



Variability of sea surface temperatures and sea ice in Baffin Bay during the last two millennia

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The Arctic region has undergone very rapid changes in the past 50 years. Climate models predict accelerating rates of change in the Arctic and long-term perspectives on natural climate variability are therefore needed to understand these changes and their further effects. We used marine fossil diatom assemblages from Baffin Bay to investigate August sea surface temperatures (aSSTs) and sea ice variability during the last two millennia. The Baffin Bay area is sensitive to changes in the climate system due to its location, where it is influenced by Atlantic and Arctic water masses.

The top most 77 cm of a 600 cm long marine sediment core (GeoTü SL-170) was used for a high resolution study of quantitative SST and sea ice reconstructions based on fossil marine planktonic diatoms. A calibration dataset consisting of 155 surface samples from the North Atlantic and a new set of 24 surface samples from Baffin Bay with 52 diatom species was utilized to convert diatom counts to aSSTs using the weighted averaging partial least squares (WA-PLS) transfer function method. The sea ice reconstruction was based on a qualitative method for specific diatom assemblages and quantitative sea ice reconstructions for the May sea ice cover based on the Maximum likelihood (ML) transfer function method. The age model for the core is based on the ¹⁴C method.

Our data shows a slight warming trend of the surface waters in Baffin Bay for the last ca. 2 kyr. The most dominating diatom species is *Thalassiosira gravida* spores, which represents typical “Baffin Current assemblage”. The highest aSSTs occurred during the Medieval Warm Period (MWP), presumably due to the increased advection of warm Atlantic water from the West Greenland Current into Baffin Bay. After the MWP, the sediment was poor in diatoms during the Little Ice Age (LIA) suggesting that the study area was covered by sea ice also in the summertime.