Distinction and inspection of the landslide domain using the Polarimetric synthetic aperture radar mounted with a plane

*Kentaro Tonagi[1], Masanobu Shimada[1]

1. Tokyo Denki University

In recent years, landslides have arisen from various factors around the world, causing damage such as collapse of buildings and isolation of mountain villages due to landslides. Also, in Japan, due to floods caused by torrential rains such as guerrilla and landslides caused by the occurrence of large-scale earthquakes, deaths are issued in Totsukawa village, Hiroshima city, Aso province and others. It is extremely important to make efforts to prevent such secondary disasters, and we believe it is important to provide safe and speedy information to the disaster prevention center, and disaster area information (such as the location of landslide areas). Therefore, in this study, we considered that it is appropriate to use weatherproof synthetic aperture radar (SAR) which can observe even in bad weather, and aims to optimize parameters to be found most efficiently in the landslide area by using the function of SAR Respectively.

The data observed with the aircraft-based synthetic aperture radar Pi - SAR - L2 was used this time. L205608 observing the Aso region on August 4, 2016 and L206001 to L206005 observing the Aso region in September 2017 are imaged with Sigma-SAR1) and the optimal combination of the obtained images is selected Therefore, the optimal combination of HH, HV and VV obtained by polarimetry data was investigated. As a method, these histogram measurements were carried out with the landslide area and the non-landslide area visually recognizable as the teacher (target), and the separability of both were measured.

Next, thresholds for classifying landslide areas and non-landslide areas were set from the intersection of the two histograms with respect to the tops of the obtained combinations, landslide areas were calculated on the basis of the thresholds, and the images were binarized. Incidentally, in this algorithm, a median filter that removes noise and inclination correction to remove the horizontal ground from the inclination of the ground surface are also executed. As a result, HH-VV-Coherence proved to be able to detect the landslide area most efficiently among possible combinations.

In order to improve accuracy from now on, in the inclination correction processing, the affected area with the small current slope is determined to be a non-affected area like the flat area, and it is displayed in black. This time we compare two different regions in the image at one time, but we think that by extracting better parameters by comparing the same region at different times, it will lead to an improvement in accuracy.

Keywords: Pi-SAR-L2, Landslide, Polarimetric image