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High Altitude airborne LiDAR at south east edge of Shinmoedake-crater in Kirishima Volcano,Japan

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1. Introduction

In general, it is important to measure the change in the amount of the gush of the ejecta to understand the transition of the volcanic eruption. About immediately outside on the edge of a crater and thickness piling up, there was no effective measurement means, and the state of the blank of data continued to the eruption in 2011 of new [mo] though the measurement was done from the lava volume and 2km in the crater by various organizations about the amount of fallout in the distance. The situation in which an explosive eruption that smoke reaches advanced several thousand m occurred at intervals of ˜ the tenth in several days, and the measurement of the sky of the crater of about 1000m in altitude of ground was extremely dangerous and impossible though was one of the best techniques for such a measurement of the purpose the Airlines laser measurement.

2. Measurement

The request of the Meteorological Agency was received and Asia Air Survey executed this measurement independently. The offer had been received from the Kagoshima Prefecture engineering works part about the geographical features data about the Ministry of Land, Infrastructure and Transport Miyazaki river national road office and Kagoshima Prefecture when attaching to Miyazaki Prefecture before it erupted for the comparison. We wish to express our gratitude for recording here.

The measurement condition is as follows.

Measurement time 10:39-10:41 on February 26, 2011

Flight altitude 5650m (18,532ft)

scanning angle +-25 degrees

flight speed 70m/s(136kt)

3. Result of a measurement

Pumice did the descent piling up by the eruption from January 26 to the 27th in the new [mo] eruption for the southeastward in the crater. In the orthophoto, the ground level within the range has changed into the discernment gray. The volcanic ash of the minute grain dark color by an explosive eruption afterwards piles up like covering on that. The axis of fallout has been biased to the north side a little. A lot of impact Craters are seen in the vicinity of the crater, and a gray spot with the scattering pumice can be made out to the surroundings. Moreover, signs of the secondary earth and sand movement can be made out in the valley muscle in the south of the shinmoe-dake (Kagoshima Prefecture side). There are remarkable the reflectivity of the laser a lot of points of the area that expands from the shinmoe-dake on the southeast side without the reflection at all from all sides 5m. The point where such reflection strength of the laser is low or the reflection was not able to be detected is roughly corresponding to the descent volcanic ash piling up region that has been clarified so far.

4. Amount of geographical features change

The closeup in the vicinity of the center part of the difference calculation results with the geographical features data before it erupted was made. In this data, the time laser measurement is DSM data after it erupts of the DEM data of doing processing that the tree is removed before it erupts at most that contains the tree etc. Because about one point and the measurement density are low, it is difficult in 5m to remove the data of the tree.

However, when the value of 1m or more in amount of the geographical features change is taken within the range not covered with before it erupts, after it erupts, and vegetation, it considers the geomorphic change by this eruption and is unquestionable.

As a result, about 10m(12m or less) was requested 4m in the shinmoe-dake edge south for the crater edge east. A theoretical measurement error is +- about 50cm.

Keywords: Airbone LiDAR, volumetry, Laser, airfall