Ice-sheet model sensitivities to environmental forcing and their use in projecting future sea level (the SeaRISE project)

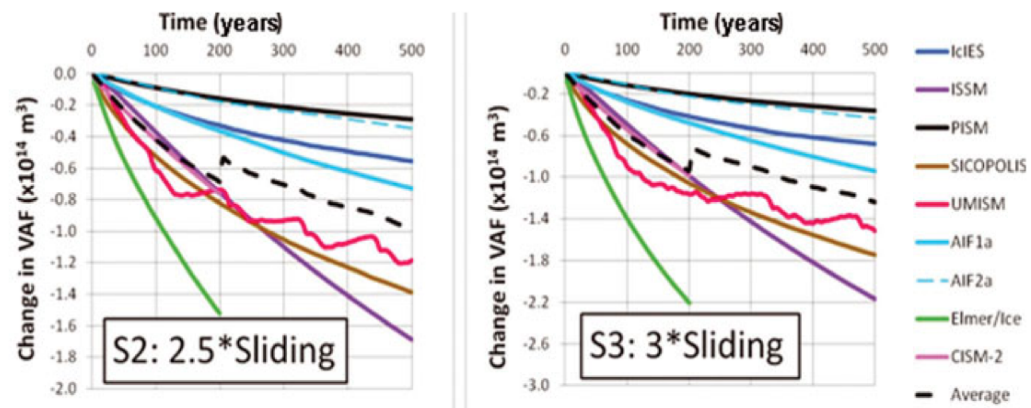
Objective

Use current models to make improved projections of sea-level rise from Greenland and Antarctica from 2000 to 2200.

Approach

- A range of ice sheet models are used but all models use the same input data, climate, and dynamic forcing
- To account for different initialization procedures, model physics, and model transients, all forced runs are differed against an unforced control run
- Climate-forcing only runs are compared and combined with runs that include a range of possible future dynamic forcings, like increased basal sliding or increased submarine melting

Modeled changes in Greenland ice sheet volume ($1x10^{14}$ m^3 ~ 0.25 m sea-level equivalent) for experiments where initial rates of modeled sliding are everywhere increased by 2.5x and 3x. Different line colors represent different models (at right).



Impact

By 2100 the projected multi-model mean sea-level rise from Greenland and Antarctica is 22 and 8 cm, respectively (range of 62 and 14 cm). By 2200, these projections increase to 53 and 27 cm, respectively (range of 79 and 43 cm).

Bindschadler, R. A. and 27 others. 2013. Ice-sheet model sensitivities to environmental forcing and their use in projecting future sea level (the SeaRISE project). *J. Glaciol.* **59,** 195–224.