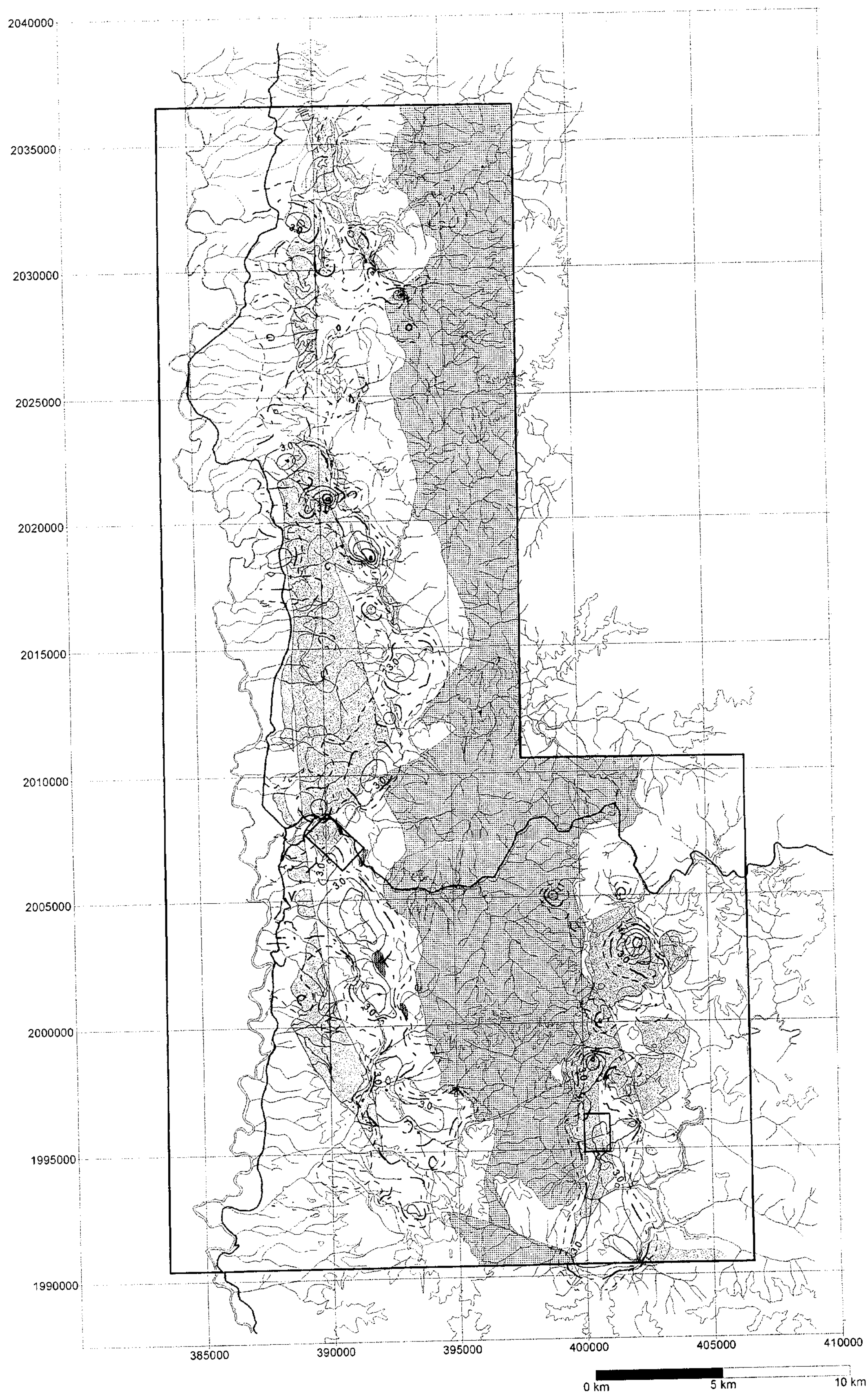
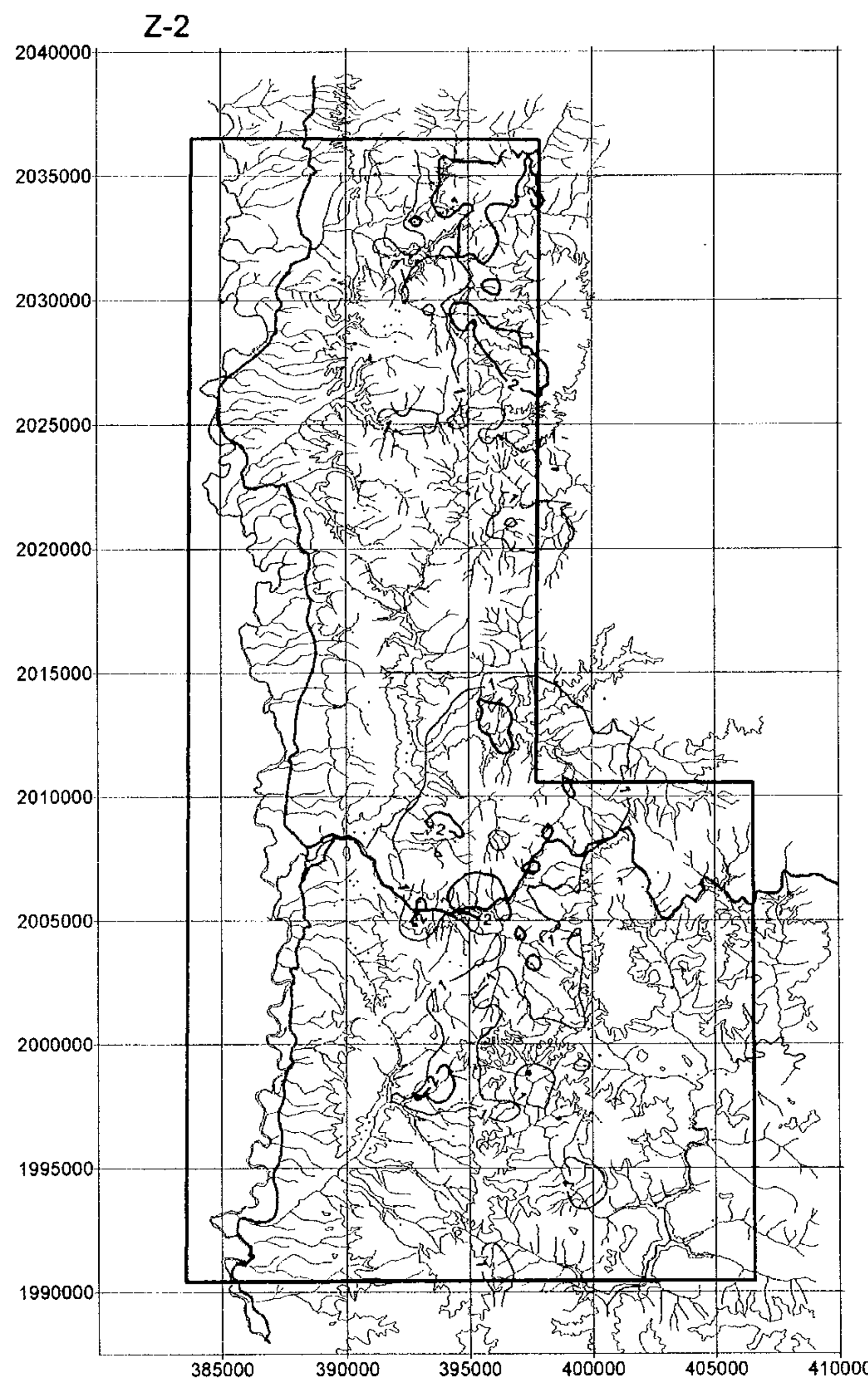



Fig.II-1-12 Result of principal analysis on stream sediment of the Mae Sariang Area(Z1)



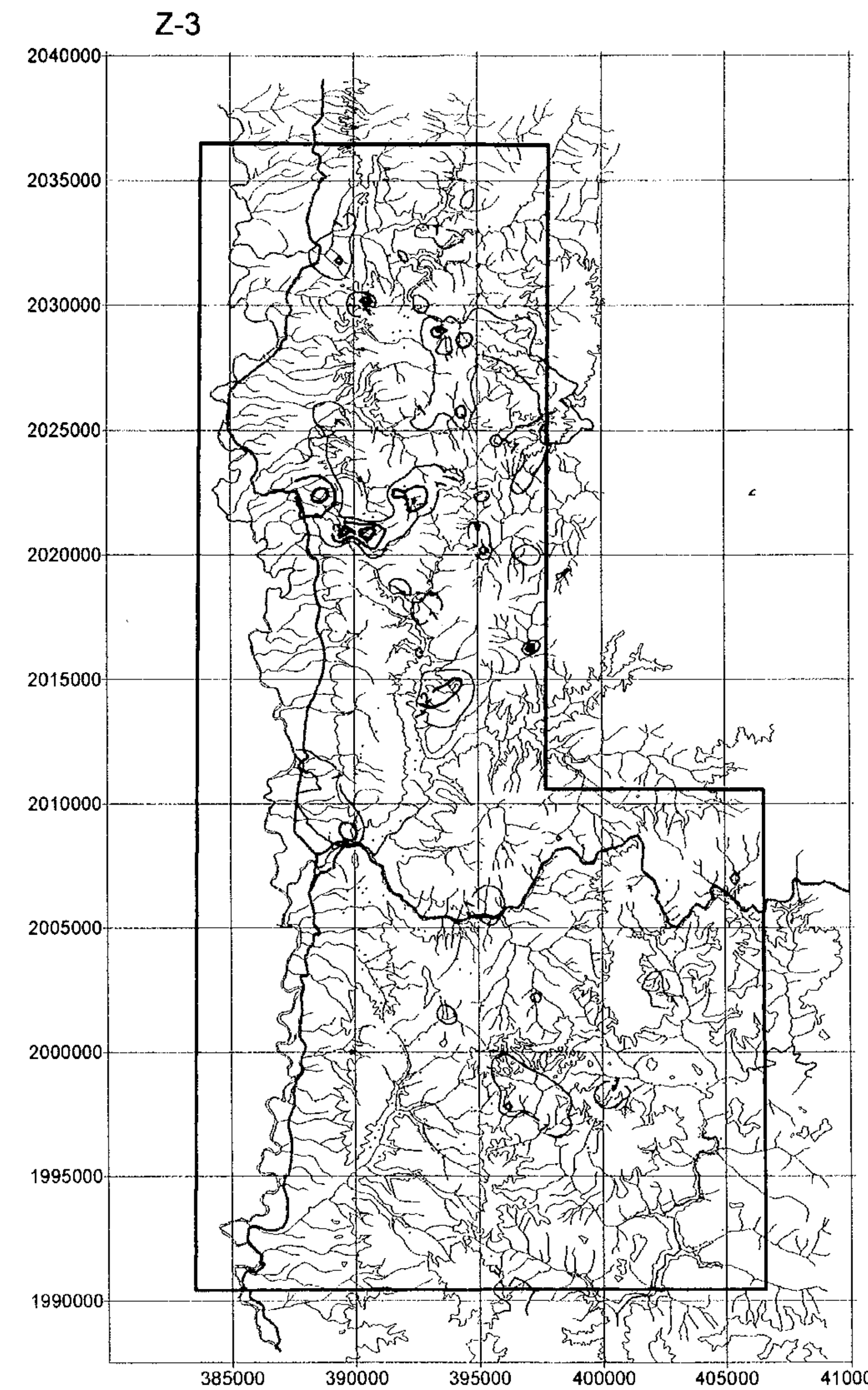




Fig.II-1-13 Result of principal analysis on stream sediment of the Mae Sariang area (Z-2, Z-3)

## Table II-1-5 Results of principal analysis of stream sediment samples

| Principal component | Eigen-value | Contribu-tion rate % | Cumula-tive rate % |
|---|---|---|---|
| Z-01 | 4.8007 | 43.6425 | 43.6425 |
| Z-02 | 2.0308 | 18.4622 | 62.1048 |
| Z-03 | 1.0609 | 9.6444 | 71.7492 |
| Z-04 | 0.7958 | 7.2348 | 78.9840 |
| Z-05 | 0.5409 | 4.9174 | 83.9014 |
| Z-06 | 0.4921 | 4.4739 | 88.3753 |
| Z-07 | 0.3847 | 3.4971 | 91.8724 |
| Z-08 | 0.3036 | 2.7597 | 94.6321 |
| Z-09 | 0.2245 | 2.0405 | 96.6726 |
| Z-10 | 0.2137 | 1.9425 | 98.6152 |
| Z-11 | 0.1523 | 1.3848 | 100.0000 |

| Factor loading | Z-01 | Z-02 | Z-03 |
|---|---|---|---|
| Zn | **0.8632** | 0.2363 | -0.0951 |
| Mn | **0.8408** | -0.2939 | -0.2121 |
| As | **0.8322** | 0.0299 | 0.0942 |
| Cu | **0.8263** | 0.0177 | -0.2794 |
| Pb | **0.7574** | 0.1367 | 0.3079 |
| Ba | **0.7192** | -0.2838 | -0.0163 |
| Sb | **0.6138** | -0.4146 | 0.3072 |
| Mg | 0.3439 | **0.8340** | -0.1002 |
| F | **0.5355** | **0.5627** | -0.0140 |
| Sn | -0.1352 | **0.5646** | **0.6966** |
| Hg | 0.2868 | -0.5343 | **0.4847** |

Noi, lower part of the Nam Mae Sariang, the area from Huai Hin Lek Fai through Huai Hu to Huai Mae Pan Noi, upper stream of Nam Mae Ka Nai, the eastward of Ma Ka Nai and the district from Huai Chang through Dong Noi district up to the junction of Nam Ritto and Huai Mae Ok. All cases well matched with limestone of the Ordovician and Permian age, and Ordovician, Devonian-Carboniferous and Permian-Triassic shale and limy shale intercalating limestone.

[Z-2] To the second principal component, factor loadings of Mg, F and Sn were high. This was considered that the Z-2 component indicates granite occurrence particularly corresponding Sn mineralization. The high score distribution overlapped the granite area. However, as it was mentioned in the item of anomaly distribution of a single element F, the score was low in the upper part of Nam Mae Um Long and that of Huai Mae Pe. There was a possibility that the kind of granite was different.

[Z-3] To the third principal component, factor loadings of Su and Hg were high. The high mark distribution was divided into the distribution over granites and that in Ordovician limestones and sedimentary rocks. It was not clear what the component indicated.

### 1-6 Discussion

The area in the eastern side of Nam Mae Yuam occupying the most of this survey area belongs to the western major mountain tectonic province. There is composed of sedimentary rocks and granite from the Cambrian age to the Triassic age. The whole geological structure is consistent with the continuous direction of ridges in this area and extends from north to south. Since Triassic granite batholith intrudes the regional center from north to south, this granite divides the Paleozoic formation into the western and the eastern sides. The Paleozoic formation on the west side has a monoclinal structure in a western dip of strike from the

north-northwest to south-southeast as a whole. Younger geologic units of sedimentary rocks from Cambrian to Triassic age overlie the unit below from the east to the west. The Paleozoic formation on the eastern side mainly consists of Ordovician sedimentary rocks and Cambrian formation exposes partly.

Thick limestone formations develop in the Ordovician and the Permian. Besides, there are thin alternating beds shale and limestone, limestone lenses and calcareous shale are found in a lower Ordovician formation, the Devonian-Carboniferous formation and in the Triassic formation.

There have been no actually operated metallic mines in this area, but there are many occurrences of galena-barite-quartz veins. Many of them distribute harmoniously with limestone. They are highly correlated particularly to the Ordovician limestone and limestone lenses of the Devonian-Carboniferous age. Most of these showings are indicating the existence of galena-barite-quartz veins. Many such occurrences of veins distribute in the wide area. It continues from the eastern end of I-4 sub-area of the east of Mae Sariang urban area through Huai Pu on the south side, Huai Mae Pan to the river basin of Huai Mae Pan Noi.

