This legend is common to Sheets 1-3 LEGEND **PHANEROZOIC** Unconsolidated Quaternary deposits and felsenmeer Lamprophyre dykes; dark green- to brown-weathering, undeformed. Locally fine grained with compositional flow zoning, or with breccia texture defined by numerous, small ultramafic xenoliths locally with nodular texture (olivine nodules). Age unknown Diabase/microgabbro dykes; brown-weathering, undeformed with fine- to coarse-grained ophitic texture; E-W trending. K-Ar=524+/-78 (Wanless et al., 1970; Taylor, 1979) MESOPROTEROZOIC Diabase/microgabbro dykes; brown-weathering, undeformed, with NNW-SSE trends. Dated to the south of the map area by the K-Ar method, at ca. 1150 Ma (Wanless et al., PALEOPROTEROZOIC HIGHLY STRAINED ROCKS Fault breccia and cataclasite, laced with pseudotachylite veins Mylonite and ultramylonite; developed under amphibolite- to greenschist-facies metamorphic Amphibolite-facies ductile shear zone and/or mylonite METAPLUTONIC ROCKS Mafic dykes Amphibolite dykes; olive green weathering, thoroughly recrystallized, hornblende-plagioclase ± garnet (rarely also with clinopyroxene) syn-tectonic intrusions in the Komaktorvik shear zone. On southeastern Killinek Island, forms≤ 50m wide, grey-green weathering dykes with irregular shape and internal compositional layering Amphibolite dykes; black to grey weathering, with an equigranular hornblende-clinopyroxeneplagioclase ± garnet matrix and, locally, relict plagioclase phenocrysts. Some are syntectonic with the Komaktorvik shear zone (bracketed by U-Pb ages of 1804-1779 Ma. D. Scott, unpublished): others may be equivalents of Avayalik dykes [Pdb] Swirly, migmatite gneiss, derived from veins of Paleoproterozoic granite [Pigr], sheets of Paleoproterozoic tonalite and diorite [PiDTG], and inclusions of Archean gneiss [Agl]: generally >20% of Paleoproterozoic intrusive rocks Pink and grey granite; sugary-textured, fine- to medium-grained rocks, intruding and retrograding charnockitic rocks [Pigd] on Killinek Island K-feldspar megacrystic granite. Texturally variable from weakly foliated and lineated to protomylonitic. Sample from McLelan Strait dated by U-Pb on zircon as ≥1864 ± 2 Ma (Scott and Machado, 1993) Mesocratic tonalite; colour index = 30-35, composed of hornblende (locally after clinopyroxene). Foliated, with relict porphyritic texture defined by augen of plagioclase feldspar. Locally contains finer-grained dioritic xenoliths. Intrusive into Archean Nain gneisses [Agl, Agn], and Paleoproterozoic charnockitic rocks [Pigd]. Sample from McLelan Straight dated by U-Pb on zircon as 1869+3/-2 Ma (Scott and Machado, 1993) Henry granite; quartz monzodiorite, locally to porphyritic granite and granodiorite. Grey- to pink-weathering, medium- to coarse-grained, foliated to schlieric rocks; at amphibolite facies. Dated by U-Pb on zircon, as 1885 ± 2 Ma (Scott and Machado, 1994) Hornblende-biotite diorite. Colour index = 30-50; locally contains 20% by volume of granite veins. Dated at Eclipse Channel by U-Pb on zircon, as 1891 ± 2 (Scott and Grey, dioritic, tonalitic to granodioritic gneiss; locally retaining relict igneous texture, but generally moderately to strongly migmatitic and strongly deformed under Paleoproterozoic amphibolite-facies conditions: probably in large part equivalent to PiDTG. Distinguished from similar adjacent Archean gneisses by the absence of Paleoproterozoic dykes; however, it is possible that the unit includes some dyke-free Archean orthogneiss Polyphase intrusive suite, including matic diorite, tonalite, granodiorite, granite and quartz monzodiorite; at amphibolite facies to retrograde granulite facies. Dominantly (>80%) foliated, homogeneous leucotonalite to quartz diorite, with inclusions of plagioclase-phyric diorite and gabbro, and layered mafic gneiss [Psmg]. Foliated tonalite at Tellialuk arm is dated by U-Pb on zircon as 1910 ± 