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**Laboratory experiments investigating the influence of subglacial discharge on submarine melting of Greenland's Glaciers**[1] CLAUDIA CENEDESE, Woods Hole Oceanographic Institution — A set of idealized laboratory experiments investigates the ice-ocean boundary dynamics near a vertical "glacier" (i.e. no floating ice tongue) in a two-layer stratified fluid, similar to Sermilik Fjord where Helheim Glacier terminates. In summer, the discharge of surface runoff at the base of the glacier (subglacial discharge) causes the circulation near the glacier to be much more vigorous and is associated with a larger melt rate than in winter. In the laboratory the effect of a subglacial discharge is simulated by introducing fresh water at melting temperatures from a source at the base of the ice block representing the glacier. The influence of both a line and a point source of subglacial discharge on submarine melting are investigated. A buoyant plume of cold melt water and subglacial discharge water entrains ambient waters and rises vertically until it finds either the interface between the two layers or the free surface. The results suggest that the melt water deposits within the interior of the water column and not entirely at the free surface, as confirmed by field observations and numerical experiments. Furthermore, the submarine melting increases with subglacial discharge. Finally, a non-monotonic dependence of the submarine melting on the distance between two point sources of subglacial discharge suggests that the distribution and number of sources of subglacial discharge may play an important role in glacial melt rates.

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Claudia Cenedese
Woods Hole Oceanographic Institution

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