



Development of experimental, monitoring, and mathematical methods to quantify water fluxes and transport in heterogeneous aquifer system models

By Marko Hünniger

Cuvillier Verlag Aug 2011, 2011. Taschenbuch. Condition: Neu. Neuware - The present study provides experimental and mathematical methods for the understanding and quantification of the water fluxes and solute transport in heterogeneous layered porous groundwater systems characterised by differences in hydraulic conductivities. On the one hand, multi-layered porous groundwater systems with different hydraulic conductivities are characterised by a heterogeneous flow field, which causes a heterogeneous mass transport. On the other hand, extreme differences in hydraulic conductivities create regions of immobile water which influence the mass transport. These two different structural heterogeneities - variable hydraulic conductivities and immobile/stagnant water zones - were investigated experimentally in different laboratory aquifer models. The influence of immobile and stagnant water zones on mass transport was investigated with multi-tracer tests using tracers with different diffusion properties, namely; uranine, bromide, deuterium, oxygen-18 as well as tritium-labelled water, in two-dimensional packed sediment column setups. Two separate column setups were filled. One column setup was filled with clay and sandy material while a second was filled with two different sand sediments. The observed tracer concentration breakthrough curves showed differences in peak concentrations and pronounced tails. Qualitative evaluation of tracer concentration curves led to the assumption that these effects



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