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SHARP project – an integrated approach for assessing CO₂ storage containment risks

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SHARP is an interdisciplinary project with the overall aim to develop improved methods for quantitative assessment of subsurface CO₂ storage containment risks. The project combines subsurface stress models, rock mechanical failure experiments, and seismicity observations with probabilistic modelling of fault stability, seismic hazard, and containment risk. This presentation will summarise and give a status update on risk quantification work of the SHARP project. Uncertainties and parameter ranges are included for the failure data, and independent and dependent failures of geological barriers are treated probabilistically. A new catalogue of natural seismicity in the North Sea form the basis for constructing offshore ground motion prediction equations (GMPEs) and an updated regional probabilistic seismic hazard analysis (PSHA). Natural seismicity, pressure, and pressure induced seismicity are identified as potential root causes of leakage (triggers) and a catalogue of generic release diagrams are built for realistic geological settings. The generic release diagrams are mapped onto test cases from the North Sea. The geological containment risk with uncertainties will be evaluated through event tree analysis and Monte Carlo runs, where the inputs are the quantified contributions from release diagrams, probabilistic fault stability analysis and the seismic hazard curve.

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