Energy, Mines and Resources Canada / Énergie, Mines et Ressources Canada

GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

MAP 1749A

GEOLOGY

ANTIGONISH HIGHLANDS

NOVA SCOTIA

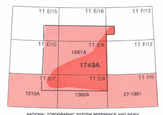
Scale 1:50 000 - Échelle 1/50 000

Kilometres 0 1 2 3 4 Kilometres

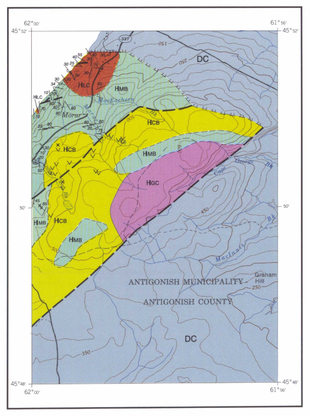
Universal Transverse Mercator Projection

Projection transverse universelle de Mercator

INDEX MAP



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS



LEGEND

SEDIMENTARY AND VOLCANIC ROCKS

QUATERNARY
PLEISTOCENE AND RECENT
- Qs — *Sand and gravel*

DEVONO-CARBONIFEROUS
- DC — *Undivided*

unconformity

EARLY DEVONIAN
ARISAIG GROUP (**OSs-Dk**; *undivided* **Sa**)
- Dk — *KNOYDART FORMATION; greyish-red mudstone, siltstone*
- Ds — *STONEHOUSE FORMATION: bluish-grey siltstone, calcareous siltstone*

LATE SILURIAN
- SMO — *MOYDART FORMATION: green mudstone, siltstone, to red mudstone*
- SMC — *McADAM FORMATION: grey to green siltstone, shale, minor limestone*
- SF — *FRENCH RIVER FORMATION: blue-grey siltstone, mudstone*

EARLY SILURIAN
- SR, SRu, SRl — *ROSS BROOK FORMATION: blue-grey shale, siltstone.* **SR**, *undivided;* **SRu**, *upper;* **SRl**, *lower*
- SBv, SBu, SBl — *BEECHILL COVE FORMATION:* **SBv**, *rhyolite;* **SBu**, *blue-green siltstone;* **SBl**, *arkose*

local unconformity

ORDOVICIAN-SILURIAN
- OSbc–OSs — *BEARS BROOK FORMATION:* **OSs**, *red arkosic sandstone, conglomerate.* **OSbv**, *rhyolite, rhyolitic tuff, minor basalt*
- OS — *Arkosic conglomerate, red siltstone, blue-green siltstone (undivided)*

unconformity

EARLY ORDOVICIAN
IRON BROOK GROUP (**CBu–Or**)
- Or — *FERRONA FORMATION: ironstone, quartzite, calcareous tuff*

EARLY CAMBRIAN
- CLl, CABu, CABl, CBu, CMc — *LITTLE HOLLOW FORMATION:* **CLh** *pink limestone, red shale*
- *BLACK JOHN FORMATION:* **CBu** *red conglomerate, sandstone, shale*
- McDONALDS BROOK GROUP (**CMc–CABu**)
- *ARBUCKLE BROOK FORMATION: basalt and basaltic tuff, rhyolite and rhyolitic tuff, red shale, minor pink limestone.* **CABu**, *upper;* **CABl**, *lower*
- *MALIGNANT COVE FORMATION:* **CMc**, *red conglomerate, sandstone, shale*

unconformity

EARLY HADRYNIAN
GEORGEVILLE GROUP (**Hk–Hg**)
- Hg — *Undivided sediments* (**Hcs–Hsr**)
- Hsr — *SOUTH RIGHTS FORMATION: black-green mudstone, minor greywacke, basalt*
- Hc — *CLYDESDALE FORMATION: basalt, black-green mudstone, greywacke*
- HLc, HLm, HLr — *LIVINGSTONE COVE FORMATION:* **HLc**, *green conglomerate, black mudstone*
- *JAMES RIVER FORMATION: conglomerate, black and green mudstone, greywacke, minor basalt.* **HLm**, *undivided;* **HLru**, *upper;* **HLrl**, *lower*
- HMh, HMb — *MAPLE RIDGE FORMATION:* **HMh**, *black and green mudstone, minor greywacke*
- *MORAR BROOK FORMATION:* **HMb**, *black mudstone, minor chert and limestone*
- HCs — *CHISHOLM BROOK FORMATION: mafic flows, tuff and breccia, interbedded marble*
- HKc — *KEPPOCH FORMATION: undivided volcanics*
- HKM — MOOSE RIVER MEMBER: *interlayered rhyolite, mafic tuff and flows, slate, minor greywacke*
- HKA, HKB, HKC, HKD — FRASERS BROOK MEMBER: **HKA**, *rhyolite, minor andesite, basalt, red siltstone, slate;* **HKB**, *andesite, minor rhyolite, basalt, red siltstone, slate;* **HKC**, *basalt, minor andesite, rhyolite, red siltstone, slate;* **HKD**, *red siltstone, slate, minor volcanics*

INTRUSIVE ROCKS

- *Dyke (age uncertain; felsic, mafic)*

DEVONO-CARBONIFEROUS
- DCg — *BARNEYS RIVER, GUNN LAKE PLUTONS: granite, granodiorite (intrudes BEECHILL COVE FORMATION)*

ORDOVICIAN-SILURIAN
- OSg — *Granite, vent complex*

CAMBRIAN OR YOUNGER (upper age limit unknown)
- Pg — *Granite (intrudes FERRONA FORMATION)*
- Ps — *Syenite (intrudes ARBUCKLE FORMATION)*

