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Retreat rate of the northern Fennoscandian Ice Sheet margin.

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The deglaciation chronologies of the northern and north-eastern margins of the Fennoscandian Ice Sheet are relatively poorly constrained. This is because the principal methodological tool to trace and date the deglaciation pattern, the occurrence of deglaciation varves, does not apply in the northernmost regions of Fennoscandia. Moreover, a paucity of radiocarbon dates allows for only a most generalised pattern for the post-Younger Dryas shrinkage of the ice sheet to its final deglaciation configuration in the northern Swedish mountains.

We are tracing the deglaciation of the Fennoscandian Ice Sheet from its Younger Dryas terminal moraines in northern Norway and eastern Finland towards the northern Swedish mountains, using cosmogenic nuclide apparent exposure ages of depositional and erosional features related to the former ice sheet margin. Because the ice sheet had initially warm-based conditions close to its margin, the dominant morphology is one of eskers and aligned lineation systems such as crag-and-tails. Abundant meltwater has locally eroded bedrock to considerable depth and deposited fans or deltas perched above current local base levels. Subglacial conditions during final deglaciation close to the mountain range were cold-based, thus inhibiting the formation of eskers and lineation systems. However, there is a ubiquity of meltwater erosional imprints and occasional plucking scars where, locally, pressure-melting conditions were reached.

Surface exposure ages from these different geomorphological settings should yield true deglaciation ages provided the following conditions are met, (i) erosion on crags of crag-and-tails, across transverse erosional scarps, and in meltwater channels has exposed bedrock surfaces without a prior exposure history, and (ii) depositional features contain exposed boulders without a prior exposure history.

Results show that transverse erosional scarps and erratics yield reliable deglaciation ages, but that bedrock samples from meltwater channels and crag-and-tails and sediment samples from eskers occasionally yield unreliable deglaciation ages due to cosmogenic nuclide inheritance and potential shielding by snow. Apparent deglaciation ages range from $\sim$14 ka at the Younger Dryas moraine to $\sim$8 ka approximately 500 km to the south in the northern Swedish Mountains. The spread of ages do not deviate from what would be expected for a regular uninterrupted retreat by the ice margin