Newfoundland & Labrador

Andre Lake

The Andre Lake area (NTS 23I/12) is situated approximately 50 km southeast of Schefferville, Québec, in the south-central part of the New Québec Orogen (Wardle, 1979; Wardle et al., 2002). The area straddles the boundary between Paleoproterozoic (ca. 2.17–1.83 Ga) supracrustal rocks of the Kaniapiskau Supergroup and underlying Archean basement (Labrador Trough; Clark and Wares, 2005) and Archean gneisses of the Griffis Complex (Baleine Domain; Hammouche et al., 2011; Lafrance et al., 2020).

This updated map of the Andre Lake area was constructed from field survey data collected in the summer of 2018. Additional data, including outcrop locations and structural measurements compiled from existing geological maps were used to guide extrapolation of unit contacts, as were aeromagnetic maps. The updated map is supplemented by numerous whole-rock geochemical analyses (Butler, 2019), in addition to several new (unpublished) whole-rock Sm-Nd and zircon U–Pb analyses (see below and map).

Data sources used in the preparation of the updated map include:
1) Station data, including rock types, structural measurements, sample locations, and photographs collected in the summer of 2018. Location data (UTM coordinates) were collected using a handheld computer and digital camera, with an accuracy of approximately 2–10 m,
2) Additional station data, outcrop locations, rock types, and structural measurements compiled from previous maps of the area by Wardle (1979, 1982), and Dufresne (1950),
3) Digital elevation data (Shuttle Radar Topography Mission; SRTM (1 arc-second resolution), and,
4) Aeromagnetic maps (50 m resolution; Dumont, 2009).

As with the recently updated map of the nearby Hollinger Lake area (Butler, 2023), the stratigraphy presented in the legend borrows heavily from previous work in the region (Wardle, 1979; 1982). The primary revisions include:
1) Assignment of gneiss units east of the Ashuanipi River Shear Zone (Gill Lake Fault of Wardle, 1982), which on previous maps are referred to as the Eastern Basement Complex (Wardle, 1982) and the Flat Point Gneiss (McKenzie River Domain; James et al., 1996), to the Griffis Complex (Hammouche et al., 2011). The latter is supported by lithological/geochemical similarities of these units to, and an apparent continuity on aeromagnetic maps with units mapped in the northern Griffis Complex by Hammouche et al. (2011).
2) Recognition of deformed, Labradorian-aged leucogranite dykes within the Griffis Complex. Two samples, dated via U–Pb zircon geochronology (unpublished), yielded ages of ca. 1630 Ma, corresponding to Labradorian magmatism elsewhere in Labrador (Gower et al., 1992). Only one of these intrusions is of sufficient size to be shown on the map (pPGrf$_3$).
3) Adjustment of the trace of the Walsh Lake Fault near Andre Island based on aeromagnetic maps and new outcrop observations. Units on the northeastern side of Andre Island, shown on previous maps as Menihek Formation (Wardle, 1979; 1982) have been reassigned to the volcaniclastic Murdoch Formation.
4) Subdivision of gabbros previously assigned to the Montagnais Intrusive Series (Wardle, 1982) into the Wakuach and Gerido Intrusive suites, following Bilodeau and Caron-Côté (2018). This scheme subdivides the mafic–ultramafic sills of the Kaniapiskau Supergroup according to whether they intrude Cycle 1 (Attikamagen, Swampy Bay, and Seward groups) or Cycle 2 (Ferriman and Doublet groups) sedimentary units (Clark and Wares, 2005).

Relevant age constraints on the Kaniapiskau Supergroup from the literature are summarized by Butler (2023). New age constraints on the units described in the legend are as follows:
1) The age of the Snelgrove Lake Basement Complex (SLBC) is constrained by a U–Pb age of 2671±5 Ma for inherited zircon in a massive tonalite from the western edge of the complex. The same sample yielded a Sm–Nd model age (T_{DM}; DePaolo, 1981) of 2820 Ma, while a sample of granodiorite gneiss from the SLBC to the south, near Wade Lake, yielded T_{DM}=2834. A sample of foliated monzogranite (the Snelgrove granite; nĀSl$_2$) from near Wade Lake yielded a U–Pb zircon age of 2198±1 Ma.
2) From the Griffis Complex, a biotite gneiss sample (nĀGrf$_2$) yielded a zircon U–Pb crystallization age of 2677±12 Ma and T_{DM} = 2804 Ma. Two tonalite gneiss samples from the adjacent unit (nĀGrf$_1$) yielded T_{DM} 3061 and 3155 Ma. These data are consistent with Neoarchean ages obtained by David et al. (2011) in the northern Griffis Complex. An amphibolite lens contained within unit nĀGrf$_2$ yielded T_{DM} = 2514 Ma.
3) Two samples, taken from separate intrusions of deformed, muscovite-bearing leucogranite from the Griffis Complex (pP$_3$Grf$_3$) yielded zircon U–Pb crystallization ages of 1633±6 Ma and 1638±1 Ma. The two stage depleted mantle model ages (DePaolo et al., 1991) for these samples are 2822 Ma and 2928 Ma.

