deposition and dewatering. Deposits above the basal sand accumulated in broad, anastomosing channels 10 to 15 m deep with variegated fill; some still contain sand and conglomerate, but most were evacuated and filled with lower energy thin-bedded sands and muds or massive hemipelagic muds, indicating significant volumes of bypassed sand.

At the base of slope, a major 100-m deep leveed channel was floored with conglomerates and large canyon-wall clasts, and filled with massive to convoluted sandstone. The channel fed a system of shallow, crosscutting, conglomeratic channels, interpreted as inner fan that extended into the canyon mouth.

Paleobathymetric relief exhibited across this ancient shelf break is minimally 600 m (outer shelf to mid-bathyal or deeper) within a lateral outcrop distance of 3,000 m.

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Comparison of Eogenetic and Mesogenetic Porosity-Diagenetic Trends in Deeply-Buried Limestone Reservoir in West Texas

Stratigraphically trapped gaseous hydrocarbons occur in porous limestones of Atokan (Middle Pennsylvanian) age in the Chapman Deep field, along the northern shelf edge of the Delaware basin in Reeves County, Texas. These rocks were deposited as a shallow-water mosaic of cyclic algal bioherms, grainstone shoals, and low-energy interbank facies. A relatively uninterrupted sequence of porosity evolution related to early and burial diagenesis is recognized in these rocks. Syndepositional subaerial exposure resulted in the formation of a secondary pore system, including biomolds, non-fabric-selective vugs and channels, and solution-enlarged fractures. However, most of this porosity was occluded rapidly in the vadose and phreatic environments by calcite cementation, dolomitization, and internal sedimentation. Progressive burial to minimum depths of 13,000 ft (3,962 m) was accompanied by bulk-volume reduction via physical and chemical compaction. However, simultaneous fabric-selective dissolution rejuvenated a pore system of relatively low permeability which, enhanced by natural fractures and the presence of open stylolites, comprises the principal reservoirs in the field. Pore types include ooid and cement-solution molds; although not recognized in these rocks, burial-solution channels and vugs are reported to be relatively abundant in Smackover carbonates of the Gulf Coast region. Such tertiary porosity is easily misinterpreted as of meteoric origin, and its occurrence attests to a possible parallel evolution of eogenetic and burial-diagenetic processes and products.

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Tectonic Effects on Meandering River Deposits, Carboniferous, Nova Scotia, Canada

Sediments of the Boss Point, Port Hood, and Parrsboro Formations (Carboniferous) of Nova Scotia were deposited on alluvial plains in tectonically active basins bounded by strike-slip faults. Some basins contain over 1 km of strata of this age. Fining-upward fluvial channel sandstones are about 20 m thick and are composed of a vertical sequence of basal conglomerate, trough cross-beds, ripple lamination, and siltstone. Large-scale lateral accretion surfaces are present and the sandstones are interpreted as meandering river deposits. Flood-plain sediments include crevasse splay sandstones, rooted mudrocks, thin coals, and lacustrine deposits.

The channel sandstones are stacked vertically and many form thick sandstone packages. One 1-km thick sequence, for example, consists of over 75% channel sandstone. There are similarly thick, laterally equivalent, sequences of flood-plain sediment with few or no channel sandstones. It appears, therefore, that meander belts were restricted in their positions for long periods, allowing the unusually thick sequences of channel and coeval overbank sediment to accumulate. The variation from the classic meander-belt model, in which avulsion randomly distributes the meander belts across the alluvial plain through time, was presumably due to differential subsidence rates which caused the meander belts to be restricted to the areas of higher subsidence, thus retarding avulsion frequency.

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Depositional Model of Sand-Dominated Mesotidal Estuary

Depositional environments were surveyed in a large sand-dominated estuary on the south-central South Carolina coast. The estuarine system is characterized by abrupt lateral variations in sediment texture, composition, and physical and biogenic sedimentary structures. Sand-dominated intertidal environments include point bars, ebb sand spits trailing seaward from marsh headlands, tidal sand ridges, and sandy tidal flats. Morphologically, point bars, trailing spits, and tidal ridges are in a continuum of linear to sinuous depositional forms 1 to 3 km long.

An idealized vertical section through these sand bodies is a fining upward sequence beginning with channel lags of coarse sand and gravel followed by interbedded and bioturbated sands and muds interpreted as channel-fill deposits. A gradation between high-angle, large-scale cross-bedding and low-angle, small-scale cross-beds is typical of bar platform and vertical accretion bar sands. Capping the sequence are muddy sands to laminated muds grading into salt-marsh deposits.

Sand flats that prograde from marsh islands typically display a fining-upward trend beginning with shell material concentrated in medium to coarse sand where high-angle cross-bedding is the dominant sedimentary structure. In the upper part of the tidal-flat sequence, biogenic structures increase and disrupt low-angle, small-scale cross-bedding. Wave-deposited laminated sands, capped by rooted, bioturbated marsh muds, top the idealized sequence. Delta-like deposits within the estuary are morphologically gradational between tidal-sand ridges and true flood-tidal deltas and include physical and biogenic structures common to both.

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Nonmarine Carbonates of Neogene Lake Idaho in Utah

Nonmarine carbonate sequences are not well known in Neogene rocks. Best known, perhaps, are two lacustrine sequences recently described in the Pliocene of western North America. One, in the Ridge Basin of southern California, contains numerous beds about one meter thick of stromatolitic and oolitic limestone interbedded with non-carbonate clastic rocks. The other, in southern Idaho, is the Glenns Ferry oolite, a 10-m thick carbonate sand unit exposed for 45 km along the western margin of the Snake River Plain. The latter unit is a deposit of the extensive Miocene-Pliocene lake system called Lake Idaho, and is considered the largest freshwater lacustrine oolitic carbonate sequence known in the rock record. New