2 Ma (Scott and Machado, 1993). Cut by porphyritic gabbro sheets (1891 ± 2 Ma: Scott and Machado, 1993) and numerous phases of leucocratic veins and pegmatitic granite. At, and south of, Ikkudliayuk Lake, passes into gneissic tonalite with numerous inclusions and rafts of mafic granulite Granitoid rocks at granulite facies "Zebra" gneiss; alternating black hornblende ± orthopyroxene rich layers and white plagioclase-quartz rich layers, on 5-30 cm scale. Also includes agmatite of amphibolite lenses [Pab] in tonalite [PiDTG?] host Tonalite and tonalite gneiss; grey to buff-white weathering, mesocratic to leucocratic (colour index = 5-30), at transitional granulite facies. Contains inclusions and rafts of amphibolite to mafic granulite [Psmg, Pab], and small bodies of metapyroxenite [Pumf], some of which might be Archean. Cut by white pegmatitic tonalite dykes and veins. Tonalite gneiss can can contain orthopyroxene and a neosome fraction; cut by several phases of paler, diorite/quartz-diorite and grey tonalite: net veining, syn-plutonic dyking (pre-layering) and multiple cross-cutting intrusive phases are common. Gneissic tonalite at Ikkudliayuk Lake dated as 1888 ± 2 Ma (Scott and Machado, 1994) Mesocratic quartz diorite; grey- to black-weathering, with colour index = 20-30. Weakly strained, foliated rock outside of Abloviak shear zone, with relict porphyritic igneous texture defined by recrystallized plagioclase aggregates, and with cognate xenoliths (≤50 cm) of fine-grained diorite: transformed into porphyroclastic mylonite within the Abloviak shear zone. Dated by U-Pb on zircon as 1895 ± 2 Ma (Scott and Machado, 1994) Tonalite to granodiorite; leucocratic, medium- to coarse-grained, characterized by wispy, indistinct layering, or containing numerous inclusions of diffuse-bounded gneissic tonalite and mafic granulite. Typically homogeneous at a large scale, although amount of mafic inclusions varies from 1-30% of rock. Derived through incomplete assimilation of granulitefacies Archean tonalitic orthogneiss [APgl] by charnockitic magmas [Pigd] Massive to foliated, homogeneous orthopyroxene-bearing granodiorite-tonalite (enderbite); buff-weathering, medium grained, equigranular. Includes coarse grained, megacrystic granite north of 60°N latitude. Locally contains inclusions of ultramafic [Pumf], mafic [Pab] and anorthositic [Panm] rocks, and locally some tonalitic orthognelss of suspected Archean age [APgl]. Two samples of enderbite dated by U-Pb on zircon as 1895 \pm 3 Ma and 1886 \pm 2 Ma (Scott and Machado, 1993, 1994). An enderbite within the Abloviak shear zone is 1839 ± 2 Ma (Scott and Machado, 1994) Mafic diorite; medium grained, granoblastic rocks, as marginal phase to charnockitic rocks [Pigd] and as small sheets within Paleoproterozoic paragneisses [PsTg, Pspg] SUPRACRUSTAL GNEISSES White granite with red-to lilac-coloured garnets; medium- to coarse-grained, with grey garnetiferous schlieren of paragneiss restite. Derived through granulite-facies anatexis of paragneiss [PsTg and Pspg] Quartzite; grey, graphitic, locally with fine grained garnet Paragneiss and metasedimentary migmatite. Dominantly grey- to buff-weathering, migmatitic paragneiss, characterized by red garnets, biotite, and abundant leucosome, but in which sillimanite is rare. At Tellialuk Arm grey, finely-layered (cm-dm) quartzo-feldspathic gneisses contain white to pink granitic leucosome veins and clots, and are locally interlayered with rusty biotite semi-pelites and mafic metasedimentary rocks interpreted as turbidites and/or volcaniclastic metasediments. At Ikkudliayuk Lake, rusty-weathering garnetiferous psammiticpelític gneiss is interlayered with green-weathering psammite/quartzite, rare garnetiferous amphibolite, and hornblende-plagioclase layers interpreted as matic metavolcanic rocks. White garnet-rich (+biotite) pegmatites and granitic