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OPEN FILE REPORT SERIES

GEOCHEMICAL STUDIES OF THE SOIL AND VEGETATION AT THE APOLLO GOLD DEPOSIT, KAMBALDA, WESTERN AUSTRALIA

M.J. Lintern, M.A. Craig and R.N. Carver

CRC LEME OPEN FILE REPORT 103

June 2001

(CRC LEME Restricted Report 30R/
CSIRO Division of Exploration and Mining Report 274R, 1997.
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CRC LEME is an unincorporated joint venture between The Australian National University,
University of Canberra, Australian Geological Survey Organisation and CSIRO Exploration and Mining
Headquarters: CRC LEME c/o CSIRO Exploration and Mining, Private Bag No 5, PO Wembley, Western Australia, 6913.

RESEARCH ARISING FROM CSIRO/AMIRA YILGARN REGOLITH GEOCHEMISTRY PROJECTS 1987-1996

In 1987, CSIRO commenced a series of multi-client research projects in regolith geology and geochemistry which were sponsored by companies in the Australian mining industry, through the Australian Mineral Industries Research Association Limited (AMIRA). The initial research program, "Exploration for concealed gold deposits, Yilgarn Block, Western Australia" had the aim of developing improved geological, geochemical and geophysical methods for mineral exploration that would facilitate the location of blind, buried or deeply weathered gold deposits. The program commenced with the following projects:

P240: Laterite geochemistry for detecting concealed mineral deposits (1987-1991). Leader: Dr R.E. Smith.
Its scope was development of methods for sampling and interpretation of multi-element laterite geochemistry data and application of multi-element techniques to gold and polymetallic mineral exploration in weathered terrain. The project emphasised viewing laterite geochemical dispersion patterns in their regolith-landform context at local and district scales. It was supported by 30 companies.

P241: Gold and associated elements in the regolith - dispersion processes and implications for exploration (1987-1991). Leader: Dr C.R.M. Butt.
The project investigated the distribution of ore and indicator elements in the regolith. It included studies of the mineralogical and geochemical characteristics of weathered ore deposits and wall rocks, and the chemical controls on element dispersion and concentration during regolith evolution. This was to increase the effectiveness of geochemical exploration in weathered terrain through improved understanding of weathering processes. It was supported by 26 companies.

These projects represented 'an opportunity for the mineral industry to participate in a multi-disciplinary program of geoscience research aimed at developing new geological, geochemical and geophysical methods for exploration in deeply weathered Archaean terrains'. This initiative recognised the unique opportunities, created by exploration and open-cut mining, to conduct detailed studies of the weathered zone, with particular emphasis on the near-surface expression of gold mineralisation. The skills of existing and specially recruited research staff from the Floreat Park and North Ryde laboratories (of the then Divisions of Minerals and Geochemistry, and Mineral Physics and Mineralogy, subsequently Exploration Geoscience and later Exploration and Mining) were integrated to form a task force with expertise in geology, mineralogy, geochemistry and geophysics. Several staff participated in more than one project. Following completion of the original projects, two continuation projects were developed.

P240A: Geochemical exploration in complex lateritic environments of the Yilgarn Craton, Western Australia (1991-1993). Leaders: Drs R.E. Smith and R.R. Anand.
The approach of viewing geochemical dispersion within a well-controlled and well-understood regolith-landform and bedrock framework at detailed and district scales continued. In this extension, focus was particularly on areas of transported cover and on more complex lateritic environments typified by the Kalgoorlie regional study. This was supported by 17 companies.

P241A: Gold and associated elements in the regolith - dispersion processes and implications for exploration (1991-1993). Leader: Dr. C.R.M. Butt.
The significance of gold mobilisation under present-day conditions, particularly the important relationship with pedogenic carbonate, was investigated further. In addition, attention was focussed on the recognition of primary lithologies from their weathered equivalents. This project was supported by 14 companies.

Most reports related to the above research projects were published as CRC LEME Open File Reports Series (Nos 1-74), with an index (Report 75), by June 1999. Publication now continues with release of reports from further projects.

P252: Geochemical exploration for platinum group elements in weathered terrain. Leader: Dr C.R.M. Butt.
This project was designed to gather information on the geochemical behaviour of the platinum group elements under weathering conditions using both laboratory and field studies, to determine their dispersion in the regolith and to apply this to concepts for use in exploration. The research was commenced in 1988 by CSIRO Exploration Geoscience and the University of Wales (Cardiff). The Final Report was completed in December 1992. It was supported by 9 companies.

P409: Geochemical exploration in areas of transported overburden, Yilgarn Craton and environs, WA.
Leaders: Drs C.R.M. Butt and R.E. Smith.
About 50% or more of prospective terrain in the Yilgarn is obscured by substantial thicknesses of transported overburden that varies in age from Permian to Recent. Some of this cover has undergone substantial weathering. Exploration problems in these covered areas were the focus of Project 409. The research was commenced in June 1993 by CSIRO Exploration and Mining but was subsequently incorporated into the activities of CRC LEME in July 1995 and was concluded in July 1996. It was supported by 22 companies.

Although the confidentiality periods of Projects P252 and P409 expired in 1994 and 1998, respectively, the reports have not been released previously. CRC LEME acknowledges the Australian Mineral Industries Research Association and CSIRO Division of Exploration and Mining for authority to publish these reports. It is intended that publication of the reports will be a substantial additional factor in transferring technology to aid the Australian mineral industry.

This report (CRC LEME Open File Report 103) is a second impression (second printing) of CSIRO, Division of Exploration and Mining Restricted Report 274R, first issued in 1997, which formed part of the CSIRO/AMIRA Project P409.

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EXECUTIVE SUMMARY

The CSIRO-AMIRA Project "Exploration in Areas of Transported Overburden, Yilgarn Craton and Environs" (Project 409) has, as its principal objective, development of geochemical methods for mineral exploration in areas with substantial transported overburden, through investigations of the processes of geochemical dispersion from concealed mineralization. The Project has two main themes. One of these, *'Surface and subsurface expression of* concealed *mineral deposits'* is addressed by this report, which focuses on the soil geochemistry of the Apollo Au deposit, Kambalda, WA.

This study is located in the central and northern part of the deposit where the thickness of transported overburden is about 5 to 10 m, and the depth to mineralization is of the order of 15 to 80 m. Apollo is about 500 m to the north-east of the Argo deposit (Lintern and Gray, 1995) where the depth of transported overburden and mineralization are greater.

Summarising the main points of the research:

(i) extraction techniques using iodide or water do not assist in the location of buried mineralization;

(ii) limited data from this study suggests that anomalous Au concentrations in soil are usually >15 ppb whereas background is <10 ppb; this needs further testing.

(iii) Zn is anomalous in soils over mineralization; however, absolute Zn concentrations are lower in saprolite and bedrock than in the soil;

(iv) Au is generally associated with Ca and Mg carbonates in soils;

(v) bluebush should be investigated further as a sample medium for Au exploration in areas of transported overburden.

C.R.M. Butt
R.E. Smith
Project Leaders

December 1996

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1. INTRODUCTION

Previous CSIRO/AMIRA Projects (240, 240A, 241 and 241A) investigated the geochemical expression of primary and supergene Au mineralization in the regolith. These studies demonstrated that in relict and erosional landform regimes, carefully directed, shallow sampling is usually more cost- and technically-effective than routine drilling to deep saprolite in regional- and prospect-scale exploration. In some locations, it was found that there was a surface expression of mineralization concealed by up to 40 m of leached saprolite. In this project (P409), outcomes of the previous projects are being further tested to determine whether similar procedures can be routinely applied in depositional regimes. In an earlier study at Argo (Lintern and Gray, 1995), it was shown that mineralization was not detected at the surface with a thickness of transported overburden in excess of 20 m and the depth to mineralization from 25 to 70 m. These further studies of the surface expression of mineralization at Apollo investigate the situation where the thickness of transported material and the depth to mineralization are less.

Two groups of sample media have particular interest for Au exploration in the Yilgarn Craton:

(i) iron-rich materials, particularly lateritic residuum, and lag;

(ii) calcareous soil horizons, which are widespread in the semi-arid parts of the southern Yilgarn. Gold concentrations are often much greater in pedogenic carbonate, compared with immediately adjacent horizons. It has been shown in previous studies in relict and erosional areas that failure to sample this horizon in an exploration programme will result in ineffective soil surveys.

In the Kalgoorlie area, the work programme has been to investigate potential sample media in the transported regolith above mineralization. Specifically the study analysed for:

(i) Au in surface horizons;

(ii) Au below surface in transported overburden;

(iii) pathfinder elements in transported and residual regolith and bedrock.

Several sites were offered by P409 sponsor companies for pilot studies (Table 1). All sites were visited and a preliminary set of samples was taken at most locations. Sites were assessed using various criteria (see Table 1) and the most suitable sites were selected for more detailed investigations of the geochemistry of regolith materials, vegetation and groundwater.

Table 1: Advantages and disadvantages of study sites examined during the P409 pilot study and previous CSIRO/AMIRA projects.

Site	Type of mineralization	Advantages	Disadvantages
Sites chosen			
Argo	*At interface and saprolite, beneath 20 m or more of lacustrine sediments.*	*Extensive drilling available. Strong mineralization. Exposed pit. Distant from upslope Au deposit.*	*Surficial sampling not completed, due to pit excavation. Poor condition of drill material in top 10 m.*
Steinway	*In saprolite, 5 m beneath 30 m of transported sediments.*	*Known surficial anomaly. Extensive drilling available. Distant from known Au mineralization*	*Not scheduled to be mined. Weak mineralization.*
Kurnalpi	*At interface and saprolite, beneath 60 m of transported sediments.*	*Moderate drilling available. Distant from known Au mineralization*	*Not scheduled to be mined. Weak mineralization.*
Wollubar (Enigma)	*At interface and saprolite, beneath 55 m of transported sediments.*	*Moderate drilling available. Distant from upslope Au deposit.*	*Not scheduled to be mined. Weak mineralization.*
Apollo	**In saprolite , beneath 5 to 10 m of transported sediments and 10 m of saprolite**	**Extensive drilling available. Strong mineralization. Distant from upslope Au deposit. Proximity to Argo deposit facilitates comparisons. Reported weak surficial anomaly.**	**Poor condition of drill material in top 10 m.**
Runway	*In saprolite, beneath 1m of possibly transported soil and 50 m of saprolite.*	*Reported strong surficial anomaly overlying strongly leached saprolite above mineralization. Distant from upslope Au deposit. Moderate drilling available.*	*Not scheduled to be mined. Not deeply buried.*
Panglo (I)	*In saprolite, beneath <1 m to 2 m of transported soil and 40 m of saprolite.*	*Reported strong surficial anomaly overlying strongly leached saprolite above mineralization. Distant from upslope Au deposit. Pit face available to sample.*	*Not deeply buried.*
Mt Celia	*Beneath 5 to 15 m of transported deposits.*	*Extensive drilling available. Distant from up slope Au mineralization*	*Not scheduled to be mined. Not typical of regolith in Kalgoorlie area.*
Higginsville	*At base of transported material beneath 35 m to 50 m of transported sediments.*	*Strong mineralization. Distant from upslope Au deposit. Reported surficial anomaly.*	*Ground partly disturbed before sampling took place.*
Sites not chosen			
Kurrawang	*Little information available.*	*Known surficial anomaly. Exposed pit (at a later stage).*	*Surface regolith mostly residual. Little drill spoil.*
Lake Cowan	*Various deposits associated with palaeochannel and underlying saprolite.*	*Known surficial anomaly. Extensive drilling available.*	*Known upslope mineralization.*
Kat Gap (Forrestania)	*Little information available.*	*Moderate drilling available. Distant from upslope Au mineralization*	*Depth of transported material not determined - may be thin.*

Table 1: (continued)

Site	Type of mineralization	Advantages	Disadvantages
Sites not chosen			
Gindalbie	*With sulphides at interface, beneath 60 m of transported sediments.*	*Moderate drilling available. Distant from upslope Au deposit.*	*Poorly mineralized. Not scheduled to be mined.*
Lady Bountiful Extended	*At interface beneath 25 m of transported deposits, and also in underlying quartz veins.*	*Moderate drilling available. Distant from upslope Au deposit. Exposed pit (at a later stage). Strong mineralization.*	*Severe surficial disturbance.*
Samphire	*Little information available.*	*Exposed pit.*	*Surface regolith mostly residual.*
Previous studies			
Zuleika	*At interface and saprolite, beneath 20 m of transported sediments.*	*Exposed pit. Extensively investigated in earlier project.*	*Known upslope mineralization. No further surface samples available.*
Matt Dam	*At interface and saprolite, 15 m beneath 10 m of transported sediments.*	*Extensively studied in earlier project. Known surficial anomaly.*	*This part of deposit not scheduled to be mined.*
Baseline	*Beneath 20 m of transported sediments.*	*Exposed pit. Known surficial anomaly.*	*Samples not available.*
Panglo (II)	*Located in saprolite 20 m beneath base of 15 m of transported sediments.*	*Extensively studied in earlier project. Known surficial anomaly.*	*This part of deposit not scheduled to be mined.*

The Apollo study, as with other studies in the Kalgoorlie area, primarily involved the collection and analysis of high quality surficial samples. At Apollo, anomalous concentrations of Au were previously noted in surficial material (0- 0.1 m) with a maximum of 19 ppb against a background of <2 ppb. The depth of transported overburden in this area is about 5-10 m with a depth to mineralization (which dips westward) of 10-50 m. This compares with the Argo deposit, 500 m south west, where no surficial expression was detected and the depth of transported overburden and mineralization is 10-70 m and commonly over 25 m, respectively. Thus, Apollo and Argo are adjacent deposits with different thicknesses of transported overburden and depth to mineralization, enabling direct comparisons of the effectiveness of exploration with varying thicknesses of overburden. The thickness of overburden at Apollo is also less than at other sites within the Kalgoorlie area, such as Steinway, Wollubar-Enigma and Kurnalpi; comparisons with these sites will enhance our regional understanding of the processes whereby Au may (or may not) be enriched in the regolith units concealing shallow Au mineralization. In addition, information and knowledge on geochemical relationships between elements, and appropriate sampling techniques for exploration in terrain with a deep sedimentary cover, will be advanced.

2. GEOLOGICAL AND GEOMORPHOLOGICAL SETTING

Argo[1] and Apollo are large Au deposits located 25 km south of Kambalda (Figure 1). The characteristics of the Apollo deposit are essentially similar to that described at Argo (Lintern and Gray, 1995). The landscape is typical of the floodplains bordering the salt lake regions to the south and east of the Kalgoorlie area. Vegetation is sparse and is composed of open eucalypt woodland with occasional *Casuarina, Eremophila, Maireana* and other small shrubs. The entire study area is part of a broad colluvial plain, with occasional clay pans and windblown dunes, that drain to the south-west towards Lake Lefroy; Lake Lefroy is located about 2 km to the west (Figure 3).

[1] Approximately 1 Mt at 3.5 g/t (B. Watchorn, Western Mining Corporation Ltd (WMC), personal communication, May, 1996)

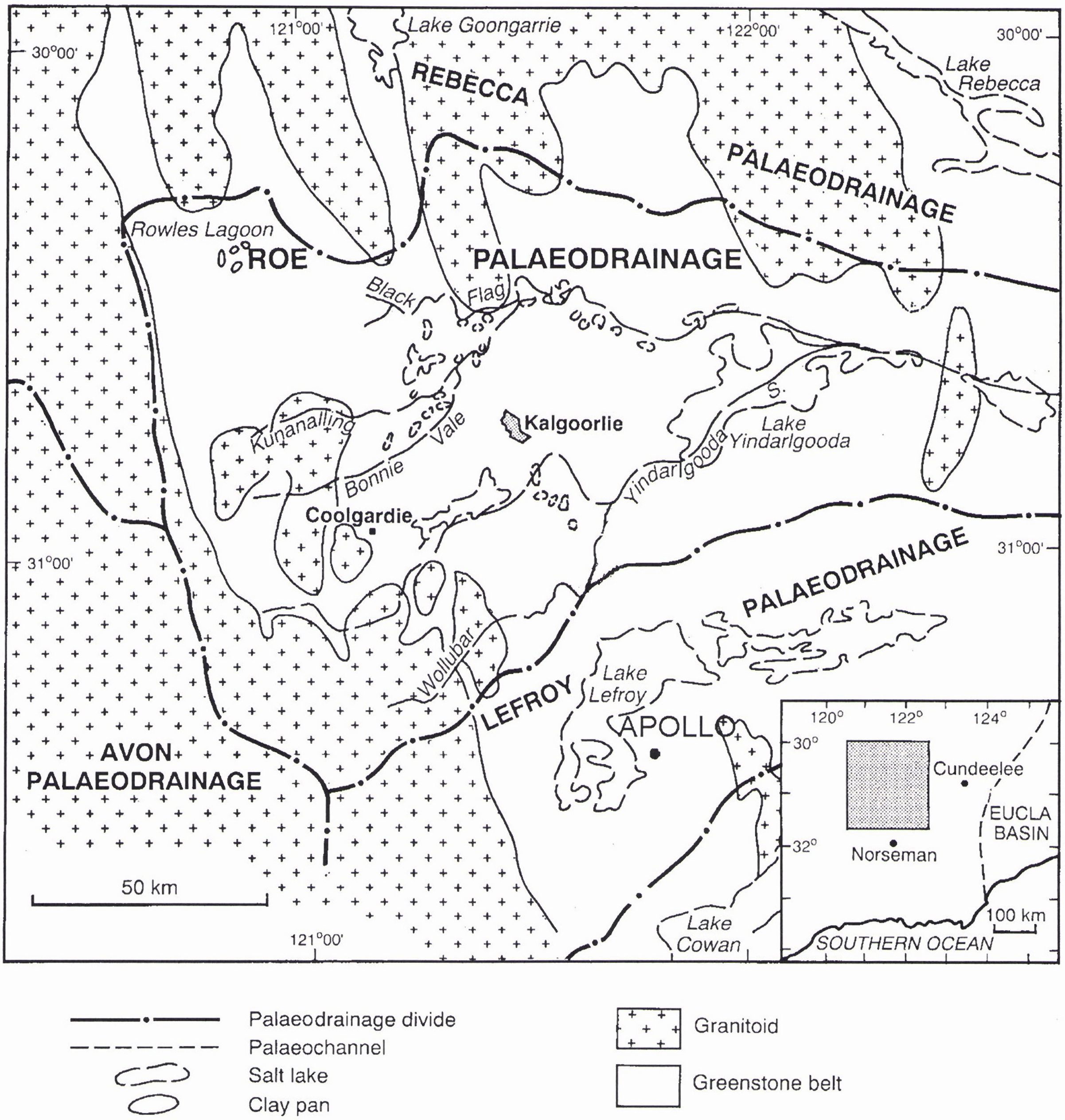

Figure 1: Location of the Apollo study area.

At Apollo and Argo, the regolith consists of:

(i) 0-0.2 m thin sand-rich topsoil (possibly aeolian),

(ii) 0.2-2 m clay-rich red subsoil. Carbonate occurs as coatings to clay peds and partially weathered lithorelics, and as nodules. A narrow, dark, manganiferous horizon is common at about 1.5 m,

(iii) 2-7 m hard red and grey clays with variable mottling to 7 m, containing zones of indurated ferruginous and siliceous material.

Below 7 m, the regolith is variable, depending on location. At Apollo, the lower regolith consists mainly of clay-rich saprolite, although some ferruginous saprolite remnants occur. In the Argo study area, particularly the south, the sediments are thicker and consist of puggy lacustrine clays with lenses and horizons of spongolite and lignite. Palaeotopographic re-constructions indicate that the sediments lie unconformably on the southern and eastern flanks of a valley (Woolrich, 1994). A palaeochannel, with up to 70 m of sediments, is located to the southern end of the Argo pit and is orientated approximately east-west. The underlying geology for the Argo area consists of high-Mg basalts, with minor interflow sediments, and well-differentiated dolerite.

Mineralization at Apollo is at about 15 m depth, but dips to 70 m or more to the west (Figure 2) and is confined to bedrock, saprolite and, at Argo, the interface with the transported material, where it appears to follow the palaeosurface downslope. At Argo, patchy but spectacular grades of mineralization (with carbonate alteration) occur in the saprolite, associated with favourable contacts (possibly Fe-rich) between basalts and dolerites (B. Watchorn, pers. comm., 1994). The St Ives Au processing plant is located about 3 km to the north east and is a potential source of contamination of the soil by Au.

3. REGOLITH LANDFORM MAPS

3.1 Methods

For regolith landform map construction, 1:86000 RC9 black and white aerial photographs were used. Approximately 130 locations were visited and observations recorded to assist with regolith interpretations and map construction. The data were used to construct regolith landform units from calibrated photopatterns and used to modulate data interpreted from satellite imagery. Compilations were performed at photoscale by scanning aerial photographs with overlays attached without the intricate removal of radial distortion. All photographs with overlays were edge-matched then compiled into one composite sheet. The regolith polygons were scanned and imported into ARC/Info to allow the automatic diagram layout and automatic legend planning.

3.2 Interpretation

The dominant regolith landform unit for the Argo-Apollo area is depositional which comprises 79% of the total mapped area (TMA) with colluvial sediments providing nearly 30% of the TMA (Figure 3, Table 2). Erosional areas comprise 22% of the TMA; the dominant erosional regolith landform unit is "moderately weathered bedrock" and represents 14% of the TMA. Relict area comprise <0.01% of the TMA.

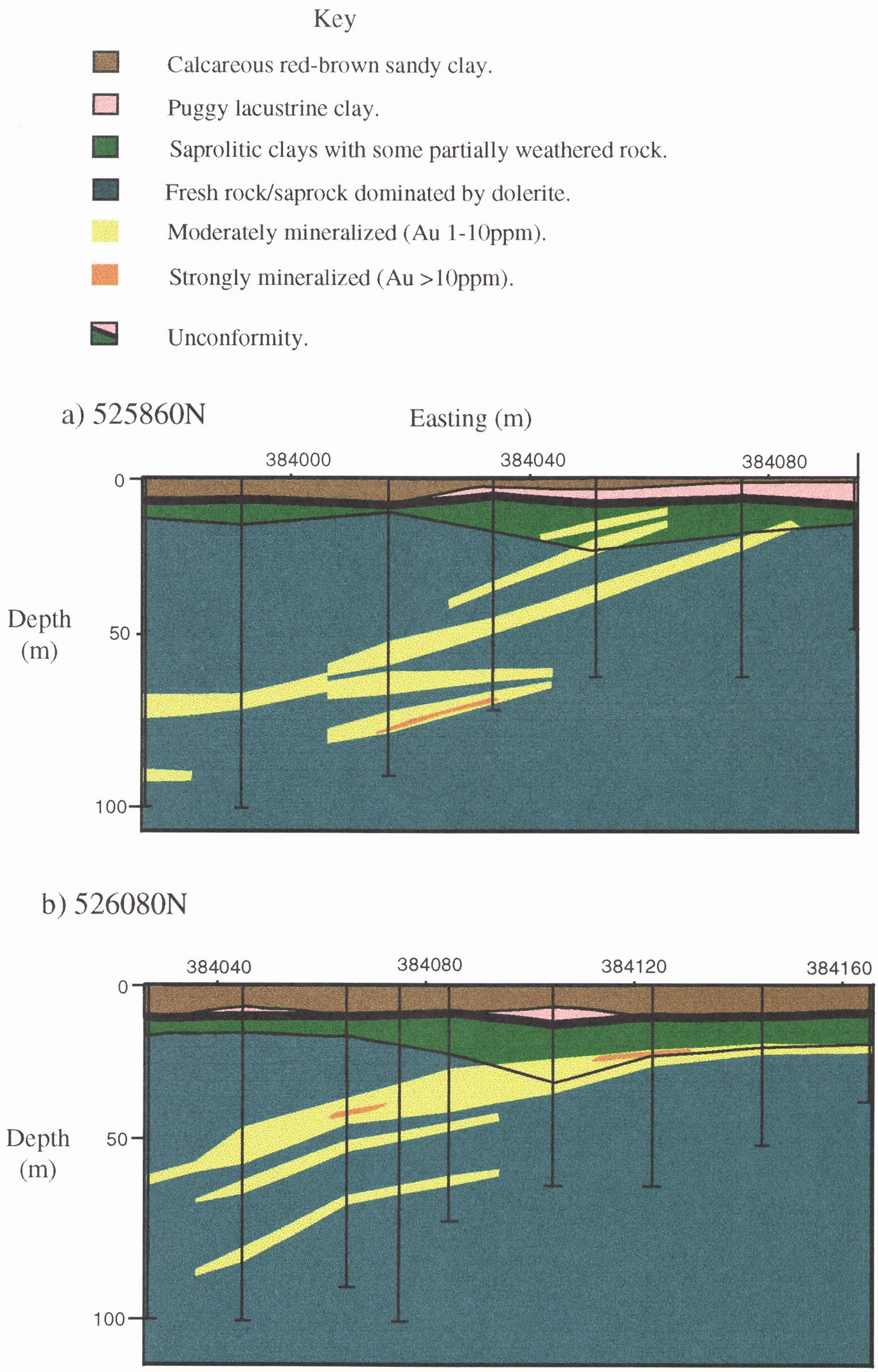

Figure 2: Stratigraphy and mineralization on a) 525860N and b) 526080N at Apollo (after data supplied by WMC).

ARGO-APOLLO INTERPRETED LANDSCAPE CLASSES

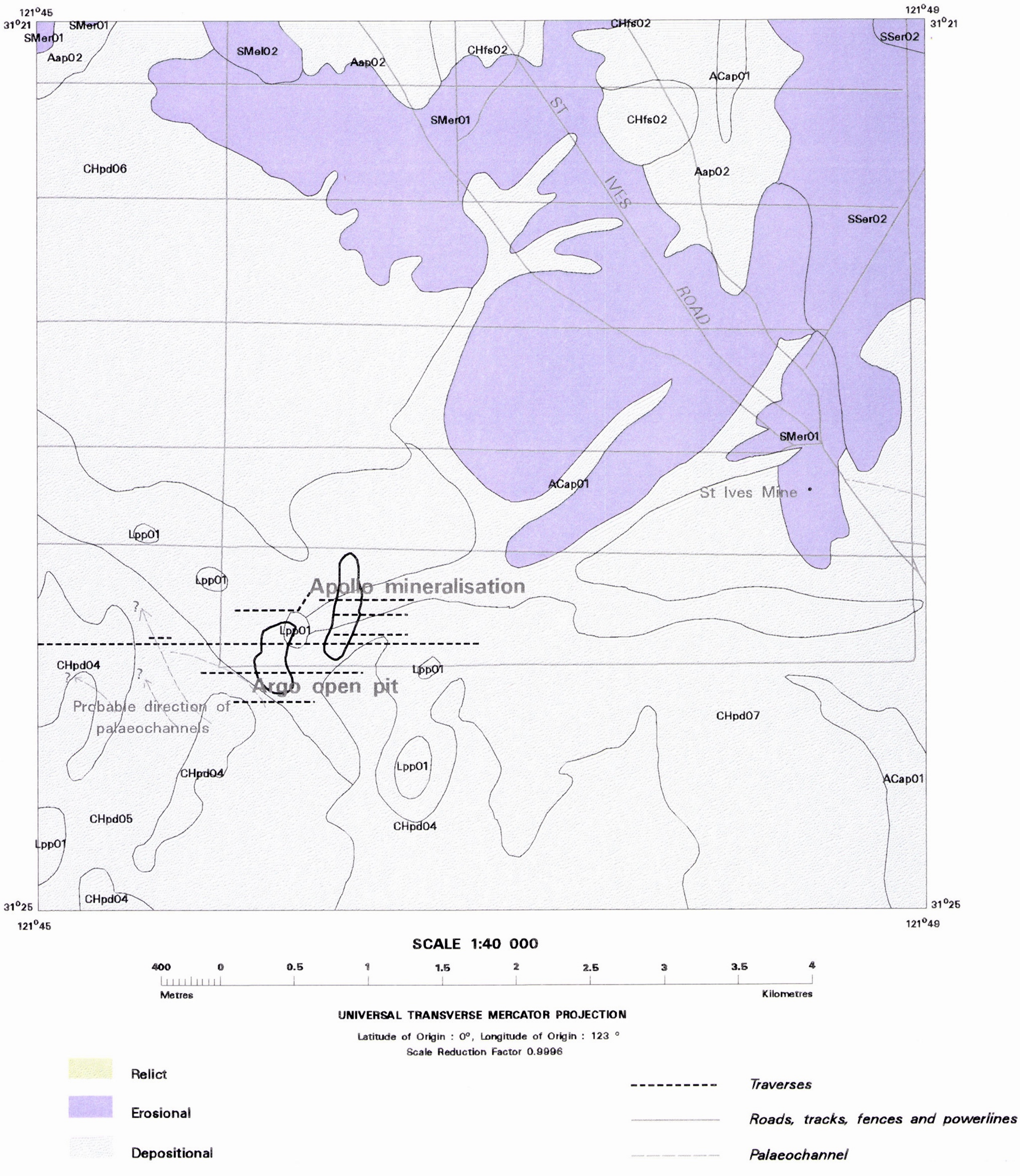

Figure 3: Simplified regolith diagram of the Apollo-Argo area. See back of report for full size detailed diagram.

Table 2: Principal regolith landform regimes.

REGOLITH LANDFORM UNIT	% OF TOTAL MAPPED AREA (TMA)
RELICT	<0.01
EROSIONAL	21.5
Very highly weathered	0.16
Highly weathered	<0.01
Moderately weathered	13.8
Slightly weathered	7.6
DEPOSITIONAL	78.5
Alluvial sediments	14.6
Aeolian sands	<0.01
Dunefield	9.1
Colluvial sediments	30.1
Lacustrine	24.7
TOTAL	100

An interpretation was made of the nature of the material expressed directly at the actual land surface (Table 3); this was possible for approximately 56% of the TMA at this level of investigation. These materials represent the source of regolith compositional information as determined by Landsat TM imagery. These surface materials do not indicate the full nature of regolith materials at depth. A complete explanation of the regolith materials and landforms comprising each unit is provided in the legend on the regolith landform map located at the back of this document.

Table 3: Surface material, Argo-Apollo area.

	UNIT	% of TOTAL MAPPED AREA
1.	Calcareous earths, soil carbonate, calcareous nodules	6.2
2.	Lag:-variable composition, but dominantly gravel-sized lithic fragments	4.1
3.	Lag gravels: dominantly quartzofeldspathic sand or granules, or mixtures	19.1
4.	Ferruginous fragments - mixed composition: lateritic residuum, duricrust, Fe segregations, Fe saprolite and Fe-stained hardpan	16.1
5.	Ferruginous saprolite	0.4
7	Unassigned	54.1
	Total map area	100.00

4. SAMPLING AND ANALYSIS

4.1 Soils

In total, 346 samples, weighing from 1 to 2 kg, were carefully collected from 0 to 5 m (Table 4). Sub-samples were selected and prepared for analysis. Composite samples, taken at 1 m intervals, were collected using an air core drilling rig from 2 traverses (6080N and 5800N) extending over mineralization and into background up to the edge of Lake Lefroy, 2 km to the west (Figure 4). Grab samples of soil were collected from small soil pits either excavated with a spade or from drill sumps. The surface at Apollo was generally undisturbed, except for considerable drilling and from mining activity in the vicinity of the Argo pit.

Table 4: Sample type, method of collection and number collected at the Apollo study area. Those marked with * were collected and analysed by WMC.

Sample type	How collected	Number of samples
0-1m	Air core	97
1-2m	Air core	97
2-3m	Air core	86
3-4m	Air core	1
4-5m	Air core	1
Other soils*	Grab	44
Soil profiles (L and M*)	Grab	20
Ferruginous material	Grab from drill spoil	20
Regolith profiles* (1 and 2)	Air core	56
Bluebush	Grab using secateurs	36
Eucalyptus leaves	Grab using secateurs	6

All samples collected by CSIRO were weighed, dried at 70° C, split, and a sub-sample extracted for pulverizing in a K1045 steel ring mill to nominal <75 µm. Aliquots of samples were analysed as follows:

(i) Gold, Sb, As, Ba, Br, Ce, Cs, Cr, Co, Eu, Hf, Ir, Fe, La, Lu, Mo, K, Rb, Sm, Sc, Se, Ag, Na, Ta, Th, W, U, Yb and Zn were analysed by INAA (Becquerel Laboratories, Lucas Heights, NSW);

(ii) Bismuth, Cu, Mn, Ni, Pb, Sr, Ti and Zr were analysed on pressed powders by in-house XRF using a Philips PW1220C instrument by the methods of Norrish and Chappell (1977) and Hart (1989), with Fe determined for matrix correction; Profile L analysed by WMC methods (see below);

(iii) Calcium and Mg were analysed on a 1 g sub-sample by atomic absorption spectrophotometry (AAS) at CSIRO Division of Minerals (Waterford, WA) after first digesting in 5M HCl for 15 minutes and then diluting to 1M HCl; this procedure dissolves the carbonate present; Ca and Mg for Profile L was anlaysed by WMC (see below).

Samples marked with asterisk were prepared and analysed by WMC laboratories. For As, Bi, Ca, Cr, Cu, Fe, Mg, Mn, Mo, Ni and Zn, a 0.2 g sample was digested in 4 mL of aqua regia at 80° C for 2 hours. The solution was then made to volume of 2 mL with deionised water. The solution was analysed by ICPMS or ICPOES using internal standardization. For Au, a 5 g sample was roasted at 600° C for 2 hours and then digested in aqua regia for 2 hours at 80° C. The solution was made up to 50 mL, mixed and the solids allowed to settle. A 10 mL aliquot was sampled and diluted with a phosphoric/hydrochloric acid solution. This sample was then extracted into 2 mL of a solution of 3% di-n-butyl sulphide/DIBK and then analysed by graphite furnace AAS. In addition, moisture content was estimated in Profile L by measuring weight loss after drying at 100° C for three days.

4.2 Partial extractions

Three partial extraction solutions, discussed in detail in Gray and Lintern (1993), were used to test the solubility of Au. In all cases, a 25 g portion of unpulverized sample material was mixed with 50 mL of extractant in a screw-cap polyethylene bottle, and then gently agitated for one week, after which the total Au extracted is measured. Total or gross-soluble Au is measured by adding a 1 g carbon sachet with the sample and analyzing the carbon using INAA; experiments have demonstrated that there is little or no re-adsorption of the dissolved Au on components within the sample under these experimental conditions. The three solutions are:

(i) deionised water: dissolves the most soluble Au;

(ii) iodide: a 0.1 M KI solution dissolves significantly more Au than water alone;

(iii) cyanide: a 0.2% KCN / 0.2 M NaOH solution dissolves all but the most refractory Au, such as large particles of Au and that encapsulated within resistant material such as quartz.

These partial extraction tests were performed sequentially using 3 different carbon sachets commencing with deionised water (i) and finishing with cyanide (iii).

4.3 Size fractions

Three soils (0.05-0.15 m) were selected from over mineralization and 3 from background; total Au analysis indicated the soils over mineralization were anomalous (>10 ppb). The 6 soils were dry sieved for 10 minutes into 4 size fractions (<180 μm, 180-500 μm, 500-2000 μm and >2000 μm) using a Ro-tap Testing Sieve Shaker (International Combustion Australia Ltd). The samples were analysed by INAA (see Section 3.1).

4.4 Ferruginous materials

Ferruginous material from transported overburden and the unconformity with the underlying Archaean was hand-picked from drill spoil which was mostly in poor condition. Samples were treated in the same manner as the soils and analysed by INAA (see Section 3.1). The samples of ferruginous material were described from microscope studies and divided into two broad groups: those with lithic material and those without.

4.5 Regolith profiles

Two holes (1 and 2) were drilled to about 30 m at 4113E, 6000N and 4113E, 5980N using an air core drilling rig. Samples were collected from each metre, and prepared and analysed by WMC laboratories for Au, As, Bi, Ca, Ce, Cr, Cu, Fe, K, La, Mg, Mn, Mo, Ni, Ti, Zn and Zr.

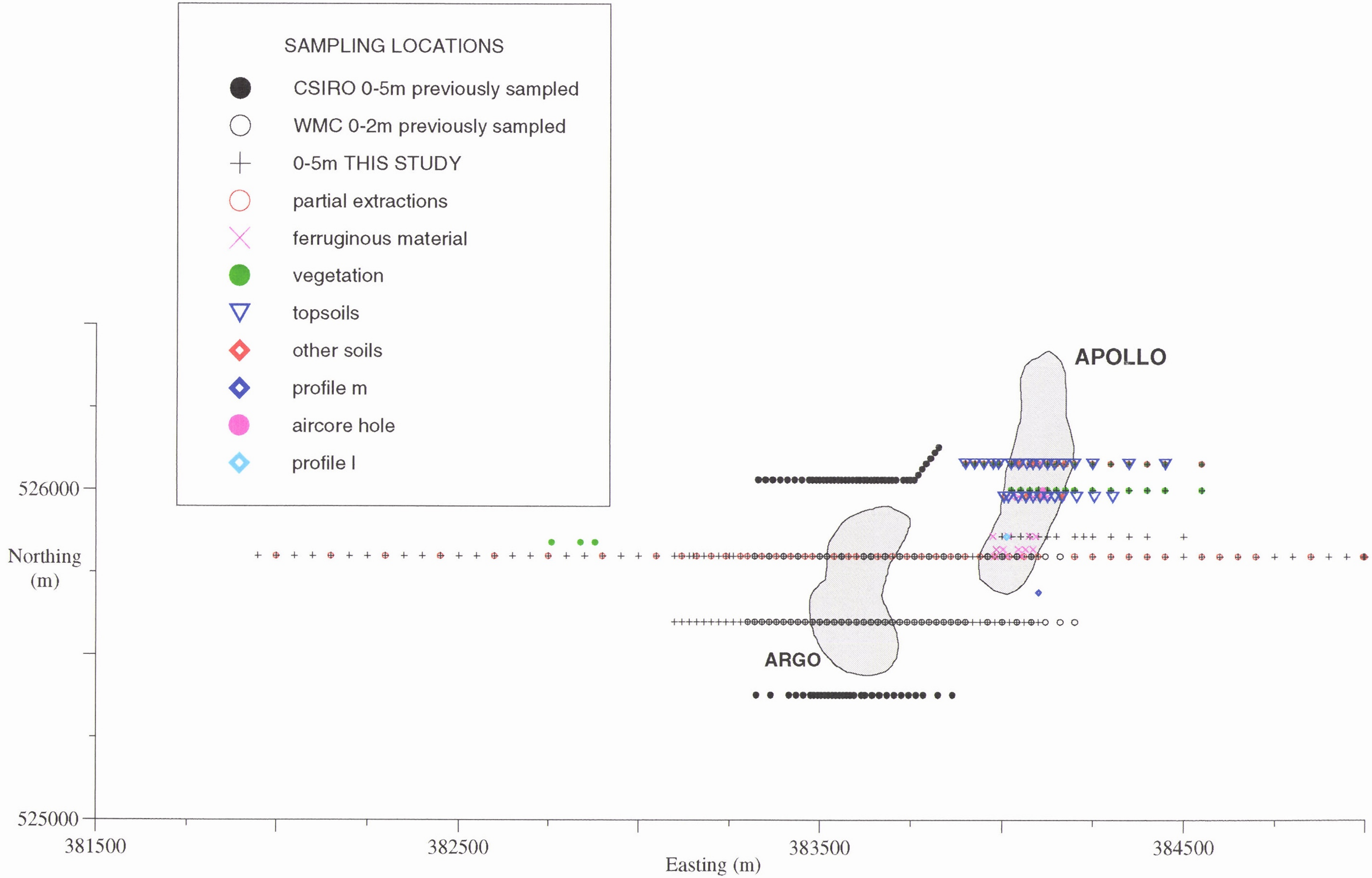

Figure 4: Sample location plan for Apollo study area. Some sample locations from the study at Argo are included.

