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## The relevance of preferential flow in catchment scale simulations

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Despite experimental evidence preferential flow is rarely included in hydrologic catchment scale models. This is, at least partly, due to the challenge of deriving preferential flow parameters. Here, we successfully used the optimization algorithm DREAM to calibrate a 3D physics-based dual-permeability model directly at the catchment scale. We limited the number of parameters to be calibrated to the ones being most influential for the simulation of discharge, and we also calibrated parameters of the matrix domain and the macropore domain with a fixed parameter ratio between soil layers. During calibration, saturated hydraulic conductivities of the macropore domain and of the matrix domain converged to very similar values. The dual-permeability parameter sets also did not outperform a calibrated single-domain reference model scenario. We conclude that the incorporation of vertical preferential flow as represented by the dual-permeability approach was not advantageous for reproducing the hydrometric response reasonably well in the studied catchment.