# Upwelling Fluids interpreted by 3D Electrical Resistivity Structure beneath island-arc volcanoes in Kyushu, southern Japan

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An electrical resistivity structure beneath the entire Kyushu island is determined by three-dimensional (3D) inversion using the Network-Magnetotelluric (Network-MT) data to interpret the generation of upwelling fluids (aqueous fluids and partial melting of the mantle). Kyushu lies in a subduction zone, where the Philippine Sea plate (PSP) descends beneath the Eurasian Plate. The PSP slab around Kyushu is classified into three segments: a young segment [15-27 Ma; Okino et al., 1999], an old segment [45-55 Ma; Hilde and Lee, 1984], and the Kyushu-Palau Ridge. In the Kyushu island, there are many Quaternary active volcanoes distributing along a volcanic front (VF). The volcanoes exist at the northern and southern parts of Kyushu, whereas no volcano exists at the central part (a non-volcanic region). Additionally, it is suggested that the Kyushu-Palau Ridge subducts beneath the non-volcanic region [e.g., Saiga et al., 2010]. The discontinuous volcanic chain along the VF is considered to originate from arc magmatism including partial melting of the mantle. The partial melting is triggered by aqueous fluids released from downgoing hydrous slabs as a consequence of metamorphic reactions [e.g., Tatsumi, 1989]. The depth of metamorphic reactions (dehydration) on slabs depends on the thermal structure of the slabs, which significantly relate to the age of slabs [e.g., Iwamori, 2007]. Since electrical resistivity is highly sensitive to the temperature of rocks as well as to the presence of fluids, we have employed electrical resistivity imaging to elucidate the generation of fluids beneath Kyushu. Two-dimensional (2D) electrical resistivity models across four volcanoes revealed conductive blocks under the volcanoes extending from deep depths (>100 km) of the backarc side [Hata et al., 2012]. However, a horizontal connection among the conductive blocks has yet unknown from the 2D models. To reveal the connection among the volcanoes, we determine the 3D electrical resistivity model beneath the entire Kyushu island in large scale. The 3D model newly shows that the center of high conductive blocks beneath the volcanoes converges one by one in the northern and southern parts of Kyushu. Moreover, a relatively conductive block beneath the non-volcanic region is significantly different configuration from the high conductive blocks beneath the volcanoes. The block in the non-volcanic region extends to shallower depths towards the forearc side along the surface of the subducting PSP. Those two conductive blocks are interpreted as follows. First, the conductive blocks beneath the volcanoes show the upwelling magma sources, which include aqueous fluids and partial melting. Second, the relatively conductive block beneath the non-volcanic region shows pathways of aqueous fluids released from the slab, which indicates that the slab in the region can release almost all aqueous fluids at shallower depths than in the volcanic regions.