Contribution ID: **494** Type: **Oral Presentation**

Reactive CO2 Density-Driven Flow in Aquifers

Friday, 4 June 2021 14:45 (15 minutes)

The dissolution of carbon-dioxide (CO_2) in deep saline aquifers is an important trapping mechanism in carbon storage. This process is triggered by unstable high-density CO_2 front, which later promotes density-driven mixing, hydrodynamic dispersion of CO_2 and favors the long-term sequestration. In many former studies, the effects of hydrodynamic dispersion and multispecies geochemical reactions have been ignored.
This work elaborates the impacts of these simplifications on the dynamics of convective mixing by numerical simulations. Geochemical effects were studied by the implementation of rock-fluid and fluid-fluid interactions for typical sandstone and carbonate aquifers. Results show that accounting for the hydrodynamic dispersion decreases the convection onset time and increases the CO_2 dissolution flux, which is more significant in larger dispersivities and Rayleigh numbers. Results indicate that carbonate geochemical reactions intense the long-term overall efficiency of the process, while decrease the total amount of sequestered carbon in the diffusion-dominated period. Conversely the sandstone geochemical interactions were shown to have a different impact on the process compared to carbonate interactions. Results also reinforce the importance of realistic geochemical representation and the importance of spatial and temporal dependence of the reactions pathway, subsequent to the finger development for more detailed simulation of the CO_2 storage process.

Time Block Preference

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

References

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