

**Structure of the crust in the Canadian Appalachians;
Implications for the development of the Maritimes Basin**

F. Marillier

*Atlantic Geoscience Centre, Geological Survey of Canada, Bedford Institute of Oceanography,
P.O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada*

The scale of the Late Paleozoic Maritimes Basin indicates that the basin formed as a result of tectonic events involving the entire lithosphere. As a result, the crust, which was affected in various ways by these events, contains clues for the formation of the basin.

Recent deep seismic reflection and refraction studies carried out as part of the Frontier Geoscience Program and Lithoprobe East have revealed the structure of the crust in the northern Appalachians. The reflection data suggest that the lower crust can be subdivided into three zones: the margin of the Grenville craton to the west, a zone associated with the Avalon Province to the east, and, between these two, a central zone of unknown affinity. The Maritimes Basin developed over the three zones, but its thickest part (up to 12 km) occurs

in the Magdalen Basin over the thinned Grenville margin.

Seismic and gravity data interpreted jointly indicate an unusually thick crust (43 km) under the Magdalen Basin with a high density/high velocity layer in its lowermost part. This has been interpreted in terms of mafic and ultramafic rocks which intruded the lower crust, presumably as a result of decompressional melting in the upper mantle. Modelling studies indicate that the presence of hot material in the crust controls the rate of sedimentation.

The sedimentation patterns in the Magdalen Basin indicating an initial crustal extension (Late Devonian–Early Carboniferous) followed by thermal relaxation over a long period of time (Carboniferous to Permian) are consistent with such studies.