

Palaeoclimate analysis for 300 ka based on the organic carbon contents of MD01-2407 core from the Oki Ridge, Japan Sea

Yuko Takizawa^{1*}, Hiroki Yamamoto², Fujio Kumon²

¹Graduate School of Science and Engineering, Shinshu University, ²Department of Environment Sciences, Faculty of Science, Shinshu University

We analyzed total organic carbon (TOC) and total nitrogen (TN) contents at 2 cm interval for a long sediment core named MD01-2407 (932 m depth, 55.28 m length) taken from the Oki ridge in the southern part of the Japan Sea. We made an age-depth relation for the MD01-2407 core, using age-control data such as 5 marker tephra layers, 7 ¹⁴C ages, 3 TL boundaries, and nine delta ¹⁸O events (after Kido et al., 2007; Yokoyama et al., 2007). This analysis was performed for the core sample from 25.50 m to 0.18 m in depth, and corresponds for the past 300 ka in age.

TOC content is generally high in MIS 7, 5, 3 and 1, and low in MIS 8, 6, 4 and 2. Fluctuation of TN content is similar to that of TOC. In MIS 8, TOC content is constantly low, around 1.0 to 1.8 %. In MIS 7, TOC content is high, varying from 1.2 to 4.3 % with periodic fluctuation. In MIS 6, TOC content is constantly low in the range of 0.5 to 1.8 %. In MIS 5, TOC content is high and fluctuates from 1.0 to 5.0 % with periodicity of a few thousand years. In MIS 4, TOC content is constantly low around 1.2 %. In MIS 3, TOC content is a slightly high, varying from 1.5 to 3.8 % frequently with short periodicity of several to tens hundreds years. In MIS 2, TOC content is in the lowest level, around 0.3 to 2.0 %. In MIS 1, TOC content varies from 2.0 to 5.0 % with distinctly fluctuation. TOC content in the sediment core reflects biological productivity in the Japan Sea (Oba and Akasaka, 1990). Therefore, high TOC content means high productivity, and vice versa.

Temporal fluctuation of TOC content in MIS 3 shows many peaks, changing drastically in short periodicities like a D-O cycle. On the other hand, TOC content fluctuates in longer periodicity than D-O cycles in MIS 7 and 5. TOC content is high at 290 ka and 262 ka in MIS 8 and at 160 ka in MIS 6, which is regarded as cold periods. According to these characteristics of TOC fluctuation, surface productivity of Japan Sea might be controlled by not only global cold-warm climate changes but also other different factors such as regional climate system or water circulation of the Japan Sea.

Keywords: TOC, TN, MD01-2407 core, Japan Sea