Extracting information from variability: Using geostatistics to improve soil carbon estimates. (S05-yost192358-Oral)

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Abstract:

Recent data confirming carbon dioxide buildup in the atmosphere have triggered concern in most countries over the adverse effects. The Kyoto protocol was developed as a positive step towards self-regulation of carbon dioxide emissions. Soil organic carbon can play a large role in reducing atmospheric carbon build up, but reliably measuring large quantities of soil organic carbon is difficult. Procedures used in the mining industry for many years, geostatistics, provide a tool for improved assessment of soil carbon quantities, especially over large regions as required by proposed carbon trading contracts operating with units of 100,000 tonnes or more. We describe these methods, giving some examples, and illustrate the need to consider the spatial dependence of samples. We then illustrate the insights that can result from the quantitative methods provided by geostatistics. We suggest that, in addition to the x (mean), s2(sample variance) used for conventional statistics, that the ? (semivariance or spatial dependence) as well should be considered in estimates of natural resource characterization. In our view these methods should be part of soil science curricula because of the insights and real-world perspective they contribute to studies of soils, geology, and environmental science.

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