

4-3

PL. I-1-1

BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II

Geological Map in Survey Area

LOCATION INDEX

METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
Prepared by Bishmet Exploration Co., Ltd.

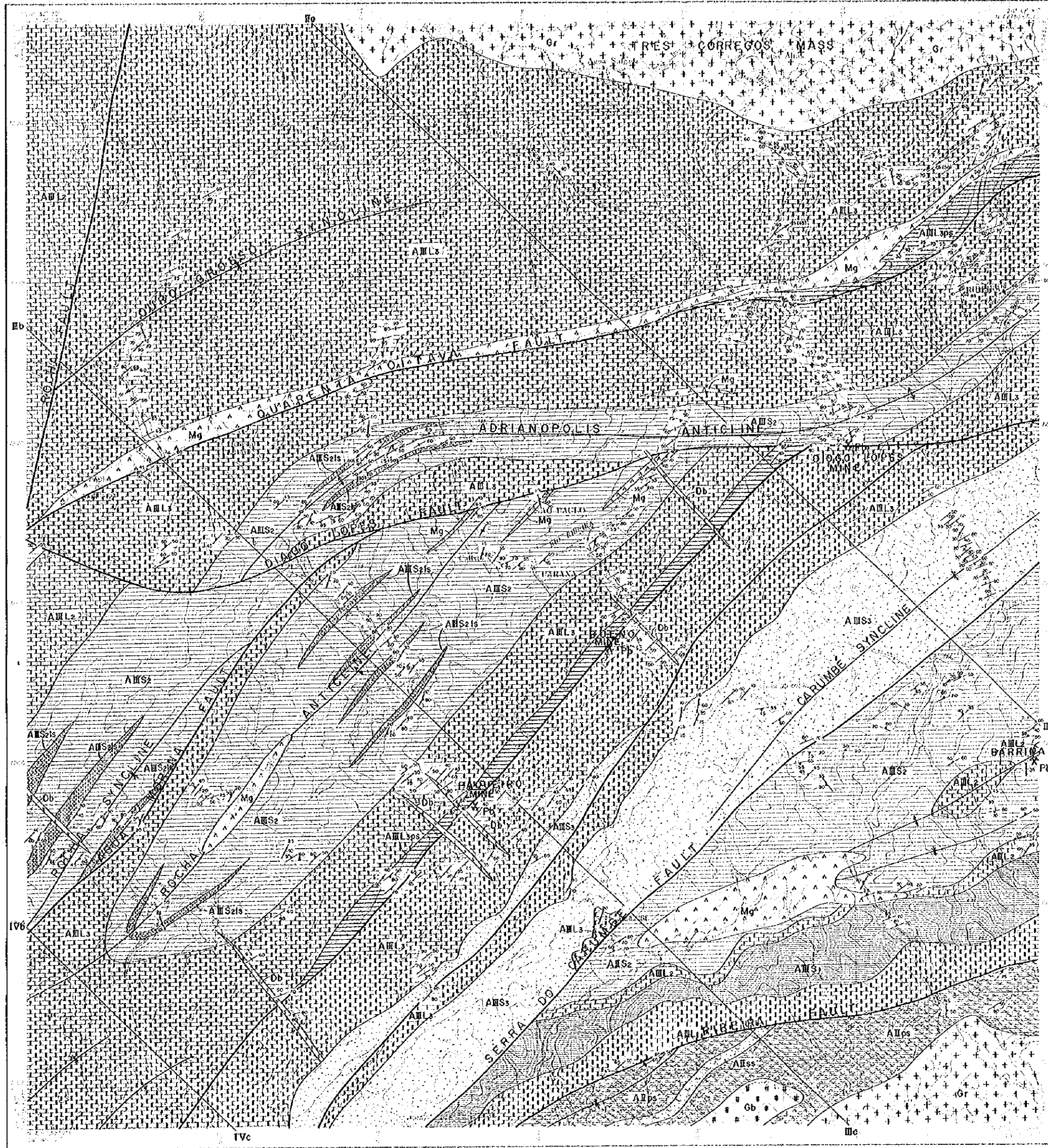
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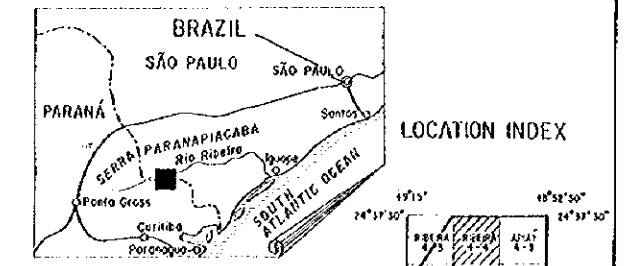
LEGEND

Upper Precambrian	Açungá Group	Upper member	AMs ₁	meta sandstone ~ quartzite & mica schist
			AMs ₂	mica schist
			AMs ₃	limestone ~ calc - schist
	Middle member	AMS ₁	mica schist - phyllite	
		AMS ₂	limestone ~ calc - schist	
		AMLe	limestone, dolomite, calc - schist	
	Lower member	AMs ₁	mica schist	
		AML ₁	limestone	
	Açungá Formation II	AMps	phyllite ~ mica schist	
		AMcs	calc - schist	
		AMom	amphibolite ~ amphibole schist	
		AMss	meta sandstone, quartzite	
	Açungá Formation I	AMcs	calc - schist ~ limestone	
		AMam	amphibolite ~ amphibole schist	
		AMps	mica schist	
AMzs		limestone, dolomite and calc-silicate rock (Perou horizon)		
Serra Formation	Aiq	quartzite		
	Sgn	gneiss		
Intrusive rocks	Sqt	quartzite		
	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
Da	dacite			

Anticlinat axis Synclinal axis Fault certain, conjectural
 X operating mine
 X closed mine



BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geological Map in Survey Area



METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
Prepared by Bishmetal Exploration Co., Ltd.

Scale 1:25,000

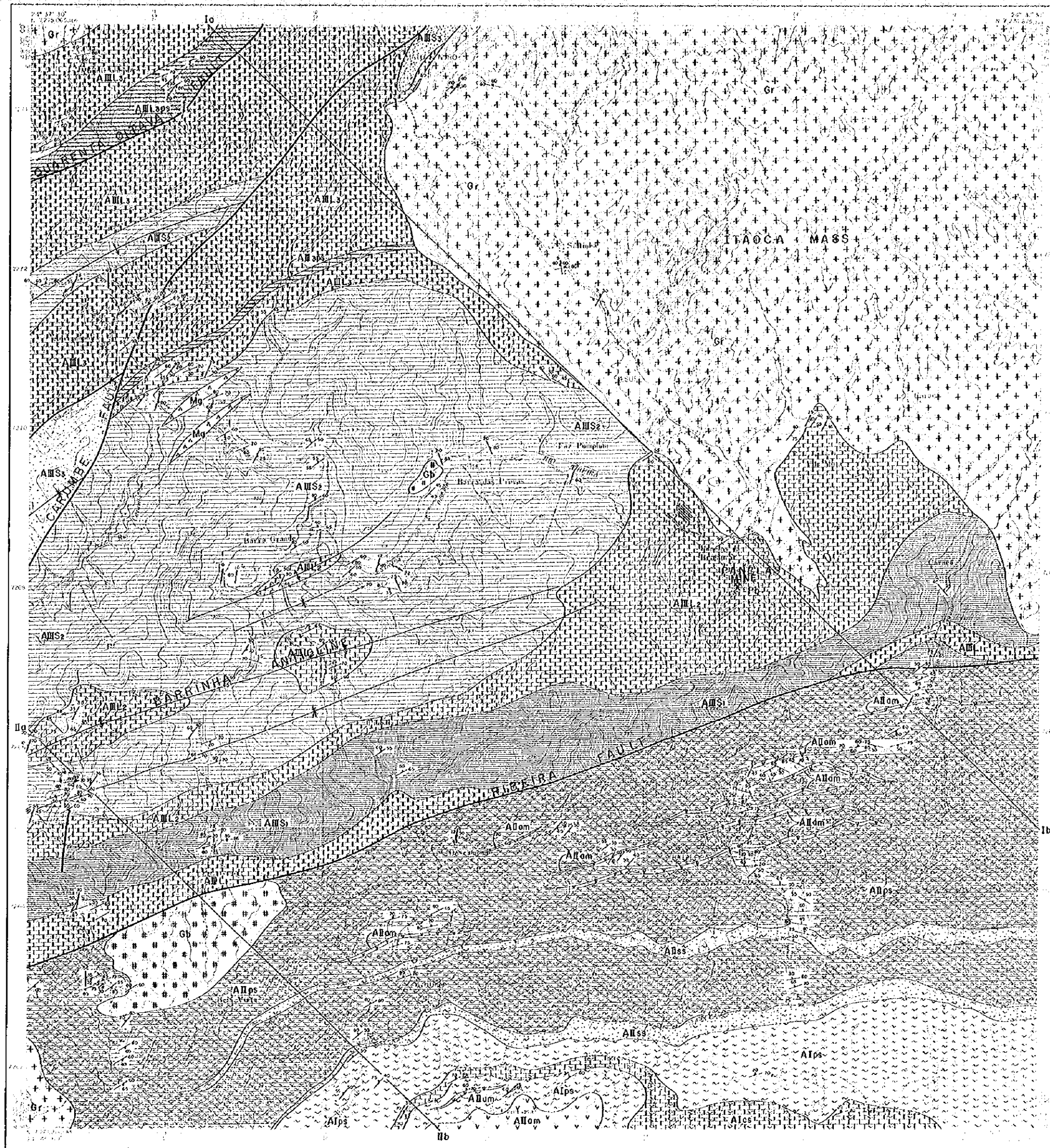


LEGEND

Upper Precambrian	Acungui Group	Acungui Formation III	AMS3	meta sandstone - quartzite & mica schist
			AML3p	mica schist
			AML3	limestone - calc - schist
	Acungui Formation II	Middle member	AMS2	mica schist - phyllite
			AMS2p	limestone - calc - schist
			AML2	limestone, dolomite, calc - schist
	Acungui Formation I	Lower member	AMS1	mica schist
			AML1	limestone
	Serra Formation	Serra Formation	AIIps	phyllite - mica schist
			AIIcs	calc - schist
			AIIom	amphibolite - amphibole schist
			AIIss	meta sandstone, quartzite
			AIIcs	calc - schist - limestone
	Intrusive rocks	Intrusive rocks	AIIom	amphibolite - amphibole schist
AIIps			mica schist	
AIIss			limestone, dolomite and calc-silicate rock (Perai horizon)	
AIIql			quartzite	
Sgn			gneiss	
Sqt	quartzite			
Intrusive rocks	Intrusive rocks	Mb	meta basite	
		Gr	granite	
		Gb	gabbro	
		Sy	syenite	
		Db	diabase	
		Do	dacite	

Anticlinical axis Synclinal axis Fault certain, conjectural

X operating mine
X closed mine



PL.1-1-3

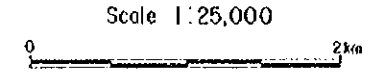
BRAZIL
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METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

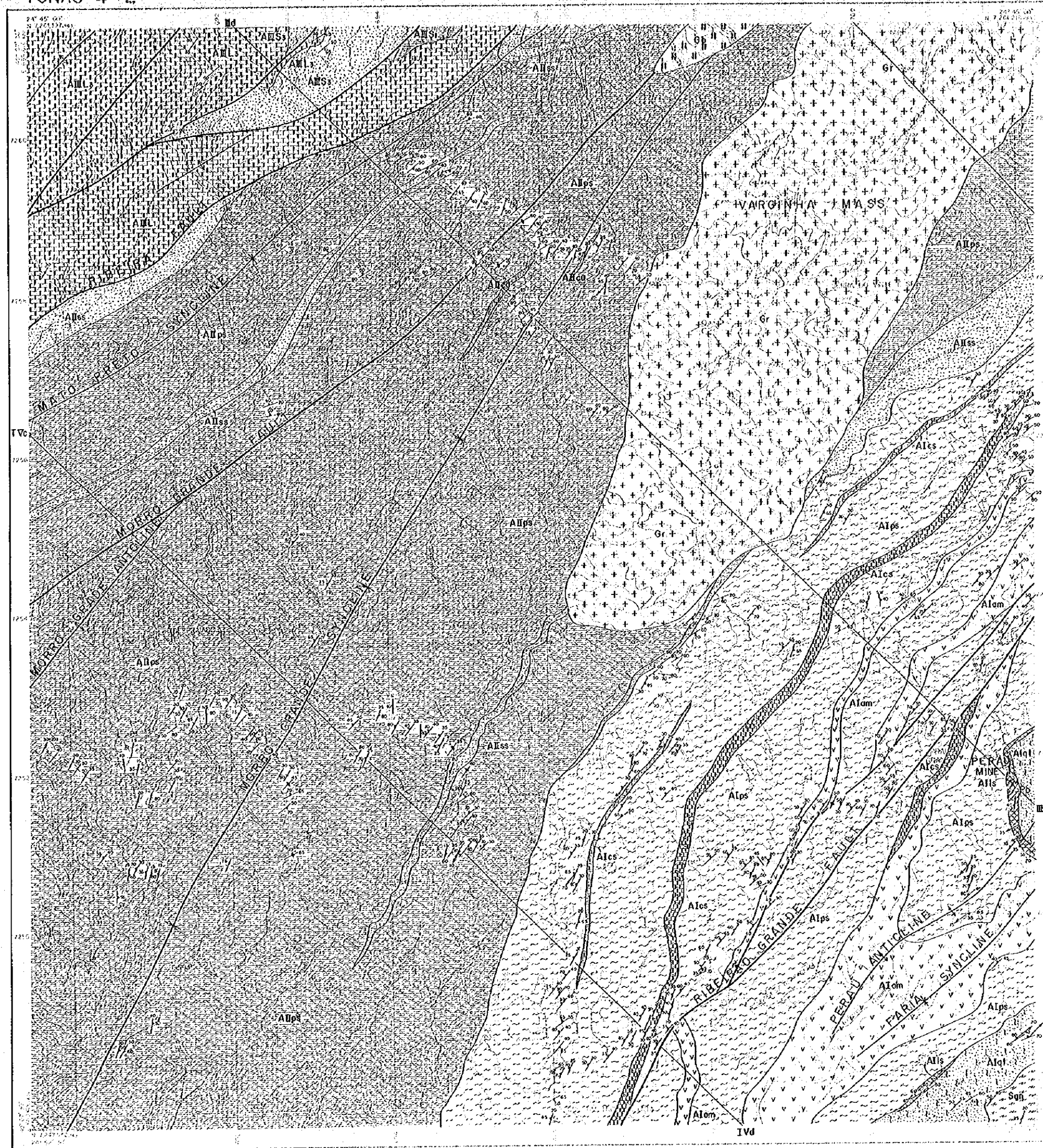
MAR. 1982
Prepared by Bishmetal Exploration Co., Ltd.



LEGEND

Upper Precambrian	Açuanga Group	Upper member	AIII _s	meta sandstone ~ quartzite & mica schist
			AIII _{sp}	mica schist
			AIII _l	limestone ~ calc - schist
		Middle member	AII _s	mica schist - phyllite
			AII _{st}	limestone ~ calc - schist
			AII _l	limestone, dolomite, calc - schist
	Lower member	AI _s	mica schist	
		AI _l	limestone	
		AI _{ps}	phyllite ~ mica schist	
	Açuanga Formation I	AI _{cs}	calc - schist ~ limestone	
		AI _{om}	amphibolite ~ amphibole schist	
		AI _{ps}	mica schist	
		AI _{ls}	limestone, dolomite and calc-silicate rock (Perau horizon)	
		AI _{qt}	quartzite	
		AI _{ss}	meta sandstone, quartzite	
Setúba Formation	Sgn	gneiss		
	Sql	quartzite		
Intrusive rocks	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
	Da	dacite		

↗	↘	---
Anticlinal axis	Synclinal axis	Fault certain, conjectural
X	X	
operating mine	closed mine	



PL. I-1-5

BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II

Geological Map in Survey Area

LOCATION INDEX

METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
Prepared by Gishimetal Exploration Co., Ltd.

Scale 1:25,000

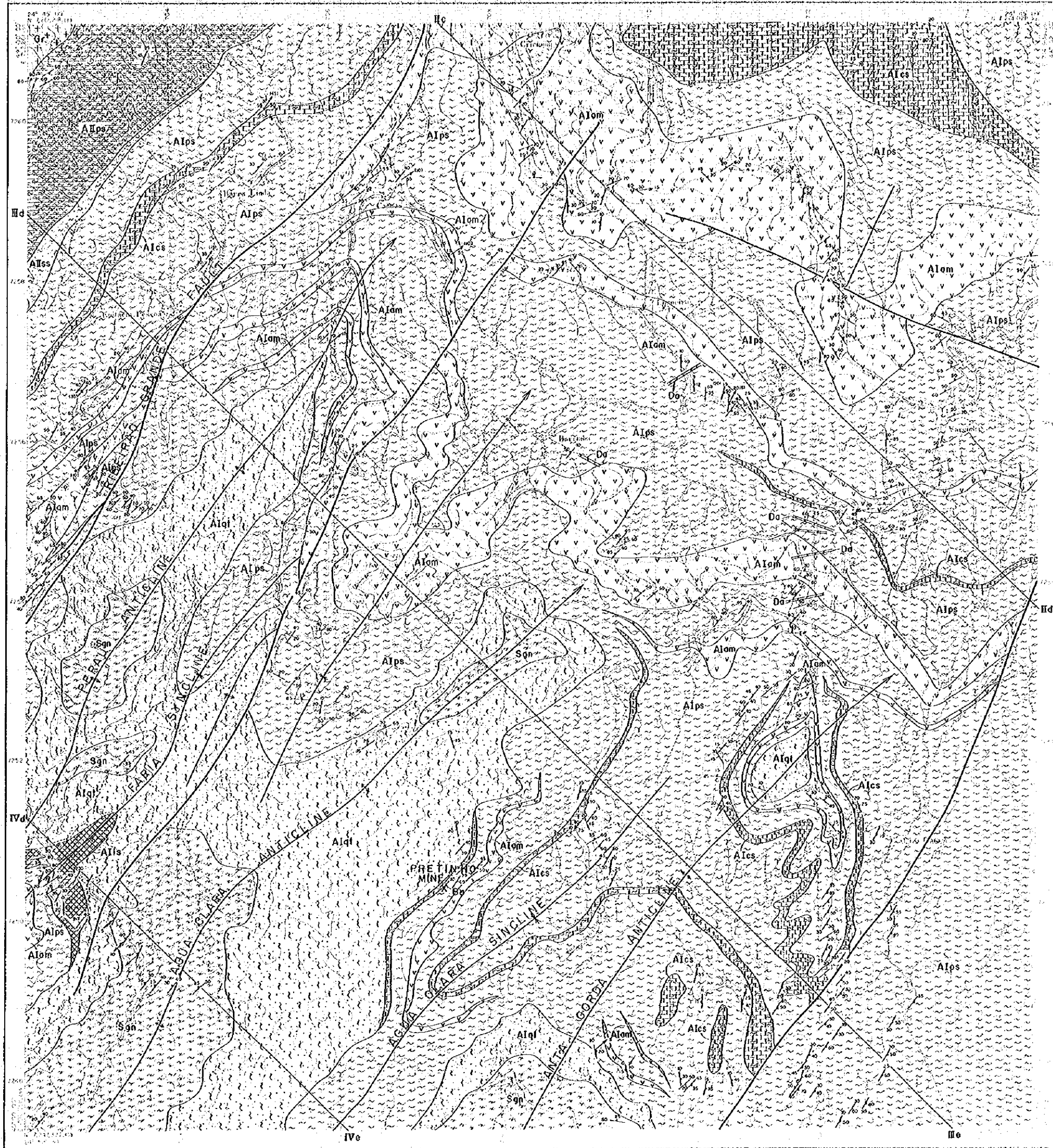
LEGEND

Upper Precambrian	Acungui Group	Acungui Formation II	AIps	meto sandstone - quartzite & mica schist
			Aics	mica schist
			AIom	limestone - calc - schist
			AIss	mica schist - phyllite
			AIs	limestone - calc - schist
			AEL	limestone, dolomite, calc - schist
	Acungui Formation I	AELz	mica schist	
		AELs	limestone	
		AELps	phyllite - mica schist	
		AELcs	calc - schist	
Setuva Formation	AIom	amphibolite - amphibole schist		
	AIps	amphibolite - amphibole schist		
	AIs	mica schist		
	AIqt	limestone, dolomite and calc-silicate rock (Perai horizon) quartzite		
Intrusive rocks	Sgn	gneiss		
	Sqt	quartzite		
Intrusive rocks	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
Da	dacite			

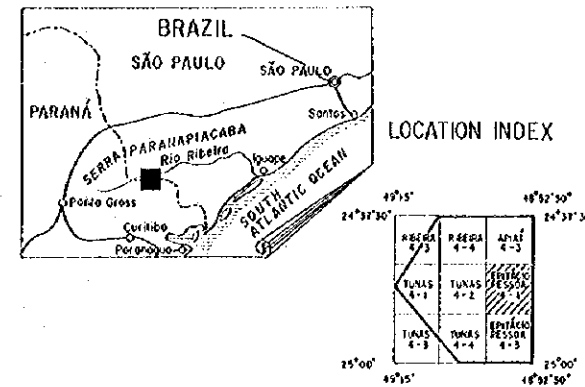
Anticlinal axis Synclinal axis Fault certain, conjectural

⊗ operating mine

⊗ closed mine



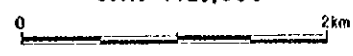
BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geological Map in Survey Area



METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

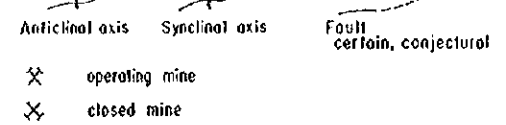
MAR. 1982
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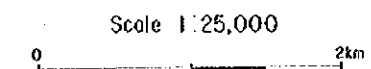
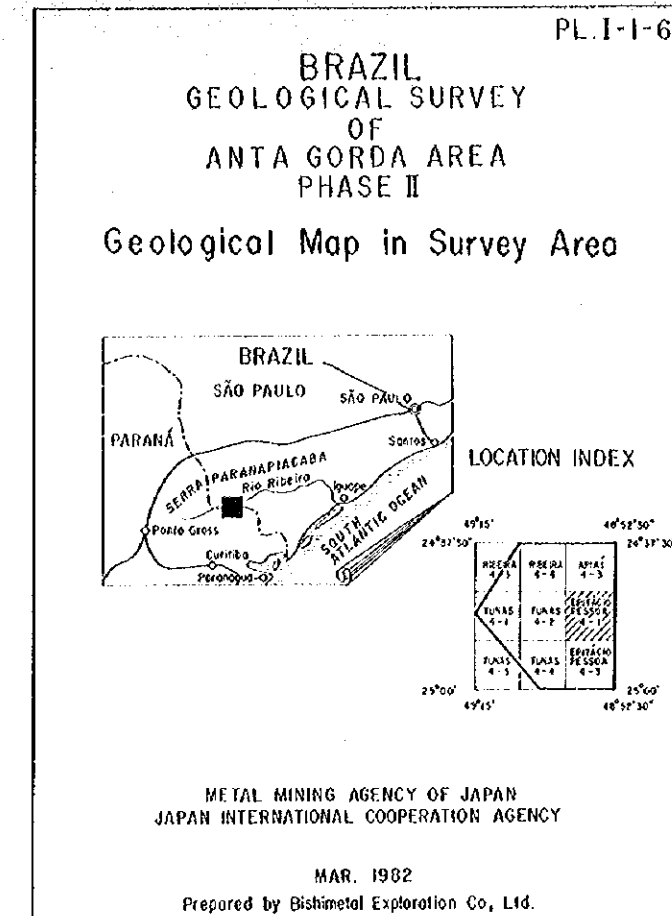
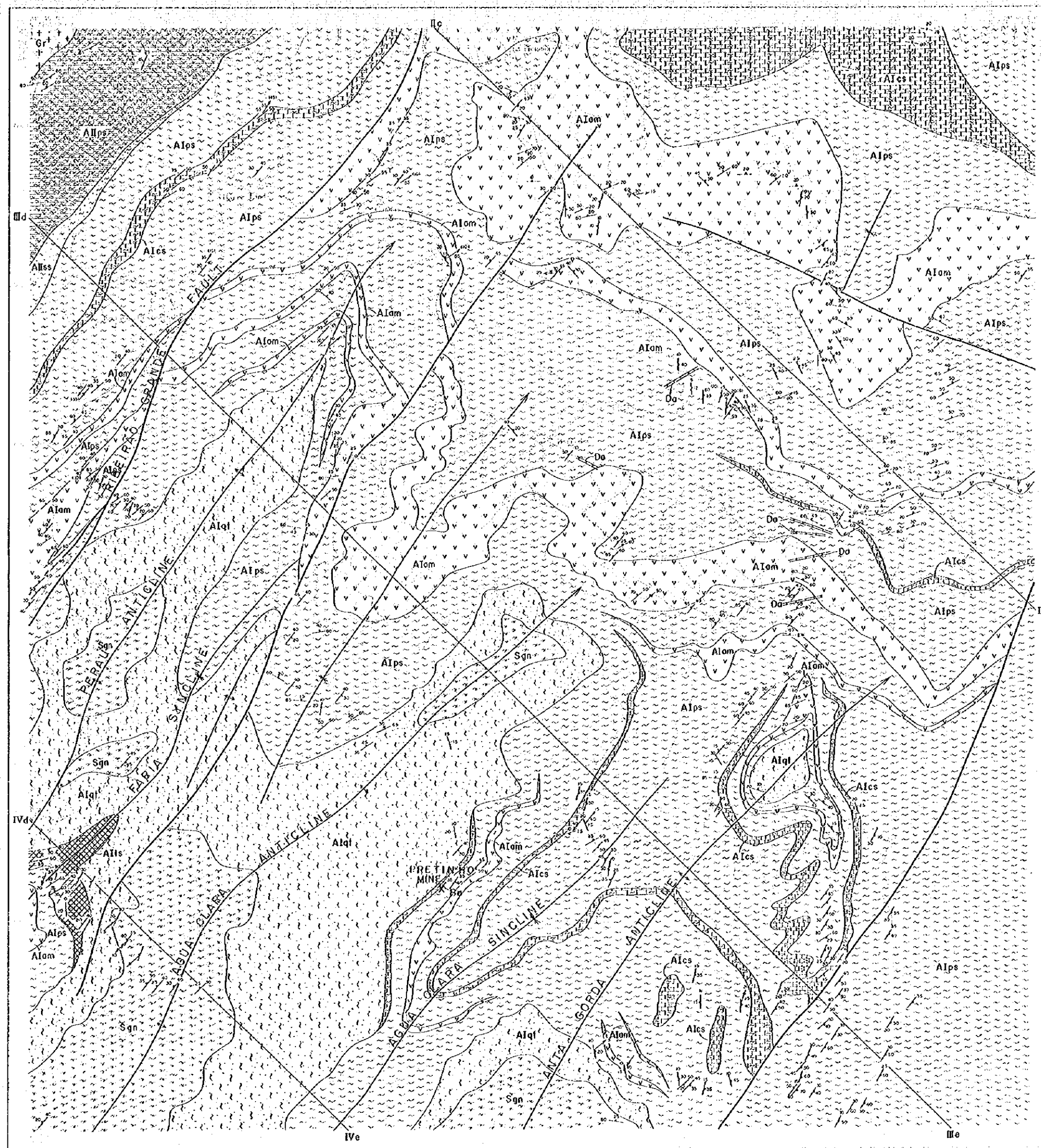


LEGEND

Upper Precambrian	Acungu Group	Upper member	AiSs	meta sandstone - quartzite & mica schist
			AiLps	mica schist
			AiLcs	limestone - calc - schist
		Middle member	AiSs+	mica schist - phyllite
			AiSsLcs	limestone - calc - schist
			AiL+	limestone, dolomite, calc - schist
	Lower member	AiSs	mica schist	
		AiL	limestone	
		AiLps	phyllite - mica schist	
	Acungu Formation I	AiLcs	calc - schist - limestone	
		AiLom	amphibolite - amphibole schist	
		AiLps	mica schist	
AiLcs		limestone, dolomite and calc-silicate rock (Parau horizon)		
AiLqt		quartzite		
AiLcs		meta sandstone, quartzite		
Setuva Formation	Sgn	gneiss		
	Sqi	quartzite		
Intrusive rocks	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Da	dacite		

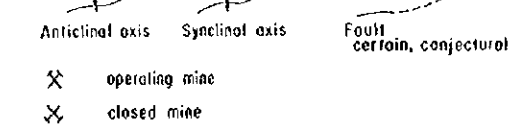


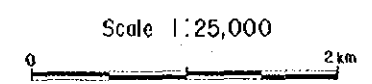
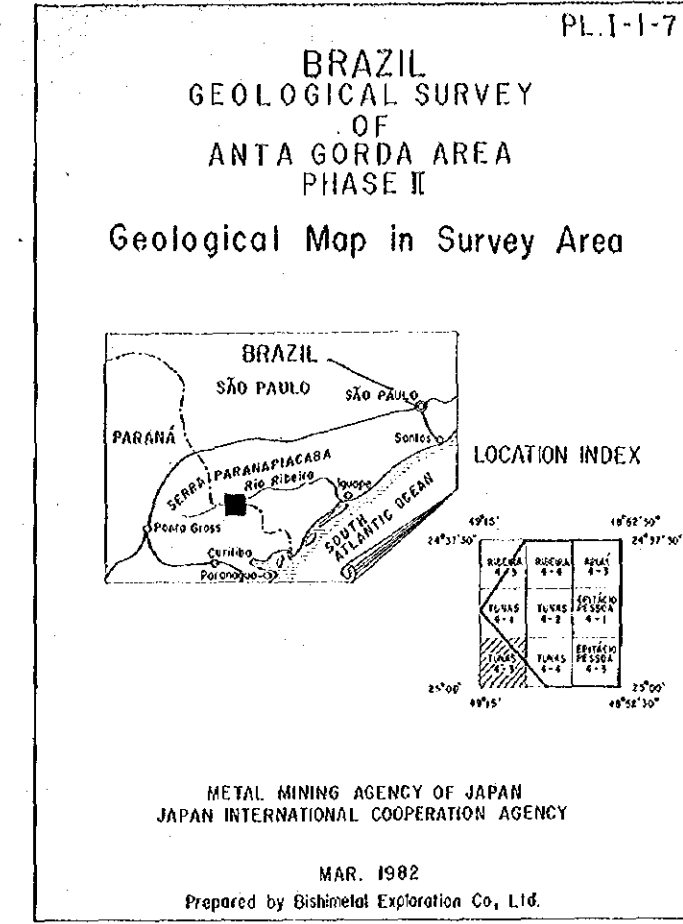
⊗ operating mine
⊗ closed mine



LEGEND

Upper Precambrian	Açungui Group	Açungui Formation I	Aics	calc. schist - limestone
			Aiom	amphibolite - amphibole schist
	Açungui Formation II	Upper member	Aips	phyllite - mica schist
			Aics	calc. schist
		Middle member	Aiom	amphibolite - amphibole schist
			Aips	meta sandstone, quartzite
	Lower member	Aiqi	quartzite	
		Aics	calc. schist - limestone	
	Serra Formation	Sgn	gneiss	
		Sqi	quartzite	
Intrusive rocks	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
	Da	dacite		

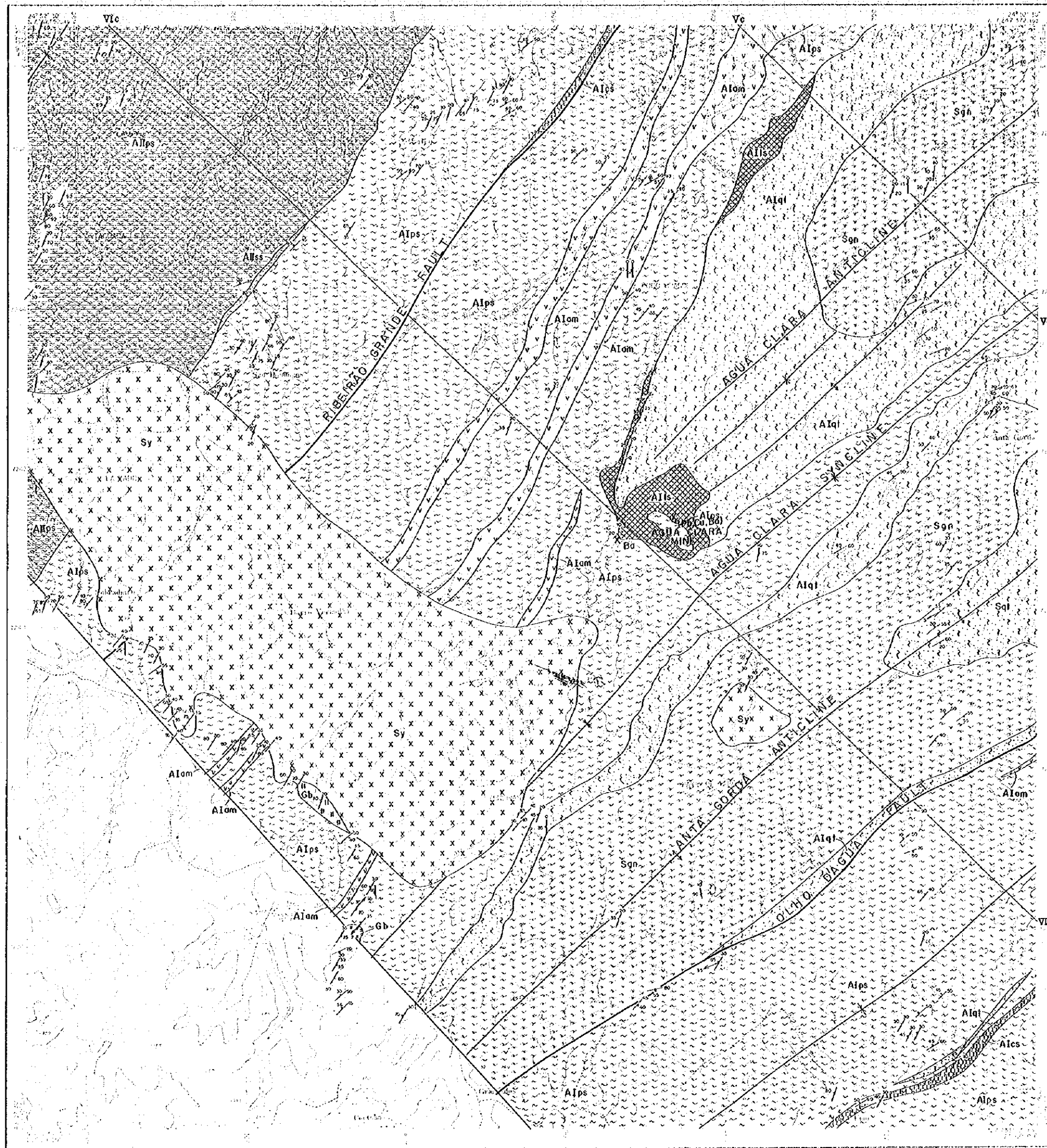




LEGEND

Upper Precambrian	Aguas Formation III	Upper member	ANSs	meta sandstone - quartzite & mica schist
			Alps	mica schist
			ANLs	limestone - calc - schist
		Middle member	ANSz	mica schist - phyllite
			ANSzls	limestone - calc - schist
			ANLz	limestone, dolomite, calc - schist
		Lower member	ANSi	mica schist
			ANLl	limestone
		Aguas Formation II	Alps	phyllite - mica schist
			Alcs	calc - schist
	Alom		amphibolite - amphibole schist	
	Alss		meta sandstone, quartzite	
	Aguas Formation I	Alcs	calc - schist - limestone	
		Alom	amphibolite - amphibole schist	
		Alps	mica schist	
Alfs		limestone, dolomite and calc - silicate rock (Perou horizon)		
Serra da Grande Escalante	Alqt	quartzite		
	Sgn	gneiss		
Intrusive rocks	Sq	quartzite		
	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
Do	dacite			

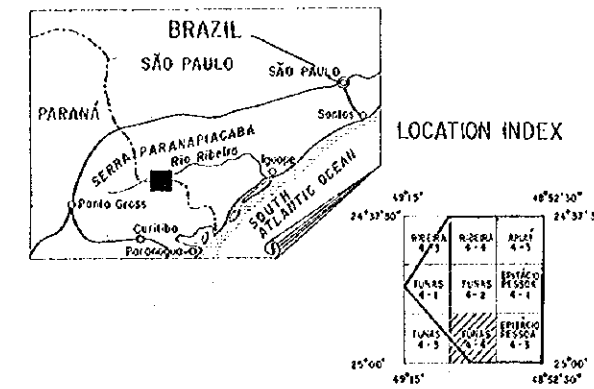
	Anticlinical axis		Synclinal axis		Fault certain, conjectural
	operating mine		closed mine		



4-4

PL.I-1-8

BRAZIL
GEOLOGICAL SURVEY
OF
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PHASE II
Geological Map in Survey Area



METAL MINING AGENCY OF JAPAN
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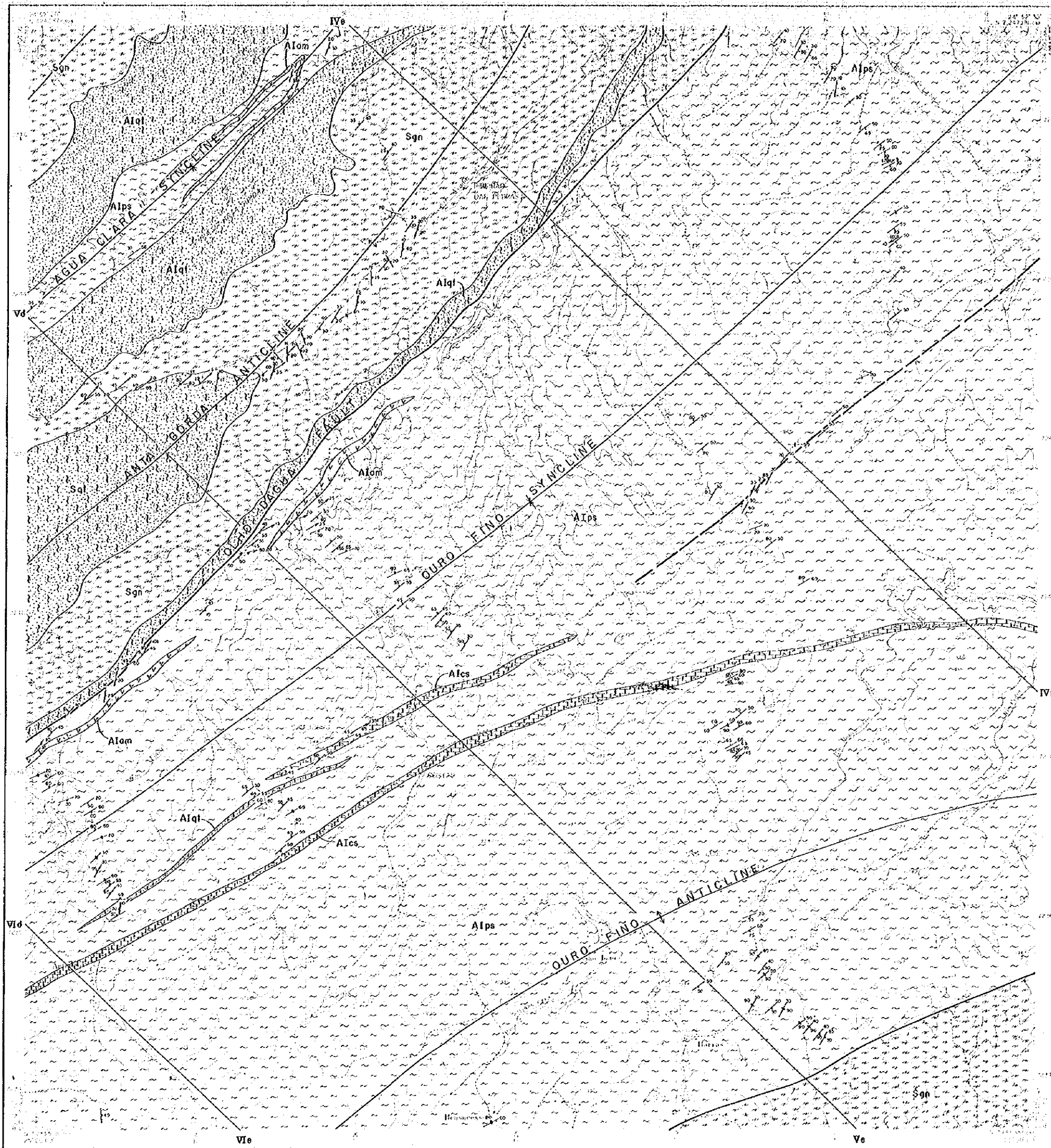


LEGEND

Upper Precambrian	Açungui Group	Upper member	A1Hs	meta sandstone ~ quartzite & mica schist
			A1Lps	mica schist
			A1Ls	limestone ~ calc - schist
		Middle member	A1Hs ₂	mica schist - phyllite
			A1Hs ₁	limestone ~ calc - schist
			A1L ₂	limestone, dolomite, calc - schist
	Lower member	A1Hs ₃	mica schist	
		A1L ₁	limestone	
	Açungui Formation I	A1ps	phyllite ~ mica schist	
		A1cs	calc - schist	
		A1om	amphibolite ~ amphibole schist	
		A1ss	meta sandstone, quartzite	
	Açungui Formation II	A1cs	calc - schist ~ limestone	
		A1om	amphibolite ~ amphibole schist	
A1ps		mica schist		
A1zs		limestone, dolomite and calc-silicate rock (Parou horizon)		
Setuva Formation	A1qt	quartzite		
	Sgn	gneiss		
Intrusive rocks	Sq1	quartzite		
	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
Da	dacite			

