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GEOLOGICAL SURVEY OF CANADA
CANADIAN GEOSCIENCE MAP 264
CANADA-NUNAVUT GEOSCIENCE OFFICE
OPEN FILE MAP 2016-01
GEOLOGY
LOKS LAND
Baffin Island, Nunavut
NTS 25-I (part)

Map Information Document

Preliminary

Geological Survey of Canada
Canadian Geoscience Maps

2016

Canada

PUBLICATION

CANADA-NUNAVUT GEOSCIENCE OFFICE
BUREAU GÉOSCIENTIFIQUE CANADA-NUNAVUT
KANATAMI-NUNAVUMI GEOSCIENCE TITIGAKVIIT

Map Number

Natural Resources Canada, Geological Survey of Canada
Canadian Geoscience Map 264 (Preliminary)

Canada-Nunavut Geoscience Office
Open File Map 2016-01

Title

Geology, Loks Land, Baffin Island, Nunavut, NTS 25-I (part)

Scale

1:100 000

Catalogue Information

Catalogue No. M183-1/264-2015E-PDF
ISBN 978-0-660-03850-6
doi:10.4095/297344

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Recommended Citation

Steenkamp, H.M., Gilbert, C., and St-Onge, M.R., 2016. Geology, Loks Land, Baffin Island, Nunavut, NTS 25-I (part); Geological Survey of Canada, Canadian Geoscience Map 264 (preliminary); Canada-Nunavut Geoscience Office, Open File Map 2016-01, scale 1:100 000. doi:10.4095/297344

ABSTRACT

The Hall Peninsula Integrated Geoscience Program was led by the Canada-Nunavut Geoscience Office, and was designed to increase the geoscience knowledge and assess the economic potential of the area. Eastern Hall Peninsula is dominantly underlain by Archean tonalite to quartz diorite orthogneiss, while Paleoproterozoic supracrustal and intrusive rocks are exposed to the west. The supracrustal rocks are dominated by pelitic, psammitic, amphibolite and calc-silicate units, are interpreted as correlative with the Lake Harbour Group, and are cut by granulite-grade monzogranite to diorite intrusions. Hall Peninsula records three phases of metamorphism and deformation associated with the Trans-Hudson Orogen that have produced thick-skinned, east-verging fold and thrust structures and amphibolite to granulite facies mineral assemblages. Hall Peninsula hosts a highly prospective diamond kimberlite field, as well as mafic and carbonate supracrustal rocks, and ultramafic intrusions that may contain base and/or precious metal, semi-precious gemstone and carving stone resource potential.

RÉSUMÉ

Le Programme géoscientifique intégré de la péninsule Hall, mené par le Bureau géoscientifique Canada-Nunavut, a été conçu pour accroître les connaissances géoscientifiques et évaluer le potentiel économique de la région. La partie est de la péninsule Hall contient principalement des orthogneiss tonalitiques à quartzodioritiques de l'Archéen, tandis que des roches supracrustales et intrusives du Paléoprotérozoïque affleurent à l'ouest. Les roches supracrustales sont dominées par des unités pélitiques, psammitiques, amphibolitiques et calcosilicatées et seraient corrélatives du Groupe de Lake Harbour. Elles sont recoupées par des intrusions de composition monzogranitique à dioritique du faciès des granulites. La péninsule Hall a conservé les traces de trois phases de métamorphisme et de déformation associées à l'orogène trans-hudsonien, qui ont donné lieu à une tectonique de socle caractérisée par la formation de structures de plissement et de chevauchement à vergence est, et à la création d'associations de minéraux du faciès des amphibolites au faciès des granulites. La péninsule Hall renferme un champ de kimberlites très prometteur pour le diamant, ainsi que des roches supracrustales mafiques et carbonatées et des intrusions ultramafiques susceptibles de contenir des ressources en métaux usuels ou précieux, en pierres semi-précieuses et en pierres à sculpter.

About the Map

General Information

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Geology conforms to Bedrock Data Model v. 2.2

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Initiative of the Canada-Nunavut Geoscience Office, conducted under the auspices of the Hall Peninsula Integrated Geoscience Project, supported by CanNor's Strategic Investment for Northern Economic Development (SINED) program.

Logistical support provided by the Polar Continental Shelf Program as part of its mandate to promote scientific research in the Canadian North. PCSP 30113

Map projection Universal Transverse Mercator, zone 20.
North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications.
Elevations in metres above mean sea level

Shaded relief image derived from the digital elevation
model supplied by the Canada-Nunavut Geoscience Office. Illumination: azimuth 315°, altitude 45°, vertical factor 1x

Mean magnetic declination 2016, 27°40'W, decreasing 22.3' annually. Readings vary from 27°11'W in the SW corner to 28°06'W in the NE corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Glacially carved fiords in grey tonalite gneiss (unit Āt) on southern Hall Peninsula, Nunavut. Field of view is approximately 1.5 km. Photograph by H.M. Steenkamp. 2015-020

The Geological Survey of Canada and the Canada-Nunavut Geoscience Office welcome corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data.

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/) and the Canada-Nunavut Geoscience Office (http://cngo.ca/).

Preliminary publications in this series have not been scientifically edited.

