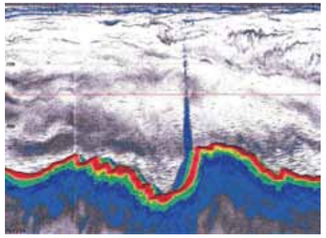
Work packages

WP1 - Architecture and Integrity of the Sedimentary Cover at Storage Sites -
will undertake geophysical acquisition, modelling, and hydro-acoustic monitoring to characterise the range of performance and efficiency of sub-seabed geological CO_2 storage, including two existing and one potential storage sites as well as two natural CO_2 seepage sites.

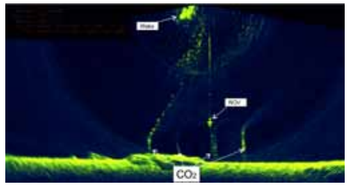


Echogram showing CO_2 gas flares above Troll Wall Vent Field (Jan Mayen); figure: University of Bergen

WP2 - Fluid and Gas Fluxes across the Seabed at Storage Sites and Natural CO_2 Seeps -
will carry out a program of fieldwork at existing storage sites as well as natural CO_2 seeps, including analysis of the chemical composition of reservoir fluids. Fieldwork data will be supplemented by laboratory studies focused on CO_2-induced mobilization of potentially toxic metals.

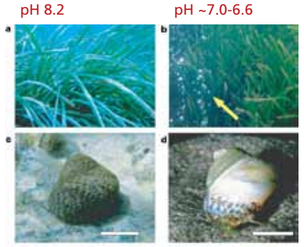
Benthic Lander Technology; photo: GEOMAR

WP3 - Fate of CO_2 and other Gases emitted at the Seabed -
will conduct process studies and model evaluations to underpin risk and impact assessments of potential leaks from CO_2 storage sites into the overlying waters. Natural CO_2 seeps, as analogues of storage leakage, will provide a detailed database on the processes involved.



Multibeam echosounder water column image showing natural release of CO_2 bubbles at Panarea (Italy); image: Eurofleets Project PaCO2

WP4 - Impact of Leakage on Benthic Organisms and the Marine Ecosystems -
will determine the biological impacts and risks associated with CO_2 leakage by controlled exposure experiments or in-situ observations at natural sites, and identify appropriate methods to monitor the marine environment above a storage site.



Benthic ecosystems may be affected by local acidification; figure: Hall-Spencer et al., 2008, Nature 454, 96-99

WP5 - Risk Assessment, Economics, Legal Studies and Policy Stakeholder Dialogue -
will consider the environmental risks associated with CCS and how these risks may impact on the financial, legal, and political considerations surrounding the future geological storage of CO_2.

WP6 - Public Perception Assessment -
will investigate how the scope and the characteristics of CO_2 storage technology and its costs-benefits are perceived by different social agents. Within a research-intervention approach, it will promote dialogue to increase knowledge and awareness of the different public and stakeholders' perspectives.

CT1 - Monitoring Techniques and Strategies -
will provide a focus for the synthesis and integration of knowledge towards the optimisation of monitoring methods for different scenarios of CO_2 leakage.

CT2 - Interfacing of the Numerical Models -
will model the whole system from reservoir leakage through to CO_2 transfer into the ocean and to the atmosphere, including biological impacts.

CT3 - International Collaboration -
will enhance the international profile of European environmental CCS research in general, and the ECO_2 consortium in particular.

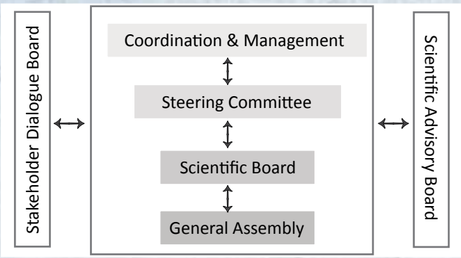
CT4 - Framework of Best Environmental Practices of Offshore CO2 Injection and Storage -
will utilise the knowledge of the ECO_2 consortium to identify considerations associated with managing the potential environmental impact of CO_2 storage.

Management and Communication

All field data produced by WP1 to WP4 will be archived and exchanged interdisciplinary by all work packages via the data repository **PANGAEA**.

The **Project Coordinator** (PC) will be supported by the **Project and Data Management Office**, the **Steering Committee** and the **Scientific Board** to ensure the project remains focused.

The internal management structure will be supplemented scientifically by the **Scientific Advisory Board** and politically by the **Stakeholder Dialogue Board**.



