LEGEND

Note : Tin (tested to contain in National Geochemical Reconnaissance No. 11-76, Open File 438), Mo (Griffy Lake Fire #4 and Mo 1-1978), Zone 17U UTM

QUATERNARY
Q — Unconsolidated glacial and alluvial deposits

PROTEROZOIC
PCC — CONGLOMERATE, shale and conglomerate, Fm, HONEY BEAR FORMATION: CONGLOMERATE, shale and pebbly, Fm, HONEY BEAR FORMATION: conglomerate and sandstone; Fm, ARTIS RED FORMATION: shale and siltstone
PCM — MARBLE, dolomitic and calcitic marble, commonly porphyritic and locally fossiliferous; minor shale
PCA — Granite and gabbro
PCM — Marble green and maroon shale and brown siltstone
PCK — KING HILL QUARTZITE: massive quartzites; minor slate and phyllite
ARCHEAN(?)
A(?) — LOWER QUARTZ diorites, quartzite, slate, phyllite and minor quartzite; Fm, limestone and shale
MESOZOIC
TRIASSIC
TR — DOGIE FORMATION: limestone and shale; unnamed clastics and carbonates
DEVONIAN
D — UNDIVIDED FORMATION, grey shale and limestone; Fm, CANOL CREEK FORMATION: sandstone, shale, carbonaceous and calcareous, pebbly
CARBONIFEROUS TO PERMIAN
CP — CITRON FORMATION, shale and limestone; HART RIVER FORMATION: shale, siltstone, sandstone and limestone; Fm, TAKHINI FORMATION: black shale, chert, chert-pebble conglomerate, dolomitic limestone, lenticular and silica
PP — HART RIVER FORMATION: shale; unnamed conglomerate
CRETACEOUS
K — UNDIVIDED SEDIMENTARY FORMATIONS
K(?) — COAL FORMATION: black shale; WITH RICH FORMATION, chert-pebble conglomerate, sandstone, siltstone, shale, slate, phyllite, and other chert-cobble conglomerate

CAENOZOIC
TERTIARY
T — UNDIVIDED VOLCANICS: basalt, andesite, rhyolite, dacite, and pyroclastics
T — UNDIVIDED SEDIMENTARY FORMATIONS: conglomerate, sandstone, shale, siltstone, and coal

LINES TO REVISE SOURCES
CC — CARLILE FORMATION: limestone; CORVUSCA FORMATION: limestone; LITTLE MICHELLE FORMATION: limestone and calcite, unnamed limestone; Fm, TAKHINI FORMATION: limestone shale chert
INTRUSIVE AND VOLCANICS
MR — MORE RIVER FORMATION: shale, limestone, black chert and argillites; minor quartzite and chert-cobble conglomerate
K — Siltstone and limestone; argillaceous limestone and dolomite; Fm, ARTIS RED FORMATION: shale
CARBONIFEROUS
C — Limestone and dolomite; minor red shale; unnamed clastics; Fm, CARBONIFEROUS FORMATION: limestone, shale, and chert; Fm, ARTIS RED FORMATION: limestone, dolomite and siltstone
PROTEROZOIC
PCC — Quartz sand, quartzite, shale, breccia, tuff, agglomerate, shale, chert, siltstone and limestone
PCK — Quartzite, sandstone, quartz-pebble conglomerate, narrow and green shale, dolomite schist, quartz-mica schist, phyllite, limestone and minor slate
ARCHEAN(?)
A — Undivided carbonates and clastics
A — WHITE ARMOUR: quartzites, limestone, iron formation and dolomite
MESOZOIC
K — KATHERINE FORMATION: sandstone and dolomite; SILVERIA FORMATION: shale, siltstone, dolomite, limestone, conglomerate, and sandstone
K — Undivided sedimentary rocks, chiefly conglomerate, sandstone, and siltstone
K — Undivided sedimentary rocks, chiefly conglomerate, sandstone, and siltstone
MILLIGAN AND ITI VOLCANICS
K — Argillites, slate, argillite quartzite, dolomite, conglomerate and siltstone

