



Seasonal variability of CO₂ fluxes in the tropical lagoons of Ivory Coast

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The seasonal variability of partial pressure of CO₂ (pCO₂) was investigated during four seasons in five lagoons in Ivory Coast (West Africa). The Potou, Ebrié and Grand-Lahou lagoons were oversaturated in CO₂ with respect to the atmosphere during all seasons in agreement with the low chlorophyll *a* concentrations suggesting the dominance of heterotrophic processes. These lagoons seem to behave as oligohaline estuarine regions that typically are CO₂ sources to the atmosphere due to strong heterotrophic activity and inputs of riverine CO₂ enriched waters. Their average air-water pCO₂ gradient ranged from 432 to 4756 ppm and the annual CO₂ emissions to the atmosphere varied from 20.5 to 23.8 mol C m⁻² yr⁻¹. In contrast, the Aby lagoon was undersaturated in CO₂ with respect to the atmosphere because of its strong permanent stratification with higher phytoplankton production and low freshwater inputs. Its annual CO₂ invasion was -5.1 mol C m⁻² yr⁻¹. The Tendo lagoon was characterized by a seasonal shift between sink and source of CO₂ depending on the fresh water discharge from Tanoé river. Annually it was a modest CO₂ source to the atmosphere of about 2.4 mol C m⁻² yr⁻¹. Overall, the five studied lagoons in Ivory Coast emit 14.0 mol C m⁻² yr⁻¹. They are moderate CO₂ sources to the atmosphere in comparison to estuaries, mangrove and salt marsh ecosystems.