

TRACER EXPERIMENTS IN PERIODICAL HETEROGENEOUS MODEL POROUS MEDIUM

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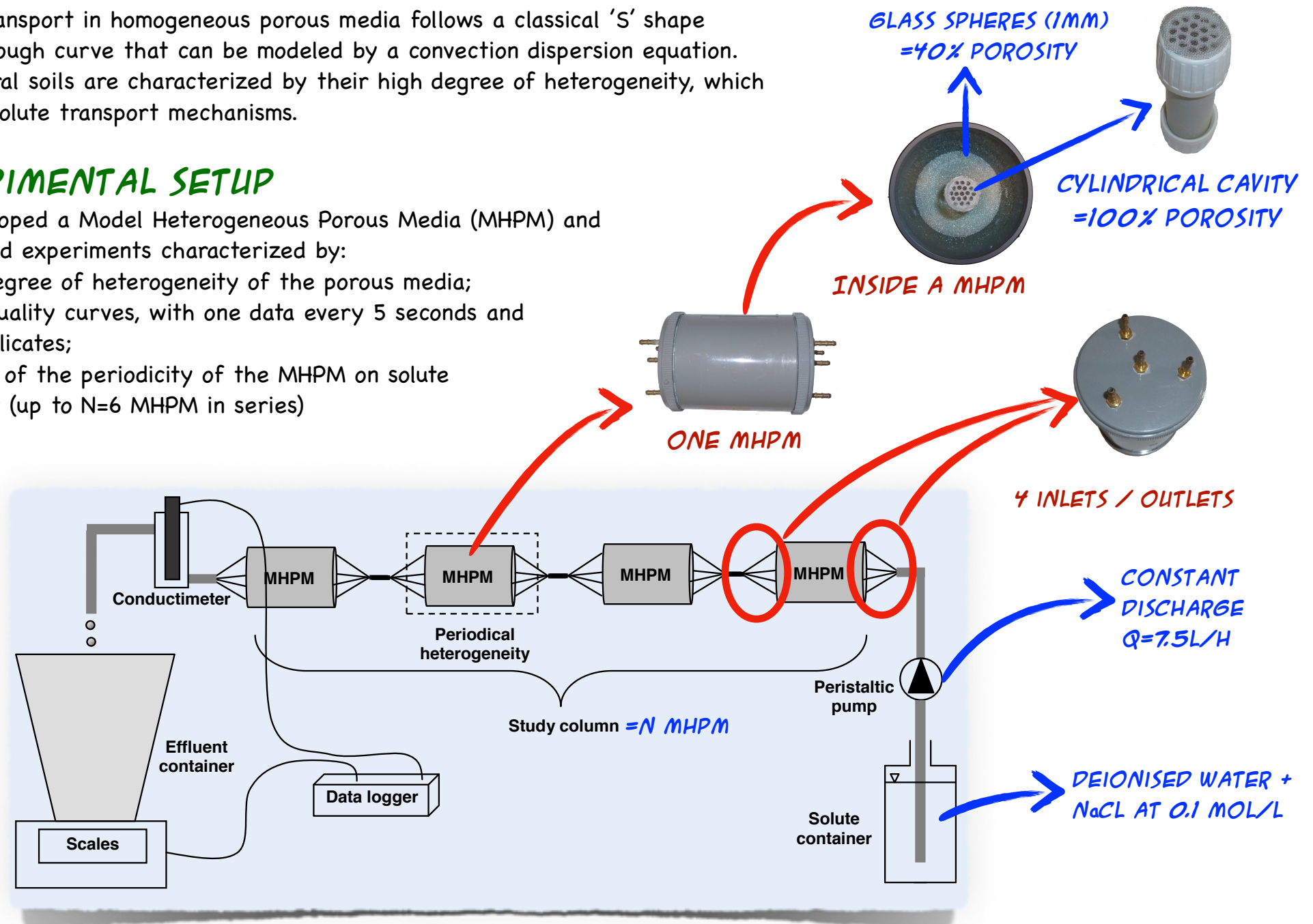
CONTEXT

Solute transport in homogeneous porous media follows a classical 'S' shape breakthrough curve that can be modeled by a convection dispersion equation. But natural soils are characterized by their high degree of heterogeneity, which impacts solute transport mechanisms.

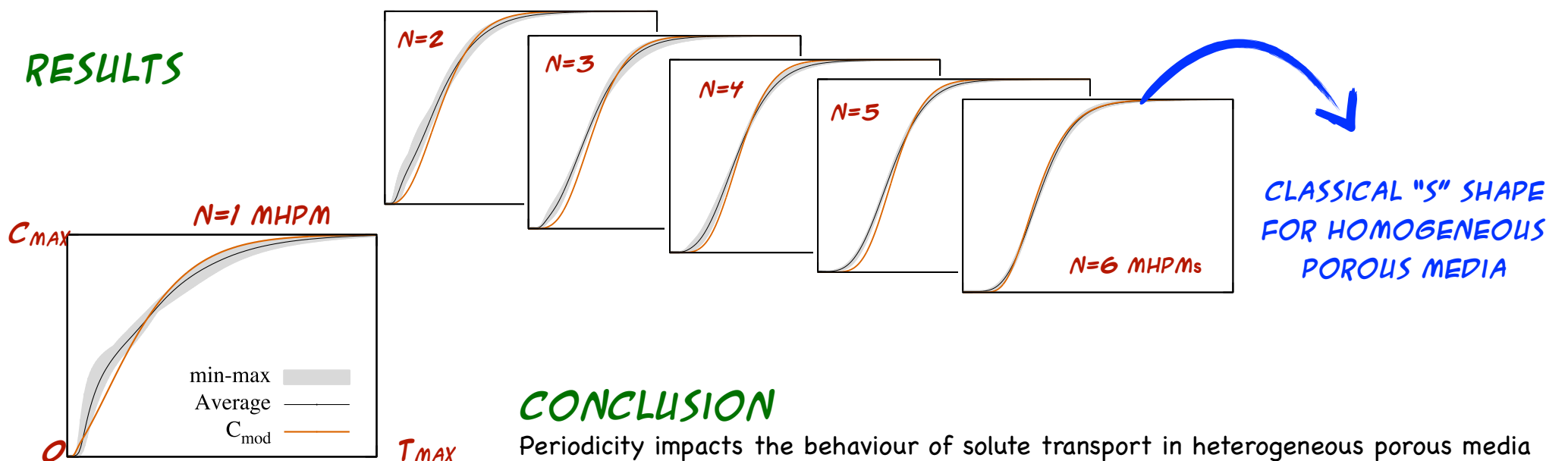
EXPERIMENTAL SETUP

We developed a Model Heterogeneous Porous Media (MHPM) and performed experiments characterized by:

- 1) high degree of heterogeneity of the porous media;
- 2) high quality curves, with one data every 5 seconds and many replicates;
- 3) effect of the periodicity of the MHPM on solute transport (up to N=6 MHPM in series)



RESULTS



→ FAR FROM "S" SHAPE!
The classical convection dispersion model fails to reproduce the breakthrough curve.

CONCLUSION

Periodicity impacts the behaviour of solute transport in heterogeneous porous media => highlights the importance of observation scale: "S" shape if the observation scale is much larger than the heterogeneity scale.

High number of replicates for each experiment & great amount of measurements => highlights the strong variability of the experimental results, even in the case of artificial and well controlled MHPM. Consequently, extreme caution is required when dealing with natural media.