Mineral and carving-stone resources of Baffin Island

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Abstract: Mineral resources of Baffin Island include iron (Mary River), diamonds, carbonate-hosted zinc and lead (Nanisivik), nickel, copper, platinum group elements, uranium, thorium, gemstones (sapphire, spinel, lapis lazuli), carving stone, and coal.

Iron deposits include the Mary River No. 1 to 4 deposits of northern Baffin Island, which came into production in 2015 and contain 586 Mt grading 66% Fe. The Mesoproterozoic Borden Basin hosts the Nanisivik deposit, mined between 1976 and 2002; this is a Mississippi Valley–type deposit and contains 9.0% Zn, 0.7% Pb, and 41 ppm Ag. Diamond-rich kimberlite occurs as sheets and small pipes at Chidliak on Hall Peninsula; largest by area is the CH-1 (6 ha) pipe. At least 32 carving-stone localities are known; 7 communities on Baffin Island have good access to quarried material. Coal occurs in the Cretaceous–Paleogene Eclipse Trough of Bylot and northwestern Baffin islands. Exposures near Pond Inlet have been excavated for local use.

Résumé : Parmi les ressources minérales de l'île de Baffin, on compte du fer (Mary River), des diamants, du zinc et du plomb dans des roches carbonatées (Nanisivik), du nickel, du cuivre, des éléments du groupe du platine, de l'uranium, du thorium, des pierres précieuses (saphir, spinelle, lapis-lazuli), de la pierre à sculpter et du charbon.

Les gîtes de fer comprennent les gisements n[os] 1-4 de Mary River, dans le nord de l'île de Baffin, qui contiennent 586 mT de minerai titrant 66 % de Fe et dont l'exploitation a débuté en 2015. Le bassin de Borden du Mésoprotérozoïque renferme le gisement de Nanisivik, qui a été exploité de 1976 à 2002. Ce gisement est de type Mississippi-Valley et consiste en une minéralisation à 9,0 % de Zn, 0,7 % de Pb et 41 ppm de Ag. À Chidliak, dans la péninsule Hall, de la kimberlite riche en diamants se présente sous forme de feuillets et de petites cheminées; la kimberlite la plus étendue (6 ha) est la cheminée CH-1. Au moins 32 sites de pierre à sculpter sont connus; 7 collectivités de l'île de Baffin ont une bonne accessibilité aux matériaux extraits de carrières. Du charbon est présent dans la cuvette d'Eclipse du Crétacé-Paléogène, dans l'île Bylot et le nord-ouest de l'île de Baffin. Près de Pond Inlet, du charbon a été extrait d'affleurements en vue d'une utilisation locale.

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INTRODUCTION

Baffin Island, like the rest of Canada's Arctic Archipelago, is part of the last frontier of mineral exploration in North America. Factors such as remoteness, the lack of infrastructure, complicated logistics, short field seasons, and high operational costs have all played a role in hindering exploration investment. Nevertheless, Baffin Island consists of geological units that formed in environments where mineralization is known to develop. Further, known correlations exist with well endowed geological provinces on the mainland areas of Nunavut, Greenland, and Nunavik (northern Quebec). as the world's fifth largest island, Baffin's sheer size (~507 000 km^2) rivals that of Manitoba and northern Ontario. It is therefore reasonable to assume that, although as only a handful of significant discoveries have been made there over the last half century, Baffin Island remains largely untapped in terms of mineral potential.

With the completion of the Geological Survey of Canada's Geo-mapping for Energy and Minerals (GEM) program and the compilation of multiple new bedrock-geology maps between 2005 and 2019 (*see* St-Onge et al., this volume) a modern, publicly available geological framework has been established for the majority of the surface area of the island. A proper knowledge base is thus in place to encourage new mineral exploration. In this paper, known mineral deposits and showings of Baffin Island are described. The aim of this compilation is to demonstrate that Baffin Island has known resources for numerous commodities, including iron, diamonds, gemstones, carbonate-hosted zinc and lead (Mississippi Valley type), magmatic nickel, copper and platinum-group elements (Ni-Cu-PGE), uranium, thorium, as well as carving stone and coal. The information provided in this paper, along with that from other GEM program contributions on Baffin Island, will hopefully help to highlight the wealth of Baffin Island and target mineral sector investment, as well as contribute to land-use decisions of benefit to both industry and northern stakeholders.

A comprehensive database of past exploration efforts and available assessment reports related to mineral prospects of Baffin Island are publicly available through Nunavut Minerals (NUMIN), a mineral occurrence database managed by the Government of Nunavut. Highlights are presented and summarized herein; the reader is referred to NUMIN for further information on mineral prospects and past exploration.

The location and distribution of mineral deposits and showings discussed herein is shown in Figure 1a, b. This review is divided by commodity type: 1) iron ore (e.g. Mary River district); 2) base and precious metals (e.g. Nanisivik); 3) diamond (e.g. Chidliak); 4) gemstones (e.g. Kimmirut); 5) uranium and thorium; 6) coal; and 7) carving stone. For further details on the geology of the areas discussed by commodity, the reader is invited to consult other chapters of this synthesis volume (e.g. St-Onge et al., this volume).

Iron ore

Mary River, northern Baffin Island, Borden Basin

Jackson (2000) and Iannelli et al. (2013b) provided a summary of past exploration efforts in the Mary River area (Fig. 2, 3). Mining exploration activities in the area have been sporadic since the discovery of Deposit No. 1 at Mary River (locality 1) by M. Watts and R. Sheardown in 1962 (Guimond, 1963). The presence of iron ore of commercial significance was proven by drilling as early as 1965. There was no new interest until 2004, when additional drilling was completed. The current owner, Baffinland Iron Mines Corporation,

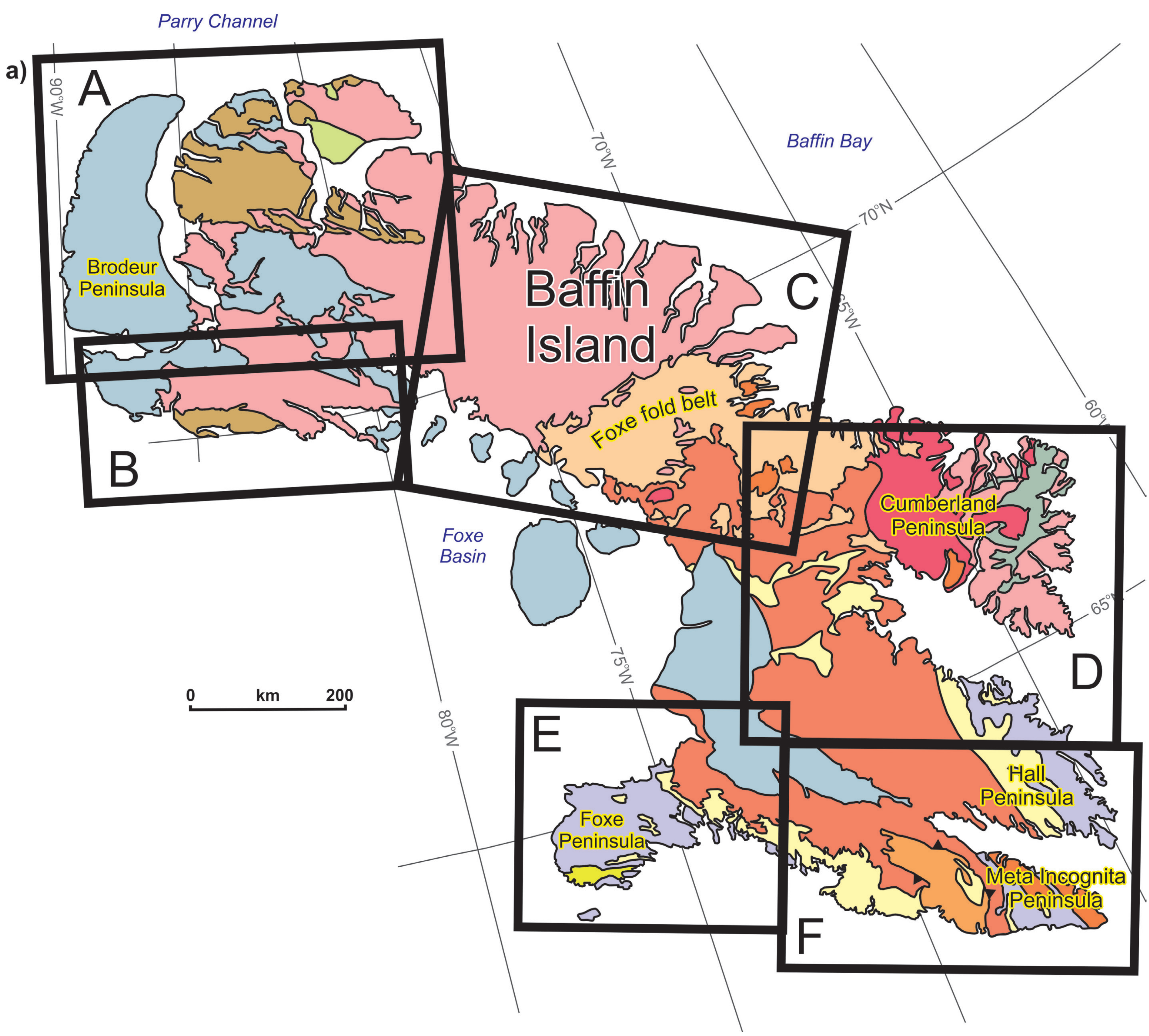


Figure 1. Mineral localities of Baffin Island (numbered localities are described in the text): **a)** index to map areas.

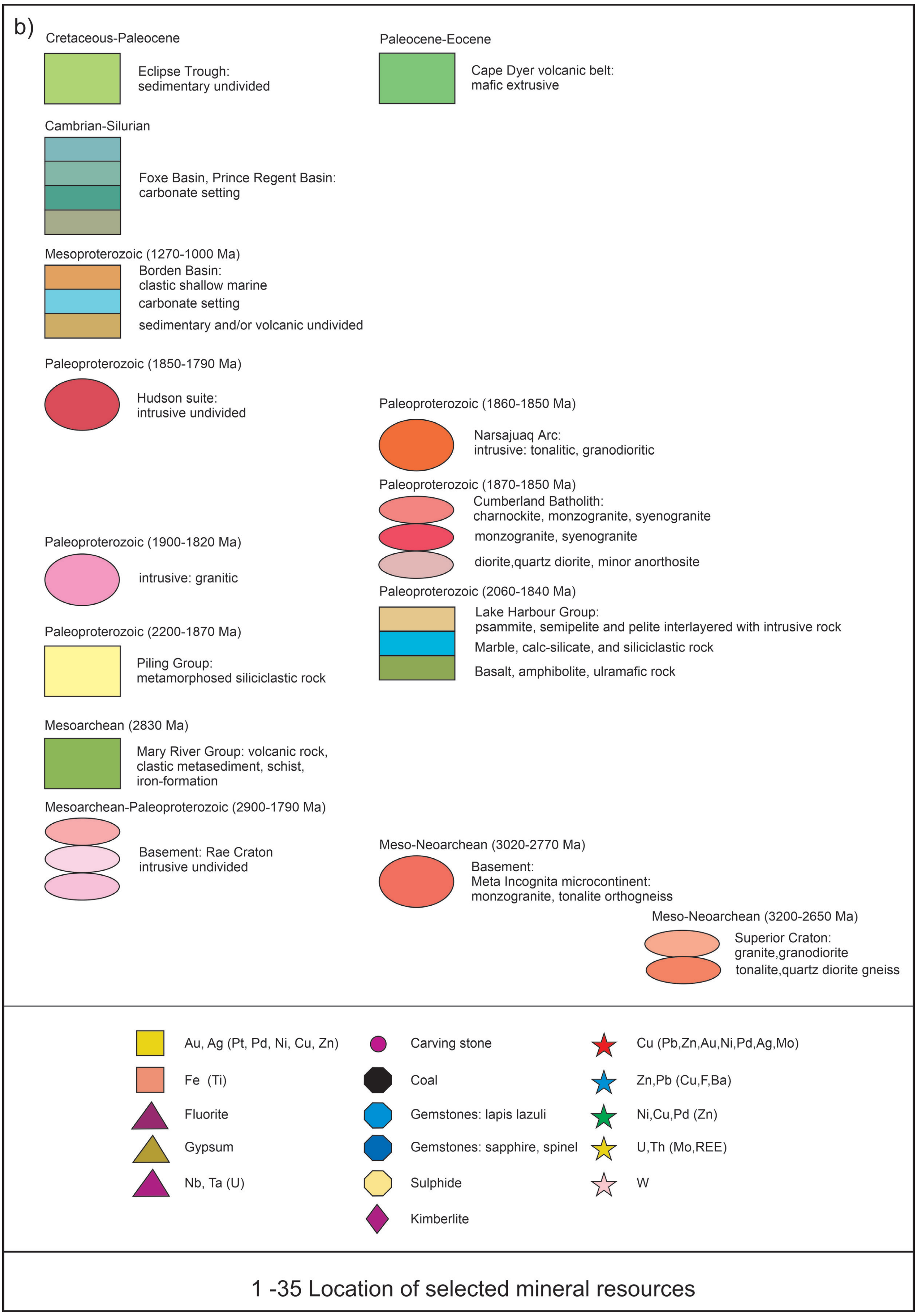


Figure 1. (cont.) b) geological legend, and mineral-resource symbols and locations.

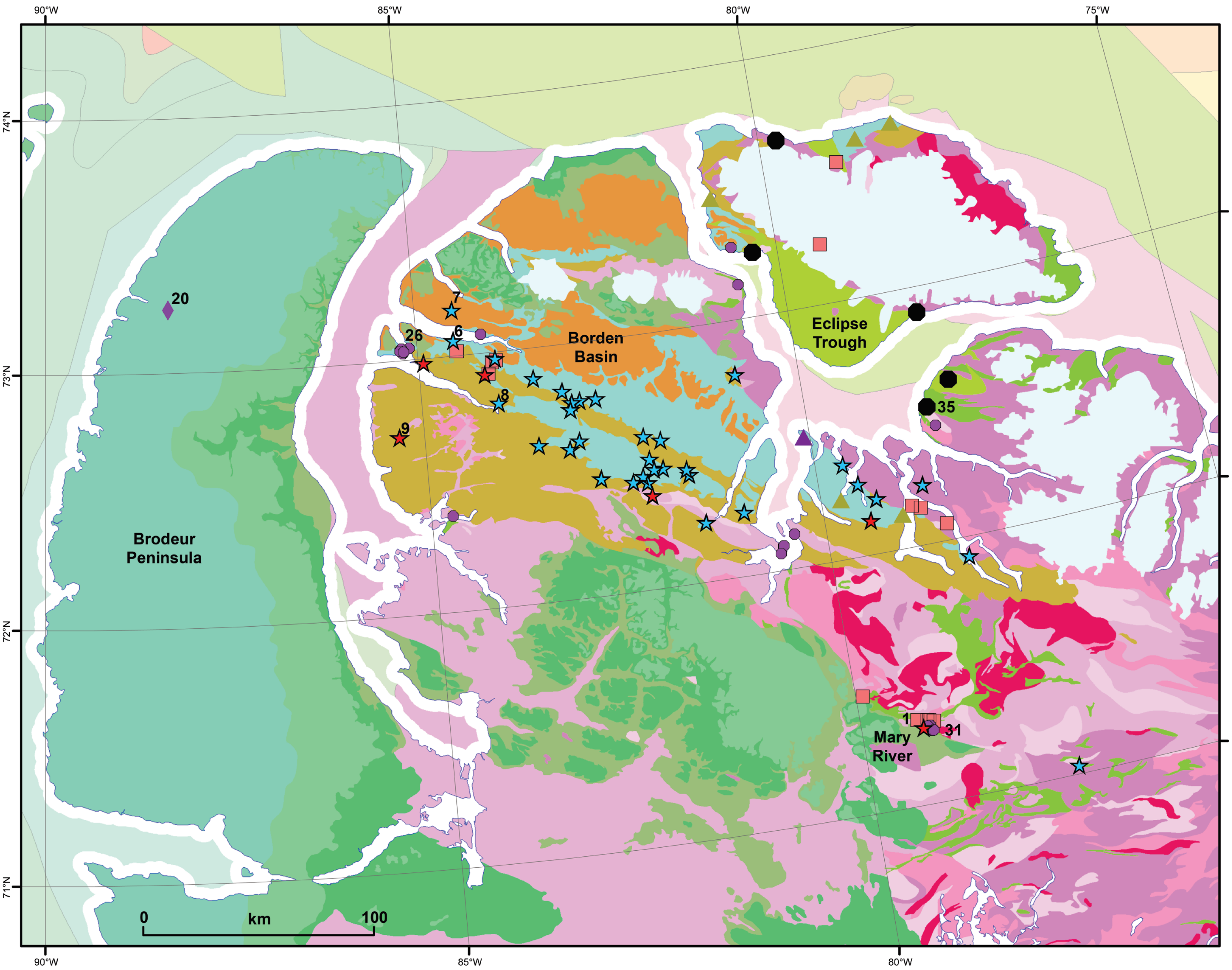


Figure 2. Mary River area, Borden Basin, Eclipse Trough, northwestern Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

