



Oceanography of a tidally choked fjord: Lake Melville, Labrador

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Lake Melville is large and complex sub-Arctic fjord that is a major outlet for freshwater on the Labrador coast. Although it has been the subject of exploration for centuries, we still know relatively little about its oceanography. We are studying the influence of changes in the fresh water discharge on the dynamics and ecosystem of Lake Melville in Labrador and how they interact with long-term climatic variability. Enormous hydroelectric developments have changed the freshwater runoff dynamics with unknown implications for the local and regional oceanography.

The fjord is tidally choked, leading to intense flows at the entrance of 3-4 m/s. We will review the role of mixing and seasonal cycles in determining water properties in the lake and how changing climatic and freshwater conditions influence the oceanography and sea-ice dynamics. We will present historical data for the Lake together with results from our recent oceanographic work. We will compare our current measurements with results of a high resolution, variable element, coupled ocean-ice model for the Lake. The long-term exchange between the Labrador Sea and Lake Melville will be studied with this high-resolution ocean model. The implications of interannual ocean and atmospheric variability on the Lake ocean ecosystem will be discussed.