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DESCRIPTIVE NOTES

INTRODUCTION

This map is one of a set of three colour Open File maps (St-Onge et al., 1998a, b, c) which present the results of 1:100 000 scale bedrock geological mapping by the Geological Survey of Canada (GSC) in the Hidden Bay (OF 3536), McKellar Bay (OF 3537) and Wight Inlet (OF 3538) map areas, Meta Incognita Peninsula, Baffin Island (Figs. 1 and 2). An overview of the principal supracrustal and plutonic units mapped in 1997, and an outline of the deformation-metamorphism history for the Hudson Strait region are presented in St-Onge et al. (1998d). Bedrock geological investigations from two previous field seasons (St-Onge et al., 1996a; 1997a, b, c; Hanmer et al., 1996; Scott et al., 1996) are summarized in St-Onge et al. (1996b) and Scott et al. (1997). Wodicka and Scott (1997) and Scott and Wodicka (in press) present recent U-Pb geochronological results for the Meta Incognita Peninsula and highlight the distinct and/or common tectonic histories of different tectonostratigraphic assemblages. Examination of the surficial deposits at 1:250 000 scale and the identification of ice flow domains from the last (late Foxe) glaciation are outlined in Hodgson (1997) with field observations presented in Hodgson (in prep.). Geological work on southern Baffin Island prior to 1965 is summarized in Blackadar (1967). With local exceptions, bedrock exposure throughout the area mapped in 1997 is excellent.

GEOLOGICAL FRAMEWORK

The metasedimentary rocks and orthogneisses of the project area (Fig. 1, 2) are part of the northeastern (Quebec-Baffin) segment of the Paleoproterozoic Trans-Hudson Orogen (Lewry and Stauffer, 1990) which comprises tectonostratigraphic assemblages accumulated on, or accreted to, the northern margin of the Archean Superior Province during > 200 Ma of tectonic activity (Lucas and St-Onge, 1992; Lucas et al., 1992; Scott et al., 1992, 1997; St-Onge et al., 1992, 1996a, in press; Scott, 1997, in press). Southern Baffin Island is characterized by three orogen-scale, stacked tectonic elements (St-Onge et al., 1997d; Wodicka and Scott, 1997). From lowest to highest structural level, these include the following map units (Table 1): Level 1 - Superior Province basement and Povungnituk Group (St-Onge et al., 1996a); Level 2 - Narsajuaq arc (Scott, 1997); Level 3 - Lake Harbour Group (Jackson and Taylor, 1972), Ramsay River orthogneiss (St-Onge et al., 1998d) and Blandford Bay assemblage (Scott et al., 1997). All units in Level 3 are intruded by the Cumberland batholith (Blackadar, 1967).

The map pattern on Meta Incognita Peninsula is largely produced by the interference between late orogenic, orogen-parallel folds (north- to northwest-trending) and cross-folds (northeast-trending). In the Hidden Bay (OF 3536), McKellar Bay (OF 3537) and Wight Inlet (OF 3538) map areas, at the lowest structural levels exposed along the antiformal hinge zone of a northeast-trending cross-fold between Kimmirut and Barrier Inlet (Fig. 2), Level 2 comprises layered monzogranite -granodiorite-tonalite gneiss with quartz diorite and rare anorthosite sheets. These units, dated at 1.84-1.82 Ga (Scott, 1997; Wodicka and Scott, 1997; Scott and Wodicka, in press), have been correlated with the Narsajuaq arc in northern Quebec (St-Onge et al., 1992; Dunphy and Ludden, in press). The Lake Harbour Group, found in Level 3 and tectonically overlying Level 2, includes marbles, psammites and semipelites that are intruded by mafic and locally layered mafic-ultramafic sills (Scott et al., 1997). The youngest detrital zircons in the Lake Harbour Group are 1.93 Ga, whereas it is cut by the 1.86 Ga Cumberland batholith (Scott and Gauthier, 1996; Scott, 1997). Along the antiformal hinge zone of the cross-fold, Lake Harbour Group supracrustal units are preserved within Level 3 structural basins or klippen that result from the interference of the two regional fold sets (Fig. 2). In contrast, on the NW and SE limbs of the antiform, Lake Harbour Group rocks occur within kilometre-scale panels that are bounded by thrust faults (cf. Scott et al., 1997; and below). The dominantly monzogranitic to tonalitic gneisses mapped in Level 3 (Ramsay River orthogneiss; Fig. 2) are dated at ca. 1.95 Ga (Scott and Wodicka, in press) and are interpreted to be imbricated with the Lake Harbour Group units. Both the Lake Harbour Group rocks and the Ramsay River orthogneiss are intruded by monzogranite plutons of the Cumberland batholith (Fig. 2) dated at ca. 1.86-1.85 Ga (Jackson et al., 1990; Wodicka and Scott, 1997; Scott, in press).

DESCRIPTION OF THE TECTONIC ELEMENTS

Narsajuaq arc (PNd-PNa)

Several types of orthopyroxene-bearing, compositionally layered metaplutonic rocks (i.e. layered monzogranite-granodiorite-tonalite gneiss; monzogranite gneiss) occur at the lowest structural levels exposed along the southeast coast of the project area (Fig. 2; OF 3537, OF 3538). These are in physical continuity with and/or are lithologically similar to plutonic rocks in the Kimmirut area (OF 3537) and the north shore of Big Island (Fig. 2; Hanmer et al., 1996) that have been dated between 1.84 -1.82 Ga and correlated by Scott (1997) and Wodicka and Scott (1997) with similar units in the 1.86-1.82 Ga Narsajuaq arc of northern Quebec (St-Onge et al., 1992; Dunphy and Ludden, in press).

