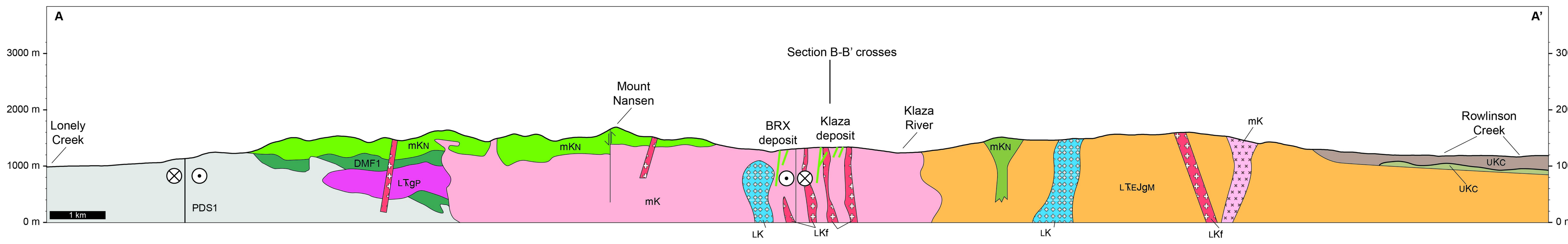


SYMBOLS

geologic contacts (defined, approximate, inferred, covered)...

fault; movement not known (defined, approximate, inferred, covered)...

dextral strike-slip fault (defined, approximate, inferred, covered)...

normal fault (defined, approximate, inferred).................

fault movement towards (L) and away (R) from section

jointing...

bedding or flow layering.............................

foliation (dominant)....................................

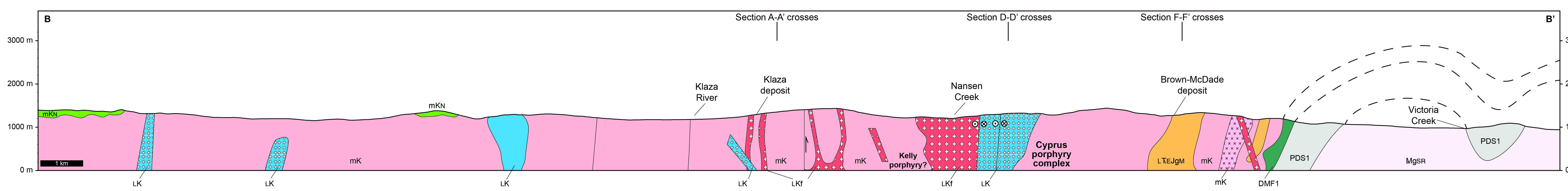
limit of outcrop, subcrop and felsenmeer...

radiometric date ($^{238}U/^{206}Pb$, $^{187}Re/^{187}Os$, $^{40}Ar/^{39}Ar$; age in Ma, ± 2s) [Zrn = zircon; Ttn = titanite; Cal = calcite; Mo = molybdenite; Hbl = hornblende; Bt = biotite; Kfs = K-feldspar; Ms = muscovite].................. ● 351 ± 1 ■ 71.0 ± 0.3 ▲ 195.2 ± 0.8

field station (this study)...............................

road (maintained, unmaintained, quad trail).

placer gold creek (major gold bearing stream, proven or high potential to be gold bearing)



LEGEND EXPLANATION

PLUTONIC SUITES: grouping of plutonic rock units based on age, regional distribution and/or composition

LAYERED ROCK ASSEMBLAGES: regionally mappable units generally of Group or Formation rank

PALEOGENE

Rhyolite Creek

PRC1 — felsic rocks; tan to cream rhyolite to rhyodacite dikes, flows, sills, crystal and ash tuff; smoky quartz±feldspar porphyritic; locally flow-banded

LATE CRETACEOUS

Prospector Mountain suite (LK)

LKdP — pyroxene±biotite porphyritic monzodiorite to monzogabbro; brown to black weathered and fresh, massive, medium grained, melanocratic; equivalent to uKCg of Colpron et al. (2007)

LKfPp — quartz-plagioclase-biotite porphyritic quartz latite; pink weathered and fresh

LKfxPp — intrusive breccia; light grey to orange-weathered, heterolithic, clast-supported breccia containing subangular to rounded sand to pebble-sized clasts of light grey porphyritic rocks in a fine-grained cream to pink matrix; locally quartz-sericite-pyrite altered; hypogene mineralization associated with the Cyprus porphyry complex contains chalcopyrite-pyrite ± molybdenite and is ca. 71 Ma (Selby et al., 2001; Lee, 2021)

