

Basal friction (part 1) and flow factor inversion (part 2)

LIWG winter meeting – 07/02/24

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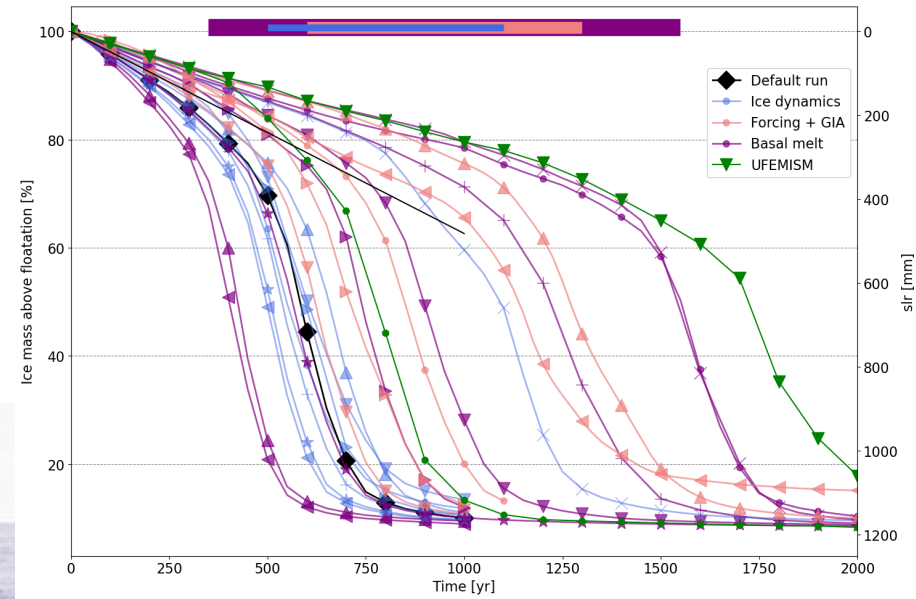


Part 1 – Basal friction

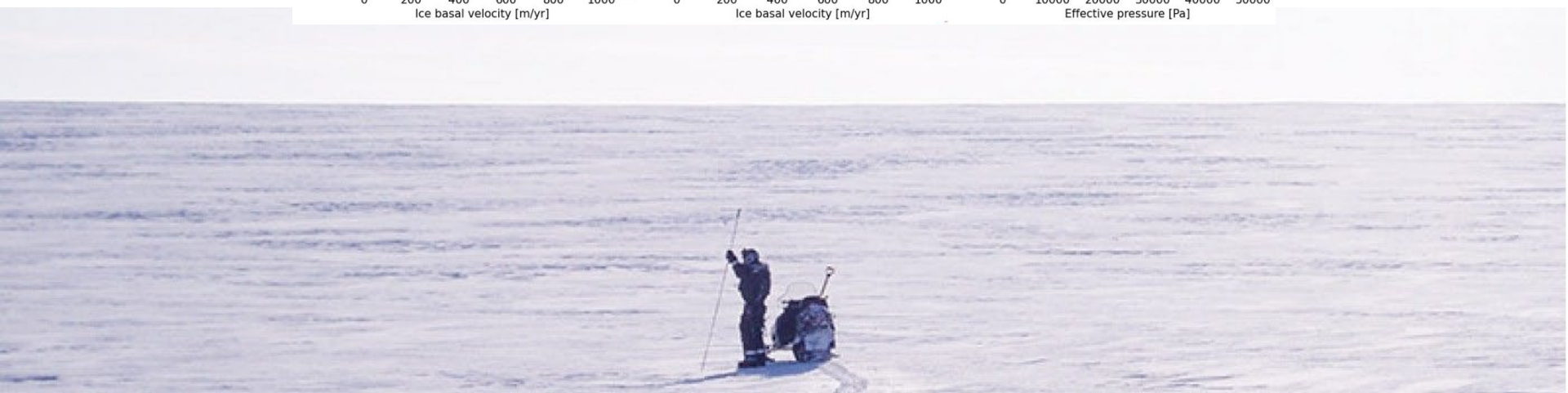
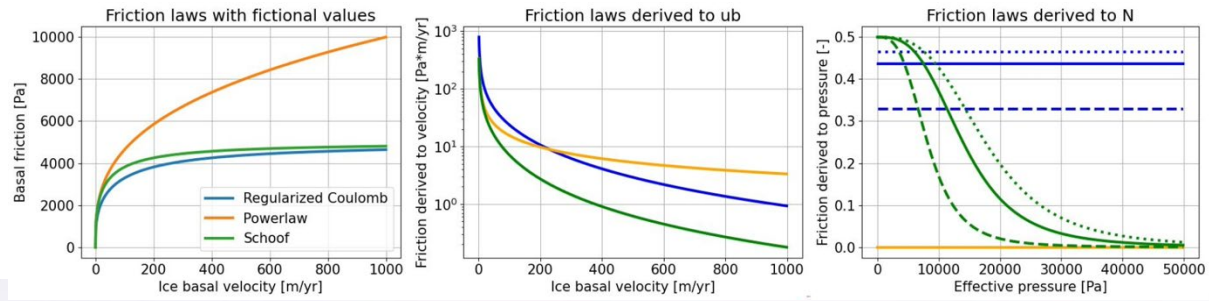
WAIS collapse in different flavours ->

