Influence of soil aggregation on carbon sequestration : A model of physical protection. (S06-yoo124515-Oral)

Authors:

- G.Yoo - *University of Illinois at Urbana-Champaign*
- M.M.Wander - *University of Illinois at Urbana-Champaign*
- X.M.Yang - *Agriculture & Agri-Food Canada*

Abstract:

Simple empirical relationships between soil texture and soil organic carbon (SOC) dynamics that are commonly used in models sometimes fail to explain carbon sequestration. Even though the importance of soil aggregation to SOC dynamics is widely recognized, few models simulate aggregate-regulated processes. Our goal was to determine if there is a need to improve the CENTURY soil carbon submodel by using it to predict trends in two agricultural fields where use of conventional and no tillage practices had contrasting influences on SOC sequestration. CENTURY predictions were then compared with results obtained from an aggregation-based SOC model that includes tillage effects on soil temperature and moisture and soil reactive mass estimated based on dry mean weight diameter (DMWD). The model includes three SOC pools: loose particulate organic matter (LPOM), occluded particulate organic matter (OPOM) and the humified fraction (HF). Decay rates of OPOM and HF are modified by the reactive mass of soil. The simulated results suggest that physical protection through soil aggregation should be included in carbon sequestration models especially in models applied at the field scale.

Corresponding Author Information:

Gayoung Yoo
University of Illinois
N215 Turner Hall 1102 S. Goodwin Ave.
Urbana, IL 61801

phone: 217-333-4912
e-mail: gayoo@uiuc.edu

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