The south mineralized zone, 400 m NW-SE and 100 m NE-SW, is formed in melanocratic diorite dyke and batholith of granodiorite-quartz diorite as dissemination of chalcopyrite, pyrite and molybdenite, which give the assay of 0.06% Cu and 0.01% W. A mineral assemblage of quartz-hornblende-(secondary biotite) is predominant in hydrothermal alteration zone.

(4) Results of Magnetic Susceptibility Measurement and Geochemical Survey

Fig. II-2-13 shows the interpretation results of the magnetic susceptibility measurement and geochemical survey together with the locations of the mineralized zones.

Three strong to moderate low anomalies of magnetic susceptibility were obtained over the north and central mineralized zone, respectively. Two of the three anomalies over the north mineralized zone is in the melanocratic diorite stock but are not consistent with the mineralization itself. These anomalies appear to be caused from hydrothermal alteration related to the mineralized zone. The remaining anomaly in the north mineralized zone is over the andesitic tuff. The three anomalies obtained over the central mineralized zone are interpreted to be caused from the mineralization and related hydrothermal alteration. The present magnetic susceptibility measurement was done only along the principal geological survey routes, then the number of measuring points was not satisfactory to confirm the expansion of anomalous zone. However, it is proven that mineralization generally causes demagnetization in variable degree.

The geochemical survey was undertaken in the central and south mineralized zones, and resulted in the detection of high factor scores of Factor 2 (Ag-Cu) and moderate factor scores of Factor 4 (Mo) in the central mineralized. In the south mineralized zone, however, only one low factor score of respective Factor 2 and Factor 4 was obtained.

2–1–8 Sicota Area

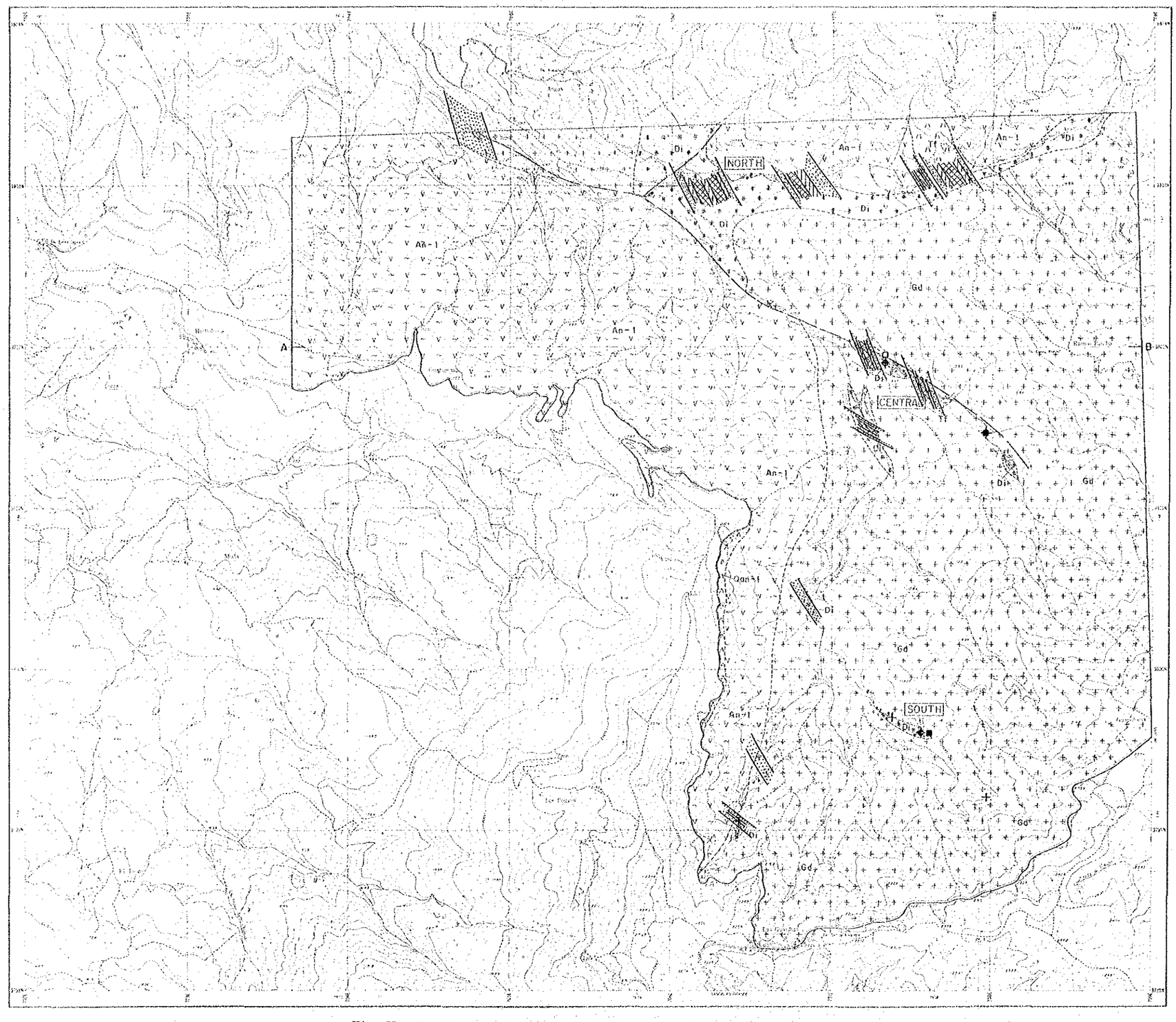
(1) Location

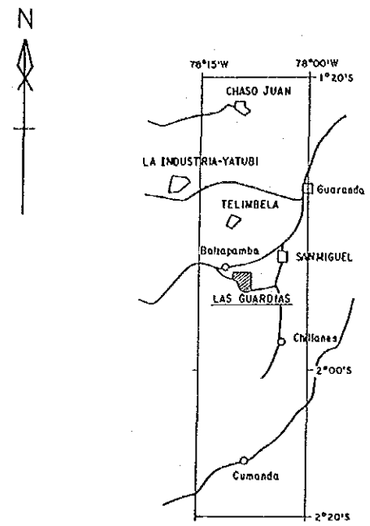
This area is situated about 13 km southeast of Balzapamba and is 35 km and 1 hour ride away from its settlements.

(2) Geology and Mineralization

Tertiary granodiorite batholith (Gd) is distributed throughout this area. In valleys located in the southern part of this area and running in a southeast direction, conglomerate bed of Quaternary partially covers this rock (Plate II-2-7).

Mineralization shows several products of hydrothermal activities. In the central part of this





N

LEGEND

Cretaceous Mocuchi Formation
- Qan-1: Quartz-bg. andesite lava (B Member)
- An-1: Andesitic hornfels with pyroclastics and sediment (Tf) (A Member)

Intrusive Rocks
- Gd: Granodiorite
- Di: Melanocratic diorite

Geological boundary
Fault
Mineralized zone (* diss, ※ network)
Alteration zone
A — B Section line

Magnetic susceptibility ≦ 5.0×10⁻³ S.I unit
5.0 < M.S. ≦ 10.0
10.0 < M.S. ≦ 20.0
20.0 < M.S.
+ Location of geochemical sample

Factor 2 (Ag - Cu)
- ○ 0.4 ≦ F2 < 1.0
- ● 0.0 ≦ F2 < 0.4

Factor 4 (Mo)
- □ −1.0 < F4 ≦ 0.4
- ■ −0.4 < F4 ≦ −0.0

0 — 1km

Fig. II－2－13 Synthetic Interpretation Map of the Mineralization, Magnetic Susceptibility and Geochemical Date of the Las Guardias Area

area, there are small outcrops where euhedral pyrite crystals are disseminated in altered rocks of granodiorite origin. The outcrops are in a maximum diameter of 2 m and occur in a 30 m range of area. Alteration consists of silicification and white argillization. Analytical results on ore samples showed 0.2 g/t Au, 3.9 g/t Ag, and 0.09% Cu. Granodiorite is dotted with a kaolinite alteration zone of about 2 m thick. Partially, hematite is mixed. In the conglomerate formation of Quaternary which is distributed along valleys, pebbles are consolidated, with their space filled with fine-grained pyrite and white clay. Pebbles are replaced by fine-grained pyrite, thereby being subjected to black alteration. This hydrothermal alteration zone is exposed for more than 20 m along the valley.

(3) Results of Magnetic Susceptibility Measurement

In this area, weathering has extremely advanced and magnetic susceptibility of rocks has dropped under its effect. However, the above mentioned hydrothermal alteration zone has a magnetic susceptibility of $0.03 \sim 0.15 \times 10^{-3}$ SI units, thereby indicating a demagnetizing phenomenon.

2–1–9 Tambillo Area

(1) Location

The Tambillo area lies on the eastern steep slop of Chimbo river, about 28 km southeast of Balzapamba. The access by road can be done from Balzapamba to La Ensillada which is at about 4 km east of Chillanes, and takes about 2 hours by car. Between La Ensillada and the survey area no motorable access is available, other than by horse back, by foot and by manual ropeway. It take about one hour and a half.

(2) Geology

The almost whole extent of the area is underlain by volcanic rocks of the Macuchi Formation, then only a small dyke of granite porphyry is cropped out in the southwest central part (Plate II-2-8, Fig. II-2-14).

The Macuchi volcanic rocks is largely composed of dark green andesite lava (An), and is intercalated with andesitic tuff (Tf) and quartz-bearing andesite (Qan). The andesite lava is underlain by basaltic pillow lava (Ba). These lighological units strike NE-SW and dip 30° more or less toward the northeast. The thickness of the volcanic rocks is estimated to be more than 1,800m.

