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GHG Emissions from Boreal Reservoirs and Natural Aquatic Ecosystems

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Chapter

Abstract

Carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) gross fluxes were measured at the air-water interface of 205 aquatic ecosystems in the Canadian boreal region from 1993 to 2003. Fluxes were obtained with a floating chamber connected to an automated NDIR or a FTIR instrument. The results show a temporary increase in CO_2 and CH_4 fluxes, followed by a gradual return to values comparable to those observed in natural aquatic ecosystems (lakes, rivers and estuaries). Mean values for CO_2 and CH_4 measured in Québec's reservoirs older than 10 years were 1508±1771 mg $CO_2 \cdot m^{-2} \cdot d^{-1}$ and 8.8±12 mg $CH_4 \cdot m^{-2} \cdot d^{-1}$. Our results showed a strong similarity between lakes, rivers, and old reservoirs across a 5000 km transect from the west coast to the east cost of Canada. These values are comparable to those observed in Finland or in the sub-tropical semi-arid western USA. Although several limnological parameters can influence these fluxes, none showed a statistical relationship. However, levels of CO_2 or CH_4 fluxes are influenced by pH, wind speed, depth at sampling stations and latitude.

Preview

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