LKyP — biotite±hornblende quartz syenite to quartz monzonite; pink weathering, pink fresh, fine-grained equigranular; ca. 70 Ma (Allan and Friend, 2018)

Casino suite (LKf)

LKfCp — rhyolite to dacite dikes and plugs; light grey to orange-weathered, typically light grey fresh; locally plagioclase-quartz porphyritic with plagioclase>quartz; plagioclase is white, 2-3 mm and subround, quartz is clear, 3-5 mm and angular to subround, commonly embayed

LKfcP — rhyolite to dacite dikes and plugs; light grey to orange-weathered, typically light grey fresh

UPPER CRETACEOUS

Carmacks Group (uKC)

uKC1 — pyroxene±olivine porphyrytic basalt flows; dark red to brown weathered; dark green fresh; may include gabbro and monzonite bodies of LKdP

uKC4 — andesite flows; andesite tuff, tuffaceous sediment and minor red weathering conglomerate; basal Carmacks unit, includes Caribou Creek conglomerate of Carlson (1987)

Tslansanlin Formation (uK)

uKmT — olivine basalt; chocolate brown weathered, massive, columnar-jointed; occurs in upper reaches of Bow Creek, near felsic Tslansanlin rocks (uKfT)

uKfT — rhyolite crystal tuff; flaggy, pale pink weathered, light grey fresh with 5-10% quartz shards; ca. 78 Ma (Allan and Friend, 2018)

EARLY CRETACEOUS

Whitehorse suite (mK)

mKgW3b — hornblende-plagioclase porphyritic intermediate dikes and plugs; 103.8 ± 0.5 Ma (Klöcking et al., 2016)

mKgW3a — hornblende±pyroxene diorite; fine-grained, equigranular; late or border phase of the Dawson Range batholith, best exposed in the vicinity of Slate Creek

mKgW2 — biotite-hornblende granodiorite; fine to medium-grained, equigranular; main phase of the Dawson Range batholith ca. 107 to 105 Ma (Klöcking et al., 2016; Mortensen et al., 2016)

mKfWp — rhyolite to dacite dikes and plugs; light grey to orange-weathered, typically light grey fresh; plagioclase-quartz porphyritic with plagioclase>quartz; plagioclase is white and commonly clay altered, quartz is clear, angular to subround and commonly embayed; at the Flex deposit, dikes of this lithology are altered by veins with a 108.5 Ma ± 0.5 Ma Re/Os molybdenite age. This lithology is very similar to LKfCp.

LOWER CRETACEOUS

Mount Nansen Goup (mKN)

mKNAaph — aphanitic to fine-grained, massive andesite; interpreted as feeder plugs to Nansen volcanic rocks, but could also be related to Carmacks volcanism

mKNFt — rhyolite tuff; aphanitic, light grey to buff weathered and fresh, densely welded

mKNFf — rhyolite breccia and flow-banded rhyolite; 107.4 ± 0.7 Ma (Klöcking et al., 2016)

mKNEb — epiclastic breccia

mKNAb — andesite breccia; dark green to brown weathered and dark green to black fresh, monomict with andesite groundmass; 115 to 112 Ma (Klöcking et al., 2016)

mKNAm — plagioclase-hornblende phyric andesite; dark green to black, massive, fine-grained; 115 to 112 Ma (Klöcking et al., 2016)

EARLY JURASSIC

Long Lake suite

EJyL — very coarse grained, crowded K-feldspar porphyritic hornblende monzonite to syenite; K-feldspar phenocrysts up to 5 cm. Only recognized in the Big Creek area, 185 to 184 Ma (Sack et al., 2020)

LATE TRIASSIC TO EARLY JURASSIC

Minto suite

LTrEJgM — K-feldspar porphyritic hornblende granodiorite; medium to coarse-grained, moderately foliated to unfoliated; ca. 197 to 196 Ma (Sack et al., 2020; Bennett, unpublished)

LTrEJgM1 — hornblende granodiorite; medium to coarse-grained, moderately foliated to unfoliated, equigranular; best exposed on eastern margin of plutons; presumably ca. 197 to 196 Ma based on association with LTrEJgM

LATE TRIASSIC

Pyroxene Mountain suite

LTrgP — hornblende±biotite tonalite; medium-grained, weakly foliated, equigranular; ca. 211 Ma (Klöcking et al., 2016)

YUKON-TANANA TERRANE

PERMIAN

Sulphur Creek suite

PgS — fine-grained monzogranite; grey to pink weathered, moderately foliated to gneissic; sparsely K-feldspar and quartz porphyritic

DEVONIAN TO MISSISSIPPIAN

Simpson Range suite

MgSR — biotite±hornblende metagranodiorite; light grey to orange weathered and light grey fresh, foliated; local feldspar augen; locally well foliated and difficult to distinguish from quartzofeldspathic Snowcap rocks; 365 to 350 Ma (Joyce et al., 2020)

Finlayson assemblage

DMF2 — felsic schist; pale yellow-orange weathered; fine-grained; ca. 348 Ma (Joyce et al., 2020); includes up to 10s of m of black, graphitic schist

DMF1 — amphibolite; dark green; strongly foliated and locally compositionally layered; generally schistose, locally gneissic; micaceous relative to the Snowcap amphibolite (PDS3)

PROTEROZOIC TO DEVONIAN?

