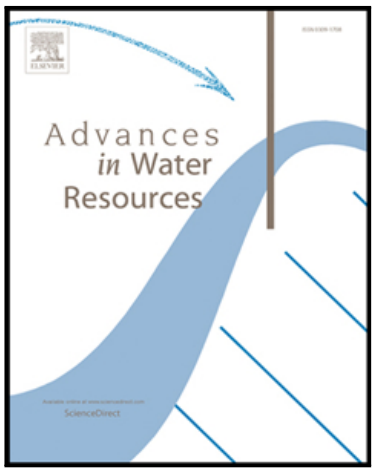

Modelling coupled microbial processes in the subsurface: Model development, verification, evaluation and application

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Highlights

A microbial model has been developed under a coupled thermal-hydraulic-chemical-mechanical framework.

The model has been verified and evaluated against laboratory results.

Capabilities of the model to investigate microbial processes in complex and coupled multiphase flow conditions, including geochemical reactions, have been demonstrated.

The applications of the model show that biofilm growth is affected by hydraulic properties of the material, gas injection rates, water content, pH, availability of substrate and electron acceptor. Microbial metabolism that leads to production of a gas phase influences overall fluid flow in a porous medium.