

Sample Progress Report

PROGRESS REPORT

“Stratigraphic Architecture of Deep-Ramp Carbonates: Implications for Deposition of Volcanic Ashes, Salona and Coburn Formations, Central Pennsylvania”

by John Lerner

SCOPE AND PURPOSE

The Late Middle Ordovician-age Salona and Coburn formations of central Pennsylvania show cyclic patterns on a scale of tens of meters. Little research has been done on sequence stratigraphy of deep-water mixed carbonate/siliciclastic systems, and a depositional model for this environment is necessary to understand the timing and processes of deposition. The stratigraphic position of the bentonites at the base of the larger cycles is significant because it indicates that they accumulated during a time of non-deposition in a deep water environment.

PROGRESS

To date, I have described five lithofacies present in the Salona and Coburn formations. Two lithofacies are interpreted as storm deposits and make up the limestone component of the thinly-bedded couplets. Some trends were observed in the raw data; however, because of the “noisy” nature of the data, a plot of the five-point moving average of bed thickness was created to define the cycles better.

ADDITIONAL WORK

Two key tasks are to be completed in the coming weeks. With the results of these tests and the field observations, I will create a model for deposition of a deep-ramp mixed carbonate/siliciclastic system in a foreland basin environment. The model will include depositional processes, stratigraphic architecture, and tectonic setting.

REMAINING QUESTIONS

Questions remain regarding the depositional processes responsible for the featureless micrite at the base of the Salona Formation. How rapid was the transition? What record (if any?) remains of the transition? Were bentonites not deposited, or were they selectively removed at certain locations by erosive storm processes?

EXPECTED RESULTS

I expect to find that the large-scale cycles represent parasequences. Flooding surfaces are marked by bentonites and shales, with bentonites removed in some locations. If the cycles are true parasequences, the implication is that eustatic sea level changes and not tectonic influences controlled the depositional changes over the interval.