

OBSERVING THE ICE PUMP UNDER THE AMERY ICE SHELF?

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Oceanographic and seismic observations of the ocean beneath the Amery Ice Shelf, taken over several seasons, describe a general pattern consistent with an “ice pump” mechanism. The ice pump is a general description of the thermohaline circulation under ice shelves. Water at the surface freezing point (such as High Salinity Shelf Water) descends into the cavity and, due to the increase in pressure, can melt the ice shelf becoming cooler and fresher. The water, now Ice Shelf Water (ISW), flows out of the cavity rising along the underside of the ice shelf and can become supercooled in-situ. Frazil ice can then form in the water column and ISW can refreeze to the base of the ice shelf forming marine ice.

Current profiles taken at two boreholes during the 05/06 season show a distinct change in characteristics about 20-50 m beneath the Amery Ice Shelf. These observations are compared to data from seismic reflection studies done nearby. The seismic data show a unique reflection originating from the water column beneath the ice shelf. Borehole conductivity, temperature and depth data indicates a sharp vertical density interface is responsible for the reflection; likely a pycnocline or particulates at the interface, such as frazil ice crystals, or both.