ECO_2 Partner:

GEOMAR • PML • NIVA • NOCS • BGS • University of Bergen • MPI • University of Trier • University of Tromsø • KDM • AWI • IOW • University of Rome Sapienza • OGS • University of Stuttgart • Statoil • DNV • University of Southampton • IfW • University of Edinburgh • University of Gent • HWU • University of Gothenburg • TNO • ECN • IFREMER • University of Gdansk • Grupa Lotos

ECO_2

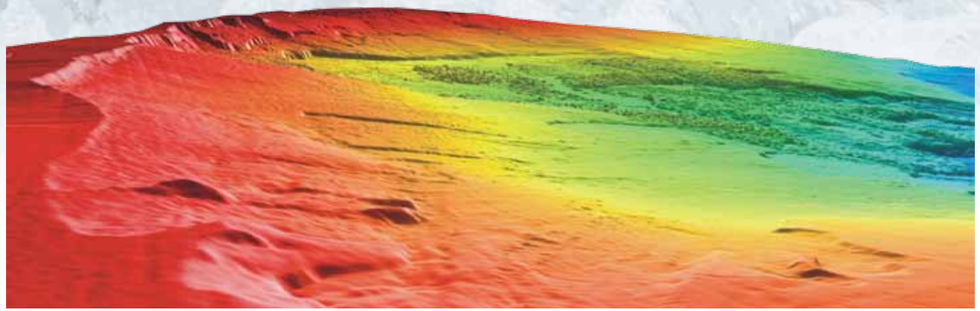
Sub-seabed CO_2 Storage:
Impact on Marine Ecosystems

SEVENTH FRAMEWORK PROGRAMME

General Information

ECO_2 - Sub-seabed CO_2 storage: Impact on Marine Ecosystems is a large-scale integrating collaborative project funded by the European Commission (EC) FP7 work program topic OCEAN.2010.3. The project sets out to evaluate the safety of storage sites and the potential impact of sub-seabed carbon dioxide leakage from storage sites on marine ecosystems. The ECO_2 consortium that comprises 27 partners from nine nations will study existing sub-seabed storage sites in the Norwegian North Sea and the Barents Sea as well as natural seeps at the seafloor.

Carbon dioxide capture and storage (CCS) is regarded as a key technology for the reduction of CO_2 emissions from power plants and other industrial facilities. Since several European states (U.K., Norway, Netherlands, Italy) aim to store CO_2 below the seabed, the EC supports ECO_2 to evaluate the likelihood of leakage, the possible impacts on marine ecosystems, and its potential economic and legal consequences.

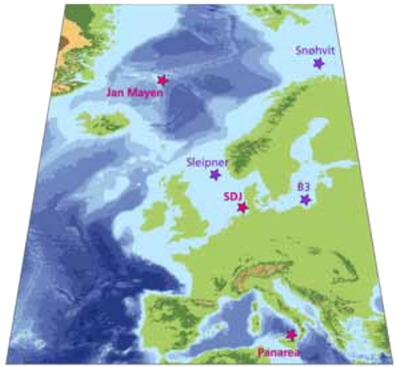


Objectives

1. **To investigate** the likelihood of leakage from sub-seabed storage sites
2. **To study** the potential effects of leakage on benthic organisms and marine ecosystems
3. **To assess** the risks of sub-seabed carbon storage
4. **To develop** a comprehensive monitoring strategy using cutting-edge monitoring techniques
5. **To define** guidelines for the best environmental practices in implementation and management of sub-seabed storage sites

Study sites

- **Sleipner** - saline aquifer on the continental shelf of the Norwegian North Sea, ~80 m water depth, ~900 m sediment depth; in operation since 1996
- **Snøhvit** - saline aquifer on the upper continental slope of the Barents Sea, ~300 m water depth, ~2.6 km sediment depth; in operation since 2008
- **B3 field site** - potential storage site, depleted oil and gas reservoirs in the Polish sector of the Baltic Sea
- **Natural CO_2 seep sites** - Field work at storage sites will be supported by modelling and laboratory experiments at natural CO_2 seep sites (e.g. Salt Dome Juist, Panarea, Jan Mayen vent field, Okinawa Trough).



CO_2 storage sites and potential storage sites
natural CO_2 seep sites

Plus potential CO_2 storage sites off Australia and natural seeps off Japan

Work Structure

The ECO_2 work covers a wide rage of approaches from basic marine research to ocean governance organised by separate work packages (WPs). The WPs are cross-cut with four themes (CCTs) that provide vital ECO_2 products and support information flow across the WPs.

WP1: Caprock integrity
WP2: Fluid and gas flux across the seabed
WP3: Fate of emitted CO_2
WP4: Impact of leakage on ecosystems
WP5: Risk assessment, economic & legal studies
WP6: Public perception
WP7: Coordination & Data Management

CCT1: Monitoring techniques & strategies
CCT2: Numerical Modelling
CCT3: International collaboration
CCT4: Best environmental practicies

ECO_2
Sub-seabed CO_2 Storage:
Impact on Marine Ecosystems

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