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Improved techniques for uncertainty quantification of foam flow in porous media

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Computational models can predict and improve our understanding of multiphase flow in porous media. In this field, the task of uncertainty quantification is of paramount importance when developing and evaluating mathematical models aimed at the design and prediction of complex processes such as enhanced oil recovery techniques. One promising Enhanced-Oil-Recovery technique is the injection of foam in the porous medium, since foam injection reduces gas mobility and increases apparent viscosity, thus improving reservoir sweeping and increasing recovery efficiency. This work focuses on parameter estimation and uncertainty quantification of the foam flow in porous media. In particular, we present an uncertainty quantification approach based on surrogate models and Bayesian inference to evaluate how these techniques can reduce uncertainties and improve physical understanding and parameter estimation of foam flow in porous media. Our results suggest that the new framework based on Bayesian inference and surrogate models enhances parameter estimation and improves the uncertainty quantification of the foam flow in porous media.

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Participation

In-Person

References

[1] Valdez, Andres R., et al. “Foam-assisted water–gas flow parameters: from core-flood experiment to uncertainty quantification and sensitivity analysis.” Transport in Porous Media 144.1 (2022): 189-209.

[2] Valdez, Andrés R., et al. “Assessing uncertainties and identifiability of foam displacement models employing different objective functions for parameter estimation.” Journal of Petroleum Science and Engineering 214 (2022): 110551.

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