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The sensitivity of West Antarctica to the submarine melting feedback.

Robert Arthern and Rosie Williams
British Antarctic Survey, Cambridge, United Kingdom (rart@bas.ac.uk)

We use an ice sheet model with realistic initial conditions to forecast how the Amundsen Sea sector of West Antarctica responds to recently observed rates of submarine melting. In these simulations, we isolate the effects of a positive feedback, driven by submarine melt in new ocean cavities flooded during retreat, by allowing the present climate, calving front and melting beneath existing ice shelves to persist over the 21st Century. Even without additional forcing from changes in climate, ice-shelf collapse, or ice-cliff collapse, the model predicts sustained retreat of West Antarctica driven by the marine ice sheet instability and current levels of ocean-driven melting. When observed rates of melting are included in new sub-glacial ocean cavities, the simulated sea level contribution increases, and for sufficiently intense melting it accelerates over time. Conditional Bayesian probabilities for sea level contributions can be derived, but these require accurate predictions of the ocean heat delivery.