

## 2-4 Survey results

### 2-4-1 Soil Geochemical Survey

#### (1) Background and Objectives

A semidetained soil geochemical survey recommended in Phase I was carried out within the C block area in a large zone that presented concentrations of gold anomalies above 25 ppb in soil.

Based on results of the above mentioned, a hand auger survey and a scout drilling survey were carried out on the basis of new detected anomalies.

#### (2) Survey area and Amounts

The semidetained soil geochemical survey area is presented in Fig. II-2-1. The location map of soil samples is shown in the Fig. II-2-4.

The total of soil samples collected in C Block during the Phase II soil geochemical survey were 1.135 samples and the descriptions of these samples are shown in Appendix 22.

#### (3) Results from statistical data analysis

The statistical data analysis was based on the data shown in Appendix 23, which included all analytical results from the Phase II semidetained soil geochemical survey in addition to the data from Phase I soil geochemical survey. The results of this analysis are indicated in Appendix 24.

Correlation coefficients were calculated in order to clarify the relation among elements (Appendix 24). The elements that show high correlation (correlation coefficients of more than 0.500) are as follows:

Pb-Zn, Pb-Fe, Co-Mn, Fe-V.

None of the analyzed elements showed high correlation with Au, though Cu shows a low correlation coefficient (0.140) with Au. The elements such as Zn(0.100), Fe(0.104) and V(0.134) also showed low correlation with Au.

#### (4) Single element analysis

Based on the results of statistical data treatment (Appendix 24), the threshold values were determined by using histogram analysis, EDA methods and cumulative frequencies.

The threshold values for each element are as follows:

Au: 25 ppb	Ag: 0.24ppm	Cu: 31.9ppm	Pb: 71ppm
Zn: 54.4ppm	Fe: 8.67%	As: 24.4ppm	Sb: 1.22ppm
Hg: 338.7ppb	Bi: 3.48ppm	Cd: 1ppm	Co: 20ppm
Ni: 20ppm	V: 188.4ppm	Mn: 2078ppm	Mo: 9ppm

K: 1.85%      W: 10ppm

Anomalous maps for each of the above elements were elaborated by using the threshold values of Appendix 24. The soil gold anomaly map indicated in Fig. II-2-5 shows a WNW-ESE trending that coincides with the direction of the regional shearing. Another trend seen along NE-SW direction is likely to represent a secondary shearing direction in this area. Five gold anomaly zones can be differentiated within the soil gold anomaly map, i.e., 1) Central zone, 2) East zone, 3) Northeast zone, 4) West zone and 5) Southwest zone. Excluding the 2 first zones, the gold anomalies are in general not continuous. The Central gold anomaly zone presents a relatively large gold anomaly area with approximate size of 2.5Km x 1.5Km and a NNW-SSE trend direction. The main gold anomaly within the East gold anomaly has an area of 1Km x 0.3km and a NW-SE trend direction. Other small and discontinuous gold anomalies are also present within the East gold anomaly zone.

As indicated by an overlapping map containing the anomalies of Au+Cu+Pb+Ag+Fe (Fig.II-2-6), the distribution of Au anomaly can not be clearly correlated to the distribution of the other elements. However, the following considerations can be inferred:

- a) In the Central gold anomaly zone, it is observed a discontinuous overlap between Pb and Ag.
- b) In the East gold anomaly zone, only Fe anomaly is present, but its distribution can not be clearly related to the gold anomalies.

#### **(5) Multi element analysis**

A multi element analysis was conducted by using factor analysis method and its results are shown in Appendix 24.

The following relationship among different elements were extracted by using the factor analysis of data from Phase II soil geochemical survey:

Factor 1 : Fe-Pb-V

Factor 2 : Mn-Zn-Co-Pb

Factor 3 : Ag-Fe-V

Factor 4 : Ni-Cd

Factor 5 : Hg

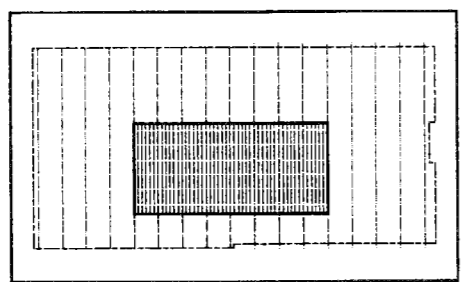
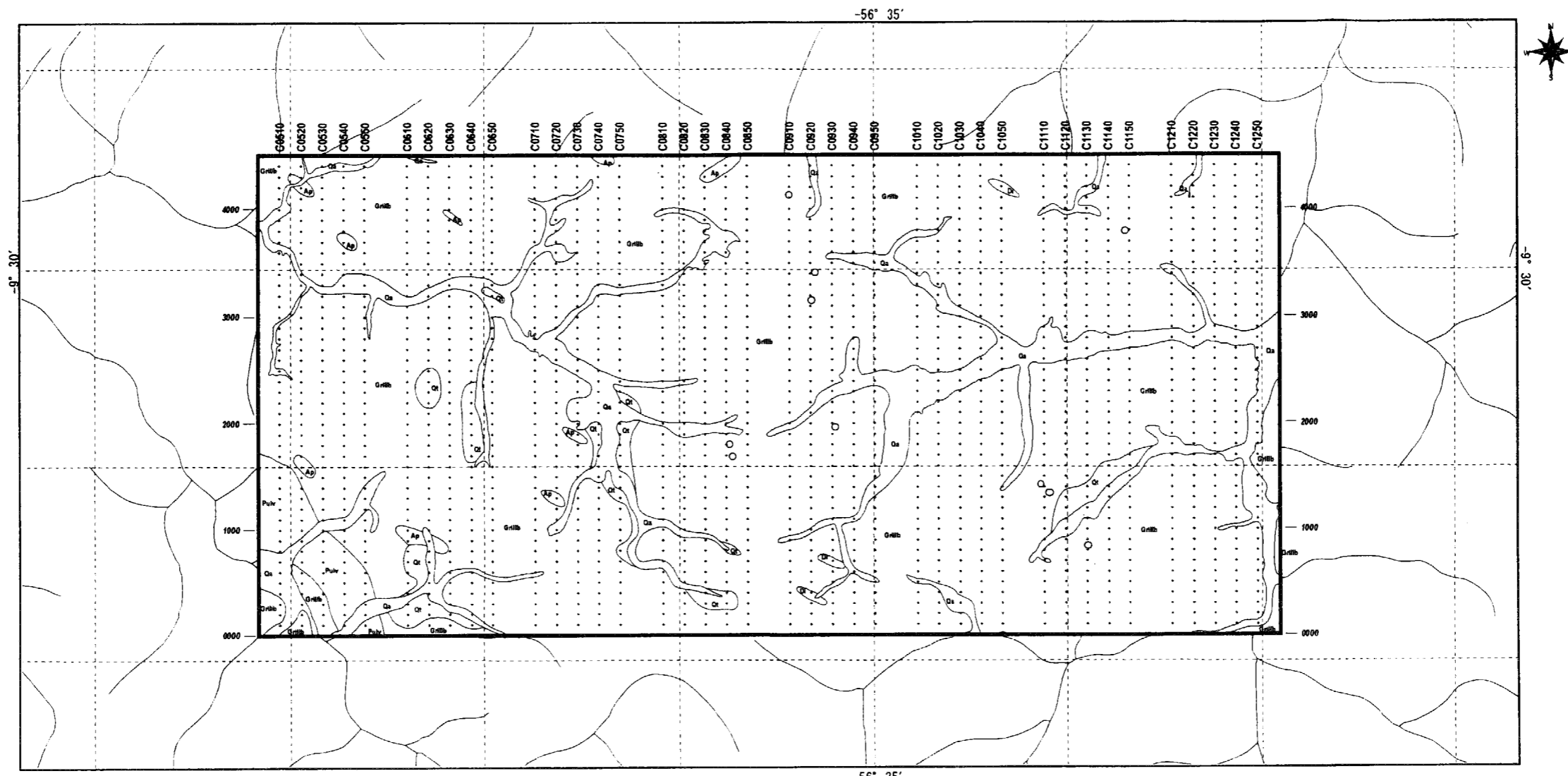
Factor 6 : Bi or Mo

Factor 7 : Au-Cu-Zn

The results of factor analysis from combined data of Phase II and parts of Phase I are as follow:

Factor 1 : Pb-Zn-Fe

Factor 2 : Ag



Location of Phase II survey area



LEGEND

- Sampling Point
- Line name
- Sampling point
- Sample number
- Claim boundary
- Phase II survey area
- River
- Geology

