



Effect of Aquifer Heterogeneity on the Transport and Activity of Functional Dechlorinating Bacteria under an Electric Field

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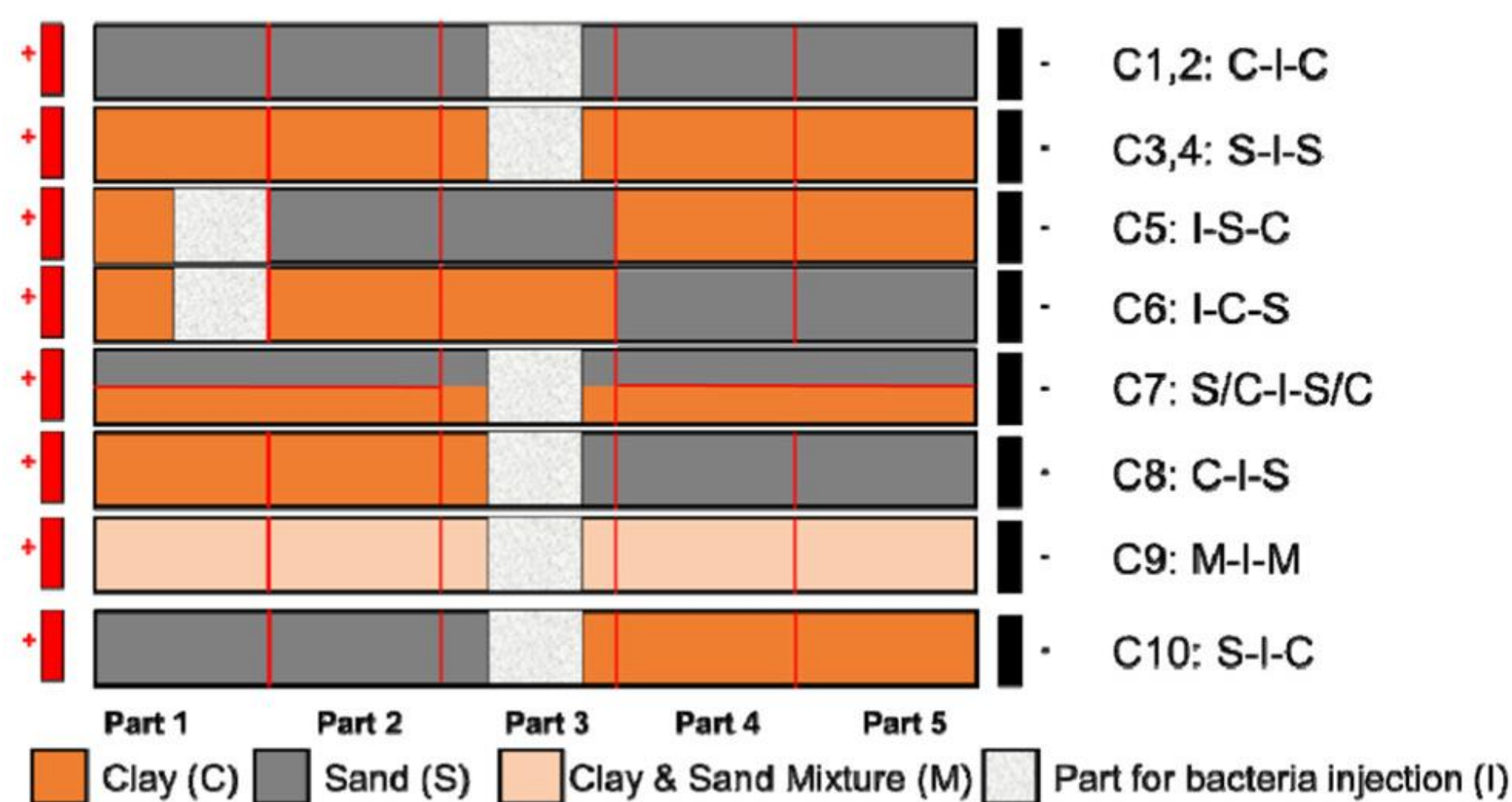
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MOTIVATION

Electrokinetic-enhanced bioremediation (EK-Bio) is an alternative strategy for remediating TCE-contaminated low-permeability aquifers. However, the influence of aquifer heterogeneity, commonly found under field conditions, on the transport and activity of functional dechlorinating bacteria under an electric field is not clear.

