Supporting Information for "Retreat of the Antarctic Ice Sheet during the Last Interglaciation and implications for future change"

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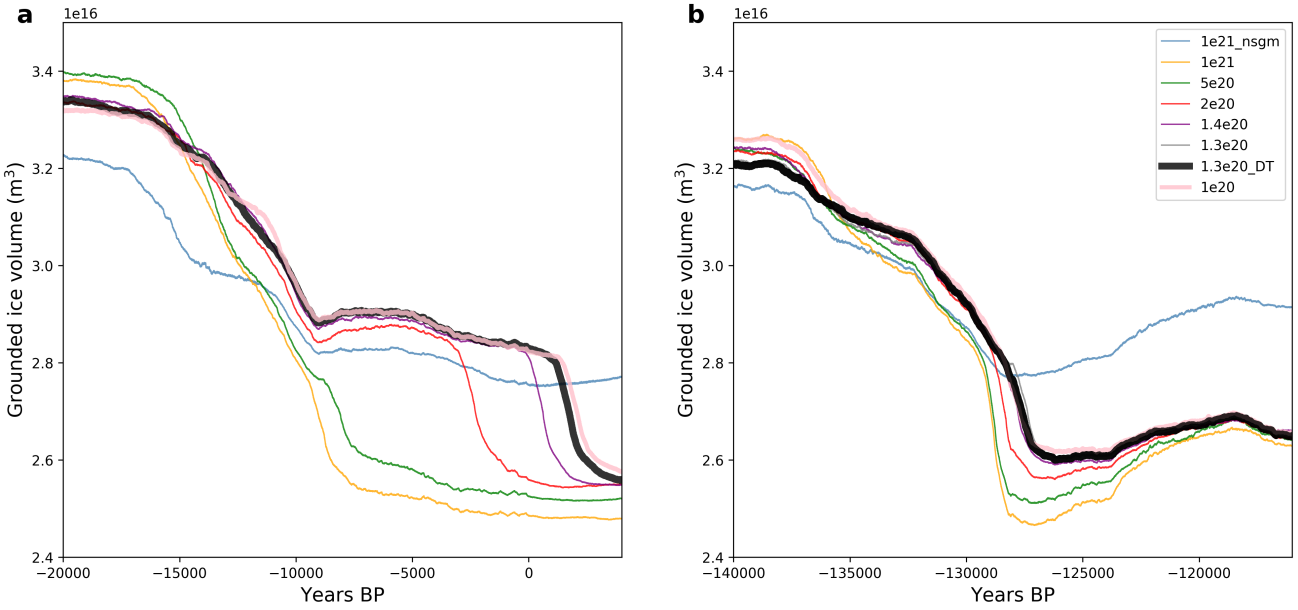

Figure S1. Impact of mantle viscosity variations on ice sheet evolution under T1 and T2 forcings. a) Timeseries of grounded ice volume for the last deglaciation (T1), used as a tuning experiment. Black line illustrates the reference experiment used as the basis for interpretations presented in this paper, pink line shows value used in previous simulations (Clark et al., 2020). Stiffer mantle viscosities lead to collapse of WAIS before simulated present-day ('Year 0') is reached. b) The same experiments as in a) but for the T2 climatology. Collapse of WAIS takes place earliest for stiffer mantle parameterisations, with only a very narrow range able to reproduce present-day grounding line extent as well as a multi-metre LIG contribution to sea level. Blue line in both panels illustrates a simulation in which the sub-grid grounding line scheme is turned off, effectively preventing the ice sheet from advancing or retreating adequately.

