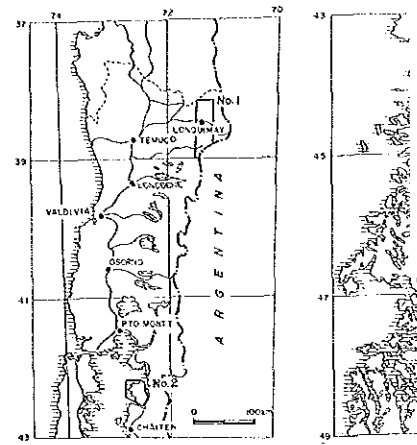


THE INVESTIGATION OF MINERAL
IN THE LOQUIMAY AREA AND REGIONS LO
PHASE II

GEOLOGICAL MAP OF FUTALEUFU-AL
(SUB-AREA ALTO PALEN)



FEBRUARY 1991

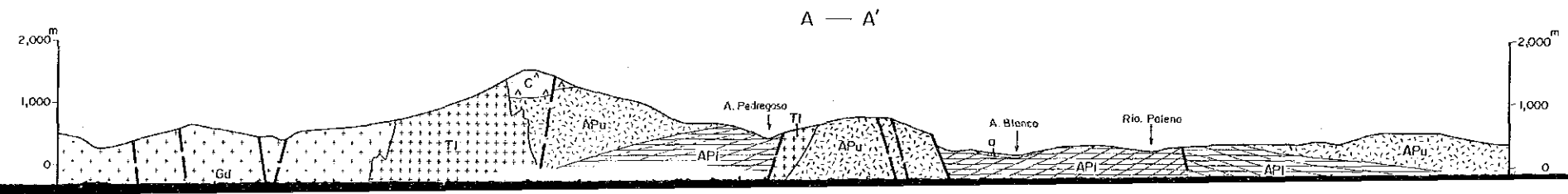
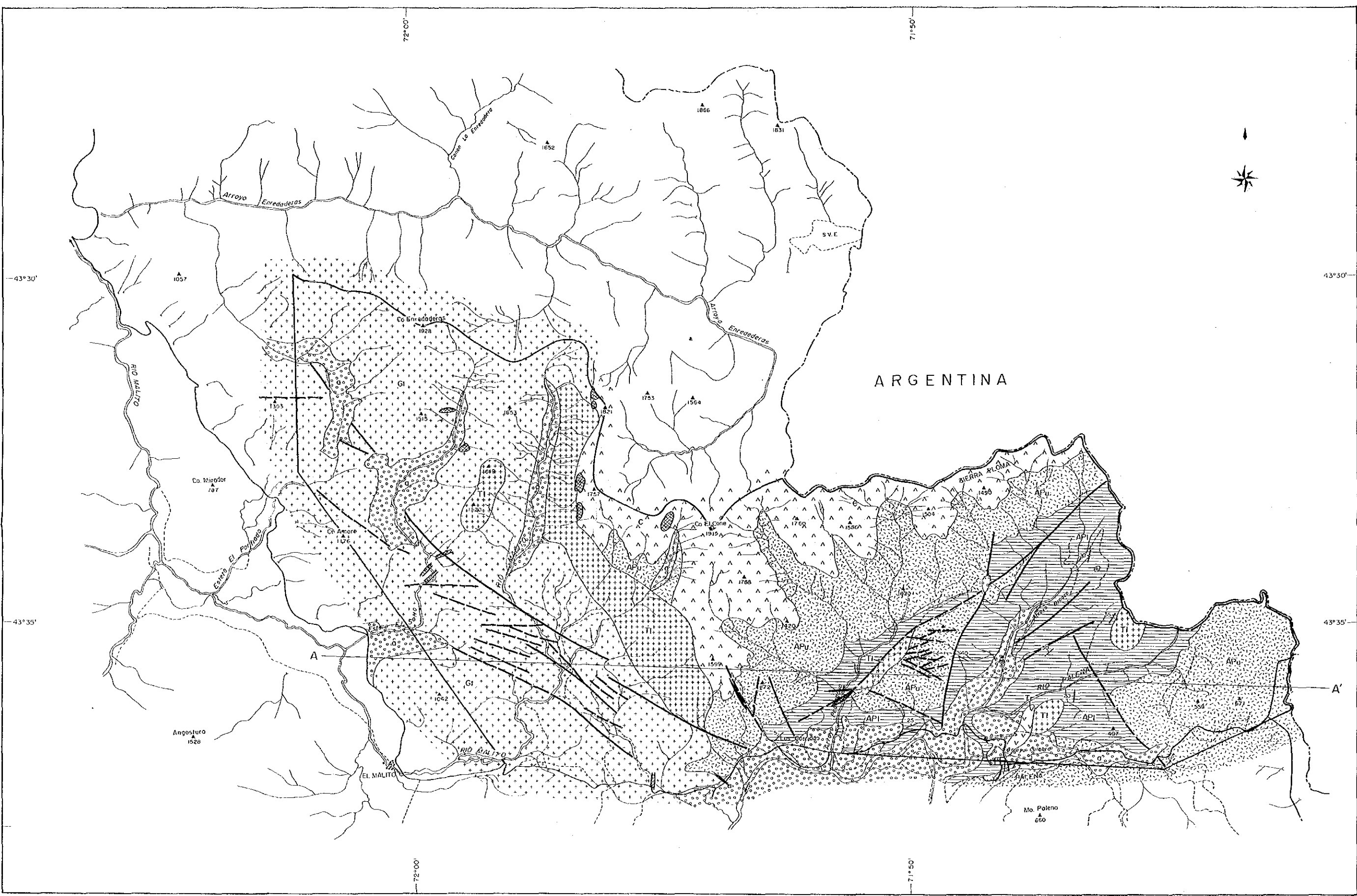
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000



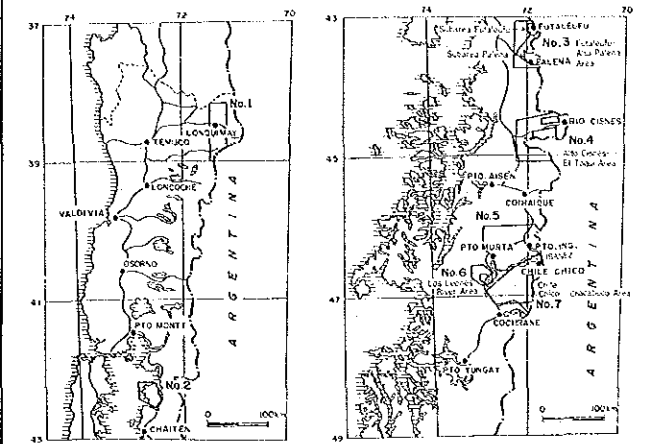
LEGEND

- | | | | |
|----------------------------|-------------------------------|--|-----|
| Quaternary | Alluvium, Terrace and Moraine | | a |
| Late Cretaceous | Cordón de Las Tobas Formation | | C |
| Early Cretaceous | Alto Palena F. | | APu |
| | | | APi |
| Intrusive Rocks | | | |
| Trachyte | | | Tr |
| Futaleufu-Palena Batholith | | | Gt |
| Tonalito | | | Tl |
| | Fault | | |
| | Budding | | |
| | Vein | | |
| | Hydrothermal Mineralization | | |



THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
PHASE II

GEOLOGICAL MAP OF FUTALEUFU-ALTO PALENA AREA
(SUB-AREA ALTO PALENA)

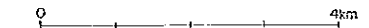


PHASE I
PHASE II

FEBRUARY 1991

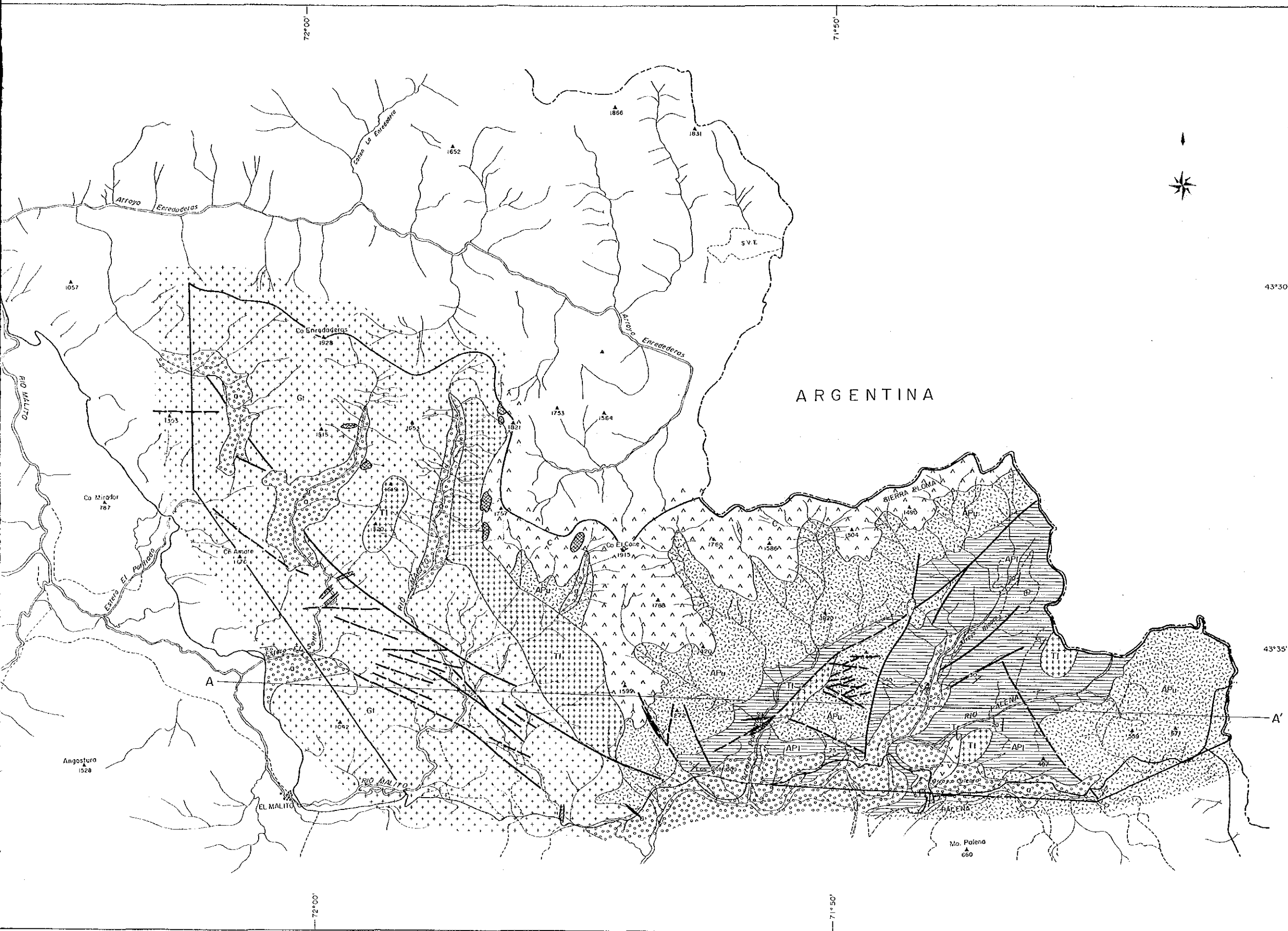
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000

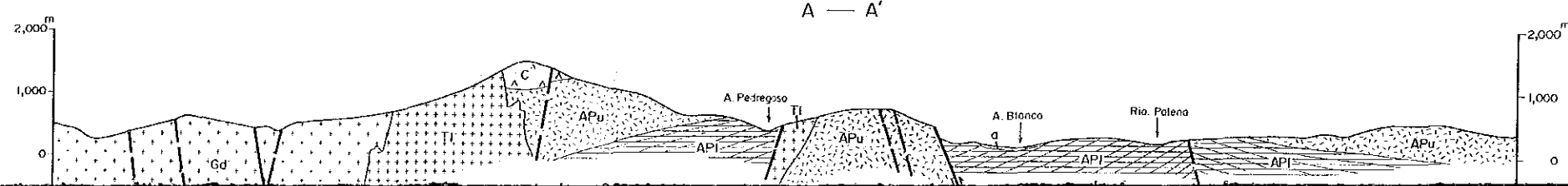


LEGEND

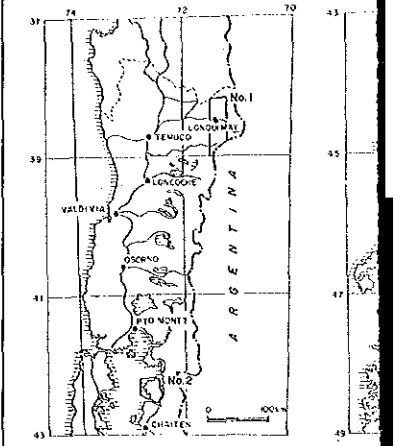
- Quaternary Alluvium, Terrace and Moraine [Symbol] a
- Late Cretaceous Gordón de Las Tobas Formation [Symbol] C
- Early Cretaceous Alto Palena F. [Symbol] APu (Upper member) [Symbol] APi (Lower member)
- Intrusive Rocks: Trachyte [Symbol] Tr, Futaleufu-Palena Batholith [Symbol] Gt, Tonalite [Symbol] Tl
- Structural Features: Fault [Symbol], Bedding [Symbol], Vein [Symbol]
- Hydrothermal Alteration [Symbol], Mineralization [Symbol]



A — A'



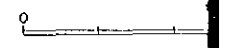
GEOLOGICAL MAP OF FUTALEUFU (SUB-AREA ALTO)



