maps are made partially palinspastic by a limited restoration of rocks along the San Gabriel and Big Pine faults to the positions occupied during the time represented by each map. The maps show that the area was divided into two depositional basins by the northwest-trending San Rafael highland. Fluvial deposition occured in both basins during the Oligocene. In the northeastern Cuyama-Soledad basin, Oligocene-Miocene marine deposits transgressed eastward over a large delta. In the southwestern Ventura basin, marine transgression was from the southwest. In the late early Miocene the ocean breached the San Rafael highland and created a strait between the remaining San Rafael peninsula and the newly formed Ynez island. During the medial Miocene, marine transgression continued, further connecting the two basins into one and shrinking the size of Ynez island. Slight marine regression in the southeast at this time was caused by tectonic uplift in the region of the present-day Simi Hills. During the latest middle Miocene, movement occurred on the San Gabriel fault, thus isolating the Soledad basin and creating an inland lake. With continued fault movement, this lake moved southward during late Miocene and merged with the ocean creating a large estuary. Marine transgression continued in the southeast during the late Miocene, while marine regression occurred in the northwest.

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Internal Breccias near Early Geosynclinal Platform Margins

The Triassic and lower Jurassic limestones of the island of Hydra (Greece) were deposited on the Pelagonian platform, near its western edge which strikes north-northwest-south-southeast. In this region, five main breccia horizons are recognized. Internal breccias are characterized by mutual fitting of clasts, indicating relatively small displacement. Transitions downward into fissures and almost undisturbed rock sections, and upward into mass flows, provide important clues as to their origin. The clasts are generally monomictic and consist of shallow-water, slope or basin ridge limestones. The matrix is derived from above and consists of basin sediments which are commonly red.

Each of the five breccia horizons represents a sequence of: (a) platform buildup; (b) tilting caused by unequal subsidence; (c) deposition of basin sediments on top of the platform carbonates; and (d) brecciation of the platform limestones and absorbing of the overlying basin sediments. In many places, early lithification and repeated brecciation also occur. These main breccia horizons correlate very well with major tectonic phases in the early geosynclinal history of the northern and eastern Alps.

Although submarine breccias are commonly related to faults, there is no evidence for this in the Triassic and Jurassic sequences of Hydra. We suggest that the breccias were produced by large migrating flexures, and that such flexures are a tectonic alternative or substitute for faults in the early stages of Tethys formation. The study of brecciation of the type discussed may provide more precise information on the configuration and evolution of early geosynclinal platform margins and shelf-to-slope breaks.

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Origin of Casing Annulus Gas in Cognac Field and Significance of Marine Sediment Hydrocarbon Surveys

Data clearly demonstrate that a near-surface geochemical anomaly over the Cognac field, offshore Louisiana, is either the result of upward migration along well-defined paths (faults) or is a false anomaly.

A pre-sale (1974) hydrocarbon survey in the Cognac area was discussed at the 1978 annual AAPG convention. Analysis of 6 ft (2 m) deep sediment samples resulted in the delineation of hydrocarbon anomalies that included the discovery well of Cognac field. A part of this survey included the determination of methane δC^{13} values (δC_1) on three sediment samples having anomalous concentrations of hydrocarbons. The δC_1 values (-38.1, -39.2, and -37.3 ppt PDB) plus the methane/ethane ratios (C_1/C_2 = 7 to 15) are excellent evidence for thermal hydrocarbons.

Later, during the drilling of developmental wells, gas pressure buildup was encountered in the casing annulus of several wells. This gas probably enters the casing annulus at casing shoes located about $-2{,}000$ and $-4{,}000$ ft (-610 and $-1{,}220$ m; subsea). The casing annulus gas is nearly pure methane (98.3 to 99.6%), with a C_1/C_2 ratio of nearly 2,000 and δC_1 values around -68 ppt PDB. Thus this gas is of low temperature, bacterial origin. It is probably related to gas shows found between $-2{,}200$ and $-3{,}500$ ft (-671 and $-1{,}067$ m) in these wells.

Thus if the near-surface gas anomaly is the result of leakage from a deep reservoir, the leakage must have developed along well-defined migration paths (faults), so that it did not become mixed with the shallow bacterial gas. Diffusional migration would have resulted in a mixing of bacterial gas and thermal gas.

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Enhanced Oil Recovery Site Selection Using Reflection Seismology

Eight lines of 2-D high resolution seismic data were acquired at a proposed enhanced oil recovery site in Montague County, Texas. Areal extent of the producing field is roughly 200 acres (80 ha.), of which 35 acres (14 ha.) were selected for the experiment. The producing formation is a Pennsylvanian sand, 40 ft (12 m) thick and 1,800 ft (549 m) deep. High-frequency broadband data (50 to 175 Hz) were collected using both shallow (10 ft or 3 m deep) and subweathering explosives. Additionally, a detailed vertical seismic profile was conducted to tie sonic logs to the seismic data. Results confirmed an area of good reservoir continuity while eliminating others owing to small-scale faulting and changing sand thickness.

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Tectonic History and Progressive Development of Fold-Thrust Belt in Eastern Gulf of Alaska

The geology of the Gulf of Alaska, east of Kayak Island, records the temporal variation of three fundamentally different tectonic settings that developed owing to the interaction between plates along the western margin of North America. A late Meosozic to early Tertiary convergent margin setting is indicated by nearly contemporaneous plutonic belts, forearc-basin sequences, and accretionary terranes. In contrast, the middle Tertiary continental margin in the eastern Gulf of Alaska was relatively stable and is characterized by sedimentation in a subsiding basin with local extensional tectonism. The present tectonic setting was probably initiated during the