Snowcap assemblage

PDS3 — amphibolite; dark green weathered and fresh; fine to medium-grained, equigranular and foliated

PDS1 — quartzite and schist; grey to white quartzite, micaceous quartzite and quartz-muscovite-biotite (± garnet) schist; strongly foliated and layered; locally forms a quartzofeldspathic gneiss difficult to distinguish from Simpson Range metagranitoid (MgSR)

NOTES

This map presents a compilation and re-interpretation of the bedrock geology in the Mount Nansen area. A total of 40 days of 1:25 000 mapping was conducted in 2019 and 2020 in the Mount Nansen porphyry district. The Mount Nansen porphyry district is herein defined as the area of historic placer gold and hard rock gold-silver production centred on the headwaters of the East Fork of Nansen Creek. The majority of MINFILE occurrences in the district are within a 12 x 6 km, northwest elongate area (Hart and Langdon, 1997) shown at 1:20 000 on sheet 2. In the northwestern part of the district, vein and porphyry mineralization was related to Late Cretaceous porphyritic rocks of the Casino and Prospector Mountain suites. Mineralization in the southeastern part of the district appears to have been primarily related to Early Cretaceous porphyritic dikes and plugs.

Our mapping is combined with previously undigitized 1:30 000 (published at 1:50 0000) bedrock mapping by Carlson (1987), 1:15 000 mapping by Klöcking et al. (2016) and 1:100 000 mapping by Ryan et al. (2016; 2018); see geological map sources inset for coverage of these maps. In addition, this map takes into consideration an unpublished reinterpretation of Carlson (1987) by Craig Hart. Company geologic data are taken from Stroshein (1999) for the Brown-McDade deposit [115I 064], Andersen and Stroshein (1998) for the Flex deposit [115I 137], Sawyer and Dickinson (1976) for the Cyprus porphyry complex [115I 066 and 140] and unpublished data from Rockhaven Resources for the Klaza deposits [115I 067 and 150]. Veins and breccia bodies, shown on sheet 2, are taken from Walls and Eaton (1987), Stroshein (1999) and Sawyer and Dickinson (1976) with locations refined using satellite imagery taken in 2013; classification of these bodies into defined or approximate are not NI 43-101 compliant but rather represent confidence similar to that for contacts and faults. Description of MINFILE occurrences (YGS, 2020a) are modified from Hart and Langdon (1997).

Uranium-lead, $^{187}Re/^{187}Os$, $^{40}Ar/^{39}Ar$ and $^{40}K/^{40}Ar$ geochronological data are from this study, Lee (2021) and the Yukon geochronology database (YGS, 2020b). The location of approximately 20 samples in YGS (2020b) were modified based on field checks and location notes in the database; geochronological samples which could not be confidently located are omitted. Previously published Rb/Sr dating results are not included as they are largely superseded by more accurate $^{40}Ar/^{39}Ar$ and U-Pb data.

The Mount Nansen area lies within the most extensive (pre-Reid) glacial limit in Yukon, and just beyond the penultimate (Reid) glacial limit (glacial limits inset map; Duk-Rodkin, 1999). The majority of the study area is underlain by material derived from bedrock immediately below or upslope, i.e., colluvium (Jackson, 1997); well exposed bedrock is restricted to ridges and mountain tops (Carlson, 1987). Significant thicknesses of eolian sand deposited in the Nansen and Victoria creek valleys is associated with the Reid glaciation, which reached its maximum extent immediately south and east of the study area ~160,000 years ago (Demuro et al., 2012). The surficial geology displayed on the map is simplified from Jackson (1997) but due to discrepancies in the original map, a 140 m shift to the west has been applied. Placer potential for creeks is modified from Lipovsky et al. (2001).