 Geological boundary and Geological unit
- Shear zone
- Primary garimpo

Fig. II-2-4 Location map of soil samples in Block C

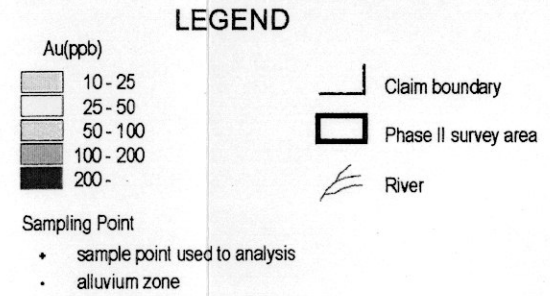
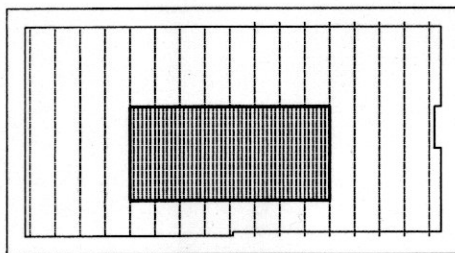
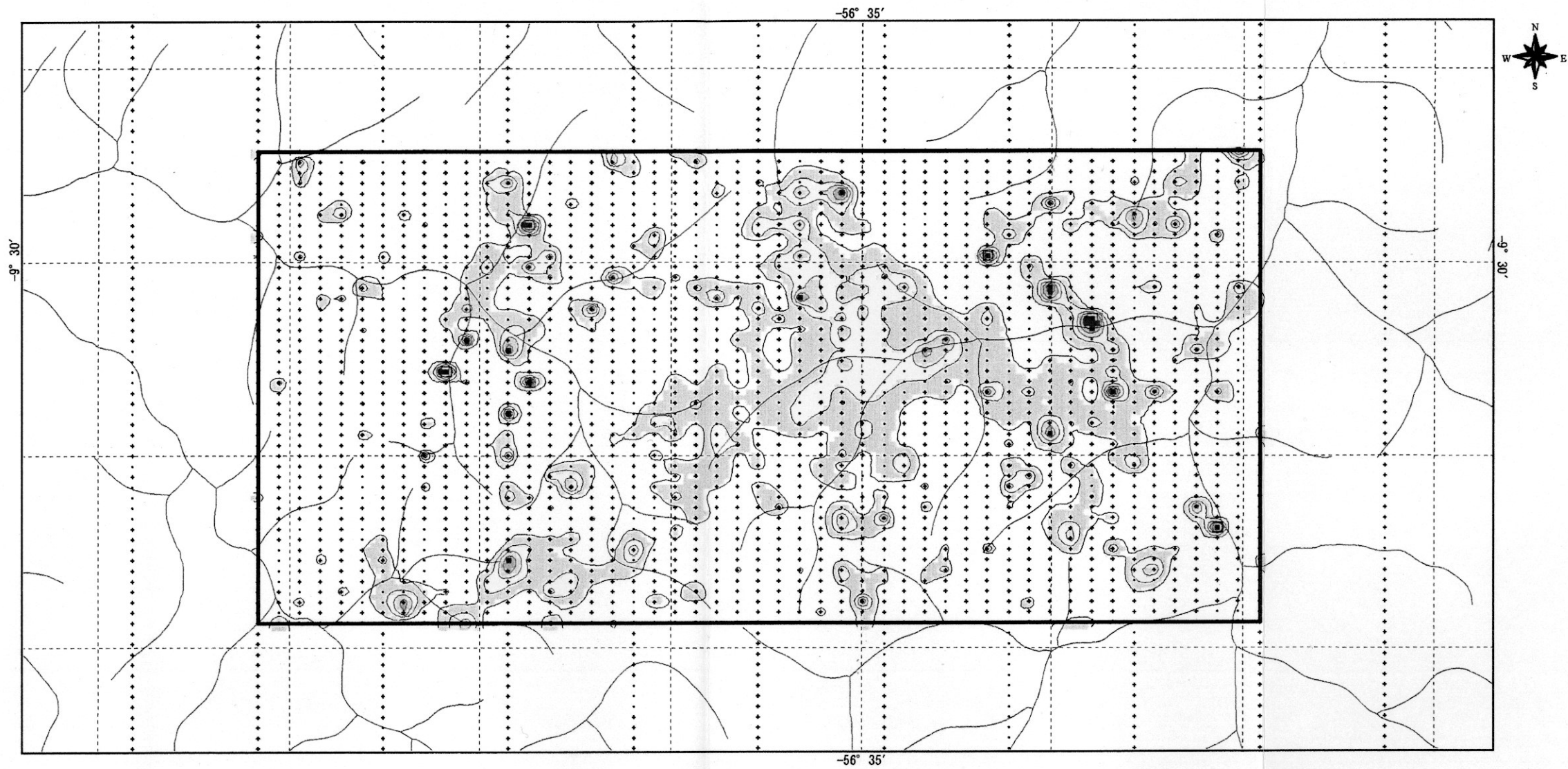
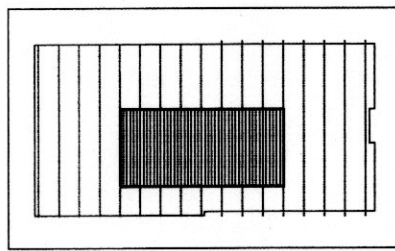
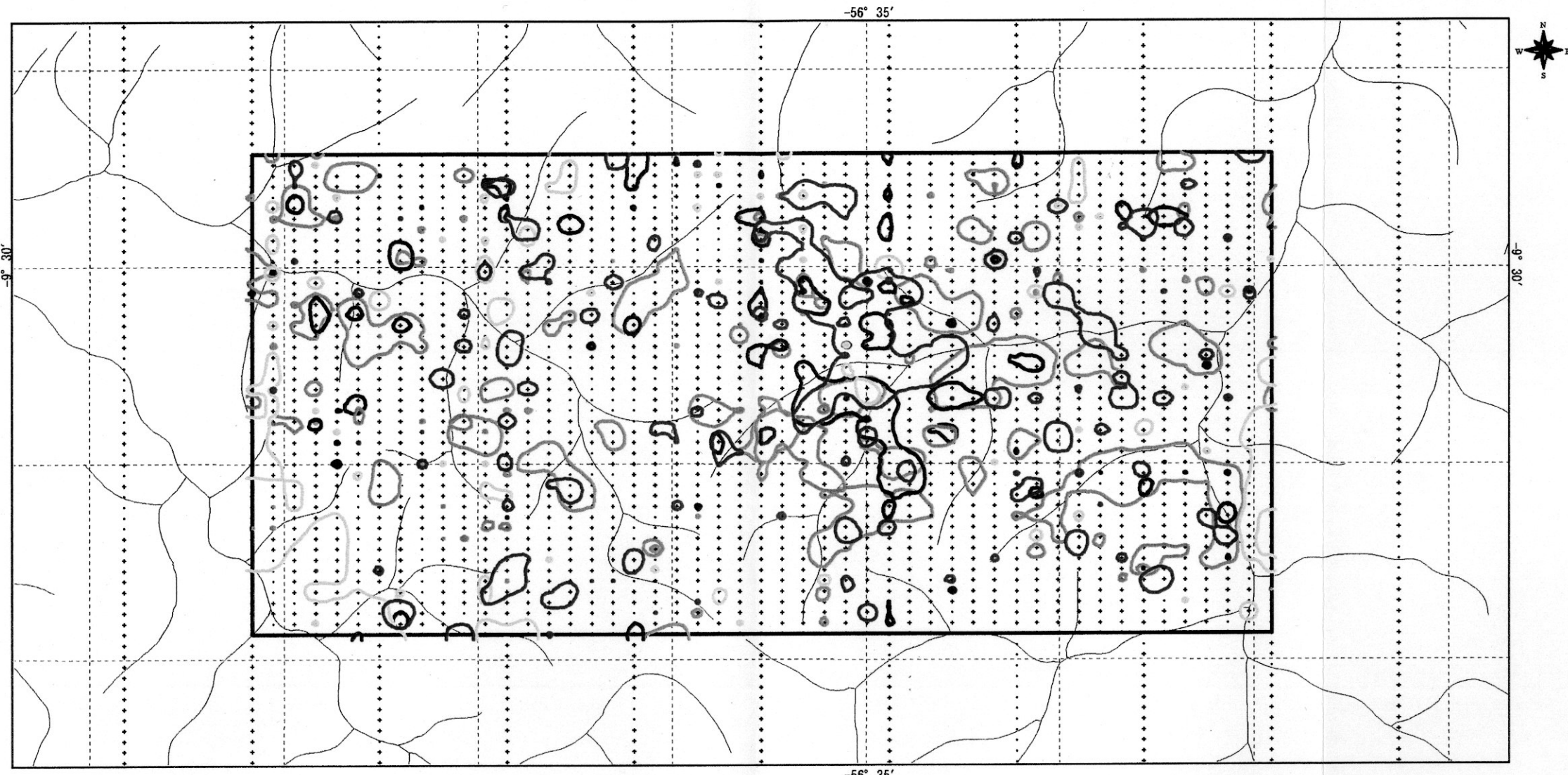
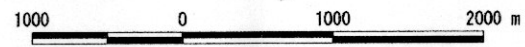


