

Greenland climate and ice sheet evolution through the last glacial cycle

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Deep ice cores from the Greenland ice sheet are providing an ever expanding set of records of past Greenland climatic conditions throughout the last glacial-interglacial cycle. Stable water isotope records from the ice cores have been influenced both by changing climatic conditions and by elevation change that has happened at the ice core drill site. The NEEM ice core drilled in NW Greenland is located on an ice divide connected to the very summit of the Greenland ice sheet. In fact four ice cores have now been drilled on this divide during the past five decades: GRIP (at the summit), NGRIP some 300km north of GRIP, NEEM some 350km north-west of NGRIP and Camp Century some 250 km west of NEEM. All four ice cores contain both the entire Holocene and most of the glacial period undisturbed.

The NEEM $\delta^{18}\text{O}$ record therefore completes a four core transect along this ice divide. The four $\delta^{18}\text{O}$ records from the cores all span more than 100,000 years. From an inter-comparison of these records a picture emerges of a dynamic Greenland ice sheet shrinking and expanding in direct response to changing climatic conditions. Indeed the glacial Greenland ice sheet must have covered vast areas that are now ice free, expanding far out on the continental shelf and forming an ice ridge all the way to the Canadian high arctic. During both the transition period and the early Holocene, the Greenland ice sheet retreated dramatically.