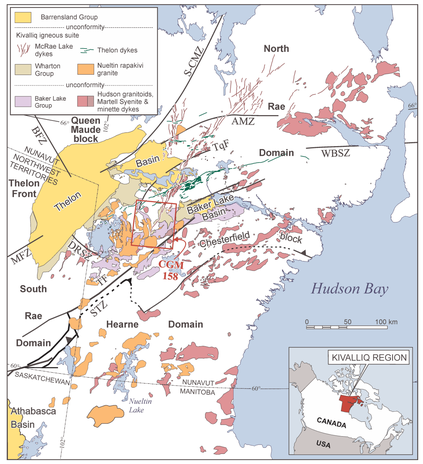


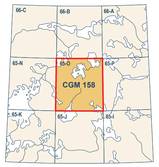
Figure 1. Location of the map area in the context of the Western Churchill Province, Kivalliq Region, Nunavut and parts of adjoining jurisdictions (modified from Miller and LeCheminant, 1985). STZ - Snowbird Tectonic Zone; WBSZ - Wager Bay Shear Zone; AMZ - Amer Mylonite Zone; S-CMZ - Slave-Chantrey Mylonite Zone; BFZ -Bathurst Fault Zone; MFZ - Macdonald Fault Zone; DRSZ - Dubawnt River Shear Zone; TF - Tulemalu Fault; TqF - Turqavik Fault.

Abstract

The map area is underpinned by three Archean terranes from west to southeast: the Snow Island Suite of 2.6 Ga granite-rhyolite (AS), the Marjorie Hills assemblage of metasedimentary and granitoid gneiss (AMH), and orthogneiss of the Chesterfield block (unit Agn). The AS-AMH boundary is the Wharton Lake fault system, initially a southwest-dipping detachment. The AMH-Agn boundary is the dextral extensional Tulemalu Fault. Brittle reactivations of these faults localized sub-basins of the Baker Lake Group and hosted coeval intrusions of Martell Syenite (minette / ~1.83 Ga Hudson Granite mix). A Hudson Granite plug intrudes the AMH. Early gabbro/anorthosite (~1.77 Ga) of the Kivalliq igneous suite was intruded by Nueltin granite, co-magmatic with bimodal Pitz Formation lavas and the ~1.75 Ga, 015° McRae Lake diabase dyke swarm and compositionally related 075° Thelon River dyke swarm. Cu-Pb veins and replacements formed near mafic centres and Au-Ag-bearing quartz veins near felsic centres.

Résumé

La région cartographiée s'appuie sur trois terranes archéens disposés du nord-ouest au sud-ouest : la Suite granitique-rhyolitique de l'Ile de Snow remontant à 2,6 milliards d'années (AS), l'assemblage de gneiss métasédimentaires et granitoïdes des collines de Marjorie (AMH), et les orthogneiss du bloc de Chesterfield (unité Agn). La frontière AS AMH est la faille du lac Wharton, initialement un décollement à pendance vers le sud-ouest. La frontière AMH Agn est la faille d'extension dextre de Tulemalu. Les réactivations fragiles de ces failles ont localisé les sous-bassins du groupe du lac Baker et ont reçu les intrusions concomitantes de syénite de Martell (mélange de minette et de granite hudsonien vieux d'environ 1,83 Ga). Un bouchon de granite hudsonien pénètre dans l'assemblage des collines de Marjorie. Les anorthosites gabbroïques précoces (env. 1,77 Ga) de la suite ignée de Kivalliq se sont mélangées après avoir été pénétrées par des granites de Nueltin, comagmatiques avec les laves bimodales de la formation Pitz et l'essaim du dyke de diabase 015° du lac McRae vieux d'environ 1,75 Ga et l'essaim de la rivière Thelon 075° proche sur le point de la composition. Les filons et les filons de remplacement cupro-plombifères sont formés près des centres mafiques et les filons de quartz auro-argentifères près des centres felsiques.



