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INVESTIGATING THE ACCURACY OF A DARCY SCALE MODEL OF COMPETITIVE ADSORPTION IN A POROUS MEDIUM THROUGH SPH PORE SCALE MODELING

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Summary. In this paper we investigate the accuracy of a Darcy-scale model for competitive adsorption in a porous medium through comparison with a smoothed particle hydrodynamics (SPH) pore-scale model. SPH is a Lagrangian, particle based modeling method which uses the particles as interpolation points to directly discretize the governing equations of the system. The models consider a binary system of competitively adsorbing species traveling through a porous medium due to advection and diffusion. The effects of Damköhler number and porous microstructure on the accuracy of the Darcy-scale model when compared to the pore-scale model are investigated. The comparison of the Darcy-scale model and the pore-scale model shows that the Darcy model overestimates the mass of a plume moving through the domain for all Damköhler numbers investigated and is not able to accurately predict the masses of both surface species in a reactive system.