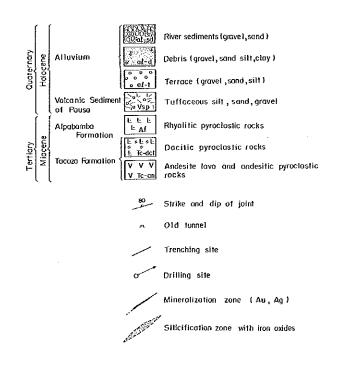
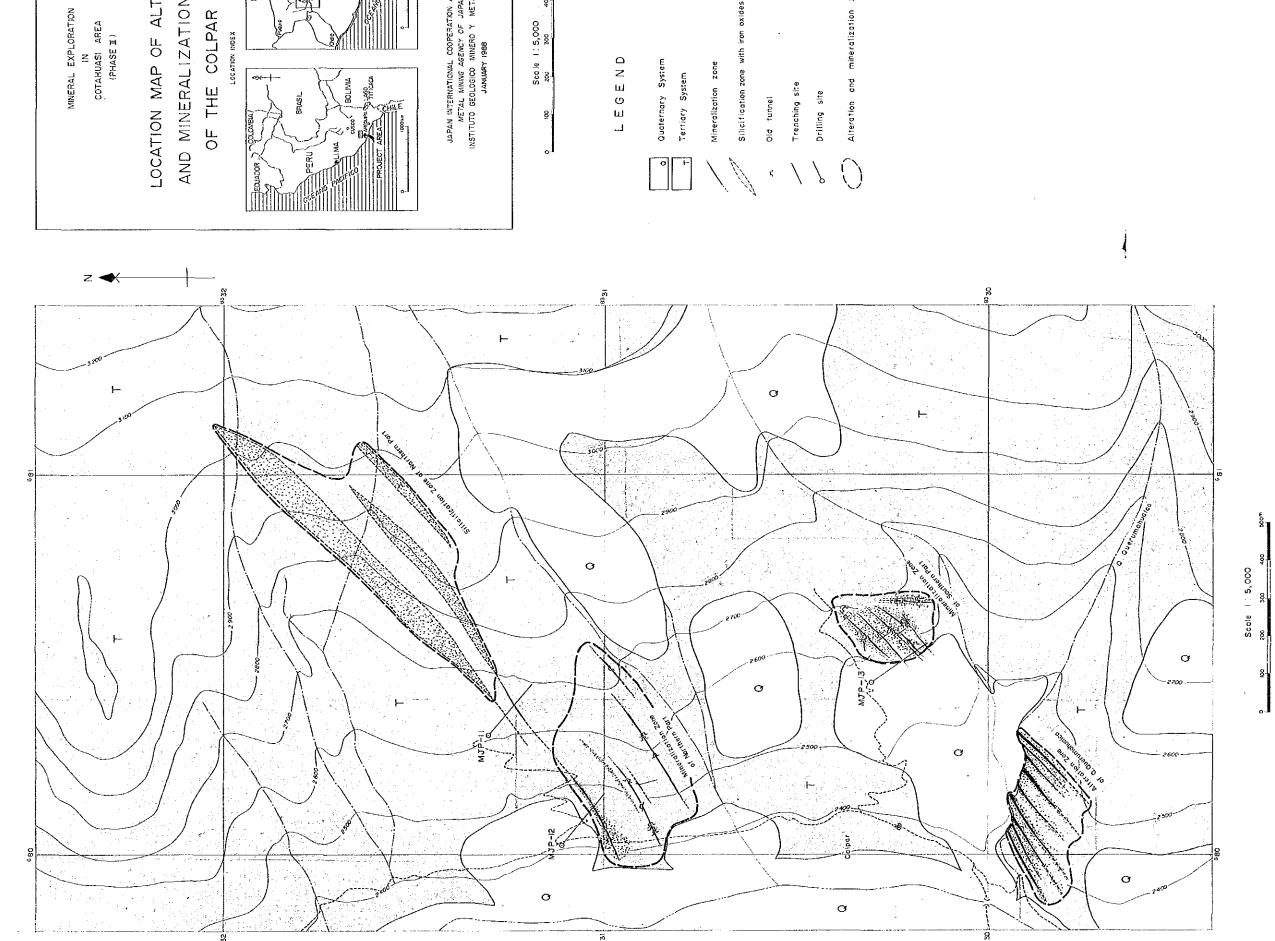


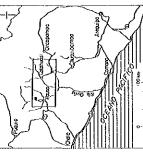
Scale I 5,000 100 200 300 400 500m

#### LEGEND

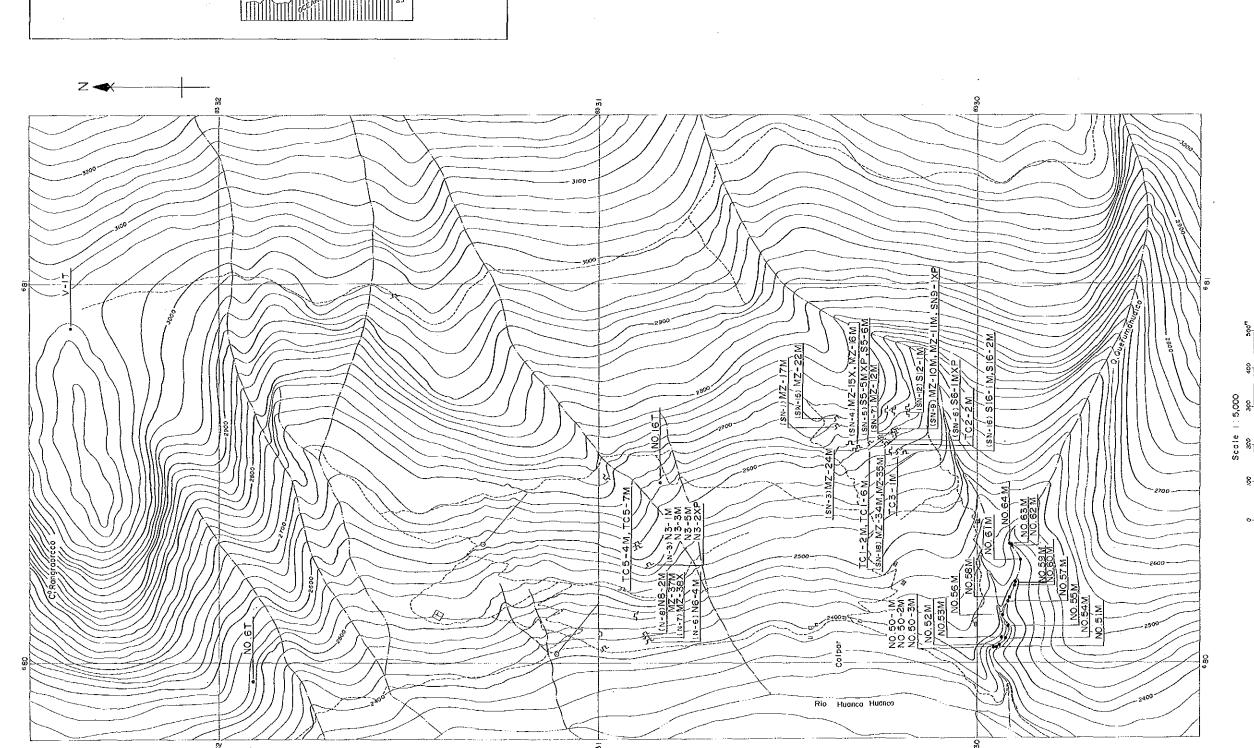




LOCATION MAP OF ALTERATION AND MINERALIZATION ZONES OF THE COLPAR AREA



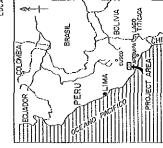
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINIERO Y METALURGICO
JAMNARY 1988



MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE II)

LOCATION MAP OF ROCK AND ORE SAMPLES OF

THE COLPAR AREA



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINNS AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINNERO Y METALURGICO
JANUARY 1988

