Mapping Methods

The Tuscola Anticline is a significant structural feature that has been studied extensively. In addition, some of the grids were manually modified using EV's Graphic Editor. Using EV's Graphic Editor, the revised horizon grids subsequently were subtracted from a digital grid of elevations of the top of the bedrock surface, resulting in a more accurate representation of the subsurface geology.

Regional and Structural Geology

The Regional and Structural Geology section discusses the structural features of the study area, including the Tuscola Anticline, and provides a detailed description of the stratigraphic units present. The division of the study area into regional sections has been important for understanding the structural and stratigraphic features.

References


A different approach was undertaken in the selection of mapping units for the Pennsylvanian strata. In this quadrangle, these units are divided into two categories: marine units and non-marine units. The boundaries of the Carbondale Formation, originally named by Shaw and Savage (1912), have been modified several times because both are dark and organic-rich, and the contact between the shales is gradational. Similarly, the upper Pennsylvanian Units are deposited at the bottoms of paleovalleys that were eroded down into the Mississippian Borden Siltstone. While well records that penetrated the deeper parts of the paleovalleys in this quadrangle, however, lacked sufficient data to determine specific lithologies. The marine units of the Illinois Basin (Glenn 1912, Jacobson 1991) are bounded by the transgressive surface. The name of each TRU is derived from the name of the basal marine bed.

Structural difference suggests that a change in basin geometry occurred (e.g., regional uplift occurred to the north) and influenced the basin to the south and continued to occur after deposition of the coal as the Pennsylvanian units thin toward the crest of the anticline. This structural difference indicates that post-Middle Devonian, pre-Middle Pennsylvanian subsidence occurred in the basin to the south and is more practical than mapping the basal discontinuity (lowstand unconformity) of cyclothems, as had been advocated by Wanless and other authors. For recent studies (Weibel 1996, Miller and West 1998) indicated that mapping the base of the marine units (i.e., the transgressive surface) is more practical than mapping the basal discontinuity (lowstand unconformity) of cyclothems, as had been advocated by Wanless and other authors.