4.6 Vegetation

Bluebush samples (?*Maireana*) were collected from 6000N and 6080N. Three samples of *Eucalyptus* leaves were collected from 6080N. In addition, three background samples of each type were collected 500 m to the west of the Argo pit on 5840N. Vegetation samples were washed with hot water and deionised water before drying at 90° C. They were macerated through a cross beater mill. The samples were then re-dried at 105° C for at least 24 hours, to prevent smearing during milling, before being passed through a four-bladed cross-beater mill twice - firstly without, and secondly with, a 1 mm mesh screen in place to ensure a suitably homogenized and macerated sample. The samples were then weighed, step-wise-ashed to 550° C before being re-weighed and sent for INAA (see Section 3.1 for elements).

5. RESULTS

5.1 Gold in soils and regolith samples

The data indicate that:

(i) for 0-1 m and 1.3-1.8 m composite samples, the mean Au content over mineralized areas is 9 ppb and for background areas is 11 ppb (Figure 5);

(ii) the distributions of Au and alkaline earths appear to be related in 0-1 m composite samples (Figure 6);

(iii) Au is not strongly associated with Ca and Mg in soil profiles, but, as at Argo, the highest concentrations occur in the calcareous horizon (Figure 7);

(iv) Au contents are higher over mineralization (Profile L) than in background (Profile M, Figure 7);

(v) for the 2 soil profiles (L and M), Au concentrations are greatest between 0.5-0.8 m and below detection near surface (0-0.1 m, <5 ppb for L and <1 for M), indicating that composite sampling of the top metre of soil is the most effective soil sampling procedure in this area. Gold contents in soil profiles over mineralization at Argo and adjacent background areas (profiles A-J) are similar to Profile L (Lintern and Gray, 1995);

(vi) Au distributions in topsoil (0.05-0.15 m) on 6080N appears to locate Au mineralization, although this may simply reflect higher carbonate contents (Figure 8a). To the east of 384045E (vertical line on Figure 8a), Au concentrations appear to be more closely related to those of Ca and Mg than to the west. This corresponds to a change from more Ca-rich soils in the west to more Mg-rich soils in the east (Figure 8b);

(vii) size fraction analysis of selected soils from 0.05-0.15 m depth (Figure 9) indicate that there is a weak association between Au, Ca and (to a lesser extent) Mg and that the 4 most Au-rich samples (including one from background) are also the most Ca-rich; most Au is found within the fine fraction;

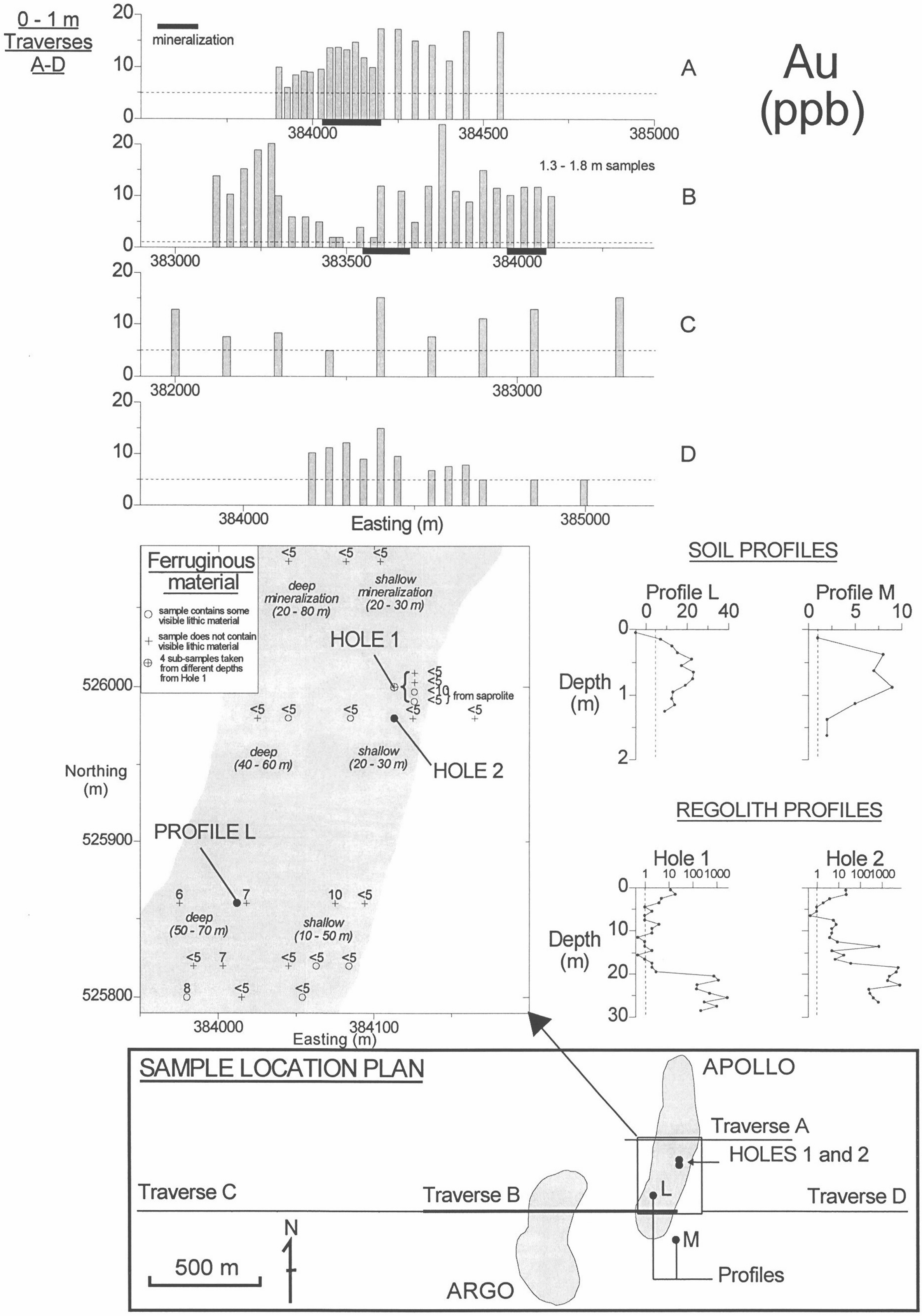

Figure 5: Gold concentrations for soil and regolith samples at Apollo. Black bars on Easting (X) axis locate mineralization. Dotted line indicates detection limit.

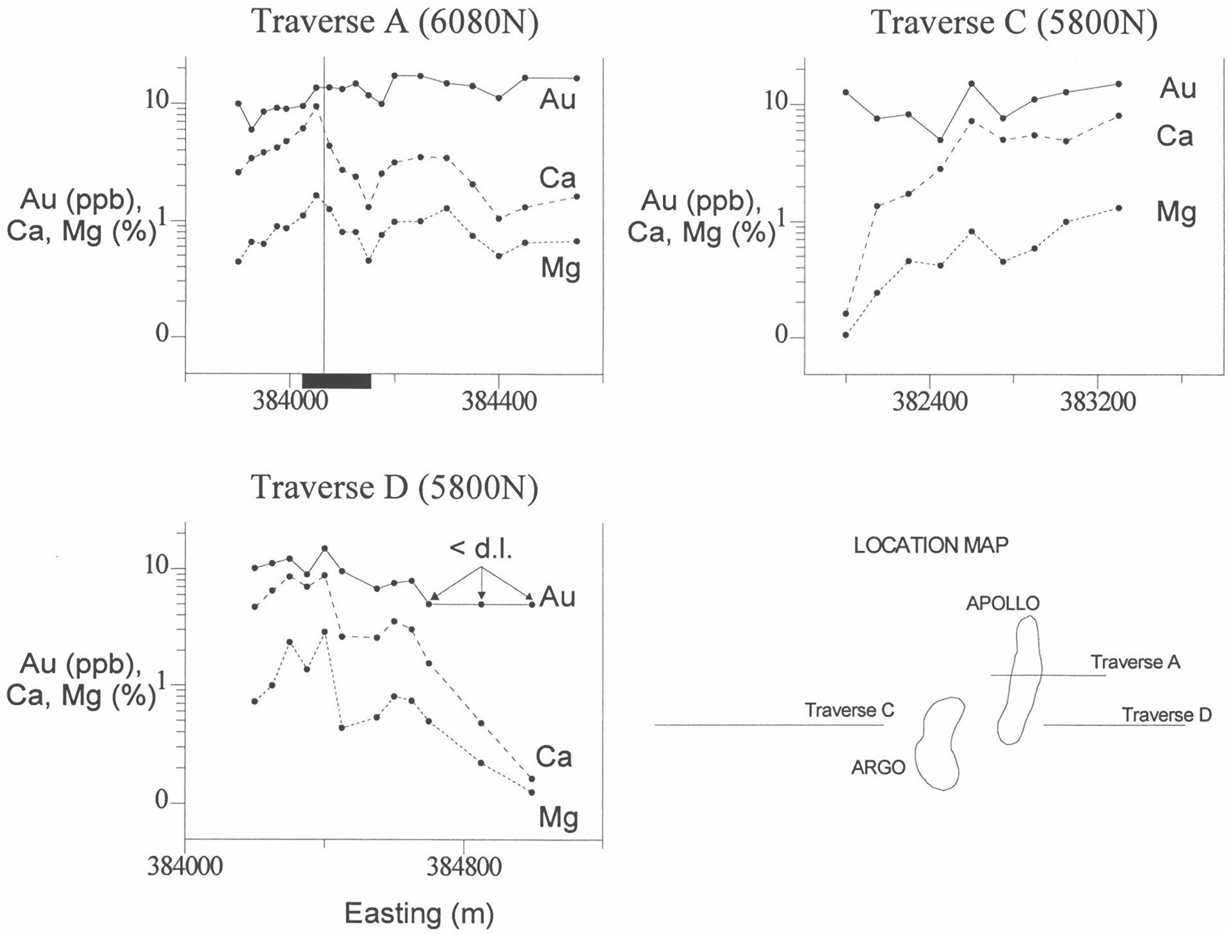

Figure 6: Gold and alkaline earth distributions for 0 - 1 m soils at Apollo. Black bar for Traverse A locates the mineralization.

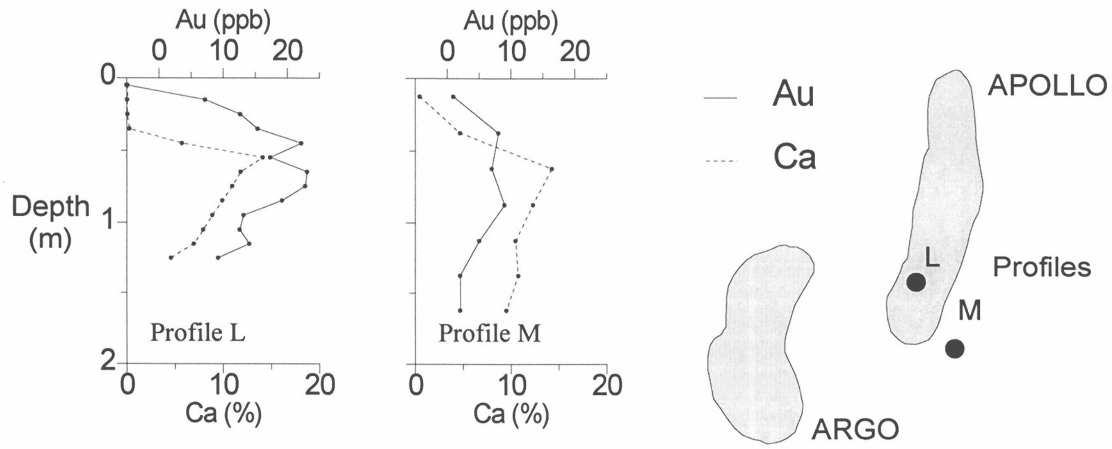

Figure 7: Gold and Ca concentrations for profiles L and M. Detection limits for Profile L and M are 5 and 1 Au ppb, respectively.

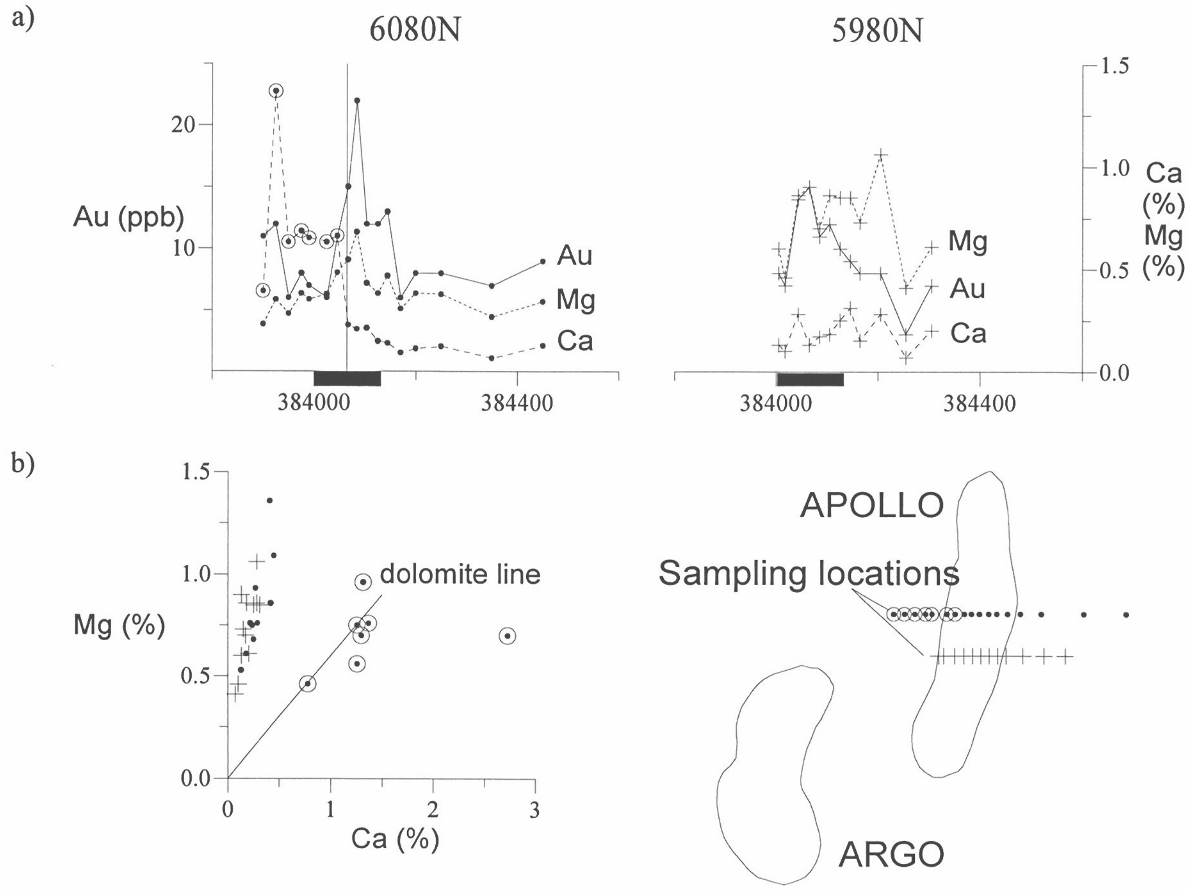

Figure 8: Gold, Ca and Mg data for topsoil samples (0.05 - 0.15 m) on 6080N and 5980N at Apollo. Data from 6080N shown as •, from 5980 as +. Circled data from 6080N indicate Ca-rich samples. Gold is more closely associated with alkaline earths in Mg-rich soils east of 384045E on 6080N (vertical line in a)).

(viii) the Au contents of the ferruginous material (including sediments and lithorelics) in transported overburden are close to or below the detection limit of 5 ppb (Figure 5). However, in the south, where depth to mineralization is shallow, Au contents are slightly higher (10 and 7 ppb). Gold concentrations were not related to Fe, which varied from 18 to 31%. Lower levels of detection are recommended for future studies of this type of material;

(ix) the Au concentrations of samples from drill holes 1 and 2 are low (<10 ppb) between 2 m and the upper (ferruginous) saprolite (Figure 5). The Au contents of deeper saprolite exceed 500 ppb. This Au distribution is similar to that at Argo (Lintern and Gray, 1995).

5.2 Other elements

Distributions of a range of elements are shown in Appendix 1. Those of As and Zn are shown below.

5.2.1 Arsenic

Arsenic concentrations are generally low and are not significantly associated with mineralization (Figure 10). The highest concentrations (180 and 200 ppb) are found in ferruginous material.

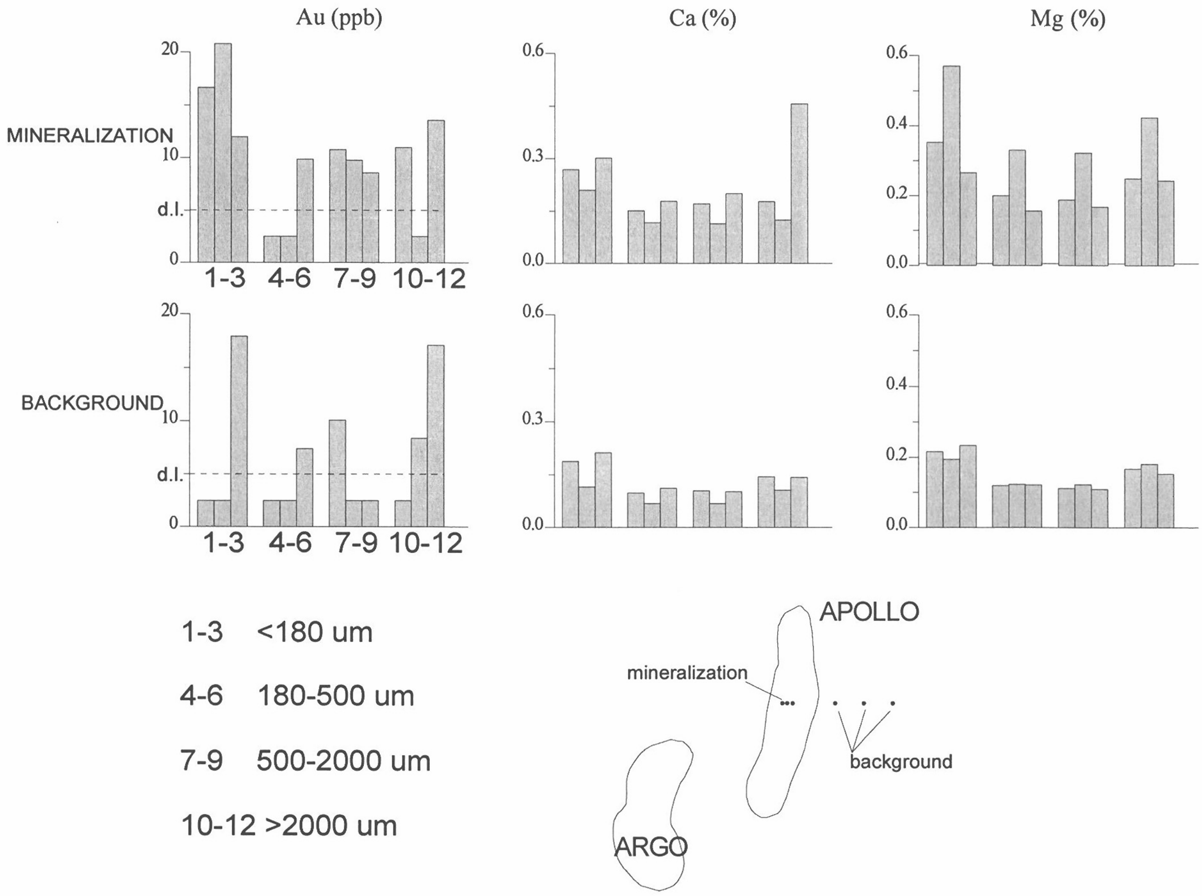

Figure 9: Gold, Ca and Mg concentrations for 6 soils (0.05 - 0.15 m) and 4 size fractions at Apollo. Histograms grouped in 3s for the 3 mineralized and 3 background soils.

5.2.2 Zinc

Zinc concentrations are strikingly elevated above mineralization at Apollo (maximum of 540 ppm, Figure 11). The reasons for this are unclear; Fe and Mn, well-known as scavengers of base metals, are not enriched above mineralization and the highest Zn value in the drill cuttings is from saprolite at 12 m (Hole 2, 390 ppm). Zinc is not anomalous in surficial samples or in mineralized samples from Argo.

5.3 Partial extraction of Au

Partial extractions tests using water (W), iodide (I) and cyanide (C) were performed on samples from traverses A-D. The results suggest that partial extraction techniques do not directly assist in the location of buried mineralization at Apollo or Argo (Figure 13 and Figure 14).

Comparison of partial extraction data with other sites indicates that Apollo has the most water- and iodide-soluble Au i.e. lowest cyanide-extractable. This suggests that the Au is in a potentially more mobile form than that at other sites, including Argo.

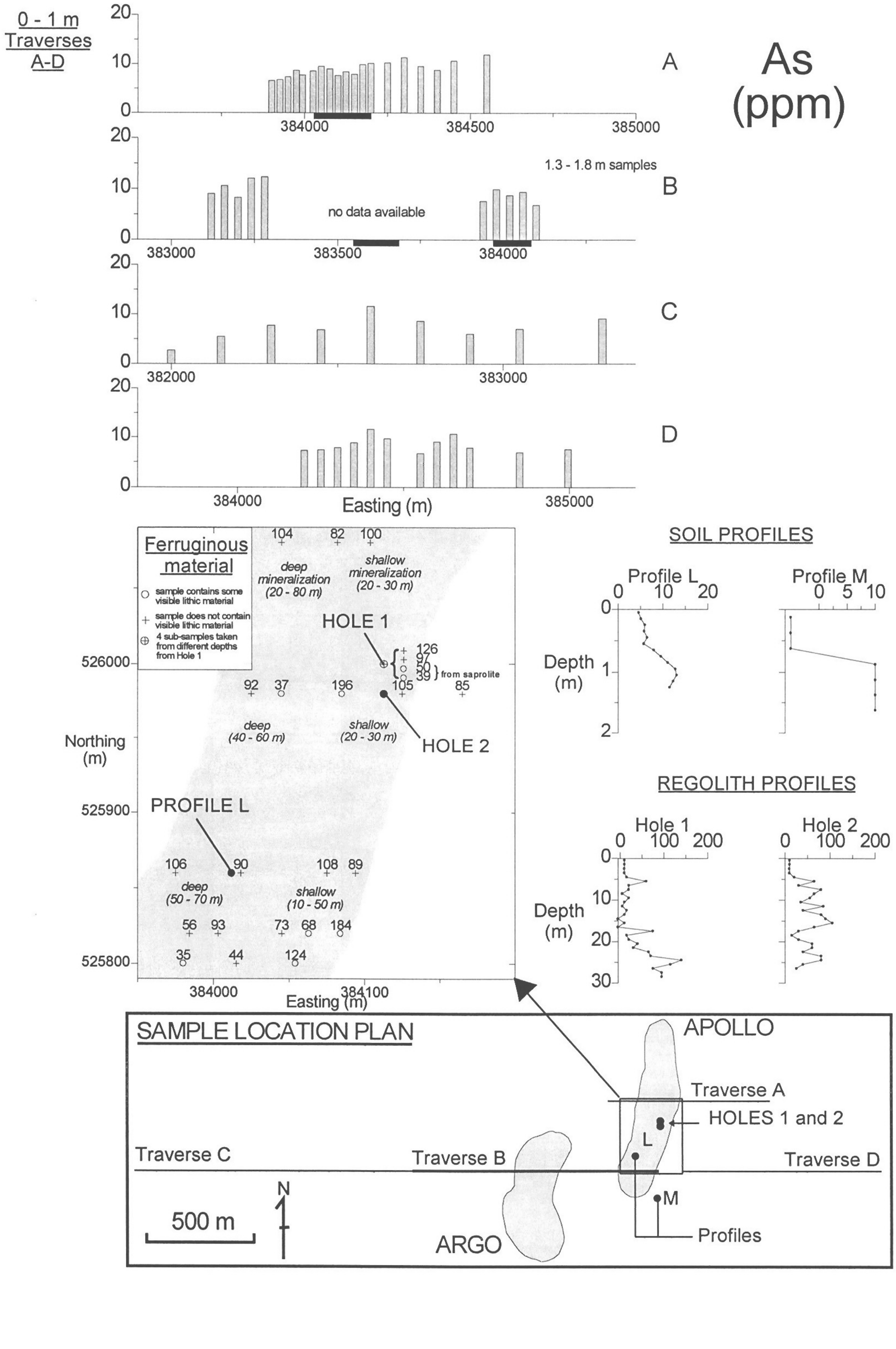

Figure 10: Arsenic concentrations for soil and regolith samples at Apollo.

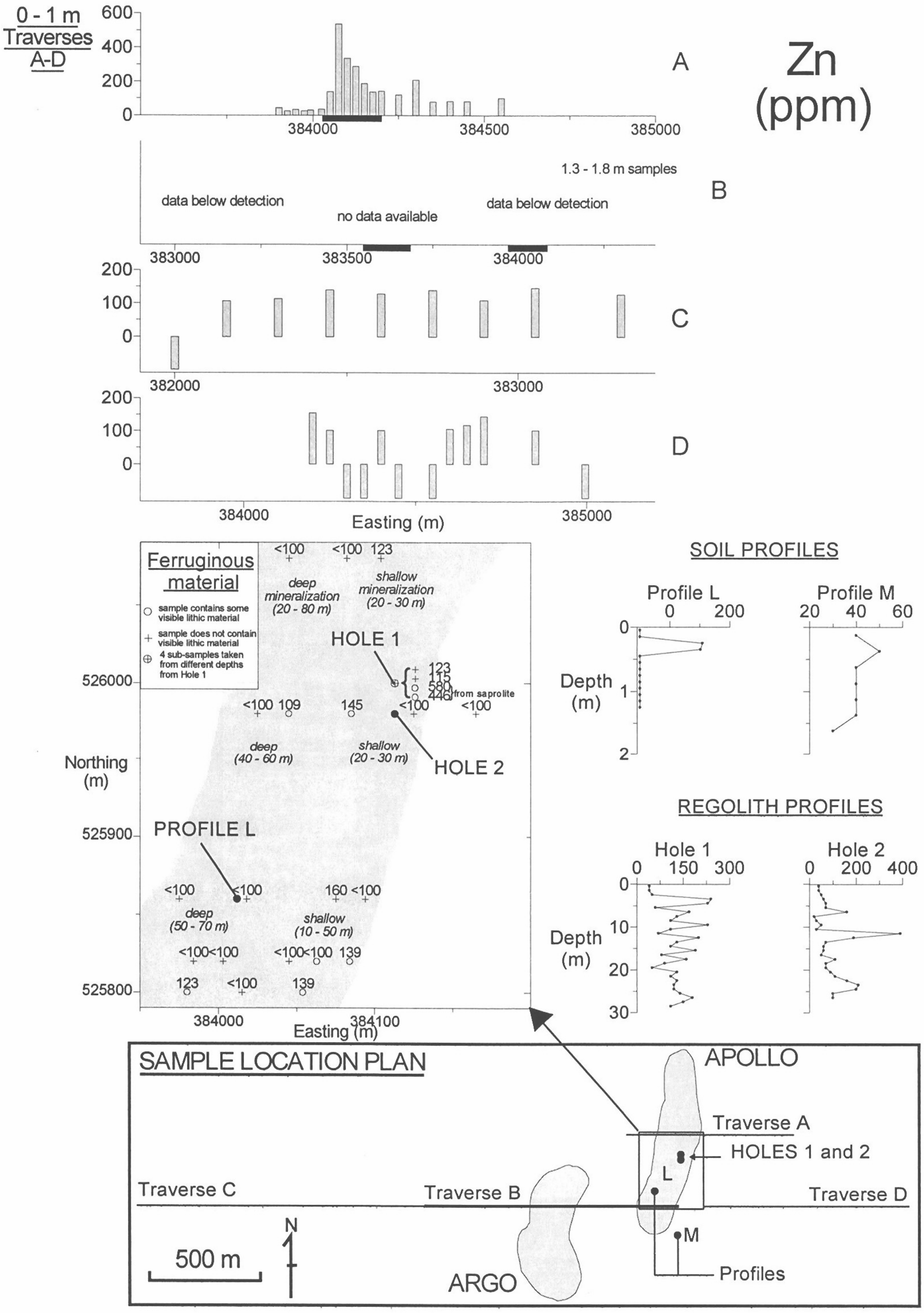

Figure 11: Zinc concentrations for soil and regolith samples at Apollo.

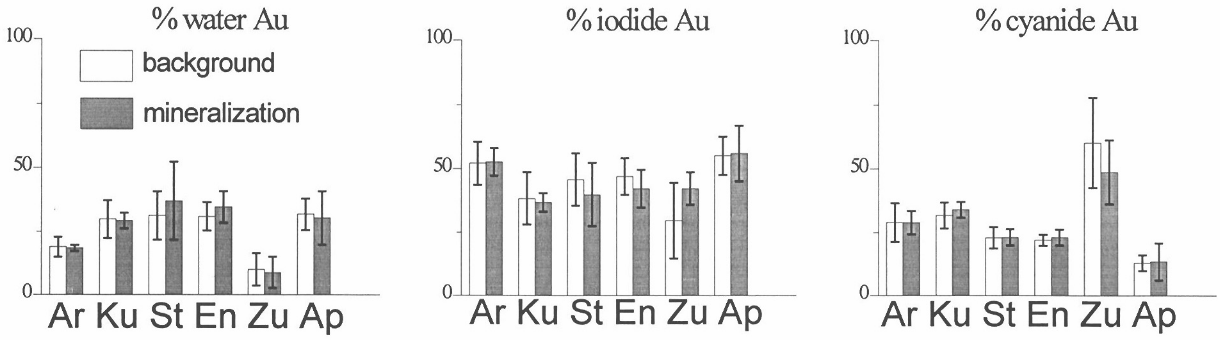

Figure 12: Comparison of water, iodide and cyanide partial extractions between sites from the Kalgoorlie area. Ar - Argo, Ku - Kurnalpi, St - Steinway, En - Wollubar-Enigma, Zu - Zuleika and Ap - Apollo.

Summing the W, I and C concentrations suggests that over and adjacent to Apollo on 5800N (383600-780E, Traverse B) Au concentrations are anomalous (the 4 highest values, mean 15 ppb) compared with background (Figure 13b). This confirms earlier results (Lintern and Gray, 1995, p17), and implies that buried mineralization may have a displaced surface expression. However: (i) sampling on Traverse B (by WMC) specifically targeted the most calcareous horizon (nominally 1.3-1.8 m) and may therefore have higher background (- alkaline earth data were not available for normalization); (ii) total Au concentration (compared with summed partial extractions) in background samples in the west of 5800N (Traverse B, around 383200E) had a mean of 16 ppb (open histograms Figure 13). The data sets are thus different, so that the displaced anomaly requires further investigation.

No other partial extraction methods (including enzyme leach, MMI, HCl (various concentrations) and pH5 acetate) assist in the detection of buried Au mineralization at Apollo (Gray et al, 1996). There is a trend from west to east on 6080N for increasing Au concentrations, but all appear to be broadly related to total Au content.

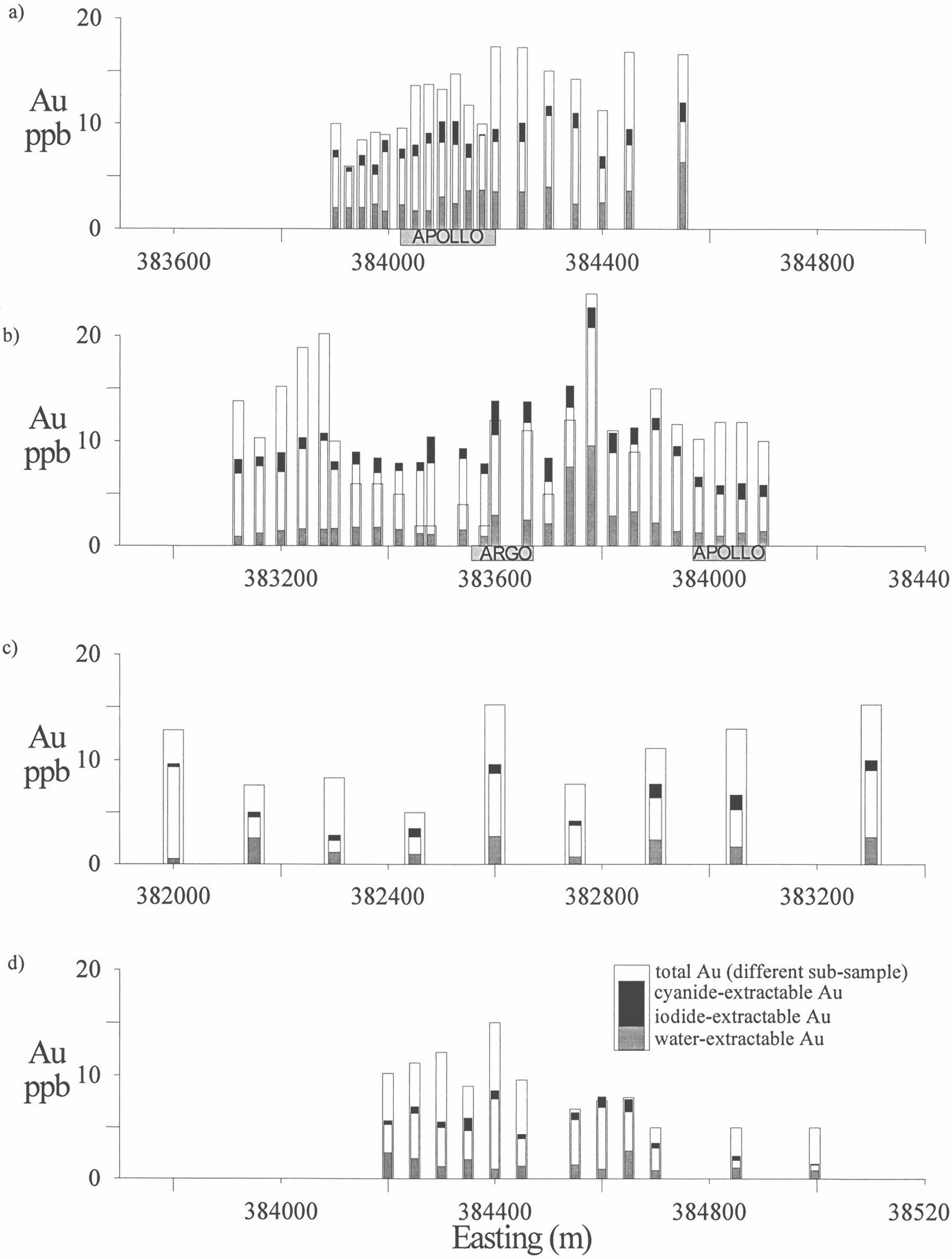

Figure 13: Stacked Au concentrations for sequential partial extractions for a) Traverse A 6080N (0-1m), b) Traverse B 5800N (1.3-1.8m), c) Traverse C 5800N (0-1m) and d) Traverse D 5800N (0-1m) at Apollo and Argo. Total Au concentration determined on a separate sub-sample. Stippled area beneath x axis represents location of mineralization.

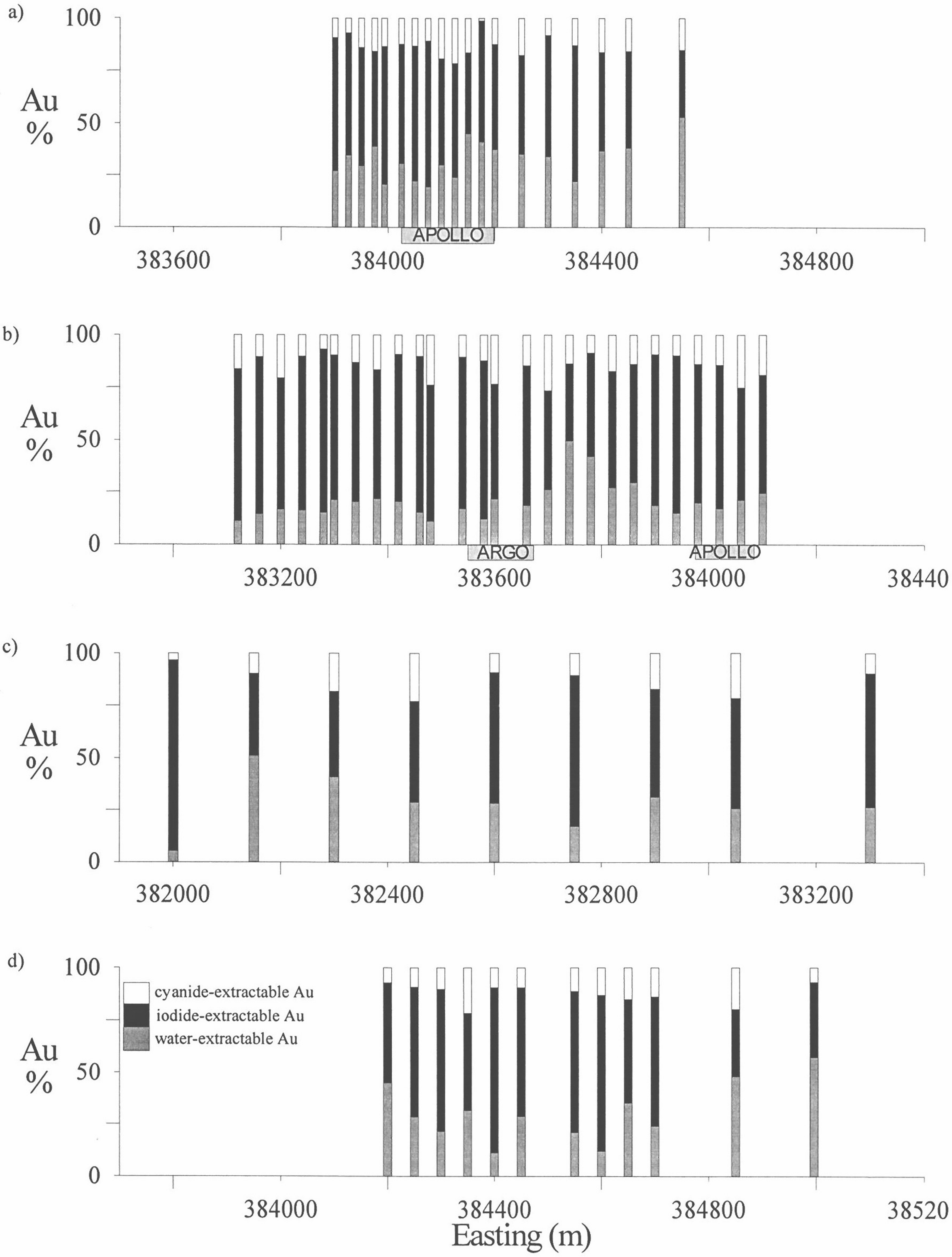

Figure 14: Stacked Au concentrations for sequential partial extractions expressed as a percentage of totally extractable Au for a) Traverse A 6080N (0-1m), b) Traverse B 5800N (1.3-1.8m), c) Traverse C 5800N (0-1m) and d) Traverse D 5800N (0-1m) at Apollo and Argo. Stippled area beneath x axis represents location of mineralization.

