

How Can We Use Observational Data to Learn About Future Climate?

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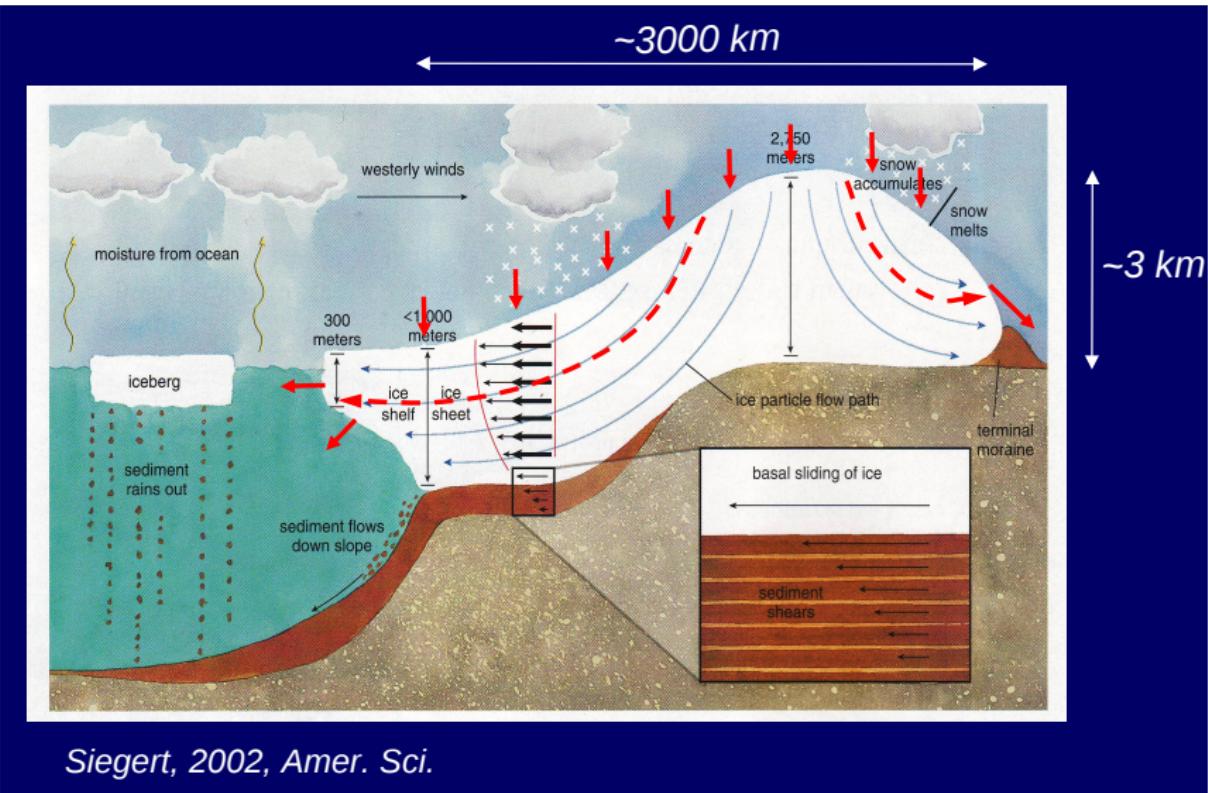
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Talk Summary

- ▶ The West Antarctic Ice Sheet (WAIS) has the potential to be a significant contributor to future sea level change.
- ▶ How can we project the future behavior of WAIS?
 1. One approach: PSU-ICE model (Pollard and DeConto, 2009).
 2. Observations of the ice sheet: modern (satellite) and historical (reconstructed).
- ▶ Challenging statistical problem: how do we combine information from these two sources to say something about the future?

