
Evaluation of the remineralization rates of nutrients in sediments in a hypersaline lagoon

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Abstract

A solution often proposed to minimize the effects of pollution in coastal lagoons is the construction of artificial bar opening between the lagoon and the sea, increasing the water exchange rate and diluting the contamination. However, the contact between the sediment and water of low concentrations can cause intense remineralization of nutrients given by the increased gradient. The aim of this study was to evaluate the rates of diffusion of nutrients from the sediments to the water column in different salinities. Sediments collected in two sampling points of Araruama Lagoon were placed in 10 experimental sets. Water samples from the lagoon, sea water and proportionally mixed were added, simulating gradient of salinity. The physical-chemical parameters were measured daily in the morning and afternoon. Water samples were collected from each tank, between January 12st and January 21st, 2016 at regular intervals. The pH values indicate reduction in alkalinity (≈ 7.8) by plunging the sediment. The concentrations of oxygen (range from 3.22 to 7.52mg L⁻¹) show that no anoxia evolved. The concentrations of chlorophyll α (range from 0.257 to 12.11 fluorescence units) remained low, indicating the absence of primary production that could modify the concentrations of nutrients in the water during experiment. The redox potential (range from - 57 to 296.5 mV), was reducing in the beginning of the experiment. Ammonium concentrations (range from 0.016 to 0.4535mg L⁻¹), nitrite (range from 0.022 to 0.622mg L⁻¹), nitrate (range from 0.014 to 0.09mg L⁻¹) and phosphate (range from 0.01 to 0.682mg L⁻¹) dissolved in the water were low. The experiments did not show a rapid release of nutrients into the water column. It is suggested that longer-term experiments, because the release of nutrients can intensify with time and processes can then be distinguished.

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