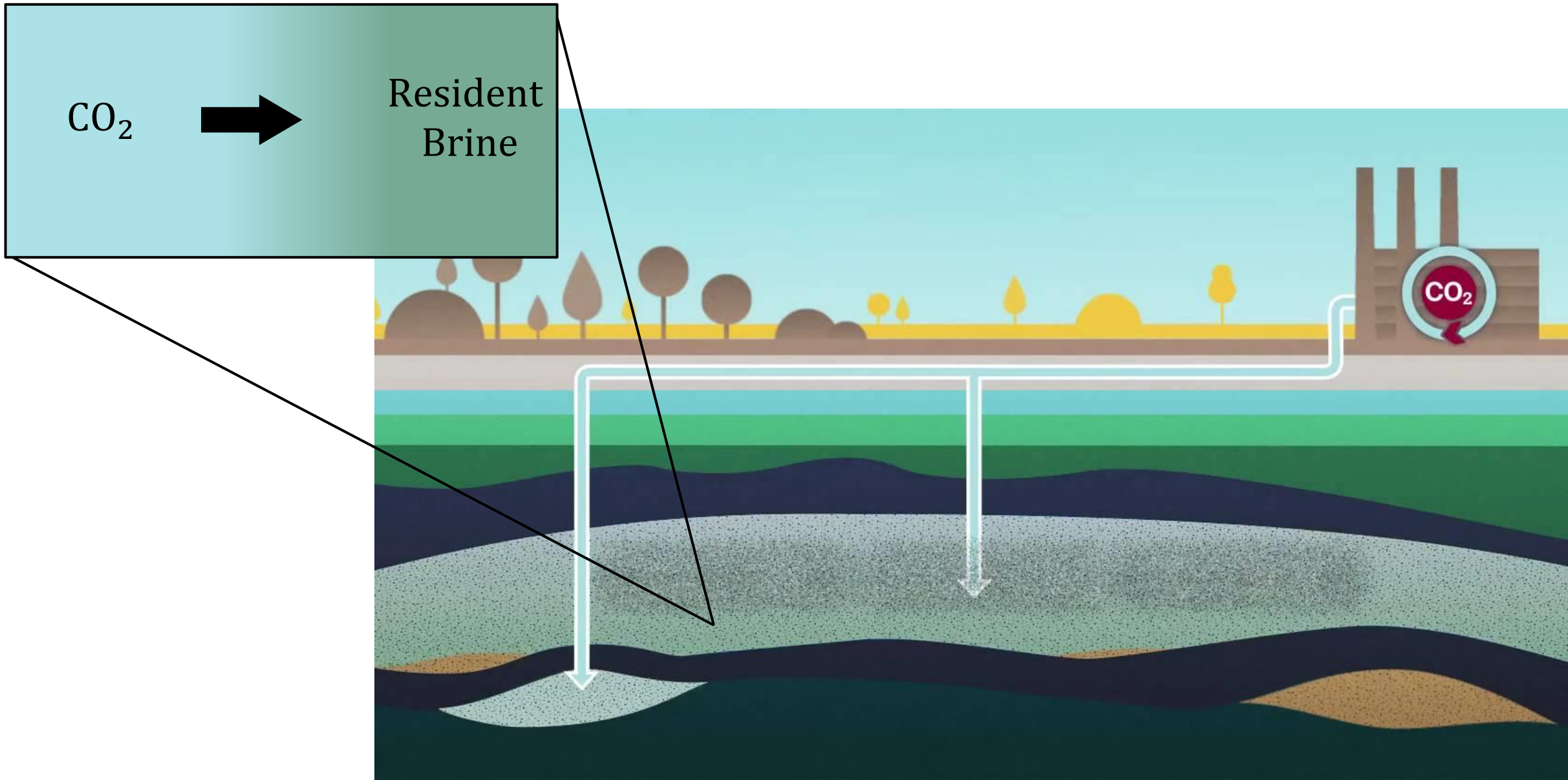
Investigating the pore scale mechanism of miscible phases mixing in porous medium 2D

Yahel Eliyahu Yakir | Dr. Yaniv Edery

Carbon Capture and Storage



Setup & properties

Darcy's law:

