ANTARCTIC GATEWAY PARTNERSHIP

Sensitivity of the Antarctic ice sheet to marine climate variability and change

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Future Sea Levels and Coastal Impacts Worskhop
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Australian Government
Australian Research Council

UNIVERSITY of TASMANIA
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Australian Government
Department of the Environment
Australian Antarctic Division

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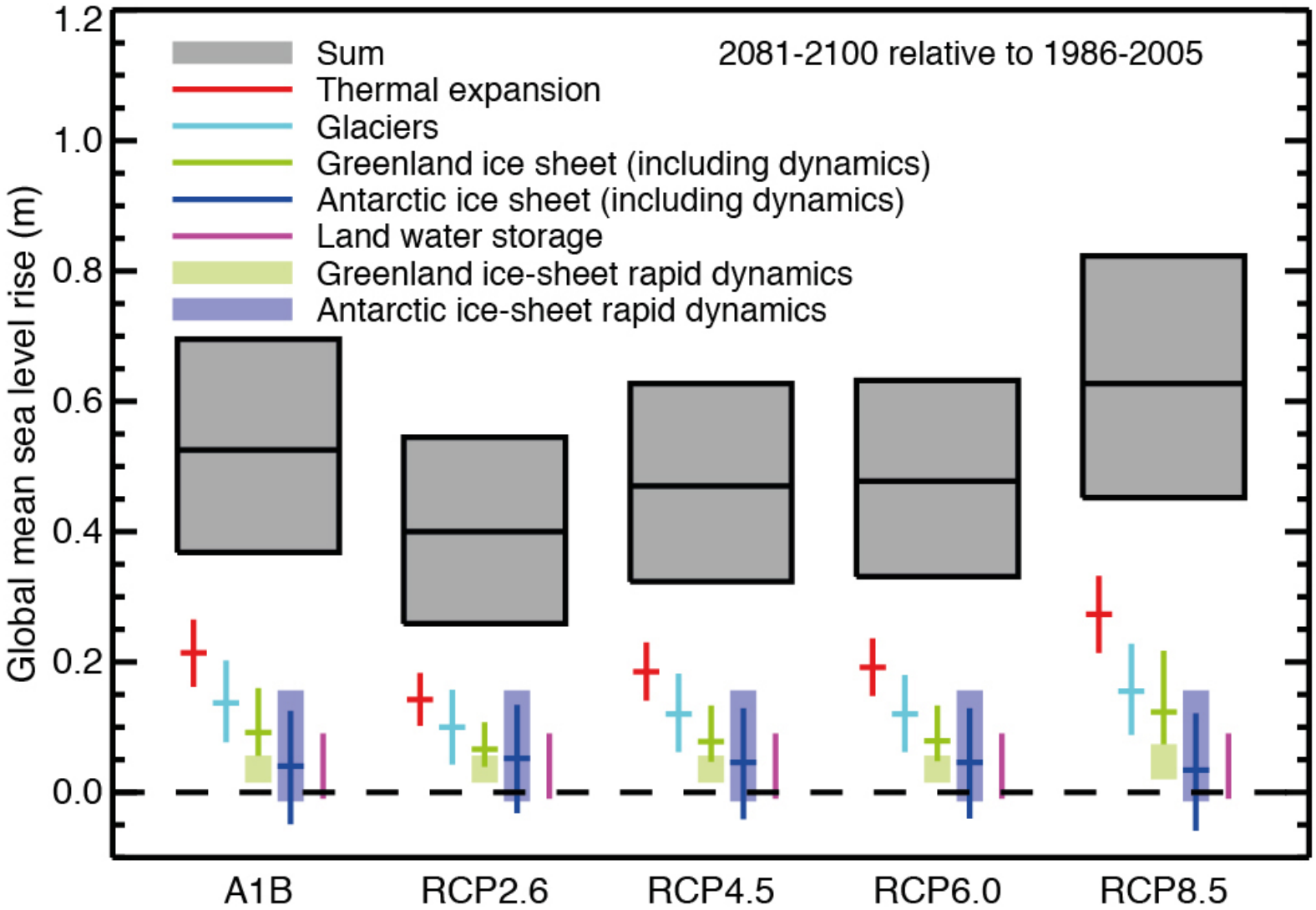
Likely changes in global sea level by 2081–2100



IPCC AR5 WG1 report (2013)

How do we project changes in global sea level?