sheets constitute ≤50% by volume Psrg Rusty brown- and red-weathering paragneiss; graphitic, with biotite ± garnet Calc-silicate and impure marble; consists of 1-5m wide layers of impure diopside-olivinecalcite marble, and light green, massive calc-silicate units (diopside), 1-10m thick, locally with numerous layer-parallel and layer-discordant white quartz veins Tasiuyak gneiss; rusty brown and white weathering paragneiss and diatexite, characterized by Illac-coloured garnets and sillimanite. Homogenous at large scale, but well-layered on a 10cm-2m scale, varying from garnet quartzite to semi-pelitic garnet-biotite-feldspar-quartz gneiss, to pelitic sillimanite-biotite-garnet quartzo-feldspathic gneiss; all cut by and/or interlayered with white garnet granite [Psdx] Mafic gneiss and amphibolite; characterized by units with centimetre-scale compositional layering, but also includes plagioclase-phyric and more homogeneous amphibolites. Probably derived from matic metavolcanic rocks ANORTHOSITIC TO ULTRAMAFIC ROCKS Amphibolite; homogeneous, equigranular textured rocks at amphibolite to granulite facies. Layering generally not present, locally sheeted and net-veined by pink-white leucogranite and pegmatite (south Sheet 3). Derived from gabbro and/or metavolcanic rocks Pyroxenite; massive to foliated, with homogeneous to layered textures, composed of opyroxene-hornblende ± anthophyllite Biotite paragneiss; varying from psammitic quartzofeldspathic gneisses, to semipelitic garnet-biotite quartzofeldspathic gneiss. Leucosome material is rare or absent, in contrast to paragneisses in the Tasiuyak gneiss complex [PsTg and Pspg] Rusty-brown weathering metapelitic gneiss Hornblende-biotite-feldspar-quartz \pm rare garnet gneiss (diorite to mesocratic amphibolite); homogeneous to layered mesocratic rocks, with <10% leucosome veins. Interpreted to be derived from volcaniclastic metasedimentary rocks Quartzite, quartz arenite and semipelitic gneiss; locally with thin units (30cm-5m) of coarse Marble; pure, white-weathering, coarse grained calcite Avayalik diabase dykes. Characteristic black feldspar phenocrysts are common throughout Four Peaks domain, where dykes vary from fresh diabase in the southeastern part of the map area, to dykes with a partly recrystallized matrix of hornblende ± biotite cut by garnet-clinopyroxene-quartz veins, to brown-weathering granulites (garnet-clinopyroxenehornblende-plagioclase ± quartz ± orthopyroxene) immediately east of the Komaktorvik shear zone. Within and to the west of the Komaktorvik shear zone, strongly foliated and deformed dykes contain hornblende-plagioclase ± garnet ± epidote assemblages, in which relict feldspar phenocrysts are white. Many dykes on Sheet 2 were interpreted from airphotographs and consequently may represent more than one age ARCHEAN OR PALEOPROTEROZOIC Clino- and orthopyroxene gabbro to leucogabbro, with igneous layering and compositional variation to anorthosite, homblende gabbro, and alkaline syenite; undeformed to weakly strained. Cut by Avayalik(?) dykes [Pdb] Mafic gneiss; massive to migmatitic, locally well layered. Associated with APgl on Killinek Island, at transitional Paleoproterozic granulite to amphibolite facies HUTTON META-ANORTHOSITIC SUITE Anorthosite, gabbroic anorthosite and leucogabbro; white-weathering, commonly with relict igneous textures and compositional layering, and locally with preserved igneous plagioclase (blue Labradorite) and coarse-grained orthopyroxene. Gabbroic anorthosite is dominant, but unit is compositionally heterogeneous Granoblastic, recrystallized anorthositic gneiss, derived from APan. Characterized by disrupted mafic layers, and a cm-dm scale gneissic layering; contains locally abundant amounts of leucotonalite-anorthosite veins in hornblende-plagioclase \pm garnet ± orthopyroxene rocks Layered metagabbro, to rare ultramafic rocks

