

From Clastic to Carbonate Facies: Borden Delta Destruction and Evolution of the Slade Carbonate Platform: Tectonics versus Eustasy, D. Brent Wilhelm and Frank R. Ettensohn, University of Kentucky, Lexington, KY 40506, brent.wilhelm@uky.edu, fettens@uky.edu

Clastic and carbonate depositional systems are generally well understood, but the cause of transition from one to the other are sometimes unclear. In some cases, why these changes occur and why they are so abrupt are still uncertain. One such example occurs in eastern Kentucky, where the Mississippian Nada and overlying Renfro members of the Borden and Slade formations, respectively, form a transition from deltaic, clastic environments to shallow-water carbonate environments. The change is generally accompanied by little or no transitional sequence, and in places, the contact is probably unconformable. Why and how this transition occurred is still debated.

Approximately 50 outcrops were examined for sedimentological, paleontological, and stratigraphic detail and correlated with well log data from the Appalachian Basin. The transition is generally sharp in east-central Kentucky where distal, deep-water, deep- to mid-ramp mudstones in the Nada are overlain by shallow upper ramp subtidal to supratidal dolomatized carbonates in the Renfro. However, in northeastern Kentucky the contact is generally gradational where shallow-marine, proximal delta-platform limestones with a diverse fauna grade upwards into lagoonal and peritidal dolostones in the Renfro. This contrast is probably best explained by the position and activity of two structural features, the Kentucky River Fault Zone, which bounds the Rome Trough to the north, and the Waverly Arch that is situated mostly north of the fault zone. Both structural features were active during late Paleozoic time and may have been reactivated in Mississippian time as a result of bulge moveout. Hence, synsedimentary activity on local structures may explain the changing nature of the clastic-carbonate, Nada-Renfro transition in different areas.