Danish Offshore Technology Centre
Technology Conference 2022

De-risking CO2 injection and storage in chalk

Rasoul Mokhtari, Hamid Nick, Karen Feilberg

In the recent assessment report from the Intergovernmental Panel on Climate Change (IPCC), Carbon Capture and Storage (CCS) is mentioned as a promising way to mitigate climate change. Storing carbon in the subsurface represents a potentially attractive and cost-effective way to reduce the environmental footprints of emissions of CO_2. When considering storage in the spent North Sea chalk reservoirs, there are specific challenges with the rock-fluid chemistry. The North Sea chalk is composed of chalk (CaCO3), for which the solubility in water is strongly enhanced by carbonation. Because there is a dynamic reaction between $CaCO_3$ and CO_2 in aqueous solutions. These challenges are: feasibility of chalk as a permanent storage site, CO_2-induced corrosion and scale, availability of inexpensive CO_2 sources, pipeline, framework that facilitates development of storage projects among others. The novelty of this study is to consider CO_2 storage for the mature oil reservoirs in late stages of production with geological and petrophysical characteristics favorable to CO_2 injection. In this study we suggest a comprehensive investigation for CO_2 flooding in chalk under different in-situ conditions to characterize 1) response of chalk to CO_2 injection in short and long term 2) response of seismic measurements to various flow and mechanical alterations. The aim is to provide an ample amount of measurements for CO_2 injection into chalk. The knowledge gained through advanced core flooding, SEM analysis, CT imaging can help to de-risk CO_2 injection into chalk reservoirs.