DESCRIPTIVE NOTES Previous work Previous work

The previous map of metamorphic grade of basement rocks of northern Melville Peninsula (Heywood et al., 1978) shows that the region is underlain by are located, and the northeast where greenschist grade rocks occur. Subsequent lower grades (Schau and Ashton, 1985; Schau and Becket, 1986; Schau and Digel, 1989; Schau, in press). The amphibolite grade of most the area is confirmed by Heywood, W.W. and Fraser, J.A. 1978: Metamorphism in the Canadian Shield; Geological Survey of Canada, Paper 78-10, 367p. Heywood, W.W. and Schau, Mikkel 1978: A subdivision of the northern Churchill Structural Province; in Current Research, Part A, Geological Survey of Canada, Paper 78-1A, p. 139-142. lower grades (Schau and Ashton, 1985; Schau and Becket, 1986; Schau and Digel, 1989; Schau, in press). The amphibolite grade of most the area is confirmed by Schau et al. 1991; Schau, in press). Later Proterozoic supracrustals are weakly undergone several stages of diagenesis (Bolton et al., 1977). Although selected regions have been manned about a third of the area has not been covered in a Jackson, G.D. and Taylor, F.C. 1972: Correlation of major Aphebian rock units in the northeastern Canadian Shield; Canadian Journal of Earth Sciences, v. 9, p. 1650-1669. endergone several stages of diagenesis (Botton et al., 1977). Although selected regions have been mapped, about a third of the area has not been covered in a systematic manner. Parts of the northeast and southwest quadrants of the map show few assemblage localities suggesting that these areas need more detailed Mazurski M.A.
1980: Geology and estimates of P-T-X/CO2 conditions of metamorphism of part of the Foxe Fold Belt (NTS. 47A/3) Melville Peninsula, Northwest Territories; unpublished MSc Thesis, Queens University, Kingston; Ontario. Brief Metamorphic History
Northern Melville Peninsula consists of a basement gneiss horst bordered by the Foxe Basin Lowland carbonates. The mainly amphibolite grade basement gneisses contain evidence of a long and complex history. Two supracrustal groups and several dyke sets serve as markers to help unravel the sequence of Schau, Mikkel
1978: Metamorphism of the Prince Albert Group, District of Keewatin; in
Heywood, W.W. and Fraser, J.A. (ed.), Metamorphism in the Canadian Shield,
Geological Survey of Canada, Paper 78-10, p. 203-213. metamorphism.

There are two metamorphic discontinuities in the region. One is a tectonic than a substitution of the northwest There are two metamorphic discontinuities in the region. One is a tectonic contact between the base of the granulite-amphibolite terrain of the northwest (the northwest domain) and the main amphibolite grade rocks, which is marked on that separates the Proterozoic amphibolite grade rocks (Penrhyn domain) to the south-east from the Archean amphibolite grade rocks.

In the northwest domain, the rocks consist of high grade tonalite-granodiorite gneisses, cut by early leucogranites and the earliest plutons and metadiabase. The domain is modelled as a gently bent slab with granulite grade in the lower part and amphibolite grade on top yielding a 1986: A survey of Granulites; Geological Association of Canada Volume with In press,a: Geology of the Prince Archean Albert Group in the Richards Bay area, northeastern Melville Peninsula, District of Franklin; Geological Survey of Canada, Bulletin 385. In press,b: Geology of Richards Bay Region, northeastern Melville Peninsula,
District of Franklin; Geological Survey of Canada, Map 1687A (scale 1:50,000). with granulite grade in the lower part and amphibolite grade on top yielding a map pattern with granulite grade at the margins and amphibolite grade in the centre. Thus the progression from amphibolite to granulite is prograde within the domain but tectonic at the base of the domain. In Press,c: Geological Bedrock Map: 1:500:000 Northern Melville Peninsula (NTS 47 A, B, C, D); Geological Survey of Canada Open File 2594. domain but tectonic at the base of the domain.