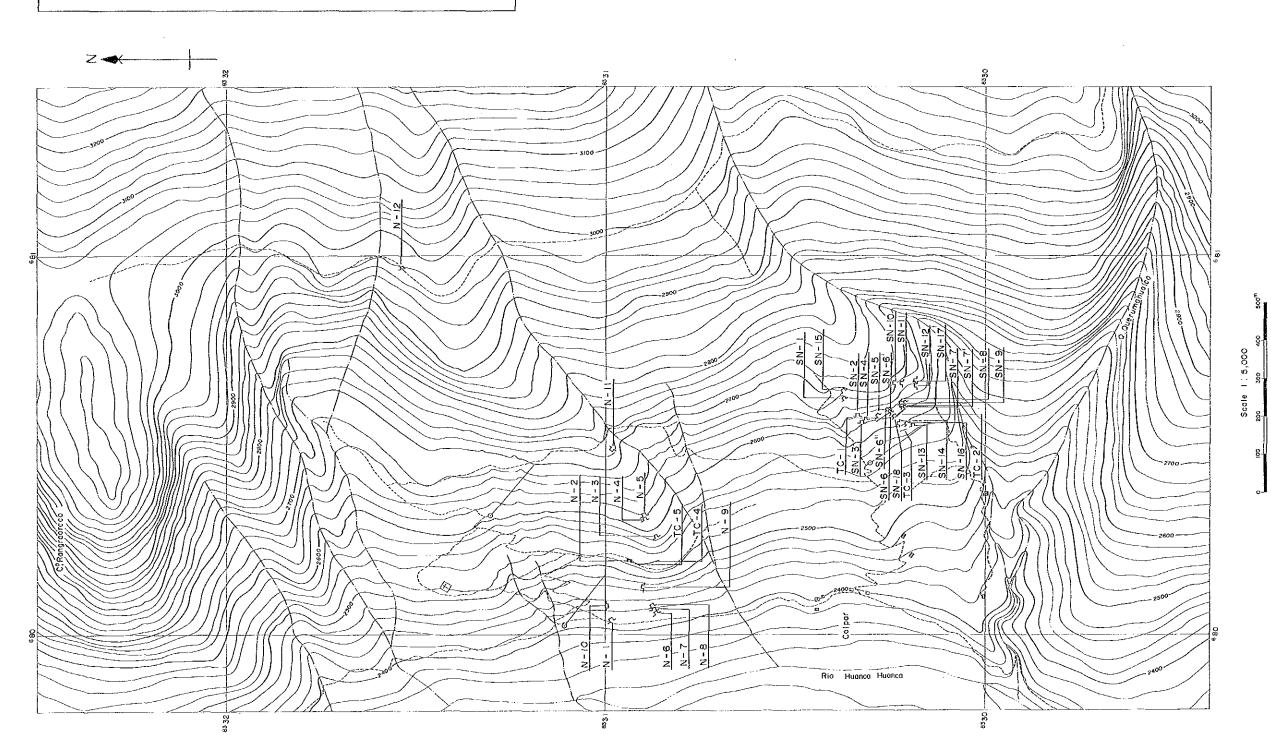
Scale 1,5,000 200 300

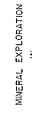
LEGEND

Polished Section

Thin Section X - Ray Powder diffraction

<u>a</u> E S <u>s</u>

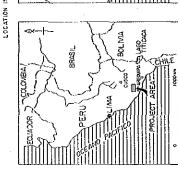


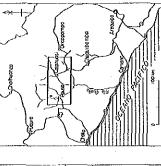


MINERAL EXPLORATION IN COTAHUAS: AREA (PHASEII)

