

Interactive comment on “A quasi-annual record of time-transgressive esker formation: implications for ice sheet reconstruction and subglacial hydrology” by Stephen J. Livingstone et al.

Anonymous Referee #1

Received and published: 22 January 2020

Disclaimer, I'm not an expert in esker formation or subglacial hydrology, rather a glacial geologist who practices glacial geomorphology and geochronology for research, and who teaches glacial geology every year or two at the university level.

This is a well-crafted paper. The presentation is already very high quality, both in terms of writing and the visuals. The study is rigorous and the interpretations are well justified by the generated data and analysis. I particularly like how the authors present alternative interpretations that exist in the literature about esker formation, and frame their analysis around supporting one of these. The relationship between esker beads and de geer moraines makes their interpretation seem fairly clear. The beaded esker

C1

vs. continuous ridge esker seems to have implications in sediment supply and ice margin history (retreat rates), both topics that are very interesting and well explored.

My comments are only aimed at helping to further streamline the presentation, I have nothing significant to suggest in terms of their analysis or interpretation.

Editorial comments (line number, followed by comment):

11, I think “across central Nunavut” lets the reader imagine a much larger area than you actually studied, reword

18, report ages in cal yr BP

24, no need to write “former” before Laurentide Ice Sheet. It is already defined as a former/Pleistocene ice sheet. Change here and throughout.

25, the tense of the writing shifts around. Already in the abstract, authors write in first person, here there is a switch to third person “are hypothesized” I suggest leaving all in first person.

48, change beads to bead

66, relief does not have units of asl, that's elevation

70, do crag and tails need bedrock, can they wholly form in till?

73, awkward to say Keewatin Ice Divide and later say that its location shifts, reword

79, This might be a stylistic thing in writing because it appears here and elsewhere, maybe it is a British thing (sorry, as an American I may follow different rules, subtle different), but is the word “on” required between “ice masses” and “either side”? I see this grammatical situation several times in this ms.

115, I would find this paragraph more helpful if there was added clarification of patterns above and below marine limit. It is in there I think, or maybe it is in the next paragraph, but being clear about where the ML is and how features are different above and below

C2

– with just a touch more clarity – would be useful.

194, not “only” because you said previously that 10% occur above the marine limit

201, “on” either side, as mentioned earlier.

203, sentence beginning with “In particular” needs some attention

261, “on” either side, as mentioned earlier.

274, “relatively” in place of “relative”

304, “provide” no s

319, “farther” better here than “further”

370, extra parenthesis

371, check punctuation with use of however

370, hereabouts, could mention (or not, your call) any implications about glacial erosion rates. Note of course that ultimately that’s what is implied here, perhaps even more specifically quarrying rates (as opposed to abrasion, which produces fines that might leave the system as suspended load).

377, marine-terminating, no need of “former”

380, would the broad ice margin here really slow down when it is above the marine limit – hard to imagine that water depths would have been deep enough to have a major influence on calving, nor that overdeepenings or pinning points (which typically come with high relief areas) would significantly offer significant control on ice dynamics?

Besides, can your method of reconstructing retreat rate not reveal rates of recession when the ice terminus was in water vs on land?

402, esker beads instead of eskers beads

402, more mixed voice (first person and third person interspersed)

C3

411, another “either side” grammatical thing

421, another “former” LIS

427, provides no s

428, deposited “during” each melt season

434, former

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-273>, 2019.

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