

Fracture Formation and Evolution in the Cardium Formation, Alberta Fold and Thrust Belt, Canada

Ozkul, C.¹

canalp.ozkul@utexas.edu

1. Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

The folded and thrustured Mesozoic clastic sequence of the Canadian Rocky Mountain foothills forms important hydrocarbon reservoirs with a long history of natural gas and oil production. Successful exploration and development of these unconventional reservoirs require understanding of fracture abundance, fracture evolution, and timing of fracture formation relative to the evolution of the fold and thrust system. The formation of fractures and their timing relationship relative to folding and thrusting has remained ambiguous. Fracture patterns in sandstones of the Upper Cretaceous Cardium Formation show that some fracture sets are subparallel to the fold axis and inclined to bedding. These fractures may have been formed after the fold hinge was established because they oppose the inclination on the two limbs when the structure is unfolded. However, most of the fracture development on the limbs of the fold may have occurred as the fold tightened to its final locked position. Ambiguity of fracture development and evolution has a large impact on fracture prediction and production of hydrocarbons. I intend to address this question by determining the timing of fracturing, the location of maximum fracture intensity relative to the fold hinges and thrusts, and how the fractures are related to evolution of the fold and thrust system. I will attempt to (i) reconstruct the thrust system evolution and strain distribution using structural modeling software(ii) calculate the strain resulting from the fracture development using scanline measurements; and (iii) tie the information obtained from fluid inclusion and cement textural analyses of fractures to the modeled sequence of evolution of the fold thrust system.

Keywords: Fracture, Fold and Thrust Belt, Balanced Cross- Section, Hydrocarbon Reservoir