



PL 22  
1:10,000

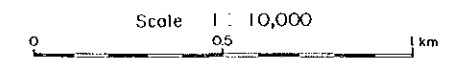
MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE I)

**GEOCHEMICAL INTERPRETATION MAP OF  
THE PIRCA EASTERN AREA  
(COMPOSITE DATA)**

LOCATION INDEX

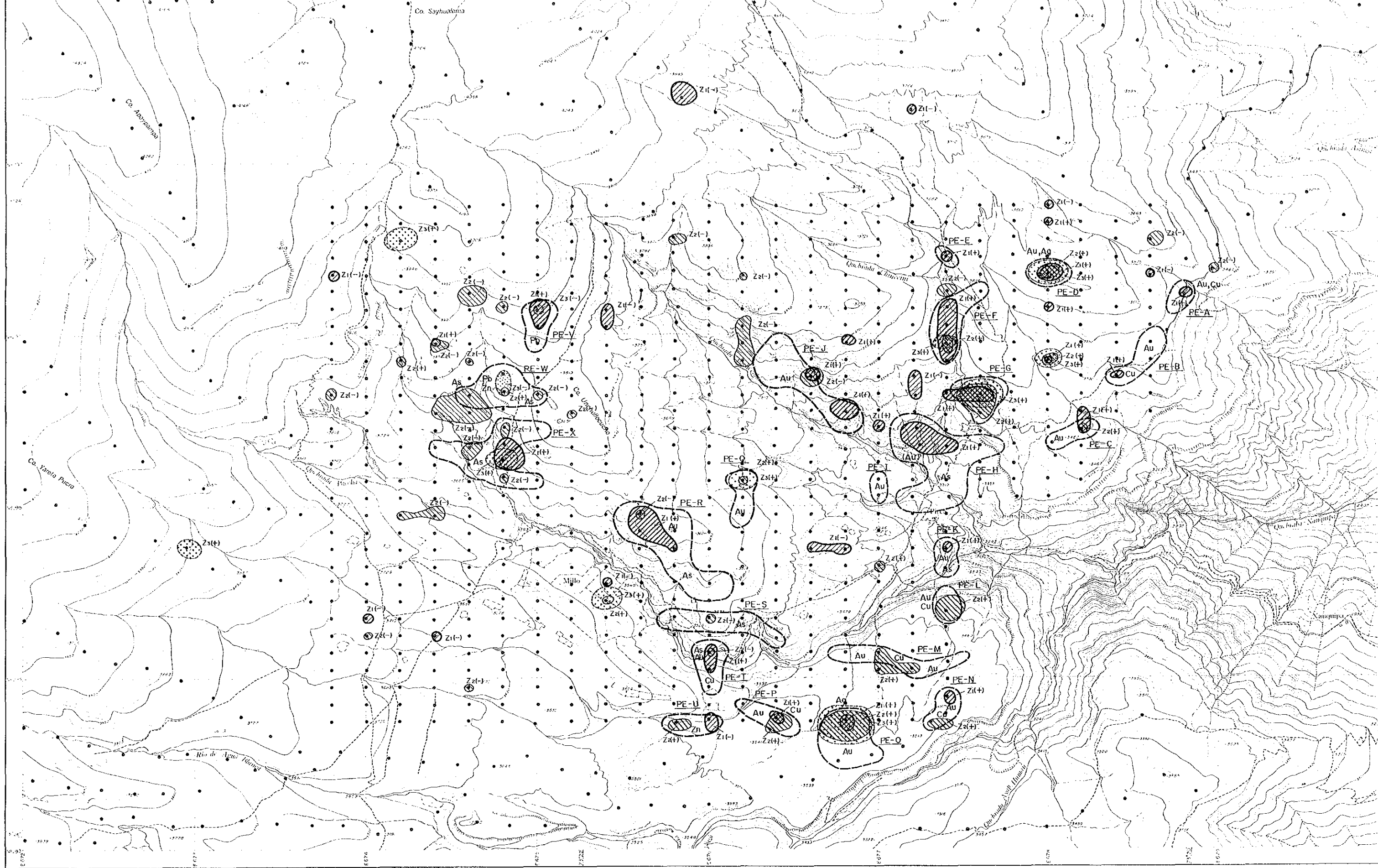



JAPAN INTERNATIONAL COOPERATION AGENCY  
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INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987

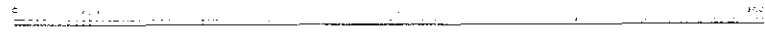


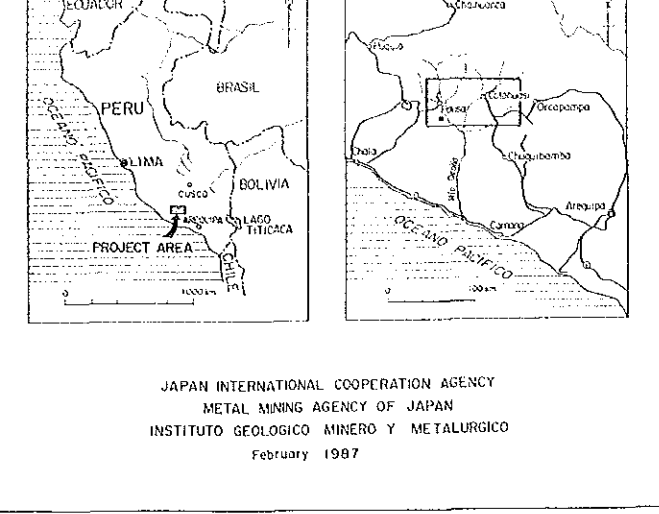
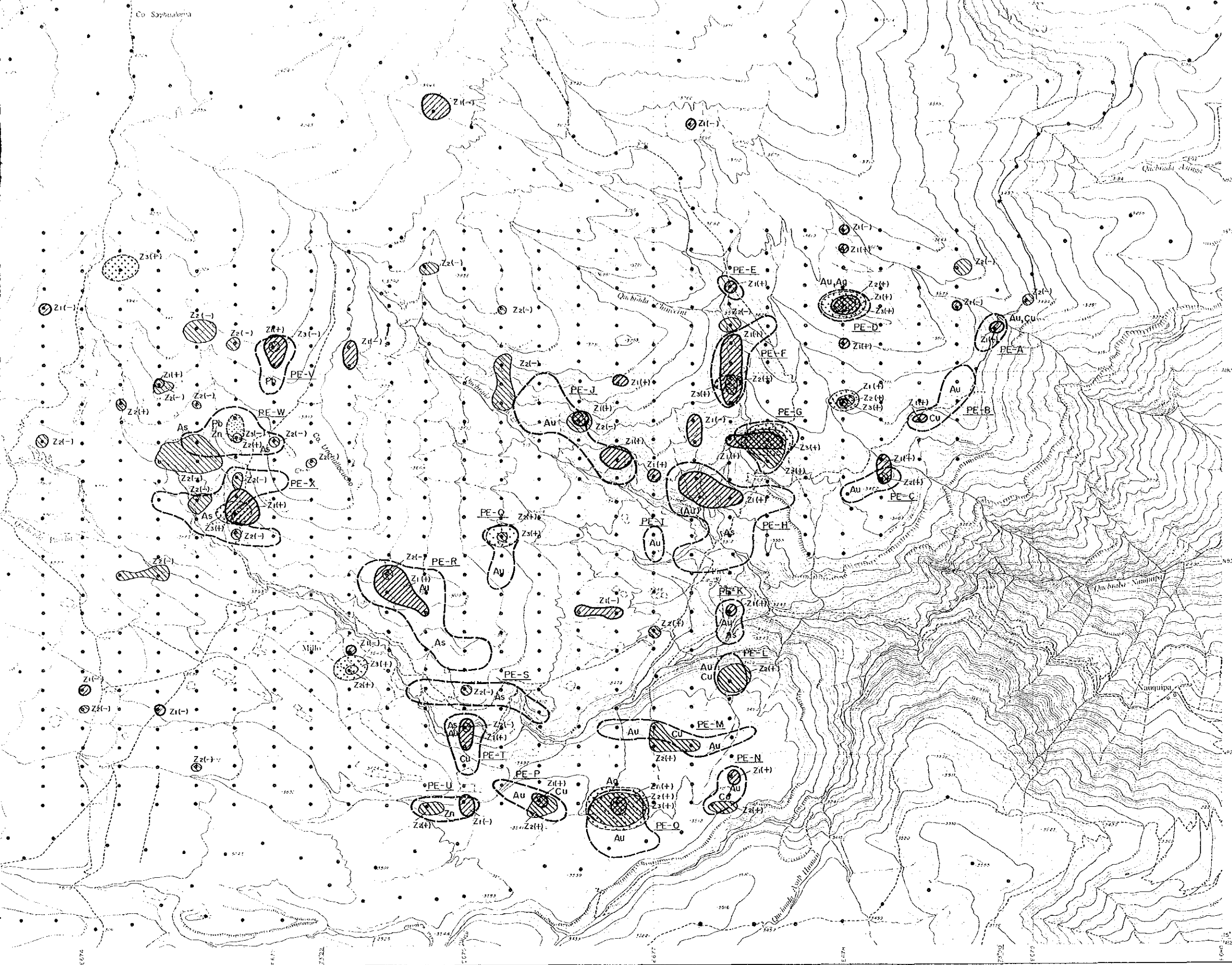
**LEGEND**

- Geochemical Anomaly
- <Univariate Analysis>
- Anomaly Zone and Anomalous Elements
  - PE-A Name of Anomaly Zone
- <Principal Components Analysis>
- 1st Principal Component
    - Z1(+) + Anomaly
    - Z1(-) - Anomaly
  - 2nd Principal Component
    - Z2(+) + Anomaly
    - Z2(-) - Anomaly
  - 3rd Principal Component
    - Z3(+) + Anomaly
    - Z3(-) - Anomaly



1:10,000





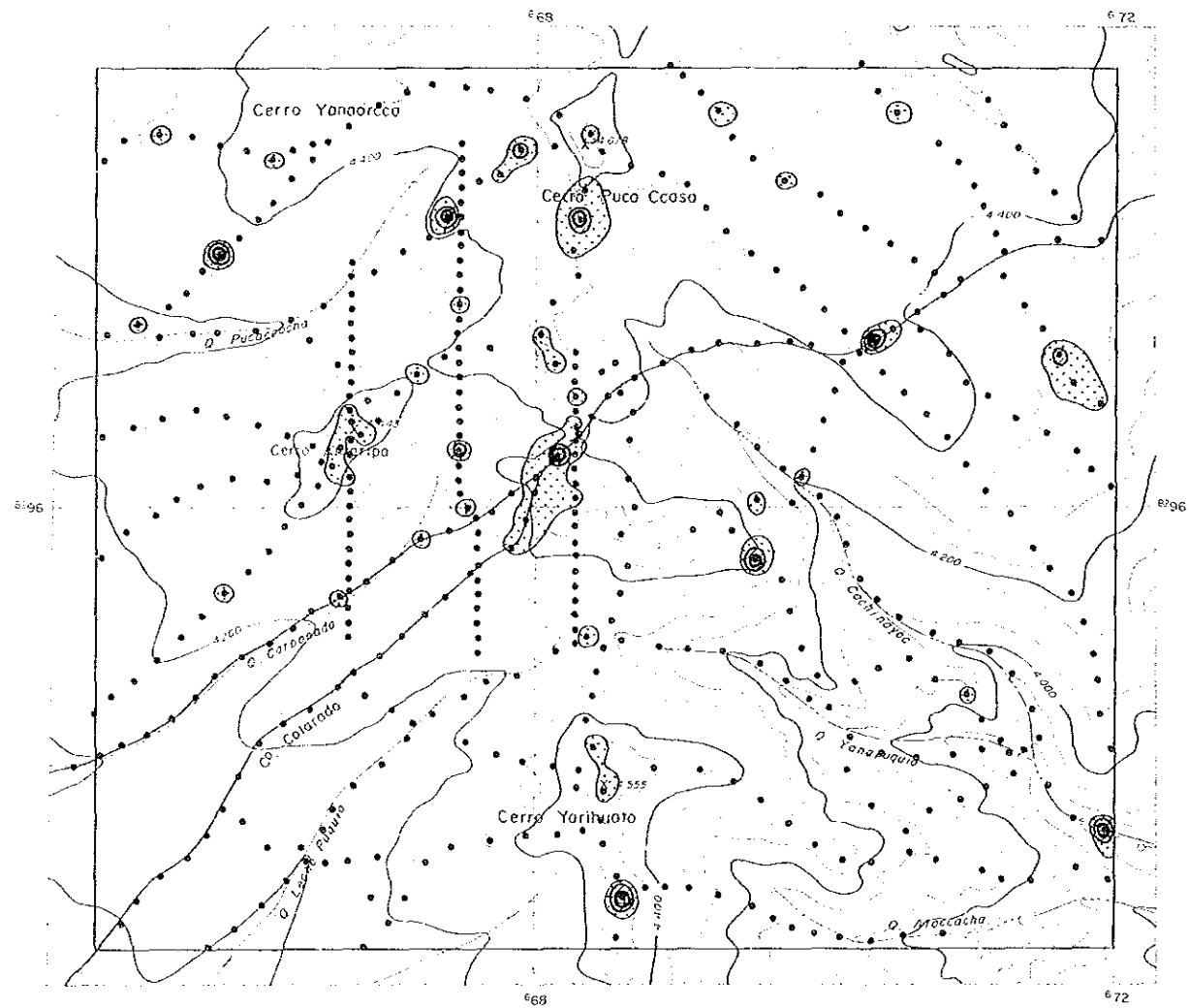
JAPAN INTERNATIONAL COOPERATION AGENCY  
 METAL MINING AGENCY OF JAPAN  
 INSTITUTO GEOLOGICO MINERO Y METALURGICO  
 February 1987

Scale 1 : 10,000  
 0 05 1 km

### LEGEND

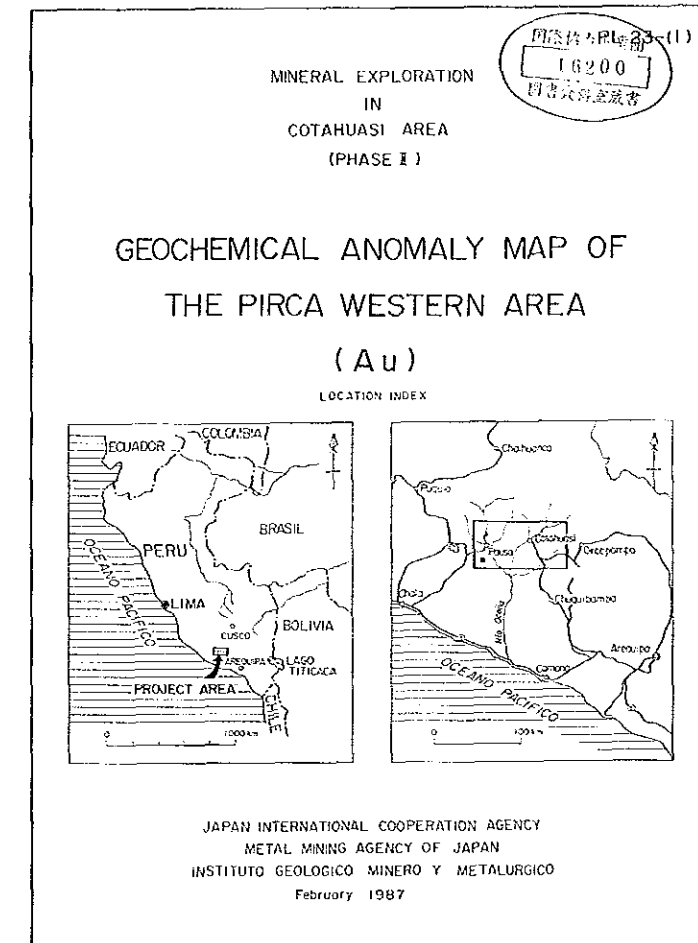
- Geochemical Anomaly  
 <Univariate Analysis>
- Anomaly Zone and Anomalous Elements
  - PE-A Name of Anomaly Zone
- <Principal Components Analysis>
- 1st Principal Component
    - Z1(+) + Anomaly
    - Z1(-) - Anomaly
  - 2nd Principal Component
    - Z2(+) + Anomaly
    - Z2(-) - Anomaly
  - 3rd Principal Component
    - Z3(+) + Anomaly
    - Z3(-) - Anomaly

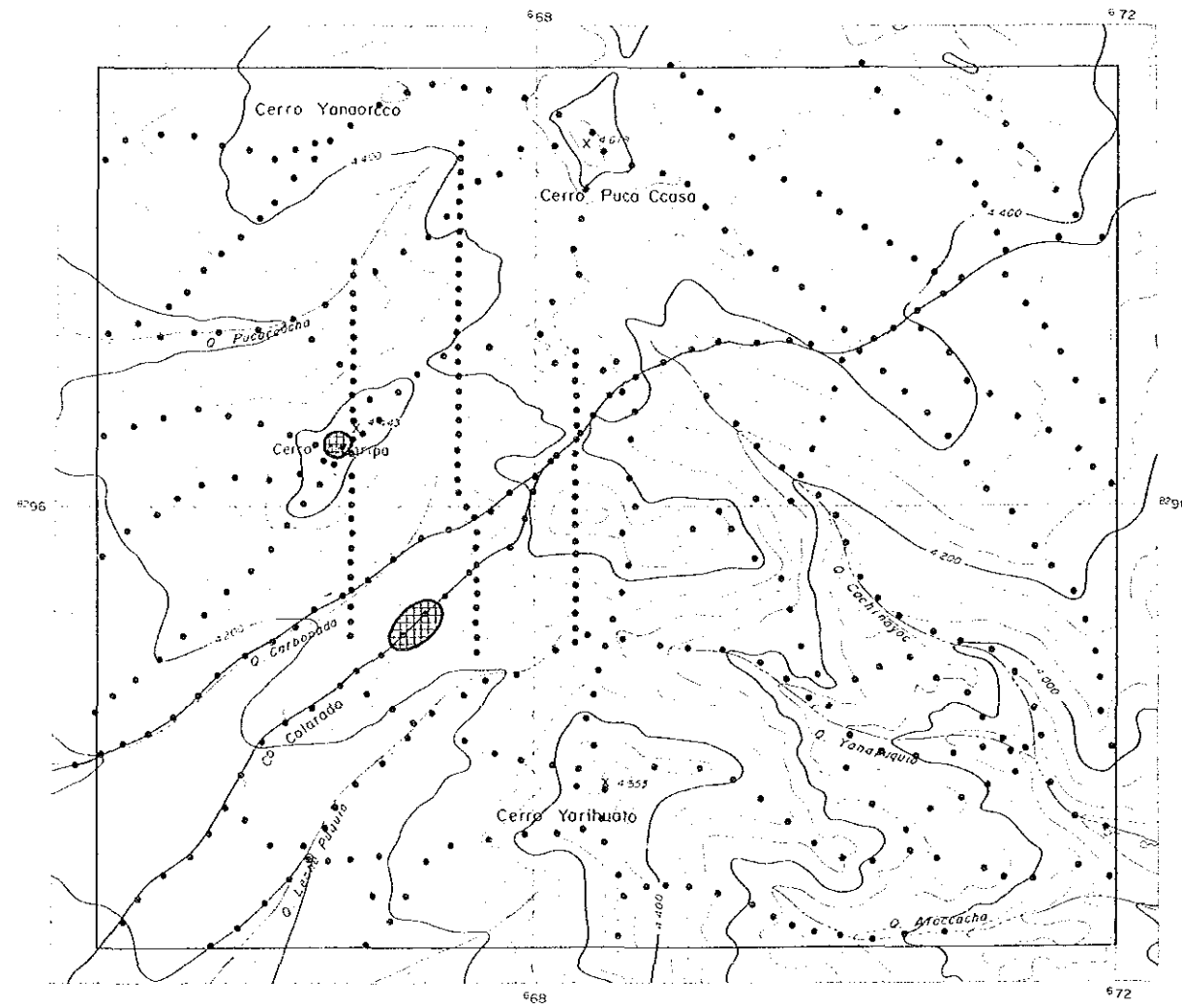
1 : 10,000



LEGEND

Symbol	Classification	Contents (in ppb)
	Anomaly A ↑ M+3σ	$Au \geq 16.7$
	Anomaly B ↑ M+2σ	$16.7 > Au \geq 7.8$
	High background ↑ M+1σ	$7.8 > Au \geq 3.6$





