Canada
Department of Energy, Mines and Resources
Geological Survey of Canada

Parts of 106 D, E and I 16 A, H

LEGEND

Note: This legend is common to National Geochemical Reconnaissance Map 14-1306, Open File 410, Map 15-1976, Open File 414 and Map 16-1976, Open File 421

CHRONOLOGY

PHANEROZOIC

CENOZOIC

Quaternary
- 30 Unconsolidated glacial and alluvial deposits

Tertiary
- 29 Conglomerate, shale and conglomeratic silt, RENAUT FLUME FORMATION: basalt, trachyte, rhyolite and tuff, DEASE LAKE FORMATION: conglomerate and shale, SLOKO FORMATION: basalt, andesite and tuff breccia
- 28 Hornblende and hornblende-biotite syenite, commonly porphyritic and sometimes hematoxenic stock
- 27 Diorite and gabbro
- 26 Mainly green and maroon shale and lesser siltstone

MESOZOIC

- 25 KEMS HILL QUARTZITE: massive quartzite; minor shale and argillite

JURASSIC

- 24 LOWER SLOCUT Division: argillite, shale, phyllite and minor quartzite; flow-, tuff- and breccia-facies

TRIASSIC

- 23 GOOSLY FORMATION: limestone and shale; unnamed clastics and carbonates

PERMIAN

- 22 SWANNELL FORMATION: grey chert and limestone; Fm. ATHOLL CREEK FORMATION: sandstone, shale, carbonates and clastics; undivided

CARBONIFEROUS TO PERMIAN

- 21 FITNESS FORMATION: shale and limestone; HART RIVER FORMATION: shale, siltstone, sandstone and limestone; Fm. ATHOLL CREEK FORMATION: shale, clastic sheet, lesser argillite conglomerate, argillaceous limestone and limestone

- 20 KAY CREEK FORMATION: shale; unnamed conglomerate

DEVONIAN

MIDDLE DEVONIAN TO ORDOVICIAN

- 19 SEDIMENTARY ROCKS: undivided shale; ARTAIN RIVER FORMATION: chert, argillite conglomerate and shale; ARTAIN SCHIST: conglomerate, shale, argillite, slate, limestone and minor chert-pebble conglomerate and quartzite

LOWER TO MIDDLE ORDOVICIAN

- 18 FIFTY MARTIN FORMATION: limestone; CHROMATIC FORMATION: limestone, dolomite and minor shale; Fm. ATHOLL CREEK FORMATION: limestone, dolomite and intermediate tuff; undivided
- 17 DEASE LAKE FORMATION: dolomite and intermediate black chert

ORDOVICIAN AND SILURIAN

- 16 ROAD RIVER FORMATION: shale, limestone, black chert and argillite; Fm. CHROMATIC FORMATION: limestone and dolomite
- 15 Dolomite and limestone; argillaceous limestone and dolomite; dark calcareous rocks

CAMBRIAN

- 14 Limestone and dolomite, minor red shale, unnamed clastics; Fm. ATHOLL CREEK FORMATION: limestone, shale, dolomite and minor quartzite; Fms. and ATTA: Fm. JAMES RIVER: limestone; unnamed clastics and carbonates

PRECAMBRIAN AND/OR LATER

- 13 Dark green volcanic rocks; breccia, tuff, agglomerate, shale, chert, siltstone and limestone

- 12 Quartzite, sandstone, quartz-pebble conglomerate, marcon and green shale, minor limestone, quartz-pebble schist, phyllite, limestone and black chert

ARCHEAN

- 11 Unnamed carbonates and clastics

- 10 BAXTER GROUP: mudstone, limestone, iron formation and dolomite

METAMORPHIC

- 9 KLONDIKE FORMATION: sandstone and dolomite; FAIRVIEW FORMATION: dolomite, limestone and siltstone; unnamed sandstone and quartzite
- 8 Diverse dolomite, slate, phyllite, gneiss, dolomite, grey and maroon marble, quartzite, amphibolite, limestone, black shale, metavolcanics

MELVILLIAN AND ITS AMAGEAN

- 7 Psammite, slate, psammite-quartzite, dolomite, conglomerate and siltstone limestone

Drift-covered areas.....
Geological contact.....
Fault.....

