Contribution ID: **682** Type: **Poster (+) Presentation**

Solute transport during unstable infiltration into layered heterogeneous porous media

Monday, 31 May 2021 19:35 (1 hour)

Gravity-driven infiltration of fluids into heterogeneous soil controls the distribution of water in soil and the fate and transport of pollutants through the vadose zone. Infiltration into dry soil is hydrodynamically unstable, leading to preferential flow through narrow wet regions. These preferential channels concentrate water and solute fluxes and persist over cycles of wetting and drying.

In this work, we use numerical simulation to explore the impact of fingering and layered soil structure on solute transport in the vadose zone. We validate our unsaturated flow model by reproducing experimental results of infiltration of water into various configurations of layered soil. Our model can accurately reproduce the flow behavior at the transition between layers with contrasting grain sizes. We propose to calibrate our continuum unsaturated flow model using the changes in finger width as a function of infiltrating flux and grain size contrast between layers. We simulate the transport of a passive tracer through initially dry soil and after multiple infiltration cycles, and characterize the transport mechanisms in 2D and 3D layered soils.

Time Block Preference

Time Block C (18:00-21:00 CET)

References

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Primary authors: PAMPILLON ALONSO DE VELASCO, Pedro (Universidad Politécnica de Madrid); CUETO-FELGUEROSO, Luis (Universidad Politecnica de Madrid); JUANES, Ruben (MIT)

Presenter: PAMPILLON ALONSO DE VELASCO, Pedro (Universidad Politécnica de Madrid)

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