



Investigation of biogeochemical interface development by a short-term incubation experiment using ^{15}N and ^{13}C labeled litter

C. Vogel (1), K. Heister (1), F. Buegger (2), A. Bannert (2), and I. Kögel-Knabner (1)

(1) Lehrstuhl für Bodenkunde, TU München, Freising-Weihenstephan, Germany (cordula.vogel@wzw.tum.de), (2) Helmholtz Zentrum München, German Research Center for Environmental Health (GmbH), Neuherberg, Germany

Fraction studies with isotopes such as ^{15}N and ^{13}C imply the possibility to get a process-oriented understanding about litter-derived carbon and nitrogen movement through various soil pools and the development of biogeochemical interfaces. The aim of our study was to follow the organic matter turnover and the formation of organo-mineral associations to get insight in the formation of biogeochemical interfaces over different time steps.

To mimic an agricultural topsoil system, sieved soil ($< 2 \text{ mm}$) was homogenized with litter ($< 200 \text{ } \mu\text{m}$) before water addition and weekly during the course of the experiment. The litter composed of ^{13}C and ^{15}N labeled maize and potato mixed in a relation of 1:1 and added in a proportion of 1:10 to the soil. The experiments were performed in three independent replicates and additional treatments with non-labeled litter as control. After litter addition, the soils were incubated for 42 days under defined conditions in a 14°C room at a water holding capacity of 60 %. For this, the columns were moistened in a two days interval. Samples were taken in 5 time steps, directly after litter addition and then after 1, 7, 21 and 42 days. The isotopic nitrogen and carbon composition of the bulk soil and the soil fractions were monitored using an isotope ratio mass spectrometer after a combined density and particle-size fraction.

First results show that ^{13}C is mineralized relatively quickly with a half-time of 12 days, by contrast ^{15}N remained more or less constant. The detection of ^{15}N and ^{13}C enrichment in organo-mineral associations after 3 weeks indicates the rapid development of newly formed interface which could have an influence on the stabilization of organic substances.