Supplementary Material for “The stability of present-day Antarctic grounding lines — Part A: No indication of marine ice sheet instability in the current geometry”

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Figure S1. Ice thickness from BedMachine Antarctica v2 and ice thickness calculated in each ice sheet model after initialisation. Grounding lines are shown in black.
Figure S2. Annual ice surface velocities from MEaSUREs for 2015/16 and ice surface velocities calculated in each ice sheet model after initialisation.
Figure S3. Exponential recovery of the change in ice flux across the grounding line in the 80 years after the perturbation. Results are presented by drainage basin for perturbation experiments using Elmer/Ice. In each case the coloured points are the model results for each perturbation experiment and the dashed lines are the exponential fit. R² values are shown for each experiment in the corresponding colour.
Figure S4. Exponential recovery of the change in ice flux across the grounding line in the 80 years after the perturbation. Results are presented by drainage basin for perturbation experiments using PISM. In each case the coloured points are the model results for each perturbation experiment and the dashed lines are the exponential fit. $R^2$ values are shown for each experiment in the corresponding colour.
Figure S5. Exponential recovery of the change in ice flux across the grounding line in the 80 years after the perturbation. Results are presented by drainage basin for perturbation experiments using Úa. In each case the coloured points are the model results for each perturbation experiment and the dashed lines are the exponential fit. $R^2$ values are shown for each experiment in the corresponding colour.
**Figure S6. Additional Antarctic-wide results.** Change in grounding line position, change in total basal mass balance and change in sea level volume are shown for all three models and all perturbation experiments with respect to their control experiments.

**Figure S7.** Change in grounding line position for individual drainage basins. Results are shown for all three models and all perturbation experiments with respect to their control experiments.
Figure S8. Change in grounding line flux for individual drainage basins. Results are shown for all three models and all perturbation experiments with respect to their control experiments.

Figure S9. Antarctic-wide results extended to 500 years for all three models for the 5 °C perturbation experiment.
Figure S10. Change in grounding line position for individual drainage basins. Results are shown for all three models for the 5 °C perturbation experiment.

Figure S11. Change in grounding line flux for individual drainage basins. Results are shown for all three models for the 5 °C perturbation experiment.
Figure S12. Profiles of the Ronne, Filchner, and Ross ice shelves for the three models at different time intervals during the 5 °C experiment. Shown are the ice-sheet geometries of the initial state (dotted line filled with light blue), at the end of the perturbation (red line), after 80 years of release (orange line), and after 500 years (cyan line). The small panels show a zoom into the grounding line zone marked by the black squares. The resolution of each profile depends on the model resolution. Profile locations are shown in Figure 2.
Figure S13. Profiles of the Amery, Cook, and Totten ice shelves for the three models at different time intervals during the 5 °C experiment. Shown are the ice-sheet geometries of the initial state (dotted line filled with light blue), at the end of the perturbation (red line), after 80 years of release (orange line), and after 500 years (cyan line). The small panels show a zoom into the grounding line zone marked by the black squares. The resolution of each profile depends on the model resolution. Profile locations are shown in Figure 2.
Figure S14. Changes in grounding line position and ice thickness (upper row), as well as rate of ice thickness changes (lower row) at the end (500 years) of the small-amplitude perturbation experiments (first five columns) and in the long-term evolution (last column) simulated with PISM, zoomed into the region of Dotson and Crosson ice shelves.