Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SMP006-P02 Room:Convention Hall Time:May 25 10:30-13:00

Mulitiple magmatic activities recorded in the mafic and ultramafic xenoliths in the Shingu alkali basaltic dike,SW Japan

Wataru Noguchi[1*], Tomoyuki Mizukami[2]

[1]Natural Science, Kanazawa University, [2]Natural system, Kanazawa University

Miocene alkali basaltic dikes in the Shingu area, central Shikoku, brought up abundant crustal and mantle fragments that include information of the petrological structure beneath the region at a beginning of subduction of the Philippine Sea plate. Our detailed petrological examination of the xenoliths revealed that there is a larger geochemical and temporal diversity in magmatism at the east Eurasian continental margin than previously thought. Dunite, which had been probably formed as a cumulate from a basaltic magma, bears small gabbroic domains in the forms of discrete grains with a granoblastic texture (discrete-type) or fine-grained aggregates with an igneous texture (vein-type). From the gabbroic xenoliths, three groups, at least, can be distinguished: Hbl-bearing olivine gabbro (A type), oxide-bearing olivine gabbro (B type) and gabbro-norite (C type). The Hbl-bearing olivine gabbro group includes dunite, olivine clinpyroxenite and olivine gabbro and is characterized by smoky green Cpx partly replaced by reddish brown Hbl. The oxide-bearing olivine gabbro group is characterized by purplish brown Cpx and shows modal layering among olivine clinopyroxenite, clinopyroxenite and gabbro with concentrations of euhedral opaque minerals. The gabbro-norite group is characterized by an association of coarse-grained Opx and Cpx. There are two types of Cpx: Cpx1 with vermicular exsolution of Opx and Cpx2 with minor exsolution. Granular Opx and Cpx2 are followed by crystallization of interstitial Cpx2 and Pl. Mineral chemistry of Pl and Cpx in each gabbroic group shows distinct differentiation trend. This is most apparent in the K content of Pl: Or2˜3.5 (A type), Or1˜2 (B type), and Or3˜9 (C type) in a range from An40 to An60. Brown Cpx in B-type gabbro shows higher Mg# than green Cpx in A-type gabbro at a similar An content. The mineral chemistry of low K and Mg-rich A-type gabbro is in accord with that of phenocrysts in the host alkali basalt. Furthermore, Pl in vein-type gabbroic domains in dunite partly overlaps these trends and possibly represents the most undifferentiated one for three magmatic trends. Petrography and mineral chemistry of gabbros clearly show that they have different origins related to various magma processes in the crust-upper mantle. Correlation of geochemistry of mafic-ultramafic xenoliths will depict a complicate history of the crust-upper mantle evolution in the Shikoku fore-arc region.