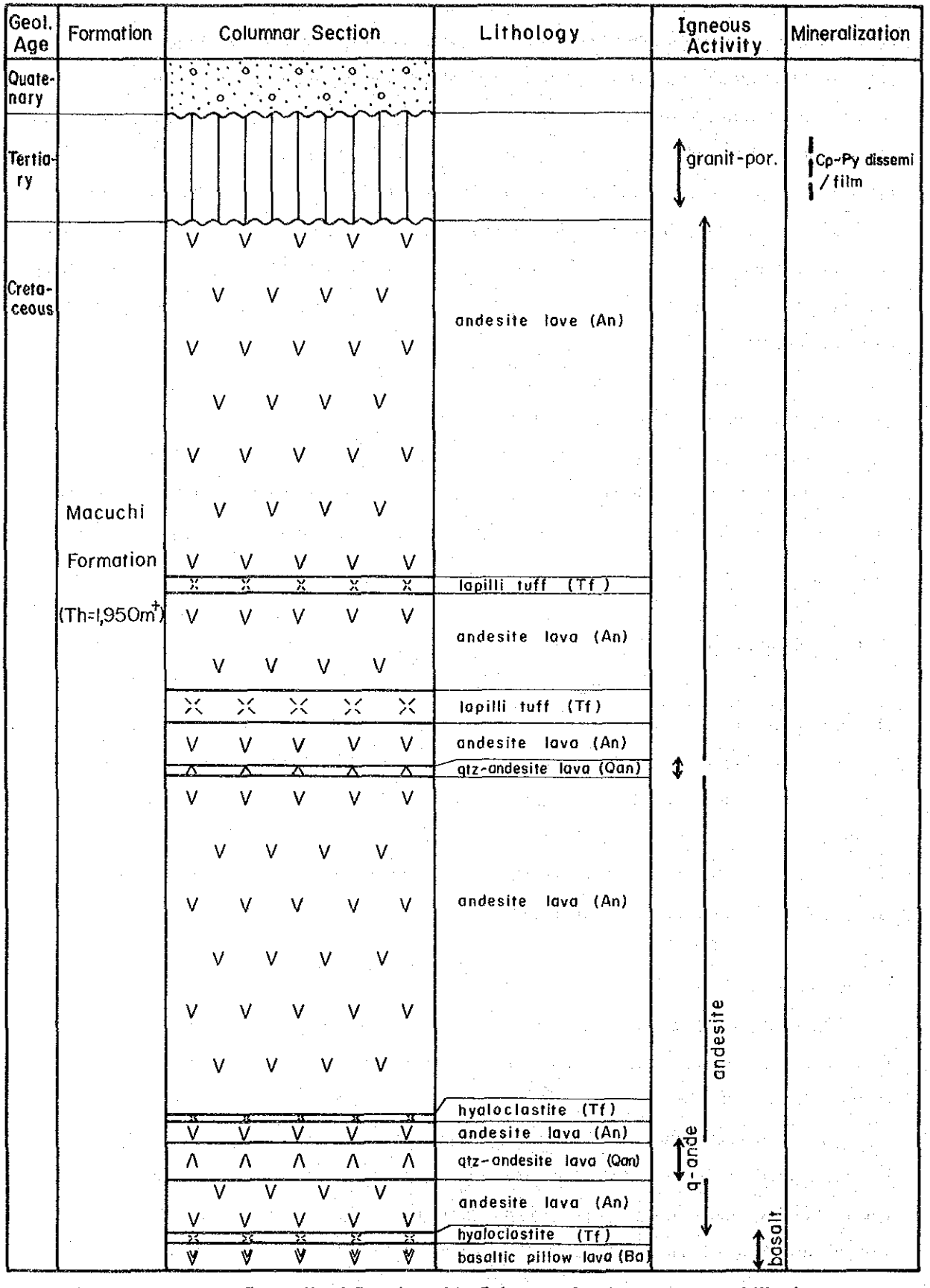


Fig. II－2－14 Generalized Stratigraphic Columnar Section in the Tambillo Area

The granite porphyry (Gp) occurs as a small, NE-SW trending dyke with 20 m wide in the southwest central part. Lithologically the dyke is coarse-grained, leucocratic and distinctly porphyritic, and is subjected to extensive silicification.

(3) Mineralization

Three local mineralized zones are located in the middle reaches of Palmar valley and in the lowermost and middle reaches of Placer valley.

The former is dissemination of chalcopyrite and pyrite formed in the granite porphyry dyke and enclosing silicified andesite lava. It can be pursued for about 200 m long along Palmar valley. The analytical result of the typical sample gave the content of 0.07 % Cu, but one of the geochemical samples contained 1,236 ppm. The X-ray diffractive analysis revealed two alteration mineral assemblages of quartz-sericite and quartz-halloysite.

The second is represented by disseminated chalcopyrite and pyrite hosted by silicified andesite. It has an extension of nearly 100 m along the stream of Placer valley. Within the mineralized zone, combination of quartz-K-feldspar is predominant alteration minerals.

The last one occurs as sparse dissemination of pyrite in silicified andesite, which extends for about 300 m along the middle streams of Placer valley.

(4) Results of Magnetic Susceptibility Measurement and Geochemical Survey

The magnetic susceptibility values in this area are less than 20×10^{-3} SI units, which are clearly lower than those in other survey areas. Particularly, the values in and around the mineralized zones did not exceed 9×10^{-3} SI units.

As the result of the geochemical survey, only high factor scores of Factor 3 (Pb-Zn-Cu) were obtained over the mineralized zone in the lowermost reaches of Placer valley, but factor scores of other all Factors on each mineralized zone were extremely low.

2–1–10 Tablas Pamba Area

(1) Location

This area is located about 8 km southwest of the Tambillo area, 32 km south-southeast from Balzapamba. The access by road can be done from Balzapamba to Tablas Pamba village via Chillanes, and it takes about 2 hours and a half. Between Tablas Pamba and the eastern bundary of the area, however, only trails are available, from which it takes about 2 hours by horse back or foot.

(2) Geology

Andesitic volcanic rocks spread over throughout the area, and only a small diorite stock is exposed near the northeastern corner of the area (Plate II-2-9, Fig. II-2-15).

The andesitic volcanic rocks are stratigraphically subdivided into 6 members; An-1, Ba-1, An-2, Tf, Ba-2 and An-3, in ascending order.

The An-1 member consists mostly of grey andesite lavas with minor intercalations of basaltic andesite flows, and occupies the easternmost of the area. The thickness of this member is more than 700 m.

The Ba-1 member is darkgrey, brecciated basaltic andesite-basalt lavas and is estimated to be 400 m thick. The microscopic characteristics of a representative sample are as follows:

Altered basaltic andesite (B1086)

Locality : 1.6 km east of Tablas Pamba village

Texture : Porphyritic

Constituent minerals : Plagioclase, mafic minerals > opaque minerals

Alteration minerals : Albite, chlorite, epidote > quartz

Plogioclases are replaced by albite, chlorite and epidote, and mafic minerals are also replaced by chlorite.

The An-2 member is composed of grey andesite, and its thickness varies from 270 m in the east to 80 m in the west.

The Tf member is comprised of pale green andesitic fine to coarse Tf. It is exposed only in the west of the area, and usually forms very high precipices, occasionally over 200 m height. This member also occurs only in the east with a maximum thickness of 250 m.

The Ba-2 member conformably overlies on the Tf member in the east and on the An-2 member in the west. It is dominated by dark grey basalt lavas associated with basaltic tuff in the north and by basaltic andesite lavas with basalt lava, which is metamorphosed to hornfels, in the west. The thickness is estimated to be 280 m in the east and 200 m in the west.

The An-3 member, the upper most unit in the area, consists mainly of dark grey andesite flows, intercalated with thin layers of andesitic tuff, and forms undulating plateau with elevation of 2,200 ~ 2,600 m developed in the central to western part of the area, in which Tablas Pamba village is situated. Around the north boundary of the area, andesite lavas are silicified and show light colour. This member has a thickness of more than 480 m.

A small stock of mafic-rich diorite is exposed in the northeastern part of the area. Mafic minerals are mostly altered to chlorite and minor amount of epidote.

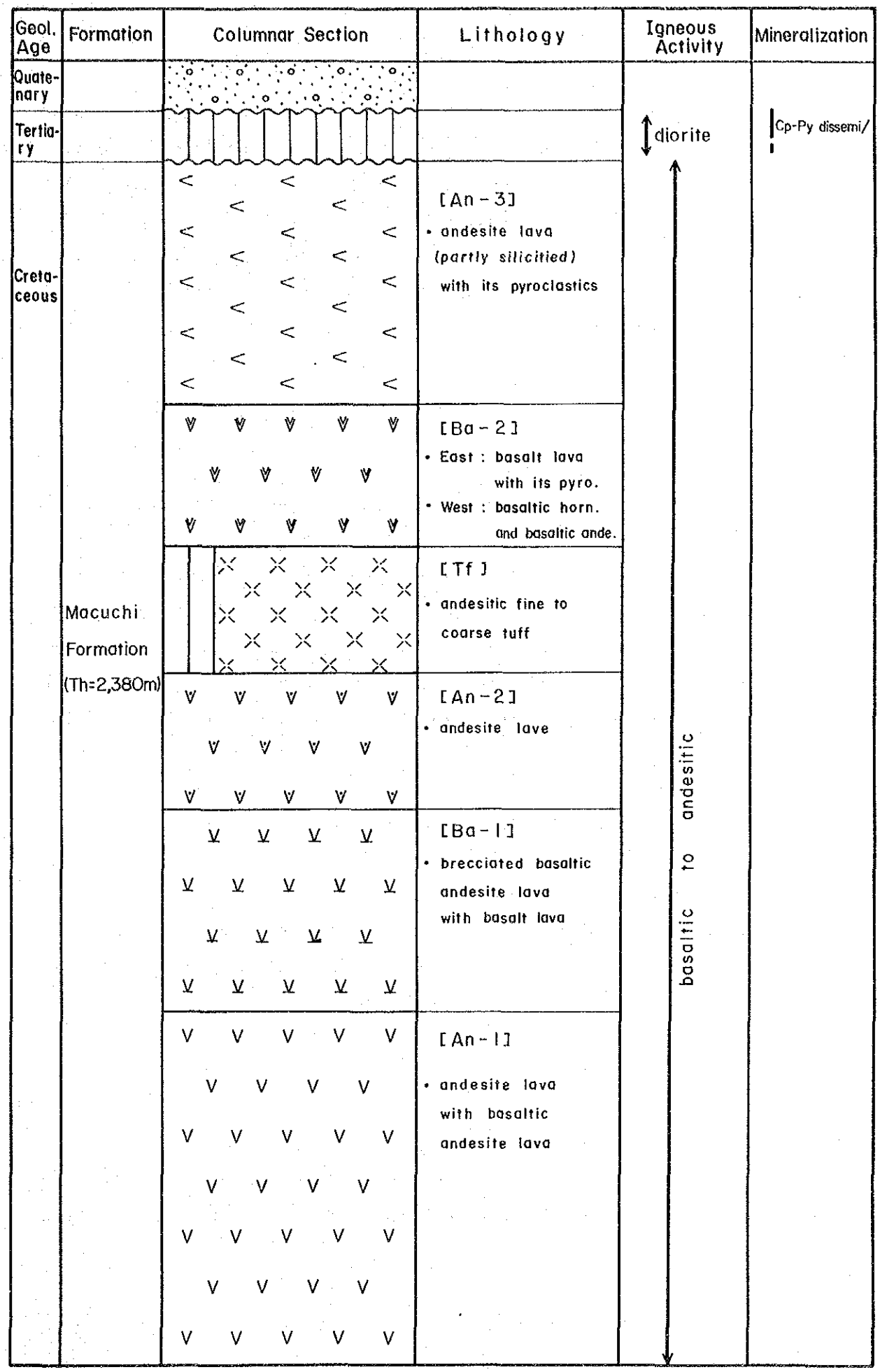


Fig. II－2－15 Generalized Stratigraphic Columnar Section in the Tablas Pamba Area

The area investigated is characterized by bimodal geological structures; fault and fold. Faults of three distinct sets, NNE-SSW system, WNW-ESE system and E-W system are developed in the central to eastern part in the area. The largest and latest of which is the NNE-SSW system that traverses at 1 km east of Tablas Pamba village with forming large-scale scarps. The western side of it is faulted down with dislocation of about 150 m. All of the members of the Macuchi Formation strike NW-SE direction and dip 20 ~ 30° W in the east, while they strike NE-SW and dip 30° E. From these evidence, it is inferred that the Macuchi Formation forms a broad syncline planging gently toward the south.

(3) **Mineralization**

Chalcopyrite-pyrite disseminated zones are located in the west, southwest, and southeast of the Tablas Pamba area. The west mineralized zone is situated about 500 m west-northwest of Tablas Pamba village, and occurs as a sparse dissemination of chalcopyrite and pyrite with an extent of 250 m N-S by 350 m E-W in andesite lava of the An-3 member. A typical sample showed the assay of 0.02 % Cu. The assemblage of alteration minerals is quartz-chlorite-amphibole. The southwest and southeast mineralized zones are extremely localized. In addition, an extensive silicified zone accompanied with sparse pyrite dissemination is observed in andesite lava of the An-3 member close to the north boundary of the investigated area, but in this zone no chalcopyrite is identified.