Geology by J. P. Butler.
GIS/digital cartography by K. Morgan.

Recommended Citation

Butler, J. P.
2024: Bedrock geology of the Andre Lake Area (NTS 23I/12). Geological Survey, Department of Industry, Energy and Technology, Government of Newfoundland and Labrador. Map 2024-01, Open File 023I/12/0105.

Correspondence

J. P. Butler, Geological Survey, Department of Industry, Energy and Technology, Government of Newfoundland and Labrador, P.O. Box 8700, St. John's, NL, A1B 4J6, Canada.
Present address: Geological Survey of Canada (Atlantic), 1 Challenger Drive, Dartmouth, NS B3B 1A6
Email: jared.butler@nrcan.gc.ca.

The digital topographic database map NTS 23I/12 used here is available from the Surveyor General Branch, Natural Resources, Canada.

Elevations are in metres above sea level. Contour interval is 50 m.
Magnetic declination at centre of the map is 20° 47' West (June 2019).
North American Datum (NAD) 1927.

Departmental website: http://www.gov.nl.ca/iet
Geological Survey website: http://www.gov.nl.ca/iet/mines/geoscience
Email: pub@gov.nl.ca

Copies of this map may be obtained from the Department of Industry, Energy and Technology, Government of Newfoundland and Labrador, P.O Box 8700, St. John's, NL, Canada, A1B 4J6.

This map is subject to revision and modification. Symbols for bedding and selected minor structures are not plotted directly at the exposure site.

Open File 023I/12/0105

Published 2024

References

Bilodeau, C. and Caron-Côté, E.
2018: Géologie de la région de la rivière Arnaud, provinces du Supérieur (Minto) et de Churchill (Fosse du Labrador), secteur de Kangirsuk, Nunavik, Québec, Canada. Ministère de l'Énergie et des Ressources naturelles, Québec. Bulletin Géologique.

Butler, J.P.
2019: Geochemical data from supracrustal and basement rocks in the Andre Lake and Marion Lake areas, Labrador (NTS map areas 23I/12 and 13). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File 23I/0103, 8 pages.

2023: Bedrock Geology of the Hollinger Lake Area (NTS 23J/16). Geological Survey, Department of Industry, Energy and Technology, Government of Newfoundland and Labrador. Map 2023-01, Open File O23J/16/0403.

Clark, T. and Wares, M.
2005: Lithotectonic and metallogenic synthesis of the New Québec Orogen (Labrador Trough). Ministère des Ressources Naturelles, Québec, MM 2005-01, 175 pages.

David, J., McNicoll, V., Simard, M., Bandyayera, D., Hammouche, H., Goutier, J., Pilote, P., Rhéaume, P., Leclerc, F. and Dion, C.
2011: Datations U-Pb effectuées dans les provinces du Supérieur et de Churchill en 2009-2010. Ministère des Ressources naturelles et de la Faune, Québec, Volume RP 2011-02, 38 pages.

DePaolo, D.J.
1981: Neodymium isotopes in the Colorado Front Range and implications for crust formation and mantle evolution in the Proterozoic. Nature, Volume 291, pages 193–197.

DePaolo, D.J., Linn, A.M., Schubert, G.,
1991: The continental crustal age distribution: methods of determining mantle separation ages from Sm-Nd isotopic data and application to the southwestern United States. Journal of Geophysical Research, Solid Earth, Volume 96, pages 2071-2088.

Dufresne, C.
1950: Geological report on the Sawyer-Snelgrove map-area, Labrador. Labrador Mining and Exploration Company Limited. Newfoundland and Labrador Geological Survey, Assessment File 23I/0003, 1950, 41 pages.

Dumont, R.
2009: Geophysical Series, NTS 23I/06, Schefferville aeromagnetic survey. Geological Survey of Canada, Open File 6136.