Cross-cutting field relationships indicate that the oldest Narsajuaq arc plutonic unit within the project area (Fig. 2) is a layered, fine- to medium-grained, grey to buff coloured, orthopyroxene-biotite ± hornblende ± garnet tonalitic orthogneiss with subordinate grey orthopyroxene-biotite ± hornblende granodiorite layers and pink monzogranite sheets and veins (PNm). Compositional layering in the orthogneiss is typically a few cm in thickness and is continuous laterally for several tens of metres. Lenses, layers and locally discordant dykes of dark, hornblende-biotite-clinopyroxene ± orthopyroxene quartz diorite (PNd), up to several tens of metres in thickness, commonly form an integral component of the orthogneiss. Both the tonalitic, granodioritic and quartz dioritic components are cross-cut by concordant to discordant veins of medium-grained orthopyroxene-biotite ± hornblende monzogranite and by rare coarse-grained hornblende-biotite-orthopyroxene syenogranite. Grey anorthosite layers (PNa), up to several tens of metres in thickness and over a kilometre in strike length, are part of the monzogranite-granodiorite-tonalite gneiss unit approximately 40 km northeast of McKellar Bay (OF 3537).

Large areas of Narsajuaq arc (Fig. 2) are underlain by medium-grained orthopyroxene-biotite ± hornblende monzogranite gneiss (PNm) that intrudes the layered tonalite-monzogranite unit described above. These rocks weather light grey to pink, and are composed of variably foliated, < 10 cm thick layers that differ principally in biotite content. Coarse-grained and locally megacrystic layers can be up to 100 metres in thickness. Hornblende-clinopyroxene-orthopyroxene-biotite quartz diorite layers (PNd) are common.

Lake Harbour Group (PLHp-PLHw)

The marbles, psammites and semipelites in the eastern portion of the project area (OF 3536, OF 3537, OF 3538) are along strike from, or are lithologically similar to rocks of the Lake Harbour Group examined previously (St-Onge et al., 1996b; Scott et al., 1997). Within these supracrustal rocks, two lithologically and geographically distinct sequences were recognized. Along the southern coastal inlets and river valleys between Barrier Inlet and 68°W (OF 3537, OF 3538), the Lake Harbour Group comprises interlayered garnetiferous psammite, semipelite and pelite (minor orthoquartzite) (PLHp) overlain by prominent, laterally continuous to boudinaged bands of pale-grey to white marble and calcsilicate rocks (PLHc) ("Kimmirut sequence" of Scott et al., 1997). Inland (OF 3536, OF 3537), exposures of the Lake Harbour Group are dominated by garnetiferous psammite interlayered with semipelite and pelite (PLHp) and are essentially devoid of marble and calcsilicate rocks ("Markham Bay sequence" of Scott et al., 1997). Both sequences are intruded by generally concordant sheets of mafic to ultramafic rocks (PLHd, PLHm, PLHu).

Within the siliciclastic rocks (PLHp) compositional layers in the psammite range from centimetres to tens of centimetres in thickness, and can be traced for as much as hundreds of metres along strike. The layers are defined by variations in the modal abundance of quartz, biotite, lilac-coloured garnet, cordierite, sillimanite and granitic melt pods. Garnet ± cordierite ± sillimanite pelite typically occurs as thin layers within garnet-biotite semipelite, the latter generally subordinate within the psammite. The psammite and semipelite are generally rusty weathering and characterized by trace amounts of disseminated graphite, pyrite and chalcopyrite. The orthoquartzite occurs as discrete layers with total thicknesses of several metres. It is often graphite-bearing, locally contains minor plagioclase and is strongly recrystallized. Primary sedimentary features such as cross-bedding are only rarely preserved within the siliciclastic rocks. White monzogranite (PLHw), rich in lilac garnet, is a ubiquitous constituent within the siliciclastic package, occurring as concordant layers or pods less than 0.5 m thick. Locally, the white garnetiferous monzogranite crops out as discrete tabular bodies several hundred metres thick.

Most of the calcareous rocks (PLHc) are medium- to coarse-grained and are locally characterized by compositional layering defined by varying modal proportions of calcite, forsterite, humite, diopside, tremolite, phlogopite, spinel and wollastonite. Individual layers range from centimetres to metres in thickness and can be traced for tens of metres along strike. Calcsilicate rocks are commonly interlayered with siliciclastic rocks and generally associated with marble. Thicknesses of individual calcareous rock sequences range typically between approximately 1000 metres north of Kimmirut (OF 3537) to 200 metres in the Wight Inlet area (OF 3538). Individual marble units can be traced from 5 to 25 kilometres along strike. Primary structures were not observed in the calcareous rocks.

Generally concordant sheets of medium-to coarse-grained, mafic to ultramafic rocks occur within both sequences of the Lake Harbour Group (OF 3536, OF 3537, OF 3538). Individual bodies are typically 10 to 20 m thick, but range up to a few hundred metres thick, and continue up to several kilometres along strike. Metagabbroic textures and compositional layering defined by variations in modal abundance of clinopyroxene, orthopyroxene, hornblende and plagioclase are commonly preserved in the mafic bodies (PLHm). The concordant nature, tabular shape and sharp contacts suggest that these bodies are sills. Several ultramafic bodies (PLHu), either clinopyroxene-orthopyroxene ± hornblende metapyroxenite or olivine-clinopyroxene-orthopyroxene metaperidotite were observed (St-Onge et al., 1998a, b, c). In one locality, a metadunitic sill several hundred metres in strike length (St-Onge et al., 1998b) is characterized by chromite seams several millimetres in thickness. Metaleucodiorite sills and metatonalite bodies (PLHd) are abundant in the siliciclastic rocks of the Lake Harbour Group northeast of the Soper River (OF 3537).