5.4 Vegetation

The vegetation results indicate:

(i) Au concentrations (maximum of 18 ppb) in bluebush (?*Maireana*) are some of the highest recorded for vegetation in CSIRO-AMIRA studies since 1987 and are of the same order of magnitude as soil Au concentrations;

(ii) Au concentrations in bluebush appear to be higher over mineralization than background (Figure 15);

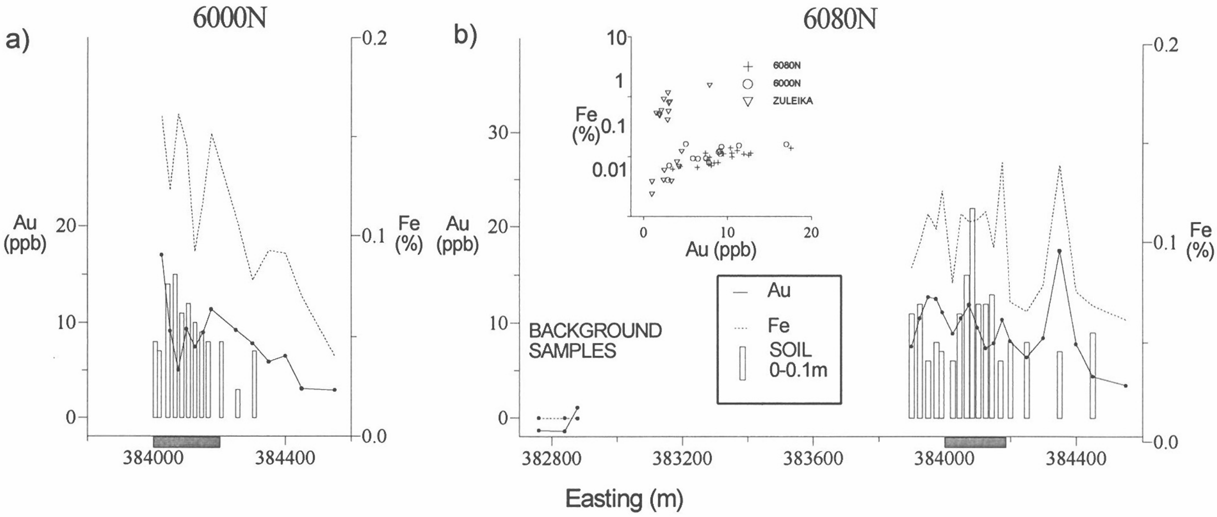

Figure 15: Gold and Fe concentrations for a) 6000N (bluebush) and 5980N (soil), and b) 6080N (bluebush and soil). Inset scatter plot in b) shows relationship between Au and Fe for bluebush at Apollo and Zuleika. Vegetation data transformed to dry weight. Soils from 0.05- 0.15 m. Stippled area beneath x axis locates mineralization at 20-30 m.

(iii) Au concentrations in bluebush are strongly related to those of Fe (and of As, Ce, Co, Cr, Hf, La, Sc, Sm, Th and Yb) (Figure 15); similar results were obtained for some samples from Zuleika (see inset graph in Figure 15b, Lintern and Butt, 1992);

(iv) Au concentrations in *Eucalyptus* leaves are at or below detection (0.5 ppb);

There are two principal explanations for the Au data for bluebush:

(a) it is a spurious anomaly caused by contamination - due to the proximity of haulage or pit operations at Argo; Au concentrations are too low in the soil to cause the anomaly and a higher grade source, such as mineralized saprolite, is required. The leaves of bluebush are covered in woolly hairs, and the bark is rough; both may trap dust particles and may be difficult to remove, even after washing.

(b) it is an authentic anomaly - Au concentrations are real and may be used to locate buried mineralization. The data suggest that Fe is controlling the uptake of other elements, but why it is in higher concentrations over mineralized areas is not clear.

More bluebush sampling is recommended to examine its potential further as a sampling medium in this type of environment. Care should be taken to properly identify the bluebush genus and species involved to ensure a consistent sample medium.

6. SUMMARY

(i) Extraction techniques using iodide or water do not assist in the location of buried mineralization.

(ii) Limited data from this study suggests that anomalous Au concentrations in soil are usually >15 ppb whereas background is <10 ppb; this needs further testing.

(iii) Zinc is anomalous in soils over mineralization; however, absolute Zn concentrations are lower in saprolite and bedrock than in the soil.

(iv) Gold is generally associated with Ca and Mg carbonates in soils.

(v) Bluebush should be investigated further as a sample medium for Au exploration in areas of transported overburden.

7. ACKNOWLEDGEMENTS

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APPENDICES

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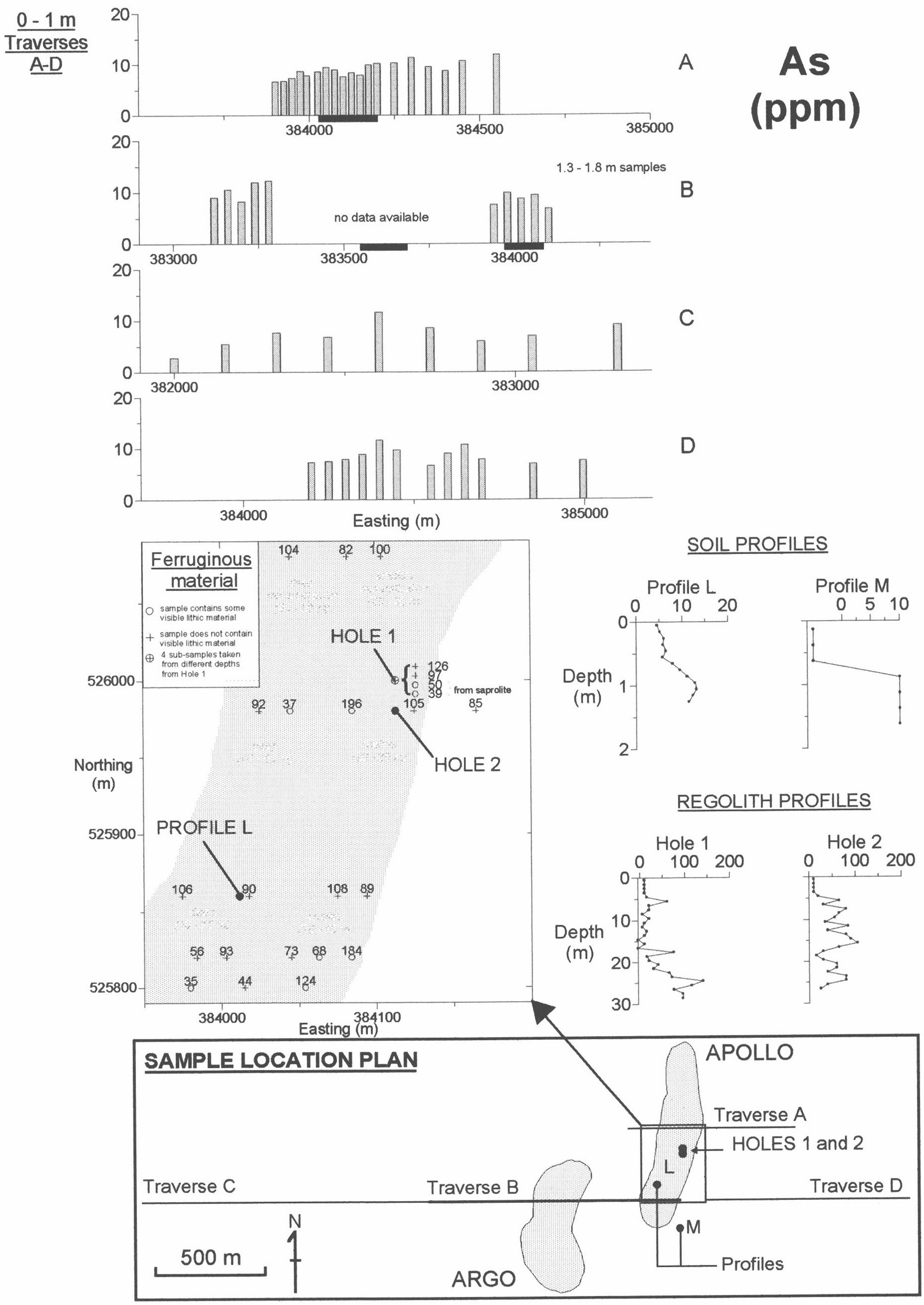

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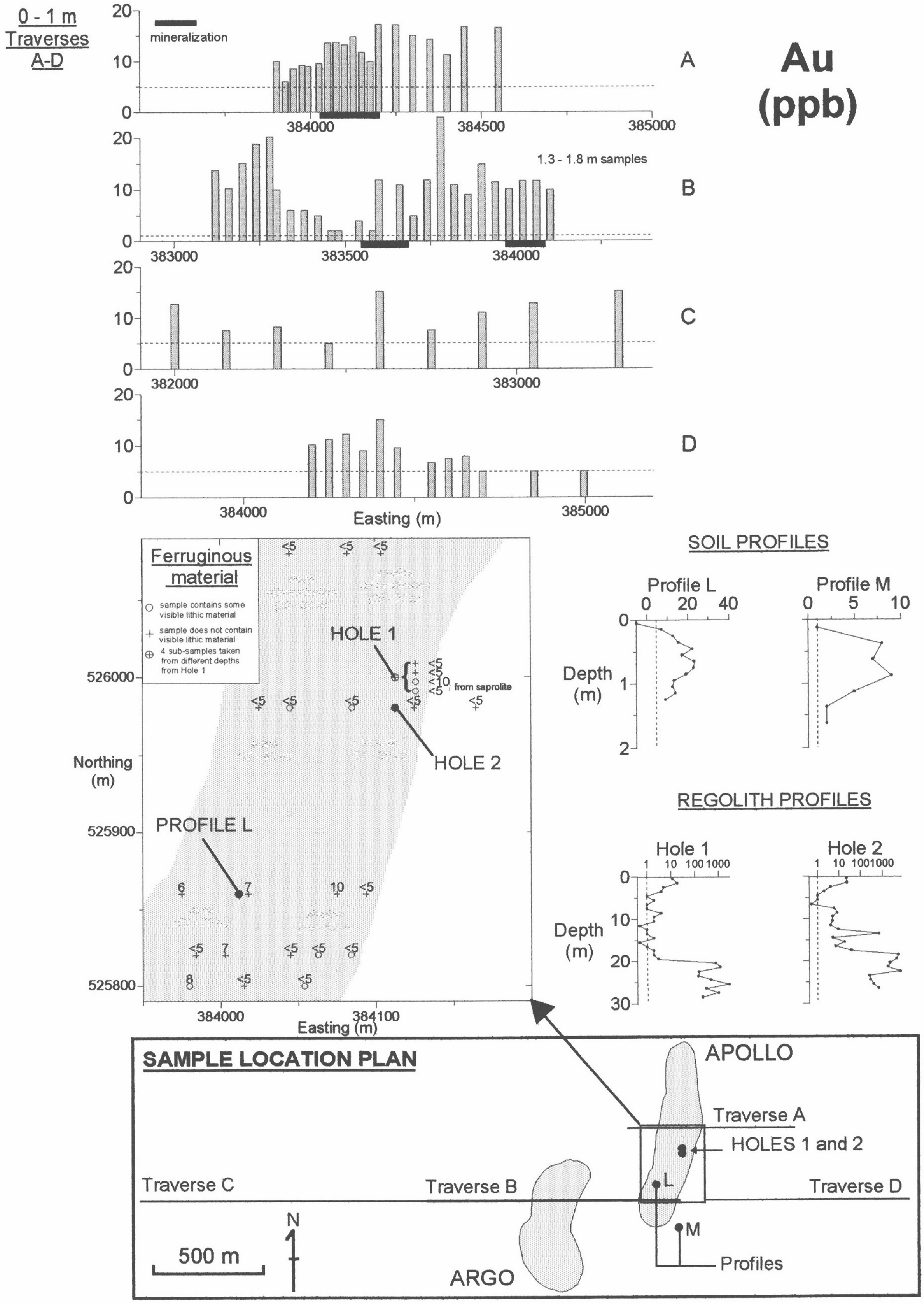
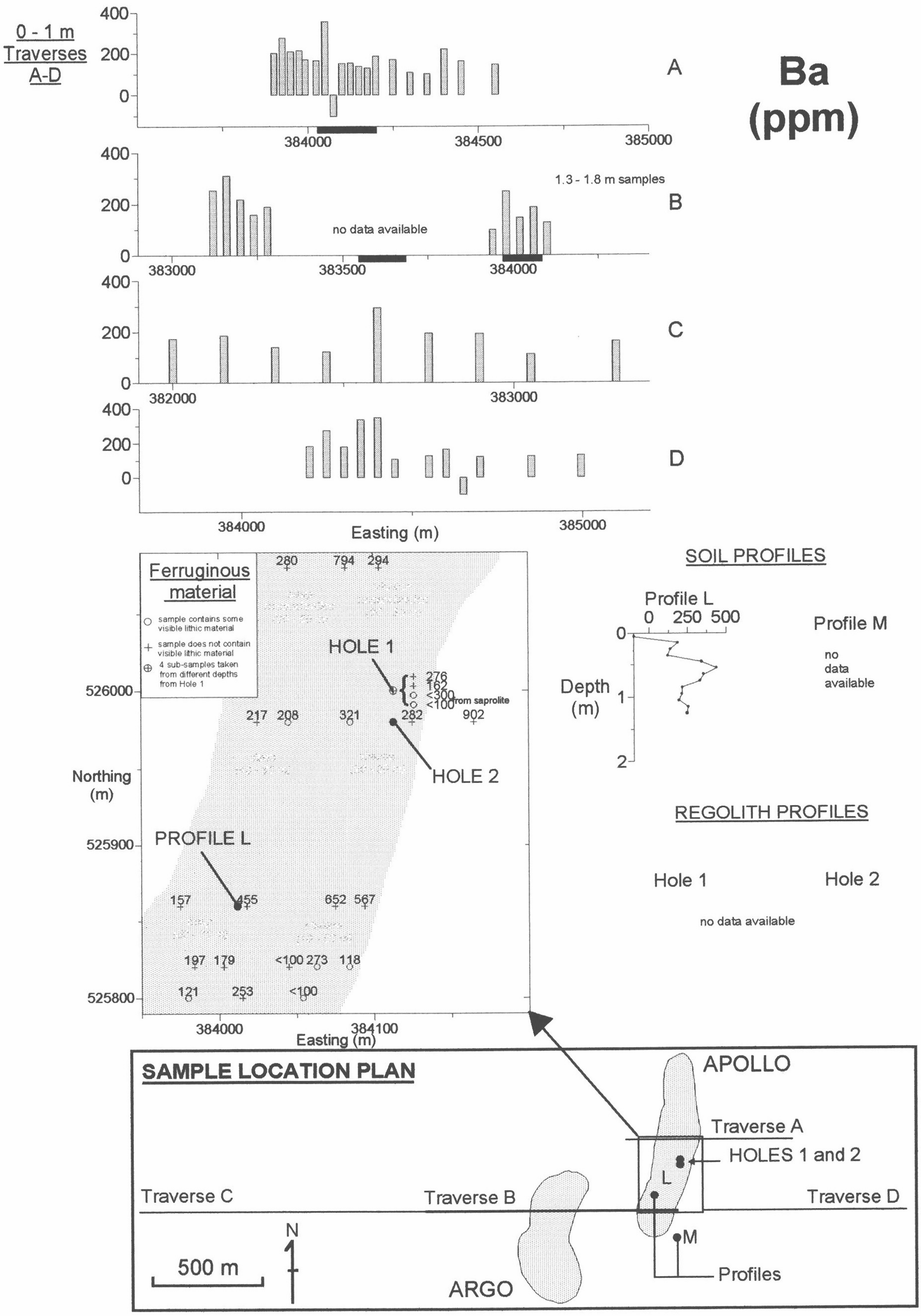


Figure A1.1.1: Elemental data for Apollo samples. Black bar indicates position of mineralization.



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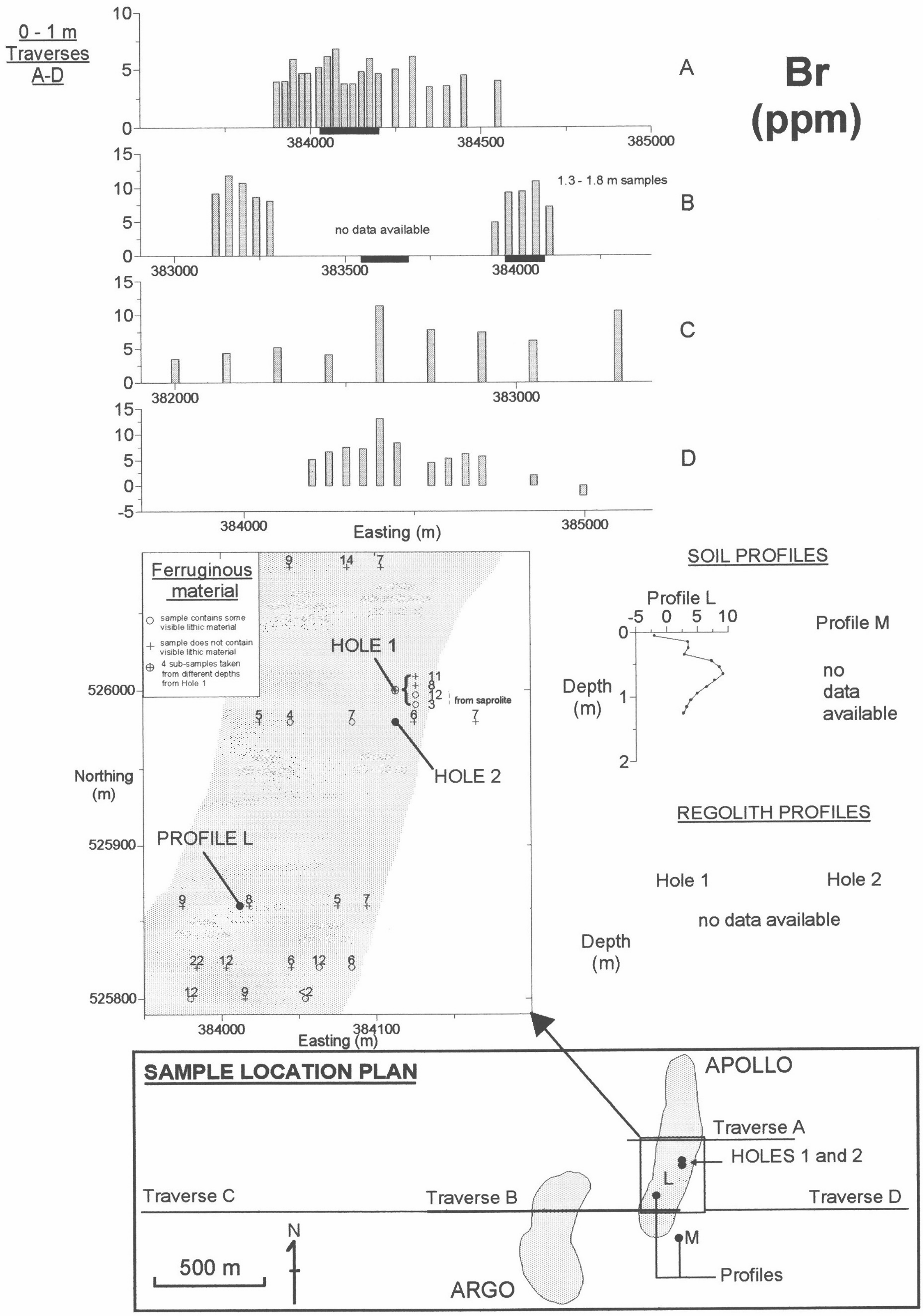

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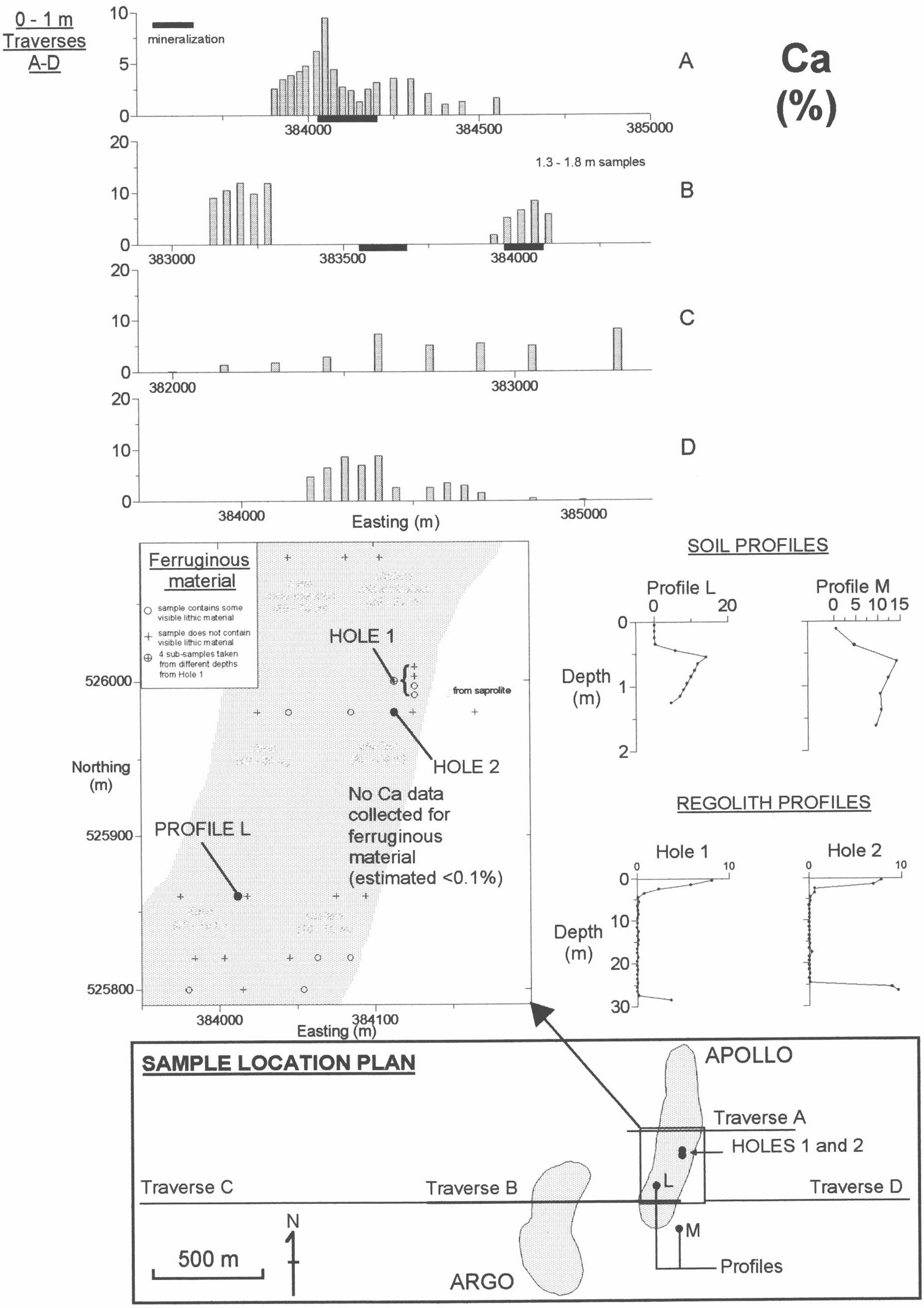

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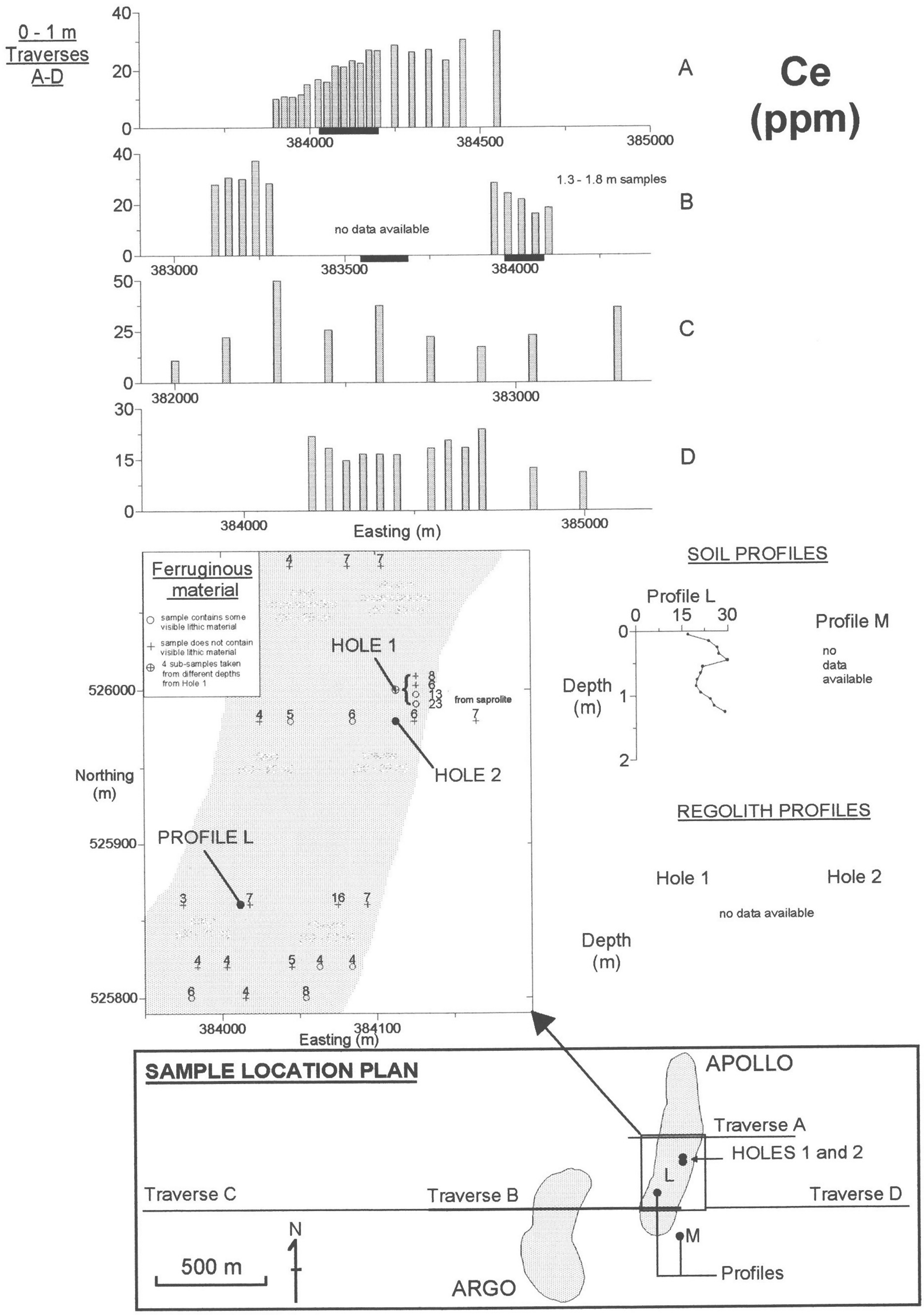

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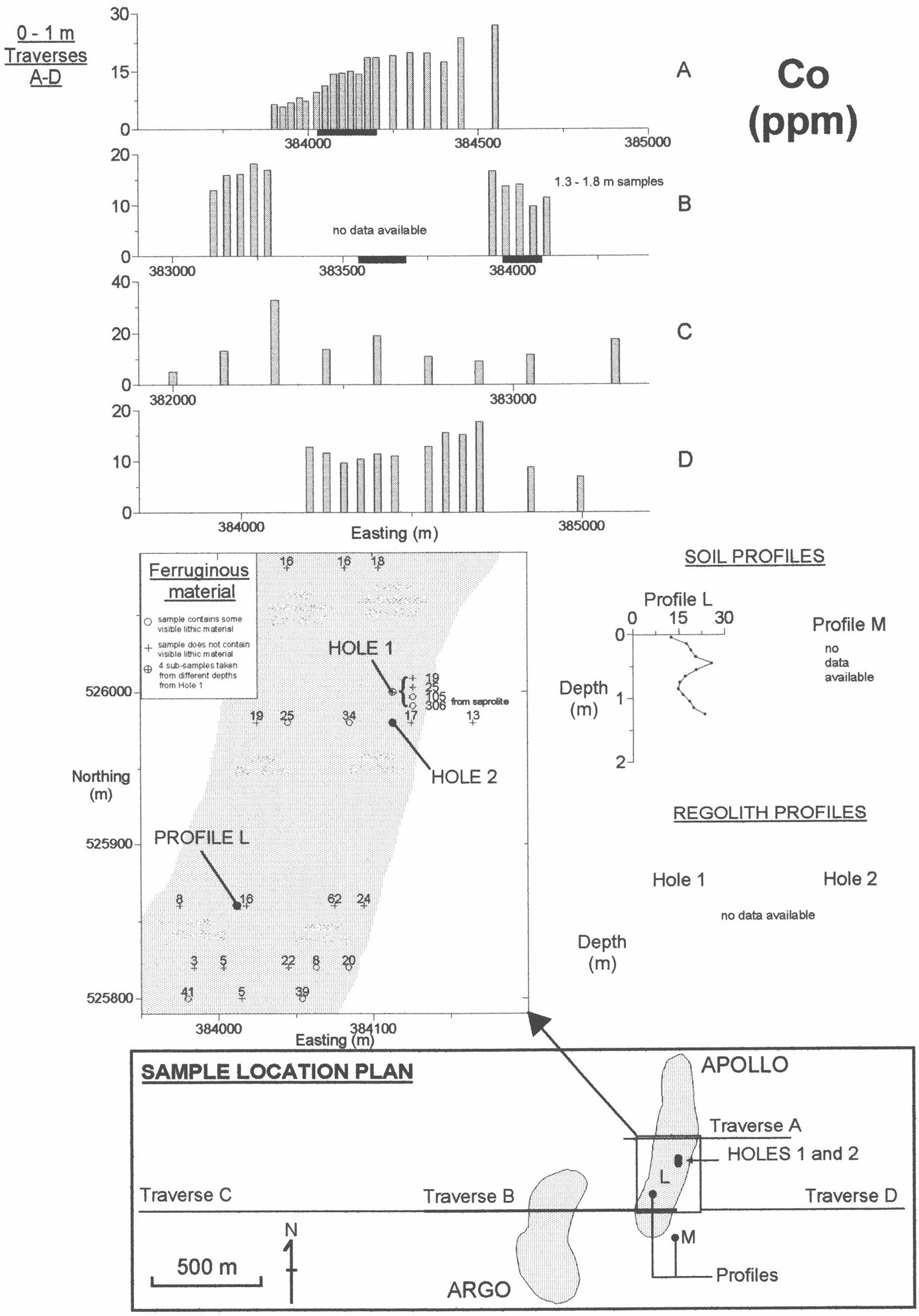

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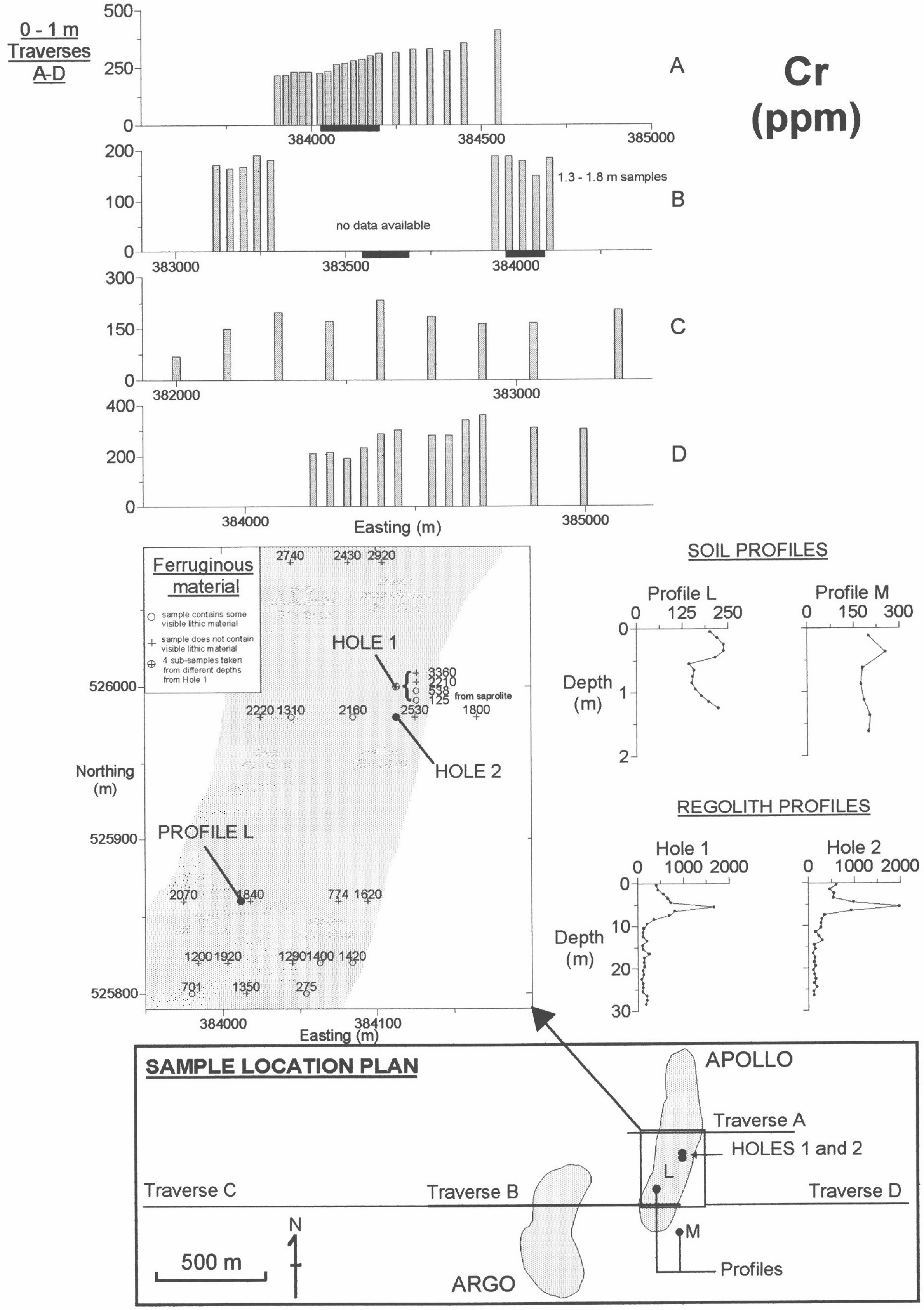

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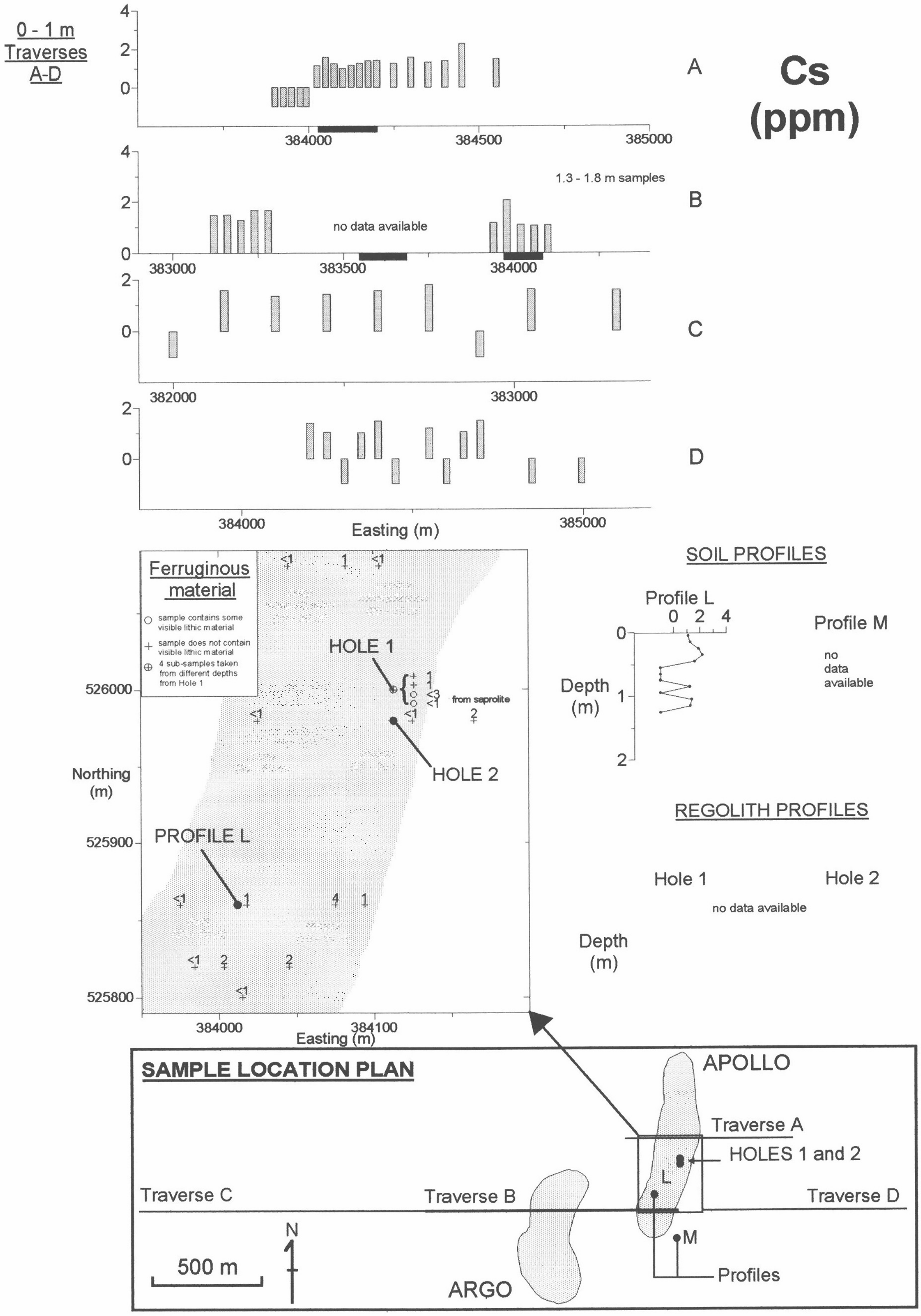

