

INTRODUCTION

New geochemical data from re-analysis of archived stream sediment samples have been assessed using weighted sums modeling and catchment basin analysis as described in the methodology report that accompanies this map (Mackie et al., 2015). Both commodity and pathfinder element abundances are evaluated to highlight areas that show geochemical responses consistent with a variety of base and precious-metal mineral deposit types.

SAMPLING AND ANALYSIS PROGRAMS

Stream sediment and water samples from the Tay River map area (NTS 105K) were collected at a reconnaissance scale in 1988 and 1989 as part of the Canada-Yukon Mineral Development Agreement (Friske and Hornbrook, 1989; Friske et al., 1990). Field descriptions and initial geochemical data for 940 sites were released in Geological Survey of Canada ("GSC") open files 1961 (473 sites) and 2174 (467 sites).

MINERAL OCCURRENCES

A variety of types of base and precious-metal mineralization are known to occur in the Tay River area as shown in Table 1 (Yukon MINFILE, 2015). These include sedimentary exhalative Zn-Pb-Ag (past-producing Faro, Vandora and Grum mines); and Swim and Dy deposits and epithermal Au-Ag (Grew Creek) deposits. Polymetallic vein, Pb-Zn skarn, Cu skarn, intrusion-related Au and volcanogenic Zn-Pb-Ag-Cu-Au and Cu-Co massive sulphide mineralization are also documented within the map area.

WEIGHTED SUMS MODELING

As described in the methodology report (Mackie et al., 2015), two approaches have been used to subdue the influence of background lithological variation and secondary absorption on the composition of stream sediments. One uses data levelled by the dominant geology mapped within each catchment, while the other uses residuals calculated from

regression against selected principal components. Weighted sums models (WSM) have been generated using the processed data. The importance rankings used in WSMs are summarized in Table 2 for a variety of deposit types. Each model is optimized for a target deposit type however other deposit types may be represented in a given model due to similarities in elemental abundances and associated factors.

For certain pathfinder elements (e.g., As, Sb and Cd) levelled by dominant lithology did not fully subdue the interpreted stratigraphic control on the spatial distribution of these elements. In order to reduce this impact on the WSM these elements were given low importance rankings (or were omitted) for certain deposit types. Additionally, strong responses for Zn, Pb and Ag related to SEDEX and polymetallic vein mineralization prevented using these elements as pathfinders for other deposit types.

For example, negative rankings for Pb and Zn are used in the WSM for epithermal Au-Ag in order to reduce the contribution of Ag related to SEDEX mineralization. In the case of the WSM for porphyry copper, a negative ranking was assigned to Cd in order dampen a terrane effect (high Ag) in the north part of the map area.

The first principal component, accounting for ~34% of the total variation, shows high loadings for Se, S, Mo, Cd, Sb, Hg, Ag, Ba and Zn and forms a spatial trend that matches the distribution of the Road River and Earn Groups which contain shale horizons that are likely to be elevated in these metals. Similarly the second principal component, accounting for ~12% of the total variation, shows high loadings for Sb, As, Pb, Ni, Mo and Ag and forms a spatial trend matching the distribution of Tay, Mount Christie and Jones Lake formations which also contain shale.

Table 2: Importance rankings for weighted sums models using data levelled by dominant mapped geology.

Table with columns: Target Deposit Type, Other Deposit Types, and elements Mn, Fe, Co, Ni, Cu, Mo, Zn, Pb, Ag, Au, As, Ba, Cd, Sn, Sb, Te, Hg, Tl, Bi, W.

*Hydrothermal Anomaly
*SEDEX = sedimentary exhalative; VMS = volcanic-hosted/associated massive sulphide deposits; Polymetallic Ag-Pb-Zn includes both vein- and matrix-style.
* Cobalt residuals are used following regression against Fe. *Gold data are not levelled by dominant geology, instead log10 transformed raw data are used.

LEGEND
Town
Mineral Occurrence
Road
Contour
River
Water Body
Wetland
Sample Location
Catchment >10km²
Catchment
Weighted Sums Model (Geology Levelled)
SEDEX Zn-Pb-Ag Deposits
incomplete element suite
0-50th percentile
50-75th percentile
75-90th percentile
90-95th percentile
95-98th percentile
98-100th percentile

REFERENCES

Friske, P.W. and Hornbrook, E.H., 1989. National Geochemical Reconnaissance Stream Sediment and Water Geochemical Data, Central Yukon (106KW and 105L). Geological Survey of Canada, Open File 1961.
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Jackman, W., 2011. Regional Stream Sediment Geochemical Data, Tay River Area, Central Yukon (NTS 105K East). Yukon Geological Survey, Open File 2011-29.
Jackman, W., 2012. Regional Stream Sediment Geochemical Data, Glenlyon Area, Central Yukon (NTS 105K West & 105L). Yukon Geological Survey, Open File 2012-7.
Mackie, R., Arne, D. and Brown, O., 2015. Enhanced interpretation of regional stream sediment (RSG) geochemical data from Yukon: catchment basin analysis and weighted sums modeling. Yukon Geological Survey, Open File Report 2015-10.