Judging from the geological features, gossan in the peripheral areas of Cahmrat barite mine of the northern part of Mae Sariang area and the surroundings of Ban Huai Ngu and Mae La Noi may indicate also vein-type mineralization. The mineral occurrence extending from the surroundings of Ban Mae Ka Nai in the eastern part of Mae Sariang area through into Don Noi district clearly indicates vein type mineralization such as the galena-barite vein in Don Noi district and along the road on the north of Ban Dong Noi. However, geochemical anomaly of Zn in Don Noi district, massive gossan, skarnized limestone as well as massive magnetite floats occurring in the Ordovician limestone can be stratiform or massive type deposits through metasomatism of limestone.

As for the results of geochemical survey of stream sediment, geochemical anomaly of Zn and Pb are found in the surroundings of the above mentioned zones of mineral showings. According to the results of principal component analysis, it has been judged that the first component with a large factor loading of Zn, Mn, As, Cu, Pb, Ba Sb and F is a factor suggesting mineral showings in Mae Sariang area. In other words, the high score area of the first component seems to have a greater possibility of existing a mineral deposit. The areas of a high score of the first principal component are the eastern part of Mae La Noi extending to the surroundings of Doi Lum Kham, from Huai Hat Ta Lan to Huai Ngu, the northern part of Doi Chang, the surroundings of the junction of Um Mae Sariang Noi, the lower stream of Um Mae Sariang, the area from Huai Hin Lek Fai through Huai Pu into Huai Mae Pan Noi, the upper stream of Nam Mae Ka Nai, the eastern part of Mae Ka Nai and the district from Huai Chang through Don Noi district into the confluence of Nam Mae Rid and Huai Mae Ok. Each of them is occupied by Ordovician limestone, Devonian-Carboniferous and Permian-

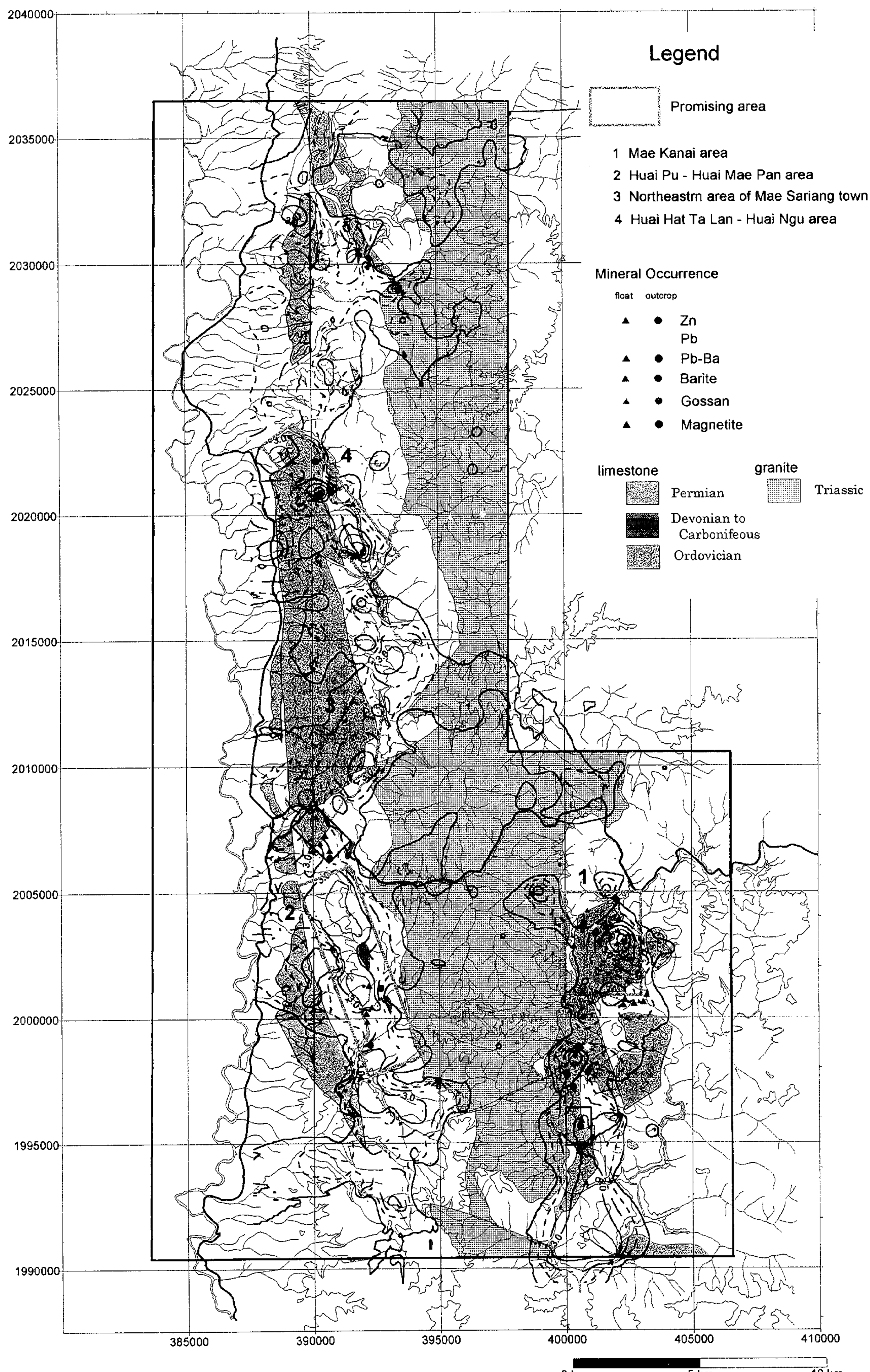



Fig.II-1-14 Interpretation map of reconnaisance geological and geochemical survey in the Mae Sariang Area

Triassic shale and calcareous shale with thin limestone layers.

Figure II-1-14 shows the distribution of limestone in the Mae Sariang area, the distribution of mineral occurrence and the results of principal components analysis. As understood from this figure, the following four districts are with high possibilities of the existence of mineral deposits.

1. **Mae Ka Nai Area**

This area locates on the eastern side of a mountain ridge extending from Doi Khun Mae Kanai to Ban Mae Ka Nai. It forms a flat plateau and it is occupied by Ordovician formation. The formation, from the base upward, consists of shale-sandstone alternating beds and limestone. Cambrian quartz arenite lie in fault contact along the northern boundary of the Ordovician formation. Triassic granite is intruding on the west side. The limestone area forms a large karst landform shaped like a boat's bottom. On the ridge surrounding the caved-in area, there are several massive gossan zones and gossan float zones in a 100 meter scale. In the tributary of Huai Mae Ho of the east end of limestone, there are many gossan floats on the boundary of limestone and sedimentary rock. The assay results of these floats show that Zn=1.5 %. Gossan in this area generally contains a high level of zinc, 1,000 to 4,400 ppm. In the branch of the southern side of the limestone, many large magnetite floats of angular shapes (4 m at maximum) distribute. In the upper stream of Nam Mae Ka Nai on the western side, skarnized limestone containing garnet distributes on the border of granite. The geological situation is similar to those of Don Noi district. Judging from mineral occurrence, existing of stratiform or massive sulfide (oxidized) mineral deposits in limestone and/or skarn deposits at the lower part of limestone are highly expected.

2. **Huai Pu - Huai Mae Pan Area**

This area consists of Devonian-Carboniferous and Permian-Triassic black shale, sandstone and chert with banded limestone and thin layers of limestone. Limestone in general contains calc silicate minerals and often becomes greenish. Many barite-quartz vein floats containing galena, chalcopyrite, sphalerite, pyrite and others are found along the stream as well as at the slope of mountainside. Moreover, small veins (below 30 cm wide) of the same components are also found among shale. Although big limestone bodies do not distribute, geochemical anomaly of zinc and lead are quite high. Therefore, there is a high possibility of existing vein type mineral deposit like the above mentioned or a massive sulfide ore body which has replaced a limestone lens.

3. **Northeastern Area of Mae Sariang Town**

Ordovician limestone distributes from the I-4 area on the east of Mae Sariang town to the north in this area. The ridge of mountains continues from north to south at 700 to 900 meters above sea level. Along the Nam Mae Sariang on the East Side, the lower Ordovician shale and sandstone distribute and Triassic granite intrudes into these rocks. On the west side it contacts with the Permian limestone by north-south faults. Although there are fluorite deposits in the southern part of the area, there are no ore showing of metallic minerals.

By geochemical survey, Zn anomalies, though their level is not so high, exists everywhere in the stream nearby. The geological situation is similar to those of Don Noi area and Mae Ka Nai area.

It is suggested that it has a possibility of existing zinc occurrence among limestone.

**4. Huai Hat Ta Lan - Huai Ngu Area**

This area extends from the right bank of Huai Hat Ta Lan on the west of Chamrat Barite Mine to Ban Huai Ngu. The lineament from Huai Hat Ta Lan to Huai Ngu has a high possibility of being a fault in terms of topography. In this area, several streaks of limestone and shale of the Ordovician age which continue from north to south distribute and quartz porphyry dykes are intruding into it.

There are many gossan and barite floats in the tributaries that run into Huai Hat Ta Lan and Huai Ngu from the east side. In the mountains and hills, barite veins without sulfide minerals are scattered. According to the assay results, gossan contains from 1,500 to 5,200 ppm of Zn. Geochemical survey has proven that Pb is showing a higher level than Zn. Anomalies are scattering and no continuous. Judging from the geological situation, a possibility of existing mineralization in veins type is high.

# Chapter 2 Results of detailed survey in the Dong Noi area

## 2-1 Outline of geology

The Dong Noi area consists of the Cambrian and the Ordovician sedimentary rocks. The survey area is divided into northern and southern parts by a fault in the E-W direction. In the northern part, the Ordovician sedimentary rocks and the Cambrian sandstone are distributed while the Cambrian sandstone is not distributed in the southern part. An galena-barite-quartz ore occurrence is situated in the central part of the area.

Fig. II-2-1 shows a geological map and profile.

## 2-2. Details of geology

### 2-2-1. Cambrian sedimentary rock (CB)

This rock widely distributes at the Doi Don Luang. This principally consists of medium grained to coarse grained, green or dark green massive and poorly stratified siliceous sandstone. The sandstone has been extensively subjected to contact metamorphism and a garnet porphyroblast is also observed. A precipitous cliff along a east-west fault has a dissemination of pyrite in a wide range.

### 2-2-2. Ordovician sedimentary rocks (O, Ol)

The Ordovician sedimentary rocks mainly consist of limestone in the upper part and shale in the lower part. The limestone layer is composed of impure banded limestone intecalating in large amount of thin or schlieren muddy layer and of grayish white massive limestone. This limestone is recrystallized and turns into in the southwestern and northern parts of the area. Since the shale is remarkably weathered, fresh rocks are not observed in outcrops. The shale has, as a whole, a somewhat strong schistosity and has partly a phyllitic appearance.

## 2-3. Geological structure

The Dong Noi area is divided into blocks by two faults in the east-west and north-south directions. For this reason, the Ordovician sedimentary rocks and the Cambrian sandstone are in fault contacts. The Ordovician sedimentary rocks are observed intense folding on outcrops. However, judging from the distribution of intercalated shale, it seems to has an almost horizontal or gentle southeast inclination. The structure of Cambrian sandstone is not clear in detail because it is massive and poorly stratified as mentioned above.

## 2-4. Ore deposit and occurrences

The Dong Noi Ore occurrence of lead and barite occurs at the central part of this area. This mineralization is stockwork form or dissemination-form of galena - pyrite - barite - quartz in banded limestone and crops out in a range of 20 x 10 m at the top of a low hill. Although the

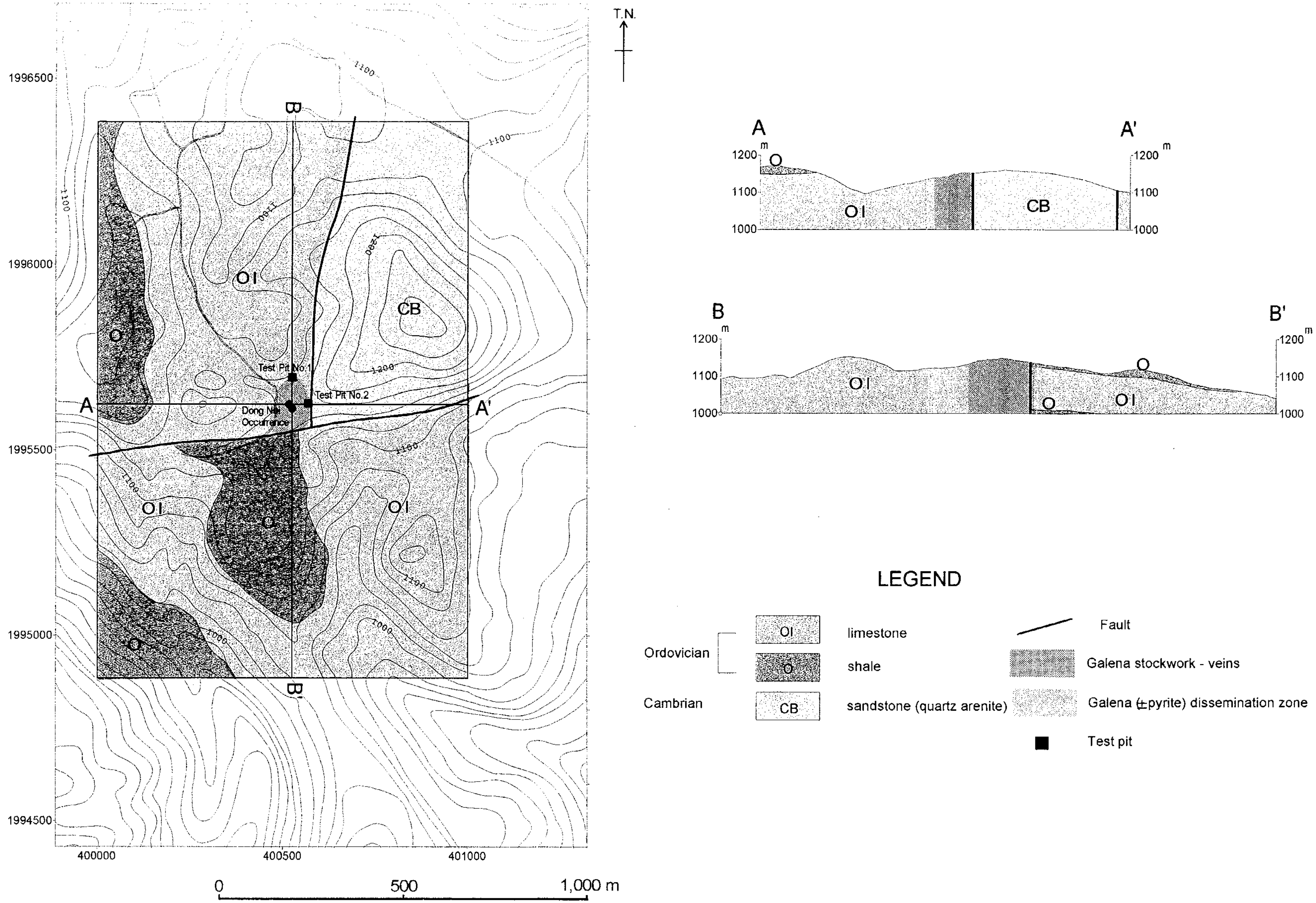



Fig.II-2-1 Geologic map and profile of the Dong Noi area mineralization range is not clear because the outcrop is poor, same floats are ovally scattered in an area of 100m east and west and 200 m north and south around this outcrop. A test pit survey, sketch shown in Appendix 13, was conducted at two points (Test Pits No. 1 and No. 2) in this floats area. These test pits did not reach fresh bedrock. However, in addition to galena and barite ores, gravel of massive pyrite and magnetite are found at Pit No. 1 and there is also a large amount of floats rich in calcareous silicate which are apparently seemed as country rocks. Furthermore, we obtained a large amount of quartz vein floats at the top of Pit No. 2. Also we observed soil with the dissemination of pyrite and weathered silicified muddy sandstone with limonite stockworks which is judged as C layer in the lower part. Assay of gravel rich in sulfide shows 970 ppm of Cu and 32.4 g/t of Ag.

