Geophysical Research Abstracts
Vol. 19, EGU2017-17401, 2017
EGU General Assembly 2017

Linking imaging spectroscopy and trait data to better understand spatial and temporal variability in functional traits

Philip Townsend, Eric Kruger, Zhihui Wang, and Aditya Singh
University of Wisconsin, Madison, United States (philip.a.townsend@gmail.com)

Imaging spectroscopy exhibits great potential for mapping foliar functional traits that are impractical or expensive to regularly measure on the ground, and are essentially impossible to characterize comprehensively across space. Specifically, the high information content in spectroscopic data enables us to identify narrow spectral feature that are associated with vegetation primary and secondary biochemistry (nutrients, pigments, defensive compounds), leaf structure (e.g., leaf mass per area), canopy structure, and physiological capacity. Ultimately, knowledge of the variability in such traits is critical to understanding vegetation productivity, as well as responses to climatic variability, disturbances, pests and pathogens. The great challenge to the use of imaging spectroscopy to supplement trait databases is the development of trait retrieval approaches that are broadly applicable within and between ecosystem types. Here, we outline how we are using the US National Ecological Observatory Network (NEON) to prototype the scaling and comparison of trait distributions derived from field measurements and imagery. We find that algorithms to map traits from imagery are robust across ecosystem types, when controlling for physiognomy and vegetation percent cover, and that among all vegetation types, the chemometric algorithms utilize similar features for mapping of traits.