

# **Fracture Network Characterization in a geological complex considered for carbon dioxide (CO<sub>2</sub>) injection in the offshore of the Lusitanian Basin**

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The urgency to mitigate climate change has demanded the development of innovative technologies to reduce carbon dioxide (CO<sub>2</sub>) emissions. Among these technologies, Carbon Capture and Storage (CCS) involves the sequestration of CO<sub>2</sub> in deep geological formations, including deep saline aquifers (DSA).

The central offshore of the Lusitanian Basin holds significant potential for CO<sub>2</sub> storage in DSA. However, caprock integrity is a critical factor in ensuring safe and long-term storage, as fractures within the sealing formation may compromise the injection site. This study aimed to characterize fracture networks of a geological site targeted for CO<sub>2</sub> injection, using the 3D Cabo Mondego seismic data as an analogue.

Fracture interpretation was conducted, followed by a statistical analysis of the identified fractures to evaluate their distribution and properties. The fracture characterization was performed considering key parameters such as fractures' length, height, orientation (strike and dip), aspect ratio (height/length ratio of the fractures), as well as the fracture intensity within the area. This characterization allowed to evaluate the influence of fracture networks on storage integrity, identify potential leakage pathways, and assess CO<sub>2</sub> storage feasibility in the area, while addressing data limitations.

This research is aligned with the PilotSTRATEGY project, aiming to investigate DSA for CO<sub>2</sub> storage across Europe. Integration of this work with the broader project by considering fracture characterization for the simulation of long-term fate of CO<sub>2</sub> plume,

provides valuable insights to the CO<sub>2</sub> storage potential, and improves the knowledge of fracture networks in deep saline aquifers.

Funding: UID/04292/MARE; LA/P/0069/2020; H2020 Grant Agr. 101022664.