Middle Devonian Low Oxygen Brachiopod Biofacies

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Low oxygen environments have been described in both modern and ancient environments utilizing primarily trace fossil models (Rhoads and Morse, 1971, Savrda et al, 1984, Thompson et al., 1985). These models, however, are not useful in Paleozoic strata because the key trace fossils used in these models (e.g. *Zoophychus*, *Chondrites*) are not restricted to deep water, low oxygen environments as they are later in the Phanerozoic. In this study, brachiopods are examined as a tool for describing low oxygen environments, and coupled with sedimentological and trace fossil data can be a more useful proxy than the traditionally used trace fossils in Paleozic black shales.

Devonian strata of New York State provides an excellent opportunity to develop a low oxygen brachiopod biofacies model because black shales are abundant and are stratigraphically and sedimentologically well constrained. One particular genus of brachiopod (*Leiorhynchus*) occurs in assemblages ranging from monospecific in laminated black shales to higher diversities in gray shales suggesting that an oxygen gradient reflected in the brachiopod assemblages can be tracked through these strata.

Black shales from at least five different stratigraphic intervals from the Levanna, Ledyard, and Windom formations and the Geneseo and Penn Yan members of the Genesee Formation through the Givetian and lower Frasnian will be sampled from several localities across the paleo-basin to describe both temporal and spatial variability in black and gray shale brachiopod assemblages. Preliminary work suggests that brachiopod assemblages of varying diversity and taxonomic composition fluctuate with oxygen levels.