



Stable volcanic gas composition during a variety of activities at the persistently degassing Asama volcano, Japan

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Asama volcano at central Japan is a persistently degassing andesitic volcano and repeated eruptions every several years. The recent eruptions occurred in September 2004, August 2008 and February 2009 and are followed by increase of the volcanic gas emission during several months. The SO_2 flux is typically 1,000-4,000 t/d during the high flux period after the eruption, whereas the flux is around 100 t/d during the low gas flux periods. This study aims to understand the controlling process of volcano degassing based on the volcanic gas composition data. In particular, we focus to evaluate the gas composition contrast between the high and low gas flux periods. Since 2004, we repeated manual measurements of Multi-GAS and alkali-filters at the summit crater of the volcano and installed an automatic Multi-GAS monitoring station for a daily measurement at the western rim of the summit crater in 2010.

During our observation, the high flux period occurred twice, 2004-2006 and 2008-2010, both with eruptive activities. In spite of the large SO_2 flux variation and eruptions, we did not see any clear variation in the gas compositions during these periods. The typical CO_2/SO_2 ratios of 0.8 and $\text{H}_2\text{O}/\text{SO}_2$ ratios of 30 were measured both during the high flux periods and the low flux periods. A manual gas measurement was conducted on 13 Sept. 2004, after a small vulcanian eruption on 1st Sept. and just before the continuous ash emission started on 15 Sept, however, the measured gas compositions are similar with those during other periods. The HCl/SO_2 ratios measured with the alkali-filters agree well with those obtained by FT-IR on 15 and 16th Sept, as well as those by leachates of ashes erupted during this period. The constant gas composition suggests a stable degassing conditions regardless of the variety of the activity. The similar HCl/SO_2 ratios obtained during both the eruptive period and the persistent degassing stage indicate a low pressure gas degassing, suggesting the conduit magma convection.