The Mount Nansen porphyry district comprises a basement of Late Triassic to Early Jurassic plutonic rocks that intrude Paleozoic metamorphic rocks. Early (ca. 115 to 104 Ma) and Late (ca. 78 to 68 Ma) Cretaceous volcanic-plutonic complexes were subsequently built on this basement. Porphyry system mineralization (epithermal, porphyry and undivided vein/breccia deposit styles) was associated with both Cretaceous magmatic events. A new Re/Os molybdenite age of 108.5 Ma ± 0.5 Ma from the Flex deposit supports previous interpretations of 'mid-Cretaceous' mineralization for these veins (Mortensen et al., 2016). Another new Re/Os molybdenite age of 76.3 ± 0.4 Ma supports previous interpretations of Selby and Creaser (2001) and Lee (2021) for Late Cretaceous mineralization associated with the Cyprus porphyry complex. A mineralization age for the past-producing Webber [115I 065] and Brown-McDade deposits is not clear, though proximity with, and similarity to the Flex deposit suggest they are Early Cretaceous. The location of several MINFILE occurrences YGS (2020b) have been updated on this map (e.g., Huestis, Eliza South, Klaza).

Dikes are steeply dipping. Early Cretaceous Whitehorse suite dikes mostly strike east, Late Cretaceous dikes form conjugate sets striking northwest and north to northeast. Fault interpretations are primarily based on bedrock mapping, with fault traces extended using compiled and leveled geophysics (Aurora Geosciences and Bruce, 2020). Faults are primarily steep and oriented northeast; they show sinistral strike-slip and vertical movement. Faults are interpreted, in part, to truncate the youngest units on the map suggesting the latest movement is Late Cretaceous or younger.

REFERENCES

Allan, M.A. and Friend, M., 2018. Bedrock geological map of the Mount Freegold district, Dawson Range (NTS 115I/6 and parts of 115I/2,3,5,7,10,11,12). Yukon Geological Survey, Open File 2018-2, scale 1:50 000.

Andersen, F. and Stroshein, R., 1998. Geology of the Flex gold-silver vein system, Mount Nansen area, Yukon In: Yukon Exploration and Geology 1997, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 139-143.

Aurora Geoscience Ltd. and Bruce, J.O., 2020. Residual total magnetic field, shaded colour contour map (NTS 115I). In: Reprocessing of Yukon magnetic data for NTS 115I. Yukon Geological Survey, Open File 2020-33, sheet 2 of 4.

Carlson, G.G., 1987. Geology of Mount Nansen (115-I/3) and Stoddart Creek (115-I/6) map areas Dawson Range, central Yukon. Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, Open File 1987-2, 194 p.

Colpron, M., Gordey, S., Lowey, G., White, D. and Piercey, S., 2007. Geology of the northern Whitehorse trough, Yukon (105E/12, 13 and parts of 11 and 14; 105L/4 and parts of 3 and 5; parts of 115H/9 and 16; 115I/1 and part of 8). Yukon Geological Survey, 2007-6, scale 1:150 000.

Demuro, M., Froese, D.G., Arnold, L.J. and Roberts, R.G., 2012. Single-grain OSL dating of glaciofluvial quartz constrains Reid glaciation in NW Canada to MIS 6. Quaternary Research, vol. 77, p. 305-316.

Duk-Rodkin, A., 1999. Glacial limits map of Yukon. Indian and Northern Affairs Canada/Department of Indian and Northern Development: Exploration & Geological Services Division, Geoscience Map 1999-2, scale 1:1 000 000.

Hart, C.J.R. and Langdon, M., 1997. Geology and mineral deposits of the Mount Nansen camp, Yukon. In: Yukon Exploration and Geology 1997, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 129-138.

Jackson, J.L.E., 1997. Surficial geology, Victoria Creek, Yukon Territory. Geological Survey of Canada, Map 1876A,
scale 1:100 000.

Joyce, N.L., Ryan, J.J., Colpron, M., Hart, C.J.R. and Murphy, D.C., 2015. A compilation of $^{40}Ar/^{39}Ar$ age determinations for igneous and metamorphic rocks, and mineral occurrences from central and southeast Yukon. Geological Survey of Canada, Open File 7924

Joyce, N.L., Iraheta Muniz, P., Rayner, N.M. and Ryan, J.J., 2020. Geochronology of the Mount Nansen-Nisling River area, Yukon. Geological Survey of Canada, Open File 8614, 28 p.

Klöcking, M., Mills, L., Mortensen, J. and Roots, C., 2016. Geology of mid-Cretaceous volcanic rocks at Mount Nansen, central Yukon, and their relationship to the Dawson Range batholith. Yukon Geological Survey, Open File 2016-25, 37 p.

Lee, W.-S., 2021. Metallogeny and characterization of Late Cretaceous superimposed porphyry Cu-Au-Mo and epithermal Au-Ag systems in the Dawson Range, Yukon, Canada: Case study on the Klaza deposit. Unpublished PhD thesis, Laurentian University, Sudbury, Ontario, Canada.