Geology generalized for geochemical maps by W.D. Goodfellow from Nash Creek [1983] and Lorrain Creek [1984] by J.V. Dawson [G.S.C. Mem. 304, 1970], and Wind River [1981] and Bark River [1980] by D.A. Norris [G.S.C. Open File 679, 1979]

Geological cartography by the Geological Survey of Canada

Base-map assembled by the Geological Survey of Canada from maps published at the same scale by the Surveys and Mapping Branch in 1984, 1975

Mean magnetic declination 1977, 30°32.7' East, decreasing 0.9' annually. Readings vary from 30°25.2' in the SE corner to 30°38.8' in the NW corner of the map-area

Elevations in feet above mean sea-level

GEOCHEMICAL SYMBOLS AND DATA PRESENTATION

The absolute background and anomalous concentrations, and the contrast between them, are a function of the complex interplay of climate, relief, geomorphology, geology, the sample matrix and the chemistry of the elements determined.

Physiographical regions within the survey area include the Hernando, Bjittle and Blackstone Mountains, the Richardson Trough and the Peel Plateau. The effect of relief and, to stream sediments, the sample matrix, are in turn derived by the mechanical breakdown of the underlying rocks and has been transported as particulates during the last glaciation. Chemical weathering is slight in the Arctic climate of the area. Soils have only minor organic matter present. By contrast, streams draining the Cache Slates and Dermot Flume basin are commonly discontinuous. Flow at low velocity during summer, large-scale ice-ponding under these conditions, organic matter may be encountered to play a significant role in the transport and deposition of certain elements (eg. Cu, Ag, Mo, Zn, Ni, Co, Mn, Fe) in stream sediments. Hydromorphic effects are suggested and field observations, such as sediment composition, present in the data limiting be considered when examining the metal content of any specific site.

Rocks of the area are mainly of Proterozoic and Paleozoic age, sedimentary and volcanic rocks that range in age from Cambrian to Pennsylvanian to Upper Cretaceous, with almost every period represented. To date, it has been reported by minor in breccias and conglomerates in the Proterozoic Hernando Group and in the Cache Slates and Mountain Formations. Other geological environments that are considered to have a high potential in the survey area include the following: the Neozoic alkaline stocks and associated intrusives, the Late Paleozoic and Mesozoic basic intrusives, the Mesozoic and Paleozoic sedimentary basins such as the Eagle Plain and Bonnet Flume basins and structures such as faults and unconformities which may serve as favourable traps for deposition of U.

Because of the mechanical derivation of stream sediments from mountainous terrain, the concentrations of many elements may be related to the presence of certain rock types, or their mechanical characteristics, which are common in Proterozoic, Paleozoic and Mesozoic rocks, have high background concentrations for U and exist other elements which may be enriched in the uranium ore deposits of the region. Therefore, it is suggested that each stream sediment sample be evaluated in terms of the local factors affecting the geochemistry of the surficial environment.

Certain elements, such as Cu, Co, Fe and Mn, are hydrous and base metal mineralization should be considered when evaluating geochemically anomalous stream sediments. For example, Ba, Cu, Co and to a lesser extent, Mn, Fe, and W are associated with the Proterozoic sedimentary environment. Ag, Mo, Cu, Pb, Zn, Ni, Co and Mn are expected to be associated with primary mineralization in the Paleozoic rocks. Furthermore, element associations in stream sediments and waters will be useful in identifying regional geochemical trends that may be, at least in part, controlled lithologically. Anomalous geochemical trends within these regional patterns should be considered as a guide to mineralization and may be the result of not only the anomalous concentrations but also element interrelations.

