

Climate change for the past 100 ka viewed from the TOC contents of the sediment cores MD10-3304 and 3312 from Japan Sea

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Sediment cores, MD10-3304 and 3312 are collected from two sites on a mound at 896 m depth and a small ridge at 1026 m depth off Joetsu, Japan Sea during the MD179 cruise. They are composed mostly of silty clay with several marker tephra beds. Based on the relationship between the depths and ages of the identified tephra and ¹⁴C measurements, the bottom age of the cores are estimated as old as 102 ka and 125 ka respectively. Total organic carbon (TOC) and total nitrogen (TN) have been analyzed on the cores in every 2 cm or 4 cm intervals corresponding to 50 to 100 years.

The TOC contents vary from 0.6 % to 2 %, showing quasi-periodic fluctuations, and the stratigraphic profiles of TOC contents of the MD10-3304 and 3312 cores are very similar each other. The temporal changes of TOC in both cores well correspond to the delta 18O profile of the ice core (NGRIP) from Greenland. Short warm period correlative to the Greenland Interstadial (GIS) 1 to 25 can be identified in the profiles for 100 ka (D-O cycle). General trends of both TOC curves are also similar the LR04 curve of marine delta 18O isotope. This fact suggests a strong teleconnection between North Atlantic region and Far East Asia, climate of which are controlled strongly by the same Arctic air mass. In a cold period, the strong cold air mass pushed the polar front southward, and cold air mass occupied around Japan Sea for a longer season. Cooling effect of sea surface temperature and expanded frozen season might be resulted in low biological productivity of Japan Sea TOC contents of the Japan Sea sediment is an excellent proxy of winter temperature in a middle latitude region of Far East Asia.

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Keywords: paleoclimate, Japan Sea, total organic carbon, MD10-3312, Greenland ice sheet, D-O cycle