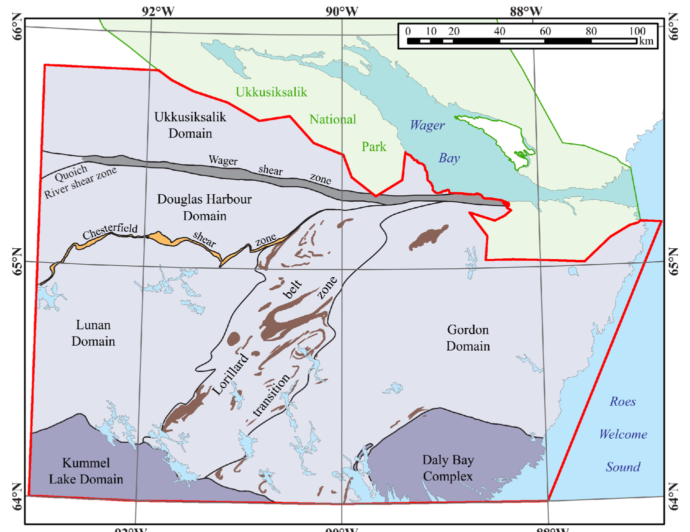


Figure 1. The Tehery Lake–Wager Bay area is divided into six domains (Ukkusiksalik, Douglas Harbour, Lunan, Gordon, and Kummel Lake domains, and Daly Bay Complex) defined by large-scale structures (including the Wager and Chesterfield shear zones) and characterized by differing metamorphic assemblages, Sm-Nd isotopic data, and/or the presence/absence of specific lithologies.

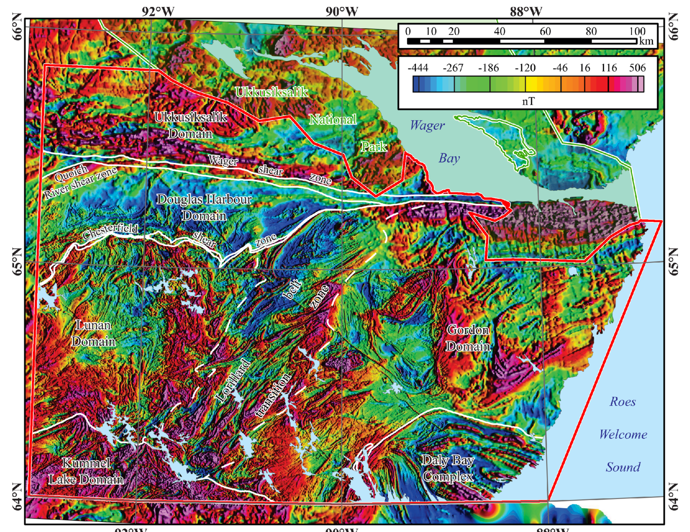


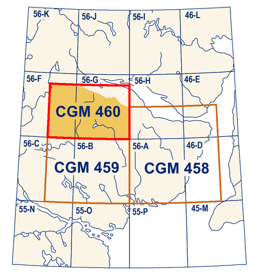
Figure 2. Total-field magnetic data underlying the Tehery Lake–Wager Bay area (Geological Survey of Canada, 1978, 1998; Keating et al., 2003; Coyle and Kiss, 2012a, b), illustrating the dominant deformational fabric, major lineaments including large-scale structures and dykes, and weakly or undeformed plutonic intrusions.