LEGEND

Symbol	Classification	Contents (in ppm)
	Anomaly A	Ag ≥ 0.13
	M+30	

PL 83-(2)  
16200

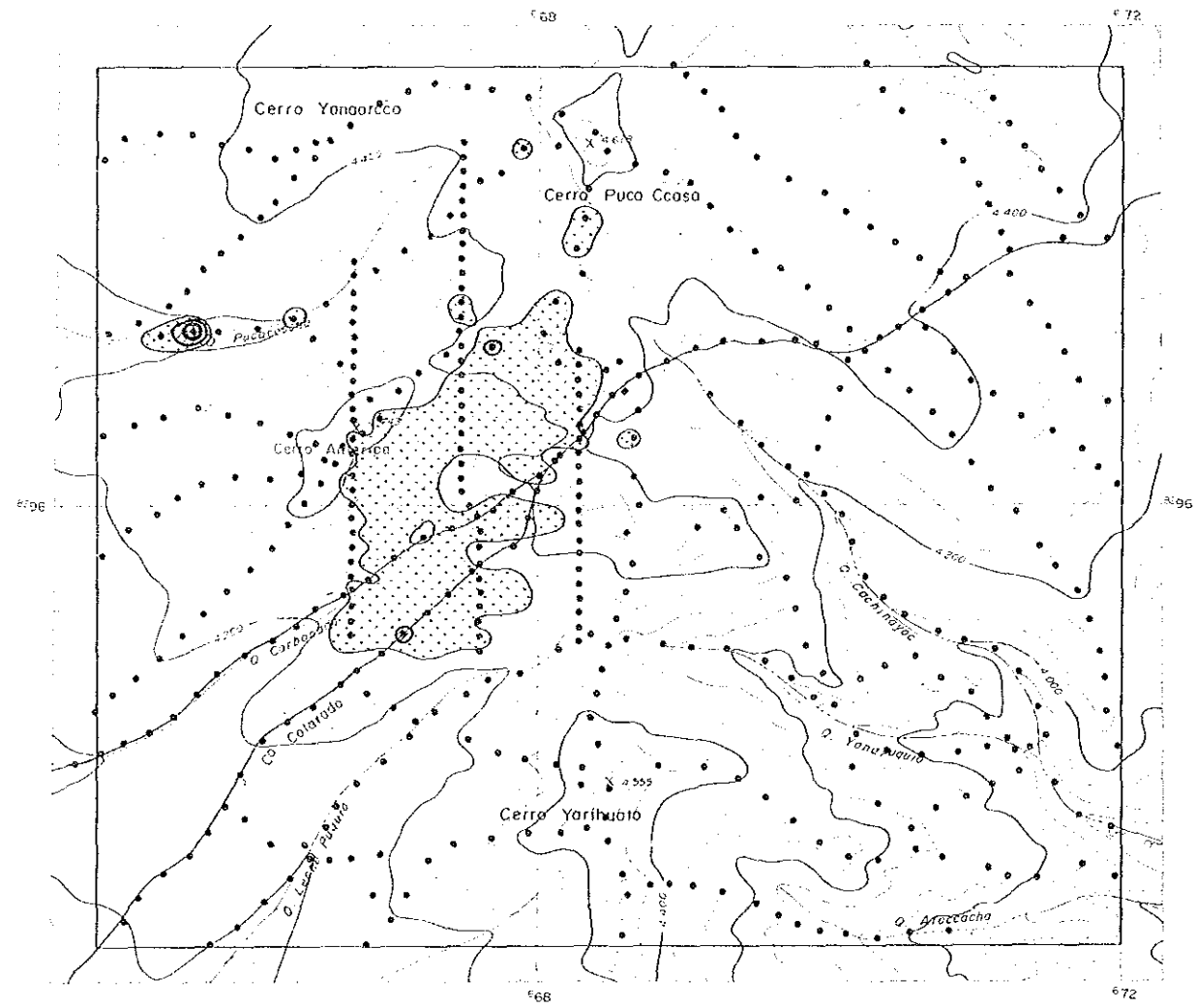
MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

GEOCHEMICAL ANOMALY MAP OF  
THE PIRCA WESTERN AREA  
(Ag)

LOCATION INDEX

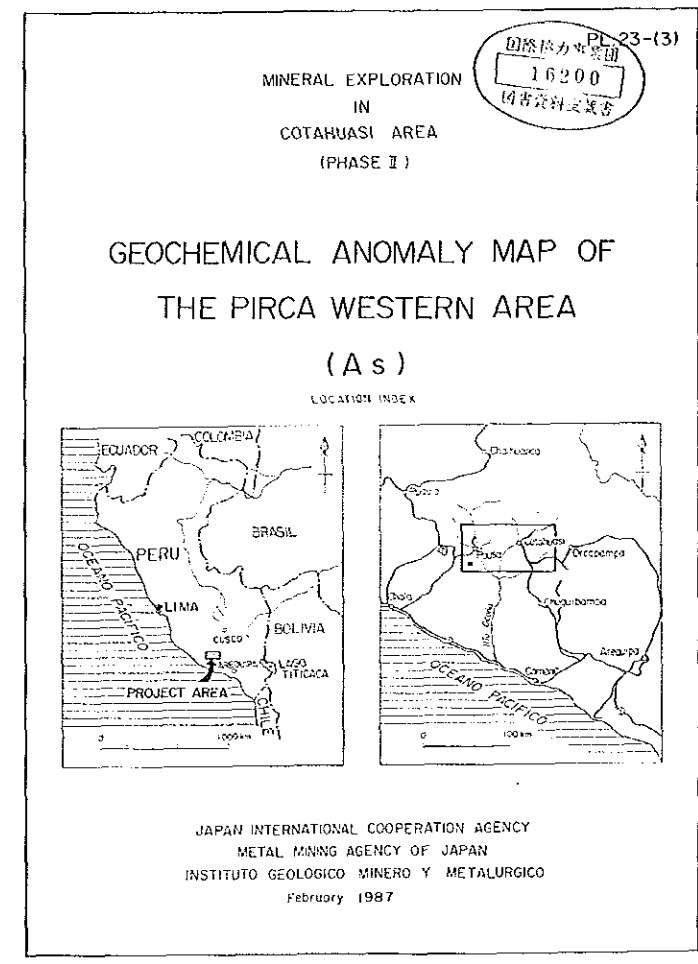
JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987

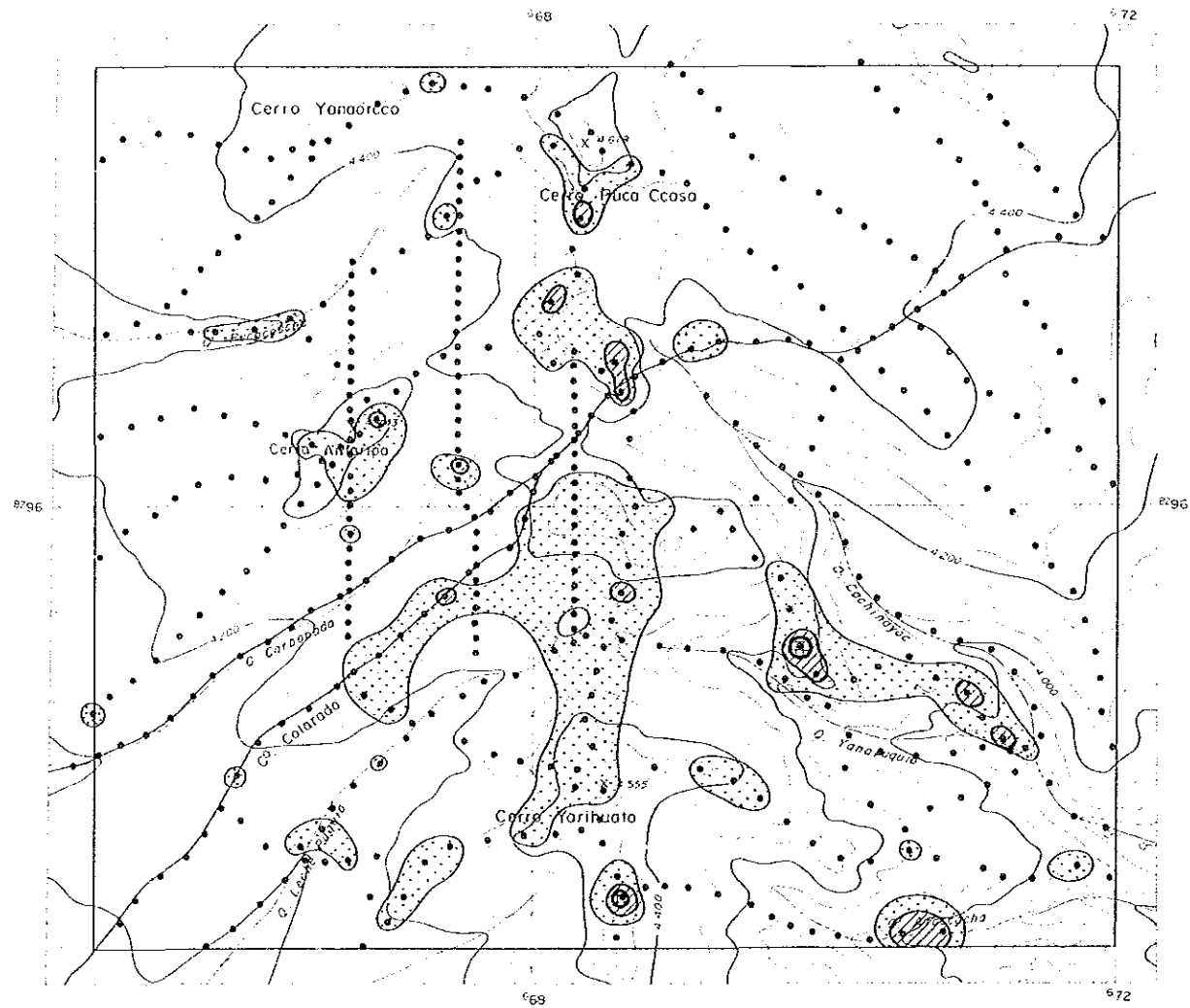
Scale 1 : 25,000



LEGEND

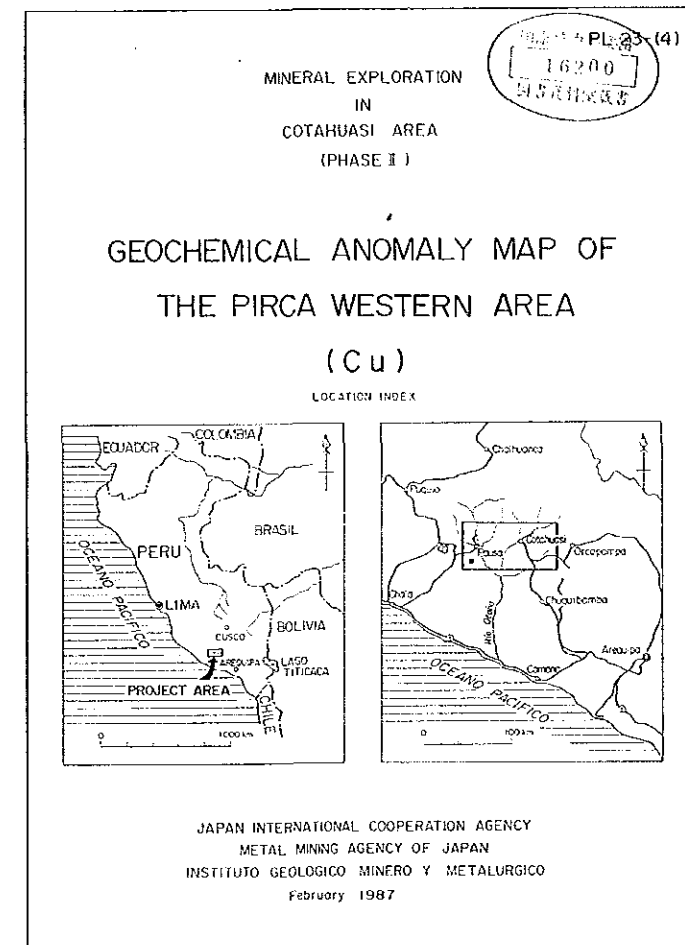
Symbol	Classification	Contents (in ppm)
	Anomaly A ↑ M+3σ	As ≥ 113.9
	Anomaly B ↑ M+2σ	113.9 > As ≥ 41.7
	High background ↑ M+1σ	41.7 > As ≥ 15.3



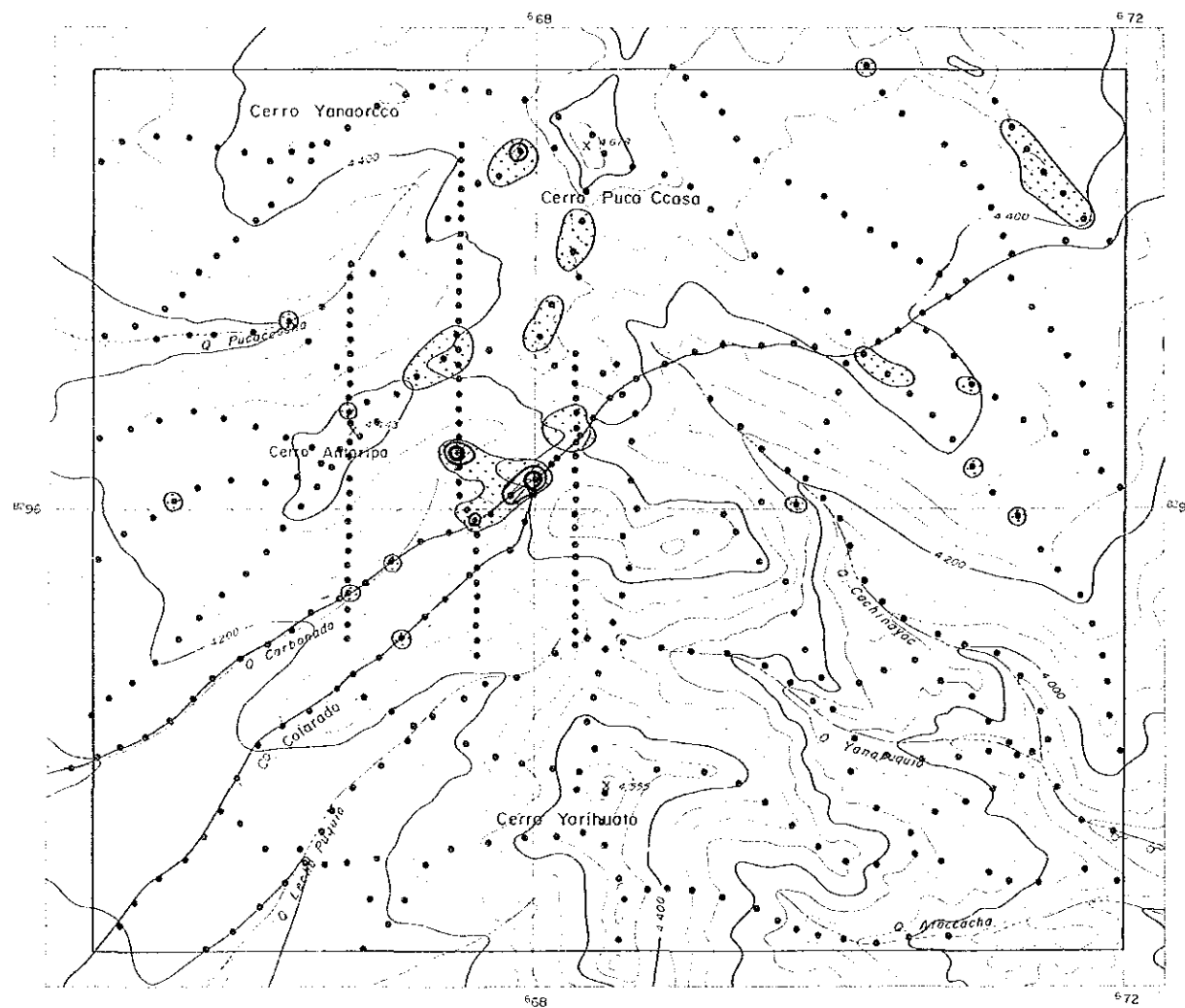


LEGEND

Symbol	Classification	Contents (in ppm)
	Anomaly A M+30'	$Cu \geq 128.4$
	Anomaly B M+20'	$128.4 > Cu \geq 89.8$
	High background M+10'	$89.8 > Cu \geq 62.8$