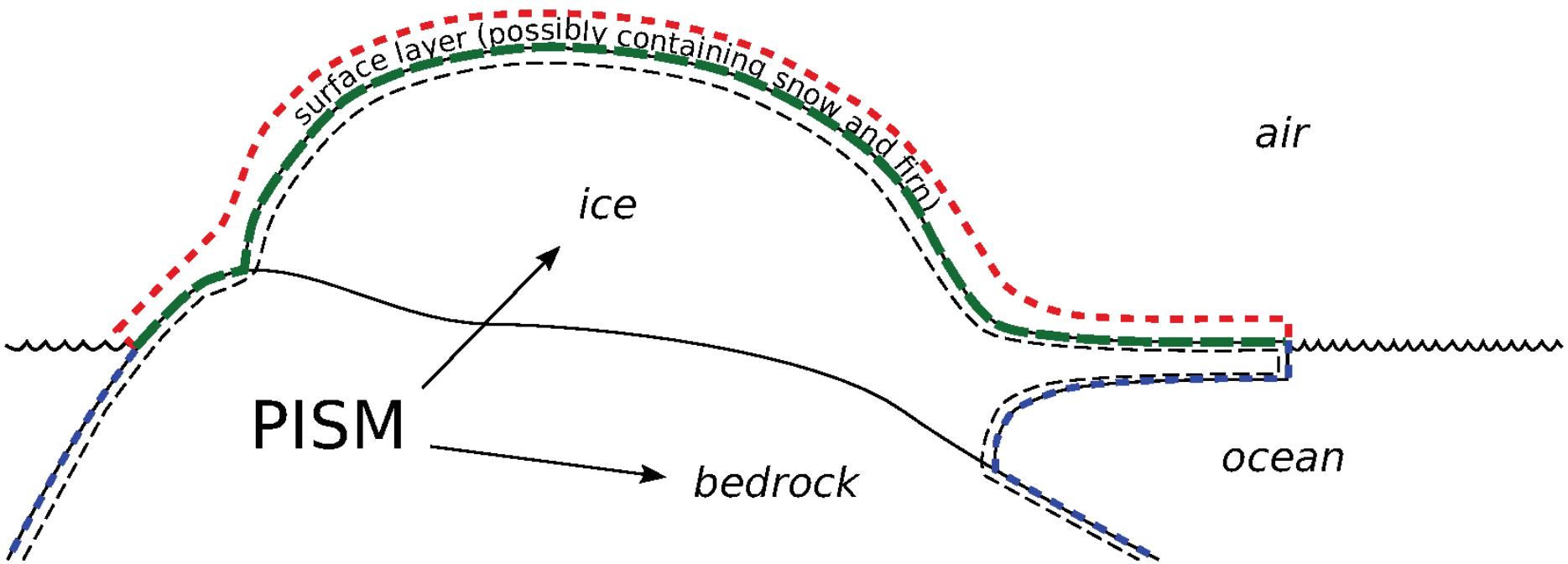
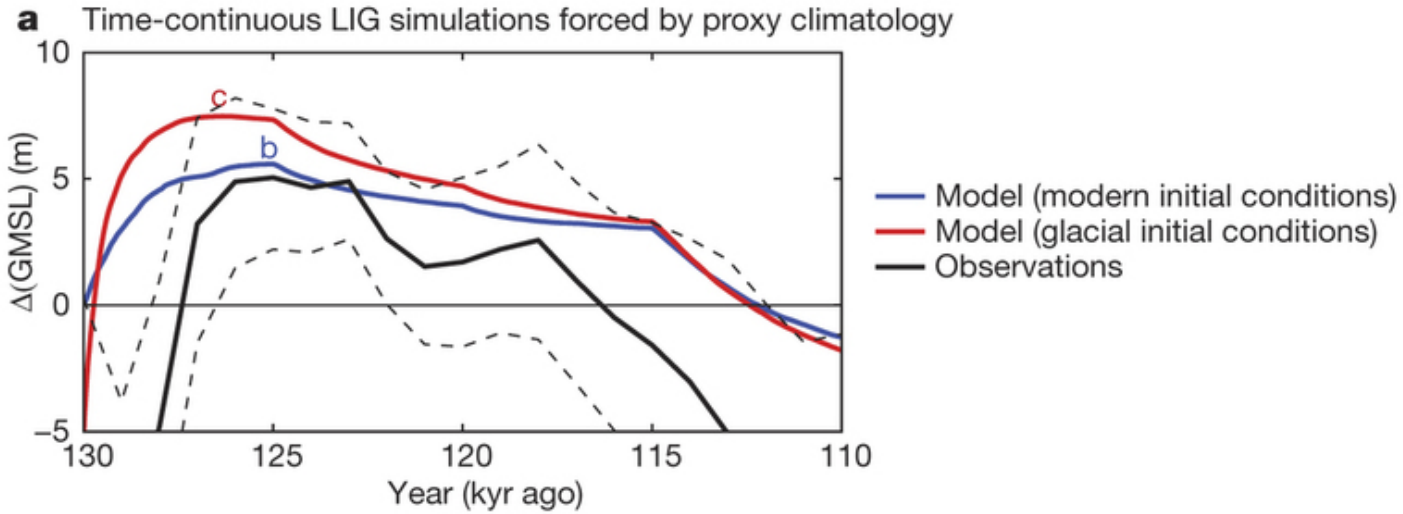
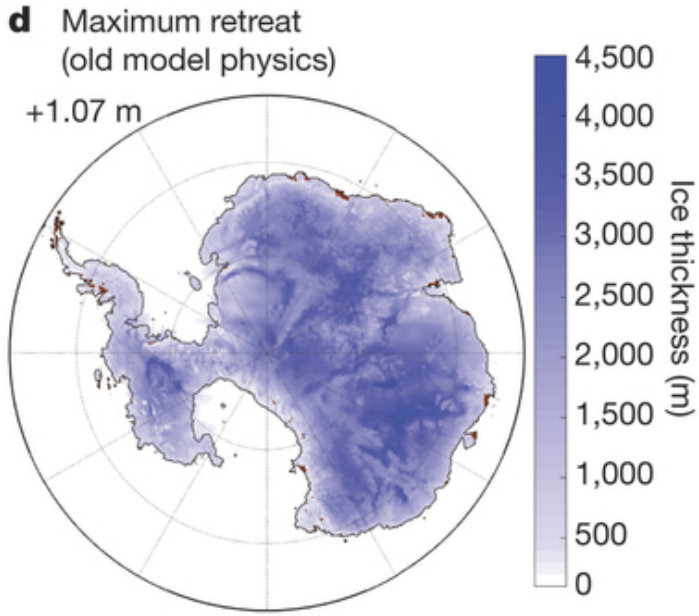


Figure 15: PISM's view of interfaces between an ice sheet and the outside world

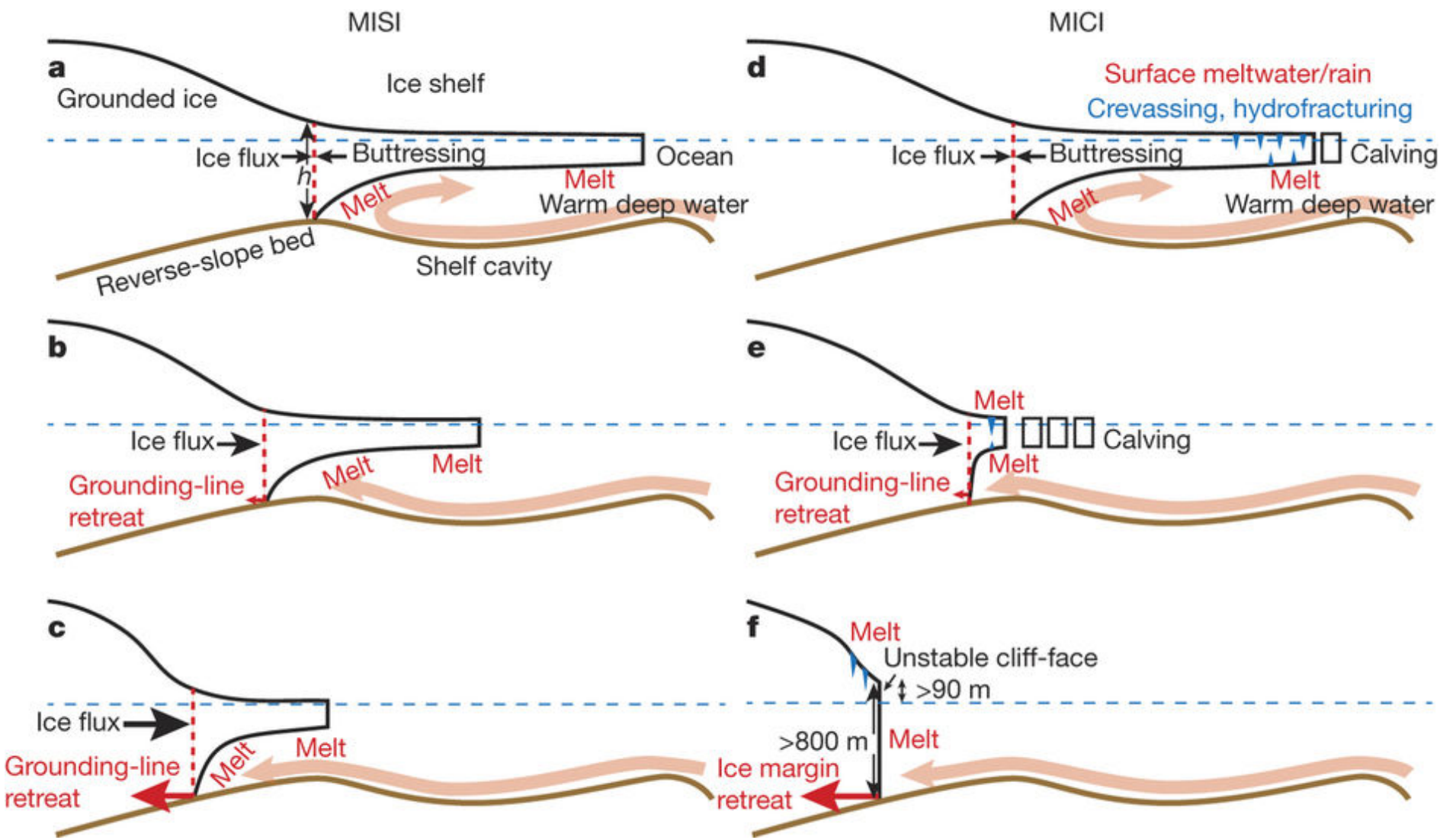
Ice sheet modelling: The case of the ice that won't melt