A very high concentrations of Zinc (> 300 ppm), lead (> 3000 ppm), and copper (> 900 ppm) are detected from soil samples from every test pits.

This ore occurrence is located on the limestone side near the intersection of the two faults, in the directions of east-west and north-south. This indicates unquestionably that the mineralization in this area is strongly controlled by both structure and lithofacies.

The Cambrian sandstone in the east of the area underwent a thermal metamorphism and calc-silicate minerals are partly found. Quartz veins and silicified parts are also observed on a cliff in the southeastern part. In addition, a intense magnetite dissemination was found near survey point 400 along the geophysical survey traverse line Y. A large number of gossan floats with a diameter of 40 to 60 cm are distributed on the boundary between a bank karst and a hill composed by the Cambrian formation in the northeastern part of the area. Cu of 210 ppm, Pb of 5,700 ppm, and Zn of 2,350 ppm were obtained through the assay of gossan. These gossan floats scatter on east-west geochemical anomaly zone in the northern part of the area described later.

## 2-5 Geochemical survey

### 2-5-1 Orientation survey

Prior to collection of soil samples, a test pit was excavated in two places, soil samples were collected in each soil profile, and a careful study was conducted to determine a proper soil sample collection depth and grain size. Afterwards, a cross-shaped traverse line was arranged around a lead ore outcrop in Dong Noi area and an examination was conducted by changing survey point intervals to obtain a proper collection interval.

(1) Proper soil sample collection depth and grain size

Test Pit 1 and Test Pit 2 were excavated 60 m north and 40 m east from the galena - barite outcrop in Dong Noi area, respectively. The test pit profiles are shown together with field photographs at the end of this report. The excavation depth is 3 m at Test Pit 1. At a glance, it is difficult to classify a soil profile because the layer from the top to the bottom is composed of dark reddish brown silty soil. The layer from the surface down to 40 cm characteristically contains a lot of plant roots and scarcely gravel. In the layer below 40 cm, floats with a diameter of 3 to 7 cm such as barite, quartz vein, magnetite, pyrite, etc. are often contained, and very few gravels of epidote skarn are found. The top section of 40 cm is called surface soil (A layer in soil section) and the lower section is called B layer. Since A layer is strongly affected by farming, samples were taken only from B layer. By comparison, B layer was provisionally classified into a 0.4 to 1.0 m section, 1.0 to 2.0 m section, and 2.0 to 3.0 m section and three samples were taken. After air-dried, they are submitted to a sieve analysis test using three types of sieves, 60 mesh, 80 mesh, and 120 mesh. The chemical analysis was conducted at DMR Chiang Mai Branch Office. For reasons of convenience related to use of the equipment, it was only possible to make an analysis of only three elements, Cu, Pb, and Zn. Table II-2-1 shows the analysis results of Test Pits 1 and 2.

The excavation depth is 2.0 m at Test Pit 2. The top layer of 40 cm is a silty layer mixed with dark brown sand and has a good deal of humus and plant roots. Many platy quartz veins with a diameter of 5 to 30 cm exist at the bottom of this layer, and the occurrence of these quartz veins indicates how they accumulated on an old surface. The layer at depths of 0.4 m to 1.0 m is a silty layer mixed with dark reddish brown sand scattered with quartz veins with a diameter of 3 to 5 cm and the upper layer of 0.4 to 0.65 m looks darker. The layer at

**Table II-2-1 Geochemical data of orientation pitting survey in the Dong Noi area**

| Sp No | depth and preparation | Zn(ppm) | Cu (ppm) | Pb (pm) | X/80Zn | X/80Cu | X/80Pb |
|---|---|---|---|---|---|---|---|
| P11 | 0.40-1.00 #60 | 503 | 1321 | 13400 | 1.091 | 1.101 | 1.098 |
| P12 | 0.40-1.00 #80 | 461 | 1200 | 12200 | 1.000 | 1.000 | 1.000 |
| P13 | 0.40-1.00 #120 | 474 | 1238 | 11000 | 1.028 | 1.032 | 0.902 |
| P14 | 1.00-2.00 #60 | 387 | 1208 | 8200 | 1.016 | 1.017 | 0.932 |
| P15 | 1.00-2.00 #80 | 381 | 1188 | 8800 | 1.000 | 1.000 | 1.000 |
| P16 | 1.00-2.00 #120 | 358 | 1171 | 8600 | 0.940 | 0.986 | 0.977 |
| P17 | 2.00-3.00 #60 | 332 | 1263 | 3200 | 1.018 | 0.984 | 0.889 |
| P18 | 2.00-3.00 #80 | 326 | 1283 | 3600 | 1.000 | 1.000 | 1.000 |
| P19 | 2.00-3.00 #120 | 374 | 1233 | 3200 | 1.147 | 0.961 | 0.889 |
| P21 | 0.40-0.65 #60 | 826 | 1333 | 15000 | 1.128 | 1.115 | 1.103 |
| P22 | 0.40-0.65 #80 | 732 | 1196 | 13600 | 1.000 | 1.000 | 1.000 |
| P23 | 0.40-0.65 #120 | 826 | 1279 | 15800 | 1.128 | 1.069 | 1.162 |
| P24 | 0.65-1.00 #60 | 597 | 833 | 17800 | 0.911 | 0.870 | 0.978 |
| P25 | 0.65-1.00 #80 | 655 | 958 | 18200 | 1.000 | 1.000 | 1.000 |
| P26 | 0.65-1.00 #120 | 710 | 992 | 22000 | 1.084 | 1.035 | 1.209 |
| P27 | 1.00-2.00 #60 | 429 | 1508 | 5200 | 0.931 | 0.928 | 0.813 |
| P28 | 1.00-2.00 #80 | 461 | 1625 | 6400 | 1.000 | 1.000 | 1.000 |
| P29 | 1.00-2.00 #120 | 448 | 1513 | 4600 | 0.972 | 0.931 | 0.719 |

depths of 1.0 to 2.0 m has dark brown silt as a matrix and contains intensely weathered altered sandstone of 50 % or more with a diameter of 5 to 40 cm. Films of hematite and limonite are often coated along a fissure and foliation in the form of network around gravel that is weakly silicified. From the above observation, the layer from the surface of the earth to a depth of 0.4 m is judged as A layer, that between 0.4 and 1.0 m as B layer, and that between 1.0 and 2.0 m as C layer of the soil profile at Test Pit 2. B layer is divided into two sub-layers having a different brightness at a depth of 0.65 cm. Three samples were taken between 0.4 and 0.65 cm, between 0.65 and 1.0 m, and between 1.0 and 2.0 m and three types of sieves were used for a sieve analysis test same as Test Pit 1.

According to the analysis values, every three elements show the highest value down to a depth of 1 m. Therefore, a proper sample collection depth seems to be about 1 m in depth. It was decided to take samples from a depth of at least 0.4 m deeper to 1m, since a layer from the surface down to a depth of 0.4 m is A layer and may be influenced by some artificial factors such as cultivation particularly in Dong Noi area.

The deviation of analytical value to a depth of 1.0m in each sieve mesh is 10 % or less in maximum in comparison with values of 80-mesh samples. Values of 60-mesh sample tends to show a slightly higher. But it is judged that this does not make a difference which affects a geochemical anomaly. Therefore, we decided to adopt an 80-mesh sieve which is the most popular for preparing soil samples.

(2) Sampling intervals

A traverse line is established in the north-south direction and east-west direction from galena-barite ore outcrops in the Dong Noi detailed survey area. Five survey points are established at intervals of 10 m in each direction from the center. On its outer side, five survey points and ten survey points are established in the east-west direction and in the north-south direction at intervals of 20 m, respectively. On its further outer side, three survey points are arranged at intervals of 50 m in each direction. After air dry, soil samples is sieved through 80 mesh to make it available for chemical analysis. Fig. II-2-2 shows counter map of three elements, Zn, Pb, and Cu. As shown in this map, in the case of Pb which is varied extremely in concentration, even survey point intervals of 10 m are not sufficient to observe its variation. In the case of a variation in concentration of Zn and Cu, it is possible to detect a variation in concentration well at survey point intervals of 20 m. In the case of survey point intervals of 50 m, an area of anomaly zone spreads about 100m in diameter like a -300 m point of Zn and a 300 m point of Pb so that it is difficult to grasp an anomaly center. Furthermore, it is highly possible that an anomaly zone in 20m size is easily missed. Under these circumstances, although we judged that survey point intervals of 20 m are the best in the present soil sampling, we adopted the intervals of 25 m to cover a range as wide as possible in the Dong Noi area.

2-5-2 Sampling

Samples are taken at intervals of 25 m in the Dong Noi area by using a geophysical survey traverse line. Samples are also taken in the middle of a geophysical survey traverse line to grasp a spread of an anomaly value in detail in the center of the area. Sampling points are

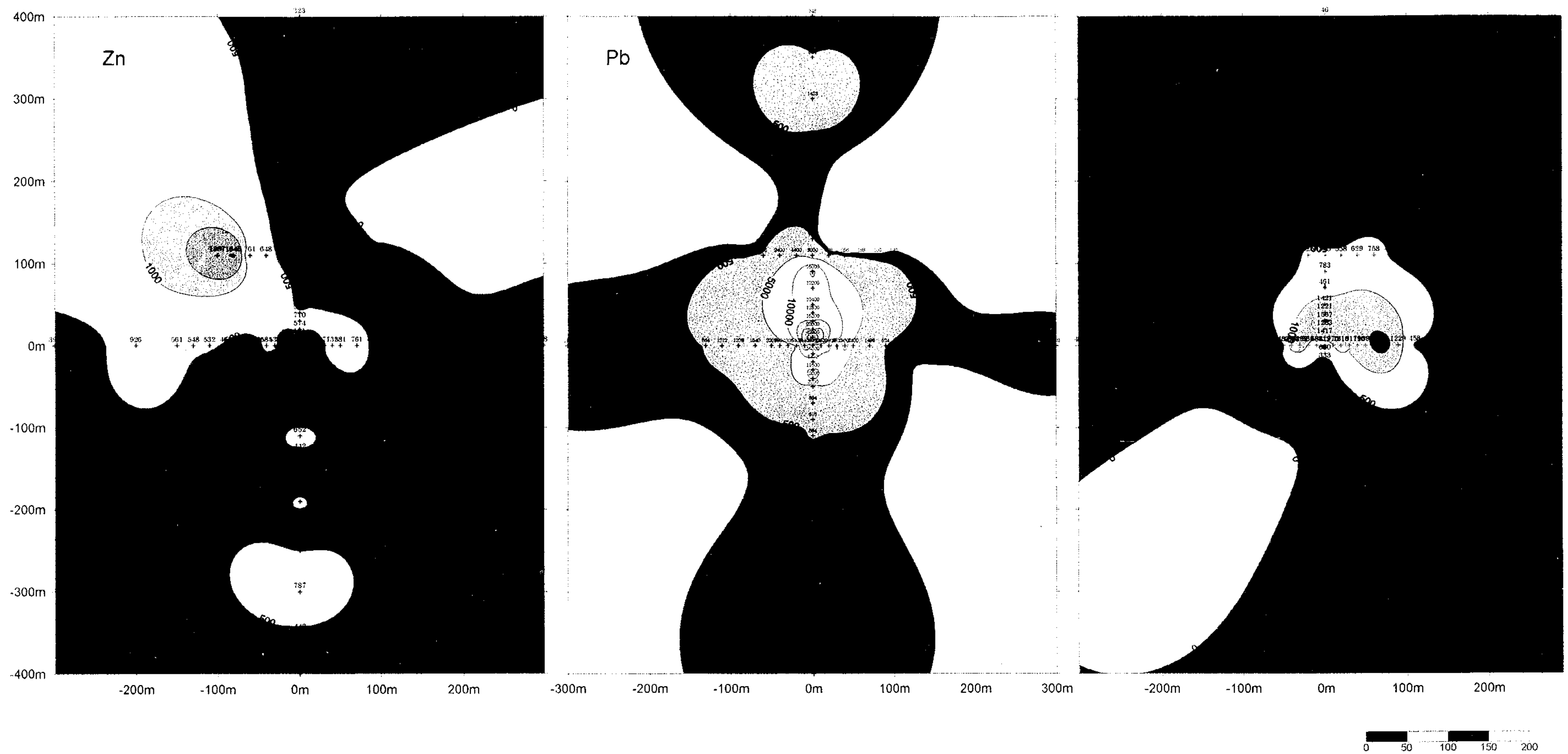



Fig. II-2-2 Geochemical map of orientation survey in the Dong Noi area arranged using existing roads and paths in places where there is no geophysical survey traverse line can cover the entire area. The sampling points are shown in Plate-7

The number of samples in the Dong Noi detail survey area is 674.

Two traverse lines in 1km length were arranged in east and west direction between the above-mentioned lead occurrence on north of Ban Dong Noi and the Dong Noi area. 82 soil samples were totally taken at intervals of 25 m in order to clarify the relationship about the mineralization condition between galena - quartz vein about 1 km north from the Dong Noi area and the Dong Noi area. These samples are included in statistical analysis of single component data.

2-5-3 Analysis of single component data

(1) Statistical processing

A common logarithm value of each analysis value is used for analysis. As for an analysis value lower than a detection limit value in statistic processing, a half value of that value was adopted. Also, as for an analysis value higher than a detection limit value, a limit value was adopted.

Table II-2-2 shows statistic quantities of each element. Also, a frequency distribution of each element and a cumulative frequency curve are shown in Figs. II-2-3(1) to (3). Classification of frequency distribution is 1/2 $\sigma$.

