Problem and Objective

A study was conducted to characterize the Cambrian Mount Simon Formation in the Illinois Basin. The objective was to compile and analyze well log data basin-wide in order to produce a basin-scale depositional model.

Background

The Mount Simon Formation has been of increasing interest as a means of not only removing CO₂ from the atmosphere and sequestering it in the subsurface over long periods of time, but also as a potential source of energy. This formation is a large and deep saline reservoir that has recently been targeted in the southern part of the basin, and at its highest thickness, in the northern part of the basin. Structurally, the Mount Simon is at its lowest elevation where it is thinnest, unconformably overlies the Precambrian basement and is capped on top by the dolomites and limestones of the Starke Shale. The Mount Simon Formation is an Upper Cambrian sandstone that may be suitable for CO₂ sequestration and storage.

Facies analysis and Reservoir Characterization of the Cambrian Mount Simon Formation in the Illinois Basin: Implications for CO₂ Sequestration and Storage

Midwest Geological Sequestration Consortium, 2005)

Contour map of the Illinois Basin, showing the study area. (Blakey, 2005)

Cambrian North America

Depositional Environments

Facies 1 - Shallow Marine:
- Interbedded sandstone and mudstone
- Fine to coarse grain, moderately to very well sorted
- Burrow structure
- Steep, bimodal, crossbeds

Facies 2 - Muddy Tidal:
- Medium to very coarse grained sandstone, well sorted
- Flaser bedded sandstone
- Interbedded sandstone

Facies 3 - Transitional Eolian-Tidal:
- Well sorted medium to very coarse grained sandstone
- Biogenic? structures

Facies 4 - Muddy Tidal:
- Medium to very coarse grained sandstone
- Interbedded sandstone

Facies 5 - Transitional Eolian:
- Well sorted medium to very coarse grained sandstone
- Heavy bioturbation

Facies 6 - Eolian:
- Well sorted medium to very coarse grained sandstone
- Pebble conglomerates

Key to Stratigraphic Columns

- Sandstone
- Sandstone (bimodal)
- Conglomerate
- Brachiopod
- Burrow structure
- Interbedded sand
- Flaser bedded sandstone
- Biogenic? structures
- Heavy bioturbation

Preliminary Conclusions and Ongoing Work

The Mount Simon Formation has been identified as a potential site for CO₂ sequestration and storage. A basin-wide depositional model has been constructed to better understand the depositional environment and potential for CO₂ storage. Future work will involve more detailed analysis of core samples and well logs to refine the model and improve our understanding of the potential for CO₂ sequestration.