Ramsay River orthogneiss (PRm)

Buff- to pink-weathering, layered orthopyroxene-biotite ± hornblende dominantly monzogranite-tonalite orthogneiss (PRm) occurs on both limbs of the northeast-trending McKellar Bay-Frobisher Bay antiform (Fig. 2). The orthogneisses in the eastern portion of the project area are along strike from orthogneisses intruded by the Cumberland batholith (see below; Fig. 2) in the Frobisher Bay area. These in turn are correlated with metaplutonic gneisses mapped on the northwestern limb of the antiform (Scott et al., 1997) and dated by Scott and Wodicka (in press) at ca. 1.95 Ga. In most outcrops examined in the eastern region, the monzogranite-tonalite gneiss is interlayered with subordinate, boudined and discontinuous layers of quartz diorite. All components of the gneiss are crosscut by white to pink biotite monzogranite and syenogranite veins that range from well-foliated to relatively massive, and from a few centimetres to more than ten metres thick. Similarities in rock type, mineral assemblage and strain state suggest that the monzogranite and syenogranite veins are related and possibly co-magmatic with the plutons of the Cumberland batholith (see below) which intrude this unit in the Wight Inlet area (OF 3538).

The orthogneiss may represent the stratigraphic basement to the Lake Harbour Group (1.93-1.86 Ga; Table 1). However, this is difficult to evaluate in the field as all observed contacts between orthogneiss and supracrustal units are tectonic. The age of the orthogneiss and its spatial association with the younger Lake Harbour Group, both restricted to Level 3 (Fig. 2), suggest that a primary stratigraphic link is possible.

Blandford Bay assemblage (PBBq-PBBm)

Light- to dark-grey weathering feldspathic quartzite (PBBq), typically medium- to coarse grained, constitutes the dominant siliciclastic component of the Blandford Bay assemblage (OF 3537). Homogeneous sections up to 500 m thick are common and form prominent ridges in the area. Individual beds are generally 10-20 cm thick, but range up to 2 m in thickness. Rusty-weathering pelite is thinly-bedded and commonly forms sections several hundreds of metres thick below the feldspathic quartzite. Garnet and sillimanite, as well as disseminated pyrite and minor chalcopyrite, are found throughout the pelite.

Sheets of homogeneous coarse-grained metaperidotite, layered metaperidotite-metagabbro, and homogeneous metagabbro (PBBm) are widespread in the siliciclastic rocks of the Blandford Bay assemblage (Scott et al., 1997). The sheets are typically 50-100 m thick, and commonly have strike lengths of up to several kilometres. Relict compositional layering, defined by variations in modal composition, has been observed in both ultramafic and mafic rocks. The contacts of these bodies with the host siliciclastic rocks are conformable, and the igneous rocks rarely preserve chilled margins. These observations suggest that these bodies are best interpreted as sills. Disseminated pyrite and minor chalcopyrite have been observed in both mafic and ultramafic sills. Finally, the presence of distinctive mafic and ultramafic sills in rocks of both the Lake Harbour Group and Blandford Bay assemblage suggests that they were in close proximity to one another at the time of sill emplacement.

Cumberland batholith (Pcmo-Pcd)

Coarse- to medium-grained, massive to foliated metaplutonic rocks in the northern portion of the Hidden Bay area (OF 3536) and eastern portions of the McKellar Bay (OF 3537) and Wight Inlet (OF 3538) map areas occur along strike from and are continuous with extensive regions underlain by the Cumberland batholith (Fig. 2; Blackadar, 1967; Jackson and Taylor, 1972; Scott et al., 1997; St-Onge et al., 1997b,c). The continuity of plutonic rocks suggest that those in the eastern portion of the project area are also part of the 1.86 -1.85 Ga batholith (Jackson et al., 1990; Wodicka and Scott, 1997; Scott, in press).

The principal rock type mapped in the southeastern Cumberland batholith is a tan- to pink weathering orthopyroxene-biotite monzogranite (Pcmo) that is massive- to weakly foliated. Minor biotite-orthopyroxene-garnet ± cordierite (Pcmb), biotite-garnet (Pcmg) and epidote bearing (Pcme) phases are present. Panels of garnetiferous psammite and forsterite-bearing marble that physically resemble (PLHp) and (PLHc) units can be traced along strike for several kilometres. Sheets of hornblende-orthopyroxene-clinopyroxene diorite (Pcd), 10-500 m wide and up to several km long, are broadly coplanar with the dominant foliation in the host monzogranite and are interpreted as sills. These sheets are typically found along the southern margin of the batholith and highlight fold interference geometries south of Frobisher Bay (OF 3536).

Along a number of well exposed contacts, septa of monzogranite truncate Ramsay River orthogneiss and Lake Harbour Group host rocks, indicating intrusion following initial juxtaposition of the orthogneisses and supracrustal units (see below). Isolated, kilometre-scale plutons of pink orthopyroxene-biotite monzogranite in the southern parts of the area (Fig. 2; OF 3537, OF 3538), one of which has been dated at 1.85 Ga (Wodicka and Scott, 1997), are interpreted as part of the Cumberland magmatic system.

DEFORMATION AND METAMORPHISM

Completion of systematic regional mapping, re-examination of key outcrops in previously mapped areas, and new geochronological data (Wodicka and Scott, 1997; Scott and Wodicka, in press) have facilitated the development of a comprehensive structural and metamorphic framework for the entire project area (Table 1). Deformation and metamorphism are polyphase, with at least three regional episodes of compression and one thermal event common to all tectonostratigraphic units (Table 1; Scott et al., 1997). The tectonothermal evolution is described in the following paragraphs, utilizing the deformation-metamorphism framework outlined in Table 1. References for age dates are given in Table 1.

