

Origin of voluminous andesite - dacite in the Hoho Volcanic Zone : Role of basaltic magma, SW Japan

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Adakites are erupted related to subduction of the Philippine Sea Plate (PSP) on the Quaternary volcanic front of the Chugoku region to the northeast Kyushu from Pleistocene time (e.g. Kimura et al., 2005). However, in the Hoho Volcanic Zone (HVZ) in northern Kyushu, a large amount of andesite - dacite continuously erupted from about 6 Ma, basalt is rare. Therefore, magmatism of the HVZ has been studied of a small amount of basalt (Nakada and Kamata, 1991). So, it is important to clarify the origin of andesite - dacite in the HVZ. It also can be to identify the evolution of PSP subduction. In this study, we have examined the Futago volcanic group (2.0 - 1.0 Ma), the Usa volcanic rocks (6.6 - 2.7 Ma) and the Hikosan volcanic rocks (4.8 - 3.8 Ma) distributed in Hikosan from Kunisaki peninsula located in the northern part of the HVZ.

The initial activity in the HVZ, High-Nb andesite with high-K₂O produced in the forearc side of the Usa volcanic rocks of about 6 Ma. The trace element pattern of High-Nb andesite is similar to alkali basalt - basanite. It is indicating that the alkali basalt - basanite magma may contribute to the genesis of the High-Nb andesite (Nagao et al., 2001). In addition, andesite - dacite of the Usa volcanic rocks are incompatible element (K₂O, Nb, Zr) decreases with increasing SiO₂, and continuously changes to the island arc andesite composition. This compositional trend can not be explained by crystallization differentiation. This compositional change suggests High-Nb andesite magma was AFC of the crust and/or mixing with felsic magma by melting of the lower - middle crust. Around 4.5 Ma, primitive tholeiitic basalt erupted in a back-arc side Hikosa volcanic rocks, show OIB-like signature. Also andesite - dacite of Hikosa volcanic rocks, it is considered to be mixed with tholeiitic magma and felsic magma indicate a linear compositional trend. In the Pleistocene, OIB-like tholeiitic basalt including mafic enclave in Futago volcanic group from 2 Ma. These are heated and remobilized as adakitic magma in the crust. But, in the Quaternary volcanic front, volcanic activity dominated by the adakitic magma.

The important things are that the amount of andesite - dacite (Usa volcanic rocks : 83 km³; Hikosan volcanic rocks : 111 km³) are erupted at HVZ, it is the need for large amounts of basaltic magma is likely to be derived from fertile mantle characteristic of the back-arc side of geochemical characteristics. Therefore, there is a possibility that the fertile mantle was flowing up by 6 - 3 Ma under the mantle of the HVZ.