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The influence of Antarctic ice shelf–ocean interactions on regional and global climate in the Energy Exascale Earth System Model (E3SM)

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Energy Exascale Earth System Model (E3SM), version 1 of which was released by the U.S. Department of Energy in April 2018, includes support for thermodynamically active ice-shelf cavities. Dynamic ice sheet–ocean interactions are under development. These new capabilities are critical for projecting Antarctica's potential future contributions to global sea level, one of three main scientific foci of the E3SM project. Here, we present results from pre-industrial control and historical runs at two resolutions ($\sim$30 km and $\sim$10 km) showing the impacts on the global climate of melt fluxes from ice shelves and resulting feedbacks. We also acknowledge biases in the Antarctic regional ocean, particularly related to warming of warm deep water masses at mid depths, and discuss plans for correcting these biases in future simulation campaigns.