

is the relatively high content of particles of less than 1 μ size in the latter.

It is concluded that the observed variations in the texture of the sediments from various environments of the Godavari delta may serve as criteria in the recognition of environments of deposition of a paleodelta.

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AMBIGUITY FUNCTIONS AND CONCEPT OF GEOLOGICAL CORRELATION

A profitable approach to quantitative geology is by identification of the methods currently employed. It is clear, for example, that the intuitive notion of correlation is vastly more general than the mathematical operation of the same name. Most obvious among the differences is the lack of provision for stretching or shrinking of scales during comparison.

The ambiguity function, an elementary extension of cross correlation, includes a scale variable, has a name taken from the parlance of radar engineers, and was devised originally for measuring target velocities or detecting fast-moving targets. Yet these same principles offer an effective means for identifying thinning or thickening stratigraphic sections with the use of well-log characteristics for matching magnetic profiles and following trends, or for estimating dispersion from seismic results.

Other applications will become apparent as the theory is exposed and simple examples studied. The principal accomplishment, however, is to bring the mathematical model of the correlation concept one step closer to the definition implied by actual practice.

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COMPOSITION, STRUCTURE, AND ERODIBILITY OF SUBTIDAL MATS, ABACO, BAHAMAS

In the Rock Harbour Cays, near Little Bahama Bank, the composition and microstructure of widespread, subtidal, sediment-binding, mat communities were examined and described. Mat-bound and unbound sediment surfaces were then subjected *in situ* to flume-created direct currents to test both resistance to erosion and breakdown behavior. The mat was removed by bleach treatment and the flume tests were repeated. The mats consist of algae, diatoms, and arenaceous tubes. Algae and/or tubes provide the resistant framework within which grains accumulate and are bound by mucilaginous secretions plus fine algal filaments. Three mat types were distinguished: a fibrous *Cladophoropsis* mat, a gelatinous *Lyngbya* mat, and an aggregated *Schizothrix* mat. Each mat type eroded in a characteristic manner and sequence dependent on mat composition and microstructure. Areas of intact mat withstood erosion better than irregular or broken surfaces. Mat-bound sediment surfaces withstood current velocities of more than 100 cm/sec, more than five times those required to erode mat-free surfaces. These studies indicate that particle size, sorting, packing, structure, and bedding-plane morphology are influenced by the presence of mats. Thus, consideration of mat communities is important when examining depositional and erosional processes at the sediment-water interface, or when making interpretation from ancient rocks which are the products of these processes.

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PLANKTONIC FORAMINIFERA FROM BASE OF TERTIARY, MILLERS FERRY, ALABAMA

The lower few centimeters of the Tertiary (Pine Barren) above the Cretaceous (Prairie Bluff) at Millers Ferry, Alabama, contains an assemblage of very small planktonic Foraminifera with largest dimensions of less than 100 μ . These foraminifers occur in the basal part of the *Globigerina edita* Zone (= *Globorotalia pseudobulloides* Zone) which corresponds in part to the lowest nannofossil zone of the Tertiary, the *Markalius astroporus* Zone. This assemblage occurs at a level similar to that of the central Apennines where Lüterbacher and Premoli Silva described a thin zone, named the *Globigerina eugubina* Zone, of very small planktonic Foraminifera.

A scanning electron-microscope study of the Alabama fossils suggests an evolutionary relation to species of the *Globigerina edita* Zone and to certain Cretaceous species. The Tertiary genera *Chiloguembelina* and *Globoconusa* appear morphologically close to *Guembelitra cretacea* Cushman of the Cretaceous, whose distribution in Cretaceous strata suggests that it was benthonic or had only a partly planktonic life stage. The Cretaceous planktonic species *Hedbergella monmouthensis* (Olsson) has morphologic characteristics similar to those of *Globigerina edita* Subbotina and also seems to be linked phylogenetically to *Globorotalia pseudobulloides* Plummer).

Perhaps the most significant evolutionary change that occurred in Cenozoic Globigerinacea is the modification of the outer bilamellid layers and the appearance of crustlike deposits of calcite in adult forms. These changes are viewed as adaptations to more efficient use of the water column including, perhaps for the first time, use of mesopelagic zone.

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SIGNIFICANCE OF PALYNOFORMS AS SEDIMENTATION INDICATORS IN CRETACEOUS STRAIGHT CLIFFS SANDSTONE, UTAH

Palynomorphs, which are abundant in maceration residues of many fine-grained clastic rocks, commonly include spore and pollen exines, waxy cuticles, resinous bodies, and vitrified and fusinized material which is incorporated with mineral grains in sediments. Differences in occurrence and relative abundance of the palynomorphs may be attributed to differential response of the particles to transport and sedimentation because of these parameters: (1) size: range from silt to fine sand; (2) shape: spheroidal, ovoidal, irregular, tabular, platy, or bladdered; (3) specific gravity: range from about 1.2 to 1.6.

Interpretation of the sedimentary environment of the Upper Cretaceous Straight Cliffs Sandstone is based on application of results of studies of the palylogy of several modern sedimentary areas, specifically by comparison of fossil and modern palynomorph residues. The following patterns are indicated for the paralic Straight Cliffs Sandstone:

1. In nearshore neritic beds, species of displaced terrigenous plants are numerous, marine microplankton abundant, resinous bodies and cuticles less abundant, and sorting poor. Apparently, once carried into the site of deposition, organic particles were winnowed little by offshore currents.