

Petrophysical Core Analysis using Mineralogical and Petrophysical Information from the Fort Pulaski Core Site, Savannah, GA and its Relation to Resistivity of Carbonates in the Floridan Aquifer System

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The purpose of this project is to establish the relationship between petrophysical and mineralogical properties of carbonate rocks from the Floridan aquifer system (FAS) and resistivity of the saturated rock. Changes in clay minerals and pore geometry will affect resistivity and the migration of fluid and this will be characterized for a core hole in Savannah, GA. In nearby coastal areas of Georgia, salt water intrusion has occurred and limitations on groundwater withdrawal have been imposed. It is therefore critical to understand the salinity variations in both the Upper and Lower Floridan Aquifer. Borehole geophysical resistivity logs can be used to map salinity boundaries in the FAS if the petrophysical characteristics of the formations are known.

Thin sections of carbonate core plugs will be analyzed under a light microscope to determine pore geometric factors and correlated with laboratory resistivity measurements. Mineralogical information will be acquired using X-ray diffraction, and permeability measurements will be conducted using a mini-permeameter. Relations between formation properties and cementation exponents will be determined and characterized according to changes in carbonate facies. These cementation exponents can be applied to similar carbonate rocks in other wells in the region to map salinity variations utilizing borehole geophysical logs.