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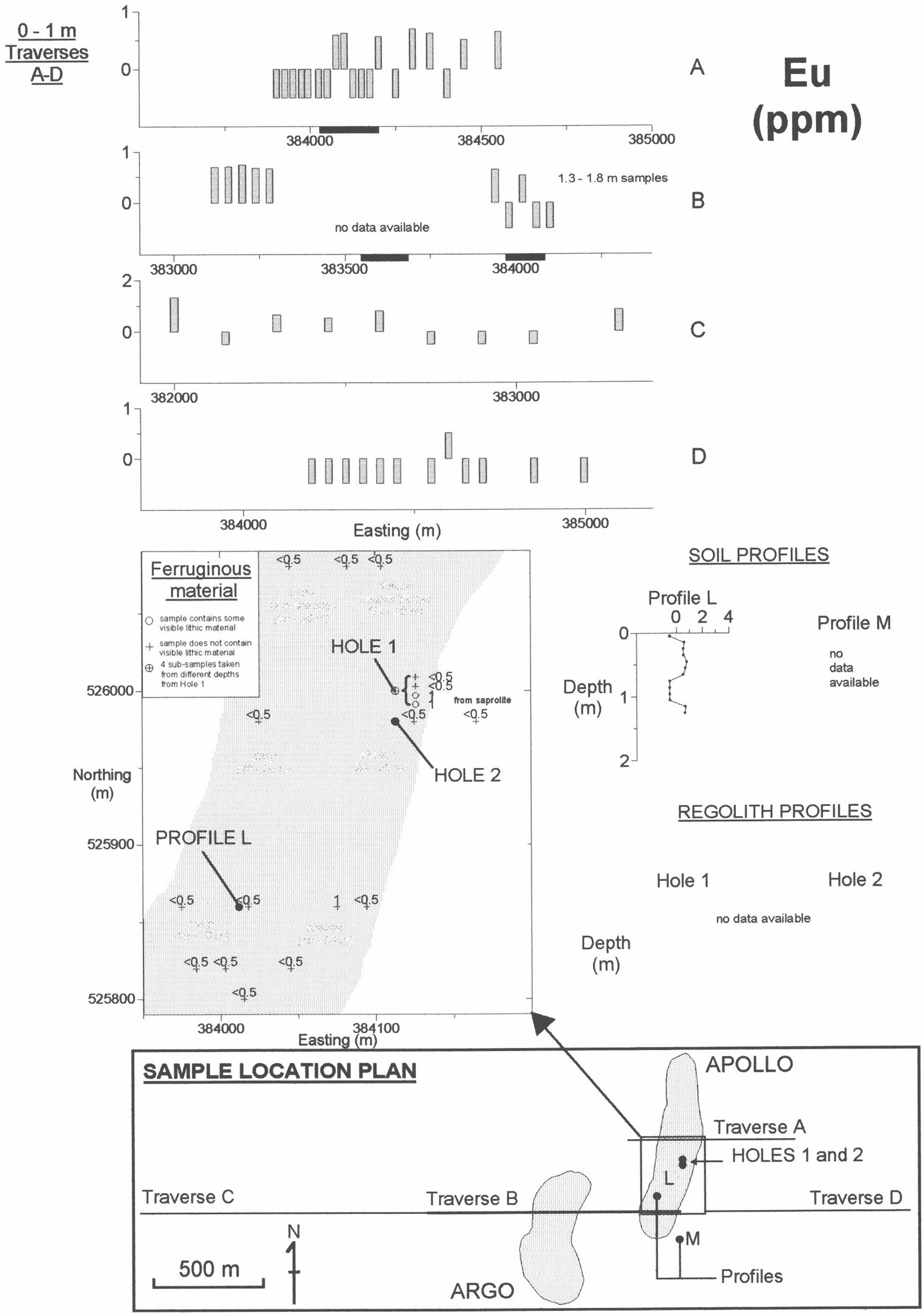

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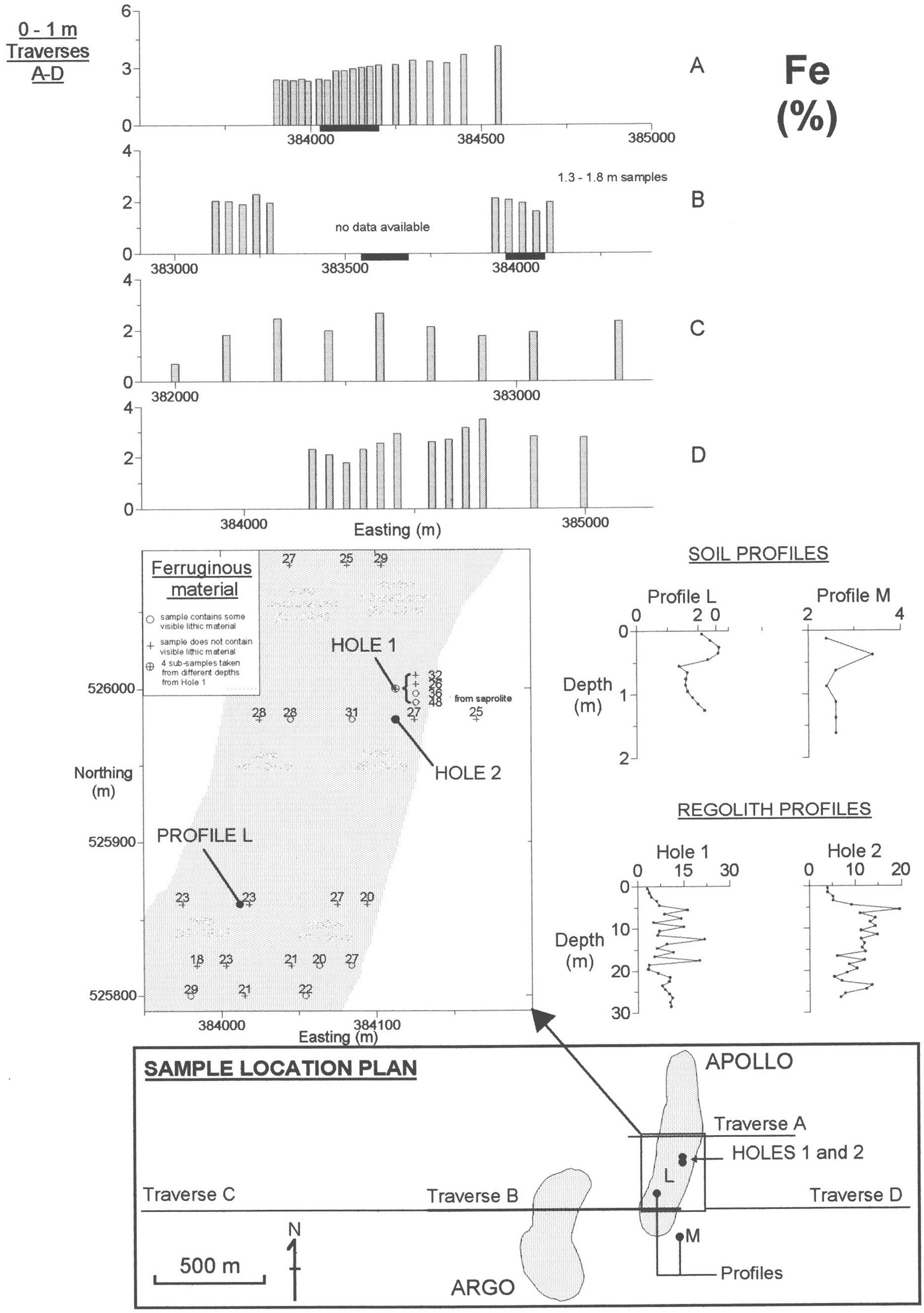

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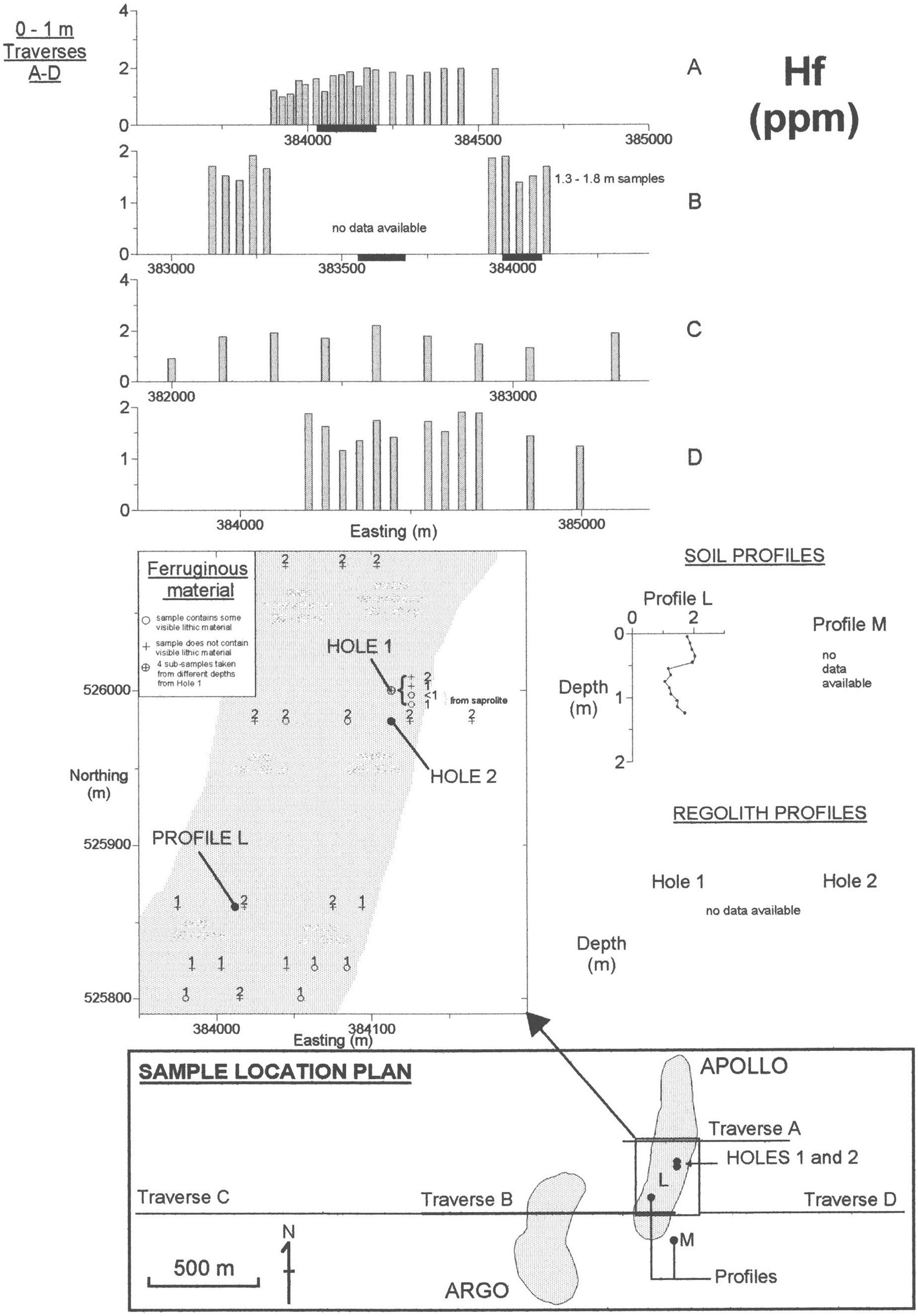

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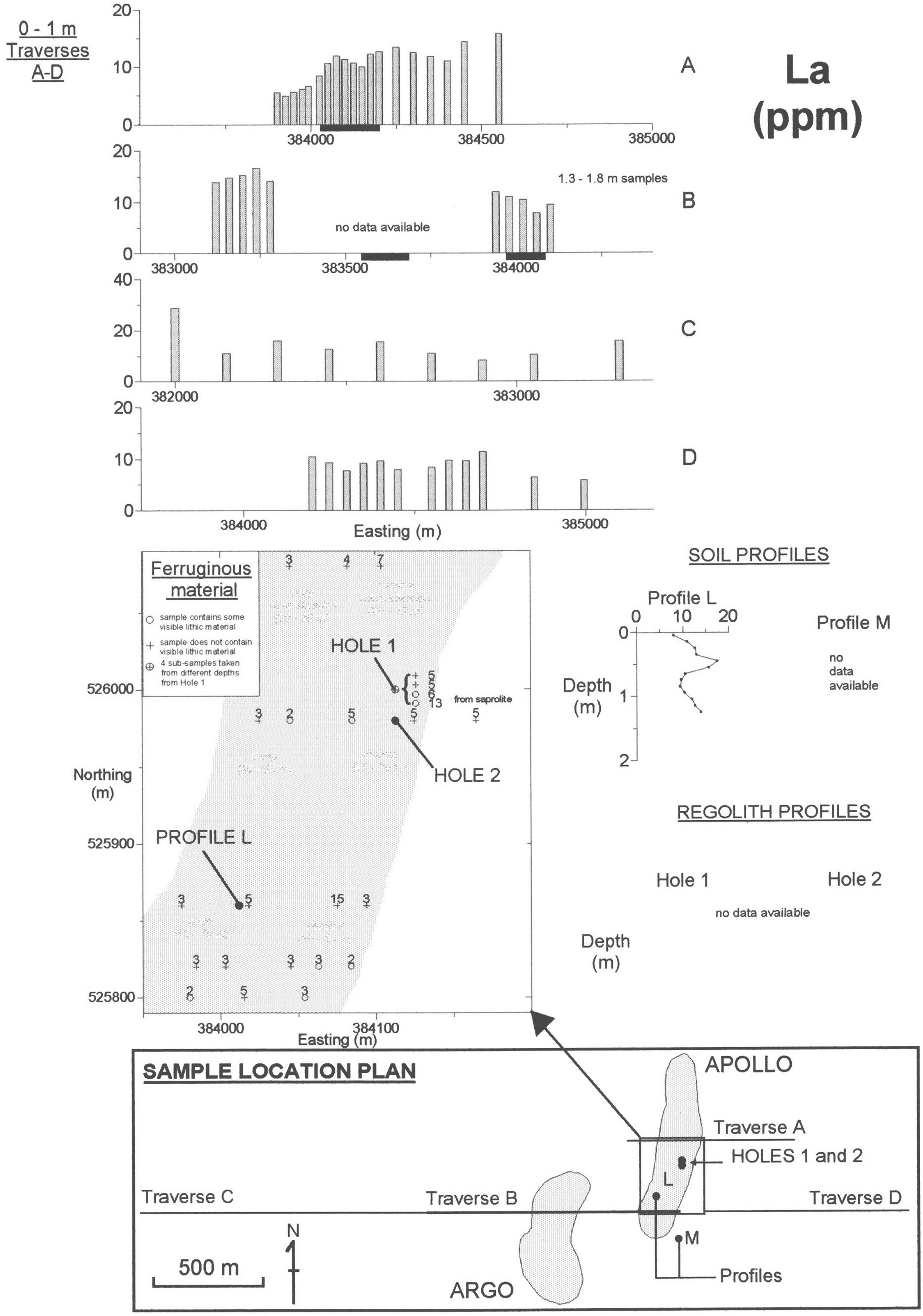

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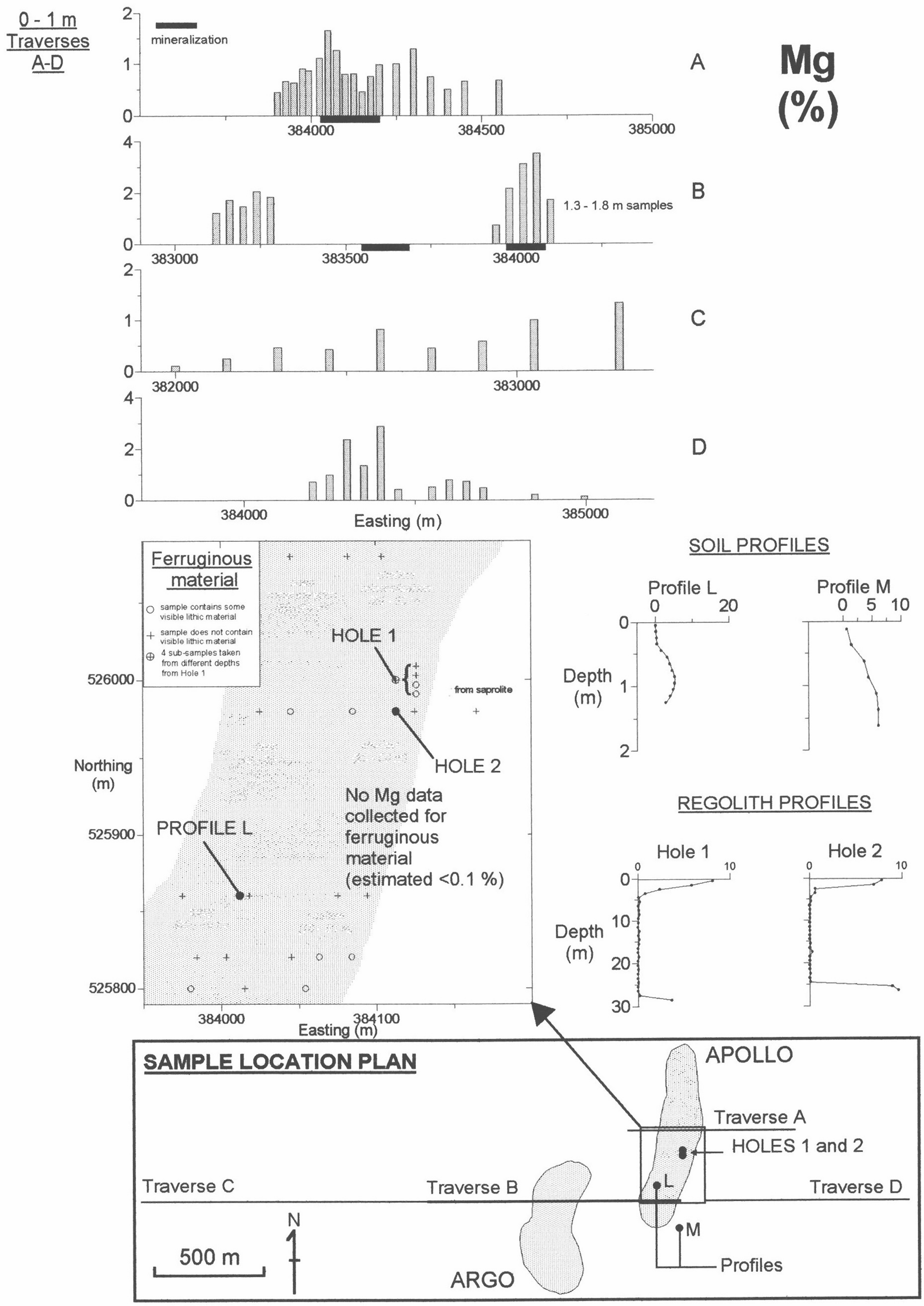

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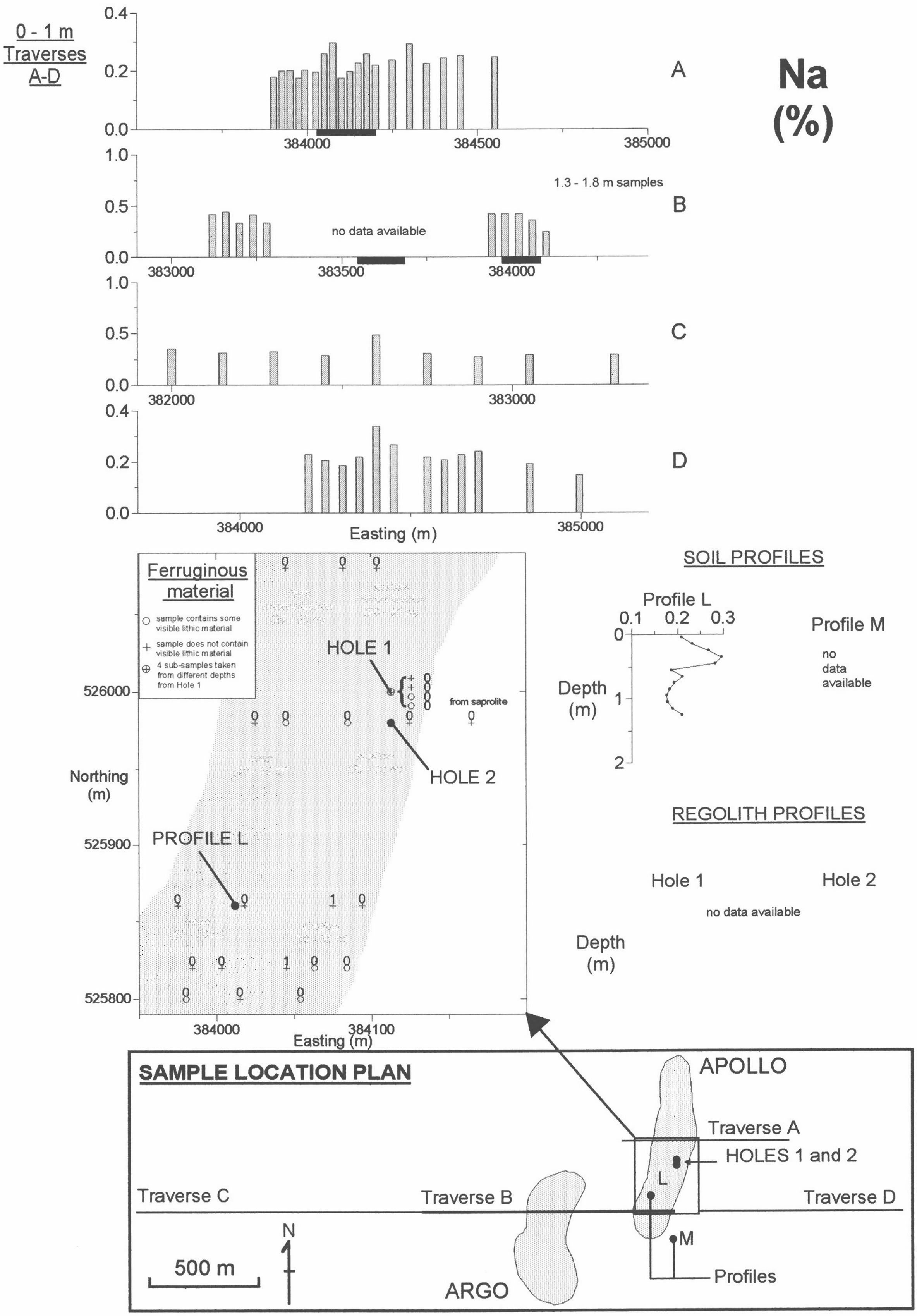

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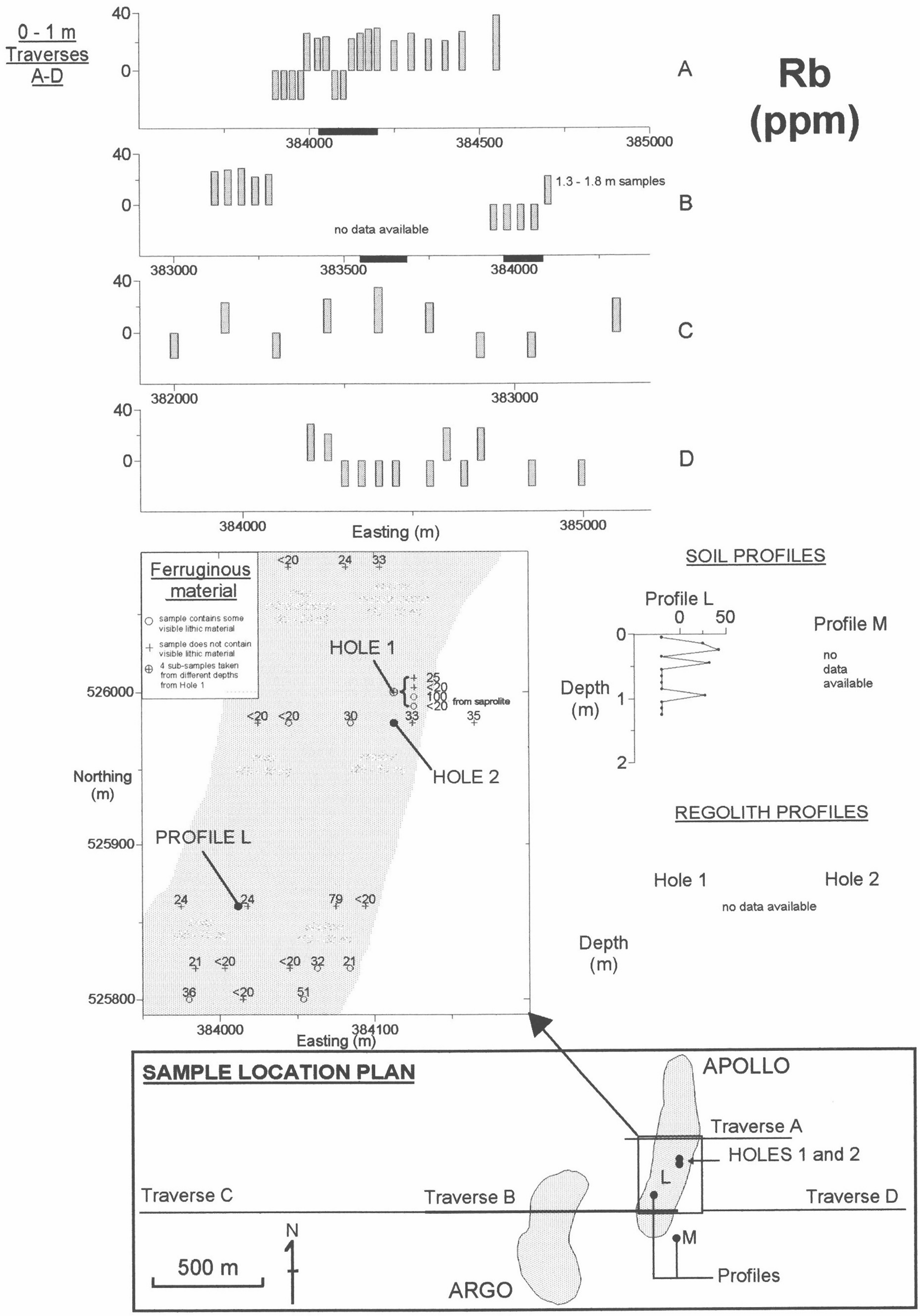

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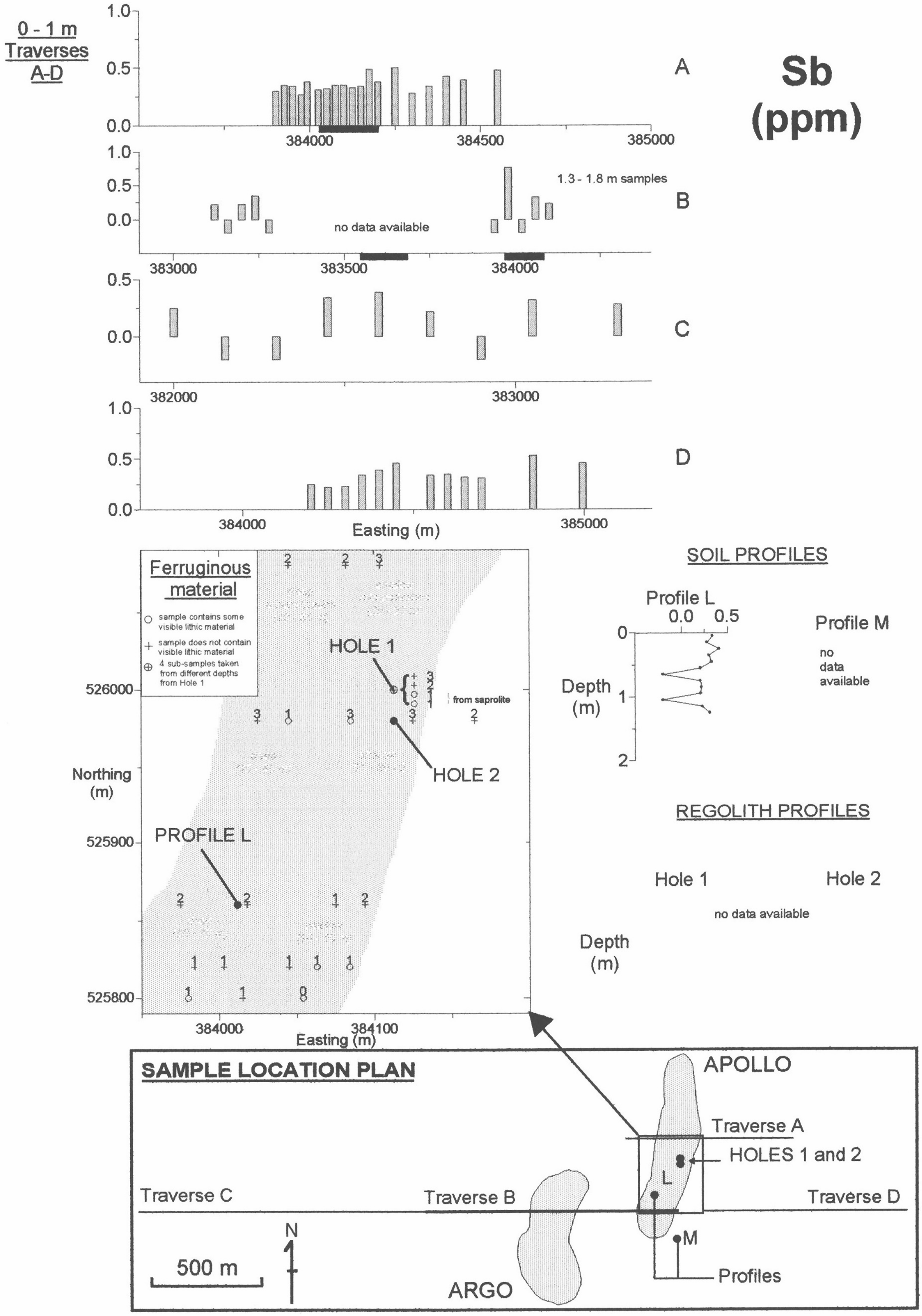

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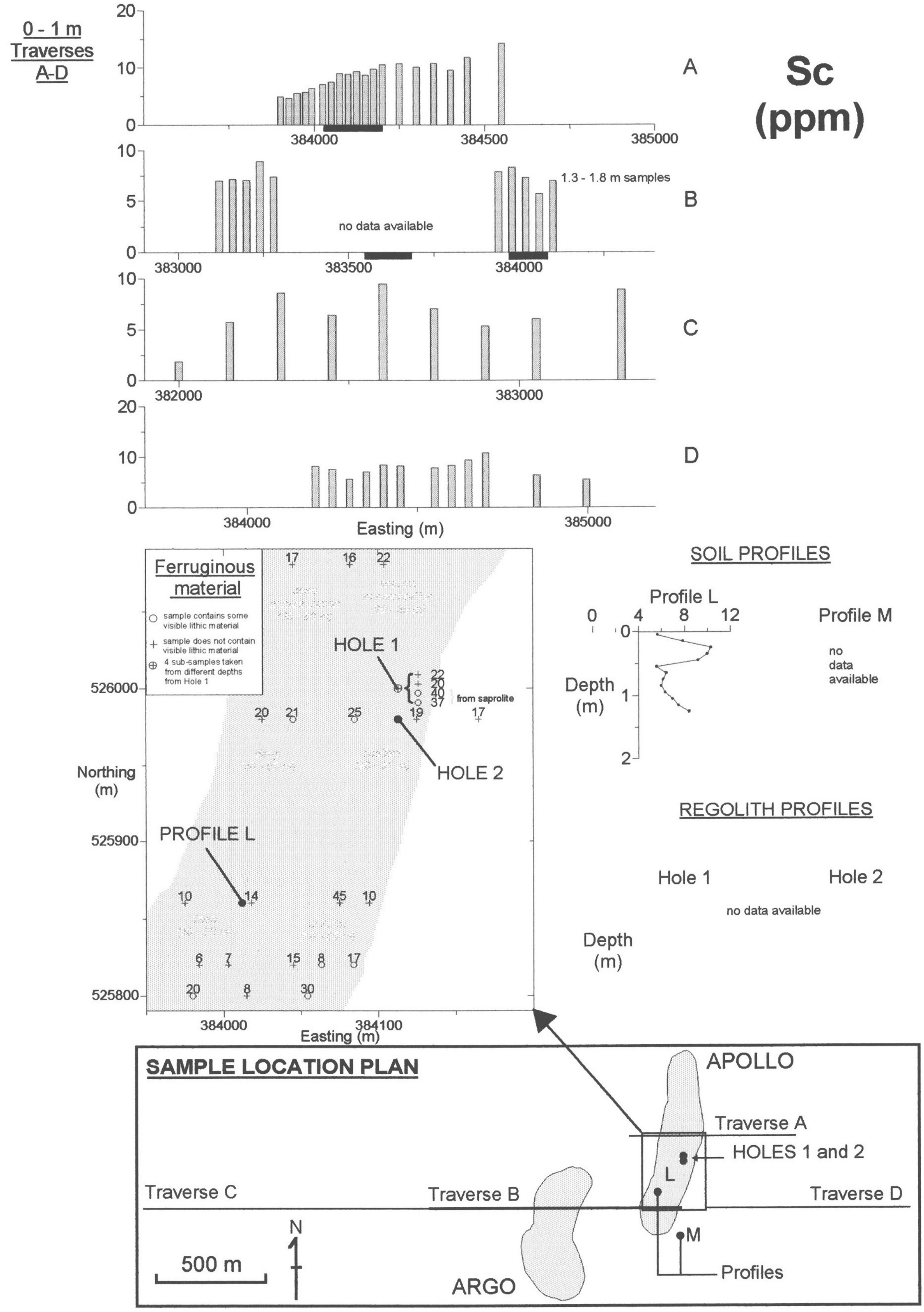

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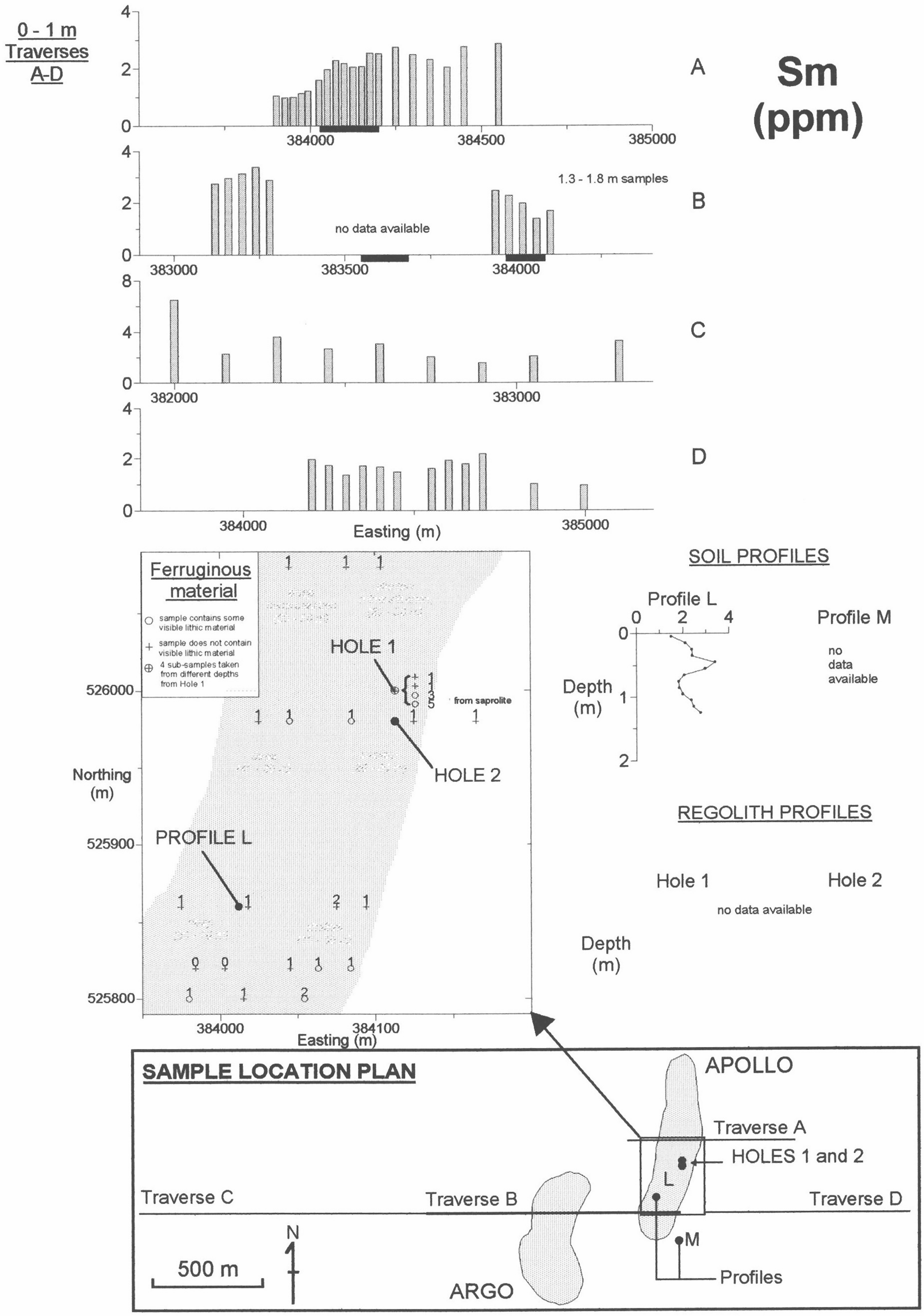

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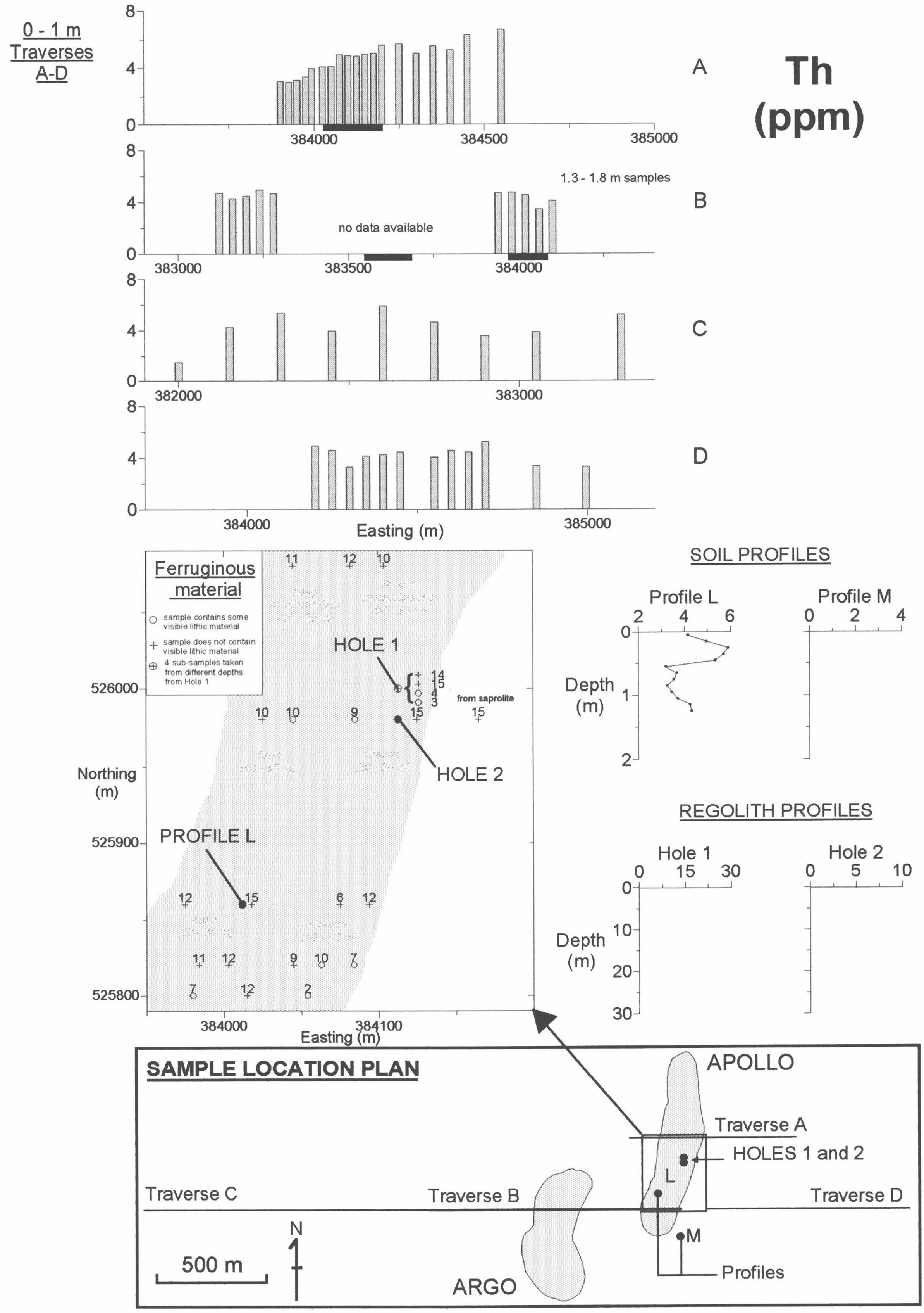