Ice Sheet Physics

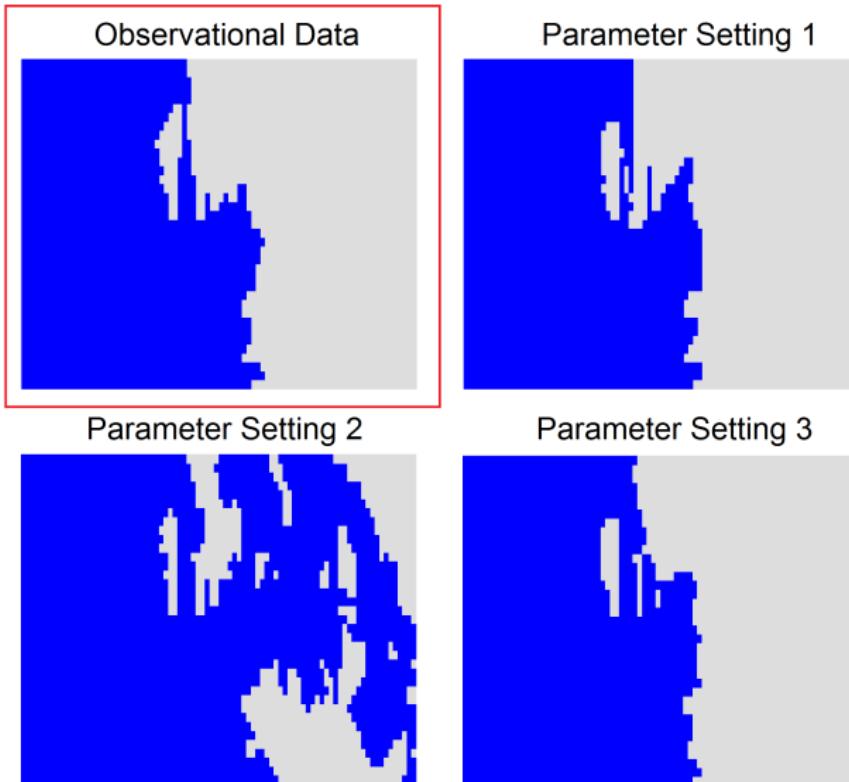


Siegert, 2002, Amer. Sci.

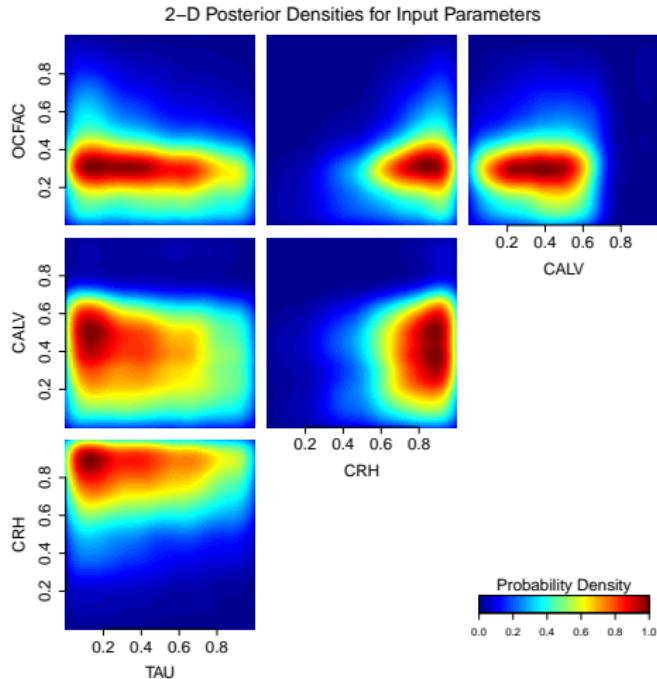
Ice Sheet Model Parameters

- ▶ The ice sheet's behavior is complex.
- ▶ Model equations predict ice flow, thickness, temperatures, and bedrock elevation, through thousands to millions of years.
- ▶ Examples of key model parameters:
 - ▶ Ocean melt coefficient: sensitivity of ice sheet to temperature change in the surrounding ocean
 - ▶ Strength of the “calving” process. Calving = where ice breaks off and transitions from attached to floating
 - ▶ “Slipperiness” of the ocean floor
- ▶ Use data to learn about these parameters. Not exact values but probability distributions.

West Antarctic Ice Sheet Example



Calibration Results



Example Projections

