

**MARATHON-SOLITARIO OROGEN,
TRANS-PECOS TEXAS**

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The Ouachita orogen extends NE across southern Trans-Pecos Texas and is exposed in the Marathon basin, the Solitario, and smaller outcrops near Persimmon Gap, Big Bend National Park at the NE end, the subsurface continuation is offset 250 km to the SE along what probably marks a transform margin during the Iapetus opening that was reactivated during the Ouachita closing.

The fold/thrust belt in the Marathon basin is divisible into structural belts from NW to SE and internally into lower, middle and upper Paleozoic structural/stratigraphic packages separated by major shale units that acted as decollement zones. The thin lower package forms isoclinal folds. The thicker middle package forms asymmetrical folds in the NW outcrop belt and a spectacular tightly folded duplex framing the Dagger Flat Anticlinorium (DFA) with a shortening of 6.2:1. Farther south the middle package is involved in imbricate thrust slices with no cut-off lines so shortening estimates are not possible. The thinness of competent units and the numerous shale interbeds cause the usual flat/ramp geometry of thrust belts to be complicated by later folding or to allow folding between flats. Minimum overall shortening of the middle package is estimated to be 4:1. The thick upper package of foreland basin fill forms large, tight synclines with thrusts cutting through the anticlinal crests. Shortening in this package is less than 2:1.

Along strike, 35 miles to the SW, the Solitario, a 5-mi diameter uplift over a laccolcaldera exposes structures of DFA style: lower package is in isoclinal folds with vertical stretching of about 2:1; the middle package shows folded thrusts, imbricate thrusts and a homocline of upper package rocks that marks the transition between DFA and southern domain style as seen in the Marathon basin.

Low-grade graphitic phyllites and metaquartzites of the interior zone are known only from two wells and one outcrop across the Rio Grande near the southeastern edge of Big Bend National Park.