

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2021-255**

Anonymous Referee #1

Referee comment on "A high-resolution Antarctic grounding zone product from ICESat-2 laser altimetry" by Tian Li et al., Earth Syst. Sci. Data Discuss.,
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The manuscript uses 18 months of ICESat-2 repeat tracks to identify the grounding zone of the Antarctica Ice Sheet. It develops a method that could automated mapping the grounding zone and produces a grounding zone product that has nearly complete coverage of the Antarctica Ice Sheet. Elevation changes derived from ICESat-2 ascending and descending cross-over passes are also used for validation.

Given the significant increase in grounding zone density and the improved coverage, I believe that this ICESat-2-derived Antarctica grounding zone product will be of large interest to the cryosphere community. Furthermore, with more ICESat-2 repeat cycles coming out in next few years, the dynamic changes of grounding zone could be evaluated repeatedly and efficiently based on the automated techniques developed in this study. The manuscript is overall well written. I have no major comments except a few suggestions listed below. Therefore, I look forward to seeing this paper published in Earth System Science Data.

Specific comments:

Line 27: There is no 'Point G' in Fig. 1.

Line 37: Suggest adding a figure to show the schematic of grounding zone. This will clearly show where the point F, H, Im and Ib located.

Figure 2, 8 & 13: The legend overlaps with the curve. Considering change the position of the legend for clarity.

Section 3.3.2: Hogg et al. (2018) also detected the Antarctica Ice Sheet break-in-slope point Ib using another altimetry data (CryoSat-2). I suggest the ICESat-2-derived Point Ib could also be compared to that product.

Reference:Hogg, A. E., A. Shepherd, L. Gilbert, A. Muir, and M. R. Drinkwater (2018), Mapping ice sheet grounding lines with CryoSat-2, *Advances in Space Research*, 62(6), 1191-1202.