# LOCATION MAP OF OLD TUNNELS AND TRENCHES

IN THE COLPAR AREA



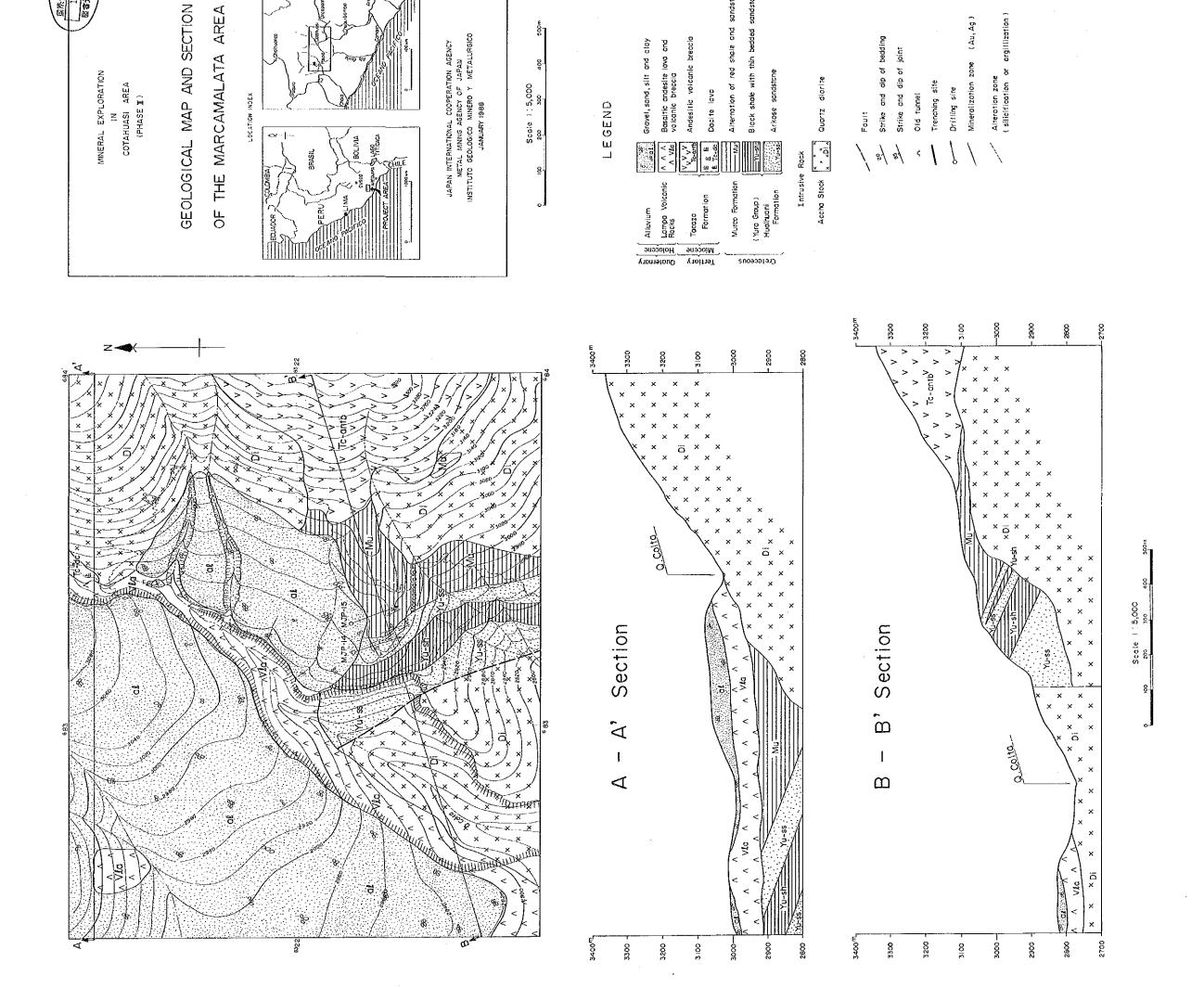


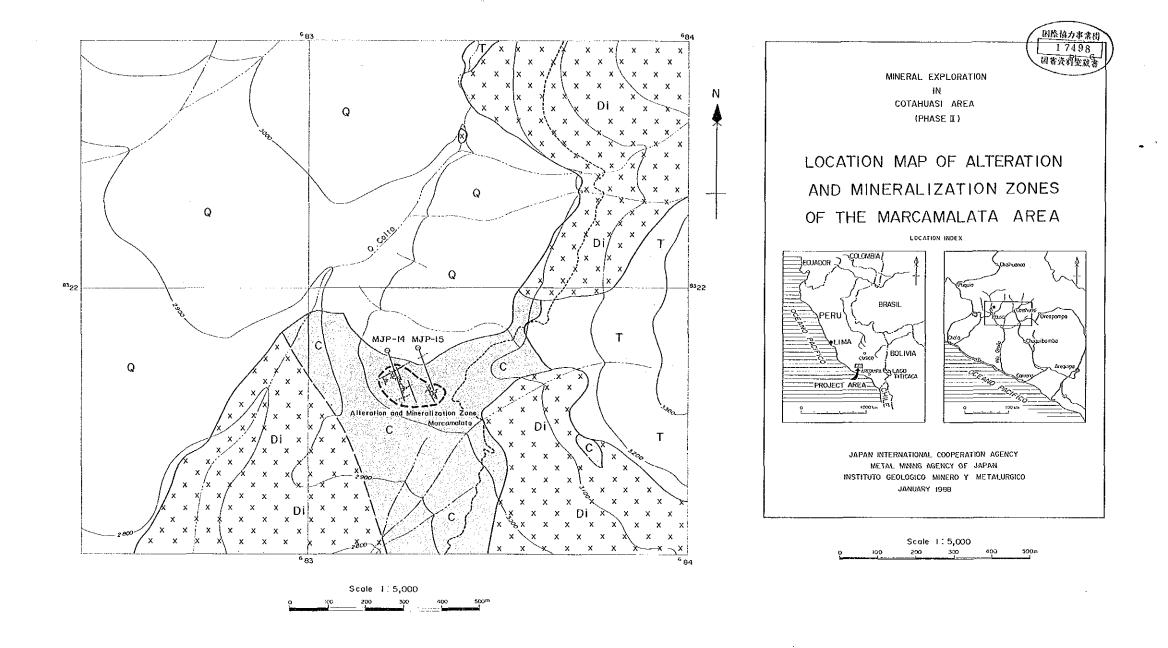
# Scale 1∶5,000 20 30

LEGEND

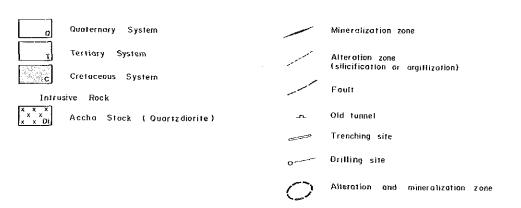
N-3 --- Number of T

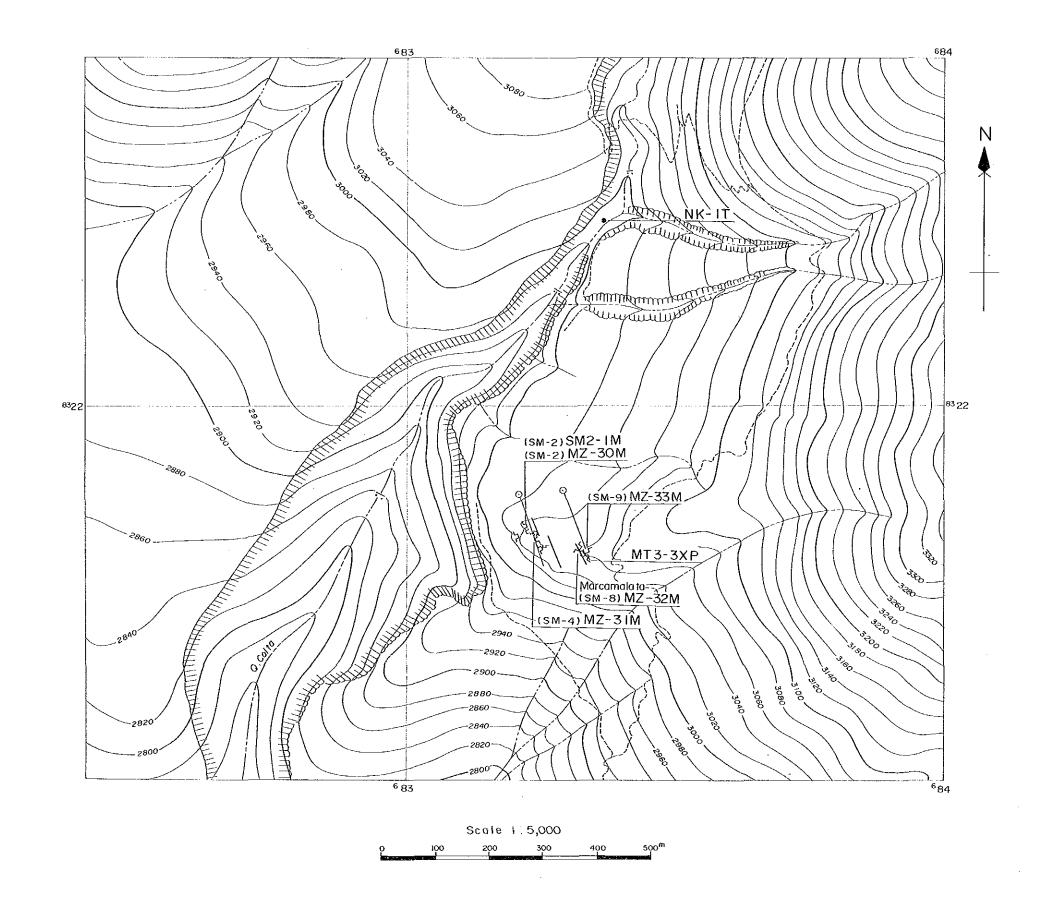
10-1-





#### LEGEND





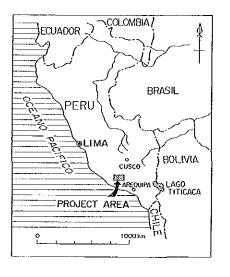


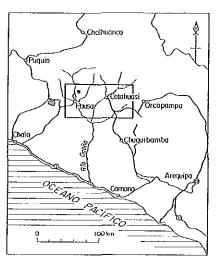
MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE IL)

## LOCATION MAP OF ROCK AND ORE SAMPLES OF

### THE MARCAMALATA AREA

LOCATION INDEX





JAPAN INTERNATIONAL COOPERATION AGENCY
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INSTITUTO GEOLOGICO MINERO Y METALURGICO
JANUARY 1988