The concentration of an element at a sample-site is graphically represented as one of fifteen symbols. The class-interval selected for each element is shown in the table located. The symbols are arranged so that they first increase in size to the eighth symbol and then increase in blackness to the fifteenth. The two smallest crosses at the bottom of the range are for the 1st and 2nd percentile values, usually below the analytical detection limit, or in the data group containing the detection limit. The data are grouped on a semi-logarithmic scale, i.e. 1-2,5,10,20,25,50,100 etc. Fine detail is not required for the purpose of this publication and has been reserved for Canada-wide series of maps coordinating the National Geochemical Reconnaissance.

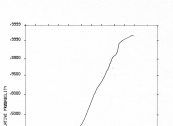
The choice of symbols and the data groups they represent for each element is based on the histogram and cumulative frequency plot for the total sample data from one, or more contiguous, 4mm file sheets covered in one field season.

The histogram is a plot of the number of values in each class. The class group usually includes the median of the data as defined by the 5.0 (50%) point on the cumulative frequency plot. Some, or all, of the remaining 14 symbols are chosen to accentuate the upper data values.

The raw data sample maps are only intended to assist the rapid inspection of the data for gross regional features. To fulfill the need for a more specific and detailed interpretation of the data, the following publications by the Geological Survey should be consulted. To assist in the appraisal of the data by the interpreter, a histogram map-bedrock geology, a table of summary statistics for the drainage samples descriptively derived from within each bedrock unit, or broad lithologic unit, is presented below the histogram. In many instances, the table will also illustrate, more clearly than the histogram, the presence of anomalous values. The table will also be observed that whilst the total data appears to approximate a log-normal distribution the data for individual map or lithologic units appears to approximate a normal distribution. Where the data approximates a normal curve, the mean and detection limit for a large number of samples (e.g. U and F in water, Ag, Mo and As in sediment). In these situations, the frequency distribution will be positively skewed and the use of the geometric mean and the median will be necessary. Care must be exercised when using the table of summary statistics to establish background and anomalous concentration ranges for a given element.

Other factors, such as the presence of certain geological, environmental and recovered data should be utilized. The data separation by bedrock type can often be improved by constructing new data subsets and deriving local threshold levels based on the most detailed and up-to-date knowledge available.

EXAMPLE



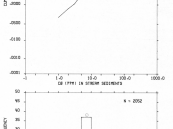


Table of Summary Statistics for Sample Media Subtotals by One Different Lithologies

Lithology	No. of Samples	Geometric Mean	Mean	Arithmetic Mean Sq.	C.V.%
Dolomite	50	4	6	6	94
Limestone	1	4	4	4	0
Argillite	106	10	16	17	121
Shale	457	6	8	7	88
Sandstone	1	7	7	7	0
Quartzite	98	7	10	8	80
Sandstone	312	8	10	8	80
Siltstone	112	10	13	9	69
Conglomerate	10	10	10	9	44
Quartzite	9	12	13	6	46
Basalt	16	25	27	9	33
Diorite	6	50	52	9	22
Undefined Sedimentary Rock	46	6	7	7	95

Data units are in ppm

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 419

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Geological Survey of Canada, Ottawa

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Technical contract supervision by J.J. Lynch
Data conforming and compilation by W.D. Garrett, N.R. Lund and J.J. Lynch

Contractors

Sample preparation by Schlee Associates
Chemical analysis by Chemex Labs Ltd.

This map forms one of a series of 45 sheets released under Geological Survey of Canada, Open Files 409, 414, 421. The Open Files consists of data for 12 elements each for stream sediments, percent loss on ignition, 2 elements for stream waters and sample site location

The data are also available in digital form. For further information please contact:

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NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 419
NORTHERN YUKON AND NORTHWEST, 1975
COBALT

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
COBALT IN STREAM SEDIMENTS
URANIUM RECONNAISSANCE PROGRAM
Scale 1:250,000
Kilometers 0 5 10 15 20 25
Miles 0 5 10 15
Universal Transverse Mercator Projection

This map has been digitized from a scanned version of the original map. Some discrepancies may be present when plotted at larger scales than 1:250,000