**LiDAR-Based vegetation structure assessment in savanna grasslands**

Savanna vegetation is characterized by the dominant presence of grass and scattered trees forming an open-canopy system. To capture the vertical and horizontal heterogeneity of an open-canopy system with understory grasses I generated the following metrics: 1) Maximum height (zmax) to represent the tallest vegetation per grid cell; 2) 95th percentile height (zq95) as a robust estimate of canopy height; 3) Standard deviation (zsd) to quantify vertical structural complexity; and 4) Point return density as a measure of horizontal vegetation “thickness.” To distinguish different canopy layers given the structure of the Savannas I computed: a) the proportions of returns above 2m (*canopy\_cover\_tall*) capturing tall trees; b) returns greater than 0.2m (*canopy\_cover\_all\_no\_ground*) showing all vegetation excluding ground; c) returns between 0.2m and 1.37m (*low\_veg\_no\_ground*) isolating grasses and shrubs.

The resulting maps reveal a typical savanna pattern, with sparse tall canopy, moderate vertical complexity, and widespread low vegetation, reflecting the expected structure of a savanna grassland ecosystem.

***Example papers that used similar metrics***

Zimbres, B., Shimbo, J., Bustamante, M., Levick, S., Miranda, S., Roitman, I., Silvério, D., Gomes, L., Fagg, C., & Alencar, A. (2020). Savanna vegetation structure in the Brazilian Cerrado allows for the accurate estimation of aboveground biomass using terrestrial laser scanning. Forest Ecology and Management, 458, 117798. <https://doi.org/10.1016/j.foreco.2019.117798>

Boucher, P. B., Hockridge, E. G., Singh, J., & Davies, A. B. (2023). Flying high: Sampling savanna vegetation with UAV-lidar. Methods in Ecology and Evolution, 14(7), 1668-1686. <https://doi.org/10.1111/2041-210X.14081>