Fig. II-2-5 Distribution map of Au anomaly in Block C



Location of Phase II survey area



LEGEND

- |   |  |
|---|--|
| <p>Geochemical anomalous zone</p> <ul style="list-style-type: none"> <li> Au <math>\geq</math> 25.0 ppb</li> <li> Ag <math>\geq</math> 0.235 ppm</li> <li> Cu <math>\geq</math> 31.89 ppm</li> <li> Pb <math>\geq</math> 60.0 ppm</li> <li> Fe <math>\geq</math> 5.0 %</li> </ul> | <p>Sampling Point</p> <ul style="list-style-type: none"> <li> Sample point used to analysis</li> <li> alluvium zone</li> </ul> <p>  Claim boundary<br/>  Phase II survey area<br/>  River         </p> |
|---|--|

Fig. II-2-6 Distribution map of soil anomalies in Block C

Factor 3 : Cu-Fe-Au-Pb

Factor 4 : Hg

Factor 5 : As

Among these factors, three of them (Factors 1, 2 and 3) were selected to prepare a distribution map of factor score by allocating three different colors for each factor (Fig. II-2-7). These three factors are represented in the map by the following colors:

Factor 1: blue      Factor 2 : yellow      Factor 3 : red

The distribution tendency of these factors can be summarized as follows:

Factor 1: Mostly distributed in the central part of the survey area.