Abstract

New geological mapping in the Tehery Lake–Wager Bay area of northwestern Hudson Bay, Nunavut, frames the emplacement, depositional, and metamorphic histories of the dominant rock types, major structures, and links to neighbouring areas of the central Rae Craton and Chesterfield Block. The area is divided into six domains (Ukkusiksalik, Douglas Harbour, Gordon, and Lunan domains presented here, and Kummel Lake Domain and Daly Bay Complex on adjoining maps) defined by large-scale structures and characterized by differing metamorphic assemblages, Sm-Nd and U-Pb isotopic data, and/or specific lithologies. Meso- to Neoarchean granitoid rocks underlie most of the area and are tectonically intercalated with Archean (volcano)sedimentary packages (Kummel Lake, Lorillard, and Paliak belts). These rocks are locally intruded by ca. 2.62 to 2.58 Ga Snow Island suite granite and cut by younger, thin, east-trending diabase dykes. Paleoproterozoic (volcano)sedimentary rocks are preserved in the Kingmirit belt (Daly Bay Complex) and in basement-cover infolds of Ketyet River group-equivalent strata (Douglas Harbour and Ukkusiksalik domains). In the south, the Daly Bay Complex (comprising mostly mafic granulite-facies rocks) and Kummel Lake Domain (a granulite-grade core complex) share some characteristics with rocks of the Kramanituar and Uvauk complexes, which may delineate the northeastern segment of the ca. 1.90 Ga Snowbird tectonic zone. The Paleoproterozoic Trans-Hudson Orogeny had widespread, penetrative structural and metamorphic effects on the area, and led to the intrusion of the ca. 1.85 to 1.81 Ga Hudson suite monzogranite and mafic ultrapotassic rocks, and ca. 1.83 Ga monzodiorite in the Ukkusiksalik and Douglas Harbour domains. The area is cut by large, southeast-trending gabbro dykes of the 1.267 Ga Mackenzie igneous event.

Résumé

La nouvelle cartographie géologique dans la région de lac Tehery-baie Wager, au nord-ouest de la baie d'Hudson, au Nunavut, encadre l'histoire de la mise en place, du dépôt et du métamorphisme des types de roches dominants, les principales structures et les liens avec les régions avoisinantes de la partie centrale du craton de Rae et du bloc de Chesterfield. La région est divisée en six domaines (domaines d'Ukkusiksalik, de Douglas Harbour, de Gordon et de Lunan présentés ici, ainsi que domaine de Kummel Lake et complexe de Daly Bay sur les cartes adjacentes) définis par des structures à grande échelle et caractérisés par des assemblages métamorphiques, des données isotopiques Sm-Nd et U-Pb et/ou des lithologies spécifiques différents. Des roches granitoïdes du Mésoarchéen au Néoarchéen couvrent la majeure partie de la région et sont tectoniquement intercalées avec des assemblages (volcano)sédimentaires de l'Archéen (ceintures de Kummel Lake, de Lorillard et de Paliak). Ces roches sont localement injectées par des intrusions de granite de la suite de Snow Island datant d'environ 2,62 à 2,58 Ga et recoupées par des dykes de diabase plus jeunes, minces et de direction est. Des roches (volcano)sédimentaires du Paléoprotérozoïque sont conservées dans la ceinture de Kingmirit (complexe de Daly Bay) et dans des replis de socle-couverture de strates équivalentes au groupe de Ketyet River (domaines de Douglas Harbour et d'Ukkusiksalik). Au sud, le complexe de Daly Bay (composé principalement de roches mafiques du faciès des granulites) et le domaine de Kummel Lake (un complexe à noyau métamorphique du faciès des granulites) partagent certaines caractéristiques avec les roches des complexes de Kramanituar et d'Uvauk, qui pourraient délimiter le segment nord-est de la zone tectonique de Snowbird d'environ 1,90 Ga. L'orogenèse trans-hudsonienne du Paléoprotérozoïque a eu des effets structuraux et métamorphiques étendus et pénétrants sur la région et a conduit à l'intrusion de monzogranite de la suite d'Hudson d'environ 1,85 à 1,81 Ga et de roches ultrapotassiques mafiques, ainsi que de monzodiorite d'environ 1,83 Ga dans les domaines d'Ukkusiksalik et de Douglas Harbour. La région est recoupée par de grands dykes de gabbro de direction sud-est, issus de l'événement igné de Mackenzie (1,267 Ga).



