Did climate change cause Greenland's ancient Viking community to collapse?

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Our changing climate usually appears to be a very modern problem, yet new research from Greenland published in *Boreas*, suggests that the AD 1350 collapse of a centuries old colony established by Viking settlers may have been caused by declining temperatures and a rise in sea-ice. The authors suggest the collapse of the Greenland Norse presents a historical example of a society which failed to adapt to climate change.

The research, led by Dr Sofia Ribeiro from the University of Copenhagen, currently at the Geological Survey of Denmark and Greenland, focused on Disko Bay in Western Greenland and used a marine sediment record to reconstruct climate change over the last 1500 years.

Events which occurred during this time frame included the arrival of Norse settlers, led by Eric the Red in AD 985. After establishing a colony known as the Western Settlement the Norse traveled north to Disko Bay, a prime hunting ground for walruses and seals.

"Our study indicates that at the time the Norse arrived in West Greenland, climate conditions were relatively mild and were favorable to the settlers" said Ribeiro. "However, in AD 1350 the settlement collapsed, the cause of which has long been debated."

The marine perspective of the research is especially relevant as the Norse inhabited inner fjord areas. The team's research compared robust air temperature reconstructions based on ice-core data with their own

marine record. The results underline the regional complexity of climate patterns in the study area, which may vary from ice core reconstructions, and are strongly controlled by the fluctuating influence of "warm" Atlantic waters entrained by the West Greenland Current.

"Our study shows a major shift towards cooler conditions and extensive sea-ice which coincides with the estimated time for the collapse of the Western Settlement in AD 1350," said Dr Ribeiro. "The Norse were proud of being Europeans, farmers and Christians, and never adopted the hunting and survival techniques of the Inuit, so these temperature shifts would have caused significant problems for the colonists and their livestock."

Agricultural difficulties are believed to have forced the Norse to rely on marine resources, yet the increase in sea-ice, the team suggests, would have had a major impact on species such as migratory seals, while blocking trade routes.

"We cannot attribute the end of the Norse civilisation to a single factor, but there is enough evidence to suggest that climate change played a major role in determining its collapse," concluded Ribeiro. "Harsh climate conditions made farming and cattle production increasingly difficult and the extensive sea-ice prevented navigation and trading with Europe."

"There is perhaps an important lesson to learn from the Norse collapse and that is a lesson of adaptation, of being able to adjust our values and life-style when times change. That is an important challenge we face today as a society."

More information: Ribeiro. S, Moros. M, Ellegaard. M, Kuijpers, A, “Climate variability in West Greenland during the past 1500 years: evidence from a high-resolution marine palynological record from Disko

Bay", *Boreas*, Wiley-Blackwell, 2001, DOI: 10.1111/j.1502-3885.2011.00216.x