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

Parts of 104 D, E and 114 A, H

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
BARIUM IN STREAM SEDIMENTS
URANIUM RECONNAISSANCE PROGRAM

LEGEND
Note: Title legend is common to National Geochemical Reconnaissance Map 14-1976, Open File 419, Title Page, Open File 419 and Map 1501, Open File 421

QUATERNARY
Qa — Unconsolidated glacial and alluvial deposits

CRETACEOUS
Kc — CRETACEOUS shale and conglomerate; Ch, KORKY CLAIM FORMATION: sandstone, shale and coal; Cb, DUNNE FLOW FORMATION: conglomerate, fine and sandstone; Cs, APEX RIVER FORMATION: shale and siltstone
Kv — CRETACEOUS basalt, andesite and rhyolite, commonly amygdaloidal and sometimes massive breccia

JURASSIC
Jg — GRANITIC and gabbro

TRIASSIC
Tv — Massive green and maroon shale and brown siltstone

DEVONIAN
Dm — KOKE HILL QUARTZITE: massive quartzites, minor slates and phyllite

ORDOVICIAN
Oc — LOWER ORDOVICIAN limestone, shale, phyllite and minor quartzite; Ctm, CHAMBERLAIN MEMBER

CAMBRIAN
Cr — CAMBRIAN CONGLOMERATE FORMATION: shale, phyllite, and minor quartzite
Cs — SEVEN SISTERS FORMATION: shale and phyllite; Cm, MOUNT CLEVELAND MEMBER: limestone, shale, calcareous shale, and siltstone; Cb, BOSWELL FORMATION: limestone, shale, calcareous and fossiliferous siltstone
Cm — MOUNT CLEVELAND MEMBER: limestone, shale, calcareous and fossiliferous siltstone

PROTEROZOIC
Pr — RUNDLE FORMATION: limestone and shale; unnamed clastics and carbonates

PROTEROZOIC
Pr — UNNAMED CARBONATES AND CLASTICS

PROTEROZOIC AND ARCHEAN
Pr — UNNAMED CARBONATES AND CLASTICS
Ar — WATSON GROUP: metaclastic, limestone, iron formation and dolomite

ARCHEAN
Ar — UNNAMED METAMORPHIC rocks

LOWER TO MIDDLE DEVONIAN
Dc — DELIZA FORMATION: limestone; CORVIDAE FORMATION: limestone; MIDDELL FORMATION: limestone and shale; unnamed limestone, dolomite, siltstone and minor shale and chert

UNDIFFERENTIATED CLASTICS
Ds — KOKE RIVER FORMATION: shale, limestone, black chert and argillite; minor quartzite and undifferentiated conglomerate
Dv — DEVONTE and limestone; argillaceous limestone and dolomite; minor quartzite and shale

CAMBRIAN
Cl — Limestone and dolomite, minor chert and clastic unnamed clastics; Ms, MOUNT STEPHEN FORMATION: limestone, dolomite, shale and minor quartzite; Mbm, MT. BOSWELL FORMATION: limestone, dolomite and limestone

PRECAMBRIAN AND CAMBRIAN
Pc — Undifferentiated metamorphic rocks, dolomite, schist, conglomerate, shale, chert, siltstone and limestone

Pc — Quartzite, sandstone, quartz-pebble conglomerate, marble and gneiss facies, dolomite schist, quartz-mica schist, phyllite, limestone and dolomite

PRECAMBRIAN
Pc — Unnamed carbonates and clastics

PRECAMBRIAN
Pc — MUSKWA GROUP: sandstone and dolomite; TSICHTSA FORMATION: limestone and dolomite, unnamed carbonates, shale and gypsum

Pc — Undifferentiated metamorphic rocks, dolomite, schist, conglomerate and minor shale, quartzite, conglomerate, limestone, black shale, phyllite and siltstone

PRECAMBRIAN AND CAMBRIAN
Pc — Limestone, shale, phyllite quartzites, dolomite, conglomerate and siltstone; limestone

Drift-covered areas.
Geological contact.
Fault.

Geology generalized for geochemical maps by W.E. Goodfellow from Hanch Creek (116I) and Carlson Creek (116J) by J.H. Green (G.S.C. Mem. 384, 1972); and Wood River (106I) and Hart River (116A) by D.H. Norris (G.S.C. Open File 229, 1975)

Geological cartography by the Geological Survey of Canada

Base-map assembled by the Geological Survey of Canada from maps published on the same scale by the Surveys and Mapping Branch in 1954, 1957

Mean magnetic declination 1977, 34°32.7' East, decreasing 7.9' annually. Readings vary from 34°01.8' in the SE corner to 34°33.8' 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 governed by the nature of the bedrock and overlying physiography, geology, the sample media and the chemistry of the elements determined.

Physiographical regions within the survey area include the Mackenzie, Ogilvie and Richardson Mountains, the Peel Plateau and the Yukon Coastal Plain. The Mackenzie Mountains consist of thick, intensely deformed, Proterozoic to Upper Cretaceous, clastic sedimentary rocks. Deep chemical breakdown of the underlying rocks and has been transported as particulates during 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 Peel Plateau flow through areas of poorly drained, thick, fine-grained glacial drift 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. Fe, Mn, Cu, Zn, Mo, U, Ag, Au) and in the development of geochemical anomalies. It is suggested that field observations, such as sediment composition, present in the data listing be considered when examining the metal content of any specific site.

