

## Response to comment tc-2022-103-RC1 by Anonymous Referee #1

We thank the anonymous reviewer for their helpful comments on our manuscript, and would hereby like to address the concerns they raised. Reviewer comments are shown in italics, our responses in regular type.

*The latest version of the manuscript “Compensating errors in inversions for subglacial bed roughness: same steady state, different dynamic response” by C. J. Berends et al. addresses most of the comments raised by both reviewers. There are a just couple of points that remain unclear to me.*

*The first one is the answer to the question of the initial conditions impact mentioning simulations have been lost. I understand that could be expensive to rerun but the phrasing of the answer is a little surprising and it might be best to remove this entirely or to write it differently.*

We will remove the reference to the preliminary experiments that demonstrated the (lack of) effect of the choice of initial bed roughness. We will also add a reference to Appendix A, where we show that the inversion converges within about 30,000 years.

*The second one is the answer to the question of inverse method convergence and overfit. Yes the presence of regularization is needed, but I don’t see the link with the different parts of the explanations in the answer to this question, so this might need a bit more clarification.*

We will add another reference to Appendix A in the paragraph on regularization in the methodology section (lines 200 – 215). Hopefully this will clarify to the reader how our regularization approach works, and how the experiments presented in the Appendix demonstrate the absence of significant overfitting.