



Submarine melt as a potential trigger of the North East Greenland Ice Stream margin retreat during MIS-3.

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The Northeast Greenland Ice Stream (NEGIS) is the largest ice stream of the Greenland Ice Sheet (GrIS). Its area has been suffering a significant ice mass loss during the last decade, partly due to rising oceanic temperatures in the subpolar North Atlantic, which increase submarine basal melting and enhance mass discharge. This behavior demonstrates the high sensitivity of this region to oceanic changes. In parallel, a recent study suggests that the NEGIS grounding line was about 300 km behind its glacial maximum location for 15 ka during Marine Isotopic Stage (MIS) 3, despite the background glacial conditions. This retreat has been explained through a combination of atmospheric and external forcings but a modelling approach to the problem is pending. Here we study the sensitivity of the NEGIS to the oceanic forcing during the Last Glacial Period (LGP) using a three-dimensional hybrid ice-sheet-shelf model, dotated of a submarine melt parameterisation that transform oceanic temperature changes into melting at the grounding line. Our results suggest that a sufficiently high oceanic forcing could account for a NEGIS ice-margin retreat of several tens of km, potentially explaining the recently proposed NEGIS grounding-line retreat during MIS-3.