

Chapter 3 Consideration of the Survey Result

3-1 Controls on Mineralisation Related to the Geological Structure and Characteristics of Mineralisation

Ore deposits in this area are stratabound copper ore deposits occurring in arkose of the Deweras Group. The Hans Mine, the Angwa Mine, the Shackleton Mine, the Norah Mine and the Mhangura (Miriam) Mine are developed. The formation of the ore deposition is considered to be strongly controlled by the sedimentary environment and geological structure of country rock (Simpson, 1990). As a result of the survey of the ore deposits and the mineralisation area, the lowest part of the Deweras Group that form a boundary zone of the basement rocks is considered to be an important geological control at the northern Mhangura Area, the NW-SE anticline structure is considered to be important at the southern Alaska Area.

3-2 Relationship Between Geochemical Anomalies and the Mineralisation

The following areas were selected as high potentialities of expected new ore deposits by the results of the existing data analysis and phase I geochemical survey.

1. Greenfields Area

- 1) Chimusenga north and central
- 2) Greenfields west
- 3) Chirombozi east

2. Piringani Area

3. Inyati Area

4. Angwa Area

- 1) Cu high content area around the Old Alaska Mine
- 2) Cu high content area from the Alaska smelter to Sinoia Drift Estate farm
- 3) Cu high content area from the Angwa Mine to the Hans Mine

In addition, following the two areas were adopted as a assignment area by the results of phase I survey.

- 1) Greenfields Area north and east (Wildene, Brenville)
- 2) Binge Area (Chipiri, Tchetchenini, Binge, Redwing)

These selected areas conform to the following condition of anomaly area by Cu-Au-Ag mineralisation, and closely related to mineralised area. Therefore, these areas were considered to be important for future survey.

- 1) Distribution area of arkose of the Deweras Group
- 2) Cu high content area of soil geochemistry
- 3) Distribution of high score of 4th principal component for 6 elements (Cu, Pb, Zn, Fe, Co, Ni)

3-3. The relationship between the results of geophysical survey and mineralisation

Summary of geophysical survey is as follows.

Table II-2-7 Summary of geophysical survey

Line	Resistivity structure	Resistivity(Ω -m)	IP(mV/V)	IP anomalous body	Depth(m)	Geology
B	2 layers	1'st layer 25-300 2'nd layer 3,000	2.5-10 4.5	-	-	slate, Sandstone, arkose
C	3 layers	1'st layer 150-180 2'nd layer 750 3'rd layer 4,000	1-7 4-7 12-20	-	-	gneiss
L	West portion -low East portion -high	West portion 85-450 East portion 3,000	1-10 2.8	70mV/V (small steep plate)	<50	arkose - granite boundary
Za	Centre part -low	Centre portion 200-500 End portion 3,000	0.5-4.5 4.5	300mV/V (flat plate)	200-350	arkose - granite boundary
O	2 layers	1'st layer 80-500 2'nd layer 4,000	1-2 3	150mV/V (small steep plate)	<150	Quartz Vein
Ys	3 layers	1'st layer 150-300 2'nd layer 750 3'rd layer 2,500	3-9 1-8 2-6	200mV/V (steep plate)	250<	arkose

An IP anomaly caused by mineralisation in this area is considered to be shown in chargeability of 50mV/V to several hundred mV/V. This value corresponds to the relationship between Cu grade and IP value which was obtained by last year's study. On the other hand, some cases of no IP anomaly with widening shape towards the deep part and high IP but low chargeability (less than 50mV/V) are not caused by mineralisation but by the influences of geology.(e.g. Line Band C)

3-4. Potentiality of expected ore deposits

The result of comprehensive analyses are shown in Fig.II-3-1.

The following sites are considered as potential ore-bearing sites based on the comprehensive study of the Cu anomalous zones obtained by soil geochemical survey and IP anomalous zones by geophysical survey.

1. The Greenfields site :

1-1) The Chironbozi farm east

- 1-2) The Brenville farm
2. The Inyati site
3. The Angwa site
- 3-1) The high copper concentration area from the Angwa mine to the Hans mine

The eastern part of the Chirombozi farm to the Brenville farm is located in the lowest horizon of the Deweras group which is nearly the border of the basement rocks. The geological situation is the same as of Mhangura mine. This site is considered to be in a successive mineralisation zone which continues from the Norah mine to the Mhangura mine.

Mineralisation of the Inyati site has a close relationship to the quartz-calcite vein, and the site is located in the northern extension part of mineralisation zone of the United Kingdom mine.

The ore deposits from the Angwa mine to the Hans mine are considered to be originally one ore-bearing zone. A Cu geochemical anomaly and IP anomaly are considered to reflect this continued mineralisation zone.

From the above mentioned analyses, the selected sites have potential new ore deposits.

