

Tracing the geology of offshore eastern Canada: a fifty year saga

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Prior to 1964, little was known about the ages and types of rocks forming the bedrock offshore eastern Canada, as most studies had focused on geophysics. The presence of Cretaceous and Tertiary rocks was suspected but there were no in situ bedrock samples other than from Georges Bank. How has this changed over the past fifty years and what led to our deeper understanding of the offshore geology? The most influential factor has been the growing understanding of plate tectonics and the realization that our offshore represents the western passive margin of the still-opening North Atlantic Ocean. This has underpinned the new views of our margins and their evolution. Other key developments accompanied the search for oil and gas. Exploration has led to extensive seismic surveying and the drilling of more than 300 wells and several core holes by industry. Government and the universities have also played a crucial role in collecting and interpreting paleomagnetic, gravity, and reflection and refraction seismic data, and establishing lithostratigraphic and biostratigraphic frameworks for the offshore basins. We now know that Precambrian, Paleozoic, Mesozoic and Cenozoic rocks, as well as extensive salt deposits, are all present offshore. Breakthroughs have included insights into the evolution not only of the North Atlantic Ocean but also of the Labrador-Baffin Seaway. Geodynamic modelling has shown how physical processes within and below the lithosphere control the evolution of our margin. As well, maturation studies, including visual kerogen, vitrinite reflectance, and Rock Eval have helped in the prediction of source rock occurrences. The advances in the first twenty-five years were reflected in the 1990 Decade of North American Geology (DNAG) volume "Geology of the Continental Margin of Eastern Canada" and in comprehensive basin atlases published by the GSC. Twenty years later, with the application of 3D reflection seismic, sequence and biostratigraphic-event stratigraphy, plus the increasingly sophisticated computer software and hardware, we are heading into a new era. It would be fascinating to be around for the 100-year review.