



## **Development of a simple ash-fall meter for monitoring volcanic ash levels**

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After a volcanic eruption, the risk of debris flow increases in the case of volcanic ash deposits on a slope. It is necessary to precisely and rapidly know the thickness of such volcanic ash, to ensure proper evacuation warnings against debris flow after the eruption. Traditionally, in order to know the thickness of volcanic ash, several observers make direct measurements in the field, or consult measurement containers. However such practices are dangerous after eruptions, and the accuracy of the survey results can vary with the observer. Therefore a machine-based measurement technique was considered, and the Automatic Tephra and Rain Gauge was developed in Japan. The instrument has good precision but is costly when deployed at multiple observation points.

Therefore, we developed a simple, low-cost ash-fall meter, which demonstrated sufficient precision for economical multipoint observation. The meter is composed of an outer container, a funnel, an inner gauge, a filter, and a camera capable of transmitting image data using the 3G network.

In order to test the system, a sample instrument was installed at the Kirishima Volcano from October 2017 to August 2018. We sampled the volcanic ash after an explosive eruption in April 2018, and confirmed that the deposit thickness was 1.5 mm. The thickness value was highly similar to that of another investigation. However the image data transmission was cut off after the collection of volcanic ash, and was not restored. We presume that the communication disorder occurred as a result of volcanic ash entering the camera, due to insufficient sealing of the camera box.

In the future, we aim to improve the simple ash-fall meter by making use of the knowledge gained in this study, and test the device at other volcanoes.