**Table II-2-2 Geochemical basic statistic quantities of soil samples in the Dong Noi area**

| Element | Unit | Lower Detection Limit | Maximum Value | Minimum Value | Average | Standard Deviation (log) |
|---|---|---|---|---|---|---|
| Au | ppb | 5 | 50 | <5 | 2.85 | 0.1672 |
| Sn | ppm | 2 | 42 | <2 | 1.88 | 0.2800 |
| F | ppm | 20 | 900 | 30 | 280.56 | 0.1801 |
| Ag | ppm | 0.2 | 30.6 | <0.2 | 0.27 | 0.5982 |
| Ba | ppm | 10 | >10,000 | 50 | 609.66 | 0.4523 |
| Cd | ppm | 0.5 | 28 | <0.5 | 0.69 | 0.4752 |
| Cu | ppm | 1 | 1,925 | 4 | 74.11 | 0.4489 |
| Fe | % | 0.01 | >15 | 2.27 | 7.75 | 0.1914 |
| Hg | ppb | 10 | 1,080 | <10 | 35.81 | 0.2817 |
| Mg | % | 0.01 | 4.54 | 0.04 | 0.20 | 0.4607 |
| Mn | ppm | 5 | >10,000 | 575 | 5,019 | 0.2628 |
| Pb | ppm | 2 | 43,500 | 24 | 330.16 | 0.5520 |
| Sb | ppm | 2 | 188 | <2 | 8.67 | 0.5287 |
| W | ppm | 10 | | <10 | ------ | ------- |
| Zn | ppm | 2 | 7500 | 20 | 216.37 | 0.4344 |

Table II-2-3 shows geochemical correlation coefficients of elements. Au and W, which are

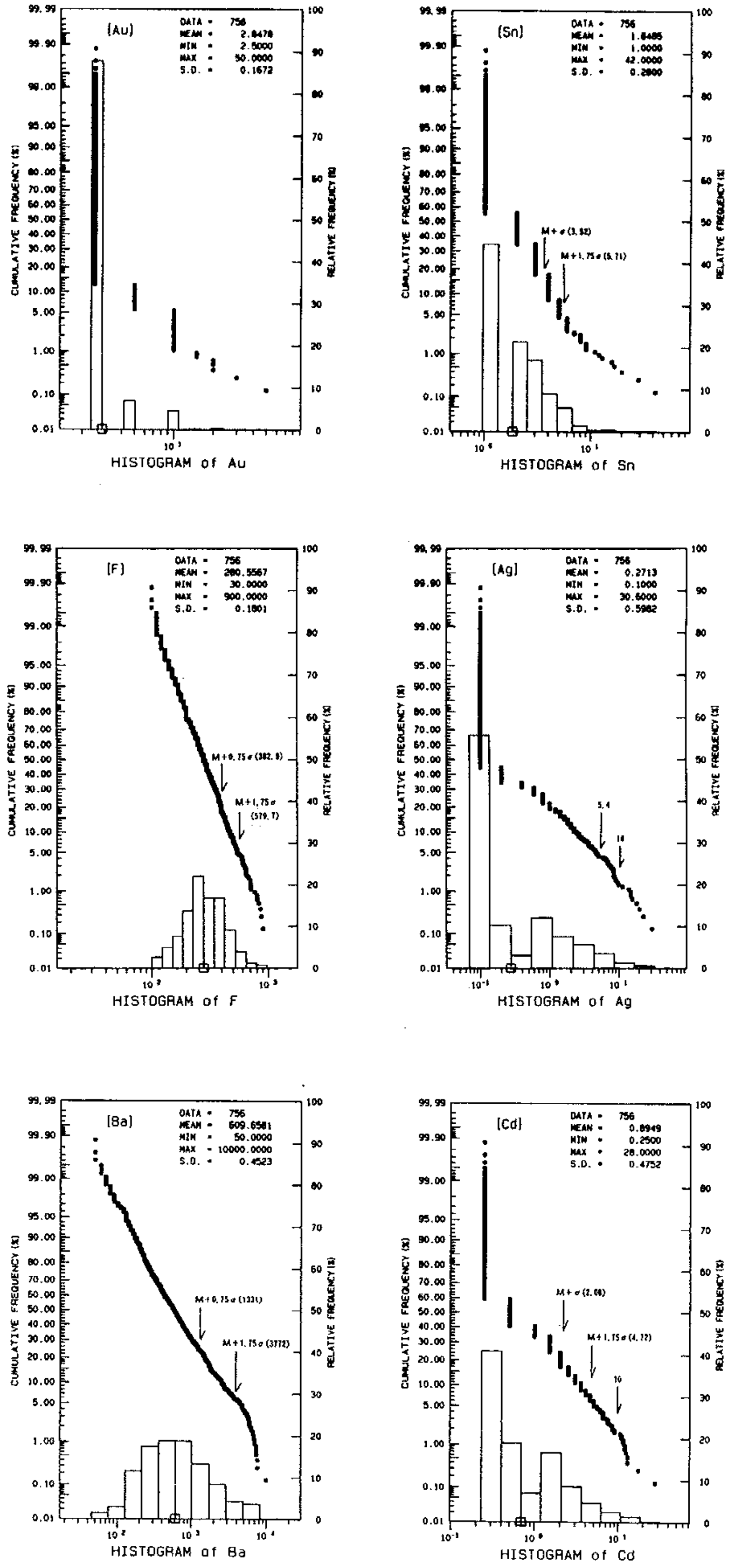



Fig.II-2-3 Relative frequency and cumulative frequency histogram of soil in the Dong Noi area (1)

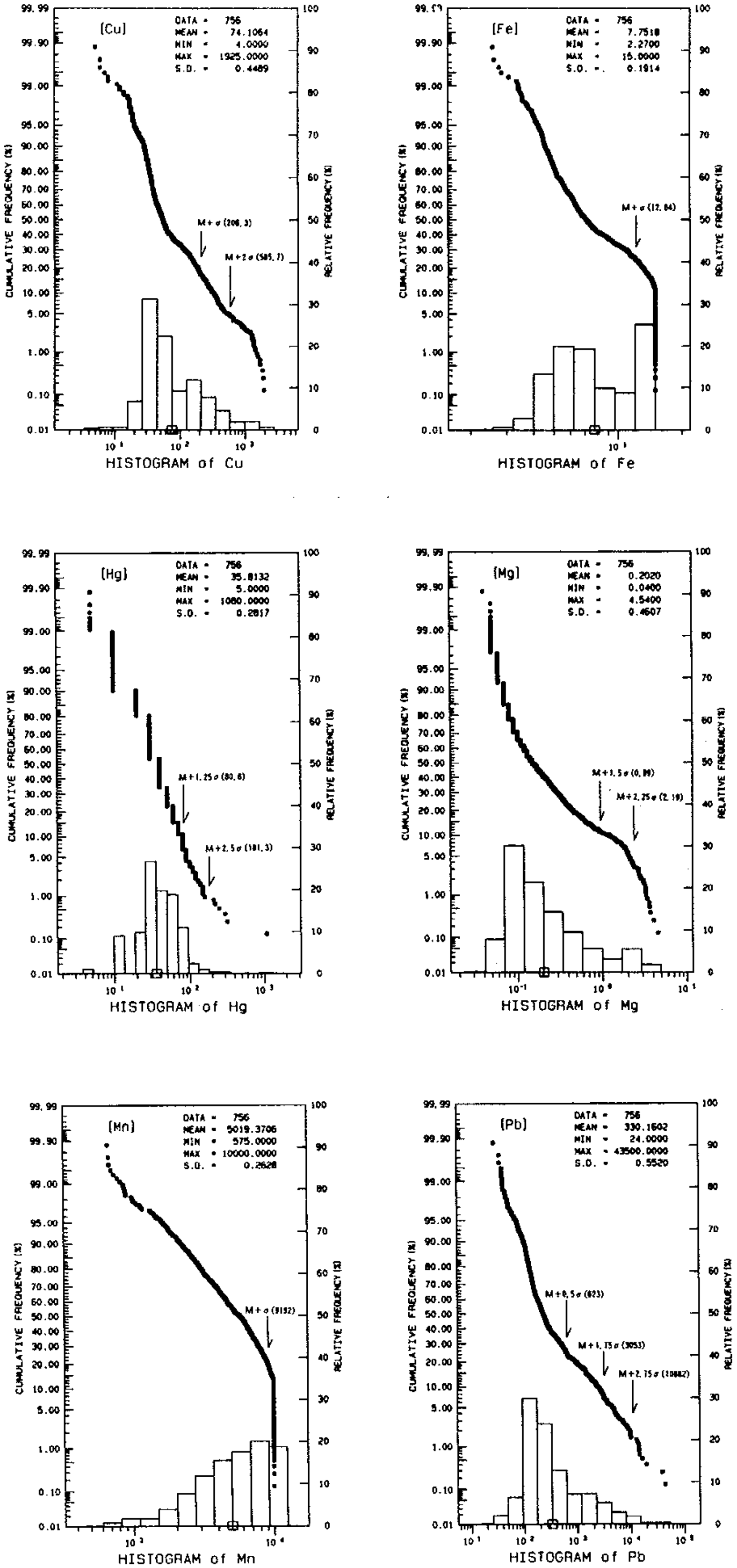
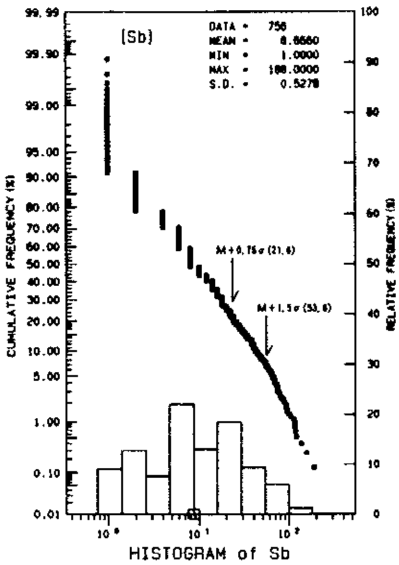



Fig.II-2-3 Relative frequency and cumulative frequency histogram of soil in the Dong Noi area (2)



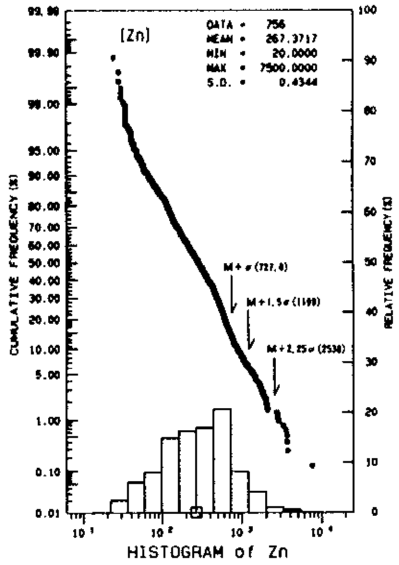




Fig.II-2-3 Relative frequency and cumulative frequency histogram of soil in the Dong Noi area (3)

**Table II-2-3 Geochemical correlation coefficients of soil samples in the Dong Noi area**

| | Sn | F | Ag | Ba | Cd | Cu | Fe | Hg | Mg | Mn | Pb | Sb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sn | 1.0000 | | | | | | | | | | | | |
| F | -0.2266 | 1.0000 | | | | | | | | | | | |
| Ag | 0.0493 | -0.3262 | 1.0000 | | | | | | | | | | |
| Ba | 0.0177 | -0.2884 | **0.6755** | 1.0000 | | | | | | | | | |
| Cd | -0.2424 | 0.2514 | 0.2080 | 0.2085 | 1.0000 | | | | | | | | |
| Cu | 0.1296 | -0.5462 | **0.5854** | **0.7123** | -0.1810 | 1.0000 | | | | | | | |
| Fe | 0.2526 | -0.5452 | **0.5386** | **0.5720** | -0.2103 | **0.7728** | 1.0000 | | | | | | |
| Hg | -0.0165 | 0.0694 | 0.1761 | 0.1233 | 0.2727 | -0.0479 | -0.0050 | 1.0000 | | | | | |
| Mg | -0.1243 | 0.2957 | 0.4758 | 0.4540 | **0.5800** | 0.0753 | -0.0118 | 0.1594 | 1.0000 | | | | |
| Mn | 0.0585 | -0.2729 | 0.4351 | **0.5926** | 0.1726 | **0.5538** | **0.7136** | 0.0836 | 0.2207 | 1.0000 | | | |
| Pb | -0.0171 | -0.2061 | **0.7340** | **0.5249** | 0.2978 | 0.4786 | 0.3705 | 0.2532 | 0.3975 | 0.3880 | 1.0000 | | |
| Sb | 0.1930 | -0.4331 | **0.6290** | **0.5670** | -0.1305 | **0.7047** | **0.7599** | 0.0913 | 0.1188 | **0.5852** | **0.5992** | 1.0000 | |
| Zn | -0.3116 | 0.3965 | 0.1831 | 0.1063 | **0.7508** | -0.2123 | -0.3435 | 0.2515 | **0.5877** | 0.0856 | 0.4732 | -0.0932 | 1.0000 |

below a detection limit value in more than 90% of the analysis samples, were excluded in finding correlation coefficients. Sn and Hg hardly correlate with other elements. F shows a strong negative correlation with Cu and Fe and a weak positive correlation with Zn. There is a strong positive correlation among Ag, Ba, Cu, Fe, Pb, Sb, and Mn. Close observation shows that these elements can be divided into two groups via Ba-Sb, a combination of Ag, Ba, Pb, and Sb and a combination of As, Cu, Fe, Ba, and Sb. Also, the former shows a positive correlation with Zn.

A positive correlation is observed among Zn, Mg, and Cd.

(2) Distribution of geochemical anomaly value

1) Determination of threshold value

A threshold value was determined, taking into consideration a percentile of frequency distribution and a break point of a cumulative frequency curve. Table II-2-4 shows a threshold value of each element.

2) Distribution of geochemical anomaly

Figs. II-2-1-4 to 8 show an anomaly value distribution chart of each element.

[Zn] Zn anomaly values are distributed in the northern and southern ends of the geophysical survey traverse lines X and Y, on the south side from an intersection point of traverse lines Y and E. Also they cover at the east-west end of traverse lines D and E, on the southwest hillsides in the Dong Noi area, etc. All of these anomaly values overlap with Ordovician limestone. An anomaly value in the northern part of the area is distributed on a limestone layer of a cliff terrain of both north and south sides with an anomaly zone of Pb described later inserted.

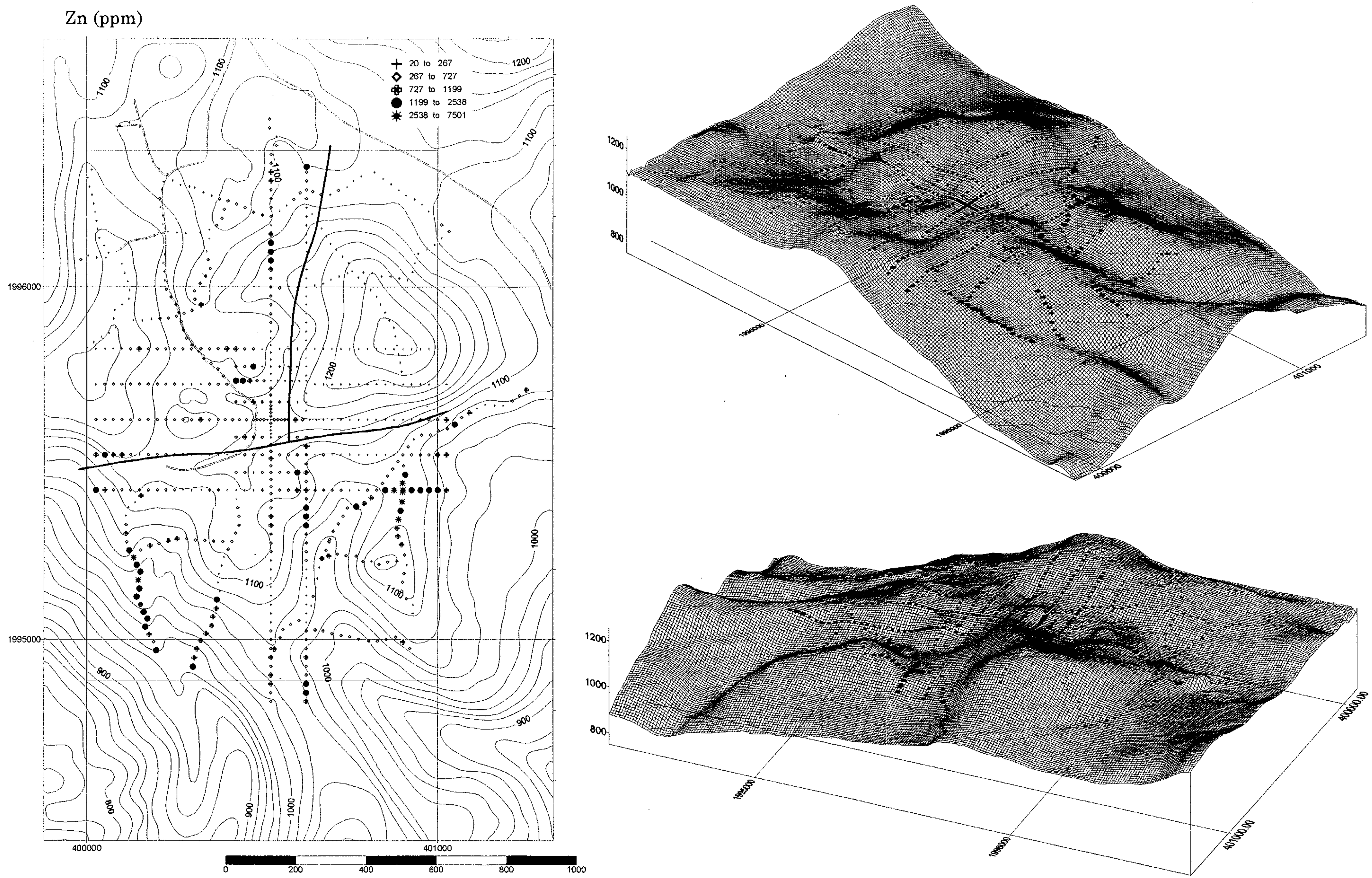



Fig.II-2-4　Geochemical map of Zn content in soil of the Dong Noi Area

Pb (ppm)

