

Hydrogeologic Framework of the Floridan Aquifer System in Florida and in Parts of Georgia, Alabama, and South Carolina

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REGIONAL AQUIFER-SYSTEM ANALYSIS

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permeable zones in the Lower Floridan by a micritic limestone confining unit.

The lower confining unit of the Floridan aquifer consists in most places of either massive bedded anhydrite of Paleocene age (part of the Cedar Keys Formation) or glauconitic, calcareous clayey to sandy strata that range in age from late Paleocene to late Eocene. The base of the aquifer system is thus a composite surface that consists of different types and ages of rocks, all of which are of much lower permeability than the rocks of the overlying aquifer system. Some of the larger structural elements of the eastern gulf coast are recognizable on a map of the aquifer system's base. Variations in permeability within the Floridan aquifer system are complex. The porosity and permeability in the carbonate rocks that comprise the system result from a combination of (1) the original texture of the rock, as determined primarily by depositional environment; (2) the diagenetic processes that have acted on the sediment, such as dolomitization and recrystallization, and that are reflected by changes in mineralogy as well as porosity; (3) the joints, fractures, faults, and other structures that affect the integrity of the brittle carbonate rocks and open channels along which ground-water flow can be concentrated; (4) the dissolution of either the carbonate rocks themselves or pore-filling materials such as evaporites and a resulting increase in porosity; and (5) the precipitation of pore-filling minerals, specifically evaporites, either from seawater or from ground water. That most of the major features seen on a map of the potentiometric surface of the Floridan aquifer system can be explained by one of the above factors or a combination thereof demonstrates the effect of the geologic framework of the aquifer system on ground-water flow patterns within it.

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