Structural characteristics around the initial rifting zone at the junction of Izu-Bonin and Mariana Arcs

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Izu-Bonin and Mariana Arcs (IBM) are oceanic island arcs subducting the Pacific Plate beneath the Philippine Sea Plate. The Izu-Bonin Arc is NS trending linear feature and the Mariana Arc is arcuate characteristics, connecting each other around the latitude 24 degrees north. The Shikoku basin exists back arc of the IBM and the Mariana basin is developed between the Mariana Arc and the west Mariana ridge. As mentioned above, the characteristics of the arcs and back arc basins are different between the northern and southern sides of the latitude 24 degree north. The structural characteristics around the junction area are important to understand the developments of arcs and back arc basins. To reveal the structural characteristics at the junction between Izu-Bonin and Mariana Arcs, we have conducted a seismic experiment using ocean bottom seismometers (OBS) and a large volume airgun array of R/V Kairei of the Japan Agency of Marine-Earth Science and Technology (JAMSTEC) in 2006. The survey and initial results have been reported in the 2006 fall meeting of Seismological Society of Japan. This presentation will give results and discussions. The data analysis is first arrival tomography (Zhang et al., 1998) using the first arrival travel time data of OBS, followed by the travel time mapping method (Fujie et al., 2006). The characteristics of the velocity image of the seismic line are as follows: 1) the crustal thickness of the junction is about 20 km and thicker than those of surroundings, 2) the thickness of the layer of 6-6.5 km/s P-wave velocity at the Mariana Arc is about 10 km and thickest in the seismic line, although that of the west Mariana ridge is about 5 km, 3) there is a crustal thinning part in fore arc region, 4) the crustal thicknesses of 6 km/s P-wave velocity layer of elongated back arc seamounts are not thick as surroundings, and 5) 7 km/s isovelocity contour suggests that the junction of arcs have two-root structure.