FEBRUARY 1991

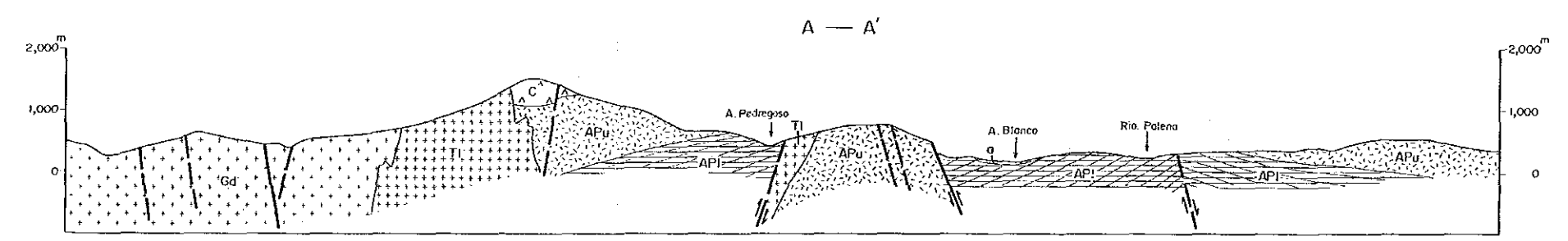
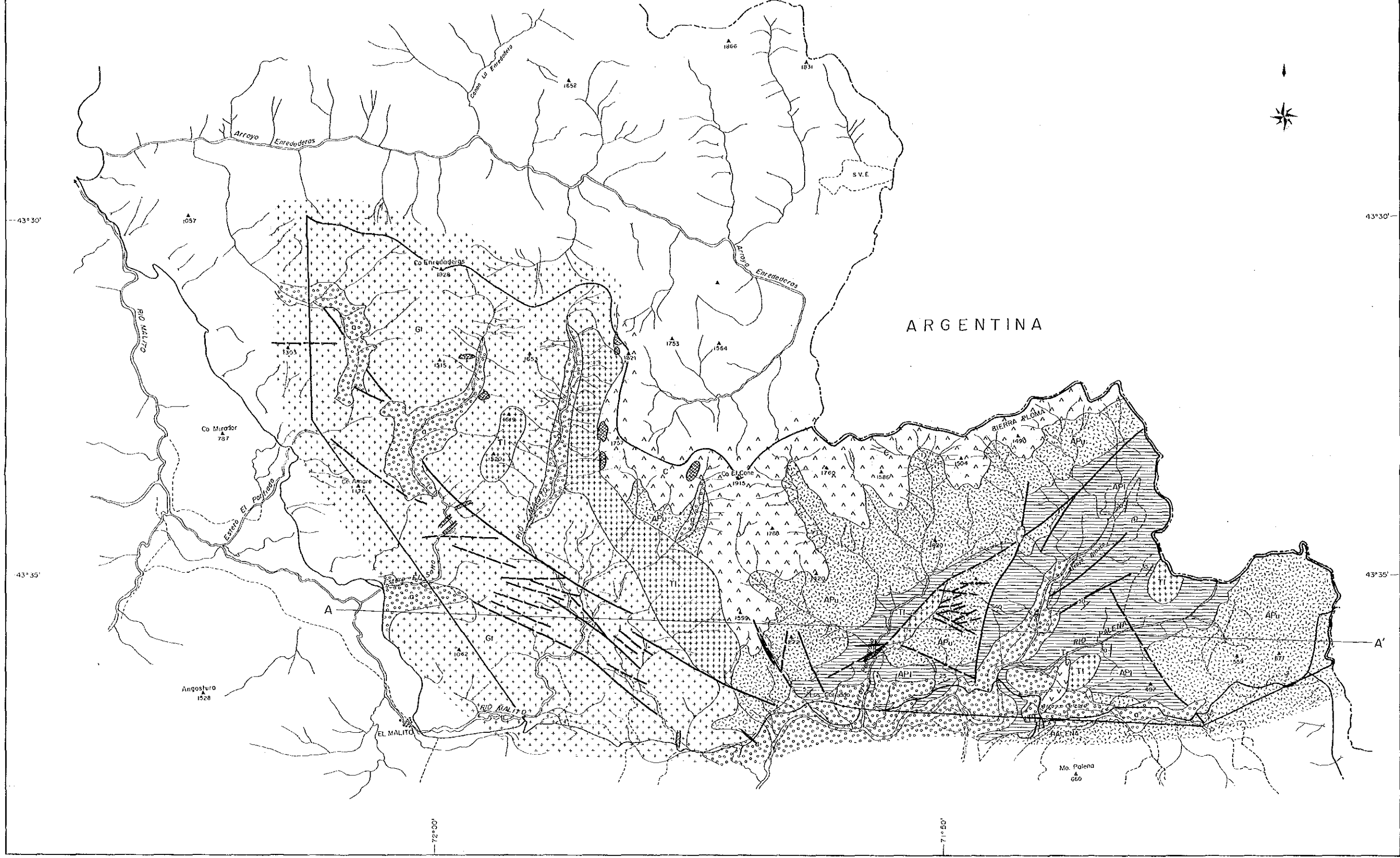
JAPAN INTERNATIONAL COOPERATION METAL MINING AGENCY

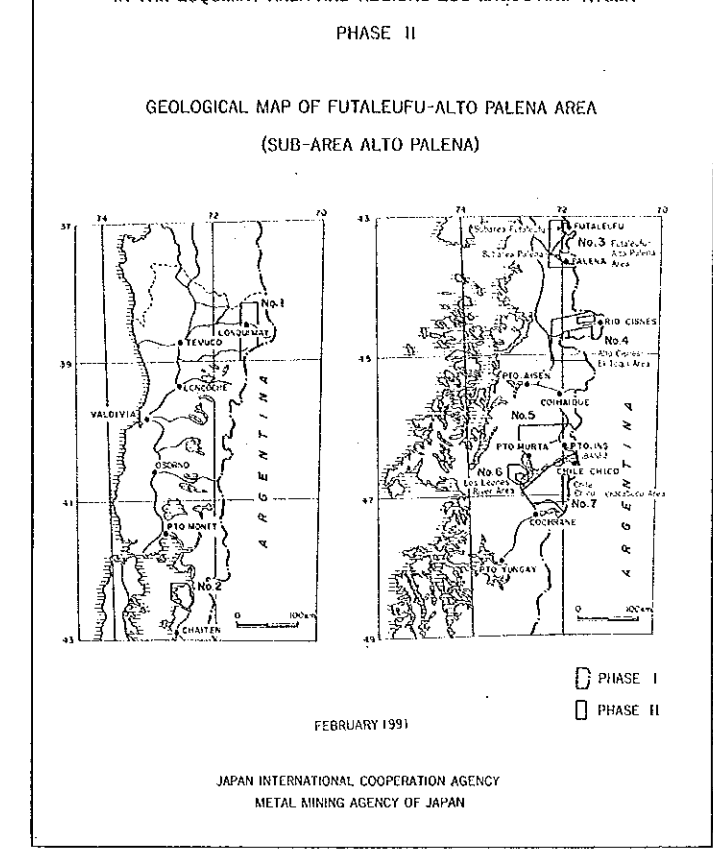
Scale 1:50,000



LEGEND

Quaternary	Alluvium, Terrace and Moraine		Qa
Late Cretaceous	Cordón de Las Tobas Formation		C
Early Cretaceous	Alto Palena F.		APu
			APl
Intrusive Rocks			
Trachyte			Tr
Futaleufu-Palena			Gt
Batholith			Tr
Tonalite			Tl

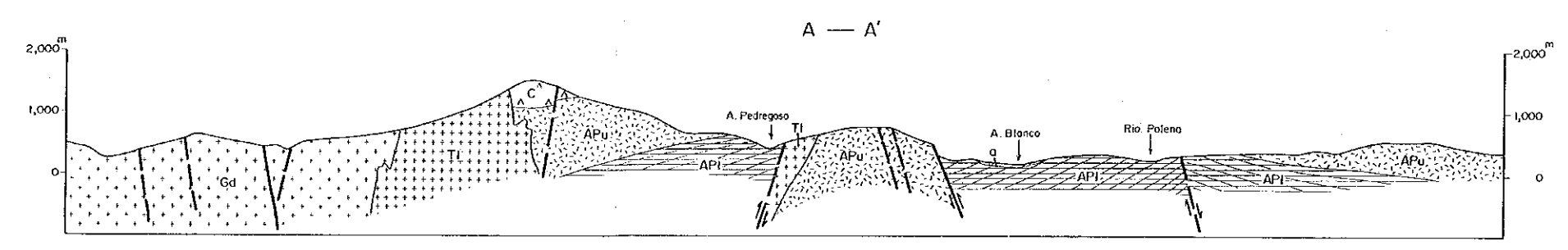




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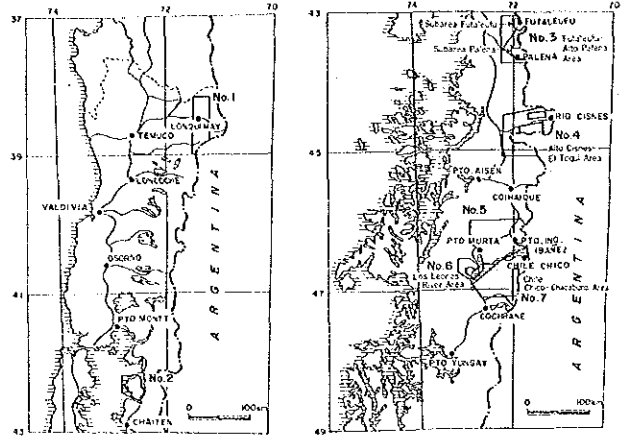
LEGEND

- | | | | |
|------------------|-------------------------------|--|-----|
| Quaternary | Alluvium, Terrace and Moraine | | a |
| Late Cretaceous | Cordón de las Tobas Formation | | C |
| Early Cretaceous | Alto Palena F. | | APu |
| | | | APi |
| Intrusive Rocks | | | |
| Trachyte | | | Tr |
| Futaleufu-Palena | | | Gt |
| Fonolite | | | Fl |
| | Fault | | |
| | Bedding | | |
| | Vein | | |
| | Hydrothermal Alteration | | |
| | Mineralization | | |



THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
PHASE II

GEOLOGICAL MAP OF ALTO CISNES-EL TOQUI AREA



FEBRUARY 1991

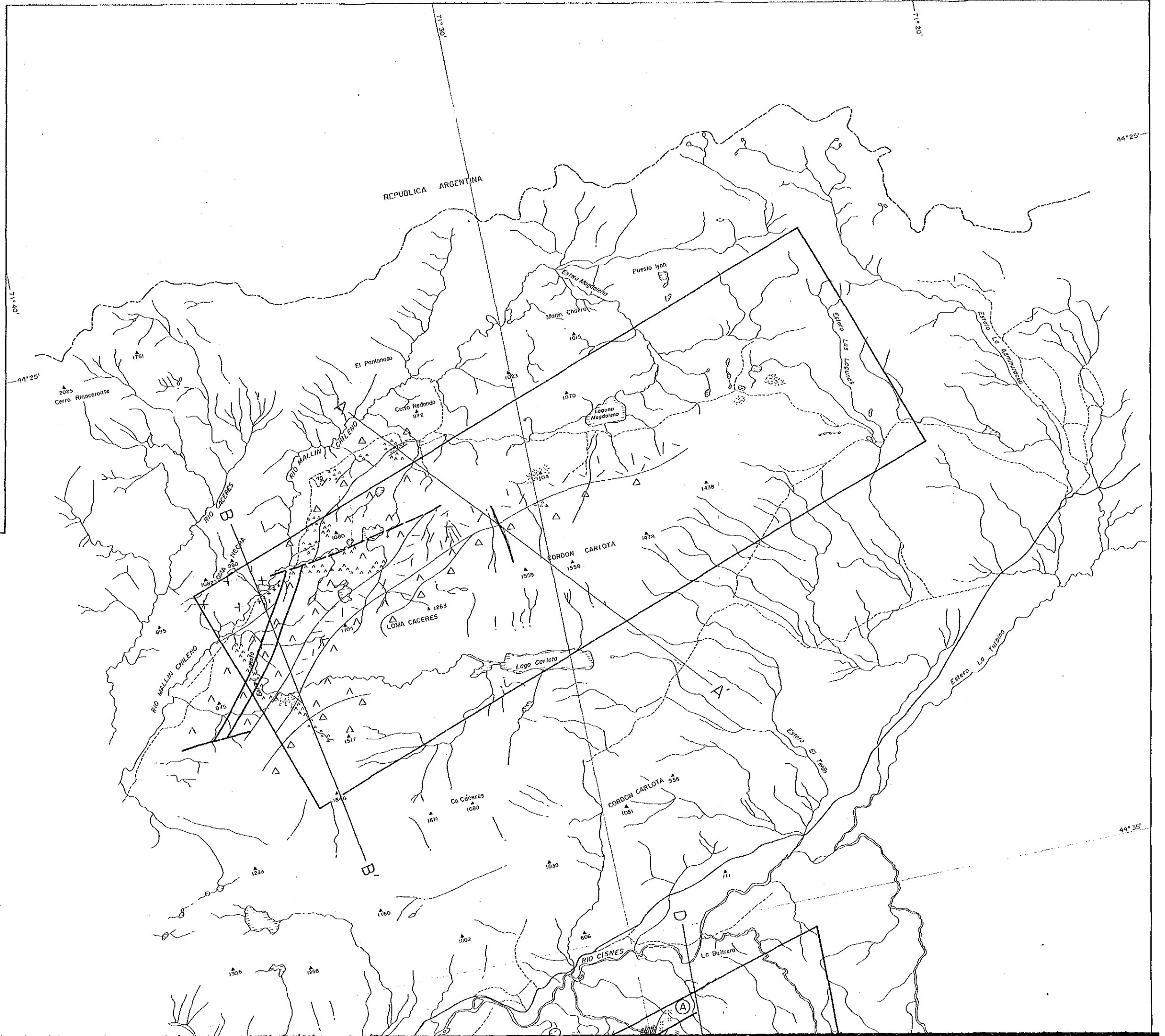
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN












