

Experimental reservoir physics for underground hydrogen storage (UHS)

Introduction

I am conducting research in experimental reservoir physics relevant for underground hydrogen storage at core scale. The core of the research work is to understand short-cycle storage microbial effect on the hydrogen stored in the subsurface porous media. The research is being conducted at Centre for Sustainable Subsurface Resources (CSSR) in collaboration with University of Bergen.

Primary objective:

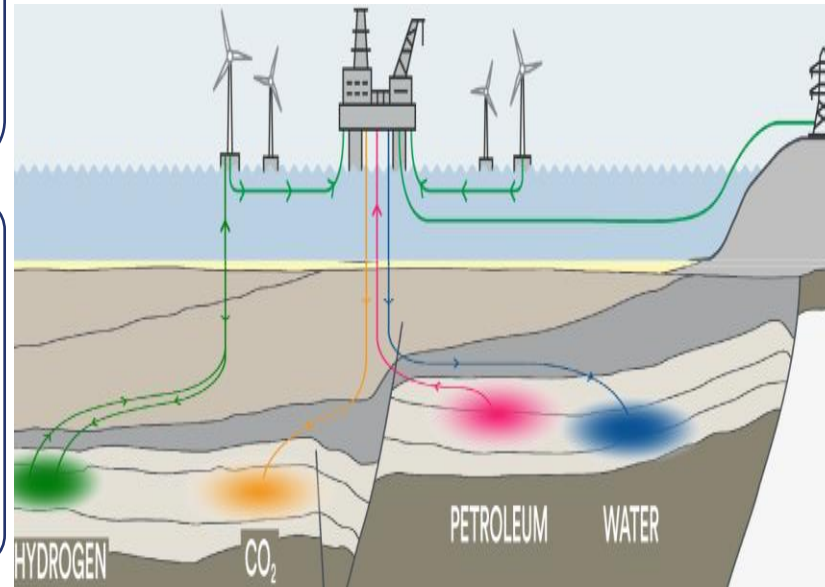
Assess porous media hydrogen storage through multi-scale and multi-phase flow tests

Project goals:

1. To understand coupled transport processes such as hysteresis and bio-geochemical reactions as a result of exposure and history
2. Study at a core scale, microbial activity on stored hydrogen under anaerobic conditions
3. Utilise MRI-PET modalities to visualise bacteria growth and make in-situ saturation measurements in core samples
4. Correlate and upscale between core and pore scale experimental data
5. To provide quality laboratory data to validate a fully coupled numerical model

Why porous media:

- Offers enormous volumes
- Well distributed worldwide
- Established expertise from the petroleum industry
- Safety and environment
- *Microbial effect on UHS efficiency*



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Related projects: Centre for sustainable subsurface resources (CSSR-NORCE)

PhD fellow at UiB

MSc. Reservoir engineering from NTNU, Trondheim

BSc. Petroleum geoscience and production from MAK, Uganda



Estimated progress of the PhD project:



Publications (in the pipeline)

- In-situ visualization of microbial hydrogen consumption in a porous medium using high-resolution PET-MRI
- Predicting ultimate hydrogen production and residual volume during cyclic underground hydrogen storage in porous media using machine learning
- Quantifying microbial hydrogen consumption in porous media



Norwegian Research School on Hydrogen and Hydrogen-Based Fuels

