



## **Reconstructing the behaviour of a major SW Greenland tidewater glacier over the last millennium.**

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Greenlandic tidewater glaciers have experienced widespread retreat over the last century. However, information on their dynamics prior to this are poorly constrained due to a lack of observations and paucity, in many cases of mapped or mappable deglacial evidence. Especially lacking is evidence for tidewater glacier advance during the Little Ice Age (LIA). This severely restricts our understanding of the long-term (centennial-millennial timescale) relationships between climate and calving at marine terminating margins in Greenland and elsewhere.

Kangiata Nunaata Sermia (KNS) is the most dynamic tidewater glacier in southwest Greenland having retreated >22 km since its LIA-maximum (c. 1761). This project takes advantage of the site's unique combination of terrestrial evidence of glacier change (glacial geomorphology, sedimentology, and Norse archaeology) and novel marine evidence (coralline algae) to reconstruct both its advance and retreat over the last millennium.

We present glacial geomorphological mapping, which followed a morphostratigraphic approach, using a combination of aerial photos, a DEM and field mapping. Radiocarbon dating from peat sequences were used to determine the timing and rates of advance of KNS to the LIAMax. This has provided evidence for pre-LIA moraines, deglacial and neoglacial, and rapid changes in meltwater routing that may have contributed to the abandonment of nearby Norse settlements. Isotopic analysis of annually banded coralline algae (*Lithothamnion glaciale*), collected during summer 2015, will provide proxy evidence for changes in fjord water conditions.

This data will contribute towards a millennial timescale record of tidewater glacier dynamics that will help to validate models linking calving to climate.