Supplement for manuscript **Oceanic gateways in Antarctica - Impact of relative sea-level change on sub-shelf melt**

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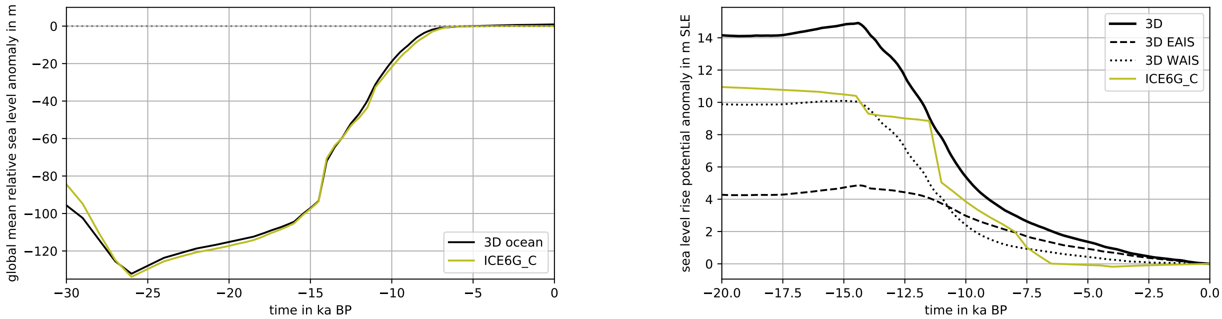

Figure S1. Global mean sea level (left) and Antarctic ice mass (right). The global Last Glacial Maximum has been reached at ca. 26 ka BP (left), but Antarctica's LGM was at around 14.5 ka BP. The ICE6G_C dataset (olive color; Stuhne and Peltier, 2015) is included for comparison to the coupled ice sheet-GIA model results from PISM-VILMA (black lines).

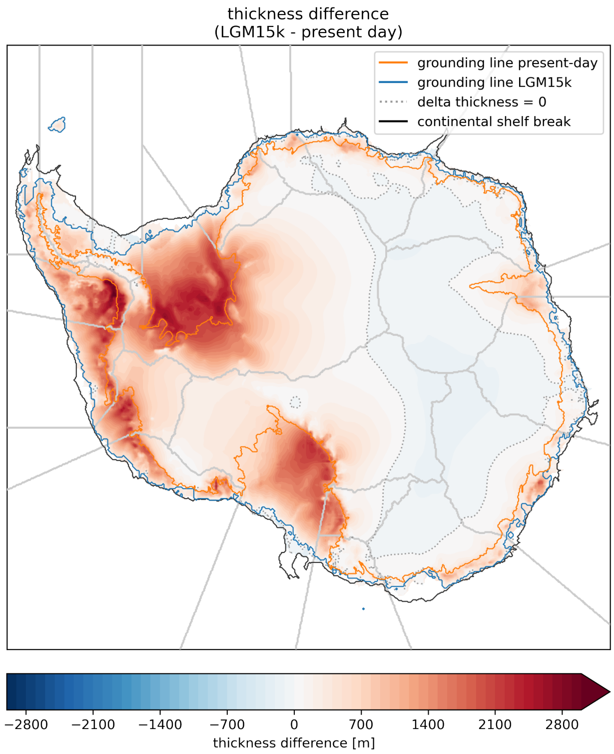

Figure S2. Ice-sheet thickness difference: LGM15k vs present-day. Grounding lines are depicted in orange for *present-day* and in blue for *LGM15k* scenario. The continental-shelf break (topography = -1800m) is marked with a black contour line. Change between positive and negative thickness anomaly is highlighted with a dotted grey line.

