where secondary migration routes across formational boundaries may have been created or where younger and/or older source beds have been brought into contact with the reservoir sandstones.

The chemical compositions of the crude oils were determined primarily by chromatographic and mass-spectrometric methods. Most useful were the analyses of the individual light-hydrocarbon components, the isoprenoid isoparaffins, the sterane naphthenes, the saturate and aromatic hydrocarbon compound types, and the stable carbon isotope ratios.

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Facies Relations in Holocene-Pleistocene Coastal Sediments: Model for Interpretation of Ancient Transgressive-Regressive Sequences

A correlation model of adjacent coastal sedimentary lithosomes in a Holocene transgressive sequence and Pleistocene regressive sequence has been formed for use in the interpretation of ancient transgressive-regressive coastal sequences. During the present Holocene marine transgression in the mid-Atlantic coastal area, sedimentary lithosomes are forming in a series of coastal sedimentary environments in a typical transgressive vertical and horizontal sequence pattern. These transgressive coastal environments are directly adjacent to and over a mid-Wisconsin or Sangamon high sea regressive coastal environment sequence.

Diagnostic sedimentary structures and textures presently forming in the Holocene coastal sedimentary environments are used to identify adjacent Pleistocene coastal sediment lithosomes. These include beach, berm?, tidal delta, dune, and other barrier subenvironments, and fringing marsh, lagoonal and shallow marine-estuarine environments. Trends of Holocene and Pleistocene barriers diverge 25–35° with additional complexity in areas of major spit development.

In applying the concept "the present is a key to the past," studies of Holocene-Pleistocene transgressive-regressive coastal environmental relations suggest that great caution should be used in attempts to project coastal trends in ancient rocks. Transgressive-regressive vertical and horizontal sedimentary sequences formed during fluctuating sea-level conditions may occur adjacent to each other and appear to correlate. Accordingly, models of lateral and vertical facies relations in adjacent Holocene transgressive and Pleistocene regressive coastal sequences should be of use in facies correlation in similar but ancient geologic settings.

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Texture of River and Beach Sediments Seaward from Active Volcanic Highlands, Southwestern Guatemala

Sedimentologists have investigated grain-size distributions of sediments from various environments in an attempt to gain uniformitarian insight for reconstruction of ancient environments. However, modern river and beach sediments occurring seaward from active volcanic highlands have been little studied even though ancient analogues may be common locally.

The Pacific coastal plain in Central America is widest in Guatemala where it is abruptly terminated 10–30 mi inland by the steep slopes of a row of active Quaternary volcanoes. The slopes are locally bare of vegetation, and the strongly seasonal, torrential rainfall provides abundant bed load to low-sinuosity streams that discharge onto the coastal plain and flow seaward in a roughly parallel pattern.

Guatemalan river and beach-face sands are mostly moderately to moderately well sorted (river average $\sigma_I = 0.87\phi$ units; beach average $\sigma_I = 0.54\phi$ units), near symmetrical, mesokurtic, medium-grained (river average $Mz = 1.44\phi$; beach average $Mz = 1.45\phi$) volcanic arenites, composed predominantly of unweathered grains of angular volcanic rock fragments, plagioclase, and ferromagnesian and opaque minerals. River sands can be distinguished from beach sands by plotting mean size versus sorting, by coarsest percentile (C) versus median percentile (M), and by inspection of cumulative probability curves. Curves for river sands commonly show subpopulations inferred to reflect sliding and/or suspension populations. Saltation populations, in both river and beach sands, are usually polymodal because of mixing of grain populations differing in specific gravity and shape.

Published bivariant plots and other techniques are assessed in terms of the Guatemalan sands.

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Sand Body Created by Migration of Fire Island Inlet, Long Island, New York

Dated maps show that Fire Island inlet, with a present channel maximum depth of 10 m, migrated 8 km WSW between 1825 and 1940 (when a jetty was built to stop migration). During those 115 years a substantial sand body, lying entirely below modern sea level, and hence having a high probability for preservation, was created by filling of the shifting inlet channel. The dimensions of this sand body are: length, 8 km; width, ~500 m; and maximum thickness, ~10 m. Assuming a triangular cross section with flat top at modern sea level the volume is 2×10^7 cu m. If average porosity is 25%, the pore space of the inlet filling would accommodate 3.3×10^6 bbl of fluids.

Study of the modern inlet from the bottom of the active channel to the spit at Democrat Point permits recognition of 3 major environments of sedimentation having 10 subdivisions; sediments of each subdivision display distinctive structures. The channel environment extends from 10.0 to 3.75 m below modern sea level. Its subdivisions are: (a) channel floor (−10.0 m), (b) deep channel (−10.0 to −4.5 m), and (c) shallow channel (−4.5 to −3.75 m). The spit-platform environment (−3.75 to −0.6 m) consists of bottomset, foreset, and topset subdivisions. The spit environment (−0.6 to +2 m) includes washover delta, bay (to −2 m), berm, and beachface subdivisions.

Despite the fact that the basal gravel layer is overlain by large sand waves (60–100 m long and 0.5–2 m high), the only large-scale cross-strata occur on washover deltas that occur locally at the top of the inlet sequence. In sands from the deep parts of the channel, where large-scale cross-strata might be expected because of the large sand waves, only small-scale, lenticular cross-strata occur. This absence of large-scale cross-strata results from the effect on the sand waves of reversing tidal currents.