

**Project title:** Collaborative Research on Ecophysiological Controls on Amazonian Precipitation Seasonality and Variability

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The principal objective of our project is to address how vegetation influences climate variability and precipitation over Amazonian rainforests, with an emphasis on plant physiological controls on deep convection triggering along a geographical water stress gradient. Using a new tool of sun-induced chlorophyll fluorescence (SIF), our study integrates plant physiological observations and climate modeling and aims to decrease the gap between field ecology and climate modeling. This year, we have installed sensors at Manaus site (K34; July-August 2015) and at Rebio Jaru (Ji-Paraná, Rondonia; September 2015).

To investigate the role of water stress on the onset of the rainy season, we have developed high-resolution cloud resolving model (CRM) simulations using a new strategy coupling convective and large-scales. The first results show that the presence of early morning fog reduces the wet season transpiration and carbon uptake over the everwet regions of Amazonia (Anber et al., in press; the top feature story on the DOE Atmospheric Science Research Program's home page right now—Fog and Rain in the Amazon). We have incorporated SIF into CLM (Lee et al., 2015) to constrain energy, carbon and water flux of tropical forests. Additionally, we have been meeting online every other week to fill the knowledge gaps among our interdisciplinary team members, to educate our students and postdocs, and to exchange ideas. Our efforts in the coming year will focus on analyzing data from the field activities and on modeling the interactions of convection and plant physiological processes.