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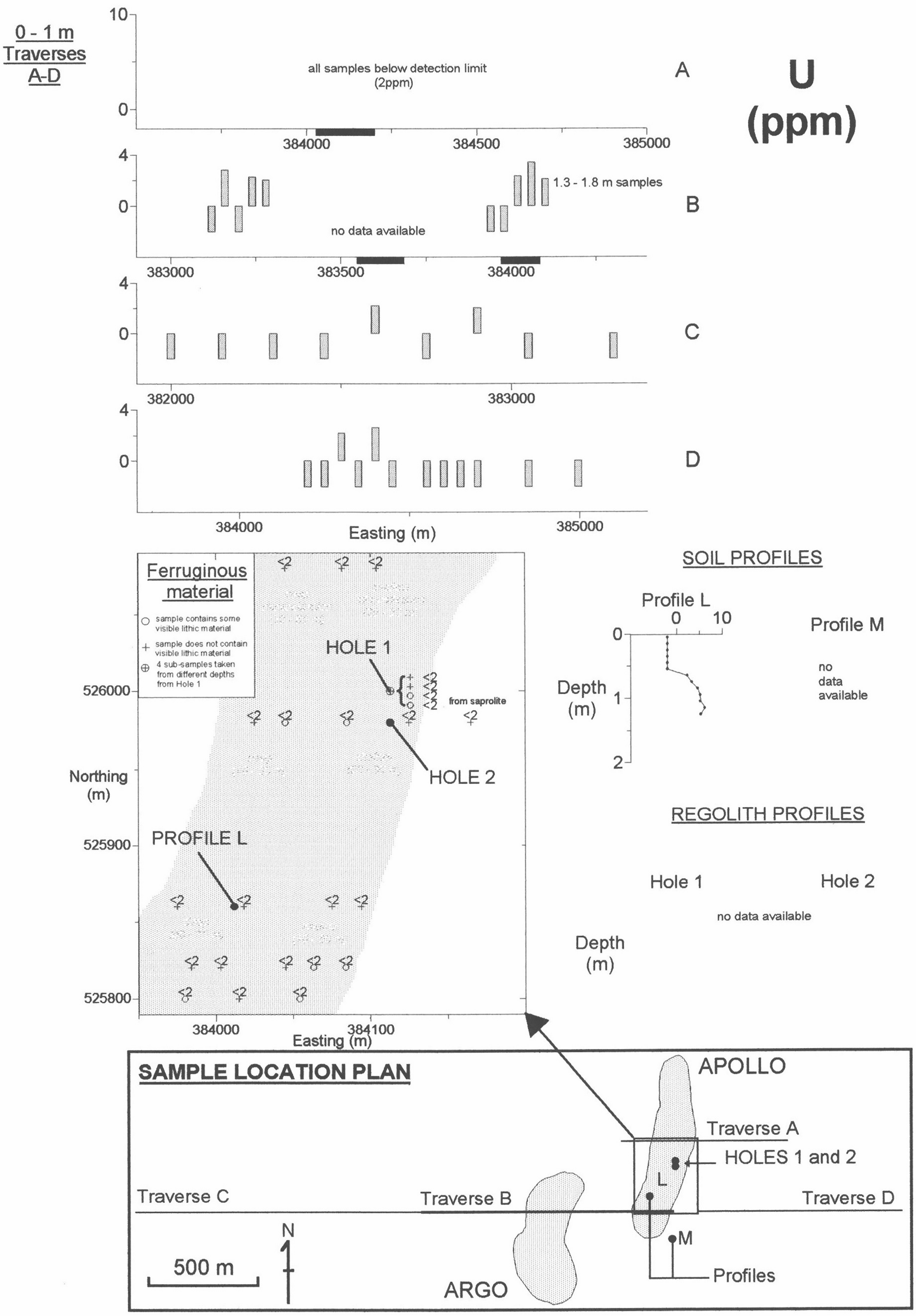

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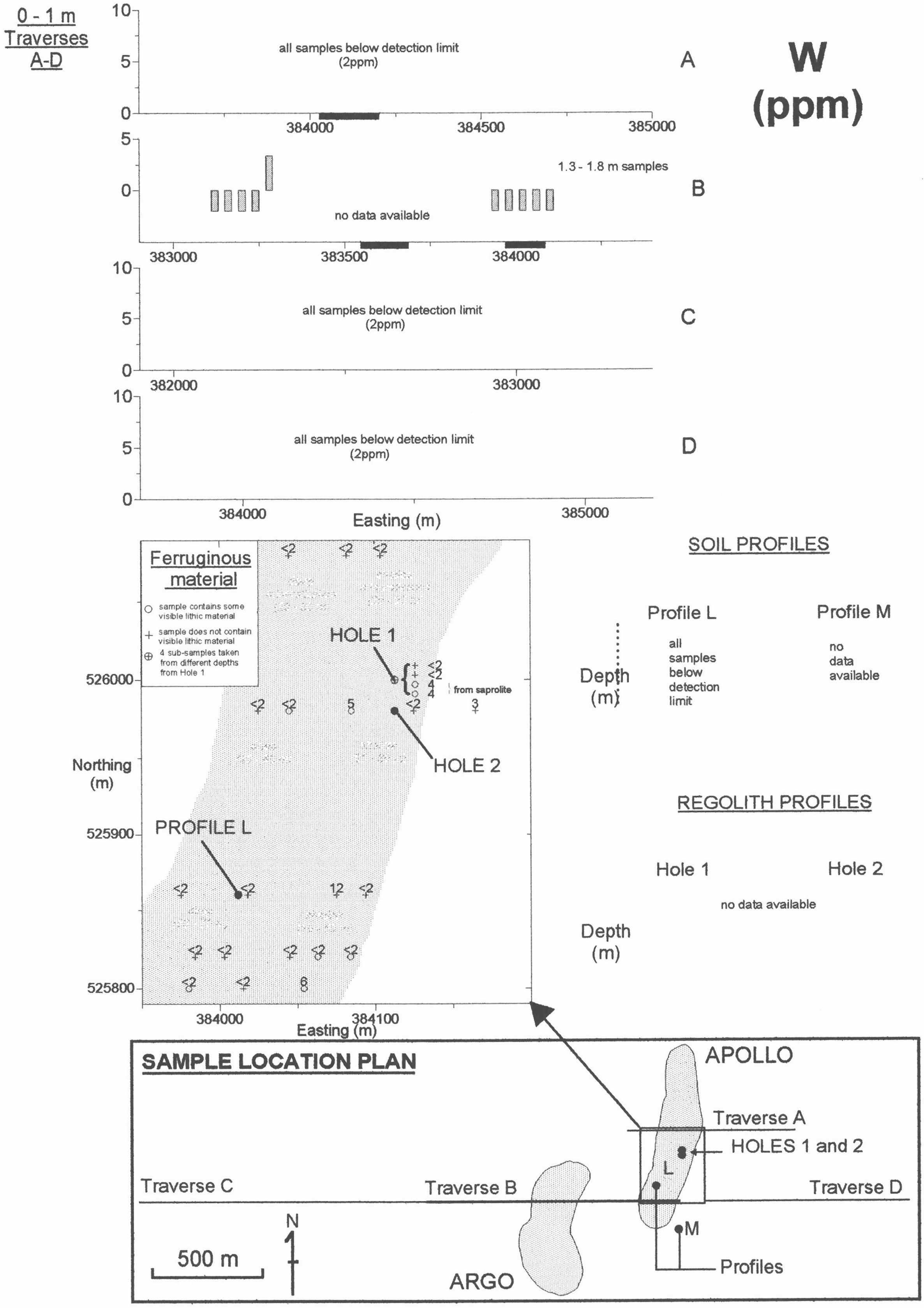

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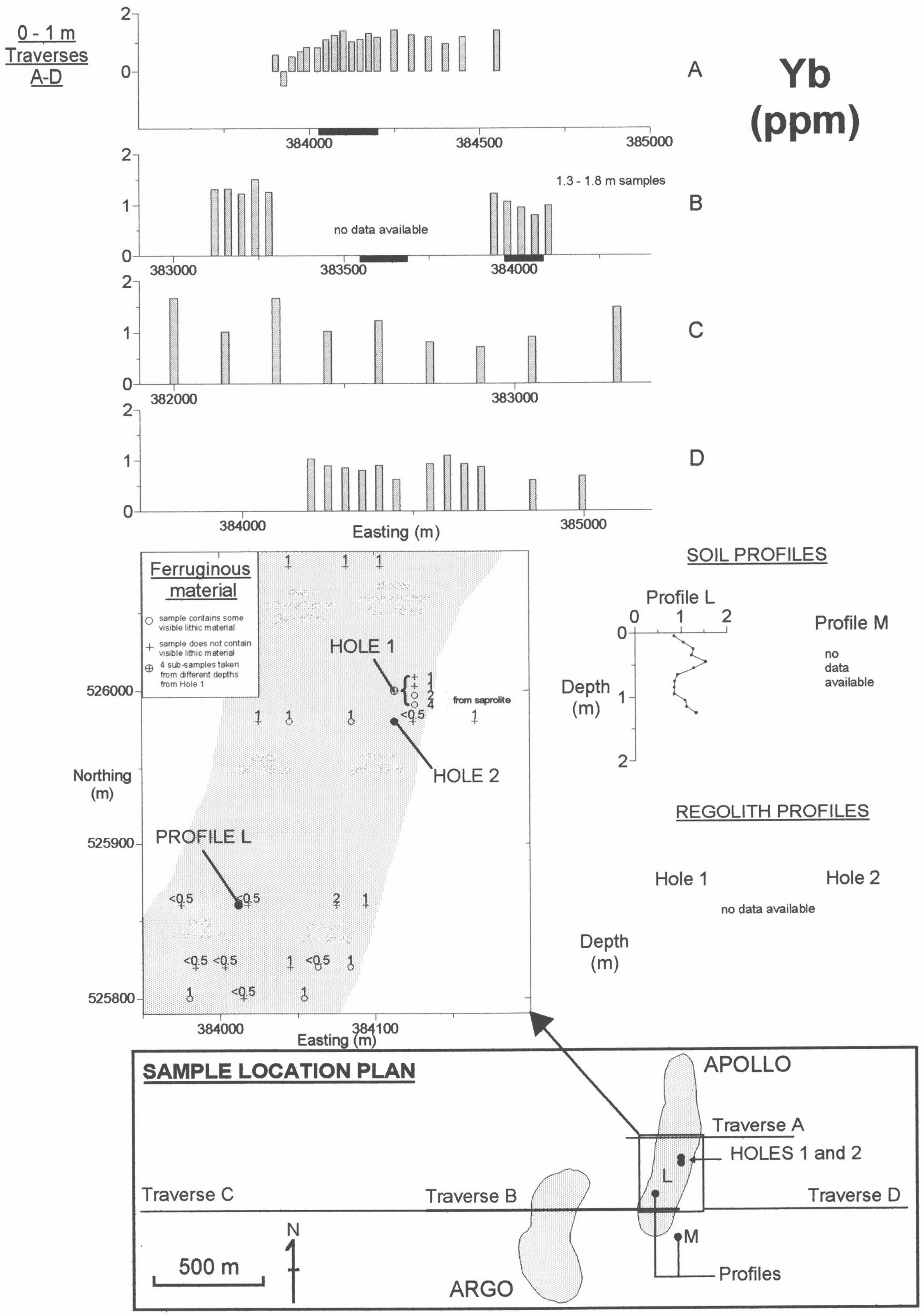

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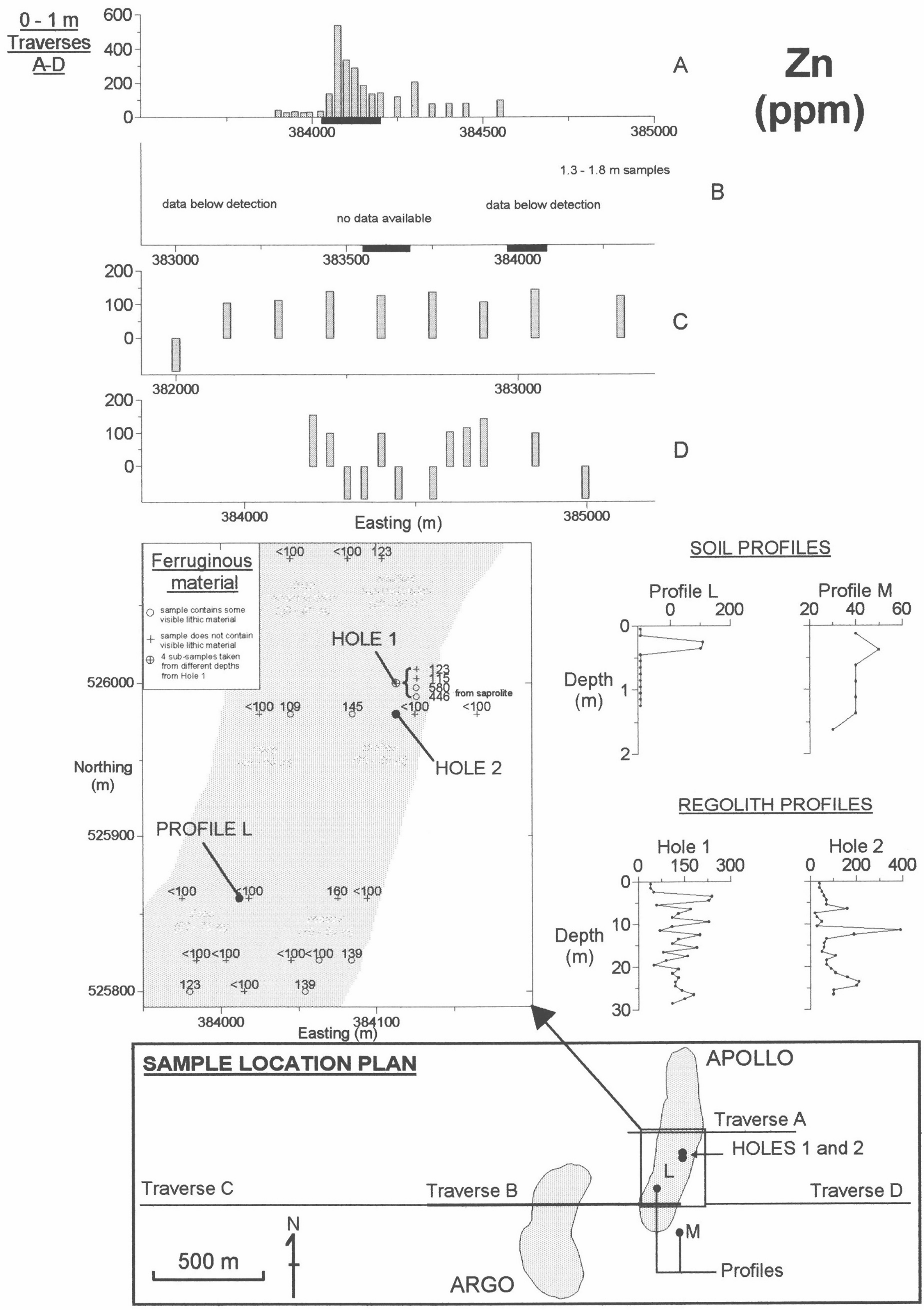

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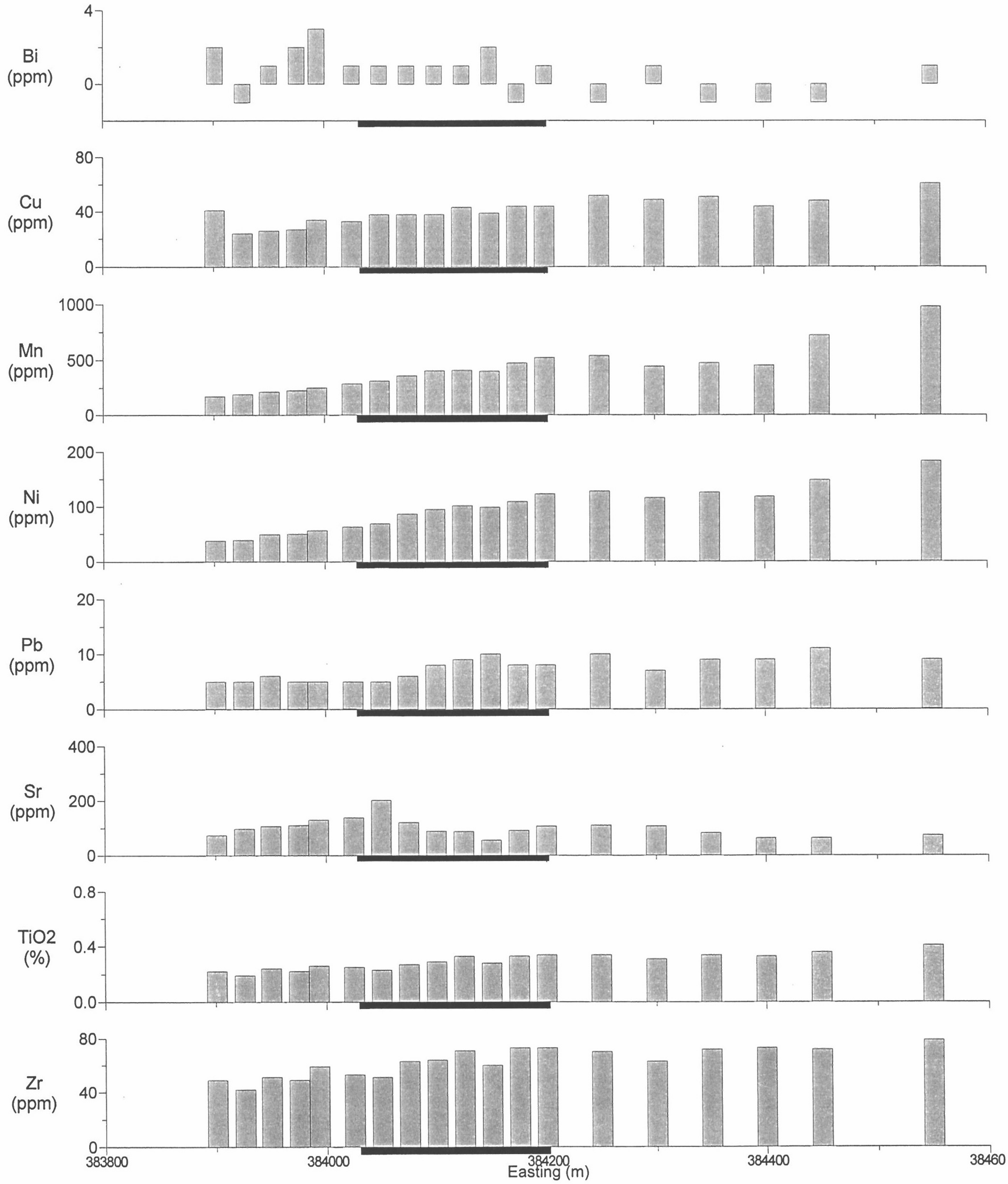


Figure A1.1.2: Selected elements for 0 - 1m samples on 526080N analysed by XRF. Black bar indicates position of mineralization.

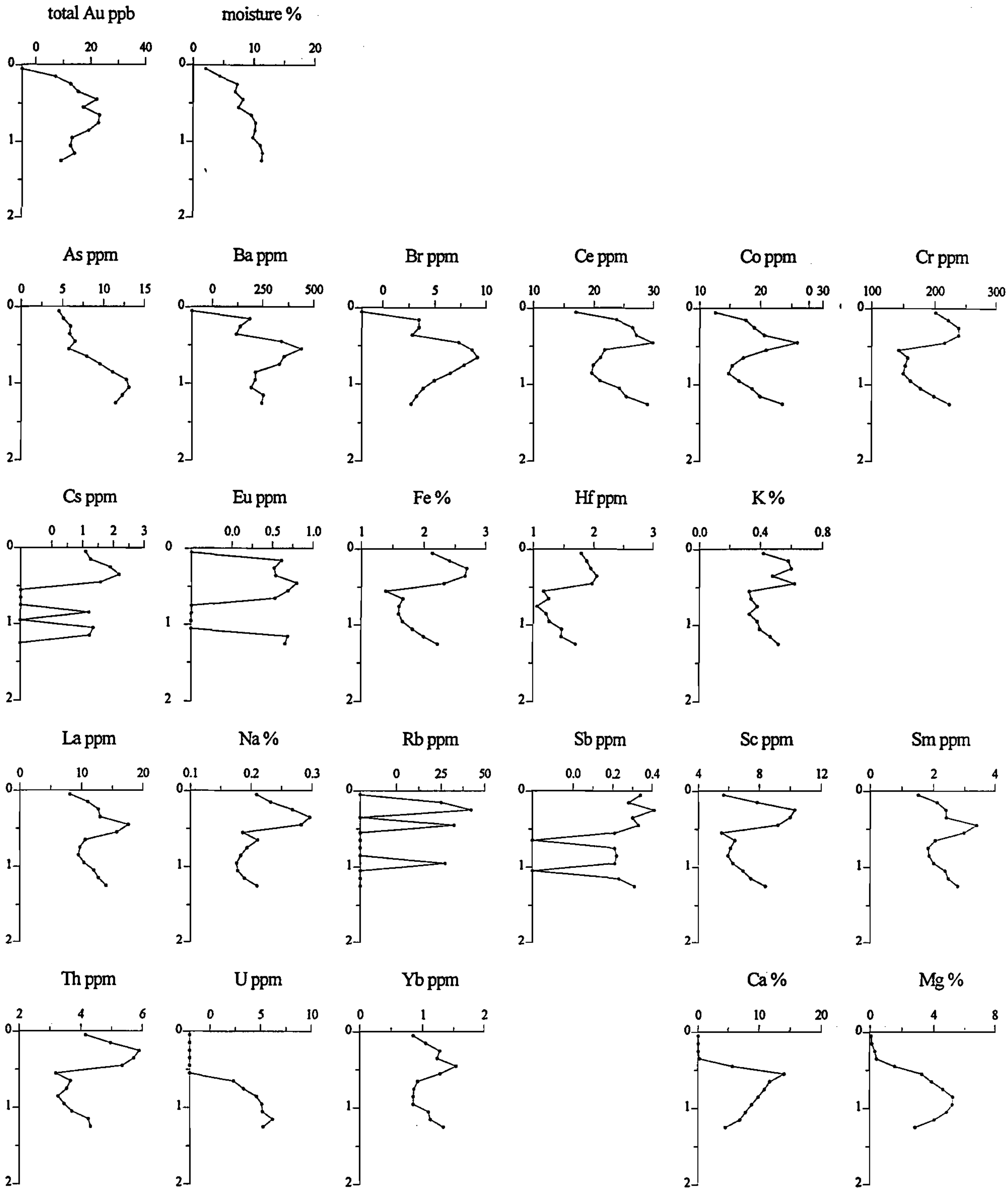


Figure A1.2: Elemental abundancies for Profile L (TD 4364 384012E 525860N) at Apollo.
Ag (5), Ir (0.02), Lu (0.2), Mo (5), Se (5), Ta (1), W (2) and Zn (100)
below detection limits indicated in parentheses (ppm).
Negative data is below detection. Y axis is Depth (m).

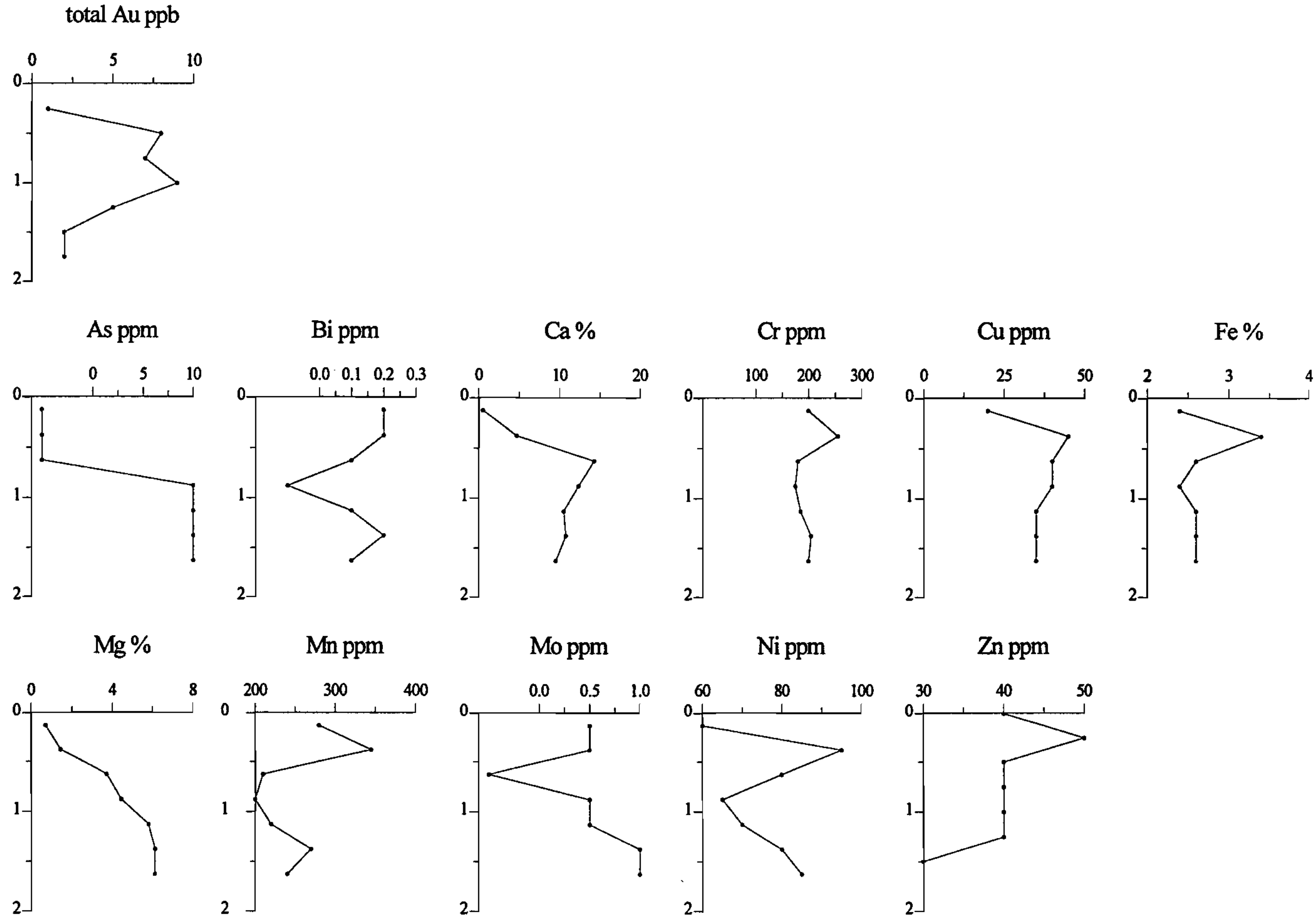


Figure A1.3: Elemental abundancies for Profile M at Apollo.
Negative data is below detection. Y axis is Depth (m).

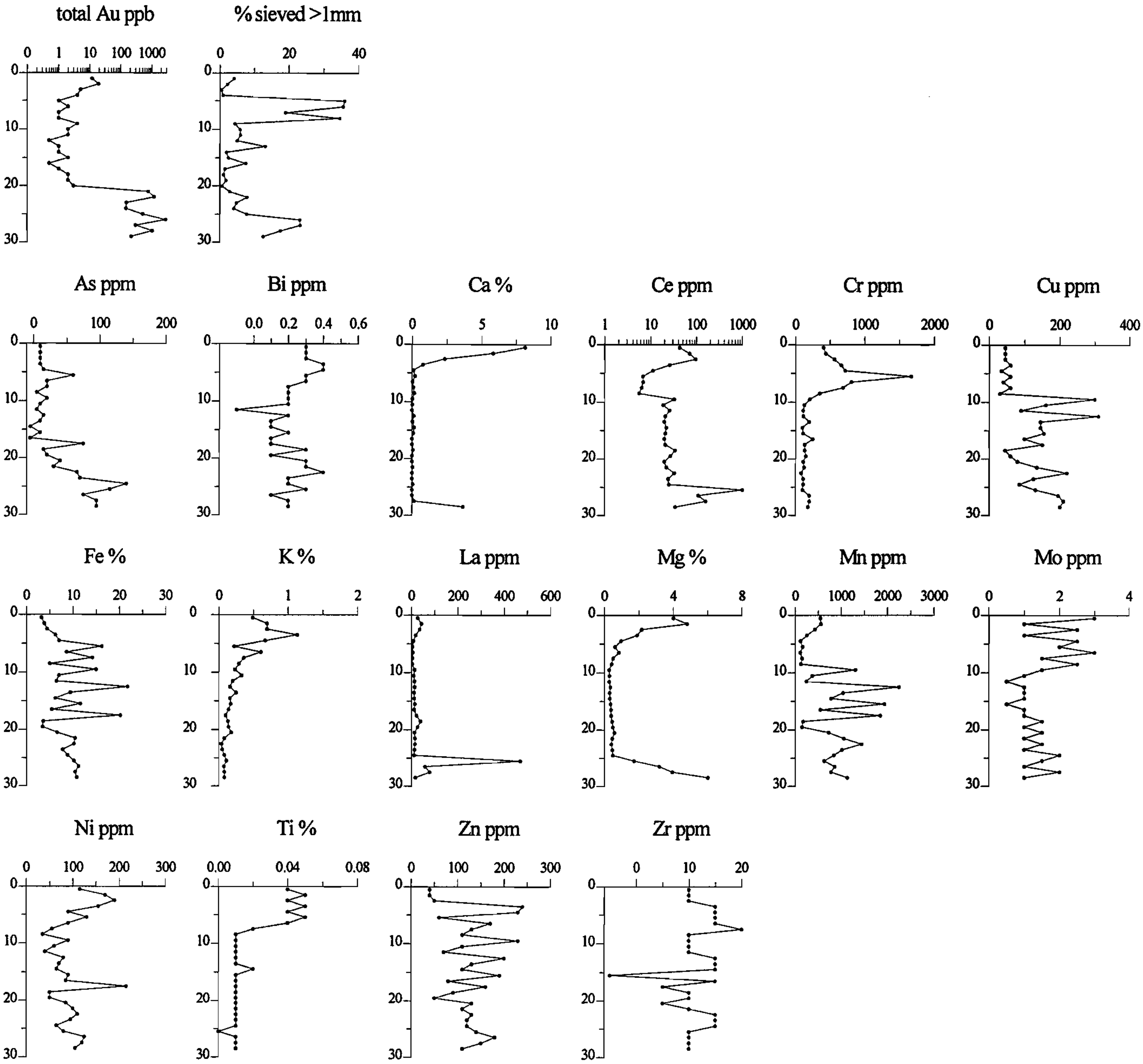


Figure A1.4: Elemental abundancies for air core drill Hole 1 (384113E 526000N) at Apollo. Negative data is below detection. Sb data is near or below dtection (0.5 ppm). Y axis is Depth (m).

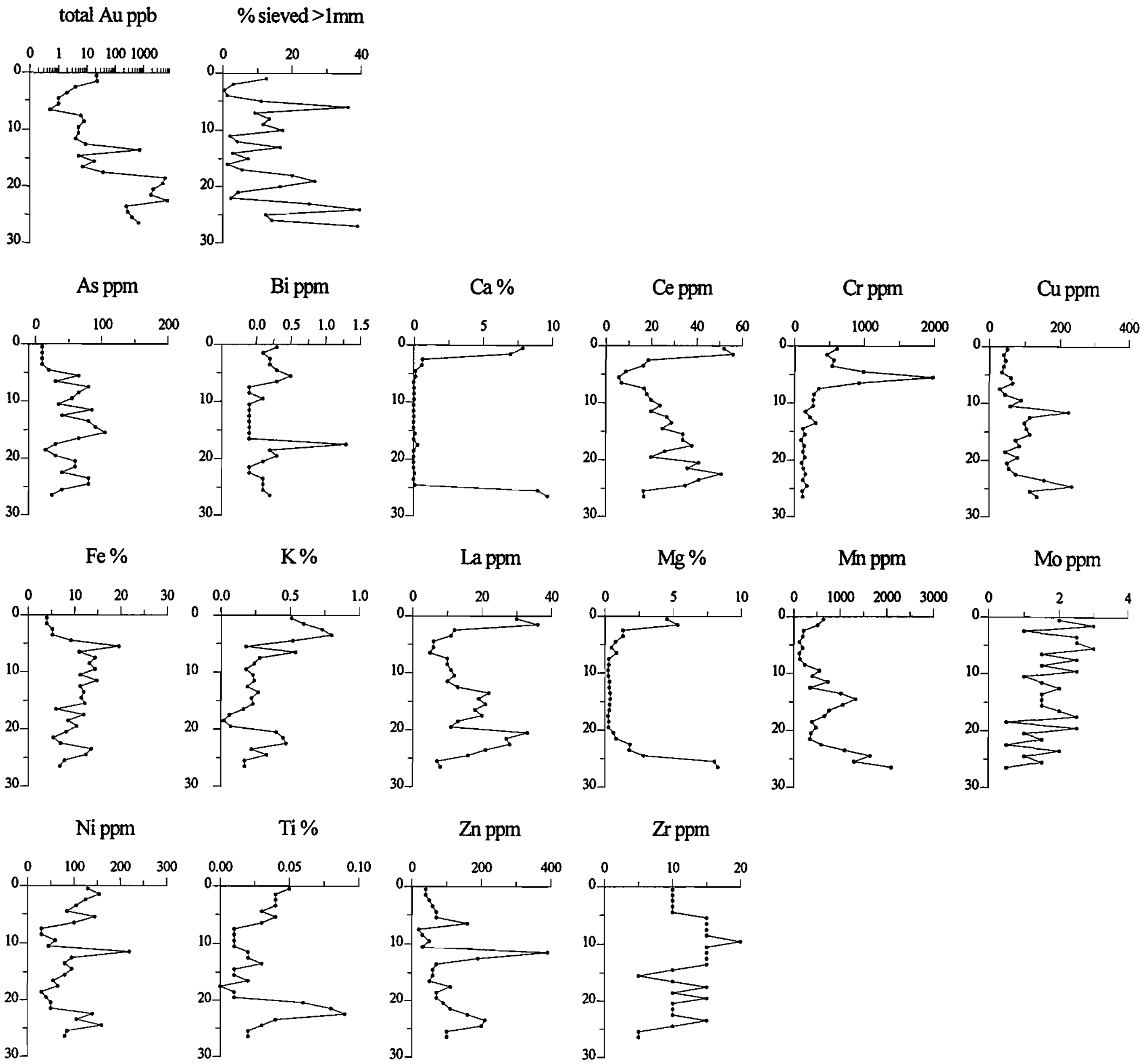


Figure A1.5: Elemental abundancies for air core drill Hole 2 (384113E 525980N) at Apollo. Negative data is below detection. Sb data is near or below dection (0.5 ppm). Y axis is Depth (m).

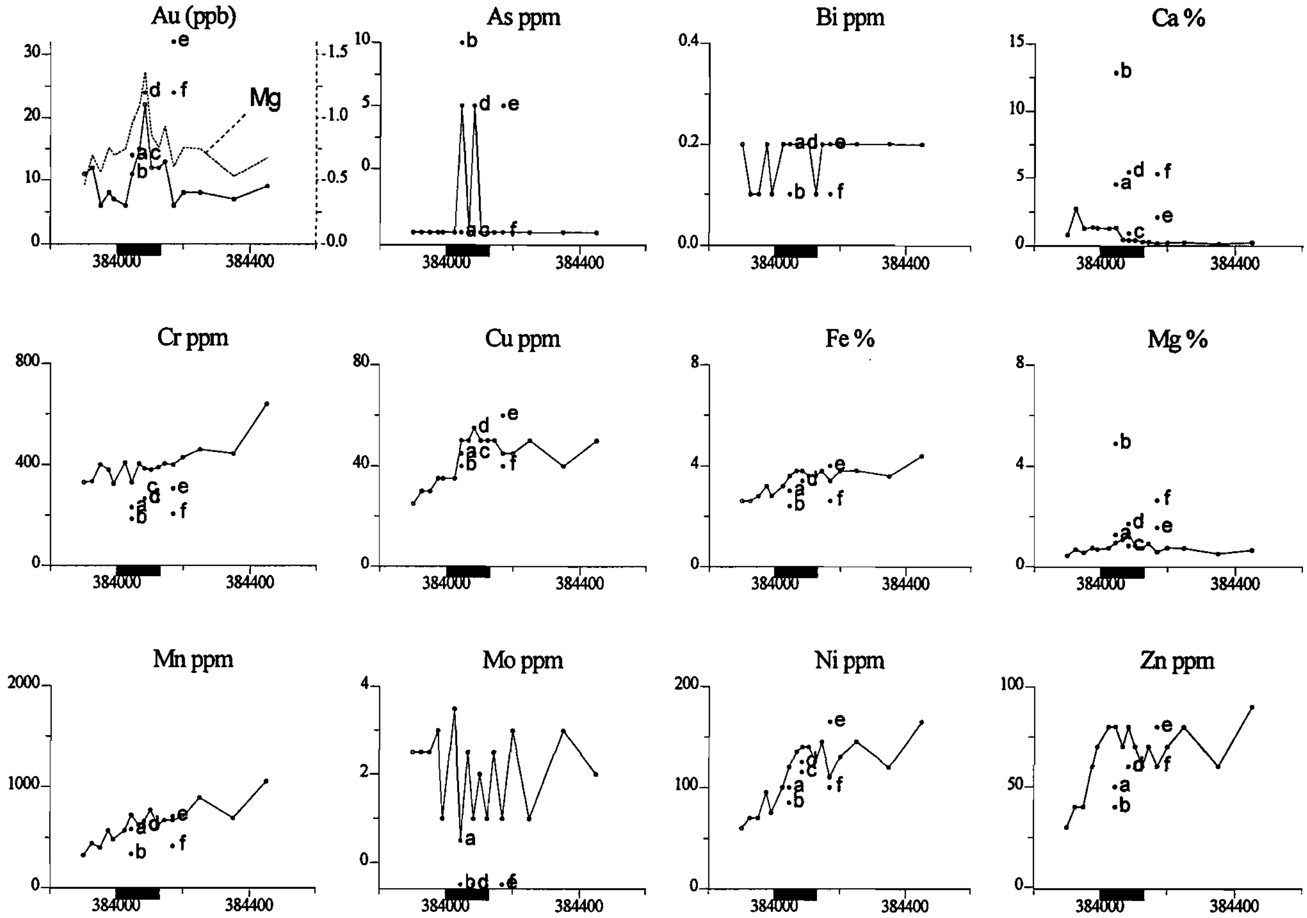


Figure A1.6: Elemental abundancies for soils (0.05 - 0.15 m) from 526080N at Apollo. Black rectangle indicates position of mineralization. X axis is Easting (m). Negative data is below detection. Sb is below detection (0.5 ppm).

