Thank you to the editor and both reviewers for once again taking the time to comment on our manuscript. Below we describe how we have addressed these comments. Line numbers refer to the version of the manuscript with changes marked on.

Editor

Figure 5: This figure is generally clear. However, as noted by one of the reviewers, the assumption L = H is rather strong, especially for Greenlandic glaciers. In Fig. 6, you show \tilde{L} = 0.5, but it would be beneficial to the readers to illustrate how the results change for different values of L/H , such as 0.3 and 0.6. Similarly, since \sigma_{\max} is not an observable parameter, further insight into its choice of this value would be beneficial. I therefore suggest expanding Fig. 6 into four sub plots, each varying a different parameter across at least three representative values.

Thanks for this suggestion – we have expanded Fig. 6 into four subplots, covering the range of values requested, and modified the associated text in section 3.4 accordingly. In addition to the figure, we have added discussion on the value of \sigma_{\max} in the paragraph beginning on L425 and have added to the manuscript on the subject of L=H – see response to reviewer comment below.

Figure 6a: It is particularly interesting that even with \sigma_{\max} = 75k, the three Greenlandic glaciers remain within the calving regime. Please consider expanding your discussion to provide more insight into the potential physical meaning of \sigma_{\max}, including the rationale behind the selected values.

We've added additional justification and discussion of the choice of \sigma_{\max} to the discussion section (paragraph beginning L425). We're not sure we follow, in this particular context, why the case of the Greenlandic glaciers with tensile strength of 75 kPa is particularly interesting – the tensile strength sets the critical ice thickness that unconfined, crevassed ice can support without horizontal stresses pulling it apart. The Greenlandic floating fronts are relatively thin, perhaps due to higher submarine melt rates than in Antarctica. In this sense, the Greenlandic fronts are a bit less useful/interesting in constraining the critical ice thickness than the Antarctic fronts. Of course, our study only provides this upper bound on unconfined ice thickness and is not able to say what drives calving for ice shelves that are within the stable envelope. This likely involves processes such as melt hydrofracturing or frontal bending, but these are beyond the present study. We hope the additional discussion suffices in this case.

Abstract and Conclusions: You mention H_0 is about 400m, but this value depends on the assumptions \sigma_{\max} = 150k and \rho = 1000. While I am comfortable with skipping these assumptions in the abstract, please ensure they are explicitly stated in the conclusions for clarity and transparency.

We've added this explicit statement to the conclusions (L518). We also fixed an inconsistency where H_0 should be denoted H_{\sigma} according to Eq. 25.

Line 117 & 178: Please use proper math notation: R_{xx} / (\rho_i g H).

Fixed as suggested.

Line 179: Do you mean \sigma_{\max}?

Yes – thanks for catching this.

Reviewer

I'm confused by Fig5. The observational data points: blue dots are for grounded glacier, which should use tau_b>0 to compare with; yellow dots are floating ice shelves, which should use tau_b=0 to compare with. Shall the authors come up with two separate stability diagrams for a) sigma_max>0, tau_b>0 to compare with blue dots; and b) sigma_max>0, tau_b=0 to compare with yellow dots? For instance, in Fig.5b, only yellow dots should be presented; in Fig.5c, only blue dots should be presented. Did I misunderstand anything?

Apologies – we can see the potential for confusion here. In Fig. 5, basal friction is only applied when \tau_b>0 AND when the front is grounded (i.e., in panels a and c, left of the flotation line). Basal friction is never applied to floating fronts. We have modified the caption of Fig. 5 to make this clearer.

Can authors explain a bit more why they choose crevasse length = ice thickness (L=H)? In Appendix B it seems the results are sensitive to the choice of L. From TRI field data, the crevasse spacing seems to vary from 300m~600m, for thickness ~1km glaciers: https://tos.org/oceanography/article/an-intensive-observation-of-calving-at-helheim-glacier-east-greenland https://tc.copernicus.org/articles/12/1387/2018/tc-12-1387-2018.pdf

Thank you for these sources and this suggestion. Following the suggestion from the editor, we've added a new subplot (Fig. 6d) showing specifically the sensitivity to the choice of L/H, including the cases L/H=0.3 and 0.6 that would be indicated by the sources you provided. The impact on the results is that for smaller crevasse spacing, the resistive to calving from basal friction is not enough to stop the thickest glaciers from being unstable (Fig. 6d). Since these glaciers do stably exist, we have favoured L/H=1 in most of the results. Note that our crevasse spacing applies to pairs of surface and basal crevasses (Fig. 1), whereas the observations linked by the reviewer are only able to see surface crevasses, which may be spaced more closely than basal crevasses. More broadly, our treatment of basal friction is very simplified and using a proper sliding law would be more realistic, so we don't wish to place too much weight on the precise values here, rather we want to make a sensible choice and then show the sensitivity to this choice. These thoughts have been added to the manuscript at L304, L368 and L488.