

Progress Towards Understanding Petroleum Potential of the Lancaster Sound Region, Northern Nunavut

T. Brent*

Geological Survey of Canada, Canada
tbrent@nrcan.gc.ca

and

G. Oakey and J. Harrison
Geological Survey of Canada, Canada

Abstract

Industry interpretation of marine seismic exploration between 1971 and 1979 identified numerous structural culminations in the mouth of Lancaster Sound and in areas offshore east of Devon and northern Bylot islands; a total area of 65,000 km² including 32 mapped closures totaling 580 km². At least seven seismic stratigraphic units are recognized in the absence of well control. New evidence for the geometry and age of the oceanic rift system in northern Baffin Bay is provided by recently published analyses of marine magnetic and gravity data in the region. These new constraints have been useful for a revised interpretation of seismic sequence boundaries and associated deformation.

A new database has been compiled comprising all identifiable legacy industry seismic profiles. This poster illustrates selected seismic transects chosen from this data set and interpreted in light of the new tectonic framework. Lancaster Basin is a mostly Eocene failed rift developed on attenuated continental crust; an arm of the late Paleocene-Eocene age oceanic rift system located within Baffin Bay. Phanerozoic basin development on the continental margin south of the Lancaster rift is exclusively late Cretaceous to early Paleocene in age. In contrast, Eocene compressive deformation, superimposed on a Cretaceous-Paleocene system of rift-transform continental margin basins, is widespread to the north; a consequence of northwesterly-directed convergence of the Greenland plate.

This study, incorporating multi-disciplinary geophysical datasets, illustrates our latest synthesis of basin evolution, and crustal dynamics with implications for petroleum potential.