

Zn-Pb-Cu VMS Weighted sums model (Principal Component Residuals) Sheet 11 of 13

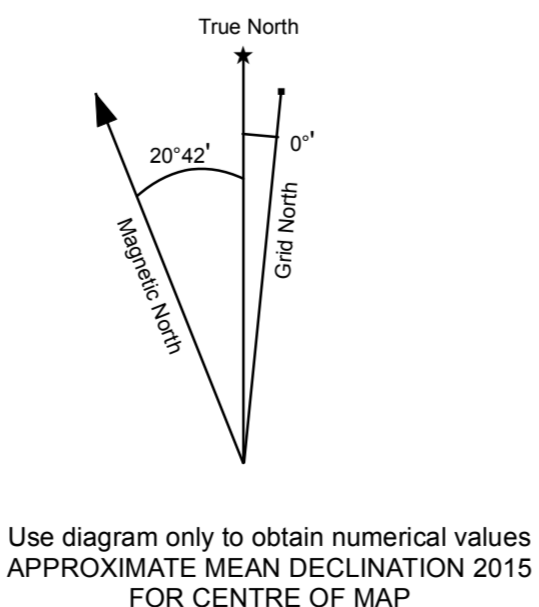
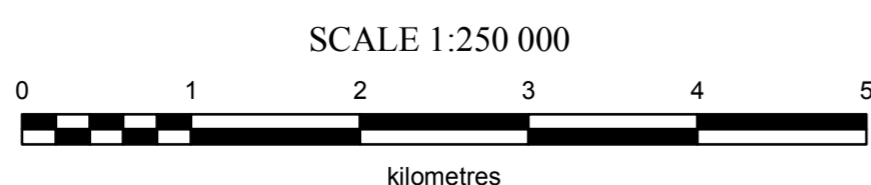


Table with 3 columns: Township (11S1, 11S4, 10SE), Range (105L, 105E, 105D), and Section (105K, 105F, 105C). The 105E range is highlighted as 'THIS MAP'.

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).

SAMPLING AND ANALYSIS PROGRAMS

Regional stream sediment and water samples from the Lake Laberge map area (NTS 105E) were collected at a reconnaissance scale in 1988 as part of the National Geochemical Reconnaissance program under the Canada-Yukon Mineral Development Agreement (Hornbrook & Friske, 1989).

MINERAL OCCURRENCES

A variety of types of base and precious-metal mineralization have been documented in the map area as summarized in Table 1 (Yukon MINFILE, 2015). The most notable occurrences are classed as Cu-Ag-Pb-Zn skarn (Laberge prospect: Dycer and D'Abadie showings).

WEIGHTED SUMS MODELING

As described in the report accompanying this map (Mackie et al., 2015), two approaches have been used to subdivide 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. The other uses residuals calculated from regression against principal components. Weighted sums models (WSM) have been generated using the processed data. Importance rankings used in the WSM for a variety of deposit types are summarized in Table 2. Each model is optimized for a specific deposit type however multiple deposit types may be represented in a given model due to similarities in elemental abundances and associations.

Exploratory data analysis of both raw element data and principal components shows that the distribution of many commodity and pathfinder elements is related to lithological variation. For example, the first principal component, accounting for ~27% of the total variation, shows high positive loadings for Sr, Ca, LOI, Se, Hg and Cu, and high negative loadings for Ce, Th, La, Li, Rb and Pb.

The effectiveness of historical sampling coverage has been assessed empirically using graphs of WSMs plotted against catchment surface area to determine the ideal maximum catchment size (12 km²). Catchments that cover larger areas (shown on the map with bold outlines) are interpreted to have been under-sampled and thus require further sampling to properly evaluate the area for geochemical anomalies.

Table 2: Importance rankings for weighted sums models using residuals on principal components.

Table with 13 columns: Target Deposit Type, Other Deposit Types, Mn, Fe, Co, Ni, Cu, Mo, Zn, Pb, Ag, Au, As, Ba, Cd, Sn, Sb, Te, Hg, Tl, Bi, W. The rows list various deposit types like Polymetallic Ag-Pb-Zn, VMS (Zn-rich), and Epithermal Au-Ag.

\*Polymetallic Ag-Pb-Zn type includes vein and manto styles; SEDEX = sedimentary exhalative; VMS = volcanic-hosted/associated massive sulphide deposits

†Raw data following a log10 transformation.

LEGEND

- Town, Mineral Occurrence, Road, Contour, River, Water Body, Wetland, Sample Location, Catchments > 12km². Weighted sums model (PC residuals) Zn-Pb-Cu VMS deposits: Incomplete element suite, 0-50th percentile, 50-75th percentile, 75-90th percentile, 90-95th percentile, 95-98th percentile, 98-100th percentile.

REFERENCES

Hornbrook, E.H. and Friske, P.W., 1989. National Geochemical Reconnaissance stream sediment and water geochemical data, southern central Yukon (105E). Geological Survey of Canada, Open File 1960.
Jackman, W., 2015. Regional stream sediment geochemical data, Lake Laberge area, southern Yukon (NTS 105E). Yukon Geological Survey, Open File 2015-7.
Mackie, R., Arne, D. and Brown, O., 2015. Enhanced interpretation of regional stream sediment geochemical data from Yukon: catchment basin analysis and weighted sums modeling. Yukon Geological Survey, Open File 2015-10.
Yukon MINFILE, 2010. Yukon MINFILE - A database of mineral occurrences. Yukon Geological Survey, www.data.geology.gov.yk.ca, accessed May 2015.

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

Table with 6 columns: Number, Name, Type, Status, Commodities. Lists 63 mineral occurrences such as Livingsston, TUV, Loon, Laberge, Ruth, Packers, Walsh, Semenov, Illusion, Cassier Bar, Sylvia, Corduroy, Mayne, Lori, Mustard, Bacon, Klusha, Salmon, Hitichens, Ovas, Enof, Lake, GERM, Preston, Rank, Deet, Dycer, Milner, Braburn Lime, Egypt, Richthofen, Reef, Slne, Rak, Nickeline, Dycer, Trefice, Crost, Napua, Srenda, Little Bear, Mendocna, Teraaktu, Fone, Debicki, Little Violet, Coughlan, D'Abadie, and Aurier.

RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND PENNIMPEDE, C., 2016. Weighted sums model for Zn-Pb-Cu VMS deposits using principal component residuals. In: Enhanced interpretation of stream sediment geochemical data for NTS 105E. Yukon Geological Survey, Open File 2016-9, scale 1:250 000, sheet 11 of 13.

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 obtained 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.

Yukon Geological Survey Energy, Mines and Resources Government of Yukon

Open File 2016-9

Weighted sums model for Zn-Pb-Cu VMS deposits using principal component residuals (NTS 105E) Sheet 11 of 13

by

Rob Mackie, Dennis Arne, and Chris Pennimpe