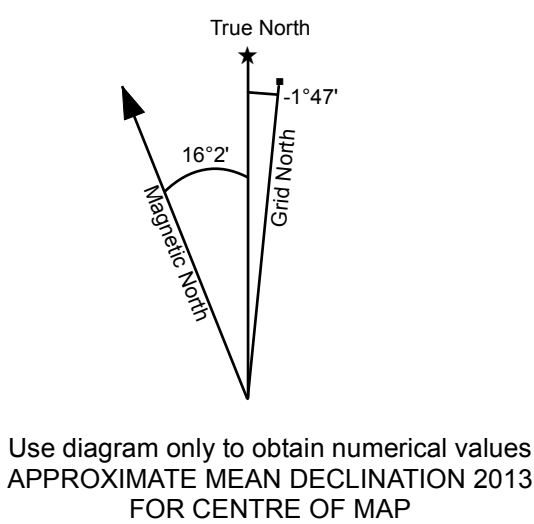
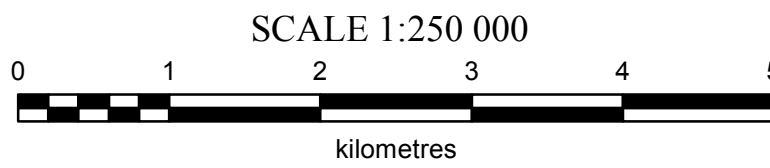


1:250 000-scale topographic base data
produced by
CENTRE FOR TOPOGRAPHIC
INFORMATION
NATURAL RESOURCES CANADA

ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 9

CONTOUR INTERVAL 100 METRES
Elevations in metres above Mean Sea Level

WEIGHTED SUMS MODEL Mo (LEVELLED) YUKON



| | | |
|------------------------|---------------------------|------------------------------|
| 106C NADALEEN RIVER | 106B BONNET PLUME LAKE | 106A MOUNT EDUNI |
| 105N LANISING RANGE | 105O THIS MAP | 105P SEKWI MOUNTAIN |
| 105K TAY RIVER | 105J SHELDON LAKE | 105I LITTLE NAHANNI RIVER |

Weighted Sums Modelling

The application of Weighted Sums Modelling (WSM) to exploration geochemistry was described by Garrett and Grunsky (2001) as a means to model multi-element data using a priori knowledge of the mineralogy and element composition of the sought after mineral deposit (Kane, 1977; Garrett et al., 1980). In this procedure weights or relative importances are assigned to each variable, or a subset of variables, according to some geochemical or mineralogical model of the target mineral deposit type or geological process. Weighted sums (WS) are new variables calculated from the multi-element geochemical results. Like Principal Components Analysis (PCA) or Factor Analysis scores, WS scores have the form of normal or standardized scores with a mean of zero and a standard deviation of one. The main difference between WSM and traditional multivariate statistical methods is that the user assigns the variable weightings rather than determining them with a covariance/correlation matrix for the dataset, as is done in PCA. Furthermore WSM is a robust statistical technique that is not influenced by the presence of outliers (Beckman & Cook, 1983).

The reader is referred to Garrett and Grunsky (2001) for a description of the WS calculation. In summary, relative importance is assigned for each variable. A weighting of 3, for example, means that that particular element is three times more important than an element with a weighting of one. Weighting can be positive or negative. Positive weightings mean that the target model is associated with elevated concentrations of an element. Negative weightings indicate that low concentrations or depletions of an element are important.

Individual relative importance is converted into weights that sum to one by dividing each importance by the sum of the absolute values of importance (i.e., ignoring the negative signs). A requirement of the method is that the sums of the squares of the final weights also equal one. This is achieved by dividing each weight by the square root of the sum of the squares of the weights.

The next step involves calculation of the normal scores for the variables included in the model for each individual sample. To do this, robust estimates of the mean and standard deviation are used. The median (or 50th percentile) is used as a robust estimate of the mean and the inter-quartile range (IQR) multiplied by 0.7413 is used as a robust estimate of the standard deviation. IQR is the difference between the 75th and 25th percentiles of the data distribution and therefore covers a band of data 25% wide (or 0.67449 standard deviation units) on either side of the mean. The constant 0.7413 is used to convert the IQR, which covers a range of 1.3490 standard deviation units to an equivalent standard deviation¹. Weighted sums are then calculated by multiplying the normal scores for each element by the element's corresponding weight and summing for each sample. The high resistance of the median and IQR to outliers mean that it is not usually necessary to trim outlier and far outliers from the dataset before calculation.

¹ For a normal distribution the standard deviation is equal to 0.7413*IQR, where 0.7413 is the reciprocal of 1.349.

Models and Weightings

Six mineral deposit types (SEDEX, Porphyry Cu, W-Skarn, IRCG, Polymetallic veins and Carlin) that are either known or believed to occur in the map sheet areas and one geochemical process (hydromorphic dispersion) are modeled using the WS method. Included elements and their relative importance are presented in Table 1.