METHODS

Our focus is on conducting both column experiments and batch incubation studies to evaluate how aquifer heterogeneity impacts the movement and functionality of dechlorinating bacteria in the presence of an electric field.



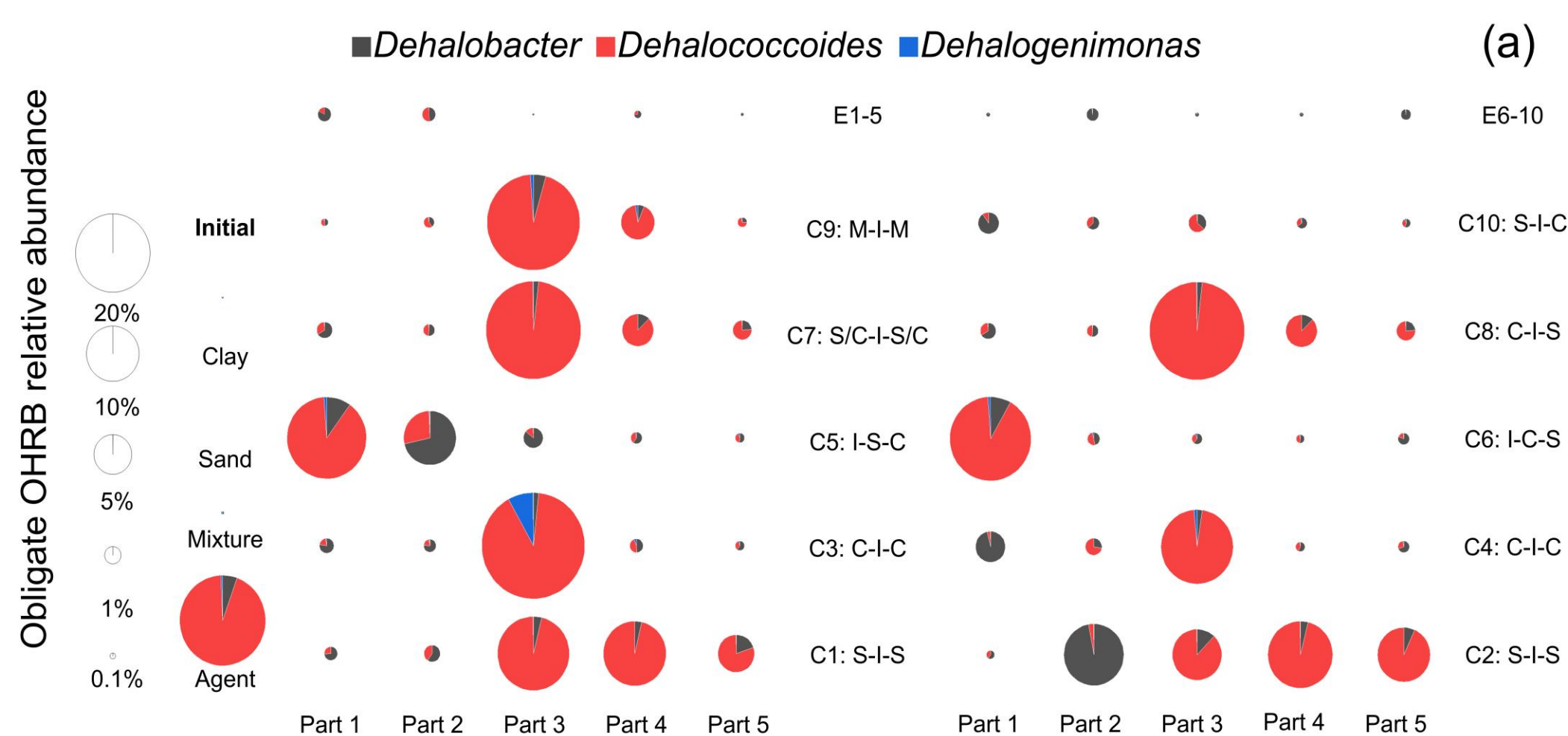
RESULTS

1. The impact of aquifer heterogeneity on indicators during operation.

- Significant impact on the voltage gradient (main due to the section near the anode)
- reduced the physical and chemical heterogeneity of the aquifer medium.
- smaller effect on the pH and ORP of the sediment