National Topographic System reference

Cover illustration
Quartz vein (epithermal or reactivated) in Pitz Formation rhyolite east of Tebesjuak Lake, Nunavut. Photograph by T.D. Peterson.
2012-07-22

Catalogue No. M183-1/158-2013E-PDF
ISBN 978-1-100-22376-6
doi:10.4095/293892

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TEBESJUAK LAKE
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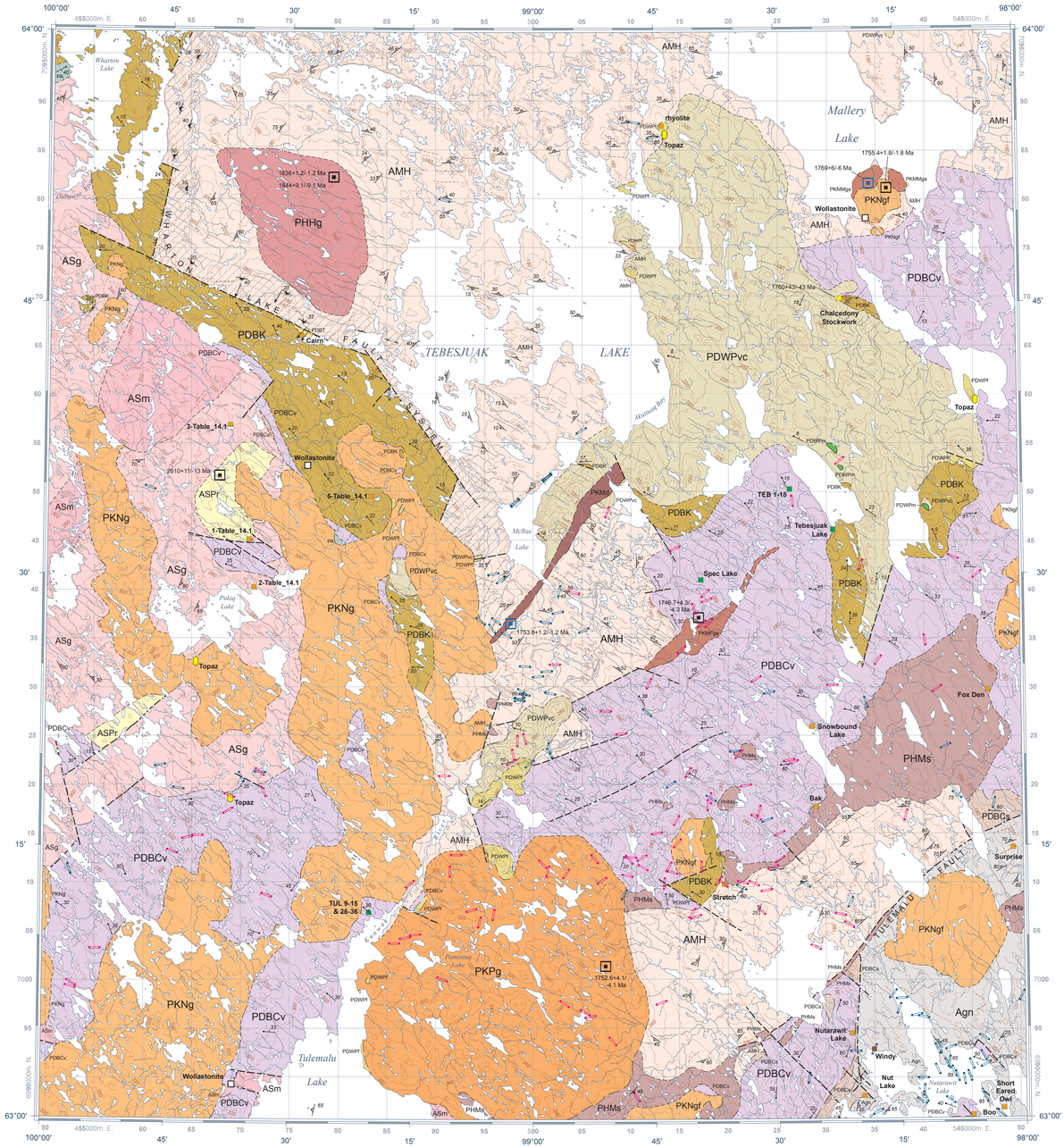

SUPRACRUSTAL ROCKS

Late Paleoproterozoic supracrustal sequences

Dubawnt Supergroup

Barrensland Group

Thelon Formation (<1.75 Ga; >1.54 Ga)

PDBT — **Thelon Formation:** Sandstone and pebbly sandstone.

