

Flood area estimation using ALOS-2 PALSAR-2 data for heavy rainfall disasters in Japan

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Japan Aerospace Exploration Agency (JAXA) operates PALSAR-2, the L-band synthetic aperture radar (SAR) aboard the Advanced Land Observing Satellite-2 (ALOS-2), and responds to emergency observation requests for various kinds of disasters. All-weather and day-and-night imaging capability of SAR is particularly important for monitoring and mitigating heavy rainfall disasters, in contrast with optical sensors that often suffer cloud cover. In this report, we show our flood area estimation results for heavy rainfall disasters in Japan. In our method, flood and non-flood areas are discriminated by thresholding of amplitude images of PALSAR-2 data. In the case of the 2015 Heavy Rainfall Disaster in Kanto and Tohoku area, Japan, the PALSAR-2-derived flood areas were validated using the inundation map based on aerial photographs by the Geospatial Information Authority of Japan (GSI) and showed sufficient accuracy (0.508 kappa coefficient). We also compared accuracy differences between different observation modes of PALSAR-2. This study successfully demonstrated the feasibility of PALSAR-2 for rapid flood monitoring. However, this method does not work in urban area because of the strong back-scattering from buildings. Detecting urban flood areas is our ongoing work.

Keywords: Synthetic aperture radar (SAR), disaster monitoring, remote sensing