The European Student Lecture Tour 2010-2011

"Geological storage of CO_2"

Capturing CO_2 at large industrial plants and storing it underground in deep geological layers is a top priority in the race to significantly reduce atmospheric emissions of greenhouse gases (GHG), thus helping to mitigate climate change and ocean acidification. By storing CO_2 underground, the carbon released through burning coal, oil and gas is returned back to where it was extracted, rather than released into the atmosphere.

Since the 90's, a huge research effort on CO_2 geological storage, especially in Europe, has led to significant outcomes and the technology has now reached a transition stage between research and worldwide deployment. There is now a need to assess the progress made, to bridge gaps between industry and research, to spread the results to a larger community of scientists and to train young engineers and researchers.

The aim of this course is therefore to draw conclusions from the last decades of research and to outline the future challenges to be faced along the road to industrial implementation.

The following topics will be treated:

1. A run-through of the characteristics of a good site for geological storage and how to select such sites,
2. then the modelling techniques available to determine the behaviour of CO_2 in the reservoir,
3. and consequently how to assess the risks linked to geological storage,
4. Followed by how to monitor a storage site.
5. Finally, a summary of the whole process of a CO_2 geological storage project, from design through injection to closure and then abandonment, will be given.

The different topics will be introduced using numerous examples of current and planned industrial demonstrations worldwide.

Typical questions that will be addressed during the course include:

- Where and how much CO_2 can we actually store underground?
- How can we inject large quantities of CO_2?
- What is the fate of CO_2 in the storage reservoir and are there any related physical and chemical changes?
- Could CO_2 leak from the storage reservoir and what would be the effects on humans and ecosystems?
- How can we monitor the storage site at depth and at the surface, and why is this necessary?
- What safety criteria —i.e. conditions for safe storage— need to be imposed and respected?

The lectures will be given by different experts from CO2GEONET.