

## CONSEQUENCES OF PORE SCALE VELOCITY CORRELATION AND NON GAUSSIAN DISTRIBUTIONS FOR UPSCALING EFFECTIVE TRANSPORT PROPERTIES IN HETEROGENEOUS POROUS MEDIA

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**Summary.** We investigate effective transport upscaling from pore scale simulations of flow and transport in periodic pores (Bolster et al. Phys. Fluids, 2009) and in heterogeneous porous media (Tartakovsky et al. GRL, 2008). The periodic pore model, although relatively simplified, allows ones to understand the effect of pore wall fluctuations on solute dispersion. We show that this effect can be quantified by computing the local distribution of particle velocities and their temporal and spatial correlation. This allows applying the Lagrangian framework proposed by Le Borgne et al. (PRL, 2008) to derive an effective transport model. The analysis is then applied to a heterogeneous porous media with a distribution of pore sizes. We discuss the consequences of the local scale correlation and non Gaussian distribution of particle velocities on the transport properties.