CANADIAN GEOSCIENCE MAP 193 Quaternary sediments. DESCRIPTIVE NOTES Jvayualuk Formation: Light brown dolomudstone to dolarenite. Thrombolite mounds are locally well developed and together with metre-scale cross-The Winter Cove Bay map area consists of NTS 87-G/10 and the southernmost part of 87-G/15. It lies within the Minto Inlier, a ~300 km long by stratification suggest a shallow marine setting. Although no fossils were 100-150 m wide belt of gently folded sedimentary and igneous rocks of early Neoproterozoic age (late Tonian-early Cryogenian) ecovered from this unit, the lower contact is gradational with mudstones The Neoproterozoic sedimentary rocks belong to the Shaler Supergroup, a \sim 4 km thick succession of shallow marine carbonate and evaporite rocks with interbedded terrigenous metasedimentary strata deposited in a shallow intracontinental epeiric sea known as the Amundsen Basin (Thorsteinsson and Tozer, 1962; Young, 1981; Rainbird et al., 1994; 1996a). The basin is considered to have formed within the supercontinent that contain Cambrian trilobites. Thickness is 30-45 m. Rodinia and similar rocks outcrop in the Mackenzie Mountains of the northern Cordillera, suggesting that the basin extended for more than NEOPROTEROZOIC 1000 km to the southwest (Long et al., 2008; Rainbird et al., 1996a). Basal strata of the Shaler Supergroup (Rae Group) are exposed only at Franklin intrusions (ca. 720 Ma): Typically massive, laterally extensive, the northeastern end of the Minto Inlier, near Hadley Bay, where they unconformably overlie Paleoproterozoic sedimentary rocks, which in turn, unconformably overlie Archean granitic rocks (Campbell, 1981; Rainbird et al., 1994). diabasic or gabbroic sills with columnar jointing (~3–50 m thick, rarely up to Shaler Supergroup strata were injected by tholeiitic basaltic sills of the ca. 723-720 Ma (Heaman et al., 1992; Macdonald et al., 2010) 150 m). Some sills are composite with internal intrusive contacts. Less Franklin igneous event. Sills are generally 20–60 m thick, constitute 10–50% of the stratigraphic section, and commonly extend for 20 km or common, 1–40 m wide dykes are generally oriented NNW with irregular to more along-strike with little change in thickness. Rare north-northwest striking dykes are interpreted to have intruded along syn-magmatic normal faults, to feed sills and possibly the flood basalts (Bédard et al., 2012). Sills of similar type and age also occur in the Coppermine very linear contacts. Commonly associated with fault breccias or drag folds in host metasediments. Dyke / sill junctions commonly have complex contact Homocline, Brock Inlier and Duke of York Inlier to the south (Jefferson et al., 1994; Rainbird et al., 1996b; Shellnutt et al., 2004) and coeval, zones of calc-silicate contact-metamorphic rocks (reddish garnet rimmed by geochemically similar intrusions and volcanic rocks associated with the Franklin event extend from Greenland to the western Yukon bright green vesuvianite), black Fe-oxide skarns, and minor sulphides. (Heaman et al., 1992; Denyszyn et al., 2009; Macdonald et al., 2010). The Shaler Supergroup in Minto Inlier is capped by Natkusiak Formation flood basalt lava flows and interflow sedimentary rocks (Williamson et al., 2013). The lavas are up to 1 km thick and are the extrusive Franklin intrusions Type 2: Younger (based on crosscutting relationships), equivalent of the Franklin sills (Baragar, 1976; Jefferson et al., 1985; Dostal et al., 1986; Dupuy et al., 1995). Two main Franklin magma more evolved, predominantly diabasic sills show enrichment in magnetite, populations are identified and discriminated on the map where possible (see legend). Basal lavas and older sills (Type 1) are slightly enriched in very incompatible trace elements (high Ce/Yb), tend to be more primitive (higher MgO), and the sills may have peridotitic bases, with up to ilmenite, quartz, and alkali feldspar towards their cores, but are rarely layered. 55% olivine (annotated as 'o' where observed: Hayes et al., 2015). These primitive Type 1 sills have potential for Ni-Cu-PGE mineralization Some sills are porphyritic and contain 10–15% plagioclase>clinopyroxene> (Jefferson et al., 1994), Younger diabasic sills (low Ce/Yb, Type 2) correspond to the major sheet flow units of the lava succession. A olivine phenocrysts and glomerocrysts up to 5 mm. Porphyritic rocks are prominent feldspar porphyritic facies characterizes some Type 2 intrusions (annotated as 'p' where observed). Note that feldspar porphyries marked as 'p' on the map where the texture has been recognized. Intrusions of are not observed in Type 1 intrusions, peridotite is never observed in Type 2 intrusions, whereas diabasic or gabbroic textures are this series are marked as '2' where geochemical data exist. The irregular edge of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the Exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproterozoic rocks from Lower Conference of the Exposed Minto Inlier is defined by an erosional unconformity that separates the Neoproteon Conference of the Exposed Minto Inlier is