

Temporal change of SO₂ discharge at Asama volcano

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Japan Meteorological Agency (JMA) has been observed amount of SO₂ emission at Asama volcano since July 2002, for the purpose of monitoring the volcanic activity. Based on the observed SO₂ discharge data, we investigate correlations among daily amount of SO₂ emission, volcanic fume index, and frequency of volcanic earthquakes dividing the term into eruption (June 2002 - April 2004, May 2004 - November 2005, August 2008 - July 2009, and May 2015 -) and non-eruption periods.

A positive correlation between frequency of BL-type volcanic earthquake and SO₂ discharge is confirmed during the 2015 eruption period; that between volcanic fume index and SO₂ discharge is in a similar way. The similar correlations are recognized during the eruption periods in 2008 and 2009. On the other hand, we can't make certain of correlations between frequencies of BL-type event and volcanic fume indexes during the eruption periods in 2003 and 2004; we frequently observed increments of SO₂ emission without increase of BL-type earthquakes and volcanic fumes. (fig.1) A very long-period pulse, hereafter we call it VLP, is an impulsive motion with a dominant period longer than 5 seconds accompanied by a tilt change, which is excited by a sudden gas emission (Maeda and Takeo, 2012). Weak correlations are confirmed between the frequencies of VLP and BL-type event, and between the frequency of VLP and SO₂ discharge. However, there are several examples of large amount of SO₂ emission with a few occurrence of VLP. During non-eruption periods, the daily SO₂ discharge rate could not exceed 2000 ton/day even though the increment of BL-type activity. The increment of SO₂ emission seems to be plausible data indicating a volcanic eruption potential, and the positive correlations among SO₂ emission, volcanic fume, and daily frequency of volcanic event are confirmed during the 2008, 2009, and 2015 eruption periods. However, there are some observations that SO₂ emission represented weak correlations with the frequencies of BL-type event and with the volcanic fume indexes even though the eruption periods (2003 and 2004). The gas emission system seems to fluctuate along the volcanic activity.

Keywords: Asama volcano, SO₂, seismic waveform, volcanic fume

