

Modelling radioiodine transport across a capillary fringe

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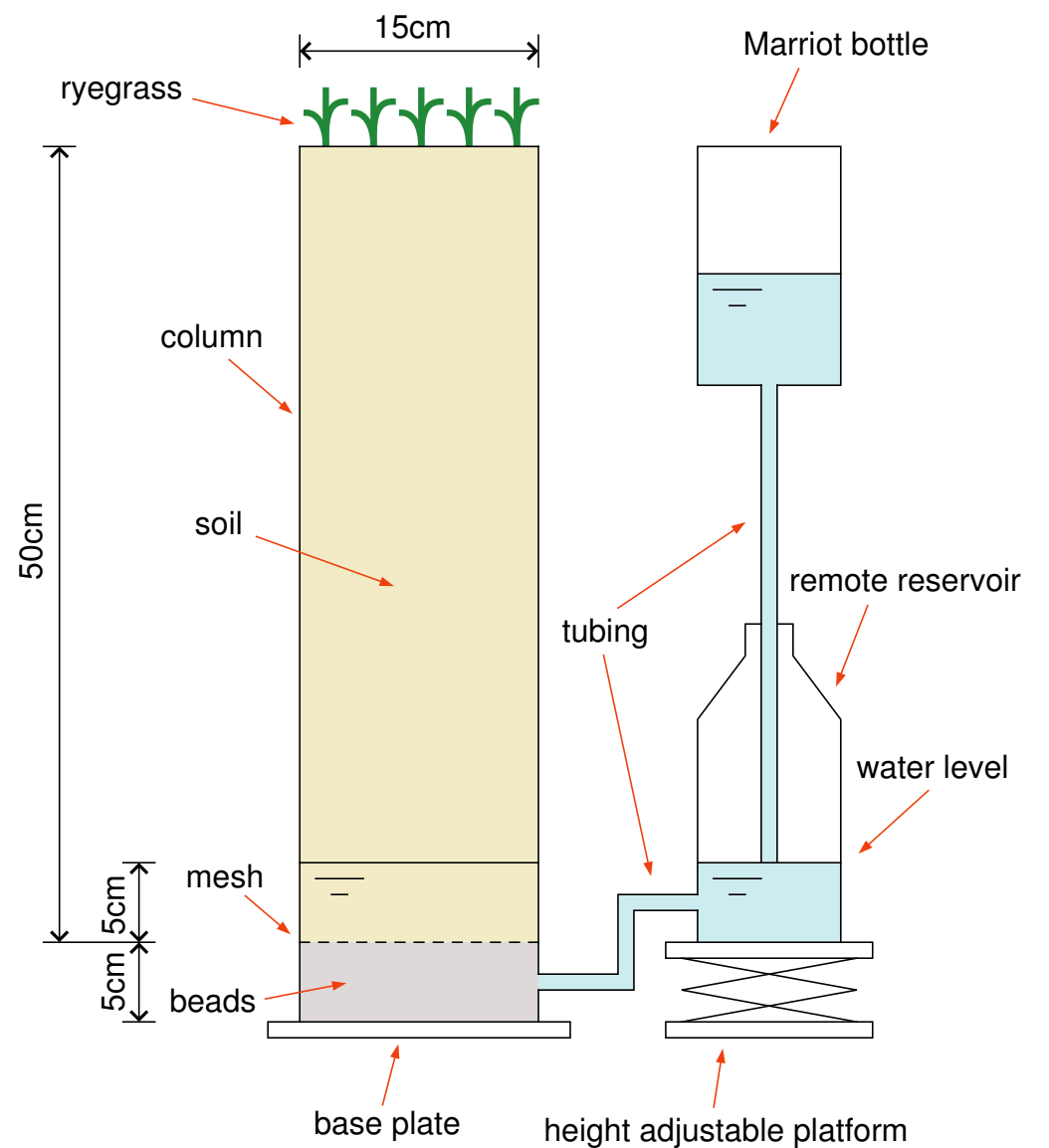
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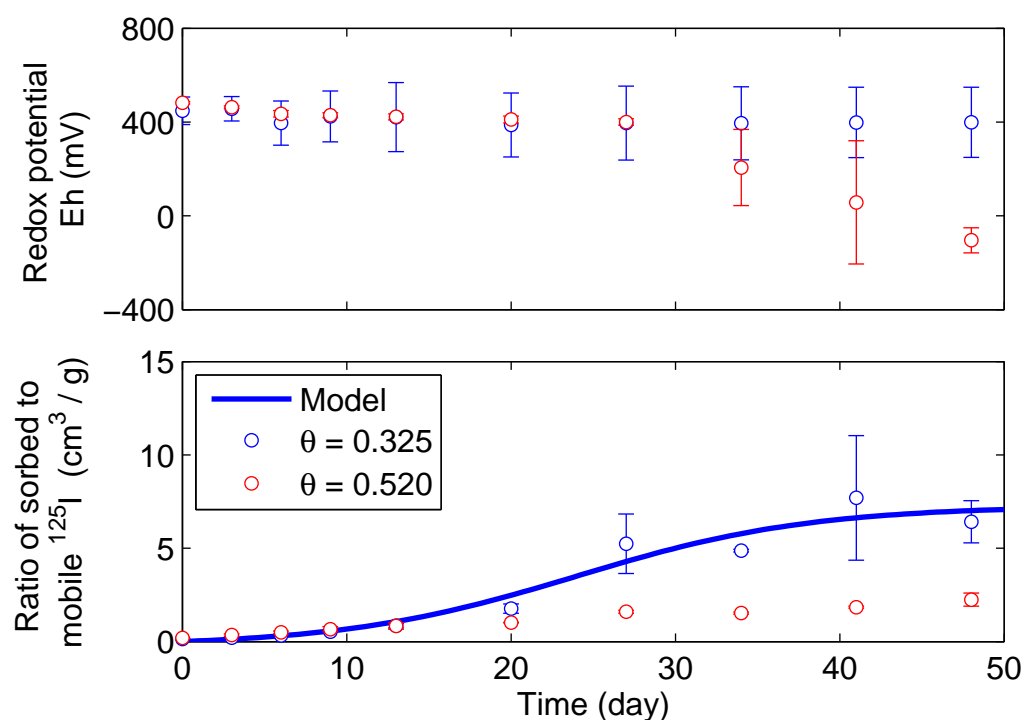
Introduction

- Due to its long radioactive half-life, iodine-129 is considered to be an important radionuclide in the context of underground radioactive waste disposal safety assessment.
- Iodine speciates as iodide (I^-) in reducing conditions and iodate (IO_3^-) in oxidizing conditions. As iodate is more reactive, it is much less mobile than iodide.
- Consequently, in considering vertically upward transport within a soil profile, iodine will tend to accumulate at the top of the capillary fringe.
- In this study, a model of iodine transport across a capillary fringe is developed by coupling equations for variably saturated flow, oxygen dynamics and rate-limited sorption.
- Model parameters are obtained by consideration of literature values, calibration on soil column data and other supporting laboratory experiments.
- The results demonstrate the importance of rate kinetics on the migration and bioavailability of radioiodine in the near-surface environment.

Experimental setup



Time dependant sorption



Comparison of experimental and modelling results

