



On the Holocene evolution of Hans Tausen Iskappe (Greenland)

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Hans Tausen Iskappe (Greenland), situated at 82.5°N, 27.5°W, is world's northernmost ice cap. During several field campaigns in the 70s and 90s, its ice thickness was measured, mass balance and meteorological measurements occurred, and a 345 m deep ice core was drilled. From this ice core it is known that the ice cap (largely) disappeared during the Holocene Thermal Maximum. The present-day ice cap started building up some 3500-4000 years ago in a wetter and warmer climate than at present.

Here we present first 3-D thermo-mechanical ice flow modelling results of the ice cap's evolution. We use field measurements and combine these with satellite derived surface velocities and palaeoclimatic reconstructions to understand the Holocene evolution of the ice cap and its present-day state. In our analysis we also investigate the effect of higher-order dynamics (compared to the Shallow Ice Approximation) and pay particular attention to different thresholds in the systems that could lead to a (partial) disappearance of the ice cap in the future.