In the main domain, amphibolite grade gneisses intruded by synorogenic reaches of the Ajaqutalik River, supracrustal rocks of lower amphibolite and upper greenschist grades suggest that grade may gradually diminish eastward on association that rests, possibly unconformably on granodioritic gneisses. The compositions such as meta-ultramafic units, quartzite, and banded iron formation, dykes of the Tasijuaq Suite of metagabbro. These aforementioned units have been and interleaving of gneisses and supracrustals, followed by later often ding, supracrustals, as well as undifferentiated granitic gneisses were formed at this Schau, Mikkel and Ashton. K.E. 1985: High-Grade Metamorphic Rocks of northwestern Melville Peninsula, District of Franklin; in Current Research, Part A, Geological Survey of Canada, Paper 85-1A, p. 527-532. 1988: The Archean Prince Albert Group, Northeastern Canada: Evidence for p. A50. Schau, Mikkel and Becket, M. 1986: High grade metamorphic rocks of northwestern Melville Peninsula, District of Franklin; Part A, Geological Survey of Canada, Paper 86-1A p. 667-674. supracrustals, as well as undifferentiated granitic gneisses were formed at this time. Early metadiabase dykes traversed these rocks and the region was, in turn, Schau, Mikkel and Digel, M.
1989: Gossans in High Grade Gneisses from the Black Inlet Area, west coast
of Melville Peninsula, District of Franklin, N.W.T.; in Current Research, Part
A, Geological Survey of Canada, Paper 89-1C, p. 395-403. time. Early metadiabase dykes traversed these rocks and the region was, in turn, intruded by Archean plutons. The age of the metamorphism and concurrent plutonism of the two domains discussed above is late Archean, based on ongoing isotopic studies of Rb/Sr and Sm/Nd and U/Pb systems (Frisch, 1982; R. McNutt, pers comm). studies of RD/Sr and Sm/Nd and U/PD systems (Frisch, 1982; R. McNutt, pers comm).

The domains were joined near the end of this metamorphic event.

Metamorphism of the Penrhyn domain metamorphism is early to mid Proterozoic in age (Henderson, 1983). The Penrhyn Group, a quartzite, carbonate, and pelite Schau, Mikkel and Heywood, W.W. 1984: Geology of northern Melville Peninsula; Geological Survey of Canada,
Open File 1046. sequence, rests unconformably on amphibolite grade gneisses containing remnants of the Prince Albert Group. It has been deformed at least twice, intruded, and metamorphosed to moderate to high emphibolite grades (Mandagan 1984). metamorphosed to moderate to high amphibolite grades (Henderson, 1983, 1984, 1988; Mazurski, 1982). The northwest contact of the Penrhyn Group is a high strain Schau, Mikkel, Brodaric, B., and Berman, R.
1991: A database design for a metamorphic map compilation, with
an example from Northern Melville Peninsula, NWT, Canada; Abstracts
with Programs, Geological Society of America vol 23, p. A449. Mazurski, 1982). The northwest contact of the Penrhyn Group is a high strain zone, and other, subparallel, coeval, narrow high strain zones cut the area northwest of the zone (cf. Schau and Digel, 1989).

All three domains were uplifted in mid-Proterozoic time and latitudinal small miarolitic granite stocks emplaced in and near faults. Lowgrade, middle to late Proterozoic sandstones rest unconformably on the professes and are migigally. Schau, Mikkel, Venance, K., Berman, R., and Brodaric, B.

1992: Metamorphic Map Pilot Study: Empirical tectono-metamorphic domains; Abstracts with Programs, Geological Society of America vol 24, p. A291. late Proterozoic sandstones rest unconformably on the gneisses and are minimally deformed. Two sets of fresh mafic dykes traverse the region. Faults have been variously reactivated, and fault blocks variably tilted. Unmetamorphosed Ordovician carbonates were deposited on a late Proterozoic peneplain, and Devonian and Cretaceous faulting formed the horst (Bolton et al., 1977). Sinha, A. Krishna, Fisher, G.W. and Trzcienski, W.E.
Plutonic-metamorphic map of the North American
Caledonides; Abstract with Programs, Geological Society of America,
vol 24, A292. Exemplars of compilation techniques Preparation of the Metamorphic Map of North America encourages experimentation of the Metamorphic Map of North America encourages experimentation with many diverse compilation strategies (Brodaric et al., 1992). For the northern Melville Peninsula pilot study area, a digital database containing point information (Schau et al., 1991) has been constructed and various thematic overlays have been extracted (Schau et al., 1992). This map various thematic overlays have been extracted (Schau et al., 1952). This map shows the geology as a backdrop (see Schau, in press,c), metamorphic peak assemblage locations, later overprints, and the resulting generalization to a metamorphic grade assignment. The assignment of grades is derived from reported metamorphic grade assignment. The assignment of grades is derived from reported assemblages compared with characteristic assemblages of published metamorphic grids (cf. Carmichael in Davidson et al.,1990, p.27). Overprints are judged to be intense or moderate by the subjective criterion of amount of retrogradation of ferromagnesian minerals and feldspar.

