# Timing of the Little Ice Age in southern Greenland

**Kjær, Kurt H.; Kjeldsen, Kristian K. ; Bjørk, Anders A.; Khan, Shfaqat Abbas; Korsgaard, Niels J.; Funder, Svend ; Larsen, Nicolaj K.; Vinther, Bo; Andresen, Camilla S.; Long, Anthony J.; Woodroffe, Sarah A.; Hansen, Eric Steen; Olsen, Jesper**

*Published in:*
Geophysical Research Abstracts

*Publication date:*
2013

*Document Version*
Publisher's PDF, also known as Version of record

Geophysical Research Abstracts
Vol. 15, EGU2013-10410, 2013
EGU General Assembly 2013


# Timing of the Little Ice Age in southern Greenland

Kurt H. Kjær (1), Kristian K. Kjeldsen (1), Anders A. Bjørk (1), Shfaqat A. Khan (2), Niels J. Korsgaard (1), Svend Funder (1), Nicolaj K. Larsen (3), Bo Vinther (4), Camilla S. Andresen (5), Antony J. Long (6), Sarah A. Woodroffe (6), Eric Steen Hansen (7), and Jesper Olsen (8)

(1) Natural History Museum of Denmark, University of Copenhagen, Centre for GeoGenetics, Denmark (kkjeldsen@snm.ku.dk), (2) DTU Space, National Space Institute, Technical University of Denmark, (3) Department of Geoscience, Aarhus University, (4) Centre for Ice and Climate, The Niels Bohr Institute, University of Denmark, (5) Geological Survey of Denmark and Greenland, (6) Department of Geography, Durham University, UK, (7) Natural History Museum of Denmark, University of Copenhagen, Denmark, (8) Department of Physics and Astronomy

Northern hemisphere temperatures reached their Holocene minimum and most glaciers reached their maximum during The Little Ice Age (LIA), but the timing of specific cold intervals is site-specific. In southern Greenland, we have compiled data from organic matter incorporated in LIA sediments, used as a signal for ice-free terrain being overridden by LIA glacier advances, and data from threshold lakes showing the onset of glacier-fed lakes, thus revealing the advance-maximum phase initiating the LIA. Finally, we have compiled lichenometry results indicating the onset of bedrock vegetation succeeding ice retreat. Our results show that the advance of glaciers during the LIA occurs early after the Medieval Warm Period terminating soon after 1200 AD and culminates c. 1500-1600 AD. Historical maps also show that many glaciers on the western coast occupy a still-stand near the LIA maximum until 1900 AD before retreat commence.

Thus in southern Greenland, we define LIA as the period between the first signs of Late Holocene glacier readvance and the latest onset of retreat – i.e. from ca. 1200 to c. 1900. During this period northern hemisphere annual mean temperatures, although fluctuating, were generally below the 1961-1990 average, with the coldest interval between c. 1600 and 1800. Even though winter temperatures may have dominated the cooling, also the summer temperatures which are most closely correlated with glacier mass balances, dropped, to c. 0.6° below the average in the northern hemisphere including the Arctic. Furthermore, the glacier response seems to be mirrored by a oceanic cooling between 500-1000 AD, followed by onset of the LIA at 1150-1250 AD as seen in the relative strength of warm subsurface water and the influence of the East Greenland Current.