Factor 2: Mostly distributed at southwestern margin and as spots within the survey area.

Factor 3: Largely distributed, but showing a concentrated distribution in the central part of the survey area.

## **(6) Discussion**

A compiled map is shown in Fig II-2-8. The single element analysis shows a WNW-ESE trend that corresponds to the same direction of the regional shearing. Other trend is found along the NE-SW direction and indicating the existence of a probable new shearing direction in the area. From the results of single element analysis, five gold anomalies zones were identified within the soil gold anomaly map, and among them, the Central and the East gold anomaly zones presented continuous and large gold anomalies.

Overlapping map by using the anomalies of Au+Cu+Pb+Ag+Fe indicates that the distribution of Au anomaly can not be clearly related to the distribution of the others elements. In the Central gold anomaly zone, a discontinuous overlapping of Pb and Ag were observed. In the East gold anomaly zone, only Fe anomaly is present, but its distribution can not be clearly related to the gold anomalies.

The multi element analysis indicates that the pattern distribution of factor scores can be summarized as follows:

Pb-Zn-Fe-Cu is distributed mostly in the central part of the survey area.

Ag is distributed mostly at southwestern margin and as spots within the survey area.

Au-Cu-Fe is largely distributed in the survey area, but with a distribution concentrated in the central part of the survey area.

The distributions of factors (Au-Cu-Fe) in the central part of the survey area show a WSW-ENE trend, which is coincident with one of most important alluvial garimpo in the area. It is likely that this factor distribution shows a gold mineralization trend with Au-Cu, which was recovered and hidden by garimpo activities in the survey area.

## 2-4-2 Auger Geochemical Survey

### (1) Background and Objectives

The Auger geochemical survey was carried out within a soil geochemical anomaly identified in the geochemical survey of the Phase II. The main objectives of this survey were to clarify the vertical distribution in the gold grade in soil and within saprolite and to understand the width of gold halo within saprolite.

### (2) Survey areas and Amounts

The Auger geochemical survey in the Block C was carried out along 8 lines distributed within of the soil geochemical anomaly (Fig.II-2-9). The number of holes and their location is as follow:

Line	Hole location	Number of holes
C0900	C09003550~C09003900	08
C0920	C09203000~C09203900	15
C0940	C09402800~C09403400	15
C0940	C09403800~C09404200	09
C1000	C10002550~C10003350	15
C1030	C10302550~C10302800	06
C1120	C11201650~C11202000	08
C1120	C11202950~C11203350	09

The Amount of survey was as follows:

Number of Auger lines	8	lines
Number of Auger holes	85	holes
Number of Auger samples	487	samples