Pre-D_1 and D_1 deformation and metamorphism (Level 1)

The oldest deformation structures and mineral assemblages recognized in the project area are found in the Level 1 Archean orthogneisses on Big Island (Fig. 1, 2), which are correlated with the Superior Province in northern Quebec (St-Onge et al., 1996b). In northern Quebec, plutonism, concomitant granulite-facies metamorphism and deformation range in age from 3.22 to 2.74 Ga (Table 1). Accumulation of the > 2.04-1.92 Ga (Table 1) Povungnituk Group on these orthogneisses is interpreted to record Paleoproterozoic rifting of the northern Superior Province (St-Onge and Lucas, 1990; and references therein). Lucas and St-Onge (1992) defined D_1 (regular sequence) thrusting deformation and associated M_1 prograde metamorphism of the Povungnituk Group rocks in the Cape Smith Belt as a pre-Narsajuaq arc event that may have been initiated by ca. 1.87 Ga. D_1/M_1 deformation structures and assemblages are not recognized on Big Island.

D_1 deformation and M_1 metamorphism (Level 2)

Arc plutonism, M_1 granulite-facies metamorphism, D_1 deformation and the development of compositional layering in the metaplutonic rocks of the Narsajuaq arc (Lucas and St-Onge, 1995) are bracketed on southern Baffin Island between 1.84-1.82 Ga (Table 1). In northern Quebec, plutonism and D_1/M_1 deformation structures and assemblages are bracketed between 1.86-1.82 Ga (Lucas and St-Onge, 1992).

D_1 deformation and M_1 metamorphism (Level 3)

Cross-cutting field relations (St-Onge et al., 1997a, b) require that early map-scale D_1 imbrication of the Ramsay River orthogneiss, Lake Harbour Group and Blandford Bay assemblage within Level 3 (Scott et al., 1997) predate emplacement of the 1.86-1.85 Ga Cumberland batholith (Table 1). Prograde metamorphism M_1 of the Lake Harbour Group and Blandford Bay assemblage, and retrogression of granulite-facies assemblages in the Ramsay River orthogneiss, is constrained at ca. 1.84 Ga (Table 1).

D_2 deformation and M_2 metamorphism

The D_2 deformation event is defined as the oldest compressional deformation event which affects all tectonostratigraphic elements in the project area (Table 1). It involves (1) accretion of the imbricated Lake Harbour Group, Blandford Bay assemblage and Ramsay River orthogneiss package (Level 3) to the metaplutonic rocks of Narsajuaq arc (Level 2), (2) accretion of Narsajuaq arc (Level 2) to the northern margin of the Superior Province (Level 1); and (3) imbrication of Povungnituk Group and Archean basement units (Level 1). The D_2 event is bracketed (Table 1) between the youngest dated unit in the Narsajuaq arc (1.82 Ga) and the age of emplacement of a post-accretion syenogranite dyke (1.79 Ga). The presence of numerous repetitions and truncations of distinct tectonostratigraphic units, and the overall ramp - flat fault geometry of the D_2 structures (Scott et al., 1997; St-Onge et al., 1997a, b, 1998a, b, c) suggest that juxtaposition of the units occurred along a system of SW-verging thrust faults. These thrusts are commonly associated with development of mylonitic fabrics over thicknesses of metres to tens of metres. In addition, D_2 thrust faulting was accompanied by outcrop to map scale recumbent folding (St-Onge et al., 1998a, b, c). In detail the recumbent folds deform D_2 thrust faults and the principal foliation/gneissosity but are themselves cut by younger D_2 faults. The recumbent folds deform D_1/M_1 fabrics in both Level 2 and Level 3 rocks.

D_2 deformation is characterized by a distinct M_2 metamorphic event involving retrogression of granulite- and upper amphibolite-facies assemblages in the Archean basement, Narsajuaq arc and Lake Harbour Group (Wodicka and Scott, 1997), and growth of thermal-peak mineral assemblages in the Povungnituk Group (cf. Lucas and St-Onge, 1992). Within the hinge zone of the D_2 recumbent folds, growth of retrograde M_2 sillimanite-biotite-quartz at the expense of M_1 garnet ± cordierite in psammites of the Lake Harbour Group led to the progressive development of a new schistose D_2 axial planar fabric.

Massive syenogranite dykes and syenite plugs, which are discordant to the principal deformation fabrics in host rocks of all three structural levels, were emplaced between ca. 1.79-1.78 Ga (Table 1). This age range provides a lower bracket for the age of the D_2 accretion event on southern Baffin Island. In addition, the documentation of 2.84 Ga zircon inheritance in a syenite north of Kimmirut (Fig. 2; Scott, 1997) suggests that the Superior Province basement extended at least that far north beneath Level 2 and 3 rocks (Scott, 1997; St-Onge et al., in press).

D_3 deformation

Both D_1 and D_2 fault and fold structures are reoriented by northwest-southeast-trending D_3 folds. The D_3 folds range from metre- to map-scale (Fig. 2; OF 3536, OF 3537, OF 3538) and display a consistent southwest-verging asymmetry. The D_3 folding is manifest at map scale by the large synform cored by Level 3 units northwest of Kimmirut and the northwest-southeast striking antiform cored by Level 2 units southwest of Frobisher Bay (Fig. 2). The numerous klippen of Lake Harbour Group rocks north and east of Kimmirut (Fig. 2; OF 3536, OF 3537, OF 3538) are second-order refolded D_3 synforms. D_3 folding in northern Quebec occurred at ca. 1.76 Ga (Table 1; Lucas and St-Onge, 1992).

