

Structural Styles in the Wichita Uplift and Anadarko Basin, Southern Oklahoma

Molly Turko, Shankar Mitra

University of Oklahoma

9.29.2020 - 10.1.2020 – [AAPG Annual Convention and Exhibition 2020](#), Online/Virtual

Abstract

Regional structural transects across the Wichita uplift and adjacent Anadarko Basin show the relationship between thick-skinned basement-involved structures and thin-skinned detached fold-thrust structures. 2D and 3D seismic, well log data, and surface geology were used to evaluate the structural styles and evolution of the region. The northwestern part of the Wichita uplift is marked by a zone of frontal imbricates forming a triangular wedge with most of the slip dissipated along basement-involved thrust faults at the Wichita front. Paleozoic units show tight folding with overturned beds in the frontal zone. The uplift is episodic as indicated by the truncation of major faults along unconformities and their subsequent reactivation. In contrast, the southeastern part shows that a significant part of the slip is transferred into structures in the Anadarko basin along two major detachments. These structures are tight faulted-detachment folds that formed above a major detachment within the Springer shale, cored by broader structures detaching at the base of the Arbuckle Group. Examples include the Carter-Knox, Chickasha, and Cruce structures. Late stage E-W trending oblique faults with normal and strike-slip components are superimposed on some of these structures, resulting in more complex geometries. An example of this superposition is the transition from the simple Chickasha faulted detachment fold to the more complexly faulted Cement structure. Rotation of regional stresses from NE-SW to a more ENE-WSW direction during the Pennsylvanian uplift may have influenced the tectonic history of the area. Pre-existing normal faults of Precambrian-Cambrian age were either reactivated along the Wichita uplift, or controlled the location of the Pennsylvanian age structures in the Anadarko basin.

