

Precision surveying of the lava flow in Nishinoshima volcano -What has been found from the ultra- low-altitude imaging by the UAV? -

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The Nishinoshima volcano started eruption in November, 2013. Because Nishinoshima was a remote island, the surveying interval was long with several months from several weeks, and the detailed observation of the lava flow situation was difficult. Japan Broadcasting Corporation (NHK) had photographed Nishinoshima island in its active volcanic activity, in a period from May to July, 2015 (Table 1). On May 9th and 12th, NHK launched unmanned aircraft from Chichi-jima island of Ogasawara Islands, and captured images of the island with a single-lens reflex camera for pre-test of a research project. From June 28 to July 3, NHK launched an unmanned helicopter (UAV) from a ship anchored at the point of 4 km from the crater and captured movies and images of the lava flow and the crater in the eruption. The unmanned helicopter had recorded imagery of high resolution and high quality, including 4k video, at 120m flight height above the ground. This project had been collected massive data of Nishinoshima island in its active volcanic activity. From the world-wide point of view, it can be said that this is the first time of collecting repeatedly imagery of volcanic activity from very close position, including lava flow and erupting crater, in a short period of time. In this study, we made 5cm and 25cm DEM based on these images using the SfM (Structure from Motion) software and generated a red relief image map. This resolution has enough precision in order to grasp the width of the crack that occurred on the lava flow surface and the change. We distinguished small impact crater, volcanic bombs, depression fake crater and hornito around the scoria cone. And we distinguished two types of lava flow, one is a'a lava flow and another one is branched tube type lava flow. The a'a lava flows have compressed ridge and levee in surface. The tension cracks are developed on surface of branch tube type lava. The width of cracks become to wide in 4days. And the front of this lava flow was proceeded to a sea shore at the same time. These evidences suggest to inflation of lava flow triggered by molten lava saturation in a tube. This type structure of the branched inflated lava tubes were founded any fields, (1) Jyo-ga-saki shore of Izu Peninsula, (2) 2nd lava flow of Taisho lava in Sakura-jima volcano, (3) Aokigahara lava field of Fuji volcano. The flow speed of a'a lava are faster than branch type lava.

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