Lee, W.-S., Kontak, D.J., Richards, J.P. and Sack, P., 2020. Updated geology and porphyry copper potential of the Klaza deposit, Mount Nansen district (Yukon MINFILE 115I 067). In: Yukon Exploration and Geology 2019, K.E. MacFarlane (ed.), Yukon Geological Survey, p. 75-97.

Lipovsky, P., LeBarge, W., Bond, J. and Lowey, G., 2001. Yukon placer activity map. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 2001-34, 1 sheet.

Mortensen, J.K., Hart, C.J.R., Tarswell, J. and Allan, M.M., 2016. U-Pb zircon age and Pb isotopic constraints on the age and origin of porphyry and epithermal vein mineralization in the eastern Dawson Range, Yukon. In: Yukon Exploration Geology 2015, K.E. MacFarlane and M.G. Nordling (eds.), Yukon Geological Survey, p. 165-185, including appendices.

Ryan, J.J., Israel, S., Williams, S.P., Parsons, A.J. and Hayward, N., 2018. Bedrock geology, Klaza River area, Yukon. Geological Survey of Canada, Canadian Geoscience Map 376, 1 sheet, scale 1:100 000.

Ryan, J.J., Westberg, E.E., Williams, S.P. and Chapman, J.B., 2016. Geology, Mount Nansen - Nisling River area, Yukon. Geological Survey of Canada, Canadian Geoscience Map 292 (ed. prelim.), 1 sheet, scale 1:100 000.

Sawyer, J.P.B. and Dickinson, R.A., 1976. Mount Nansen. In: Porphyry deposits of the Canadian Cordillera, S.A. Brown (ed.), The Canadian Institute of Mining and Metallurgy, p. 336-343.

Selby, D. and Creaser, R.A., 2001. Late and mid-Cretaceous mineralization in the northern Canadian Cordillera: Constraints from Re-Os molybdenite dates. Economic Geology, vol. 96, no. 6, p. 1461-1467.

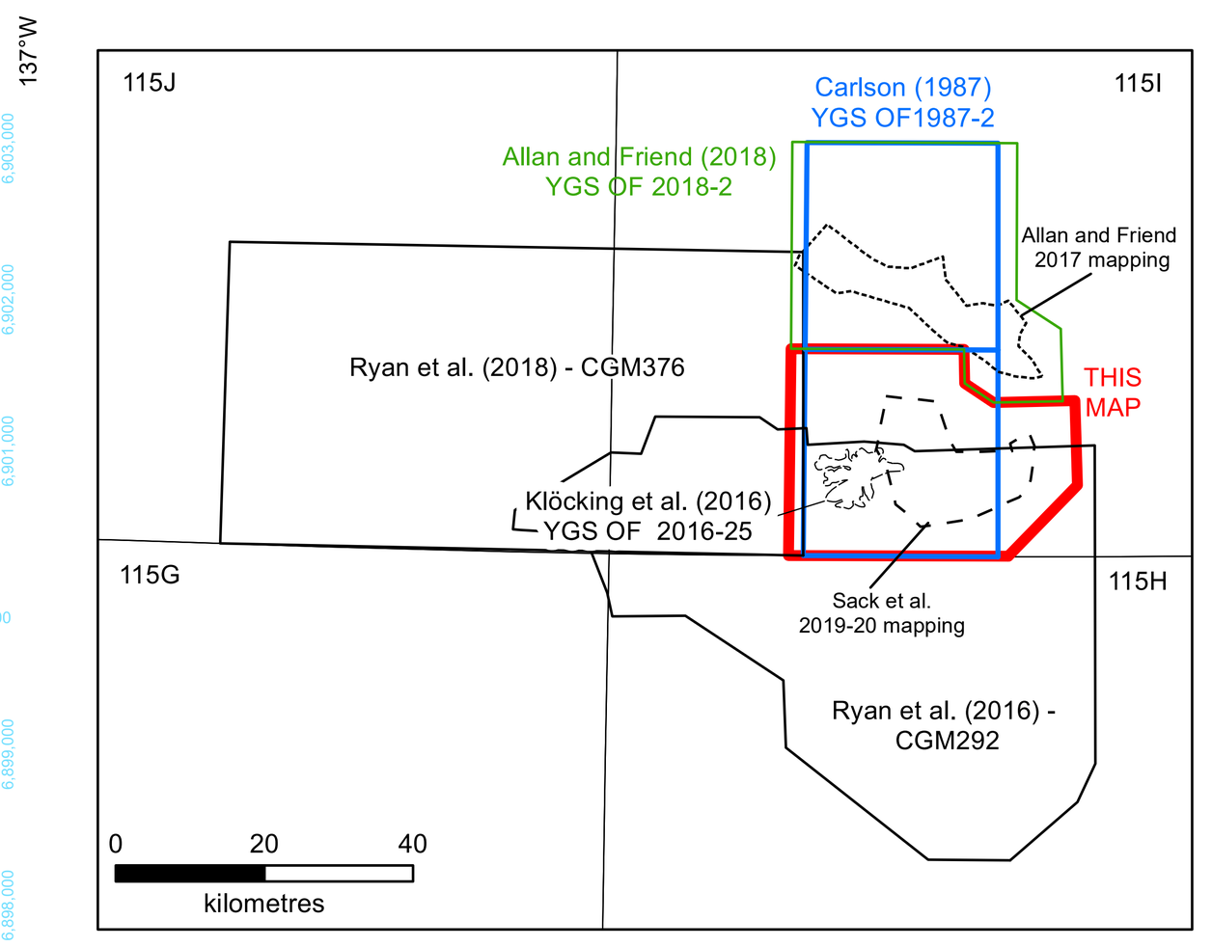
Stroshein, R., 1999. A summary report on the geology of the Brown-McDade gold-silver deposit, Mount Nansen mine area, Yukon. In: Yukon Exploration and Geology 1998, C.F. Roots and D.S. Emond (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 231-236.

