7,000 years in which to remove 1,500 to 2,000 km³ of material. It is highly probable, therefore, that the canyon originated from massive shelf-edge slope failure on an unstable continental margin. A series of successive failures, each one creating an upslope instability that triggered the next failure, caused an elongate trough to form that excavated the canyon to a depth of 4,000 ft (1,220 m) below present sea level. Once the canyon had formed, its steep side walls continued to be unstable, and sediments slumped into the canyon axis, forming the initial canyon fill. This phase is well documented: the lowermost sediment fill is composed of displaced material similar to that now found on the canyon rim.

Large scars from sidewall failures can also be easily mapped on the seismic data. From 20,000 years to approximately 5,000 years B.P., a series of late Wisconsin and Holocene delta lobes formed, which were responsible for the remainder of the fill of the canyon. During the past 5,000 years only a thin deep-water pelagic drape has been deposited within the canyon. Maps have been constructed that depict the various horizons, and the geometry of these horizons verify this mode of formation.

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Basement Structure in Northwest Peninsular Florida

Results of a recently completed gravity investigation suggest that basement offsets produced by normal faulting are the sources of observed gravity and magnetic anomalies in northwest peninsular Florida (Lafayette, Dixie, Gilchrist, and Levy Counties). A series of parallel fault-block basins and uplifts is proposed as the dominant basement structure. These basins and uplifts and the Southwest Georgia Embayment developed in response to the same regional stress field in early Mesozoic time.

Two-hundred sixteen gravity stations have been established and correlated with the International Gravity Standardization Net. Bouguer anomaly values have been derived for each station and regional gravity components analyzed, using trend-surface analyses. Geologic cross sections have been made on the basis of available stratigraphic information. The gravity effect for each section was calculated, using the method of polygons. Basement structural interpretations were iteratively adjusted within geologic constraints until close agreement was achieved between calculated and observed gravity profiles.

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Stratigraphic Distribution of Hydrocarbons with Differing API Gravities in East Texas Basin

In studying the stratigraphic and geographic distributions of oils initially produced from seven East Texas Cretaceous formations, the effects of depth, temperature, and rate of burial on increasing hydrocarbon maturation, expressed as increasing API gravity, can be determined statistically. Analysis of both linear-regression and data-density trends indicates that API gravity increases as the oil matures during burial. Linear-regression analyses yield positive API-gravity gradients and low correlation coefficients for the data populations. Data-density trends show well-delineated and differing API-gravity gradients with ordinal and abscissal limits.

From younger to older formations, there are two main trends of increasing API gravity. The oil from sub-Clarksville reservoirs, showing the best-delineated high API-gravity gradient, represents one main trend. The oils from Woodbine and Paluxy reservoirs show both main trends; API gravity increases rapidly, then slowly, as burial continues. The oils from Glen Rose, Rodessa, Pettet, and Travis Peak reservoirs show the second main trend, that is, a low API-gravity gradient. A composite plot for the seven formations, showing one curvilinear trend, with both high and low API-gravity gradients, implies different radiocarbon maturation rates tor the East Texas oils. Almost all maturation trends are within a temperature range of 110 to 250°F (43 to 121°C), which falls below the theoretical temperature window of 250 to 350°F (121 to 177°C) for maximum hydrocarbon generation.

For each formation, the geographic distributions of API gravity, depth of burial, and formation temperature establish a stratigraphic, geographic, and tectonic framework for studying the statistical distributions. Generally, high API gravity oils have been produced from the deep southern and shallow eastern parts of the basin. Lower API gravity oils are produced from the northern and western shallow parts of the basin.

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Implications of Fission-Track Ages from Kaplan Geothermal-Geopressure Zone, Vermilion Parish, Louisiana

Apatite and zircon mineral separates were extracted from cores from near the bottom of two geopressured-geothermal wells in Vermilion Parish, southern Louisiana, and dated by the fission-track method. Samples were taken in the sandstone units of the Oligocene age Frio Formation. The purpose of the study was to determine if fission-track clocks had been affected by long-term heating within the zone. Downhole temperature measurements indicate that the samples are currently at ~277°F (136°C) and ~338°F (169°C). Fission-track clocks, such as apatite and zircon, lose their tracks when subjected to temperatures of ~212°F (100°C) and ~ 347°F (175°C), respectively, for geologically significant periods of time (1 m.y.).

Results show that apatite clocks were reset to 0 m.y. whereas zircon yielded ages of 82 and 88 m.y. (Cretaceous). If bottom-hole temperatures are reliable, then the data suggest the following. (1) Zircon ages are relict, reflecting times of cooling of the volcanic, plutonic, or metamorphic source. The Frio Formation in southern Louisiana was at least in part derived from a Cretaceous or older source. Such cooling ages are common in the Ouachitas, southern Appalachians, and the Gulf coast plain. (2) Reset apatite and relict zircon ages suggest that temperatures within the geopressured zone have probably not been any higher than the 347°F (175°C) they are today.

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Using Nannofossil Counts in Interpretation of Subsurface Deltas

The Balize delta in Plaquemines Parish, Louisiana, and the six preceding Holocene deltas offer models for subsurface interpretation. Nannoplankton counts were made from 65 bottom samples from the shelf area of the Gulf of Mexico off Louisiana. This work indicated a correlation between surface salinity and nannoplankton counts. In the subsurface, an ecology of outer middle neritic (water depth approximately 120 ft; 37 m) or deeper, accompanied by low (less than 5,000 per slide) nannofossil counts, indicates a deltaic environment. The Miocene *Cristellaria* "I" Hollywood and Krumbhaar sands, which were deposited by prograding deltas, are examples of nanno-