



Sediments' connectivity and transport properties

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The heterogeneities at fine scales of alluvial sediments have strong impact on water flow and contaminant transport in the subsurface at larger scale. In particular the spatial distribution of hydrofacies controls the spatial variation of hydraulic conductivity (K), which in turn controls, together with the hydraulic gradient and the stresses on the aquifer system, groundwater flow and the fate of contaminant in the subsurface. However, the connectivity of permeable materials could be more important than the K values to determine the behaviour of solute transport because it controls the existence of preferential flow paths or of hydraulic barriers. Numerical experiments of convective transport of conservative solutes conducted on different kinds of sedimentary structures are interpreted with single and dual domain models; the results are compared with connectivity indicators, in order to confirm the previous qualitative remark about the role of connectivity and to assess which connectivity indicator is more appropriate to characterize transport processes. The results show similarities and differences of connectivity and transport characteristics among various sedimentary structures and scales.