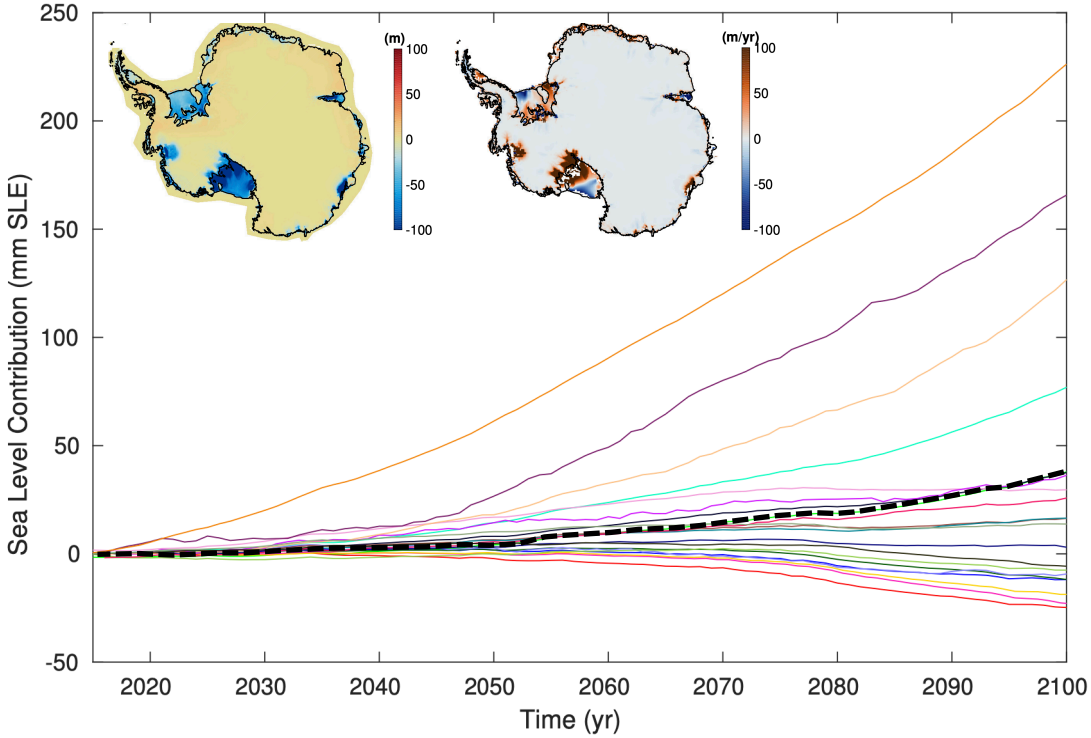
Using SciDAC Ice Sheet Models to Simulate Antarctica's 21st Century Evolution and Sea Level Contribution

Scientific Achievement

- DOE SciDAC's MALI ice sheet model is part of a multi-model intercomparison focused on better assessing the evolution and sea-level contribution of Antarctica during the 21st century
- MALI results represent the highest-resolution, highest fidelity, and most computationally ambitious simulations contributed

Significance and Impact

- CMIP6 coordinated Antarctic evolution and sea-level rise experiments will inform IPCC AR6
- Multiple ice sheet and climate models provide estimates for the sensitivity and uncertainties resulting from choice of ice sheet model, climate model, and parameterizations of ice sheet and climate coupling



Simulated mm of global mean sea-level equivalent (SLE) change for all ice sheet models between 2015 and 2100 under the RCP 8.5 emissions scenario. MALI results are shown by the bold, black-dashed line. Inset map view figures show the ensemble mean of simulated ice thickness change (upper-left) and ice speed change (upper-right). Mass loss is largest from marine-based regions of the ice sheet and / or those regions with fringing ice shelves. Speed reductions on ice shelves represent the of loss of driving force from thinning (following increased sub-ice shelf melting) while speed increases on grounded ice result from the loss of ice shelf buttressing and grounding line retreat.

Seroussi et al. (2020). ISMIP6 Antarctica: a multi-model ensemble of the Antarctic ice sheet evolution over the 21st century. *The Cryosphere.* **14**, doi: https://doi.org/10.5194/tc-14-3033-2020

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