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Type: Oral Presentation

Impact of hydro-chemical conditions on structural and hydro-mechanical properties of chalk samples during dissolution experiments

Thursday, June 2, 2022 11:35 AM (15 minutes)

The importance of karst reservoirs for water resources, and their complexity in terms of structural properties and hydraulic responses, require a better understanding of the formation and location of conduits in these systems, in particular for chalk reservoirs. For this purpose, we conduct laboratory experiments of acid solutions injection in chalk core samples using a homemade experimental device. Three different flow rates and two acid concentrations are applied on six samples at atmospheric conditions with Peclet numbers around 1 and low Damköhler numbers. Hydraulic and chemical measurements are carried out during the experiments, while petrophysical characterization is conducted on the samples before and after the reactive percolation experiments. The analysis of these data shows an increase in permeability of the rock samples due to calcite dissolution, which is associated with the creation of preferential conduits. We also observe that the initial structural properties control the dissolution regime with the following main conclusions. For homogeneous systems, the overall dissolution rate and percolation time are directly linked to the considered flow rate and injected acid concentration. For heterogeneous systems, (i) pre-existing large-scale structural heterogeneities control the location of newly created paths while reducing the value of the dissolution rate, and (ii) micro-scale heterogeneities result in highly heterogeneous general structures, which are responsible for channels formation while applying low Damköhler numbers.

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France

References

Time Block Preference

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

Participation

In person

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