Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07904, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07904
EGU General Assembly 2008

Variability of CO_2 parameters along tidal cycles in Tagus estuary

A.P. Oliveira, S. Costa and G. Cabeçadas

Instituto Nacional de Recursos Biológicos (INRB-IPIMAR), Avenida de Brasília, 1449-006, Lisboa, Portugal (aoliveira@ipimar.pt)

In an attempt to assess CO_2 parameters variability along tidal cycles in estuarine waters, sampling was carried out at surface, every hour for 13 h, covering neap and spring tides, in Winter (13 and 22 February 2007) and Spring (17 and 24 April 2007) periods, in a fixed station in Tagus estuary. The following parameters have been measured: salinity (S), temperature (T), dissolved oxygen (DO), chlorophyll a (Chl a), pH, CO_2 partial pressure (pCO_2), total alkalinity (TA) and dissolved inorganic carbon (DIC).

It was found out that higher values of salinity were always reached at spring tides and higher temperatures attained at neap tides. Chl $a$values were, in general, higher at ebb tide but quite low in Winter (0.9 - 1.0 mg m^{-3}) and definitely higher in Spring (up to 10 mg m^{-3}) at spring tides. From examination of data general patterns of variability of CO_2 parameters emerged: pH, TA and DIC values decrease at ebb and increase along flood, reflecting sea water influence besides photosynthesis effects. pCO_2 pattern of variability was not so well defined: while during spring tides higher values were reached at ebb and a decrease was observed at flood, following the opposite trend of pH, along neap tides, lower values were displayed at ebb and increased at flood.

In addition, application of multivariate analyses (PCA) to all the data set helped to achieve the pattern of variability: a sharp difference is established between the productive and non-productive period and at neap and spring conditions during the productive period. Simultaneously, ebb and flood came out well individualized at spring tides for that period.

Results lead to the conclusion that tidal influence as well as photosynthesis are nearly

negligible factors/mechanisms on the variability of CO_2 parameters in Winter, when river flow is intense. Contrasting with this situation, tidal impact and biological productivity are significant factors on regulation of distributions and concentrations of estuarine CO_2 properties during Spring due, to a large extent, to the reduced river discharge.