Uncertainty is dominated by choice of model and basal melting

Not so much by basal friction..



Part 1 – Basal friction



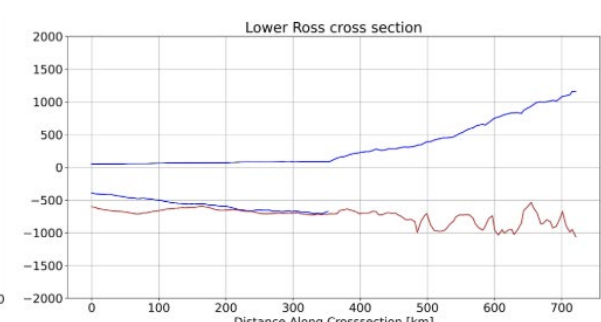
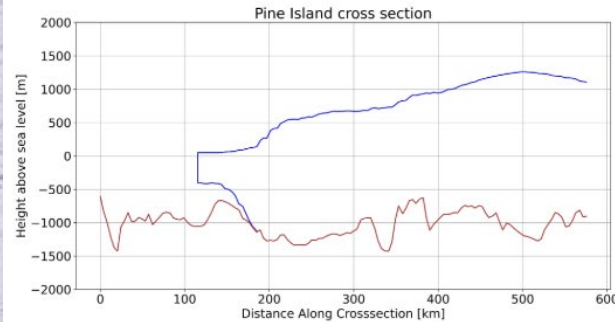
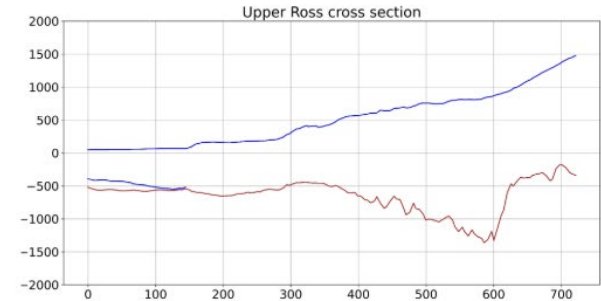
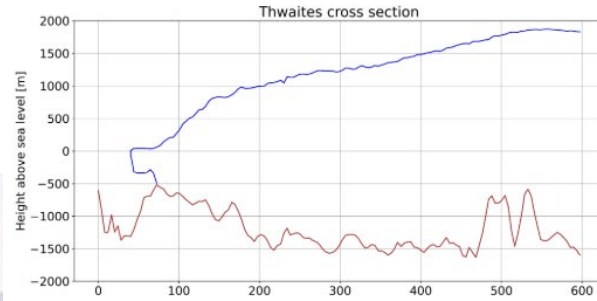
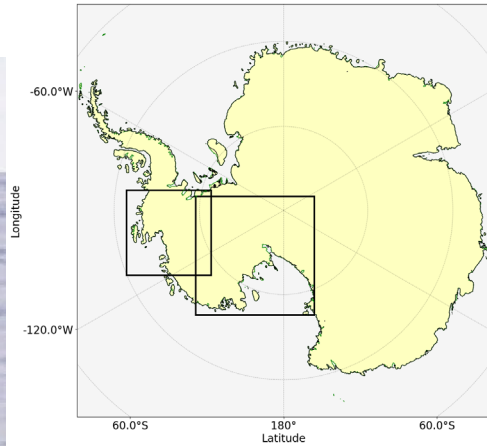
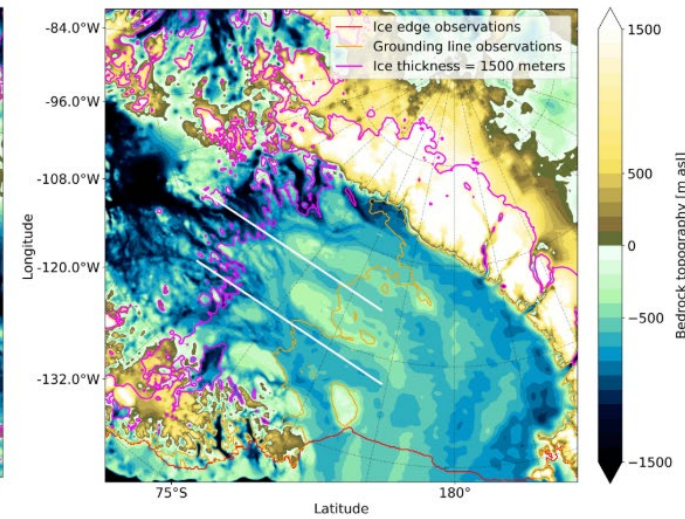
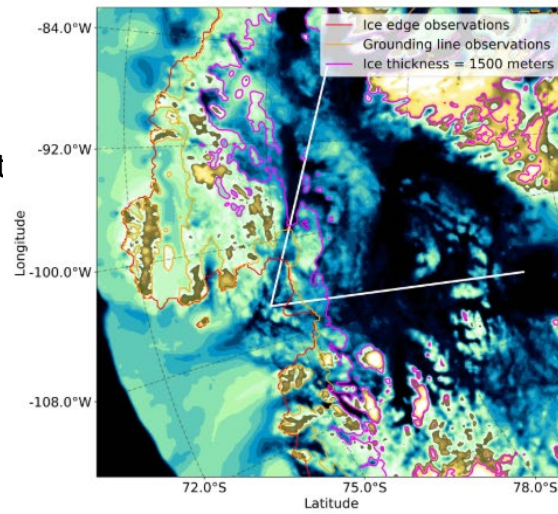
Regional case studies

