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# Influence of $CO_2$ injection on mechanical properties of chalk

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In the present-day context, considerable savings are presumed if old chalk reservoirs are given a 2nd-life, serving as $CO_2$ storage sites. Depending on the reservoir conditions and injection scheme, a concern for large-scale $CO_2$ injection is the potential effect of acid $CO_2$ causing a mechanical reservoir weakening. The risk of geochemically-induced reservoir damage thus needs identification. However, cost cuts are anticipated if the chalk reservoirs maintain mechanical properties upon $CO_2$ injection or if the risks are manageable.

In order to increase our experimental knowledge of the potential extent of $CO_2$-induced changes in mechanical chalk properties, we planned a series of mechanical triaxial tests with an injection of supercritical $CO_2$ into brine-saturated reservoir chalk. Both elastic wave velocity and stress-strain curves are used to determine stiffness and strength changes before, during, and after $CO_2$ injection/exposure. Pore fluid samples are analyzed for changes in pH and chemical composition. These data are combined with analysis for changes in pH and chemical composition from a designated long-term flooding experiment with alternating brine and supercritical CO2 injection. Before testing, chalk samples were analyzed using conventional core analysis, and by use of NMR-spectrometry, we seek to quantify $CO_2$-induced bulk changes in pore size distributions. Analysis of pore size distribution and geochemical composition is assisted by petrography. A preliminary interpretation of the experimental result is presented.

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