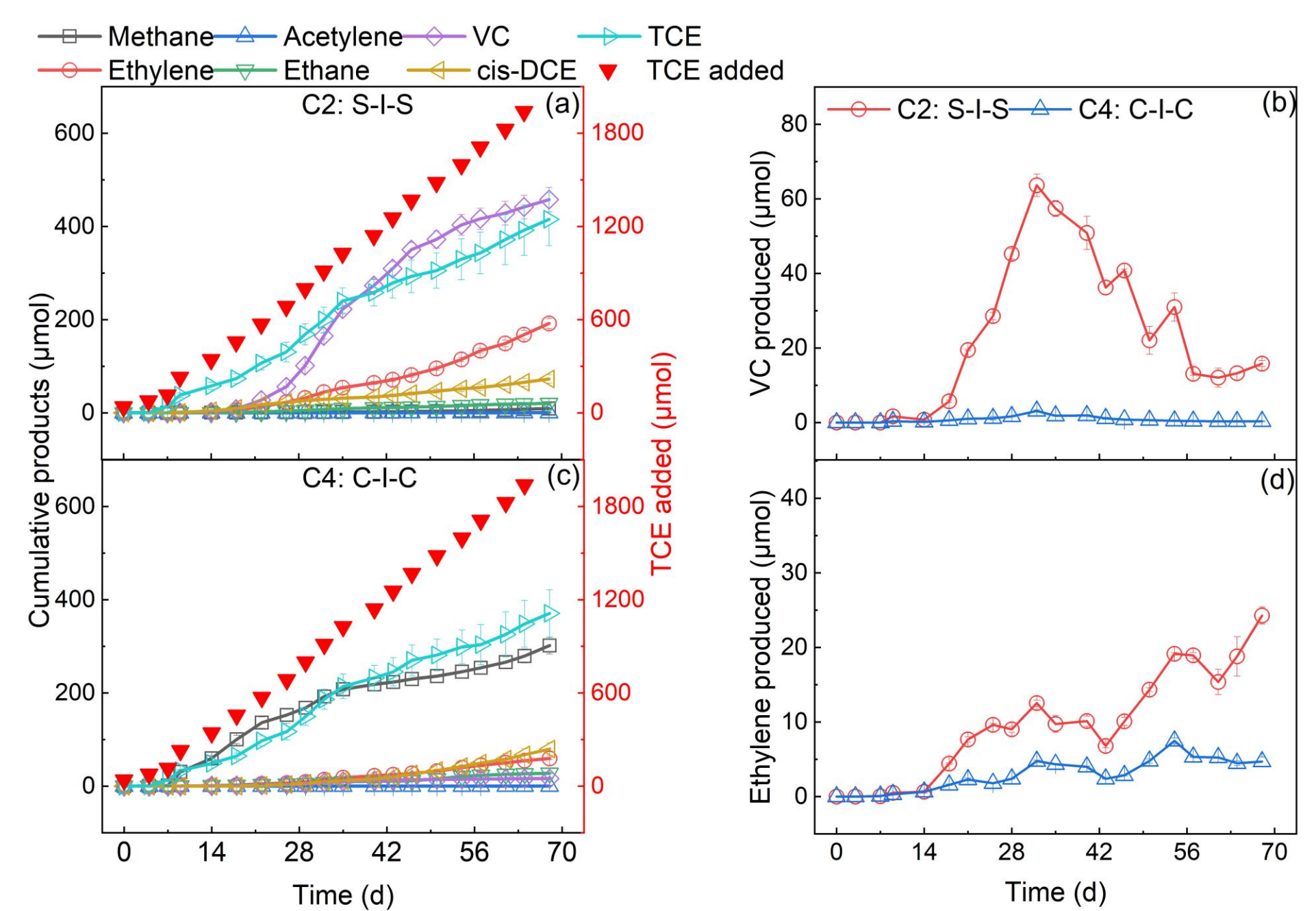
2. Heterogeneity affected the transport of *Dhc*

- The *Dhc* mainly transport from the injection point toward the cathode.
- The transport of *Dhc* was more efficient in sandy fillings
- The relative abundance of *Dhc* is higher in sandy soil.



