

Analysis of seismic and gravity data collected from the Howley Basin, Howley, Newfoundland, Canada

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Little is known of the Carboniferous Howley basin, a lateral basin that is part of the Deer Lake Basin in between western Newfoundland's Humber and Dunnage zones. Shallow seismic reflection and high-resolution gravity data have been collected in the area with the purpose of imaging the basin. The results of this data can lead to a better understanding of the tectonic evolution of the Deer Lake area.

The Deer Lake Basin is a late Paleozoic, non-marine sedimentary basin located in western Newfoundland. It trends northeast-southwest lying parallel to the Cabot Fault Zone and is composed of two lateral basins separated by a positive flower structure. The eastern portion of the basin has been labeled the Cormack basin, whereas the western portion has been deemed the Howley basin. Because of petroliferous units found within the Deer Lake Basin's lacustrine facies there has been an interest in oil exploration within the area. This interest has led to extensive geological and geophysical studies performed in the Cormack leading to a characterization of its stratigraphy and structure, as well as an uneasy consensus on the development of the greater Deer Lake Basin. In contrast, there has been little geophysical exploration in the Howley basin. This can be attributed to the lack of visible outcrop within the Howley basin, which is largely covered by water, or Quaternary glacial till. This absence in data limits interpretation of the Howley basin's subsurface and structures within, and also makes any stratigraphic interpretations and correlations made with the Cormack basin subject to heavy speculation.

As part of the Petroleum Exploration Enhancement Program (PEEP) and with funding from NALCOR Energy, Memorial University has gathered seismic data on the Howley Basin from shallow reflection seismic surveys performed using a MUN-designed prototype source, and gravity data using a Scintrex CG-5 gravimeter. A major objective of this research is to characterize the stratigraphic and structural character of the Howley basin to provide an improved understanding of the tectonic evolution of the greater Deer Lake Basin and the nature of the eastern bounding Grand Lake fault.