Anticlinal axis Synclinal axis Fault certain, conjectural

X operating mine
X closed mine



PL.1-1-9

BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II

Geological Map in Survey Area

LOCATION INDEX

METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

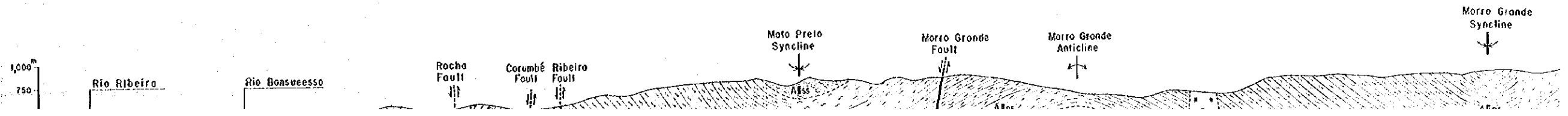
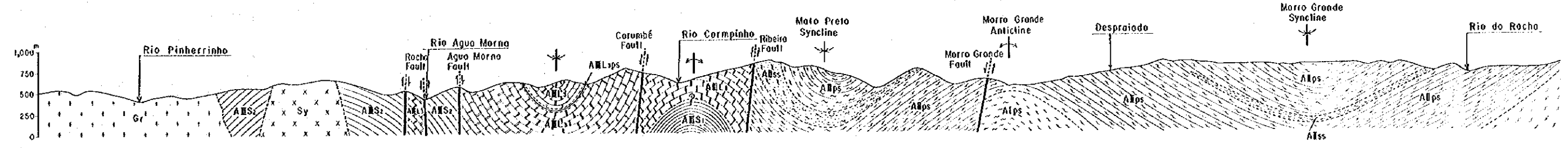
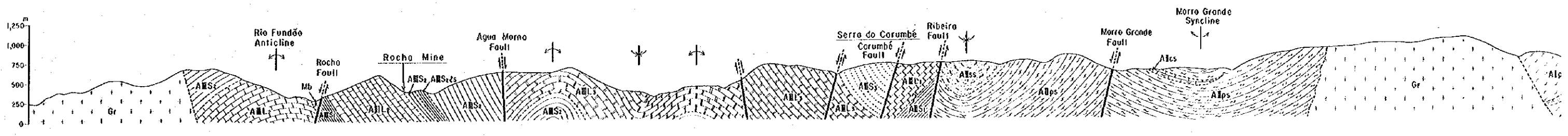
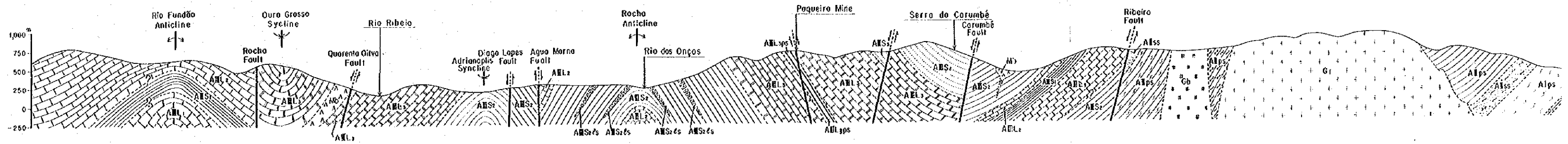
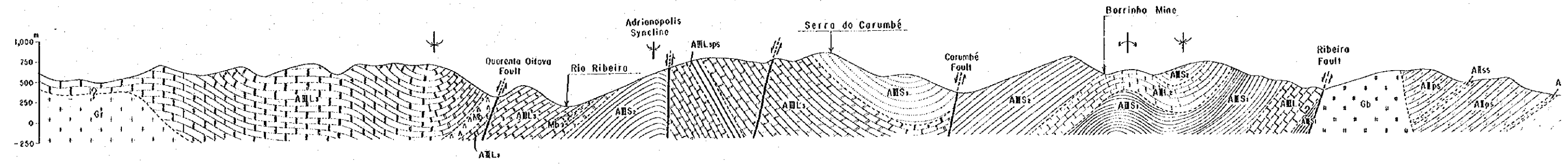
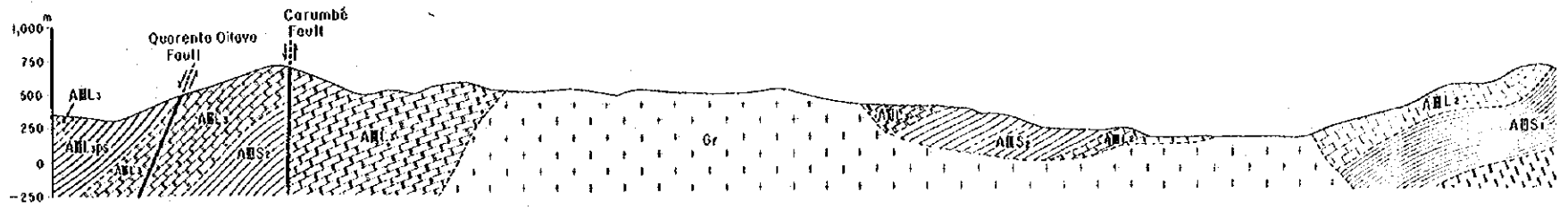
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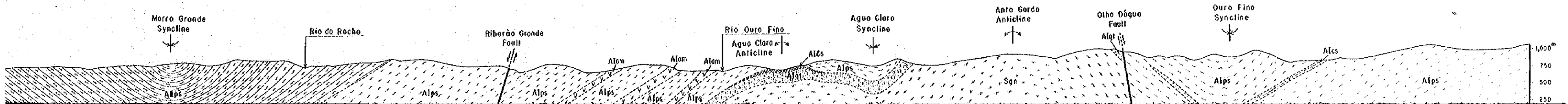
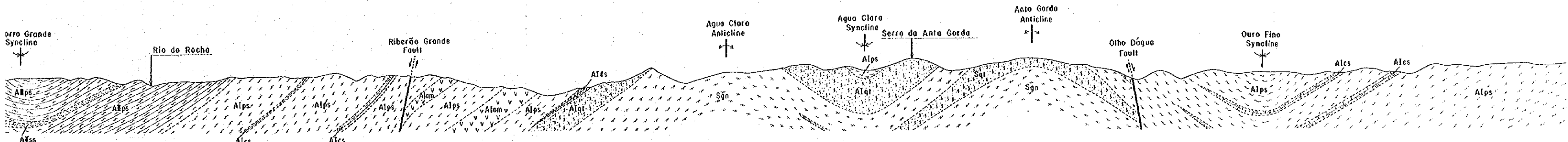
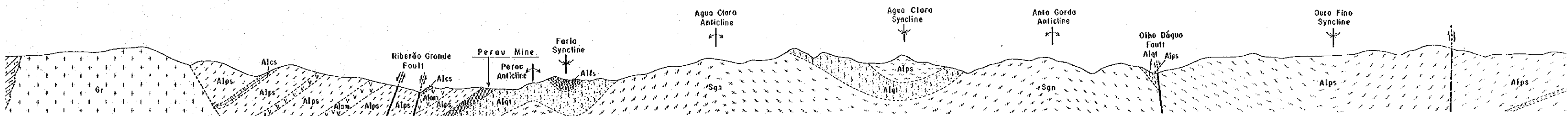
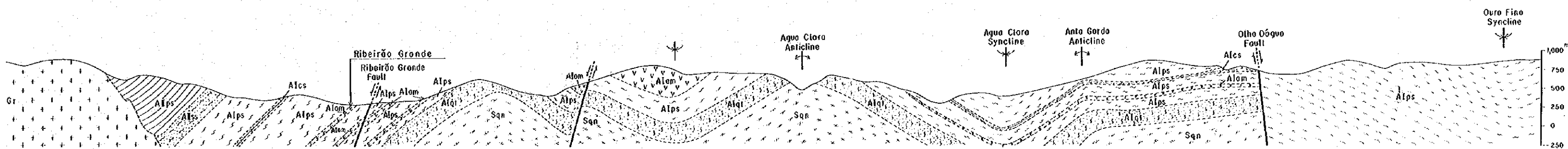
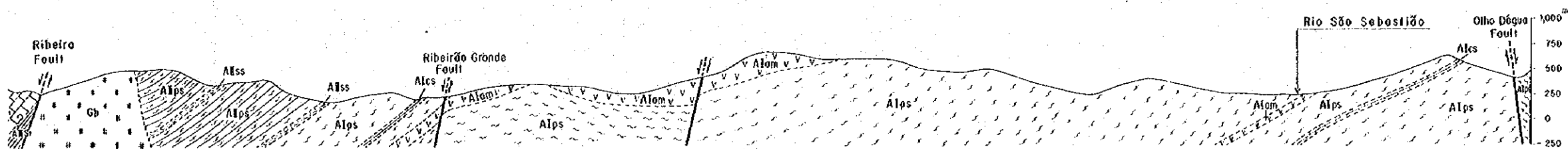
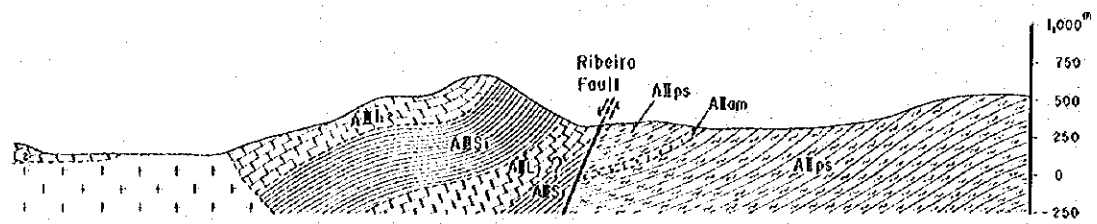
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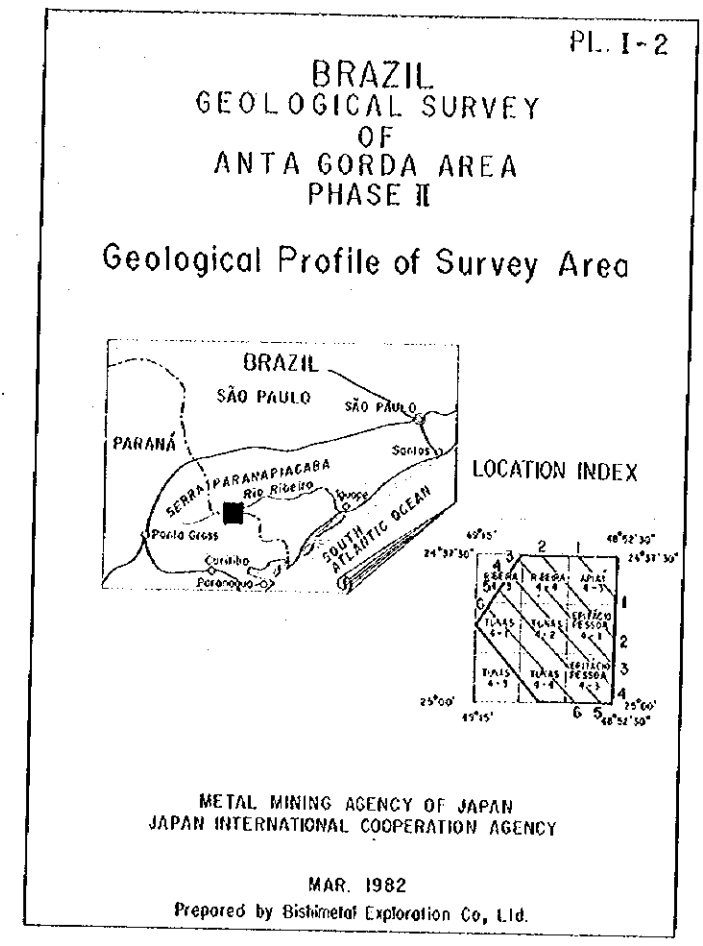
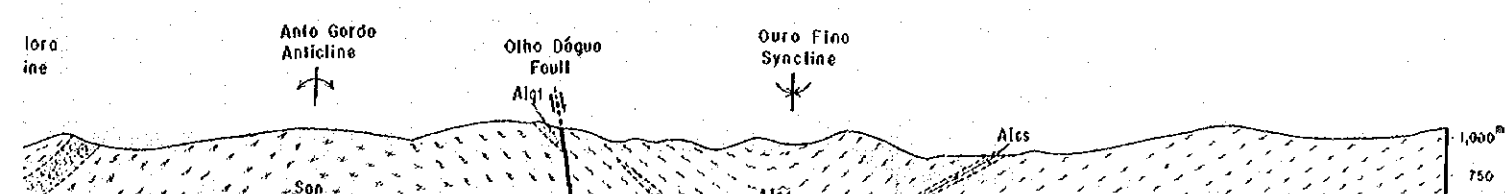
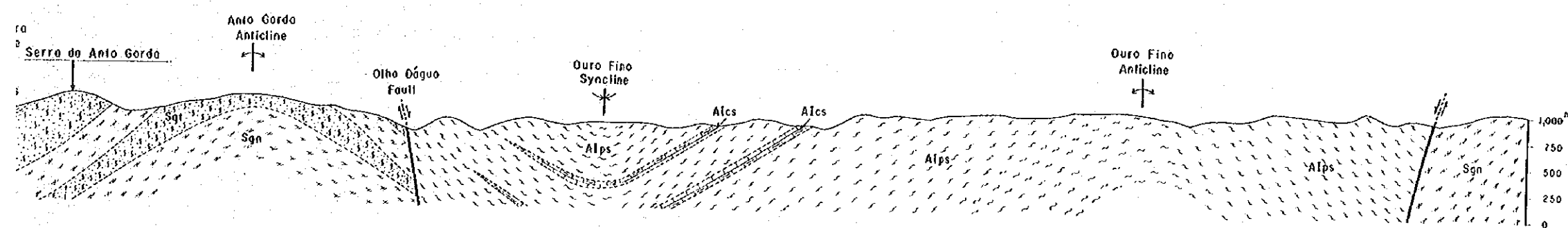
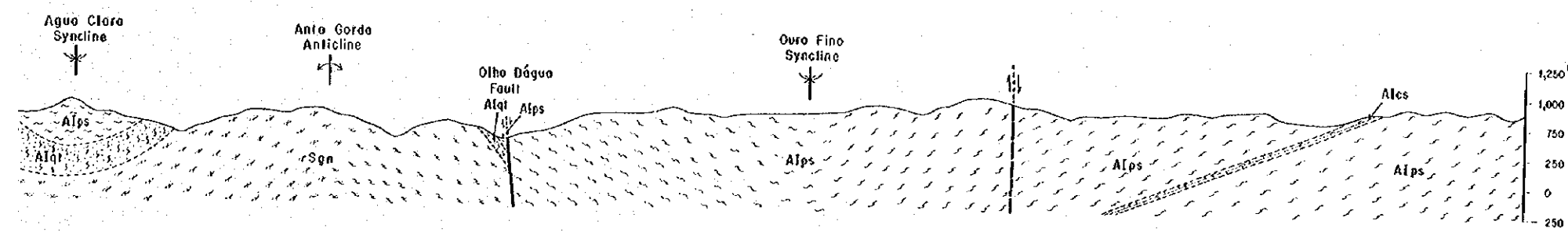
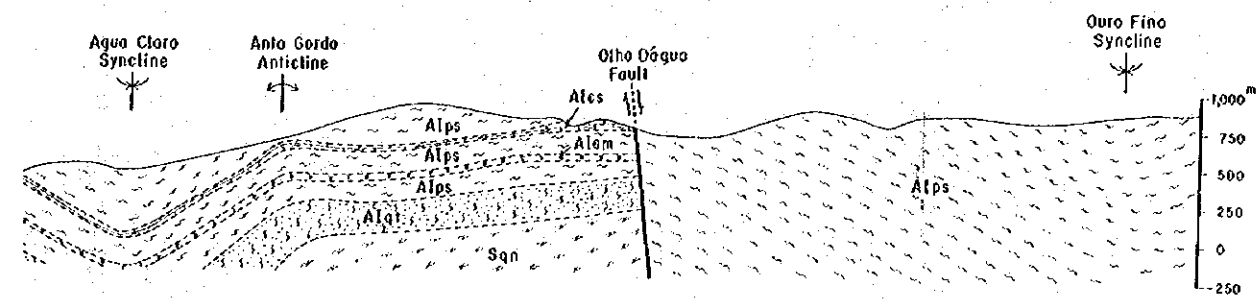
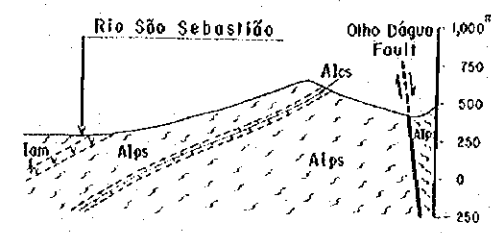
LEGEND

Upper Precambrian	Apungá Group	Apungá Formation II	AMS ₁	meta sandstone ~ quartzite & mica schist
			AML _{1ps}	mica schist
			AML _{1s}	limestone ~ calc - schist
		Nucle member	AMS ₂	mica schist - phyllite
			AMS _{2c}	limestone ~ calc - schist
			AML ₂	limestone, dolomite, calc - schist
	Lower member	AMS ₁	mica schist	
		AML ₁	limestone	
		Apungá Formation I	AEPs	phyllite ~ mica schist
	AECs		calc - schist	
	AIOm		amphibolite ~ amphibole schist	
	AISS		meta sandstone, quartzite	
	Setuva Formation		AICS	calc - schist ~ limestone
		AIOm	amphibolite ~ amphibole schist	
		AIPs	mica schist	
Intrusive rocks	AIEs	limestone, dolomite and calc-silicate rock (Perau horizon)		
	AIQI	quartzite		
	Sgn	gneiss		
	Sqt	quartzite		
	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
	Da	dacite		

	Anticlinal axis		Synclinal axis		Fault
	operating mine		closed mine		certain, conjectural

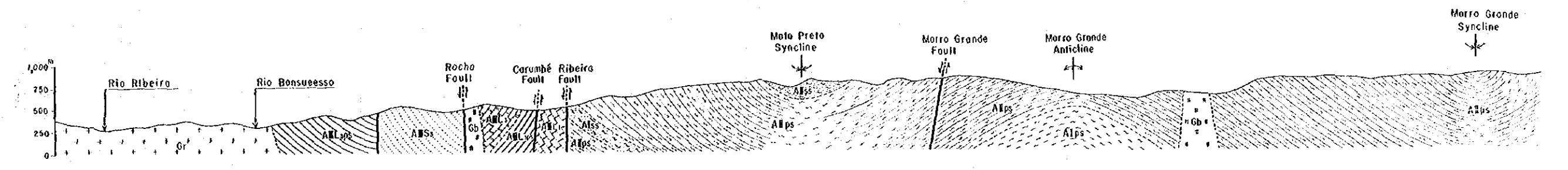
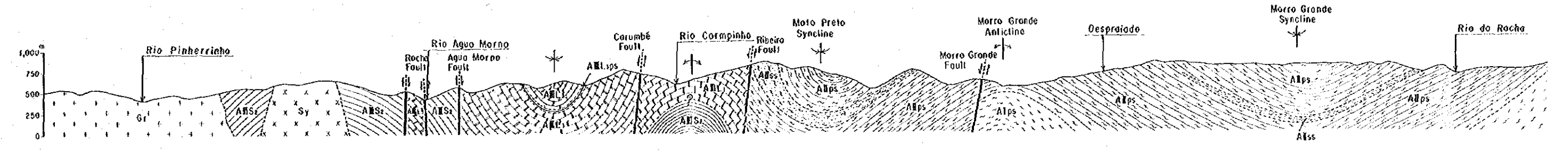
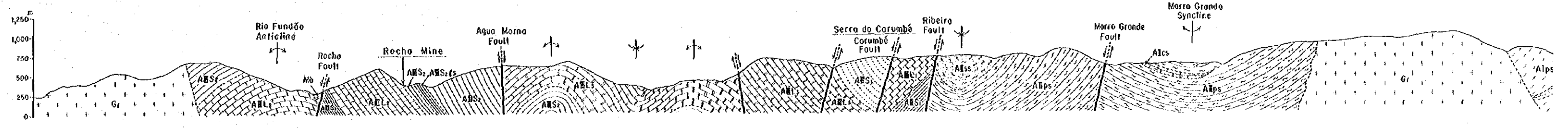
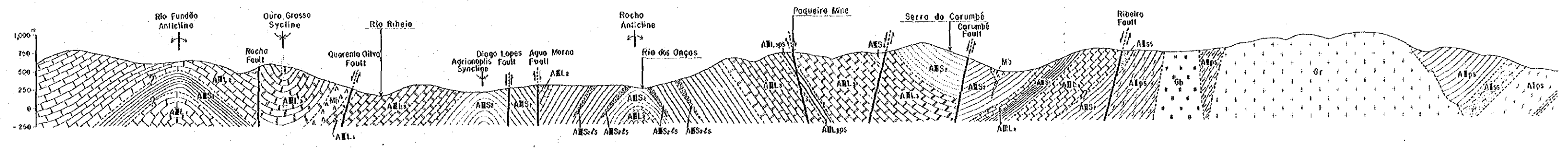
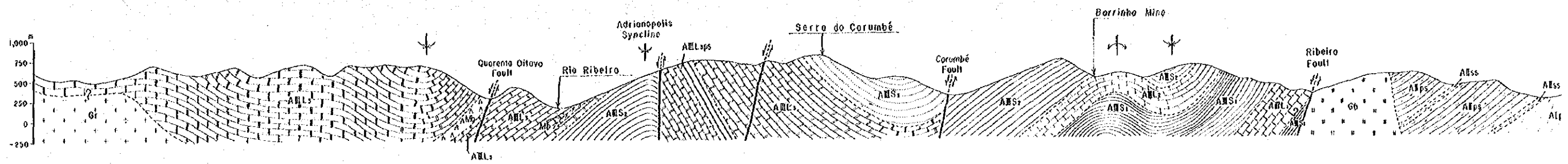


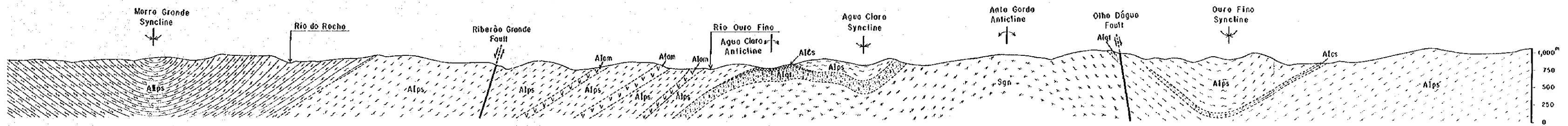
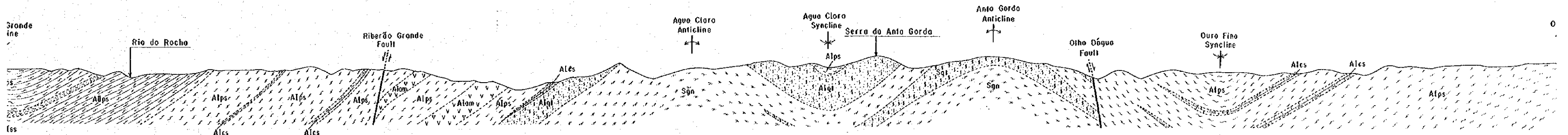
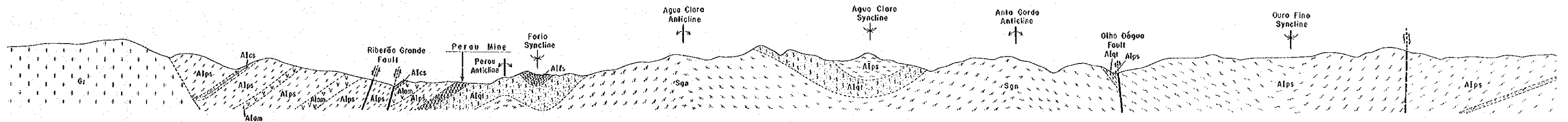
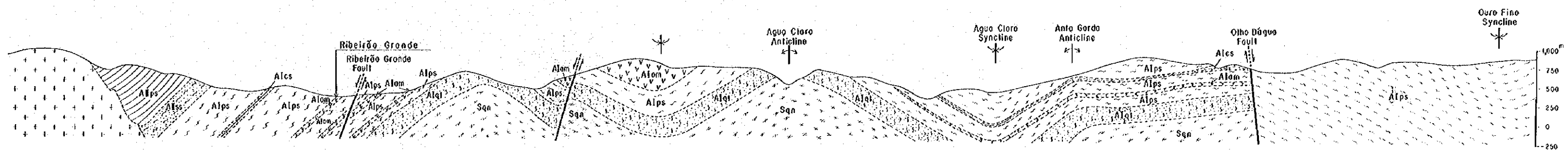
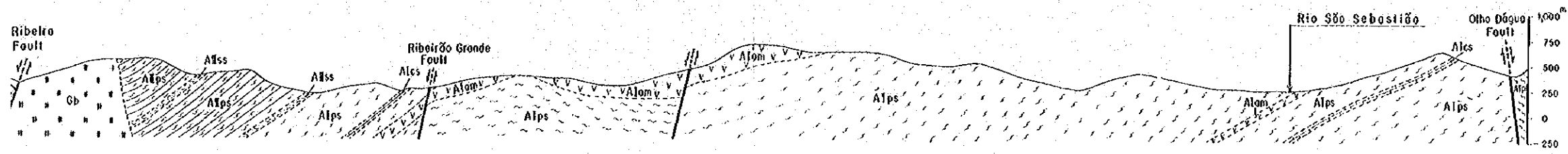


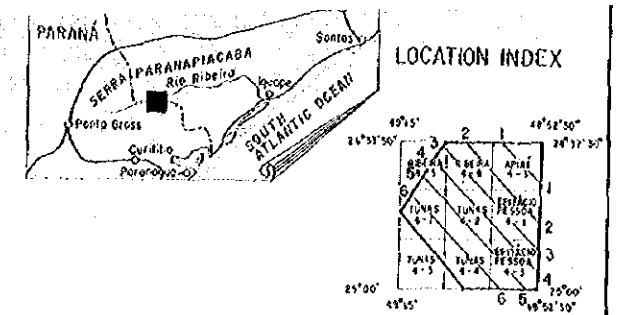
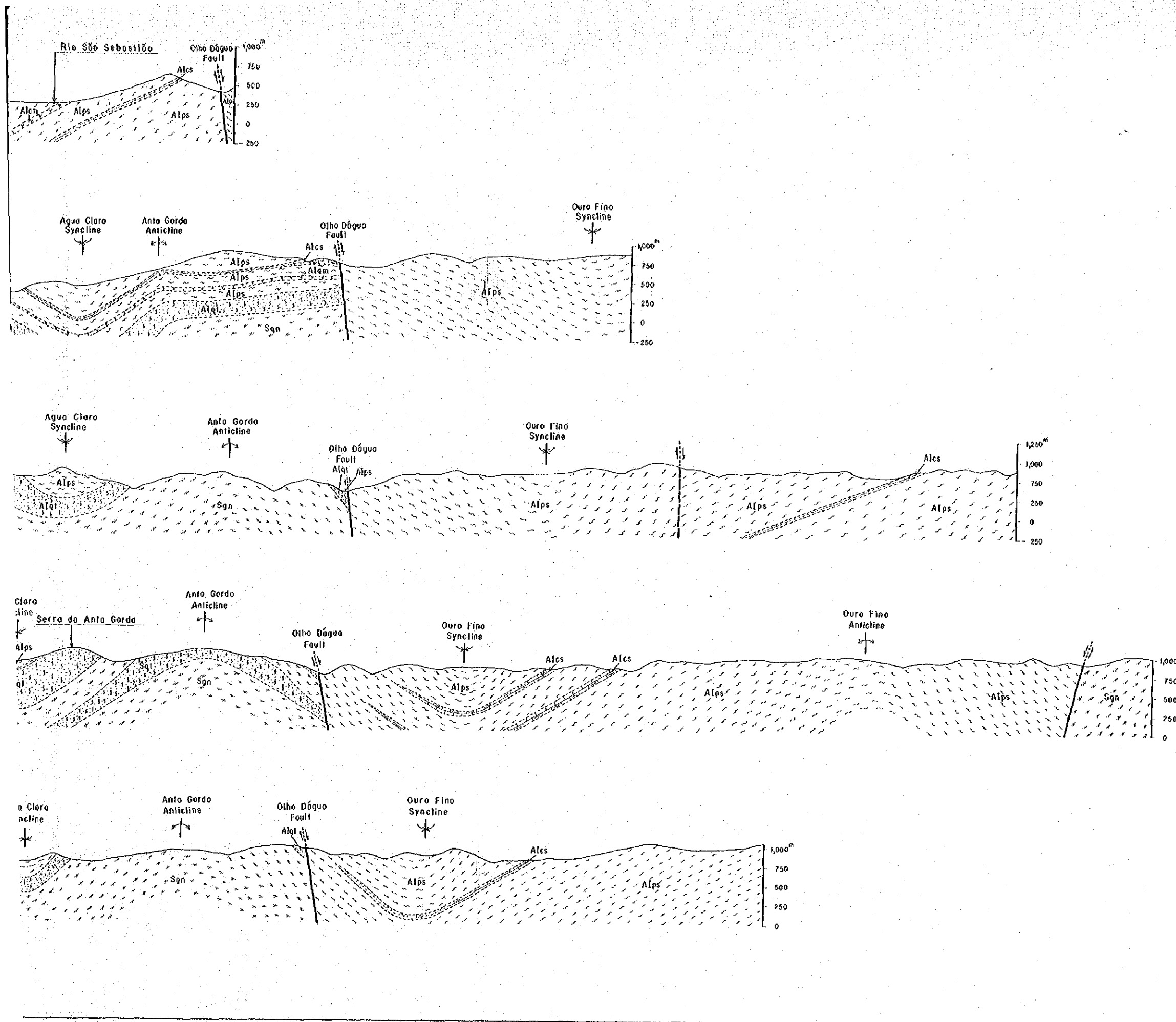


LEGEND

Upper Precambrian	Acungá Group	Acungá Formation II	ARS ₃	meta sandstone - quartzite & mica schist
			ARL _{3ps}	mica schist
			AML ₃	limestone - calc - schist
		Acungá Formation I	ABS ₂	mica schist - phyllite
			ARS _{2cs}	limestone - calc - schist
			AML ₂	limestone, dolomite, calc - schist
	Serra do Anta Gorda Formation	Upper Member	ARS ₁	mica schist
			AML ₁	limestone
			ARps	phyllite - mica schist
		Lower Member	ABcs	calc - schist
			AIcm	amphibolite - amphibole schist
			AIss	meta sandstone, quartzite
Intrusive rocks	AIcs	calc - schist - limestone		
	AIcm	amphibolite - amphibole schist		
	AIps	mica schist		
	AIcs	limestone, dolomite and calc-silicate rock (Perau horizon)		
	AIqt	quartzite		
	Sgn	gneiss		
Serra do Anta Gorda Formation	Sqt	quartzite		
	Mb	meta basite		
	Gr	granite		
	Gb	gabbro		
	Sy	syenite		
	Db	diabase		
Da	dacite			







METAL MINING AGENCY OF JAPAN
 JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
 Prepared by Bishmetal Exploration Co., Ltd.

Scale 1:25,000

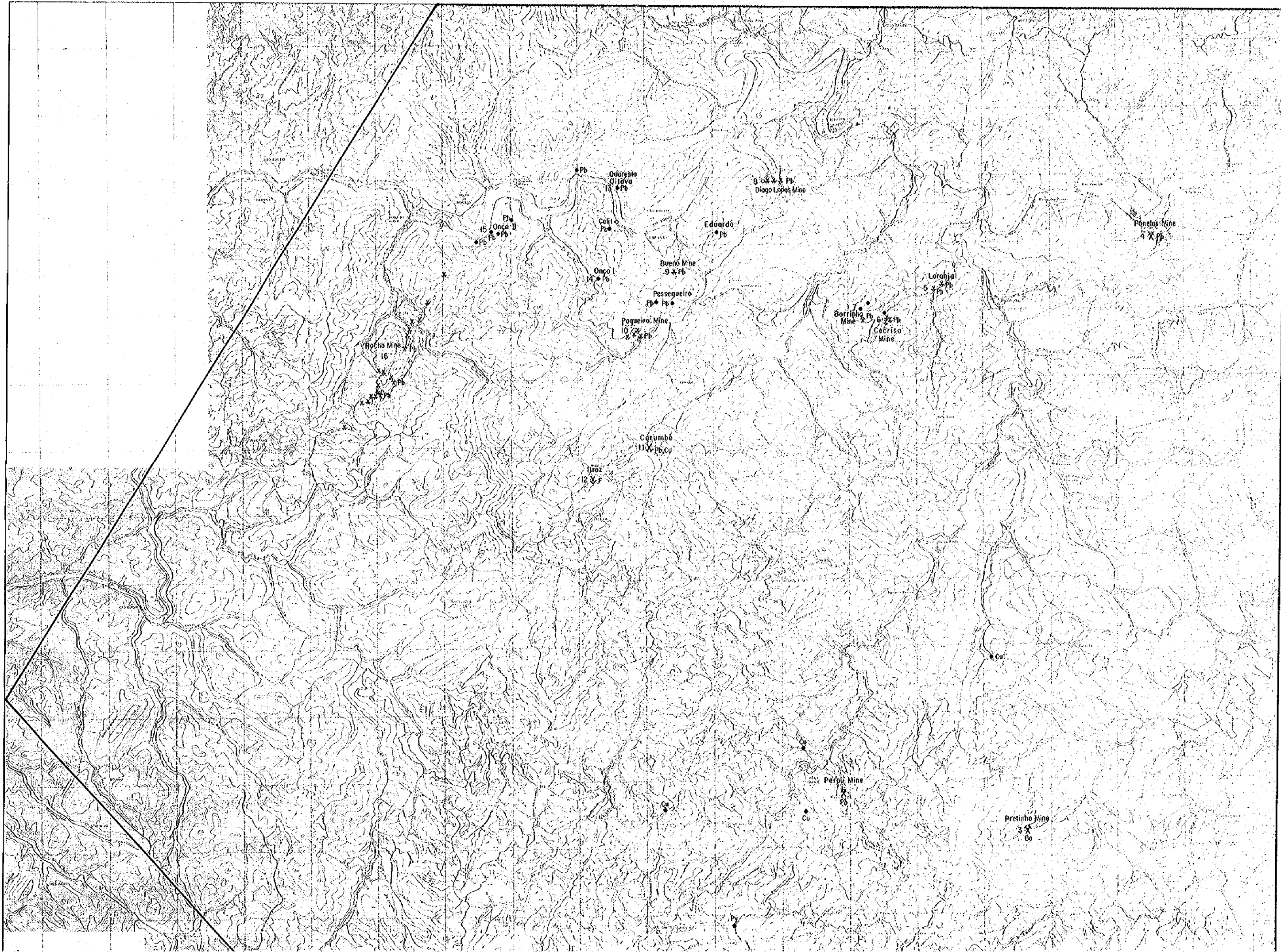


LEGEND

Upper Precambrian	Apungá Formation II	Upper member	AMS ₂	meta sandstone - quartzite & mica schist
			AMS ₁	meta sandstone - quartzite & mica schist
		Middle member	AML ₃	limestone - calc - schist
			AMS ₃	mica schist - phyllite
			AMS ₄	limestone - calc - schist
			AML ₄	limestone, dolomite, calc - schist
	Lower member	AMS ₁	mica schist	
		AML ₁	limestone	
	Apungá Formation I	Upper member	Alps	phyllite - mica schist
			Alcs	calc - schist
			Alom	amphibolite - amphibole schist
		Lower member	Alss	meta sandstone, quartzite
Aics			calc - schist - limestone	
Alom			amphibolite - amphibole schist	
Serra Paranapiacaba	Upper member	Alps	mica schist	
		Alzs	limestone, dolomite and calc-silicate rock (Porco horizon)	
		Alqt	quartzite	
	Lower member	Sgn	gneiss	
		Sqt	quartzite	
Intrusive rocks	Mb	meta basite		
	Gt	granite		
	Gb	gabbro		
	Sy	syenite		
	Da	dacite		

Anticlinal axis Synclinal axis Fault (certain, conjectural)

X operating mine
 X closed mine



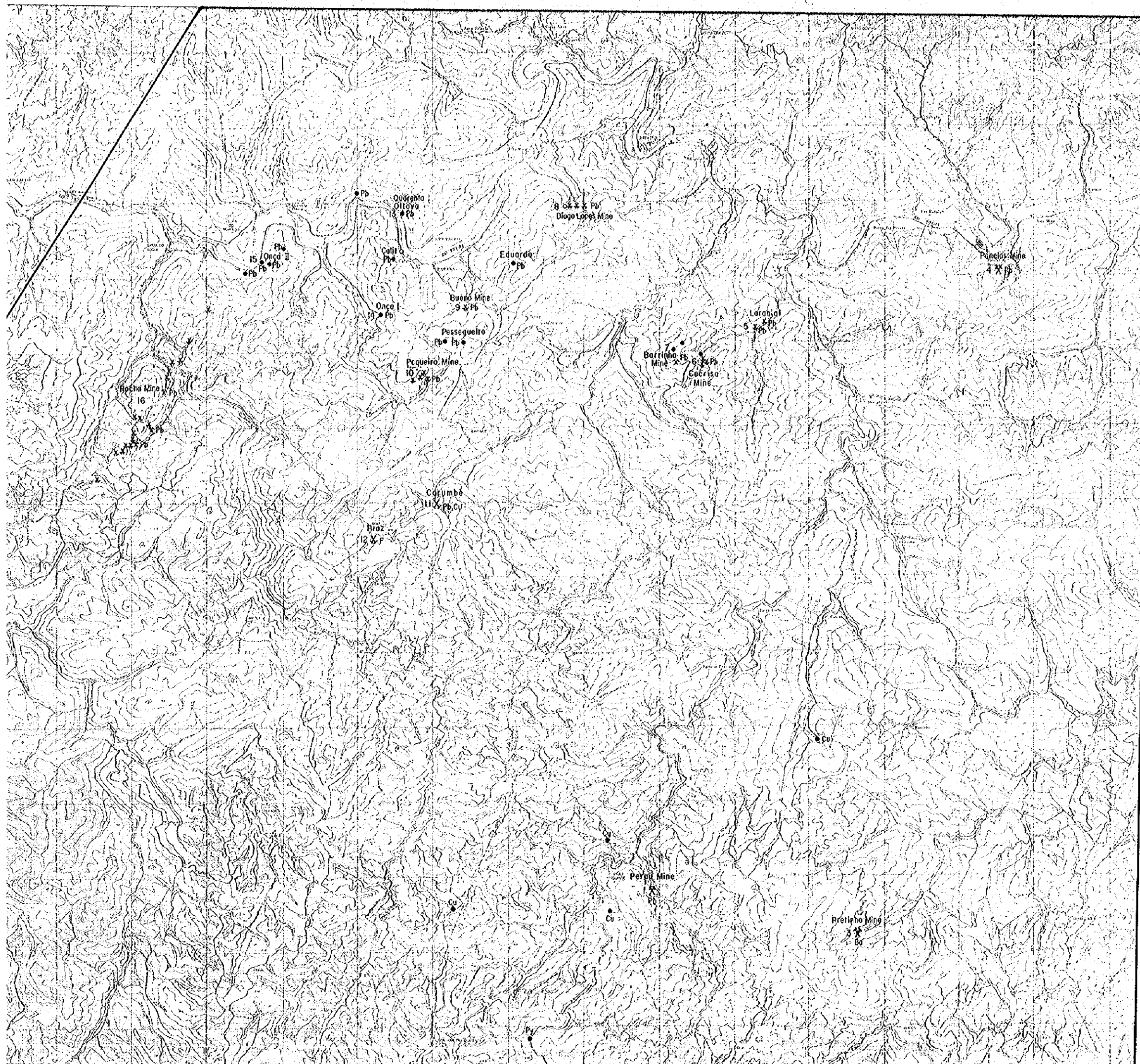
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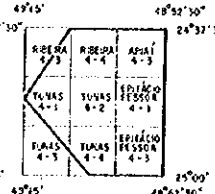
PL. I-3

**BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II**

**Distribution Map of Mines and
Showings in Survey Area**



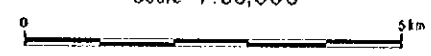
LOCATION INDEX



METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

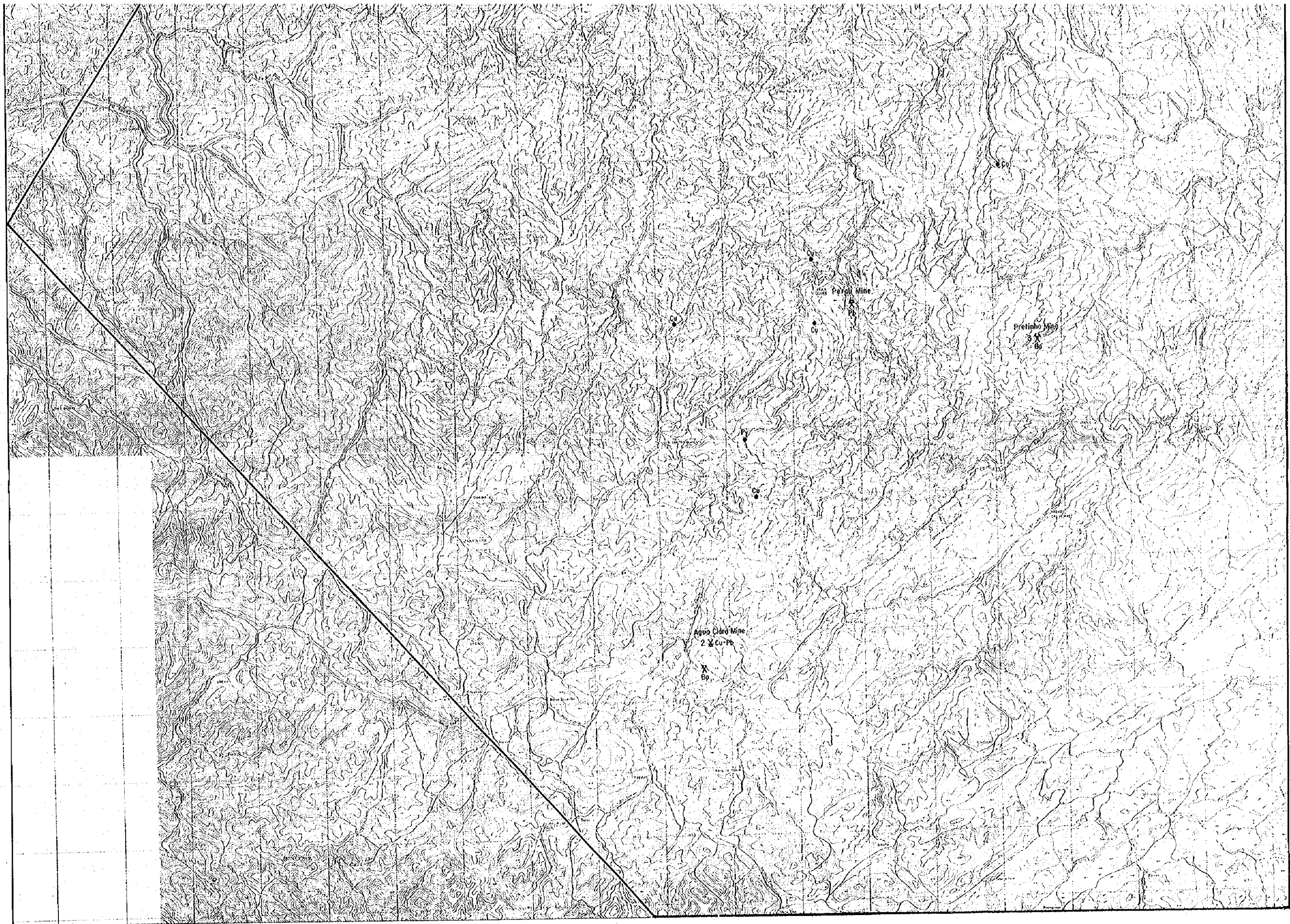
MAR. 1982
Prepared by Bishmetal Exploration Co., Ltd.

