

Circumpolar Antarctic Ice Sheet-Ocean obs: towards an integrated view and improved climate models

Topics covered:

- International collaborative data initiatives such as RINGS and NECKLACE aim to improve data availability to answer globally important questions around Antarctic mass loss.
- The importance of glacier processes and small-scale seafloor features for understanding ocean flow on the Antarctic continental shelf
- Processes affecting Antarctic Bottom Water Properties

Important Developments in the field:

- In recent years there has been a substantial increase in data availability in bed topography under the Antarctic Ice Sheet, but gaps still remain, particularly in dynamically important areas such as the coast.
- Including seafloor roughness in ocean model reduces eddies in the model as drag at the ocean floor dissipates eddy energy, and can reduce the ability of warm Circumpolar Deep Water pulses to cross the continental shelf, demonstrating the importance of bathymetry data.
- Mixing on the continental shelf is important for understanding heat and nutrient fluxes, and also formation of Antarctic Deep Water, and can be impacted by sea floor roughness, subglacial discharge, and iceberg calving processes.

Key Outstanding Questions/Future Directions:

- How would Antarctic coastal ocean models change if we systematically included freshwater sourced from the subglacial system?
- How can we increase observations on the continental shelf, which is key to the formation of Antarctic Bottom Water (a crucial component of global ocean circulation)?
- RINGS aims to support geophysical surveys to develop the next generation of Antarctic datasets of bed topography, ocean bathymetry, snow accumulation and geological properties.
- Ocean state estimates struggle to reproduce conditions on the continental shelf, and carefully assimilating observational data can help to improve this.