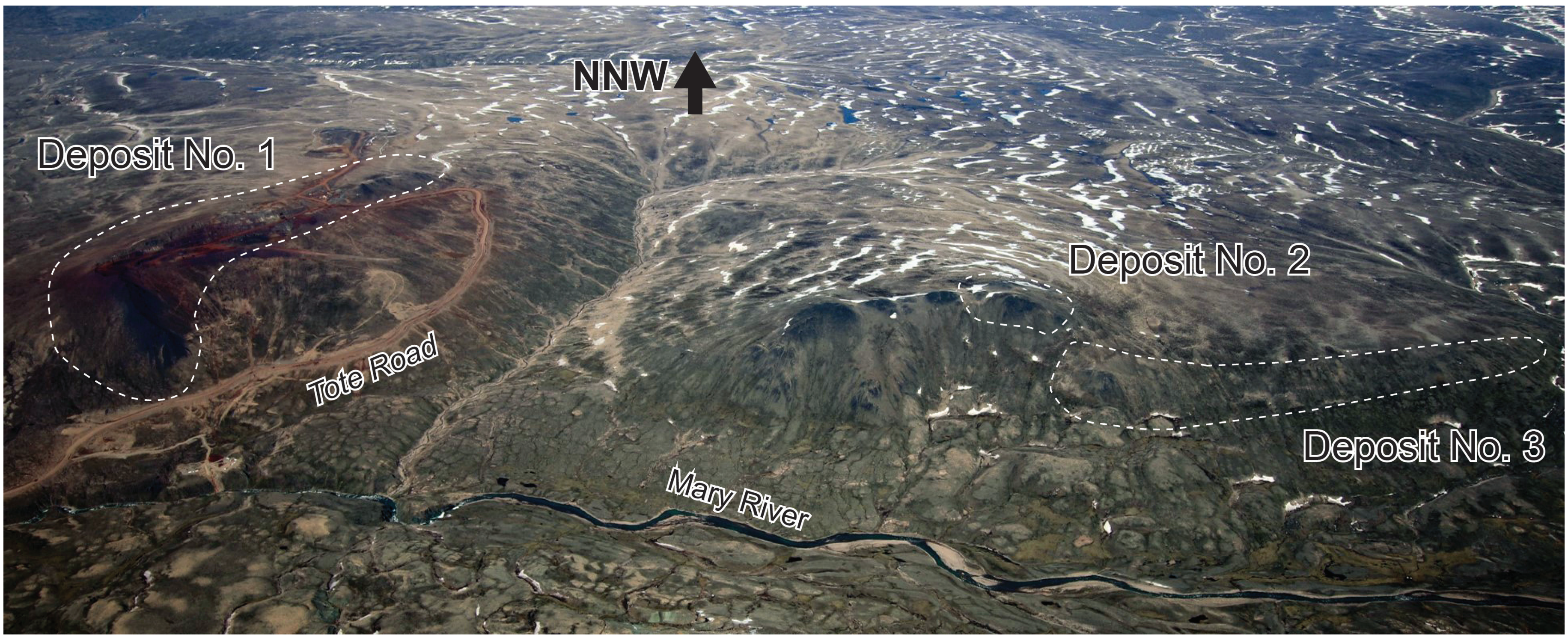


Figure 3. Panoramic aerial view of Mary River Deposits No. 1, 2, and 3 (Iannelli, 2018), northern Baffin Island (field of view is 6 km). Photograph by T. Iannelli, courtesy of Baffinland Iron Mines Corporation.

provided the following National Instrument 43-101 compliant resource figures (G.H. Wahl, R. Gharapetian, J.E. Jackson, V. Khera, and G.G. Wortman, unpub. report, 2011) for the combined No. 1, 2, and 3 deposits: 444 Mt grading 66.2% measured and indicated Fe, as well as 549 Mt of 66.3% inferred Fe. In addition to these resources, there are two other drilled deposits (Deposit No. 4 and Deposit No. 5) and four more (>60% Fe) discovered in 2010 for a total strike length of 160 km of iron-formation (Campbell and MacLeod, 2014). Production from Deposit No. 1 started in 2014, with a target mining rate set at 18 Mt/a. Mary River ore is currently hauled by road 100 km to Milne Inlet, where it is stockpiled and then transferred to bulk carriers. The first ore was shipped to European markets in July 2015. Further details are available from assessment reports recently released by Baffinland (Iannelli et al., 2013a, b, c), which are available in the public domain via NUMIN.

The Mary River Group (ca. 2.83 Ga and ca. 2.76 –2.72 Ga; available ages from Young et al., 2007, Skipton et al., 2017) is comprised of supracrustal outliers in the northwestern part of Baffin Island, which overlie Mesoarchean to Neoarchean basement. With respect to regional architecture, Fe deposits of the Mary River Group tend to occur within tight 10 km-scale folds that are broadly oriented consistently with the northwest- to west-trending structural grain (Young et al., 2004; Johns and Young, 2006). The area is strongly polydeformed; Skipton et al. (2017) and Saumur et al. (2018) summarized the current state of understanding of the structural framework of the area. Jackson (2000) and Johns and Young (2006) have correlated the Mary River Group with the Prince Albert and Woodburn groups of Melville Peninsula, and with similar rocks in northwestern Greenland, a tectonic entity that they identified as the ‘Committee Orogen’ (Jackson, 1969, 2000). However, these relationships are currently being tested by new research stemming from the GEM mapping program (Skipton et al., 2017; Saumur et al., 2018; Skipton et al., 2020a, b). The Mary River Group overlies a basement complex that includes foliated to strongly gneissose monzogranitic to tonalitic orthogneiss (ca. 3.9–2.8 Ga; Campbell and MacLeod, 2014; Skipton et al., 2017; Saumur et al., 2018). The contact relationship is thought to be unconformable, but in places is faulted, mylonitic, intrusive, and migmatitic (e.g. Bros and Johnston, 2017; Skipton et al., 2017). This highlights the different and locally ambiguous relationships with the multiple granitoid units occurring in the area, some of which are as young as ca. 2.7 Ga (Jackson et al., 1990; Bethune and Scammell, 2003). The Mary River Group is succeeded regionally by the Paleoproterozoic Piling Group (central Baffin Island), generally unmetamorphosed Mesoproterozoic strata of the Borden Basin, diabase dykes of the Franklin (720 Ma) swarm, and flat-lying to slightly tilted Ordovician carbonate and siliciclastic strata (Skipton et al., 2017; Saumur et al., 2018).

Previous reconnaissance-scale mapping (e.g. Jackson and Morgan, 1978; Jackson et al., 1978; Davidson et al., 1979) identified extensive tracts of Mary River Group in the surroundings of the Mary River Mine (Deposit No. 1) and north of the Barnes Ice Cap, as well as numerous smaller (1–10 km scale) exposures. Recent targeted mapping by personnel of the Geological Survey of Canada (Skipton et al., 2018, 2020a, b; Saumur et al., 2020a, b) has shown that the Mary River Group is less extensive than previously suggested at the regional scale; areas previously mapped as such are instead dominantly underlain by tonalitic to monzogranitic gneiss and/or monzogranitic to granodioritic plutons. Nevertheless, the thickness of the Mary River Group in the vicinity of the iron deposits varies between 2000 and 4000 m (Jackson, 2000). The regional metamorphic grade on northern Baffin Island ranges from greenschist to granulite facies, and amphibolite facies conditions prevail in the area of the Mary River iron deposits (Jackson, 2000; Jackson and Berman, 2000; Skipton et al., 2017; Saumur et al., 2018).

The Mary River Group comprises mafic–intermediate metavolcanic rocks with lesser ultramafic rocks, psammite to pelite, and iron-formation. Jackson (2000) identified five units within the Mary River Group, which include, from the stratigraphic base:

- pelite, mafic metavolcanic rocks; lenses of metaconglomerate
- quartzite; metarhyolite, metadacite (2718 +5/-3 Ma; Jackson et al., 1990), mafic metavolcanic rocks; oxide-facies iron-formation (and ore deposits)
- metaconglomerate and breccias; metagreywacke, pelite; metavolcanic rocks; metabasites; iron-formation
- local metaconglomerate and breccias; metagreywacke, pelite
- local metaconglomerate, breccia; metavolcanic strata with meta-anorthosite, metagabbro, and granulite-facies mafic rocks

Local unconformities have been proposed under the metaconglomerate within each unit. Layering of iron-formation with other lithofacies is common and has been attributed to a mixture of both depositional-facies variation and tectonic interleaving (Jackson, 2000).

Varieties of facies found in the Mary River Group include oxide-facies, silicate-facies, pelitic and carbonate-facies (calcitic and/or ferroan dolomitic), and locally pelitic and/or aluminosilicate-facies iron-formation, such as in the Rowley River prospect (Fig. 4e; Hey et al., 2015). Oxide- and pelitic-facies iron-formation also contain small amounts of disseminated pyrite and pyrrhotite. The greatest thickness of iron-formation occurs in the vicinity of the main orebodies: 52 to 195 m thick and traceable for up to 3.8 km (Fig. 4a–f). However, the ore zones are generally lenticular in shape; ore zone mineralogy is mostly hematite-magnetite grading to hematite and specularite. These high-grade zones often commonly comprise oxide- to silicate-facies iron-formation grading into or interlayered with quartzite, quartz-mica schist, or chlorite-schist (Iannelli et al., 2013a, b, c). Subsidiary phases within banded iron-formation (BIF) include grunerite, anthophyllite, clinochlore, quartz, garnet, pyrite, pyrrhotite, chalcopyrite, and covellite (G.H. Wahl, R. Gharapetian, J.E. Jackson, V. Khera, and G.G. Wortman, unpub. report, 2011). Upgrading of iron orebodies is attributed to pervasive metasomatism causing desilicification of oxide- and silicate-facies banded iron-formation, which has been linked to the Trans-Hudson Orogen (MacLeod, 2012). The Mary River Group in the area is also strongly polydeformed (*see* Young et al., 2004); thus deformation may also have played a role in the distribution and upgrading of iron ore, as was the case in other camps such as Hamersley, Australia (Egglseder et al., 2017).

Other Archean iron prospects of northern Baffin Island

Other iron-formation prospects in the larger Mary River district include Glacier Lake (Deposit No. 6), Turner River (Deposit No. 7), North Cockburn River (Deposit No. 8), North Rowley River (Deposit No. 9), Cockburn-Rowley, North Isortoq, South Isortoq, and Eqe Bay (Iannelli et al., 2013a; Campbell and MacLeod, 2014). The Glacier Lake deposit (locality 2) also contains base- and precious-metal occurrences (Iannelli et al., 2013b); other minor showings are highlighted by Skipton et al. (2017) and Saumur et al. (2018). Oxide-facies iron-formation (including hematite pseudomorphs after magnetite) occurs in Mary River Group belts up to 300 m in width and in excess of 1000 m in strike length. Channel samples have been collected from magnetite iron-formation grading 64% Fe over widths of 20 and 22 m at the Knob Hill and River Bend (Iannelli, 2018) prospects (locations uncertain), and grading 65% Fe over 54 m at the BIM (Baffinland Iron Mines) Island hematite iron-formation prospect (location uncertain; Campbell and MacLeod, 2014).

Additional iron-formation deposits, documented in the Eqe Bay belt, were largely explored by personnel of the Patino Mining Corporation (Eqe Bay area deposits 1 to 7 at locality 3; Boyd, 1969). Deposit 1 consists of banded hematite and magnetite interbedded with mafic to intermediate volcanic rocks. Resources quoted from the assessment report compiled by Boyd (1969) for deposits 1, 2, 3, and 4 combined are 236 Mt, with an additional 350 Mt of inferred resource. Probable resource in deposits 5, 6, and 7 amounts to 150 Mt (Boyd, 1969). The lithostratigraphy, structure, and age of supracrustal rocks that host iron-formation at Eqe Bay were studied during targeted mapping campaigns by the Geological Survey of Canada in the 1990s (Bethune and Scammell, 1997, 2003). Ages of the supracrustal rocks range between 2740 and 2725 Ma (Bethune and Scammell, 2003).

Banded iron-formations of the Piling Group, north-central Baffin Island

Showings of BIF are locally reported within the Astarte River formation of the Paleoproterozoic Piling Group (ca. 2160–1883 Ma; Fig. 5; Wodicka et al., 2014); such as an occurrence mapped approximately 30 km east of Steensby Inlet and discovered through helicopter-supported reconnaissance (Jackson and Morgan, 1978). A more complete study of the Piling Group was completed in 2000–2002, followed by the release of six new maps (St-Onge et al., 2005a–f). Recent traverse-supported fieldwork in this area, which covered the northernmost extent of the Piling Group on Baffin Island (Skipton et al., 2019, 2020b), found that BIFs in the Piling Group are neither extensive nor common. Unlike those of the Archean Mary River Group, Piling Group BIFs are considered sub- to uneconomic.

