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# Synthesis of 1200 years of climate change in the Nordic Sea

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Despite their area, the oceans are under-represented in reconstructions of the climate of the last millennium, which are dominated by terrestrial, especially dendroclimatological, proxies. This reflects the greater chronological precision and resolution available in these terrestrial proxies. Recent improvements in the resolution attained in palaeoceanographic analyses allow this imbalance to be corrected.

This presentation synthesises several high resolution proxies from the Nordic Seas, one of the source regions for North Atlantic Deep Water. The different proxies incorporated are sensitive to different aspects of the climate: the sea-ice proxies are most sensitive to winter surface temperatures; diatoms respond to summer temperatures; foram-based proxies, in this area, record summer temperatures below the thermocline, so temperatures may be determined by winter condition.

The first axis of a principal co-ordinates analysis of the smoothed data is more than twice the length of the second and explains almost 40% of the variance: despite the different locations and proxies used, a single signal is apparent.

Threshold counting (adopted from Osborn and Briffa, 2006) shows that most of the proxies are indicating warm conditions in the Medieval Warm Period (between 900 and 1200 AD) with colder conditions during the Little Ice Age, especially at $\sim$1400, 1600 and 1900 AD. Twentieth Century warming is pronounced in some of the proxies but few exceed the warmth of the Medieval Warm Period (some of the proxies

terminate at 1950).

The warming in the Medieval Warm Period is presumable due to an enhanced flux of Atlantic Water into the Nordic Seas, as both surface and sub-surface proxies are affected; surface heating would only influence the surface proxies. During this time, there were also warmer condition in the Sargasso Sea, and an enhanced flux of water through the Florida Strait.

The pronounced nature of the Medieval Warm Period reconstructed in the Nordic Seas is in contrast to the weak expression in many summer sensitive Scandinavian proxies. This many reflect a seasonal bias in the warmth during this period.