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Sea surface temperature changes in the Okhotsk Sea and adjacent North Pacific during the Last Glacial Maximum and deglac

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We determined sea surface and subsurface temperatures in the Okhotsk Sea during the Last Glacial Maximum (LGM) and the last deglaciation from measurements of biomarker proxies in piston core sediments, which reveal the climate response of this region to global climate changes. During the LGM, alkenone-derived temperatures in the Okhotsk Sea were relatively warm. Warm alkenone-derived temperatures have also been found at many other sites in the western North Pacific and may reflect the shift in the season and depth of biomarker production from early summer and autumn to midsummer because of an expansion of the season of sea-ice cover. During the last deglaciation, alkenone-derived temperatures changed in response to the millennial-scale climate change; from 19?10 kyr BP the main feature was higher temperatures during Heinrich Event 1 (H1; 4.1~14.2 C) and Younger Dryas (YD; 6~11.9 C) and lower during the Bolling-Allerod (B-A; 4.8~11.6 C). The apparent warmer alkenone-derived temperatures during the cold events (H1 and YD) may result from a cause similar to that for the LGM temperatures. Empirical Orthogonal Function (EOF) analysis also indicated a shift in the alkenone production season as the first principal component. The EOF analysis further implied that the alkenone-derived temperature traced the precessional cycle of fall insolation at 45_N and millennial time-scale variability in the North Atlantic. The millennial-scale response of alkenone-derived temperatures was probably related to the equatorward/polarward migration of the westerly jet axis and to the weakened/strengthened Asian summer monsoons resulting in colder and drier or warmer and wetter climates in East Asia, including the Okhotsk Sea.

Keywords: Okhotsk Sea, North Pacific, Alkenone SST, Sediment, LGM, Deglaciation