EGU24-13533, updated on 09 Nov 2024
https://doi.org/10.5194/egusphere-egu24-13533
EGU General Assembly 2024

Experimental Confirmation of Emergence of Fast- and Slow-Attaching Subpopulations from Identical Individuals Produces Non-Exponential Decreases in Colloid Concentrations with Distance from Source under Unfavorable Conditions

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The cause of non-exponential decreases in colloid concentrations with distance from source was posited to derive from the emergence of fast- and slow- attaching populations from identical individuals (Johnson, 2018). Fast-attachers were posited to attach according to a rate coefficient corresponding to favorable conditions, whereas the remainder of the population were posited to attach according to a slower rate coefficient. This talk demonstrates the emergence of fast- and slow- attaching populations in pore network transport experiments under unfavorable conditions. We explain the segregation into two subpopulations as being driven by colloid-surface repulsion, topological impacts of the flow field (incomplete pore scale mixing), and consequent impacts on the number of interceptions incurred prior to attachment.