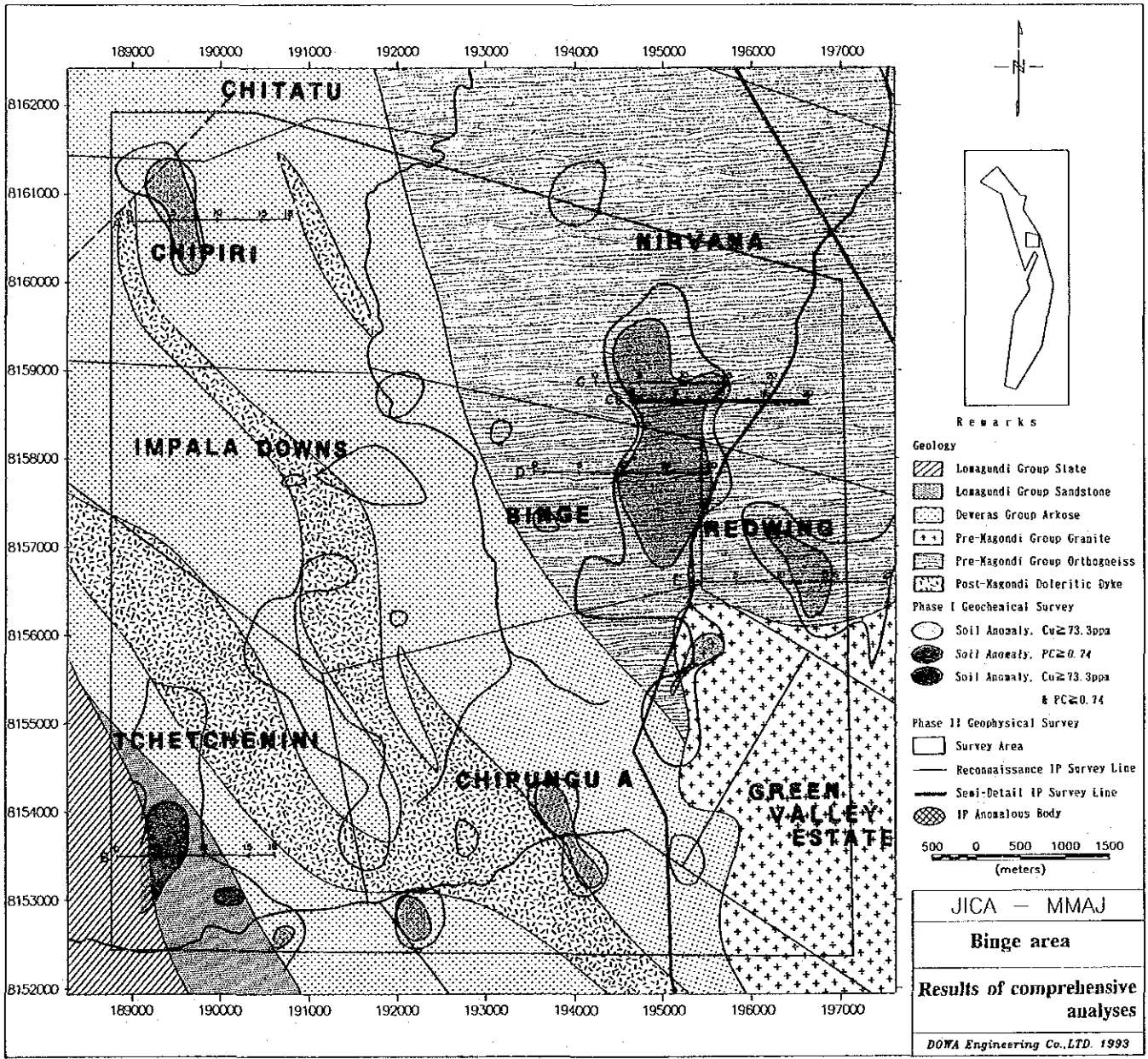


Fig.II-3-1 Results of comprehensive analyses (Binge area)

