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REFERENCE GEOCHEMICAL DATA SETS FROM THE MT. GIBSON ORIENTATION STUDY, WESTERN AUSTRALIA

R.E. Smith, J.E. Wildman, R.R. Anand and J.L. Perdrix

CRC LEME OPEN FILE REPORT 46

November 1998

(CSIRO Division of Exploration Geoscience Report 157R, 1992. Second impression 1998)

CRC LEME is an unincorporated joint venture between The Australian National University, University of Canberra, Australian Geological Survey Organisation and CSIRO Exploration and Mining, established and supported under the Australian Government's Cooperative Research Centres Program.

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Headquarters: CRC LEME c/o CSIRO Exploration and Mining, Private Bag, PO Wembley, Western Australia, 6014

RESEARCH ARISING FROM CSIRO/AMIRA REGOLITH GEOCHEMISTRY PROJECTS 1987-1993

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" (1987-1993) 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 included 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. 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.

Although the confidentiality periods of the research reports have expired, the last in December 1994, they have not been made public until now. Publishing the reports through the CRC LEME Report Series is seen as an appropriate means of doing this. By making available the results of the research and the authors' interpretations, it is hoped that the reports will provide source data for future research and be useful for teaching. CRC LEME acknowledges the Australian Mineral Industries Research Association and CSIRO Division of Exploration and Mining for authorisation 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 46) is a Second impression (second printing) of CSIRO, Division of Exploration Geoscience Restricted Report 157R, first issued in 1992, which formed part of the CSIRO/AMIRA Projects P240 and P240A.

Copies of this publication can be obtained from:
The Publication Officer, c/- CRC LEME, CSIRO Exploration and Mining, PMB, Wembley, WA 6014, Australia. Information on other publications in this series may be obtained from the above or from http://leme.anu.edu.au/
Cataloguing-in-Publication:

Reference geochemical data sets from the Mt Gibson orientation study, Western Australia
ISBN 0 642 28216 1
1. Laterite 2. Geochemistry 3. Gold - Western Australia.
I. Smith, Raymond Ernest II. Title
CRC LEME Open File Report 46.
ISSN 1329-4768

EXECUTIVE SUMMARY

Data sets from the Mt. Gibson geochemical orientation study have been organized into reference groups based upon the regolith stratigraphy for the area. The data sets (with the numbers of samples making up each set in brackets) consist of *soils* (17 or, with gravelly red earths included, 31), *colluvium* (58), *lateritic gravel* (55), *lateritic duricrust* (112), *mottled zone* (13), and *saprolite* (25). In addition, some data are presented for calcretes, iron segregations, mineralized veins, and lag. The total number of samples included in this report is 296.

The main information required to support the geochemical data is presented in concise and accessible form. This includes maps of the surface regolith relationships, bedrock geology, and sample sites for each sample set, together with a regolith-landform model and a schematic diagram of the regolith stratigraphy. Listings of chemical analyses for each sample, grouped according to sample type, are included, and summary statistics are presented. Box plots show the distribution of levels for each element, or oxide, for units of the regolith stratigraphy. Histograms for colluvium, lateritic gravel, and lateritic duricrust are presented for each element and oxide. Separate maps showing the geochemical dispersion patterns for Au, Pb, As, and Bi in colluvium, lateritic gravel, and lateritic duricrust allow the sampling to be seen in terms of the shape of the geochemical dispersion anomaly. Scales used for maps in this report are common to a previous report (20R) which comprehensively discussed the regolith relationships at Mt. Gibson. Correlation webs highlight relationships between some elements for several of the sample media and a Si-Al-Fe triangular diagram shows the main characteristics of laterite samples.

The use of standardized formats for data presentation allow the characteristics of each data set to be appreciated, and comparisons to be made between the data sets. Furthermore, the Mt. Gibson data can then be readily compared with data sets, as they arise, whether from other orientation studies, or from company exploration data. A floppy disk of the geochemical data together with sample type and location is included in standard format to enable users to have easy access and readily manipulate the data for their required purposes.

Data sets, such as those presented, which are controlled within a regolith-landform framework, are being generated from other orientation studies within the Laterite Geochemistry Project. Collectively, these reference data sets will form an essential part of a growing interpretational data system.

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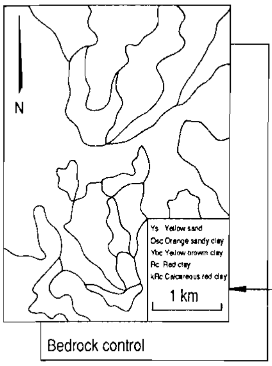

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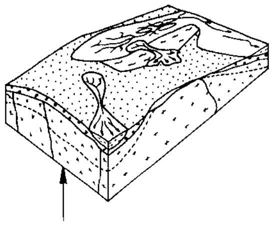
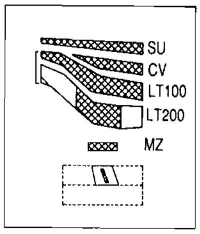


Report 20R for detail

Regolith stratigraphy



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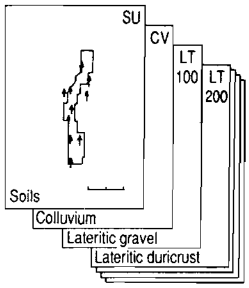

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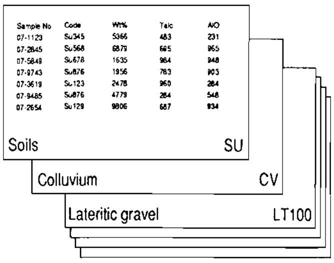

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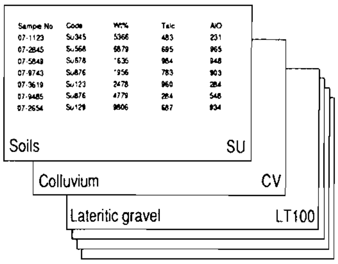

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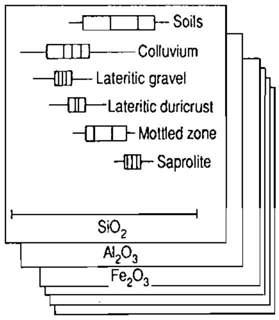

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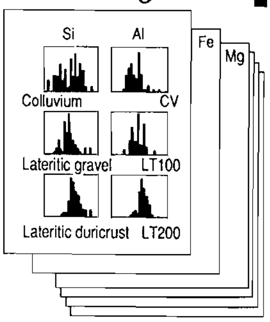

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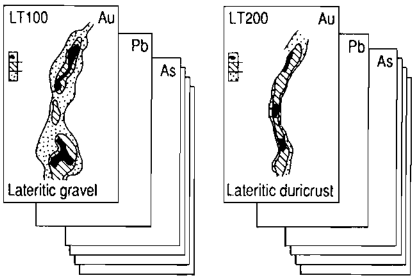
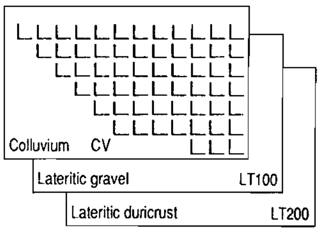


Correlation plot matrix



Available for reference at CSIRO or plot from floppy disk

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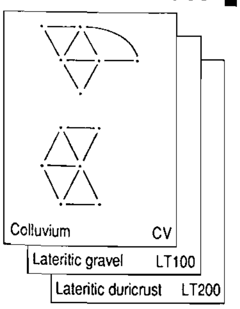

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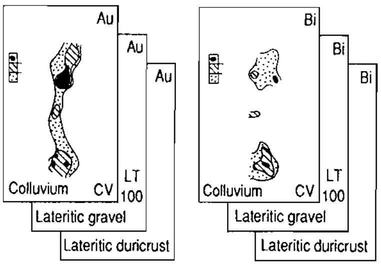

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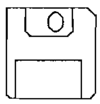

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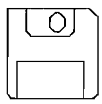
Data interpretation demonstrations



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1.0 PROJECT LEADER'S PREFACE

R.E. Smith - 30 September 1991

Fundamental building blocks of the CSIRO/AMIRA Laterite Geochemistry Project are four substantial multidisciplinary geochemical orientation studies: Mt. Gibson, Bottle Creek, Lawlers, and Boddington. In each case the geochemical dispersion arising from concealed Au deposits is studied by establishing an understanding of the regolith, landform, and bedrock relationships, not only of the immediate ore environments, but also of the district within which the deposits lie. In this way a regolith-landform framework of reference is established for each orientation study within which each sample or collection of samples is tightly controlled. The necessary high resolution of sample type, which allows application of sophisticated data interpretational methods, is provided by the classification codes established by the Project's *Terminology, Classification and Atlas* (Anand *et al.*, August 1989). The present report on the Mt. Gibson orientation study is thus documenting the conversion of data into information.

A wide range of multivariate statistical procedures can be applied to geochemical data interpretation, many of which have the advantage of allowing the identification of significant anomalies to be optimized (Smith *et al.*, 1984; Grunsky, E.C., 1991). Some multivariate procedures are based upon a knowledge of the geochemical characteristics of *target groups* of samples (related to mineralization) and comparing these and contrasting them with various *background groups* of samples. Data from the orientation areas will serve as target data sets. In contrast, various background data sets will arise from information in the CSIRO/AGE Yilgarn laterite geochemical database (Grunsky *et al.*, 1988), or from specifically chosen background areas within the orientation areas. Exploration samples can then be treated as unknowns and classification may be carried out by comparison of these unknowns with the reference target and background groups. Other multivariate procedures do not use prior knowledge of anomalous characteristics and instead seek to understand structure within the geochemical data clouds using *exploratory data analysis* (Tukey, 1977), with emphasis on identification of outliers which may relate to mineralization. Both approaches are important in mineral exploration (Grunsky, 1991), and the well-controlled data sets from the orientation areas will be of central importance.

This report assembles the reference data sets for the Mt. Gibson Orientation Study with the intent that they will be of lasting value to explorationists as the building blocks of a growing, multivariate data interpretative system.

Comprehensive coverage of regolith-landform relationships and descriptions of regolith units for the main orientation area at Mt. Gibson are provided by Report 20R, *Exploration geochemistry about the Mt. Gibson Gold deposits, Western Australia - Progress to 31 March 1989*, by Anand *et al.* (March 1989). For ease of reference, several key maps from that report are included here. The setting of the Mt. Gibson orientation study is expanded by Report 165R, titled *Regolith-landform development and siting and bonding of elements in regolith units, Mt. Gibson district, Western Australia,* by Anand *et al.* (1991).

2.0 INTRODUCTION

2.1 Background

The Mt. Gibson orientation study was described in some detail in Report 20R (Anand *et al.*, March 1989). That report presented the overall objectives, the attributes of the area, and the components of the CSIRO research. It also comprehensively described and interpreted the regolith-landform relationships of the orientation area and the initial geochemical dispersion patterns in the loose pisolitic and nodular lateritic residuum.

The Project's volume *Laterite Types and Associated Ferruginous Materials — Terminology, Classification, and Atlas* (Anand *et al.*, August 1989), hereinafter called the *Atlas*, with its alpha-numeric codes for regolith type was developed after completion of Report 20R. Hence, in the present report sufficient regolith information is presented to enable the classification codes to be applied to the materials sampled.

2.2 Objectives

The overall objectives of this report are to prepare the data sets from the Mt. Gibson orientation study for numerical manipulation and to carry out some basic, standard procedures for data display and interpretation.

The specific objectives are:-

- To present reference data sets for the Mt. Gibson orientation study where each sample is tied within a well-controlled regolith-landform framework of reference; like-samples being grouped together by means of the project's standardized codes for sample type and regolith stratigraphy;

- To document specific steps of pre-treatment of data;

- To carry out initial tests for internal consistency of each sub-group based upon sample type;

- To present the data sets in a series of standard formats to facilitate:-

    - a synoptic view of element levels in the Mt. Gibson study area;
    - comparisons between element levels at Mt. Gibson and those at other orientation study areas;

- To document and investigate some of the geochemical patterns within the data sets.

2.3 Scope

This report summarizes procedures carried out to prepare and present the geochemical data sets arising from the Mt. Gibson orientation study. The format of the report documents the sequential stages of data treatment of this component of the Mt. Gibson study, as follows:-

- Sample preparation and chemical analysis
- Data preparation
- Data presentation
- Initial stages of data interpretation

This report thus provides a summary of work carried out to date on the Mt. Gibson geochemical data. The data sets used in the research are provided along with standard presentations of formatted data.

3.0 REFERENCE FRAMEWORK PROVIDING CONTROL OF SAMPLES

3.1 Framework of Reference

The Mt. Gibson geochemical data sets are integrated within a framework, described below, consisting of the defined regolith-landform mapping units, the regolith stratigraphy, sample type including hand specimen characterization and, where sufficient information is available, with bedrock geology of the sampled area. Parent lithologies have been listed for residual sample types on the floppy disk. Maps are scaled to match those of Report 20R.

3.2 Regolith-Landform Setting

The regolith relationships for the Mt. Gibson orientation area are delineated in Figure 1 based upon regolith type, macroscopic relief and vegetation patterns, as an overlay to a black and white air photograph. Figure 2 shows the distribution of all samples collected for this research within the area, totalling 296. These are mostly distributed along a major multi-element laterite geochemical dispersion anomaly much of which represents mined or mineable lateritic Au ore. The geochemical anomaly extends particularly to the N of the mapped area (to the Midway North deposit) for a total strike length of 7 km and closely follows the mineralized bedrock sequence and included mineral deposits (Gee, 1990).

Interpretation of regolith-landform field relationships coupled with establishment of the regolith stratigraphy led to an understanding of the regolith-landform dynamics, shown in Figure 3. The figure exemplifies the importance in exploration geochemistry of considering such lateritic terrain in terms of preservation versus dismantling of the lateritic profile. Experience shows that it is particularly useful to consider such terrain in terms of residual, erosional, and depositional regimes — where the datum for residual regimes is preservation of the lateritic residuum.

3.3 Regolith-Landform Model, Regolith Stratigraphy, and Classification of Samples

Figure 4 provides a three-dimensional model of regolith-landform relationships for the Mt. Gibson orientation area. The regolith stratigraphy is shown by the stratigraphic columns in Fig. 4 and schematically in Fig. 5a. The alpha-numeric codes provide the necessary control for regolith stratigraphy and sample type, and are used in the geochemical database. Lists of codes for each sample type are given in Tables 1 to 7. However, readers need to refer to tables in the *Atlas* for the hierarchical structure.

The conceptual cross-section, Figure 5a, shows the number of samples for which chemical analyses have been generated during the research in terms of regolith stratigraphy. Compatible sample types have been grouped together according to the codes shown in Fig. 5a, CVALL, LT100, LT200, etc. These groups are used throughout this report and are coded in the database as "box fields", because they are used to generate the box plots in Section 6.4. All types of samples of loose lateritic pisoliths and nodules, which form the gravel category of lateritic residuum, are grouped as LT100. Likewise lateritic duricrust samples are grouped as LT200. However, codes for specific sample types (LT203, LT204, etc.) for individual samples are always retained in the database. The proportions of each sample type are shown in the pie chart Fig. 5b.

For the main data presentations, a group of 14 samples of gravelly red earths have been shown within the colluvium data set. It is also correct and can be appropriate for some purposes to include these samples, which are from the surface of a colluvium unit, within the soils data set. Both of these alternatives are shown in maps of the distribution of soil sample sites and in the summary statistics tables. In the database and accompanying diskette, these samples are coded as CV106. Should users wish, the samples could alternatively be coded as SU203. This was done for the study of soils, and their sub-samples developed from colluvium in Report 165R (Anand *et al.*, 1991).

3.4 Bedrock Control

Knowledge of the distribution of bedrock lithologies in the study area has been limited by the poor outcrop due to soil, laterite, and colluvial cover. Furthermore, development of the mine pits in the study area has not generally completely removed the lateritic residuum, saprolite only being exposed locally.

Figure 6 shows a map of bedrock lithologies compiled from sparse outcrops, exploration regolith drilling, and information provided by the Mt. Gibson Gold Project. Unfortunately, this map can only represent a simplification of the bedrock geology. It is known from diamond drilling in the area and from exposures in the Midway Pit, 4 km along strike to the north, that the mineral deposits and associated mineralization occur within a deformational zone in the mafic sequence and that there are accompanying hydrothermal alteration assemblages, particularly silicification and biotite alteration (Brabham *et al.*, 1990). In addition, the metavolcanic units consist of variable mixtures of mafic and felsic components. Amongst the latter are numerous quartz-feldspar phyric lenses, some of which are interpreted to be intrusive.

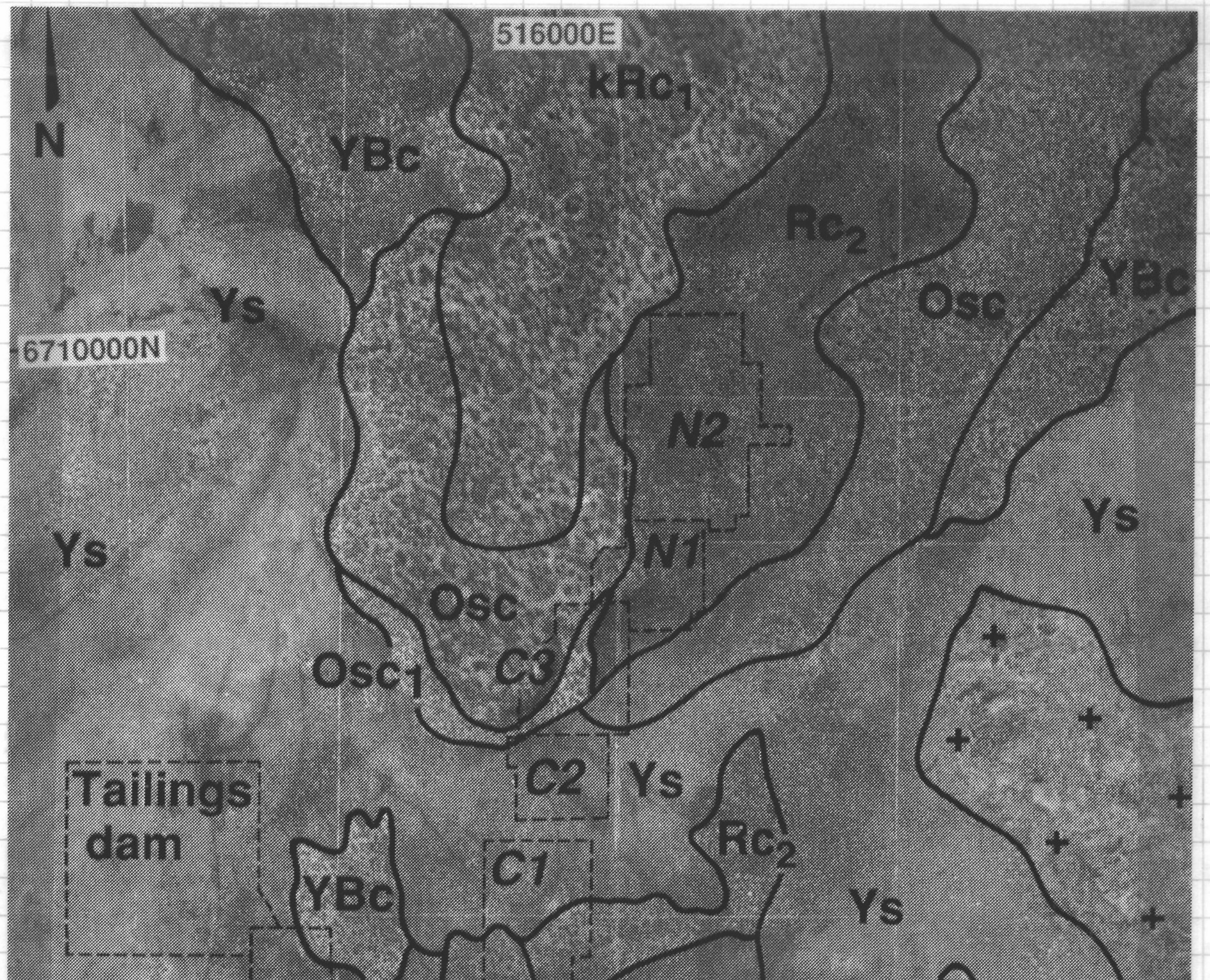


Fig. 1. Map showing the surface distribution of regolith units in the Mt. Gibson orientation area, from Report 20R(Anand et al., 1989).The map is offset to correspond with the AMG co-ordinates of the computer generated maps. DOLA Licence 548/98. WA 1929, Run 11, Frame 5239, Project 790020.

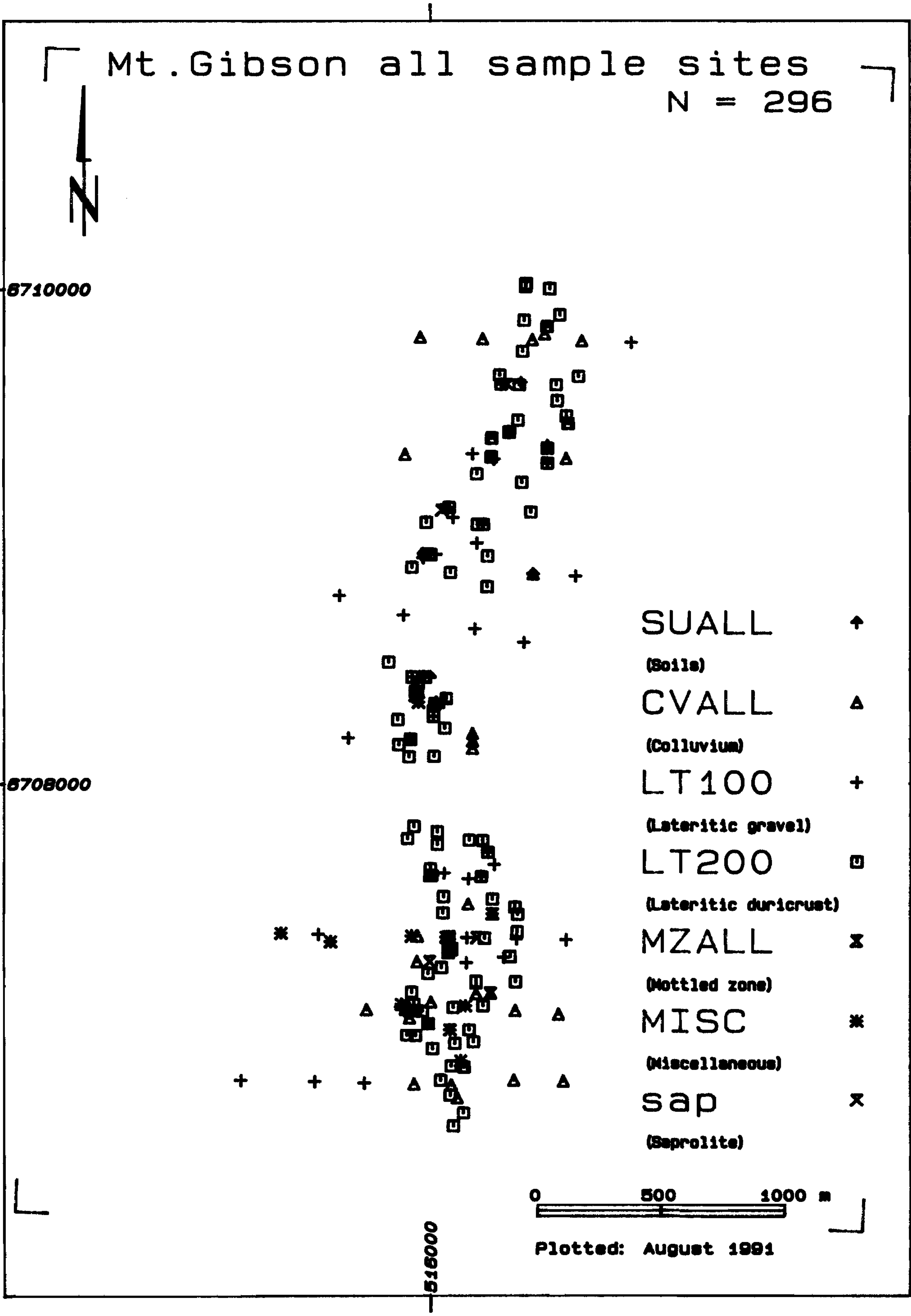


Fig. 2. Map showing the distribution of samples collected during the CSIRO orientation study.

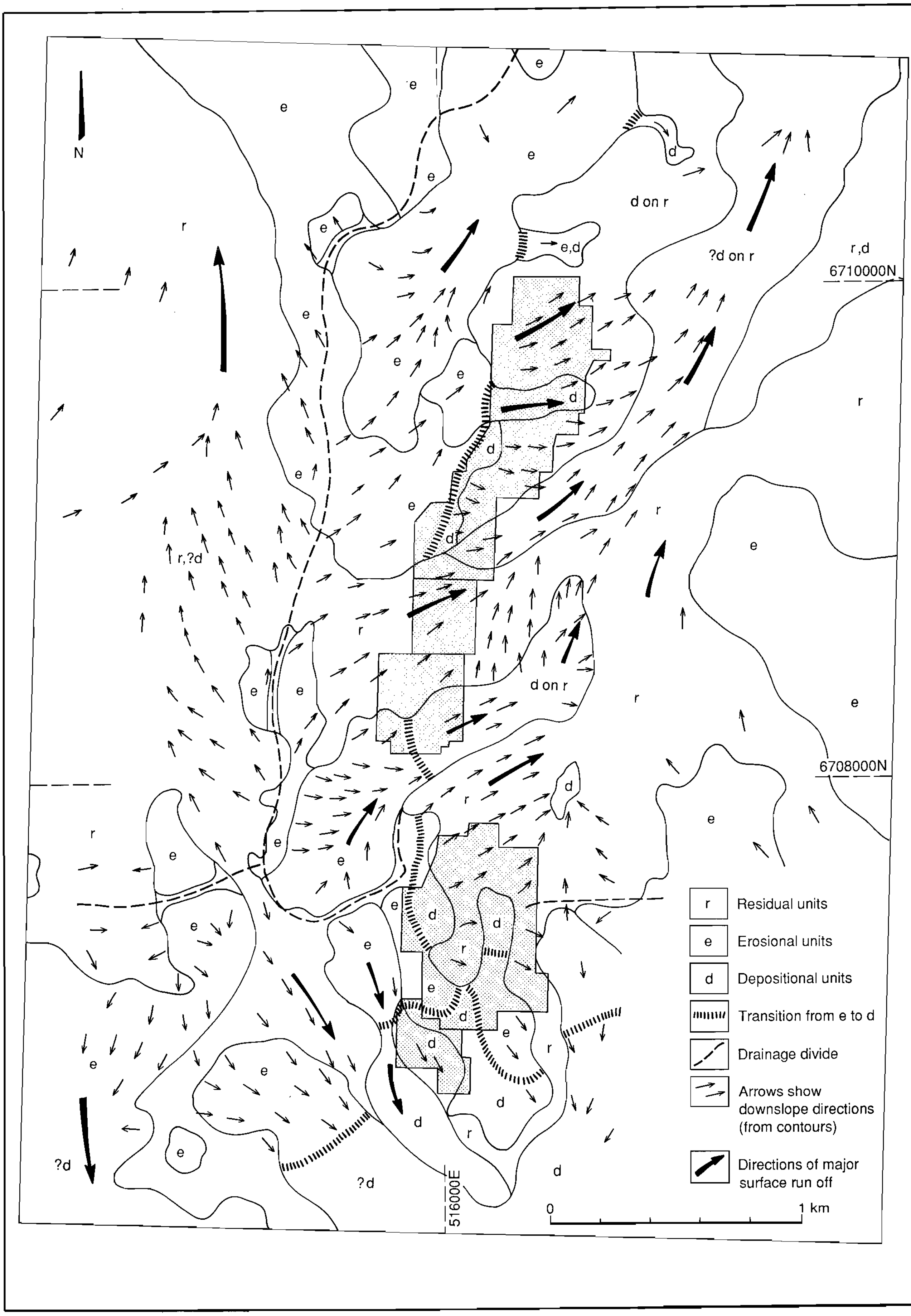


Fig.3. Map of the Mt. Gibson orientation area showing the synthesis of regolith-landform dynamics. The map is offset obliquely to correspond with the Australian Map Grid (AMG) co-ordinates used for the computer generated maps. From Anand *et al.*, March 1989.

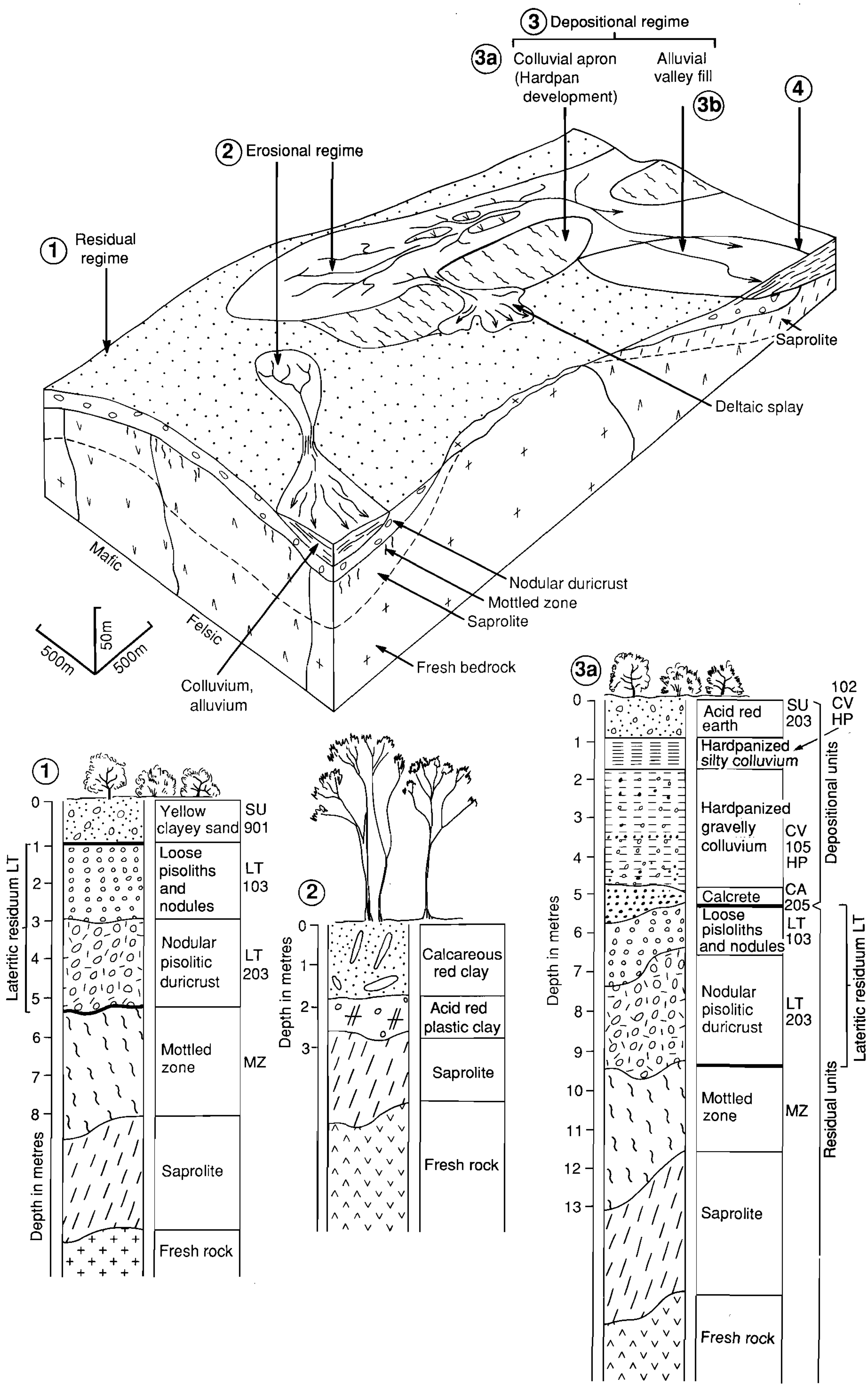


Fig. 4. Generalized regolith-landform facies model based upon the Mt. Gibson orientation area.

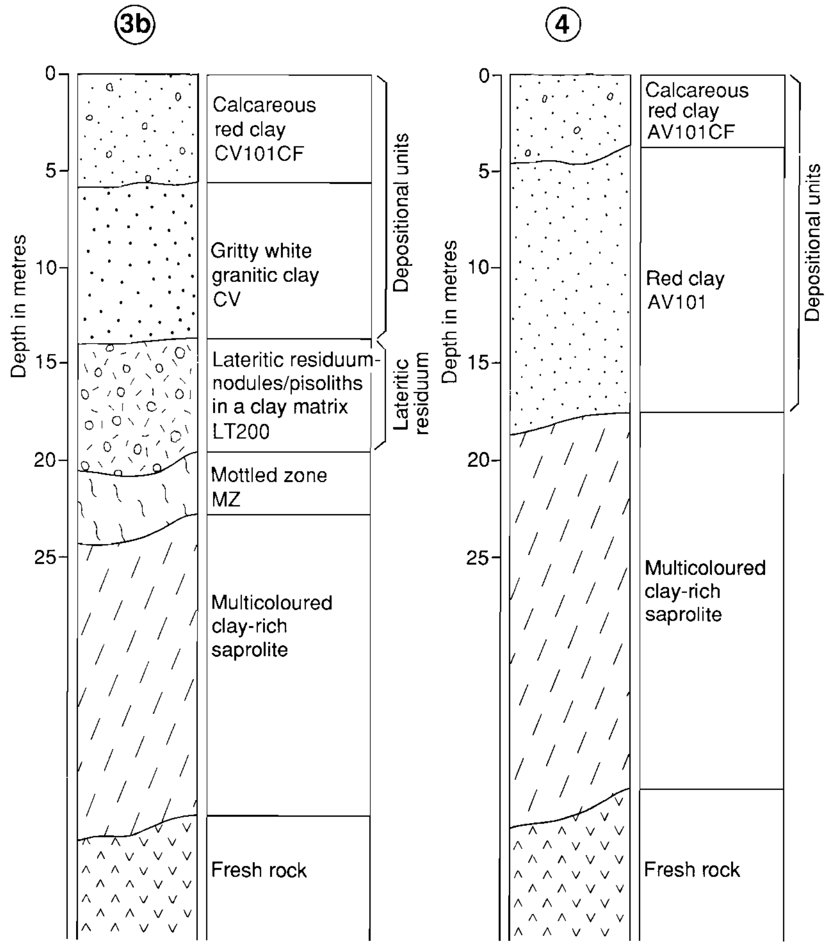


Fig. 4 Contd. Generalized regolith-landform facies model based upon the Mt. Gibson district. After Anand *et al.*, 1991.

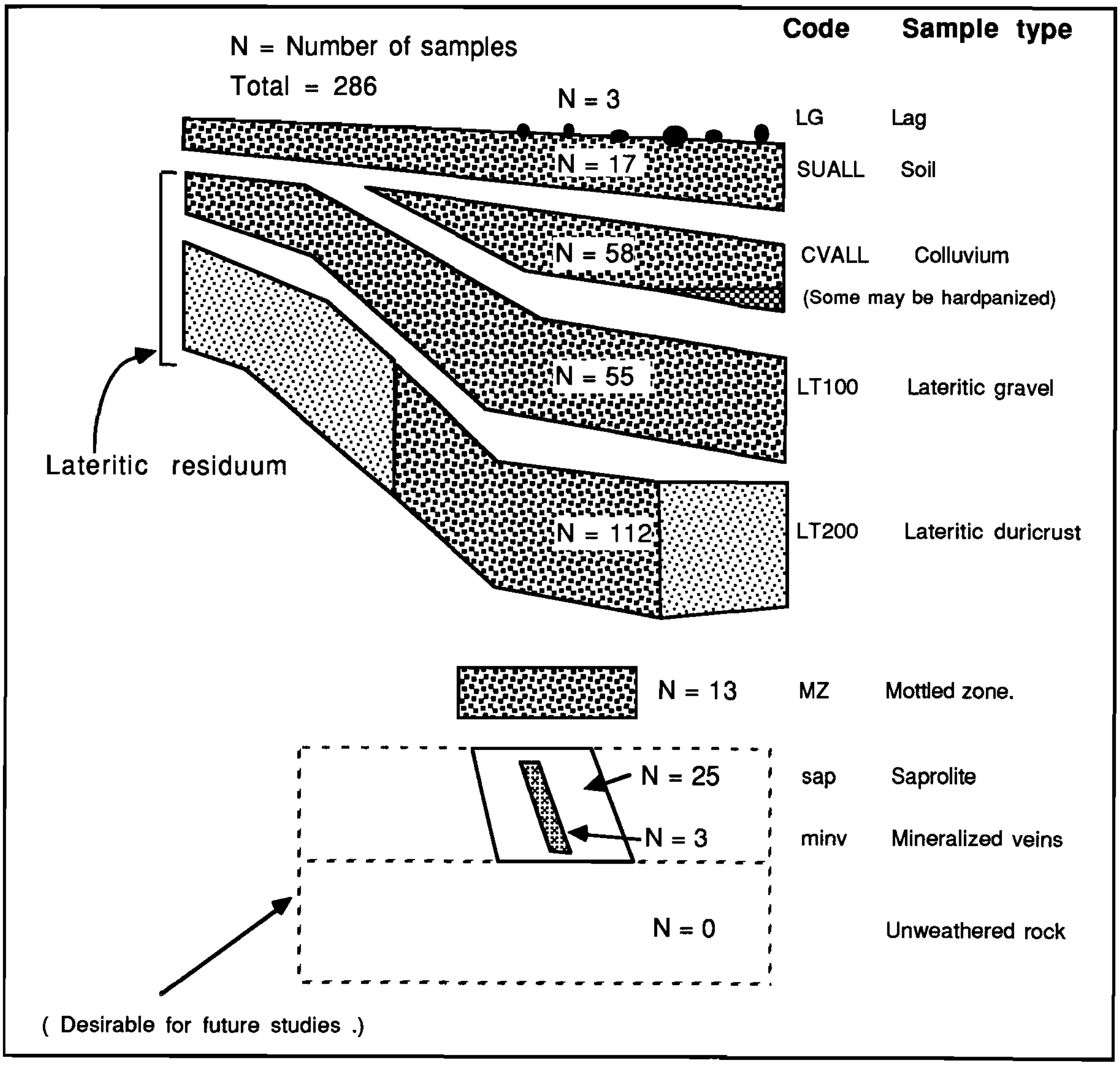


Fig 5a. The Mt.Gibson reference data sets arising from this study in relation to the schematic regolith stratigraphy for the S, C, and N pits.(Calcrete and iron segregation samples have been ommitted)

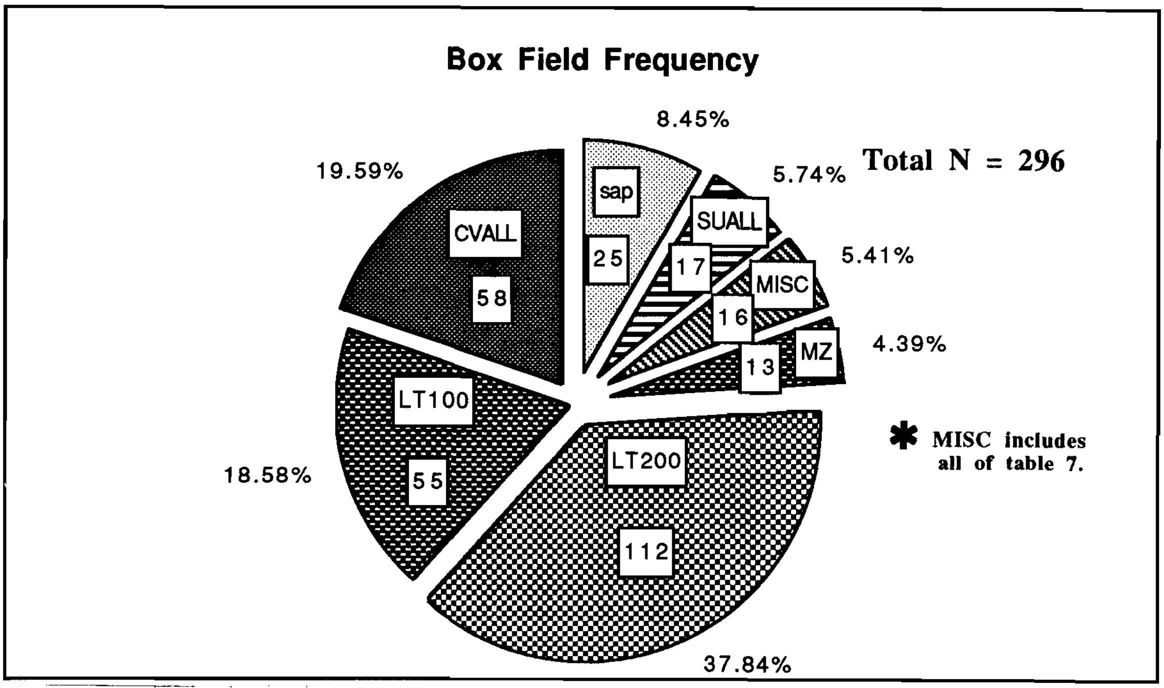


Fig.5b Pie diagram showing the broad groupings of sample types (box fields) which form the data sets of this report. The numbers of samples in each grouping are also shown.

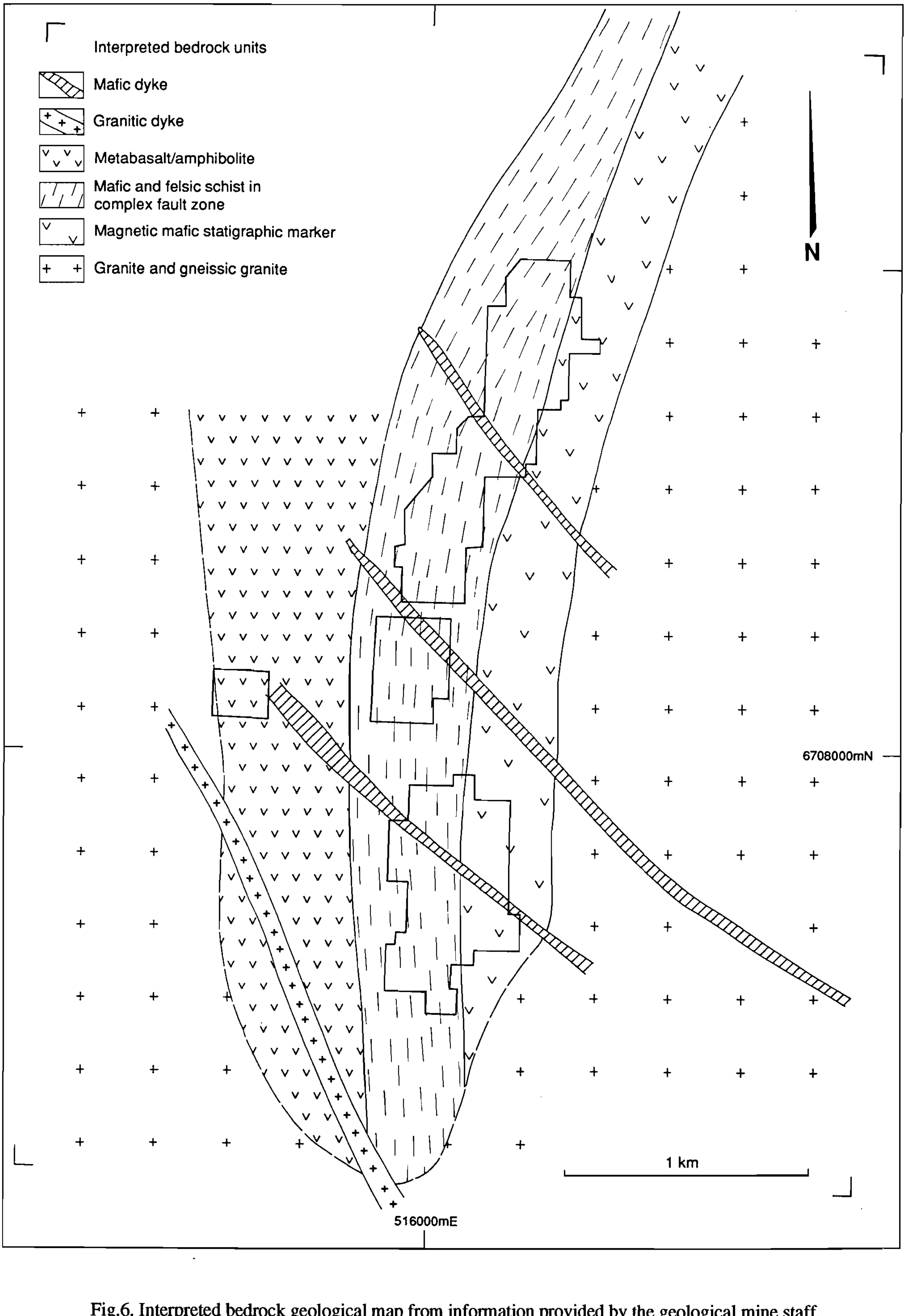


Fig.6. Interpreted bedrock geological map from information provided by the geological mine staff, Mt. Gibson Gold Project. Corner marks allow registration of maps , from Anand *et al*, March 1989.

TABLE 1. Categories of soil samples analysed showing the number of samples in each category.

Sample type	Number	Description
SU202	11	Undifferentiated orange earthy sesquioxide rich soil .
SU901	5	Undifferentiated yellow clayey sand.
SU500	1	Undifferentiated cracking clay.
TOTAL SUALL	17	

TABLE 2. Categories of colluvium samples analysed showing the number of samples in each category.

Sample type	Number	Description
CV102HP	2	Hardpanized colluvial silty clay.
CV104	1	Colluvial gravelly clay.
CV105CFHP	9	Calcified hardpanized colluvial gravelly silty clay.
CV105HP	2	Colluvial gravelly silty clay.
CV106	14	Colluvial gravelly sandy clay.
CV305	2	Colluvial polymictic gravel.
CV305HP	1	Hardpanized colluvial polymictic gravel.
CV333	27	Colluvial pisolitic/nodular lateritic gravel.
TOTAL CVALL	58	

TABLE 3. Categories of lateritic gravel samples analysed showing the number of samples in each category.

Sample type	Number	Description
LT102	12	Loose pisoliths.
LT103	23	Loose pisoliths and nodules.
LT104	20	Loose nodules.
TOTAL LT100	55	

TABLE 4. Categories of lateritic duricrust samples showing the number of samples in each category.

Sample type	Number	Description
LT202	4	Pisolitic duricrust.
LT202HP	3	Hardpanized pisolitic duricrust.
LT203	35	Pisolitic-nodular duricrust.
LT203CF	1	Calcified pisolitic-nodular duricrust.
LT203HP	1	Hardpanized pisolitic-nodular duricrust.
LT204	38	Nodular duricrust.
LT204CF	1	Calcified nodular duricrust.
LT204HP	13	Hardpanized nodular duricrust.
LT212	2	Packed pisolitic duricrust.
LT214	2	Packed nodular duricrust.
LT231	1	Vermiform duricrust.
LT241	11	Mottled duricrust.
TOTAL LT200	112	

TABLE 5. Mottled zone categories.

Sample type	Number	Description
MZ	11	Mottled zone.
MZCF	2	Calcified mottled zone.
TOTAL MZ	13	

TABLE 6. Multicoloured clay-rich saprolite.

sap	25	Saprolite .

TABLE 7. Some miscellaneous materials analysed.

Sample type	Number	Description
CA	3	Calcrete.
CA204	3	Nodular calcrete.
IS101	4	Vesicular goethite pod.
LG102	1	Oolitic lateritic lag.
LG105	1	Hardened mottled lateritic lag.
LG201	1	Ferruginous granular lag.
minv	3	Mineralized veins.
TOTAL MISC	16	

4.0 LOCATION AND DESCRIPTION OF SAMPLES

4.1 General

Because of the nature of the research project, sampling focussed upon lateritic residuum — at surface, nearsurface, or where it was buried beneath Cainozoic sediments. Other materials, such as mottled zone, saprolite, or oxidized mineralized veins were collected in order to provide knowledge of some of the deeper regolith units. Also included are samples of gravelly soils and gravelly and silty colluvial units, particularly where these contain an abundance of lateritic nodules and pisoliths amongst the detritus.

Geochemical sampling of the regolith stratigraphic units will be discussed in order, downwards, as shown in the conceptual cross section, Figure 5a.

4.2 Lag [LG]

For the purposes at hand, use of specific codes for lateritic residuum (LT series) and colluvium (CV series) are far more useful than using lag (LG series) categories which can be default alternatives. Use of the more specific codes allows direct grouping of surface samples with corresponding samples taken from vertical profiles in pit walls and from drill spoil.

Only three samples, therefore, are specifically listed as lag. Two are samples of lateritic lag, the third is a sample of lag of ferruginous granules from a soil area on saprolite within an erosional regime.

Categorizing of the granule and/or pebble components of surface samples as lag is an option for the Mt. Gibson type of terrain. However, as can be appreciated from the regolith-landform mapping and the regolith stratigraphy, it is critical in sampling design, execution, and data interpretation to distinguish lag collected from residual (i.e. lateritic) regimes from lag collected from erosional regimes.

4.3 Soils [SUALL]

Seventeen samples of soils were collected from the mining pits, their distribution being shown in Figure 7. These soils, forming the upper part of the regolith, are generally very friable and range in texture from clayey sand to sandy clay loam. The soils show very little or no profile development (i.e. A and B horizons are lacking) and hence these soils are included under the broad category of soils undifferentiated (SU). The soils contain varying amounts of clasts which are derived from the erosion of lateritic residuum in upland areas.

Almost 80% of the samples are of gravelly orange earths. The remaining samples are yellow clayey sands. As already mentioned, if the gravelly red earths listed in the colluvium as CV106 are counted as soils, the number of soil samples is 31, Figure 8.

4.4 Colluvium [CVALL]

A total of 58 samples in the colluvium category were collected within the mapped area. They are discontinuously distributed along the geochemical anomaly as shown in Figure 9. Most numerous are samples of colluvial pisolitic/nodular lateritic gravel (CV333, 27 samples), gravelly sandy clay (CV106, 14 samples), six other samples, and gravelly silty clay (CV105, some hardpanized, some calcified, as shown by HP and CF suffixes, 11 samples), Table 2.

Estimates of the distance and direction of transportation for the detritus at each sample site have been made based upon the interpreted regolith-landform dynamics, Figure 3, and consideration of the field setting. Estimates of transportation distances vary from as little as 50 m for some samples to about 600 m for others. The symbols in Figure 9 show the positions of samples as collected.

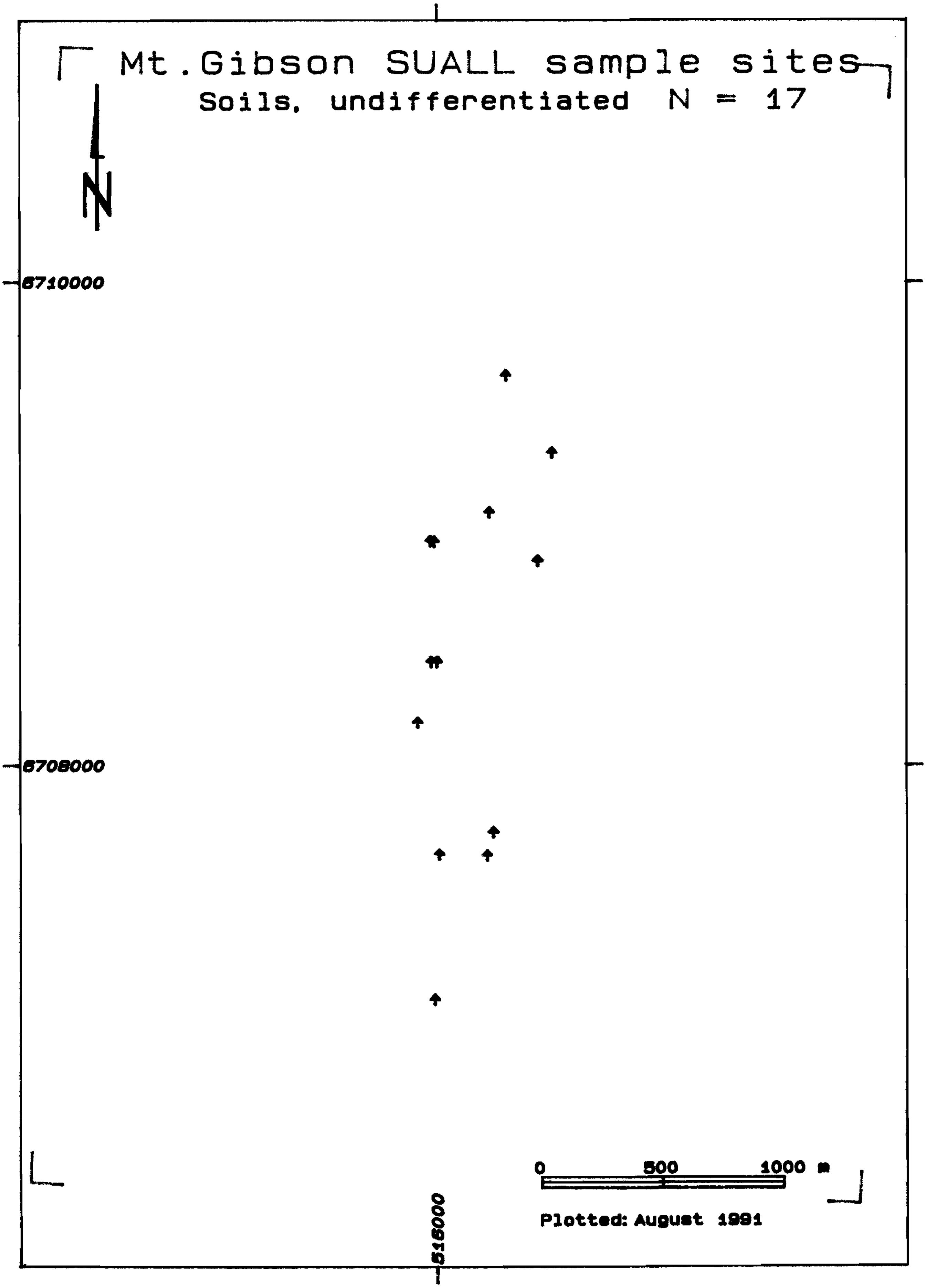


Fig. 7. Map showing the distribution of soil samples.

