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Dycrypting tropical forest phenology with coupled remote sensing and field observation

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Tropical forests are integral to the global carbon, water and energy budgets. However, the magnitude of matter and energy fluxes are poorly resolved both spatially and temporally, and the driving underlying mechanisms by which they occur remain unclear poorly described. Specifically, the diversity of foliar phenological patterns and there influence forest fluxes in the tropics has not been properly studied. As a result of these knowledge gaps, dynamic global vegetation models (DGVMs) consistently fail to exhibit observed productivity dynamics and climate-vegetation feedbacks. These shortcomings prevent reliable predictions on the fate and role of tropical forests under changing climate conditions from being made.

Working at perminant tropical forest fieldsites in French Guiana, we demonstrate that biweekly scans with UAV mounted LiDAR and multispecral sensors can observe subtle phenological changes of individual trees across novel spatial scales. We explore the intra- and inter-species variation in phenological behavoirs and link these dynamics to in-situ flux measurements.