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Saguenay fjord entrance whale feeding ground: Acoustic study of sill dynamics and tidal aggregation of forage fish

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The Saguenay fjord entrance in the St. Lawrence Estuary at Tadoussac is a world famous site where beluga and minke whales can be regularly observed from the coast. Strong tidal upwelling over the shallow sill of the fjord controls the exchanges with the St. Lawrence. In May 2005, an intensive oceanographic and acoustic survey was conducted to understand how the complex 3D hydrodynamics may contribute to concentrating whale preys. High time-space resolution acoustics (38 and 120 kHz split-beam), ADCP (acoustic Doppler current profilers), CTD profiles, plankton and micronekton sampling were used to track the 3D movements of water masses, zooplankton and forage fish. During flood, the dense cold waters that jump over the sill block the Saguenay outflow and subduct into the fjord with their fish and zooplankton content. This complex 3D circulation generates fronts and convergence zones where biomass is concentrating until current reversal occurs during ebb. These concentrations are then advected and dispersed downstream over the sill with the Saguenay surface plume. This whale prey tidal concentrating process depends on the existence of sufficient forage fish densities in the mesoscale neighbourhood. It is likely at the basis of the persistent high frequentation of this area by whales.