Scale 1 5,000 0 100 200 300 400 500 m

## LEGEND

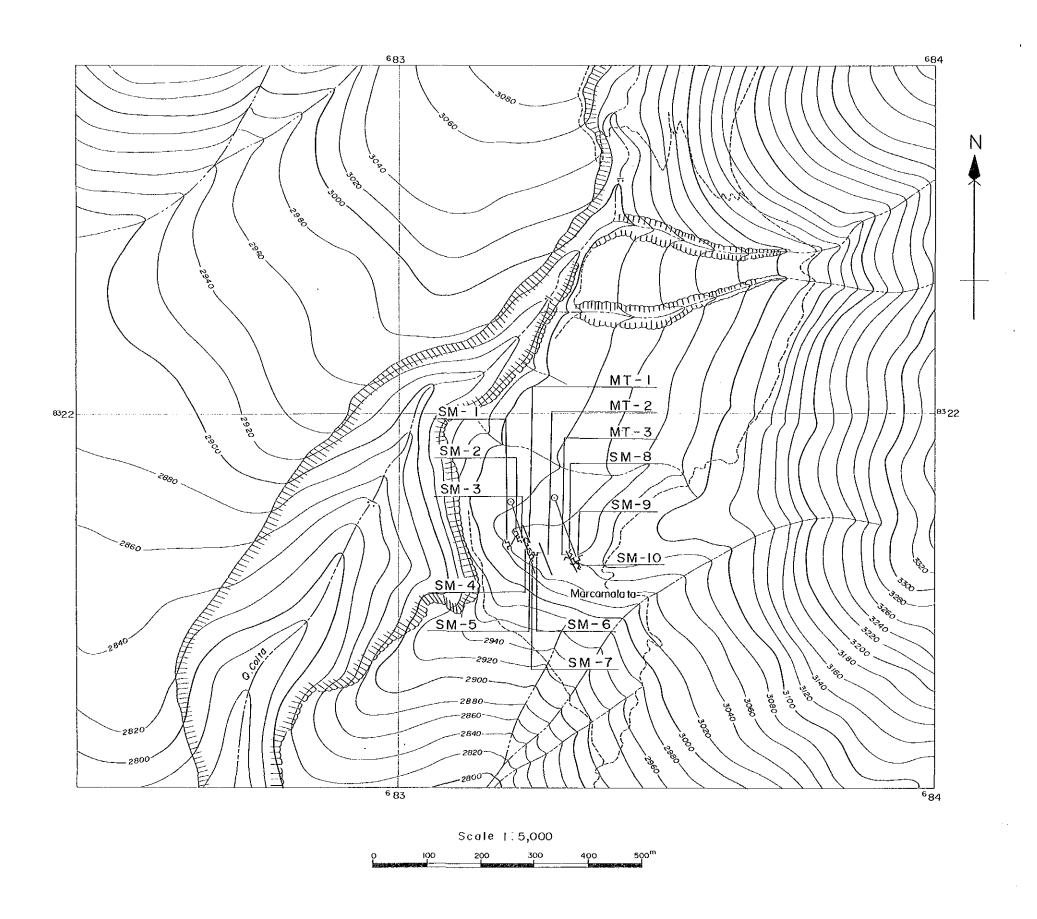
(P) : Polished Section

(T) : Thin Section

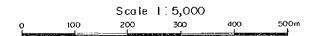
(X): X-Ray Powder diffraction

(M) : Chemical Analysis of Ore

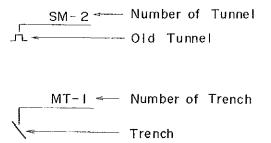
Number of tunnel Number of sample

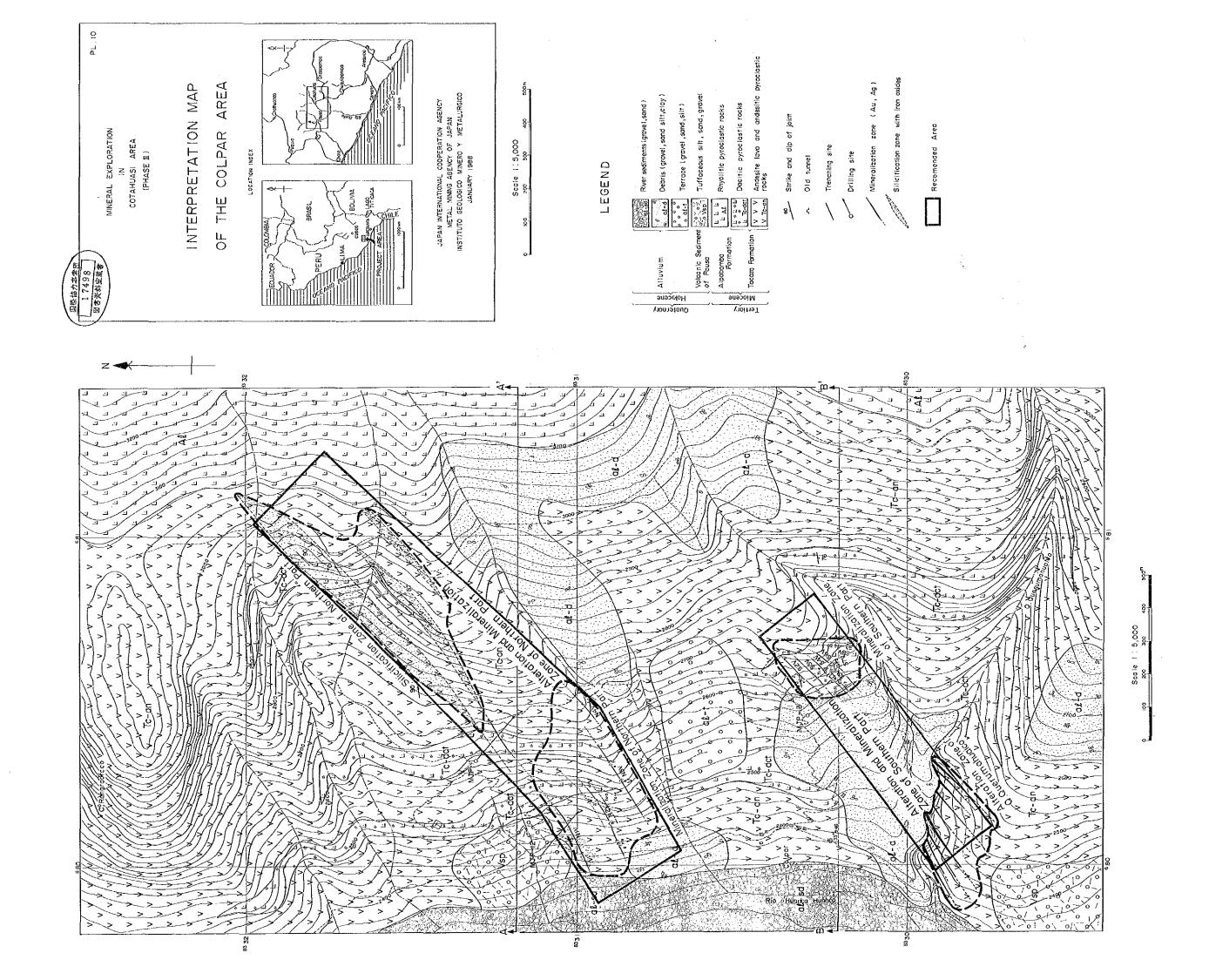


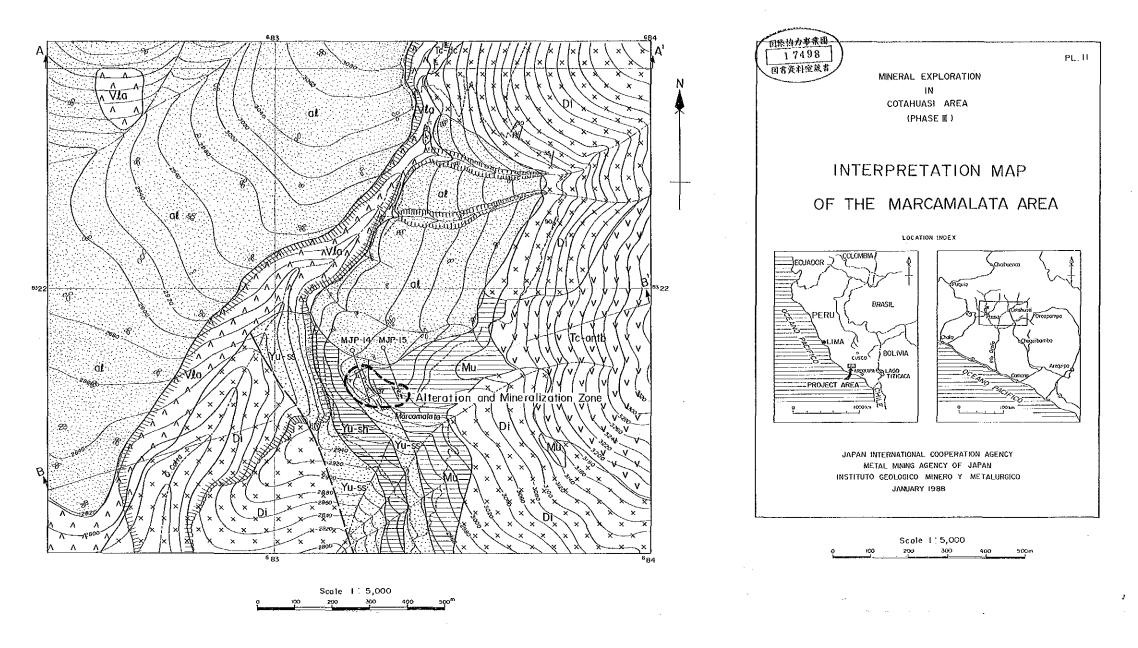
國實資料定放省 MINERAL EXPLORATION IN COTAHUASI AREA (PHASE II ) LOCATION MAP OF OLD TUNNELS AND TRENCHES IN THE MARCAMALATA AREA LOCATION INDEX <sub>Ά</sub>ΡΕRU΄ PROJECT AREA JAPAN INTERNATIONAL COOPERATION AGENCY METAL MINING AGENCY OF JAPAN INSTITUTO GEOLOGICO MINERO Y METALURGICO JANUARY 1988



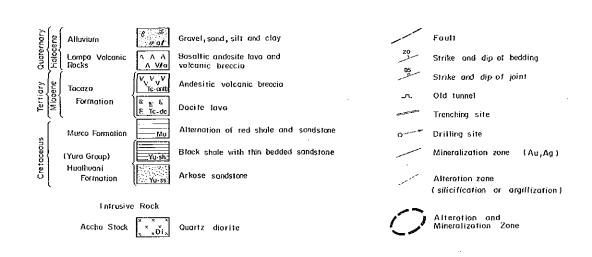
### LEGEND







#### LEGEND



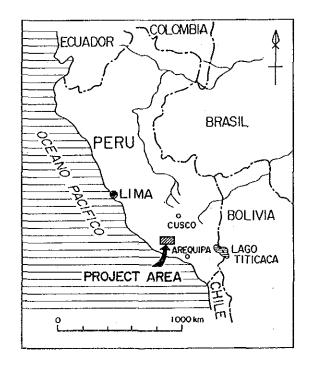
MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE II)

