

Geological setting of Au-Cu-Ni-Pb occurrences in the Second Gold Brook area, southwestern Cape Breton Highlands, Nova Scotia, Canada

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Exploration and mining activity in the Gold Brook area of the southwestern Cape Breton Highlands dates back to the late 1800s, and focused on auriferous quartz veins in metasedimentary and metavolcanic rocks of what was then called the Precambrian George River Group. As a result of mapping in the 1980s, the metamorphic rocks were reassigned to the Silurian Sarach Brook Metamorphic Suite. Subsequent work in the southern Cape Breton Highlands did not include the Second Gold Brook area, in spite of its apparent economic potential. Hence this study was undertaken to provide enhanced understanding of the geology of the Second Gold Brook area, including mapping, sampling, petrographic interpretations and chemical analyses. Results so far show that the area is underlain by mafic metavolcanic rocks (amphibolite) interlayered with metasedimentary rocks and intruded on the east by granite of probable Devonian age. Petrographic features indicate that the metamorphic grade increases from south to north across the area. Chemical characteristics of the mafic metavolcanic rocks suggest they are tholeiitic and mixed MORB plus within-plate characteristics suggest that they may have formed in a back-arc setting. Chemical similarity suggests that they are related to the Silurian Sarach Brook and MacRae Brook formations elsewhere in the highlands. No indications of economic Au or other mineralization are evident in the chemical signatures of the metamorphic rocks, suggesting that such occurrences may be confined to the areas of historical mining activity.

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