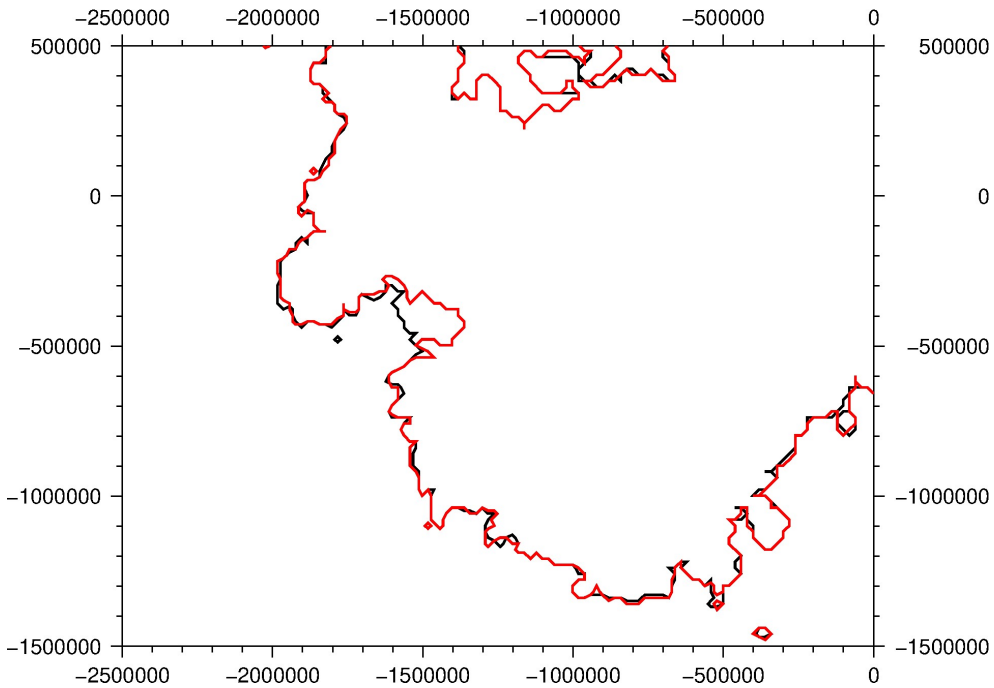

Figure S2. Impact of mantle viscosity variations on modelled present-day grounding line positions. In black, the grounding line as represented by the reference configuration (1.3e20 Pa s) for the T1 experiment. In red, the grounding line for a very slightly stiffer mantle (1.4e20 Pa s). The retreated GL of Thwaites Glacier shown in the stiffer mantle experiment is at odds with the empirically located grounding line, despite similar present-day ice volumes (SI Fig. 1).

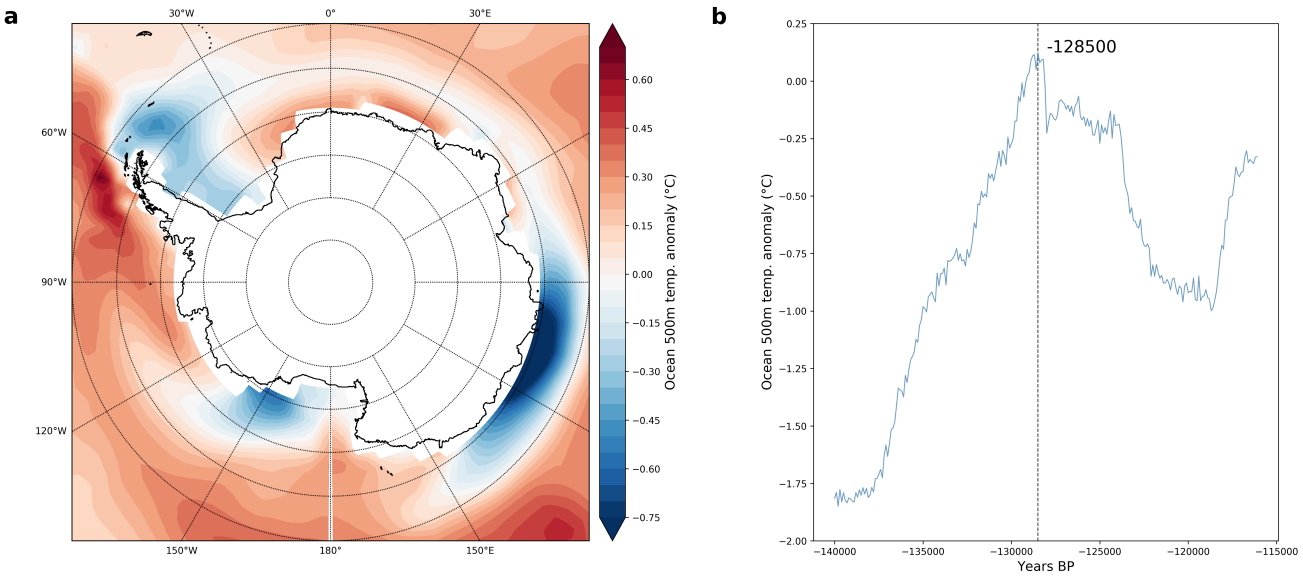

Figure S3. a) Ocean temperature (as anomalies from modelled present) simulated by CCSM3 for 500 m depth at the time of peak warmth (128.5 ka BP). Warming close to the Antarctic coast is evident along the western Antarctic Peninsula and into the Amundsen Sea Embayment, but cooler-than-present conditions prevail in the Weddell Sea and Ross Sea embayments. b) Zonally-averaged ocean temperature anomalies at 500 m depth from CCSM3. Vertical line shows peak warmth timeslice illustrated in a).