

Soil carbon content in residential areas in Auburn, Alabama

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Abstract:

The rise in global atmospheric CO₂ concentration has enhanced the relevance of knowledge about the amount and change in soil carbon over time, and of discerning the natural and manmade influences on soil carbon. Natural areas have generally been the sites for soil carbon investigations; however, information about urban soil carbon content has recently become important due to the rapid increase in the migration rate of rural people to urban locales. This movement has recently resulted in a unique precedent where over half of the world's population now lives in cities.

Urban residential areas are important sites to measure soil carbon because of the near ubiquitous and often very long term presence of soil and vegetation, e.g. homes over 100 years old. In this project, we will measure the soil carbon content in residential yards in Auburn, Alabama (a small, rapidly expanding metropolis in the southern US). We will also investigate yard management practices, woody vegetation biomass, age of yard, and soil texture as possible factors that may influence soil carbon levels.

In the project we are measuring soil carbon in 50-75 single family residential yards. Two paired cores are taken at the edges of a meter square placed in the front yard in the dominant yard vegetation, usually turf. One core provides soil samples for carbon and routine soil chemistry analysis and the second core permits measurement of bulk density and analysis of soil texture. Three depth profiles will be sampled: 0-15 cm, 15-30 cm, and 30-50 cm. Total soil carbon and nitrogen will be analyzed at the USDA Soil Dynamics Lab at Auburn University. Soil chemistry (pH, P, K, Ca, Mg, Zn, Mn) will be evaluated for each of the three depth profiles. Trees that intercept a 45° angle from the center of the plot at ground level are measured for dbh, height, and distance from the center of the plot. Above ground biomass and aboveground carbon content are determined for the woody vegetation. Information on the frequency of lawn irrigation, fertilization and aeration, and the lawn mowing practices of bagging or mulching will be related to soil carbon content. The age of residence and the soil texture will also be related to soil carbon levels. This project will provide a thorough case study for soil carbon levels in residential areas in Auburn, Alabama, and will provide much needed data to determine urban soil carbon storage capacity.

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