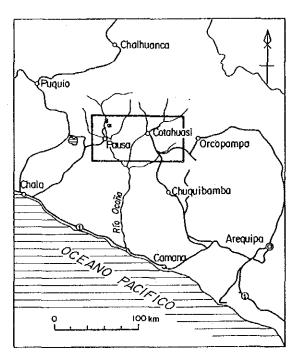


# GEOLOGICAL LOG OF DIAMOND DRILLING HOLE (MJP-11,12,13,14,15)

Scale 1 200

LOCATION INDEX





JAPAN INTERNATIONAL COOPERATION AGENCY

METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO

JANUARY 1988



8 SCALE CORE RECOVERY Δs Z g 70 70 RESULTS Ag (a/t) Αu ASSAY Width Depth 1 1111111 ii [i ŧ ï Depth : 251.05m POSITION OF EXAMINED CORE SAMPLES 0.00~9.60m Alluvium 0.00~1.50m; grey soil and small (\$\phi1\$~4cm) grave! 1.50~9.60m; mainly grave! (\$\pi1\$1 cm) with grey soil. grave! ... grey andesite and light grey dacite, unglar 76.00 m: light grey weakly altered andesite 76.00 m: lenticular pyrite vein 76.05 m: white calcite vein (w = 1.0 cm) with crystal of calcite grey and esitic tuff breecia breecia: light grey porphyritic and esite ( $\phi 1 \sim 5~{\rm cm}$ ) matrix: grey and esitic tuff yellowish brown weathered andesitie tuff breccia 29.70~29.90 m: strongly sheared zone with clay. 30.40~32.90 m: sheared zone (many fracture) groy andesific tuff breccia breccia: mainly light grey porphyritic andesite (\$0.5~7.0 cm) grey to greenish grey porphyritic andesite with many fractures Direction SE 50°, Angle: - 45° 53.90~54.40 m, 55.30~55.50 m:
greenish grey andesitic tuff breccia with
dissemination of pyrite
55.50~57.90 m:
dark grey hard massive andesitic fine tuff 88.25~89.25 m: six calcite veinlets (w = 0.2) in andesite 89.85 m: calcite vein white calcite vein network dark grey hard massive andesite mafic mineral chlorite grey dacitic lapilli tuff with quartz grain. lapilli: white grey dacite (40.5~2.0 cm) grey hard compact andesitic fine tuff 48.30 m: white lenticular calcite vein 94.10~94.20 m: white calcite veinlet 95.10~96.40 m: calcite veinlet and net 98.10 m: white calcite vein (w = 0.5 cm) 99.90 m: calcite vein (w = 0.2 cm) 60.50~61.00 m: light greenish grey andesitic lapilli 63.25 m: white calcite veinlets brown to dark brown iron oxides along greenish grey hard compact andesitic tuff 69.00 m: calcite veinlet (w = 0.3 cm) 83.20 m $\sim$ 83.40 m; white calcite 83.58 m; calcite vein (w = 0.5 cm) DESCRIPTION 9.60~11.50 m, 17.30~18.10 m, 19.60~28.90 m; many fracture dark grey hard massive andesite dark grey hard massive andesite chlorite 85.90 m: calcite veinlet 42,25~42,30 m; \$<mark>7}} \$</mark> DEPTH AND CORE ANGLE 60.50 57.90 65.90 > > > GEOLOGIC COLUMN > > SCALE **4** စ္ပ 9 6 စ္တ 8 ပ္ပ 8 0

回際協力等業団 17498 図会が特権関係 (1(2)

8 8 ß 8 SCALE <u>9</u> RECOVERY CORE ΑS Zn (%) g Q 18 RESULTS P 9 1 2 PU ASSAY Width ALTERATION
AND
AND
MINERALIZATION
SILIC
O A Y SECOND Co Sp Go H---| ļ- ---<del>||--</del>-| Depth : 251.05 m POSITION OF EXAMINED CORE SAMPLES 35√119 40 m 1PX 118.80~122.20 m: light grey strongly altered lapilli tuff
119.35~119.70 m: dark grey quartz vein with
breecia of strong silicified rock and
dissominated metalic mineral (Cp, Sp, Ga, Py).
119.70~120.70 m: light grey strong silicified
lapilli tuff with many quartz veinlets contain
metalic mineral (Cp, SP, Ga, Py).
120.70~120.75 m: light grey to dark grey
breeciated quartz vein with dissemination of
pyrite.
120.75~120.95 m: light grey strongly silicified
rock. light greenish grey dacitic lapilli tuff
lapilli: ungular to subungular lapilli (\$0.5~2.0 cm) of
andesite and dacito
matrix: greenish grey tuff with quartz grain
dark greenish grey dacitic lapilli tuff
lapilli: green porphyritic andesite (\$2 cm under)
matrix: dark greenish grey tuff with quartz grain
gradual change
light greyish green dacitic tuff with green lenticular patch
and quartz grain green dacitic lapilli tuff lapilli: ungular, dark green andesite, grey andesite and light grey dacite (\$3 cm under, ave 0.5~1 cm) matrix: small fragments of rock and quartz grain 104.70 m: white calcite veinlet (w=0.5 cm) 105.20~105.75 m: brown iron oxides along many cracks 117.00—118.80 m: grey to light grey bleached andesite with dissemination of pyrite crystal light greyish green dacitic tuff with small breccia of green andesitic tuff, green lenticular patch and quartz grain (\$0.1 cm) green to light green dacitic tuff breccia breccia: \$\phi cm under, grey andesite white dacite etc. matrix: rock fragments and quarts grain dark grey hard massive andesite with reddish brown iron oxides along cracks, mafic mineral changed to chlorite. green dacitic tuff with small (\$0.2~0.4 cm) breccia of green andosite ≥ light grey dacite and quartz grain in matrix light green dacitic tuff with light green lenticular patch , Angle:-45° rock. 120.95~122.20 m: light grey strongly blead lapilli tuff parii-colored dacitic tuff breccia breccia: \$5 cm under, some kind of andesite matrix: rock fragments and quartz grain weakly silicified rock, dissemination of pyrite white grey hard compact dacitic tuff breccia breccia: \$\phi cm under, white grey dacite matrix: rock fragments and quartz grain 151.55 m: white quartz vein (w = 0.7 cm) DESCRIPTION Direction : SE 50° 111.35 m: calcite veinlet light green dacitic fine tuff \* no contain lenticular gradual change <u>8</u>\_8 \$ \$\sum\_{\text{3}}\text{2} 118 80 11935~3970 DEPTH AND CORE ANGLE 52 85.95 73.00 79.00 8 - 50 82 20 120,70\*/1 35 50 Ê 0470 0520 87.50 GEOLOGIC COLUMN ه اند \* > SCALE 9 120 130 <u>4</u> 5 8 <u>6</u> 0 පි

国際協力事業団 17498 図書登科室蔵書 11(3) Direction SE 50。, Angle: - 45。, Depth: 251.05m

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CORE	(%)	8	1							
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S	<sub>50</sub>									
RESULTS	Ag (9/1)					<del></del>				
	Au (9/1)									
ASSAY	Width	2								
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ь О О	APLES N									-
POSITION OF EXAMINED	ORE SAN	1								
<u>ā</u>	<u> </u>	itch acitic tuff	rtz vein	nder)	di C	nder)				
		ar patch ed daciti	itic tuff with green patch and quartz	220.40 m: small fault? grey clay (thickness 3 cm) light green dacitic tuff with small fragments (ф0.5 cm under) of andesite and dacite ≥ lenticular green patch, and quartz grain in matrix	light green dacitic lapilli tuff lapilli: \$2 cm under, dark green and grey andesite, white grey dacite and a little of green patch matrix: small fragments of rock and quartz grain	green dacitic tuff breccia				
		reen lenticular pa wcakly altored de	een patck	220.40 m: small fault? grey clay (thickness 3 cm) t green dacitic tuff with small fragments (φ0.5 cm ndesite and dacite ≥ lenticular green patch, and qin in matrix	and grey ittle of gr	  ments (\$ in in matu				
NOIL		ght green grey wes	Twith grand and grey	ey clay () mall frag	rk green e and a li	 mall frag				
DESCRIPTION		off with light g a: white grey	acitic tuf n: white	fault? gr uff with si	e pilli tuff inder, da irey dacit ragments	occia	pilli tuff			
36		it green dacitic tuff 201.40~202.40 m: (bleached)	t greenish grey dac in in matrix. 211.40~212.00 m: let.	n: small dacitic tu und dacit	gradual change green dacitic lap pilli: \$2 cm ur white gri atrix: small fra	c tuff bre dacitic tu	dacitic la			
		light green dacitic tuff with light green lenticular patch 201.40~202.40 m: white grey weakly altered daciti (bleached)	light greenish grey dacitic tuff with green patch grain in matrix.  211.40~212.00 m: white and grey lenticula let.	220.40 1 ht green andesite in ma	– gradu htgreen lapilli: matrix:	sen daciti ht green andesite	light green dacitic lapilli tuff			
<u> </u>	m <sub>©</sub>		ing:		± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ±		i			
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国際協力事業団 17498 図客者#3年3

