

Plaeoclimatology and palaeoceanography of Japan Sea based on the organic carbon contents of MD10-3304 core for the past

URABE, Tasuku^{1*}, KIGOSHI, Tomohiko¹, KUMON, Fujio¹

¹Department of science, Shinshu university

The organic carbon (TOC) and the nitrogen (TN) contents were measured at 3 cm interval for a long sediment core (MD10-3304) taken from a site of 896 m depth of Umitaka ridge in Japan Sea off Joetsu City. The bottom of the 33 m-long core is estimated as old as 103 ka, and data interval is 50 to 100 years on average. TOC was separated into the marine organic carbon (MAOC) and the terrigenous organic carbon based on difference of C/N ratio.

The temporal changes of TOC and MAOC content well correspond both to the marine oxygen isotope curve (LR-04) and to the oxygen isotope curve from Greenland ice sheet (NGRIP). Glacial-interglacial cycle on orbital scale, Heinrich event and furthermore stadial-interstadial cycle called Dansgaard-Oeschger(D-O) cycle are well identified on the TOC and MAOC profiles. This fact suggests a strong teleconnection between the Northern Atlantic and Far East Asia.

The relationship of TOC and MAOC contents with dark layer (TL) in Japan Sea is classified into the four modes, which might be caused in response to temperature and sea level changes. For example, the combination of very low TOC and MAOC content and thick TL layers (TL 2, 3), Mode 1, was observed in the Last glacial maximum (MIS 2), resulting from very cold climate and persistent anaerobic bottom-water conditions forced by lower sea level and density stratification. Mode 3, which is characterized by many thin TL layers of high TOC and MAOC content are observable in MIS 3, 4, 5a, 5b, and 5d. TL layers of this mode were caused by enhanced biological productivity due to warm climate, resulting in anaerobic condition of the bottom water due to oxygen consuming for decomposition of abundant organic matter. The temporal change of TROC content well corresponds to annual precipitation reconstructed by the best-modern-analogues method applied to the pollen data from Lake Nojiri in the north of Nagano Prefecture.

Keywords: Plaeoclimate change, Total organic carbon, Japan Sea, Teleconnection, TL layer, Air temperature variation