

## Seismic structure of the western Mariana arc - backarc system

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A deep seismic profiling in the Mariana area using an airgun array and Ocean Bottom Seismographs (OBSs) was carried out in June and July, 2003, to make up a loss of airgun shooting in previous cruise as a part of the MARGINS program (US-JAPAN COLLABORATIVE RESEARCH: MULTI-SCALE SEISMIC IMAGING OF THE MARIANA SUBDUCTION FACTORY). We report the velocity model of the western part of the Mariana arc - back arc system using above seismic data.

We had already reported the velocity structure of the eastern part of the Mariana arc - backarc system, which is from the Mariana trough to serpentinite diapir on the forearc region. According to above results, we understood the structure as follows. (1) Crustal thicknesses of the Mariana arc and troughs are about 20-25 km and 6 km, respectively. (2) A middle crust with a P-wave velocity of 6km/s exists beneath the arc region and the thickness is about 5 km. (3) A middle crust has lateral variation and the P-wave velocity beneath the forearc is faster than that beneath the arc. (4) A lower crust of the arc has P-wave velocity of over 7.0 km/s and the thickness is about two or three times of that beneath the trough area. (5) The lower crust of the arc - backarc transition zone indicates fast P-wave velocity of 7.0-7.6 km/s. Above characteristics are common to that of northern Izu-Ogasawara area (Suyehiro et al., 1996; Takahashi et al., 1998). However, the common to the old like the West Mariana ridge is still unknown. Main objective of this study is to understand the relationship between the velocity structure and the age.

The velocity structure of the western part of the Mariana arc - backarc system has roughly common characteristics to that of the eastern part. The crustal thickness of the West Mariana ridge is about 15 km and those of the Mariana and Parece Vela basins are about 6 km, respectively. A middle crust with a P-wave velocity of 6km/s exists beneath the arc region and the thickness is about 7 km. A lower crust of the arc has P-wave velocity of about 7.0 km/s and the P-wave velocity increase to 7.2-7.4 km/s beneath the boundary between the West Mariana ridge and the Parece Vela basin. On the other hand, the large difference between these structures is the ratio between the middle crust and the lower crust. The Mariana arc including new volcanoes has thicker lower crust than the middle crust; however, the West Mariana ridge with old age has thinner lower crust and thicker middle crust. It is possible that the difference indicates the process of the crustal growth. We would like to understand the details of the crustal growth by not only P-wave structure but also S-wave.