D_4 deformation

Upright refolding of all structural elements about north-northeast-trending axes generated the large D_4 cross-fold antiform that dominates the map pattern between McKellar Bay and Frobisher Bay (Fig. 2). D_4 refolding of D_3 synformal keels created the series of klippen of Level 3 units (Fig. 2) along the D_4 antiformal hinge zone. It is the interference of D_3 and D_4 folds that has generated sufficient structural relief in the area to allow the study of the architecture of the South Baffin orogenic belt and its three principal structural levels at the present erosion surface. D_4 folding in northern Quebec occurred between 1.76 and 1.74 Ga (Table 1; Lucas and St-Onge, 1992).

ECONOMIC POTENTIAL

The presence of mafic and ultramafic sills in siliciclastic rocks of the Lake Harbour Group may present conditions favourable for the formation of magmatic Cu-Ni sulphide mineralization. The largest sills are indicated on the companion 1:100 000-scale maps (OF 3536, OF 3537, OF 3538). Serpentinized ultramafic rocks have been identified in a number of localities in the map area, some of which may provide material suitable for stone carving.

QUATERNARY

Quaternary deposits (Q) comprise till, except for outwash along south-flowing river valleys (e.g. Soper River, OF 3536, OF 3537). Till is a clast-supported silty sand; clasts are granule to large boulder size, entirely of Precambrian lithologies except for rare Paleozoic carbonates below marine limit (100 m elevation) on Hudson Strait shores (OF 3537, OF 3538). The till forms a blanket > 2 m thick, locally much thicker in end moraines marking readvances during overall deglaciation. No exposures of till fabric were observed. Till was deposited by a strong southwesterly ice flow during the last (late Foxe) glaciation. The ice sheet divide lay north of the present Meta Incognita Peninsula watershed. Late deglacial events included a readvance over the present watershed, and reversals of flow over the Frobisher Bay/Amadjuak Lake lowland. Outwash is sand, minor silt and gravel, derived from till during late stages of deglaciation. Kettle fluvial terraces are 2-10 m thick, locally thicker where coalesced with (few) eskers.

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1998c: Geology, Wight Inlet, District of Franklin, Northwest Territories; Geological Survey of Canada, Open File 3538, scale 1:100 000

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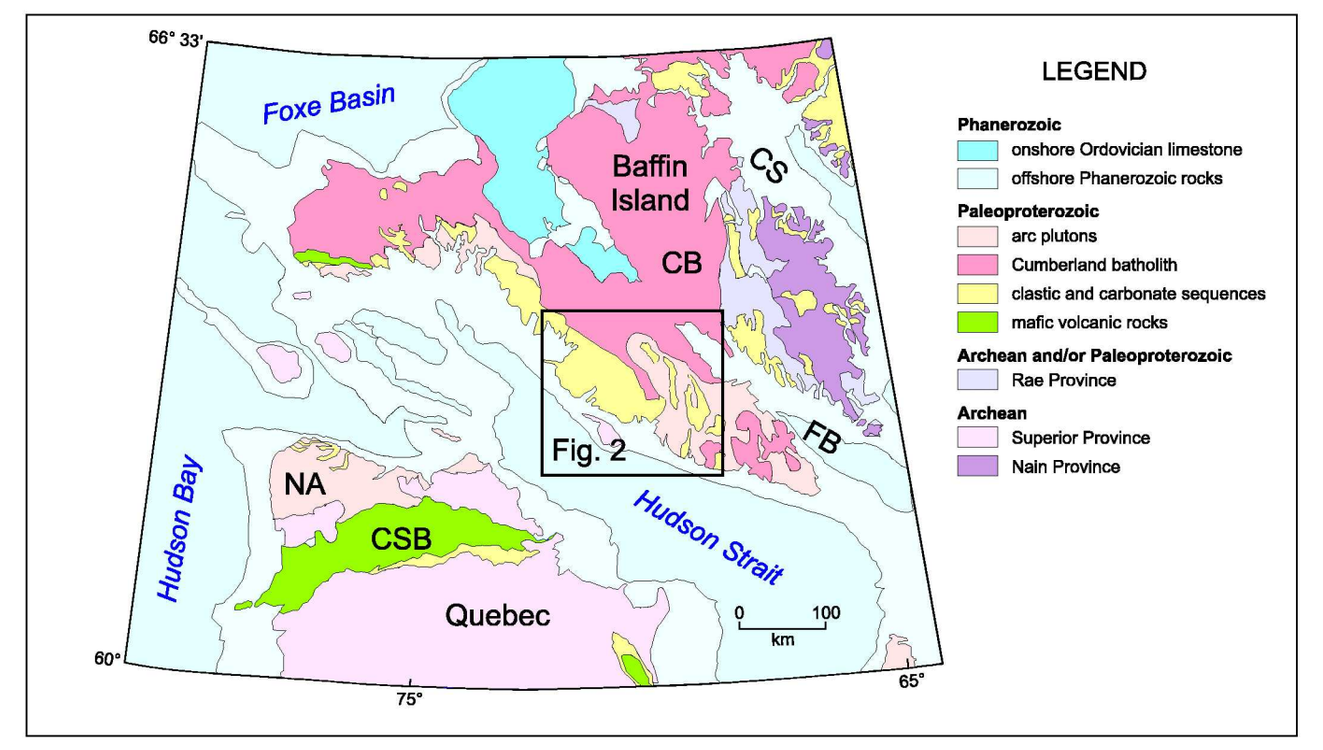

Figure 1. Location of the project area on the Meta Incognita Peninsula (modified after Wheeler et al., 1996). Abbreviations: CB - Cumberland batholith, CS - Cumberland Sound, CSB - Cape Smith Belt, FB - Frobisher Bay, NA - Narsajuaq arc

