Soil Carbon Dynamics of a Subtropical Savanna Ecosystem. (S03-liao163705-Poster)

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Abstract:

Woody plants have increased in many grasslands worldwide over the past 200 y. To evaluate the impact of this change on soil organic C (SOC) storage and dynamics in the Rio Grande Plains of Texas, we used long-term soil incubations (2 y) in conjunction with density fractionation of SOC. Total SOC (0-10 cm) increased from 6.4 g C/kg in grasslands to 20-40 g C/kg in wooded areas. Long-term incubations revealed that pools of slow/resistant C increased from 85% of SOC in grasslands to 95% of SOC in wooded areas. Conversely, labile C decreased from 15% of SOC in grasslands to 5% of SOC in woodlands. Mean residence times (MRTs) of labile C were comparable in all landscape elements (<120 d), but MRTs for slow C pools were 50% greater in wooded areas (>25 y) than in grasslands (12 y). This shift towards more resistant C is consistent with density fractionations indicating larger pools of high density C (>1.8 g/cm3) in wooded areas vs. grasslands. Grassland-to-woodland conversion during the past 200 y has been geographically extensive in grasslands worldwide, suggesting that changes in SOC storage and dynamics documented here could have significance for the global C cycle and climate.

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