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Trans-Labrador Sea modern reflection data show unorthodox rift

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During 2006 Geophysical Service Incorporated (GSI) acquired two regional multichannel 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 59ž and 63ž North Latitude and 51ž to 63ž 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: if any true oceanic crust was emplaced between the northern Labrador and Greenland shelves; the location, timing, extent and modality of such emplacement; and if a continuous mid-ocean ridge was active in the area. 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. 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 West Greenland margin. In the Labrador Sea case, crustal geophysical data can be used to establish marine jurisdiction based on structure and nature of the continental margin rather than bathymetry or thickness of sedimentary cover overlying basement.