

O26.8**Seasonal and spatial variability of CO₂ emissions in a large tropical mangrove-dominated delta**

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Abstract

Tropical estuarine systems are a key component in the transport of carbon to the open ocean and important sources of CO₂ to the atmosphere. However, many large tropical estuaries are still unaccounted for regarding their carbon dynamics and CO₂ fluxes. In this study, we aimed to understand the seasonal and spatial variability of CO₂ fluxes in the Parnaíba River Delta, the largest delta in the Americas. This delta is a pristine environment dominated by mangrove forests located in a climatic transitional coast, with marked seasonality in rainfall and river discharge. Four major channels and bays of the Parnaíba delta were sampled during dry and wet seasons. Continuous measurements of pCO₂, temperature, salinity, and wind velocity were taken, while subsurface water samples were collected in discrete stations to analyze for pH, total alkalinity, dissolved oxygen and chlorophyll-a. The seasonal variability of pCO₂ is mostly related to rainfall and river discharge, with important contribution of riverine CO₂ in both seasons. Significant correlation between carbonate system parameters and salinity was found in both periods, with average salinity significantly higher during the dry one. The ecosystem showed high spatial variability of pCO₂, with highest values in mangrove-dominated waters, moderate values in the freshwaters and lowest values in the coastal bays. These differences, together with the spatial changes of the variables sampled indicate that the pCO₂ variability is likely controlled by a combination of river and ocean water mixing, respiration, and primary production, in both seasons. Averaged fluxes per area gave the dry season fluxes significantly lower ($56.92 \pm 2.66 \text{ mmol.m}^{-2}.\text{d}^{-1}$) than during the rainy season ($111.07 \pm 56.34 \text{ mmol.m}^{-2}.\text{d}^{-1}$), indicating that the season variability of fluxes is important in the estimation of annual contribution of CO₂ by this type of systems. We acknowledge CNPq for the financial support (Grant n° 405.244/2018-5).

Keywords: CO₂; Estuaries; Mangroves; Season.

Keywords

CO₂, Estuaries, Mangrove, Season