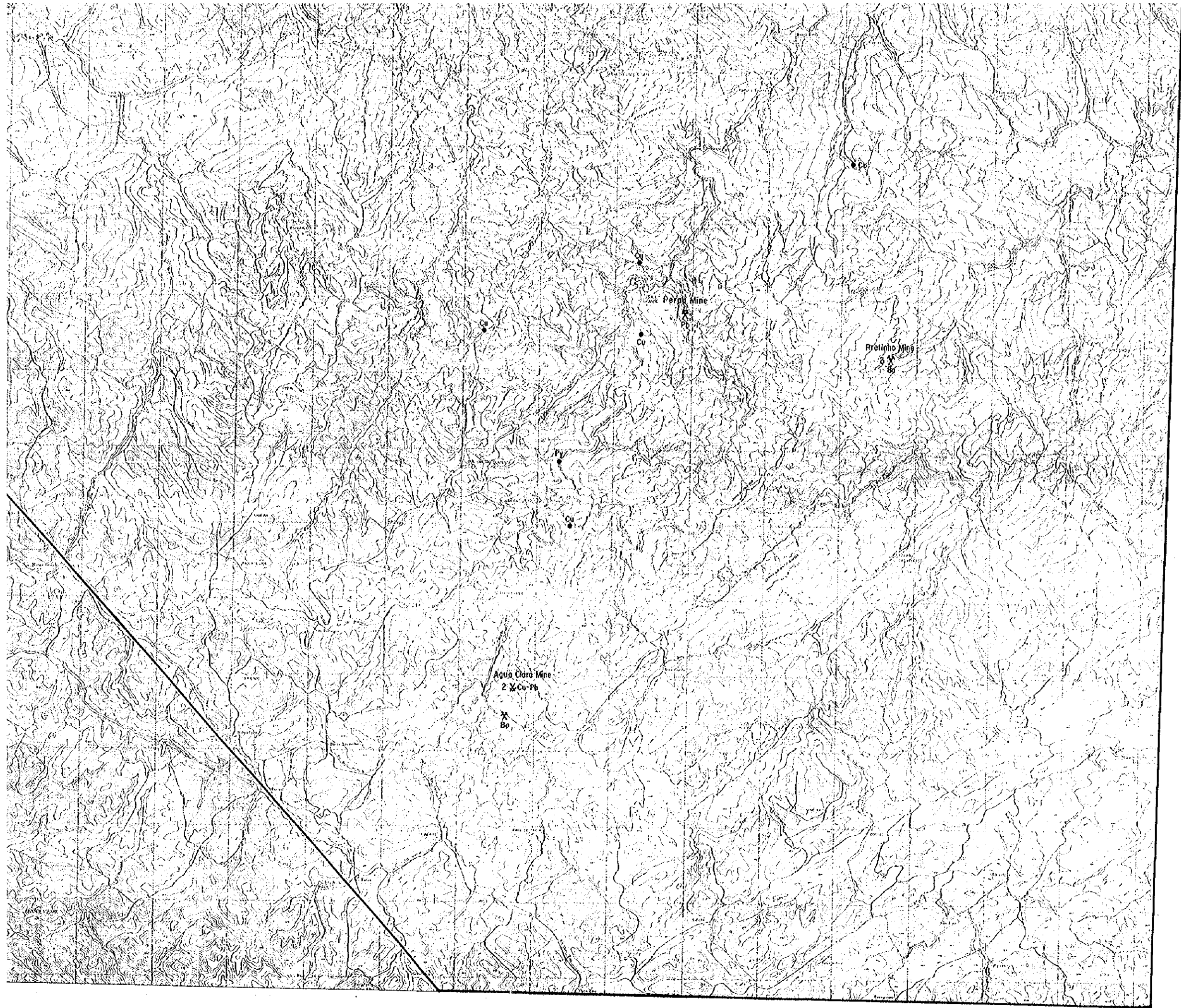
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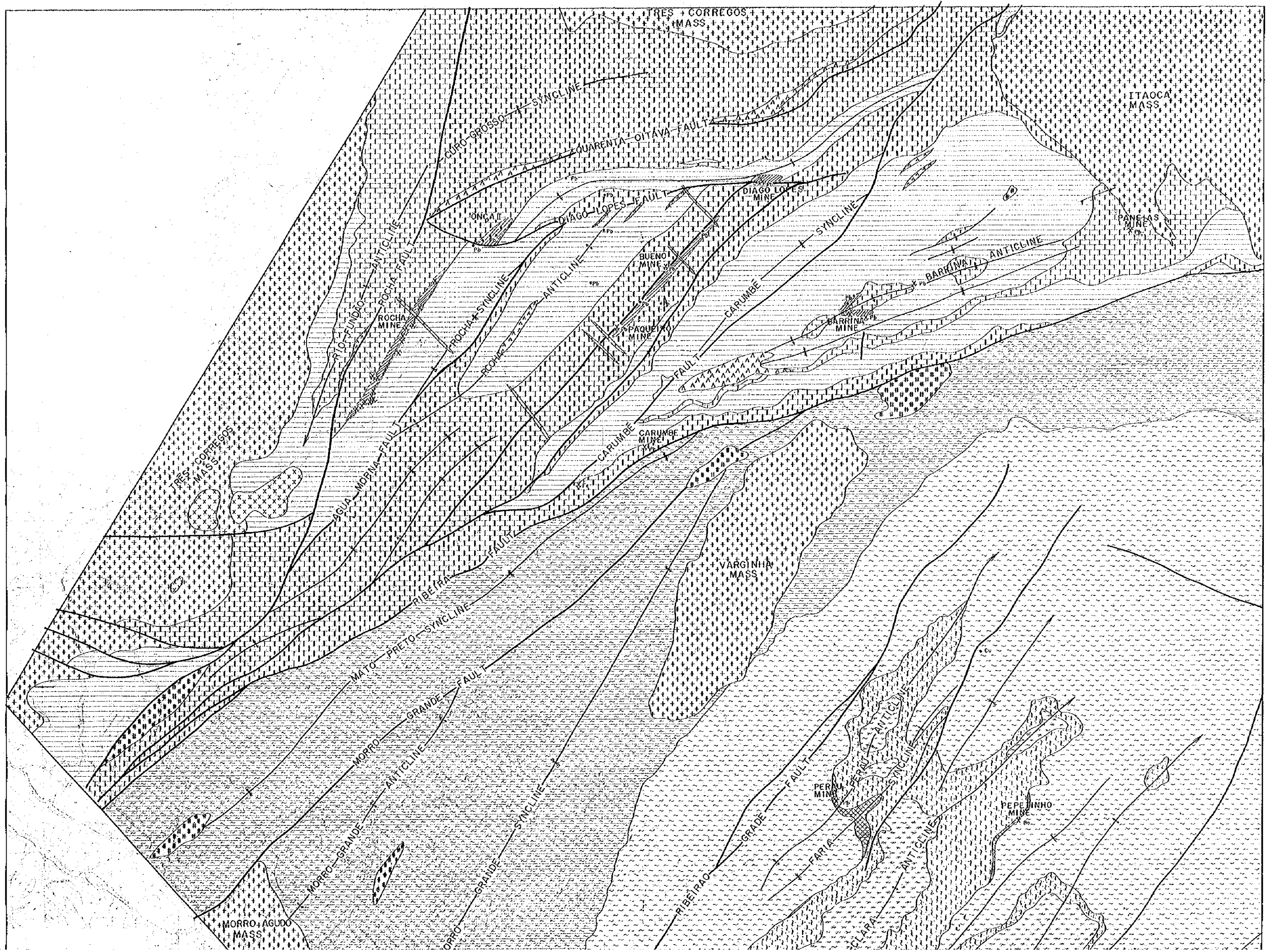
- x Operating Mine
- X Closed Mine
- Showing





LEGEND

- X Operating Mine
- X Closed Mine
- Showing



Rela
and
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Upper Precambrian
Acungui Group
Acungui
Seturo

Intrusive
rocks

Antic
X
X



Pl. I-4

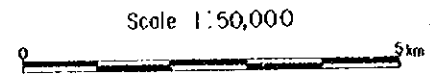
BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II

Relation Map between Mineralization and Geological Structure in Survey Area

LOCATION INDEX

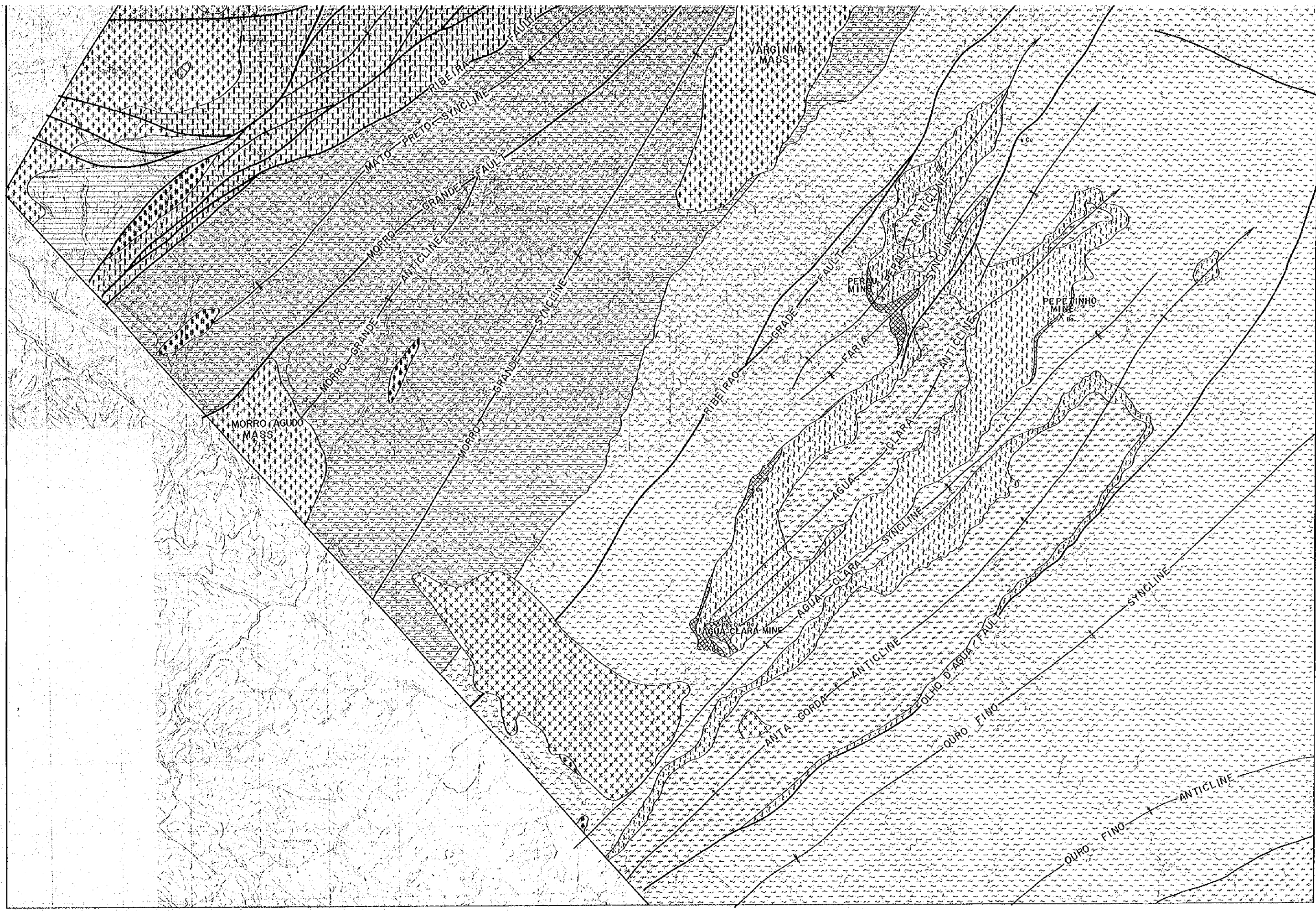
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
Prepared by Doshimetal Exploration Co., Ltd.



LEGEND

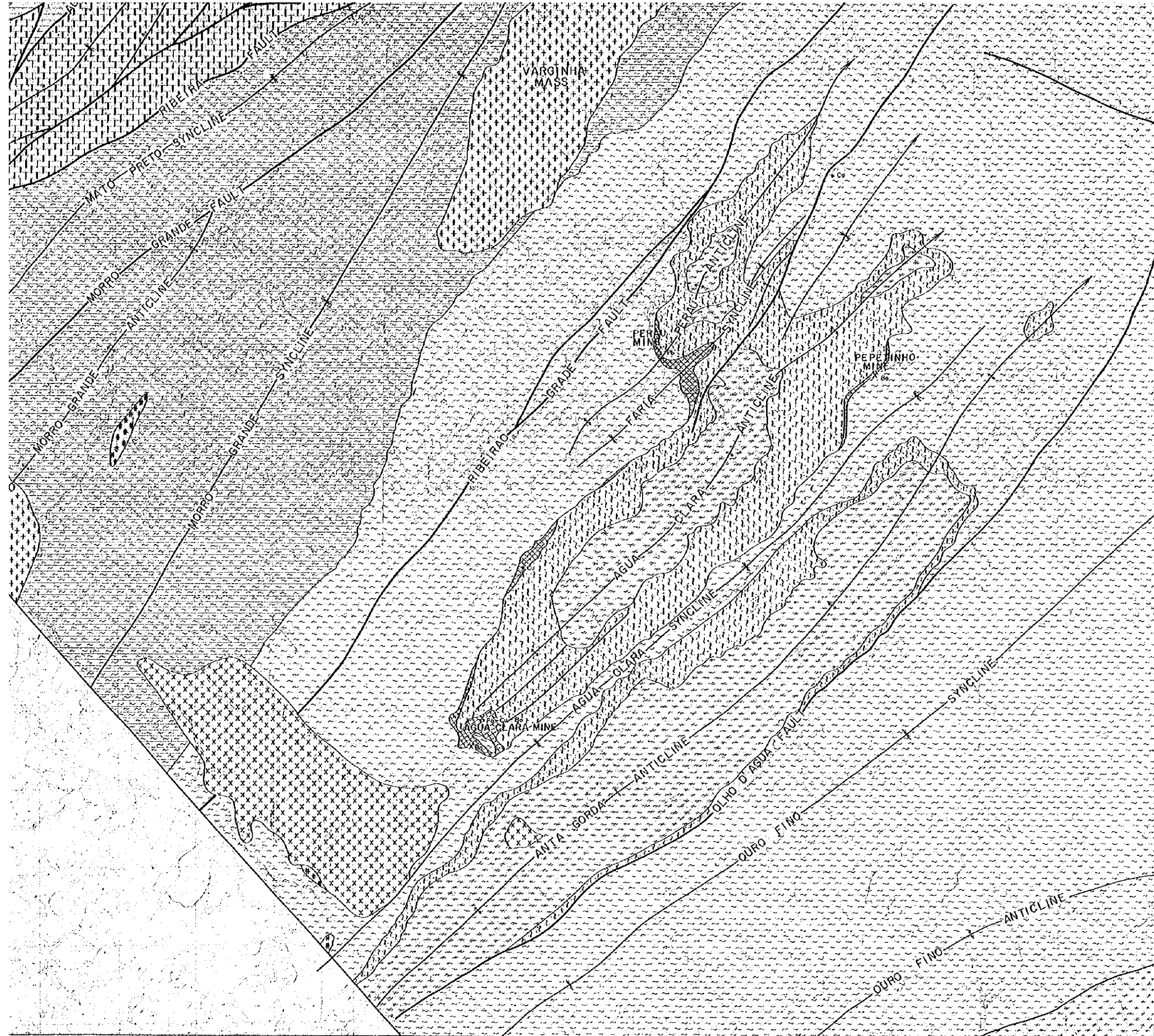
Upper Precambrian	Araucario Formation I		mica schist - phyllite with meta sandstone
			limestone, dolomite and calc-stilicate rock (Peru horizon)
	Araucario Formation II		L3: limestone
			L2: limestone
	Araucario Formation III		L1: limestone
			mica schist - phyllite and meta sandstone
Seturo Formation		quartzite	
		gneiss	
Intrusive rocks		meta basite	
		granite	
		gabbro	
		syenite	
		diorite	
			Anticline axis
			Syncline axis
			operating mine
			showing mine
			Fault certain, conjectural
			mineralized zone



Upper Precambrian
 Apungá Group

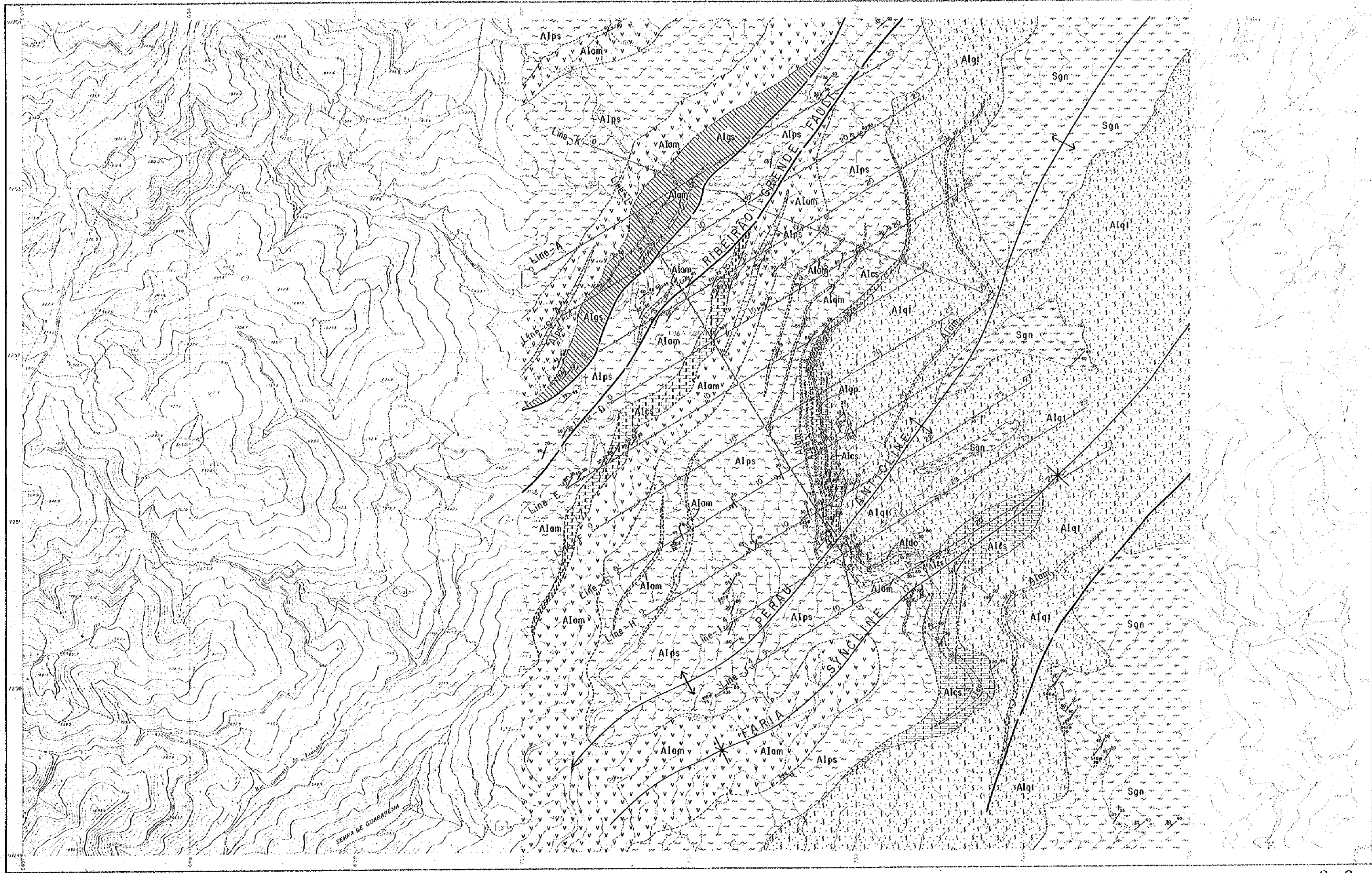
Intrusive rocks

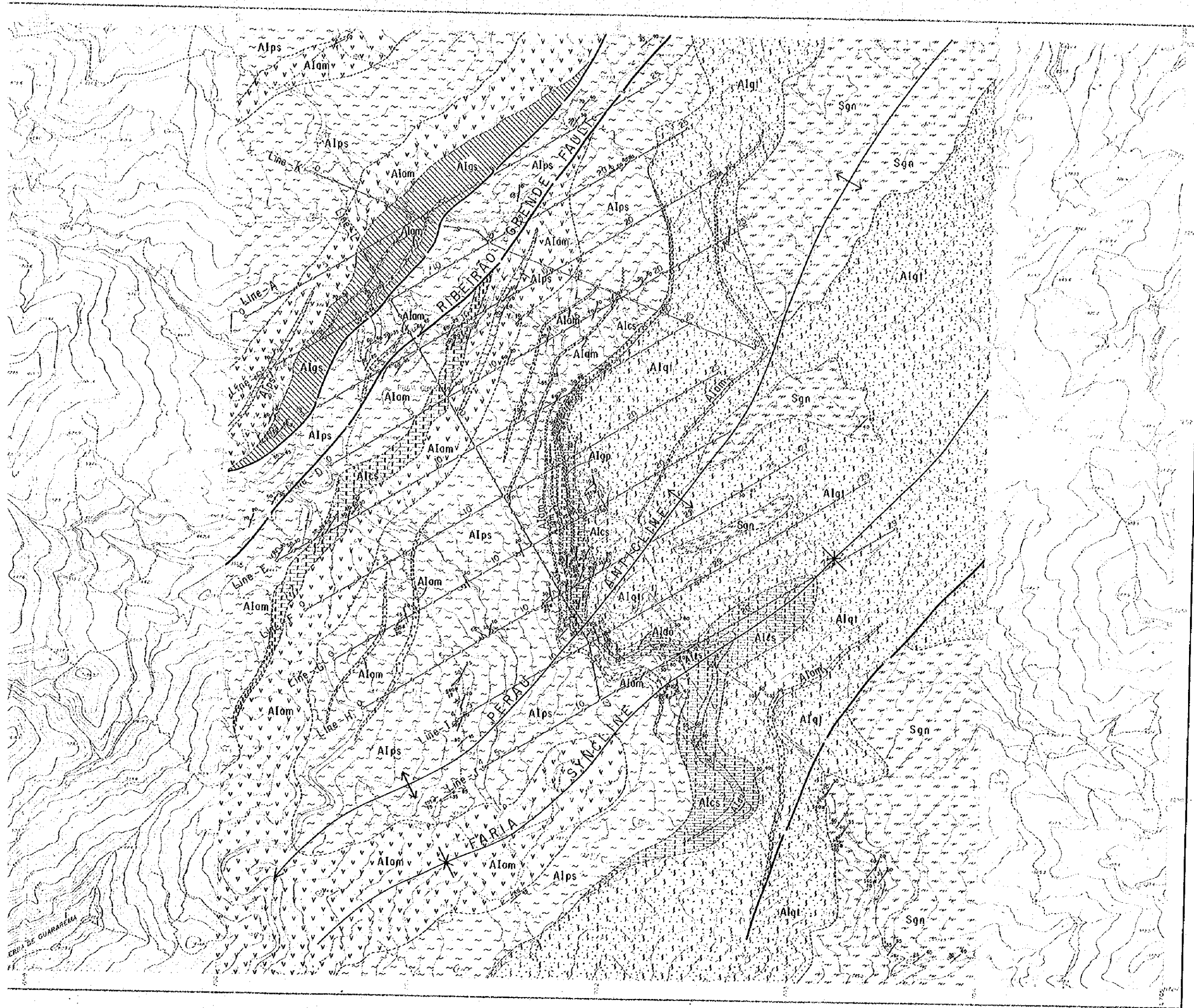
N
 X
 X



LEGEND

- | | | | |
|-------------------|-------------------|----------------|--|
| Upper Precambrian | Agungui Group | L3: limestone | |
| | | L2: limestone | |
| | | L1: limestone | |
| | Agungui Formation | 1-2 | mica schist ~ phyllite and meta sandstone |
| | | 1-4 | mica schist ~ phyllite with meta sandstone |
| | Agungui Formation | 1 | mica schist with amphibolite and calc-schist |
| | | | limestone, dolomite and calc-silicate rock (Perau horizon) |
| | | | quartzite |
| | Serra Formation | | gneiss |
| | Intrusive rocks | | meta basite |
| | | granite | |
| | | gabbro | |
| | | syenite | |
| | | diabase | |
| | Anticlinal axis | Synclinal axis | Fault certain, conjectural |
| x | operating mine | • showing | mineralized zone |
| X | closed mine | | |





PL. I-5

**BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II**

Geological Map of Perau Area

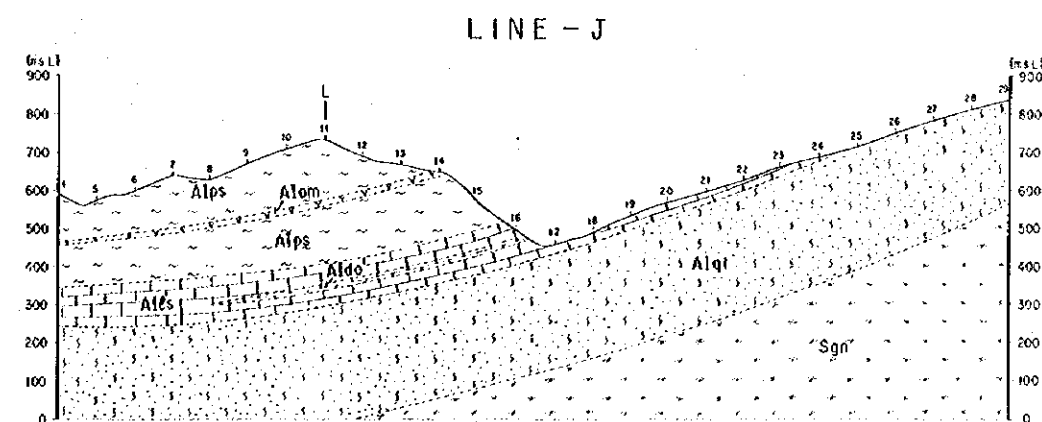
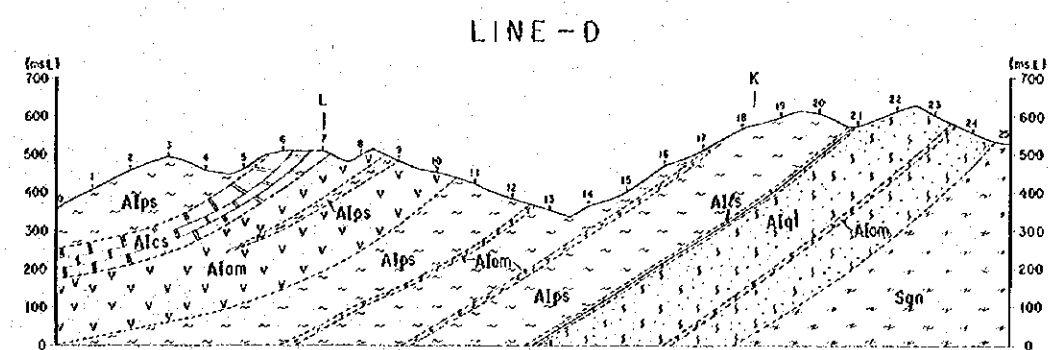
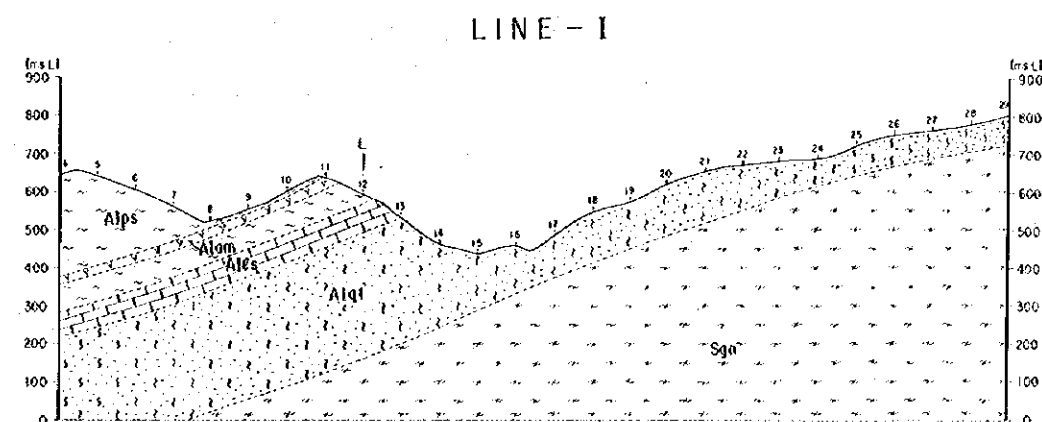
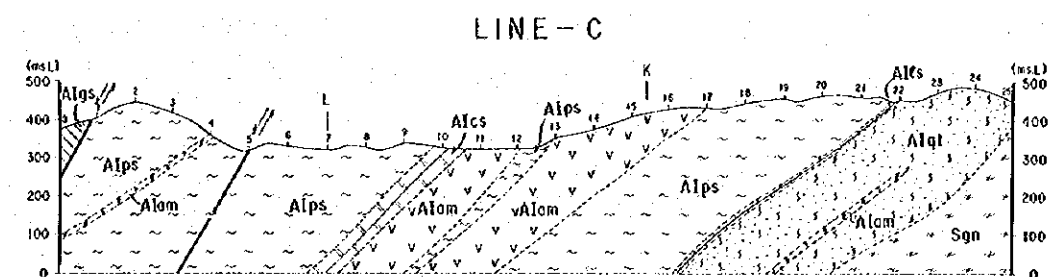
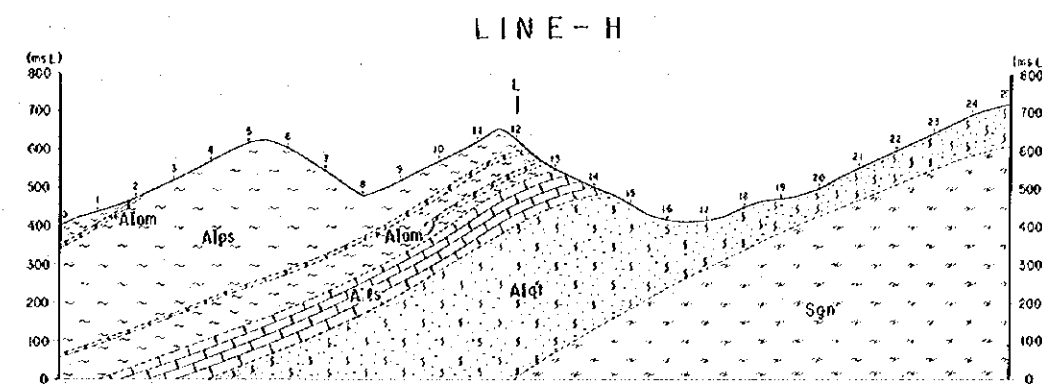
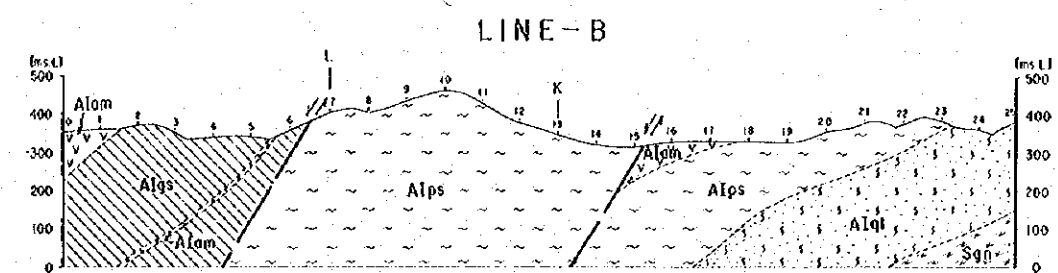
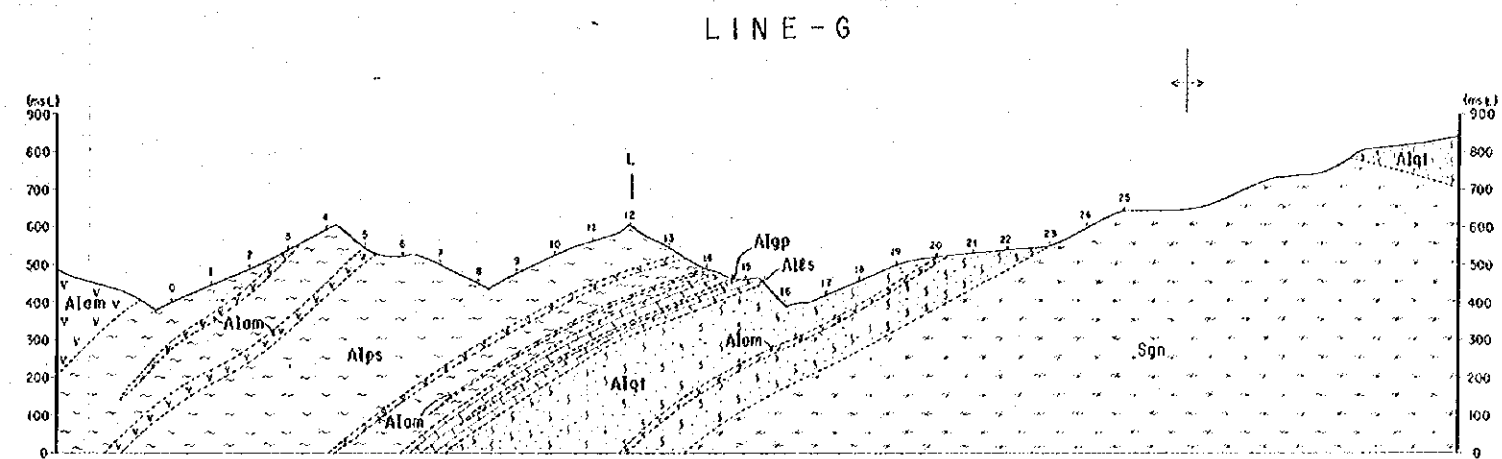
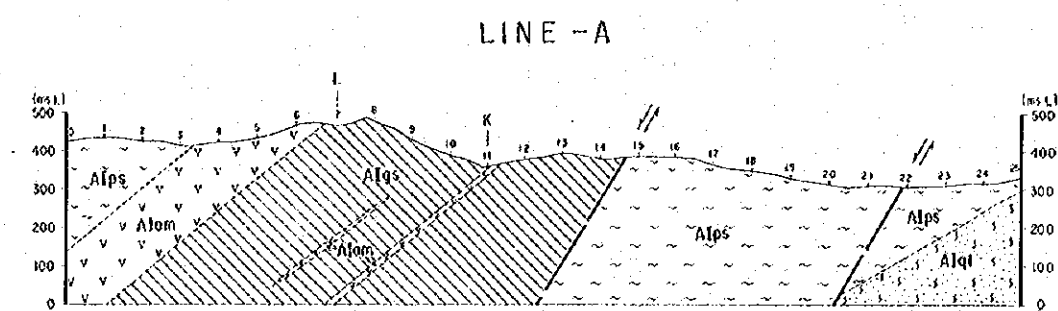
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

MAR. 1982
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Scale 1 : 10,000

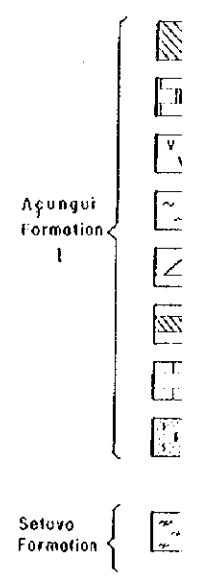
LEGEND

- | | | | |
|---------------------------|--|------|--|
| | | Alqs | Graphite schist |
| | | Alca | calc - schist |
| | | Alom | Amphibolite, omphibole schist |
| Açunqui
Formation
I | | Alps | Mica schist |
| | | Aldo | Dolomite layer |
| | | Alap | Graphite schist, phyllite layer |
| | | Alzs | Limestone, dolomite, calc-silicate rock, barite and sulphides. "Perau horizon" |
| | | Alqi | Quartzite, with amphibolite |
| Setava
Formation | | Sgn | Gneiss with minor amphibolite |
| | | | Anticlinol axis |
| | | | Synclinal axis |
| | | | Fault |
| | | | Bedding |
| | | | Schistosity |
| | | | Lineation |
| | | | Plunge of fold |

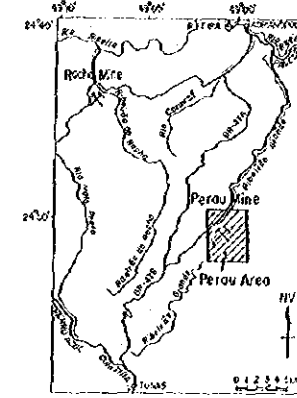


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BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geological Profile
in Perau Area



METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

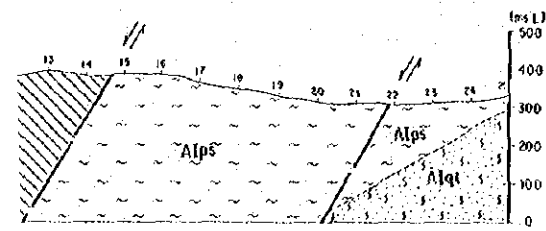
MAR. 1982
Prepared by Bishinetol Exploration Co., Ltd.

Scale 1:10,000

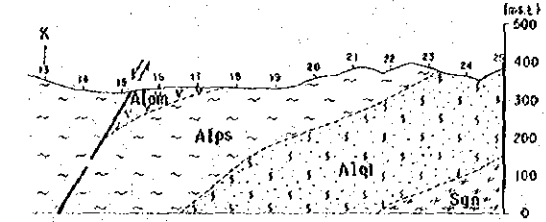
LEGEND

Açunqui Formation 1		Algs	Graphite schist
		Alca	calc-schist
		Alam	Amphibolite, amphybole schist
		Alps	Mica schist
		Aldo	Dolomite layer
		Alqp	Graphite schist, phyllite layer
		Alts	Limestone, dolomite, calc-silicate rock, barite and sulphides, "Perau horizon"
Setuva Formation		Sgn	Gneiss with minor amphibolite
			Anticlinical axis
			Synclinal axis
			Fault

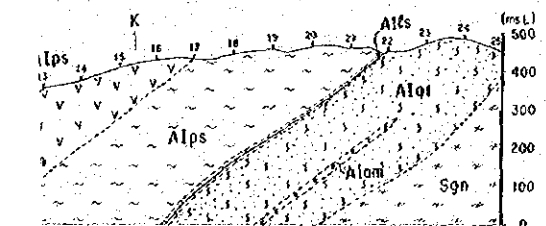
IE-A



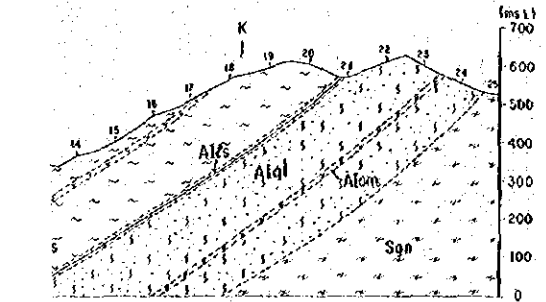
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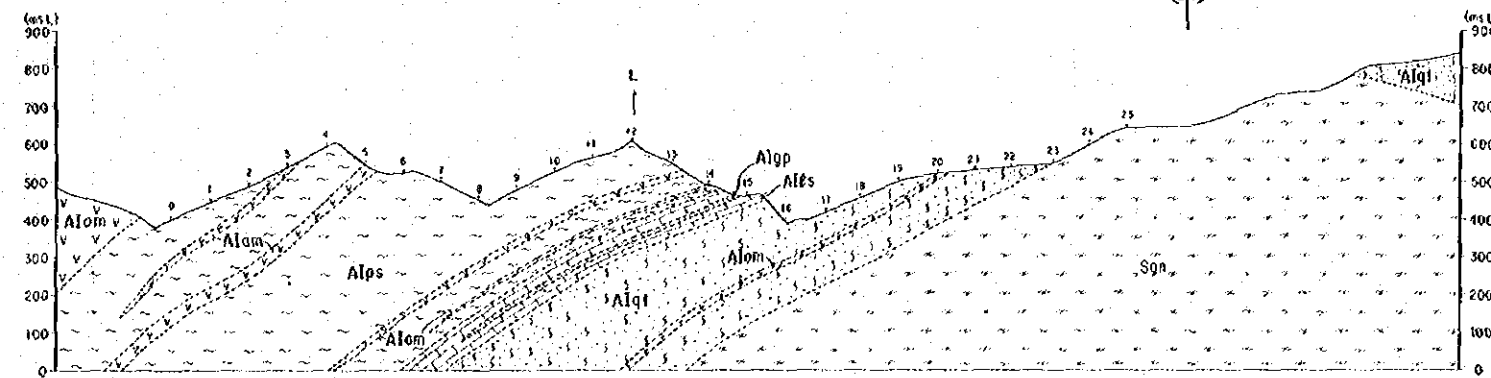
-C



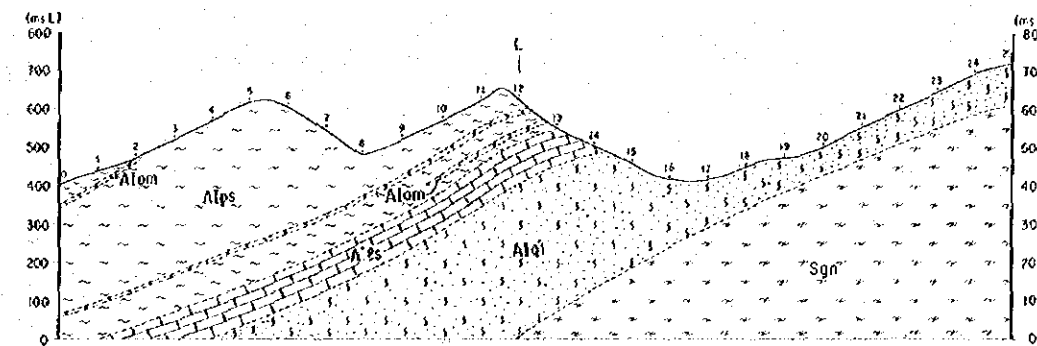
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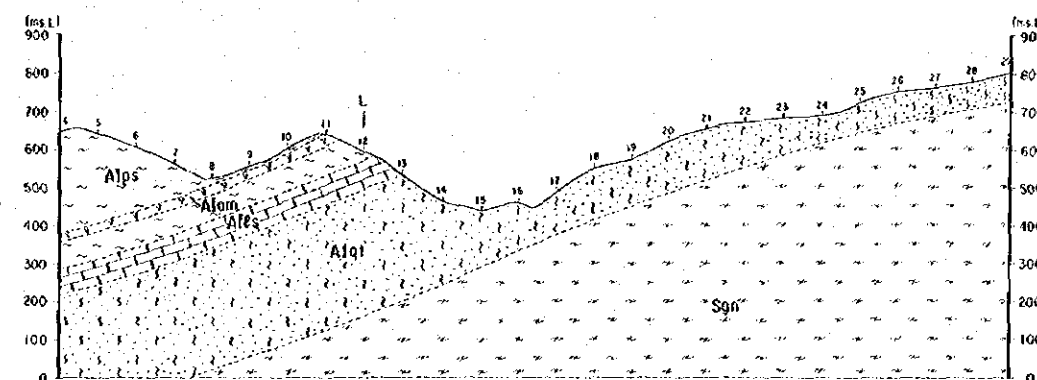
LINE-G