Lafrance, I., Vanier, M-.A., and Charette, B.
2020: Domaine Lithotectonique de Baleine, Sud-Est de la Province de Churchill, Nunavik, Québec, Canada : Synthèse de la Géologie. Ministère des Ressources Naturelles, Québec, BG2020-07.

Gower, C.F., Schärer, U. and Heaman, L.M.
1992: The Labradorian orogeny in the Grenville province, eastern Labrador, Canada. Canadian Journal of Earth Sciences, Volume 29(9), pages 1944-1957.

Hammouche, H., Legouix, C., Gonfler, J., Dion, C., and Petrella, L. 2011: Géologie de la région du lac Bonaventure. Ministère des Ressources naturelles, Québec; RG 2011-03, 35 pages, 1 map.

James, D.T., Connelly, J.N., Wasteneys, H.A. and Kilfoil, G.J.
1996: Paleoproterozoic lithotectonic divisions of the southeastern Churchill Province, western Labrador. Canadian Journal of Earth Sciences, Volume 33(2), pages 216-230.

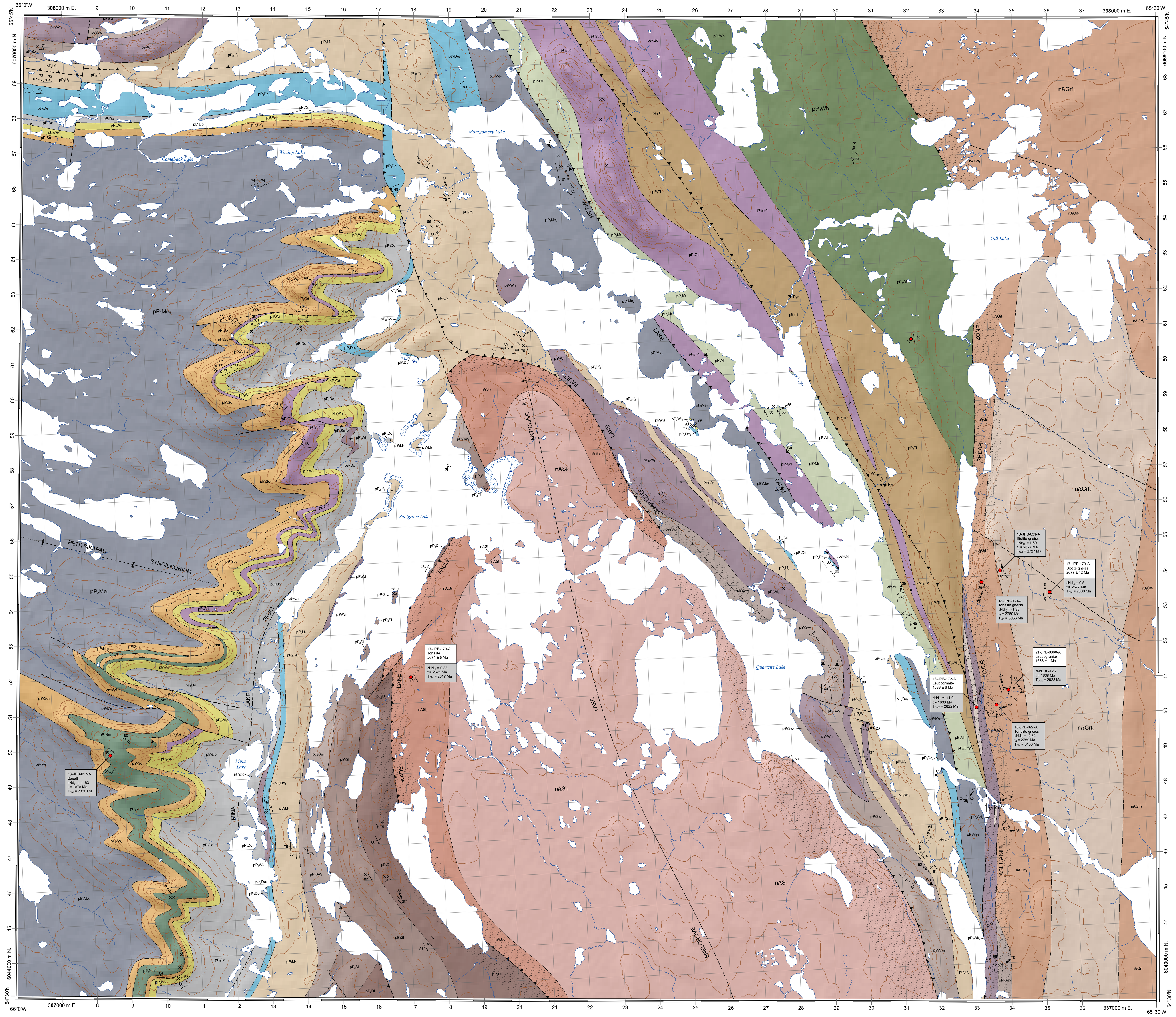
Wardle, R.J.
1979: Western margin of the Labrador Trough. In Report of Activities. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division, Report 79-1, pages 122-128.