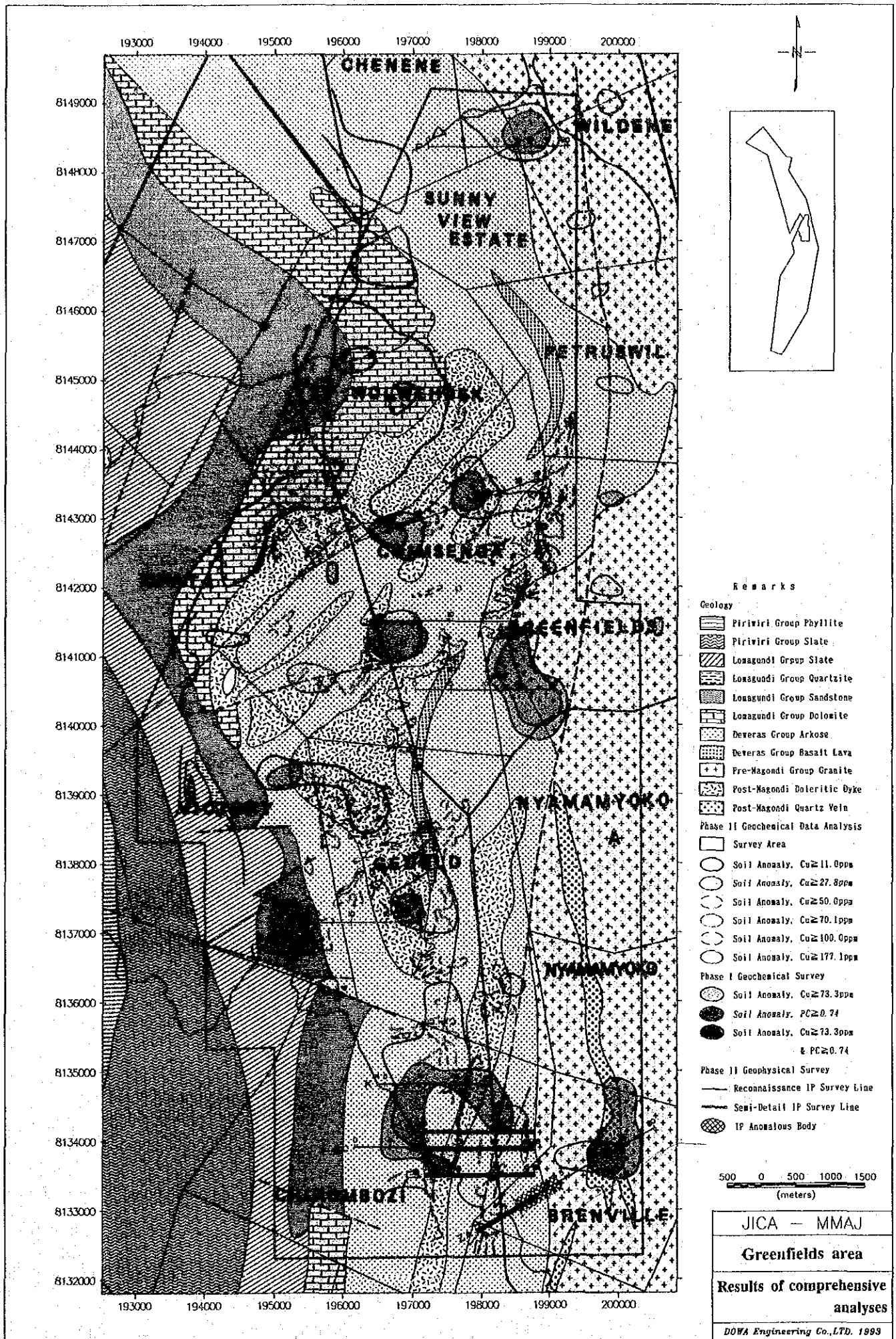


Fig.II-3-1 Results of comprehensive analyses (Greenfield area)

