Geophysical Research Abstracts
Vol. 19, EGU2017-8127, 2017
EGU General Assembly 2017


# Remote Sensing of plant functional types: Relative importance of biochemical and structural plant traits

Teja Kattenborn and Sebastian Schmidtlein
Germany (teja.kattenborn@kit.edu)

Monitoring ecosystems is a key priority in order to understand vegetation patterns, underlying resource cycles and changes their off. Driven by biotic and abiotic factors, plant species within an ecosystem are likely to share similar structural, physiological or phenological traits and can therefore be grouped into plant functional types (PFT). It can be assumed that plants which share similar traits also share similar optical characteristics. Therefore optical remote sensing was identified as a valuable tool for differentiating PFT.
Although several authors list structural and biochemical plant traits which are important for differentiating PFT using hyperspectral remote sensing, there is no quantitative or qualitative information on the relative importance of these traits. Thus, little is known about the explicit role of plant traits for an optical discrimination of PFT. One of the main reasons for this is that various optical traits affect the same wavelength regions and it is therefore difficult to isolate the discriminative power of a single trait. A way to determine the effect of single plant traits on the optical reflectance of plant canopies is given by radiative transfer models. The most established radiative transfer model is PROSAIL, which incorporates biochemical and structural plant traits, such as pigment contents or leaf area index.
In the present study 25 grassland species of different PFT were cultivated and traits relevant for PROSAIL were measured for the entire vegetation season of 2016. The information content of each trait for differentiating PFTs was determined by applying a Multi-response Permutation Procedure on the actual traits, as well as on simulated canopy spectra derived from PROSAIL.
According to our results some traits, especially biochemical traits, show a weaker separability of PFT on a spectral level than compared to the actual trait measurements. Overall structural traits (leaf angle and leaf area index) are more important for differentiating PFT than biochemical traits.