

Topographic changes in Kirishima Iwo-yama volcanic area obtained by UAV photogrammetry

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Aerial photogrammetry using UAV(Unmanned Aerial Vehicle) is a speedier, cheaper, and safer method than conventional topographic surveying methods, and has been spread rapidly in recent years. This can be utilized in active volcano observation, but there are still few examples.

In this study, We conducted mission flight by UAV in Kirishima Iwo-yama located Ebino city, Miyazaki prefecture before and after the phreatic eruption in April 2018. Then, the eruption area was three-dimensional modeled by aerial photogrammetry.

While the model before the eruption was successfully constructed, in the constructed model after eruption, a gap has occurred due to the effect of the fumarole. This is one of problems of UAV photogrammetry in active volcano. In this study, to resolve this problem, adding to the conventional nadir photography, the oblique photography from the low altitude was carried out again in November 2019. As a result, the model after the eruption could be constructed without the gap.

By comparing the model before and after the eruption, it was suggested that the local uplift detected by InSAR may be observed in the central part of survey area. In the erupted area, large topographic changes due to crater formation that could not be observed by InSAR were observed. From the measurement results, volume changes due to topographic changes before and after the eruption, which were not measured until now, could be estimated.

These results indicate that UAV photogrammetry is a simple and effective method for detecting topographic changes in active volcanic observation.

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