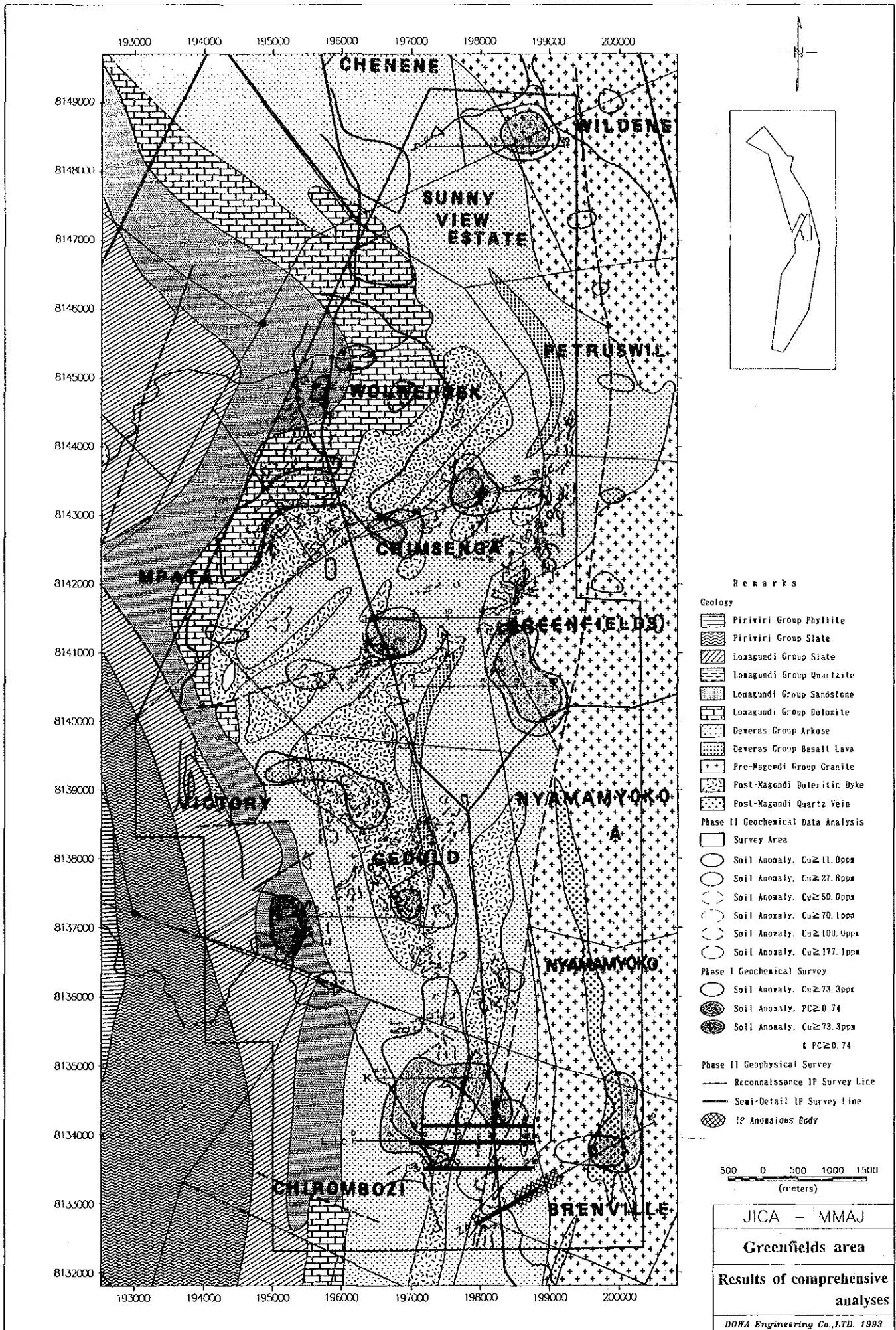
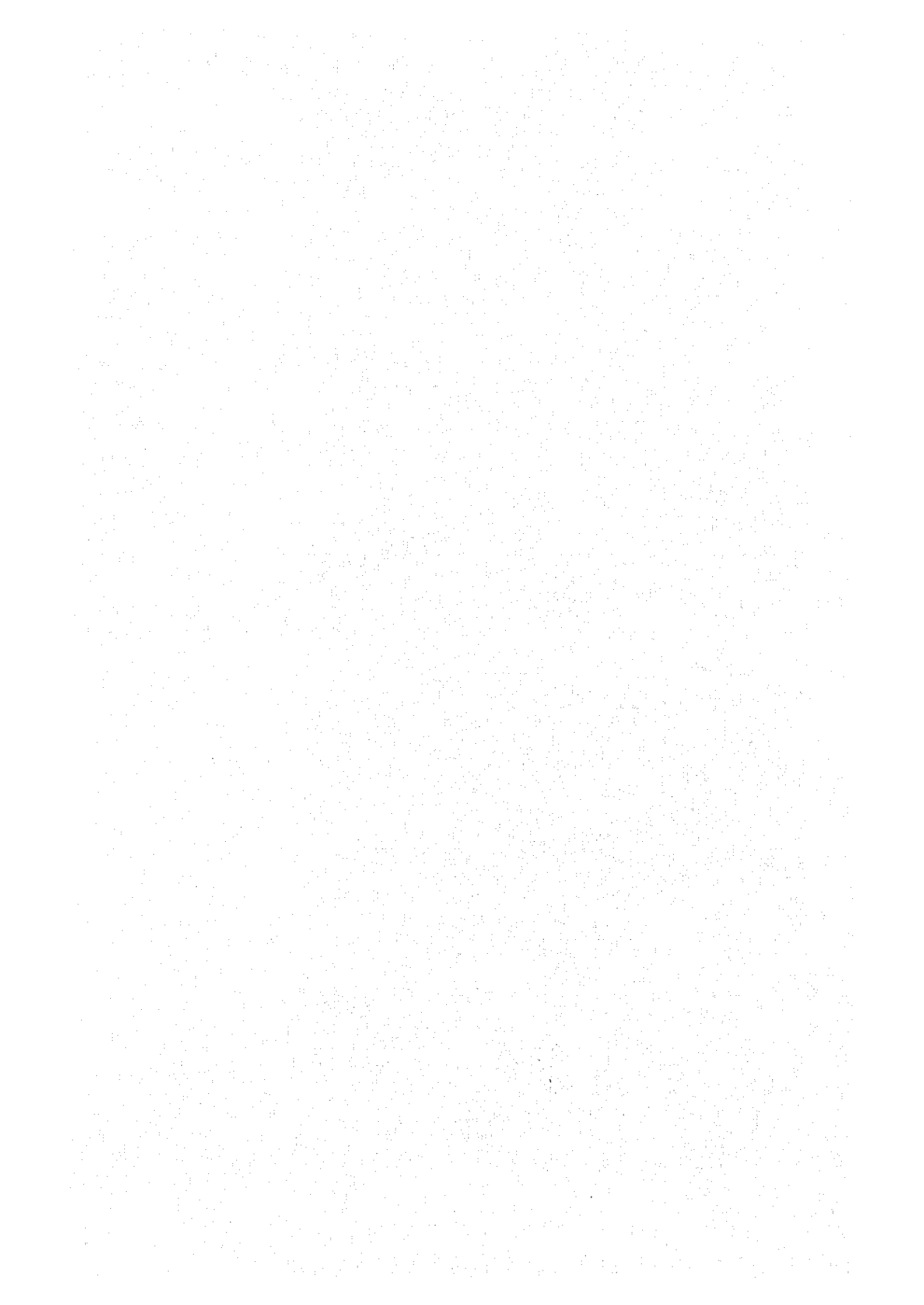
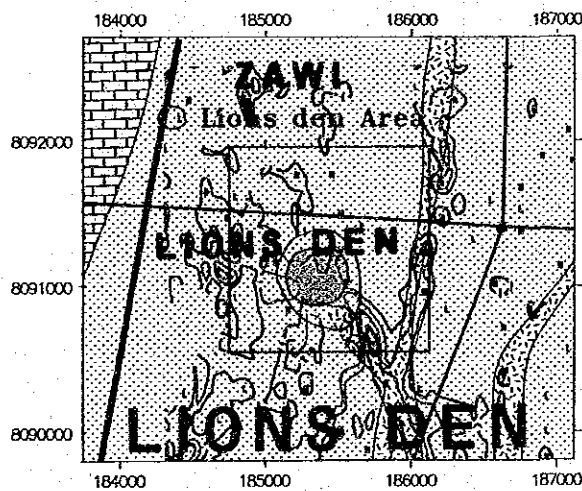
