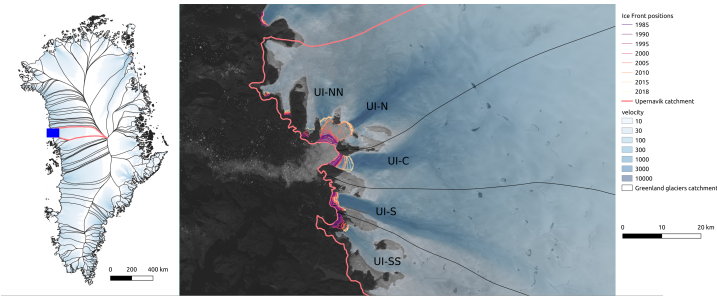
Use of observations to constrain projection of tidewater glaciers

Application to Upernavik Isstrøm



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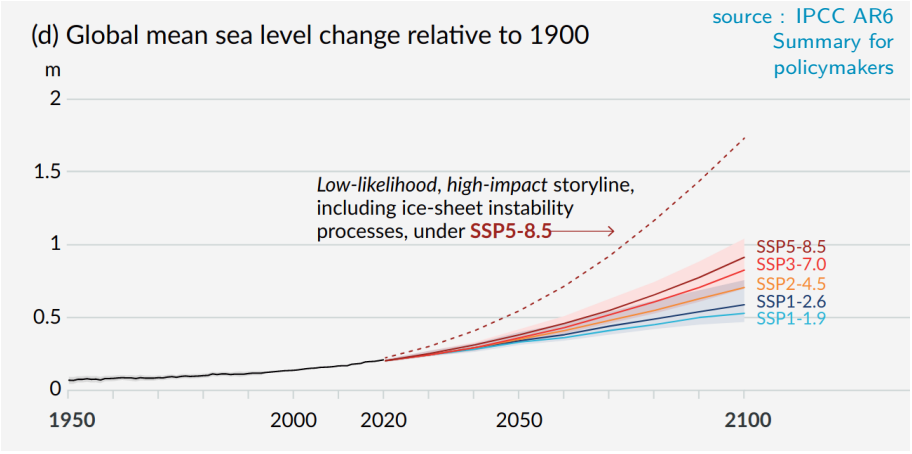
IGE, CNRS, Université Grenoble-Alpes

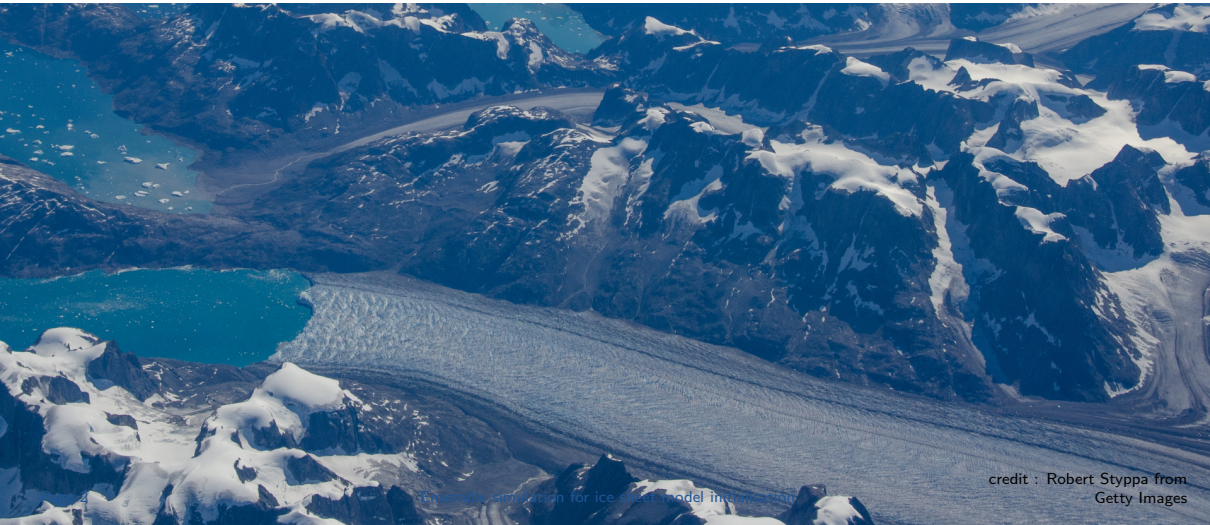
Co-authors : Gillet-Chaulet Fabien, Champollion Nicolas and Romain Millan

