

## Late Quaternary paleoceanographic changes in the southwestern Okhotsk Sea based on geochemical and siliceous microfossil records

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High resolution analyses of geochemical parameters (biogenic opal, calcium carbonate, organic carbon, and nitrogen) and microfossil assemblages (diatoms and radiolarians) on Core MD01-2412 clarified detailed paleoceanographic changes such as sea-ice cover and biological production in the southwestern Okhotsk Sea during the last 115 kyrs. An age model of Core MD01-2412 was established based on oxygen isotope stratigraphy, accelerator mass spectrometer (AMS)  $^{14}\text{C}$ , and tephrochronology. Millennial-scale oceanographic oscillations, which were linked with the Dansgaard-Oeschger (D-O) climatic cycles, were identified from organic carbon and C/N ratios. Increases in TOC and C/N ratios reflect abrupt sea-level rises associated with 14 interstadial events over the past 115 kyrs, attributing to the downward transport to eroded continental shelf sediments. Sea-ice history reconstructed by siliceous microplankton records indicated that the present sea-ice condition has been formed during the last 8 kyrs. Only during Marine Isotope Stage (MIS) 2 was the duration of sea-ice cover in this region much longer than that of today (four to five months a year). Two diatom species, *Thalassionema nitzschioides* and *Fragilariopsis doliolus* revealed that the Soya Warm Current Water (SWCW) flowed into the Okhotsk Sea near the site of Core MD01-2412 during the last 12 to 14 kyrs and MIS 5a and was associated with sea-level rise. Biological productivity rapidly increased during MIS 1, associated with sea-ice retreat. Two major increases of organic carbon (OC) contents (wt%) and Corg/N ratios were observed and the timings of these events were 15.8-16.7 ka (Event 1) and 13.1-13.6 ka (Event 2). Corresponding to these events, the abundance of *Cycladophora davisiana*, an intermediate water dwelling radiolarian species, increased. This high *C. davisiana* abundance can be correlated to the input of terrestrial organic matter from the submerged shelf to the intermediate water and/or prolonged residence time of organic matter derived from coccolithophorids, bacteria, and detrital materials in water column under well-stratified surface-layer. Apart from the radiolarians, the production of diatoms in the surface waters was suppressed by the development of well stratified surface water along with sea-ice melting during the early Holocene. Diatom production increased gradually during the last 10 kyrs with enhanced vertical mixing.