

### **Geologic history of the Gander Zone and the Exploits Subzone in Newfoundland during the Early Paleozoic: a review**

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During the Cambrian and Early Ordovician, the Gander Zone and the Exploits Subzone of the Dunnage Zone formed continental margin and oceanic terranes, respectively. These lay adjacent to the continent of Gondwana, which is represented in North America by the Avalon Zone. Evidence for their separation from Laurentia and the oceanic terranes of the Notre Dame Subzone is provided principally by faunal provinciality. Gondwanan faunal provinces in early Llanvirn and older rocks are restricted to the area southeast of Red Indian Line and Laurentian provinces to northwest of the line.

Although the Exploits Subzone and the Gander Zone were located on the same side of the Iapetus Ocean, they developed in separate tectonic settings until the late Arenig. Rocks of the Exploits Subzone formed on oceanic crust in an island arc and back-arc system, while those of the Gander Zone were probably deposited on continental crust as a continentally-derived sedimentary wedge.

In the late Arenig, rocks of the Exploits Subzone were thrust onto the Gander Zone during a tectonic event equated with the Penobscot Orogeny of Maine. This orogeny was roughly synchronous with the Taconian Orogeny, but is

distinct because the two occurred on opposite sides of the still open Iapetus Ocean.

Following the Penobscot Orogeny, an upper Arenig to lower Llanvirn overlap sequence was deposited with varying degrees of conformity and unconformity on both the Gander Zone and the Exploits Subzone. Thermal activity later in the Llanvirn caused high grade metamorphism and granite intrusion in deep Gander Zone rocks, and granite intrusion and volcanism in rocks of the overlying Exploits Subzone. Most magmas of this age contrast with earlier ones in that they contain significant amounts of old, continental material.

A second overlap sequence succeeded the Llanvirn thermal activity. It has sporadic upper Llanvirn to lower Llandeilo limestone at its base, followed by Llandeilo to Ashgill black shale, Caradoc to Llandovery turbidites, and Ashgill to Ludlow shallow marine and subaerial deposits. Fossils in these rocks belong to Laurentian faunal provinces and indicate that from the late Llanvirn onwards there was free migration across the remnants of the Iapetus Ocean.

Renewed thermal activity in the Silurian Salinic Orogeny caused major granite intrusion and subaerial volcanism, and was accompanied by mainly sinistral shearing that dis-

placed the Exploits Subzone southwestward relative to the Gander Zone, and the Gander Zone southwestward relative to the Avalon Zone. Post-tectonic granite intrusion sealed the

boundary between the Gander and Avalon Zones in the Devonian and may have continued into the Carboniferous.