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

Parts of 106 E, Level 1161H, I

Note: This layout is closest to National Geochemical Reconnaissance Map 14-1976, Open File 404, Map 15-1976, Open File 414 and Map 16-1976, Open File 422

Geology generalized for geochemical maps by R.D. Gandolfini from Allad Bliwer (1966) and Gert Struer 1968) by R.G. Worrin (G.S.C. Open File 274, 1974), and Eagle River (1981) manuscript unpublished map by R.G. Worrin

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 1956, 1959

Mean magnetic declination 1977, 30°27.2' East, decreasing 2.4' annually. Readings vary from 30°36.4' in the SE corner to 30°21.8' 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 controlled by the geochemical characteristics such as the physiography, geology, the sample media and the characteristics of the chemical tests used.

Physiographical regions within the survey area include the Barnesdale, Ophiolite 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 rock in situ and by the direct introduction of rock debris into streams by 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 sediments, a high organic content 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. U, Zn, Cu, Mo, Ag, Ni, Co, Mn, Fe) and consequently, in the formation of anomalies. It is against this background information, and the sediment composition, that the data relating be considered when examining the metal content of any specific site.

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 Quaternary deposits covering much of the area. Mineral deposits are of several types associated with the Proterozoic sedimentary and volcanic rocks of the Ogilvie and Mountains. Other geological environments that are considered to have a high potential for mineral deposits are: (1) the Upper Devonian black shales, cherts and carbonates; the Paleozoic shales as a source of low grade and high tonnage Cu, Pb, Zn; (3) Mesozoic and Cenozoic sedimentary basins such as the Eagle Plains and Bonnet Plume basin, which may act 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 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, may contain high concentrations of Cu, Pb, Zn and other elements determined which is reflected in the geochemistry of the stream sediments. Therefore, it is suggested that each stream system be evaluated in terms of the local facies and the chemical characteristics of the rocks underlying it.

The element associations expected for particular types of U and base metal mineralization should be considered when evaluating geochemically anomalous stream sediments. For example, Cu, Pb, Zn, Ag, Ni, Co, Mn, Fe, Mo, Ba and Sr may be associated with the Proterozoic U occurrences whereas Mo, F and Sn may favour association.

Fluorine, which is a pathfinder element for U, is known to be associated with different criteria than for stream sediment maps. The data for the U-F field data-entry, presented in the data listings, give a measure of the combined field and analytical errors. Each site was sampled in duplicate and analyzed in duplicate. Duplicate sampling over a short time-period in order to eliminate ephemeral effects. Seasonal variations in the magnitude of anomalies have been detected. However, in terms of contrast, the anomalies are persistent because both background and anomalous values vary synchronistically over longer periods of time. Considering the above, cautions must be exercised when using the data presented in the data listings and on the data maps.

Samples displaying the highest U and F levels are not necessarily indicative of the mineral occurrences. Differential leaching of bedrock and recycling of U and F in high-energy environments may be responsible for some of the highest values. Therefore, it can be expected to give a qualitative indication of the anomalies. The data should be interpreted in terms of the drainage basin geology, i.e. potential primary source and secondary and recycling environments. Anomalous U and F stream sediments collected may not necessarily support a particular model of uranium provenance.

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 arranged so that they first increase in size to the eighth symbol and then decrease in size to the fifteenth symbol. The values listed in the Tab and Uf the scale are used to respectively denote concentrations less than the analytical detection limit, or in the data group containing the detection limit. The data groups are established arbitrarily for each element. The U and F data groups can be updated and this arbitrary division has been chosen for the continuing Canada wide series of maps constituting the National Geochemical Reconnaissance. Each data group is represented by a different symbol on the data maps. The symbols used in each of the histogram and cumulative frequency plot for the element survey data from one, or more contiguous, open file sheets covered to one field season. The eighth symbol is used for the model group as defined by the histogram, this group usually includes the median of the data as defined by the 0.5 (50%) point on the cumulative frequency plot. The first seven and the remaining 15 symbols are chosen to achieve an approximate graphical impact.

The raw data symbol maps are only intended to assist the rapid inspection of the data and to illustrate regional variations. They should not be used as a substitute for thorough interpretation, the field and analytical data provided in the data listings should be consulted. To assist in the appraisal of the data in terms of the symbol maps, histograms and cumulative frequency plots have been prepared. Histograms, solely derived from within each geochemical unit, or bound 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 be observed that whilst the total data appears to approximate a log-normal distribution, the data for individual rock units may not. Many rock units display a normal distribution except where the concentration of an element at or below the detection limit for a large number of samples (e.g. U and F in water, Bo, Mo and Sn in sediments). In such cases, the distribution curve will be cut off to the left or 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 threshold concentrations for each of the rock units.

To comprehensively study an area, all available geological, environmental and recorded data should be utilized. The data separately 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.

