

## Deep magma feeding system of Fuji volcano, Japan

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Fuji volcano is the largest among Japanese Quaternary volcanoes. For the last 100kya, Fuji has erupted dominantly basalt magma, but its eruption style changed (from debris flow and tephra dominant Ko-Fuji or Older Fuji, to lava flow dominant Shin-Fuji or Younger Fuji) at 15 kyaBP. The incompatible trace element composition of the magma changed abruptly between Ko-Fuji and Shin-Fuji. The origin of the voluminous yet monotonous basalt production and the simultaneous changes in volcanic style and magma chemistry in Fuji volcano have been discussed but remain unanswered.

Here we report the seismic tomographic images of Fuji volcano for the first time, which reveal the existence of strong upwelling flow in the mantle and its connection to the voluminous lower crustal magma chamber. The velocity perturbations in the upper mantle and lower crust beneath Fuji volcano are much greater than other volcanoes in Izu arc (e.g., Hakone, Izu Oshima) and those in North Japan arc (e.g., Azuma, Iwate) suggesting higher degree of melting or larger volume of magma storage. Magma chamber is imaged in the lower crust 20-40 km depth and is wider in NW section but is narrower in EW section.

We also carried out high-pressure melting experiments on Fuji Basalt (Hoei-IV, AD1707) and demonstrate that its main magma chamber is located at ca.25km depth (Asano et al., this conference). The chemistry of Fuji magma is buffered by a lower crustal AFC magma chamber located at 25-35km depth. Very frequent low frequency earthquakes just above the magma chamber may be due to the injection of basalt magma and/or fluids (Ukawa, 2007). The total lack of silica-rich rocks (basaltic andesite and andesite) in Fuji volcano must be due to the special location of the volcano. The plate boundary between the Eurasia plate and the subducting Philippine Sea plate is located just beneath Fuji volcano (5 km depth). Large tectonic stress and deformation associated with the plate boundary inhibit the survival of a shallow level magma chamber, which would allow the evolution of basalt to silica-rich magma (as observed in nearby volcanoes, e.g., Hakone, Izu Oshima).

The change in volcanic eruption style may be understood by assuming the existence of a glacier (or thick ice-cap) during Ko-fuji. A landslide occurred at 17 kyBP and a large part of its volcanic edifice, including the summit of Ko-fuji, has been lost. This landslide would have been triggered by melting of the glacier and should have caused a significant deloading effect on the magma feeding system. Very large magma production with a peak at 10 kyBP might be explained by this deloading effect.