
**Proterozoic to early Paleozoic lithotectonic
terrane in New Brunswick, Canada**

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A significant advance was made to the understanding of the geodynamics of the Appalachian orogen with the introduction of four lithotectonic zones defined on the island of Newfoundland by Hank Williams in the early 1960s. The plate tectonic evolution of these zones was interpreted in terms of a simple, orthogonal Wilson Cycle. In such a model, the Humber Zone in the west and Gander Zone in the east represented opposing Laurentian and Gondwanan continental margins of the Paleozoic Iapetus Ocean. Vestiges of Iapetan island arcs and oceanic crust were preserved in the intervening highly deformed Dunnage Zone. The clastic sedimentary rocks characterizing the Gander Zone were thought to represent the continental rise prism deposited along the margin of Gondwana represented by the Neoproterozoic basement rocks of the Avalon Zone. The application of suspect terrane concepts in the early 1980s led to the recognition that the tectonic evolution of the Appalachians was far more complex than previously envisioned. The Gander and Avalon zones came to be viewed as separate ribbon microcontinents that were rifted at different times from different parts of the Gondwanan margin - Ganderia from the Amazonian craton and Avalonia from a position between the West African and Amazonian cratons. These microcontinents and fringing volcanic arc systems were subsequently accreted to the Laurentian continental margin during various episodes of Paleozoic orogenesis associated with oblique subduction of Iapetan ocean crust and closure of backarc basins.

Eight pre-Silurian lithotectonic terranes are presently recognized along the peri-Gondwanan margin of Iapetus in New Brunswick. The Caledonia terrane, which forms part of Avalonia, comprises Neoproterozoic continental volcanic arc rocks and comagmatic plutons. The **remaining terranes are associated with Ganderia** and include: Brookville terrane - Mesoproterozoic to Neoproterozoic platform carbonates and Neoproterozoic to Early Cambrian plutonic rocks; New River terrane - Neoproterozoic volcanic and comagmatic plutons unconformably overlain by Early to Middle Cambrian rifted arc volcanic rocks; Annidale terrane - Late Cambrian to Early Ordovician arc-backarc volcanic rocks unconformably overlain by late Early Ordovician volcanic rocks; St. Croix terrane - Cambrian to Late Ordovician sedimentary rocks deposited along the continental margin of Ganderia; Miramichi terrane - Cambrian to Early Ordovician sedimentary rocks unconformably overlain by Early to Late Ordovician, ensialic, arc-backarc

volcanic rocks; Elmtree terrane - Middle to Late Ordovician, backarc ophiolitic and sedimentary rocks; and Popelogan terrane - Middle to Late Ordovician volcanic arc and sedimentary rocks. The accretion of these terranes to the Laurentian margin is attributed to four major tectonic events: Early Ordovician Penobscot Orogeny; Late Ordovician Taconic Orogeny; Late Ordovician to Late Silurian Salinic Orogeny; and Late Silurian to Early Devonian Acadian Orogeny.