2599 ± 15 (mda) 1815–1764

Lithology^a, location

Amp quartz gabbro, SW granulite inlie

Bt syenogranite, granitoid inlier

Bt-amp tonalite, south Boas River

Bt-opx-grt tonalite, north Boas River

Epiclastic, SW basement complex

Amp-bt-opx tonalite, Duke of York Bay

Bt-opx granodiorite, Kirchoffer River

Amp-bt-mt monzogranite, Cape Bylot

Amp-bt syenite, central Kirchoffer River

Amp-bt monzogranite, Cape Arvingvaq

Gabbroic anorthosite, Kokumiak River

Amp-cpx qtz gabbro, Kokumiak River

Bt monzogranite, central Post River

Bt-mt granodiorite, South Kirchoffer River

Opx-bt quartz diorite gneiss, South Bay

Sil-bt monzogranite, north tributary, Ford River

Amp-cpx quartz gabbro, E coast Cape Fisher

Kfd-megacrystic bt monzogranite, Caribou Island

Bt-opx granodiorite, Terror Point, Bell Peninsula

Amp-bt gabbro anorthosite, Nalojoaq Bay, Bell Peninsula

Amp-bt qtz monzodiorite gneiss, Gorden Bay, Bell Peninsula

Gneissic bt monzogranite, Seahorse Point, Bell Peninsula

Depleted mantle ages (T_{DM}) based on model of DePaolo (1981)

^a Plutonic rock types based on Q'-ANOR diagram of Streckeisen and LeMaitre (1979)

^c References: 1 = Rayner et al. (2011), 2 = Rayner et al. (2013), 3 = Whalen et al. (2011), 4 = N. Rayner, unpub. data, 2013

Table 1. Isotopic data for plutonic and clastic rocks of Southampton Island. Final error estimates for U-Pb ages not included for unpublished data. Locations

shown on map face by yellow squares numbered sequentially from west to east. Abbreviations: amp = amphibole, bt = biotite, cpx = clinopyroxene, grt = garnet,

kfd = K-feldspar, ol = olivine, opx = orthopyroxene, mt = magnetite, px = pyroxene, sil = sillimanite, mda = maximum depositional age, NC = not calculated.

Analysis method: FA-MS = fire assay-mass spectrometry; TD-ICP = total digestion-inductively coupled plasma emission; MULT INAA/TD-ICP = multicollector instrumental

Table 2. Assay data for gossanous rocks sampled across Southampton Island. Sample locations are shown on map face by red circles numbered sequentially

neutron activation analysis/total digestion-inductively coupled plasma emission; INAA = instrumental neutron activation analysis

from west to east. The analyses were performed at Activation Laboratories (ActLab), Ancaster, Ontario.

Grt-sil-bt psammite, Seahorse Point, Bell Peninsula

Bt-mt monzogranite, E coast Cape Fisher

Amp-bt qtz monzonite, Rocky Brook

Opx-bt tonalite, Granite Hills

Opx-bt-mt tonalite, NE coast

Bt-amp tonalite, East Bay

Gabbroic anorthosite, SW basement complex

Ol-px peridotite, northeast of Kingarlaittuq Mountain

Quartzite, western margin

Blue quartz porphyry, SW granulite inlier

Kfd-porphyritic bt-amp tonalite, Duke of York Bay

Amp-cpx-bt diorite, The Buttocks, Boas River

Amp-bt-mt monzogranite, Duke of York Bay

coincident with mafic granulites

l00 m resolution aeromagnet

data (Coyle, 2008a, b, c, d, e,

BELL PENINSULA

Figure 2. Geophysical data for Southampton Island including 400 m resolution aeromagnetic total-field data (Coyle, 2008a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p)

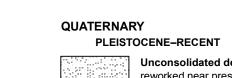
acquired over exposed Precambrian rock and regional Bouguer high-frequency gravity anomaly (Miles et al., 2000) that transects the Phanerozoic-covered

southwest part of the island, and which reflects, in part, mafic granulites of the Snowbird tectonic zone (see also Fig. 1).

g, h, i, j, k, l, m, n, o, p)

Precambrian basement

Phanerozoic cover



Unconsolidated deposits: Mainly glacial till and fluvial deposits, commonly marine, reworked near present-day shoreline.