Map Viewing Files

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Cartographic Representations Used on Map

Black point symbols indicate an actual station location. Grey symbols are secondary measurements from a station that have been offset for display purposes only. Not all measurements are displayed. Additional measurements can be found in the digital geodatabase accompanying this release. Please note that the accompanying geodatabase does not contain cartographic representations. About the Geology

Descriptive Notes

INTRODUCTION

The Hall Peninsula Integrated Geoscience Program (HPIGP) was led by the Canada-Nunavut Geoscience Office in collaboration with federal and territorial government offices and scientists, as well as researchers and students from several Canadian universities and colleges. The program aimed to produce regional, framework bedrock and surficial geological maps (1:100 000 scale), complemented by thematic studies that were designed to provide new fundamental geoscience information for Hall Peninsula.

Regional bedrock mapping was conducted over a total of 14 weeks during the summers of 2012 to 2014. Digital photographs, geological measurements, GPS co-ordinates, visual observations, and rock samples were collected from 2027 field stations. To interpret the bedrock geology (Figure 1; Machado et al., 2013a), the data has been combined with previously published information, including aeromagnetic survey data, archival reconnaissance-scale geological maps, scientific literature, and assessment reports from the mineral exploration industry. Surficial geological mapping was conducted over a total of 12 weeks during the summers of 2012 and 2013, with initial results published in field reports (Tremblay et al., 2013, 2014b, 2015a; Leblanc-Dumas et al., 2013) and maps (Tremblay et al., 2014a, 2015b).

PREVIOUS WORK INTEGRATED INTO MAP INTERPRETATION

Reconnaissance-scale bedrock mapping was conducted in the mid-1960's by the Geological Survey of Canada during Operation Amadjuak (Blackadar, 1967). The resulting maps and field documentation from that campaign have since been digitized and optimized for integration into modern mapping projects, providing a wealth of observational field data. Regional airborne geophysical surveys were flown in 1996–1997 with 800 m flight-line spacing over southwestern Baffin Island (Pilkington and Oneschuk, 2007), and in 2010 with 400 m flight-line spacing over most of Hall Peninsula (Dumont and Dostaler, 2010a-g). Full airborne geophysical survey coverage of Hall Peninsula was achieved in 2015 with the completion of the McKeand River survey (Kiss and Tschirhart, 2015), which was flown with 400 m flight-line spacing. The compiled survey data (Figure 2; Geological Survey of Canada, 2015), paired with high-resolution satellite imagery and field observations, was used to extrapolate geological boundaries and structures between visited field stations.

Detailed geology mapping on Hall Peninsula was conducted by Scott (1996) along a 90 km-long corridor located east of Iqaluit. This work provided some of the first U-Pb zircon crystallization and detrital ages for the Hall Peninsula area (Scott, 1999; Scott et al., 2002). In the mid-2000's, the mineral exploration company Peregrine Diamonds Inc. identified kimberlite indicator minerals in glacial till samples, and eventually diamond-bearing kimberlite deposits on eastern Hall Peninsula. This discovery has prompted industry-led, airborne and ground geophysical surveys (Pell and Neilson, 2010, 2011), thematic research projects focused on kimberlite emplacement (Pell et al., 2013; Zhang and Pell, 2013) and diamond genesis (Nichols et al., 2013; Nichols, 2014), and detailed bedrock and surficial geology mapping within the Chidliak diamond district (Ansdell et al., 2015). The above resources have provided information that was helpful for bedrock mapping interpretation, and adds valuable data to the maps.

MAP UNITS

The eastern half of Hall Peninsula is dominantly underlain by an Archean orthogneiss complex comprising felsic to intermediate phases. The phases all have internal compositional layering, and display complicated crosscutting relationships.

Map unit Āt is the most abundant and compositionally variable orthogneiss unit. It is dominated by biotite±hornblende tonalite to granodiorite that weathers dull grey (Figure 3). Overall, this unit is medium to coarse grained with biotite, and locally hornblende, defining a mineral foliation. Pods, enclaves, and rafts of diorite, quartz diorite, and minor gabbro are locally found in this unit, and have well-defined lithological boundaries (Figure 4) and a well-developed internal compositional fabric (gneissosity).

Areas with voluminous biotite±hornblende granodiorite are mapped as unit Āg. Local compositional variation to monzogranite has been documented within this unit (Figure 5). In general, unit Āg is coarse grained and contains less than 5% mafic minerals.

Map unit Āmk represents coarse-grained biotite monzogranite to quartz monzonite with distinctive 1–5 cm wide K-feldspar phenocrysts and an average of 2% mafic mineral content. Areas with a greater abundance of mafic minerals (up to 10%) or a more granodioritic composition were observed within this unit. This unit weathers buff pink, and is locally injected with discontinuous granitic pegmatite veins that are less than 1.5 m wide.

Magnetite-biotite monzogranite is represented by map unit Āmm. This unit is typically coarse grained, and contains abundant (1–2%) anhedral magnetite crystals.

The unit corresponds to areas with a high magnetic anomaly signature in the aeromagnetic survey data. Additionally, this unit is crosscut by granitic to syenogranitic pegmatite dykes that also contain magnetite megacrysts. Both fresh and weathered surfaces are pale to light pink.

Supracrustal metasedimentary rocks were documented across Hall Peninsula, and were found to disconformably overlie the Archean orthogneiss complex. A basal quartzite (unit ƤLHq) is locally found directly in contact with the orthogneiss, or within the first few metres of metasedimentary strata. The quartzite is blueish-grey and translucent, contains heavy mineral bands that may indicate original bedding, and occurs as laterally discontinuous beds that are 1 to 25 m thick. Rare metamorphic garnet, sillimanite, biotite, and magnetite have been documented within the quartzite and along bedding planes.

