THE FLOOD EVENT/ICE AGE STRATIGRAPHIC BOUNDARY ON THE UNITED STATES SOUTHEASTERN COASTAL PLAIN

Carl R. Froede, Jr.*

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Abstract

With the introduction of two creationist geological timescales, it is imperative that we begin to consistently interpret the stratigraphic record within the constraints of the Biblical narrative. Young-Earth geoscientists should develop Biblically-based geologic concepts and conduct field work to substantiate those interpretations. With this in mind, three sections within the Southeastern Coastal Plain of the United States are examined in an effort to define its strata within the construct of a creationist stratigraphic column. A broad-based concept is suggested to differentiate which strata reflect Floodwater deposition and which were formed during the single post-Flood Ice Age. It is further suggested that the boundary separating these sedimentary deposits (and their associated Timeframes) would be found at the termination of marine deposits and the institution of terrigenous (i.e., freshwater) deposition.

Introduction

Presently, two very similar creationist geological timescales have been proposed, both which seek to define geologic time and the stratigraphic record within the constraints of the Biblical narrative (Froede, 1995a; Walker, 1994, 1996a, 1996b). These timescales should now serve as the general framework from which the Young-Earth geoscientist should interpret the stratigraphic record. The major factor in defining stratigraphy within our model should be based on energy-effect relationships which directly reflect the changes in geologic-energy levels (Froede, 1995a; Reed, Froede, and Bennett, 1996). Hence, global generalizations about Earth history from a Biblical standpoint should NOT be based on the use of the uniformitarian stratigraphic column and its "handmaiden" evolutionary biology. We must define strata within limited areas and then compare/contrast them to determine how they correlate within the creationist stratigraphic column. To do otherwise will only result in confusion. What follows is a logical and reasonable approach to discerning Earth history for the United States Southeastern Coastal Plain. The generalized creationist geological timescale previously proposed by the author (Froede, 1995a) will be followed in defining the "Flood/Ice Age Timeframe" boundary for this region of the United States.

Much geologic information already exists for the strata comprising the Southeastern Coastal Plain. This existing information can be examined and reinterpreted in a manner which fits within the "Timeframes" and geologic-energy levels of our model. Additional site-specific field work is necessary to verify the projected interpretation.

Currently there is controversy regarding the positioning of coastal plain deposits within the creationist geological timescale (Froede 1996a, 1996b; Garner, Robinson, Garton, and Tyler, 1996; Oard, 1996; Robinson, 1996). This article suggests a logical approach in determining the "Flood Event/Ice Age Timeframe" boundary. The author believes that most of the Cenozoic deposits, as found on the coastal plain, represent regressing (i.e., retreating) Floodwater produced marine deposits which correlate to the "Upper Flood Event Timeframe." However, "Ice Age Timeframe" deposits also occur on the coastal plain and only through a close examination of the strata and its composing sediments can the differences and boundary between the Flood and Ice Age strata be discerned. A glossary of terms is included to aid the reader in understanding some of the terminology.

Floodwater "Epeiric" Seaway

Uniformitarians have proposed that a warm-shallow Cretaceous Epeiric Seaway formerly existed on the North American continent. Some Young-Earth Creationists view this seaway and its associated sediments as reflecting retreating Floodwaters (Froede, 1995b). The slow withdrawal of these marine waters during the late stages of the Flood coupled with the development of various clastic depositional environments (e.g., volcanic, fluvial, deltaic, etc.) served to strand and bury both living and dead (i.e., bloated and floating**) creatures. The fossilized remains of these creatures along with the associated marine sediments raises the question: when/where do the Flood sediments end and ice age sediments begin in the stratigraphic record? The answer to this question is not as complex as it might seem.

How Many Floods?

It should be obvious to most Quarterly readers that: **There has only been one global Flood which resulted in the formation of most of the stratigraphic rock record.** It has been suggested that major post-Flood transgressions and

*Carl R. Froede, Jr., B.S., P.G., 2895 Emerson Lake Drive, Snellville, Georgia 30278-6644.

**A creationist model (Froede, 1996c, p. 200) has previously been suggested to explain the "Bloat and Float" occurrence of fossilized vertebrates found within portions of the stratigraphic record.

regressions can be invoked to account for the deposition of thousands of feet of sediments following the Flood (Garner, 1996; Garton, 1996; Robinson, 1996; Tyler, 1996). This writer does not accept this explanation and believes that it cannot provide logical or reasonable (i.e., parsimonious) answers to depositional basins such as the Gulf Coastal Plain. Rather, after the highstand of the Floodwaters on Earth's continents, the waters continually withdrew.*** During this time the author acknowledges that global tectonic activity coupled with glacial advances and retreats could have created various small scale transgressive and regressive deposits. However, the wholesale withdrawal and later readvancement of marine waters across such broad areas as the North American continent in a post-Flood setting is unlikely.

