

Structure and Tectonics of the Lexington Fault System, Kentucky

Krista L. Morisen
Miami University
Department of Geology
Oxford, OH
morisekl@muohio.edu

The north-northeast trending Lexington Fault System (LFS) in Central Kentucky has been described as a series of parallel to sub-parallel normal faults that has been associated with extension. This fault system has been investigated to document structures related spatially and possibly temporally to the LFS to constrain the tectonic history within the framework of the regional geology of the Appalachian Basin. The strata in the study area consists primarily of Ordovician and Mississippian limestones locally interbedded with shale. High angle reverse and thrust faults are the dominant structures in the strata surrounding the main fault system and show varying trends. That is, in the northern region of the fault system these structures trend predominantly northeast, in the central region, northwest and in the south, east. These faults are spaced between 1-4 m in outcrops with steep to moderately dipping planes. Additionally, limited mineral lineations with sub-horizontal and horizontal plunges indicate oblique and lateral motion along these structures and the LFS. Outcrop scale z-folds show east-plunging fold axes associated with the compressional faulting forming the reverse faults in the region. Several normal faults also exist in the same outcrops and exhibit the same strikes as their reverse counterparts. The reverse and thrust faults are interpreted as having formed during compression in the later stages of the Appalachian Orogenesis. However, the normal faults are inferred to have formed either synkinematically with the thrust faults to accommodate the shortening or as a result of flexural subsidence and partitioning of the Appalachian Basin.