanghari River Basin in Sumatra