layers was not significant to predict the enzyme activities. This supports the assumption that the litter quality is more important as a source of variability. Using the N-acetylgalactosaminidase activity measurements of the entire year we analyzed their omnidirectional spatial structures. The OI layer had no spatial correlation and the Oh layer showed a structure with a range of 2.5m. On our poster we will discuss our findings and draw some conclusions.

P215
Soil organic matter stability and radionuclides availability to plants
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The less is soil organic matter stability the more is radionuclides (RN) availability to plants from soil. Agricultural land-use increase "new" organic matter income into soil with plant residues and organic manures. This "new" soil organic matter (NSOM) to a considerable extent is not stable, and, under such destabilizing factors as fertilizing, tillage etc., can undergo intensive mineralization, which, as it was shown in our previous investigations, is accompanied with increased RN plants uptake.

The aim of this work was to evaluate influence of accumulated during long-term field experiment NSOM on RN plant uptake under nitrogen fertilization. The investigations were carried out on soddy-podzolic sandy soil, contaminated by 137Cs. For 25 years on the background I (NPK) in soil was accumulated 3.6 1 C ha⁻¹ of NSOM and on the background II (NP + manure) - 9.0 1 C ha⁻¹ of NSOM. Soils of both backgrounds contained equal quantity of exchangeable potassium which controls 127Cs plant uptake. Ammonium nitrate was added at the rates of 0, 45, 90 and 135 kg N ha⁻¹. Our results demonstrated that under nitrogen fertilization specific 137Cs accumulation (Bq kg⁻¹) in oats grain and straw increased in 1.1, 2.2, 3.0 and 1.1, 1.2, 1.4 times on the background I, and in 1.7, 3.7, 3.9 and 1.5, 1.9, 2.3 times on the background II, respectively. This increase was caused by mineralization of organic compounds of soil. The more NSOM was accumulated due to the long-term fertilizing, the less was the extent of total soil organic matter stability against mineralization and the more was 137Cs plant uptake. The work was supported by Russian Foundation of Basic Research, project Bel_a.

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Characterization of Soil Organic Matter (SOM) from Brazilian Umbisol by 13C NMR spectroscopy and oxidative degradation
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Considering the role of SOM as a C sink, a better understanding of its stabilization is needed to mitigate the effects of the global climatic change. Specially, in tropical and subtropical regions where climatic conditions allow for intense mineralization of SOC and fast C-turnover rates. Because those soils present an advanced pedogenic stage, the maintenance of SOM is critical because of its importance for soil fertility, CEC, aggregate formation. Therefore, our intention was to characterize the SOM of Brazilian soils by oxidative degradation and solid-state 13C NMR to reveal size and quality of the C pool. Two Cambic Umbisols (CU-1; CU-2) from S-Brazil were studied. Samples were collected from each horizon, air-dried, ground and sieved (<2 mm). The pH (H₂O) and total C content (dry combustion) were measured. Samples were analyzed by solid-state CPMAS 13C-NMR spectroscopy after demineralization (HF, 10%). In addition, HF-treated fractions were oxidized (acid K₂Cr₂O₇) and the chemical oxidation resistant elemental carbon (COREC) was analyzed by solid-state NMR. Also, the degree of oxidizability of SOM was established by wet chemical oxidation (K₂Cr₂O₇; KMnO₄) and on the background II (NP + manure) - 9.0 1 C ha⁻¹ of NSOM. Soils of both backgrounds contained equal quantity of exchangeable potassium which controls 127Cs plant uptake. Ammonium nitrate was added at the rates of 0, 45, 90 and 135 kg N ha⁻¹. Our results demonstrated that under nitrogen fertilization specific 137Cs accumulation (Bq kg⁻¹) in oats grain and straw increased in 1.1, 2.2, 3.0 and 1.1, 1.2, 1.4 times on the background I, and in 1.7, 3.7, 3.9 and 1.5, 1.9, 2.3 times on the background II, respectively. This increase was caused by mineralization of organic compounds of soil. The more NSOM was accumulated due to the long-term fertilizing, the less was the extent of total soil organic matter stability against mineralization and the more was 137Cs plant uptake. The work was supported by Russian Foundation of Basic Research, project Bel_a.
Solid-state $^{13}$C-NMR spectra of HF+ K$_2$Cr$_2$O$_7$-treated samples demonstrate chemical differences in the composition of COREC of the individual soils. Whereas in deeper horizons of CU-1 dominated carboxylic-C and carboxyl-C. In CU-2 the contribution of aromatics increases with depth revealing that a part of the stabilized SOM occurs as black carbon. Our results confirm that such black carbon represents an important fraction of subsoil SOM.