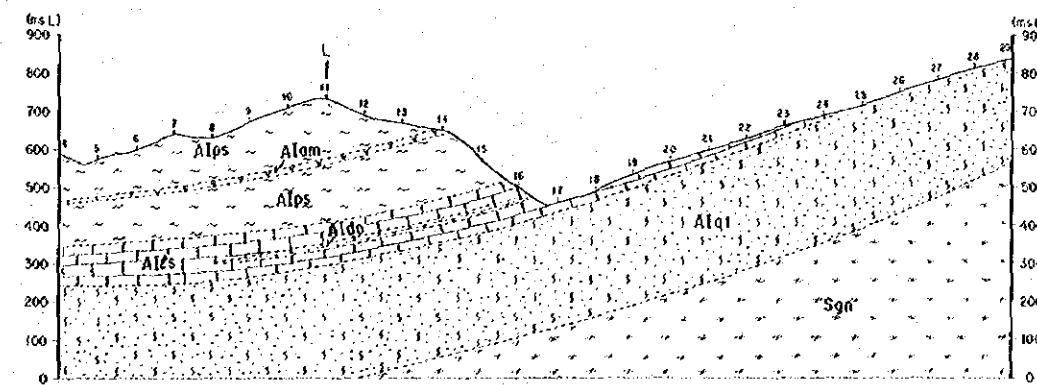
LINE-H



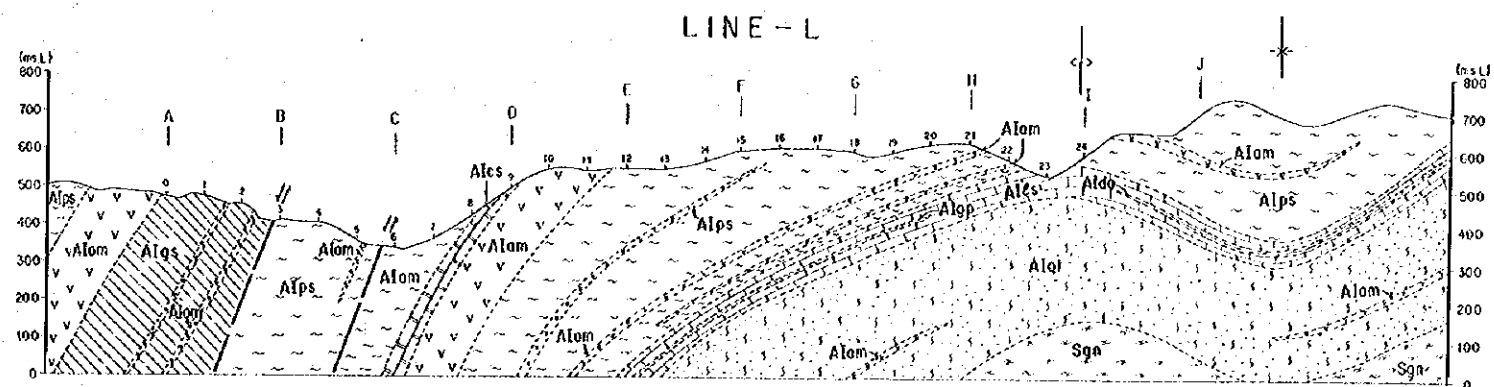
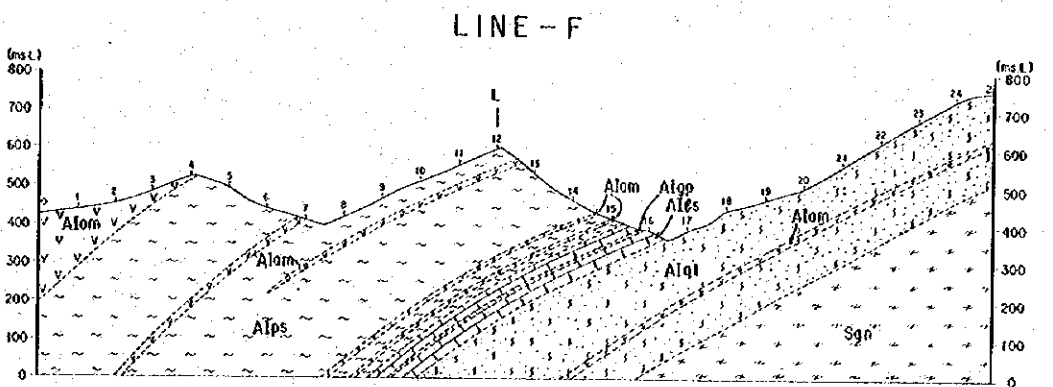
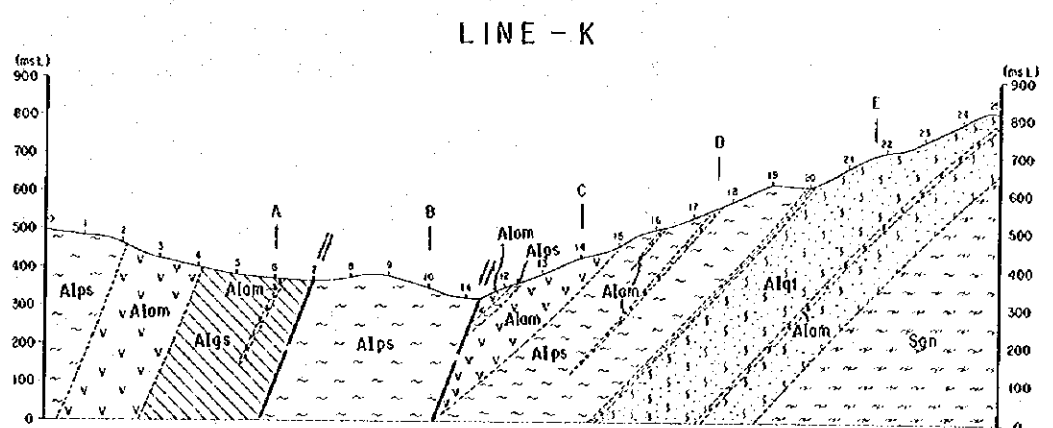
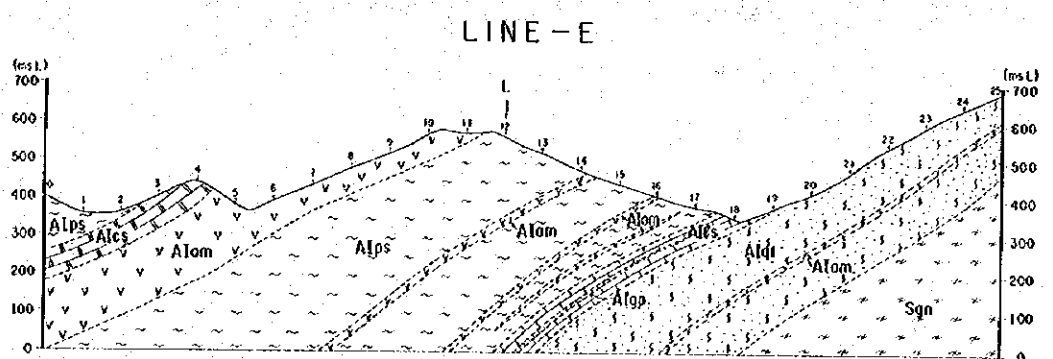
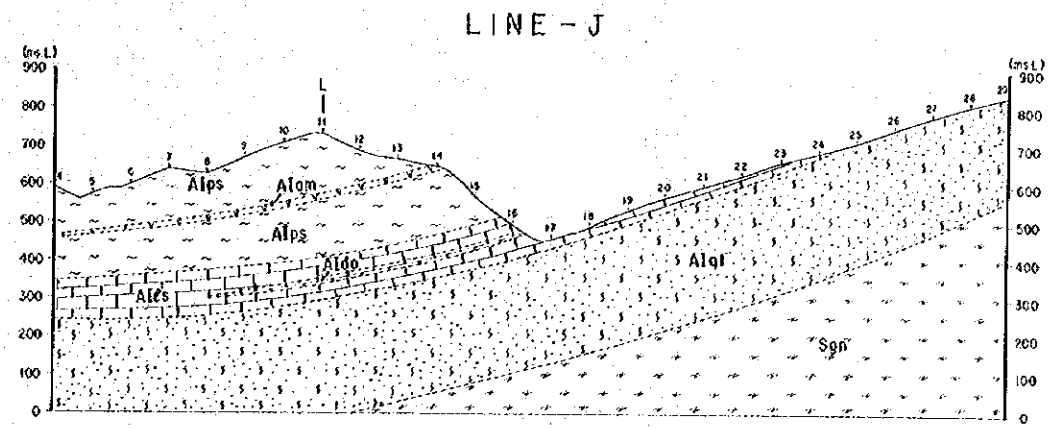
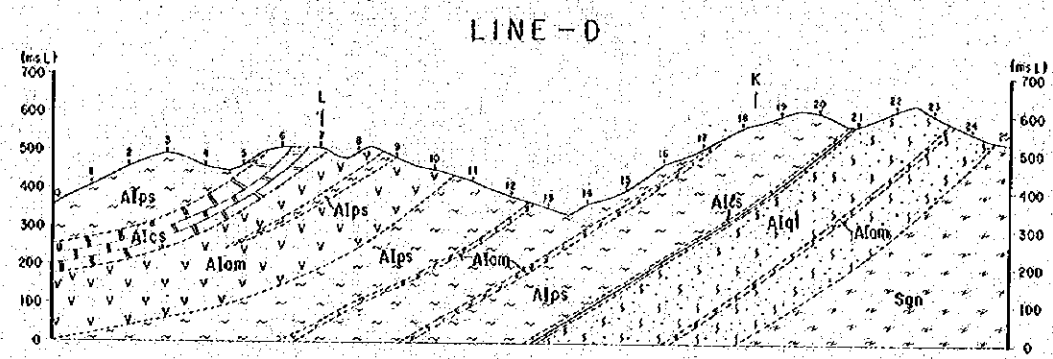
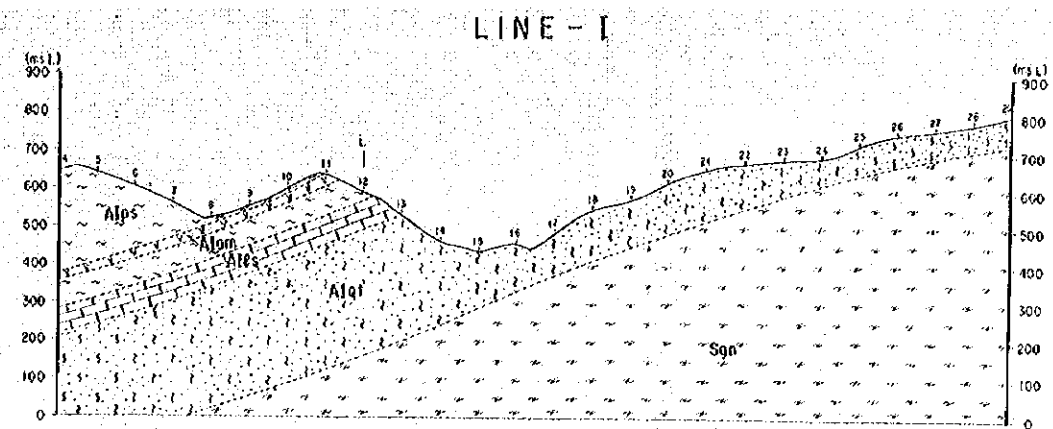
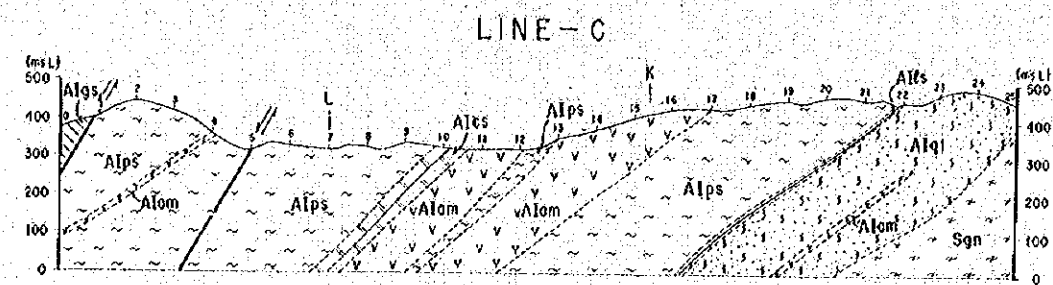
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LINE-J

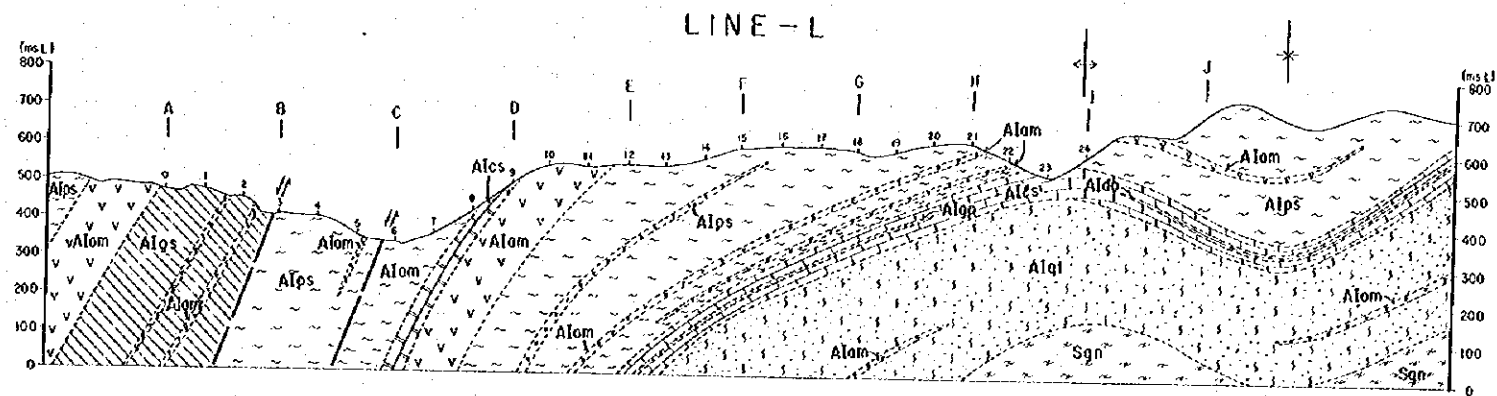
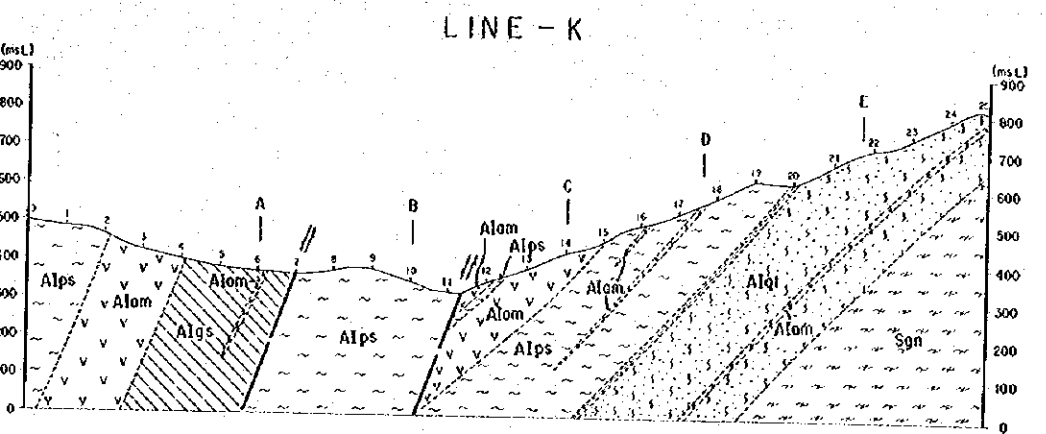
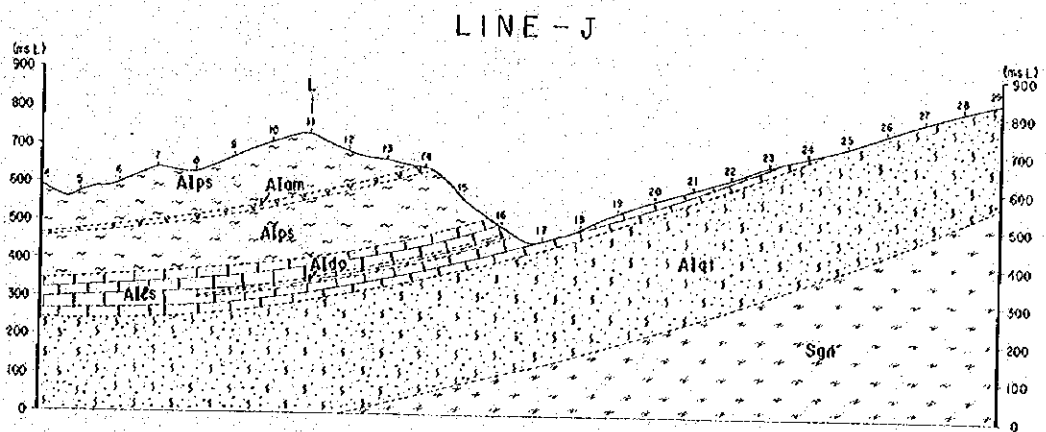
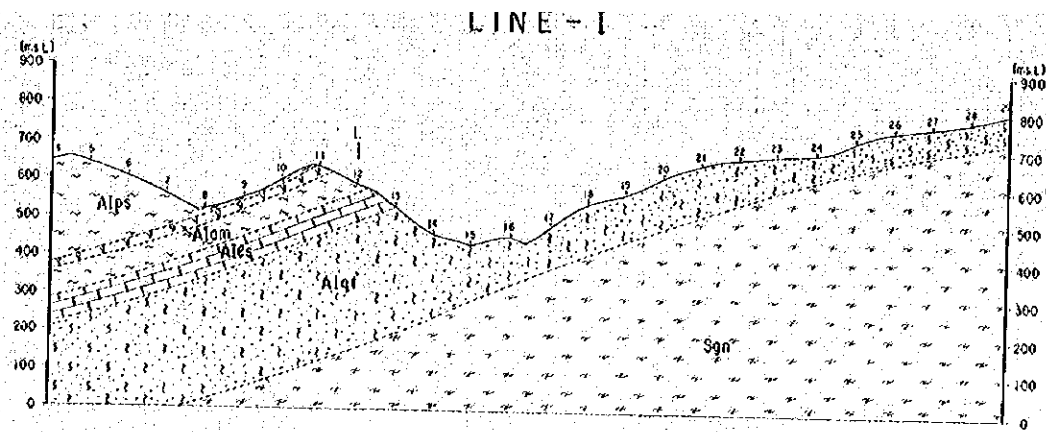
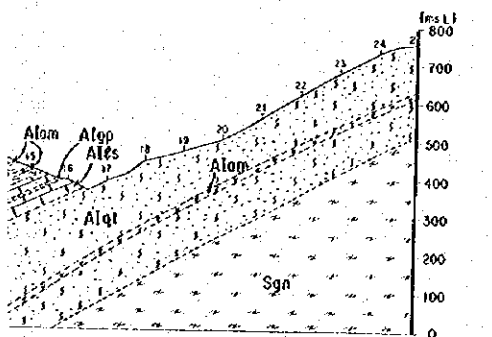
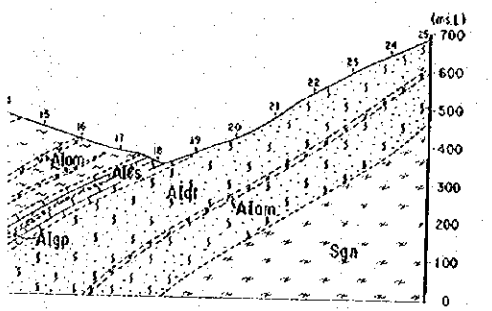
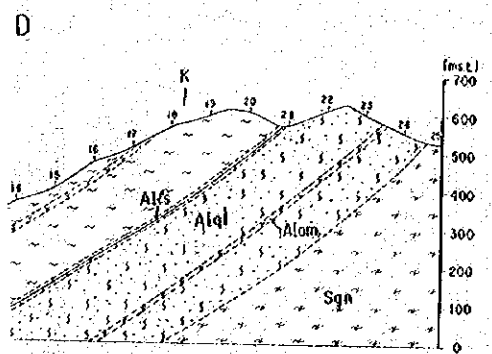
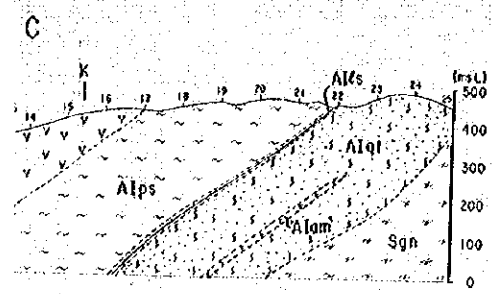


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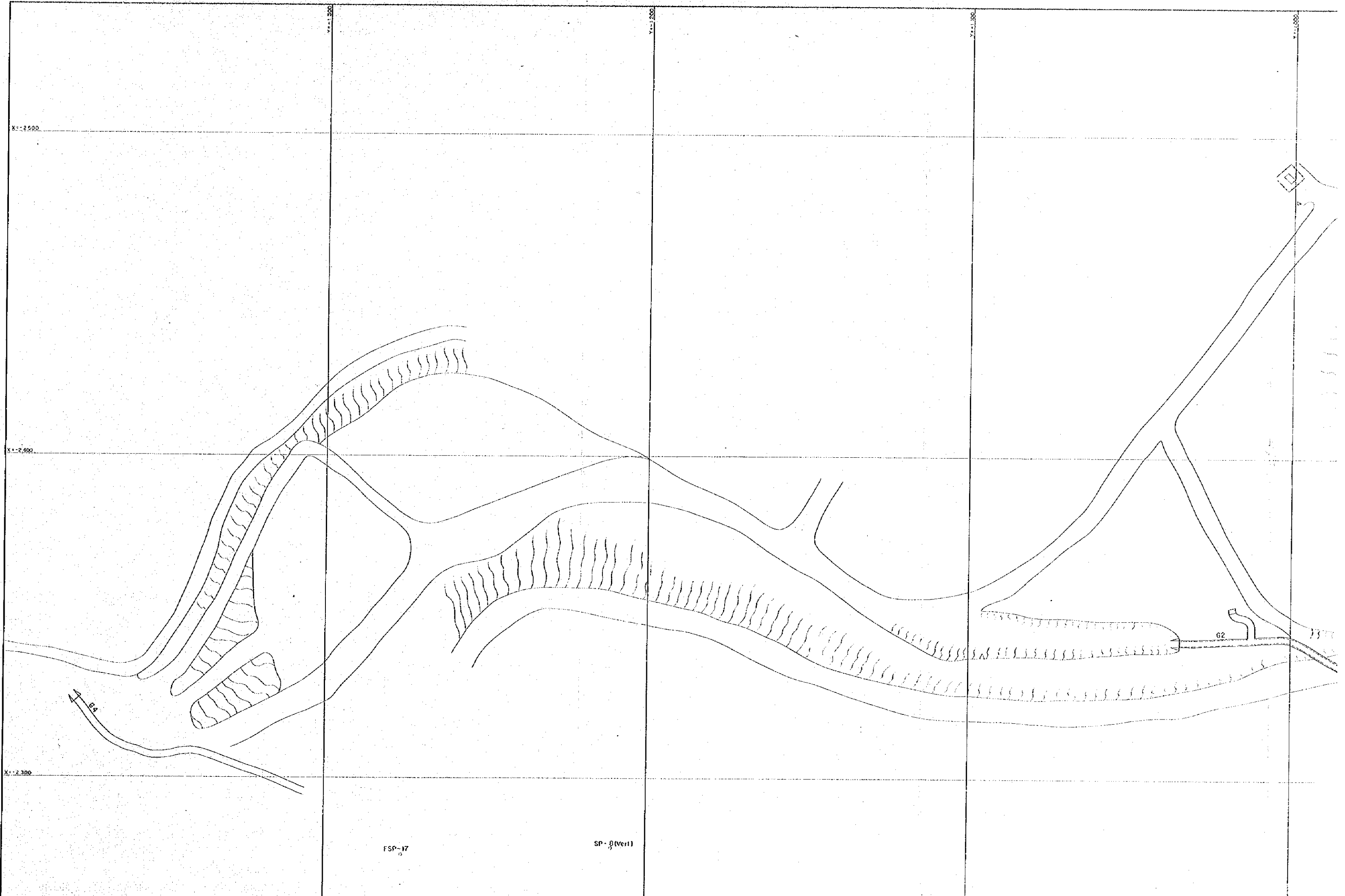


Açungu
Formatic
I

Selva
Formation



- | | | | |
|---------------------------|--|------|--|
| Açungui
Formation
1 | | Algs | Graphite schist |
| | | Alca | calc - schist |
| | | Alom | Amphibolite, amphybolic schist |
| | | Alps | Mica schist |
| | | Aldo | Dolomite layer |
| | | Alap | Graphite schist, phyllite layer |
| | | Alcs | Limestone, dolomite, calc-silicate rock, barite and sulphides, "Perau horizon" |
| | | Alqi | Quartzite, with amphibolite |
| Selva
Formation | | Sgn | Gneiss with minor amphibolite |
| | | | Anticline axis |
| | | | Syncline axis |
| | | | Fault |

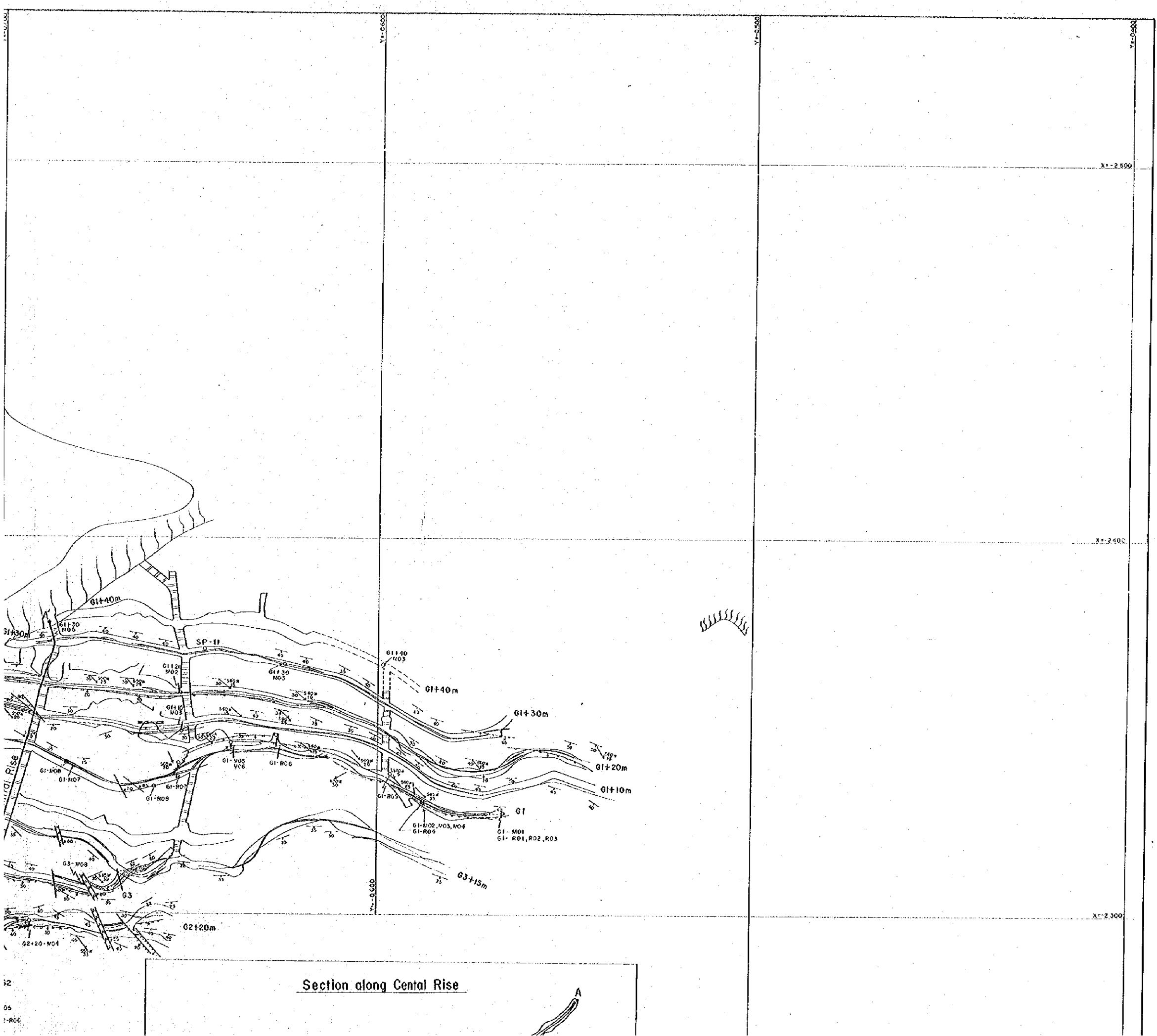


FSP-17
0

SP-3(Ver1)



Section along Cental Ris



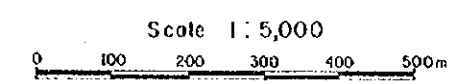
PL. I-7

BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II

Underground Geological Map in Prea Mine

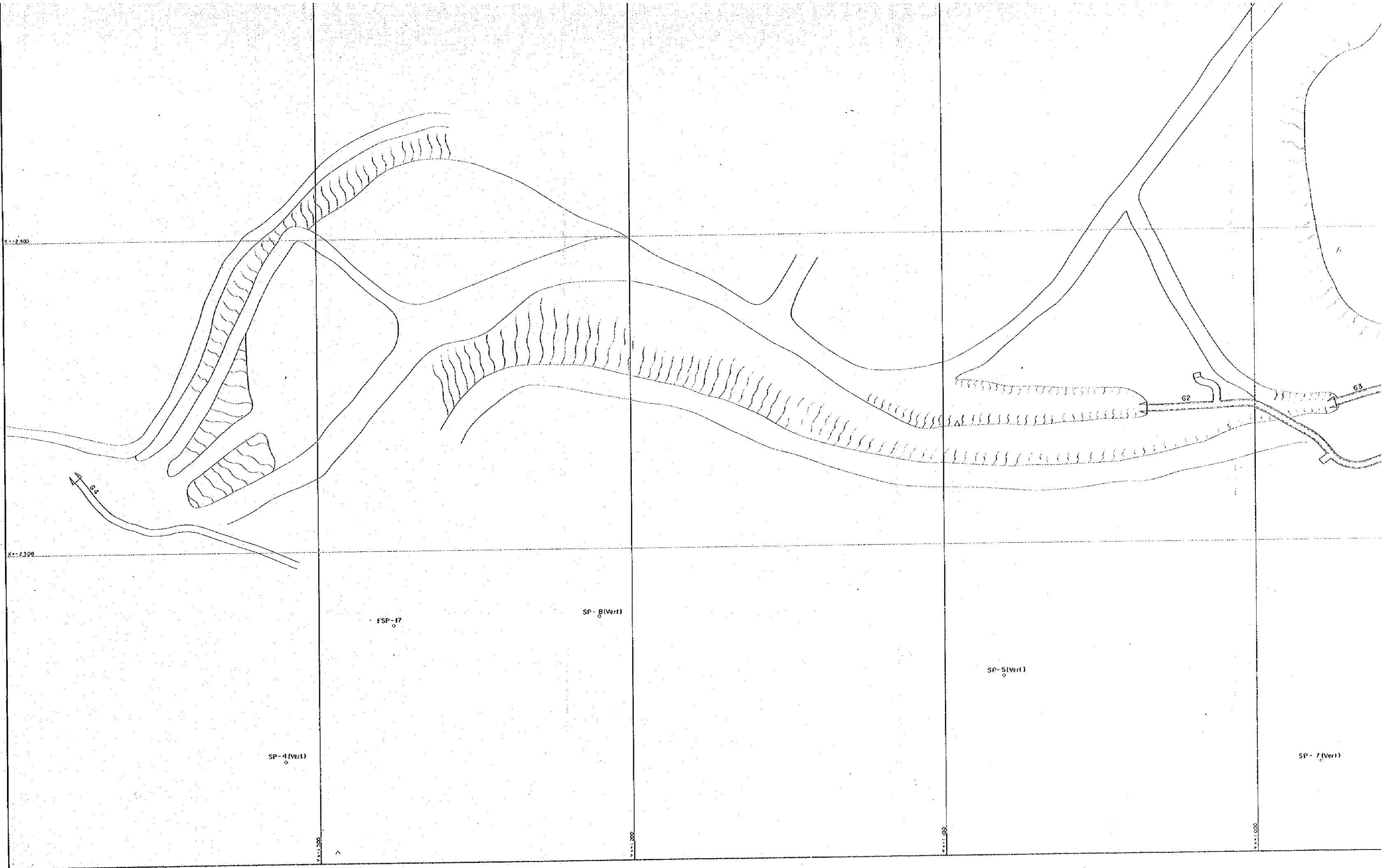
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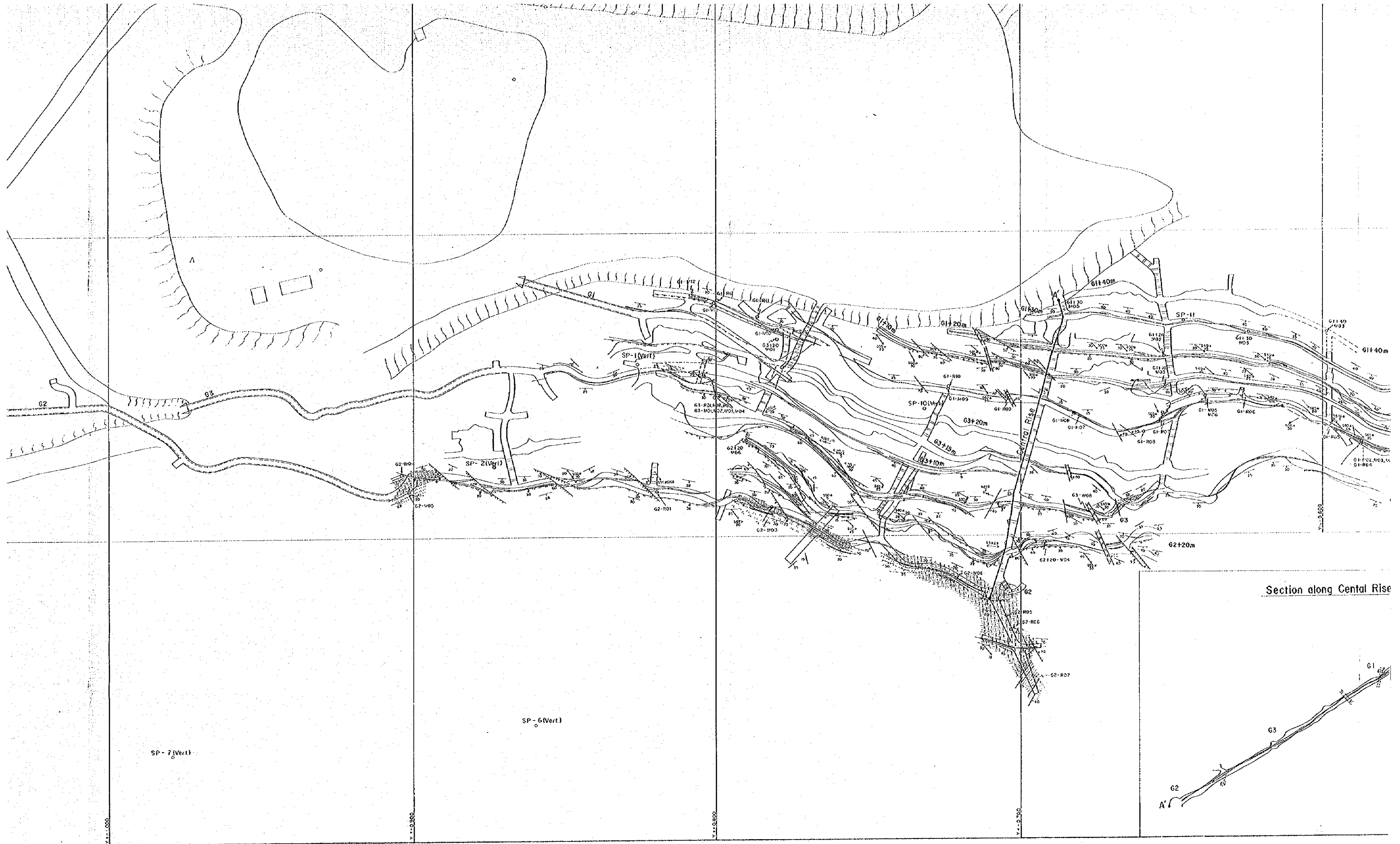
MAR. 1982
Prepared by Bishimetal Exploration Co., Ltd.

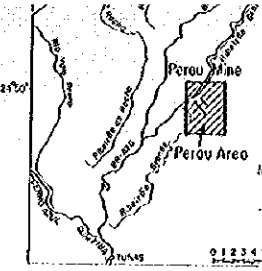


LEGEND

- Ore
 - Low grade mineralized zone
 - Thin out
 - Calc silicate rock, limestone dolomite
 - Phyllite ~ graphite schist
 - Garnet - biotite - quartz - sericite schist
 - Magnetite bearing garnet - biotite - quartz - sericite schist
 - Colcreous ~ siliceous barite
 - Diabase dyke
 - Oblique fault
 - Strike fault
 - Fracture
 - Bedding
 - Lineation
 - Plunge of fold
- G2-R03 Rock sample for chemical & X-ray analysis
- G3-M04 Ore sample for chemical analysis
- ⊙ SP-6 Bore Holes

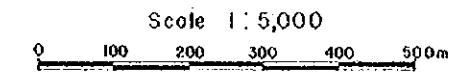






METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

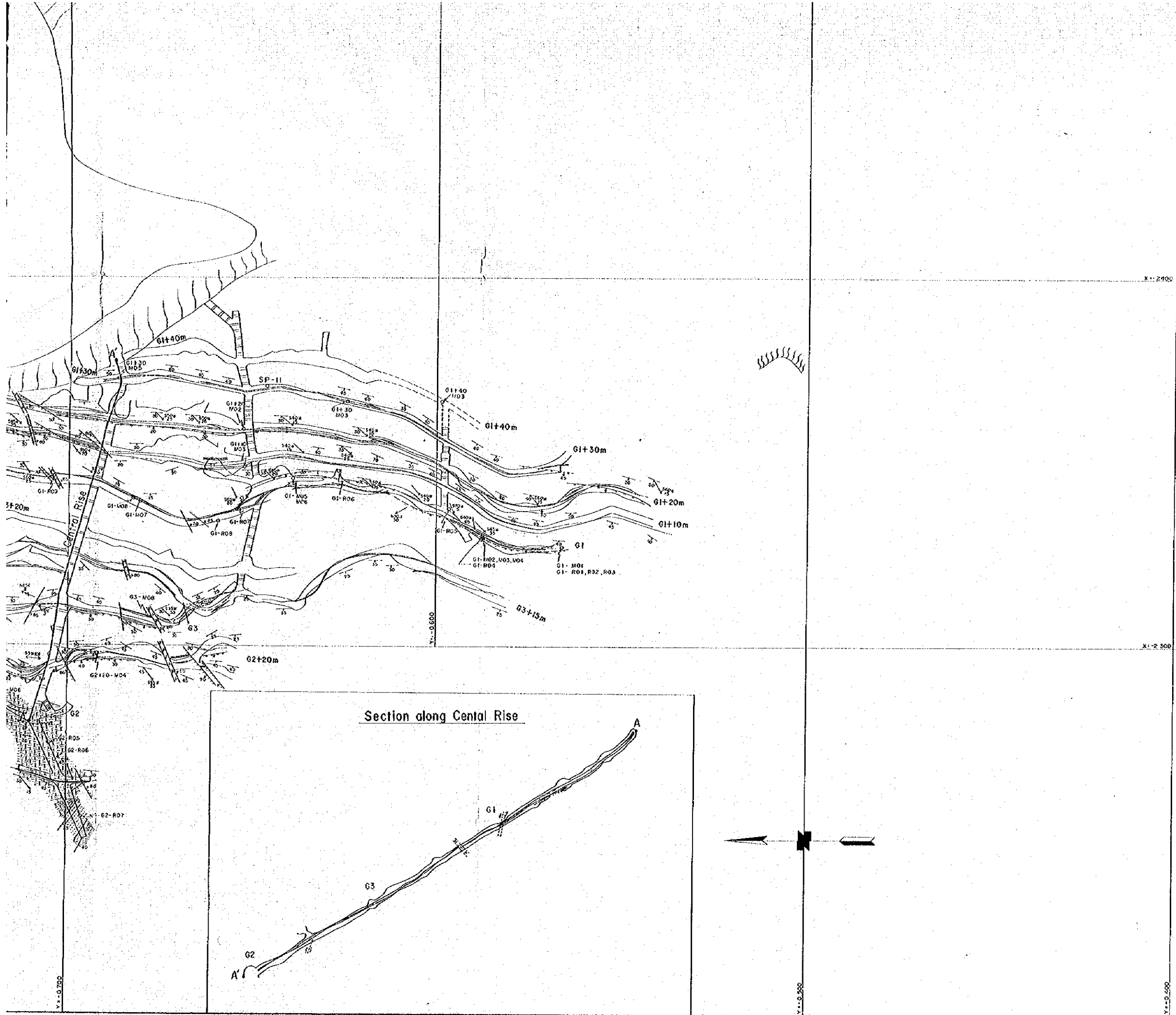
MAR. 1982
Prepared by Bishmetal Exploration Co., Ltd.



