Evaluating the Effects of Long Term Subsurface Storage and Related Hydrodynamic Processes: A Case Study of Carbon Sequestration in the San Juan Basin

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The San Juan Basin, located in northwestern New Mexico and Southwestern Colorado, is one of the largest coalbed methane producing basins in the United States. Because of this, large quantities of carbon dioxide (CO_2) are often stored at depth due to both processes of secondary methane (CH_4) extraction and storage of CO_2 under a shale cap layer. The question is how long the subsurface geology of the San Juan Basin will allow carbon dioxide to remain sealed or, at a minimum, stored at depth. This problem is being approached using a number of modeling techniques ranging from basic qualitative, conceptual modeling to complex 3D modeling, which examines heat flow, hydrodynamics, phase changes, and gas movement in the subsurface. Data for model building and calibration is being collected and compiled from well top and formation data, water chemistry data analyses, isotopic analyses, previous studies in the San Juan Basin, as well as known equations of state for reactive transport. Results will be determined through an inter-comparison of models, leading to an analysis of spatial and temporal variability of storage in the San Juan Basin, with application to other basins, particularly those where methane extraction occurs.

Biographical Sketch:
Drew Haerer was born outside of Philadelphia, PA, but was raised in rural central Pennsylvania. He attended Juniata College in Huntingdon, PA and received a B.S. in Environmental Science in 2005. He then came straight to New Mexico Tech and is currently working on his Masters Degree with Dr. Brian McPherson. His research is focused on a combination of hydrology, geology, subsurface storage, and carbon sequestration. His probable end date is August 2007 at which point he plans on pursuing one of a number of job possibilities and living somewhere he can go fishing every day.