

Evaluation of volcanic activity by using LiDAR Data in Aso Volcano, Japan

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It is generally more difficult to collect geological information about a volcano with an old formation age, owing to erosion or deposition of ejecta. Therefore, it is necessary to develop a new investigation method as an alternative to a conventional geological survey. Sakagami and Sasaki (2010) performed a terrain analysis with a terrain model with various resolutions (DEM and DSM) on four volcanic edifices in the Aso central cones (Komezuka, Ujoudake, Kijimadake and Kusasenrigahama). As a result of analyzing the dissection degree of volcanic edifices, we revealed that the standard deviation of the laplacian was most suitable to evaluate the relative ages of four volcanoes. The formation age of Komezuka, which was unknown at the time, was estimated to be about 2.4 ka, based on the standard deviation of the laplacian, the formation ages of which were known from previous reports. The formation age of Komezuka was determined by Miyabuchi (2010) to be about 3.3 cal. ka. It showed no significant difference from the formation age estimation result achieved by Sakagami and Sasaki (2010). A high-resolution terrain model generated from an airborne laser scanner, were therefore considered suitable for the assessment of volcanic activity.

In this study, an existing volcanic crater terrain was considered to be one of the indices for assessing volcanic activity; this volcanic crater terrain data was extracted using a high-resolution terrain model generated from an airborne laser scanner. The diameter of the volcanic crater was measured using the extracted a high-resolution terrain model. And, we estimated the amount of ejecta using the method of Sato and Taniguchi (1997). Based on the results, we interpreted some new volcanic crater terrain at Kijimadake and Kusasenrigahama, which have not been reported in the previous studies. The amount of ejecta was calculated based on the volcanic crater diameter while interpretation of geographical features and was found to be similar to the amounts of ejecta derived by previous geological surveys. Furthermore, we obtained by estimating the assumed amount of ejecta in Komezuka, which had previously been unresolved. We estimated the maximum ejecta amount from each volcano using our method. When we are not able to obtain enough geological information, it is possible to evaluate of volcanic activity using this method.

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