(4) **Results of Magnetic Susceptibility Measurement and Geochemical Survey**

The magnetic susceptibility values obtained is 13 ~ 63 x 10^{-3} SI units in lavas, less than 8 x 10^{-3} SI units in tuff unit, and less than 1 x 10^{-3} SI units in mineralized zones.

The geochemical survey was carried out on the west mineralized zone. As the result of the interpretation, high factor scores of Factor 1 (Co-Ni-Zn) are obtained. This appears to reflect the characteristic of the host rock rather than the mineralization.

2–1–11 Balaron Area

(1) **Location**

The Balaron area lies about 55 km south-southeast of Balzapamba and can be reached from Balzapamba through Babahoyo with 3 hours and a half traveling by car plus 3 hours by horse back.

(2) Geology and Mineralization

The area is underlain by volcanic rocks of the Macuchi and Alausi Formations (Plate II-2-10, Fig. II-2-16).

The Macuchi Formation occupies most part of the surveyed area and is composed of basalt lave (Ba), basaltic andesite lava (Ban) and andesite lava (An).

The porphyritic andesite lava (Po) of the Alausi Formation overlies unconformably on the andesite lava of the Macuchi Formation in the norther most of the area.

Mineralization in the area is represented by a quartz vein formed at 800 m west of Remigon village and a basalt float containing disseminated malachite obtained at the village which showed the analytical values of 7.3 g/t Ag and 1.47 % Cu. Quartz-chlorite is the common assemblage of alteration minerals.

The magnetic susceptibility values are generally $10 \sim 30 \times 10^{-3}$ SI units, but around the mineralized zone the values are not over 1×10^{-3} SI unit.

The geochemical survey was undertaken around the quartz vein, then detected moderate factor scores of Factor 1 (Co-Ni-Zn) which is interpreted to be caused from the geochemical characteristic of the host rock.

2–1–12 Chilcales Alto Area

(1) Location

The area is situated at the southern end of the project area, about 60 km south from Balzapamba. It is accessible from Balzapamba via Babahoyo with 2 hours and a half traveling by car.

(2) Geology and Mineralization

The area is completely underlain by volcanic rocks belonging to the Macuchi Formation, which are comprised mainly of brecciated andesite lava (An), intercaleted with andesitic tuff (Tf) at the strike of N60°E and dip of 15°E and basaltic andesite flows (Ban). In the northwest, black mudstone is locally exposed (Plate II-2-11, Fig. II-2-17). The entire thickness is estimated to be more than 1,500 m.

Within the area, dissemination and network of pyrite, and network of quartz veinlets are recognized in the south. The latter arrayed 0.01 % Cu.

The magnetic susceptibility measurement resulted in detecting the values of $14 \sim 50 \times 10^{-3}$ SI units in lavas less than 1×10^{-3} SI unit in the tuff, and 1×10^{-3} SI unit more or less aroud the mineralized zones.

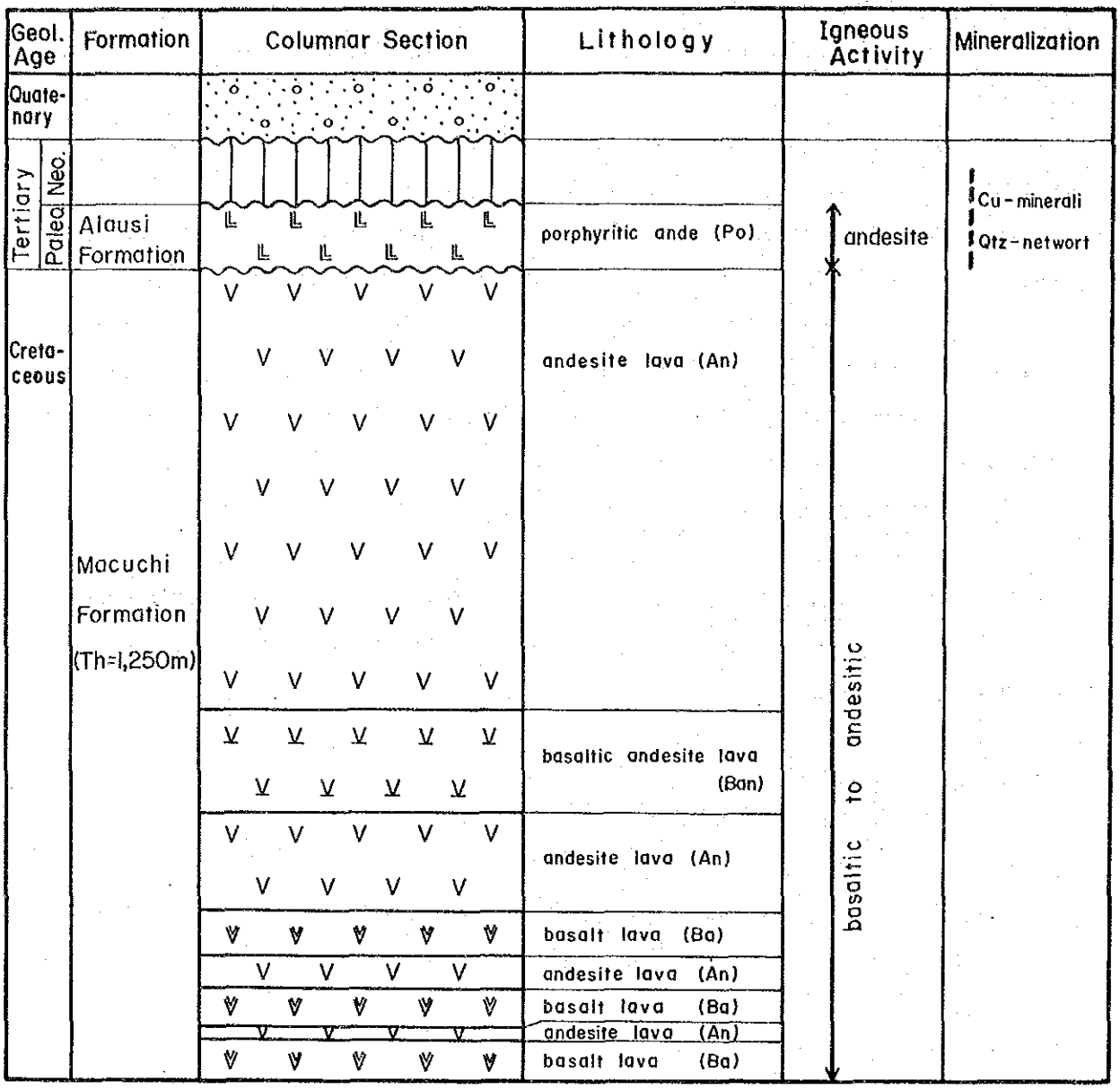


Fig. II－2－16 Generalized Stratigraphic Columnar Section in the Balaron Area

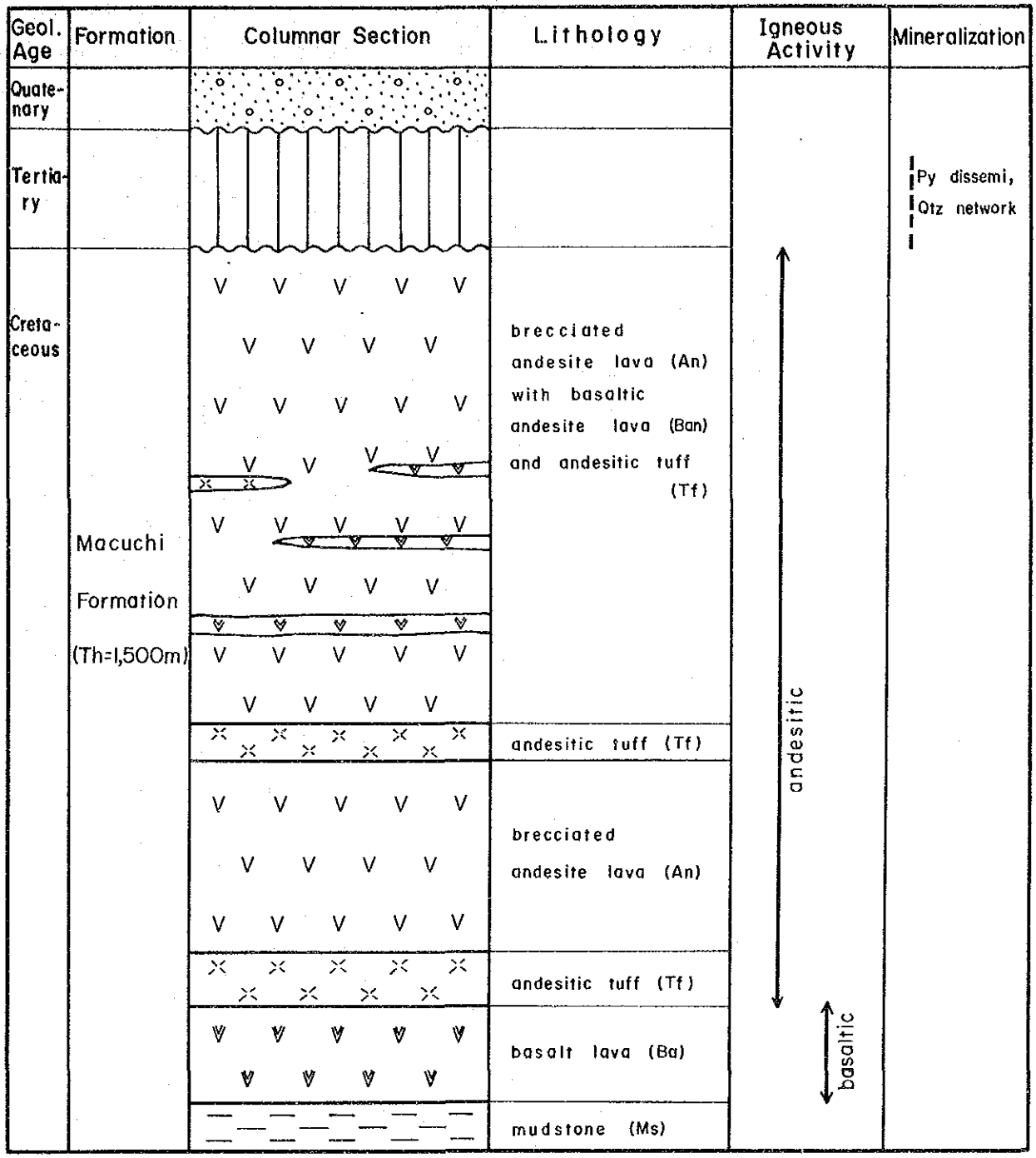


Fig. II－2－17 Generalized Stratigraphic Columnar Section in the Chilcales Alto Area

As the result of the geochemical survey, high factor scores of Factor 1 (Co-Ni-Zn) are obtained. These scores are interpreted to be caused from the characteristic of the host rock rather than of the mineralization.

PART Ⅲ CONCLUSIONS AND RECOMMENDATIONS

Chapter 1 Conclusions

1–1 Balzapamba Area

The geology of this area consists of the Macuchi Formation of Late Cretaceous and granitic rocks of Oligecene to Miocene that intrude into this Formation.