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15N-DNA Stable isotope probing and active soil microbial community in plant residue decomposition process

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Knowledge of soil organic matter (SOM) turnover is essential for understanding nutrient cycling. SOM turnover is largely controlled by microbial communities, however most of soil microorganisms are still unknown and very few have been directly related to their function in specific soil processes. The recently developed DNA-Stable isotop probing (SIP) technique allows direct observations of substrate assimilation in microbial communities and represents an interesting new tool for linking microbial identity and function. To identify the active microbial community involved in the decomposition process of crop residues, an incubation experiment was conducted with high and medium 15N-enriched residues (90 atom %) incorporated (1%) in a Vertisol soil, taken from a long-term field experiment carried out in Venezuela since 1997. The residues were incubated for 30 days (25 oC) at 40 % WHC; A control without residue was also used. Microbial activities (CO2 evolution, ergosterol content, enzymes activities, C and N biomass) were measured after 3, 7, 15 and 30 days. DNA was extracted and the active and passive community was analyzed by using the 15N-DNA stable isotope probing (SIP) and molecular (DGGE, cloning and sequencing) techniques. The results showed that residue additions stimulated soil microbial activities and the 15N-DNA stable isotope probing technique allowed the isolation of the active bacterial and fungal community involved in the decomposition process.

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Soil organic carbon and nitrogen dynamics in soils amended with organic residues

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The application of organic residues to soils have received considerable attention recently, due to the sequestration of atmospheric carbon and the subsequent increase in soil productivity and fertility. Added organic matter is beneficial especially in the case of soils susceptible to degradation (with low organic matter content). Such soils are typically found in the Southeastern Mediterranean zone. Thus in an incubation experiment, a soil from Greece with low organic matter content was amended with four different organic residues (cattle manure, pig manure, poultry litter, and sewage sludge) at a rate equivalent to 200 kg N ha$^{-1}$, and was tested for a period of one year. During that time organic carbon, as well as nitrogen mineralization were monitored. Inorganic fertilizer was also added to the soil at similar nitrogen rate. For comparison, a second soil from Romania, with high organic matter content was also amended with the same organic residues and inorganic fertilizer and was incubated along the other soil. It was found that soil organic carbon increased significantly in both amended soils. Although organic carbon decreased over the time, at the end of the incubation period organic carbon was still higher in the amended soils compared to the unamended. Nitrogen release was slower in the amended samples than in the samples with inorganic fertilizer, and this showed the agronomic benefits of using organic residues.

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Fertilizer type and rate: effects on labile carbon and nitrogen pools in a long-term trial on a sandy Cambisol

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Type and rate of fertilizers influence the level of soil organic carbon (C$_{org}$) and N markedly, but the effect on labile C- and N-pools is open to question. Objectives were to investigate the impact of fertilizer type and rate on labile C- and N-pools on a sandy Cambisol. From the 27 year old long-term experiment in Darmstadt, six treatments were compared: application of mineral fertilizer with straw-yield incorporation (MSI) and application of farmyard manure (FYM), both at high, medium and low rate. Soil microbial biomass C (C$_{mic}$) and N (N$_{mic}$) were determined. In an addition experiment (266 days, 10 °C, 55 % WHC), we assessed CO$_2$-C and netto-N-mineralization. An exponential two-pool model was fitted to the mineralization data for separating labile C- and N-pools (C$_1$, C$_2$, N$_1$, N$_2$). In all treatments, stocks of C$_{org}$ declined since 1982. N stocks were maintained in the FYM treatment at high and medium rate.

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Decomposition of tropical tree litters: Impact of litter quality on C mineralization kinetics and soil organic matter characteristics

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Tree litters and more particularly the tropical ones are recognized to have high levels of polyphenols and lignins. Polyphenols are the most abundant class of plant secondary metabolites and are mainly distributed in the vacuole of cells (soluble fraction) while lignin is an important polymer of plant structural C (cell walls). These compounds are both recognized to slow down litter decomposition and N mineralization rates. However, this relationship between litter quality and rate of decomposition is not quantified and moreover not fully explained yet. In addition the impact of initial intrinsic quality of such litters on soil organic matter chemical characteristics was not reported. For instance, is there a qualitative continuum between the initial characteristics of lignin polymer in the tree litter and that found in soil after decomposition?

The aims of our study were to i) better characterize the role of litter composition in slowing down C and N mineralization.