Grab Samples:

Code	From (m)	To (m)	Description
a	0.1	0.3	red loam
b	0.5	0.7	calcareous red loam
c	0.05	0.15	red loam
d	0.15	0.3	calcareous red loam
e	0.1	0.25	red loam
f	0.3	0.5	calcareous red loam

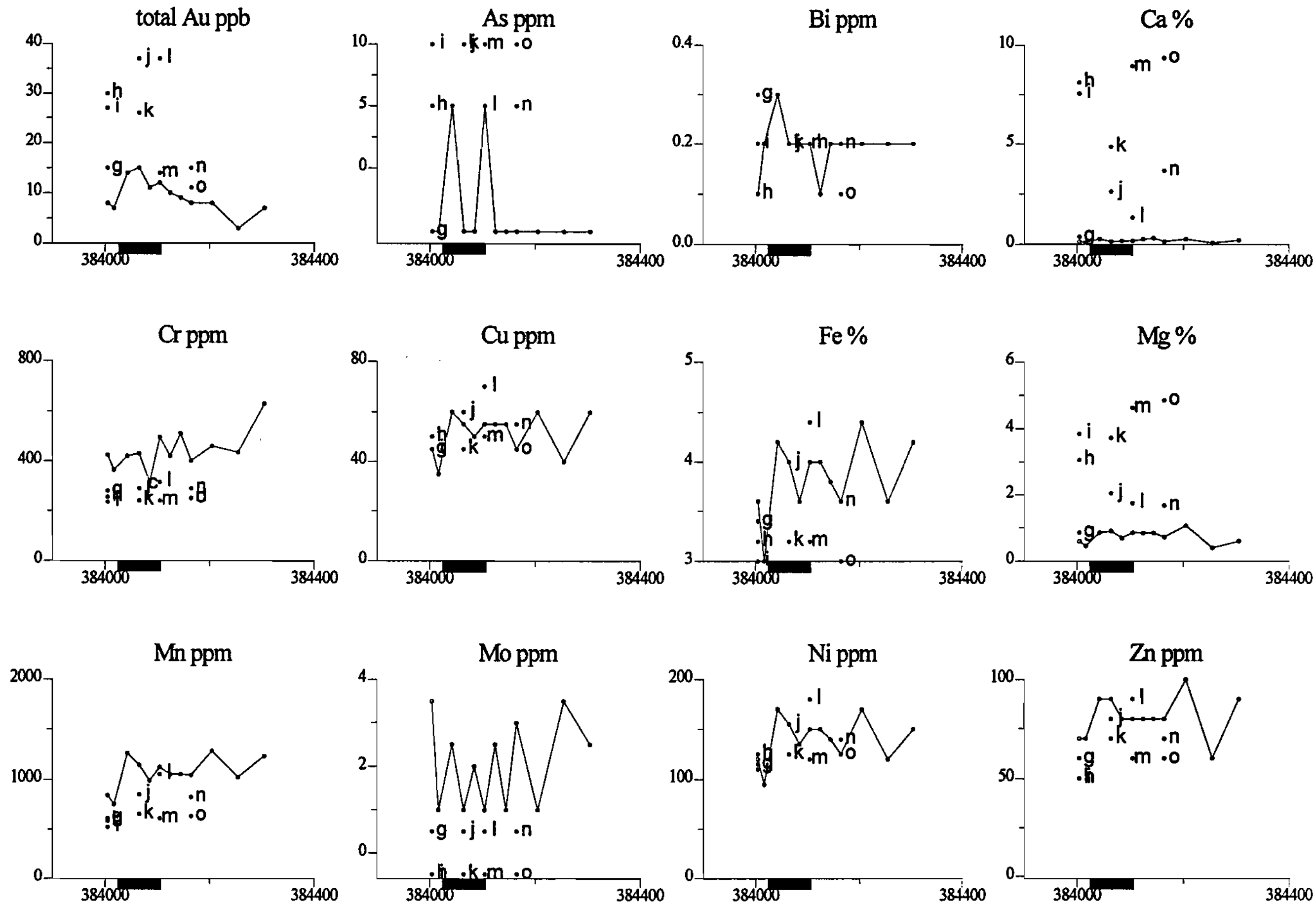


Figure A1.7: Elemental abundancies for topsoils (0.05 - 0.15 m) and grab samples from 525980N at Apollo.
Black rectangle indicates position of mineralization. X axis is Easting (m).
Negative data is below detection. Sb is below detection (0.5 ppm).

Grab Samples:

Code	From (m)	To (m)	Description
g	0.05	0.25	red loam
h	0.25	0.5	calcareous red loam
i	0.5	0.75	calcareous red loam
j	0.3	0.5	red loam
k	0.5	0.6	calcareous red loam
l	0.2	0.4	red loam
m	0.4	0.6	calcareous red loam
n	0.1	0.3	red loam
o	0.4	0.5	calcareous red loam

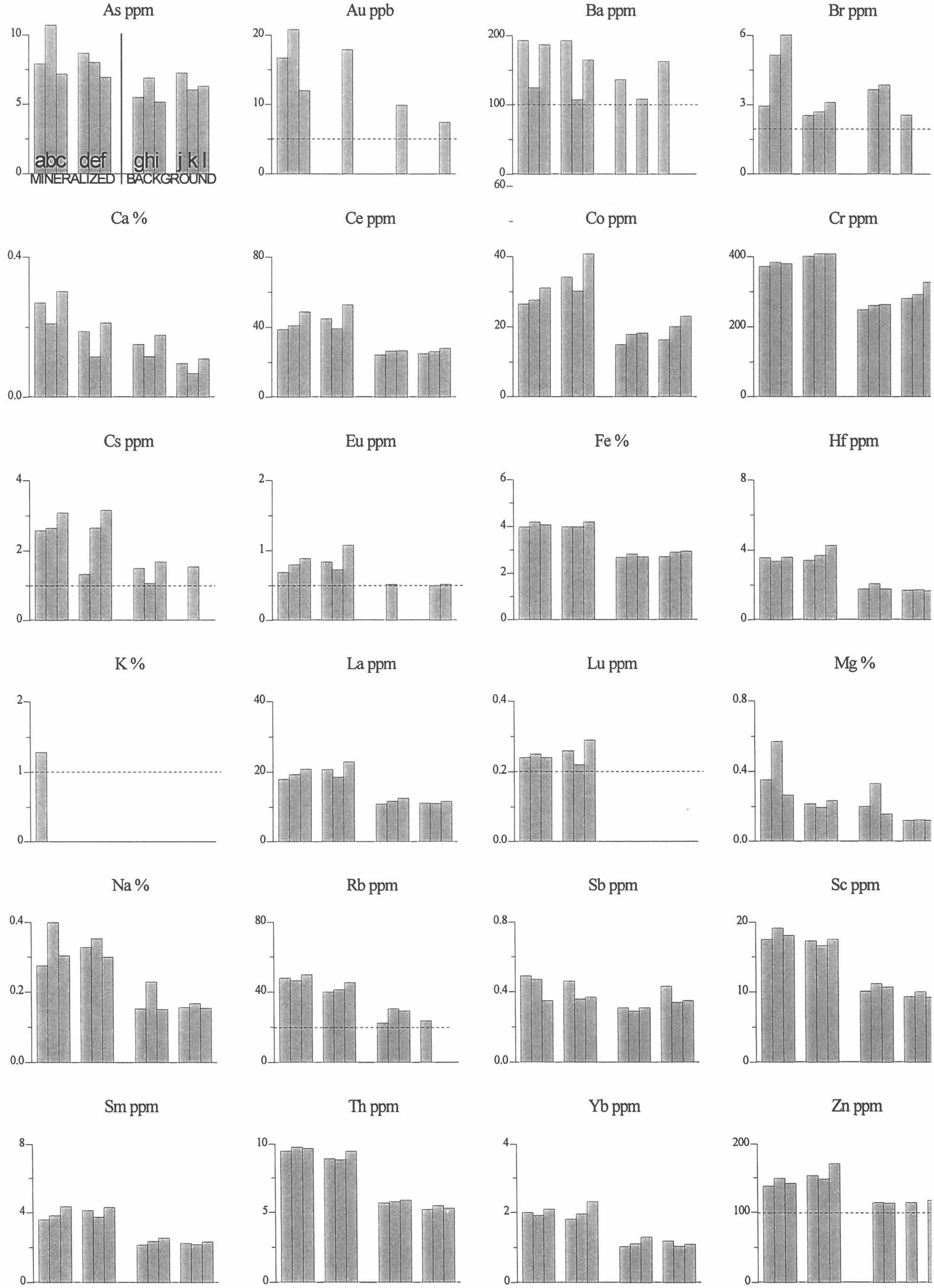


Figure A1.8.1 : Elemental abundances for two fine size fractions from 6 soils (12 sub-samples) from over mineralized and background areas at Apollo

Samples a-c: <180µm mineralized. Samples d-f: +180µm-500µm mineralized.

Sample g-i: <180µm background. Samples jkl+180µm-500µm background

For all samples Ag (5), Bi (1), Ir (0.02), Se (5), Ta (1), U (2) and W (4) below detection (ppm) indicated in parentheses.

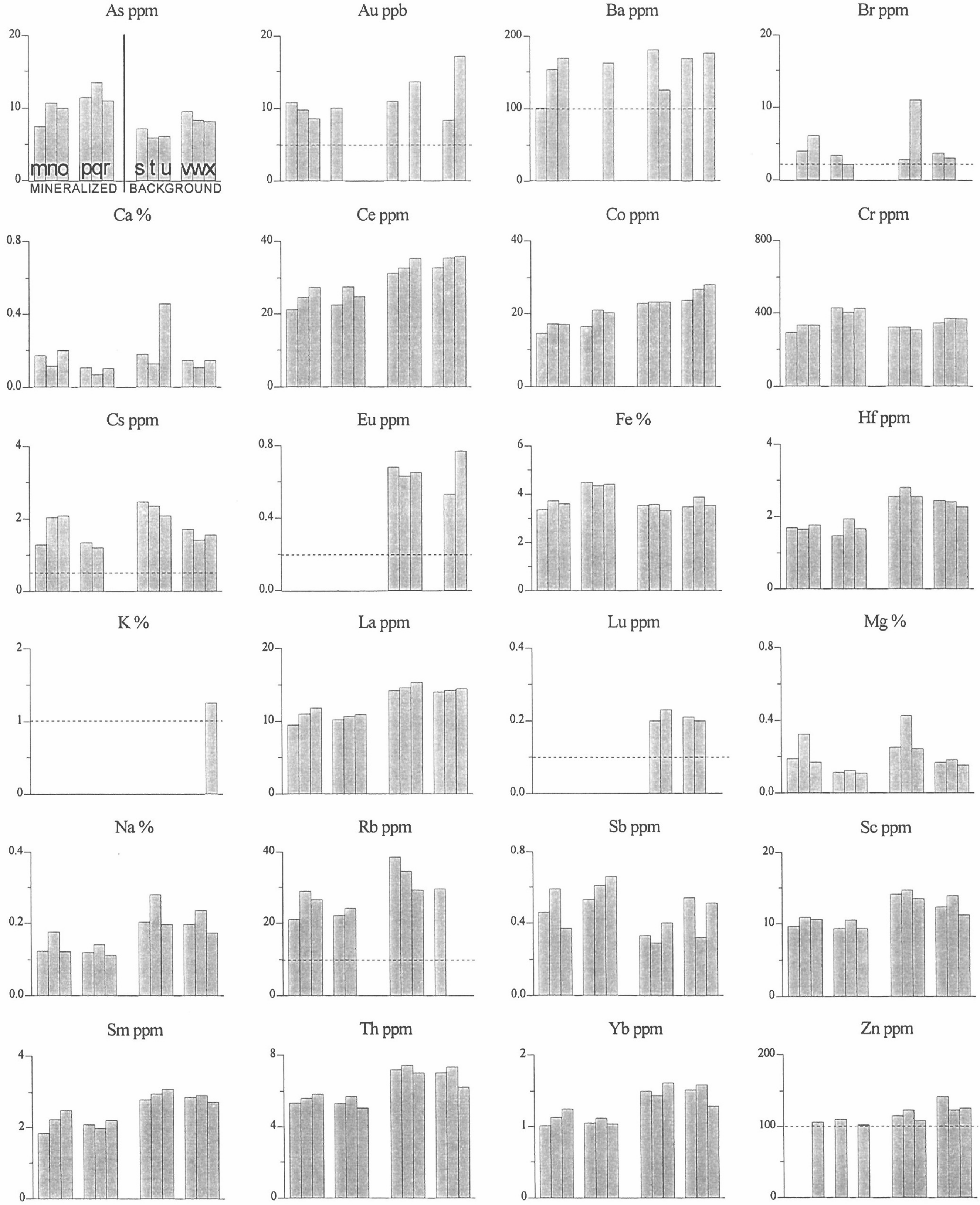


Figure A1.8.2 : Elemental abundances for two coarse size fractions from 6 soils (12 sub-samples) from over mineralized and background areas at Apollo
Samples mno: +500µm-2000µm mineralized. Samples pqr: >2000µm mineralized.
Sample stu: +500µm-2000µm background. Samples vwx: >2000µm background
For all samples Ag (5), Bi (1), Ir (0.02), Se (5), Ta (1), U (2) and W (4) below detection (ppm) indicated in parentheses.

Table A1.9.1: Elemental data for soil samples from 525800N

Sample	Easting	Northing	Depth	Au	Au	Au	Au
	(m)	(m)	(m)	INAA	water	iodide	cyanide
				ppb	ppb	ppb	ppb
3742	383300	525800	1.55	10	1.72	7.32	0.76
3744	383340	525800	1.55	6	1.84	7.84	1.16
3746	383380	525800	1.55	6	1.84	7.04	1.40
3748	383420	525800	1.55	5	1.64	7.24	0.72
3750	383460	525800	1.55	2	1.24	7.24	0.80
3751	383480	525800	1.55	2	1.16	7.96	2.48
3754	383540	525800	1.55	4	1.60	8.40	0.96
3756	383580	525800	1.55	2	0.96	6.96	0.96
3757	383600	525800	1.55	12	3.00	10.60	3.24
3760	383660	525800	1.55	11	2.56	11.76	2.00
3762	383700	525800	1.55	5	2.20	6.20	2.24
3764	383740	525800	1.55	12	7.60	13.20	2.08
3766	383780	525800	1.55	24	9.60	20.80	1.92
3768	383820	525800	1.55	11	2.92	8.92	1.88
3770	383860	525800	1.55	9	3.32	9.72	1.56
3772	383900	525800	1.55	15	2.28	11.08	1.12

Table A1.9.2 : Elemental data for selected soil samples form 526080N and 525980N. na denotes sample not analysed for this element

Sample	Northing	Easting	Au	As	Bi	Ca	Cr	Cu	Fe	Mg	Mn	Mo	Ni	Sb	Zn
	(m)	(m)	AAS	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
			ppb	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm
GB431418	525980	384005	8	<5	0.1	0.1	425	45	3.6	0.6	840	3.5	120	<0.5	70
GB431419	525980	384017	7	<5	0.2	0.1	365	35	3.0	0.46	750	1.0	95	<0.5	70
GB431420	525980	384043	14	5	0.3	0.3	420	60	4.2	0.86	1260	2.5	170	<0.5	90
GB431421	525980	384065	15	<5	0.2	0.1	430	55	4.0	0.9	1140	1.0	155	<0.5	90
GB431422	525980	384085	11	<5	0.2	0.2	315	50	3.6	0.7	990	2.0	135	<0.5	80
GB431423	525980	384105	12	5	0.2	0.2	495	55	4.0	0.86	1120	1.0	150	<0.5	80
GB431424	525980	384125	10	<5	0.1	0.3	420	55	4.0	0.85	1050	2.5	150	<0.5	80
GB431425	525980	384145	9	<5	0.2	0.3	510	55	3.8	0.85	1050	1.0	140	<0.5	80
GB431426	525980	384165	8	<5	0.2	0.2	400	45	3.6	0.73	1040	3.0	125	<0.5	80
GB431427	525980	384205	8	<5	0.2	0.3	460	60	4.4	1.06	1280	1.0	170	<0.5	100
GB431428	525980	384255	3	<5	0.2	0.1	435	40	3.6	0.41	1020	3.5	120	<0.5	60
GB431429	525980	384305	7	<5	0.2	0.2	630	60	4.2	0.61	1230	2.5	150	<0.5	90
GB431401	526080	383900	11	<5	0.2	0.8	330	25	2.6	0.46	325	2.5	60	<0.5	30
GB431402	526080	383925	12	<5	0.1	2.7	335	30	2.6	0.7	440	2.5	70	<0.5	40
GB431403	526080	383950	6	<5	0.1	1.3	400	30	2.8	0.56	400	2.5	70	<0.5	40
GB431404	526080	383975	8	<5	0.2	1.4	380	35	3.2	0.76	570	3.0	95	<0.5	60
GB431405	526080	383990	7	<5	0.1	1.3	325	35	2.8	0.7	480	1.0	75	<0.5	70
GB431406	526080	384025	6	<5	0.2	1.3	410	35	3.2	0.75	570	3.5	100	<0.5	80
GB431407	526080	384045	11	5	0.2	1.3	330	50	3.6	0.96	720	0.5	120	<0.5	80
GB431408	526080	384067	15	<5	0.2	0.5	405	50	3.8	1.09	620	2.5	135	<0.5	70
GB431409	526080	384084	22	5	0.2	0.4	385	55	3.8	1.36	660	1.0	140	<0.5	80
GB431410	526080	384103	12	<5	0.2	0.4	380	50	3.6	0.86	770	2.0	140	<0.5	70
GB431411	526080	384125	12	<5	0.1	0.3	390	50	3.6	0.76	620	1.0	125	<0.5	60
GB431412	526080	384144	13	<5	0.2	0.3	405	50	3.8	0.93	670	2.5	145	<0.5	70
GB431413	526080	384170	6	<5	0.2	0.2	400	45	3.4	0.61	670	1.0	110	<0.5	60
GB431414	526080	384200	8	<5	0.2	0.2	430	45	3.8	0.76	700	3.0	130	<0.5	70
GB431415	526080	384250	8	<5	0.2	0.2	460	50	3.8	0.75	890	1.0	145	<0.5	80
GB431416	526080	384350	7	<5	0.2	0.1	445	40	3.6	0.53	690	3.0	120	<0.5	60
GB431417	526080	384450	9	<5	0.2	0.3	640	50	4.4	0.68	1050	2.0	165	<0.5	90
AA723707	525980	384005	15	<5	0.3	0.4	280	45	3.4	0.86	610	0.5	115	na	60
AA723708	525980	384005	30	5	0.1	8.1	255	50	3.2	3.05	580	<0.5	125	na	50
AA723709	525980	384005	27	10	0.2	7.6	235	45	3.0	3.85	520	<0.5	110	na	50
AA723710	525980	384065	37	10	0.2	2.6	290	60	4.0	2.04	850	0.5	155	na	80
AA723711	525980	384065	26	10	0.2	4.8	240	45	3.2	3.73	650	<0.5	125	na	70
AA723712	525980	384105	37	5	0.2	1.3	315	70	4.4	1.74	1050	0.5	180	na	90
AA723713	525980	384105	14	10	0.2	9.0	240	50	3.2	4.64	610	<0.5	120	na	60
AA723714	525980	384165	15	5	0.2	3.7	290	55	3.6	1.67	820	0.5	140	na	70
AA723715	525980	384165	11	10	0.1	9.4	250	45	3.0	4.86	630	<0.5	125	na	60
AA723701	526080	384045	14	<5	0.2	4.5	230	45	3.0	1.28	580	0.5	100	na	50
AA723702	526080	384045	11	10	0.1	12.9	185	40	2.4	4.89	335	<0.5	85	na	40
AA723703	526080	384084	14	<5	0.2	0.9	265	45	3.4	0.85	610	<0.5	115	na	60
AA723704	526080	384084	24	5	0.2	5.5	265	55	3.4	1.72	610	<0.5	125	na	60
AA723705	526080	384170	32	5	0.2	2.1	305	60	4.0	1.57	710	<0.5	165	na	80
AA723706	526080	384170	24	<5	0.1	5.3	205	40	2.6	2.64	415	<0.5	100	na	60

Table A1.9.3 : Elemental data for soil samples (1.3-1.8 m, 0-1 m) from 525800N and 526080N. na = not analysed

Sample	Easting (m)	Northing (m)	depth (m)	Au INAA ppb	Au water ppb	Au iodide ppb	Au cyanide ppb	Ag INAA ppm	As INAA ppm	Ba INAA ppm	Bi XRF ppm	Br INAA ppm	Ca AAS %
3722	383120	525800	1.55	13.80	0.92	6.92	1.36	<5	9	254	na	9	9.0
3724	383160	525800	1.55	10.30	1.24	7.64	0.88	<5	11	311	na	12	10.4
3726	383200	525800	1.55	15.20	1.48	7.08	1.84	<5	8	220	na	11	11.9
3728	383240	525800	1.55	18.90	1.68	9.28	1.04	<5	12	160	na	9	9.8
3730	383280	525800	1.55	20.20	1.64	10.04	0.72	<5	12	191	na	8	11.8
3732	383940	525800	1.55	11.60	1.44	8.64	0.92	<5	8	101	na	5	1.7
3734	383980	525800	1.55	10.20	1.32	5.72	0.92	<5	10	250	na	9	5.0
3736	384020	525800	1.55	11.80	1.00	5.00	0.84	<5	9	148	na	9	6.5
3738	384060	525800	1.55	11.80	1.28	4.52	1.52	<5	9	188	na	11	8.3
3740	384100	525800	1.55	10.00	1.44	4.76	1.12	<5	7	127	na	7	5.7
3940	382000	525800	0.50	12.80	0.52	9.32	0.32	<5	3	174	na	3	0.2
3931	382150	525800	0.50	7.60	2.56	4.52	0.48	<5	6	187	na	4	1.4
3922	382300	525800	0.50	8.30	1.16	2.32	0.52	<5	8	140	na	5	1.7
3913	382450	525800	0.50	5.00	1.00	2.68	0.8	<5	7	123	na	4	2.8
3904	382600	525800	0.50	15.20	2.72	8.72	0.88	<5	12	295	na	11	7.3
3895	382750	525800	0.50	7.70	0.72	3.76	0.44	<5	9	197	na	8	5.0
3886	382900	525800	0.50	11.10	2.40	6.40	1.32	<5	6	194	na	8	5.5
3877	383050	525800	0.50	12.90	1.72	5.24	1.44	<5	7	114	na	6	4.9
3862	383300	525800	0.50	15.20	2.64	9.04	0.96	<5	9	164	na	11	8.2
3859	384200	525800	0.50	10.20	2.56	5.28	0.4	<5	7	185	na	5	4.7
3856	384250	525800	0.50	11.20	2.00	6.40	0.64	<5	7	274	na	7	6.5
3853	384300	525800	0.50	12.20	1.20	5.00	0.56	<5	8	181	na	8	8.6
3850	384350	525800	0.50	9.00	1.88	4.68	1.28	<5	9	335	na	7	7.0
3847	384400	525800	0.50	15.00	0.96	7.76	0.8	<5	12	346	na	13	8.8
3844	384450	525800	0.50	9.60	1.24	3.92	0.4	<5	10	109	na	8	2.6
3838	384550	525800	0.50	6.80	1.36	5.76	0.72	<5	7	127	na	5	2.6
3835	384600	525800	0.50	7.60	0.96	6.96	1.04	<5	9	168	na	5	3.5
3832	384650	525800	0.50	7.90	2.72	6.56	1.16	<5	11	<100	na	6	3.0
3829	384700	525800	0.50	5.00	0.84	3.00	0.48	<5	8	121	na	6	1.6
3820	384850	525800	0.50	5.00	1.08	1.80	0.44	<5	7	126	na	2	0.5
3811	384996	525800	0.50	5.00	0.84	1.36	0.1	<5	8	131	na	<2	0.2
3808	384997	525800	0.50	5.00	0.96	1.48	0.6	<5	7	118	na	2	0.4
3800	385000	525800	0.50	5.00	0.52	1.56	2.36	<5	8	106	na	<2	0.6
3946	383900	526080	0.50	10.40	1.96	6.76	1.32	<5	6	181	na	4	3.1
3952	383925	526080	0.50	11.40	2.52	7.72	0.72	<5	7	166	na	6	5.3
3949	383901	526080	0.50	10.00	2.04	6.84	0.68	<5	7	203	2	4	2.6
3953	383926	526080	0.50	6.00	2.04	5.48	0.4	<5	7	276	<1	4	3.4
3955	383950	526080	0.50	8.50	2.08	6.08	0.96	<5	7	209	1	6	3.8
3957	383993	526080	0.50	9.00	1.76	7.36	1.12	<5	8	172	3	5	4.8
3959	383975	526080	0.50	9.20	2.40	5.20	0.96	<5	9	216	2	5	4.2
3961	384025	526080	0.50	9.60	2.36	6.76	0.92	<5	9	167	1	5	6.2
3963	384050	526080	0.50	13.70	1.80	7.00	1.04	<5	10	356	1	6	9.5
3965	384075	526080	0.50	13.80	1.80	8.20	0.96	<5	9	<100	1	7	4.4
3967	384100	526080	0.50	13.30	3.08	8.28	1.96	<5	8	152	1	4	2.7
3969	384125	526080	0.50	14.80	2.48	8.08	2.2	<5	8	156	1	4	2.4
3971	384150	526080	0.50	11.80	3.68	6.84	1.32	<5	8	139	2	5	1.3
3973	384175	526080	0.50	10.00	3.72	8.92	0.1	<5	10	131	<1	6	2.5
3975	384200	526080	0.50	17.40	3.56	8.36	1.16	<5	10	188	1	5	3.2
3977	384250	526080	0.50	17.30	3.56	8.36	1.76	<5	10	173	<1	5	3.5
3979	384300	526080	0.50	15.10	4.00	10.80	0.92	<5	11	111	1	6	3.5
3981	384350	526080	0.50	14.30	2.44	9.64	1.4	<5	10	104	<1	4	2.1
3983	384400	526080	0.50	11.30	2.56	5.84	1.12	<5	9	222	<1	4	1.1
3986	384450	526080	0.50	16.90	3.64	8.04	1.48	<5	11	164	<1	5	1.3
3989	384550	526080	0.50	16.70	6.40	10.24	1.8	<5	12	149	1	4	1.6

Table A1.9.3 (continued)

Sample	Easting (m)	Northing (m)	depth (m)	Ce INAA ppm	Co INAA ppm	Cr INAA ppm	Cs INAA ppm	Cu XRF ppm	Eu INAA ppm	Fe INAA %	Fe XRF %	Hf INAA ppm	Ir INAA ppm	K INAA %	La INAA ppm
3722	383120	525800	1.55	27.7	13.0	172	1.47	na	0.7	2.0	na	1.7	<20	<0.5	13.9
3724	383160	525800	1.55	30.4	16.0	165	1.48	na	0.7	2.0	na	1.5	<20	<0.5	14.8
3726	383200	525800	1.55	29.8	16.1	168	1.26	na	0.8	1.9	na	1.4	<20	<0.5	15.3
3728	383240	525800	1.55	37.1	18.2	190	1.67	na	0.7	2.3	na	1.9	<20	0.59	16.6
3730	383280	525800	1.55	28.2	16.9	181	1.65	na	0.7	2.0	na	1.7	<20	0.83	14.1
3732	383940	525800	1.55	28.3	16.7	188	1.18	na	0.7	2.1	na	1.9	<20	<0.5	12.1
3734	383980	525800	1.55	24.2	13.8	188	2.06	na	<0.5	2.1	na	1.9	<20	<0.5	11.1
3736	384020	525800	1.55	21.9	14.1	179	1.09	na	0.5	2.0	na	1.4	<20	<0.5	10.5
3738	384060	525800	1.55	16.2	9.8	149	1.06	na	<0.5	1.6	na	1.5	<20	<0.5	7.9
3740	384100	525800	1.55	18.7	11.6	184	1.08	na	<0.5	2.0	na	1.7	<20	<0.5	9.5
3940	382000	525800	0.50	10.9	5.2	70	<1	na	1.3	0.7	na	0.9	<20	<0.5	28.8
3931	382150	525800	0.50	22.2	13.2	151	1.59	na	<0.5	1.8	na	1.8	<20	<0.5	11.0
3922	382300	525800	0.50	49.9	32.9	199	1.35	na	0.7	2.5	na	1.9	<20	<0.5	16.0
3913	382450	525800	0.50	25.8	13.8	172	1.43	na	0.5	2.0	na	1.7	<20	<0.5	12.7
3904	382600	525800	0.50	37.4	19.3	233	1.58	na	0.8	2.7	na	2.2	<20	0.91	15.5
3895	382750	525800	0.50	22.4	11.1	186	1.8	na	<0.5	2.2	na	1.8	<20	0.67	11.0
3886	382900	525800	0.50	17.3	9.2	165	<1	na	<0.5	1.8	na	1.5	<20	<0.5	8.3
3877	383050	525800	0.50	23.3	11.6	166	1.63	na	<0.5	1.9	na	1.3	<20	0.68	10.4
3862	383300	525800	0.50	36.3	17.6	204	1.6	na	0.9	2.4	na	1.9	<20	<0.5	15.8
3859	384200	525800	0.50	21.8	12.8	210	1.41	na	<0.5	2.3	na	1.9	<20	<0.5	10.5
3856	384250	525800	0.50	18.4	11.6	215	1.04	na	<0.5	2.1	na	1.6	<20	<0.5	9.3
3853	384300	525800	0.50	14.7	9.7	192	<1	na	<0.5	1.8	na	1.2	<20	<0.5	7.7
3850	384350	525800	0.50	16.6	10.5	233	1.02	na	<0.5	2.3	na	1.4	<20	<0.5	9.2
3847	384400	525800	0.50	16.5	11.4	286	1.49	na	<0.5	2.6	na	1.7	<20	0.85	9.7
3844	384450	525800	0.50	16.4	11.0	302	<1	na	<0.5	2.9	na	1.4	<20	<0.5	8.0
3838	384550	525800	0.50	18.4	12.9	280	1.21	na	<0.5	2.6	na	1.7	<20	<0.5	8.5
3835	384600	525800	0.50	20.7	15.6	280	<1	na	0.5	2.7	na	1.5	<20	<0.5	9.8
3832	384650	525800	0.50	18.5	15.2	342	1.06	na	<0.5	3.2	na	1.9	<20	<0.5	9.7
3829	384700	525800	0.50	23.9	17.7	360	1.5	na	<0.5	3.5	na	1.9	<20	<0.5	11.4
3820	384850	525800	0.50	12.3	8.8	311	<1	na	<0.5	2.8	na	1.4	<20	<0.5	6.4
3811	384996	525800	0.50	11.0	7.0	304	<1	na	<0.5	2.8	na	1.2	<20	<0.5	5.8
3808	384997	525800	0.50	10.5	6.8	285	<1	na	<0.5	2.6	na	1.6	<20	<0.5	5.8
3800	385000	525800	0.50	11.4	7.0	278	<1	na	<0.5	2.7	na	1.3	<20	<0.5	5.4
3946	383900	526080	0.50	14.2	7.7	225	1.18	na	<0.5	2.3	na	1.4	<20	<0.5	6.2
3952	383925	526080	0.50	12.6	8.5	222	<1	na	<0.5	2.3	na	1.6	<20	<0.5	6.6
3949	383901	526080	0.50	10.0	6.5	217	<1	41	<0.5	2.4	2.2	1.2	<20	<0.5	5.5
3953	383926	526080	0.50	10.8	5.8	218	<1	24	<0.5	2.4	2.2	1.0	<20	<0.5	4.9
3955	383950	526080	0.50	10.6	6.9	232	<1	26	<0.5	2.3	2.3	1.1	<20	<0.5	5.6
3957	383993	526080	0.50	15.1	7.4	231	<1	34	<0.5	2.3	2.3	1.4	<20	<0.5	6.6
3959	383975	526080	0.50	11.5	8.3	231	<1	27	<0.5	2.4	2.3	1.6	<20	<0.5	6.1
3961	384025	526080	0.50	16.8	9.8	226	1.14	33	<0.5	2.4	2.4	1.6	<20	<0.5	8.4
3963	384050	526080	0.50	16.0	11.4	235	1.59	38	<0.5	2.4	2.3	1.2	<20	<0.5	10.6
3965	384075	526080	0.50	21.5	14.3	265	1.25	38	0.6	2.9	2.8	1.7	<20	<0.5	11.9
3967	384100	526080	0.50	21.2	14.6	270	1.01	38	0.6	2.8	2.9	1.8	<20	<0.5	11.3
3969	384125	526080	0.50	23.3	15.1	281	1.18	43	<0.5	3.0	3.0	1.9	<20	0.51	10.7
3971	384150	526080	0.50	22.4	14.3	287	1.29	39	<0.5	3.0	3.1	1.4	<20	<0.5	10.0
3973	384175	526080	0.50	26.8	18.7	303	1.42	44	<0.5	3.1	3.1	2.0	<20	0.55	12.2
3975	384200	526080	0.50	26.7	18.7	314	1.43	44	0.6	3.2	3.3	1.9	<20	0.54	12.7
3977	384250	526080	0.50	28.6	19.2	317	1.29	52	<0.5	3.2	3.3	1.9	<20	<0.5	13.4
3979	384300	526080	0.50	26.2	20.0	331	1.59	49	0.7	3.4	3.4	1.8	<20	<0.5	12.5
3981	384350	526080	0.50	27.1	19.9	333	1.33	51	0.6	3.3	3.5	1.9	<20	<0.5	11.8
3983	384400	526080	0.50	23.5	17.6	325	1.42	44	<0.5	3.3	3.4	2.0	<20	<0.5	11.0
3986	384450	526080	0.50	30.5	23.8	356	2.29	48	0.5	3.7	3.7	2.0	<20	0.5	14.4
3989	384550	526080	0.50	33.6	27.0	415	1.52	61	0.7	4.1	4.3	2.0	<20	0.56	15.9

Table A1.9.3 (continued)

Sample	Easting (m)	Northing (m)	depth (m)	Lu INAA ppm	Mg AAS %	Mn XRF ppm	Mo INAA ppm	Na INAA %	Ni XRF ppm	Pb XRF ppm	Rb INAA ppm	Sb INAA ppm	Sc INAA ppm	Se INAA ppm	Sm INAA ppm	Sr XRF ppm
3722	383120	525800	1.55	<0.2	1.2	na	<5	0.4	na	na	26.4	0.2	7	<5	2.7	na
3724	383160	525800	1.55	<0.2	1.7	na	<5	0.4	na	na	27.7	<0.2	7	<5	3.0	na
3726	383200	525800	1.55	<0.2	1.5	na	<5	0.3	na	na	28.9	0.2	7	<5	3.1	na
3728	383240	525800	1.55	<0.2	2.0	na	<5	0.4	na	na	22.3	0.4	9	<5	3.4	na
3730	383280	525800	1.55	<0.2	1.8	na	<5	0.3	na	na	24.0	<0.2	7	<5	2.9	na
3732	383940	525800	1.55	<0.2	0.7	na	<5	0.4	na	na	<20	<0.2	8	<5	2.5	na
3734	383980	525800	1.55	<0.2	2.2	na	<5	0.4	na	na	<20	0.8	8	<5	2.3	na
3736	384020	525800	1.55	<0.2	3.1	na	<5	0.4	na	na	<20	<0.2	7	<5	2.0	na
3738	384060	525800	1.55	<0.2	3.5	na	<5	0.4	na	na	<20	0.3	6	<5	1.4	na
3740	384100	525800	1.55	<0.2	1.7	na	<5	0.2	na	na	22.7	0.2	7	<5	1.7	na
3940	382000	525800	0.50	0.2	0.1	na	<5	0.4	na	na	<20	0.3	2	<5	6.5	na
3931	382150	525800	0.50	<0.2	0.2	na	<5	0.3	na	na	23.0	<0.2	6	<5	2.3	na
3922	382300	525800	0.50	0.22	0.5	na	<5	0.3	na	na	<20	<0.2	9	<5	3.6	na
3913	382450	525800	0.50	<0.2	0.4	na	<5	0.3	na	na	25.7	0.3	6	<5	2.7	na
3904	382600	525800	0.50	<0.2	0.8	na	<5	0.5	na	na	34.5	0.4	9	<5	3.1	na
3895	382750	525800	0.50	<0.2	0.5	na	<5	0.3	na	na	22.7	0.2	7	<5	2.0	na
3886	382900	525800	0.50	<0.2	0.6	na	<5	0.3	na	na	<20	<0.2	5	<5	1.6	na
3877	383050	525800	0.50	<0.2	1.0	na	<5	0.3	na	na	<20	0.3	6	<5	2.1	na
3862	383300	525800	0.50	<0.2	1.3	na	<5	0.3	na	na	25.7	0.3	9	<5	3.2	na
3859	384200	525800	0.50	<0.2	0.7	na	<5	0.2	na	na	28.7	0.3	8	<5	2.0	na
3856	384250	525800	0.50	<0.2	1.0	na	<5	0.2	na	na	21.0	0.2	8	<5	1.7	na
3853	384300	525800	0.50	<0.2	2.4	na	<5	0.2	na	na	<20	0.2	6	<5	1.4	na
3850	384350	525800	0.50	<0.2	1.4	na	<5	0.2	na	na	<20	0.3	7	<5	1.7	na
3847	384400	525800	0.50	<0.2	2.9	na	<5	0.3	na	na	<20	0.4	8	<5	1.7	na
3844	384450	525800	0.50	<0.2	0.4	na	<5	0.3	na	na	<20	0.5	8	<5	1.5	na
3838	384550	525800	0.50	<0.2	0.5	na	<5	0.2	na	na	<20	0.3	8	<5	1.6	na
3835	384600	525800	0.50	<0.2	0.8	na	<5	0.2	na	na	25.4	0.4	8	<5	1.9	na
3832	384650	525800	0.50	<0.2	0.7	na	<5	0.2	na	na	<20	0.3	9	<5	1.8	na
3829	384700	525800	0.50	<0.2	0.5	na	<5	0.2	na	na	25.5	0.3	11	<5	2.2	na
3820	384850	525800	0.50	<0.2	0.2	na	<5	0.2	na	na	<20	0.5	6	<5	1.0	na
3811	384996	525800	0.50	<0.2	0.1	na	<5	0.1	na	na	<20	0.5	6	<5	1.0	na
3808	384997	525800	0.50	<0.2	0.2	na	<5	0.2	na	na	<20	0.4	5	<5	1.0	na
3800	385000	525800	0.50	<0.2	0.3	na	<5	0.2	na	na	<20	0.4	5	<5	0.9	na
3946	383900	526080	0.50	<0.2	0.3	na	<5	0.2	na	na	20.5	0.3	6	<5	1.2	na
3952	383925	526080	0.50	<0.2	0.9	na	<5	0.2	na	na	22.0	0.3	6	<5	1.4	na
3949	383901	526080	0.50	<0.2	0.4	174	<5	0.2	38	5	<20	0.3	5	<5	1.1	74
3953	383926	526080	0.50	<0.2	0.7	192	<5	0.2	39	5	<20	0.4	5	<5	1.0	97
3955	383950	526080	0.50	<0.2	0.6	217	<5	0.2	49	6	<20	0.3	6	<5	1.0	106
3957	383993	526080	0.50	<0.2	0.9	253	<5	0.2	56	5	26.2	0.4	6	<5	1.2	129
3959	383975	526080	0.50	<0.2	0.9	229	<5	0.2	50	5	<20	0.3	6	<5	1.2	109
3961	384025	526080	0.50	<0.2	1.1	288	<5	0.2	63	5	22.8	0.3	7	<5	1.6	137
3963	384050	526080	0.50	<0.2	1.7	314	<5	0.3	69	5	23.9	0.3	8	<5	2.0	202
3965	384075	526080	0.50	<0.2	1.3	361	<5	0.3	87	6	<20	0.4	9	<5	2.3	120
3967	384100	526080	0.50	<0.2	0.8	404	<5	0.2	95	8	<20	0.4	9	<5	2.2	89
3969	384125	526080	0.50	<0.2	0.8	409	<5	0.2	102	9	22.5	0.3	9	<5	2.1	87
3971	384150	526080	0.50	<0.2	0.5	402	<5	0.2	99	10	26.2	0.3	9	<5	2.1	55
3973	384175	526080	0.50	<0.2	0.8	474	<5	0.3	109	8	29.1	0.5	10	<5	2.6	90
3975	384200	526080	0.50	<0.2	1.0	525	<5	0.2	123	8	29.8	0.4	11	<5	2.5	106
3977	384250	526080	0.50	<0.2	1.0	541	<5	0.2	128	10	20.9	0.5	11	<5	2.8	109
3979	384300	526080	0.50	<0.2	1.3	445	<5	0.3	116	7	26.3	0.3	10	<5	2.5	106
3981	384350	526080	0.50	<0.2	0.8	477	<5	0.2	126	9	22.1	0.3	11	<5	2.3	82
3983	384400	526080	0.50	<0.2	0.5	452	<5	0.2	118	9	21.0	0.4	10	<5	2.1	63
3986	384450	526080	0.50	<0.2	0.7	721	<5	0.3	148	11	27.4	0.4	12	<5	2.8	63
3989	384550	526080	0.50	<0.2	0.7	977	<5	0.2	183	9	38.2	0.5	14	<5	2.9	73

