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Soil Carbon Storage and Turnover in Tropical Forests Along a Precipitation Gradient in Panama

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Tropical forests account for over 50% of the global terrestrial carbon sink and 29% of global soil carbon, but the stability of carbon in these ecosystems under a changing climate is unknown. Recent work suggests moisture may be more important than temperature in driving soil carbon storage and emissions in the tropics. Here, we explore the role of moisture and soil type in controlling soil carbon storage and turnover at a natural precipitation gradient in Panama where differences in parent material result in different fertility and other soil characteristics. While the three sites included in this study maintain similar mean annual temperature, they range in mean annual precipitation from 1875 to 2850 mm/yr. At each precipitation level (low, medium, high), a high and a low fertility soil were also compared. Surface soils were incubated to determine the size of the “active” carbon pool and the age of heterotrophic respiration. Bulk soil carbon stocks and radiocarbon values were also measured and compared to land model predictions.

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