



Penultimate and last glacial cycles in the western Bering Sea: evidence from micropaleontological and sedimentary records

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The short- and long-term variability of sea-surface bioproductivity, intermediate-water oxygenation, sea ice conditions and bottom current velocities are inferred from the high-resolution multi-proxy study based on benthic (BF) and planktonic (PF) foraminiferal assemblages and sedimentary record of the 18m-long Core SO₂01-2-85KL (western Bering Sea). Early MIS 6 is characterized by a very low seasonal bioproductivity, moderate bottom-water oxygenation, and expanded seasonal sea ice conditions, as documented by the abundant phytodetritus species *Alabaminella weddelensis*, *Islandiella norcrossi* and *Epistominella arctica*, suboxic group of BF, and high accumulation rates of gravel grains, respectively. Middle MIS 6 is represented by intercalation of green diatomaceous ooze and grey clayey silt layers with sharp peaks of BF abundance in green interbeds. These spikes might result either from short-term events of enhanced sea surface bioproductivity or from lateral BF transport by intensified bottom currents, as it is demonstrated by high-amplitude variations of the clay/silt ratio. Rather high seasonal productivity and northward migration of the sea ice margin are reconstructed for the late MIS 6 that is also characterized by a slight increase in the Northern Hemisphere summer insolation. Strong dissolution of calcareous microfossils is revealed for MIS 5.5-5.1 when the Bering Strait was open. Dissolution might be caused by an excess of carbon dioxide in the bottom-water due to an abundant organic matter decay and/or to an influence of the old CO₂-rich deep water. MIS 4 – early Termination I is characterized by a dominance of glacial benthic foraminiferal assemblages that implies low bioproductivity conditions. A prevalence of suboxic BF group suggests moderate bottom-water oxygenation. Sea ice rafting occurred in the western Bering Sea during MIS 4 – early Termination I but the drifted ice was not so dense as during MIS 6. The well-known productivity spikes at Bølling/Allerød and Early Holocene with the corresponding weakening of the bottom water oxygenation are well-pronounced in the studied record. We argue that the peaks of PF and BF abundance, as well as high percentages of the high-productivity species *Bulimina marginata* and *Bolivina seminuda* reflecting an increase in bioproductivity during the Bølling/Allerød and Early Holocene, were mainly related to an intensified advection of nutrients by the surface currents from the gradually flooded northeastern Bering Sea shelf during the glacioeustatic sea level rise.