Table A1.9.3 (continued)

Sample	Easting (m)	Northing (m)	depth (m)	Ta INAA ppm	Th INAA ppm	TiO2 XRF %	U INAA ppm	W INAA ppm	Yb INAA ppm	Zn INAA ppm	Zn xrf ppm	Zr xrf ppm
3722	383120	525800	1.55	<1	4.73	na	<2	<2	1.3	<100	na	na
3724	383160	525800	1.55	<1	4.31	na	3	<2	1.3	<100	na	na
3726	383200	525800	1.55	<1	4.5	na	<2	<2	1.2	<100	na	na
3728	383240	525800	1.55	<1	4.97	na	2	<2	1.5	<100	na	na
3730	383280	525800	1.55	<1	4.71	na	2	3	1.3	<100	na	na
3732	383940	525800	1.55	<1	4.73	na	<2	<2	1.2	<100	na	na
3734	383980	525800	1.55	<1	4.77	na	<2	<2	1.1	<100	na	na
3736	384020	525800	1.55	<1	4.57	na	2	<2	1.0	<100	na	na
3738	384060	525800	1.55	<1	3.44	na	3	<2	0.8	<100	na	na
3740	384100	525800	1.55	<1	4.13	na	2	<2	1.0	<100	na	na
3940	382000	525800	0.50	<1	1.5	na	<2	<2	1.7	<100	na	na
3931	382150	525800	0.50	<1	4.3	na	<2	<2	1.0	106	na	na
3922	382300	525800	0.50	<1	5.36	na	<2	<2	1.7	113	na	na
3913	382450	525800	0.50	<1	3.96	na	<2	<2	1.0	140	na	na
3904	382600	525800	0.50	<1	5.9	na	2	<2	1.2	128	na	na
3895	382750	525800	0.50	<1	4.66	na	<2	<2	0.8	139	na	na
3886	382900	525800	0.50	<1	3.59	na	2	<2	0.7	109	na	na
3877	383050	525800	0.50	<1	3.88	na	<2	<2	0.9	146	na	na
3862	383300	525800	0.50	<1	5.23	na	<2	<2	1.5	126	na	na
3859	384200	525800	0.50	<1	4.92	na	<2	<2	1.0	155	na	na
3856	384250	525800	0.50	<1	4.59	na	<2	<2	0.9	101	na	na
3853	384300	525800	0.50	<1	3.29	na	2	<2	0.9	<100	na	na
3850	384350	525800	0.50	<1	4.14	na	<2	<2	0.8	<100	na	na
3847	384400	525800	0.50	<1	4.25	na	3	<2	0.9	101	na	na
3844	384450	525800	0.50	<1	4.46	na	<2	<2	0.6	<100	na	na
3838	384550	525800	0.50	<1	4.05	na	<2	<2	0.9	<100	na	na
3835	384600	525800	0.50	<1	4.57	na	<2	<2	1.1	105	na	na
3832	384650	525800	0.50	<1	4.44	na	<2	<2	0.9	117	na	na
3829	384700	525800	0.50	<1	5.23	na	<2	<2	0.9	144	na	na
3820	384850	525800	0.50	<1	3.35	na	<2	<2	0.6	101	na	na
3811	384996	525800	0.50	<1	3.29	na	<2	<2	0.7	<100	na	na
3808	384997	525800	0.50	<1	3.48	na	<2	<2	0.7	<100	na	na
3800	385000	525800	0.50	<1	3.34	na	<2	<2	0.5	106	na	na
3946	383900	526080	0.50	<1	3.41	na	<2	<2	0.7	<100	na	na
3952	383925	526080	0.50	<1	3.95	na	<2	<2	0.7	<100	na	na
3949	383901	526080	0.50	<1	3.07	0.22	<2	<2	0.6	<100	43	49
3953	383926	526080	0.50	<1	2.99	0.19	<2	<2	<0.5	<100	26	42
3955	383950	526080	0.50	<1	3.13	0.24	<2	<2	0.5	<100	33	51
3957	383993	526080	0.50	<1	3.96	0.26	<2	<2	0.8	<100	30	59
3959	383975	526080	0.50	<1	3.36	0.22	<2	<2	0.7	<100	26	49
3961	384025	526080	0.50	<1	4.09	0.25	<2	<2	0.8	<100	35	53
3963	384050	526080	0.50	<1	4.12	0.23	<2	<2	1.1	179	139	51
3965	384075	526080	0.50	<1	4.97	0.27	<2	<2	1.3	557	537	63
3967	384100	526080	0.50	<1	4.9	0.29	<2	<2	1.4	370	336	64
3969	384125	526080	0.50	<1	4.87	0.33	<2	<2	1.0	330	289	71
3971	384150	526080	0.50	<1	4.99	0.28	<2	<2	1.1	233	187	60
3973	384175	526080	0.50	<1	5.05	0.33	<2	<2	1.3	188	137	73
3975	384200	526080	0.50	<1	5.62	0.34	<2	<2	1.2	206	143	73
3977	384250	526080	0.50	<1	5.72	0.34	<2	<2	1.4	164	120	70
3979	384300	526080	0.50	<1	5.05	0.31	<2	<2	1.3	274	209	63
3981	384350	526080	0.50	<1	5.59	0.34	<2	<2	1.2	156	78	72
3983	384400	526080	0.50	<1	5.31	0.33	<2	<2	1.0	131	82	73
3986	384450	526080	0.50	<1	6.37	0.36	<2	<2	1.2	129	82	72
3989	384550	526080	0.50	<1	6.74	0.41	<2	<2	1.4	163	101	79

Table A1.9.4 : Elemental data for drill cuttings from Hole 1 (384113E, 526000N) and Hole 2 (384113E, 525980N).

Sample	Easting	Northing	depth	Au	As	Ce	Bi	Ca	Cr	Cu	Fe	K_2O
	(m)	(m)	(m)	GFAA	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
				ppb	ppm	ppm	ppm	%	ppm	ppm	%	%
09-4072	384113	526000	0.5	12	10	43	0.3	8.12	405	45	3.2	0.49
09-4073	384113	526000	1.5	19	10	71	0.3	5.82	440	45	3.8	0.70
09-4074	384113	526000	2.5	5	10	96	0.4	2.32	560	45	4.4	0.70
09-4075	384113	526000	3.5	4	10	26	0.4	0.76	660	60	6.2	1.13
09-4076	384113	526000	4.5	1	15	11.2	0.3	0.07	720	35	7.0	0.67
09-4077	384113	526000	5.5	2	60	6.8	0.3	0.21	1670	60	16.2	0.22
09-4078	384113	526000	6.5	1	20	6.9	0.2	0.03	810	40	8.6	0.61
09-4079	384113	526000	7.5	1	20	6.4	0.2	0.07	690	60	14.2	0.36
09-4080	384113	526000	8.5	4	5	5.6	0.2	0.15	350	30	5.0	0.29
09-4081	384113	526000	9.5	2	20	33	0.2	0.01	205	300	15.0	0.23
09-4082	384113	526000	10.5	2	10	18.9	<0.1	0.01	130	160	7.0	0.33
09-4083	384113	526000	11.5	<1	5	26	0.2	<0.01	110	90	6.4	0.20
09-4084	384113	526000	12.5	1	15	21	0.1	0.11	115	310	21.8	0.16
09-4085	384113	526000	13.5	1	10	20	0.1	0.03	200	145	9.4	0.25
09-4086	384113	526000	14.5	2	<5	22	0.2	0.13	99	145	6.2	0.16
09-4087	384113	526000	15.5	<1	10	21	0.1	0.07	110	155	11.6	0.17
09-4088	384113	526000	16.5	1	<5	20	0.1	<0.01	250	100	5.4	0.14
09-4089	384113	526000	17.5	2	75	21	0.3	<0.01	135	150	20.2	0.10
09-4090	384113	526000	18.5	2	15	34	0.1	0.06	135	45	3.6	0.13
09-4091	384113	526000	19.5	3	20	27	0.3	<0.01	150	60	3.4	0.14
09-4092	384113	526000	20.5	780	40	20	0.3	<0.01	110	80	6.6	0.18
09-4093	384113	526000	21.5	1210	30	22	0.4	0.03	125	135	10.4	0.08
09-4094	384113	526000	22.5	154	65	33	0.2	<0.01	81	220	10.2	0.04
09-4095	384113	526000	23.5	146	70	24	0.2	<0.01	110	125	7.8	0.05
09-4096	384113	526000	24.5	510	140	25	0.3	0.04	110	85	8.8	0.08
09-4097	384113	526000	25.5	2799	115	1010	0.1	<0.01	100	130	10.2	0.11
09-4098	384113	526000	26.5	304	75	110	0.2	<0.01	200	195	11.2	0.07
09-4099	384113	526000	27.5	1040	95	160	0.2	0.14	200	210	10.4	0.08
09-4100	384113	526000	28.5	222	95	34	0.3	3.64	180	200	10.8	0.08
09-4104	384113	525980	0.5	22	10	52	0.1	7.84	610	50	4.0	0.51
09-4105	384113	525980	1.5	23	10	56	0.2	6.98	465	40	4.0	0.60
09-4106	384113	525980	2.5	4	10	18.7	0.2	0.64	560	45	5.2	0.73
09-4107	384113	525980	3.5	2	10	16.6	0.3	0.59	540	40	5.2	0.80
09-4108	384113	525980	4.5	1	20	8.8	0.5	0.11	990	35	9.2	0.52
09-4109	384113	525980	5.5	1	65	5.9	0.3	0.14	1980	60	19.6	0.18
09-4110	384113	525980	6.5	0.5	30	7	<0.1	<0.01	930	65	11.0	0.54
09-4111	384113	525980	7.5	6	80	17	<0.1	0.03	355	30	14.4	0.28
09-4112	384113	525980	8.5	8	65	18.2	0.1	0.03	290	45	13.2	0.24
09-4113	384113	525980	9.5	5	55	20	<0.1	0.03	275	90	14.4	0.18
09-4114	384113	525980	10.5	5	35	24	<0.1	<0.01	275	60	11.2	0.23
09-4115	384113	525980	11.5	4	85	20	<0.1	<0.01	160	225	14.8	0.24
09-4116	384113	525980	12.5	9	40	27	<0.1	0.01	230	115	11.2	0.19
09-4117	384113	525980	13.5	740	80	29	<0.1	<0.01	310	100	12.0	0.27
09-4118	384113	525980	14.5	5	90	25	<0.1	<0.01	125	105	11.4	0.22
09-4119	384113	525980	15.5	18	105	34	<0.1	0.08	150	115	12.2	0.23
09-4120	384113	525980	16.5	7	65	34	1.3	<0.01	99	75	6.0	0.16
09-4121	384113	525980	17.5	37	30	38	0.2	0.28	145	85	12.0	0.06
09-4122	384113	525980	18.5	5821	15	26	0.3	<0.01	125	45	8.6	0.02
09-4123	384113	525980	19.5	4742	30	20	0.1	<0.01	150	80	10.4	0.07
09-4124	384113	525980	20.5	2259	60	41	<0.1	<0.01	105	50	8.2	0.40
09-4125	384113	525980	21.5	1850	60	36	<0.1	<0.01	135	55	5.4	0.45
09-4126	384113	525980	22.5	7055	40	51	0.1	0.06	160	75	7.0	0.47
09-4127	384113	525980	23.5	254	80	41	0.1	<0.01	125	155	13.6	0.22
09-4128	384113	525980	24.5	286	80	35	0.1	0.08	185	235	12.4	0.33
09-4129	384113	525980	25.5	400	40	16.6	0.2	8.95	115	115	7.8	0.17
09-4130	384113	525980	26.5	690	25	16.8	0.2	9.65	120	135	6.8	0.17

Table A1.9.4 (continued)

Sample	Easting	Northing	La	Mg	Mn	Mo	Ni	Sb	TiO2	Zn	Zr
	(m)	(m)	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
			ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm
09-4072	384113	526000	26	4.0	550	3.0	115	<0.5	0.04	40	10
09-4073	384113	526000	43	4.8	560	1.0	170	<0.5	0.05	40	10
09-4074	384113	526000	35	2.2	425	2.5	190	<0.5	0.04	50	10
09-4075	384113	526000	18	1.9	255	1.0	155	<0.5	0.05	240	15
09-4076	384113	526000	8	1.0	115	2.5	90	<0.5	0.04	230	15
09-4077	384113	526000	5	0.6	160	2.0	130	1.0	0.05	60	15
09-4078	384113	526000	6	0.9	110	3.0	90	<0.5	0.04	170	15
09-4079	384113	526000	4	0.5	150	1.5	55	<0.5	0.02	130	20
09-4080	384113	526000	3	0.4	120	2.5	35	<0.5	0.01	110	10
09-4081	384113	526000	14	0.3	1310	1.5	90	<0.5	0.01	230	10
09-4082	384113	526000	9	0.3	370	1.0	60	<0.5	0.01	110	10
09-4083	384113	526000	13	0.3	245	0.5	40	<0.5	0.01	70	10
09-4084	384113	526000	14	0.4	2250	1.0	80	<0.5	0.01	200	15
09-4085	384113	526000	11	0.3	1040	1.0	70	<0.5	0.01	130	15
09-4086	384113	526000	12	0.3	780	1.0	65	<0.5	0.02	110	15
09-4087	384113	526000	15	0.4	1930	0.5	90	<0.5	0.01	190	<5
09-4088	384113	526000	11	0.4	550	1.0	85	<0.5	0.01	80	15
09-4089	384113	526000	22	0.4	1840	1.0	215	<0.5	0.01	160	5
09-4090	384113	526000	40	0.5	170	1.5	50	<0.5	0.01	90	10
09-4091	384113	526000	26	0.5	150	1.0	50	<0.5	0.01	50	10
09-4092	384113	526000	13	0.6	730	1.5	85	<0.5	0.01	130	5
09-4093	384113	526000	15	0.5	1060	1.0	100	<0.5	0.01	110	10
09-4094	384113	526000	15	0.4	1440	1.5	110	<0.5	0.01	130	15
09-4095	384113	526000	13	0.5	1020	1.0	95	<0.5	0.01	120	15
09-4096	384113	526000	12	0.5	840	2.0	65	<0.5	0.01	120	15
09-4097	384113	526000	470	1.7	630	1.5	80	<0.5	<0.01	140	10
09-4098	384113	526000	58	3.2	860	1.0	125	<0.5	0.01	180	10
09-4099	384113	526000	78	4.0	780	2.0	120	0.5	0.01	150	10
09-4100	384113	526000	17	6.0	1130	1.0	105	<0.5	0.01	110	10
09-4104	384113	525980	30	4.5	640	2.0	130	<0.5	0.05	40	10
09-4105	384113	525980	36	5.3	520	3.0	155	<0.5	0.04	40	10
09-4106	384113	525980	12	1.3	215	1.0	125	<0.5	0.04	50	10
09-4107	384113	525980	11	1.3	200	2.5	105	<0.5	0.04	60	10
09-4108	384113	525980	6	0.8	125	2.5	85	<0.5	0.03	70	10
09-4109	384113	525980	6	0.5	195	3.0	145	1.0	0.04	70	15
09-4110	384113	525980	5	0.9	120	1.5	100	0.5	0.03	160	15
09-4111	384113	525980	10	0.3	130	2.5	30	<0.5	0.01	20	15
09-4112	384113	525980	10	0.3	240	1.5	30	<0.5	0.01	30	15
09-4113	384113	525980	11	0.2	560	2.5	60	<0.5	0.01	50	20
09-4114	384113	525980	12	0.3	405	1.0	45	<0.5	0.01	30	15
09-4115	384113	525980	10	0.3	740	1.5	220	<0.5	0.02	390	15
09-4116	384113	525980	13	0.3	360	2.0	95	<0.5	0.02	190	15
09-4117	384113	525980	22	0.4	1020	1.5	80	<0.5	0.03	70	15
09-4118	384113	525980	19	0.4	1330	1.5	95	<0.5	0.01	60	10
09-4119	384113	525980	21	0.4	1060	1.5	80	<0.5	0.01	60	5
09-4120	384113	525980	18	0.3	770	2.0	55	<0.5	0.02	50	10
09-4121	384113	525980	20	0.2	670	2.5	65	<0.5	<0.01	110	15
09-4122	384113	525980	13	0.3	400	0.5	30	<0.5	0.01	70	10
09-4123	384113	525980	11	0.3	485	2.5	40	<0.5	0.01	70	15
09-4124	384113	525980	33	0.6	375	1.0	50	<0.5	0.06	90	10
09-4125	384113	525980	27	0.8	355	1.5	50	<0.5	0.08	110	10
09-4126	384113	525980	28	1.8	590	0.5	140	0.5	0.09	160	10
09-4127	384113	525980	21	1.8	1100	2.0	105	0.5	0.04	210	15
09-4128	384113	525980	16	2.8	1640	1.0	160	0.5	0.03	200	10
09-4129	384113	525980	7	8.0	1300	1.5	85	0.5	0.02	100	5
09-4130	384113	525980	8	8.3	2100	0.5	80	0.5	0.02	100	5

Table A1.9.5: Elemental data for size fraction analysis

Ag (5), Ir (0.02), Mo (5), Se (5), Ta (1), U(2) and W(4) are below detection limits as indicated in the parentheses

sample	Easting	Northing	depth	Au	As	Ba	Br	Ca	Ce	Co	Cr	Cs	Eu	Fe
	(m)	(m)	(m)	INAA	INAA	INAA	INAA	AAS	INAA	INAA	INAA	INAA	INAA	INAA
				ppb	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%
09-4262 +2000um	384067	626080	10	11.0	7.1	<100	<2.0	0.18	31	23	322	2.5	0.7	3.5
09-4262 +500um	384067	626080	10	10.8	7.5	101	<2.0	0.17	21	15	292	1.3	<0.5	3.4
09-4262 +180um	384067	626080	10	<5.0	5.5	137	<2.0	0.15	24	15	249	1.5	<0.5	2.7
09-4262 -180um	384067	626080	10	16.7	7.9	193	3.0	0.27	39	27	372	2.6	0.7	4.0
09-4263 +2000um	384084	626080	10	<5.0	5.9	181	2.8	0.12	33	23	321	2.4	0.6	3.6
09-4263 +500um	384084	626080	10	9.8	10.7	153	4.0	0.11	25	17	334	2.0	<0.5	3.7
09-4263 +180um	384084	626080	10	<5.0	6.9	<100	3.7	0.12	27	18	261	1.1	0.5	2.8
09-4263 -180um	384084	626080	10	20.8	10.7	125	5.1	0.21	41	28	384	2.7	0.8	4.2
09-4264 +2000um	384103	626080	10	13.6	6.1	125	11.0	0.46	35	23	305	2.1	0.7	3.3
09-4264 +500um	384103	626080	10	8.6	10.0	169	6.1	0.20	27	17	334	2.1	<0.5	3.6
09-4264 +180um	384103	626080	10	9.9	5.2	109	3.9	0.18	27	18	264	1.7	<0.5	2.7
09-4264 -180um	384103	626080	10	12.0	7.2	187	6.0	0.30	49	31	380	3.1	0.9	4.1
09-4269 +2000um	384250	626080	10	<5.0	9.5	169	3.7	0.14	33	24	345	1.7	<0.5	3.5
09-4269 +500um	384250	626080	10	10.1	11.4	<100	3.4	0.10	23	16	431	1.4	<0.5	4.5
09-4269 +180um	384250	626080	10	<5.0	7.3	163	2.6	0.10	25	16	281	<1.0	<0.5	2.7
09-4269 -180um	384250	626080	10	<5.0	8.7	193	2.5	0.19	45	34	402	1.3	0.8	4.0
09-4270 +2000um	384350	626080	10	8.4	8.3	<100	3.0	0.11	36	27	372	1.4	0.5	3.9
09-4270 +500um	384350	626080	10	<5.0	13.4	<100	2.2	0.07	28	21	404	1.2	<0.5	4.4
09-4270 +180um	384350	626080	10	<5.0	6.0	<100	<2.0	0.07	26	20	292	1.6	0.5	2.9
09-4270 -180um	384350	626080	10	<5.0	8.0	108	2.7	0.12	39	30	408	2.7	0.7	4.0
09-4271 +2000um	384450	626080	10	17.1	8.1	176	<2.0	0.14	36	28	369	1.6	0.8	3.5
09-4271 +500um	384450	626080	10	<5.0	11.0	162	<2.0	0.10	25	20	428	<1.0	<0.5	4.4
09-4271 +180um	384450	626080	10	7.4	6.3	<100	<2.0	0.11	28	23	327	<1.0	0.5	3.0
09-4271 -180um	384450	626080	10	17.9	7.0	165	3.1	0.21	53	41	408	3.2	1.1	4.2

sample	Hf	K	La	Lu	Mg	Na	Rb	Sb	Sc	Sm	Th	U	Zn
	INAA	INAA	INAA	INAA	AAS	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
09-4262 +2000um	2.55	<1.0	14	<0.20	0.25	0.20	39	0.3	14.1	2.8	7.2	1.5	115
09-4262 +500um	1.7	<1.0	9	<0.20	0.19	0.12	21	0.5	9.6	1.8	5.3	1.0	<100
09-4262 +180um	1.77	<1.0	11	<0.20	0.20	0.15	22	0.3	10.1	2.2	5.7	1.0	<100
09-4262 -180um	3.58	1.3	18	0.24	0.35	0.28	48	0.5	17.5	3.6	9.5	2.0	138
09-4263 +2000um	2.8	<1.0	15	0.20	0.42	0.28	35	0.3	14.7	3.0	7.4	1.4	123
09-4263 +500um	1.66	<1.0	11	<0.20	0.32	0.18	29	0.6	10.9	2.2	5.6	1.1	<100
09-4263 +180um	2.08	<1.0	12	<0.20	0.33	0.23	31	0.3	11.2	2.4	5.8	1.1	114
09-4263 -180um	3.37	<1.0	19	0.25	0.57	0.40	46	0.5	19.2	3.8	9.8	1.9	149
09-4264 +2000um	2.55	<1.0	15	0.23	0.24	0.20	29	0.4	13.5	3.1	7.0	1.6	108
09-4264 +500um	1.78	<1.0	12	<0.20	0.17	0.12	27	0.4	10.6	2.5	5.8	1.3	106
09-4264 +180um	1.79	<1.0	13	<0.20	0.16	0.15	29	0.3	10.7	2.6	5.9	1.3	113
09-4264 -180um	3.6	<1.0	21	0.24	0.27	0.30	50	0.4	18.1	4.4	9.7	2.1	142
09-4269 +2000um	2.44	<1.0	14	0.21	0.17	0.20	30	0.5	12.3	2.9	7.0	1.5	142
09-4269 +500um	1.48	<1.0	10	<0.20	0.11	0.12	22	0.5	9.3	2.1	5.3	1.1	110
09-4269 +180um	1.71	<1.0	11	<0.20	0.12	0.16	24	0.4	9.3	2.3	5.2	1.2	114
09-4269 -180um	3.42	<1.0	21	0.26	0.22	0.33	40	0.5	17.3	4.1	8.9	1.8	153
09-4270 +2000um	2.4	<1.0	14	0.20	0.18	0.24	<20	0.3	13.9	2.9	7.3	1.6	123
09-4270 +500um	1.94	<1.0	11	<0.20	0.12	0.14	24	0.6	10.5	2.0	5.7	1.1	<100
09-4270 +180um	1.73	<1.0	11	<0.20	0.12	0.17	<20	0.3	10.0	2.2	5.5	1.0	<100
09-4270 -180um	3.72	<1.0	19	0.22	0.19	0.35	41	0.4	16.6	3.7	8.8	2.0	148
09-4271 +2000um	2.27	1.3	14	<0.20	0.15	0.17	<20	0.5	11.2	2.7	6.2	1.3	126
09-4271 +500um	1.67	<1.0	11	<0.20	0.11	0.11	<20	0.7	9.3	2.2	5.1	1.0	102
09-4271 +180um	1.67	<1.0	12	<0.20	0.12	0.15	<20	0.4	9.3	2.3	5.3	1.1	117
09-4271 -180um	4.28	<1.0	23	0.29	0.23	0.30	45	0.4	17.5	4.3	9.5	2.3	171

Table A1.9.6: Elemental data from ferruginous material hand picked from drill cuttings

sample	Easting	Northin	depth	Au	Ag	As	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ir
	(m)	(m)	(m)	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
				ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb
09-3604	384054	525800	6.5	<5	<5	124	<100	<2	8	39	275	2.1	<0.5	22	0.6	<20
09-3603	384015	525800	7.0	<5	<5	44	253	9	4	5	1350	<1	<0.5	21	1.6	<20
09-3602	383980	525800	8.5	8	<5	35	121	12	6	41	701	3.6	<0.5	29	0.8	<20
09-3601	383984	525820	4.5	<5	<5	56	197	22	4	3	1200	<1	<0.5	18	1.4	<20
09-3600	384003	525820	4.5	7	<5	93	179	12	4	5	1920	1.6	<0.5	23	0.8	<20
09-3599	384045	525820	5.0	<5	<5	73	<100	6	5	22	1290	2.0	<0.5	21	1.1	<20
09-3598	384063	525820	4.5	<5	<5	68	273	12	4	8	1400	<1	<0.5	20	1.3	<20
09-3597	384084	525820	7.0	<5	<5	184	118	6	4	20	1420	<1	<0.5	27	1.5	<20
09-3596	384094	525860	5.5	<5	<5	89	567	7	7	24	1620	1.1	<0.5	20	1.3	<20
09-3595	384075	525860	7.0	10	<5	108	652	5	16	62	774	4.1	0.7	27	2.1	<20
09-3594	384018	525860	7.0	7	<5	90	455	8	7	16	1840	1.2	<0.5	23	1.9	<20
09-3593	383975	525860	5.0	6	<5	106	157	9	3	8	2070	<1	<0.5	23	1.3	<20
09-3592	384025	525980	5.0	<5	<5	92	217	5	4	19	2220	<1	<0.5	28	2.1	<20
09-3591	384045	525980	5.0	<5	<5	37	208	4	5	25	1310	<1	<0.5	28	2.0	<20
09-3590	384085	525980	5.0	<5	<5	196	321	7	6	34	2160	1.2	<0.5	31	1.8	<20
09-3589	384125	525980	5.0	<5	<5	105	282	6	6	17	2530	<1	<0.5	27	1.9	<20
09-3588	384165	525980	3.5	<5	<5	85	902	7	7	13	1800	1.5	<0.5	25	1.7	<20
09-3587	384104	526080	3.5	<5	<5	100	294	7	7	18	2920	<1	<0.5	29	1.8	<20
09-3586	384082	526080	5.0	<5	<5	82	794	14	7	16	2430	1.1	<0.5	25	1.7	<20
09-3585	384045	526080	3.5	<5	<5	104	280	9	4	16	2740	<1	<0.5	27	1.6	<20

sample	K	La	Lu	Mo	Na	Rb	Sb	Sc	Se	Sm	Ta	Th	U	W	Yb	Zn
	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
09-3604	0.7	3	<0.2	<5	0.06	51	0.4	30	<5	1.5	<1	2	<2	6	1.1	139
09-3603	0.2	5	<0.2	<5	0.12	<20	1.0	8	<5	0.5	<1	12	<2	<2	<0.5	<100
09-3602	<0.2	2	<0.2	<5	0.23	36	0.6	20	<5	0.7	<1	7	<2	<2	0.6	123
09-3601	<0.2	3	<0.2	<5	0.16	21	1.1	6	<5	0.4	<1	11	<2	<2	<0.5	<100
09-3600	<0.2	3	<0.2	<5	0.10	<20	1.4	7	<5	0.4	<1	12	<2	<2	<0.5	<100
09-3599	0.3	3	<0.2	<5	0.83	<20	1.5	15	<5	1.1	<1	9	<2	<2	0.9	<100
09-3598	0.2	3	<0.2	<5	0.15	32	1.4	8	<5	0.6	<1	10	<2	<2	<0.5	<100
09-3597	0.5	2	<0.2	<5	0.32	21	1.4	17	<5	1.0	<1	7	<2	<2	0.9	139
09-3596	0.3	3	<0.2	<5	0.16	<20	1.9	10	<5	1.1	<1	12	<2	<2	0.8	<100
09-3595	1.7	15	0.2	<5	0.71	79	1.2	45	<5	2.0	<1	6	<2	12	2.0	160
09-3594	0.3	5	<0.2	<5	0.12	24	2.1	14	<5	0.8	1.01	15	<2	<2	<0.5	<100
09-3593	0.2	3	<0.2	<5	0.14	24	1.8	10	<5	0.5	<1	12	<2	<2	<0.5	<100
09-3592	<0.2	3	<0.2	<5	0.08	<20	2.6	20	<5	0.7	<1	10	<2	<2	0.7	<100
09-3591	<0.2	2	<0.2	<5	0.07	<20	1.0	21	<5	0.8	<1	10	<2	<2	0.9	109
09-3590	0.4	5	<0.2	<5	0.17	30	3.1	25	<5	1.0	<1	9	<2	5	0.9	145
09-3589	0.3	5	<0.2	<5	0.12	33	2.7	19	<5	0.9	<1	15	<2	<2	<0.5	<100
09-3588	0.4	5	<0.2	<5	0.17	35	2.0	17	<5	1.0	<1	15	<2	3	0.6	<100
09-3587	0.3	7	<0.2	<5	0.11	33	2.9	22	<5	0.9	<1	10	<2	<2	0.6	123
09-3586	<0.2	4	<0.2	<5	0.13	24	2.2	16	<5	0.8	<1	12	<2	<2	0.6	<100
09-3585	<0.2	3	<0.2	<5	0.20	<20	2.3	17	<5	0.6	<1	11	<2	<2	0.5	<100

Figure A1.9.6 (continued)

Sample	Easting (m)	Northing (m)	Description
09-3604	384054	525800	Nearly all ferruginized saprolite, some partially ferruginized rock.
09-3603	384015	525800	Nearly all sediments.
09-3602	383980	525800	Some sediments, some saprolite.
09-3601	383984	525820	Sediments.
09-3600	384003	525820	Sandy material, partially weathered rock and fine lag cemented together and partly ferruginized. Individual nodules range from a few mm up to 2 cm.
09-3599	384045	525820	Sediments.
09-3598	384063	525820	?Hardpanized saprolite. Sandy material and fine lag cemented together with ?hyaline silica (?hardpan).
09-3597	384084	525820	Sandy material and fine lag cemented together and ferruginized AND ferruginous saprolite.
09-3596	384094	525860	Mainly sediments.
09-3595	384075	525860	Mainly sediments.
09-3594	384018	525860	Sediments.
09-3593	383975	525860	Sediments.
09-3592	384025	525980	Mainly sediments.
09-3591	384045	525980	Some sediments, some saprolite. Nodules mainly >5mm in size (surface coated with sand grains).
09-3590	384085	525980	Some sediments, some saprolite.
09-3589	384125	525980	Sediments.
09-3588	384165	525980	Sediments.
09-3587	384104	526080	Mainly sediments.
09-3586	384082	526080	Mainly sediments.
09-3585	384045	526080	Sediments.

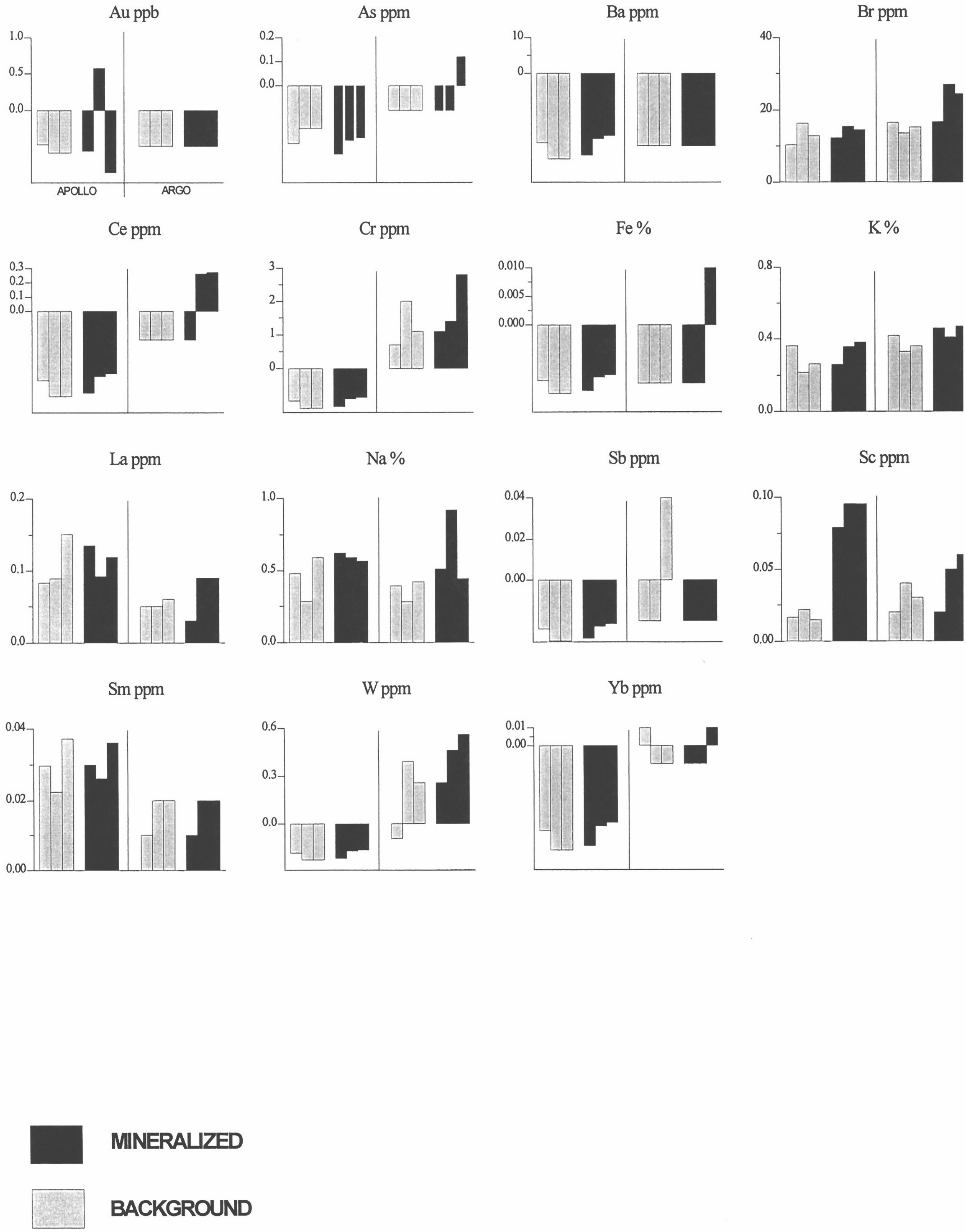


Figure A2.1: Elemental abundancies for *Eucalyptus* leaves at Apollo and Argo.
Negative data below detection limit.
Ba (15), Co (0.2), Eu (0.04), Hf (0.04), Lu (0.01) and Th (0.1) data below detection (ppm indicated in parentheses).

