



Glacial history and paleoceanographic changes of the Eastern Arctic Ocean during the late Quaternary glacial-interglacial cycles

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Two sediment cores (PS66/321-4SL, PS66/325-3SL) were retrieved from the eastern Arctic Ocean during the "Polarstern" ARK-XX/3 expedition (2004). Core PS66/321-4SL was taken in the deep-sea floor east of the Yermak Plateau in water depth of ca. 2359 m, whereas core PS66/325-3SL was collected on the northern continental margin of the Barents Sea in water depth of ca. 896 m. Major objectives of this study are to reconstruct late Quaternary glacial history and paleoceanographic changes along the Svalbard continental margin underlying the Atlantic water inflow. Detailed multi-proxies, i.e. stable isotopes of planktonic (*N. pachyderma* sin.) and benthic (*L. lobatulus*) foraminifera, stable carbon and nitrogen isotopes of organic carbon, magnetic susceptibility (MS) and IRD contents were used to for this study.

The stratigraphic framework of investigated sediment cores is primarily based on AMS ^{14}C dating and oxygen and carbon isotope measurement on the planktonic foraminifera *N. pachyderma* sin., occurrence of *P. bulloides* (Holocene, MIS 5.1, 5.5) together with physical properties and magnetic susceptibility which are commonly used for lateral core correlation in the Arctic Ocean. Based on this combined stratigraphic framework, both cores PS66/325-3SL and PS66/321-4SL appear to extend back to the MIS 6 and well recorded paleoenvironmental changes in terms of waxing and waning of Svalbard/Barents Sea ice sheet (SBIS), Atlantic water inflow and sea-ice coverage over the last 190 ka. In particular, a couple of pulses of maximum IRD

supply during MIS (MIS) 6, 4/3, 2, T2 and T1 strongly reflect advances/ retreats of the near-by Svalbard-Northern Barents Sea Ice sheet. In general, glacial stages are characterized by distinctly increased TOC coinciding with high C/N ratios (>10) and light $\delta^{13}\text{C}_{org}$ values ($<-24.5\%$) and $\delta^{15}\text{N}_{org}$ values ($<3\%$), reflecting enhanced supply of terrigenous organic matters to the Arctic Ocean. In contrast, interglacial stages, i.e. Holocene and MIS 5.5 reflect increased paleoproductivity in the surface water, supported by low C/N ratios (<10), and relatively heavy $\delta^{13}\text{C}_{org}$ values ($>-24\%$) and $\delta^{15}\text{N}_{org}$ values ($>5\%$). This is also substantiated by marked increase in calcium carbonate contents corresponding to enhanced occurrence of planktonic foraminifera due to reduced sea-ice coverage resulting from the Atlantic water inflow during those time intervals.