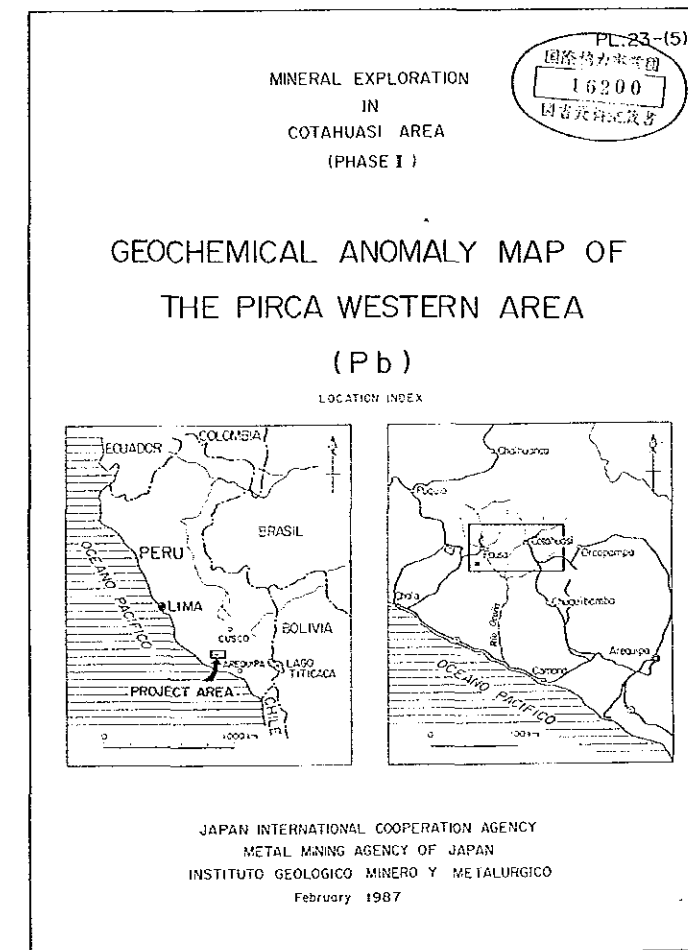


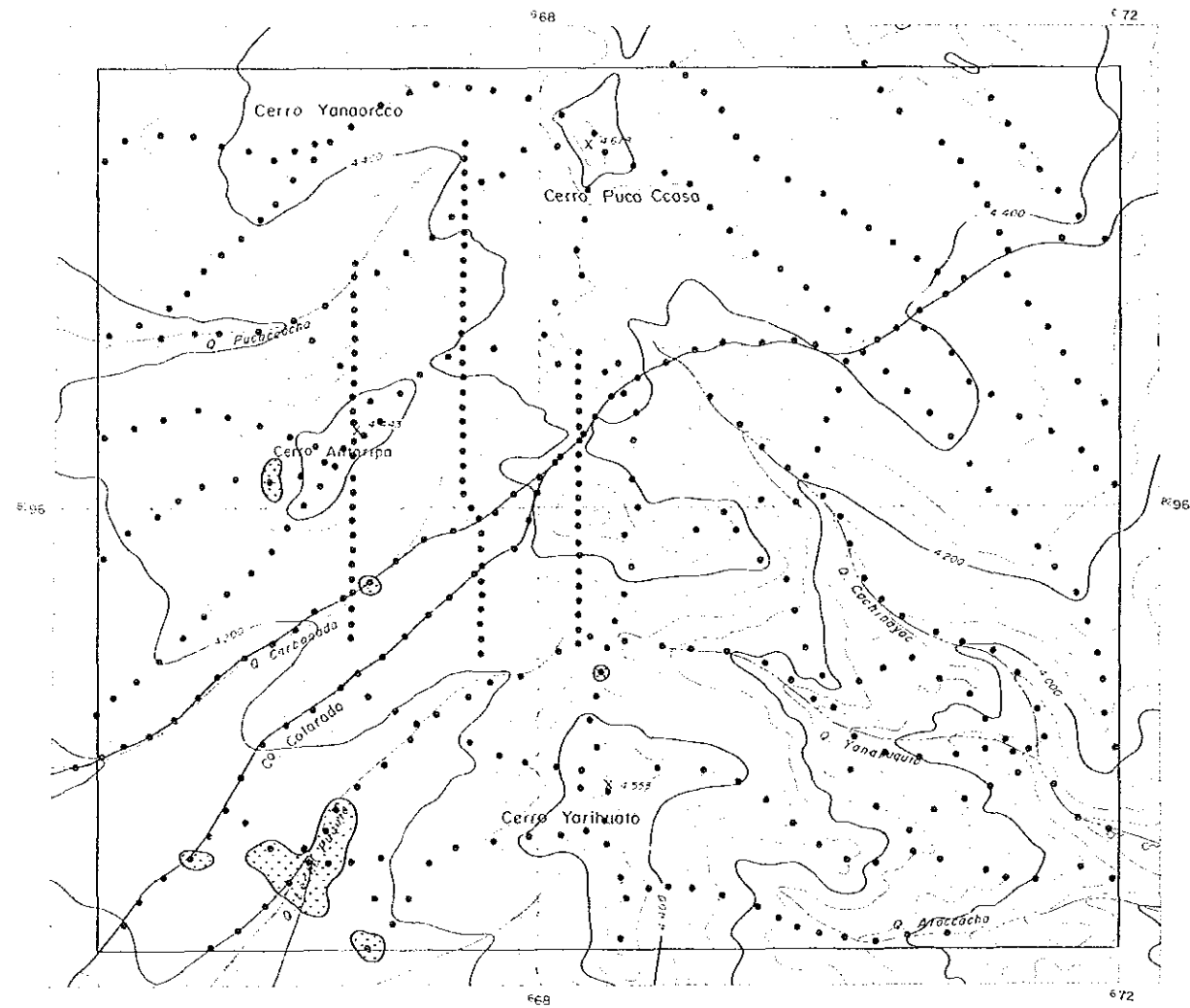




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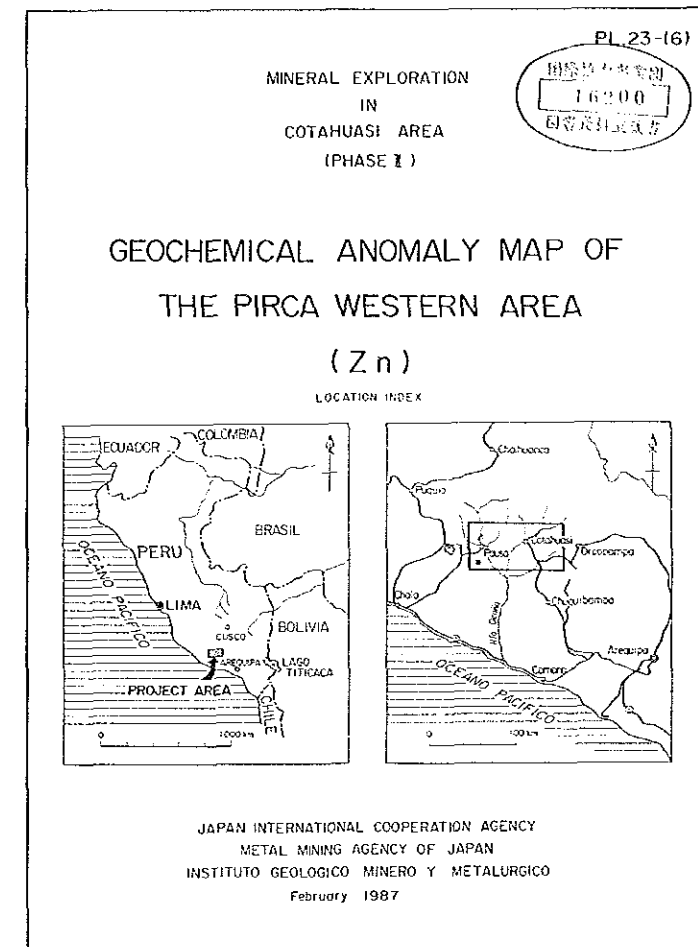
Symbol	Classification	Contents (in ppm)
	Anomaly A ↑ M+30'	$Pb \geq 42.1$
	Anomaly B ↑ M+20'	$42.1 > Pb \geq 21.1$
	High back-ground ↑ M+10'	$21.1 > Pb \geq 10.6$





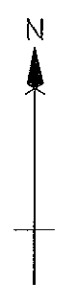
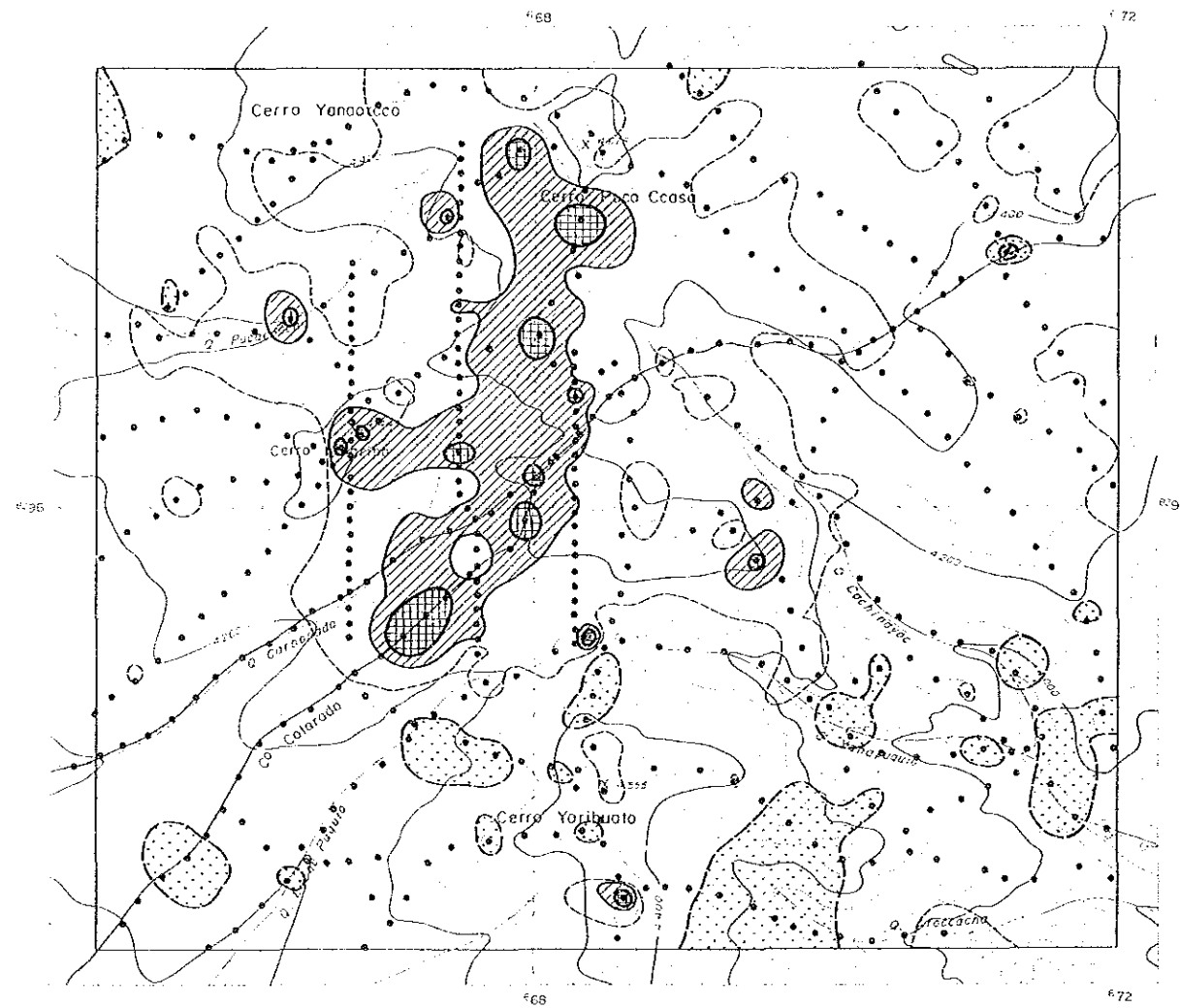
LEGEND

Symbol	Classification	Contents (in ppm)
	High background	146.1 > Zn ≥ 93.5
	M+10'	



PL 23-16)

16200



LEGEND

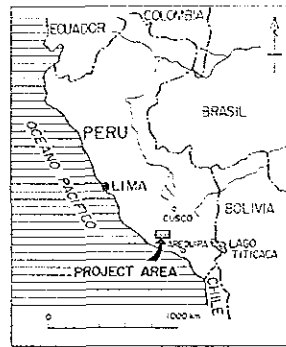
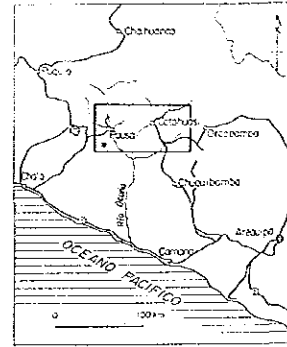
Symbol	Score	Classification
	M+2σ 2.49	+ Anomaly
	M+σ 1.24	+ High background
	M 0	Background
	M-σ -1.24	- High background
	M-2σ -2.49	- Anomaly

16200 PL-24-11  
国産協力調査団  
国産資料室蔵

MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)


GEOCHEMICAL ANOMALY MAP  
BY PRINCIPAL COMPONENT ANALYSIS,  
PIRCA WESTERN AREA  
(FIRST : Z<sub>1</sub>)

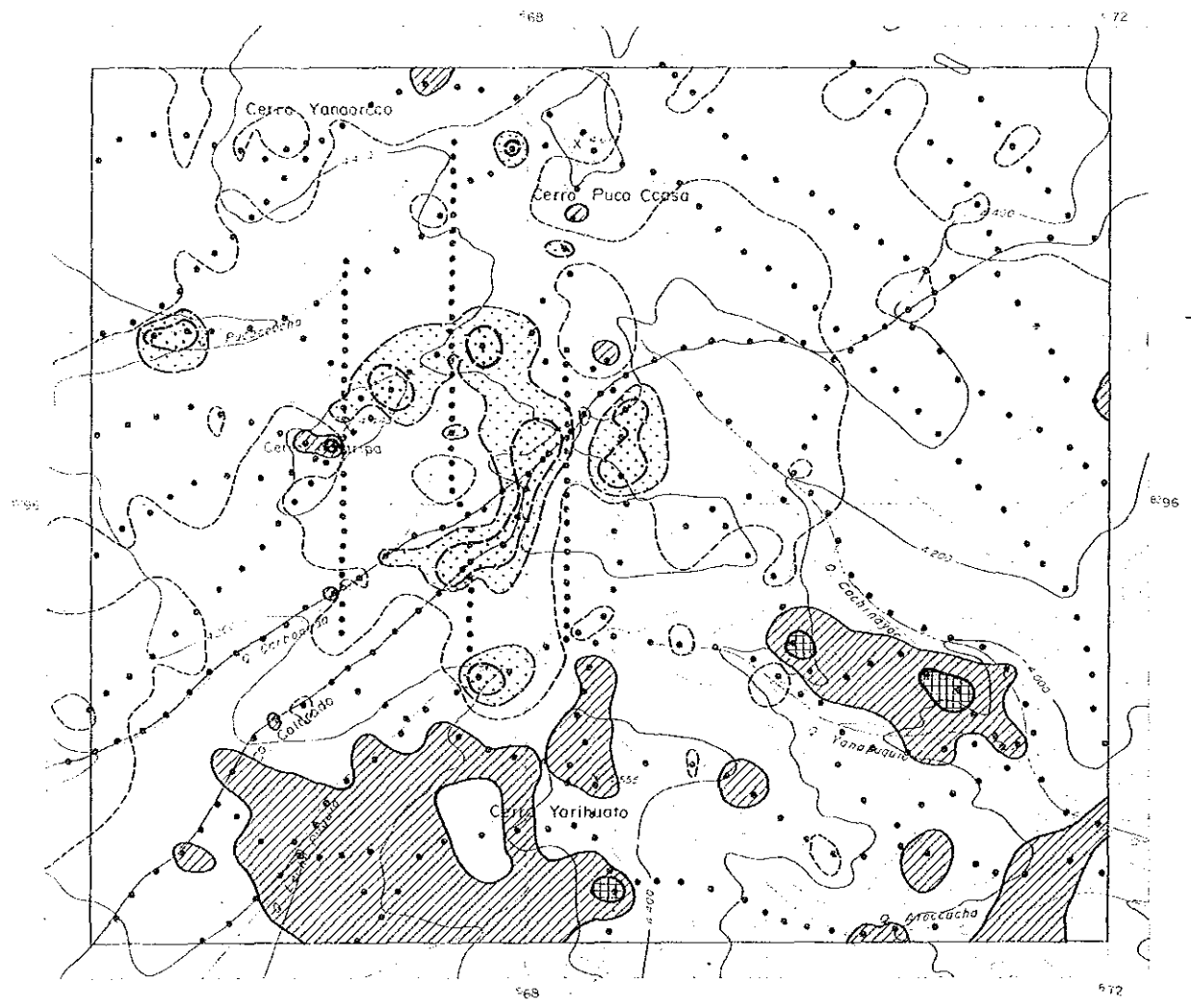
LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
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February 1987

Scale 1 : 25,000





LEGEND

Symbol	Score	Classification
	M+26 - 2.25	+ Anomaly
	M+6 - 1.12	+ High background
	M - 0	Background
	M-6 - -1.12	- High background
	M-26 - -2.25	- Anomaly

