section. With different depositional units readily distinguishable in such a display, a clearer understanding can be obtained of the represented depositional environment. Further, well-to-well correlation is easier to make.

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Morphology of Central California Continental Margin, Revealed by Long-Range Side-Scan Sonar (GLORIA)

Leg 2 of the 4-leg USGS EEZ-SCAN 84 program used GLORIA long-range side-scan sonar to survey the region from Pt. Conception to just south of Pt. Arena, from the shelf break to the 200-nmi coverage. The overlapping digital sonographs were slant-range and anamorphically corrected, and a photomosaic of the sonographs was constructed at a scale of 1:375,000 (1 in. = 11.1 km).

The underlying bed rock appears to be an important control in shaping the morphology of this margin. Several faults have sea-floor expression and lie subparallel to the margin. The density of canyons and gullies on the slope varies from south to north, probably because of variations in the characteristics of the bed rock. The slope west of San Francisco is the most dissected segment of the central California slope.

Monterey Fan is covered by large-scale bed forms (5-15 m amplitude and 1.5-2.0 km wavelength) over much of its surface. Monterey channel crosses southwestward across the fan, but abruptly turns south along a 40-km long surface fault that coincides with a well-mapped meander loop. The channel loops to the north then turns southward crossing the entire Monterey Fan and, at its distal reach, changes to a broad, braided pattern. Major slumps on the margin have long (> 30 km) scarps, some have slump folds, and one has a debris-flow deposit that can be acoustically traced for more than 75 km.

Seventeen new seamounts were mapped. Taney Seamounts are large, rimmed, calderas with diameters of about 15 km each; these appear to be very large explosive or summit-collapse features.

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Prolific Overton Field Gas Reservoirs Within Large Transverse Oolite Shoals, Upper Jurassic Haynesville, Eastern Margin East Texas Basin

Late Triassic rifting along a northeast-southwest spreading center in east Texas resulted in basement highs along the eastern margin of the East Texas basin that became sites of extensive ooid shoal deposition during Late Jurassic time. Reservoirs within oolite facies at Overton field contain over 1 tcf of natural gas. These large shoals, each approximately 15 mi (24 km) long and 3 mi (4.8 km) wide, trend north-south as a group and northeast-southwest individually. They are oblique to the basin margin but parallel with Jurassic diffracted tidal currents within the East Texas embayment. Modern Bahamian ooid shoals of similar size, trend, and depositional setting occur at the terminus of the deep Tongue-Of-The-Ocean platform reentrant. Overton field reservoirs are in ooid grainstone shoal facies and in transitional shoal margins of skeletal-oolitic-peloidal grainstones and packstones. Adjacent nonreservoir facies are peloidal-skeletal-siliciclastic wackestones and mudstones.

Early diagenesis of grainstone reservoir facies included meteoric dissolution and grain stabilization, resulting in abundant "chalky" intraparticle porosity and equant and bladed calcite cements filling interparticle porosity. Subsequent burial diagenesis resulted in intense solution compaction and coarse equant calcite and saddle crystal dolomite that occluded remaining interparticle porosity. Whole-rock trace element analysis indicates greatest diagenetic flushing (less magnesium, strontium) in porous zones. Stable isotopes for grains and cements show strong overprint of later burial diagenesis, with greater depletion of $\delta^{18}O$ in reservoir facies. However, hydrocarbons were emplaced prior to late cementation, and unlike other Jurassic Gulf Coast reservoirs, deep burial diagenesis provided no late-stage formation of porosity.

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Gas Monitoring During Drilling Substantiates Hydrogen Occurrence and Eliminates Corrosion as Source

Chromatograms from the simultaneous use of 2 gas "sniffers," one monitoring hydrocarbon gases and one monitoring H_2, while drilling 5 uncased exploratory bore holes in Paleozoic rocks in Kansas substantiates that H_2/N_2-rich gas emissions are from the sedimentary rocks above the Central North American rift system and are not the result of corrosion of casing pipe. The gases extend over an area of more than 100 mi^2, within which they appear to be migrating through formation waters along permeable zones at the silty to sandy base of pyritic shales. H_2 was detected in various zones from ± 500 ft depth in the Indian Cave Sandstone (Pennsylvanian) to depths of 2,100 ft in the Hunton Limestone (Silurian-Devonian). Negative peaks (noncombustible), which overlapped the H_2 positive peaks on the Wheatstone Bridge chromatograms, are thought to indicate N_2 gas. Possible N_2 gas occurs from about 1,300 to 2,100 ft, from the Heebner Shale Member (Pennsylvanian) to the Hunton Limestone. H_2/N_2 peaks on the chromatograms correlate well with the crossover peaks indicative of gas zones on open-hole wireline logs.

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Diagenesis in Upper Miocene Sandstones, Louisiana Gulf Coast

Study of diagenesis in upper Miocene sandstones of coastal Louisiana documents depth-related cementation and geochemical changes of primary detrital mineralogy. Samples were collected from depths of 8,000-20,000 ft (2,600-6,500 m) in an area roughly corresponding to the upper Miocene depocenter in the Terrebonne trough of southeast Louisiana. Sandstones are primarily subarkoses and sublitharenites with minor amounts of feldspathic litharenites and lithic arkoses. Plagioclase feldspar (oligoclase/andesine composition) composes approximately 60% of the detrital feldspar. Dominant rock fragments are siltstone or mudstone, silicified volcanic rock, and chert.

Authigenic minerals and cements occur in the following order: dolomite, chlorite grain coats, albite overgrowths on plagioclase and K-feldspar, quartz, calcite, kaolinite, and ankerite. Calcite composition remains nearly constant with depth, but ankerite composition differs both with depth and within individual samples. In general, the mineralogy and order of cements resemble that of the lower Tertiary sandstones of the Texas Gulf Coast; however, in the upper Miocene, the volume of each cement is much less and the depth of first occurrence is greater.

Feldspars have reacted substantially with pore fluids. With increasing depth, feldspar becomes more sodic because of albitization and dissolution of calcic plagioclase. At approximately 20,000 ft, 75% of the plagioclase is nearly pure albite. Alteration of K-feldspar is not common above 17,000 ft; below 17,000 ft occurrences are rare because of dissolution.

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Compactional Features in Cambro-Ordovician Carbonates of Central Appalachians and Their Significance

Compactional features are well known from siliciclastic rocks, but it is generally believed that carbonates have undergone little burial compaction. However, in the 3.5-km thick Cambrian-Ordovician carbonates of the Central Appalachians, many small-scale compaction features have been recognized. Evidence for differential compaction is: (1) wrapping of thin beds around meter-scale early-cemented algal bioherms and (2) sedimentary boudinage and pinch-and-swell features in interlayered thin beds of carbonate grainstone and mudstone. The grainstone layers have deformed in a brittle manner (cracking or yielding boudins), whereas mudstone layers behave ductily (flowing and bending around boudins), indicating that at the time of burial, grainstone layers were lithified but mudstone layers were unlithified. Burrows and shells in sandy layers are preserved, but burrows are deformed and shells broken in muddy layers. Pervasive, rather than differential, compaction in muddy carbonates is evidenced by flattened burrows, rotation of platy allochems parallel with