



Air-water exchange and vertical profiles of organic carbon in a subarctic fjord

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ABSTRACT: In this article, we examine the air-sea exchange of exchangeable organic carbon (OC) as well as the internal pools and sources within a subarctic fjord. Air-water fluxes of OC ranged from an uptake of 22 ± 10 mmol C m⁻² d⁻¹ in winter to a release of 2 ± 8 mmol C m⁻² d⁻¹ in the fall, sizable compared to that of CO₂ (average uptake of 136 mmol C m⁻² d⁻¹ for the fall and 2.6 ± 0.84 mmol C m⁻² d⁻¹ in the winter). The water column profiles of exchangeable dissolved organic carbon (EDOC) followed closely those of dissolved organic carbon (DOC), and EDOC represented, on average, about one-third of DOC. The dynamic characteristic and active cycling of EDOC was evidenced by incubation experiments performed on each fjord compartment (sediment, water column, macroalgae) where sediments and macroalgae were found to be substantial sources and the water column acted as a strong sink of EDOC.

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