Tuesday April 4th 2023

We have a lot of uncertainties of future sea level rise



It comes mainly from the future of the two ice sheets



credit : Robert Styppa from Getty Images

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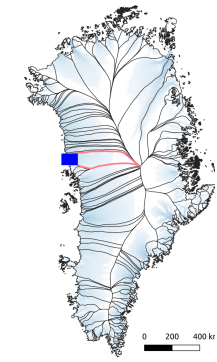

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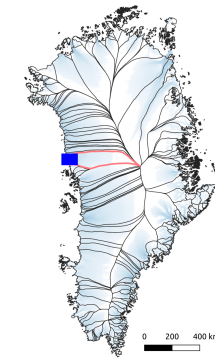

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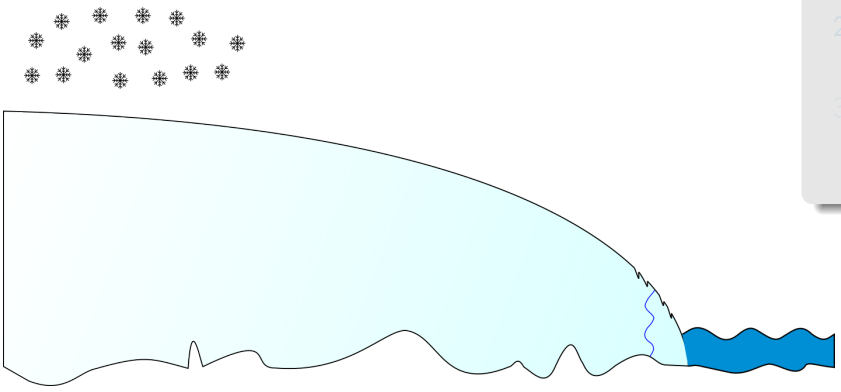

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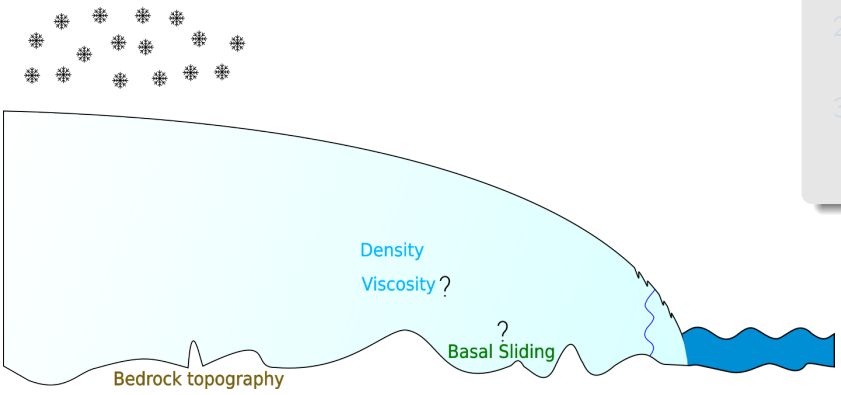

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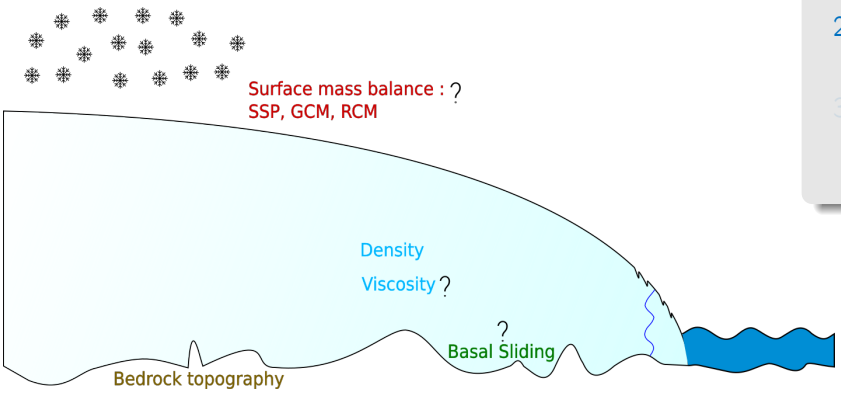

