

Seismic structure of the Kita-Daito Basin and Minami-Daito Basin in the northwestern Philippine Sea plate

Azusa Nishizawa^{1*}, Kentaro Kaneda¹, Mitsuhiro Oikawa¹

¹Japan Coast Guard

Several large topographic features characterize the northwestern Philippine Sea plate. They are, for example, three large bathymetric highs, the Amami Plateau, Daito Ridge and Oki-Daito Ridge with thicker crust over 15 km, which indicates they are paleo-island arc. There are also large basins between them, the Kita-Daito Basin and Minami-Daito Basin.

The Kita-Daito Basin exists between the Amami Plateau and Daito Ridge and the Minami-Daito Basin between Daito Ridge and Oki-Daito Ridge. The average depth of the Kita-Daito Basin is 5300 m and that of the Minami-Daito Basin is slightly shallower, 5000 m. However, the difference of gravity anomalies between these basins is significantly large compared with the difference in water depth, which give us crucial information of the evolution of the Daito Ridge Group.

We could carry out several seismic refraction and multi-channel seismic reflection explorations across these basins under the Japanese Continental Shelf Project in 2004-2008. The P-wave velocity structure of the Kita-Daito Basin is normal oceanic with rather thinner crust of 4-6 km and is same as those of the Shikoku Basin and Parece Vela Basin on the Philippine Sea plate. The Pn velocity beneath the Kita-Daito Basin ranges 7.9-8.1 km/s generally, but is 8.3 km/s at the boundary with the northern end of the Daito Ridge. The crust beneath the Minami-Daito Basin is thicker than that of the Kita-Daito Basin and reaches to 10 km in the transition area to the Kyushu-Palau Ridge. The velocity at the bottom of the crust is slightly high, around 7.2 km/s, and Pn velocity is 8.0-8.2 km/s. There is not thick middle crust with $V_p=6.3-6.8$ km/s characterizing island arc crusts. The crustal structure for the Minami-Daito Basin rather resembles those of the Kyushu-Palau Ridge.

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