Multicomponent Transport Model HYDRUS-PHREEQC For Variably-Saturated Porous Media: Application To the Transport Of Heavy Metals in Soils. (S01-simunek130429-Poster)

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Abstract:

A new coupled model for multicomponent, reactive transport during transient variably-saturated flow based on combination of two comprehensive models (HYDRUS-1D and PHREEQC) is presented. HYDRUS-1D is a one-dimensional finite element model simulating the movement of water, heat and multiple solutes in variably saturated heterogeneous or layered soils under various boundary conditions. PHREEQC is a computer program simulating the behavior of complex chemical systems including such reactions as speciation, ion exchange, surface complexation, mineral precipitation/dissolution. As a verification of the coupled HYDRUS1D-PHREEQC model, we compared results for a steady-state saturated flow problem obtained with both the coupled model and PHREEQC. We will illustrate the possibilities of the new code for the long-term leaching of heavy metals (Cd, Zn, Pb) in a contaminated soil profile. The example considers several levels of complexity that are included into the coupled model: multicomponent transport in homogeneous and physically and chemically heterogeneous (layered) soil profiles under steady-state, periodic or atmospheric flow conditions.

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