Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SCG10-05 会場:101B 時間:5 月 22 日 15:15-15:30

A tale of two magmas: Contrasting MORB-Boninite reaction trends in IBM forearc moho transition zone
A tale of two magmas: Contrasting MORB-Boninite reaction trends in IBM forearc moho transition zone

Matthew Loocke[1*], Jonathan E. Snow[1], Osamu Ishizuka[2]
Matthew Loocke[1*], Jonathan E. Snow[1], Osamu Ishizuka[2]

[1]University of Houston, [2]2Institute of Geology and Geoinformation, Geological Survey of Japan/AIST
[1]University of Houston, [2]2Institute of Geology and Geoinformation, Geological Survey of Japan/AIST

Petrographic and geochemical analysis of spinel from 35 lower crustal dunites, harzburgites, wehrlites and gabbros recovered from the inner trench slope of the Bonin Ridge (BR) reveals 2 groups of samples which reacted with distinct melt compositions. The first group (Group M) consists of peridotites (cpx-harzburgite), wehrlites, and gabbroic rocks with medium Cr# (100 x Cr / Cr + Al) spinels ranging from 45 to 60 and high TiO2 and Al2O3 spanning ˜0.1-2.25 and ˜12-30 wt. % respectively. The second group (Group B) consists of only dunites and cpx-free peridotites with high Cr# spinels ranging from 65 to 94 and low TiO2 and Al2O3 spanning ˜0-0.12 and ˜3-21 wt. % respectively. Clinopyroxene is present in samples from group M but not group B. Clinopyroxene major element compositions range from 98 to 86 in Mg# with low TiO2 (0 - 0.11 wt. %) and heavily depleted REE compositions similar to depleted MORB mantle peridotite clinopyroxenes. The group M and group B samples are the result of melt-rock reaction with a mid-ocean ridge basalt (MORB)-like melt and a more depleted boninitic melt respectively. MORB-like forearc basalts (˜50-52 Ma) and boninites (˜44-48 Ma) recovered from the BR have been interpreted to represent a change from decompression melting at subduction initiation to flux melting and boninitic volcanism. The group M and group B samples are a record of the change from MORB-like melts created by decompression melting of already depleted mantle at or soon after subduction initiation to arc-type flux melting and boninite volcanism. Further, the presence of melt-hybridized peridotites and gabbroic rocks with spinels belonging to group M and not group B suggests that the lower crust and the mantle transition zone of the BR may be dominated by gabbroic rocks and material related to the FABs. This would imply that a large portion of the lower crust in the fore-arc was formed during or shortly after subduction initiation and is similar in composition to MOR lower crust.

キーワード: peridotite, Bonin Ridge, melt-rock reaction, subduction initiation, spinel, moho transition zone
Keywords: peridotite, Bonin Ridge, melt-rock reaction, subduction initiation, spinel, moho transition zone