Hydrogeology and Radiocarbon Ground Water Dating of the Salt Basin, NM
Andre Ritchie
Graduate Seminar
March 18, 2009

Abstract

The Salt Basin is a Tertiary Basin and Range physiographic feature that is located in Southeastern New Mexico and Western Texas. The Salt Basin can be subdivided into a northern and southern ground water system, owning to a ground water divide associated with a NW-SE oriented structural features known as the Babb Flexure and Bitterwell Break. The northern Salt Basin is a closed drainage basin, and natural ground water discharge occurs through evaporation in a series of playas located along the center of a structural and topographic depression known as the Salt Basin Graben, which is located along the eastern margin of the basin. The northern Salt Basin encompasses an area of 9,000 km² in New Mexico and Texas. Several ground water geochemical studies have been conducted in the northern Salt Basin, but relatively little is known about the distribution of permeability (water-transmitting characteristics of the rocks) in the basin, sources and amounts of recharge, controls on the evolution of ground water chemistry, and ground water flow rates. In this study, radiocarbon dating of ground water is combined with a model of the water-mineral interactions controlling ground water chemistry to estimate ground water flow rates within, and the hydraulic conductivity of the northern Salt Basin aquifer.

Biographical Sketch

I grew up along the coast (the Outer Banks) of North Carolina in the small town of Manteo on Roanoke Island. I graduated from Manteo High School in 2000, and enrolled at a local community college (College of the Albemarle) in 2001. After graduating with an Associate in Arts, I transferred to the University of North Carolina Wilmington and decided to major in Geology. After my first year at UNCW I participated in the National Student Exchange program and attended Cal Poly Pomona in Southern California for a year. I returned to UNCW to complete my B.S. in Geology in 2007, after which I enrolled as a M.S. student in the Hydrology program at New Mexico Tech. I am currently working under my advisor Dr. Fred Phillips on a research project funded by the Interstate Stream Commission of the NMOSE. The goal of my research project is to develop a better understanding of the ground water system within the Salt Basin, Southeastern NM.