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Numerical simulation of NMR responses of coupled pore systems using 3D FEM modelling.

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Structure and state of soils have considerable influence on their flow and transport properties in particular for the vadose zone. In NMR the evolution of magnetization in a fluid filled porous medium is related to the pore geometry and to the surface properties of rocks or soils. Numerical simulations of multiphase flow and NMR responses for isolated and coupled pore systems have been carried out using 3D finite element modelling to quantify these relations. The simulations are verified by corresponding laboratory experiments on synthetic samples. Based on these investigations we aim at an interpretation scheme for NMR measurements in order to assess structure, state, and thus flow properties of partially saturated soils.