Mineralization in this area can broadly be divided into the three types of porphyry copper type that occur in granitic rocks and adjacent Macuchi Formation, vein type and hot spring type, the latter two found in the Macuchi Formation. The El Torneado, Osohuayco and Las Juntas mineralized zones belong to porphyry copper type. The El Cristal mineralized zone is vein type, and the Las Palmas and Cochapamba alteration zones are hot spring type. In the El Torneado mineralized zone of porphyry copper type, five NNE-SSW trending major zones (A ~ E), 20 to 70m in width are formed within a range of 400m x 400m as bymodal occurrences of dissemination and network of sulfide minerals or quartz veins. For ore minerals, pyrite, chalcopyrite, molybdenite, magnetite, scheelite and pyrrhotite are observed. The results of drilling revealed that the mineralized zone A continues toward downward with dipping 60° SE and swells in the depth, and also that a concealed underlying networked mineralized zone exists below the mineralized zone A. The assay of ore samples from the mineralized zone A and the underlying mineralized zone are 0.09% to 0.66% Cu and 0.01 ~ 0.36% Cu, respectively.

Magnetic susceptibility measurements detected low magnetic susceptibility anomalous zones related to demagnetization caused by mineralization over each mineralized zones. Of these anomalous zones, those discovered in the El Torneado and Osohuayco mineralized zones are wide in scale.

Factor analysis of geochemical data identified the factors indicating Cu and Mo mineralizations in the El Torneado, Osohuayco and Las Juntas mineralized zones.

As a result of the geophysical survey, low resistivity zones were obtained over mineralized zone and alteration zone. Particularly, interesting low resistivity zones were found at the lower parts of the El Torneado and Osohuayco mineralized zones.

1–2 Other Areas

The geology of other 11 areas consists of the Macuchi Formation of Late Cretaceous, with intrusion of granitic rocks in Oligocene to Miocene.

Macroscopically, mineralization in these areas can be classified into the three types of porphyry copper, vein and hot spring. Porphyry copper type mineralized zones occur mainly in peripheral zone of granitic rocks and enclosing Macuchi Formation. Vein type occurs in the Lourdes Volcanic Rocks and hot spring type is observed in granitic rocks and the Lourdes Volcanic Rocks.

Mineralization of porphyry copper type is observed in the Chaso Juan, Telimbela and Las Guardias areas, vein type in the San Miguel area, and hot spring type in the La Industria-Yatubi and San Miguel areas.

In the Chaso Juan area, mineral showings of 20 to 200m in width are located at 10 places and form the north, the east and the south mineralized zones. Grades of ores show 1.2 to 1.8g/t Ag and 0.24 to 0.44% Cu with maximum contents of 1.5g/t Au, 160.9g/t Ag and 9.03% Cu. In the Telimbera area, mineralized zones are confirmed at four places, 500m x 350m to 400m x 200m in scale, and 150m wide. Grades of ores gave maximum content of 1.60% Cu. In the Las Guardias area, mineralized zones are located at three places, 400m x 100m to 350m x 500m in scale, and 150m in width. Maximum contents of ores are 0.6g/t Ag, 0.09% Cu and 0.01% W.

The mineralized zones in the Chaso Juan, Telimbela and Las Guardias areas are relatively large in scale. The mineralized zones in the Chaso Juan area are high in chalcopyrite/pyrite ratio and the occurrence of scheelite was reported. General trends of mineralized zones are N-S direction in the Chaso Juan area, NE-SW in the Telimbela area, NW-SE in the Las Guardias area, and NNW-SSE in the San Miguel area.

Measurements of magnetic susceptibility showed anomalous zones of low magnetic susceptibility related to demagnetization caused by mineralization. The anomalous zones of 1km x 1km in scale in the Chaso Juan area and 2km x 750m of NE-SW system in the Telimbela area, were detected, respectively. The anomalous zones were also clarified in the La Industria-Yatubi and San Miguel area where hot spring type mineralizations are observed. The scale of the former is 500m x 200m and the later 2.5km x 500m of NNW-SSE system.

As a result of geochemical survey, zones with high to moderate factor scores characterizing Cu and Mo mineralizations were obtained in the Chaso Juan, Telimbela and Las Guardias areas. In the La Industria-Yatubi and San Miguel areas, factors indicating hot spring type mineralization in another stage were also detected.

Chapter 2 Recommendations for Phase II Survey

2–1 Balzapamba Area (Fig. III-2-1)

(1) Borehole geophysical survey (IP) and drilling to clarify the detailed occurrence of the El Torneado mineralized zone

(2) Geophysical survey (IP or SIP) to clarify bonanza of mineralized zone related to low resistivity zones at the lower part of Osohuayco mineralized zone

2–2 Other Areas (Fig. III-2-2)

(1) Detailed geological survey and geophysical survey (IP or SIP) to define the detailed occurrence of mineralized zone in the Chaso Juan, Telimbela and Las Guardias areas where porphyry copper type deposits can be expected

(2) Soil geochemical survey in the southwestern part of the La Industria-Yatubi area where the occurrence of hot spring type gold deposits may be expected

(3) Geophysical survey (SIP) in the San Miguel area to clarify the detailed occurence of mineralized zone of copper vein type and detailed geological survey in the San Miguel area to follow up the mineralized which may be expected hot spring type gold deposit.

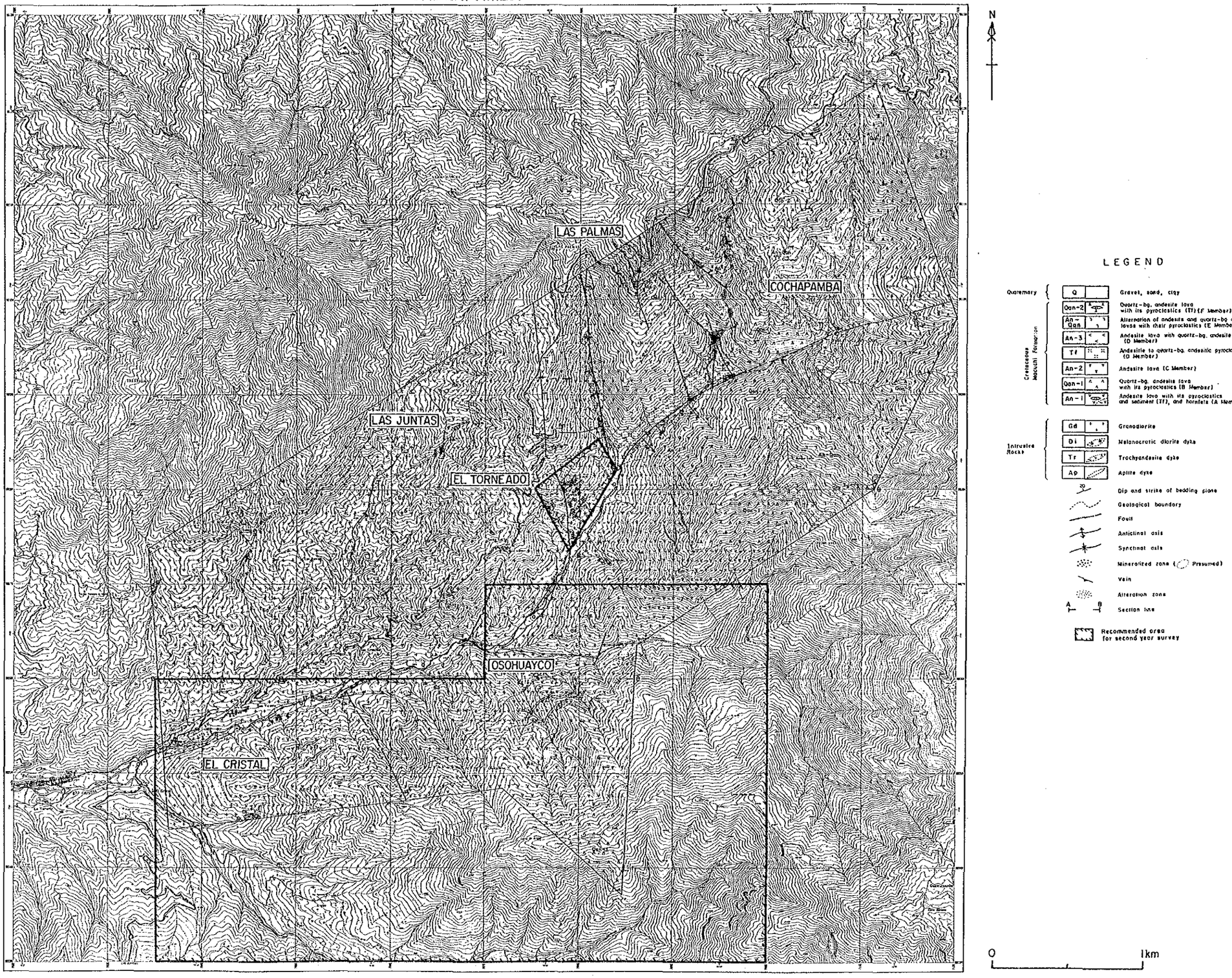


Fig. III－2－1　Recommended Area for Second Year Survey of the Balzapamba Area

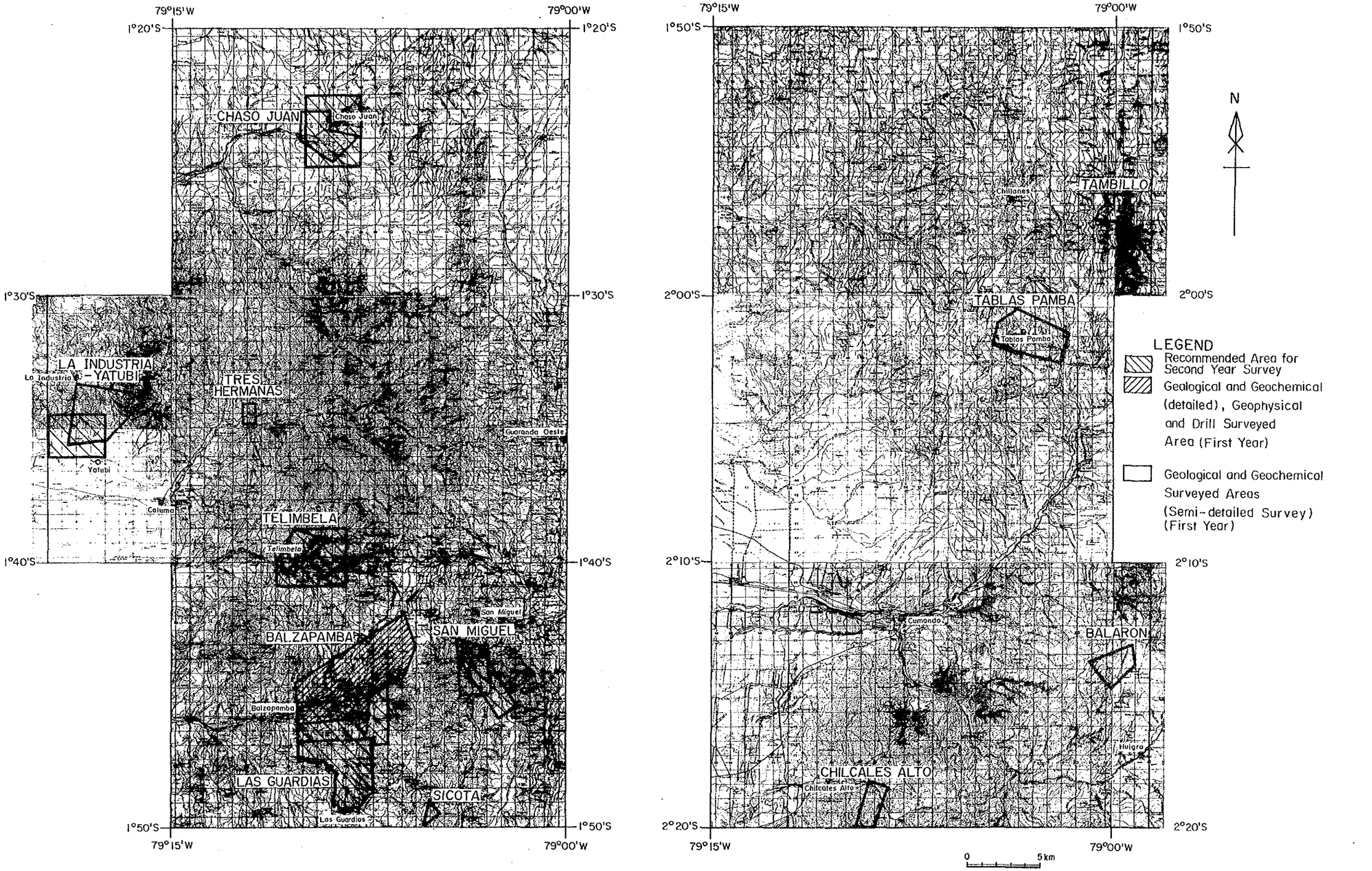


Fig. III－2－2　Recommended Area for Second Year Survey of the other Areas

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Plate II－1－16 Analyzed Resistivity Plan Map(500m depth) (1 : 25,000)

