

عنوان مقاله:

In situ yields in primary productivity of sand mine ponds of the Otamiri River in a southeastern city of Nigeria

محل انتشار:

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خلاصه مقاله:

In situ yields in primary productivity of sand mine ponds of the Otamiri River in Owerri, southeastern Nigeria was investigated during the wet and dry seasons of 2012/2013. Eighteen sampling points designated as WC 1-WC 18 and located within 9 artificial ponds where active sand mining was ongoing and 9 ponds where it had ceased were studied. In situ measurements were made for surface water temperature, dissolved oxygen (DO), pH, conductivity, salinity and total dissolved solids (TDS) using standard methods. Measurements were also made of other physicochemical variables. The single factor ANOVA, means plots, Principal Components Analysis (PCA), Pearson correlation (r) and student's t-test were used to analyse data. Gross and net primary productivity (GPP & NPP) as well as community respiration (CR) varied as follows: 0.1800-0.6550 (0.3121 ± 0.0377), 0.1013-0.6000 (0.2761 ± 0.0382) and 0.0100- 0.0810 (0.03363 ± 0.0055) mgCL⁻¹d⁻¹ respectively. There was significant spatial heterogeneity in mean variance of primary productivity [$F(169.80) > F_{crit}(3.93)$] at $P < 0.05$, with the actively sand mined pond showing higher productivity, accompanied with high nutrients (PO₄²⁻, NO₃⁻, SO₄²⁻) concentrations and slightly higher turbidities than the non-mined pond. Productivities also differed markedly (Sig. t=0.000) between the seasons, with higher dry than wet season yields. The first four PCs formed the extraction solution in the original 16 physicochemical parameters measured with a cumulative 95% variability contribution. The components had high loadings for the nutrients and turbidity factors. GPP correlated with PO₄²⁻ ($r=0.976$), NO₃⁻ ($r=0.955$) and turbidity ($r=-0.946$) at $P < 0.01$. Active sand mining appeared to enhance primary productivity in the mine pond through re-suspension and elevation of growth nutrients in water column, even as this was associated with slightly increasing turbidities

کلمات کلیدی:

Primary productivity , Community respiration , Sand mining , Mine ponds , Photosynthesis

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