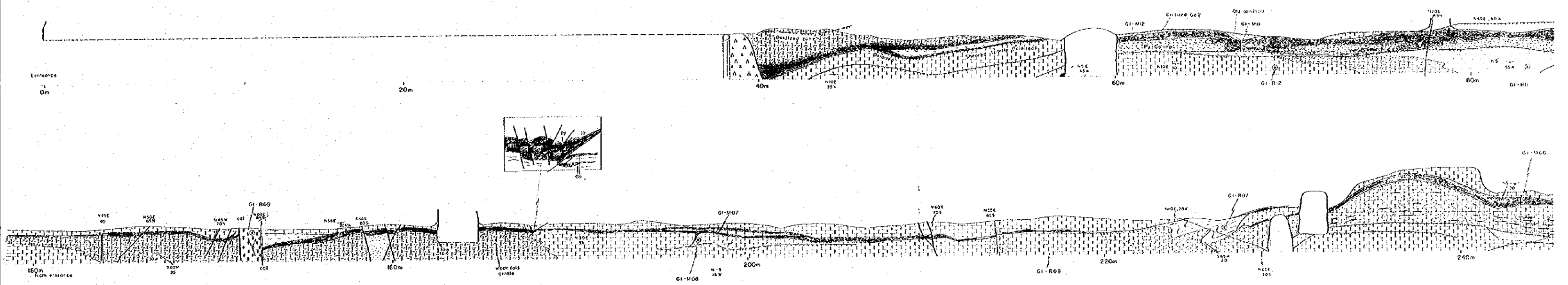
LEGEND

- Ore
- Low grade mineralized zone
- Thin out
- Calc silicate rock, limestone dolomite
- Phyllite ~ graphite schist
- Garnet - biotite - quartz - sericite schist
- Magnetite bearing garnet - biotite - quartz - sericite schist
- Coloursous - siliceous barite
- Diabase dyke
- Oblique fault
- Strike fault
- Fracture
- Bedding
- Lineation
- Plunge of fold

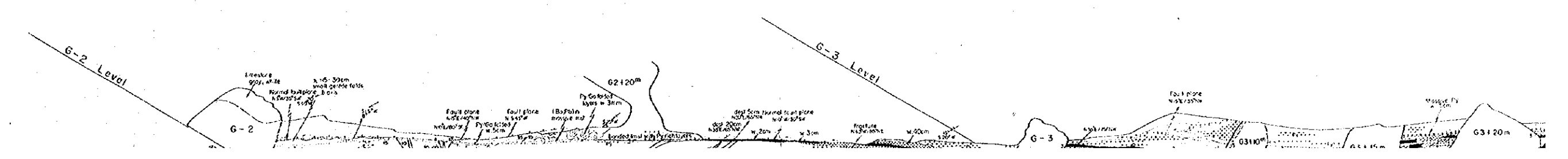
- G2-R03 Rock sample for chemical B X-ray analysis
- G3-M04 Ore sample for chemical analysis
- SP-6 Bore Holes



G-1 Level (Entrance -

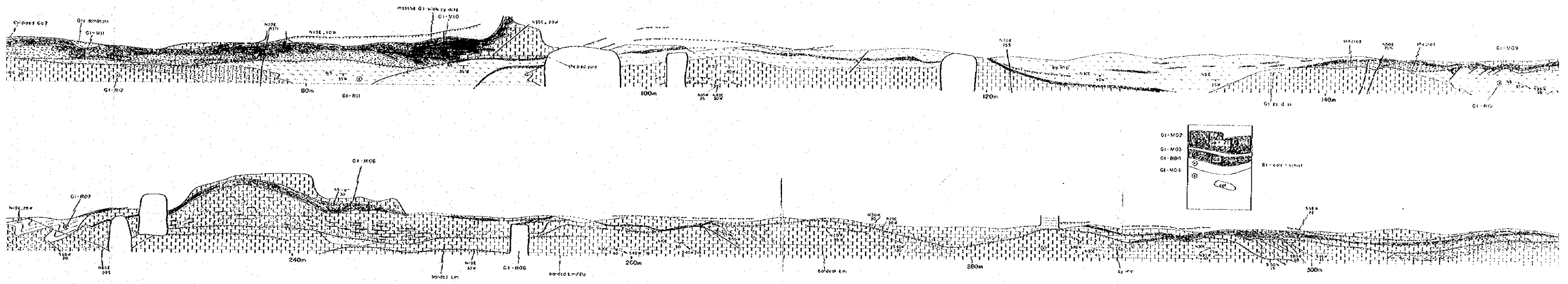


Central Rise (G-2 L



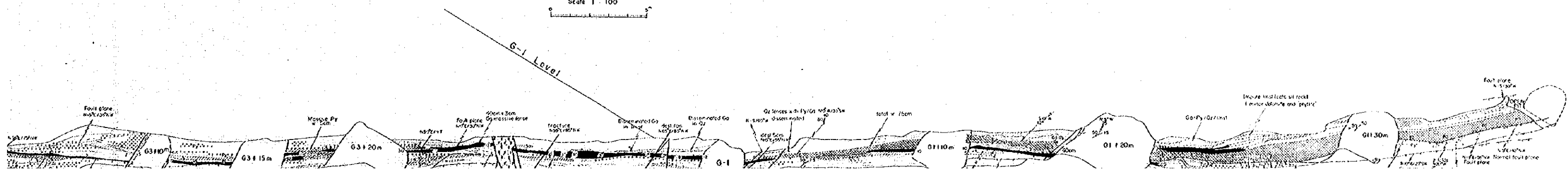
G-1 Level (Entrance - 320m)

Scale 1 : 100



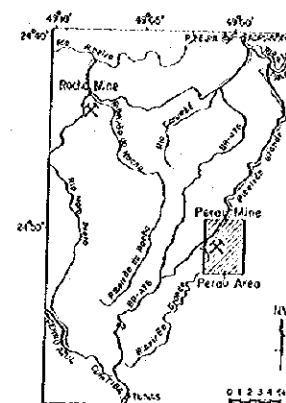
Central Rise (G-2 Level - Open pit)

Scale 1 : 100



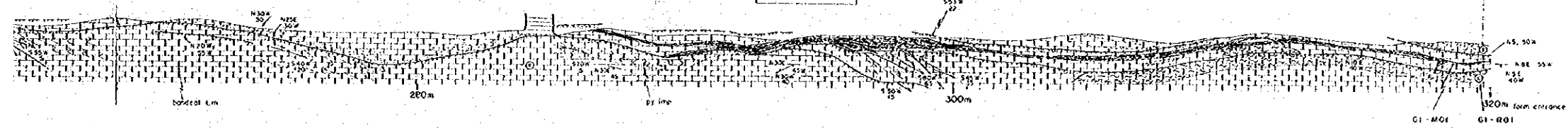
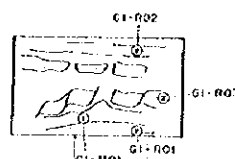
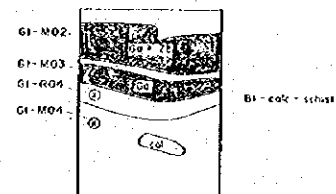
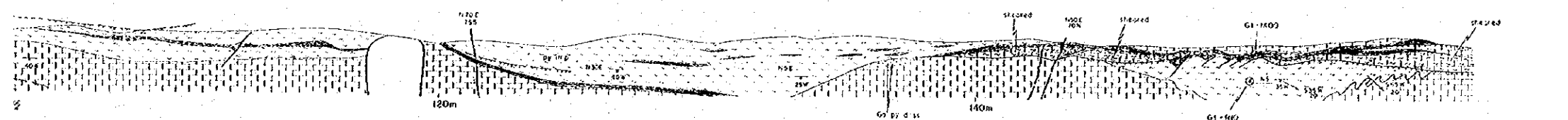
BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II

Sketch of Ore Beds in Perou Mine



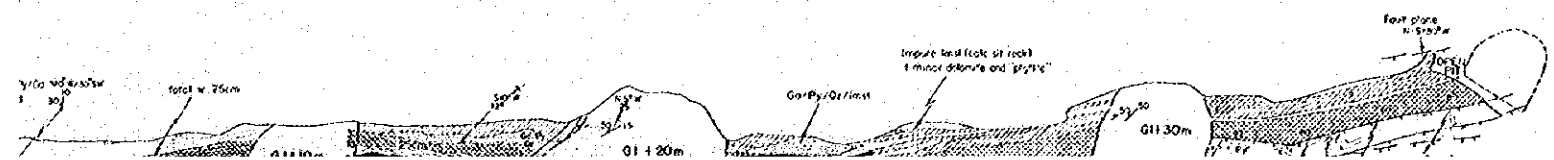
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

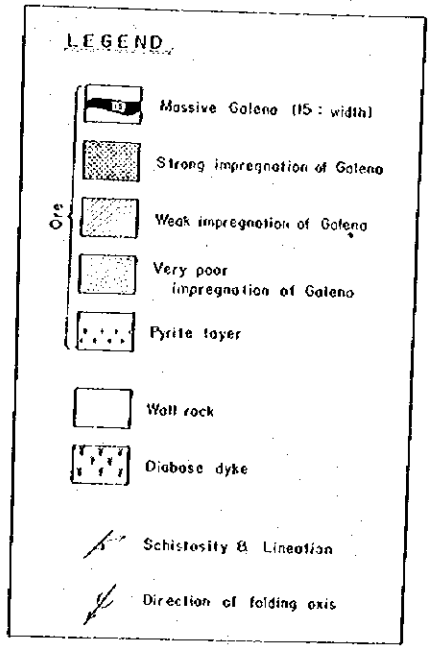
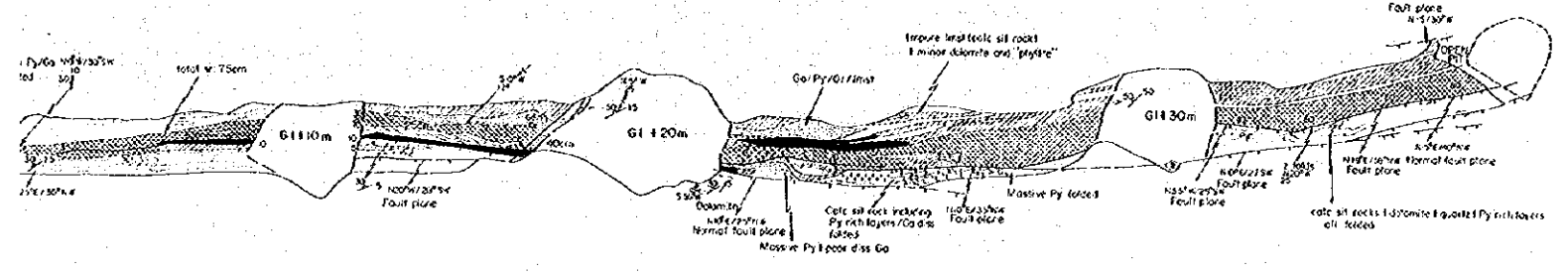
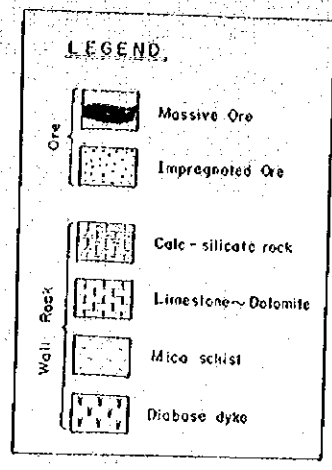
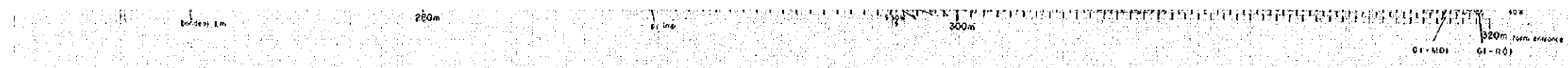
MAR. 1982
Prepared by Bishimetal Exploration Co., Ltd.



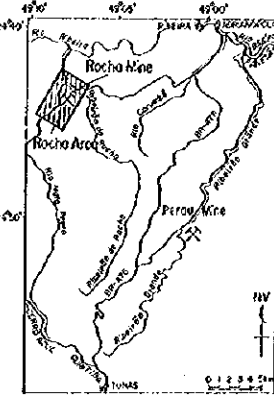
LEGEND

Ore		Massive Ore
		Impregnated Ore
Wall Rock		Calc-silicate rock
		Limestone-Dolomite
		Mica schist
		Diabase dyke





BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geological Map and Profile
of Rocha Area



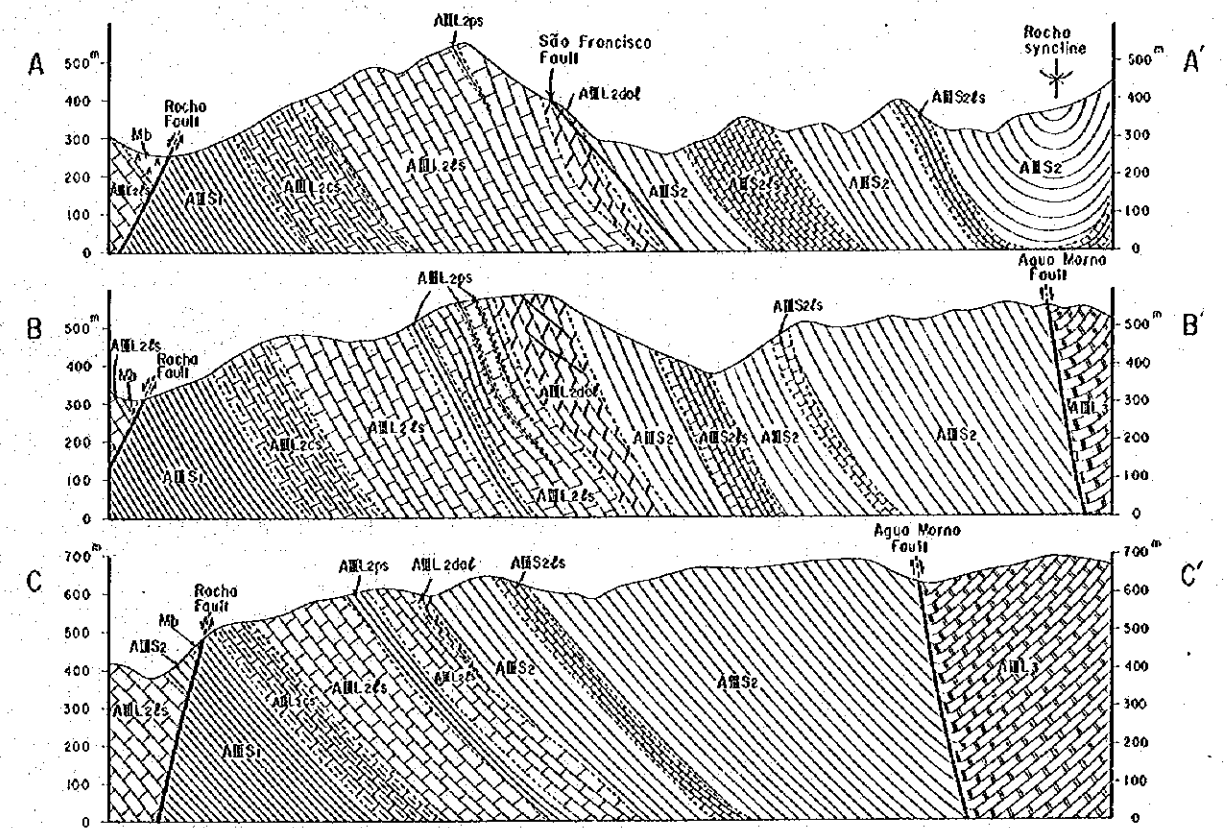
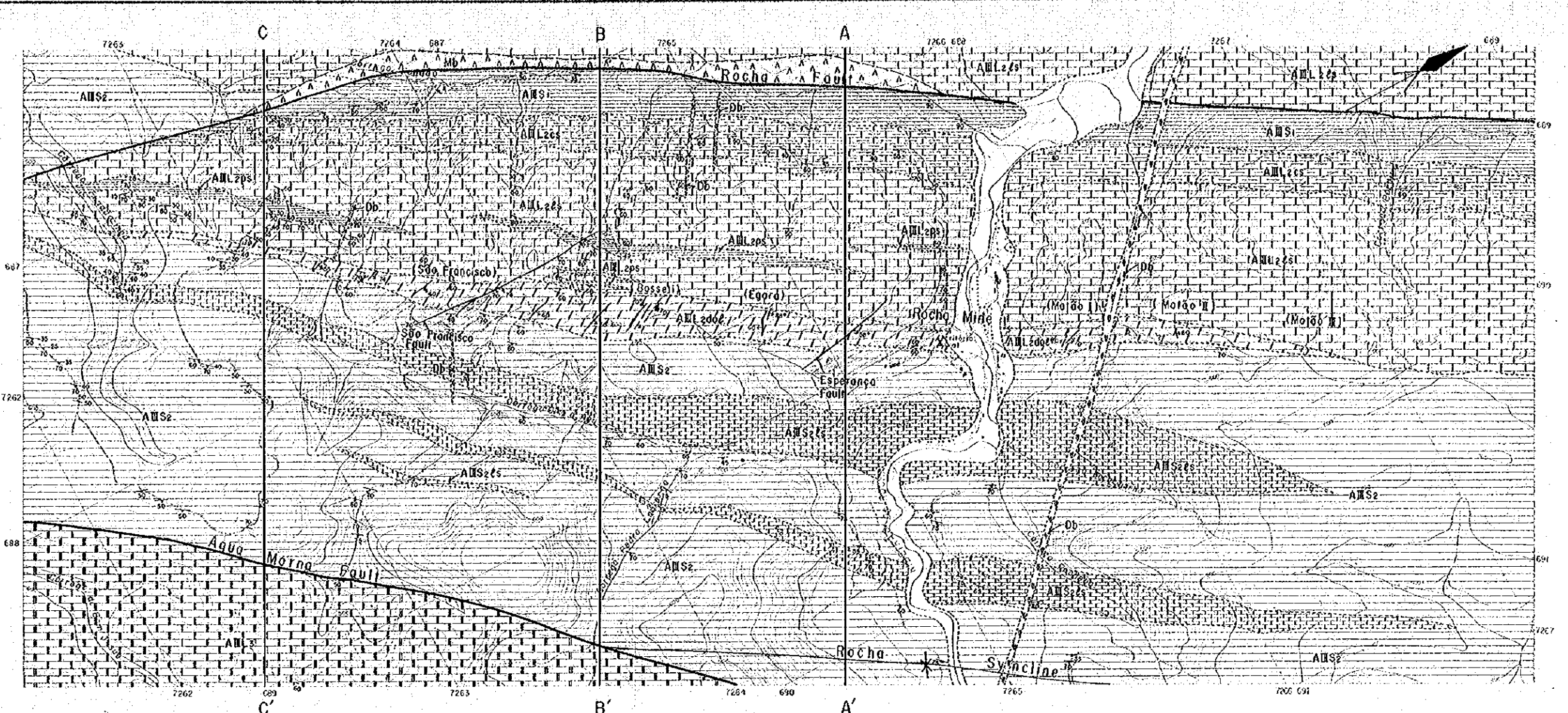
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY
MAR. 1982
Prepared by Dishimel Exploration Co., Ltd.

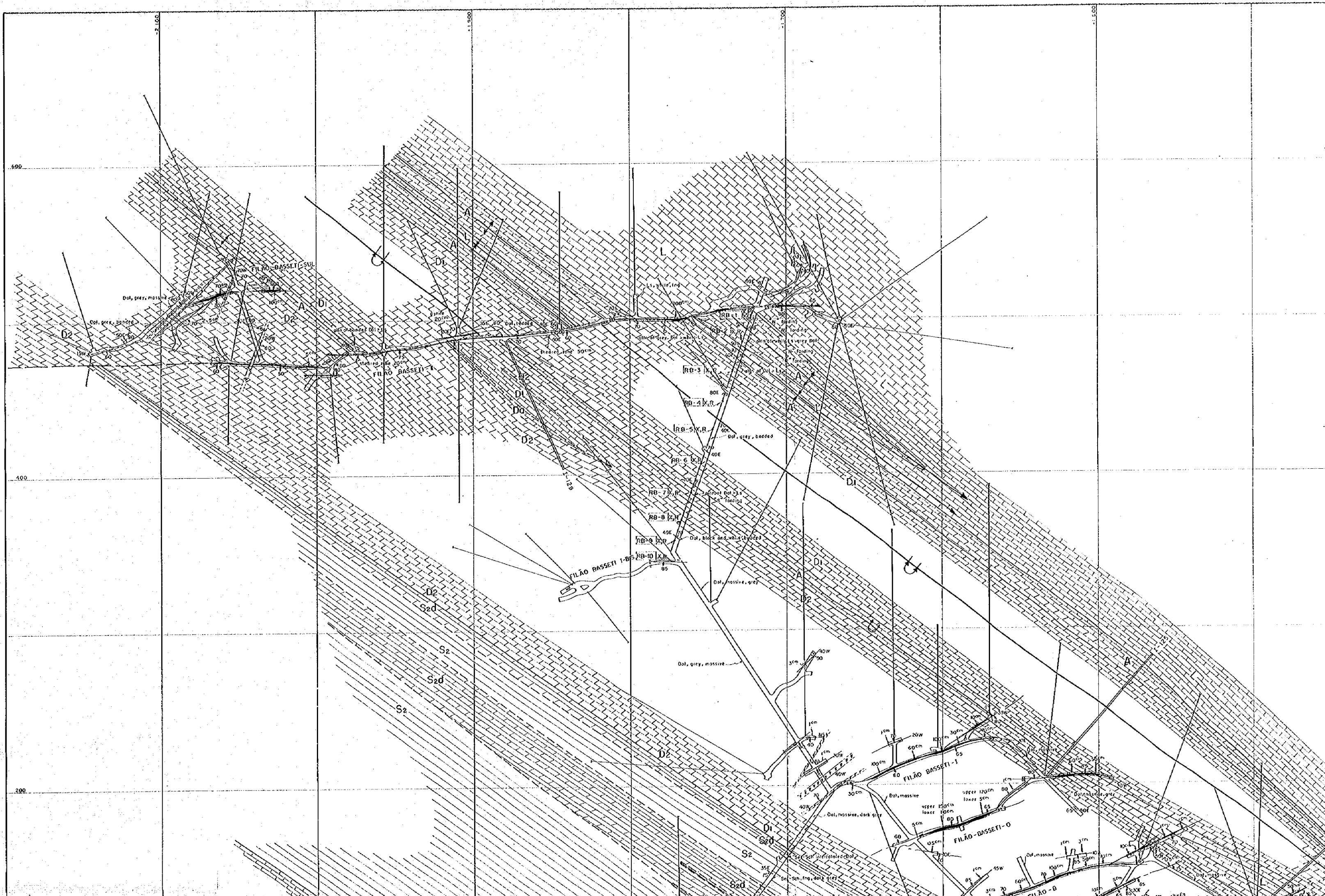
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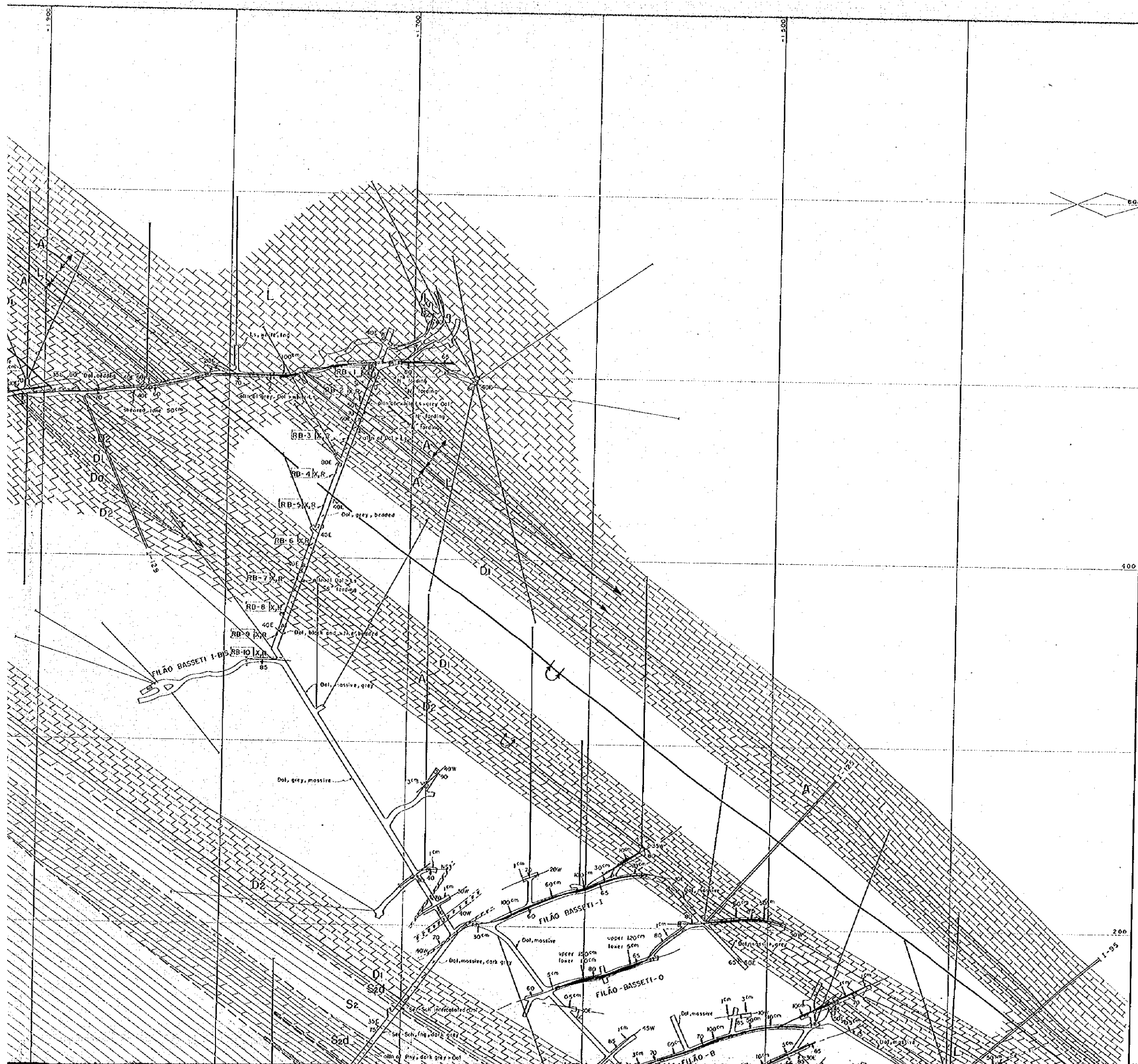


LEGEND

- gravel
- Upper Member
 - limestone
 - tremolite bearing zone
 - limestone with calc-schist
- Middle Member
 - mico (sericite)-schist ~ phyllite
 - dolomite
 - mico (sericite)-schist
 - limestone
 - calc-schist with limestone
- Lower Member
 - mico (sericite) - schist
- Intrusive rocks
 - meta basite
 - diabase
- Synclinal axis
- Bedding
- Profile line
- Fault and Vein
- Schistosity







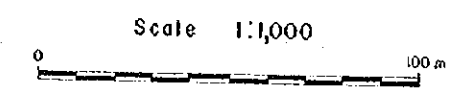
PL.I-10-1

BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II

Underground Geological Map
in Rocha Mine (403 mL)

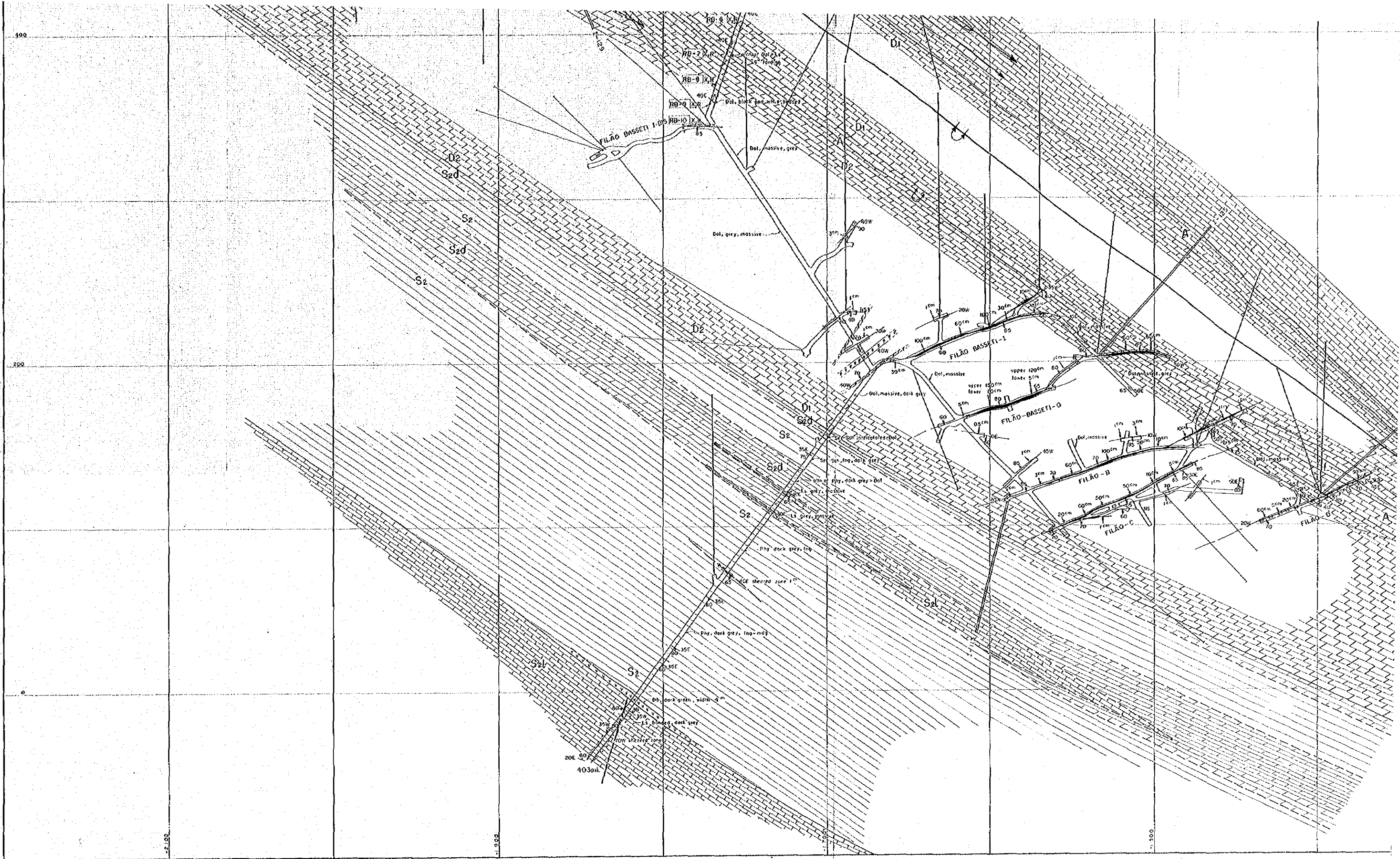
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

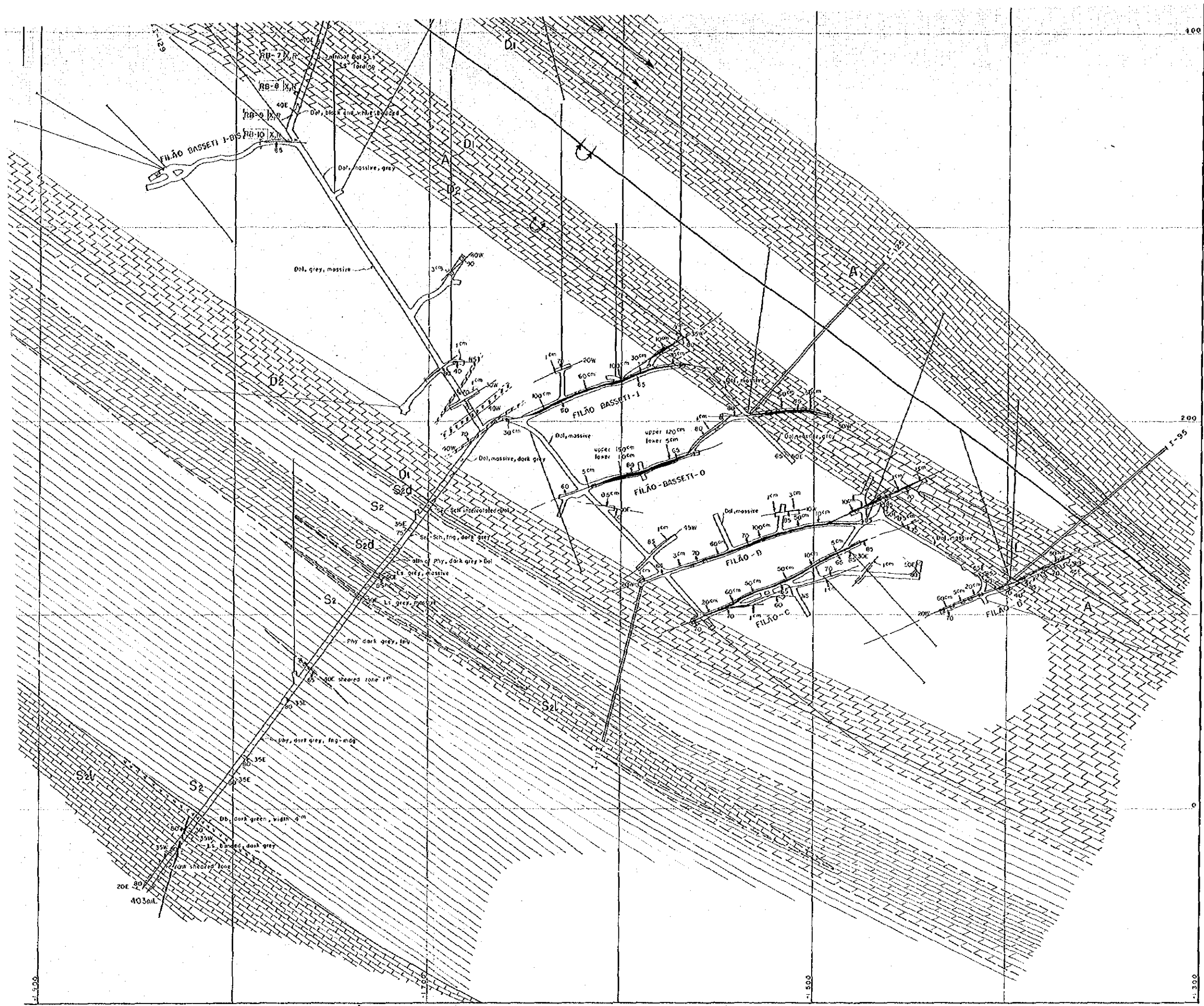
MAR. 1982
Prepared by Bishmetal Exploration Co., Ltd.



LEGEND

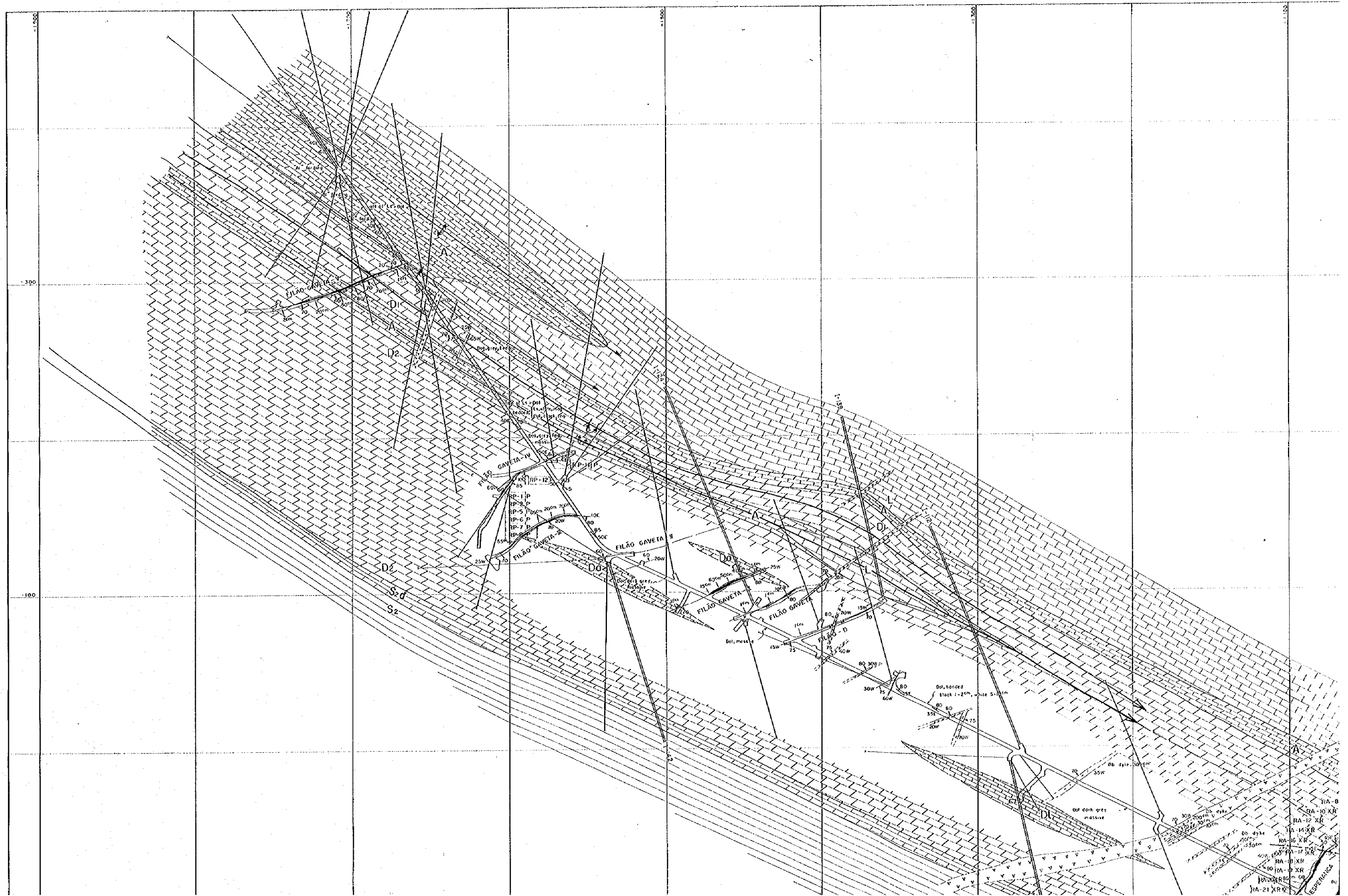
Surface in Rocha Area	Underground in Rocha Mine	
AIII S ₂ S ₄ S ₅		intercalation of limestone
AII S ₂		sericite schist
		sericite schist with dolomite
		massive dolomite
		intercalation of limestone
AIII D ₂ D ₄		intercalation of dolomite & limestone
		bedded dolomite
AIII L ₂ L ₃ L ₄		alternation of dolomite & limestone
		limestone
		diabase
		Anticlinal axis
		Synclinal axis
		Bedding
		Overturned synclinal axis
		Overturned anticlinal axis
		Schistosity

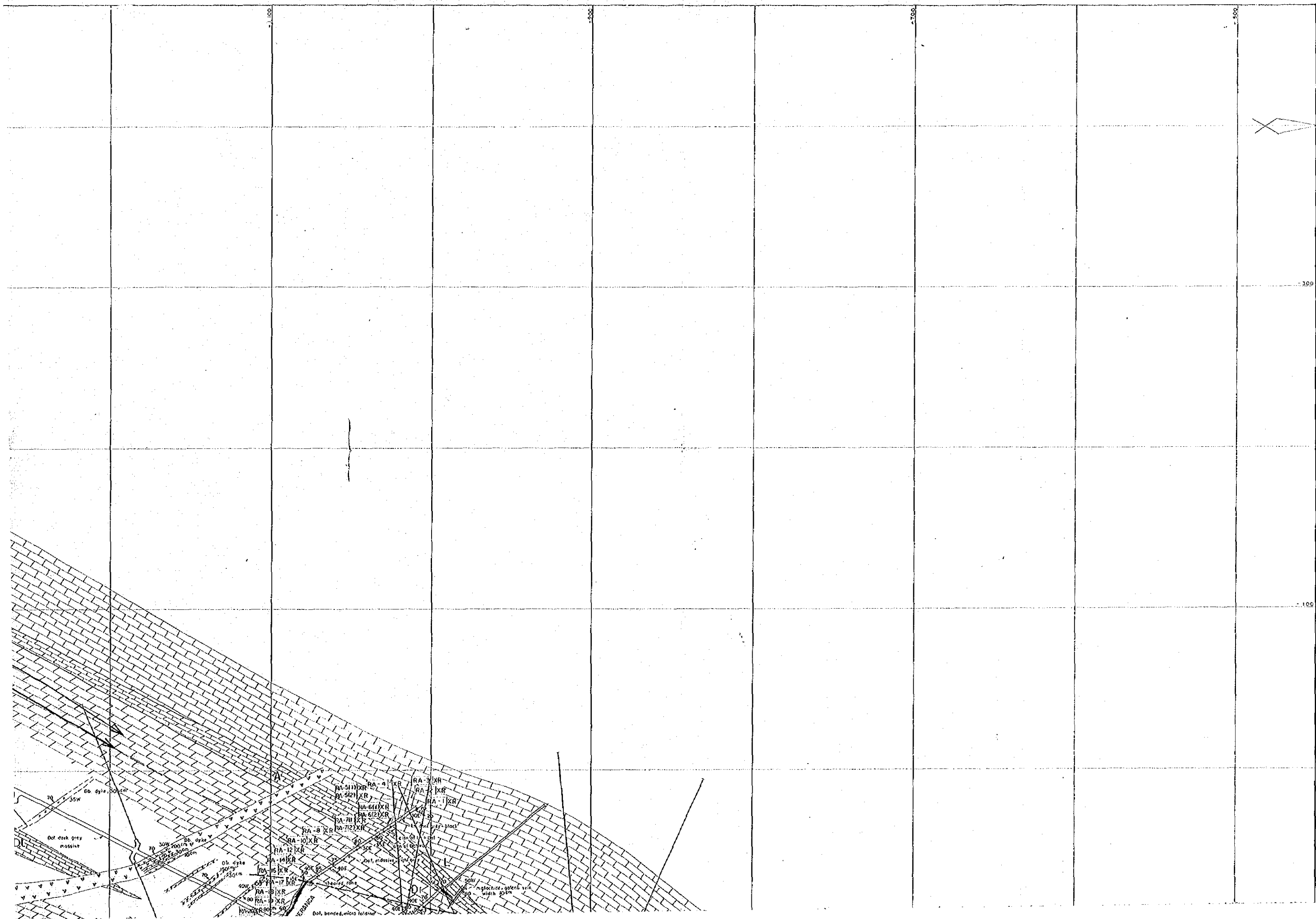




LEGEND

Surface in Rocha Area	Underground in Rocha Mine	
A ₁ S ₂ S ₂ s	S ₂ & L	intercalation of limestone
A ₁ S ₂	S ₂	sericite schist
	S ₂ d	sericite schist with dolomite
	D ₂	massive dolomite
	D ₂ & L	intercalation of limestone
A ₁ L ₂ dol	D ₀	intercalation of alternation of dolomite & limestone
	D ₁	bedded dolomite
A ₁ L ₂ s	A	alternation of dolomite & limestone
	L	limestone
	Db	diabase
		Anticlinal axis
		Synclinal axis
		Bedding
		Schistosity
		Overturned synclinal axis
		Overturned anticlinal axis
		Sample for Polished section
		Sample for X-ray analysis
		Sample for Chemical analysis
		Surveyed core Logs
		Core Logs

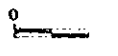




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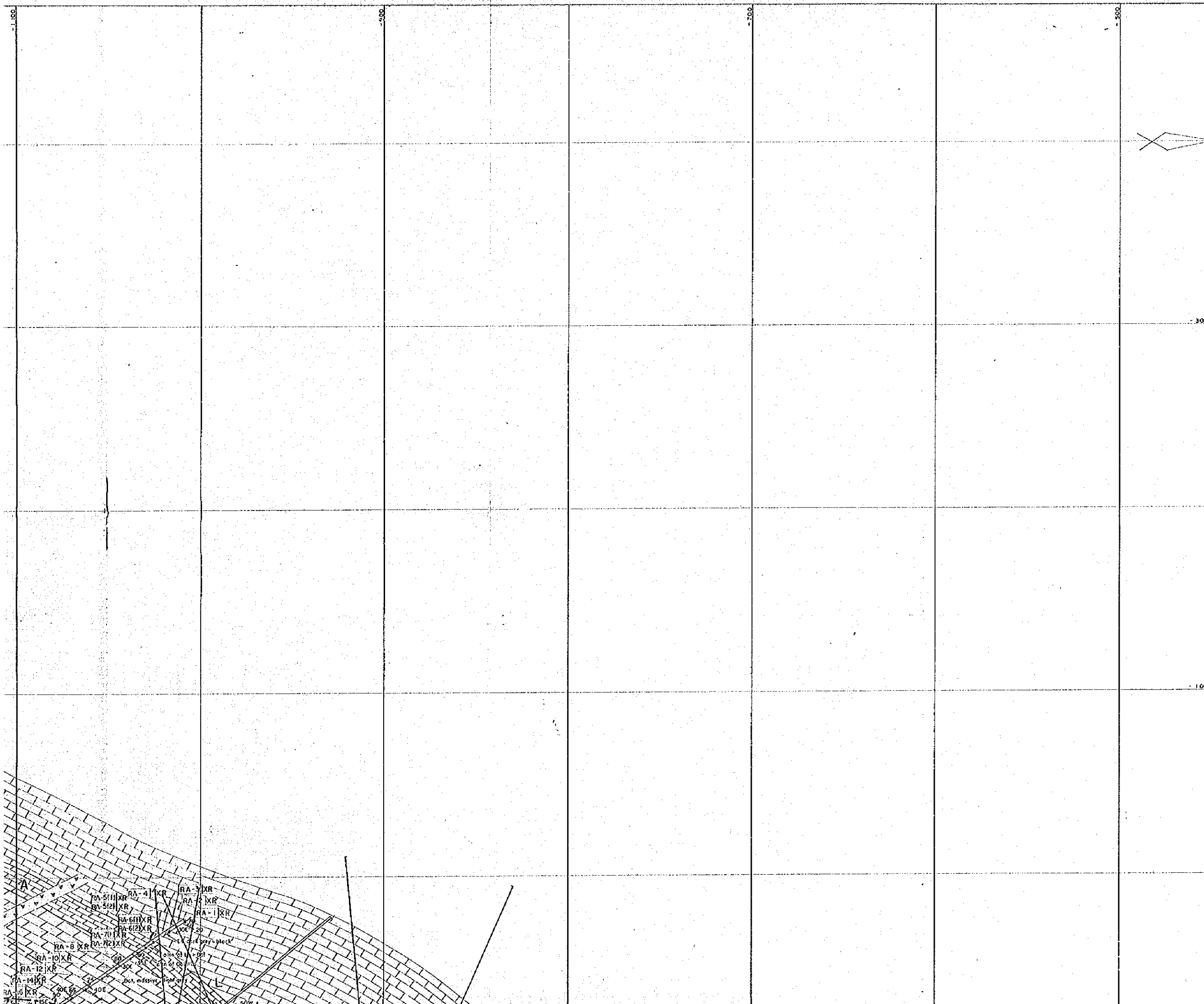
ME
JAPAN II

Prepar



L

Surface in Rocha Area	Undergrour in Rocha (M)
AIII S2fs	S2L
AIII S2	S2
	S2d
AIII d01	D2
	Df
	D0
	D1
AIII Lfs	A
	L
	D0
	Anti
	Sync
	Bed