Plate II－1－17 Analyzed Resistivity Plan Map(1,000m depth) (1 : 25,000)

Plate II－1－18 ρa-f Spectra

Plate II－1－19 Drilling Log MJE-1 (1 : 200)(1)~(2)

Plate II－1－20 Drilling Log MJE-2 (1 : 200)(1)~(2)

Plate II－1－21 Drilling Log MJE-3 (1 : 200)(1)~(2)

Plate II－1－22 Geological Section of Drill Holes (1 : 1,000)(1)~(2)

Plate II－2－1 Geological Map and Geological Profile of the Chaso Juan Area (1 : 10,000)

Plate II－2－2 Geological Map and Geological Profile of the La Industria-Yatubi Area (1 : 10,000)

Plate II－2－3 Geological Map and Geological Profile of the Tres Hermanas Area (1 : 10,000)

Plate II－2－4 Geological Map and Geological Profile of the Telimbela Area (1 : 10,000)

Plate II－2－5 Geological Map and Geological Profile of the San Miguel Area (1 : 10,000)

Plate II－2－6 Geological Map and Geological Profile of the Las Guardias Area (1 : 10,000)

Plate II－2－7 Geological Map and Geological Profile of the Sicota Area (1 : 10,000)

Plate II－2－8 Geological Map and Geological Profile of the Tambillo Area (1 : 10,000)

Plate II－2－9 Geological Map and Geological Profile of the Tablas Pamba Area (1 : 10,000)

Plate II－2－10 Geological Map and Geological Profile of the Balaron Area (1 : 10,000)

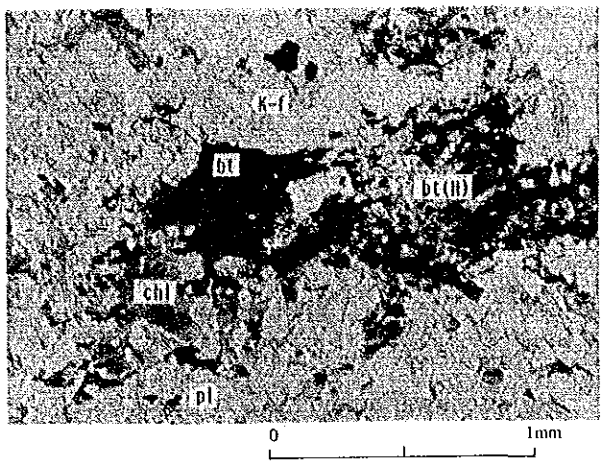
Plate II－2－11 Geological Map and Geological Profile of the Chilcales Alto Area (1 : 10,000)

APPENDIXES

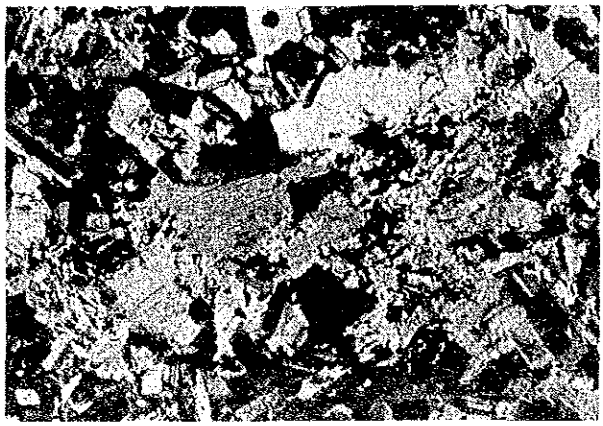
Photo A－1 Microphotograph of Thin Section (1)~(4)

Abbreviations

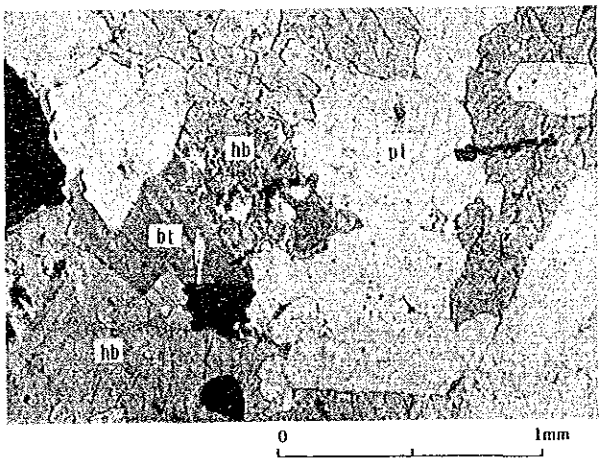
q	:	quartz
pl	:	plagioclase
K–f	:	potash felspar
bt	:	biotite
bt (H)	:	secondary biotite
hb	:	hornblende
chl	:	chlorite
epi	:	epidote



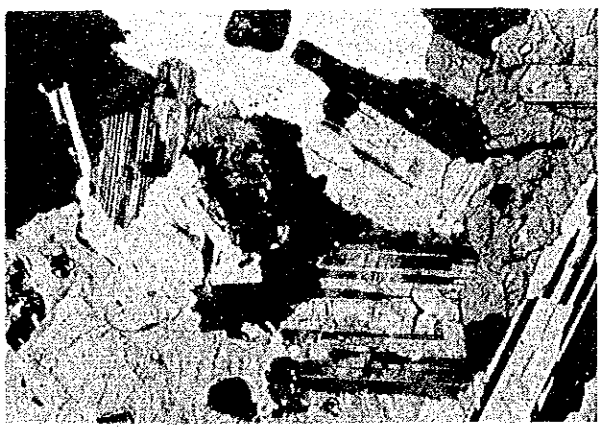
Sample No. : A1011
Rock name : bt quartz diorite
Location : Balzapamba
Texture : holocrystalline, granular
(only lower polar)



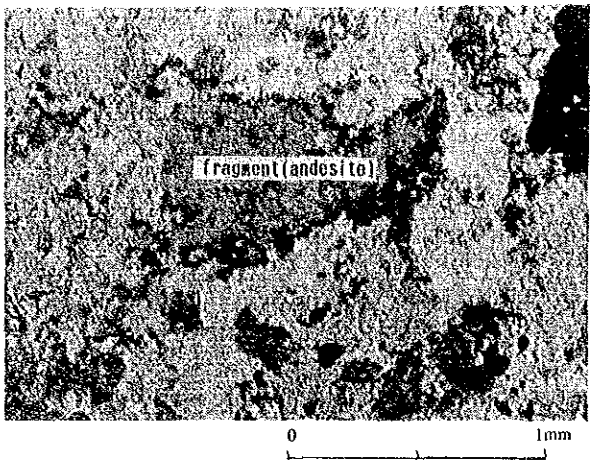
(crossed polars)



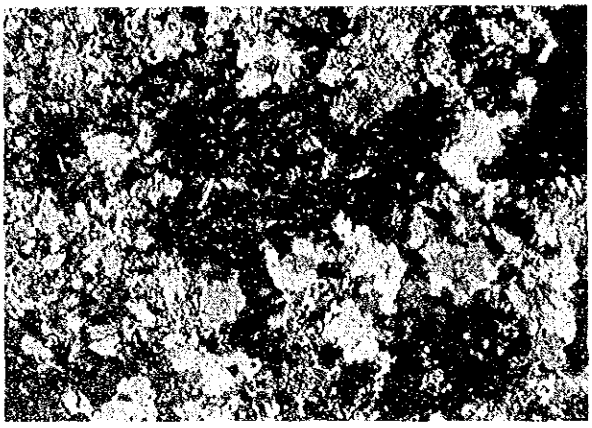
Sample No, : A1131
Rock name : bt-hb quartz dio
Location : Balzapamba
Texture : holocrystalline, granular
(only lower polar)



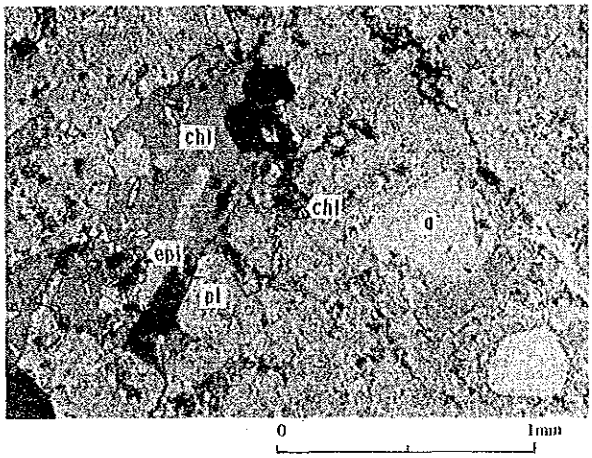
(crossed polars)



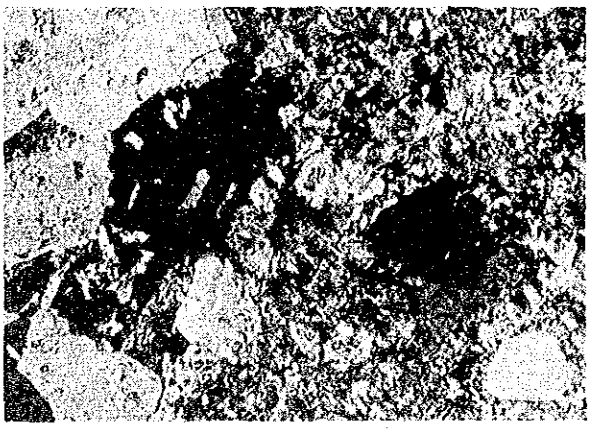
Sample No. : C1016
Rock name : quartz-bg. andesitic lapilli tuff
Location : Balzapamba
Texture : clastic
(only lower polar)