Within the survey area, the Precambrian Mackenzie Mountains and Ogilvie and Richardson Mountains host rocks that range in age from Upper(?) Proterozoic to Upper Cretaceous, with almost every period represented. To date, it has been reported to occur in brecciated dolomite, in quartz-pebble conglomerate, and in veins in the Ogilvie and Richardson Mountains. Other geological environments that are considered to have a high potential in the survey area include the following: the Mesozoic clastics stocks and batholiths; the Paleozoic shales as a source of Ba; grade and high tonnage Cu; the Mesozoic and Cenozoic sedimentary basins such as the Eagle Plains and Bonnet Plume Basin; the Proterozoic Rae and Hare Faults and unconformities which may serve as possible traps for deposition of U.

Because of the mechanical derivation of stream sediments from mountainous terrain, the concentrations of many elements are controlled by the presence of "resistant" minerals, for example shale, or their metamorphic equivalents, which are common in Proterozoic, Paleozoic and Mesozoic rocks. Some high background concentrations for U and most other elements may be found in the fine fraction of sediments derived from these sources. Therefore, it is suggested that each stream system be evaluated in terms of the local factors affecting the geochemistry of the surficial environment.

The relationship between the concentrations of Fe, Mn, Co and base-metal anomalies should be considered when evaluating geochemically anomalous stream sediments. For example, Ba, Cu, Co tend to a lesser extent, Mn, Y, and a are associated with the Proterozoic U occurrences whereas Mo, F and to a lesser extent Sn would be expected to be associated with primary U mineralization in shallow plutons. Because of the complex nature of the geochemistry of the survey area, care 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 the most favourable exploration targets on the basis of not only the absolute concentration but also element interrelationships.

The concentration of an element at a sample site is graphically represented as one of nine different sizes of symbol, the largest symbol being reserved for the highest 2% plotted. 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 spoil crosses at the Anvil Range Camp (116A/15) are not considered anomalous because of the high analytical detection limit, or in the data group containing the detection limit. The data are grouped on a semi-logarithmic scale, i.e. 1,2,3,5,10,20,30,100 etc. Five decades can be zoomed and this arbitrary distribution has been chosen for the survey Canada wide series of maps constituting the National Geochemical Reconnaissance.

The data listing should be examined before any attempt is made to use the map, such is based on the histogram and cumulative frequency plot for the total survey data from one, or more contiguous, open file sheets covered in one field season.

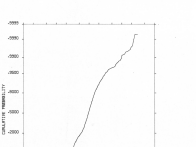
Histograms, which are a plot of the number of times a value occurs in a group usually includes the median of the data as defined by the 0.5 (50%) point on the cumulative frequency plot. Some, or all, of the remaining 14 symbols are chosen to enhance the anomalous data distribution.

The data symbol maps are only intended to assist the user to become familiar with the data for gross regional features. To fulfil the need for a more specific and detailed examination of the data, the data listing, which is part of the Open File, should be consulted. To assist in the appraisal of the data in terms of the symbol map legend-group, a table of summary statistics for the drainage samples determined for each lithology within each bedrock unit, or local lithologic unit, is presented below the histogram. In many instances, the table will also illustrate, more clearly than the histogram, the presence of anomalous data within the survey area. It 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. Some elements are characterized by a large number of data at the detection limit for a large number of samples (e.g. U and F in water; Ag, Mo and a in sediment). In these situations, the frequency distribution will be positively skewed. Where this is the case, the mean and standard deviation of the data must be examined when using the table of summary statistics to establish background and anomalous concentration ranges for a given element.

Where more than one sample medium is collected, geological, environmental and recorded 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.

Universal Transverse Mercator Projection
(Zones illegibly indicated)

This map has been reproduced from a copy of the best available quality. Any inaccuracies in the reproduction are due to poor original.



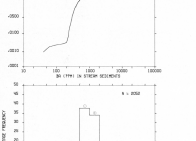


Table of Summary Statistics for Sample Media Underlain by the Different Lithologies

Lithology	No. of Samples	Geometric Mean	Geometric Mean	Arithmetic S.D.	C.V.1
Undefined	58	580	650	402	75
Limestone	351	580	674	1038	830
Dolomite	106	680	682	1050	170
Shale	952	1301	1653	1795	111
Siltstone	77	1000	1053	1731	111
Limestone	38	1000	1422	1050	74
Sandstone	712	1095	1267	1239	98
Quartzite	75	1000	1000	242	24
Conglomerate	58	851	1065	247	23
Syenite	7	1043	1044	307	64
Granite	15	1000	1000	307	64
Intrusive	1	1145	1172	366	30
Undefined Sedimentary Rock	44	1629	3176	4742	

Data units are in ppm

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OPEN FILE 419

Resource Geophysics and Geochemistry Division

Geological Survey of Canada, Ottawa

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Sample preparation by Bondar Associates
Data monitoring and compilation by R.C. Garrett, R.G. Lund and D.J. O'Connor.

Contractors

Sample preparation by Bondar Associates
Chemical analysts by Chemex Labs Ltd.

This map forms one of a series of 45 sheets released under Geological Survey of Canada, Open Files 416, 419, 420. The Open Files consists of data for 17 elements each for stream sediments, percent loss on ignition, pH 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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OPEN FILE 419
NORTHERN YUKON TERRITORY, 1976
BARIUM