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Sulfur dioxide flux of Shinmoedake 2011 eruption

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Shinmoedake at Kirishima volcanoes had a small eruption on Jan. 19, 2011 and the volcano started magmatic eruption from Jan. 26. From Jan. 27, 2011, we started sulfur dioxide flux measurements from the volcano using SO₂ monitoring system based on a compact UV spectrometer (COMPUSS).

Sulfur dioxide flux measurements were carried out by traverse method. The sulfur dioxide amount in the cross-section of the volcanic plume was obtained by moving beneath the volcanic plume with the car equipped with the COMPUSS aiming the zenith. The sulfur dioxide flux was retrieved by multiplying the sulfur dioxide amount and the plume speed. For the plume speed, we used GPV wind speed data corresponding to the plume height. At the end of January, since the amount of ash and gas in the plume was so large, traverse measurements were carried out on the roads about 25km away from the volcano. After the emission of ash has decreased, the measurements were conducted on the roads about 7-10km away.

The sulfur dioxide fluxes of the first 10 days were huge and exceeded 10000 ton/day. Especially, on Jan. 28, when the lava dome was growing inside the summit crater, the observed flux recorded more than 40000 ton/day. This huge flux decreased more than an order of magnitude to several hundred ton/day by mid February. Although the flux sometimes increases to about 1000 ton/day, the flux is basically several hundred ton/day until present(the end of March). In the presentation, we will discuss the sulfur dioxide flux variation of the Shinmoedake 2011 eruption and report precursory flux decrease observed before the eruption occurred on Feb. 3.

Keywords: Kirishima Volcano, Shinmoedake, sulfur dioxide, volcanic gas, flux