## Ground surface change induced by the 2019 White Island volcano eruption detected by ALOS-2 and Sentinel-1

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At 1:11 UTC, 9th December, 2019, a phreatic eruption occurred in Whakaari/White Island located in the north part of New Zealand, and the ash plume reached up to the altitude of 3.7 km approximately. Although this eruption did not result in economic losses such as collapse of houses, there were multiple victims who happened to be there for sightseeing. For identifying the area affected by the eruption and detecting the ground movements and surface changes before and after the eruption, we analyzed ALOS-2 data to generate the InSAR and intensity images before the eruption (06/03/19-13/11/19), and before and after the eruption (13/11/19-11/12/19). In addition, we also analyzed the Sentinel-1 data to generate the InSAR images before and after the eruption (27/11/19-09/12/19) for the sake of comparison with the ALOS-2 images.

In the InSAR image of ALOS-2 before the eruption, we identified slight ground displacement away from the satellite in the summit area, which is consistent with the subsidence (1-2 cm) observed at the GNSS CORS installed in the summit area by GNS Science. In the InSAR image of ALOS-2 before and after the eruption, incoherent area can be seen within the caldera area while no significant displacement is observed. Correspondingly, clear ground surface change which possibly corresponds to ash/debris deposits within the caldera area is identified in the intensity images before and after the eruption.

The incoherent area is also identified in the InSAR image of Sentinel-1 before and after the eruption (27/11/19-09/12/19), and it covers the similar area as that of ALOS-2 image. However, the InSAR image of ALOS-2 allow us to capture the shape of the incoherent area more finely owing to its finer pixel spacing (18m) as compared to that of Sentiniel-1 (30 m).

InSAR and SAR intensity images were rapidly provided to Land Information New Zealand and its geoscience research agency, GNS Science, so as to help them understand possible land movement and ash/debris deposits, and then published on the web page of GSI Japan.

Acknowledgement: ALOS-2 data were provided by the Japan Aerospace Exploration Agency (JAXA) through the activity of the SAR analysis working group of Coordinating Committee for Prediction of Volcanic Eruption.