国務院地质部 24-(2)  
16200  
地质部地质研究所

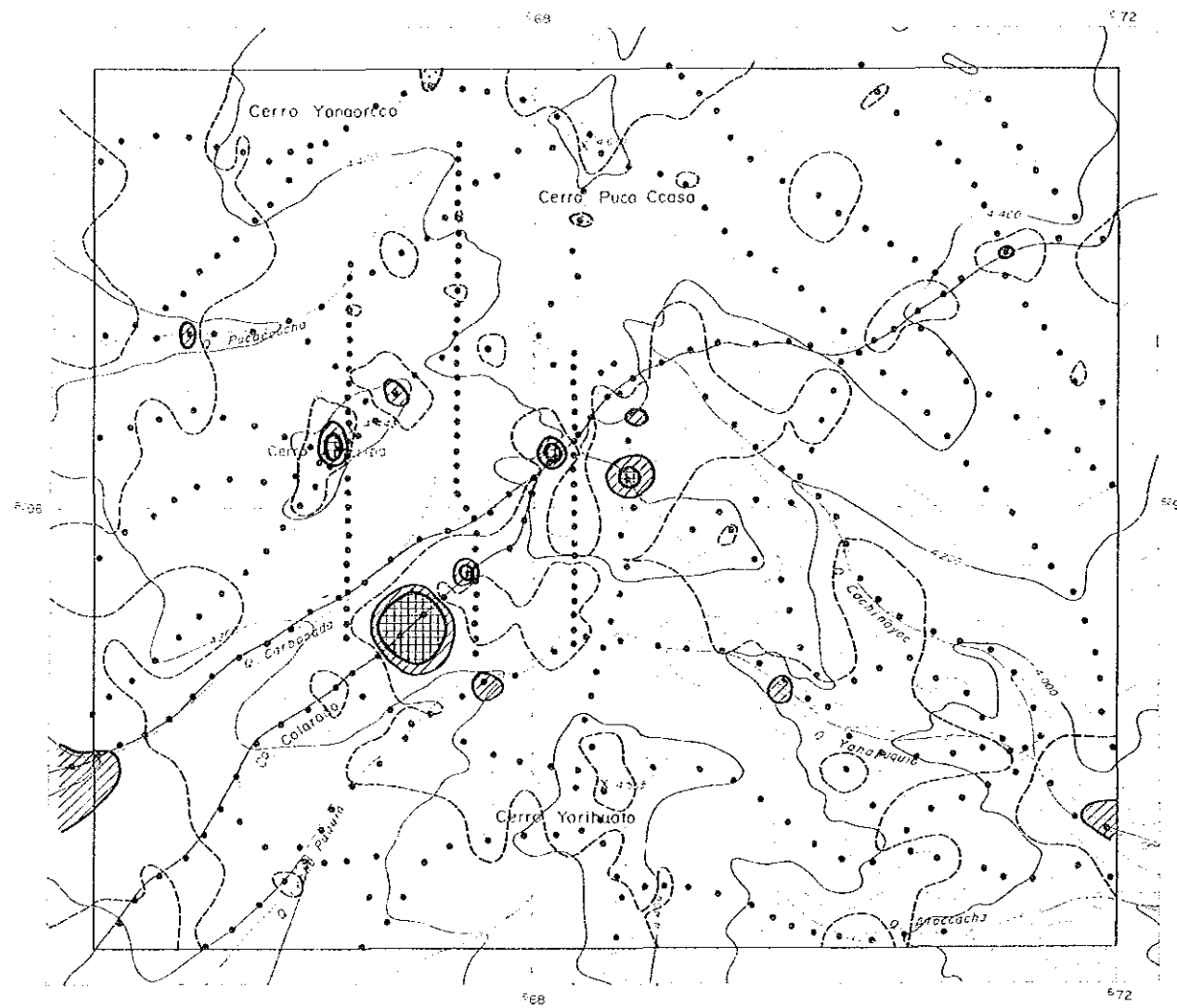
MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

GEOCHEMICAL ANOMALY MAP  
BY PRINCIPAL COMPONENT ANALYSIS,  
PIRCA WESTERN AREA  
( SECOND : Z<sub>2</sub> )

LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987

Scale 1 : 25,000



LEGEND



Symbol	Score	Classification
	M+2σ 1.98	+ Anomaly
	M+σ 0.99	+ High background
	M - 0	Background
	M-σ -0.99	- High background
	M-2σ -1.98	- Anomaly

国際協力事業団(3)  
16200  
図書院蔵

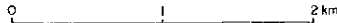
MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

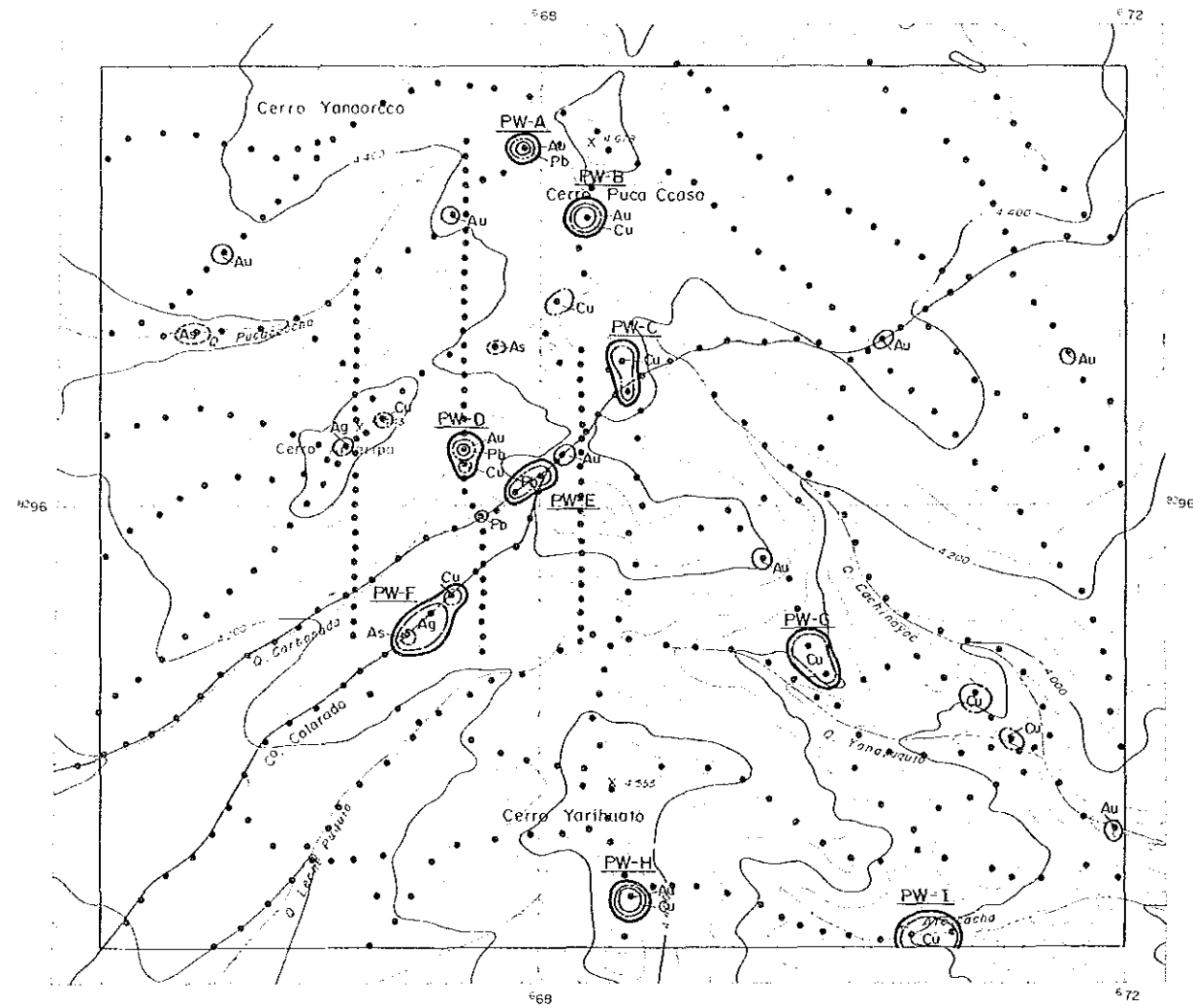
**GEOCHEMICAL ANOMALY MAP**  
BY PRINCIPAL COMPONENT ANALYSIS,  
PIRCA WESTERN AREA  
( THIRD : Z3 )

LOCATION INDEX

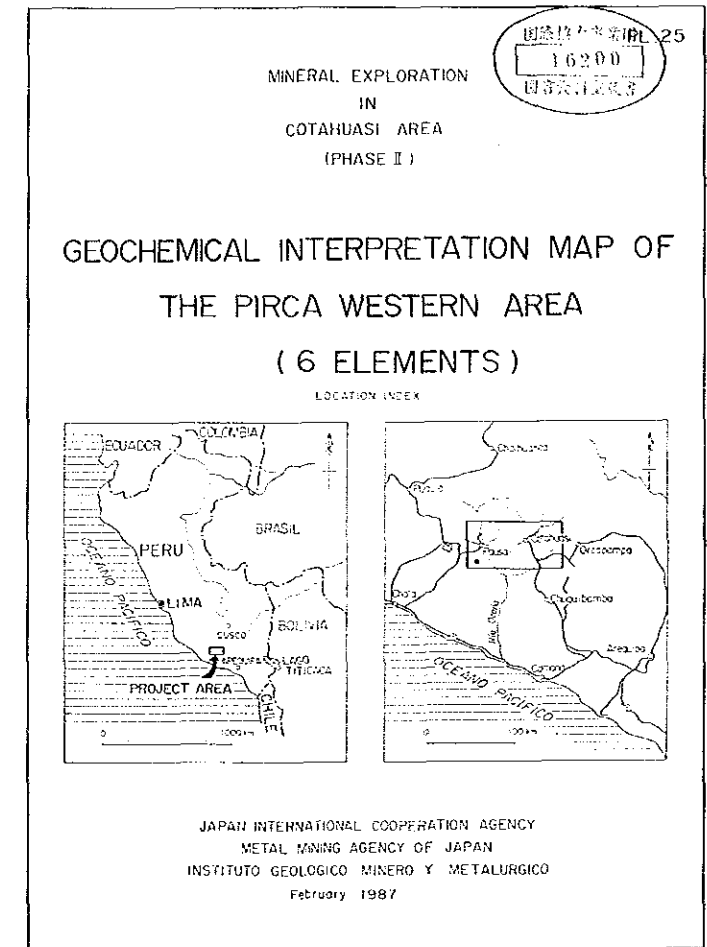
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METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987

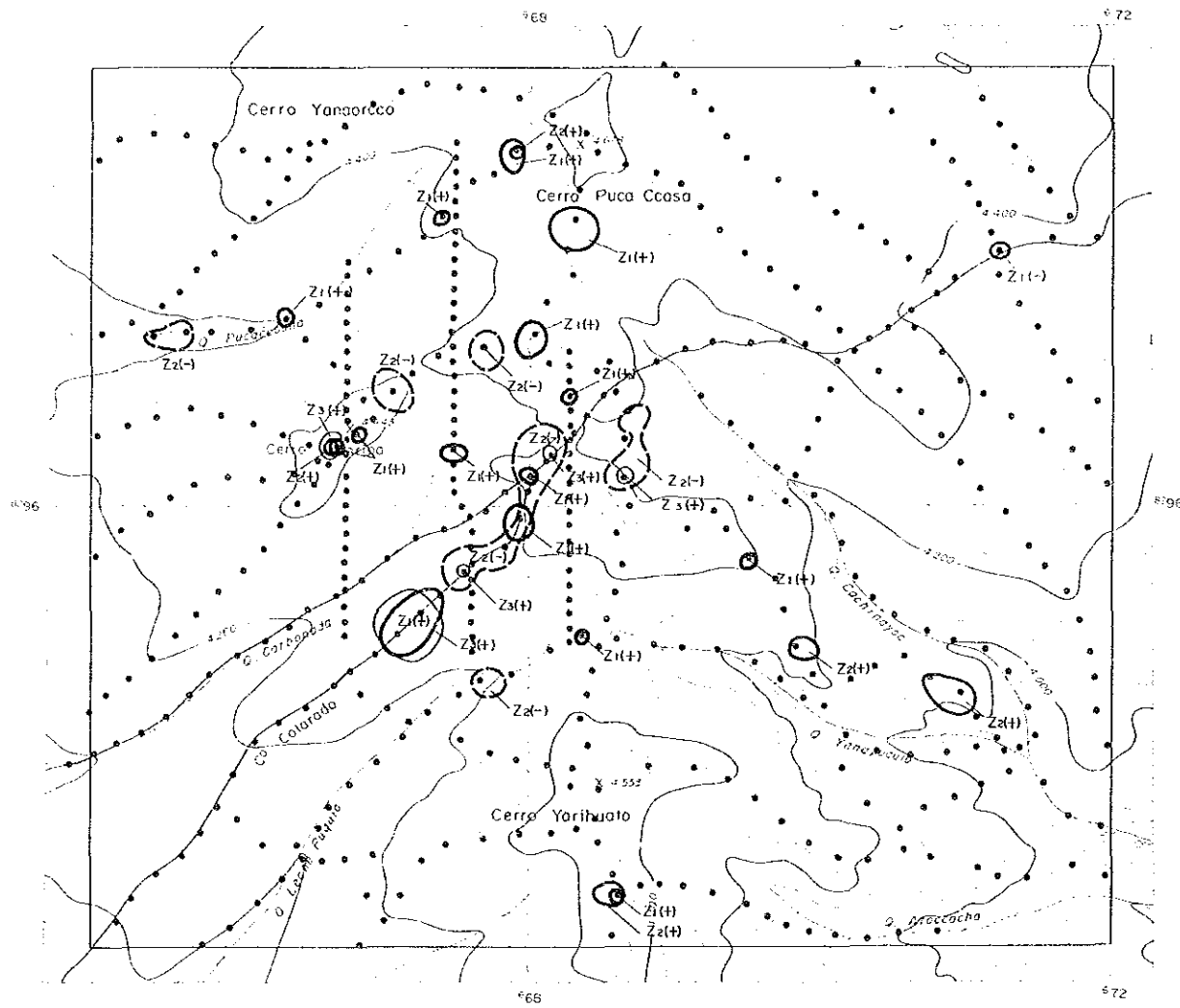
Scale 1 : 25,000  




LEGEND

- Anomaly Zone
- PW-A : Name of Anomaly Zone
- Au Anomaly : Au  $\geq$  7.8 ppb
- Ag Anomaly : Ag  $\geq$  0.13 ppm
- As Anomaly : As  $\geq$  41.7 ppm
- Cu Anomaly : Cu  $\geq$  89.8 ppm
- Pb Anomaly : Pb  $\geq$  21.2 ppm
- Zn Anomaly : Zn  $\geq$  146.1 ppm





LEGEND

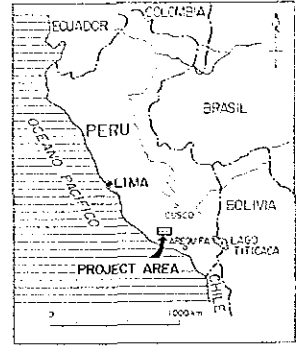

Principal Component	Anomaly	
	+	-
1st	Z1(+)	Z1(-)
2nd	Z2(+)	Z2(-)
3rd	Z3(+)	Z3(-)

16200 26  
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 国書院科学図書


MINERAL EXPLORATION  
 IN  
 COTAHUASI AREA  
 (PHASE I)

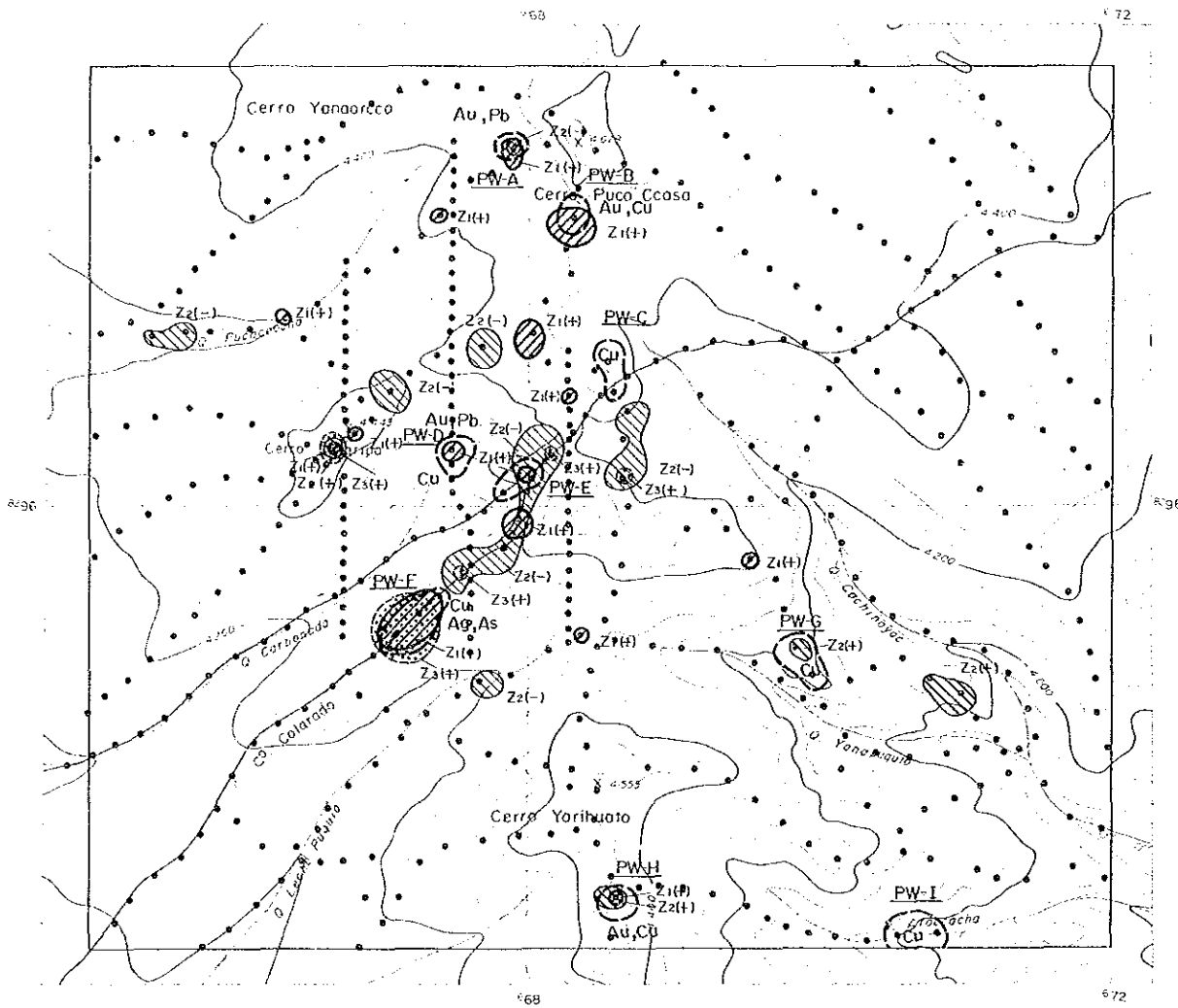
GEOCHEMICAL INTERPRETATION MAP OF  
 PRINCIPAL COMPONENT ANOMALY,  
 PIRCA WESTERN AREA

