Experimental Evidence of Helical Flow in Porous Media - DTU Orbit (08/11/2017)

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Helical flow leads to deformation of solute plumes and enhances transverse mixing in porous media. We present experiments in which macroscopic helical flow is created by arranging different materials to obtain an anisotropic macroscopic permeability tensor with spatially variable orientation. The resulting helical flow entails twisting streamlines which cause a significant increase in lateral mass exchange and thus a large enhancement of plume dilution (up to 235%) compared to transport in homogenous media. The setup may be used to effectively mix solutes in parallel streams similarly to static mixers, but in porous media.

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Authors: Ye, Y. (Ekstern), Chiogna, G. (Ekstern), Cirpka, O. A. (Ekstern), Grathwohl, P. (Ekstern), Rolle, M. (Intern)
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