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Title:

Relationships between Forest Composition and Soil and Hydrological Characteristics in a Tropical Forest in NW Mato Grosso

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Abstract:

Elucidating the factors that contribute to spatial dynamics in forest composition and structure can help inform forest management protocol. In this study we analyzed the soil and landscape controls affecting forest attributes. Transects were established in a 25,000 ha reduced-impact logging concession in the southwestern Amazon Basin. All trees = 10 cm DBH and all lianas = 1 cm DBH were measured, identified and geo-referenced. Soils were sampled every 25 m along transects and landscape position was recorded. High variability exists across the study area in tree and liana biomass ($301 \pm 50 \text{ Mg ha}^{-1}$ and $13 \pm 7 \text{ Mg ha}^{-1}$, respectively) as well as soil chemical and physical properties. Three major forest types differentiated by tree species composition and biomass (*cerrado*, palm and upland *terra firme*) are present. Landscape attributes (slope, topography, drainage class and elevation) were derived from a digital elevation model and compared to transect data. Within the study area, landscape features include gently sloping uplands (the major attribute) dominated by *terra firme* forests, steep ravines, and low-lying seasonally inundated areas typically associated with palm forests. Elevation ranges from 220-310 m a.s.l. with a higher proportion of poorly drained landscape units and low slope classes located in lower elevations which are typically characterized by coarser textured soils. Tree biomass is significantly greater (51 Mg ha^{-1}) in upland positions while liana stem density is higher in lowland positions possibly due to increased frequency of disturbance. Relationships of soil properties to forest attributes will be discussed.

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