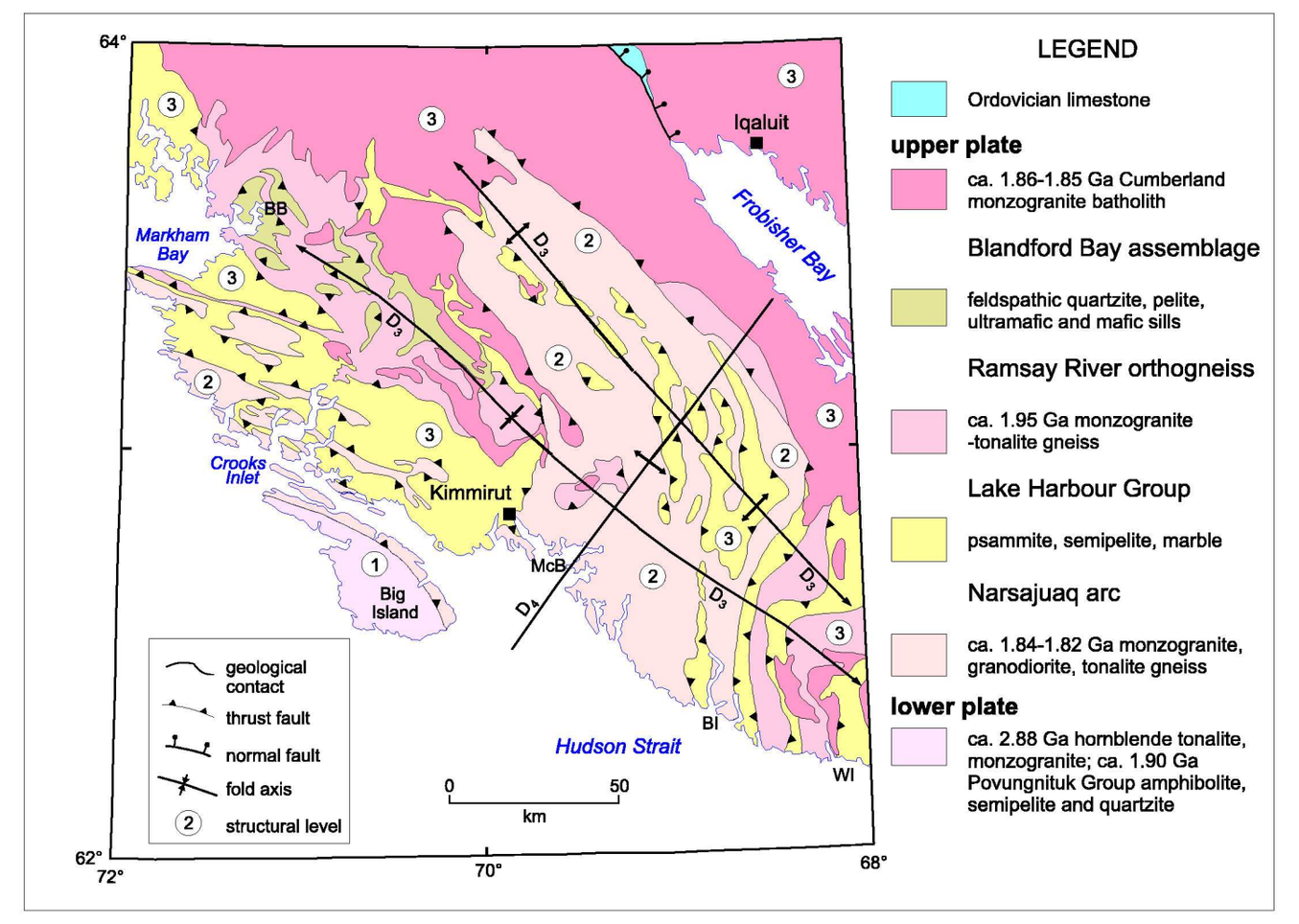

Figure 2. Generalized geology of the project area. Abbreviations: BB - Blandford Bay, BI - Barrier Inlet, McB - McKellar Bay, WI - Wight Inlet

Age (Ga)	Lower plate: Archean basement	Lower plate: Povungnituk Group	Upper plate: Narsajuaq arc	Upper plate: Lake Harbour Group	Upper plate: Ramsay River Orthogneiss	Upper plate: Blandford Bay Assemblage
Structural level (5,14)	-1-	-1-	-2-	-3-	-3-	-3-
3.22-2.74 (1,2,3,4,5)	granulite-facies arc plutonism, deformation, development of compositional layering					
[illegible]	[illegible]	[illegible]			[illegible]	
<1.93, >1.86 (8,9,10)				deposition of platformal clastic and carbonate units (basement uncertain), emplacement of mafic & ultramafic sills		deposition of clastic units (basement unknown), emplacement of mafic & ultramafic sills
ca. 1.87 (?) (11)	D1: basal shear zone deformation	D1: SW-directed thrusting and folding (Cape Smith Belt), basal shear zone deformation				
	M1: retrogression of granulite-facies assemblages, development of mineral foliation	M1: prograde metamorphism, development of mineral foliation				
>1.86 (10)				D1: SW-directed (?) thrusting and folding	imbrication	imbrication
1.86-1.85 (5,12,13)				emplacement of Cumberland batholith		
ca. 1.84 (5,9)				M1: prograde upper amphibolite facies metamorphism, development of mineral foliation	retrogression of granulite-facies assemblages	prograde upper amphibolite facies metamorphism, development of mineral foliation
1.84-1.82 (4,5,7,9)			D1/M1: granulite-facies arc plutonism, deformation, development of compositional layering			
1.82-1.79 (3,5,7,9,10,11)	D2: SW-directed basement imbrication	SW-directed thrusting	accretion to Superior margin, imbrication and recumbent folding		accretion to Narsajuaq arc, SW-directed thrusting and recumbent folding	
	M2: retrogression of granulite-facies assemblages, foliation development	prograde upper amphibolite facies metamorphism, foliation development	retrogression of granulite-facies assemblages, foliation development		retrogression of upper amphibolite and granulite-facies assemblages, foliation development	
ca. 1.79-1.78 (5,9)		emplacement of post-accretion syenogranite		emplacement of post-tectonic syenite		
ca. 1.76 (1,9,11)			D3: SW-vergent folding about NW-SE axes, cleavage development, emplacement of syenogranite pegmatite			
<1.76 (11)			D4: upright folding about NNE-SSW axes			

