The indigenous origin of petroleum in oolites, which obviates a long and wasteful primary migration process, affords an explanation for the exceptionally rich petroleum accumulations in such reservoirs. It is proposed that with the exception of leached oolites with oomoldic porosity, other petroleum-bearing oolites could be viewed as integrated source-reservoir beds. The prolific oolite reservoirs of the Arab Formation in Saudi Arabia were selected as natural case studies and the result found to be consistent with the hypothesis.

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Stratigraphic Implications of Geochemistry of Oils from Middle Magdalena Valley, Colombia

Seventeen oils from the Middle Magdalena Valley of Colombia were studied for the purpose of acquiring an improved view of the number and nature of hydrocarbon sources in the region. Oils from this basin possess a range of bulk compositions (API gravity, sulfur content, gasoline content, etc) and occur mainly in Tertiary reservoirs developed in nonmarine sediments. Several explanations have been informally offered regarding the origin of the oils. Most of these explanations have depended on a concept of the "immature" oil.

Examination of the chemistry of the oils and comparison of these data to oils from other basins lead to the conclusion that the Magdalena oils were derived from a single source or series of closely related sources. The sources for the oils are believed to be stratigraphic units deposited in marine environments. This conclusion is based mainly upon the isoprenoid, normal paraffin, and polycyclic alkane composition of the oils. A marine source virtually eliminates the possibility of the source occurring within the Tertiary section.

Study of lithologic descriptions of the Cretaceous sediments stratigraphically underlying the Tertiary allows the nomination of several units that may have been the source for the oils: the La Luna, Simiti, and Paja formations. Each of these formations was deposited under anoxic marine conditions, and some of them contain enough organic debris to be described as "carbonaceous."

Differences in the bulk compositions of the oils are interpreted to be related to secondary alteration processes. Altered oils from the Magdalena possess compositional attributes similar to oils that have been modified during in-vitro bacterial degradation experiments. There is little evidence that collectively the oils represent a range of maturities; consequently, the idea that the more dense fluids are examples of immature oils is rejected.

The Middle Magdalena oils are derived from a single source or a series of closely related sources that are probably Cretaceous in age. Some of the oils have experienced secondary alteration that is believed to account for the range of bulk compositions observed in the region.

The complicated source-reservoir relationships suggested by knowledge of the oil chemistry are undoubtedly contributory to protracted exploration history of the Magdalena. Improved knowledge of these relationships should be of assistance in the search for new reserves that may be obscured by the complex structural features characteristic of the Magdalena and adjacent terrain.

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Termination of Southern Appalachian Overthrust

Autochthonous sediments equivalent to Valley and Ridge formations are interpreted to exist beneath crystalline rocks of the entire Blue Ridge and western portion of the Piedmont. Although hydrocarbon potential has not been determined, we have defined the southeastern extent of sediments beneath the allochthonous southern Appalachians. Truncation of underlying sediments by a subsurface fault occurs at 10 km (6 mi) depth approximately 55 km (34 mi) southeast of the Brevard zone. Farther southeast, a basal detachment might exist, but it would be within mylonitized Grenville basement. Blue Ridge basement rocks probably originated from this area. The interpretation is primarily based on detailed analysis of reprocessed COCORP seismic data, modeling potential fields, and the undisputable fact that Grenville rocks must be cut by a deep fault someplace beneath the southern Appalachians. All previous theories which attempted to correlate with the original interpretation of a regional detachment underlying the entire southern Appalachians should be reexamined. Although detachments and major thrust faults undoubtedly exist throughout the southern Appalachians, they do not form one continuous overthrust sheet and are not underlain by sediments deposited on the ancient continental margin of North America.

Geophysical studies of the southern Appalachians have determined them to be largely allochthonous. Seismic data show that a continuous master decollement underlies the Valley and Ridge, Blue Ridge, and Piedmont provinces. Other forms of geophysical data are consistent with the hypothesis of an extensive overthrust system. The question remains, however, how far east can we define a continuous master decollement? This question has been debated in many conferences in recent years where two extreme positions have developed. One side believes that the Brevard zone represents a cryptic suture continuing to depth beneath the inner Piedmont and terminating the master decollement at depth. The alternative position draws a detachment continuous from the western Valley and Ridge, beneath the entire Appalachians to the southeast, deep beneath the coastal plain, and possibly out to the edge of the continent in the Atlantic Ocean. In this paper, a moderate position is presented which places a sloping master decollement root zone beneath the eastern Piedmont. The adjoining province of island arc assemblages is thus regarded as an accreted terrain which is generally regarded as autochthonous. Evidence for such a model is primarily from reflection profiles across Georgia. Additional support comes from gravity, aeromagnetics, magnetotellurics, and surface geology.