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3. University of Göttingen (Germany)
4. Council for Scientific Research (Spain)
5. Israel Institute of Technology (Israel)
6. University of Nottingham (England)
7. Centre National de la Recherche Scientifique (France)
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17. Lapidoth – Israel Oil Prospectors Corporation
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International Experts: LBNL, Stanford University (USA), CO2CRC (Australia), IAE-GHG, JOGMEC(Japan)

Industriesa and End-users: EnBw, EON, Statoil-Hydro, Vattenfall, IEC, LAFARGE, Marathon, Progressive Energy, Thermoelecrica, CEA,CIUDEN, EIFER, PETROBRAS, SCHLUMBERGER CARBON SERVICES.

Regulators: CDE, Israel Water Authority, German Ministry of Environment, NAMR, SGU

SEVENTH FRAMEWORK PROGRAMME

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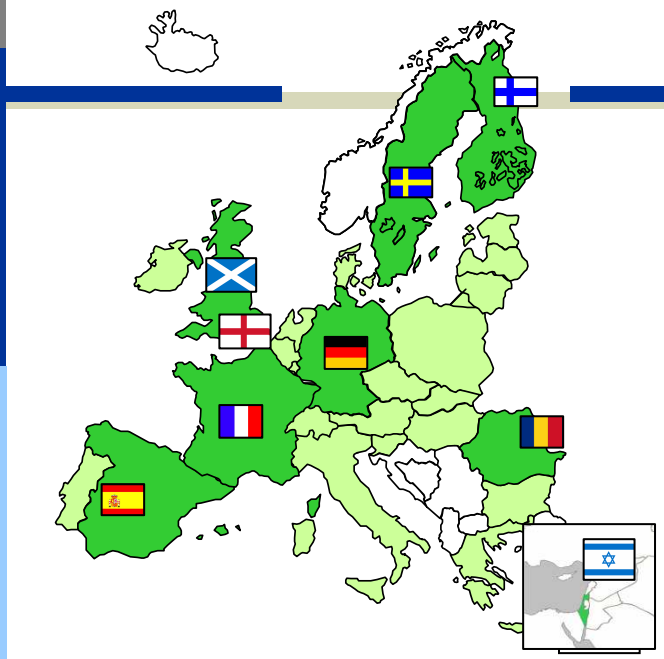
EC FP7, Collaborative Project
Large Scale Integrating Project

MUSTANG

A MUltiple Space and Time scale Approach for the quaNtification of deep saline formations for CO_2 storaGe (2009-2013)



Background

It is widely recognized that extensive efforts are required to mitigate the atmospheric releases of carbon dioxide. Storage in deep geological formations is considered a viable alternative for achieving this goal (e.g. IPCC, 2007). There are already operating facilities employing this technique. However, for the system to be built in populated areas and in a large number of locations and geological settings, great confidence in system performance is needed. This requires (i) a thorough understanding of the relevant hydro-mechanical-chemical processes of the multiphase-multicomponent spreading in various geological settings and (ii) good methods for the site characterization, monitoring and modeling of the system.

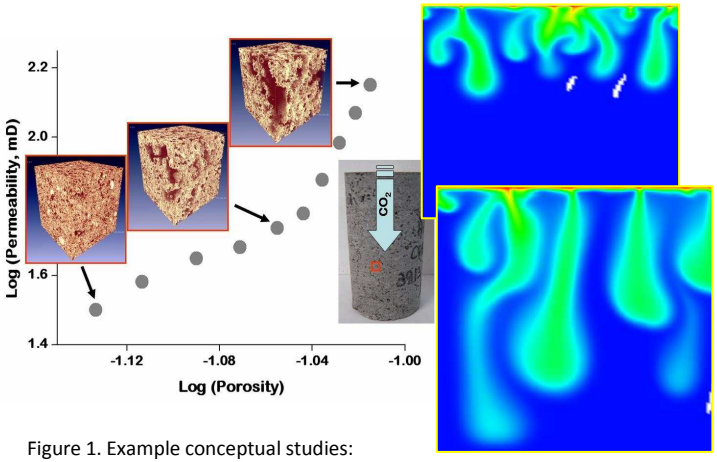


Figure 1. Example conceptual studies:
a) Effect of CO_2 injection on poro-permeability relation (left);
b) Simulation of time evolution of dissolved CO_2 concentration (right).
Source: MUSTANG elaboration

Overall Objective

The MUSTANG project aims to develop and disseminate a comprehensive set of tools and methodologies for the identification, assessment, characterization and evaluation of deep saline aquifers for CO_2 storage.

