

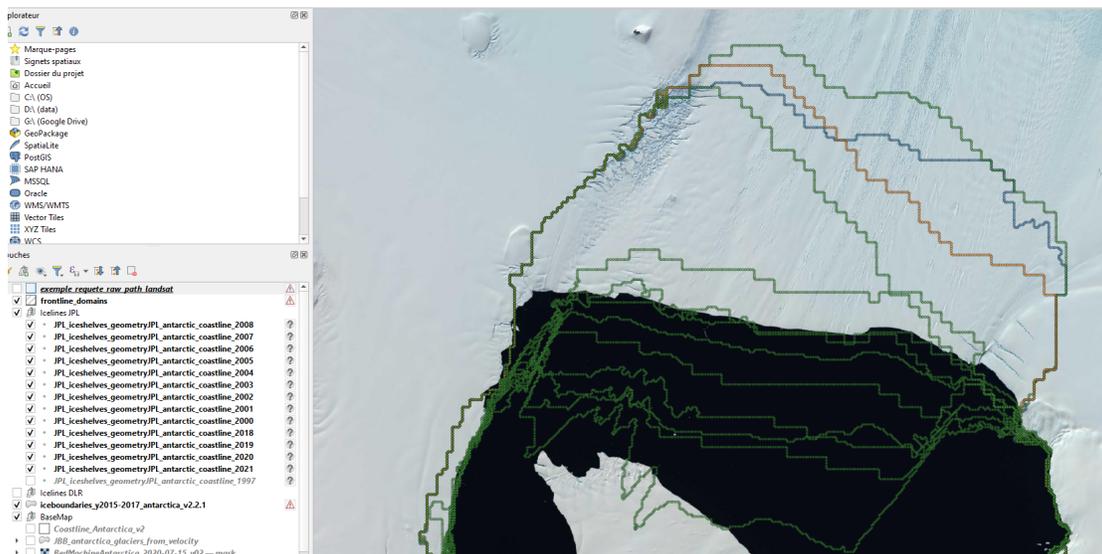
The paper by Andreasen et al, entitled “Change in Antarctic Ice Shelf Area from 2009 to 2019”, reconstruct the history of changes in ice shelf extent and volume using MODIS optical imagery throughout 34 ice shelves around Antarctica. The paper is well written, structured, and the figures are well presented. The main general concern with this paper is that there is almost no mention and comparison with the recently published Green et al., 2022. This needs to be addressed before publication, and I am providing some clues and directions below that may help the authors. Secondly, the way ice shelves retreat are classified seems a bit random, with no clear justification on why parameters have been chosen. Some clarifications needs to be made in that regards. Finally, some details needs to be provided on the datasets used to calculate calving fluxes (thickness and ice velocity), along with some methodological details.

Please find specific comments below.

L51. I would not call ice shelf calving front position rare given the dense amount of paper that came out just in 2022. Maybe you can stress out that there is only one time series that goes far back in time (Green et al., 2022) ?

L53. Another thing that could be stressed out is that recent studies are combining different sources of data (MOA, RAMP, MODIS, Sentinel-1a). Those dataset have different spatial resolution, with different related uncertainties. For example, the RAMP MOA and MODIS are composite mosaics, hence there is an uncertainties on seasonal front variations at these times right ? What are these datasets most representative of? What are the uncertainties related to these datasets and the way they are combined ? One of the good point of this study is that the product is higher resolution and uses one single source of data, hence reducing sources of errors.

Also from the Greene et al paper, we can see that the delineation of the coastlines is really rough, and lots of the fronts looks like staircase, and does not follow smoothly the ice frontal position. I am wondering, overall, how these "wrong" or "low resolution" delineation are impacting the total change in area. These points of comparison should be stressed out in this paper, to try to assess the quality of product, and how the ones from Andreasen should be considered as a reference compared to other studies (see figure below from Pine island glacier). A comparison with products from Baumhoer et al., 2018 should also be performed, as it was derived from deep learning vs manual in this study.



L58. Why not doing all ice shelves ? If you are missing 20% then you can't have a title saying "Change in Antarctic Ice shelf Area", this is misleading. How much work would be needed to add those missing ice shelves ? I think that you should really consider having this comprehensive view of ice shelves here, which will contribute in imposing this dataset as a reference.

L61. Does the choice of the month will impact the results compared to Green et al ? I think they have chosen March right?

Figure 1. If you use a classification on the type of retreat, I would recommend using different symbol for the retreat types (circle, triangle, square...). Or some kind of symbology that would give an idea on the behavior of each ice shelf ?

L78. How does the sampling distance influences the accuracy of the ice front position and the overall derived ice shelf area ? Can you provide a figure in supplementary maybe, that shows how the ice shelf area change with the sampling ? That would be a good point of comparison with Green et al., who seem to have used a rather coarse sampling method.

L93. Why not using the continent wide grounding line mapping made by Rignot et al to have the most accurate delineation ? In the Antarctic peninsula, updated grounding line position where also made using Sentinel-1, and could also be used to update grounding line with the yearly front position (Christie et al., 2022).

L100. Why using BEDMAP-2? How is the ice shelf thickness determined in there ? Why not using BedMachine that used REMA as a DEM ?

L106. Where does this 1 km² comes from ? How was it calculated ?

Table 1. I am thinking that this Table should be given as a supplementary file. Here it is not really readable.

L124. This is over a short period I guess ? I think you need to include here a time variable for the definition of major calving events

L159-160. I don't understand why this is not resolved in this study ? For those specific cases, can you investigate that using Sentinel-2 if MODIS is not sufficient ?

L163-164. General comment for all the classification part: you need to give the reader some insights on how you determined those % area loss or increase used for the classification. Now it seems a bit random.

Section 3.7. Please compare your values with Green et al over the same time period

L366. Why do you use the most inland observed calving front position and not the latest 2019 position ? Why not the average ice front position over the time period ?

L366. which ice speed do yo use? did you make sure it was representative of the ice front date ?

L368. Split this sentence in two.

L370. Could you consider calculating a yearly calving flux ? Would it make sense to compare it with the yearly mass losses from your changes in ice shelf area ?