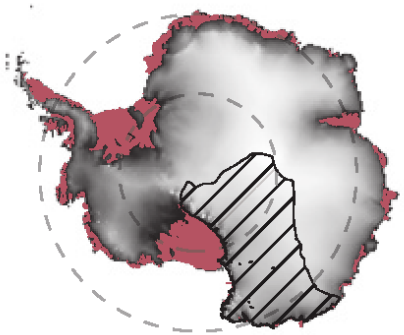
DeConto and Pollard (2016), *Nature*

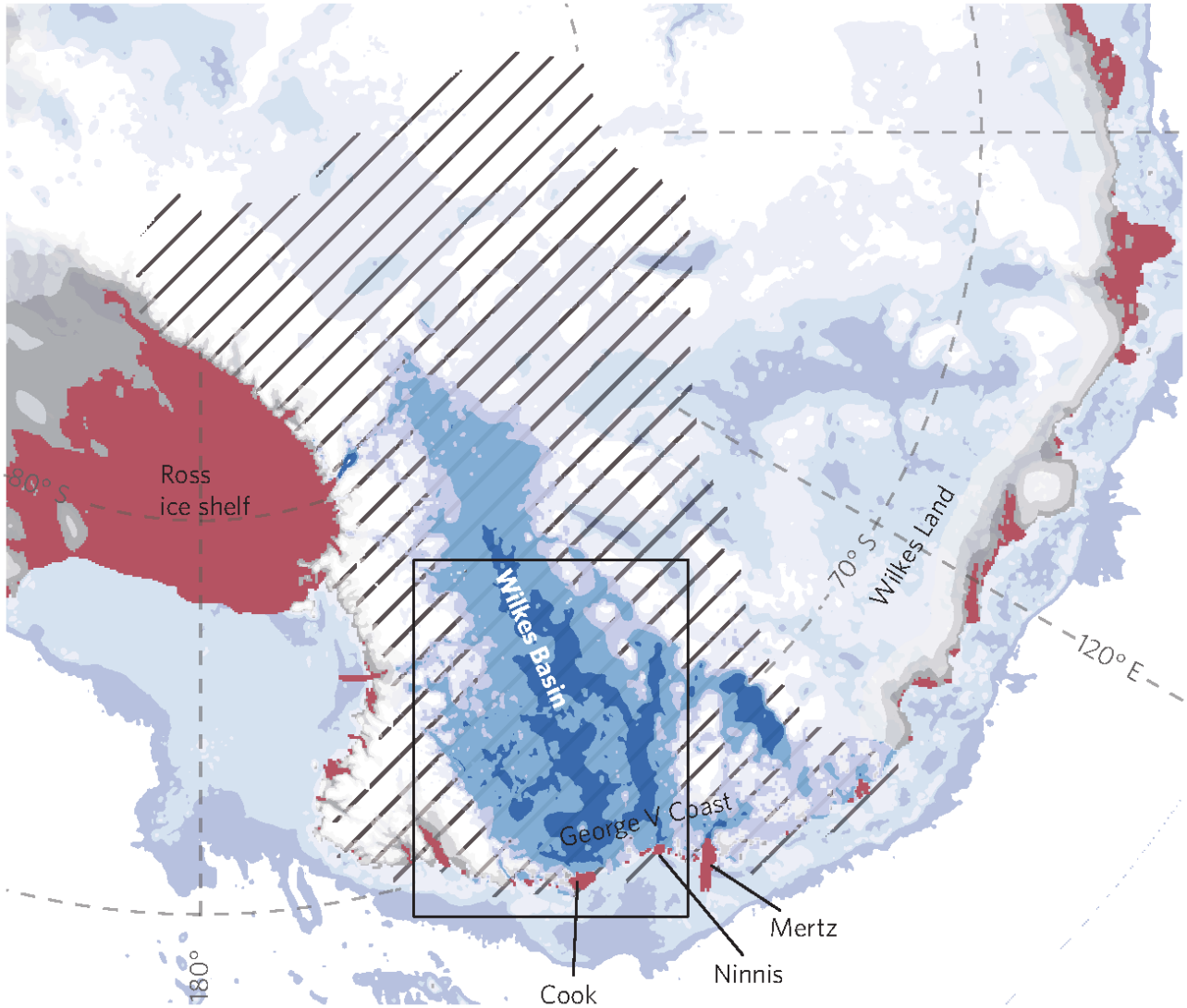
Mechanisms of ice sheet instability



DeConto and Pollard (2016), *Nature*

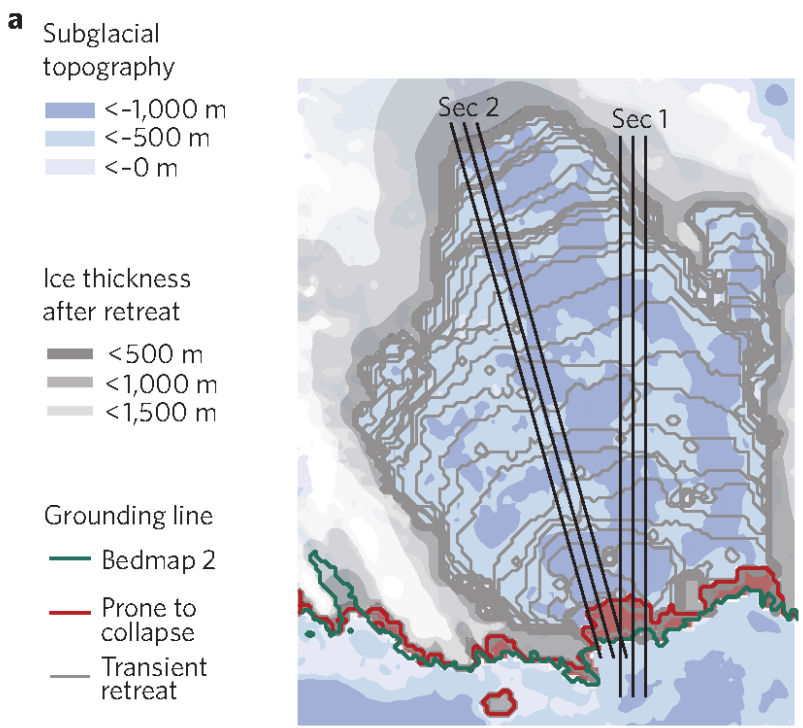
Marine ice sheet instability (MISI)

