Climate
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Supplement of

Hysteresis and orbital pacing of the early Cenozoic Antarctic ice sheet

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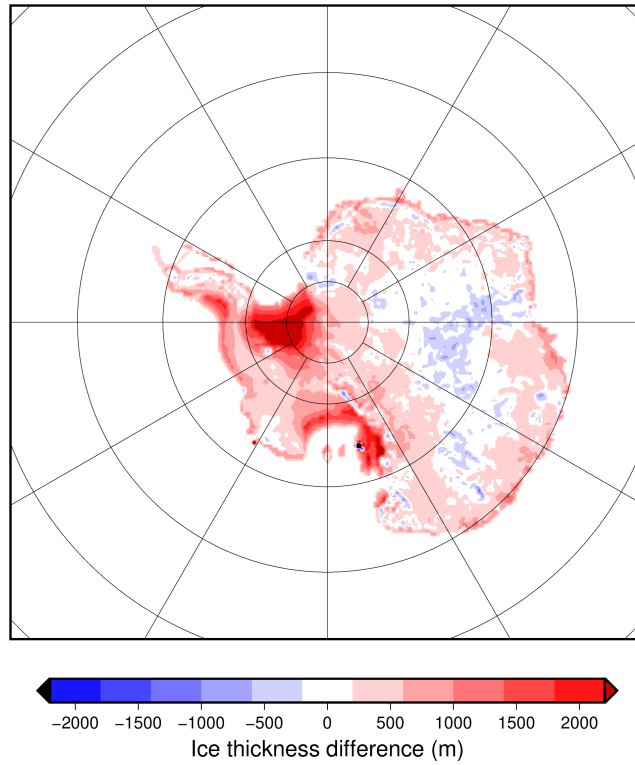*Correspondence to:* Jonas Van Breedam (jonas.van.breedam@vub.be)

Figure S1: Ice thickness difference between the simulation ran with the Wilson maximum bedrock dataset and the Wilson minimum bedrock dataset, corresponding to the ice sheet geometries in Fig. 4.
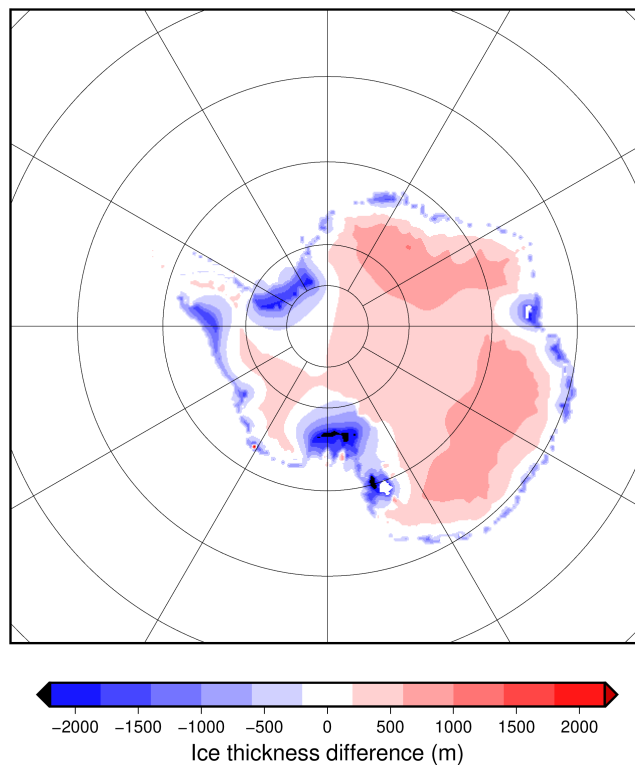