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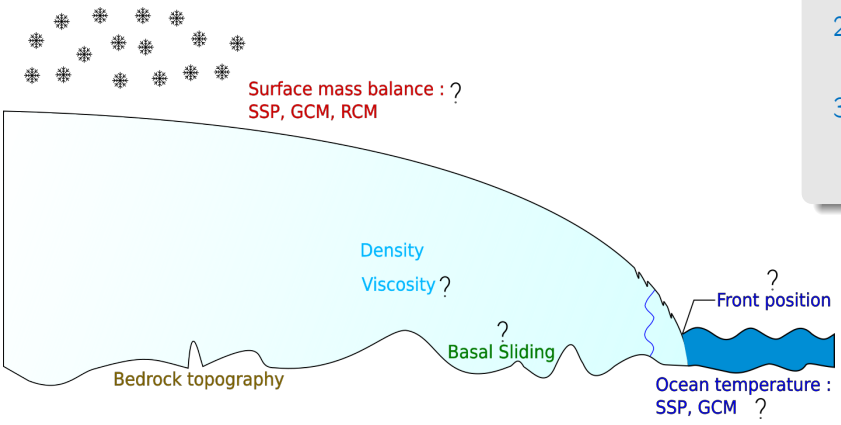

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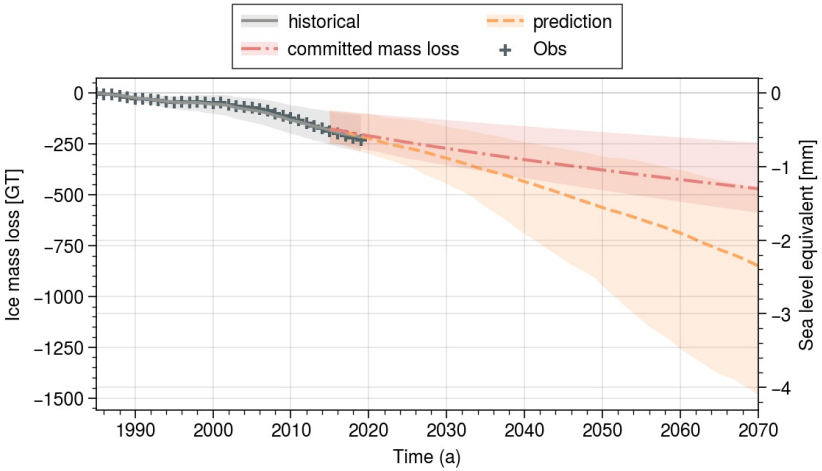
3/ Extend these members into the **future** with ISMIP protocol taking into account uncertainties related to **SSP, GCM, RCM** and **front retreat**

Historical, committed and predicted mass loss



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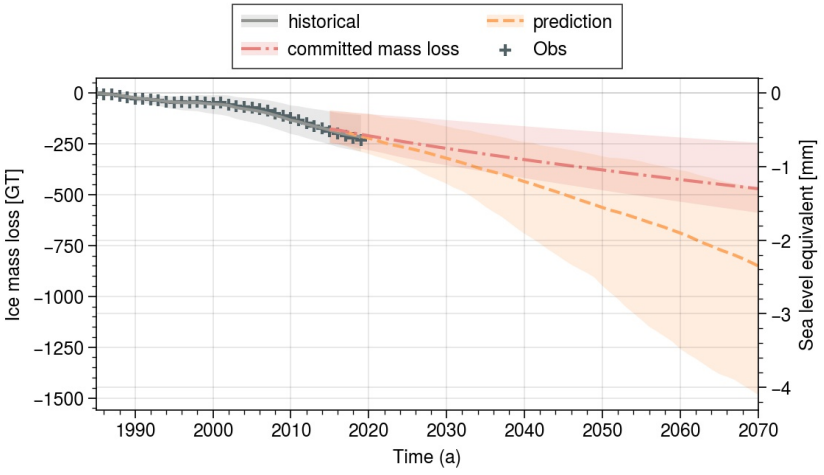