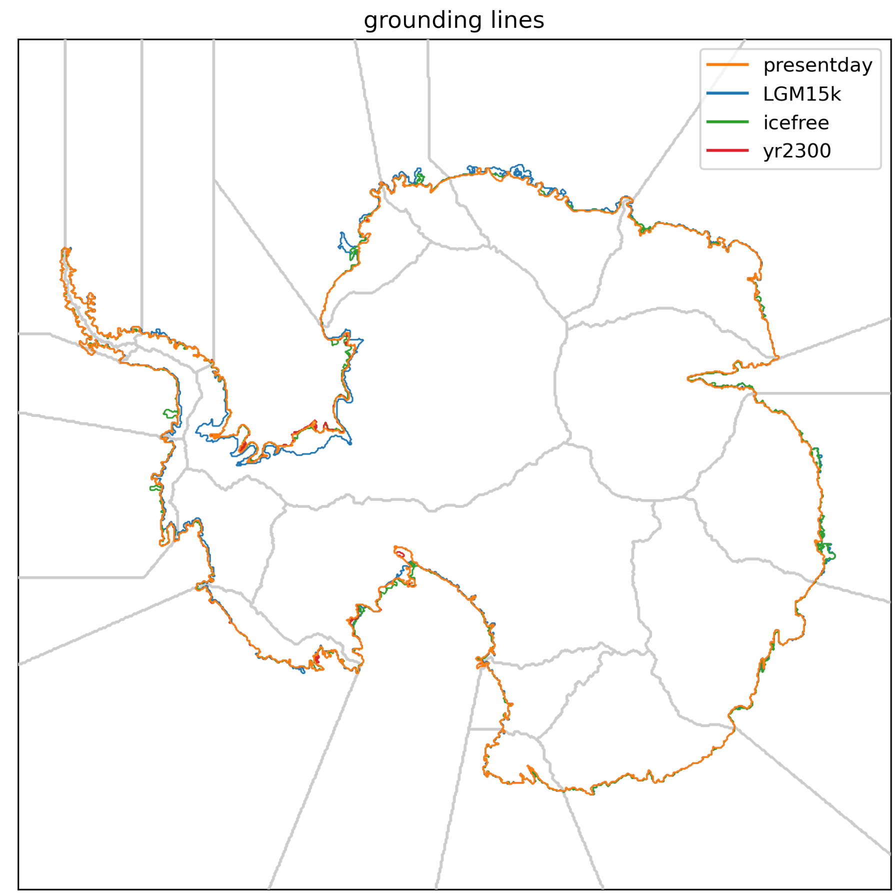

Figure S3. Horizontally adjusted grounding lines. After applying vertical bedrock adjustments from relative sea level changes, the grounding line positions have been re-computed via the floatation criterion, using present-day ice-sheet geometry. Basin boundaries are shown in light gray.

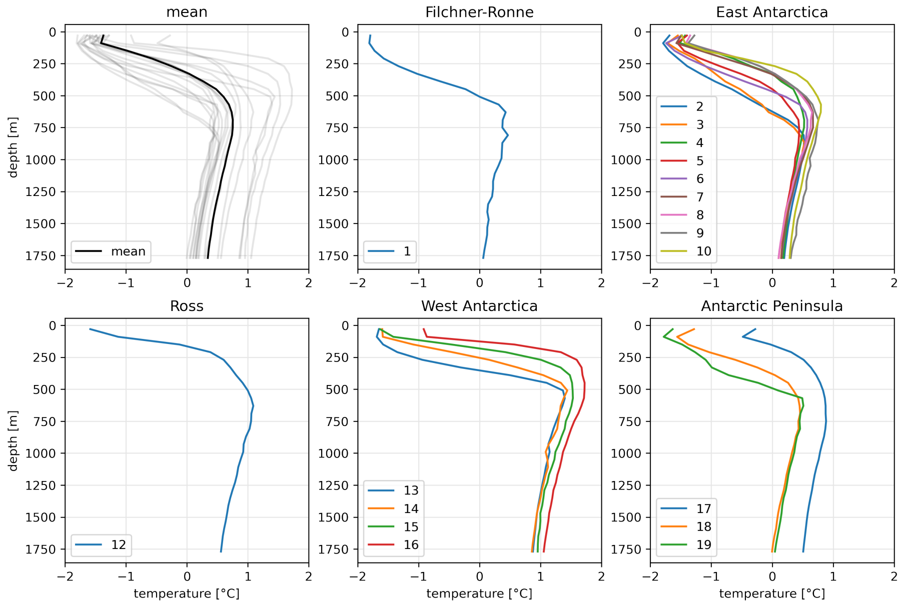

Figure S4. Vertical temperature profiles at continental-shelf break. Subplots show horizontal average of vertical potential temperature profiles at all continental-shelf break grid points in each basin. Legends indicate basin numbers. Upper left subplot shows mean of all basin averages. Continental-shelf break is defined at the −1800 m isobar. Data used from Jourdain et al. (2020).