Limestone-dolomitic limestone±shale: Upper Ordovician to lowest Silurian os carbonate strata, totalling 180–300 m thick, dominated by variably dolomitized ossiliferous limestone with three organic-rich shale intervals, less than 1 m thick (Heywood and Sanford, 1976; Zhang, 2010). From oldest to youngest, the succession includes: basal clastic rock, about 2 m thick, overlain by 65 m dark gre to brownish-grey dolomitized, fossiliferous (gastropods, nautiloids, algae crinoids) limestone (Bad Cache Rapids Group); conformably overlying greenish-grey argillaceous bioclastic limestone (Churchill River Group); conformably overlying orange-tan thinly layered to laminated argillaceous dolomitic limestone (~30 m thic interbedded with three oil-shale intervals overlain by massive biostromal dolomitic limestone (Red Head Rapids Formation); disconformably overlying light brown and tan mottled limestone and dolomite (Lower Silurian Severn River Formation); conformably overlying brown and tan, thin- to thick-bedded limestone with massive biostromal lenses (Ekwan River Formation); conformably overlying light grey, tan, and brown, massive biostromal limestone and dolomite with biohermal swarms (Attawapiskat Formation).

NEOPROTEROZOIO

Gabbro: Unmetamorphosed and undeformed gabbro dykes.

1852 ± 8 Ma (map symbol #22; Table 1).

M_{P4} at 1.82 Ga Monzogranite±syenogranite: Pink- to coral-weathering, biotite-magnetite-bearing monzogranite±syenogranite. Equigranular, massive to weakly foliated, mediumgrained to pegmatitic, typically occuring as veins cutting older plutonic phases and

rarely as isolated plutons, dated at 1821.7 ± 2.5 Ma at basement inlier (U-Pb map symbol #3; Table 1). D₂ ends at 1.84–1.82 Ga Diorite-quartz diorite±tonalite±leucodiorite: Medium to light grey-weathering, Pdr variably foliated, hornblende-bearing mafic plutonic rocks, dated near Cape Fisher at

1842 ± 5 Ma (map symbol #29; Table 1). This age is consistent with field interpretation from The Buttocks area (western margin) that hornblende-bearing diorite was emplaced syn- to late-D₂. M_{P3} and/or D_2 at 1.86 Ga Monzogranite-granodiorite: Pale pink- to grey-weathering, biotite-magnetite-

 M_{P2} and/or D_1 at ca. 1.88 Ga Blue quartz porphyry: Buff-weathering, hypabyssal rock of intermediate (dacitic-Ppy tonalitic) composition containing 20–40% opaline-blue, anhedral quartz eyes; restricted to a small inlier in the southwest where it cuts and hydrates mafic granulite; dated at 1934 ± 8 Ma (map symbol #2; Table 1), providing a minimum age for mafic metaplutonic granulite bodies of the southwest inlier.

enerations of tectonic fabrics; dated at 2058 ± 4 Ma (map symbol #12; Table 1); likely age of the mafic granulite inlier (map symbol #1; Table 1). PROTEROZOIC OR ARCHEAN (UNDETERMINED AGE) Monzogranite: Pink-weathering, biotite±hornblende monzogranite±granodiorite of PAgg unknown age; typically strongly foliated to gneissic, containing inclusions and

locally containing up to 15% 1 mm garnet; variably foliated and locally displaying two