General Information

MUSTANG project sets out to develop methods and models for the characterization of deep saline aquifers for long term storage of CO_2, based on a solid scientific understanding of the underlying critical processes. An improved understanding of the processes relevant to CO_2 spreading is aimed at by means of theoretical investigations, laboratory experiments, natural analogue studies as well as a dedicated field scale injection test at Heletz site (Israel). Conceptual and computational models will allow prediction of system performance for the future. There will be a special focus on processes relevant to:

1) Seal integrity;
2) Possible seepage via pre-existing or reactivated fault zones;
3) Effect of formation heterogeneities;
4) CO_2 trapping mechanisms;
5) Effective simulation of the wide span of spatial and temporal scales of the coupled thermo-hydro-mechanical-chemical processes.

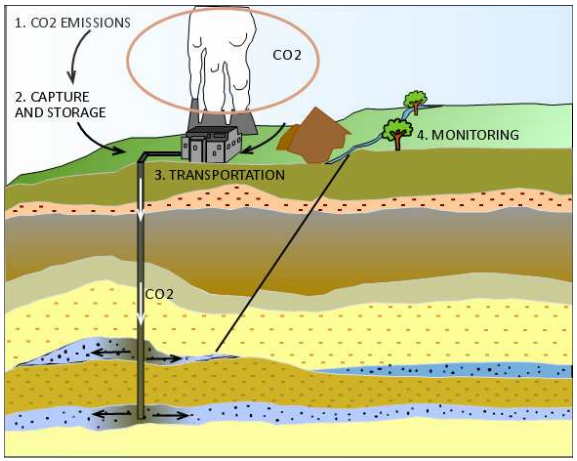


Figure 2: CO_2 Capture and sequestration
Source: MUSTANG elaboration

Methodology

The project is hierarchically structured as follows:

(1) Process understanding and description; Laboratory experiments, natural analogue studies and theoretical analyses for improved process understanding and conceptual models.

(2) Field characterization; Data from test sites (see figure) will be analyzed and new data collected. Development of advanced field techniques includes tracer testing, seismic and electric monitoring.

(3) Interpretation and synthesis; Updating of some of the best-performance computational models based on the project findings and their application to the test sites. Integration into a risk assessment framework.

(4) CO2 injection experiment; A small scale CO_2 injection experiment will be carried out to validate the field methods and models at Heletz (Israel). The target layer is at a depth of ~ 1600 m.

Test Sites

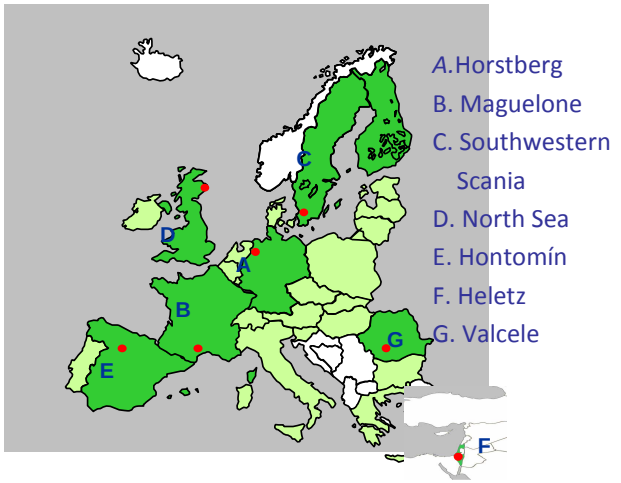


Figure 3: MUSTANG test sites
Source: MUSTANG elaboration