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

Parts of 106 E, Level 114 H, I

# NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 16-1976
## URANIUM IN STREAM SEDIMENTS
## URANIUM RECONNAISSANCE PROGRAM

Scale 1:250,000

Kilometres 0 5 10 15 20 25 30 Kilometres
Miles 0 5 10 15 20 Miles

Universal Transverse Mercator Projection
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NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 16-1976
OPEN FILE 420
NORTHERN YUKON TERRITORY, 1976
URANIUM

LEGEND

Note: This legend is common to National Geochemical Reconnaissance Map 14-1976, Open File 419, Map 15-1976, Open File 420 and Map 16-1976, Open File 421

QUATERNARY

Q — Unconsolidated glacial and alluvial deposits

CRETACEOUS

K1 — Sandstone, shale and conglomeratous; CH, KORKET PLUME FORMATION; sandstone, shale and conglomerate; KH, HUSKY FORMATION; sandstone and siltstone; CRA, ARTIC RED FORMATION; shale and siltstone

K — Porcellanite and bentonitic/silicic tuffs; commonly porphyritic and contains moderately minor olivine

JK — Diorite and gabbro

TRIASSIC

TR — Marine green and maroon shale and brown siltstone

DEVONIAN

D — BIRCH HILL QUARTZITE; massive quartzite; minor slate and phyllite

ORDOVICIAN

O — LOWER SILURIAN division; argillite, slate, phyllite and minor quartzite; fine, sandstone and shale

PROTEROZOIC

PZ — EAGLE FORMATION; limestone and shale; uncomed clastics and carbonates

PLUTONIC

PZ — TRAVERSE FORMATION; grey-green and limestone; TA, ZONALI GRIS FORMATION; lamprophyre, shale, carbonates and clastics; undivided

LOWER/PROTEROZOIC TO ARCHEAN

PA — ITKILYA FORMATION; shale and limestone; HUNT RIVER FORMATION; shale, limestone and dolomite; BEAVER RIVER FORMATION; shale, siltstone, black shale, chert, chert-pebble conglomerate; miscellaneous, quartzites, sandstone and shale

PA — ITKILYA FORMATION; shales; uncomed conglomerate

ARCHEAN

PA — MIDDLE PROTEROZOIC TO CRYPTOZOIC(?)

PA — LOWER PROTEROZOIC; BAYLISS RIVER FORMATION; chert, quartzite, dolomite, limestone, shale, phyllite, quartzite, slate, limestone and minor chert-pebble conglomerate and quartzite

LOWER TO MIDDLE DEVONIAN

DCM — DELORME FORMATION; limestone, CARMACKS FORMATION; limestone, MISSELLE FORMATION; limestone and shale; uncomed limestone, dolomite and interbedded black chert

ORDOVICIAN AND SILURIAN

OSR — ROAD RIVER FORMATION; shale, limestone, black chert and argillite, SILURIAN; limestone, dolomite and minor shale

O — Dolomite and limestone; undifferentiated limestone and dolomite; minor black cherty nodules

CAMBRIAN

C — Quartz limestone and dolomite, minor red shale; uncomed clastics; Ea, massive sandstone conglomerate, shale and local anhydrite and limestone; CAMBRIAN, Ea, GRANITE CREEK FORMATION; limestone, dolomite and limestone

PROTEROZOIC AND/OR LATER

PZ — Dark green volcanic rocks, basalts, tuff, agglomerate, shale, limestone and minor quartzite

PZ — Quartzite, sandstone, quartz-pebble conglomerate, marine and green shale, siltstone schist, quartz-mica schist, phyllite, limestone and black chert

PROTEROZOIC

PZ — Uncomed carbonates and clastics

PZ — BOYTON SERVOS; dolomite, limestone, iron formation and dolomite

PROTEROZOIC AND ARCHEAN

PA — ITKILYA FORMATION; Lonestone and dolomite; TEXTURE FORMATION; Lonestone and dolomite; uncomed carbonates, shale and gypsum

PA — Tsango Dolomite, slate, phyllite, gray dolomite, gray and maroon shale; QUARTZITES; conglomerate, limestone, black chert, dolomite and minor shale

ARCHEAN AND (?) GRANITOIDS

A — Gneiss, schist, phyllite, quartz-mica, dolomite, conglomerate and diffused limestone

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

Geology generalized for geochemical map by A.D. Goodfellow from sited River (1961) Geological Map of Canada, Map 1141A, Scale 1:1 Million File (74, 1976), and Eagle River (1961) Geological established map by D.K. Norris

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, 1958

Mean magnetic declination 1977, 20°52.2' East, decreasing 2.4' annually. Readings vary from 20°36.6' in the SE corner to 21°21.2' 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.

In the Yukon Territory, particularly in the areas below the Barnecke, Ogilvie and Richardson Mountains, and the Eagle Plains and Bonnet Plume basins. Most of the sediment in streams intersecting mesozoic terrain has been derived by the mechanical breakdown of the underlying rocks. Fine-grained sediments are commonly absent and the heavy spring run-off flushes 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 commonly silicaceous, flow at low velocities, and deposit organic-rich sediment. Under these conditions, organic matter may be expected to have a significant effect on the concentrations of certain elements (e.g. Mo, Ti, Fe, Cu, Zn, Ni, Mn, etc.) and may therefore produce spurious anomalies. It is suggested that field observations, such as sediment composition, present in the data bank, be used to evaluate anomalies caused by organic concentrations in the sediment.

