

Crustal structure around the Minami-Hiyoshi Seamount at the northern end of the Mariana arc

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The Minami-Hiyoshi Seamount is positioned at 1,200 km south of Tokyo, Japan and is one of the submarine volcanoes on the volcanic front of the northern Mariana arc. The seamount is also called Hiyoshi-okinoba. Submarine eruption was detected on Aug. 25, 1975 and widespread discolored water was observed in 1977. Discolored waters were observed in 1992 and 1996. No signals of the submarine eruption were detected since then.

We, Hydrographic Department, Japan Coast Guard, carried out several geological and geophysical surveys to elucidate the present seismic and volcanic activity of the Minami-Hiyoshi Seamount in Aug. 2001. The survey includes multi-beam swath bathymetry, sidescan imaging, single-channel seismic reflection and refraction profiling, microseismicity, magnetic and gravity measurements. In this paper, we report mainly results of seismic refraction survey using an airgun and ocean bottom seismograph and hydrophone (OBS) system.

We deployed nine OBSs on and around the Minami-Hiyoshi Seamount. Four airgun profiles with lengths of 50-70 km were surveyed. An airgun with a capacity of 16 or 65 liter, firing at an interval of 40 s, resulted in the spatial shot interval is about 100 m. The obtained crustal model shows P wavespeeds are higher just beneath the summit than those around the seamount. No significant signals suggest the existence of low wavespeed materials in the shallow crust beneath the seamount.