Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05141, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05141
EGU General Assembly 2008

A general framework for n-dimensional quantification of soil structure — from pore scale to the continuum

H.-J. Vogel (1) and U. Weller (1)

(1) Department of Soil Physics, Helmholtz Centre for Environmental Research - UFZ, Theodor-Lieser-Str. 4 06120 Halle (Saale), Germany (email: hjvogel@ufz.de)

Modern imaging techniques provide high quality data on soil pore structure and on structural heterogeneity at larger scales. Especially X-ray tomography has become more and more available. The number of possible measures that can be taken from the obtained image data is huge, the number of useful measures is somewhat less.

We present a general framework for the quantification of binary pore structures and of heterogeneous grey-scale images which is applicable for 2D as well as for 3D images. It is based on integral geometry combined with tools of mathematical morphology. The resulting morphological functions include valuable information on size distributions, interface geometries, topology and the spatial correlation of binary features or grey scale images. It is demonstrated how these morphological function can be used to predict soil functions and herewith their potential to improve our understanding of the soil structure-function complex is discussed. All tools are implemented in a open source C/C++-library.