Contribution ID: **754** Type: **Oral Presentation**

Influence of intermittency effects on anomalous transport in single- and multi-phase flow in porous media

Wednesday, 2 June 2021 20:20 (15 minutes)

Multi-phase flow and transport in porous media is prevalent in a wide range of challenging fluid mechanics problems in sustainability, energy, and the environment. Accurate prediction of the displacement and interaction of such flows is vital in addressing these problems, particularly the small- or pore-scale study of the flow's spatial and temporal evolution, which can impact flow behavior at system scales in a nontrivial manner. Intermittency is a phenomenon currently observed in numerical and experimental studies of single-phase flow, but the case of multi-phase flow has yet to receive much study in this regard due to challenges faced in both simulations and experiments. Due to strong nonlinearities and nonlocalities, a comprehensive understanding of multi-phase flow at very small scales is necessary in the development of accurate upscaled system-scale prediction models. We present results from a coordinated numerical and experimental study of intermittency effects over a range of viscous and inertial flow regimes in single- and multi-phase flows in 2D porous media micromodels to quantify Lagrangian flow statistics. The applicability of different modeling frameworks such as the correlated-continuous time random walk is tested by studying statistics of particle trajectories obtained by experimental particle tracking velocimetry measurements and numerical particle tracking in Lattice Boltzmann simulations.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

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