presence of abundant granite veins and a lesser amount of leucosome and ultramafic inclusions. Cut by rare amphibolite dykes, chamockitic rocks of suspected Paleoproterozoic age [Pigd], and by Paleoproterozoic granite sheets Lithotectonic assemblage boundary; defined, extrapolated . . Dn+3 high strain zone boundary; arrows denote sense of Dn+3 high strain zone boundary, with reverse sense of Boundaries of Dn+2 high strain zones . . Trace of Fn+3 folds; synform, antiform, overturned antiform . Trace of Fn+2 folds; synform, antiform, overturned antiform . Western limit of detailed mapping; data west of this line are compiled from Taylor (1977a, 1977b) . . Isograds separating zones in the Four Peaks domain (Sheet 2) are related to the progressive development of the Paleoproterozoic static overprint reaction: orthopyroxene + plagioclase = garnet + clinopyroxene + quartz that affects both Archean gneisses [Agl] and Paleoproterozoic Avayalik dykes [Pdb], and which increases in intensity to the west . . . opx - zone: largely retaining Archean orthopyroxene-clinopyroxenehornblende assemblages in both felsic and mafic gneisses. Avayalik dykes retain igneous texture with minor garnet growth in veins and segregations, and with greenschist facies overprint on igneous mineralogy cpx+ga+opx - zone: characterized by development of clinopyroxene and garnet at expense of orthopyroxene in both mafic and felsic gneisses, but retaining metastable orthopyroxene. Avayalik dykes are variably overprinted by vein network and blotchy overgrowths of garnet + cpx+ga - zone: in which orthopyroxene bearing assemblages have been almost totally replaced by clinopyroxene-garnet assemblages. All Avayalik dykes are overprinted by vein networks and blotchy overgrowths Abbreviations: BI = biotite, HB = hornblende, OPX = orthopyroxene, PL = plagioclase, QZ = quartz, SI = sillimanite, XL = intersection lineation Strike and dip of inclined Cambrian dyke [Cd] too small to show on map . . Strike and dip of inclined Avayalik dyke [Pdb] too small to show on map . . STRUCTURAL FABRIC ELEMENTS Paleoproterozoic Dn+4: ultramylonites and faults Strike and dip of inclined ultramylonite zone or fault; no movement sense, reverse, normal . . Strike and dip of vertical ultramylonite zone; no movement sense . Trend and plunge of lineation; mineral elongation, slickensides Strike and dip of inclined foliation or schistosity; no movement sense, sinistral, dextral. Strike and dip of vertical foliation or schistosity; no movement sense, sinistral, dextral . . Strike and dip of fold axial plane; inclined, vertical . Trend and plunge of fold axis; symmetrical, s-asymmetric, z-asymmetric Trend and plunge of lineation; mineral elongation, streaks . Strike and dip of inclined foliation; no movement sense, sinistral. Strike and dip of vertical foliation; no movement sense, sinistral. Strike and dip of fold axial plane; inclined, vertical . . . Trend and plunge of fold axis; symmetrical, s-asymmetric, Trend and plunge of lineation; mineral elongation, streaks . . Strike and dip of foliation; inclined, vertical . . Horizontal transposed bedding (S_0/S_{n+1}) in Tasiuyak gneiss . Trend and plunge of symmetrical fold axis Strike and dip of gneissosity; inclined, vertical . Trend and plunge of symmetrical fold axis Trend and plunge of lineation; mineral elongation, streaks . SHEET 2 Geology by R.J. Wardle 1, D. Bridgwater 2, F.C. Mengel 2, L.M. Campbeli 3, M.J. Van Kranendonk 4, L. Reid 4, A. Haumann², and R. Churchill¹, 1991-1993 ¹Geological Survey, Newfoundland Department of Natural Resources Geological Museum of Denmark: now at Danish Lithosphere Centre ³Department of Geological Sciences, University of Colorado ⁴Geological Survey of Canada Digital map compilation by R.J. Wardle and L.V.J. Crisby-Whittle, Newfoundland Geological Survey, 1994 Digital cartography by E. Everett, Geological Survey of Canada Electrostatic plot produced by the Geological Survey of Canada Any revisions or additional information known to the user would be welcomed by the Geological Survey of Canada Digital base map assembled and modified by the Geological Survey of Canada from digital bases compiled by the Surveys, Mapping and Remote Sensing Branch Copies of the topographical edition of this map may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario, K1A 0E9 Mean magnetic declination 1995, 33 ° 02 W, decreasing 12.8' annually. Readings vary from 32 ° 39 W in the SW corner to 33°25 W in the NE corner of the map Elevations in feet above mean sea level COOPERATION
AGREEMENT
MINERAL DEVELOPMENT COOPÉRATION SUR L'EXPLOITATION MINÉRALE Contribution to Canada-Newfoundland Cooperation Agreement on Mineral Development (1990-1994), a subsidiary agreement under the Economic and Regional Development Agreement. Contribution à l'Entente de coopération Canada-Terre-Neuve sur l'exploitation minérale (1990-1994), entente auxillaire négociée en vertu de l'Entente Canada/Terre-Neuve de développement économique et Newfoundland OPEN FILE DOSSIER PUBLIC 2927 GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA

