Title: Quantifying Phenological Variations in Tropical Forests Across Scales Using High Spatio-Temporal Satellite Remote sensing

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Project Abstract: Vegetation phenology is an integrated and sensitive indicator of ecosystem function that responds to disturbance, seasonality, variability and extremes in weather and climate change. Vegetation phenology modulates the surface energy balance and hydrological processes at the landscape scale. Understanding of tropical forest phenology however is limited, due to high diversity of tree species exhibiting a variety of phenological patterns. Heterogeneous tropical forests also exhibit highly variable and heterogeneous responses to the biotic and abiotics stressors. Satellite remote sensing has been long used to study vegetation phenology. However, frequent cloud cover, smoke from fire, and sensor artifacts complicates the satellite based study of land surface phenology. Widely used satellite platforms like MODIS and Landsat suffer from the limitation over coarse spatial resolution or lack of temporal repeat frequency, this limiting their ability to provide detailed understanding of heterogeneous phenological patterns on the landscape. However, increasing availability of high spatial and temporal resolution remote sensing data offer new opportunities to study tropical tree phenology and understand the role of diversity and heterogeneity across spatial scales of a Flux tower to the landscape. In this study we used satellite remote sensing data from VENμS, an cooperative Earth observation program of Israel and France is a mini-satellite with scientific mission of terrestrial environment monitoring, to study phenology. We acquired and processed data, at 10m spatial resolution, VENμS at a number of FlUXNET sites in Panama and Amazon during 2017-2019. While the satellite captures data at every other day interval, the number of usable cloud free images, while limited, still provides an new insight in the temporal variability in vegetation phenology at high resolution. Analysis of these data sets along with those from MODIS and Sentinel-platforms near selected FLUXNET sites also help quantify and understand the multi-scale nature of phenology and role of diversity and heterogeneity. In this poster, we will share results from our ongoing analysis of tropical forest phenology using multi-source remote sensing data at varying spatial and temporal resolution.