Figure S2: Ice thickness difference between the simulation ran with isostasy and without isostasy, corresponding to the experiments in Fig. 8.
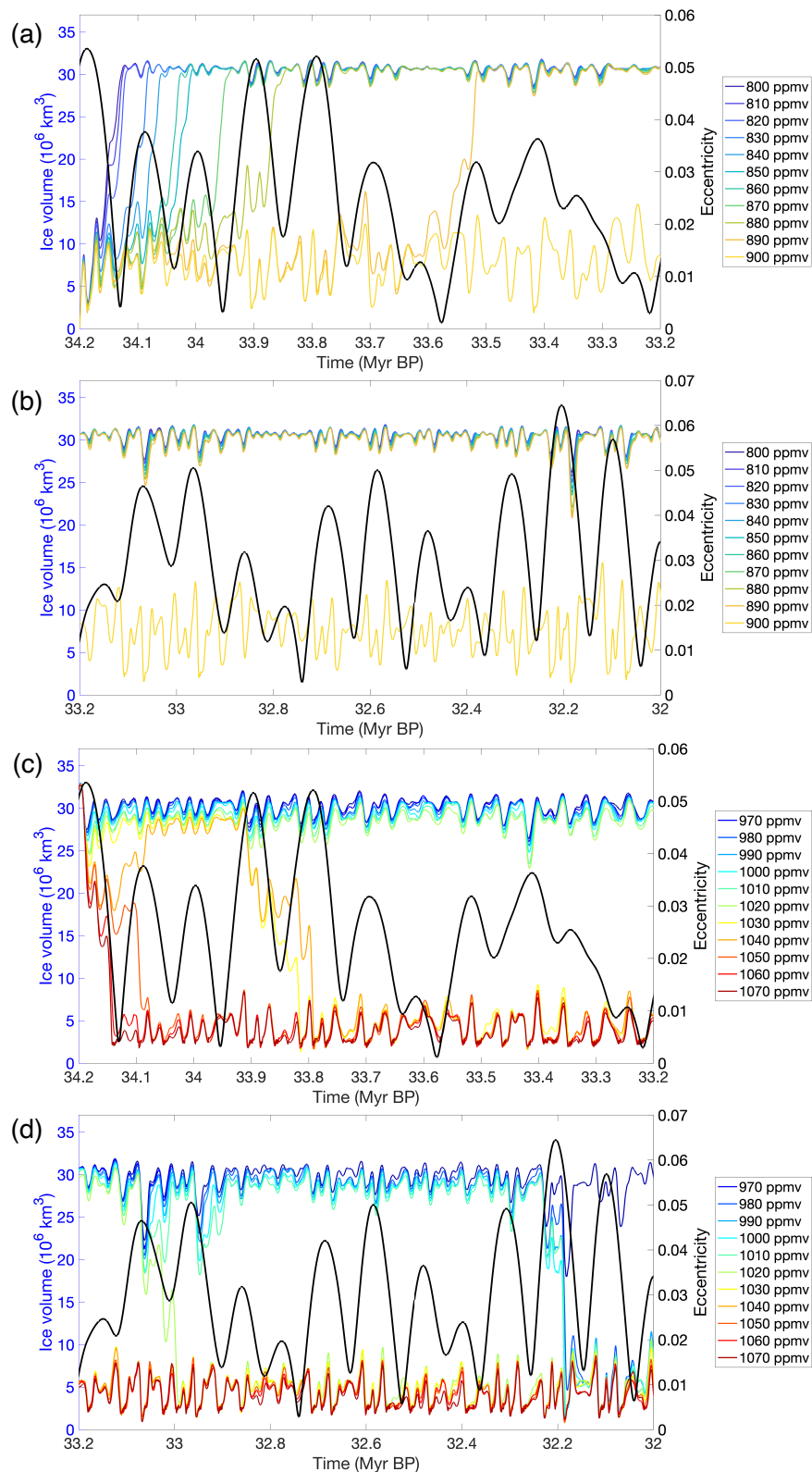
Figure S3: Ice volume evolution for the simulations where the eccentricity threshold to glaciation and deglaciation is investigated. (a) The different simulations start from a bare bedrock and are run for constant CO_2 forcing scenarios ranging from 800 ppmv to 900 ppmv at an interval of 10 ppmv. (b) Continuation of (a) between 33.2 Ma and 32 Ma. (c) The different simulations start from a continental-scale ice sheet and are run for constant CO_2 forcing scenarios ranging from 970 ppmv to 1070 ppmv at an interval of 10 ppmv. (d) Continuation of (c) between 33.2 Ma and 32 Ma.
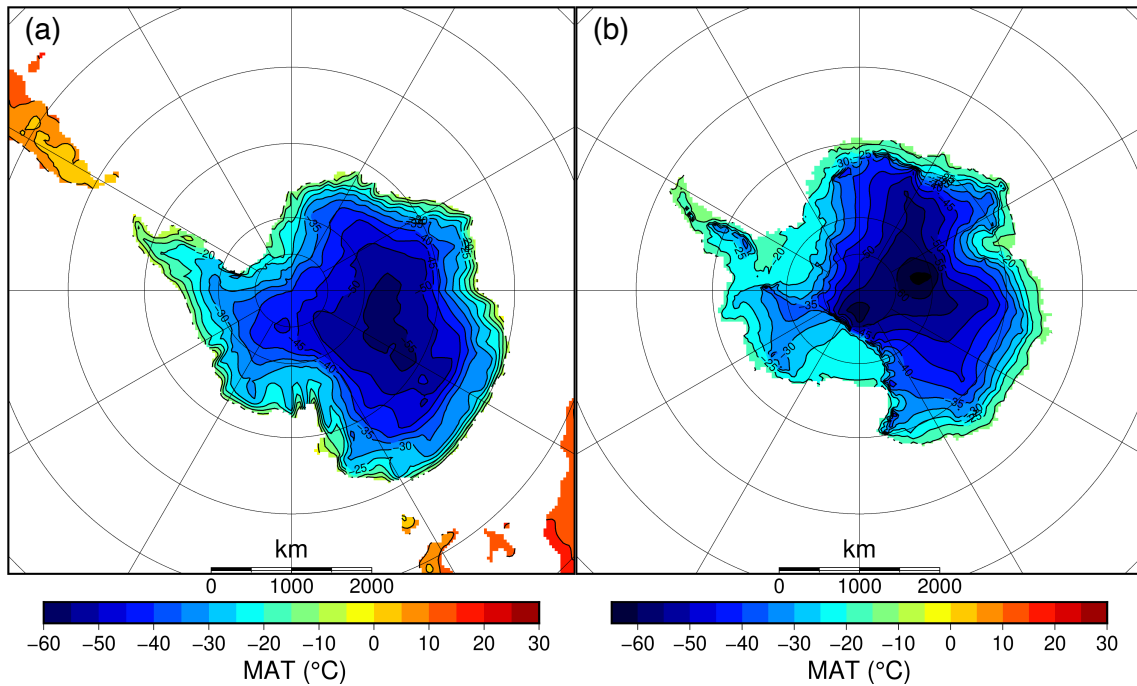
