

# ABSTRACT

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Seismic reflection profiling carried out by COCORP (the Consortium for Continental Reflection Profiling) in conjunction with other geological and geophysical data have suggested the existence of layers of sedimentary origin underlying much of the crystalline rock area of the southern Appalachians. The first phase of operation resulted in a profile which extends eastward from the Valley and Ridge and crosses a significant portion of the Blue Ridge and Piedmont; the second continued the traverse to within a few kilometers of the coast. Results indicate that the southern Appalachians are characterized by large-scale, west-directed, compressional deformation associated with the emplacement of thin sheets of crystalline rock above Late Precambrian and Early Paleozoic miogeoclinal strata. As the metamorphic grade of these strata is unknown, their potential for hydrocarbon production is also unknown. The southeastward extension of the initial profile reveals a structurally complex crust beneath the Eastern Piedmont and Coastal Plain. A southeast-dipping reflection projects to the surface location of the Augusta fault. In conjunction with surface geological information, the seismic data indicate that Late Paleozoic compressive deformation, as exemplified by the Augusta fault, affected rocks at least 400 kilometers east of the concurrent Valley and Ridge activity. Simultaneous deformation over such a large distance is most easily explained by stress relief along subhorizontal detachments. Some Triassic faults associated with subsequent opening of the Atlantic are apparently listric into the underlying Augusta fault detachment and may be reactivated Paleozoic thrusts.