

## ***Interactive comment on “Sediment loading in Fennoscandia during the last glacial cycle” by Wouter van der Wal and Thijs Ijpelaar***

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This paper presents a clear and very well presented discussion of the incorporation of sediment loading effects into calculations of sea level change and other observables related to GIA. I think this discussion is warranted and contributes to the accuracy with which GIA effects are calculated. I would suggest this paper be accepted with minor technical revisions which I identify below:

- 1) Page 1, Line 29: "shown known" should simply be "shown"
- 2) Page 2, Equation 1: This formula is mis-labelled and is incorrect. The quantity represented here is not sea-level it is water-depth. In this context  $I$  should be multiplied by  $\frac{\rho_i}{\rho_w}$  since it is not total ice thickness that is important, only that portion of ice thickness that displaces water.

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- 3) Page 3, Equation 3: With the amendments suggested above the grounding line becomes  $SL_j > 0$
- 4) Page 5, Line 3: "entire" should be deleted or replaced with "all of" or "the whole of"
- 5) Page 5, Line 7: "largest of such" should be "largest such"
- 6) Figure 3: The projection used for this figure makes the geography a little difficult to interpret.
- 7) Figure 4: It is very hard to make out the modern coastline which makes the figure difficult to interpret.
- 8) Figures 2, 3, 4, 5 and 6 use different projections. It would, I think, be better to standardise.
- 9) While there is a discussion of the uncertainty in the viscosity model and the observational record the uncertainty in the ice load seems to be the most significant element for this analysis. If GIA data are used to constrain the ice sheet and sediment changes are not considered then the change in ice thickness will be biased to compensate for the neglected sedimentary load. The implicit assumption that ice thickness is fixed and known is inaccurate.

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