論　説

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# 霧島火山新燃岳 2011 年 3 月～2012 年 2 月の降灰量調査：即時的降灰量推定の予察的検討

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# Amounts of Tephra Fall Deposits from Shinmoedake Volcano, Kirishima Volcanoes, during March 2011-Febrary 2012: A Preliminary Study for Immediate Estimation of the Eruptive Mass

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Since even small amounts of tephra fall can have a significant negative impact on infrastructure, a rapid estimate of the eruptive mass of magma, which is one of the most important indicators of the scale of eruption, is required. Shinmoedake volcano, part of the Kirishima volcanoes, Japan, began erupting on 19 January 2011 after a dormant period of 300 years. Sub-plinian eruptions occurred on 26−27 January, followed by vulcanian eruptions and eruptions of ash fall thereafter. Here, we report the results of a preliminary study that sought to estimate the eruptive mass and the distribution of ash fall based on observations of tephra fall within 2 weeks of an eruption at Shinmoedake. In cooperation with municipal authorities, we observed temporal changes in the amounts of ash erupted during volcanic activity at Shinmoedake volcano from 24 February 2011 to 29 February 2012. Observations were made at 35 sites in five municipalities (Miyakonojo City, Takaharu Town, Kirishima City, Kobayashi City, and Ebino City). The observations enabled estimates of the eruptive masses of ash from seven eruptive events. The eruptive masses are between $1\times10^6$ kg and $2\times10^8$ kg, with the largest being the eruption of 13 March 2011. We found positive correlations between (1) the eruptive mass and the height of volcanic cloud determined by radar echo and between (2) the eruptive mass and the height of cloud that reported by the Japan Meteorological Agency. The former correlation is consistent with a relatively well-known geophysical relationship between the maximum height of a convection current and the amount of thermal output pulse. The empirical correlation may allow us to easily and rapidly estimate the eruptive mass from the observed height of the volcanic cloud top.

**Key words**: Shinmoedake volcano, Kirishima volcanoes, tephra fall deposit, estimation of the eruptive mass, 2011 eruption

## 1. はじめに

マグマ噴出量は，噴火の規模を示す重要な指標であるため，噴火直後に迅速に求める必要がある．特に降下火砕物は，比較的小さな噴火でも条件しだいで遠方まで飛散するため，各種交通機関や道路交通のほか，農業などへの影響が広範囲にわたる．そのため，迅速に噴火時の降灰量と分布を集約することは，火山学的のみならず，噴火災害を軽減する観点からも重要である．しかし，小～中規模噴火の降下火砕物は，遠隔地では堆積物として残りにくい程度の量であることが多い．そのため，噴火直後の調査でないと，詳細を明らかにすることが難しい．

宮崎県・鹿児島県境に位置する霧島(きりしま)火山の新燃岳(しんもえだけ)（標高 1421 m，Fig. 1）では 2011 年 1 月 19 日の小規模噴火以降，1 月 26～27 日には噴煙到達高度が海抜 7000 m を超える準プリニー式噴火が発生し，1 月 27 日には火口内に蓄積された溶岩が確認された（福岡管区気象台・鹿児島

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