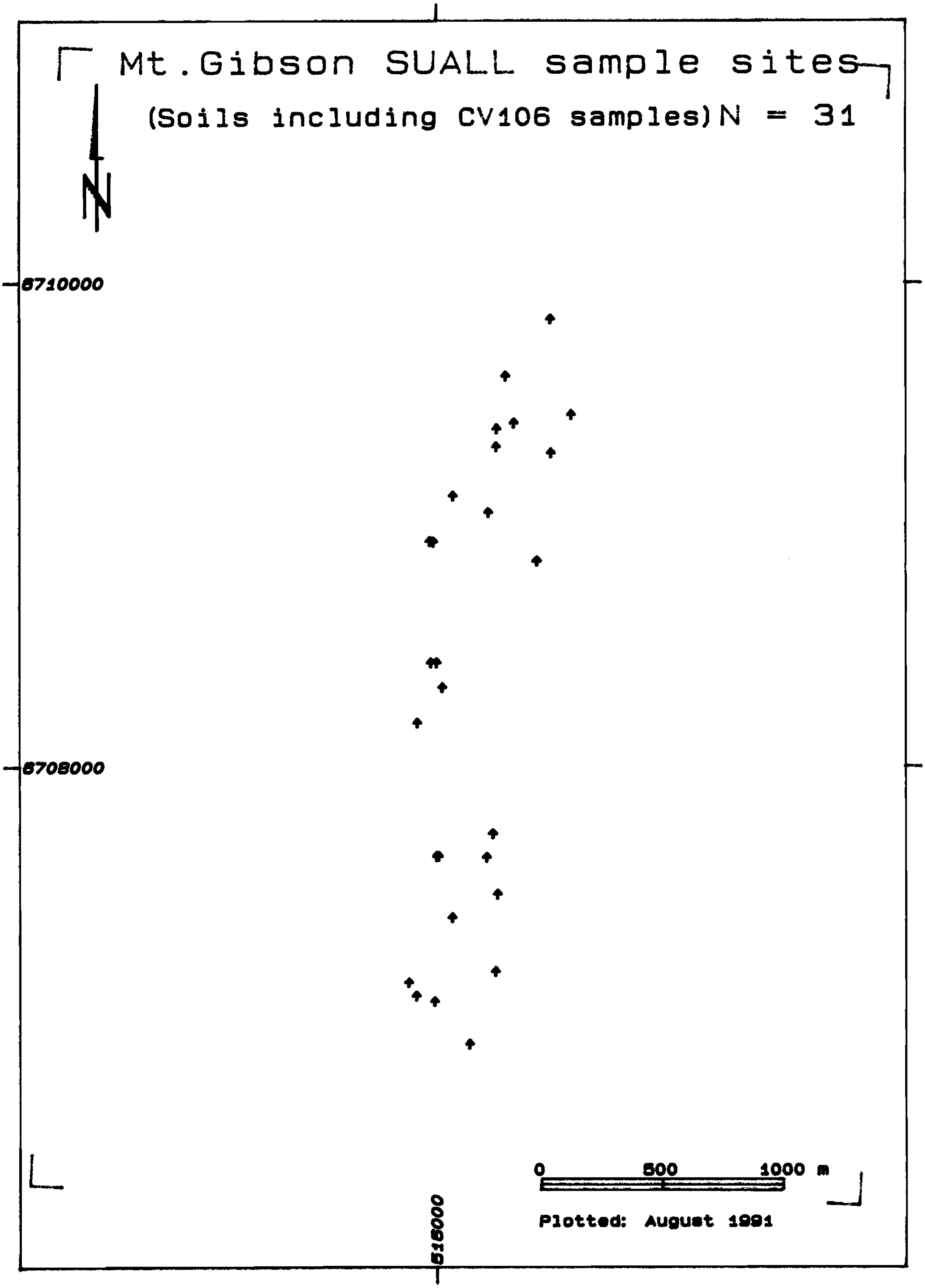


Fig. 8. Map showing the distribution of soil samples when 14 samples of gravelly red earths are included (see text).

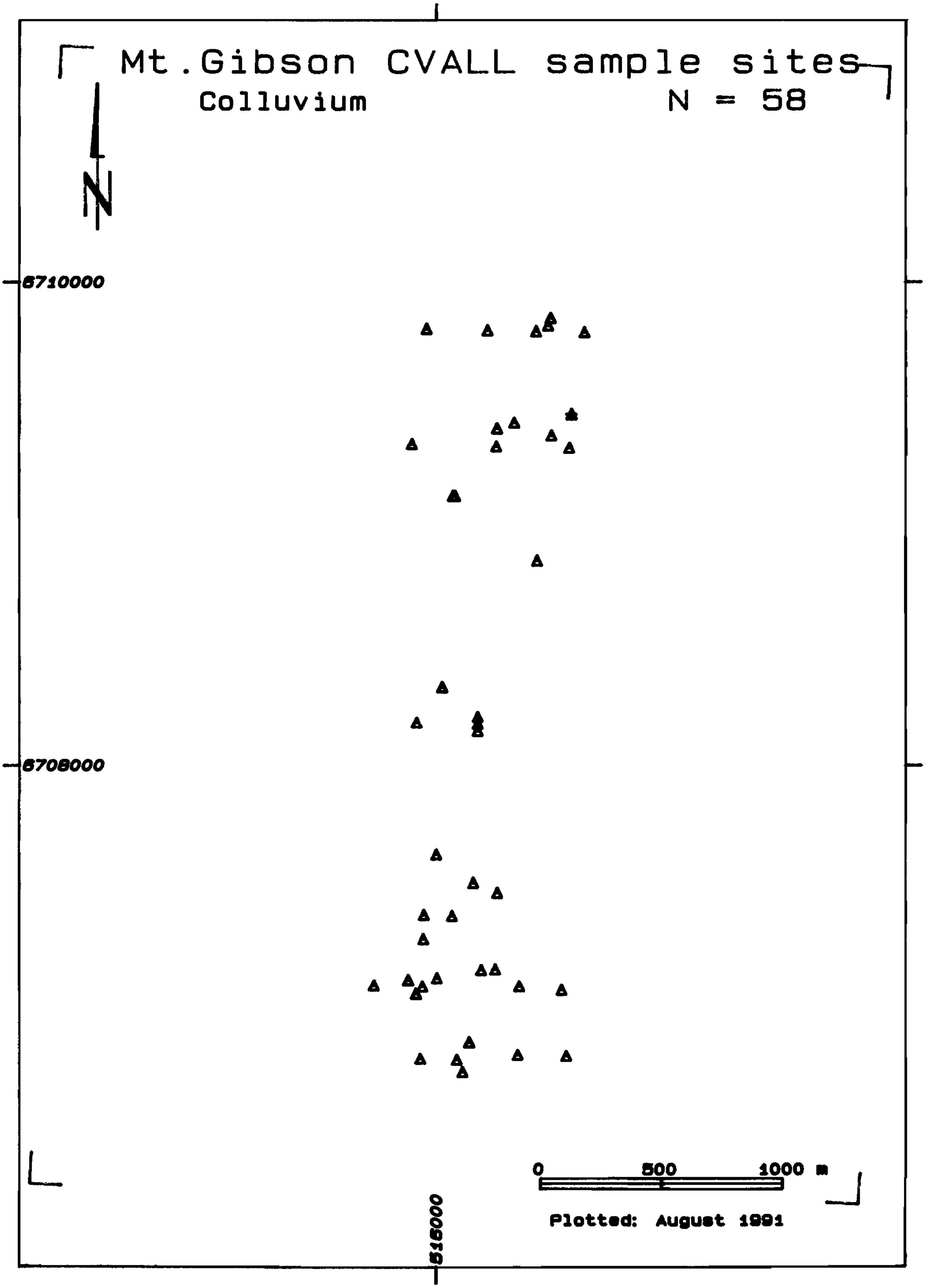


Fig. 9. Map showing the distribution of colluvium samples.

Fourteen of the colluvium samples are hardpanized, some also show noticeable to extensive replacement by calcium carbonate (calcification).

4.5 Lateritic Gravel [LT100]

Fifty-five samples of the loose lateritic gravel layer of the lateritic residuum were collected in the area, distributed along the geochemical anomaly, Figure 10. Some samples are of material from the original ground surface, many were immediately beneath soil, and others were collected from subsurface positions from pit walls and from drill spoil.

The main variation of sample type simply depended on whether lateritic pisoliths (LT102) or lateritic nodules (LT104) dominate, or, whether both pisoliths and nodules are abundant (LT103).

4.6 Lateritic Duricrust [LT200]

One hundred and twelve samples of lateritic duricrust were analysed from the mapped area, Figure 11. The samples were collected from mining pits because the duricrust layer normally is covered completely by the lateritic gravel unit and by soil, sand, or colluvium. The sampling provides coverage of the main part of the anomaly with the exception of two areas where mining pits had not been developed.

Almost half of the samples (52) are of nodular duricrust, about a third of these are hardpanized. Forty samples are pisolitic-nodular duricrust. A list of the various categories of duricrusts sampled and the numbers of each type are given in Table 4.

Of all the duricrust samples, hardpanization has affected 17. Varied degrees of calcification has affected samples, many of which are also hardpanized.

4.7 Mottled Zone [MZ]

From scattered costeans and limited areas of outcrop it can be seen that mottling within the weathering profile is only sporadically developed and has preferentially formed from some of the intermediate and felsic bedrock lithologies rather than from the mafic lithologies. However, the upper levels of saprolite are only sporadically exposed.

At this stage only 13 isolated samples of mottled zone have been collected, Figure 12.

4.8 Saprolite [sap]

Sampling of saprolite was carried out to provide some information on representative bedrock types. Twenty-five samples were collected, Figure 13. Systematic collection to form the basis of a study of dispersion in saprolite was beyond the scope and resources of the project. Such an undertaking would be very desirable as a future study and would compliment research carried out to date. (Use of lower case letters for codes, in this case, sap, indicates informal codes pending further development).

4.9 Mineralized Zones and Other Sample Types

Three samples of quartz-goethite-hematite veins were analysed early in the study to provide some multi-element information on likely source materials for the laterite geochemical dispersion anomaly. That information has been supplemented by analysis subsequently published or provided by the Mt. Gibson exploration or development departments.

Various other materials analysed are listed in Table 7, and their distribution is shown in Figure 14.

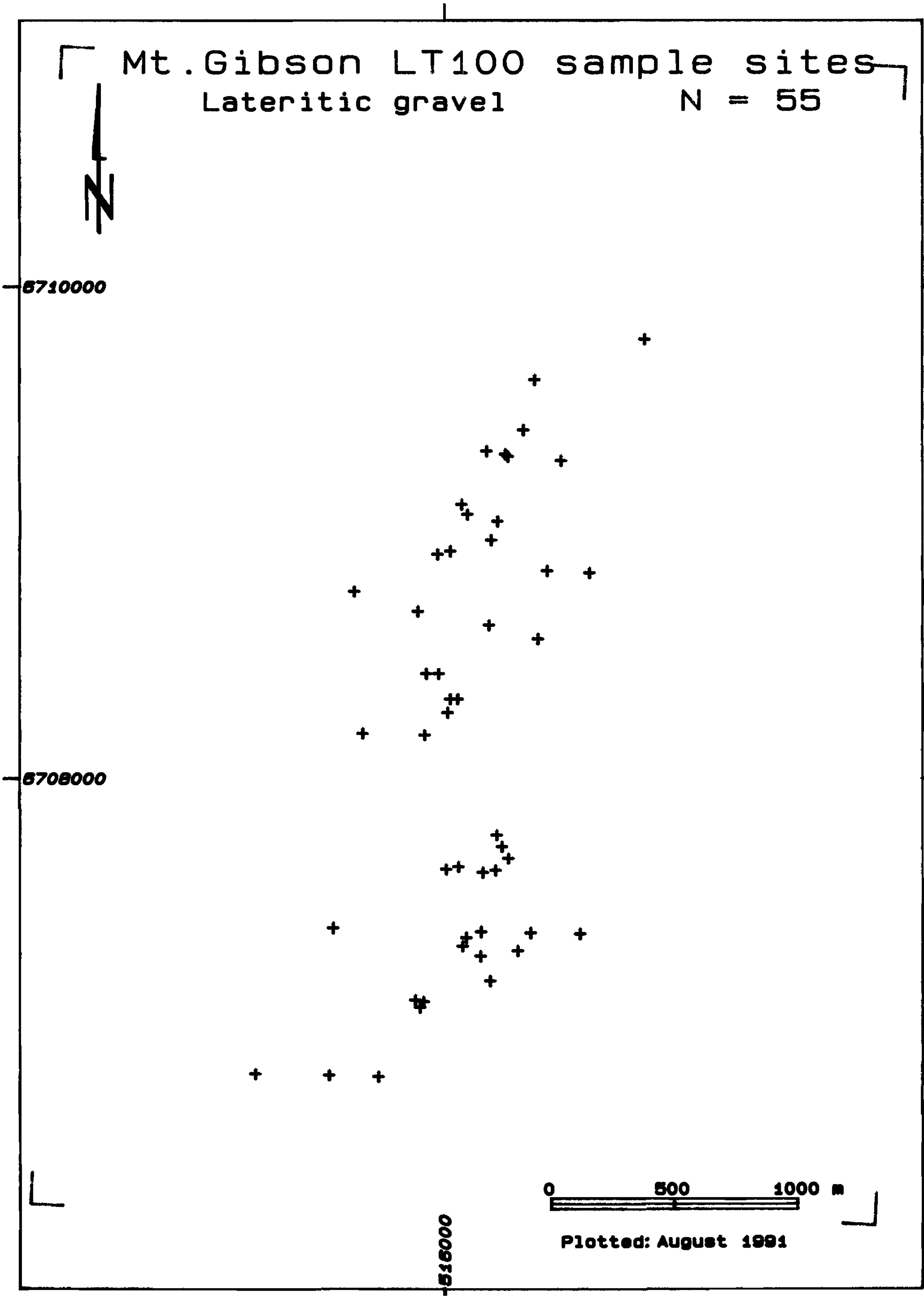


Fig. 10. Map showing the distribution of samples from the laterite gravel unit of the lateritic residuum.

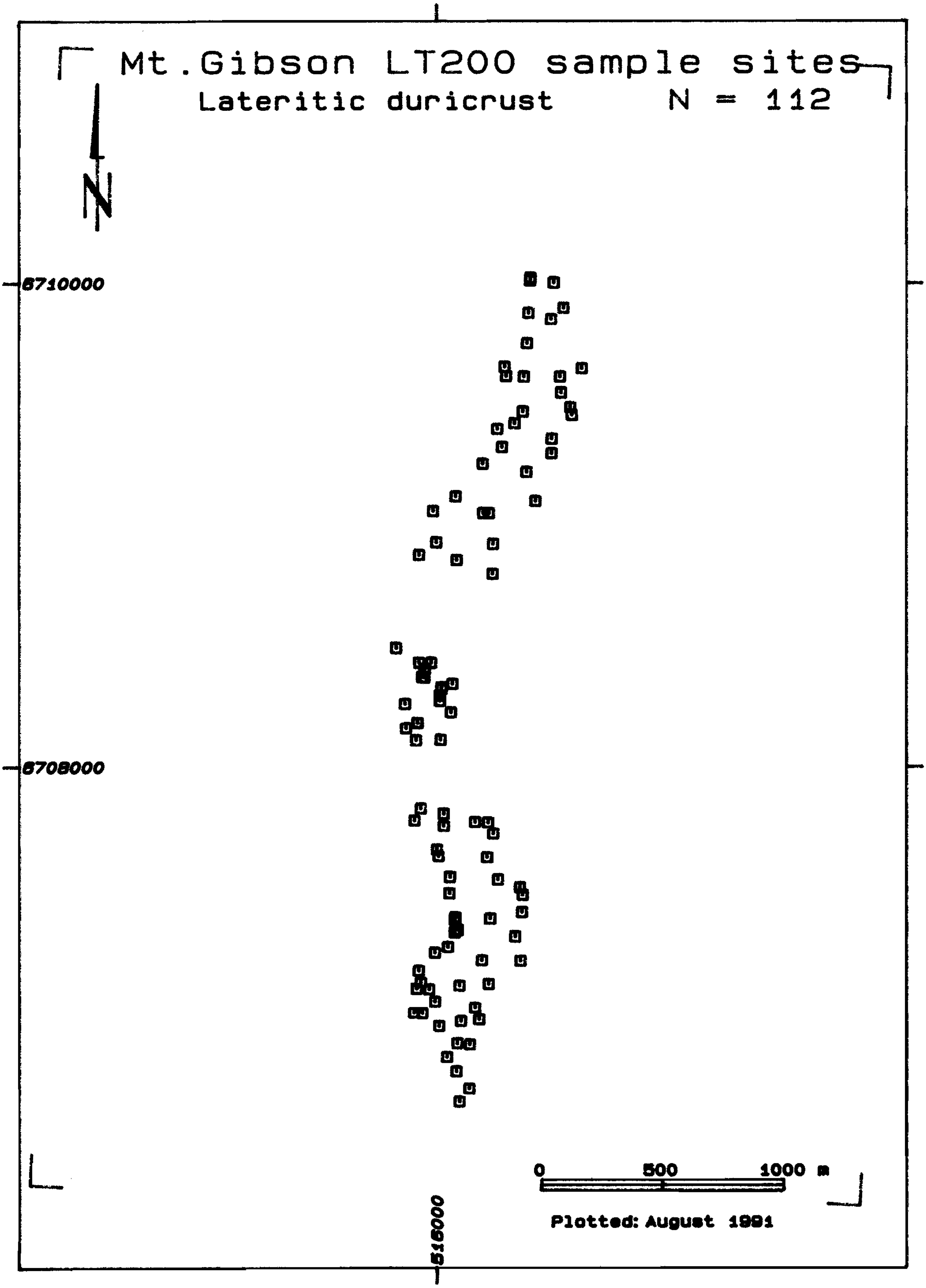


Fig. 11. Map showing the distribution of lateritic duricrust samples.

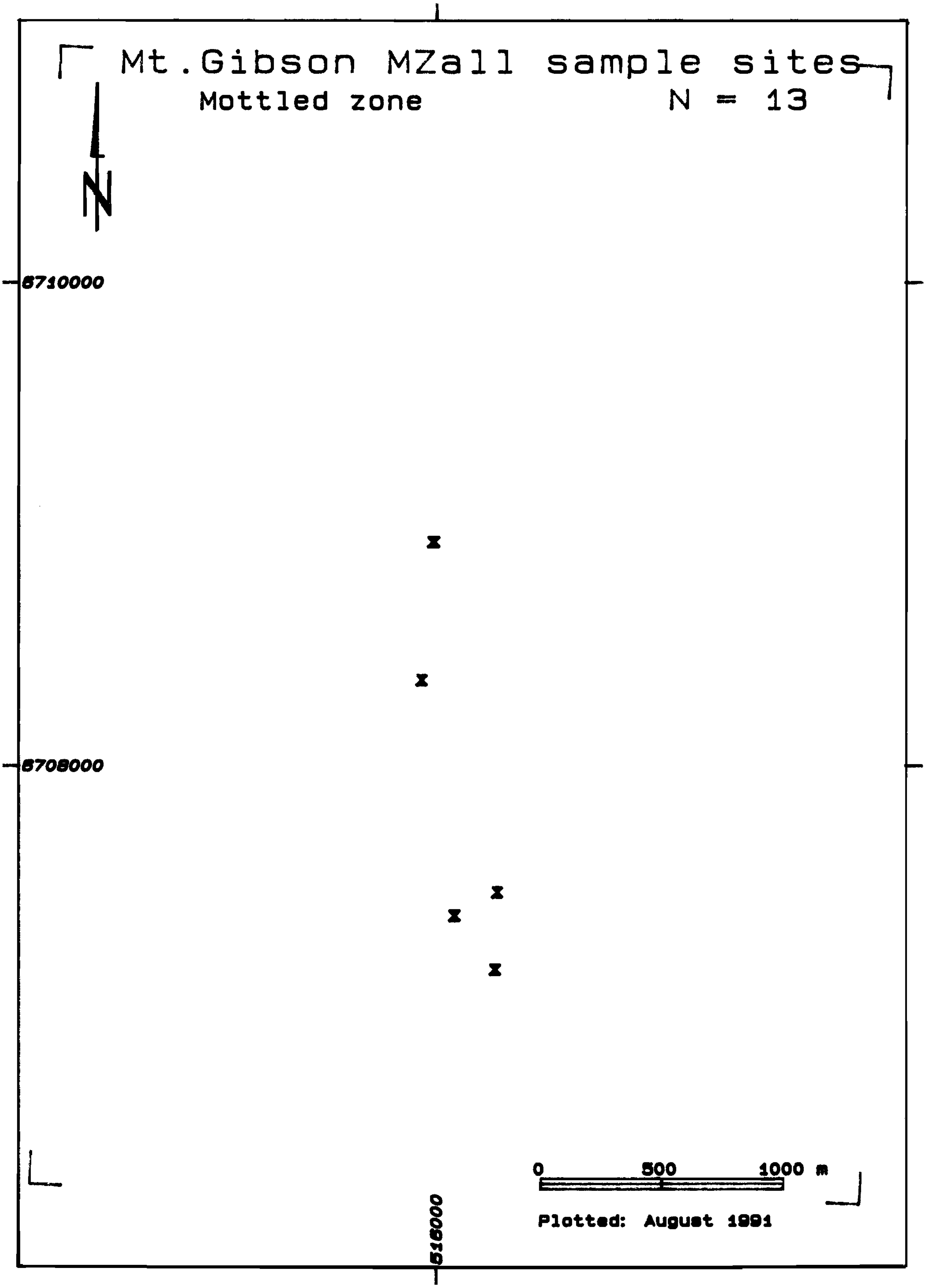


Fig. 12. Map showing the distribution of mottled zone samples.

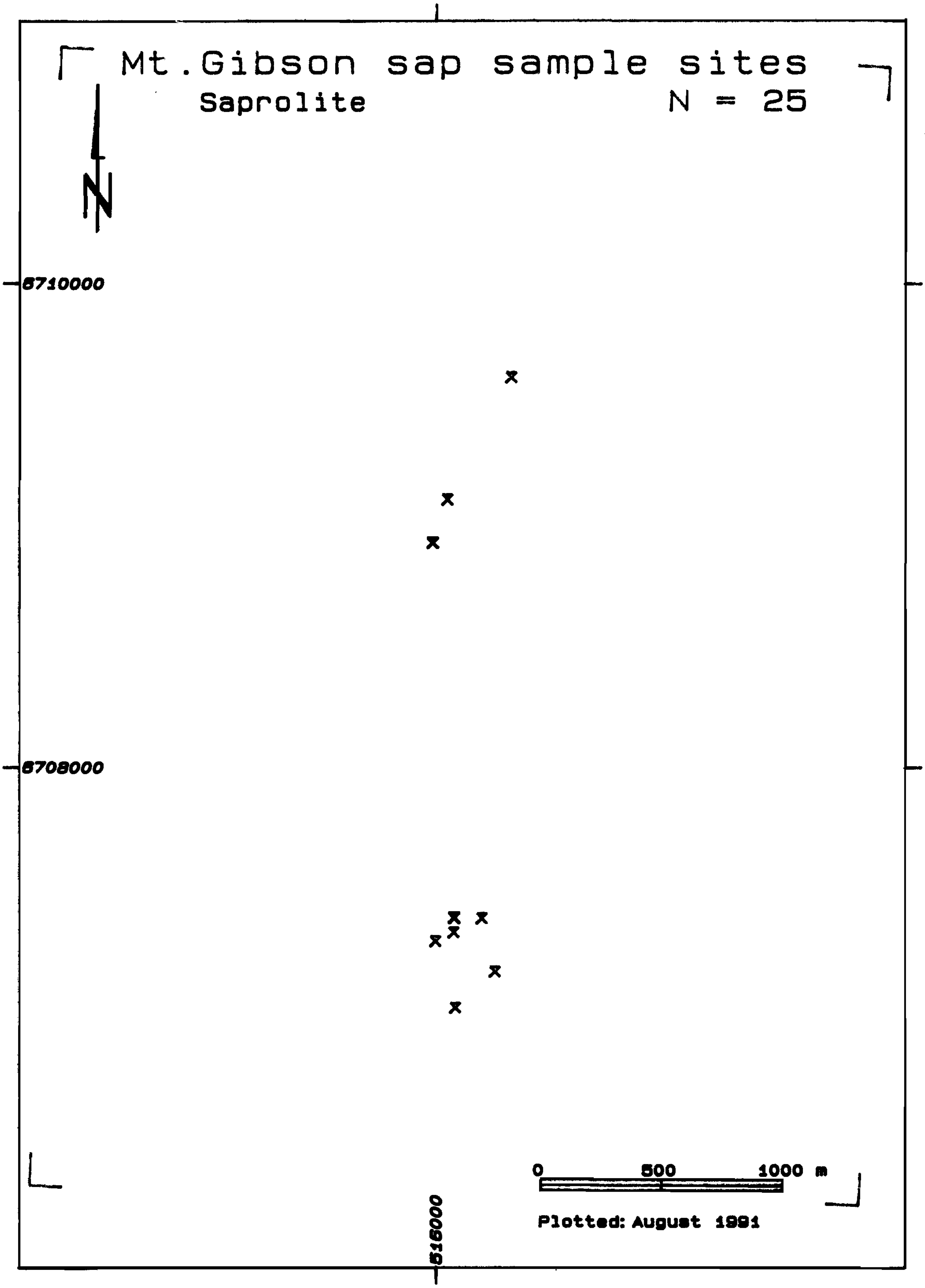


Fig. 13. Map showing the distribution of saprolite samples.

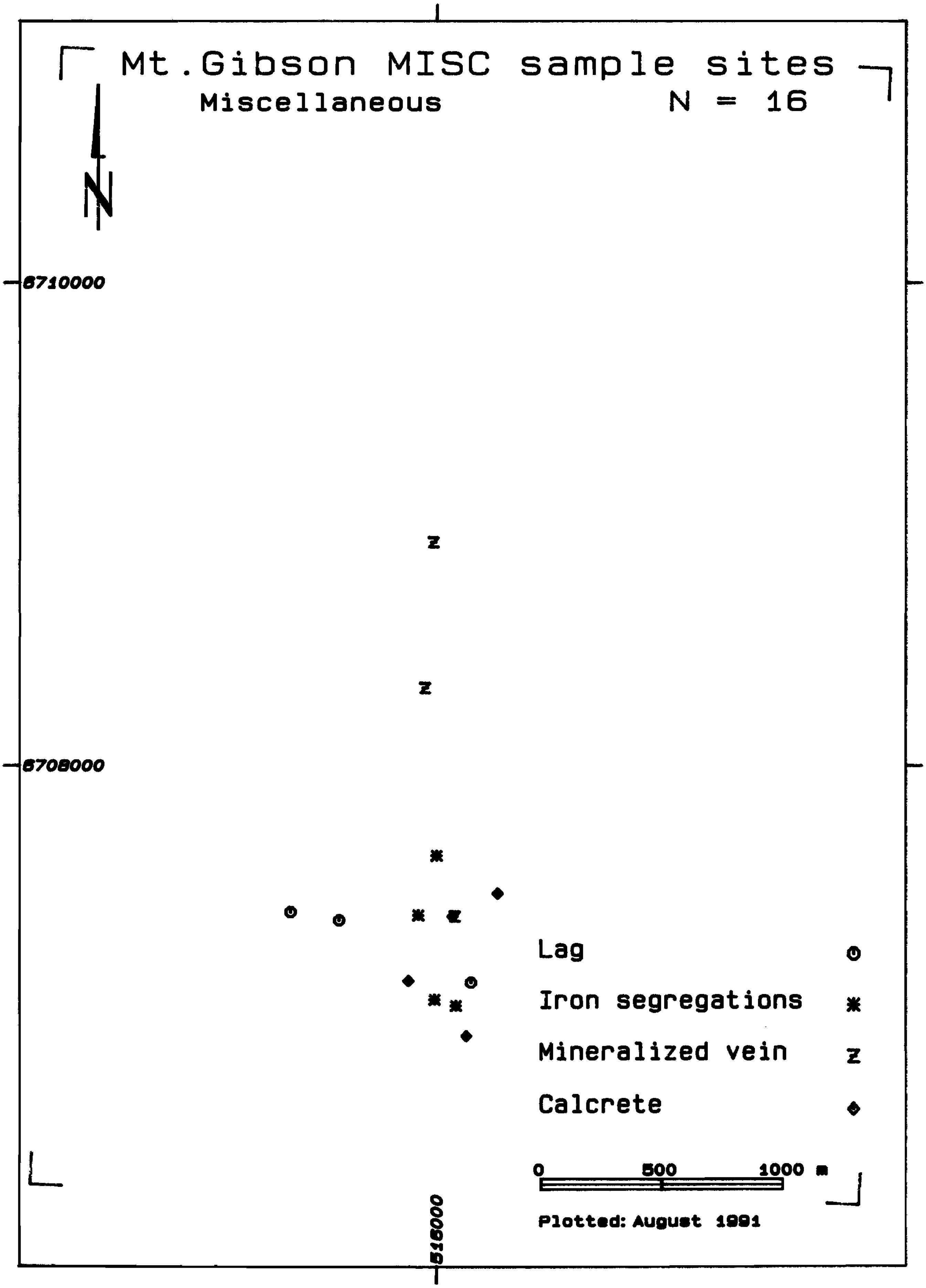


Fig. 14. Map showing the distribution of various other sample types.

5.0 SAMPLE PREPARATION AND CHEMICAL ANALYSIS

5.1 Sample Preparation

Samples were crushed and ground using non-metallic methods described by Smith *et al.* (1987) and Anand *et al.* (March 1989). Oversize material from the bulk sample was reduced to minus 8 mm by crushing between zirconia plates in an automated hydraulic press with the undersize then being processed through an epoxy-resin lined disc grinder with alumina plates and reduced to minus 1 mm. Final grinding was done in an agate mill. Cleaning of the equipment was performed by a combination of air- and sand-blasting, and by the passage of quartz blanks.

5.2 Chemical Analytical Methods

A combination of analytical methods was used. Table 8 shows the elements analysed, the methods, and the lower limits of detection. These include major and minor elements by inductively coupled plasma optical emission (Si, Al, Fe, Ti, Cr, V after alkali fusion, with the others after $HCl/HClO_4/HF$ digestion), some minor and trace elements by atomic absorption spectrophotometry (AAS) after $HCl/HClO_4/HF$ digestion. Many trace elements were determined by X-ray fluorescence (XRF) on pressed powder discs, some using extended counting times to lower detection limits. Gold was determined on a 30-g pulp using aqua regia digestion and graphite furnace AAS. The samples were analysed for in excess of 30 elements, some being verified by additional methods.

5.3 Data Preparation

Generation of a tidy, reliable geochemical database takes considerable, tedious effort. However, unless this stage be carried out correctly, all subsequent data treatment and interpretation run the risk of numerous errors and erroneous conclusions, perhaps wasting months of people's time and effort, particularly if follow-up investigations are carried out. It is obviously pointless to apply sophisticated multivariate interpretation unless the database is in order and is known to be reliable.

Each sample was assigned an alpha-numeric code, for sample type, as mentioned above. The code provides resolution of sample type at the working level in the field. The scheme is hierarchical, allowing broader terms to be selected as desired. For convenience, "box fields" are also included in the database. Map reference codes were added for the 1:250,000 map sheet. Australian Map Grid (AMG) eastings and northings are used, having been calculated from the exploration and mining grids.

Compatibility of analytical methods usually becomes an issue with an on-going project because of inevitable changes and improvements in analytical parameters or methods as time progresses. For these reasons, several blocks of data within the Mt. Gibson database arise from re-analysis of archive pulps to ensure compatibility of analytical methods.

In the source database (as distinct from the tidy database accompanying this report) some elements have analyses by two or more methods, because of overlap in element suites by different methods. Only data by the preferred analytical methods are presented here. However, the additional sets of data have been used in cross checking. Three or more control samples were included in each analytical batch and, in addition, selected samples from each batch were re-analysed in subsequent batches.

For all samples loss on ignition (LOI) was determined and this allowed summation of major oxides to provide additional quality control. The intent was to have data for most samples lying between 95 and 103 wt %.

For each sample an uncrushed reference is archived, so too are the pulps and coarsely crushed residues to enable analysis of additional elements and analysis by more sensitive methods in the future.

Table 8 **Analytical Methods and lower limits of detection.**

Element	Reported as	Method	Detection Limit
SiO2	%	icp	0.1
Al2O3	%	icp	0.1
Fe2O3	%	icp	0.1
MgO	%	icp	0.003
CaO	%	icp	0.007
Na2O	%	icp	0.007
K2O	%	icp	0.06
TiO2	%	icp	0.003
LOI	%		0.01
Mn	ppm	icp	15
Cr	ppm	icp	20
V	ppm	icp	5
Cu	ppm	aas	2
Pb	ppm	xrf	2
Zn	ppm	aas	2
Ni	ppm	aas	4
Co	ppm	aas	4
As	ppm	xrf	2
Sb	ppm	xrf	2
Bi	ppm	xrf	2
Mo	ppm	xrf	1
Ag	ppm	aas	0.1
Sn	ppm	xrf	2
Ge	ppm	xrf	2
Ga	ppm	xrf	4
W	ppm	xrf	4
Ba	ppm	icp	5
Zr	ppm	icp	5
Nb	ppm	xrf	2
Se	ppm	xrf	2
Be	ppm	icp	1
Au	ppm	gf-aas	0.001

icp = inductively coupled plasma optical spectrometry, Si Al, Fe,Ti, Cr, V after an alkali fusion ,others after HCL/HCLO4/HF digestion.

xrf = X-ray flourescence.

aas = Atomic absorption spectrophotometry, after HCL/HCLO4/HF digestion.

gf-aas = Graphite furnace atomic absorption spectrophotometry after aqua regia digestion.

6.0 DATA PRESENTATION

6.1 General

For a study area, whether it be an orientation area as in this report or an exploration tenement area, the geochemical data, after being put in order as described above, need to be taken systematically through a series of standard, routine steps. For convenience, the initial standard steps are referred to as the *data presentation* stage. Included are rudimentary items such as listings of the data, tables showing the summary statistics (mean, minimum, maximum, percentiles, etc.) for each group of data, box plots showing the range of values for each element, histograms for each element in a sample group, and so on. This stage presents the fundamental information, in readily accessible form, upon which the next stage of *data interpretation* draws and progresses onwards with increasing degrees of complexity. Summary presentations of this sort are particularly valuable in exploration because they allow comparison of data from one area to another.

Table 9 shows the steps which currently form the basis of the data presentation and initial data interpretation stages. These steps are also shown diagrammatically in the index to this report which uses icons. The steps are designed to allow appreciation of the geochemical characteristics of the data sets and to allow ready comparisons with data sets arising from other orientation and background areas. We now proceed through the salient steps.

6.2 Listings of Chemical Analyses

The database for chemical analyses together with locational and descriptive information for all samples arranged in overall numerical order is contained on the accompanying floppy disk. That database forms a fundamental record for the project. Data sorted by sample type are also available on the floppy disk.

As a basis for interpretation, listings of the geochemical data sorted on compatible sample types are more useful than an overall numerical listing. Sorting of samples into compatible groups for data presentation has been done on the basis of the conceptual diagram of regolith stratigraphy, Figure 5a. So as to keep this report a manageable size only listings for the sorted data are presented, Appendix 1.

6.3 Summary Statistics

Summary statistics for the sample groups are given in Tables 10 to 17.

Inspection of Table 10 (and also Table 11), using the 25th, 50th and 75th percentiles, shows that this collection of soil samples (SUALL, N=17) has anomalously high levels of Pb, As, and very anomalously high levels of Au.

The colluvium samples (Table 12) have a high proportion of lateritic nodules and pisoliths having formed by dismantling of lateritic duricrust and include detritus derived by erosion of saprolite. Their statistics show levels anomalous in Cu, Pb, As, Sb, Bi, Ag, W, and Au. It will be seen that the Mn level at the 75th percentile is approximately 100 ppm greater than the 75th percentile levels for the lateritic residuum groups, LT100 and LT200. These higher Mn levels follow the observation of black Mn oxide staining in exposures of colluvium which commonly has been effected by hardpanization.

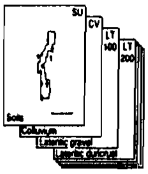
The separation of magnetic and non-magnetic clasts from the selected samples of soils and colluvium suggested that most of the Au, As, Pb, Cu, Ag, W, Zn and Bi are associated with Fe-oxide-rich clasts. Matrices analysed from the samples, comprising quartz and kaolinite, are relatively low in these elements (see Report 165R, Anand *et al.*, 1991).

Statistics for the upper unit of lateritic residuum, the lateritic gravel (LT100), are given in Table 13. These samples are also anomalous in Cu, Pb, As, Sb, Bi, Ag, W, and Au.

Table 9 Methods of Data Presentation.

The data were presented in the following forms, after establishing the regolith relationships.

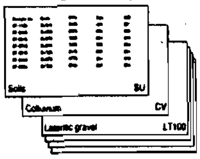
Sample sites



STEP

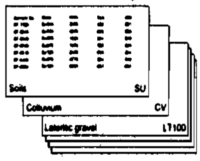
1 Plots of sample sites at A4 size for each sample type, Section 4.

Listings of analyses



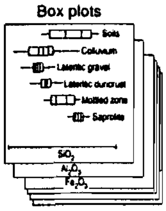
2 Listings of analyses grouped into sample type, Appendix1.

Tables of summary statistics



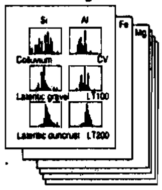
3 Tables of summary statistics for each sample type, Section 6.3.

Box plots



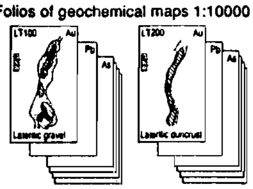
4 Box plots showing the ranges for each oxide or element in all sample types, Section 6.4.

Histograms



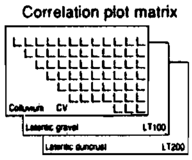
5 Stacked histograms for each oxide or element for the colluvium, lateritic gravel, and lateritic duricrust, Section 6.5.

Folios of geochemical maps 1:10000

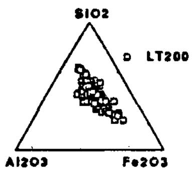


6 Folios of geochemical maps at 1:10,000 scale consisting of maps for individual elements with a separate stack for colluvium, lateritic gravel,and lateritic duricrust(These were too bulky to include with the report . They are available for reference at CSIRO or can be plotted using the data on the enclosed floppy disk).

Correlation plot matrix

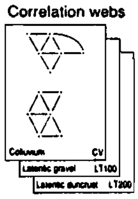


7 Correlation plot matrices (up to 31 X 31 elements, A1 size) for the colluvium, lateritic gravel, and lateritic duricrust, also too voluminous toinclude in the report are available or can be generated from the floppy disk).



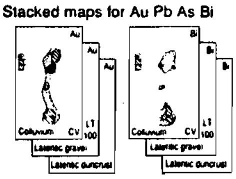
8 Ternary diagrams of SiO2, Al2O3,and Fe2O3 for the three main sample groups.

Correlation webs



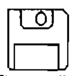
9 Correlation webs for the three main sample groups, emphasizing the relative importance of interelement relationships , Section 6.6.

Stacked maps for Au Pb As Bi



10 Stacked maps for Au, Pb, As, Sb, and Bi for the three main sample groups. Section 7.

Mt Gibson reference geochemical data sets



Floppy disk in pocket

11 Floppy disk of all the Mt.Gibson reference geochemical data sets in standard format, in the pocket at the rear of the report.

Table 10 **Summary statistics on Mt.Gibson data sets: Soil samples SU**

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO2	%	icp	0.1	17	36.845	47.65	75.933	81.986	82.621	84.259	84.804	30.74	85.35	55.554	20.549
Al2O3	%	icp	0.1	17	8.735	13.72	14.998	20.114	24.466	26.22	26.805	6.88	27.39	13.835	5.763
Fe2O3	%	icp	0.1	17	4.868	24.265	37.575	40.381	42.459	43.408	43.724	3.19	44.04	23.121	15.863
MgO	%	icp	0.003	17	0.062	0.069	0.082	0.091	0.105	0.11	0.111	0.04	0.113	0.072	0.019
CaO	%	icp	0.007	17	0.039	0.054	0.075	0.11	0.121	0.126	0.127	0.024	0.129	0.063	0.031
Na2O	%	icp	0.007	17	0.027	0.035	0.068	0.078	0.09	0.122	0.132	0.018	0.143	0.05	0.032
K2O	%	icp	0.06	17	0.16	0.198	0.233	0.291	0.304	0.316	0.319	0.02	0.323	0.195	0.079
TiO2	%	icp	0.003	17	0.599	1.074	1.343	1.542	1.572	1.581	1.583	0.394	1.586	1.056	0.425
LOI	%	615	0.01	17	4.94	6.865	8.41	10.8	11.785	12.754	13.077	3.91	13.4	7.245	2.684
Total	%		0.1	17	100.413	100.875	101.132	102.651	104.671	105.187	105.358	98.63	105.53	101.183	1.607
Mn	ppm	icp	15	17	74.25	125.5	159.5	180.4	188.25	195.9	198.45	51	201	123.941	48.154
Cr	ppm	icp	20	17	157.25	437	709.75	862.2	978.3	1101.72	1142.86	69	1184	482.824	334.65
V	ppm	icp	5	17	179.75	652	944	1032.7	1049.65	1085.86	1097.93	63	1110	582.882	394.702
Cu	ppm	aas	2	17	15	26	37.25	45.2	51.3	62.52	66.26	9	70	29.529	15.977
Pb	ppm	xrf	2	17	7	35.5	53	87.5	99.2	103.28	104.64	0.667	106	38.98	33.003
Zn	ppm	aas	2	17	6.75	14.5	18	21.8	26.3	27.32	27.66	0.667	28	13.784	7.849
Ni	ppm	aas	4	17	27	38	45	61.6	71.5	76.6	78.3	15	80	40.588	17.136
Co	ppm	aas	4	17	4	6	8	13.8	18	18	18	1.333	18	7.275	4.905
As	ppm	xrf	2	17	2.75	10.5	28	41.4	47.9	50.96	51.98	0.667	53	18.235	16.775
Sb	ppm	xrf	2	17	0.75	2.5	5.25	6.6	8.3	9.32	9.66	0.667	10	3.275	2.899
Bi	ppm	xrf	2	17	0.667	2	4.75	5.6	7.75	10.3	11.15	0.667	12	3.235	3.018
Mo	ppm	xrf	1	17	2.25	3	4	5.3	6.15	6.66	6.83	0.667	7	3.431	1.691
Ag	ppm	aas	0.1	17	0.033	0.033	0.725	1.22	1.56	1.764	1.832	0.033	1.9	0.429	0.589
Sn	ppm	xrf	2	17	1	3	3	5	5	5	5	0.667	5	2.745	1.575
Ge	ppm	xrf	2	17	0.667	0.667	0.667	0.667	0.867	1.547	1.773	0.667	2	0.745	0.323
Ga	ppm	xrf	4	17	13.75	30.5	44.5	47.2	50.15	50.66	50.83	9	51	31.059	15.266
W	ppm	xrf	4	17	1.667	6.5	10	11.6	13.45	14.98	15.49	1.667	16	6.51	4.744
Ba	ppm	icp	5	17	44.5	54	66.75	74.2	78.8	84.92	86.96	14	89	55.353	17.72
Zr	ppm	icp	5	17	91	138	175.25	227.8	254.35	258.94	260.47	54	262	147.353	62.346
Nb	ppm	xrf	2	17	5	7	9	9.3	10.3	11.32	11.66	3	12	7.353	2.317
Se	ppm	xrf	2	17	0.667	1.333	3.75	4.3	5	5	5	0.667	5	2.137	1.675
Be	ppm	icp	1	17	0.333	0.333	1	1.3	2.15	2.66	2.83	0.333	3	0.824	0.728
Au	ppm	gf-aas	0.001	16	0.13	0.34	0.58	1.042	1.832	2.677	2.958	0.08	3.24	0.579	0.795

Table 11 **Summary statistics on Mt.Gibson data sets: Soils including colluvial samples CV106.**

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO2	%	icp	0.1	31	38.662	44.055	59.46	80.663	82.019	83.36	84.355	30.74	85.35	50.93	16.933
Al2O3	%	icp	0.1	31	11.735	14.14	18.03	18.469	21.2	25.257	26.324	6.88	27.39	14.745	4.665
Fe2O3	%	icp	0.1	31	13.475	27.245	36.645	39.603	42.761	43.687	43.863	3.19	44.04	25.967	12.972
MgO	%	icp	0.003	31	0.066	0.084	0.145	0.292	0.338	0.388	0.398	0.04	0.408	0.132	0.1
CaO	%	icp	0.007	31	0.05	0.086	0.148	0.301	0.344	0.689	0.963	0.024	1.237	0.157	0.222
Na2O	%	icp	0.007	31	0.032	0.056	0.078	0.14	0.142	0.152	0.16	0.018	0.167	0.066	0.042
K2O	%	icp	0.06	31	0.176	0.255	0.313	0.444	0.486	0.535	0.544	0.02	0.552	0.267	0.121
TiO2	%	icp	0.003	31	0.844	1.186	1.483	1.567	1.606	1.714	1.782	0.394	1.851	1.162	0.395
LOI	%	615	0.01	31	6.525	7.375	9.642	11.43	12.16	12.904	13.152	3.91	13.4	8.024	2.484
Total	%		0.1	31	94.548	100.64	101.058	101.626	101.891	102.122	102.271	91.87	102.42	98.552	3.544
Mn	ppm	icp	15	31	107.25	157	187.5	345.7	409.55	511.88	550.94	51	590	187.161	120.17
Cr	ppm	icp	20	31	301.5	506.5	719	802.1	879.3	1033.96	1108.98	69	1184	514.871	273.27
V	ppm	icp	5	31	330.75	655.5	997	1070.7	1092.95	1160.92	1202.46	63	1244	666.387	349.966
Cu	ppm	aas	2	31	24.25	32.5	42	47.8	51.8	60.08	65.04	9	70	33.355	13.87
Pb	ppm	xrf	2	31	22	41	60.5	70.7	89.75	101.04	103.52	0.667	106	43.183	26.695
Zn	ppm	aas	2	31	9.75	18	22.75	28	29.8	32.76	33.38	0.667	34	17.462	8.714
Ni	ppm	aas	4	31	33.5	40	46.5	61.6	66.7	73.8	76.9	15	80	42.548	14.142
Co	ppm	aas	4	31	4	8	12	21.6	22	22.76	23.38	1.333	24	9.699	6.657
As	ppm	xrf	2	31	9	16.5	25.25	44.4	49.7	67.82	79.91	0.667	92	20.548	19.127
Sb	ppm	xrf	2	31	0.917	3	6	6.9	7.45	8.76	9.38	0.667	10	3.409	2.658
Bi	ppm	xrf	2	31	2	3.5	5	7	9.25	13.14	14.07	0.667	15	4.129	3.267
Mo	ppm	xrf	1	31	2.75	3	4	5	5.45	6.38	6.69	0.667	7	3.43	1.404
Ag	ppm	aas	0.1	31	0.033	0.117	0.6	1.1	1.335	1.652	1.776	0.033	1.9	0.406	0.505
Sn	ppm	xrf	2	31	0.667	2	3	5	5	5	5	0.667	5	2.441	1.557
Ge	ppm	xrf	2	31	0.667	0.667	0.667	2	2.45	3.38	3.69	0.667	4	0.978	0.793
Ga	ppm	xrf	4	31	26	38	43.5	49.6	54.6	59.38	59.69	9	60	35.258	13.861
W	ppm	xrf	4	31	1.667	5.5	10	15.9	18.35	20.76	21.38	1.667	22	7.183	6.077
Ba	ppm	icp	5	31	52.25	67	108.75	143.9	190.95	222.84	243.92	14	265	85.516	53.763
Zr	ppm	icp	5	31	122.75	140	191	216.9	257.05	273.02	282.01	54	291	154.968	56.812
Nb	ppm	xrf	2	31	5.75	8	9	10	10.9	12	12	3	12	7.645	2.346
Se	ppm	xrf	2	31	0.667	2	3.25	4	5	5.38	5.69	0.667	6	2.215	1.63
Be	ppm	icp	1	31	0.333	1	1	2	2	2.38	2.69	0.333	3	0.925	0.708
Au	ppm	gf-aas	0.001	30	0.27	0.55	0.935	1.48	1.97	2.76	3	0.08	3.24	0.736	0.705

Table 12 **Summary statistics on Mt.Gibson data sets: Colluvium samples CV**

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO2	%	icp	0.1	58	19.1	32.94	42.355	48.602	50.198	58.263	62.875	5	67.59	32.104	14.007
Al2O3	%	icp	0.1	58	14.46	18.16	20.62	23.382	27.256	29.718	32.55	9.56	35.85	18.199	5.056
Fe2O3	%	icp	0.1	58	25.6	31.67	46.16	59.094	64.523	65.252	66.056	7.14	67.1	35.347	16.523
MgO	%	icp	0.003	58	0.054	0.116	0.431	1.327	1.782	2.438	2.948	0.027	3.54	0.434	0.686
CaO	%	icp	0.007	58	0.064	0.14	1.346	4.474	8.779	12.223	13.76	0.025	15.49	1.486	3.164
Na2O	%	icp	0.007	58	0.022	0.059	0.167	0.372	0.526	0.544	0.586	0.011	0.64	0.136	0.16
K2O	%	icp	0.06	58	0.02	0.161	0.333	0.462	0.54	0.602	0.693	0.02	0.804	0.207	0.19
TiO2	%	icp	0.003	58	1.079	1.436	1.801	2.392	2.556	2.775	2.885	0.497	3.03	1.503	0.601
LOI	%	615	0.01	58	7.18	10.01	12.7	18.56	19.96	21.568	21.726	4.39	21.9	10.869	4.721
Total	%		0.1	58	97.365	100.97	101.955	103.482	103.881	104.058	104.216	92.92	104.39	99.992	3.013
Mn	ppm	icp	15	58	127	167	235	370	476.6	855.44	1016.46	29	1169	222.5	187.881
Cr	ppm	icp	20	58	428.5	659	850	1292.4	1456.3	1506.76	1652.22	139	1850	698.707	375.199
V	ppm	icp	5	58	587.5	985	1405.5	1653.6	1875.6	2095.08	2174.3	143	2270	1002.79	525.269
Cu	ppm	aas	2	58	32	42	54	68.4	75.6	106.8	118.4	18	130	46.897	20.756
Pb	ppm	xrf	2	58	35.5	62	84.5	95.2	111	120	132.6	16	150	62.293	30.447
Zn	ppm	aas	2	58	12	17	25	30.4	32.2	35.68	41.04	6	48	18.948	8.775
Ni	ppm	aas	4	58	31	40	54	62	64	67.36	70.94	18	75	42.224	13.647
Co	ppm	aas	4	58	10	12	14.5	22	24	25.68	28.52	4	32	12.741	5.946
As	ppm	xrf	2	58	11.5	20	33.5	66	88.4	93.68	98.62	0.667	105	28.523	25.456
Sb	ppm	xrf	2	58	1	4	6	9.2	11	11.84	12	0.667	12	4.431	3.267
Bi	ppm	xrf	2	58	2	5	9	15	16.2	21.36	22.84	0.667	24	6.46	5.464
Mo	ppm	xrf	1	58	3	4	5	6.2	8.1	9	10.26	0.667	12	4.201	2.093
Ag	ppm	aas	0.1	58	0.033	0.5	1	1.22	1.51	2.608	3.556	0.033	4.6	0.64	0.774
Sn	ppm	xrf	2	58	1.333	3	4	5.2	6.2	8	9.26	0.667	11	3.178	2.166
Ge	ppm	xrf	2	58	0.667	0.667	2	3.2	4	4.84	5.42	0.667	6	1.592	1.301
Ga	ppm	xrf	4	58	38	48	68	88	106.5	124.2	137.6	20	155	55.586	26.461
W	ppm	xrf	4	58	4.5	10	15	18.4	22	23.68	24.42	1.333	25	10.598	6.69
Ba	ppm	icp	5	58	32.5	104	196.5	385.2	425.2	526.24	575.04	11	640	144.517	145.045
Zr	ppm	icp	5	58	127.5	145	189	229.2	253.2	334.68	403.9	65	488	165.069	67.188
Nb	ppm	xrf	2	58	7	9	12	13.2	17.2	19	19.42	1	20	9.534	3.78
Se	ppm	xrf	2	58	0.667	3	4	8.2	11	12.68	13	0.667	13	3.563	3.148
Be	ppm	icp	1	58	0.333	1	1	2	2	2	2.42	0.333	3	0.977	0.678
Au	ppm	gf-aas	0.001	58	0.408	0.953	1.815	2.63	2.93	5.388	6.133	0.021	6.633	1.287	1.278

