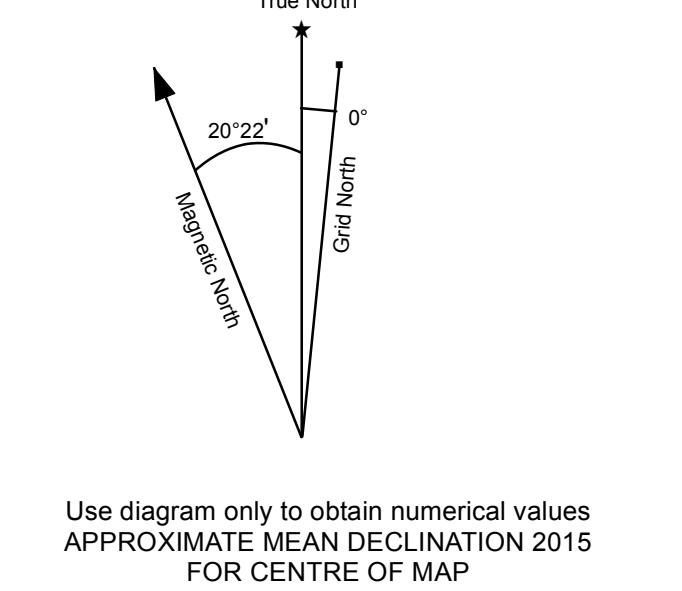


1:250 000-scale topographic base data produced by CENTRE FOR TOPOGRAPHIC INFORMATION, NATURAL RESOURCES CANADA. Copyright Her Majesty the Queen in Right of Canada. ONE THOUSAND METRE GRID Universal Transverse Mercator Projection North American Datum 1983 Zone 8. CONTOUR INTERVAL 100 FEET Elevations in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

Epithermal Au-Ag Weighted sums model (Principal Component Residuals) Sheet 8 of 13. SCALE 1:250 000. True North, Magnetic North, and Grid North diagrams showing a 20°22' declination.



Grid coordinate table with columns 11SH, 10SE, 10SF, 11SA, 10SD, 10SC, 11AP, 10AM, 10AN, 11AH, 10AD, 10AC, 11AP, 10AM, 10AN.

INTRODUCTION

New geochemical data from re-analysis of archived stream sediment samples have been assessed using weighted sums modeling and catchment 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 Whitehorse Area (NTS 105D) were collected at a reconnaissance scale in 1985 as part of the Canada-Yukon Mineral Development Agreement (Geological Survey of Canada, 1986). Field descriptions and initial geochemical data for 1003 sites were released in Geological Survey of Canada (GSC) Open File 1218.

MINERAL OCCURRENCES

A variety of types of base and precious-metal mineralization has been identified in the Whitehorse Area as listed in Table 1 (Yukon MINFILE, 2015). The most significant deposits are classed as Cu skarn (Past Producing Whitehorse Cu deposit), Epithermal Au-Ag (Past Producing Tally-Ho and Mount Skukum deposits), Polymetallic Ag-Pb-Zn-Au (Past Producing Union Mines, Venus and Big Thine deposits) and unclassified quartz-vein related Au (Rose, Charlson, Gold Hill, Arscott and Joe Creek prospects).

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. 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 associations. Importantly, the area of Cu skarn mineralization in the vicinity of Whitehorse, given the low topographic relief, has not been effectively sampled which limits the ability to validate the model presented for this deposit type.

Exploratory data analysis using both raw element data and principal components indicate that lithological variation and secondary scavenging influence the distribution of certain commodity and pathfinder elements. However for this map area, signals related to mineralization are also prevalent. The first principal component, accounting for ~30% of the total geochemical variation, has high positive loadings in Cr, Ni, Co, Mg, V, Cu and Sc; and high negative loadings in Y, La, Ce, U, Bi, Pb, Th, Mo, Rb and Ag. Spatially, these groupings match the mapped distribution of mafic and felsic rocks respectively. The second component with high positive loadings for As, Cd, Ag and Sb accounts for ~15% of the variation shows a spatial match with epithermal Au-Ag and polymetallic Ag-Pb-Zn occurrences indicating it represents a mineralization signal.

Regression analysis of selected metals against the relevant principal component(s) effectively filters the scavenging and lithological controls while preserving responses related to known occurrences. Levelling by mapped geology has a more subdued effect on filtering the interpreted lithological control on the distribution of certain pathfinder elements. In order to reduce the impact of this the WSMs, certain elements were given low importance rankings for certain deposit types. Negative rankings are used to help distinguish between deposit types with similar metal associations.