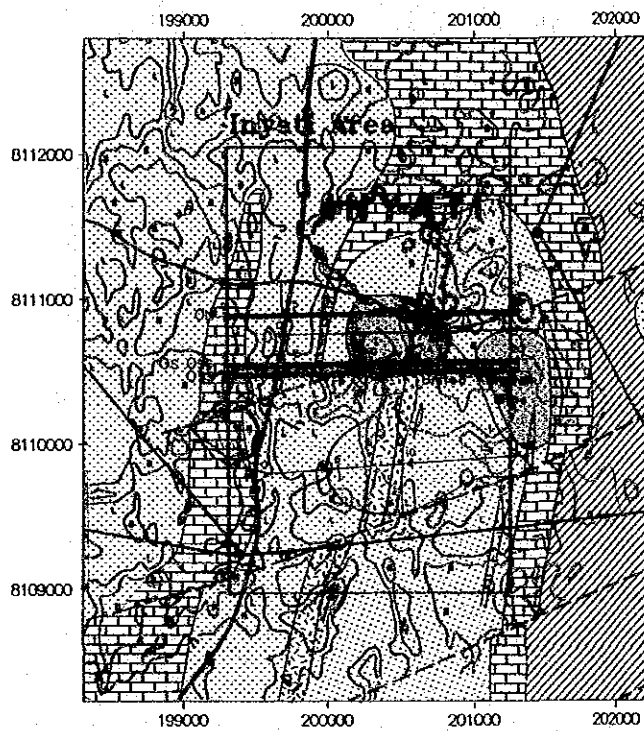
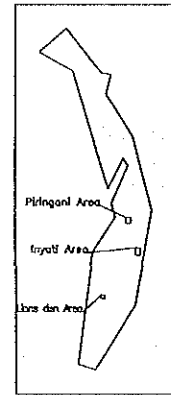
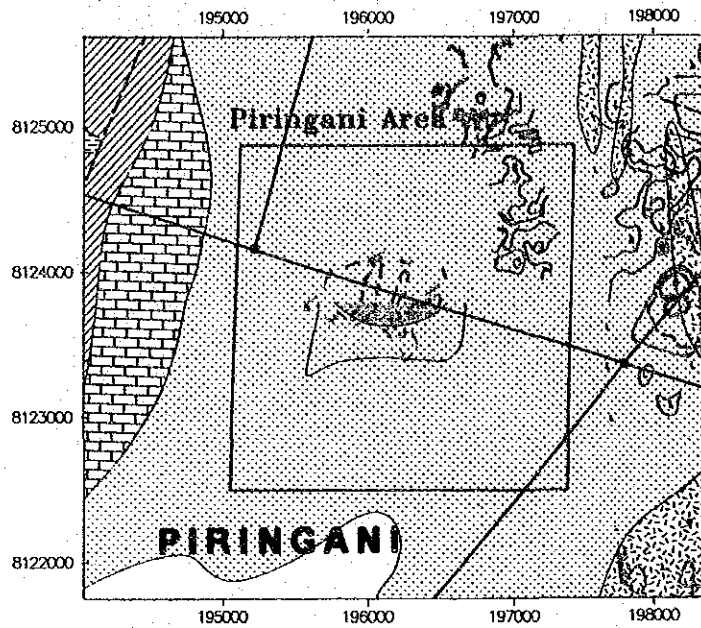


