

## **Size distribution and composition of soil nanoparticles and small microaggregates in dependence of clay content**

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Soil microaggregates (SMA, <250  $\mu\text{m}$ ) are one important factor influencing soil properties of ecological and structural relevance. The characterization of SMA building units composed of large (250-20  $\mu\text{m}$ ) and small SMA (< 20  $\mu\text{m}$ ) and nanoparticles (NP, <220 nm) can be helpful to better understand their formation and role in soil ecosystems. German Luvisols with five different clay contents were fractionated into macroaggregates (8000-250  $\mu\text{m}$ ); large and small SMA and NP by wet sieving and pressure filtration. Free and occluded SMA were distinguished by using ultrasonication. The particle size distribution (PSD) of isolated small SMA was determined by using the XPT particle analyzer. NP size and composition were investigated using field flow fractionation coupled to a UV detector and ICP-MS. The percentage of occluded large and small SMA increased with clay content. Strikingly the proportion of free SMA was constant and independent from clay content. There were no differences in the PSD of free and occluded small SMA. The NP fraction showed three different size classes which were mainly composed of Al, Si and Fe. Between free and occluded NP the mass ratio of these elements was different suggesting a crucial role in SMA formation.