Introduction to CO_2 Storage

Carbon dioxide storage in subsurface geologic formations is one option to reduce significant levels of CO_2 emitted to the atmosphere. Fundamental science and engineering principles indicate that such systems should be feasible and safe: the energy cost of preparing CO_2 for injection can be as low as a few percent of the heating value of the original fuel; and the very existence of oil and gas reservoirs is proof that buoyant fluids can be contained in the subsurface for millions of years. Carbon dioxide has been injected safely into subsurface reservoirs for many years for enhanced oil recovery. However, long-term CO_2 storage does carry a risk of possible leaks to the atmosphere. The costs and risks are not insurmountable, but research is required to make these concepts economically and technologically feasible.

Historically, GCEP-funded scientists have investigated a range of research concepts in CO_2 storage, from rock characterization in the presence of CO_2 to simulations, models and theory that predict and monitor fluid flow. Currently, there is one ongoing GCEP research activity taking place in the area of CO_2 Storage

Professor Sally Benson's team continues to study the fundamental science behind the long-term fate and trapping of CO_2 storage in saline aquifers. They focus on the multiphase flow of CO_2 in brine and to a lesser degree, in enhanced oil recovery operations. Experimental investigations and numerical simulations are used to address important questions about multiphase flow theory needed to reliably predict field-scale performance. Their progress so far this year has led to 11 journal publications and submissions, 16 conference posters and presentations.