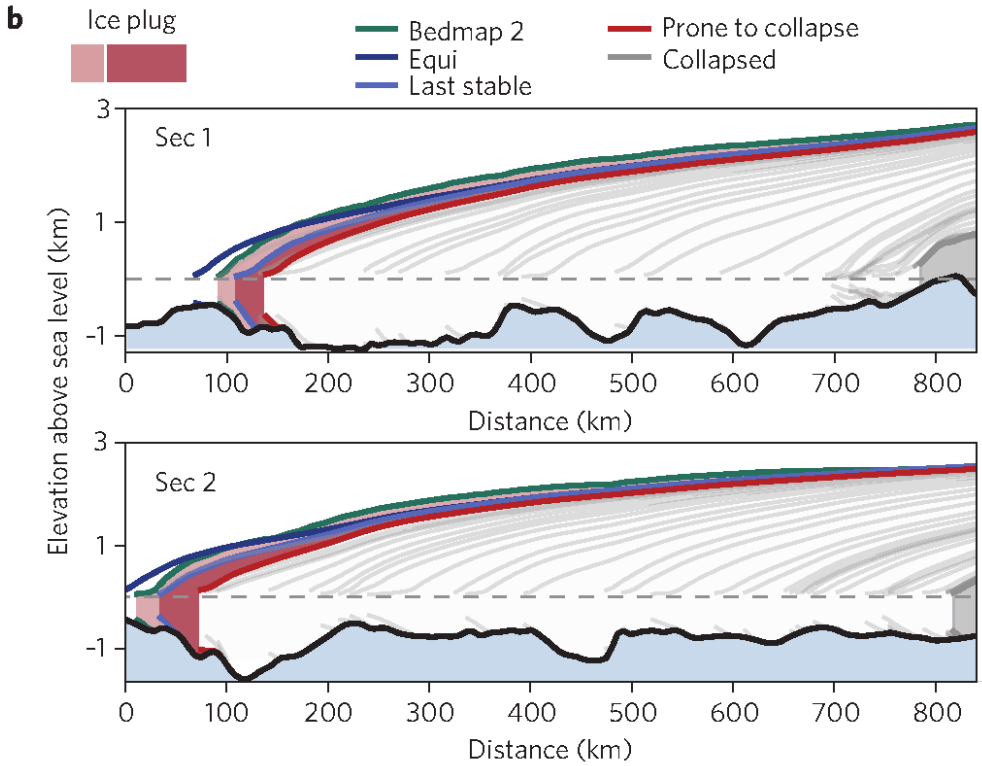




Mengel and Levermann (2014), *Nature Climate Change*

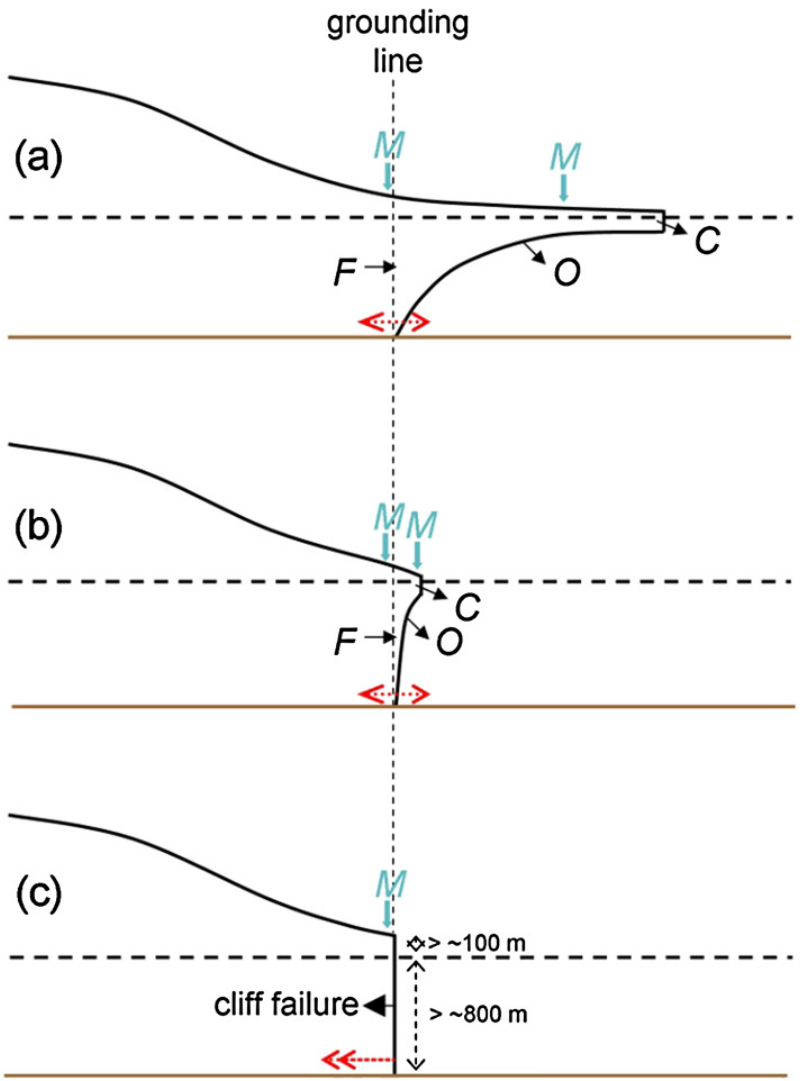
Marine ice sheet instability (MISI)