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

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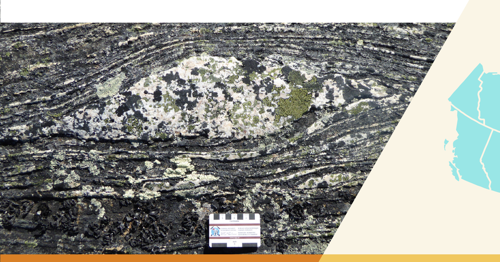

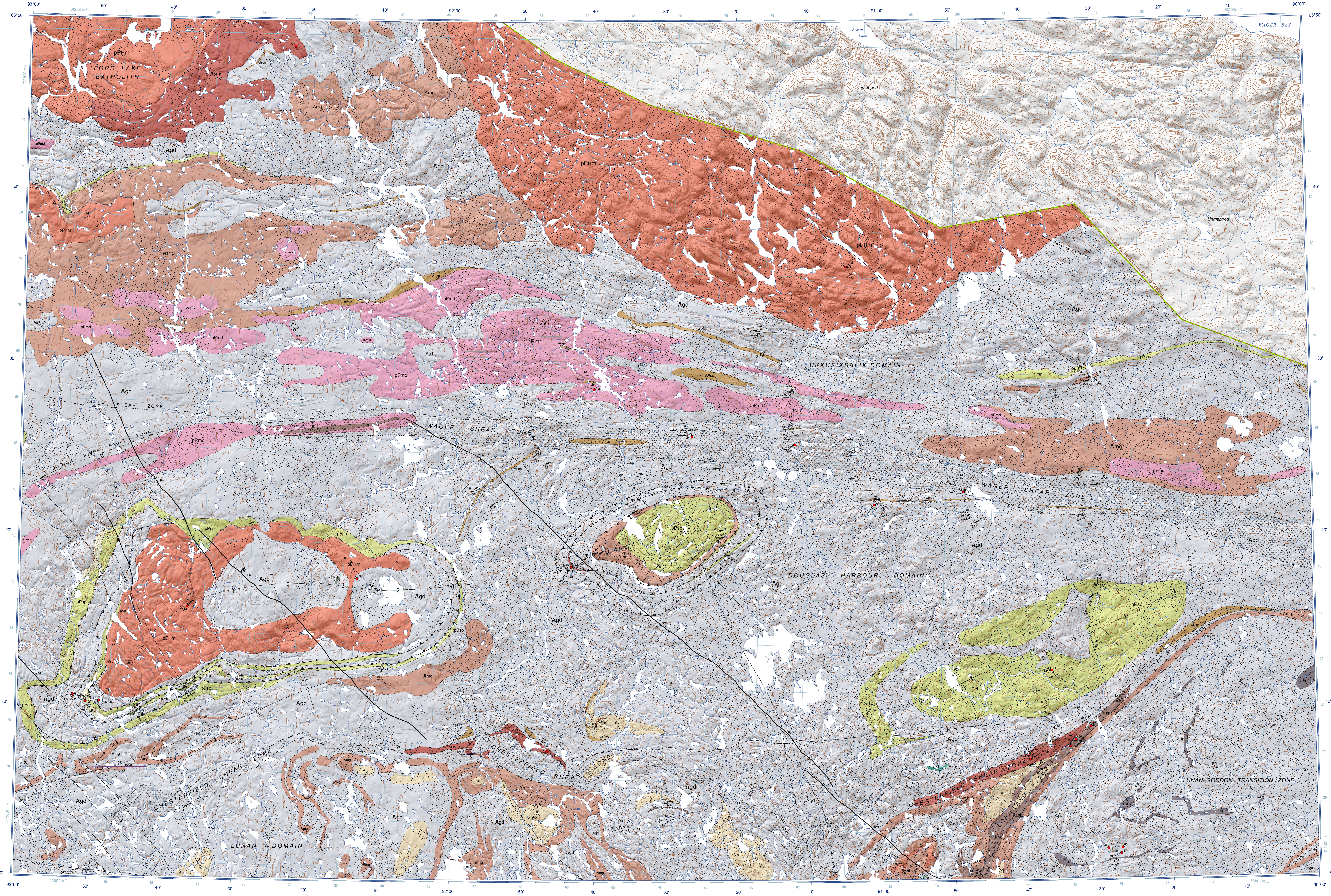

This legend is common to CGM 458, CGM 459, and CGM 460. Coloured legend blocks indicate map units that appear on this map.

Zones of high strain: Rock units are strongly deformed; mylonitic fabrics, locally with kinematic indicators, are present.

QUATERNARY

Glacial till (>2 m thick and continuous bouldery, sandy, and silty diamicton), glaciofluvial sand and gravel, including eskers; glaciolacustrine, glaciomarine, and marine sand, silt, and gravel; alluvial sand and gravel; talus, scree, and bouldery diamicton.

MESOPROTEROZOIC

mPM — **Mackenzie Dyke:** Diabase or gabbro, medium- to coarse-grained; 10 to 50 m wide; subvertical to steeply dipping.

PALEOPROTEROZOIC

pPdb — Diabase or gabbro dyke, plagioclase phenocrysts in fine-grained matrix; 1 to 5 m wide; subvertical to steeply dipping.

pPup — Phlogopite clinopyroxenite, biotite-pyroxene syenite, clinopyroxene melasyenite, leucosyenite phases, and minette dykes, medium- to coarse-grained, locally homogeneous; contain net-veined complex at intrusion margins and partly resorbed rafts of more mafic phases.

pPmd — Biotite+magnetite±hornblende monzodiorite, massive, medium- to coarse-grained; contains grey translucent feldspar with visible twinning and white rims.

pPHm — **Hudson suite:** Biotite±magnetite monzogranite to syenite, medium- to coarse-grained, massive, rare fluorite; occurs as plutons or sills that locally contain xenoliths of older basement rocks, and as coarse-grained to pegmatitic dykes.

Daly Bay Complex (units pPDBq–pPDBgb)

