

## **Origin of Meter-Scale Cycles in a Mixed Siliciclastic-Carbonate Unit: The Cincinnati Series (Upper Ordovician) Kope Formation, Cincinnati, Ohio Region**

By

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The Kope Formation is an Upper Ordovician mudrock-limestone unit deposited on a storm-dominated siliciclastic-carbonate ramp. It is well-exposed in the Cincinnati, Ohio area, and exhibits ~40 meter-scale shallowing-up sedimentary cycles consisting of thick mudrock and thinner limestone beds. Rigorous testing of models for meter-scale cyclicity in the Kope has been hampered by insufficient correlational resolution. Recently, however, a high-resolution stratigraphy has been constructed for the Kope in northern Kentucky using marker horizons and through-going discontinuities.

My research will extend the new Kope stratigraphy into exposures to the north, then carry out stratigraphic, sedimentologic, and paleontologic analyses of it to evaluate three existing models for Kope Formation meter-scale cyclicity. They invoke temporal change in storm intensity, sea-level shallowing, or sea-level deepening as the primary control on cycle stratigraphic architecture. Initially, stratigraphic analysis will focus on a single mudrock-grainstone cycle and document sedimentologic, paleoecological, and taphonomic evidence for: energy of depositional environment; paleocurrent direction; evidence for sediment deposition, bypassing, or starvation; and depositional hiatuses. This analysis will be extended to other exposures of the same interval to reveal any lateral changes in sedimentologic and faunal character and interval thickness, and vertically to other cycles in the Kope for comparison. The resulting data trends will be used to test predictions about cycle architecture made using the three cyclicity models. If none of the models is satisfactory, an alternative will be constructed.