

# Ice-Ocean Boundary Dynamics

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The inter-play between ocean circulation and ice sheet dynamics is ultimately mediated by processes that take place at the interface between ice and ocean. Heat transferred from ocean to ice drives melting, and the resulting input of freshwater creates a buoyancy driven current in the adjacent ocean. That current, which may be subject to additional buoyancy forcing from sub-glacial drainage, drives both the small-scale mixing that effects the heat transfer to the ice and the near-ice circulation that draws ocean heat from the surroundings and into the ice-ocean boundary layer. There is thus a close and complex interaction between the melt rate and the ice-ocean boundary dynamics that determine the melt rate. This talk aims to briefly summarise what is known about that interaction.

The ice-ocean boundary layer, particularly that against the rapidly calving terminus of an active tidewater glacier, is challenging to observe directly. Much of the current understanding has come from observations of the far-field conditions some distance from the calving front, combined with insights gained from observations beneath ice shelves. Those observations are themselves far from trivial to undertake, so much of our understanding of the small-scale processes beneath ice shelves has come from studies conducted on the turbulent boundary layer beneath sea ice. Key results from these broader studies provide a starting point for the development of parameterisations that may be applied to the Greenland tidewater glaciers.