VERIFICATION OF HOURLY GSMAP RAINFALL ESTIMATES DURING THE FLOOD EVENTS IN KUMAMOTO PREFECTURE, JAPAN

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Abstract: Japan and other countries have been greatly damaged by floods in the past due to heavy rainfall. A flood forecasting system using rainfall data observed by satellite is desirable. GSMaP is a satellite to measure the amount of rainfall for which high temporal resolution is available. Using GSMaP data, there is a possibility to predict the occurrence of flood even in remote areas. Monthly and daily GSMaP data has been verified before with a high correlation value. For that reason, it is important to measure the accuracy of hourly GSMaP data. Kumamoto prefecture was chosen as a research location because in the past ten years flood has several time occurred due to heavy rainfall. We studied seven cities in Kumamato prefecture which were subjected to flood in 2006, 2007 and 2012. Hourly GSMaP_MVK and GSMaP_NRT data and hourly rain gauge data (AMEDAS) were used for this research. The aim of this research are to verify hourly GSMaP data in both type file with rain gauge data and to define the rainfall pattern which causes flood. Verification was done by comparing one pixel average of GSMaP data with the same position of rain gauge data and was done for each type of GSMaP. Two weeks hourly data of GSMaP and rain gauge data were used to define the rainfall pattern in each cities. Verification of hourly rainfall data of GSMaP_MVK shows that GSMaP_MVK can predict for rainfall measurement by AMEDAS with a time lag which varies from 9 to 20 hours. GSMaP_MVK underestimates rain gauge data with the correlation coefficient 0.56, RMSE 5.19 mm/hour and percentage error of -67.61%. Verification of GSMaP_NRT with rain gauge data shows an underestimation with correlation coefficient 0.25, RMSE 8.27 mm/hour and percentage error of -66.06%. The result indicates that GSMaP_NRT is inadequate to represent the rainfall data. Based on the data, the rainfall pattern before a flood occurs is almost same except in 2012. In 2012, in Kumamoto city and Aso city heavy rainfall occurred for only 5 hours at 25mm/hour and 87 mm/hour, but flood affected those cities. The occurrence of extreme rainfall events and their intensities should be considered.

Keyword: *GSMaP_MVK, GSMaP_NRT, verification, flood, kumamoto*