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Generalized Stratigraphy
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GENERALIZED STRATIGRAPHY AND GEOLOGIC HISTORY OF THE SOUTH FLORIDA BASIN

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ABSTRACT

The Post-Eocene is composed of some 1200 feet (360 m) of mixed clastics and carbonates. The Eocene is a chalky limestone of some 2500 feet (750 m), containing occasional dolomite beds. The 2700 feet (810 m) of Paleocene is anhydrite and dolomite with minor limestones. The Upper Cretaceous is mainly a chalky limestone some 2400 feet (720 m) thick. The Paleocene-Gulfian Cretaceous Rebecca Shoal Dolomite (2500 feet, 750 m) and the Gulfian Card Sound Dolomite (1400 feet, 420 m) are both reefs. The Lower Cretaceous is some 7000 feet (2100 m) thick and is divided into the very cyclic carbonate-evaporite Comanchean and the less cyclic limestone and anhydrite Coahuilan. The dolomite-anhydrite Wood River Formation is mostly Jurassic in age. Three different sets of basin configurations characterize the Jurassic-Coahuilan, Comanchean and Cenozoic time intervals.

CENOZOIC

In oil tests, the Pleistocene-Miocene section of 100 feet (300 m) is poorly sampled, due to the large hole (15 inch), the rapid drilling, and the almost total loss of clays due to sample washing as well as to drilling. This section consists generally of clay, shells, sand, phosphatic sand, dolomitic sandstone, phosphatic dolomite and phosphatic limestone in rapidly changing facies relationships. All of the nomenclature is derived from partial and poorly exposed surface sections, and its applications to the subsurface are highly speculative. Several very thin Pleistocene formations in this interval are not shown inFigure 1 due to scale limitations.

The Oligocene is represented by the Suwannee Limestone (200 feet) which consists of both skeletal and chalky limestone.

The Eocene is poorly sampled in oil tests due to the frequent occurrences of lost circulation including the various "Boulder Zones" (see below). The Ocala Formation (200 feet) is a chalky foraminiferal limestone which thins by erosion in a southerly direction to nothing in the Florida Keys. The Avon Park Formation (400 feet) consists of grain and foraminiferal limestone with high porosity and permeability. The Lake City (900 feet) and Oldsmar Formations (800 feet) are predominately chalky limestones with occasional microcrystalline dolomite beds. These two formations become increasingly difficult to separate southward. Within them, three well-developed anhedral dolomite beds are frequently present,and when porous enough, these comprise the

"Boulder Zones" mentioned above. Caverns occur in these beds in Hendry, Lee and Collier Counties, one of which was reported to be 100 feet high.

The Paleocene Cedar Keys Formation (2000 feet) is composed of microcrystalline dolomite with numerous beds of anhydrite in the middle portion. In the Florida Keys, part of the porous Rebecca Shoal Dolomite takes the place of the Cedar Keys. Circulation is usually lost in this barrier reef which forms yet another "Boulder Zone."

MESOZOIC

The Upper Cretaceous Pine Key Formation (3000 feet) is essentially a white chalk and chalky limestone. In northern Key Largo, 1500 feet of porous Card Sound Dolomite replaces the lower part of the chalk section. Elsewhere in the Florida Keys, the other part of the Rebecca Shoal Dolomite replaces the upper portion of the chalk. Circulation is usually lost in this section, which forms the deepest "Boulder Zone." A 50-foot cave was reported in the Marquesas Keys area.

The Lower Cretaceous Comanchean section (5000 feet) is composed of numerous back-reef cycles of limestone, dolomite, and anhydrite. These have been subdivided into 11 formations and 4 groups by using regionally persistent anhydrites. The carbonates are frequently porous, but effective porosity is not very high.

The Coahuilan some 3000 feet thick is a sparsely oolitic brown limestone, with occasional similarly-textured dolomites and anhydrites.

Rocks of Jurassic age are principally dolomite and anhydrite. The dolomite is microcrystalline and brown with relic oolite texture. In the deeper basin a few thin salt stringers occur toward the base. Maximum thickness penetrated to date is 2000 feet.

A basal red-bed clastic unit, averaging some 200 feet thick transgresses time northward out of the Basin. It is composed of red shale and sandy dolomite with sandstone becoming increasingly common northward. This clastic section rests on extrusive igneous rocks of Jurassic or Triassic age.

The minimum thickness of the sedimentary column is estimated to be on the order of 25,000 feet in the vicinity of Cay Sal in the Florida Straits to the south, where 18,906 feet of section have been drilled without reaching basement.

GEOLOGIC HISTORY

After the break-up of Pangea, the Florida-Bahama area was apparently subjected to three major basin-modifying movements. Following the graben formation and volcanic activity of the Triassic-Lower Jurassic, Middle Jurassic salt was deposited in what remained of the grabens in the Bahamas and northern Cuba.