pPDBgb — Gabbro, medium- to coarse-grained, homogeneous; occurs as plutons or subconcordant dykes and sills that cut the host-rock fabric.

pPDBla — Layered gabbroic anorthosite, fine- to medium-grained; occurs as branching sheets and dykes that cut unit pPDBan.

pPDBan — Anorthosite to gabbroic anorthosite, coarse-grained; local deformation recrystallization and flaser structures around outer-body margins.

pPDBpg — Orthopyroxene±clinopyroxene tonalite (pyroxene granulite of Gordon, 1988), fine- to medium-grained, intruded by subconcordant sheets of orthopyroxene-clinopyroxene tonalite–diorite–gabbro; includes intercalated sheets of garnet leucogranite (unit pPDBgl), lesser mafic lithologies (units pPDBgb and pPDBla), and locally anorthosite (unit pPDBan).

pPDBpgs — Same lithologies as in unit pPDBpg, but with moderate to strong mineral foliations, tighter gneissic banding, and local mylonitic fabrics and high-strain zones.

pPDBgl — Garnet±sillimanite±biotite leucogranite, coarse-grained, porphyroblastic, weakly foliated and layered; locally contains cordierite, orthopyroxene, and graphite; contains remnant interlayered migmatitic garnet±biotite±sillimanite pelite with rusty weathering.

pPDBsp — Psammite-semipelite phyllite, schist, and gneiss, orthoquartzite, and local marble.

pPDBq — Impure white quartzite, lesser semipelitic phyllite, marble, and ultramafic rock; locally gossanous.

pPsp — Sillimanite±muscovite quartzite, biotite±garnet±sillimanite±muscovite psammite, semipelite, and minor pelite, and discrete biotite±clinopyroxene±garnet amphibolite; occur as discontinuous panels and sheets, local gossanous horizons.

pPq — Sillimanite±muscovite white quartzite, medium-grained; occurs as 3 to 20 m thick beds.

