Abstract for EGU 2024, session ERE3.1: Secure subsurface storage for future energy systems

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Abstract body 100-500 words

SHARP project – an integrated approach for assessing CO_2 storage containment risks

SHARP is an interdisciplinary project with the overall aim to develop improved methods for quantitative assessment of subsurface CO_2 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 dependent failures of geological barriers are treated probabilistically. A** new ~~unique harmonized and cleaned~~ **catalogue of natural seismicity in the North Sea form the basis for constructing offshore** g~~G~~**round** m~~M~~**otion** p~~P~~**rediction** e~~E~~**quations (GMPEs) and** an updated regional p~~P~~**robabilistic** s~~S~~**eismic** h~~H~~**azard** a~~A~~**nalysis (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 though Monte Carlo runs, where the inputs are the quantified contributions from release diagrams, probabilistic fault stability, and the ~~relevant PSHA~~seismic **hazard curve.** ~~This presentation will give a status on the work.~~