

Aggregation but Not Organo-Metal Complexes Contributed to C Storage in Tidal Freshwater Wetland Soils

Feb 01, 2019

Author:

Christine E. Maietta, Zachary A. Bernstein, Joshua R. Gaimaro, Jeffrey S. Buyer, Martin C. Rabenhorst, Victoria L. Monsaint-Queeney, Andrew H. Baldwin, and Stephanie A. Yarwood

Abstract

One of the many goals of wetland restoration is to promote the long-term storage of carbon (C) in the terrestrial biosphere. Unfortunately, soil C reservoirs in restored wetlands are slow to accumulate even after hydrology and plant communities are reestablished. Oftentimes wetland restoration changes the soil matrix and thus can dramatically alter how soil C is stored and processed. Our research investigated whether soil organic matter (SOM) preservation theories derived from studies in non-wetland soil systems can be extended to wetland soils. We examined C associated with water-stable soil aggregates, minerals, and metal oxides within habitats of one natural and one restored tidal freshwater wetland. This study revealed that a majority of the soil C in the natural site was associated with large macroaggregates ($>2000\ \mu\text{m}$), and soils from the restored site stored more C in small macroaggregates (≥ 250 to $<2000\ \mu\text{m}$). Despite these different associations, the chemical composition of SOM followed similar patterns across each aggregate-size class. Results from the sequential extraction procedure suggest organo-metal oxide complexes do not contribute to C stabilization in these habitats. This research is one of the few studies that have examined C stabilization related to soil structure in wetland soils. Our results suggest soil aggregate formation may be an important mechanism driving C stabilization, and that disruption to macroaggregates may limit C accumulation in restored wetlands. Additional empirical research and long-term field monitoring are needed to confirm linkages between aggregate-C stabilization and accumulation in wetland soils.

Read the article in [Soil Science Society of America](#) [1].

Associated SESYNC Researcher(s):

[cmaietta](#) [2]

DOI for citing:

10.2136/sssaj2018.05.0199

Source URL:

<https://www.sesync.org/aggregation-but-not-organo-metal-complexes-contributed-to-c-storage-in-tidal-freshwater-wetland>

Links

[1] <https://dl.sciencesocieties.org/publications/sssaj/articles/0/0/sssaj2018.05.0199>

[2] <https://www.sesync.org/users/cmaietta>