----------unconformity----------

Wharton Group (1.76–1.75 Ga)

Epithermal alteration

Swarms of epithermal drusy quartz, agate, and fluorite veins cementing *in-situ* breccia.

Pitz Formation (extrusive component of the Kivalliq igneous suite)

PDWPvc — **Felsic and bimodal volcanic rocks, undivided:** Silicic porphyritic lavas, vesicular basalt, welded volcaniclastic rocks, tuff, and epiclastic rocks.

PDWPf — **Rhyolite:** Flow banded.

PDWPm — **Mafic-intermediate volcanic rocks:** Brown to green-weathering mafic to intermediate lavas, large epidote-chalcedony filled vesicles, white plagioclase laths to 1 cm.

----------unconformity----------

Baker Lake Group (1.84–1.79 Ga)

Kunwak Formation

PDBK — **Sedimentary rocks:** Arkose, pebbly arkose and conglomerate.

----------unconformity----------

Christopher Island Formation

PDBCv — **Volcanic rocks:** Minette flows, pyroclastic and volcaniclastic rocks.

PDBCs — **Sedimentary rocks:** Basal conglomerate and grey arkose. Unseparated correlatives of the South Channel and Kazan Formations.

----------unconformity----------

Early Paleoproterozoic supracrustal sequences (<2.3 Ga; >1.87 Ga)

Amer Group

PA — **Metasedimentary rocks:** Quartzite, calc-silicate rocks, and jasper-bearing conglomerate.

----------unconformity----------

Neoarchean supracrustal rocks

Snow Island Suite

ASPr — **Pukiq Lake Formation:** Feldspar and quartz-phyric rhyodacite.

Marjorie Hills assemblage

AMH — **Marjorie Hills paragneiss and orthogneiss:** Strongly foliated quartzofeldspathic paragneiss including metagreywacke, iron-formation and amphibolite; intruded by and/or tectonically interleaved with tonalite/granodiorite gneiss, amphibolite, migmatite, and two-mica granite.

Undivided Archean, Chesterfield block

Agn — **Undivided Archean gneiss:** Banded gneiss.

Age determinations

U-Pb baddeleyite

U-Pb zircon

Igneous and metamorphic mineral localities

Topaz

Wollastonite

Mineral showings

Precious metals

Uranium

Uranium plus base metals

Base metals

Structural measurements

Lineation, plunge indicated

Bedding, inclined, top indicated

Foliation, inclined

Foliation, mylonitic to cataclastic

Foliation trace

INTRUSIVE ROCKS

Late Paleoproterozoic intrusive rocks

Kivalliq igneous suite (1.765–1.750 Ga)

PKMd — **McRae Lake dyke:** Composite gabbro and quartz monzodiorite intrusion, inclusions of gneiss and rapakivi granite. Unique, coarse-grained phase of the McRae Lake diabase dyke swarm exposed at McRae Lake.

PKNg — **Nueltin granite:** Rapakivi granite with zoned K-feldspar phenocrysts overgrown by oligoclase; PKNgf - equigranular to porphyritic, fluorite-bearing, hypabyssal granite.

PKPg — **Pamiutuq intrusion:** Hypabyssal granite porphyry with a well developed chilled margin, containing abundant wall rock inclusions, and characterized by variably resorbed rafts, inclusions and blebs of basaltic composition.

PKMga — **Mallery gabbro:** Gabbro, leucogabbro, and anorthosite; PKMMga - Mallery Lake intrusion: coarse, dark grey-green weathering, alkaline gabbro with cumulate Ti-Al augite; PKMFga - Fish intrusion: leucogabbroic to anorthositic rock with cumulate, green-weathering labradorite to 7 cm; also occurs as patches in PKMMga.

----------intrusive contact----------

Shear zone

Cataclastic to mylonitic shear zone.

Hudson intrusive suite (1.845–1.795 Ga)

PHMs — **Martell syenite:** Hybrid intrusive rocks consisting of comingled minette of the Christopher Island Formation and the Hudson granite.

PHHg — **Hudson granite:** Equigranular white to pink biotite granite to quartz monzonite.

Neoarchean intrusive rocks

Snow Island Suite

ASm — **K-feldspar megacrystic monzonite:** Potash feldspar augen orthogneiss.