Data Presentation

Results of each WS model are attached to the corresponding catchment basin polygons using a spatial join in ArcGIS. This process allows for the entire polygon to be assigned a colour based on its WS score. Colours are assigned on the basis of the following percentile breaks:

0-50% Dark blue
50-75% Pale blue
75-90% Pale green
90-95% Yellow
95-98% Orange
98-100% Red

With this scheme, catchment basins with the hotter colours represent samples with geochemical characteristics consistent with the mineralization style being modelled.

Table 1: Table of Relative Importance used to calculate weighted sums models

| Deposit Type | Ag | Au | As | Ba | Bi | Cd | Co | Cs | Fe | Hg | K | Mn | Mo | Ni | Pb | Sb | Te | Ti | W | Zn |
|-------------------------|----|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|---|----|
| Polymetallic Veins | 4 | 4 | 3 | | | 4 | 1 | 2 | | 1 | 1 | | 1 | 1 | 5 | | 3 | | | 5 |
| W-Skarn | | | | | | | | | | | | | | | | | | | | |
| Porphyry Cu | 2 | 2 | 3 | | 3 | | | | 5 | 3 | | 3 | | | | | | | 5 | 1 |
| Intrusive Related Cu-Au | 1 | 2 | 5 | | 5 | | | 2 | 1 | 5 | | 1 | 2 | | 1 | | 1 | 5 | 2 | 5 |
| SEDEX | | | | | | | | | | | | | | | | | | | | |
| Carlin | 2 | 1 | 5 | 2 | | 3 | | | | 4 | | | | | 1 | 5 | | | | |
| Hydromorphic Dispersion | 2 | | 1 | | | 4 | 5 | 2 | | 5 | | 5 | 2 | 4 | 2 | | 1 | | | 3 |

LEGEND

- Regional Geochemistry Sample (RGS) location
- National Topographic System grid (1:250 000 scale)
- National Topographic System grid (1:50 000 scale)
- Yukon-Northwest Territories border
- highway, paved
- highway, unpaved
- local road, unpaved
- contour
- watercourse
- waterbody
- wetland

Mo (Levelled)

WSM Percentiles: WSM Score, Number of RGS Samples

- 0 - 50%: -3.296 - -0.048, 466 samples
- 50 - 75%: -0.047 - 0.703, 239 samples
- 75 - 90%: 0.704 - 1.293, 139 samples
- 90 - 95%: 1.294 - 1.572, 47 samples
- 95 - 98%: 1.573 - 2.150, 28 samples
- 98 - 100%: 2.151 - 3.451, 19 samples

