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A Correlation and Stratigraphy of Detailed Measured Core Sections of the Waynesville and Liberty Formations (Katian; Richmondian) - Transecting Warren, Clinton, and Fayette Counties of Ohio

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Research & Scholarship SYMPOSIUM

A Correlation and Stratigraphy of Detailed Measured Core Sections of the Waynesville and Liberty Formations (Katian; Richmondian) – Transecting Warren, Clinton, and Fayette Counties of Ohio

The stratigraphy of the Cincinnati is difficult to understand and interpret which has resulted in various models for deposition ranging from a layer cake model with continuous beds to completely discontinuous beds. The interest of this study is the Liberty and Waynesville Formations (previously part of the Bull Fork Formation); these are Late Ordovician (Katian; Richmondian) units of predominantly limestone and shale. This project assesses the continuity of fine scale beds within these formations across a small area (approx. the size of Ohio's Clinton County) by correlating measured sections from drill cores. The project involved the study of five rock cores (cores 2627, 3240, 868, 2682, and 2620) held in the ODNR H.R. Collins Core Repository and the comparison with published sections and unpublished field notes from neighboring outcrops. The project's goal was to increase the detail of the measured sections to a one-inch resolution for the Waynesville and Liberty Formations and to increase the number of completed sections for the northeastern portion of the Cincinnati Arch. The paleontology was noted, when visible in core section, for correlation with the known faunal epiboles. The use of these has proven troublesome when examining cores due to the inherent limitations in encountering the fossils when drilling which has led to more reliance on lithological correlations between the cores. This project has revealed continuity of sets of lithological beds; however, no continuous individual lithological beds were recognizable in core samples across the region. Without the use of fossil correlation, there are no continuous lithological beds and no clear formational contacts for the Liberty, Waynesville, and Whitewater Formations. Without the use of these fossil epiboles, the differentiation of the formations is extremely difficult and nearly impossible in some localities. In summary, in areas where surface outcrops are limited for these formations, core sections can be used to correlate the larger cycles, but the fine resolution correlation requires the identification of epiboles, which is only practical in outcrop.