

Thirty-two species of calcareous nannofossils from 20 genera have been identified from the late Pliocene and early Pleistocene strata of the Louisiana continental shelf. Of these 32 species, 2 are restricted sufficiently to be useful as stratigraphic criteria. The significant occurrences are, the extinction of *Discoaster brouweri* Tan Sin Hok and the first appearance of *Gephyrocapsa caribbeanica* Boudreaux and Hay and these 2 species may be used to define the base of the early Pleistocene marine shale in the north-central Gulf Coast. Other results include: (1) delineation of a phylogenetic series extending from *Coccolithus daronicoides* Black and Barnes in the middle Pliocene section to *Emiliania huxleyi* (Lohmann) in the Holocene, (2) recognition of the co-occurrence of *Ceratolithus cristatus* (Kamptner) and *Ceratolithus rugosus* Bukry and Bramlette in the earliest Pleistocene sediments, (3) extension of the geologic range of *Gephyrocapsa protohuxleyi* McIntyre and *Cricolithus jonesi* Cohen back to the early Pleistocene, and (4) the first reported fossil record of *Homozygosphaera wettsteini* (Kamptner) and *Calyptrorpha oblonga* Lohmann.

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#### DEPOSITION OF COCCOLITHS IN COMPENSATION ZONE OF ATLANTIC OCEAN

Recent coccoliths deposited in the Atlantic Ocean undergo selective dissolution in the calcium carbonate compensation realm, resulting in an increase in the relative proportion of solution-resistant placoliths in the assemblage. Solution of the coccoliths proceeds through gradual selective removal of ultrastructural elements in a sequence characteristic for each taxonomic group.

Selective dissolution of coccoliths allows recognition of 3 zones: (1) a basal dissolution zone termed here the "Mesolytic zone," about 500 m thick, directly overlying the calcium carbonate compensation depth. Sediments in this zone lack planktonic Foraminifera, have a low  $\text{CaCO}_3$  content, and contain a coccolith assemblage of low diversity and composed of solution-resistant species, chiefly placoliths. In the southern and equatorial Atlantic these sediments are bathed by Antarctic bottom waters. (2) The middle Oligolytic zone is in the region from 500 to 1,500 m above the calcium carbonate compensation depth. Sediments contain corroded and fragmental tests of planktonic foraminifers and a coccolith assemblage with abundant resistant species and some corroded, less resistant forms. (3) The upper Eolytic zone extends from about 1,500 m above the calcium carbonate-compensation depth to the calcium carbonate-saturation depth. Sediments contain normal planktonic foraminiferal assemblages and diverse, well- to moderately well-preserved coccoliths, with only a few species showing obvious signs of corrosion.

Selective dissolution with depth removes "tropical" species, so that assemblages deposited at greater depths resemble living assemblages from higher latitudes.

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#### MODERN WELLSITE EVALUATION OF EOCENE WILCOX IN TEXAS

Present exploration efforts in the Eocene Wilcox of Texas are being conducted in areas with varied depositional environments and associated significant changes in sedimentary facies. The facies changes that most affect quantitative log interpretation are sediment size,

sorting, and composition. Variable lithologic fabric and the wide range of connate waters present in the various intervals can cause difficult and unreliable interpretation when applying conventional methods for Sw and productivity analysis.

Supplemental methods are used to (1) locate zones of interest, (2) gain an idea of whether hydrocarbon production can be expected, and (3) provide porosity and saturation information.

Zones of interest are detected by the  $R_{xo}/R_t$  Quick-Look curve as compared to the S.P. curve. Changes in connate water and/or shaliness do not affect this method. Zones so located are then analyzed by using the dual-induction data to verify productivity.

Finally, an  $R_o$  curve is obtained by positioning a density-derived formation-factor curve in water-bearing sands, aided by information gained by the  $R_{xo}/R_t$  Quick-Look curve. This permits verifying the constants needed for water-saturation evaluation. In the pay zones, both porosity and water saturation can be scaled off this overlay.

This simultaneous display for visual analysis, available on the basic resistivity log, provides a convenient way to compare the quality of the zones of interest. The interpretational aids are mutually supplemental and lead to significant improvements in formation evaluation.

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#### GULF COAST EARLY CRETACEOUS NANNOPLANKTON BIOSTRATIGRAPHY—REVIEW

Formal zones have now been proposed for virtually the entire stratigraphic range of nannoplankton. Those for the Late Cretaceous and Cenozoic, though in various states of standardization, are generally applicable. However, the study of Early Cretaceous nannofossils is just emerging from the descriptive state, taxa are becoming stabilized, and attention is being directed to their stratigraphic and geographic distribution patterns. Recently published zonations, based primarily on coccoliths and related forms, are reviewed and evaluated in terms of their practical utility in the subsurface of the Gulf Coast. A state of flux is indicated by the general lack of agreement among these zonal schemes, either in terms of species ranges or in the choice of species by which zones should be defined. These conflicts suggest, in part, that provincialism and perhaps homotaxis are involved. Most of these zonations have been established outside of the Gulf Coast. The practice of defining zonal boundaries by evolutionary appearances renders them difficult to apply to most subsurface samples. Consequently, none of these zonations are entirely satisfactory.

Nannoconids are an important, and someplaces the only, constituent in Gulf Coast Early Cretaceous nannofossil suites. This group represents a remarkable evolutionary lineage consisting of approximately 12 usable species. They are geographically widespread and their occurrence in varied lithofacies suggests that they were less environmentally restricted than many nannoplankton. They apparently are less susceptible to diagenetic destruction than other calcareous microfossils and consistently are recovered from the deepest wells of the region. Although nannoconids themselves do not provide the desired degree of resolution, they are indispensable as a means of establishing a basic biostratigraphic framework which can be augmented by less common occurrences of coccoliths and related nannofossils, as well as other microfossil groups. Despite