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Constraining millennial scale dynamics of a Greenland tidewater glacier for the verification of a calving criterion based numerical model

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The ability to successfully model the behaviour of Greenland tidewater glaciers is pivotal to understanding the controls on their dynamics and potential impact on global sea level. However, to have confidence in the results of numerical models in this setting, the evidence required for robust verification must extend well beyond the existing instrumental record.

Perhaps uniquely for a major Greenland outlet glacier, both the advance and retreat dynamics of Kangiata Nunata Sermia (KNS), Nuuk Fjord, SW Greenland over the last $\sim$1000 years can be reasonably constrained through a combination of geomorphological, sedimentological and archaeological evidence. It is therefore an ideal location to test the ability of the latest generation of calving criterion based tidewater models to explain millennial scale dynamics.

This poster presents geomorphological evidence recording the post-Little Ice Age maximum dynamics of KNS, derived from high-resolution satellite imagery. This includes evidence of annual retreat moraine complexes suggesting controlled rather than catastrophic retreat between pinning points, in addition to a series of ice dammed lake shorelines, allowing detailed interpretation of the dynamics of the glacier as it thinned and retreated. Pending ground truthing, this evidence will contribute towards the calibration of results obtained from a calving criterion numerical model (Nick et al, 2010), driven by an air temperature reconstruction for the KNS region determined from ice core data.