MUSTANG News

Newsletter, January 2010

In this issue:

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1st Semi-Annual NEWSLETTER

About MUSTANG

http://www.co2mustang.eu

MUSTANG is a four year large-scale integrating project that started 1 June 2009. It is mainly funded by the EU FP7, and is coordinated by Uppsala University. The **MUSTANG** consortium comprises 19 institutions (universities, research institutes and SMEs). Its strategic objective is to develop guidelines, methods and tools 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. The main research activities include: 1) Improvement and development of **MMV (Measurement, Monitoring and Verification) technologies** specifically suited to CO_2 storage, for a reliable determination of the relevant physical and chemical properties of the site, and enabling short response times in the detection and monitoring of CO_2 plumes and pressure in the reservoir and the overburden during both the injection and containment phases; 2) An improved understanding of the relevant processes of CO_2 migration by means of theoretical investigations, **laboratory experiments**, natural analogue studies as well as a dedicated **field scale injection test**, to be carried out at the Heletz site (Israel).

This newsletter gives a brief overview of the project activities and progress during the first 6 months of the project (June 2009-December 2009).

SUMMARY OF ACTIVITIES

Key activities and progress for the first six projects months can be summarized as follows:

- Contractual issues have been successfully concluded.
- The kick-off meeting was held at Uppsala University. Its purpose was to present the overall objectives and work plan of the project, the partners and their respective roles within the project.

The project began on 1st June 2009

- According to the work plan, the scientific and technical work has started and progress has been presented during the 2nd Consortium Meeting held in Göttingen (Germany) from 11 to 13 January 2010.
- A public web page and intranet have been developed and are used by the members of the consortium and interested organizations, related to the project or outside the project.

WORD FROM THE EDITOR

We welcome the new readers to this issue of the MUSTANG newsletter and to the MUSTANG consortium! As you will see, this first Newsletter will concentrate on presenting the work plan for the project.

MUSTANG project aims at contributing to a better understanding of the fate of injected CO_2 in geological formations in order to enable reliable estimates of large scale implementation of Carbon Capture and Storage (CCS). CCS is regarded as a major bridging technology, capable to substantially mitigate the adverse effects of the global climate change.

We see that disseminating the findings of MUSTANG is of key importance to increase public awareness of a complex technology like CCS. It is for this reason that the MUSTANG newsletter aims to inform you about the project, the project findings, the partners and other related subjects which may be of interest to both the scientific and wider public. If you have an item to contribute for the next issue, please contact us: beatriz.medina@amphos21.com.

RESEARCH

Project objectives and major achievements during the first six projects months

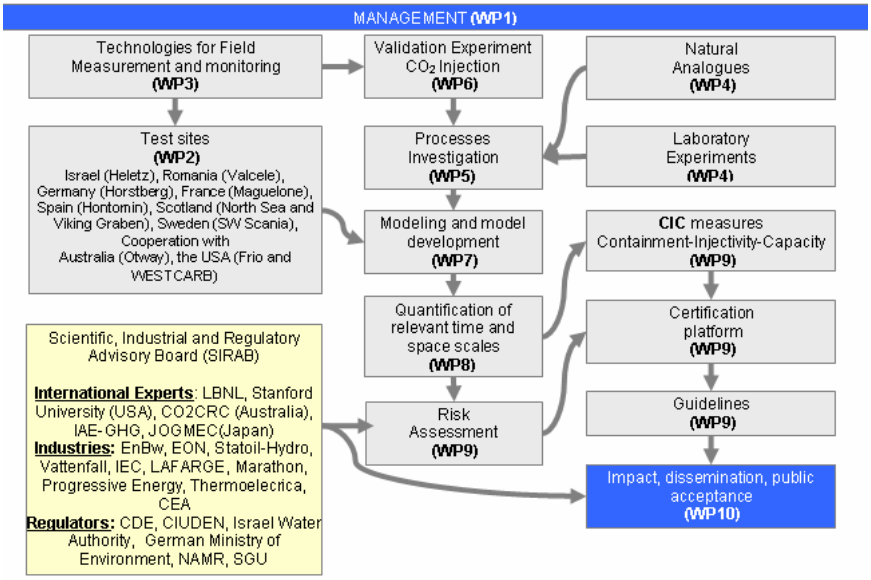
The overall activities of the first 6 month project period have included described as ensuring that the project is starting appropriately, that research and technical manpower has been hired by the partners, detailed scientific programs have been delineated and the basic components of the validation experiments identified. During this period, all required documents (Contract Accession Form and Consortium Agreement) have been signed by all partners, work package activities have started appropriately, milestones and deliverables concerning determination of investigation material for future studies have been met, the knowledge management system have been implemented, including MUSTANG and the intranet.

