

Sulfur dioxide flux of Shinmoedake 2011 eruption II

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Shinmoedake at Kirishima volcanoes had a small eruption on Jan. 19, 2011 and one week later on Jan. 26m the volcano started magmatic eruption. In the Shinmoedake 2011 eruptive activity, there were altogether 13 explosive eruptions until March 2011 including sub-plinian eruptions occurred on Jan. 26 and 27. The number of smaller eruptions also decreased by the end of March and the eruptions sporadically occurred until first week of Sept. 2011.

From Jan. 27, 2011, we started sulfur dioxide flux measurements from the volcano using SO₂ monitoring system based on a compact UV spectrometer (COMPUSS). The flux measurements were carried out by traverse method. The sulfur dioxide flux was retrieved by multiplying the sulfur dioxide amount in the cross-section of the plume and the plume speed. For the plume speed, we used GPV wind speed data corresponding to the plume height.

The sulfur dioxide flux 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 exponentially to several hundred ton/day by the second half of March 2011. Since April 2011, the flux basically kept several hundred ton/day until present (Feb. 2012) except soon after the eruptions occurred on June 23 and August 31. The flux exceeded 1000 ton/day in these occasions.

In the presentation, we will discuss the sulfur dioxide flux variation of the Shinmoedake 2011 eruption and estimate the total SO₂ amount emitted by the eruptive activity. Precursory SO₂ flux decrease was observed for a Vulcanian eruption at 12:18 on Feb. 3, 2011. Precursory variations were also observed for tilt meter at Shinmoedake NE observation site and summit video footage of Japan Meteorological Agency. We also discuss the precursory decrease of the sulfur dioxide flux by comparing with other observed precursory changes in the presentation.

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