



Turnover of soil organic matter estimated from molecular isotope ratios of biomarkers

G. Gleixner

MPI for Biogeochemistry, 07749 Jena, Germany (gerd.gleixner@bge-jena.mpg.de)

This presentation summarizes our current understanding of organic matter cycling in soils. Natural labelling using vegetation change in C3 and C4 plant systems and application of low level labelled organic matter is used to trace the flow of carbon, nitrogen and hydrogen into various biomarkers of soil organic matter. We used 2H, 13C and 14C isotope ratios of alkanes and phospholipid fatty acids in solvent extracts in addition to 13C and 15N measurements on pyrolysis products to estimate the turnover of these compounds or their precursors in soil. Our results highlight that (a) plant derived carbon is not the only carbon source to soil organic matter, (b) recycling of soil organic matter plays an important role for soil organic formation (c) additional carbon sources for soil organic matter exist, (d) geogenic and atmospheric contaminations to soil organic matter that interfere with turnover calculations, can easily be detected using dual or triple (13C, 14C and 2H) molecular isotope ratios, (e) plant organic nitrogen is uniformly redistributed to nitrous pyrolysis products of soil organic matter. Our results suggest that soil organic matter turnover is in the decadal timeframe and a simple biological solution for more stable soil organic matter “pools” is given.