Pgb garnet-hornblende±clinopyroxene±orthopyroxene-bearing mafic plutonic rocks

PAtg magnetite±orthopyroxene tonalite-granodiorite cut by closely spaced, centimetrewide, pink-weathering monzogranite veins; displays two penetrative tectonic fabrics and variably preserves evidence of granulite-facies metamorphism.

may be garnet±clinopyroxene-bearing. Ultramafic plutonic rocks: Green- to black-weathering pyroxenite and/or brownweathering peridotitic ultramafic plutonic rocks of unknown age; commonly occurring

Mafic gneiss: Dark green- to black-weathering, fine- to medium-grained mafic gneiss Aam of uncertain age and origin (volcanic versus plutonic); mafic minerals are dominated by hornblende, but may include clinopyroxene, orthopyroxene, and/or garnet. Calc-silicate-quartzite: White- to grey-weathering, siliceous carbonate interlayered

maximum age of deposition of 2615 ± 23 Ma (map symbol #9; Table 1).

Monzogranite: Pink-weathering, biotite±hornblende monzogranite±granodiorite.

Granodiorite: Grey-weathering, hornblende-biotite granodiorite±monzogranite lesser xenoliths of silicate- or oxide-facies iron-formation and metasedimentary rocks: cut by centimetre-wide biotite-magnetite±orthopyroxene monzogranite veins;

Granodiorite-tonalite±monzogranite: Grey-, white-, or light pink-weathering, Agd biotite-magnetite±hornblende granodiorite±monzogranite with 15–20% mafic content. Typically strongly foliated to gneissic; dated at ca. 2750 Ma (map symbol #28); commonly contains xenoliths of mafic-ultramafic plutonic rocks (Agb) with lesser xenoliths of silicate- or oxide-facies iron-formation and metasedimentary rocks

Tonalite±granodiorite±quartz diorite: Beige- or rusty-weathering, biotitemagnetite±orthopyroxene tonalite-granodiorite-quartz diorite typically displaying atrong foliation or well defined gneissosity; distinguished by greasy, pale greenishbrown fresh surface and variably retrogressed orthopyroxene, both indicating former granulite-facies conditions; contains elongate inclusions and schlieren of maficultramafic plutonic rocks (Agb and Aum), metasedimentary rocks (Asp), and lesser silicate- or oxide-facies iron-formation (A_{Fe}); dated at 2770 ± 6 Ma (map symbol #11; Table 1) and 2757 ± 5 Ma (map symbol #23; Table 1); typically cut by pink

Iron-formation: Rusty-weathering, silicate- and/or oxide-facies iron-formation most commonly interbedded with semipelitic rocks, or as elongate garnetiferous rafts in

Metasedimentary rocks and associated peraluminous granite: Grey- to rustyweathering semipelitic±psammitic rocks with garnet±sillimanite±cordierite, locally minor quartzite±calc-silicate; contains variable amounts of metamorphic neosome, locally cut by 2682 ± 17 Ma peraluminous granite (map symbol #26; Table 1).

Psammite: Grey-weathering psammitic rocks with biotite±garnet, as inclusions within unit Atg and unit Agd.

Gabbro±diorite±leucodiorite: Green-, black-, to rusty-weathering, garnethornblende±clinopyroxene±orthopyroxene-bearing mafic plutonic rocks. May contain garnet porphyroblasts, up to 10 cm, mantled by plagioclase±orthopyroxene symplectite, or be characterized by mottled grey texture reflecting complete retrogression of garnet porphyroblasts. Other localities that lack garnet typically

occur as xenoliths in units Agd, Atg, and Agg. as compositionally layered central complex with garnet porphyrobiastic gabbrol

granodiorite (Atg), described above. Anorthosite±gabbroic anorthosite: Granular, light grey-weathering

recrystallization; dated at 3007 ± 14 Ma (map symbol #31, Table 1) at Nalojoaq Bay, Tonalite-granodiorite±monzogranite: Grey-, white-, or rust-weathering, Atn biotite±orthopyroxene tonalite±granodiorite with 10–15% mafic content; typically finegrained and moderately to strongly foliated; dated at ca. 3390 Ma (map symbol #7; Table 1) and ca. 3680 Ma (map symbol #13; Table 1); pervasively cut by

monzogranite veins.