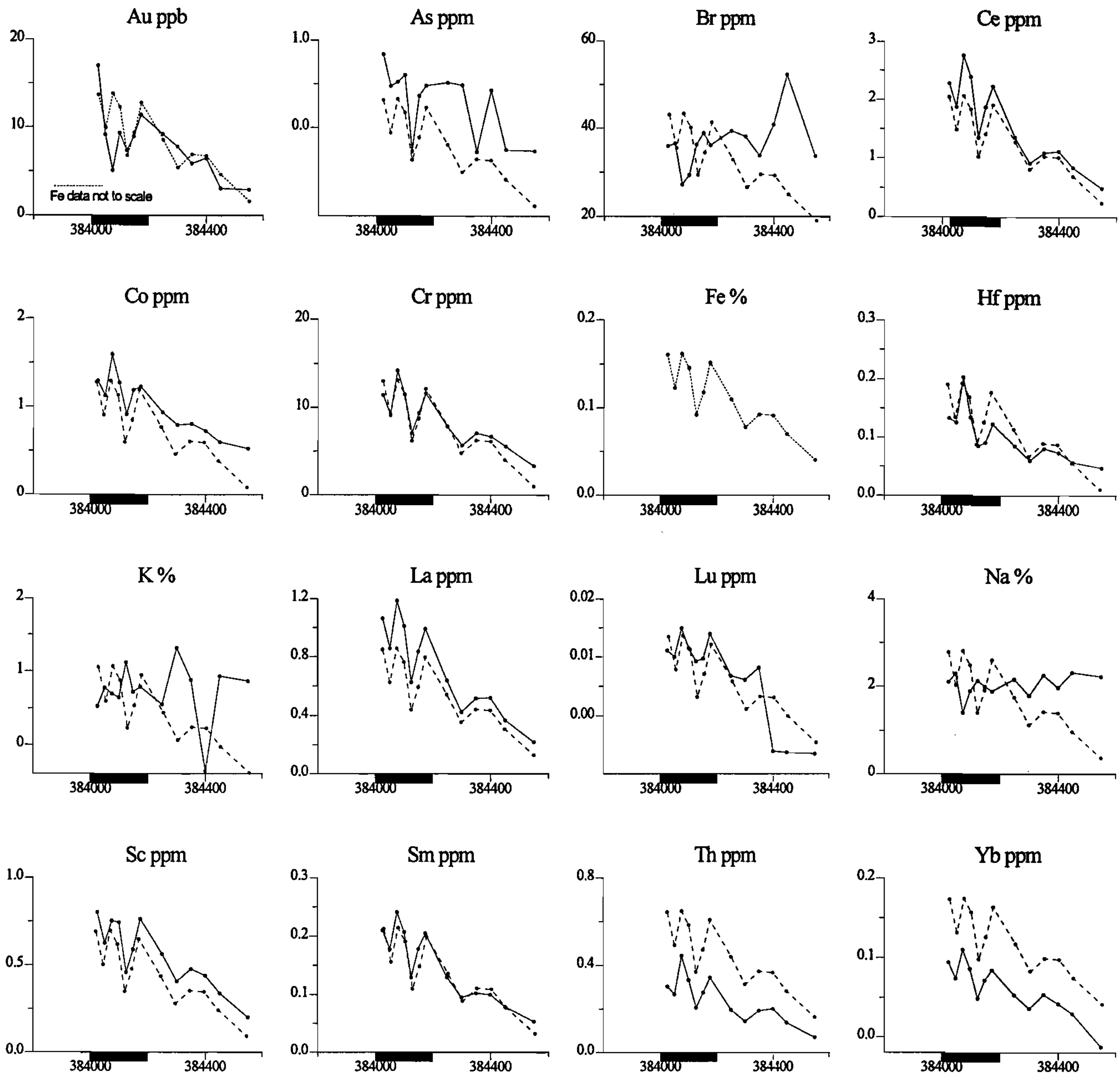


Figure A2.2 : Elemental abundancies for bluebush samples from 526000N at Apollo.
Black rectangle indicates position of mineralization. X axis is Easting (m). Dotted line is Fe data (not to scale).
Negative data is below detection. Sb (0.5), Ba (300), Cs (3) Co (3), Eu (1), Ir (0.04),
Lu (0.1), Mo (10), Rb (60), Se (15), Ag (15), 10 (Ta) W (5) and U (5) are below detection indicated in parentheses (ppm).

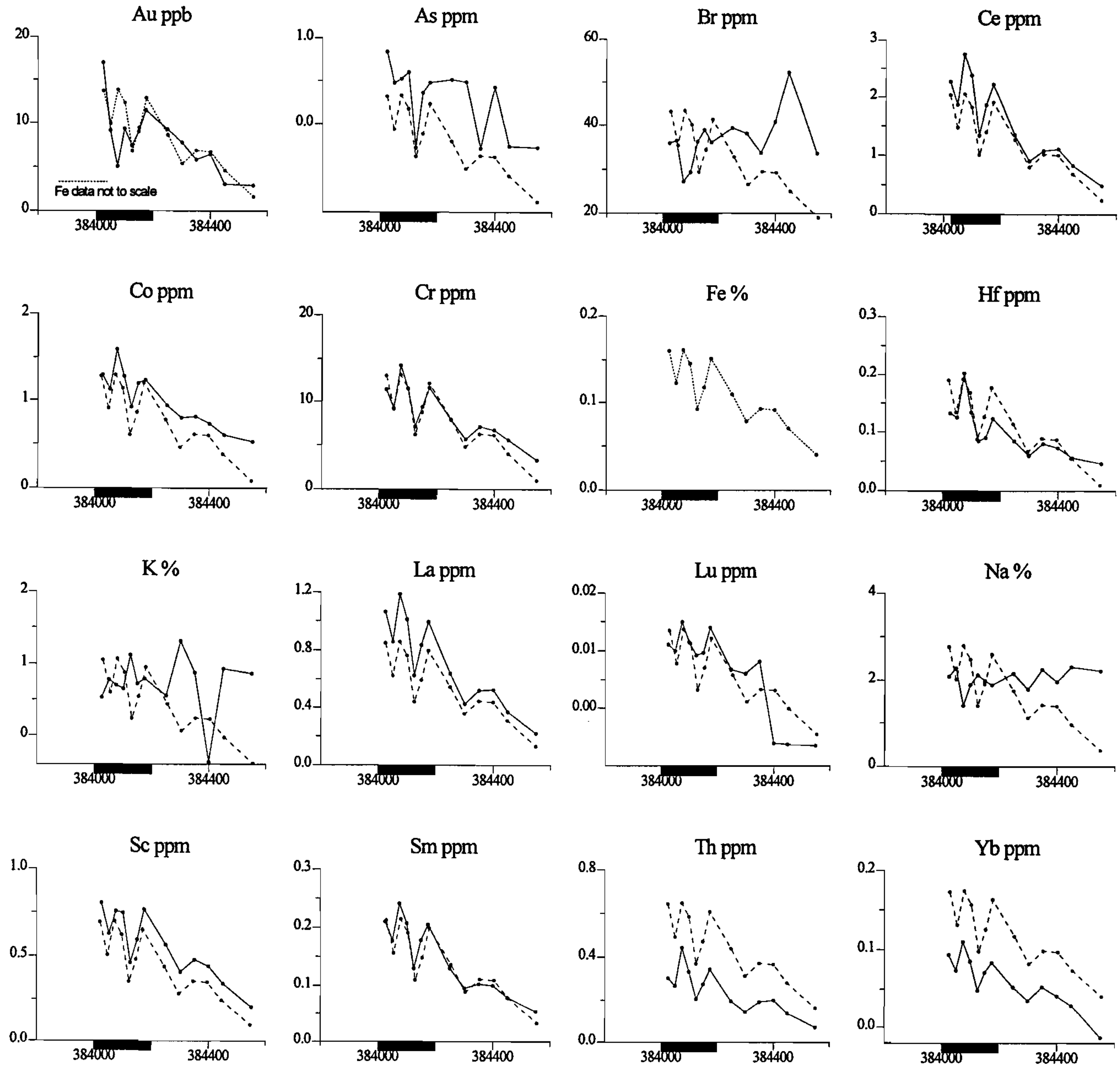


Figure A2.3 : Elemental abundancies for bluebush samples from 526000N at Apollo.
Black rectangle indicates position of mineralization. X axis is Easting (m). Dotted line is Fe data (not to scale).
Negative data is below detection. Sb (0.5), Ba (300), Cs (3) Co (3), Eu (1), Ir (0.04),
Lu (0.1), Mo (10), Rb (60), Se (15), Ag (15), 10 (Ta) W (5) and U (5) are below detection indicated in parentheses (ppm).

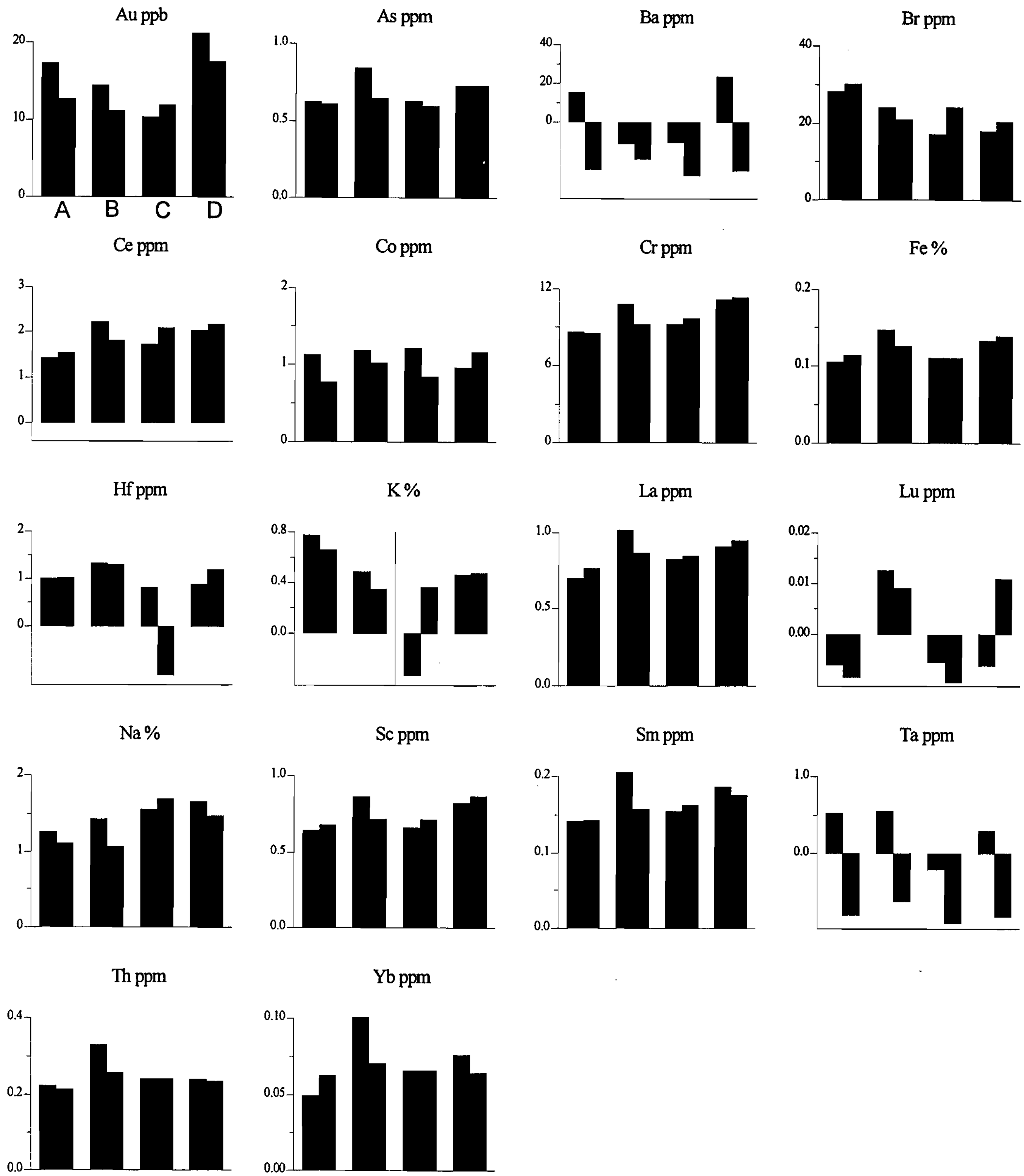


Figure A2.4 : Elemental abundancies for replicate Bluebush samples at Apollo at Argo. Negative data below detection limit.
A = 09-3007; B = 09-3009; C = 09-3012; D = 09-3020.

Table A2.5: Geochemical data for vegetation samples. na denotes sample not analysed for this element

Sample **bluebush**	Easting (m)	Northing (m)	ash/dry %	Au INAA ppb	Ag INAA ppm	As INAA ppm	Ba INAA ppm	Br INAA ppm	Ce INAA ppm	Co INAA ppm	Cr INAA ppm	Cs INAA ppm	Eu INAA ppm	Fe INAA %	Hf INAA ppm
09-3605	383900	526080	5.1	8	<0.8	0.4	<15	17	1.2	0.8	7	<0.2	<0.05	0.09	0.07
09-3606	383925	526080	4.6	11	<0.7	0.5	<14	19	1.4	0.8	7	<0.1	<0.05	0.10	0.09
09-3607	383950	526080	8.3	13	<1.2	0.6	<25	30	1.5	0.8	9	<0.2	<0.08	0.11	0.09
09-3607R	383950	526080	8.5	17	<0.6	0.6	15	28	1.4	1.1	9	<0.1	<0.06	0.11	0.12
09-3609	383993	526080	6.5	11	<1.0	0.6	<19	21	1.8	1.0	9	<0.2	<0.06	0.13	0.08
09-3609R	383993	526080	8.7	14	<0.6	0.8	<11	24	2.2	1.2	11	<0.1	<0.06	0.15	0.15
09-3610	384025	526080	5.4	9	<0.8	0.5	<16	23	1.4	0.6	7	<0.2	<0.05	0.08	0.07
09-3611	384050	526080	8.3	11	<1.2	0.6	<25	25	1.7	0.8	10	<0.2	<0.08	0.11	0.10
09-3612R	384075	526080	9.2	10	<0.5	0.6	<11	17	1.7	1.2	9	<0.1	<0.05	0.11	0.09
09-3612	384075	526080	9.3	12	<1.4	0.6	<28	24	2.1	0.9	10	<0.3	<0.09	0.11	<0.09
09-3613	384100	526080	7.3	10	<1.1	0.5	<22	24	1.8	0.9	10	<0.2	<0.07	0.11	0.10
09-3614	384125	526080	9.3	7	<1.4	0.5	<28	37	2.1	0.8	10	<0.3	<0.09	0.12	0.11
09-3615	384150	526080	9.2	8	<1.4	0.5	<27	31	1.7	0.9	9	<0.3	<0.09	0.10	0.09
09-3616	384175	526080	8.9	10	<1.3	0.6	<27	22	2.4	1.1	12	<0.3	<0.09	0.14	0.11
09-3617	384200	526080	7.4	8	<1.1	0.4	<22	26	1.2	0.5	6	<0.2	<0.07	0.07	<0.07
09-3618	384250	526080	7.2	6	<1.1	0.4	<22	26	1.3	0.4	6	<0.2	<0.07	0.07	<0.07
09-3619	384300	526080	7.8	8	<1.2	0.4	<23	22	1.4	0.6	7	<0.2	<0.08	0.08	<0.08
09-3620	384350	526080	8.5	18	<1.3	0.7	<25	21	2.2	1.2	11	<0.3	<0.08	0.14	0.10
09-3620R	384350	526080	8.3	21	<0.6	0.7	23	18	2.0	1.0	11	<0.1	<0.06	0.13	0.11
09-3621	384400	526080	7.7	8	<1.2	0.3	<23	22	1.2	0.5	7	<0.2	<0.08	0.08	<0.08
09-3622	384450	526080	7.9	4	<1.2	0.3	<24	26	1.1	0.4	6	<0.2	<0.08	0.07	<0.08
09-3623	384550	526080	6.6	3	<1.0	0.3	<20	31	1.1	0.3	5	<0.2	<0.07	0.06	<0.07
09-3624	384025	526000	8.1	17	<0.6	0.8	15	36	2.3	1.3	11	<0.1	0.03	0.16	0.13
09-3625	384050	526000	7.0	9	<0.7	0.5	<14	37	1.9	1.1	9	0.1	0.05	0.12	0.13
09-3626	384075	526000	9.4	5	<0.5	0.5	13	27	2.8	1.6	14	0.2	0.05	0.16	0.20
09-3627	384100	526000	7.8	9	<0.6	0.6	19	29	2.4	1.3	12	0.1	0.04	0.15	0.13
09-3628	384125	526000	7.6	7	<0.7	<0.3	21	36	1.3	0.9	7	<0.1	0.04	0.09	0.09
09-3629	384150	526000	8.3	9	<0.6	0.4	<12	39	1.9	1.2	9	0.1	0.06	0.12	0.09
09-3630	384175	526000	7.9	11	<0.6	0.5	<13	36	2.2	1.2	12	0.1	0.04	0.15	0.12
09-3632	384250	526000	7.4	9	<0.7	0.5	<14	39	1.4	0.9	8	0.1	0.03	0.11	0.09
09-3633	384300	526000	8.2	8	<0.6	0.5	<12	38	0.9	0.8	6	<0.1	<0.02	0.08	0.06
09-3634	384350	526000	7.3	6	<0.7	<0.3	<14	34	1.1	0.8	7	0.1	<0.03	0.09	0.08
09-3635	384400	526000	8.2	6	<0.6	0.4	13	41	1.1	0.7	7	<0.1	0.03	0.09	0.07
09-3636	384450	526000	8.0	3	<0.6	<0.3	<13	52	0.8	0.6	6	<0.1	<0.03	0.07	0.06
09-3637	384550	526000	7.7	3	<0.7	<0.3	16	34	0.5	0.5	3	<0.1	<0.03	0.04	0.05
09-4393	382760	525840	15.0	<1	<1.3	0.3	<27	20	<0.7	<0.4	<1	<0.3	<0.07	<0.01	<0.07
09-4394	382840	525840	14.2	<1	<1.4	0.3	<28	19	<0.7	<0.4	<1	<0.3	<0.07	<0.01	<0.07
09-4395	382880	525840	13.6	1	<1.5	0.3	<29	27	<0.7	<0.4	<1	<0.3	<0.07	<0.01	<0.07
eucalyptus															
09-4387	382760	525840	20.9	0	<1.0	<0.2	<19	10	<0.5	<0.3	<1	<0.2	<0.05	<0.01	<0.05
09-4388	382840	525840	16.9	<1	<1.2	<0.2	<24	16	<0.6	<0.4	<1	<0.2	<0.06	<0.01	<0.06
09-4389	382880	525840	16.9	<1	<1.2	<0.2	<24	13	<0.6	<0.4	<1	<0.2	<0.06	<0.01	<0.06
09-4390	384065	526080	17.7	<1	<1.1	<0.3	<23	12	<0.6	<0.3	<1	<0.2	<0.06	<0.01	<0.06
09-4391	384085	526080	22.2	1	<0.9	<0.2	<18	15	<0.5	<0.3	<1	<0.2	<0.05	<0.01	<0.05
09-4392	384150	526080	23.3	<1	<0.9	<0.2	<17	14	<0.4	<0.3	<1	<0.2	<0.04	<0.01	<0.04

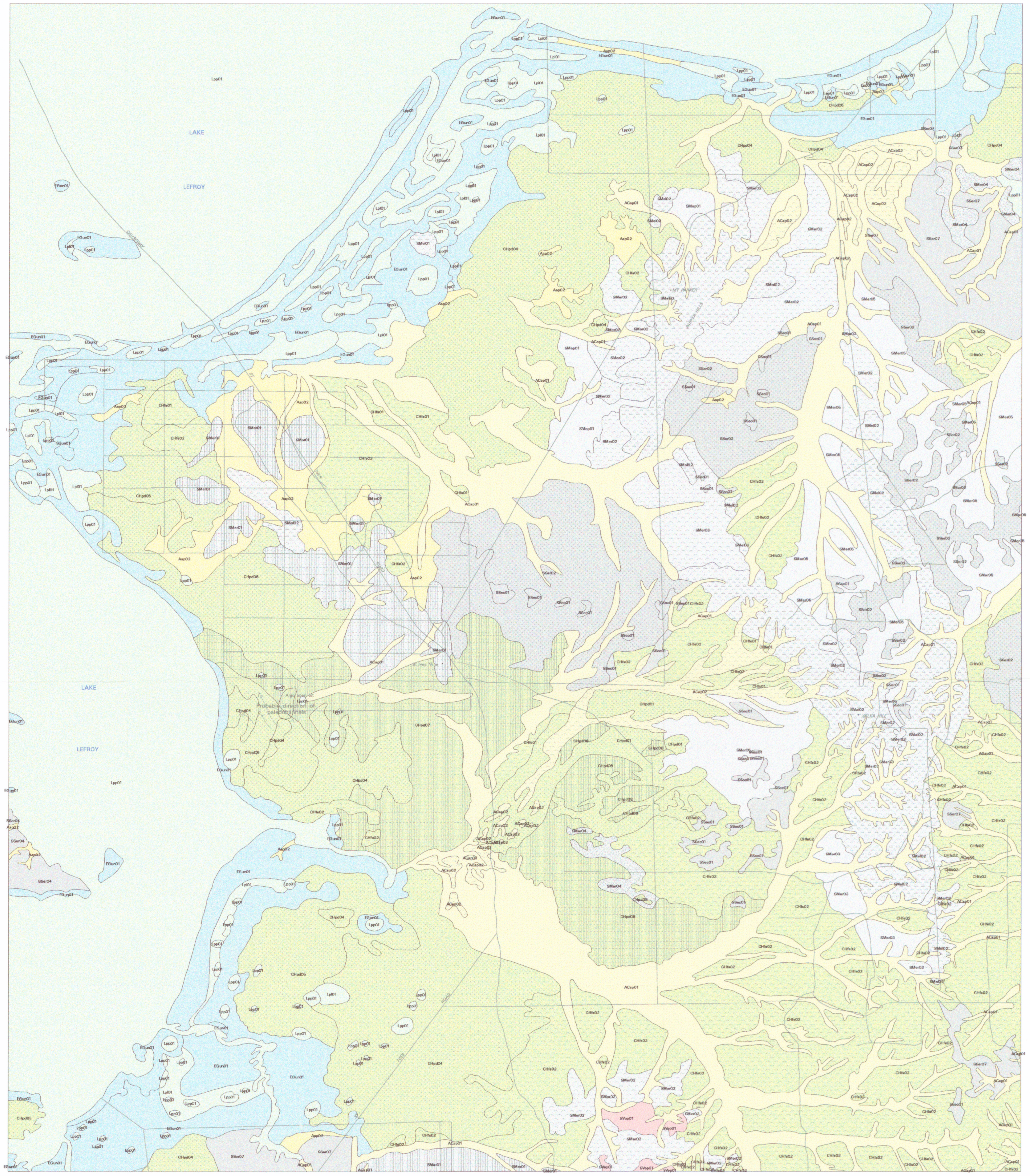
Table A2.5 (continued)

Sample **bluebush**	Ir INAA ppb	K INAA %	La INAA ppm	Lu INAA ppm	Mo INAA ppm	Na INAA %	Rb INAA ppm	Sb INAA ppm	Sc INAA ppm	Se INAA ppm	Sm INAA ppm	Ta INAA ppm	Th INAA ppm	U INAA ppm	W INAA ppm	Yb INAA ppm	Zn INAA ppm
09-3605	<2.0	0.4	0.6	0.01	<0.5	0.8	<3	0.11	0.5	<0.8	0.12	<0.5	0.16	<0.3	<0.3	0.05	na
09-3606	<1.8	0.3	0.7	0.01	<0.5	0.7	<3	<0.02	0.6	<0.7	0.13	<0.5	0.19	<0.2	<0.2	0.05	na
09-3607	<3.3	0.7	0.8	<0.01	<0.8	1.1	<5	<0.04	0.7	<1.2	0.14	<0.8	0.21	<0.4	<0.4	0.06	na
09-3607R	<2.4	0.8	0.7	<0.01	<0.6	1.3	<4	<0.02	0.6	<0.6	0.14	0.5	0.22	<0.2	<0.5	0.05	na
09-3609	<2.6	0.3	0.9	0.01	<0.6	1.1	<4	<0.03	0.7	<1.0	0.16	<0.6	0.26	<0.3	<0.3	0.07	na
09-3609R	<2.3	0.5	1.0	0.01	<0.6	1.4	<3	<0.02	0.9	<0.6	0.21	0.6	0.33	<0.2	<0.5	0.10	na
09-3610	<2.2	0.3	0.6	0.01	<0.5	1.0	<3	<0.03	0.5	<0.8	0.12	<0.5	0.20	<0.3	<0.3	0.05	na
09-3611	<3.3	0.4	0.8	0.01	<0.8	1.4	<5	<0.04	0.7	<1.2	0.16	<0.8	0.23	<0.4	<0.5	0.06	na
09-3612R	<2.2	<0.3	0.8	<0.01	<0.5	1.6	<3	<0.02	0.7	<0.5	0.15	<0.2	0.24	<0.2	<0.4	0.07	na
09-3612	<3.7	0.4	0.8	<0.01	<0.9	1.7	<6	<0.05	0.7	<1.4	0.16	<0.9	0.24	<0.5	<0.5	0.07	na
09-3613	<2.9	0.5	0.8	0.01	<0.7	1.3	<4	<0.04	0.7	<1.1	0.16	<0.7	0.25	<0.4	<0.4	0.06	na
09-3614	<3.7	0.6	0.9	0.01	<0.9	1.5	<6	<0.05	0.7	<1.4	0.17	<0.9	0.29	<0.5	<0.5	0.06	na
09-3615	<3.7	0.4	0.7	<0.01	<0.9	1.7	<5	<0.05	0.6	<1.4	0.15	<0.9	0.22	<0.5	<0.5	0.05	na
09-3616	<3.5	0.6	1.0	0.01	<0.9	1.5	<5	<0.04	0.8	<1.3	0.20	<0.9	0.32	<0.4	<0.4	0.07	na
09-3617	<3.0	0.5	0.6	0.01	<0.7	1.5	<4	<0.04	0.4	<1.1	0.11	<0.7	0.15	<0.4	<0.4	0.04	na
09-3618	<2.9	0.4	0.5	<0.01	<0.7	1.2	<4	<0.04	0.4	<1.1	0.11	<0.7	0.13	<0.4	<0.4	0.05	na
09-3619	<3.1	0.5	0.6	<0.01	<0.8	1.6	<5	<0.04	0.5	<1.2	0.12	<0.8	0.17	<0.4	<0.4	0.03	na
09-3620	<3.4	0.5	0.9	0.01	<0.8	1.5	<5	<0.04	0.9	<1.3	0.18	<0.8	0.23	<0.4	<0.4	0.06	na
09-3620R	<2.4	0.5	0.9	<0.01	<0.6	1.7	<4	<0.02	0.8	<0.6	0.19	0.3	0.24	<0.2	<0.5	0.08	na
09-3621	<3.1	0.6	0.5	<0.01	<0.8	1.4	<5	<0.04	0.5	<1.2	0.10	<0.8	0.14	<0.4	<0.4	0.03	na
09-3622	<3.2	0.6	0.5	<0.01	<0.8	1.3	<5	<0.04	0.4	<1.2	0.09	<0.8	0.16	<0.4	<0.4	0.03	na
09-3623	<2.6	0.4	0.5	<0.01	<0.7	1.3	<4	<0.03	0.3	<1.0	0.08	<0.7	0.13	<0.3	<0.3	0.03	na
09-3624	<2.5	0.5	1.1	0.01	<0.6	2.1	<2	0.06	0.8	<0.6	0.21	<0.1	0.30	<0.2	<0.5	0.09	na
09-3625	<2.9	0.8	0.9	0.01	<0.7	2.3	<3	0.03	0.6	<0.7	0.18	<0.1	0.27	<0.3	<0.6	0.07	na
09-3626	<2.1	0.7	1.2	0.01	<0.5	1.4	3	<0.02	0.8	<0.5	0.24	<0.1	0.44	<0.2	<0.4	0.11	na
09-3627	<2.6	0.7	1.0	0.01	<0.6	1.9	3	0.04	0.7	<0.6	0.21	<0.1	0.33	<0.3	<0.5	0.09	na
09-3628	<2.6	1.1	0.6	0.01	<0.7	2.1	<3	<0.03	0.5	<0.7	0.13	<0.1	0.21	<0.3	<0.5	0.05	na
09-3629	<2.4	0.7	0.8	0.01	<0.6	2.0	<2	<0.02	0.6	<0.6	0.18	<0.1	0.27	<0.2	<0.5	0.07	na
09-3630	<2.5	0.8	1.0	0.01	<0.6	1.9	<3	<0.03	0.8	<0.6	0.21	<0.1	0.34	<0.3	<0.5	0.08	na
09-3632	<2.7	0.6	0.6	0.01	<0.7	2.2	<3	<0.03	0.6	<0.7	0.13	<0.1	0.20	<0.3	<0.5	0.05	na
09-3633	<2.4	1.3	0.4	0.01	<0.6	1.8	<2	<0.02	0.4	<0.6	0.10	<0.1	0.14	<0.2	<0.5	0.04	na
09-3634	<2.7	0.9	0.5	0.01	<0.7	2.3	<3	<0.03	0.5	<0.7	0.10	<0.1	0.19	<0.3	<0.5	0.05	na
09-3635	<2.4	<0.4	0.5	<0.01	<0.6	2.0	<2	<0.02	0.4	<0.6	0.10	<0.1	0.20	<0.2	<0.5	0.04	na
09-3636	<2.5	0.9	0.4	<0.01	<0.6	2.3	<3	<0.03	0.3	<0.6	0.08	<0.1	0.14	<0.3	<0.5	0.03	na
09-3637	<2.6	0.9	0.2	<0.01	<0.7	2.2	<3	<0.03	0.2	<0.7	0.05	<0.1	0.07	<0.3	<0.5	<0.01	na
09-4393	<2.7	0.5	0.1	<0.01	<0.3	1.1	<7	<0.03	0.1	<1.3	0.03	<0.7	0.13	<0.1	<0.3	<0.07	31
09-4394	<2.8	0.3	0.1	<0.01	<0.4	1.3	<7	<0.04	0.1	<1.4	0.03	<0.7	0.14	<0.1	<0.3	<0.07	43
09-4395	<2.9	0.2	0.1	<0.01	<0.4	1.4	<7	<0.04	0.1	<1.5	0.03	<0.7	0.15	<0.1	<0.3	<0.07	48
eucalyptus																	
09-4387	<1.9	0.4	0.1	<0.01	<0.2	0.5	<5	<0.02	0.0	<1.0	0.03	<0.5	0.10	<0.1	<0.2	<0.05	26
09-4388	<2.4	0.2	0.1	<0.01	<0.3	0.3	<6	<0.03	0.0	<1.2	0.02	<0.6	0.12	<0.1	<0.2	<0.06	11
09-4389	<2.4	0.3	0.2	<0.01	<0.3	0.6	<6	<0.03	0.0	<1.2	0.04	<0.6	0.12	<0.1	<0.2	<0.06	27
09-4390	<2.3	0.3	0.1	<0.01	<0.3	0.6	<6	<0.03	0.1	<1.1	0.03	<0.6	0.11	<0.1	<0.2	<0.06	24
09-4391	<1.8	0.4	0.1	<0.01	<0.2	0.6	<5	<0.02	0.1	<0.9	0.03	<0.5	0.09	<0.1	<0.2	<0.05	39
09-4392	<1.7	0.4	0.1	<0.01	<0.2	0.6	<4	<0.02	0.1	<0.9	0.04	<0.4	0.09	<0.1	<0.2	<0.04	28

Table A3.1 : Nominal detection limits for regolith materials. Some detection limits are reported higher because of interferences and/or sample weight.

Element	Method	Detection limit
Au	INAA	5 ppb
Au	water	<0.2 ppb
Au	iodide	<0.2 ppb
Au	cyanide	<0.2 ppb
Ag	INAA	5 ppm
As	INAA	1 ppm
Ba	INAA	100 ppm
Bi	XRF	1 ppm
Br	INAA	2 ppm
Ca	AAS	100 ppm
Ce	INAA	0.2 ppm
Co	INAA	1 ppm
Cr	INAA	5 ppm
Cs	INAA	1 ppm
Cu	XRF	10 ppm
Eu	INAA	0.5 ppm
Fe	INAA	500 ppm
Fe	XRF	50 ppm
Hf	INAA	0.5 ppm
Ir	INAA	20 ppb
K	INAA	1000 ppm
La	INAA	0.2 ppm
Lu	INAA	0.2 ppm
Mg	AAS	12.5 ppm
Mn	XRF	20 ppm
Mo	INAA	5 ppm
Na	INAA	50 ppm
Ni	XRF	10 ppm
Pb	XRF	5 ppm
Rb	INAA	20 ppm
Sb	INAA	0.2 ppm
Sc	INAA	0.1 ppm
Se	INAA	5 ppm
Sm	INAA	0.2 ppm
Sr	XRF	5 ppm
Ta	INAA	1 ppm
Th	INAA	0.5 ppm
TiO2	XRF	30 ppm
U	INAA	2 ppm
W	INAA	2 ppm
Yb	INAA	0.5 ppm
Zn	INAA	100 ppm
Zn	XRF	5 ppm
Zr	XRF	5 ppm

ARGO_APOLLO REGOLITH LANDFORMS SCHEMATIC DIAGRAM



Erosional

Very highly weathered bedrock

SVep01	Very weathered mafic to ultramafic and metabasaltic bedrock exposures developed on erosional plains. In places, may sometimes be bounded by erosional scarps usually at the head of drainage tracts.

Moderately weathered bedrock

SMep01	Moderately weathered mafic to ultra-mafic dykes and metamorphosed magnesium basalts forming an erosional plain with a shallow colluvial mantle.
SMer01	Moderately weathered, dominantly greenstones bedrock lithologies developed as rises (>9 m local relief) with calcareous colluvial mantles of very fine sandy light textured clays.
SMer02	Moderately weathered mafic schists, metadiorites, metabasalts and metakomatiites forming mostly erosional rises (>9 m local relief) and rarer low hills. Colluvial mantles consisting of calcareous red-brown fine sandy ferruginous granules and possibly pisoliths; likely to have ferruginous granular lag including iron saprolite fragments.
SMer03	Moderately weathered mafic schists, metabasalts, metadolerites and amphibolite forming erosional rises to undulating plain
SMer04	Moderately weathered mudstones, siltstones, sandstones, spongelitic siltstones, calcarenites, calcareous sandstones, bituminous siltstones forming rises merging to undulating plain. Poorly indurated ferruginous cappings present in some parts.
SMer05	Moderately weathered granitic bedrock (In some parts very weathered) forming erosional rises to undulating erosional plain with a thin mantle consisting of quartzofeldspathic fine to medium sands with some mixtures of ferruginous granules and iron bedrock fragments.
SMel01	Moderately weathered greenstone bedrock exposures forming low hills (30-90m local relief) with a mantle of colluvium containing bedrock fragments and also bedrock fragments sometimes present as surface lag.
SMel02	Moderately weathered mafic schists, metabasalts and metadolerites forming erosional low hills (9-30 metres local relief).

Slightly weathered bedrock

SSec01	Slightly weathered granitic bedrock exposures forming limited extent etched planar to slightly undulating platforms with little or no colluvial mantle remaining.
SSer02	Slightly weathered granitic bedrock exposures forming gently to moderately inclined surfaces on the flanks of erosional rises and having an extensive but mostly shallow veneer of sandy to slightly clayey colluvial sheetflow sediments.
SSer04	Slightly sometimes moderately weathered metasedimentary sequences developed as bedrock rises (> 9 m local relief) with a colluvial mantle of clayey, silty sands through to sandy clays.
SSer07	Slightly to moderately weathered (in part) bedrock rises consisting of acid to intermediate volcanic and volcaniclastic rocks. A thin mantle of quartzofeldspathic sand covers and undulating small erosional plains between rises.

Depositional

Alluvial sediments

Alluvial sediments

Aap02	Alluvial sediments with minor colluvium derived from nearby slopes. Calcareous sandy silty clays and clayey silty sands are exposed on an alluvial plain and smaller tracts between rises and low hills.
ACap01	Alluvial channel sediments consisting of various combinations of quartz sands, clays, and silts.
ACap02	Alluvial channel sediments consisting of calcareous sand, red to red-brown clays derived from mixed felsic and mafic source rocks, developed on broad shallow alluvial tracts. Granule to very scattered polymict lags consisting of 1-5cm quartz and 1-3cm lithic fragments with red-brown and bright black iron granules.

Colluvial sediments

Sheet flow deposit

CHfs01	Sheetflow deposits consisting of colluvial sediments derived from ultramafic bedrock exposures, and having a surface lags consisting of Fe granules over calcareous soils.
CHfs02	Colluvial sediments as sheetflow deposits from ultramafic source rocks with ferruginous granular lag gravels, some calcareous nodules and some calcareous soils.
CHpd01	Calcareous sheetflow sediments consisting of red-brown sandy, light to medium textured clays to a depth of more than 70 cm and occurring on and inclined to gently undulating depositional plain. Some areas of quartzofeldspathic sandy lag at the surface and with less than 2pc of Fe granular lithic bedrock fragments derived from local greenstone.
CHpd04	Moderately weathered mafic schists, metadorites, metabasalts and metakomatites forming mostly erosional rises (>9 metres developed on depositional plain. Some calcareous nodules also present at the surfaces and within one metre of the surface as a layer between 2-4cm thick and developed over further sand.
CHpd05	Aeolian modified sheetflow sediments consisting of calcareous very fine sandy light clays to red-brown clayey very fine sands to about 4 metres developed on a slightly inclined to undulating depositional plain
CHpd06	Aeolian uniform red-brown and well sorted fine to very fine sand at least 25cm thick developed over compact medium textured red-brown non-calcareous clay. Rare angular vein, quartz fragments are present at the surface and within sandy upper horizon. Sediments are developed on an inclined plain.
CHpd07	Colluvial sheetflow sediments consisting of calcareous sandy light to medium red-brown textured clays over brown cracking clays at about 6 metres in some locataions and probably mostly overlying weathered felsic bedrock
CHpd08	Colluvial sheetflow sediments consisting of calcareous slightly sandy (medium), light brown, light textured clays through to medium and heavy textured clays to at least 75cm. Lags are rare to mostly absent with some calcrete nodules present in rills and flow lines.

Dunefield Sediments

Lunette Sediments

EGun01	Lunettes and single dune forms consisting of combinations of some halite, quartz sands, silts and playa plains and lakes.

Lacustrine sediments

Lacustrine sediments

Lpl01	Lacustrine sediments consisting of saline gypsiferous red-brown muds (ie clays and silt mixtures) forming mud flats on the edge of saline lakes and broad playa plains.
Lpp01	Lacustrine sediments with some halite, and gypsiferous red-brown clays and silts forming salt lake beds and playa plains.

INDURATION MODIFIER

- *Calcareous earths, soil carbonate, calcareous nodules*
- *Lag - variable composition but dominantly gravel-sized consisting of bedrock fragments*
- *Lag-gravels: dominantly sandy quartzofeldspathic, or quartzofeldspathic granules or mixtures*
- *Ferruginous fine gravel lags*
- *Ferruginous saprolite*

DEPOSITIONAL LANDFORMS

ap	Alluvial plain
un	Lunette
fs	Sheet-flood fan
pd	Depositional plain
pp	Playa plain
pl	Lacustrine plain

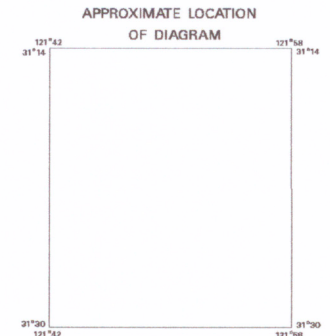
EROSIONAL LANDFORMS

ep	Erosional plain
ec	Etchplain
er	Rises
el	Low hills

Roads, tracks, fences and powerlines

MAP LOCALITY

APPROXIMATE LOCATION OF DIAGRAM



APPROXIMATE SCALE 1:50 000

1000 Metres 0 1 2 3 4 5 Kilometres

UNIVERSAL TRANSVERSE MERCATOR PROJECTION

Latitude of Origin : 0°, Longitude of Origin : 123 °
Scale Reduction Factor 0.9996

WARNING: This is not a rectified map, the scale is approximate and non-linear, spatial relationships are only approximate.

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Compiled by M.A. Craig (CRC LEME/AGSO), 1996

Diagram composition by P Ursem and M.A. Craig (AGSO), 1996

This Diagram forms part of the following document:

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M. J. Lintern, R. N. Carver and M. A. Craig

The regolith diagram is based on the interpretation of 1:86 000 RC9 panchromatic aerial photography (1967) of the Widgiemooltha 250k sheet areas and selected field traverses. This diagram provides a broad overview of regolith landforms as a framework for more detailed local knowledge. Boundaries and polygon descriptions are generalised to show the main regolith and landform types. The diagram is not a true map. It is not fully spatially rectified. The scale is non linear and is only approximate. Relative spatial relationships are approximate.

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Topographic information shown on this diagram has been derived from 1:86 000 RC9 panchromatic aerial photography 1967.

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