

Interactive comment on “Multibeam Bathymetry and CTD-Measurements in two fjord systems in Southeast Greenland” by Kristian Kjellerup Kjeldsen et al.

Anonymous Referee #2

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This is a nice study that involves the collection of new bathymetric data and some oceanic data in a largely unexplored fjord system in Greenland. It will contribute to improving the ability to understand and model ocean circulation at the edge of glaciers draining into this fjord.

Overall the data are well presented and described. I have only a few comments that should be addressed before publication.

Figure 4b and d are confusing.

It may be easier for IBCAO bathymetry to have a fixed color and the new bathymetry a different color. The bifurcation (red and green) in 4a could be shown as a single

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color and a solid plus a dashed line. The new bathymetry should be a different color. Similarly, overlaying the eastern and western sounds on the same map makes for some complicated deciphering. I would recommend either making two separate plots or stretching the along-axis to 150km and plotting the two sounds sequentially.

Fig 5. Please show an inset on a larger map on where these blowups are.

CTD section description

While I don't necessarily disagree with the interpretation of the CTD profiles, I think the paper should also make it clear that the attribution of the observed changes to glacial processes is only speculative. From T/S alone it is not possible to infer glacial transformation for certain (e.g. Beaird et al. 2015, GRL) and, furthermore, the unsteady nature of these fjords make it difficult to draw conclusions without knowing the temporal variability.

Interpretation of SSSund CTD profiles: The description of the seaward, sill etc. . . CTDs should include the CTD number. CTD1404 – the sill CTD is not really visible in the plots. I don't understand the sentence starting with “Interestingly” line 15, page 9. We expect that profiles on either side of the sill (02 versus 02 and 08) will differ below sill depth. And, in particular, that properties on the landward side of the sill be similar to those that can flow just over the sill and fill up the mostly isolated basin. It is good to point this out but also mention that there is a simple explanation for this.

Last paragraph – page 9 The fact that the deep waters of Timmiarmiut Fjord are warmer at depth is consistent with the absence of a shallow sill. Thus the Atlantic water flows into the fjord un-impeded. For the other systems, the Atlantic water is mostly blocked which means that the deep water is filled by a shallower, colder water mass. To be clarified also in the conclusions.

Page 10, line 6 The Atlantic water comes from the North Atlantic Current, I would not mention the Faeroe Islands, they are further downstream from the NAC.

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Page 10 last sentence – again I think this has more to do with sills blocking the AW as opposed to mixing.

Figures – it would be helpful if the sills were indicated on the same maps as the CTD locations so one does not have to flip back and forth between figures.

The CTD data show the spiraling that is typical of having a temporal offset between the conductivity and temperature sensors. The authors should either remove this by lagging one with respect to the other or, at least, bin the data a little more. This will also remove some of the unphysical instabilities shown in the data (wiggles in the salinity profiles).

From what I could (somewhat limited) see the data and metadata files seem ok. For the CTD data it may make sense to add some pressure binned average (1 or 2 dbars) on top of the raw - as is usually done for submission to data centers (with the instabilities and spiraling removed).

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