Geophysical Research Abstracts
Vol. 18, EGU2016-4110, 2016
EGU General Assembly 2016

Soil organic carbon fractionation for improving agricultural soil quality diagnosis in different management practices.

Sylvain Trigalet (1), Caroline Chartin (1), Inken Kruger (2), Monique Carnol (2), Kristof Van Oost (1), and Bas van Wesemael (1)

(1) UCL - Earth and Life Institute, Louvain-La-Neuve, Belgium (sylvain.trigalet@uclouvain.be), (2) Laboratoire d'écologie végétale et microbienne, Université de Liège, Liège, Belgium.

Preserving ecosystem functions of soil organic matter (SOM) in soils is a key challenge. The need for an efficient diagnosis of SOM state in agricultural soils is a priority in order to facilitate the detection of changes in soil quality as a result of changes in management practices. The nature of SOM is complex and cannot readily be monitored due to the heterogeneity of its components. Assessment of the SOM level dynamics, typically characterized as the bulk soil organic carbon (SOC), can be refined by taking into account carbon pools with different turnover rates and stability. Fractionating bulk SOC in meaningful soil organic fractions helps to better diagnose SOC status. By separating carbon associated with clay and fine silt particles (stable carbon with slow turnover rate) and carbon non-associated with this fraction (labile and intermediate carbon with higher turnover rates), effects of management can be detected more efficiently at different spatial and temporal scales. Until now, most work on SOC fractionation has focused on small spatial scales along management or time gradients. The present case study focuses on SOC fractionation applied in order to refine the interpretation of organic matter turnover and SOC sequestration for regional units in Wallonia with comparable climate, management and, to a certain extent, soil conditions. In each unit, random samples from specific land uses are analyzed in order to assess the Normal Operative Ranges (NOR) of SOC fraction contents for each unit and land use combination. Thus, SOC levels of the different fractions of a specific field in a given unit can be compared to its corresponding NOR. It will help to better diagnose agricultural soil quality in terms of organic carbon compared to a bulk SOC diagnosis.