Kick-off meeting took place in Uppsala (Sweden), 11-12 June 2009, hosted by Uppsala University, the Coordinator of the Project. During these days also the first Project Steering Committee meeting was held. Nearly 30 persons attended the 1st meeting, including the European Commission Officer, Dr. Jeroen Schuppers.

MUSTANG Partners in Uppsala taking part in the kick-off meeting, June 2009.

MUSTANG's main areas of research

The scientific-technical work program is structured along 9 Research Technological Development Work Packages (WP2-10). They cover activities focused on the integration of measurement and monitoring technologies, cutting edge laboratory experiments as well as improved modeling methodologies.



MUSTANG work programme

Test sites (WP2)

The main objective of this WP is to gather all the available data and information that is relevant to the quantification of CO_2 storage and develop a conceptual model of each test site. Detailed conceptual models are developed for the sites in South Scania (Sweden), Horstberg (Germany), Valcele (Romania), Heletz (Israel) and Hontomín (Spain). This WP will prepare all the necessary input for the computational models of each test site. The site in France (Maguelone) is destined for the testing of novel geo-electric monitoring technologies. The two natural analogue sites from UK are used to gain understanding of how the long-term contact of naturally occurring CO_2 has influenced the subsurface. The information from the collaboration projects at LBNL (e.g. the Frio and WESTCARB projects) and CO2CRC (the Otway project) is used as general reference material.

WP leader: Swedish Geological Survey (SGU)

For more information: Dr. Mikael Erlström

Mikael.Eristrom@sgu.se

Hydraulic testing at Horstberg.

Photo: A. Weitze

Field quantification techniques (WP3)

This WP will develop innovative, CCS-adapted, field measurement techniques for assessing the suitability of a deep geologic saline formation for CO_2 storage. Technologies are provided within the MUSTANG project for monitoring the fate of CO_2 during the injection and migration phases in a saline aquifer. In addition, the project aims to recommend suitable and cost-effectives technologies that could be applied for the MMV (Measurement Monitoring Verification) process.

WP leader: University of Götttingen (UGOE)

For more information: Prof. Dr. Martin Sauter

Martin.Sauter@geo.uni-goettingen.de

Laboratory experiments and natural analogues (WP4)

This WP aims to produce a comprehensive, self consistent, experimental and field observation data base for validating models. The objective is to provide support for the improvement of reservoir-scale modeling, including parameter upscaling, by characterizing mass transfer mechanisms and identifying controlling parameters from core-sample scale to reservoir scale. In addition, it aims to parameterize the thermo-hydro-mechanical & chemical THMC processes associated with the migration of supercritical and dissolved CO_2 in the aquifers and through the seal.

WP leader: Centre National de la Recherche Scientifique (CNRS)

For more information: Dr. Philippe Gouze

philippe.gouze@msem.univ-montp2.fr

Processes (WP5)

The overall objective of this WP is to provide a comprehensive framework, in the form of process models, for the description and investigation of the major processes occurring during the injection of CO_2 into a saline formation and the interactions that will take place between the injected CO_2, the solid matrix and the indigenous liquid in the formation. This will enable the investigation of:

(i) The relative significance of the various processes under different conditions, and

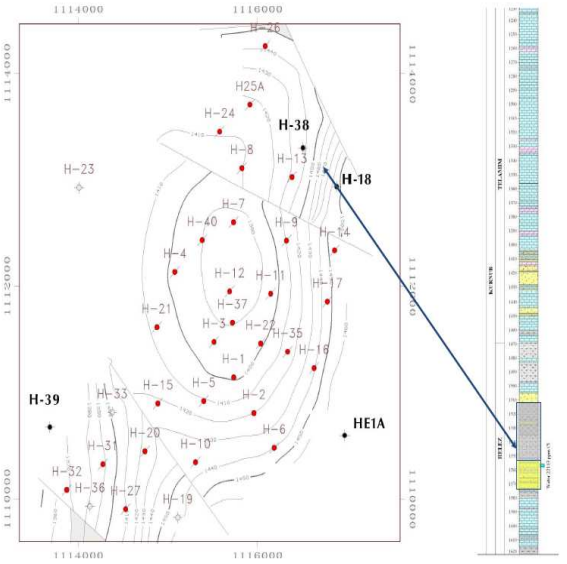
(ii) The behavior of the system as a whole, in response to various scenarios.

