Testing an Aggregate-Based Fractionation Technique to Detect Soil C Storage in Mineral-Associated Fractions. (S03-jastrow042044-Poster)

Authors:

- J.D.Jastrow * - *Argonne National Laboratory*
- J.Six - *Colorado State University*
- J.J.Ullian - *Argonne National Laboratory*

Abstract:

Soil aggregates play an important role in the stabilization of soil organic matter. The intimate associations of decomposing organic matter with soil minerals in aggregates may enable more residues to enter into protected organomineral associations with longer residence times. We developed a technique to physically fractionate particulate- and mineral-associated organic matter according to the hierarchical organization of soil aggregate structure (within microaggregates, within macroaggregates but outside microaggregates, and unaggregated). In addition, silt- and clay-sized fractions from each location were acid hydrolyzed to isolate chemically resistant C from more labile C. We then evaluated the role that aggregate hierarchy plays in the turnover and storage of C in the isolated fractions by using the natural abundance of stable C isotopes following a switch from C4 to C3 grassland. Fifty-five years after the vegetation switch, all particulate organic matter had essentially turned over. However, we found differences in both the amounts and residence times of C in silt- and clay-sized fractions from different locations within the soil's aggregate hierarchy.

Corresponding Author Information:

Julie Jastrow
Argonne National Laboratory
Environmental Research Division, Bldg. 203
Argonne, IL 60439

phone: 630-252-3226
fax: 630-252-8895
e-mail: jdjastrow@anl.gov

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