Earth Syst. Sci. Data Discuss., referee comment RC1
https://doi.org/10.5194/essd-2020-340-RC1, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on essd-2020-340

Mohammed Shokr (Referee)

Referee comment on "A 15-year circum-Antarctic iceberg calving dataset derived from continuous satellite observations" by Mengzhen Qi et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2020-340-RC1, 2021

Review of the manuscript "A 14-yr Circum-Arctic iceberg calving dataset derived from continuous satellite observations" by Menzhen et al., submitted to the Earth System Science Data.

The manuscript presents a 14-year record of iceberg calving from Antarctic ice shelves from August 2005 to August 2019 (the Abstract mentions 15 year). The approach involves simulation of the coastline based on glacier velocity, then manually delineate the difference between the actual coastline obtained from multi-source satellite observation (optical and radar). This difference represents the calving events. As stated in the manuscript "An annual calving event occurs when an independent calved area has an outline that does not overlap or is spatially adjacent to other calving events occurring in the same year". Data are validated through cross-checking between the different satellite sensors and sources for uncertainty are identified.

One can appreciate the enormous manual work done to develop this dataset but this should result in a most accurate and comprehensive dataset of iceberg calving. The data include information on the area, size, mass, average thickness, type of icebergs in addition to the rate and recurrence of calving for each of the studies year and region of the Antarctic. Most interesting results are the interannual change in iceberg parameters. It is not linear as one might think (in connection to the contiuous global warming) and not all parameters behave in the same manner in different areas. This adds to the value of this comprehensive dataset.

This work is important for a few reasons, some are already stated in the manuscript such as the estimation of the mass balance of the Antarctic glaciers (of which iceberg calving represent 50% of the total loss) but, while expanding the picture to the 2 polar regions, I would consider the Arctic as the territory of sea ice and the Antarctic the territory of icebergs. That is to say, the study of icebergs in the latter is as relevant to climate change as the study of the sea ice in the former. As we concentrate on the reduction of sea ice in the Arctic (extent and thickness), we should concentrate on the calving and dynamics of

icebergs in the Antarctic; both are impacts of climate change.

That is why I find this dataset timely, comprehensive, and informative. It is the answer to the question of the impact of climate change on the Antarctic and Southern Ocean. I study and follow many studies on the impact of climate change on Arctic sea ice, and we see clearly the impact manifested in aspects of ice thinning, area shrinking, replenishment of perennial ice with seasonal ice, etc. Researchers have tried, and still trying, to "apply" same impact on Antarctic sea ice but we don't see the same impact there because the geography of the two regions and the climate are different in many aspects. The impact of global warming on Antarctic ice should be studied in terms of glacier mass balance and iceberg calving. That is where the importance of this study lies.

Back to the manuscript; it is well written; and the figures are well done. Figure 8 in particular is excellent. The authors put the satellite data, especially the European SAR systems, which are made available for free, to good use. I have no comments regarding corrections except the "15 year" in the Abstract (should be 14). Therefore, I recommend publication.

M. Shokr