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Contribution ID: **388** Type: **Poster (+) Presentation**

RHEOLOGICAL RESPONSE OF FOAM FLOODING MODELS CONSIDERING EXPERIMENTAL UNCERTAINTIES

Thursday, 3 June 2021 14:40 (1 hour)

In this work, we study uncertainties originating from foam flood models' responses concerning non-Newtonian behavior. This work presents how uncertainty affects foam rheology and analysis of Newtonian and non-Newtonian foam formulations. To this end, the Markov Chain Monte Carlo (MCMC) technique was used to estimate parameters for the different foam models. In addition, a global sensitivity analysis based on Sobol indices was also performed to determine which input parameter is more relevant to variations in the quantities of interest. The quantities of interest are apparent viscosity, mobility reduction factor, and total relative mobility, among others. Experimental data were obtained from the literature for the Bayesian parameter estimation of the STARS models. In particular, to focus on Newtonian and non-Newtonian behavior, we adopted the STARS model with its dry-out component and shear thinning function. The results indicate how much the choice of a specific model for foam flow (Newtonian or non-Newtonian) can be affected by uncertainties from estimated parameters.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

A. R. Valdez, B. M. Rocha, G. Chapiro, and R. W. dos Santos. Uncertainty quantification and sensitivity analysis for relative permeability models of two-phase flow in porous media. Journal of Petroleum Science and Engineering, 2020. doi: 10.1016/j.petrol.2020.107297

F. F. de Paula, T. Quinelato, I. Igreja, and G. Chapiro. A numerical algorithm to solve the two-phase flow in porous media including foam displacement. In Lecture Notes in Computer Science, volume 12143, pages 18–31. Springer, 2020. doi: 10.1007/978-3-030-50436-6_2

A. Valdez, B. Rocha, A. Pérez-Gramatges, J. Façanha, A. de Souza, G. Chapiro, and R. dos Santos. Foam assisted water-gas flow parameters: from core-flood experiment to uncertainty quantification and sensitivity analysis. Transport in Porous Media, 2021. doi: 10.1007/s11242-021-01550-0

L. F. Lozano, R. Q. Zavala, and G. Chapiro. Mathematical properties of the foam flow in porous media. Computational Geosciences, 25(1):515–527, 2021. doi: 10.1007/s10596-020-10020-3

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Student Poster Award

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Presenter: VALDEZ, Andres (PhD candidate in computational modeling)

Session Classification: Poster +

Track Classification: (MS6-A) Physics of multi-phase flow in diverse porous media