EARLY CAMBRIAN
- Cgb — *Gabbro*

LATE PRECAMBRIAN OR YOUNGER (age uncertain)
- HCg — *OHIO, JAMES RIVER, INDIAN LAKE PLUTONS: granite, granodiorite*

LATE PRECAMBRIAN
- HA — *ALASKITE APPINITIC COMPLEX*
- HGC — *GREENDALE COMPLEX: appinite, lamprophyre, pegmatite, microgranite, basalt, marble*
- *BLACK BROOK PLUTON: appinite, minor microgranite*
- *EDEN LAKE COMPLEX: appinite, hornblende syenite, pegmatite, microgranite*

Rock outcrop
Granite, granodiorite
Outcrop of volcanic rock (mafic, intermediate, dacite, felsic)
Geological boundary (defined, approximate, assumed)
Magnetic anomaly
Bedding, top known (horizontal, inclined, vertical, overturned)
Bedding, top unknown (inclined, vertical)
Fracture cleavage (vertical)
Cleavage, S_1 (inclined, vertical)
S_2 (inclined, vertical)
S_3 (inclined)
Lineation (inclined)
Minor fold (arrow indicates plunge)
Fault (defined, approximate, assumed)
Unconformity (defined, assumed)
Antiform (defined, arrow indicates plunge)
Antiform (overturned, arrow indicates plunge)
Synform (defined, arrow indicates plunge)
Synform (overturned, arrow indicates plunge)
Fossil locality
Mine
Mineral occurrence

MINERALS

Copper	Cu	*Silver*	Ag
Lead	Pb	*Zinc*	Zn
Pyrite	PY		

Geology by J.B. Murphy, J.D. Keppie, and A.J. Hynes, 1982

Geological cartography by the Geological Survey of Canada

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Base map assembled by the Geological Survey of Canada from parts of maps published at the same scale by the Surveys and Mapping Branch in 1980, 1981, 1982

Copies of the topographical editions covering this map area may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, Ontario, K1A 0E9

Approximate magnetic declination 1990, 21°43'W decreasing 3.4' annually

Elevations in feet above mean sea level

DESCRIPTIVE NOTES

This geological map illustrates the distribution of pre-Carboniferous rocks in an area covered by parts of NTS map sheets 11E/7,8,9,10,16 and F/13. The northeastern corner of this map, the northern Antigonish Highlands, was mapped by Murphy et al. (1982). Four major sequences predominate: the late Precambrian Georgeville Group, the Cambro-Ordovician Iron Brook and McDonalds Brook groups, and the uppermost Ordovician to Silurian Arisaig Group. Plutonic rocks range in age from late Precambrian to Devono-Carboniferous.

The Georgeville Group consists of subaerial to shallow marine volcanic rocks, interlayered with volcanogenic and calcareous sediments near the top of the sequence and overlain by a thick sequence of turbidites and minor mafic volcanic rocks. This stratigraphy records the progressive development of a sedimentary basin. The geochemistry of the volcanic rocks indicates that there are at least three distinct contemporaneous volcanic rock types: (i) a calc-alkalic and basaltic andesite, (ii) a continental within-plate tholeiitic-alkalic basalt, and (iii) volcanic arc-related rhyolites. The geochemistry and stratigraphy suggest that the Georgeville Group is genetically associated with subduction and was deposited in an intra-arc or peri-arc basin.

Deformation of the Georgeville Group by thrusts, easterly vergent isoclinal folds and north-south and east-west upright folds is associated with westward telescoping and closure of the basin. Synchronous movement along major northeast-trending strike-slip faults may have accompanied this deformation and may have continued into the Cambrian. Intrusions by ca. 600 Ma appinitic gabbro and granite are spatially associated with the major faults.

Cambrian-Lower Ordovician rocks of the Antigonish Highlands were deposited in a pull-apart basin associated with a dextral transpressional stage of the late Precambrian Avalonian-Cadomian Orogeny. Two groups of rocks were deposited: the predominantly sedimentary Iron Brook Group and the predominantly volcanic McDonalds Brook Group. The rocks were deposited in a continental to shallow marine environment. The geochemistry of the volcanic rocks is consistent with a continental within-plate tectonic environment and is genetically related to the development of the pull-apart basin. Cambrian plutonic rocks (granite and gabbro) display geochemical characteristics consistent with a transpressional environment. The basin was deformed by thrusts and isoclinal folds probably in the Middle Ordovician. Deformation is possibly related to sinistral motion on northeast-trending faults.

Late Ordovician to Early Devonian rocks of the Arisaig Group consist of mafic to felsic volcanic rocks overlain by a thick sequence of fossiliferous siliciclastic rocks, and were deposited in a continental to shallow marine environment. The geochemistry of the volcanic rocks is consistent with a continental rift-related tectonic environment. These rocks were deformed by faults and thrusts, probably in the Middle Devonian. Upper Devonian-Carboniferous plutonic rocks are associated with the transpressional stages of the Acadian Orogeny and may be related to the docking of the Meguma Terrane.

REFERENCE

Murphy, J.B., Keppie, J.D., and Hynes, A.J.
1982: Geological map of the northern Antigonish Highlands, Nova Scotia Department of Mines and Energy, Map 82-3.

Nova Scotia Department of Mines and Energy

Contribution to Canada-Nova Scotia Mineral Development Agreement 1984-89, a subsidiary agreement under the Economic and Regional Development Agreement. Project funded by the Geological Survey of Canada

Copies of this map may be obtained from the Geological Survey of Canada:
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7

Canada

Printed by the Cartographic Information and Distribution Centre. Published 1991

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1991: Geology, Antigonish Highlands, Nova Scotia; Geological Survey of Canada, Map 1749A, scale 1:50 000