Table 13 **Summary statistics on Mt.Gibson data sets: Lateritic gravel samples LT100**

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO2	%	icp	0.1	55	23.408	27.81	32.915	40.535	48.875	55.04	56.04	11.8	56.7	28.924	10.04
Al2O3	%	icp	0.1	55	14.555	18.505	22.167	24.245	25.587	29.837	30.256	9.35	30.41	18.847	4.71
Fe2O3	%	icp	0.1	55	32.597	36.955	44.905	57.565	61.24	63.271	65.256	19.66	67.56	39.547	11.438
MgO	%	icp	0.003	55	0.045	0.056	0.097	0.276	0.425	0.769	0.837	0.019	0.895	0.119	0.174
CaO	%	icp	0.007	55	0.032	0.043	0.09	0.241	0.52	0.989	1.061	0.019	1.144	0.126	0.232
Na2O	%	icp	0.007	55	0.015	0.032	0.073	0.27	0.303	0.341	0.367	0.01	0.394	0.077	0.1
K2O	%	icp	0.06	55	0.02	0.02	0.077	0.109	0.16	0.344	0.482	0.02	0.63	0.065	0.097
TiO2	%	icp	0.003	55	1.048	1.333	1.87	3.045	3.694	4.023	4.129	0.474	4.237	1.665	0.928
LOI	%	615	0.01	55	7.743	10.25	12.45	13.1	14.367	17.12	18.865	3.88	20.9	10.266	3.211
Total	%		0.1	55	96.69	100.805	101.503	102.06	102.702	104.939	105.679	94.07	106.3	99.605	2.904
Mn	ppm	icp	15	55	57	101	132.25	188.5	231.5	325.1	367.75	6.667	409	108.497	74.843
Cr	ppm	icp	20	55	601.5	716.5	1023	1427.5	1455	1530.6	1674.25	181	1842	841.109	345.082
V	ppm	icp	5	55	876.75	1123.5	1441.75	1786.5	2159.5	2400.4	2783.85	383	3220	1213.56	542.257
Cu	ppm	aas	2	55	28	36	52.75	89	97.5	120	201	13	300	48.382	42.488
Pb	ppm	xrf	2	55	50.75	67.5	90.25	107	115.5	139.5	149.2	33	158	73.418	27.271
Zn	ppm	aas	2	55	10	13.5	18.25	30	39	52.8	54.9	2	56	16.291	11.03
Ni	ppm	aas	4	55	31.5	37	50.5	59	65	65.9	72.3	22	80	41.109	13.479
Co	ppm	aas	4	55	10	12	14	14.5	15	17.7	18	1.333	18	10.848	3.807
As	ppm	xrf	2	55	18.25	33	46.25	68	97	113.5	115	3	115	37.964	26.381
Sb	ppm	xrf	2	55	2	4.5	7	9	10.25	11	11	0.667	11	4.891	3.115
Bi	ppm	xrf	2	55	3	5	10.25	16.5	19.75	36.4	44.3	0.667	52	8.339	8.97
Mo	ppm	xrf	1	55	2.75	4	5	7	8.25	9.9	12.7	0.667	16	4.37	2.67
Ag	ppm	aas	0.1	55	0.2	0.7	1.3	1.55	1.625	1.97	2.045	0.033	2.1	0.775	0.596
Sn	ppm	xrf	2	55	2	3.5	5	7	7.75	10.9	11.45	0.667	12	3.903	2.477
Ge	ppm	xrf	2	55	0.667	0.667	2	3	3.25	4.9	5.45	0.667	6	1.558	1.227
Ga	ppm	xrf	4	55	45	60	72	91	102	124.5	156.5	10	195	63.727	28.245
W	ppm	xrf	4	55	6	8.5	16	20.5	24.25	29.5	37.2	1.333	46	11.661	8.461
Ba	ppm	icp	5	55	19.5	35.5	64.75	129	157	197.8	207.3	6	215	55.2	50.737
Zr	ppm	icp	5	55	130.75	157.5	188.25	241	261	277.2	313.1	72	356	165.382	54.401
Nb	ppm	xrf	2	55	7	9	11	16	19.25	26.3	29.25	1	32	9.945	5.71
Se	ppm	xrf	2	55	4	6	8	9	10	10.9	11	0.667	11	5.867	2.704
Be	ppm	icp	1	55	0.333	0.333	1	2	2	2.9	3	0.333	3	0.933	0.76
Au	ppm	gf-aas	0.001	55	0.44	1.564	3.263	5.39	10.359	12.524	12.679	0.005	12.757	2.508	3.061

Table 14 Summary of Mt.Gibson data sets: Lateritic duricrust samples. LT200

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO2	%	icp	0.1	112	31.23	35.29	40.64	47.24	50.602	55.018	55.549	20.17	56.26	36.537	7.759
Al2O3	%	icp	0.1	112	19.55	21.76	24.21	26.698	28.136	29.795	30.885	12.56	32.11	21.872	3.718
Fe2O3	%	icp	0.1	112	20.33	28.46	34.02	39.544	42.382	48.623	49.517	8.98	56.48	28.091	9.588
MgO	%	icp	0.003	112	0.078	0.135	0.255	0.596	0.712	2.047	2.518	0.032	4.692	0.291	0.557
CaO	%	icp	0.007	112	0.037	0.092	0.295	2.012	5.23	13.156	15.357	0.002	16.846	0.96	2.869
Na2O	%	icp	0.007	112	0.058	0.13	0.213	0.307	0.399	0.448	0.525	0.015	1.266	0.161	0.153
K2O	%	icp	0.06	112	0.06	0.1	0.15	0.264	0.345	0.405	0.461	0.02	0.51	0.121	0.102
TiO2	%	icp	0.003	112	0.925	1.189	1.403	1.808	2.148	2.427	2.493	0.484	3.086	1.25	0.453
LOI	%	615	0.01	112	9.73	11.1	12.7	14.74	16.34	19.352	20.192	6.69	23	11.528	2.784
Total	%		0.1	112	99.62	99.94	101.73	102.528	103.604	105.412	105.95	95.22	107.65	100.766	1.747
Mn	ppm	icp	15	112	46	76	124	170.8	219.8	235.32	264.28	16	275	92.688	59.041
Cr	ppm	icp	20	112	402	539	701	948.2	1118	1376.48	1450.64	118	2230	604.571	305.181
V	ppm	icp	5	112	508	785	985	1234	1405.4	1773.68	2044.48	255	2476	799.634	374.699
Cu	ppm	aas	2	112	32	46	62	94.8	150	191.6	235.2	4	240	56.786	42.258
Pb	ppm	xrf	2	112	35	48	62	83.2	92	97.04	103.28	13	113	51.366	20.857
Zn	ppm	aas	2	112	9	16	22	30	36.8	42	47.28	0.667	160	18.161	16.622
Ni	ppm	aas	4	112	34	44	54	62	67.6	74.56	83.04	14	145	44.777	16.87
Co	ppm	aas	4	112	4	8	12	18	20	20	23.52	1.333	32	8.568	6.386
As	ppm	xrf	2	112	17	24	38	54	92	120.2	131.16	5	150	32.473	25.933
Sb	ppm	xrf	2	112	4	6	8	11	12	12.76	14.76	0.667	15	6.107	3.359
Bi	ppm	xrf	2	112	3	5	7	11	14	17.52	18	0.667	24	5.783	4.231
Mo	ppm	xrf	1	112	2	3	4	6	7	8.76	9.88	0.333	18	3.699	2.281
Ag	ppm	aas	0.1	112	0.033	0.5	1.1	1.5	2	2.276	2.476	0.033	3.4	0.669	0.666
Sn	ppm	xrf	2	112	0.667	2	3	4	4.4	6	6.88	0.667	7	2.086	1.507
Ge	ppm	xrf	2	112	0.667	1.333	1.333	2	3	3.76	4	0.667	4	1.369	0.733
Ga	ppm	xrf	4	112	39	47	54	63.8	72.4	76	81.28	16	90	47.33	14.161
W	ppm	xrf	4	112	1.667	6	10	12	13.4	14.76	18.52	1.333	20	6.512	4.345
Ba	ppm	icp	5	112	80	192	403	1062.4	1632.2	2401.24	2908.92	6	3425	401.464	603.683
Zr	ppm	icp	5	112	109	132	156	240.6	275.8	298.96	312.8	57	319	145.223	57.192
Nb	ppm	xrf	2	112	6	8	11	13	14	16	17.76	1	19	8.438	3.693
Se	ppm	xrf	2	112	2	4	6	8	9.4	10.76	11	0.667	13	4.229	2.774
Be	ppm	icp	1	112	0.333	1	1	2	2	2	2	0.333	3	0.943	0.555
Au	ppm	gf-aas	0.001	112	0.58	1.36	2	2.578	4.04	4.798	5.782	0.024	6.43	1.5	1.212

Table 15 Summary statistics on Mt.Gibson data sets: Lateritic residuum, combined LT100 and LT200

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO21	%	icp	0.1	167	28.167	33.205	39.15	46.65	50.679	55.364	55.825	11.8	56.7	34.03	9.269
Al2O31	%	icp	0.1	167	18.26	21.075	23.63	26.106	27.898	30.099	30.605	9.35	32.11	20.876	4.3
Fe2O31	%	icp	0.1	167	23.007	31.81	38.28	46.417	54.813	60.092	62.707	8.98	67.56	31.864	11.541
MgO1	%	icp	0.003	167	0.06	0.095	0.225	0.458	0.703	1.472	2.281	0.019	4.692	0.234	0.473
CaO1	%	icp	0.007	167	0.036	0.061	0.23	0.882	2.158	10.291	14.303	0.002	16.846	0.685	2.382
Na2O1	%	icp	0.007	167	0.034	0.089	0.186	0.296	0.379	0.435	0.477	0.01	1.266	0.134	0.143
K2O1	%	icp	0.06	167	0.02	0.08	0.121	0.214	0.337	0.403	0.482	0.02	0.63	0.103	0.104
TiO21	%	icp	0.003	167	0.955	1.225	1.543	2.213	2.758	3.586	3.926	0.474	4.237	1.387	0.675
LOI1	%	615	0.01	167	9.318	10.9	12.7	14.33	16.365	19.332	20.498	3.88	23	11.128	2.985
Total	%		0.1	167	99.527	100.61	101.7	102.409	103.204	105.441	106.099	94.07	107.65	100.353	2.251
Mn	ppm	icp	15	167	50.75	83.5	128.5	176.5	227	260.18	294.47	6.667	409	97.894	64.874
Cr	ppm	icp	20	167	466	610.5	831.5	1096.7	1415.2	1468.58	1637.65	118	2230	682.473	336.819
V	ppm	icp	5	167	576.5	862	1137.25	1506.6	1789.95	2160.32	2443.17	255	3220	935.958	477.081
Cu	ppm	aas	2	167	30	41	58.5	92	138.25	188.1	240	4	300	54.018	42.391
Pb	ppm	xrf	2	167	40	54	74	92.6	102.95	114.32	125.25	13	158	58.629	25.315
Zn	ppm	aas	2	167	9.75	15	22	30.6	38	45.96	54.66	0.667	160	17.545	15.004
Ni	ppm	aas	4	167	32	42	54	62	65.65	73.96	81.32	14	145	43.569	15.887
Co	ppm	aas	4	167	4	10	12	18	20	20	21.32	1.333	32	9.319	5.757
As	ppm	xrf	2	167	17	26.5	42	62	95.65	115	127.31	3	150	34.281	26.131
Sb	ppm	xrf	2	167	3	6	8	10.3	12	12	13.66	0.667	15	5.707	3.321
Bi	ppm	xrf	2	167	3	5	8	13.3	16.65	20.98	28.62	0.667	52	6.625	6.293
Mo	ppm	xrf	1	167	2	4	5	7	8	9.66	11.98	0.333	18	3.92	2.429
Ag	ppm	aas	0.1	167	0.1	0.55	1.1	1.53	1.965	2.166	2.366	0.033	3.4	0.704	0.644
Sn	ppm	xrf	2	167	0.667	2	4	5	7	7	10.33	0.667	12	2.685	2.061
Ge	ppm	xrf	2	167	0.667	1.333	2	3	3	4	4.33	0.667	6	1.431	0.926
Ga	ppm	xrf	4	167	41.75	50.5	62	74	86.6	94.64	121.65	10	195	52.731	21.292
W	ppm	xrf	4	167	4	7	12	15.3	20	24	26.65	1.333	46	8.208	6.466
Ba	ppm	icp	5	167	33.75	106	246.75	756.8	1338.15	2113.06	2628.97	6	3425	287.425	520.737
Zr	ppm	icp	5	167	113	139	173.5	241.6	273.25	296.86	315.65	57	356	151.862	56.923
Nb	ppm	xrf	2	167	6	9	11	13.3	16	19	22.31	1	32	8.934	4.498
Se	ppm	xrf	2	167	3	4.5	7	9	10	11	11	0.667	13	4.768	2.85
Be	ppm	icp	1	167	0.333	1	1	2	2	2	3	0.333	3	0.94	0.628
Au	ppm	gf-aas	0.001	167	0.53	1.42	2.22	3.786	4.871	8.727	12.005	0.005	12.757	1.832	2.063

Table 16 Summary statistics on Mt.Gibson data sets: Mottled zone samples. MZ

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO21	%	icp	0.1	13	38.18	51.76	62.188	64.234	65.559	66.394	66.672	32.73	66.95	51.418	12.689
Al2O31	%	icp	0.1	13	18.163	20.12	22.995	29.245	30.635	31.298	31.519	16.96	31.74	22.07	4.851
Fe2O31	%	icp	0.1	13	9.267	14.19	18.265	21.549	27.025	32.602	34.461	7.19	36.32	15.845	7.816
MgO1	%	icp	0.003	13	0.106	0.148	0.178	1.193	1.605	1.63	1.638	0.076	1.646	0.371	0.554
CaO1	%	icp	0.007	13	0.023	0.027	0.036	2.859	6.521	9.281	10.202	0.02	11.122	1.194	3.182
Na2O1	%	icp	0.007	13	0.101	0.138	0.204	0.305	0.331	0.339	0.341	0.073	0.344	0.171	0.089
K2O1	%	icp	0.06	13	0.091	0.153	0.288	0.437	0.637	0.843	0.911	0.078	0.98	0.261	0.248
TiO21	%	icp	0.003	13	0.594	0.896	1.787	2.083	2.544	3.019	3.178	0.562	3.336	1.277	0.845
LOI1	%	615	0.01	13	10.35	11.75	13.025	15.85	18	19.56	20.08	8.1	20.6	12.432	3.305
Total	%		0.1	13	102.305	105.08	106.46	107.319	108.473	109.701	110.11	101.07	110.52	104.958	2.687
Mn1	ppm	icp	15	13	35.25	69	150.75	188.7	255.9	323.76	346.38	29	369	109.615	97.223
Cr1	ppm	icp	20	13	161.5	257.5	362	409.5	456.25	493.3	505.65	60	518	270.846	136.408
V1	ppm	icp	5	13	309.25	458.5	604.5	959.9	1125.5	1254.2	1297.1	239	1340	564.077	325.37
Cu1	ppm	aas	2	13	32.5	43.5	71	138.5	154	169.6	174.8	28	180	68.154	50.496
Pb1	ppm	xrf	2	13	5.25	17.5	31.25	47	50.85	55.14	56.57	2	58	22.538	18.528
Zn1	ppm	aas	2	13	7.5	12	15.75	18.7	31.25	44.9	49.45	4	54	15.077	12.546
Ni1	ppm	aas	4	13	28.5	35	47.5	63.2	72.2	76.88	78.44	16	80	40.769	17.991
Co1	ppm	aas	4	13	4	4	5.75	9.7	10.7	11.48	11.74	1.333	12	5.487	3.005
As1	ppm	xrf	2	13	6.5	22.5	32.25	50.7	234.6	435.84	502.92	0.667	570	64.103	152.861
Sb1	ppm	xrf	2	13	0.667	1	2.75	4	5.4	6.96	7.48	0.667	8	2.179	2.15
Bi1	ppm	xrf	2	13	4	5	6.75	10.4	28.5	48	54.5	0.667	61	9.564	15.713
Mo1	ppm	xrf	1	13	0.667	0.667	3	3	3.7	4.48	4.74	0.667	5	1.821	1.444
Ag1	ppm	aas	0.1	13	0.033	0.15	0.3	0.78	1.11	1.344	1.422	0.033	1.5	0.333	0.428
Sn1	ppm	xrf	2	13	2	4	4.75	6.7	7.7	8.48	8.74	0.667	9	3.949	2.418
Ge1	ppm	xrf	2	13	0.667	2	2	2.7	3.35	3.74	3.87	0.667	4	1.718	1.035
Ga1	ppm	xrf	4	13	25.25	27.5	31	36.5	39.75	41.7	42.35	20	43	29.385	6.049
W1	ppm	xrf	4	13	1.667	1.667	5	8.1	9.7	10.48	10.74	1.667	11	3.795	3.202
Ba1	ppm	icp	5	13	91.25	125	239	305.5	416.8	529.12	566.56	16	604	186.538	154.376
Zr1	ppm	icp	5	13	97.25	117.5	155.75	206.4	233.1	258.84	267.42	89	276	141.308	55.704
Nb1	ppm	xrf	2	13	6.25	7.5	9.75	14.2	16	16	16	1	16	8.538	4.075
Se1	ppm	xrf	2	13	0.667	2	3.75	4.7	5.35	5.74	5.87	0.667	6	2.41	1.842
Be1	ppm	icp	1	13	0.333	0.333	0.333	0.333	0.567	0.827	0.913	0.333	1	0.385	0.185
Au1	ppm	gf-aas	0.001	13	0.07	0.165	1.207	2.37	2.535	2.652	2.691	0.045	2.73	0.801	1.024

Table 17 Summary statistics on the Mt. Gibson data sets: Saprolite samples sap

Element		Method	lld	#values	25th	50th	75th	90th	95th	98th	99th	Min	Max	Mean	S.D.
SiO21	%	icp	0.1	25	61.067	64.705	69.412	74.545	75.668	76.47	76.845	40.85	77.22	64.538	8.615
Al2O31	%	icp	0.1	25	17.985	20.97	23.752	26.23	27.472	28.24	28.475	12.92	28.71	21.115	4.137
Fe2O31	%	icp	0.1	25	0.673	1.68	4.86	19.875	23.305	25.165	25.737	0.4	26.31	5.848	8.065
MgO1	%	icp	0.003	25	0.092	0.139	0.227	0.293	0.341	0.441	0.483	0.038	0.526	0.17	0.114
CaO1	%	icp	0.007	25	0.024	0.028	0.031	0.042	0.44	0.749	0.837	0.02	0.926	0.086	0.206
Na2O1	%	icp	0.007	25	0.088	0.112	0.193	0.238	0.261	0.386	0.445	0.058	0.505	0.15	0.095
K2O1	%	icp	0.06	25	0.116	0.2	1.303	1.638	1.925	2.109	2.169	0.02	2.229	0.641	0.714
TiO21	%	icp	0.003	25	0.417	1.041	1.626	1.977	2.172	2.26	2.281	0.294	2.302	1.126	0.648
LOI1	%	615	0.01	25	6.69	10.15	10.975	11.6	12.45	13.25	13.525	5.16	13.8	9.333	2.4
Total	%		0.1	25	93.507	94.765	97.135	101.365	102.257	102.55	102.625	89.98	102.7	95.53	3.626
Mn1	ppm	icp	15	25	23	51	117.75	195.5	225.75	263	278.5	17	294	88.24	77.964
Cr1	ppm	icp	20	25	16.667	99.5	429.25	619.5	872.75	1121.5	1218.75	16.667	1316	275.413	332.073
V1	ppm	icp	5	25	57.25	231	326.5	499	1140.25	1369	1379.5	38	1390	306.92	354.534
Cu1	ppm	aas	2	25	7.75	16.5	45.75	82.5	126.25	145	150	2	155	36	40.919
Pb1	ppm	xrf	2	25	0.667	11.5	43.5	287	413.25	564	621	0.667	678	81.8	168.105
Zn1	ppm	aas	2	25	4	6.5	21.25	33.5	52.25	58	58	0.667	58	15.347	16.247
Ni1	ppm	aas	4	25	10.5	25	46	67	70	79	83.5	5	88	32	24.182
Co1	ppm	aas	4	25	1.333	1.333	4	13	14.75	21.5	24.75	1.333	28	4.453	6.36
As1	ppm	xrf	2	25	3	6	22.25	33	44.75	60.5	67.25	0.667	74	15.08	17.639
Sb1	ppm	xrf	2	25	0.667	1.5	3	5.5	6.75	7.5	7.75	0.667	8	2.493	2.222
Bi1	ppm	xrf	2	25	0.667	1.333	3.75	11.5	17.25	44.5	57.25	0.667	70	5.96	14.075
Mo1	ppm	xrf	1	25	0.667	2	3	3	3	3	3	0.667	3	1.893	0.956
Ag1	ppm	aas	0.1	25	0.033	0.033	0.033	0.4	0.875	1.05	1.075	0.033	1.1	0.147	0.292
Sn1	ppm	xrf	2	25	2	3	4	5.5	6.75	8	8.5	0.667	9	3.333	2.086
Ge1	ppm	xrf	2	25	0.667	2	2	2.5	3	3.5	3.75	0.667	4	1.68	0.9
Ga1	ppm	xrf	4	25	23.25	26	30	33.5	47	53.5	54.75	14	56	28.2	8.907
W1	ppm	xrf	4	25	1.667	1.667	5	7	8.75	11.5	12.75	1.667	14	3.453	3.143
Ba1	ppm	icp	5	25	64.75	100	216	557.5	1342.5	2310	2690	19	3070	330.16	652.957
Zr1	ppm	icp	5	25	87.5	105.5	113.5	140.5	145	152	155.5	56	159	104.6	25.138
Nb1	ppm	xrf	2	25	4	5.5	7.75	9.5	10	10.5	10.75	1	11	5.92	2.66
Se1	ppm	xrf	2	25	0.667	0.667	0.667	3.5	4	4.5	4.75	0.667	5	1.2	1.28
Be1	ppm	icp	1	25	0.333	0.333	0.333	1	1.75	2.5	2.75	0.333	3	0.56	0.629
Au1	ppm	gf-aas	0.001	25	0.021	0.071	0.375	0.895	2.608	3.325	3.423	0.006	3.52	0.439	0.911

The lateritic duricrust samples (LT200, Table 14), because of their matrix component, naturally have higher levels of Si and Al than the related lateritic gravels. Likewise, the Fe content is lower in the duricrusts because of this dilution, 28.5 wt% Fe_2O_3 compared with 37.0 wt% for the respective 50th percentiles. The duricrust samples are anomalous in Cu, Pb, As, Sb, Bi, Ag, W, and Au. It can be seen that Pb and As, which tend to be associated with goethite and hematite are proportionately lower, roughly following the lower Fe levels of the duricrusts.

Summary statistics are given for the total lateritic residuum samples (i.e. lateritic gravels LT100 plus lateritic duricrust, LT200) in Table 15. This is a useful summary because in reconnaissance exploration it is common, and valid, to treat samples of lateritic residuum as one group.

Summary statistics for mottled zone samples show a heterogeneous collection, as would be expected, Table 16. Some of these samples have relatively high Bi (to 61 ppm), Au values are all anomalously high, and As sporadically anomalous. Many of the samples come from costeans close to, or exposing mineralized veins.

6.4 Box Plots

Box plots are useful because they show the main range of values for an element in a group of samples. Furthermore, boxes for several sample groups can be stacked in one plot to a common scale, allowing easy comparisons between sample types.

Box plots for all the elements analysed in the Mt. Gibson orientation study are given in Figures 15 to 29. The boxes are arranged down the page in regolith stratigraphic order as in the conceptual cross section, Figure 5a. The extremities for the boxes in these diagrams were chosen to be the 25th and 75th percentiles, with the median, (50th percentile) boldly marked within the box. The horizontal line extending from each box represents twice the standard deviation. Outliers are shown by x and extreme outliers by *.

In the box plot for Fe_2O_3, Figure 16, the accumulation of Fe from saprolite through mottled zone, lateritic duricrust, to lateritic gravel, due to lateritic weathering is clearly evident. It should also be noticed that the box for the colluvial samples echoes the mixed origin of that group. The box plot for K_2O (Fig. 17) also shows the result of the mixed origin for the colluvium samples, linking their compositions to K levels in the mottled zone and saprolite.

The occurrences of authigenic calcium carbonate explains the elevated levels of Ca in the colluvium and duricrust samples (Fig. 17).

The increased level of Mn within the colluvium samples, probably due to shallow ground water infiltration, cementation, and staining, is clearly evident in Figure 18.

The box plot for V (Fig. 19) shows the well-described lateritic trend, similar to that for Fe already described whilst Cr shows this to a lesser extent.

It is interesting to note that the Au levels, Fig. 29, are systematically highest in the lateritic gravel samples, being slightly higher than levels in the duricrust samples.

6.5 Histograms

Provided that there are sufficient samples and that the analytical lower limits of detection are adequate, histograms are important in showing the shape and characteristics of the distribution of values for each oxide and element in a sample group. Histograms for the colluvium, lateritic gravel, and lateritic duricrust sample groups are shown in Figures 30 to 43.

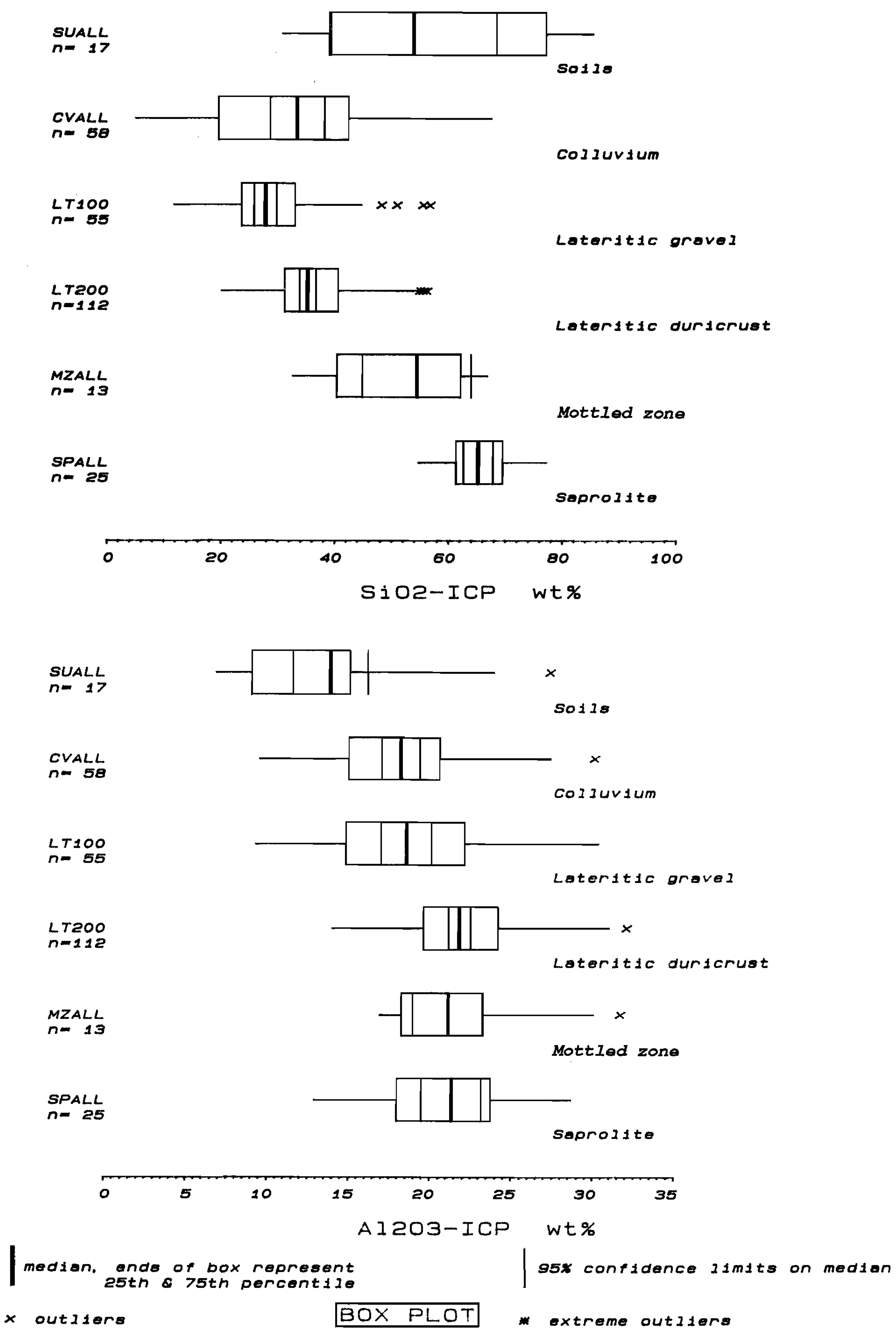


Fig.15.Box plots showing the distribution of SiO_2 and Al_2O_3 in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy .

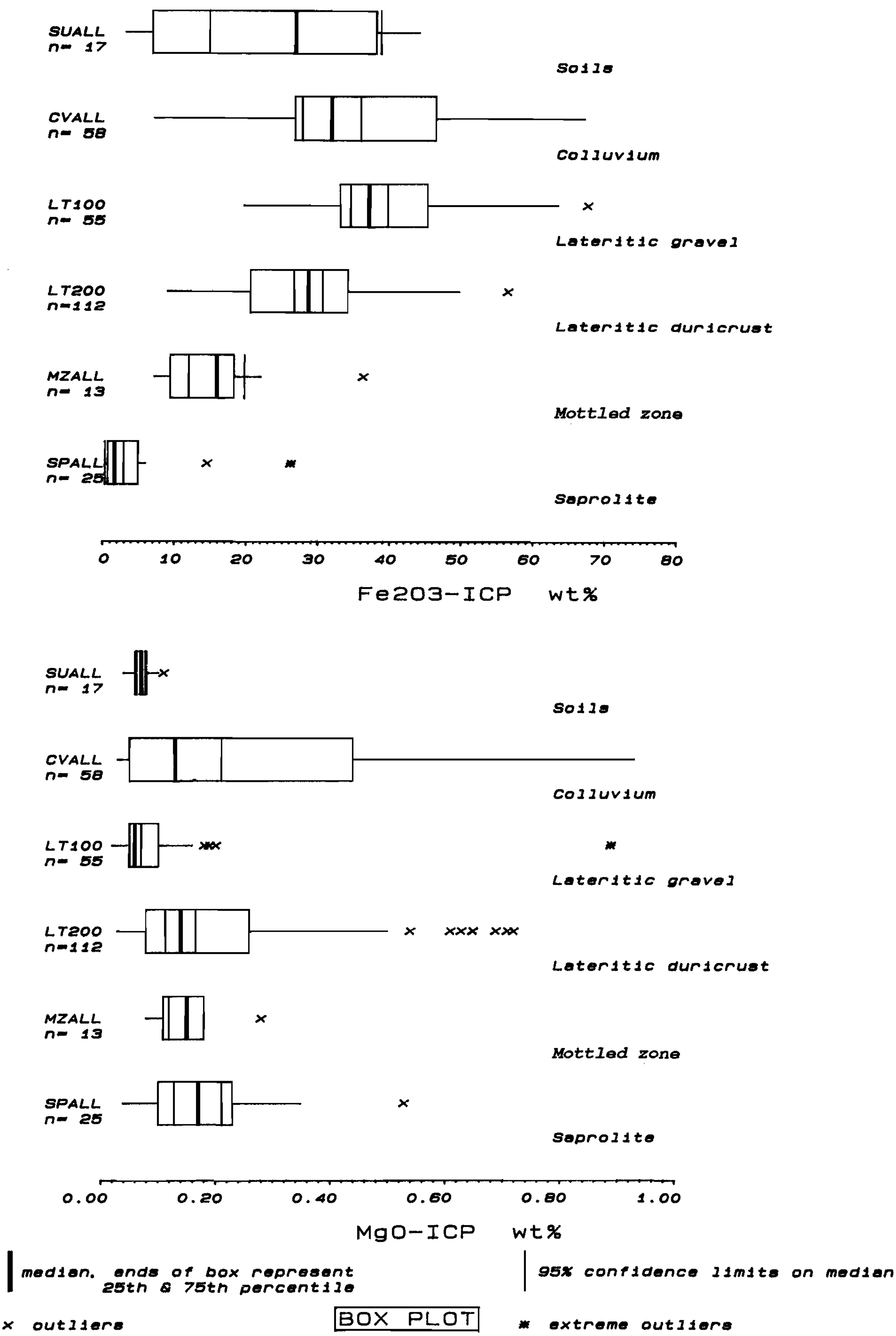


Fig.16 Box plots showing the distribution of Fe_2O_3 and MgO in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

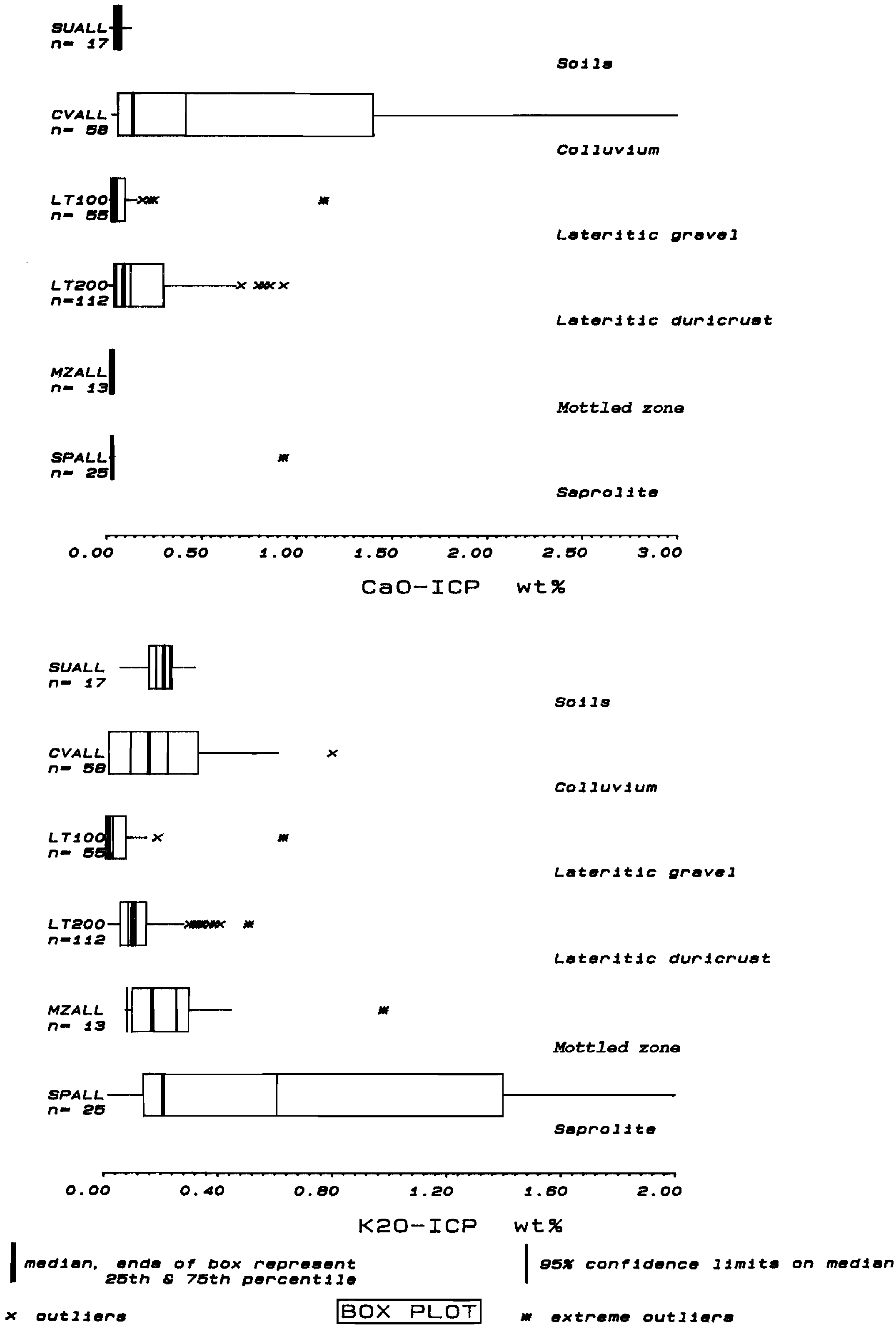


Fig.17.Box plots showing the distribution of CaO and K_2O in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

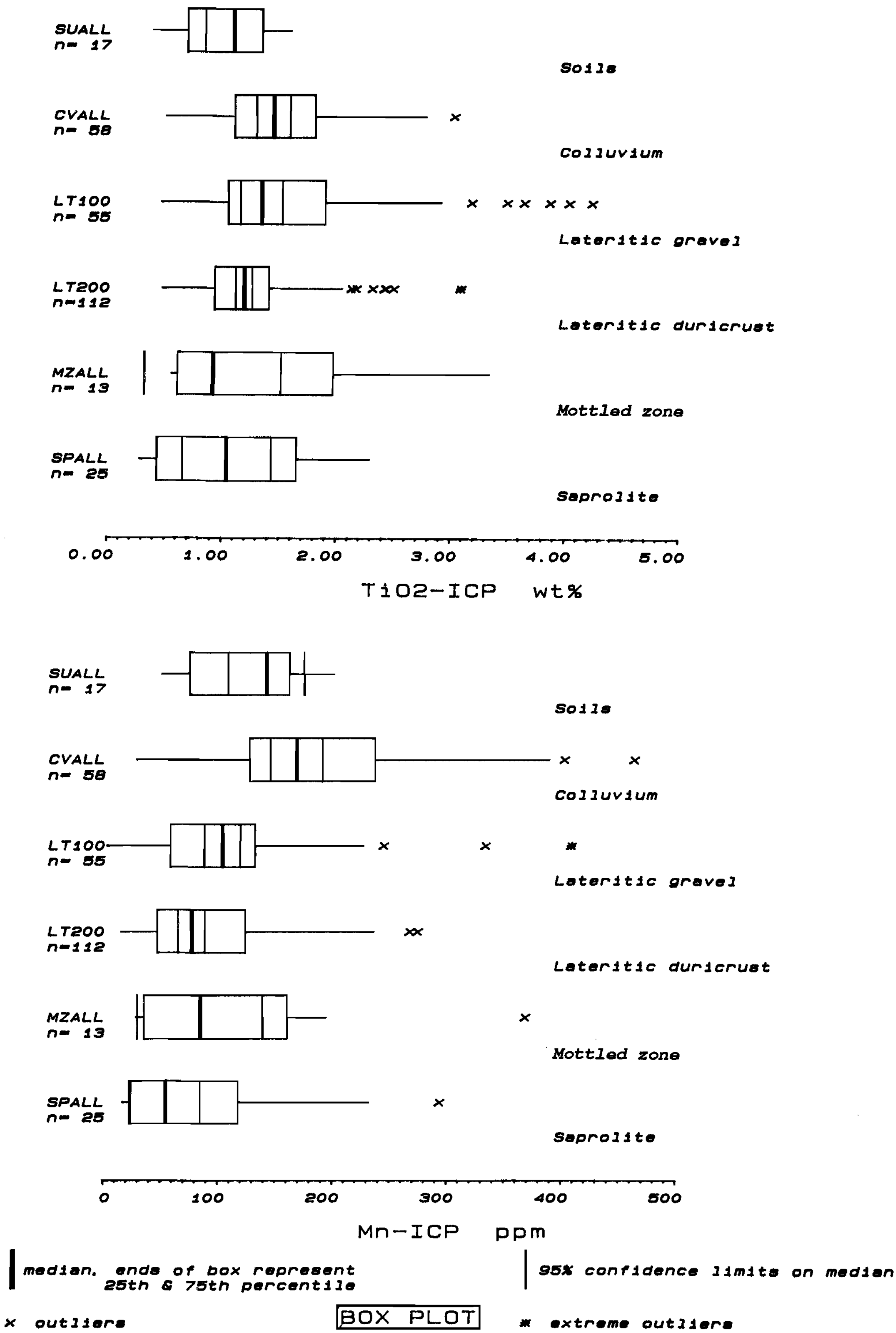


Fig.18.Box plots showing the distribution of TiO_2 and Mn in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

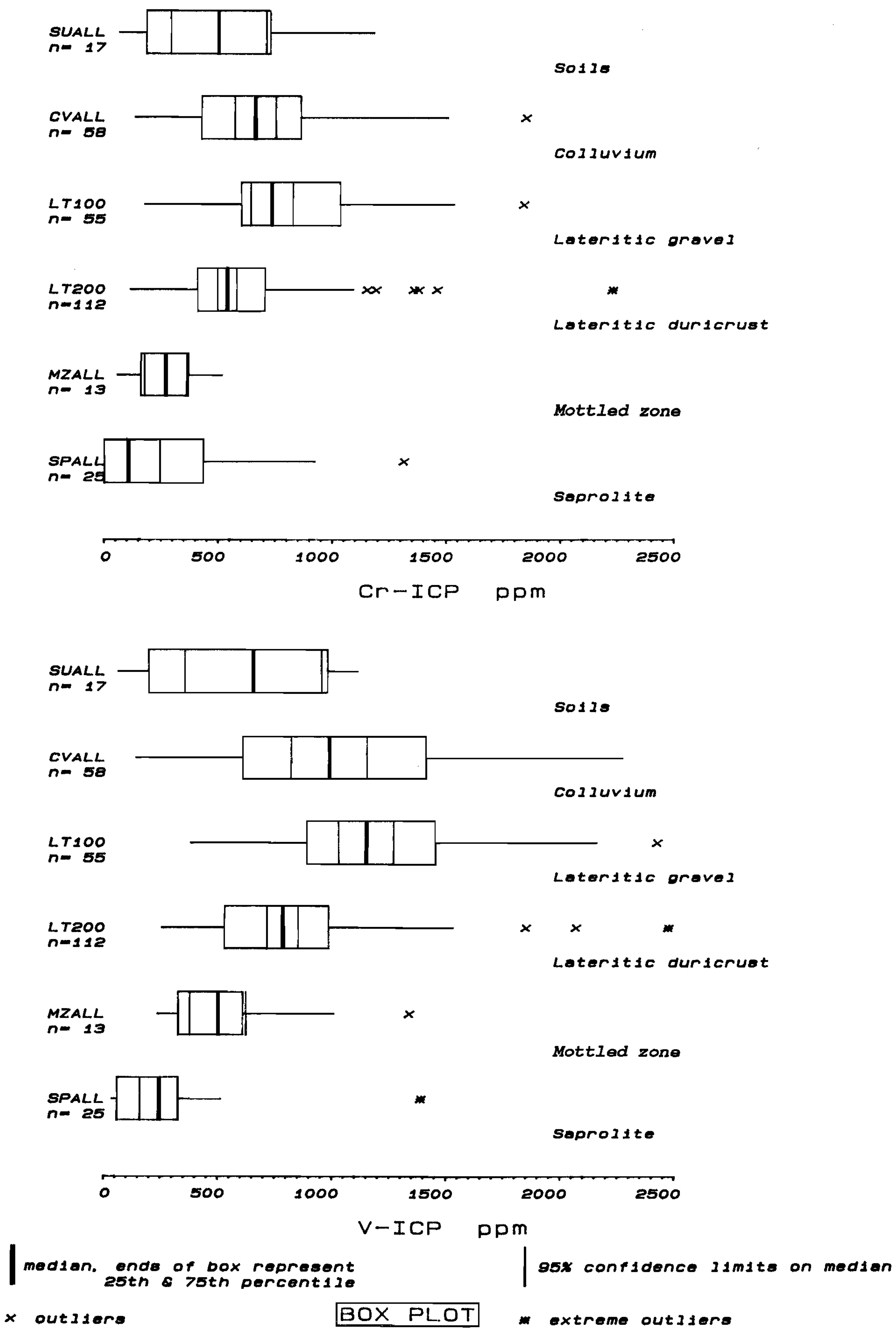


Fig.19.Box plots showing the distribution of Cr and V in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

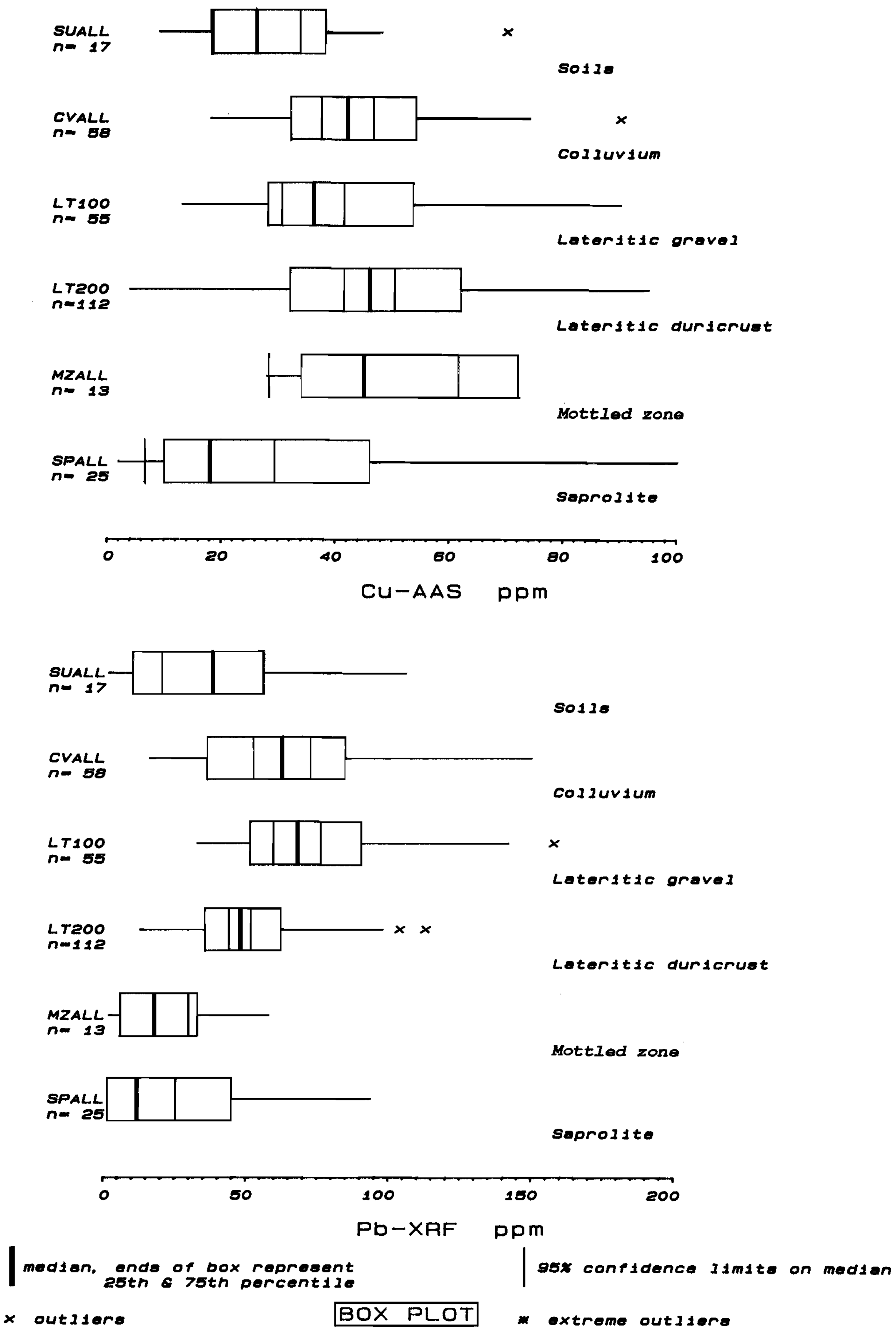


Fig.20.Box plots showing the distribution of Cu and Pb in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

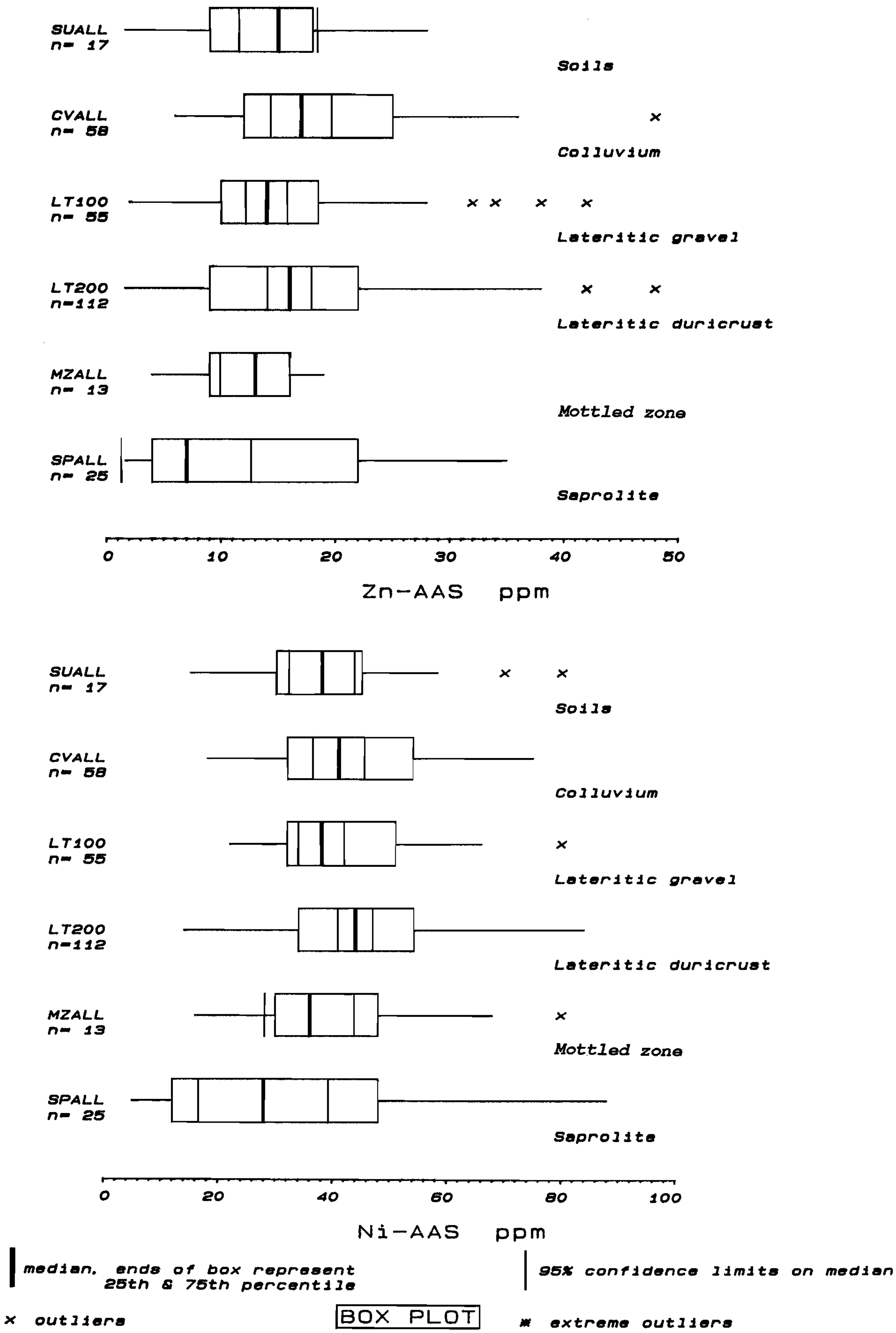


Fig.21.Box plots showing the distribution of Zn and Ni in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