Unit ƤLHs is found in the lower part of the metasedimentary sequence and can be up to 250 m in thickness. This unit comprises (in order of abundance) interbedded semipelite, pelite, psammite, quartzite, and minor diorite, amphibolite, metaironstone, marble, and calc-silicate. The semipelitic and pelitic lithologies typically contain metamorphic garnet, sillimanite, biotite, and rare muscovite porphyroblasts (Figure 6). The quartzite is 20–50 cm thick, ranges from gray and translucent to white and opaque, and commonly has heavy mineral bands. The diorite and amphibolite layers are fine to medium grained and locally contain metamorphic garnet (unit ƤLHa, resolved on map where thick enough). Metaironstone layers are less than 1.5 m thick, and have internal compositional segregation of garnet, quartz, and grunerite layers that are 1–5 cm thick. The marble and calc-silicate layers recessively weather, and typically contain metamorphic diopside, clinohumite, phlogopite, and rare olivine, apatite, spinel, and graphite (unit ƤLHm, resolved on map where thick enough). The ƤLHs unit also contains 1–4 m wide dykes and sills of medium- to coarse-grained leucogranite with metamorphic garnet, biotite, and local muscovite.

Stratigraphically above unit ƤLHs, the metasedimentary rocks represented by unit ƤLHp are dominated by pelite and psammite that contain garnet, biotite and minor sillimanite. This unit also has seams and layers of leucogranite which increase in abundance toward the west. The leucogranite is interpreted as recrystallized melt that was generated during regional metamorphism through muscovite- and biotite-dehydration reactions in the pelitic to psammitic metasedimentary rocks (Dyck and St-Onge, 2014). Therefore, the pelitic and psammitic rocks of unit {LHp are interpreted as having restitic compositions following partial melting and recrystallization of the leucogranitic melt into distinct dykes, sills and layers.

The top of unit ƤLHp becomes increasingly dominated by leucogranitic material, to the point where rafts of restitic pelite and psammite are floating in the leucogranite. Unit ƤLHw represents the areas where the volume of leucogranite exceeds that of the remnant pelite or psammite. The leucogranite is fine to medium grained, weathers bright white, and contains abundant lilac garnet porphyroblasts and minor biotite (Figure 7). Rare metamorphic cordierite was documented in the leucogranite on the southwestern coast of Hall Peninsula.

Paleoproterozoic igneous phases were documented across Hall Peninsula. Unit Ƥu (resolved on map where thick enough) represents mafic-ultramafic sills in the metasedimentary sequence, and plugs and sills in the Archean tonalite to granodiorite orthogneiss (unit Āt; Figure 8). Unit Ƥu includes metaperidotite, metapyroxenite, and metadunite lithologies which typically contain orthopyroxene, hornblende, phlogopite, tremolite, actinolite, and rare serpentinite. The presence of hydrous phases (i.e. serpentinite or phlogopite), which are commonly found at the boundary of the mafic-ultramafic intrusion and the host rock, implies localized hydrothermal alteration at some point after emplacement of the sills and/or plugs. Two relatively unaltered, large-scale (up to 350 m thick and 7 km long) and layered mafic-ultramafic sills were documented within unit PLHp (Steenkamp et al., 2014).

Other Paleoproterozoic igneous phases on Hall Peninsula are generally felsic, yet typically contain orthopyroxene suggesting crystallization at high temperatures. Unit Pgo represents orthopyroxene-hornblende-biotite±magnetite granodiorite that is typically medium to coarse grained. The relative abundance of mafic minerals in this unit ranges from 2% to 5%. Orthopyroxene is locally megacrystic, and hornblende and biotite define a weak to moderate mineral foliation. Magnetite is fine to very-fine grained and typically found adjacent to other mafic phases. Fresh rock surfaces are a distinctive pale green with a greasy lustre, while weathered surfaces are dark orange to brown.

Unit Pmo represents orthopyroxene-biotite±magnetite monzogranite that is generally very-coarse grained, and locally contains megacrystic K-feldspar up to 4 cm wide. Garnet was observed at a few locations within a few metres of a contact zone with the PLHw unit. Quartz is characteristically blueish-grey, and occurs in discontinuous ribbons that are 1–2 cm thick and define a weak foliation fabric.

Biotite-garnet±orthopyroxene monzogranite containing small rafts, pods, and lenses of metasedimentary rock was identified on the western side of Hall Peninsula and is represented by unit Pmg. This lithology is coarse grained and equigranular. The abundance of garnet increases and the grain size becomes more inequigranular with proximity to included bodies of metasedimentary rock.

All Archean and Paleoproterozoic rock units are cut by NW-SE trending gabbroic diabase dykes (unit Nd) presumed to be associated with the Neoproterozoic Franklin swarm event documented elsewhere across the Canadian Arctic (Heaman et al., 1992; Denyszyn et al., 2002). The dykes are fine to medium grained, homogeneous, weather brown, and are about 100 m wide and laterally continuous for hundreds of kilometres.

