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The Slick Hills of Oklahoma and Their Regional Setting: Abstract

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ABSTRACT

The Slick Hills of southwestern Oklahoma are the exposed portion of the Frontal fault zone, a region of intense Pennsylvanian-age deformation that is located between the contemporary Wichita uplift (to the south) and the Anadarko basin. During the Lower Palaeozoic the area formed part of the N6OW trending Southern Oklahoma aulacogen. A thick and structurally anisotropic sequence of thinly bedded rocks (mostly carbonates) was deposited on a thick suite of Cambrian igneous rocks, some of which are thickly layered. Subsequent Pennsylvanian deformation dismembered the aulacogen. Geomorphology of the Hills is essentially of Permian age.

Lower Paleozoic sedimentation took place on a passive margin in a tropical setting south of the equator, carbonates facies dominate some late Cambrian siliciclastic increments may record tectonic adjustments; most are probably associated with global sea level variation. The structural styles developed during Pennsylvanian deformation reflect variation in isotropy between igneous basement (both within and without the aulacogen) and sedimentary cover. In essence the cover incrementally detached itself along numerous horizons of slippage recording progressive phases of deformation, while strain in more massive basement rocks was resolved by large faults.

Various deformation signatures suggest a principal stress oriented approximately NE-SW. This direction is difficult to reconcile with more or less contemporary orogenic deformation in the Oklahoma Ouachitas, but may reflect a reorientation of stress as the result of the final incorporation of the Laurentia plate within Pangaea.

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