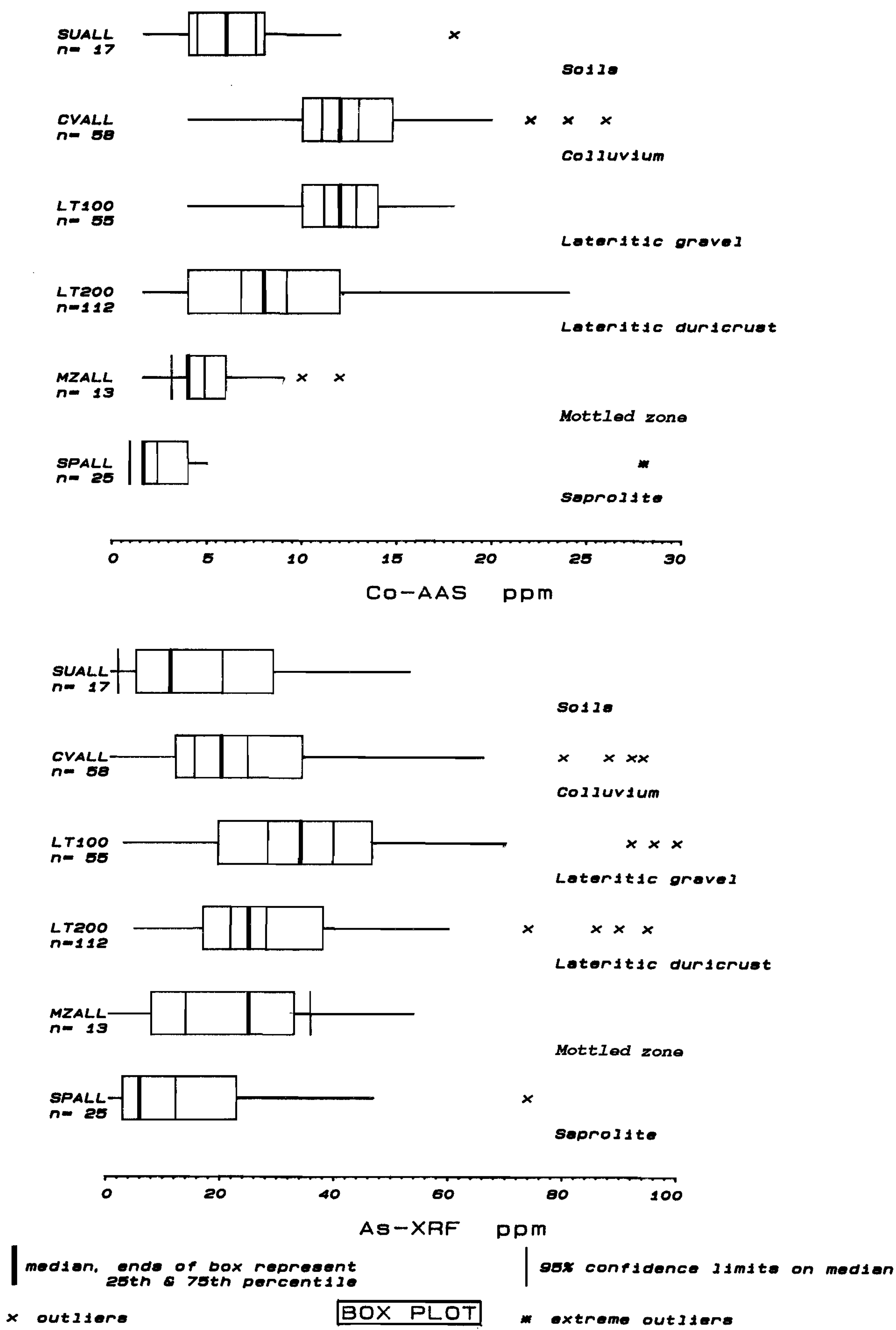


Fig.22.Box plots showing the distribution of Co and As in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

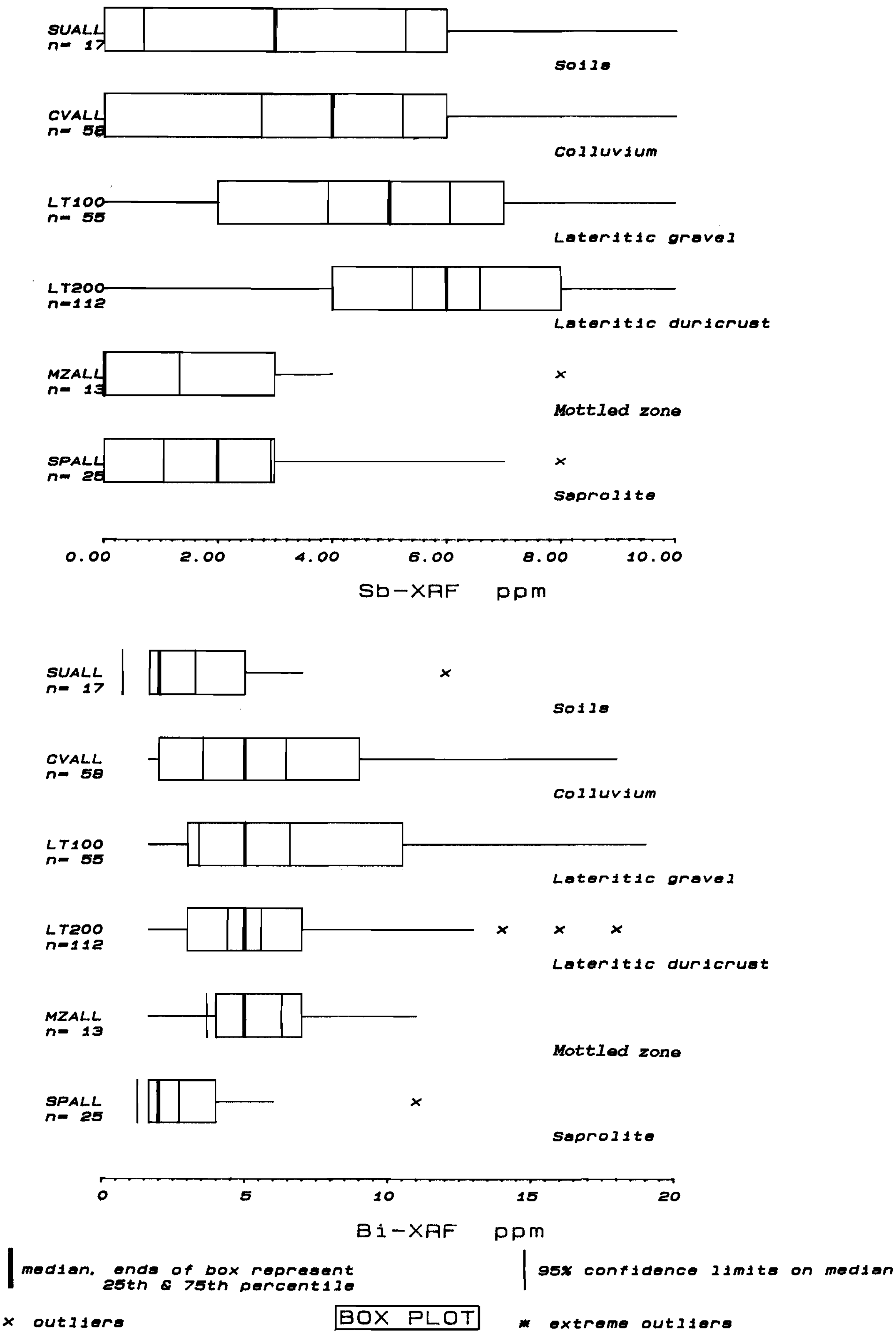


Fig.23.Box plots showing the distribution of Sb and Bi in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

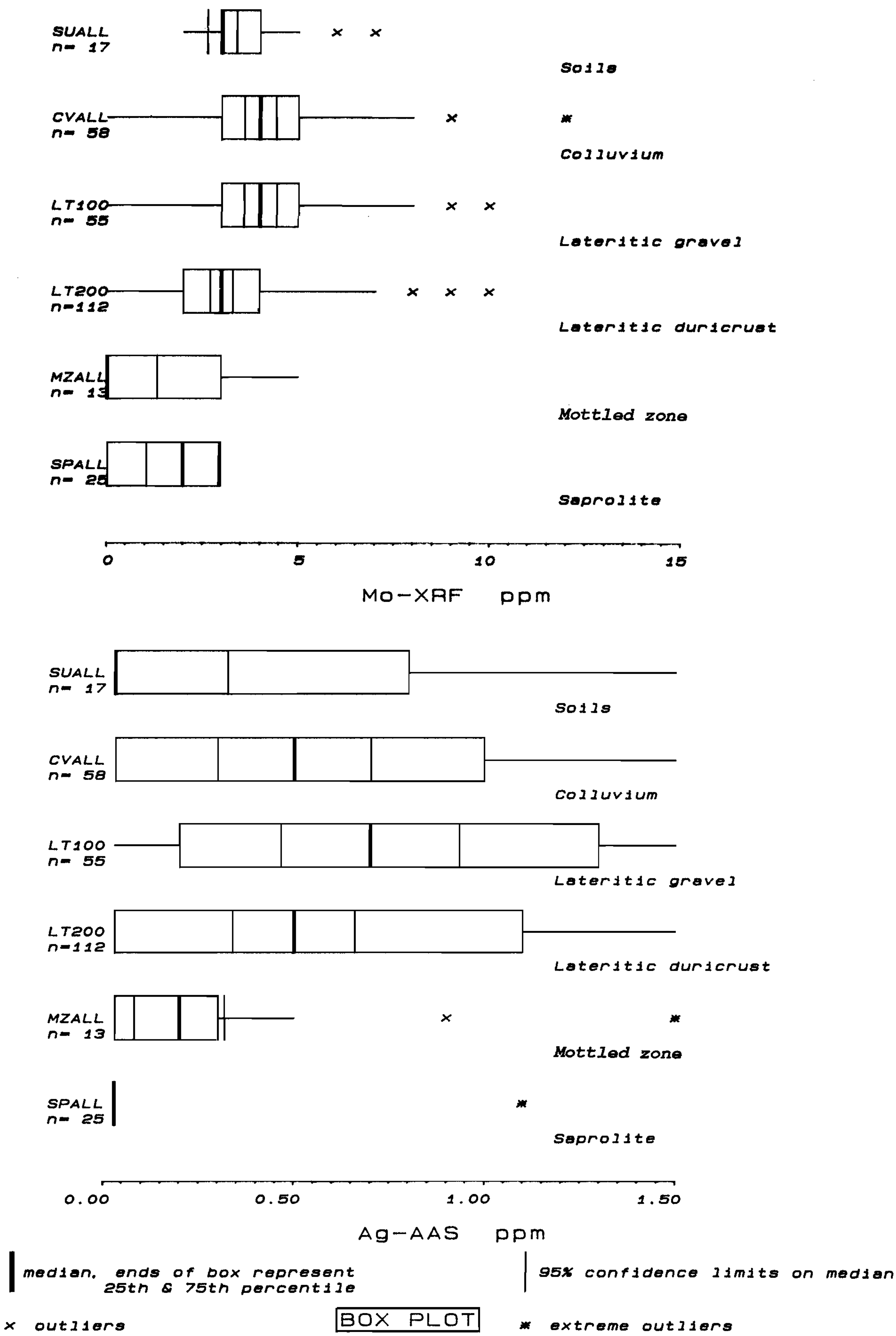


Fig.24.Box plots showing the distribution of Mo and Ag in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

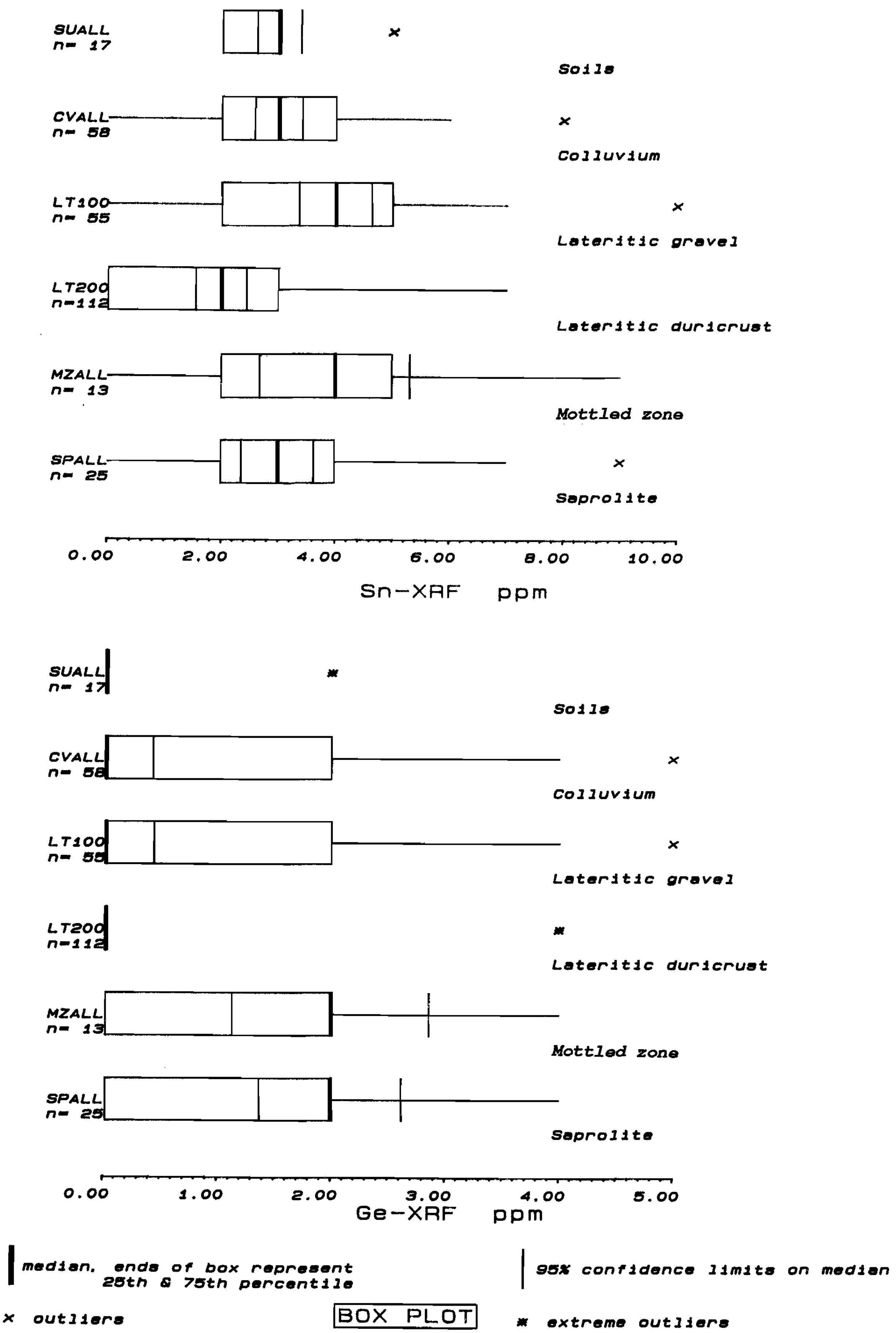


Fig.25.Box plots showing the distribution of Sn and Ge in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

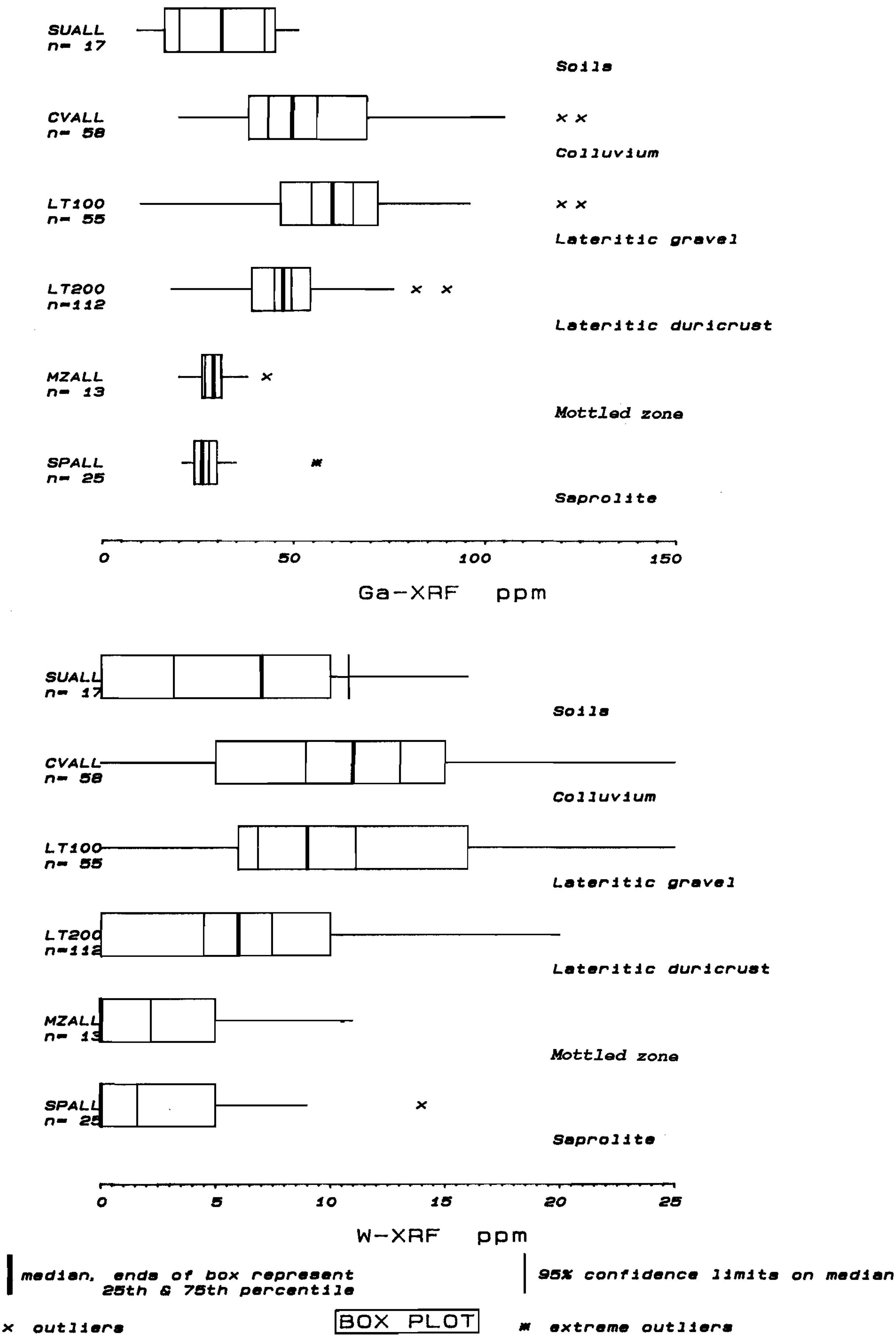


Fig.26.Box plots showing the distribution of Ga and W in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

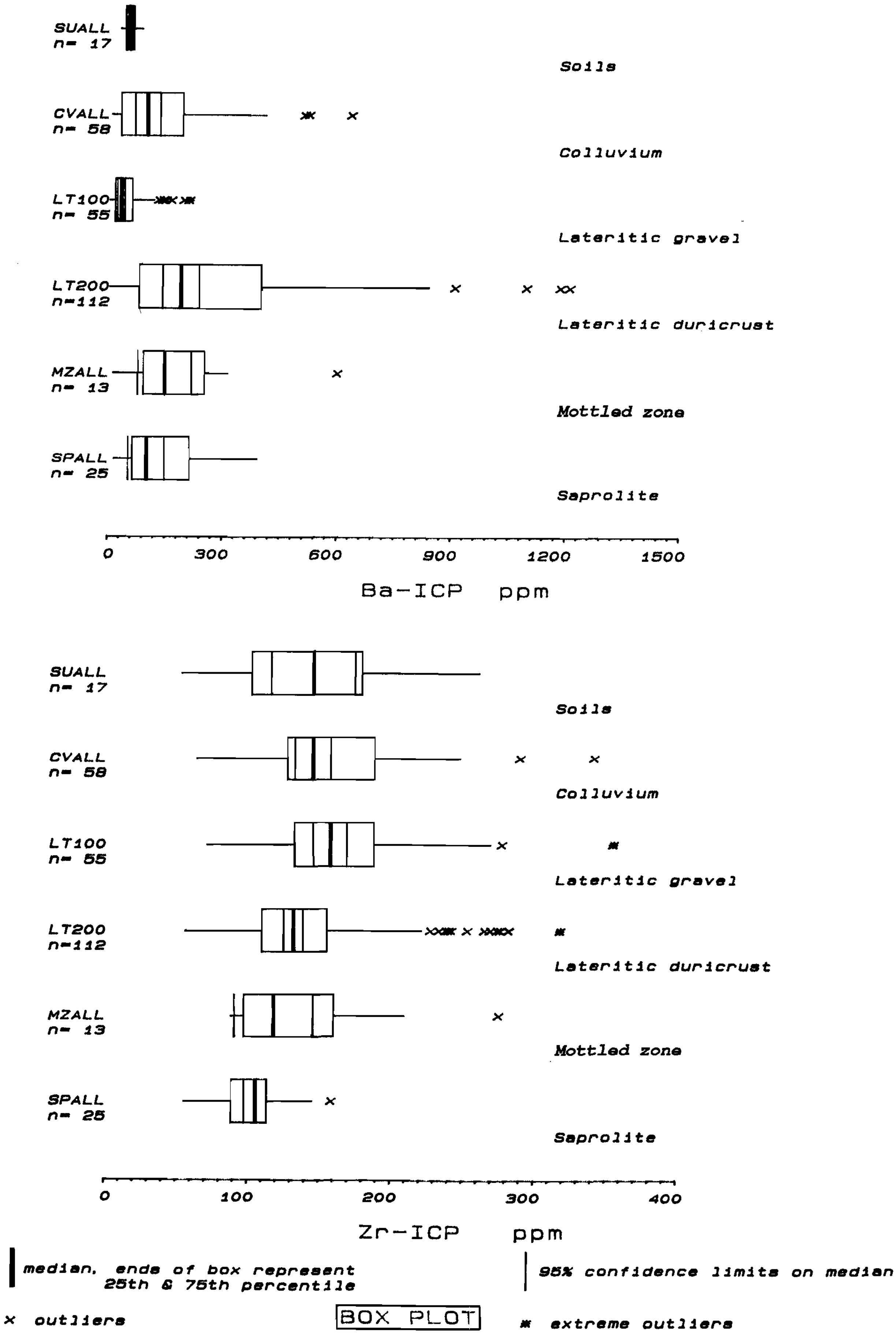


Fig.27.Box plots showing the distribution of Ba and Zr in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

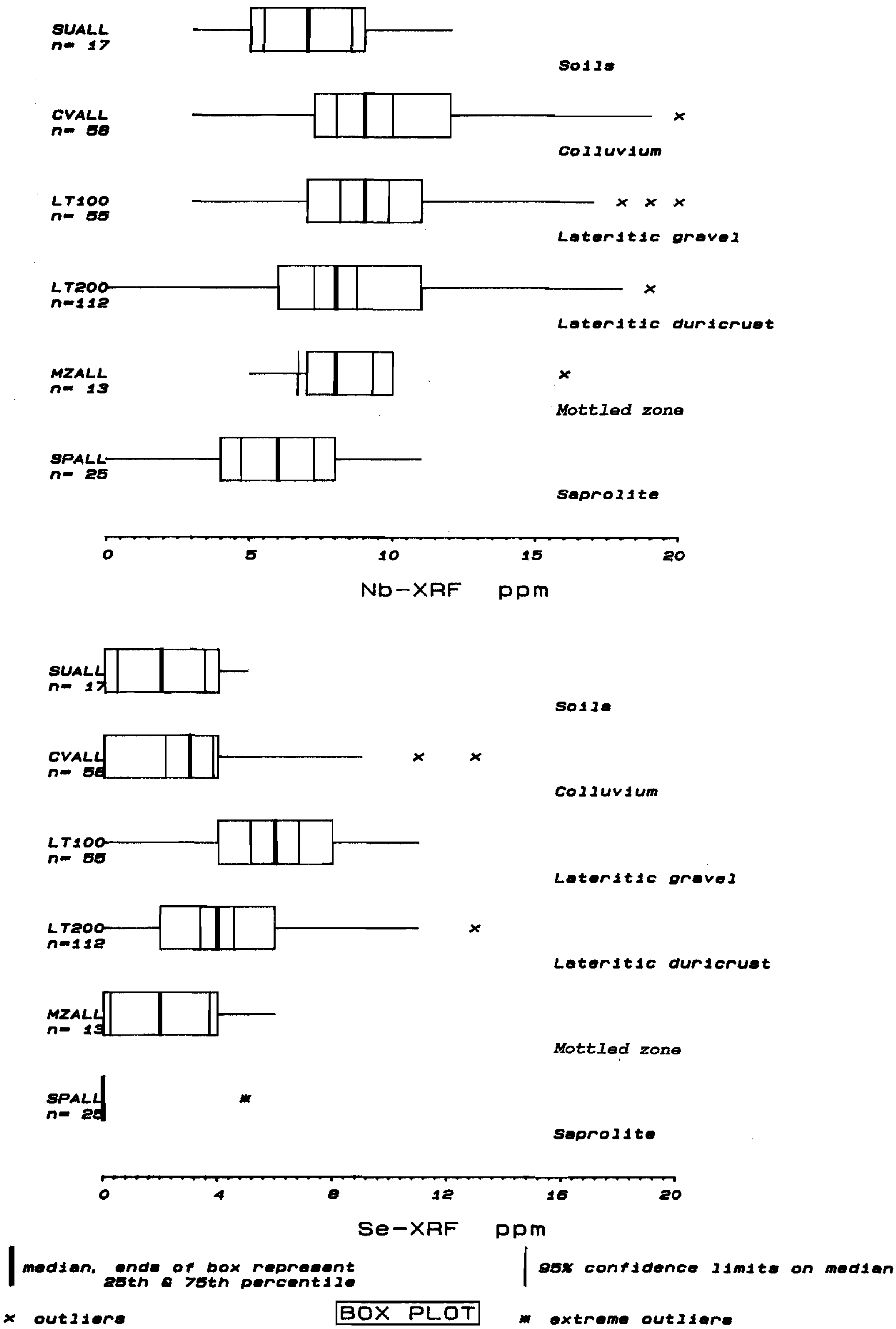


Fig.28.Box plots showing the distribution of Nb and Se in several materials from Mt. Gibson arranged vertically in order of the stratigraphy.

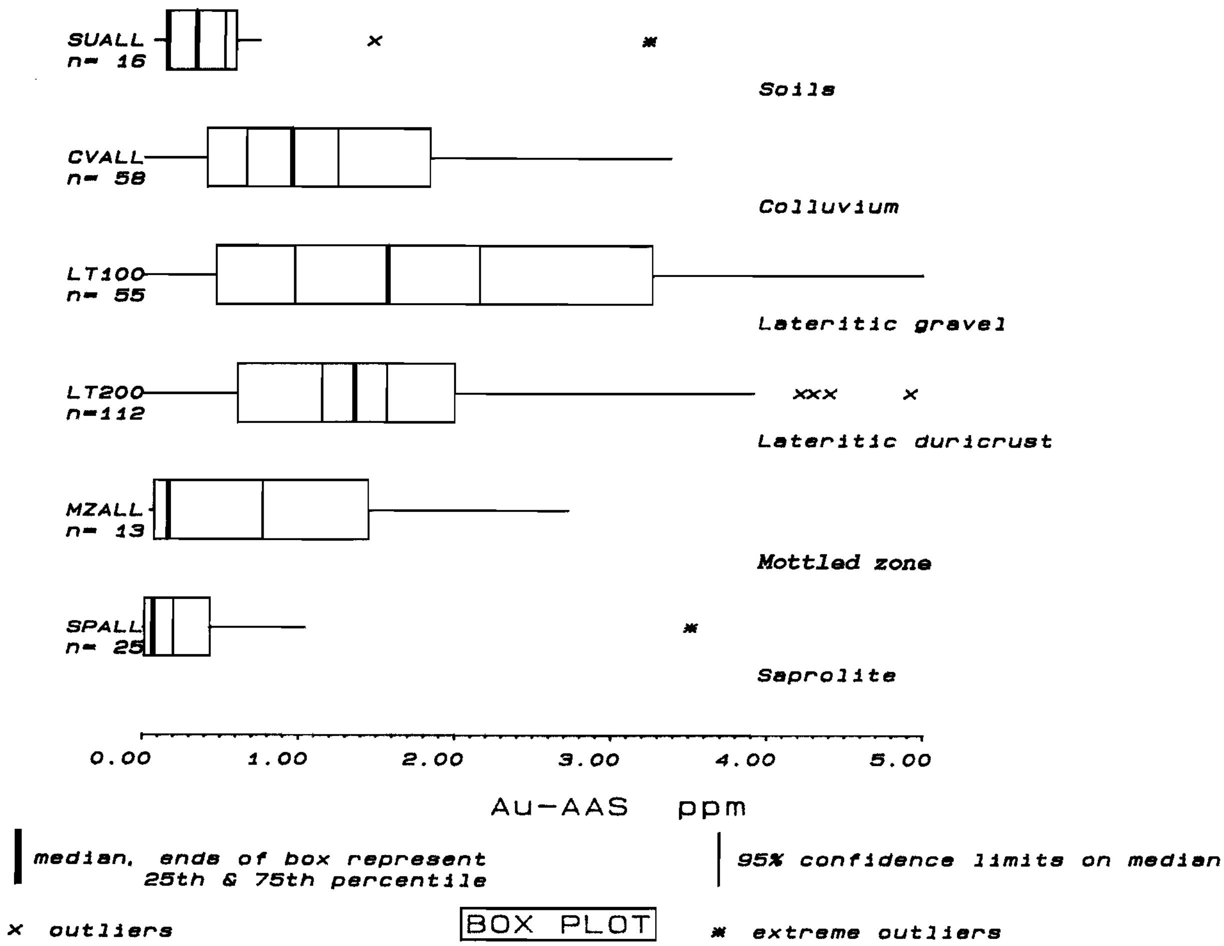


Fig.29.Box plot showing the distribution of Au in several materials from Mt. Gibson arranged vertically in order of the regolith stratigraphy.

Box Plots

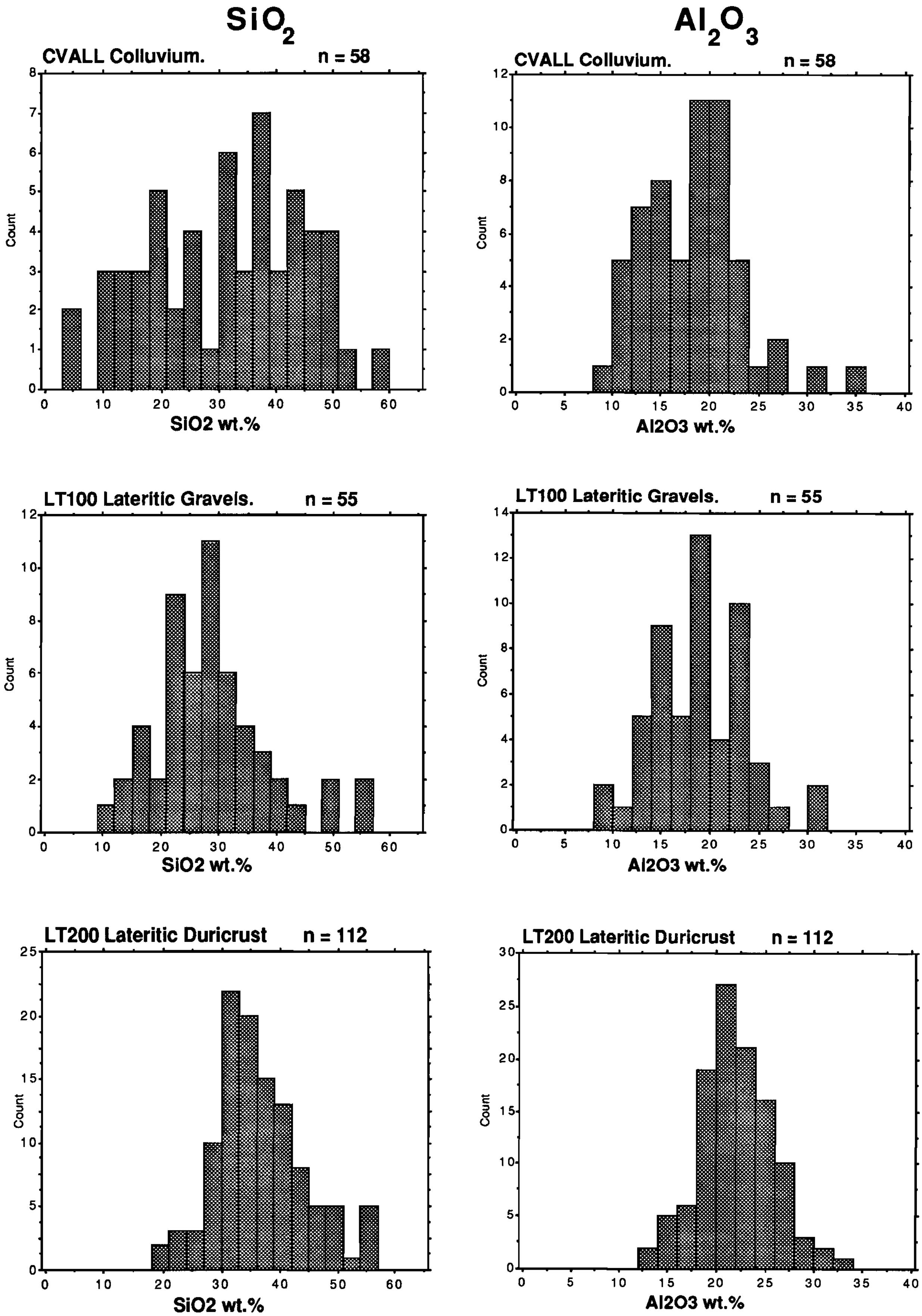


Fig.30 Histograms comparing box field types CVALL, LT100, and LT200 for SiO_2 and Al_2O_3.

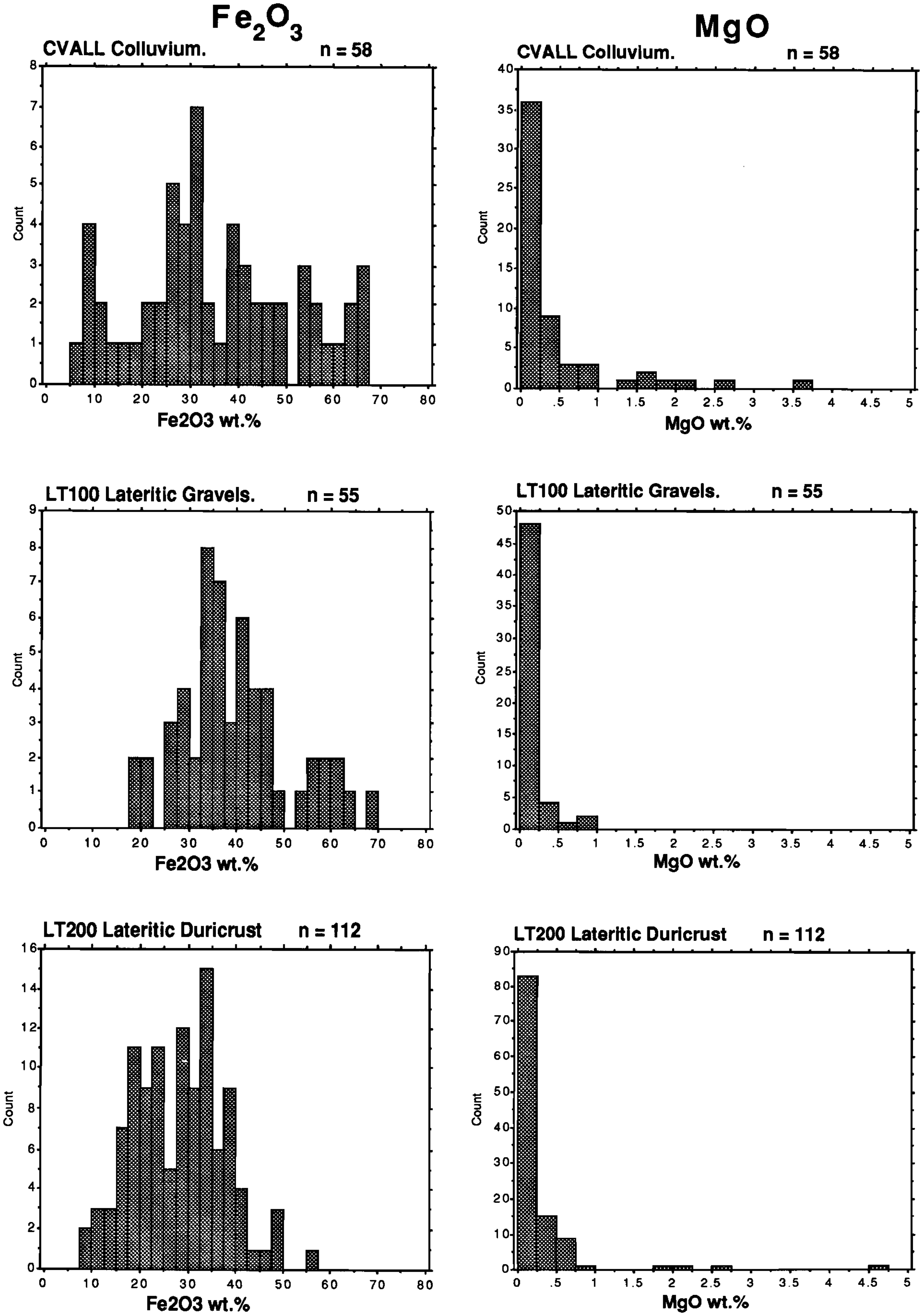


Fig.31. Histograms comparing box field types CVALL, LT100, and LT200 for Fe_2O_3 and MgO.

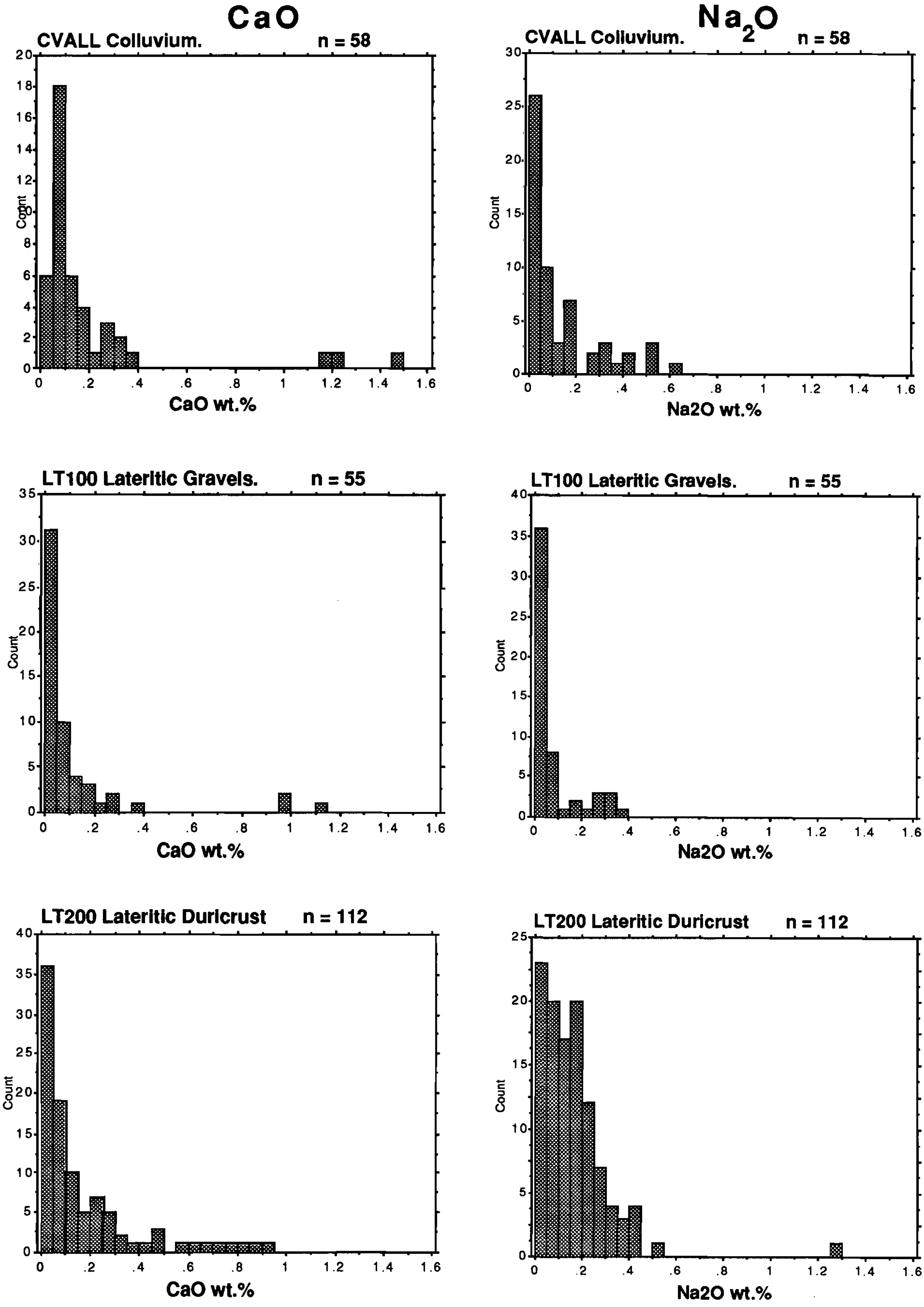


Fig.32. Histograms comparing box field types CVALL, LT100, and LT200 for CaO and Na_2O.

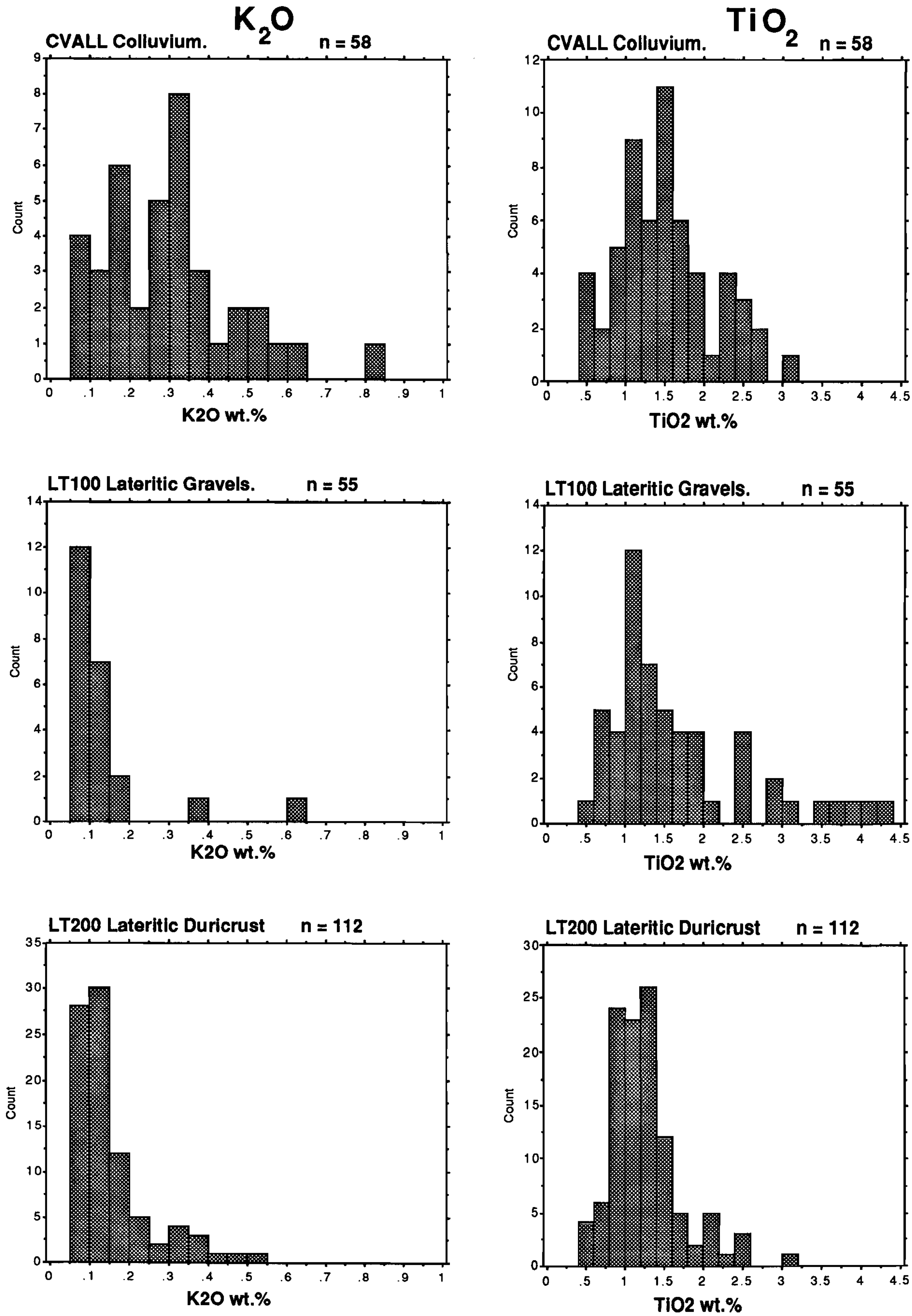


Fig.33. Histograms comparing box field types CVALL, LT100, and LT200 for K_2O and TiO_2

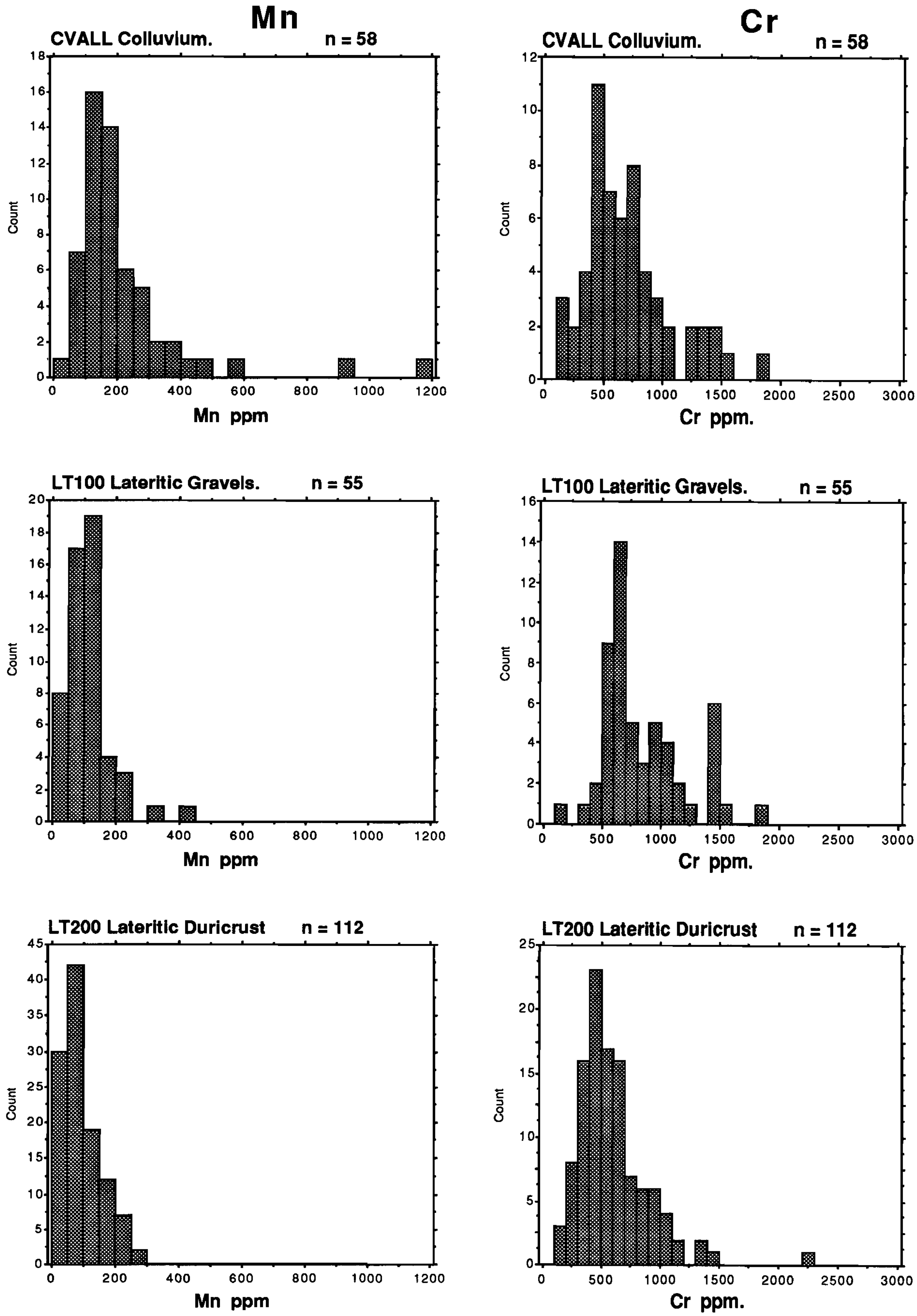


Fig.34. Histograms comparing box field types CVALL, LT100, and LT200 for Mn and Cr.

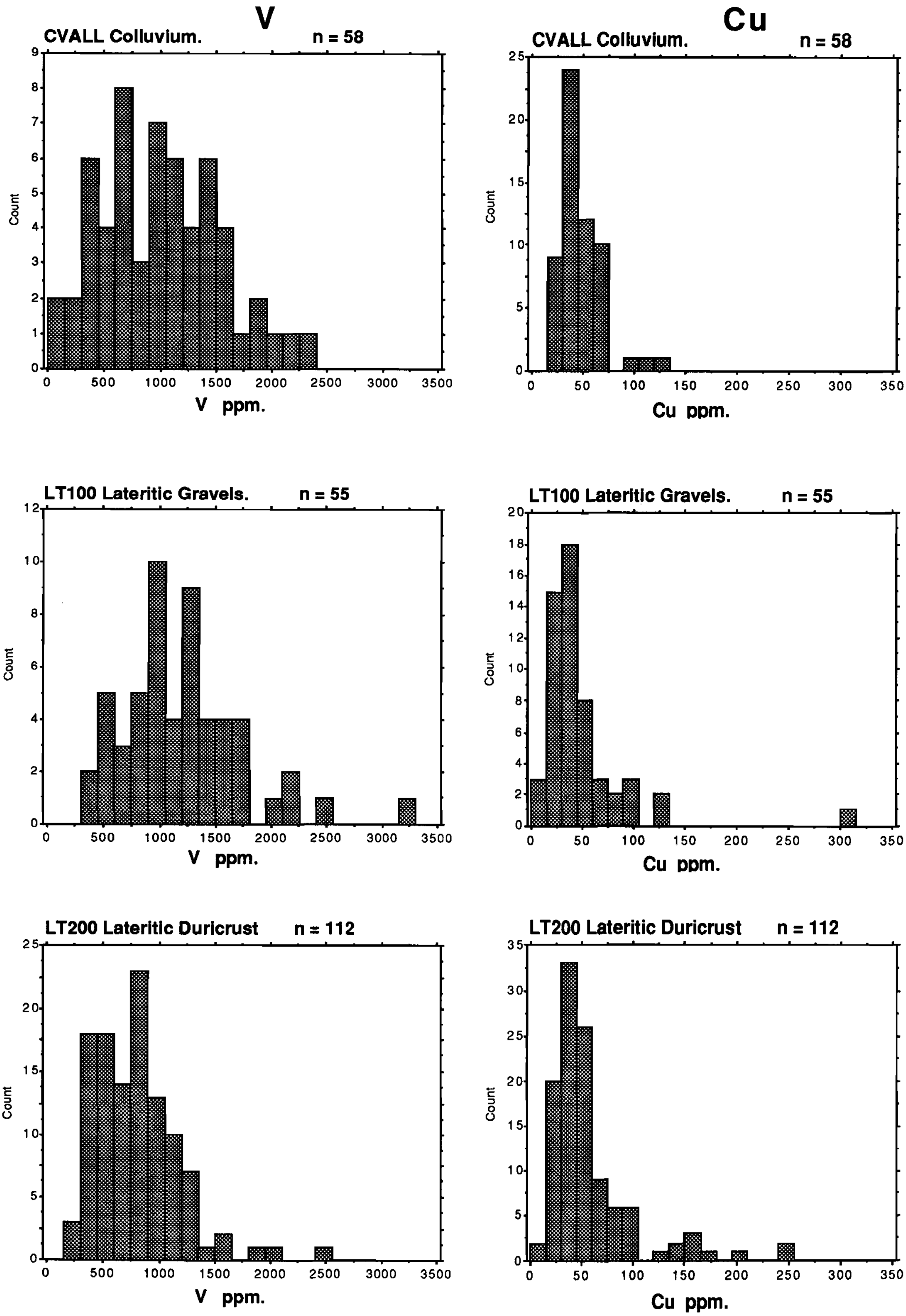


Fig.35. Histograms comparing box field types CVALL, LT100, and LT200 for V and Cu.

