Contribution ID: **659** Type: **Oral Presentation**

Uncertainty quantification for reactive transport in random porous media

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In this work a problem that describes a reactive transport inside a random porous medium is considered. The main driving force of the transport is the processes of convection and diffusion, which are influencing the reaction. This type of simulations has practical applications in oil recovery, soil pollution and remediation, as well as in several industrial and biomedical processes.

A steady-state two-dimensional convection-reaction-diffusion equation with random coefficients is considered. It describes reactive transport in random porous media consisting of sand, gravel, and other soils. The equation is considered in its dimensionless form. The applicability and superiority of MLMC method for solving such problems with a huge parametric space is demonstrated. The coarse grain strategies used for constructing the MLMC model are discussed. Lognormal distribution of the permeability is considered, based on numerous experimental observations. Essential part of the algorithm is the fact that the random coefficients for the flow problem and for the reactive transport are not independent. In fact, random coefficients are generated for the flow problem, and using them coefficients for the reactive transport are derived based on the standard models for flows in porous media and heterogeneous reactions.

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References

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