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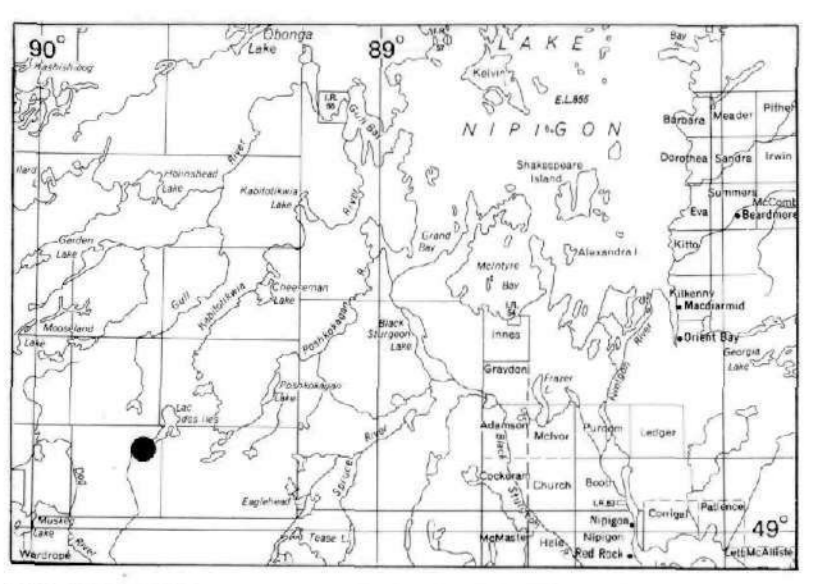


# HUMUS GEOCHEMISTRY IN THE LAC DES ILES AREA

## DISTRICT OF THUNDER BAY

NTS Reference: S2/4  
DDM-GSC Aeromagnetic Map: 20990  
DDM-GSC Geological Correlation Map: 20485

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Scale: 1:1 884 000 or 1 inch = 25 miles.  
"Science consists in grouping facts so that general laws or conditions may be drawn from them."  
Charles Darwin (1882)

### DESCRIPTION OF THE LAC DES ILES INVESTIGATION

**LOCATION**  
Lac des Iles is located 80 km northwest of Thunder Bay in the Huron and Bruce Shores area. The Lac des Iles area is approximately 1 km long and 0.5 km wide. The Lac des Iles is situated 1 km south of the Huron and Bruce Shores area. The Lac des Iles is situated 1 km south of the Huron and Bruce Shores area.

**Geological Setting**  
The geology and mineralization in the Lac des Iles area is described by Sutcliffe and Sweney (1985). The Huron and Bruce Shores area is primarily controlled by a contact between two gabbros: the Eastern Gabbro (a uniaxial leucogabbro/bedrock) and the Western Gabbro (Bedrock Domain B in Figure 3) which is more complex and includes gabbro, gabbroic, and gabbroic gabbro (Sutcliffe and Sweney 1985). Non-PGE mineralization occurs in the Western Gabbro in contact with the Eastern Gabbro. The sulphide mineralization which hosts the patterns of PGE mineralization also contains significant levels of nickel and copper and appears to be related to the contact between the two gabbros. Other copper-nickel and associated districts zones are described by Sweney and Sutcliffe (1985). Macton (1985).

**Bedrock Geochemistry**  
Rock geochemical data for the two bedrock domains (Landscape Domains I and II) are presented in Table 1. The Lac des Iles area is situated 1 km south of the Huron and Bruce Shores area. The Lac des Iles is situated 1 km south of the Huron and Bruce Shores area.

### RESULTS

Field descriptions of the humus samples collected along Line E are provided in Table 3. Generally, the humus material is typical of forest soils in the Lac des Iles area. The humus material is typical of forest soils in the Lac des Iles area. The humus material is typical of forest soils in the Lac des Iles area.

**Table 3. Description of the humus material collected along the sample line at Lac des Iles.**

Sample	Depth of humus (cm)	Notes
1	0-10	Dark brown humus on mineral soil.
2	10-20	Dark brown humus on mineral soil.
3	20-30	Dark brown humus on mineral soil.
4	30-40	Dark brown humus on mineral soil.
5	40-50	Dark brown humus on mineral soil.
6	50-60	Dark brown humus on mineral soil.
7	60-70	Dark brown humus on mineral soil.
8	70-80	Dark brown humus on mineral soil.
9	80-90	Dark brown humus on mineral soil.
10	90-100	Dark brown humus on mineral soil.

