

Trans-Labrador Sea Modern Reflection Data Show Unorthodox Rift

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During 2006 Geophysical Service Incorporated (GSI) acquired two regional multi-channel seismic (MCS) reflection lines across the Labrador Sea at the approximate latitude of the northern Saglek Basin, on the Labrador shelf (Canada) and Lady Franklin Basin on the Greenland shelf (Denmark). More precisely, the two NE-SW trending lines run between 59° and 63° North Latitude and 51° to 63° West Longitude and are each approximately 750 km long. The data was acquired using a 7200 m streamer, a 37.5 m source point interval, and a 12.5 m group interval resulting in a nominal fold of ninety-six. The lines were recorded to 12 seconds and processed to prestack time migration using a Kirchhoff curved ray algorithm.

These data are crucial for deciphering the nature of the basement beneath the sedimentary cover of the Labrador Sea shelf, slope and rise. They also help to clarify the evolution of the Labrador Sea and its sedimentary basins through the following stages: 1) Mesozoic intra-cratonic extension (intercontinental rifting); 2) mantle exhumation and transitional crust formation; 3) Cenozoic oceanic crust creation (oceanic rifting) and 4) cessation of oceanic rifting (drifting) with associated prominent regional thermal subsidence. The lines are complementary to earlier MCS research data in the area and offer critical information in determining:

- (a) if any true oceanic crust was emplaced between the northern Labrador and Greenland margins;
- (b) the location, timing, extent and modality of such emplacement; and
- (c) if a continuous mid-ocean ridge was active in the area.

These lines will also provide fundamental geoscientific data in support of Canada's ongoing United Nations Convention on the Law of the Sea (UNCLOS) negotiations regarding the delineation of maritime jurisdictional boundaries in the Labrador Sea. Of particular interest is that the lines show the presence of thick Mesozoic and probably older sedimentary basins with potential hydrocarbon resources, in currently drillable water depths (3km) lying far seaward of the 200 NM limit, and well beyond any boundary that might be defined by currently proposed bathymetric criteria. In this regard the GSI lines can be used to support an extension of Canada's

jurisdiction boundary to include new areas of significant environmental and economic interest. Similar observations relating to the extension of sedimentary basins into the Labrador Sea deepwater have also been made using data sets that were recorded for petroleum exploration on the Greenland margin.

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