Fig.II-3-1 Results of comprehensive analyses (Greenfield area)





Remarks

Geology

- Lowagendi Group Slate
- Lowagendi Group Sandstone
- Lowagendi Group Dolomite
- Deveras Group Arkose
- Post-Magondi Doleritic Dyke
- Post-Magondi Quartz Vein

Phase II Geochemical Data Analysis

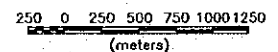
- Survey Area
- Soil Anomaly, Cu \geq 11.0ppm
- Soil Anomaly, Cu \geq 27.8ppm
- Soil Anomaly, Cu \geq 50.0ppm
- Soil Anomaly, Cu \geq 70.1ppm
- Soil Anomaly, Cu \geq 100.0ppm
- Soil Anomaly, Cu \geq 177.1ppm

Phase I Geochemical Survey

- Soil Anomaly, Cu \geq 73.3ppm
- Soil Anomaly, PC \geq 0.74
- Soil Anomaly, Cu \geq 73.3ppm & PC \geq 0.74

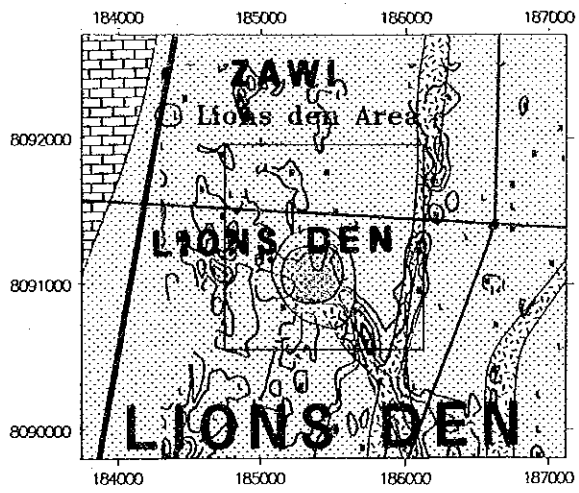
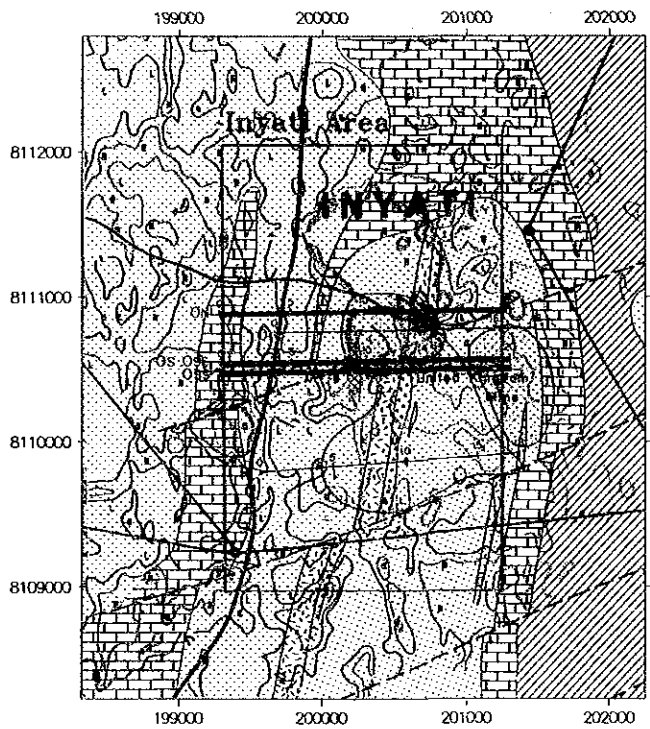
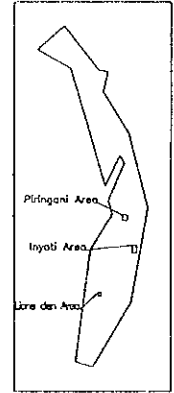
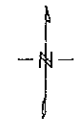
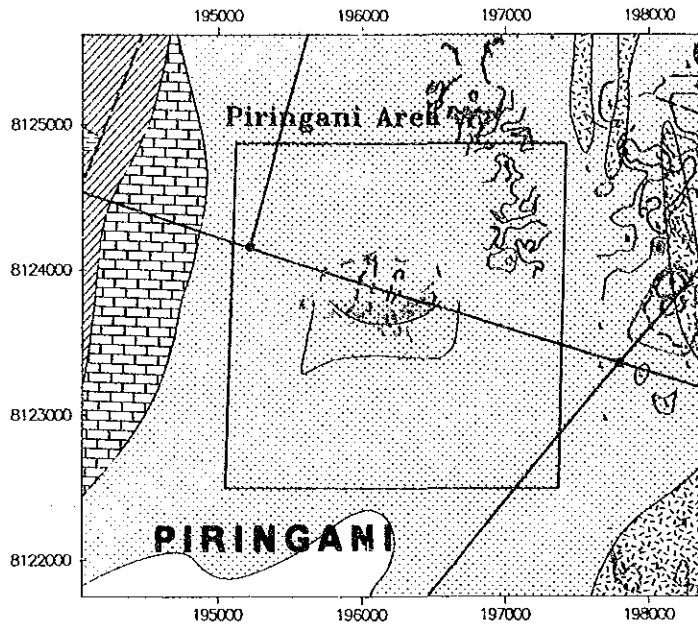
Phase II Geophysical Survey