$$Q = -\frac{kA}{\mu L}\Delta p \qquad \Delta p = p_1 - p_2$$

Q- discharge

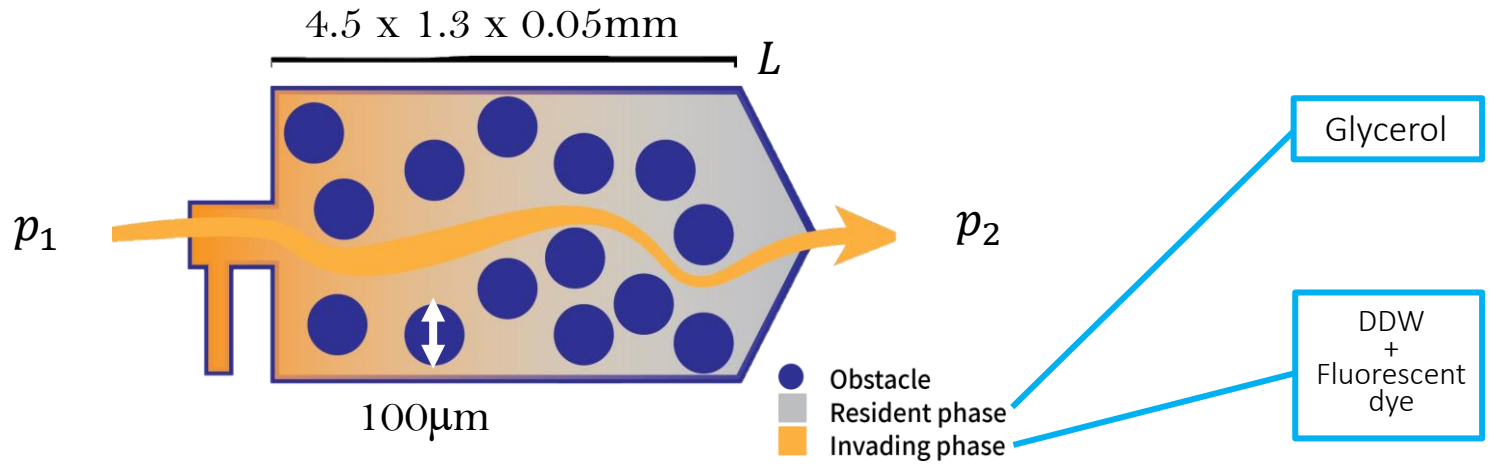
μ- viscosity

A-cross section

k- permeability

