

Extraction of ground changes near the crater by the eruption of Kilauea volcano.

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Synthetic Aperture Radar, SAR, is a sensor that irradiates radio waves (microwaves) and receives radio waves reflected and returned from the ground surface.

It is characterized that SAR can observe the target regardless of weather and day and night. Even when the plume is blowing hard, SAR signal can penetrate through the clouds and smokes and can observe the crater.

The Kilauea volcano to be investigated is one of the five shield volcanoes that made up the Island of Hawaii on Hawaii Island. It is an active volcano that is presumed to have formed about 600,000 years ago, and is presumed that it appeared on the sea surface about 100 thousand years ago and the eruption is still continuing, but the eruption of 2018 stopped the flow of the lava did. The Kilauea is known for its calm eruption, but since 1983 it continues to erupt almost continuously, depending on the direction of the lava flow, lava may swallow the settlement and destroy the settlement.

This research will detect the deformation of the volcanic mountain by using the interferometric SAR technique. INSAR uses two types of data with different times and finds variates from the differential distance between from the satellite to the target (phase difference).

Using this method, we measure the crustal deformation with accuracy of several mm to several cm by capturing the variation near the crater of Kilauea volcano which can not be investigated locally. We will quantitatively evaluate the crustal deformation around the crater using image data of two periods including the eruption occurrence period from October 9, 2014 to July 31, 2018.

As a result, the crater was subsided by 6.5 cm from November 25, 2014 to March 27, 2018 in the ascending orbit, and it was subsided by 9 cm during the period from October 9, 2014 to December 14, 2017 in descending orbit.

As a future task, since we observed fluctuations in the north direction other than vertical component fluctuations in the crater, we plan to conduct research including the relation with the ground characteristics of Hawaii Island.

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