

Active shallow structures of Muroto-off Ashizuri uplifted ridges, SW Japan

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Several topographic highs such as the Muroto, the Nishi-Muroto and the Ashizuri Knolls are intermittently developed from Cape Muroto to off Cape Ashizuri exhibiting a reverse L-shaped. A seismic reflection survey revealed an asymmetric anticlinal structure cut by a reverse fault at the eastern wing and consisted of a gentle slope at the western wing, and suggested beginning of uplift around late Pliocene to early Quaternary (Okamura and Joshima, 1986, GSJ Marine Geology Map). This reverse L-shaped uplifted zone is thought to be caused by oblique subduction of the Philippine Sea Plate to the Nankai Trough (Sugiyama, 1989, Bull. Geol. Surv. Japan).

We carried out deep-towed subbottom profiler (SBP) survey during R/V Hakuho-maru KH-15-2 and KH-16-5 cruises to detect sedimentation and deformation structures associated with uplift movements. A high resolution profile was successfully obtained by deep-towing operation of a chirp system (EdgeTech DW-106) at approximately 15 m above the seafloor using ROV NSS (Navigable Sampling System).

The survey areas are the Nishi-Muroto Knoll 45 km south of Cape Muroto and an unnamed knoll (called Minami-Ashizuri Knoll tentatively) 70 km south of Cape Ashizuri. The Nishi-Muroto Knoll consists of NE-SW trending highs and the survey was conducted across the two major summits from SE to NW. The sedimentary basin southeast of the south summit shows northwestward dipping and the dip angle increases with burial depth. The sedimentary sequence northwest of the south summit steeply dips northwestward and about 100 meters' displacement is estimated at the southeast scarp of the south summit. The slope northwest of the south summit is also characterized by a NE-SW trending deep valley. In contrast, few reflectors are recognized at the north summit suggesting exposure of older sequence than the south summit. The small basin between the north and south summits indicates relative uplift movement of the north summit to the south summit. A NE-SW trending lineament is developed in the southern slope of the Minami-Ashizuri Knoll. The survey was conducted across this structure from SE to NW and showed the horst structure bounded by a high angle fault and a flexure. Our high resolution SBP survey successfully revealed characteristic sedimentation and deformation associated with recent tectonics along the uplifted zone from Cape Muroto to off Cape Ashizuri.

Keywords: active fault, active fold, outer ridge, subbottom profiler, Navigable Sampling System