Dear colleagues,

This is a very nice paper which is a pleasure to read. There is not much to criticize as Figures and Text are well crafted. Compared to the rest, I found the Discussion unfocused and rather weak. This part would profit from some comparisons with model parameter studies.

Overall, I think the paper should be published after the few minor comments below have been addressed.

Sincerely, Martin Lüthi

Specific comments

1.9 “responses time”: something’s wrong here (also 10), maybe should be “response times”?

3.10 and other places: Please refrain from “full-Stokes” (an Elmer-Ice invention). Either these are the Stokes equations, or some approximation, e.g. SSA or SIA (where the “A” already means “approximation”).

3.14 The horizontal ice flux divergence.

3.21 The reader should be informed that $b$ is the part of the ice sheet below ocean (which is obvious, but not clear until looking at Fig. 1). Where is $b$ measured? is it an average? (OK, it’s given later, but maybe it could be indicated here?)

3.29 “transsects”? (plural)

3.32 Is there a rationale for PIG? How would the results look if some other glacier were chosen?

13.15 one comma too much in the citation.

13.17 What should the meaning be of this error comparison. An error of several 1000 m for bedrock would be, indeed unusable. Since everything is shallow, the errors should be discussed with respect of the respective scales, which differ by one to two orders of magnitude.