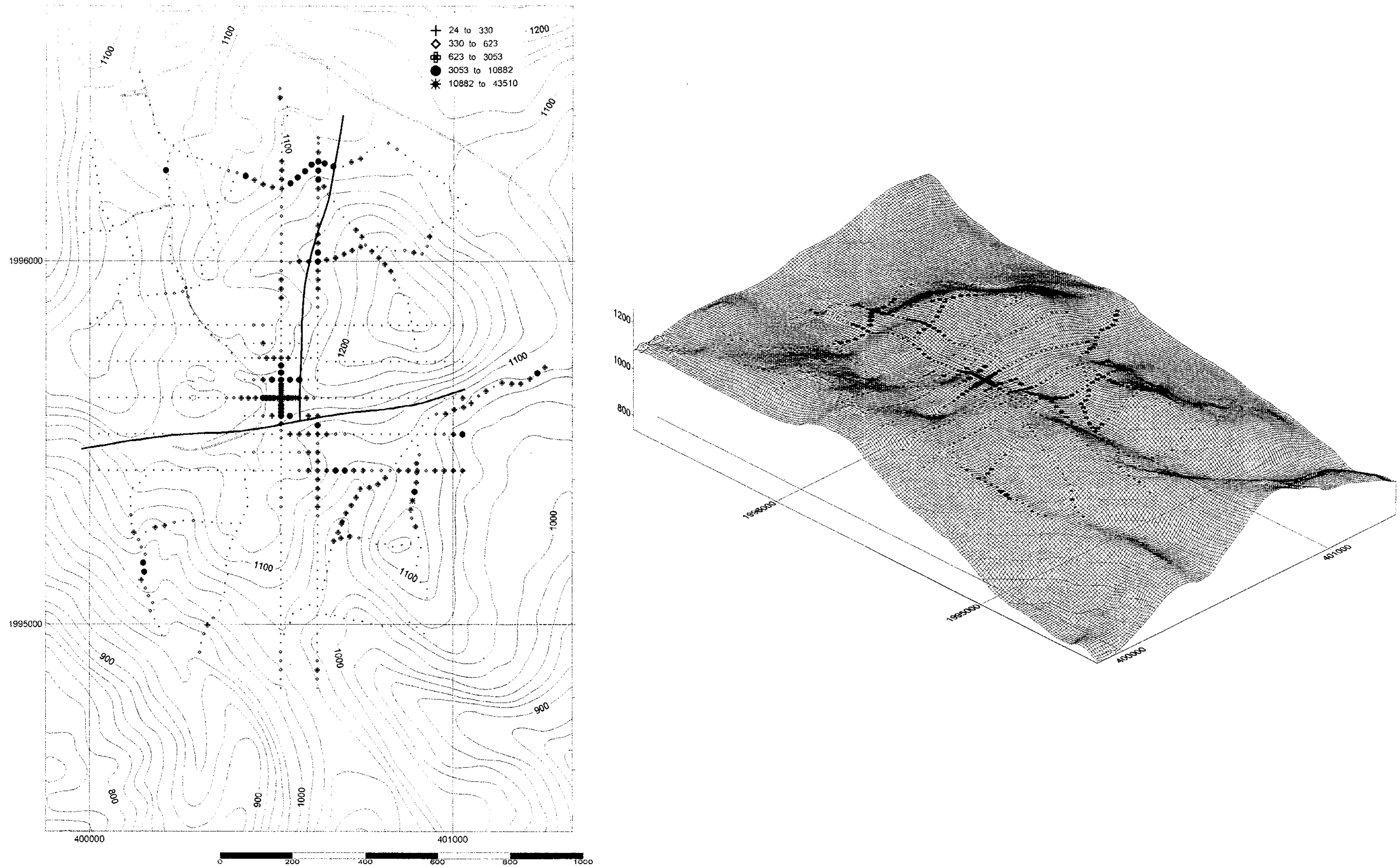



Fig.II-2-5 Geochemical map of Pb content in soil of the Dong Noi Area

**Table II-2-4 Division into geochemical anomaly levels of soil samples in the Dong Noi area**

| Element | Unit | Background | High anomaly1 | High anomaly2 | High anomaly3 |
|---|---|---|---|---|---|
| Zn | ppm | | M+σ 727 | M+1.5σ 1,199 | M+2.25σ 2,538 |
| Pb | ppm | | M+0.5σ 623 | M+1.75σ 3,053 | M+2.75σ 10,882 |
| Cu | ppm | | M+σ 209 | M+2σ 586 | |
| Sb | ppm | | M+0.75σ 21.6 | M+1.5σ 53.6 | |
| Au | ppb | | 5 | 10 | |
| Ag | ppm | | M+1.5σ 2.2 | M+2.25σ 6.0 | M+2.75σ 12.0 |
| Sn | ppm | | M+σ 3.6 | M+1.75σ 5.7 | |
| F | ppm | | M+0.75σ 383 | M+1.75σ 580 | |
| Hg | ppb | | M+1.25σ 81 | M+2.5σ 182 | |
| Mn | ppm | | M+σ 9,192 | | |
| Mg | % | | M+1.5σ 0.99 | M+2.25σ 2.19 | |
| Fe | ppm | | M+σ 12.1 | | |
| Ba | ppm | | M+0.75σ 1,311 | M+1.75σ 3,772 | |

No anomaly value overlaps on galena outcrop where a north-south traverse line intersects an east-west traverse line in the central part of the area, and some anomaly zones are distributed in a slightly lower place in the altitude around that occurrence. Topographically Zn anomaly seems to be distributed in the lower part of Pb anomaly zone and a stretch of that anomaly zone shows a direction of NNW- SSE. An anomaly zone extending from the center in the southern part of the area to the west side is distributed accompanied by a limestone layer from 1,060 m to 980 m above sea level. However, it is not observed in shale and sandstone covering the ridge and in shale of the lowest part. An anomaly zone distributed at the western end of traverse line E is distributed on the small-scale ridge. There is occupied by a coarse-grain recrystallized banded limestone.

[Pb] Pb anomalies mostly occur in limestone, but some of them are distributed in metamorphosed sandstone. A concentration of the highest anomaly value is found in the neighborhood of a galena outcrop located at an intersection point of traverse lines X and C. The anomaly zone stretchs in the direction of north-northwest - south-southeast, and they extend from the intersection point of traverse lines X and B in the north to the southeastern side of the intersection point of traverse lines Y and E in the south. Even in the southwestern part of the area where Zn anomaly zones are distributed and in the eastern end of traverse line E, Pb anomaly values distribute with Zn anomaly values correlatively.

Anomaly zones are distributed in almost east-west direction in the north end of traverse lines X and Y and on both sides of this is distributed an anomaly value of Zn.

It is thought that an anomaly value which continues to the east side from the east end of traverse line C is accompanied by a fault system which traverses the center of the area. It is thought that an anomaly value extending to the northern central part near 1996000N on traverse line Y is accompanied by a fault of the north-south system. However, since an anomaly value continues in the further east than that, it is also assumed that an inferred ENE direction fault exists.

[Cu] The distribution of Cu anomaly is similar to that of Pb anomaly. However, Cu anomaly are not observed within Pb anomaly zones in the southwestern part of the area and the eastern end along traverse line E. Anomalies are also distributed in the meta-sandstone area in the eastern half of traverse lines A, B, and C.

[Cd] Cd anomalies have almost the same distribution as Zn anomalies. Their distribution range is slightly wider than that of Zn anomaly zones.

[Ag] Ag anomalies coincide with Pb high anomalies. This is because Ag replaces for part of Pb site in galena. Ag of 28 to 146 g/t and that of 230 g/t were obtained in the ore assay of the project finding survey and in the galena occurrence at the north of Ban Dong Noi in this survey, respectively.

[Au] Au less than the detection limit value accounts for about 90 %. The highest value is 50 ppb, which is far from an anomaly value. An Au high concentration sample is harmonious with a Zn high anomaly sample and is scattered in the northwest part of the area.

[F] F anomalies are distributed in the limestone area and their distribution is harmonious with that of Zn and Cd anomalies. Many samples showing the average value of Zn can be classified as anomaly values of F.

[Sn] Sn is not so high as to be called an anomaly value, but it has a high concentration in places near granite in the northwestern part of the area and in the meta-sandstone area of the east side.

[Hg] Hg is not so high as to be called an anomaly value. High-concentration samples are distributed in the galena outcrop, in the eastern part along traverse line E, in a karst depression of the northwestern side of the area.

[Sb] The distribution of Sb anomaly is very similar to the Pb anomaly zone.

[Mg] Mg anomalies are only observed in the limestone area and many of these anomalies overlap Zn anomaly zone. However, these anomalies are not distributed in the southwestern part of the area.