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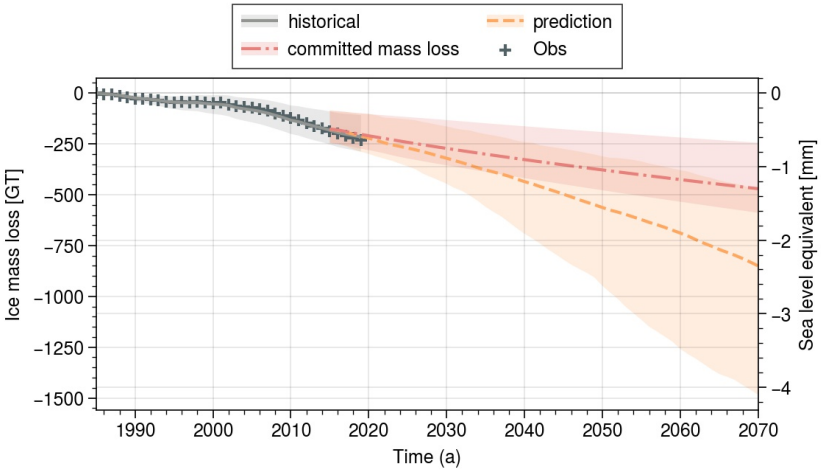

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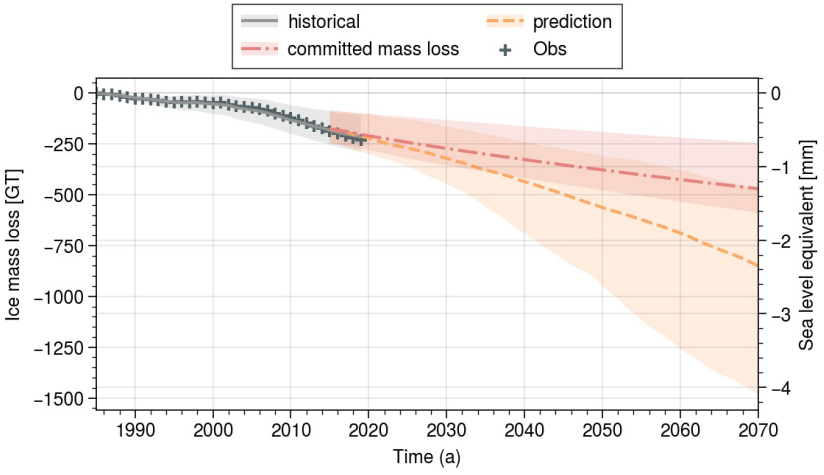

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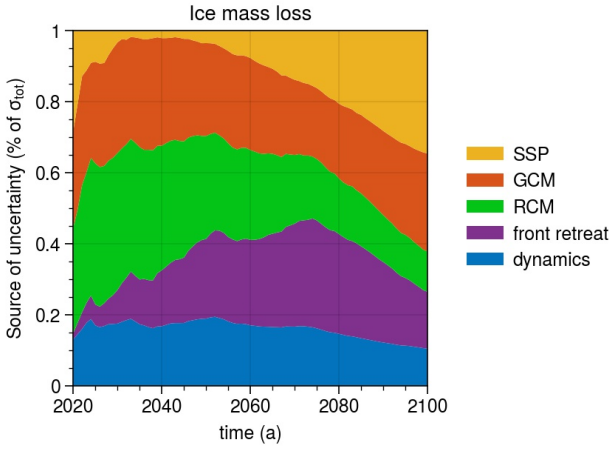

