

Interactions between plant physiology and atmospheric chemistry as a part of the GoAmazon 2014/15 Terrestrial Ecosystem Collaborative Project (Geco)

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Emissions of biogenic volatile organic compounds (BVOCs) from tropical forests play central roles in atmospheric processes by fueling atmospheric chemistry resulting in modified aerosol and cloud lifecycles and their associated feedbacks with the terrestrial biosphere. However, the identities of tropical BVOCs, their biological and environmental controls, and functions within plants and ecosystems remain highly uncertain. In addition, the accurate representation of atmospheric and biological processes associated with BVOCs within Earth System Models including the Community Land Model requires a tight connection between observational and modeling efforts. As part of the DOE ARM program's GoAmazon 2014/15 campaign, extensive field and laboratory observations of BVOCs are being conducted in the central Amazon together with model development aimed at improving the representation of BVOCs in the Community Land Model. Here we report the results of our ongoing Terrestrial Ecosystem Science (TES) activities at the National Institute of Amazon Research (INPA) in Manaus, Brazil, the ZF2 forest reserve in the central Amazon, and Lawrence Berkeley National Laboratory. Among the results of the research is new evidence for the importance of BVOCs in protecting plants from oxidative stress under elevated temperatures highlighting the need to model allocation of carbon to BVOCs to protect against the damaging effects during environmental extremes. We provide a brief overview of the results recently described in nine papers published in international journals including *Plant Physiology*, *Plant Cell and Environment*, *Atmospheric Chemistry and Physics*, *Global Biogeochemical Cycles*, and *Geophysical Research Letters* as well as current progress in ongoing research in the last year of the GoAmazon project.