

Observations and Interpretations of Two Mountain Glaciers on the Eastern slope of Mt. Tsurugi by Pi-SAR2 airborne SAR

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We have performed airborne synthetic aperture radar (SAR) measurements at two glaciers near Mt. Tsurugi, Japan, in August, October 2013, August 2014, and March 2015. The Pi-SAR2 system used in this study consists of two X-band SAR antennas, and allows us to perform single-pass interferometry. Also, the Pi-SAR2 allows us to perform full polarimetry with the maximum spatial resolution of 0.3 m.

Differencing the digital elevation models (DEM) at multiple epochs, it turns out that the differences between August and October 2013 reach ~10 to 20 meters with errors of 5-10 meters, which would mostly represent the seasonal changes in snow thickness.

Full-polarimetric observation results indicated significant intensity in the HV channel over the glacier areas even in the summer seasons. The significant signals in the HV channel were unexpected, because we tend to attribute the HV signals to volume scattering processes. The Pi-SAR2 is an X-band radar, and we cannot expect significant penetration over the snow/ice areas. We suggest another likely interpretation on the apparent HV signals over the glaciated areas.

Keywords: Mt. Tsurugi, Sannomado glacier, Komado glacier, Pi-SAR2, Polarimetric SAR