

Evolution of the Central Cone of Hakone Volcano and its relation to the Tan-na-Hirayama active fault system.

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The Hakone Volcano after 0.14Ma comprises Older and Younger Central Cone. The Central Cone of Hakone Volcano consists of following 5 stages. (1) Stage-1 (0.14Ma:high K2O): The Manazuru air fall pumice deposit (74 to 76wt.%SiO₂: tholeiitic), Hatajyuku aphyric rhyolite block and ash flow deposit (70 to 71wt.%SiO₂: tholeiitic) and Hatajyuku aphyric dacite lava(65 to 66wt.%SiO₂: tholeiitic) erupted successively; (2) Stage-2 (0.13 to 0.10Ma: medium K2O): Firstly, the Yuba porphyritic andesite lava (55 to 57wt.%SiO₂: calcalkaline) and Yumotojyaya nearly aphyric andesite lava (59 to 63wt.%: tholeiitic) effused. Then, Takanosuyama porphyritic dacite lava and Usuitoge lava 1 (63 to 66wt.%SiO₂: tholeiitic), Miyanoshita aphyric dacite lava and Usuitoge lava 2 (66 to 68wt.%SiO₂:tholeiitic), Takanosuyamasancho aphyric rhyolite lava and block and ash flow deposit (71 to 73wt.%: tholeiitic) erupted in this order. Plinian eruptions gave rise to the lower Kissawa tephra (65 to 70wt.%SiO₂: tholeiitic) in this stage. (3) Stage-3 (0.10 to 0.08Ma:low K2O): The Sengenyama porphyritic andesite lava (56 to 61wt.%SiO₂: calcalkaline), and Byobuyama and Futagoyamakabu aphyric dacite lava (67 to 68wt.%SiO₂: tholeiitic) erupted successively. In this stage, the middle Kissawa tephra (61 to 71wt.%SiO₂: tholeiitic) was formed by Plinian eruptions. (4) Stage-4 (0.08Ma to 37ka:medium K2O): The Oharadai air fall pumice and pyroclastic flow deposit (71 to 72wt.%SiO₂:calcalkaline) erupted in 0.08Ma, following Hakone-Anjin tephra (0.07Ma) and Hakone-Miura tephra. Next, the large Plinian eruption produced the Tokyo air fall pumice and pyroclastic flow deposit (61 to 72wt.%SiO₂:calcalkaline) in 0.06Ma, then the Hakone-Sanshokuki tephra and Hakone-Central Cone tephra 1-7 erupted from 46 to 37ka. (5) Stage-5 (37ka to recent: high K2O): Porphyritic andesite lava (55 to 62wt.%SiO₂: calcalkaline) with small block and ash flow deposits effused to construct lava domes and several polygenetic volcanoes (the Younger Central Cone). The Central Cone is situated in the pull-apart part of the Tan-na-Hirayama left lateral strike slip active fault. The deformation rate of Tan-na-Hirayama active fault was probably larger in Stage-5.