INTERPRETED GEOLOGICAL HISTORY

Hall Peninsula is contained within the northeastern (Quebec-Baffin) segment of the Trans-Hudson Orogen (THO), a Paleoproterozoic collisional orogenic belt that extends from northeastern to south-central North America in a broad arcuate shape (Hoffman, 1988; Lewry and Collerson, 1990). The THO marks the collision between the upper-plate collage of Archean crustal blocks (Churchill plate) and the lower-plate Superior craton. The southern Baffin Island region in particular records the southward migration of the Churchill plate and its terminal collision with the Superior craton at ca. 1.82–1.80 Ga (St-Onge et al., 2009). This was the last major deformational event that the Hall Peninsula area endured, and it therefore contains lithological, structural, metamorphic, and textural evidence to attest to the timing and conditions of the associated orogenic processes.

The orthogneiss complex exposed on the eastern part of Hall Peninsula has been studied in detail to identify the ages of the various lithological components. At one locality the orthogneiss complex was documented to comprise at least seven distinct lithologies within a few hundred metres based on crosscutting relationships (From et al., 2013, 2014). Uranium-lead isotopic geochronology conducted on a variety of orthogneiss compositions collected across the complex reveal crystallization ages scattered between about 2976 to 2608 Ma (Scott, 1999; Rayner, 2014, 2015; From et al., 2015). Furthermore, a group of ages determined from chemically distinct zircon rim domains range from about 2740 to 2680 Ma and are interpreted to represent an Archean metamorphic and/or deformational event (From et al., 2015). Further geochemical and isotopic analyses are expected to constrain the ages of the different compositional phases that make up the orthogneiss complex, and provide insight into potential genetic relationships between Archean rocks on Hall Peninsula and other nearby Archean cratons, such as those in northern Quebec and Labrador, or southwestern Greenland.

Based on stratigraphy, and the rock types and their abundance, the supracrustal metasedimentary rocks on Hall Peninsula are interpreted as correlative with the Paleoproterozoic Lake Harbour Group, which has been described and documented to the southwest on Meta Incognita and Foxe peninsulas (St-Onge et al., 1996; Sanborn-Barrie et al., 2008; St-Onge et al., 2015). The lower part of the sequence (eastern Hall Peninsula) is marked by a blue basal quartzite overlain by dominantly pelitic to semipelitic lithologies, with limited mafic, ultramafic, and carbonate components. The upper part of the sequence (western Hall Peninsula) contains mostly pelitic to psammitic, restitic metasedimentary rocks and large amounts of leucogranite derived from partial melting of the metasedimentary units. The transition from the lithologically varied units in the east to dominantly pelitic to psammitic units in the west is interpreted to represent a change in the paleo-depositional environment from a proximal shallow-marine setting with input of mafic materials, possibly from a local rifting environment, to a more distal continental-shelf and slope-rise setting (MacKay et al., 2013; Machado et al., 2013b; Steenkamp and St-Onge, 2014).

Uranium-lead detrital zircon geochronology of rock units from different stratigraphic positions in the metasedimentary sequence help constrain the maximum age of sediment deposition and the provenance of detrital materials. Zircon from the blue basal quartzite (unit PLHq) yields provenance profiles with exclusively Archean ages (primarily 2.95–2.65 Ga), similar to crystallization ages from the Archean orthogneiss complex, suggesting a local sediment source (Rayner, 2014, 2015). Quartzite, psammite and semipelite layers from unit PLHs contain detrital zircon with a wide range of ages (3.8–1.9 Ga; Rayner, 2014, 2015), including known Archean orthogneiss ages, as well as detrital ages that have not yet been identified on Hall Peninsula. A psammitic layer from Beekman Peninsula yields a maximum depositional age of 1959 ± 12 Ma, the youngest from the PLHs unit (Rayner, 2014). Despite the increasing effects of metamorphic overprinting on detrital zircon grains, two samples collected from western Hall Peninsula constrain the maximum depositional age of unit PLHp to about 1906 Ma.

Mafic rocks within units PLHa and PLHs have lost all primary mineral compositions and proportions, and igneous/depositional textures due to the intense metamorphic and deformational conditions of the THO. Therefore, it is difficult to determine if the mafic rocks are derived from intrusive and/or extrusive protoliths. Samples of mafic rocks within the metasedimentary sequence, and ultramafic rocks found as sills and plugs in both the metasedimentary sequence and Archean orthogneiss complex, can be classified as alkaline, calc-alkaline, transitional or tholeiitic based on their whole-rock geochemistry (MacKay and Ansdell, 2014). Further investigation of the major and minor element concentrations in these rocks suggest their genesis was related to partial melting of a subduction-modified mantle source that was upwelled possibly during plume-initiated rifting of the North Atlantic Craton (MacKay, 2014).

The orthopyroxene-bearing monzogranitic to granodioritic intrusive rocks occur as laterally continuous panels that cut the psammitic upper units of the supracrustal sequence. The panels are ubiquitous in the central and western parts of Hall Peninsula, and range in width from 100 m to several kilometres. Weak to moderate foliation fabrics were observed in these rocks, typically defined by the preferential growth-orientation of biotite and elongate concentrations (ribbons) of blueish-grey quartz. Uranium-lead zircon crystallization ages have been determined from two samples as 1892 ± 7 Ma (Rayner, 2014) and 1872 ± 5 Ma (Rayner, 2015). The presence of orthopyroxene documented in the majority of these plutonic phases suggests crystallization at high temperatures. Therefore, these rocks are thought to represent plutonism that preceded the terminal collision of the THO.

