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Atlantic-derived water inflows and environmental changes of the western Laptev Sea continental margin during the last 17.5 cal.yrs

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Past inflows of Atlantic-derived waters and postglacial environmental changes of the western Laptev Sea continental slope were reconstructed based on high-resolution investigation of microfossils and IRD (lithic grains >500 μm) from marine sediment core PS51/154-11 recovered at 270 m water depth (77º16.56'N; 120º36.5'E). Core chronology is based on 16 AMS^{14}C datings. The lowermost age estimation of the fossil-rich part of the core is 15.4 cal.ka. The underlying more than 1 m thick sediment sequence is almost fossil-barren, besides a thin layer aging back to 17.1 cal.ka. The extrapolated age of the core base is 17.6 cal.ka. IRD is abundant in the time interval 17.6-16 cal.ka and after 7 cal.ka.

Main evidence for an influence of Atlantic-derived waters is provided by high relative proportions of benthic foraminifer *Cassidulina neoteretis*, planktic foraminifers, and ostracods with North Atlantic affinities. Indication for a first notable inflow is found in the sediments aging back to 17.1 cal.ka which contain rare benthic foraminifers (including *C. neoteretis*), but extremely abundant planktic foraminifers, largely within the size fraction 63-125 μm. The remarkable feature of this planktic foraminiferal assemblage is a predominance of subpolar species (*Neogloboquadrina pachyderma*

dex., *Turborotalita quinqueloba, Globigerinita glutinata, G. uvula, Globorotalia scitula, G. inflata, Globigerina bulloides*) over the polar species *Neogloboquadrina pachyderma* sin. The subpolar assemblage might be an indication of a strong subsurface Atlantic-derived water inflow during early postglacial or late glacial times due to the existence of polynya along the steep paleocoast maintained by strong offshore winds blowing from the cold exposed shelf hinterland.

The whole sediment sequence aging back to 17.6-16 cal.ka features a strongly anaerobic bottom water environment as it is almost devoid of benthic fossils, but enriched in vivianite mineral and concretions composed of rhodochrosite. Such conditions could be due to perennial sea-ice cover and strong water mass stratification produced by freshwater from the melting Barents-Kara ice sheet. Most samples within this sequence contain extremely rare, but well preserved planktic foraminifers largely represented by subpolar species, thus probably evidencing occasional subsurface inflows of Atlantic-derived waters.

A steady inflow of Atlantic water masses to the western Laptev Sea continental slope was established since approximately 16 cal.ka as interpreted from the continuous presence of planktic foraminifers including subpolar species, numerous deep-water ostracod species with North Atlantic affinities, and the periodic occurrence of *C. neoteretis*. The strongest inflows of Atlantic-derived water to the Laptev Sea, as shown by high proportions of *C. neoteretis,* occurred between 16 and 12 cal.ka and after 7 cal.ka, and correlate in time with other evidence of enhanced subsurface inflows via Fram Strait and the northern Barents and Kara seas troughs.

After 7 cal.ka increasing abundances of planktic foraminifers and *C. neoteretis* are observed simultaneously with the occurrence of angular IRD fragments and increased proportions of euryhaline ostracods as well as river-proximal foraminifers, which were most likely ice-rafted to the site from the inner shelf regions. All this point to an enhanced Atlantic-derived water inflow in association with climate cooling, probably as a consequence of a major change in the general pattern of the atmosphere-ocean circulation regime.