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Objectives

- more mechanistic method for develop a 0 determining leaf structure and biochemistry from spectral data that characterizes and partitions sources of variability and uncertainty
- 2. To investigate the spatial scales and processes driving leaf trait variability.



Figure 1 (above) Data were 1349 leaves collected for from 52 species across 12 Both reflectance sites. direct spectra and biochemical measurements were collected.

Figure 2 (right) Example leaflevel reflectance of leaves of Acer rubrum and Quercus rubrum.







Figure 3 Sensitivity of PROSPECT4 model to its four leaf biophysical parameters (Feret et al. 2008 *Remote Sens. of Environ.* 112(6):3030)

Chloroplasts to canopies: Analysis of leaf spectral trait variability across spatial scales

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Bayesian inversion







Figure 5 Comparison of measured and estimated leaf water content (g cm⁻²) for three broad plant types. Dashed line is a 1:1 fit. Colors distinguish between plant type (left) or ecological succession (center, right).



Estimated

Figure 6 Comparison of measured and estimated leaf mass per unit area (g cm⁻²) for three broad plant types. Dashed line is a 1:1 fit. Colors distinguish between plant type (left) or ecological succession (center, right)...



Figure 7 The effect of relative leaf location in canopy on inverted spectral traits. Except for chlorophyll in conifers, all spectral traits increase significantly with higher position in the canopy.



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Contact: Alexey Shiklomanov, *ashiklom@bu.edu* The PEcAn RTM package developed for performing these analyses an be downloaded at: www.github.com/PecanProject/pecan/modules/rtm

Variability