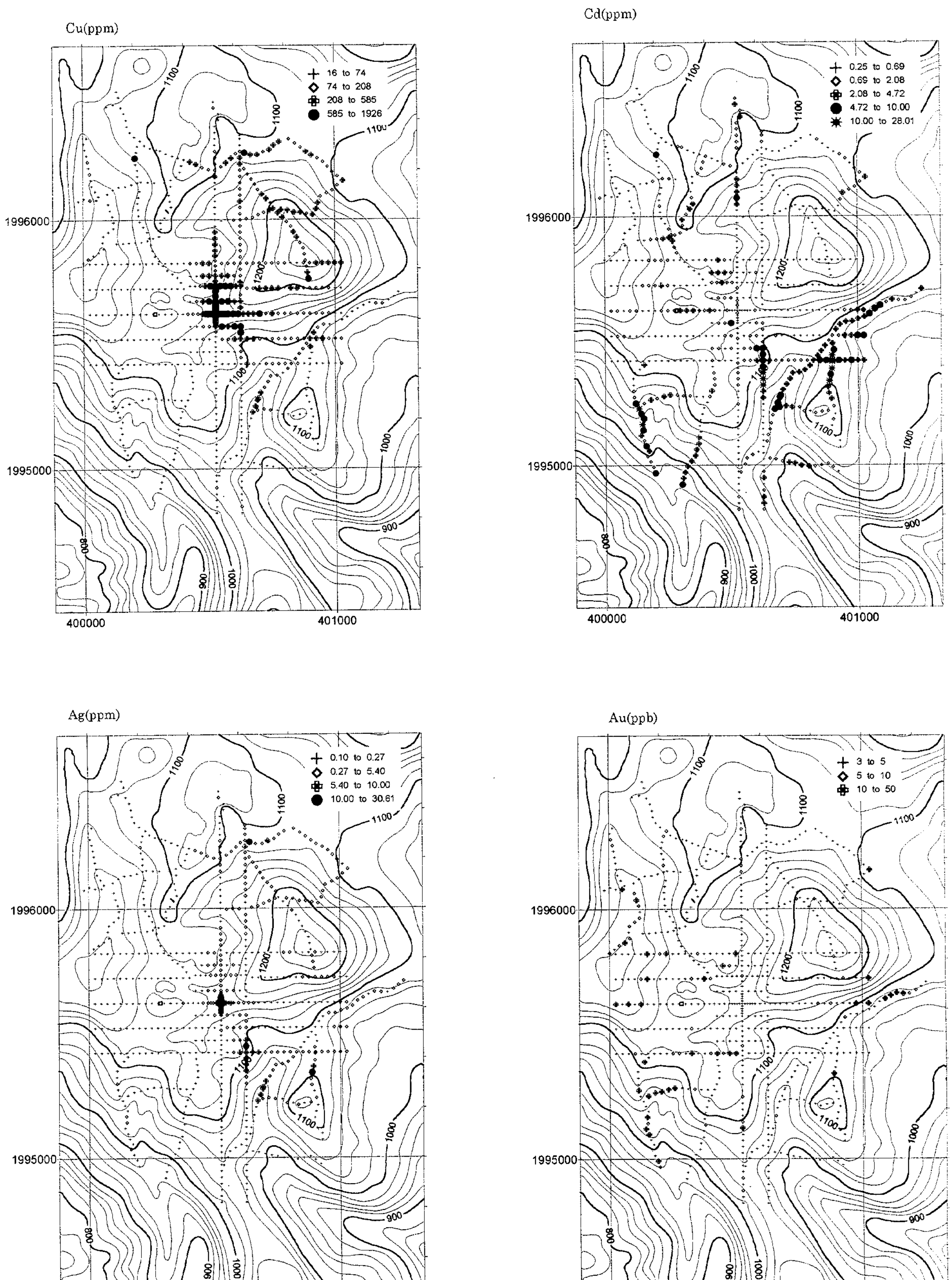



Fig.II-2-6 Geochemical map of Cu,Cd, Ag, Au in soil of the Dong Noi Area

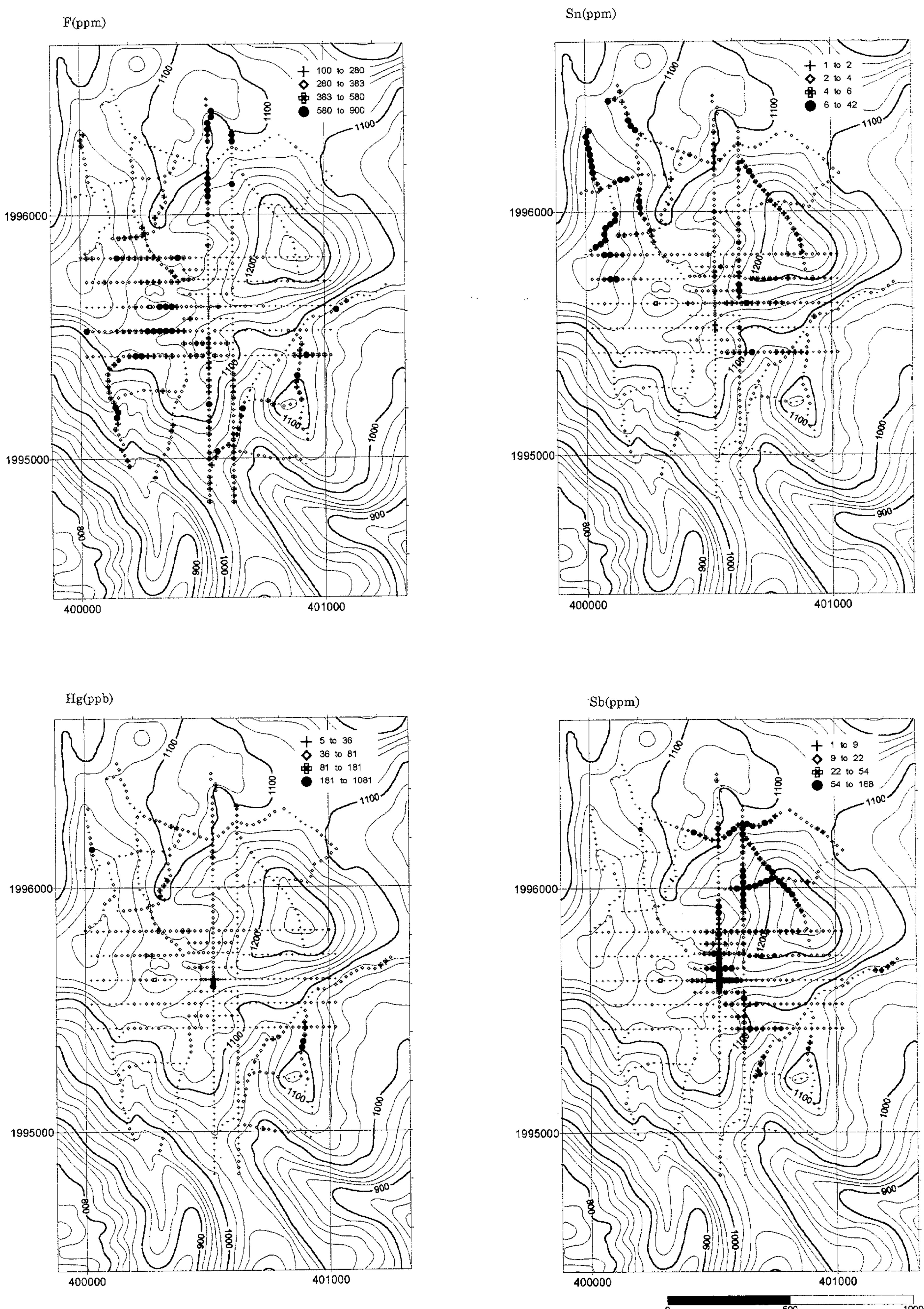



Fig.II-2-7 Geochemical map of F, Sn, Hg, Sb in soil of the Dong Noi Area

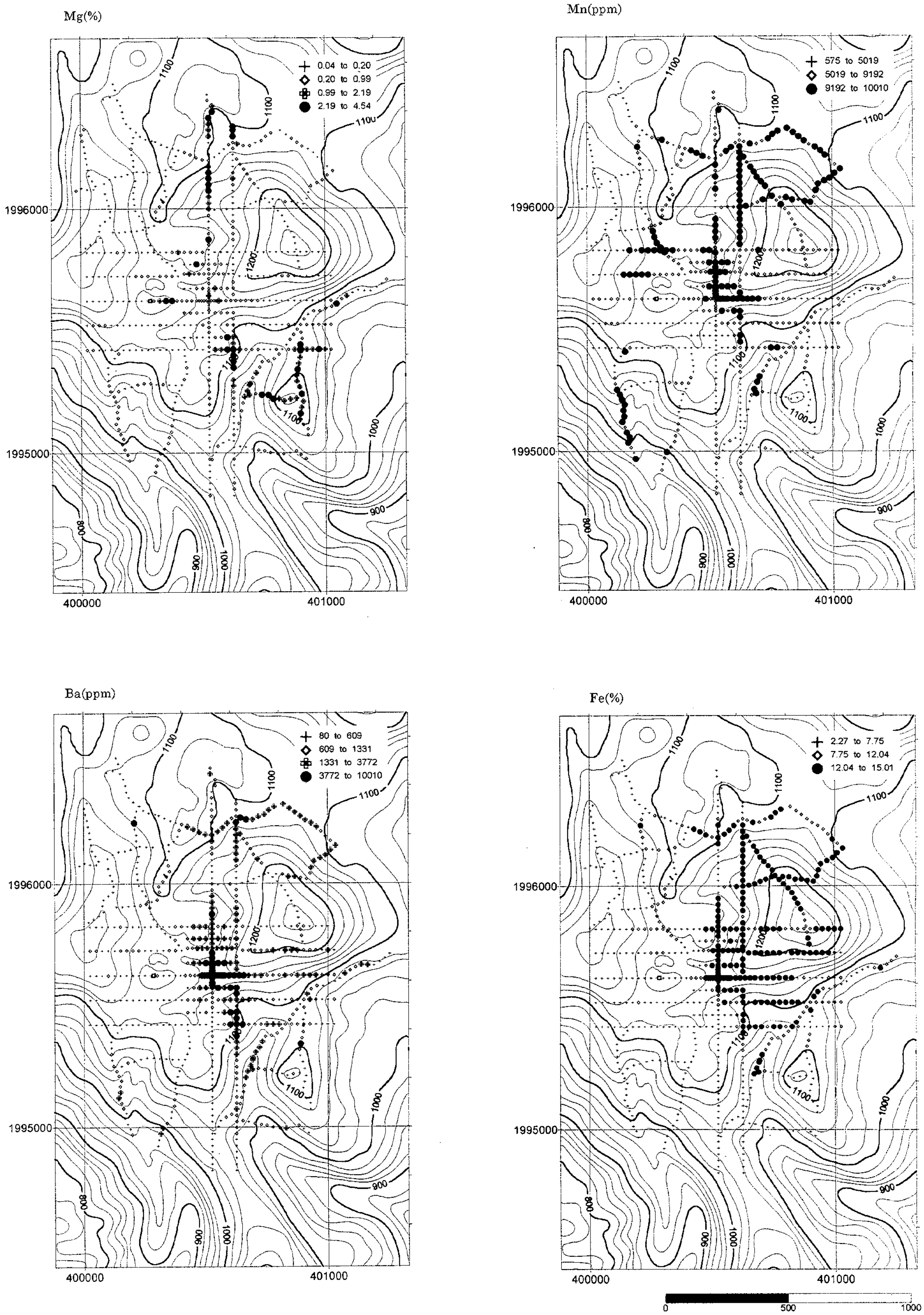



Fig.II-2-8 Geochemical map of Mg, Mn, Ba, Fe in soil of the Dong Noi Area

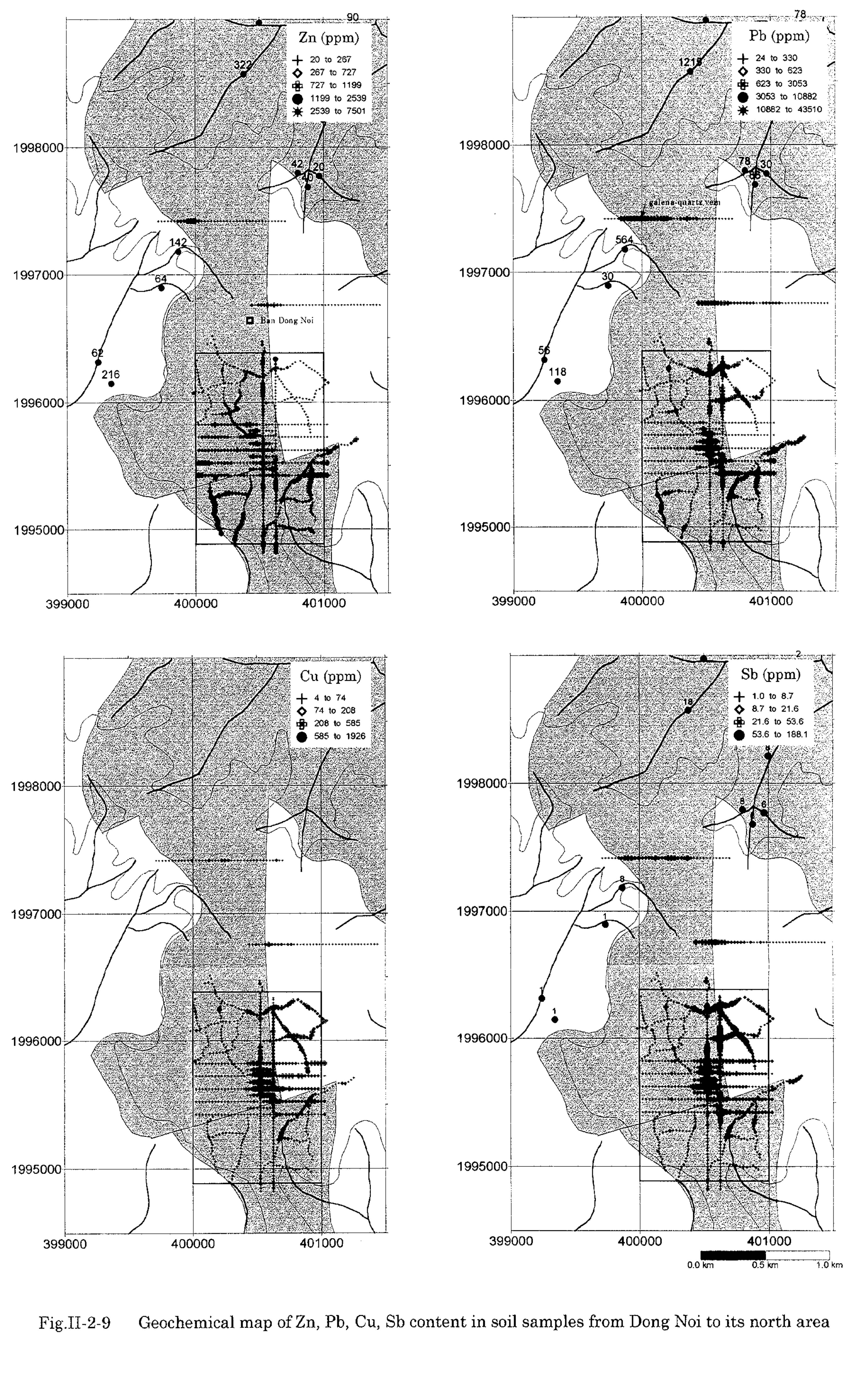



Fig.II-2-9 Geochemical map of Zn, Pb, Cu, Sb content in soil samples from Dong Noi to its north area

[Mn] Although the Mn anomaly zone is very harmonious with the Fe anomaly zone, some of these anomalies are distributed in correspondence with the Zn and Cd anomaly zones in the southwestern part of the area.

[Ba] Many of Ba anomalies overlap Pb anomalies. In particular, Ba shows a high anomaly value near the galena - barite outcrop, is not accompanied, however, by the Pb anomaly appearing along the fault.

3) Distribution of geochemical anomalies On the northern part of Dong Noi

As mentioned in the section of sampling, galena ore floats are distributed by the roadside approximately 1 km north of the Dong Noi village. These floats were discovered a few years ago on the occasion of road repairs. It is said that these boulders are 1 m wide and several meters long with a direction of N 20° E. Pb of 58 % was obtained through the present ore analysis. It is said that galena and barite floats exist in various places along the ridge in this neighborhood. Two east - west traverse lines were established to verify a relationship with the mineralization in the Dong Noi area and soil samples were taken. An anomaly value classification was established in the same way as in the Dong Noi area to compare it with that in the Dong Noi area. Fig. II-2-9 shows only Zn, Pb, Cu, and Sb. Anomaly values are distributed for every four elements along a fault running north to south from the Dong Noi area on the middle traverse line, which shows that this north-south fault predominates the mineralization. However, anomalies are not detected along a traverse line on the north side so that the effect of mineralization does not seem to extend over this zone.

Pb and Sb anomaly values are observed 500 m across near a galena - quartz vein. The Zn anomalies are observed only in a place very close to the vein, but they show no sign of extending into the neighboring limestone as in the Dong Noi area.

