

Mixing processes in highly heterogeneous formations

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Abstract We numerically explored the interplay between formation heterogeneity and local dispersion on the transport of a passive tracer in highly heterogeneous formations. In order to minimize the negative impact of numerical diffusion, we used the Smoothed Particle Hydrodynamics scheme recently proposed by Herrera *et al.* (2009). Heterogeneity enhances mixing, as measured by the dilution index, with a rate of increase with the logtransmissivity variance that attenuates passing from moderately to highly heterogeneous formations. In addition, the sample frequency distribution of the solute concentration is well represented by a Beta model at both low and high variances. The Beta model requires the knowledge of the spatial mean and variance of the solute concentration as the only parameters to be determined.

Key words mixing; highly heterogeneous formations; concentration distribution