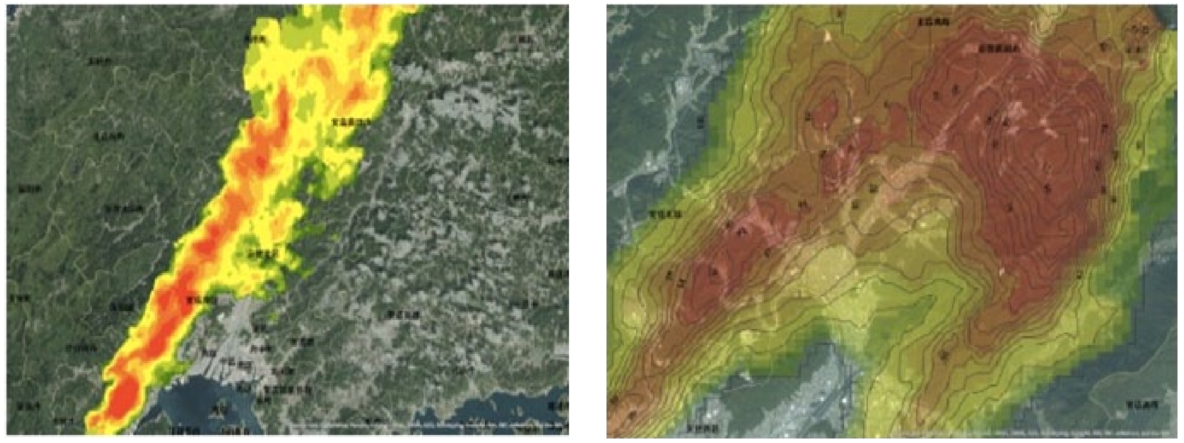
Analysis of Debris Flow due to Heavy Rain

Priority for Actions 1 and 4 - Detection of accumulated rainfall using SAR data and for developing scenarios of future risks

Result of taking rainfall information of the X-band MP radar into GIS (2014.8.20 1:00 and 4:00)



Application field: Authors of the paper developed a method on how to determine rainfall from radar data.

Methodology available/workflows: The X-band MP radar observes local rainfall in near-real time. Therefore, the data of flood damage and landslide disaster caused by localized torrential and heavy rains (downpours) can be analyzed for appropriate river management and disaster prevention activity. The X-band MP radar collects detailed observations of regional heavy rain in real time (observation radius = 60 km, versus 120 for the C-band radar), which makes it suitable for gauging large-area rainfall. The high resolution of the X-band MP radar is enabled by its shorter wavelength (8-12 GHz), when compared directly with that of the C-band radar (4-8 GHz).

The raindrop shape can be understood by transmitting vertically and horizontally polarized light. The rainfall can be deduced from the flatness and other shape-like properties of the raindrops. Such highly accurate rainfall data, collected in real time, requires no correction by the ground rain gauge. Information on the movement, direction and transfer rate of the raindrops, which can be useful for rainfall prediction, can be deduced from the Doppler function.

Key results: The X-band MP radar can observe at a frequency 5 times higher than that of the C–band radar, with a resolution that is 16 times greater. Its minimum observation area is a 250m mesh, and its delivery period is 1 min.

Innovative impact: The special data structure of the X-band MP radar is difficult to process by GIS or other software. Therefore, to enable compatibility with GIS, original software was developed. The result of this method can not only be used to calculate the rainfall, but the spatial distribution of the rainfall also.

Global Partnership using Space-based technology applications for disaster risk reduction – GP-STAR

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Application status: Pre-operational. Methodology including new software

Hiroshima City

Background: Many of the sediment disasters were likely generated by the heavy rain. Sediment danger is alerted to during heavy rainfalls (≥20 mm/h), or when the total rainfall exceeds 100 mm. The new system can analyse the amount of accumulated rainfall, which is important for landslide disaster prevention.

Key publications:

Kim, G., Yune, C. Y., Paik, J., and Lee, S. W.: ANALYSIS OF DEBRIS FLOW BEHAVIOR USING AIRBORNE LIDAR AND IMAGE DATA, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLI-B8, 85-88, doi:10.5194/isprs-archives-XLI-B8-85-2016, 2016.
H. Yamamoto, H. Kobayashi: Characteristics of Heavy Rainfall and Debris Flow Disaster in Hiroshia City by Akisame-front, 20 August 2014, J. JSNDS, Vol.33, No.3, pp.293-312, 2014.
M. Nishio, M. Mori: The Web-based accumulated rainfall amount monitoring system by X-band MP radar, Journal of Flood Risk Management, online: AUG.,jfr3.12196, 2015. 220152015.jfr3.12196, 2015.

http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XLI-B8/85/2016/

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