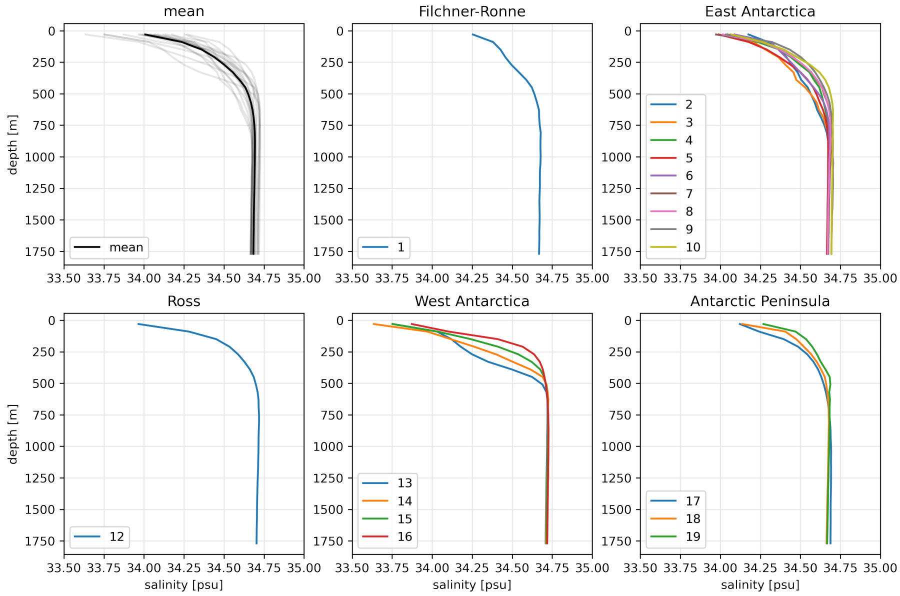

Figure S5. Vertical salinity profiles at continental-shelf break. Subplots show horizontal average of vertical practical salinity profiles at all continental-shelf break grid points in each basin. Legends indicate basin numbers. Upper left subplot shows mean of all basin averages. Continental-shelf break is defined at the −1800 m isobar. Data used from Jourdain et al. (2020).