Specific to the Coastal Plain, the regression of Floodwater probably required many years.**** Evidence to support this interpretation comes from buried marine paleoenvironments found within this region. These former marine environments were eventually buried due to continued sedimentation derived from the newly emerging landmasses as well as from other sources (e.g., biogenic carbonate producers, volcanic ash, etc.). The marine environments shifted ever seaward as the Floodwaters continued to recede toward the Gulf of Mexico.

The Flood/post-Flood Boundary Determination

Attempting to identify the Flood Event/Ice Age stratigraphic boundary is a problem involving both the lateral variation and vertical distribution of sedimentary deposits. It is proposed that generally all strata which reflect a **marine** fauna (e.g., oysters, snails, clams, marine fish skeletons) or **marine** lithology (e.g., carbonates, glauconite, bentonite) should be relegated to Flood deposition. Overlying sediments which reflect a terrestrial depositional setting (i.e., **freshwater** environment) would be identified as Ice Age or even later times (possibly even "Present Age Timeframe" deposits). **This determination must he based on the site specific stratigraphic position of the strata in question** (see Appendix). The boundary demarcating the two time frames should be indicated by the termination of marine indicators and the occurrence of freshwater conditions. Hence, the Flood/Ice Age boundary would likely occur in the uppermost portion of any site-specific stratigraphic section.

As the Flood Event/Ice Age boundary moves towards the modern coastal environment (tied directly to the withdrawal of the Floodwaters) its specific location within the stratigraphic record will become much more complicated. This is due to the changing sea-level positions associated with the continued but lessening intensity of tectonics (Reed, Froede, and Bennett, 1996) and the waxing and waning of the continental glaciers during the Ice Age Timeframe (Oard, 1990). Only through a careful study and understanding of the site and its specific stratigraphy, within the context of glacio/tectonic eustatic-shoreline change, can we further decipher the Flood Event/Ice Age boundary along the coasts.

Generalized Southeastern Coastal Plain Stratigraphy

Any attempt to understand when a specific site was deposited must begin with an overall knowledge of its stratigraphic position (Figures 1 and 2). A close examination of the contacts between strata along with lithologic and paleontologic composition of the various layers might prove useful in determining the possible original environment of deposition (without appealing to "millions of years" for its development).

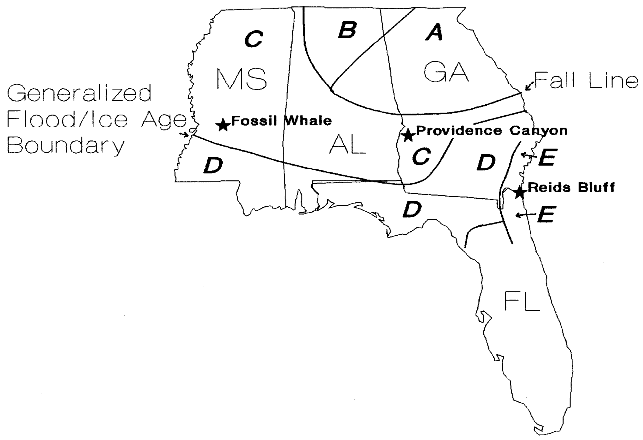

Figure 1. Generalized surface outcrop map of the Southeastern United States showing the locations cited as examples of either Flood or Ice Age deposits. Key to the letters: A. Piedmont (Lower Flood Deposits - Precambrian to Paleozoic): B. Valley and Ridge (Middle Flood Deposits - Paleozoic); C. Coastal Plain marine sediments (Upper Flood Deposits - Upper Cretaceous through lower Miocene); D. Gulf Coastal Plain fluvial sediments (Lower Ice Age deposits - Miocene to Pleistocene); E. Atlantic Coastal Plain sediments (Ice Age deposits - Pleistocene to Holocene) - representing cyclic marine/fluvial deposits. Map compiled from Bennison, 1975.

In specifically dealing with the Southeast the author will address the surface expression of the stratigraphic units and then explain how this translates into the subsurface. Figure 1 presents the first part of our discussion. The Fall Line marks the upgradient boundary for the issues which are to

***The rate of Floodwater withdrawal from the continents was controlled by orogenic plate movement, accommodation space provided by oceanic basins, and as a result of the formation and development of continental glaciers associated with the onset of the Ice Age.