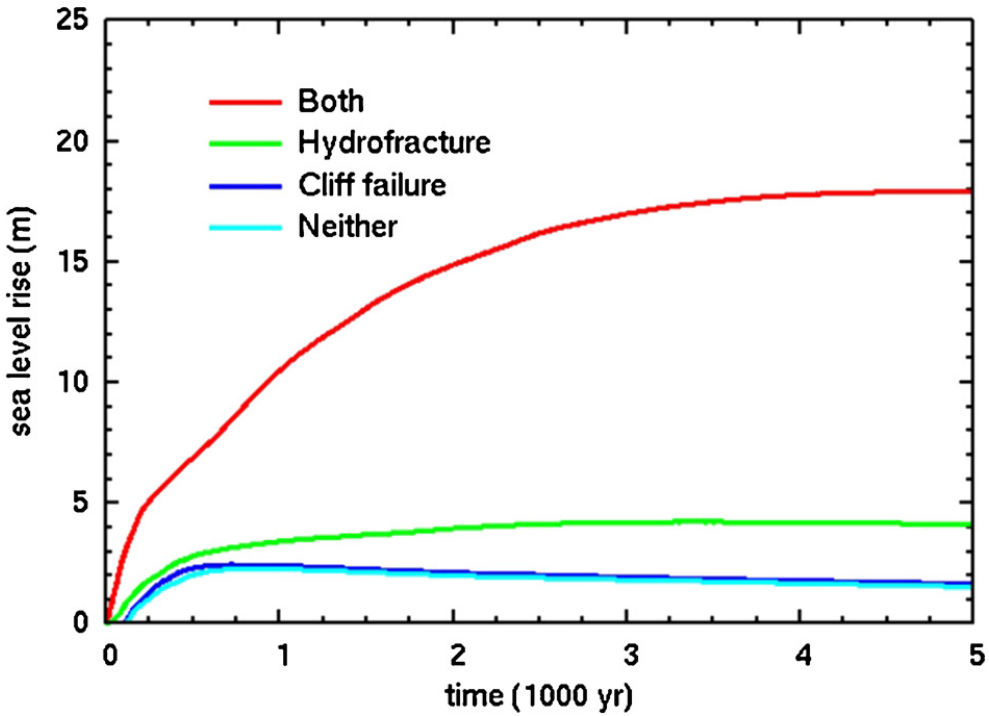




Mengel and Levermann (2014), *Nature Climate Change*

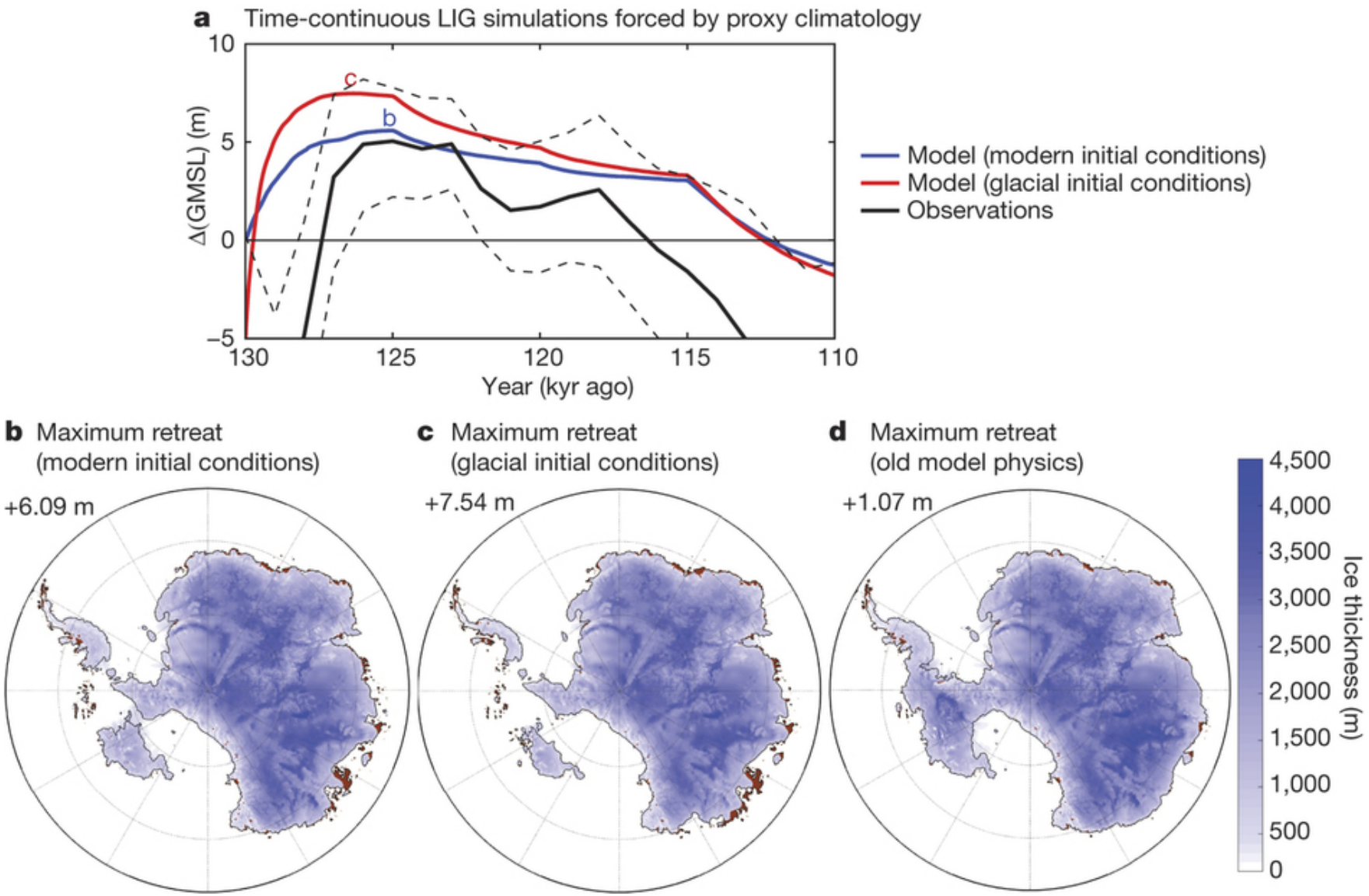
Hydrofracturing and ice cliff failure





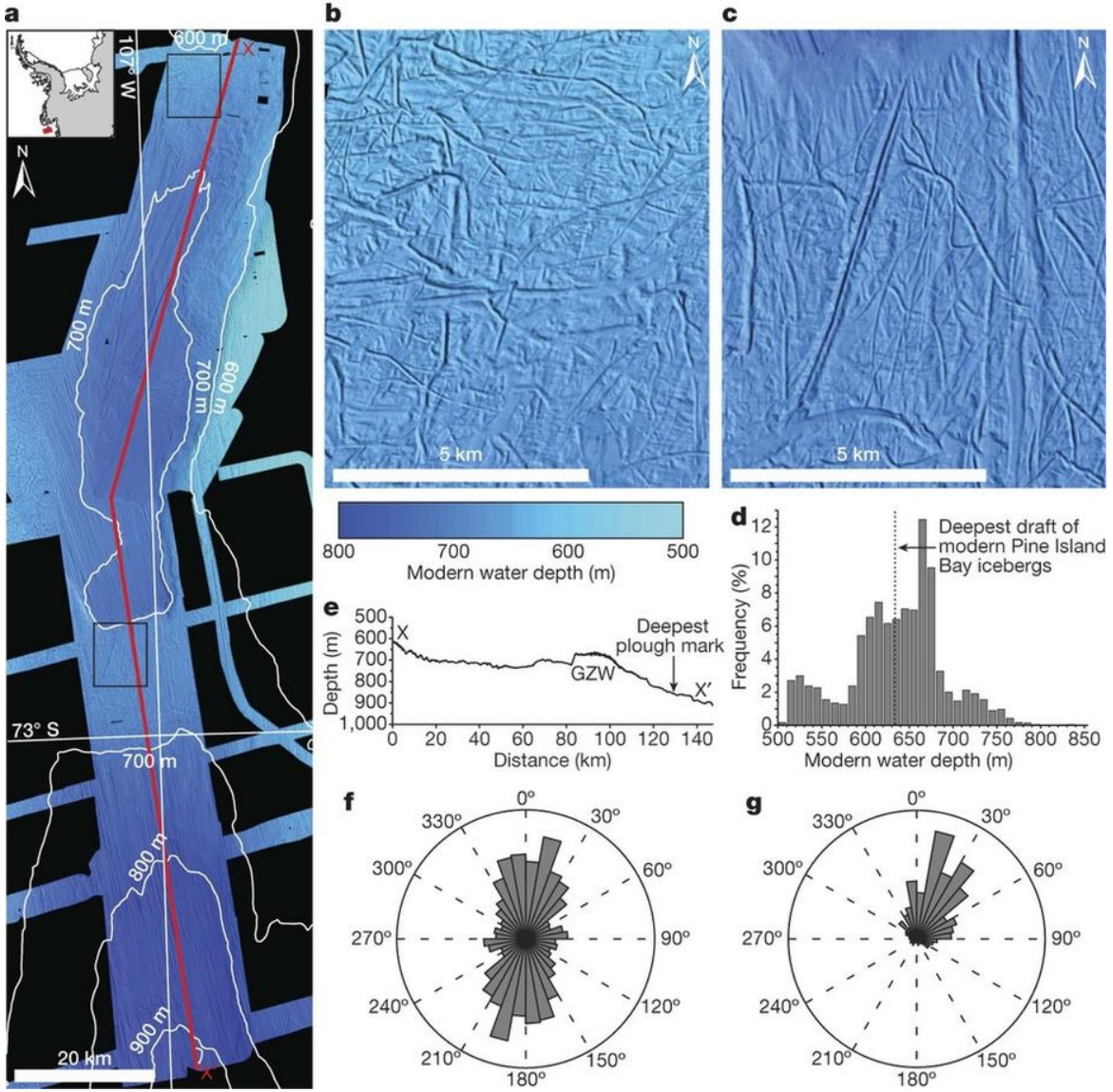
Pollard et al. (2015), *Earth and Planetary Science Letters*

Marine ice cliff instability (MICI)