defined by the Neoproteon Conference of CoFranklin intrusions Type 1: Older, more primitive intrusions are commonly Cambrian sandstone and siltstone (Quyuk Formation) that passes upward into a thick succession of mainly dolomitic carbonate rocks, layered, with microdiabasic lower and upper border zones and olivine-enriched ranging in age from Cambrian to Devonian (Thorsteinsson and Tozer, 1962; Dewing et al., 2015). Minto Inlier rocks are affected by open folds with northeast trending axial traces. Beds typically dip no more than 10° and there is generally no penetrative deformation fabric. The origin of the folding is unknown but it occurred after 720 Ma, before uplift and erosion of the Proterozoic rocks and prior to deposition of overlying lower basal cumulate (olivine gabbro to feldspathic wehrlite,) that is locally capped by a thin, (1–2 m) feldspathic pyroxenite cumulate. The olivine cumulate is Cambrian siliciclastic rocks (Durbano et al., 2015), which are not folded, but dip gently towards the northwest. Two main generations of faults commonly covered with bright orange lichen, weathers chocolate brown, and are present (Bédard et al., 2012; Harris, 2014): north- to northwest trending syn-magmatic Proterozoic normal faults; and a younger set of east-northeast to east trending normal faults that cut all rocks in the area. The normal faults form horst and graben systems with up to 200 of shows a characteristic layer-parallel ribbed weathering. It is marked as 'o' on the map where it has been recognized. The upper one half to three quarters of metres of stratigraphic separation on individual faults, although throws are generally much less than this. A wide zone of intense sills comprise massive olivine and pigeonite gabbros, a magnetite gabbro with east-northeast to east trending normal faulting stretches from Boot Inlet in the west to Wynniatt Bay in the east. This regional-scale, characteristic pitted weathering (magnetite oikocrysts) and a granophyric en-echelon, stepping normal fault system records sinistral transtensional motion (Harris, 2014). Observed contacts and lithologies were sandwich horizon containing abundant ocelli of granophyre and coarse, extrapolated and/or inferred using aeromagnetic data and satellite imagery (e.g. orthorectified air photos, Landsat7, SPOT5, and Google Earth™). Many linear structures visible on air photos and linear discontinuities on the 1st-derivative aeromagnetic maps bladed clinopyroxene crystals. Intrusions of this series are marked as '1' where (Kiss and Oneschuk, 2010) are interpreted to be faults, although significant throws cannot always be demonstrated. Late Wisconsinan proglacial and glacial deposits cover about 50% of the map's area (Hodgson, 2012). The extent of Quaternary cover shown on this map is not meant to be comprehensive, but to highlight areas where bedrock attributions are uncertain. NEOPROTEROZOIC-TONIAN TO CRYOGENIAN NTS 87-G/10 (Winter Cove Bay and the southern part of NTS 87-G/15) is mostly underlain by Neoproterozoic rocks of the Reynolds Point Group (Boot Inlet, Fort Collinson, Jago Bay formations) and the Minto Inlet Formation. In places, insufficient data were available to allow Shaler Supergroup (nPMi) subdivision of Reynolds Point Group rocks. Detailed descriptions of these rocks are provided in Young and Long (1977). Young (1981) and Morin and Rainbird (1993). Together with intercalated mafic sills, strata are typically either flat lying, or dip gently to the north or south to Minto Inlet Formation: Four informal members in ascending either side of the Walker Bay Anticline, the axial trace of which crosses the map area. The common bulls-eye contact patterns stratigraphic order: maroon-green gypsiferous siltstone-calcilutite, (e.g. UTM, 494000E, 7936000N) reflect the relative thinness of some units, the shallowly dipping contacts, and significant topographic relief. dark grey limestone, bedded white gypsum, and cyclical calcisiltite to poorly exposed regional-scale erosional unconformity that separates Paleozoic rocks in the north from the Proterozoic rocks is commonly nodular gypsum. Evaporite lithofacies include laminated to faulted out. Exposed Paleozoic rocks include pebbly sandstones of the Cambrian Quyuk Formation (Durbano et al., 2015) and massive tan thin-bedded and crosslaminated white gypsite and grey anhydrite, dolostone of the overlying Uvavualuk Formation (Dewing et al., 2015). Isolated domains of Paleozoic rocks are also preserved within red gypsiferous siltstone and buff to grey calcisiltite. Chickenwire, east-northeast trending graben in the south-center, north of Amgmaluqtuhuk (lake, e.g. UTM, 479500E, 7943000N). nodular anhydrite and crosscutting satinspar veinlets common in Carbonate rocks of the Boot Inlet Formation are widespread. Only the upper third of the formation is exposed in the map area. Massive to brecciated, orange-tinged dolomitized zones are common near faults. Most outcrops are composed of rhythmically layered grey calcareous upper evaporite as are up to 2 m thick beds of crystalline gypsum. and buff dolomitic arenite and