

Editor's comments are in blue, our reply in black, quotes in the revised manuscript in red.

L394+: How come that both the C_m80 and C_m40 exhibit the exact same grl retreat until 2100? Maybe a mix up in the numbers? Please confirm whether these numbers are correct. -> "Along the main trunk FL1 both the regularized Coulomb (C_m80) and linear Weertman (LW_m80) sliding parameterizations produce comparable grounding line retreat rates of 0.14 km yr⁻¹ over 2015-2100 (Fig. 7). By 2050, this results in 8.08 km of retreat, increasing to 12.20 km by 2100. In contrast, with nonlinear Weertman sliding, retreats are 5.94 km by 2050 along FL1 followed by then stabilization (Fig. 6). Meanwhile, the drift control experiment (C_m40) shows a grounding line retreat of 8.08 km along FL1 by 2100."

Reply: Sorry, maybe the sentence is misleading. What we mean is that C_m80 produces GL retreat of 8.08 km by 2050, and C_m40 produce retreat of 8.08 km by 2100. To be clearer, we improved this sentence to be as below:

"Along the main trunk FL1 both the regularized Coulomb (C_m80) and linear Weertman (LW_m80) sliding parameterizations produce comparable grounding line retreat rates of 0.14 km yr⁻¹ over 2015-2100 (Fig. 7). These rates corresponds to retreats of 8.08 km by 2050 and 12.20 km by 2100. In contrast, with nonlinear Weertman sliding, retreats are 5.94 km by 2050 along FL1 followed by then stabilization (Fig. 6). Meanwhile, the drift control experiment (C_m40) shows a grounding line retreat of 8.08 km along FL1 by 2100."

Can you please structure the paragraph below (L400+) such that the annual retreat rates are followed by the integrated retreat until 2100 so the reader does not have to jump from one to the other through the paragraph : -> approximately 0.42 km/yr (35.7 km until 2100) using linear Weertman (LW_m80) etc.

I also was confused that you quantify 0.27km/yr or C_m80 but 23.29 until 2100. If I multiply 0.27 km/yr with 85 years I get 22.95km. The difference is small but should be zero if you compute the average retreat rate.

L400-406: "Along FL2, the retreat rates differ significantly across parameterizations (Fig. 8): approximately 0.42 km yr⁻¹ using linear Weertman (LW_m80), 0.27 km yr⁻¹ using regularised Coulomb (C_m80) from 2015 to 2100, 0.04 km yr⁻¹ from 2015 to 2050 followed by near-stabilization using non-linear Weertman sliding parameterization (NW_m80). Along FL2, the grounding line retreats 12.09 km by 2050 and 35.85 km by 2100 using linear Weertman; 10.83 km by 2050 and 23.29 km by 2100 using regularised Coulomb; and only 1.32 km by 2050 followed by near-stabilization using nonlinear Weertman sliding parameterizations (Fig. 6). Meanwhile, the drift control experiment (C_m40) shows a grounding line retreat of 12.33 km along FL2 by 2100. "

Reply: Thanks for your suggestion. We change this paragraph to:

"Along FL2, the grounding line retreats 12.09 km by 2050 and 35.85 km by 2100 (~0.42 km yr⁻¹) using linear Weertman (LW_m80) ; 10.83 km by 2050 and 23.29 km

by 2100 ($\sim 0.27 \text{ km yr}^{-1}$) using regularised Coulomb (C_{m80}); and only 1.32 km by 2050 ($\sim 0.04 \text{ km yr}^{-1}$) followed by near-stabilization using nonlinear Weertman (NW_{m80}) sliding parameterizations (Fig. 6).”

The accurate retreat rate for $\sim 0.27 \text{ km/yr}$ is 0.274 km/yr . So if we multiply 0.274 km/yr with 85 years, we get 23.29 km. But we reported the rates with two decimal places.

L598 please correct the sentence.

Reply: Corrected. We delete “as”, and it becomes “Our simulations do not retreat past this slope before the year 2100.”