LOCATION INDEX

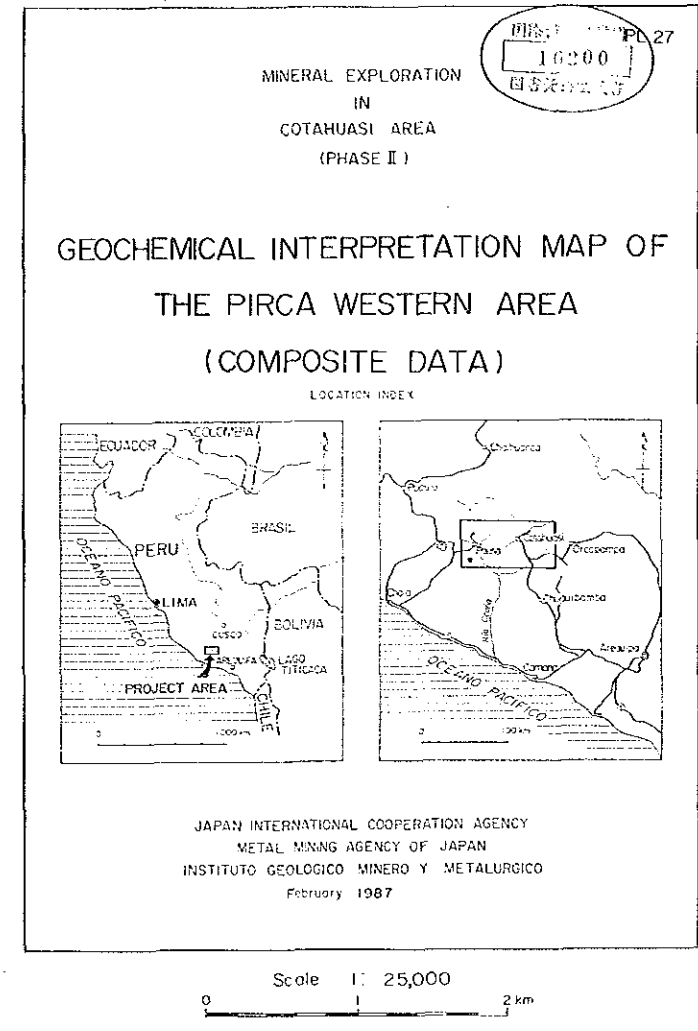
JAPAN INTERNATIONAL COOPERATION AGENCY  
 METAL MINING AGENCY OF JAPAN  
 INSTITUTO GEOLOGICO MINERO Y METALURGICO  
 February 1987

Scale 1:25,000  


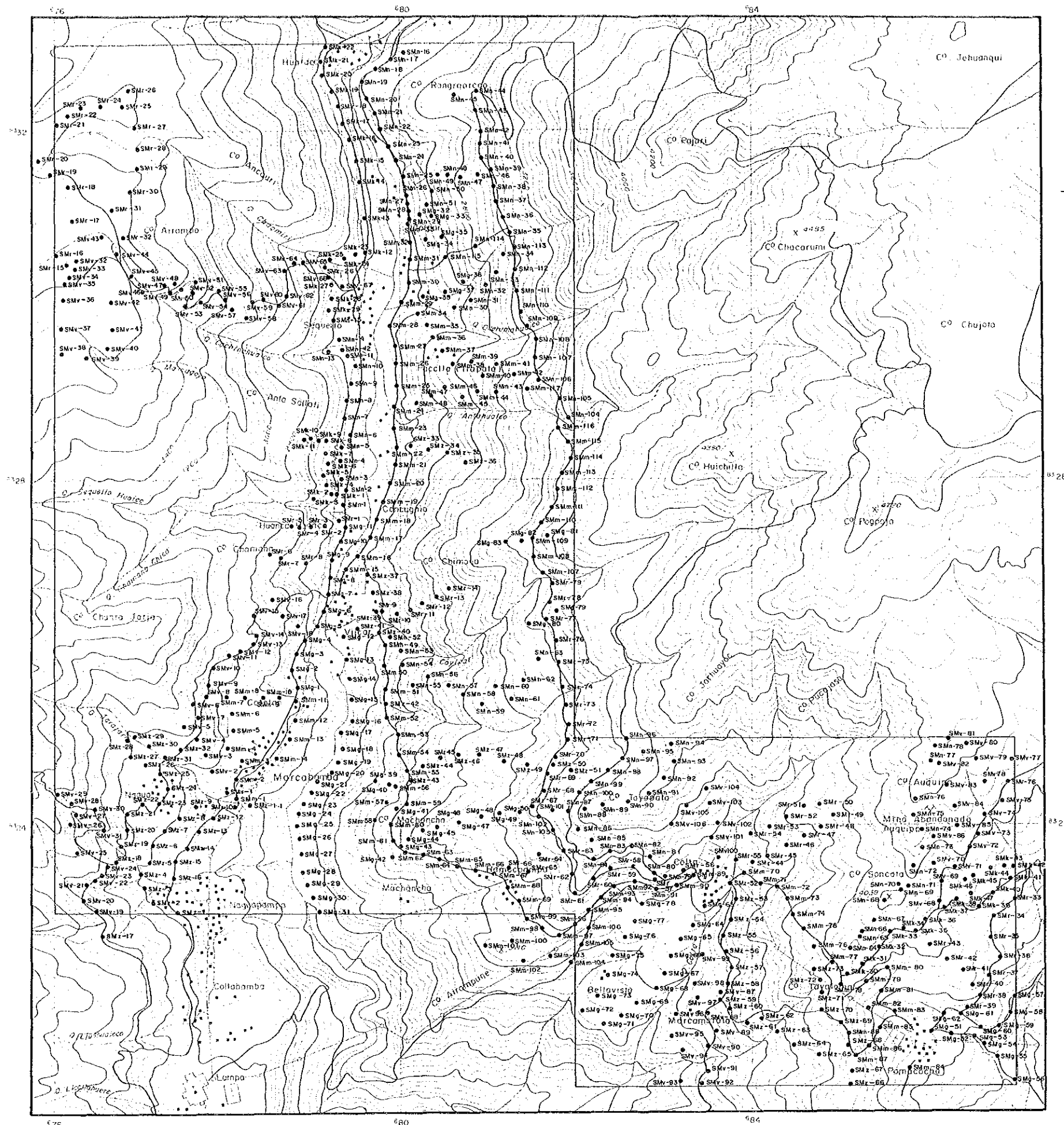


LEGEND

- Geochemical Anomaly
- <Univariate Analysis>
- Anomaly Zone and Anomalous Elements
  - PW-A Name of Anomaly Zone
- <Principal Components Analysis>
- 1st Principal Component
    - Z<sub>1</sub>(+) + Anomaly
    - Z<sub>1</sub>(-) - Anomaly
  - 2nd Principal Component
    - Z<sub>2</sub>(+) + Anomaly
    - Z<sub>2</sub>(-) - Anomaly
  - 3rd Principal Component
    - Z<sub>3</sub>(+) + Anomaly
    - Z<sub>3</sub>(-) - Anomaly



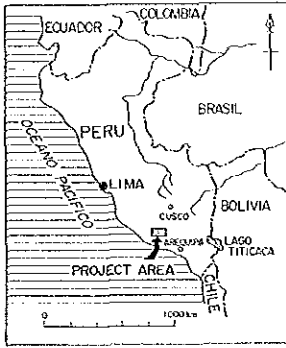
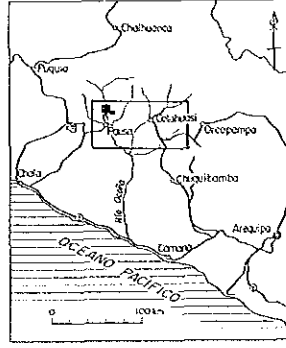




MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)


LOCATION MAP OF GEOCHEMICAL  
SOIL SAMPLES OF  
THE MARCABAMBA AREA

LOCATION INDEX

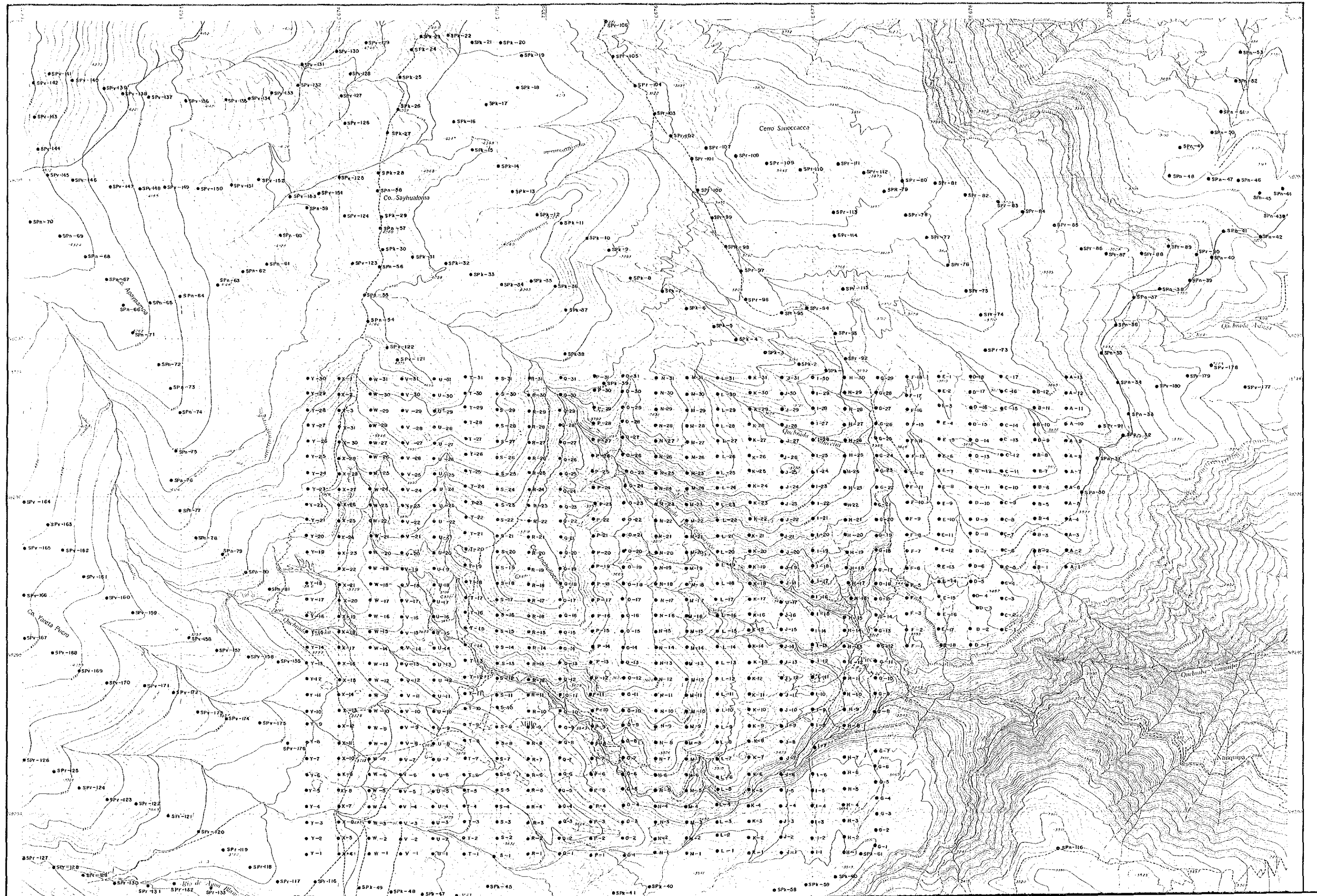



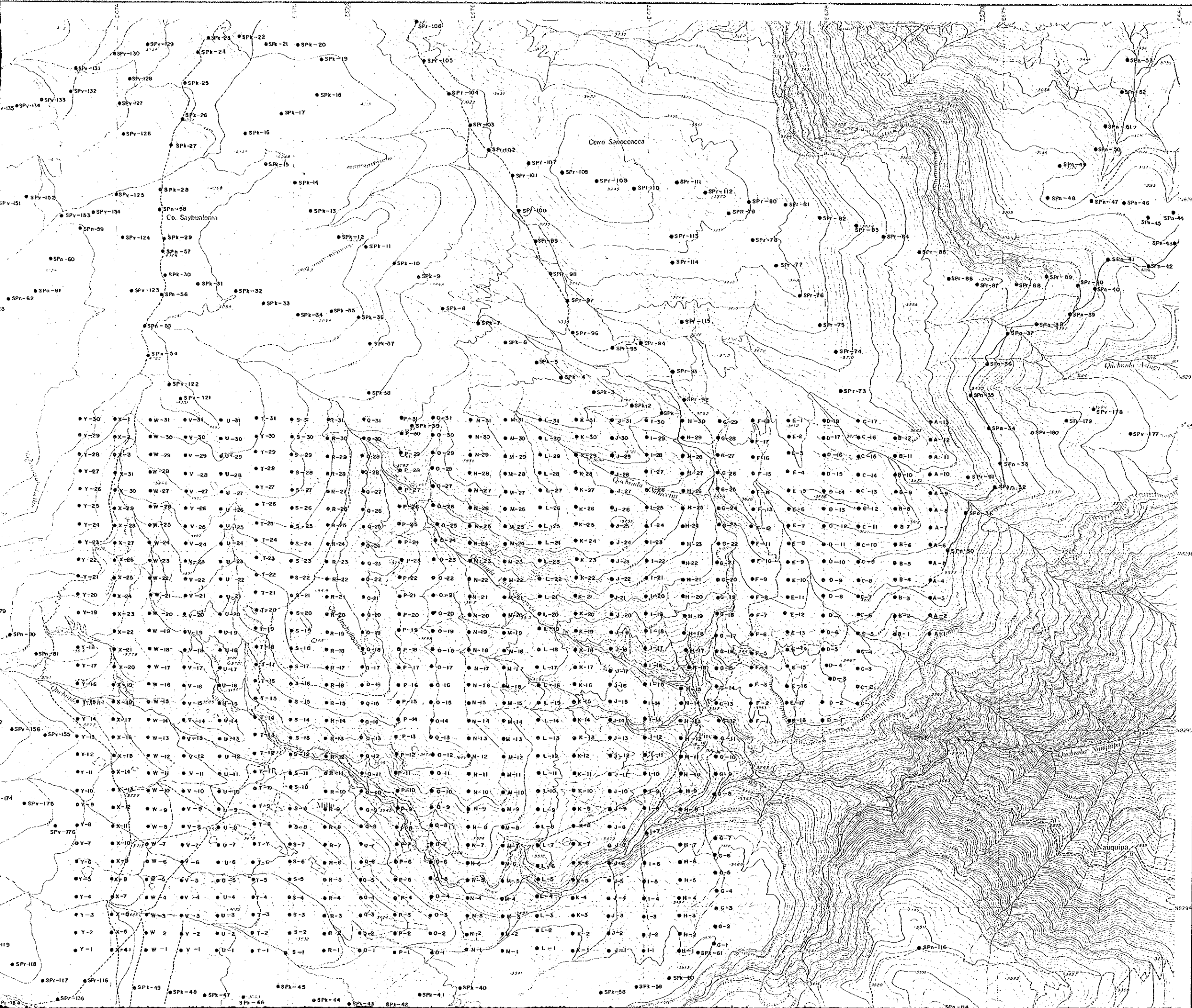
JAPAN INTERNATIONAL COOPERATION AGENCY  
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February 1987

Scale 1 : 25,000



PL. 28  
16300  
G17240004




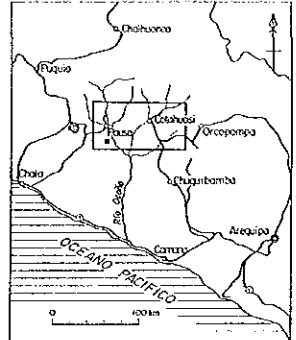


PL-29

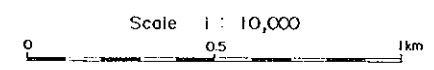
MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

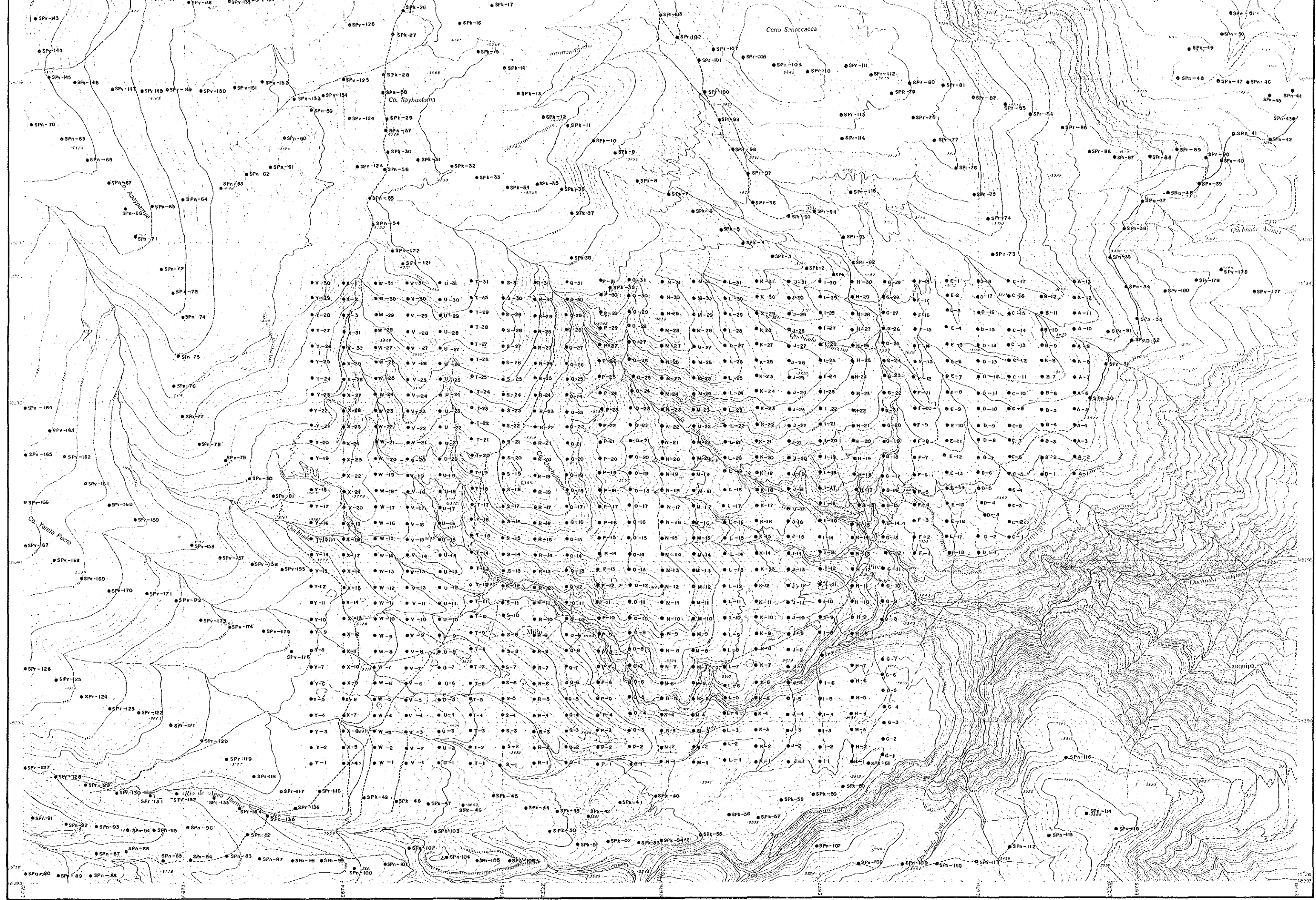
LOCATION MAP OF GEOCHEMICAL  
SOIL SAMPLES OF  
THE PIRCA EASTERN AREA

LOCATION INDEX

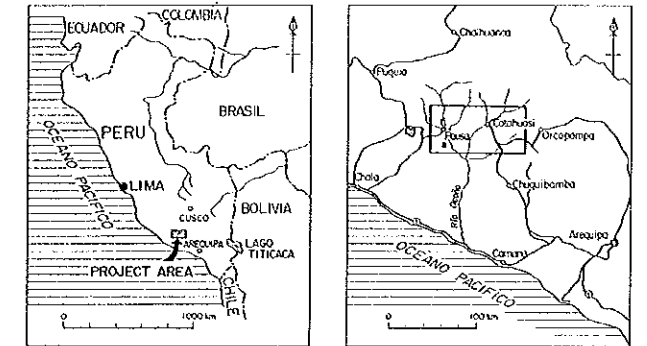
JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987