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		Pb										1 1 1		1		
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	RESU	Au A (9/t) (										7 2 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	7 G B B B B B B B B B B B B B B B B B B	4		
	ASSAY	Width ,										0	0 50	0		
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		Metd-M. Sampl										M	× a	8		
	ALTERATION AND MINERALIZATION	Arg [		<b>├</b> ─┤	<del>                                     </del>			<del></del>							Participation is interested as a finishmost in an article of the second	
E (	ALTER AN MINERA	Silic V-50						<b>├</b>				<u> </u>	<u> </u>	1	 	
250.46	ON OF INED				Ë								<u>a</u> .			<b>⊢</b>
Depth	POSITIC EXAMIN				2 4 0 4 11								T5 47m			w 66
Direction : SE50°, Angle:- 45°,	DESCRIPTION		Pausa Sediments silt, sand, gravel silt and sand: white to light grey tuffaccous silt and sand. gravel: size under 20 cm, bio-dacito, light green andesite, dark grey andesite.	dark grey hard compact andesite with weak chloritization.  18.34~19.05 m: brown iron oxides along cracks.  19.54~19.90 m: strongly sheared zone with brown and white clay	24.85~24.85 m: argilized zone with iron oxides 24.85~27.27 m: dark grey to light grey hard compact hornblende andesite. 25.35~25.47 m: brown iron oxides	27.27~39.55 m: light greenish grey weakly altered andesitic tuff 28.40~29.10 m 30.30~30.60 m: strongly sheared zone fault breecia with clay	35.30~35.50 m; brown iron oxides along cracks and quartz veinlets (w=0.5 cm)	39.55~43.52 m: light grey hard compact bleached andesitic tuff with pyrite and brown iron oxides along crack. 43.52~46.10 m: brownish grey strongly sheared zone	greenish grey hard compact andesitic tuff with lenticular green patch and a little breccia of andesite ( $\phi1 \sim 3$ cm), yellowish brown iron oxides along crack.		light greenish grey hard compact andestic tuff with a little breecia of grey andesite (\$1-3 cm)	63.80~65.67 m: grey to light grey strongly silicified rock with dissemination of pyrite. 65.35~65.48 m: grey quartz veinlet network light greenish grey hard compact andesitic tuff with small breccia (\$0.5 cm) of grey andesite.	75.40~76.80 m: light grey strongly silicified rock with dissemination of pyrite 75.47~75.60 m: very strongly silicified zone with quartz vein (w=2 cm), Cp, Ga, Sp greenish grey weakly altered andesitic tuff	84.05~84.14 m: white grey quartz vein		light greenish grey silicified rock (dacitic tuff?) with phenocryst of quartz grain (\$0.1 ~0.2 mm)
( I ) V	DEPTH AND CORE	ANGLE (m) (°)		දැහිදී බි <u>කි වුලබ</u> ල හැරිම යි ස ටහල ව හ	22 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	20 00 00 12 12 14 15 15 15 15 15 15 15 15 15 15 15 15 15	00 / 2 00 / 2 00 / 3	25 24 25 25 25 25 25 25 25 25 25 25 25 25 25	84 01 84 € 7 84	(g) <u>(</u>	58 50 5885 49 50 × 59 30	63.85 63.80 63.87 63.87 63.67 65.02 65.02	73.60 77.540 75.40,75.60 76.80 78.80 79.55 809.00	84.55 84.14 (V)	56.62.7 77.36.7 77.36.7 77.36.9 8.67.38.9 6.15.9 6.15.9 70.15.9 70.15.9	08.00
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国際協力率樂園 17498 図各灣內倉廠四 12(2)

8 ß 8 SCALE Ö RECOVERY CORE Αs Z<sub>n</sub> ď ₹ RESULTS P A 9 A 9 ASSAY Width 193.70 10M 193.80 0. 89.00 Depth ⊙M-otaM <del>| |---|</del>--| -ALTERATION AND MINERALIZATIO Ŋιζ ļ.... -1 1 11 ۸- **۷**۲ H o i 1iS 250. POSITION OF EXAMINED CORE SAMPLES Depth light grey strongly silicified daeitic tuff with phenocryst of quarts
111.50~112.95 m: light grey very strongly silicified rock
with black mineral (Sp. Ga, Ag? Py) along cracks
112.95~113.95 m: dark grey quartz vein with black
mineral and pyrite.
113.95~114.70 m: light grey strongly silicified rock
with black mineral (Sp. Ag?) along open crack 119.80~121.00 m: light grey strongly silicified rock with black vein along crack.
121.00~122.00 m: groy very strongly silicified rock wit black vein network and pyrite vein along cracks.
122.00~123.30 m: light grey strongly silicified rock with black vein along crack. light greenish grey silicified andesitic tuff with lonticular green patch light greyish green hard compact andesitic tuff with lenticular green patch and a little breccia of andesite (φ1 white grey very strongly silicified rock (dacitic tuff) with phenocryst of quartz grain and lenticular breccia grey silicified andesitic tuff with lenticular green patch light grey medium to strongly silicified andesitic tuff, bleached. 189.20 m: black mineral (Sp. Mg, Mn?, Py) lenticu vein (w=3 cm) 164.50 m: white quartz - calcite vein (w=0.5 cm) 165.65 m: white quartz - calcite vein (w=0.1 cm) 165.60 m: white quartz vein (w=0.8 $\sim$ 1.0 cm) 167.12 m: white quartz vein (w=0.5 cm) ئ ئ 186.30 m: black mineral (Mg, Sp) irregular vein 186.30~193.70 m: dots and veinlet of black min 193.70~193.80 m: white grey to grey quartz-chl vein with black minoral 193.80~193.90 m: grey clay and silicified rock 193.90~194.00 m: grey clay light greyish green hard compact andesitic tuff with Ienticular green patch 151.55 m: white calcite veinlet ( $w=0.2~\rm cm$ ) 152.10 $\sim$ 152.20 m: grey clay vein with pyrite ( $w=0.2\sim0.5~\rm cm$ ) , Angle . -131.20 $\sim$ 131.40 m: strongly silicified zone 131.32 m: quartz veinlet ( $w=0.5\,\mathrm{cm}$ ) along 171.30 m; white quartz vein (w = 1 cm) 176.45 in: quartz voinlet (w = 0.1 cm) DESCRIPTION °0° ა П 158.00~158.05 m; 180.77~184.10 m along crack 181.50 m: fault b 146.97 m: black Direction 136.40 m: c 108.20 108.40~108.73 109.80 110.00 111.50 2 × × 193.70~193.80 193.80~193.80 193.80~194.00 34 B 8/2 3/8 Σ δ\_ε Σ<u>⁄</u>k DEPTH AND CORE ANGLE 50.75 3 L. 8 1 19 6 0 12 1 00 122 00 123 30 149 85 150.50 150.50 151.10 151.50 152.00 (78.50 180.77 3: 20 0 165.63 156.60 01 781 66.30 GEOLOGIC **W** SCALE 8 09 8 120 30 40 5 0 8

国際協力等業団 17498 図舎本外字書 12(3)

Depth : 250.46m

Direction : SE 50°, Angle: -45°

SCALE CORE RECOVERY Zu <u>.</u> | S | S | Ag (9/1) A (§) Width 1 HН į-POSITION OF EXAMINED CORE SAMPLES white grey strongly silicified andesitic tuff with dots of black mineral
212.30~212.60 m: breecia bearing dark grey quartz vein 212.60~212.75 m: black vein (w=7 cm) with white calcite veinlets (0.1 cm)
212.75~213.10 m:dark grey quartz vein with black mineral 213.00~212.30 m: grey strongly silicified rock 213.00~214.00 m: grey quartz vein with white quartz vein network
216.57~216.77 m: lenticular black vein 220.62 m, 220.80 m: black veinlet and dots
220.62 m, 220.80 m: white quartz vein (w=6.2 cm)
221.20~221.30 m: white quartz veinlet and black veinlet 200.50 m: dots of black mineral
202.22 m: quartz veinlet with reddish brown mineral
203.35~203.38 m: white quartz vein with black mineral
(w=2.5 cm)
204.25~204.85 m: quartz veinlet network with black
mineral
206.60~206.70 m: grey to white quartz vein network
206.95~207.00 m: black and reddish brown vein
(w=1.5 cm) light greyish green andesitic tuff with lenticular green palch light greenish grey medium silicified andesitic tulf with lenticular green patch. 224.35 m: black vein with pyrite (w = 0.5 cm) 225.35 m: grey and black quartz vein (w = 1.5 cm) white quartz vein network 246.58~246.78 m: grey quartz feldspar vein 230.05 m: grey quartz vein with reddish bro and pyrite 230.20~230.50 m; quartz veinlet network 222.85 m; lenticular black vein (w = 1.0 cm) 235.80~236.05 m: 247.70~248.40 m: 248.40~249.00 m: 212.30%212605 212.73%21250 213.73%21373 213.73%21373 213.73%213 202.22 203.35 ~ 203.38 204.25 204.85 35° (v) 230.05 230.20 230.50 230.50 15° 3.~£ § **∠**\$ ે≥∡ટ્રેટ 206.60%20670 206.95%207.00 22.0.25 235.80 236.05 222.85 246.58 246.76 247.70 248.40 249.00 SCALE 240 220 20 230 250

国際協力率崇団 17498 図客資本権支援 13(1)