****In following the single post-Flood Ice Age model suggested by Michael Oard (1990, p. 117) the total withdrawal of marine Floodwaters from the North American Continent could have taken as long as 300 to 500 years. The author suggests that the geologic energy required to completely reconfigure the ocean basins to receive all the Floodwaters from the North American Continent (based on Reed, Froede, and Bennett, 1996) did not occur until well into the Ice Age Timeframe. Thus it is suggested that there were marine waters still covering most of the Southeastern United States when Noah emerged from the Ark.

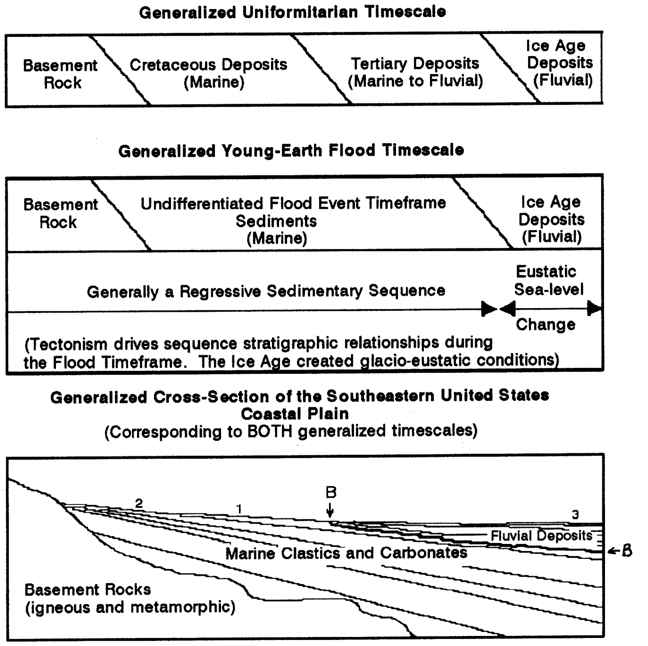

Figure 2. Generalized subsurface cross-section along dip of the typical southeastern coastal plain strata. This stratigraphic section is compared with both the uniformitarian and Young-Earth Flood Model geological sections. Key to the numbers and letter: 1. *Basilosaurus* sp. locale; 2. Providence Canyon; 3. Reids Bluff, B. Boundary separating the Flood deposits from the overlying Ice Age deposits. The boundary marks the transition from receding Flood waters (i.e., marine) to terrestrial fluvial (i.e., fresh water) conditions.

be addressed. Areas A and B represent the higher elevations of the Piedmont and are suggested to represent Lower to Middle Flood Event Division rocks/strata. These two regions served as the source areas for much of the sediments which presently fill the Gulf Coastal Basin and Atlantic Coastal Plain. Area C contains strata which were deposited in a marine environment. The marine sediments which compose Area C were originally derived from at least three sources: 1) floodwater sources (precipitation of calcium carbonate and/or other minerals by biota), 2) from adjacent areas of higher elevation [Areas A and B], and 3) from areas outside of this region (e.g., volcanic ash). These strata are identified by Uniformitarians as ranging from the Upper Cretaceous to middle Miocene in age. Area C is in many places overlain by a small amount of Holocene (i.e., Quaternary) sediments. These overlying sediments are often of a continental composition and sometimes contain fossils suggestive of a terrigenous setting (e.g., loess, fluvial deposits, freshwater snail and/or clam shells, along with the bones of a variety of land animals - mammoth, mastodon, camel, and horse). Additionally, these freshwater/terrestrial sediments also extend and thicken gulfward across Area D. Figure 1 provides the surface boundary where Flood deposited marine strata (Area C) lie adjacent to Ice Age deposited freshwater strata (Area D).

The surface exposure marking the Flood Event/Ice Age boundary can generally be interpreted to occur where the marine sediments found in Area C are **overlain** by freshwater/terrigenous sediments of Area D (Figure 2 - Letter B). This boundary is expressed as a contact line exposed both on the surface (e.g., Figure 1 - line separating Area C from Area D) and in the subsurface (e.g., Figure 2 - line "B").

Floodwater withdrawal resulted in the development of the terrigenous/freshwater sediments and strata found in Area D which were derived from upgradient areas (sediments derived from areas A, B, and C and from outside sources (e.g., loess and volcanic ash). The sediments which compose Area D are typical to those of a fluvial/flood plain setting. This type of environment resulted in the development of soils which in turn allowed the ground to be vegetated by various plants (being driven by climatic forces and a drop in sea-level). However, there are places within Area D where surface (e.g., rivers, creeks, streams, etc.) and subsurface (e.g., limestone dissolution) erosion have served to remove Ice Age freshwater sediments exposing the underlying marine sediments. With an understanding of the local stratigraphy these locations can be easily identified. Hence, the freshwater strata found in Area D would then date to the Ice Age Timeframe.