Figure 5: I would suggest adding the grounding line position at the year 2100 of the drift_ctrl experiment in figure 5b and 5c as well as in the transects (e.g. as a black or white line) so the relative positioning of the other runs with respect to the ctrl are accessible from the figure.

Reply: Okay, we improved Fig. 5 as the editor suggested.

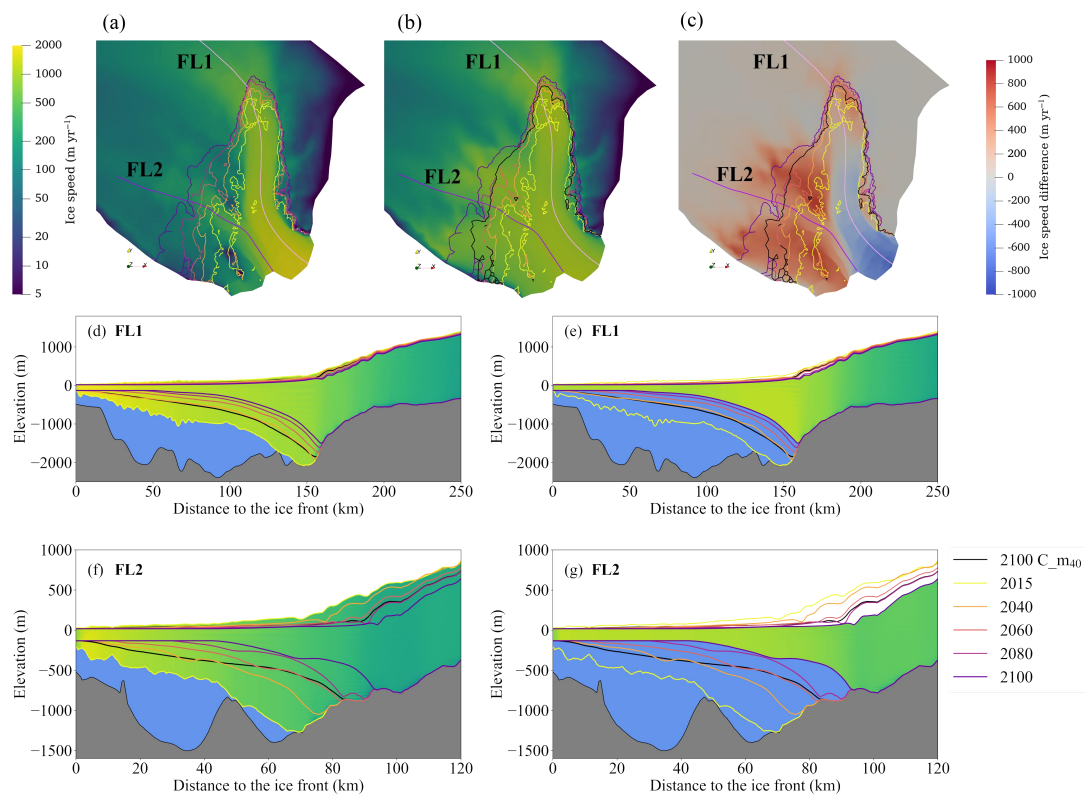


Figure 5. Surface velocity at the beginning of the initial year 2015 (a) and the end of the year 2100 (b) in the reference run. The surface velocity difference (2100 minus 2015) is shown in (c). The grounding line positions in the year 2015, 2040, 2060, 2080 and 2100 in the reference run C_{m80} are shown in (a-c). The grounding line position in the year 2100 in the drift control run C_{m40} is shown in (b-g) with black lines. Pink and purple solid lines in (a) and (b) represent flowlines FL1 and FL2 as labelled. The solid color portions of the figures show the ice flow velocity (upper

colorbar) profiles along FL1 **(c, d)** and FL2 **(e, f)** in the reference run in the initial year 2015 **(d, f)** and the end year 2050 **(e, g)**, with bedrock in dark grey and seawater in blue. The geometry change of TG is marked with colored solid lines for the years 2015, 2040, 2060, 2080 and 2100. The vertical elevations are exaggerated by a factor of 25.