Foxe Basin: Cape Dorset area

Iron prospects are also documented in the Cape Dorset area on southwestern Baffin Island, including Maltby Lake, Chorkbak Inlet (four deposits; locality 4), and Korok Inlet (locality 5). The Maltby

Figure 4. Banded iron-formation, ironstone and iron ore of the Mary River district: **a)** view to the northwest of Mary River Deposit No. 1, which is 2.5 km long and consists of hematite and magnetite with average 68.2% iron content. Photograph by B. Saumur. NRCan photo 2019-255; **b)** outcrop of strongly foliated iron-formation 11 km east-northeast of Mary River Deposit No. 1. Photograph by B. Saumur, NRCan photo 2019-256; **c)** disharmonic folding in quartz garnet iron-formation with interbedded dacite and amphibolite located near Mary River Deposit No. 4. Photograph courtesy of H. Sandeman, Department of Natural Resources, Government of Newfoundland and Labrador; **d)** strongly lineated banded iron-formation at the Turner River prospect, 36 km northeast of Mary River Deposit No. 1. Photograph by B. Saumur. NRCan photo 2019-258; **e)** aluminosilicate-facies ironstone (grunerite+garnet+cordierite+magnetite±sillimanite) at the Rowley River prospect. Photograph by B. Saumur. NRCan photo 2019-259; **f)** recumbently folded banded iron-formation at the Nivalis Lake showing, near Barnes Ice Cap (NTS 37-E). Photograph by B. Saumur. NRCan photo 2018-334

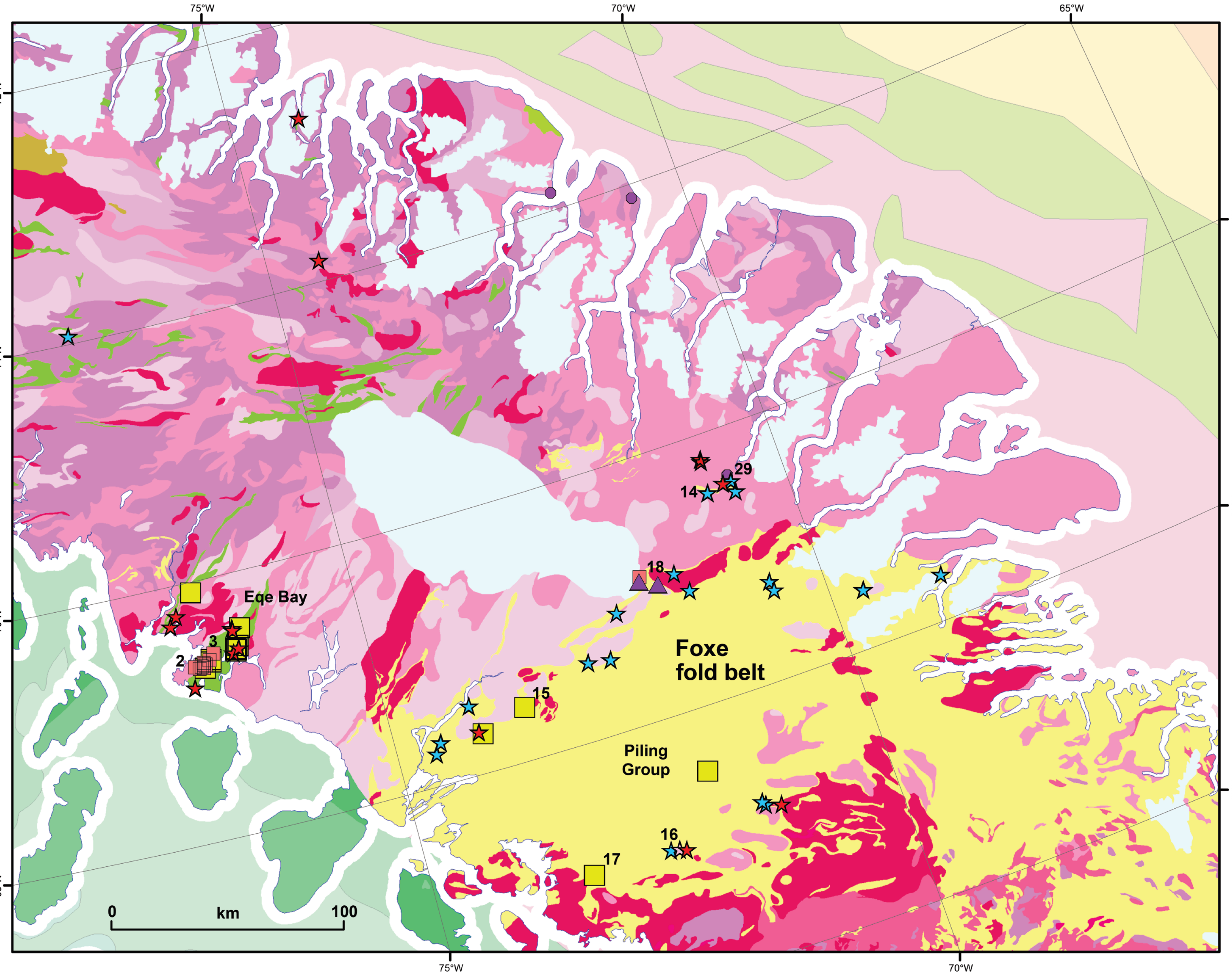


Figure 5. Piling Group and Foxe fold belt, central Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

Lake deposit, discovered and assessed by the Oceanic Iron Ore Corp., is generally disregarded as a potentially economic resource due to low grades (20–24% Fe in magnetite) and low tonnage (200 Mt; Siegel, 1956). While the Chorkbak Inlet prospects 1 to 3 of Ultra-Shawkey Mines Ltd. consist primarily of low-grade disseminated magnetite in garnet amphibolite, prospect 4 at Chorkbak Inlet is described as magnetite iron-formation (Labow, 1957). In contrast to the Chorkbak Inlet properties, magnetite at Korok Inlet features an intrusive relationship into gneissic country rock; however, the tonnage (7 Mt in four lenses) is not significant (Labow, 1957).

Base and precious metals

Nanisivik Mississippi Valley–type Zn-Pb, Arctic Bay area, northern Baffin Island

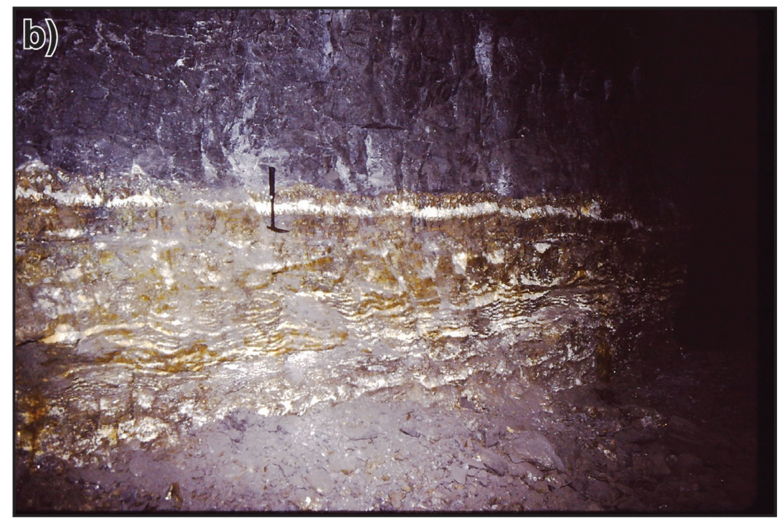
The Mesoproterozoic rocks of the Borden Basin on northern Baffin Island host the Nanisivik deposit (Fig. 6a–c; locality 6). Borden Basin is interpreted as the result of rifting that happened ca. 1270 Ma, with episodic extensional faulting occurring during basin evolution (Jackson, 2000). Sedimentation was terminated by inversion at ca. 1000 Ma (Turner, 2009). The Nanisivik mineralization is hosted in the Nanisivik and Ikpiarjuk formations, which were formerly grouped together in the Society Cliffs Formation (*see* Turner, 2009, 2011 for updated stratigraphy). These formations consist mainly of dolostone (>1000 m thick) featuring deep-water laminates and deep-water carbonate mounds in the western part of Borden Basin. In the eastern part of the basin, the (former) Society Cliffs formation is dolostone forming peritidal cycles reaching 250 m in thickness. Radiometric dating using the Pb-Pb (common lead) method indicates a sedimentation age of 1199 Ma (Dewing et al., 2007).

Prospecting in the vicinity of Strathcona Sound and the Nanisivik ore deposit was first carried out by prospector A. English, who accompanied an Arctic Expedition of 1910 (Bernier, 1911). A vein of pyrite and quartz 12 m thick was discovered, traceable for "several miles"; the site was noted as "metallic rocks" on an accompanying map. Years later, Blackadar and Lemon (1963) reported that A. English had also located a deposit of pyrite with sphalerite and galena in an exposure of four 1–10 m thick veins collectively exposed across a width of approximatively 90 m. The occurrence of an erratic sample of silver and nickel ore was also reported; however, the bedrock source of this material has not been located. Similarly, near Arctic Bay, rusty dolostone containing small quantities of copper sulphides was discovered. The Nanisivik deposit was subsequently staked by Texas Gulf Sulphur Company in 1957 and was mined from 1976 to 2002; the community of Nanisivik, now abandoned, was built to support the mine and its workers. The other nearest settlement, Arctic Bay, was accessed from the mine and airport by an all-weather gravel road. Concentrate was removed by ship from a purpose-built port in the immediate vicinity of the mine.

Local features of the orebody, which occurs in a horst block that is part of a zone of east-striking normal faults, include a laminated dolostone host rock. The orebody is 3 km long, 100 to 200 m wide, 10 to 30 m thick, and contains 17 Mt grading 9.0% Zn, 0.7% Pb and 41 ppm Ag; in addition, there is an ore-zone keel 65 m deep and 5 to 30 m wide. The ore is mostly pyrite with zones rich in sphalerite, galena, and dolospar. The age of the orebody is unresolved, but determinations range from 1095 Ma (paleomagnetic dating of hydrothermally altered dolomite) to 461 Ma (dating of feldspathic alteration; Dewing et al., 2007). The latter age is unlikely as the deposit is cut by dykes of the 723 Ma Franklin swarm (Dewing et al., 2007). Early genetic models emphasized a void-filling, karst-related origin for the Nanisivik deposit (Dewing et al., 2007). More recent models emphasize staged replacement of host rocks involving a gas cap trapped beneath overlying Victor Bay Formation shale, with only minor, initial karst-related porosity in the Society Cliffs. Turner (2011) showed that hydrothermal mineralization is controlled by faults and fractures, as well as stratigraphic controls acting as barriers to fluid migration.

Other base-metal prospects of the Borden Basin

Exploration in the Arctic Bay, Nanisivik, and Pond Inlet region of northern Baffin Island has been the focus of Nanisivik, Mines Ltd. in the Society Cliffs Formation (Thorpe and Thalenhorst, 1981; Sutherland and Dumka, 1995), Petro-Canada in the Nauyat Formation



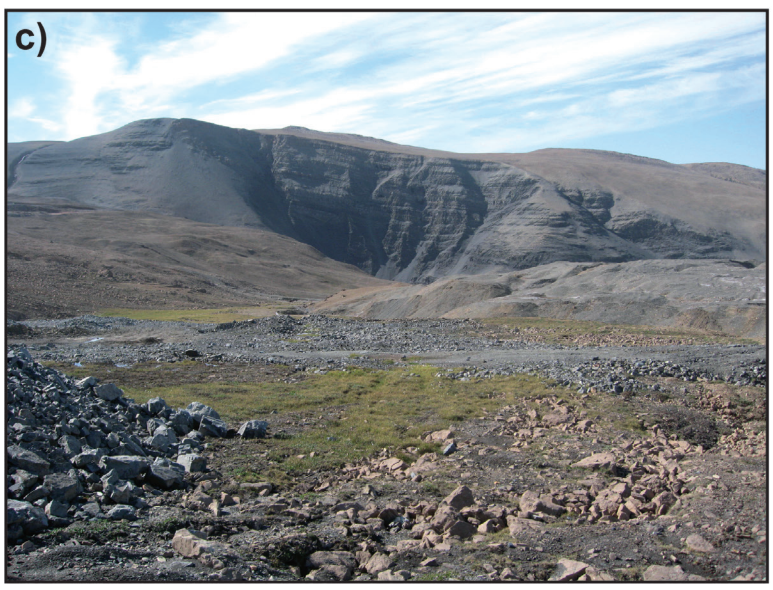


Figure 6. Photographs of the Nanisivik Mississippi Valley–type deposit area: **a)** Nanisivik townsite (single-family dwellings), with mill and port. Photograph courtesy of E. Turner, Laurentian University; **b)** Nanisivik underground ore face under dolostone. Photograph courtesy of R. Sherlock, Laurentian University; **c)** former Nanisivik mine site, with dolostone of the (former) Society Cliffs formation exposed in the hill in the background, which is approximately 50 m high. Photograph courtesy of E. Turner, Laurentian University.

basalt and Adams Sound Formation quartz arenite (Moffatt and Donald, 1985; Moffatt, 1986), and Noranda Exploration Company Ltd. in the Nauyat Formation (Wunder, 1994).

Apart from the Nanisivik mine, showings of sphalerite and galena or of anomalous metals (Zn, Pb, Ag, and locally Cu) are primarily located in the Society Cliffs Formation, between Strathcona Sound and Arctic Bay (13 showings). Additional mineralization has been located over a distance of 118 km to the east-southeast of the Nanisivik mine (9 showings). Notable separate showings include a site north of Strathcona Sound, which intersected stringers, vugs, and cavity fills in the Society Cliffs Formation with assay values of up to 5% Zn and 2% Pb (Sutherland, 1999; locality 7). In a separate locality east of the head of Arctic Bay, grab samples from a 200 m long interval of the Society Cliffs Formation returned assay values of 13.5% Pb and 10% Zn (Moffatt and Donald, 1985; locality 8).

Petro-Canada primarily focused its activities on quartz arenite of the Adams Sound Formation (Moffatt and Donald, 1985; Moffatt, 1986) in the 1980s. This included the discovery of disseminated malachite at a site near the northern shore of Arctic Bay, and barite and pyrite (up to 32%) at a site east of Arctic Bay. The mineralogy of a cluster of ten showings located east of Elwin Inlet consisted of galena and barite, with anomalous silver.

Mineralization was also found in shale intervals within the Nauyat Formation basalt. Noranda Exploration Company Ltd. reported copper from two showings south of Arctic Bay, with grab samples grading up to 7.1% Cu (Wunder, 1994; locality 9).

Minor subeconomic showings of sphalerite and galena have been documented near Tay Sound, within the Iqqittuq Formation on the hanging wall of the White Bay fault zone, roughly 75 km southwest of Pond Inlet (Young et al., 2004).

Mafic–ultramafic systems of the Kimmirut area

Twenty-six base- and precious-metal prospects were investigated by Rubicon Minerals Corporation in 1998 and 1999 west and north of the village of Kimmirut, near the southern coast of Baffin Island (Vande Guchte, 1998; Vande Guchte and Gray, 1999; showings in the vicinity of locality 10). All have broadly similar geological and metallogenic characteristic host rocks: psammite and semipelite of the Lake Harbour Group, specifically sulphidic and graphitic metasedimentary rocks. These are intruded by mafic–ultramafic sills, with phases including pyroxenite and peridotite. Sulphide mineralization occurs within the Lake Harbour Group strata or within the sills. Often, there are no sills in the vicinity of the mineralized sediments. Commodities in anomalous concentrations include nickel, copper, palladium, platinum, and sometimes gold, silver, and zinc. Pod-shaped sulphide bodies can be only a few metres long, but are contained within larger gossans measuring up to 100 m (West-1 and West-2 showings; locality 10), 150 m (MD showing; locality 11), 400 m (Blue Lake showing; locality 12), and 700 m (Elephant Island property; locality 13). Favourable comparisons, in terms of analogous geological environments and mineral associations, have been made with base-metal deposits of Thompson, Manitoba (Vande Guchte, 1998; Vande Guchte and Gray, 1999). International Capri Resources Ltd. (Larouche, 1997; Lichtblau, 1997) investigated five similar showings of disseminated mineralization in the Kimmirut area hosted in diorite, tonalite, gabbro, and pyroxenite.

Base-metal showings of the Piling Group, central Baffin Island

Exploration centred on the Paleoproterozoic Piling Group was carried out by Cominco Ltd. (Armstrong et al., 1976), Petro-Canada Limited (Moffatt, 1986), Savanna Resources Ltd. (Durocher, 1994, 1995), Comaplex Minerals Corp. (McPherson, 1992), and Commander Resources Ltd. (Sexton, 2008; Fleming and Sexton, 2010).

