distribution and speciation by affecting paleogeography, climate, and deposition. Intercontinental links were broadened during regressions. Transgressions had moderating effects on climate, produced by lessening continentality. A middle Paleocene major regression probably marked the withdrawal of the North American interior seaway, and its absence was linked to Paleocene-Eocene transition climatic warming and drying. Shifts in sea level shifted loci of deposition, affecting rates of animal burial and diagenesis.

Sea level effects on shape and disjunction of ranges on the Gulf Coast were of particular importance because southern sources were likely for the wave of new forms, many representing the first appearance of modern mammal orders, which marks the Paleocene-Eocene transition in northern sites. Gulf Coast regressions exposed a broad continental shelf producing terrestrial conditions analogous to those of the broad, stable epicontinental seas produced by major transgressions. An embayment in Texas at the location of the Cretaceous interior seaway could have functioned to produce eastern and western Gulf Coast terrestrial provinces as the Mississippi embayment did in the Pleistocene. Transgressions reduced the area of lowlands, constricted ranges, and promoted speciation by isolating demes in highlands. Regressions could also promote speciation, by lowering water tables, increasing the extent of savannas, and thus fragmenting the habitats of forest dwellers. The effects of sea level changes are important in the burst of mammalian speciation that characterizes the early Tertiary, just as they are in marine evolution.

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Late Tertiary and Quaternary Depositional Systems in Subsurface of Central Texas Coastal Plain

Late Miocene, Pliocene, and Pleistocene deposits in the subsurface of the central Texas coastal plain were subdivided into six operational units equivalent to the surface-defined Fleming, Goliad, Willis, Lissie, and Beaumont Formations. These sedimentary units constitute the last major depositional episodes in the northwestern Gulf Coast basin. Late Miocene deposition is represented by transgressive shelf and shallow-marine shales overlain by progradational clastics of the upper part of the lower Fleming, upper Fleming, and lower Goliad–Willis units. A minor Pliocene transgressive event is represented by downdip, marine embayment facies of the upper Goliad–Willis unit. Finally, Pleistocene highstand fluviodeltaic progradation (Lissie and Beaumont units) terminated pre-Holocene sedimentation.

Interpretation of sediment distribution, established by constructing a series of net and percentage sand-maps for each unit, permits delineation of the following main depositional systems: fluvial braided-meander belt and flood basin; fluviodeltaic; lagoon; large marine embayments; small bayhead deltas; thick wave-dominated deltas; strand plain; and thick stacked coastal barriers. Western fluviodeltaic systems were consistently less active than the eastern ones, which deposited greater volumes of sand.

Inherited, subtle structural influence of the deeper seated San Marcos arch had some effect on sediment distribution and paleogradients. Shallow extensions of the deeper Vicksburg, Frio, and Miocene fault systems display respectively decreasing (from 400 ft or 122 m) displacements in the section studied. Faults clearly were a central factor in the distribution of fluvial, deltaic, and strike-oriented coastal sands.

Most sands in the updip parts of the operational units contain fresh water, whereas those of downdip areas contain predominantly brackish to saline waters. The area with greatest reservoir potential for fresh water includes Victoria, Jackson, Wharton, and Colorado Counties. Possible use of sealed, thick coastal sands in the lower Fleming unit for the disposal of industrial and municipal liquid-waste is recommended.

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Characteristics of Diapirs on Outer Continental Shelf-Upper Continental Slope Boundary, Northwest Gulf of Mexico

An 18,000 km^2 segment of the shelf-slope boundary off southwest Louisiana was studied using high resolution seismic profiles. Mapping of the distribution of diapirs, faults, synclinal and anticlinal axes, and the configuration of the subseafloor surface of diapiric material revealed significant patterns.

On the outer continental shelf, diapirs are characteristically either buried or exposed and severely eroded. Erosional surfaces on upper-slope diapirs can be used to estimate subsidence rates. The complex bathymetric contours on the upper slope are the result of diapiric activity and show characteristic fault patterns and relations to pierced sediments that can be attributed to gravity-induced movement of salt downslope triggered by the weight of overlying sediment prisms. Salt is present at shallow depths on the upper slope and is usually capped by a sheath of seismically chaotic, fine-grained sediments. Diapirism and the loading of sediments in depositional basins are interdependent processes actively reshaping the shelf-slope boundary through marginal accretion.

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Evolution and Morphology of Sedimentary Environments, Atchafalaya Delta, Louisiana

Progradation of Atchafalaya Delta, one of the most dynamic geologic events of the century, has produced a sizable new sand body on the Louisiana coast. Evolution of depositional environments in Atchafalaya Bay has been determined from analysis of sediment cores and bathymetric surveys. Use of X-ray radiography has made possible recognition of a number of subenvironments within major environments. Atchafalaya Delta exhibits all of the sedimentary environments recorded in earlier Mississippi delta lobes. However, excellent stratigraphic control and current knowledge of the processes of deposition in Atchafalaya Bay make it possible to link process-response better in this than in other Mississippi subdeltas. In contrast to the modern Mississippi subdelta, the Atchafalaya should prograde more rapidly, form thinner sand bodies, and eventually cover a wide area, much like the Lafourche, St. Bernard, and Teche delta lobes.

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Atchafalaya Mud Stream and Recent Mud Flat Progradation: Louisiana Chenier Plain

The Chenier plain coast of southwestern Louisiana has been recognized as the downdrift recipient of fine-grained sediment derived from the Atchafalaya River, to the east. Carried as suspended sediment in the Atchafalaya "mud stream," silts and clays are now accumulating as nearshore deposits of gel-like fluid mud along what has historically been one of the most