A STRUCTURAL CLASSIFICATION SYSTEM OF SOIL PORE SPACE: A PROPOSAL

ABSTRACT: A structural classification system of soil pore space is presented which is similar to the textural classification. Instead of particle size, it is based on pore size distribution. Pore size is equivalently measured by water suction (s) and the cumulative pore size distribution is considered to be the function [A(s)] that relates the normalized air content (A) to suction, where the scaling factor for normalizing air content is the effective porosity (porosity minus residual water content, θ_r). θ_r is calculated according to a parametrization protocol based on the van-Genuchten equation for water retention. The goal of the system is to group soils (soil families) with similar air availability curves, which are the functions that relate the air content to suction. Selected suctions were arbitrarily chosen (zero, 60cm and 15000cm) and three pore volume fractions – A(60), A(15000)-A(60), 1-A(15000) - , which add up to 1.0, are considered as the input data in a classification triangle, in a similar procedure used for textural classification. This triangle which sides represent the scales for plotting the input fractions is called the structural triangle, in which specific sub-areas define the nine possible soil family types. Each family type can have four orders, corresponding to possible effective porosity ranges of 0.20 cm3/cm3 in the space 0-0.80 cm3/cm3. So, a maximum of 36 soil families is predicted . A database with water retention information of about 1500 undisturbed samples was used to verify the classification system. It is confirmed that most of the predicted families contained samples of the selected database and that the families grouped samples with similar air availability curves. This result indicates the potential usefulness of the proposed system for pedologic knowledge and as tool for inference of hydraulic characteristics from pedotransfer functions.