

Minor comments

The comments from the anonymous reviewer 1 (RC1) use the black font color. Our comments (AC) are using the blue font color.

However, I have some comments and suggestions:

Line 21. Higher rather than larger.

Agreed. It will be changed in the revised manuscript.

Line 22, suggest: While records of two giant tsunamis can be found in lake sediments,

Agreed. It will be changed in the revised manuscript.

Line 44. Rewrite.

Agreed. It will be rewritten as "Farther north at Karrat Isfjord, a large rock avalanche triggered a tsunami in June 2017 that inundated the nearby settlement of Nuugaatsiaq and cost four human lives (Paris et al., 2019; Svennevig et al., 2020) showing that landslides are also occurring outside of the Vaigat strait."

Line 50. I think the bottom of Vaigat is smooth because there is a thick succession of Early Holocene glaciomarine deposits.

Agreed. For example, Fig. 3. from Marcussen (2001), which is used as reference in the manuscript, shows a thick cover of Holocene sediments on the floor of Vaigat. The sentence will be changed to include this fact. "They are recognizable by their hummocky and blocky topography in the otherwise smooth U-shaped glacial trough with a Holocene sediment cover comprising the bottom the Vaigat strait (Fig. 1.)"

Line 60. Elevations

Agreed. It will be changed to plural in the revised manuscript.

Line 63. Loon Lake

Agreed. It will be changed to Lake Loon in the revised manuscript.

Line 69. Vaigat strait

Agreed. "Strait" will be changed to small letter in the revised manuscript.

Line 79. delete time.

Agreed. "time" will be deleted in the revised manuscript.

Line 80. Change: Weidick and Bennike; Table 2; Fig. 2). To: Weidick and Bennike (2007; Fig. 22).

Agreed. The manuscript will be revised as suggested.

Line 80. According to Weidick & Bennike (2007) an age of 10 cal. ka BP. provides a minimum age for the last deglaciation. This is in accordance with K-994 (see comment below to Table 1).

Agreed. This will be revised as suggested. We also agree on the later comments on Table 1. The revised sentence will read:

"Weidick & Bennike (2007, Fig. 22) provides a minimum age of the last deglaciation of 10 cal. ka BP from dating marine shells at 70 m elevation today (Fig. 2). Thus, susceptibility of the lakes to inundation from tsunami waves would have been more pronounced in the Early Holocene considering Saqqaq dalen would have been submerged more than 70 m due to glacial isostatic subsidence, and in the mid-Holocene the glacial isostatic subsidence would be c. 20-25 m (7.2-7.6 cal. ka BP).

Line 82. sediment cover.

Agreed. We believe it is in line 83. "cover" will be added at the end of the sentence.

Line 92. not previously been.

Agreed. The sentence will be changed accordingly.

Line 102. Did you hammer the piston corer into the sediment?

Yes, we hammered the corer into the sediment. The sentence will be changed to "...at the deepest part of the lake by hammering a 60 mm piston corer into the lake sediments from a Zodiac inflatable boat."

Line 106. Change: and the and to: and the

The excessive "and" will be deleted.

Line 116. described by rather than identified by

"Identified" will be replaced with "described" in the sentence.

Line 118. inundated by

"by" will be added in the sentence.

Line 120. rewrite, for example: The tsunami deposit is separated from existing lake sediments by an erosional unconformity. Erosion was caused by...

Agreed. The proposed sentence structure work much better and will be changed to "The tsunami deposit is separated from existing lake sediments by an erosional unconformity. The erosional unconformity was caused by the turbulence from the tsunami as it crossed the lake threshold."

Line 131. we dated samples.

Agreed. "samples were dated" will be replaced with "we dated samples".

Line 134. what about the marine sample? See Table 1

The revised manuscript will read: "The 14C ages for samples from this study were calibrated into calendar years using the OxCal v4.4 (Bronk Ramsey, 2009) and the IntCal20 calibration curve (Reimer et al., 2020). K-994 has not been normalised for isotopic fractionation to a delta ¹³C value of -25 permille i.e., we have added 400 years before calibrating the date into calendar years using Marine20 (Heaton et al., 2020) using a local dR= -49±59 from West Greenland (Pearce et al., 2023)."

