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Hydrodynamic dispersion in heterogeneous anisotropic porous media: A simple model for anomalous diffusion emergence

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*Cover letter and Highlights

Highlights

- Simple model for anomalous diffusion emergence in heterogeneous anisotropic porous media where discrete sets of preferential flow paths can be identified.

- Advection and diffusion coupling in heterogeneous anisotropic porous media, produce complex dynamical behaviors ranging from superdiffusion due to long-range correlations to superdiffusion due to Lévy walks.

- Sub and super diffusive phenomena can be found in the same transport process along different spatial directions.

- In contrast to the usual findings in isotropic systems, strong medium heterogeneites are responsible for superdiffusive behavior due to Lévy walks.