

Study tracks safety of underground CO₂ storage

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(PhysOrg.com) -- In a paper published today in the *Proceedings of the National Academy of Sciences*, an international team of geoscientists, including Simon Fraser University groundwater expert Dirk Kirste, show that carbon dioxide can safely be stored underground in depleted natural gas fields.

The experiment, in the Otway basin near Melbourne, Australia, is the most heavily monitored project for CO₂ storage in the world.

The project, funded by the Cooperative Research Centre for Greenhouse Gas Technologies (CO₂CRC), is a joint venture between government, universities and industry. Storage of CO₂ underground is an important component of worldwide greenhouse gas reduction.

Kirste says, “We showed no leakage was detected. Our models fit well with the experimental results, which means we can apply these models in other places with confidence.”

In Western Canada there are several dozen sites where CO₂ as well as H₂S sour gas is being injected into depleted gas fields.

A true stand-alone experiment and not part of any industrial process, the CO₂CRC Otway project, which began injection in 2008, took large amounts of CO₂ from one gas field a kilometer away and pumped it down another well to a depth of two kilometers, where it filled a depleted natural [gas](#) reservoir.

Kirste, an assistant professor of earth sciences specializing in aqueous geochemistry, was responsible for groundwater monitoring and geochemical modeling of fluids deep in the reservoir, as well in drinking water aquifers near the surface.

Kirste says it's not easy monitoring water two kilometers below the surface. Scientists must obtain samples, which exist at relatively high pressure, and bring them to the surface without chemically altering them on the way up.

“Carbon dioxide forms carbonic acid in water and it reacts with surrounding rock minerals,” says Kirste.

The study's results are important for future commercial carbon storage and monitoring, which are mandatory in many jurisdictions.

“Governments can set up regulatory frameworks for monitoring leakage of future CO₂ storage facilities based on the knowledge we obtained from this study,” says Kirste.

Provided by Simon Fraser University

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