Spatial Patterns of Soil Properties in a Savanna Parkland Landscape: Bulk Density and Soil Water Content. (S07-boutton152842-Poster)

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Abstract:

Ecosystem structure and function can be strongly related to spatial characteristics of soil attributes. To examine spatial patterns in bulk density (BD) and soil gravimetric water content (GWC), and their relationship to biophysical structure and process, we quantified these parameters 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). Spatial analyses based on variography and Mantel tests revealed significant spatial patterns in BD, GWC and a vegetation density index (VDI). Results suggest that both hydrologic processes related to landscape-scale patterns and biophysical processes related to local-scale vegetation structures affect the spatial pattern of BD and that of GWC soon after rainfall. As soils dry, the influence of landscape-scale pattern on GWC diminishes and the influence of local-scale vegetation structure predominates, which leads to temporal dynamics in the spatial pattern of GWC.

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