2C**∀**ΓE CORE Αs Zn ď ö RESULTS PA 9 132 ASSAY Width Depth ALTERATION AND AND WINERALIZATION 9 Xeto-MN Н Depth : 250.20m POSITION OF EXAMINED CORE SAMPLES dark grey weakly weathered andesite with xenolith of green andesite (φ5 cm). 39.05~45.5 m: pebble of grey andesite and a little bit of parplish dacite 8.90~13.55 m: cobble gravel of dacitic lapilli tuff and parplish groy dacite grey tuffaceous coarse to fine grained sandstone with thin bedded brownish grey shale 79.95 ~80.65 m: grey tuffaceous conglomerate pebbl subangular,  $\phi=1$  cm  $\pm$ 18.40~28.10 m; boulder (max. φ30 cm) and cobble gravel of grey andesite, yellowish grey dacite an light grey dacite 29.50~38.25 m: pebble gravel of light grey dacite, greenish grey dacite (ma \$00 cm). nish grey tuffaccous shale with many fracture 0.00~1.00 m: grey sand and pebble gravel of dacite 1.00~3.00 m: pebble gravel of dacite and grey soil 3.00~8.40 m: cobble and pebble gravel of light grey dacite, >> rhyolite, andesitic tuff. 26.10~29.50 m: block and pebble gravel of dacite , Angle : -45° light grey massive dacitic tuff with green lenticular and quartz grain green patch:  $\phi 1$  cm  $\times$  0.3 cm under, lenticquartz grain:  $\phi 0.2$  cm  $\pm$ 13.55~18.40 m: block of light grey to light bro-grey dacite 38.25~39.05 m; block of parplish grey dacite light green fine dacitic tuff, weakly argillization brownish grey shale with dark grey lenticular 92,90 m; brown iron oxides along crack 97.50~98.80 cm: dacitic tuff with brow along crack and stain. 95.10∼95.75 m: weakly argillization 8,40~8.90 m; grey sand and granule grey tuffaceous coarse grained sandstone DESCRIPTION dark grey porphyritic andesite of plagioclase (ф0.5 cm -) Direction SE35° 48.35~48,65 m: 43.95~44.95 m: 3 ∠\$ DEPTH AND CORE ANGLE 85.90 8685 87.00 73.50 75.25 75.75 76.40 48.93 48.93 48.55 69 20 78 45 የ ው መ ው ው -ያ ው ው የ የ የ 63.75 4 444445 5 888445 6 886990 6 886088 67.20 8.55 6.55 8.45 8.45 8.65 8.65 8.65 8,40 8,50 " نا GEOLOGIC SCALE 09 8 8 Ĝ 8 8 0 8 တ္တ

250.20 m

Depth :

, Angle. –

Direction : SE

8 8 8 8 SCALE Êo  $\underline{\Omega}$ RECOVERY CORE As Za a. 1 3 3) RESULTS PA 9 ΡΩ ASSAY Width 56.90 Depth ALTERATION
AND
AND
WINERALIZATION
OF THE CONTROL OF H 1 POSITION OF EXAMINED CORE SAMPLES light green dacitic tuff with green patch ( $\phi$ 1 cm  $\times$  0.3 cm  $\pm$ ) 126.90 m: white quartz vein (w=0.03 cm) with pyrite cia (ф1 cm±) 156.90~157.55 m: dark grey strongly altered rock with white quartz veinlets network and grey clay 159.00~160.10 m: reddish brown iron oxides network 160.10~160.40 m: dark grey strongly altered rock with white quartz veinlet network. light greenish grey dacitic tuff breccia breccia: \$2~5 cm, ungular, breccia of green and brown andesite, porphyritic andesite and dacite. matrix: small fragments of andesite and quartz grain light green massive dacitic lapilli tuff with lenticular green patch ( $\Phi 1\!\sim\! 3$  cm) and quartz grain white grey strongly altered rock
199.00 m, 199.05 m: white quartz veinlet
199.45~199.60 m: white grey strongly altered rock
crystal of Cp., Sp. and fine black mineral 103.60∼104.00 m: light green dacitic fine tuff light green dacitic tuff with a little small green 196.55 m: white quartz voin (w = 0.5 cm) light green massive dacitic tuff with a little of white dacite and green andesite. dacitic lapilli tulf with quartz grain lapilli: \$3 cm under, lapilli of andesite light greenish grey dacitic tuff with green patch ( $\phi$ 1 cm  $\times$  0.3 cm) and quartz grain light green dacitic tuff with light green quartz grain DESCRIPTION white grey bleached dacitic tuff with and quartz grain gradual change £2 80 25° €2 80 5° €2 80 5° 5∕2 DEPTH AND CORE ANGLE 144.00 14180 30.50 135.75 54.85 00. 90 60.10 04.03 2.90 126.25 156.90 0.00 0.00 0.00 GEOLOGIC COLUMN SCALE <u>4</u> 9 පි 5 8 8 o = 8 8

国際協力率業団 17498 国際政権を選手 13(3) Directio

83 250 SCALE 20 CORE RECOVERY Αs Zu ď. S (g/y) PΓ Width Depth <sup>O</sup>M-α¹9M 1 | | |---ALTERATION AND MINERALIZATIO H---ριΑ V-50 oilis Depth : 250.20m POSITION OF EXAMINED CORE SAMPLES 203.65m | P white groy strongly altered rock
200.50 m: lenticular vein of Sp, Cp, Ga and Py.
201.14~201.30 m: white quartz vein network with black
201.20~201.25 m: Sp>Ga>Cp>Py mineral
202.20~203.50 m: strongly altered rock with partly
lenticular veinlet of Sp and Cp.
203.50~204.20 m: white groy strongly altered rock with
Sp-Cp-Ga-Py veinlet network and disseminated
204.20~205.80 m: white grey strongly altered rock with
partly black vein network

gradual change
white to light grey massive altered (bleached) dactite tuff
with dissemination of pyrite, quartz grain light grey weakly altered (bleached) dacitic tuff with light green andesite and quartz grain, partly white quartz veinlet light grey weakly altered dacitic tuff with quartz grain and small ( $\phi$ 1~3 mm) light green andesite. light grey weakly altered dacitic tuff with breccia of light green lenticular andesite (Φ1~3 mm) and partly white quartz veinlet 212.90~213.10 m: black veinlet with Sp > Ga > Cp 'Direction | SE 35°, Angle | 45° sometimes contain breccia (\$2 cm) of green porphyritic andesite DESCRIPTION 225.00~227.40 m; dissertine veinlet 240.25 m, 240.35 m; (w=0.1~0.3 cm) gradual change ŝ∠ŝ DEPTH AND CORE ANGLE 240.25 205.80 22740 20114472 20114472 202.20 203.50 204.20 GEOLOGIC COLUMN SCALE 240 220 230 20

国際協力等禁国 17498 国宏和研究(1)

8 8 SCALE Ê o CORE RECOVERY As Zn 7%, ď 20 30 RESULTS 84 69 PΠ ASSAY Width 5 M 17.40 6 M 18.40 23.15 7 M 23.25 28.50 8 M 29.65 9 M 30.70 14.15 Depth ALTERATION AND MINERALIZATION 1.1 , Depth ∶200.65m POSITION OF EXAMINED CORE SAMPLES 47.00~47.55 m: strongly sheared zone, black clay and small chip of black shale light grey quartz vein network, likely 17.40~17.50 m; light grey quartz vein, partly brown quartz and black band
18.42~18.47 m; light grey quartz vein with black fine band brownish grey soil with a little gravel of 28.00~30.70 m: light grey arkose sandstone with brown to reddish brown iron oxides along many cracks alternation of black shale and grey fine to medium grained sandstone alternation of black shale and grey to dark grey sandstone 30.70~32.00 m: grey shale with small chips of black shale 32.00~36.75 m: dark grey shale, sheared 23.15~23.25 m: light grey to grey quartz vein with dissemination of pyrite and white clay grey sandstone with many pyrite 64.80~65.15 m; black carbon bearing black shale 36.75~43.00 m: grey to dark grey massive shale , Angle : - 45° mainly black shale, partly intercalated with very thin bedded fine sandstone and lenticular sandstone 43.00~43.90 m: alternation of grey fine sandst dark grey shale 43.90~44.50 m: light grey fine sandstone gravel of quartzite and dacite 14.15~14.25 m: white quartz vein with dr lenticular pyrite vein white grey hard compact arkose sandstone white grey hard compact arkose sandstone  $0.00\sim2.20$  m; dark grey soil with: grey to dark grey hard massive shale grey to dark grey hard massive shale DESCRIPTION 87.60~87.70 m: pyrite veinlet black to dark grey massive shale black carbon bearing black shale 77.30~78.50 m: black coal grey to dark grey massive shale Direction : SE 20° dark grey massive shale grey to dark grey shale 8.90~12.75 m; breccia vein. 57.40~57.50 m; 92.95~93.15 m. black massive shale 2.20~6.95 m; t quartzite grey to dark grey veinlet. 6.95~8.90: 43.00 43.00 50 89.20 (b) 89.00 (b) 91.00 91.70 64.80 ~65 is 75 3 K 8 878 DEPTH AND CORE ANGLE 17,40 4.17,50 18,42 218,47 14.154.14.25 97.80 30.70 75.75 90 78 70 28.50 36.75 GEOLOGIC . 0 (E) O SCALE 5 9 8 2 8 တ္တ 2 റ്റ 0

