Contribution ID: **516** Type: **Oral Presentation**

Modelling and Model Validation Methods for Porous Media Solute Flow Problems

Thursday, 22 May 2025 09:50 (15 minutes)

In this talk I will outline combined experimental approach my group has taken to quantify porous media, such as soil, solute movement, such as plant nutrient P, movement using high temporal resolution techniques.

The reason for focusing on phosphorus is that it is an essential nutrient for crops. Precise spatiotemporal application of P fertilizer can improve plant P acquisition and reduce run-off losses of P. Optimizing application would benefit from understanding the dynamics of P release from a fer- tilizer pellet into bulk soil, which requires space- and time-resolved measurements of P concentration in soil solutions. In this study, we combined microdialysis and X-ray computed tomography to investigate P transport in soil. Microdialysis probes enabled repeated solute sampling from one location with minimal physical disturbance, and their small dimensions permitted spatially resolved monitoring. We observed a rapid initial release of P from the source, producing high dissolved P concentrations within the first 24 h, followed by a decrease in dissolved P over time compatible with adsorp- tion onto soil particles. Soils with greater bulk density (i.e., reduced soil porosity) impeded the P pulse movement, which resulted in a less homogeneous distribution of total P in the soil column at the end of the experiment. The model fit to the data allow for the pinpoint identification of the processes involved in phosphorus behavior in soil in fine temporal resolution.

Country

UK

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

Water & Porous Media Focused Abstracts

This abstract is related to Water

References

Primary author: ROOSE, Tiina

Presenter: ROOSE, Tiina

Session Classification: MS02

Track Classification: (MS02) Porous Media for a Green World: Water & Agriculture