



1 Laboratory experiments of eddy blocking by ice shelves

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The Weddell Sea, Antarctica, is a region where the production of deep oceanic water masses occurs. Part of this process involves the flow of dense water down slopes which can break up into domes and form eddies in the overlying water. A pathway of dense High Salinity Shelf Water (HSSW) in the Weddell Sea is down slope into the cavity beneath the Filchner-Ronne Ice Shelf (FRIS). In addition, the water mass in the region of the ice front outside the ice shelf is subject to seasonal stratification.

Results from laboratory work investigating the flow of dense water down slopes in the region of an ice shelf front are presented. The experiments simulate the ice front by recreating the sudden depth change in the region of ice shelf front. Initial experiments used a 1.1m diameter rotating table with later experiments conducted on the 13m diameter LEGI-Coriolis platform. The aim of this study is to determine whether eddy activity impedes the flow of water down slope and if there is penetration of any eddy-like flow in to the sub-ice-shelf cavity.

In the experiments, eddies are generated in upper layer of fluid near the source and propagate along the slope towards the ice shelf. Upon meeting the ice shelf the eddies are distorted only penetrating a short distance into the cavity and propagating up and/or down slope along the ice shelf front. The dense fluid is moved up and down slope with the eddies. It is concluded that the ice shelf can block the penetration of eddies into the FRIS cavity and this blocking can also be affected by the stratification.