Geophysical Research Abstracts,
Vol. 11, EGU2009-1412, 2009
EGU General Assembly 2009

Multi-Component Modeling of Porous Media Flow Coupled with Free Flow

K. Mosthaf (1), H. Class (1), B. Flemisch (1), R. Helmig (1), A. Leijnse (2), and I. Rybak (3)

(1) Universitaet Stuttgart, IWS, Germany (klaus.mosthaf@iws.uni-stuttgart.de), (2) Wageningen Universiteit, Netherlands, (3) Universitaet Stuttgart, IANS, Germany

When a fluid infiltrates into an unsaturated soil or when a wet porous medium dries, the different driving forces of the infiltration or drying processes can lead to an unstable growth of the water-gas interface or to self-stabilizing behavior. The free flow - porous media interface processes have a strong influence on the above mentioned flow and transport mechanisms.

Up to now, the coupling of free flow with porous media flow has been often considered only for single-phase systems. We extend this classical concept to two-component non-isothermal flow with two phases inside the porous medium and a single phase in the free flow region. With this, our model also takes evaporation and condensation processes into account.

We will discuss the influence of the free flow - porous media interface on evaporation and water distribution and present comparisons of our concept with classical concepts.