Amundsen Sea Embayment vs Siple coast

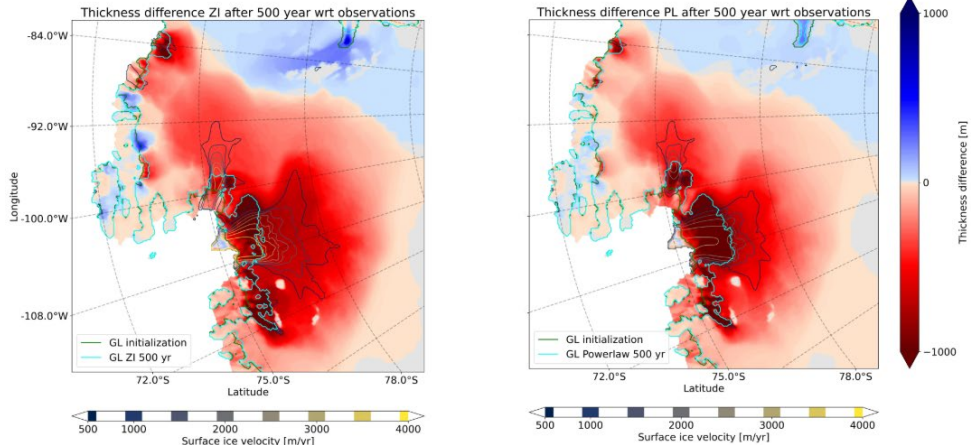
Buttressing vs no Buttressing

Three sliding laws

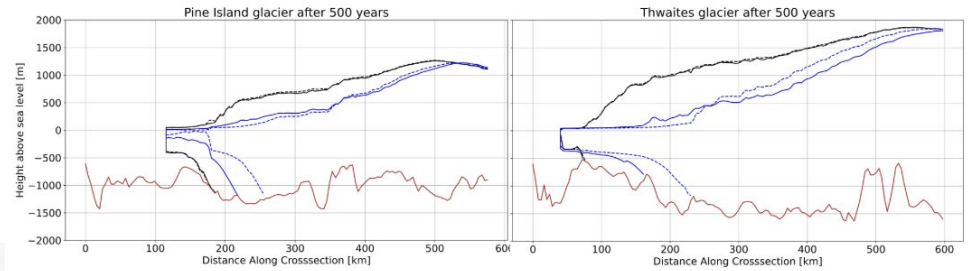
Two experiments (normal and +1)



