Projections of Mountain Glacier Mass Loss: Results from the Latest GlacierMIP Experiment

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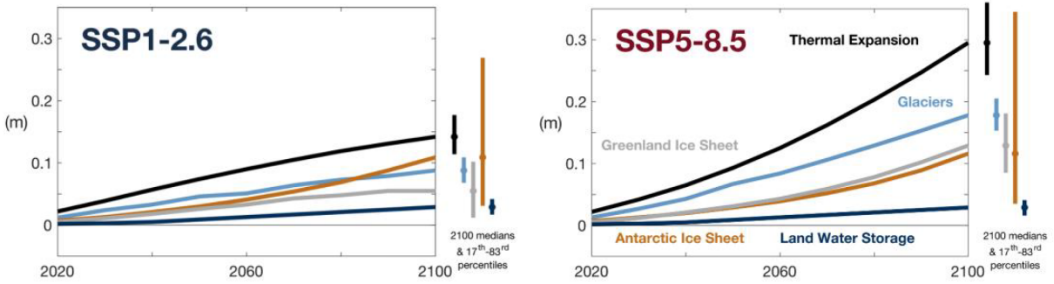
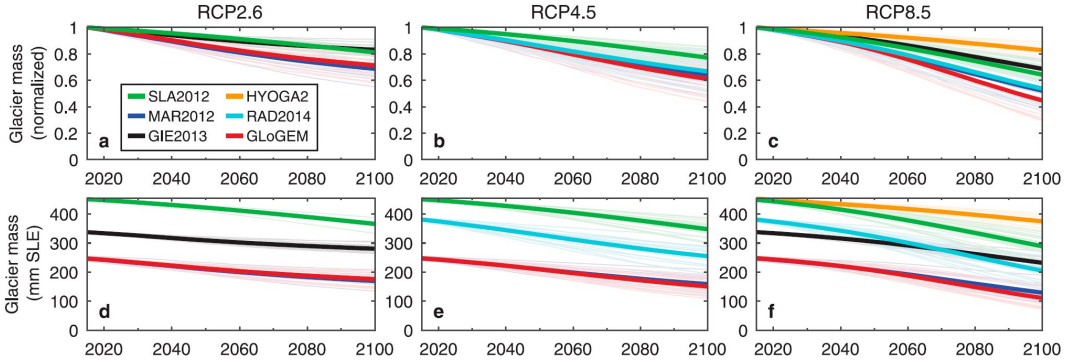
September 20, 2021

Projected Contributions to Sea-Level Rise



IPCC AR6

GlacierMIP 1 – Opportunistic MIP



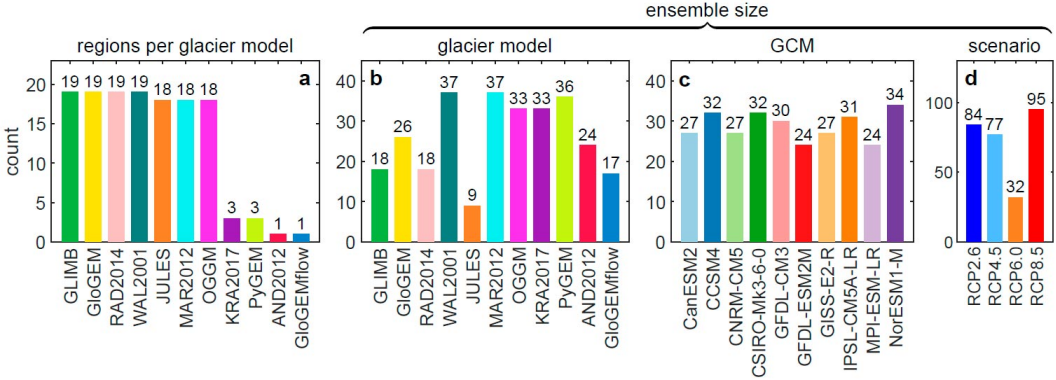
Hock et al. (2019)

- 214 ensemble members, but different initial conditions
- very few ensemble members using identical GCM-RCP combinations

GlacierMIP 2 – Dedicated Experiments

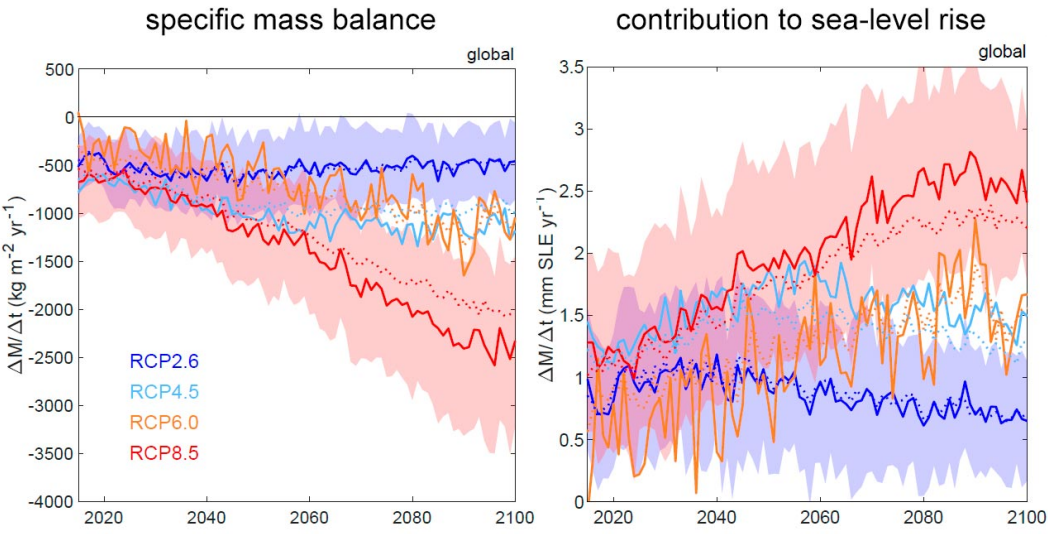
- RGIv6.0 prescribed as initial condition, initial ice thickness updated from Huss & Farinotti (2012), if needed
- 10 GCMs prescribed as boundary conditions
- RCP2.6 and RCP8.5 prioritized
- entire RGI regions necessary, global coverage not needed to participate