In Upper Jurassic time, the Sarasota Arch was already in existence, trending southwest from Sarasota County to the present continent edge.

From Upper Jurassic through Coahuilan time a broad shallow basin extended from the Sarasota Arch to the south and east, including South Florida, the Great Bahama Bank, and the Blake Plateau.

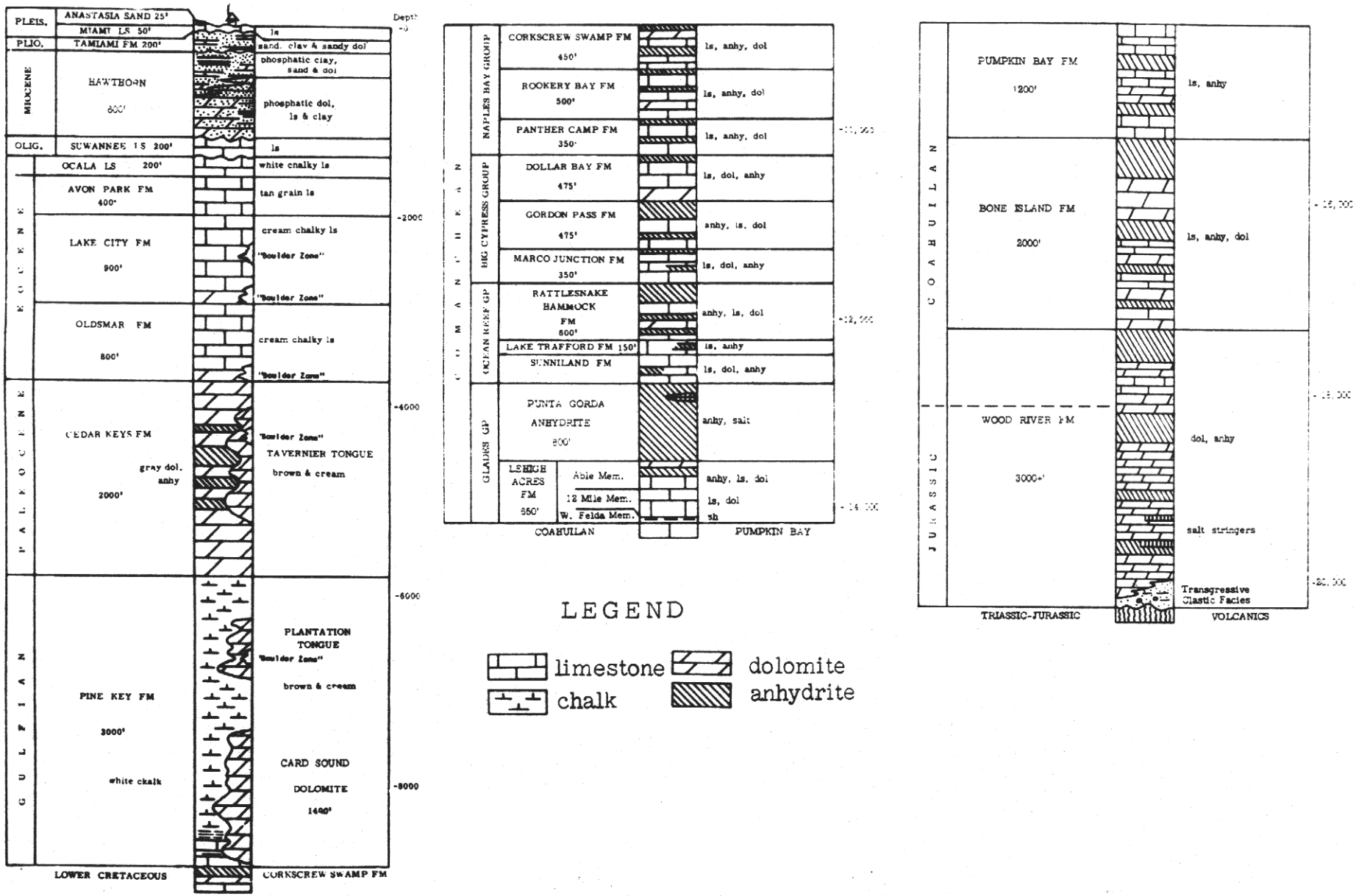

Figure 1. Generalized geologic column of South Florida Basin

In late Coahuilan or early Comanchean time, the Peninsular and Cay Sal Arches appeared and divided the Bahamas Basin from the proto-South Florida Basin. This proto-Basin encompassed the present South Florida Basin, the western Florida Straits, and part of northern Cuba.

In early Gulfian time, the western Florida Straits were down-faulted, reducing the Basin to its present form with the south boundary at the continental shelf off the Florida Keys.