PL.I-10-2

**BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II**

**Underground Geological Map
in Rocha Mine (308 mL)**

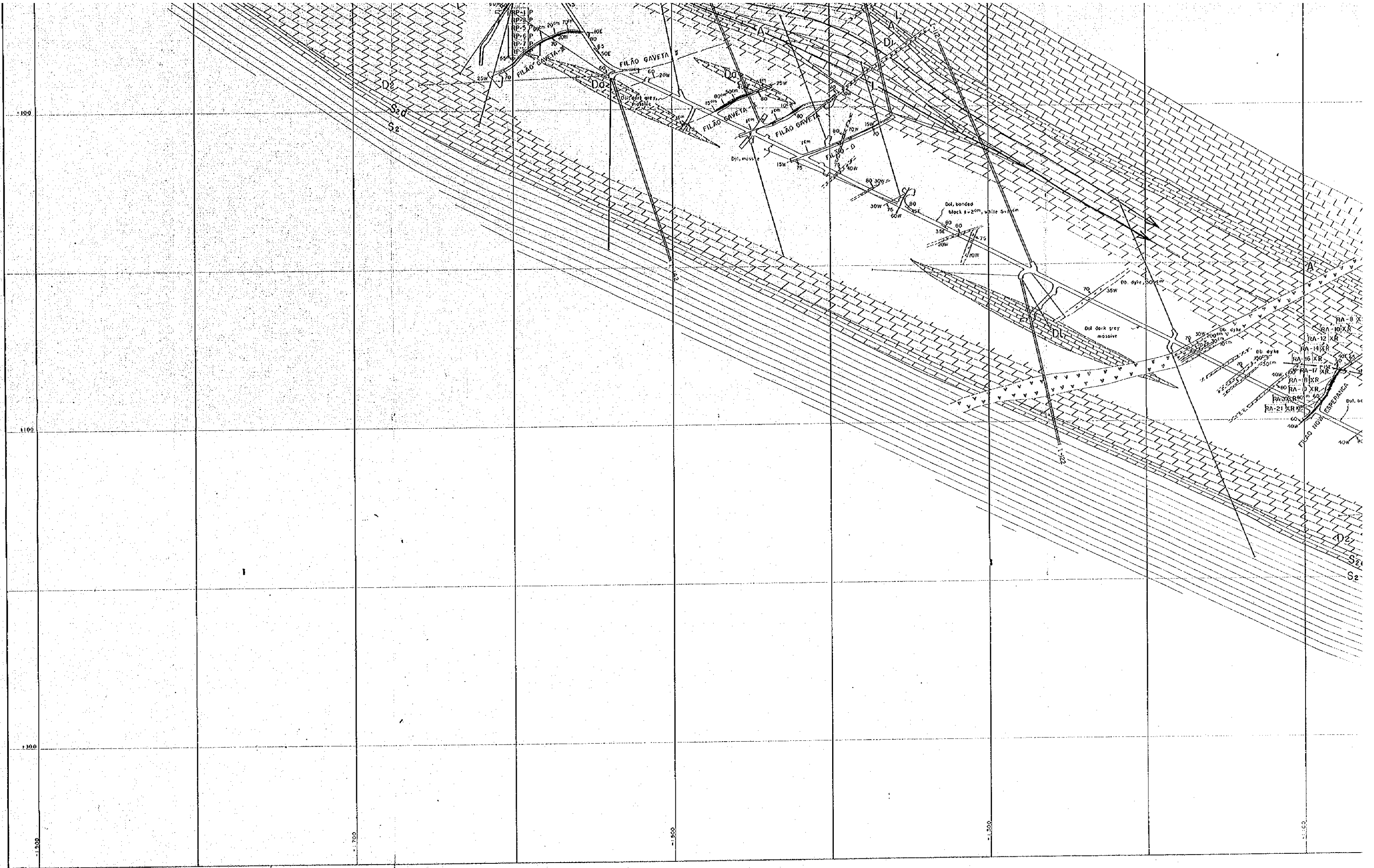
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

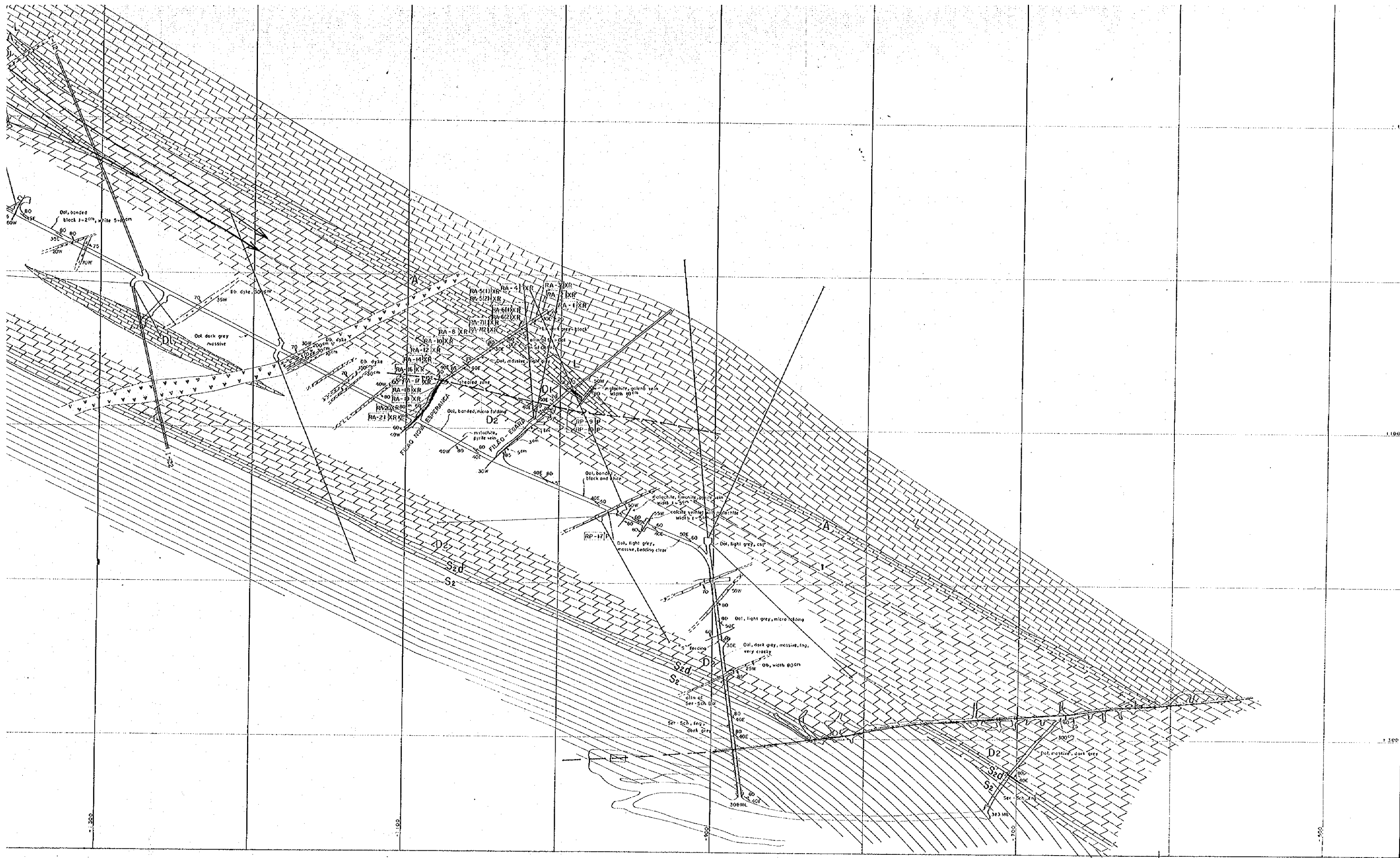
MAR. 1982
Prepared by Bishimetal Exploration Co., Ltd.

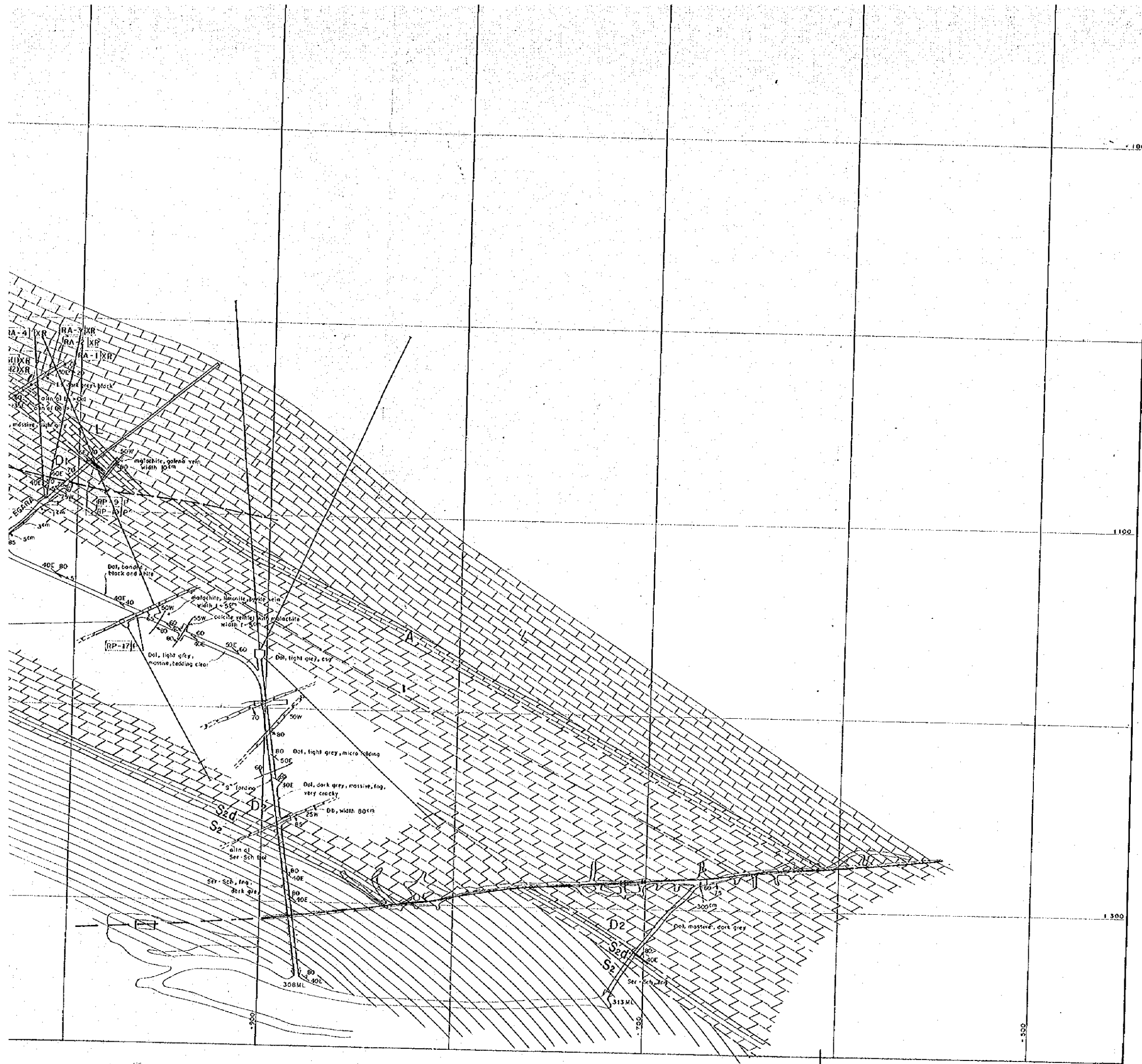


LEGEND

Surface in Rocha Area	Underground in Rocha Mine		
AIII S ₂ fs	S ₂ δ	intercalation of limestone	
	S ₂	sericite schist	
	S ₂ δ	sericite schist with dolomite	
AIII dδol	D ₂	massive dolomite	
	D ₂	intercalation of limestone	
	D ₀	intercalation of alternation of dolomite & limestone	
	D ₁	bedded dolomite	
AIII L ₂ fs	A	alternation of dolomite & limestone	
	L	limestone	
	Ob	diabase	
⌵	Anticlinal axis	⌵	Overtured synclinal axis
⌶	Synclinal axis	⌶	Overtured anticlinal axis

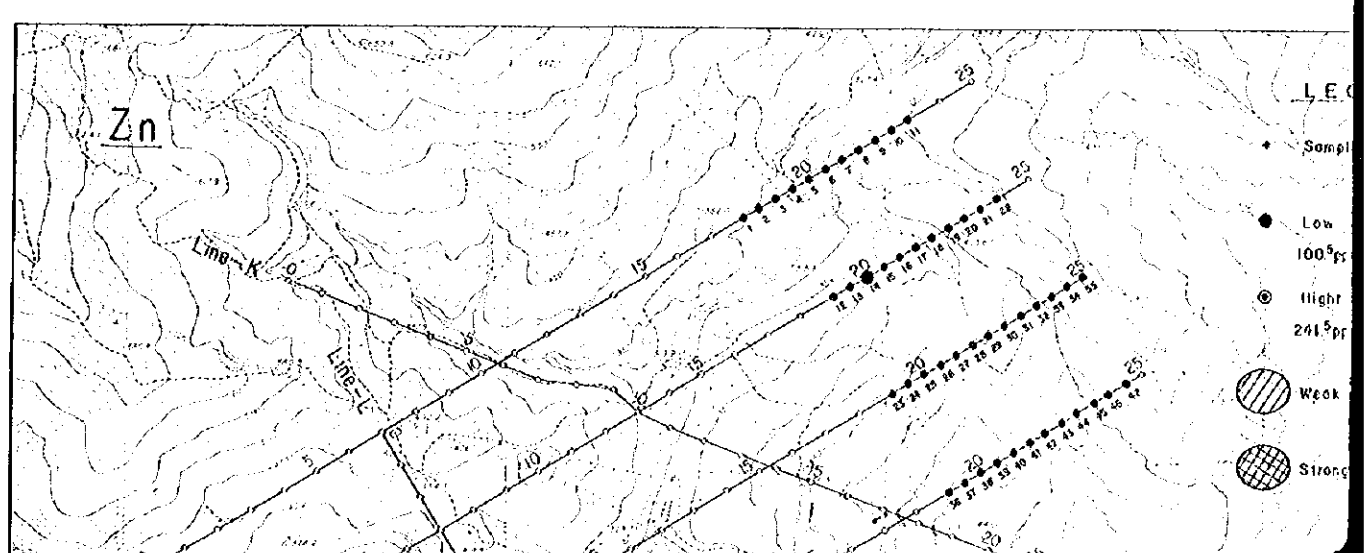
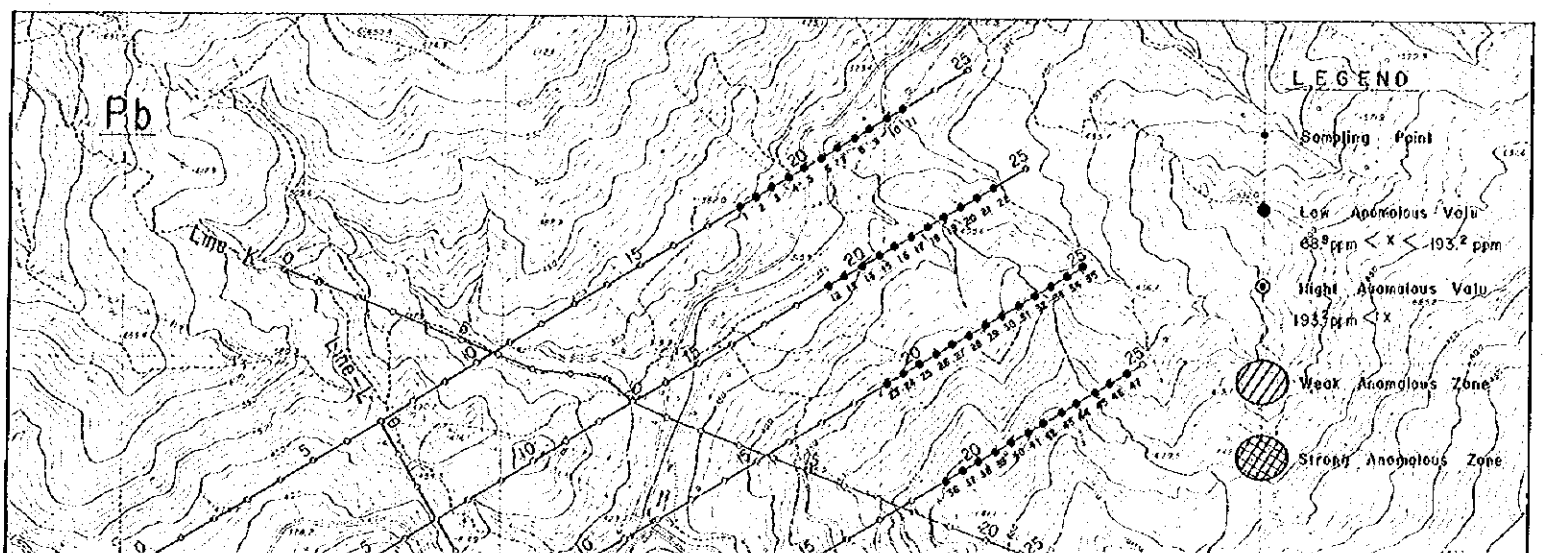
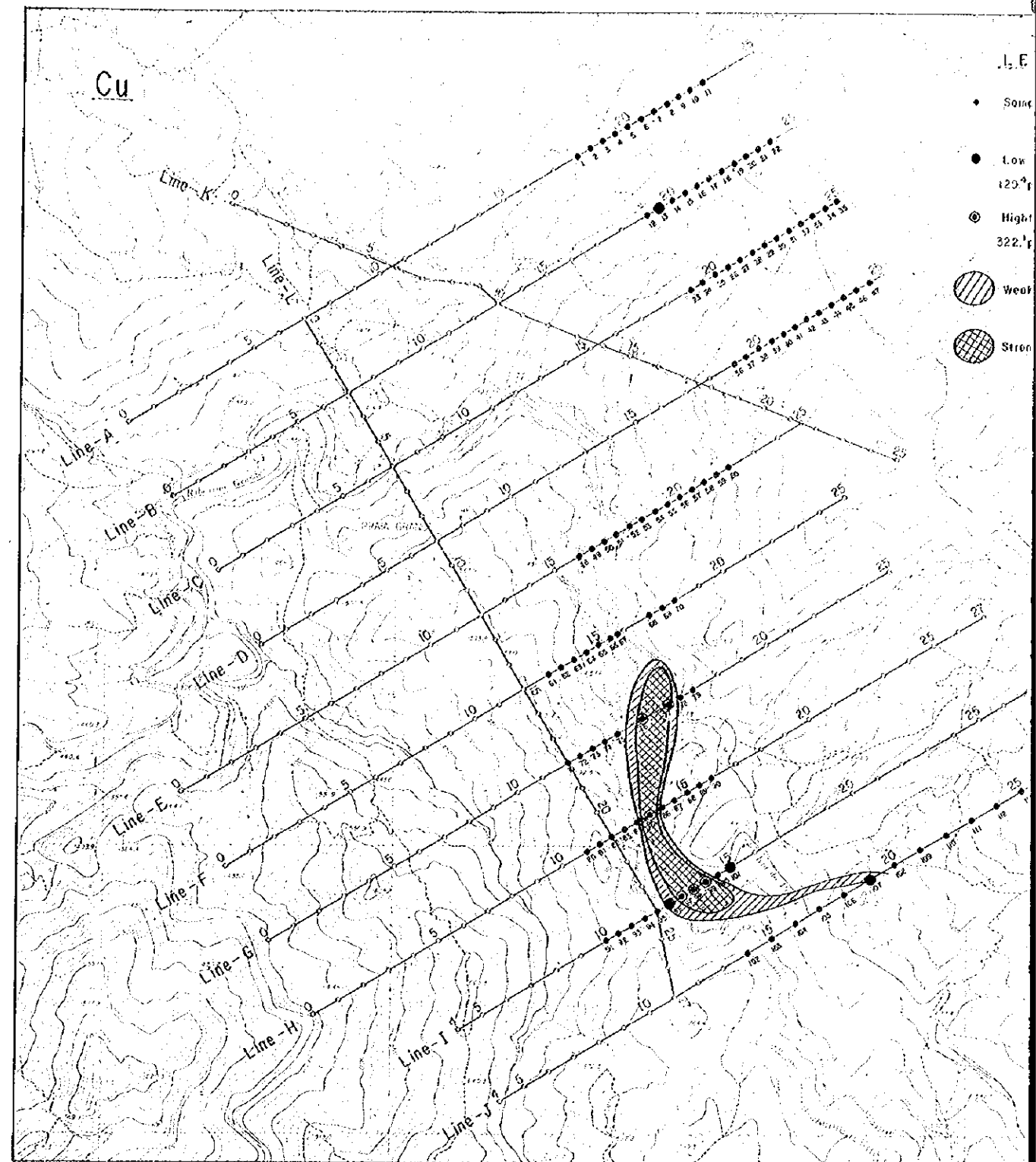
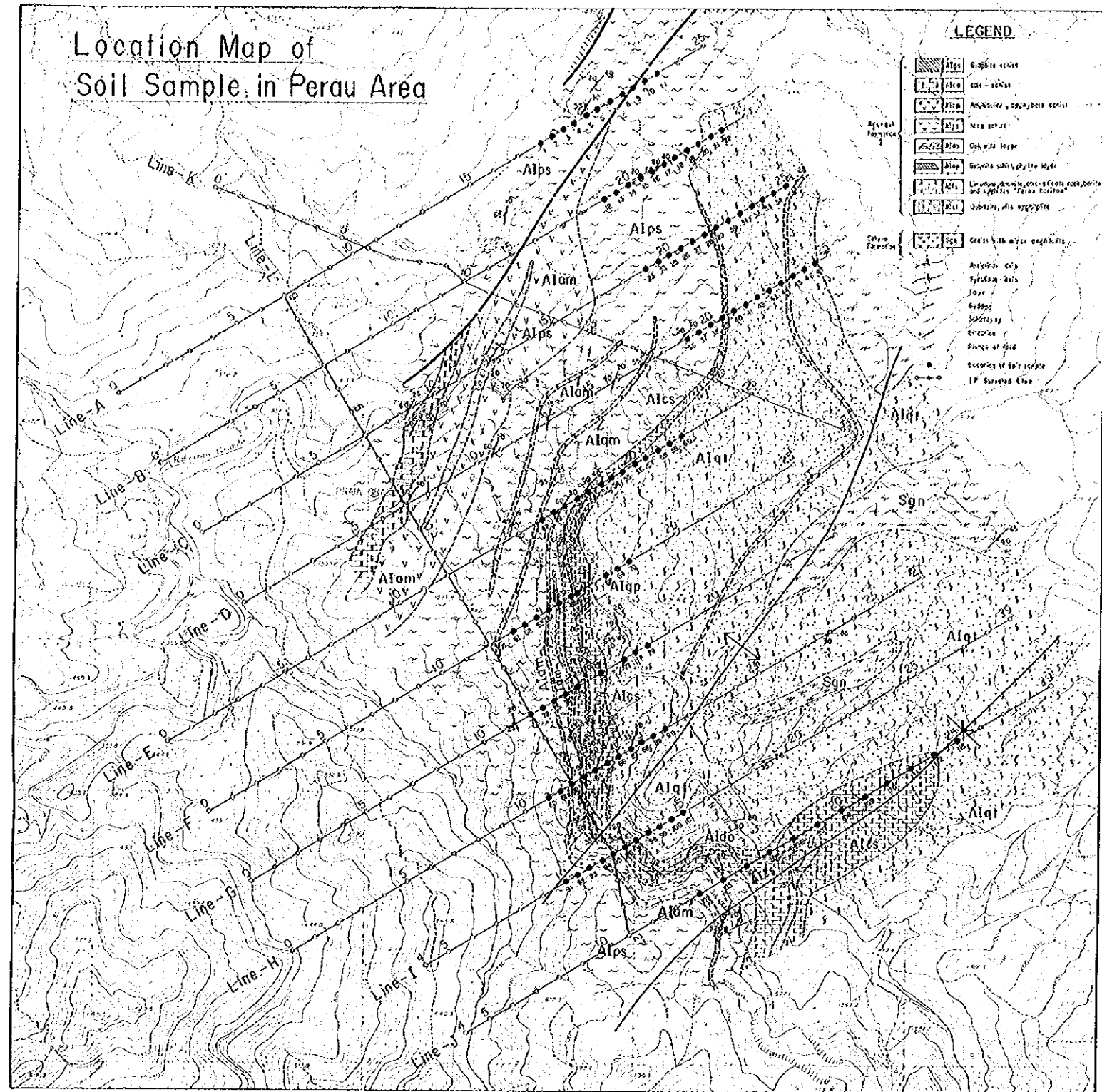




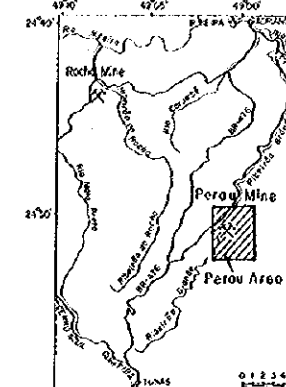


LEGEND

- | | | | |
|--|------------------------------------|--|----------------------------|
| Surface in Rocha Area | Underground in Rocha Mine | | |
| A ₁ S ₂ f _s | S ₂ l | intercolation of limestone | |
| A ₁ S ₂ | S ₂ | sericite schist | |
| | S ₂ d | sericite schist with dolomite | |
| | D ₂ | massive dolomite | |
| | D ₂ l | intercolation of limestone | |
| A ₁ L ₂ dol | D ₂ a | intercolation of alternation of dolomite & limestone | |
| | D ₂ b | bedded dolomite | |
| A ₁ L ₂ f _s | A | alternation of dolomite & limestone | |
| | L | limestone | |
| | Db | diabase | |
| | Anticlinal axis | | Overturned synclinal axis |
| | Synclinal axis | | Overturned anticlinal axis |
| | Bedding | | Schistosity |
| | RP1: Sample for Polished section | | Sureyed core Logs |
| | RA1X: Sample for X-ray analysis | | Core Logs |
| | RB1R: Sample for Chemical analysis | | |



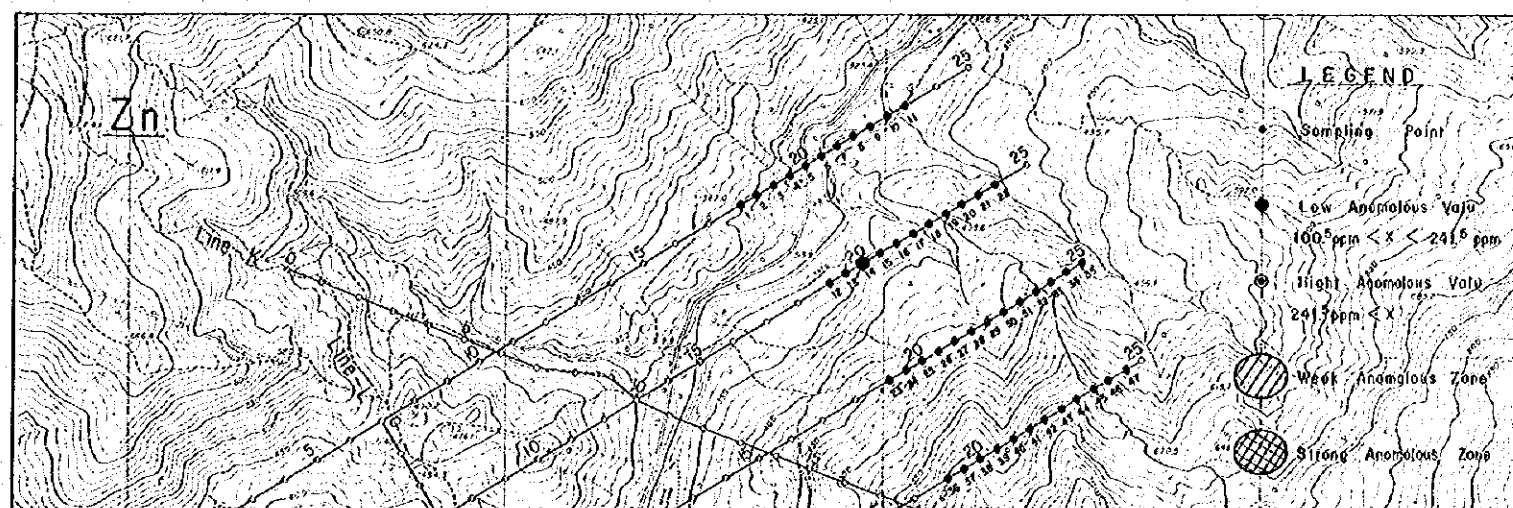
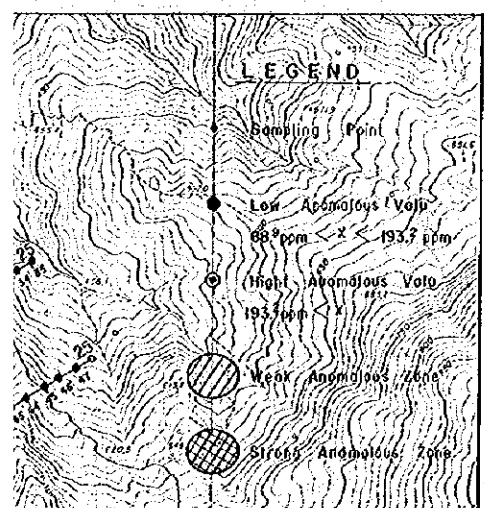
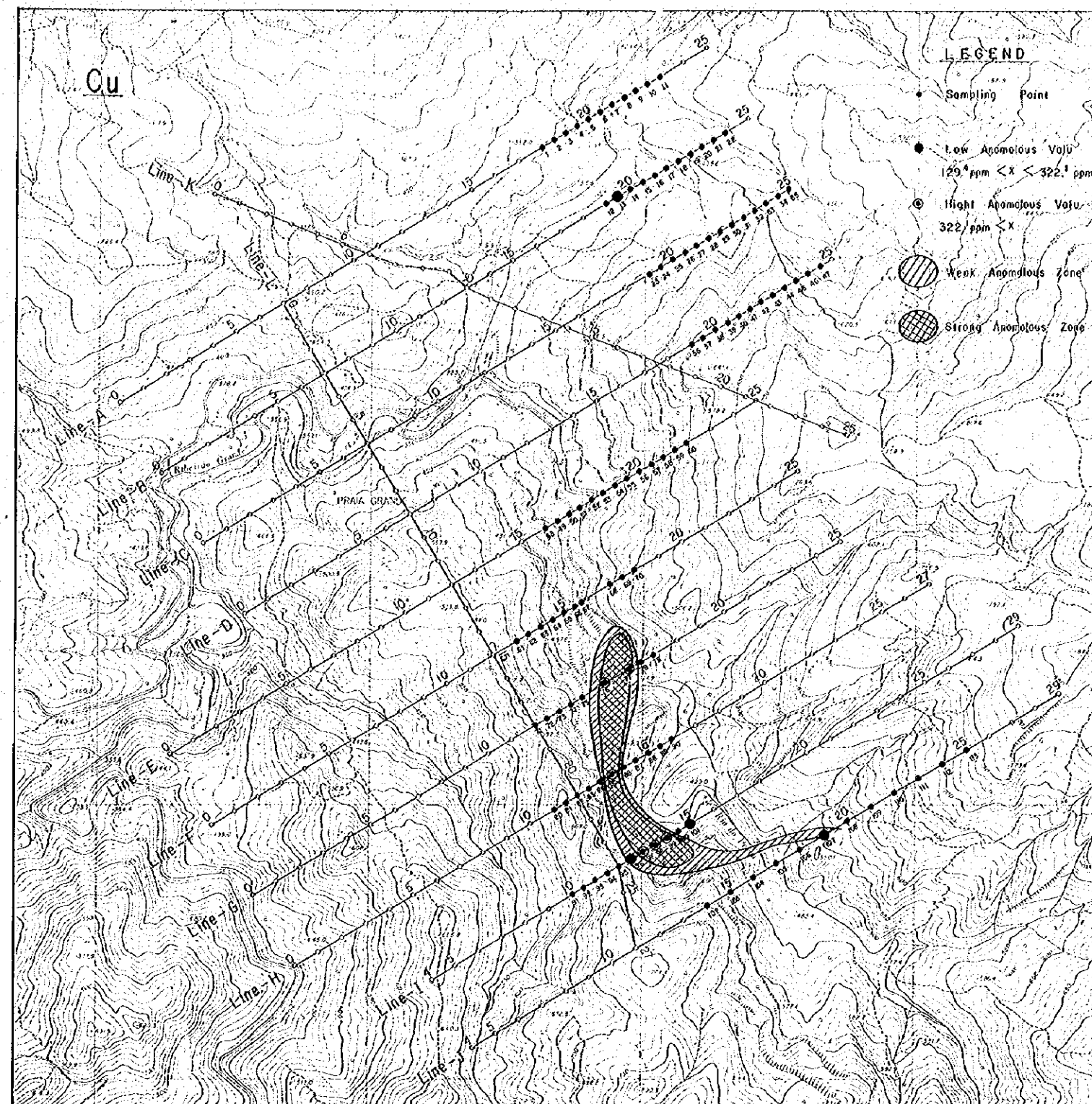
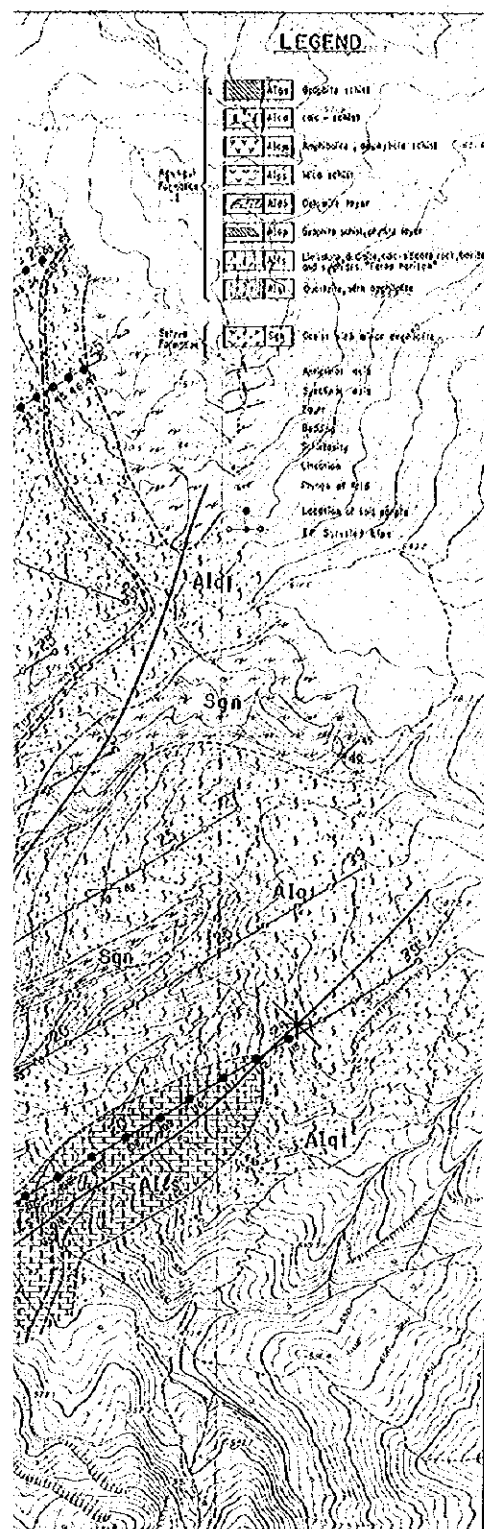
BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geochemical Anomaly Maps and
Location Map of Soil Samples in Perau Area
(Cu , Pb , Zn)

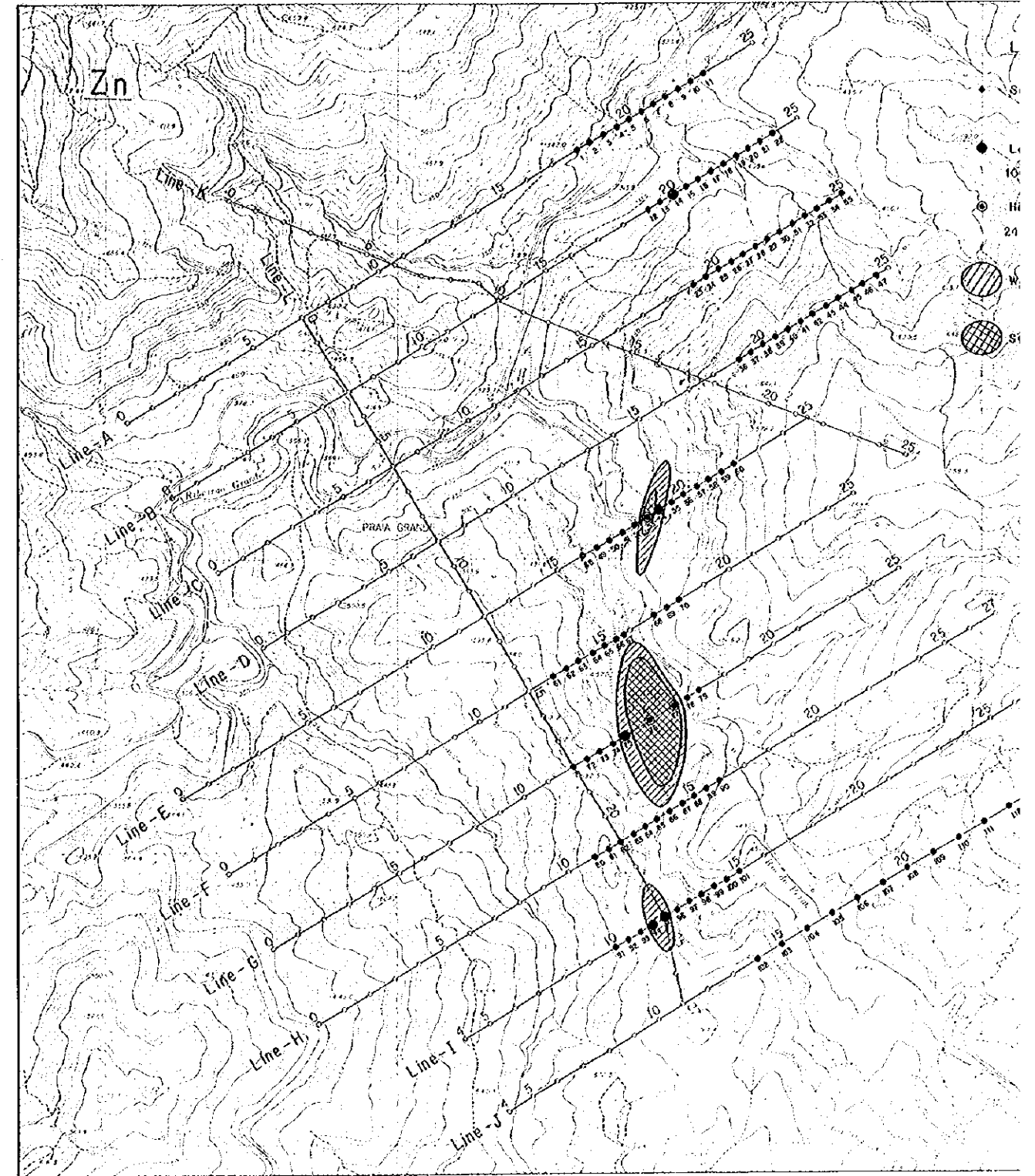
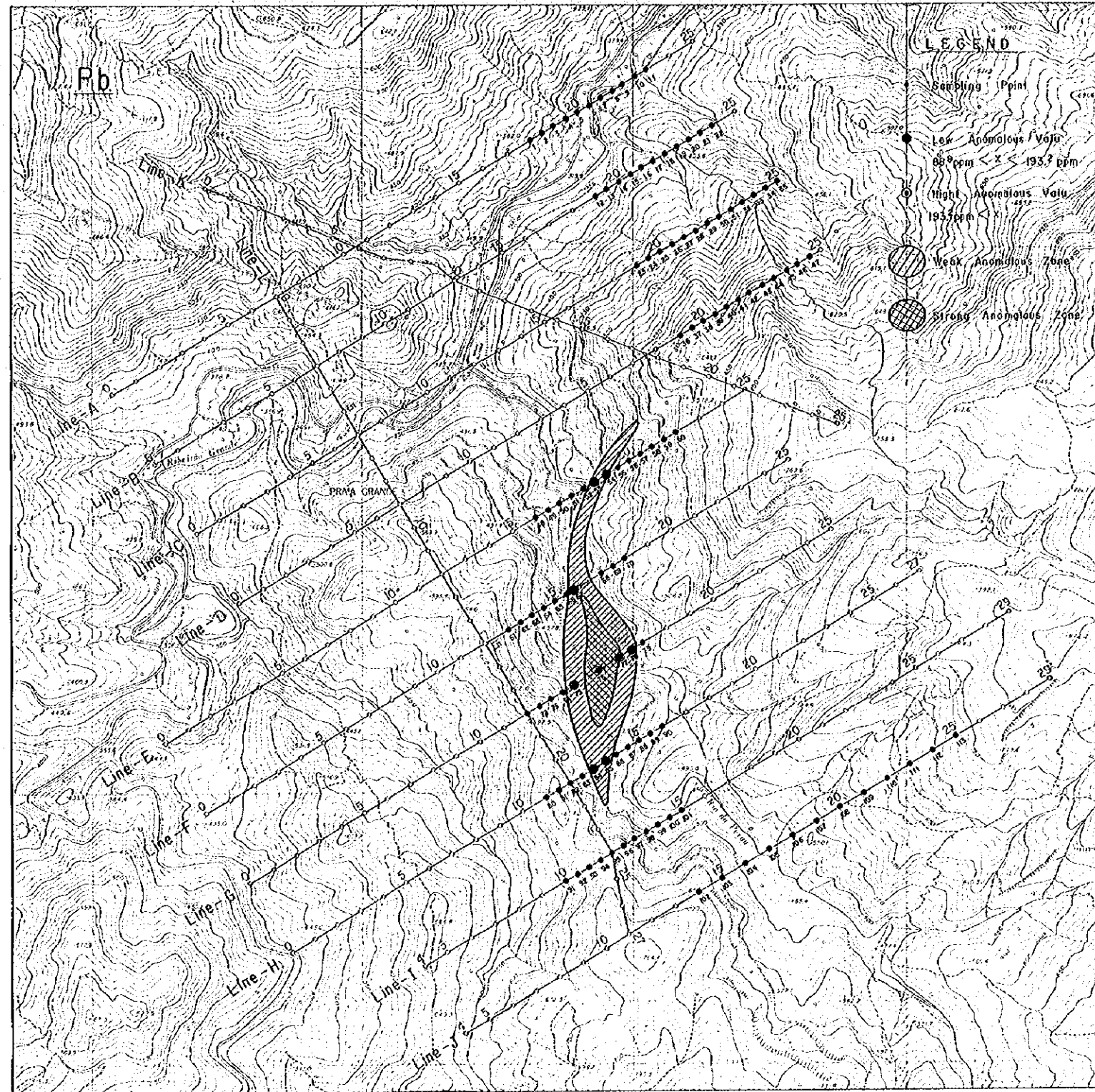
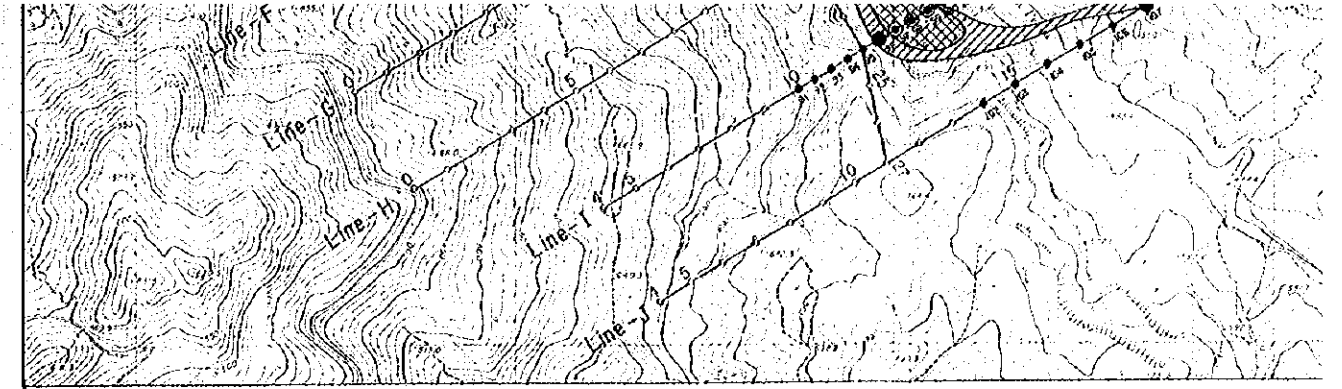
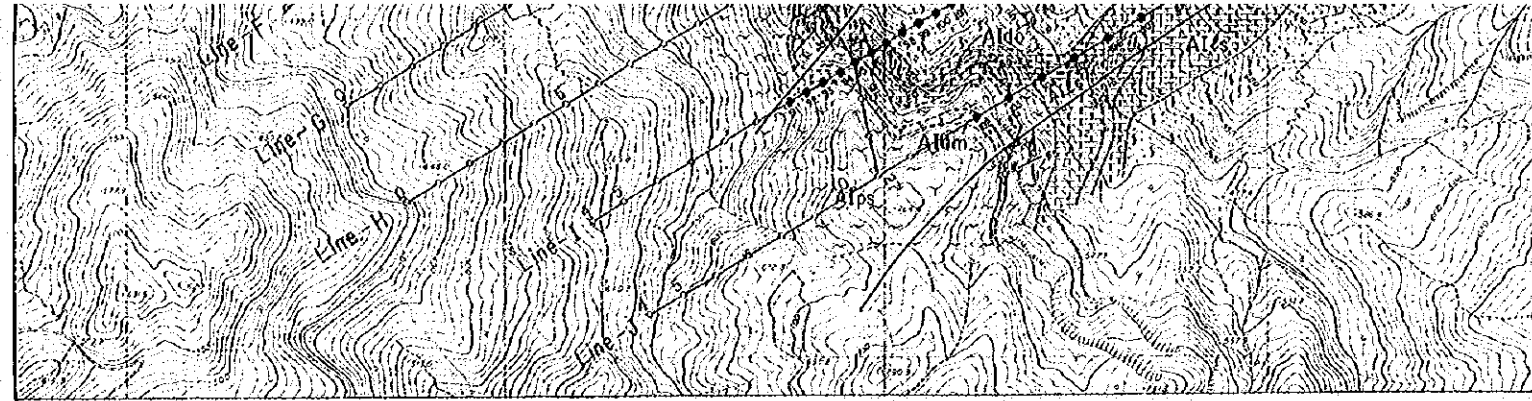


