



Seasonal variability of carbon dioxide and methane in the rivers and lagoons of Ivory Coast (West Africa)

Y.J.M. Koné (1), G. Abril (2), B. Delille (1,2), and A.V. Borges (1)

(1) Chemical Oceanography Unit, University of Liège, Liège, Belgium (alberto.borges@ulg.ac.be, +32-(0)4-3663367), (2) Environnement et Paléoenvironnements OCéaniques, Université Bordeaux 1, France

We report a data-set of carbon dioxide (CO₂) and dissolved methane (CH₄) in three rivers (Bia, Tanoé and Comoé) and five lagoons (Tendo, Aby, Ebrié, Potou and Grand-Lahou) of Ivory Coast (West Africa), during the four main climatic seasons (high dry season, high rainy season, low dry season and low rainy season). The surface waters of the three rivers were oversaturated in CO₂ and CH₄ with respect to atmospheric equilibrium, the seasonal variability of CO₂ and CH₄ seemed to be largely controlled by dilution during the flooding period. The strong correlation of CH₄ concentrations with the partial pressure of CO₂ (pCO₂) confirm the dominance of a continental sources (from soils) for both CO₂ and CH₄ in these rivers. The largest CH₄ over-saturations and diffusive air-water CH₄ fluxes were observed in the Tendo and Aby lagoons that are permanently stratified systems (unlike the other 3 lagoons), leading to anoxic bottom waters favorable for a large CH₄ production. In addition, these two stratified lagoons showed low pCO₂ values due to high primary production, which suggests an efficient transfer of organic matter across the pycnocline. As a result, the stratified Tendo and Aby lagoons were respectively, a low source of CO₂ to the atmosphere and a sink of atmospheric CO₂ while the other 3 well-mixed lagoons were strong sources of CO₂ to the atmosphere but lower sources of CH₄ to the atmosphere.