



## **Continental breakup and early sea-floor spreading offshore eastern Canada**

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This paper will review the nature of continental breakup and earliest sea-floor spreading offshore eastern Canada from the Newfoundland basin to Davis Strait, based on observations from deep seismic reflection and refraction profiles. These margins are non-volcanic and continental breakup occurred in a complex sequence beginning in the south between Grand Banks and Iberia in the early Cretaceous and ending in the north between Labrador and Greenland in the early Paleocene. This was a period with no major plume-related volcanism on the margins apart from that evidenced by the Newfoundland Ridge. In the Newfoundland basin, we observe a wide transitional region in the southern part, with partially serpentinized mantle overlain by basement varying from highly thinned continental crust to highly serpentinized mantle (HSM). This transitional region becomes narrower to the north and the HSM zone terminates south of Flemish Cap. At magnetic chron M3/M4 time, oceanic crust first occurs in the south and at chron M1 time in the north. The crust is thinner in the north where it resembles crust produced at ultra slow spreading centres. Robust oceanic crust finally appears within the Aptian, when breakup of Newfoundland with southern Rockall progressed north of Flemish Cap and rifting began in the Labrador Sea. This pulse is possibly contemporaneous with volcanism associated with the Newfoundland Ridge. Another period of slow rifting and breakup followed between Labrador and Greenland until chron 31, when oceanic crust first occurs offshore central Labrador, to chron 27 when it appears further to the north. These results suggest a consistent pattern of slow rifting beginning in the south, with variable exposure of mantle or production of ultra slow spreading crust, followed by abrupt production of more robust ocean crust leading to the next phase of slow rifting on the following margin segment to the north.