Deep Seismic Profiling on the Atlantic Margins of Canada

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8000 km of multichannel, normal-incidence, deep seismic reflection profiles have been recorded on the Atlantic margins of Canada in the last 15 years by academic and government groups. Wide-angle seismic data at a number of locations provide critical seismic velocities.

The geological targets have ranged from Proterozoic continental accretion; Paleozoic ocean opening, and closure in the Appalachian orogen; and the Mesozoic and Tertiary opening of the Atlantic Ocean, and the accompanying development of sedimentary basins.

The last major tectonic episode in each part of the region dominates the reflection fabric. Inboard of the modern shelf, the last events were associated with orogenesis, but the precise origin of the fabrics are still debated: collisional tectonism, or subsequent extensional collapse?

The history of development of the modern continental margin and the sedimentary basins that evolved with it, can be related to the stepwise northward migration of the onset of seafloor spreading. Each rifting episode can be seen to make use of pre-existing structures to some extent. Extensive salt diapirism occurs in some parts of the margins, adding a degree of uncertainty to tectonic reconstructions. The variety, and overlap, of rifting episodes that have been observed here, seen in the broader context of the conjugate margins, continues to provide many research opportunities of relevance both to the understanding of rifting processes and to the development of hydrocarbon plays.