Turner, M. and Dumala, M., 2017. The Klaza Project: An expanding high-grade gold and silver resource in the Mount Nansen gold camp (Yukon MINFILE 115I067). In: Yukon Exploration and Geology Overview 2016, K.E. MacFarlane (ed.), Yukon Geological Survey, p. 89-96.

Walls, M.J. and Eaton, W.D., 1987. Nansen Project: Final Report. Yukon Mining Assessment Report 092122.

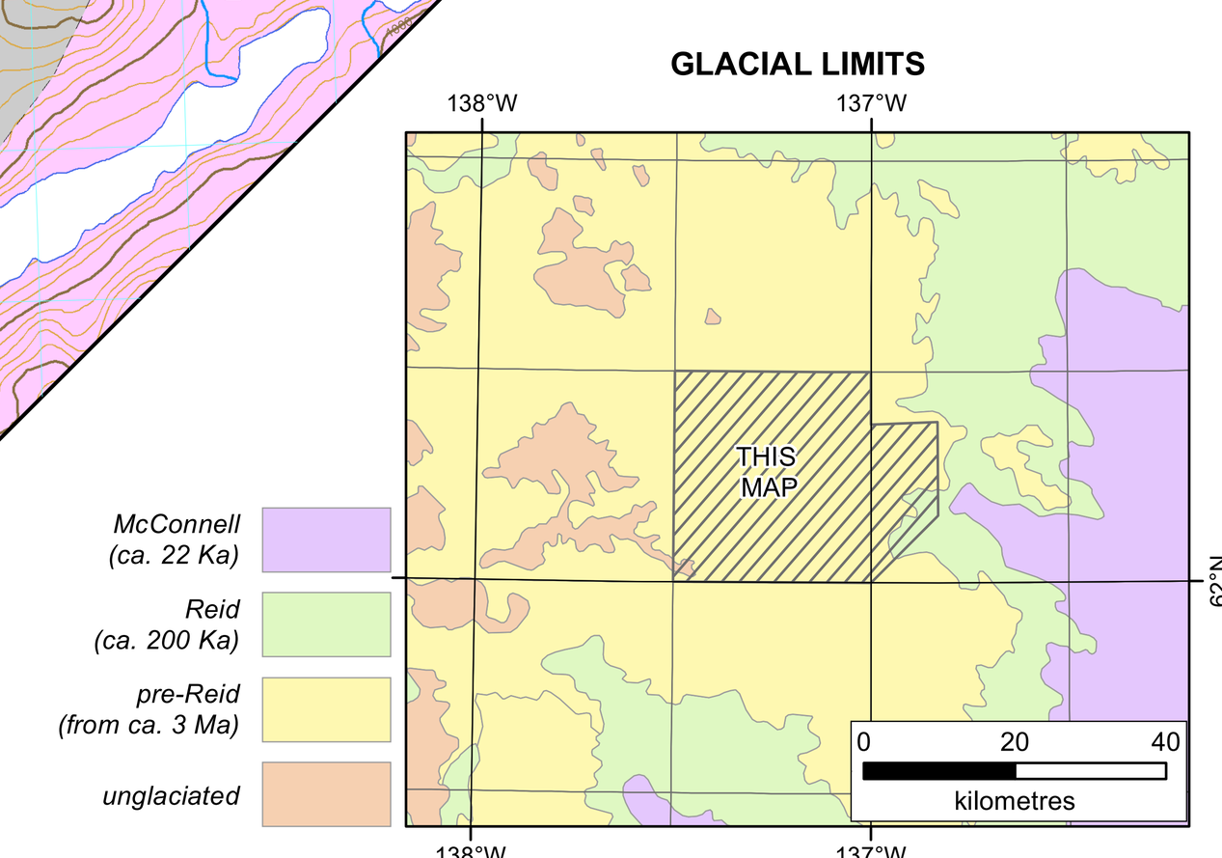
Yukon Geological Survey, 2020a. Yukon MINFILE - A database of mineral occurrences data.geology.gov.yk.ca [accessed November 3, 2020].

