

Geological Correlations Between Northern Nova Scotia, New Brunswick and Newfoundland: Underexplored Mineral Potential in Nova Scotia

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The northern Appalachian orogen preserves vestiges of peri-Laurentian and peri-Gondwanan arcs and microcontinental terranes that can be traced from Newfoundland, through Nova Scotia, to New Brunswick and New England. Many of these arcs and microcontinental terranes exposed in New Brunswick and Newfoundland contain mineral deposits that have significantly contributed to the economy of those provinces. In contrast, these same arcs and microcontinental terranes in northern Nova Scotia remain underexplored and their economic potential is relatively unknown. This situation is largely due to the continued misconception that northern Nova Scotia lies entirely within the Avalon zone or terrane (“Avalonia” in the latest terminology) and the fact that no modern geological maps of the area have been published. As a result, exploration activities in northern Nova Scotia have been significantly hindered.

Northern Nova Scotia, Newfoundland and New Brunswick are strikingly similar in rock types, ages and isotopic signatures. The Blair River Inlier in northwesternmost Cape Breton Island is a fragment of the Laurentian (Grenvillian) margin and is similar to Grenvillian inliers in the Humber Zone of western Newfoundland and elsewhere in the Grenville Province. The Grenville Province hosts numerous past-producing Zn-Pb-Ag-Au (\pm Cu) mines as well as Ni-Cu and Fe, Au, Mo, Zn and U deposits. The Blair River Inlier is in faulted contact with Neoproterozoic through lower Paleozoic rocks of the Aspy terrane to the south.

Lower Paleozoic rocks in the Aspy terrane formed in arc/back arc settings and may be correlative to rocks exposed in the Exploits Subzone in Newfoundland and the New-River-Annidale -Miramichi-Tetagouche belts in New Brunswick. These belts comprise the Penobscot and Popelogan-Victoria arcs and host significant VMS deposits, as well as granite-related occurrences of Sb, Sn, W, Au and other metals. Granite plutons of similar ages and chemical characteristics are a major component of the Aspy terrane.

The boundary between Aspy terrane and Bras d’Or terrane to the south is marked by major shear zones (i.e., Eastern Highlands shear zone) that contain gold occurrences similar to the Hope Brook gold occurrence and other shear-related gold occurrences in central Newfoundland and New Brunswick. The mainly Neoproterozoic Bras d’Or terrane is interpreted to represent the continental margin (gneiss, marble-metasedimentary rocks, granitoids rocks) on which lower Paleozoic Gander zone sedimentary rocks were deposited. These basement rocks host the Burnt Pond VMS occurrence in Newfoundland and in Nova Scotia the Lime Hill sulphide deposit.

The Mira terrane of southeastern Cape Breton Island and the Antigonish and Cobequid Highlands of northern mainland Nova Scotia are part of Avalonia and consist of rock units similar to those in eastern Newfoundland and southern New Brunswick. Several sulphide occurrences are hosted in the Late Neoproterozoic volcanic rocks (i.e., Winter Hill and Frenchmans Head in Newfoundland, Stirling in Cape Breton Island, and Teahan-Lumsden in New Brunswick). Recently, the potential for epithermal gold occurrences in Newfoundland and southern New Brunswick has been recognized, and also in the Cobequid Highlands.

Rock units in northern Nova Scotia are largely untapped in terms of mineral resources. By recognizing the fact that the geology is similar to that of Newfoundland and New Brunswick, companies may be better able to develop appropriate strategies to do more exploration and development activity.

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