

Eruptive style of Aso Volcano: Implication from magma intrusion rate

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Aso Volcano, one of the most active volcanoes in Japan, resumed magmatic eruption in November 2014 after a 21 year's dormancy. Magmatic eruptions continued until May 2015 followed by phreatomagmatic eruptions on 14 September and 23 October, 2015. After that, several phreatic explosions intermittently occurred until March 2016. About 6 months after the 2106 Kumamoto earthquake, a phreatic eruption occurred at 21:52 on October 7, 2016, followed by a phreatic explosion at 01:46 on October 8. These eruptions and their precursory phenomena were well recorded by observation network surrounding the active crater and the central cones of Aso Volcano. In this presentation, we compile similarity and difference in precursory phenomena of the magmatic and phreatic eruptions.

Before the magmatic eruption in November 2014, a decrease in contraction rate of the magma chamber, located at about 3km west of the crater at 5 km depth, was detected by GPS observations from 2008 through 2014. And crater lake disappeared in July 2014. And an expansion of the magma chamber was also detected from July to November 2014. Furthermore, frequency and amplitude of long period tremor (LPT), originated from a resonance of a crack-like conduit just beneath the active crater, gradually increase from August 2014, corresponding to the temperature of the crater pit. In addition, from October 20, the amplitude of LPT and continuous short period tremor (SPT) rapidly increased while the magnetic total force changes indicated rapid temperature rise in the shallower part of the crater.

Before the phreatic eruption in Sept. 2015, an expansion of the magma chamber observed and followed by amplitude increase of LPT and SPT as observed before the magmatic eruption. However, the magnetic total force changes indicated gradual temperature rise in the shallower part of the crater, where the crater lake partially resumed.

The phreatic explosion in Oct. 2016 was also preceded by an expansion of the magma chamber and amplitude increase of LPT and SPT with the crater lake existing.

It is possible that these differences in precursory phenomena are correlated to the following eruption style.

Keywords: Aso Volcano, Magmatic eruptions, Phreatic eruptions, Magma intrusion rate