Global sea-level fluctuated rapidly throughout the Ice Age Timeframe and has probably continued to do so into more recent times. This is best exemplified in Area E. Any attempt to identify the Flood Event/Ice Age boundary at the ground surface within Area E would be confusing. A general understanding of the stratigraphy of this area can solve this confusion.

Three specific sites will illustrate this approach in defining the Flood Event/Ice Age stratigraphic boundary on the Southeastern Coastal Plain. While much work remains to be conducted at specific locations within this region, the author is confident that what is proposed can serve as a starting point from which future field activities can be based.

The Yazoo Formation in Mississippi

The Yazoo Formation as found in central Mississippi is described as:

> . . . a thick undifferentiated sequence of clay (Dockery and Siesser, 1984).
>
> The Yazoo Clay is fossiliferous and the whale-like mammal ***Basilosaurus*** cetoides is common.***** The clay is montmorillonitic with occasional stringers of bentonite (Kolb, Russell and Johnson, 1976, p. 3).

The composition of the Yazoo Formation; a montmorillonite clay with bentonite lenses, suggests that it was originally a volcanic ash (see Carozzi, 1993, pp. 93-95; Charnley,

*****See Figure 4.

1989, pp. 41l-414; Fisher and Schmincke, 1984, pp. 336-340; Grim, 1968, pp. 566-570; Williams, Turner, and Gilbert, 1982, pp. 272-274). Changing environmental conditions (e.g., marine to freshwater) resulted in the further alteration of the bentonite clay to a montmorillonitic clay.

The Upper Eocene (Jackson Stage) in Mississippi (which includes the Yazoo Formation) has been found to contain numerous specimens of Eocene whales, *Basilosaurus cetoides* and *Zygorhiza kochii* (Frazier, 1980; Carpenter and Dockery, 1985; Dockery and Johnston, 1986; Carpenter and White, 1986; Johnston, 1991; see also Thurmond and Jones, 1981). However, few of the whales have been found as complete skeletons, rather most are incomplete assemblages of bones, suggesting dead "bloated and floating" carcasses that were buried. Several years ago a Basilosaurus, discovered in the Yazoo Formation, was excavated and examined (Dockery and Johnston, 1986; Johnston, 1991) [Figure 5]. The condition of the specimen was reported as:

> The lack of a skull or jaws at the anterior end of the vertebral column was a disappointment. . . . the last eight vertebrae were disjointed so that they did not conform to the arched trend of the spine and were approximately two feet higher than the rest of the skeleton. This configuration of the skeleton suggests that the main body of the whale (possibly excluding the head and front limbs) settled into a small depression on the ocean floor. The presence of oysters attached to one of the anterior vertebrae indicates that the skeleton lay exposed for some time before burial (Dockery and Johnston, 1986, pp. 6-7).

Several conclusions can be drawn from the condition of this specimen. First, the whale once existed in marine waters and was apparently dead for some period of time before it was buried due to its missing skeletal parts and the presence of oyster spats on its vertebrae (Figure 1). The time of its death cannot be determined. Secondly, the decomposing whale was probably buried rapidly under several feet of volcanic ash in a marine environment. This can be determined by the depth of burial (approximately 10 feet below the present ground surface - see Figure 5), the presence of bentonite clay layers in the Yazoo Formation, and the presence of marine oyster spats on the vertebrae.

The marine fossils along with the lithologic composition of the formation suggest that the Yazoo Formation was deposited in a marine environment. Likely this environment existed as Floodwaters continued their slow withdrawal toward the Gulf of Mexico. Hence, the Yazoo Formation, in Mississippi, would be considered a Flood deposit (Upper Flood Event Division).

The Providence Formation in Georgia

Another example of the contact between Flood Event and Ice Age deposits can be found at Providence Canyons, Georgia (Figure 6). Williams (1995) has provided a description of the history and development of this most interesting series of canyons, and Froede (1996d) has outlined a mechanism for their continuing growth. The Cretaceous Providence Formation and the overlying Paleocene Clayton Formation are exposed in the canyon walls.