siltite, but stromatolites, oolitic grainstones and intraformational conglomerates are locally prominent. Carbonate lithofacies includes dark grey to buff-grey laminated to The locally well exposed Fort Collinson Formation is typified by variably dolomitic, medium-bedded, orange to grey-weathering quartz arenite, thin-bedded dolosiltite with molar-tooth and fine-grained dolarenite commonly with herringbone cross-stratification. This unit is gradational with parallel-stratified to crossbedded, quartz sand-bearing, oolitic with hummocky cross-stratification. Approximately 250 m thick. grainstone of the underlying Boot Inlet Formation. Its overall thickness varies from 50–100 m (Young and Long, 1977, Rainbird et al., 1994). In the northern part of the map area, diagenesis, contact metamorphism and facies variations make this unit difficult to recognize. Extensive Reynolds Point Group (nPB-nPJ) occurrences of Fort Collinson Formation rocks are probably present among the unsubdivided Reynolds Point Group outcops in the north (e.g. UTM, 471000E, 7953000N). Jago Bay rocks comprise massive, thick-bedded, yellowish-grey-weathering limestone or dolostone that alternate with thinner-bedded carbonate grainstones, silty limestones, and stromatolitic units. Rare gypsum interlayers have been observed Jago Bay, Fort Collinson, and Boot Inlet formations: Undivided. near the gradational upper contact with the Minto Inlet Formation. A small domain of Minto Inlet Formation rocks is exposed on a graben floor $near the south-eastern \ margin of the \ map \ area \ (UTM, 498000E, 7934500N). \ The \ rocks \ are \ crumbly \ weathering, thin-to thick laminated \ white$ gypsum with interbedded grey-green calcisiltite, red gypsiferous siltstone and nodular gypsum. Jago Bay Formation: Lower predominantly wavy-bedded calcilutite At least two Type 1 sills are exposed in the area, but block faulting makes correlation difficult. One example with a prominent peridotitic with black shale partings, molar-tooth structure, minor beds of base was emplaced just above the Fort Collinson quartz arenite (UTM, 499240E, 7941760N) and similar, presumably correlative sills occupy crossbedded quartz-sandy calcarenite and stromatolitic limestone. the same stratigraphic level in adjoining mapsheets (NTS 87-G/9: Bédard et al., 2012; NTS 87-G/7: Hayes et al., 2015). Type 1 sills are also hosted by the Boot Inlet Formation at UTM, 495600E, 7933220N. Several Type 2 sills occur in this map area. Feldspar-rich porphyritic rocks characterize a prominent sill (UP sill) emplaced within the Jago Bay Formation (e.g. UTM, 499500E, 7934000N), about 20 m above the Upper is mainly laminated calcilutite with subordinate grainstone. calcareous sandstone, and gypsum near upper gradational contact peridotite-based LP sill. The UP sill also can be traced for considerable distances toward the southwest (NTS 87-G/7) and east (NTS 87-G/9). with Minto Inlet Formation. Approximately 200 m thick. This entire area is heavily affected by both normal fault sets. North to northwest-trending faults are interpreted to be syn-magmatic (Franklin-age) because associated cataclastic breccias contain fragments from older basaltic pulses that are injected by chilled basalt Fort Collinson Formation: Medium-bedded, fine-to medium-grained (Bédard et al., 2012). Both east-side down and west-side-down normal motions are recorded. An especially prominent fault runs through Jago quartzarenite, glauconitic quartzarenite and dolomitic quartzarenite. Bay and extends all the way to the southern edge of the map and into the next sheet to the south (NTS 87-G/7). The main east- to northeast-Herringbone crossbedding throughout with subordinate trending normal faults are associated with contemporaneous east-west and north-south-trending oblique-slip faults. This fault system was sub-horizontal planar stratification to low angle crossbedding. initiated during deposition of the basal Cambrian clastic rocks (Quyuk Formation: Durbano et al., 2015) but continued to move afterwards. Approximately 100 m thick. Locally, these faults anastomose and form multiple splays (e.g. UTM, 499000E, 7955500N), that locally reactivated the older fault set. Bedding and sill contacts are markedly steepened adjacent to some faults (UTM, 491000E, 7935500N) demonstrating local north-side down Boot Inlet Formation: Rhythmically laminated to thinly bedded, motions. Conversely, south-side-down motion is required by the offsets of formation boundaries at UTM, 499500E, 7948650N. These two intersecting fault sets break up the outcrop pattern into polygonal blocks. Prominent aeromagnetic discontinuities (Kiss and Oneschuck, dark-grey dololutite/calcilutite and light-grey dolosiltite/calcisiltite with common molar-tooth structure, gutters, scours, tool marks, convolute 2010) allow the major faults to be traced beneath the Quaternary cover (e.g. UTM, 489000E, 7962000N). pedding and other loading features. Interbedded with trough cross-stratified to hummocky cross-stratified dolarenite/calcarenite, ACKNOWLEDGMENTS including ubiquitous oolitic arenite (grainstone). In the type