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Session 5 : "Climate extreme impacts on the carbon cycle "

Title: Tree4flux – Forecasting future forest dynamics by exploring climate-growth relationships in the Biosphere Reserve of Yangambi in the Democratic Republic of the Congo

Abstract: Tropical forests hold a crucial role in the global carbon cycle. Despite their potential role in mitigating the evolution of the Earth system, they are threatened by climate change. In this context, assessing the carbon balance and the underlying phenomena is a key element in understanding and optimizing the management of tropical forests. At the forest scale, the carbon balance is commonly defined by fluxes, i.e., net primary productivity and respiration, exchanged between three main reservoirs: canopy, stems, and roots. The TREE4FLUX project aims to fill the gaps left on these subjects for the first time in the forests of Congo Basin forests, by focusing research around the CongoFlux tower in the Yangambi Biosphere Reserve (DRC). The flux tower provides continuous measurements of greenhouse gas fluxes, such as CO₂, using the Eddy Covariance approach. On-the-ground approaches through a network of multiple permanent inventory plots help define the processes underlying these fluxes. The combination of these strategies is promising to refine CO₂ exchanges between vegetation and the atmosphere. This is essential because expected rising dry periods and temperatures are likely to alter forest dynamics by modifying growth patterns, and mortality risks. More specifically, wood formation, which is actively controlled by different climatic drivers, plays a significant role in carbon uptake by tree growth. But climate-growth relations remain elusive. Pursuing the characterization of forest dynamic components is therefore mandatory to better understand the ongoing changes.