### (3) Survey Methodology

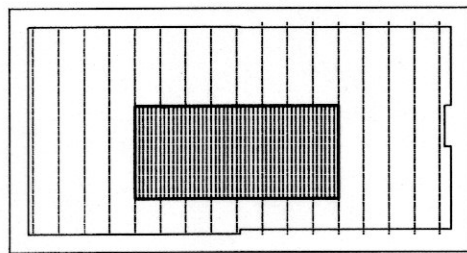
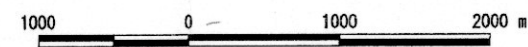
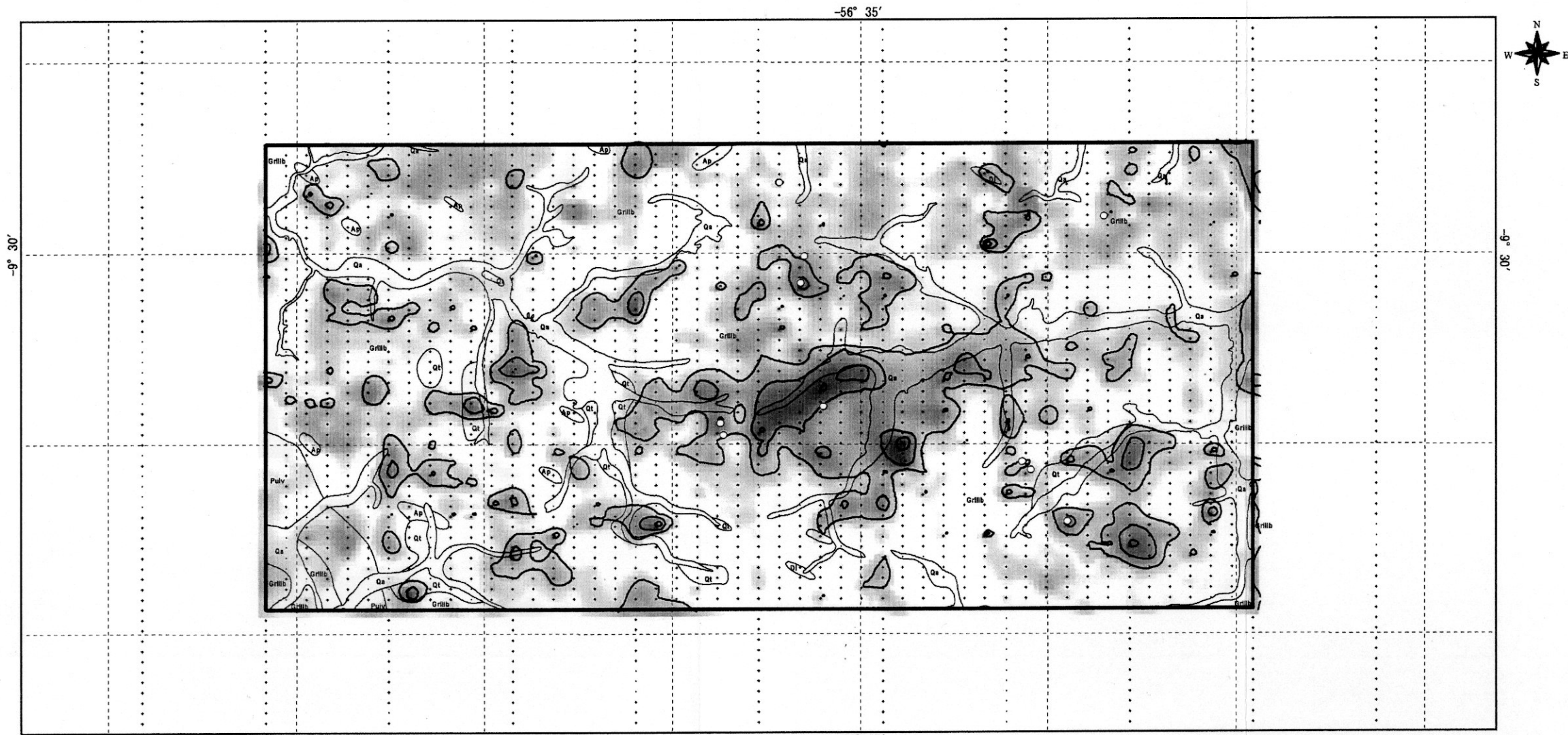
The auger survey methodology was the same as Block B survey.

The location map of Auger samples is shown in Fig. II-2-9 and the list of Auger samples are shown in Appendix 26.

### (4) Results from Auger geochemical survey

A total of 487 auger samples were collected from 8 lines located within soil geochemical anomaly in the C block. The survey result shows its geological and geochemical similarity with the block B.

Geological sections for each auger lines showing the auger holes and their respective gold analytical



Location of Phase II survey area

LEGEND

Factor Score

Factor 1 Score (Pb,Zn,Fe,Cu)

Low High

Factor 2 Score (Ag)

Low High

Factor 3 Score (Cu,Fe,Au)

Low High

○ Factor 3 Score isoline(interval = 0.5)

