

Motivation

• Soil organic carbon (SOC) is the largest terrestrial carbon stock and an important component of the global carbon cycle. Converting land from forest to pasture may alter the amount of C stored in soils, but the direction and magnitude of change is not consistent across studies. Different responses are likely due to the importance of factors other than land use, primarily soil properties. Our study addresses uncertainties in predictions of land-use effects on SOC to identify environmental predictors of SOC content at the regional scale.

Research Questions

- How much SOC is stored in pastures and forests across different soils in Puerto Rico?
- How much SOC is stored in Mollisols, Oxisols, and Inceptisols in **Puerto Rico?**
- Do soil properties influence how SOC responds to land-use change?

Methods





- Soils were collected from 25 forest and pasture sites on three regionally important soil orders (Oxisols, Mollisols and Inceptisols).
- At each site 5 pits were dug down to 1 m and soil was collected by horizon.
- Total soil C and organic C percentages were determined on an elemental analyzer, and C stocks to 30 cm depth were calculated using bulk density measurements.
- Differences between treatments were analyzed using one- and two-way ANOVA tests.

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Effects of land use and soil order on soil carbon storage in Puerto Rico

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Both land use (p = .09) and soil order (p = .039) influenced SOC stocks (Fig. 1). **Forested Mollisols had higher SOC** stocks than either land cover on Oxisols. There was no significant interaction between soil order and land use on SOC stocks to 30 cm.

Mollisols had greater SOC stocks than Oxisols when averaged across all land use classes (Fig. 2; p = .057).

- There was no difference between land use classes when averaged across all soil orders (Fig. 3).



• Determine effects of other soil properties on SOC stocks (e.g., soil texture, pH, and mineralogy).

soil orders.

Results

Next Steps

• Expand analyses to 1 m depths and include other land cover types and











Figure 3. SOC stocks to 30 cm averaged by land use. Error bars represent one standard error.

