



## **Numerical Aspects of Material Discontinuities in Soils**

O. Ippisch

University of Heidelberg, Interdisciplinary Center for Scientific Computing, Heidelberg, Germany  
(olaf.ippisch@iwr.uni-heidelberg.de)

In natural porous media rather sharp interfaces between materials with completely different hydraulic properties (e.g. horizon boundaries, Ap-horizon/plowplan) can exist. These discontinuities pose problems for the stability and accuracy of numerical solutions of the flow and transport equations. The choice of adequate averaging techniques of the hydraulic conductivity at the interface and the correct treatment of capillary barrier effects are essential to obtain a good solution already at rather coarse grids. The use of stabilization techniques and robust linear solvers is necessary. The flow field calculated for water/gas transport has to be interpolated in an appropriate manner to obtain mass conservative solutions of solute transport simulations.

The numerical difficulties and approaches for the treatment of strong heterogeneity are discussed and illustrated with examples.