Scale 1 : 50,000



LEGEND

- Sands and gravels
- Shale
- Tuff
- Lapilli tuff
- Volcanic breccia
- Rhyolite
- Dacite
- Andesite
- Andesitic dyke
- Quartz-monzonite porphyry
- Granitoid
- Hydrothermal alteration
- Lineament
- Bedding
- Flow structure
- Profil line



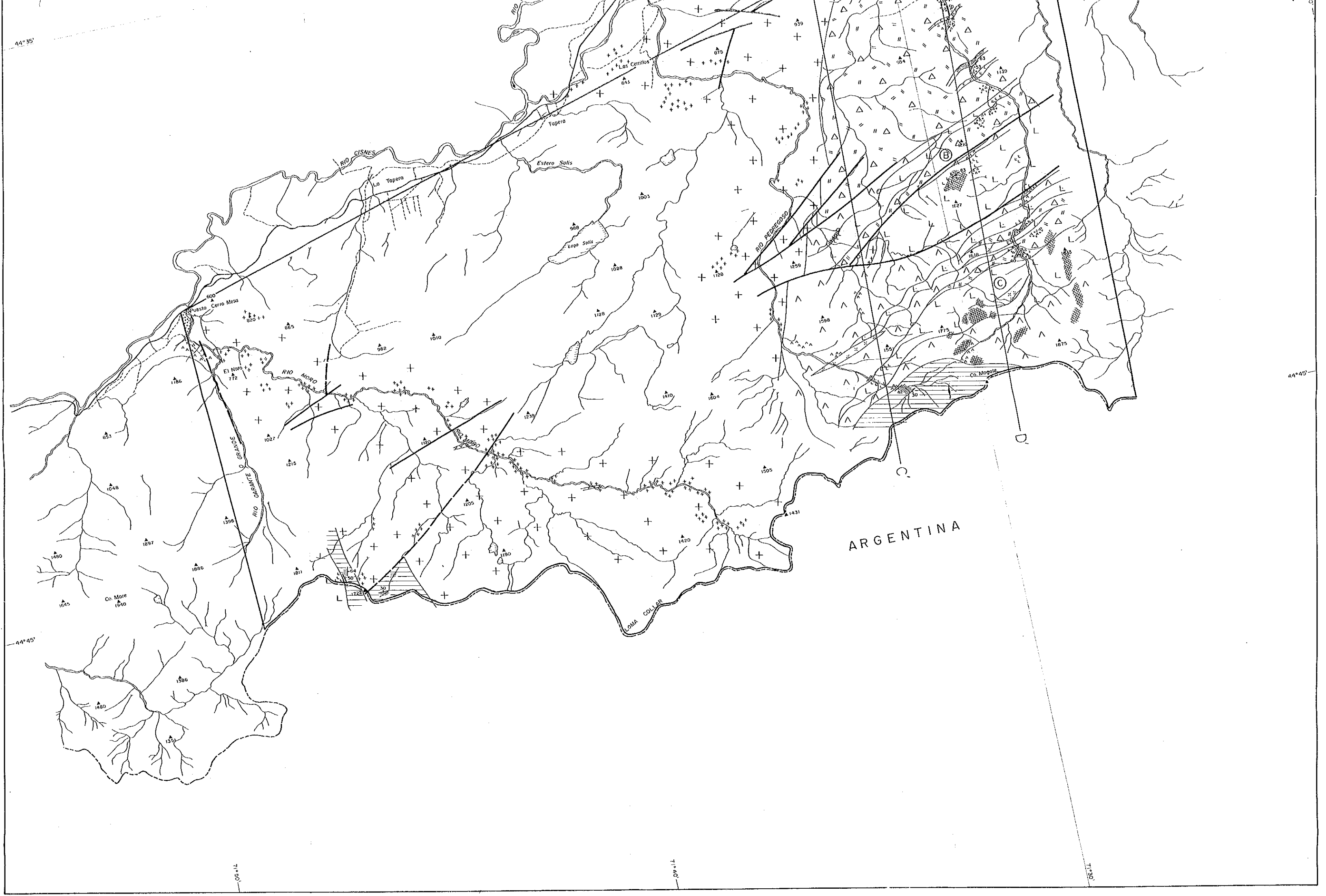
-  Rhyolite
-  Dacite
-  Andesite
-  Andesitic dyke
-  Quartz-monzonite porphyry
-  Granitoid
-  Hydrothermal alteration
-  Lineament
-  Bedding
-  Flow structure
-  Profil line



44° 35'

44° 45'

44° 45'



7° 30'

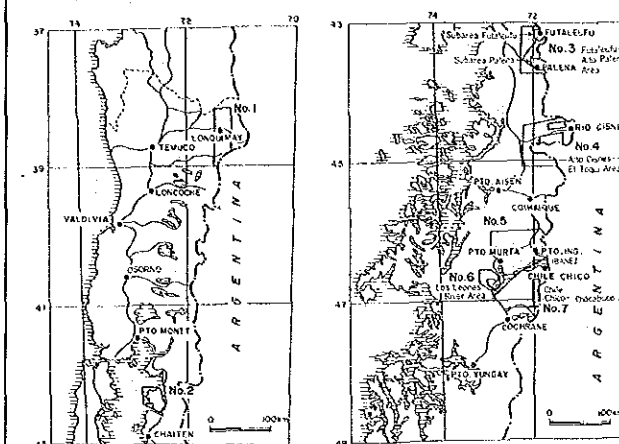
7° 40'

7° 30'

THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN

PHASE II

GEOLOGIC PROFILE OF ALTO CISNES-EL TOQUI AREA



PHASE I
PHASE II

FEBRUARY 1991

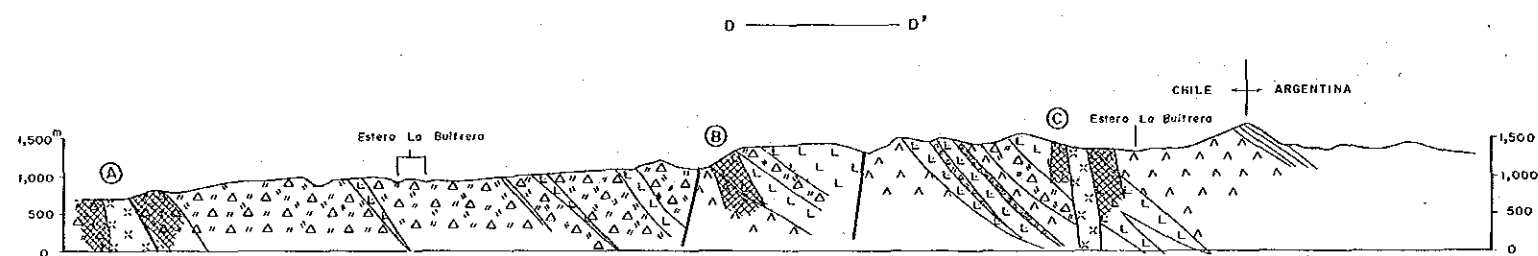
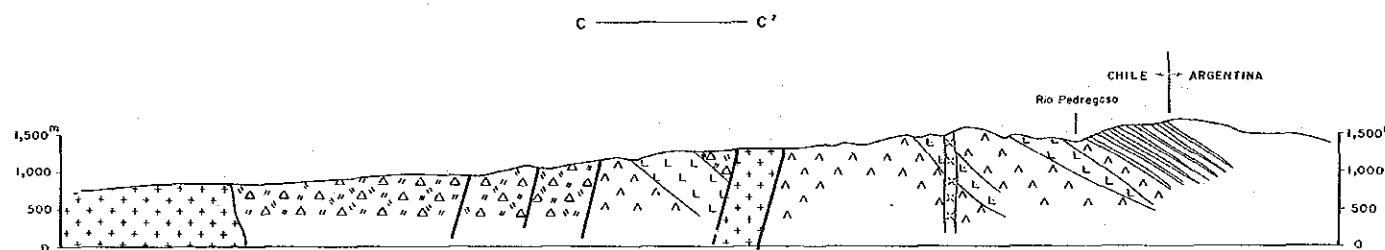
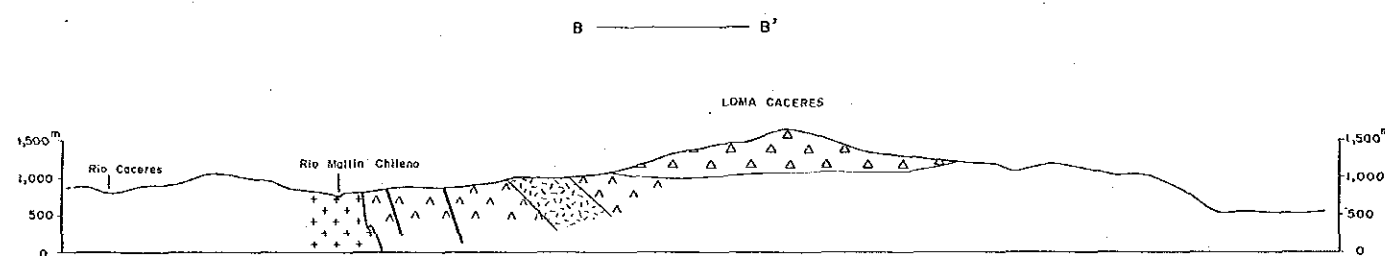
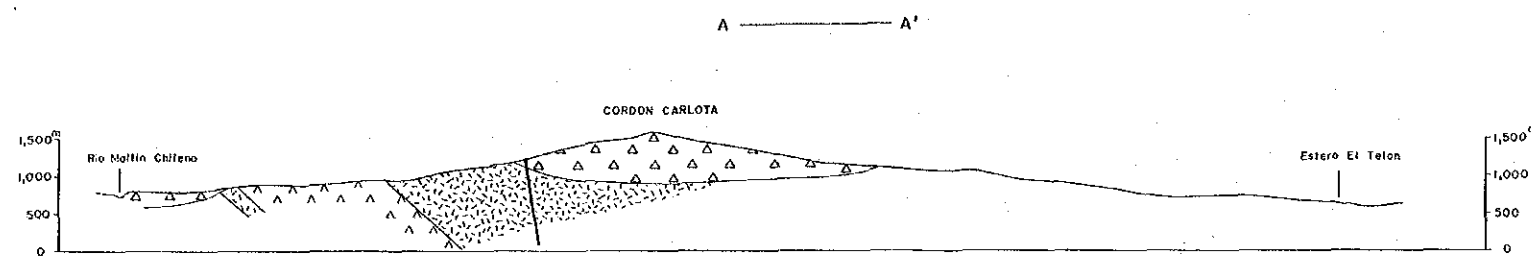
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

