

Evolution of the Appalachian Laurentian margin: Lithoprobe results in western Newfoundland

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Abstract

ABSTRACT

The Humber Zone of the western Newfoundland Appalachians represents the early Paleozoic Laurentian margin established by Neoproterozoic rifting. After a period of passive margin thermal subsidence, Taconian deformation began in the Early Ordovician with westward thrusting. Subsequently, an extensive foreland basin developed beneath the Gulf of St Lawrence. It records rapid Late Ordovician to Early Silurian subsidence; mid-Silurian erosion; and renewed Late Silurian to Devonian subsidence. The Humber Zone was traversed by Lithoprobe seismic reflection profiles. Within the external part of the orogen, seismic reflections in the upper crustal section appear more coherent where seismic lines are parallel to fold hinges. Some subhorizontal reflectors are interpreted as thrust sheets of shelf limestone, but others probably represent intrabasement structures. A group of moderately northwest-dipping reflections probably represents late extensional shear zones. On the Baie Verte Peninsula, low-angle reflections passing beneath the Baie Verte Line are probably also late extensional shears, possibly reactivating earlier thrusts. Tectonism in the Humber Zone probably began with attempted eastward subduction of the Laurentian margin. Deep burial of the margin, accompanied by eclogite-facies metamorphism, probably coincided with rapid subsidence in the foreland basin. Later Barrovian metamorphism was associated with cleavage development and east-directed shear, and with dextral oblique slip, in Baie Verte Peninsula. Later Silurian sinistral transpression with thrusting east of the Baie Verte Line was followed by dextral transpression to transtension. "Acadian" thrusting dominated the western margin of the orogen in the Devonian and possibly earliest Carboniferous.

Reference for the full paper:

Waldron, J.W.F., Anderson, S.D., Cawood, P.A., Goodwin, L.B., Hall, J., Jamieson, R.A., Palmer, S.E., Stockmal, G.S., Williams, P.F. Evolution of the Appalachian Laurentian margin: Lithoprobe results in western Newfoundland. *Canadian Journal of Earth Sciences* 35: 1271-1287, 1998