1982: Geology of the south-central Labrador Trough. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division, Map 82-005.

Wardle, R.J., James, D.T., Scott, D.J. and Hall, J.
2002: The southeastern Churchill Province: synthesis of a Paleoproterozoic transpressional orogen. Canadian Journal of Earth Sciences, Volume 39, pages 639-663.

Note

Disclaimer



Map 2024-01
BEDROCK GEOLOGY OF THE ANDRE LAKE AREA (NTS 23I/12)
OPEN FILE 023I/12/0105

Scale 1:50 000

LEGEND

KANIAPISKAU SUPERGROUP

PALEOPROTEROZOIC INTRUSIVE ROCKS

Orosirian

Gerido Intrusive Suite

pP$_3$Gd — Gabbronorite and diabase. Fine to medium grained, with (sub)ophitic textures. Disseminated pyrite and chalcopyrite common

Rhyacian

Wakuach Suite

pP$_3$Wk$_1$ — Gabbronorite and olivine gabbronorite. Fine to medium grained, with (sub)ophitic textures. Olivine is rare. Disseminated pyrite and chalcopyrite common. Map unit includes numerous thin, gossanous fine-grained sedimentary lenses (typically argillite) either rafted within, or separating sills

pP$_3$Wk$_2$ — Amphibolite. Medium grained and massive; locally schistose, gnesissic, or mylonitic

PALEOPROTEROZOIC SEDIMENTARY AND VOLCANIC ROCKS

Orosirian to Statherian

Ferriman Group (west of Walsh Lake Fault)

Menihek Formation

pP$_3$Me$_1$ — Bluish-grey slate and siltstone, black slate

pP$_3$Me$_2$ — Bluish-grey pyritic slate, siltstone, and sublitharenite sandstone; minor hydrothermal breccia (adjacent to Walsh Lake Fault)

Sokoman Formation

pP$_3$So$_1$ — Tuffaceous iron formation

pP$_3$So$_2$ — Oxide-facies iron formation. Medium to thick bedded and alternating hematite- and jasper-rich beds; unit includes basal black shale and interbedded chert of the Ruth Formation

Nimish Formation

pP$_3$Nm — Pillow basalt and mafic agglomerate. Locally interbedded with iron formation

Wishart Formation

pP$_3$Wi$_1$ — White orthoquartzite interbedded with grey siltstone. Hummocky crossbedding common. Minor granule conglomerate and grey chert

pP$_3$Wi$_2$ — Grey chert

Doublet Group (east of Walsh Lake Fault)

Willbob Formation

pP$_3$Wb — Pillow basalt, minor tuff

Thompson Lake Formation

pP$_3$Tl — Laminated black shale and siltstone, commonly pyritiferous. Typically exposed as thin, metre- to decametre-scale lenses within gabbro (*Gd$_1$*)

Murdoch Formation

pP$_3$Mr — Chlorite phyllite, siltstone, and metabasalt. Generally foliated and locally crenulated

- - - - - - - - - - - - - - - - - Disconformity - - - - - - - - - - - - - - - - -

Rhyacian

Attikamagen Group

Dolly Formation

pP$_3$Do — Grey shale and siltstone. Locally calcareous. Laminated to thin bedded

Denault Formation

pP$_3$De$_1$ — Dolomite. Beige-weathering, light to medium grey, fine grained, varying from massive to laminated and crosslaminated

pP$_3$De$_2$ — Stromatolitic dolomite with abundant discordant chert veins

pP$_3$De$_3$ — Marble, quartz–mica–carbonate schist

Swampy Bay Group

Le Fer Formation

pP$_2$Lf$_1$ — Medium- to dark-grey laminated shale, siltstone, and minor greywacke. Locally gossanous

pP$_2$Lf$_2$ — Biotite phyllite to biotite–garnet schist (in southeastern exposures), typically crenulated; rare orthoquartzite