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 the Proterozoic and Cretaceous rocks the most widespread. The Proterozoic rocks are associated with the Proterozoic sedimentary and volcanic rocks of the Ogilvie Mountains. Other geological environments that are considered to have a high U potential in the survey area include the Tertiary: the Mesozoic alkaline stocks and batholiths; the Paleozoic clastics as a source of low grade and high tonnage U; the Proterozoic and Archean granitoids as a source of U; and the Proterozoic mafic, basic, and intrusives such as faults and unconformities which may serve as favourable traps for deposition of U.

The geochemical and geochemical derivation of stream sediments from mountainous terrain, the geochemistry is strongly influenced by the chemistry of the underlying rocks. For example shales, or their metamorphic equivalents, which are common in Proterozoic, Paleozoic and Mesozoic rocks, are usually enriched in many elements. The abundance of other elements determined which is reflected in the geochemistry of the stream sediment. 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 U and base metal ore-deposits should be established and used to evaluate anomalies in the stream sediments. For example, Cu, Co, Zn and to a lesser extent, Mo, Y, and W are associated with the Proterozoic U occurrences whereas Mo, F and to a lesser extent Pb, Zn, Ag and Cu are associated with the Cretaceous U occurrences in the Yukon Territory. Furthermore, element associations in stream sediments and waters will be useful for identifying regional geochemical trends that may be, at least in part, controlled by bedrock geology. Local geochemical trends within the basin of individual streams can then be evaluated for possible mineralization on the basis of not only the absolute concentrations but also element interrelations.

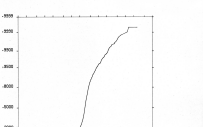
The concentration of an element at a sample site is graphically represented as one of 15 symbols if a sample was collected but there is no data available a dot is plotted. The symbols are made up of a square, a circle and a triangle, a square symbol and then increase in blackness to the fifteenth. The two small crosses at the low end of the scale are used to respectively denote concentrations below the analytical detection limit and at the detection limit. The concentration ranges for the data are grouped on a semi-logarithmic scale, i.e. 1-2,5,10,25,50,100 etc. Five decades can be spanned and this arbitrary division has been chosen for the continuing Canada-wide series of maps for the National Geochemical Reconnaissance.

The choice of symbols and the data ranges they represent for any specific element is based on the histogram and cumulative frequency graph for the particular data from one, or more contiguous, open file sheets covered in one field season.

The eighth symbol is used for the modal group as defined by the histogram, this group usually includes 40 to 60 percent of the total population. The 1st, 2nd, 14th and 15th symbols frequency plot. Some, or all, of the remaining 10 symbols are chosen to achieve an appropriate graphical impact.

The histogram and probability graph is intended to assist the rapid inspection of the data for gross regional features. To fulfil the need for a more specific and thorough interpretation, the field and analytical data provided on the data listings should be consulted. To assist in the appraisal of the data in terms of the total map-bedrock geology, a table of summary statistics for the drainage samples distributed by lithology and sample media for each element is presented on the data sheet below the histogram. In many instances, the table will also illustrate, more clearly than the maps, the dependence of some geochemical levels on bedrock type. It may be noted that the mean value for U in stream sediments is higher than the median value for 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. In this instance, the distribution of the data is skewed to the left (i.e. is sublevel). In these situations, the frequency distribution will be positively skewed and the mean will not represent the total population. Therefore, caution must be exercised when using the table of summary statistics to establish background and anomalous concentration ranges for a given element.

The relationship between the data and the various 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.



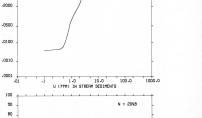




Table of Summary Statistics for Sample Media Underlain by the Different Lithologies

| Lithology | No. of Samples | Geometric Mean | Arithmetic Mean | S.D. | C.V. |
|---|---|---|---|---|---|
| Bolosdon | 50 | 1.7 | 1.8 | 0.9 | 50 |
| Boundary | 351 | 1.7 | 2.1 | 1.7 | 80 |
| Argillite | 186 | 3.3 | 4.9 | 5.1 | 103 |
| Shale | 433 | 3.3 | 3.6 | 2.1 | 57 |
| Limestone | 7 | 2.2 | 2.6 | 1.3 | 49 |
| Siltstone | 89 | 1.7 | 2.0 | 1.8 | 90 |
| Sandstone | 110 | 1.1 | 3.0 | 6.0 | 196 |
| Conglomerate | 13 | 2.3 | 2.3 | 0.8 | 35 |
| Conglomerate | 90 | 0.9 | 1.0 | 0.8 | 77 |
| Igneous | 7 | 26.8 | 29.5 | 20.2 | 69 |
| Tuff | 50 | 2.4 | 3.5 | 4.1 | 116 |
| Diorite | 6 | 2.4 | 4.5 | 4.3 | 96 |
| Undivided | | | | | |
| Sedimentary Rock | 46 | 4.4 | 7.3 | 8.4 | 114 |

Data units are in ppm

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 16-1976
OPEN FILE 420

Resource Geophysics and Geochemistry Division

Geological Survey of Canada, Ottawa

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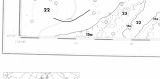
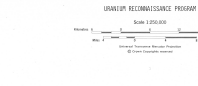
This map forms one of a series of 40 sheets released under Geological Survey of Canada, Open Files 416, 419, 420. The Open Files consists of data for 12 elements each for stream sediments, percent loss on ignition, 2 elements for stream waters and sample site location

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

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