

4-2010

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Recommended Citation

Greff, K.G., W.S. Borowski, 2010. Changing depositional environments in an Upper Ordovician stratigraphic sequence, Ashlock Formation, Madison County, Kentucky, ECU Undergraduate Presentation Showcase, 9 April 2010.

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Changing depositional environments in an Upper Ordovician stratigraphic sequence, Ashlock Formation, Madison County, Kentucky

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We investigate the sedimentology, stratigraphy, and depositional environments of a 7-meter, Upper Ordovician limestone sequence cropping out in Richmond, Madison County, Kentucky. The stratigraphic section lies within the Ashlock Formation with good lateral exposure stretching along 200 meters of a highway roadcut. We took approximately 20 samples from the measured section, focusing on representative samples and lithologic transitions. We use standard laboratory procedures in slabbing rock samples and making thin sections.

The Ashlock Formation here consists of alternating layers of limey mudstone and limestone (field units A through F). Megafossils - brachiopods, bryozoans, trilobites, gastropods, ostracodes, coralline algae, and bivalves - are abundant in limestone units. These observations are consistent with depositional environments representing marine, shallow-water deposits. The contact between units F and G contains beads of weathered pyrite perhaps representing an omission surface. Field units G through J contain more terrigenous mud. The observed transition from limestones to lithologies with more terrigenous mud suggests any combination of: (1) increase in water depth; (2) climatic change resulting in more runoff; or (3) tectonic activity delivering more mud to the basin. The stratigraphic section is capped by fossiliferous limestone (unit K), which again represents shallow, marine conditions without terrigenous input.

EKU Undergraduate Presentation Showcase, 9 April 2010