

Review of **Recent changes in drainage route and outburst magnitude of Russell Glacier ice-dammed lake, West Greenland** by Mads Dømgaard et al.

This study by Mads Dømgaard et al. reports on a time series of 14 GLOF events from the ice-dammed lake at Russell Glacier, West Greenland. They have a uniquely long and detailed dataset of these events, including estimated volumes and drainage dates. This study nicely presents the record through time, including a more detailed analysis of the basin using high-resolution DEM and orthomosaics. The authors describe interesting observations of multiple drainage paths and a potential change over time. Datasets such as the authors present are important for understanding ice-dammed lake drainage dynamics and their evolution over time.

General comments:

Within the text, there are many long sentences which can be difficult to interpret- I suggest trying to shorten sentences/remove extra words to improve clarity. The overall manuscript and structure are well organized.

I don't believe the authors discussed the presence or absence of ice within the ice-dammed lake. If ice is present, I suggest looking at Jenson et al. (2022) for how ice presence can influence lake discharge/volume and may produce discharge values different than would be expected.

Specific comments:

L11-12: Difficult to follow. Perhaps "...are frequent in Greenland and can influence local ice dynamics, cause geomorphological changes, and pose flooding hazards." – I'm not sure what you mean by "bedrock displacement"?

L13-15: Too many parts to this sentence—difficult to follow. Break into multiple sentences. Do this elsewhere in the abstract as well.

L20: perhaps use "~" instead of c.? more commonly used- here and throughout manuscript

L22: for consistency, say "drainage dates ranging from late May to mid-September and drainage volumes ranging between..."

L61: remove "and up"

L63: remove "reoccurring" – annual implies that it is reoccurring

L64: remove "different" – variety implies they are different

Figure 1: I believe the star should be "stream gauge"? The hydrograph is what is recorded, not the actual instrument that is in place

L68: "6th of September"

L69-70: This sentence is a bit confusing. Please clarify. Is it the ice margin drainage route and outlet drainage route?

L106: remove the comma after “Mission II”

L125: did you mosaic them together? Or separately?

L139: Was there any ice present in the lake? That could produce real differences in elevation of the lake surface? See Jenson et al. (2022)

L149-50: “...spacing of 20 m, however, they vary depending on the visibility of the waterline and by avoiding areas with apparent morphological changes.”

L150: what do you mean “it only has”? Could remove “only” for clarity

L166: “based on”

L183: “Water discharge was then obtained”

L184: Are these from manual discharge measurements? Or how did you take these measurements?

L189-92: Did you apply a lapse rate? It appears that the weather station is ~200 m above the lake. Or clearly state if you determine this is not necessary

L229: remove “through”

L264: “respectively (Table 2). However, ...”

L270-71: I suggest removing “which show variations in timing and magnitude”

L308: What do you mean by “weaken the ice dam”? In what ways?

Figure 5: It is difficult to follow the labels all the way to the plots on the right – it would be helpful to either add y-axis labels to all plots, or perhaps add a line at 0 degrees so it is easier for the reader to quickly see whether the temperatures are above or below 0 C.

L351: could say “which is 63% lower than the 37.7...”

L352: “explained by the observed thinning” – suggestion for clearer text

L353-54: can remove “suddenly” and “sudden”

L357: “low drainage volumes”

References

Jenson, A., Amundson, J. M., Kingslake, J., and Hood, E.: Long-period variability in ice-dammed glacier outburst floods due to evolving catchment geometry, *The Cryosphere*, 16, 333–347, <https://doi.org/10.5194/tc-16-333-2022>, 2022.