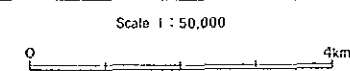
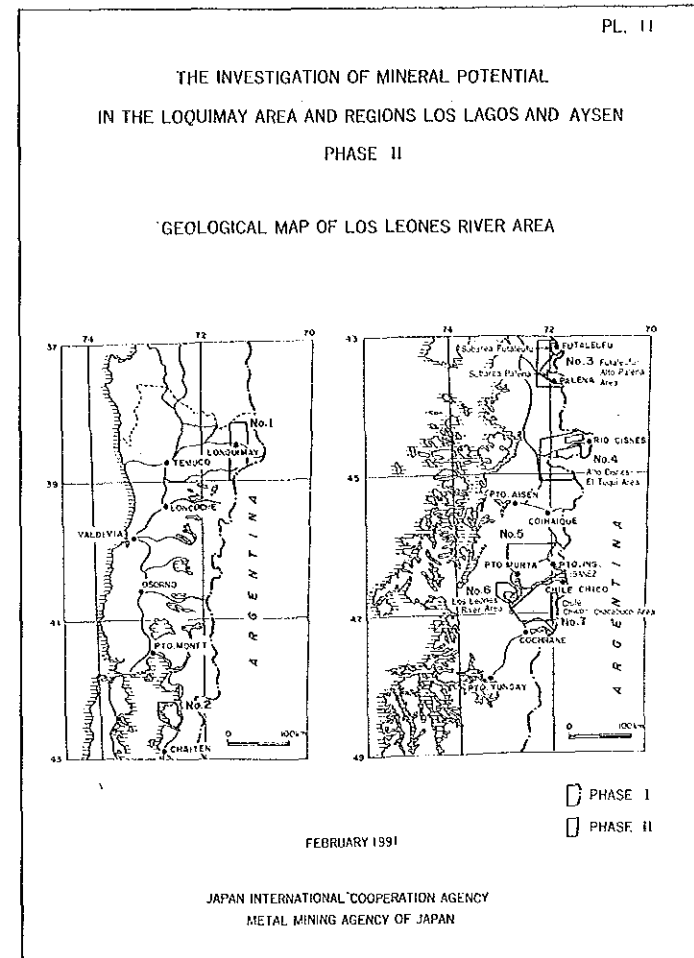
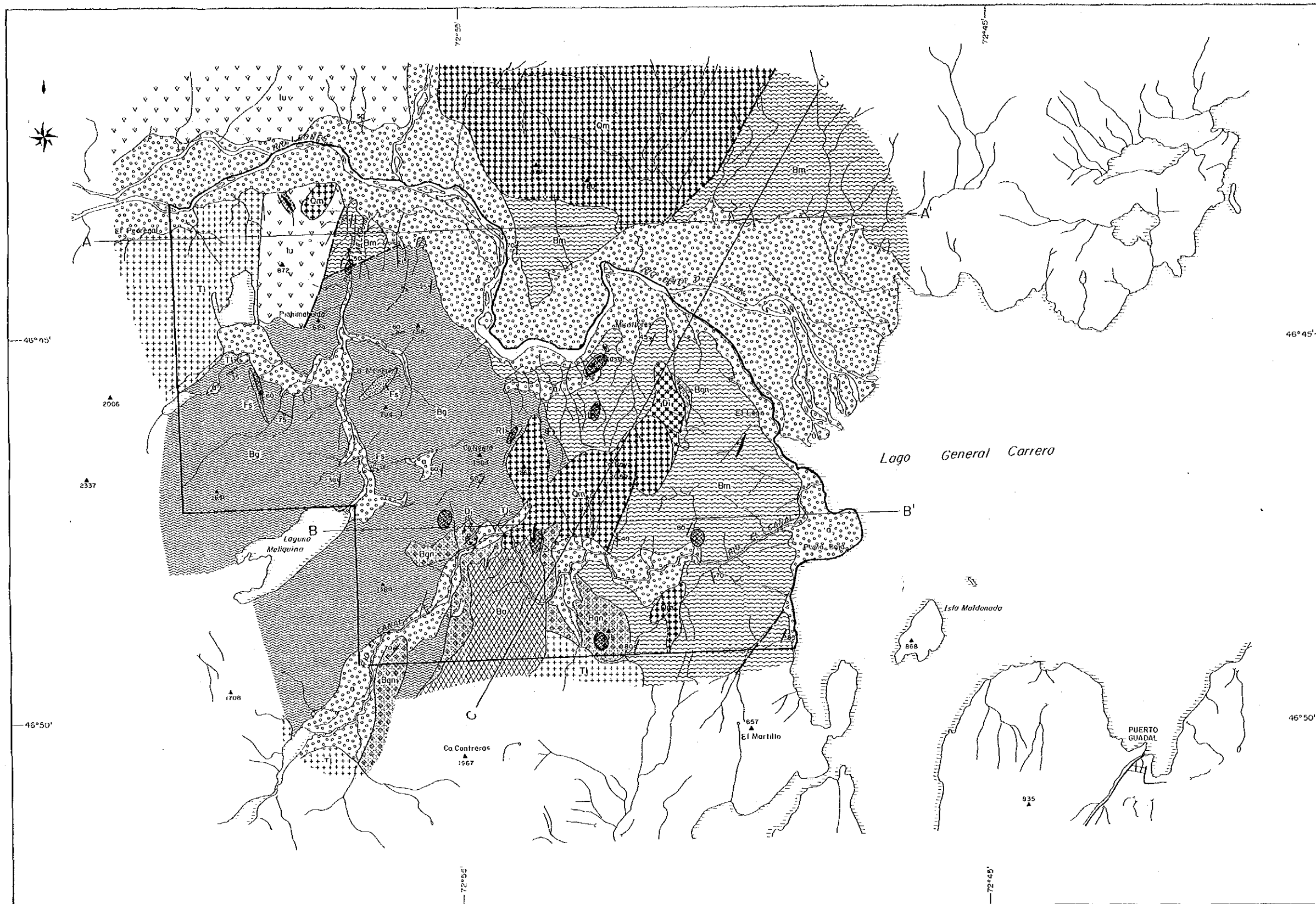
Scale 1 : 50,000



LEGEND

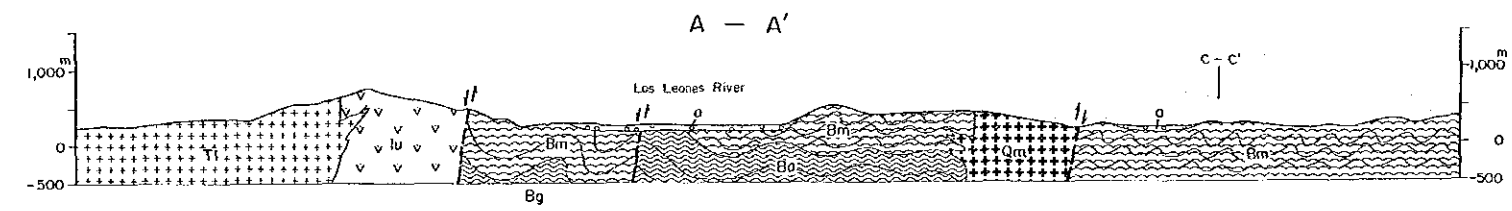
- Sands and gravels
- Shale
- Tuff
- Lapilli tuff
- Volcanic breccia
- Rhyolite
- Dacite
- Andesite
- Andesitic dyke
- Quartz-monzonite porphyry
- Granitoid
- Hydrothermal alteration
- Lineament

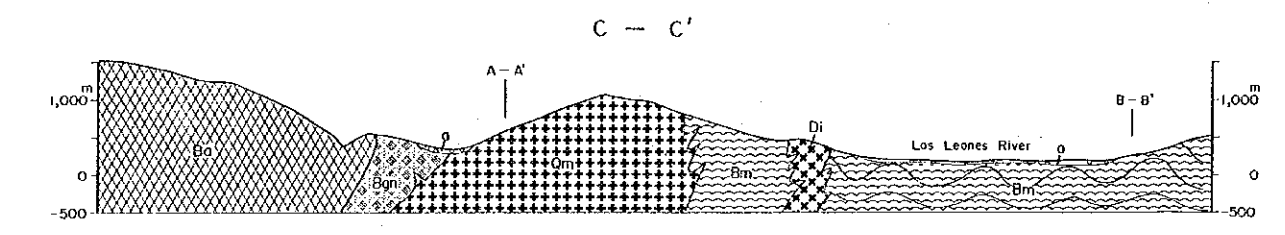
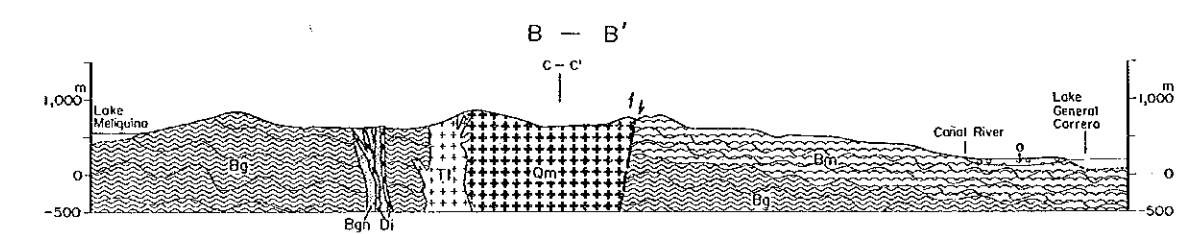
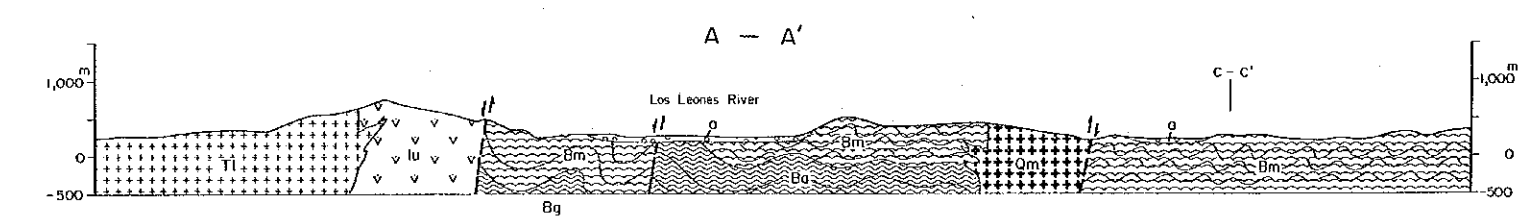
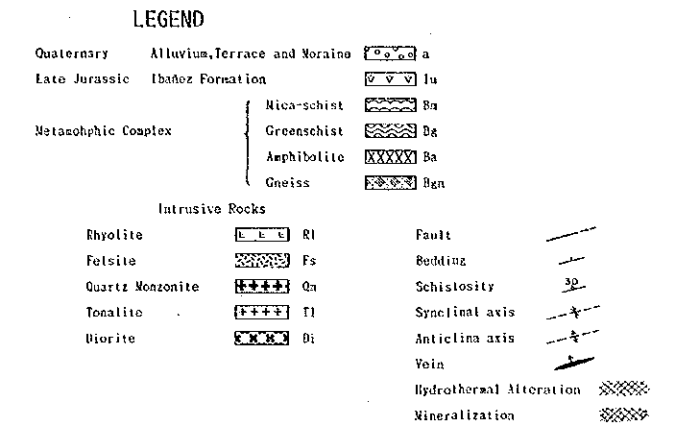
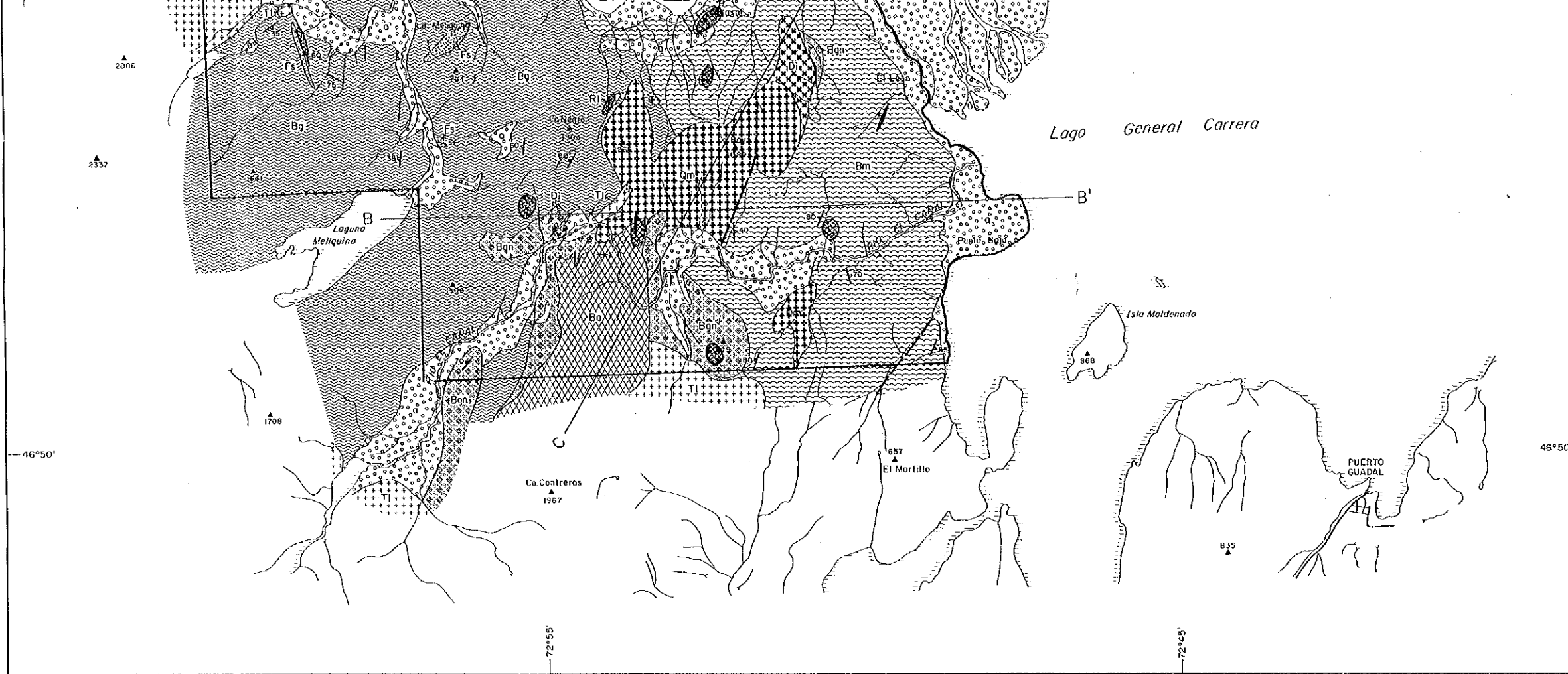
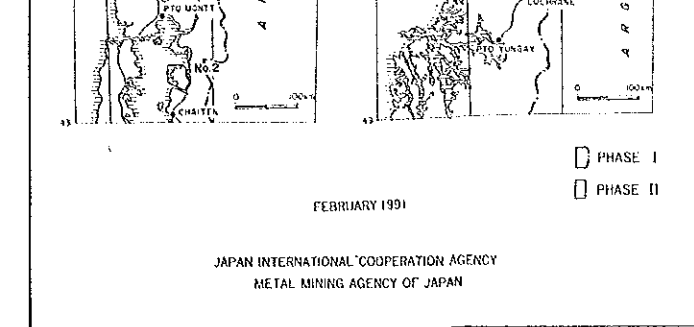




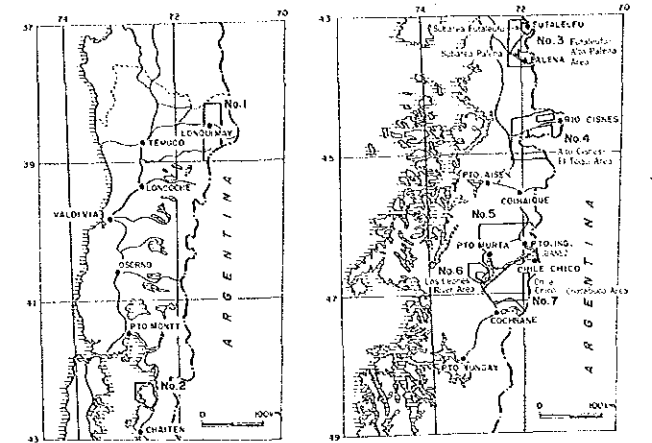
LEGEND

Quaternary	Alluvium, Terrace and Moraine		Quaternary
Late Jurassic	Ibañez Formation		Late Jurassic
Metacohpic Complex	Mica-schist		Mica-schist
	Greenschist		Greenschist
	Ampibolite		Ampibolite
	Quartzite		Quartzite
Intrusive Rocks			
Phylite		Phylite	Fault
Felsite		Felsite	Bedding
Quartz Monzonite		Quartz Monzonite	Schistosity
Tonalite		Tonalite	Synclinal axis
Diorite		Diorite	Anticlinal axis
			Vein
			Hydrothermal Alteration
			Mineralization