### DISCUSSION

The discussion and interpretation of the geochemical patterns in the humus data are described at each of the three humus size fractions (L.O.I., L.O.I. (N), and L.O.I. (K)). The abundance of 12 "major" elements in the Lac des Iles humus is compared with similar data obtained from other humus samples in the Lac des Iles area. The geochemical patterns along the traverse line in the Lac des Iles humus are discussed at the regional level.

**GLOBAL LEVEL**  
The Global Level interpretation of humus geochemical data provides a general summary of the "major" element geochemical data from the Lac des Iles area as compared with similar datasets from other areas in Ontario (Huron and Bruce Shores area). The group referred to here as "major" elements, includes the elements: Al, Si, Fe, Ca, Mg, Na, K, Ti, P, Mn, Ba, Sr, Ni, V, Zn, Cu, Ni, Pb, Bi, and W. The high correlations of most of these "major" elements with L.O.I. (Table 5), elements discussed in this section are identified with an asterisk (\*) indicates that the levels of many of these elements in humus is primarily controlled by the relative proportions of organic matter to mineral matter in humus. In humus, the mineral matter is primarily controlled by the relative proportions of organic matter to mineral matter in humus. In humus, the mineral matter is primarily controlled by the relative proportions of organic matter to mineral matter in humus.

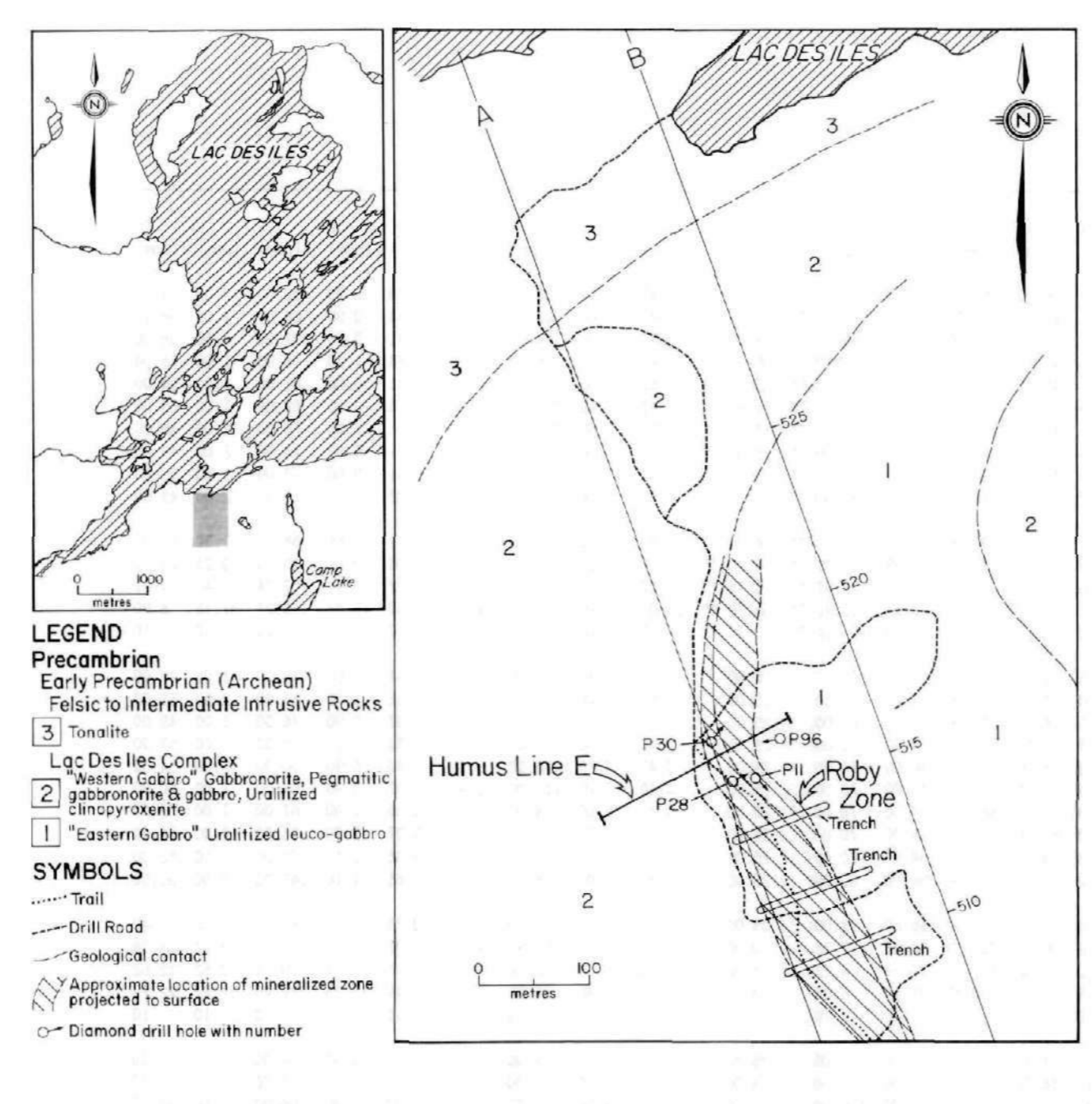


Figure 2. Location of the Lac des Iles sample line (Line E), together with general geological features of the sampled area from Sweney and Sutcliffe (1985).

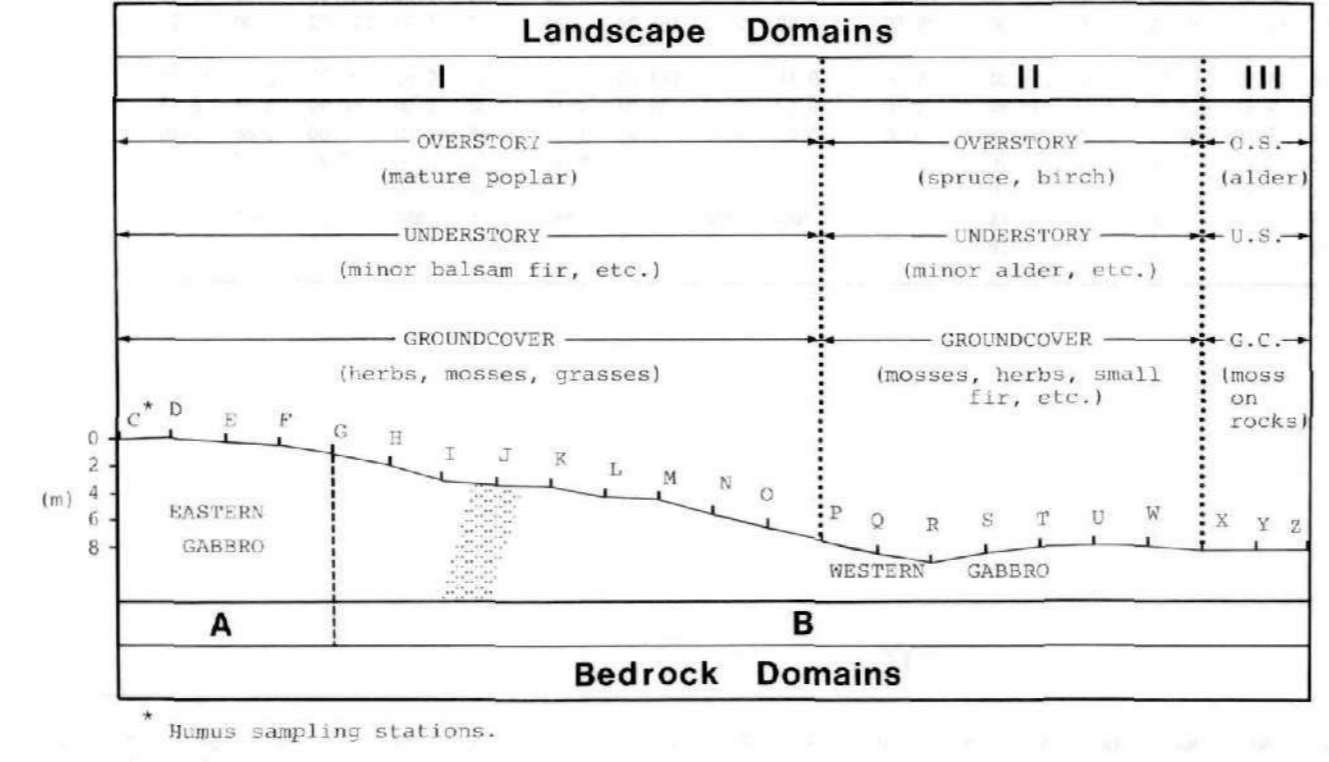


Figure 3. Landscape section of the Lac des Iles sample line (Line E) illustrating the generalized geology, relative vegetation along the line. The mineralized zone, located in Bedrock Domain B and identified by the dot pattern, has been inferred from drillhole data (see Figure 2 for location of drillholes).

