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# 南島原玄武岩の起源
# The genesis of the Minami-Shimabara basalts erupted at the pre-stratovolcao stage of Unzen

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Hydrous components derived from the subducting slab, such as aqueous fluids and hydrous melts, are generally believed to play an essential role in subduction zone magmatism. From the viewpoint of this petrologic concept, the genesis of the Unzen magmatism in west Kyushu, southwest Japan is an enigma. The Wadachi-Beniof Zone beneath Kyushu indicate that the subducted Philippe Sea Plate does not extend to Unzen, which indicates that petrologic models emphasizing the role of slab-derived hydrous components cannot explain the genesis of the Unzen magmatism. In other words, the Unzen magmatism gives us new insights into our understanding of the subduction zone magmatism. The petrogenesis of Unzen, however, has not been well understood yet, since the modern Unzen volcanism is dominated by eruptions of dacite and is devoid of primitive basalt lavas. It is, therefore, impossible to constrain physicochemical conditions of primitive magma genesis using petrologic observations for present magmatic products there. The Minami-shimabara basalts (MSBs) distributed at the southern foot of Unzen erupted at the pre-stratovolcao stage from 4.6 to 1.0 Ma. The genesis of the MSBs would give us some insights into our understanding of the Unzen magmatism.

The MSBs do not show meaningful correlations on the major element oxide vs. MgO diagrams, indicating that magmatic processes the MSBs experienced were complicated. The behaviors of compatible elements such as Ni and Cr, however, indicate that magmatic processes in the mantle would have played essential role in the compositional features of the MSBs. The Mg-Fe-Ni compositions indicate that the MSBs could have been in equilibrium with Fe-rich mantle olivines with Fo = 80 -87. On the normative olivine-quartz-Jd+Ca diagram, the MSB are plotted parallel to the adiabat of melting anhydrous peridotite. These features indicate that multi-stage partial melting at 1.5-0.5GPa would essentially have formed compositional variations of the MSBs. The low pressure where the primitive melts were last in equilibrium with the source mantle is consistent with seismic observations of Unzen suggesting that crustal thinning occurs there.

The normative compositions also indicate that the source mantle would have had relatively low temperature (Tp ≈ 1300 ℃). The estimated low potential temperature indicates the MSB magmatism would have caused by a passible upwelling induced by the subsidence of the Shimabara Basin. Forcal mechanisms and GPS displacements indicate that dextral transtensional strain of the Amakusa-nada Graven controls these geologic phenomena.

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