

## Bottom water temperature changes in the Okhotsk Sea during the last 30,000 years: The evidences from benthic foraminifer

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The Okhotsk Sea is the source region of North Pacific Intermediate Water (NPIW) and it plays an important role to the northern hemisphere climate systems. Some circumstantial evidences from deep sea sediments suggested that cold, dense and saline intermediate water should be generated in the Okhotsk Sea and propagated throughout the north Pacific. However there are no direct evidences about such intermediate/bottom water properties during the last glacial period in the Okhotsk Sea. Here we present the evidences of decreasing bottom water temperature (BWT) in the Okhotsk Sea using trace metals of benthic foraminifers during the last 30,000 years. Sediment core sample MR06-04 PC4, was recovered from 1,217m water depth in southern part of the Okhotsk Sea, off Shiretoko Peninsula. In this study, magnesium / calcium ratio (Mg/Ca) of foraminiferal skeletons was used as a tracer of paleotemperature in seawater. Mg/Ca data in benthic foraminifers *Uvigerina akitaensis* were fluctuated in short intervals and ranged from 0.6 to 1.2 mmol/mol and during the last 30,000 years. These fluctuations correspond approximately from 0 to 5 degree C water temperature changes of the bottom water. Significant three BWT decreasing events were identified at 19,000, 16,000 - 15,000, and 12,500 years ago. These periods were correspond with global cold events: namely, the end of last glacial, Heinrich event 1(H1), and Younger Dryas event (YD), respectively. Oxygen isotope records of seawater ( $\delta^{18}O_{sw}$ ) reconstructed from benthic foraminiferal  $\delta^{18}O$  and BWT in the last glacial maximum (LGM) indicated approximately 1.3 permil heavier than modern surface water. It means that bottom water salinity increased ca. 0.5 during the last glacial period. Such cold and saline bottom water should be originated from brine water related with sea ice.

Keywords: Okhotsk Sea, Benthic foraminifers, deglacial period, bottom water temperature, Mg/Ca