ARCHEAN OR PALEOPROTEROZOIC

Daly Bay Complex (unit ApPDBgd)

ApPDBgd — Biotite±hornblende granodiorite to granite, gneissic to migmatitic; possible high-grade equivalents of units Agd to Amg.

ARCHEAN

ASIs — **Snow Island suite:** K-feldspar-phyric biotite±magnetite monzogranite to monzonite, medium- to very coarse-grained, massive to locally foliated, locally with pseudo-rapakivi texture; local mafic to intermediate variability (gabbro to diorite) with magma-mixing textures at boundaries; occurs as large plutons with high-strain zones at margins, and smaller, deformed sheets in units Agd and Amg.

Agab — Gabbro; massive to locally deformed, medium- to coarse-grained; locally contains coronitic metamorphic textures with amphibole±garnet±biotite; occurs as large boudinaged bodies in unit Agd.

Aamph — Garnet±pyroxene±biotite±magnetite amphibolite to diorite; massive to locally foliated, medium- to coarse-grained.

APsp — **Paliak belt:** Biotite±garnet±sillimanite semipelite to pelite, garnet±clinopyroxene amphibolite, and lesser ultramafic rocks, iron-formation, and quartzite, medium- to coarse-grained, foliated; occurs as discontinuous panels and sheets in units Agd and pPmd.

ALsp — **Lorillard belt:** Biotite±garnet psammite to semipelite, biotite+garnet+sillimanite±cordierite pelite, quartzite, garnetite, silicate-facies iron-formation, biotite±garnet amphibolite, metagabbro, metaperidotite, calc-silicate and rare marble, medium- to coarse-grained, foliated; occurs as discontinuous panels, screens, and lenses in units Agd and Amg.

ALif — Iron-formation, silicate-facies with quartz-, grunerite-, garnet-, and/or magnetite-rich layering.

Kummel Lake Domain (units AKLggd–AKLsp)

AKLsp — Biotite±garnet leucogranite with remnant semipelitic enclaves, garnet±clinopyroxene-bearing amphibolite, medium-grained, foliated.

AKLan — Gabbroic anorthosite to anorthosite, medium-grained, foliated.

AKLgmg — Biotite+magnetite±hornblende±orthopyroxene monzogranite, granulite-facies, medium- to coarse-grained, massive to foliated.

AKLggd — Biotite+magnetite±orthopyroxene granodiorite, predominantly granulite-facies, medium-grained, foliated, gneissic to migmatitic, greasy green colour; locally contains patches and zones of homogeneous, massive recrystallized granodiorite, and pods and discontinuous layers of units AKLgmg, AKLan, and AKLsp.

Amg — Biotite±hornblende±magnetite monzogranite, medium- to coarse-grained, locally K-feldspar-phyric, foliated to mylonitic; augen texture where associated with high strain.

Aggd — Biotite+magnetite±hornblende±orthopyroxene granodiorite, predominantly granulite-facies, medium-grained, foliated, gneissic to migmatitic, greasy green colour; locally contains patches and zones of homogeneous, massive, recrystallized granodiorite, and pods and discontinuous layers of units Agab, Aamph, ALsp, and ALif.

Agd — Biotite±hornblende±magnetite±muscovite granodiorite, medium-grained, foliated, gneissic to migmatitic, locally mylonitic; commonly injected by foliation-parallel monzogranite (unit Amg) veinlets (0.5–2 cm thick), locally contains pods and discontinuous layers of units Agab, Aamph, APsp, ALsp, and ALif.

At — Biotite±hornblende±epidote tonalitic gneiss, foliated, fine- to medium-grained; contains pods and lenses of diorite (unit Aamph) and gabbro (unit Agab).

