

The Cryosphere Discuss., referee comment RC2
<https://doi.org/10.5194/tc-2021-131-RC2>, 2021
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Comment on tc-2021-131

Anonymous Referee #2

Referee comment on "Semi-automated tracking of iceberg B43 using Sentinel-1 SAR images via Google Earth Engine" by YoungHyun Koo et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-131-RC2>, 2021

In this paper, the authors do present and apply a semi-automatic approach for iceberg motion tracking from SAR imagery using the Google Earth Engine (GEE) as a base environment for data acquisition and processing. Then, is discussed the main drift patterns and area decay observed along with the B-43 iceberg correlating it with the major forces involved in the iceberg lifetime.

A significant problem is addressed and, while the manuscript does not add that much new information to improve the search for reliable methods able to improve iceberg detection/tracking in the complex polar environment and also, to enhance our understanding of icebergs and their drift patterns, the paper contributes to icebergs studies bringing to light the potential of the application of the cloud-based GEE as a platform to improve massive data processing. However, the manuscript could be strengthened by putting more effort into a validation analysis about the robustness of the method (segmentation, classification e tracking scores) for different scenes in which icebergs appear with different (i) radiometric signatures, (ii) shapes, (iii) surrounded by sea-ice/ice mélange, (iv) proximity to clusters of small icebergs/ice shelves, and others issues that may be present in different SAR scenes. It could do assist the reader in the reproducibility of the method on a large scale. Once, automated approaches able to detect and tracking icebergs on large scale can be very useful to construct reliable iceberg-coupled models for climate studies.

Following some specific questions, that could help to make clear if the method is semi-automatic for iceberg detection or B-43 detection. As described in the manuscript, the method was applied only on the iceberg B-43 (target of the study), leading the reader to ponder about the specificity and limitations of the method that could do not allow its reproducibility for a bigger number of icebergs.

- The chosen iceberg is very well defined with a shape very descriptive. In the

conclusions, this issue is mentioned however would be useful to elaborate better on this kind of issue once this can be a serious limitation. Also about the need for the polygon to be manually digitized to be used as a reference to track.

- Don't you think the superpixel approach used is sensitive to the iceberg surface complexity (i.e. texture)? Although a smooth process is performed which can help to search the target B-43. Aspects such as edges definition can be decreased for smaller bergs reducing segmentation performance, maybe demanding specific segmentation tuning for all different icebergs;
- As discussed in previous papers, the classification approach based directly on the iceberg backscattering strength is more suitable for bright icebergs or icebergs in open water. This can reduce even more the automatic aspect demanding more human intervention to constantly manually find the references used to computed the centroid distance histograms (CDH's).
- As described, to perform motion tracking the method is sensitive to shape changes, which can increase the total number of human interventions for continuing the tracking (What is unfeasible for a large number of icebergs). In this sense, would be very useful an analyze how much shape change the tracking method is reliable to overpass in order to keep tracking without manual intervention.

Furthermore, the manuscript is well-written with good-quality figures. Just a few additional analyses about the method's robustness and some comparison/discussion with other state-of-art methods could strengthen the paper.