Geophysical Research Abstracts
Vol. 21, EGU2019-2370-1, 2019
EGU General Assembly 2019


# Impact of clay content on soil microaggregate arrangement and organic matter

Steffen A. Schweizer (1), Franziska B. Bucka (1), Markus Graf-Rosenfellner (2), Ingrid Kögel-Knabner (1,3)

(1) Soil Science, Research Department Ecology and Ecosystem Management, TUM School of Life Sciences Weihenstephan, Technical University of Munich, Freising (Germany), (2) Soil Ecology, Institute of Forest Sciences, Faculty of Environment and Natural Resources, University of Freiburg, Freiburg (Germany), (3) Institute for Advanced Study, Technical University of Munich, Garching (Germany)

Aggregation confounds soil particles of different sizes into a larger architecture. Such mixture impedes resolving which particles build aggregates and how these control the accumulation of soil organic matter (OM). We used a novel method to differentiate microaggregates (<250 $\mu$m) from dispersed particles based on a dynamic image analysis in water. To identify the impact of soil texture, we analyzed 25 topsoil samples of an arable site in Scheyern (Germany) with a gradient in clay content of 16-37 % clay and organic carbon concentrations of 10-15 g kg$^{1}$. We found that soils with a higher clay content contained larger microaggregates and more occluded ones. The soils with lower clay contents consisted of less occluded microaggregates while the <53 $\mu$m aggregates contained higher OM concentrations. This shows that in the low clay soils a similar amount of OM could be held despite containing fewer fine particles and less occluded aggregates. The additional OM in the low clay soils was decoupled from the BET specific mineral surface area which remained constant across the clay gradient. Soils with a higher content of fine particles were related with the increased preservation of OM through aggregation and occlusion. Our data reveal that a higher fine particle content builds larger soil microaggregates and allocates more OM into occluded aggregate units.