Supplementary material

Influence of topography and winds on the distribution of water masses on the Antarctic Continental Shelf

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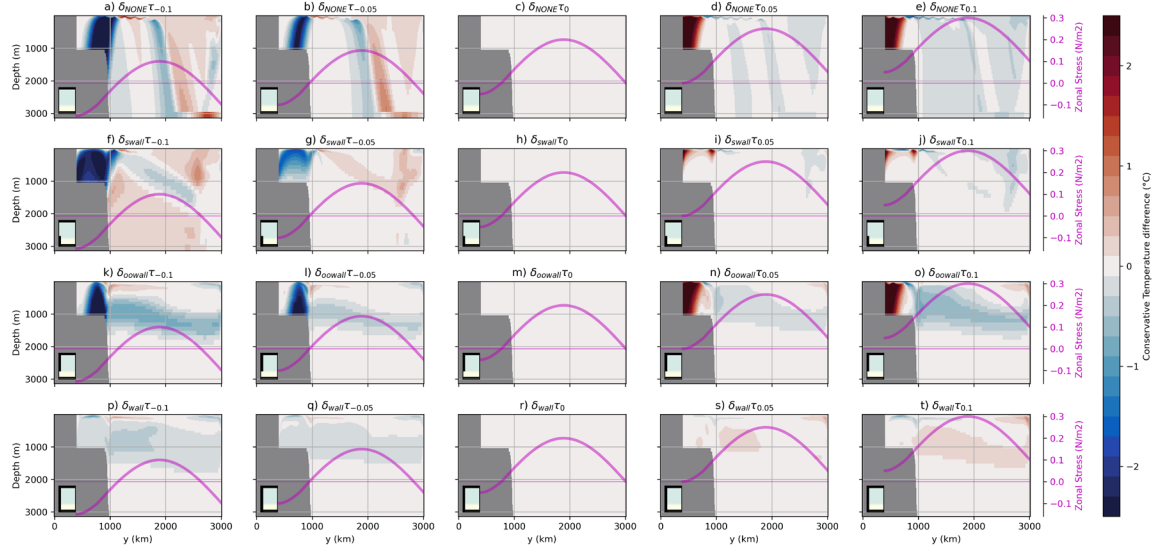[b] *British Antarctic Survey, Cambridge, United Kingdom.*

Figure S1. Zonal mean temperature (same data as Figure 6) difference, for all experiments (Table 2) with control removed. Control simulation changes on each row where each row uses the experiment with wind stress offset $c = 0$. Middle column then is zero everywhere by definition.
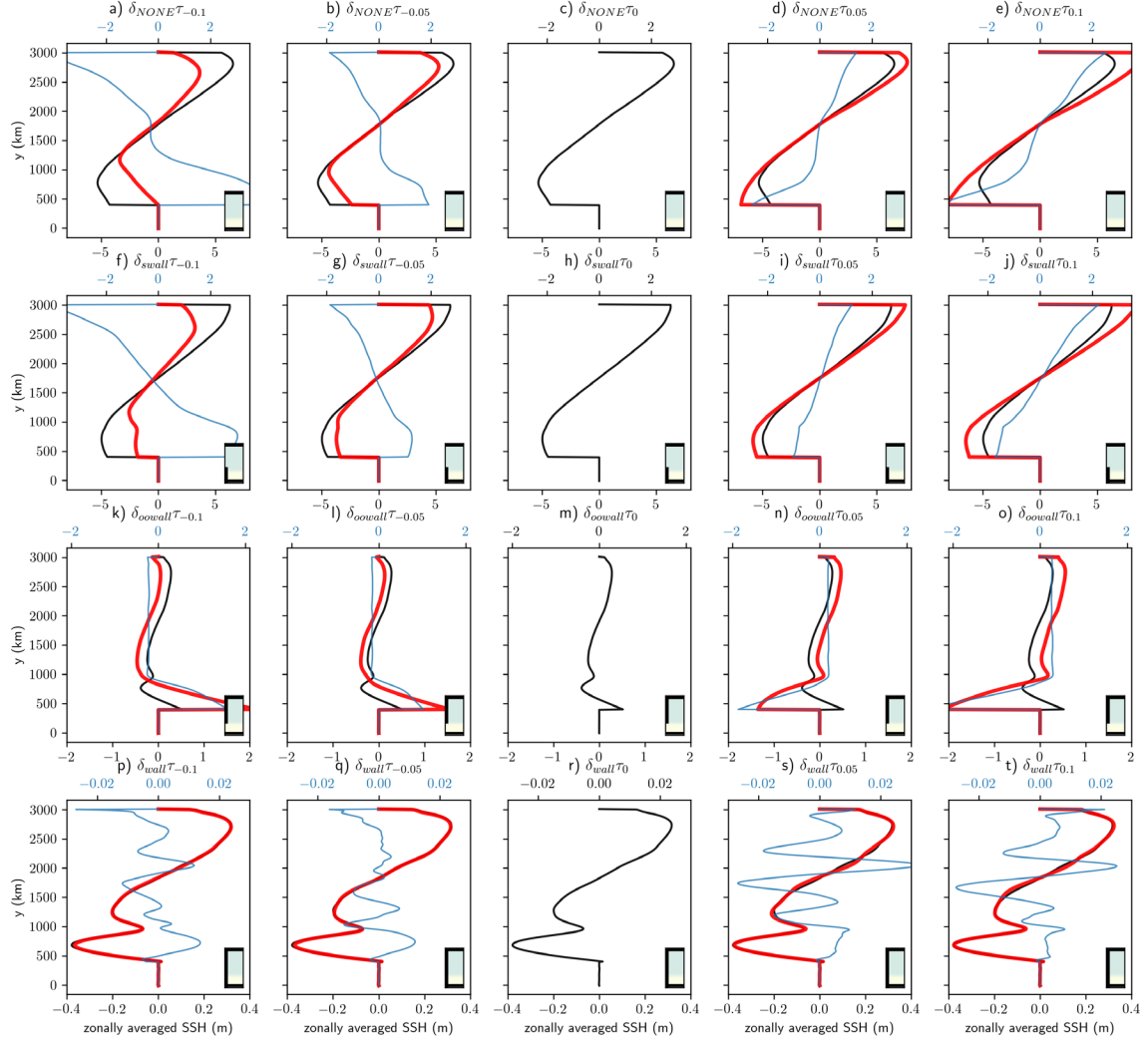
Figure S2. Zonal mean sea surface height for all experiments with same panel-experiment layout as Figure 6 (each column has a new wind stress forcing where the middle column is the control wind stress, each row has a new boundary condition indicated by the glyphs). In all panels, black is the control simulation (wind