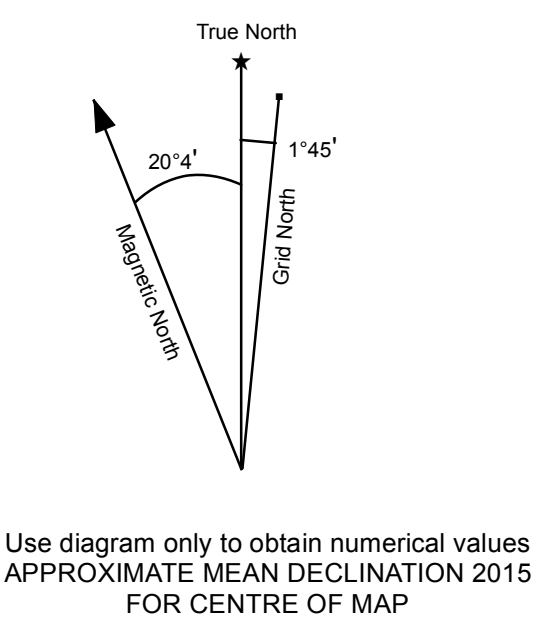
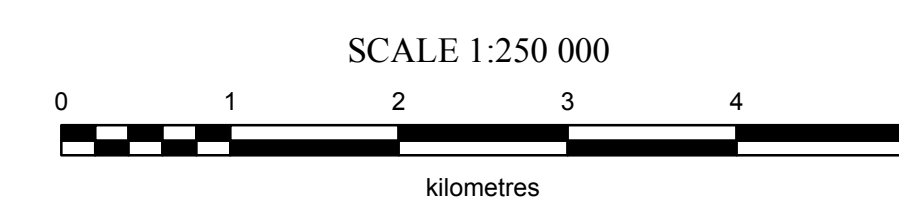


**Epithermal Au-Ag
Weighted sums model
(Geology Levelled)
Sheet 1 of 13**



PART OF 115K	115J	115I
STEVENSON RIDGE		CAMACKS
115F	THIS MAP	115H
		ASHRIK LAKE
115C	115B	115A
PART OF 115B	MOUNT ST ELIAS	DEZKASH RANGE

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 Klunene 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 (Jackman, 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 Klunene 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 (Arm and Az prospects), and quartz vein (Aishrik Lake) contains several quartz vein-related Au occurrences (Morn, Shut and Lib prospects) that form a trend that projects towards the southeast corner of the Klunene 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 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.

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 Co, Mg, Ni and Cr, and high negative loadings for Bi, Pb, U, La, Cd, Y, Th, Ag and Zn. Respectively, these groupings form spatial patterns that match the distribution of mafic-ultramafic intrusions and felsic intrusions. The second principal component shows negative 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 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 data levelled by dominant mapped geology.

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

*Polymetallic Ag-Pb-Zn type includes vein and matrix styles; SEDEX = sedimentary exhalative Pb-Zn (Ag); VMS = volcanic-hosted/associated massive sulphide deposits
*Raw data following a log_e transformation
*Residual from regression against loss-on-ignition

LEGEND

- Town
- Mineral Occurrence
- Road
- Contour
- River
- Water Body
- Wetland
- Sample Location
- Catchment
- Catchments > 15km²

**Weighted sums model (geology levelled)
Epithermal Au-Ag deposits**

- Incomplete element suite
- 0-50th percentile
- 50-75th percentile
- 75-90th percentile
- 90-95th percentile
- 95-98th percentile
- 98-100th percentile

Table 1: List of Mineral Occurrences for NTS map sheet 115F and 115G (Yukon MINFILE, 2015)