-___ Approximate

% of the geological polygon, is separated by a comma (,) from the secondary unit and, in rare cases, the secondary unit is

separated by a comma (,) from the tertiary unit. The digital geodatabase denotes primary, secondary, and tertiary units as

Structural form line S₁, may have representative dip S₂, may have representative dip Faults and lineaments

Ductile shear zone, sense of shear unknown Salient linear aeromagnetic anomalies, in part reflecting geometry of rock units ----- Positive

Overturned, north-dipping limbs Axial trace of second generation (F₂) antiform, synform ... <u>†</u> .. <u>†</u> .. _ Upright ... ▼ .. ↑ Overturned, north-dipping limbs $-\dots \stackrel{\blacktriangle}{+} \dots \stackrel{\dagger}{+}$ Axial trace of third generation (F₃) antiform, synform

× Bedrock outcrop examined for this study 16 Location of isotopic data, see Table 1

Location of cover photograph Location of figure photograph

Vertical: facing unknown

Schistosity, known first generation or sole foliation present: inclined, vertical Schistosity, known second generation (S₂) or S₂+S₁

Pmz bearing monzogranite; equigranular, variably foliated, medium-grained; dated at Gneissosity, known second generation (S₂) or S₂+S₁

Gabbro-leucogabbro±gabbroic anorthosite: Green-, black-, to rusty-weathering,

schlieren of granodiorite, enderbite, and diorite; rarely muscovite±garnet-bearing.

PAgb Gabbro-leucogabbro±gabbroic anorthosite: Mafic plutonic rocks of unknown age;

PAum as inclusions, average 50–100 cm, rarely up to 300 m.

with quartzite, variably intruded by at least one generation of granodioriticmonzogranitic rocks; youngest detrital zircon age in quartzite establishes a

Psammite-quartzite±semipelite: Grey- or brown-weathering, clastic rocks typically PAps quartz-rich; rare epiclastic or dacitic volcaniclastic rocks with maximum depositional age of 2599 ± 15 Ma (map symbol #10, Table 1). M_{P1}at ca. 2.32 Ga

Agg Typically strongly foliated to gneissic, locally mylonitic; contains inclusions and schlieren of granodiorite, enderbite, and diorite; dated at 2618 ± 4 Ma (map symbol #18, Table 1); cut by parallel veins of less strained monzogranite. M_{A1} at ca. 2.7–2.66 Ga

Agd_{HB} distinguished by presence of hornblende as primary mafic mineral; strongly foliated to gneissic, amphibolite facies, containing abundant mafic-ultramafic xenoliths with dated at 2692 ± 6 Ma (map symbol #6; Table 1).

hornblende diorite.

(Asp); typically pervasively cut by pink-weathering monzogranite veins or

younger plutonic units.

Quartzite: Light grey- to white-weathering quartz-rich clastic rocks with garnet±cordierite, typically occurring as isolated inclusions within unit Atg.

Ultramafic plutonic rocks: Green- and brown-weathering, olivine-bearing Aum ultramafic plutonic rocks including peridotite, dunite, pyroxenite±leucogabbro; occurs

anorthosite dated at ca. 3005 Ma (map symbol #20; Table 1) and as xenoliths and isolated layered remnants within biotite-magnetite±orthopyroxene tonalite-

an anorthosite±gabbroic anorthosite; gneissic layering obscured by pervasive

Limit of mapping

__ _ _ _ Sense unknown Vertical, normal

–o——o— Negative Axial trace of first generation (F₁) synform

Cape Donovan ● Oil shale occurrence Gossan, see Table 2

⁵ Horizontal Inclined: facing known, facing unknown

First generation: inclined

transposition foliation: inclined Schistosity, third generation: inclined, vertical Gneissosity, known first generation or sole gneissosity

transposition gneissosity present: inclined, vertical Ductile shear zone Shear zone with dip Inclined shear band, sinistral

