

I appreciate the authors addressing each comment carefully. I believe the revised manuscript is much improved and will make an important contribution to The Cryosphere. I'd only ask that the reviewers address one issue detailed below. The original comment is in black, their response in blue, and my final comment in red.

Ideally, the authors would address the issue of future projections of GIA by running a fully coupled simulation with a dynamic ice model. This would be the only way to fully understand the impact that their REG_X viscosity models might have on grounding line dynamics and GIA. Without coupled simulations, it is hard to interpret their results since these ice-loading models (ICE-FUT) are based on different viscosity structures. At a minimum, it would be helpful to plot the grounding line evolution (as calculated by the flotation criterion in the Seakon) in Figure 6 for different models to assess the potential impact this viscosity structure might have on ice stability.

We agree that coupled simulations with a dynamic ice model would be the best way to understand the impact of incorporating regional upper mantle structure on grounding line dynamics and, motivated by the results of this investigation, we foresee pursuing such an investigation in the future. Such simulations are highly computationally expensive and as illustrated in Gomez et al. (2024) with the continental viscosity model, the strength and nature of the feedback is sensitive to the climate forcing. We thus feel that a thorough exploration merits its own study.

As the flotation criterion in Seakon does not accurately capture the feedbacks between GIA and ice sheet dynamics, we feel that it would be misleading to show and challenging to interpret grounding line positions calculated using the flotation criterion for each viscosity model. Thus, we only show grounding line positions predicted using the ICE-FUT model in Figs. 4-5.

I agree that Seakon does not accurately capture GIA-ice sheet feedbacks. However, the purpose of Figure 8 is to demonstrate the potential impact that GIA could have on ice sheet dynamics. This impact is mostly related to where the ice is grounded, so it seems important to show whether the Seakon model predicts large changes in where the ice sheet is floating. This would provide a better understanding of the impact of regional

First, we would like to thank the Reviewer for their feedback and continued interest in improving this manuscript.

We have now plotted the projected grounding line position for the REG_P simulation in dark gray dashed lines in panels c-h of Figure 5 (which is the figure that the Reviewer refers to as Figure 8 above). In the caption, we specify that the “..grounding line positions are calculated by applying the flotation criterion to the output of the REG_P simulation”. We also note that “Because projected grounding line positions from simulations with CONT, REG_S, and 1D_WAIS show minimal difference from REG_P, only grounding line positions from the REG_P simulation are plotted” in the caption. We

believe that the changes made to Figure 5 now illustrates the amount of change that Seakon predicts in where the ice sheet is floating versus that prescribed by the ICE-FUT model.