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CO_2Seals – Investigation in sealing efficiency of cap rocks above potential CO_2 storage sites

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CO_2Seals is based on previous and ongoing research activities and aims to evaluate the sealing properties of geological barriers exposed to dissolved and free CO_2. In addition to mineralogical, petrophysical and geochemical properties of litho-types, the effect of structural features, like faults and joint networks in the overburden, on the migration of CO_2 will be studied. The major research topics focus on mineral alterations and reactive CO_2/brine/rock interactions, the changes in petrophysical and fluid transport behaviour including transport along faults and damage zones, and the evolution of the geomechanical properties of fault zones as a function of the degree of alteration.

The generic geological reservoir and overburden models comprise generic structural geological features, such as faults, in Mesozoic and Cenozoic formations of the Northern German Sedimentary Basin or other large sedimentary basins. In the initial stage numerical models will be used to simulate the geochemical and fluid-transport processes on the experimental scale. From these simulations, numerical models will be scaled up to the reservoir scale. New numerical simulation tools for risk and safety assessment will be developed and decision support in the selection and characterization of potential storage sites will be provided.