Structural Geology of Southern Caddo Gap Quadrangle, Arkansas: New Evidence for Strike-Slip Faulting

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ABSTRACT

The Caddo Gap, Arkansas, quadrangle is on the southern margin of the Benton Uplift, the orogenic core of the Ouachita Mountains (Fig. 1). No detailed geologic maps are readily available for this structurally complex area. Recent field mapping has focused on delineating stratigraphic and structural relationships in this classic fold belt at scales of 1:24,000 up to 1:6000.

The Devonian-Mississippian Arkansas Novaculite is the principal formation within the study area, and has been divided into three members (Lower, Middle, and Upper) by previous researchers (Miser, 1917; Miser and Purdue, 1929). The Lower Novaculite Member is the main ridge former given its extremely fine-grained (microcrystalline to cryptocrystalline) siliceous composition and thick to massive bedding that provide excellent resistance to weathering. The Middle Chert and Shale Member, composed of thin, alternating chert and shale beds, is intensely fractured and commonly forms talus slopes of gravel to cobble sized detritus. The Upper Novaculite Member, comprised of more carbonate-rich novaculite, is more resistant to weathering and overlies the Middle Chert and Shale Member. The Upper Novaculite forms subtle flatirons where it dips moderately (30 to 60 degrees), but flatiron development is much less pronounced where dips exceed 70 degrees as the Lower Novaculite Member provides more topographic control at steep dips. The Arkansas Novaculite forms broad macroscopic folds in the study area such as the Nelson Mountain Anticline located just east of Caddo Gap (Evansin, 1976).

Previous researchers (e.g., Sholes, 1977) reported that chert-clast conglomerate beds occur sporadically at the top and upper part of the Arkansas Novaculite and are laterally discontinuous, and are therefore not a reliable marker bed. However, our field work has found black to gray, angular to subangular, poorly sorted, coarse sand to coarse pebble chert conglomerate beds, up to 2–4 feet thick at numerous localities near the Arkansas Novaculite–Stanley Shale contact throughout the field area. This may indicate the conglomerate beds are more laterally continuous than once thought, and may represent a discrete disconformity between the Arkansas Novaculite and the overlying Stanley Shale.

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