EGU2020-8325
https://doi.org/10.5194/egusphere-egu2020-8325
EGU General Assembly 2020

Soil Cohesion Development under Different Pore and Size Characteristics

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Soil cohesion (Co) is one of the most important physical soil characteristics and it is closely related to the basic soil properties and physical distribution forces (e.g. particle size distribution, pore sizes, shear strength) and so it is mostly determined by experimentally approaches with the help of other soil properties in general terms. Instead of using these assumptions, the fluidized bed approach provides an opportunity for direct measurement of intrinsic soil cohesion. In this study, soil cohesion development for different soil types was investigated with the fluid-bed method by which pressure drop in soil mass measures under increasing water pressures until the cohesion between particles disappears. For this purpose, 20 different soils varying with a wide range of relevant soil physical properties were sampled; such that clay, silt and sand contents varied between 2% and 56%, 1% and 50%, and 1% and 97%, respectively while porosity values were between 0.38 and 0.92. By those textural diversities of the soils, obtained cohesion values changed between 5203 N m^{-3} and 212276 N m^{-3}. Given results from regression analysis, a significant relationship was found between cohesion values of the soils and their porosity and silt fractions (R^2: 86.6).These findings confirm that the method has a high potential to reflect differential conditions and show that soil cohesion could be modeled by such basic and easily obtainable parameters as particle size distribution and porosity, as well.

Key words; **Mechanical soil cohesion, particle size distribution, fluidized bed approach, porosity**