area, near Boot Inlet, the upper part of the formation is characterized by a thick, Thanks are due to our cooks (Sharon Brown, Rosanda Belaar-Spruyt, and Susie Memogana), pilots, mechanics and other support personnel, tabular, stromatolitic reef complex composed of strongly dolomitized, Technical Field and Supply Services, Polar Continental Shelf Program (notably Michael Kristjanson), Laboratoire de cartographie numérique digitate stromatolites interbedded with dolarenite grainstone. Only the et de photogrammétrie staff (notably Nathalie Côté and Étienne Girard), and the wonderful people of Ulukhaktok, notably Isaac Inuktalik, Bryan Kudlak, Stephen Joss, Noah Akhiatak, Lena Egotak, Robert Kuptana, Margaret and David Kanayok, Derek Ogina, upper half (~200 m) of the formation is exposed in the map area. Jack Alanak, Justine Okheena, Ashley Kagyut, Angus Banksland, and Ryan Oliktuak. C.W. Jefferson is thanked for an informed and Contact; depositional, depositional-conformable or intrusive / Approximate Inferred Contact; depositional-unconformable ∠ ✓ ✓ Approximate رم^{۲۱۲}۲۲۲۲۲٬۰۲۲ Inferred Fault, generic; steep dip ——— Defined ———· Approximate ····· Inferred or concealed Fault, normal; upright ____ Defined — — — · Approximate Le sous-sol du feuillet 87-G/10 (Winter Cove Bay) ainsi ····I Inferred or concealed que de la partie sud du feuillet 87-G/15 du SNRC est principalement constitué de roches sédimentaires du Station location Supergroupe de Shaler du Néoprotérozoïque, qui comprennent des calcaires et des dolomies des Ground observation formations de Boot Inlet et de Jago Bay, des arénites quartzeuses de la Formation de Fort Collinson et des Planar structure évaporites gypseuses de la Formation de Minto Inlet. Les roches sédimentaires sont injectées de filonscouches et de dykes basaltiques d'un âge correspondant à celui de l'événement de Franklin (env. 720 Ma), qui se divisent en intrusions de type 1, plus WALKERanciennes et plus riches en olivine, et en intrusions de Intrusive contact type 2, plus récentes et à texture diabasique ou porphyrique à feldspath. Les strates reposent à plat ou s'inclinent faiblement vers le nord ou le sud, de part et d'autre de l'anticlinal de Walker Bay. Des pendages plus abrupts sont observés près de failles en raison d'un entraînement structural. Une discordance régionale sépare les roches détritiques et les roches carbonatées du Paléozoïque présentes au nord des roches du Protérozoïque sous-jacentes que l'on trouve au sud, mais le contact est souvent faillé et des domaines isolés Glacial striation or groove de roches du Paléozoïque ont été conservés dans des grabens. Des failles normales de direction nord-nord-REFERENCES ouest (failles synmagmatiques du Protérozoïque) et de direction est-nord-est (failles du Phanérozoïque) sont Baragar, W.R.A., 1976. The Natkusiak basalts, Victoria Island, District of Franklin; in Current Research, Part A; omniprésentes et produisent une mosaïque Geological Survey of Canada, Paper 76-1A, p. 347-352. d'affleurements constituée de blocs polygonaux. Bédard, J.H., Naslund, H.R., Nabelek, P., Winpenny, A., Hryciuk, M., Macdonald, W., Hayes, B., Steigerwaldt, K., Hadlari, T., Rainbird, R., Dewing, K., and Girard, É., 2012. Fault-mediated melt ascent in a Neoproterozoic continental flood basalt province, the Franklin sills, Victoria Island, Canada; Geological Society of America Bulletin, v. 124, p. 723–736. doi:10.1130/B30450.1 Campbell, F.H.A., 1981. 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Thomson, as part of Natural Resources Canada's Geo-mapping for Elevations in metres above mean sea level The Geological Survey of Canada welcomes **Geoscience Maps** Energy and Minerals (GEM) program. corrections or additional information from users. J. Prince, B. Hayes, N. Williamson, M. Hryciuk, K. Steigerwaldt, J.C. Carpenter, A. Winpenny, G. Lafond, L.J. Hulbert, P. Behnia, Shaded relief image derived from the digital elevation Victoria Island, Northwest Territories K. Dewing, T. Hadlari, T. Dell'Oro, A.M. Durbano, Natural Resources Logistical support provided by the Polar Continental Shelf Program Data may include additional observations not portrayed on this map. model supplied by GeoBase. as part of its mandate to promote scientific research in the Illumination: azimuth 225°, altitude 45°, vertical factor 1x Canada; H.R. Naslund, W.M. MacDonald, Binghamton University; See documentation accompanying the data. Preliminary publications in L. Ootes, Northwest Territories Geoscience Office: B. Krapez. Canadian north. PCSP 005-10 this series have not been Proximity to the North Magnetic Pole causes the magnetic Curtin University; B. Pratt, University of Saskatchewan, This publication is available for free download through GEOSCAN **CANADIAN GEOSCIENCE MAP 193** scientifically edited. Map projection Universal Transverse Mercator, zone 11. 2008–2011, with compilation of earlier work. compass to be erratic in this area. (http://geoscan.nrcan.gc.ca/). North American Datum 1983 Magnetic declination 2015, 20°17'E, decreasing 46.8' annually. Geomatics by É. Girard **WINTER COVE BAY**