Figure S4: (a) Mean annual surface temperature for the early Cenozoic Antarctic ice sheet using a present orbital forcing and a pre-industrial CO_2 forcing. (b) Mean annual surface temperature for the present-day Antarctic ice sheet from the standard parameterisation employed in the model (Huybrechts, 2002).
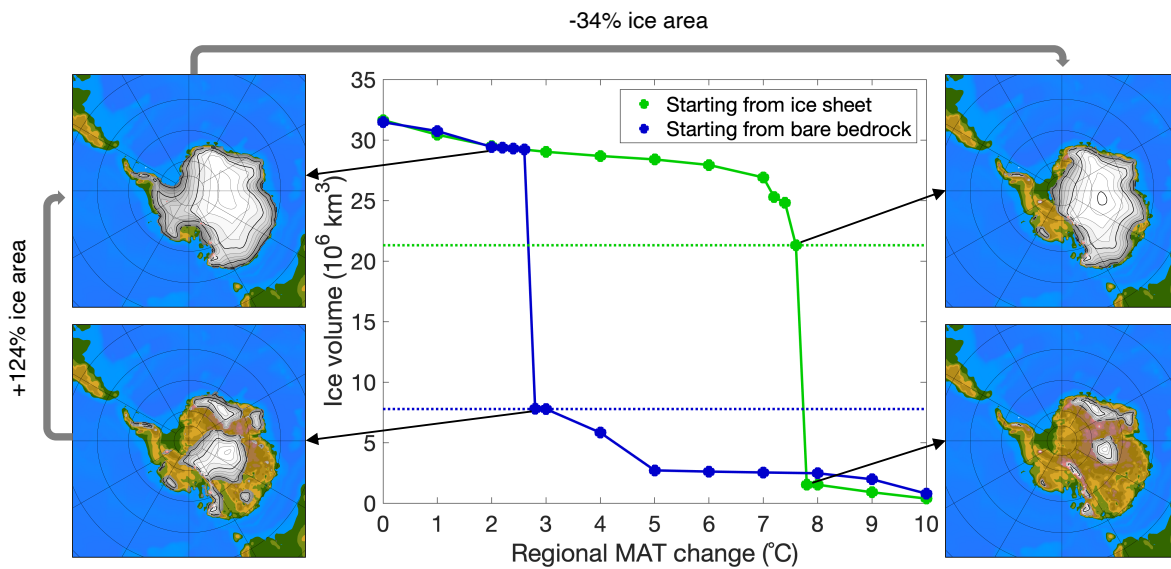

Figure S5: Steady-state ice sheet volume for a range in mean annual temperature perturbation thresholds for ice sheet growth and decline for a present-day orbital configuration and a constant CO_2 concentration of 280 ppmv. The green horizontal dotted line indicates the ice sheet volume at which the strong nonlinear ice sheet decline initiates. The ice sheet volume at which a strong nonlinear increase of ice sheet growth initiates is indicated by the blue horizontal dotted line. Snapshot of the ice sheet geometry are given at the tipping points. Thin contour intervals are given every 250 m, while thick contour intervals are given each 1000 m.