volume versus production histories and will influence pattern alignment and well spacing.

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Quaternary Eustatic Sedimentary Accretion of Southern Bahamas Archpelago

Surficial geologic mapping indicates that the southern half of the Bahamas Archipelago is forming by the accretion of discrete depositional sequences resulting from successive eustatic sea level changes: (1) multiple beach and dune ridges, (2) estuarine, (3) lacustrine, (4) shallow subtidal, (5) reef and reef rubble, and (6) megadune complexes. The lithologies are accreted along unconformable erosional-solutional contacts—marine terraces and subaerial caliche crusts. During periods of significant transgression, sequences 1-5 are accreted. Sediments are predominantly skeletal and peloid. During periods of significant regression, megadune complexes are accreted. Ooids are the dominant sediment.

Erosional-solutional features reflect areas of subaerial exposure and/or coastline erosion. Terraces at 10, 20, and 40 ft elevations are preserved along arid eastern Great Inagua Island. The calichification of Bahamian Quaternary carbonates has concentrated insoluble residues (quartz, feldspar, heavy minerals, crandallite, micrometeorites). Insoluble residue analysis provides a basis for the correlation of accreted eustatic sedimentary sequences.

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Potential Geologic Hazards of North Aleutian Shelf, Bristol Bay, Alaska

Federal OSC lease sale 92, North Aleutian shelf, Alaska, is scheduled for April 1985. The area, located in the southeastern Bering Sea, has 3 basins with sedimentary thicknesses in excess of 4 km.

Six geologic conditions that could cause problems during petroleum development are: (1) seismicity, (2) recent faulting, (3) gas-charged sediment, (4) bed forms and active sediment transport, (5) scours, and (6) volcanism.

Since 1953, the region has a history of at least 10 shallow earthquakes, including a 1971 back-arc event with a Richter magnitude of 5.2. The largest event impacting the entire region, a Richter magnitude 8.7 earthquake, occurred in 1938. Normal faults are located along the southern edge of the St. George basin, and on the northeastern edge of the Amak basin. Many exhibit increased offset with depth, surficial sags, and small surficial cracks. Surprising was the absence of any evidence of sea-floor sediment instability. "Sonar bright spots," and possible, near-surface gas-charged sediment occur west of Amak Island and north of Unimak Island. An area of megaripples and dunes covers more than 1,500 km^2. Bed forms have spacings of 20-50 m and heights of 1-3 m. Observations suggest that coarse sand may be actively transported. Thousands of scours, many linear and parallel, some greater than 800 m long, 250 m wide, and incised up to 5 m, were identified. Pavlof, an Alaskan Peninsula active volcano, located 45 km northeast of Cold Bay, has a continuous history of steam release and occasional eruption. Lahars, nuée ardentes, and other volcanogenic activities are possible, but their probabilities are unknown. None of the geologic conditions identified precludes petroleum development or production. The potential impact of these factors must, however, be included in planning for future petroleum activities.

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Shelf Storm-Deposited Sandstones, Upper Mancos Shale, San Juan Basin, New Mexico

Hummocky cross-stratified and amalgamated sandstone beds in the upper Mancos Shale of the San Juan basin record sedimentation on a storm-dominated shelf. Interbedded silty shale, siltstone, and sandstone form coarsening-upward cycles in Mancos shelf deposits. Abundance of cycles suggests storms were frequent, and preservation potential of shelf storm deposits is high.

Mancos storm beds typically have an erosional base with tool marks, and planar laminations overlain by hummocky cross-stratification (HCS). HCS comprises 20-90% of the primary sedimentary structures in these beds. Wave-ripple lamination commonly overlies HCS in ≤2-m thick beds high in the section. Less commonly, wave ripples overlie planar lamination in some thinner beds (5-15 cm) low in the section. In comparison, planar lamination commonly overlies HCS in storm sequences. Paleoflow trends are northeast to southwest, normal to presumed regional paleoshoreline.

Distal to proximal changes in the beds are seen in vertical section. Increases in sand to shale ratio, amagamated beds, abundance of sole marks, average grain size (from 0.05 to 0.125 mm), and wavelength of HCS are seen upsection. Bioturbation of beds decreases upsection. These trends reflect progressive shoaling of the Mancos shelf.

Upward-coarsening interbedded silty shale, siltstone, and sandstone intervals comprise the bulk of upper Mancos shelf deposits. A hummocky storm bed 30-100 cm thick caps each cycle, and contact with the overlying interval is sharp. Contact with the overlying Point Lookout shoreface sandstone is abrupt. The cycles indicate that episodic storm sedimentation characterized the Santonian-Campanian shelf in the study area.

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Upper Jurassic of East Texas, a Stratigraphic Sedimentologic Reevaluation

The Smackover-Haynesville of east Texas has long been modeled as a simple progradational carbonate-evaporite ramp. Recent data indicate that the conventional ramp model for this sequence should be abandoned in favor of an evolving rimmed shelf to platform model, forming in response to changes in rate of relative sea level rise during the Late Jurassic. Evidence for Smackover-Haynesville shelves include: (1) thick high-energy carbonates along the basin margin in the Smackover and throughout the Haynesville, (2) low-energy pellet-dominated lagoonal carbonates, evaporites, and evaporitic siliciclastics occurring landward of, and interfingering with, the Smackover and Haynesville basin-margin carbonate barriers, (3) deeper water, open-marine low-energy limestones with black shales seaward of the basin-margin barriers (Smackover-Gilmer undifferentiated), and (4) the Gilmer shale forms a siliciclastic wedge seaward of the Haynesville basin margin and its zero isopach defines the Kimmeridgian shelf margin. The Smackover and Haynesville seem to represent 2 distinct sedimentologic cycles, with each cycle reflecting an initial relative sea level rise during which a rimmed shelf and lagoon are developed, and a terminal sea level standstill during which the shelf evolved into a high-energy platform. Although these sedimentologic patterns seem compatible with accepted Jurassic sea level curves, they may also reflect differential basin-margin subsidence combined with variable carbonate production rates. Finally, the shelf-platform model more clearly defines future exploration strategies for Smackover-Haynesville targets in east Texas and perhaps across the Gulf of Mexico, if eustatic sea level changes were the dominant causative factor for shelf development in the Late Jurassic.

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Organic Facies and Petroleum Potential of Eastern North American Margin

Sufficient data now exist to permit reconstruction of the organic facies for Late Jurassic and middle Cretaceous times when the potential for source rock deposition was greatest on the eastern margin of North America. Three distinct and one mixed organic facies have been mapped for these 2 geologic intervals: facies B (oil-prone) amorphous organic material plus alginite and exinite deposited under marine anoxic conditions, facies C (gas-prone) terrestrial plant debris deposited in mildly oxic environments, facies B-C (waxy oils and gas condensate) mixed facies, and facies D (nonsource) degraded and/or recycled organic material.

Distribution of the Late Jurassic organic facies was greatly influenced by the relatively arid subtropical climate and the shelf-edge carbonate