GlacierMIP 2 – Ensemble Statistics



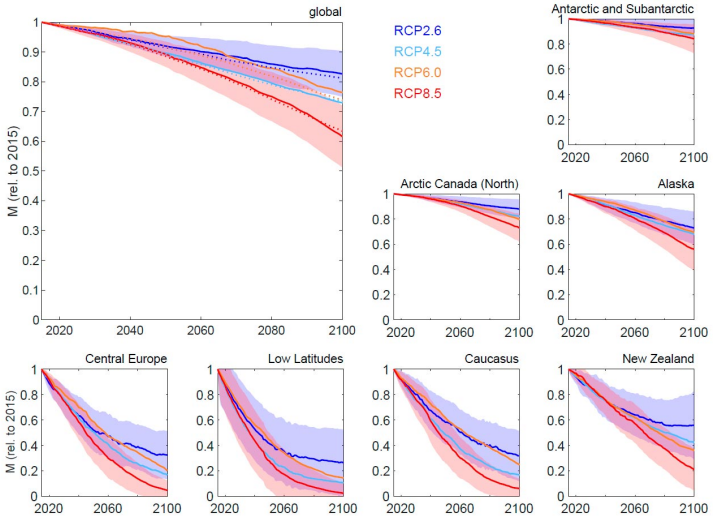
Marzeion et al. (2020)

Global Mass Change Rates



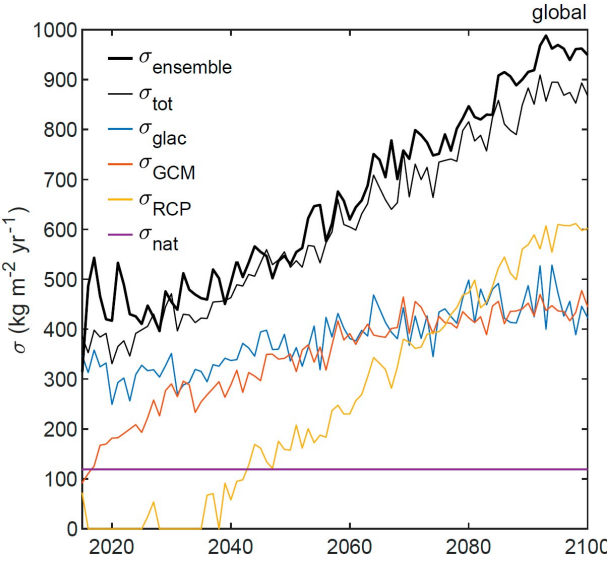
Marzeion et al. (2020)

Mass Relative to 2015 – Regional Differences



Marzeion et al. (2020)

Contributions to Ensemble Uncertainty

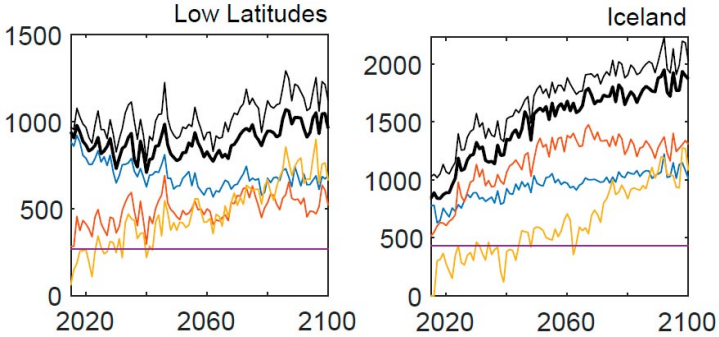


assumptions/approximations

- no interaction between different sources of uncertainty
- natural variability constant in time

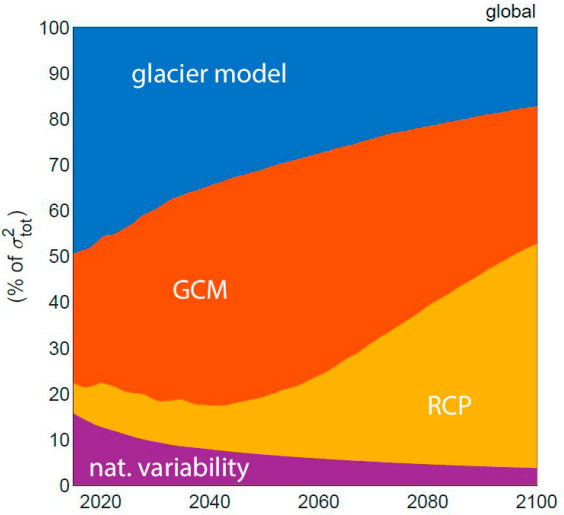
Marzeion et al. (2020)

Contributions to Ensemble Uncertainty – Regional Differences



Marzeion et al. (2020)

Relative Contributions of Uncertainty to Accumulated Mass Change



Marzeion et al. (2020)

Conclusions

- glaciers are important contributors to sea-level rise now and will remain important throughout the 21st century
- independent of emissions, they will continue to lose mass throughout the century
- overall, GlacierMIP 2 results agree very well with previous projections
- disagreement between glacier models is greatest source of uncertainty until mid of the 21st century
- scenario uncertainty dominates at the end of the 21st century
- great regional differences in structure of projection uncertainty