Hall Peninsula preserves evidence of three distinct phases of deformation and metamorphism related to the THO:

- D_1: Initial east-west shortening (pre-thermal metamorphic peak) that produced isoclinal folds (F_{1a}) and a metamorphic foliation (S_{1a}) axial planar to F_{1a}. These early events are interpreted from micro-fabric analysis of inclusion trails in porphyroblastic phases (Braden, 2013). Continued deformation around the time of peak thermal metamorphism produced isoclinal folds (F_{1b}) of S_{1a} and development of a new metamorphic mineral foliation (S_{-1b}) axial planar to F_{1b}. This event coincides with the partial melting of metasedimentary units that produced muscovite-bearing leucogranite sills and dykes on the eastern part of the peninsula, and voluminous garnet-bearing leucogranite on the western part of the peninsula (Skipton et al., 2013; Dyck and St-Onge, 2014; Skipton and St-Onge, 2014).
- D_2: Intensified east-west shortening continued following the thermal metamorphic peak, and resulted in the development of large-scale, east-verging, thick-skinned recumbent folds (F_2) and thrusts (T_2). Mylonite zones, and ductile stretching and mineral-growth lineations (L_2) expressed as rodded quartz or amphibole, oriented sillimanite, and aligned orthopyroxene (Dyck and St-Onge, 2014) were recognized in the hanging and footwalls of thrust planes. Altered ultramafic intrusions (unit Pu; Figure 8) were locally identified as plugs and sills along thrust surfaces in the Archean orthogneiss, as well as boudinaged sills in the supracrustal sequence. Based on field relationships and deformation of the ultramafic bodies, it is believed that their emplacement either preceded or was synchronous with this deformational stage (Steenkamp et al., 2014).
- D_3: Late north-south shortening produced broad, open folds (F3), and a crenulation cleavage (S_3) defined by muscovite, biotite, and faserkiesel sillimanite reoriented axial planar to F_3. The F_3 folds locally deflect the strike of older fabrics, and the interference of F_3 on F_2 folds creates doubly-plunging and bulls-eye map patterns.

The metamorphic mineral assemblages documented across Hall Peninsula in pelitic to semi-pelitic rocks reflect a gradual increase in peak metamorphic grade from amphibolite-facies conditions (~740°C; garnet+biotite+sillimanite+K-feldspar±muscovite) in the east to granulite-facies conditions (>850°C; garnet+biotite+K-feldspar+melt±sillimanite) in the west (Skipton et al., 2013; Skipton and St-Onge, 2014). Chemically distinct rim domains on zircon identified in Archean orthogneiss, and Paleoproterozoic supracrustal and plutonic rocks are interpreted to represent zircon growth during metamorphism (Rayner, 2014, 2015; From et al., 2015). Ages interpreted as metamorphic include 1855 ± 13 Ma from tonalite orthogneiss (unit At; Rayner, 2015), 1856–1832 Ma from K-feldspar megacrystic granite (unit Amk; Rayner, 2014), 1861 ± 25 Ma from quartzite (unit PLHq), 1886–1832 Ma from psammite (unit PLHp), and 1828 ± 3 Ma from orthopyroxene-biotite monzogranite (Rayner, 2014).

Following the terminal collision of the THO, the rocks underlying Hall Peninsula experienced a very slow, protracted cooling history beginning in the latest Paleoproterozoic and continuing through the Phanerozoic. Muscovite extracted from pelitic supracrustal rocks on eastern Hall Peninsula were analyzed by 40Ar/39Ar step-heating and UV-laser spot dating to determine the cooling history of the area. The step-heating ages range from 1690 ± 3 to 1657 ± 3 Ma, while the spot dating on three muscovite grains show a 20–30 m.y. age decrease from core to rim analyses (Skipton et al., 2015). This implies that the rocks on Hall Peninsula took at least 140 m.y. to cool from peak thermal metamorphic conditions through approximately 420–450°C, the nominal closure temperature for radiogenic Ar in muscovite.

Further cooling and exhumation of Hall Peninsula during the Phanerozoic has been constrained with apatite and zircon (U-Th)/He low-temperature thermochronology (Creason and Gosse, 2014) which has been used as input parameters in the HeFTy and PECUBE thermal modelling programs (Creason, 2015). The thermal modelling results support an exhumation scenario with an extremely slow exhumation rate (8–10 m/m.y.) during the Phanerozoic. Furthermore, variations in the models isotherm outputs between about 340 to 400 Ma are coincident with post-Ordovician fault block movements in the Eastern Canadian Arctic (e.g. Sanford, 1987), and may indicate disturbances of the footwall isotherms due to fault motion in Cumberland Sound (Creason, 2015).

ECONOMIC CONSIDERATIONS

Hall Peninsula hosts a variety of geological features and occurrences with potential for economic deposits. Mafic-ultramafic dykes and layered sills bear resemblance to the lithologies in the Cape Smith belt of northern Quebec which hosts the Raglan Ni-Cu-platinum group element deposit (St-Onge and Lucas, 1993; Lesher, 2007; Steenkamp and St-Onge, 2014). Ultramafic rock bodies that have hydrothermally altered mineral assemblages have also been evaluated as potential carving stone resources for local Inuit artists (Senkow, 2013; Beauregard and Ell, 2015).

