

**Poster #91**

**Tropical Rain Forest Biogeochemistry in a Warmer World: Results From A Novel Warming Experiment in A Puerto Rico Tropical Forest**

Molly Cavaleri<sup>1</sup>, Tana Wood<sup>2</sup> and Sasha Reed<sup>3</sup>

<sup>1</sup> Michigan Technological University

<sup>2</sup> U.S. Forest Service

<sup>3</sup> U.S. Geological Survey

Contact: Molly Cavaleri [macavale@mtu.edu]

Tropical forests represent one of the planet's most active biogeochemical engines. They account for the dominant proportion of Earth's live terrestrial plant biomass, nearly one-third of all soil carbon, and exchange more CO<sub>2</sub>, water, and energy with the atmosphere than any other biome. In the coming decades, the tropics will experience unprecedented changes in temperature, and our understanding of how this warming will affect biogeochemical cycling remains notably poor. Given the large amounts of carbon tropical forests store and cycle, it is no surprise that our limited ability to characterize tropical forest responses to climate change may represent the largest hurdle in accurately predicting Earth's future climate. Here we describe results from the world's first tropical forest field warming experiment, where forest understory plants and soils are being warmed 4 °C above ambient temperatures (warming began in October, 2016). This Tropical Responses to Altered Climate Experiment (TRACE) was established in a rain forest in Puerto Rico to investigate the effects of increased temperature on key biological processes that control tropical forest carbon cycling, and to establish the steps that need to be taken to resolve the uncertainties surrounding tropical forest responses to warming. In this poster we will describe the experimental design, as well as the wide range of measurements being conducted. We will also present results from the initial phase of warming, including data on how increased temperatures from infrared lamp warming affected soil temperature and moisture, soil respiration rates, a suite of carbon pools, soil microbial biomass, nutrient availability, and the exchange of elements between leaf litter and soil (plant physiology data are shown in a separate poster by Kelsey Carter). These data represent a first look into tropical rain forest responses to an experimentally-warmed climate in the field, and provide exciting insight into the non-linear ways tropical biogeochemical cycles respond to climate change. Overall, we are striving to help improve Earth System Model parameterization of the pools and fluxes of water, carbon, and nutrients in tropical forested ecosystems and the data shown will highlight how these cycles are coupled and independently altered by warming.