Yukon Geological Survey, 2020b. Yukon geochronology database ftp.geomaticsyukon.ca/GeoYukon/Geological/Geochronology/Geochronology.shp.zip [accessed February 17, 2020].



GEOLOGICAL MAP SOURCES

GLACIAL LIMITS



Digital cartography and drafting by Patrick Sack, Yukon Geological Survey.

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

A paper copy of this map may be obtained from the Yukon Geological Survey, Energy, Mines and Resources, Government of Yukon, Room 102, 300 Main Street, Whitehorse, Yukon, Y1A 2B5. Email: geology@yukon.ca

A digital PDF (Portable Document File) of this map may be accessed free of charge from the Yukon Geological Survey website: yukon.ca/science-and-natural-resources/geology

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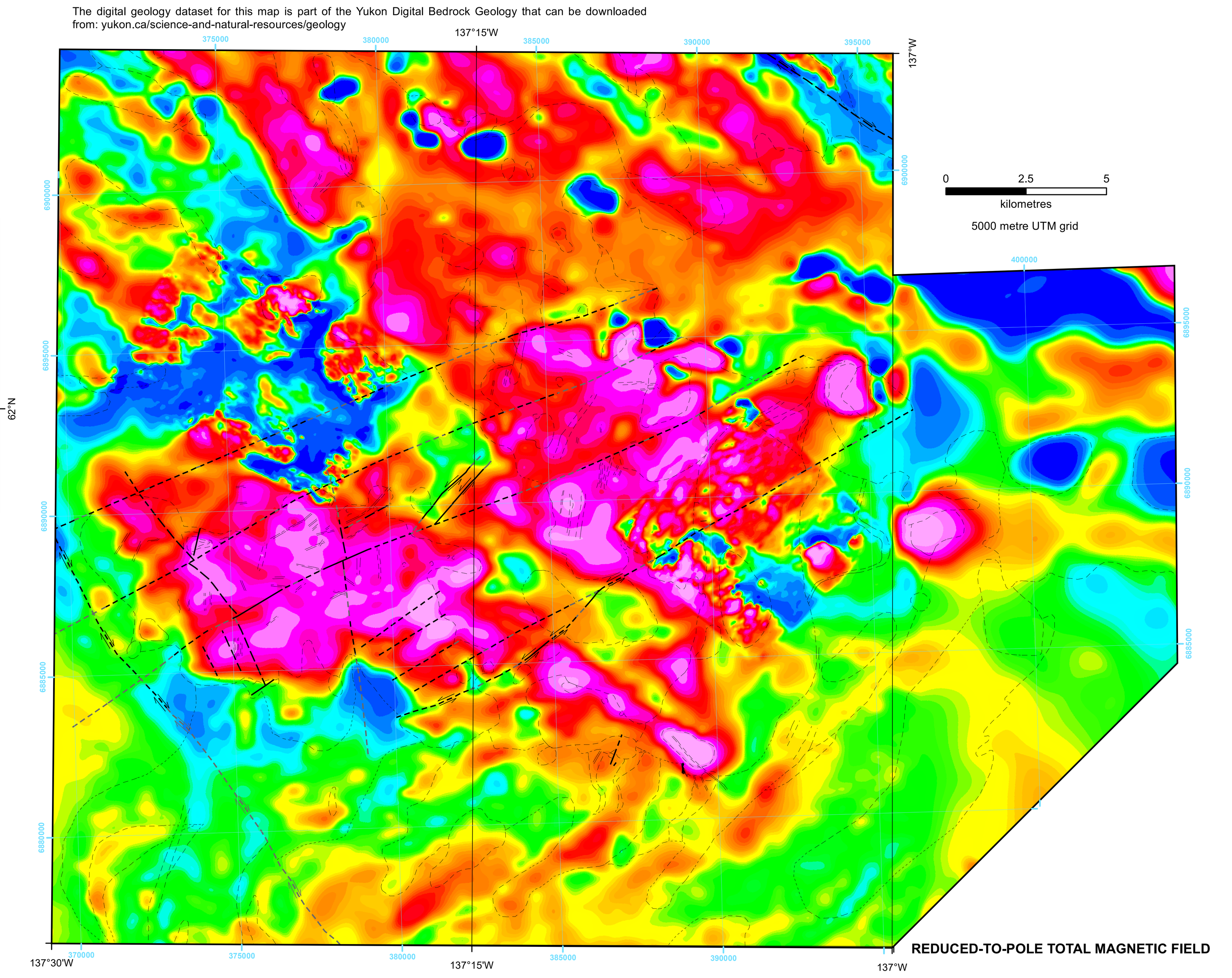
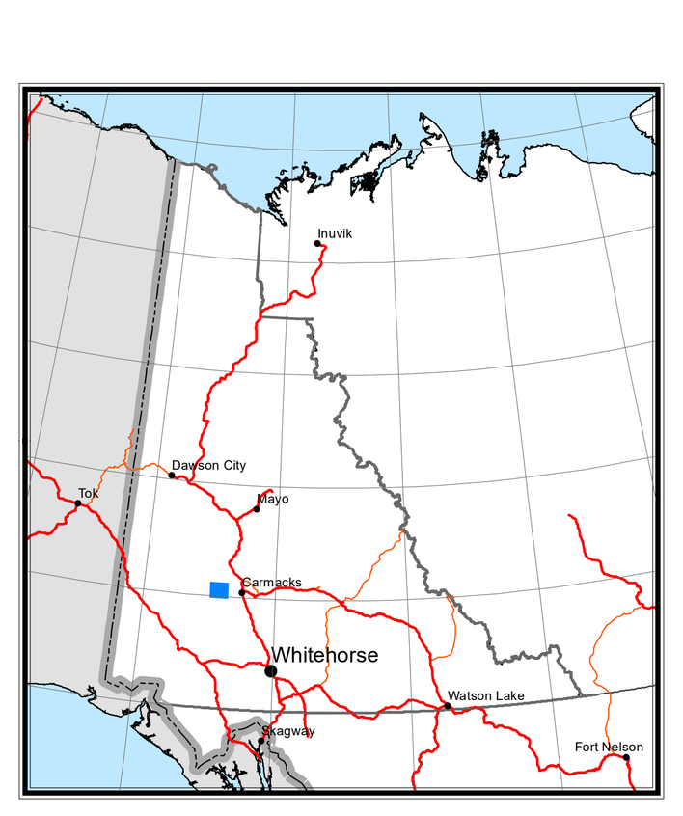
RECOMMENDED CITATION

