

# ORGANIC MATTER CHARACTERIZATION OF SURFACE SEDIMENTS IN PARNAÍBA RIVER DELTA, BRAZIL EQUATORIAL

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The Parnaíba River Delta (PRD) in Brazil is an important Environmental Protection Area located in the climate transition of humid Amazonian and the dry semi-arid with a diverse environment that includes estuaries, bays, and dunes. The area also contains the third-largest mangrove forest in the world, representing 7% of the total. This study aimed to characterize and identify the organic matter (OM) sources in the surface sediments of the PRD. In December 2019, surface sediment sampling was conducted at 11 stations using a carbon steel dredge (Fig.1). The samples were dried and powdered to determinate grain size, percentage of carbon (%C) and nitrogen (%N) contents. In addition, humic substances were extracted from the sediment using a 0.01M solution of NaOH for subsequent analysis via fluorescence spectrophotometry. The grain size analysis revealed spatial variations that reflect the diverse hydrodynamic systems present in the environment. Stations located in the main river were mainly composed of sand fraction, while stations P04 and P07 had high amount of fine grain-sized fractions (silt and clay). In general, 50% of the stations exhibited N ranging from 0.1 to 0.3%, and 60% of stations demonstrated values for C varying from 1.0 to 3.5%. The C/N ratio indicated values ranging from 13.5 to 19.8, which correspond to C3 terrestrial plants, like mangrove trees composed of lignin and cellulose and low in N, except for stations in the main river with no fine grain-sized fractions. The fluorescence analysis identified three components (Comp.1, Comp.2, and Comp.3) composing humic and protein substances. Comp.1 consisted of terrestrial humic-like (peak A) from allochthonous sources, collaborating with C/N ratios. Comp.2 corresponded to autochthonous sources of tryptophan-like (peak T) related to aromatic protein structures generated by microbial degradation. Comp.3 was composed of a mixture of allochthonous and autochthonous sources of terrestrial humic-like with tryptophan-like (peak C + T). Therefore, the results suggest that the OM in the PRD's sediments is primarily from the degradation of the mangrove forest in the area, further studies are required to better understand the transport, fate, and age of the OM geochemistry in this tropical estuarine environment.