stress offset $c = 0$) where the control experiment changes on each row. The red line is the perturbed stress experiment and the blue is the difference between the two (alternative x-axis with blue scale). If comparing between rows, one should focus on the red lines in the perturbed experiments and the black line for the central column.
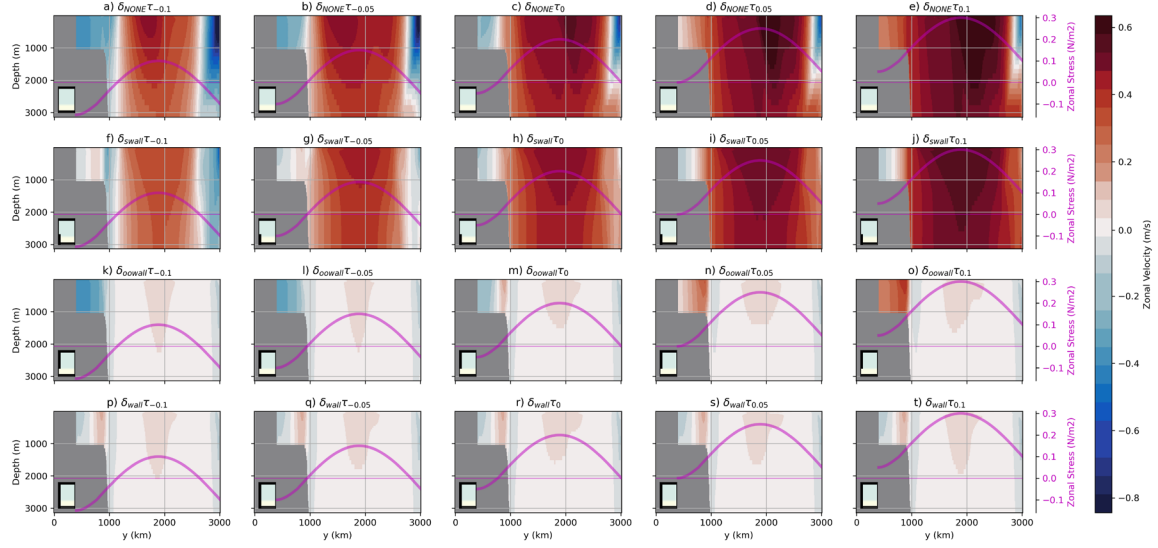
Figure S3. Zonal mean velocity for all experiments (Table 2), with red being eastward and blue westward. Each column has a new wind stress forcing where the middle column is the control wind stress. The magenta line highlights the zonally averaged wind stress. Each row has a different boundary condition, in order: i) fully re-entrant, ii) blocked shelf, iii) blocked deep ocean and iv) fully blocked shelf and deep ocean, respectively. The small glyphs (bottom-left) schematically indicate the geometry under consideration in each panel.
