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THE 'LITTLE ICE AGE' WARMING IN THE WEST GREENLAND WATERS BASED ON DIATOM MICROFOSSILS

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Distribution of present-day diatoms in the West Greenland marine waters is closely related to environmental conditions. The diverse marine ecosystems around Greenland are influenced by a circumventing coastal current originating from the Arctic Ocean with input from North Atlantic current systems and coastal fjord water. The fjords in Greenland experience seasonal freshwater input from the Greenland Ice Sheet, affecting the annual succession in the diatom species. This species-environment relationship provides a reference for palaeoenvironmental reconstruction of the West Greenland marine sediments, based on analogy of present-day and fossil diatoms.

In this study, present-day dataset and fossil material were compared and analyzed using diatom species. Present-day dataset includes samples collected from 1) South-West to West Greenland waters during summer 2007 and 2) monitoring station in the South-West Greenland on a monthly basis from 2006 to 2010. Fossil material includes a decadally resolved diatom record from a sediment core collected from West Greenland, encompassing the past *c.* 3600 years (late Holocene).

Identified diatoms were represented mainly by three genera *Thalassiosira, Chaetoceros*, and *Fragilariopsis* (see Figure 1) and were linked to observed hydrographic and environmental conditions, such as glacial input or inflow of the West Greenland Current transporting Atlantic water masses. Additionally, the monitoring study (Greenland Ecosystem Monitoring program) showed distinct seasonal species succession influenced by temperature and salinity gradients and dynamic fjord-ocean water exchange. This present-day dataset was used to evaluate paleoenvironmental conditions from the fossil material. The reconstructed Late-Holocene diatom record revealed an interesting anti-phase relationship between surface water temperatures off West Greenland and climate events recorded in the north-east Atlantic region. It was particularly clear during the Little Ice Age, when diatoms reflected relatively warm surface water conditions despite large-scale cooling of the climate. This anti-phase pattern is possibly linked to the local melting of sea ice/glacial ice and large-scale ocean-climate interactions within the North Atlantic Oscillation and the Atlantic Meridional Overturning Circulation.

The presented study provides information on the present-day relationship between diatom species and environmental conditions along the West Greenland, which help better understand mechanisms of the past environmental changes influenced by both local and large-scale ocean-climate interactions.

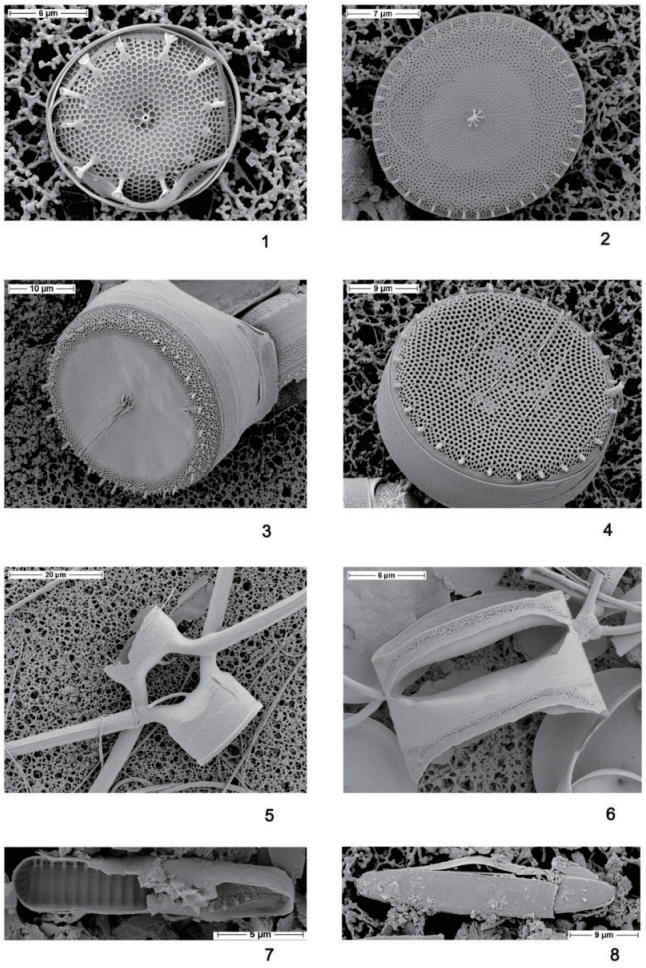

Figure 1. Diatom species: 1-4) *Thalassiosira* spp., 5-6) *Chaetoceros* spp., and 7-8) *Fragilariopsis* spp.