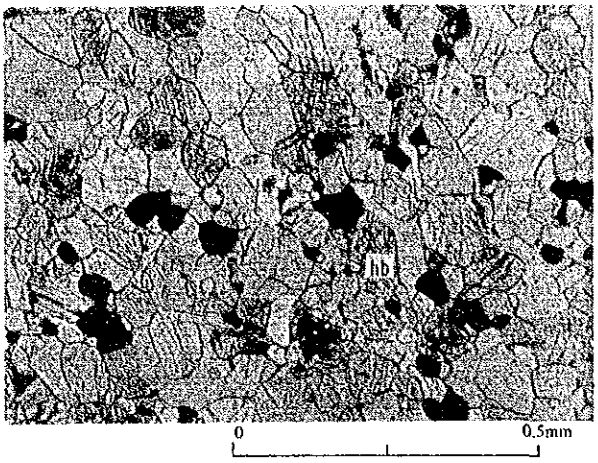
(crossed polars)



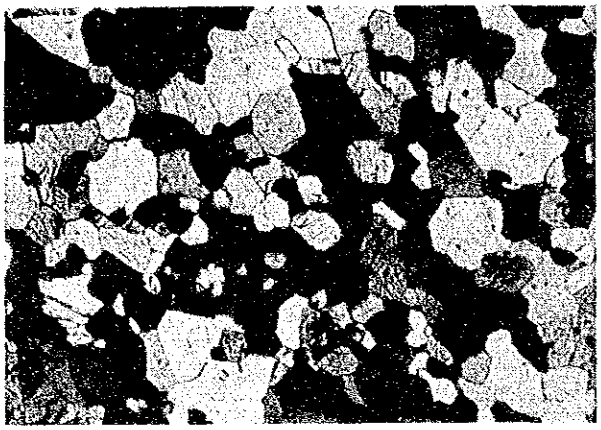
Sample No. : C1031
Rock name : quartz-bg. andesite
Location : Balzapamba
Texture : porphyritic
(only lower polar)



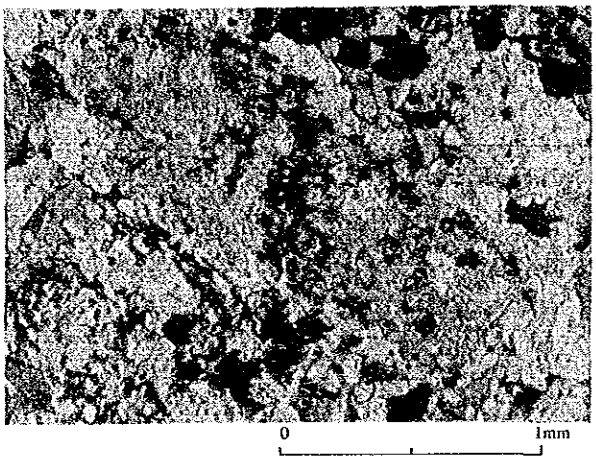
(crossed polars)



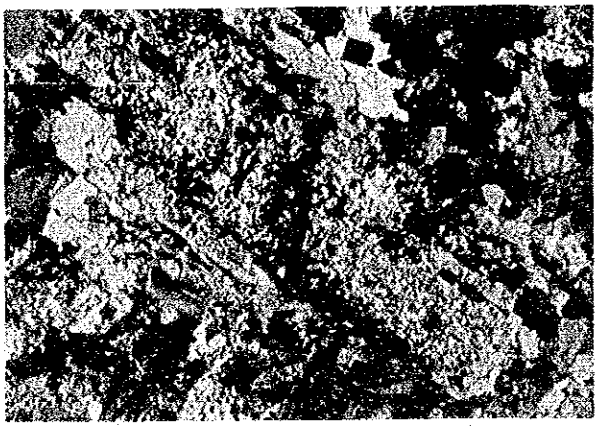
Sample No. : E1003
Rock name : andesitic hornfels
Location : Balzapamba
Texture : granoblastic
(only lower polar)



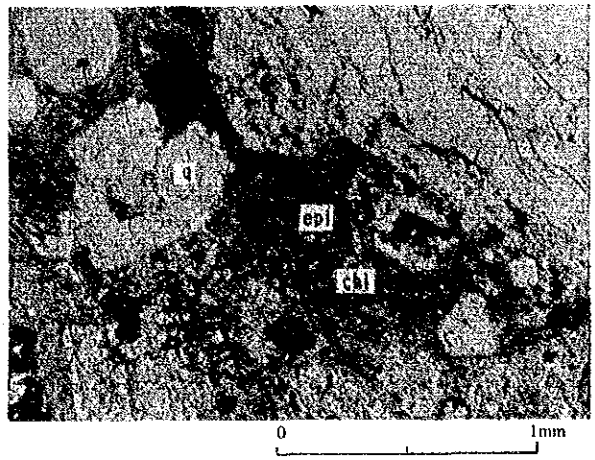
(crossed polars)



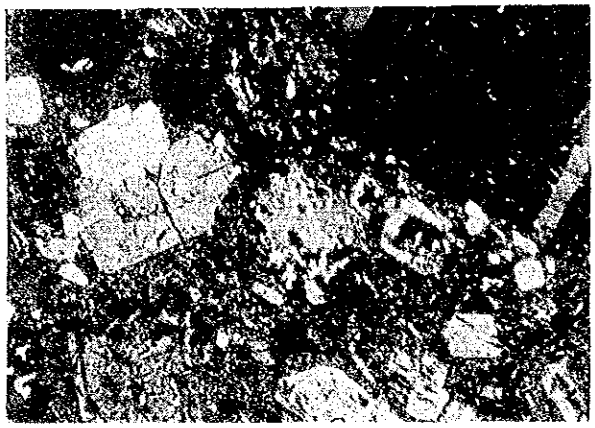
Sample No. : C1079
Rock name : bt-hb quartz diorite
Location : *La Industria– Yatubi*
Texture : holocrystalline, granular
(only lower polar)



(crossed polars)

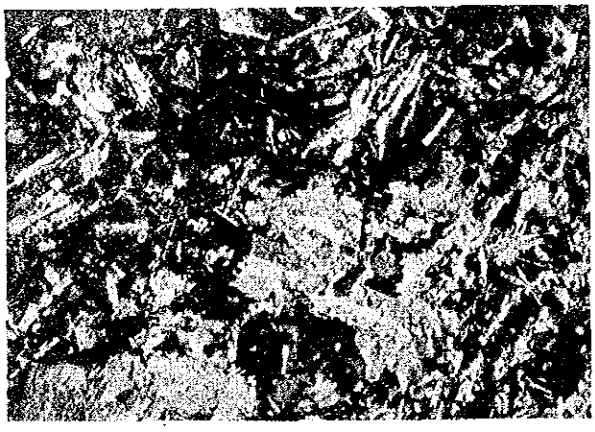


Sample No. : B1154
Rock name : quartz porphyry
Location : Telimbela
Texture : porphyritic
(only lower polar)



(crossed polars)

Sample No. : B1086
Rock name : altered basaltic andesite
Location : Tablas Pamba
Texture : porphyritic
(only lower polar)

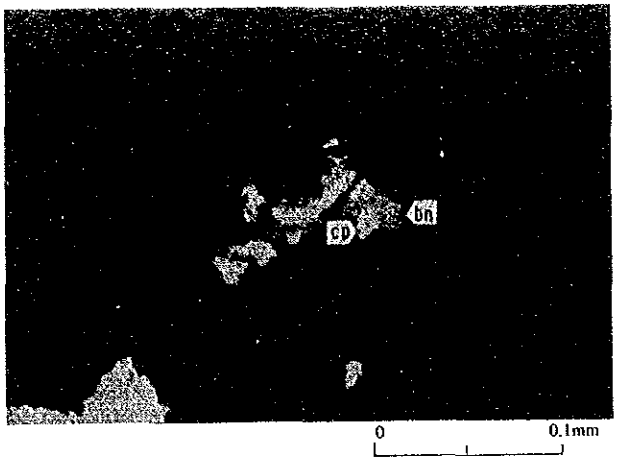


(crossed polars)

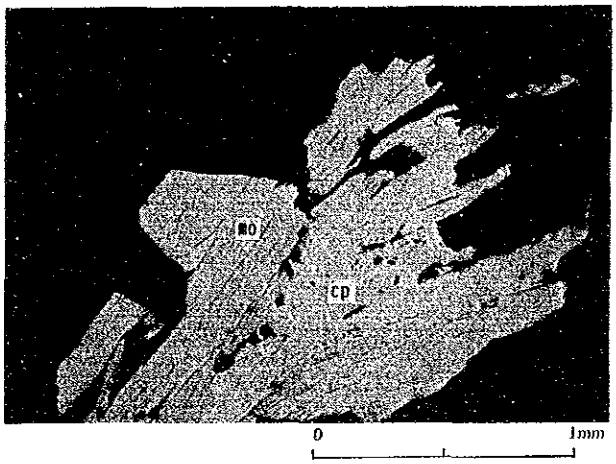
Photo A－2 Microphotograph of Polished Section (1)~(2)

Abbreviation

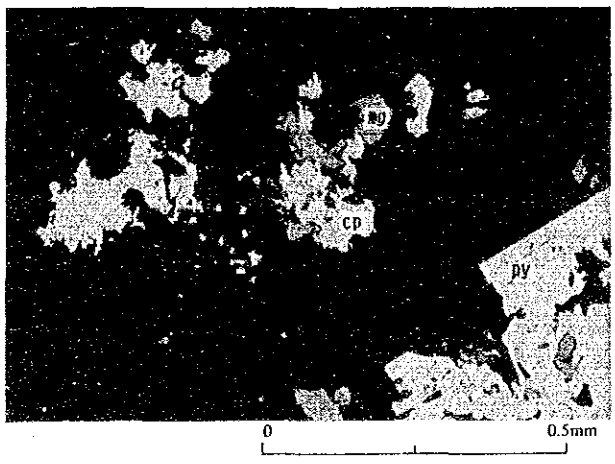
cp	:	chalcopyrite
bn	:	bornite
mo	:	molybdenite
py	:	pyrite
mg	:	magnetite
hm	:	hematite
po	:	pyrryhotite
py (H)	:	secondary pyrite



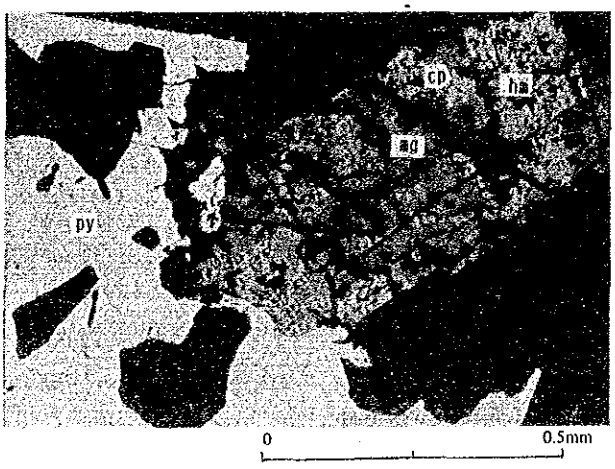
Sample No. : E1002
Ore name : cp-bn
quartz-grandite vein
Location : Balzapamba
(only lower polar)



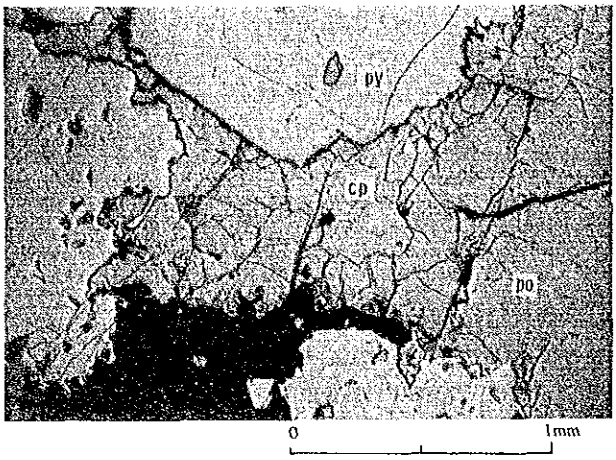
Sample No. : B1108
Ore name : mo > cp
quartz vein
Location : Chaso Juan
(only lower polar)



