and Sacate Formations. That this westerly shift continued is documented by Oligocene (Sespe) isopach trends and paleocurrent-slope indicators. In late Paleogene-early Neogene time, Vaqueros sands, unconformably overlying the nonmarine Sespe, were winnowed over time-persistent, east-west structural highs.

The culmination of the development of the western Transverse Ranges is marked by middle Miocene rifting, foundering, and volcanism. Deep-basin sedimentation essentially began with this event. The synclinal distribution of late Miocene turbidite sands is evidence for the continued growth of the early formed structural highs.

Late Neogene sediments within the Santa Clara graben offer a classical example of structurally controlled sedimentation. Pleistocene and Holocene submarine-fan deposits reflect the impingement of the westward-plunging Montalvo anticlinorium. Contrasting northern and southern shelf deposits of similar age also are controlled by early formed structural trends. Many of these structures are the oil and gas fields of the modern Santa Barbara basin.

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DELTAIC SEDIMENTATION, SALT MOBILIZATION, AND GROWTH FAULTING IN GULF COAST BASIN

Regional facies mapping and analysis of thick, terrigenous wedges, and mapping of principal structural features (salt intrusion and growth faulting) indicate a direct relation between sedimentation and tectonics in the western Gulf basin. Proximal parts of clastic wedges infilling the basin consist of paralic, mainly deltaic, depositional systems; distal parts are made up largely of deep-water, continental-slope deposits. Two kinds of delta systems are characteristic: (1) high-constructive deltas marked by rapid, large-volume deposition; and (2) high-destructive deltas with large sand content and slower rates of accumulation.

Distribution of 4 major high-constructive delta systems and associated continental-slope systems is coincident with 4 major salt-diapir fields (including about 90% of the domal salt structures of the basin). Mobilization of deep seated, bedded salt occurred by lateral migration to interdeltaic areas and by distal migration, establishing diapir fields fronting major delta systems and coincident with slope systems. Salt mobilization related to strike-depositional (barrier bar and strandplain) systems was generally as broad salt ridges rather than domes.

In high-constructive deltas, growth faulting is facies coincident, forming at the boundary of delta-front sands and thick prodelta muds. As with salt mobilization, the principal tectonic grain of growth faulting developed in connection with the 4 major episodes of high-constructive wedges in the offlap filling of the basin, rejuvenating growth faulting and salt mobilization initiated by the high constructive deltas. Accordingly, direct facies correlation in distribution of growth faulting and salt mobilization occurred.

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HOW MINING INDUSTRY CONSIDERS THE ENVIRONMENT

No abstract available.

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PRACTICAL APPLICATION OF REMOTE SENSING TO PETROLEUM AND MINERAL EXPLORATION

The symposium papers concern many aspects of the application of remote sensing to natural resource exploration. Remote sensing is best discussed in the context of the electromagnetic spectrum. Any device which senses a part of the spectrum from a remote position may be classified as a remote sensor. Visible light is the most familiar part of the spectrum, and our eyes and a camera with its film are remote sensors. In the shorter wavelengths, ultraviolet light has been useful in limestone-dolomite studies. X-ray diffraction patterns long have been used in mineral identification. In exploration for radioactive minerals, sensing parts of the gamma-ray spectrum with airborne or ground scintillometers is a common technique. On the longer wavelength side of the spectrum, near and far infrared are adjacent to visible light. Near or photographic infrared, when taken with a low sun angle, has been very useful in mapping faults and other features which are topographically expressed. Far, or thermal, infrared is also useful in mapping faults. Because water has a tendency to be more abundant in fault zones, they commonly are expressed as slight temperature lows due to the cooling effect of evaporation.

Side-looking-radar imagery also is very useful in fault delineation and for general mapping purposes, particularly in areas where cloudiness is a problem in conventional aerial photography. Side-scan sonar is a technique used to obtain underwater imagery, and should prove useful in bathymetric studies of shelf areas.

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PETROLOGY AND SEDIMENTATION OF EARLY PALEOZOIC ISLAND-ARC DEPOSITS, NEWFOUNDLAND

The Cambro-Ordovician New Bay Formation (2,000 m) of the Newfoundland Appalachians is a southward-thickening prism of conglomeratic, volcanogenic turbidites interbedded with sandstone and black argillite. Abundant sedimentary structures include tool and scour marks, cross-lamination, normal and multiple graded bedding, slump folds, and channels. The top of the formation is mostly agglomerate interbedded with red-and-green laminated silty argillite. Trails and burrows are the only fossils.

The sandstones are lithic-feldspathic arenites and basaltic wackes composed of fresh, angular unstable mineral grains and little quartz. The conglomerates have volcanic and sedimentary clasts enclosed in an ashy matrix altered to chlorite. Volcanic clasts are basalt, andesite, and dacite porphyry. Sedimentary clasts include green cherty siltite, fine-grained feldspathic arenite, abundant rip-up clasts of argillite, and rare jasper.

Analysis of Bouma sequences, amalgamated contacts, and trace fossils indicates abrupt regression late in New Bay deposition. Sole marks, slump folds, and channel axes indicate marginal sediment supply from turbidity currents and slumping down an east-facing submarine slope.

On the northwest the formation thins and apparently passes into marine and subaerial pyroclastic strata of the Wild Bight Group. On the east it is in sedimentary and tectonic contact with the Dunnage mélange which has been interpreted as an ocean trench deposit. The petrology and sedimentology of the New Bay Formation compares closely with certain Miocene volcanic arc deposits described from Malekula Island, New Hebrides. Therefore the New Bay is interpreted as a volcanogenic "apron" deposited in the arc-trench gap of a Cambro-Ordovician island arc.

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STARVED ROCK MEMBER OF ST. PETER SANDSTONE—OFFSHORE SHOAL

The Starved Rock Member of the St. Peter Sandstone has been described as a clean, medium-grained sandstone that was deposited in a broad band across northern Illinois. This deposit displays a sequence of sedimentary structures that indicates deposition in shallow water. From the base upward the structures include (1) massive beds; (2) small-scale trough cross-strata; (3) high-angle tabular cross strata; (4) large-scale trough