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Use of phytoplankton assemblages to assess the quality of coastal waters of a transitional ecosystem: Río de la Plata estuary

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ABSTRACT

Among the estuarine ecosystems under anthropogenic stress, the Río de la Plata represents a case study to identify phytoplanktonic species capable of diagnosing and warning about water quality changes. This water source is used for several purposes, including recreational and navigational activities and the provision of drinking water. We analyzed the relationship between the abundance of the phytoplanktonic species and changes in water quality (linked to enrichment with nutrients and organic matter) and the land use on the coast. The canonical correlation analysis (CCA) allowed us to identify two environmental gradients, one of anthropogenic origin, where the most influential factors were BOD_5, DIN, PO_4^{3-} and DO, and a second gradient conformed by turbidity and conductivity. The relative abundances of 24 species obtained a significant correlation with the deterioration of the water quality. This set of tolerant species is mostly composed of taxa considered C-strategists and the most represented group was the Chlorococcalean algae. The percentage of this group allowed us to have an early warning indicator capable of detecting the