Contribution ID: **900** Type: **Poster Presentation**

Pore-scale imaging of nonlinear multiphase flow in porous media

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Multiphase flow in porous materials is conventionally described by an empirical extension to Darcy's law, which assumes that the pressure gradient is proportional to the flow rate. Through a series of bench and pore-scale imaging two-phase flow experiments, we demonstrate that even when capillary forces are dominant at the pore scale, there is a nonlinear intermittent flow regime with a power-law dependence between pressure gradient and flow rate. Energy balance is used to predict accurately the start of the intermittent for a range of fractional flows, fluid viscosities, and different rock types. The pore-scale explanation of the behaviour based on the periodic filling of critical flow pathways is also confirmed through 3D micron-resolution X-ray imaging.

Participation

In-Person

References

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Energy Transition Focused Abstracts

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