

## **A Thick Section of Rift Related Basalts and Rift Fill Sediments in the Arbuckle Mountains, Oklahoma, as Revealed by Deep Drilling.**

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Bimodal volcanism and interbedded volcanic and rift fill sedimentary rocks are characteristics of continental rifts. Although rhyolites are present, mafic volcanic rocks and rift fill sedimentary rocks are not exposed in the outcrops of the Southern Oklahoma Aulacogen. Drilling penetration of basalt has been limited to a maximum of 300m in southwestern Oklahoma. Although basalt extrusion is thought to have been widespread, most of these rocks have apparently been removed by erosion or deeply buried by Paleozoic sedimentation and tectonics. This paper describes the geologic section encountered in a deep exploratory well in the Arbuckle area in south central Oklahoma that penetrated 4,800m of over-thrust Cambrian igneous rocks including 2,813m of basalt and altered basalt. This section occurs in the hanging wall of the Washita Valley Fault, a Cambrian normal fault bounding the aulacogen which was re-activated as a regional thrust fault in Pennsylvanian time. Also present is a lower section of 1000m of apparently interbedded rhyolite and rift fill sedimentary rocks. Although alternative structural interpretations for the lower section must be considered, the lithologic evidence strongly favors a rift fill origin. The sedimentary rocks contain a total of 155m of dolomite and lithic dolomitic conglomerate. The lithic clasts in the conglomerate were derived from 1.4Ga Southern Granite Rhyolite Province granites exposed on the craton. Thirty four boreholes penetrate the overthrust along a 42km band to the northwest along strike with regional faulting. Magnetic survey evidence indicates a significant basalt accumulation which is confirmed by sample examination of these wells. The presence of these basalt accumulations has important implications for seismic interpretation in structurally complex areas in southern Oklahoma.