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# Deep crustal structure of the rifted margin of eastern Grand Banks, Newfoundland, Canada

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When the margins of Newfoundland and Iberia rifted in the Late Jurassic and Early Cretaceous, deep lithospheric rocks were exhumed to shallow levels on both flanks. The distribution of crustal and mantle rocks give us insight in the mode of extension that lead to breakup. We present a profile of the seismic and density profile across the eastern rim of the Grand Banks, the Flemish Pass, and into the northern Newfoundland Basin. The 27 km thick crust beneath Flemish Pass presumably experienced some stretching during the rift. Further seaward, the continental crust tapers rapidly beneath the continental slope to $\sim$6 km. In the distal margin we find a 60 km wide zone with seismic velocities between 5.0 and 6.5 km/s that thins to the southeast from 6 km to 2 km, which we interpret as highly extended continental crust. Contrary to other seismic studies of the margins of the Grand Banks, we find seismic velocities of 8 km/s and higher beneath this thin crustal layer in the continent-ocean transition. We conclude that mantle was locally emplaced at shallow levels without significant hydration from seawater, or serpentinized mantle in removed along a decollement in the final stages of the continental rift. The outer edge of highly extended continental crust borders a 25 km wide zone where seismic velocities increase gradually from 6.3 km/s just below the top of acoustic basement to 7.7 km/s at 5 km below basement. The eastern Grand Banks appear to have a particularly wide section of thinned continental crust in the distal margin, whereas the conjugate southern Iberia Abyssal Plain is characterized by a broad zone of exhumed continental mantle. This difference in seismic structure indicates an asymmetric separation of the crust in the late stages of the rift.