

The Arctic presents one of the world's most hostile environments, and any of man's enterprises in this area are subject to formidable logistical and operational problems. MINI-CREW proved to be very successful in this environment, and with modification lends itself to practical and efficient seismic operations in other parts of the world.

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COMPARATIVE COMPOSITIONAL STUDIES OF ORGANIC MATTER IN VARIOUS DEEP-SEA DRILLING PROJECT CORES

The Deep-Sea Drilling Project (JOIDES) is providing cored samples taken through the sedimentary layers of the deep ocean basins and continental rises. Preliminary organic geochemical studies on spot samples from cores in the Atlantic and Pacific Oceans have yielded data which suggest that planktonic versus terrigenous components in the total extractable organic matter may be distinguished. The biologic markers of terrestrial detritus used in this study are the high-weight paraffins (odd numbered $n-C_{27}-n-C_{33}$) with the corresponding high-weight fatty acids (even numbered $n-C_{22}-n-C_{30}$) and triterpenes. Some specific terrigenous markers found are a series of dehydroabietic acids, traceable to a conifer rosin derivation.

In addition, a remarkable degree of preservation of certain suites of organic compounds, such as monolefins and diolefins (phytadienes), has been found in anoxic recent marine cores, decreasing markedly with depth, for example, in a continuous calcareous clay and organic carbon-rich sediment from the Cariaco Trench. A concentration correlation of the phytadienes with the chlorin pigments is positive, indicating the source of these olefins is phytoplankton chlorophyll metabolized by zooplankton and thus preserved.

Recently available continuous cores from the Cariaco Trench and the Bengal fan promise to yield an excellent opportunity to analyze further and then compare planktonic, calcareous clay-rich anoxic sediments with oxic sandy-silt sequences having a high terrigenous component.

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ECONOMIC VARIABLES IN PRODUCTION OF OIL FROM OIL SHALE

The oil-shale production cost estimates reported by the National Petroleum Council in December 1972, as part of an overall study of the U.S. energy situation are the most recent publicly available data on oil-shale economics. Using the basic NPC costs, this paper examines several important parameters affecting shale oil's economic viability. Other factors pertinent to consideration of oil shale as a domestic fuel source, such as the leasing of Federal oil shale lands, water availability, and environmental restraints are reviewed.

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HUASTECA SERIES (MIDDLE AND UPPER JURASSIC) AND ITS RELATION WITH POZA RICA RESERVOIR, MEXICO

Jurassic rocks, with a stratigraphic thickness close to 400 m, have been cored in 172 wells in an area of over 8,000 sq km. These rocks are quite important because they are the only rocks in Mexico of this age that produce petroleum. A lithostratigraphic study did not explain the nature of the reservoir, the time-stratigraphic method was used to comprehend the lithofacies changes, which occur at the stage level. Stratigraphic study based on analysis of cores from the western Sierra Madre Oriental established nine zones of ammonites: *Wagnericeras*, *Keplerites*, *Reineckeia*, *Discosphinctes*, *Ataxioceras*, *Idoceras*, *Virgatixioceras*, *Mazapilites*, and *Suarites* (Bathonian-Tithonian). Pelecypods also were present in the cores.

The common occurrence of the same fossils in other characteristic beds, which have been identified by radioactive well logs, permits their use as time-stratigraphic markers. These data were used to make subsurface structural and isopach maps.

In the northwestern Poza Rica area the Middle Jurassic transgression began during the Bathonian. Later it advanced to the central, east, and west parts, and the covered area is characterized by distinct transgressive lithofacies. The last phase of the transgression was in the early Tithonian in the southeast part of the trend, and calcarenites were formed which now produce hydrocarbons (San Andres). In northwestern Poza Rica, the San Andres calcarenitic member is within the uppermost part of the lower Kimeridgian stage.

The reservoirs are stratigraphic and structural traps. On the southeast the San Andres calcarenitic member can be subdivided at the stratigraphic level in the lower Tithonian; this fact is related to the occurrence of oil or salt water.

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EXOTIC BLOCKS OF FOREREEF SLOPE, CRETACEOUS VALLES-SAN LUIS POTOSI PLATFORM (MEXICO)

The outcrops of the folded Sierra Madre Oriental in the Xilitla, San Luis Potosi area, allow the study of contemporaneous, shallow-water, rudistid-reef, forereef, and basinal carbonate sediments.

The "Tamabra" and Mendez Formations represent the forereef and basinal sediments and also the host rocks of the platform-derived exotic blocks. Parts of these formations are composed largely of lithoclastic fragments of rudistid reefs, or shallow-water, fossiliferous carbonates mixed with basinal, fossiliferous micrite containing planktonic foraminifers, radiolarians, calcispheres, and a few ammonites. These sediments show such sedimentary structures as graded bedding, and thin horizontal, and convolute laminations; many of these features are arranged in combinations analogous to Bouma's sequence of turbidite structures. The exotic blocks are formed mainly of rudistid biomicrite (biolithite?); their stratigraphic thicknesses range from 10 to 95 m.

Stratigraphic correlations between the reef and forereef or basinal sediments were made by using fossils to determine the probable displacement of the exotic blocks; by palinspastic reconstructions of Barremian, Albian, and Maestrichtian times, approximate displacement of 5.5, 3.5, and 1 km, respectively, were inferred.

Although the Valles-San Luis Potosi platform is the counterpart of the subsurface Cretaceous Golden Lane platform, it does not have comparable large displacements of sediments which were derived from the reefs of the latter. These sediments were transported 10-15 km or more from the Golden Lane and are now contained in the "Tamabra Formation." Perhaps this large displacement has not yet been discovered in the Valles-San Luis Potosi platform, or perhaps the patterns of sedimentation differed, because the tectonic settings of the platforms were different.

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APPLICATION OF COAL PETROGRAPHIC METHODS IN RELATING LEVEL OF ORGANIC METAMORPHISM TO GENERATION OF PETROLEUM

The generation of petroleum is a thermal process dependent on the maximum temperature and on the duration of the maximum heating phase attained by the source rock. The coalification process, which is governed by the same factors, offers a convenient means of determining the stage of thermal alteration of organic matter, because coals form a continuous metamorphic series ranging from peat to graphite.

The LOM scale (level of organic metamorphism) devised by Hood and Gutjarh is used to correlate a variety of measures of