L- length

Δp- pressure drop



Flow cells

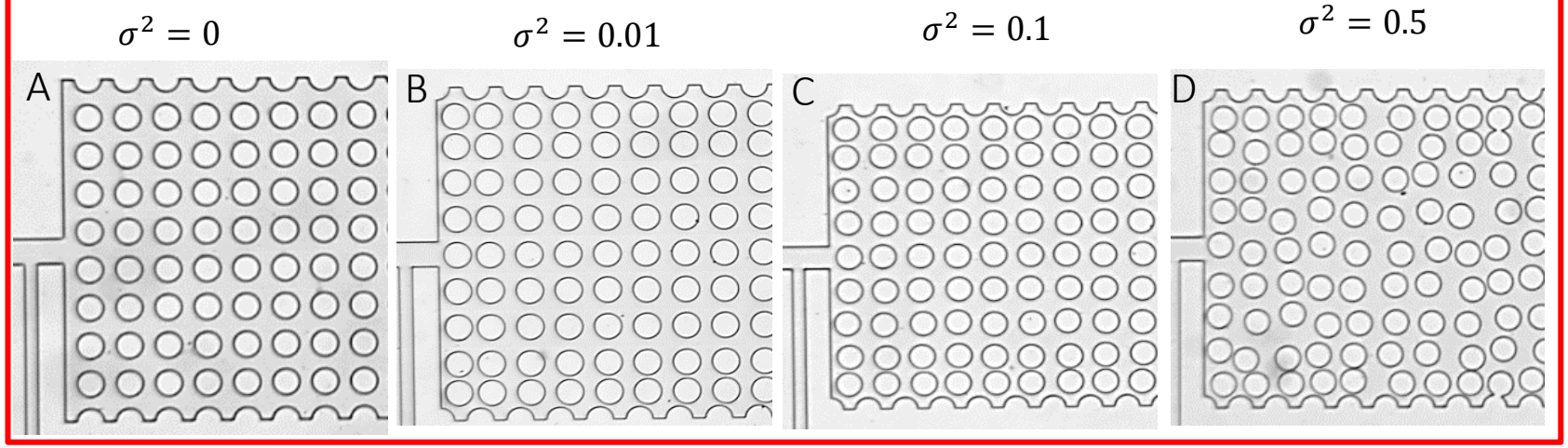
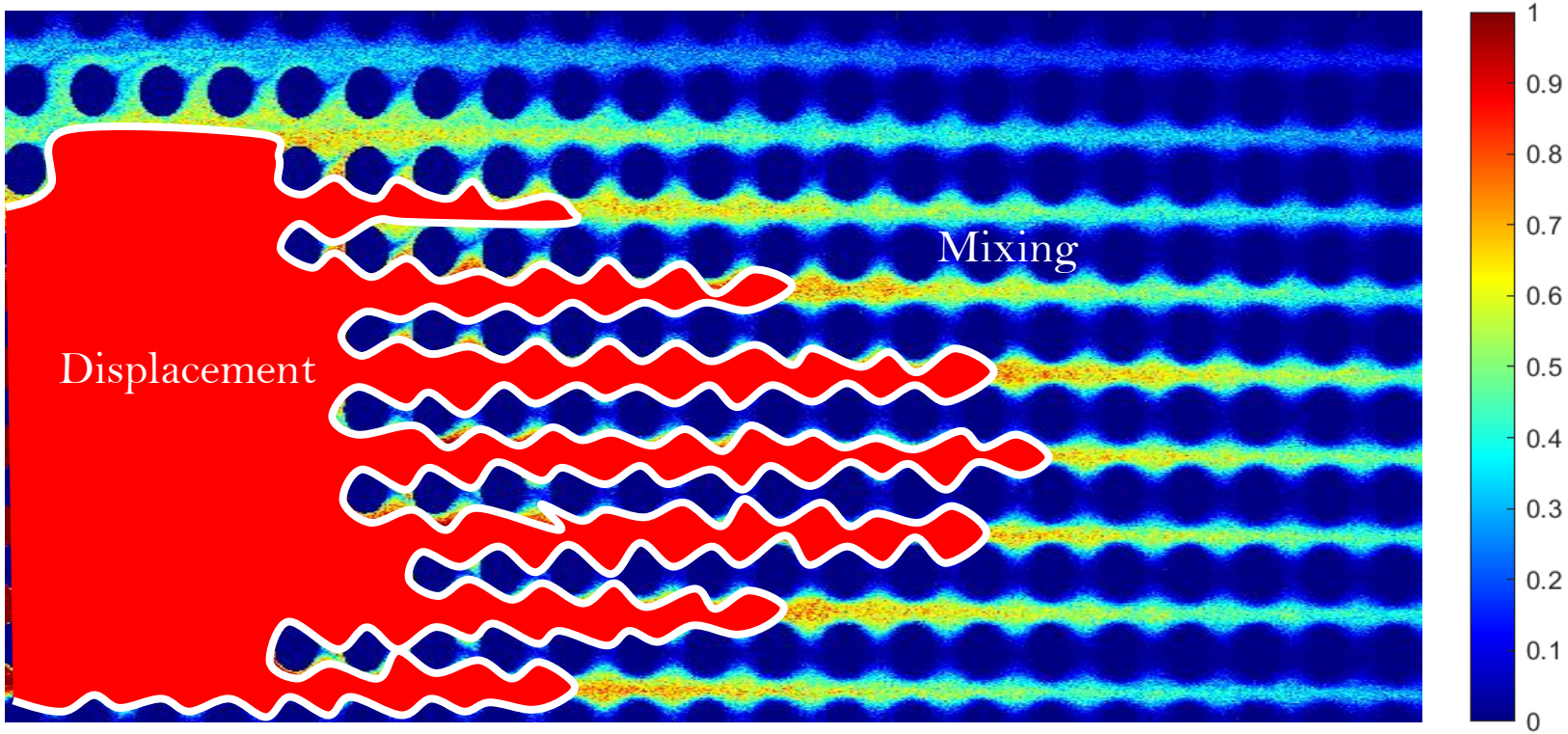
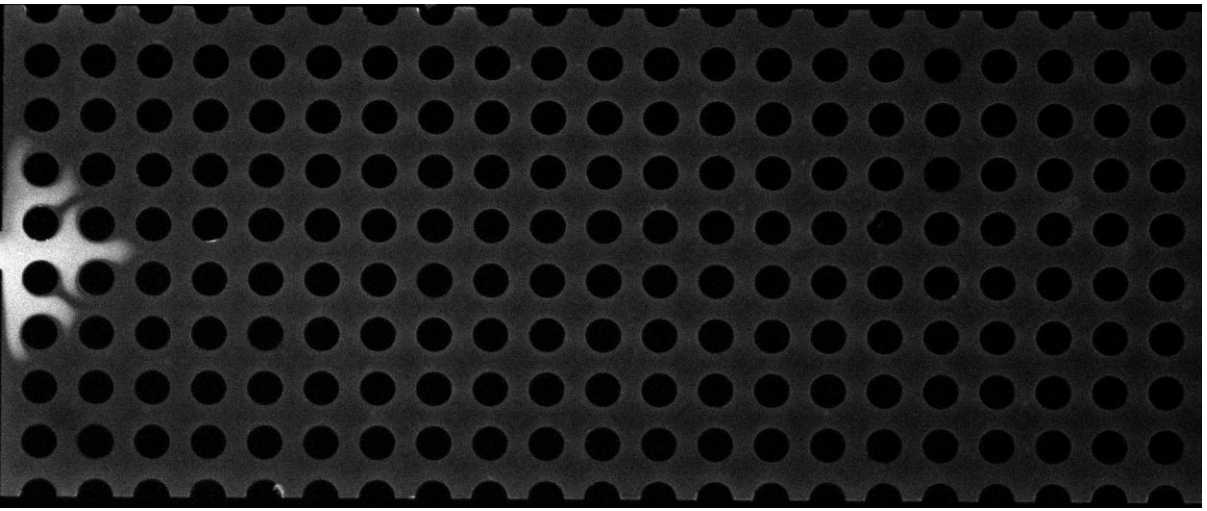