The supracrustal sequence contains abundant granitic pegmatites that may bear rare-earth elements (Bigio et al., 2015), and metamorphosed carbonate units with euhedral pale-purple spinel and light-blue apatite, which can both be used as semi-precious gemstones. Mafic metasedimentary rocks, metaironstones, and pyrite- and pyrrhotite-bearing silicified gossanous layers also have potential to contain base and/or precious metal concentrations (Steenkamp, 2014).

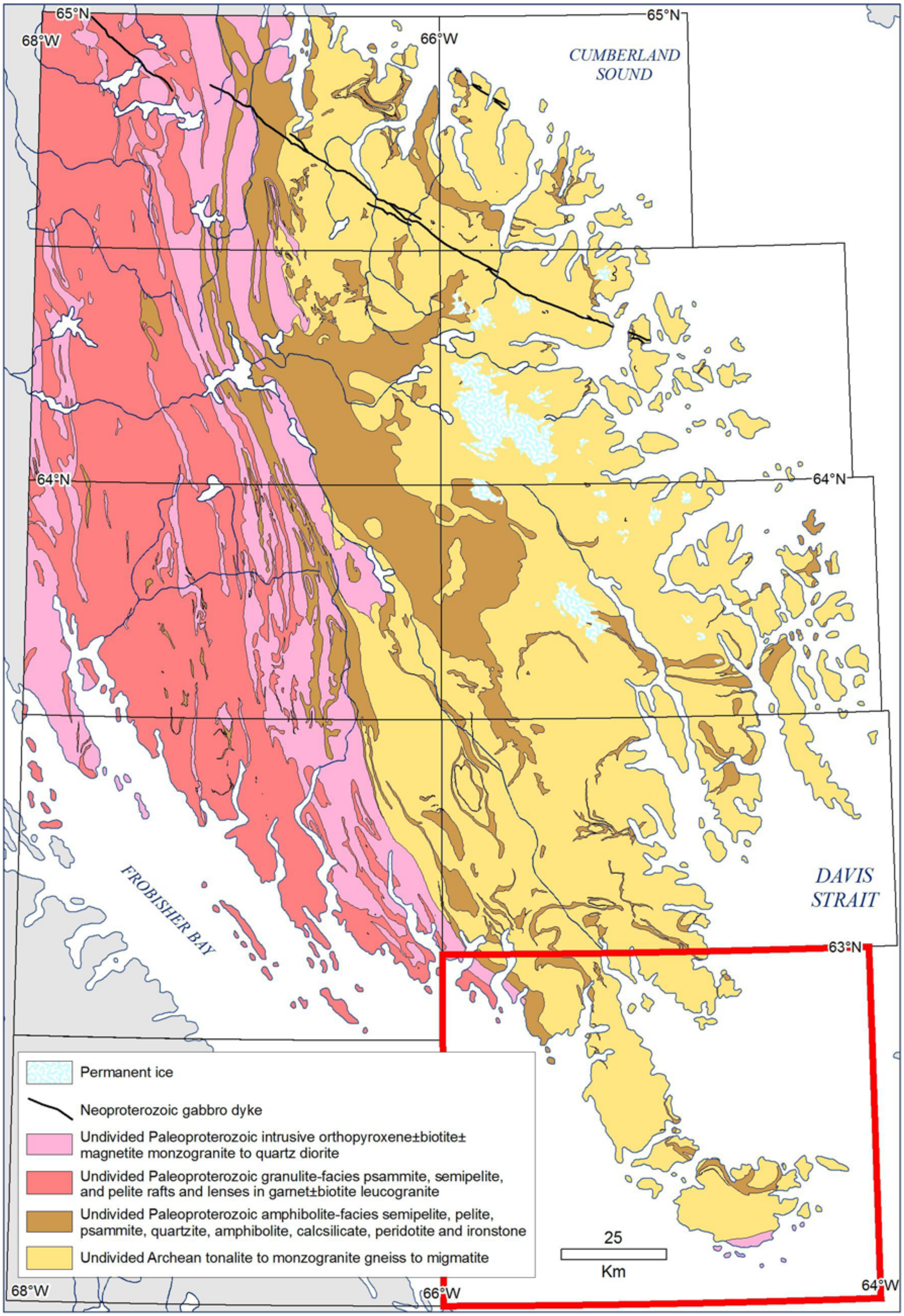

Figure 1. Simplified bedrock geology of the Hall Peninsula, Baffin Island, Nunavut, compiled from regional and targeted mapping conducted in 2012, 2013, and 2014, and supplemented by archival observations collected during the Geological Survey of Canada's Operation Amadjuak in 1965 (Blackadar, 1967), regional aeromagnetic data, scientific literature, and assessment report data from the mineral exploration industry. The Loks Land map sheet is outlined in red.

