

## Fluid contribution and geometry of the subducting slab: Implication from the isotopic variation in Central Japan

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Arc magmatism is thought to be caused by hydrous melting of the mantle wedge fluxed by aqueous fluids released from the subducting slab. A number of studies, based on high-pressure experiment and numerical simulation, have attempted to clarify the fluid generation and transportation in subduction zones (e.g., Ono, 1998; Schmidt and Poli, 1998; Iwamori, 1998). Based on geochemical studies, the fluid contribution from the subducting Pacific plate has been detected in the lavas from Izu arc and Northeast Japan arc (e.g., Ishikawa and Nakamura, 1994; Moriguti et al., 2004; Kimura and Yoshida, 2006). However, the origin and sources of the fluid, its mixing proportion to the mantle wedge, and their spatial (e.g., across- and along-arc) variation are still largely controversial.

Here, we focus on volcanic rocks in Central Japan to understand the fluid process raised above. Central Japan is located behind a trench-trench-trench (TTT) triple junction with two obliquely subducting plates, the Pacific plate (PAC) and the Philippine Sea plate (PHS). This unique tectonic setting allows us to examine the following points. Is the overall fluid flux enhanced due to double subduction, imprinting a strong fluid signature to the arc magmas with a better resolution of the fluid processes? Can we identify two fluids from the two subducting plates?

In Central Japan, we have found the systematic spatial variations in both EW and NS directions on Nd-Sr-Pb isotopic ratios, as well as elemental abundances, for 51 samples from Quaternary 28 volcanoes, which were chosen to cover the whole area and the compositional range from basaltic to andesitic rocks in each volcano. Based on these variations, we have identified the two aqueous fluids from the two subducting plates and an enhanced fluid flux related to chemically and spatially distinct input from the Philippine Sea plate. We have also determined the parameters regarding the fluid processes, i.e., the origin and sources of the fluid, its mixing proportion to the mantle wedge, and their spatial (e.g., across- and along-arc) variation. The results clearly show that there are three distinct regions: eastern part (mainly corresponding to the Kanto region), central part (north of the Izu peninsula), and the western part (including Norikura and Hakusan volcanic regions).

Beneath Central Japan, the complicated geometry of subducted Philippine Sea plate has been deduced based on the distribution of hypocenters, analyses of converted waves, and tomographic studies (e.g., Iidaka et al., 1990; Sekiguchi, 1991; Nakajima and Hasegawa, 2006). Beneath the eastern part of Central Japan (north of Kanto region), the leading edge of the subducted Philippine Sea plate reaches a depth of 60-100 km, overlapping the subducted Pacific plate, whereas beneath the north of the Izu peninsula where the arc-arc collision occurs, no slab that is seismically evident exists. Beneath the western part of Central Japan, again the subducted Philippine Sea plate is seismically evident and overlapping the Pacific plate, although it does not reach the Japan Sea coastal range in this western part.

The three segments that are geochemically discriminated coincide well with these tectonic domains related to the configurations of the subducted Philippine Sea plate. These results suggest that the geometry and thermal state of the subducted plates and the mantle control the spatial compositional variations and segmentation in Central Japan, through the dehydration and melting processes.