The Providence Formation sands contain trace fossils indicative of a marine environment (e.g., *Ophiomorpha. Rosselia, Cylindricus, Thalassinoides,* and *Palaeophychus)* [Donovan and Reinhardt, 1986]. Additional information on trace fossils (i.e., ichnology) and their usefulness to the Young-Earth Flood Model can be found in Cowart and

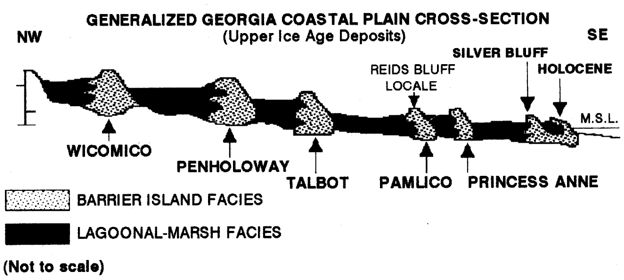

Figure 3. Generalized stratigraphic cross-section of the Georgia Coastal Plain (not to scale). Sea-level changes have resulted in stranded "harrier island" types of sand dune fields. This cross-section represents approximately 40 miles in lateral extent by 95 feet of relief (Kellam, Mallary, and Laney, 1991, pp. 6-16). These stranded dune ridges are believed to represent sea-level changes throughout the Pleistocene. The abbreviation "M.S.L." is mean sea-level. Modified from Henry, et al., (1993, p. 4). These features are suggested to reflect the withdrawal of Floodwaters. Transgression/regression cycles within these terraces are suggested to reflect tectonic and glacial activity associated with the close of the Flood and the onset of the Ice Age.

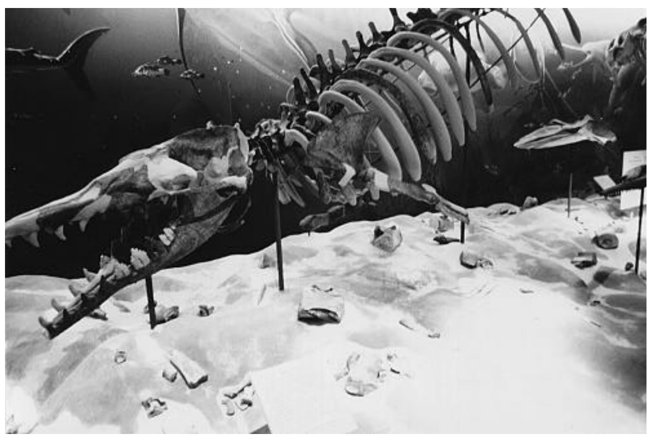

Figure 4. This is a reconstructed skeleton of a Basilosaurus cetoides from the United States National Museum of Natural History. These fossilized skeletal remains are found in the upper Eocene sediments of Mississippi, Louisiana, and Alabama and clearly reflect a marine environment. Additional support for a marine environment is provided with the occurrence of fossilized marine shells and sediments.

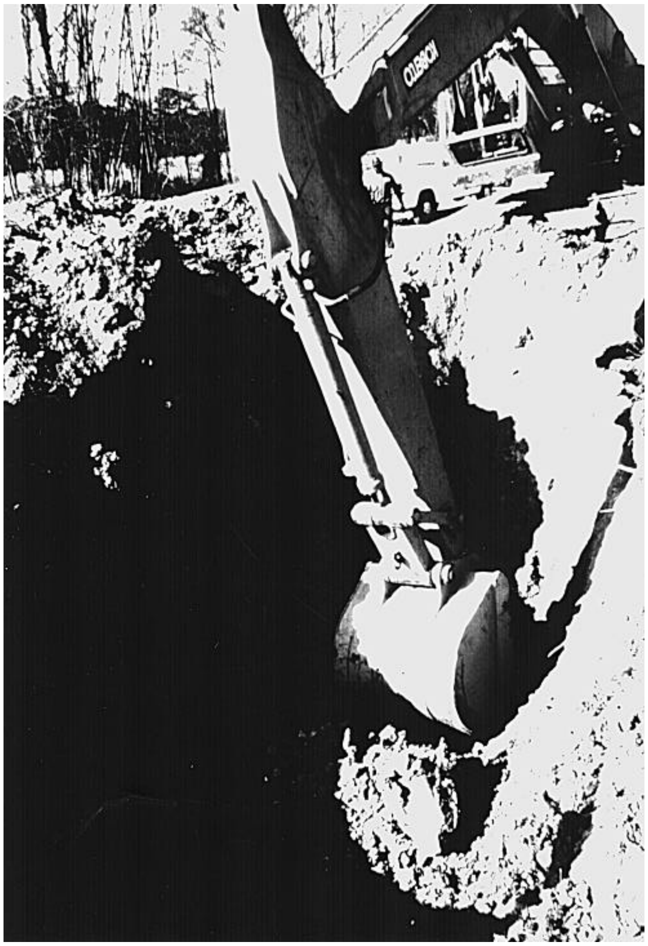

Figure 5. This is a photograph showing the excavation of the undifferentiated Yazoo Formation clay from the top of the *Basilosaurus* skeleton. Approximately 10 feet of overburden was removed to enable the excavation of the disarticulated skeleton.

