

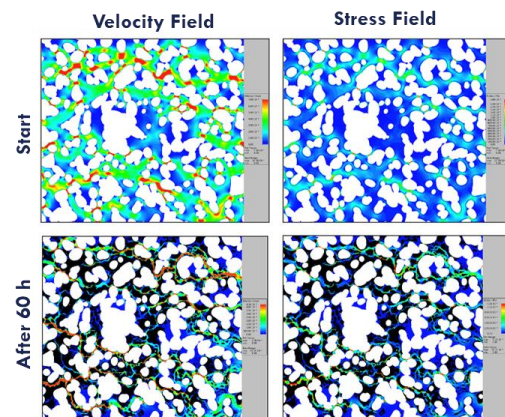
MSc Thesis on Geological Hydrogen storage / bio-methanation

The project addresses microbial activity in underground reservoirs, which can pose a threat to underground hydrogen storage, but also an opportunity for in-situ methanation and the production of renewable methane. In this process, microorganisms convert hydrogen into methane according to the Sabatier reaction:



The prediction of subsurface hydrogen methanation by microorganisms requires detailed knowledge of fluid transport mechanisms on the pore scale, which are relevant for the nutrient supply of microorganisms. These transport mechanisms depend to a large extent on how the hydraulic properties of the porous medium change due to microbial growth and the properties of the accumulated biomass.

In the project, you will perform microfluidic experiments to colonize the pore space with microorganisms and then study their growth and hydraulic properties in the pore space under saturated and two-phase flow conditions. They will use a lab-on-a-chip approach that represents different petrophysical parameters for different rock types. The data will be analyzed by processing microscopic images and interpreted by direct numerical flow simulations on digital twins.



If you are interested in this research and a MSc thesis, please contact:

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