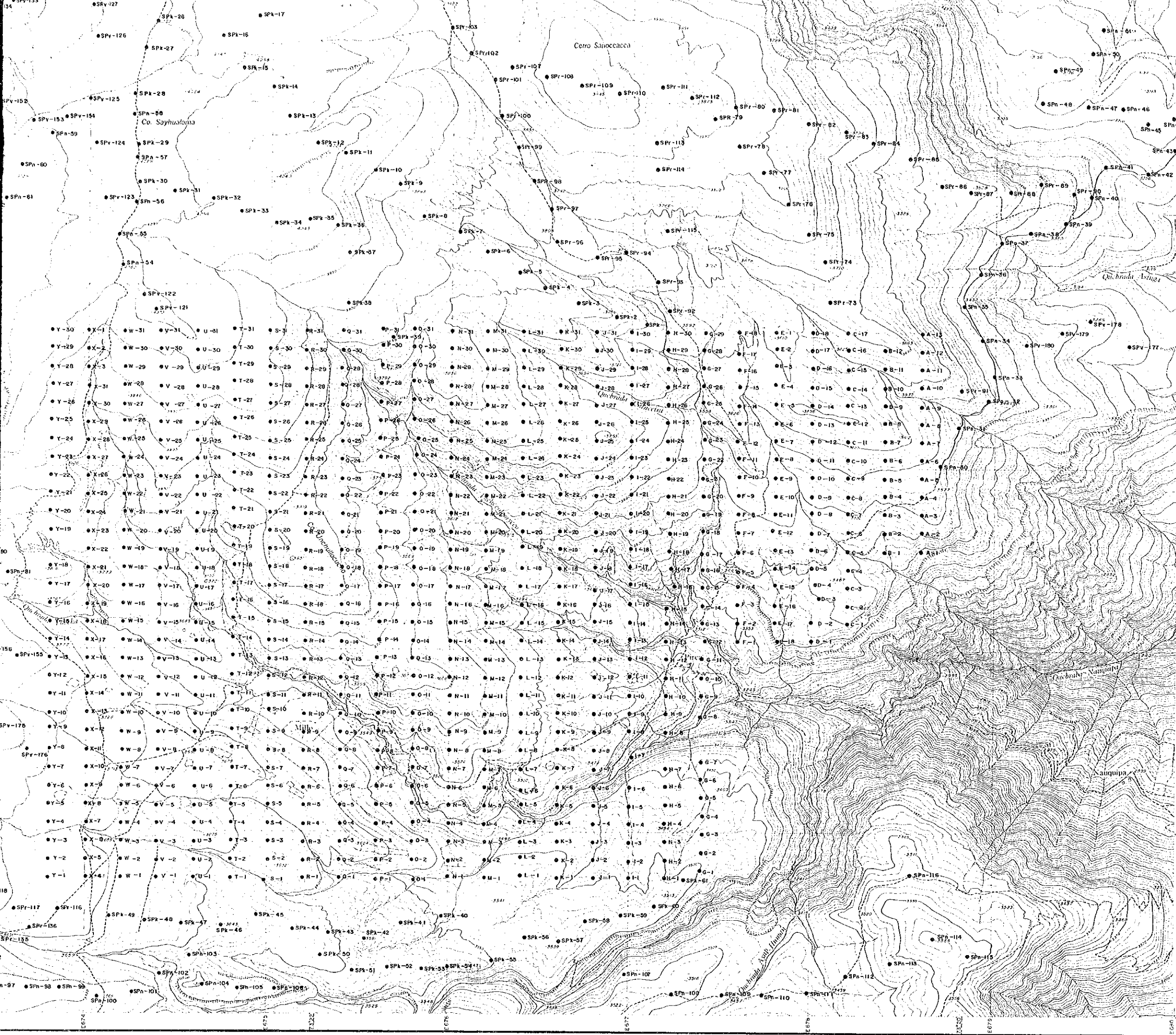
LOCATION MAP OF GEOCHEMICAL  
SOIL SAMPLES OF  
THE PIRCA EASTERN AREA

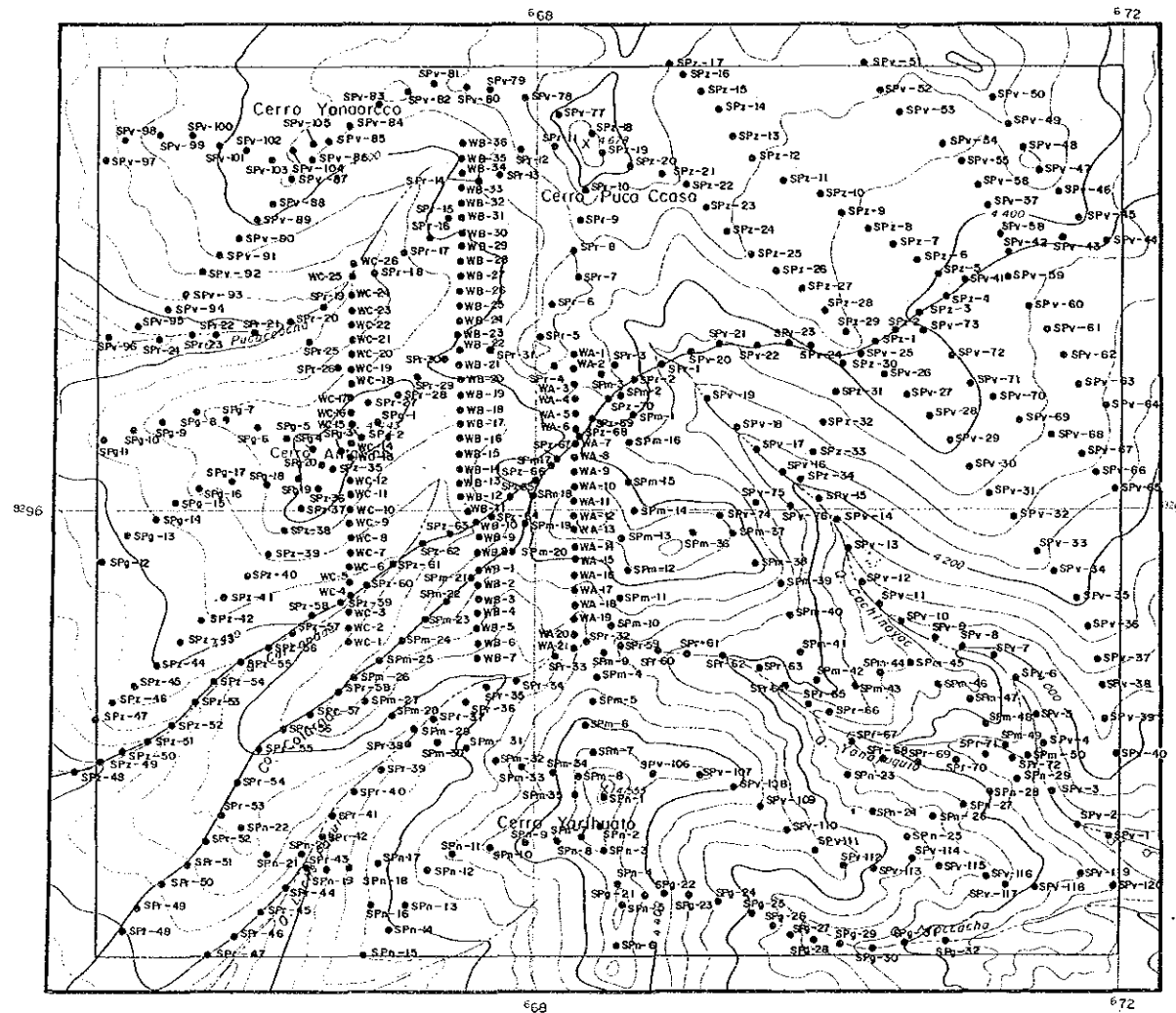
LOCATION INDEX



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METAL MINING AGENCY OF JAPAN  
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February 1987

Scale 1 : 10,000  
0 05 1 km





PL. 30  
 國際地質年表  
 16200  
 圖書分類號

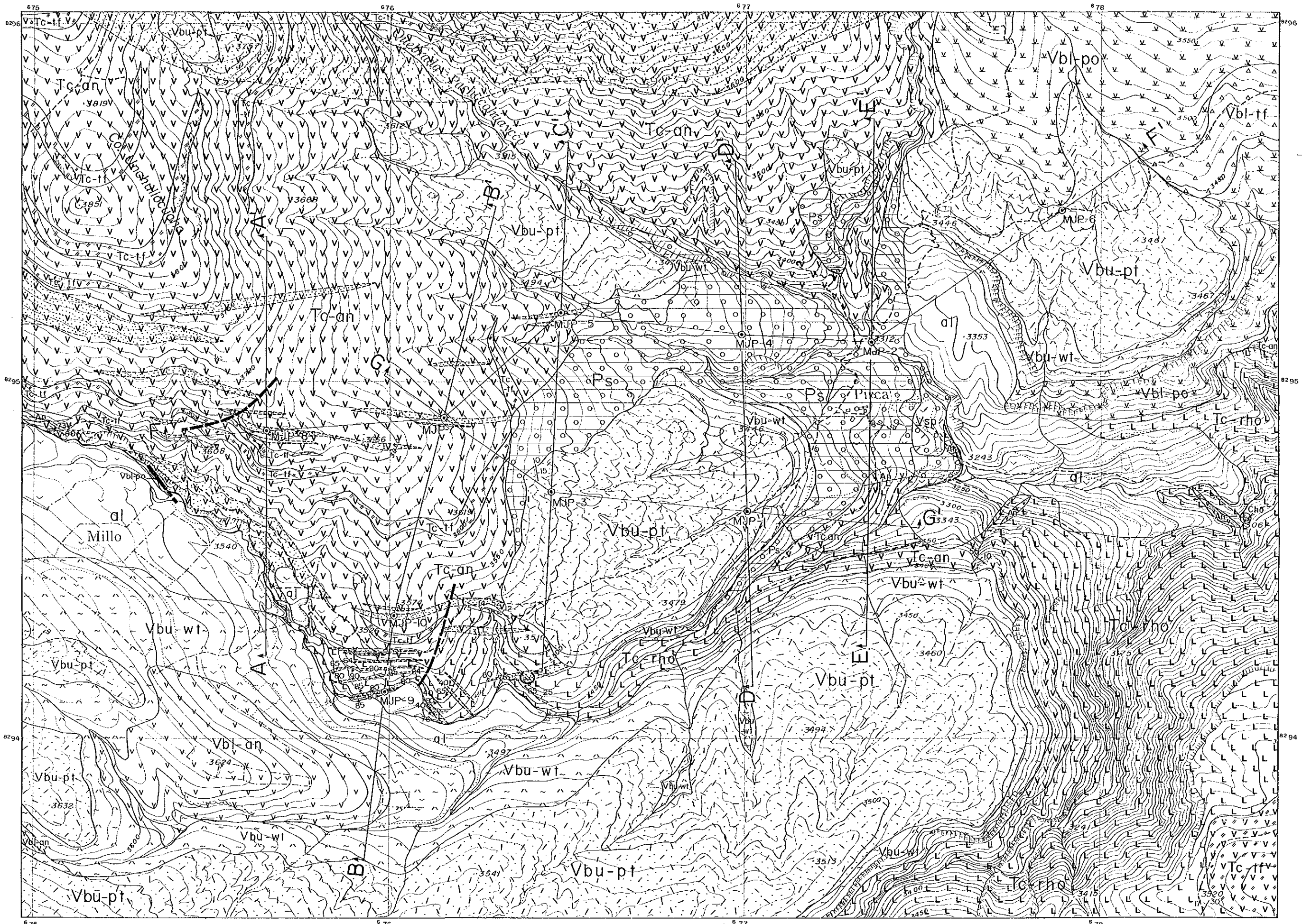
MINERAL EXPLORATION  
 IN  
 COTAHUASI AREA  
 (PHASE II)

LOCATION MAP OF GEOCHEMICAL  
 SOIL SAMPLES OF  
 THE PIRCA WESTERN AREA

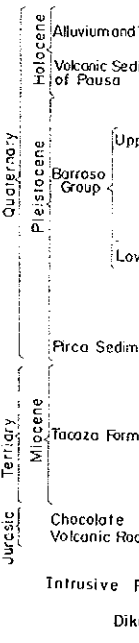
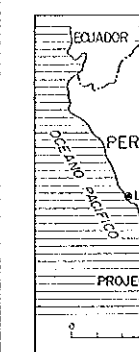
LOCATION INDEX

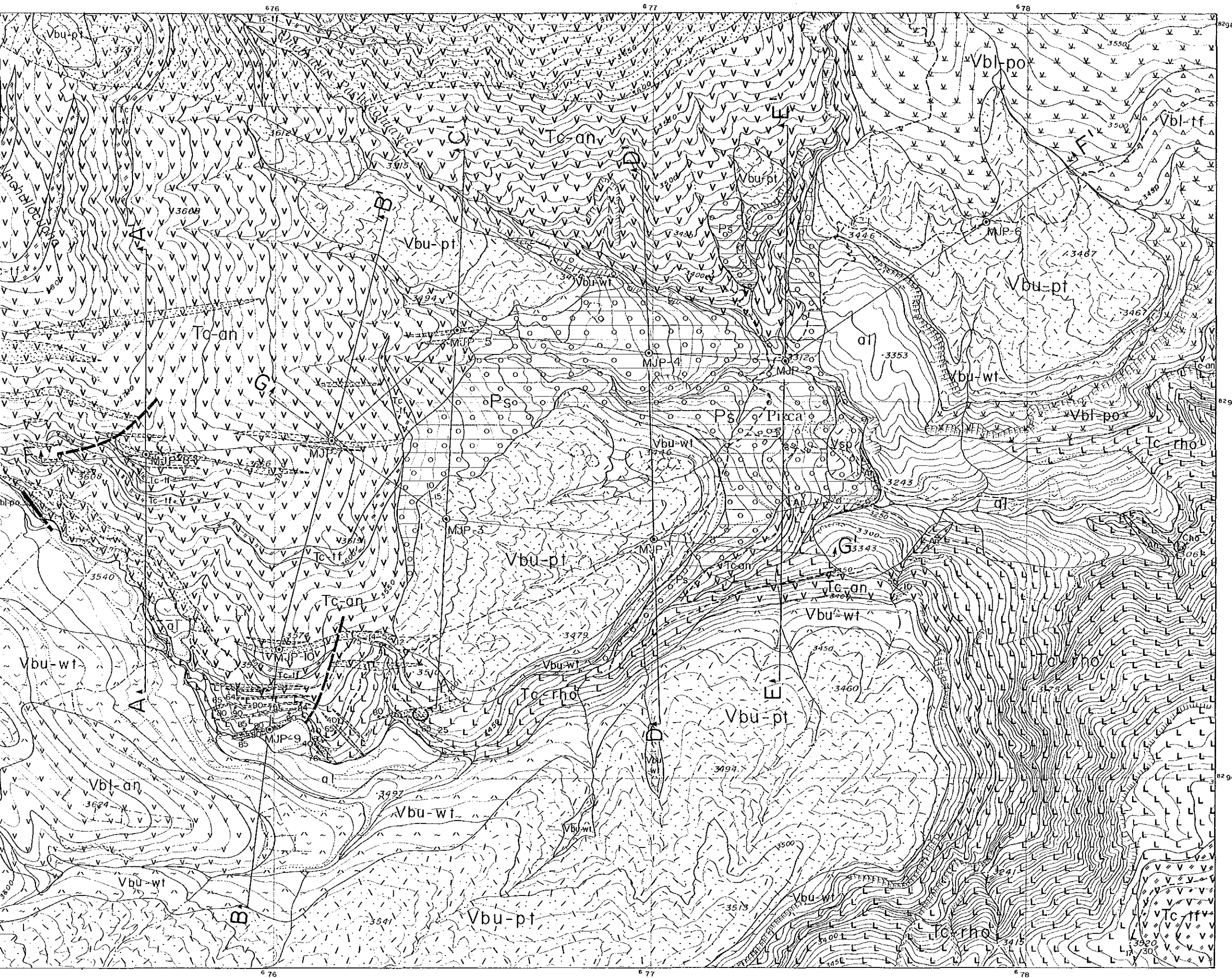
JAPAN INTERNATIONAL COOPERATION AGENCY  
 METAL MINING AGENCY OF JAPAN  
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 February 1987

