

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. The results of modeling, completed using two approaches, are presented as a series of catchment maps and associated data files. This release is part of a regional assessment of stream sediment geochemistry that covers a large part of Yukon.

SAMPLING AND ANALYSIS PROGRAMS

Stream sediment and water samples from the Klutane Lake area (NTS 115F and part of 115G) were collected at a reconnaissance scale in 1980 as part of the Canada-Yukon Mineral Resource Development Cooperation Agreement (Geological Survey of Canada, 1987). Field descriptions and initial geochemical data for 1005 sites were released in Geological Survey of Canada (GSC) Open File 1362. New geochemical data from the re-analysis of archive sample material from 699 sites were released in Yukon Geological Survey (YGS) Open File 2012-15 (Jackaman, 2015). The discrepancy in number of sites between the two releases is because samples that occur within present limits of protected areas were not re-analyzed. The reader is referred to these reports for detailed descriptions of sampling techniques, analytical procedures and quality control measures.

MINERAL OCCURRENCES

A variety of types of base and precious-metal mineralization are known to occur in the Klutane Lake area as shown in Table 1 (Yukon MINFILE, 2015). The most significant deposits are classified as Cu-Ni-PGE (Wellgreen and Canalsak deposits), Cu-Mo porphyry (Rockslide and Raft prospects), Cu skarn (Am and Az prospects), and quartz vein Au (Berdahli prospect). The adjacent map area to the east (Ashihik Lake) contains several quartz vein-related Au occurrences (Mom, Shut and Lib prospects) that form a trend that projects towards the southeast corner of the Klutane map area supporting the prospectivity of the region for this type of mineralization.

WEIGHTED SUMS MODELING

As described in the methodology report (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, 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.

Exploratory data analysis using both raw element data and principal components indicate that the distribution of many commodity and pathfinder elements is strongly influenced by lithological variation. Additionally, there is evidence of scavenging of metals ions by secondary Fe- and Mn-oxides/hydroxides, clays, and/or organic material. The first principal component accounts for ~32% of the total geochemical variation and shows high positive loadings for Hg, Mo, LOI, Cd, Sb and Cu, and, using LOI as a proxy for carbon, is suggestive of scavenging by organic material. This interpretation is supported by the fact that the map pattern of inverse PC2 coincides with low-lying regions where accumulation of organic material and/or clay is likely. Regression analysis of selected metals against the relevant principal component(s) effectively filters these effects while preserving responses related to known occurrences. Leveling 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 this has on the WSM using this approach, certain elements were given low importance rankings or, in some cases, were omitted for certain deposit types.

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 (15 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 anomalism. 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.

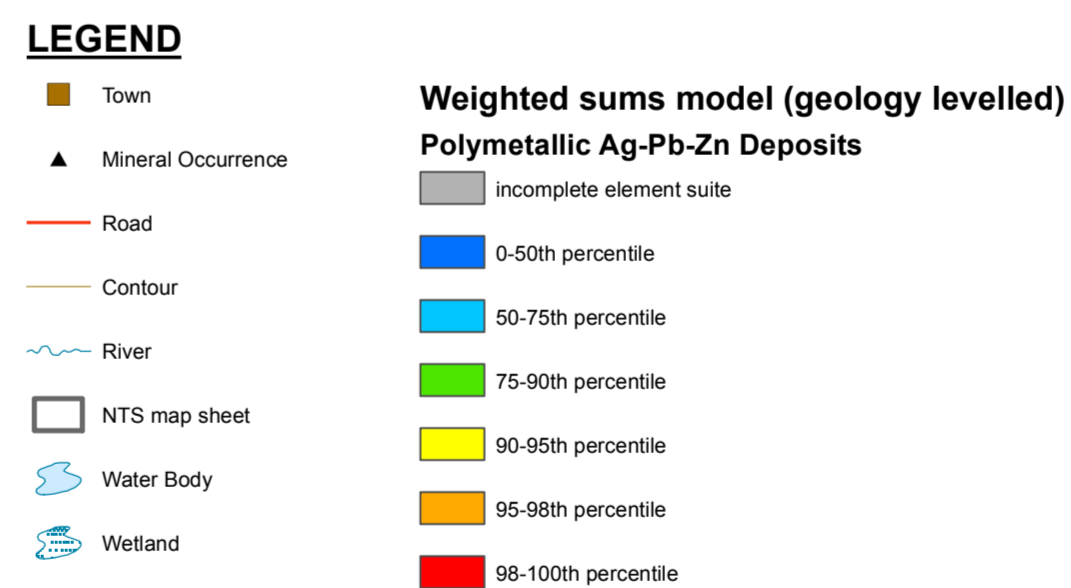
Table 2: Importance rankings for weighted sums models using data levelled by dominant mapped geology.

