tween the two profiles being correlated. In the magnetic anomaly application, it reveals asymmetries in the spreading rates at the particular spreading center. Uniqueness of the correlations (at any particular level of resolution) is estimated statistically and analytically.

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Particulate Organic Matter of Jurassic-Cretaceous "Black Shales" in Deep North Atlantic Ocean

More than 650 DSDP samples were studied using Masran & Pocock's 1981 classification of particulate organic matter to define a number of particulate organic matter assemblages; these assemblages are characterized both by their source material and the mode of preservation. Both marine and terrestrial sources can be identified. The distribution of these assemblages shows that: (1) the eastern deep North Atlantic, Gulf of Mexico, Caribbean, and Demerara Rise are characterized by a high proportion of marine derived matter; (2) western North Atlantic sites received a high input of terrestrial organic matter; (3) marine-derived material is dominant in Cenomanian sediments of all areas; (4) highly degraded gray amorphous matter, indicating low oxygen conditions, occurs throughout the deep North Atlantic Ocean; (5) circular bodies, occurring in all areas, are interpreted as remains of seaweed spores; and (6) the distribution of various types of organic matter assemblages agrees with the sedimentology studies given in the various reports of the Deep Sea Drilling Project.

The cyclicity reported by sedimentologists is also recognized in the contained organic matter. Its origin must be explained in terms of preservational mode of the organic matter, its original source (marine or terrestrial), and mode of original and final sedimentary deposition.

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Carbonate Sedimentation of Reef and Associated Shoal-Water Facies, Sligo Formation (Aptian), Black Lake Field, Natchitoches Parish, Louisiana

The Black Lake field is one of the larger Lower Cretaceous carbonate hydrocarbon reservoirs along the U.S. Gulf Coast. The field produces from the Pettet porosity zone of the upper Sligo Formation. This porous zone coincides with a variety of carbonate facies that were deposited on a wave-dominated shelf as caprinid reefs and associated shoal-water deposits.

Distinctive associations of lithologies, textures, fabrics, structures, and faunas provided the basis for recognizing seven major carbonate lithofacies in the field. Lithofacies present in the field include (1) caprinid, (2) oncolite, (3) oolite, (4) bioclastic, (5) bioclastic micritic, (6) foraminiferal, and (7) micrite lithotypes.

A sequence of lithofacies maps and stratigraphic cross sections describe the areal geometry, distribution, growth, and movement of the various major carbonate lithofacies within the field through a short span of geologic time. Sediments deposited under the caprinid reef in the field were predominantly foraminiferal and bioclastic lime mudstones and wackestones characterized by massive bedding, bioturbation, mollusk debris, and abundant remains of *Orbitolina texana.* Caprinids initially began flourishing in the northeastern part of the field as one distinct circular body surrounded by mud-supported sediments. The caprinid lithofacies migrated in a southwesterly direction, suggesting that the predominant movement of longshore currents was from the northeast to the southwest. The caprinids formed a distinct linear carbonate buildup that trended in a northeast-southwest direction. Bioclastic micritic and bioclastic sediments formed on the landward and seaward sides of the reef trend, respectively. This demonstrates the the reef acted as a local wave-resistant barrier or baffle that allowed muddier bioclastic wackestones to accumulate behind (landward) the caprinid reef trend. The cross-sectional geometry of the caprinid lithofacies along with the dominance of reef debris landward of the main reef axis suggests that the caprinid reef developed on a wave-dominated shelf. As the reef development continued, a landward shift in local energy levels occurred. Along with the shift of energy level, the position of the longshore current also moved landward. This allowed stronger currents to move behind the reef trend (landward) and form and deposit coarser-grained sediments. The elongate reef trend was severed presumably by longshore and tidal currents. The resultant buildups were separated by a sub-perpendicular trend that consisted of bioclastic sediments which most likely represented a tidal channel through the caprinid reef. Bioclastic micritic sediments accumulated on the lee side of the reef trend in current sheltered areas. Caprinid reef growth stabilized and shoal-water deposits began to develop on the landward side of the reef trend. These shoal-water deposits consist of oolite and oncolite shoals and bioclastic reef-flank sediments deposited laterally adjacent to the caprinid lithofacies. The shoal-water deposits continued to develop and prograded over the area formerly occupied by the caprinid reef trend.

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Origin of Natural Gases, Po Valley Basin

Natural gases from productive wells in Po Valley basin have been investigated in order to study their origin. $^{13}C/^{12}C$, D/H isotopic ratios and GC analyses have been conducted. Some data on vitrinite reflectance and kerogen composition are also supplied where available.

The gases showed $^{13}C/^{12}C$ ratios in the range of $-73$ to $-38‰$ and D/H ratios in the range of $-210$ to $-150‰$.

A first interpretation based on stable isotopes, kerogen composition, maturity, and the geological setting indicates two main processes responsible of gas origin: bacterial (or early diagenetic) and thermogenic. Also, some gases seem to be the result of an interaction between the above mentioned processes.

Data on productive wells are in good agreement with some head-space analyses and with maturity values.

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Evaluation of Potential of Stratigraphic Trends Using Computer Well Data Files

Historical data from approximately 1.5 million wells residing on an IMS data base were computer processed by Amoco's Applications Management and Graphics Systems. Output consists of gridded "blindspot" maps for each stratigraphic section within each of thirty-four United States stratigraphic trend areas. In addition, a table of computed statistics was prepared for each trend in order to characterize rate of drilling, grid success ratio, and the projected number of years needed to find various percentages of remaining reserves of hydrocarbons based on current drilling rates.

From this information, it was possible to identify relatively untested, large scale subbasinal areas which were surrounded by