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LATE PALEOZOIC BASIN EVOLUTION OF THE ANADARKO BASIN: IMPLICATIONS FOR LAURENTIAN TECTONICS AND THE ASSEMBLY OF PANGEA

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Interplay between marginal and intraplate tectonics in southern Laurentia has long been a subject of debate. In southern Laurentia, intraplate deformation has been attributed to various combinations of compressive forces from orogenic belts in the west, southwest, and southeast acting on the plate interior. Here we have analyzed the Southern Oklahoma Transform System (SOTS), a 500 km long fault zone that extends from the southeastern Laurentian margin into the plate interior along Mesoproterozoic lithospheric weaknesses inherited from the Southern Oklahoma Aulacogen. Here, we use a compilation of published studies to present detailed, time-integrated sedimentary thickness maps of the Anadarko Basin. We combine these results with novel interpretation of three 2D seismic lines. These two datasets constrain timing and kinematics on all major SOTS fault zones. The resulting maps and interpretations show that the SOTS was a left-lateral transpression zone during Mississippian-Early Pennsylvanian time and transitioned to a left-lateral strike slip zone during Middle Pennsylvanian-Early Permian. Pulses of tectonic activity and fault kinematics in the SOTS fit with a model in which a remnant oceanic basin, located between Laurentia and Gondwana, closed diachronously from northeast to southwest along the Southern Appalachian and Ouachita-Marathon Orogens. We interpret slab pull to be the major driving force of collision, subduction, and SOTS intraplate deformation.

Session No. 198

[T2. Assembling Laurentia: Paleozoic Mobile Margins I](#)

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[Back to: T2. Assembling Laurentia: Paleozoic Mobile Margins I](#)

[<< Previous Abstract](#) | [Next Abstract >>](#)