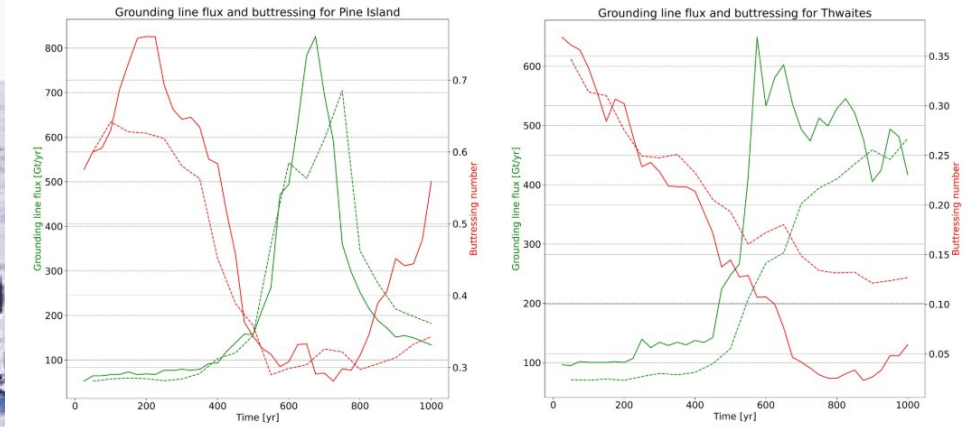
Thickness difference after 500 years:
 (Coulomb sliding left, powerlaw sliding right)



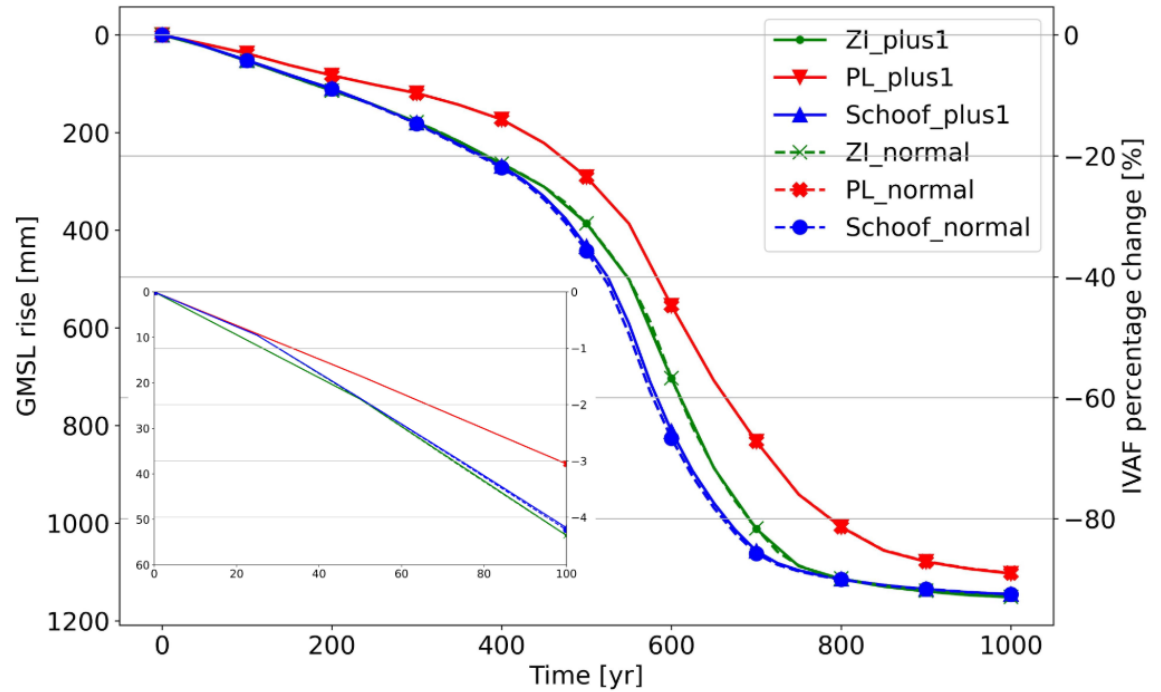
Glacier outlines:



