

Sensitivity of ice shelf basal melting to ocean forcing

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The Antarctic ice sheet is coupled to the ocean via ice shelves that fringe most of the coast. Changes to ice shelves can influence the flow of grounded ice into the oceans, with implications for the mass budget of the ice sheet, sea-level rise and the global thermohaline circulation. Recent observed ice shelf thinning is thought to be a result of enhanced basal melting, driven by increased ocean heat circulating beneath the ice shelves. This ocean heat supply is regulated by several factors including winds, sea ice production rates, ocean circulation, mixing, and the shape of both the bathymetry and ice shelf draft. Generally, the relative importance of each of these factors for basal melt, and their interaction with each other, is different for each ice shelf/ocean system. For each system, it is the combination of these factors that determines the sensitivity of basal melting to the available heat. Here, the sensitivity of each system is calculated using observed basal melt rates and estimates of ocean temperature, representing the heat. This approach also provides the susceptibility of each system to change. These results are then used as a robust evaluation metric for an ice-shelf/ocean model.

Theme: Ice-ocean interaction (*Surfin' USA*)