Inclined shear band, dextral Mineral, stretching, first generation ⁴ Mineral, stretching, second generation

S fold, first generation; showing dip of axial plane and plunge of fold axis S fold, second generation; showing dip of axial plane and plunge of fold axis S fold, third generation; showing dip of axial plane and plunge of fold axis U fold, first generation; showing dip of axial plane and plunge of fold axis U fold, second generation; showing dip of axial plane and plunge of fold axis

U fold, third generation; showing dip of axial plane and plunge of fold axis Z fold, first generation; showing dip of axial plane and plunge of fold axis Z fold, second generation; showing dip of axial plane and plunge of fold axis **Fold axis may occur without axial plane.

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Figure 5. Tight F₂ folds of moderately developed S₁ foliation

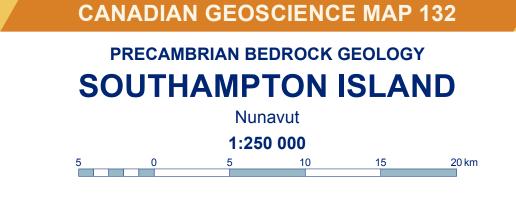
and S₁-parallel leucocratic veins. F₂ axial planes (trace shown by dot-dash line) oriented 190/70°W a representative of north-trending, variably dipping D structures throughout the western margin of the basement complex. Portion of pen for scale is 1.5 cm lo Photograph by M. Sanborn-Barrie. 2013-259

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SOUTH

Figure 6. Open, upright F_3 folding of S_2+S_1 transposition gneissosity, variably oriented 070/36°S to 336/30°NE, central basement complex. Trace of F₃ axial surfaces (040/85°SE) are denoted by dot-dash lines. Grey unit at thickest part

is 1.5 m. Photograph by D. Tersmette. 2013-258



N A T I V E

B A Y

Figure 3. Structural style characteristic of basement complex of Southampton

(dashed white line), Cape Fisher; hammer for scale 26 cm; b) open, upright F₃

fold (trace of F₃ axial surface denoted by black dot-dash line) of recumbent,

isoclinal F2 fold, (trace of F2 axial surface denoted by white dot-dash line) the

latter defined by tightly folded S₁ schistosity (solid white line) in the F₂ hinge and

 S_1+S_2 transposition foliation on the F_2 limbs, Cape Fisher; hammer for scale is

26 cm c) straight S_2+S_1 transposition gneissosity, typically occurring as panels

alternating with a) and b); hammer for scale is 32 cm long. Photographs 3a and

3b by M. Sanborn-Barrie; 2013-256, 2013-261; photograph 3c by D.T. James.

injection layering, with structurally overlying panel of S₁+S₂ transposition foliat

Island. a) Recumbent, isoclinal folds (F₂) of S₁ gneissosity (solid white line) and

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, 21°44'W, decreasing 17.6' annually. Readings vary from 17°39'W in the SW corner to 25°30'W in the NE corner of the map.

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/). This map is not to be used for navigational purposes.

The Geological Survey of Canada welcomes corrections or additional information

Canada

DESCRIPTIVE NOTES

Southampton Island, Nunavut, is situated within a 400 km gap between the Archean-dominated western Churchill

