Title: **Process-Based Model Predictions of Tropical Forest Function Across a Precipitation Gradient in Panama.**

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Project Abstract:
Climate change over the coming century is likely to cause large and diverse impacts on plant available water (PAW) across many areas of the tropics. However, there is considerable uncertainty regarding how diverse tropical forest structure and function will respond to changes in PAW. Therefore, we used the Functionally Assembled Terrestrial Ecosystem Simulator (FATES) to assess how tropical forests may respond to PAW gradients caused by edaphic and precipitation variation. The three sites examined in this study cover a precipitation gradient across the Isthmus of Panama: Parque Nacional San Lorenzo (SLZ: c. 3000 mm yr^{-1}), Barro Colorado Island (BCI: c. 2600 mm yr^{-1}), and Parque Nacional Metropolitano (PNM: c. 1800 mm yr^{-1}). The three sites also differ in soil texture with clay contents of approximately 80%, 70% and 35% for SLZ, BCI, and PNM, respectively. Three different sets of simulations were performed with FATES to examine the effects site-level differences in meteorology and edaphic properties independently and jointly have on model predictions. The first set of three simulations used a common soil texture from BCI and meteorology from each site. The second set of three simulations used a common meteorology from BCI and soil textures from each site. The third set of three simulations used the meteorology and soil texture of each site respectively. Included in this analysis is a characterization of how locally measured precipitation, air temperature, and incoming radiation differs across the three sites. Model results explore how gross primary production (GPP), forest structure and composition, and aboveground biomass vary across the precipitation and edaphic gradients.