Thermo-Hydro-Mechanical-Chemical Coupling in Chalk Reservoirs: Insights Into Fluid Flow And Deformation

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THERMO-HYDRO-MECHANICAL-CHEMICAL COUPLING IN CHALK RESERVOIRS: INSIGHTS INTO FLUID FLOW AND DEFORMATION

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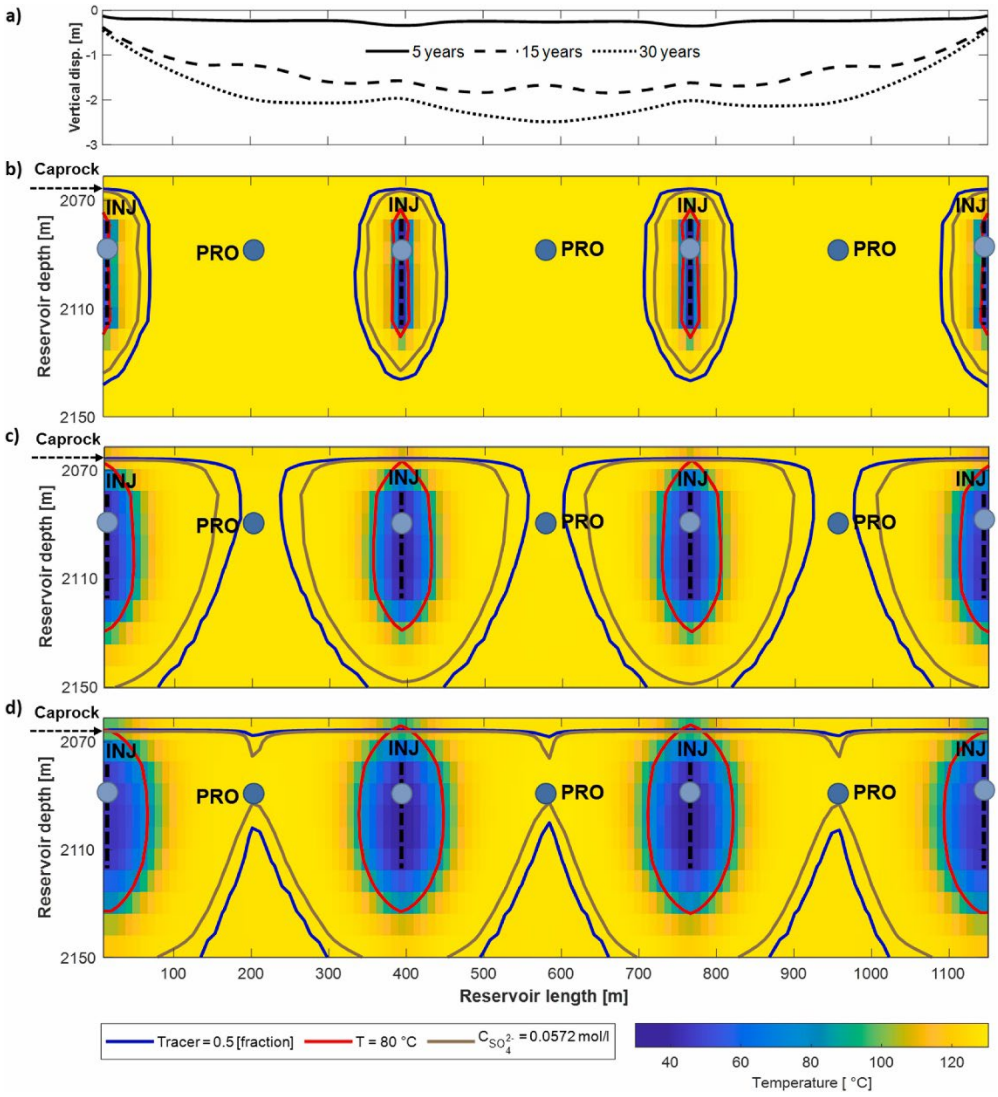
Reliable prediction of elasto-plastic strain evolution in chalk is crucial for managing sea-floor subsidence and subsurface deformation risks. We quantify the impact of temperature and sulfate concentration on hydrostatic pore collapse strength and bulk modulus in water-saturated chalk. We develop a wrapper to integrate multi-phase flow and geomechanics simulations, considering thermo-hydro-mechanical-chemical processes. Our computational results emphasize the significance of reservoir pressure, temperature changes, and water weakening in controlling deformation and production. Explicitly accounting for these coupled processes is essential for reliable chalk reservoir predictions during water flooding.



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