



Seasonal variability of dissolved inorganic carbon and surface water pCO₂ in the Scotian Shelf region of the Northwestern Atlantic

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The seasonal variability of inorganic carbon in the surface waters of the Scotian Shelf region of the Canadian northwestern Atlantic Ocean is investigated. Seasonal variability is assessed using hourly measurements covering a full annual cycle of the partial pressure of CO₂, (pCO₂), and hydrographic variables obtained by an autonomous moored instrument. These measurements are complimented by frequent shipboard sampling of dissolved inorganic carbon (DIC), total alkalinity (TA), and pCO₂, at the mooring site, and over the larger spatial scale. Biological processes, temperature, and advection are found to be the main factors controlling inorganic carbon in the surface waters and mixed layer. The air-sea fluxes of CO₂ are estimated; the region acts as a net source of CO₂ to the atmosphere on the annual scale, with a reversal of this process occurring only during the spring bloom, when a rapid undersaturation of the surface waters is reached for a short period. Annual mixed layer net community production is also assessed.