(1) Parrish (1989) (2) St-Onge et al. (1992) (3) Scott and St-Onge (1995) (4) Lucas and St-Onge (1995) (5) Wodicka and Scott (1997) (6) Machado et al. (1993) (7) Scott and Wodicka (in press) (8) Scott and Gauthier (1996) (9) Scott (1997) (10) Scott et al. (1997) (11) Lucas and St-Onge (1992) (12) Jackson et al. (1990) (13) Scott (in press) (14) St-Onge et al. (in press)

Table 1. Deformation-metamorphism framework for project area

Canada

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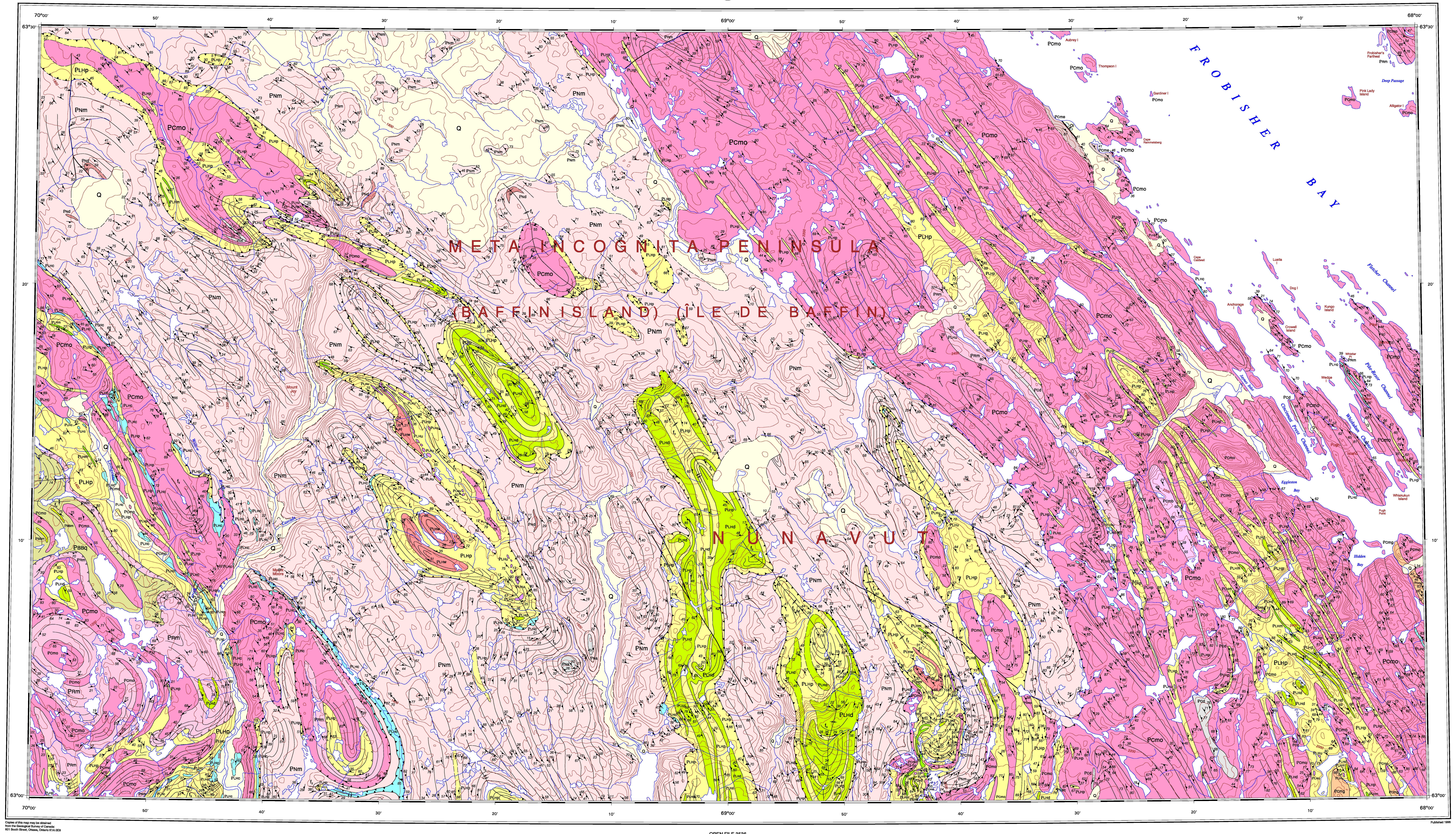


Published 1998

LEGEND

This legend is common to OF 3536, OF 3537, and OF 3538. All units and symbols may not appear on this map

QUATERNARY

- **Q** — Till, outwash, deltaic gravel and sandy alluvium

ORDOVICIAN

- **Ol** — Limestone

PALEOPROTEROZOIC

NARSAJUAQ ARC

- **PNa** — Hornblende ± clinopyroxene anorthosite; orthopyroxene-biotite ± hornblende monzogranite to syenogranite veins
- **PNm** — Orthopyroxene-biotite ± hornblende monzogranite, layered orthopyroxene-biotite ± hornblende ± garnet ± clinopyroxene tonalite, granodiorite and quartz diorite gneiss; hornblende anorthosite layers; amphibolite, hornblendite and metapyroxenite enclaves; orthopyroxene-biotite ± hornblende monzogranite to syenogranite veins
- **PNd** — Hornblende-biotite-clinopyroxene ± orthopyroxene quartz diorite; orthopyroxene-biotite ± hornblende monzogranite and hornblende-biotite tonalite veins