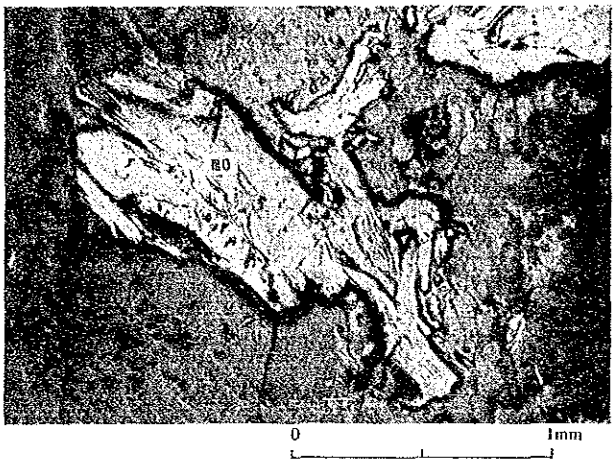
Sample No. : B1142
Ore name : py-mg > cp
vein and dissemi.
Location : Telimbela
(only lower polar)



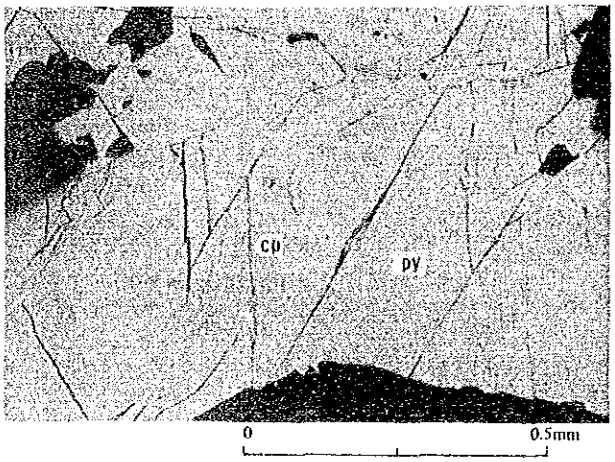
Sample No. : A1077
Ore name : cp-py > mg-hm
dissemi
Location : Las Guardias
(only lower polar)



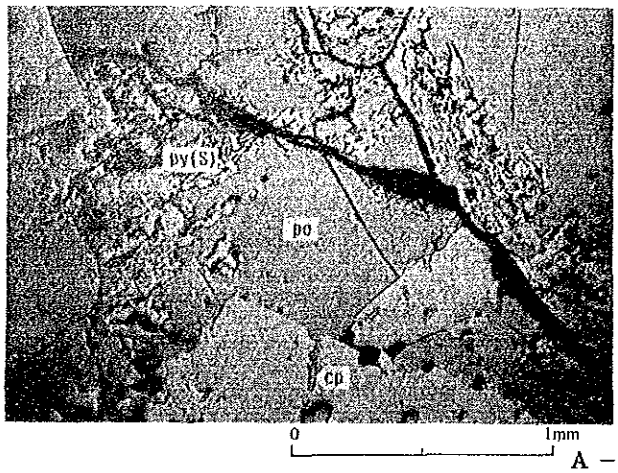
Ore name : py 〉 po 〉 cp 〉 mo-sp-mg
vein and dissemi
Location : D/D MJE–1; 92.60m
(only lower polar)



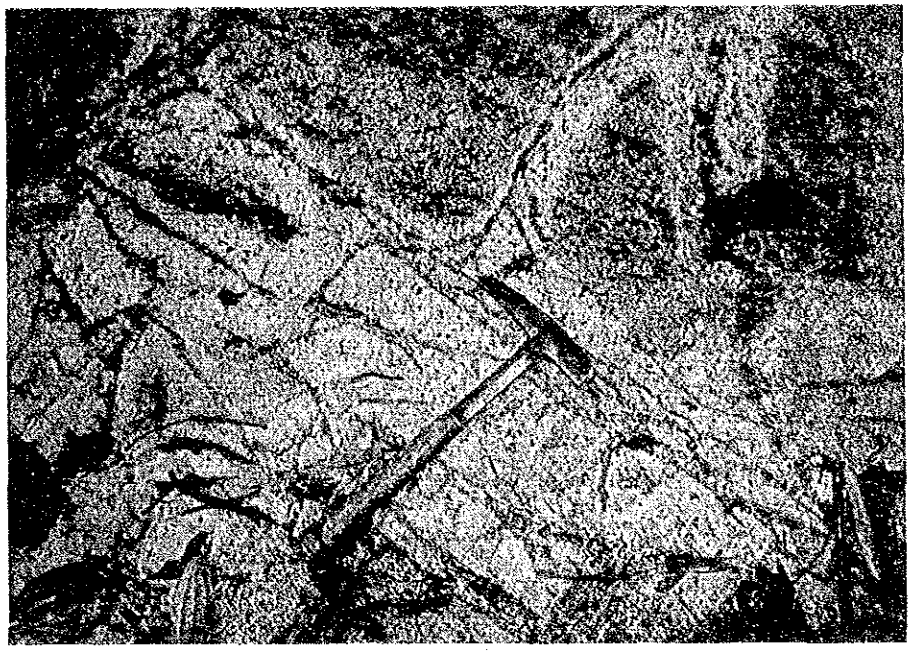
Ore name : py 〉 mo-mg 〉 cp-hm
vein and dissemi
Location : D/D MJE–2; 91.60m
(only lower polar)



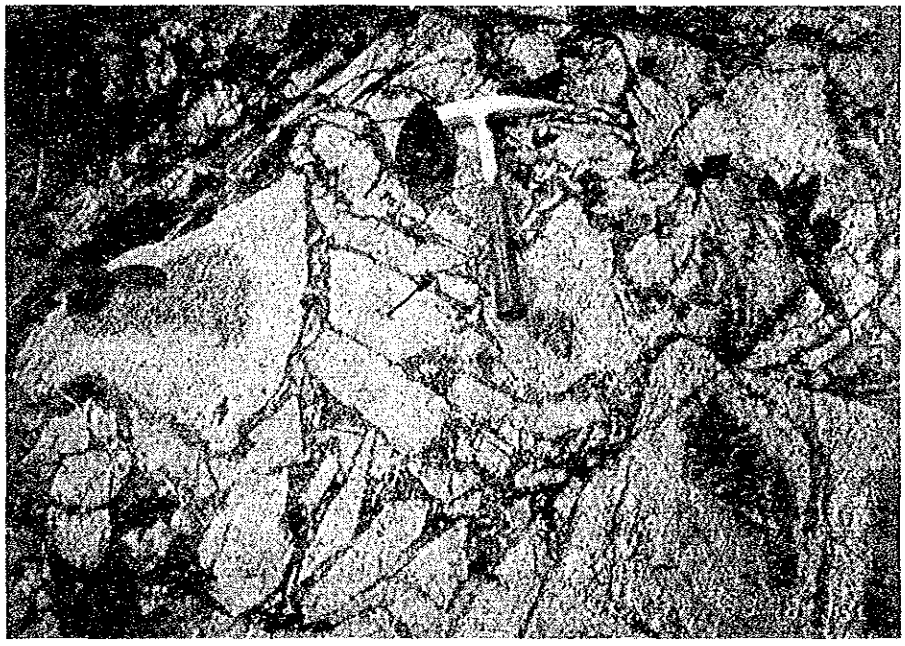
Ore name : py 〉 cp 〉 sp-mg
vein and dissemi
Location : D/D MJE–2; 177.55m
(only lower polar)



Ore name : po 〉 cp-py 〉 mg-hm
vein and dissemi
Location : D/D MJE–3; 235.50m
(only lower polar)



1. Early stage of the forming of network-vein :
   Sulphide minerals-chlorite-secondary biotite-quartz veins cut the country rock like a form of twig. The surroundings of the veins are altered by the white-argillization.



2. Brecciated stage by the forming of network-vein :
   The shape of each breccia shows the form restored it to its original state. Unaltered granodiorite remains in the central part of breccias.

Photo A－3 Development Process of Networked vein in the El Torneado Mineralized Zone