Granodiorite - tonalite plutons; buff-weathering, foliated, at granulite facies (≤ 5-10% orthopyroxene ± biotite ± garnet). Varies from medium grained, equigranular textures to

coarse grained, megacrystic rocks; locally containing enclaves of earlier gneiss [Agl]. Contacts with surrounding gneisses are diffuse and obscured by metamorphism. Cut by plagioclase-phyric, metamorphosed diabasic dykes [Pdb] and altered to a grey, foliated

Orthogneiss Agl, Agn, Argn: Undivided tonalite-granodiorite orthogneiss and migmatite, with highly variable composition and texture: generally contains abundant interlayers of massive and banded amphibolite/mafic granulite, ultramafite and minor amounts of pelitic

at Archean granulite (orthopyroxene + clinopyroxene ± hornblende) facies and subsequently overprinted by a variety of Paleoproterozoic metamorphic effects

garnet-clinopyroxene high-pressure granulite-facies assemblage

gneiss and garnet quartzite. The gneisses were originally metamorphosed and migmatized

Buff-weathering granulite-facies gneisses that generally retain Archean orthopyroxene +

Peaks domain, gneisses were largely overprinted by a static Paleoproterozoic (1.83-1.79 Ga) garnet-clinopyroxene high-pressure granulite-facies assemblage, that developed prior to the later Paleoproterozoic amphibolite-facies retrogression

Grey-weathering gneisses, retrogressed to Paleoproterozoic amphibolite-facies assemblages

Supracrustal gneisses; white- to rusty-weathering, well layered and generally strongly migmatitic. Composed predominantly of rusty, garnetiferous quartzite, rusty sillimanite-

bearing pelitic gneiss, garnet leucogranite, and minor marble/calc-silicate and garnet-

ultramafite similar to, and locally having gradational contacts with, Amf

layering and 'leopard'-rock textures are locally preserved

anthophyllite-bearing rocks with rosette texture

ARCHEAN GNEISS IN TASIUYAK GNEISS AND NOODLEOOK COMPLEXES

clinopyroxene-magnetite iron formation; all interlayered with mafic granulite and podiform