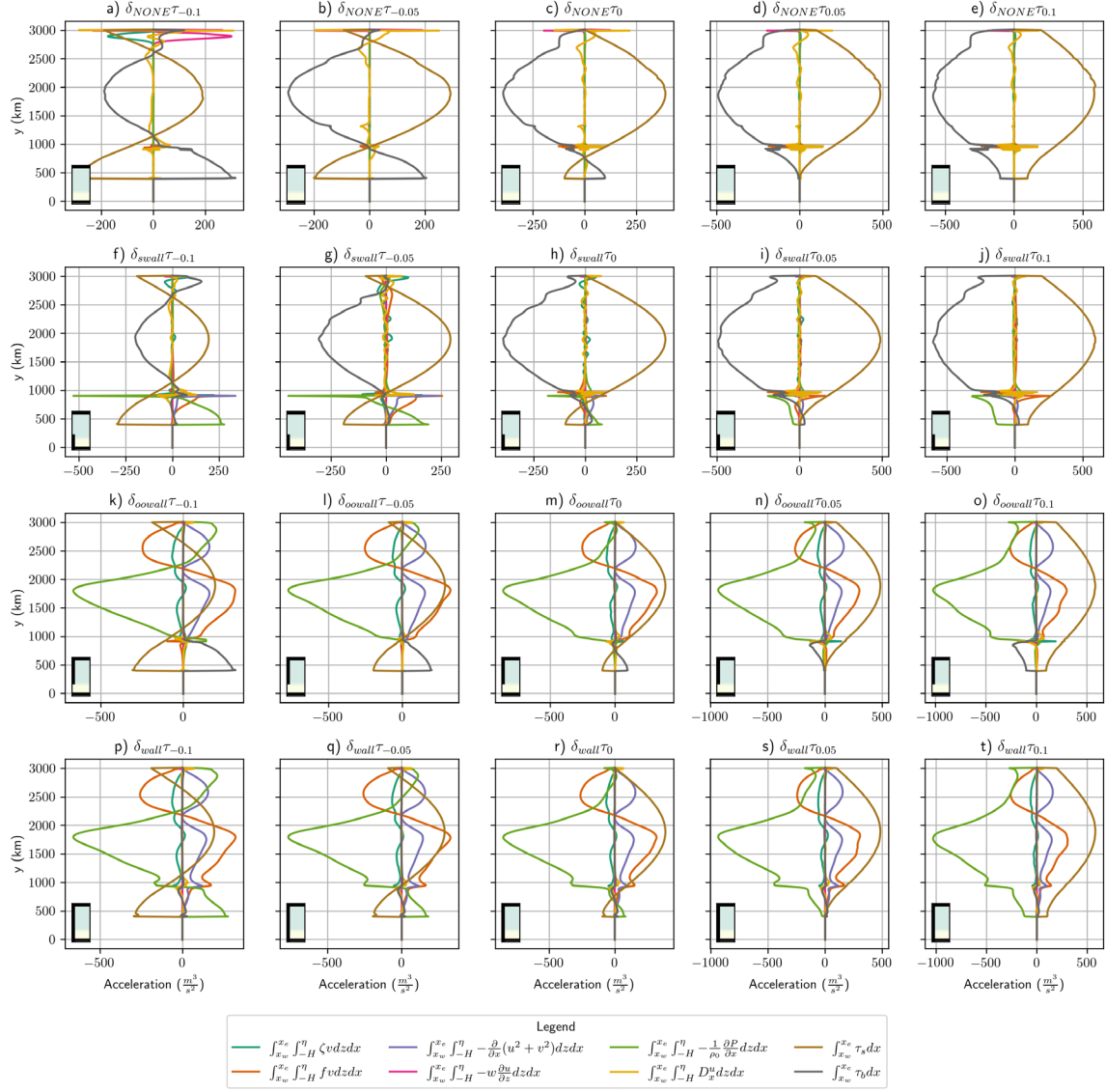
Figure S4. The 10 year time-average vertically and zonally integrated zonal momentum budget. The terms are as described in Section 4.4 and indicated by the legend. Each row has a different boundary condition, in order: i) fully re-entrant, ii) blocked shelf, iii) blocked deep ocean and iv) fully blocked shelf and deep ocean, respectively. The small glyphs (bottom-left) schematically indicate the geometry under consideration in each panel.