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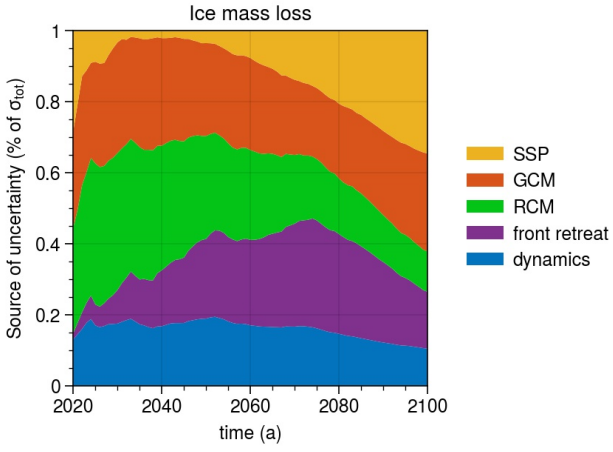

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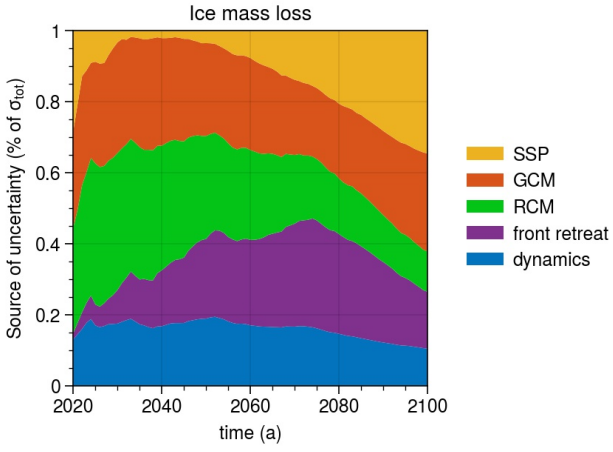

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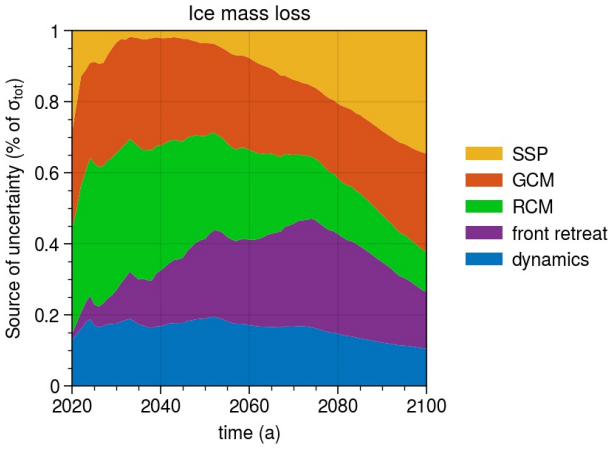

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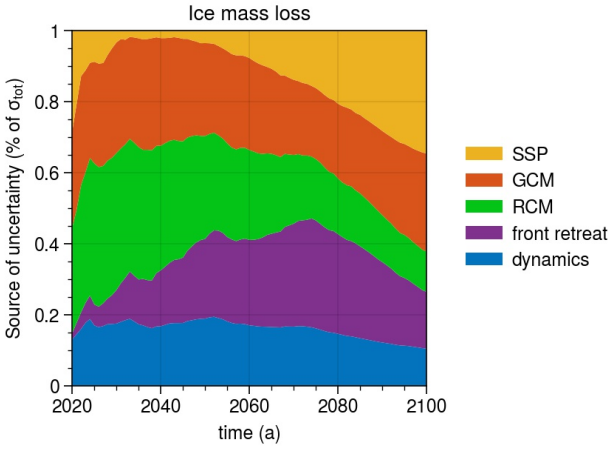

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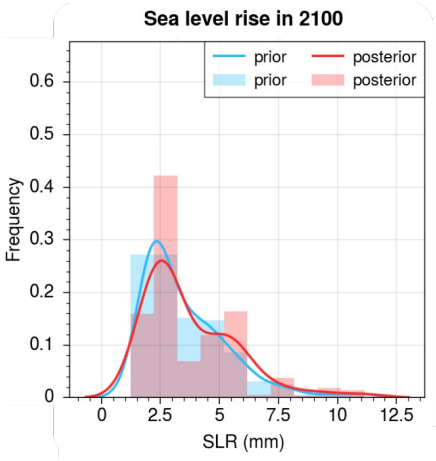