Depositional, intrusive, or sheared contacts:
- *Approximate*
- *Inferred*

Thrust fault, approximate (teeth indicate hanging-wall side)
Fault, generic, steep dip, approximate
Shear, generic, steep dip, approximate

Fold, synform, approximate, upright:
- *Second generation*
- *Third generation*

Fold, synform, inferred, upright, first generation

Fold, antiform, approximate, upright:
- *Second generation*
- *Third generation*

Structural form line
Igneous layering
Dyke margin, vertical
Cleavage, slaty

Fold hinge, crenulation:
- *General*
- *S crenulation*

Foliation
Gneissosity
Shear zone, unknown sense
Foliation, mylonitic
Mineral lineation
Stretching lineation

Fold hinge:
- *General*
- *Antiform*
- *Synform*
- *Minor S*
- *Minor Z*

Axial plane:
- *General*
- *Minor S*

Station
Geochronology location (*see* Table 1)
Photo location

Figure 3. Ca. 2.6 Ga Snow Island suite monzgranite (unit ASIs) with porphyroclastic texture due to deformation along the Chesterfield shear zone (photo location 1). Photograph by H.M. Steenkamp. NRCan photo 2022-267

Figure 4. Close-up of garnet+biotite+sillimanite+cordierite pelite (unit APsp) in the Archean Paliak belt found north of the Wager shear zone (photo location 2). Photograph by H.M. Steenkamp. NRCan photo 2022-268

Figure 5. Thick, white quartzite of the Paleoproterozoic supra-crustal sequence (unit pPsp) that likely correlates with the lower-most Ketyet River group (Rainbird et al., 2010; photo location 3). Photograph by H.M. Steenkamp. NRCan photo 2022-269

Figure 6. Close-up of the ca. 1825 Ma coarse-grained Hudson monzogranite (unit pPHm) from a large pluton north of the Wager shear zone (photo location 4). Photograph by N. Wodicka. NRCan photo 2022-271

Figure 7. Close-up of the ca. 1833 Ma biotite+magnetite± hornblende monzodiorite intrusive phase (unit pPmd in Agd) identified along the central and western segments of the Wager shear zone (photo location 5). Photograph by H.M. Steenkamp. NRCan photo 2022-270

Figure 8. Outcrop view of the ca. 1276 Ma Mackenzie gabbro dyke (unit mPM; LeCheminant and Heaman, 1989) cutting through basement granodiorite gneiss (unit Agd; photo location 6). Photograph by H.M. Steenkamp. NRCan photo 2022-272

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GSC CANADIAN GEOSCIENCE MAP 460 • CNGO OPEN FILE MAP 2023-06

Geological Survey of Canada
Canadian Geoscience Maps

Canada

Authors: H.M. Steenkamp, N. Wodicka, O.M. Weller, J. Kendrick, I. Therriault, T. Peterson, C.J.M. Lawley, and V. Tschirhart

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BEDROCK GEOLOGY
WAGER BAY AREA
Kivalliq, Nunavut
parts of NTS 56-F, G
1:150 000

2 0 2 4 6 8 10 12 km

Map projection Universal Transverse Mercator, zone 15
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

Shaded-relief image derived from the digital elevation model supplied by Natural Resources Canada
Illumination: azimuth 315°, altitude 45°, vertical factor 5x

Mean magnetic declination 2023, 8°04′W, decreasing 17.4′ annually
Readings vary from 10°21′W in the NE corner to 5°47′W in the SW corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Boudinaged leucosome layer in basement granodiorite gneiss (unit Agd) with dextral shear sense in the Wager shear zone, Nunavut (photo location 7). Photograph by H.M. Steenkamp. NRCan photo 2022-266

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Data may include additional observations not portrayed on this map. *See* map info document accompanying the downloaded data for more information about this publication.

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