Soil-Landscape Modeling of Carbon Storage and Soil Respiration Rates: Scaling Point Data to the Landscape Scale. (S05-kolka122044-Oral)

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Abstract:

When assessing watershed and regional scale soil carbon storage and respiration, spatial extrapolation is an important issue. Our objective is to use soil carbon and respiration point data and develop predictive landscape scale models using topographic variables. We measured the amount of carbon stored soils of the central hardwoods region to a depth of 30 cm in triplicate 6.25-cm cores at 104 forest inventory plots established in a 380-m grid across a 1500 ha watershed. Within an 80 ha subwatershed we measured soil respiration at 48 sampling points selected using a random stratified approach, with strata established based on topographic variables. We used 30 m digital elevation model data to calculate various terrain attributes and developed multivariate statistical models using forward stepwise selection and robust linear regression to describe the relationships between topographic variables and soil organic carbon and in situ soil respiration. These relationships explain up to 69% of variability in soil carbon and up to 52% of variability in measured soil respiration. Using these models, we are able to predict soil carbon storage and soil respiration at the watershed scale.

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