Drift-covered areas
Geological contact
Fault

Geology generalized for geochemical maps by W.D. Goodfellow from Nash Creek (1969) and Larsen Creek (1964) by J.H. Green (G.S.C. Mem. 366, 1971), and Wind River (1965) and Hart River (1960) by D.C. Norris (G.S.C. Open File 279, 1975)

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 1964, 1973

Mean magnetic declination 1977, 30°00.7' East, decreasing 2.5' annually. Readings vary from 30°25.0' in the SE corner to 30°36.0' 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 from one geochemical province to another, depending on physiography, geology, the sample media and the chemistry of the elements determined.

Physiographical regions within the survey area include the Wernecke, Ogilvie and Mackenzie Mountains, the Peel Plateau and the Mackenzie Plain. Each of these is characterized by extensive, intersecting escarpments. Intensive mass-movement has been derived by the mechanical breakdown of the underlying rocks and has been transported as particulates during the Pleistocene by glaciers, meltwaters and gravity, and by wind during the Holocene. Bedrock is only minor organic matter present. By contrast, streams intersecting the Canol Plains and Bonnet Plume basin are commonly discontinuous, flow at low velocities, and deposit fine-grained sediments. Lakes are numerous and commonly shallow. Permafrost is present to play a significant role in the transport and deposition of certain elements (e.g. Ag, Bi, Sn, Cu, Co, Ni, Mo, etc.) and may therefore produce spurious anomalies. It is suspected that the presence of permafrost may enhance the mobility of some elements at the bedrock-overburden interface thereby increasing the areal contrast of any specific element.

The geology of the survey area is represented by sedimentary, volcanic and intrusive rocks that range in age from Lower(?) Proterozoic to Upper Cenozoic, with almost every period represented. To date, U has been reported to occur in brecias associated with the Proterozoic unconformity and in Cretaceous and Tertiary granites. Other geological environments that are considered to have a high uranium potential in the survey area include the following: the Mesozoic alkaline stocks and dykes; the Cretaceous and Tertiary granites; the Tertiary and Quaternary volcanics; the Mesozoic-Cenozoic sedimentary basins such as the Eagle Plain and Bonnet Plume basin; and structures such as faults and unconformities which may serve as favorable channels for U-bearing fluids.

Because of the mechanical dominance of stream sediments from mechanical terrain, the geochemistry is strongly influenced by the chemistry of the underlying rocks. For example, the Rapitan Group sediments, which are derived from the Coppermine Volcanics and Mequasis rocks, have high background concentrations for Cu and most other elements determined which is reflected in the geochemistry of the stream sediments. Similarly, the Proterozoic sediments of the Hart River anomaly is seen at the local scale affecting the geochemistry of the surficial environment.

The element associations expected for particular types of U and base metal mineralization should be considered when evaluating geochemically anomalous stream sediments. For example, Ba, Cu, Co and Sc a lesser extent, Mo, F, and W are associated with U in vein-type mineralization, whereas Mo, Cu, Ag, Pb, Zn and Ni with Cu, Pb and Zn would be expected to be associated with primary U-mineralization in sandstone strata. Furthermore, element associations in stream sediments and waters will be useful in delineating geochemical provinces which may reflect U-Th fertility of underlying lithologicity. Anomalous geochemical trends within these regional patterns should then be evaluated for possible mineralization on the basis of not only the absolute concentrations but also the element associations.

The concentration of an element of a sample site is graphically represented as one of 15 symbols; if a sample was collected but there is no data available a dot is plotted. The symbols increase in size from 1/16 inch for the smallest to 1 inch for the largest symbol and then increase in blackness by 5% fifteenth. The two small crosses at the low end of the scale are used to respectively denote concentrations below the analytical detection limit and those which are considered to be of no significance. The data are grouped on a semi-logarithmic scale, i.e. 1,2,5,10,20,50,100 etc. The decades can be spanned and this arbitrary division has been chosen for the contouring Canada wide series of maps constituting the National Geochemical Reconnaissance.