Sack, P.J., Eriks, N. and van Loon S., 2021. Revised geological map of Mount Nansen area (NTS 115I/3 and part of 115I/2). Yukon Geological Survey, Open File 2021-2, 2 sheets; sheet 1 scale 1:50 000, sheet 2 scale 1:20 000.



REDUCED-TO-POLE TOTAL MAGNETIC FIELD



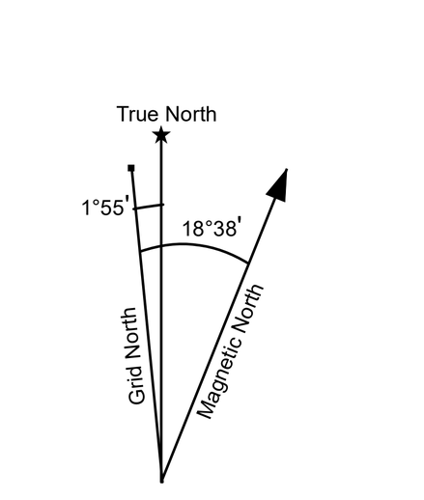
ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 8

BEDROCK GEOLOGY
MOUNT NANSEN
YUKON

SCALE 1:50 000

0 1 2 3 4 5
Kilometres

CONTOUR INTERVAL 20 metres
Elevation in metres above mean sea level



Use diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION 2020
FOR CENTRE OF MAP

115I/5 PROSPECTOR MOUNTAIN	115I/6 STODDART CREEK	115I/7 MERRICE LAKE
115I/4 FALSE TEETH CREEK	115I/3 THIS MAP	115I/2 ROWLINSON CREEK
115H/13 SCHIST CREEK	115H/14 MACKINTOSH CREEK	115H/15 UPPER NISLING RIVER

Yukon

Yukon Geological Survey
Energy, Mines and Resources
Government of Yukon

Open File 2021-2

Revised geological map of Mount Nansen area (NTS 115I/3 and part of 115I/2) (scale 1:50 000) Sheet 1 of 2

by

Patrick Sack, Nicole Eriks and Sydney van Loon