This map subdivides the plutons as to their relative ages with respect to the major metamorphic enisodes (Sinha et al. 1992) yielding in effect a man Metamorphic petrology by T. Frisch, 1982; J.A. Fraser et al. 1978; J.R. Henderson, 1988; M.A. Mazurski, 1982; M. Schau, in press. 1992 M. Schau and K. Ashton, 1985; M. Schau and M. Becket, 1986; M. Schau and M. Digel 1989; K. Venance, 1992,1993 the major metamorphic episodes (Sinha et al., 1992), yielding, in effect, a map of heat input during regional metamorphism. A third symbol set shows the development of textures associated with various stages of metamorphic reconstitution. In detail the map shows the distribution stages of metamorphic reconstitution. In detail the map shows the distribution of several types of quartz:

1/ protolithic quartz (volcanic phenocrysts and sand grains), implying very little homogeneous strain throughout the history,

2/ polygonized quartz grains in foliation, implying early ductile deformation,

3/ sutured quartz grains implying recrystallization at peak conditions,

4/ undulatory extinction in quartz grains implying late brittle ductile Geology by R. Blackadar, 1963; T.E. Bolton et al., 1977;
P. Chernis et al. 1978; W.F. Fahrig and D. Jones, 1969;
W.F. Fahrig et al., 1971; T. Frisch, 1982; J.R. Henderson, 1988;
W.W. Heywood, 1966, 1967, 1974; M.A. Mazurski, 1982; M. Schau, 1981;
in press [a,b]; M. Schau and Ashton, 1985; M. Schau and Becket, 1986;
M. Schau and W.W. Heywood 1984; M. Schau and M. Digel 1989; H.P.Trettin, 1975 These categories reflect the five stages of metamorphism (see Schau 1986) Inese categories reflect the five stages of metamorphism (see Schau in any given orogenic cycle. The combination of structural information with metamorphic history displayed here yields empirically defined domains of equivalent tectono-metamorphic activity (Schau et al., 1992). Digital map compilation by Mikkel Schau, K. Venance, E.Brodaric, and R. Berman 1993, Geological Survey of Canada SELECTED BIBLIOGRAPHY AND REFERENCES Digital cartography by R.L. Allard, with assistance from V. Dohar and M. Methot, Geological Survey of Canada

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Brodaric, B., Berman, R., Schau, Mikkel 1992: A digital technique for metamorphic map compilation; Abstracts with Programs, Geological Society of America vol. 24, p. A292. Davidson, A., Carmichael, D.M., and Pattison, D.R.M. Metamorphism and Geodynamics of the southwestern Grenville Province; IGCP Project 235-304. Field Trip #1 Guidebook.

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Cosmochimica Acta, v. 42, p. 1645-1654.

Henderson, J.K.
1983: Structure and metamorphism of the Aphebian Penrhyn Group and its
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Franklin; Geological Survey of Canada Bulletin 324, 50p.. 1984: Description of a virgation in the Foxe Fold Belt, Melville Peninsula, Canada; in Precambrian Tectonics Illustrated, A. Kroner and R. Greiling (editors), E. Schweizerbart'sche Verlagsbuchhandlung (Nagele u. Obermiller)

1988: Geology, southeastern Melville Peninsula, District of Franklin, Northwest territories; Geological Survey of Canada, Map 1655A, 1:100,000