Line 138. Certainly more than one shell. In the 60s you needed a handful of shells, around 100 gram of shells for a C-14 age determination.

The revised manuscript will use "Shells" instead of "One or more shells".

Line 139. Change: providing the minimum age of deglaciation to: providing a minimum age of the last deglaciation.

The revised manuscript will use "providing a minimum age of the last deglaciation" instead of the current "providing a minimum age of deglaciation".

Line 159. I am surprised to see that the coring tubes cracked. What material did you use? Polycarbonate?

We used polycarbonate coring tubes. It was part of a batch which was used successfully on previous field work. The tubes should supposedly not have been exposed to frost or sunlight since then, which could explain the cracking. But as the tubes did crack, the most likely explanation is that the tubes were exposed regardless.

Line 171. by high Ti and MS values.

Agreed. "values" will be added in the revised manuscript.

Line 174. Change: The gyttja facies is interpreted to as lacustrine sediments to: The gyttja facies is interpreted as lacustrine sediments

"to" will be deleted in the revised manuscript.

Line 216. coarse not corse

This typographical error will be corrected in the revised manuscript.

Line 226. Change: The lowest part of the T1 and T2 consists to: The lowest part of T1 and T2 Consists

"to" will be deleted in the revised manuscript.

Line 236. Change: in the two, to: in the two lakes

"lakes" will be added to the sentence in the revised manuscript. See also rephrasing of paragraph in the reply below.

Line 237-241. Rephrase

The paragraph has been rephrased for improved clarity:

"Although T2 has the same general appearance in the two lakes, there are some notable differences. These reflect that lake SAQ21-09 is much more exposed to tsunamis and has experienced much more turbulence and erosion when invaded by the tsunami compared to SAQ21-06. SAQ21-09, has a coarser sand fraction at the base and no gyttja below the base of the tsunami facies which is standing directly on top of an impenetrable substrate. The sediment core also has sand lenses from distinct waves from the same landslide-tsunami wave train, indicating that aspect to the strait and exposure to the incoming tsunamis is more important than lake height for capturing tsunamis in the lake sediments. This may also explain why there is no erosional unconformity in SAQ21-06."

Line 247-251. Rephrase

We have rephrased the sentence so it will read:

"Only one sample (from 61-62 cm depth) in core SAQ21-06 included diatoms that are marine origin. This sample was taken from the massive sand layer in the base of the T1 deposit, and included diatom species, *Cocconeis scutellum*, which is a common species in marine and brackish coastal waters (Cremer 1998; Witkowski et al., 2000; Pearce et al., 2014; Oksman et al., 2022)."

Line 278. Change: minimal faulting to: earthquake activity

"minimal active faulting" will be replaced with "minimal earthquake activity".

Line 308. Change: ice sheet to: Greenland ice sheet

It will be changed to the "Greenland Ice Sheet".

Line 309. Qeqertarsuaq is the Greenland name of Disko, not Disko Bugt

"(Qeqertarsuaq)" will be deleted in revised manuscript.

Line 358. Change: Peninsula to: peninsula

It will be changed to “peninsula” in the revised manuscript.

Line 364. Change: who produced the T1 and T2 tsunamis we to: that produced the T1 and T2 tsunami deposits we
“who” will be replaced with “that”.

Line 491, 572, 642. The name of the journal was Geological Survey of Denmark and Greenland Bulletin
In all three lines “*GEUS Bulletin*” will be replaced with “*Geological Survey of Denmark and Greenland Bulletin*”

Fig. 2. Where is the triangle on the map?
It is there as the top-most symbol. Halo surrounding symbol labels will be improved for better legibility of map figure.

Line 667. cal. not ca.
Typographical error which will be corrected in revised manuscript. Note to self: also fix K-994 age in this caption.

