Contribution ID: **625** Type: **Oral Presentation**

Revisiting pedotransfer function databases by fitting dual porosity model and analyzing matrix and macro-pore properties

Tuesday, 1 June 2021 10:45 (15 minutes)

Soil database was traditionally used to characterize uni-modal soil water retention curve and hydraulic conductivity curve in the past decades. However, soil is often shown to have dual-modal property, being described by macropores/fracture pore system and matrix pore system, respectively, indicating structured soils/fractured rocks and microscopic soils. Here we employed widely-used pedotransfer function databases, including UNSODA 2.0, Vereecken, and HYPRES databases, to characterize both uni-modal and dual-modal water retention curves and hydraulic conductivity curves. Only undisturbed samples were selected from the databases. We further required strict criteria to choose the soil samples to ensure that there is enough information in the measurement. A new fitting approach was then proposed to obtain the global minimal soil hydraulic parameters for both the unimodal and dual-modal Mualem van Genuchten (MvG) functions (van Genuchten, 1980; Mualem, 1976). Results suggested there is a decreasing trend of alpha (inverse of air entry parameters) and n (pore size distribution parameters) with the increasing of alpha values in the MvG functions. This trend seems to contradict our physical principles that larger alpha values usually correspond to larger n values. The decreasing trend between alpha and n were further verified analytically. We also find that the ratio of n parameters between macropore and matrix properties has an interesting relationship with the weighting factors obtained from the fitting of dual-modal soil water retention curve and hydraulic conductivity curve, respectively, for the two properties. We anticipate that the results will help to derive soil pedotransfer functions for macropore and matrix properties, which might alleviate unrealistic combinations of MvG parameters.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

Both Time Block A and B are good for me.

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