

EGU21-6987

<https://doi.org/10.5194/egusphere-egu21-6987>

EGU General Assembly 2021

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## Use of nitrogen as a tool for the study of the trophic state of vulnerable coastal ecosystems

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Concentration and flux of nitrogen in mangrove wetlands and coral reefs are modified by chemical and hydrodynamic mechanisms determined by natural and anthropic factors. Nearby anthropic activities impact ecosystems making them vulnerable, mainly due to nutrient flow increase which modifies biogeochemical cycles and trophic dynamics. Here, spatial-temporal variability of N in three tropical coastal ecosystems under different levels of anthropic pressure were studied; 1) trophic dynamics of mangroves in the Colombian Pacific using stable isotopes ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ); 2) quantification of  $\delta^{15}\text{N}$  in octocorals from the northwestern region of Cuba as an indicator of wastewater pollution, and 3) determination of the trophic status of coastal and continental sites in the Mexican Caribbean using Karidy's index and CE-CCA-001-89. In the mangrove food web, a value of 5 ‰ for  $\delta^{15}\text{N}$  was found, principally in systems with modified trophic structures close to tourist and urban centers. In octocorals,  $\delta^{15}\text{N}$  was significantly higher in reefs close to polluted river basins, evidencing a positive and significant correlation with the concentration of fecal and total coliforms, fecal streptococci, heterotrophic and sulfate-reducing bacteria. The nutrients analyzed in the Mexican Caribbean, exceeded the permissible limit for the protection of marine life, with Karidy's index suggesting in some sites concentrations of nitrates in a mesotrophic and eutrophic state, principally during the months of highest tourist influx. The results confirm the effect and vulnerability of these ecosystems towards anthropic N, which could result in a reduction of ecosystem services and diversity.