(Rae, Hearne) Province and the Paleoproterozoic Baffin-Ungava segment of the Trans-Hudson collisional orogen

mafic-anorthositic intrusions and metasedimentary rocks. The plutonic gneiss complex consists of a component of ca. 3.68-3.39 Ga tonalite-granodiorite (unit Atn), cut by widespread 2.77-2.76 Ga orthopyroxene-bearing tonalitequartz diorite (unit Atg) and 2.75 Ga biotite granodiorite (unit Agd). Anorthositic (unit Aan), ultramafic (unit Aum) and gabbroic (unit Agb) plutonic rocks commonly occur as inclusions in unit Atg and unit Agd, and form one of the oldest components of the island, with isotopic and zircon trace-element data (Rayner et al., 2012) pointing toward a ca. 3.0 Ga

ancestry (map symbols #20, #31; Table 1). Lesser 2692 ± 6 Ma hornblende monzogranite (unit Agd_{Hb}) is prevalent in the northern Duke of York Bay region. Magnetite-bearing biotite monzogranite dated at 2618 ± 4 Ga (unit Agg) forms

Also contained within the plutonic gneiss complex are semipelitic (unit Asp) and psammitic (unit Aps) rocks that

typically occur as panels less than 100 m wide, but locally attain a thickness of 1–2 km. These metasedimentary rocks,

which everywhere lack primary textures, are demonstrably Archean in the central part of the basement complex where

they are cut by 2.68 Ga peraluminous granite (map symbol #26; Table 1). Associated quartz-rich clastic rocks (unit Aqz)

and magnetite-bearing oxide-facies iron-formation (unit A_{Fe}), the latter typically associated with semipelite, occur at

A north-trending corridor proximal to the western margin of the exposed basement is characterized by a low-intensity

aeromagnetic signature (Fig. 2) and by sparse exposures of psammite-quartzite±semipelite (unit PAps) and calc-silicate

(unit PAcs). Detrital zircon in quartzite establishes this sequence was deposited after ca. 2615 Ma (map symbol #9;

Table 1), distinctly younger than semipelitic rocks (unit Asp) elsewhere on the island. The lithological association of

quartzite-calc-silicate opens the possibility that this sequence may be a remnant of Paleoproterozoic cover rocks

recognized elsewhere on the Rae Craton (Rainbird et al., 2010). Notable other potential supracrustal rocks of uncertain

age include dark green-weathering amphibolite gneiss (unit PAam) the fine (less than 2 mm) grain size of which at

Paleoproterozoic rocks are mainly plutonic, with most voluminous components represented by 1852 ± 8 Ma

granodiorite (unit Pmz) and massive to weakly foliated 1822 ± 3 Ma syenogranite (unit Pgr). Lesser mafic plutonic

Gossanous outcrops sampled for multi-element assay (Table 2) are mainly developed in iron-formation±chert

interstratified with semipelite or ultramafic-mafic plutonic rocks, particularly those in contact with metasedimentary rocks.

Although gossanous semipelite only rarely contains elevated metal contents (i.e. samples 23, 26, 27, 45, 57; Table 2),

iron-formation at several localities has elevated Au, Pt-Pd±sulphide minerals (samples 5-7, 82; Table 2). Gossanous

peridotite more commonly contains sulphide minerals (samples 33–35), elevated Au (samples 36–40), and/ or elevated

The map area is characterized by moderately to strongly developed, shallow-dipping, gneissic foliation (Fig. 3, 6)

commonly displaying inclined to overturned folds, the axial plane of which is parallel to the dominant foliation (Fig.

3a, b). Two penetrative deformational events (D₁ and D₂) are established by overprinting fabric relationships and by

recognition of folded foliation (S₁) in the hinge zones of the dominant fold set (Fig. 3a, b, 5), establishing the latter as F₂.

