



Seasonal inorganic carbon dynamic in two coastal systems in Cadiz Bay: CO₂ emissions estimation

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Seasonal variations of partial pressure of CO₂ (pCO₂) have been estimated in two coastal systems in Cadiz Bay (Rio San Pedro Creek and Sancti Petri Channel). Chlorophyll, nutrients, dissolved oxygen and total organic matter were analyzed as additional parameters.

Rio San Pedro Creek is essentially a marine system since it is tidally controlled. The area receives long amount of organic matter from several fish farms distributed on its banks discharging effluents without previous treatment. Nine sampling stations are distributed along this system 12 Km length. Sancti Petri Channel is a flow channel-ebb tides extending from the inner Cadiz Bay to the Atlantic Ocean along 17 Km, where it has been established 11 sampling stations. There exist different organic matter inputs from aquaculture effluents and sewage discharges coming through the Iro River, which flows into the Channel central part. In addition there are natural organic matter inputs from surrounding marshes.

pCO₂ vary widely between 410 and 1272 μatm along the year 2013. Gas concentration increase toward the inner zone of Rio San Pedro Creek, and next to Iro River's mouth in Sancti Petri tidal Channel. Both environments show seasonal variations of CO₂ fluxes with a mean value of 6.8 mmol m⁻² d⁻¹. Therefore, the aquatic systems act as CO₂ sources into the atmosphere. The contribution of dissolved organic compounds on the total alkalinity (TA) and the dissolved inorganic carbon (DIC) have been investigated in the two coastal zones. Typical variation range for this contribution has been found between 100 and 300 μM for both systems. The studied variables are affected by several organic matter inputs, such as sewage, drainage of marshes or fish farms.