

venting downward percolation of fresh waters during periods of exposure and erosion in younger, overlying strata.

The transection of stylolites indicates that dolomitization took place at moderate depths of burial, from 500 to 1,000 m or greater.

The only fluids available for dolomitization during intermediate burial were subsurface brines released from adjacent and underlying compacting strata, a model first proposed by L. V. Illing. Detailed information on the diagenetic and geologic histories is needed before the origin of secondary dolomites can be interpreted widely.

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Dissolved Hydrocarbons in Coastal Waters of North America

No abstract available.

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Coorong Model for Penecontemporaneous Dolomite Formation in Middle Proterozoic McArthur Group, Northern Territory, Australia

Many types of penecontemporaneous dolomites have been explained in the literature by involving the well-known sabkha model. The various carbonates now precipitating in the ephemeral lakes of the South Australian Coorong Lagoon are the products of a more humid climatic and hydrologic regime. The distribution of carbonate rocks in the Coorong region is largely controlled by the hydrology of the depositional environment. Both primary and early diagenetic mineralogy can be related to regional hydrology as it has varied throughout the Quaternary. Characteristic sedimentary structures (including stromatolites) are formed in specific parts of the Coorong system, and these can be confidently identified in an ancient analogue, the 1,600-m.y.-old Yalco Formation of the McArthur Group of Australia. The resemblance between the ancient and modern environments, in terms of both sedimentary structures and mineralogy, is striking. The following conclusions can be drawn from the comparison:

1. All penecontemporaneous dolomites are not necessarily formed in an arid sabkha environment; a significant number may be formed in a more humid environment analogous to that of the Coorong, in which distinct climatic and seasonal factors prevail.

2. The lack of evaporite minerals or evaporitic casts in an ancient dolomite sequence does not mean that concentrated brines were never present. In the modern Coorong system, minor evaporite minerals are precipitated in the dolomite lakes during dry summer months, but are flushed out during winter by a reflux mechanism.

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Seismic Facies and Depositional Processes of Modern Off-Platform Carbonate Rocks in Northern Bahamas

Seismic facies analyses of more than 1,200 km of high-resolution air-gun seismic reflection profiles, combined with sedimentologic data from 150 bottom samples, and observations from submersibles, have resulted in correlation of reflection patterns with sedimentary facies for various off-platform carbonate environments in the northern Bahamas. Divergent to oblique progradational reflection patterns have been recorded from large (100 km × 50 km × 600 m) carbonate-sediment drifts of well-sorted fine sands off the northwest corners of both Little (LBB) and Great Bahama Bank (GBB). These drifts have been constructed since the middle Miocene by contour-following near-bottom flow of the Florida Current with velocities of up to 50 cm/sec and greater. Discontinuous subbottom reflections were observed at the base of the slope south of LBB and were found to correlate with proximal turbidites. An even, parallel, continuous subbottom reflection pattern is typical of basinal areas of pelagic oozes, deposited uniformly over wide areas, interbedded with thin, distal turbidites.

Large-scale (1 to 5 km across) mounded, chaotic to contorted-discordant reflection patterns were observed predominately on the upper slope south of LBB and appear to be indicative of large slumps. Smaller scale (less than 0.5 km across), mounded, chaotic reflection patterns, however, were found to correlate with in-situ constructional deep-water bioherms (lithoherms) found at the base of the slope west of LBB. Chaotic reflection patterns are common on upper slopes and are interpreted as a highly variable sediment gravity-flow and slump facies. Lenses of wavy, subparallel, chaotic reflectors found on the slope north of GBB are interpreted as channelized debris-flow deposits.

Recognition of similar reflection patterns from ancient off-platform limestone sequences may be useful in the seismic stratigraphic interpretations of paleo-environments and lithofacies.

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Application of Potential Field Data to Structural Interpretations in Idaho-Wyoming Thrust Belt

The integration of gravity and magnetic data is used to aid the determination of the structural configuration along a regional profile in the Idaho-Wyoming thrust belt. The magnetic data can be used for depth estimations of the crystalline basement. At the eastern limit of the thrust belt, the crystalline basement is conformable with the overlying autochthonous sediments. In this area, the magnetic data suggest that basement structures are present beneath the leading thrust sheet and thereby provide an attractive potential for hydrocarbon accumulation. Toward the west, the leading thrust cuts down to the basement so that structures indicated by the magnetic data are essentially of the basal decollement. Seismic data indicate that the allochthonous sediments above the decollement are essentially concordant with the basement; therefore, structures determined by

magnetics in this area can also be considered prospective.

