



## High-latitude oceanography using the Autosub autonomous underwater vehicle

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**ABSTRACT:** A combination of measurements from Autosub, an autonomous underwater vehicle, and ship-based instruments are used to describe the oceanographic conditions beneath Fimbul Ice Shelf, Antarctica. The data show an intricate oceanographic regime that is suggestive of variability at seasonal or longer time scales. Results from a numerical model of the flow beneath the ice shelf lend support to a strong seasonal variability, and data from instruments moored beneath the ice shelf show substantial temporal variations. The Autosub data indicate temperatures within the cavity somewhat lower than our model results would suggest; thus, our modeled melt rates (average of 0.85 m yr<sup>-1</sup>) might be overestimates, although they are substantially lower than from previously published model studies (4.9 and 1.9 m yr<sup>-1</sup>). The contribution of ice shelf melt in the freshwater balance of the waters upstream of the climatically important Filchner-Ronne Ice Shelf needs to be reassessed.

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