Yukon MINFILE, 2015. Yukon MINFILE - A database of mineral occurrences. Yukon Geological Survey, www.data.geology.gov.yk.ca accessed May 2015.

RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND BROWN, O., 2015. Weighted sums model for SEDEX Zn-Pb-Ag deposits levelled by geology. In: Enhanced interpretation of stream sediment geochemical data for NTS 105K - Yukon Geological Survey, Open File 2015-25, scale 1:250 000, sheet 13 of 17

Catchment basin polygons generated by the Yukon Geological Survey (J. O. Bruce).

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

Paper copies of this map and the accompanying report may be purchased from the Yukon Geological Survey, Energy, Mines and Resources, Government of Yukon, Room 102-300 Main St., Whitehorse, Yukon, Y1A 2B5. Ph. 867-667-3201, Email geology@gov.yk.ca.

A digital PDF (Portable Document File) file of this map may be downloaded free of charge from the Yukon Geological Survey website: http://www.geology.gov.yk.ca/

Table 1: List of Mineral Occurrences for NTS map sheet 105K (Yukon MINFILE, 2015)

Table with columns: Number, Name, Type, Status, Commodities. Lists 115 mineral occurrences including names like SHEENA, WOP, RAGS, DARC, DEELEY, SHONCAP, CITATION, MOURNE, GREW CREEK, FARGO, LHM, CASCA, THOMAS, TILLMAN, EYE, BRIDGE, FAN-TAN, TAKU, GLYN, NESBITT, SPIT, BOBCAT, GREEN VALLEY, HOLLY, ORCHALY, SOCK, SPUR, DOMO, LAD, WELD, TRUMP, LODGE, DARR, ADAMSON, TEL, BETA, BLIND, GENTIAN, CLUB, NASTY, ABRAHAM, BEA, BLACKWOOD, BEA, SWIM, WANN, ELBOW, ST. LUCE, OTCOONOR, BUBBLE, CIRQUE, ARSENO, SHRIMP, VANGORDA, GRUM, KILLAN, KIM, LO, TAY, FARO, FLAGSTONE, BRIDEN, JACOLA, CROWN, LEON, LORNA, RESEERVE, PARADOX, MARY, COWARD, PAGE, KWIKWETE, COLT, BLUE, HOOT, OWL, KEG, IVAN, SHANNON, COMPLICATION, TRY, REBEL, HAMMER, YETT, MARKS, TEDDY, SIROLA, ANDREW, MYSCHKA, EL PINO, GALWAY, PARLIAMENT, CESSNA, BUNBURY, JON, CHAPLIN, MOR, DY, SELLMER, TENAS, DEV, SIR JOHN A., KILN, WEEDKIND, LADY DI, PRINCE CHARLES, MT. MENZIE, UNION, STARLIGHT, PONTON, MULTI.

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Open File 2015-25

Weighted sums model for SEDEX Zn-Pb-Ag deposits levelled by mapped geology (NTS 105K) Sheet 13 of 17

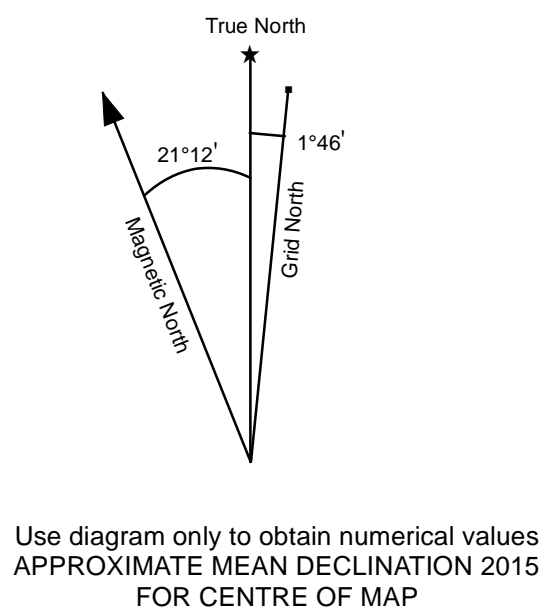
by

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1:250 000-scale topographic base data produced by CENTRE FOR TOPOGRAPHIC INFORMATION, NATURAL RESOURCES CANADA
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ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 8
CONTOUR INTERVAL 100 FEET
Elevations in metres above Mean Sea Level

SEDEX Zn-Pb-Ag Weighted sums model (Geology Levelled) Sheet 13 of 17

SCALE 1:250 000



Grid coordinate table with columns: 105M, 105N, 105O and rows: MAYO, LANSING RANGE, NIDDERY LAKE; GLENLYON, THIS MAP, SHELTON LAKE; LAKE LABERGE, QUIET LAKE, FINLAYSON LAKE.