



Contribution ID: 544

Type: Oral 20 Minutes

Modeling of Additional Oil Recovery Processes by Low Salinity Water Injection using the Open Source Software Platform DUNE-DUMUX

Tuesday, 15 May 2018 10:08 (15 minutes)

In this work a general model of multiphase flow and multicomponent transport in porous media to simulate, analyze and interpret hydrocarbon recovery processes by injecting low salinity water using open source software is presented. The flow model is multiphase considering capillary pressure and relative permeabilities depending on salinity, while the transport model is multicomponent and includes several relevant physico-chemical phenomena such as advection, diffusion and reactions. To obtain the numerical solution, the finite volume method is applied in space and backward Euler finite difference method in time, resulting in a fully implicit scheme. Its computational implementation was carried out in C++ using the open source software platform DUNE-DUMUX. From the methodological point of view, each stage of the development of the model is described (conceptual, mathematical, numerical and computational). The resulting model is applied to a case of study of low salinity water injection in a core at laboratory conditions.

References

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Session Classification: Parallel 3-G

Track Classification: MS 2.10: Advanced finite-volume methods for flow and transport in porous media