Sediment accumulation rates of organic matter, nutrients, and trace metals vary across mangrove forests on the island of Puerto Rico

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**Objective:** To assess the capacity of mangrove forests to accrete sediments and sequester nutrients and metals across climatic, physiographic, and land-use gradients on the island of Puerto Rico over the past ~100 years of sea level rise (SLR)

1. Study Sites
We selected core sites in 3 basin mangrove forests in Puerto Rico, located across a gradient of low to high rainfall (mm yr-1) and varying physiography and surrounding land-use histories. Locations of cores and tide gauges are marked with orange dots and stars, respectively.

2. Methods
For this pilot study, we collected a single 40-cm deep core from each basin mangrove forest in June 2017. 1-cm sections (2-cm for top 10 cm) were analyzed for % organic matter (OM) from LOI, inorganic & organic carbon (IC & OC), nitrogen (N), phosphorus (P), & dry bulk density (DBD). 210Pb isotopic dating generated sediment accumulation rates (mm yr-1). Trace metal analysis was conducted on every third interval using inductively coupled plasma mass spectrometry (ICP-MS).

3. Results: Sediment accretion rates keep pace with SLR at Punta Pitahaya, but not at Jobos Bay.

4. Results: Mass accumulation rates are driven by IM at Pinoñes and are generally 2-4x that of the other sites, which are dominated by OM. Peaks are associated with tropical cyclone activity or possible upslope erosion events.

5. Results: Trace metal accumulation rates are comparatively low for Jobos Bay. Peaks in some metals are associated with higher IM inputs (see Box 4). Increase in accumulation rates for As, Cu, Ni, and Zn occur in the last couple decades for Punta Pitahaya and perhaps Jobos Bay.

6. Results & Discussion:
Low sediment accretion rates compared to SLR could be explained by declines in forest cover at Jobos Bay (right). Increases in P (N:P) are likely attributable to the history of intensive agriculture upslope at Jobos Bay (below).