

Effect of Basal Channels on Oceanic Ice-Shelf Melting

Abstract: Prominent basal channels have been found on ice-shelves undergoing strong oceanic melting in both Greenland and Antarctica. The question as to their importance to the stability of these ice shelves remains open; with proposed impacts including an increase in mechanical instability and a reduction in basal melting, leading to an increase in ice-shelf stability. One such channelized ice-shelf is Petermann Glacier, which is one of the largest and most influential glaciers in northern Greenland in terms of ice discharge into the ocean and drainage area. The dominant term in the mass budget of Petermann Glacier is not iceberg formation, but basal melting (80%), so having an understanding of the impact of its four deep along shelf channels is paramount to understanding the stability of the ice shelf. We have applied a three-dimensional ocean model to the cavity beneath a, idealised, Petermann-style ice shelf containing channels running along the length of the ice shelf. Here we discuss findings detailing the effect of such basal channels on ocean flow and ice-ocean interactions.