THE INVESTIGATION OF MINERAL POTENTIAL
 IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
 PHASE II
 DISTRIBUTION MAP OF MINERALIZATION AND ALTERATION ZONE
 OF CHILE CHICO-CHACABUCO AREA



FEBRUARY 1991

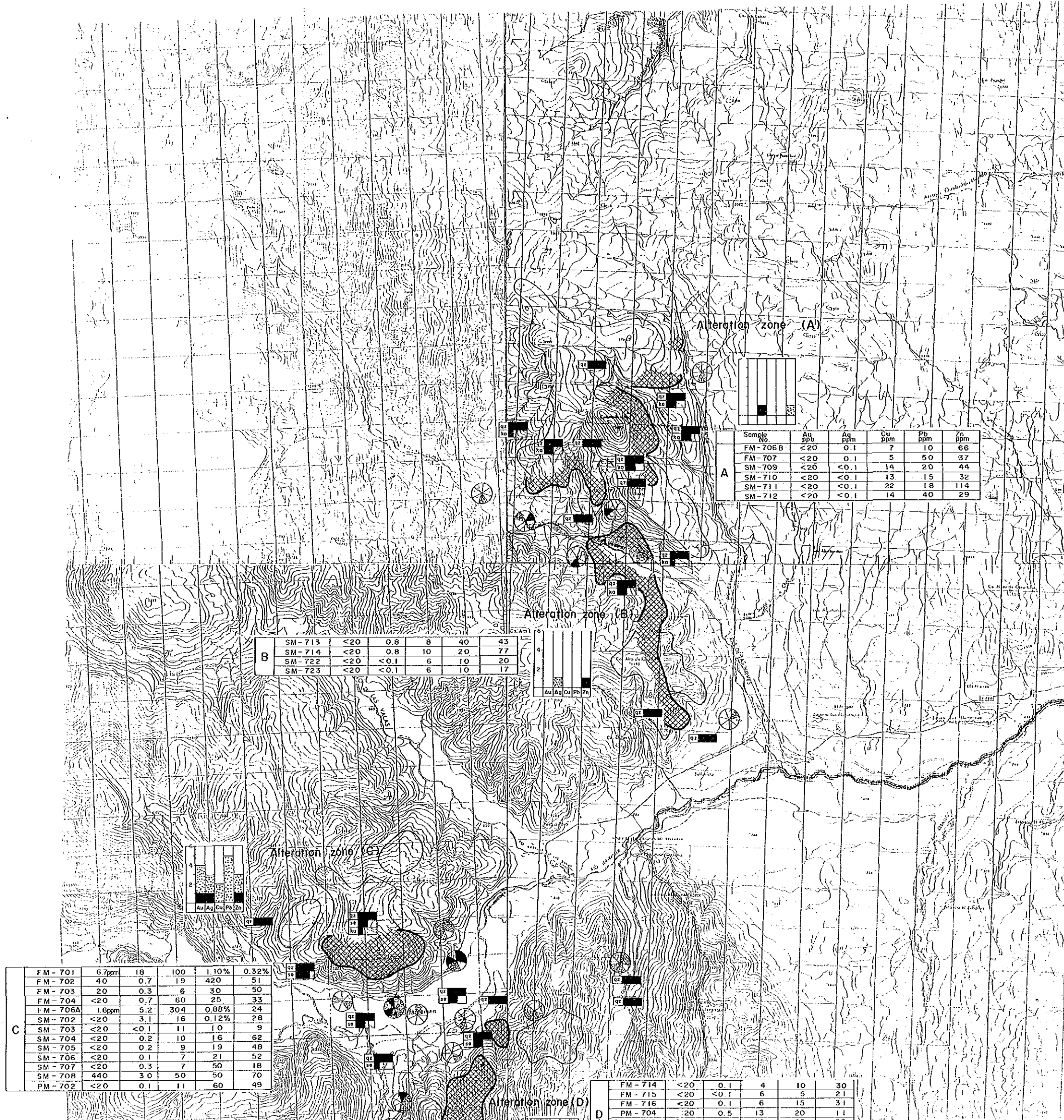
JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000



LEGEND

- Hydrothermal alteration zone interpreted by Landsat TM Image
- Hydrothermal alteration zone confirmed by field survey
- Class A geochemical anomaly of Pan Concentrate (dark shading) : M + 2B
 Au : 223.3ppb ≤ Cu : 289ppm ≤ Zn : 882ppm ≤ As : 281ppm ≤
 Ag : 4.1ppm ≤ Pb : 3,947ppm ≤ Mo : 5.8ppm ≤
- Class B geochemical anomaly of Pan Concentrate (dot)
 M + 1B ≤ M + 2B
 Au : 64.1ppb ≤ , < 223.3 ppb Mo : 2.3ppm ≤ , < 5.8ppm
 Ag : 1.63 ppm ≤ , < 4.1 ppm As : 75 ppm ≤ , < 281 ppm
 Cu : 77 ppm ≤ , < 289 ppm
 Pb : 782 ppm ≤ , < 3,947 ppm
- Number of class A geochemical anomaly on each alteration zone
- Number of class B geochemical anomaly on each alteration zone
- qz : Principal alteration mineral assemblage determined by X-ray diffraction analysis and these peak intensities
 - strong
 - medium
 - weak
- qz : quartz
- Se : sericite
- Ko : kaoline minerals
- FM-701 : Ore assays



A

Sample No	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm
FM-706 B	<20	0.1	7	10	66
FM-707	<20	0.1	5	5.0	37
SM-709	<20	<0.1	14	2.0	44
SM-710	<20	<0.1	13	1.5	32
SM-711	<20	<0.1	22	1.8	114
SM-712	<20	<0.1	14	4.0	29

B

Sample No	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm
SM-713	<20	0.8	8	40	43
SM-714	<20	0.8	10	20	77
SM-722	<20	<0.1	6	10	20
SM-723	<20	<0.1	6	10	17

C

Sample No	Au ppm	Ag ppm	Cu ppm	Pb ppm	Zn ppm
FM-701	6.7ppm	18	100	1.10%	0.32%
FM-702	40	0.7	19	420	51
FM-703	20	0.3	6	30	50
FM-704	<20	0.7	60	25	33
FM-706A	1.6ppm	5.2	304	0.88%	24
SM-702	<20	3.1	16	0.12%	28
SM-703	<20	<0.1	11	10	9
SM-704	<20	0.2	10	16	62
SM-705	<20	0.2	9	19	48
SM-706	<20	0.1	7	21	52
SM-707	<20	0.3	7	50	18
SM-708	440	3.0	50	50	70
PM-702	<20	0.1	11	60	49

D

Sample No	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm
FM-714	<20	0.1	4	10	30
FM-715	<20	<0.1	6	9	21
FM-716	<20	0.1	6	15	31
PM-704	20	0.5	13	20	11

Class of geochemical anomaly of Pan Concentrate (oot)
 M + 18%, M + 28
 Au : 64.1ppb ≤, < 223.3 ppb Mo : 2.3ppm ≤, < 5.8ppm
 Ag : 163 ppm ≤, < 4.1 ppm As : 75 ppm ≤, < 281 ppm
 Cu : 77 ppm ≤, < 289 ppm
 Pb : 782 ppm ≤, < 3,947 ppm

Number of class A geochemical anomaly on each alteration zone
 Number of class B geochemical anomaly on each alteration zone

qz : Principal alteration mineral assemblage determined by X-ray diffraction analysis and these peak intensities
 stronge
 medium
 weak
 qz : quartz
 se : sericite
 ka : kaoline minerals

FM-701 : Ore assays

FM-701	6.7ppm	18	100	1.10%	0.32%
FM-702	40	0.7	19	420	51
FM-703	20	0.3	6	30	50
FM-704	<20	0.7	60	25	33
FM-706A	1.6ppm	5.2	30.4	0.88%	24
SM-702	<20	3.1	16	0.12%	28
SM-703	<20	<0.1	11	10	9
SM-704	<20	0.2	10	16	62
SM-705	<20	0.2	9	19	48
SM-706	<20	0.1	7	21	52
SM-707	<20	0.3	7	50	18
SM-708	440	3.0	50	50	70
PM-702	<20	0.1	11	60	49

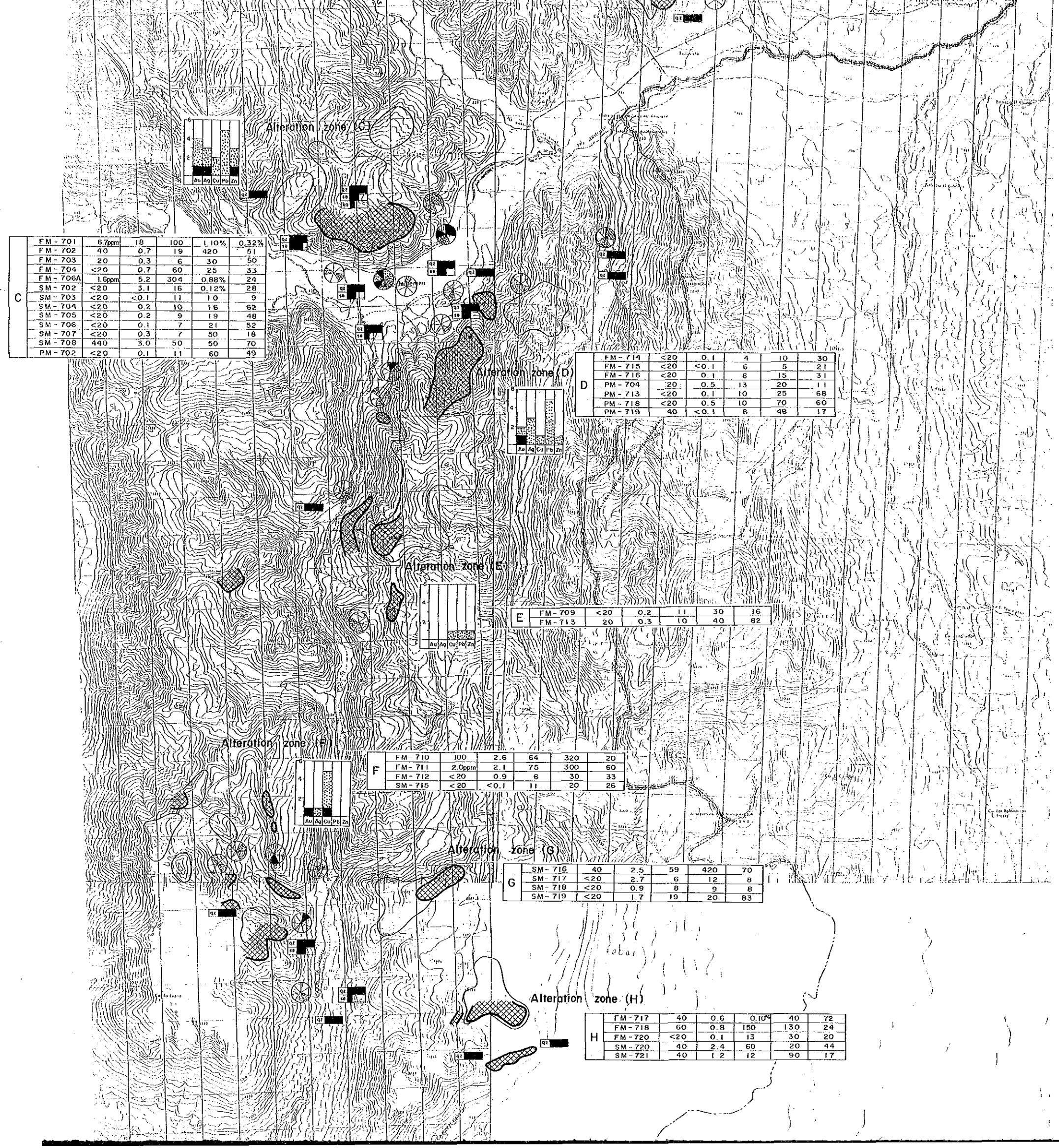
FM-714	<20	0.1	4	10	30
FM-715	<20	<0.1	6	5	21
FM-716	<20	0.1	6	15	31
PM-704	20	0.5	13	20	11
PM-713	<20	0.1	10	25	68
PM-718	<20	0.5	10	70	60
PM-719	40	<0.1	6	48	17

FM-709	<20	0.2	11	30	16
FM-713	20	0.3	10	40	82

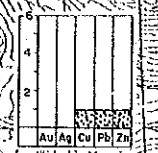
FM-710	100	2.6	64	320	20
FM-711	2.0ppm	2.1	75	300	60
FM-712	<20	0.9	6	30	33
SM-715	<20	<0.1	11	20	26

SM-716	40	2.5	59	420	70
SM-717	<20	2.7	6	12	8
SM-718	<20	0.9	6	9	8
SM-719	<20	1.7	19	20	83

FM-717	40	0.6	0.10%	40	72
FM-718	60	0.8	150	130	24
FM-720	<20	0.1	13	30	20
SM-720	40	2.4	60	20	44
SM-721	40	1.2	12	90	17

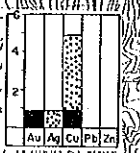


Alteration zone (E)



