

REACTIVE TRANSPORT IN UNSATURATED POROUS MEDIA

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ABSTRACT

The environmental protection and essentially water resources become a priority on a national scale as international. The consequences of the soil pollution and its impact on the quality of subterranean waters take a run-up the last years. This pollution can be various origins such (atmospheric pollution, the agricultural storage of waste due with care of pesticides in surfaces of grounds, etc...). These pollutants are infiltrated in the ground and can affect ground waters. Therefore, the studies of the pollution as well as the hydric transfers in unsaturated grounds are at present the objective of active research.

The aim of this work was to study the link between water flow and physical and chemical interactions in soils under variably water flow conditions, in order to improve the prediction of contaminants fate. It deals with understanding how the porous media water content can modify soil reactivity towards contaminants, and assessing the possibility to predict reactivity under unsaturated conditions with reactive solute transport studied in unsaturated porous media. In each case, experiments were carried out with soil columns at the laboratory scale under unsaturated steady-state flow conditions, in order to characterize at first hydrodynamics and then to study the link with reactivity. The experimental device is composed essentially of different tensiometer and electrical conductivity implanted at different positions to follow respectively the pressure head and the concentration of pollutant within the column. The experimental ground used on this study is a mixture of sand and clay. The experimental results were compared with numerical results using the finite elements methods.