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Interactive comment on "Estimate of Greenland and Antarctic ice-sheet total discharge from multiple GRACE solutions" *by* Ida Russo et al.

Anonymous Referee #1

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The authors use four post-treatments of GRACE datasets and two modelled surface mass balance datasets for estimating monthly ice discharge and runoff for Greenland and Antarctic main basins. I regret I must reject this article, despite it is in the scope of The Cryosphere.

My major issues are the following:

- Most of the references are outdated.

- 4 GRACE datasets are used, but at the end 3 of the GRACE estimates give very similar results, while the last one ("GRGS") gives significantly different results. Consequently, presenting these 4 GRACE estimates as 4 separate "members" of an "ensemble" is wrong.

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Discussion paper

- Basins shown for the Greenland seem small compared to GRACE resolution. Basins for Antarctica are not shown.

- PGR correction seems crucial and is not detailed

- ERA-Interim precipitation pattern is known to be incorrect over ice sheets (e.g.https://link.springer.com/article/10.1007/s00382-015-2512-6 and https://pdfs.semanticscholar.org/ffac/a3a11eb5025184dd51e21e132a3b1c144e38.pdf). The RACMO version used here is outdated, with known biases that have been corrected since. So the ensemble is made of 4 GRACE members of which 3 are identical, times 2 incorrect SMB datasets. The fact that the ensemble looks like the InSAR data is not convincing at all, it very likely results of compensating biases.

Novelty is fair:

- The first method used (2.1) is known as the input-output method. The second method (2.2) proposed ended to be not valid.

- The added value compared to IMBIE estimates is not clear.

I join an annotated version of the manuscript, so that the authors can consider my remarks in view of a re-submission.

Please also note the supplement to this comment:
https://www.the-cryosphere-discuss.net/tc-2019-16/tc-2019-16-RC1-supplement.pdf

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