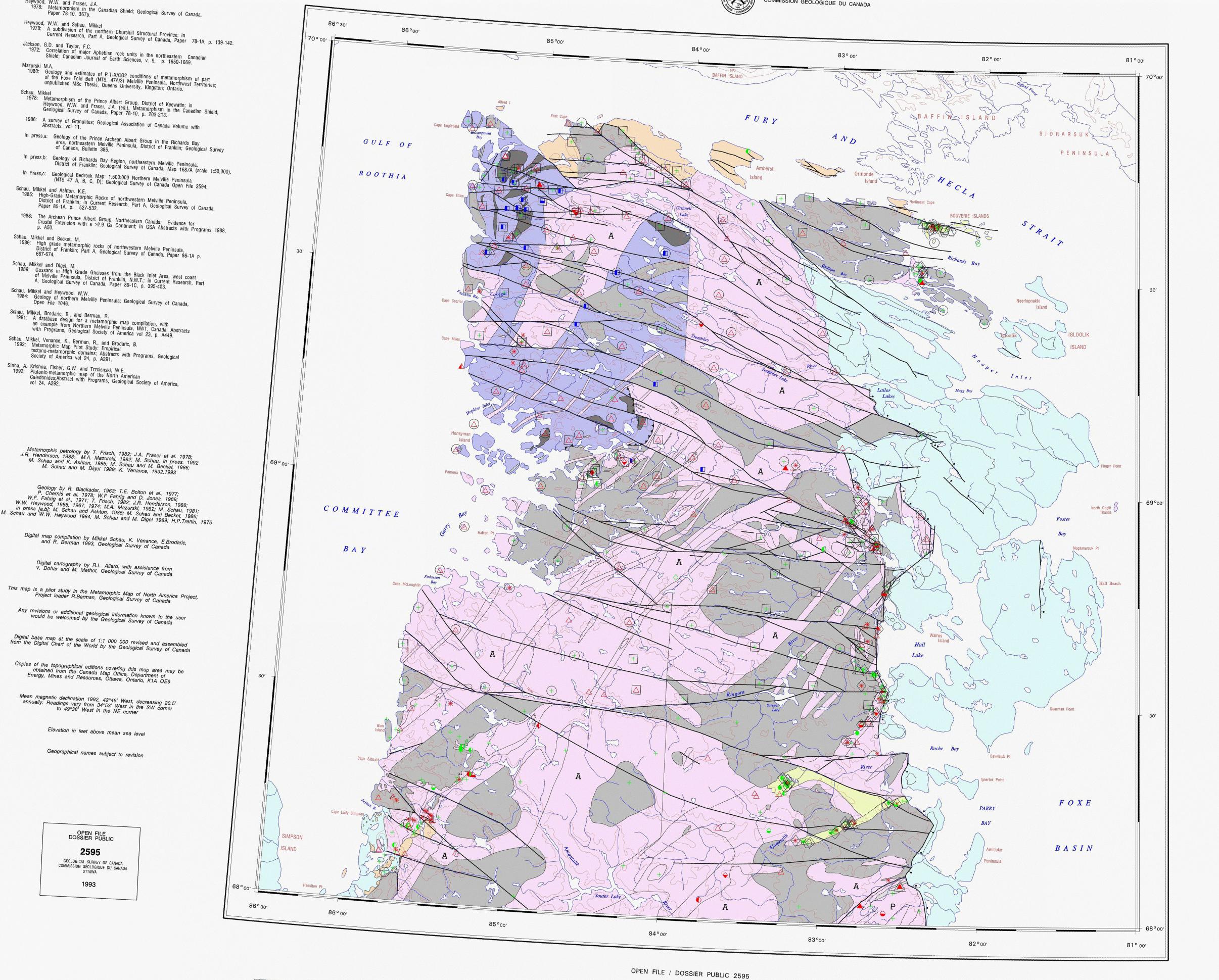
Heywood, W.W.
1966: Geological notes on Operation Wager, N.W.T.;Geological Survey of Canada, Paper 66-10. 1967: Geological notes, northeastern District of Keewatin and Southern Melville Peninsula, District of Franklin (parts of 46, 47, 56, 57); Geological Survey of Canada, Paper 66-40.

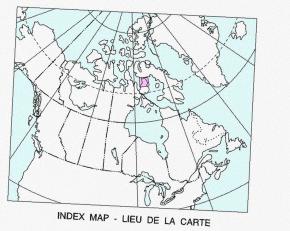
1974: Geological reconnaissance of northern Melville Peninsula, District of Franklin; in Report of Activities, Part A, April to October, 1973, Geological Survey of Canada, Paper 74-1A, p. 381.

OPEN FILE DOSSIER PUBLIC 2595 GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA OTTAWA 1993

Elevation in feet above mean sea level

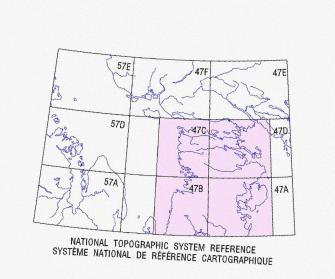
Geographical names subject to revision





METAMORPHIC MAP NORTHERN MELVILLE PENINSULA DISTRICT OF FRANKLIN NORTHWEST TERRITORIES

Scale 1:500 000 - Échelle 1/500 000 Transverse Mercator Projection Projection transverse de Mercator CM 84°00', Scale Factor 1 © Crown copyrights reserved © Droits de la Couronne réservés



LEGEND

Anchimetamorphozed, reaching greenschist in SW corner

Bt-Chi-Ms-Qtz . Grt-Bt-Chl-Ms-Qtz . Srp-Chl .

Amphibolite (low to intermediate P) -Early Proterozoic metamorphism
A -Archean metamorphism HBI-PI-Qtz (Ep, Bt) . Grt-Bt-Ms-Qtz-Bt . St-Bt-Ms-Qtz-Pl

Middle: Di-Cal-Qtz . Crd-Bt-Ms-Qtz-Pl . And-Ms-Bt-Qtz-PI . And-Sil-Ms-Bt-Qtz-Pl . Sil-Ms-Bt-Qtz-Pl .

Upper: Kfs-Sil-Qtz-Bt-Pl .

Opx-Cpx-PI-Qtz . Opx-PI-Kfs-Qtz . Cpx-Grt-PI-Qtz .

GREENSCHIST OVERPRINT PLUTONIC ROCKS

Early to Mid-Proterozoic (syn to post metamorphism)

Late Archean (syn to post metamorphism)

Normal fault (solid circle on hanging wall). . . . Thrust fault (teeth on hanging wall).

QUARTZ TEXTURES Volcanic quartz . Polygonized quartz . Sutured quartz . . Sutured quartz with undulatory extinction . Quartz with undulatory extinction . .