Spatial Patterns of Soil Properties in a Savanna Parkland Landscape: Soil Organic Carbon and Total Nitrogen. (S07-boutton154224-Poster)

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Abstract:

Scaling soil C and N from the plot to the landscape level is a critical issue in the development of accurate element budgets at large spatial scales. To address this issue, we quantified spatial patterns of soil organic C (SOC) and total N (TN) in a savanna parkland landscape in southern Texas. A 100 x 160 m2 plot consisting of 10 x 10 m2 grid cells was established on a sandy loam upland characterized by discrete clumps of woody vegetation embedded in a grassy matrix. Soils (0-15 cm) were collected at two randomly selected points within each cell (n = 320 samples). Both SOC and TN decreased significantly from large woody groves to woody clusters, cactus patches, and herbaceous matrix. Spatial analyses based on variography and Mantel tests revealed significant spatial structures in SOC, TN, and a remote sensing-based vegetation density index (VDI). Spatial patterns of SOC and TN had significant correlation with the spatial pattern of VDI, suggesting strong influence of vegetation pattern on spatial distributions of SOC and TN. Results indicate that spatial patterns of vegetation can be useful in spatial interpolation of soil C and N across this savanna parkland landscape.

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Presentation Information:

Presentation Date: Monday, November 11, 2002
Presentation Time: 3:00-5:00 pm
Poster Board Number: 1639

Keywords:

spatial patterns, landscape ecology, soil organic carbon, scaling from plot-to-landscape