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### **Late Paleozoic Foreland Deformation in the Southwestern Midland Basin and Adjacent Areas: Implications for Tectonic Evolution of the Permian Basin, West Texas**

The southwestern Midland Basin is located at the junction of several important late Paleozoic tectonic features within the Permian Basin, including the Central Basin Platform (CBP), Ozona Arch, and several basement-involved fault systems that partition the southwestern Midland Basin into smaller depocenters. These tectonic features formed far inboard of the Marathon fold-and-thrust belt. This study examined the late Paleozoic stratigraphic and structural characteristics of the southwestern Midland Basin and adjacent areas in order to constrain the timing and causes of the deformation events.

Three stages of deformation can be recognized based on significant changes in the lithofacies distribution, the style of deformation, and the area of active deformation through time. Before late Mississippian time, the study area was a tectonically stable region that was dominated by extensive shallow-water carbonate sedimentation. Minor en echelon folding reflected the initial, regionally distributed right-lateral strike-slip deformation that developed during late Mississippian-middle Pennsylvanian time. Soon after deposition of Strawn carbonate ramp facies during a middle Pennsylvanian phase of relative tectonic quiescence, renewed and amplified right-lateral convergence enhanced structural relief of en echelon asymmetrical faulted anticlines. During late Pennsylvanian-Wolfcampian time, en echelon folding and faulting in the basin diminished, but right-lateral convergence continued and was mostly accommodated along the eastern boundary of the CBP as oblique-slip deformation, which is expressed by steeply dipping reverse faults and asymmetrical flower structures. Major uplift of the CBP occurred during this last phase of intraforeland deformation and the CBP served as the source for wedge-shaped, upper Pennsylvanian through Wolfcampian synorogenic periplatform deposits. The entire area returned to tectonically stable conditions during Leonardian time, which allowed development of extensive carbonate platforms that built away from the structural margins of the CBP.