

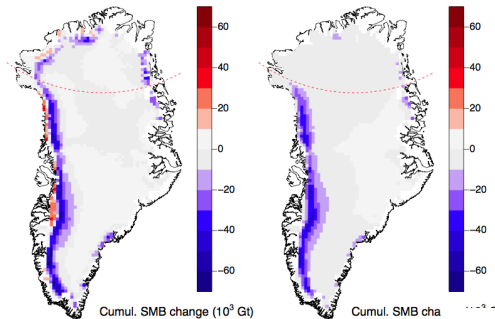
# Effect of uncertainty in the surface mass balance-elevation feedback on projections of the future sea level rise from the Greenland ice sheet

## Objective

Estimate uncertainty in future sea-level rise from Greenland resulting from the feedback between ice sheet elevation change and surface mass balance (SMB)

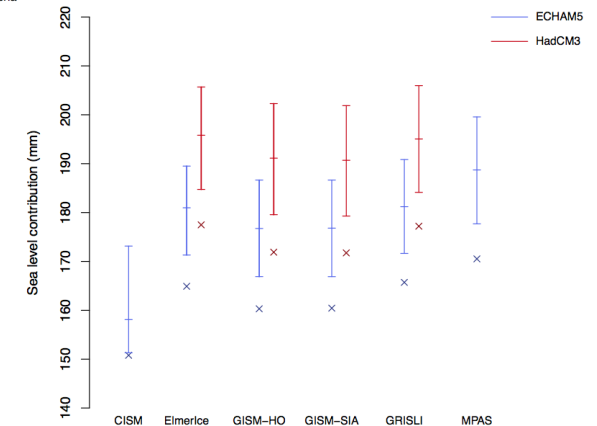
## Approach

- Using coupled model results, parameterize the change in SMB as a function of changes in ice sheet elevation
- Implement the parameterization in next-generation ice sheet models
- Force these models (offline) from 2000 to 2200 with GCM output for A1B and assess the importance of the feedback



Cumulative SMB change by 2100 for coupled model simulation that accounts for the SMB-elevation feedback (left) vs. results from the maximum likelihood parameterization (right).

Cumulative sea-level rise by 2200 for 6 next-generation ice sheet models, including CISM and MPAS, with (vertical ranges) and without (crosses) the SMB-elevation feedback parameterization.



## Impact

For Greenland at 2200, additional sea-level rise from SMB – elevation feedbacks is estimated to be ~10% larger than when these feedbacks are ignored

Edwards, T. L. and Coauthors (inc. Hoffman, Perego, Price), 2014a: Probabilistic parameterisation of the surface mass balance–elevation feedback in regional climate model simulations of the Greenland ice sheet. *The Cryosphere*, **8**, 181–194, doi:10.5194/tc-8-181-2014.

Edwards, T. L. and Coauthors (inc. Hoffman, Perego, Price), 2014b: Effect of uncertainty in surface mass balance–elevation feedback on projections of the future sea level contribution of the Greenland ice sheet. *The Cryosphere*, **8**, 195–208, doi:10.5194/tc-8-195-2014.