Abstract Title:
A regional perspective on the charcoal record of the northeastern Caribbean and the role of humans and climate in driving fire occurrence over the Holocene

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Abstract:
Charcoal preserved in lake sediments is commonly used to reconstruct past trends in fire occurrence. However, interpretation of the charcoal record is often complicated, as changes in charcoal influx could represent natural changes in fire regimes associated with changes in climate, changing patterns of anthropogenic burning, or both. Here we examine sedimentary charcoal records from three lakes on the Caribbean islands of Hispaniola and Puerto Rico: Lake Miragoane in Haiti, Laguna Saladilla in the Dominican Republic, and Laguna Tortuguero in Puerto Rico. All records are based on microscopic charcoal fragments quantified on pollen slides, by ourselves (Saladilla) or other researchers. We compare charcoal influx values to archeological and palynological evidence of human activity, and explore the role of increasing winter insolation over the Holocene in driving increases in charcoal deposition, particularly around 6000-5000 cal yr BP. Taking a regional approach to interpreting these microscopic charcoal records highlights possible intervals of synchronous, climate-driven burning as distinct from more localized anthropogenic burning. We present a new interpretation of the northeastern Caribbean charcoal record that emphasizes regional shifts in climate as a driver of mid-Holocene increases in fire activity. We suggest that a sharp increase in charcoal influx at Laguna Tortuguero at ca. 5200 cal yr BP, previously interpreted as a signal of human settlement on Puerto Rico that predated archaeological evidence, may instead reflect insolation-driven shifts in winter drying that led to more frequent and possibly more intense natural fires.

Keywords:

Microscopic charcoal, fire, Taino, orbital forcing, Hispaniola, Puerto Rico