Froede (1994). The Providence Sands exhibit high-angle cross-bedding and contain kaolin clay balls (rip-up clasts) along with apparent bedding surfaces. These deposits reflect a high-energy marine setting, possibly analogous to a beach environment. The Cretaceous Providence Formation is divided into 15 units (Donovan and Reinhardt, 1986) of which the uppermost is described as:

> Unit 15: 16 ft (4.8 m); Fining-upward sand; pale yellowish-orange; very fine sand to pebbles (quartz, muscovite, heavy minerals, clay clasts); medium-scale tabular and trough cross-stratified sets scattered throughout; unit locally bioturbated, scattered distinct burrow fabrics *Ophiomorpha, Microcladichus;* clay clast lag at base, upper 2 ft (0.6 m) of unit is a massive, rooted clayey sand.

Overlying the Cretaceous Providence Formation is the Paleocene Clayton Formation. The Clayton is divided into two units (Donovan and Reinhardt, 1986), and is described as:

> Unit 16: 3 ft (0.9 m); Pebbly sand; grayish- orange to pink; medium sand/pebbles (quartz, muscovite, heavy minerals); massive-bioturbated; undulatory base with scattered quartz pebbles concentrated in basal 1 ft (0.3 m) of unit.
>
> **Unit 17: 6 ft (1.8 m); very clayey sand; dark reddish brown; clay-granules (quartz); massive local ironstone development.** (emphasis mine)

The reader will note that the Providence Formation unit 15 is similar in description to the base of the Clayton Formation (unit 16). The stratigraphic division between unit 15 and unit 16 was a subjective decision made by the investigators based on their own interpretation of the Clayton Formation (Donovan and Reinhardt, 1986; Donovan, 1993). The unit which this author suggests is an Ice Age deposit is the upper unit of the Clayton (unit 17) [Figure 6]. Note the complete change in lithology and the loss of bioturbation. This section lacks body fossils and as such is interpreted based on the loss of what are viewed as marine trace fossils. Hence, the uppermost layer (unit 17) then probably represents terrestrial weathering conditions which suggest that it was deposited following the recession of the Floodwaters.

Reids Bluff (Satilla Formation) in Florida

We now move to a locale where the Flood Event/Ice Age stratigraphic boundary can be easily misinterpreted. This outcrop is located at Reids Bluff, along the St. Marys River in Nassau County, Florida (Figure 1). Various studies have been undertaken at this site to understand its depositional history within the context of the late stages of the Pleistocene (e.g., Farrell and Henry, 1993; Huddlestun, 1988; Kussel and Jones, 1986; Pirkle, Pirkle, and Reynolds, 1991). This particular stratigraphic sequence represents a series of transgressive/regressive cycles which convey Flood Event/Ice Age boundary problems associated with a modern coastal environment (Figure 7). The outcrop rises 62.3 feet above the river and exposes Late Pleistocene to Holocene stratigraphic relationships which according to Rich and Pirkle (1993, p. 80) suggest:

> . . . a classic transgressive/regressive sequence wherein a freshwater forest is overlain by brackish/marine strata which are in turn overlain by the Holocene sand ridge and forest.

Huddlestun (1988, pp. 134) cites Reids Bluff as his principal reference locality for the Satilla Formation, which he describes as:

> . . . a heterogeneous unit that consists of variably fossiliferous, shelly sands and clays of offshore, inner continental shelf origin; prominently bedded to non-

Figure 6a.

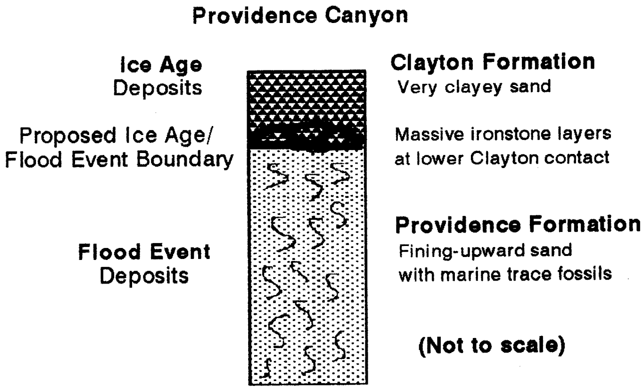

Figure 6b.

Figure 6c.

Composite showing a generalized cross-section (6b) compared with the actual outcrop (top section (6a) - note person on right of photo for scale). The bottom photograph (6c) shows the darker Clayton Formation (Ice Age deposits) above the lighter Providence Formation (Flood Event deposits) as exposed in one of the nine canyons at Providence Canyon State Park.

