# Modeling the past and future evolution of the Antarctic Ice Sheet: Millennial scale variability in the Southern Hemisphere

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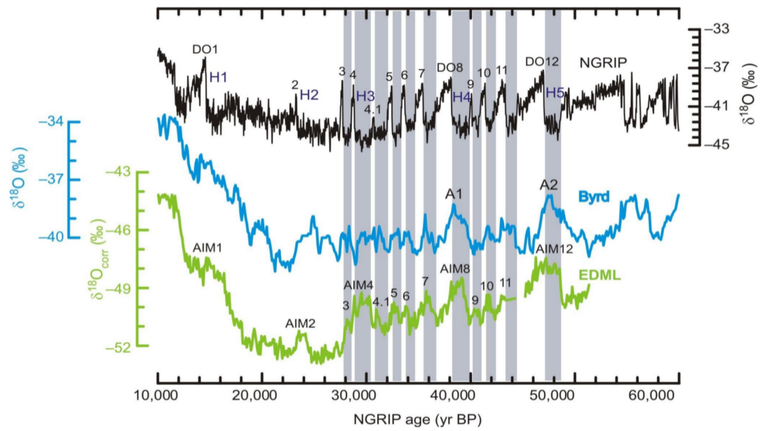
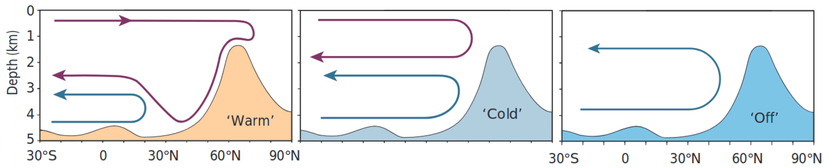
## 1. MOTIVATION

Ice proxies from the Northern Hemisphere (NH) show that during the Last Glacial Period (LGP, ca. 120-10 kyrs) two types of abrupt climate events happened, Dansgaard-Oeschger (D/O) and Heinrich (H) events. Althoughtheir ultimate cause is not fully understood, it is generally accepted that ice sheets played a major role. Many studies have focused on this millennial variability and the effect of ice sheet-ocean interaction in the NH, however this has not been studied yet for the Antarctic Ice Sheet (AIS).

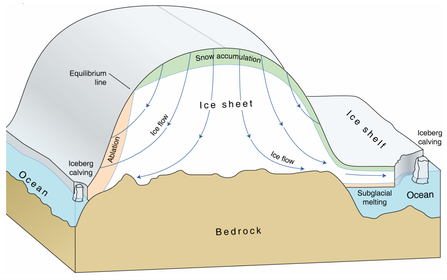
The aim of this work is to study the effects of oceanic and atmospheric millenial variability on the AIS with a hybrid Ice-Sheet-Shelf model.



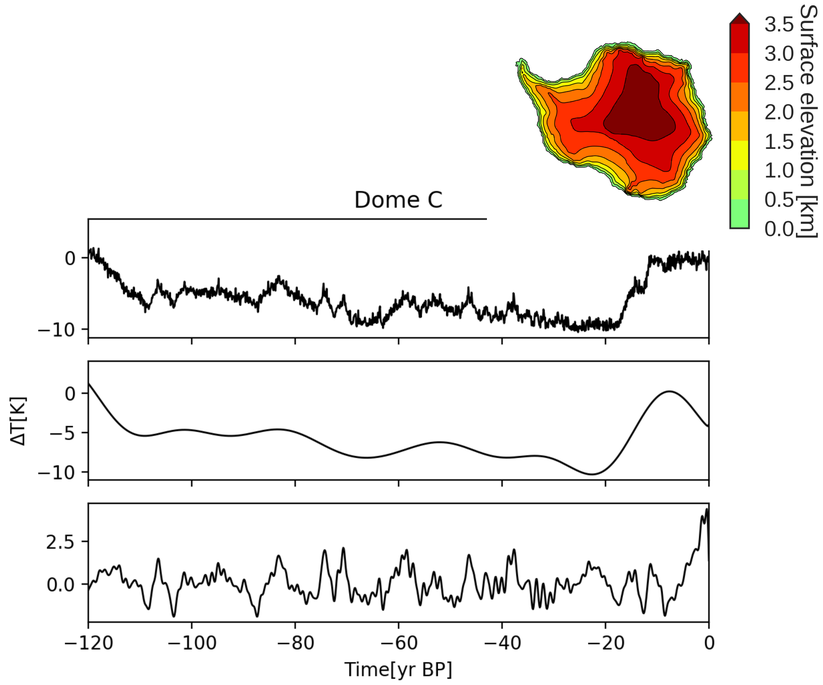

## 2. GRISLI-UCM MODEL

- Thermomechanical 3D hybrid Ice-sheet-shelf model.
- Capable of solving slow moving ice (SIA) and fast flowing ice areas (SSA).

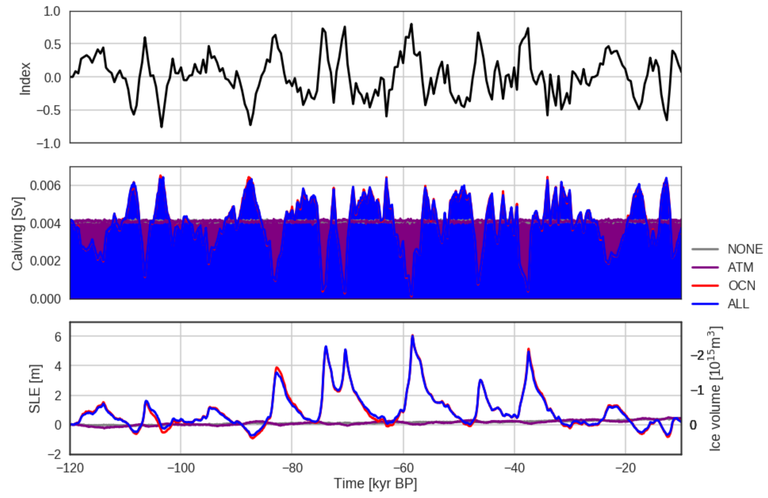



## 3. EXPERIMENTAL DESIGN

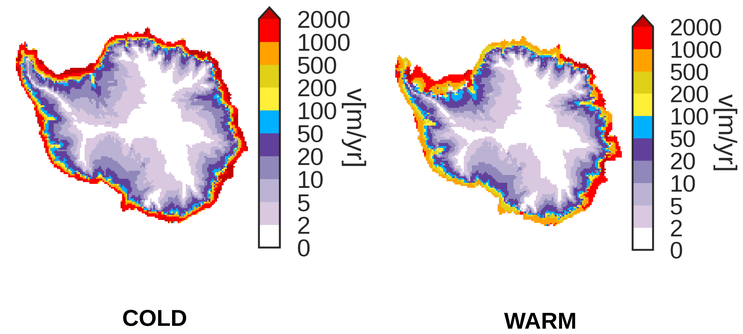
- Perturbations over LGP ice configuration from Ice Core Dome C.




## 4. RESULTS




## 5.VELOCITIES




## 6. CONCLUSIONS

- Ocean forcing main driver of millennial variations.
- Atmospheric perturbations have almost no effect: no ablation and small precipitation changes.
- During warm periods the ice lost is due to oceanic subsurface melting.
- AIS is a potential contributor to variabilities and potential oceanic changes.

## FUTURE WORK

- Compare calving with IRDB proxies (Weber et al., 2012).
- Compare results to different oceanic sensitivities.

## References:

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