

The Cryosphere Discuss., referee comment RC1
<https://doi.org/10.5194/tc-2022-164-RC1>, 2022
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Comment on tc-2022-164

Anonymous Referee #1

Referee comment on "Automated ArcticDEM iceberg detection tool: insights into area and volume distributions, and their potential application to satellite imagery and modelling of glacier-iceberg-ocean systems" by Connor J. Shiggins et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2022-164-RC1>, 2022

Automated ArcticDEM iceberg detection tool: insights into area and volume distributions, and their potential application to satellite imagery and modelling of glacier-iceberg-ocean systems. Shiggins et al. (2022).

This paper develops a new method within Google Earth Engine to detect icebergs using ArcticDEM data. They apply this method to three study sites in Greenland, and use the data retrieved to produce area to volume conversions. The paper also includes a link to a GUI, which allows readers to use the method on their own study sites.

Overall, this paper is well written, and presents a novel workflow for calculating iceberg areas and volumes using ArcticDEM data. The paper is, in my opinion, very close to being ready for publication. However, I have a few key comments, the major ones are stated below, but all minor comments can be found attached, on a marked version of the manuscript.

- Please can the authors comment on the two iceberg distributions found at two of their

study sites? I thought the purpose of defining a threshold above sea level was to remove the chance of multiple bergs that are held together by melange being detected as single icebergs. But in your results (e.g. Figures 7 and 8) you present two distributions for SKJI and KNS. You suggest that Distribution 2 does in-fact represent bergs frozen together by melange. Should the threshold above sea-level therefore be increased, to remove this phenomenon? You would then only retrieve a single distribution per study site.

- The authors make a couple of references to this method having the potential to be upscaled across the full continent. However, they also suggest that there would need to be good enough data coverage for this. Please can the authors clarify whether there is enough data for pan-Arctic application or not?

- It would be good to see some figures showing what the DEM data looks like. You may have readers who have not worked with the Arctic DEM before, and it makes your workflow hard to understand without seeing some visualisations. Please can the authors add a figure (or two) where they deem it most appropriate.

- Please can the authors double check that all results that they present have an equivalent section within the results section. Readers new to the topic need to fully understand (and even be able to recreate) how you take a 3-D DEM and produce area to volume conversions (for example).

For detailed comments, please see the attached PDF.

Please also note the supplement to this comment:

<https://tc.copernicus.org/preprints/tc-2022-164/tc-2022-164-RC1-supplement.pdf>