Where recognized, S₁ is a moderately to steeply inclined planar-tectonic fabric (Fig. 4), typically defined by high-grade

mineral alignment, leucosome, and/or compositional layering. In metasedimentary rocks, S₁ is defined by aligned

sillimanite, whereas orthopyroxene and biotite define S_1 in granodiorite. The attitude of S_1 is highly variable due to

strong reworking during subsequent deformation. Where least reworked in the north, S₁ strikes north to northwest. In the

southwest, where exposure is less continuous, S₁ is inferred to have been at a high angle to the south- and southeast-

striking S₂ foliation. Elongate monazite inclusions that contribute to S₁ within garnet porphyroblasts yield a mean U-Pb

SHRIMP age of 1881 \pm 6 Ma for metamorphism (M_{P2}) at an early stage of penetrative D_1 deformation (Berman et al.,

The dominant structures across the area are attributed to D2, given that S1 is generally either reoriented about F2

folds or transposed into parallelism with F2 axial planes. D2 resulted in tight, inclined to recumbent, west- to southwest-

trending, south- to southeast-vergent F_2 folds (Fig. 3a, b) and/or relatively straight panels of shallow-dipping S_1+S_2

transposition foliation (Fig. 3c, 6). D₂ folds and fabrics define a broad bend at the scale of the exposed basement such

that, in the north, S2±S1 strikes southwest, with progressively more southerly orientations along the western margin of

the exposed basement. This bend, or orocline, is thought to reflect syn-D₂ boundary conditions, rather than a separate, subsequent buckling event, given the absence of suitably oriented overprinting structures that would accommodate this

amplitude of post-D₂ buckling. S₂ mineral assemblages regardless of orientation indicate upper amphibolite- to

granulite-facies conditions, consistent with the ubiquitous occurrence of S2-concordant leucosome. Textural features of

monazite-bearing mineral assemblages (M_{P3}) establish initiation of D₂ deformation at 1860 Ma, and its waning by about

Open, upright, northeast-trending F₃ folds of the transposition foliation (Fig. 3b, 6) highlight a nonpenetrative, near-

horizontal component of shortening (D₃). A distinct episode of post-tectonic monazite growth took place from 1826–1815

2013); however, a relationship to D_3 could not be independently established. Exhumation and cooling took place at

Southampton Island's lithological units, isotopic character, and geophysical expression collectively support

correlation of this region to the Rae Craton (Fig. 1). Voluminous 2.77-2.7 Ga plutonic rocks with ca. 2.9-3.0 Sm-Nd

3.6–3.0 Ga Nd model ages identified on Southampton Island, are also recognized at several localities within the margins

of the Rae Craton (Hartlaub et al., 2005; Young et al., 2007; Peterson et al., 2010; Corrigan and Tremblay, 2011). In

addition, the occurrence of ca. 2.62 Ga monzogranite (map symbol #18; Table 1) and an epiclastic rock with a unimodal,

ca. 2.61 Ga zircon detrital population (map symbol #10; Table 1) highlight a potential link to voluminous 2.62–2.58 Ga

plutonic rocks that extend across much of the mainland Rae Craton (e.g. Hinchey et al., 2011). Penetrative deformation

and metamorphism at ca. 1.88 Ga (D₁) and ca. 1.86–1.82 Ga (D₂) is attributed to crustal shortening and thickening

during the early stages of the ca. 1.89-1.8 Ga Trans-Hudson collisional orogeny. The island's numerous occurrences of

ultramafic plutonic rocks should be of economic interest for Pd-Pt, Au, base metals, and carving stone.

Paleoproterozoic con't

Granite (1.84–1.82 Ga)

Metasedimentary rocks (2.1–1.8 Ga)

(RAE. SUPERIOR)

Figure 1. Simplified geological map of northeast Laurentia showing the context of Southampton Island. Abbreviations:

of z = Chesterfield fault zone, CP = Cumberland Peninsula, Dc = Daly Bay granulite complex, HB = Hoare Bay group,

HP = Hall Peninsula, Kc = Kramanituar granulite complex, MI = Meta Incognita, Pi = Piling group, Pr = Penrhyn group,

Southampton Island, Nunavut, is situated between the L'île Southampton (Nunavut) est située entre le

