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Real time volcano hazard assessment by precise terrain model and experiments with shampoo

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Volcanic disaster, within the range occur when various substances are released from the crater during the eruption, to reach, human and social activities have been conducted. Range that does not impact residents, not build important social infrastructure is the ultimate volcano disaster prevention. However, the frequency of occurrence of volcanic eruption is low, around the volcano for a variety of land use is in progress, when the eruption occurred, it is necessary to an emergency evacuation. In order to perform proper evacuation, start early in the eruption, the position of the crater (1), type of eruption (2), based on the (eruption rate) scale of the eruption (3), expected to reach to achieve, to plan evacuation of ”real-time volcanic hazard” is highly desirable.

However, to perform calculations in a short period of time ie real-time simulation, hardware-consuming and expensive with the advanced computing power. In particular, basaltic lava flows in order to change significantly the flow direction by microtopography, it is necessary to compute accurate terrain model. In the vicinity of volcanic eruption is considered to be construction of infrastructure such it is quite difficult.

Thus, in the (2009), were examined analog experiment model to create a precise topographical model of Izu-Oshima, using other liquids on the model forest. Cutting the plastic rigid polyurethane based on DEM detail by Airborne LiDAR, to create a topographical model that was printed in 3D inkjet printer the three-dimensional map red on its surface, on it, is a stream of the liquid variety, lava flows most picked out something close to.

This system, when the eruption occurred, it becomes clear even the position of the crater, which imitated the lava flow, is that which flows down the whiskey and water 50% of the shampoo, it is possible to predict the range of influence rough immediately is. The experimental results can be observed in three dimensions from any direction in 3D, it is easy you can not change the position of the crater, to change the runoff rate. In addition, this model experiment, because it does not use any power, can also be used in situations outside the assumption that the all electric power loss.

Reference:

Hiroshi MORI,Hiroshi KISHIMOTO,Yusuke SUZUKI and Tatsuro CHIBA(2009)A laboratory study of lava flow and debris flow on the 3D model of Izu-Oshima Volcano,Proceedings of the Volcanological Society of Japan,p168.

Keywords: volcanic hazard, hazard map, simulation, analog model experiments, red relief image map, LiDAR