Cominco Ltd. targeted the Flint Lake formation along the northern margin of the Piling Group (St-Onge et al., 2005a), with the expectation of finding carbonate-hosted mineralization like that of the Black Angel deposit of west-central Greenland. Better prospects, also in the Flint Lake formation, included the Miki Maku Lake prospect (locality 14), in which sphalerite and galena occur parallel to bedding in marble over a distance of 1.5 km and reach a thickness of 10 to 20 cm. Elsewhere, up to 5% sphalerite occurs in dolomitic marble, and disseminated pyrite, pyrrhotite, and chalcopyrite are hosted in grey marble. Cominco Ltd. also identified rusty and graphitic schist (Astarte formation?) with variably anomalous Zn, Ni, and Cu. Petro-Canada Limited documented sulphide-bearing boulders in three localities with anomalous Zn, Ni, and Cu, potentially derived from the Astarte formation. At a fourth locality, a gossan in amphibolite with anomalous Cu was identified.

The exploration activities of Savanna Resources Ltd. focused on the Astarte formation exposed in the western part of the Piling Group (St-Onge et al., 2005a, b). Eight prospects are recorded (in the vicinity of locality 15) consisting of the following dominant rock units: 1) pyritic graphitic meta-argillite; 2) sulphide breccia; and 3) quartzite and metasiltstone. Dominant elements vary between showings. However, typical anomalies in pyritic argillite include As, Pb, Ag, and Cd with 20 to 70% pyrite and pyrrhotite. Sulphide breccia contains anomalous Ag, Zn, Cu, Mn, Cd, As, Pb, and Ni. Breccia clasts consist of sandstone and argillite in a matrix of 20 to 100% pyrite and pyrrhotite. Sandstone and siltstone exposed in the vicinity of argillite and breccia also contain locally massive sulphides (up to 30%) and anomalous concentrations of Ba, Mn, Ag, Ni, and Cu.

Comaplex Mineral Corp. focused its exploration activities in the southern and southwestern Piling Group on gossans developed in the Astarte formation. Typical showings (near locality 16) include massive to pod-shaped pyrrhotite and pyrite, and pyritic graphitic argillite with variably anomalous Zn, Ag, Cu, and Ni. Comaplex also documented a tungsten showing in the same general area.

Commander Resources Ltd. located five showings in the southern Piling Group. The best of these is the Tuktu prospect (locality 17), which is hosted by mafic metavolcanic rocks of the Bravo Lake formation, itself the host of semimassive sulphide-containing sphalerite, galena, pyrite, and pyrrhotite. Assays returned values up to 0.55 g/t Au, 513.3 g/t Ag, 0.14% Cu, 11.34% Pb, and 18.6% Zn.

Rounding out the mineral occurrences in the Piling Group are two properties featuring niobium and tantalum. The first of these is an occurrence on the Barnes Ice Cap (locality 18) consisting of radioactive columbite and tantalite in pegmatite (Lang et al., 1962); no other details are provided. The occurrence reported at the second property consists of columbite in pegmatite and is located on the Plex claim block owned by Cominco Ltd. (LeCouteur, 1979).

Northern Baffin Island

Sparse showings and potential for Ni-Cu-PGEs and precious metals have been noted for the greenstone belts of the Mary River district (Young et al., 2004; Johns and Young, 2006) and the Kangiqłuruluk layered mafic–ultramafic intrusion, 50 km west of Pond Inlet (Skipton et al., 2017). Minor showings of Cu and Mo have been documented along the shores of Quernbiter Fiord and Royal Society Fiord (Jackson, 1969), roughly 200 km northwest of Clyde River; these are probably associated with units of intrusive granitic basement.

Diamond-bearing kimberlite

Chidliak, southern Baffin Island

The Chidliak property (locality 19), initially held by Peregrine Diamonds Ltd. and now by De Beers Canada, consists of 60 prospecting permits located on Hall Peninsula (southern Baffin Island), approximately 150 km northeast of Iqaluit.

Bedrock on Hall Peninsula (Fig. 7, 8) includes Archean orthogneissic basement (ca. 2920–2701 Ma; Scott, 1999; Rayner, 2014, 2015) that is generally considered to form part of the Meta Incognita microcontinent (*see* St-Onge et al., 2009). Various cratonic affinities have been proposed for the basement, including: the Rae, Superior, or Nain craton; the Aasiaat domain in western Greenland; or the Core Zone in Labrador (Jackson et al., 1990; Scott, 1999; St-Onge et al., 2009). Archean orthogneissic basement is unconformably overlain by Paleoproterozoic cover strata, with a maximum depositional age of ca. 1960 Ma (Rayner, 2014, 2015) and which are considered to form part of the Lake Harbour Group (*see* St-Onge et al., 2009), or, alternatively, the northern extent of the Tasiuyak gneiss (*see* Scott et al., 2002). On western Hall Peninsula, these strata host orthopyroxene-bearing felsic intrusions (ca. 1890–1852 Ma; Rayner, 2014, 2015) that mostly represent the eastern margin of the Paleoproterozoic Cumberland batholith (*see* Whalen et al., 2010). Hall Peninsula underwent regional middle amphibolite- to granulite-facies metamorphism and crustal shortening ca. 1860 to 1820 Ma, followed by post-thermal peak folding and intrusions of pegmatitic dykes ca. 1800 to 1750 Ma (Skipton et al., 2016a, b).

The bulk of the Chidliak property consists of Archean ortho-gneiss (3019–2784 Ma; J. Pell, unpub. report, 2008). North-trending belts of the Lake Harbour Group are also present, which comprise psammite, quartzite, semipelite, pelite, minor marble, calc-silicate, and leucogranite. Additionally, leucodiorite, peridotite, pyroxenite, and dunite occur as basement-sourced units. All units experienced peak mid-amphibolite-facies metamorphism (J. Pell, unpub. report, 2008; Skipton et al., 2016a).

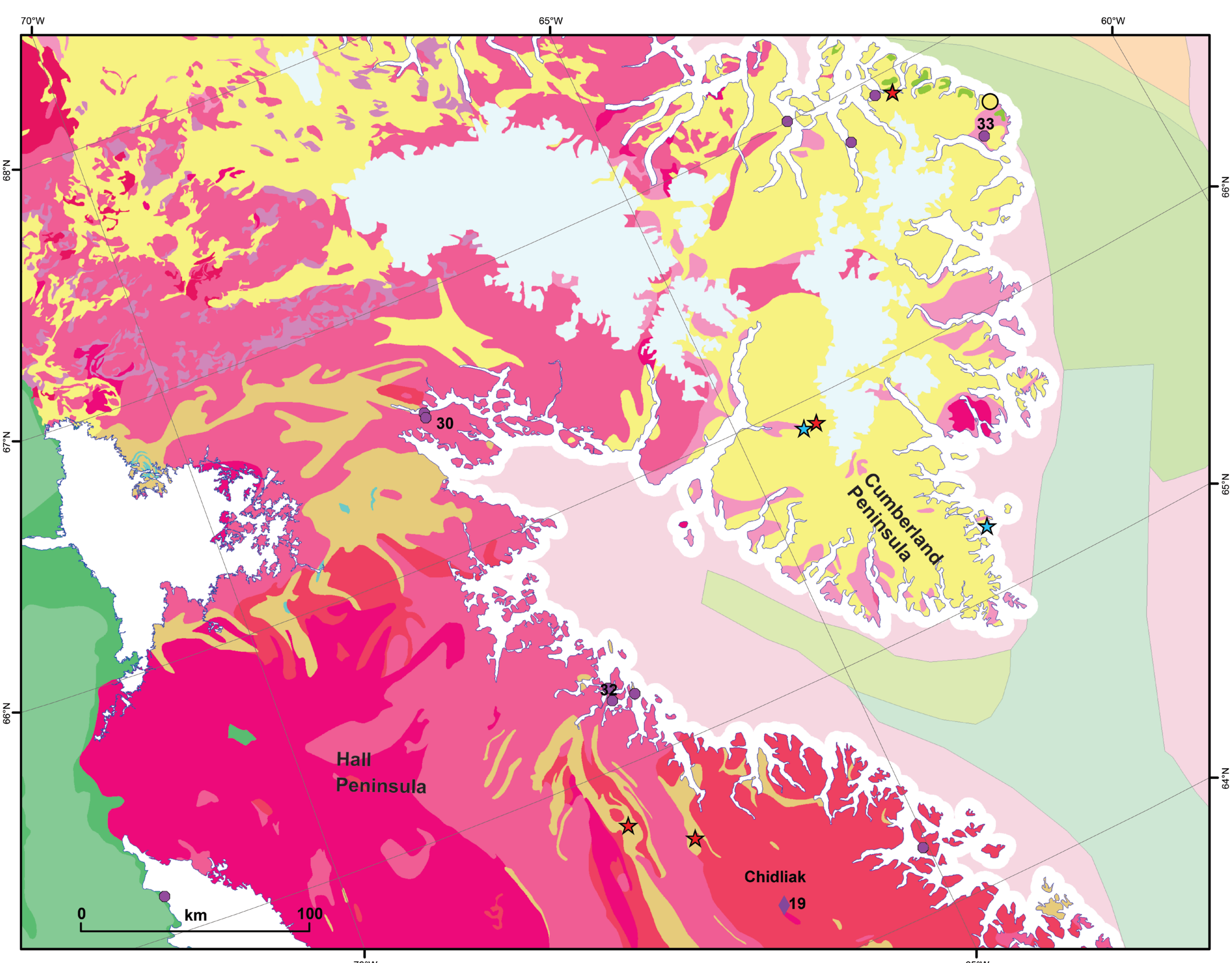


Figure 7. Cumberland Peninsula and northern Hall Peninsula, eastern Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

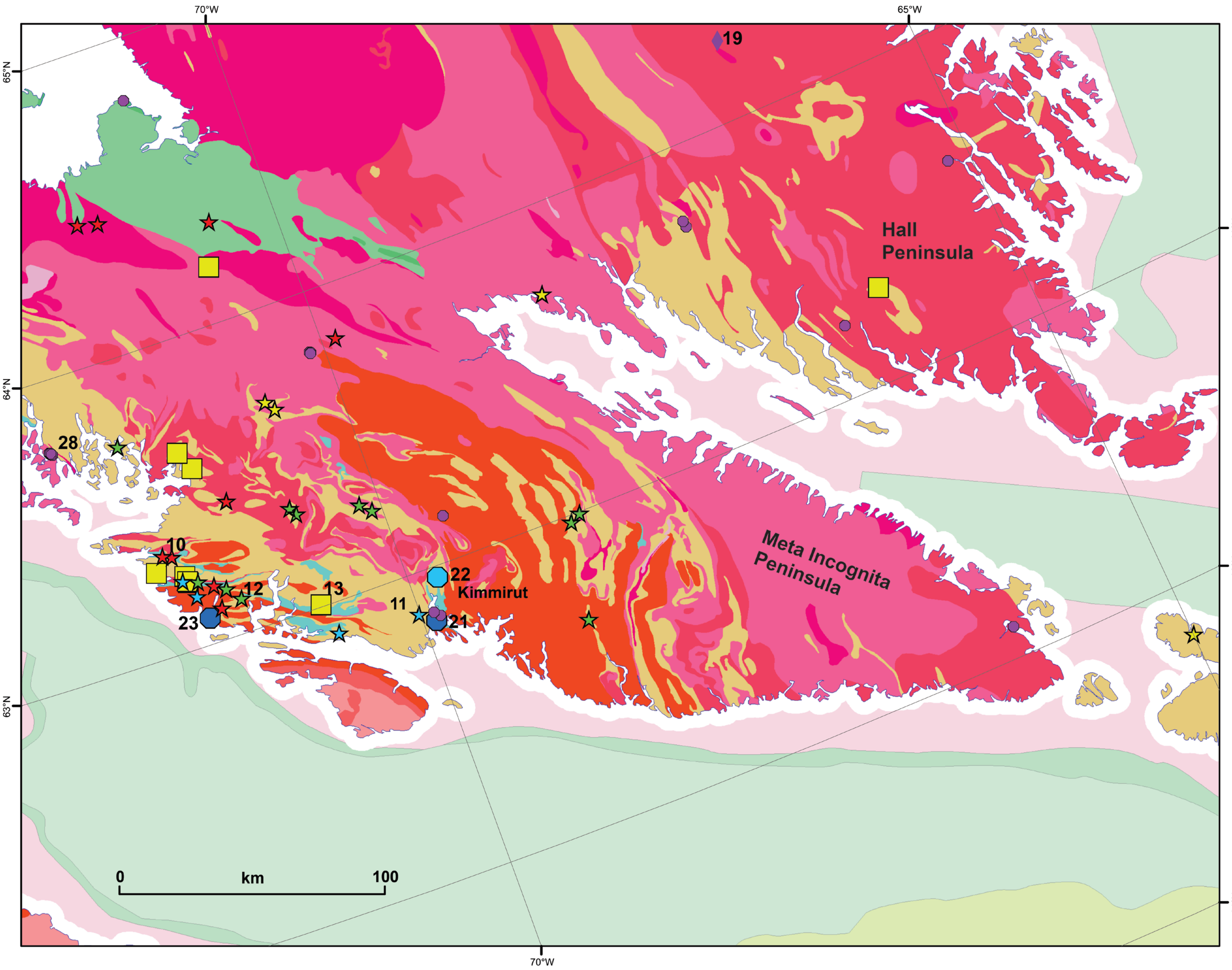


Figure 8. Southern Hall Peninsula and Meta Incognita Peninsula, southern Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

Kimberlites on the Chidliak property include sheets and pipe-like bodies up to 6 ha in area. The sheet-like bodies consist of hypabyssal (coherent) kimberlite with basement xenoliths. The kimberlite pipes contain basement xenoliths and fragments of carbonate and clastic rock of Late Ordovician to early Silurian age (Zhang and Pell, 2013). As these rocks are not encountered at the surface, it is presumed that the Ordovician–Silurian was a former cover on Hall Peninsula (Zhang and Pell, 2013). The kimberlites provide a U-Pb age range on perovskite of 156.7 to 138.9 Ma (Kimmeridgian to Valanginian; Heaman et al., 2015). Kimberlite facies at the Chidliak property are distinguished as volcanic kimberlite, hypabyssal kimberlite, coherent kimberlite, and pyroclastic kimberlite. All of these contain mantle xenoliths; however, some contain clasts of Archean gneissic basement but none of lower Paleozoic age.

The most prospective kimberlites for diamonds are CH-1, CH-6, CH-7, and CH-44. The CH-1 kimberlite covers an area of close to 6 ha and consists of coherent (magmatic) kimberlite with pyrope garnet, chrome diopside, olivine phenocrysts up to 0.1 m across, eclogite, and peridotite xenoliths (Pell, 2008). It is exposed as cobbles in frost boils. The CH-6 kimberlite underlies an area of approximately 1 ha and consists of carbonate-clast-bearing kimberlite. Deeper in the pipe, there are kimberlite facies that are either carbonate-poor or carbonate-rich. Basement xenoliths are also rare. It is unclear whether this is facies of the kimberlite-bearing carbonate xenoliths or whether it is a distinct and separate phase (Farrow et al., 2015). The CH-7 kimberlite, also measuring about 1 ha across, consists of two distinct lobes, the smaller of which comprises coherent kimberlite and the other, apparently coherent kimberlite and volcanic kimberlite, with clasts of carbonate and basement (Farrow et al., 2015). The CH-44 kimberlite covers 0.5 ha with apparently coherent kimberlite in the upper part and volcanic kimberlite or pyroclastic kimberlite at greater depths.

Jackson Inlet, Brodeur Peninsula, northern Baffin Island

Brodeur Peninsula (locality 20) has been notably active for kimberlite exploration in recent years, as carried out specifically by Twin Mining Corporation, Mountain Province Diamonds, and Kennecott Canada Exploration Inc. The most favourable prospect was the kimberlite swarm discovered near Jackson Inlet by F. Tatarnic in 1998, worked by Twin Mining Corp., and reported by Dalmin Corporation (Davis, 2000).

