



# Exploring the impact of different past- and present-day climatic forcings on Antarctic Ice sheet evolution

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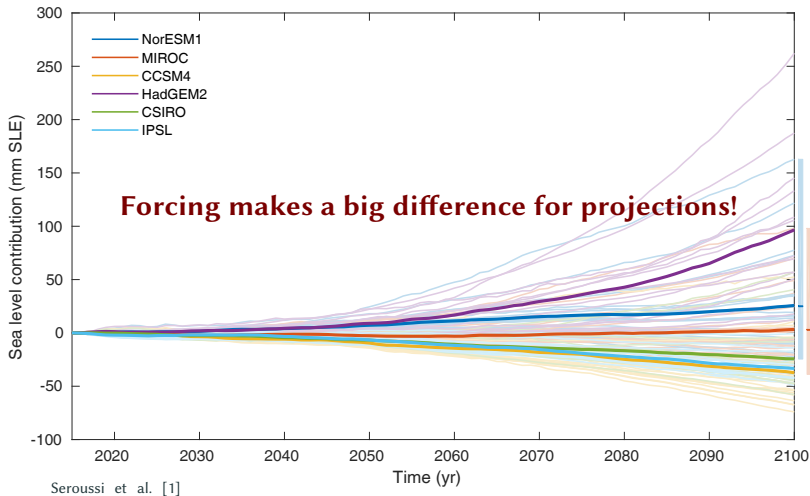
*u<sup>b</sup>*

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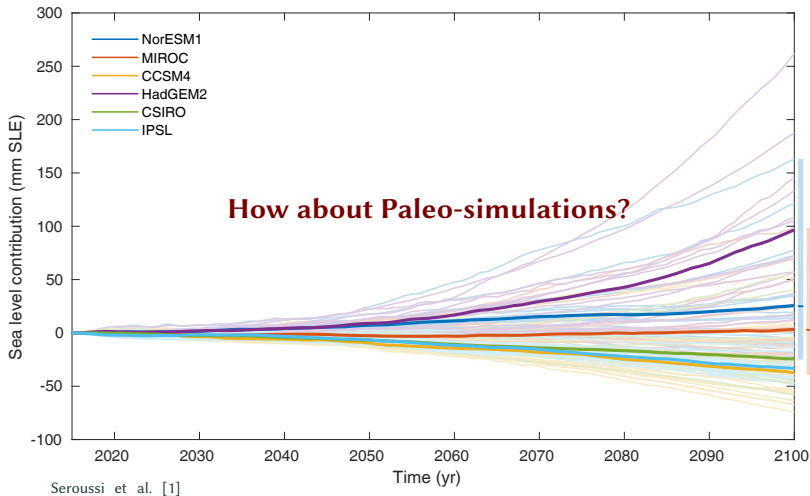
<sup>b</sup>  
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# Does the chosen climate forcing make a difference?



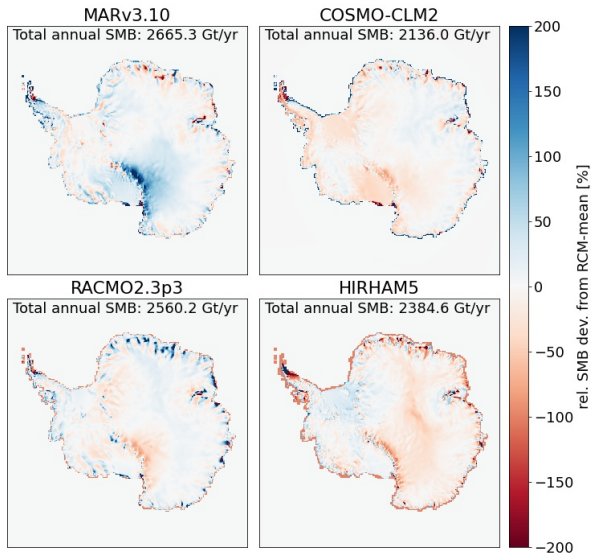
# Does the chosen climate forcing make a difference?



# Surface mass balance forcing

- Largest SMB difference at coastal and mountain regions
- Broad scale difference on EAIS

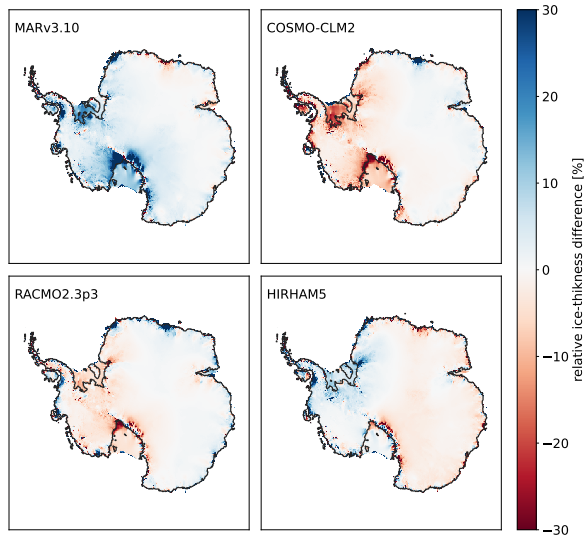
MARv3.10 from Christoph et al. [2], RACMO2.3p3 from Dalum, Berg, and Broeke [3], COSMO-CLM2 from Souverijns et al. [4], HIRHAM5 from Hansen et al. [5]





