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Characterisation of particle size fractions in relation to specific surface area in a Eutric Cambisol

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Interfaces in soil are affected by the characteristics of the particle surfaces present. We analysed particle size fractions of a Eutric Cambisol from a long-term field experiment in Ultuna, Sweden to gain insight into the contribution of the different particle size fractions to biogeochemical interfaces in soil. C and N content and dithionite and oxalate extractable iron were compared to the specific surface area of the particle size fractions. Specific surface area was measured by BET-N2 adsorption and EGME retention. The soil exhibits very stable micoraggregates in the coarse and middle silt fractions which could not be disrupted by ultrasonication during the fractionation procedure. Furthermore, specific surface area measurement showed that the dispersion procedure during particle size fractionation did not provide extra surface area. A strong correlation between the measured BET-N2 and EGME specific surface areas indicated that EGME surface area measurement was not affected by changes in organic matter content between the size fractions in this soil. Specific surface area decreased significantly after iron extraction. This indicates that iron oxides play an important role providing surface area in the soil. Further, a decrease in carbon content after iron extraction could indicate that part of the organic matter in the soil is closely associated with iron oxides.