

## **The transferability of adjoint inversion products between different ice flow models**

### **Minor revisions - response to editor comments**

Author responses written in blue.

Dear Jowan,

Thanks for this revised version of your manuscript which has greatly improved since its nominal submission. I have nevertheless still few comments that should be accounted for before it is accepted for publication in The Cryosphere. They are listed below.

Best regards,  
Olivier Gagliardini

Thank you for the comments. Revisions have been made as noted below.

- I think the paper would be easier to follow if sub-sections 3.1 and 3.2 were switched?

These have now been switched.

- line 198: "using the result". Which result? Missing something here?

Updated to clarify that the hydrostatic inversion is using the smoothed surface.

- line 216: it is not clear from this sentence if only the normal velocity or all components are set to zero for  $U_a$  on the lateral boundary of the grounded parts (the classical BC on the edges of a drainage basin would be normal velocity set to zero, i.e. no flux BC).

Changed wording to "all velocities" to make this clearer (both  $u$  and  $v$  are set to zero in this case).

- line 235: "some areas" -> "these areas" ?

Changed this phrase as suggested.

- line 344: this change in the inversion procedure for STREAMICE should be justified. The way it is presented, it looks suspicious for the reader and breaks the well designed sets of experiments.

The justification has now been added to this section. This was certainly needed! (It was previously mentioned in Appendix B4, but had not been referred to in the main text where it should have been)

- line 352 and at many other places in the manuscript: "in Figure 6" -> "in Fig. 6". See <https://www.the-cryosphere.net/submission.html#figurestables> (The abbreviation "Fig." should be used when it appears in running text and should be followed by a number unless it comes at the beginning of a sentence, e.g.: "The results are depicted in Fig. 5. Figure 9 reveals that...").

The references have been changed to comply with submission guidelines. All

occurrences of Figure, Section and Equation have been updated to Fig., Sect. and Eq., except at the start of a sentence. Consistent capitalisation of geographic terms in names (eg. Thwaites Glacier) has also been applied throughout, including updating Fig.1.

- line 366: How the friction below ice-shelves is treated in each model in the case of a GL advance should be explained in the model description

Úa's different treatment of friction is now addressed at the start of section 5, along with the difference in STREAMICE priors. This seems the most appropriate place to introduce it, as it was a choice made for these experiments, rather than being a general feature of the model. The original paragraph in Sect. 5.1 has been altered to reflect this.