# Ice-thickness

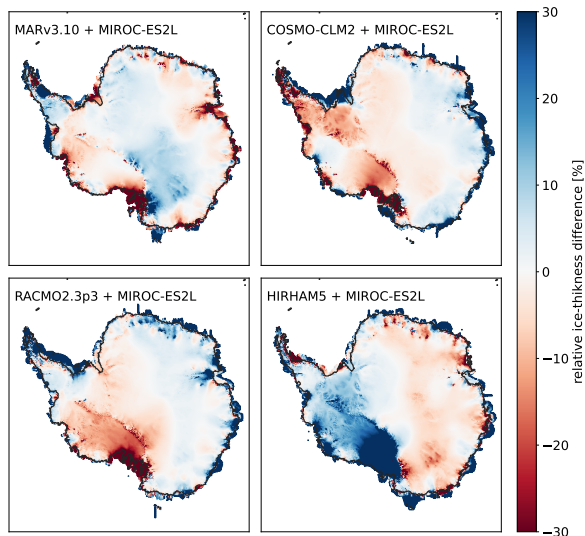
- MAR: Large SMB results in relatively thick ice sheet
- Bipolar WAIS & EAIS pattern



# Ice mass & thickness in the LGM

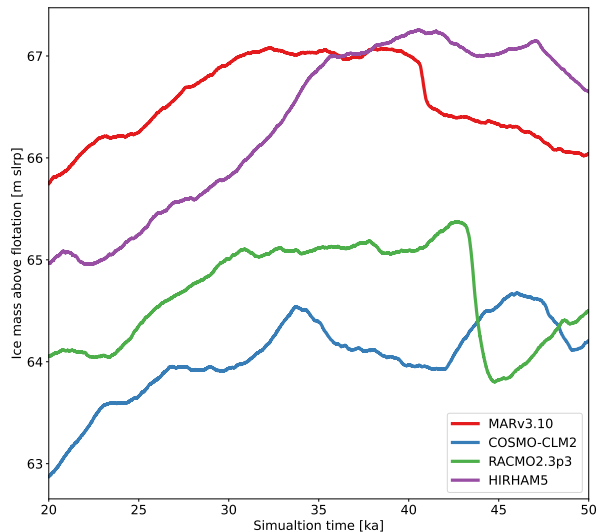
- Thickness difference gets larger
- Largest impact at WAIS esp. at Ross Sea

MIROC-ES2L from Ohgaito et al. [6]



# Ice mass & thickness in the LGM

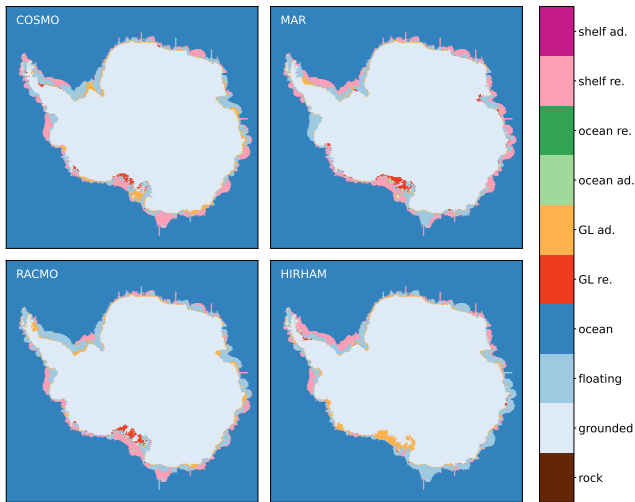
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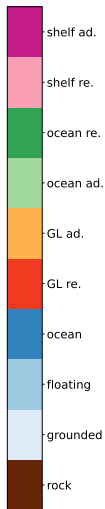
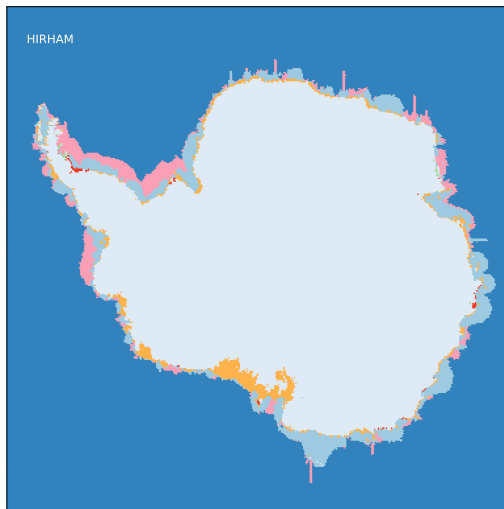
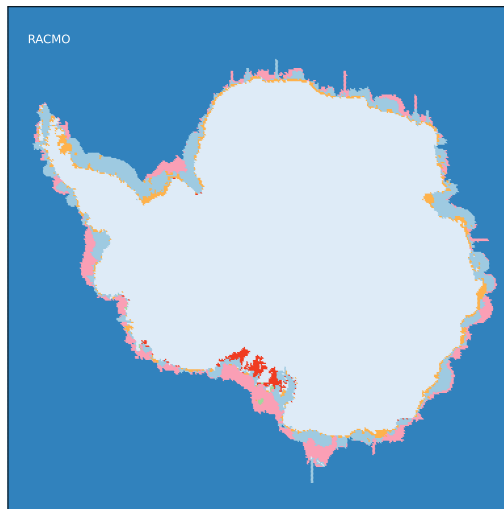
MIROC-ES2L from Ohgaito et al. [6]

# Ice mask in the LGM

- Large difference on the ice shelves
- HIRHAM5 favors larger extend of GL into the Ross Sea



# Ice mask in the LGM



## Conclusion

- Climatic forcings are responsible for large deviation of ice-sheet height
- Deviations increase in colder climate (LGM)
- Potential non-linear response implies the importance to handle forcings with care

## Outlook

- What happens in warmer climate states?  
e.g. LIG, mid-Pliocene

# Acknowledgment

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