- Reconnaissance IP Survey Line
- Semi-Detail IP Survey Line
- IP Anomalous Body

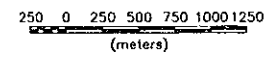


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Pringani, Inyati, Lions den area
Results of comprehensive analyses
DONA Engineering Co., LTD. 1993

Fig.II-3-1 Results of comprehensive analyses (Pringani, Inyati, Lions den area)



- Remarks
- Geology**
- Loazgundi Group Slate
 - Loazgundi Group Sandstone
 - Loazgundi Group Dolomite
 - Deveras Group Arkose
 - Post-Magondi Doleritic Dyke
 - Post-Magondi Quartz Vein
- Phase II Geochemical Data Analysis**
- Survey Area
 - Soil Anomaly, Cu \geq 11.0ppm
 - Soil Anomaly, Cu \geq 27.8ppm
 - Soil Anomaly, Cu \geq 50.0ppm
 - Soil Anomaly, Cu \geq 70.1ppm
 - Soil Anomaly, Cu \geq 100.0ppm
 - Soil Anomaly, Cu \geq 177.1ppm
- Phase I Geochemical Survey**
- Soil Anomaly, Cu \geq 73.3ppm
 - Soil Anomaly, PC \geq 0.74
 - Soil Anomaly, Cu \geq 73.3ppm & PC \geq 0.74
- Phase II Geophysical Survey**
- Reconnaissance IP Survey Line
 - Semi-Detail IP Survey Line
 - IP Anomalous Body



JICA -- MMAJ
**Pringani, Inyati,
 Lions den area**
**Results of comprehensive
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 DOWA Engineering Co.,LTD. 1993

Fig.II-3-1 Results of comprehensive analyses (Pringani, Inyati, Lions den area)

