

The magmatic processes of the latest eruption of Hakusan Volcano

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Low-frequency earthquakes were observed for the first time in 1999 at 37 km in depth beneath Hakusan Volcano, which has 400 year-long cyclic activities for the last 1300 years. It is very likely that Hakusan Volcano may have started the next active period. It is critical to understand the current status of the magma reservoirs beneath Hakusan Volcano in order to anticipate the possible styles of the forthcoming eruptions. For this purpose, I studied the latest volcanic products in 17th century of Hakusan Volcano to understand the magmatic conditions.

Hakusan Volcano consists of 4 stratovolcanoes. The latest, Younger Hakusan Volcano began its activity at ca 50 ka. A projectile in the south of the summit craters of the latest eruptions was chosen for detailed analysis of the magmatic conditions.

Together with the disequilibrium phenocryst assemblage, phenocrystic hornblende is decomposed and surrounded by clinopyroxene, orthopyroxene. Rims of orthopyroxene phenocrysts show a wide range, while cores show bimodal compositions. The wide and disequilibrium mineral chemistry and textures, combined with incompatible phenocryst assemblage, led us to conclude the mixing origin for the sample with three magmas: basalt magma, andesite magma, and dacite magma. The plagioclase-hornblende thermobarometry (Holland and Blundy, 1994) was applied to a zoned hornblende with plag inclusions showed the increase in T from 800°C to 950°C without changing P, and then gradual increase in both T and P to 1000°C and 0.9 kb. The final T recorded by the groundmass cpx-opx pairs indicates 1250°C. The above T-P path suggests that the dacite magma was initially highly crystalline near the solidus at 800°C and 7-8 km in depth. The dacite magma was injected by the andesite magma that remelted and remobilized the dacite, both of which were partially mixed together and started to ascend. At a depth of ~2.5 km, the basalt magma was injected into the ascended dacite magma batch and triggered the eruption.

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