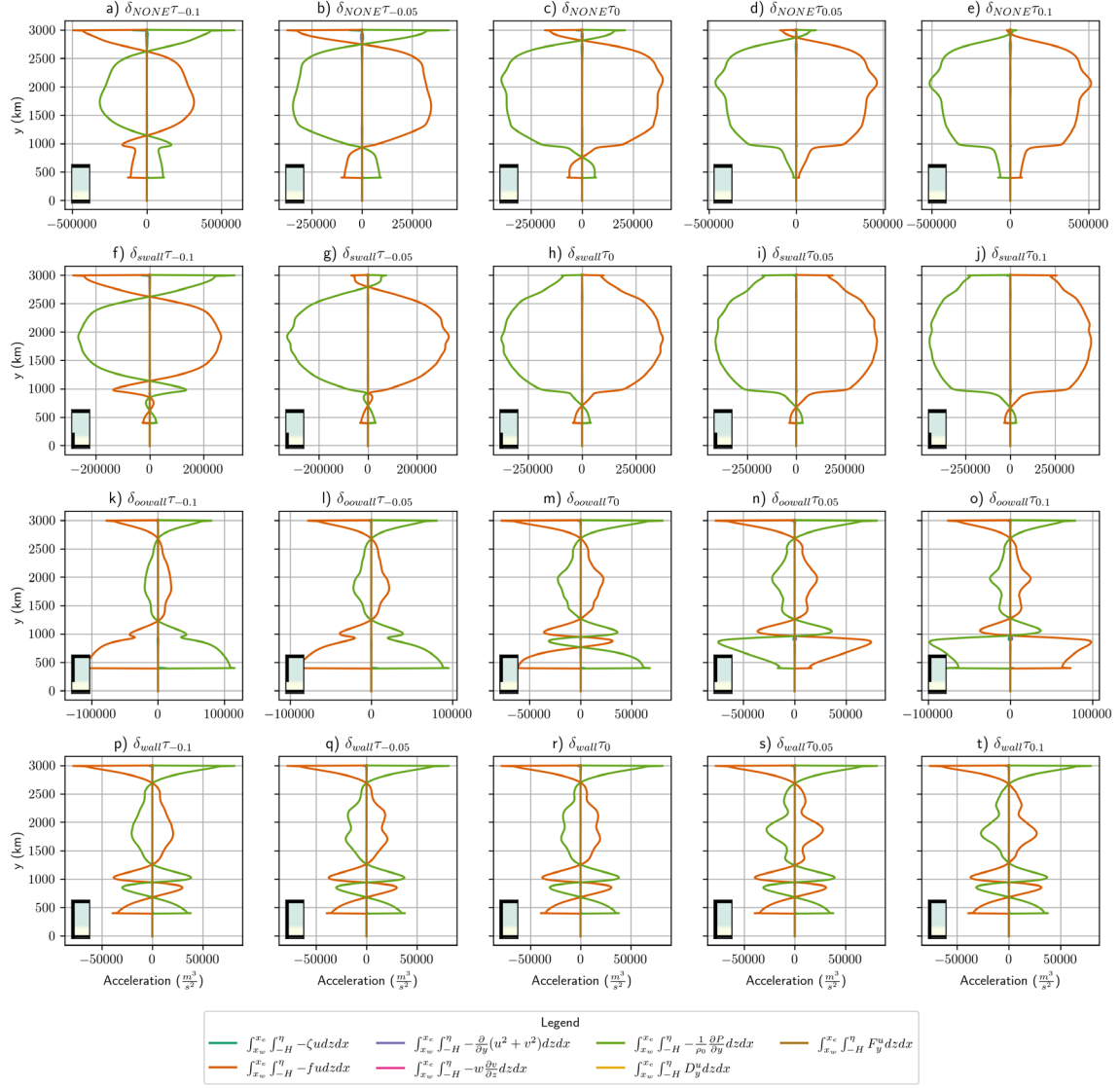
Figure S5. The 10 year time-average vertically and zonally integrated meridional momentum budget. The terms are as described in Section 4.4 and indicated by the legend. Each row has a different boundary condition, in order: i) fully re-entrant, ii) blocked shelf, iii) blocked deep ocean and iv) fully blocked shelf and deep ocean, respectively. The small glyphs (bottom-left) schematically indicate the geometry under consideration in each panel.