

A Revised Model for the Evolution of the Labrador Margin

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Summary

Petroleum exploration on the Labrador Margin during the late 1960s through early 1980s led to the discovery of recoverable reserves of 4.2 Tcf gas and 123 Mbbs of condensate. The resurgence of exploration activity in the past few years has highlighted the need for updated data and information on the margin, specifically better control on stratigraphic ages and units.

We have recently completed a major study of the margin that integrated new palynological analyses with a regional seismic interpretation, yielding new and consistent age control for the major lithostratigraphic units. The results include the identification of five regional unconformities clearly identified in the biostratigraphy: Aptian-Turonian, Selandian, Lutetian, Rupelian-Chattian, and middle-late Miocene. In addition, a Maastrichtian-Danian unconformity is recognized but appears to be restricted to the northeastern margin of the Labrador Sea. Other unconformities of various ages were recognized primarily from seismic data.

The tectonic evolution has been re-examined in light of recent research on non-volcanic margins, and now includes recognition of two stages of rifting on the Labrador Margin. The early phase represents the classical development of grabens and half-grabens which fill with rift-stage sediments. The late phase focuses on more distal regions with mantle exhumation and the development of transitional crust, accompanied by passive thermal subsidence further away from the zone of breakup.

The results of our studies are summarized in a new tectonostratigraphic chart which links the stratigraphic interpretation with tectonic and global events.