Summary and comments on the revised manuscript entitled

# Diagnosing the sensitivity of grounding line flux to changes in sub-ice shelf melting

initially presented on 11.02.2020

by

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## General

I want to congratulate the authors to this very well written and well structured manuscript, which is rich in content and of high scientific quality. The conclusions drawn in this article will rectify the view of glaciologists on locally defined measures of the ice-dynamic state of ice-shelves with regard to grounding line flux (GLF) response. Their recommendations in terms of assessing the GLF sensitivity are very useful for improving future assessments. The authors succeeded in resolving my main initial concerns and they moderated their assessment on the local measures. As it stands, I recommend this manuscript for publication in *The Cryosphere* after some few technical corrections have been addressed.

## Techincal comments

**L128** By stating that $R$ is quantified as the 'change in the GLF over a year due to a perturbation in the thickness', I was initially confused and thought that you conduct transient simulations for a year. Yet you clearly state above that you quantify the instant response. Anyhow, I would reformulate this part to avoid confusion. You only need to mention this time period to obtain a non-dimensional number.
**L281** You missed to specify the components which enter the correlation mentioned here.
**L368** Doubling of 'only'.

**Fig. 3** I do not see the necessity to invoke the linear regression analysis in the caption here. Initially it confused my interpretation of the figure.
**Fig. 3** In the caption, you distinguish between 'modeled' and 'predicted' values for $N_{rp}$ but I am not sure how you distinguish them in the panels. I suspect the two shades of blue indicate these two categories. Please amend.
**Fig. 4** Same comments as for Fig. 3.
**Fig. S2** $n_{rp} \longrightarrow N_{rp}$