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Hydro-Mechanical-Chemical Modelling of CO₂ storage in a depleted chalk reservoir

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Abstract

This study investigates CO₂ injection into one of the depleted Danish North Sea hydrocarbon chalk reservoirs, considering coupled Hydro-Mechanical-Chemical (HMC) processes. A wrapper is developed in C# that utilizes the Eclipse reservoir simulator and Visage geomechanics simulator to capture the induced alteration of mechanical and petrophysical properties of the chalk. The HMC model is based on a detailed reservoir model matched to over 20 years of production data. Different simulation scenarios are considered with and without aquifer support and chalk compaction, to assess storage potential of the studied chalk reservoir.