Kerogen in the Miocene Monterey Formation in the Pismo syncline consists of amorphous material of algal orgin. Most of the rocks presently contain 1 to 5 wt. % total organic carbon. Thermal alteration index determinations and pyrolysis (thermal extract) data suggest that the organic material at the center of the fold is mature, whereas the organic material on the limbs of the fold is immature. The Monterey Formation in this region entered the liquid hydrocarbon window at a present day depth of approximately 1,700 m. The liquid window appears to be coincident with the opal-CT to quartz reaction (80 ± 10°C).

Hydrocarbons were expelled from the Monterey rocks deep in the center of the fold and began migrating as a result of microfracturing. The hydrocarbons migrated up into the southwest limb of the fold through macrofractures. This limb of the fold is characterized by brittle dolomitic and opal-CT rich rocks that were intensely fractured prior to hydrocarbon migration. The potential reservoirs on this limb of the fold are in fractured Monterey. In contrast, on the northeast limb of the fold, Monterey rocks consist of silty and sandy siliceous rocks that tend to be more resistant to fracturing; hydrocarbons migrate up into this limb of the fold through relatively low angle faults and spread into structural traps along the fault in the adjacent Pliocene Pismo Formation through conjugate shears. The potential reservoirs on this limb are in structural traps in the Pismo Formation. A third potential hydrocarbon target is the basal sand in the Pismo Formation; almost everywhere in the fold this unit is highly bituminous.

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Sedimentologic Framework of Green River Formation, Wyoming

During deposition of the Green River Formation, ancient Lake Gosiute began as a freshwater lake, evolved to a saline, alkaline lake, and ended as a freshwater lake. This evolution reflects the change from a closed-basin to an open-basin hydrologic regime; as a result, sedimentation in the Lake Gosiute system was strongly influenced by the relation between evaporation and inflow of water into the basin. In the Green River Formation, stratification sequences, sedimentary structures, and mineralogy of lithofacies provide important insights into the evolution of the system and the competing factors that determined the type of sediment accumualated in the lake and fringing environments. Carbonate sedimentation was strongly influenced by lacustrine transgressions and regressions across a low topographic gradient. Terrigenous rocks reflect progradation of beach and deltaic shorelines during wetter climatic intervals when detritus that was produced and stored in upland areas during preceding drier intervals was transported to the lake.

Hydrochemistry of lake Gosiute during the deposition of the Wilkins Peak member was controlled by ground water discharge; during the deposition of the Tipton and Laney Members it was controlled largely by surface water. Calcite precipitated as a result of mixing calcium-rich inflow and saline-alkaline lake waters. Dolomite formed as a result of periodic flooding and drying of the playa fringe (carbonate mud flat), where carbonate muds were saturated with saline-alkaline lake waters and underwent evaporitive pumping. Some surface waters were preconcentrated by dissolution of efflorescent crusts in alluvial plain and mud-flat sediments. Trona and halite precipitated from brine pools as the lake shrank during periods of intense aridity. During himid periods the lake expanded and oil shale was deposited.

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Wave-Dominated Deltaic Sedimentation in Devonian Bokkeveld Basin of South Africa

In the Devonian Bokkeveld basin on the southwestern periphery of Gondwanaland, over 3,000 m of mudstones and sandstones were deposited as a southerly prograding clastic wedge. Five thick regressive sequences record processes on arcuate deltas along a mixed wave and tidal energy coastline. Variations among the upward-coarsening sequences are the result of differential preservation and transgressive reworking caused by uneven rates of relative sea level rise.

The base of each sequence is represented by dark shelf-prodelta shales which grade upward through mudstones to graywackes and lithic arenites of river-mouth bar facies. This upward-coarsening deltaic package is topped by tidal flat, shallow subtidal, and interdistributary bay deposits of the delta plain. These delta plain deposits are extensively bioturbated and contain brackish invertebrate taxa of the Malvinocaffric province. Reworked sands are present largely as tidal channel and tidal inlet quartzarenites that unconformably overlie the distributary-mouth bar facies and in places the delta plain facies. Plane-bedded sheet sands locally occur below the quartzarenites and are attributed to storm washover processes.

It is suggested that deposition of the Bokkeveld Group occurred on arcuate deltas similar to the modern Brazos and Niger deltas. Rates of relative sea level rise were high and were punctuated by periods of near stillstand. The duration of these stable periods increased through time, culminating in stable shelf conditions in Witteberg time.

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Paleogeographic Setting and Depositional Environments of Santa Margarita Formation, Ventura County, California

The Santa Margarita Formation in Ventura County, California, represents a transgressive-regressive sequence of rock deposited in a late Miocene shallow marine and paralic environment. A relatively steady low rate of subsidence with an initially low rate of sedimentation produced the transgressive phase. Increased rate of sedimentation produced a seaward progradational sequence or regressive phase.

Rocks that represent the transgressive sequence are herein divided into two facies: (1) facies A, a basal conglomerate zone and thick beds of bioturbated, locally fossiliferous, fine-grained sandstone with some large-scale cross bedding; and (2) facies B, laminated mudstone, phosphatic mudstone, and pelletic phosphate. Rocks that represent the regressive sequence conformably overlie facies B and are herein divided into three facies: (1) facies C, medium to very coarse-grained fossiliferous sandstone characterized by small to large-scale cross bedding; (2) facies D, thin to thick beds of laminated, nodular, and honeycomb gypsum and intercalated claystone, and lenticular-bedded and interlaminated mudstone and very fine-grained sandstone; (3) facies E, medium to thick-bedded mudstone and medium to very coarse-grained sandstone characterized by cross bedding.

