Note: This legend is common to National Geochemical Reconnaissance Map 15-1976, Open File 419, Map 15-1976, Open File 419 and Map 16-1976, Open File 420

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

Parts of 104 D, E and 116 A, H

LEGEND

QUATERNARY
- Qa — Unconsolidated glacial and alluvial deposits

CRETACEOUS
- Kc — Sandstone, shale and conglomerate; Eq. DONNELY ELBOW FORMATION, sandstone, shale and coal; Eq. DOWNE ELBOW FORMATION, conglomerate, sandstone, shale and coal; Eq. ARCTIC RED FORMATION, conglomerate
- Kv — Hypabyssal and hypabyssal(?) basalt, andesite, porphyritic andesite, trachyte, minor diorite

JURASSIC
- Jd — Diorite and gabbro

TRIASSIC
- TrM — Mafic dykes and narrow shale and breccia windows

PALEOZOIC
- PzM — MARK HILL QUARTZITE: massive quartzites, minor slate and phyllite

DEVONIAN
- DSP — CANOL EXPOSIT Alaskites, granites, slate, phyllite and minor quartzite; Eq. TOLL Limestone and basalt

TRIASSIC
- TrS — SHALE FORMATION: limestone and shale; unnamed clastics and limestone

TRIASSIC
- TrG — GRANDEST FORMATION, grey chert and limestone; TR, JURASSIC CREEK FORMATION, cherts, limestones and clastics; undifferentiated

CARBONIFEROUS TO PERMIAN
- CPG — GRANDEST FORMATION, chert and limestone; GRAY RIDGE FORMATION, shale, siltstone and limestone; Lisburne Group undivided; Eq. limestone, black shale, chert, minor gabbro and basalt
- CPS — SEVEN SISTERS FORMATION: shale; unnamed conglomerate

DEVONIAN
- DSP — CANOL EXPOSIT Alaskites, granites, slate, phyllite and minor quartzite; Eq. TOLL Limestone and basalt

PALEOZOIC
- PzM — MARK HILL QUARTZITE: massive quartzites, minor slate and phyllite

JOINT TO MIDDLE DEVONIAN
- D — BEAUFORT FORMATION, limestone; CHERRIDGE FORMATION, limestone, dolomite and minor chert; ROAD RIVER FORMATION, limestone, dolomite and intermediate black shale

DEVONIAN AND SILURIAN
- DS — ROAD RIVER FORMATION: shale, limestone, black chert and argillite; minor quartzite and cherty-pebble conglomerate
- DS — Dolomite and limestone; argillaceous limestone and dolomite; minor bituminous shale

ORDOVICIAN
- O — Limestone and dolomite; minor red shale; unnamed clastics; Eq. quartz sandstone, conglomerate, shale and basal limestone; Eq. DELORME FORMATION, limestone, shale and basal sandstone; Eq. GROS RUSSE FORMATION, limestone, dolomite and limestone

PRECAMBRIAN AND/OR LATER
- Pz — Dark green schist, slate, breccia, tuff, agglomerate, shale, greywacke and minor limestone
- Pz — Quartzite, limestone, quartz-pebble conglomerate, calcareous and green schist, chlorite schist, quartz-mica schist, phyllite, limestone and minor chert

PRECAMBRIAN
- Pz — Unnamed carbonates and clastics
- Pz — HAYTEN GROUP: mudstone, limestone, iron formation and dolomite

HELIKIAN
- Pz — HELIKIAN FORMATION: sandstone and mudstone; FOOTHILLS FORMATION: sandstone and mudstone; unnamed carbonates, shale and gypsum
- Pz — Granite gneisses, schist, quartzites, pink dolomites, grey and maroon argillites, minor basic intrusions, limestone, black dacite, argillite and siltstone

HELIKIAN AND (?) ARCHEAN
- Pz — Quartzites, schist, pink quartzite, dolomite, conglomerate and diffrabed limestone

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

Geology generalized for geochemical maps by A.D. Goodfellow from Bosch Creek (1963) and Lennan Creek (1964) by J.H. Green (G.S.C. Mem. 366, 1971); and Wind River (1960) by O.E. Norris (G.S.C. Open File 270, 1973)

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 1954, 1957

Mean magnetic declination 1977, 29°30.7' East, decreasing 2.9' annually. Readings vary from 28°01.0' in the SE corner to 30°59.9' 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 will vary regionally depending on factors such as the physiography, geology, the sample media and the chemistry of the elements determined.

Regionally, the Precambrian Shield, the Interior Plains, the Hermanville, Ogilvie and Richardson Mountains, and the Eagle Plains and Bonnet Plume basin. Most of the sediment in streams intersecting mountains terrain has been derived by the mechanical breakdown of bedrock and is generally coarse grained and poor in organic matter and the heavy spring run-off. Stream sediments range in size from fine silt to boulders with only minor organic matter present. By contrast, streams intersecting the Eagle Plains and Bonnet Plume basin are characterized by fine grained, clay and silt rich, and organic-rich sediment. Under these conditions, organic matter may be expected to play a significant role in the transport and deposition of certain elements (eg. Cu, Ni, Co, Zn, Mn, Fe, Mo, U, Ag, Au) and in the dispersion of anomalies. The U.S.G.S. geochemist had field observations, such as sediment composition, present in the data highly be considered when examining the metal content of any specific site.

