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Magmatic processes of mafic dykes in Ryoke belt at Awaji and Shodo Islands, southwest Japan

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The synplutonic mafic dykes are widely exposed at Awaji and Shodo Islands in southwest Japan, which intrude into the Ryoke plutonic rocks of granitoids and/or gabbroic rocks (Yoshikura and Atsuta, 2000). Mode of occurrences of mafic dykes in the Awaji Island is characterized by the alignment of melanoclatic lenticular enclaves with several centimeters in length. On the other hand, the mafic dykes in the Shodo Island occur as continued shape of mafic swarm intrusions.

Constituent minerals of mafic enclaves in Awaji Island or dyke in Shodo Island are plagioclase, hornblende and biotite. The chemical composition of plagioclase in the mafic rocks from the Awaji Island is An_{25-95}. On the other hand, chemical compositions of plagioclase in the mafic rocks from Shodo Island is An_{27-67} in matrix parts, and An_{62-92} in the phenocrysts parts.

The SiO_2 wt.% contents of the mafic rocks from Awaji Island, and those from Shodo Island are 46-59, and 50-63, respectively. On the N-type MORB normalized spiderdiagram, the mafic rocks in both sites are shown similar by the LIL elements enriched and HFS elements depleted pattern. Moreover, on the variation diagrams, the Ti and V contents are shown by negative trends with respect to the variation of SiO_2 contents. The K and Na contents are shown same or more value than granitic rocks. But most of the composition of granitic rocks are plotted on the extension line of enclaves.

These results suggest that the mafic dykes in Awaji Island and Shodo Island were formed by the processing of chemical mixing between mafic magma and felsic magma or alkaline fluid. The result that the SiO_2 contents do not show significant correlation with respect to the variation of Fe/Mg ratio, and the presence of quartz and biotite in the mafic rocks of the lowest SiO_2 contents (49 wt.%) may further support the evidence of chemical mixing between mafic and felsic magmas.

References: Ishihara *et. al.*., 2003, Hutton Symposium V, Field Guidebook Geological Survey of Japan, Interim-Report 28, 41-60. Takahashi, H., 1995, Bulletin of the Geological Survey of Japan, 46, 23-40. Yokoyama, S., 1980, Geological report of the Hiroshima University, 24, 1-63. Yoshikura, S. and Atsuta, S., 2000, Chikyu monthly extra, 30, 140-145.

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