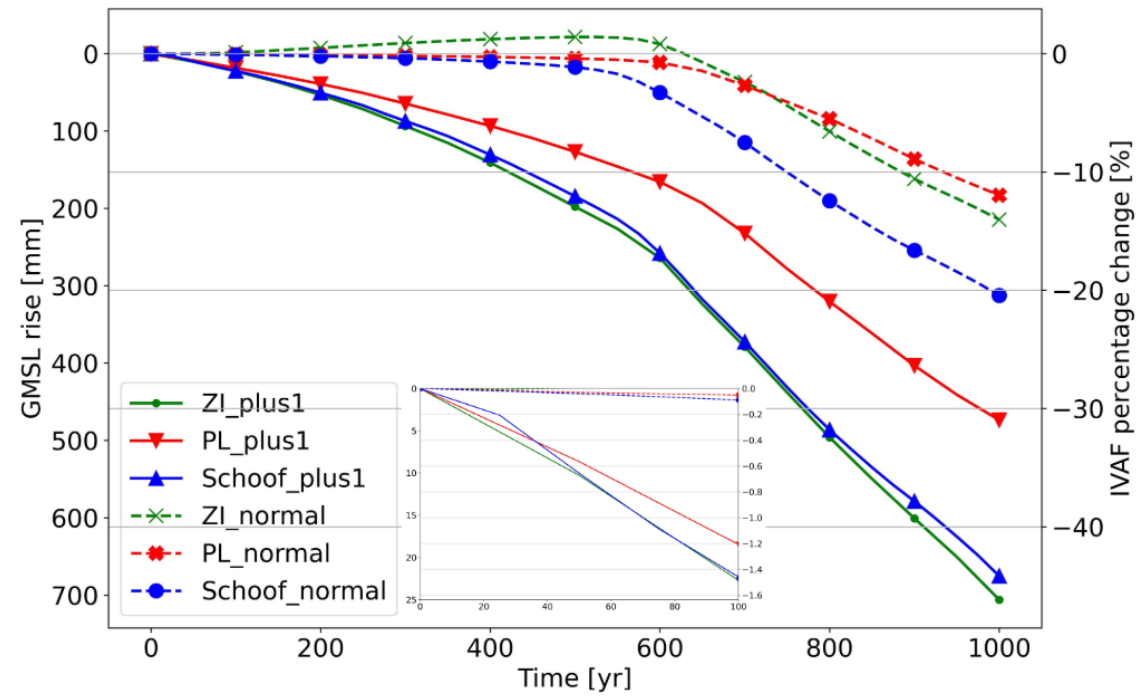
Buttressing versus grounding line flux:



