

Subduction tectonics of the Ogasawara Plateau, southern Izu-Ogasawara Trench area

Ryo Miura[1], Yasuyuki Nakamura[2], Kyoko Okino[3], Kensaku Tamaki[4], Hidekazu Tokuyama[5], Koichi Hisatani[6]

[1] ORI, Univ. of Tokyo, [2] Ocean Res. Inst., Univ. Tokyo, [3] ORI, [4] ORI, Univ of Tokyo, [5] ORI, Univ. Tokyo, [6] MMAJ

The Ogasawara Plateau is a topographic high located on the Pacific plate at the junction of the Izu-Ogasawara trench and the Mariana trench. The plateau has 2,000 to 3,000 m of relief above the ocean floor, and several guyots rest on it. This plateau is the largest subducting seamount in the Western Pacific area. Multi-channel (240 ch, streamer length: 6,000 m) seismic reflection data was collected (by JNOC and MMAJ) in the Ogasawara Plateau area. In this study, three seismic profiles, D00-1 ('typical' subduction of oceanic plate), D00-2 (central part of subducting Ogasawara Plateau) and D00-3 (southern part of subducting Ogasawara Plateau) were processed and interpreted. These profiles clarify the geologic structure and tectonics of the subducting seamount. Seismic profiles show distinct topographic lineations corresponding to high-angle normal faults. There is no evidence for compressional features such as reverse faults or folds in the plateau. The normal faults were probably formed during bending of the subducting oceanic plate. On the other hand, many reverse faults are observed in the frontal part of the landward (Philippine Sea) plate, and a very small accretionary prism is also observed in seismic profile 'D00-1'. The top of the Ogasawara Plateau is imaged in seismic profile 'D00-2', and is located beneath a fore-arc serpentinite seamount on the Philippine Sea Plate, named 'Hahajima Seamount'. This observation indicates that the Ogasawara Plateau has been subducting beneath the landward (Philippine Sea) plate, and that the plateau is not accreting to the overriding plate. This observation also suggests that there is no mantle wedge beneath the Hahajima Seamount, because of basal-type tectonic erosion. Bathymetric map and seismic profile 'D00-3' show structures that indicate gravitational collapse along the front of the landward slope, indicating frontal-type tectonic erosion. The structural features of the Ogasawara Plateau and the landward plate imaged using high-resolution bathymetric and seismic profiling suggest that basal- and frontal-type tectonic erosion occur simultaneously in this area. These data also suggest that high-relief oceanic plateaus or seamounts do not necessarily accrete to the overriding plate as ophiolites.