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Revised chronology of northwest Laurentide ice-sheet deglaciation from beryllium-10 exposure-dated erratics on the western Canadian Shield

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The timing of northwest Laurentide ice-sheet deglaciation is important for understanding how ice-sheet retreat, and associated meltwater discharge, may have been involved in abrupt climate change and rapid sea-level rise at the end of the last glaciation. However, the deglacial chronology across the western Canadian Shield is poorly understood, with only a handful of minimum-limiting ^{14}C dates and sparse cosmogenic nuclide exposure dates constraining the timing and pattern of northwest Laurentide ice-sheet retreat across >1000 km of ice-sheet retreat to the marine limit west of Hudson Bay. We present cosmogenic ^{10}Be surface exposure dating of glacial erratics at two sites, within a ~160,000 km^2 region with no reliable temporal constraints on ice-margin retreat, to directly date the timing of northwest Laurentide ice-sheet deglaciation. Six erratics perched directly on bedrock at a site on the western edge of the Slave Craton have exposure ages between 12.8±0.6 and 12.2±0.6 thousand years ago (ka; ±1sigma). Five erratics on bedrock, sampled at a site 115 km up-ice to the east, yielded exposure ages between 10.8±0.5 and 11.6±0.5 ka. When corrected for decreased atmospheric depth due to isostatic uplift since deglaciation, the error-weighted mean ages for the two sites indicate that the Laurentide ice sheet retreated through this region of the western Canadian Shield between 13.3±0.2 and 11.8±0.2 ka, or at least 1 kyr earlier than inferred from the canonical compilation of minimum-limiting ^{14}C dates for deglaciation and paleo-glaciological models. We tentatively infer a preliminary ice-margin retreat rate of ~0.1 m kyr^{-1} over this interval spanning much of the Younger Dryas which, compared to earlier estimates, implies a substantially lower volume of meltwater flux from the retreating northwest Laurentide ice sheet at this time. Additional exposure ages on glacial erratics across this data-poor region are needed for validation of existing deglacial ice-sheet models, which can in turn contribute to comprehensive testing of hypotheses related to northwest Laurentide ice-sheet retreat rate, abrupt deglacial sea-level rise, and potential forcing of associated climate change events.