Séminaire / Seminar AMAP

Dr. Chris Doughty is currently an associate professor at Northern Arizona University, Flagstaff, Arizona, USA. Working on tropical forest structure and ecology, he is interested in understanding the role of tropical forest structure on biomass and animal ecology using field, remote sensing and modelling approaches.

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Salle 201, Bâtiment PS2, CIRAD-UMR AMAP
Zoom link : click here
Meeting ID: 914 4925 7781; Passcode: 158362

What controls forest structure across tropical forests?

presented by

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ABSTRACT

The stratified nature of tropical forest structure had been noted by early explorers, but until recent use of satellite-based LiDAR (GEDI, or Global Ecosystems Dynamics Investigation LiDAR), there has been no way to quantify stratification across all tropical forests. Understanding stratification is important because by some estimates, a majority of the world's species inhabit tropical forest canopies. Stratification can modify vertical microenvironment, and thus can affect a species' susceptibility to global warming. A better understanding of structure could also improve predictions of biomass across the tropics. Here we find that, based on analyzing each GEDI 25m diameter footprint in tropical forests (after screening for human impact), most footprints (60-90%) do not have discernible layers. This result is highly scale dependent, but with a 25m footprint, the most common forest structure has a minimum plant area index (PAI) at ~40m followed by a linear increase in PAI until ~15m followed by a linear decline in PAI to the ground layer (described hereafter as a 1 peak footprint). However, there are large geographic patterns to forest structure within the Amazon basin (60-90% 1 peak) and between the Amazon (~90%) and other tropical areas (SE Asia ~70% and Central Africa ~80% 1 peak). Layering is significantly correlated with tree height (r^2=0.14), AGBD (r^2=0.15), VPD (r^2=0.03) and total cation exchange capacity (r^2=0.01). Certain boundaries, like the Pebas Formation and Ecoregions, clearly delineate continental scale structural changes. More broadly, deviation from more ideal conditions (i.e. lower fertility or higher VPD) leads to shorter, less stratified forests with lower biomass.

KEYWORDS Forest structure ; GEDI ; biomass

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