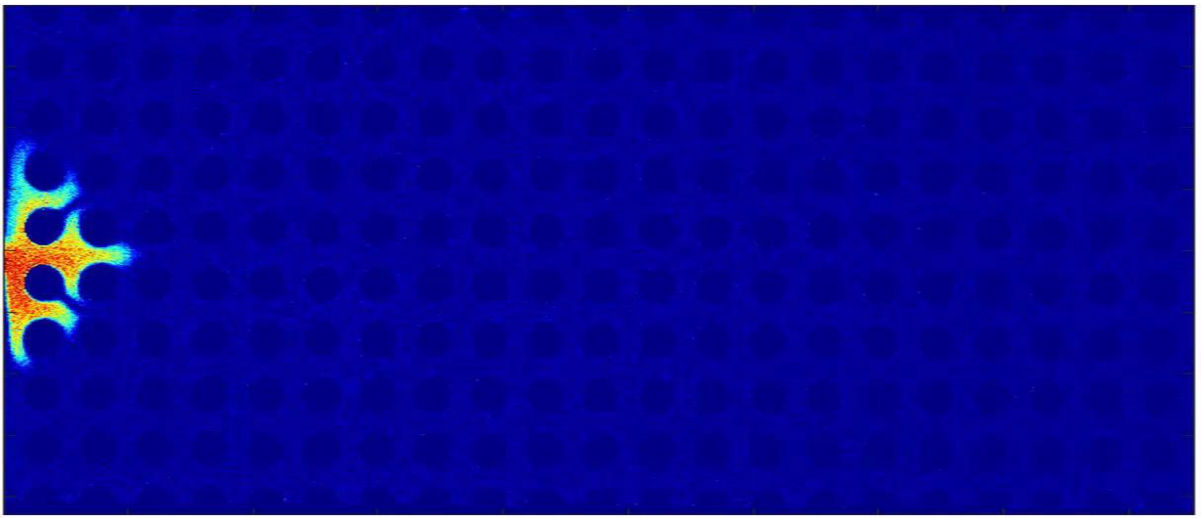
Image analysis



$\sigma^2 = 0.0$

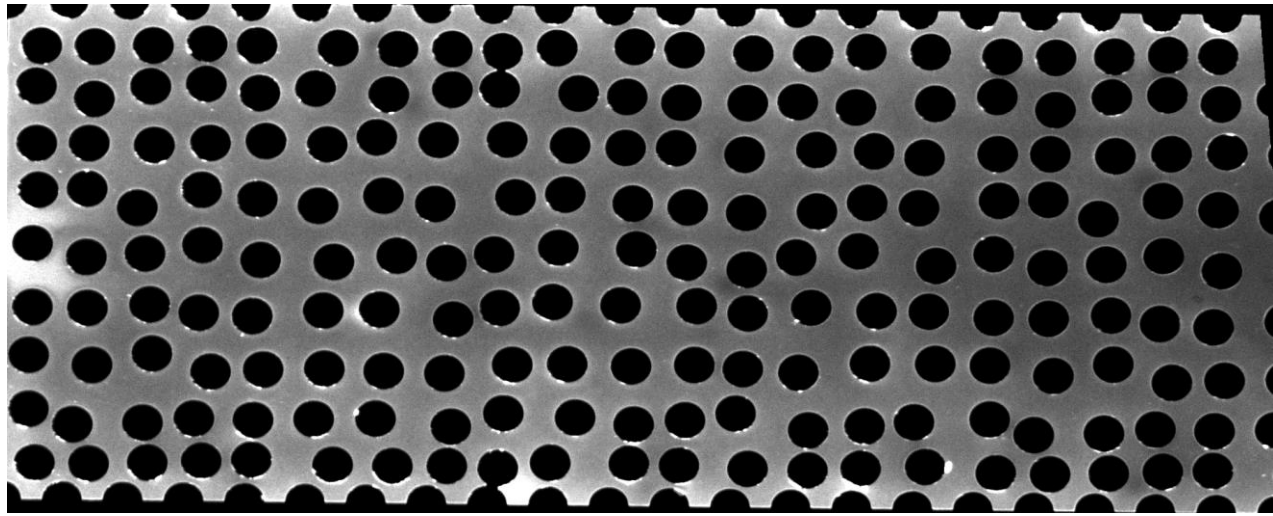
Uniformed mixing followed by the displacement