Line 681. red or black line?
Red line signature will be made thicker in revised manuscript.

Fig. 4. I am surprised to see that you did not retrieve minerogenic sediments at the base of most sediment cores. Minerogenic sediments are usually found below organic-rich gyttja in lakes in the region. I think there could be more (older) tsunami deposits in the lakes.

It was also our expectation to find minerogenic sediment at the bottom of the cores and we did bring coring tubes for multiple, overlapping cores in each lake.

It cannot be conclusively ruled out that the sediment package is thicker than what we have retrieved from the lakes. We experienced coring tubes cracking or breaking at the end and had to make several attempts at each site to get a good core. The procedure was to hammer until an “impenetrable substrate” was reached, identified by the hammer bouncing back. Then we measured how deep the core was into the sediment before hammering aggressively to see if we could penetrate further. If we got a cracked or broken end of the core back, then we knew that this was as deep as we could go. On a few occasions the tubes would have a fist-sized rock caught in the bottom of the tube cracking it along the length of the tube. Others would have the bottom of the tube broken to pieces as it was hammered into the impenetrable substance. Multiple coring attempts were made in each lake, except for lake SAQ21-11 which was cored in one attempt.

We used up all the tubes we brought for the field work. The ones that we successfully retrieved used the procedure described above, and they are presented in this study. The rest ended up as cracked tubes.

The above information will be added to the manuscript in a modified form, so that other researchers doing field work on the site will be aware of this. We do not wish to go into the nature of the impenetrable substrate in the manuscript, as it would be speculative if it is bedrock, boulders, or something else that prevented us from getting longer cores.

Line 701. Disko island not Disko Island

It will be changed to “island”.

Line 702. Change: historical landslides in Vaigat in 1952 (Niiortuut, yellow), 2000 (Paatuut, blue), and 2021 (Assapaat, green) is also indicated. To: Historical landslides in Vaigat in 1952 (Niiortuut, yellow), 2000 (Paatuut, blue), and 2021 (Assapaat, green) are also indicated.

Agreed, it should be plural. “are” will replace “is”.

Table 1. *Saxicava arctica* is now named *Hiatella arctica*.

Saxicava arctica will be changed to *Hiatella arctica* in the revised manuscript.

Table 1. Marine20 assumes that the age was normalised for isotopic fractionation to a delta¹³C value of -25 permille. However, K-994 was not normalised for isotopic fractionation. This means that you must add 400 years to the age before you calibrate it, so you must enter 9340 years instead of 8940 years. Furthermore, Marine20 assumes a reservoir age of 550 years. If you want to use a reservoir age of 400 years, you need to subtract an extra 150 years. Using CALIB this resulted in a median probability age of 10178 cal. years BP (9582-10712 cal. years BP). The uncertainty is extremely large, maybe this age determination should be put on pension.

Agreed. This has also been fixed in line 134, where the revised manuscript will read: “K-994 has not been normalised for isotopic fractionation to a delta ¹³C value of -25 permille i.e., we have added 400 years before calibrating the date into calendar years using Marine20 (Heaton et al., 2020) using a local $\delta R = -49 \pm 59$ from West Greenland (Pearce et al., 2023).”

Our calibration yields a median age of 10026 cal. ka BP and a mean of 10025. The min-max bracket is 9525-10521, and sigma 256. Table 1 will be updated accordingly, as will Figs. 2, 6, and 7 where k-994 is occurring.

Pearce, C., Özdemir, K. S., Forchhammer, R. C., Detlef, H., and Olsen, J.: The marine reservoir age of Greenland coastal waters, *Geochronology Discuss.* [preprint], <https://doi.org/10.5194/gchron-2023-7>, in review, 2023. [Table 5, zone 5]

Line 707. delete: All macrofossil samples in this study are aquatic bryophytes.

Agreed. It will be deleted. This information is also found in column “Material” in Table 1, so it is redundant in the caption.

Finally, I note that the authors use a mixture of American and British spelling.

We will have a native English speaker go through the manuscript.