

‘The collapse of the Laurentide-Cordilleran ice saddle and early opening of the Mackenzie Valley, Northwest Territories, Canada, constrained by ¹⁰Be exposure dating’ by Stoker et al.

The authors have provided a robust response to the issues raised by the reviewers, and they have implemented relevant edits in the revised version of the manuscript. This is a rigorous and well-written piece of work, and I am delighted to confirm that my decision is: ‘publish subject to minor revisions (review by the editor)’. A few points require clarification, and these are detailed below (line numbers relate to the track-change version of the article).

Pippa Whitehouse (Editor)

Main comment: the method used to calculate the GIA correction requires clearer justification. Your argument that using the new TCN ages would over-estimate the influence of GIA (mentioned in the author response document) is robust, but it is not clear to me that identifying “when a site became ice-free according to the model of Lambeck et al. (2017)” (line 185, revised manuscript) is a more accurate approach, given the widely differing rebound curves predicted by the three GIA models you consider (Figure S1). Differences between site-specific GIA model predictions of elevation change since deglaciation are typically >100m, translating into GIA corrections that can amount to several kyrs (Table S1). Your arguments for adopting the Lambeck et al. (2017) model are robust, and I am not requesting that you alter the approach you have used to calculate the GIA correction, but given the lack of independent estimates on postglacial rebound in the region, the statement that the effect of GIA is “reasonably well constrained” (line 166, revised manuscript) is not really justified and I recommend considering the following points as you carry out final revisions to the manuscript:

- both methods of determining the GIA correction (use of GIA model output/new TCN ages) contain errors; consider quantifying this or, at least, comment on how well the assumptions in the Lambeck et al. (2017) model agree with the new chronology presented here
- lines 178-180: briefly quantify the differences described here
- lines 186-187: references to ‘sea level data’ and ‘average Δ RSL’ are confusing; review the description of the methods used to calculate the GIA correction
- table S1: what does the column labelled ‘standard’ represent (include units)?

Minor comments

lines 44-46: the logic here is awkward, be more explicit that it is no longer assumed that an ice free corridor persisted between the CIS and LIS throughout the last glaciation

line 118/119 and 437/438: text is repeated [only an issue in the track change version]

line 143-144: mention that the impacts of different methodological choices are quantified in the results section (i.e. not just in the supplementary material) and reasons for preferring not to use the Arctic production rate are discussed in section 4.1.2

lines 213-215: text repeats that of lines 197-199

line 338: “The alternate...” – does this refer to calculations using the Arctic production rates?

line 476: Makenzie -> Mackenzie

line 499: insulation -> insolation

line 502: the wording is a little strong and I suggest editing “...mean that we can quantify...” to something like “...allows us to estimate...”. Also, review use of the term ‘observed’ on line 506

line 264/505/fig. 5 caption: do you use 14 or 15 simulations?

lines 519-520: do these ages relate to the time at which the meltwater channels were originally incised, or the period when they contained meltwater?