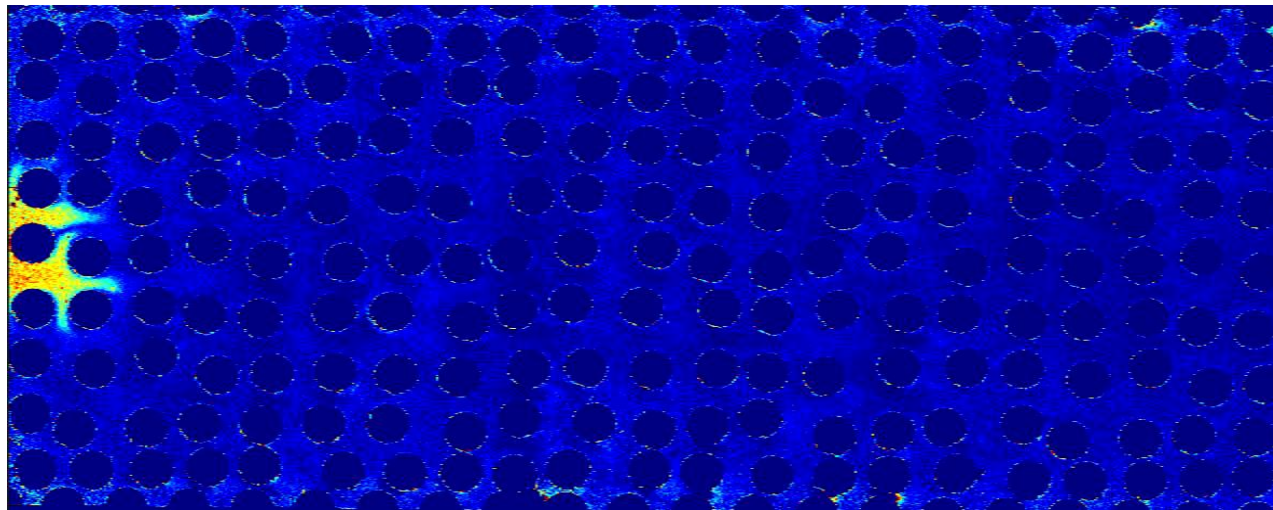




$\sigma^2 = 0.5$

finger displacement followed by mixing towards the edges



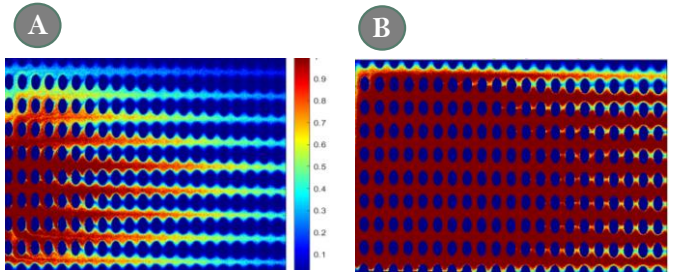


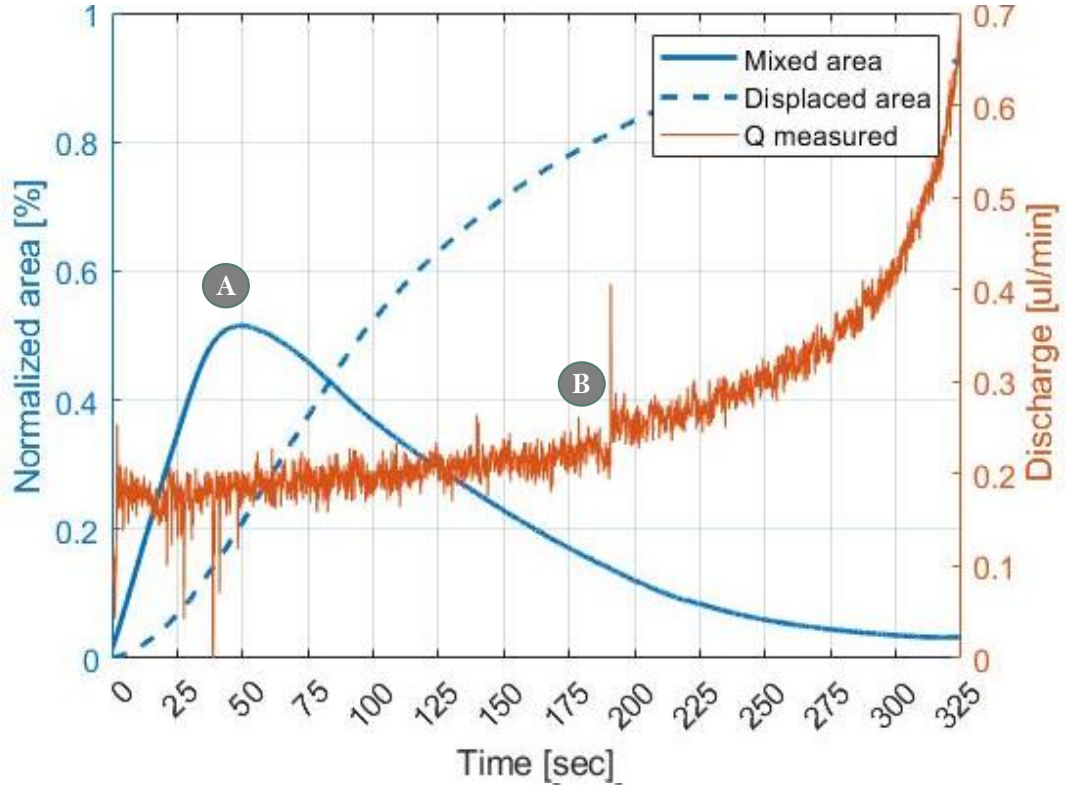
Darcy's law:

