

北西太平洋の深海底における音響特性評価 Acoustic characterization of abyssal plain, northwestern Pacific region

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The old seafloor covered by pelagic sediment has not attracted large scientific attention and remained untouched for many years, however, the recent studies on intra-plate volcanism as well as the increasing interest in deep-sea natural resources focus spotlight on the abyssal plains. We analyzed the multi-beam bathymetry, beam intensity, and side-scan images of abyssal plain in the northwestern Pacific, around the Minami-Torishima (Marcus) Island. The data were collected by Japan Coast Guard as part of Japanese EEZ survey and by R/V Yokosuka for decades. The beam intensity data from multi-beam echo sounder were processed to create a backscatter mosaic without geometric distortion. The mosaic shows a large variation of acoustic characteristics in whole study area. The high backscattering areas at the foot of large seamounts likely reflect the distribution of volcanoclastic sediments and debris. We can also recognize another type of high backscattering areas in flat seafloor, where neither remarkable seamounts nor knolls exist. The latter type partly corresponds to the area where the high concentration of rare-earth elements were reported and may suggest a thin cover of uppermost soft sediment layer. We try to integrate the backscattering mosaics and the statistic analysis of bathymetry and to establish a new method of acoustic characterization of abyssal plain. We also plan to compare our results with piston core samples as ground references and to discuss the sedimentation process and the relationship with intra-plate volcanism on old seafloor.

Keywords: marine acoustics, muti-beam echo sounder, backscattering intensity, abyssal plain