

Paleoenvironmental changes based on biomarker in the northern Chukchi Sea during the Holocene

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Abstract

Glycerol dialkyl glycerol tetraethers (GDGTs) are useful biomarkers to reconstruct paleoenvironment such as sea surface temperature, mean annual air temperature, the contribution of soil organic matter and the soil pH, but the application of GDGTs to the Arctic paleoenvironmental study was yet limited. In this study, we tried to reconstruct Holocene changes in the northern Chukchi Sea, western Arctic Ocean by analyzing GDGTs in three sediment cores based on GDGT distribution in surface sediments from the western Arctic Ocean (Park et al., 2014). High concentrations of isoprenoid GDGTs, reflecting high primary production combined with elevated sedimentation rates, occurred after ca. 8–9 ka and were likely controlled by sea-ice conditions and Pacific water inflow via the Bering Strait. Geographic heterogeneity in these processes is indicated by different downcore patterns among the cores from the northern Chukchi Sea sites. Low GDGT concentrations and high BIT and CBT values before ca. 8 ka may indicate heavy sea-ice conditions in combination with terrestrial inputs during deglaciation and sea-level rising. TEX₈₆ and TEX₈₆^L indices potentially indicative of sea surface temperatures appear to show millennial-scale variability, but the controls on these fluctuations are not well understood.

Keywords: Arctic Ocean, Chukchi Sea, Holocene, GDGT

References

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