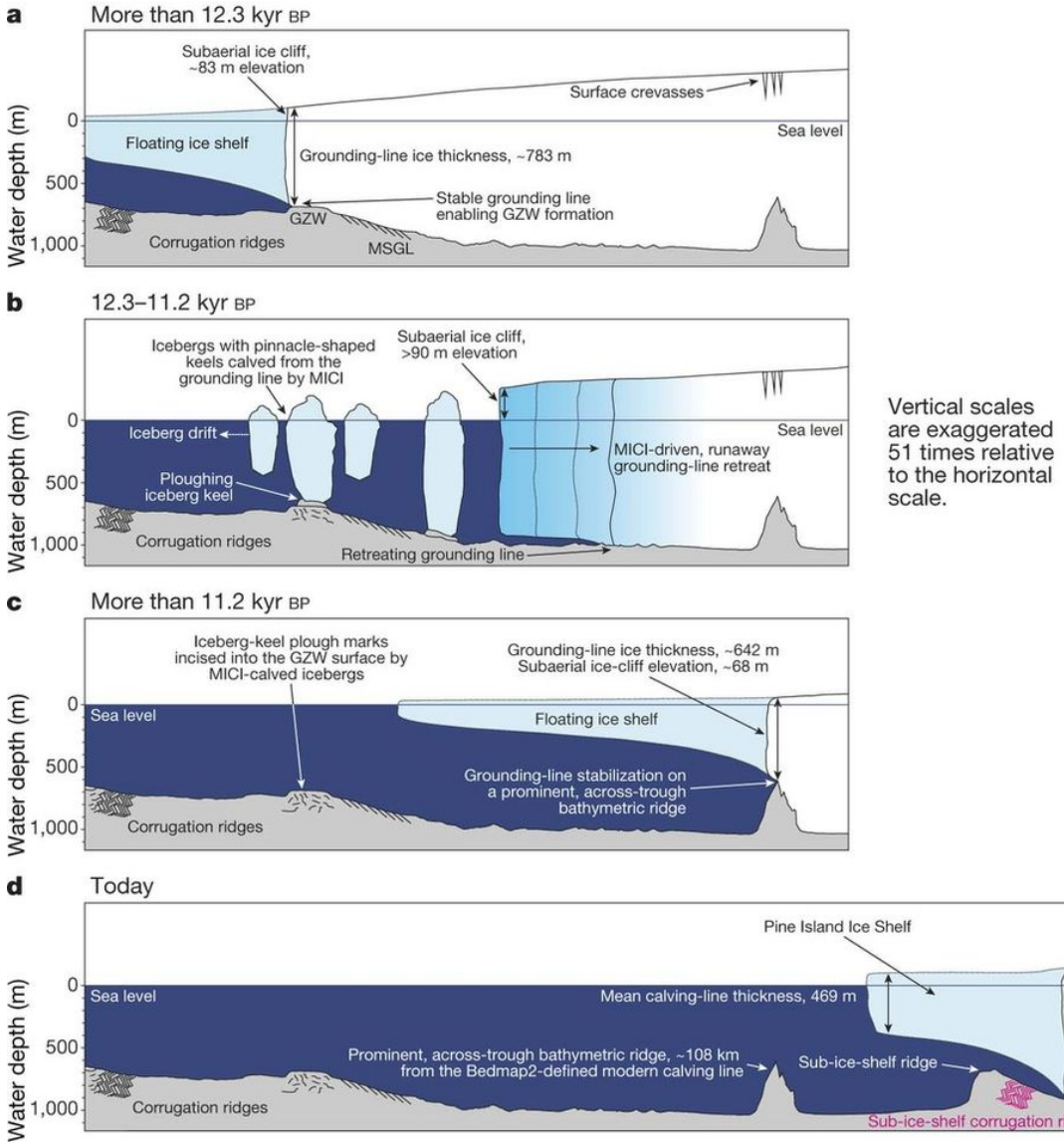
DeConto and Pollard (2016), *Nature*

Marine ice cliff instability: observational evidence



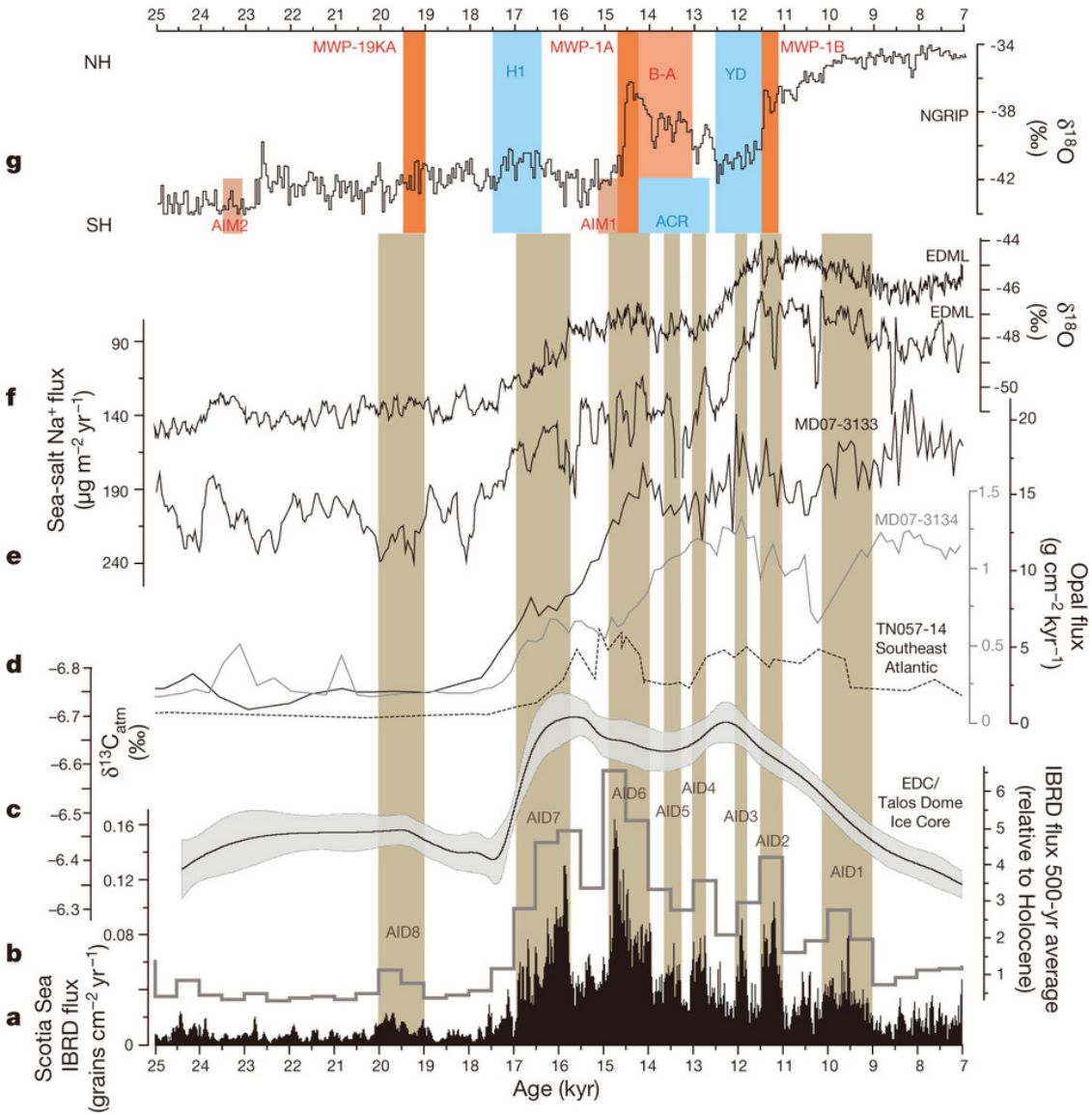
Wise et al. (2017), *Nature*

Marine ice cliff instability: observational evidence



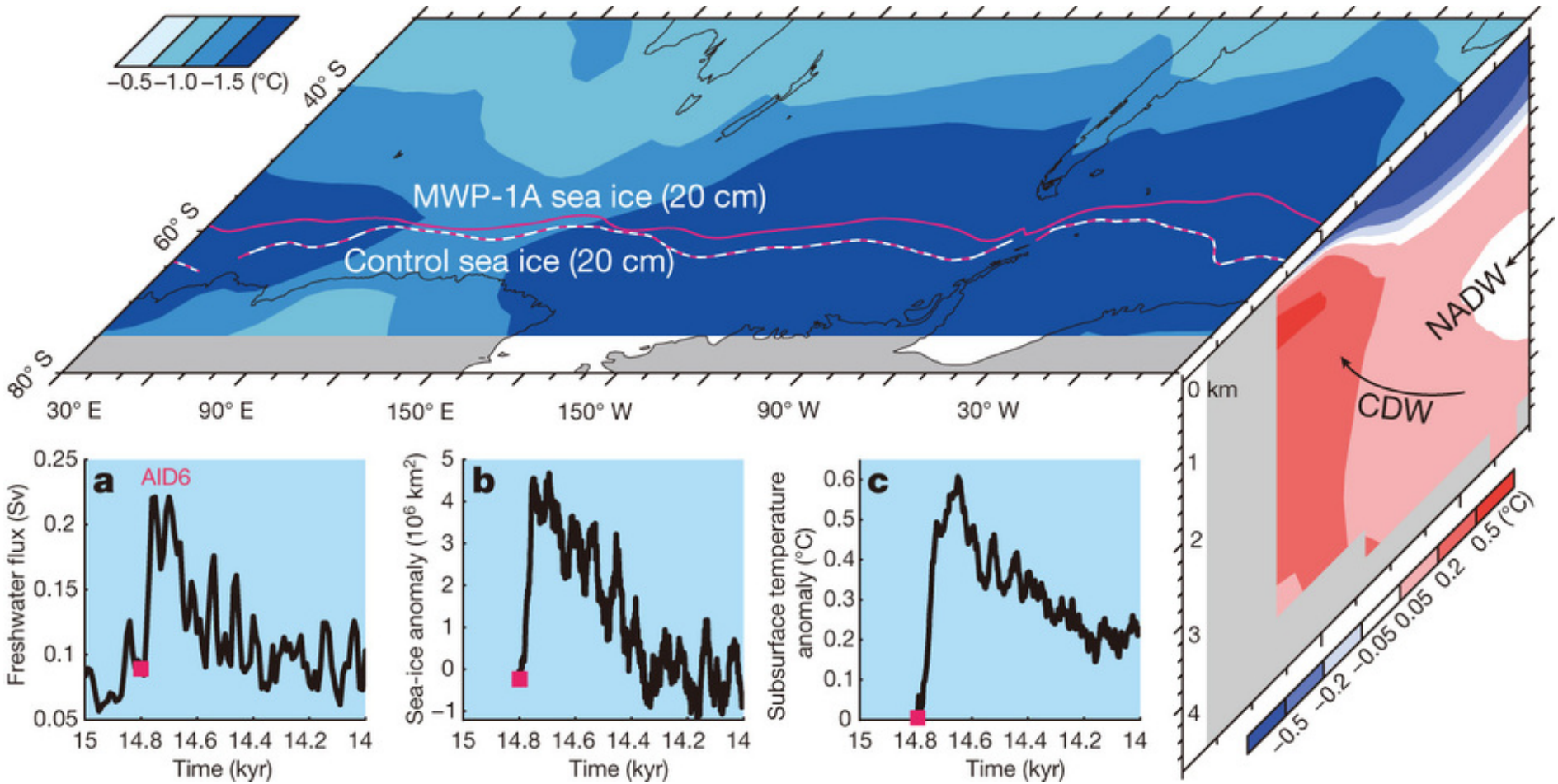
Wise et al. (2017), *Nature*

Millennial-scale ice sheet–ocean variability