Victoria Island, Northwest Territories

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Cartography by N. Côté

undiagnostic of magmatic affinity.

constructive review. This is a GEM1 product.

NTS 87-G/10 (Winter Cove Bay) and the southern part

Shaler Supergroup sedimentary rocks, with limestone

formations, quartz arenite of the Fort Collinson

Formation, and gypsum evaporite of the Minto Inlet

Formation. Sedimentary rocks are injected by basaltic

sills and dykes of Franklin age (ca. 720 Ma) that can be

divided into older, more olivine rich Type 1 intrusions

and younger diabasic to feldspar-porphyritic Type 2

intrusions. Strata are either flat-lying, or dip gently to the

north or south to either side of the Walker Bay Anticline.

Steeper bedding orientations occur near faults as a

result of structural entrainment. A regional-scale

unconformity separates Paleozoic clastic and carbonate

rocks in the north from underlying Proterozoic rocks to

domains of Paleozoic rocks are preserved within

graben. North-northwest-trending syn-magmatic

(Proterozoic) and east-northeast-trending (Phanerozoic)

normal faults are ubiquitous, breaking up the outcrop

pattern into a series of polygonal blocks.

NW-trending fault offsets sill/limestone contact.

A. Winpenny. 2014-146

GEOLOGY

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Victoria Island, Northwest Territories. Photograph by

WINTER COVE BAY

Victoria Island, Northwest Territories

the south, but the contact is often faulted, and isolated

of NTS 87-G/15 are mostly underlain by Neoproterozoic

and dolostone of the Boot Inlet and Jago Bay