

珪藻殻が堆積物の物性に与える影響 —東北三陸沖の例— Influence of Diatomaceous Structure on the Physical Properties - An Example of off San-riku, North Japan -

小嶋 孝徳^{1*}, 斎藤 実篤²

Takanori Ojima^{1*}, Saneatsu Saito²

¹ 東京大学大気海洋研究所, ² 海洋研究開発機構

¹AORI, The University of Tokyo, ²JAMSTEC

During Ocean Drilling Program(ODP) Leg. 186, two sites(Site 1150 and Site 1151) were drilled on the continental slope of the deep-sea forearc basin of northern Japan. Diatomaceous sediments were recovered Site 1150 (39° 10.9'N, 143° 19.9'E) and Site 1151 (38° 45.1'N, 143° 20.0'E), and the depth of each site is 1181.60 mbsf and 1113.60 mbsf, respectively. This area is under the influence of the Oyashio current and is one of the highly bio-productive regions of the North Pacific Ocean (Motoyama et al., 2004). The combination of high productivity and active tectonic deformation that often caused high rate accumulating of fossil and organic rich sediments.

The onboard results of porosity measurements show high value (50-70 %) down to 1000 mbsf, and obviously higher than nearby subduction trench, Nankai Trough (Taylor and Fisher, 1993). There is a possibility that diatomaceous shell keep a frame structure from effective stress and load pressure. On another drilling site result, DSDP(Deep Sea Drilling Project) Leg. 19 located 60 km to the north of ODP sites, was reported high value of porosity, but recognized only shallow range (>500 mbsf) (Shephard and Bryant, 1980).

We focused on the relationships between physical property, microstructure, and logging data at deep range(?1000 mbsf). We picked 14 samples to observe microstructure using SEM and measure permeability using flow-ump approach(1.5-4.5 MPa), and compiled Logging data respectively.

We observed many pore in and around diatom fossils using SEM even in the sample from deeper than 1000 mbsf. And we measured pore size and permeability at each depth. As depth is increased, permeability generally decreased by effective stress and load pressure. In this site, we recognized diminish wavy curve in correlation between depth and permeability. Furthermore, wavelength cycle nearly matched resistivity alternation, and promised to have a correlation with lithofacies change.

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