E	FM-709	<20	0.2	1.1	3.0	1.6
	FM-713	20	0.3	1.0	4.0	8.2

Alteration zone (F)



F	FM-710	100	2.6	6.4	3.2	2.0
	FM-711	2.0ppm	2.1	7.5	3.0	6.0
	FM-712	<20	0.9	6	3.0	3.3
	SM-715	<20	<0.1	1.1	2.0	2.6

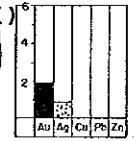
Alteration zone (G)

G	SM-716	40	2.5	5.9	4.2	7.0
	SM-717	<20	2.7	6	1.2	8
	SM-718	<20	0.9	8	9	8
	SM-719	<20	1.7	1.9	2.0	8.3

Alteration zone (H)

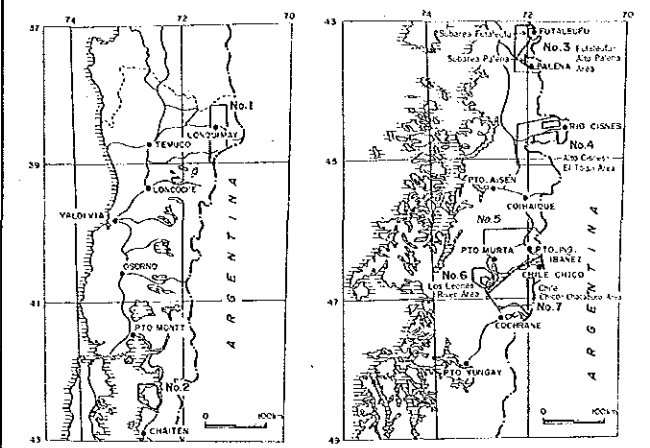
H	FM-717	40	0.6	0.10%	4.0	7.2
	FM-718	60	0.8	1.50	1.30	2.4
	FM-720	<20	0.1	1.3	3.0	2.0
	SM-720	40	2.4	6.0	2.0	4.4
	SM-721	40	1.2	1.2	9.0	1.7

Alteration zone (I)



I	SM-724	<20	0.1	1.1	2.0	2.0
	SM-725	<20	0.1	7	3.0	3.9
	SM-726	<20	0.1	8	2.0	3.3
	SM-727	<20	<0.1	1.7	4	1.28
	SM-728	<20	0.1	9	3.0	1.1
	SM-729	<20	0.1	1.3	1.9	6.7

THE INVESTIGATION OF MINERAL POTENTIAL
 IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
 PHASE II
 INTERPRETATION MAP OF FUTALEUFU-ALTO PALENA AREA
 (SUB-AREA FUTALEUFU)

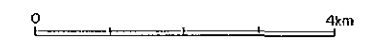


□ PHASE I
 □ PHASE II

FEBRUARY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000



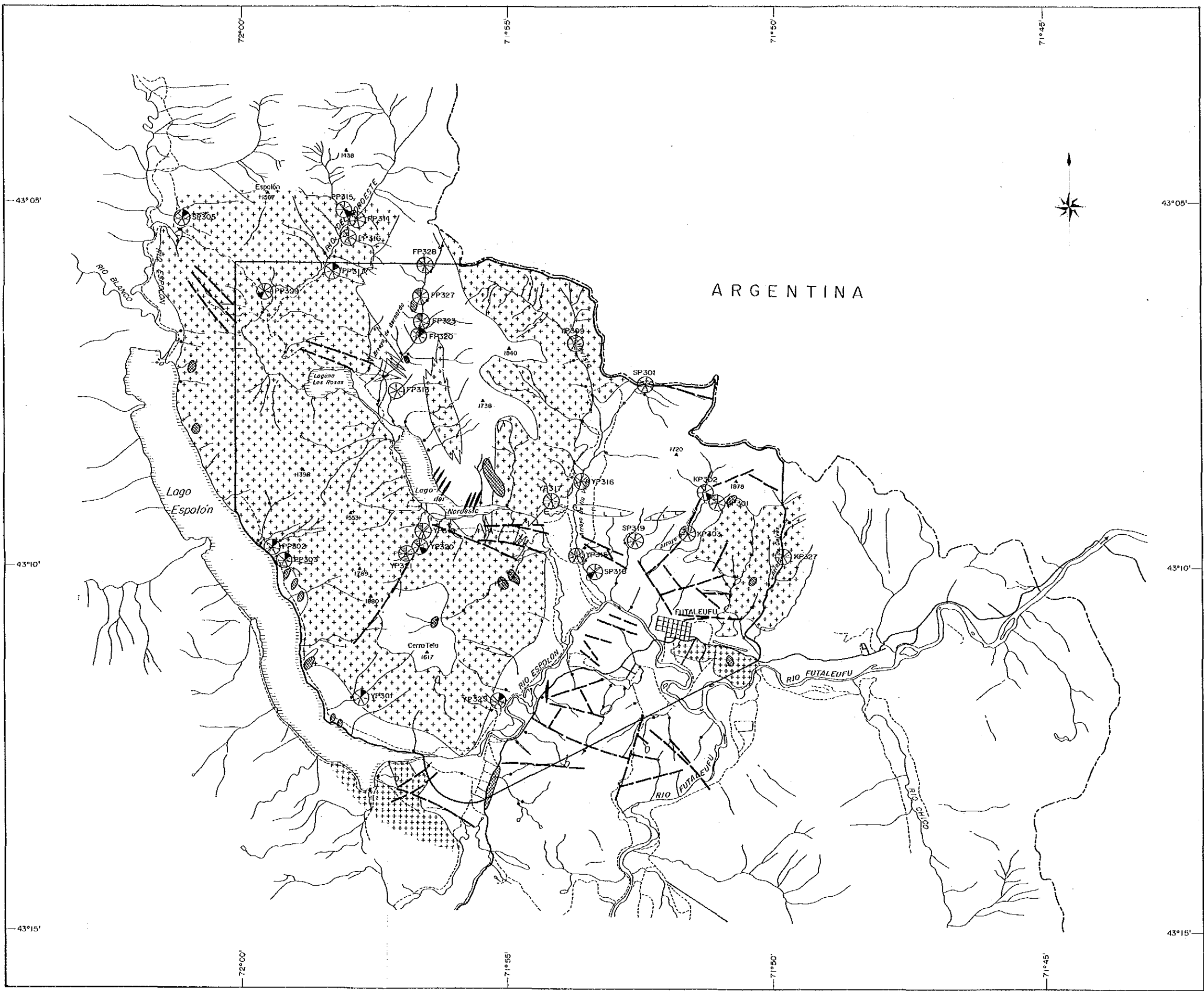
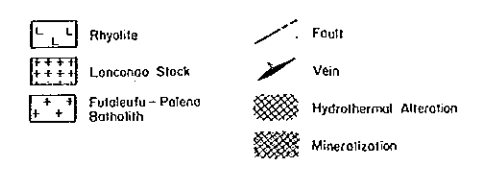
LEGEND

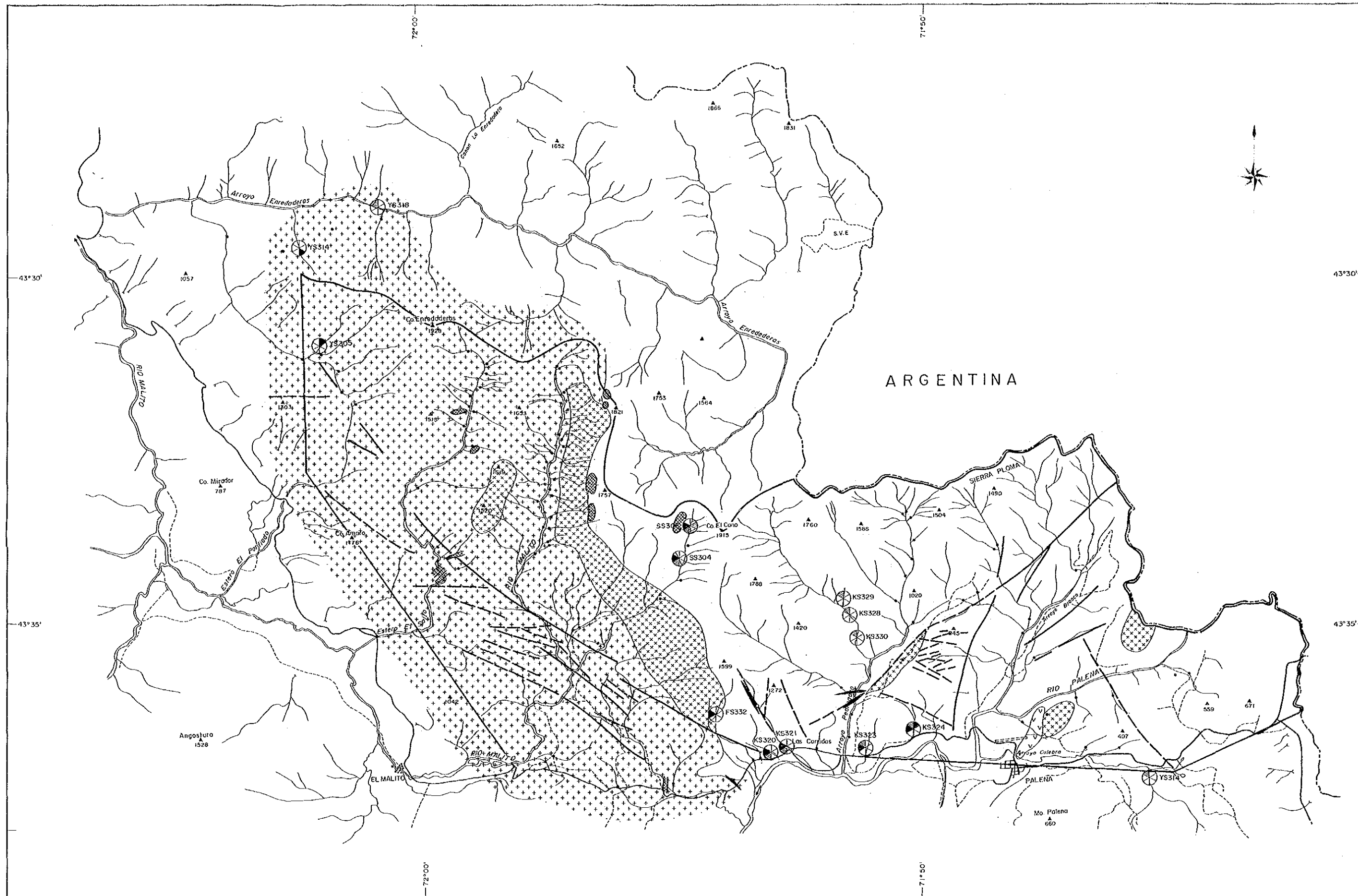
Pan Concentrate Samples



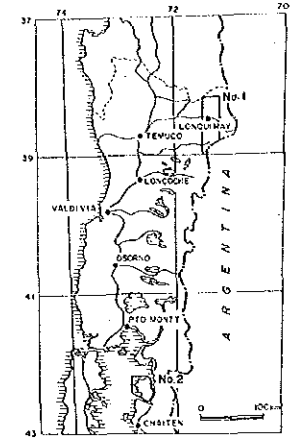
#12: Au ≥ 378 ppb
 Ag ≥ 1.7 ppa
 Cu ≥ 191.1 ppa
 Pb ≥ 152 ppa
 Zn ≥ 252 ppa
 Mo ≥ 5 ppa
 As ≥ 14 ppa

Survey Area

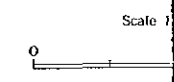




THE INVESTIGATION OF
 IN THE LOQUIMAY AREA AND
 PHASE
 INTERPRETATION MAP OF
 (SUB-AREA)