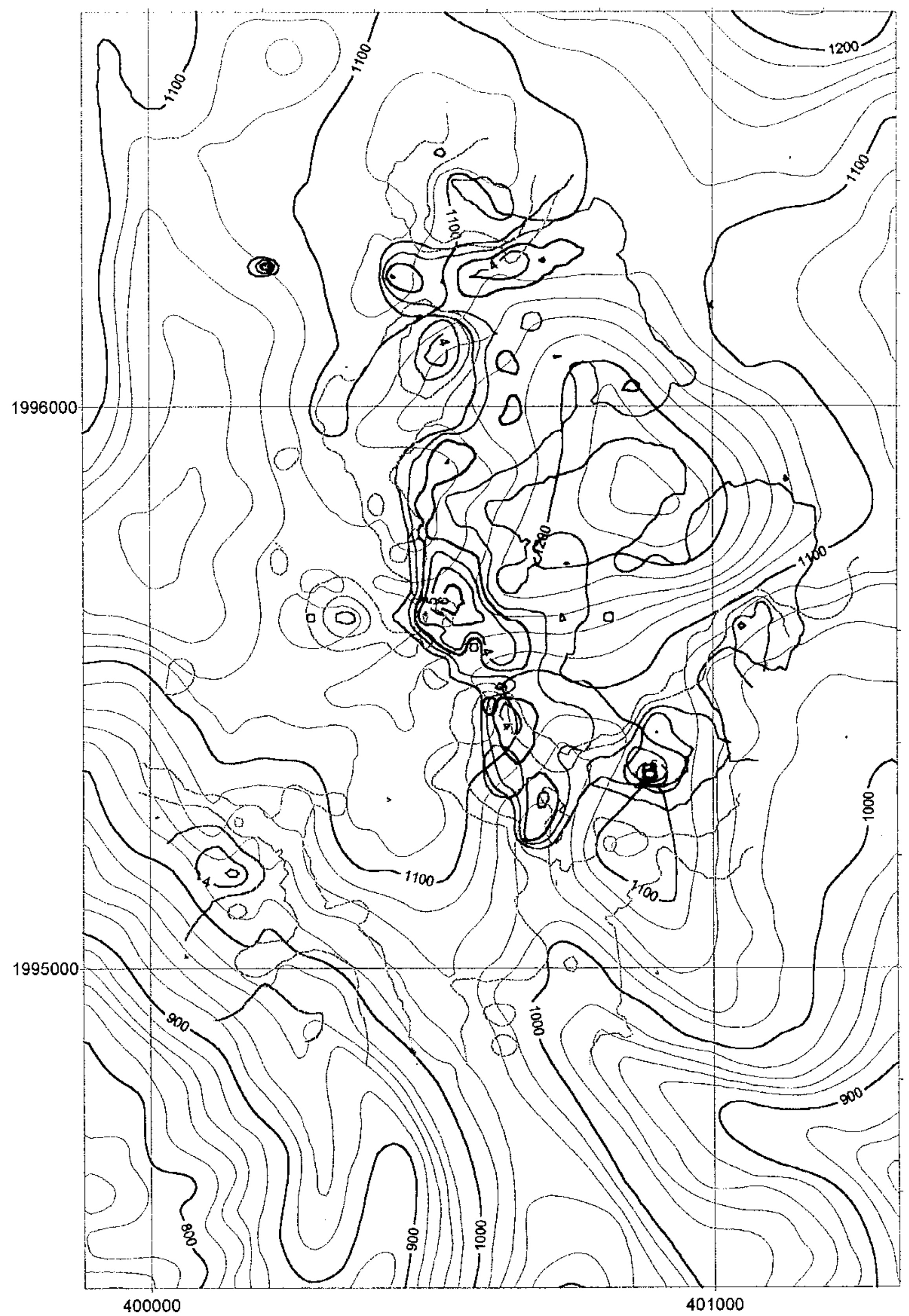
2-5-4 Analysis of principal components

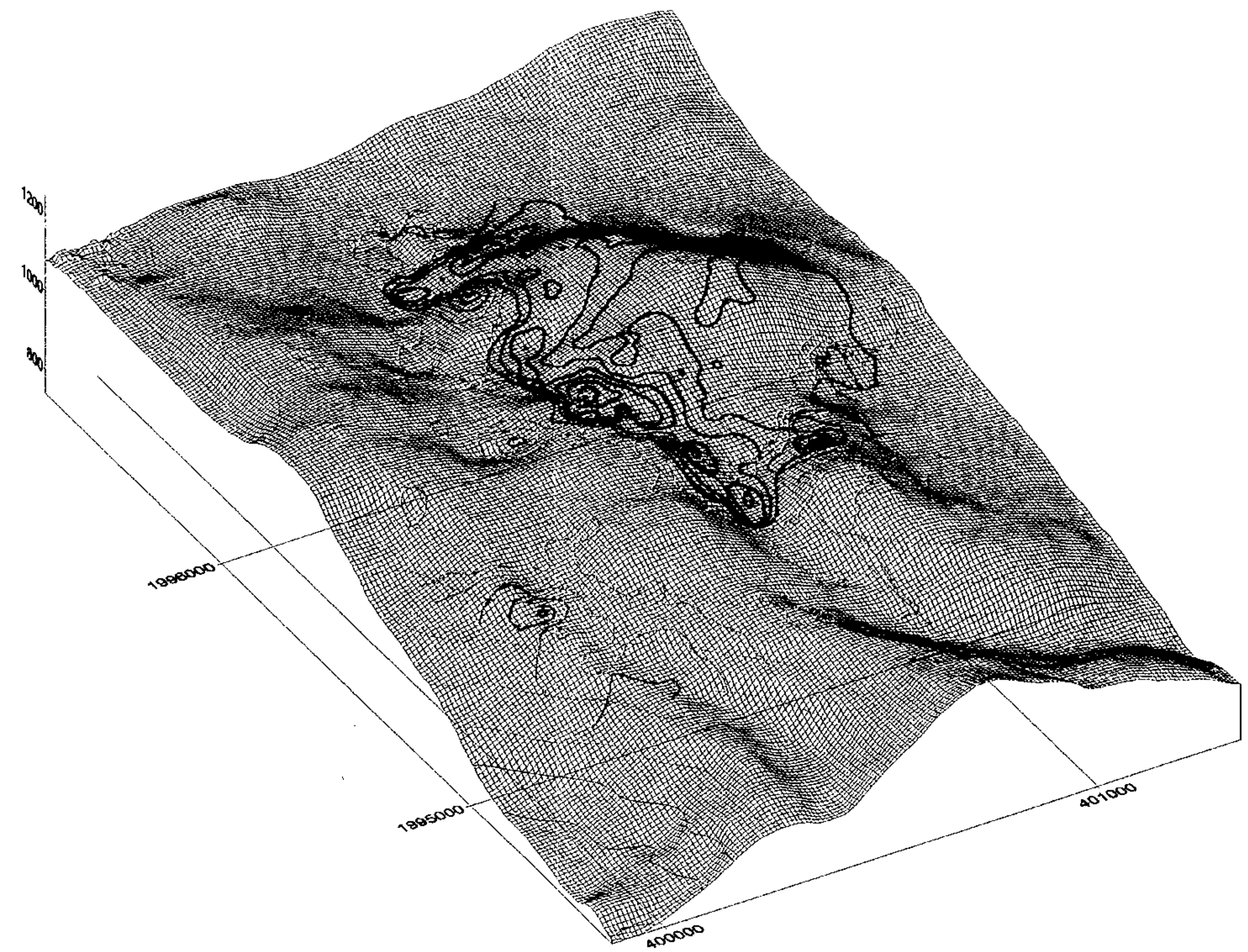
Analysis of principal components was made on correlation matrix obtained from the logarithmic value of a soil analysis value. Table II-2-5 shows the results.

Although the eigen value is 1 or more up to the third principal component, but the contribution rate is 22 in the second principal component and 7 in the third principal component, showing a great difference. It is judged that up to the second principal component is significant.

Figure II-2-10 shows a score distribution of the first and second principal components.

[Z-1] The factor loadings of Cu, Sb, Fe, Ba, Mn, Pb, and As is large and it is thought that this is a factor which reflects ore showing existence of these elements. A high score zone of Z-1 is distributed 700 m long and 100 m wide in the direction of NNW - SSE around the galena - barite outcrop and continues curving in the ENE direction in the northern end. On the northern side a high score zone is also distributed almost in the east - west direction. Since it is thought that a combination of these elements represents a sulfide mineral (mainly galena) -




Factor loading

| | Z-01 | Z-02 |
|---|---|---|
| Cu | 0.8613 | -0.2530 |
| Sb | 0.8546 | -0.1440 |
| Fe | 0.8410 | -0.3620 |
| Ba | 0.8088 | 0.1980 |
| Ag | 0.7967 | 0.2668 |
| Mn | 0.7411 | 0.0570 |
| Pb | 0.7074 | 0.4216 |
| As | 0.6845 | -0.1048 |
| Zn | 0.0126 | 0.9058 |
| Cd | 0.0572 | 0.8406 |
| Mg | 0.2907 | 0.7565 |
| Hg | 0.1211 | 0.3719 |
| Sn | 0.1481 | -0.3893 |
| F | -0.5201 | 0.5054 |

Z-1
score 6
score 5
score 4
score 3
score 2
score 1

Z-2
score 6
score 5
score 4
score 3
score 2
score 1

Fig.II-2-10 Result of principal analysis in the Dong Noi Area

**Table II-2-5 Results of principal analysis of soil samples in the Dong Noi area**

| Principal component | Eigen-value | Contribution rate % | Cumulative rate % |
|---|---|---|---|
| Z-01 | 5.3816 | 38.4401 | 38.4401 |
| Z-02 | 3.1628 | 22.5912 | 61.0313 |
| Z-03 | 1.0247 | 7.3192 | 68.3506 |
| Z-04 | 0.8658 | 6.1846 | 74.5351 |
| Z-05 | 0.7570 | 5.4073 | 79.9425 |
| Z-06 | 0.6568 | 4.6917 | 84.6342 |
| Z-07 | 0.6104 | 4.3600 | 88.9941 |
| Z-08 | 0.4535 | 3.2390 | 92.2331 |
| Z-09 | 0.2994 | 2.1382 | 94.3713 |
| Z-10 | 0.2179 | 1.5566 | 95.9279 |
| Z-11 | 0.2050 | 1.4642 | 97.3921 |
| Z-12 | 0.1642 | 1.1729 | 98.5649 |
| Z-13 | 0.1147 | 0.8192 | 99.3842 |
| Z-14 | 0.0862 | 0.6158 | 100.0000 |

| Factor loading | Z-01 | Z-02 | Z-03 |
|---|---|---|---|
| Cu | **0.8613** | -0.2530 | -0.1369 |
| Sb | **0.8546** | -0.1440 | 0.0801 |
| Fe | **0.8410** | -0.3620 | -0.0042 |
| Ba | **0.8088** | 0.1980 | -0.0830 |
| Ag | **0.7967** | 0.2668 | 0.1226 |
| Mn | **0.7411** | 0.0570 | -0.1310 |
| Pb | **0.7074** | 0.4216 | 0.1300 |
| As | **0.6845** | -0.1048 | -0.2754 |
| Zn | 0.0126 | **0.9058** | -0.0406 |
| Cd | 0.0572 | **0.8406** | -0.0037 |
| Mg | 0.2907 | **0.7565** | -0.0367 |
| Hg | 0.1211 | 0.3719 | **0.6698** |
| Sn | 0.1481 | -0.3893 | **0.6373** |
| F | -0.5201 | **0.5054** | -0.0999 |

barite quartz vein often observed in the Mae Sariang area, the distribution on continuous lines indicated by this score is presumed to represent an existence of the above vein or an existence of an ore solution path.

[Z-2] The factor loadings of Zn, Cd, Mg, and F is large for the second principal component and it is thought that this is a factor which reflects mineral occurrence existence of these elements.

A high score zone is in the limestone area and is located in the periphery of a high score area of the first principle component. Mineralization in which Zn and Cd exist in limestone is similar to the Mae Sod Ore Deposit of Padeang Industry Limited. There is a strong possibility that Mg represents dolomitization in limestone caused by mineralization and F represents an existence of halogen elements in mineralized solution.

## 2 − 6 Geophysical Survey

### 2-6-1 Survey method

(1) Measurement method

It made electrode arrangement dipole- dipole array with pole interval 100 m and pole separation coefficient from n=1 to 4.

The plot concept figure of the dipole dipole array and the measurement data is shown in Fig. II -2-11.

It measured IP method in the time domain, it floated down the pause corrugation of 1/8 Hz as the principle and it measured decay voltage after electric current cutting.

An output corrugation from the transmitter is shown in Fig. II -2-12 and the example of sampling of the time domain data is shown in Fig. II -2-13.

(2) Instrumentation

The instrumentation to have used for this survey is the system made by the PHOENIX GEOPHYSICS LIMITED in Canada.

It writes down below about the specification of the equipment.

**Table II -2-1-6 Specification of TDIP survey instruments**

| | |
|---|---|
| **Receiver** | Phoenix Multi-purpose Receiver V5-16 |
| Number of Channels | 8 maximum |
| Dynamic Range | (+/-) 5 V |
| Gain | from 1 to 2,048 |
| Resolution of A/D Conversion | 16 bits |
| Notch Filter | 50/60 Hz ,21st order harmonics maximum |
| **Transmitter** | Phoenix IPT1 |
| Maximum Output Power | 2 KW |
| Output Current | 10 A maximum |
| Frequency | 0.125 Hz , 50% duty cycle |
| **Generator** | Phoenix MG-2 |
| Maximum Output Power | 2 KW |
| Output Frequency | 400 Hz , 3 Phase |
| Engine | 4 cycle , 5 HP |
| **Potential Electrode** | Phoenix Non-polarizable Pb/PbCl2 Pot |

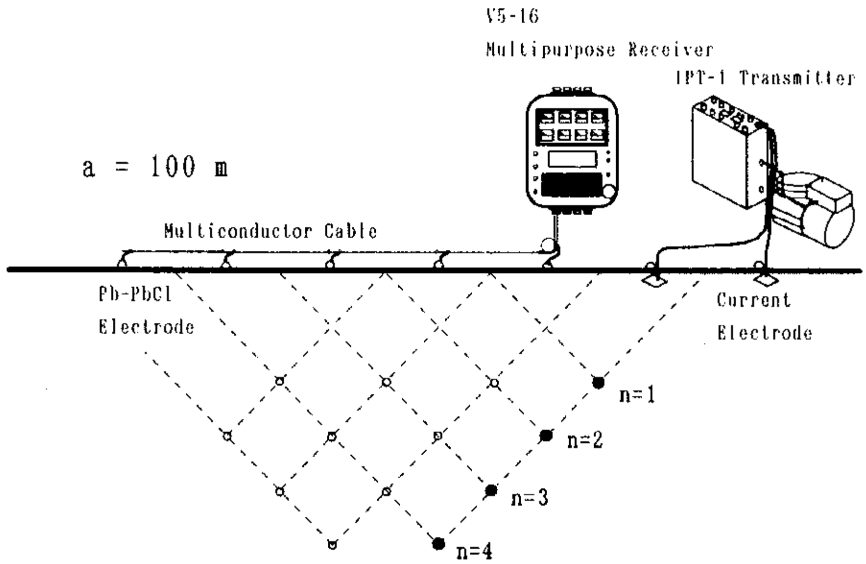



**Fig.II-2-11 Dipole-dipole array and plotting procedure**

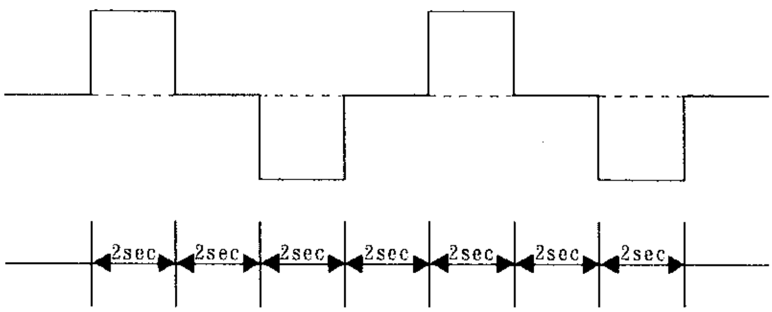



**Fig.II-2-12 Waveform produced by the transmitter**

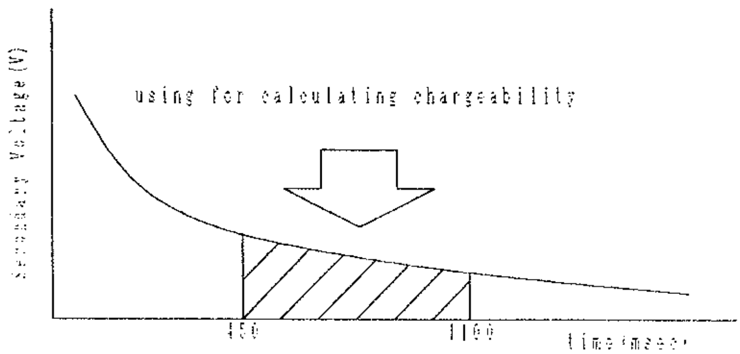



Fig.II-2-13 Sampling span for chargeability

2-6-2 Analysis method

(1) Data processing

Apparent resistivity and chargeability are given by the following formula.

Apparent resistivity and chargeability are automatically calculated in V5 when measuring and it is possible for the data to evaluate quality in the place.

a) Apparent resistivity ($\rho_a$)

$$\rho_a = \frac{\pi \times V}{I} \times a \times n \times (n+1) \times (n+2)$$

V : received voltage(volt)

a : electrode spacing

n : separating coefficient

I : transmitted current(ampere)

b) Chargeability (M)

$$M = \frac{1}{(T_2 - T_1)Vp} \times \int_{T1}^{T2} Vs$$

Vp : primary voltage(volt)

Vs : secondary voltage(volt)

T1 : sampling time of secondary voltage(450 milli-second)

T2 : sampling time of secondary voltage(1100 milli-second)

(2) Topographical correction

When calculating apparent resistivity, it supposes a pole arrangement coefficient as the one to have arranged a pole in the infinite plan.

However, the apparent resistivity that the earth was calculated even if it was homogeneous electrically is influenced by the topography.

It is detected, that the apparent resistivity is small in the place of the valley topography in the dipole-dipole type array by the IP method and that it is high in the ridge topography.

On the other hand, because chargeability is calculated from the transition phenomenon with potential after electric current cutting, it is hardly influenced in the topography.

It is conspicuous that either of the topography heaves about the Dong Noi area and the I-4 area which implemented this year survey. Therefore, topographic correction using the finite element method of two dimensional were carried out in the all measurement Line . After correction , the value of apparent resistivity were revised and using these corrected value , pseudo sections and plan maps were made.

(3) Two Dimensional model analysis

In this investigation, it analyzed in simulation by the finite element method of Two Dimensional( 2-D ) about all lines.

It used model computation (Forward Modeling) by the finite element method and the 2-D inversion analysis method (Sasaki, 1988) which composes an automatic analysis method by the non-linear least square method each other for the computation.

In the model analysis of 2-D, it gives all the blocks identical resistivity as the first basic model and it calculates a theoretical value with apparent resistivity and chargeability to this model. Next, for residuals with this theoretical value and measurement value to become small, it corrects a model by the automatic iteration analysis by the least square approximation method and it calculates replying to the correction model. Then, it does this work repeatedly, and it makes a theoretical value approximate a measurement value and it estimates optimal underground structure.

In this investigation, it provided a resistivity block boundary for the middle of basically marching station and moreover, it made the all sides -shaped block which divided a block under each station to become thick at the depth thin at the shallowness to the direction of the depth. Then, it transforms this according to the topography of the surface of the ground, in the level direction, it made and it used the resistivity block which becomes parallel to the topography for the analysis.

Incidentally, in partial lines, because the convergence was bad in the bigness of the difference between the theoretical value and the measurement value, it computed, increasing a block to the line both edge part and it made an effort toward the improvement of the analysis precision.

2-6-3 Measurement of rock properties

(1) Method of measurement

By the purpose to collect the electric characteristic data of rock, gathered samples ( 33 ) of rock and ore on the surface of the ground from the Dong Noi area and the I-4 area . After adjusting the body of the samples and soaking in distillation water for 2 days , it measured apparent resistivity and chargeability by the time domain IP method.