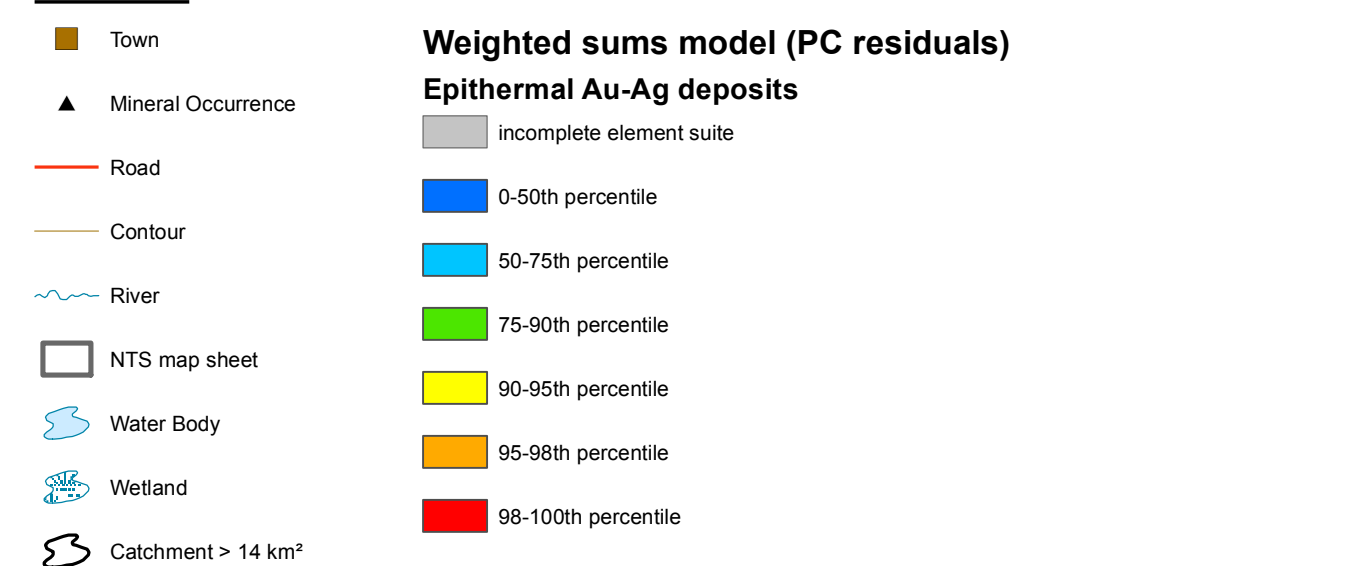
The effectiveness of historical sampling coverage has been assessed empirically using graphs of WSMs plotted against catchment surface area to determine the ideal maximum catchment size (14 km²). Catchments that cover larger areas (shown on the map with bold outlines) are interpreted to have been under-sampled and thus require further sampling to properly evaluate the area for geochemical anomalies. Given the likelihood that a mineralization signal would be progressively diluted with increasing catchment size, marginally high WSM scores in large catchments may also be of interest.

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

Table with columns: Target Deposit Type, Other Deposit Types, and 17 elements (Mn, Fe, Co, Ni, Cr, Mo, Zn, Pb, Ag, Au, As, Ba, Cd, Sn, Sb, Se, Te, Hg, Tl, Bi, W). The table shows numerical importance rankings for various deposit types across these elements.

*Polymetallic Ag-Pb-Zn type includes vein and manto styles; SEDEX = sedimentary exhalative Pb-Zn-(Ag); VMS = volcanoc-hosted/associated massive sulphide deposits. *Raw data following a log10 transformation.

LEGEND



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RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND PENNIMPEDE, C., 2016. Weighted sums model for Epithermal Au-Ag deposits using principal component residuals. In: Enhanced interpretation of stream sediment geochemical data for NTS map sheet 105D. Yukon Geological Survey, Open File 2016-26, scale 1:250 000, sheet 8 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) 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 105D (Yukon MINFILE, 2015)

Table with columns: Number, Name, Type, Status, Commodities. Lists numerous mineral occurrences across the region, including various types of copper, silver, lead, zinc, and other minerals.