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The Cryosphere Discussions

Interactive comment on "Driving Forces of Circum-Antarctic Glacier and Ice Shelf Front Retreat over the Last Two Decades" *by* Celia A. Baumhoer et al.

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This paper is unusually thorough and represents a major contribution to the field. I will certainly build off of these results in my own work.

I have a few minor comments. It'd be interesting to have the information in Table 2 presented in m/y by taking the areal rate kmˆ2/yr and dividing by the ice front length. This would be useful for modelers who often calculate "calving rates" in m/yr.

Second, it would be interesting to explain in a bit more detail how observed retreat rates are related to major tabular calving events. See list here:

https://www.scp.byu.edu/data/iceberg/. For example, consider B15, the biggest known iceberg. How much of the 868±1.3 kmˆ2/yr (= 9548 kmˆ2 over 11 yr) number for Ep-F in Table 2 is due to the calving event that created iceberg B15? Let's see... it was about 200km x 50km. So that's 10,000 kmˆ2. In other words, the entire amount of retreat. This might be worth noting.

Third, it would be interesting to see a bit more discussion of the relationship between calving physics and the observed retreat rates. The authors cite the paper by Larour 2004, Yu et al., 2017, and Mosbeux et al., 2020, which is a great start! But there are many other ways that surface and basal melting have been proposed to relate to calving. Consider these papers, for example:

Bassis, Jeremy N., and C. C. Walker. "Upper and lower limits on the stability of calving glaciers from the yield strength envelope of ice." Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences 468.2140 (2012): 913-931.

Lipovsky, Bradley Paul. "Ice shelf rift propagation: stability, three-dimensional effects, and the role of marginal weakening." The Cryosphere 14.5 (2020): 1673-1683.

Banwell, Alison F., Douglas R. MacAyeal, and Olga V. Sergienko. "Breakup of the Larsen B Ice Shelf triggered by chain reaction drainage of supraglacial lakes." Geophysical Research Letters 40.22 (2013): 5872-5876.

Overall, I find this paper to be exceptional in its quality and depth. Well done!

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