Paleoceanographic reconstruction of Japan Sea inferred from organic carbon content of depth transect sediments offshore Wakasa Bay

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Alternations of dark and light color are observed in the last glacial sediments of the Japan Sea, and change in brightness of sediments resembles millennia cycle of $\delta^{18}O$ in the Greenland ice core (Dansgaard-Oeschger cycle: DO cycle). Brightness (L*) of Japan Sea sediment mainly reflects total organic carbon (TOC) content. In previous studies, variations in TOC contents have been attributed to changes in marine productivity due to nutrients and changes in dissolved oxygen concentration in the bottom water due to changes in salinity in Japan Sea caused by the East Asian summer monsoon (EASM). However, ventilation due to fluctuations in surface water temperature may also be related to fluctuations in dissolved oxygen concentration in the bottom water. Since the ventilation depth in Japan Sea depends on the density of surface water, comparison of the variation of the TOC content between shallow and deep sediments would provide new insight into the effect of ventilation on TOC contents in Japan Sea sediments. However, no previous studies have analyzed TOC content in shallow sediments in detail. Here, we analyze Br/Ti using XRF core scanner of shallow (~400 m water depth: WB4) and deep (~850 m water depth: WB6) sediment cores collected off Wakasa Bay, Japan Sea, in order to understand the formation mechanism of dark layers in sediments of Japan Sea.
Analyzed Br/Ti shows a strong positive correlation with the marine organic carbon (MOC) contents estimated by carbon isotope, we use Br/Ti as a MOC content proxy. The MOC contents of WB6 shows a larger amplitude and higher frequency fluctuation than that of WB4. This difference in the MOC content is presumably due to changes in dissolved oxygen concentration in the deep water of Japan Sea. Because the variation of MOC content of WB6 is similar to that of Mg/Ca-based sea surface temperature (SST) of *Globigerina bulloides*, which has a prominent flux peak in March in the modern Japan sea, it is suggested that the fluctuation of ventilation was strongly influenced by the cooling in winter. Since the MOC fluctuation of WB6 is more similar to the Greenland ice core record the WB4, it is suggested that the MOC content variation (alternation of dark and light color) in the deeper Japan Sea sediments were not only caused by EASM, but also affected by surface cooling by the East Asian winter monsoon (EAWM).

Keywords: Last Glacial period, Japan Sea, organic carbon, Dansgaard-Oeschger cycle