Anorthosite, layered anorthositic gabbro and metagabbro; purple-to white-weathering, with

Mafic gneisses; variably migmatitic, including layered (supracrustal?) mafic granulite, layered metagabbro - mafic granulite, and thin ultramafite (largely meta-pyroxenite) layers. Dominated by clinopyroxene-garnet-hornblende assemblages but locally with relict

orthopyroxene. Unit probably derived from a mixture of metavolcanic and intrusive rocks

Tonalite-granodiorite orthogneiss and migmatite, with highly variable composition and texture. Generally contains abundant interlayers of massive and banded amphibolite/mafic granulite, ultramafite and minor amounts of pelitic gneiss and anorthositic rocks. In the Tasiuyak

gneiss complex, the unit is preserved at Paleoproterozoic granulite facies and veined by Paleoproterozoic charnockitic rocks [Pigd] or grades into Pigm. In the Noodleook complex,

White to grey tonalite gneiss and migmatite; contains inclusions and layers of amphibolite,

layered mafic gneiss, anorthositic rocks, and rare metasedimentary rock: interlayered with Lake Harbour Group. Distinguished from Archean Nain gneisses [Agl, Agn, Argn] by

this unit is preserved at transitional Paleoproterozic granulite to amphibolite facies

Ultramafic rocks; tan coloured metadunite or dark brown pyroxenite, often spatially

associated with metasedimentary gneisses. Locally altered to actinolite-

recrystallized granoblastic textures, locally garnetiferous (\$\leq 40\%). Occurs as sheets and disrupted trains of tectonic inclusions within orthogneisses [Agl, Agn, Argn, APgl]. Igneous

clinopyroxene ± hornblende assemblages and which are largely unaffected by subsequent

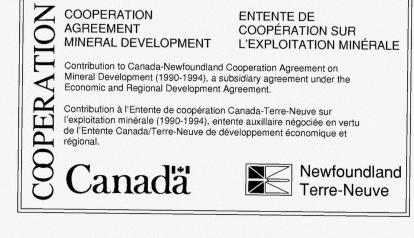
Buff-weathering granulite-facies gneiss, which locally retain relict Archean orthopyroxene-hornblendeclinopyroxene assemblages partially retrogressed to grey amphibolite-facies equivalents during 1.79-1.71 Ga Paleoproterozoic metamorphism. South of Eclipse Channel in the Four

Paleoproterozoic overprints or retrogression. South of Eclipse Channel in the Four Peaks domain, gneisses were largely overprinted by a static Paleoproterozoic (1.83- 1.79 Ga)

unknown, but probably Late Archean

Supracrustal gneisses and associated rocks

orthogneiss where deformed and retrogressed to Paleoproterozoic amphibolite facies. Age



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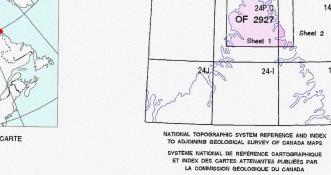
SHEET 2 OF 4 Recommended citation: Van Kranendonk, M.J. and Wardle, R.J. 1995: Geology of the Archean Nain Province and Paleoproterozic Torngat Orogen, Newfoundland (Labrador), Québec, and Northwest Territories;

Geological Survey of Canada, Open File 2927, scale 1:100 000

PALEOPROTEROZOIC TORNGAT OROGEN NEWFOUNDLAND (LABRADOR) - QUÉBEC - NORTHWEST TERRITORIES

> Scale 1:100 000 - Échelle 1/100 000 Transverse Mercator Projection CM 63°45', Scale Factor 1.0 Projection transverse de Mercator M.C. 63°45', facteur d"échelle 1,0 © Crown copyrights reserved © Droits de la Couronne réservés





Sheet 1

Pegmatitic granite sheets; white, non-foliated, generally shallowly dipping