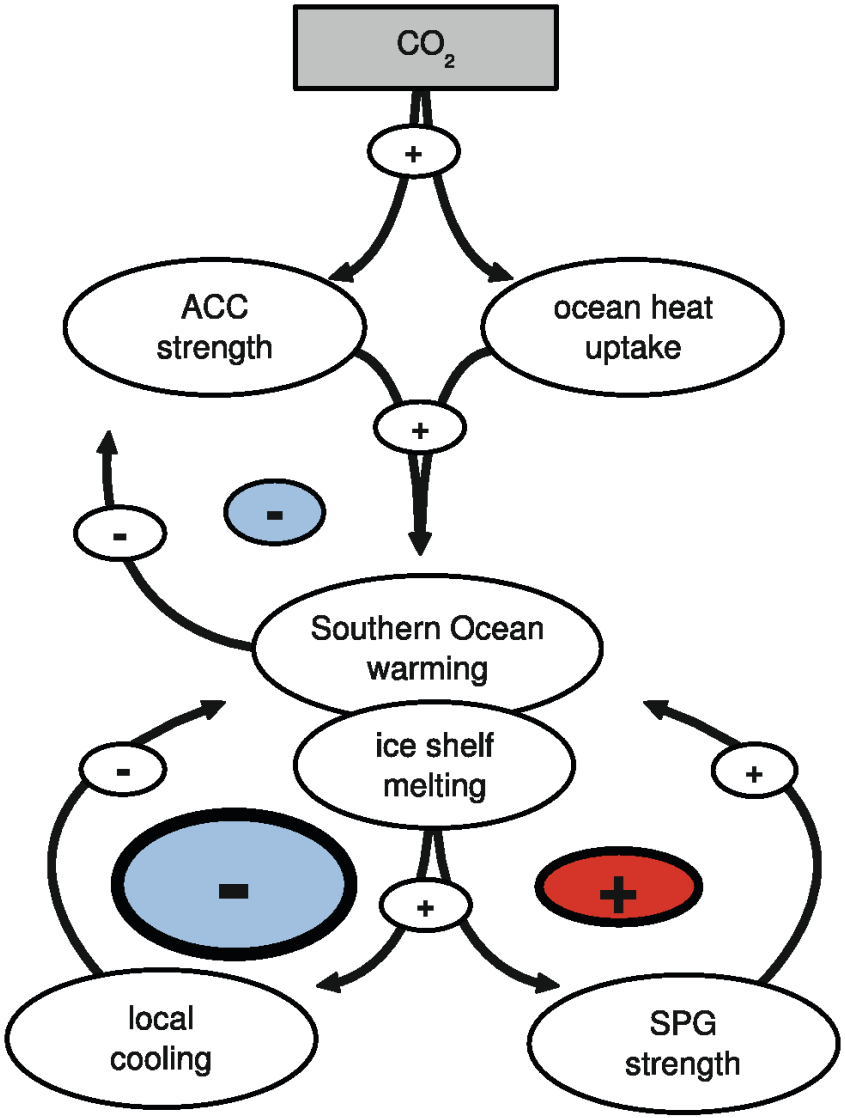
Weber et al. (2014), *Nature*

Millennial-scale ice sheet–ocean variability



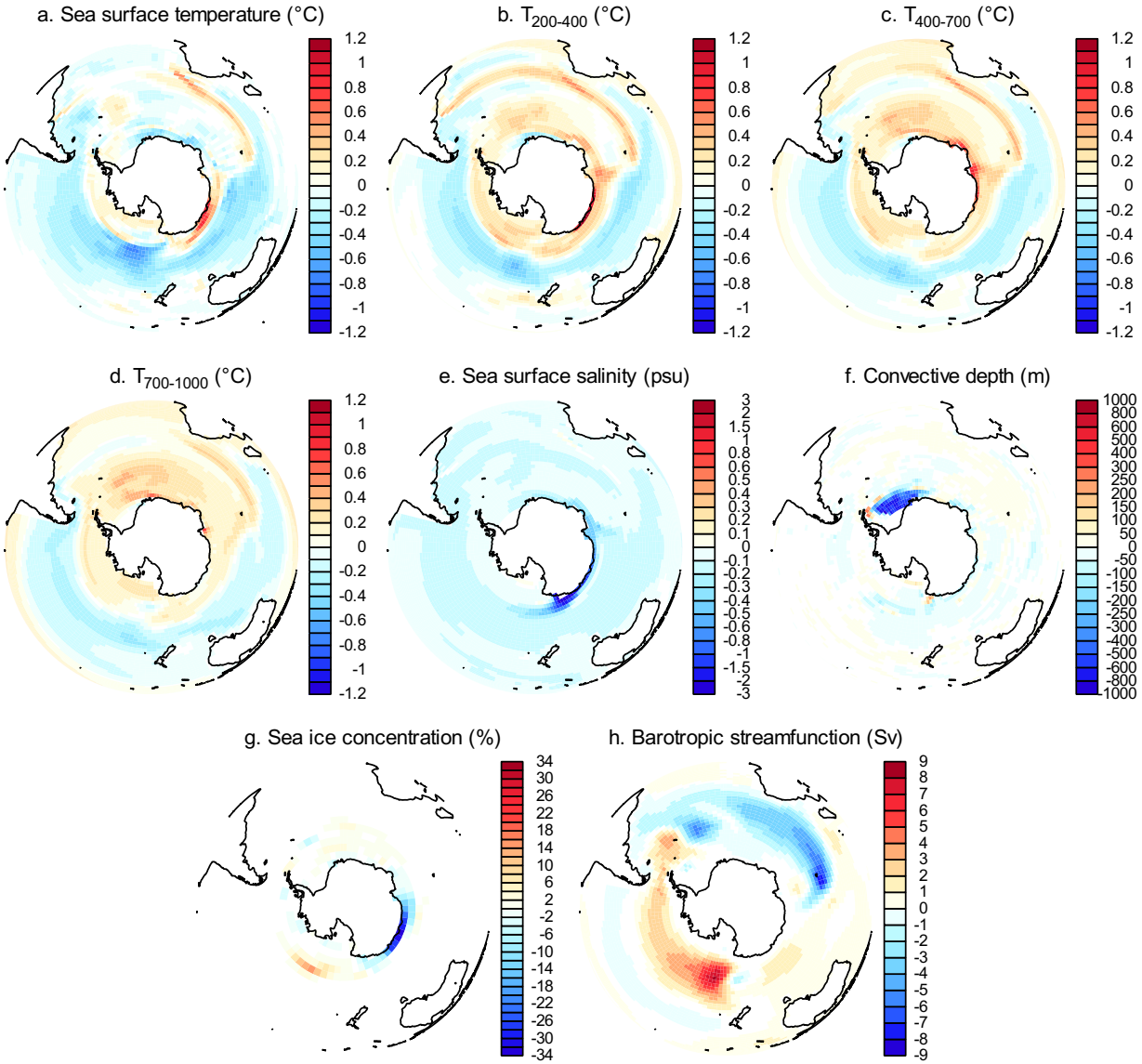
Weber et al. (2014), *Nature*

Ice sheet–ocean feedback loops



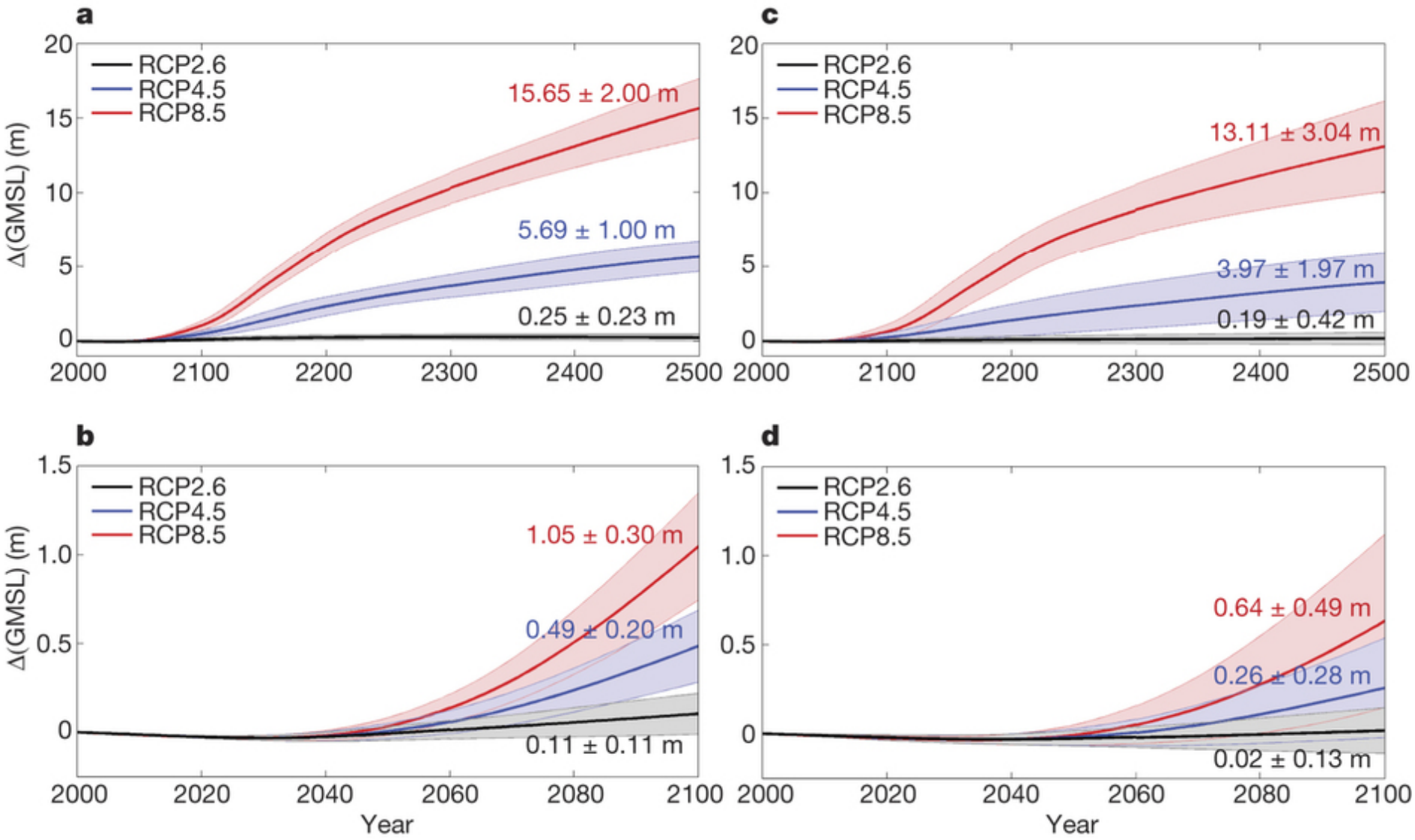
Hattermann and Levermann (2010), *Climate Dynamics*

Ice sheet–ocean coupling: freshwater fluxes into the ocean



Phipps et al. (2016), *The Cryosphere*

Consequences for global sea level



DeConto and Pollard (2016), *Nature*

Future research priorities

- Undertake large-scale observational programs to study the stability of the Antarctic margin.
- Use palaeoclimate data to identify missing processes and incorporate them into ice sheet models.
- Develop coupled climate–ice sheet models to be used for future climate projections.