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TOPOGRAPHY RELATED HABITAT ASSOCIATIONS OF TREE SPECIES ATTRIBUTES AND CARBON STORAGE IN A TROPICAL FOREST

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Topography is recognized as an important driver in shaping tree assembly community and aboveground biomass in tropical forest. We hypothesized that i) topographic heterogeneity shape structural and taxonomic attributes of tree species and promotes high diversity and ii) high diversity increases the carbon storage in aboveground biomass (AGB) in the Brazilian Atlantic Forest. We measured and compiled data of the maximum height, wood density and dbh (diameter at breast height) of 157 tree species located in two hillsides with 100 subplots (10 x 10 m) to each south (As) and west area (Aw). Topographic variables were measured and calculated for each subplot. Habitat types were classified by multivariate regression tree analyses (MRT) that cluster areas with similar species composition according to the topographic variables. The MRT partitioned the habitats of south area and west area into six and three types respectively, showing that As presents greater topographic heterogeneity in relation to the Aw. We found a significant difference in richness between areas (As = 127 and Aw = 85), due to the effect of topographical heterogeneity, but the structural attributes did not show differences between the areas neither did they have effects on richness. Despite variations in floristic composition, the pattern of carbon storage remained in relation to richness. In each area the topographical drivers determined contrasting changes in the β -diversity between habitat types, maintaining relatively constant α -diversity and carbon storage. Our results suggest that despite the close relationship between richness and diversity, there is a critical point where productivity remains similar across areas regardless of richness variations. Probably this pattern responds to a functional redundancy, where few hyperdominate species have greater relevance in ecosystem functioning. Heterogeneity determines high richness, but not carbon stock, because structural attributes there are not change between areas and habitats.

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