INVESTIGATION OF STRIKE-SLIP DEFORMATION MAGNITUDE IN THE ARBUCKLE MOUNTAINS AND ITS IMPLICATIONS TO CROSS SECTIONAL MODELS

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Abstract

The Arbuckle Mountains expose Pre-Cambrian through Permian rocks that record Late Mississippian through Late Pennsylvanian constructional deformation. Outcrops throughout the area not only expose this deformation in great detail, but also contain numerous slickenlines indicating a strike-slip component to that deformation. Quantify the kinematics of fault slope is thus needed to asses the magnitude of strike-slip deformation. If strike-slip deformation was of a significant degree, then current geologic cross section drawn across regional strike may be inaccurate. Field data will be collected from roadside outcrops the I-35 corridor and nearby roads in southern Oklahoma, with a focus on structures caused by shearing that could help quantify the amount of strike-slip. Fault-stiae data will be plotted and analyzed numerically to determine the fault kinematics, including the slip direction and the possible magnitude of slip. The resulting kinematics will be applied to pre-existing cross sections and models of the area. Where the models do not balance with the new calculated shear amount, they will be adjusted and redrawn to include both a strike-slip and thrusting component. The addition of this study to the existing body of knowledge of the Arbuckles will greatly improve our understanding of a mountain range that consists of some of the most productive units throughout Oklahoma. It will result in more accurate models of the area, allowing for better petroleum development within Oklahoma, and possibly assisting in other complex structural plays.

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