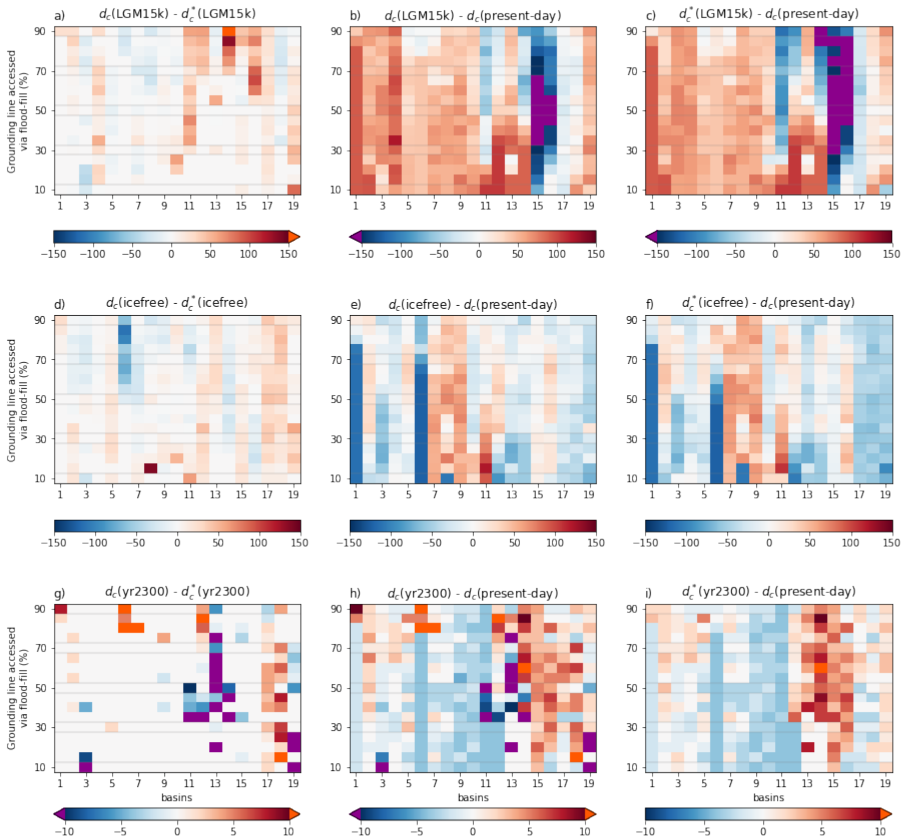

Figure S6. Comparison of critical access depths with respect to horizontal grounding line adjustment d_c^* denotes critical access depths, based on a grounding line position that has not been adjusted to bedrock changes, like used for d_c. The adjustment leads to a dampening of the critical access depth difference signal in most cases, but also introduces additional noise that can most clearly be seen in the year 2300 scenario. Suppl. Fig. 7 and 8 show changes of T_{csb}, S_{csb} and melt rates based on critical access depth without horizontal grounding line adjustment d_c^*.

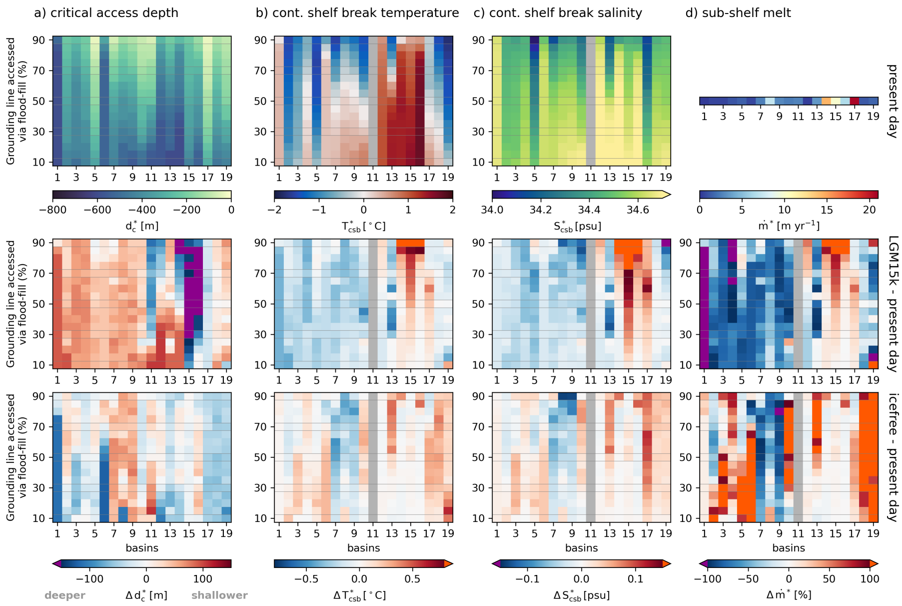

Figure S7. Replication of Fig. 6 without horizontal grounding line adjustment

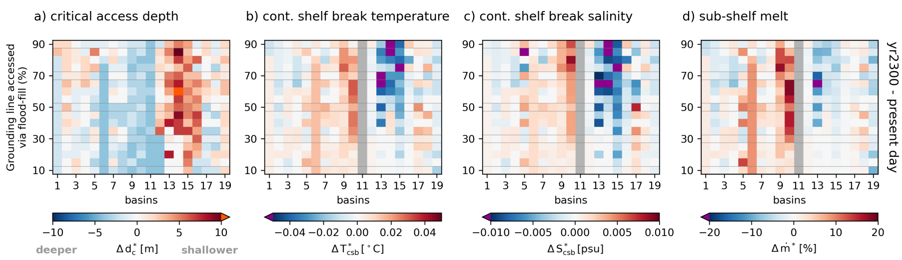

Figure S8. Replication of Fig. 7 without horizontal grounding line adjustment

References

Jourdain, N. C., Asay-Davis, X., Hattermann, T., Straneo, F., Seroussi, H., Little, C. M., and Nowicki, S.: A protocol for calculating basal melt rates in the ISMIP6 Antarctic ice sheet projections, The Cryosphere, 14, 3111–3134, https://doi.org/10.5194/tc-14-3111-2020, 2020.

Stuhne, G. R. and Peltier, W. R.: Reconciling the ICE-6G_C reconstruction of glacial chronology with ice sheet dynamics: The cases of Greenland and Antarctica, Journal of Geophysical Research: Earth Surface, 120, 1841–1865, https://doi.org/10.1002/2015jf003580, 2015.