

# **Hydrothermal Fluid Sources of Fault-Fracture Dolomite Petroleum Fields in the Trenton and Black River of Southern Michigan**

**Regina Dunseith<sup>1</sup>**

<sup>1</sup>Oklahoma State University, Petroleum, Stillwater, OK USA  
gfdunseith@gmail.com

## **ABSTRACT**

The type locality for fault/fracture hydrothermal dolomite petroleum fields is the giant Albion-Scipio trend in the southern Michigan Basin. In addition to the Albion-Scipio, a number of other parallel trending fault/fracture fields have been discovered in Trenton and Black River (Middle Ordovician) carbonates across southern Michigan. The sources and relative timing of hydrothermal dolomitizing fluids in these petroleum fields are poorly understood and are a longstanding problem. Analysis using thin section petrography, cathodoluminescence petrography, and stable carbon and oxygen isotopic geochemistry are being used to determine cement paragenesis in multiple oil fields and the relative timing of distinct diagenetic events. Fluid inclusion microthermometry of late stage carbonate cements will determine the salinity and temperatures of the hydrothermal fluids. Petroleum inclusions will be used in conjunction with petrographic techniques to determine timing of hydrocarbon emplacement. Strontium isotope analysis will be important in determining sources and regionality of the dolomitizing fluids. Specifically, consistently high  $^{87}\text{Sr}/^{86}\text{Sr}$  isotope values will indicate a likely deep regional source of basement granite or basement derived arkose for these fluids.