



## **Temporal variation of soil organic matter composition affected by fertilization and soil heterogeneity**

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Soil organic matter (SOM) is affected by fertilization and soil management via input of litter and exudates. However, SOM composition may also be affected by weather conditions or the spatial heterogeneity of soils. Archived soil samples from long-term field experiments offer a possibility to study such effects.

Our objective is to analyze OM composition with respect to effects of i) long-term fertilization, ii) annual climatic conditions and iii) spatial heterogeneity of soils. We compared data from archived top soil samples from differently fertilized plots at Groß Kreutz, Bad Lauchstädt, and Müncheberg (taken in 1999) and samples from Halle (different years). The composition of SOM in terms of functional groups was characterized with FTIR spectroscopy.

Long-term fertilization with farmyard manure was found to increase the cation exchange capacity (CEC) of a pyrophosphate soluble fraction (OM-PY), while N- fertilization resulted in a relative decrease in CEC of OM-PY. Archived samples from different years and from plots with identical fertilization but different location suggested that the SOM composition (bulk soil) reflected not only the kind of fertilization but also the annual weather conditions (relevant for plant growth and related to litter input), and small scale differences in elevation (possibly responsible for soil erosion). We concluded that the weather condition in the sampling year and effects of erosion need to be considered in addition to the effects of long-term fertilization.