complete reservoirs.

Identifying zones with a consistent and continuous log response greatly aids manual log interpretation. It also provides a valid means of data reduction for the first passes of a computer-processed interpretation because an interpretation model may be tested by treating a limited, yet representative, number of points. Cross-plot interpretation can also be simplified by using the electrofacies type on the z-axis, and displaying averaged log values for each electrofacies.

The FACIOLOG approach is designed not to compete with conventional facies analysis but to put electric logs into a framework which the geologist can easily integrate with his own studies and thereby squeeze the maximum amount of geological information out of them.

LLOYD, R. MICHAEL, Consultant, Houston, TX

"Transgressive" Pore-Filling Calcite, Cretaceous of South Texas

Early marine cementation and subaerial leaching of Stuart City rudist reef facies in south Texas yielded a rock with substantial intergranular, moldic, and shelter porosity. Most of this porosity was subsequently filled with a mosaic of blocky calcite, resulting in a tight rock. A detailed study integrating transmitted light and luminescent petrography with electron microprobe and stable isotope analysis reveals that the pore filling occurred in three stages representing distinctly different diagenetic environments. All three stages are seen commonly in single syntaxial crystals, suggesting continuous crystal growth while the environments were changing.

A model consistent with the data would have the following sequence of events: (1) initiation of calcite druse on pore walls in a freshwater phreatic environment, (2) continued pore filling in the phreatic mixing zone, and (3) final pore filling in the "marine" saline phreatic zone. The sequence could have occurred during a single, transgressive submergence of the pore system.

LOHMANN, KYGER C., Univ. Michigan, Ann Arbor, MI

Role of Fluid Inclusions in Diagenesis of Metastable Marine Cements

Early diagenesis of metastable marine cements occurs through a phase of dissolution along intercrystalline boundaries which is accompanied by precipitation of low magnesium calcite (LMC) within enlarged intercrystalline pores. This LMC cement is a luminescent phase complexly intergrown with non-luminescent, corroded crystallites of the precursor fibrous marine cement. This intergrowth results in early coalescence of the multicrystalline cement, which effectively isolates metastable phases from open chemical exchange with ambient pore waters during subsequent diagenesis.

Closure of the diagenetic system during subsequent stabilization is indicated by the preservation of chemical signatures retained within final calcitized products. Multiple carbon and oxygen isotopic analyses of a single generation of marine cement, for example, define strongly covariate compositional trends that reflect varying mixtures of the luminescent and non-luminescent calcites which presently comprise the stabilized marine precursor. End-member compositions of such trends reflect the compositions of intergrown LMC and precursor marine cement, respectively. Although early coalescence provides for closure of the chemical system, it does not prevent ultimate stabilization of metastable phases to LMC. Importantly, metastable relics are not preserved in ancient marine cements.

From all available data on solid-state processes, we infer that, at diagenetic temperatures, water is a required diagenetic medium to effect transformations of aragonite and high magnesium calcite phases to LMC. If, however, water is involved in this stabilization process, how is it possible to maintain a chemically closed system? An abundance of associated fluid inclusions is characteristic of fibrous cement mosaics. Such fluids, trapped along intercrystalline boundaries during early coalescence, migrate through the metastable host. As metastable phases dissolve, driven by their solubility difference with LMC, they concomitantly precipitate LMC, which paramorphically replaces the precursor cement. Such a mechanism not only provides for the retention of overall crystal fabric, via a submicron dissolution-precipitation process, but also provides for the maintenance of chemical signatures of the dissolving, metastable precursor cements.

LOPEZ, CYNTHIA M., Shell Oil Co., Houston, TX

Early Diagenesis of Sands and Sandstones from Middle America Trench and Trench Slope, Offshore Mexico and Guatemala

Siliciclastic sediments from the northern and southern segments of the Middle American Trench are distinctive both petrologically and diagenetically. Samples of terrigenous sands recovered in piston and DSDP cores from the continental margin of southern Mexico are primarily arkose and lithic arkose of plutonic and metamorphic provenance. Accessory constituents and diagenetic features are useful criteria for distinguishing sands from different tectonic provinces along the Mexican (northern) segment of the trench. Basal, early Miocene sandstones from the upper- and middle-slope regions (continental block) contain abundant skeletal grains and are cemented by calcite or gypsum. Early Pliocene to middle Miocene sands from the accretionary wedge are weakly lithified and contain fractured framework grains. Unlithified trench sands of Quaternary age have undergone significant pore-space reduction at very shallow burial depths.

Samples of Holocene terrigenous sands recovered in piston cores offshore from central Guatemala (southern segment) are feldspathic litharenite and litharenite of volcanic provenance. Authigenic pyrite is ubiquitous in these sands, and pore-filling phillipsite occurs locally. Partial dissolution of glass fragments, pyroxene, and plagioclase has occurred in sands from every environment sampled.

The differences observed in sands from the two segments of the Middle America Trench may also characterize siliciclastic sediments deposited along other segmented convergent margins. Within a trench segment, changes in sand composition with time could indicate intermittent volcanic activity and changes in relative sea level.

LORENZ, JOHN C., Sandia National Laboratories, Albuquerque, NM

Determination of Widths of Meander-Belt Sandstone Reservoirs from Vertical Downhole Data

Once it has been determined that a meandering fluvial model is applicable to a formation, paleohydrologic reconstructions can be applied to downhole measurements to derive sand body widths. The nonmarine part of the Mesaverde Formation in the east-central part of the Piceance Creek basin of northwestern Colorado was deposited in a predominantly meandering fluvial