Sampling Point

- sample point used to analysis
- alluvium zone

Geology

Grlb Geological boundary and Geological unit

Shear zone

○ Primary garimpo

Claim boundary

Phase II survey area

River

Fig. II-2-7 Distribution map of factor scores in Block C



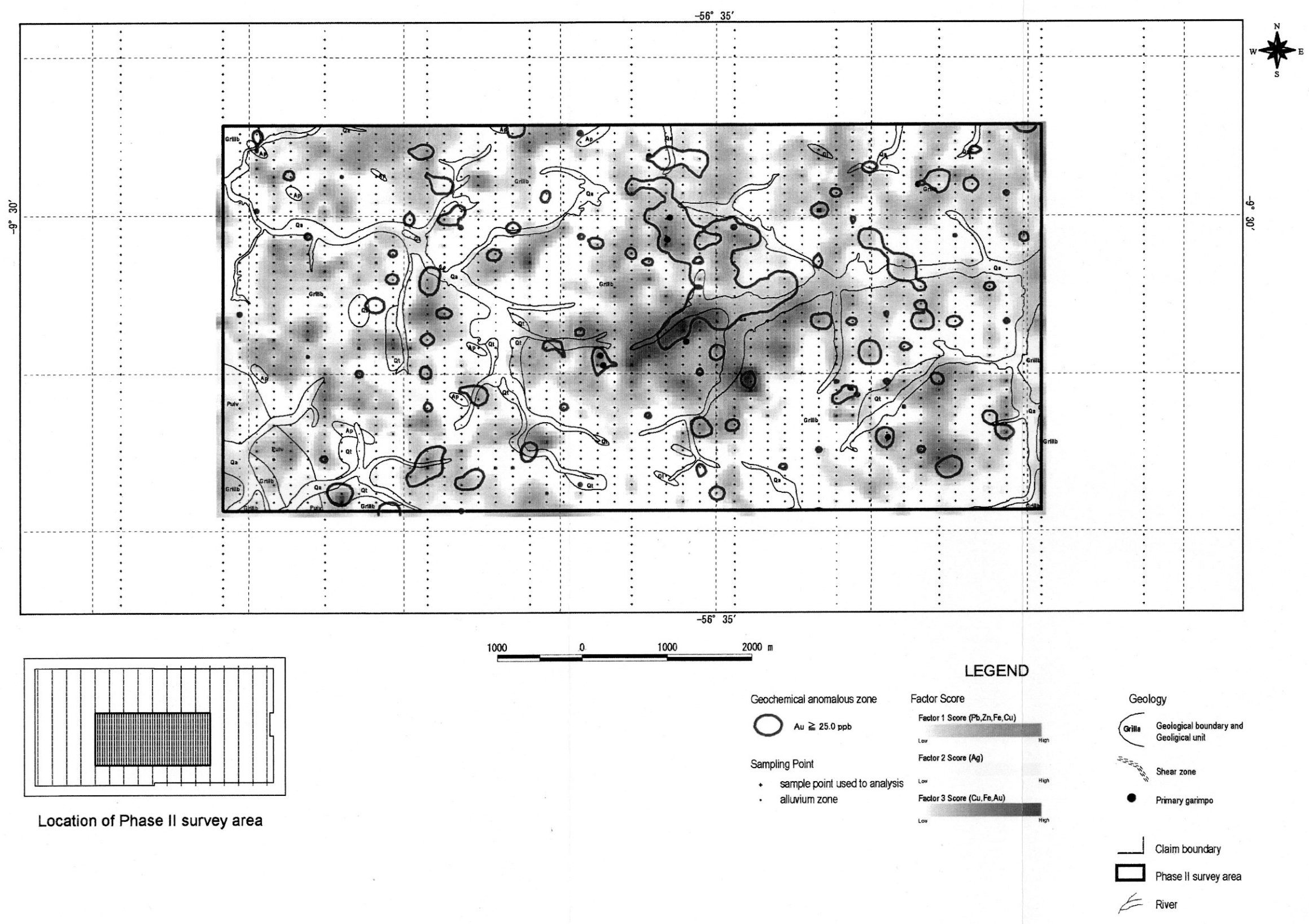
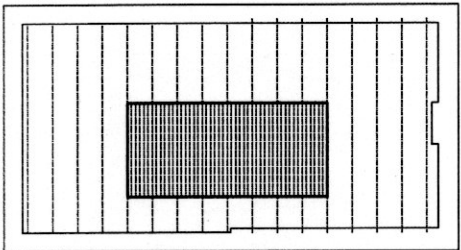
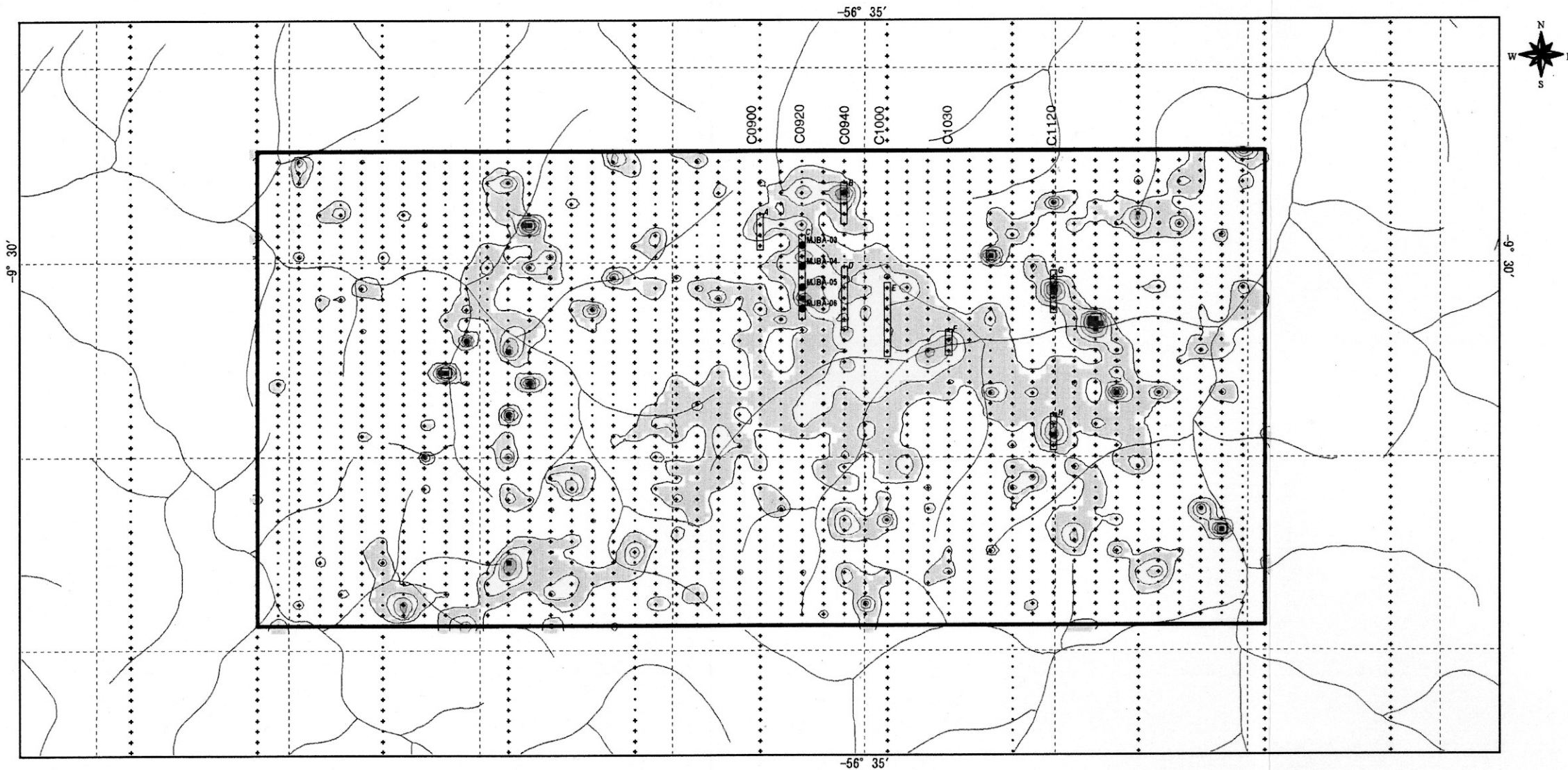
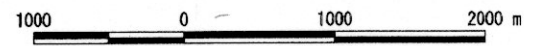


