

Interactive comment on “The contrasting response of outlet glaciers to interior and ocean forcing” by John Erich Christian et al.

Anonymous Referee #2

Received and published: 18 April 2020

In this study, the authors used simplified models to explore the response of ice flow to different sources of climate forcing, including perturbations at the grounding line and to the surface mass balance in the ice interior. I found this approach to be novel and very interesting. It successfully provides new insights into the connections between various forcings, in terms of amplitude and effects operating at different timescales.

The manuscript is well organised and very well written, overall. I support its publication after minor corrections.

Comments: -L. 93: delete “model” in “The PD12 model model. . .”

-L. 203: It isn't clear to me, what does “a different flowline model” refer to. Is it simply the flowline model described in section 2.2?

C1

-L. 339: correct “instantaneous equilibrium”

-L. 372, and first paragraph after subtitle: it would be helpful to define “emergence and detectability” more explicitly. As currently presented, I am not sure how the paragraph (lines 373-377) introduces the section.

-L. 381 and 382: Can you clarify how the glaciers' memory mentioned relates to the committed change discussed previously?

-L. 386: Specify which “two types of forcing” you are talking about (ocean vs interior, presumably?)

-L. 399: can you specify “detectability. . .” of what?

-L. 458: Did you mean a reference to Figure 7c?

Generally, I find the figures to be clear, although I would suggest working a bit more on / completing some of the figure legends, in particular for Figure 1, Figure 2, Figure 5 and Figure 6. For example:

Figure 1: insert “(blue)” and “(orange)” after “omega” and “S” respectively, in caption d.

Figure 2: same thing for caption c, d, and e.

Figure 5: Caption needs to be more precise: aren't panels a, b and c showing the response of glaciers to idealized climate forcing? As it stands, it reads as if they show the climate forcing itself.

Figure 6: Similarly, some details and descriptions are missing. E.g., suggest completing the legend for panel b. I would also suggest making the titles currently in grey stand out a bit more.

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2019-301, 2020.

C2