Table 2: List of Mineral Occurrences for NTS map sheets 105O and part of 105P

| OCCURRENCE # | OCCURRENCE NAME | ALIAS(ES) | DEPOSIT TYPE | STATUS | ECONOMIC COMMODITIES | OTHER COMMODITIES |
|--------------|-----------------|-----------|---|------------------|----------------------|-------------------------------|
| 105O 001 | TOM | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Deposit | Pb, Ag, Zn, Ba | Sb, barite, Cu |
| 105O 002 | MACTUNG | | W Skarn | Deposit | W | Cu |
| 105O 003 | JEFF | | Porphyry Mo (Low F-Type) | Showing | | Mo |
| 105O 004 | ALP | | Au-Quartz Veins | Showing | | Au, Ag |
| 105O 005 | NIDDERY | | Plutonic Related Au | Prospect | | barite, Cd, Cu, Au, Ni, Ag |
| 105O 006 | SCOT | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Drilled Prospect | | Cu, Ni, Ag, Zn |
| 105O 007 | ART | | Au-Quartz Veins | Prospect | | Sb, As, Bi, Au, Pb, Ag |
| 105O 008 | KEELE | | Porphyry Mo (Low F-Type) | Showing | | Mo |
| 105O 009 | EMERALD | | Porphyry-related Au | Showing | | Bi, Cu, Au, Mo, Ag, W |
| 105O 010 | HORN | | Cu Skarn | Prospect | | Cu, Au |
| 105O 011 | BEN | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Showing | | Pb, Zn |
| 105O 012 | ARROWHEAD | | Polymetallic Veins Ag-Pb-Zn/-Au | Showing | | Cu, Pb, Zn |
| 105O 013 | RACOCOT | | Sediment-Hosted Barite | Deposit | barite | Zn |
| 105O 015 | INCA | | Polymetallic Veins Ag-Pb-Zn/-Au | Past Producer | Ag | Pb, Zn |
| 105O 016 | STANDARD | | Polymetallic Veins Ag-Pb-Zn/-Au | Showing | | Pb, Ag, Zn |
| 105O 018 | ODD | | Mississippi Valley-Type Pb-Zn (MVT) | Drilled Prospect | | Pb, Ag, Zn |
| 105O 019 | JASON | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Deposit | Pb, Ag, Zn | barite |
| 105O 020 | SAMOVAR | TEA | Sediment-Hosted Barite | Deposit | barite | barite, Cu, Pb, Ag, Zn |
| 105O 021 | WALT | BAR | Sediment-Hosted Barite | Deposit | | barite, Ba, Cu, Pb, Ag, Zn |
| 105O 022 | TRYALA | | Sediment-Hosted Barite | Drilled Prospect | | barite, Cu, Pb, Mo, Ni, V, Zn |
| 105O 023 | DRIZZLE | RAIN | Shale-Hosted Ni-Zn-Mo-PGE (Nick) | Showing | | barite, Ag, Zn |
| 105O 024 | NIDD | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Drilled Prospect | | Cu, Pb, Zn |
| 105O 025 | BRENNER | | Unknown | Drilled Prospect | | Cu, Pb, Mo, Zn |
| 105O 026 | DICKIE | | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Unknown | | |
| 105O 027 | GARY | GARGANTUA | Sediment-Hosted Barite | Deposit | barite | barite, Zn |
| 105O 028 | FETCH | | Sediment-Hosted Barite | Drilled Prospect | | barite |
| 105O 029 | GOW | TH | Sedimentary Exhalative Zn-Pb-Ag (Sedex) | Anomaly | | barite |
| 105O 030 | GRIZZ | | Porphyry Mo (Low F-Type) | Showing | | Au, Mo, Ag, W |
| 105O 031 | VAN ANGEREN | | Porphyry Mo (Low F-Type) | Showing | | Mo |
| 105O 032 | NEVE | BRICK | Au-Quartz Veins | Drilled Prospect | | Sb, Au, Ag, Zn |
| 105O 033 | KELVIN | BORD | Polymetallic Veins Ag-Pb-Zn/-Au | Prospect | | Sb, Au, Pb, Ag |
| 105O 036 | FAN | | Unknown | Showing | | barite |
| 105O 037 | LONER | | Barite Veins | Showing | | Ba |
| 105O 038 | DUET | | Unknown | Anomaly | | Zn |
| 105O 039 | OLD CABIN | | Polymetallic Veins Ag-Pb-Zn/-Au | Showing | | Cu, Au, Pb, Mo, Ag |
| 105O 040 | URSA | | Unknown | Anomaly | | Cu |
| 105O 041 | FANGO | | Polymetallic Veins Ag-Pb-Zn/-Au | Prospect | | Sb, Au, Pb, Ag, Zn |
| 105O 042 | FAL | | Unknown | Unknown | | |
| 105O 043 | SIM | | W Skarn | Showing | | Pb, W, Zn |
| 105O 044 | NUT | | W Skarn | Showing | | Cu, Pb, Ag, W, Zn |
| 105O 045 | STROSHEIN | | Sediment-Hosted Barite | Showing | | barite |
| 105O 046 | MINORCO | | Sediment-Hosted Barite | Showing | | barite |
| 105O 048 | NIKE | | Polymetallic Veins Ag-Pb-Zn/-Au | Showing | | Sb, As, Bi, Cu, Au, Pb, Ag |
| 105O 049 | FAINZI | | Au-Quartz Veins | Showing | | As, Au |
| 105O 050 | NORTH MACMILLAN | | Barite Veins | Showing | | |
| 105O 051 | DALL | HARLAN | Au-Quartz Veins | Prospect | | Cu, Au |
| 105O 052 | BAILES | | Unknown | Unknown | | Cu, Au, Pb, Ag, Zn |
| 105O 054 | ROGUE | | Polymetallic Veins Ag-Pb-Zn/-Au | Prospect | | Au, Pb, Ag, Zn |
| 105O 055 | CHRISTINA | | Subvolcanic Cu-Au-Ag (As-Sb) | Showing | | Cu, Au, Ag |
| 105O 056 | GOLD | | Porphyry Mo (Low F-Type) | Anomaly | | |
| 105O 057 | STUMP | NID | Plutonic Related Au | Showing | | As, Cu, Au, Pb, Ag |
| 105O 058 | LM | | Plutonic Related Au | Drilled Prospect | | Cu, Au, Ag |
| 105O 059 | SCRONK | | Polymetallic Veins Ag-Pb-Zn/-Au | Showing | | Sb, Bi, Cu, Au, Ag, Zn |
| 105O 060 | HASTEN | | Unknown | Drilled Prospect | | Zn |
| 105O 061 | FUN | | Unknown | Anomaly | | Pb, Zn |
| 105P 001 | MEHTABEL | | Cu Skarn | Drilled Prospect | | Au |

Mineral Occurrence Deposit Type (Total on map)

- Au-Quartz Veins (5)
- Barite Veins (2)
- Cu Skarn (2)
- Mississippi Valley-Type Pb-Zn (MVT) (1)
- Plutonic Related Au (3)
- Polymetallic Veins Ag-Pb-Zn/-Au (9)
- Porphyry Mo (Low F-Type) (5)
- Porphyry-related Au (1)
- Sediment-Hosted Barite (8)
- Sedimentary Exhalative Zn-Pb-Ag (Sedex) (7)
- Shale-Hosted Ni-Zn-Mo-PGE (Nick) (1)
- Subvolcanic Cu-Au-Ag (As-Sb) (1)
- Unknown (7)
- W Skarn (3)

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Yukon Geological Survey
Energy, Mines and Resources
Government of Yukon

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Yukon Geochemistry Weighted Sums Model for NTS 105O
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by

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