

Evolution of the Appalachian Foreland Basin and Thrust Front, western Newfoundland.

Since 1990 significant new seismic data collected in western Newfoundland, both onshore and offshore, reveal a thrust front that includes a triangle zone or tectonic wedge cut by several later thrusts. The thrust front includes substantial along-strike variations. Wells drilled to date, have tested, or are testing structures associated with this thrust front. The adjacent foreland basin succession remains poorly described and under-explored.

The proposed research will produce reports on:

- 1) Foreland basin provenance, to shed light on potential porosity development
- 2) Timing and variability of the thrust front, to guide the search for additional structural traps
- 3) Outcrop-scale structures associated with the thrust front including fracture development

The objectives of this study are:

- 1) Provenance of foreland basin sediment samples from Port au Port Peninsula using petrographic and detrital zircon U/Pb methods. By distinguishing sources and compositional modes, we will shed light on the age, environment, and potential for porosity development.
- 2) Examine outcrop-scale structures associated with the Round Head thrust on the Port au Port Peninsula; to determine the transport direction. This will allow documentation and prediction of the state of strain near the thrust during deformation, and its impact on fracture development.
- 3) Examine available seismic data, onshore and offshore, to determine the timing of thrusting along the entire thrust front. Produce a coherent model of thrust front evolution, to guide the search for potential reservoir structures and fracture systems on land.