Damage Assessment using Airborne Polarimetric and Interferometric SAR: Pi-SAR2

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1 Extended abstract

The National Institute of Information and Communications Technology has been developed the airborne polarimetric and interferometric synthetic aperture radar (SAR) named Pi-SAR2 since 2006. The Pi-SAR2 has been conducting observations of disaster areas due to earthquakes and volcanic activities. In this paper, we introduce the performance of Pi-SAR2 for damage assessment in disaster area.

Rapid assessment of damage in disaster areas is quite important to mitigate damage and accelerate the recovery. The remote sensing technology is one powerful method to quickly assess disaster area damage without direct access. In particular, the airborne microwave radar can quickly observe the ground surface day and night irrespective of the weather.

The Pi-SAR2 is X-band fully-polarimetric SAR with spatial resolution of 0.3 m. The high-resolution polarimetric SAR data obtained by Pi-SAR2 provides the information on ground features. In addition, by using the receiving antenna added in the cross track direction, it is possible to simultaneously measure topography with a single pass. Therefore, the topography after the disaster can measure in a short time over a wide area. On the other hand, the moving object detection is enabled by using additional receiving antennas along the track direction. From the result of moving object detection, it is possible to provide information on the passable route within the damaged area. The fully-polarimetric image processed by the onboard processor of Pi-SAR2 can be sent to the ground via the satellite network connection during the observation flight.

Using the Pi-SAR2, the NICT have conducted observation of damaged areas in several disasters. At the time of presentation, we introduce mainly the data acquired during the Kumamoto earthquake in 2016 and Ontake volcano in 2014, and discuss the information gathering ability of Pi-SAR 2 in case of disaster.

Figure 1. Polarimetric image of a large scale landslide caused by the Kumamoto earthquake in 2016. RGB composit (R: HH, G: HV, B: VV).