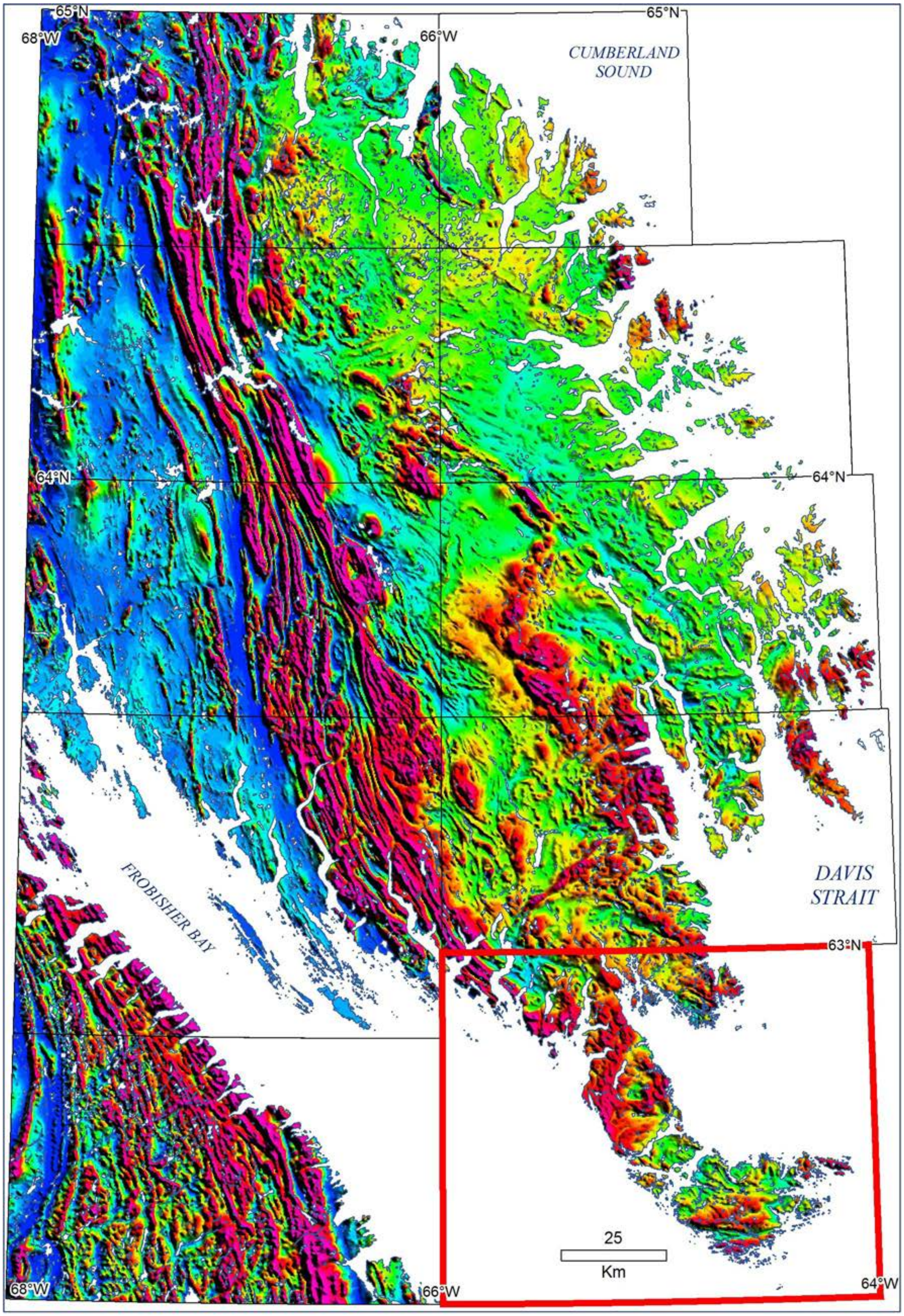

Figure 2. Aeromagnetic anomaly map of Hall Peninsula, Baffin Island, Nunavut, showing the residual total field data (Geological Survey of Canada, 2015), compiled from regional airborne geophysical survey data collected in 1996–1997 (800 m flight-line spacing; Pilkington and Oneschuk, 2007), 2010 (400 m flight-line spacing; Dumont and Dostaler, 2010a-g), and 2015 (400 m flight-line spacing; Kiss and Tschirhart, 2015). The Loks Land map sheet is outlined in red.

Figure 3. Biotite tonalite orthogneiss (unit At) with minor, fine-grained magnetite on Blunt Peninsula, Baffin Island, Nunavut. Biotite defines the S_{1b} mineral foliation that has been folded (F_2) during D_2 compressional events of the Trans-Hudson Orogen. Photograph by C.G. Creason. 2015-021

Figure 4. Compositional heterogeneity in unit At, comprising diorite and amphibolite layers intercalated with biotite monzogranite to biotite tonalite orthogneiss on Hall Peninsula, Baffin Island, Nunavut. Hammer for scale is approximately 1 m long. Photograph by R.E. From. 2015-022

Figure 5. Strongly foliated and intercalated monzogranite and granodiorite gneiss (unit Ag) in the footwall of a T_2 thrust plane on Hall Peninsula, Baffin Island, Nunavut. Hammer for scale is approximately 1 m long. Photograph by R.E. From. 2015-023

Figure 6. Pelitic gneiss in the metasedimentary supracrustal rocks (unit PLHs) on Hall Peninsula, Baffin Island, Nunavut, containing large (up to 5 cm) garnet porphyroblasts, and finer grained biotite and sillimanite crystals in the matrix that define the S_{1b} mineral foliation. Hammer for scale is approximately 30 cm long. Photograph by C. Bilodeau. 2015-024

Figure 7. White-weathering, fine-grained garnet leucogranite produced by partial melting of siliceous supracrustal rocks (unit PLHw) on Hall Peninsula, Baffin Island, Nunavut. Pencil is approximately 8 mm wide. Photograph by D.R. Skipton. 2015-026