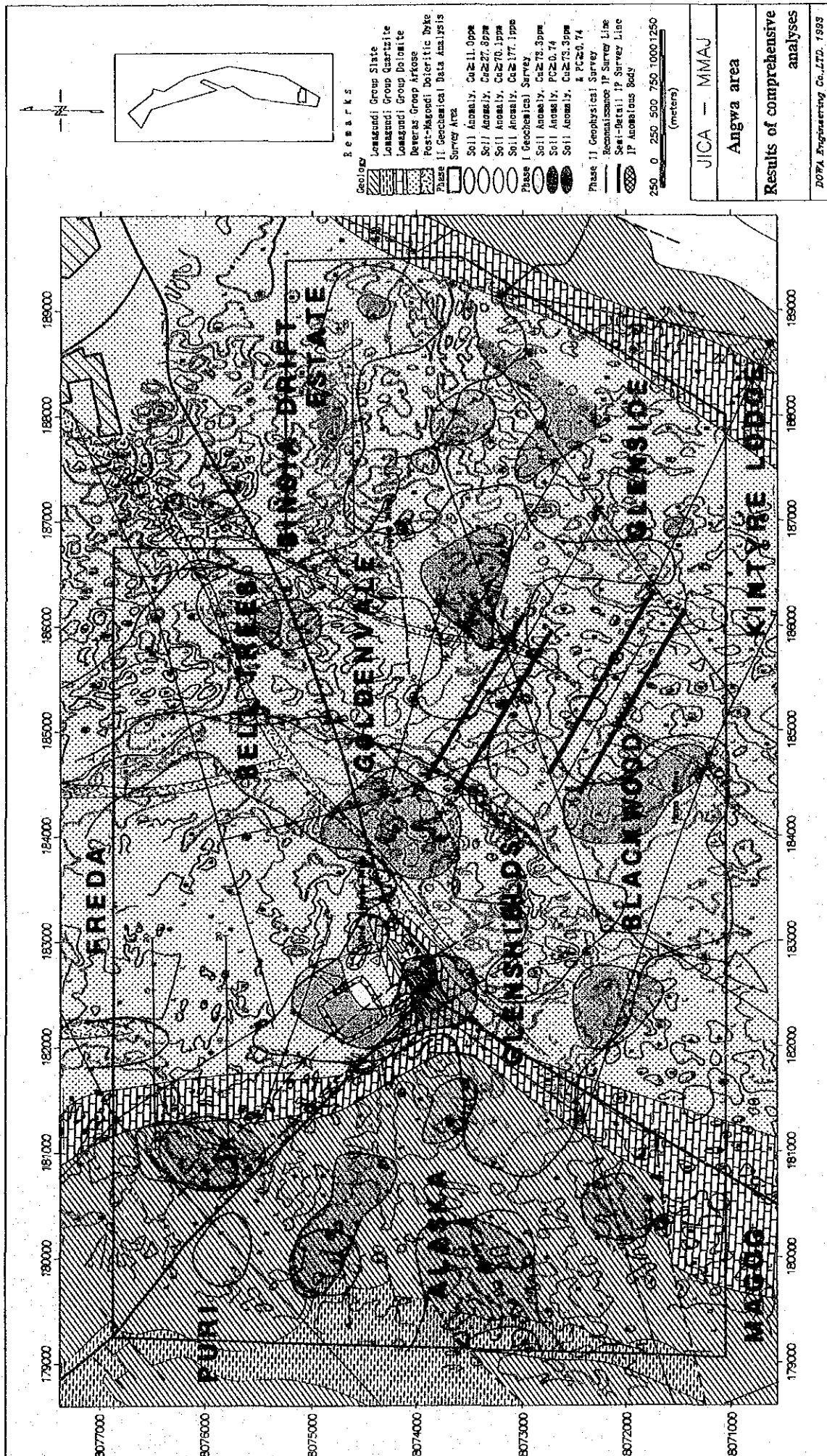


Fig.II-3-1 Results of comprehensive analyses (Angwa area)

Part III Conclusion and Recommendation

PartIII Conclusion and recommendations

Chapter 1 Conclusion

The analyses of previous geochemical data(5 sites, 110 km²) and IP geophysical survey (6 sites, 74.2 line km)were carried out as this year's survey.

1-1. The analyses of previous geochemical data

Five sites, total area 110km², which were selected from 1992's survey were the target of the analyses of previous geochemical data of this year.

The soil geochemical data and analysed data which are kept in GSD and ZMDC were supplied for this year's study. 33,681 geochemical data values were analysed.

Geochemical data and the coordinates of sampling point were input into a computer for univariate analyses.

The following sites were selected by comprehensive analyses of 1992's and 1993's studies as expected ore-bearing sites.

1. The Binge site

1-1) The Tchetchenini farm

1-2) The Binge farm

1-3) The Redwing farm

2. The Greenfields site

2-1) The Wilden farm

2-2) The northern part to the central part of the Chimusenga farm

2-3) The western part of the Greenfields farm

2-4) The eastern part of the Chirombozi farm

2-5) The Brenville farm

3. The Piringani site

4. The Inyati site

5. The Angwa site

5-1) The wide high copper concentration area around the Old Alaska mine

5-2) The high copper concentration area from the Alaska refinery to the Sinoia Drift Estate farm

5-3) The high copper concentration area from the Angwa mine to the Hans mine

1-2. Geophysical survey

Electrical method of prospecting i.e. IP reconnaissance survey was carried out by setting up the survey lines on the geochemically anomalous areas, as follows:

method	-	inducted polarisation method(IP method)
measurement	-	time domain method
electrodes arrangement	-	dipole-dipole
electrodes separation	-	a=200m
coefficient of electrodes separation	-	n=1 ~ 4
number of survey lines	-	21
total length of the survey lines	-	51.0km

The survey lines which detected anomalous zones were extended or new survey lines were added to carry out semi-detailed survey.

The semi-detailed survey is specified as follows:

electrodes separation	-	a=200m,a=100m
number of survey lines	-	12
total length of the lines	-	23.2km

The following sites were determined as potential ore-bearing sites by simulation analyses of provisional section based on the results of reconnaissance survey, semi-detailed survey and the measurement of physical properties(laboratory test) of rocks.

1. The Greenfields site :

1-1) The eastern part of the Chirombozi

1-2) The Brenville

2. The Inyati site

3. The Angwa site

3-1) The high copper concentration area from the Angwa mine to the Hans mine

1-3. Recommended drilling sites for 1994-Phase III Makonde Exploration Project

By comprehensive study and analyses of previous geochemical data and geophysical survey, the following sites are recommended as potential sites to find new ore deposits.

1. The Chirombozi site (L line No.18~19 station)
2. The Brenville A site (Za line No.--3 station)
3. The Brenville B site (Za line No.2 station)
4. Inyati site (Os line No.9 ~ Oss line No.9 station)
5. The Blackwood A site (Ys line No.9 station)
6. The blackwood B site (Y line No.13~14 station)

Chapter 2 Recommendations for the Phase III Maconde Mineral Exploration Project

Based on results of Phase I and Phase II survey, 6 sites of hopeful IP anomalous bodies were identified in the geochemical anomalous areas. These IP anomalous bodies must be confirmed by drilling.

The minimum amount of drilling and priority is as follows;

Priority;

- | | |
|----------------|------|
| 1) Blackwood A | 600m |
| 2) Blackwood B | 500m |
| 3) Brenville A | 300m |
| 4) Brenville B | 400m |
| 5) Inyati | 200m |
| 6) Chirobozi | 200m |

In the case of potential ore deposits revealed by above drilling, detailed drilling will be necessary to explore the extend of mineralisation and to calculate the ore-reserves and grade.

- 1) Blackwood A 600m
- 2) Blackwood B 500m
- 3) Brenville A 300m
- 4) Brenville B 400m
- 5) Inyati 200m
- 6) Chirobozi 200m

In the case of potential ore deposits revealed by above drilling, detailed drilling will be necessary to explore the extend of mineralisation and to calculate the ore-reserves and grade.

Reference

Reference

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