Brodeur Peninsula is underlain by flat-lying Ordovician and Silurian carbonate rocks and a blanket of till. The exposed kimberlites near Jackson Inlet show up as three dark brown patches within a halo of tan-brown altered carbonate. Sixteen kimberlite pipes have been outlined in an oval-shaped (580 by 430 m) area; five pipes have been subjected to trenching. Olivine, garnet, and phlogopite are the dominant phenocryst phases set in 20 to 30% groundmass. In addition, there are host rock xenoliths of limestone, shale, gneiss, lapilli, and mantle-derived peridotite. Trench sampling results indicate good diamond grades, although the pipes are relatively small in diameter (15–60 m each).

Steensby Inlet, northern Baffin Island

Kimberlitic diamond-exploration campaigns south and southwest of Mary River by De Beers (P. Hundt., unpub. assessment report, 2004; D. Wiznar and J. McKenzie, unpub. assessment report, 2005; B. McMonnies, J. McKenzie, N. Januszczac, and D. Chartier, unpub. assessment report, 2007), which included airborne aeromagnetic surveys, did not yield significant prospects.

Gemstones

The Kimmirut area is well endowed in gemstones (sapphire, lapis lazuli, gem-quality spinel), all of which occur within metasedimentary rocks of the mid-Paleoproterozoic Lake Harbour Group (ca. 1.93–1.86 Ga; Scott et al., 2002) that was affected by high-grade granulite-facies metamorphism.

Sapphire (Kimmirut area, southern Baffin Island)

The NUMIN file entry indicates that Canadian Arctic sapphires were first discovered in the vicinity of Kimmirut on southern Baffin Island (locality 21) by a local prospector, N. Aqpik, in 2002. An option agreement was drawn up with True North Gems Inc. in 2003, which subsequently acquired a 100% right to the property. Two additional small showings have been located 100 km to the west, in the vicinity of Beaumont Harbour and Crooks Inlet (Lepage, et al., 2012). Assessment of resource potential included property-scale mapping (2006–2008), prospecting with an ultraviolet lamp (2007–2008), and bulk sampling (2004–2008). During and after 2006, 27 additional localities were discovered in the vicinity of the main (Beluga) showing, including Beluga South, Aqpik, Mark Ruby, and Narwhal.

The sapphires near Kimmirut (Fig. 9a–c) occur within the Lake Harbor Group, which is exposed over a strike length exceeding 500 km from Cape Dorset in the west to Kimmirut in the east. Units of the Lake Harbour Group include: 1) semipelite and garnet psammite; 2) garnet psammite and quartzite; and 3) marble and calc-silicate schist, which is host to the sapphire showings. The marble contains phlogopite and graphite, whereas the calc-silicate contains diopside and lesser phlogopite, wollastonite, tremolite, titanite, and apatite. Common association of sapphire with calc-silicate includes scapolite, spinel, tourmaline, and apatite. The main discovery area (Beluga) extends over 1000 m, with specific occurrences located in detached blocks. The most prospective rocks feature 10% sapphire as euhedral and subhedral crystals, many averaging 1.5 cm in length and some reaching 7 cm. Gangue phases include anorthite, calcite, scapolite, phlogopite, and pyroxene. It has been suggested that the occurrence of scapolite may indicate an origin linked to the regional metamorphism of impure evaporites (Lepage, et al., 2012). Alternatively, recent work has indicated that the protolith was most likely dolomitic argillaceous marl, and that sapphire formed as a result of retrograde replacement and breakdown of the peak granulite-facies metamorphic mineral assemblage (Belley et al., 2017).

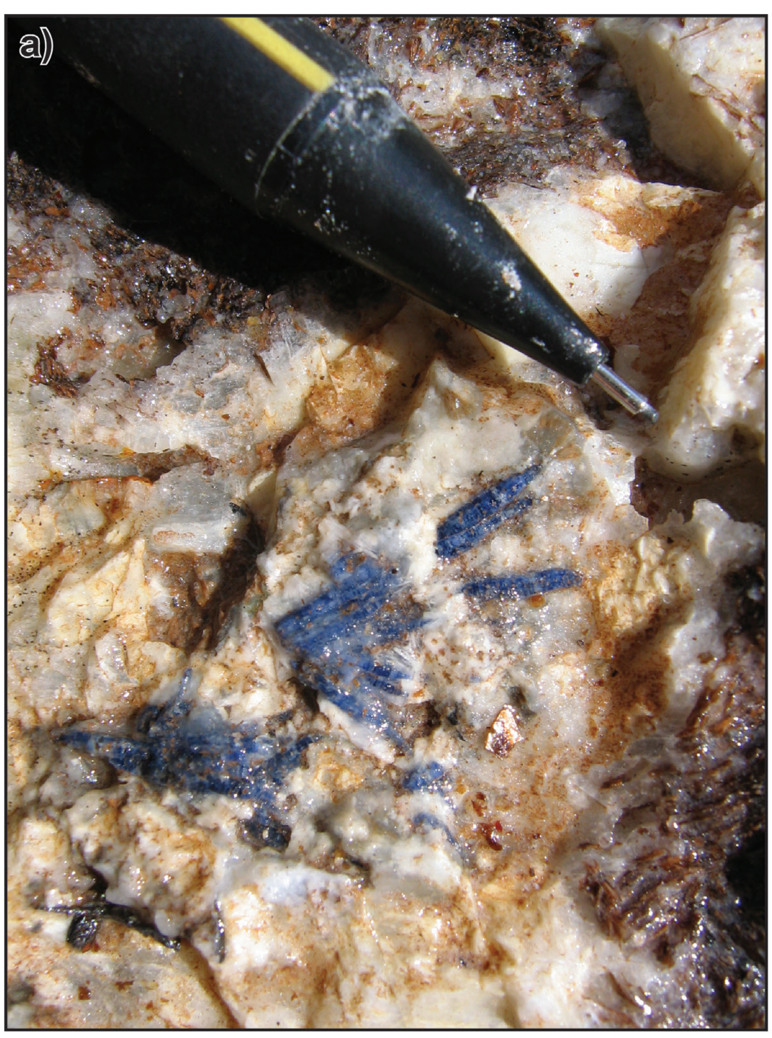
Lapis lazuli (Kimmirut area, southern Baffin Island)

The local Inuit have known for some decades of the occurrence of lapis lazuli 15 km north of Kimmirut, on southern Baffin Island (locality 22; Hogarth, 1971). The host rock is white to grayish marble of the Paleoproterozoic Lake Harbour Group containing minor components of phlogopite and graphite. Occurrences are located in a northeast-plunging regional synform, with the favourable area totalling 3500 m^2. Two outcrop areas, 1.6 km apart, are known as the Main and North occurrences. Commercially significant material consists of haüyne, diopside, nepheline, plagioclase, and phlogopite; the association of haüyne with pyrite is considered to be the origin of the lazurite in lapis lazuli (Rogers, 1938; Deer et al., 1966; Hogarth, 1971). The most common texture in Kimmirut lapis lazuli consists of granoblastic diopside in a lazurite matrix. Mineralogy of enclosing gneiss indicates regional granulite-facies metamorphism (St-Onge et al., 2007). The original model for the genesis of the Lake Baikal lapis lazuli involved metasomatism associated with pegmatite emplacement (Korzhinskii, 1947). However, the favoured and more current model suggests that the lapis lazuli originated from regional granulite-facies metamorphism of an evaporite-dolomite-shale sequence and the removal of large volumes of Na and Cl from the evaporite (Hogarth and Griffin, 1978).

Although some lapis lazuli could be considered valuable as an unusual source of carving stone, Hogarth (1971) has described the Kimmirut lapis lazuli as “not as attractive as that of specimens from Afghanistan and Siberia.”

Gem-quality spinel and cobalt-blue spinel, southern Baffin Island

Recent research by Belley and Groat (2019) has documented the presence of gem-quality spinel and cobalt-blue spinel (locality 23) at 14 localities within metasedimentary (metamarl, marble,



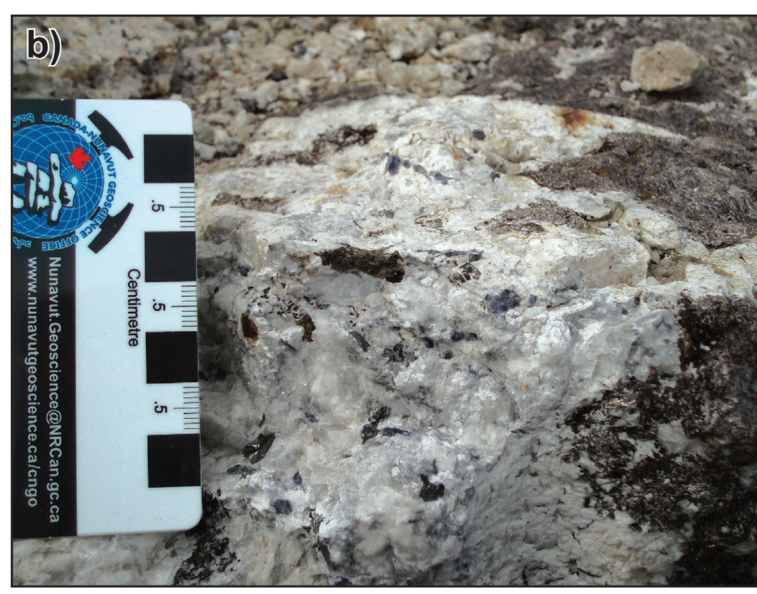


Figure 9. Gemstones of the Kimmirut area, within Lake Harbour Group metasedimentary rocks: **a)** blue sapphires in outcrop, pen tip for scale. **b)** blue sapphires in outcrop. **c)** cobalt-blue spinel in metamarl. All photographs courtesy of A. Bigio, Crown-Indigenous Relations and Northern Affairs Canada.

calc-silicate) rocks of the Lake Harbour Group, notably at Markham Bay, Glencoe Island, Waddell Bay, and the Kimmirut area. Granulite-facies metamorphism yields a stable assemblage of calcite, dolomite, phlogopite, pargasite, diopside, humite, forsterite, scapolite, anorthite, graphite, spinel, and pyrrhotite. The presence of gem-quality and cobalt-blue spinel is strongly dependent on the composition of the protolith, requiring a low Si/Al ratio, low K activity, low X_{CO_2} in marble, and relatively low Mg content. Belley and Groat (2019) noted that the strong partitioning of Fe into pyrrhotite decreases its amount in spinel, thus making the spinel clearer and more attractive.

Uranium–thorium

Foxe Peninsula–Cape Dorset area

Airborne and ground radiometric surveys in 1967 and afterwards by Borealis Exploration Ltd. (Henderson, 1969) and Esso Minerals Canada (Garvey, 1978) uncovered eleven showings of uranium and thorium in the Foxe Peninsula–Cape Dorset area (locality 24; Fig. 10). Host rocks consist of pegmatite (six showings), biotite gneiss (three showings), granite and granitic gneiss (two showings), quartzite (one showing), and grey gneiss (one showing). Four properties were drill tested. However, results of drilling and grab-sample assaying were deemed to be either low grade or too small to be economically significant.

More recently, property work was done by Peregrine Diamonds Ltd. on the Kimmirut and Kimmirut-B claims. Uranium and thorium were found to occur in a small area in dark green silicates of altered amphibolite (Nielson and Pell, 2009).

Other properties in the Kimmirut region include two prospects of uranium and thorium in pegmatites explored by Borealis Exploration Ltd. (Henderson, 1969).

Fury and Hecla Basin, northern Baffin Island

Uranium and thorium prospects are located close to the northern contact of the Mesoproterozoic Fury and Hecla Basin of northwestern Baffin Island (locality 25; Fig. 11). A western cluster of nine showings occur in Neoarchean pegmatite intruding gneiss in close proximity to small bodies of late-phase granite. Pegmatite intrusions are seldom traceable for more than a few metres and none are commercially significant (Maurice, 1982; Chandler, 1988). An eastern cluster of eight unconformity-related showings includes occurrences discovered by Geological Survey of Canada personnel during follow-up of an airborne radiometric survey (Chandler et al., 1980). These prospects are associated with a single, large granite body near the sub-Fury and Hecla Basin unconformity surface. Additional showings were discovered in this area by Dejour Mines Ltd. along a faulted contact between Fury and Hecla Group sandstone and basement granite (Fisher, 1981; Fisher and Kwiecien, 1981). Likewise, a showing discovered by Noranda Exploration Ltd. is adjacent to a quartz vein in Fury and Hecla Group sandstone (Prest, 1977).

As part of recent bedrock mapping conducted in the Fury and Hecla Strait area by personnel of the Canada-Nunavut Geoscience Office (*see* Steenkamp et al., 2018), hand-held gamma-ray spectrometry measurements were taken throughout the Fury and Hecla Group and along the unconformity with Archean metaplutonic rocks to quantify radioactive U, Th, and K concentrations (Patzke et al., 2018). No new anomalous values were obtained during fieldwork, although interpretation of new radiometric-survey data suggests the occurrence of relatively high radioactive signatures north of the basin (Steenkamp et al., 2018).

Carving stone

At least 32 localities of carving stone are located in the Baffin Island (Qikiqtaaluk) region. Seven communities are well served and have good access to carving-stone localities. These include Arctic Bay, Cape Dorset, Clyde River, Iqaluit, Kimmirut, Pangnirtung, and Pond Inlet. Typical carving-stone material includes serpentinite (antigorite), marble, and argillite.

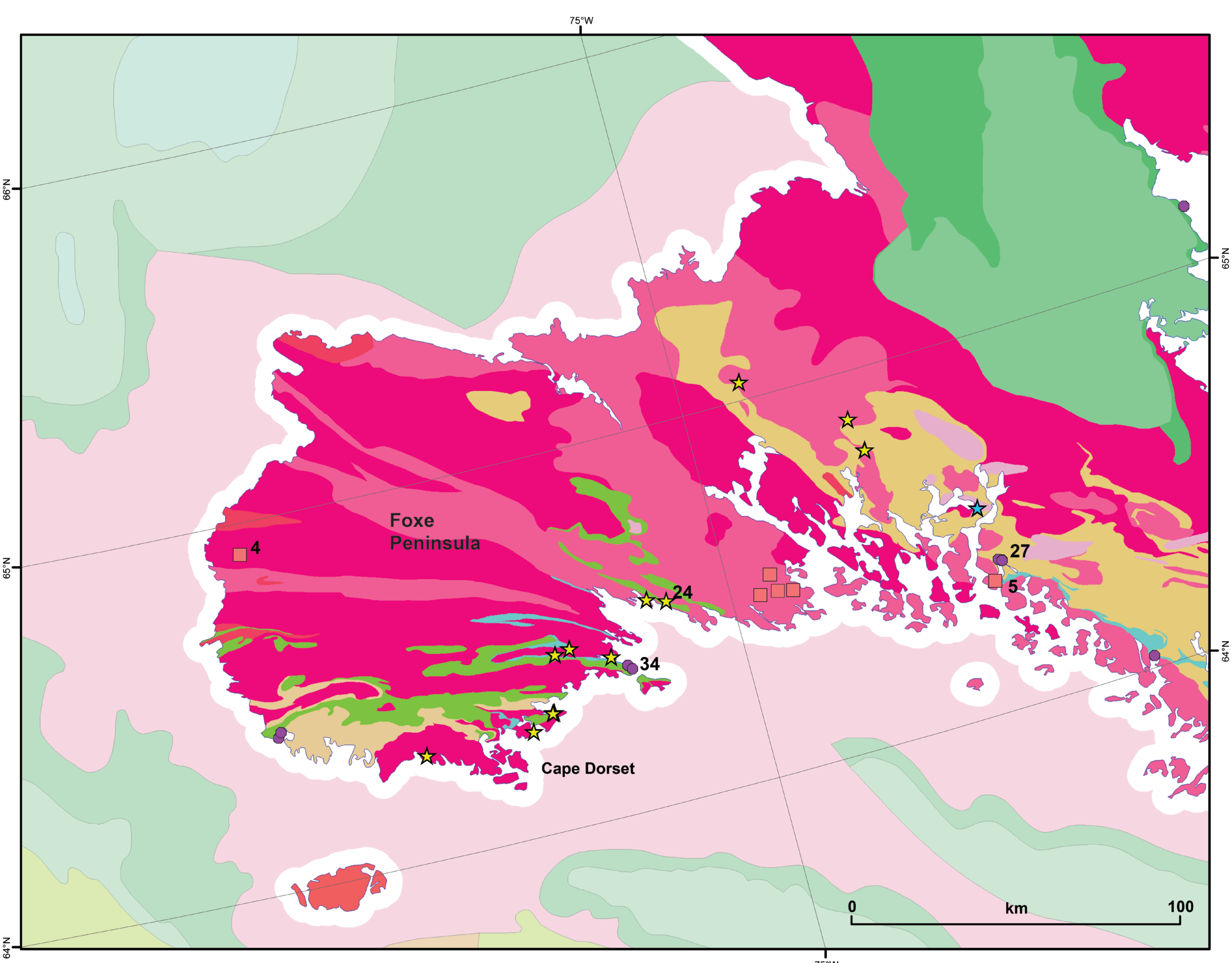


Figure 10. Foxe Peninsula, southwestern Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

