Geophysical Research Abstracts, Vol. 9, 09318, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09318

Using Belgian soil series classification to predict soil hydraulic properties

M. Weynants (1), H. Vereecken (2), M. Javaux (1,2)

(1) Env. Sciences Dpt., Université catholique de Louvain, Belgium, (2) Agrosphaere, Forschungszentrum Jülich, Germany

Soil hydraulic properties have a great influence on hydrological model results and their optimal parametrization is therefore of paramount importance. Pedotransfer functions (PTF) relate these properties with more readily available information which can be typically obtained from soil surveys. The PTF outputs are however often less accurate than expected. The explanation may be that they usually do not account for the soil pore space structure. This study aims at investigating the correlations between soil structure and hydraulic soil properties for a Belgian soil dataset, developed by Vereecken. The dataset describes the hydraulic conductivity curve with Gardner model: $K(h) = K_{sat} / (1 + (bh)^n)$ for some 114 horizons within 36 soil profiles. The b parameter in this model has been related to macrostructure process. We therefore propose to express b as a function of horizon type and soil series information: textural, drainage and profile development classes, which are available in the Belgian soil survey database. Regression trees were used to split the dataset into homogeneous subsets according to those categorical data. Different combinations of those data were used. The smallest residual variance occurred with the more complete model, including all the variables tested. The horizon type was the best grouping parameter for coarse textural classes, while for the others, drainage class splits the dataset first by horizon type. $Log(b)$ data could be separated into groups having distinct average values using textural classes and other qualitative data related with soil structure.