Meltwater Corridors and Eskers of the Keewatin Region of the Laurentide Ice Sheet, Canada: Their Significance for Understanding Ice Sheet Decay and Improving Mineral Exploration Models.

Retreat of the Keewatin sector of the Laurentide ice Sheet is often depicted as a step-wise and sequential pattern, implying active back stepping of the ice margin toward Keewatin Ice Divide. However, these patterns are not well constrained by landforms and/or dates, and lead to re-evaluation of this retreat pattern and the deglacial dynamics of the Laurentide Ice Sheet in Keewatin region.

The glacial land system of western Keewatin region, northern Canada, consists of three significant events: (1) regional emplacement of subglacial sediments, mainly till; (2) landscape erosion with development of an integrated, anabranched network of meltwater drainage routes leading to meltwater corridors; and (3) deposition of an extensive array of eskers, and related landforms, within meltwater corridors. The network of long (~100–200 km), relatively wide (~1–3 km) meltwater corridors record confined subglacial erosion that scoured sediment (and bedrock) prior to glaciofluvial sedimentation (predominantly eskers).

Despite considerable sediment erosion along meltwater corridors, moraines and other ice-marginal deposits are rarely observed on the western Keewatin landscape. This is a perplexing phenomenon that needs to be accounted for by any proposed deglacial model. We evaluate the evidence for differing deglacial models of the western Keewatin sector of the Laurentide Ice Sheet: step-wise, active retreat vs. regional thinning and stagnation. Resolving these questions has important implications for understanding the decay of continental ice sheets. It is also relevant to mineral exploration models in glaciated terrains, especially those that rely on eskers for establishing regional and property-scale dispersal patterns of indicator minerals.