Contribution ID: **641** | Type: **Oral 20 Minutes**

Impact of disorder on pressure saturation curves, and graph theory shedding light on the life and death of capillary bridges and films pathways.

Wednesday, 16 May 2018 16:16 (15 minutes)

We study experimentally and numerically drainage situation in a disordered porous medium. We show how the fractal dimension associated to capillary fingering, the Bond number and fluctuations amplitude in capillary thresholds allow to compute the residual saturation under various gravitational fields, and in various disordered distributions for the capillary thresholds. We also show how these parameters can allow to compute saturation-pressure curves for a given medium, and how the size of the chosen representative elementary volume has to be taken into account when using such curve. In the experiments, we study the residual saturation left behind as a fully saturated porous media is drained on a quasi two-dimensional porous model. The model is transparent, allowing the displacement process and structure
to be monitored in space and time.
Slow transport are aslo studied directly past a primary invasion front: Observations show the residual saturation to be interconnected by means of capillary bridges, allowing for seemingly entrapped fluid to be transported back to the bulk. This process shows dependence with the Bond number and a statistical decay with increasing distance from the invasion front.
Furthermore we have analyzed the spatial connectivity of the networks spanned by capillary bridges, and examined the occurrence of rupturing of individual bridges. We characterize the dynamics of this slow transporting lowly connecting network of bridges and films using graph theory.

References

Acceptance of Terms and Conditions

Click here to agree

Primary authors: AYAZ, Monem (IPGS); TOUSSAINT, Renaud (IPGS, Univ Strasbourg, PoreLab, Univ Oslo); Prof. MÅLØY, Knut Jørgen (PoreLab, Department of Physics, University of Oslo); Dr MOURA, Marcel (PoreLab, Department of Physics, University of Oslo); Prof. SCHÄFER, Gerhard (LHYGES, Univ. Strasbourg)

Presenter: TOUSSAINT, Renaud (IPGS, Univ Strasbourg, PoreLab, Univ Oslo)

Session Classification: Parallel 8-F

Track Classification: MS 1.09: front & interface dynamics and up scaling transport properties in porous media