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Preliminary Results from IODP Exp. 323 to the Bering Sea: the ocean history for the last 5 Ma

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The shift from the Late Pliocene to Pleistocene is an important transitional period from global warmth to the initiation of glacial-interglacial cycles on orbital time-scales. Little is understood about the processes responsible for this major shift in the Earth's climate, and until now, a lack of data in critical regions of the Pacific, such as the Bering Sea, has prevented an evaluation of the role of North Pacific processes in global climate change (Takahashi, 1999). The Bering Sea is a marginal sea in the North Pacific that has experienced, and is sensitive to, major climatic change.

Here we present preliminary microfossil results from IODP Expedition 323 to the Bering Sea. Diatoms are the dominant microfossil group in this region and reveal major ecological shifts throughout the $\sim$5 Ma record. The onset of Northern Hemisphere Glaciation is clearly depicted by a shift from warm, nutrient-rich, shade flora species Coscinodiscus marginatus and Pyxidicula horridus to the appearance of sea-ice species at ca. 2.5 Ma. A secondary shift is also observed at 1.0-0.9 Ma and coincides with the Middle Pleistocene Transition. The shift to sea-ice dominated assemblages in the northern sector of the Bering Sea, is further intensified at ca. 0.9 Ma and demonstrate a clear response to glacial/interglacial cycles. These observations are further supported by dinoflagellate, radiolarian, foraminifera and geochemical records. The persistence of C. marginatus beyond 2 Ma in the northern latitude sites suggests continued mixing and high nutrient supplies to this zone, and refutes dissolution issues. Increases in intermediate water formation radiolarian species after 1 Ma, together with diatom sea-ice related species suggest the development of NPIW during glacial times.