$$Q = -\frac{kA}{\mu L}\Delta p$$

Results

$\sigma^2 = 0.0$





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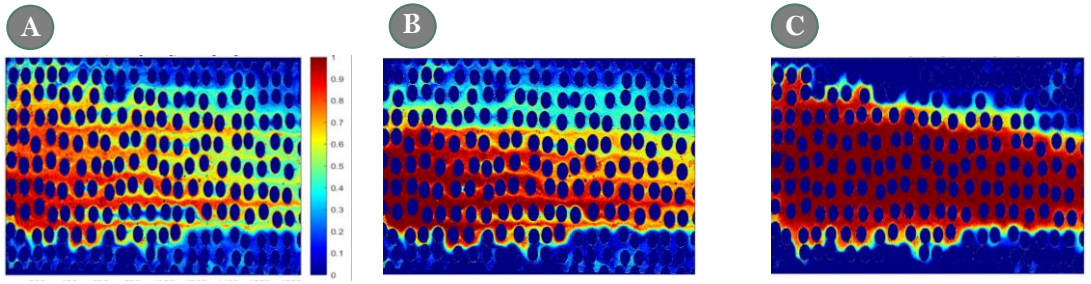

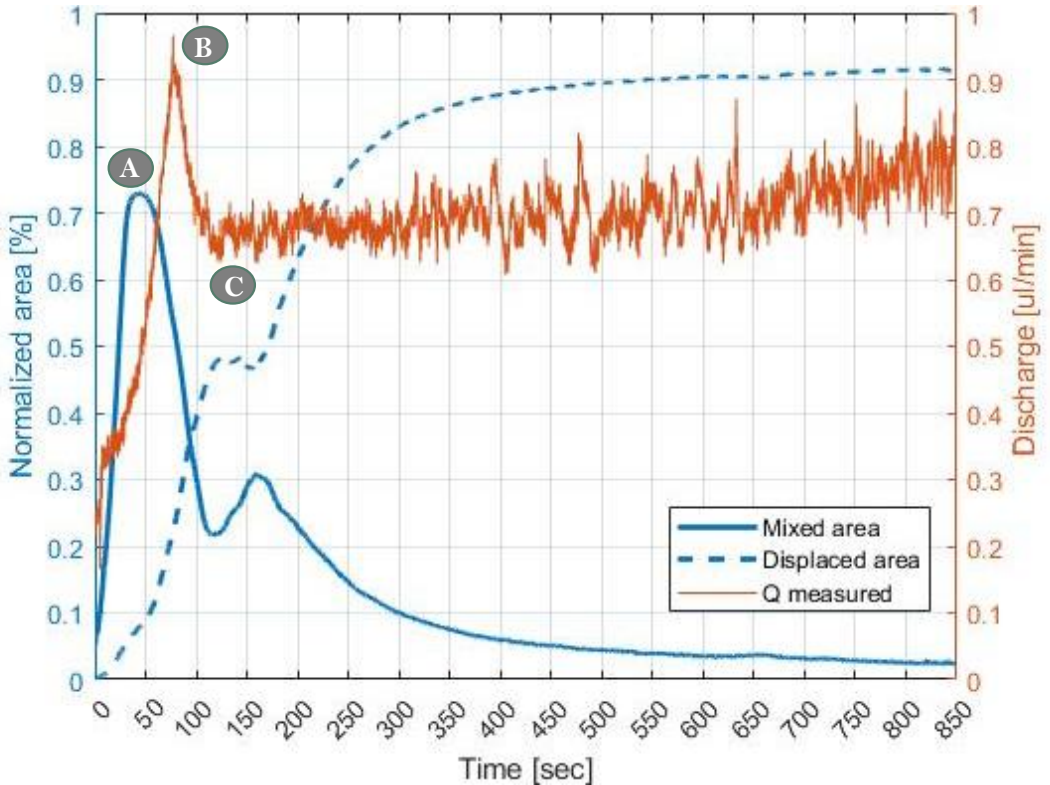

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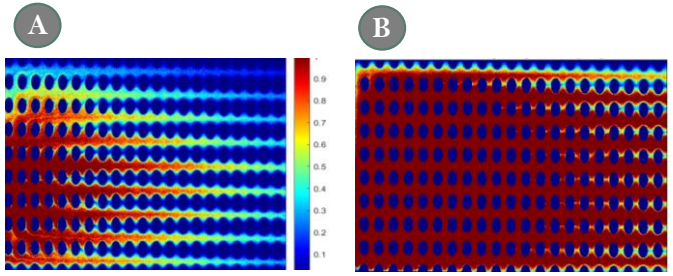