Within the Yukon Territory, the background concentrations of many elements tend to vacillate over a wide range in age from Cenozoic to Precambrian to Upper Cenozoic, with almost every period represented. To date, it has been reported to occur in breccias associated with the Proterozoic sedimentary and volcanic rocks of the Mackenzie Mountains. Other geological environments that are considered to have a high-to-moderate potential for stratiform sediment-hosted Zn-Pb-Ag deposits are the Early and Devonian(?) clastics as a source for low grade and high tonnage; in the Mesozoic and Cenozoic sedimentary basins such as the Eagle Plains and Bonnet Plume basin, where they occur as fluids and concentrations which may serve as favourable traps for deposition of U.

Because of the mechanical derivation of stream sediments from mountainous terrain, the background concentrations of many elements will be controlled by the abundance of mafic rocks, or their metamorphic equivalents, which are common in Proterozoic, Paleozoic and Mesozoic rocks. Some high background concentrations for Zn and most other elements may be expected in areas of Cenozoic and Precambrian sedimentary rocks. Therefore, it is suggested that each stream system be evaluated in terms of the local factors affecting the geochemistry of the surficial environment.

The element associations expected for particular types of stream base metal mineralization should be considered when evaluating geochemically anomalous stream sediments. For example, Cu, Pb and Zn may be expected to be the best pathfinders associated with the Proterozoic U occurrences whereas Mo, F and Sn in lesser extent Pb, would be expected to be associated with primary U mineralization in siltation plateau. Regional geochemical trends may be present in some areas and the ability to identifying regional geochemical trends may be, at least in part, controlled lithologically. Anomalous geochemical trends within these regional patterns should be considered as being of significant importance on the basis 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 nine different symbols. The largest symbol, a solid circle, is used to show the highest 2% of the data. The symbols are arranged so that their first horizontal is size to the eighth symbol and then increase in blackness to the fifteenth. The sun spoil crosses at the base of the symbol is used to show the concentrations which are 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. 1,2,3,5,10,20,30,50 etc. Five decades can be covered and this arbitrary division has been chosen for the contour maps. Canada wide series of maps constituting the National Geochemical Reconnaissance.

The symbol size is not intended to assist the eye in locating the regional trends. Even if the symbol size were intended to assist the eye in locating the regional trends of the data for gross regional features. To fulfill the need for a more specific and quantitative description of the data, histograms, frequency curves and tables should be consulted. To assist in the appraisal of the data in terms of the symbol map bedrock geology, a table of summary statistics for the drainage samples derivatively derived from artistic such bedrock units, on broad lithologic units, is presented below the histogram. In many instances, the table will also illustrate, more clearly than the histogram, the contrast between the various rock units. It should also be observed that whilst the total data appears to approximate a log-normal distribution the data for individual rock or lithologic units appear to approximate a normal distribution. Consequently, the geometric mean will be close to the limit of detection limit for a large number of samples (e.g. Li and F in water, Ag, Mo and A in sediment). In these situations, the frequency distribution will be positively skewed and the use of the arithmetic mean and standard deviation as parameters must be exercised when using the table of summary statistics to establish background and anomalous concentration ranges for a given element.

The threshold values shown on the figure are for geological, environmental and recorded data should be utilized. The data separation by common 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.

Table of Summary Statistics for Sample Media Underlain by the Different Lithologies

Lithology	No. of Samples	Geometric Mean	Arithmetic Mean	Geometric S.D.
Dolomite	60	2.1	2.1	0.4
Limestone	98	2.1	2.1	0.4
Argillite	106	2.1	2.1	0.4
Shale	457	2.0	2.0	0.3
Siltstone	29	2.0	2.0	0.3
Siltstone	26	2.0	2.1	0.3
Sandstone	312	2.1	2.2	1.9
Quartzite	113	2.1	2.1	0.3
Conglomerate	56	2.1	2.1	0.3
Syenite	7	3.6	4.4	3.2
Granite	16	2.1	2.1	0.2
Basalt	6	2.1	2.1	0.2
Undivided Sedimentary Rock	66	2.1	2.3	1.9

Data units are in ppm

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 419

Resource Geophysics and Geochemistry Division

Geological Survey of Canada, Ottawa

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Data processing by Computer Sciences Canada
Data verification and compilation by R.G. Garrett, N.C. Lund and D.J. Ellwood.

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 419, 420, 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 TERRITORY, 1976
Tombstone

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
TOMBSTONE IN STREAM SEDIMENTS

URANIUM RECONNAISSANCE PROGRAM

Scale 1:250,000

Kilometres 0 5 10 15 20 25
Miles 0 5 10 15

Universal Transverse Mercator Projection
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