**Poster #1-54**

**Quantifying Forest Growth, Mortality, and Canopy Closure following Hurricane Maria**

Douglas Morton[1*], Maria Uriarte[2], Michael Keller[3,4,5], Sebastian Martinuzzi[6], Melissa Sauri[2], and Sam Farrar[2]

[1] NASA Goddard Space Flight Center, Greenbelt, MD;
[2] Columbia University, New York, NY;
[3] Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA;
[4] International Institute of Tropical Forestry, USDA Forest Service, Rio Piedras, PR;
[5] Embrapa Agricultural Informatics, Campinas, SP, Brazil;
[6] University of Wisconsin, Madison, WI

Contact: douglas.morton@nasa.gov

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Hurricane Maria made landfall in Puerto Rico as a powerful, Category 4 storm. Strong winds and torrential rains snapped and uprooted trees, creating 30 to 50 times more forest gaps in one day than the island's tropical forests typically experience in a year. The loss of canopy trees altered forest structure and species composition, selecting traits that favor resilience to windthrow, and synchronized forest succession in the extensive gap area across the island. Following the storm, we remeasured long-term forest inventory plots in El Yunque National Forest and the Cambalache and Carite State Forests to quantify immediate impacts and track the rates and mechanisms of forest recovery. Here, we report results from remeasurements in paired plots with low and high damages from the storm, selected based on pre and post-storm data from NASA Goddard's Lidar, Hyperspectral, and Thermal (G-LiHT) Airborne Imager. Total mortality by species was higher from Maria than from Hurricane Hugo (Category 3). Wood density was the best predictor of total mortality by species, but not the proportion of snapped or broken trees. In addition to field surveys of mortality, branch loss, and resprouting, we installed 1000 new dendrometer bands to track stem growth for common species with differing levels of crown damage. In February, 2019, we used a Riegl VZ400i terrestrial laser scanner (TLS) to collect detailed, 3D data for each plot and complete scans of more than 200 individual trees with dendrometer bands. TLS data provide an unprecedented look at the distribution of canopy and understory vegetation to assess changes in stem density, canopy closure, and allometry from branch loss and resprouting after hurricane damages. In addition, the combination of TLS and dendrometer band data support the evaluation of diameter growth increment as a function of canopy leaf area, allocation to resprouting, and illumination conditions. Repeated TLS scans will capture dynamics of canopy closure, including the specific contributions from resprouting, regrowth, and delayed mortality for space-filling of the canopy volume over time. Tracking the structural reassembly of forests in disturbed patches will directly inform the representation of forest disturbance in FATES and other ecosystem models, including the impacts of delayed mortality and depressed productivity of damaged individuals on canopy closure and the net carbon balance of disturbed forests.