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The variety of silisic rocks around the Myojin volcano, central Izu-Bonin arc

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The Izu-Bonin arc located western margin of the Philippine sea plate (PSP) extend to ca. 1200 km south from central Honshu of Japan with ca. 400 km width. The Izu-Bonin arc is a match for NE Honshu arc (Nishimura and Yuasa, 1991). Active rifts (AR) exist just behind volcanic front (VF) with 20-30 km width. These are parallel to the VF and Izu-Bonin Trench and enclosed with escarpment. Generally primitive basalts possibly erupted at oceanic arc volcano without any process in the oceanic crust due to be thinner than continental crust. Although it is well known that Izu-Oshima and Miyakejima, located on VF, erupted basalts, Kouzushima, Niijima and Myojin reef are represented volcanoes which provide mostly felsic products exist on the Izu-Bonin arc VF (Tamura et al., 2009). Nowadays extensive seismic experiments in the Izu-Bonin arc have documented the occurrence of middle crust with P-wave velocity of 6.0-7.0km/s (e.g. Suyehiro et al., 1996). Because of the rock, with P-wave velocity of 6.0-7.0km/s, correspond to tonalite exposed Tanzawa complex Izu collision zone and tonalitic xenoliths in the volcanic rocks sampled VF, inferred middle crust of Izu-Bonin arc composed of tonalitic igneous rocks (Suyehiro et al., 1996). In this study, our aim is to understand mechanism of felsic volcanism contribute to making continental crust. Therefore we consider about felsic rocks dredged from Myojin volcano, Myojin rift and Aogashima rift.

Felsic rocks in this study are divided into three suites (type 1, type 2, type 3) on the basis of Zr/Y versus Zr diagram. Type 1 is lowest Zr/Y ratio trend, type 3 exhibit highest Zr/Y ratio and type 2 have intermediate Zr/Y ratio. Type 1 occur mainly VF, and small amount of type 1 appear AR. Type 2 collected overall from VF to AR. Type 3 occurs only AR.

Although Sr and Nd isotopic compositions of type 1 is similer to the basalt from the VF, Hf isotopic compositions of type 1 differ from VF basalt, and Hf isotopic compositions of type 1 is same as mafic xenoliths in VF lava rather than VF basalt. Isotopic features of type 2 are distinguished from lavas erupted normal-arc magmatism after cessation of Shikoku basin. And Isotopic features of type 2 dredged from more AR-side have higher Nd, Hf isotope ratios. Although Sr and Nd isotopic compositions of type 3 is similer to the basalt from the AR, Hf isotopic compositions of type 3 differ from AR basalt, and isotopic compositions of type 3 is different from lavas erupted normal-arc magmatism after cessation of Shikoku basin and tephra data from ODP boring (Straub et al., 2010).

On the basis of Na2O vs ASI diagram, three type felsic rocks in this study agree with compositions of experimental liquids which derived from basaltic source materials (e.g. Sission et al., 2005). There is possibility that felsic rocks derived from associated basalt. But because of Hf isotope ratio, all felsic rocks are not derived from associated basalt. Therefore all felsic rocks, provided by recent volcanism, are rejuvenated products of old arc crust.

Because of isotopic compositions of type 1 are similer to mafic xenoliths in VF lava, type 1 derived from remelting of arc crust which have postdate VF basalt composition (Bryant et al., 2003). Altough There is possibility that type 2 derived from remelting of Oligocene mafic arc crust, type 2 dredged from more AR-side have higher Nd, Hf isotope ratios. It suggests that AR-side type 2 is possibly affected by PSP. Geochemical data which is similer to type 3 have been found out in previous ODP boring data, and it is possible exist crustal material which is peculiar to AR. We long for IODP projects which start at this year to accumulate new AR crustal material data to consider source of type 3. We propose heterogeneous crust model. It have made by underplating or intrusion of mafic magma derived from mantle into PSP for 50Ma.

Keywords: acidic rock, Izu-Bonin arc, Myojin volcano, Myojin rift, Aogashima rift