

## Petrological work on rocks of various oceanic plates in Western Pacific: abyssal diatreme, megamullion, serpentine seamount, etc.

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Geological and geophysical models for the various oceanic crusts (or lithosphere) have been proposed on the basis of the combined studies between seismic observation for the oceanic crusts and petrological models of the onland ophiolites, which have been assumed as fossil of oceanic crusts. It is very important to collect basement rocks constituting various oceanic crusts and to characterize those petrological features. Ocean floor is commonly covered by effusive volcanic rocks, however occasionally hypabyssal and plutonic rocks are observed among the unique geological environments in the Western Pacific as shown in the followings, i.e. tectonic windows such as transform fault, megamullion structure (or oceanic core complex), huge tectonic depression at the back-arc ridge systems, trench inner wall area in the subduction zone environment including serpentine seamounts, and volcanic diatremes discovered quite recently in the typical oceanic lithosphere.

**VOLCANIC DIATREME:** Very unique volcanic knolls have been recently discovered by N. Hirano at the typical oceanic crust in the Northwestern Pacific, off Tohoku of Northeastern Japan. The constituting rocks for the main volcanic edifice are porous alkaline lavas with 1-5Ma age containing abundant lithic fragments including gabbros as well as mantle peridotites. They are assumed as a volcanic diatreme induced in the Cretaceous oceanic lithosphere. Geological and petrological analyses on those volcano and volcanic rocks can make clear the geological cross (or columnar) section of the typical oceanic lithosphere including crust as well as upper mantle down to 100 km deep asthenospheric mantle.

**MARIANA TROUGH:** The dredge hauls were operated by M. Arima at west facing steep scarps on the east side of deep structural grabens in the Northern Mariana Trough. We collected diverse suite of upper mantle and lower crustal rocks from the Central Graben South.

**PARECE VERA BASIN:** The Parece Vela Basin (PVB) is an extinct backarc basin in the Philippine Sea. The NNE extending escarpments and depressions (maximum depth 7500 m) are fossil fracture zones and extinct segmented spreading axes (first-order segments), respectively. Oceanic core complexes (OCCs), or megamullions, develop at each first-order segment. Recently discovered OCCs at slow-spreading ridges have been interpreted as exhumed footwalls of oceanic detachment faults in magma-starved ridge environments. Godzilla Mullion, one of the OCC in the PVR, is the worlds largest OCC, 10 times larger in area than the normal OCCs in the Mid-Atlantic Ridge (Ohara et al., 2001). Various plutonic rocks including mantle peridotites were recovered from the megamullion.

**IZU-OGASAWARA(BONIN)-MARIANA FOREARC:** Many topographic highs are recognized along the Izu-Ogasawara-Mariana forearc. A number of igneous rocks including lavas, gabbros and serpentinized depleted peridotites; so called ophiolitic rocks were dredged from those seamounts by several investigators, who concluded that these seamounts originated from serpentine diapirs derived from the upper parts of the mantle wedge. Remnant mantle diapir is assumed to be the depleted source peridotite of diapiric serpentinite seamount.

**TONGA FOREARC:** The serpentine diapiric seamount have never been observed along the forearc, on the other hand, geological cross section is recognized along the Tonga Trench inner wall including very fresh mantle peridotites.

**SOUTHERN MARIANA TRENCH:** Inner trench wall of the Southern Mariana shows very steep slope with about 400 km wide. Outcrops of a series of the geological cross section for the island-arc system may be observed along the escarpment. The system includes the West Mariana Ridge (remnant arc) - Mariana Trough (back arc basin) - Mariana Arc (active arc + remnant arc) -Mariana Forearc - Mariana Trench from the west to the east. Serpentinized harzburgites, dunites, gabbros, dolerites and basalts were collected along the escarpment.