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Abstract for an Invited Paper
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The Dynamics of Greenland's Glacial Fjords and Their Role in Climate.¹

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Rapid mass loss from the Greenland Ice Sheet has sparked interest in its glacial fjords for two main reasons: Increased submarine melting of glaciers terminating in fjords is a plausible trigger for glacier retreat, and the anomalous freshwater discharged from Greenland is transformed by fjord processes before being released into the large-scale ocean. Knowledge of the fjords' dynamics is thus key to understanding ice sheet variability and its impact on climate. Major gaps in understanding include the interaction of the buoyancy-driven circulation (forced by the glacier) and shelf-driven circulation, and the dynamics in the near-ice zone. These must be addressed before appropriate forcing conditions can be supplied to ice sheet and ocean/climate models. Idealized laboratory experiments have been conducted to investigate the leading order dynamics that control submarine melting and the meltwater export near a vertical ice/ocean interface as a function of ambient properties and stratification, subglacial discharge characteristics and fjord topography, in particular the presence and height of a sill.

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