DRIVERS OF EVAPOTRANSPIRATION IN GLOBAL CLIMATE ZONES

Kathryn L. McCurley*, and James W. Jawitz*
Soil and Water Sciences Department, University of Florida, Gainesville, FL, USA

Terrestrial evapotranspiration (ET) is a direct indicator of water yield and helps sustain precipitation rates at all spatial scales. Globally varying climate characteristics and land cover attributes impose climate zone-dependent effects on ET, suggesting that climate changes and land conversions may cause unexpectedly large ET shifts within sensitive climate zones. This study investigated the relative impact of climate and land cover on mean annual ET within 27 global Köppen-Geiger climate zones. Previous work has generally concluded that climate variables are more important than land cover in driving ET. Here we test the hypothesis that the relative significance of climate and land cover drivers of ET are climate zone-specific. We compiled a global gridded dataset consisting of climate variables (mean annual precipitation, P, mean annual potential evapotranspiration, PET, and intra-annual monthly synchronicity of P and PET) as well as coverage proportion of nine major land cover types (crop, desert, forest, grass, pasture, shrub, tundra, urban, and water). The relative importance of statistically significant variables in each zone was found using a multi-adaptive regression approach. This study provided three main conclusions: 1) climate factors were the primary ET controls, with variable land cover influence on ET (R^2 increase between 0.02-0.16 when included with climate), 2) P was the overall most important ET driver, and 3) tundra and forest were the most important land cover types. This work can inform climate zone-specific land management strategies to better protect the reliability of local and regional water supply.

PRESENTER BIO: Kathryn is a PhD candidate and is the manager of the Landscape Hydrology Laboratory. She graduated from the University of Georgia with a Bachelor of Science in environmental economics and intends to pursue a career in applied scientific research.