



Seasonal, diel, and tidal CO₂ variation in the Bay of Fundy

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Anthropogenic CO₂ emissions acidify the oceans and have potentially adverse effects for ecosystems, living marine resources, and the fisheries and mariculture industries that depend on them. Assessing the vulnerability of these resources to ocean acidification requires a detailed understanding of both the system's natural variability and its response to the ocean's uptake of anthropogenic CO₂. A cabled-to-shore observatory was installed in Grand Passage, a tidal channel in the Bay of Fundy, Nova Scotia. Measurements from a CO₂ sensor, CTD, and ADCP provide year-long time series of pCO₂, temperature, salinity, and currents. The dominant seasonal cycle of pCO₂ indicates a spring bloom in April and May, and net respiration from November through March. This seasonal cycle is modulated by a large diel cycle in summertime, and by equal contributions from diel and tidal variation in winter. The oceanic CO₂ partial pressure (pCO₂) is higher than the atmospheric pCO₂ for most of the year, indicating an annual average balance between respiration and outgassing at this site. Further analysis aims to link observations in this tidal channel to the larger Bay of Fundy - Gulf of Maine carbon system.