# Simulating mining-related reactive transport processes across multiple length and time-scales

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**Extended Abstract**

Accounting simultaneously for both subsurface fluid flow and biogeochemical processes through reactive transport modeling has become an essential tool for interpreting observed hydrochemical data and to understand the processes controlling natural and contaminated subsurface systems.

Spatial scales of interest range from the pore scale to the regional scale and time scales of interest for reactive transport problems may vary from minutes to 1000's of years. Depending on data availability to constrain model development and applications the chemical complexity addressed by the reactive transport simulations often varies widely and typically decreases with increasing spatial scale.

This presentation will discuss several mining-related reactive transport modelling studies across scales to illustrate current capabilities and the application of data-driven modelling approaches. The illustrative examples will include laboratory-scale modelling underpinning the development of a novel arsenic remediation technique, model investigations on improved uranium in situ leaching strategies, predictive modelling for uranium mine closure scenarios and model predictions of the diffuse sulphate emissions from a former mining district.