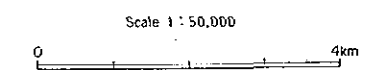
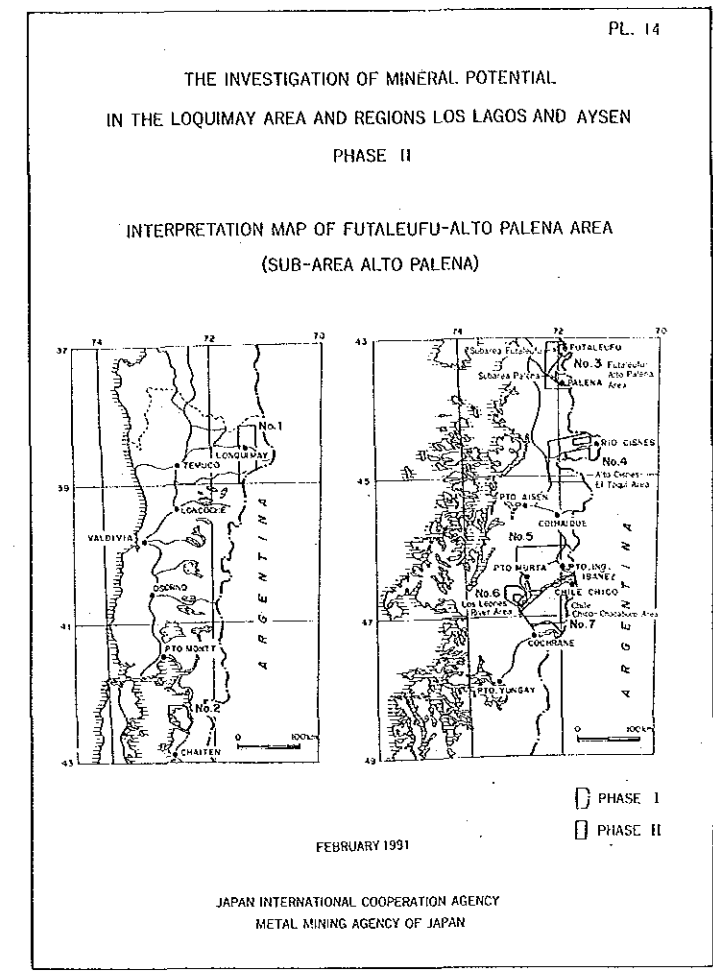
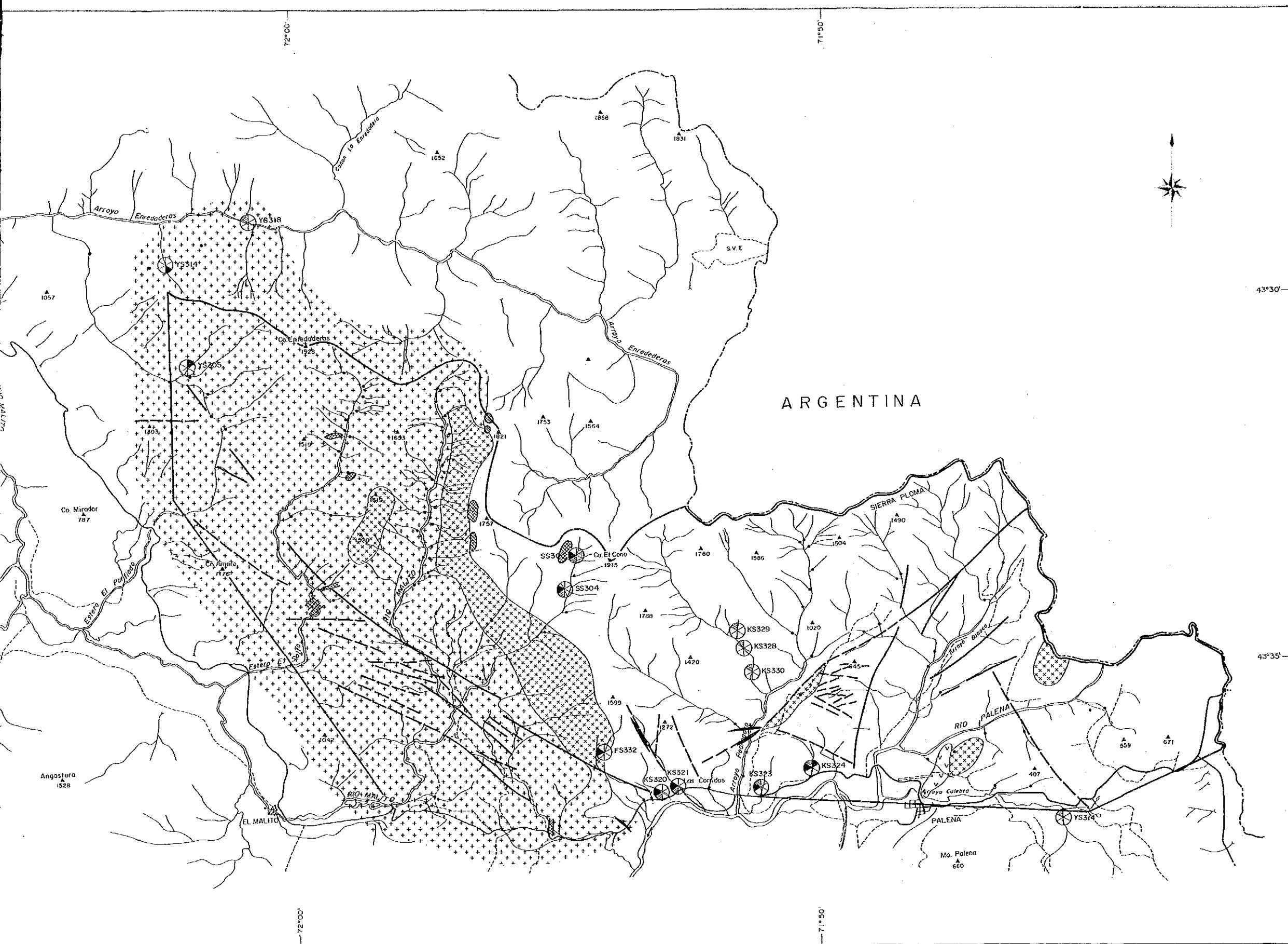


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LEGEND

- Stream Sediment Sample
- Au ≥ 11 ppb
 - Ag ≥ 0.16 ppa
 - Cu ≥ 70 ppa
 - Pb ≥ 47 ppa
 - Zn ≥ 165 ppa
 - As ≥ 13 ppa
- Survey Area
- Trachyte
 - Granitic rock
 - Tonalite
 - Mineralization Alteration zone
 - Ore vein
 - Fault

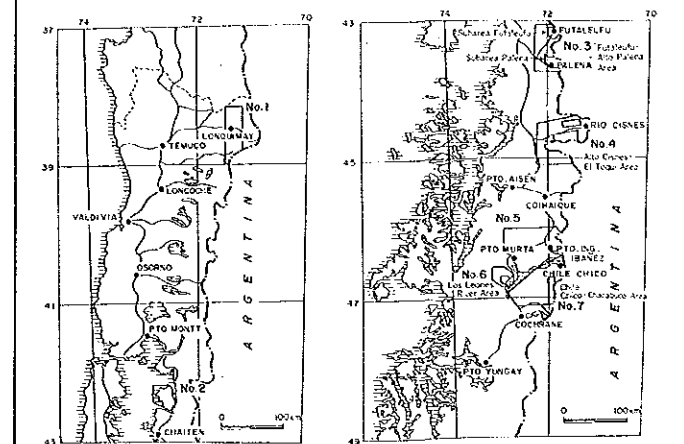


LEGEND

- Stream Sediment Samples
- | | |
|--|-------------|
| | Threshold < |
| | Threshold > |
- Au ≥ 11 ppb
 Ag ≥ 0.16 ppa
 Cu ≥ 70 ppa
 Pb ≥ 47 ppa
 Zn ≥ 165 ppa
 As ≥ 13 ppa
- Survey Area
- | | |
|--|---|
| | Trachyte |
| | Granitic rock |
| | Tonalite |
| | Mineralization and Hydrothermal Alteration zone |
| | Ore vein |
| | Fault |

THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
PHASE II

INTERPRETATION MAP OF LOS LEONES RIVER AREA



PHASE I
PHASE II

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JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000



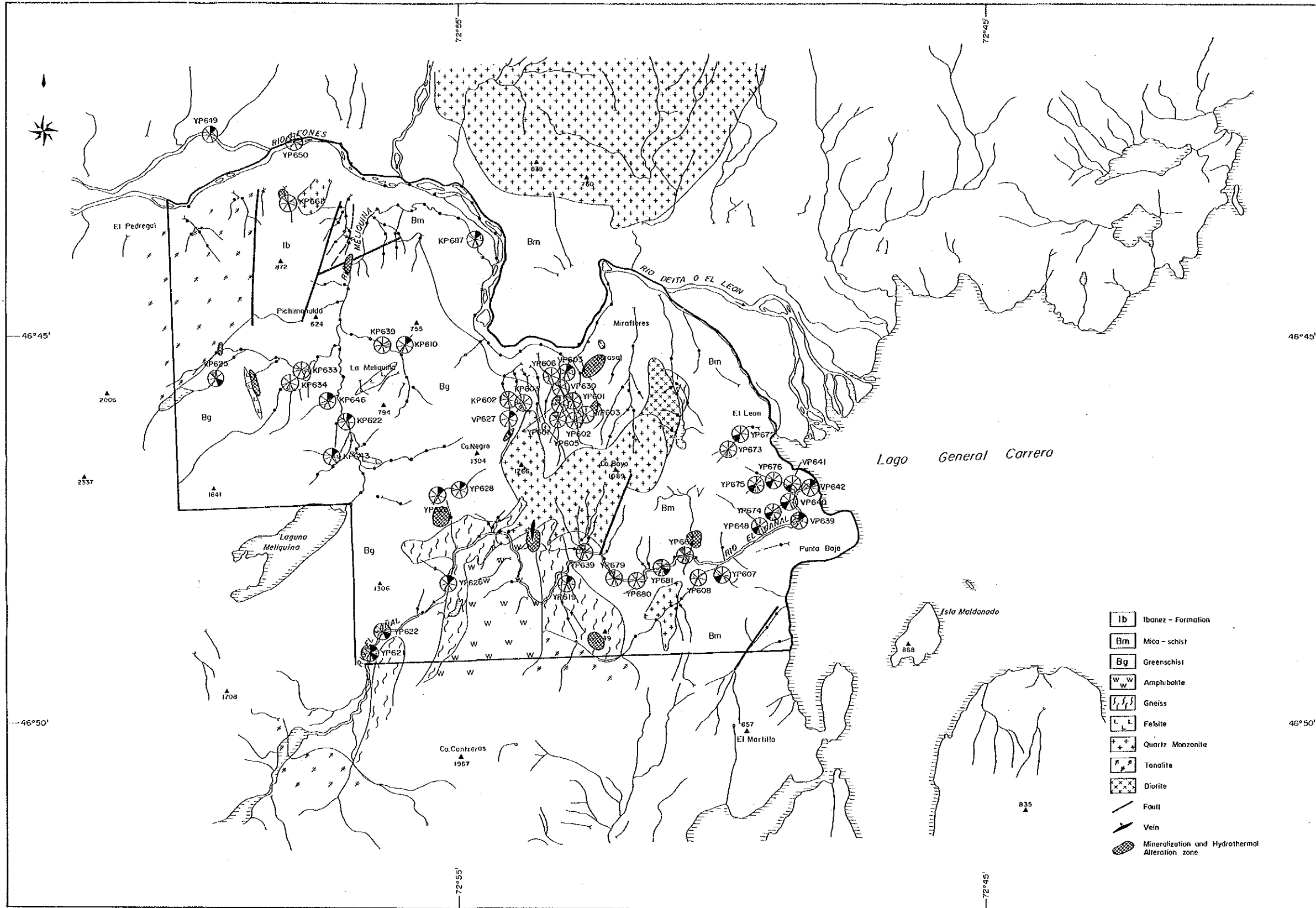
LEGEND

Pan Concentrate Samples



Threshold <
Threshold >
Au ≥ 170 ppb
Ag ≥ 0.5 ppa
Cu ≥ 83 ppa
Pb ≥ 27 ppa
Zn ≥ 230 ppa
Mo ≥ 2 ppa
As ≥ 58 ppa

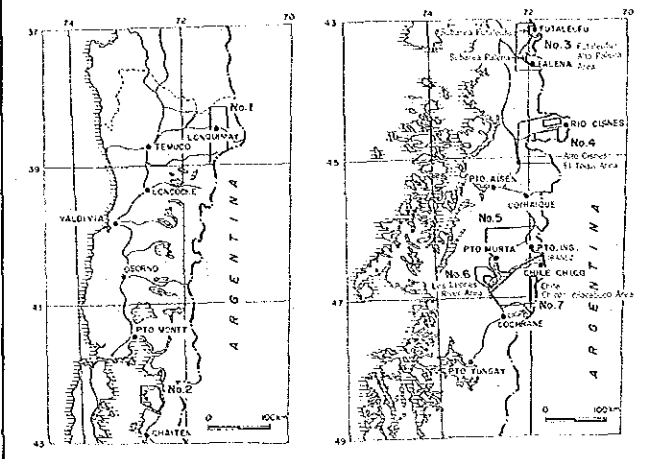
Survey Area



- lb** Ibanez - Formation
- Bm** Mica - schist
- Bg** Greenschist
- Ww** Amphibolite
- Gneiss
- Felsite
- Quartz Monzonite
- Tonalite
- Diorite
- Fault
- Vein
- Mineralization and Hydrothermal Alteration zone

THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSÉN
PHASE II

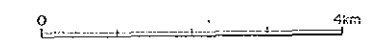
LOCATION MAP OF MINERAL INDICATION AND ALTERATION ZONE
OF FUTALEUFU-ALTO PALENA AREA (SUB-AREA FUTALEUFU)



