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Structural Inversions During the Phanerozoic in the Rocky Mountain Area

Recurrent movements on basement faults during the Phanerozoic are well-documented in the Rocky Mountain Area. Generally, the direction of recurrent movement is consistent through time, i.e., movement in the same direction. However, structural inversions (reversals in direction of movement) have occurred in both major and minor fault block structures. This pattern of fault movement is important in petroleum exploration because a basement block may be structurally and topographically low and control sand (reservoir) distribution at the time of deposition. Later structural inversion places the reservoir in a high structural position to trap petroleum during migration.

The Sawatch Range of Colorado, Big Snowy Mountains of Montana, Rock Springs uplift, Rawlins uplift and Casper arch are all examples of present day structural highs that were once parts of depositional troughs. The Transcontinental arch was a positive feature throughout most of the Paleozoic but portions were down-faulted during the Laramide orogeny (e.g. the Denver basin).

Examples of small-scale structural inversions controlling petroleum accumulation and production are the Lanyard and Zenith fields (D Sandstone, Cretaceous, Denver basin) and the Sorrento field (Morrow Sandstone, Pennsylvanian, Southeast Colorado).