Less ice in the Arctic Ocean 6000-7000 years ago

October 20 2008

Recent mapping of a number of raised beach ridges on the north coast of Greenland suggests that the ice cover in the Arctic Ocean was greatly reduced some 6000-7000 years ago. The Arctic Ocean may have been periodically ice free.

”The climate in the northern regions has never been milder since the last Ice Age than it was about 6000-7000 years ago. We still don’t know whether the Arctic Ocean was completely ice free, but there was more open water in the area north of Greenland than there is today,” says Astrid Lysså, a geologist and researcher at the Geological Survey of Norway (NGU).

Together with her NGU colleague, Eiliv Larsen, she has worked on the north coast of Greenland with a group of scientists from the University of Copenhagen, mapping sea-level changes and studying a number of shore features. She has also collected samples of driftwood that originated from Siberia or Alaska and had these dated, and has collected shells and microfossils from shore sediments.

”The architecture of a sandy shore depends partly on whether wave activity or pack ice has influenced its formation. Beach ridges, which are generally distinct, very long, broad features running parallel to the shoreline, form when there is wave activity and occasional storms. This requires periodically open water,” Astrid Lysså tells me.

Pack-ice ridges which form when drift ice is pressed onto the seashore

piling up shore sediments that lie in its path, have a completely different character. They are generally shorter, narrower and more irregular in shape.

”The beach ridges which we have had dated to about 6000-7000 years ago were shaped by wave activity,” says Astrid Lysså. They are located at the mouth of Independence Fjord in North Greenland, on an open, flat plain facing directly onto the Arctic Ocean. Today, drift ice forms a continuous cover from the land here.
Astrid Lysså says that such old beach formations require that the sea all the way to the North Pole was periodically ice free for a long time.

”This stands in sharp contrast to the present-day situation where only ridges piled up by pack ice are being formed,” she says.

However, the scientists are very careful about drawing parallels with the present-day trend in the Arctic Ocean where the cover of sea ice seems to be decreasing.

"Changes that took place 6000-7000 years ago were controlled by other climatic forces than those which seem to dominate today,” Astrid Lysså believes.

The mapping at 82 degrees North took place in summer 2007 as part of the LongTerm project, a sub-project of the major International Polar Year project, SciencePub. The scientists also studied ruined settlements dating from the first Inuit immigration to these desolate coasts.

The first people from Alaska and Canada, called the Independence I Culture, travelled north-east as far as they could go on land as long ago as 4000-4500 years ago. The scientists have found out that drift ice had formed on the sea again in this period, which was essential for the Inuit in connection with their hunting. No beach ridges have been formed

since then.

”Seals and driftwood were absolutely vital if they were to survive. They needed seals for food and clothing, and driftwood for fuel when the temperature crept towards minus 50 degrees. For us, it is inconceivable and extremely impressive,” says Eiliv Larsen, the NGU scientist and geologist.

Source: NGU