SOIL PHOSPHORUS FORMS IN TREE ISLAND ECOSYSTEMS OF THE CENTRAL AND SOUTHERN EVERGLADES

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Abstract:

The soil P pool is composed of organic and inorganic forms, which are cycled through physical processes, chemical reactions and biological function of flora and fauna. Tree island ecosystems in the Florida Everglades offer a unique opportunity to study mechanisms controlling soil P dynamics through characterization of the forms of soil P. The Everglades is considered to be a historically P limited ecosystem, however high soil P concentrations (e.g. >10,000 mg kg^{-1}) have been reported in some Everglades tree islands. Recent literature has suggested tree islands may play an important role in soil nutrient distribution dynamics in the landscape as P sinks, however little data is available regarding the specific forms of P present in tree island soil. Surface soil (0-10 cm) from tree islands (n=21) in the Central and Southern Everglades was sequentially extracted to quantify the proportions of different forms of soil P. Calcium-/magnesium-bound P accounts for 87±5.4% of the total P. A subset of samples were analyzed using x-ray diffraction and preliminary results suggested deposition, or in-situ formation, of hydroxyapatite. The high proportion of inorganic P observed in tree island soil coupled with presence of a P mineral suggests these unique ecosystems may accumulate P through biological mechanisms and serve as discrete sources for P within the Everglades.