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The onset of the Middle Pleistocene Transition in the Sub-arctic North Pacific: surface and deep water conditions and sea-ice response.

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The Middle Pleistocene Transition (MPT) is defined as a dramatic change in the Earth's climate when glacial/interglacial cyclicity evolved from a 41-kyr orbital obliquity to ∼100-kyr precessional forcing. The cause of the 100-kyr cycle emergence in the absence of any change in orbital forcing remains debated. Some hypotheses invoke a change in the dynamics of North American ice sheets, whilst others propose a secular fall in global ocean temperatures and expansion of sub-arctic sea ice. High latitude locations, such as the Bering Sea, can therefore provide important data on the timing and mechanisms behind this major climatic shift. This study will present diatom data from three cores recovered during IODP Expedition 323in 2009, covering the Bower's Ridge and the northern Shelf Break: IODP-323-U1340A, 323-U1343, and 323-U1344A respectively. Benthic foraminiferal data will also be presented for site U1343.

Results reveal a broad intensification of cold surface water conditions and increased duration of sea ice, particularly at the Shelf Break sites, at ca. 0.8-1.1 Ma. At U1343, absolute abundance of benthic and planktic foraminifera increases after the MPT, coupled with a higher variability in low oxygen benthic assemblages. These results suggest an intensification of glacial/interglacial cycles and changes to surface water productivity after this transition that appears to have affected the eastern Bering Sea.