National Topographic System reference map

Ungava de l'orogène trans-hudsonien

orientale de l'île est occupée par des hautes terres qui

est constitué principalement de gneiss tonalitiques

Paléoprotérozoïque. La majeure partie de la moitié

mettent au jour un socle précambrien alors que la

granodioritiques-granitiques datant de 3000-2700 Ma

qui renferment des enclaves et des inclusions d'environ

3 Ga de roches plutoniques mafigues-ultramafigues

Paléoprotérozoïque sont également présents. Ces

tectonométamorphique au faciès des amphibolites-

granulites à 1880-1820 Ma lors de la collision trans-

hudsonienne entre les cratons de Rae et du lac

Supérieur, ce qui est à la source de leur nature

fortement foliée à gneissique, événement qui a été suivi d'une exhumation et d'un refroidissement à

roches ont été soumises à un profond remaniemen

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anorthositiques et de moindres quantités de roches

moitié occidentale laisse voir des strates carbonatées

Ag = Amer group, BL = Baker Lake, Cb = Chesterfield block, CB = Cumberland Batholith, CBb = Committee Bay belt,

Intracratonic basins (ca 1.7 Ga)

Granitic plutons (2.0 –1.88 Ga)

aleoproterozoic Baffin-Ungava segment of the Trans-

Hudson Orogen. The island exposes a highland of

Precambrian basement across much of its eastern half

and flat-lying Paleozoic carbonate strata across its

western half. The Precambrian basement complex

consists predominantly of 3000-2700 Ma tonalite-

granodiorite-granite gneiss, containing enclaves and

inclusions of ca. 3 Ga mafic-ultramafic-anorthositic

plutonic rocks and lesser metasedimentary rocks. A

smaller proportion of Paleoproterozoic gabbroic and

granitic plutons also occurs. These rocks experienced

metamorphic reworking at 1880-1820 Ma, during the

Superior cratons, resulting in their strongly foliated to

Cover illustration

Shallowly foliated to gneissic granitoid rocks (unit Agd) containing a rust-weathering ultramafic inclusion (unit Aum) exposed on the northeast coast, Southampton

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CANADIAN GEOSCIENCE MAP 132

PRECAMBRIAN BEDROCK GEOLOGY

Island, Nunavut. Caribou (1.2 m high) in foreground. Photograph by M. Sanborn-Barrie. 2013-260

gneissic character, followed by exhumation and cooling

Trans-Hudson Orogen collision between the Rae and

Granitic plutons (1.87–1.84 Ga) Meta Incognita basement

RB = Repulse Bay, Uc = Uvauk granulite complex, W = Woodburn Lake group, fz = fault zone.

model ages (Whalen et al., 2011) are typical of much of the Rae Craton, whereas remnants of 3.4-2.9 Ga crust and/or

Ma during a high-grade event (M_{P4}) at calculated P-T conditions between 5.5–7.3 kbar and 690–775°C (Berman et al.,

1841 Ma in the north and by 1825 Ma in the south (Berman et al., 2013).

numerous localities along the length of the northeastern coast of the island and are inferred to be Archean.

components include 2.06 Ga gabbroic anorthosite (unit Pgb) and 1.84 Ga quartz diorite (unit Pdr).

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coherent phases locally expressed by high-intensity aeromagnetic signatures (Fig. 2).

amphibolite facies is suggestive of a volcanic origin.

Pd±Pt (samples 64–70; Table 2).

ca. 1790–1780 Ma.

(Fig. 1). It exposes a Precambrian high-grade gneiss complex dominated by plutonic rocks with remnants of ultramafic

Cartography by A. Ford, G. Buller, C. Gilbert, and K. Brazel Scientific editing by E. Inglis and E. Everett

Figure 4. F₂ folds of weakly developed, steep west-dipping S₁ foliation

shown by dot-dash line) dip shallowly to the east (010/26°E),

the Mount Saorre region; hammer for scale is 32 cm long. Photograph

representative of the north-trending, shallow east-dipping S₂ foliation

70/70°W) and S₁-parallel leucocratic veins. F₂ axial planes (trace