
A Structural Model for Typical Hydrocarbon Traps in Saudi Arabia

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The typical hydrocarbon trap in Saudi Arabia comprises a broad, low relief, asymmetric anticline formed above a moderate to high angle (45-70 degree) master reverse fault. The fault-fold geometry of one typical trap, the Khurais Field, can be quantitatively modeled by basement-involved block rotation along a listric, circular arc fault that flattens to a mid-crustal lower detachment approximately 20 km below ground level. The majority of anticline-forming compressional deformation occurred during Late Cretaceous (Turonian) time. The structural model proposed here, which is readily applicable to several other hydrocarbon-bearing anticlines in Saudi Arabia, provides a quantitative relationship between the shape of the master fault, the geometry of the hanging wall, the depth to fault detachment and the kinematic history of the structure.