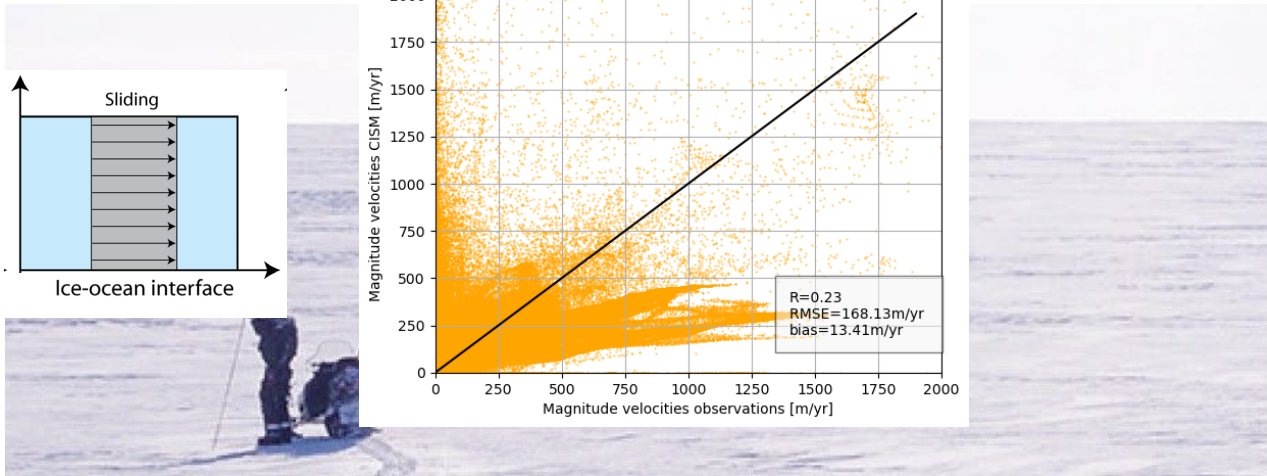
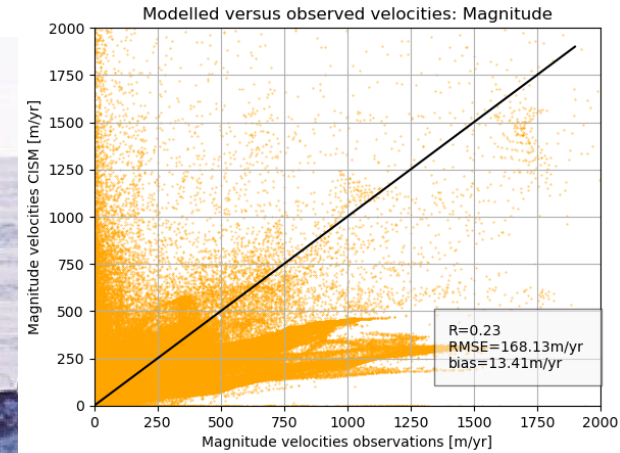
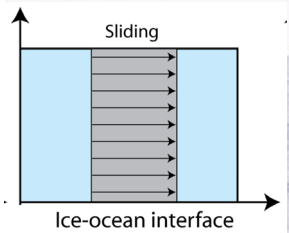
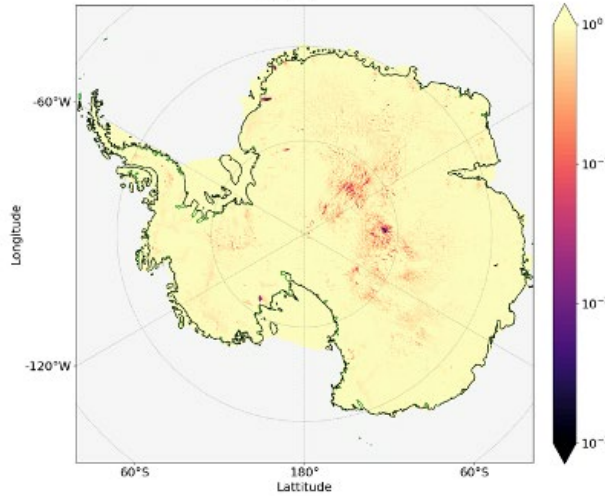
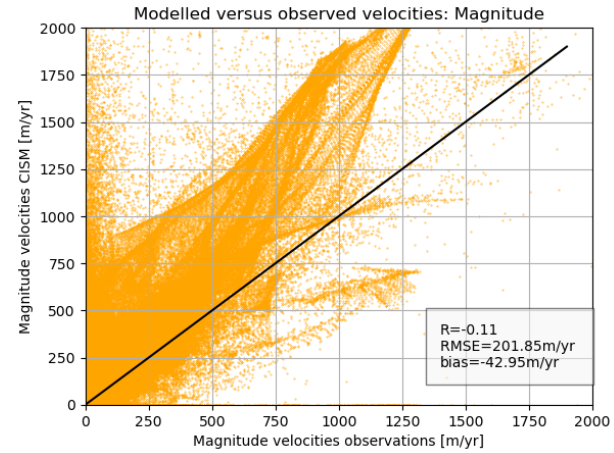
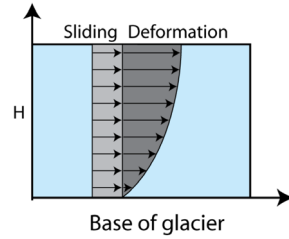
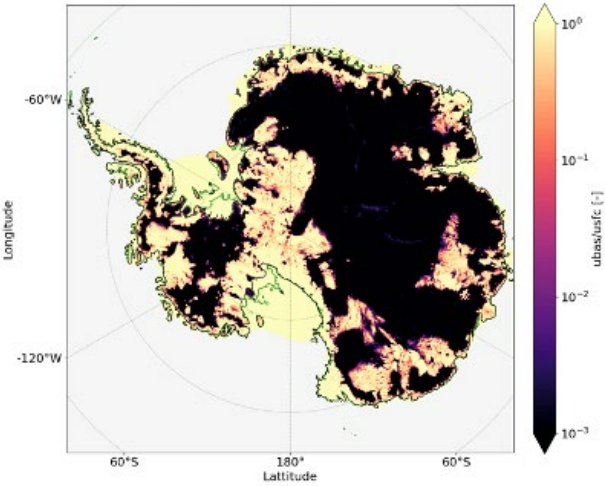
Sea level rise from the ASE:



