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Late glacial dynamics on the continental shelf of NE-Greenland - implications from submarine landforms

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Favorable sea-ice conditions gave way to an acoustic survey offshore NE-Greenland in 2009. The acquired data set clearly depicts an area of sediment ridges in an area of at app. 18 x 9 km. The ridges are found in water depths between 270 and 350 m. The sediment ridges expand between 2,5 – 9 km, are 50 – 250 m wide and between 10 and 25 m high. In profile and without exception, these ridges are characterized by steep slopes towards West and gentle slopes towards East. Their internal structure, imaged by parametric echo-sounding data, shows that they have been deposited on a rather plain surface, thus representing positive sedimentation features rather than erosive remnant structures. Their curved shape, joint orientation and position on a basal till surface indicate their origin from glacial dynamics. We interpret these ridges as a set of terminal moraines. Since they are positioned on a basal till that extends further east, we consider these moraines to reflect short-lived re-advances during an overall recession of the ice stream. This is direct evidence for a highly dynamic behavior of an ice stream from the NE-Greenland Ice Sheet. The ages for these re-advances can be inferred from a thin sedimentary drape indicating a timing between Late Glacial and early Holocene.