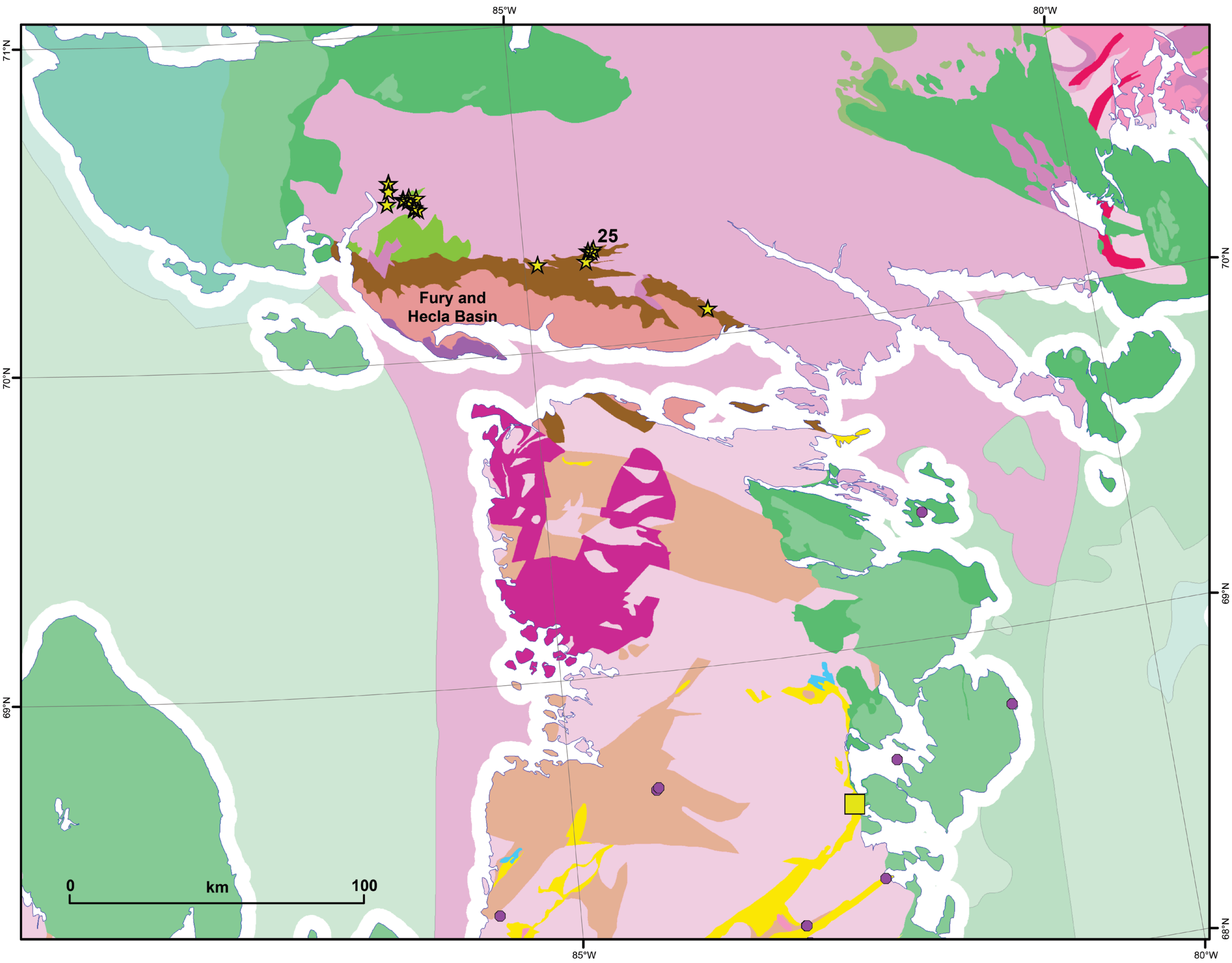


Figure 11. Fury and Hecla Basin, western Baffin Island (*see* Fig. 1a, b for legend, and mineral-resource symbols and location).

The deposits near Arctic Bay (locality 26) consist of eight sites of Mesoproterozoic carbonate altered to marble in contact-metamorphic proximity to Franklin dykes, one site of serpentinite, and one site of ilmenite-bearing kimberlite near Fabricius Fiord (McDermott, 1992; Beauregard and Ell, 2015).

The Kangiqsukutaaq deposit (15 500 t extracted) is located near the northeastern shore of Korok Inlet on the southern coast of Baffin Island, 160 km east of Cape Dorset (Fig. 12a; locality 27; Steenkamp et al., 2014) and consists of two quarries. The lower southern pit is a large deposit, now exhausted, of serpentinized magnesian marble of the Lake Harbour Group, iron-rich serpentinite, and antigorite serpentinite (total production since the 1960s was 15 400 t at a rate of 301 t/a; Elgin, 2017). The upper (northern) pit, consisting of serpentinized magnesian carbonate, continues to provide good material and may have 2880 t or 10 years of production remaining (Elgin, 2017).

There are two carving-stone quarries on Aberdeen Bay, 160 km west of Kimmirut (locality 8; Beauregard et al., 2013; Elgin, 2017). The Tatsiituk (Ujaraniarvik) deposit is of modest size (3000 t) and consists of apple green serpentinized magnesian marble of the Lake Harbour Group intruded by ultramafic rocks and monzogranite of the Cumberland batholith (Fig. 12b; Beauregard and Ell, 2015; Elgin, 2017). This site has been active since the 1950s, with production of 4.2 to 10.6 t/a (Elgin, 2017). The nearby Tatsiituk Taniinya deposit consists of altered ultramafic rocks (Beauregard, 2014). Total remaining resource is estimated to be a maximum of 2237 t (Elgin, 2017).

Locality 29, 80 km from the hamlet of Clyde River, is a large deposit of pink marble (Beauregard et al., 2013). Other carving-stone materials include black and green serpentinized dolomitic marble (Fig. 12c).

The Ikatuyak deposit (locality 30) is located near Clearwater Fiord and Iqaluit. This is a modest-size deposit of coarse-grained, partly serpentinized peridotite (Fig. 12d).

The Koonark deposit (locality 31; Beauregard et al., 2013) is located 5 km southeast of the Mary River iron mine and is accessible by road from Pond Inlet. Carving stone is green and black soapstone, and consists of three undeveloped small deposits (Valley Side, Upper Koonark, and Scree Slope; Fig. 12e; Steenkamp et al., 2017) and one of large size (Koonark Mountain: 63 000 t), which collectively represent a total resource of 80 240 t (Steenkamp et al., 2017).

The modest-size Opingivik deposit (locality 32; Steenkamp et al., 2015) is located on the southwestern shore of Cumberland Sound, 112 km southwest of Pangnirtung. It lies midway between Ikpit Bay (to the north) and Robert Peel Inlet (to the south). The quarry-hosted talc-altered (steatite; Fig. 12f) ultramafic rock and serpentinite (Fig. 12g) occur within a fault-bounded ultramafic boudin enclosed in monzogranite. It has been suggested that this talus-impacted hillside quarry may one day be able to supply carving-stone material to other communities in the Baffin Island region.

Other noteworthy carving-stone localities include a resource site near Cape Dyer (locality 33) and a marble exposure located on the western side of Andrew Gordon Bay, 40 km east of Cape Dorset (locality 34; Beauregard et al., 2013).

Coal

Coal seams have been reported to occur in Cretaceous strata on Bylot Island and on adjacent parts of northern Baffin Island, the first accounts of which were those of McMillan (1910). Coal seams, up to 2 m thick, occur at the eastern end of the basin on Bylot Island and near the settlement of Pond Inlet, where some local use excavation work has occurred (locality 35). The presence of thin coal seams has also been noted in western and northern Bylot Island. Host strata, located in the lower part of Eclipse Trough, are assigned to the Albian Cenomanian Hassel Formation (Miall et al., 1980).

SUMMARY

Baffin Island has a proven track record of large-scale mining, both at present at the Mary River mine and formerly for zinc, lead, and silver at Nanisivik. Small-scale quarrying operations for carving stone have been important for nearby communities at many locations and new discoveries indicate that the activity will continue

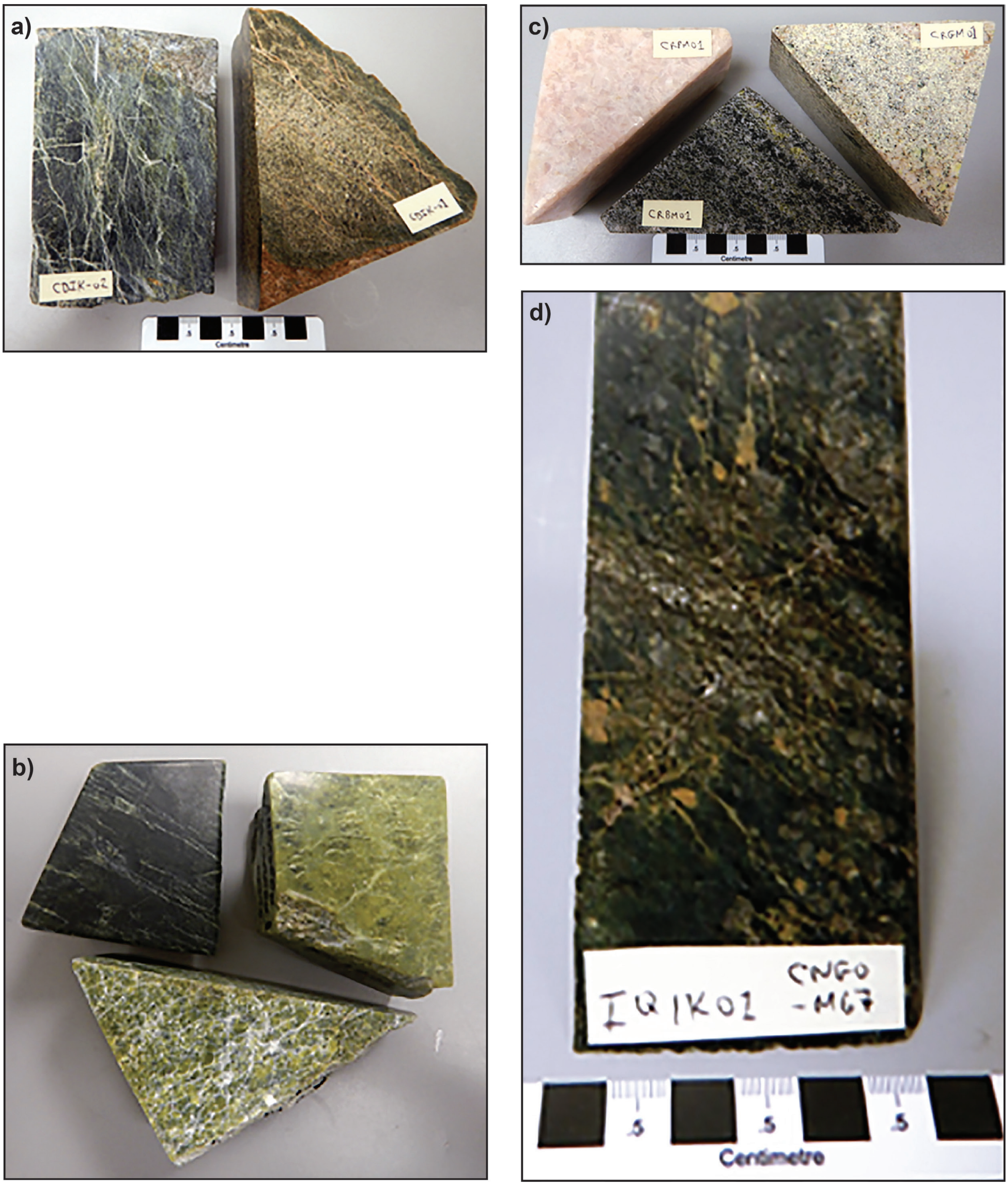


Figure 12. Photographs from carving-stone localities on Baffin Island, Nunavut. **a)** Polished carving stone, from the Kangiqsukutaaq quarry at Korok Inlet on southern Baffin Island, varies greatly in colour and texture throughout the deposit; these 2011 polished samples of excellent-quality serpentine+magnetite-altered marble were collected from the active upper pit (green stone on the left) and inactive lower pit (slightly weathered and iron-stained yellowish-green stone on the right), respectively. **b)** Hand-sized polished demonstration samples approximately 15 cm in length of Ujaraniarvik serpentinized marble from Aberdeen Bay, southern Baffin Island; shown at the top left is an excellent-quality, dark green soapstone; at the top right, an excellent-quality, vibrant green soapstone; and at the bottom is a good-quality, surface-altered, lime green soapstone. **c)** Clyde River community quarry, Clyde River drainage, north-central Baffin Island; polished hand samples of good-quality, coarsely crystalline pink marble (the quarry's traditional carving stone) on the left, excellent-quality serpentine-altered black marble at the bottom, and good-quality serpentine-altered green marble on the right. **d)** Ikatuyak quarry, Hall Peninsula, eastern Baffin Island; polished sample of excellent-quality, medium-hard, partially serpentinized peridotite from the Ikatuyak soapstone deposit.

