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Chaotic advection in 2D anisotropic porous media[1] STEPHEN VARGHESE, MICHEL SPEETJENS, RUBEN TRIELING, FEDERICO TOSCHI, Eindhoven University of Technology — Traditional methods for heat recovery from underground geothermal reservoirs employ a static system of injector-producer wells. Recent studies in literature have shown that using a well-devised pumping scheme, through actuation of multiple injector-producer wells, can dramatically enhance production rates due to the increased scalar / heat transport by means of chaotic advection. However the effect of reservoir anisotropy on kinematic mixing and heat transport is unknown and has to be incorporated and studied for practical deployment in the field. As a first step, we numerically investigate the effect of anisotropy (both magnitude and direction) on (chaotic) advection of passive tracers in a time-periodic Darcy flow within a 2D circular domain driven by periodically reoriented diametrically opposite source-sink pairs. Preliminary results indicate that anisotropy has a significant impact on the location, shape and size of coherent structures in the Poincare sections. This implies that the optimal operating parameters (well spacing, time period of well actuation) may vary strongly and must be carefully chosen so as to enhance subsurface transport.

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