EGU2020-3613
https://doi.org/10.5194/egusphere-egu2020-3613
EGU General Assembly 2020

Modelling dynamic interactions between soil structure and soil organic matter

Nicholas Jarvis[1], Elsa Coucheney[1], Claire Chenu[2], Anke Herrmann[1], Thomas Keller[1,3], Thomas Kätterer[4], and Katharina Meurer[1]

[1]SLU, Soil & Environment, Uppsala, Sweden (nicholas.jarvis@slu.se)
[2]AgroParisTech, AgroParisTech, UMR Ecosys France
[3]Agroscope, Reckenholz-Tänikon Research Station ART, Zurich Switzerland
[4]SLU, Ecology, Uppsala, Sweden

The aggregated structure of soil is known to reduce rates of soil organic matter (SOM) decomposition and therefore influence the potential for long-term carbon sequestration. In turn, the storage and turnover of SOM strongly determines soil aggregation and thus the physical properties of soil. The two-way nature of these interactions has not yet been explicitly considered in soil organic matter models. In this study, we present and describe a new model of these dynamic feedbacks between SOM storage, soil pore structure and soil physical properties. We show the results of a test of the model against measurements made during 61 years in a field trial located near Uppsala (Sweden) in two treatments with different OM inputs (bare fallow, animal manure). The model was able to successfully reproduce long-term trends in soil bulk density and organic carbon content (SOC), as well as match limited data on soil pore size distribution and surface elevation. The results suggest that the model approach presented here could prove useful in analyses of the effects of soil and crop management practices and climate change on the long-term potential for soil organic carbon sequestration.