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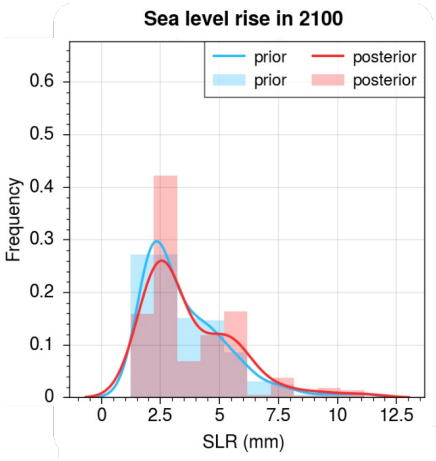

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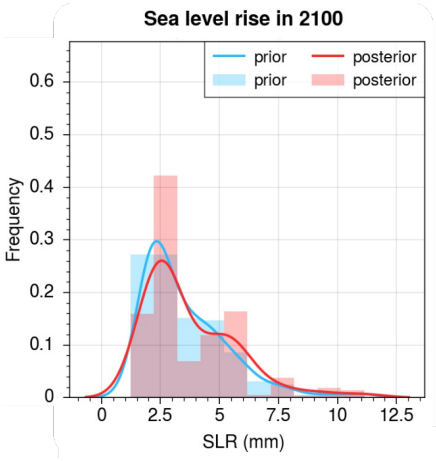

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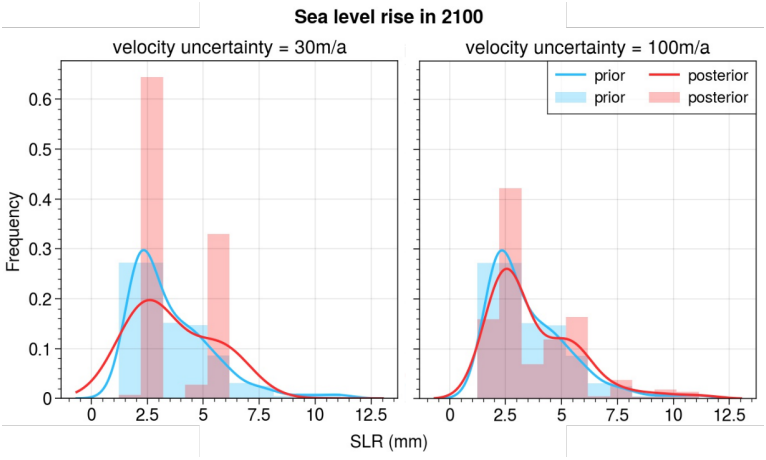


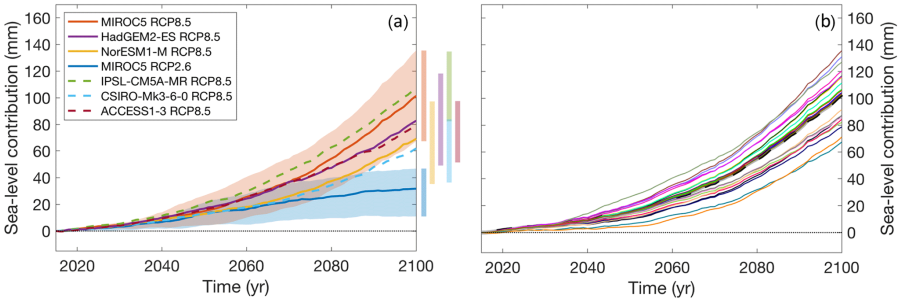
Take-home messages

1. Our ensemble initialisation **method** is able to **reproduce past changes** of Upernavik Isstrøm (Jager et al., JOG, submitted)
2. To **reduce** uncertainty of ice mass loss, **each sources matter**
3. When using **scoring**, beware of **overconfidence**: it depends on a multitude of **choices**.

Perspective : **Extend** the method to the **GrIS scale**.