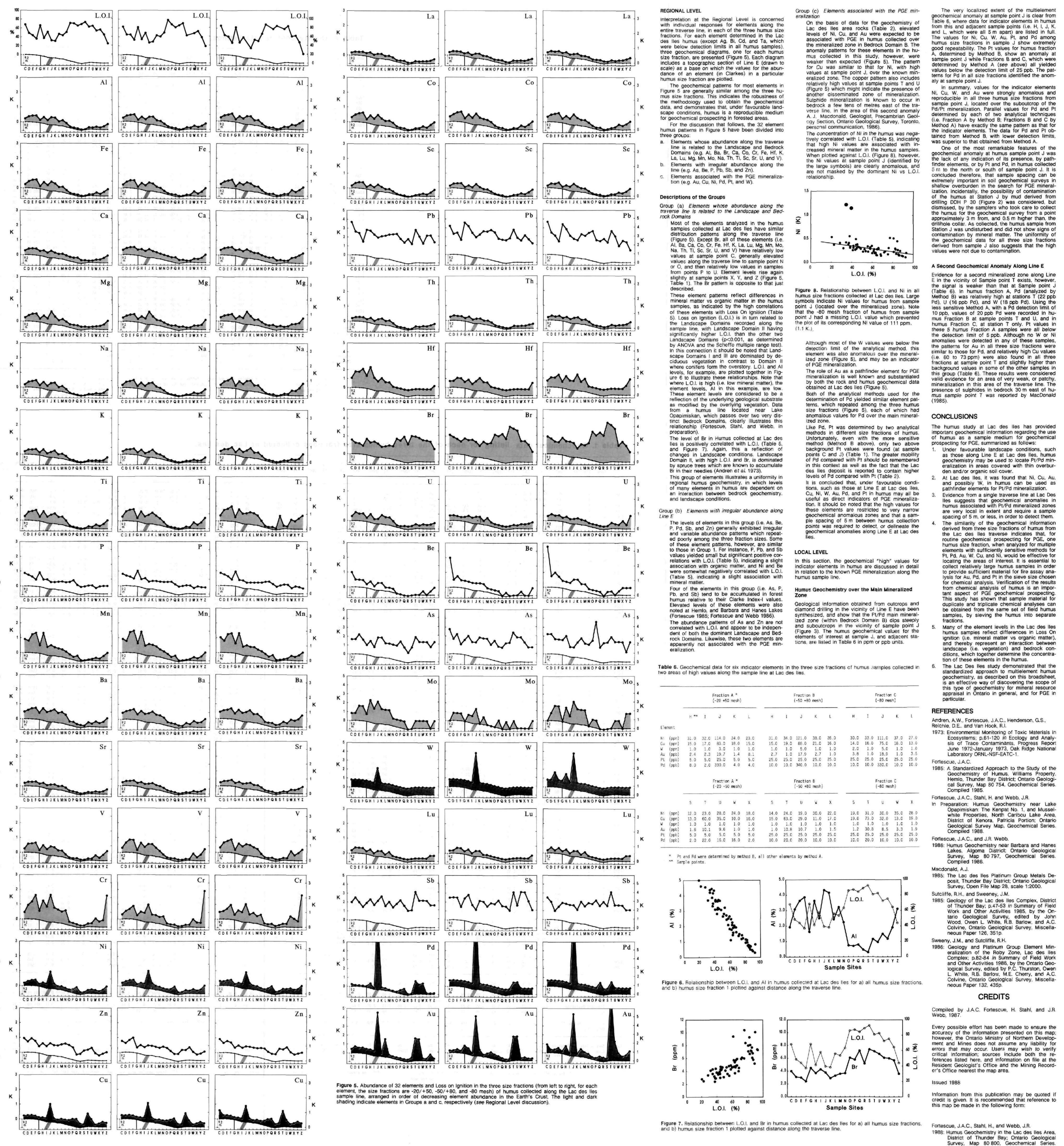


Figure 4. Relationship between Loss On Ignition (L.O.I.) and 12 "major" elements in all fractions of humus samples collected from the Lac des Iles area. The figure consists of a grid of scatter plots for elements: Al, Si, Fe, Ca, Mg, Na, K, Ti, P, Mn, Ba, Sr, Ni, V, Zn, Cu, Ni, Pb, Bi, and W. Each plot shows the concentration of the element versus L.O.I. (N) or L.O.I. (K). Note that two sample stations along the traverse line, with low Ni values, have been omitted from the figure in order to prevent excessive compression of the y-axis scale.