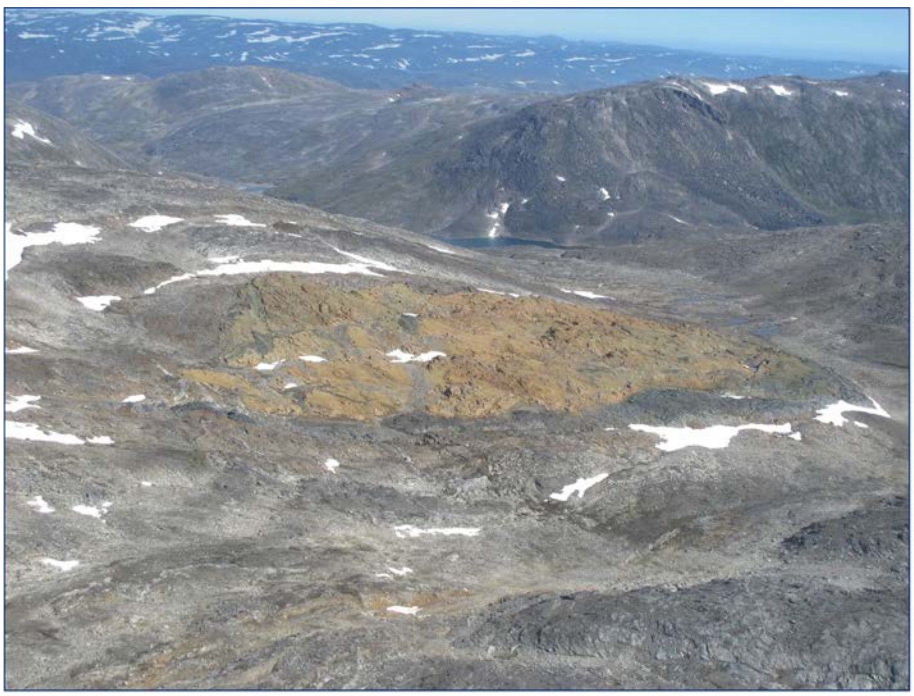

Figure 8. Boudinaged ultramafic sill (unit Pu) in well-foliated biotite±hornblende tonalite gneiss on Hall Peninsula, Baffin Island, Nunavut. The ultramafic mineralogy has been altered to an amphibolite-facies assemblage containing tremolite, actinolite, diopside, phlogopite, and carbonate minerals in well-defined lenses. The long axis of the ultramafic body is approximately 550 m. Photograph by H.M. Steenkamp. 2015-025

Acknowledgments

The authors thank all those who participated in the Hall Peninsula Integrated Geoscience Program: G. Machado, C. Bilodeau, R. Takpanie and D.J. Mate, all formerly with the Canada-Nunavut Geoscience Office; N.M. Rayner from the Geological Survey of Canada; M. Senkow, P. Budkewitsch and A. Bigio from Aboriginal Affairs and Northern Development Canada; M. Beauregard from the Government of Nunavut, Department of Economic Development and Transportation; M.D. Young, C.G. Creason, Z.M. Braden and E.R. Bros from Dalhousie University; D.R. Skipton and K. Martin from the University of Ottawa; R.E. From of the University of Manitoba; C.B. MacKay from the University of Saskatchewan; B.J. Dyck from Oxford University; J. Leblanc-Dumas from Université Laval; and P. Peyton, C. Sudlovenick, R. Hinanik and K. Napayok from the Nunavut Arctic College.

A. Camacho (University of Manitoba), K. Ansdell (University of Saskatchewan), D. Schneider (University of Ottawa), and D. Lentz (University of New Brunswick) are thanked for the lively discussions in the field, and their scientific contributions. Expert air support was provided by Universal Helicopters and organized by the Polar Continental Shelf Program. Exceptional cook and first aid services were provided by 1984 Group of Companies with assistant cooks from the Nunavut Arctic College Camp Cook Program. Special thanks are given to the many locally owned and operated businesses in Iqaluit and Pangnirtung that provided logistics, grocery, and camp services and support. Peregrine Diamonds Ltd. is thanked for their co-operation in sharing logistics, camp facilities, and geology information that aided in making this map. A thorough and thoughtful review of this map by N. Wodicka is greatly appreciated.

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Additional information

The Additional Information folder of this product's digital download contains additional geological information not depicted on the PDF of the map, not included in this Map Information Document, or not included in any geodatabase. Additional information refers to an Excel® spreadsheet of the map legend.

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Coordinate System

Projection: Universal Transverse Mercator
Units: metres
Zone: 20
Horizontal Datum: NAD83
Vertical Datum: mean sea level

Bounding Coordinates

Western longitude: 66°00'00"W
Eastern longitude: 64°00'00"W
Northern latitude: 63°00'00"N
Southern latitude: 62°15'00"N

Software Version

Data has been originally compiled and formatted for use with ArcGIS™ desktop version 10.1 developed by ESRI®.

Data Model Information

Geological Dataset accompanying this publication complies with the GSC's Project Bedrock Schema (beta version 2.2). A short text describing the feature classes, tables and attributes is currently under review and will be made available for download shortly.

All attribute names and definitions are identical in the geodatabase (.gdb file), the shapefiles and the XML workspace file.