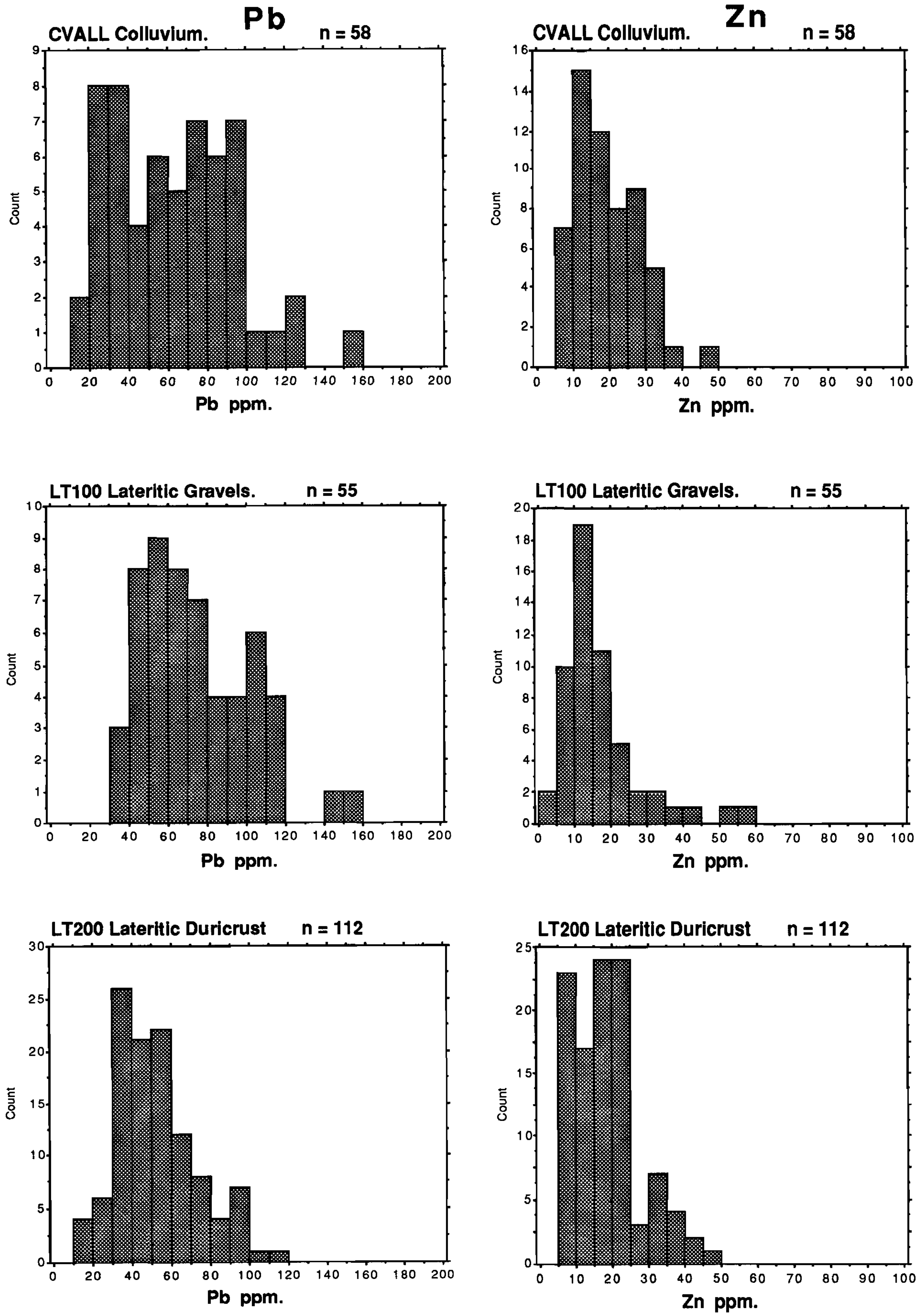


Fig.36. Histograms comparing box field types CVALL, LT100, and LT200 for Pb and Zn.

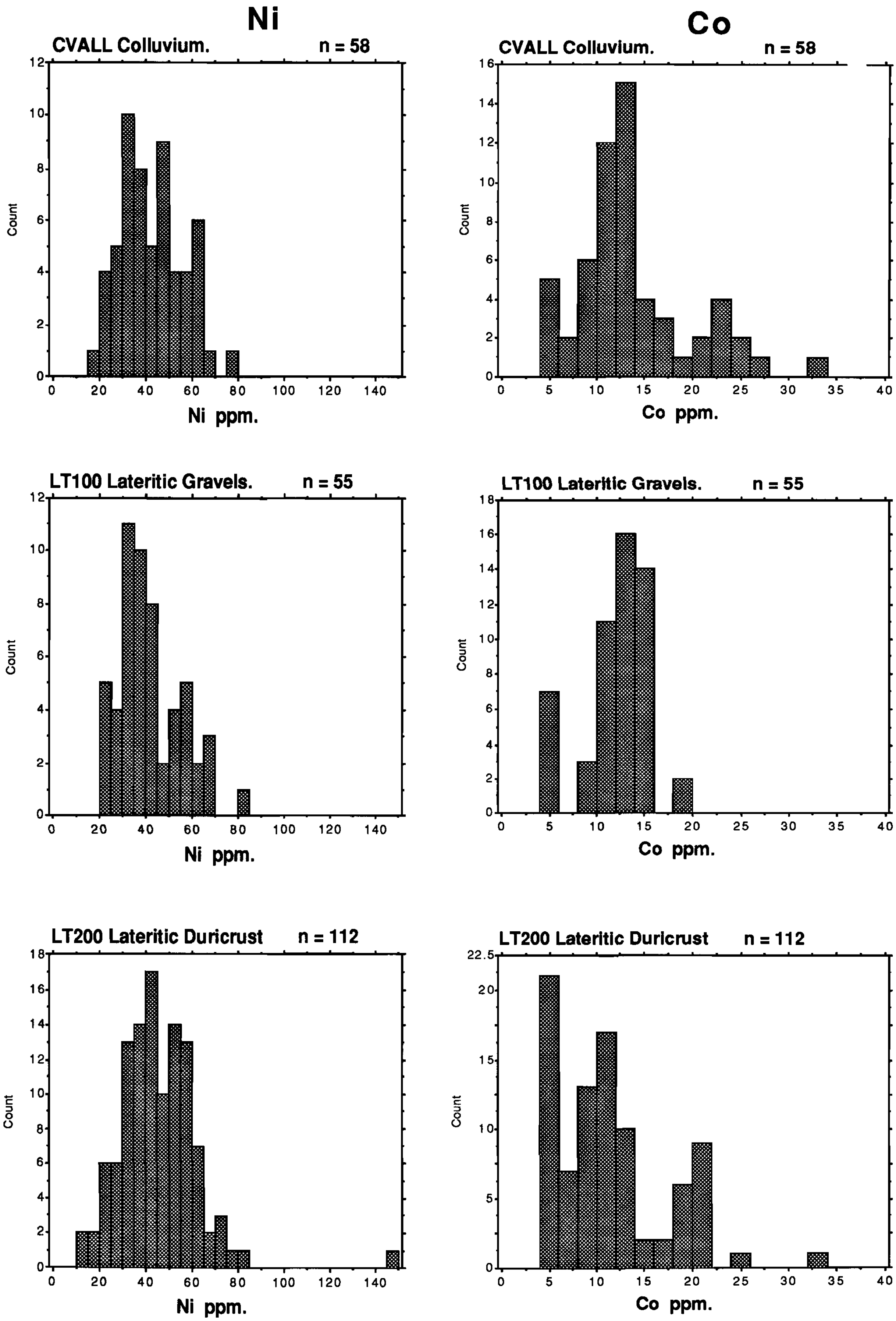


Fig.37. Histograms comparing box field types CVALL, LT100, and LT200 for Ni and Co.

Histograms

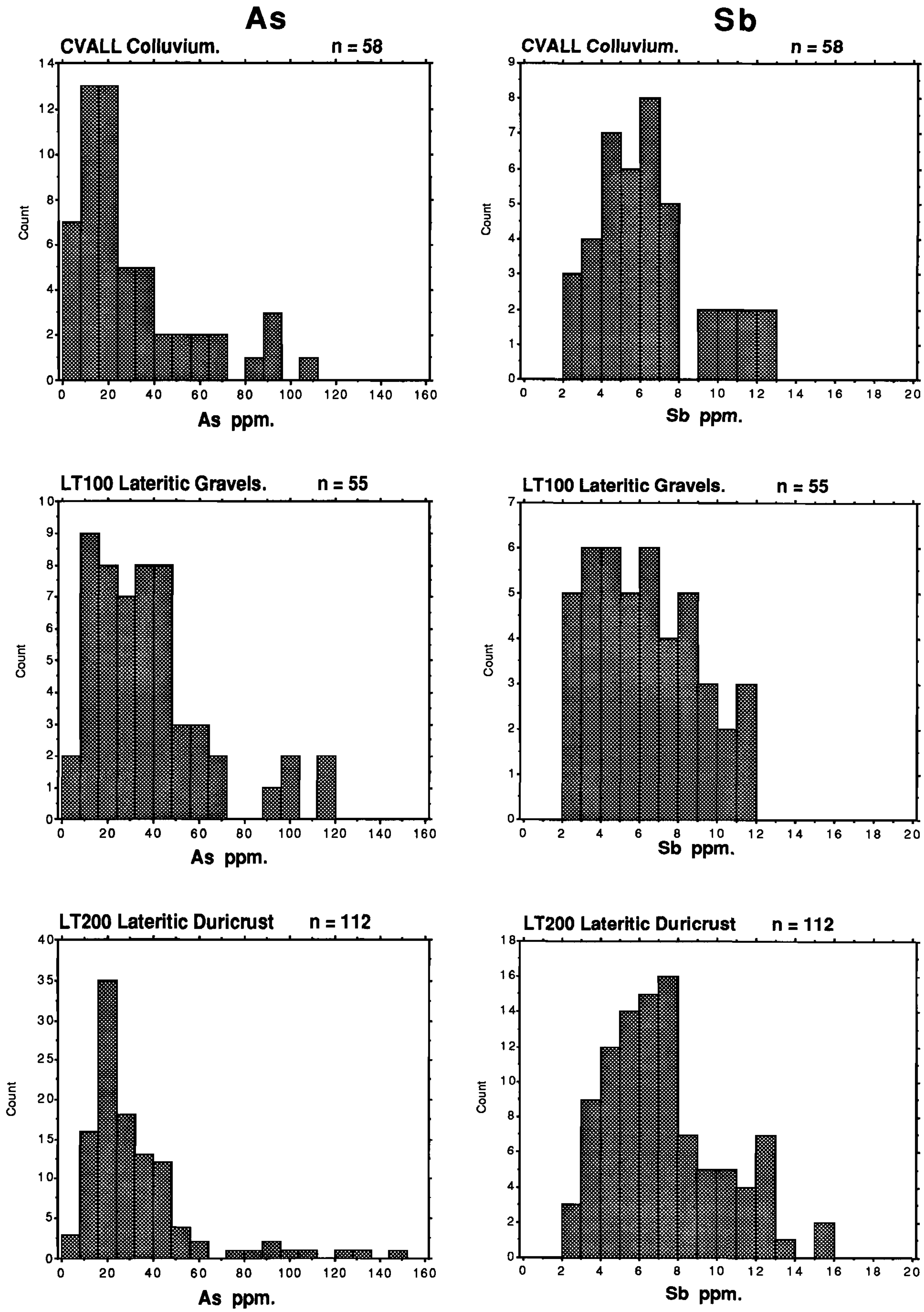


Fig.38. Histograms comparing box field types CVALL, LT100, and LT200 for As and Sb.

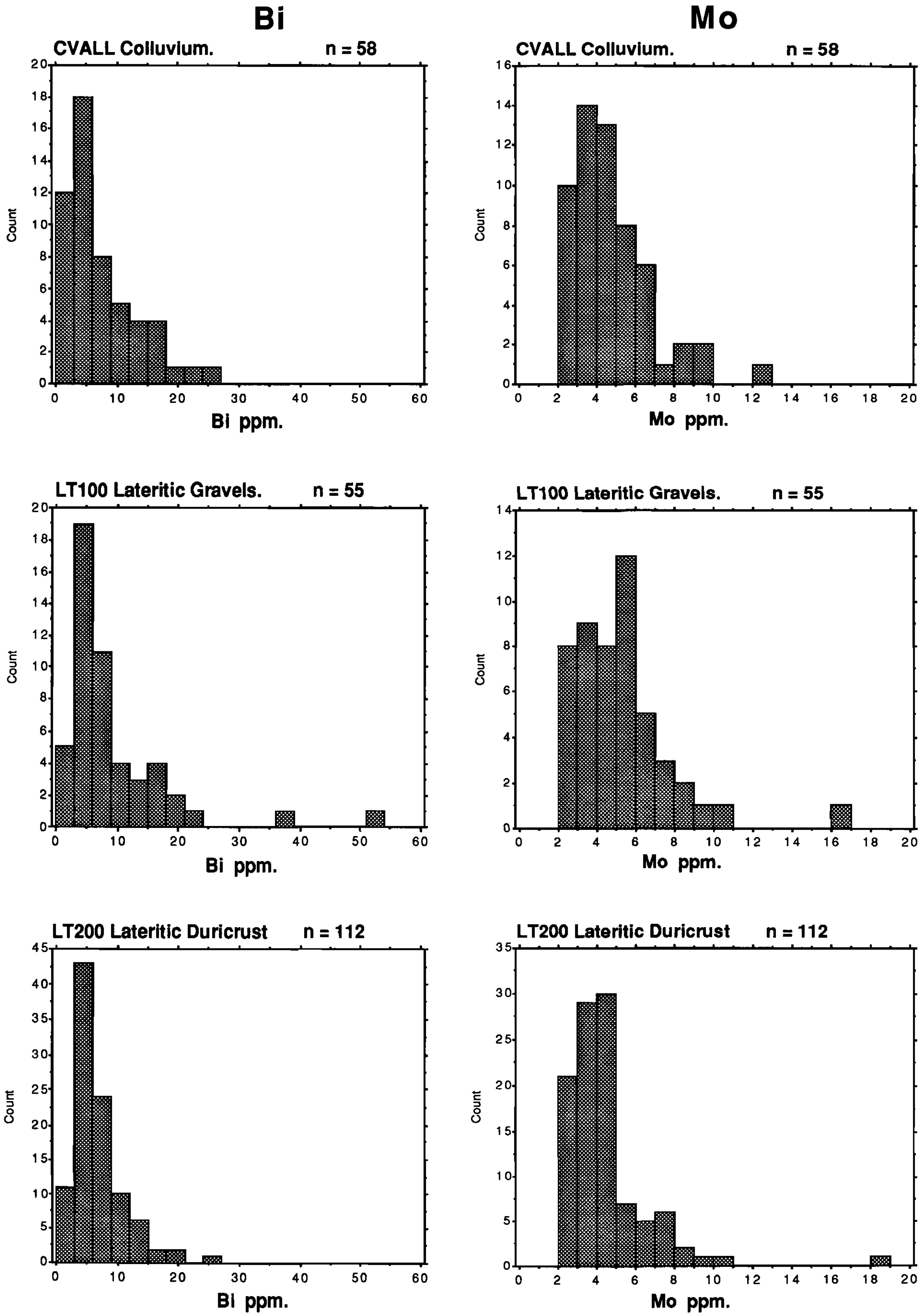


Fig.39. Histograms comparing box field types CVALL, LT100, and LT200 for Bi and Mo.

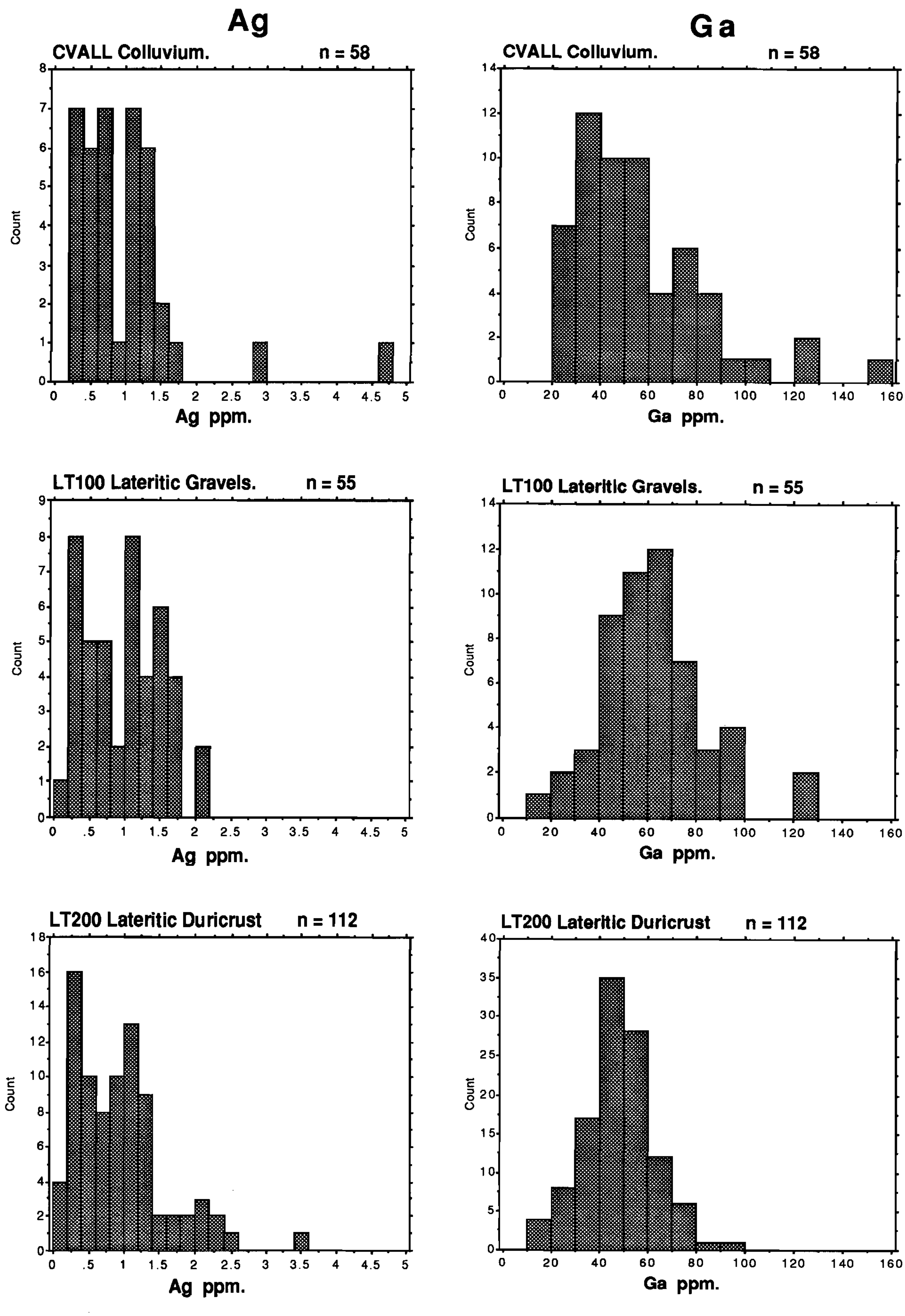


Fig.40. Histograms comparing box field types CVALL, LT100, and LT200 for Ag and Ga.

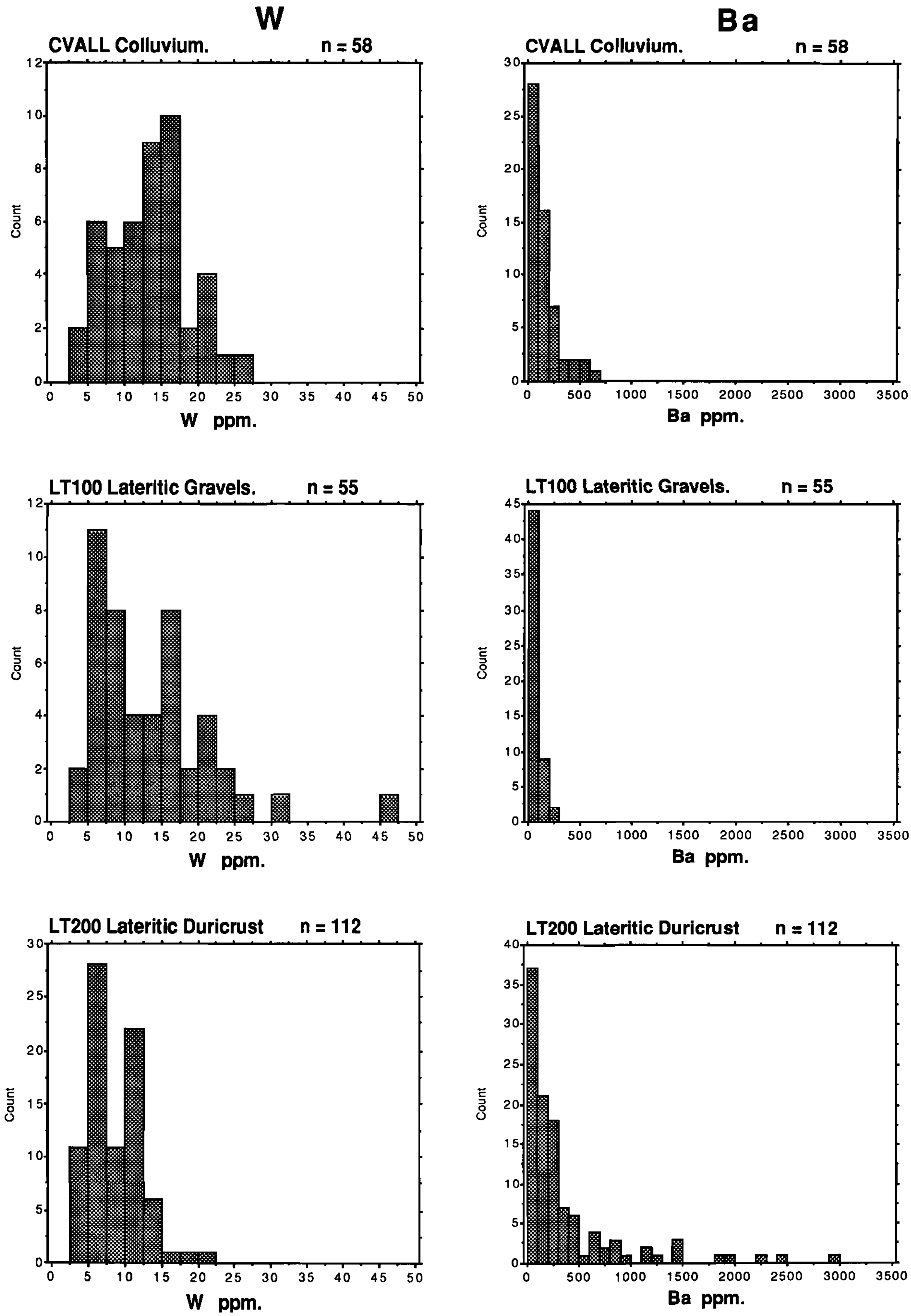


Fig.41. Histograms comparing box field types CVALL, LT100, and LT200 for W and Ba.

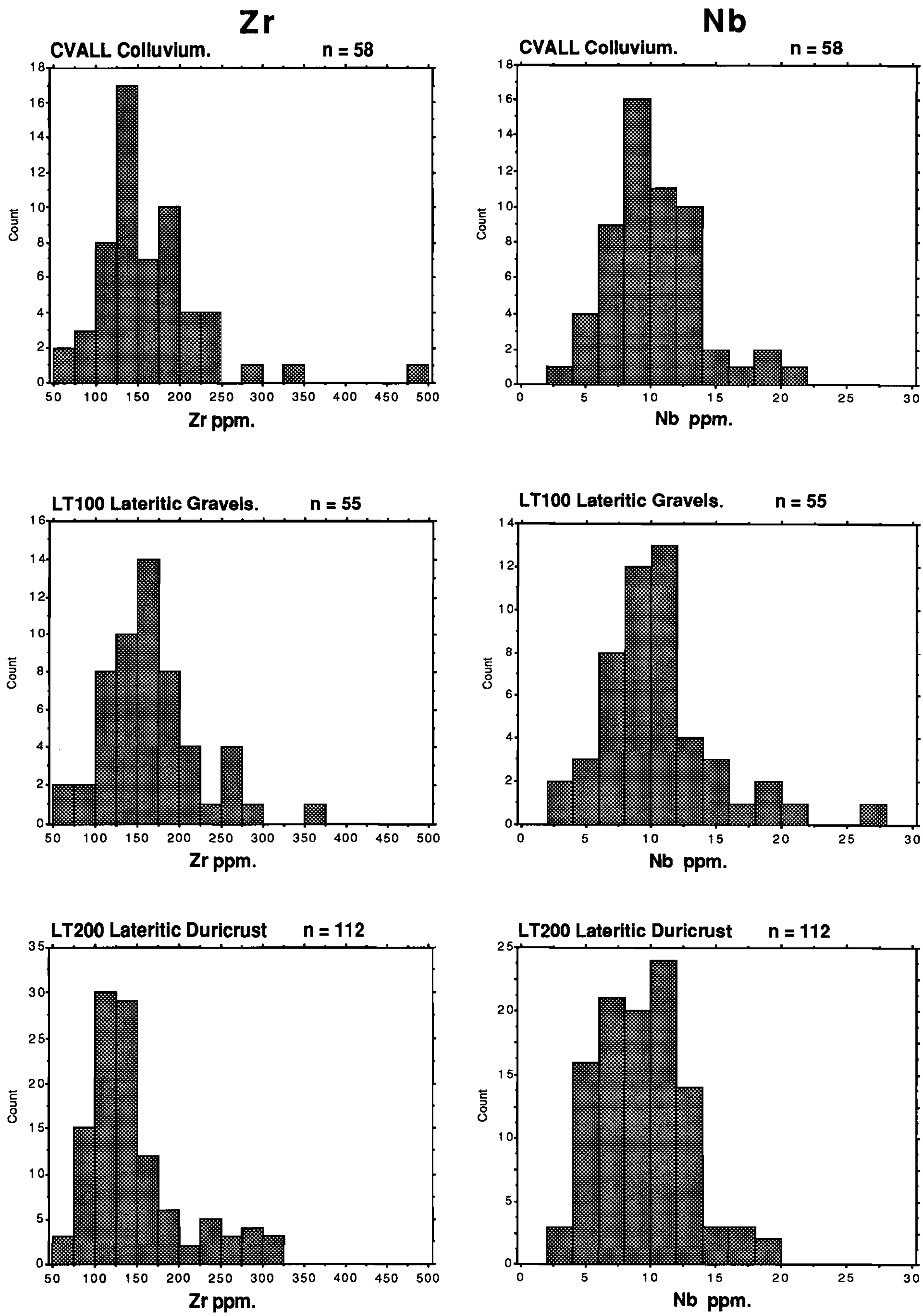


Fig.42. Histograms comparing box field types CVALL, LT100, and LT200 for Zr and Nb.

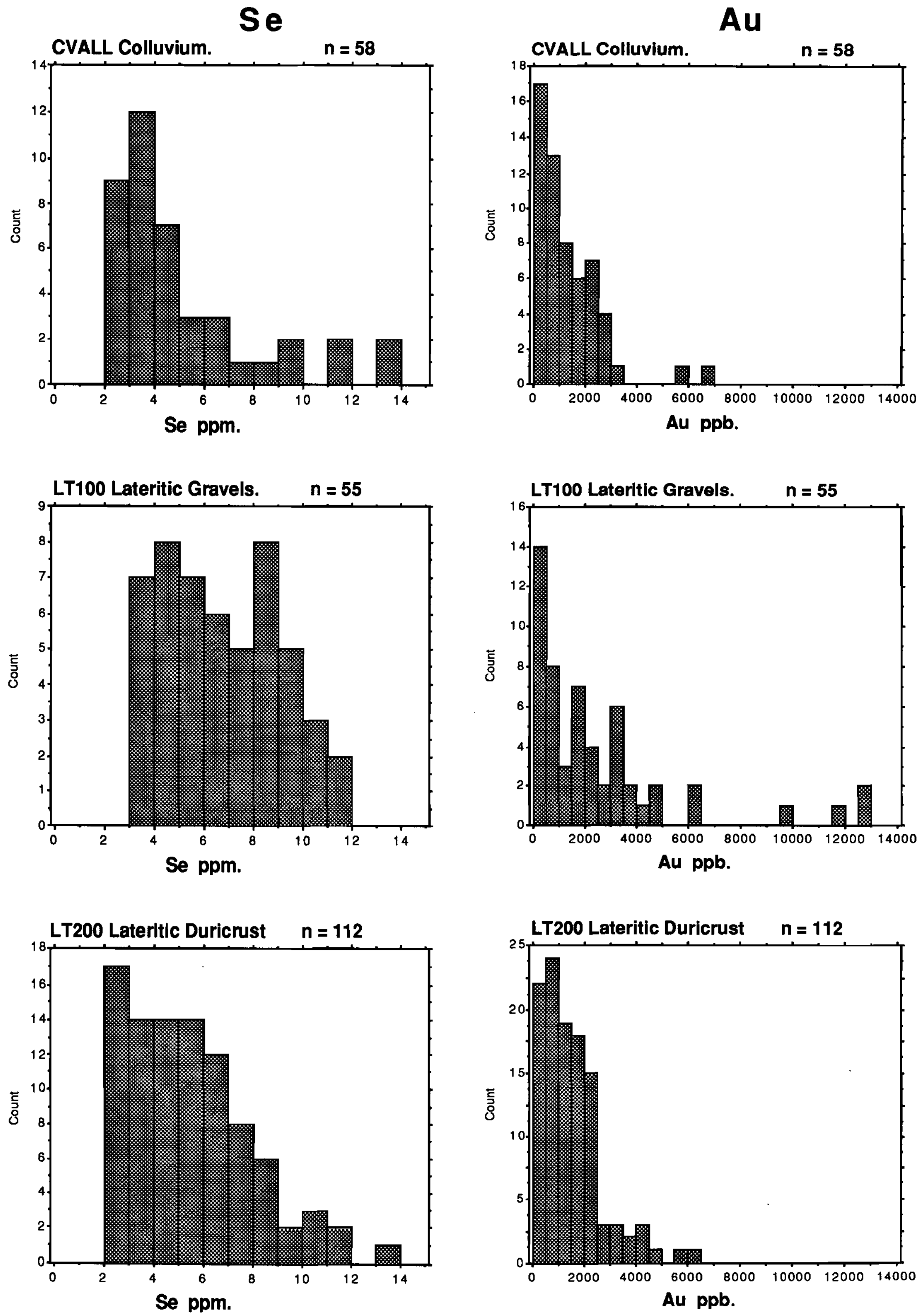


Fig.43. Histograms comparing box field types CVALL, LT100, and LT200 for Se and Au.

6.6 Correlation Coefficients and Scatterplot Matrices

One of the rudimentary steps in the study of the inter-element relationships is the use of correlation coefficients. Caution is needed in interpretation of a calculated coefficient since extreme outliers can dramatically influence the calculated value. This potential problem can be partly overcome by using robust correlation coefficients in which such outliers are trimmed from the data, (Grunsky, 1991, Section 1.8).

Correlations between element pairs which are sufficiently high to warrant attention should always be plotted as XY scatterplots. Programs are now readily available which plot the correlations as a matrix of XY plots, or provide this information in real time on the screen. Such scatterplot matrices have the advantage of allowing significant correlations to be seen graphically and allow extreme outlying points to be recognized. Appropriate programs such as Data Desk (Odesta Corporation)allow inter-active graphical identification of points on the Apple Macintosh.

Scatterplot matrices involving 31 x 31 elements were generated for the colluvium, lateritic gravel, and lateritic duricrust sample groups as three sets of graphs, each on an A1 size sheet, impractical to accompany this report.

Interpretation of correlation coefficients has led to the correlation webs presented separately for the colluvium samples, colluvial lateritic gravel, lateritic gravel (residuum), and lateritic duricrust, in Figures 44 to 46. Some general trends are seen within these correlation webs:

Fundamental lateritic correlations:	Fe V Ga Pb Ti (with negative correlation between Fe and Si)
Carbonate-related correlations:	Ca Mg K Na
Correlations perhaps related to hardpanization	Mn Co Zn
Correlations related to mineralization:	As Sb Pb

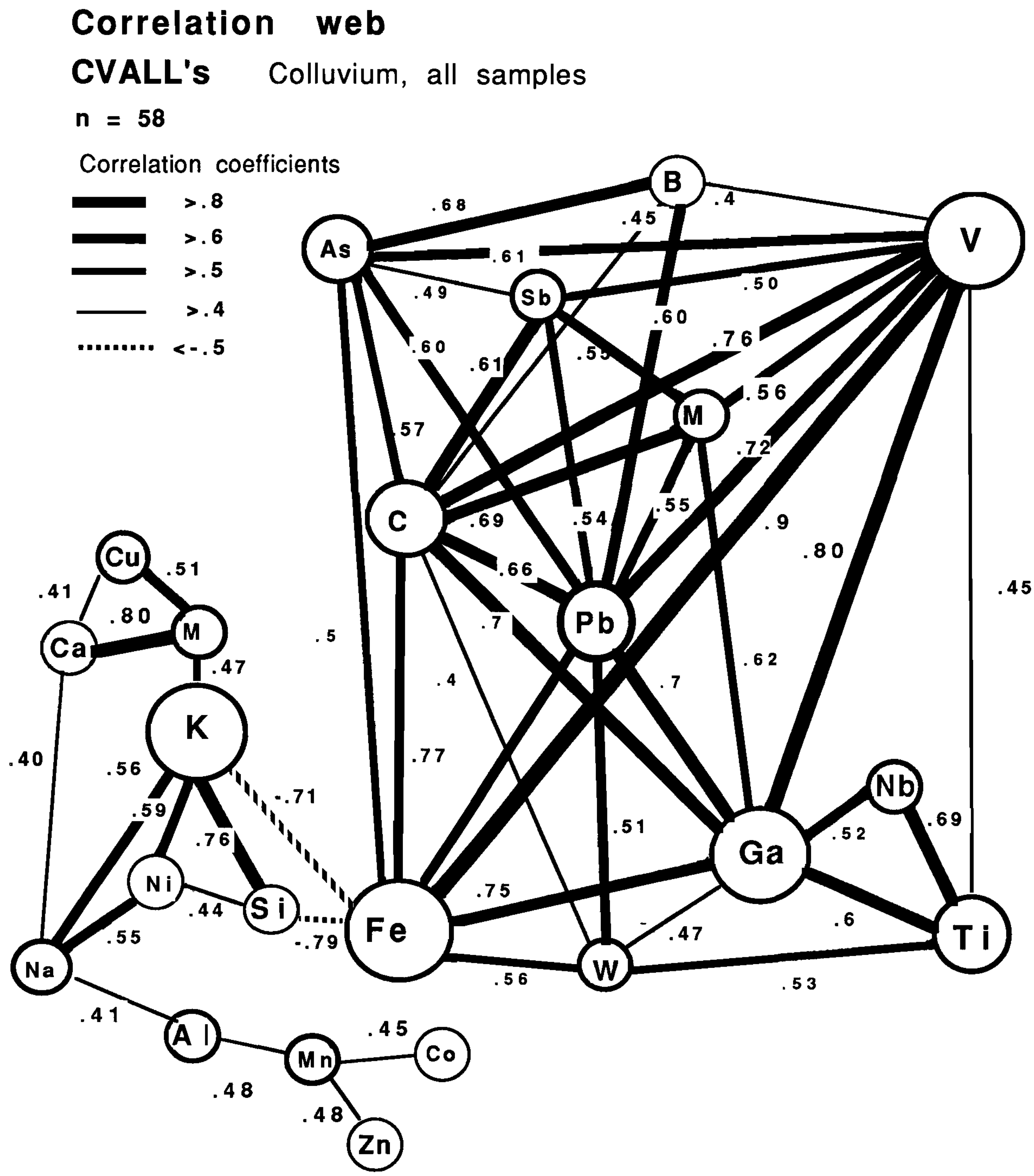


Fig. 44. Correlation web for the colluvium samples.

Correlation web

CV333's Colluvial pisolitic/nodular lateritic gravel

n = 26

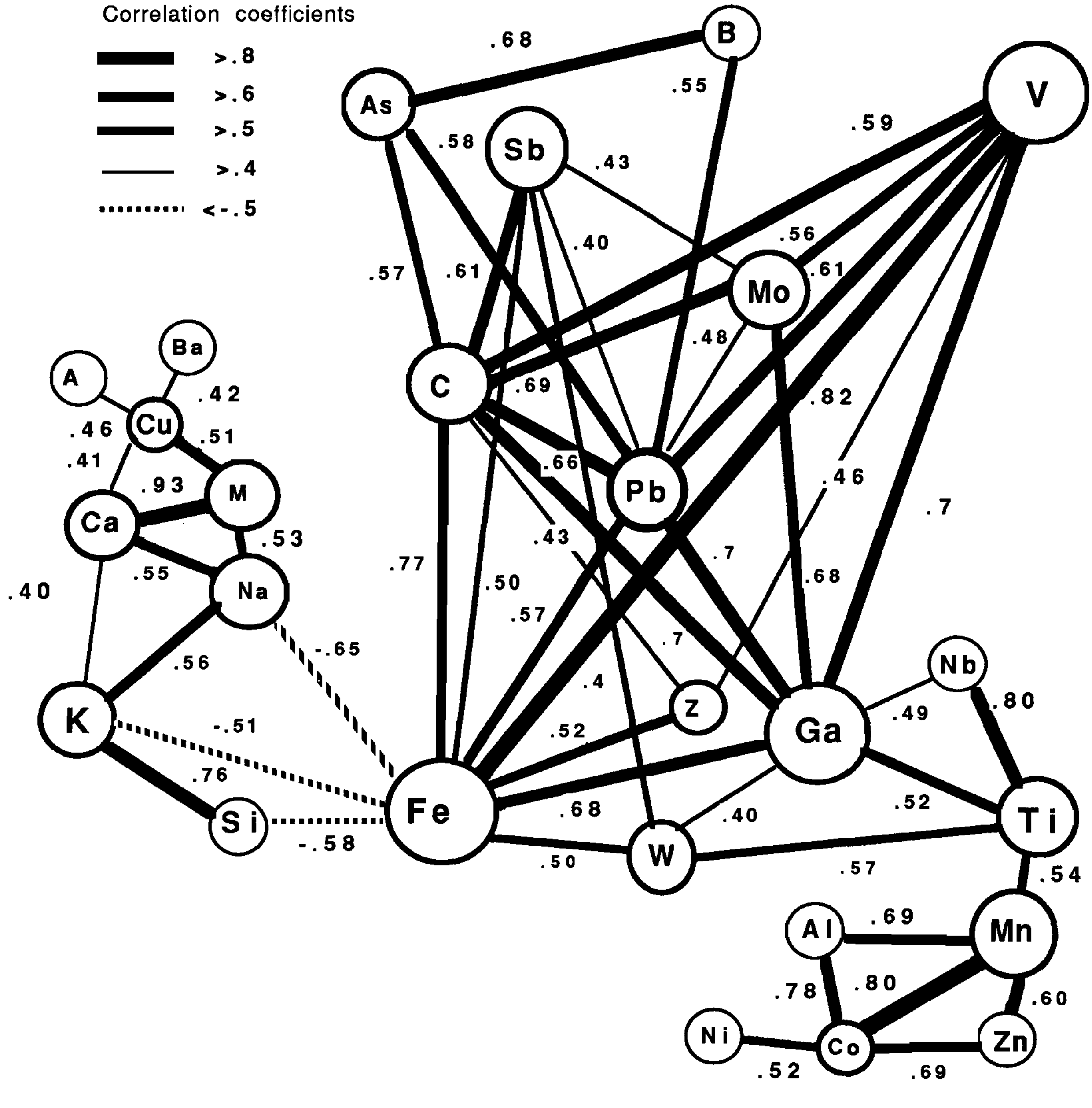


Fig. 45. Correlation web for the colluvial pisolitic/nodular lateritic gravel samples.

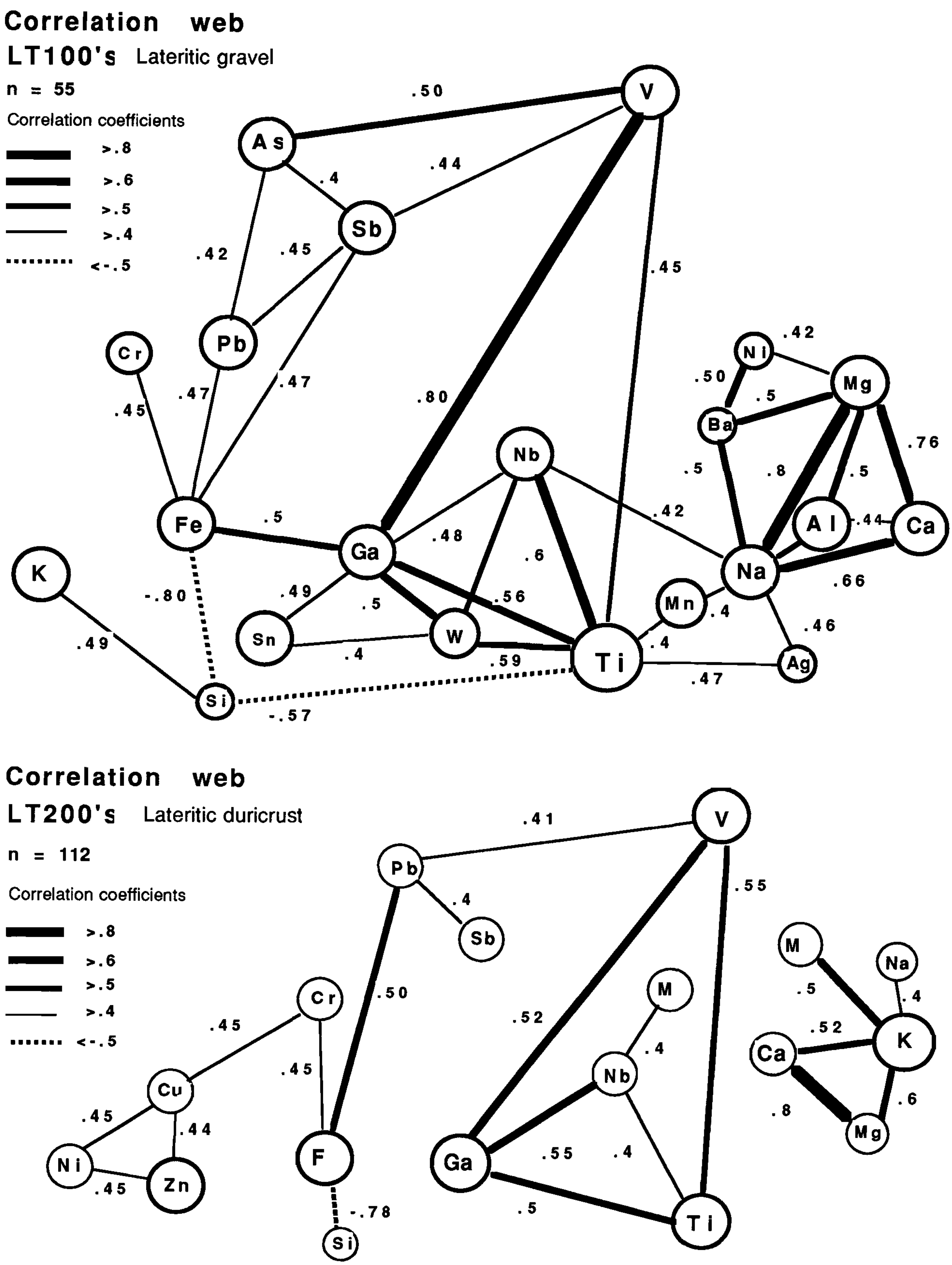


Fig. 46. Correlation web for the residual lateritic gravels and lateritic duricrust.

7.0 SOME COMMENTS ON THE DATA SETS

7.1 Ternary Diagrams for SiO_2 - Al_2O_3 - Fe_2O_3

Ternary diagrams using SiO_2, Al_2O_3 and Fe_2O_3 as the apices are useful in showing some of the dominant chemical and mineralogical characteristics of lateritic materials. The minerals kaolinite, quartz, goethite, hematite, and gibbsite, which commonly dominate, plot within this system. However, it needs to be kept in mind that the quartz is mostly residual. It also needs to be kept in mind that carbonates can be locally important yet they are not represented on this diagram. The effects of authigenic carbonate growth in lateritic materials is discussed in Section 7.2.

Figure 47 shows the distribution of all the samples (A) with symbols for the main sample types. The figure also has subsidiary diagrams for each of the main sample types (B and C).

It can be seen that, as expected, samples of the lateritic gravels (LT100) overlap the lateritic duricrusts (LT200) and spread towards higher Fe contents, the main difference being more of the kaolinitic and siliceous matrix in the duricrusts. The saprolite samples are very much more siliceous and kaolinitic than most of the samples of lateritic residuum.

The samples of colluvium, being gravels, gravelly clays, and gravelly sands all derived from dismantling of the upper parts of lateritic weathering profiles, understandingly show a wide spread in compositions which overlaps those for the component materials. As would be expected, the colluvial pisolitic/nodular lateritic gravel (CV333) samples show a close similarity to the ferruginous end of the spread of samples of residual lateritic gravel.

7.2 Replacement of Regolith Materials by Authigenic Carbonate

Growth of authigenic carbonate due to ground water infiltration and subsequent evaporation is visible in some units of the regolith stratigraphy, particularly where trenches and mining pits expose the units. Descriptions of carbonates and these settings are given in Report 20R by Anand *et al.* (March 1989, Section 2.9) and Report 165R by Anand *et al.* (1991, Section 6.0).

This authigenic carbonate is locally conspicuous within some pits and trenches exposing gravelly colluvium and the underlying lateritic residuum, particularly in lateritic duricrust. The carbonate is generally a magnesian calcite, the process for classification being referred to as calcification. Extreme replacement has led to the formation of veining and sheets of calcrete, ranging from centimetre scale to tens of metres along the bedding directions within these regolith units.

Development of authigenic carbonate can have a marked effect on the major and minor element chemistry. This is not distinct on a standard Si-Al-Fe triangular diagram already discussed (Fig 47A); however, the effects of replacement by carbonate is well seen on a three-dimensional plot of Si-Al-Fe. The majority of samples of lateritic duricrust, lateritic gravel, and colluvium are composed of goethite, hematite, kaolinite and quartz. On a three-dimensional Si-Al-Fe plot, these minerals essentially form a plane. Investigation of outliers shows that here the main departures from this plane are caused by the compositional effects of calcification, Figure 48.

In forming this figure, the plane containing the majority of samples has been rotated end on and the Al and Fe axes have been placed in the same plane as the X-axis, the Y-axis being Si. The position of samples forming outliers, on the origin side of the main linear trend, is derived predominantly from their CaO composition. Samples with greater than 3% CaO tend to plot away from the main linear trend, with the displacement proportional to the CaO content. Calcrete samples, which are the extreme cases of replacement by authigenic carbonate growth, are shown as the larger black squares in Figure 48.

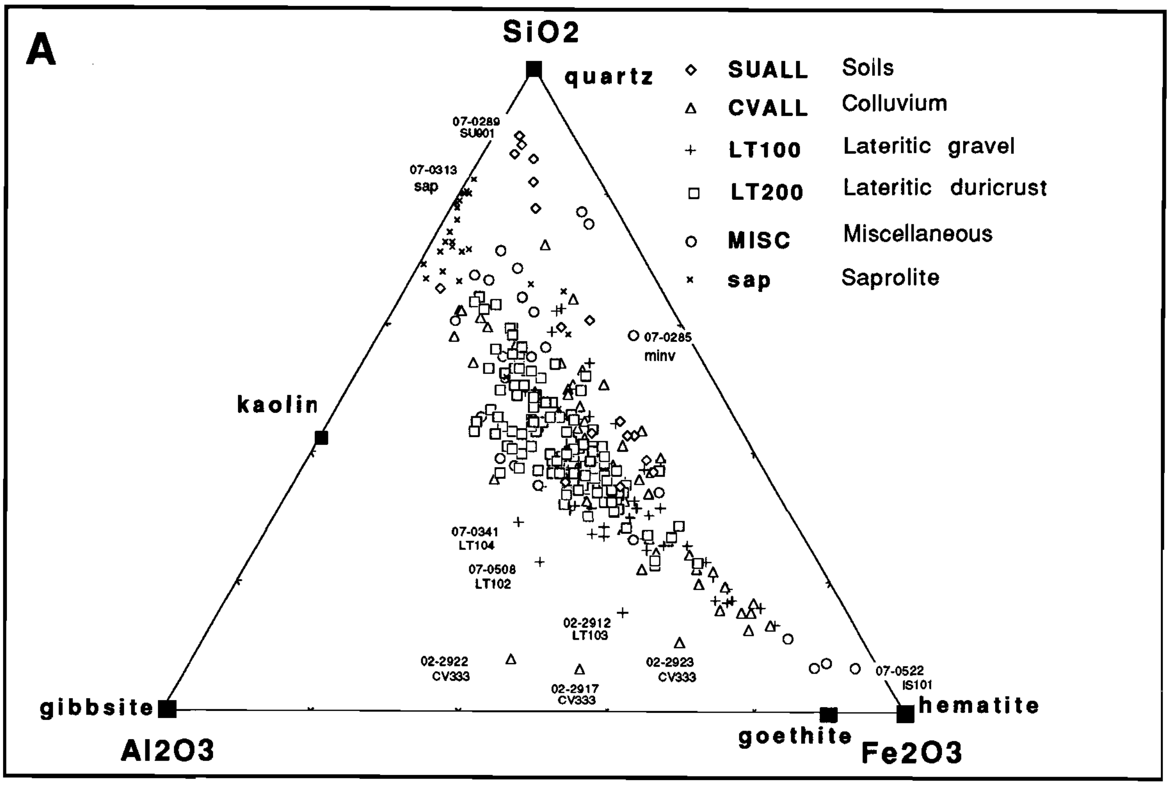


Fig. 47A. Samples from all of the data sets, coded for sample type. Some outliers are annotated.

