

Influence of water content on pore velocity in unsaturated sand column.

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ABSTRACT: The abstract should be between 150 to 200 words. It must clearly describe the most important contributions of your work.

Frequently, the solute flux is described as a Fickian process because a mechanical dispersion. However in unsaturated porous media, due to the air contribution, transport may be considered as non-Fickian process. In this case, asymmetrical elution curves with early initial arrival and long effluent tailings may be restituted at the outlet of unsaturated soil columns. Dual-porosity and mobile-immobile models are usually used to described transport behavior. Pore velocity is assumed to be a linear relation of flow velocity with water content. However, pore velocity is introduced in models as an adjustment variable although water content and flow velocity are independently measured. Profiles concentration at 16 locations within the column and breakthrough curves have been collected at 5 flow rate conditions. Pore velocities deduced from the 16 concentration profiles show lower or higher values than expected with the linear relation in the upper part of the unsaturated column. As water content reaches the capillary fringe, pore velocities are slightly higher than expected. In this case, difference should result from a immobile water fraction which don't contribute to flow. A new expression of pore velocity depending on water content and flow velocity was expressed as a power law equation. The two transport behavior tendencies depend on water content distribution within the porous media.