A preliminary geologic cross section is constructed using an integration of surface geology, well control, and seismic and magnetic data. Two-dimensional gravity profiles of the geologic cross section are computed and compared with the observed gravity. The interpreted subsurface geology is then modified to improve the match between the calculated gravity and the observed gravity while retaining the constraints imposed by the seismic and magnetic data.

The results of this study illustrate that potential field data can be a useful tool when integrated with available information. Use of these data provides an improved determination of the structural geology in the Idaho-Wyoming thrust belt, and provides attractive leads which ordinarily would be followed by seismic surveys. However, in this particular modeling study, the gravity data do not directly yield prospects, although they do yield an improved interpretation of the structural geology which is compatible with all other available data.

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Dispersal of Fine-Grained Sediment in Strongly Stratified Coastal-Boundary Layer

An investigation of the relation between dynamic oceanography and the dispersal of fine-grained sediment has been conducted on the unusually broad (100 to 250 km) and shallow (20 to 30 m) Mosquito Bank (Cayos Miskitos), off the east coast of Nicaragua. Exceedingly high rainfall (500 cm/year) on the coastal watersheds supplies enormous quantities of fresh water and suspended sediment to the nearshore area. A dynamic balance between the density and water-slope pressure-gradient forces, the Coriolis forces, the forces of internal friction, and the spatial acceleration of the water parcels produces a very distinct, turbid, brackish coastal-boundary layer (CBL). The dynamics are such that this CBL is dominated by a coastal jet 20 to 30 km wide, with a velocity of 50 to 70 cm/sec predominantly alongshore. Owing to the steadiness of the local trade winds, the jet appears to be a persistent feature, thereby minimizing large-scale exchanges with the shelf water beyond the CBL. Data on both suspended and bottom sediment clearly show the overriding influence of CBL dynamics on sediment dispersal. Despite the enormous input of terrigenous material brought to the shelf of about 25×10^6 m³/year (five times more than is delivered to the entire U.S. Atlantic Coast), fine-grained sediments are distinctly confined to the vicinity of the CBL.

The vast expanse of this shallow bank outside the CBL, essentially free of terrigenous sedimentation, has developed into a suite of carbonate environments. Environments grade seaward from a relatively flat depositional plane dominated by *Halimeda*-rich aragonitic muds to a mid-shelf and outer-shelf zone of island-flank platforms and topographic highs associated with coral-algal reefs. Likewise, the bank-edge escarpment displays rough bottom conditions typical of reef development.

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Stratigraphic Correlation of Keathley Anomaly, Magnetostratigraphy of Tunisia

A magnetostratigraphic study of upper Mesozoic limestone sections in northeastern Tunisia combined with a study of existing radiometric data leads to a slight modification in the correlation of the marine magnetic anomaly sequence with the biostratigraphic scale. The base of the Keathley sequence (M25) lies in the upper Oxfordian with M22 being within the lower Kimmeridgian. The upper part of the section studied (uppermost Campanian-Maestrichtian) matches with data from previous studies. There is a tentative suggestion that the Cretaceous quiet interval, from 77 to 112 m.y.B.P., may contain a number of reversals of short duration. The nature of our samples prevents verification of this. The geomagnetic pole position for the Upper Jurassic is 62.0S 15.9E $A_{95} = 7.9$.

The ammonitico rosso sections suggest correlation which implies that although reduced in thickness there are no major lacunae in the sections.

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Subsurface Stratigraphy of Upper Devonian Clastics in Southern West Virginia

Studies of Upper Devonian shales and siltstones in southern West Virginia have resulted in a refinement of the stratigraphic framework used in characterizing the gas-producing "Devonian shales." Gamma-ray log correlation around the periphery of the Appalachian basin has extended the usage of New York stratigraphic nomenclature for the interval between the base of the Dunkirk shale and the top of the Tully Limestone to southern West Virginia. Equivalents of the Dunkirk shale and younger rocks of New York are recognized in southwestern West Virginia and are named according to Ohio usage.

Gas production is primarily from the basal black shale member of the Ohio Shale. Gas shows from older black shale units (Rhinestreet and Marcellus shales) are recorded from wells east of the major producing trend. Provided suitable stimulation techniques can be developed, these older and deeper black shales may prove to be another potential gas resource.

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Characterization of Rock Mineral and Pore Space Properties for Proper Reservoir Description and Formation Evaluation, Gulf Coast

No abstract available.

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Carbonate Facies Variation on Guadalupian Shelf Crest (Upper Yates and Lower Tansill Formations), Guadalupe Mountains, New Mexico