> bedded barrier island deposits (excluding the undifferentiated soft, incoherent, massive, structureless sands of probably aeolian origin that cap the barrier islands and emergent barrier islands); and marsh deposits.

The following compilation (Rich and Pirkle, 1993, pp. 74-75; Farrell and Henry, 1993, pp. 93-98) reflects the uniformitarian view regarding the changes in depositional environments exposed at this outcrop:

> The fossils contained within these lowest clay layers suggest storm deposition. Above this marine unit is a sandy layer containing in situ (growth position) cypress tree stumps *(Taxodium distichum).* These trees and their surrounding sediments are buried beneath blue-gray clayey sediments which contain lenses of oyster shells *(Crassostera* sp.). This clayey layer is then overlain by 42.7 feet of quartz sand which suggests aeolian deposition.

Any determination of the Flood Event/Ice Age boundary in a present day coastal environment along the Atlantic and Gulf Coasts could be complicated by stacked marine and freshwater sedimentary deposits. This illustrates the need for an in-depth understanding of the regional stratigraphy before field work is conducted. It would appear that the Flood Event/Ice Age boundary should lie between the lowest marine facies and the overlying cypress tree stumps. However, despite the cyclic stacked nature of freshwater and marine deposits exposed at Reids Bluff, this locality is totally composed of Ice Age deposits (Figure 2 - location 3). There are no Flood deposits exposed at this outcrop despite the presence of the marine layers. This conclusion follows from an understanding of the overall geology of the Georgia coastal plain, which beautifully displays the transgressions and regressions associated with the Middle to Upper Ice Age Timeframe.

According to Herrick (1965) the Pleistocene deposits are easily identified in Georgia by the numerous fluvio-marine terraces, which correspond laterally across the state (see also MacNeil. 1950). Currently there are seven terraces recognized along the Georgia coastal plain (Figure 3). The Reids Bluff outcrop correlates to the Pamlico terrace. This outcrop represents only the upper-most section of the Ice Age Timeframe deposits (Figure 2 - location 3). Hence, the boundary separating Flood Event deposits from those of the overlying Ice Age would actually lie well below the Reids Bluff outcrop (Figure 2). Only through the evaluation of well logs and cores taken from considerable depth could we then attempt to determine the exact depth/location of the Flood Event/Ice Age boundary at this location.

More work remains in delineating the complexity of the sea-level changes which occurred in Georgia during the Ice Age Timeframe. These transgressions and regressions are mappable and form sequences (Figure 3) which can be analyzed using sequence stratigraphic methods [using Ice Age Timeframe eustatic sequences all within the Young-Earth Flood Model - see Froede, 1994].

Figure 7a.

Figure 7c.

Composite showing a generalized stratigraphic cross-section of Reids Bluff, Nassau County, Florida (7b), compared with the actual outcrop, 7a, [Modified from Pirkle, Pirkle, and Reynolds (1991, p. 33)]. The bottom photograph, 7c, provides scale. On 7b, letters correspond to eustatic sea-level facies changes suggested by the author: A- Lowstand facies, B- Transgressive facies, C- Highstand facies, D- Regressive facies, E- Lowstand facies. Note that each one of these sea-level rise (i.e., B, C, and D) facies does not require any significant period of time for development, rather only drowned conditions. Units B and D actually better fit with a storm depositional environment while the unit C paleoenvironment probably was the only one which actually existed. Hence, the transgressive/regressive cycle is highly interpretive.

Discussion

Most if not all of the surface deposits exposed in Area C reflect deposition in a marine setting (Floodwater deposits-e.g., Yazoo and Providence Formations). These marine deposits correlate to the slow withdrawal of the Floodwaters during the Upper Flood Event Timeframe. These marine Flood deposits (Upper Cretaceous through most of the Cenozoic) and their inferred or apparent cyclicity reflect tectonic and glacial episodes which might correlate on a basinal scale, via sequence stratigraphic concepts (Froede, 1994). However, at this time insufficient physical evidence

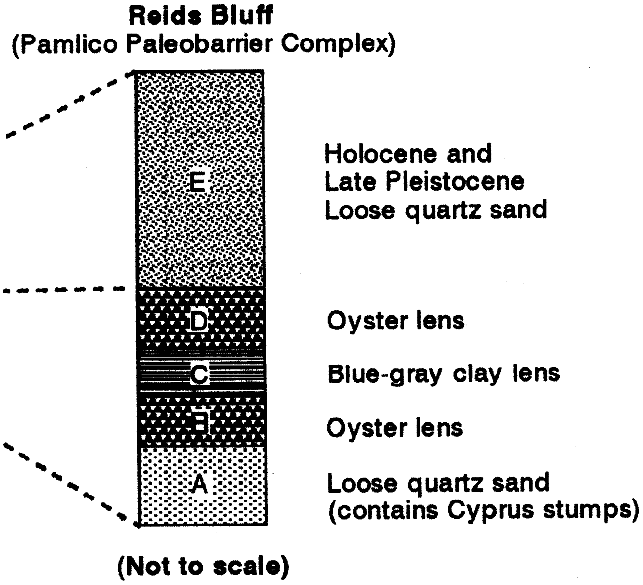

Figure 7b.

exists to support a regional much less global correlation of marine transgressions and regressions within a sequence stratigraphic framework as some have suggested (Davison, 1995).

