voirs has stimulated detailed analysis of the generation and occlusion of porosity in these rocks. Porosities, which may exceed 45%, reflect conditions of sedimentation and subsequent diagenesis. Sedimentation rate, a function of skeletal productivity and dissolution within the water column, influences cementation at the seafloor. Intraparticle porosity is relatively rare and is found primarily within foraminiferal tests. The more abundant primary interparticle porosity is imprinted during deposition, and reflects calcareous nannofossil preservation. Highest porosities are characteristic of zones containing relatively well-preserved nannofossils. Porosity in chalk may be secondarily enhanced by fracturing.

Initial porosity is reduced by mechanical compaction (dewatering), by solution-transfer of calcite, by growth of authigenic clays, and by precipitation of silica on skeletal elements. These siliceous coatings and locally abundant chert nodules are interpreted as products of remobilization of biogenic opal. Although these observations and interpretations are based on North Sea chalk reservoirs, exploration in frontier areas should reveal chalks with similar features and comparable reservoir potential.

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Sedimentation in Mississippi Trough, Gulf of Mexico

Interpretation of high-resolution seismic data indicates that the Mississippi Trough was eroded, and then partially filled, by submarine gravity flows. These flows occurred primarily during late Quaternary stages of lowered sea level. Present-day mass transport appears to be a combination of seafloor creep and low-velocity turbid-layer flow.

An acoustically chaotic seismic facies characterizes the deeper parts of the trough fill. Visible reflectors are discontinuous, wavy, and subparallel; they commonly disappear into almost reflectorless, seismically homogeneous units. Sediments deposited lateral to the chaotic facies are commonly composed of continuous, parallel reflectors. These strong reflecting units were deposited as onlapping fill and ponded sediments, and many are confined to semienclosed depressions within the trough walls. These various seismic-facies units represent the "freezing-in" stage of submarine-canyon sedimentation, and may result from separate submarine debris flows. The deposits of the Mississippi Trough debris flows are fine-grained sediments generated by mass failures of oversteepened deposits which occurred at the mouth of the ancestral Mississippi River. High-energy gravity flows thoroughly mixed the depositional material, leaving little bedding to produce coherent seismic-reflector patterns. Debris flows generated lower velocity gravity flows, which moved independently and lateral to the main flows. The onlapping fill deposits and sediment ponding were deposited by lower velocity flows.

Recent sediments, which were sampled by piston coring along the axis of the trough, are rapidly deposited, hemipelagic, olive-gray silty clays. Sedimentary structures are limited to scattered, very thin laminae and thin beds. Clay sedimentation has been continuous during the late Quaternary, as is revealed by the clays containing mixtures of indigenous planktonic Foraminifera, displaced shallow-water microfauna, and terrigenous mineral grains.

Large diapirs controlled the position and flow direction of the main erosional channel. Small feeder channels were eroded into the walls of the trough. Trough-wall sediments cover a steep erosional escarpment; they have moved downslope by slump and creep failure. An isopach map of the canyon fill, above erosional surfaces, outlines a linear channel-fill deposit.

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Gamma-Ray Spectral Logging Data Assist in Geologic Studies

Natural gamma-ray spectral logging in open and in older, already cased wellbores has a broad problem-solving capability in evaluation of clastics, carbonate rocks, evaporites, and igneous formations.

Geologic application of such gamma-ray spectral data on a qualitative basis includes detailed stratigraphic correlation, identification of rock types, presence of secondary porosity and natural fracture systems, recognition of the depositional environment and source-rock potential of shales, location of watered-out intervals in reservoirs under enhanced recovery, etc; and on a qualitative basis, the determination of reservoir shaliness, in-situ potash concentration, etc.

Basically, natural gamma-ray spectral logging techniques yield a calibrated, continuous record of the total natural gamma-ray radioactivity and the individual potassium, uranium, and thorium content of subsurface formation as illustrated by field studies from the United States, the North Sea area, South America, and the Middle East.

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Videotapes of Active Primary Physical and Biogenic Sedimentary Structures of Epicontinental Shelf, Northern Bering Sea

Videotapes from 23 camera stations in the northern Bering Sea provide a unique view of the formation and modification of primary sedimentary structures in the marine environment. The study area is a shallow-water (<35 m) ridge and swale terrane located west of Seward Peninsula and south of Bering Strait, Alaska. Strong, north-flowing, unidirectional currents of Alaskan coastal water dominate the region. Ancillary information collected at each station includes bottom samples, surface-to-bottom current-meter and light-transmission data, and high-resolution seismic reflection and side-scan sonar records.

Ridges exhibit 5 to 10 m of relief and are mantled by fine to medium, moderately well-sorted detrital sand. Bed forms observed on ridge crests and flanks include wave and current ripples and two populations of sand waves ($\lambda \cong 15$ m and $\lambda \cong 200$ m). Videotapes recorded atop sand ridges show modification of ripples in response to oscillatory bottom currents. Observations of