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

SCG059-12 会場:105 時間:5 月 26 日 15:00-15:15

フィリピン海プレート創成過程復元と島弧創成メカニズムの解明
Tectonic reconstruction of initial stage of Philippine Sea Plate formation

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Recent research in the Izu-Bonin-Mariana (IBM) forearc revealed volcanic section representing earliest record of IBM arc magmatism (e.g., Ishizuka et al., 2006; Reagan et al., 2010). The obtained stratigraphy combined with petrological, geochemical and geochronological study led us to propose a model for subduction initiation along this arc (Ishizuka et al., 2006). This model assumes spontaneous subduction of old and cold, thus, with higher density plate begins to sink beneath younger and hotter plate with lower density (Stern, 2004). This model for subduction initiation, however, has not been tested from a tectonic point of view. To do this, it is necessary to reconstruct tectonic environment at c. 50 Ma and before of Philippine Sea region.

R/V Yokosuka YK10-14 cruise investigated Palau Basin and southern part of West Philippine Basin (WPB) to obtain crucial geological and geophysical data for reconstruction of one of the oldest parts of the Philippine Sea Plate.

Bathymetric and geomagnetic survey in the Palau Basin and southern WPB revealed: 1) Topographic fabric associated with the seafloor spreading can be recognized in the southern WPB. The strike of the topographic fabric in the northern part near the Central Basin Fault is close to E-W, whereas that of the southernmost part is nearly NW-SE, which suggests that the spreading direction of WPB changed clockwise with time. 2) The topographic fabric and magnetic lineations near N-S strike can be recognized in the Palau Basin, suggesting seafloor spreading of E-W direction. This fabric in the Palau Basin curves eastward in the vicinity of the Mindanao Fracture Zone (MFZ). 3) A trough of unknown origin runs WNW-ESE near 5^{o}N, 130^{o}E. 4) Southern and eastern part of the Palau Basin is occupied by numerous seamounts.

Main targets of dredge sampling were: 1) oceanic crust of the oldest part of WPB. 2) oceanic crust of Palau Basin exposed along the fracture zones. 3) volcanic structure within the Palau Basin. 4) basement of Southern Kyushu-Palau Ridge (KPR) which corresponds to the eastern margin of the Palau Basin.

Sampling of the Palau Basin crust along the MFZ, which separates the Palau Basin from WPB, was conducted in 2 regions. One is at c. 130^{o}E, where seafloor in the Palau Basin is relatively deep (generally deeper than 6000m) and shows series of abyssal hills trending N-S to NE-SW. The other region, east of the first one, has much shallower basin floor of 4500 - 4000 m deep. Dredge hauls in these region successfully recovered pillow lava blocks of mainly aphyric basalt with remaining fresh glass rind and olivine-rich dolerite. Sampling of crustal materials in the Palau Basin was also conducted at WNW-ESE trending trough in the middle part of the Basin near 5^{o}N, and recovered olivine basalt with some fresh glass.

Southern part of the Palau Basin is characterized by abundant NE-SW-trending ridges crosscutting N-S-trending abyssal hills. Clinopyroxene-olivine basalts were mainly recovered from these ridges. They are distinct in petrography from basalts from the Palau Basin along the MFZ, but similar to those from near 5^{o}N.

The oldest part of ocean crust of WPB was sampled at the NW-SE-trending scarp at c. 8^{o}26'N. Pillow lava blocks of aphyric basalt were recovered. These samples will provide first reliable age constraint in the southern WPB which can be linked with magnetic anomaly data obtained during this cruise.

In southernmost part of the KPR, eastern escarpment of a ridge between main KPR crest and the Palau Trench was dredged to recover basement of the KPR. This dredge recovered the metamorphic rocks including amphibolites, amphibole schist and siliceous schist, which implies occurrence of non-oceanic crust.

Preliminary geochemical data indicate that basalts from the Palau Basin and the WPB have characteristics of MORB-like backarc basin basalt. Details of geochemical data and $^{40}Ar/^{39}Ar$ ages will be reported in this presentation.

Keywords: Palau Basin, subduction initiation, West Philippine Basin, tectonic reconstruction, ArAr age, magnetic anomaly