## Ice shelves in cold and warm oceanic environments

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Antarctic ice shelves exist in a variety of oceanographic thermal regimes: from "cold" for Filchner-Ronne and Ross ice shelves, where sub-ice-shelf water masses are dominated by High Salinity Shelf Water, to "hot" for Pine Island Glacier or George VI ice shelves, where sub-ice-shelf water masses are dominated by Circumpolar Deep Water. Observations show that ice shelves in different oceanic environments experience a variety of basal conditions – from refreezing and mild melting on Filchner-Ronne and Ross ice shelves to strong melting on Pine Island Glacier floating tongue. Dynamic and thermodynamic aspects of the ice shelves and cavities underneath them are investigated with a one-dimensional, fully-coupled ice/ocean model. Model simulations show that ice shelves afloat in warm ocean waters have significantly colder internal ice temperatures than those that float in cold waters. This implies that ice shelves in a warm ocean environment are stiffer (less deformable) and are thus more prone to fracturing and crevassing than ice shelves afloat in cold waters. Sensitivity experiments show that ice shelves with faster flow across the grounding line (larger mass flux) experience stronger melting than ice shelves with weaker flow through the grounding line, and in the case of confined ice shelves, have configurations quantitatively similar to ice shelves floating in the ocean environments with increased heat content.