Scale 1 : 25,000



OF THE





PL 31  
1:5,000

MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

## GEOLOGICAL MAP OF THE PIRCA SOUTHEASTERN AREA

LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION AGENCY  
METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METALURGICO  
February 1987

Scale 1 : 5,000  
0 0.1 0.2 0.3 0.4 0.5 km

### LEGEND

Quaternary	Holocene	al	Gravel, sand, silt and clay	
		vso	Volcanic ash and gravel	
	Pleistocene	Upper	vbu-pi	Pumice fall and tuffaceous sand
			vbu-wi	Dacite, dacitic tuff and welded tuff
		Lower	vbi-an	Olivine basalt and pyroxene andesite lavas
			vbi-tf	Andesitic tuff, lapilli tuff and tuff breccia
	Pirca Sediment	Upper	vbi-po	Hornblende andesite lava
			ps	Gravel, sand, silt and clay
		Lower	vbi-rh	Andesitic volcanic breccia
			vbi-rh	Andesite lava with thin bedded tuff, lapilli tuff and tuff breccia
Tertiary	Miocene	vbi-rh	Rhyolite lava, tuff and lapilli tuff	
		vbi-rh	Andesitic tuff breccia	
		vbi-rh	Andesite lava with thin bedded tuff, lapilli tuff and tuff breccia	
Jurassic	Volcanic Rocks	vbi-rh	Andesitic tuff breccia	
		vbi-rh	Andesite lava with thin bedded tuff, lapilli tuff and tuff breccia	
		vbi-rh	Intrusive Rock	
		vbi-rh	Dike	

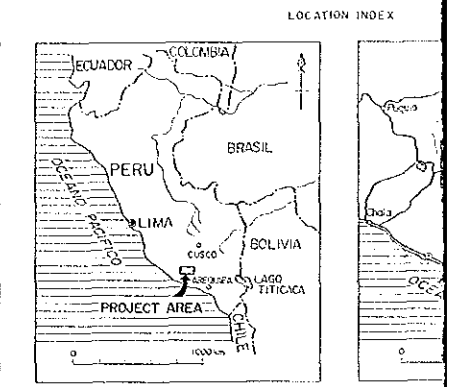
  

	Fault
40 80	Strike and dip of bedding
80 70	Strike and dip of contact plane
	Strong alteration zone
	Quartz vein
⊙	Location of drilling
A—A	Geological profile line

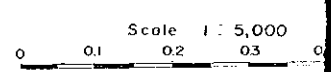


MINERAL EXPLORATION  
IN  
COTAHUASI AREA  
(PHASE II)

### GEOLOGICAL PROJECT OF THE PIRCA SOUTHEAST

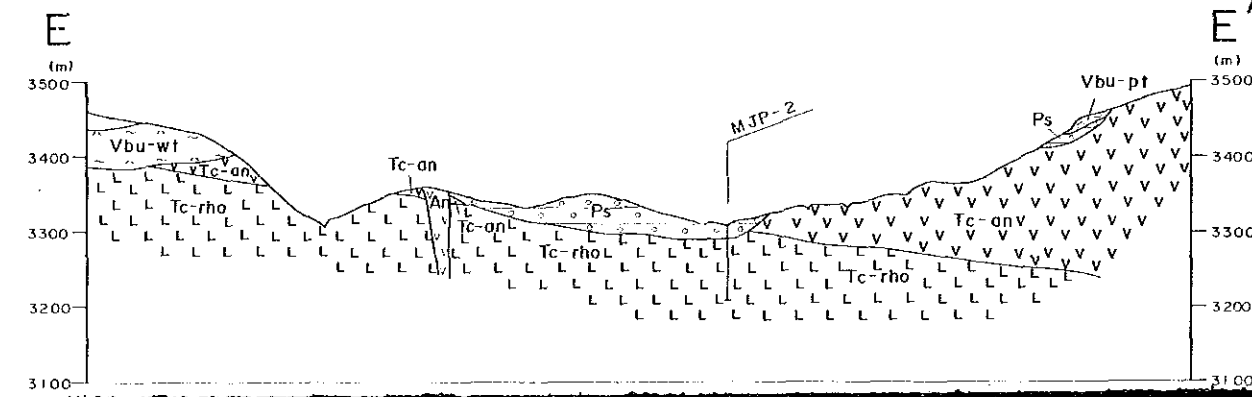
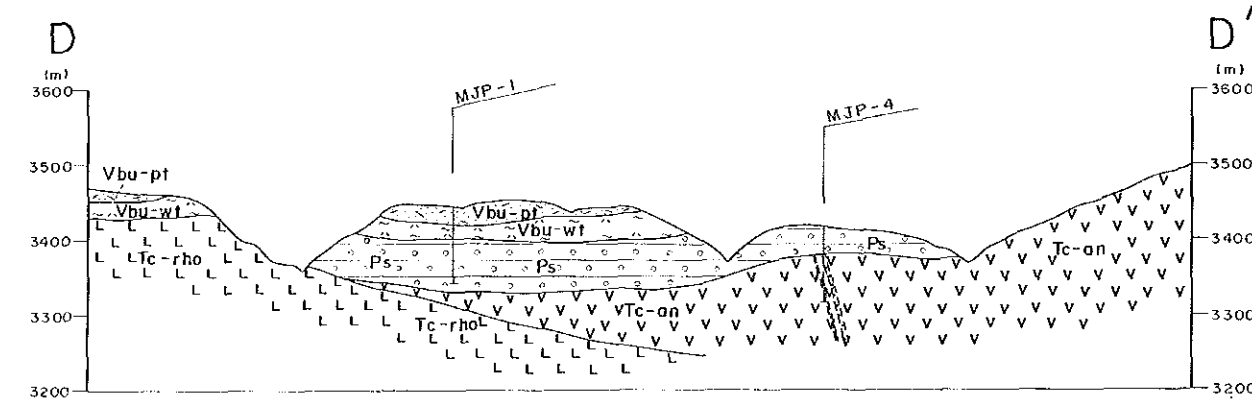
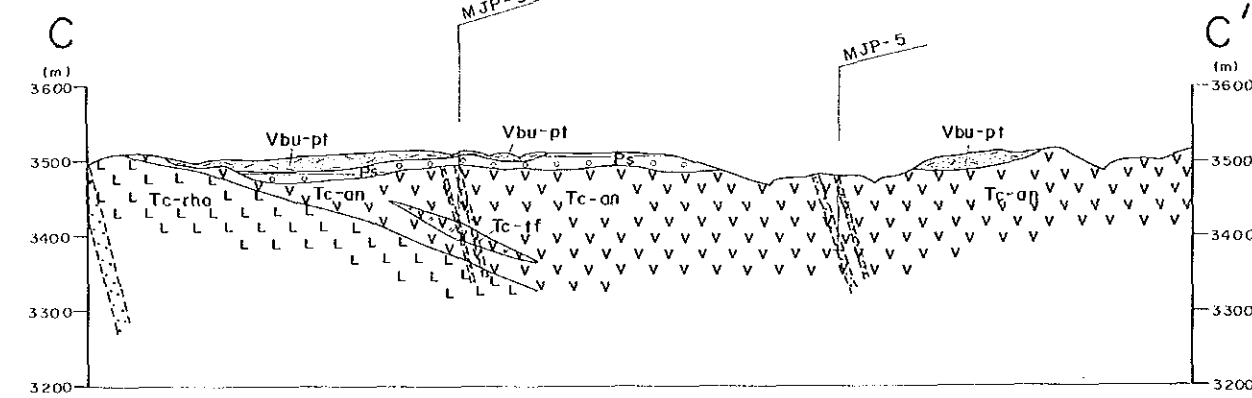
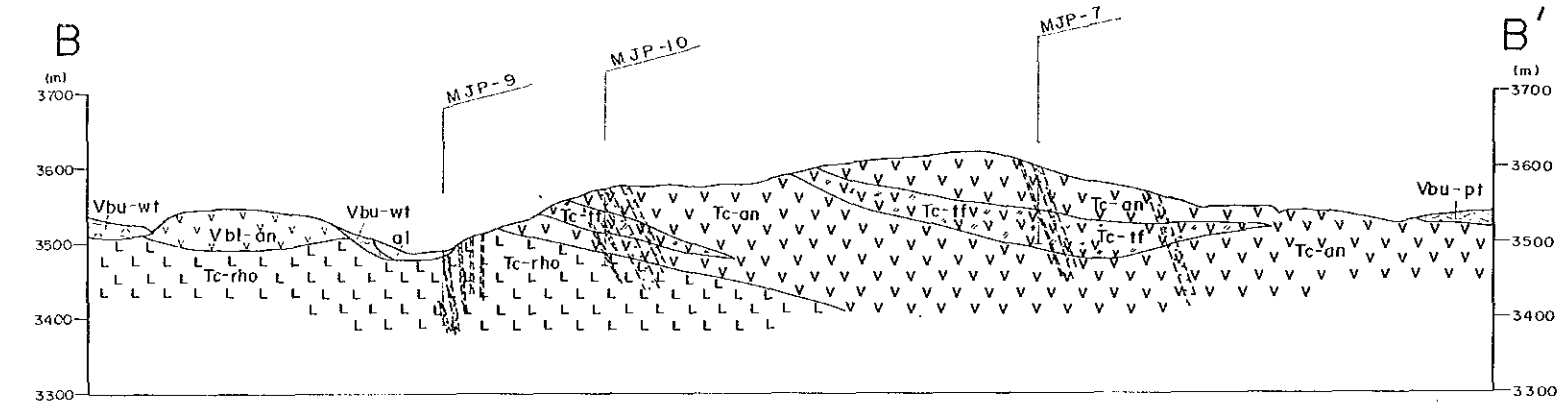
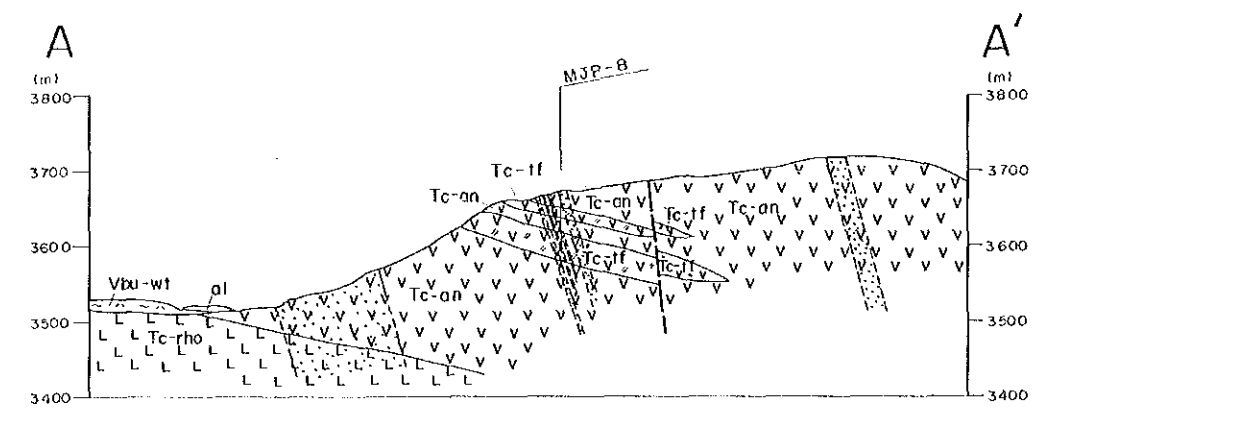


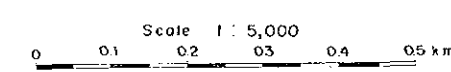
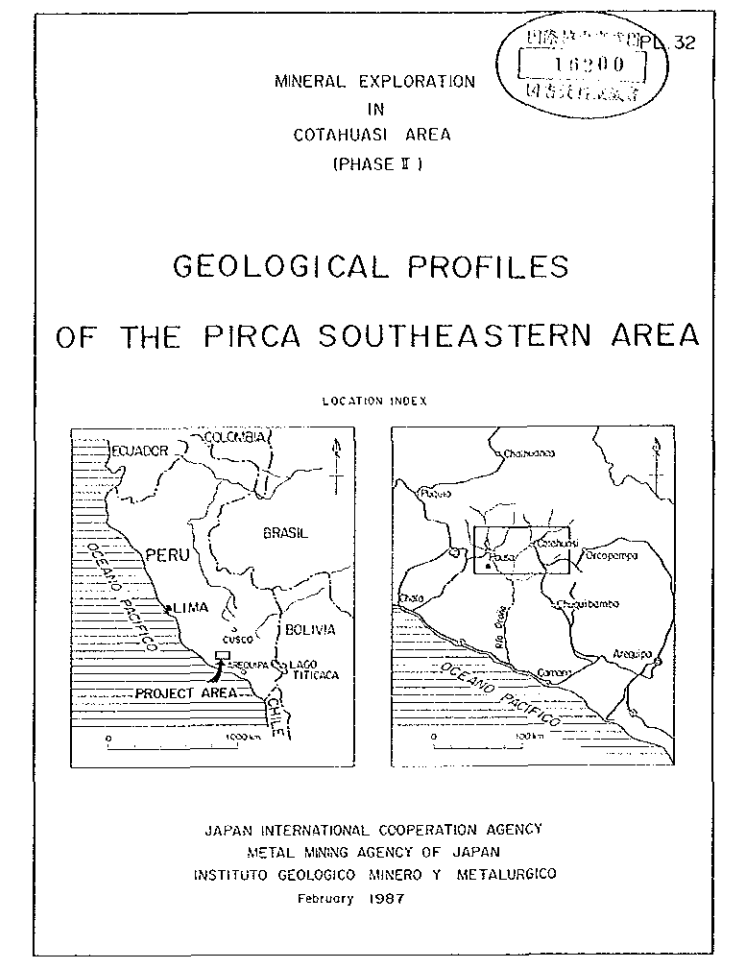
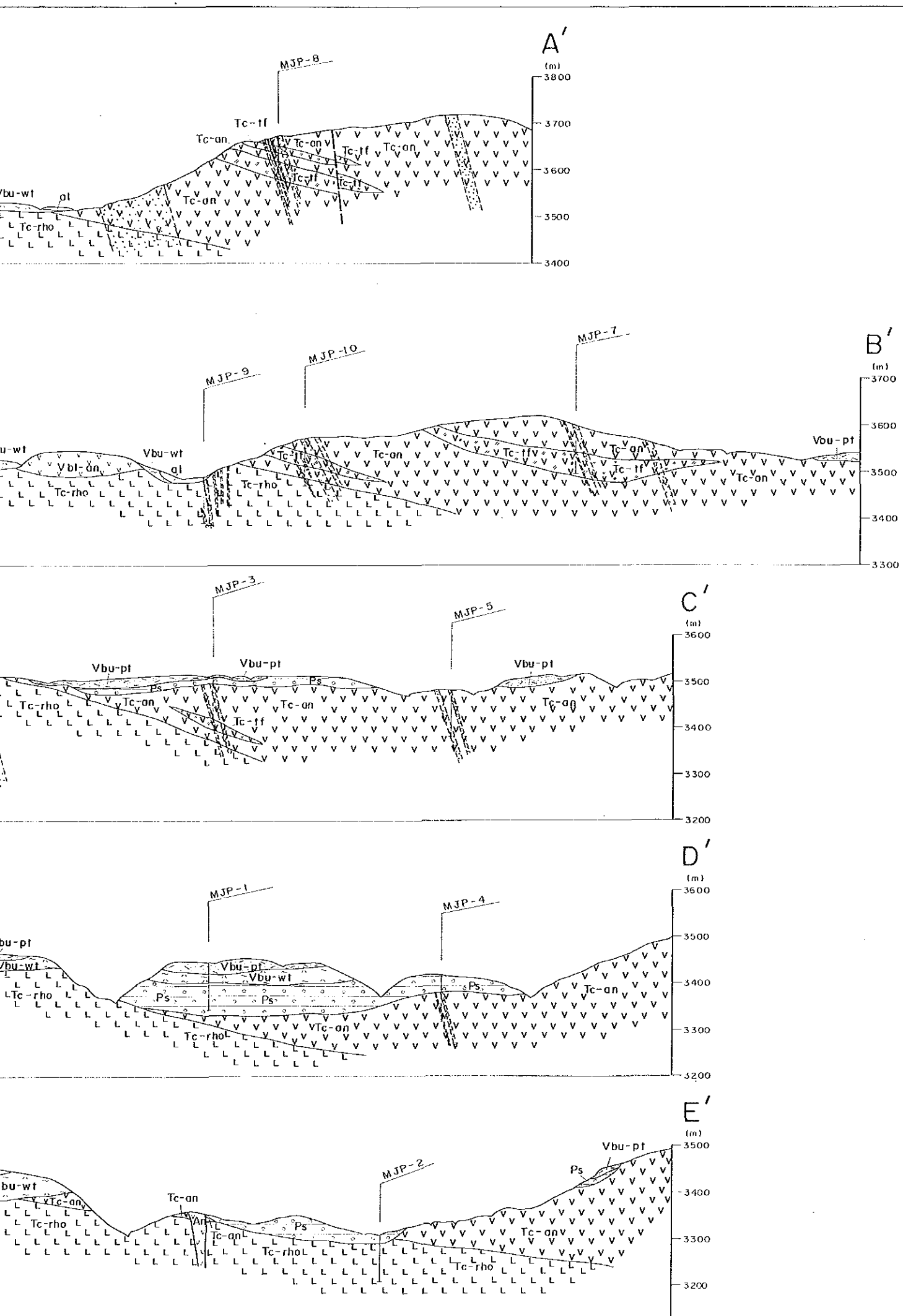
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METAL MINING AGENCY OF JAPAN  
INSTITUTO GEOLOGICO MINERO Y METEOROLOGICO DE PERU  
February 1987



#### LEGEND

Quaternary	Alluvium and Talus		al	Gravel, sand, silt and clay	
	Volcanic Sediment of Pausa		avsp	Volcanic ash and gray sand	
	Upper	Pumice fall and tuff		vbrpi	
		Dacite, dacitic tuff and andesite		vbuu	
		Olivine basalt and pyroclast		vbl-an	
		Andesitic tuff, lapilli and tuff		vbl-if	
	Lower	Hornblende andesite lavas		vbl-po	
		Gravel, sand, silt and clay		ps	
	Pirca Sediment	Gravel, sand, silt and clay		ps	
		Andesitic volcanic breccia		v-an	
Andesite lava with tuff and tuff breccia		v-an			
Miocene	Tocaza Formation		v-an	Andesite lava with tuff and tuff breccia	
			v-rho	Rhyolite lava, tuff and ash	
	Chocolate Volcanic Rocks		v-cho	Andesitic tuff breccia	
	Intrusive Rock		v-an	Hornblende andesite	
Jurassic	Dike		v-an	Hornblende andesite	
	Fault		- - -		
	Strike and dip of fault		20/80		
	Strike and dip of fault		80/70		
Strong alteration zone		--- ---			
Quartz vein		--- ---			
Location of drill hole		MJP-1			