ISMIP6 Greenland is today the state of the art for uncertainty quantification

source : Heiko Goelzer et al. (2020)



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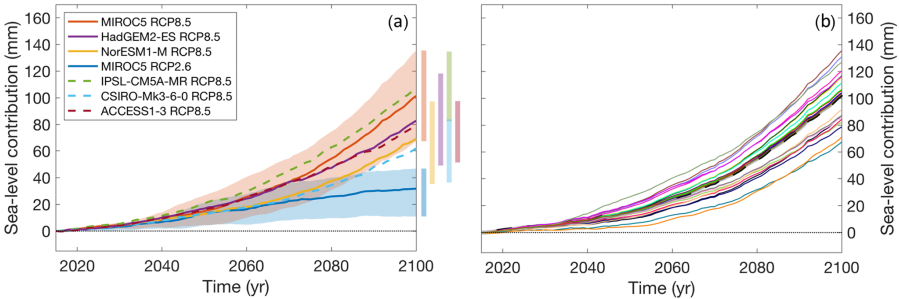

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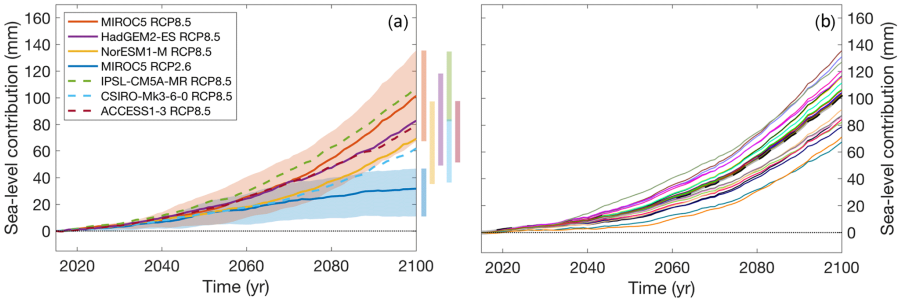

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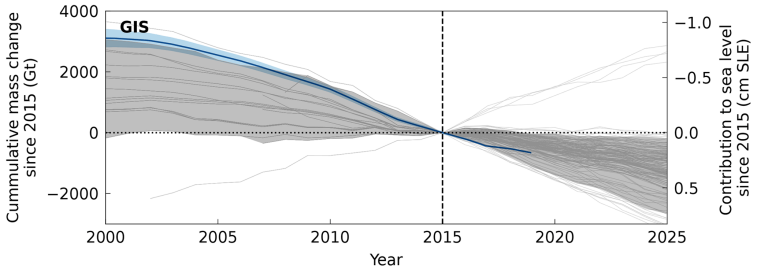

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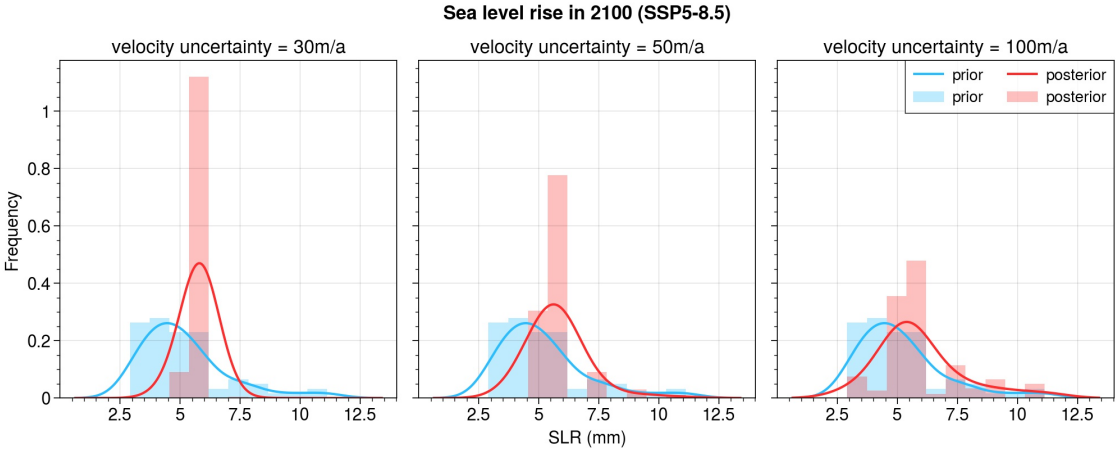

The future will be complicated, but not as bad as the SSP5-8.5

Limiting warming to 1.5°C and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions

Net zero CO_2 and net zero GHG emissions can be achieved through strong reductions across all sectors