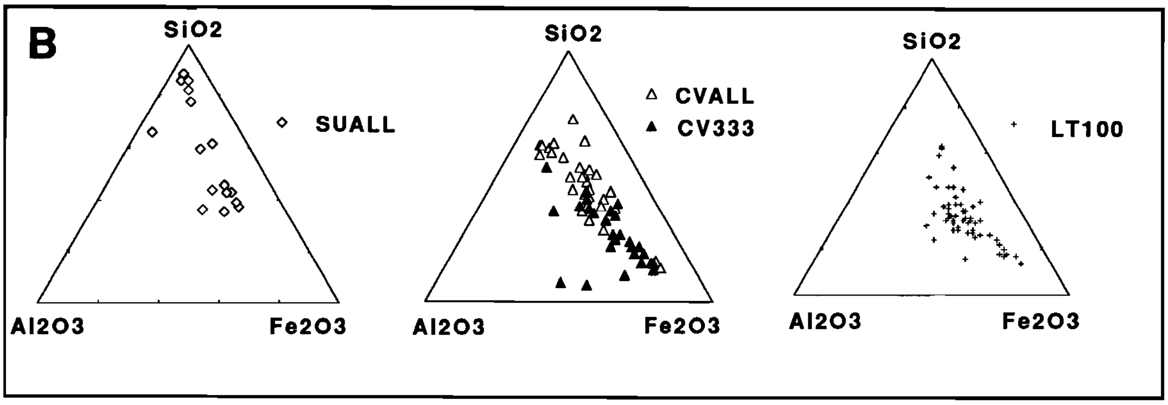


Fig. 47B & C. Showing sample types separately.

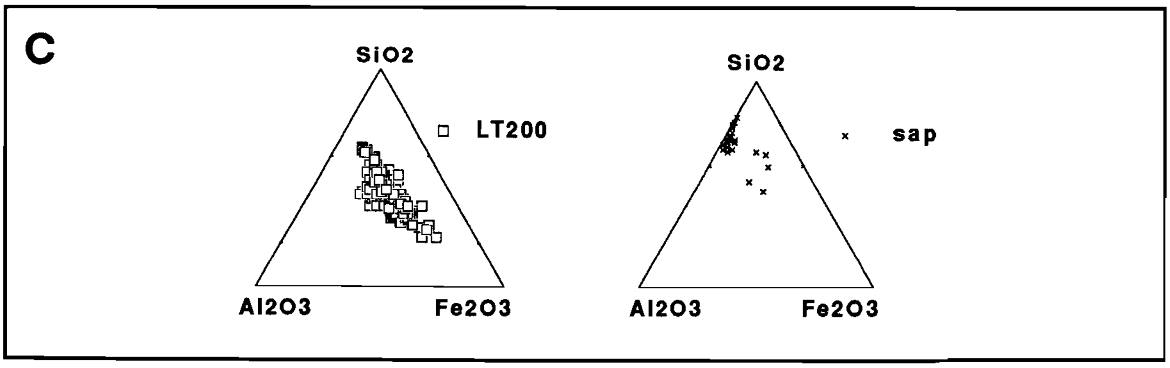


Fig. 47. Ternary plots of SiO2-Al2O3-Fe2O3.

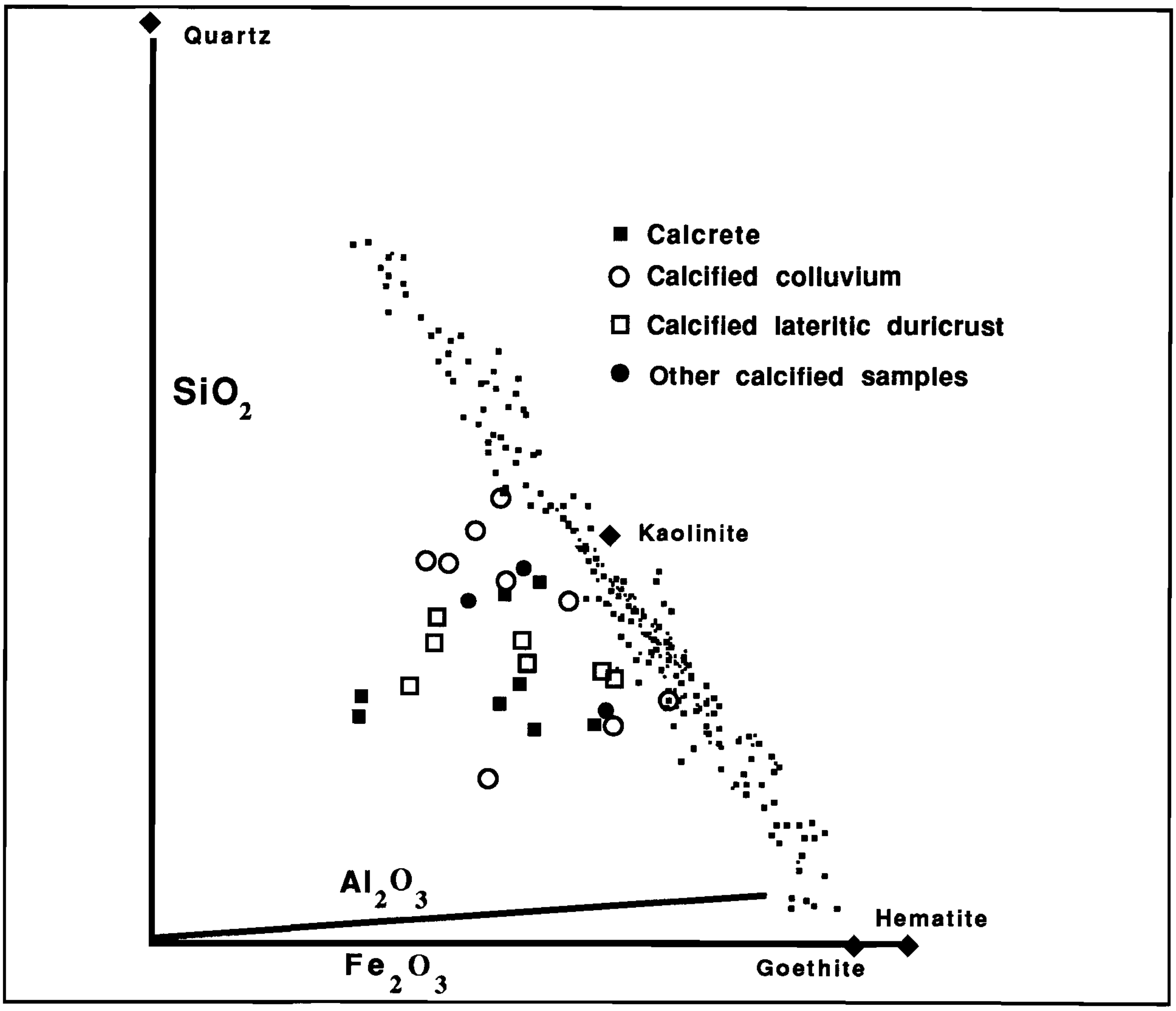


Fig.48 Section through a three-dimensional plot showing samples with CaO > 3% in larger symbols and their deviation from the Si-Fe plane of the total sample group.

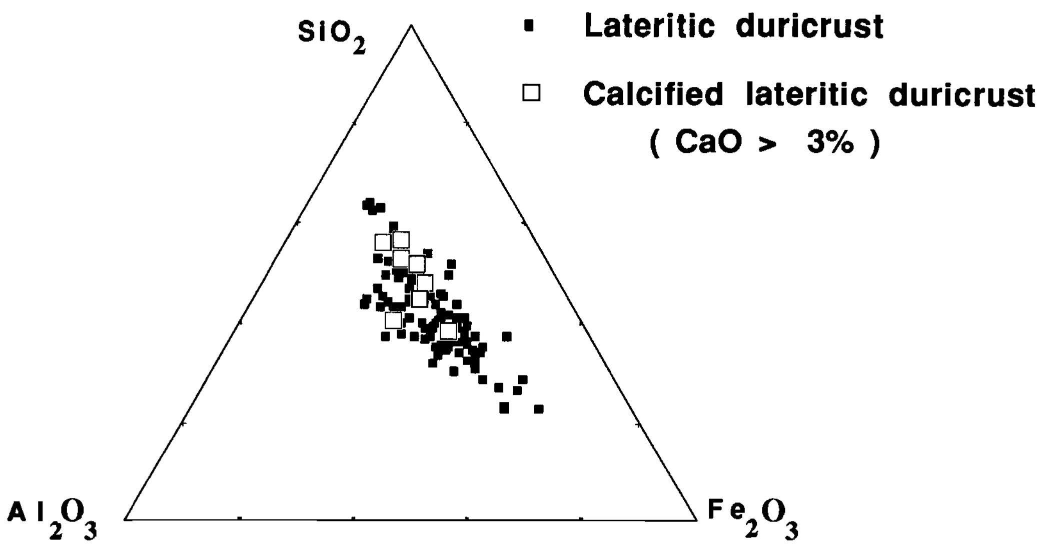


Fig.49 On this triangular plot the calcified samples are indistinguishable from the rest of the lateritic duricrust samples.

Where data interpretation requires use of representative samples, such as of lateritic gravel or lateritic duricrust, the samples effected by calcification would need to be flagged and excluded. On the other hand, where the effects of calcification need to be identified, the calcified samples provide important data.

For comparative purposes, a triangular Si-Al-Fe plot for the lateritic duricrust samples, some of which are calcified, is shown in Figure 49.

7.3 The bimodal Si Characteristics of the Colluvium Samples

The histogram of Si for the colluvium samples is bimodal. Highlighting samples forming the low Si mode (Fig. 50), using 30% SiO_2 for the division, shows that those samples are, as expected, relatively high in Fe and correspond to the more gravelly colluvial samples in the data set.

7.4 Mn in Relation to Hardpanization

Figure 51 shows the Mn distribution in colluvium samples against Mn in a combined grouping of the colluvium, lateritic gravel and lateritic duricrust samples. The distribution of Mn in the colluvium samples is relatively high in this comparison, which is compatible with Mn introduction by processes of hardpanization.

Figure 52 shows Mn for hardpanized lateritic duricrust against a background of all of the lateritic duricrusts. These results also are compatible with Mn introduction through hardpanization processes.

7.5 Stacked Maps for Au, Pb, As and Bi

In this section three maps for each element, Au, Pb, As and Bi, are shown as stacks for colluvium, residual lateritic gravel, and lateritic duricrust, Figures 53 to 64. The purpose is to allow some comparisons between these three units of the regolith stratigraphy. Within the limitations of existing sampling, the following observations are made:

- The geochemical patterns within the colluvium almost coincide with the patterns in the residual lateritic gravels and the lateritic duricrust;

- The geochemical patterns in the colluvium and residual lateritic gravel are, however, somewhat broader than those in the lateritic duricrust. This is compatible with (a) some degree of mechanical dispersion having taken place during lateritization when the residual lateritic gravel formed by breakdown of the duricrust; and (b) more recent colluvial transportation of lateritic gravel during partial dismantling of the laterite profile;

- The patterns for all the four elements are slightly displaced eastwards (up to 100 m), which is down the paleoslope direction, compared with the line of quartz hematite veining which may mark the source mineralization. However, information on the distribution of these elements in saprolite and bedrock is very sporadic.

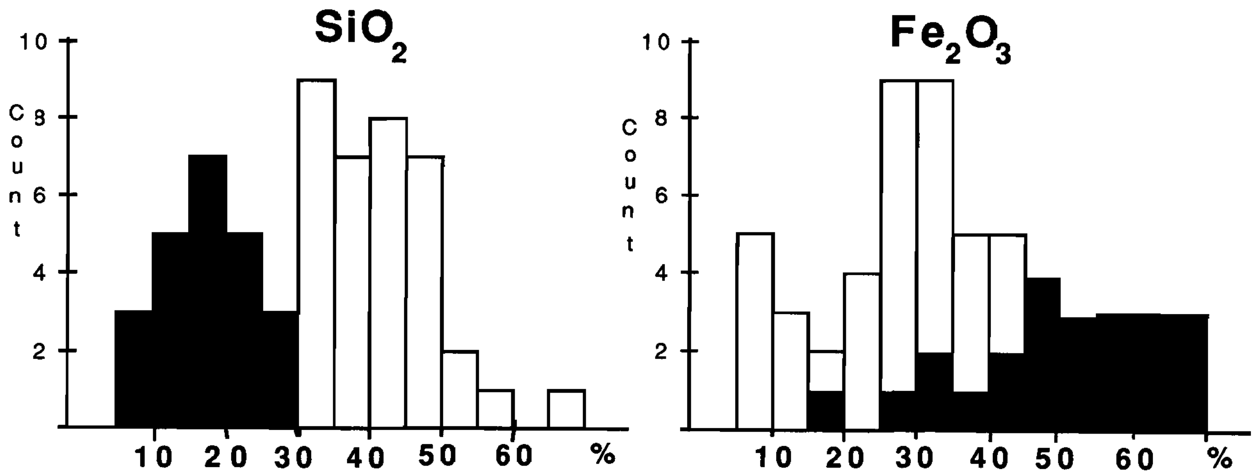


Fig.50 Histograms showing the bimodal distribution of SiO2 in colluvial samples and the corresponding high Fe2O3 in those highlighted as less than 30% SiO2.

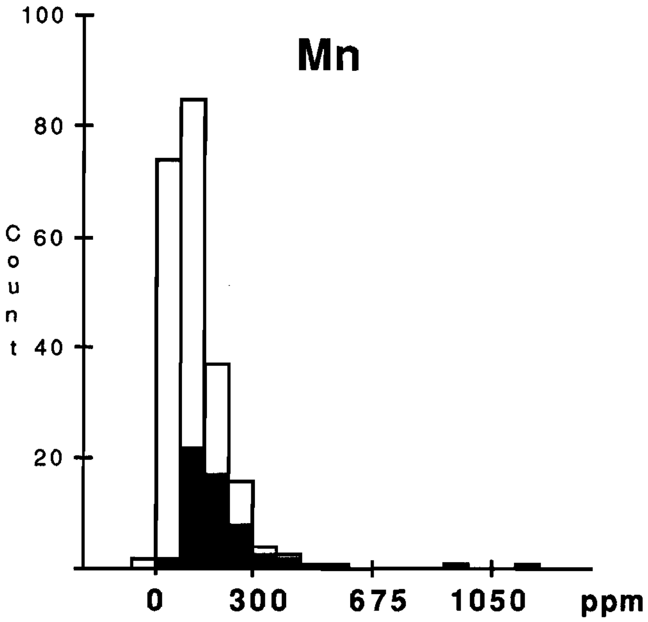


Fig.51 Histogram showing high Mn in colluvial samples (CVALL as black), compared with the total of all samples of lateritic residuum and colluviurr (CVALL+LT100+LT200).

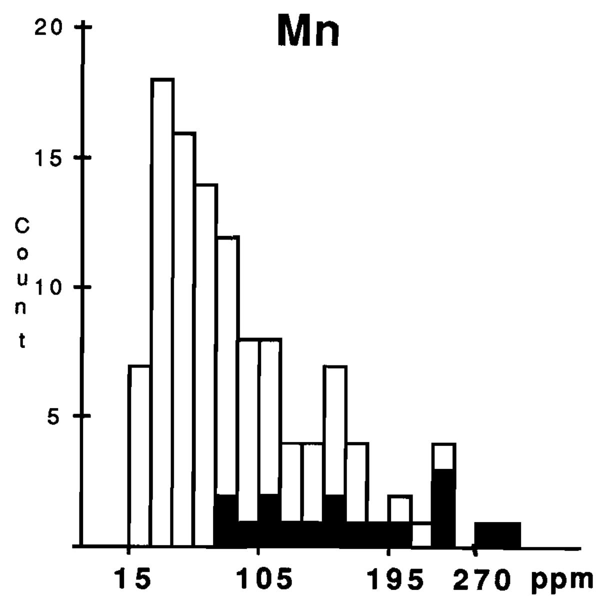


Fig.52 Histogram for the lateritic duricrust samples(LT200) with the hardpanized duricrust in black, showing their higher Mn values.

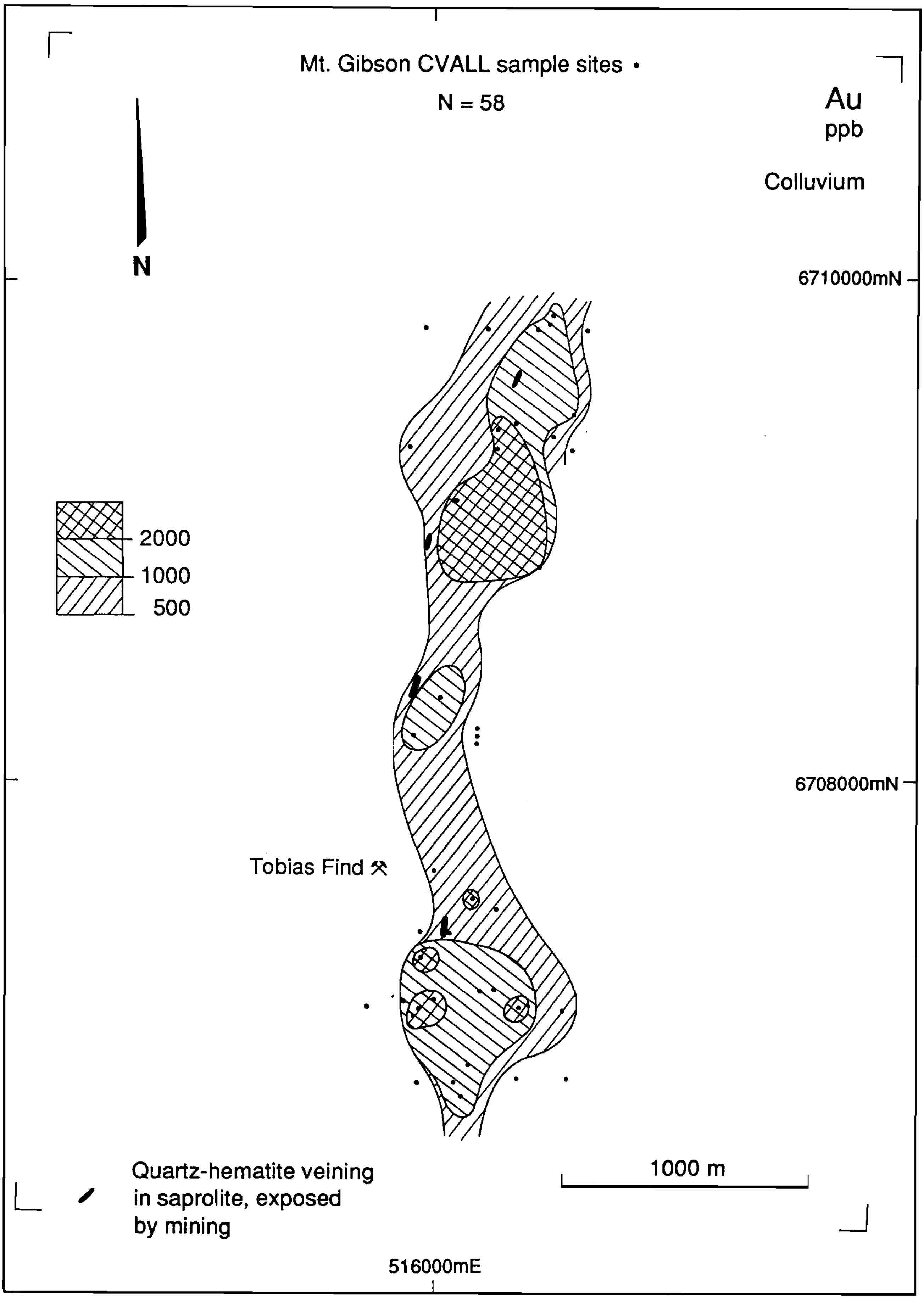


Fig. 53. Map showing the distribution of Au in colluvium. Note: Corner markers show locations of maps from Report 20R, Anand *et al.*, March 1989.

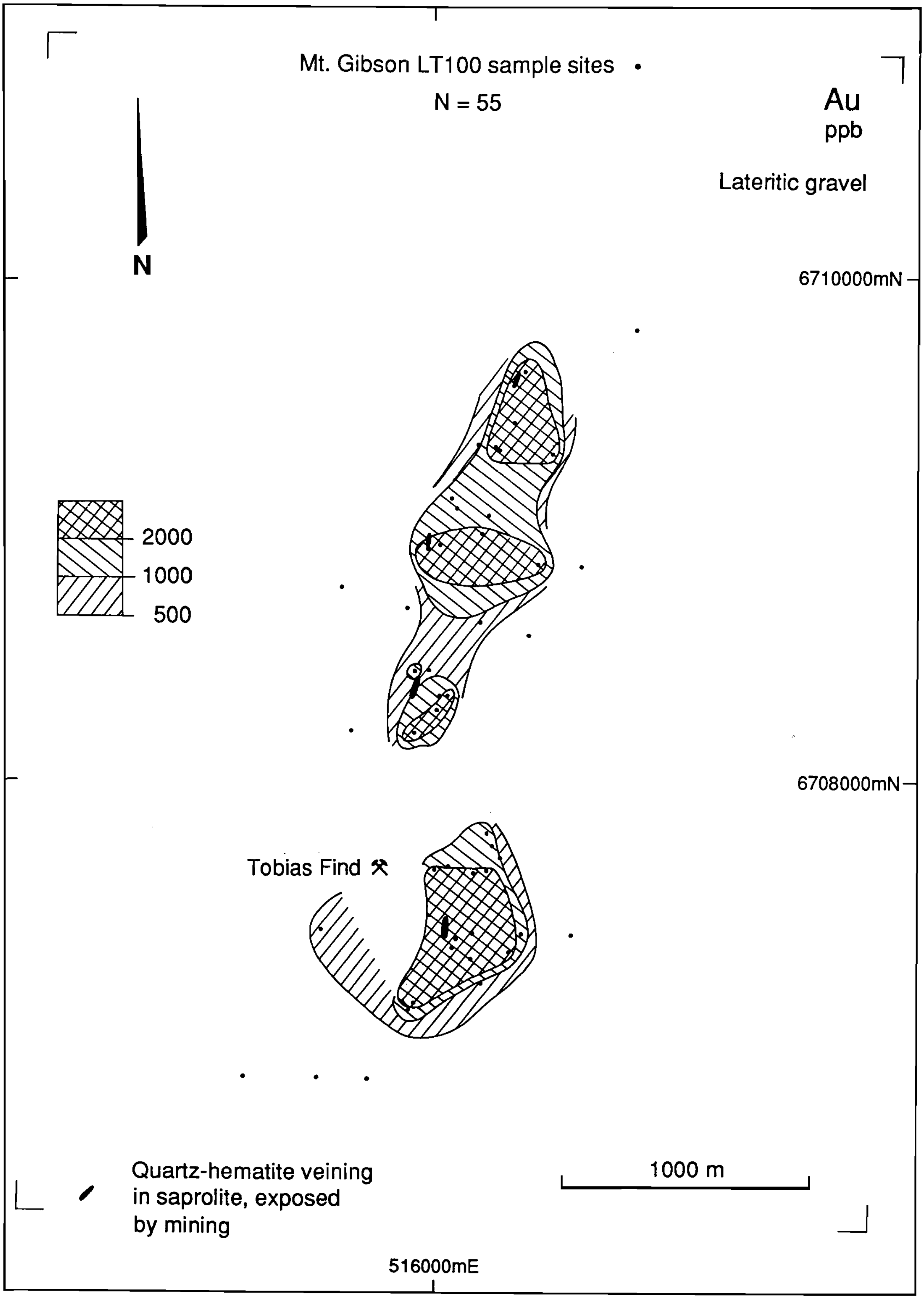


Fig. 54. Map showing the distribution of Au in residual lateritic gravel.

Stacked Maps

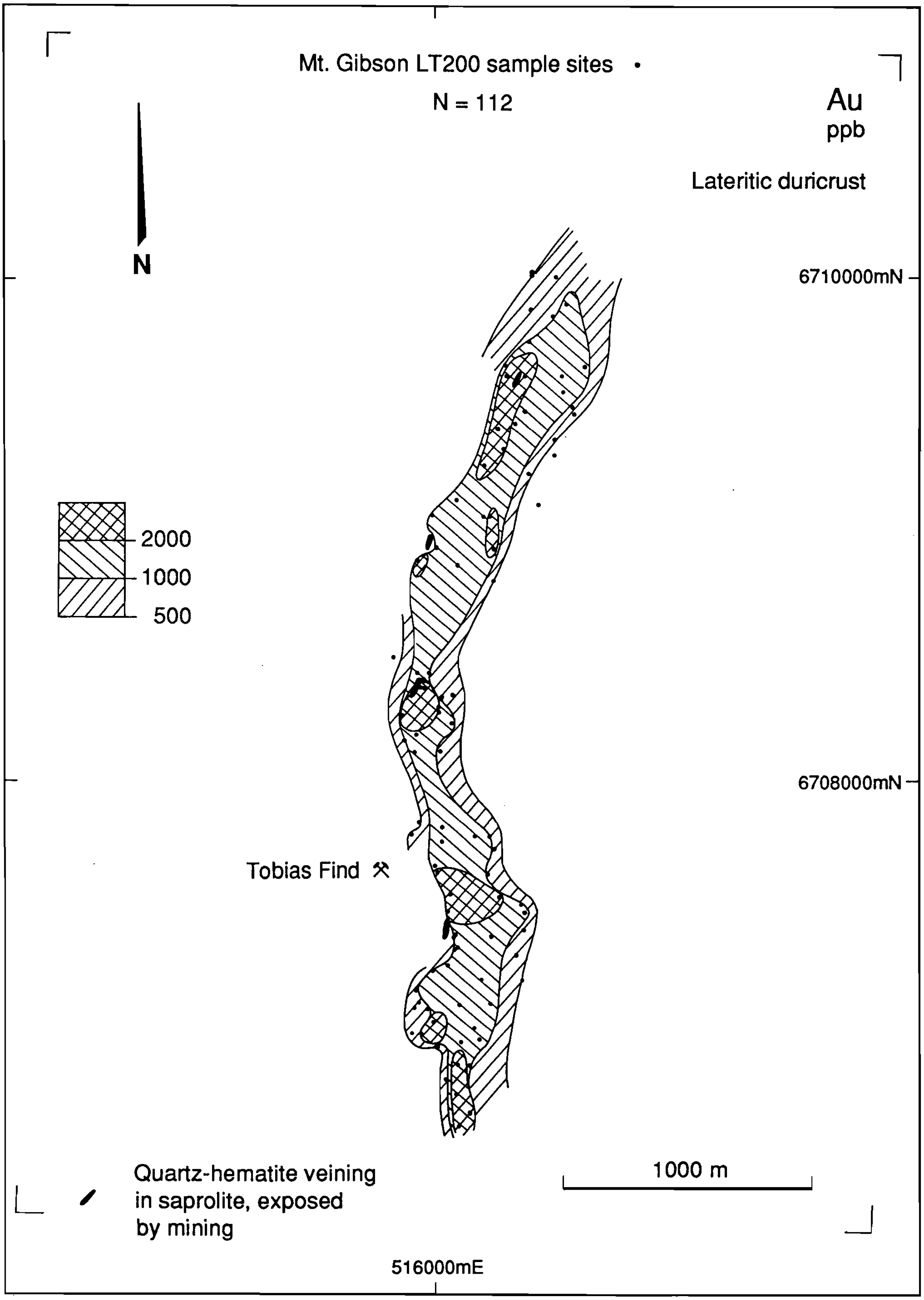


Fig. 55. Map showing the distribution of Au in lateritic duricrust.

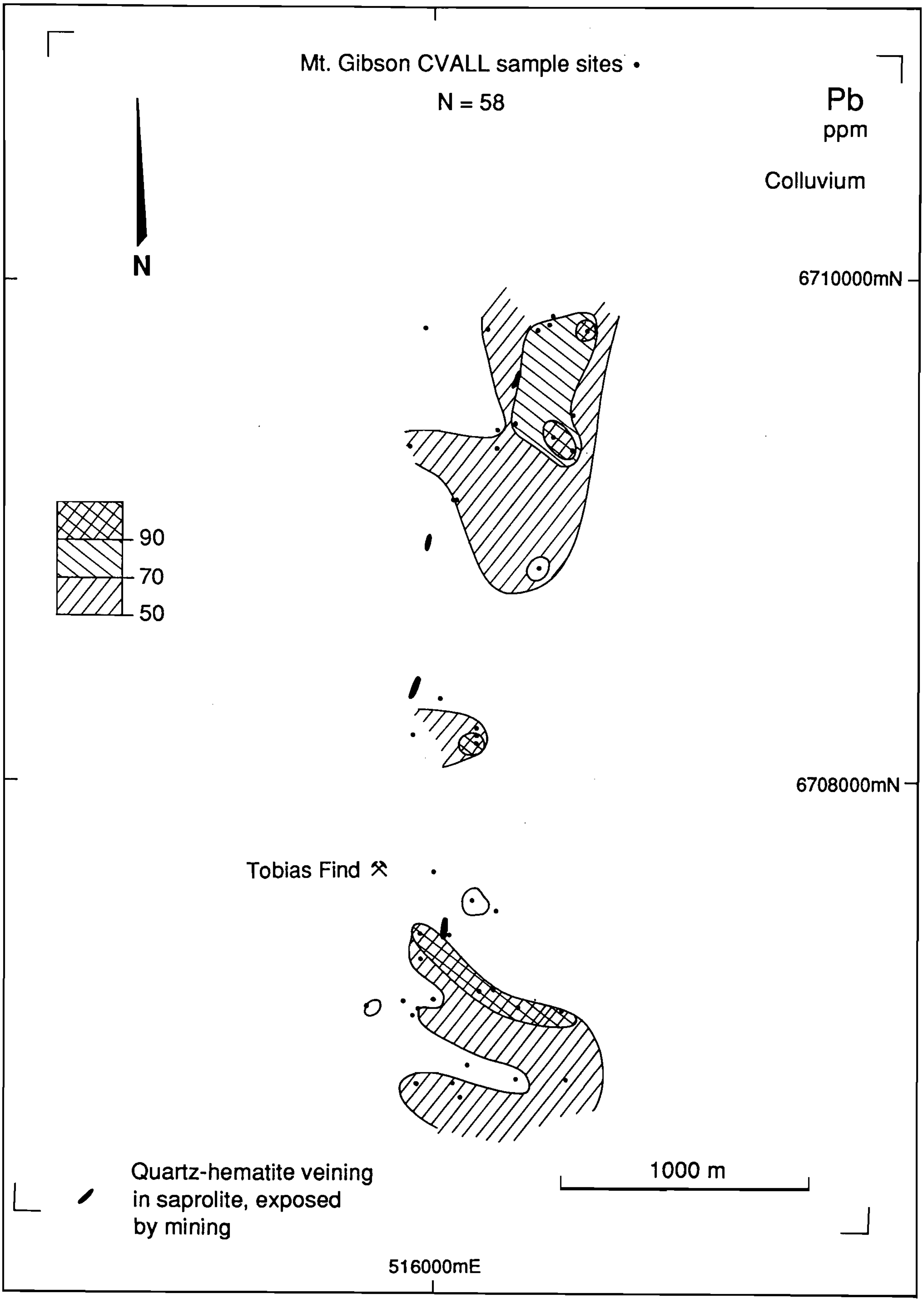


Fig. 56. Map showing the distribution of Pb in colluvium.

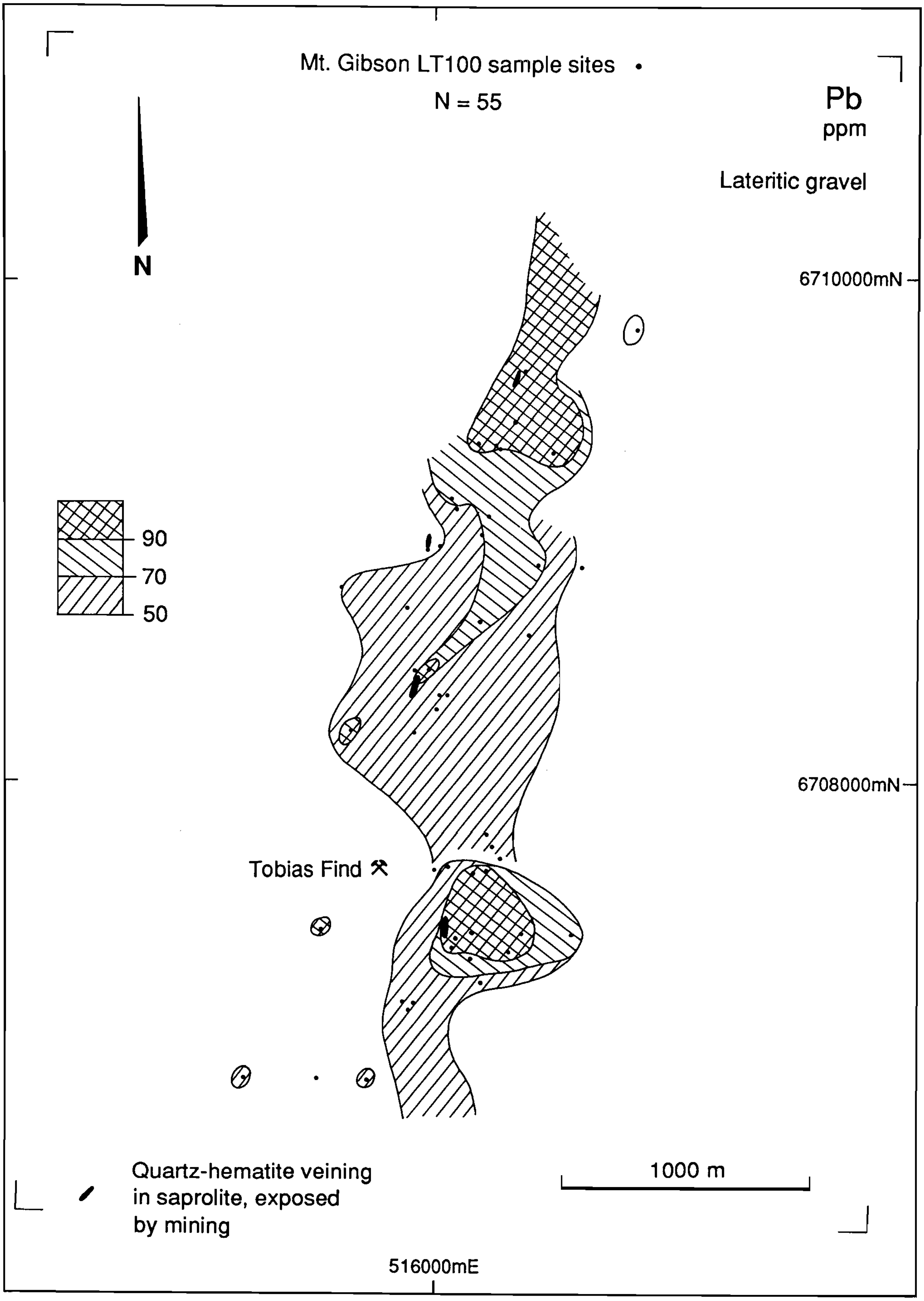


Fig. 57. Map showing the distribution of PB in residual lateritic gravel.

Stacked Maps

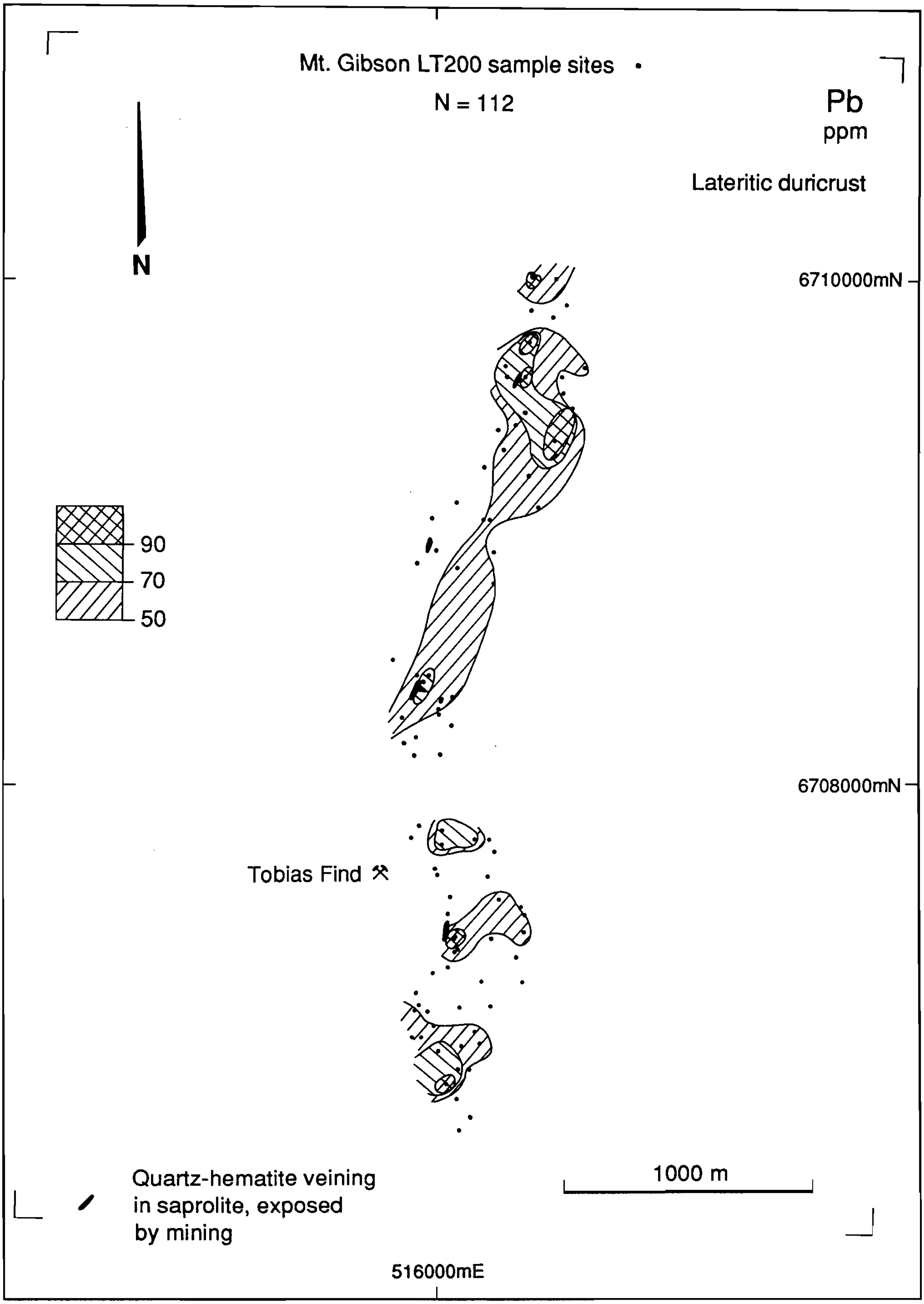


Fig. 58. Map showing the distribution of Pb in lateritic duricrust.

Stacked Maps

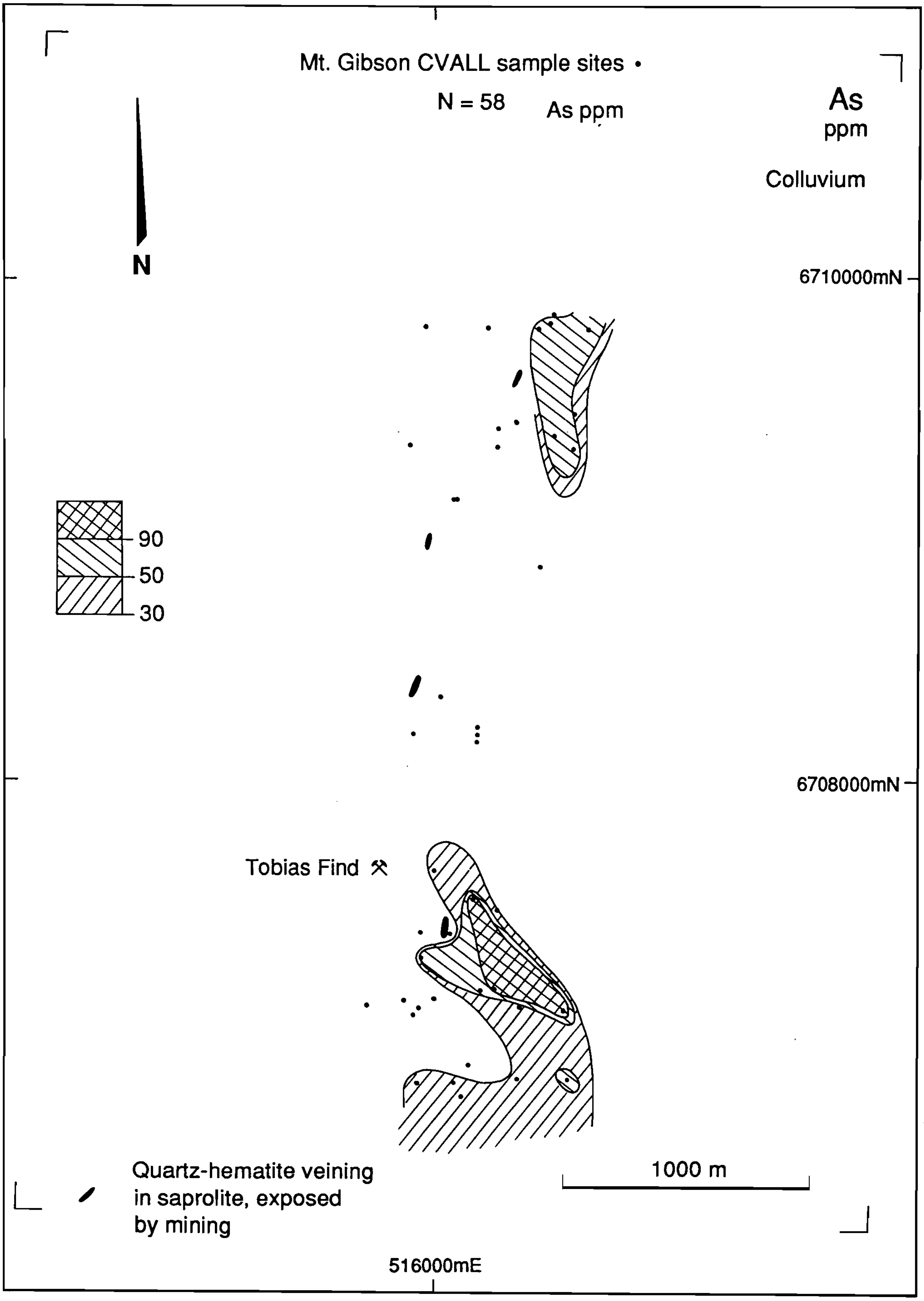


Fig. 59. Map showing the distribution of As in colluvium.

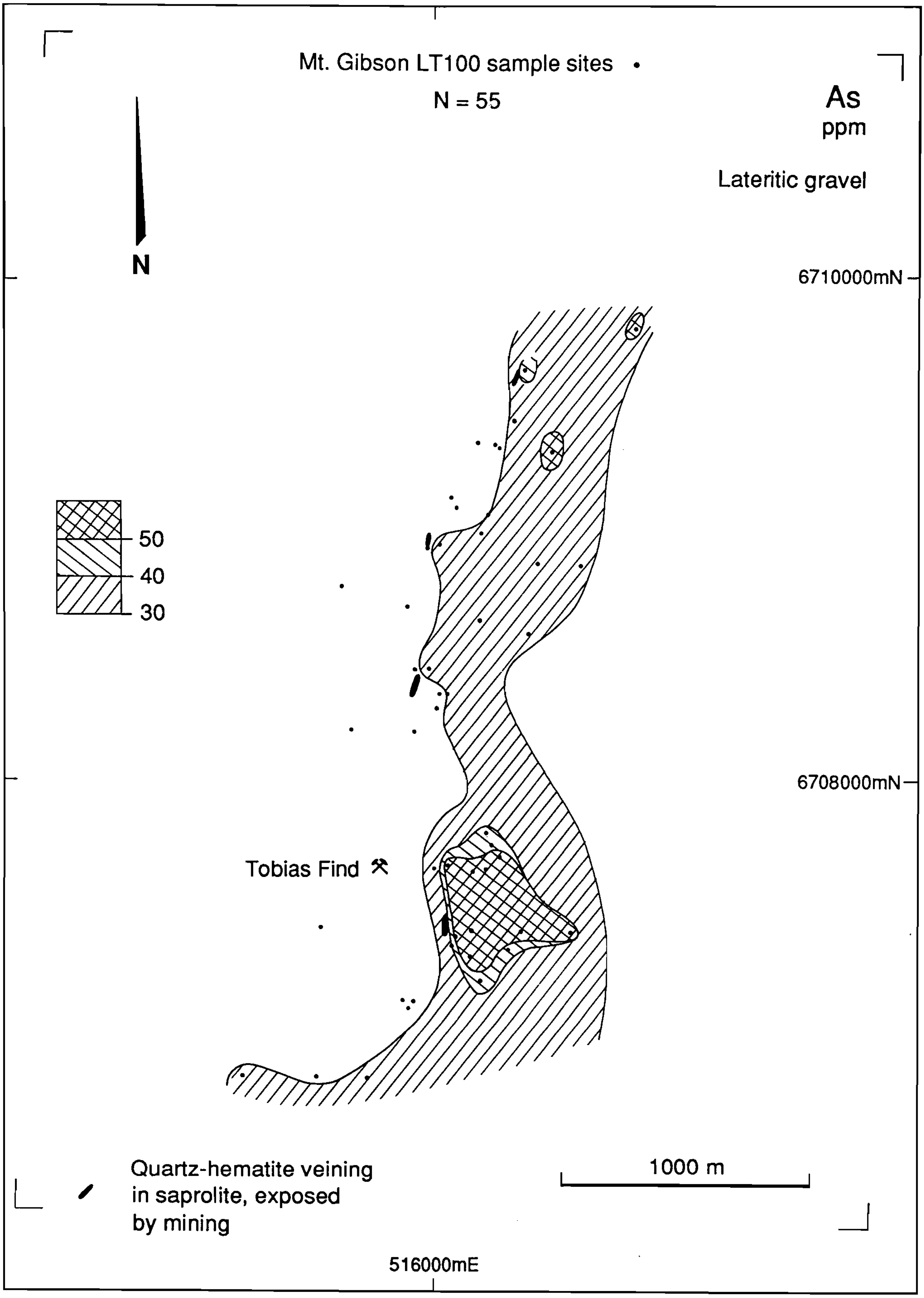


Fig. 60. Map showing the distribution of As in residual lateritic gravel.

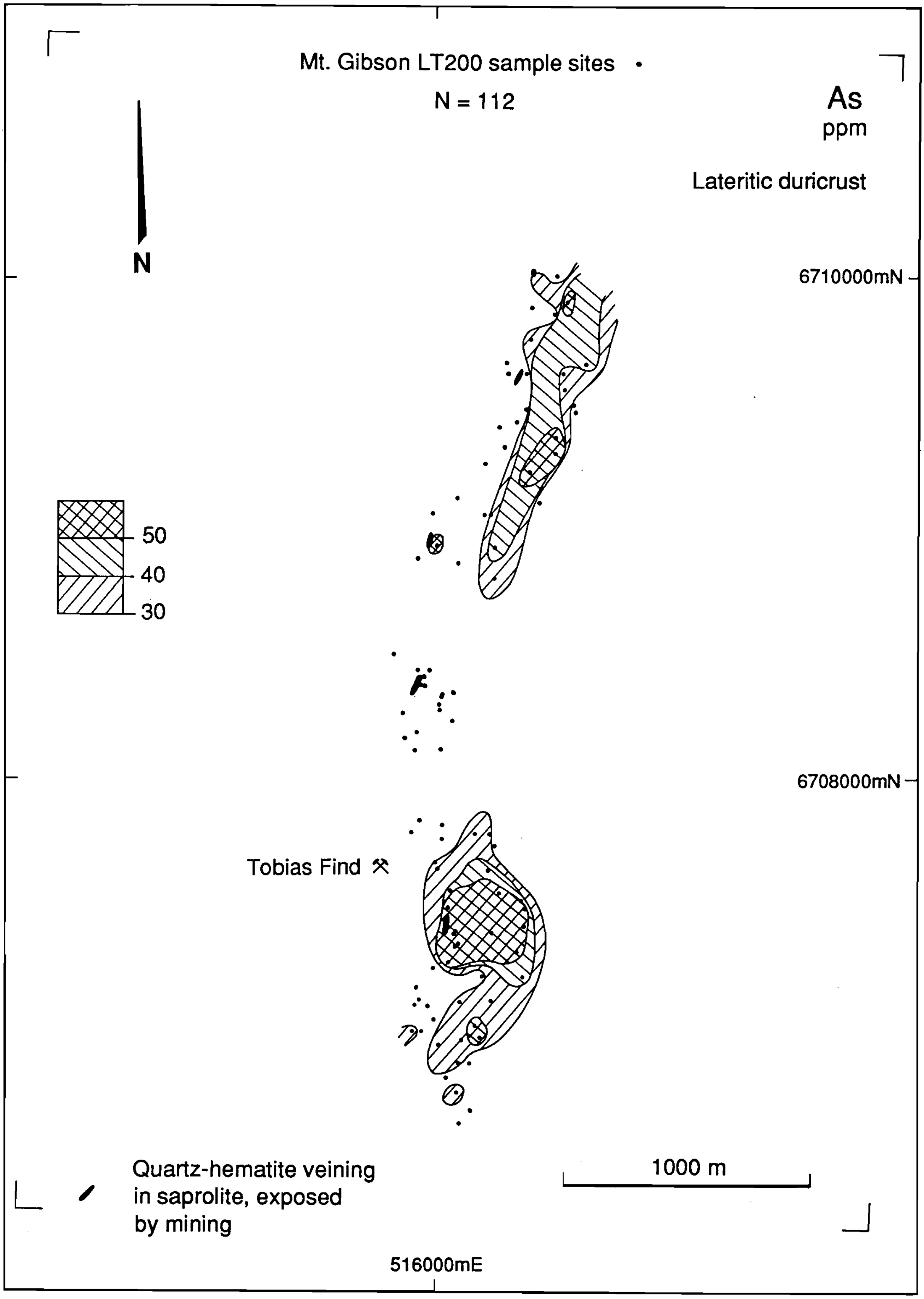


Fig. 61. Map showing the distribution of As in lateritic duricrust.

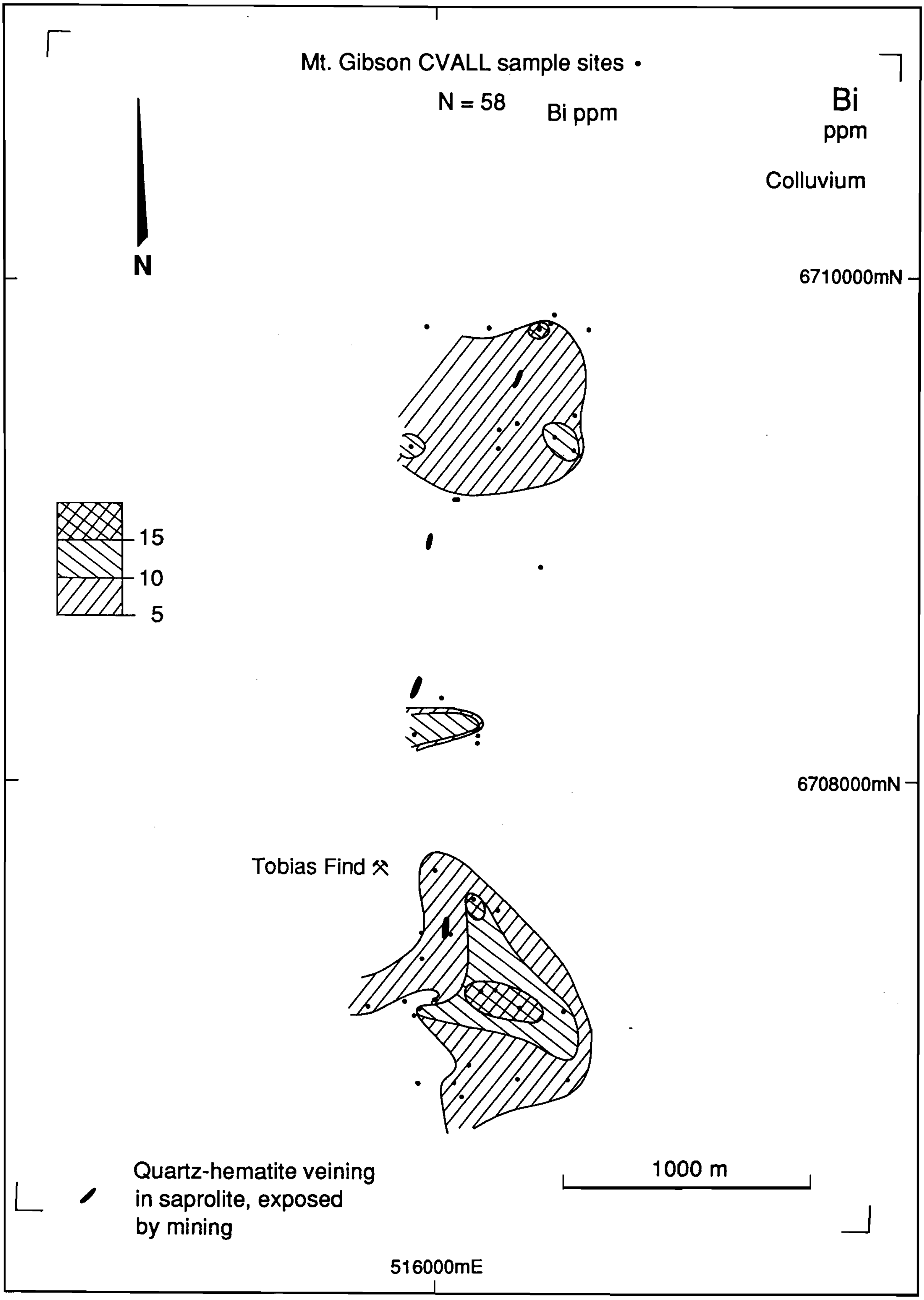


Fig. 62. Map showing the distribution of Bi in colluvium.