Facies A represents marine deposition in a high-wave-energy, shoreface environment. Facies B represents deposition in a low-wave-energy, embayed, inner-shelf environment. Facies C was deposited in a high-wave-energy, east-west-trending, shoreface environment consisting of barriers, bars, tidal channels, and shoals. Facies D was deposited behind the barrier complex in hypersaline lagoon, evaporitic intertidal-flat, and supratidal-falt environments. Facies E represents deposition on a prograding fluvial plain. A modern analog for the late Miocene barrier-lagoon-tidal flat complex exposed in Sespe Creek area is the coastal zone between San Felipe, Baja California, and the present mouth of the Colorado River.

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Fortescue Field—Stratigraphic Trap in Gippsland Basin, Australia

The Fortescue 1 well, drilled in the Gippsland basin in June 1978, was a dry hole. However, the results of a detailed stratigraphic analysis and interpreted seismic data provided sufficient information to predict the possible occurrence of a stratigraphic trap on the flank of the giant Halibut structure. Three months later, the West Halibut 1 well encountered oil in the Latrobe group 16 m below the depth used as the oil-water contact for the Halibut field. Following wireline testing in both the water- and oil-bearing sandstone units, two separate pressure systems were recognized in the well. Three additional wells, Fortescue 2, 3, and 4, were drilled to delineate the limits of the field, the complex stratigraphy, and the pore fluid contacts. Detailed well log correlations, stratigraphic interpretations, and interpreted seismic data indicated that the Fortescue reservoirs were a discrete set of units stratigraphically younger and separated from those of Halibut and Cobia fields. Analysis of pressures confirmed the presence of two separate pressure systems, proving none of the Fortescue reservoirs were being produced from the Halibut platform. Geochemical analysis of oils from both accumulations supported the above results, with indications that no mixing of oils has occurred. Because the Fortescue field is interpreted as a hydrocarbon accumulation which is completely separated from both Halibut and Cobia fields, and was not discovered prior to September 17, 1975, it qualified as new oil under the federal government's existing crude oil pricing policy.

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Mass-Movement Processes in Fine-Grained, Hemipelagic Basin: Santa Barbara Basin, California Borderland

Mass-movement features defined by high-resolution and air gun seismic profiling are located at nine specific sites in silty clays and clayey silts on slope and slope apron settings. Two basic scales of processes occur: eight small-scale mud flows and slumps 2 to 8 m thick and 4 to 15 sq km in area extent; and a large compound feature about 100 sq km in areal extent and 2 to 25 m thick in the northeast part of the central basin. Mud flow and slump deposits sampled with box and piston cores have liquid limits (% dry basis) of 50 to 120, plasticity indices of 15 to 60, and water contents (wwb) of 40 to 65%. The compound feature has liquid limits of 75 to 105, plasticity indices of 25 to 45 and water contents of 55 to 85%. Envelopes of values of plasticity indices versus liquid limits for different mud flows, slumps, and the compound feature show good separation, perhaps indicative of varying sedimentation rates. Mud flows and slumps exhibit a swirled x-radiography signature, fluid escape features, inclined and folded layers, and dramatic matrix-supported random fabrics with round clasts as large as 4 cm. Distorted laminations, minor faults, small folds, and homogeneous sections typify different areas of the large compound feature. Suspended sediment transport, centered on the compound mass movement feature, provides faster sedimentation rates which may partly explain the feature. Only a relatively small part of the basin, the deep flat area which slopes gradually to the south, is somewhat immune to mass movement.

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Organic Maturity and its Geologic Bearing in Tertiary of Spitsbergen

Vitrinite reflectance measurements on coals and dispersed organic matter in the Spitsbergen Tertiary are reported. Maturity profiles through the Tertiary sequence (950 m) show gradual increase ranging from $R_O = 0.40$ at the top to $R_O = 0.68$ at the base. The maturity level along the economically important coal horizon at the base of the Tertiary sequence shows considerable regional variation ranging from $R_O = 0.41$ to $R_O = 1.1$. Maturity is highest in central and southern parts of the basin and decreases toward the western and eastern flanks.

Isoreflectance lines are interpreted in terms of isopachs. The main conclusions are: the area of greatest sediment-accumulation migrated eastward during deposition owing to tectonic activity related to the early opening of the Norwegian-Greenland sea. During the subsequent post-orogene uplift and denudation of Spitsbergen, approximately 1.0 to 1.5 km of the Tertiary deposits were eroded.

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Sedimentary Facies Analysis, El Dorado Field, Kansas, Micellar Chemical Pilot Project

The Permian 650-ft sand, one of several productive sands in the El Dorado field, has yielded 36.5 million bbl by primary and secondary methods, with 71 million bbl remaining. During initial stages of the micellar-polymer tertiary recovery pilot project drilling in 1974, a Phase I geologic analysis, using seven cores, identified distributary channels and associated smaller splay channels as productive facies. The western edge of the pilot area was determined to have the best channel sandstone development. A two-layer geologic facies model was proposed.

Oriented cores were included in the drilling of 24 wells in Phase II. North and northeast flow directions were indicated for the channel sandstones. The influence of intertidal redistribtuion of sands, particularly in the northern lease area, was recognized, as were inactive channel fill mud plugs which reduced the total thickness of the channel sandstone reservoir.

During Phase III four observation wells were cored. These wells were drilled at intervals of 90 ft (27 m) diagonally from earlier wells in the north and south block. Micellar injection for the pilot was completed in early 1979 and polymer injection followed.

Limited computer simulation tests suggested that a one-layer model yielded fluid flow results similar to a multi-layer model and also indicated that the oil bank would bypass one of the observation wells. Cores analyzed in Phase III indicated no reason to expect that the observation well should not produce the amounts of hydrocarbons indicated by log analysis. Detailed description of cores and construction of cross sections in