Faunal Distribution and Relative Abundance in a Silurian (Wenlock) Pinnacle Reef Complex - Ray Reef, Macomb County, Michigan

Jennifer L. Trout[1] and G. Michael Grammer[2]
[1]Western Michigan University, Michigan Repository for Research and Education, Kalamazoo, MI 49006, jennifer.l.trout@wmich.edu
[2]Western Michigan University, Michigan Repository for Research and Education, Kalamazoo, MI 49006, michael.grammer@wmich.edu

Niagaran reefs are important sources of hydrocarbons in the Michigan Basin and have been since their discovery in southwest Ontario in the early 1900's. In addition, some of these reservoirs have been used for gas storage and may be potential CO_2 sequestration sites.

Despite extensive research on Niagaran reefs, most studies concerning faunal abundance have been conducted by paleontologists with an emphasis on taxonomy, paleoecology, and evolution. Relatively few studies by sedimentologists have focused on faunal abundance as a potential indicator of reservoir characteristics.

The purpose of this study is threefold: 1) to quantitatively determine faunal abundance from subsurface cores of Ray Reef, 2) to determine if the faunal abundance is variable or consistent on windward vs. leeward margins vs. crest, and 3) to analyze porosity and permeability data in conjunction with faunal abundance. This will be accomplished by scanning core slabs to electronic images, marking the identified fauna on the electronic image, and using image analysis software to calculate faunal counts and the percentage of core surface area occupied.

Preliminary semi-quantitative observations show that the windward margin of Ray Reef is comprised mostly of low matrix rubble with more extensive cementation than is found along the leeward margin. Windward margins also contain a higher percentage of skeletal components, primarily stromatoporoids, tabulate corals and bryozoans than leeward margins.

Little is known about faunal distribution and relative abundance in ancient reef complexes, especially relative to windward/leeward orientation. If faunal distribution and relative abundance are factors that are indicative of reservoir characteristics such as porosity and permeability, then these proxies could point to more or less productive zones within the reef. In addition, this method may be used to investigate other reef types or reefs of other geologic ages that have different frame-building fauna.