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Mountain Flank Deformation, Facies and Petroleum Occurrences, Ancestral Rocky Mountains, Eastern Colorado

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Eastern Colorado and adjacent areas were subjected to fault block tectonics during the late Paleozoic. Throughout Pennsylvanian and Permian, non-marine red arkose facies was shed from uplifts into adjacent depositional basins in which marine detrital, carbonate, and evaporite sediment accumulated that range in thickness from 2,000 to 5,000 ft.

The style of deformation along the uplifts, largely as fault zones with near vertical fault plane dips, is illustrated by detailed mapping in the subsurface along the Sierra Grande—Apishapa and Front Range source areas. Recurrent movement on basement-controlled fault zones spanned a time interval of at least 60 million years (early Pennsylvanian to mid-Permian.)

Fault patterns suggest wrench and related oblique slip systems that extended into Colorado from the southeast and south. No volcanism is known to have accompanied the crustal block movements. The faulting supports the Continental Collision Theory on the origin of the Ancestral Rocky Mountains.

Significant petroleum has been produced from channel sandstones in valley-fill deposits of the Morrow Formation in southeast Colorado. Syn-depositional faulting controlled drainage systems and, therefore, structural interpretations play a role in the fields largely regarded as stratigraphic traps.