AD 2015 eruptive activity induced by basalt input at Sakurajima volcano: Inference from petrological monitoring data

*Akiko Matsumoto[1], Mitsuhiro Nakagawa[1], Masato Iguchi[2]

1.Graduate School of Science, Hokkaido University, 2.Disaster Prevention Research Institute, Kyoto University

Sakurajima volcano, located in southern Kyushu, Japan, has resumed its eruptive activity at Showa crater since June 2006. After that, the volcanic explosions has been continued until 2013. Although the number of explosions declined in 2014, the volcano had become higher level of eruptive activity accompanied with clear inflation since January 2015. In addition, the dyke intrusion event had occurred in August 2015. In order to reveal the magma plumbing system of the 2015 eruptive events, we carried out the petrological examination of the 2015 juvenile lapilli. We also discussed the possible reason for the activation of the 2015 eruptive activity.
The 2015 juvenile lapilli consists of lithic, scoria, pumice, and a small amount of altered rocks. Plagioclase, orthopyroxene, clinopyroxene, and Fe-Ti oxides are the dominant phenocryst phases, and a small amount of olivine phenocrysts are often occurred. The core compositions of the olivine phenocrysts without reaction rim are Fo80-81, compositionally disequilibrium with the co-existed pyroxenes. On whole-rock chemistry, the 2015 juveniles range 58.3-59.0 wt.% in SiO_2, exhibiting the most mafic compositions in all the samples since 2006. These samples are plotted on the same compositional trends of the juvenile materials since 2006 on Harker diagrams. On matrix glass chemistry, the 2015 juveniles show clearly lower in SiO_2 than those of the activity before 2014. In addition, within 2015, the silica content becomes lower with time.
The similar petrological features to the juveniles since 2006 as well as the consistency in the compositional trends of whole-rock chemistry suggest that the magma plumbing system since 2006 has been continued in 2015. The most mafic compositions of the 2015 juveniles both in whole-rock and matrix glass chemistries reflect that the considerable input of basaltic magma had occurred since 2015. Comparing to the geophysical monitoring data since January 2015, as the ratio of the basaltic magma in erupted magma increased, the volcanic edifice inflated and the eruptive activity became larger. After that, the activity changed to the magma intrusion event. It is highly probable that the activation of the 2015 eruptive activity had been induced by newly input of basaltic magma.

Keywords: Sakurajima volcano, glass chemistry, whole-rock chemistry, temporal change

