



## **Impact of clay-organic coating material on adsorption characteristics of differently textured soils**

Steffen Beck-Broichsitter, Marisa Rixte Gerriets, and Horst H. Gerke

The estimation of adsorption isotherm data is essential to predict adsorption mechanisms that characterise the interactions between soils and solutes in soil aggregates, columns and profiles. Such mechanisms will affect soil filtration function with respect to the transport of reactive solutes. Dye tracer experiments are often used to reflect the transfer of reactive solutes. For soils sensitivity analysis of dye tracer experiments the Ultraviolet-Visible (UV-vis) spectrophotometry is a commonly used method in biochemical and water research field.

The linear and non-linear models of Henry, Freundlich, Langmuir, and Dubinin-Radushkevich were used to obtain the adsorption isotherms from batch experiments with Brilliant Blue (E133) for three differently textured soils (glacial till, loess, sand) with (i) mixed bulk soil samples which includes soil organic matter (SOM) and clay-organic coatings, (ii) mixed soil samples in which SOM is destroyed and (iii) clay-organic coatings that are separated from the respective soils. The results indicate that the non-linear Langmuir model ( $r^2$ : >0.97) reflects the experimental data better and to a larger extent than the three other models ( $r^2$ : 0.89–0.95). The values of maximum adsorption capacities estimated from the non-linear Langmuir model decrease in the following order: glacial till > loess > sand with iii) > i) > ii). The authors can conclude that a) more clayey soils show a higher adsorption capacity than sandy soils and b) clay-organic coatings are key factors affecting the adsorption capacity of differently textured soils.