

INITIAL STRUCTURAL SUBSIDENCE AS REFLECTED IN MORROWAN AND ATOKAN (PENNSYLVANIAN) SUBSURFACE STRATIGRAPHY, NORTHERN ARKOMA BASIN, NORTH-CENTRAL ARKANSAS

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ABSTRACT

The Arkoma Basin is a carboniferous foreland basin that is known for its prolific gas production. The objective of this research is to study the initial subsidence of the basin by analyzing the stratigraphic and structural features of the study area. This was accomplished through IHS Petra, Surfer 13, and Win-Tensor software. Field work studies comprised a large part of this study. Also, a seismic profile and Google earth elevation profiles are among the methods used to study the initial subsidence of the Arkoma Basin. The study area within the basin represents a transitional zone from the shelf into the northern portion of the basin. The defining formations in this project are of Morrowan and Atokan age.

Within the vicinity of the Arkoma Basin in north-central Arkansas, the stratigraphic analysis confirms a continuous thickening of the Middle Atoka interval south of the study area toward the Ouachita thrust belt, determined through utilizing raster well logs. Furthermore, system tracts were defined for each formation in this study, giving a general overview of the change in sea-level associated with the process of subsidence of the basin.

Structural analysis presents distinctive features that dominated the study area. Both the Mulberry and Clarksville master faults are east-west trending normal faults. These master faults are considered to be syn-depositional growth faults, which are the main evidence for tectonic subsidence of the basin. Additionally, the area shows a graben feature named Bullfrog Graben that is considered significant evidence for the local flexure loading of the Arkoma basin.

Keywords: *Ouachita thrust belt, syn-depositional faults, Arkoma Basin, Morrowan*