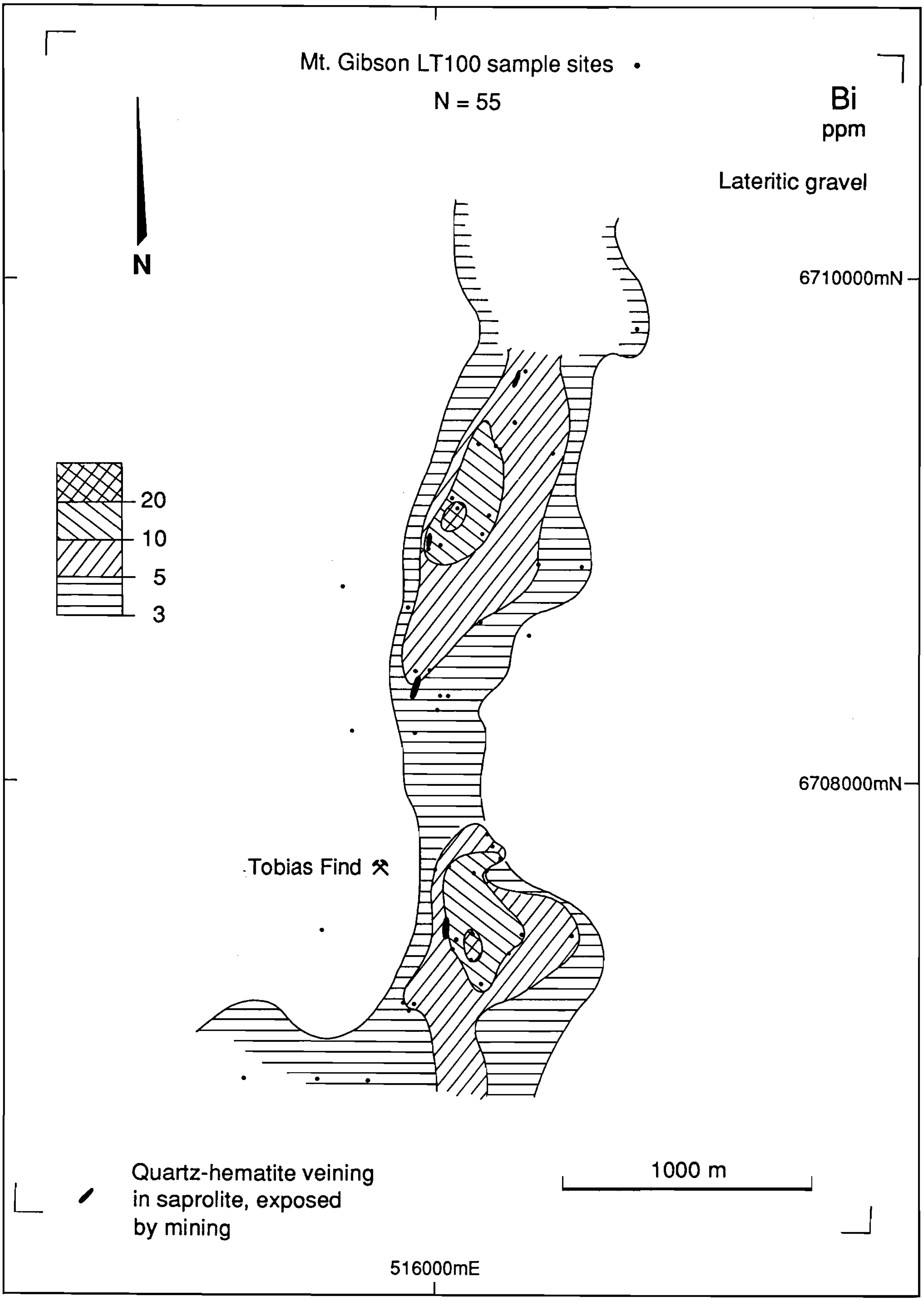


Fig. 63. Map showing the distribution of Bi in residual lateritic gravel.

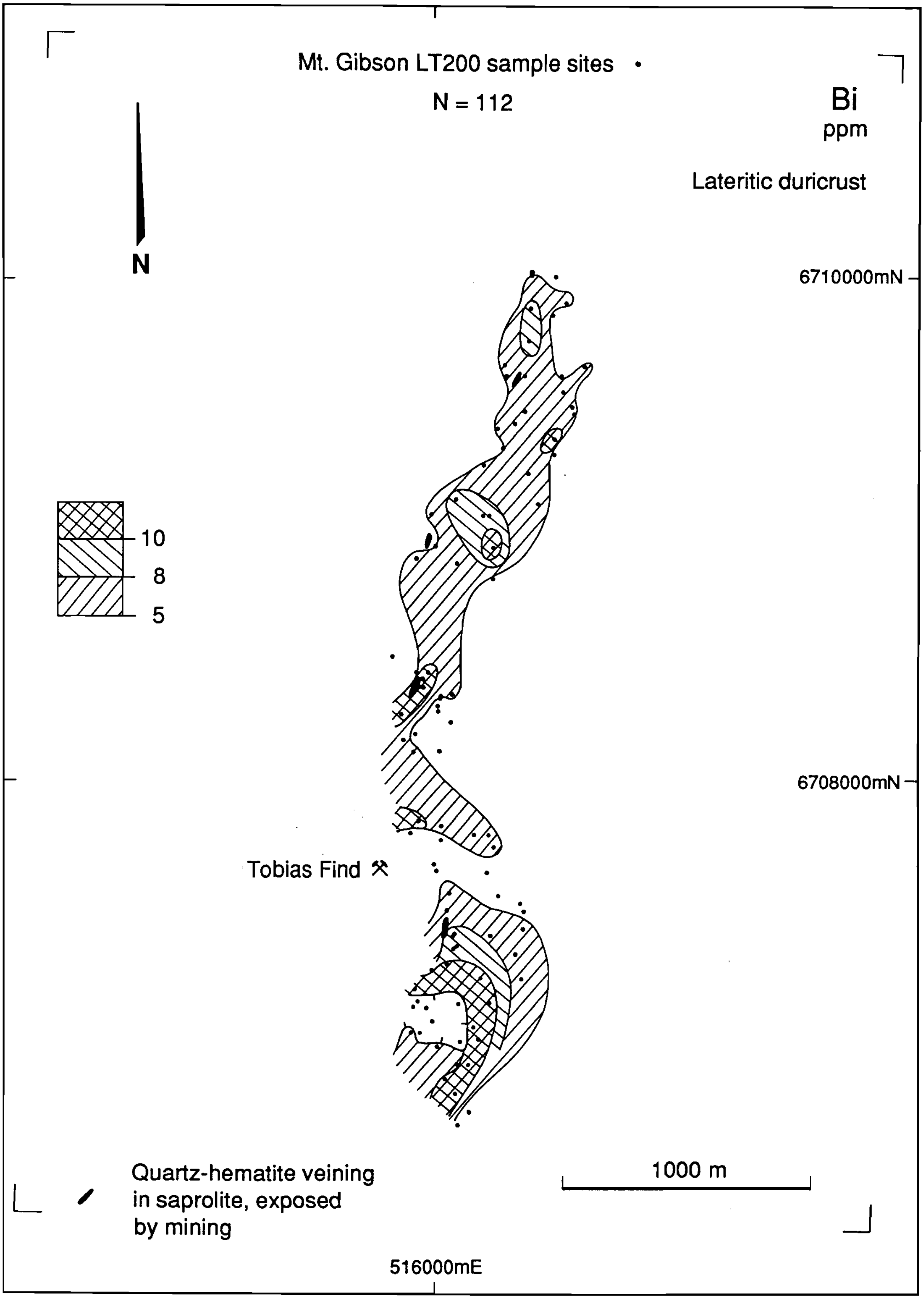


Fig. 64. Map showing the distribution of Bi in lateritic duricrust.

Stacked Maps

8.0 OUTLOOK

Interpretation of the data presented in this report is ongoing and further interpretation will be incorporated in the writing up of results for publication. It is intended that archived sample pulp will be re-analyzed by methods with lower limits of detection as appropriate.

It is intended that reports on other orientation studies within the Laterite Geochemistry Project will present reference data sets in a similar format to that used here.

9.0 ACKNOWLEDGEMENTS

We wish to thank the following people who participated, at various stages, in the generation of this report or the management of the included data: Ms Pauline English, of Geochemex Australia for the necessary meticulous stage of transforming raw data into tidy data sets; Mr Brett Carter, a student from Curtin University of Technology on a CSIRO Vacation Scholarship, who set up the data presentation and interpretation methods; Dr Eric Grunsky, CSIRO Division of Exploration Geoscience for some preliminary interpretation; and Mr Alfred Eggo of CRA Exploration for advice on hardware and software systems.

We wish to thank Dr Mark Trotman of the Apple agents Western Edge, for hardware and software support over a four-month period of sponsorship and Apple Computers WA for a loan of a Macintosh computer (Mac IIfx) over that period.

Many of the diagrams were drafted by Angelo Vartesi under the supervision of Colin Steel of the CSIRO Division of Exploration Geoscience, Visual Communications Group.

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APPENDIX 1

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-0261	SU202	SUALL	SH-50-07	516206	6707623	39.57	13.56	39.18	0.071	0.052	0.081	0.21	1.264	6.98	100.97
07-0265	SU202	SUALL	SH-50-07	516009	6707628	41.50	14.24	36.18	0.076	0.060	0.077	0.22	1.344	7.47	101.17
07-0287	SU500	SUALL	SH-50-07	515988	6708928	59.46	27.39	4.23	0.085	0.024	0.143	0.18	1.528	11.50	104.54
07-0289	SU901	SUALL	SH-50-07	515973	6708929	82.14	7.29	4.10	0.061	0.025	0.027	0.32	0.457	4.24	98.66
07-0296	SU202	SUALL	SH-50-07	516216	6709048	59.25	11.90	26.74	0.076	0.077	0.077	0.22	1.059	6.18	105.58
07-0326	SU901	SUALL	SH-50-07	516001	6708428	85.35	7.29	3.19	0.040	0.038	0.034	0.16	0.394	3.91	100.41
07-0327	SU901	SUALL	SH-50-07	516001	6708428	81.92	9.05	3.96	0.051	0.042	0.036	0.23	0.497	4.35	100.14
07-0516	SU202	SUALL	SH-50-07	515991	6707028	39.14	14.72	38.04	0.081	0.081	0.032	0.25	1.338	7.48	101.16
07-0550	SU202	SUALL	SH-50-07	516473	6709296	31.23	18.47	39.61	0.113	0.106	0.071	0.16	1.586	10.50	101.85
07-0557	SU202	SUALL	SH-50-07	516285	6709611	34.44	13.88	44.04	0.068	0.043	0.026	0.17	1.339	6.96	100.97
07-0573	SU901	SUALL	SH-50-07	516416	6708848	81.07	6.88	6.78	0.066	0.120	0.030	0.23	0.569	4.79	100.54
07-0574	SU202	SUALL	SH-50-07	516416	6708848	77.00	8.63	8.31	0.083	0.063	0.057	0.30	0.689	5.45	100.58
07-0575	SU202	SUALL	SH-50-07	516416	6708848	38.93	18.46	32.68	0.083	0.069	0.047	0.14	1.570	9.11	101.08
07-0584	SU202	SUALL	SH-50-07	515920	6708180	53.80	15.09	21.79	0.104	0.129	0.042	0.29	1.088	8.72	101.05
07-0610	SU901	SUALL	SH-50-07	515976	6708429	72.73	10.37	10.58	0.065	0.056	0.020	0.16	0.709	5.39	100.08
07-0614	SU202	SUALL	SH-50-07	516233	6707722	36.15	14.02	42.18	0.063	0.053	0.027	0.06	1.530	6.77	100.85
07-0615	SU202	SUALL	SH-50-07	516233	6707722	30.74	23.95	31.46	0.041	0.029	0.018	<0.06	0.984	13.40	100.62

Appendix **MT.GIBSON SOILS DATA SUALL**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
07-0261	SU202	152	728	1110	26	43	14	32	<4	47	3	7	4	0.8	3	<2	43	<5	57	262	5	2	<1	210
07-0265	SU202	166	609	1030	35	41	18	38	4	53	<2	5	4	0.8	5	<2	43	13	66	253	9	4	<1	650
07-0287	SU500	201	332	197	44	<2	28	80	4	10	3	12	<2	<0.1	5	<2	30	7	46	82	9	<2	<1	110
07-0289	SU901	63	106	89	25	6	16	24	4	<2	<2	<2	<2	<0.1	<2	<2	9	<5	89	103	5	<2	<1	130
07-0296	SU202	142	511	760	33	38	15	38	5	11	2	2	4	1.5	<2	<2	28	7	59	216	6	<2	<1	na
07-0326	SU901	51	69	63	9	4	6	15	<4	<2	<2	<2	2	<0.1	2	<2	10	<5	34	180	12	<2	<1	80
07-0327	SU901	62	75	73	12	5	9	24	4	<2	<2	<2	3	<0.1	2	<2	12	<5	54	217	9	<2	<1	150
07-0516	SU202	178	502	750	42	60	26	40	18	25	6	5	3	0.5	3	<2	38	10	67	148	7	4	1	550
07-0550	SU202	109	942	842	48	98	11	58	10	29	<3	5	7	<0.1	5	<2	51	16	46	161	10	2	3	3240
07-0557	SU202	186	828	1039	20	106	6	40	18	21	10	4	3	<0.1	5	<2	45	10	54	122	5	3	1	750
07-0573	SU901	74	148	174	10	10	<2	26	6	2	<3	<2	2	0.2	<2	<2	13	<5	67	54	3	<2	1	170
07-0574	SU202	96	185	215	14	16	<2	30	8	5	6	<2	3	<0.1	3	<2	16	<5	77	68	5	<2	1	340
07-0575	SU202	102	753	978	38	83	16	55	8	19	<3	2	3	1.1	3	<2	50	6	44	130	9	5	2	1480
07-0584	SU202	142	372	651	32	33	20	45	12	10	6	2	5	<0.1	2	2	31	9	73	115	9	4	1	580
07-0610	SU901	75	209	267	18	19	10	30	6	6	3	<2	5	<0.1	3	<2	18	10	54	87	8	<2	1	370
07-0614	SU202	162	655	1018	26	56	20	45	6	39	8	3	6	0.2	<2	<2	45	11	40	161	7	2	<1	100
07-0615	SU202	146	1184	653	70	44	18	70	8	31	3	4	3	1.9	3	<2	46	<5	14	146	7	5	<1	350

Appendix **MT.GIBSON SOILS DATA SUALL**

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
02-2886	CV333	CVALL	SH-50-07	515934	6706780	16.90	12.74	58.30	0.051	0.063	0.022	< 0.06	1.640	6.32	96.10
02-2887	CV333	CVALL	SH-50-07	516084	6706776	32.00	22.45	28.52	0.038	0.029	0.013	< 0.06	0.946	11.50	95.56
02-2888	CV333	CVALL	SH-50-07	516108	6706725	14.20	15.57	62.27	0.068	0.082	0.023	< 0.06	2.390	6.62	101.28
02-2889	CV333	CVALL	SH-50-07	516335	6706795	20.70	17.94	45.80	0.114	0.122	0.037	< 0.06	1.180	11.35	97.30
02-2890	CV333	CVALL	SH-50-07	516535	6706790	22.50	15.66	54.93	0.044	0.052	0.018	< 0.06	1.150	4.57	98.98
02-2891	CV333	CVALL	SH-50-07	516517	6707065	31.80	20.39	32.66	0.046	0.065	0.019	< 0.06	1.040	10.01	96.09
02-2892	CV333	CVALL	SH-50-07	516342	6707080	18.80	9.56	27.05	3.540	15.490	0.084	0.12	0.641	21.90	97.19
02-2894	CV333	CVALL	SH-50-07	515942	6707080	13.80	11.65	65.00	0.065	0.143	0.025	< 0.06	2.470	5.61	98.82
02-2895	CV333	CVALL	SH-50-07	515742	6707085	24.50	19.33	48.18	0.043	0.083	0.037	< 0.06	1.410	9.19	102.83
02-2899	CV333	CVALL	SH-50-07	515949	6707379	28.20	18.33	40.01	0.108	0.051	0.020	0.35	1.160	10.47	98.70
02-2906	CV333	CVALL	SH-50-07	515919	6708180	19.10	21.19	46.52	0.104	0.281	0.064	< 0.06	3.030	7.56	97.91
02-2908	CV305HP	CVALL	SH-50-07	516169	6708204	34.90	18.16	38.26	0.174	0.164	0.257	0.09	1.510	9.18	102.70
02-2909	CV333	CVALL	SH-50-07	516169	6708174	38.00	18.89	29.45	0.137	0.095	0.150	0.06	1.200	10.64	98.62
02-2910	CV305	CVALL	SH-50-07	516169	6708144	11.90	10.06	67.10	0.053	0.089	0.022	< 0.06	1.620	4.52	95.42
02-2917	CV333	CVALL	SH-50-07	515898	6709331	5.00	30.16	39.54	0.099	0.197	0.021	< 0.06	2.750	17.17	95.00
02-2918	CV333	CVALL	SH-50-07	516548	6709315	22.90	16.32	47.93	0.055	0.058	0.020	0.06	1.110	8.45	96.90
02-2920	CV333	CVALL	SH-50-07	516474	6709367	19.10	14.88	53.18	0.055	0.045	0.014	0.07	1.370	7.19	95.90
02-2922	CV333	CVALL	SH-50-07	515960	6709805	5.90	35.85	31.67	0.053	0.094	0.020	< 0.06	2.780	19.80	96.23
02-2923	CV333	CVALL	SH-50-07	516210	6709799	9.2	21.2	55.04	0.035	0.051	0.016	< 0.06	2.261	5.12	92.98
02-2924	CV333	CVALL	SH-50-07	516410	6709794	17.3	15.77	55.47	0.038	0.059	0.018	< 0.06	2.18	7.43	98.33
02-2925	CV333	CVALL	SH-50-07	516610	6709789	13.90	12.84	64.47	0.048	0.066	0.025	< 0.06	1.820	5.81	99.04
02-2927	CV333	CVALL	SH-50-07	516460	6709817	10.80	12.52	63.20	0.041	0.063	0.015	< 0.06	1.770	5.71	94.18
02-2931	CV333	CVALL	SH-50-07	515947	6707279	34.60	19.45	30.31	0.027	0.025	0.011	< 0.06	1.200	11.05	96.73
02-2935	CV305	CVALL	SH-50-07	516153	6707510	15.20	10.77	65.30	0.041	0.064	0.014	< 0.06	1.710	4.39	97.55
02-2943	CV333	CVALL	SH-50-07	516184	6707150	18.60	12.57	54.64	0.051	0.042	0.023	< 0.06	0.961	6.27	93.22
07-0253	CV106	CVALL	SH-50-07	516065	6707376	45.35	17.64	27.03	0.235	0.234	0.167	0.45	0.964	10.10	92.07
07-0272	CV106	CVALL	SH-50-07	515999	6707628	37.86	15.70	38.04	0.098	0.099	0.075	0.28	1.451	8.17	93.60
07-0274	CV106	CVALL	SH-50-07	516252	6707471	42.57	18.06	29.46	0.267	0.336	0.140	0.45	1.032	11.80	92.32
07-0298	CV105CFHP	CVALL	SH-50-07	516068	6709117	26.95	21.72	33.60	0.907	3.106	0.526	0.27	2.302	14.40	89.38
07-0299	CV105CFHP	CVALL	SH-50-07	516068	6709117	40.85	20.59	21.02	1.283	3.218	0.402	0.54	1.471	14.80	89.37
07-0301	CV106	CVALL	SH-50-07	516068	6709117	59.46	11.69	21.74	0.176	0.304	0.058	0.33	1.091	7.17	94.85
07-0302	CV105CFHP	CVALL	SH-50-07	516078	6709116	24.17	20.40	40.90	0.617	1.539	0.526	0.16	2.535	12.60	90.85
07-0336	CV102HP	CVALL	SH-50-07	516023	6708327	49.84	23.23	7.14	1.505	5.316	0.547	0.50	0.599	18.50	88.67
07-0337	CV106	CVALL	SH-50-07	516023	6708327	67.59	11.75	14.44	0.171	0.133	0.067	0.31	0.716	6.64	95.18
07-0343	CV102HP	CVALL	SH-50-07	516023	6708327	51.98	23.99	7.59	1.757	2.266	0.640	0.61	0.592	16.70	89.43
07-0502	CV106	CVALL	SH-50-07	515883	6707106	44.28	18.02	26.60	0.295	0.274	0.096	0.55	1.540	9.80	101.46
07-0505	CV333	CVALL	SH-50-07	515883	6707106	30.35	20.27	35.12	0.478	1.186	0.088	0.32	2.302	11.80	101.92
07-0506	CV333	CVALL	SH-50-07	515883	6707106	26.31	27.24	19.59	2.006	4.855	0.333	0.13	1.818	19.80	102.08

Appendix **MT.GIBSON COLLUVIUM DATA CVALL**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
02-2886	CV333	183	530	1472	40	86	15	30	12	42	4	3	4	1.6	111	5	72	5	30	188	13	5	<1	112
02-2887	CV333	29	694	846	42	82	11	38	12	30	<2	12	5	1.1	2	<2	66	6	17	109	8	9	1	1449
02-2888	CV333	88	1452	2105	40	150	8	32	10	32	4	16	9	1.5	8	2	155	18	94	190	19	6	1	1535
02-2889	CV333	86	1288	1395	130	40	12	45	12	32	2	3	4	2.8	5	<2	36	10	296	343	9	9	2	33
02-2890	CV333	127	1495	1467	28	82	10	32	10	52	7	9	6	1.2	8	3	88	8	17	240	8	2	1	21
02-2891	CV333	104	974	1624	35	95	15	30	12	94	4	14	5	1.0	3	2	75	4	26	147	7	4	1	953
02-2892	CV333	176	428	1015	110	94	19	28	12	38	2	18	2	1.4	4	<2	20	4	252	97	4	3	1	2080
02-2894	CV333	147	695	2043	48	94	9	28	8	26	6	10	8	0.7	5	3	105	24	390	167	14	11	<1	2652
02-2895	CV333	139	346	1613	32	74	13	28	10	28	<2	5	3	1.1	5	3	54	14	51	198	10	5	<1	50
02-2899	CV333	146	667	1270	62	76	28	20	12	20	5	2	3	<0.1	2	3	55	18	45	133	5	13	<1	425
02-2906	CV333	111	1000	1508	32	94	11	35	12	18	6	12	4	0.5	6	<2	125	22	231	116	19	3	2	1681
02-2908	CV305HP	99	729	1226	48	72	16	32	14	35	6	10	9	0.5	4	<2	56	14	384	143	12	<2	1	78
02-2909	CV333	95	515	985	62	58	12	30	12	22	5	2	3	<0.1	<2	<2	60	10	196	129	6	4	1	190
02-2910	CV305	296	669	1772	26	120	17	20	10	17	11	3	5	0.7	<2	2	70	16	35	192	12	<2	<1	21
02-2917	CV333	906	912	1178	72	52	28	28	20	18	5	10	4	4.6	<2	<2	58	25	37	176	14	4	<1	583
02-2918	CV333	97	876	906	58	120	32	48	15	66	6	24	5	0.4	5	<2	55	14	21	157	10	4	1	311
02-2920	CV333	131	1251	1421	32	110	13	38	12	60	9	12	6	0.7	2	<2	70	15	22	182	9	4	<1	870
02-2922	CV333	1169	413	876	70	30	32	54	32	7	<2	4	2	0.2	3	<2	45	10	28	99	13	2	<1	59
02-2923	CV333	275	793	1416	20	51	16	23	14	20	4	2	3	<0.1	2	2	82	13	20	249	12	2	1	579
02-2924	CV333	183	1310	1835	32	88	24	35	12	52	7	15	6	1.2	4	<2	90	16	21	227	13	3	<1	6633
02-2925	CV333	170	1509	1461	34	105	24	34	12	58	11	<2	8	0.2	5	6	88	10	28	158	12	2	1	396
02-2927	CV333	127	1850	1857	28	84	13	28	10	66	12	7	12	1.2	5	<2	120	15	13	151	8	3	<1	2197
02-2931	CV333	67	422	1183	32	96	7	24	10	88	5	9	2	<0.1	4	4	42	15	16	168	8	13	<1	5771
02-2935	CV305	211	1392	2270	26	85	17	30	10	105	12	22	6	1.0	3	4	82	12	17	224	10	8	<1	2625
02-2943	CV333	145	966	1523	36	94	12	32	10	80	5	16	7	0.3	4	4	56	15	402	193	9	11	<1	1205
07-0253	CV106	348	457	619	42	26	25	36	8	11	<2	7	3	<0.1	5	<2	36	<5	265	213	9	3	<1	580
07-0272	CV106	184	561	1050	38	41	22	34	4	45	2	6	4	0.5	3	<2	42	5	78	291	4	4	<1	550
07-0274	CV106	590	596	658	54	39	28	45	4	18	3	5	5	0.6	<2	2	39	<5	134	200	10	<2	<1	960
07-0298	CV105CFHP	162	776	1060	74	72	15	46	8	7	4	2	2	0.9	5	2	71	13	209	238	11	2	<1	2300
07-0299	CV105CFHP	226	476	606	90	37	22	55	6	2	<2	4	2	<0.1	4	<2	48	<5	517	178	12	<2	<1	2810
07-0301	CV106	268	418	569	46	35	22	38	5	3	<2	2	2	0.4	2	<2	28	5	111	188	3	<2	<1	510
07-0302	CV105CFHP	116	881	1290	44	66	6	44	4	<2	6	6	2	1.0	4	3	70	17	192	488	11	3	<1	370
07-0336	CV102HP	223	148	143	68	24	22	58	10	<2	<2	2	4	0.3	<2	<2	27	<5	11	142	11	<2	<1	2120
07-0337	CV106	149	210	352	30	23	18	38	8	11	<2	2	2	0.5	<2	<2	20	<5	64	215	8	<2	<1	420
07-0343	CV102HP	255	139	145	60	21	26	62	10	2	<2	<2	3	0.3	6	2	28	5	60	179	11	<2	<1	1100
07-0502	CV106	464	352	564	42	33	28	48	22	15	7	3	3	<0.1	3	4	38	9	145	144	12	2	1	830
07-0505	CV333	390	430	779	54	38	30	46	20	14	<3	6	4	0.6	6	2	61	13	162	143	20	5	2	1760
07-0506	CV333	118	318	412	36	21	9	48	17	14	9	5	4	<0.1	4	2	39	8	104	134	17	6	1	1050

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-0511	CV106	CVALL	SH-50-07	515916	6707050	43.83	18.38	26.88	0.308	0.353	0.088	0.40	1.383	10.80	102.42
07-0512	CV105CFHP	CVALL	SH-50-07	515916	6707050	42.14	18.61	8.47	1.623	10.730	0.344	0.35	0.522	21.60	104.39
07-0513	CV105CFHP	CVALL	SH-50-07	515916	6707050	32.51	21.53	31.89	0.730	1.777	0.290	0.23	1.401	12.70	103.06
07-0525	CV105HP	CVALL	SH-50-07	516136	6706849	45.99	20.36	10.77	2.520	4.379	0.365	0.80	2.402	16.50	104.09
07-0526	CV333	CVALL	SH-50-07	516136	6706849	38.93	22.72	10.77	0.933	8.562	0.329	0.33	0.927	18.80	102.30
07-0528	CV106	CVALL	SH-50-07	516136	6706849	48.56	17.51	24.18	0.408	0.262	0.142	0.53	1.108	9.24	101.94
07-0533	CV106	CVALL	SH-50-07	516321	6709420	40.21	12.45	39.54	0.060	0.045	0.026	0.18	1.506	6.87	100.89
07-0536	CV106	CVALL	SH-50-07	516250	6709397	40.21	18.30	31.03	0.136	0.192	0.059	0.27	1.851	9.59	101.64
07-0537	CV105CFHP	CVALL	SH-50-07	516250	6709397	42.57	16.09	9.18	0.877	12.507	0.170	0.36	0.497	21.40	103.65
07-0541	CV106	CVALL	SH-50-07	516248	6709322	47.70	15.45	27.46	0.116	0.130	0.043	0.35	1.475	8.28	101.00
07-0551	CV333	CVALL	SH-50-07	516557	6709454	36.79	12.11	44.33	0.058	0.045	0.024	0.16	1.476	5.88	100.87
07-0552	CV333	CVALL	SH-50-07	516557	6709454	32.94	15.92	42.04	0.085	0.062	0.036	0.17	1.580	8.21	101.04
07-0553	CV105CFHP	CVALL	SH-50-07	516557	6709454	48.77	20.65	16.42	0.453	1.637	0.167	0.22	1.066	14.50	103.89
07-0554	CV105HP	CVALL	SH-50-07	516557	6709454	38.07	22.18	24.60	0.317	1.875	0.156	0.16	1.259	14.20	102.82
07-0555	CV106	CVALL	SH-50-07	516557	6709454	46.42	13.98	31.32	0.106	0.090	0.039	0.29	1.436	7.28	100.97
07-0570	CV106	CVALL	SH-50-07	516471	6709847	33.80	14.04	43.47	0.113	0.104	0.055	0.27	1.630	7.22	100.70
07-0571	CV105CFHP	CVALL	SH-50-07	516471	6709847	36.79	20.33	29.40	0.355	1.455	0.182	0.35	1.299	11.10	101.26
07-0576	CV105CFHP	CVALL	SH-50-07	516416	6708848	31.87	24.01	31.60	0.504	0.186	0.415	0.17	1.985	12.70	103.44
07-0595	CV106	CVALL	SH-50-07	516244	6707152	36.58	18.95	30.74	0.375	1.237	0.137	0.30	0.886	12.60	101.81
07-1032	CV104	CVALL	SH-50-07	516003	6707115	50.00	27.40	8.96	0.192	0.140	0.153	0.11	1.785	10.80	99.54

Appendix **MT.GIBSON COLLUVIUM DATA CVALL**

Sample Number	Sample Type	Mn *ppm*	Cr *ppm*	V *ppm*	Cu *ppm*	Pb *ppm*	Zn *ppm*	Ni *ppm*	Co *ppm*	As *ppm*	Sb *ppm*	Bi *ppm*	Mo *ppm*	Ag *ppm*	Sn *ppm*	Ge *ppm*	Ga *ppm*	W *ppm*	Ba *ppm*	Zr *ppm*	Nb *ppm*	Se *ppm*	Be *ppm*	Au *ppb*
07-0511	CV106	167	409	662	40	46	18	64	22	13	<3	3	4	<0.1	2	<2	41	<5	197	129	10	2	2	1500
07-0512	CV105CFHP	129	152	176	65	19	22	75	22	6	<3	<2	3	<0.1	<2	<2	25	<5	214	72	4	<2	2	3380
07-0513	CV105CFHP	164	500	720	54	29	14	64	26	12	<3	4	2	0.2	<2	<2	38	13	105	120	7	7	2	2160
07-0525	CV105HP	403	431	375	66	32	48	62	16	10	3	4	3	1.2	3	2	45	6	152	131	12	3	2	1110
07-0526	CV333	231	527	425	48	27	26	58	24	14	<3	6	4	1.3	<2	<2	37	<5	135	94	6	<2	1	1080
07-0528	CV106	365	544	535	44	51	34	46	24	18	6	7	3	0.6	<2	3	38	<5	108	128	7	<2	2	330
07-0533	CV106	136	805	1073	22	64	25	36	18	26	4	5	2	1.2	<2	<2	45	20	47	135	6	4	1	1090
07-0536	CV106	176	716	1244	38	71	32	54	10	21	3	6	5	1.1	4	<2	60	17	186	129	10	6	2	2440
07-0537	CV105CFHP	215	215	223	44	16	28	44	8	4	<3	<2	<2	0.7	2	<2	27	12	146	65	<3	<2	1	2010
07-0541	CV106	189	472	636	32	54	17	62	6	13	6	5	3	<0.1	2	<2	42	15	118	123	9	<2	1	920
07-0551	CV333	166	824	904	18	72	13	42	10	32	7	4	5	<0.1	2	2	48	14	47	165	9	3	1	82
07-0552	CV333	126	1002	970	35	91	11	56	8	30	10	5	6	<0.1	3	<2	52	22	45	145	6	2	2	690
07-0553	CV105CFHP	193	429	338	52	36	10	68	16	11	5	2	6	<0.1	<2	<2	33	13	640	100	8	<2	1	1630
07-0554	CV105HP	94	601	454	52	49	13	54	12	20	10	2	5	<0.1	3	<2	37	15	415	127	6	<2	1	910
07-0555	CV106	147	776	718	26	63	8	42	12	20	7	5	4	<0.1	<2	2	37	22	70	124	8	2	1	420
07-0570	CV106	325	733	990	28	62	8	46	22	21	3	2	4	0.2	4	<2	59	9	71	144	8	3	2	950
07-0571	CV105CFHP	296	659	740	34	52	15	54	14	19	<3	2	3	<0.1	2	<2	51	<5	528	123	7	<2	2	1870
07-0576	CV105CFHP	239	702	1026	65	77	12	64	12	11	<3	2	3	1.0	3	<2	59	9	220	100	8	3	3	2880
07-0595	CV106	187	704	1079	50	68	22	40	12	92	6	15	4	<0.1	<2	<2	40	<5	116	136	8	3	1	1310
07-1032	CV104	157	386	360	54	26	36	18	4	12	4	3	3	<0.1	3	<4	38	<4	81	155	10	3	1	39

Appendix **MT.GIBSON COLLUVIUM DATA CVALL**

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
02-2883	LT103	LT100	SH-50-07	515235	6706797	56.70	13.62	20.65	0.070	0.076	0.040	0.63	0.474	7.06	99.32
02-2884	LT103	LT100	SH-50-07	515534	6706790	55.50	14.01	19.66	0.043	0.057	0.020	<0.06	0.629	7.42	97.34
02-2885	LT103	LT100	SH-50-07	515734	6706785	29.80	16.37	37.02	0.050	0.055	0.023	<0.06	0.951	20.90	105.17
02-2898	LT102	LT100	SH-50-07	515549	6707389	15.30	14.22	62.38	0.029	0.048	0.012	<0.06	2.100	5.78	99.87
02-2900	LT103	LT100	SH-50-07	516088	6707350	28.76	22.19	33.94	0.028	0.019	0.012	<0.06	1.421	11.45	97.82
02-2903	LT104	LT100	SH-50-07	516149	6707374	28.90	20.67	35.99	0.027	0.027	0.011	<0.06	1.340	11.86	98.83
02-2904	LT103	LT100	SH-50-07	516349	6707369	18.20	13.27	55.30	0.046	0.040	0.020	<0.06	1.630	6.47	94.98
02-2905	LT103	LT100	SH-50-07	516549	6707364	38.70	19.30	35.57	0.032	0.040	0.014	<0.06	0.807	8.40	102.86
02-2907	LT102	LT100	SH-50-07	515669	6708187	31.00	16.62	33.87	0.019	0.029	0.010	<0.06	2.910	9.98	94.44
02-2911	LT103	LT100	SH-50-07	516189	6708974	26.40	21.91	35.29	0.050	0.038	0.015	0.06	1.310	11.26	96.33
02-2912	LT103	LT100	SH-50-07	516023	6708928	12.60	24.62	44.57	0.197	0.296	0.208	0.08	4.040	13.69	100.30
02-2913	LT103	LT100	SH-50-07	516092	6709076	21.30	18.42	39.98	0.176	0.137	0.154	<0.06	3.490	10.41	94.07
02-2914	LT103	LT100	SH-50-07	516586	6708839	38.90	18.31	28.61	0.050	0.042	0.013	0.07	0.637	10.09	96.72
02-2916	LT103	LT100	SH-50-07	516258	6709312	31.90	22.50	29.82	0.159	0.956	0.167	0.06	1.190	12.80	99.55
02-2919	LT102	LT100	SH-50-07	516173	6709334	13.90	9.76	63.37	0.118	0.228	0.030	<0.06	3.180	5.03	95.62
02-2921	LT103	LT100	SH-50-07	516365	6709620	25.00	21.95	34.11	0.038	0.032	0.012	<0.06	1.570	12.73	95.44
02-2926	LT103	LT100	SH-50-07	516810	6709784	15.00	14.54	57.36	0.034	0.044	0.012	<0.06	1.800	5.76	94.55
02-2928	LT102	LT100	SH-50-07	515892	6708681	50.90	15.78	19.82	0.060	0.042	0.034	0.06	0.784	9.12	96.60
02-2929	LT103	LT100	SH-50-07	515634	6708763	28.10	18.26	39.66	0.046	0.038	0.041	<0.06	1.840	9.99	97.98
02-2930	LT103	LT100	SH-50-07	516180	6708624	48.20	13.89	27.33	0.058	0.050	0.016	0.06	0.751	7.82	98.18
02-2932	LT103	LT100	SH-50-07	516147	6707274	32.80	23.12	31.40	0.026	0.028	0.012	<0.06	1.960	12.22	101.57
02-2933	LT103	LT100	SH-50-07	516297	6707296	28.90	22.16	32.93	0.056	0.085	0.053	<0.06	1.250	11.72	97.15
02-2937	LT103	LT100	SH-50-07	516056	6707637	11.80	9.35	67.56	0.029	0.051	0.012	<0.06	2.550	3.88	95.23
02-2938	LT103	LT100	SH-50-07	516155	6707614	16.80	12.53	58.60	0.038	0.048	0.015	<0.06	1.820	6.23	96.08
02-2939	LT103	LT100	SH-50-07	516257	6707672	15.10	12.98	60.86	0.034	0.047	0.013	<0.06	1.480	5.71	96.22
02-2940	LT103	LT100	SH-50-07	516379	6708569	34.10	11.59	41.57	0.067	0.054	0.030	0.10	1.190	6.57	95.27
02-2942	LT103	LT100	SH-50-07	516184	6707174	38.80	16.65	29.38	0.063	0.028	0.032	0.15	0.823	9.37	95.30
07-0262	LT104	LT100	SH-50-07	516206	6707623	30.16	27.20	29.17	0.048	0.027	0.089	<0.06	1.051	13.40	101.15
07-0266	LT102	LT100	SH-50-07	516006	6707628	29.95	18.02	43.19	0.068	0.042	0.063	0.09	1.393	9.06	101.88
07-0268	LT102	LT100	SH-50-07	516006	6707625	35.08	21.91	33.03	0.068	0.024	0.059	<0.06	1.164	10.70	102.04
07-0290	LT104	LT100	SH-50-07	515973	6708914	26.52	19.08	42.18	0.046	0.031	0.043	<0.06	0.652	13.10	101.65
07-0295	LT104	LT100	SH-50-07	516216	6709048	21.39	14.22	57.77	0.055	0.029	0.022	0.09	1.623	6.20	101.40
07-0300	LT102	LT100	SH-50-07	516068	6709117	24.38	19.65	46.62	0.192	0.158	0.084	0.19	2.402	8.34	102.01
07-0335	LT104	LT100	SH-50-07	516023	6708327	44.71	23.99	22.02	0.789	0.253	0.394	0.36	1.019	13.00	106.54
07-0341	LT104	LT100	SH-50-07	516012	6708273	23.96	30.41	27.03	0.895	1.144	0.303	0.11	1.648	16.40	101.90
07-0507	LT104	LT100	SH-50-07	515882	6707096	24.38	22.16	38.28	0.264	0.193	0.305	<0.06	3.870	12.40	101.85
07-0508	LT102	LT100	SH-50-07	515917	6707090	18.61	30.13	31.60	0.288	0.152	0.284	<0.06	3.636	17.20	101.90
07-0510	LT102	LT100	SH-50-07	515902	6707067	23.10	23.61	36.89	0.371	0.375	0.293	<0.06	4.237	13.10	101.98

Appendix **MT.GIBSON LATERITIC GRAVEL DATA LT100**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
02-2883	LT103	128	587	441	32	66	38	26	12	38	<2	16	16	0.2	5	<2	34	20	62	135	12	8	2	9
02-2884	LT103	33	973	459	20	40	10	38	8	28	<2	7	10	0.2	5	2	38	20	18	163	15	3	2	5
02-2885	LT103	124	616	977	32	60	10	32	12	36	4	3	5	0.2	4	<2	66	8	22	185	9	4	1	160
02-2898	LT102	96	696	1775	13	100	6	22	10	20	3	<2	5	1.1	2	<2	120	15	6	214	11	4	<1	530
02-2900	LT103	51	626	1772	19	101	14	36	12	62	6	10	2	0.5	2	2	74	8	20	270	7	4	<1	11705
02-2903	LT104	<20	1410	2159	25	82	8	26	10	92	8	52	4	0.1	4	3	92	10	15	140	8	8	<1	12615
02-2904	LT103	96	1473	1733	24	110	13	30	12	70	8	15	6	0.5	5	<2	72	14	84	189	11	6	<1	1099
02-2905	LT103	58	1168	1264	19	72	8	28	12	62	5	7	5	0.3	5	<2	68	8	17	171	9	8	<1	13
02-2907	LT102	20	543	1637	13	94	10	25	12	20	2	<2	5	0.3	7	2	62	16	10	119	19	8	<1	125
02-2911	LT103	84	931	1280	40	68	11	36	12	34	3	14	6	1.0	5	<2	70	6	24	144	9	9	1	4707
02-2912	LT103	409	1009	1610	42	46	25	30	14	45	2	12	4	1.5	4	<2	96	30	101	102	18	3	<1	9910
02-2913	LT103	334	1082	1555	88	64	34	42	14	26	7	38	5	2.1	2	<2	74	18	47	162	14	8	<1	1704
02-2914	LT103	85	625	694	28	46	15	34	12	38	6	4	4	<0.1	2	<2	62	4	23	188	12	6	1	34
02-2916	LT103	32	737	1002	90	78	7	44	14	25	10	11	2	1.4	5	2	55	8	63	152	9	8	<1	2104
02-2919	LT102	138	968	2427	52	100	12	22	12	13	10	19	9	1.2	12	3	195	46	122	146	20	4	<1	858
02-2921	LT103	52	1537	1310	50	115	54	54	18	48	9	8	5	0.8	7	2	62	6	16	131	8	6	<1	3185
02-2926	LT103	107	1449	1325	24	90	14	38	12	50	11	<2	8	<0.1	4	6	92	14	13	196	12	7	<1	50
02-2928	LT102	46	491	542	28	56	15	40	15	22	<2	3	3	<0.1	3	<2	42	<4	29	139	11	3	1	397
02-2929	LT103	81	620	1429	28	54	18	42	14	16	<2	2	5	<0.1	5	3	72	5	112	185	11	5	1	47
02-2930	LT103	59	594	621	44	74	17	32	14	32	4	5	5	<0.1	3	<2	42	6	22	130	11	6	1	733
02-2932	LT103	115	826	1798	45	88	20	24	12	115	11	22	3	0.5	2	3	72	4	20	187	9	10	<1	12757
02-2933	LT103	<20	786	1097	36	110	6	38	12	45	2	8	2	0.8	3	4	58	6	27	102	10	9	1	4779
02-2937	LT103	143	1442	3220	14	86	8	22	10	96	8	17	7	<0.1	6	5	125	16	11	232	15	<2	<1	1558
02-2938	LT103	133	1215	2161	28	100	9	36	10	115	11	11	8	0.6	7	<2	88	12	18	220	11	5	<1	3004
02-2939	LT103	135	1418	2069	34	100	12	30	10	100	9	18	7	1.1	5	<2	78	6	13	204	9	4	<1	1665
02-2940	LT103	153	474	1373	56	65	20	32	12	35	2	4	7	0.7	7	3	60	6	44	163	10	<2	1	60
02-2942	LT103	63	604	890	35	54	10	34	10	52	3	16	3	<0.1	4	2	45	6	64	158	7	10	<1	756
07-0262	LT104	34	626	1080	32	50	6	36	<4	43	4	4	3	1.5	3	<2	57	<5	35	163	9	8	<1	2440
07-0266	LT102	132	776	1250	36	57	14	30	5	47	<2	6	5	1.1	<2	<2	53	<5	36	250	5	11	<1	2590
07-0268	LT102	76	681	1010	30	45	7	42	<4	35	2	4	4	0.7	<2	<2	45	12	28	203	5	9	<1	137
07-0290	LT104	128	527	923	300	37	28	44	5	19	3	7	<2	1.0	3	<2	23	17	21	192	<3	4	<1	2220
07-0295	LT104	167	1080	1480	42	74	18	48	4	24	4	12	3	1.4	5	2	59	24	18	278	10	3	<1	1440
07-0300	LT102	213	910	1340	60	81	16	56	5	3	5	10	4	1.7	3	<2	84	14	136	255	10	3	<1	1950
07-0335	LT104	227	383	592	90	47	12	66	12	16	<2	3	2	1.1	4	2	43	8	215	258	12	<2	<1	1570
07-0341	LT104	130	546	891	55	50	12	58	5	15	4	4	<2	1.5	4	2	54	5	107	356	9	6	<1	2650
07-0507	LT104	190	538	971	42	47	11	42	18	14	7	5	4	1.3	11	<2	68	24	25	157	32	7	2	3780
07-0508	LT102	54	515	1040	38	52	4	44	15	15	<3	3	5	1.6	7	<2	60	19	59	120	17	4	2	6000
07-0510	LT102	84	535	1305	38	51	9	36	15	14	4	4	6	1.0	10	<2	90	20	39	165	27	6	2	1290

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-0534	LT104	LT100	SH-50-07	516321	6709420	27.81	17.30	45.76	0.058	0.036	0.022	0.07	1.421	9.23	101.71
07-0542	LT104	LT100	SH-50-07	516248	6709322	28.19	18.19	43.33	0.101	0.111	0.062	0.10	1.668	9.31	101.06
07-0546	LT104	LT100	SH-50-07	516473	6709296	23.96	19.04	46.33	0.056	0.034	0.049	<0.06	1.096	10.80	101.37
07-0547	LT104	LT100	SH-50-07	516473	6709296	21.99	19.66	47.19	0.045	0.024	0.027	<0.06	1.002	11.50	101.44
07-0548	LT104	LT100	SH-50-07	516473	6709296	23.51	17.74	49.91	0.058	0.029	0.023	0.07	1.416	8.45	101.20
07-0577	LT104	LT100	SH-50-07	516416	6708848	23.96	23.73	40.33	0.290	0.106	0.256	0.08	2.552	10.80	102.10
07-0578	LT104	LT100	SH-50-07	516416	6708848	26.72	25.05	33.60	0.589	0.993	0.345	0.11	2.552	12.70	102.66
07-0585	LT104	LT100	SH-50-07	515920	6708180	40.00	22.42	25.74	0.098	0.106	0.044	0.15	1.326	11.60	101.48
07-0589	LT102	LT100	SH-50-07	516053	6708327	32.08	18.59	40.04	0.096	0.062	0.073	<0.06	1.306	9.16	101.41
07-0592	LT102	LT100	SH-50-07	515926	6708430	33.26	14.26	41.04	0.048	0.043	0.120	<0.06	2.869	9.18	100.82
07-0606	LT104	LT100	SH-50-07	516073	6707316	34.44	19.53	35.03	0.048	0.043	0.024	0.10	1.198	11.00	101.41
07-0611	LT104	LT100	SH-50-07	515976	6708429	41.07	15.30	35.61	0.095	0.067	0.043	0.10	1.124	7.51	100.92
07-0613	LT102	LT100	SH-50-07	515976	6708429	23.83	15.21	53.91	0.073	0.043	0.032	<0.06	1.233	6.76	101.09
07-0618	LT104	LT100	SH-50-07	516233	6707722	27.81	24.50	34.61	0.033	0.031	0.016	<0.06	1.041	12.80	100.84
07-0619	LT104	LT100	SH-50-07	516233	6707722	27.38	19.91	40.33	0.050	0.041	0.042	<0.06	0.939	12.60	101.29
07-0620	LT104	LT100	SH-50-07	516233	6707722	27.17	14.56	44.62	0.051	0.057	0.073	<0.06	1.151	13.00	100.68
07-0989	LT103	LT100	SH-50-07	516210	6707770	32.04	22.63	33.3	0.049	0.022	0.014	0.06	1.05	11.62	100.79

Appendix **MT.GIBSON LATERITIC GRAVEL DATA LT100**

Sample Number	Sample Type	Mn	Cr	V	Cu	Pb	Zn	Ni	Co	As	Sb	Bi	Mo	Ag	Sn	Ge	Ga	W	Ba	Zr	Nb	Se	Be	Au
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
07-0534	LT104	114	1103	1187	28	91	20	34	10	30	6	8	2	1.4	3	<2	55	15	24	150	5	10	2	3300
07-0534	LT104	107	774	1150	32	117	12	54	8	26	9	6	5	<0.1	<2	<2	59	15	38	139	7	3	3	3480
07-0534	LT104	30	637	556	72	142	2	50	8	57	7	2	2	<0.1	2	<2	41	8	115	97	<3	9	2	3270
07-0534	LT104	28	801	829	90	158	14	60	10	66	6	3	2	0.3	3	2	40	9	16	108	<3	9	2	500
07-0534	LT104	124	1065	1040	28	104	15	46	10	42	7	2	3	0.6	2	<2	60	8	75	178	7	5	2	450
07-0534	LT104	121	906	1355	52	76	15	65	12	24	3	8	3	1.3	4	3	80	21	153	111	9	5	3	1540
07-0534	LT104	245	692	1037	52	76	12	60	14	7	<3	4	<2	1.0	3	2	59	15	146	98	11	3	2	2000
07-0534	LT104	107	584	812	60	43	20	65	12	11	5	2	6	0.5	2	<2	48	<5	52	154	7	7	1	6280
07-0534	LT102	72	737	1028	32	73	13	58	10	21	8	4	4	<0.1	3	<2	66	<5	201	139	8	<2	2	3560
07-0534	LT102	37	643	1286	40	63	15	52	14	9	8	8	4	2.0	4	3	69	25	169	107	11	8	1	4490
07-0534	LT104	62	685	1522	22	67	11	36	14	42	5	7	3	0.3	<2	<2	55	6	60	173	6	11	<1	3260
07-0534	LT104	104	605	921	28	65	19	58	15	22	<3	5	3	0.5	<2	2	43	<5	42	151	6	4	1	410
07-0534	LT102	98	859	1213	25	90	32	58	10	34	3	3	5	1.3	<2	<2	55	17	59	167	<3	5	1	870
07-0534	LT104	187	1842	620	82	44	22	36	4	15	<3	3	<2	1.6	3	2	30	<5	9	120	3	7	<1	970
07-0534	LT104	134	1437	383	120	33	56	80	14	15	6	2	<2	1.6	2	<2	21	14	67	72	3	5	<1	340
07-0534	LT104	106	181	468	120	33	42	22	14	46	6	<2	2	0.7	<2	<2	10	11	46	73	7	5	1	640
07-0534	LT103	68	693	837	56	53	15	32	4	41	5	5	6	0.2	4	3	64	5	22	135	10	7	1	1938