Incidentally, as for the chargeability, it calculated a value using the 2nd potential from 450 milli-second to 1100 milli-second which are the same as the field measurement.

(2) Measurement result

The measurement results of rock and ore samples are shown in Table II -2-1-8, Fig. II -2-14. Also, the rock acquisition position of the Dong Noi area was shown in Fig. II -2-15.

In the Dong Noi area, it acquired 15 samples. The apparent resistivity shows from 1603Ω·m to 13520 Ω·m value and the chargeability shows a maximum of 18.8 mV·sec/V.

CR021,CR022 and CR023 were silicified rock and were extracted from the gossan place which is in station 500 of line C. The resistivity value is about 8000Ω·m - 10,000 Ω·m and shows a resembling tendency but the chargeability is the value that CR021 shows 18.8mV·sec/V but that the other two are low.. It supposes these samples to contain either of galena c/V but that the other two are low.. It supposes these samples to contain either of galena but a difference is supposed to occur in the chargeability such as the containing quantity because it is different.

About sandstone, as for AR036 ( the station 1100 neighborhood of line Y ), the resistivity is 13520 Ω·m and the chargeability shows 16.28mV·sec/V. As for AR035 which was gathered in the neighborhood of AR036, the resistivity is 7387 Ω·m and a high but the chargeability shows 4.68mV·sec/V and the value of the lowering.

About limestone, the resistivity shows a 1603Ω·m - 5582 Ω·m value.
As for the chargeability, FR010 rather shows an relatively high value with 14.78mV·sec/V but the other sample becomes the value of the lowering below roughly 10 mV·sec/V.

**Table Ⅱ-2-1-7 Resistivity and chargeability of rock samples in the Dong Noi area**

| Sample name | Rock name | Resis. (Ω·m) | Charge. (mV·sec/V) |
|---|---|---|---|
| AR033 | Limestone with shale schlielen | 1603 | 2.9 |
| AR035 | Metamorphosed sandstone | 7387 | 4.6 |
| AR036 | Metamorphosed sandstone | 13520 | 16.2 |
| BR030 | Bedded limestone | 2095 | 8.5 |
| BR031 | Metamorphosed sandstone | 10800 | 4.9 |
| BR032 | Bedded limestone | 3325 | 4.7 |
| BR033 | Bedded limestone | 3313 | 4.0 |
| CR018 | Marble | 2757 | 1.4 |
| CR021 | Silicified rock with galena diss. | 10310 | 18.8 |
| CR022 | Silicified rock with galena diss. | 9173 | 1.4 |
| CR023 | Silicified rock with galena diss. | 8620 | 4.8 |
| DR025 | Metamorphosed calcareous sandstone | 2269 | 12.1 |
| FR010 | Bedded limestone | 5582 | 14.7 |
| FR011 | Bedded limestone | 2570 | 8.8 |
| GR012 | Metamorphosed siltstone | 10350 | 5.5 |

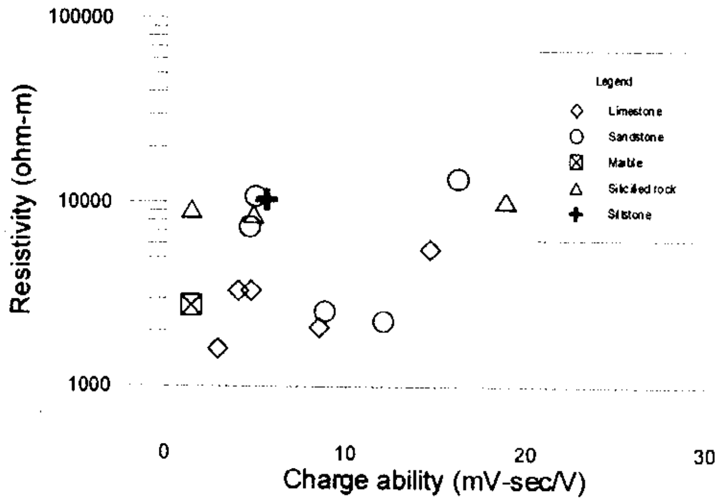



**Fig. Ⅱ-2-14 Resistivity and Chargeability of rock sample in the Dong Noi area**

2-6-4 Measurement result

(1) Line setting

In this area, it set total line length of 8 km in amount which 2 X 1.5 Km length with the direction of NS ,5 X 1.0Km length with the direction of EW .

The line locations are shown in Fig. Ⅱ-2-16.

(2) Measurement result

1) Line A (Fig. Ⅱ-2-17)

The apparent resistivity shows from 74Ω·m to 1608 Ω·m value. The west of station 700 shows the apparent resistivity of more than roughly 200 Ω·m and especially, under station 200, it is the amount apparent resistivity of 1608Ω·m(N=1). The east of Station 700 shows the apparent resistivity of approximately less than 200 Ω·m. Also, the part which shows the apparent resistivity of less than 200 Ω·m in the depth between station 200 and 300, too, is seen.

As for the chargeability, mainly in n=1 of station 500 and 600, high chargeability above 20mV·sec/V is seen to the convex type. The value as the part of the neighborhood of it leaves becomes low ,following far from high chargeability .

2) Line B (Fig. Ⅱ-2-18)

The apparent resistivity shows from 86Ω·m to 978 Ω·m value. The apparent resistivity of less than 200 Ω·m is distributed between station 400 and 800 and also the part which shows the apparent resistivity of less than 200 Ω·m in the depth between station 200 and 300 is seen. The west of station 400 shows roughly 500 Ω·m numerical value.

As for the chargeability, high chargeability above 20mV·sec/V is approximately seen un-

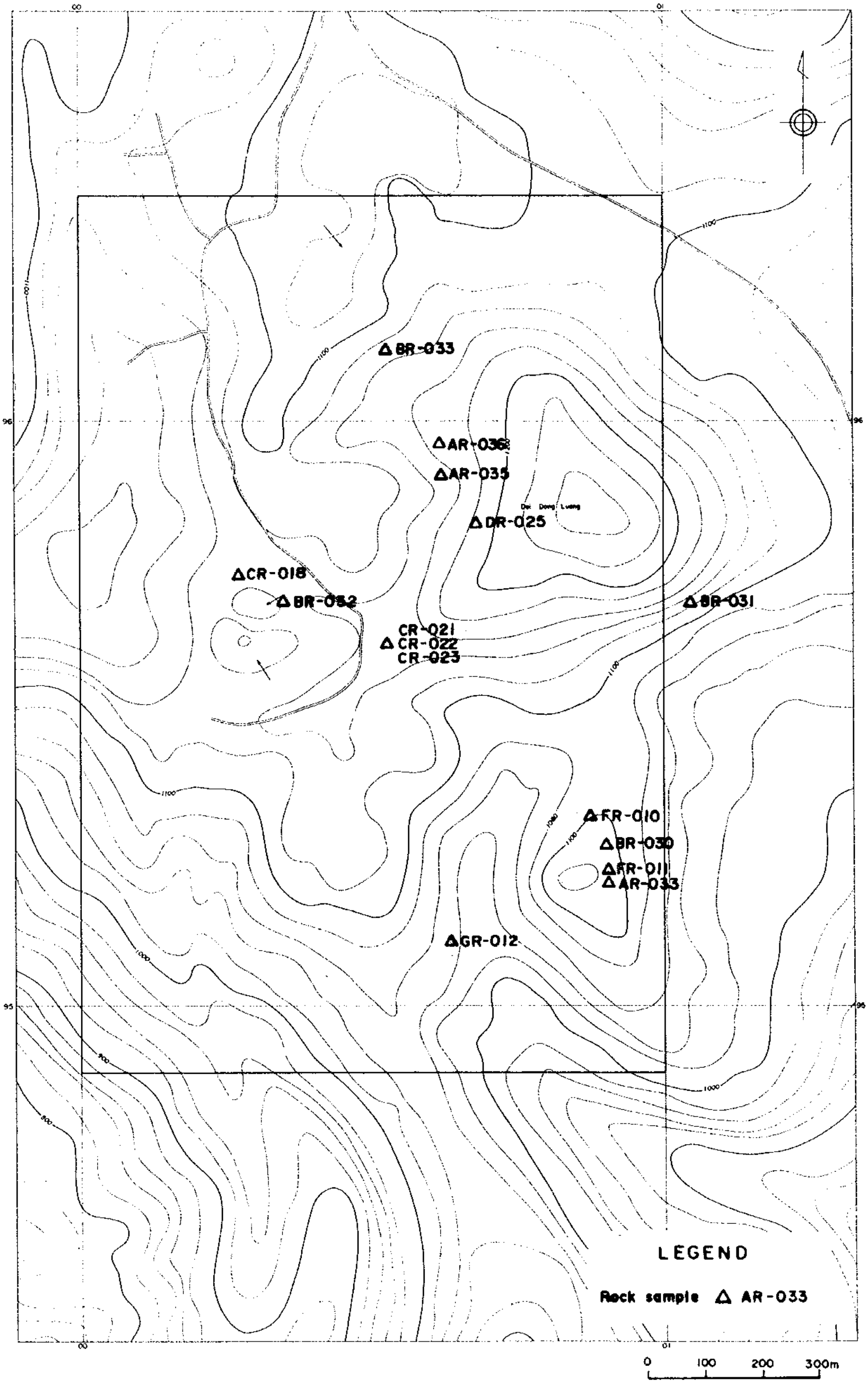



Fig.II-2-15 Locality of rock samples for laboratory test in the Dong Noi area

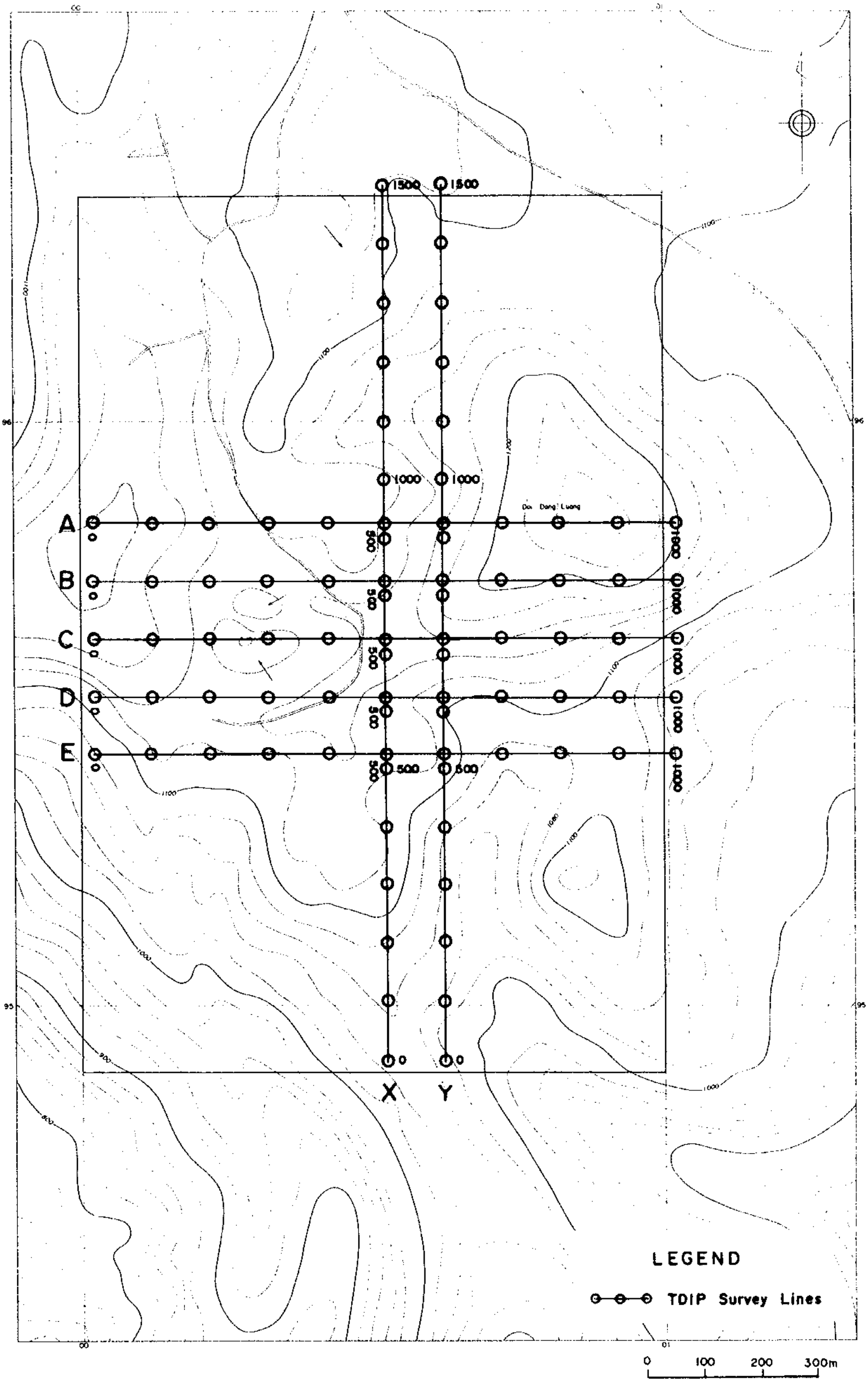



Fig.II-2-16 Location of survey line in the Dong Noi area der about station 600 and the numerical value of the eastern side rather is lowering ,but mainly in this place a convex type contour lines can be seen. The value as the part of the neighborhood of it leaves becomes low following far from high chargeability .

3) Line C (Fig. II -2-19)

The apparent resistivity shows from 67Ω·m to 1040 Ω·m value. The apparent resistivity of less than 200 Ω·m is seen under station 500 and 600. Also, the apparent resistivity of less than 200 Ω·m is seen in the depth under about station 400, the depth from station 700 and the east of station 800 , too. The west of Station 300 shows the high apparent resistivity of roughly 500 Ω·m.

As for the chargeability, the high chargeability of 22mV·sec/V is seen in n=4 under about station 300 but the other part shows low value . But, in the same way as line B, the distribution of the figure of convex type chargeability centered on station 500·600 can be seen.

4) Line D (Fig. II -2-20)

The apparent resistivity shows from 115Ω·m to 700 Ω·m value. The apparent resistivity of less than 200 Ω·m is seen the shallowness between station 300 to 600 and about the depth of station 600 but the distribution range is small. The other part shows the apparent resistivity of more than 200 Ω·m and the depth between station 300 and 500 and the eastern side of the line show the apparent resistivity of about 500 Ω·m.

Generally, the chargeability is lowering and it is 17mV·sec/V ( n=4 under about station 300 ) in the maximum. But, the distribution of the chargeability of convex type can be seen under the shallowness of the station 600.

5) Line E (Fig. II -2-21)

The apparent resistivity shows relatively high value from 209Ω·m to 984 Ω·m. The apparent resistivity of more than 500 Ω·m is seen under from station 300 to 500 and in eastern part of the line and the distribution of high apparent resistivity is wider than line D.

Like the whole chargeability, it is lowering and it is 15mV·sec/V ( n=4 under station 300 and 400 ) in the maximum. But, like line D, the distribution of chargeability of convex type centered on the station 600 can be seen.

6) Line X (Fig. II -2-22)

The apparent resistivity shows from 91Ω·m to 929 Ω·m value. The distribution of the apparent resistivity of less than 200 Ω·m is seen the southern end of the line, the northern end part and the center part ( under about station 700 ) partially. Also, the apparent resistivity from 200Ω·m to 500 Ω·m are distributed as the putting in of low apparent resistivity in this central part.

As for the chargeability, a high chargeability part above 20mV·sec/V is observed between station 800 and 900 ,and mainly in this part the distribution of chargeability of convex type can be approximately seen.

7) Line Y (Fig. II -2-23)