

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



SVC070-P18

Room:Convention Hall

Time:May 23 16:15-18:45

Tephra fallout model and grain size distribution of Shinmoe-Dake tephra, 2011 eruption of Kirishima volcano.

Toshiaki Hasenaka^{1*}, Haryo Edi Wibowo¹, Idham Andri Kurniawan¹, Chuck Connor², Laura Connor², Koji Kiyosugi², Costanza Bonadonna³

¹Grad School Sci & Tech, Kumamoto Univ., ²Dept. Geology, South Florida Univ., ³Sec. Earth Environ. Univ. Geneve

We report the result of our grain-size distribution analyses of Shinmoe-Dake tephra and show the result of tephra fallout modeling based on our tephra data. A total of 67 tephra samples were collected at stations located SE of Shinmoe-Dake, Kirishima volcano, mostly on January 28, 29 and February 1. They probably correspond to the major first eruption products of Shinmoe-Dake, which occurred between the morning of January 26 and the morning of January 28. Although several eruption episodes were reported during this period, we basically observed a single tephra unit, which is overlain by very thin light-grey colored fine ash. Everywhere, the deposit was reversely graded and characteristically coarse-grained for its thickness. Along the profile 6 km away from the vent, tephra measurements show the thickest value at Miike elementary school. Abundant coarse-grain pumice was found near Miike Miyazaki Nature House for Youth. The isopach map shows a very narrow band of tephra fallout area extending from the crater to southeast through most of Miyakonojo city to the coast of Nichinan city.

Modeling of the medial and distal deposit was performed using the Tephra2 computer code and numerical inversion methods. Input consisted of the thicknesses measured at the tephra sample stations. The inversion process, the downhill simplex method, searches for best-fit eruption parameters to explain observed variation in tephra thickness. We were able to obtain best fit using an eruption column height of approximately 8 km and eruption mass (medial and distal facies only) of approximately 5×10^9 kg. This volume does not include near-vent tephra, but only the tephra dispersed at distances > 5 km from the vent, in the populated region SE of Kirishima. Volume estimates should be refined using more proximal data when the eruption subsides.

Our initial observations of the medial and distal zones suggests the bulk of the deposit was the product of a short-lived, relatively energetic eruption, producing a small volume of tephra fallout, with unusually large clast size and relatively high column height (approximately 8 km) during the most intensive phase of activity, given the thickness of the deposit and volume in medial and distal zones.

Keywords: Kirishima volcano, Shinmoedake, Tephra, eruption column, grain size distribution, downhill simplex method