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
02-2901	LT203	LT200	SH-50-07	516085	6707326	44.40	16.67	28.04	0.034	0.028	0.029	0.06	1.480	9.73	100.47
02-2934	LT203	LT200	SH-50-07	516053	6707542	33.00	12.59	42.05	0.051	0.050	0.024	<0.06	2.430	7.45	97.65
02-2936	LT203	LT200	SH-50-07	516352	6707469	22.80	17.44	42.88	0.090	0.151	0.116	0.06	1.060	10.62	95.22
02-2941	LT241	LT200	SH-50-07	516184	6707200	49.96	19.55	14.38	0.060	0.024	0.058	0.21	0.838	10.23	95.31
07-0257	LT202HP	LT200	SH-50-07	516075	6707376	54.33	20.40	11.21	0.652	2.057	0.449	0.39	0.547	15.70	105.74
07-0258	LT203	LT200	SH-50-07	516075	6707376	40.85	19.65	28.46	0.080	0.071	0.160	0.08	1.835	10.40	101.59
07-0263	LT203	LT200	SH-50-07	516206	6707623	33.15	25.88	30.17	0.046	0.029	0.111	<0.06	0.916	13.10	103.40
07-0267	LT203	LT200	SH-50-07	516006	6707628	37.65	27.01	26.45	0.071	0.031	0.065	<0.06	1.022	12.60	104.90
07-0270	LT203HP	LT200	SH-50-07	516001	6707628	30.59	19.46	29.89	0.635	4.938	0.392	0.22	0.896	15.50	102.52
07-0271	LT202HP	LT200	SH-50-07	516001	6707628	54.76	21.91	15.59	0.439	0.417	0.318	0.34	0.781	13.50	108.06
07-0278	LT241	LT200	SH-50-07	516219	6707372	48.98	22.10	18.59	0.216	0.278	0.150	0.11	0.966	12.50	103.89
07-0291	LT241	LT200	SH-50-07	515998	6708928	55.61	21.91	9.14	0.099	0.035	0.100	0.12	1.600	11.60	100.21
07-0294	LT203	LT200	SH-50-07	516216	6709048	20.53	20.02	49.62	0.058	0.029	0.034	<0.06	1.239	9.93	101.46
07-0297	LT203	LT200	SH-50-07	516191	6709048	31.23	24.56	32.03	0.101	0.077	0.119	<0.06	1.379	12.10	101.60
07-0303	LT203	LT200	SH-50-07	516078	6709116	34.01	24.56	28.74	0.167	0.187	0.186	0.08	1.952	12.00	101.88
07-0319	LT241	LT200	SH-50-07	516075	6707376	50.27	18.89	24.17	0.061	0.024	0.043	<0.06	2.135	10.00	105.59
07-0322	LT203	LT200	SH-50-07	516075	6707376	37.43	21.35	30.32	0.081	0.027	0.066	0.15	1.541	11.00	101.96
07-0323	LT203	LT200	SH-50-07	516074	6707366	35.29	21.91	31.46	0.076	0.028	0.067	0.16	1.391	11.30	101.68
07-0328	LT212	LT200	SH-50-07	515950	6708404	21.60	15.02	56.48	0.096	0.074	0.102	0.08	1.218	6.69	101.36
07-0329	LT212	LT200	SH-50-07	515950	6708404	31.23	22.67	34.46	0.098	0.084	0.163	0.08	1.513	11.30	101.59
07-0330	LT203	LT200	SH-50-07	515949	6708369	30.16	24.37	32.75	0.196	0.062	0.237	0.14	1.701	12.40	102.02
07-0331	LT203	LT200	SH-50-07	515939	6708370	28.23	26.26	33.18	0.244	0.111	0.255	0.12	2.018	11.90	102.31
07-0333	LT214	LT200	SH-50-07	515950	6708404	36.36	22.29	30.74	0.126	0.101	0.158	0.10	1.189	10.50	101.57
07-0338	LT203	LT200	SH-50-07	516020	6708322	37.65	27.20	21.74	0.542	0.119	0.446	0.24	0.937	13.90	102.78
07-0339	LT203	LT200	SH-50-07	516020	6708327	31.23	20.40	34.46	0.718	2.168	0.404	0.27	1.148	11.90	102.70
07-0340	LT203	LT200	SH-50-07	516012	6708293	40.64	32.11	17.73	0.086	0.038	0.065	<0.06	1.053	14.30	106.02
07-0342	LT203	LT200	SH-50-07	516012	6708273	31.23	30.04	22.45	0.328	<0.007	1.266	0.19	1.416	15.60	102.52
07-0509	LT231	LT200	SH-50-07	515917	6707082	28.66	19.49	38.90	0.164	0.059	0.198	<0.06	1.294	12.40	101.17
07-0515	LT241	LT200	SH-50-07	515967	6707078	35.72	28.56	22.16	0.347	0.214	0.414	0.09	0.912	14.10	102.52
07-0517	LT203	LT200	SH-50-07	515991	6707028	20.17	19.06	47.05	0.033	0.050	0.018	<0.06	0.504	14.40	101.29
07-0519	LT203	LT200	SH-50-07	515991	6707028	36.58	19.10	33.12	0.081	0.031	0.073	<0.06	1.022	11.80	101.81
07-0523	LT203	LT200	SH-50-07	516099	6706945	34.44	27.18	24.10	0.239	0.476	0.307	0.12	0.666	14.50	102.03
07-0527	LT204CF	LT200	SH-50-07	516136	6706849	31.23	24.93	20.33	0.650	4.827	0.305	0.11	3.086	16.40	101.87
07-0535	LT203	LT200	SH-50-07	516321	6709420	32.08	17.91	40.75	0.078	0.031	0.040	0.08	1.153	9.69	101.82
07-0538	LT203	LT200	SH-50-07	516250	6709397	34.65	17.11	20.59	1.757	7.890	0.201	0.32	1.039	19.20	102.76
07-0539	LT203	LT200	SH-50-07	516250	6709397	38.93	18.78	28.26	0.708	0.862	0.253	0.30	1.491	13.00	102.59
07-0543	LT203	LT200	SH-50-07	516248	6709322	29.73	23.23	33.03	0.230	0.362	0.152	0.20	1.243	13.60	101.78
07-0544	LT203	LT200	SH-50-07	516268	6709322	37.00	26.77	19.69	0.212	2.140	0.225	0.11	0.752	14.80	101.70

Appendix **MT.GIBSON LATERITIC DURICRUST DATA LT200**

Sample Number	Sample Type	Mn	Cr	V	Cu	Pb	Zn	Ni	Co	As	Sb	Bi	Mo	Ag	Sn	Ge	Ga	W	Ba	Zr	Nb	Se	Be	Au
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
02-2901	LT203	113	414	938	22	66	15	16	10	150	4	9	<1	1.2	4	2	52	5	503	200	10	7	<1	1357
02-2934	LT203	45	1094	2071	35	36	16	26	12	34	7	6	5	<0.1	4	4	90	12	33	177	16	5	<1	941
02-2936	LT203	97	1382	937	66	55	24	35	12	125	9	4	8	<0.1	2	3	52	8	217	154	10	9	<1	1757
02-2941	LT241	57	498	419	25	18	9	25	10	23	<2	24	<1	<0.1	3	2	25	4	1877	148	5	3	<1	1225
07-0257	LT202HP	155	249	255	50	13	22	42	10	8	<2	5	<2	<0.1	2	2	28	7	131	101	6	<2	<1	580
07-0258	LT203	227	343	1490	36	87	15	22	<4	86	6	7	4	0.8	3	<2	53	5	212	228	10	8	<1	1510
07-0263	LT203	24	539	874	36	45	5	35	<4	47	3	2	4	1.1	2	<2	51	5	18	175	3	10	<1	690
07-0267	LT203	46	594	809	40	39	15	52	<4	31	4	3	3	0.8	<2	2	45	7	18	177	7	8	<1	2580
07-0270	LT203HP	229	486	506	95	15	18	38	10	15	<2	4	3	0.8	3	2	33	<5	140	159	6	5	<1	1200
07-0271	LT202HP	143	269	319	52	20	22	56	20	8	<2	<2	2	0.1	3	<2	32	7	1100	159	4	2	<1	1160
07-0278	LT241	50	323	1320	36	33	7	50	20	17	2	5	2	0.9	4	<2	33	<5	844	166	5	<2	<1	1870
07-0291	LT241	154	267	381	8	19	17	34	4	132	5	4	2	<0.1	3	<2	31	<5	281	150	8	2	<1	100
07-0294	LT203	114	914	1320	4	53	11	52	4	20	<2	2	4	1.9	3	<2	64	12	6	234	<3	7	<1	3350
07-0297	LT203	59	666	1100	34	40	8	48	6	5	2	9	4	0.7	4	<2	54	5	107	239	7	10	<1	1460
07-0303	LT203	34	762	1120	35	34	7	44	4	10	4	9	4	0.7	3	<2	63	11	43	222	9	3	<1	1630
07-0319	LT241	170	239	1850	36	94	5	24	4	103	4	6	3	1.0	6	<2	47	<5	410	173	14	4	<1	260
07-0322	LT203	171	475	1240	28	57	8	32	4	32	3	8	3	1.1	<2	<2	45	14	828	275	10	8	<1	1360
07-0323	LT203	143	450	1500	24	59	10	38	<4	41	4	8	4	1.1	7	3	59	7	323	254	8	7	<1	890
07-0328	LT212	108	673	1060	24	63	9	45	5	19	<2	<2	4	1.5	6	3	47	13	92	319	<3	3	<1	530
07-0329	LT212	40	671	1210	32	75	6	48	4	10	6	8	5	2.0	2	<2	55	5	127	283	11	2	<1	1260
07-0330	LT203	79	396	819	95	38	12	44	4	16	3	8	2	3.4	2	<2	42	5	61	241	6	5	<1	5900
07-0331	LT203	44	687	1290	32	90	8	45	4	7	7	10	2	1.0	5	<2	73	7	278	277	10	2	<1	4300
07-0333	LT214	65	527	852	30	54	8	42	5	10	4	5	3	0.8	4	2	46	8	151	270	9	6	<1	310
07-0338	LT203	153	422	570	124	35	23	84	20	14	<2	4	3	1.3	3	3	40	7	622	314	10	2	<1	2220
07-0339	LT203	150	475	842	85	63	11	50	8	13	<2	2	3	0.5	3	4	52	<5	223	283	8	<2	<1	3020
07-0340	LT203	73	548	673	32	32	6	54	4	36	<2	2	4	1.2	<2	3	50	<5	241	243	5	2	<1	1460
07-0342	LT203	128	466	699	44	27	8	55	4	12	2	3	3	1.1	3	<2	43	6	90	304	11	10	<1	340
07-0509	LT231	24	201	1349	240	51	13	64	32	27	3	3	2	0.8	2	3	18	12	58	74	5	4	2	850
07-0515	LT241	42	394	483	52	30	6	56	18	16	<3	3	2	<0.1	<2	<2	39	11	46	101	6	4	1	250
07-0517	LT203	55	269	288	240	54	38	48	17	13	3	<2	2	2.5	2	<2	19	6	13	79	3	6	1	4220
07-0519	LT203	63	384	419	60	51	13	42	18	24	5	4	3	0.9	<2	<2	31	<5	2970	139	5	9	2	490
07-0523	LT203	71	388	422	165	50	17	56	20	35	7	2	3	0.5	<2	<2	31	<5	192	103	3	3	1	1300
07-0527	LT204CF	84	1154	1030	58	41	13	56	20	21	3	14	4	2.3	3	<2	82	<5	220	123	16	7	1	930
07-0535	LT203	102	882	985	26	67	22	44	10	20	8	6	3	1.2	<2	2	47	20	252	133	5	6	1	140
07-0538	LT203	109	433	580	68	27	32	58	8	20	4	5	4	1.0	4	<2	46	9	92	113	4	3	1	2350
07-0539	LT203	204	671	1025	92	44	22	52	10	30	8	7	3	0.3	4	<2	54	6	158	142	5	4	2	1490
07-0543	LT203	117	365	360	150	55	22	65	18	13	<3	4	<2	1.0	2	<2	28	10	260	124	<3	5	2	1980
07-0544	LT203	31	550	387	58	32	7	70	10	15	6	4	4	<0.1	<2	<2	33	6	2212	113	5	5	1	2170

Sample	Sample	Box field	Map	AMG Coordinates		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	LOI	Total
Number	Type		Reference	Easting	Northing	% wt	% wt	% wt	% wt	% wt	% wt	% wt	% wt	% wt	%
07-0545	LT203	LT200	SH-50-07	516248	6709322	27.81	23.69	31.13	0.332	1.945	0.213	0.12	0.847	16.30	102.38
07-0549	LT241	LT200	SH-50-07	516473	6709296	27.38	19.99	39.75	0.075	0.032	0.059	<0.06	0.832	12.70	100.82
07-0556	LT202HP	LT200	SH-50-07	516557	6709454	31.44	23.42	32.73	0.224	0.295	0.183	0.11	1.326	12.7	102.43
07-0558	LT241	LT200	SH-50-07	516285	6709611	30.59	23.52	34.02	0.060	0.022	0.016	< 0.06	1.248	11.90	101.38
07-0559	LT241	LT200	SH-50-07	516285	6709611	32.51	28.43	24.97	0.156	0.022	0.276	0.08	2.168	13.00	101.61
07-0560	LT203	LT200	SH-50-07	516285	6709611	31.87	19.72	37.04	0.081	0.041	0.055	0.06	2.135	10.90	101.90
07-0564	LT203	LT200	SH-50-07	516360	6709609	33.37	20.80	33.02	0.119	0.039	0.159	0.11	2.502	11.10	101.22
07-0565	LT203	LT200	SH-50-07	516360	6709609	25.41	14.02	48.76	0.076	0.025	0.089	0.06	0.525	12.20	101.17
07-0568	LT203	LT200	SH-50-07	516386	6710019	39.57	24.27	23.74	0.209	0.676	0.243	0.11	1.326	12.20	102.35
07-0569	LT203	LT200	SH-50-07	516385	6710009	23.59	15.68	48.19	0.345	0.830	0.155	0.47	1.371	11.10	101.73
07-0572	LT203CF	LT200	SH-50-07	516471	6709847	31.23	18.15	19.88	0.501	11.528	0.395	0.18	1.133	19.40	102.40
07-0586	LT204	LT200	SH-50-07	515920	6708180	37.22	31.00	17.00	0.055	0.049	0.034	<0.06	1.231	14.90	101.49
07-0587	LT203	LT200	SH-50-07	515920	6708180	37.00	29.02	19.86	0.076	0.035	0.054	<0.06	1.498	13.50	101.04
07-0593	LT241	LT200	SH-50-07	515926	6708430	37.86	24.20	24.78	0.078	0.069	0.179	<0.06	1.701	12.70	101.57
07-0607	LT241	LT200	SH-50-07	516073	6707316	42.35	20.84	25.31	0.071	0.052	0.094	0.12	1.328	11.10	101.27
07-0608	LT241	LT200	SH-50-07	516073	6707316	56.26	23.23	8.98	0.076	0.045	0.119	0.15	1.508	11.40	101.77
07-0612	LT203	LT200	SH-50-07	515976	6708429	34.01	23.57	29.74	0.131	0.064	0.175	0.08	1.281	12.70	101.75
07-0616	LT214	LT200	SH-50-07	516233	6707722	26.52	23.84	36.75	0.032	0.029	0.016	<0.06	0.956	13.40	101.54
07-0617	LT203	LT200	SH-50-07	516233	6707722	28.66	21.08	37.89	0.065	0.060	0.061	<0.06	0.827	12.30	100.94
07-0988	LT203	LT200	SH-50-07	516210	6707770	32.75	22.95	32.56	0.059	0.039	0.036	0.06	0.854	11.61	100.92
07-1008	LT204HP	LT200	SH-50-07	516027	6707755	31.00	18.59	40.67	0.213	0.328	0.140	0.07	1.387	7.41	99.81
07-1009	LT204HP	LT200	SH-50-07	516028	6707805	30.80	19.17	39.65	0.228	0.276	0.099	0.11	1.386	7.82	99.54
07-1010	LT204HP	LT200	SH-50-07	515934	6707827	42.80	22.12	22.27	0.192	0.329	0.180	0.14	2.419	9.30	99.75
07-1011	LT204HP	LT200	SH-50-07	515908	6707778	35.90	19.26	33.06	0.312	0.460	0.176	0.18	2.052	8.31	99.71
07-1012	LT204	LT200	SH-50-07	516158	6707772	35.00	24.30	27.79	0.194	0.217	0.164	0.11	1.549	10.30	99.62
07-1013	LT204	LT200	SH-50-07	516252	6707530	27.00	20.28	39.12	0.135	0.145	0.082	0.06	0.811	11.70	99.33
07-1014	LT204	LT200	SH-50-07	516342	6707498	34.60	22.85	29.54	0.282	0.550	0.183	0.14	0.906	10.80	99.85
07-1015	LT204	LT200	SH-50-07	516350	6707398	34.20	24.21	29.56	0.086	0.070	0.041	<0.06	1.166	10.50	99.83
07-1016	LT204	LT200	SH-50-07	516322	6707299	32.40	26.41	27.44	0.130	0.156	0.162	<0.06	1.557	11.50	99.76
07-1017	LT204	LT200	SH-50-07	516345	6707198	46.10	24.35	17.26	0.053	0.022	0.022	<0.06	1.142	10.60	99.55
07-1018	LT204	LT200	SH-50-07	516213	6707101	48.80	21.35	18.02	0.177	0.799	0.124	0.12	0.916	9.18	99.49
07-1019	LT204HP	LT200	SH-50-07	516093	6707093	36.10	15.03	12.66	2.570	13.670	0.154	0.51	0.652	18.30	99.65
07-1020	LT204	LT200	SH-50-07	516156	6707002	34.40	18.94	35.80	0.085	0.103	0.029	0.10	0.940	9.22	99.62
07-1021	LT204	LT200	SH-50-07	516175	6706952	32.70	19.62	36.43	0.094	0.059	0.036	0.15	0.660	9.97	99.72
07-1022	LT204	LT200	SH-50-07	516041	6706795	55.10	22.65	10.50	0.162	0.101	0.082	0.07	1.172	9.60	99.44
07-1024	LT204HP	LT200	SH-50-07	516133	6706662	34.00	16.33	10.12	2.139	15.587	0.356	0.41	0.619	20.30	99.86
07-1025	LT204HP	LT200	SH-50-07	516092	6706608	46.30	25.71	15.01	0.421	0.238	0.216	0.28	0.877	10.80	99.85

Appendix **MT.GIBSON LATERITIC DURICRUST DATA LT200**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
07-0545	LT203	83	380	354	150	46	20	58	12	23	5	6	2	1.1	<2	<2	29	10	71	113	<3	5	1	2330
07-0549	LT241	44	466	449	135	92	20	66	12	60	4	3	<2	0.3	<2	2	28	19	809	107	5	6	2	270
07-0556	LT202HP	94	828	991	30	89	-2	56	24	29	15	5	8	1.6	2	2	62	15	1405	120	10	3	2	630
07-0558	LT241	64	945	1133	26	90	<2	52	20	22	7	4	4	<0.1	3	<2	52	12	14	114	8	13	1	3400
07-0559	LT241	82	521	785	48	35	<2	55	20	12	6	4	2	0.2	3	<2	52	13	152	102	7	11	1	48
07-0560	LT203	82	956	1319	28	76	<2	42	18	27	6	12	3	<0.1	2	<2	62	14	301	139	6	5	2	2020
07-0564	LT203	157	1194	1532	28	113	42	30	20	42	8	5	2	0.3	2	<2	37	8	311	179	8	4	3	1160
07-0565	LT203	69	2230	273	200	55	160	145	17	31	7	3	<2	0.3	<2	<2	16	11	96	62	<3	4	1	3920
07-0568	LT203	71	684	726	20	57	<2	50	20	16	5	3	4	<0.1	3	<2	44	6	33	111	6	<2	2	250
07-0569	LT203	85	842	765	82	104	8	50	18	47	15	5	<2	1.9	4	4	58	13	151	266	9	7	2	1700
07-0572	LT203CF	58	542	667	32	32	<2	45	12	17	<3	<2	6	0.5	<2	<2	45	8	223	75	5	4	1	700
07-0586	LT204	67	605	816	36	32	20	56	12	17	3	2	4	0.7	2	2	49	7	29	179	5	7	1	1900
07-0587	LT203	99	624	933	38	33	9	62	10	16	5	3	4	0.2	<2	<2	51	7	21	156	6	11	1	430
07-0593	LT241	22	380	559	50	28	6	52	12	6	5	2	3	2.1	3	2	47	12	135	114	5	7	1	1630
07-0607	LT241	34	305	2476	25	60	6	25	10	95	9	9	2	1.1	2	2	40	9	89	140	6	4	1	51
07-0608	LT241	90	118	788	24	33	25	38	9	12	6	<2	3	<0.1	<2	<2	33	<5	355	146	7	2	1	24
07-0612	LT203	30	949	1173	30	74	6	62	10	23	7	14	6	1.3	2	2	76	11	389	141	8	4	1	520
07-0616	LT214	215	1460	539	68	45	30	76	10	28	7	2	<2	2.2	<2	2	39	<5	7	127	4	6	<1	530
07-0617	LT203	46	863	507	84	45	22	44	6	20	6	2	<2	1.3	<2	<2	30	<5	266	93	<3	6	<1	690
07-0988	LT203	65	665	785	57	54	12	32	<4	41	5	6	7	0.2	3	-2	62	7	24	119	9	7	1	1942
07-1008	LT204HP	172	545	904	42	76	20	36	10	18	5	<2	7	<0.1	<2	<4	56	6	243	144	12	<2	1	1150
07-1009	LT204HP	230	550	869	50	80	22	58	8	15	10	5	2	<0.1	<2	<4	50	4	1189	141	10	<2	2	2220
07-1010	LT204HP	110	402	621	38	42	18	34	10	17	10	18	2	<0.1	7	<4	50	8	403	135	12	3	1	480
07-1011	LT204HP	275	293	800	58	20	34	34	12	22	5	<2	3	<0.1	<2	<4	48	<4	199	151	14	<2	1	640
07-1012	LT204	100	454	678	78	68	15	48	4	32	12	7	3	0.4	<2	<4	52	4	749	135	11	2	1	1460
07-1013	LT204	88	880	1017	76	68	30	32	8	74	5	<2	3	0.9	4	<4	44	<4	85	93	6	<2	1	2000
07-1014	LT204	127	489	442	62	46	17	40	12	32	11	<2	4	0.3	<2	<4	40	<4	447	125	10	3	1	750
07-1015	LT204	31	1060	969	28	64	12	38	10	54	8	5	7	0.3	<2	<4	68	4	46	132	12	6	1	530
07-1016	LT204	56	586	696	56	42	30	36	8	58	6	5	3	0.8	2	<4	50	<4	237	95	16	2	<1	900
07-1017	LT204	31	558	863	22	42	7	28	8	40	7	5	4	<0.1	3	<4	60	<4	245	126	10	4	<1	130
07-1018	LT204	34	558	677	30	30	16	26	8	36	7	16	3	<0.1	<2	<4	42	8	72	93	7	5	1	1400
07-1019	LT204HP	268	288	325	94	32	38	38	6	30	7	4	2	<0.1	<2	<4	26	6	108	89	7	<2	1	1800
07-1020	LT204	52	518	1059	58	62	16	22	<4	52	7	11	3	1.2	<2	<4	44	<4	50	139	8	6	1	1360
07-1021	LT204	27	472	549	68	54	19	22	8	42	8	10	4	0.3	<2	<4	46	<4	431	130	9	3	1	2000
07-1022	LT204	16	356	575	38	72	15	32	4	20	6	16	3	<0.1	4	<4	40	4	1411	95	12	<2	1	200
07-1024	LT204HP	202	397	308	76	32	22	44	10	18	7	4	2	<0.1	3	<4	26	<4	290	83	6	<2	1	1790
07-1025	LT204HP	112	521	368	52	44	15	52	18	22	4	8	3	0.2	3	<4	38	<4	76	115	10	<2	1	2410

Appendix **MT.GIBSON LATERITIC DURICRUST DATA LT200**

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-1026	LT204	LT200	SH-50-07	516080	6706734	41.20	23.18	22.80	0.094	0.046	0.049	<0.06	1.403	10.80	99.57
07-1027	LT204HP	LT200	SH-50-07	516083	6706854	35.90	21.25	30.48	0.255	0.217	0.117	0.18	1.178	10.10	99.68
07-1028	LT202	LT200	SH-50-07	516009	6706925	28.20	20.01	38.28	0.280	2.029	0.240	0.11	1.275	9.35	99.77
07-1030	LT204	LT200	SH-50-07	515940	6706977	41.90	21.27	24.12	0.387	0.709	0.187	0.23	1.085	9.64	99.53
07-1031	LT204	LT200	SH-50-07	515905	6706981	31.00	20.02	38.82	0.318	0.103	0.325	0.16	1.453	7.54	99.74
07-1033	LT204HP	LT200	SH-50-07	515933	6707107	27.90	12.56	13.49	4.692	16.846	0.242	0.37	0.843	23.00	99.94
07-1034	LT204	LT200	SH-50-07	515924	6707157	36.40	17.76	33.77	0.069	0.092	0.038	<0.06	0.484	10.50	99.11
07-1036	LT204	LT200	SH-50-07	515991	6707231	44.30	24.03	19.20	0.071	0.031	0.025	0.13	1.198	10.60	99.59
07-1037	LT204	LT200	SH-50-07	516046	6707255	39.30	18.09	32.56	0.060	0.046	0.038	0.10	1.226	8.33	99.75
07-1038	LT202	LT200	SH-50-07	516051	6707474	46.50	23.01	18.22	0.120	<0.007	0.091	0.13	1.320	10.10	99.49
07-1039	LT202	LT200	SH-50-07	516000	6707656	39.10	25.04	24.24	0.160	0.103	0.120	<0.06	1.077	10.10	99.94
07-1040	LT204	LT200	SH-50-07	515915	6708108	35.00	22.11	29.74	0.295	0.289	0.149	0.14	2.319	9.74	99.78
07-1041	LT204HP	LT200	SH-50-07	516015	6708110	37.00	20.17	32.02	0.278	0.232	0.114	0.08	1.213	8.38	99.49
07-1042	LT204HP	LT200	SH-50-07	516057	6708224	48.20	22.04	16.67	0.919	0.495	0.535	0.35	1.061	9.16	99.43
07-1043	LT204	LT200	SH-50-07	516065	6708344	44.00	23.05	22.97	0.196	0.037	0.248	0.10	1.185	7.64	99.43
07-1044	LT204	LT200	SH-50-07	515833	6708489	43.90	26.04	18.01	0.215	0.121	0.241	0.06	1.235	10.90	100.72
07-1045	LT204	LT200	SH-50-07	515868	6708259	35.30	18.09	35.27	0.145	0.037	0.205	0.18	1.248	9.32	99.80
07-1046	LT204	LT200	SH-50-07	515874	6708158	40.40	27.94	17.71	0.175	0.098	0.268	0.08	1.110	11.60	99.38
07-1047	LT204	LT200	SH-50-07	516230	6708796	32.80	22.05	34.71	0.102	0.051	0.081	0.07	1.144	8.78	99.79
07-1048	LT204	LT200	SH-50-07	516233	6708921	39.40	27.82	19.22	0.073	0.029	0.052	0.12	0.879	11.90	99.49
07-1049	LT204	LT200	SH-50-07	516081	6708854	40.20	21.07	26.88	0.115	0.028	0.102	0.09	1.350	9.59	99.43
07-1050	LT204	LT200	SH-50-07	515927	6708877	47.30	15.55	28.28	0.088	0.044	0.055	<0.06	0.861	7.28	99.46
07-1051	LT204	LT200	SH-50-07	515986	6709056	43.00	24.38	20.09	0.064	0.040	0.047	0.10	1.621	10.20	99.54
07-1052	LT204	LT200	SH-50-07	516407	6709097	47.00	21.18	20.63	0.083	0.033	0.028	0.10	1.075	9.73	99.86
07-1053	LT204	LT200	SH-50-07	516369	6709218	25.00	20.38	41.89	0.064	0.026	0.015	0.07	1.224	10.80	99.47
07-1054	LT204HP	LT200	SH-50-07	516190	6709252	41.60	20.04	16.82	0.695	5.667	0.293	0.19	0.936	13.50	99.74
07-1055	LT204	LT200	SH-50-07	516508	6709610	37.40	26.03	23.02	0.202	0.238	0.121	0.09	0.916	11.50	99.52
07-1056	LT204	LT200	SH-50-07	516511	6709545	39.00	24.03	23.76	0.335	0.230	0.209	0.16	0.925	11.10	99.75
07-1057	LT204	LT200	SH-50-07	516598	6709643	32.20	24.32	30.08	0.079	0.090	0.080	<0.06	1.213	11.60	99.66
07-1058	LT204	LT200	SH-50-07	516522	6709895	29.80	21.18	35.99	0.247	0.294	0.260	0.16	1.563	10.00	99.49
07-1059	LT202	LT200	SH-50-07	516481	6710001	32.60	20.00	37.58	0.154	0.101	0.157	0.09	1.332	7.61	99.62
07-1061	LT204	LT200	SH-50-07	516371	6709748	38.70	21.12	28.95	0.109	0.053	0.046	0.11	1.118	9.70	99.91
07-1062	LT204	LT200	SH-50-07	516378	6709873	44.40	23.09	20.65	0.090	0.155	0.135	0.08	0.957	10.20	99.76
07-1063	LT204	LT200	SH-50-07	516279	6709650	34.60	20.06	33.75	0.247	0.929	0.130	0.07	1.278	8.73	99.79
07-1064	LT204	LT200	SH-50-07	516355	6709468	39.70	21.76	25.65	0.147	0.195	0.132	0.08	1.609	10.30	99.57
07-1065	LT204	LT200	SH-50-07	516472	6709356	33.90	18.26	38.19	0.069	0.029	0.017	0.08	1.154	7.82	99.52
07-1066	LT204HP	LT200	SH-50-07	516550	6709484	51.10	20.79	15.52	0.609	0.602	0.251	0.33	0.813	9.66	99.68

Appendix **MT.GIBSON LATERITIC DURICRUST DATA LT200**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
07-1026	LT204	36	690	864	56	92	19	42	8	44	9	13	7	<0.1	2	<4	74	4	23	147	13	5	1	2570
07-1027	LT204HP	87	329	384	140	84	24	60	14	44	10	6	3	0.1	<2	<4	38	<4	170	106	13	4	1	2230
07-1028	LT202	49	779	709	40	74	20	30	6	38	7	5	6	0.4	2	<4	54	10	80	114	10	3	1	360
07-1030	LT204	136	351	434	92	60	24	70	10	26	8	4	4	0.4	3	<4	46	<4	157	119	12	<2	2	2550
07-1031	LT204	132	488	955	36	52	17	22	8	42	6	7	5	0.6	3	<4	62	4	119	134	19	<2	1	650
07-1033	LT204HP	189	189	337	44	30	20	14	6	17	6	<2	2	<0.1	<2	<4	16	<4	193	101	6	4	1	620
07-1034	LT204	52	184	563	155	36	22	28	6	16	3	12	2	0.4	<2	<4	20	4	650	57	5	5	<1	4920
07-1036	LT204	86	415	495	32	32	15	18	4	24	4	6	7	<0.1	<2	<4	44	<4	34	152	9	6	1	1780
07-1037	LT204	55	850	1127	19	46	24	14	6	38	10	10	4	0.2	2	<4	68	<4	912	154	12	6	<1	760
07-1038	LT202	23	653	856	26	36	15	24	8	54	12	7	4	0.3	<2	<4	58	6	1214	138	10	2	1	4410
07-1039	LT202	38	496	652	24	38	12	32	8	28	4	2	3	<0.1	4	<4	48	8	151	113	11	2	1	1060
07-1040	LT204	94	565	861	54	48	19	30	10	18	6	6	4	0.6	5	<4	70	10	775	128	18	<2	2	1580
07-1041	LT204HP	124	485	763	50	50	16	50	14	17	6	3	2	0.1	<2	<4	58	10	2461	131	11	3	2	940
07-1042	LT204HP	237	321	442	62	44	36	62	12	14	5	4	2	<0.1	3	<4	42	<4	162	112	10	2	1	1450
07-1043	LT204	76	462	588	50	54	18	56	4	22	11	7	3	0.9	2	<4	46	<4	31	119	12	2	1	950
07-1044	LT204	33	440	577	24	38	11	58	4	16	6	<2	4	<0.1	<2	<4	48	6	86	91	11	2	1	160
07-1045	LT204	61	681	1076	44	50	36	40	<4	28	11	11	4	1.7	<2	<4	48	4	105	156	9	8	2	6430
07-1046	LT204	37	589	732	54	34	14	50	<4	18	7	7	2	1.2	2	<4	54	<4	98	139	9	5	1	760
07-1047	LT204	81	746	848	32	54	13	48	<4	34	9	5	5	<0.1	<2	<4	52	8	143	139	13	6	1	380
07-1048	LT204	31	509	796	24	40	6	36	<4	40	12	18	6	2.0	<2	<4	72	4	46	106	8	8	1	2330
07-1049	LT204	48	687	1072	56	60	13	42	<4	26	7	7	6	1.2	<2	<4	60	12	234	113	13	6	1	1370
07-1050	LT204	67	414	548	92	38	22	38	<4	16	3	5	4	0.7	<2	<4	34	8	434	94	6	4	1	2400
07-1051	LT204	163	728	1005	60	48	32	70	<4	22	8	6	3	0.2	<2	<4	58	12	3425	156	9	3	<1	1800
07-1052	LT204	57	444	583	48	50	19	46	<4	28	6	5	5	0.1	<2	<4	48	12	43	125	13	5	1	220
07-1053	LT204	63	643	657	62	58	13	34	<4	90	12	5	10	0.5	<2	<4	64	14	30	137	11	5	1	220
07-1054	LT204HP	83	323	464	58	40	26	40	<4	22	4	5	3	<0.1	<2	<4	36	6	240	90	7	<2	1	2090
07-1055	LT204	68	1032	508	46	46	22	64	4	34	10	<2	4	0.6	<2	<4	44	<4	459	102	8	3	2	1800
07-1056	LT204	58	1003	480	38	40	20	54	4	34	12	5	9	<0.1	2	<4	34	6	129	88	8	2	1	2050
07-1057	LT204	113	1359	894	52	58	48	44	<4	44	9	5	4	0.4	2	<4	42	6	630	116	10	4	1	1690
07-1058	LT204	72	701	663	46	34	14	38	<4	105	7	5	18	1.5	<2	<4	58	12	97	187	13	2	1	3800
07-1059	LT202	142	799	855	30	62	16	48	4	26	5	<2	4	0.3	3	<4	48	<4	683	122	10	2	1	550
07-1061	LT204	43	900	1073	52	92	30	30	4	38	13	10	5	1.0	4	<4	54	10	356	136	8	3	1	1610
07-1062	LT204	33	687	618	32	22	42	36	<4	28	12	8	4	0.7	<2	<4	44	10	229	109	7	5	1	860
07-1063	LT204	168	664	807	34	74	13	44	<4	20	11	5	4	1.1	2	<4	54	6	335	98	7	<2	1	2490
07-1064	LT204	28	718	924	28	70	9	42	<4	28	5	7	7	0.2	2	<4	76	10	1469	118	14	<2	1	1460
07-1065	LT204	101	913	897	34	98	22	36	<4	52	12	13	5	1.0	<2	<4	60	12	29	139	12	8	<1	400
07-1066	LT204HP	156	471	370	48	42	26	62	<4	22	5	2	3	0.4	2	<4	44	4	1921	86	11	<2	1	1560

Appendix **MT.GIBSON LATERITIC DURICRUST DATA LT200**

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-0259	sap	sap	SH-50-07	516075	6707376	72.73	19.46	0.47	0.172	0.022	0.144	1.42	0.325	6.36	101.11
07-0260	sap	sap	SH-50-07	516075	6707376	60.96	27.77	4.35	0.181	0.041	0.135	0.27	1.153	10.80	105.66
07-0273	sap	sap	SH-50-07	516189	6707373	62.03	23.80	1.69	0.050	0.039	0.102	<0.06	2.302	10.90	100.91
07-0279	sap	sap	SH-50-07	515988	6708928	54.76	15.00	24.02	0.045	0.024	0.101	<0.06	1.051	7.60	102.60
07-0280	sap	sap	SH-50-07	515988	6708928	62.03	25.88	3.45	0.106	0.028	0.210	<0.06	2.035	11.50	105.24
07-0281	sap	sap	SH-50-07	515988	6708928	63.96	12.92	21.16	0.038	0.020	0.096	<0.06	0.911	6.96	106.07
07-0282	sap	sap	SH-50-07	515988	6708928	67.59	22.29	1.54	0.096	0.025	0.216	0.11	1.661	10.10	103.63
07-0283	sap	sap	SH-50-07	515988	6708928	65.24	23.23	1.67	0.103	0.029	0.244	0.18	1.668	10.60	102.97
07-0286	sap	sap	SH-50-07	515988	6708928	63.10	21.35	4.23	0.171	0.027	0.266	0.14	1.031	11.10	101.41
07-0304	sap	sap	SH-50-07	516048	6709107	46.63	24.93	18.59	0.065	0.028	0.058	0.08	1.299	12.70	104.38
07-0306	sap	sap	SH-50-07	516075	6707376	67.16	21.72	5.03	0.109	0.032	0.080	0.26	1.004	9.54	104.94
07-0307	sap	sap	SH-50-07	516075	6707376	61.39	24.75	6.06	0.096	0.028	0.112	0.21	1.520	10.80	104.97
07-0309	sap	sap	SH-50-07	516075	6707376	67.16	23.61	2.83	0.103	0.027	0.081	0.18	1.419	10.30	105.71
07-0310	sap	sap	SH-50-07	516075	6707376	73.58	18.00	0.49	0.254	0.027	0.085	1.40	0.350	6.49	100.67
07-0311	sap	sap	SH-50-07	516075	6707376	75.72	17.98	1.06	0.355	0.029	0.131	1.99	0.410	6.60	104.27
07-0312	sap	sap	SH-50-07	516075	6707376	75.51	17.89	0.77	0.287	0.027	0.080	2.23	0.294	5.16	102.25
07-0313	sap	sap	SH-50-07	516075	6707376	77.22	16.04	0.59	0.217	0.029	0.109	1.54	0.372	5.56	101.68
07-0314	sap	sap	SH-50-07	516075	6707376	71.66	19.83	0.63	0.184	0.029	0.121	1.02	0.664	7.94	102.07
07-0315	sap	sap	SH-50-07	516075	6707376	69.09	20.59	1.63	0.230	0.024	0.113	1.41	0.440	7.89	101.42
07-0316	sap	sap	SH-50-07	516075	6707376	69.52	18.29	0.40	0.234	0.022	0.109	1.74	0.330	6.52	97.16
07-0325	sap	sap	SH-50-07	515997	6707278	65.67	28.71	0.64	0.091	0.024	0.080	0.54	1.426	11.00	108.18
07-0521	sap	sap	SH-50-07	516080	6707001	58.39	15.24	14.56	0.526	0.926	0.233	0.74	0.587	11.20	102.40
07-0561	sap	sap	SH-50-07	516310	6709611	40.85	20.17	26.31	0.169	0.036	0.210	0.17	2.218	11.70	101.83
07-0598	sap	sap	SH-50-07	516244	6707152	57.33	26.58	1.62	0.298	0.572	0.505	0.19	1.751	13.80	102.65
07-0609	sap	sap	SH-50-07	516073	6707316	64.17	21.84	2.40	0.061	0.042	0.125	0.14	1.918	10.20	100.90

Appendix **MT.GIBSON SAPROLITE DATA sap**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
07-0259	sap	17	<50	45	2	<2	7	6	<4	<2	<2	3	2	<0.1	2	2	24	<5	213	110	8	<2	<1	37
07-0260	sap	47	108	430	10	11	4	12	<4	38	<2	<2	<2	<0.1	3	<2	29	<5	19	87	<3	<2	<1	6
07-0273	sap	118	170	279	22	19	22	40	<4	3	<2	<2	2	<0.1	<2	<2	28	<5	3070	112	8	<2	<1	100
07-0279	sap	184	710	481	100	271	19	28	<4	47	3	11	<2	0.5	4	4	24	<5	42	81	4	<2	<1	460
07-0280	sap	207	361	245	62	678	26	32	4	28	2	<2	2	<0.1	4	2	35	<5	80	145	6	3	<1	85
07-0281	sap	167	529	282	135	67	15	32	<4	74	6	70	<2	0.3	2	3	24	<5	68	63	3	4	<1	3130
07-0282	sap	232	343	63	40	450	35	60	5	6	<2	2	<2	<0.1	3	<2	29	<5	71	107	6	<2	<1	750
07-0283	sap	294	206	56	45	303	28	70	<4	9	5	<2	2	<0.1	3	2	26	5	104	106	10	<2	<1	440
07-0286	sap	112	439	217	38	5	17	88	<4	20	<2	6	<2	<0.1	4	2	21	<5	34	70	<3	<2	<1	180
07-0304	sap	61	927	1390	52	14	9	70	4	23	5	12	2	1.0	6	2	56	<5	1550	159	4	5	<1	3520
07-0306	sap	42	91	328	15	6	6	18	4	13	3	2	2	<0.1	5	2	30	5	64	114	11	<2	<1	72
07-0307	sap	149	<50	517	65	12	6	10	<4	27	3	4	2	<0.1	2	2	32	<5	41	103	9	<2	<1	34
07-0309	sap	26	72	303	15	<2	3	16	<4	13	3	19	3	<0.1	9	2	31	9	57	89	9	<2	<1	130
07-0310	sap	23	<50	53	3	<2	5	5	4	3	2	<2	2	<0.1	7	<2	23	<5	138	107	4	<2	<1	24
07-0311	sap	39	<50	56	22	<2	4	12	<4	<2	<2	<2	<2	<0.1	4	<2	22	<5	720	81	5	<2	<1	20
07-0312	sap	37	<50	55	5	<2	5	8	<4	4	<2	3	2	<0.1	3	2	21	6	208	123	6	<2	<1	21
07-0313	sap	23	<50	61	7	<2	6	10	<4	5	<2	<2	3	<0.1	5	2	21	6	166	90	5	<2	<1	13
07-0314	sap	19	59	85	10	<2	4	22	<4	3	3	2	3	1.1	5	<2	26	<5	95	117	7	<2	<1	10
07-0315	sap	22	61	73	13	<2	3	15	<4	<2	<2	<2	3	0.1	3	2	24	<5	286	96	5	<2	<1	45
07-0316	sap	23	<50	38	5	<2	3	10	<4	4	<2	<2	3	<0.1	3	3	24	<5	343	136	6	<2	<1	8
07-0325	sap	23	493	297	3	13	8	48	<4	6	<2	<2	<2	<0.1	3	2	28	8	110	110	5	<2	<1	22
07-0521	sap	57	400	189	155	39	58	64	14	14	<3	<2	<2	<0.1	<2	<2	14	5	395	56	3	<2	1	640
07-0561	sap	117	1316	1348	46	94	<2	60	28	28	8	5	3	<0.1	<2	<2	51	14	96	145	10	4	3	1040
07-0598	sap	55	467	322	18	12	58	30	15	3	7	<2	3	<0.1	<2	2	30	<5	217	103	5	<2	2	110
07-0609	sap	112	<50	460	12	45	32	34	12	4	4	2	3	<0.1	<2	<2	32	<5	67	105	7	<2	1	70

Appendix **MT.GIBSON SAPROLITE DATA sap**

Sample Number	Sample Type	Box field	Map Reference	AMG Coordinates Easting	AMG Coordinates Northing	SiO2 % wt	Al2O3 % wt	Fe2O3 % wt	MgO % wt	CaO % wt	Na2O % wt	K2O % wt	TiO2 % wt	LOI % wt	Total %
07-0503	CA	misc	SH-50-07	515883	6707106	23.96	21.01	17.56	1.628	11.975	0.127	0.15	1.868	23.40	101.68
07-0504	CA	misc	SH-50-07	515883	6707106	24.81	22.38	23.27	1.467	6.813	0.186	0.13	2.402	20.30	101.76
07-0524	CA	misc	SH-50-07	516122	6706874	26.74	9.48	11.05	0.774	25.965	0.119	0.11	0.394	26.60	101.23
07-0254	CA204	misc	SH-50-07	516065	6707376	24.60	10.20	9.94	1.907	25.182	0.201	0.29	0.452	28.40	101.17
07-0275	CA204	misc	SH-50-07	516252	6707471	29.09	18.32	19.16	1.757	11.989	0.213	0.37	0.804	20.60	102.30
07-0276	CA204	misc	SH-50-07	516252	6707471	26.52	18.55	16.30	1.300	16.508	0.507	0.15	0.602	24.70	105.14
07-0269	IS101	misc	SH-50-07	516001	6707628	6.84	5.53	73.64	0.221	0.653	0.179	<0.06	0.257	13.80	101.12
07-0518	IS101	misc	SH-50-07	515991	6707028	6.22	7.23	72.50	0.027	0.018	0.019	<0.06	0.215	14.60	100.83
07-0522	IS101	misc	SH-50-07	516080	6707001	6.24	2.74	81.08	0.148	0.214	0.054	<0.06	0.065	8.92	99.46
07-0605	IS101	misc	SH-50-07	515925	6707380	10.20	8.46	68.64	0.041	0.045	0.020	<0.06	0.239	13.60	101.25
02-2896	LG102	misc	SH-50-07	515399	6707393	39.40	24.03	23.06	0.036	0.046	0.011	<0.06	0.752	11.93	99.27
02-2897	LG105	misc	SH-50-07	515599	6707358	22.90	19.87	43.08	0.027	0.056	0.022	<0.06	1.260	11.15	98.37
02-2893	LG201	misc	SH-50-07	516142	6707100	26.50	12.40	38.63	0.789	8.850	0.068	0.20	0.734	11.29	99.46
07-0285	minv	misc	SH-50-07	515988	6708928	55.40	7.16	32.46	0.030	0.017	0.054	<0.06	0.202	5.90	101.22
07-0308	minv	misc	SH-50-07	516075	6707376	76.15	5.01	19.59	0.035	0.022	0.022	0.08	0.272	3.37	104.55
07-0332	minv	misc	SH-50-07	515953	6708329	74.86	4.63	17.16	0.048	0.018	0.057	0.11	0.203	2.81	99.89
07-0277	MZ	misc	SH-50-07	516252	6707471	41.92	31.74	18.30	0.284	0.095	0.344	0.08	0.605	14.10	107.47
07-0284	MZ	misc	SH-50-07	515988	6708928	59.68	18.12	18.16	0.154	0.021	0.163	0.98	0.590	8.92	106.79
07-0288	MZ	misc	SH-50-07	515988	6708928	62.24	21.16	9.44	0.143	0.024	0.152	0.24	1.148	10.80	105.34
07-0292	MZ	misc	SH-50-07	515988	6708928	48.98	23.23	20.45	0.104	0.020	0.073	0.08	1.968	12.30	107.20
07-0293	MZ	misc	SH-50-07	515991	6708928	32.73	18.81	36.32	0.113	0.022	0.074	0.10	0.919	12.80	101.89
07-0305	MZ	misc	SH-50-07	516075	6707376	62.03	22.29	7.19	0.085	0.029	0.093	0.13	3.336	10.30	105.48
07-0317	MZ	misc	SH-50-07	516075	6707376	66.95	17.68	9.21	0.169	0.031	0.143	0.30	0.569	10.50	105.55
07-0318	MZ	misc	SH-50-07	516075	6707376	62.89	19.08	16.02	0.181	0.038	0.128	0.45	0.562	11.20	110.55
07-0320	MZ	misc	SH-50-07	516075	6707376	64.81	16.96	12.51	0.076	0.028	0.123	0.14	2.118	8.10	104.86
07-0321	MZ	misc	SH-50-07	516075	6707376	54.54	27.39	8.08	0.164	0.027	0.133	0.17	1.243	12.30	104.05
07-0334	MZ	misc	SH-50-07	515939	6708355	33.80	30.04	22.02	0.126	0.027	0.324	0.09	2.002	13.10	101.53
07-0596	MZCF	misc	SH-50-07	516244	6707152	37.43	18.29	12.41	1.646	11.122	0.217	0.40	0.666	20.60	102.78
07-0597	MZCF	misc	SH-50-07	516244	6707152	40.43	22.12	15.87	1.583	4.043	0.262	0.25	0.872	16.60	102.03

Appendix **MT.GIBSON MISCELLANEOUS DATA (Sorted by sample type) misc**

Sample Number	Sample Type	Mn ppm	Cr ppm	V ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	As ppm	Sb ppm	Bi ppm	Mo ppm	Ag ppm	Sn ppm	Ge ppm	Ga ppm	W ppm	Ba ppm	Zr ppm	Nb ppm	Se ppm	Be ppm	Au ppb
07-0503	CA	127	243	417	44	20	9	32	24	13	8	<2	5	<0.1	7	<2	34	<5	357	104	17	3	1	2440
07-0504	CA	149	329	602	46	27	12	40	22	17	9	4	4	0.1	7	<2	47	12	155	131	21	4	1	2260
07-0524	CA	225	189	277	32	47	6	18	7	16	7	5	<2	0.5	<2	<2	13	<5	279	68	<3	2	1	1270
07-0254	CA204	120	238	266	44	9	14	25	8	3	<2	2	3	<0.1	2	<2	15	9	231	87	<3	<2	<1	800
07-0275	CA204	404	393	402	78	27	28	54	8	17	<2	<2	4	0.9	<2	<2	27	8	144	173	6	2	<1	4140
07-0276	CA204	102	392	358	80	23	10	40	4	25	2	3	3	1.9	4	<2	23	<5	704	113	5	3	<1	3000
07-0269	IS101	225	146	186	220	20	130	56	18	2	3	13	<2	2.6	<2	5	6	18	98	77	<3	<2	<1	1600
07-0518	IS101	148	88	80	270	67	115	58	21	3	<3	2	<2	2.4	<2	<2	2	<5	16	29	<3	2	3	2040
07-0522	IS101	4623	<50	40	410	107	450	125	105	37	<3	2	<2	1.9	<2	2	<2	17	101	44	3	3	1	360
07-0605	IS101	247	57	61	410	115	92	60	22	<2	<3	<2	<2	1.4	<2	<2	4	12	61	18	3	2	2	670
02-2896	LG102	34	2336	1005	70	38	13	40	14	36	4	3	5	1.6	3	2	65	14	17	190	10	3	1	33
02-2897	LG105	100	253	817	32	65	10	24	18	8	<2	<2	2	0.2	2	3	52	14	9	195	9	9	<1	1187
02-2893	LG201	223	619	1090	65	80	20	30	12	54	6	17	2	0.9	<2	<2	35	8	98	122	5	7	1	1085
07-0285	minv	100	657	621	330	127	25	100	<4	2196	40	329	<2	1.5	2	<2	8	<5	38	48	5	2	<1	31000
07-0308	minv	24	58	1170	130	46	6	12	<4	167	5	99	2	0.5	3	5	8	21	355	<20	<3	17	<1	17800
07-0332	minv	26	190	933	24	53	4	10	<4	25	<2	20	<2	0.7	5	4	6	6	24	<20	<3	3	<1	600
07-0277	MZ	29	518	503	28	18	7	38	4	33	2	4	5	0.5	2	<2	31	9	55	98	10	6	<1	160
07-0284	MZ	85	271	239	135	47	9	68	4	570	8	61	3	0.1	<2	2	20	11	316	97	7	3	<1	420
07-0288	MZ	161	244	358	72	6	18	80	4	14	<2	6	<2	<0.1	4	2	26	<5	99	116	7	2	<1	86
07-0292	MZ	195	332	612	140	11	54	36	6	6	3	5	<2	0.3	2	2	29	<5	95	198	7	2	<1	1450
07-0293	MZ	53	372	843	180	17	19	48	4	20	<2	11	<2	0.9	<2	3	25	6	281	210	<3	5	<1	2430
07-0305	MZ	369	60	1340	42	47	13	22	4	29	2	5	<2	<0.1	7	2	38	<5	191	119	16	<2	<1	45
07-0317	MZ	31	163	264	36	2	9	32	5	<2	<2	<2	<2	0.2	3	<2	25	<5	604	116	6	<2	<1	66
07-0318	MZ	36	187	303	34	4	11	30	4	<2	<2	<2	<2	0.1	5	2	26	<5	255	140	9	<2	<1	170
07-0320	MZ	174	85	1010	32	58	7	16	<4	54	4	7	<2	<0.1	9	4	29	<5	90	120	10	<2	<1	82
07-0321	MZ	35	161	328	28	5	4	34	10	8	4	5	3	0.3	6	<2	33	<5	96	161	8	<2	<1	63
07-0334	MZ	92	378	582	68	19	14	46	4	25	<2	6	2	1.5	4	2	43	5	16	276	5	4	<1	2730
07-0596	MZCF	120	327	414	46	33	16	52	9	30	<3	4	3	0.3	4	<2	26	<5	151	89	9	2	1	2230
07-0597	MZCF	45	423	537	45	26	15	28	12	43	<3	9	3	<0.1	4	<2	31	5	176	97	16	4	<1	480

Appendix **MT.GIBSON MISCELLANEOUS DATA (Sorted by sample type) misc**