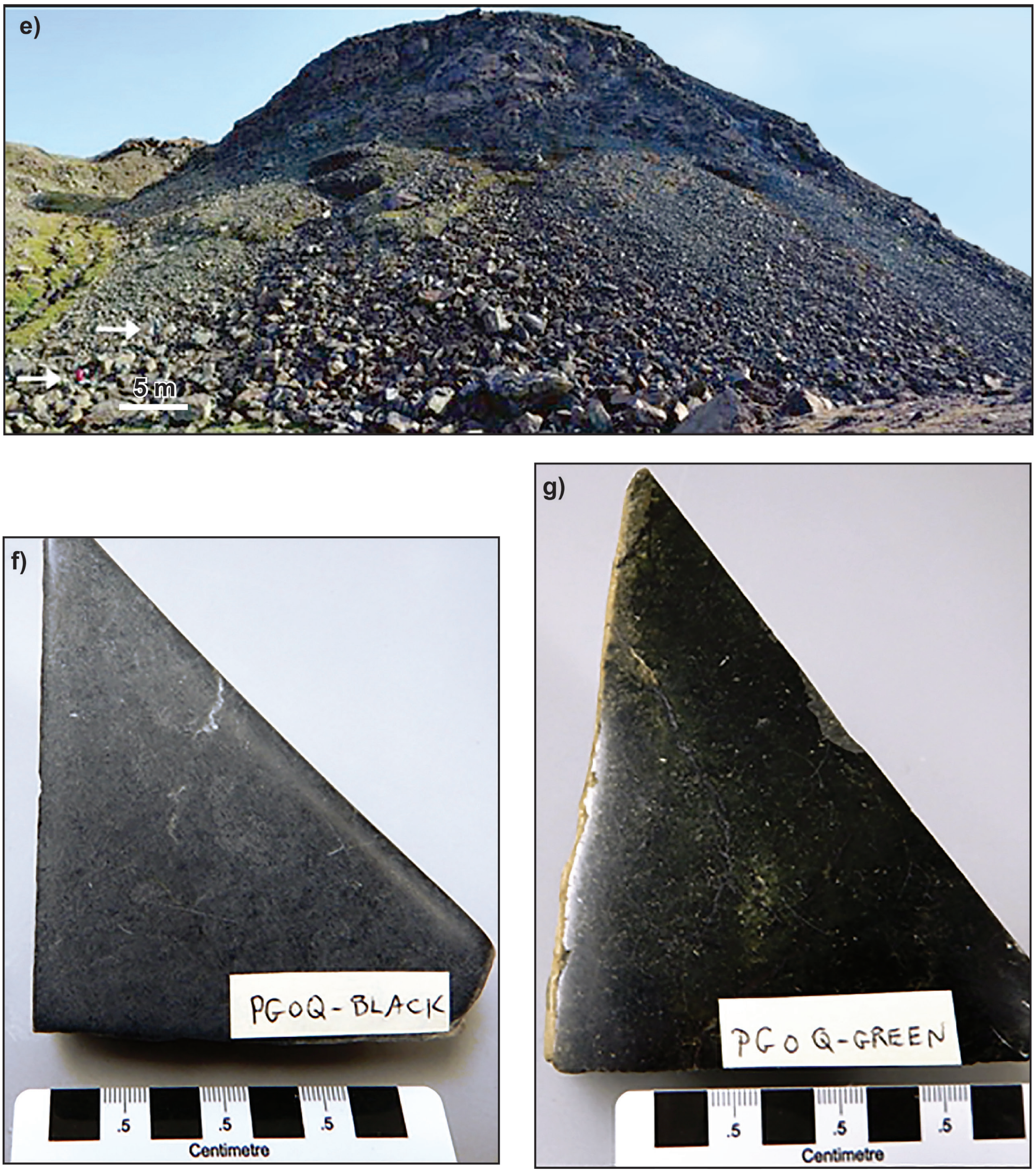


Figure 12. (cont.) e) Panorama of the large Koonark carving-stone deposit in the Mary River area, northwestern Baffin Island; good- to excellent-quality serpentinite of medium hardness is exposed on the hillside and talus slope; east-facing view taken in 2017. Photograph courtesy of the Canada-Nunavut Geoscience Office. **f)** and **g)** Opingivik quarry, at Cumberland Sound in eastern Baffin Island, polished hand samples of a soft, black, talcose-altered ultramafic rock (steatite) in (f) and a dark green, medium-hard serpentinite in (g); both demonstration samples are excellent-quality carving stone). All photographs, except (e), courtesy of the Government of Nunavut, Department of Economic Development and Transportation.

for years to come. The future of iron mining is promising as many high-grade deposits have been discovered and exploration for viable resources is still in its infancy. Also promising is the potential for commercial diamond in kimberlite, most notably at Chidliak on Hall Peninsula. Nickel-copper-PGE occurrences are common in mafic–ultramafic sills in the Lake Harbour group and may one day lead to the discovery of one or more commercial deposits, as was the case for the Raglan-area deposits of northern Quebec. Other commodities of lesser importance include uranium, thorium, tungsten, niobium, tantalum, gemstones, and coal.

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REFERENCES

Armstrong, R.C., Das Gupta, U., Downes, M.J., Grosl, V., and Lecouteur, P.C., 1976. Baffin Recce – 1976 assessment report; Aboriginal Affairs and Northern Development Canada, Assessment Report 061531. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Beauregard, M.A., 2014. Highlights from a four-year evaluation of carving stone resources in Kitikmeot, Kivalliq and Qikiqtaaluk regions, Nunavut, Canada; presentation at the 2014 Nunavut Mining Symposium, Nunavut Department of Economic Development and Transportation, Iqaluit, April 9–10, 2014, 36 p. <https://www.nunavutminingsymposium.ca/2014-presentations> [accessed April 2014].

Beauregard, M.A. and Ell, J., 2015. Nunavut Carving Stone Deposit Evaluation Program: 2015 fieldwork at Rankin Inlet, Cumberland Sound and Arctic Bay, Nunavut; *in* Summary of Activities 2015, Canada-Nunavut Geoscience Office, p. 183–192.

Beauregard, M.A., Ell, J., Pikor, R.K., and Ham, L.J., 2013. Nunavut carving stone deposit evaluation program (2010-2013): third year results; *in* Summary of Activities 2012, Canada-Nunavut Geoscience Office, p. 151–162.

Belley, P.M. and Groat, L.A., 2019. Metacarbonate-hosted spinel on Baffin Island, Nunavut, Canada: insights into the origin of gem spinel and cobalt-blue spinel; Canadian Mineralogist, v. 57, p. 147–200. https://doi.org/10.3749/canmin.1800060

Belley, P.M., Dzikowski, T.J., Fagan, A., Cempírek, J., Groat, L.A., Mortenson, J.K., Giuliani, G., Fallick, A.E., and Gertzbein, P., 2017. Origin of scapolite-hosted sapphire (corundum) near Kimmirut, Baffin Island, Nunavut, Canada; Canadian Mineralogist, v. 55, p. 669–699. https://doi.org/10.3749/canmin.1700018

Bernier, J.E., 1911. Report on the Dominion Government expedition to the northern waters and Arctic Archipelago of the D.G.S. "Arctic" in 1910; Department of Marine and Fisheries, 157 p.

Bethune, K.M. and Scammell, R.J., 1997. Precambrian geology, Koch Island area (part of NTS 37C), District of Franklin, Northwest Territories; Geological Survey of Canada, Open File 3391, scale 1:50 000. https://doi.org/10.4095/208509

Bethune, K.M. and Scammell, R.J., 2003. Geology, geochronology, and geochemistry of Archean rocks in the Eqe Bay area, north-central Baffin Island, Canada: constraints on the depositional and tectonic history of the Mary River Group of northeastern Rae Province; Canadian Journal of Earth Sciences, v. 40, p. 1137–1167. https://doi.org/10.1139/e03-028

Blackadar, R.G. and Lemon, R.R.H., 1963. Admiralty Inlet area, Baffin Island, District of Franklin; Geological Survey of Canada, Memoir 328, 84 p. https://doi.org/10.4095/100662

Boyd, J.A., 1969. Report of geological and geophysical investigations of the Eqe Bay claims group, Eqe Bay, Baffin Island. Patino Mining Corp. Aboriginal Affairs and Northern Development Canada Assessment Report 019501. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Bros, E.R. and Johnston, S.T., 2017. Field observations of the Mary River Group south of Tay Sound, northern Baffin Island, Nunavut: stratigraphy and structure of supracrustal sequences and surrounding plutonic units; *in* Summary of Activities 2017, Canada-Nunavut Geoscience Office, p. 69–80.

Campbell, H. and MacLeod, M., 2014. Mary River project: 2013 exploration program highlights and outline of 2014 program; presentation at the 2014 Nunavut Mining Symposium, Nunavut Department of Economic Development and Transportation, Iqaluit, April 9–10, 2014, 37 p. <https://www.nunavutminingsymposium.ca/2014-presentations> [accessed January 2017].

Chandler, F.W., 1988. Geology of the late Precambrian Fury and Hecla Group, northwest Baffin Island, District of Franklin; Geological Survey of Canada, Bulletin 370, 30 p. https://doi.org/10.4095/126938

Chandler, F.W., Charbonneau, B.W., Ciesielski, A., Maurice, Y.T., and White, S., 1980. Geological studies of the Late Precambrian supracrustal rocks and underlying granitic basement, Fury and Hecla Strait area, Baffin Island, District of Franklin (80-1AP125); *in* Current Research, Part A; Geological Survey of Canada, Paper 80-1A, p. 125–132. https://doi.org/10.4095/106192

Davidson, A., Jackson, G.D., and Morgan, W.C., 1979. Geology, Icebound Lake, District of Franklin; Geological Survey of Canada, Map 1451A, scale 1:250 000. https://doi.org/10.4095/109161

Davis, D.W., 2000. Report of representation work on behalf of Fred Tatarnic (Licence number N30953), Mineral claim: Freightrain – tag number F65593, Brodeur Peninsula, Baffin Island, Nunavut; Aboriginal Affairs and Northern Development Canada, Assessment Report 084331. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Deer, W.A., Howie, R.A., and Zussman, J., 1966. An introduction to the rock-forming minerals; John Wiley and Sons, New York, New York, 528 p.

Dewing, K., Turner, E., and Harrison, J.C., 2007. Geological history, mineral occurrences, and mineral potential of the sedimentary rocks of the Canadian Arctic Archipelago; *in* Mineral deposits of Canada: a synthesis of major deposit-types, district metallogeny, the evolution of geological provinces, and exploration methods, (ed.) W.D. Goodfellow; Geological Association of Canada, Special Publication 5, p. 733–753.

Durocher, M., 1994. Report on Savanna Resources Limited Foxe project – 1993 exploration program; Aboriginal Affairs and Northern Development Canada, Assessment Report 083350. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Durocher, M., 1995. Report on [Savanna Resources Limited] 1994 prospecting and lithogeochemical sampling program; Aboriginal Affairs and Northern Development Canada, Assessment Report 083477. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Egglseder, M.S., Cruden, A.R., Dalstra, H.J., and Nicholas, L., 2017. The role of deformation in the formation of banded iron formation-hosted high-grade iron deposits, Hamersley Province (Australia); Precambrian Geology, v. 296, p. 62–77. https://doi.org/10.1016/j.precamres.2017.04.034

Elgin, R.A., 2017. Status and implications of reserves at carving stone quarries within the Qikiqtaaluk Region of Nunavut; *in* Summary of Activities 2017, Canada-Nunavut Geoscience Office, p. 151–158.

Farrow, D., Fitzgerald, C., and Pell, J., 2015. 2015 technical report for the Chidliak Project, Baffin Region, Nunavut; NI 43-101 Technical Report, Geostrat Consulting Services Inc., 2015-02-23, 176 p.

Fisher, D., 1981. Fury and Hecla uranium project; geological reconnaissance and prospecting report – 1979 exploration programme [Dejour Mines Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 081302. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Fisher, D. and Kwiecien, B.S., 1981. Report on 1980 exploration programme [Dejour Mines Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 081218. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Fleming, D.B. and Sexton, A., 2010. Assessment report on 2010 exploration program [Commander Resources Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 085594. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Garvey, R.T., 1978. Radiometric surveying and diamond drilling on the HEW, TED and RAY claims [Esso Minerals Canada]; Aboriginal Affairs and Northern Development Canada, Assessment Report 080938. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Guimond, R., 1963. Exciting iron ore discovery on the Baffin Island; Precambrian, v. 36, no. 1, p. 6–8.

Heaman, L.M., Pell, J., Gruetter, H.S., and Creaser, R.A., 2015. U-Pb geochronology and Sr/Nd isotope compositions of groundmass perovskite from the newly discovered Jurassic Chidliak kimberlite field, Baffin Island, Canada; Earth and Planetary Science Letters, v. 415, p. 183–199. https://doi.org/10.1016/j.epsl.2014.12.056

Henderson, J.R., 1969. Mineral exploration on southern Baffin Island [Borealis Exploration Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 019944. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Hey, J., Duke, N., Moser, D., and Iannelli, T., 2015. A metallogenic study of high-grade iron ores on north Baffin Island in the "granulite facies" domain south of the Central Borden Fault Zone; *in* Conference Proceedings, SEG 2015: World-Class Ore Deposits: Discovery to Recovery, Society of Exploration Geophysicists, September 27–30, Hobart, Australia. <https://www.segweb.org/SEG/_Events/Conference_Archive/2015/Conference_Proceedings/files/pdf/Oral-Presentations/Abstracts/Hey.pdf>

Hogarth, D.D., 1971. Lapis lazuli near Lake Harbour, southern Baffin Island, Canada; Canadian Journal of Earth Sciences, v. 8, p. 1210–1217. https://doi.org/10.1139/e71-112

Hogarth, D.D. and Griffin, W.L., 1978. Lapis lazuli from Baffin Island – a Precambrian meta-evaporite; Lithos, v. 11, p. 37–60. https://doi.org/10.1016/0024-4937(78)90030-0

Iannelli, T., 2018. Baffinland Iron Mines–Exploration Review; presentation at the 2018 Nunavut Mining Symposium; Nunavut Department of Economic Development and Transportation, Iqaluit, April 10–11, 2018, 36 p. <https://www.nunavutminingsymposium.ca/2018> [accessed April 2018].

Iannelli, T., Robatian, M., Breckon, S., Campbell, H., Dao, P., and MacLeod, M., 2013a. Baffinland–Assessment Report: rock sampling, prospecting, geological mapping and geophysical surveying; unpublished report prepared for Indian and Northern Affairs Canada, Assessment Report 085816. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Iannelli, T., Robatian, M., Breckon, S., Campbell, H., Dao, P., and MacLeod, M., 2013b. Baffinland–Assessment Report: rock sampling, prospecting, geological mapping, and geophysical surveying; unpublished report prepared for Indian and Northern Affairs Canada, Assessment Report 085823. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Iannelli, T., Robatian, M., Breckon, S., and Iannelli, E., 2013c. Baffinland–Mary River Project Assessment Report: rock sampling, prospecting, geological mapping and geophysical surveying; unpublished report prepared for Indian and Northern Affairs Canada, Assessment Report 085842. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Jackson, G.D., 1969. Reconnaissance of north-central Baffin Island (27C-G, 37C-H, 38A-C, parts of 48A); *in* Report of Activities, Part A; Geological Survey of Canada, Paper 69-1A, p. 171–176. https://doi.org/10.4095/119856

Jackson, G.D., 2000. Geology of the Clyde-Cockburn Land map area, north-central Baffin Island, Nunavut; Geological Survey of Canada, Memoir 440, 316 p. https://doi.org/10.4095/211268

Jackson, G.D. and Berman, R.G., 2000. Precambrian metamorphic and tectonic evolution of northern Baffin Island, Nunavut, Canada; Canadian Mineralogist, v. 38, p. 399–421. https://doi.org/10.2113/gscanmin.38.2.399

Jackson, G.D. and Morgan, W.C., 1978. Geology, Conn Lake, District of Franklin; Geological Survey of Canada, Map 1458A, scale 1:250 000. https://doi.org/10.4095/109162

Jackson, G.D., Morgan, W.C., and Davidson, A., 1978. Geology, Steensby Inlet, District of Franklin; Geological Survey of Canada, Map 1450A, scale 1:250 000. https://doi.org/10.4095/109160

Jackson, G.D., Hunt, P.A., Loveridge, W.D., and Parrish, R.R., 1990. Reconnaissance geochronology of Baffin Island, N.W.T.; *in* Radiogenic age and isotopic studies report 3; Geological Survey of Canada, Paper 89-2, p. 123–148. https://doi.org/10.4095/129079

Johns, S.M. and Young, M.D., 2006. Bedrock geology and economic potential of the Archean Mary River group, northern Baffin Island, Nunavut; Geological Survey of Canada, Current Research 2006-C5, 13 p. https://doi.org/10.4095/222954

Korzhinskii, D.S., 1947. Bimetasomatic phlogopite and lazurite occurrences from the Archean of the Baikal area; Trudy In-ta Geologicheskikh Nauk 29, Petrograf Series 10, 164 p. (in Russian).