The choice of symbols and the data groups they represent for any specific element is a function of the distribution of the data. Experience has shown that a simple data free one, or more contiguous, open fifth shows clustered in one field usually. The eighth symbol is used for the model group as defined by the histogram, this group usually includes the median, the mean and the mode. The 15 symbols are used on the statistic frequency plot. Some, or all, of the remaining 7 symbols will be used to achieve an appropriate graphical layout.

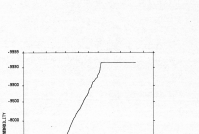
The symbol system described above is intended to assist the rapid inspection of the data for gross regional features. To fulfill the need for a more specific and thorough interpretation, the field and analytical data provided in the data listings should be considered. The use of the symbol system is such that the data listings may be ordered geology, a table of summary statistics for the drainage samples determined 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 maps, the dependence of mean geochemical levels on bedrock type. It may also indicate the degree to which the data from each bedrock unit is skewed. Distribution the data for individual map or lithologic units appears to approximate a normal distribution except where the concentration of an element at or below the detection limit is high, in which case distribution will be highly skewed (e.g. Mo in sediments). In these situations, the frequency distribution will be positively skewed and the mean will not represent the total population. Therefore, caution should be exercised in the use of the mean and standard deviations to establish background and anomalous concentration ranges for a given element.

To comprehensively study an area, all available geological, environmental and regional geochemical data must be used. Interpretation of the data may be greatly improved by constructing new data subsets and deriving local threshold levels based on the most detailed and up-to-date knowledge available.

EXAMPLE

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

Parts of 106 D, E and 116 A, H



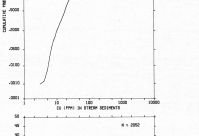


Table of Summary Statistics for Sample Media Underlain by the Different Lithologies

Lithology	No. of Samples	Geometric Mean	Mode	Arithmetic Mean ± S.D.	C.V.
Dolomite	60	14	16	15	68
Limestone	186	16	16	17	58
Shale	1161	29	58	810	365
Clastic	457	20	24	26	91
Mudstone	8	21	29	26	59
Siltstone	112	19	24	21	50
Argillite	712	19	24	24	86
Quartzite	113	46	54	54	64
Conglomerate	17	46	58	58	58
Chert	7	66	58	78	50
Basalt	15	95	49	118	57
Intrusive	8	34	61	37	48
Undivided Sedimentary Rock	46	19	22	14	61

Data units are in ppm

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 439

Resource Geophysics and Geochemistry Division

Geological Survey of Canada, Ottawa

Planning and coordination by staff of the Geochemical Section, Resource Geophysics and Geochemistry Division, and of the Cordilleran Subdivision, Regional Geology Division, GSC, Ottawa
Field operations supervised by R.G. Lynd and W.D. Goodfellow
Analytical contract supervision by J.J. Lynch
Computer program and compilation by M.E. Cornwall, R.G. Lynd and D.C. Ellwood

Contractors

Sample preparation by Bondar 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 438, 439, 440. The Open Files consists of data for 11 elements each for stream sediments, pan-mat test on tailings, 2 elements for stream waters and sample site location

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

The Director,
Computer Science Centre,
Department of Energy, Mines and Resources
Ottawa, Ontario K1A 0G1

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
COPPER IN STREAM SEDIMENTS
URANIUM RECONNAISSANCE PROGRAM
Scale 1:250,000

© Crown Copyrights reserved

This map has been reproduced from a copy supplied by the author. Reproduction and distribution of such copy is unauthorized.

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 15-1976
OPEN FILE 439
NORTHERN YUKON TERRITORY, 1976
COPPER