Transferability of Soil Carbon Models across Regions and Scales within Florida

Xiong X., S. Grunwald, D.B. Myers, W.G. Harris, A. Stoppe, N.B. Comerford

Soil carbon models have been used to quantify the carbon pools usually at a specific scale or in a specific region and our knowledge on the transfer behavior of soil carbon models across regions and scales is still limited. Our objectives were to: 1) explore the transferability of soil carbon models developed in one geographic region to another; 2) explore the transferability of soil carbon models developed at state scale to regional scales and vice versa.

We used 1014 soil samples (0-20 cm) collected across the State of Florida. The sampling design followed the stratified-random scheme using mainly two major strata (land cover/land use and soil suborder) due to their strong influences on soil organic carbon (SOC) across the state. Various layers of environmental factors were compiled using ArcGIS. The State of Florida was divided into four regions, i.e., Panhandle, Northern, Central and Southern Florida which generally represent distinct soil taxonomy, ecoregions, geographical and climatic conditions. Statistical and geostatistical methods were used to characterize and compare the variation and spatial patterns of SOC in different regions and at different scales (regional and state scale) using SOC observations and ancillary environmental data. Comparison and cross-application of models were conducted to evaluate the model transferability and identify the major environmental factors that influence the transferability. Results revealed transferability across regions and scales varied case by case and identified the possible causes to the different transferability.