



## **A simple Model for describing hydraulic Conductivity in unsaturated porous Media accounting for film and capillary Flow**

**A. Peters**(1) and W. Durner(1)

(1) Institute of GeoEcology, Dept. of Soil Science and Soil Physics, Braunschweig Technical University (a.peters@tu-bs.de)

The commonly used models for characterizing hydraulic conductivity of porous media, such as the Burdine (1953) or Mualem (1976) model rely on pore bundle concepts that presume only capillary flow, neglecting film flow phenomena. There is a lot of experimental evidence that water flow in medium and strongly unsaturated porous media can be significantly underestimated by these capillary bundle models. Therefore Tuller and Or (2001) presented a model accounting for both, capillary and film flow. However, their model is quite complex and coupled to their special model for water retention (Or and Tuller, 1999) and thus cumbersome to implement in a numerical framework. We present a new model that combines a simple film flow function to the capillary flow model of Mualem. This new model may be coupled to any retention model and thus is easy to implement in a modeling framework. We investigated a set of literature data for retention and conductivity functions that all reached dry conditions and were poorly described by capillary bundle models. These data could be well described with the new model, if coupled with an appropriate retention model.