

Variation in sediment nutrient concentrations in an urban-mangrove ecosystem, Piñones, Puerto Rico

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Goal

- Determine the variation in sediment nutrients and soil properties downcore at two mangrove sites:
 - Site 1** closer to coast, dominated by red mangrove, *Rhizophora mangle*
 - Site 2** farther inland, dominated by black mangrove, *Avicennia germinans*

Site Description

- Average air temperature: 23.9° C.
- This forest is on the northern side of the island, adjacent to the airport, built in the 1950's.
- Located in the Rio Loíza watershed

Site 1 (red mangrove)- distance to coast 223meters. Salinity=40.4ppt..

Site 2 (black mangrove)- distance to coast 409 meters. Salinity=21.9ppt.



Figure 1. Locations of core samples.

Research Methodology

- Collect mangrove peat in 50cm cores on the sites.
- Tests for loss on ignition (LOI) to estimate the percent of organic matter.
- The samples were analyzed for carbon, and nitrogen by a CHN analyzer.
- Colorimetric analysis was used for phosphorous analysis.
- Dry and weigh samples for dry bulk density (DBD).
- Lead 210 is being done at USF, J. Smoak laboratory.



Figure 2. Cores are being processed, samples are being prepared in sub-samples and being homogenized(left images). Collecting cores at the mangrove forest (bottom right).



Results

- Site 1** had high percent LOI throughout the core compared to **Site 2**, while both cores had high DBD.
- Clay and mud observed throughout the cores is consistent with low LOI and hi DBD.
- This suggests that sediments coming in to the mangrove forest from upland.
- Site 1** had higher nutrient concentrations and greater variability at depths 15-35cm.
- The results of high nutrient on **Site1** reflects the impact of urbanization, agriculture and land use on the site.

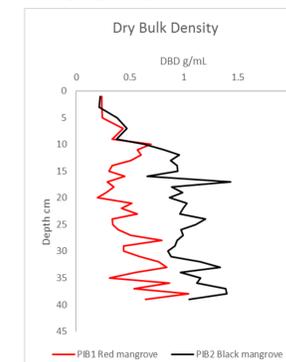


Figure 3. DBD throughout the depth of the core for PIB1 and PIB2 (left image).

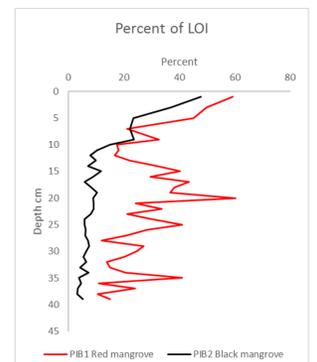


Figure 4. Percent of LOI throughout the depth of the cores(right image).

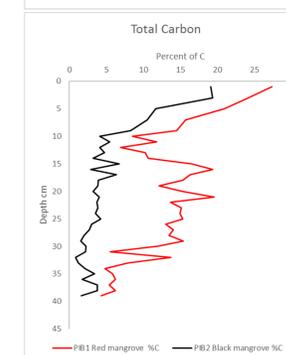


Figure 5. Total percent of carbon throughout the depth of the core.

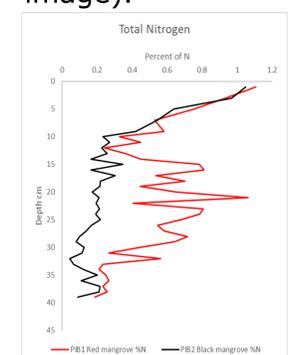


Figure 6. Total percent of nitrogen throughout the depth of the core.

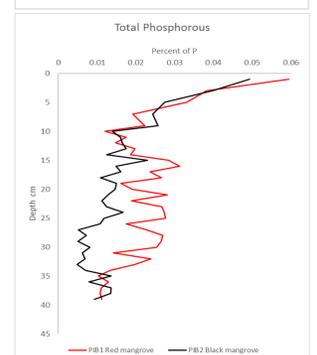


Figure 7. Total phosphorous throughout the depth of the cores.