Seward Group

Sawyer Lake Formation

pP$_2$Sw$_1$ — Purple arkosic arenite and/or orthoquarzite, red–purple shale and siltstone

pP$_2$Sw$_2$ — White to pink quartzite

pP$_2$Sw$_3$ — Biotite phyllite/schist and chlorite–sericite schist

Snelgrove Lake Formation

pP$_2$Sl — Red to grey arkosic to subarkosic sandstone, quartz granule to pebble conglomerate, minor red shale

Discovery Lake Formation

pP$_2$Di — Grey arkosic sandstone, granule to pebble conglomerate. Trough crossbedded. Locally foliated and chloritized

ARCHEAN TO PALEOPROTEROZOIC BASEMENT ROCKS

Snelgrove Lake Basement Complex

Paleoproterozoic

nĀSl$_2$ — Monzogranite to syenogranite. Moderately foliated and augen textured, to mylonitic. Minor massive tonalite intrusions found locally

Neoarchean

nĀSl$_1$ — Granodiorite gneiss. Locally migmatitic

Griffis Complex

Paleoproterozoic

pP$_3$Grf$_3$ — Monzogranite. Leucocratic, with muscovite and minor garnet. Moderately foliated and augen textured to mylonitic

Neoarchean

nĀGrf$_2$ — Granodiorite to tonalite gneiss. Strongly foliated with transposed migmatitic layering

nĀGrf$_1$ — Tonalite gneiss, locally migmatitic, with abundant foliation-parallel (transposed) mafic dykes

SYMBOLS

Bedding; measured, younging known (inclined)............................. 45

Cleavage; measured (slaty, crenulation).. 45

Fold hinge; measured (fold, crenulation, minor S, minor U)............ 45

Foliation; measured (foliation, transposed bedding, mylonitic)....... 45 45 45

Gneissosity; measured..

Schistosity; measured.. 45

Compositional layering.. 45

Mineral lineation..

Rodding, stretching lineation...

Geological contact (defined, approximate, assumed).....................

Fault (motion undefined, approximate)...

Thrust fault (approximate)...

Anticline, syncline (approximate)..

Gossan...

Geochronology/Sm–Nd isotopic sample...

Zircon U–Pb geochronology

Sample Number
Rock Type
Crystallization or maximum depositional (<) age

Sm–Nd isotopic data

Sample Number
Rock Type
$\varepsilon Nd_{(t)}$ - Epsilon value at time (t)
time (t) - assumed (t_a) or known age (Ma)
T_{DM} - Depleted Mantle model age

Mineral occurrence....................................

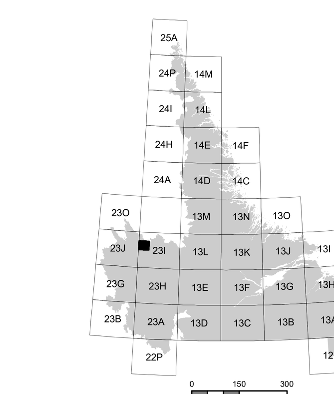
Station...

Shear zone..

Mineral Occurrences (NTS 23I/12)

Mineral Occurence	Easting	Northing	Name	Commodity	Status
Cu	325960	6060580	Andre Island No 1	Copper	Indication
Cu	328180	6057740	Andre Island No 2	Copper	Indication
Cu	327990	6056700	Andre Island No 3	Copper	Showing
Cu	332890	6047650	Andre Lake No 1	Copper	Showing
Cu	332070	6048400	Andre Lake No 2	Copper	Indication
Cu	322300	6066000	Montgomery Lake	Copper	Prospect
Cu	321720	6066690	Montgomery North	Copper	Showing
Cu	328970	6051680	Quartzite Lake East No 1	Copper	Indication
Cu	329370	6051640	Quartzite Lake East No 2	Copper	Indication
Cu	331810	6045320	Quartzite Lake Southwest	Copper	Indication
Cu	318480	6057600	Snelgrove Lake	Copper	Indication
Pyr	328410	6062160	Andre Lake East No 1	Pyrite	Indication
Pyr	330920	6056690	Andre Lake East No 2	Pyrite	Indication

Note: Mineral occurences table is a subset of the database (it excludes all iron (Fe) occurences).



INDEX MAP