



Decadal to millennial-scale variability in sea ice, primary productivity, and Pacific-Water inflow in the Chukchi/East Siberian Sea area (Arctic Ocean)

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Sea-ice is an essential component of the global climate system and, especially, the Polar Oceans. An alarming decrease in term of sea-ice concentration, thickness and duration, has been observed in the Arctic Ocean and its marginal seas over the last 30 years. Thus, understanding the processes controlling modern sea-ice variability and reconstructing paleo-sea-ice extent and variability in polar regions have become of great interest for the international scientific community during the last years. Here, we present new proxy records determined in sediment cores from the East Siberian Sea (RV Polarstern Expedition ARK-XXIII/3 in 2008; Core PS72/350) and from the Chukchi Sea (RV Araon Expedition ARA2B in 2011; Core ARA2B-1A, -1B). These records, including organic-geochemical bulk parameters, specific biomarkers (IP25 and sterols; PIP25; for recent reviews see Stein et al., 2012; Belt and Müller, 2013), biogenic opal, mineralogical data as well as high-resolution XRF scanning data, give new insight into the short-term (decadal-, centennial- to millennial-scale) variability in sea-ice, primary productivity and Pacific-Water inflow during Holocene times. Maximum concentrations of phytoplankton biomarkers and biogenic opal were determined between 8.5 and 4 kyrs. BP, suggesting enhanced primary productivity triggered by increased inflow of nutrient-rich Pacific Water (and/or an increased nutrient input due to an ice-edge position). Short-lived peak values in productivity might be related to strong pulses of Pacific-Water input during this time period (cf., Ortiz et al., 2009). A seasonal sea-ice cover was present in the Chukchi Sea throughout the last 10 kyrs. During the last 3-4 kyrs. BP, the sea-ice cover significantly extended.

References

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