Number	Name	Type	Comments
115F 030	SHARPE	Porphyry Cu-Mo-Au	Showing
115F 031	CALLOPINS	Porphyry Cu-Mo-Au	Showing
115F 032	ICE FIELD	Porphyry Mo (Low F-Type)	Anomaly
115F 034	GARLIK	Porphyry Cu-Mo-Au	Prospect
115F 038	HANNIKS	Unknown	Unknown
115F 037	KOBERLIN	Unknown	Unknown
115F 038	LIBERTY	Vein Cu-Ag Quartz	Showing
115F 038	GLIBESIC	Unknown	Anomaly
115F 041	CATS AND DOGS	Ultramafic Mafic Gabbro Cu-Ni-PGE	Showing
115F 042	MEMCO	Skarn Cu	Showing
115F 042	PEWASHOLE	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 044	SEVENSMA	Ultramafic Mafic Gabbro Cu-Ni-PGE	Anomaly
115F 045	CANALASK	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 047	EPIC	Ultramafic Mafic Gabbro Cu-Ni-PGE	Prospect
115F 048	ARM	Skarn Cu	Drilled Prospect
115F 049	SANPETE	Skarn Cu	Prospect
115F 050	MENADAY	Skarn Cu	Prospect
115F 051	RAI	Skarn Cu	Drilled Prospect
115F 051	MEMOR	Coal	Anomaly
115F 054	MEMOR	Coal	Showing
115F 056	MELELAN	Coal	Showing
115F 056	RABBIT	Vein Cu-Ag Quartz	Drilled Prospect
115F 057	LEP	Skarn Cu	Drilled Prospect
115F 059	WHITE RIVER	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 060	SHARE	Volcanogenic Sulfide - type not determined	Drilled Prospect
115F 061	KLETSAN	Vein Cu-Ag Quartz	Showing
115F 067	CANYON MOUNTAIN	Porphyry Cu-Mo-Au	Showing
115F 067	WYESTER	Vein Polymetallic Ag-Pb-Zn-Au	Anomaly
115F 067	HAWLEY	Unknown	Anomaly
115F 067	ME FALLINE	Sediment hosted bedded Gypsum	Prospect
115F 067	STOVE	Coal	Prospect
115F 067	COMB	Ultramafic Mafic Gabbro Cu-Ni-PGE	Prospect
115F 067	MALLER	Porphyry Cu-Mo-Au	Showing
115F 067	DICKSON	Ultramafic Mafic Gabbro Cu-Ni-PGE	Prospect
115F 067	DESTRUCTION	Ultramafic Mafic Gabbro Cu-Ni-PGE	Prospect
115F 067	COOPER JOE	Ultramafic Mafic Gabbro Cu-Ni-PGE	Unknown
115F 067	SCORRILL	Ultramafic Mafic Gabbro Cu-Ni-PGE	Unknown
115F 067	WINDGAP	Coal	Prospect
115F 067	HOSE	Ultramafic-hosted asbestos	Showing
115F 067	HOSE	Coal	Prospect
115F 067	AMPHITHEATRE	Coal	Showing
115F 067	WAGE	Ultramafic Mafic Gabbro Cu-Ni-PGE	Prospect
115F 067	AMP	Porphyry Cu-Mo-Au	Anomaly
115F 067	COOK	Porphyry Cu-Mo-Au	Drilled Prospect
115F 067	GLEN	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 067	BURWASH	Volcanogenic Massive Sulfide (VMS) Beach Cu Zn	Drilled Prospect
115F 067	LICHAULT	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 067	VAG	Unknown	Unknown
115F 067	DULE	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 067	VERSLICE	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 067	CALLAN	Unknown	Unknown
115F 024	WELLGREEN	Ultramafic Mafic Gabbro Cu-Ni-PGE	Deposit
115F 025	ARWAYS	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 026	MEKETEER	Ultramafic Mafic Gabbro Cu-Ni-PGE	Showing
115F 027	SWIDE JOHNSON	Ultramafic Mafic Gabbro Cu-Ni-PGE	Showing
115F 028	CEMENT	Coal	Showing
115F 028	ST. ELIAS	Vein Mo	Showing
115F 033	SEXSMITH	Ultramafic Mafic Gabbro Cu-Ni-PGE	Drilled Prospect
115F 035	NOX	Unknown	Anomaly
115F 052	BOITARD	Unknown	Anomaly
115F 052	DONKEL	Unknown	Anomaly
115F 053	ELEVEN THIRTY	Skarn W	Showing
115F 054	KENNEDY	Skarn W	Showing
115F 055	TINUP	Ultramafic-hosted asbestos	Drilled Prospect
115F 056	NUNATAEA	Ultramafic-hosted asbestos	Anomaly
115F 057	DOOPACK	Unknown	Anomaly
115F 058	BRIDGES	Skarn Mo	Showing
115F 059	TALBOT	Porphyry Cu-Mo-Au	Showing
115F 059	RAFT	Porphyry Cu-Mo-Au	Drilled Prospect
115F 071	ROCKSLIDE	Porphyry Cu-Mo-Au	Drilled Prospect
115F 072	NORTH STAR	Porphyry Mo (Low F-Type)	Anomaly
115F 073	BED	Porphyry Mo (Low F-Type)	Anomaly
115F 074	ALASKITE	Porphyry Mo (Low F-Type)	Anomaly
115F 075	THREHILL	Porphyry Cu-Mo-Au	Anomaly
115F 076	DWARF	Porphyry Mo (Low F-Type)	Showing
115F 077	BIRCH	Skarn Cu	Showing
115F 081	EASTER	Unknown	Unknown
115F 079	RHYOLITE	Porphyry Cu-Mo-Au	Drilled Prospect
115F 080	NICK	Ultramafic Mafic Gabbro Cu-Ni-PGE	Showing
115F 083	CULUS	Unknown	Unknown
115F 082	ALTE	Unknown	Unknown
115F 083	ELIAS	Unknown	Unknown
115F 084	BOCK	Ultramafic Mafic Gabbro Cu-Ni-PGE	Unknown
115F 085	MAPLE	Sediment hosted bedded Gypsum	Showing
115F 086	COPSLAR	Sediment hosted bedded Gypsum	Showing
115F 088	LYNX CREEK	Unknown	Unknown
115F 089	FREIBERG	Volcanogenic Massive Sulfide (VMS) Kurat Cu-Pb-Zn	Showing
115F 090	ROBERTSON	Unknown	Anomaly
115F 091	ELIAS	Unknown	Anomaly
115F 092	BEZDEK	Paleosol	Anomaly
115F 094	LINDA	Ultramafic Mafic Alaskan-type P1+O1+R1+I+J	Drilled Prospect
115F 095	ARBY	Unknown	Unknown
115F 096	HUDYK	Unknown	Unknown
115F 097	LONTH	Unknown	Anomaly
115F 098	TONY	Ultramafic Mafic Alaskan-type P1+O1+R1+I+J	Showing
115F 099	KILLANE	Unknown	Showing
115F 100	WASH	Ultramafic Mafic Alaskan-type P1+O1+R1+I+J	Drilled Prospect
115F 101	TAL	Unknown	Unknown
115F 102	TREMBLAY	Vein Cu-Ag Quartz	Unknown
115F 104	JURI	Unknown	Anomaly
115F 105	COFER	Unknown	Unknown
115F 106	BERDHAL	Vein Au-Quartz	Prospect
115F 107	LAKE	Unknown	Unknown

RECOMMENDED CITATION

MACKIE, R., ARNE, D. AND PENNIMPEDE, C., 2016. Weighted sums model for Epithermal Au-Ag 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 1 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 2016-13

**Weighted sums model for Epithermal Au-Ag deposits
levelled by mapped geology (NTS 115F and 115G)
Sheet 1 of 13**

by
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and Chris Pennimpe