Ice Age deposits overlie the previously deposited Flood Event sediments (Figure 2) reflecting the change from marine to continental (i.e., terrestrial) depositional environments. Surficial fluvial deposits are suggested as serving as the first indication of a transition between a marine and continental setting.

Conclusions

The determination of Flood vs. Ice Age deposits can be accomplished assuming that the Floodwaters retreated slowly from the North American continent. Various sedimentary sources (e.g., volcanics, carbonates, elastics, etc.) contributed to the transition from the marine to the continental environmental setting as it is found on the Southeastern Coastal Plain. A study of these sediments, including other paleo-indicators, e.g., fossils, trace fossils, paleosols, etc., will allow us to approximate the changes in the environment (e.g., marine versus freshwater) and mark the transition from the close of the Flood into the Ice Age. Further refinement of this transition along with a comparison between regions will help to determine the local, regional, and perhaps even global boundary demarcating the Flood Event and Ice Age Timeframe deposits as we reconstruct Earth history within the constraints of the creationist stratigraphic column.

Appendix

The determination of the Flood/Ice Age boundary **MUST** be made on a site or small regional basis. Uniformitarian information on a specific site or small area can be used to help make this determination. However, it must be realized that the interpretive framework in which the uniformitarian scientist conducted their work is not acceptable within the Young-Earth Flood Model. Hence, the physical information will be the same for both models, but the interpretation will be different.

For the Southeastern Coastal Plain, the physical evidences available to make the determination between Floodwater and Ice Age deposits (e.g., paleosols, root traces, freshwater fossils, etc.) will be found within the upper portions of the stratigraphic column (top few inches to several hundred feet).

Presently marine deposits extend out basin-ward from the shoreline. Marine sediments continue to be deposited. The determination of the Flood/post-Flood boundary in an offshore setting requires an investigation of greater detail than would be required for sediments found on the continent.

Glossary

Accommodation Space - A term used within sequence stratigraphy to define the space made available within a basin for water storage and/or additional sedimentary deposition. Without sufficient accommodation space basins would fill with sediments and/or waters would overflow the basin.

Fall Line - The boundary between the Piedmont and Coastal Plain, where the more resistant rocks of the Piedmont Plateau stand out in contrast to the weaker rocks of the Coastal Plain. As a result, numerous streams descend from the Piedmont Plateau onto the Coastal Plain over a series of rapids or small waterfalls at this boundary (Thombury, 1965, p. 92).

Interstade - A warmer substage of a glacial stage, marked by a temporary retreat of the ice (Bates and Jackson, 1987, p. 341). Within Creationist usage it refers to the time within the Ice Age Timeframe when the continental glaciers receded due to a warming trend. Sea-level would rise during this period.

Sea-level Highstand - A term used to define when sea-level is at its maximum elevation — not as a function of tides. This maximum is attained when the continental glaciers receded or totally disappear, hence supplying additional waters to the oceans.

Sea-level Lowstand - A term used to define when sea-level is at its lowest elevation — not as a function of tides. This sea-level minimum is attained when the continental glaciers grow and incorporate additional waters through precipitation, hence drawing additional waters from the oceans.

Stade - A substage of a glacial stage marked by a glacial readvance (Bates and Jackson, 1987, p. 639). For creationist usage it refers to the time in the Ice Age Timeframe when the continental glaciers advanced with the addition of snow, and generally cooler and wetter global conditions. Sea-level would fall during this period.

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Quote

Isaiah 55:10-13

10 As the rain and the snow come down from heaven, and do not return to it without watering the earth and making it bud
and flourish, so that it yield seed for the sower and bread for the eater,
11 so is my word that goes out from my mouth: It will not return to me empty, but will accomplish what I desire and achieve
the purpose for which I sent it.
12 You will go out in joy and be led forth in peace; the mountains and hills will burst into song before you, and all the trees
of the field will clap their hands.
13 Instead of the thornbush will grow the pine tree, and instead of briars the myrtle will grow. This will be for the LORD'S
renown, for an everlasting sign, which will not be destroyed.