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Hydraulic properties of mine soils with embedded lignitic fragments

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Lignitic mine soils represent a typical two-scale dual-porosity medium consisting of a technogenic mixture of overburden sediments that include lignitic components as dust and as porous fragments embedded within a mostly coarse-textured matrix. Flow and transport processes in such soils are not sufficiently understood to predict the course of soil reclamation or of mine drainage. The objective of this contribution is to identify the most appropriate conceptual model for describing small-scale heterogeneity effects on flow on the basis of the physical structure of the system. Two-domain hydraulic properties were derived based on multi-step outflow data. The interface between fragments and sandy matrix represents an additional pore region that cannot be derived from information of either the matrix or the fragments. New information is required on the geometry (size and shape) and spatial distribution of fragments to describe the properties of the mine soil as a whole.