Labow, L.F., 1957. Report on geological and mapping program, Foxe Peninsula, Baffin Island; Ultra Shawkey Mines Ltd. Aboriginal Affairs and Northern Development Canada Assessment Report 017004. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Lang, A.H., Griffith, J.W., and Steacy, H.R., 1962. Canadian deposits of uranium and thorium; Geological Survey of Canada, Economic Geology Series 16, 342 p. https://doi.org/10.4095/102450

Larouche, C., 1997. Prospecting, mapping, sampling and geophysical test surveys [International Capri Resources Ltd]; Aboriginal Affairs and Northern Development Canada, Assessment Report 083972. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

LeCouteur, P.C., 1979. Geological survey on Plex claim group [Cominco Ltd]; Aboriginal Affairs and Northern Development Canada, Assessment Report 081247. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Lepage, L., Fagan, A.J., Miller, E., and Weston, B., 2012. 2007–2009 assessment report describing geological mapping, UV surveying and geological sampling at the Beluga sapphire project, Baffin Island, Nunavut territory, Canada; Aboriginal Affairs and Northern Development Canada, Assessment Report 085511. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Lichtblau, A., 1997. Baffin Island project – Report of work [International Capri Resources Ltd]; Aboriginal Affairs and Northern Development Canada, Assessment Report 083824. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

MacLeod, M., 2012. Metallogenic setting of high-grade iron ores, Mary River District, north Baffin Island, Nunavut; M.Sc. thesis, University of Western Ontario, London, Ontario, 285 p.

Maurice, Y.T. (ed.), 1982. Uranium in granites; Geological Survey of Canada, Paper 81-23, 173 p. https://doi.org/10.4095/111360

McDermott, G., 1992. Carving stone occurrences in the Northwest Territories; Economic Geology Series 1992-15, Department of Indian Affairs and Northern Development, 128 p.

McMillan, J.G., 1910. Geologist's report on the Arctic Expedition, 1908–1909; *in* Cruise of the Arctic, 1908–1909, (ed.) J.E. Bernier, 529 p.

McPherson, R.L., 1992. Geological, geochemical and prospecting in the central Baffin Island area [Comaplex Minerals Corp.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 084078. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Miall, A.D., Balkwill, H.R., and Hopkins, W.S., 1980. Cretaceous and tertiary sediments of Eclipse Trough, Bylot Island area, Arctic Canada, and their regional setting; Geological Survey of Canada, Paper 79-23, 20 p. https://doi.org/10.4095/102162

Moffatt, L., 1986. Dewar Lakes, mineral inventory year end report, 1985. [Petro-Canada Resources Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 082051. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Moffatt, L. and Donald, K.G., 1985. Geological/geochemical report [Petro-Canada Resources Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 081834. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Nielson, S. and Pell, J., 2009. Satellite photo terrain mapping, heavy mineral sampling, and till geochemistry in the Kimmirut area. [Peregrine Diamonds Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 085421. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Patzke, M., Greenman, J.W., Ielpi, A., and Halverson, G.P., 2018. Sedimentology of the sandstone-dominated units in the Fury and Hecla Basin, northern Baffin Island, Nunavut; *in* Summary of Activities 2018, Canada-Nunavut Geoscience Office, p. 75–84.

Prest, S.E., 1977. Geological and geochemical investigations of prospecting permits 385 and 386 [Noranda Exploration Company Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 061534. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Rayner, N.M., 2014. New U-Pb geochronological results from Hall Peninsula, Baffin Island, Nunavut; *in* Summary of Activities 2013, Canada-Nunavut Geoscience Office, p. 39–52.

Rayner, N.M., 2015. New (2013–2014) U-Pb geochronological results from northern Hall Peninsula, southern Baffin Island, Nunavut; *in* Summary of Activities 2014, Canada-Nunavut Geoscience Office, p. 31–44.

Rogers, A.F., 1938. Lapis lazuli from San Bernardino County, California; American Mineralogist, v. 23, p. 111–114.

Saumur, B.M., Skipton, D.R., St-Onge, M.R., Bros, E.R., Acosta-Gongora, P., Kelly, C.J., Morin, A., O'Brien, M.E., Johnston, S.T., and Weller, O.M., 2018. Precambrian geology of the surroundings of Steensby Inlet and western Barnes Ice Cap (parts of NTS 37E, 37F, 37G), Baffin Island, Nunavut; *in* Summary of Activities 2018, Canada-Nunavut Geoscience Office, p. 29–45.

Saumur, B.M., Skipton, D.R., St-Onge, M.R., Jackson, G.D., Wodicka, N., Bros, E.R., Weller, O.M., and Johnston, S.T., 2020a. Bedrock geology, Angijurjuk-Mary River, Baffin Island, Nunavut, NTS 37-G west; Geological Survey of Canada, Canadian Geoscience Map 403, scale 1:100 000. https://doi.org/10.4095/321794

Saumur, B.M., Skipton, D.R., Zhang, S., St-Onge, M.R., Bros, E.R., Acosta-Gongora, P., Kelly, C.J., O'Brien, M.E., Weller, O.M., and Johnston, S.T., 2020b. Bedrock geology, Nina Bang Lake, Nunavut, NTS 37F west and parts of NTS 37C; Geological Survey of Canada, Canadian Geoscience Map 404, scale 1:100 000. https://doi.org/10.4095/314876

Scott, D.J., 1999. U-Pb geochronology of the eastern Hall Peninsula, southern Baffin Island, Canada: a northern link between the Archean of West Greenland and the Paleoproterozoic Torngat Orogen of northern Labrador; Precambrian Research, v. 93, p. 5–26. https://doi.org/10.1016/S0301-9268(98)00095-3

Scott, D.J., Stern, R.A., St-Onge, M.R., and McMullen, S.M., 2002. U-Pb geochronology of detrital zircons in metasedimentary rocks from southern Baffin Island; implications for the Paleoproterozoic tectonic evolution of northeastern Laurentia; Canadian Journal of Earth Sciences, v. 39, p. 611–623. https://doi.org/10.1139/e01-093

Sexton, A., 2008. Assessment report on 2008 exploration program [Commander Resources Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 085400. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Siegel, H.O., 1956. Small geophysical report, [Maltby Lake Iron deposit], Foxe Basin, Baffin Island. Oceanic Iron Ore Company of Canada; Aboriginal Affairs and Northern Development Canada, Assessment Report 017003. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Skipton, D.R., St-Onge, M.R., Schneider, D.A., and McFarlane, C.R.M., 2016a. Tectonothermal evolution of the middle crust in the Trans-Hudson Orogen, Baffin Island, Canada: evidence from petrology and monazite geochronology of sillimanite-bearing migmatites; Journal of Petrology, v. 57, no. 8, p. 1437–1462. https://doi.org/10.1093/petrology/egw046

Skipton, D.R., Schneider, D.A., McFarlane, C.R.M., St-Onge, M.R., and Jackson, S.E., 2016b. Multi-stage zircon and monazite growth revealed by depth profiling and in situ U-Pb geochronology: resolving the Paleoproterozoic tectonics of the Trans-Hudson Orogen on southeastern Baffin Island, Canada; Precambrian Research, v. 285, p. 272–298. https://doi.org/10.1016/j.precamres.2016.09.002

Skipton, D.R., Saumur, B.M., St-Onge, M.R., Wodicka, N., Bros, E.R., Morin, A., Brouillette, P., Weller, O.M., and Johnston, S.T., 2017. Precambrian bedrock geology of the Pond Inlet–Mary River area, northern Baffin Island, Nunavut; *in* Summary of Activities 2017, Canada-Nunavut Geoscience Office, p. 49–68.

Skipton, D.R., Saumur, B.M., St-Onge, M.R., Wodicka, N., Bros, E.R.,Currie, L.D., Haggart, J.W., and Weller, O.M., 2018. Bedrock geology, Pond Inlet, Nunavut, part of NTS 38-B; Geological Survey of Canada, Canadian Geoscience Map 347, scale 1:100 000. https://doi.org/10.4095/306578

Skipton, D.R., Saumur, B.M., St-Onge, M.R., Bros, E.R., Acosta-Gongora, P., Kelly, C.J., O'Brien, M.E., Weller, O.M., and Johnston, S.T., 2020a. Bedrock geology, Barnes Ice Cap northwest, Baffin Island, Nunavut, NTS 37-E west; Geological Survey of Canada, Canadian Geoscience Map 402, scale 1:100 000. https://doi.org/10.4095/314657

Skipton, D.R., Saumur, B.M., St-Onge, M.R., Bros, E.R., Acosta-Gongora, P., Kelly, C.J., O'Brien, M.E., Johnston, S.T., and Weller, O.M., 2020b. Bedrock Geology, Rowley River–Isortoq River, Baffin Island, Nunavut, NTS 37-F east; Geological Survey of Canada, Canadian Geoscience Map 406, scale 1:100 000. https://doi.org/10.4095/315401

Steenkamp, H.M., Pizzo-Lyall, M., Wallace, C.J., Beauregard, M.A., and Dyck, B.J., 2014. Geology, history and site-management planning of the Kangiqsukutaaq carving stone quarry, southern Baffin Island; *in* Summary of Activities 2013, Canada-Nunavut Geoscience Office, p. 193–200.

Steenkamp, H.M., Beauregard, M.A., and Mate, D.J., 2015. Carving stone and mineral resource potential of the Opingivik deposit, southern Baffin Island; *in* Summary of Activities 2014, Canada-Nunavut Geoscience Office, p. 153–162.

Steenkamp, H.M., Elgin, R.A., and Therriault, I., 2017. Geological mapping and resource evaluation of the Koonark carving stone deposit, northern Baffin Island, Nunavut; *in* Summary of Activities 2017, Canada-Nunavut Geoscience Office, p. 139–150.

Steenkamp, H.M., Bovingdon, P.J., Dufour, F., Généreux, C.-A., Greenman, J.W., Halverson, G.P., Ielpi, A., Patzke, M., and Tinkham, D.K., 2018. New regional mapping of Precambrian rocks north of Fury and Hecla Strait, northwestern Baffin Island, Nunavut; *in* Summary of Activities 2018, Canada-Nunavut Geoscience Office, p. 47–62.

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005a. Geology, Ikpik Bay, Baffin Island, Nunavut; Geological Survey of Canada, Map 2077A, scale 1:100 000. https://doi.org/10.4095/221054

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005b. Geology, Flyway Lake, Baffin Island, Nunavut; Geological Survey of Canada, Map 2078A, scale 1:100 000. https://doi.org/10.4095/221091

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005c. Geology, Clyde River, Baffin Island, Nunavut; Geological Survey of Canada, Map 2079A, scale 1:100 000. https://doi.org/10.4095/221092

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005d. Geology, Clyde River, Baffin Island, Nunavut; Geological Survey of Canada, Map 2080A, scale 1:100 000. https://doi.org/10.4095/221093

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005e Geology, Straits Bay, Baffin Island, Nunavut; Geological Survey of Canada, Map 2081A, scale 1:100 000. https://doi.org/10.4095/221094

St-Onge, M.R., Scott, D.J., Corrigan, D., and Wodicka, N., 2005f. Geology, Dewar Lakes, Baffin Island, Nunavut; Geological Survey of Canada, Map 2082A, scale 1:100 000. https://doi.org/10.4095/221095

St-Onge, M.R., Wodicka, N., and Ijewliw, O., 2007. Polymetamorphic evolution of the Trans-Hudson Orogen, Baffin Island, Canada; integration of petrological, structural and geochronological data; Journal of Petrology, v. 48, no. 2, p. 271–302. https://doi.org/10.1093/petrology/egl060

St-Onge, M.R., van Gool, J.A.M., Garde, A.A., and Scott, D.J., 2009. Correlation of Archaean and Palaeoproterozoic units between northeastern Canada and western Greenland: constraining the pre-collisional upper plate accretionary history of the Trans-Hudson Orogen; Geological Society of London, Special Publications, v. 318, p. 193–235. <https://doi.org/10.1144/SP318.7>

Sutherland, R., 1999. Diamond drilling report for the BB1 and BB2 claims, Nanisivik mine area, Nunavut; Aboriginal Affairs and Northern Development Canada, Assessment Report 084196. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Sutherland, R.A. and Dumka, D., 1995. Geology of Nanisivik mine, N.W.T., Canada; *in* Carbonate-hosted lead-zinc-fluorite-barite deposits of North America, (ed.) K.C. Misra; Society of Economic Geologists, Guidebook Series 22, p. 4–12.

Thorpe, L. and Thalenhorst, H., 1981. Report on exploration results, 1979 and 1980, on the Nanisivik mine property [Nanisivik Mines Ltd]; Aboriginal Affairs and Northern Development Canada, Assessment Report 082447. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Turner, E.C., 2009. Mesoproterozoic carbonate systems in the Borden Basin, Nunavut; Canadian Journal of Earth Sciences, v. 46, p. 915–938. <https://doi.org/10.1139/E09-062>

Turner, E.C., 2011. Structural and stratigraphic controls on carbonate-hosted base metal mineralization in the Mesoproterozoic Borden Basin (Nanisivik District), Nunavut; Economic Geology, v. 106, p. 1197–1223. <https://doi.org/10.2113/econgeo.106.7.1197>

Vande Guchte, M.J., 1998. Geological, geochemical and geophysical report on the Incognito joint venture project [Rubicon Minerals Corp.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 084053. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Vande Guchte, M.J. and Gray, M.J., 1999. Geological, geochemical and diamond drilling report on the Incognito joint venture project, 1997 exploration program [Rubicon Minerals Corp.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 084168. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Whalen, J.B., Wodicka, N., Taylor, B.E., and Jackson, G.D., 2010. Cumberland Batholith, Trans-Hudson Orogen, Canada: petrogenesis and implications for Paleoproterozoic crustal and orogenic processes; Lithos, v. 117, p. 99–118. <https://doi.org/10.1016/j.lithos.2010.02.008>

Wodicka, N., St-Onge, M.R., Corrigan, D., Scott, D.J., and Whalen, J.B., 2014. Did a proto-ocean basin form along the southeastern Rae cratonic margin? Evidence from U-Pb geochronology, geochemistry (Sm-Nd and whole-rock), and stratigraphy of the Paleoproterozoic Piling Group, northern Canada; Geological Society of America, Bulletin, v. 126, no. 11–12, p. 1625–1653. <https://doi.org/10.1130/B31028.1>

Wunder, M., 1994. Summary report on the Adams Sound project [Noranda Exploration Company Ltd.]; Aboriginal Affairs and Northern Development Canada, Assessment Report 083230. <http://nunavutgeoscience.ca/pages/en/numin.html> [accessed January 2020].

Young, M.D., Sandeman, H., Berniolles, F., and Gertzbein, P.M., 2004. A preliminary stratigraphic and structural geology framework for the Archean Mary River Group, northern Baffin Island, Nunavut; Geological Survey of Canada, Current Research 2004-C1, 14 p. <https://doi.org/10.4095/215376>

Young, M.D., McNicoll, V., Sandeman, H., Creaser, R., and James, D., 2007. Meso- to Neoarchean crustal growth and recycling on northern Baffin Island and correlation of Rae Province rocks across mainland Nunavut and Greenland; Geological Association of Canada–Mineralogical Association of Canada Annual Meeting, Yellowknife, May 23–25, 2007, Abstract Volume 32, p. 89.

Zhang, S. and Pell, J., 2013. Conodonts from carbonate xenoliths in Chidliak kimberlites confirm the previous existence of lower Paleozoic cover on Hall Peninsula, Nunavut and provide temperature estimates; *in* Summary of Activities 2012, Canada-Nunavut Geoscience Office, p. 107–112.