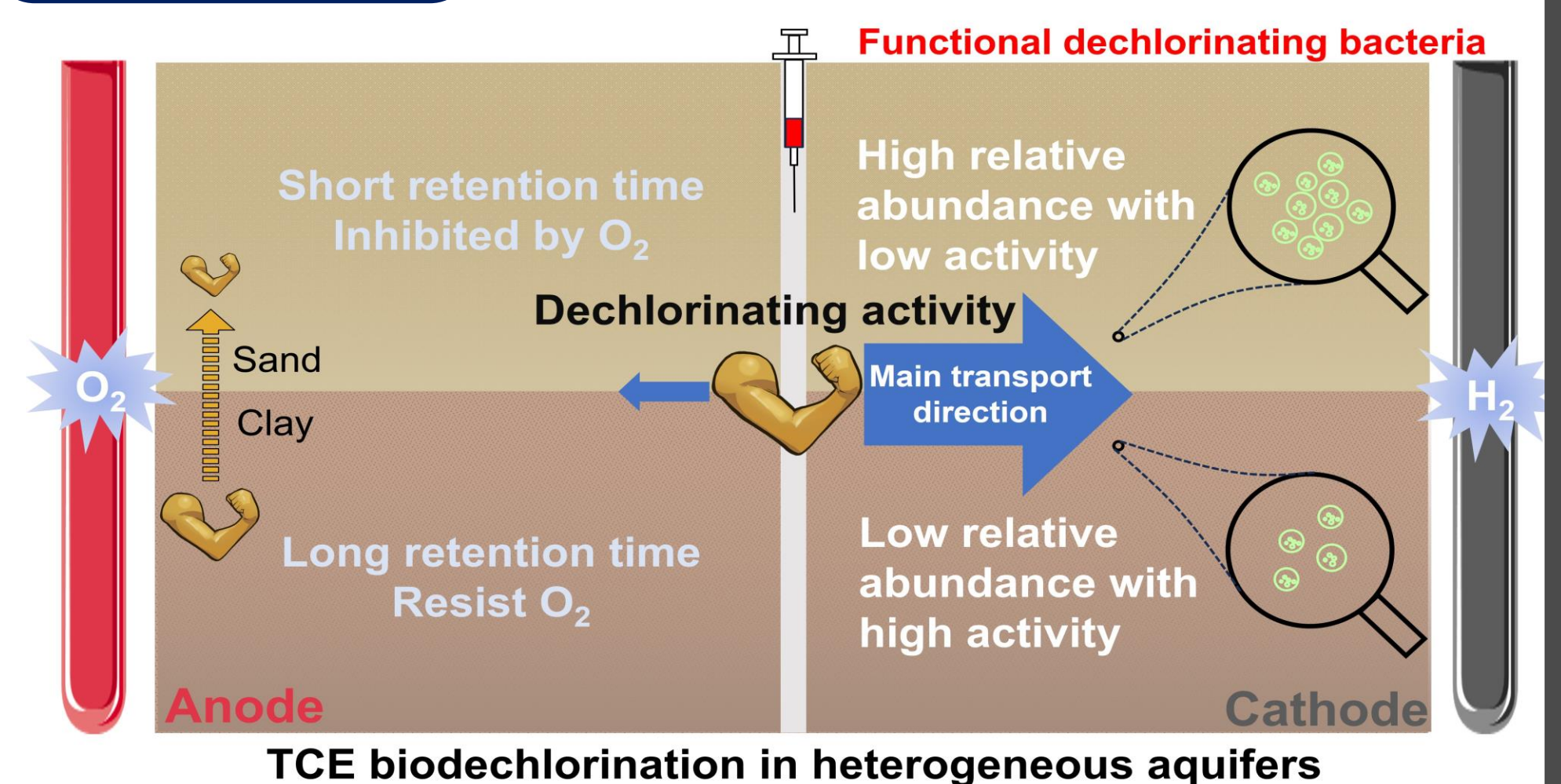
3. Heterogeneity affected the dechlorinating activity

- All columns achieved efficient degradation of TCE during and after EK-Bio



- During the EK-Bio: High-permeability medium in the columns led to the accumulation of more toxic intermediate products
- After the EK-Bio: The activity of dechlorinating was higher in clayed fillings compared to sandy fillings, despite a lower relative abundance of the *Dhc* in clayed areas.

CONCLUSIONS



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