Time series of the partial pressure of carbon dioxide (2001-2004) and preliminary inorganic carbon budget in the Scheldt plume (Belgian coastal waters)

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A four-year time series (2001-2004) of the partial pressure of CO2 (pCO2) and air-sea CO2 fluxes is reported in the Scheldt estuarine plume. This system is oversaturated in CO2 with respect to the atmosphere, except during the spring phytoplanktonic bloom, and acts as a net source of CO2 to the atmosphere of 0.7 mol C m-2 yr-1 that represents 7 to 27% of the inner Scheldt estuary CO2 emission. Results also highlight that a high spatial and temporal coverage of the surface pCO2 in coastal ecosystems is crucial for reliable estimations of air-sea CO2 fluxes. The seasonal variations of pCO2 seem to be more dominated by biological activities (photosynthesis/respiration) than by temperature change. Based on a preliminary dissolved inorganic carbon input/output budget, the annual emission of CO2 towards the atmosphere seems to be largely due to the outgassing of the inputs of CO2 from the inner Scheldt estuary, rather than due to organic carbon degradation.