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A 14 - 0 ka record of trends and events of sea ice cover, primary production and freshwater discharge in the Beaufort Sea, Arctic Ocean

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The Arctic is changing rapidly, and one of the main and most obvious features is the drastic sea-ice retreat over the past few decades. Over such time scales, observations are deficient and not long enough for deciphering the processes controlling this accelerated sea-ice retreat. Thus, high-resolution, longer-term proxy records are needed for reconstruction of natural climate variability. In this context, we applied a biomarker approach on the well-dated sediment core ARA04C/37 recovered in the southern Beaufort Sea directly off the Mackenzie River, an area that is characterized by strong seasonal variability in sea-ice cover, primary productivity and terrigenous (riverine) input. Based on our biomarker records, the Beaufort Sea region was nearly ice-free in summer during the late Deglacial to early Holocene (14 to 8 ka). During the mid-late Holocene (8 to 0 ka), a seasonal sea-ice cover developed, coinciding with a drop in both terrigenous sediment flux and primary production. Supported by multiple proxy records, two major flood events characterized by prominent maxima in sediment flux occurred near 13 and 11 ka. The former is coincident with the Younger Dryas Cooling Event probably triggered by a freshwater outburst from the Lake Agassiz. The origin of the second (younger) one might represent a second Mackenzie flood event, coinciding with meltwater pulse 1B/post-glacial flooding of the shelf and related increased coastal erosion. Here, our interpretation remains a little bit speculative, and further research is needed and also in progress.