UNIVERSITY OF SOUTH FLORIDA

Creation of Carbon Sequestration Data, Technologies and Professional Cohorts for Florida

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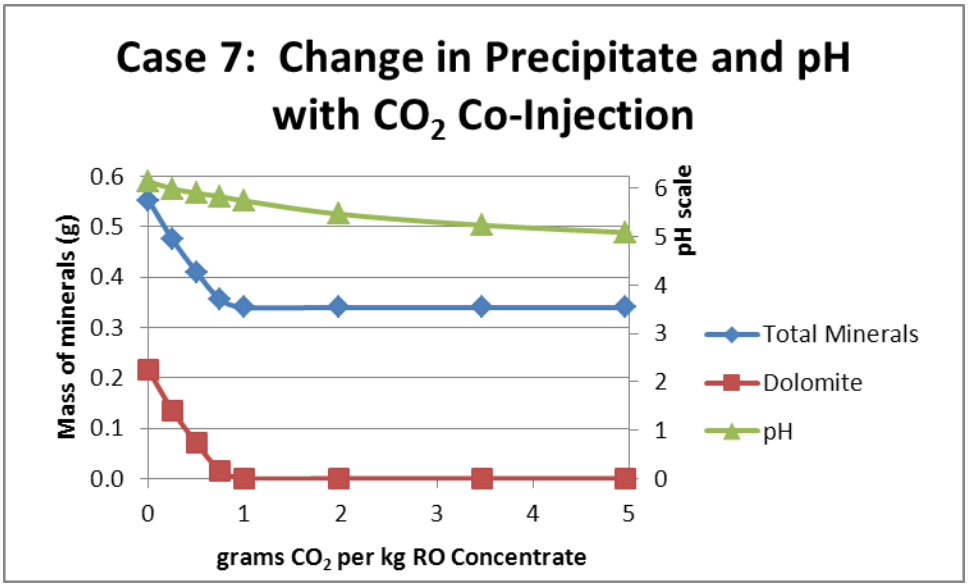
Description: Rising concerns over increasing levels of green house gases, especially carbon dioxide, have led to suggestions to capture carbon dioxide at fixed sources, such as fossil fuel power plants, and sequester the carbon for millennia by injecting it underground. Florida overlies many thousands of feet of carbonate rocks which may be suitable for geologic sequestration of carbon dioxide. This project will investigate the potential for geologic sequestration of carbon dioxide in Florida, the physical and chemical changes that may occur as a result of injection, assess the potential for escape of injected carbon dioxide, determine the risk, if any, to aquifer systems used for water supplies, develop methodologies for Florida utilities to predict the performance and risks of proposed sequestration projects, and educate a cohort of geologic sequestration professionals to create a carbon sequestration industry in Florida.

Budget: $147.360
Universities: USF
External Collaborators:
Tampa Electric Company (TECO)
Florida Power and Light (FPL)
Environmental Consulting and Technology (ECT), Inc.
Los Alamos National Laboratory

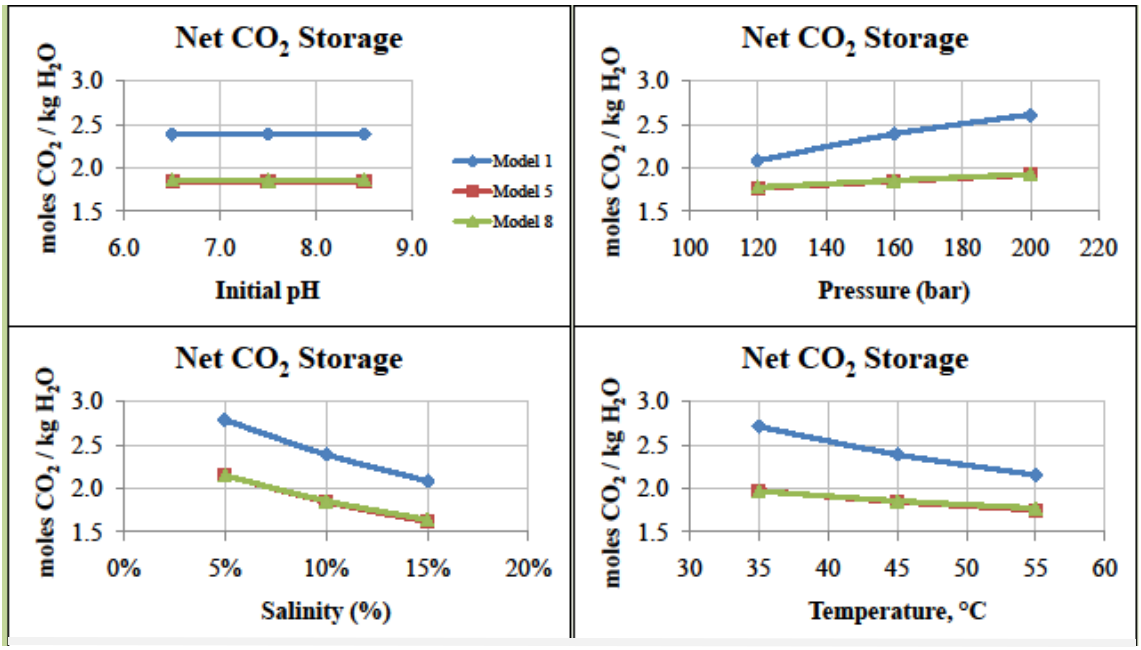
Progress Summary

In late 2010, we leveraged our project to obtain additional funding from Environmental Consulting and Technology (ECT), Inc. ECT is working with Tampa Electric Company (TECO) to drill and develop wells at the Polk Power Station approximately 2400 m (8000 ft) deep. These wells will be used to test the injection of wastewater and, pending the acquisition of appropriate permits, may be used to test the injection of supercritical CO_2. Our team at USF is performing modeling work to predict how injected wastewater and/or CO_2 streams will behave above-ground and below-ground.

The following figure demonstrates how the co-injection of CO_2 along with process wastewater can prevent the formation of mineral precipitation and therefore reduce or prevent clogging of pipelines and wells. (Note that several scenarios were considered as part of this work; the figure presented here represents results of one of those scenarios, named Case 7.) Thus we have concluded that co-injection of certain levels CO_2 has a beneficial effect.



We also have continued the development of models to predict the physical and chemical effects of CO_2 storage in deep saline aquifers, such as that underlying the Polk Power Station. The following figure shows how CO_2 storage capacity depends on environmental conditions.



Finally, two presentations were delivered at the 2010 Fall Meeting of the American Geophysical Union in San Francisco, California:

Anwar S, Cunningham JA, Trotz M, Thomas MW, Stewart M. Pore-scale modeling of reactive-multiphase-buoyant flow for carbon capture and storage. Presentation # H13C-0969. American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 13–17, 2010.

Thomas MW, Briley A, Trotz M, Stewart M, Cunningham JA. Geochemical modeling of CO2 sequestration in deep saline aquifers in Florida. Presentation # H13C-0985. American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 13–17, 2010.

Funds Leveraged / Partnerships Created

Grants Awarded					
Title	**Agency**	**Reference Number**	**Investigators/ Collaborators**	**Period of Performance**	**Funding awarded**
Geochemical modeling of waste stream injection into deep aquifers	Environmental Consulting and Technology (ECT), Inc.	Work Order 01-CO2, subcontract S-090299-0300	PI: Maya Trotz Co-PIs: Mark Stewart, Jeffrey Cunningham	Dec 2010 – June 2011	$ 29,201