Fig. II-2-8 Compiled map of geology and geochemical anomalies in Block C



Location of Phase II survey area



LEGEND

- Au(ppb)
  - 10 - 25
  - 25 - 50
  - 50 - 100
  - 100 - 200
  - 200 -
- Claim boundary
- Phase II survey area
- River
- Sampling Point
  - sample point used to analysis
  - alluvium zone
- Auger geochemistry line
- MJA-01 Drilling site

Fig. II-2-9 Location map of Auger samples and drilling sites in Block C

results are indicated in Fig.II-2-10. Gold anomalies in saprolite inferred from the geological sections are illustrated in Fig.II-2-11.

**(i) Results from statistical data treatment**

A statistical data treatment was performed using all the auger saprolite data (Appendix 27) but excluding the auger soil data. The results of statistical data treatment are shown on Appendix 28.

Five elements, Ag, As, Sb, Cd and W indicated values less than the detection limit in almost all saprolite samples.

Correlation coefficients were calculated in order to clarify the correlation among the selected elements. The elements showing high correlation coefficients (more than 0,500) are as follows:

Co-Ni, Pb-Zn, Zn-Co, Zn-Mn, Fe-V, and Co-Mn

None of the analyzed elements showed high correlation coefficient with Au. However, Ag, Hg and Mn showed a low correlation coefficient with Au.

**(ii) Single element analysis**

Based on statistical data analysis, the threshold values were determined using histogram analysis, EDA methods and cumulative frequencies.

Since the auger survey carried out within a soil gold anomaly area resulted with very high threshold values for gold, a threshold value of 20 ppb for gold in saprolite was adopted for the interpretation of the auger data.

**(iii) Multi element analysis**

A multi element analysis was conducted by using factor analysis method. This analysis indicated that the gold in saprolite is related to the following elements:

Factor 3: Au-Mn    Factor 4: Au-Ag-Pb-Cd

**(iv) Interpretation of auger geochemical survey**

The subdivision of soil horizon was possible by using auger information. Based in this subdivision, the thickness of A-horizon was confirmed to be very thin and with a very limited distribution on the surface.

At C-horizon, the original structure of the rock is still preserved, and for this reason in the field it was named saprolite. Generally, the boundary between B-horizon and saprolite was not clear and the preservation of original rock structure was used to the identification of saprolite. The boundary line between soil and saprolite was determined from the geological section of each auger lines. In the same geological section the gold analytical results were also plotted for each interval ( Fig.II-2-10 ). From