Comment on tc-2021-317
Anonymous Referee #2

Referee comment on "Brief communication: Impact of common ice mask in surface mass balance estimates over the Antarctic ice sheet" by Nicolaj Hansen et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-317-RC2, 2022

This paper demonstrates that different RCMs used to simulate Antarctic SMB use different ice masks. As a result, total SMB values are impacted, which the authors nicely demonstrate can be large and lead to important uncertainties in the total mass balance estimate for the AIS. The authors conclude with recommendations for developing a common ice mask and surface type dataset to be used among various modeling groups.

While this is a simple, brief paper, the results are important and warrant publication. I have two concerns, however, that I think should be addressed before this can be published:

1) More information on why there are differences in the various land-ocean masks is warranted. Please see comment below regarding L35 and L95.
2) As the coastline evolves every year, and will continue to evolve in the future, what recommendations can be made in terms of using a common ice mask? Both the grounding line and ice shelf extent change through time. Should the ice mask not dynamically evolve both over the reanalysis era and in the future? The authors only discuss creating one, static, ice mask. This in itself will create uncertainty as it will only be “correct” at one point in time. And what point in time should that be?

Minor comments:
L16: Remove comma after “Although”
L26: Can you provide an approximate grid cell length in km as well?
L35-: Can you please provide more information for these various datasets? Over what time period(s) were each developed? How were the masks developed? What does IGBP mean? On line 95, you go on to speculate why there differences may exist in the ice masks, but this is only very briefly discussed, and in my opinion, insufficiently discussed.
L45: change first instance of defined -> define
L58: adn -> and