Crustal structure around the Oki-Daito Ridge in the northern West Philippine Basin (2)

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The Philippine Sea consists of three marginal basins, the Shikoku Basin, Oki-no-Tori-Shima (Parece Vela) Basin and West Philippine Basin. Several bathymetric highs, the Daito Ridges, characterize the region to the north of the West Philippine Basin. In May-July 2004, we carried out two wide angle seismic and multi-channel seismic (MCS) profilings across the Oki-Daito Ridge and Daito Ridge that are the members of the Daito Ridges. The results provided the first images of the deep structure in this region and important clue to origin of the Daito Ridges.

The controlled sources used in this seismic experiment were a tuned array of 36 airguns with a total volume of 8,040 inch3 and two explosives. We shot the airgun array at an interval of 100 m along EW 240 km and NS 660 km long lines. We used 251 ocean bottom seismographs (OBS) at an interval of 3-5 km, and a 6 km long, 480-channel hydrophone streamer as receivers. Clear PmP signals and reflections from the lower crust and/or upper mantle were detected in many OBS records. These data were modeled by a tomographic inversion and two-dimensional ray tracing.

The thick crust with thickness of 20-25 km exists beneath the Daito Ridge and Oki-Daito Ridge. Velocity structure of the upper crust largely varies between these ridges. The oceanic layer 2 of the West Philippine Basin shows smaller velocity gradient than that of normal oceanic crusts. A low velocity layer in the oceanic layer 3 and very high velocity of 8.6 km/s at about 2 km below Moho characterize the velocity model to the north of the Oki-Daito Escarpment in the West Philippine Basin. No significant differences in Poisson's ratios of the oceanic crust between north and south of the escarpment are shown.