

# **Apatite Fission Track and U/Th He-Thermochronology to Unravel Uplift and Erosion History for 2D- Basin Modeling in Frontier Petroleum Basins – A Case Study of Western Newfoundland.**

**Martin Schwangler<sup>1</sup>**

<sup>1</sup>University of Alberta, Petroleum, Edmonton, Canada  
schwangl@ualberta.ca

## **ABSTRACT**

Newfoundland is situated on the Atlantic margin of Canada, and the west coast of the island comprises the east portion of the Anticosti Basin, one of the big Appalachian Basins. This area contains an active but poorly studied petroleum system. Despite past exploration and limited exploitation, the basin remains unsuccessful in terms of economic oil production. It has been suggested three orogenies (Taconian, Salinia, and Acadian) affected the current fold and thrust belt. Additionally, the uplift and erosion history past the Devonian is poorly studied and highly controversial.

This research will acquire the apatite fission track (AFT) and U/Th He (AHe) data to constrain uplift, erosion, and temperature history for this frontier onshore petroleum system. These data will be used to develop structural restorations and to calibrate 2D-basin models for the region.

To assess the thermal evolution of petroleum basins in general, and to advance understanding of oil generation and migration in complex tectonic fold and thrust belts, it is necessary to develop regional basin models. The limiting factor in frontier basins is often the availability of calibration data for these models. The proposed AFT and AHe thermochronology methods will provide reliable data on one of the most important calibration aspects in basin modeling: thermal evolution of a basin over time. This will further allow for a detailed understanding of the burial history and enable reliable restoration of the structural evolution of the fold and thrust belt in western Newfoundland.