

Pathways of Petermann Glacier meltwater, Greenland

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Radar and satellite observations suggest that the floating ice shelf of Petermann Glacier loses up to 80% of its mass through basal melting, caused by the intrusion of warm Atlantic Water into the fjord and under the ice shelf. The fate of Petermann's glacial meltwater is still largely unknown. It is investigated here, using hydrographic observations collected during a research cruise on board I/B Oden in August 2015. Two methods are used to detect the meltwater from Petermann: a mathematical one that provides the concentration of ice shelf meltwater, and a geometrical one to distinguish the meltwater from Petermann and the meltwater from other ice shelves. The meltwater from Petermann mostly circulates on the north side of the fjord. At the sill, 0.5 mSv of meltwater leave the fjord, mostly on the northeastern side between 100 and 350 m depth, but also in the central channel, albeit with a lesser concentration. Meltwater from Petermann is found in all the casts in Hall Basin, notably north of the sill by Greenland coast. The geometrical method reveals that the casts closest to the Canadian side mostly contain meltwater from other, unidentified glaciers. As Atlantic Water warms up, it is key to monitor Greenland melting glaciers and track their meltwater to properly assess their impact on the ocean circulation and sea level rise.