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Title of dissertation: **Reconstruction of oceanographic conditions off the southwestern coast of Greenland in Late Pleistocene and Holocene based on diatom analysis of oceanic sediments**

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Summary of dissertation

The subject of the forwarded thesis was to investigate the Late Pleistocene and Holocene changes in oceanographic conditions in the south-west region of Greenland. The reconstruction of oceanographic conditions was based on diatom analyses of two long sediment cores which covered the last 12,000 years. The study area is located in the Godthåbsfjord system which is still poorly understood in terms of oceanographic changes during the Holocene. The major aim of this research was therefore to reconstruct changes in oceanographic conditions in the study area during the Holocene but also to investigate the relationship of these changes between the internal and external parts of Godthåbsfjord system. Therefore, one core (SA13-ST3-20G) was taken from the continental shelf at the mouth of the Godthåbsfjord and the other core (SA13-ST6-40G) inside its main basin (branch). Both quantitative and qualitative reconstruction methods were used. Quantitative method consisted of transfer function analysis which was applied to reconstruct such variables as: sea surface temperature (°C), sea surface salinity (PSU), as well as sea ice concentration (%). The Baffin Bay and Labrador Sea surface sediment database with corresponding ocean satellite measurements calibrated specifically for diatom-based reconstructions from this area was used as a modern calibration dataset. The results of quantitative reconstructions were strengthened by additional use of qualitative reconstructions, based on the ecological preferences of dominant diatom species identified in particular cores. Taxonomic composition of diatom assemblages found in both cores was consistent with those considered typical of Arctic and sub-Arctic regions. Planktonic diatom species were dominant, in particular those belonging to genus *Thalassiosira*, *Fragilariopsis* and

Chaeteroceros. The results of reconstructions, in the case of the core from the continental shelf, were consistent with the general climate changes trends in the northern hemisphere, during the Holocene and allowed to investigate activity of the ocean circulation in the Baffin-Labrador seas region. These changes were mainly controlled by the declining insolation associated with large-scale solar cycles. Reconstruction in the shelf part of study area showed a clear signal of deglaciation at about 11 ky BP, then, the maximum activity of the North Atlantic Current to about 7 ky BP, stabilization of oceanographic conditions in the middle Holocene, as well as weakening of the surface waters circulation in the Baffin-Labrador seas region after about 2.5 ky BP. The second aim of this research was to compare the results of reconstructed sea surface water parameters from the shelf area with those from the inner parts of the Godthåbsfjord. Such a comparison identified opposite trends in oceanographic conditions between the shelf part of the Godthåbsfjord area and its inner part. In the early Holocene, the pattern of such a temperature anti-phase was opposite to that of the earlier periods, due to differences in insolation, and thus less energy in the form of heat carried into the fiord system by ocean currents. This study also distinguished the individual cycles of this anti-phase, which were separated by moments of equalization of water parameters between the Godthåbsfjord and the Labrador Sea, related to the temporary strong activity of the West Greenland Current. An additional aspect of this research was to indentify changes in the primary production of diatoms in the Godthåbsfjord area, as well as to test whether and how the primary production was influenced by identified oceanographic conditions trends throuthout the Holocene. The results of selected measures of productivity did not show a particular pattern of changes, that could be a response to the Holocene variability of oceanographic conditions in this region. However, it was noticed that both, diatom concentration and species richness were lower during rapid changes in reconstructed oceanographic conditions (e.g. early and late Holocene), and slightly higher at times of stabilization (i.e. with relatively evenly distributed oscillations, e.g. middle Holocene).

Keywords: paleoceanology, paleoreconstruction, diatoms, transfer function, Holocen, Godthåbsfjord

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