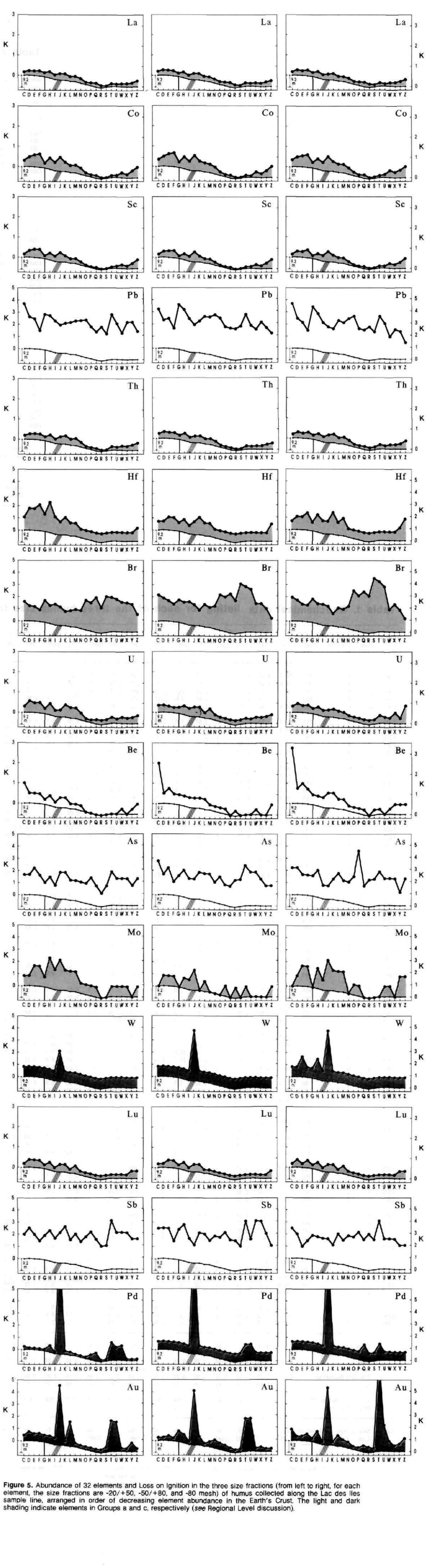


Figure 5. Abundance of 32 elements and Loss on Ignition in the three size fractions from left to right, for each element, the fractions  $(-20/+90)$ ,  $(-50/+80)$  and  $(-80/+70)$  ppm of humus collected along the Lac des Iles sample line, arranged in order of decreasing element abundance in the Earth's crust. The light and dark shading indicate elements in Groups a and c, respectively (see Regional Level discussion).



Figure 6. Relationship between L.O.I. and Br in humus collected at Lac des Iles for all humus size fractions, and b) humus size fraction 1 plotted against distance along the traverse line.

### INTRODUCTION

This study is one of a series of small scale projects designed to examine the feasibility of using multi-element humus geochemistry for the location of gold, base metal, or platinum group elements (PGE) mineralization in areas of shallow overburden (<5m deep) on the Canadian Shield of Ontario. Previous studies in this series have been completed in the vicinity of the Huron and Bruce Shores area (Forsuec, 1985), and at Lake Opinicon (Forsuec and Webb, 1985), and in the vicinity of the Huron and Bruce Shores area (Forsuec and Webb, 1985), and in the vicinity of the Huron and Bruce Shores area (Forsuec and Webb, 1985).

### GENERAL METHODOLOGY

#### DESCRIPTION OF LANDSCAPE MODEL

The standardized methodology for the collection of humus in the vicinity of a mineral deposit developed by Sutcliffe (1985) and used later at the Barbara and Huron Lake sites (Forsuec and Webb, 1985), and at Lake Opinicon (Forsuec and Webb, 1985), and in the vicinity of the Huron and Bruce Shores area (Forsuec and Webb, 1985), and in the vicinity of the Huron and Bruce Shores area (Forsuec and Webb, 1985).

#### OBJECTIVES

The project has three objectives:

1. to apply a standardized methodology for the study of multi-element geochemistry of humus at Lac des Iles area, in order to provide information on the feasibility of using humus as a medium for geochemical exploration of platinum group elements in the Canadian Shield;
2. to determine if geochemical patterns, indicative of platinum group element mineralization, are present in Lac des Iles humus;
3. to display and discuss the behaviour of 37 elements (Ag, Au, Ba, Bi, Br, Ca, Cd, Co, Cr, Cs, Cu, Fe, Hg, K, Li, La, Mn, Mo, Ni, Pb, Pd, Pt, Sb, Se, Sr, Ta, Te, Tl, U, V, W, Zn, Zn) in humus collected from Lac des Iles sites, and compare some of these elements with other geochemical data collected elsewhere in Ontario.

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