to low Mg-calcites forming an unusual radiaxial texture observed in the coarse to very coarsely crystalline, bladed, calcite cement. Evidence of their marine origin consists of a relative 1 mole % Mg^{++} memory, a marine-like isotopic character ($\delta^{18}O \approx -2.5$ and $\delta^{13}C \approx +2.0$), and early relative timing of precipitation. Diagenetic alteration of these carbonate sediments by the interaction with meteoric water in lenses that formed within topographic highs along the shelf margin changed the initial marine chemical, isotopic, and textural character of the sediments. Secondary porosity formation, mineral stabilization, aggrading neomorphism, and equant spar calcite cementation are the important products of meteoric diagenesis. The equant spar calcite cements make up approximately 16% by volume of the limestones studied. They are iron and manganese poor. The majority have a $\delta^{13}C$ composition which falls in the range of modern marine carbonates, i.e., 0.9 to +3.5‰. The $\delta^{18}O$ compositions range from −1.3 to −6.6‰ relative to the PDB standard. Oxygen stable isotopic and petrographic data suggest that over 50% of the equant spar calcite cements were formed in a near-surface meteoric environment. A large percentage of the remaining equant spar calcite cements formed at shallow burial depths in a water-limited system where mass transfer was dominated by diffusional processes. Thermally induced $\delta^{18}O$ depletion of the equant spar calcites, indicating significant fluid flow, was of minimal importance. Pyrobitumen pore fillings and inclusions in the outer 1.0 mm-thick rims of the very coarsely crystalline, equant spar calcite cements indicate that only minor amounts of cementation have occurred since the introduction of hydrocarbons. Deep burial diagenesis (i.e., post-hydrocarbon migration) consisted of the precipitation of minor amounts of galena, fluorite, and Sr^{++}-rich equant spar calcites. These diagenetic products can be directly related to the present-day formation water.

The chemical, isotopic, and textural characteristics of the Stuart City trend limestones contain the imprints of their initial marine composition and shallow diagenetic alterations in a hydrodynamic system. Burial diagenesis has not significantly altered these limestones. Fault and fracture control on the movement of formation waters in this system determine the location and intensity of late stage diagenetic events.

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Ocean Margin Drilling Project Data Synthesis off Eastern North America: 34° to 41° N Latitude

An atlas of geological and geophysical maps has been compiled for the east coast of the North American continent covering an area from well onshore to the ocean crust, and from 34° to 41°N as part of the Ocean Margin Drilling Project.

Included in the atlas are maps of the depth to continental and oceanic basement, depth to the top of Lower and Middle Jurassic (reflectors J_M/J_3 and J_S/J_2), to the top of Jurassic (reflectors J/J_1), to the top of Neocomian (reflector Beta), to the top of Cretaceous (reflector A*), to the top of Paleogene (reflector A_u), and to the top of lower Miocene (reflector X). Isopach maps between these reflectors and between them and the sea floor are also included. Contours are two-way traveltime with a contour interval of 0.25 to 1 sec.

The atlas also contains a tectonic map of basement, a pre-Quaternary geologic map, and lithofacies maps for six time slices.

There are geophysical maps of magnetic and gravity anomalies and compressional wave velocities in sediments and basement.

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A Synthesis of Marine Geological/Geophysical Data for Ocean Margin Drilling on Continental Margin of Morocco

The continental margin of Morocco represents the conjugate segment to the North American margin south of Nova Scotia. The total sedimentary cover in the continental margin province is considerably thinner off Morocco than it is off the east coast of North America. Further, selected portions of the Morocco continental margin have undergone major tectonics, either exposing or bringing near the surface older elements of the stratigraphic section. Thus, scientific objectives requiring sampling of the earliest drift phase sediments, the oldest oceanic crust, and the basement rocks in the ocean-continental transition zone can be more easily addressed off Morocco than off North America.

We have recently compiled a synthesis of marine geological/geophysical data for the offshore regions bordering the continental margin of Morocco. The synthesis was undertaken in order to evaluate future scientific deep-sea drill sites. The final product of the synthesis is a set of maps on Mercator projection for the area 29° to 35°N, 5° to 22°W. The maps include: bathymetry contours, free-air gravity anomaly contours, total intensity magnetic anomalies plotted normal to the ship's tracks, seismic velocity crustal structure, reflection time to basement, blue reflector (upper Jurassic) and red reflector (upper Cretaceous), isopach (in seconds of two-way reflection time) of sea floor to basement, sea floor to blue reflector, sea floor to red reflector, and blue reflector to red reflector, locations of surface sediment samples, hazards, and tectonics. In addition, seismic crustal sections from the nearshore across the disturbed piercement structure province to the deep ocean floor have been compiled.

Our synthesis reveals that the continental margin of Morocco consists of several unique segments. A dominant structural unit is the NNE-SSW-trending zone of salt diapirs and piercement structures observed on the continental shelf and slope. The salt is presumed to be of Late Triassic to Early Jurassic age. A prominent magnetic anomaly which may represent a magnetic edge effect anomaly can be traced along most of the western boundary of the Moroccan diapiric zone. On the conjugate continental margin south of Nova Scotia, a diapir zone is also observed. The seaward edges of the Moroccan and eastern North American diapiric zones match very well in pre-drift reconstructions, thus suggesting that before the separation of the African and North American plates a single evaporite basin existed. The magnetic and seismic data suggest that the seaward boundaries of the piercement fields mark the likely boundary between oceanic and continental basement.

The westernmost portion of the synthesis area is characterized by the well-defined Mesozoic sequence of magnetic anomalies from M0 (≅108 m.y.B.P.) to M25 (≅152 m.y.B.P.). These anomalies are situated on seismically observed oceanic crust formed by sea-floor-spreading processes. Between the seaward edge of the diapiric zone and magnetic anomaly M25 we observe a broad structural arch beneath which our single-channel seismic records in general fail to resolve the underlying basement. This is the region of the Jurassic magnetic quiet zone.