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A 3D visualization of a sub-seafloor CO2 storage site. It shows a cross-section of the ocean floor with a large, reddish-brown pipe extending from the surface down to a storage reservoir. The reservoir is filled with a dark, dense fluid. Above the reservoir, there are several layers of red and yellow, representing different geological strata. The background shows a ship on the surface and a large structure on the seafloor.

Monitoring and Impacts of Leakage from Sub-Seafloor CO₂ Storage Sites

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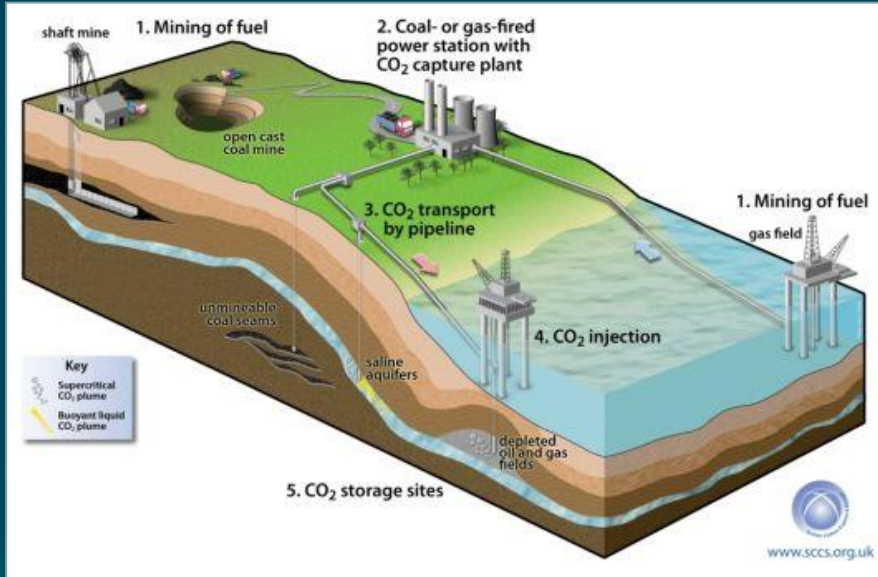
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Carbon capture and storage (CCS)

on shore <-> off shore

worldwide > 60 CCS projects identified
 17 active projects
 Europe:-> offshore storage

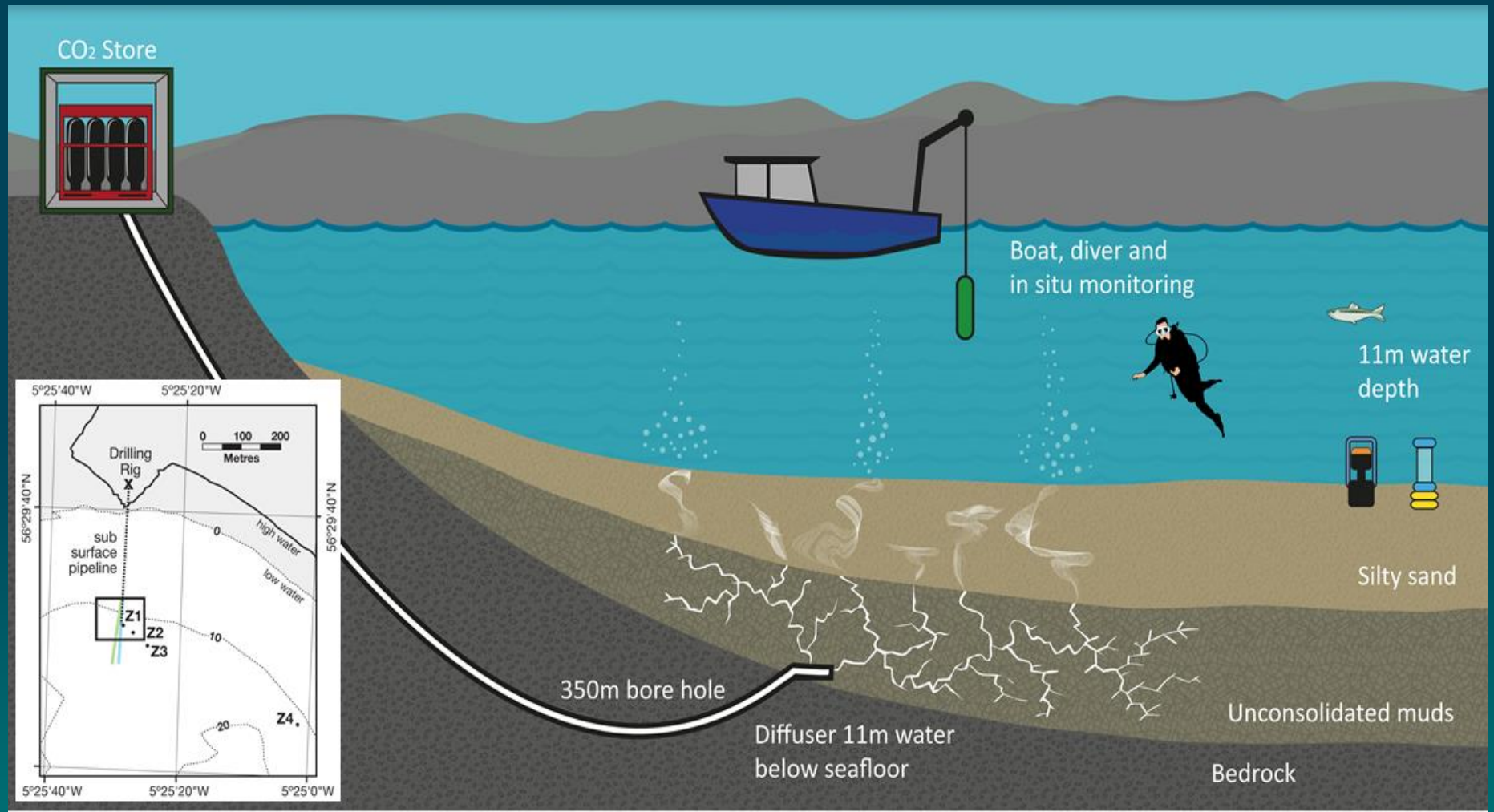


Longest operated site (since 1996)
 1 Mt CO₂ a⁻¹



shore C
 off

Barriers to CCS: CO₂ storage → CO₂ leakage?



May
2012

Pre-release

Injection

Recovery

Sept
2012

Summary of key findings

- CO₂ leakage was detectable at relatively low flow rates (20–210kg CO₂ d⁻¹):
 - Geophysical imaging (chirp/boomer/multibeam)
 - Biogeochemical sensors (pCO₂/pH/ORP)
 - Direct observation (camera, video, divers)
- CO₂ bubbles were:
 - Easily recorded (pCO₂, hydrophones, imaging)
 - Sensitive to hydrostatic pressure
 - Represented only a fraction (<15 %) of injected CO₂
 - Reached shallower depths than expected
- Pore water and bottom water chemistry was impacted by CO₂ release, but:
 - Limited to release epicentre (~25 m diameter)
 - Quick recovery (within 20 days of termination of release)
 - Dissolution of CaCO₃ buffers pH
- Biological impacts appear to be limited