Target Deposit Type ^a	Other Deposit Types ^a	Mn	Fe	Co	Ni	Cu	Mo	Zn	Pb	Ag	Au	As	Ba	Cd	Sb	Te	Hg	TI	Bi	W	
Porphyry Cu-Mo	Cu skarn; Porphyry Mo	-	2	5	3	3	3	2	1	1	1	1	1	1	1	1				1	1
Polymetallic Ag-Pb-Zn	SEDEX, VMS, Pb-Zn skarn; Epithermal Au-Ag																				
Magmatic Ni-Cu-PGE		2	4	3	-1			-1													
Epithermal Au-Ag	Orogenic Au; Intrusion-related Au															1		1			
Orogenic Au	Intrusion-related Au, Epithermal Au-Ag				-2				2	4	3	1									1
Hydrothermal Anomaly		3	4	2					1												

^aPolymetallic Ag-Pb-Zn type includes vein and matrix styles; SEDEX = sedimentary exhalative Pb-Zn-Ag; VMS = volcanic-hosted/associated massive sulphide deposits

^bRaw data following a log_e transformation

^cResidual from regression against loss-on-ignition



RECOMMENDED CITATION

Mackie, R., Arne, D. and Pennimpede, C., 2016. Weighted sums model for Polymetallic Ag-Pb-Zn deposits levelled by geology. In: Enhanced interpretation of stream sediment geochemical data for NTS 115F and 115G. Yukon Geological Survey, Open File 2016-13, scale 1:250 000, sheet 5 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.

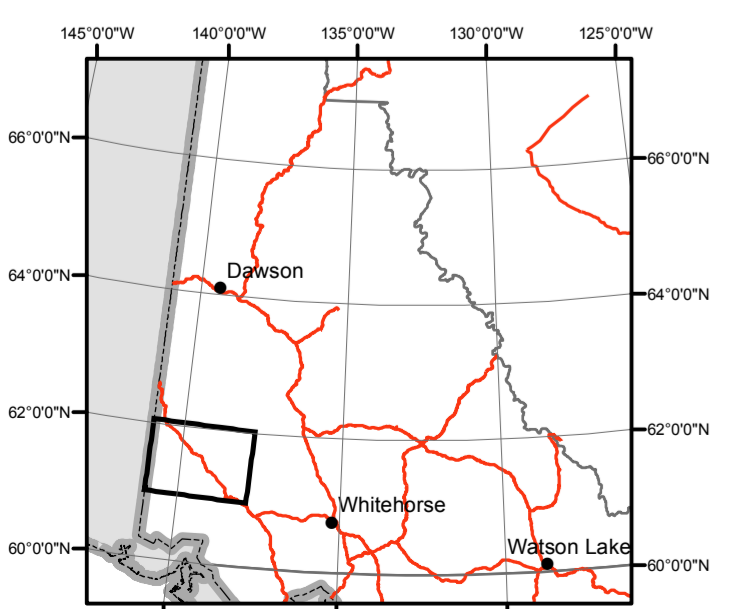
A digital PDF (Portable Document File) file of this map may be downloaded free of charge from the Yukon Geological Survey website: <http://www.geology.gov.yk.ca>.

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Energy, Mines and Resources
Government of Yukon

Open File 2016-13

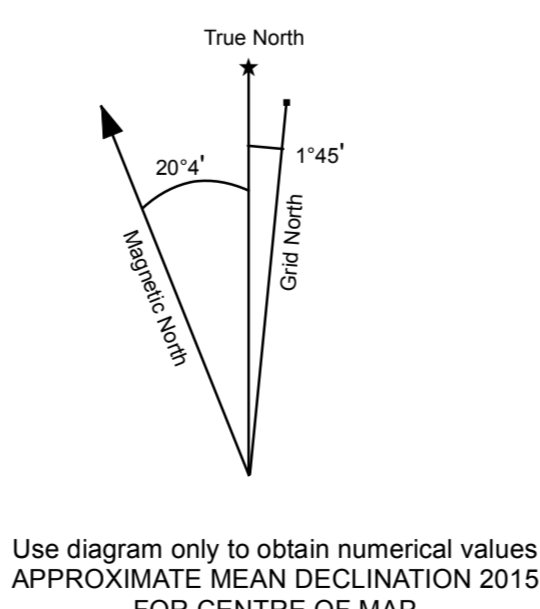
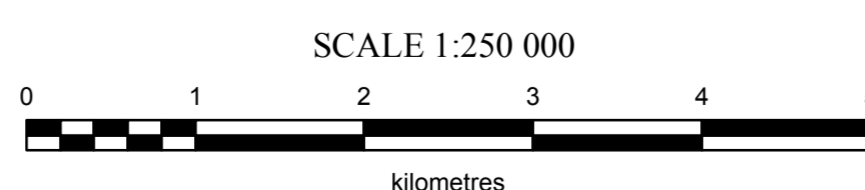
Weighted sums model for Polymetallic Ag-Pb-Zn deposits levelled by mapped geology (NTS 115F and 115G) Sheet 5 of 13

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ONE THOUSAND METRE GRID Universal Transverse Mercator Projection North American Datum 1983 Zone 7
CONTOUR INTERVAL 100 FEET Elevations in metres above Mean Sea Level

Polymetallic Ag-Pb-Zn Weighted sums model (Geology Levelled) Sheet 5 of 13



115K	115J	115I
PART OF T141	STEVENSON RIDGE	CAMRACKS
115F	THIS MAP	115H
		ASHIHK LAKE
115C	115B	115A
PART OF 115B	MOUNT ST ELIAS	DEZADASH RANGE

REFERENCES

- Geological Survey of Canada, 1987. Regional Stream Sediment and Water Geochemical Reconnaissance Data, Yukon (115F & 115G). Geological Survey of Canada, Open File 1362.
- Jackaman, W., 2012. Regional Stream Sediment Geochemical Data, Klutane Lake Area, southwest Yukon (NTS 115F and 115G). Yukon Geological Survey, Open File 2012-15.
- Mackie, R., Arne, D. and Brown, O., 2015. Enhanced interpretation of regional stream sediment (RGS) geochemical data 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.