turbidite. These, however, do not appear to offer an entirely satisfactory explanation of the depositional conditions.

At all of the sections in which the sandstone complex is present, the Cretaceous-Tertiary boundary is slightly above the complex. In these sections, deposition across the boundary is continuous although the biostratigraphic units may vary in thickness in the sections. A most reasonable explanation of the Cretaceous-Tertiary transition as expressed in these sections is that deposition of the sandstone complex, probably by several related processes, occurred in latest Cretaceous time. The biologically catastrophic boundary event occurred rapidly but somewhat later, and probably was not directly related to deposition of the sandstone complex.

GARY, ANTHONY C., Old Dominion Univ., Norfolk, VA (present address: Univ. South Carolina, Columbia, SC)

Relationship Between Test Morphology and Bathymetry in Recent *Bolivina albatrossi* Cushman, Northwestern Gulf of Mexico

An automated video digitizer and closed-form Fourier series analysis were used in this study to quantify benthic foraminiferal test morphology. This approach allows morphology to be described rapidly, objectively, and accurately and to be compared statistically to important environmental variables. Canonical discriminant analysis reduced the variable dimensions and revealed specific shape components relatable to bathymetry in Holocene specimens of *Bolivina albatrossi* Cushman from the northwestern Gulf of Mexico. Populations of *B. albatrossi* exhibit reduced test triangularity and increased surface sculpture relief with increasing water depth. Margin lobateness decreases with increasing depth. A depth classification algorithm using Fourier harmonic amplitudes divides the bathyal zone into four subzones. With further development this approach could allow paleoenvironmental reconstructions to be automated and quantified.

GLYNN, W. G., Wisenbaker Prod. Co., Tyler, TX, T. E. COVINGTON, Mobil Oil Co., Denver, CO, and R. G. LIGHTY and W. M. AHR, Texas A&M Univ., College Station, TX

Prolific Overton Field Gas Reservoirs Within Large Transverse Oolite Shoals, Upper Jurassic Haynesville, Eastern Margin of 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, which became sites of extensive ooid shoal deposition during the Late Jurassic. Reservoirs within oolite facies at Overton field contain more than 1 tcf of natural gas. These large shoals—each approximately 15 mi (24 km) long and 3 mi (5 km) wide—trend north-south as a group and northeast-southwest individually, oblique to the basin margin but most likely parallel with Jurassic diffracted tidal currents within the East Texas basin embayment of the Gulf Coast. 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 and strontium) in porous zones. Stable isotopes for grains and cements show strong overprint of later burial diagenesis, with greater depletion of $^{18}O$ 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.

GOSE, WULF A., and J. RICHARD KYLE, Univ. Texas at Austin, Austin, TX, and MARK R. ULRICH, Univ. Texas at Austin, Austin, TX (present address: Mobil Oil Co., Dallas, TX)

Preliminary Paleomagnetic Investigations of Winnfield Salt Dome Cap Rock, Louisiana

Quarrying operations at Winnfield salt dome in the North Louisiana basin provide access to calcite, gypsum, and anhydrite cap-rock zones. Sulfide laminae in the anhydrite zone are comprised dominantly of pyrrhotite with lesser amounts of sphalerite, galena, pyrite, and marcasite. Sulfides cement euhedral anhydrite grains and represent the products of the episodic introduction of metalliferous waters along the salt-anhydrite interface during halite dissolution and residual anhydrite accumulation. Thus, sulfide laminae provide a chronological record of anhydrite cap-rock accretion.

Two hundred oriented samples were collected in stratigraphic sequence, covering much of the exposed anhydrite section. Alternating field demagnetization readily revealed the magnetic polarity of most samples. Using only reversely magnetized samples with a well-defined stable magnetization ($N = 50$, $\alpha_{95} = 6.2°$) yields a pole position at 71.4°N, 125.7°E, which implies that the sampled cap-rock sequence formed in the Late Jurassic. This age is consistent with geologic evidence indicating that cap-rock formation began in the Late Jurassic and was most intense during the Early Cretaceous.

A densely sampled 45-ft stratigraphic interval contains a sequence of normal and reverse polarity zones. Assuming a constant formation rate, these zones can be compared with the M-anomaly sequence. A growth rate of about 67 ft/m.y. (20 m/m.y.) is indicated. This value is about 30 times less than estimates of salt dome growth rates. Because a 10 to 50-fold decrease in volume is associated with halite dissolution and anhydrite accretion, the paleomagnetically determined value for cap-rock formation rate is reasonable.

This investigation is the first such study undertaken. The results are encouraging and offer a unique approach for investigating the timing of various geologic processes related to salt dome formation.

GRUEBEL, RALPH D., Gruebel Energy, Houston, TX

Exploring Lower Tuscaloosa in Southwest Mississippi

The updip Tuscaloosa trend of southwest Mississippi is north of both the Lower Cretaceous shelf edge and the currently developing "intermediate" lower Tuscaloosa play in Florida, Louisiana, and Wilkinson County, Mississippi. The updip trend first became active in the 1940s with the discovery of major reserves at Brookhaven and Mallalieu fields in Lincoln County and Cranfield field in Adams County. Today, the trend is considered mature; however, it has become more active with the discovery of several new fields since 1981, including Olive, Liberty, and Friendship Church fields. A primary reason for several of these discoveries is the development of new seismic-stratigraphic methods integrated with detailed subsurface geologic interpretations. The fact that oil can be found at relatively shallow depths with reasonable drilling costs and minimal engineering problems has provided incentive to pursue this play.

HARGIS, RICHARD N., Statex Petroleum, San Antonio, TX

Proposed Stratigraphic Classification of Wilcox Group of South Texas

Numerous classifications and nomenclatures of the Wilcox section and various portions of that section in south Texas, determined on regional, subregional, and localized bases, lead to considerable confusion among geologists using different nomenclatures and the application of "upper," "middle," and "lower" designations to the section. An overall stratigraphic classification framework is proposed in which the various facies of the Wilcox and all other classifications and nomenclatures will fit, thereby standardizing recognition of the various facies and sections of the Wilcox throughout the south Texas area.

In the proposed informal classification, the Wilcox Group is subdivided in the updip subsurface, where the stratigraphy is primarily nonmarine, into the Indio Formation and the Carrizo Formation. The Carrizo Formation is further subdivided into the Wilcox-Carrizo Member, the Massive Carrizo Member, and the Carrizo-Bigford Member. In the downdip subsurface, where the stratigraphy is essentially marine, the Wilcox Group is subdivided into the lower, middle, and upper Wilcox Formations. The upper Wilcox Formation is divided into lower and upper members. The upper Member is further subdivided into the Massive, Mackhank, Luling, and Slick Sands in the areas where these sands are present.

Regional and area studies within the past 20 years, along with greater well control in sparsely or previously undrilled areas, have significantly increased our knowledge and understanding of Wilcox stratigraphy.