Geophysical Research Abstracts
Vol. 12, EGU2010-8769, 2010
EGU General Assembly 2010

Peopling of the high Arctic – induced by sea ice?

Svend Funder
University of Copenhagen, Natural History Museum, Copenhagen, Denmark (svf@snm.ku.dk)

"*We travelled in the winter after the return of daylight and did not go into fixed camp until spring, when the ice broke up. There was good hunting on the way, seals, beluga, walrus, bear.*" (From Old Merkrusârk's account of his childhood's trek from Baffin Island to Northwest Greenland, told to Knud Rasmussen on Saunders Island in 1904)

Five thousand years ago people moving eastwards from Beringia spread over the barrens of the Canadian high Arctic. This was the first of three waves of prehistoric Arctic "cultures", which eventually reached Greenland. The passage into Greenland has to go through the northernmost and most hostile part of the country with a 5 month Polar night, and to understand this extraordinary example of human behaviour and endurance, it has been customary to invoke a more favourable (warmer) climate. This presentation suggests that land-fast sea ice, $i.e.$ stationary sea ice anchored to the coast, is among the most important environmental factors behind the spread of prehistoric polar cultures. The ice provides the road for travelling and social communion - and access to the most important source of food, the ocean.

In the LongTerm Project (2006 and 2007) we attempted to establish a Holocene record for sea ice variations along oceanic coasts in northernmost Greenland. Presently the coasts north of 80°N are beleaguered by year-round sea ice - for ten months this is land-fast ice, and only for a period in the stormy autumn months are the coasts exposed to pack-ice. This presentation

Land-fast ice – as opposed to pack-ice – is a product of local temperatures, but its duration over the year, and especially into the daylight season, is also conditioned by other factors, notably wind strength. In the geological record we recognize long lasting land-fast ice by two absences: absence of traces of wave action (no beach formation), which, however, can also be a result of pack-ice along the coast; - and absence of driftwood on the shore (land-fast ice blocked its landing). Our record shows that a period with less sea ice than now ended shortly after 6 kaBP. When the Independence I people (4450-3850 kaBP) came into the area, the sea ice conditions may have been similar to the present with land-fast ice for a good part of the year. The annual insolation was 2-3% higher than now, but the vegetation, especially in coastal areas, had deteriorated to Polar desert, as at present. This development continued, and when the second wave of immigrants came, The Independence II people (2900-2300 kaBP), both sea-ice conditions and insolation were similar to the present. Finally, when the last group of immigrants, the Thule people (AD1400-1500), reached the area had year-round land-fast ice.

These results show that there is no clear correlation between climate change and human migration into Greenland, but it may have been the increase in sea ice after 6 kaBP that paved the ground for the peopling of high Arctic Canada and Greenland. The three North Greenland immigration-waves took place in a "deteriorating" (cooling) climate, and evidence from lake sediments and ice coring show that the immigrants met an environment that was similar to today's – or even more harsh.