CUMBERLAND BATHOLITH

- **Pcd** — Hornblende-orthopyroxene-clinopyroxene quartz diorite; locally layered with compositions ranging from leucodiorite to anorthosite
- **Pcme** — Epidote-biotite monzogranite
- **Pcmb** — Biotite ± orthopyroxene monzogranite; with garnet ± cordierite
- **Pcmg** — Biotite-garnet monzogranite; commonly contains inclusions of metasedimentary rocks
- **Pcmo** — Orthopyroxene-biotite monzogranite to syenogranite; locally with K-feldspar megacrysts

BLANDFORD BAY ASSEMBLAGE

- **PBBm** — Metaperidotite, metagabbro, layered metaperidotite-metagabbro, metapyroxenite
- **PBBq** — Feldspathic quartzite; pelite, semipelite

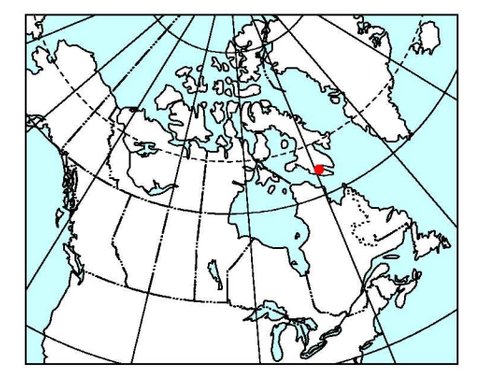
LAKE HARBOUR GROUP

- **PLHw** — White biotite-garnet monzogranite: commonly interlayered with metasedimentary rocks
- **PLHd** — Metaleucodiorite, metatonalite
- **PLHm** — Metagabbro, amphibolite
- **PLHu** — Metaperidotite, metapyroxenite, metadunite
- **PLHc** — Marble, calc-silicate; minor siliciclastic layers; white biotite-garnet monzogranite pods and seams
- **PLHp** — Dominantly psammite; semipelite, orthoquartzite, pelite; minor marble and calc-silicate; white biotite-garnet monzogranite pods and seams

RAMSAY RIVER ORTHOGNEISS

- **PRm** — Orthopyroxene-biotite ± hornblende monzogranite-tonalite gneiss; hornblende-biotite-clinopyroxene ± orthopyroxene quartz diorite; orthopyroxene-biotite ± hornblende monzogranite to syenogranite veins

Geological boundary (defined, approximate)
Form lines
D_1 thrust fault (defined, approximate), ornament on hanging wall
D_2 thrust fault (defined, approximate), ornament on hanging wall
Oblique-slip fault (defined)
Normal fault (defined), ornament on hanging wall
Compositional layering
Foliation
Extension lineation
Fold axis
Intersection lineation
D_2 synform (upright, overturned)
D_2 antiform (upright, overturned)
D_3 synform (upright, overturned)
D_3 antiform (upright, overturned)
D_4 synform (upright, overturned)
D_4 antiform (upright, overturned)



LOCATION MAP

Geology by M.R. St-Onge, D.J. Scott, N. Wodicka, S. Hanmer, D. Copeland, I. Russell, C. Herd, J. Ruechel (1995), Geological Survey of Canada; J. White (1995), University of New Brunswick; M.R. St-Onge, D.J. Scott, N. Wodicka, E. Piper, J. Robillard, E. Turner, G. Brown, S. McMullen, O. Ijewliw, and S. Lucas (1997); Geological Survey of Canada

Geological compilation and notes by M.R. St-Onge, 1997

Digital cartography by E. Everett, Geoscience Information Division

Electrostatic plot produced by the Geoscience Information Division

OPEN FILE 3536

GEOLOGY

HIDDEN BAY

DISTRICT OF FRANKLIN

NORTHWEST TERRITORIES

Scale 1:100 000 - Échelle 1/100 000

Kilometres 2 0 2 4 6 8 Kilomètres

Universal Transverse Mercator Projection / Projection transverse universelle de Mercator

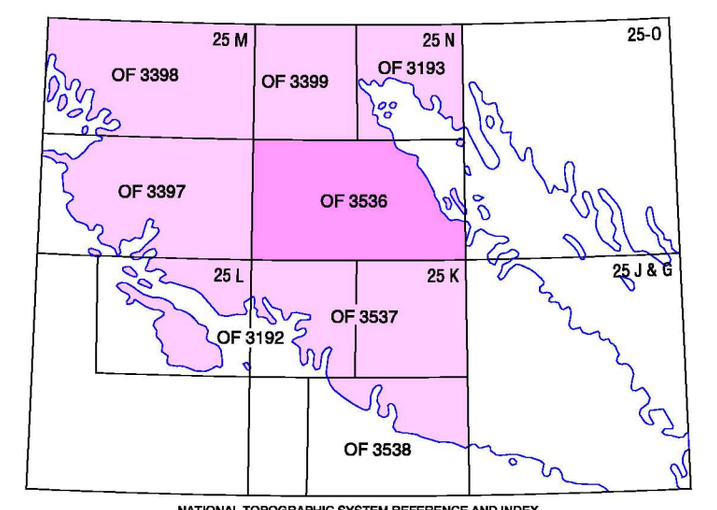
Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map from data compiled by Geomatics Canada, modified by the Geoscience Information Division

Copies of the topographic map for this area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario K1A 0E9

Mean magnetic declination 1998, 36°14′E, decreasing 15.4′ annually. Readings vary from 35°31′W in the SW corner to 36°53′W in the NE corner of the map

Elevations in feet above mean sea level



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OTTAWA
01/1998

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