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2) Direction : SE 20°, Angle: -45°, Depth: 200.65m

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ε	ALTERATION AND ANINFRALIZATION	02~70						·			1.1	*	<del>     -     </del>	H I I		1
200.65	E E	4											4 X +	<b>4</b> 1		
epth .	POSITION C EXAMINED	1200 1200											т (66.50 m 167.60 m 172.85 m	•		
Direction . SE 20°, Angle 45°, D	DESCRIPTION		dark grey massive shale black massive shale with thin calcite veinjet	grey massive shale	dark grey massive shale 113.70~114.30 m: alternation of black shale and grey sandstone 114.30~115.20 m: grey fine to medium grained sandstone with thin bedded black shale 115.40~115.60 m: grey shale with many pyrite dark grey massive shale		127.25~128.15 m: dark grey shale with many pyrite veinlet network	grey to dark grey fine grained sandstone with very thin bedded black shale 133.15 m: brown iron oxides along crack	black to dark grey massive shale	141.35~141.70 m: grey fine grained sandstone 141.50~141.60 m: concentrated pyrite black to dark grey massive shale	146.75~146.90 m: dissemination and veinlet of pyrite 148.60~148.65 m: black carbon bearing black shale grey to dark grey fine sandstone with pyrite along crack 150.30 m, 151.35 m: quartz veinlet 151.45~152.10 m: black shale with a little carbon stain and thin bedded sandstone 153.00~153.20 m: disseminated pyrite	grey hard massive medium grained sandstone with white quartz veinlet (w < 0.5 cm)  161.95~162.05 m: white quartz vein network with brown iron oxides along crack	164.95~165.30 m: light grey silicified sandstone 165.30~165.40 m: quartz vein with brown iron oxides 165.40~165.70 m: light grey strongly silicified sandstone 165.70~166.40 m: light grey and light brown very strongly silicified sandstone with quartz vein network 166.40 m: white quartz vein with druse 166.55~167.30 m: grey to light grey silicified sandstone with white quartz veinlet. 167.30~167.85 m: light brown very strongly silicified sandstone with white quartz veinlet. 167.85~168.85 m: light brown very strongly silicified sandstone with quartz veinlet.	groy hard massive medium grained sandstone IT1.40 m: white quartz vein network (w = 1 cm) 171.80 m: white quartz vein (w = 2 cm) 170.22~179.40 m: white and grey quartz vein 179.40~180.00 m: light grey silicified sandstone with white quartz vein (v = 0.5 cm) 183.60 m: white quartz vein (w = 0.5 cm) 184.75 m: white quartz vein (w = 0.5 cm)	ight grey hard massive fine to medium grained arkose sandstone with brown iron oxides along crack.	white grey hard massive fine grained arkose sandstone 200.40~200.50 m: white quartz voinlet network
(3) t	DEPTH AND CORE	ANGLE (m) (°)	0.4.0	0 00 21	112.60 113.70 115.20 115.40 / 115.60	22.80 22.80 23.80	(27.15 (27.25 × 120.15 (27.25 × 120.15 (128.45	131.50 13.150 13.4.20	O 7 8	44 4 12 4 100 F 80 V O	66.737.468.90 6.03.10 10.030	156 85 166 85 161 95 1162 05	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	179 22,17940 180.00 183.50 184.73	08. 0.	196.73
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	SCALE	Œ.	<u> </u>	= =		8		}		C <del>5</del>	85	09	2	8	8	500

國際協力率業团 17498 國智**州子**港

SCVLE RECOVERY CORE Ζu g Q Ö RESULTS I M 382.88 0.75 < 0.07 1.9 \$ 9 92.20 6M 93.10 0.90 < 0.07 Au (q1 Width 8275 8380 63 70 64.00 Depth Sample **|--**| . 200.35m POSITION OF EXAMINED CORE SAMPLES Depth white grey arkose sandstone with brown to reddish brown iron oxides along crack
91.85 m: reddish brown iron oxides
92.20~93.80 m: white to greyish white strongly silicified arkose sandstone with veinlet and spot of pyrite
93.48~93.65 m: yellowish brown and reddish brown veinlet network of iron oxides
grey to light grey clay with pyrite
black carbon bearing black shale
dark grey shale with pyrite along crack 32.70~34.20 m: grey hard compact silicified arkose sandstone with white quartz vein network and black patch of pyrite
34.60 m: grey clay (w = 1 cm)
35.00~37.15 m: grey arkose sandstone with brown iror oxides along crack 63.35~63.65 m: reddish brown iron oxides along crack with dissemination of pyrite 63.95~67.00 m: grey shale with pyrite veinlet and dissemination, weakly silicified. 67.00~68.35 m: reddish brown iron oxides along crack 68.35~69.55 m: dark grey arkose sandstone with pyrite and black mineral 70.35~70.45 m: grey shale 70.75~70.86 m: white quartz vein and yellowish browr clay (w=5 cm) 17.15~18.05 m: gravel of grey to brownish grey andes 18.05~18.55 m: grey sand 18.55~19.45 m: igrkt brown soil 19.45~20.20 m: gravel of black shale and andesite 20.20~23.00 m: gravel of spreenish grey diorite and grey sand 23.00~23.45 m: gravel of brown shale and white sands requish brown shale white grey argillaceous weathered shale light grey to white grey hard compact arkose sandstone brown to reddish brown iron oxides along crack.
28.75~29.00 m: white quartz veinlet network , Angle: - 45° 82.20~82.40 m: white quartz vein network sp. 75~83.80 m: white quartz vein network an quartz along open crack 84.50~85.00 m: quartz vein (w = 2 cm) × 68.25~85.40 m: white quartz vein network light grey to grey shale with yellow, brown and i brown iron oxides along crack. vnish grey soil (grey silt and sand) iron oxides along crack grey arkose sandstone light brownish grey soil with a little gravel DESCRIPTION grey soil contained gravel (\$1~5 andesite, green andesite and tuff. Direction : SE 20° grey clay 37.45~37.65 m: grey to light grey ark 56.30~56.80 m: 74.80~85.00 m; light grey to grey light brow 59.55 7055 ^7045 7075 ^7085 53.65 DEPTH AND CORE ANGLE 67.00 67.60 68.33 244 6 244 6 2000 37, 15 37, 45 \$0.80 63.35 ~ 53.93 · 54.90 32.70 59.00 44.30 20.20 20.20 20.20 GEOLOGIC COLUMN SCALE 8 8 0 ß ၀ွ 2 8 8 0

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Direction : SE 20°

SCALE 0 CORE RECOVERY As Z ď (§ 5 ) 2 g Pa 291 ASSAY ALTERATION
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ON -Y
AFG
ON AFG -| | | | | Depth : 200.35 m POSITION OF EXAMINED CORE SAMPLES grey to dark grey sandstone with thin bedded black shale and pyrite along crack 148.40 m: crystal quartz veinlet (w = 0.1 cm) along crack grey medium grained sandstone with veinlet and dissemination of pyrite 165.40~165.80 m, 166.20~166.30 m, 167.20~167.70 black shale 105.85 ~ 106.00 m: black carbon bearing black shale 106.80 ~ 108.10 m: pyrite along fracture 107.20 ~ 107.40 m: black carbon bearing black shale 154.30~154.60 m: dissemination of pyrite 154.50~154.80 m: black carbon bearing black shale alternation of dark grey sandstone and black shale black shale and lenticular grey sandstone with pyrite , Angle light grey to grey shale grey to dark grey shale with many fracture 146.65~147.00 m; grey silt stone pyrite veinlet DESCRIPTION olackish grey shale 111.10-111.45 m: black 197,45~197.80 m: black massive shale dark grey to black 105.85 V 106.00 106.80 107.20 V 107.40 108.10 ê <u>\</u> å êZê 343 2 X 🕏 DEPTH AND CORE ANGLE 171.55 173.20 173.95 174.30 194 10 19.4 80 19.5 \$5 19.5 \$6 19.6 \$0 19.1 \$4 19.9 10 19.9 10 19.9 10 19.9 10 19.9 10 19.9 10 19.9 10 178.90 178.65 46.65 01 621 67.70 136.20 140.90 181 80 182 60 184,00 65 70 86 00 67 19 61 783 GEOLOGIC SCALE 9 64 <u>ගි</u> 5 8 0 150 3 8

