Oral Presentation

Rapid Assessment and Modeling of Soil Carbon Storage in Florida

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The goal of this research is to assess the effects of soil suborder and land cover/land use (LC/LU) on carbon stocks giving special attention to translating site-specific soil organic carbon pools (total, recalcitrant, labile) to landscape scales. Our objectives are to: (i) Determine soil organic carbon pools (total, recalcitrant, labile) in various ecosystem types in Fl; (ii) Investigate the strength and magnitude of relationships between environmental landscape properties and corresponding carbon pools; (iii) Derive models relating measured soil carbon fractions to soil spectra in the visible/near-infrared (VNIR) range. We completed a statewide sampling of 1,014 locations representing various ecotypes. The range and mean of soil organic carbon (SOC) were 0.5 to 34.1 and 4.6 kg m^{-2}, for recalcitrant carbon (RC) was 0.2 to 25.0 and 2.8 kg m^{-2}, and for hot water extractable carbon (HC) was 0.01 to 0.71 and 0.15 kg m^{-2}. Significant differences among LC/LU, and soil suborder classes ($a<0.001$) were found for all carbon fractions based on analysis of variance. Important environmental variables for predicting carbon fractions were taxonomic group, order, and suborder, available water capacity and organic matter content (SSURGO). Successful models for VNIR were developed for total carbon ($R^2=0.86$, RMSE=15 g kg^{-1}). Modeling of carbon pools across a large mixed-use landscape facilitates to improve our understanding of interactions, feedbacks, and carbon dynamics within and among different managed and non-managed ecotypes, geographic regions, and soil-hydrologic trajectories. Findings allow assessing adaptation an mitigation potential aiming to enhance soil carbon sequestration to counteract global climate change.