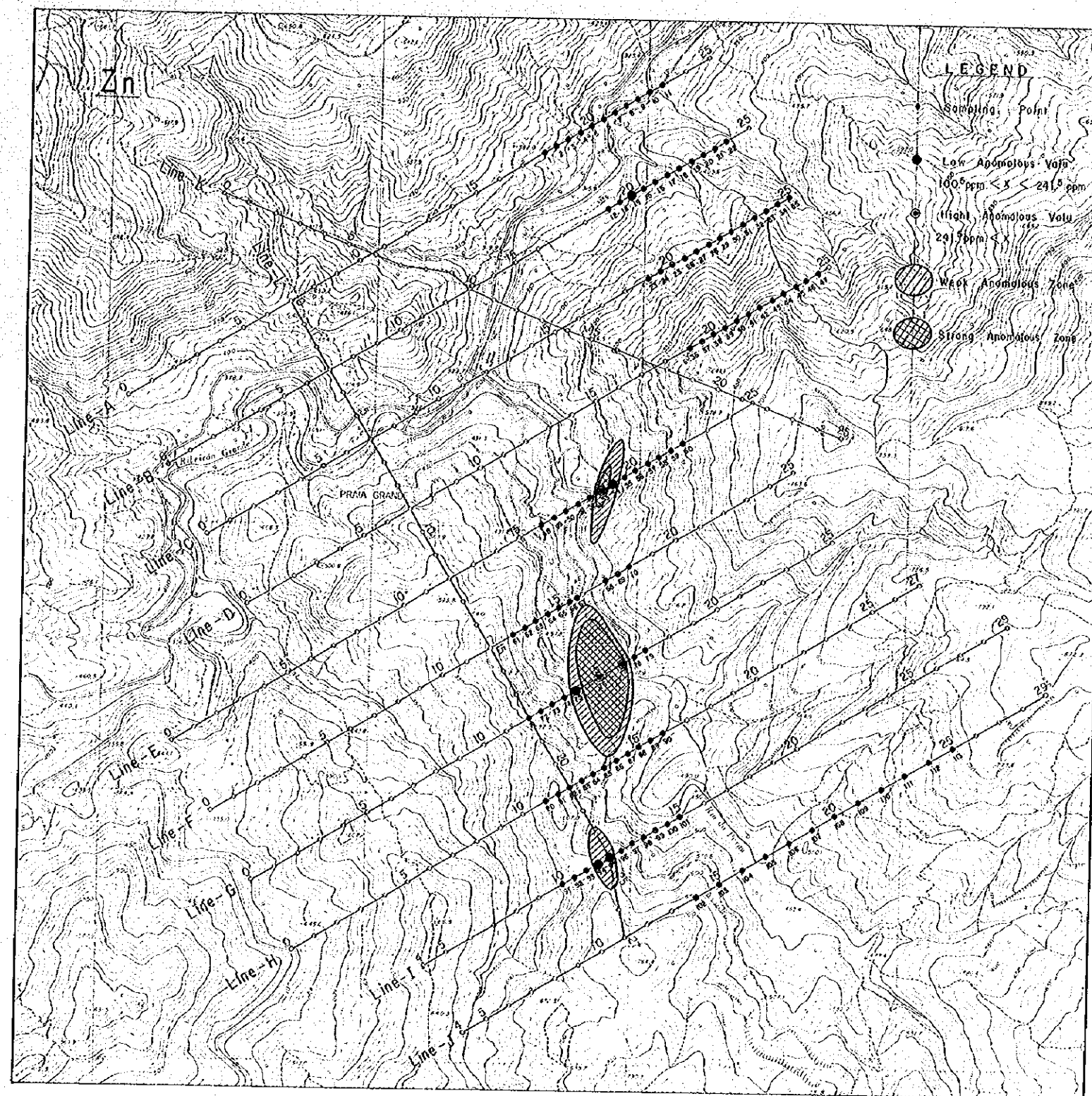
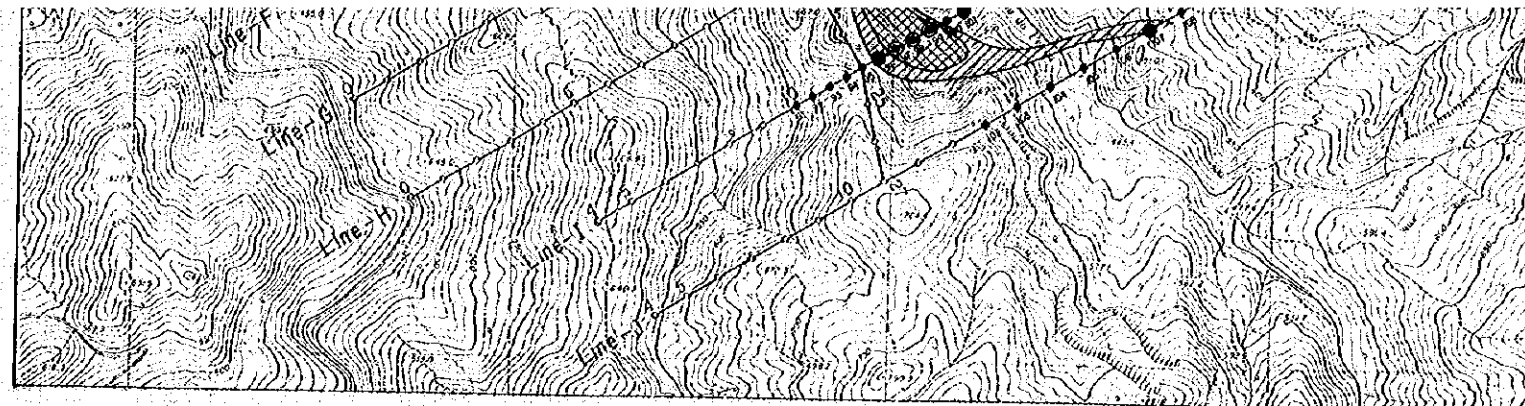
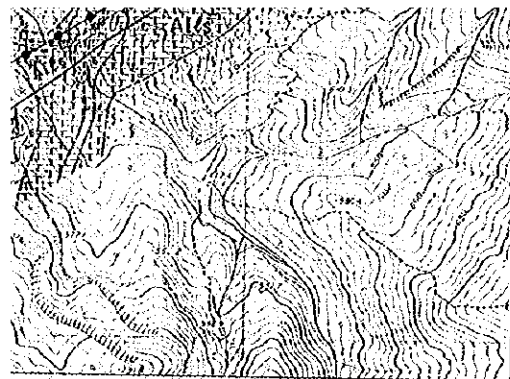
METAL MINING AGENCY OF JAPAN
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MAR. 1982
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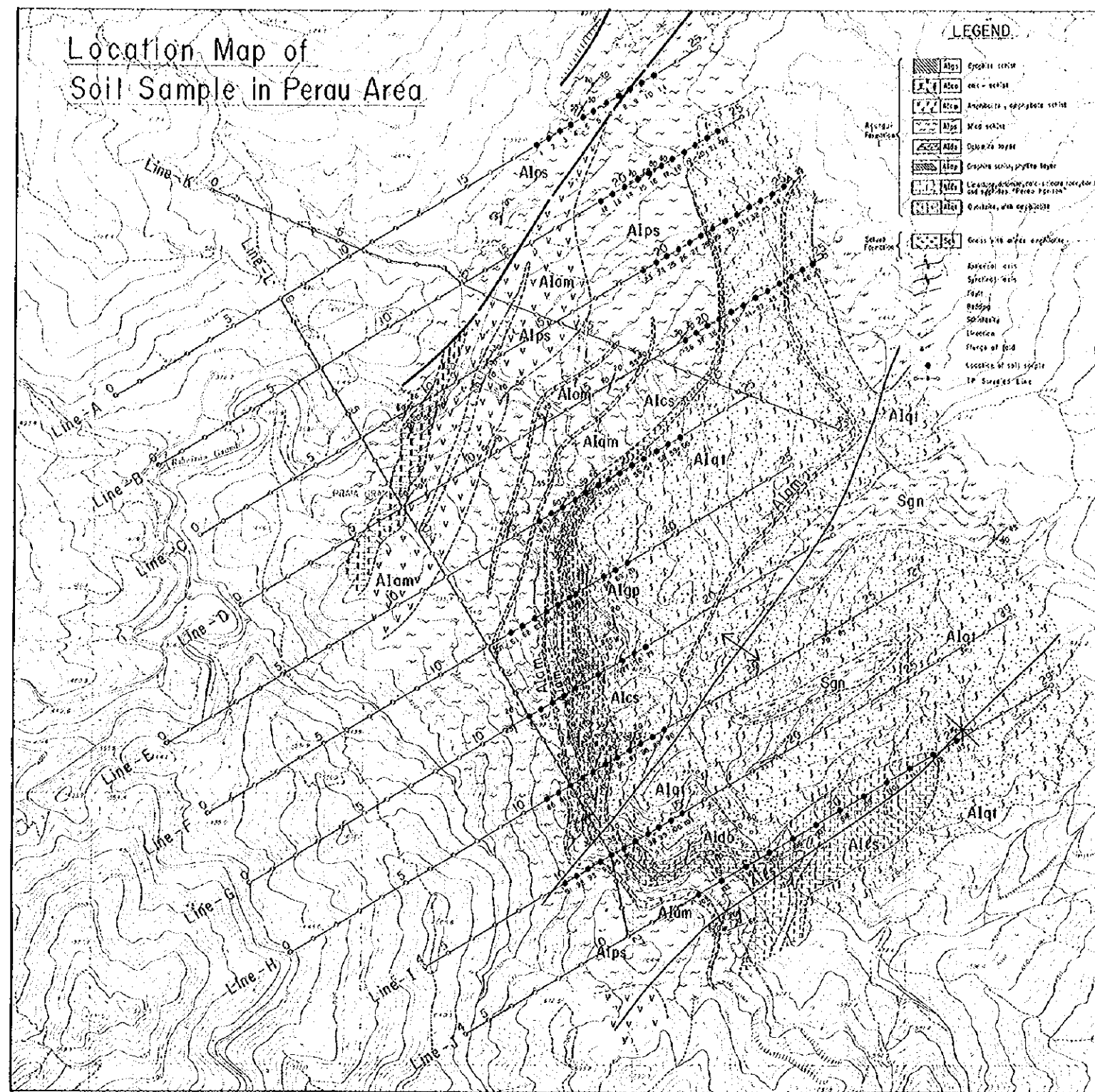
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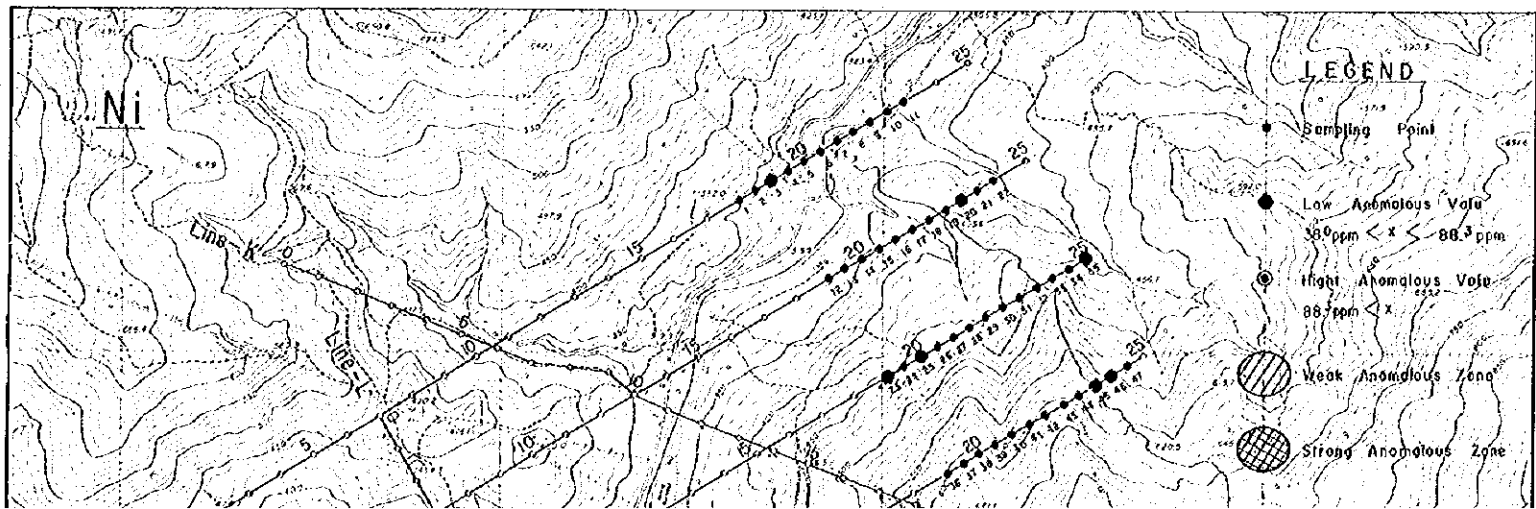
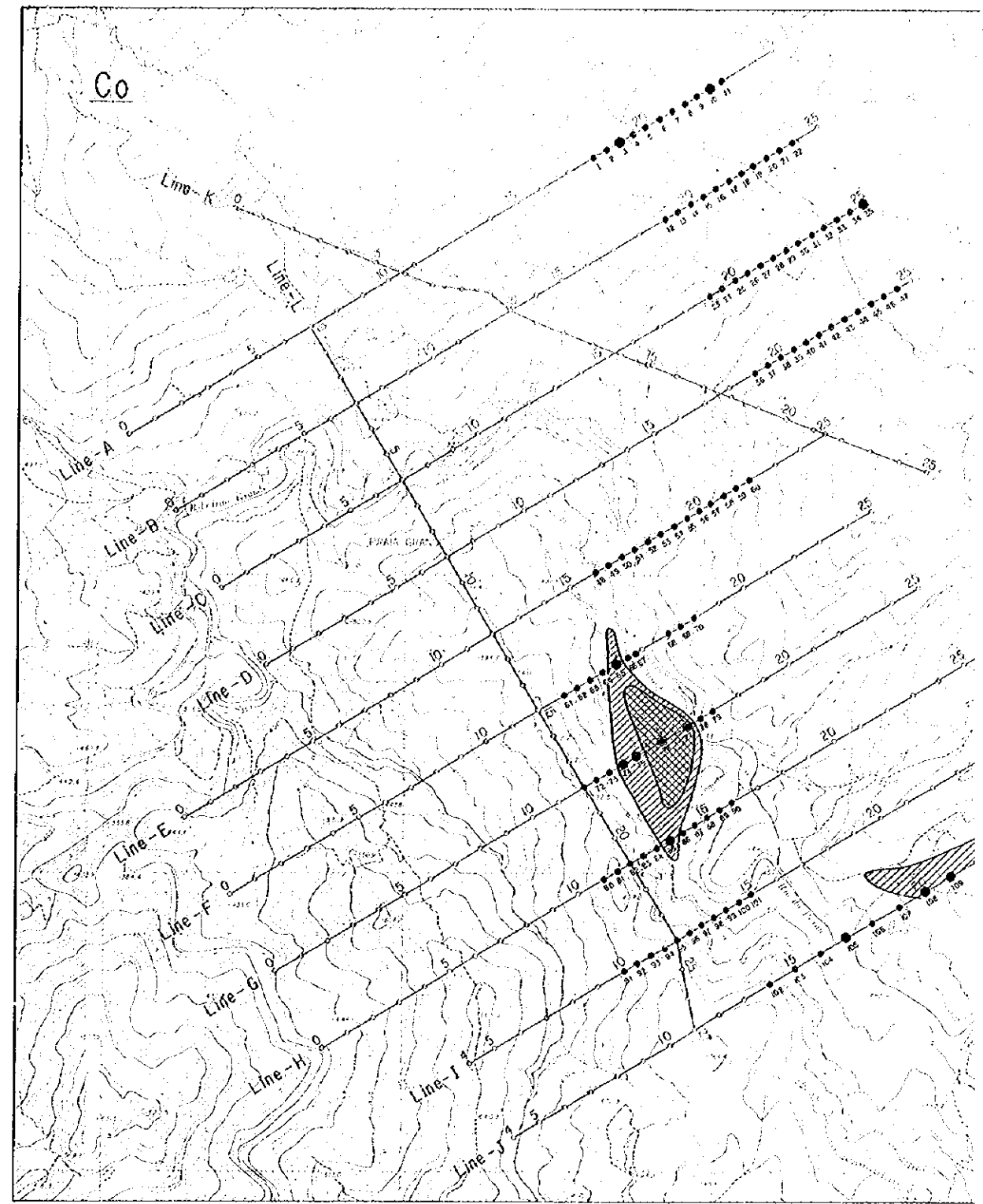




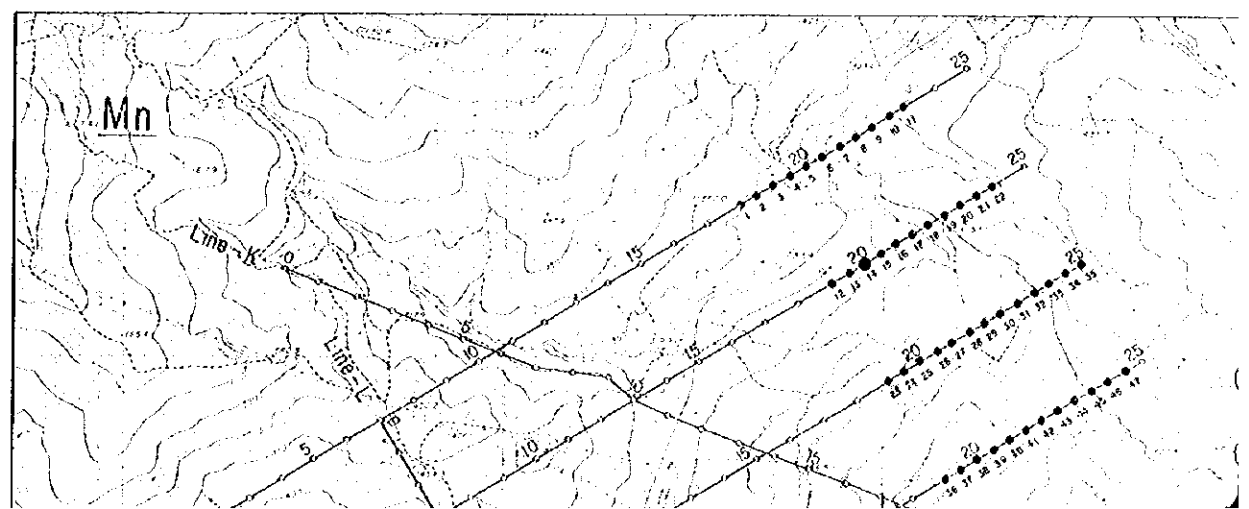
Location Map of
Soil Sample in Perau Area



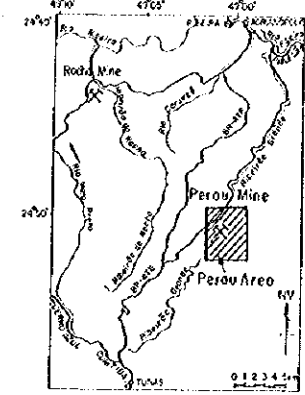
- LEGEND
- Alps (with symbol) Forest cover
 - Alom (with symbol) Rice field
 - Alcs (with symbol) Rubber, oil palm, etc.
 - Alqi (with symbol) Mixed forest
 - Sgn (with symbol) Open field
 - Alps (with symbol) Open field, grassy field
 - Alom (with symbol) Open field, grassy field
 - Alcs (with symbol) Open field, grassy field
 - Alqi (with symbol) Open field, grassy field
 - Sgn (with symbol) Open field, grassy field
 - Alps (with symbol) Open field, grassy field
 - Alom (with symbol) Open field, grassy field
 - Alcs (with symbol) Open field, grassy field
 - Alqi (with symbol) Open field, grassy field
 - Sgn (with symbol) Open field, grassy field
 - Alps (with symbol) Open field, grassy field
 - Alom (with symbol) Open field, grassy field
 - Alcs (with symbol) Open field, grassy field
 - Alqi (with symbol) Open field, grassy field
 - Sgn (with symbol) Open field, grassy field



- LEGEND
- Sampling Point
 - Low Anomalous Value
 $30 \text{ ppm} < x < 88 \text{ ppm}$
 - High Anomalous Value
 $88 \text{ ppm} < x$
 - Weak Anomalous Zone
 - Strong Anomalous Zone



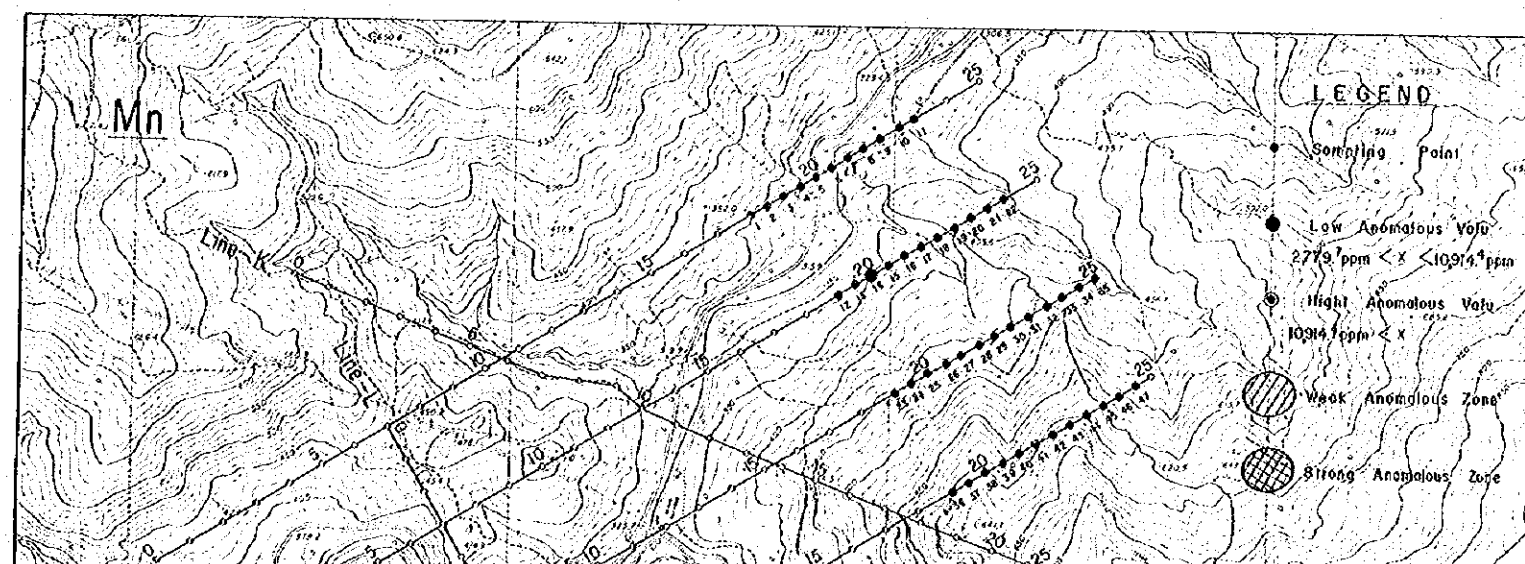
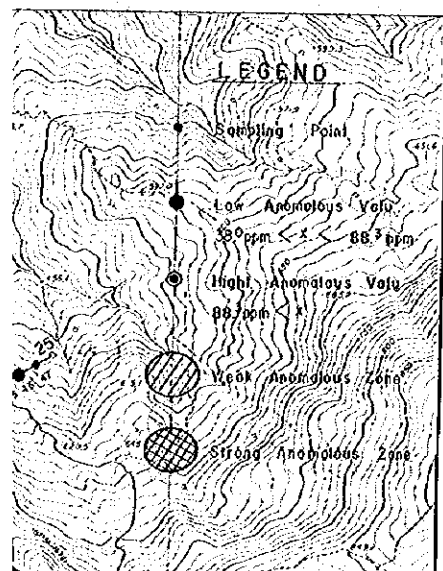
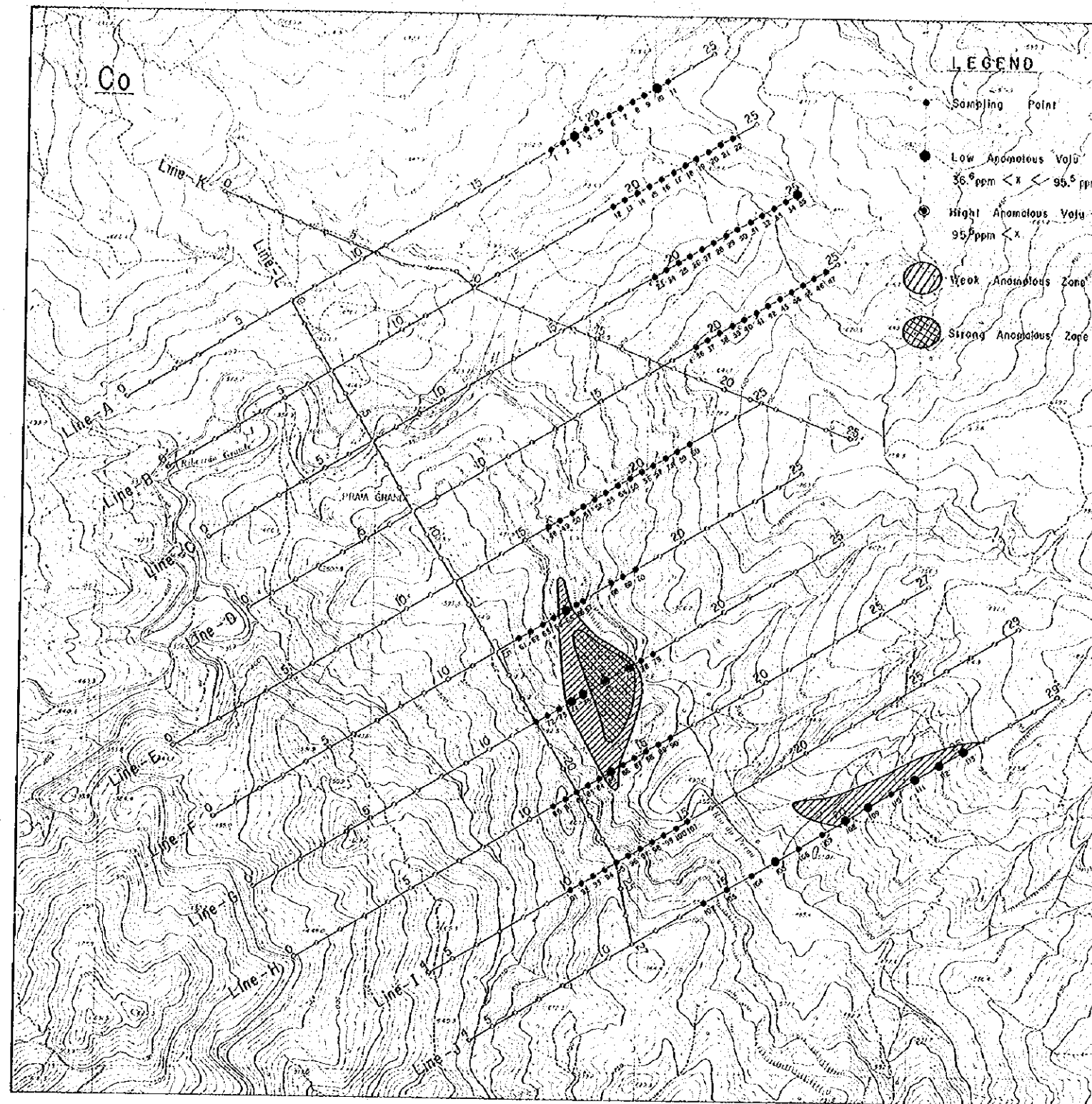
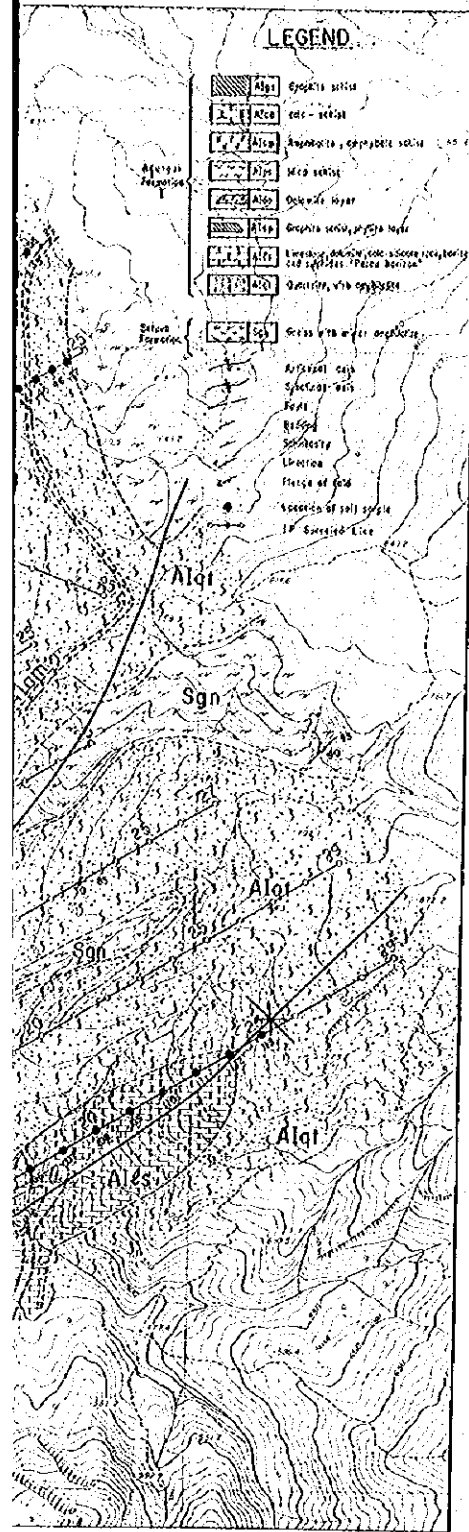
BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II
Geochemical Anomaly Maps and
Location Map of Soil Samples in Perau Area
(Co, Ni, Mn)

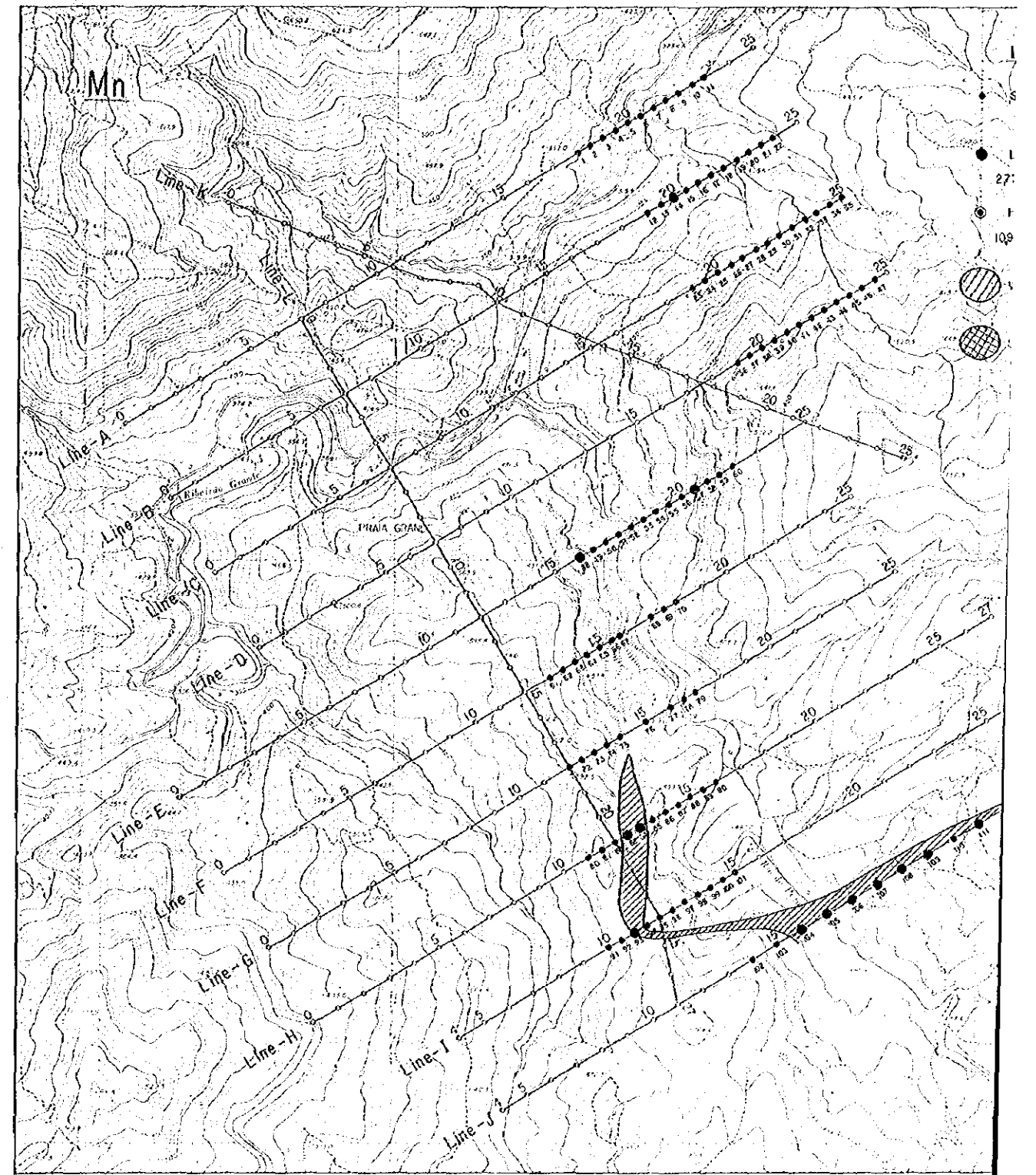
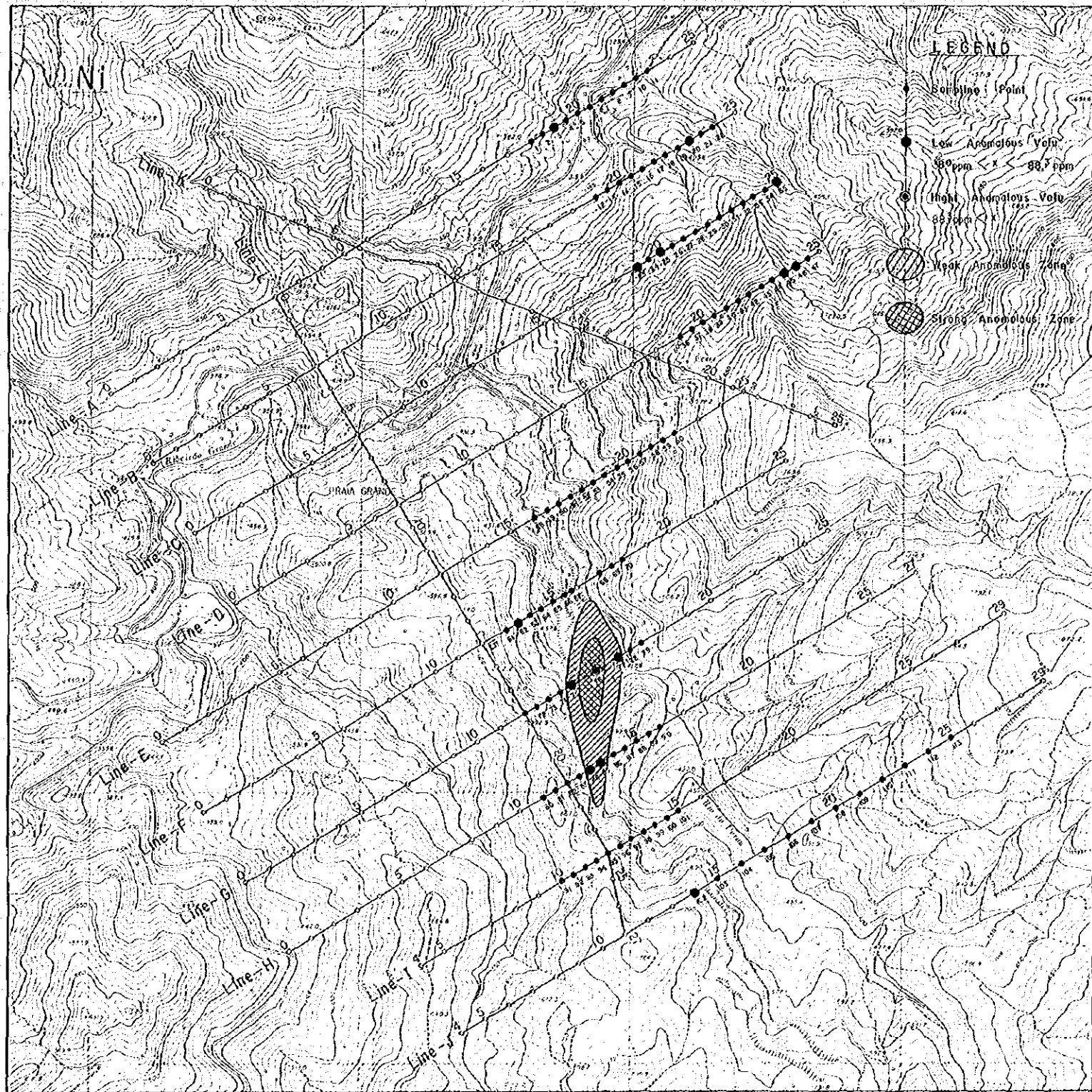
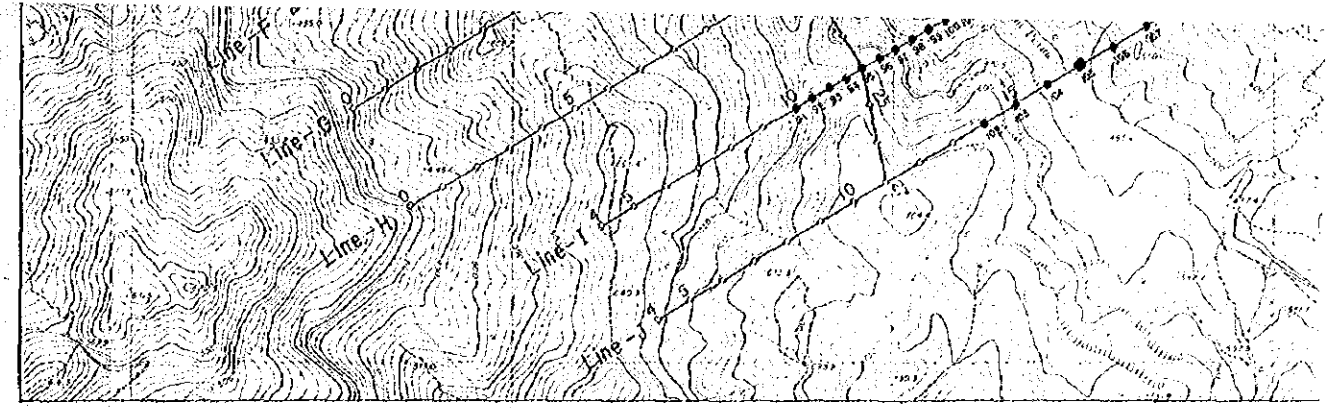
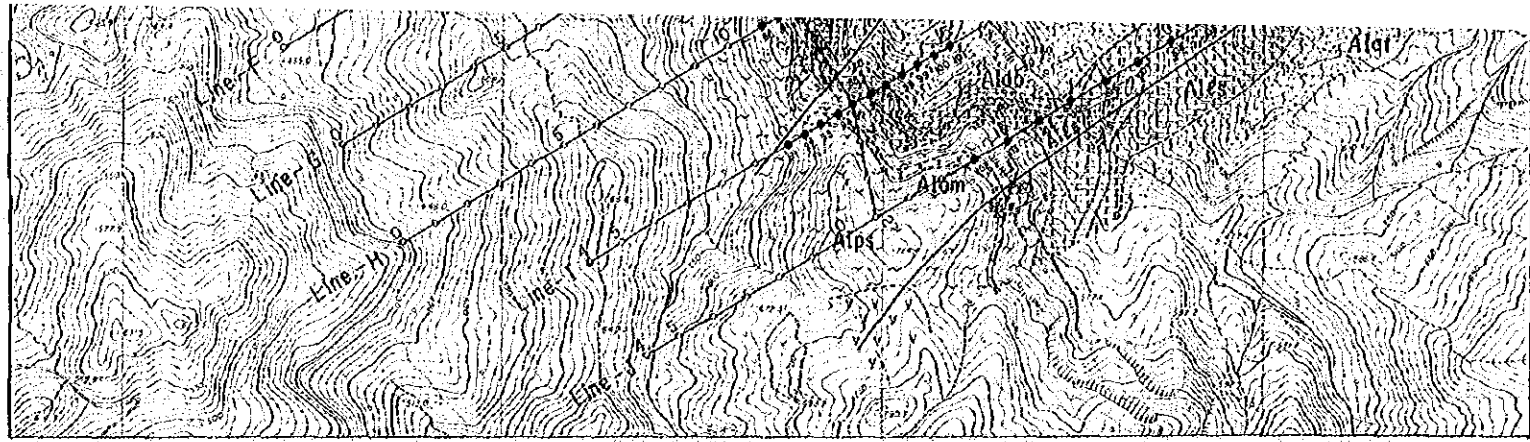


