

# ***Interactive comment on “Google Earth Engine Digitisation Tool (GEEDiT), and Margin change Quantification Tool (MaQiT) – simple tools for the rapid mapping and quantification of changing Earth surface margins” by James M. Lea***

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I applaud the author for taking the time to share effective practices for the combined use of the Google Earth Engine Digitization Tool and the Margin change Quantification Tool. A substantial portion of the paper is devoted to both screen shots and description of the approach. This detailed description, along with Figure 1, does not provide a usable sequence of steps a researcher can follow. Though I have some experience with Google Earth Engine, I could not use the sequence of steps here to derive a useful outcome. I would recommend as a supplement that a screen capture video be used to replace Fig-

ure 1 (NASA Earthdata example: <https://www.youtube.com/watch?v=9ZoqZTmTjmE>). I would also suggest that the basic script that is used to generate results for the provided example of Breiðamerkurjökull be shared for one of the techniques. This will ensure the author's approach can be readily followed and adapted to other research studies.

Specific Suggestions Abstract: make reference to Breiðamerkurjökull as the case study used to demonstrate the techniques.

28: ...of glacier margin/boundary changes...

96: In line 96 shared code is referred to, what shared code?

219: "they" must refer to the methods being transferrable. Unclear if there is a set of developed methods, and one would choose from this menu depending on the research question.

231: Figure 2 not of value here, move to supplement or simply into screen capture video.

360-368: Recommend this be in a supplement.

381: What level of detail was used in this case?

402: how much elevation change is significant?

420: The methods are more representative as they also average changes across the front.

434: For tidewater glaciers does this tool have potential for even shorter time periods that may help quantify velocity, calving and frontal melt rates, such as in Moyer et al (2017)?.

442: MaQIT is highly dependent on coding skill, yet for those without coding skill it takes time to derive a single margin change value. For this group of users, myself

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included, how usable is MaQIT?

465: Is it possible to incorporate UAV photogrammetry or LIDAR data into MaQIT as a compliment to satellite imagery, that may have more detailed boundary mapping such as the type of data used by Fischer et al (2015) and Ryan et al, (2015). No detail need be provided just a basic explanation of whether it is possible in these two tools.

Fischer, A., Seiser, B., Stocker Waldhuber, M., Mitterer, C., and Abermann, J.: Tracing glacier changes in Austria from the Little Ice Age to the present using a lidar-based high-resolution glacier inventory in Austria, *The Cryosphere*, 9, 753-766, <https://doi.org/10.5194/tc-9-753-2015>, 2015.

Moyer, A., Nienow, P., Gourmelen, N., Sole, A., and Slater, D.: Estimating Spring Terminus Submarine Melt Rates at a Greenlandic Tidewater Glacier Using Satellite Imagery. *Frontiers in Earth Science*, DOI=10.3389/feart.2017.00107, 2017.

Ryan, J. C., Hubbard, A. L., Box, J. E., Todd, J., Christoffersen, P., Carr, J. R., Holt, T. O., and Snooke, N.: UAV photogrammetry and structure from motion to assess calving dynamics at Store Glacier, a large outlet draining the Greenland ice sheet, *The Cryosphere*, 9, 1-11, <https://doi.org/10.5194/tc-9-1-2015>, 2015.

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Interactive comment on *Earth Surf. Dynam. Discuss.*, <https://doi.org/10.5194/esurf-2018-24>, 2018.

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