LEGEND

QUATERNARY
[1] Recent/Holocene glacial eu.,fluvial deposits

CRETACEOUS
[2] Conglomerate, shale and conglomerate; Tn, ROMEO FLUME FORMATION: conglomerate, shale and coal; Tnb, ROMEO FLUME FORMATION: conglomerate, shale and coal; Tnb, BOMBAY PEAK FORMATION: conglomerate

[3] Sandstone and hornblende-biotite tuffs, commonly pyroclastic and pumice textured; minor shale

[4] Granite and gabbro

[5] Mottled green and maroon shale and brown siltstone

[6] HOOD HILL SUBSUITE: basaltic quartzite, minor shale and quartzite

JURASSIC
[7] LOWER JURASSIC division; arquillite, shale, phyllite and minor quartzite, tuff, conglomerate and shale

TRIASSIC
[8] EAGLE FORMATION: limestone and shale, unnamed clastics and carbonates

PERMIAN
[9] GRANDROY FORMATION: grey chert and limestone; Dw, JARREL CREEK FORMATION: sandstone, shale, carbonates and clastics, undivided

CARBONIFEROUS TO PERMIAN
[10] ITSEKA FORMATION: shale and limestone; HART RIVER FORMATION: shale, siltstone and limestone; Intrusive Group undivided; Ifa, limestone, shale, siltstone and tuff; Ifb, limestone, arkose, siltstone, limestone and tuff

[11] DEVONIAN FORMATION: shale; unnamed conglomerate

DEVONIAN TO CARBONIFEROUS
[12] CANOL FORMATION: black shale; NATION RIVER FORMATION: cherts, limestone and shale; unnamed limestone, dolomite, chert, shale, siltstone and minor clastic-carbonate conglomerate and quartzite

LIARD TO MIDDLE DEVONIAN
[13] DELORIE FORMATION: limestone; CHAPMAN FORMATION: limestone; unnamed limestone, dolomite and interbedded black shale; unnamed limestone, dolomite and interbedded black shale

ORDOVICIAN AND SILURIAN
[14] Limestone, dolomite, shale, limestone, black chert and argillite; minor quartzite and chert-pebble conglomerate

[15] Dolomite and limestone; argillaceous limestone and dolomite; dark siliceous rocks

CAMBRIAN
[16] Limestone and dolomite; minor red shale; unnamed clastics; Ou, Cambrian sandstone, conglomerate, shale and local anhydrite; and basalts; Pbmv and vBlu, RA CREEK VOLC Interbeds; unnamed basalt, andesite and tuff

PROTEROZOIC AND/OR LATER
[17] Dark green volcanic rocks, breccia, tuff, agglomerate, shale, chert, siltstone and limestone

[18] Quartzite, conglomerate, quartz-pebble conglomerate, carbon and green phyllite; Pbmv, basalt and andesite; quartz-pebble schist; phyllite, limestone and black chert

INTRUSIVE
[19] Unnamed carbonates and clastics

[20] BARTON GROUP: mudstone, limestone, iron formation and dolomite

SILICEOUS
[21] SATURDAY FORMATION: sandstone and dolomite; TAYLOR FORMATION: sandstone, siltstone, shale and limestone; unnamed sandstone

[22] Bronze dolomite, slate, phyllite, pink dolomite, grey and maroon shale, quartzite, conglomerate, limestone, black shale, sandstone and tuff

MELVILLE AND FIFTEEN RIVER

[23] Argillite, shale, phyllite quartzite, dolomite, conglomerate and siltstone limestone

Drift-covered areas.....
Geological contacts.....
Faults.....

Classifications in feet above mean sea-level

Table of Summary Statistics for Sample Media (underlain by the Different Lithologies)

Lithology	No. of Samples	Geometric Mean	Arithmetic Mean	C.V.
Dolomite	47	24	29	59
Limestone	117	19	24	69
Argillite	188	55	69	100
Shale	411	85	106	126
Mudstone	4	20	8	20
Siltstone	38	57	64	33
Sandstone	57	64	73	67
Quartzite	126	52	60	70
Conglomerate	66	13	35	93
Volcanics	7	30	23	60
Basalt	18	18	27	67
Diorite	6	46	50	27
Undivided Sedimentary Rock	42	95	375	1471

Data units are in ppb

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP 16-1976
OPEN FILE 422

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Contractor

Chemical analysis by Barringer Research Ltd.

This map forms one of a series of 45 sheets released under Geological Survey of Canada, Open Files 404, 479, 422. The Open Files consists of: Maps 1 to 45 Inclusive, Publication Information Sheet Text on ignition, 45 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 MAP16-1976
OPEN FILE 422
NORTHERN YUKON TERRITORY, 116N
FLUORINE IN STREAM WATERS

NATIONAL GEOCHEMICAL RECONNAISSANCE MAP16-1976
FLUORINE IN STREAM WATERS

URANIUM RECONNAISSANCE PROGRAM

Scale 1:250,000

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

Universal Transverse Mercator Projection
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EXAMPLE