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Interactive comment on "Comparing a thermo-mechanical Weichselian ice sheet reconstruction to GIA driven reconstructions: aspects of earth response and ice configuration" *by* P. Schmidt et al.

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We thank H.-G. Scherneck for his short comments that aided in clarifying aspects of the manuscript. Here we reply to two of the short comments while our reply to the first comment by H.-G. Scherneck has been published before. We further wish to acknowledge offline discussions with H.-G. Scherneck regarding the 2007 and 2010 processing of the Bifrost data (Lidberg et al., 2007, 2010), both of which H.-G. Scherneck is a co-author.

1 Reply to short comment published 2014-01-12

In the revised manuscript we are now using the Lidberg et al. (2010) processing of the Bifrost data.

Regarding the horizontal component we agree with H.-G. Scherneck as well as the studies by Milne et al. (2001, 2004) that these contain information than will help to disentangle the model parameters for mantle viscosity and lithospheric thickness. However, we do not use the horizontal component as it has been found that the methodology we use (the Wu (2004) implementation of the flat earth approximation) may result in to large horizontal displacements (Schotman et al., 2008), although inclusion of material compressibility (as also done in our study) were found to improve the quality of the predictions. Since we have not yet tested our implementation in this respect we can only assume that the results found by Schotman et al. (2008) also applies to our implementation and therefore we will not use the horizontal displacements. This is already touched upon in the description of our earth model and in the revised version of the manuscript we have made this even more explicit.

2 Reply to short comment published 2014-01-22

We agree with the reviewer P. Whitehouse that our comparison of predicted uplift rates to RSL data is not the correct thing to do. We have therefore removed this comparison from the manuscript. Note however that we still present and compare uplift curves at the Ångerman river and further have added two more sites at which we present and compare uplift histories. This to better quantify the differences in the predictions of the ice sheet reconstructions.

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