Geophysical Research Abstracts
Vol. 18, EGU2016-7542, 2016
EGU General Assembly 2016

Preliminary results on the influence of mineralogy on the turnover rates of SOM from different Hungarian soils

Dóra Zacháry (1), Zoltán Szalai (1,2), Gergely Jakab (1), Tibor Németh (3,4), Péter Sipos (3), and Tibor Filep (5)

(1) Geographical Institute, Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences, Budapest, Hungary (zachary.dora@gmail.com), (2) Department of Environmental and Landscape Geography, Institute of Geography and Earth Sciences, Eötvös Loránd University, Budapest, Hungary, (3) Institute for Geology and Geochemical Research, Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences, Budapest, Hungary, (4) Department of Mineralogy, Institute of Geography and Earth Sciences, Eötvös Loránd University, Budapest, Hungary, (5) Institute for Soil Sciences and Agricultural Chemistry, Research Centre for Agricultural Research, Hungarian Academy of Sciences, Budapest, Hungary

Fine textured soils generally considered containing more microbial biomass, and having a lower rate of biomass turnover and organic matter decomposition than coarse textured soils. In spite of this, several recent studies have shown contradicting trends. For example, the relative importance of different clay minerals for stabilizing SOM remains an open question.
The aim of this study is to evaluate soil mineralological effect on the turnover of SOM by identifying and quantifying soil phyllosilicates.
Our samples are derived from C3 forests and C3 croplands from different sites of Hungary. C4 maize residues are added to the soils in order to get natural 13C enrichment as tracer for the young carbon. Bulk samples of the soils from 0 to 20 cm depth were collected. The samples were dried at room temperature and preincubated in the dark for 4 months at 20 °C. The basic soil properties (pH, cation exchange capacity) were analysed after 2 mm sieving and homogenization. The amount of total C and N in the soils and maize residues were analysed using NDIR-chemiluminescent analyzer (Tekmar Dohrman Apollo 9000N). Particle size distribution was determined by laser diffraction (Fritsch Analysette MicroTec 22 plus) and particle imaging method (Malvern Morphologi G3-ID). The mineralological composition of the samples was determined by X-ray diffraction (Philips PW 1730 X-ray diffractometer).
Moist soil equivalent to 400 g dry soil mixed with 2 g maize leaves is kept in air tight glass chambers for 183 days at 20°C. The leaves had previously been dried at 60 °C, were cut into pieces and sieved through a 2 mm mesh. The evolved CO_2 is trapped by 10 mL 2 M NaOH, which is exchanged on day 1, 3, 5, 7, 10, 14, 21, 28 and subsequently every 31 days.
The fractional abundance of 13C of the soils, the plant material and the evolved CO_2 is measured with isotope ratio mass spectrometer (Thermo Scientific Delta V IRMS).
Our work show the preliminary results on the link between phyllosilicate mineralogy and soil C dynamic by reporting a quantified phyllosilicate data in connection with SOM turnover and stabilization.

Acknowledgement
This research was supported by the Hungarian Scientific National Fund (OTKA K100180).