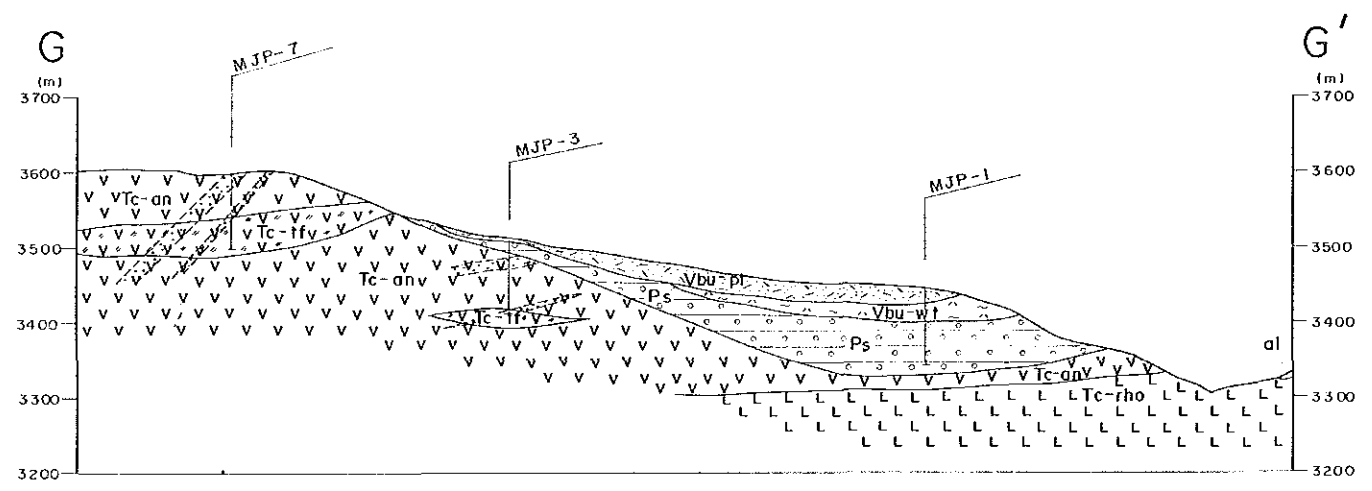
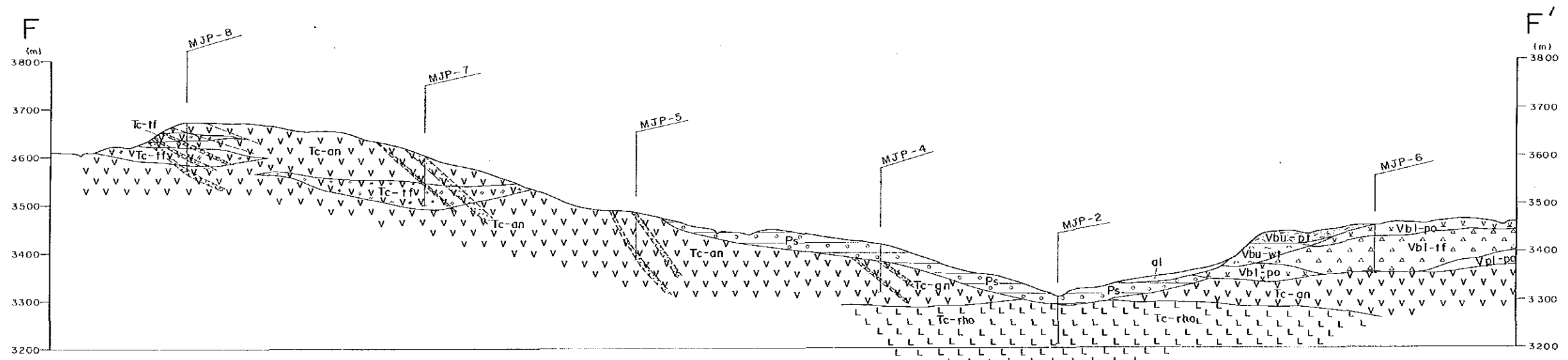
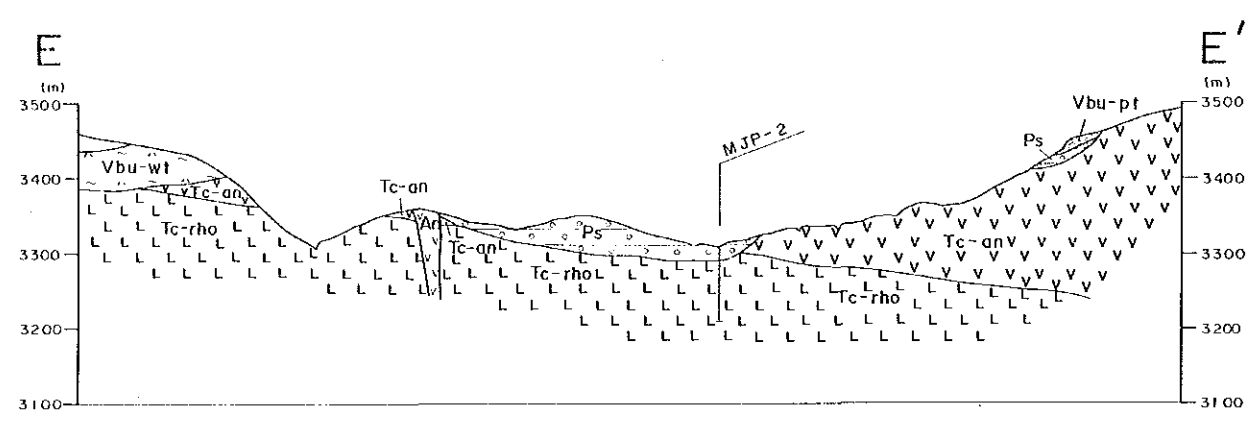
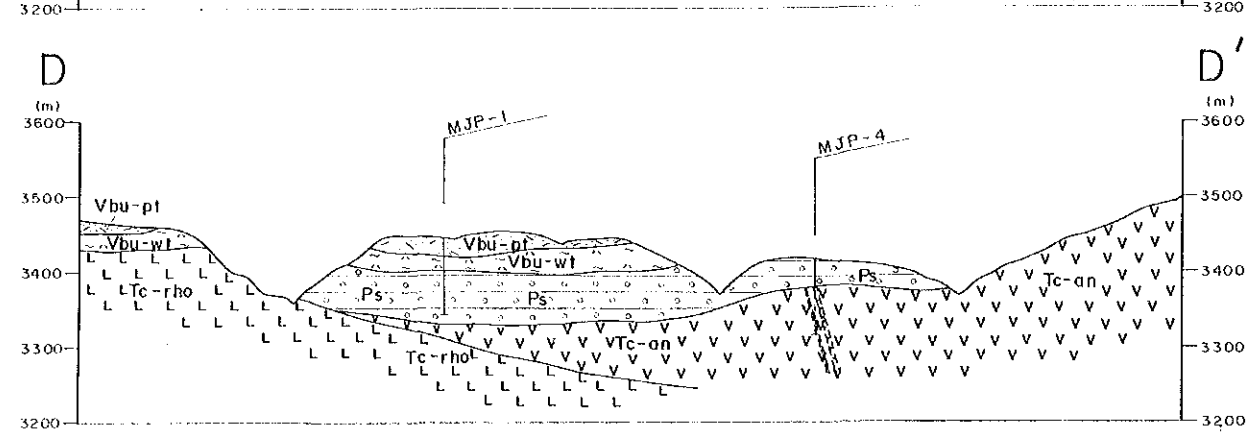


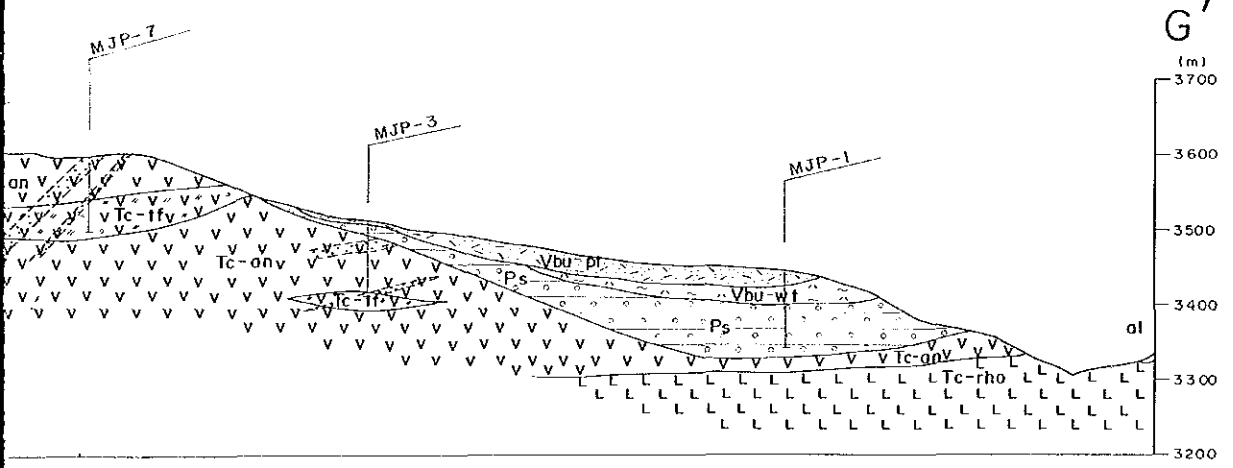
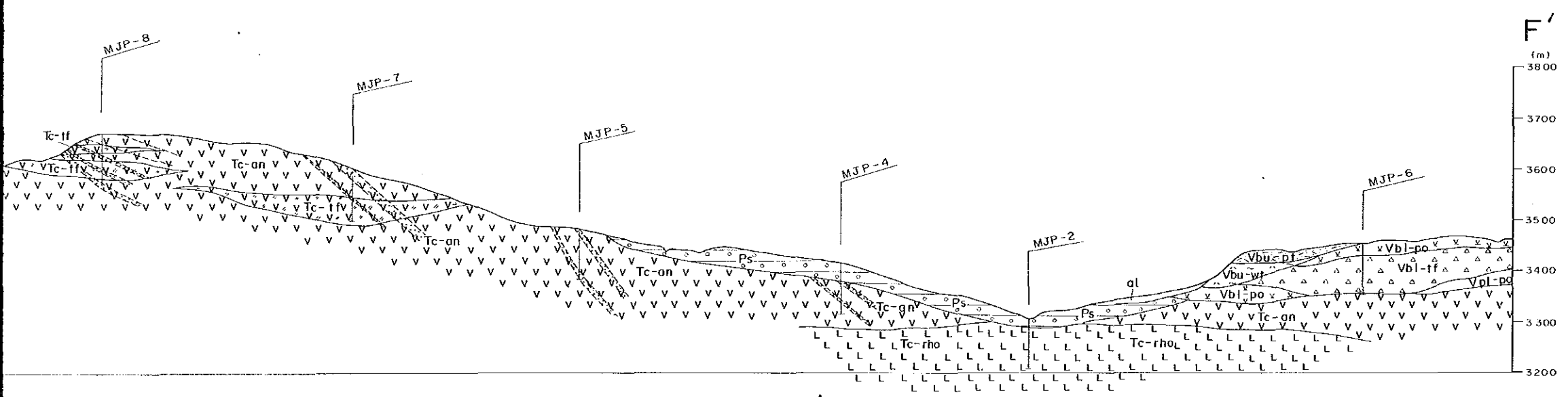
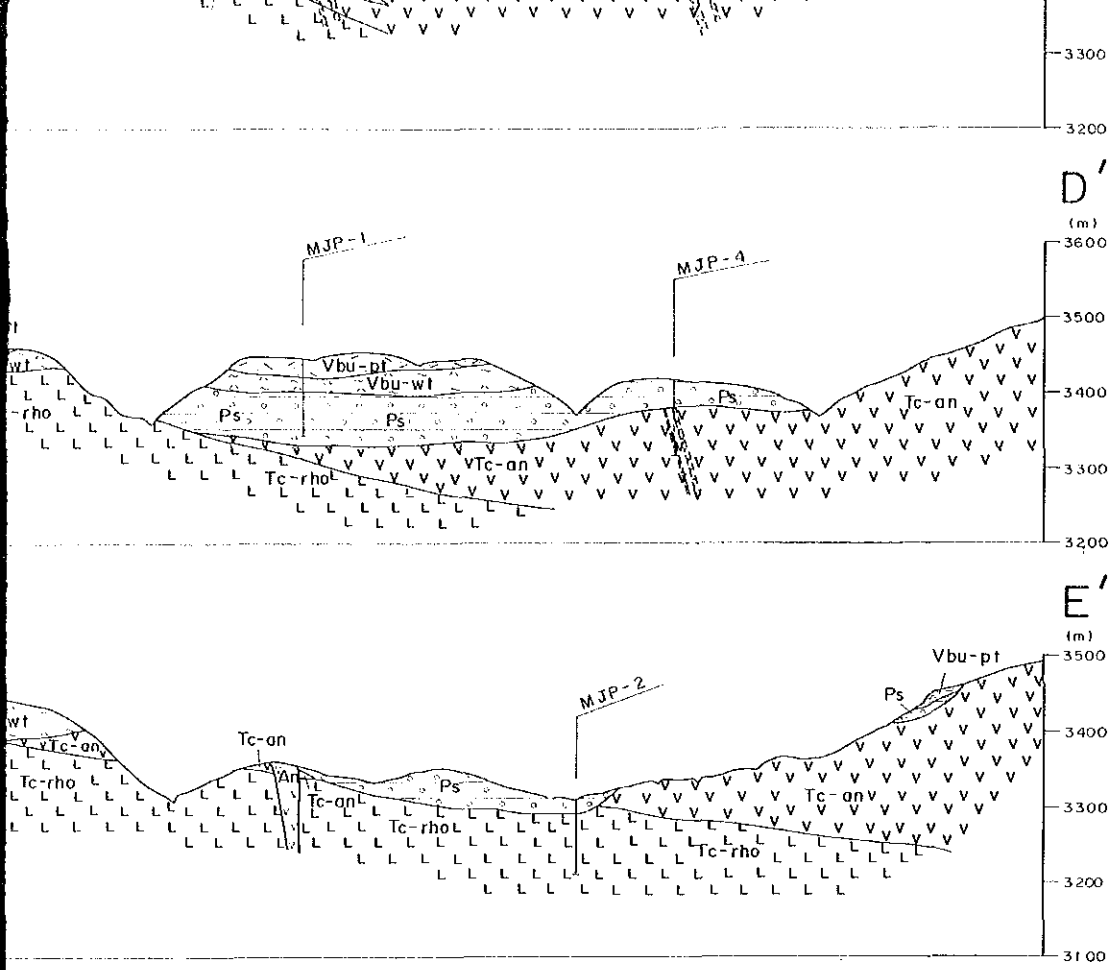
**LEGEND**

Quaternary	Holocene	at	Alluvium and Talus	Gravel, sand, silt and clay	
	Pleistocene	Vbu-sp	Volcanic Sediment of Pausa	Volcanic ash and gravel	
		Vbu-pl	Barroso Group	Upper	Pumice fall and tuffaceous sand
	Pleistocene	Vbu-wt	Barroso Group		Dacite, dacitic tuff and welded tuff
		Vbu-an			Olivine basalt and pyroxene andesite lavas
		Vbu-ff	Lower		Andesitic tuff, lapilli tuff and tuff breccia
	Pleistocene	Vbu-pe			Hornblende andesite lava
		Ps	Pirca Sediment		Gravel, sand, silt and clay
		Vbu-ff			Andesitic volcanic breccia
		Vbu-ff			Andesite lava with thin bedded tuff, lapilli tuff and tuff breccia
Tertiary	Miocene	Vbu-ff	Toaza Formation	Rhyolite lava, tuff and lapilli tuff	
		Lc-rho			
		Vbu-ff			
Jurassic	Volcanic Rocks	Vbu-ff	Chocolate	Andesitic tuff breccia	
		Vbu-ff			
		<b>Intrusive Rock</b>			
		Vbu-ff	Dike	Hornblende andesite	
		<b>Structural Features</b>			
		Fault			
		Strike and dip of bedding			
		Strike and dip of contact plane			
		Strong alteration zone			
		Quartz vein			

LEGEND

Quaternary	Holocene	Alluvium and Talus	al	Gravel, sand
		Volcanic Sediment of Pausa	o.v.sp	Volcanic ash
	Pleistocene	Upper	Vbu-pl	Pumice fall c
			Vbu-wl	Dacite, dacit
		Lower	Vbl-an	Olivine basalt
			Vbl-ff	Andesitic tuff
	Tertiary	Miocene	Vbl-po	Hornblende ar
			Arca Sediment	Ps
	Jurassic	Chocolate Volcanic Rocks	V.v.v	Andesitic vol
			V.v.v	Andesite lava and tuff brecc
L.L.L			Rhyolite lavc	
		V.v.v	Andesitic tu	
Intrusive Rock				
Dike		v.v.an	22 Hornblende a	
Fault				
Strike and		20		
Strike and		30		
Strong alterc				
Quartz vein				
Location of		MJP-1		





LEGEND

Quaternary	Alluvium and Talus	at	Gravel, sand, silt and clay	
	Holocene	Volcanic Sediment of Pauso	o o o o o o v sp	Volcanic ash and gravel
		Upper		Pumice fall and tuffaceous sand
			Barraso Group	
	Lower			Olivine basalt and pyroxene andesite lavas
				Andesitic tuff, lapilli tuff and tuff breccia
				Hornblende andesite lava
		Pirca Sediment		Gravel, sand, silt and clay
	Tertiary	Miocene		Andesitic volcanic breccia
			Tacaza Formation	
			Rhyolite lava, tuff and lapilli tuff	
Jurassic	Chocolate Volcanic Rocks		Andesitic tuff breccia	
Intrusive Rock				
	Dike		Hornblende andesite	
Fault				
Strike and dip of bedding				
Strike and dip of contact plane				
Strong alteration zone				
Quartz vein				
Location of drilling				