FEBRUARY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000

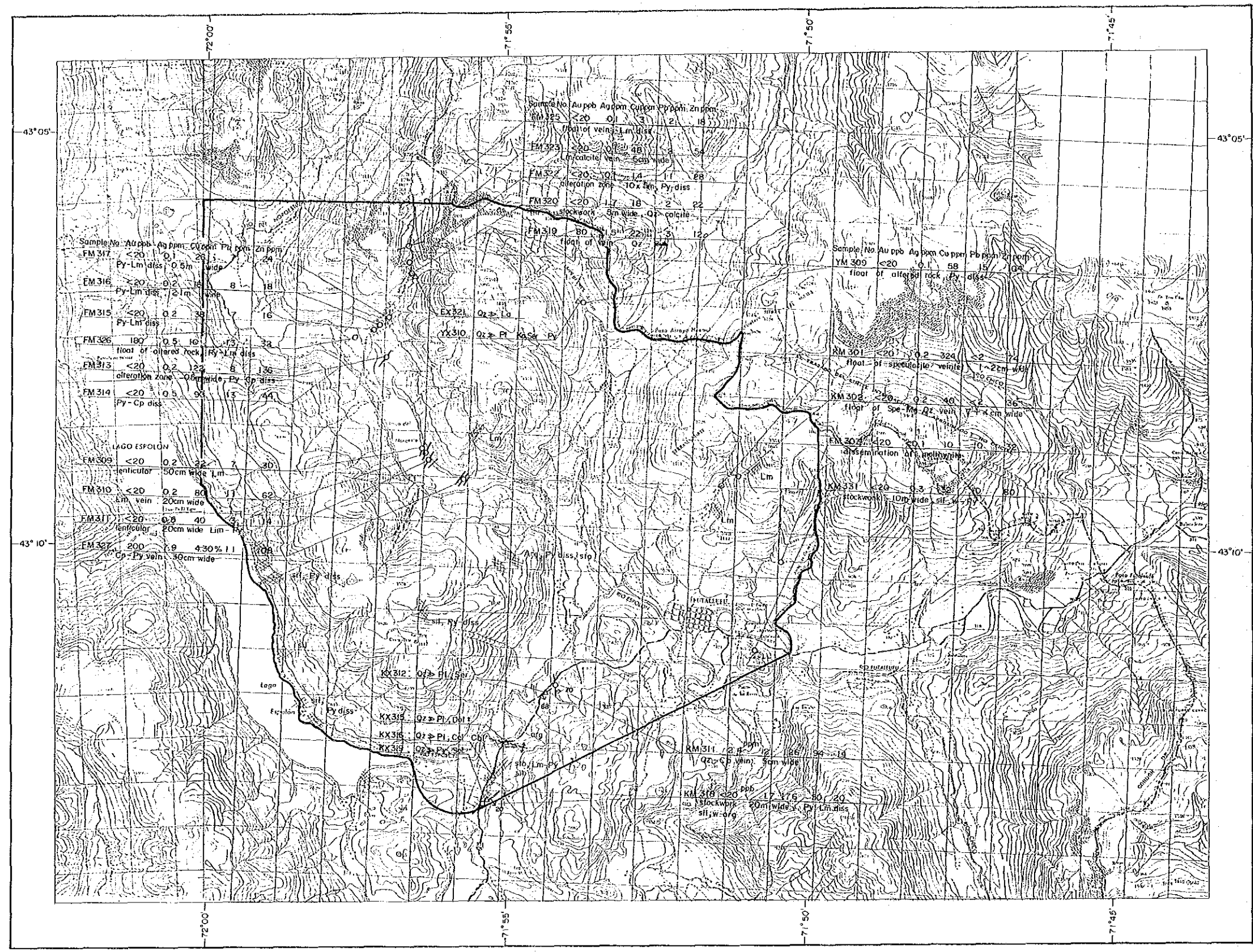


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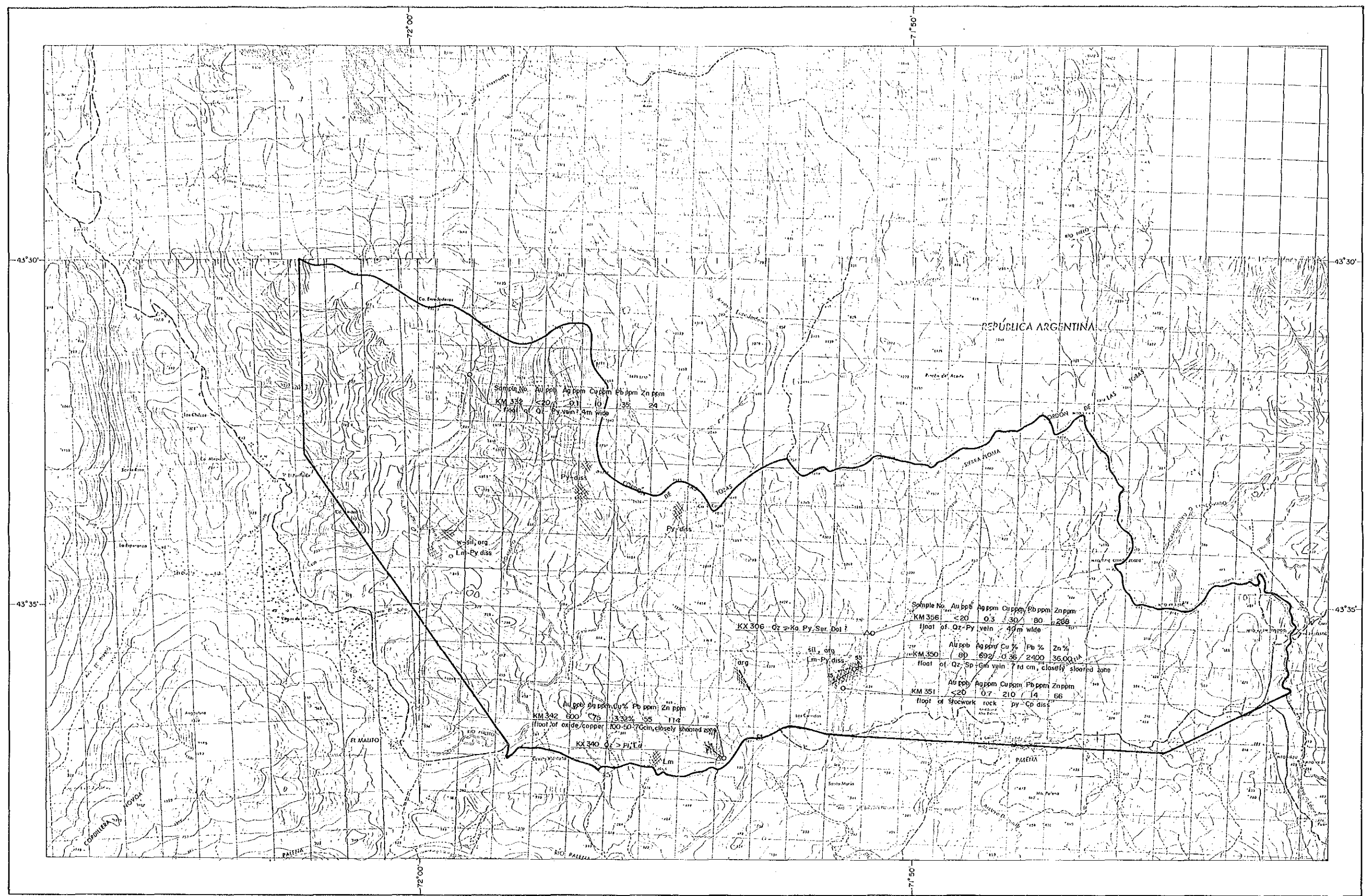
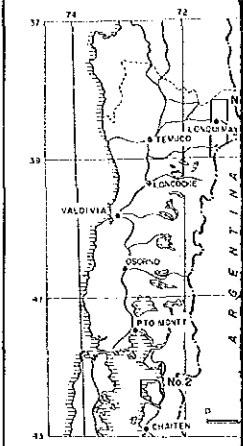
- Chemical analysis of ore sample
- △ X-ray diffraction analysis
- vein, veinlet
- sheared zone
- Alteration zone

Abbreviation

- Oz : quartz, Py : pyrite, Cp : chalcopyrite, Po : pyrrothite
- Sp : sphalerite, Gn : galena, Spe : specularite
- Lm : limonite, Mg : magnetite, w : weak
- diss : dissemination, sta : stockwork
- sil : silicification, org : argillization
- Pl : plagioclase, K-fe : K-feldspar, Chl : chlorite
- Ka : kaolinite, Cal : calcite, Ser : sericite
- La : laumontite, Dol : dolomite, Ho : hornblende



THE INVESTIGATION
IN THE LOQUIMAY
LOCATION MAP OF
OF FUTALEUFU-ALT



Sample No. Au ppm Ag ppm Cu ppm Pb ppm Zn ppm
KM 352 <20 0.1 10 35 24
float of Oz-Py vein 4m wide

sil, org
Lm-Py diss

KX 306 - Oz - Ka, Py, Ser, Dol
float of Oz-Py vein 40m wide

Sample No. Au ppm Ag ppm Cu ppm Pb ppm Zn ppm
KM 356 <20 0.3 30 80 260

KM 350 Au ppm Ag ppm Cu % Pb % Zn %
80 692 0.36 2400 36.00
float of Oz-Sp-Gln vein 7rd cm, closely sheared zone

Sample No. Au ppm Ag ppm Cu ppm Pb ppm Zn ppm
KM 351 <20 0.7 210 14 66
float of stockwork rock py-Cp diss

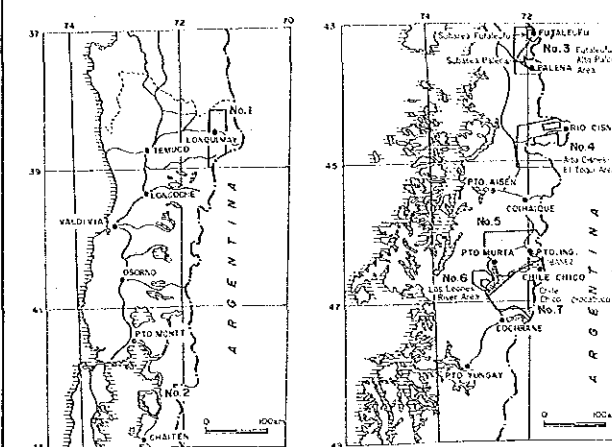
Au ppm Ag ppm Cu % Pb ppm Zn ppm
KM 342 800 75 3.32 95 114
float of oxide/copper 100-50-70cm, closely sheared zone

KX 340 - Oz - Py, Lm

- Legend:
- Chem
 - △ X-ray
 - ↑ vein
 - ↑ sheared
 - Alter
- Abbreviation:
- Oz: quartz, Py
 - Sp: sphalerite,
 - Lm: limonite, Mn
 - diss: dissemination
 - sil: silicification
 - Pl: plagioclase,
 - Ka: kaolinite, Ca
 - La: laumontite,

THE INVESTIGATION OF MINERAL POTENTIAL
IN THE LOQUIMAY AREA AND REGIONS LOS LAGOS AND AYSEN
PHASE II

LOCATION MAP OF MINERAL INDICATION AND ALTERATION ZONE
OF FUTALEUFU-ALTO PALENA AREA (SUB-AREA ALTO PALENA)



PHASE I
PHASE II

FEBRUARY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000

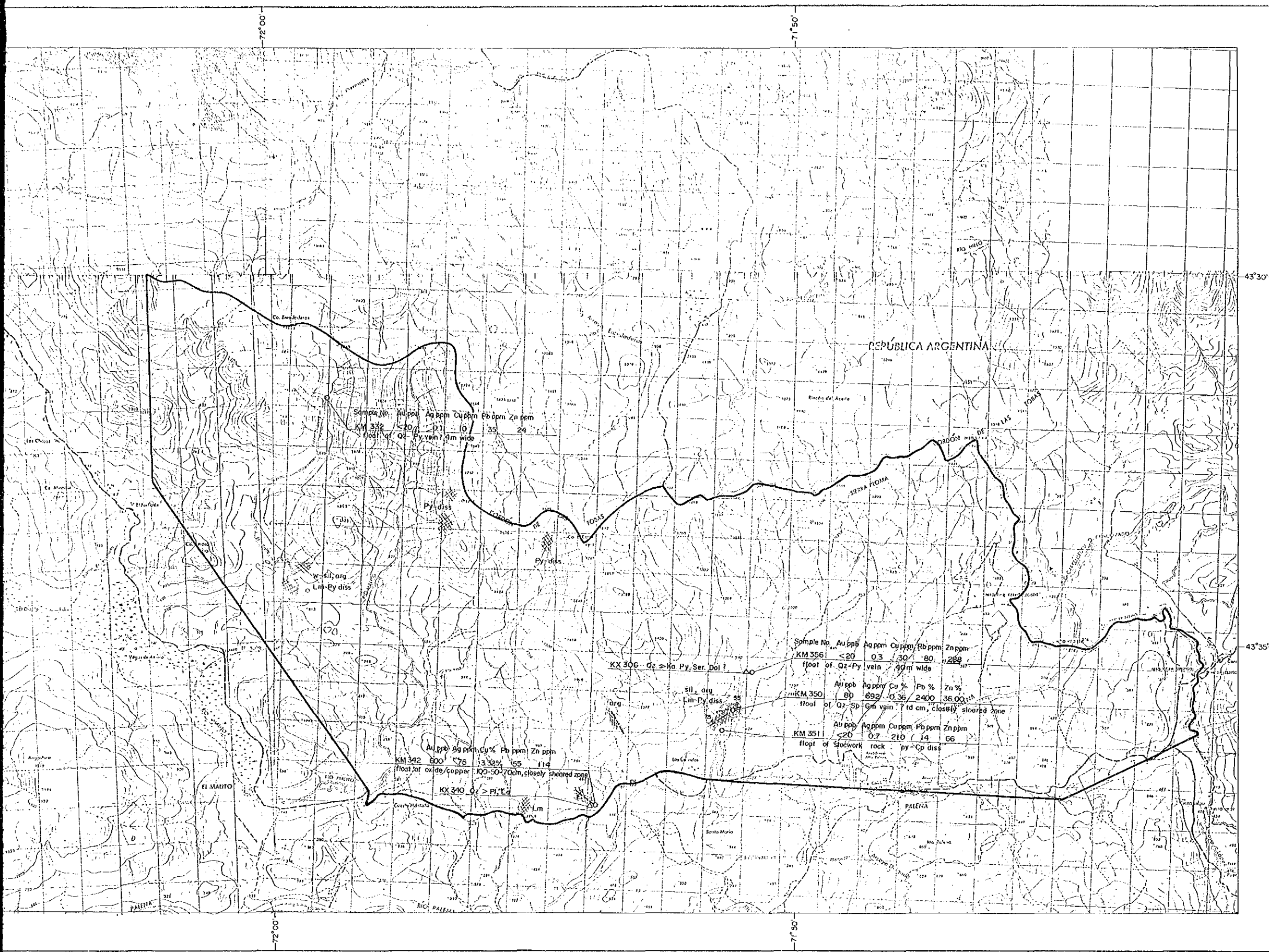


LEGEND

- Chemical analysis of ore sample
- △ X-ray diffraction analysis
- vein, veinlet
- sheared zone
- Alteration zone

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- Ko : kaolinite, Cal : calcite, Ser : sericite
- Lo : laumontite, Dol : dolomite, Ho : hornblende



72° 00'

71° 50'

43° 30'

43° 35'

72° 00'

71° 50'