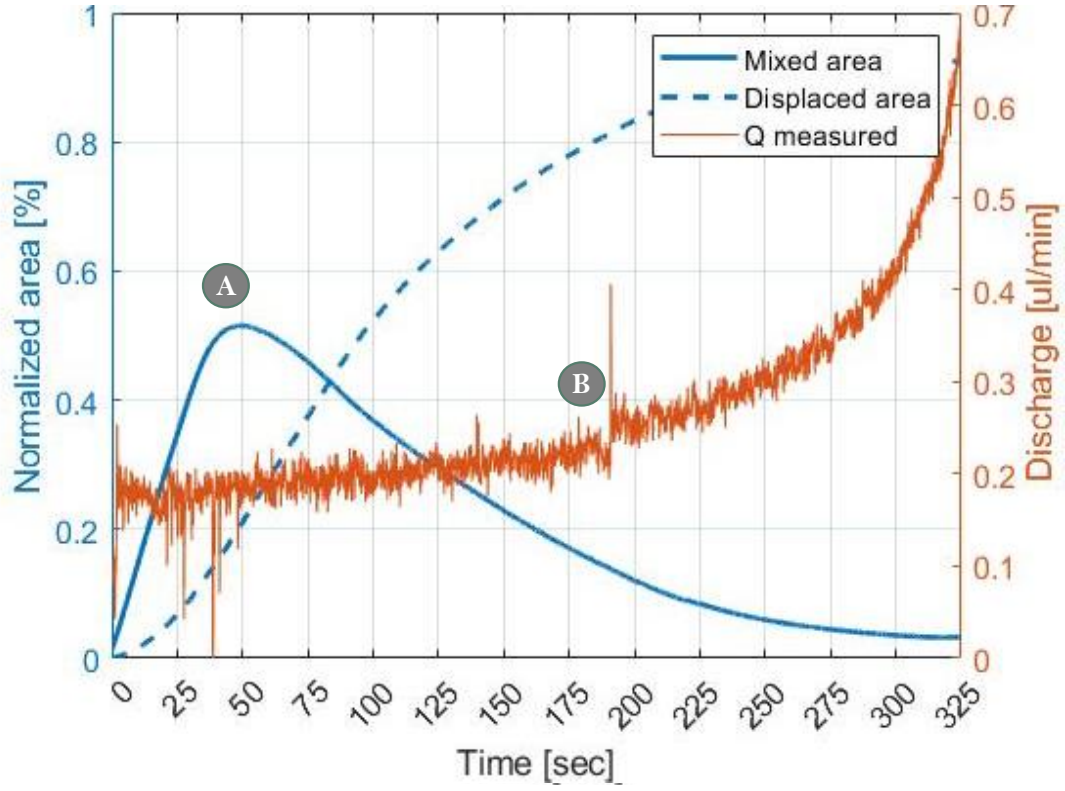

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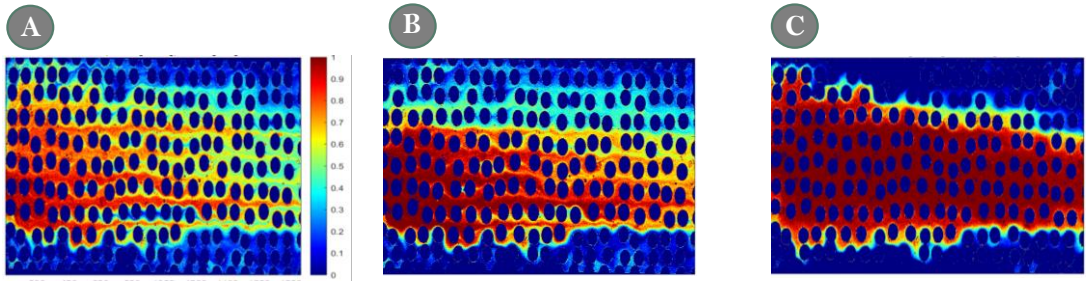
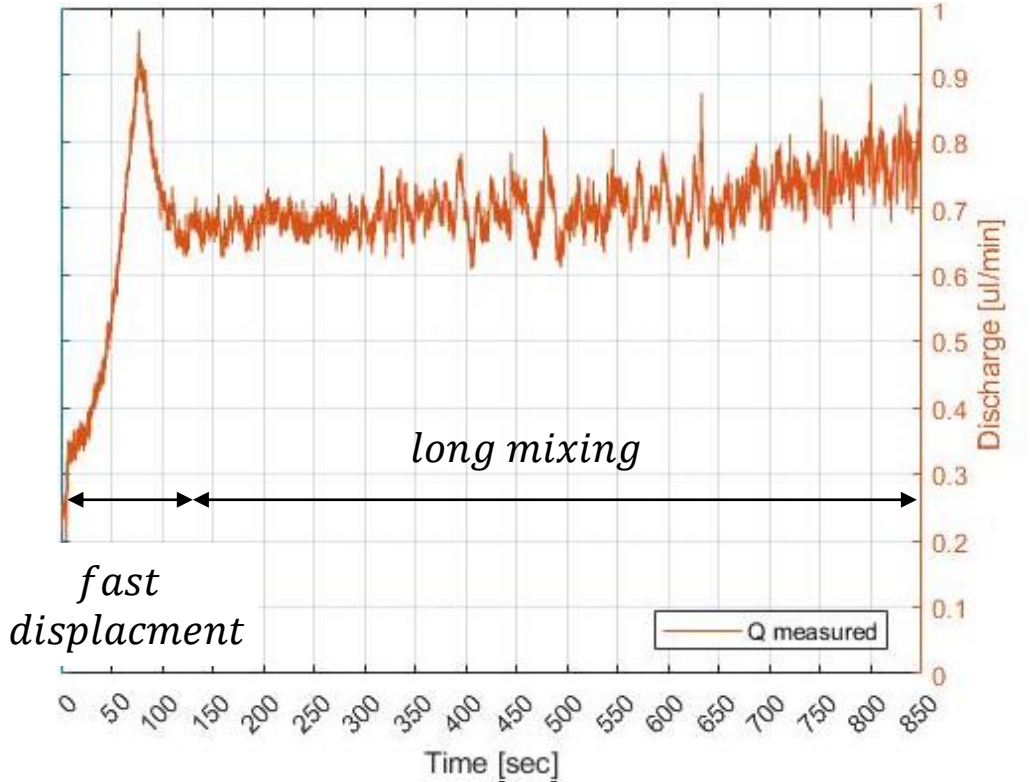
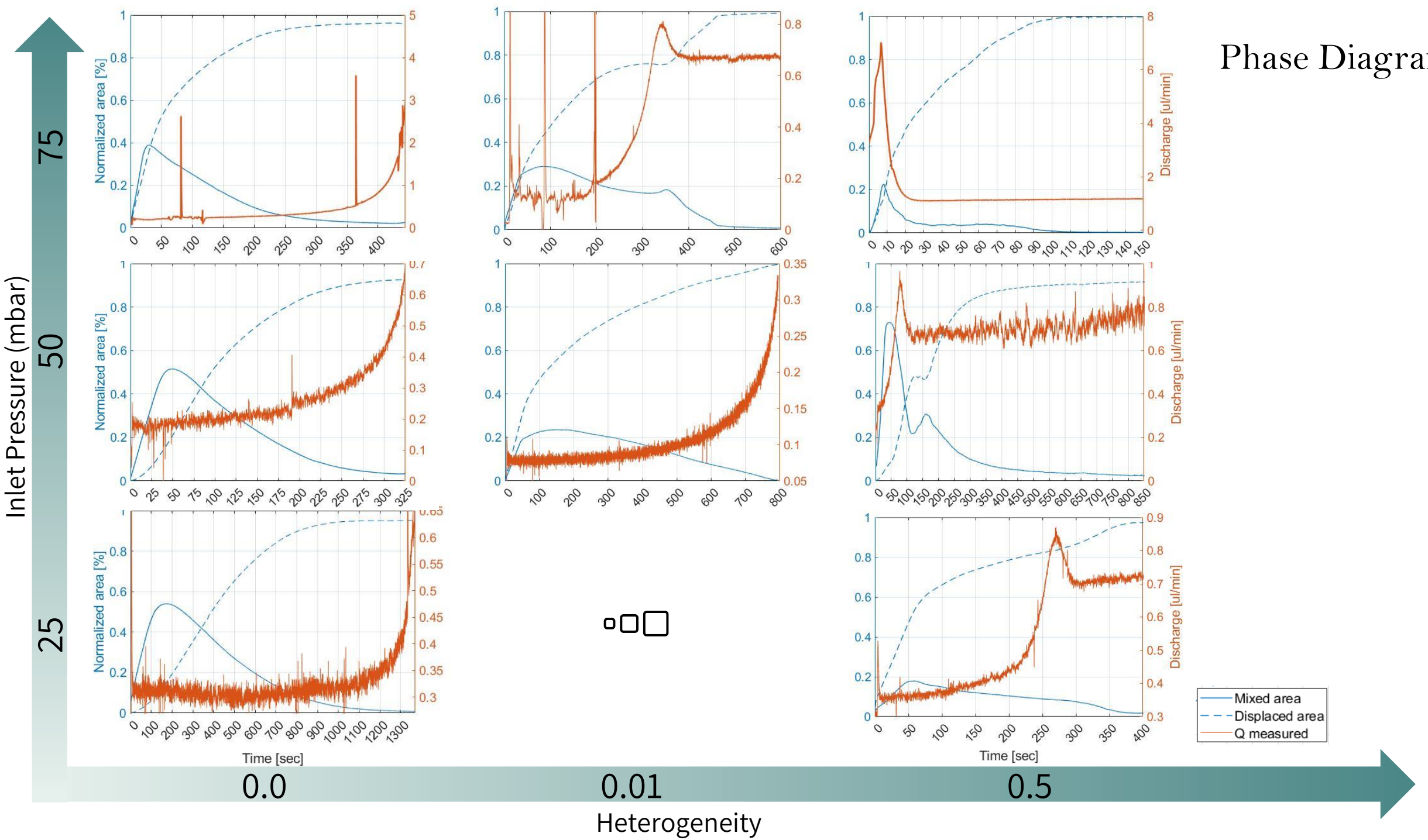




Phase Diagram



Thank you!

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https://sites.google.com/view/pmvlab

Acknowledgments

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