



## **Potential for future sea-level contributions from the Antarctic ice sheet**

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Recent Antarctic ice-sheet modeling that includes the effects of surface meltwater on ice-sheet dynamics (through hydrofracturing and ice-cliff collapse) has demonstrated the previously underappreciated sensitivity of the ice sheet to atmospheric warming in addition to sub-ice oceanic warming. Here, we improve on our modeling of future ice-sheet retreat by using time-evolving atmospheric climatologies from a high-resolution regional climate model, synchronized with SSTs, subsurface ocean temperatures, and sub-ice melt rates from the NCAR CCSM4 GCM. Ongoing improvements in ice-sheet model physics are tested and calibrated relative to observations of recent and ancient (Pliocene, Last InterGlacial, and Last Deglaciation) ice-sheet responses to warming. The model is applied to a range of future greenhouse-gas emissions scenarios, including modified RCP scenarios corresponding to the 1.5° and 2.0° targets of the Paris Agreement and higher emissions scenarios including RCP8.5. The results imply that a threshold in the stability of the West Antarctic Ice Sheet and outlet glaciers in East Antarctica might be exceeded in the absence of aggressive mitigation policies like those discussed in Paris. We also explore the maximum potential for Antarctica to contribute to future sea-level rise in high greenhouse gas emissions scenarios, by testing a range of model physical parameters within the bounds of observations.