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Early Rifting of the Labrador Sea and Baffin Bay: A New Evidence from Seismic, Well and Sea-Bed Data

The sedimentary basins in the Labrador Sea - Baffin Bay region have previously been interpreted as the result of two main rifting episodes, one in the Early Cretaceous, and one in the Palaeogene. The latter was associated with extensive Late Paleocene volcanism and continental break-up between Canada and Greenland.

However, modern seismic data combined with an integrated seismic-gravity-magnetic (SGM) interpretation suggest a much earlier history of basin development in the region and furthermore challenge the position of the continent-ocean boundary in Palaeogene time.

Seismic data combined with gravity data have proven the existence of very deep sedimentary basins where only the upper half may be correlated to known Cretaceous and Palaeogene sequences. The age and nature of the deeper sedimentary sequences are unknown. However, regional analogues and the existence of reworked clasts and microfossils suggest that Lower Palaeozoic and Mesozoic sediments may be present. The presence of Oxfordian-Kimmeridgian dinoflagellates is very encouraging for petroleum exploration possibilities and the geochemistry of oil seeps also suggest that several pre-Upper Cretaceous marine source rocks exist in the region.

The present data strongly suggest the presence of a system of connected older rift basins and several episodes of strike-slip movement calling for a renewed discussion of the extent and timing of sea-floor spreading.

Many of the emerging basin models obviously have very strong implications for the prospectivity of the Labrador Sea - West Greenland region, especially because the chances for finding Cretaceous and older oil-prone source rocks seem higher than previously believed