Séminaire / Seminar AMAP

Le Bienfaiteur Sagang is currently a PhD candidate at the University of Yaoundé I, Yaoundé, Cameroon. Working on tropical vegetation, he is interested in combining remote sensing and field inventories to understand the role of ecological factors on vegetation dynamics (structure and composition) in forest-savanna transitional landscapes.

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Monitoring vegetation dynamics in a forest-savanna transitional landscape of the central region of Cameroon

presented by

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ABSTRACT

Widespread extension of forest into savannas have been reported in Central Africa over the last decades, but this dynamics is liable to encompass different processes of varying strength and kinetics that have insufficiently been studied in sufficiently diverse conditions. We focused on two nearby landscapes in central Cameroon displaying a variety of soil conditions and two distinct levels of human presence to monitor complex forest-savanna dynamics. Open access satellite imagery and cloud computing facilities (Google Earth Engine) was used to track land cover change. Current spectral species assemblages were estimated using spectral dissimilarity from Sentinel 2 imagery. Aboveground biomass (AGB) was characterized using airborne LiDAR scanning data collected over the study area. Field inventory data from grass and woody layer as well as soil properties were collected. Landsat image archives recorded a long-term (> 40 years) forest spread into savanna at a rate of ca. 1%.year^{-1} (6Km².year^{-1}). Species assemblage computed from spectral dissimilarity in forest vegetation followed a successional gradient consistent with forest age. AGB accumulation rate was 25% higher in young secondary forests (≤ 20 years) compared to old growth forests (≥ 20 years). Fire occurrence recorded via Landsat archives, modulated bush encroachment and forest expansion with a five-year fire frequency found to be the threshold below which woody savanna dominates and opens the way to forest transition. While a large share of savannas turned into forest during the last decades, vegetation in the remaining savannas was shaped by a gradient leading from sandy soils with low grass production and low fire frequencies to clayey soils with high grass production and frequent fire situations. Floristic succession from savanna specialist to forest pioneers occurred on clay soils as fire frequency reduces meanwhile savanna perpetuates on sandy soils. These findings highlights the importance of soil modulation of the grass-fire feedback and have implications for carbon sequestration and biodiversity conservation policies.

KEY WORDS

Forest-savanna ecotone, Google earth Engine, Airborne laser scanning, aboveground biomass, fire, floristic succession.

Invited and animated by: Dr. Barbier Nicolas (UMR AMAP)
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