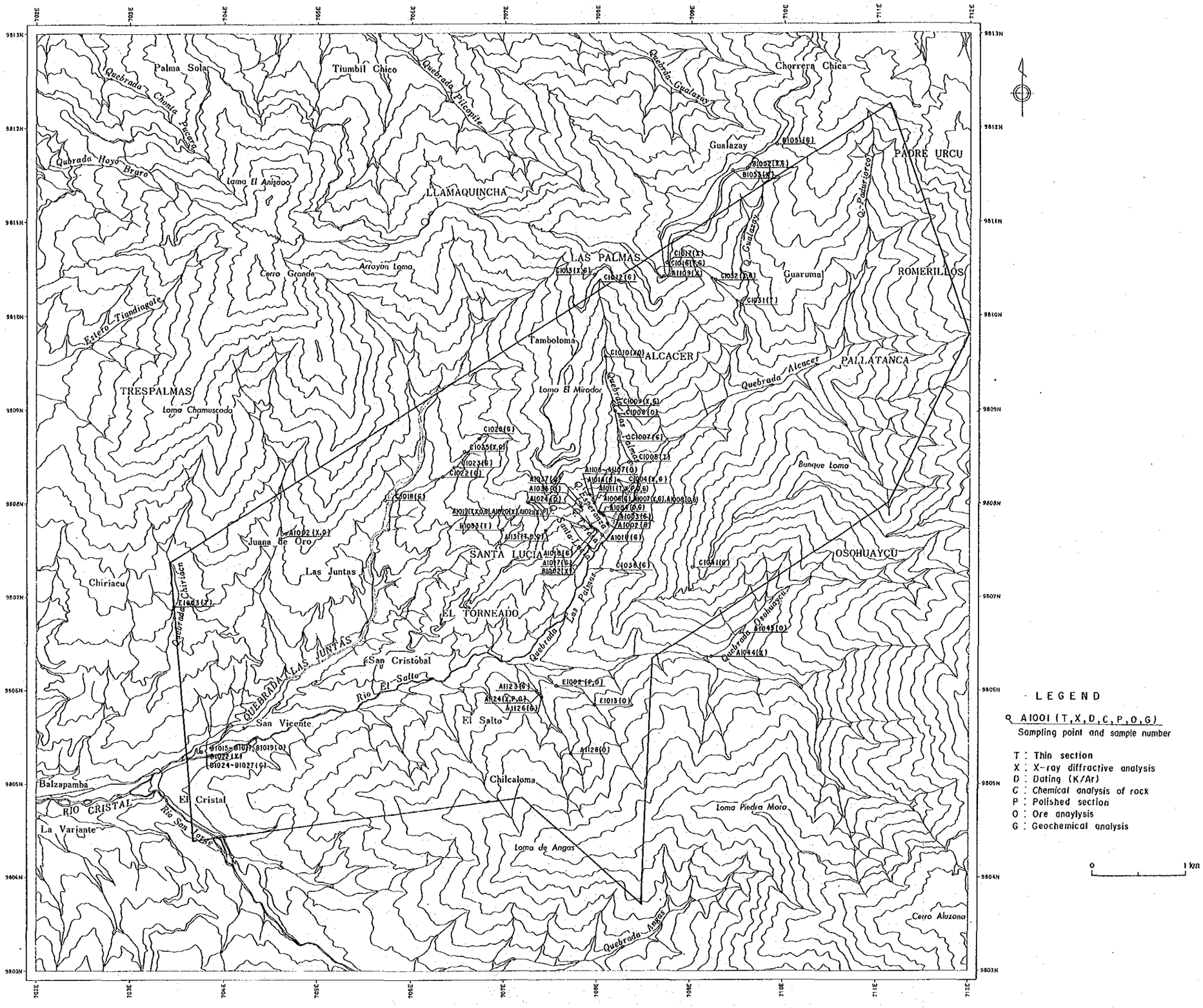
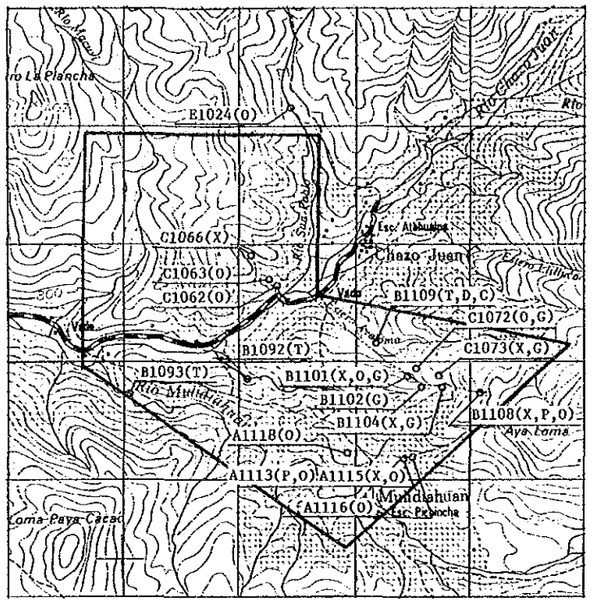
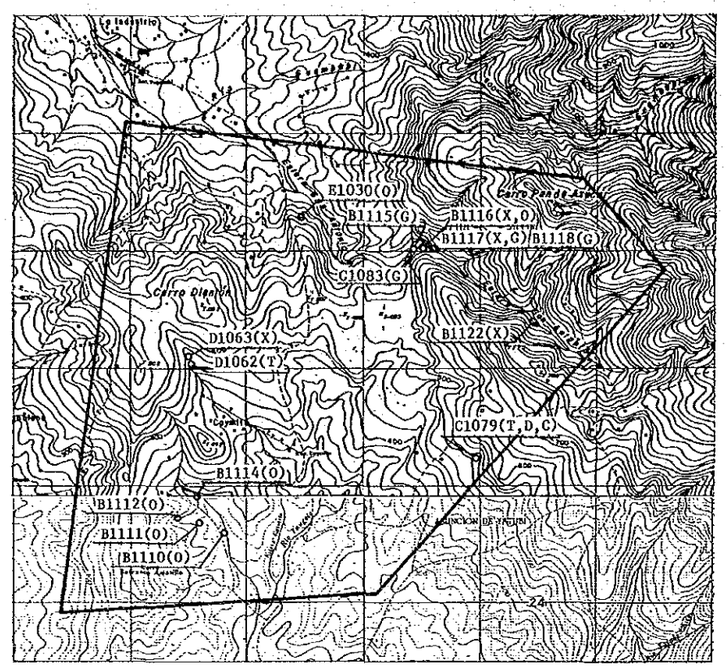


Fig. A－1 Location Map of the Samples Tested

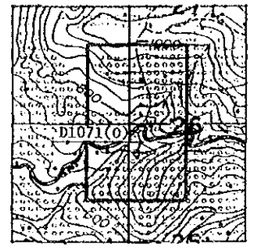
Chaso Juan



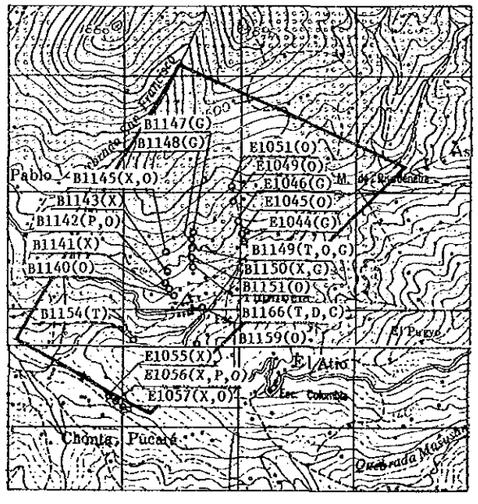
La Industria - Yatubi



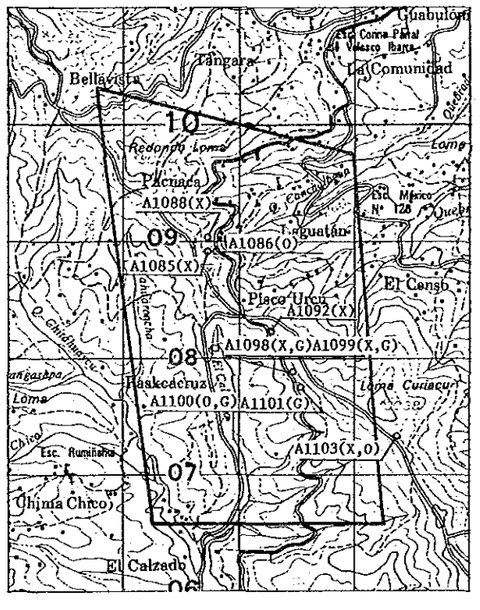
Tres Hermanas



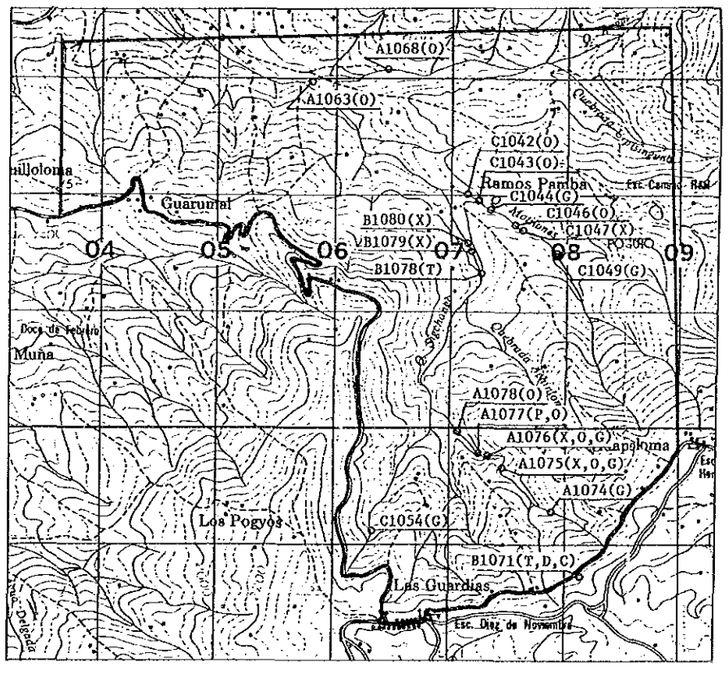
Telimbela



San Miguel



Las Guardias



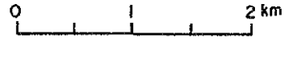
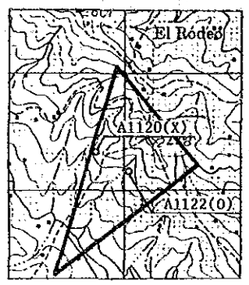
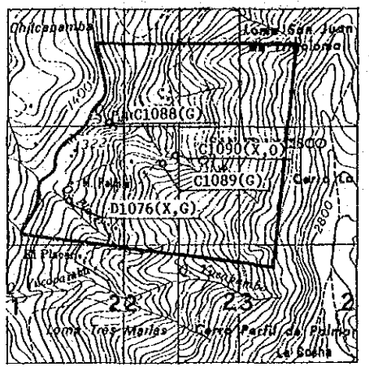


Fig. A－1 Location Map of the Samples Tested

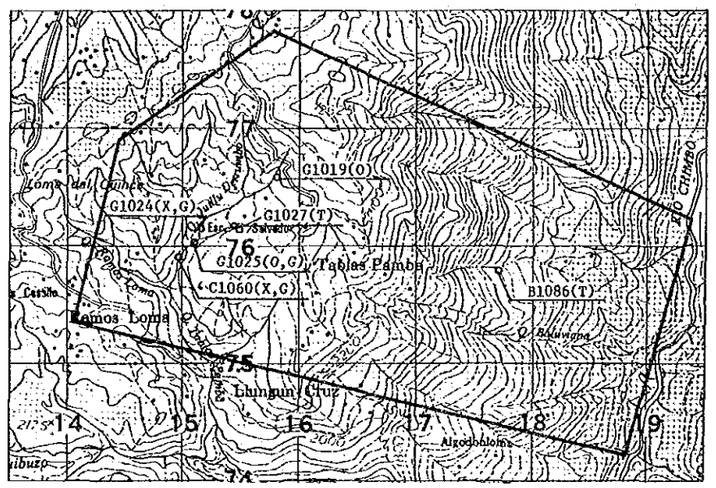
Sicota



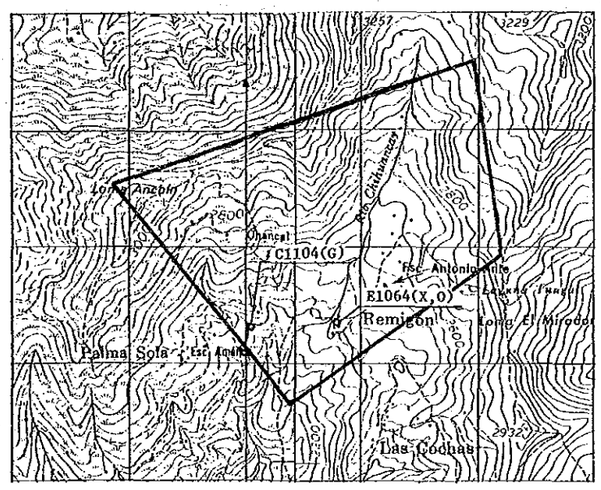
Tambillo



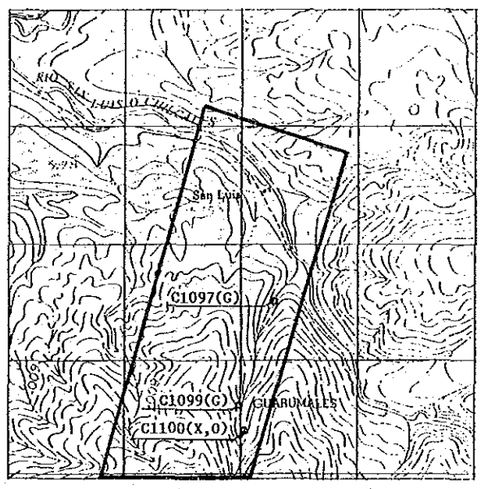
Tablas Pamba



Balaron



Chilcales Alto



LEGEND

A1001 (T,X,D,P,O,G)

Sampling point and sample number

T : Thin section
X : X-ray diffractive analysis
D : Dating (K/Ar)
C : Chemical analysis of rock
P : Polished section
O : Ore dnaylysis
G : Geochemical analysis

N

Fig. A－1 Location Map of the Samples Tested

0 1 2 km