

Stress field information from seismicity to de-risk large-scale CO₂ injections in the North Sea Horda platform region

Kühn, Daniela; Dichiarante, Anna Maria; Kettlety, Tom; Martuganova, Evgeniia; Asplet, Joseph; Goertz-Allmann, Bettina; Fellgett, Mark; Hopper, John; Jerkins, Annie; More Authors

Publication date

2024

Document Version

Final published version

Citation (APA)

Kühn, D., Dichiarante, A. M., Kettlety, T., Martuganova, E., Asplet, J., Goertz-Allmann, B., Fellgett, M., Hopper, J., Jerkins, A., & More Authors (2024). *Stress field information from seismicity to de-risk large-scale CO₂ injections in the North Sea Horda platform region*. 363-363. Abstract from 39th General Assembly of the European Seismological Commission (ESC2024), Corfu, Greece.

Important note

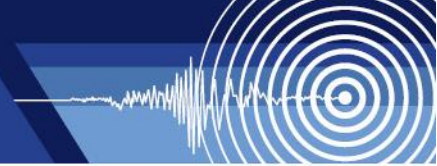
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.



ESC2024-S21-094

Stress field information from seismicity to de-risk large-scale CO₂ injections in the North Sea Horda platform region

Daniela Kühn^{1*}, Anna Maria Dichiarante¹, Tom Kettlety², Evgeniia Martuganova³, Joseph Asplet², Bettina Goertz-Allmann², Mark Fellgett⁴, John Hopper⁵, Annie Jerkins¹, Johannes Schweitzer¹, Jung Chan Choi⁶, Peter Voss⁵, Brian Baptie⁷, Nadège Langet¹, Tine Larsen⁵

¹NORSAR, Kjeller, Norway, ²University of Oxford, Oxford, United Kingdom, ³TU Delft, Delft, The Netherlands, ⁴BGS, Keyworth, United Kingdom, ⁵GEUS, Copenhagen, Denmark, ⁶NGI, Oslo, Norway, ⁷BGS, Edinburgh, United Kingdom

* daniela@norsar.no

Carbon capture and storage technologies are an essential part of EU's decarbonisation efforts. Combined with sustainable energy resources, they are necessary to move Europe towards a net zero carbon emissions economy. Currently, several Mt-scale CO₂ storage projects are being developed in the North Sea. Containment risk evaluation includes analysing tectonic earthquake patterns to potentially map faults, reveal their orientation and failure style, invert for stress directions and at later stages, enable the discrimination of natural and induced seismicity. In addition, seismological information may contribute to the geomechanical understanding of the reservoir and caprock response to large-scale CO₂ injection over time.

A wealth of data exists from various European seismological agencies, but much of it has not been analysed collectively. Within the framework of the ACT3 project SHARP Storage, an extensive unique earthquake bulletin was compiled using seismicity data from all relevant data centres serving as a basis for further analysis, including event relocation and magnitude homogenisation. Inverted moment tensors, shear-wave splitting measurements, and stress drop analysis will be compared to and complement a review of borehole stress measurements to better gauge the present-day stress field and provide constraints on geomechanical models. In addition, the seismological data is integrated with geomechanical data, further improving the understanding of the state of stress and how this relates to fault failure and slip tendency.

