

Newsletter from the SUCCESS centre – September 2012 – no. 4

**SUCCESS in China:
3rd Global CCS Summit**

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www.fme-success.no

Last month, **Maria Elenius** from Uni Research in Bergen attended **The 3rd Global Carbon Capture & Storage Summit 2012** in Beijing. Maria gave an introduction to the SUCCESS center and presented her research on dissolution trapping of carbon dioxide (CO₂).

The overall purpose of the conference was to explore collaboration possibilities and to discuss technology and project development of Carbon Capture Utilization and Storage (CCUS). Key ingredients were on the status of CCUS in especially China, Norway and the US, and on challenges and their possible solutions.

Tore Amundsen from Technology Center Mongstad (TCM) pointed out that CCS is cost-competitive with renewable energy. However, both approaches will be needed, as well as other strategies, all at large scale, in order to combat climate change. IEA has calculated a scenario where CCS contributes 19 % of the emission reductions needed to obtain the 2005 level of emissions in 2050. China's large interest in CCUS is connected with the fact that the country has the world's largest CO₂ emissions, with 78 % of the energy demand supplied from coal.

Holger Bietz from Global CCS Institute presented statistics on planned and ongoing CCS projects around the world. The institute database (<http://www.zeroco2.no/projects/list-projects>) presently lists 51 operating projects in the world, and many more planned. They list 12 projects in China, mostly related to coal-fired power plants. Three of these are now operating. 12 projects are listed in Norway, of which 5 are operating.

At the summit, there were also talks on other uses of CO₂, for example enhanced coal bed methane production and industrial uses.

TCM has summarized the major challenges for CCS operations, that were also mentioned in the meeting: **High CO₂ capture costs and unproven technology at scale, public concern over the safety of geological**



Norwegians at the summit; from left: Jens Hetland (SINTEF), Aage Stangeland (NFR), Kari Kveseth (Norwegian Embassy in Beijing), Tore Amundsen (Technology Centre Mongstad) with wife, and Klaus Schöffel (Gassnova). Picture taken by Maria Elenius (Uni Research).

storage of large amounts of CO₂ and lack of an internationally harmonized regulatory framework to incentivize and regulate CCS deployment. There may also be a conflict between vendors' intellectual property and efficient knowledge sharing. Additionally, Roger Aines pointed out that in USA, when oil is no longer produced and the formation is used only for storage, the company must apply for a new kind of permit, which is more difficult to obtain.

Some of the actions mentioned in the meeting to overcome the challenges, are intensified R&D, experience from pilot-projects, improved international collaboration, educational programs such as “CarbonKids” in Australia, and improved communication with stakeholders.

Carmen Dybwad from IPAC-CO₂ Research in Canada talked about effective stakeholder communication and engagement. She emphasized that the goal should not be public acceptance, but rather the public embracing this tool to fight climate change.

Aage Stangeland from the Research Council of Norway pointed out that although there will be a need for an “energy revolution” in order to reach the IEA emission scenario mentioned earlier, it also gives large market opportunities.

The Longyearbyen CO2Lab field season: Tracking the Triassic

See more pictures at
www.fme-success.no

UNIS Postdoc **Ingrid Anell** reports:

Standing just outside Longyearbyen in Adventdalen, we know that somewhere deep beneath our feet we have a Triassic reservoir that we hope to use for injection of CO₂ for long-term storage. The Mesozoic rocks are deeply buried beneath thick Mesozoic and Tertiary basins, and in order to fully understand the reservoir and cap-rock we head across the mountains to the north to study fractures, and far to the east to remote Triassic outcrops.

To the North of Adventdalen, at Deltanaset, both the cabin and the Triassic outcrops dip. The result is acrobatic sleep positions and long winding beaches revealing progressively younger and younger rocks. The location is well studied from previous years, but being on site once again gave the geologists from UNIS and UiB/UNI CIPR the chance to expand the dense scan-line network and delve deeper (and higher) into the cap-rock above. While paleontologists scour this rock for remains of giant marine Plesiosaurs our group is more interested in its ability to provide a tight seal.

On another trip, seven geologists from UNIS, UiB and the University of Nebraska at Omaha, went for eight full days of fieldwork onshore Edgeøya, known for its polar-bear density and its magnificent Mesozoic outcrops. Luckily for us the latter was far more prominent. Working on the steep cliffs of Kvalpynten (picture) the geologists logged perilous sections and performed detailed studies of the unique growth faults exposed along the beach. These faults are found in the Tschermakfjellet and DeGeerdal Formations, in pro-delta and delta deposits. Their origin has been ascribed to a combination of denser sands on less dense clays with excess pore-fluids, a southward slope or paleoslope, differential loading or a tectonic trigger (earth-



Section of Kvalpynten showing two major growth-faults.

quake). The factors contributing to their formation are of key importance to understanding the Mesozoic development of the region. In addition to conducting detailed studies of the onshore exposures we also aim to compare them to the offshore seismic data. We hope to resolve similar features in the offshore data and provide definitive answers on links to deeper processes. Studying the onshore exposures also provides a link to understanding the offshore development as part of a regional mapping of the Mesozoic to tie back to the Longyearbyen injection site.

The trip also allowed new PhD student Berit Husteli, working on the GeC project, to begin data-collection for her studies by detailing lateral variations in tidal delta deposits. The Kvalpynten cliffs provide excellent exposures of tidal dominated deltaic deposits reveal sedimentological features over several parasequences and display beautiful examples of sand-wave migration, large and small-scale herringbone cross stratification, scours and small channels, rip-up clasts and rejuvenation surfaces, varying crossbedding and planar parallel deposits and variations in lithology. The analysis will further refine the reservoir model and constrain parameters for understanding CO₂ migration through the Longyearbyen reservoir.

Remember the SUCCESS fall conference

in Oslo **October 22–23**. This is primarily a gathering for members of the SUCCESS community (research and industry partners), but a session of keynote talks before lunch Monday will also be open for other interested parties. Check <http://fme-success.no/index.cfm?id=379917> for more info.

SUCCESS (Subsurface CO₂ Storage – Critical Elements and Superior Strategy) is one of several Norwegian centres for environment-friendly energy research, funded by the Norwegian Research Council and industry partners. For more info and contact address: www.fme-success.no.

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