

Olivine xenocrysts in lava of petit-spot volcano

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Petit-spot is a small volcano erupted on the seafloor. The magma comes from asthenosphere, just below oceanic lithosphere, through a crack in subducting plate. The petit-spot volcanoes appear globally on the seafloor where the plate is flexing (e.g., Japan and Chile Trenches). The petit-spot lavas and entrained mantle materials have been already reported from areas of Japan Trench oceanward slope (Sites A), and of NW Pacific (Site B). Although the discovery of the petit-spots has been anticipated from Site C (offshore of Fukushima, south of Site A), lava samples and entrained mantle materials have never been reported. To examine the activity of the petit-spot volcanoes, we conducted the nine submersible dives of the *SHINKAI 6500* submersible during cruise YK14-05 of *R/V Yokosuka* at Site C in April 2014.

Alkaline pillow lavas were collected from the Site C during cruise YK14-05. Eruption age is at the time between 0.31 and 2.1 Ma estimated on the basis of the thickness of paragonite on quenched glass rind. The lavas are classified into basanite, and include large amount of olivine (>10% normative olivine). Large (1-5 mm) olivines have anhedral morphology. The large olivines show forsterite numbers (Fo) of 88-90 and NiO contents of 0.3-0.5 wt. %, corresponding to the composition of the primitive mantle peridotite. On the other hand, the small olivines surrounding the large olivines have similar range of compositions (Fo of 84-87, CaO contents of >0.1 wt. %) to those of groundmass olivines. These observations imply that large olivines are fragments of mantle peridotites, that is, these are mantle xenocrysts. If these are xenocrystic olivines, it tells us the cryptic aspects of an old oceanic lithosphere. Fo values of the present olivine xenocrysts are slightly lower than those of the mantle xenoliths reported from Site A and B (90-93). The chemically heterogeneous mantle might be existed in the subducting NW Pacific plate.

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