WP leader: Israel Institute of Technology
For more information: Prof. Jacob Bear
cvrbear@techunix.technion.ac.il

Validation (WP6)

This WP will perform a CO_2 injection experiment at the Heletz (Israel) site to test novel monitoring and measurements technologies and validate the process understanding and the resulting mathematical and numerical models. This WP aims to achieve a high degree of integration of measurements and computational technologies and contribute to the preparation of best practices for the MMV process. Furthermore, the MMV (Measurement Monitoring Verification) process is demonstrated and the most appropriate and cost-effective measurement and monitoring technologies are recommended.

WP leader: Environmental & Water Resources Engineering Ltd. (EWRE)
For more information: Dr. Jacob Bensabat
jbensabat@ewre.com



General structural map of Heletz-Kohav

Numerical model development and modelling (WP7)

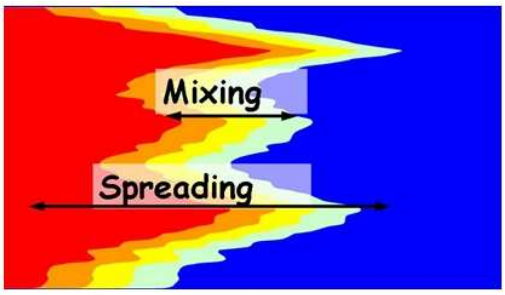
The overall objective of this WP is to provide a comprehensive modeling approach and associated numerical tools for the simulation of flow, transport, reactive transport, thermal and chemical processes occurring to the fluids and to the rock matrix during the injection and storage of CO_2.

WP leader: Nottingham University (UNOTT)
For more information: Prof. Henry Power
Henry.Power@nottingham.ac.uk

Scale effects (WP8)

The objectives of this WP are to identify the time and space scales that are relevant for understanding and modelling of CO_2 spreading and for evaluation of performance and risk assessment. For each identified level of time – space scale, outline the significant flow and transport processes that need to be taken in account. For each process and time – space scale, define the upscaled formulation of the individual processes and of the comprehensive models that describe the injection and spreading in the brine saturated formation.

WP leader: National Research Council of Spain (CSIC)
For more information: Prof. Jesús Carrera
jcarrera@ija.csic.es



Mixing of CO_2 rich brine (red) and resident brine (blue) promotes dissolution of the rock and precipitation of secondary phases. Traditional solute transport formulations lead to artificial increase by equating true mixing and spreading.

Certification (WP9)

This WP aims to develop a generic methodology for performance and risk assessment raised by CO_2 storage in saline aquifers as well as a decision support system in order to assist the decision making process both at the scientific and the decision making level. The methodology will be applied to one of the MUSTANG test sites. This WP develops measures for the performance evaluation of the CO_2 storage in a specific reservoir and outlines a set of practical guidelines for the quantification of a specific site for CO_2 storage.

WP leader: Oxand

For more information: Dr. Yvi LE GUEN

Yvi.leguen@oxand.com

Impact (WP10)

The objective of this WP is to ensure an efficient and reliable flow of information and knowledge within the consortium during the project lifetime as well as to ensure an adequate degree of communication and understanding at the level of the scientific community. Results and findings of the project are disseminated among the members of the consortium and also to the wider community of scientists, engineers and end users. The transfer of knowledge is sought internally and externally to different stakeholders – regulators, policy-makers, experts, industry representatives and the general public. MUSTANG has set up a network of other CO_2 storage related research projects, experimental sites and commercial companies. In addition, MUSTANG will organize the next training course in Barcelona.

WP leader: Amphos 21

For more information: Dr. Meritxell Martell

meritxell.martell@amphos21.com

Schedule of key events

Below are given key events of MUSTANG project

JUNE 2010						
Mo	Tu	We	Th	Fr	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

3rd Consortium Meeting

14-16 June 2010, Montpellier (France)

Training workshop

17-19 June 2010, Barcelona (Spain)

4th Consortium Meeting

November/December 2010, Haifa (Israel)