ASg — **Undivided intrusive rocks:** Gneissic to weakly foliated diorite to granite.

Porphyry and minette dykes

Quartz-feldspar porphyry, dip unknown

Quartz-feldspar porphyry, vertical

Minette (lamprophyre), dip unknown

Minette (lamprophyre), dip known

Minette (lamprophyre), vertical

Prominent dyke swarms

Mackenzie diabase dyke, exposed

Mackenzie diabase dyke, geophysical trace

Thelon River diabase dyke, geophysical trace

McRae Lake diabase dyke, exposed

McRae Lake diabase dyke, geophysical trace

Geological discontinuities

Contact, defined

Contact, approximate

Contact, inferred

Fault, multistage detachment

Fault, approximate

DATASOURCES

This geological map is derived from GSC Open File 728 (LeCheminant, 1981) and is based on 1:250,000 scale mapping (LeCheminant et al., 1979a, 1980, 1981), university theses (Booth, 1983; Burton, 1981; Roberts, 1981; Tamborosso, 1981; Webb, 1981; Turner, 2000) and unpublished legacy notes and data tables. The reports and theses are the principal sources for the contents of the Descriptive Notes. The first two authors re-examined the Tebesjuak Lake map area in 2010 and 2012 because the earlier mapping indicated the presence of mafic volcanic rocks that may be key components of the 1.75 Ga Pitz Formation and mafic plutonic rocks associated with a plug-like intrusion of Nueltin Granite at Mallery Lake. Interpretation of this map area benefitted from subsequent mapping to the north in the Aberdeen Lake (NTS 66-B) and Beverly Lake (NTS 66-C) map areas by LeCheminant et al. (1983, 1984), and detailed investigations around Mallery Lake (T.D. Peterson and J.M.J. Scott, 2010–2012 field notes).

In addition to geology from Open File 728, this map includes geochronology, mineral occurrences, and alteration zones. Published U-Pb ages extracted from the Canadian Geochronology Knowledgebase (2013) and new U-Pb ages for ca. 1.75 Ga granites, the McRae Lake Dyke, and the Mallery Lake gabbro (Peterson et al., in prep.) are included. Data for historical mineral showings in this area were downloaded from NUMIN (2013), and updated from Best et al. (1977), LeCheminant et al. (1980), Lewis and Bosschart (1967), Mazur (1980), and Prasad (1981). The epithermal alteration zones shown on the map were derived from Biczok (1996, 1998).

Updates and transformation of this map into a GIS-ready product were supported by the Northern Uranium for Canada Project under the Geo-Mapping for Energy and Minerals Program (2009–2013).

Recommended citation
Peterson, T.D., Scott, J.M.J., LeCheminant, A.N., Chorlton, L.B., and D'Aoust, B.M.A., 2014. Geology, Tebesjuak Lake, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 158 (preliminary), scale 1:250 000. doi:10.4095/293892

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Geology by A.N. LeCheminant, M.B. Lambert, A.R. Miller, G.W. Booth, M.J. Murray, G.A. Jenner, T.R. Iannelli, B. Zaitlin, J.D. Burton, A.W. Tamborosso, D.R. Webb, and K.A. Roberts in 1978, 1979, and 1980. Union Oil Company of Canada supported field work by J.D. Burton and D.R. Webb.

Geology supplemented by T.D. Peterson and J.M.J. Scott in 2010, and T.D. Peterson and J.A. Percival in 2012.

CANADIAN GEOSCIENCE MAP 158
GEOLOGY
TEBESJUAK LAKE
Nunavut
1:250 000

5 0 5 10 15 20 km

Geomatics and information management by B.M.A D'Aoust, L.B. Chorlton, and G.S. Hanna

Cartography by G.S. Hanna

Initiative of the Geological Survey of Canada supported by Northern Uranium for Canada as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program.

Map projection Universal Transverse Mercator, zone 14. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level

Mean magnetic declination 2014, 1°39'E, decreasing 14' annually. Readings vary from 3°16'E in the SW corner to 0°06'W in the NE corner of the map.

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data. Additional descriptive notes and references are included in the map information document.

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This map is not to be used for navigational purposes.

Preliminary publications in this series have not been scientifically edited.

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