Sea level rise from the Siple coast:



Part 2 – Flow factor inversion



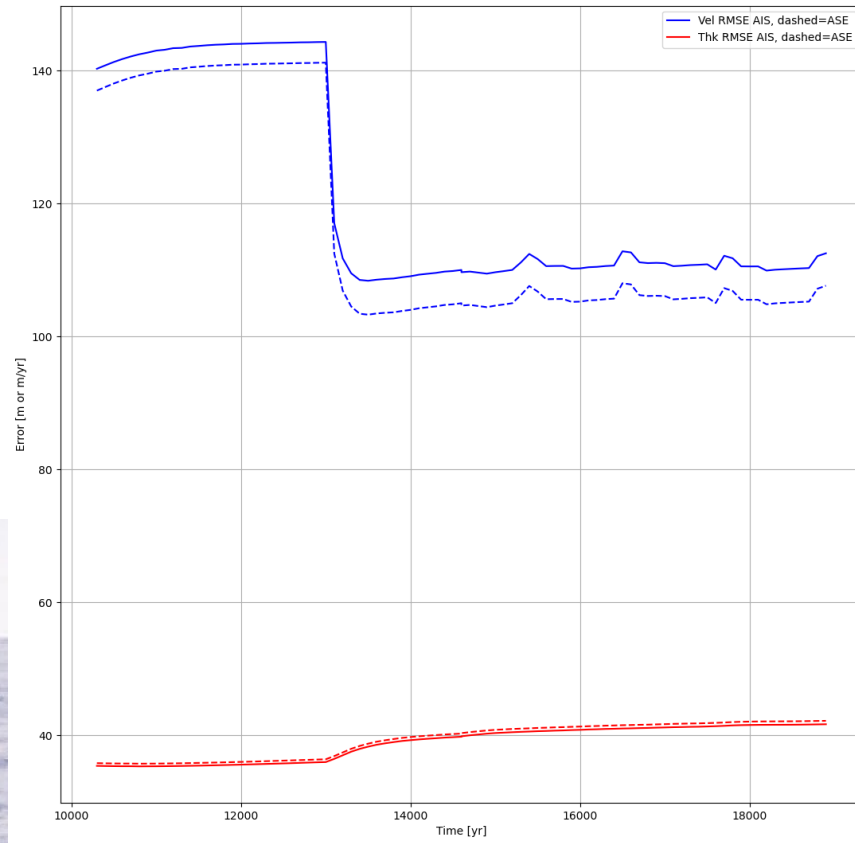
Part 2 – Flow factor inversion

Higher flow enhancement factor -> softer ice -> larger velocities

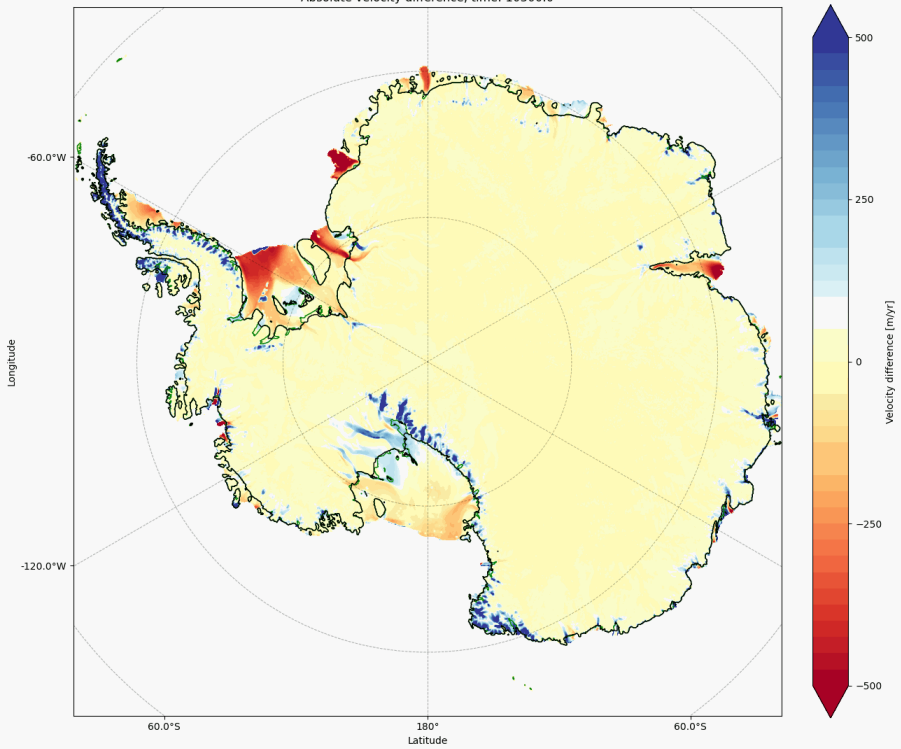
Lower flow enhancement factor -> stiffer ice -> lower velocities

Friction takes care of thickness, FEF of velocities

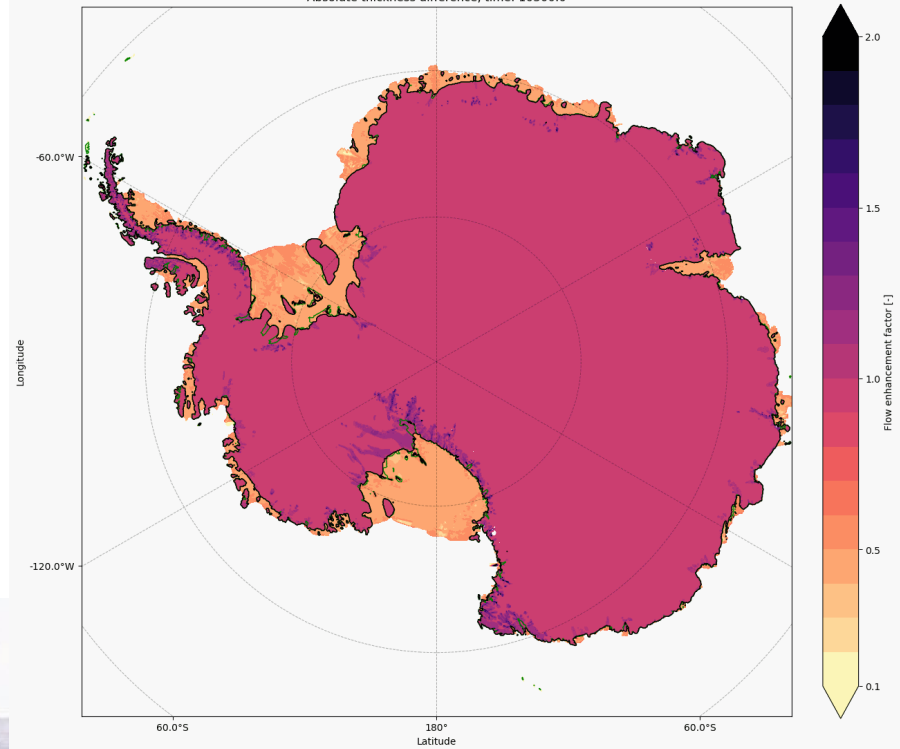




Absolute velocity difference, time: 10300.0



Absolute thickness difference, time: 10300.0



Next steps:

- More firmly investigate the basal friction -> grounding line flux -> buttressing relation (MISMIP, or other idealized/analytical settings)
- Fine tune the flow factor inversion
- Write it up 😊



Thanks for your attention!

Happy to take questions or to discuss

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