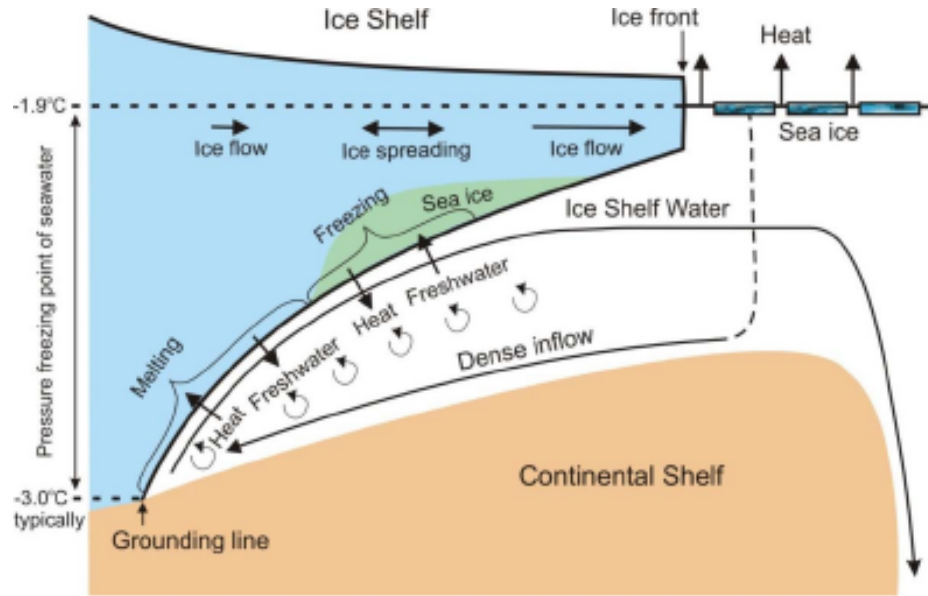


Physical Oceanography

Supervision: Dr. Harmut Hellmer (Hartmut.hellmer@awi.de)

Title: Parametrization of basal melting in a shallow grounding zone using FESOM1.4

Data: Numerical modeling



Conceptual picture of sub-ice shelf overturning, where the layer interacting with the ice shelf is assumed to be sufficiently thin that friction dominates over rotation in the force balance.

Goal

- Implement the new parametrization in FESOM1.4.
- Test the applicability of the new parametrization.
- Determine the impact of the new parametrization on cavity circulation and ice-shelf-wide basal melting.
- Assess the impact of the new parametrization on ice sheet dynamics (**Optional**).

Background

- Ocean-driven ice-shelf basal melting is one of the two dominant terms in the mass balance of the Antarctic Ice Sheet.
- Basal melting affects the flow of inland ice towards the ocean (buttressing effect), thus, has an impact on global sea level rise.
- The buttressing effect is most pronounced near the grounding line where the water column is only few tens of meters thick.
- Numerical models fail to resolve this shallow area due to numerical stability constraints.
- A new parametrization of basal melting in shallow grounding zones has been proposed but still needs to be tested in an ocean-ice-model applied to the Filchner-Ronne Ice Shelf.