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**AAPG Annual Convention**
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**Bending Stresses, Faulting, and Deep Migration of Fluids in the Arkoma Basin**

Reconstructed thickness of Late Paleozoic sediments in the Arkoma Basin are consistent with flexure of the lithosphere with an effective elastic thickness of 70 km. This result is consistent with a previous estimate of lithospheric flexure from gravity data and the expected flexural rigidity based on the thermal age of the lithosphere at the time of the Ouachita orogeny.

Tensional bending stresses in the crust beneath the foreland are large (>100 MPa) immediately following the orogeny, which could fracture and/or reactivate faults in the basement to depths of >10 km. Tensional bending stresses in the crust beneath the foreland diminish with uplift/erosion and/or viscoelastic relaxation. Rebound of the lithosphere following erosion of the thrust belt at the end of the Ouachita orogeny generates approximately 1 km of differential topography. Accumulated bending stresses are largest when the lithosphere is cold/strong and/or loading/unloading is rapid.

At the end of the orogeny, fluids will infiltrate into the fractured/faulted crust beneath the foreland where they are heated and chemically interact with basement rocks. With time, tensional bending stresses are reduced by uplift and erosion and/or viscoelastic relaxation. Thus, as fractures and faults in the basement close, heat and fluid are transported upward and away from the thrust belt into distal basin sediments. These basement-derived fluids would then interact with basinal fluids transported by the newly generated topography in the foreland basin.