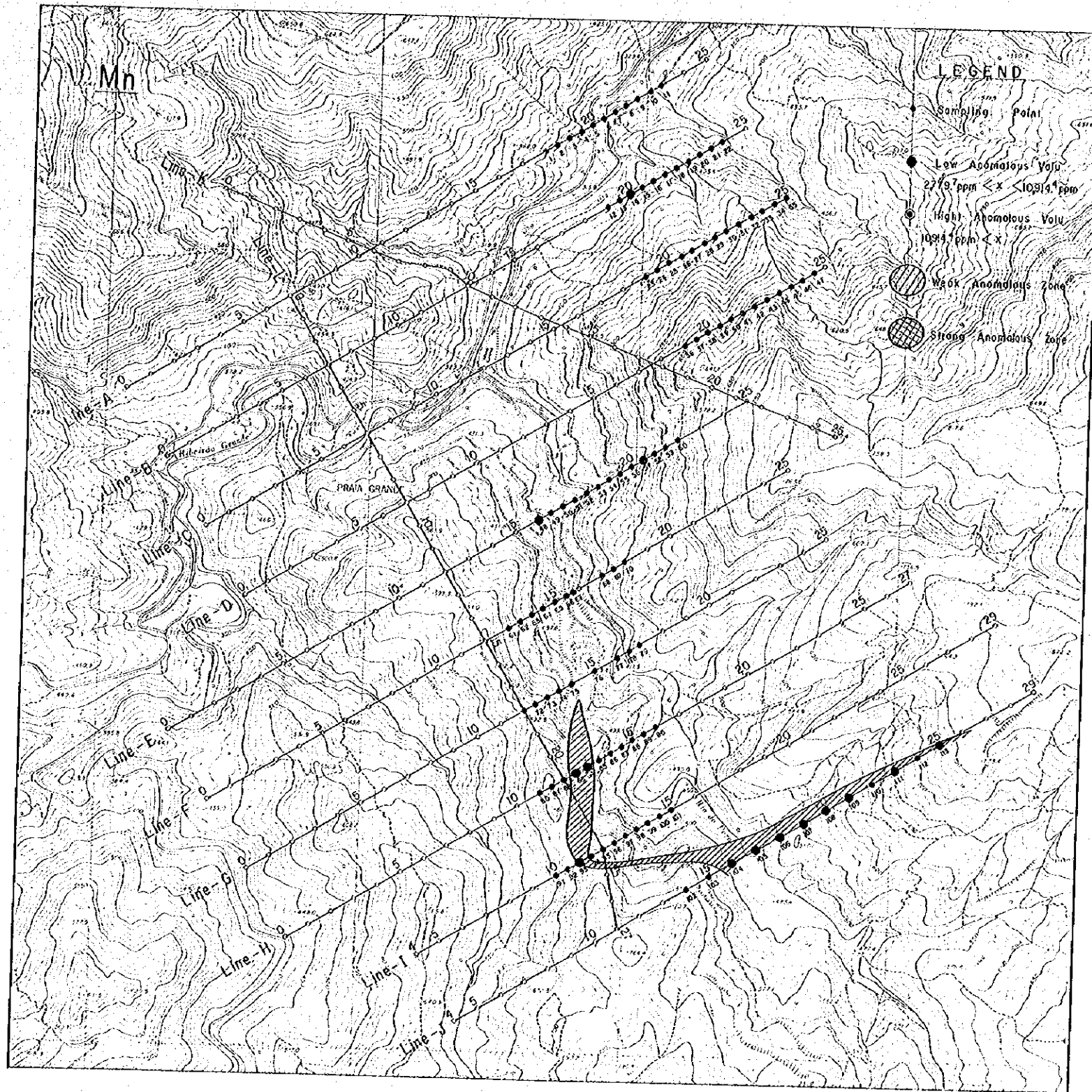
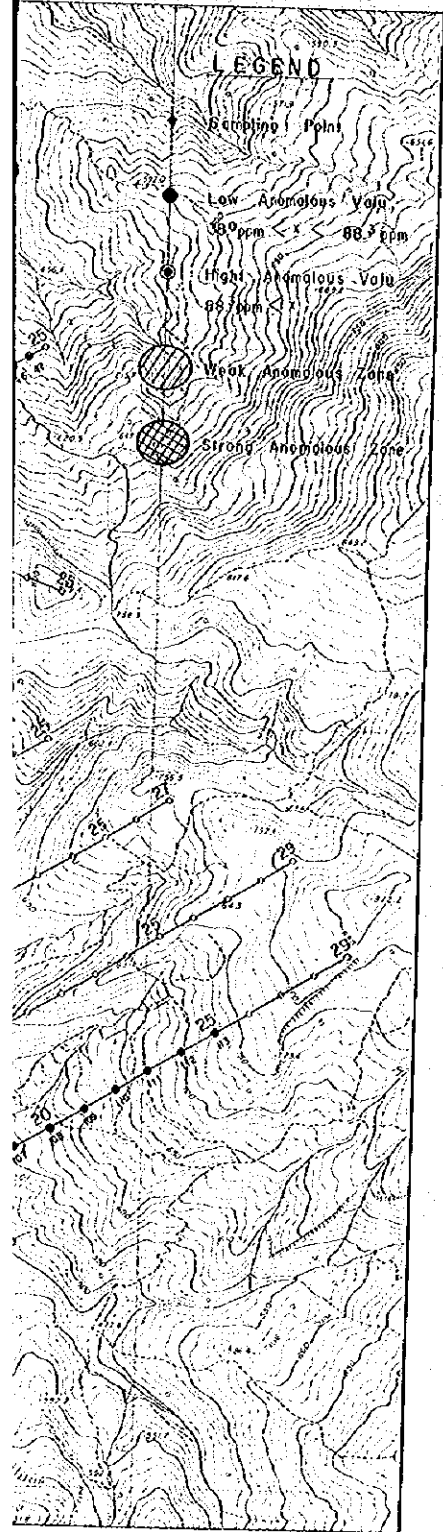
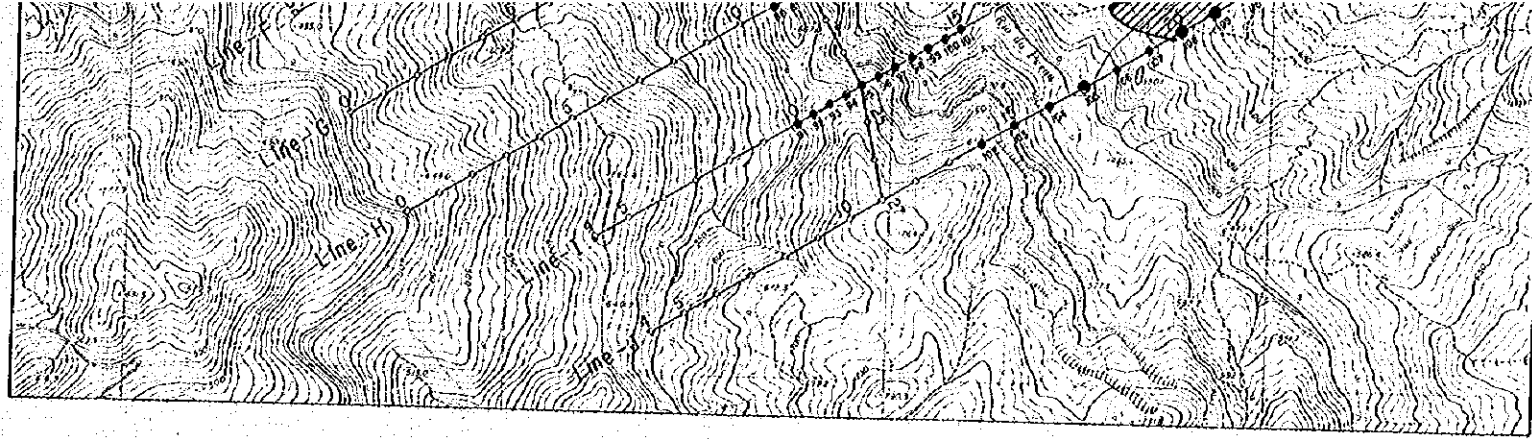
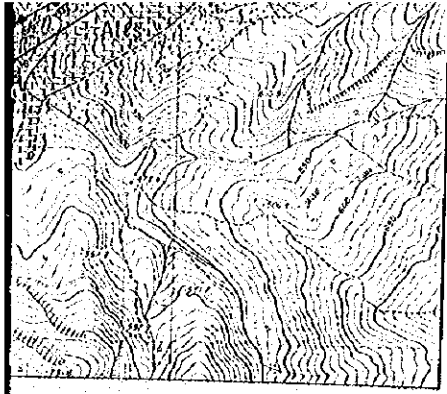
METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

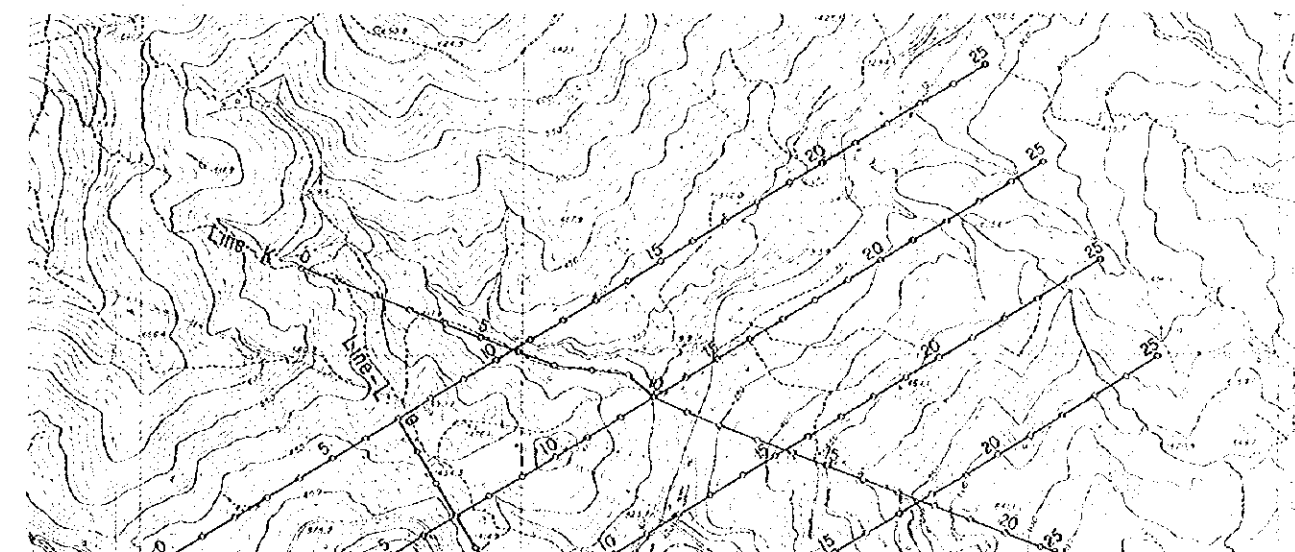
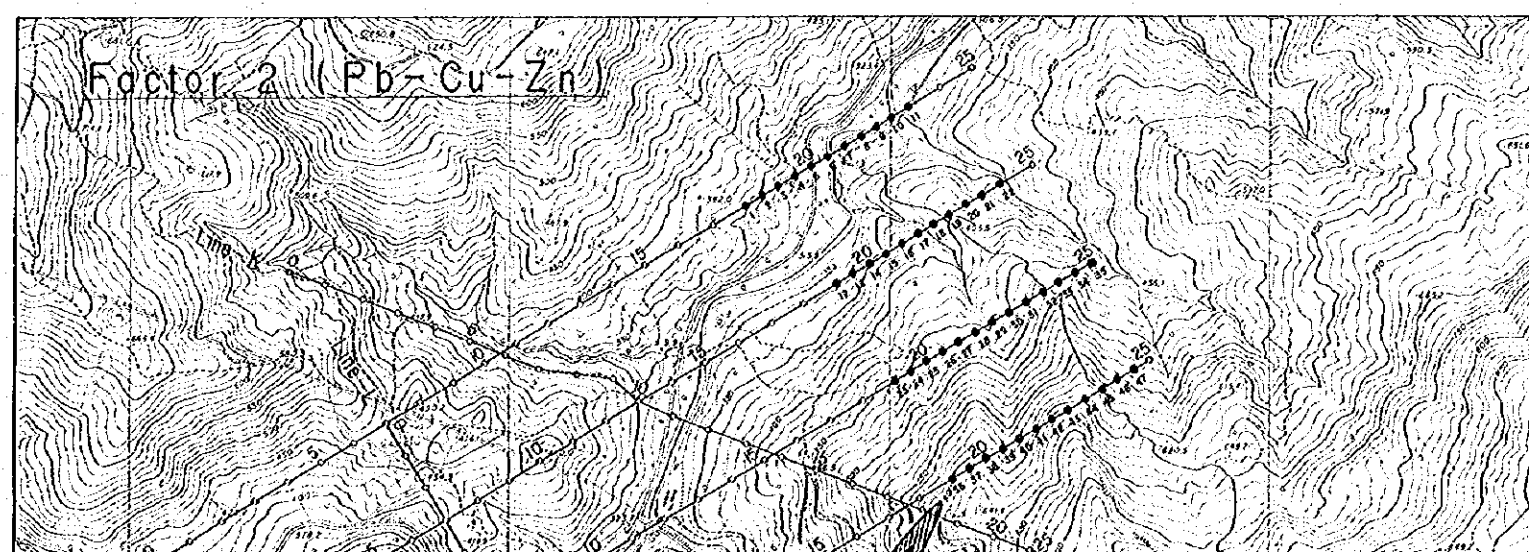
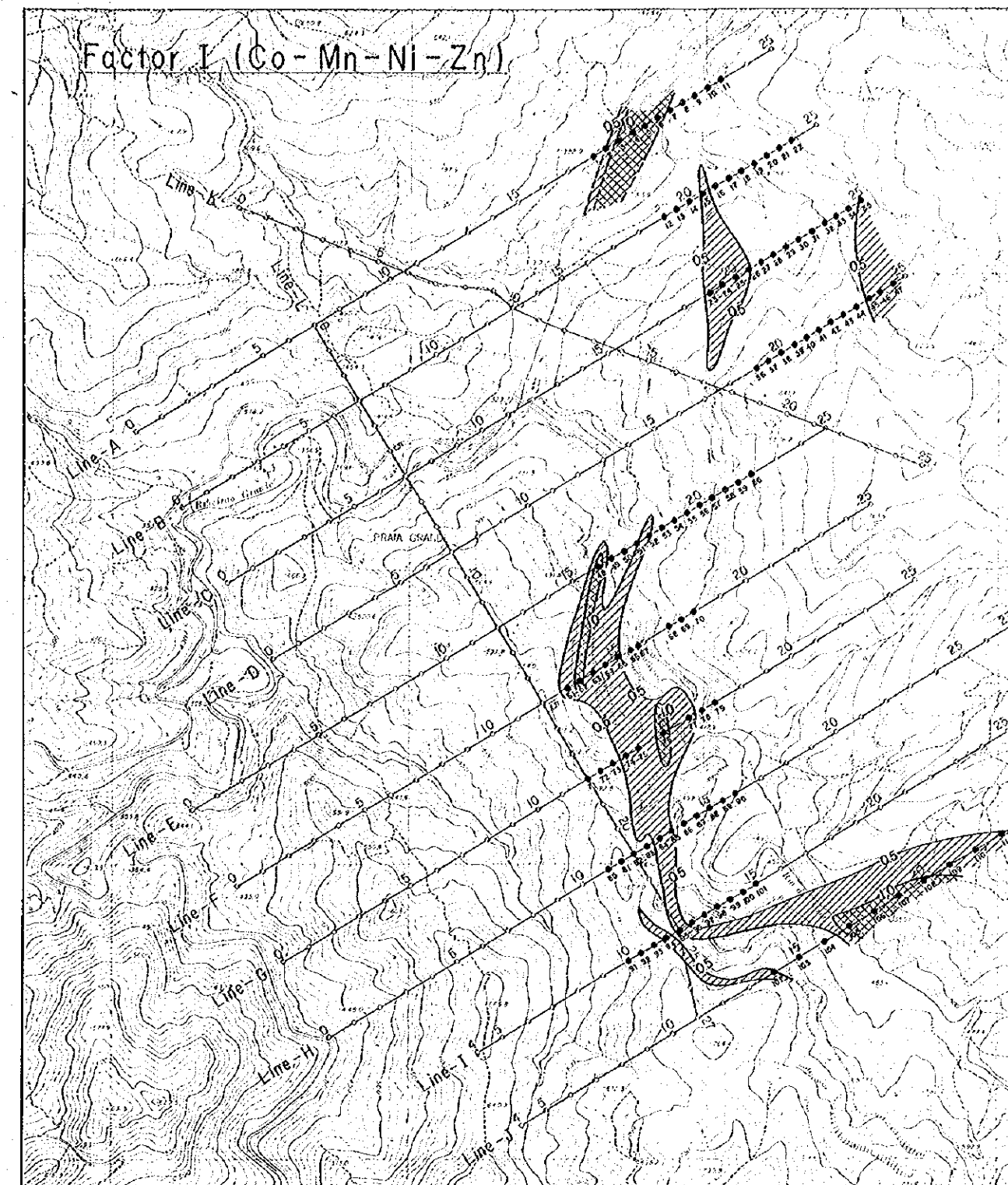
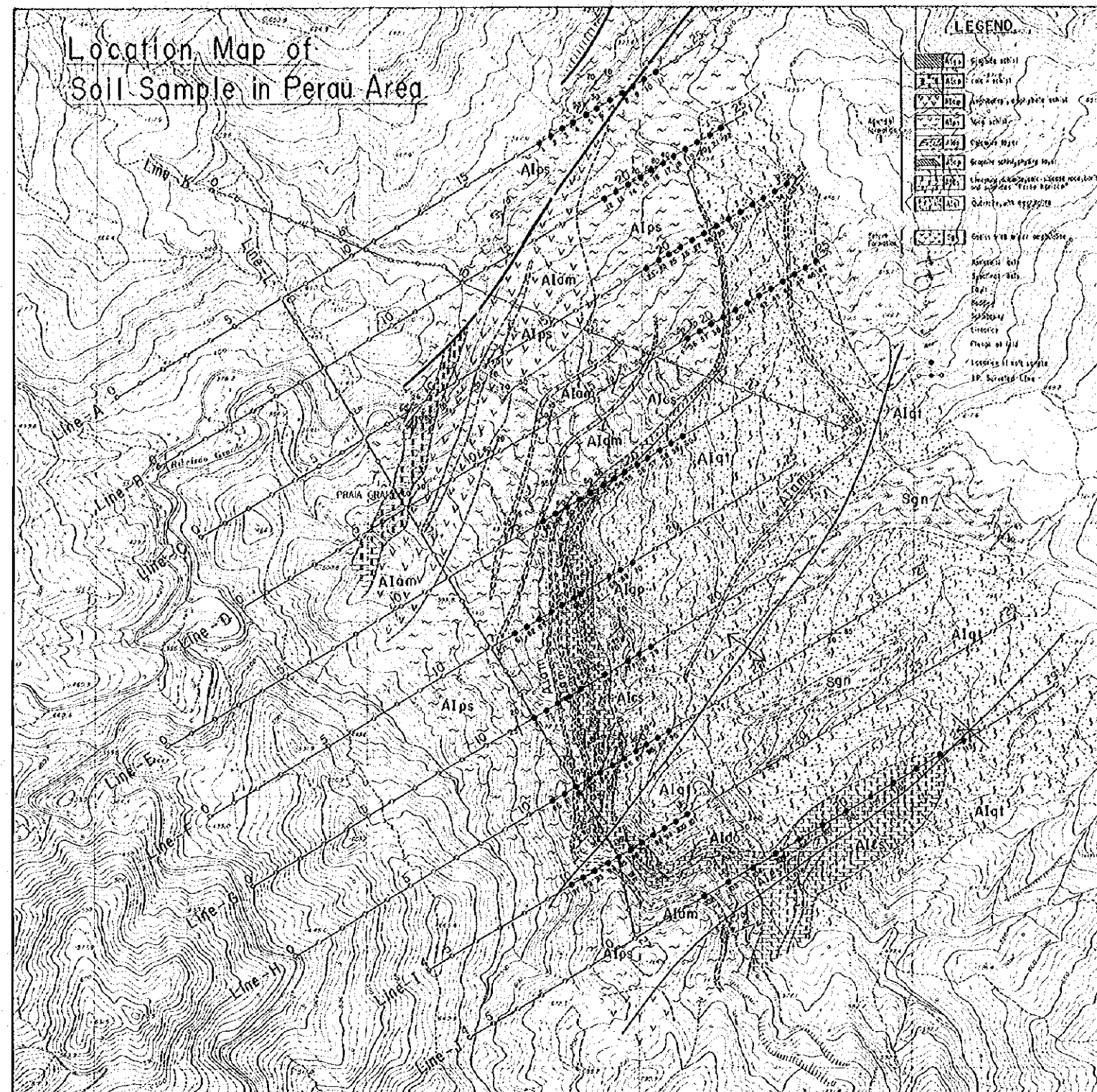
MAR. 1982
Prepared by Bishmetol Exploration Co., Ltd.

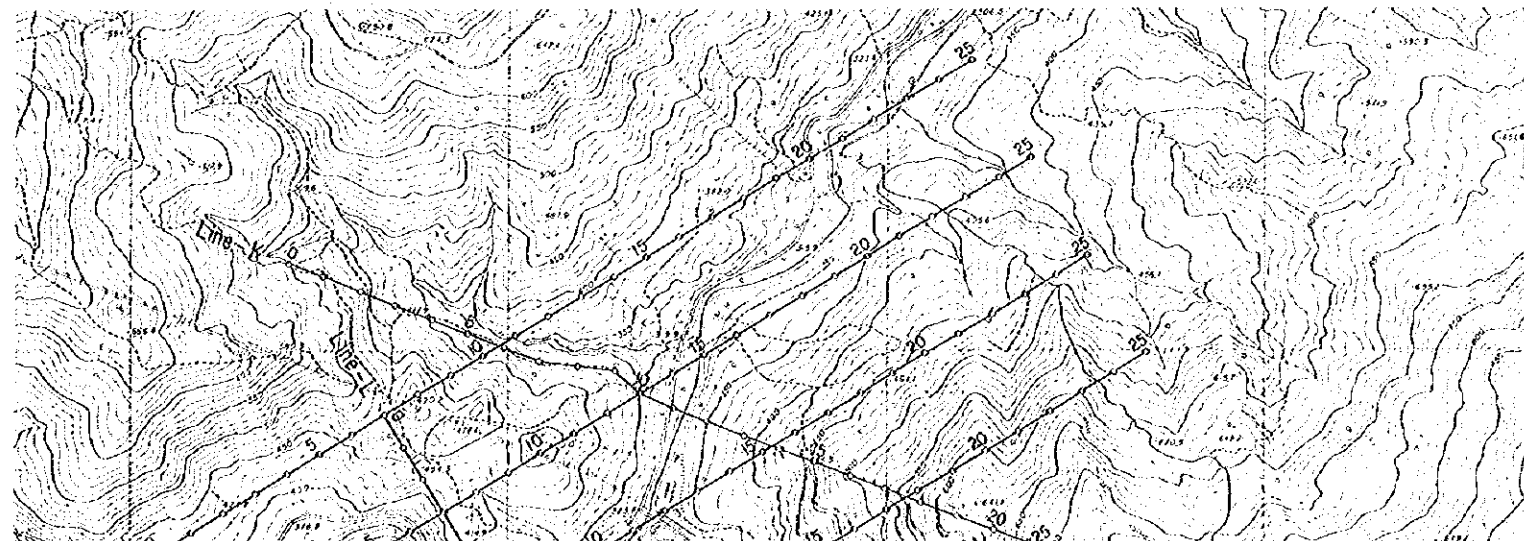
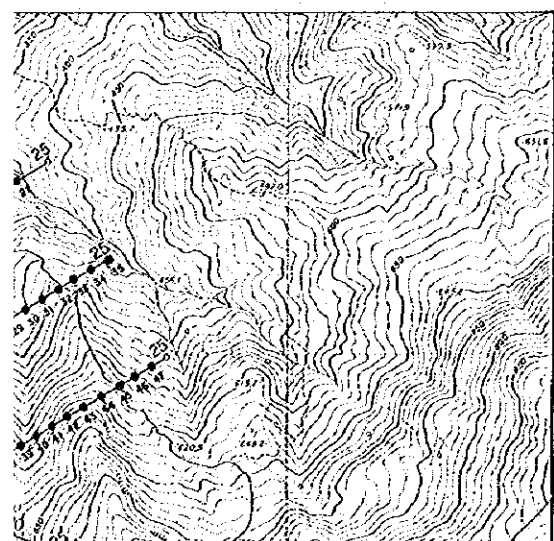
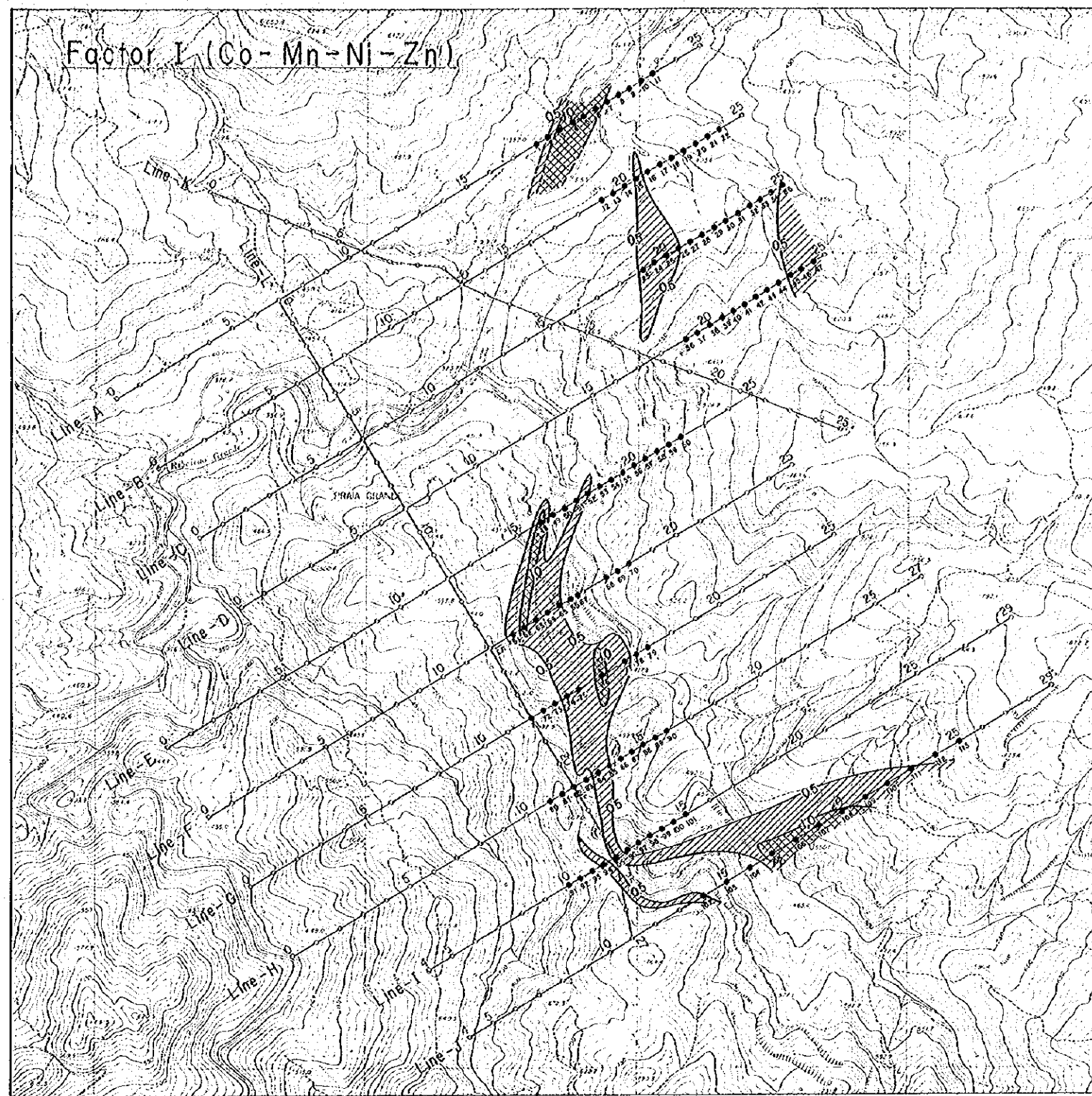
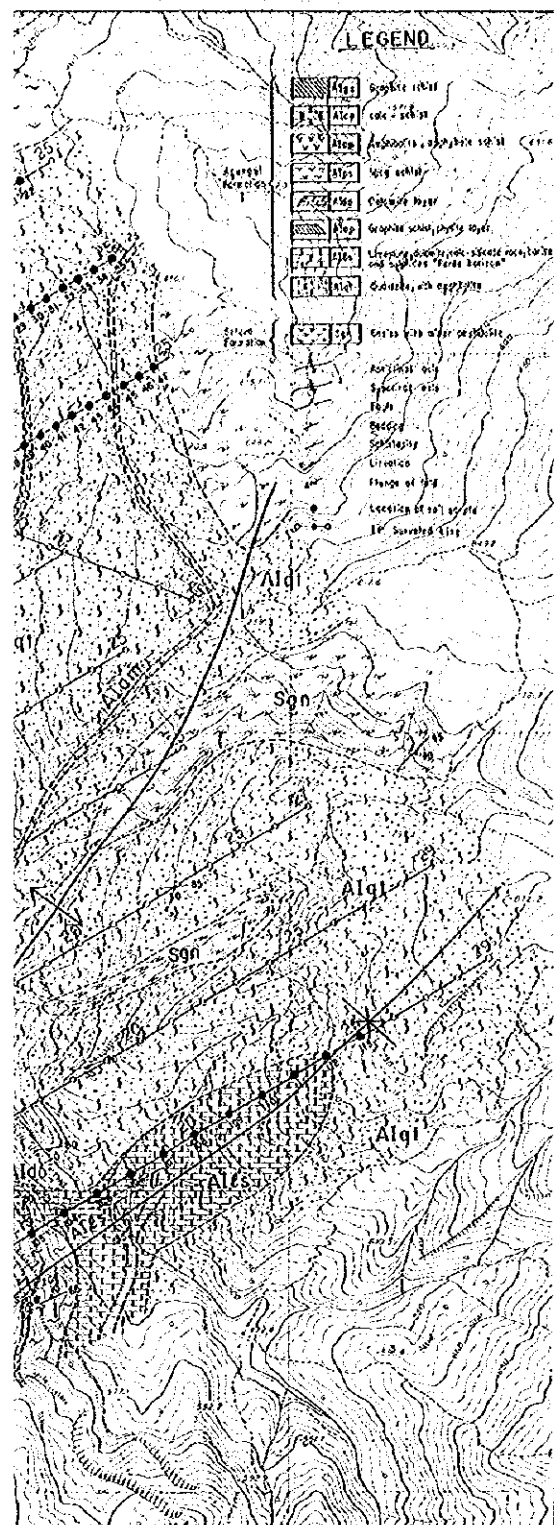
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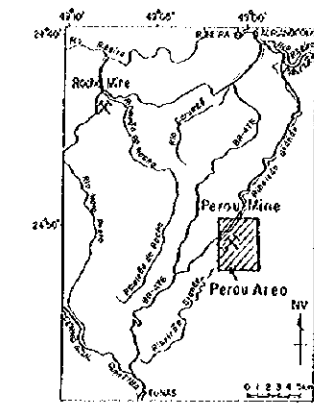






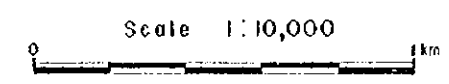
**BRAZIL
GEOLOGICAL SURVEY
OF
ANTA GORDA AREA
PHASE II**

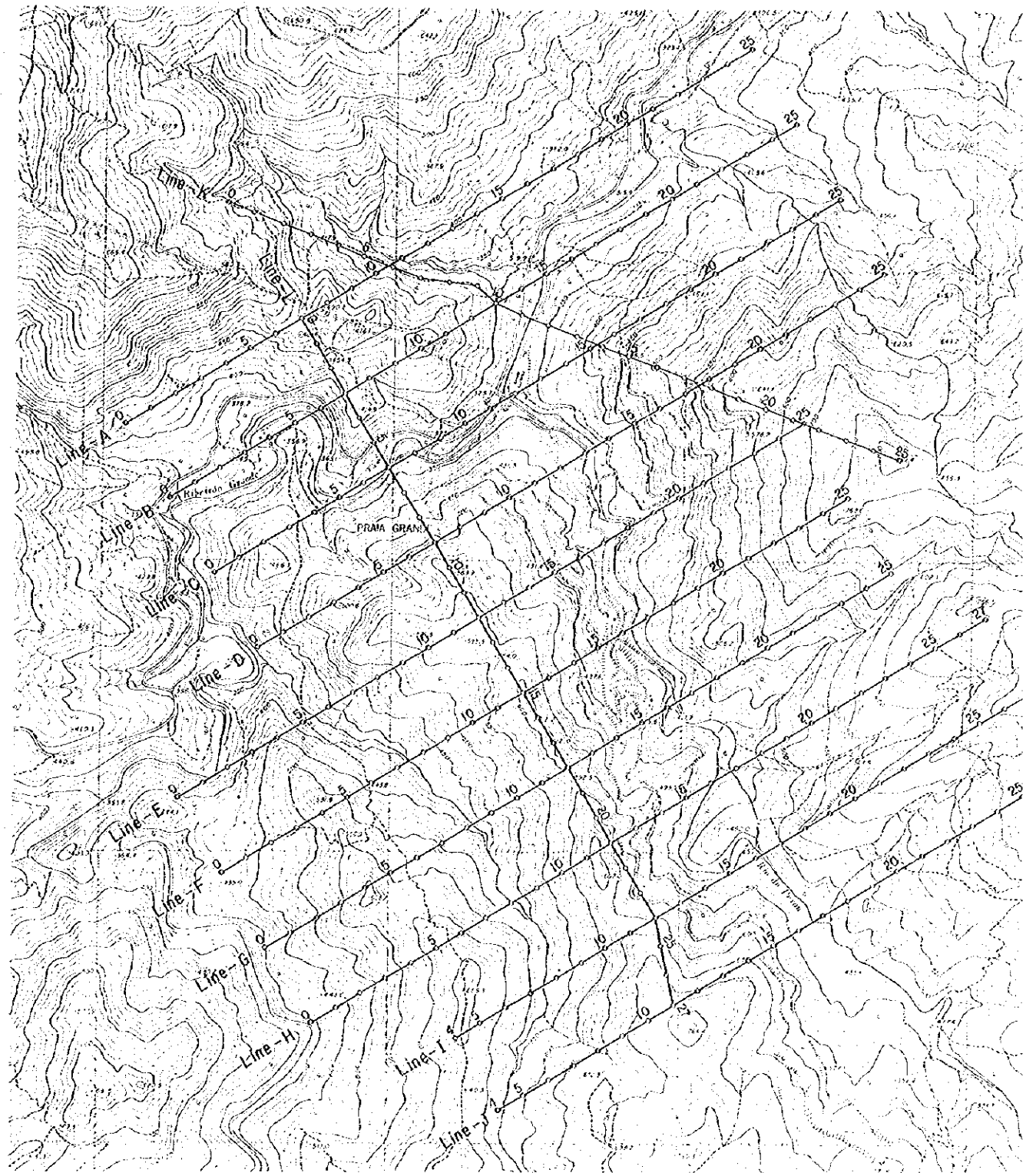
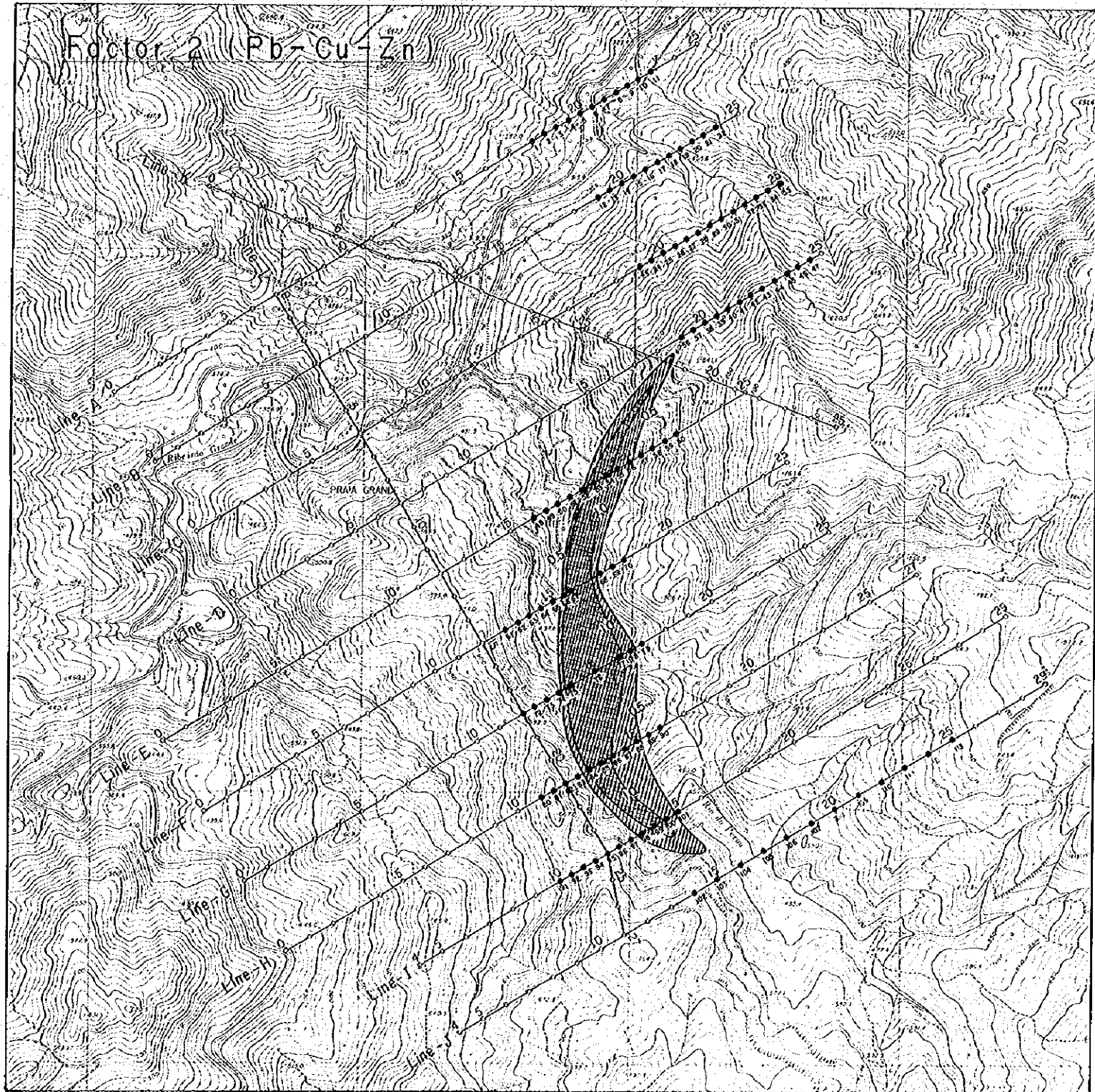
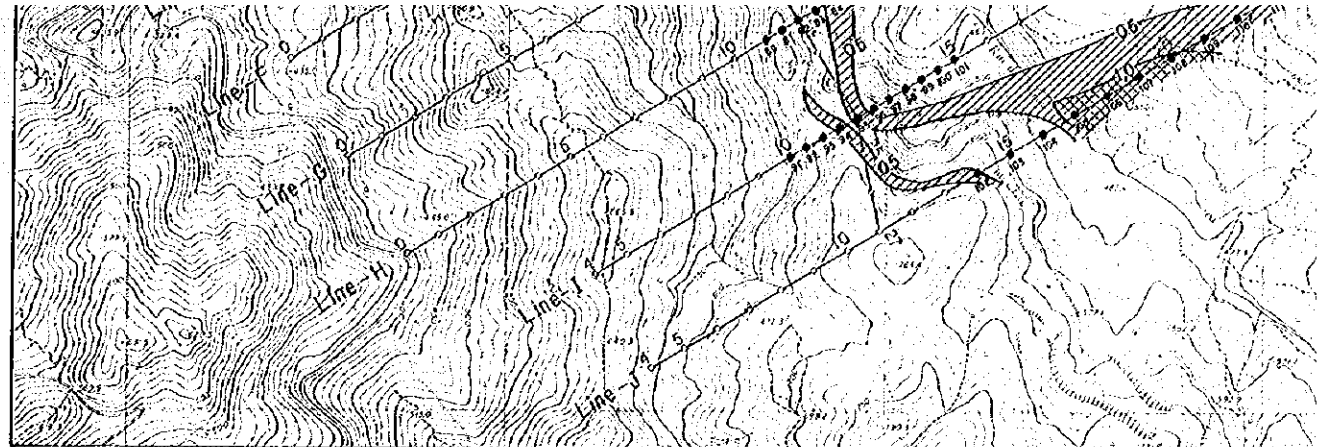
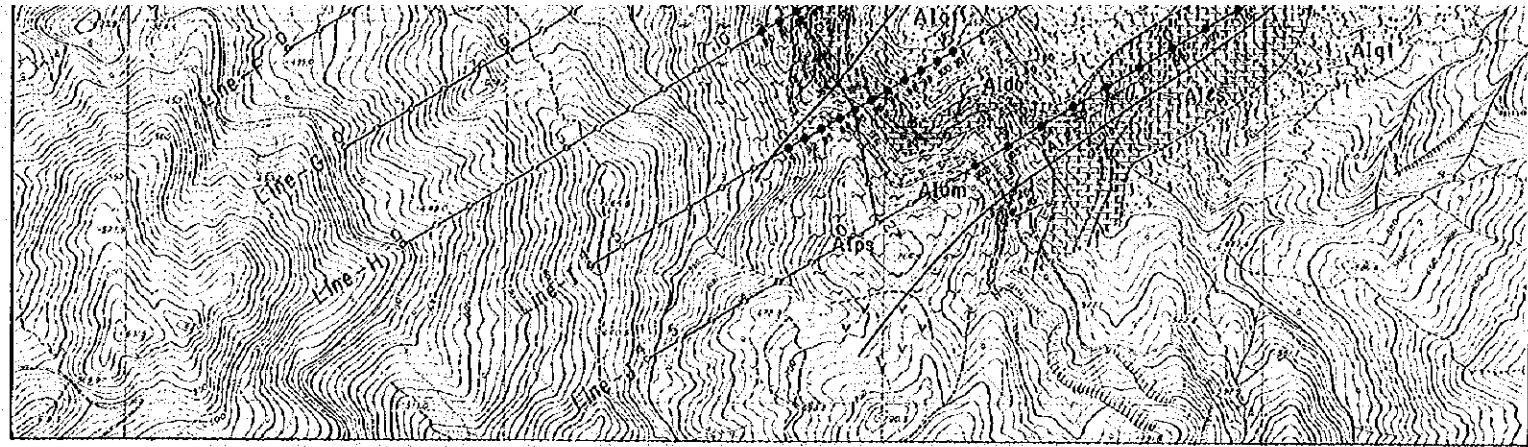
**Geochemical Factor Map of
Soil Samples in Peru Area**

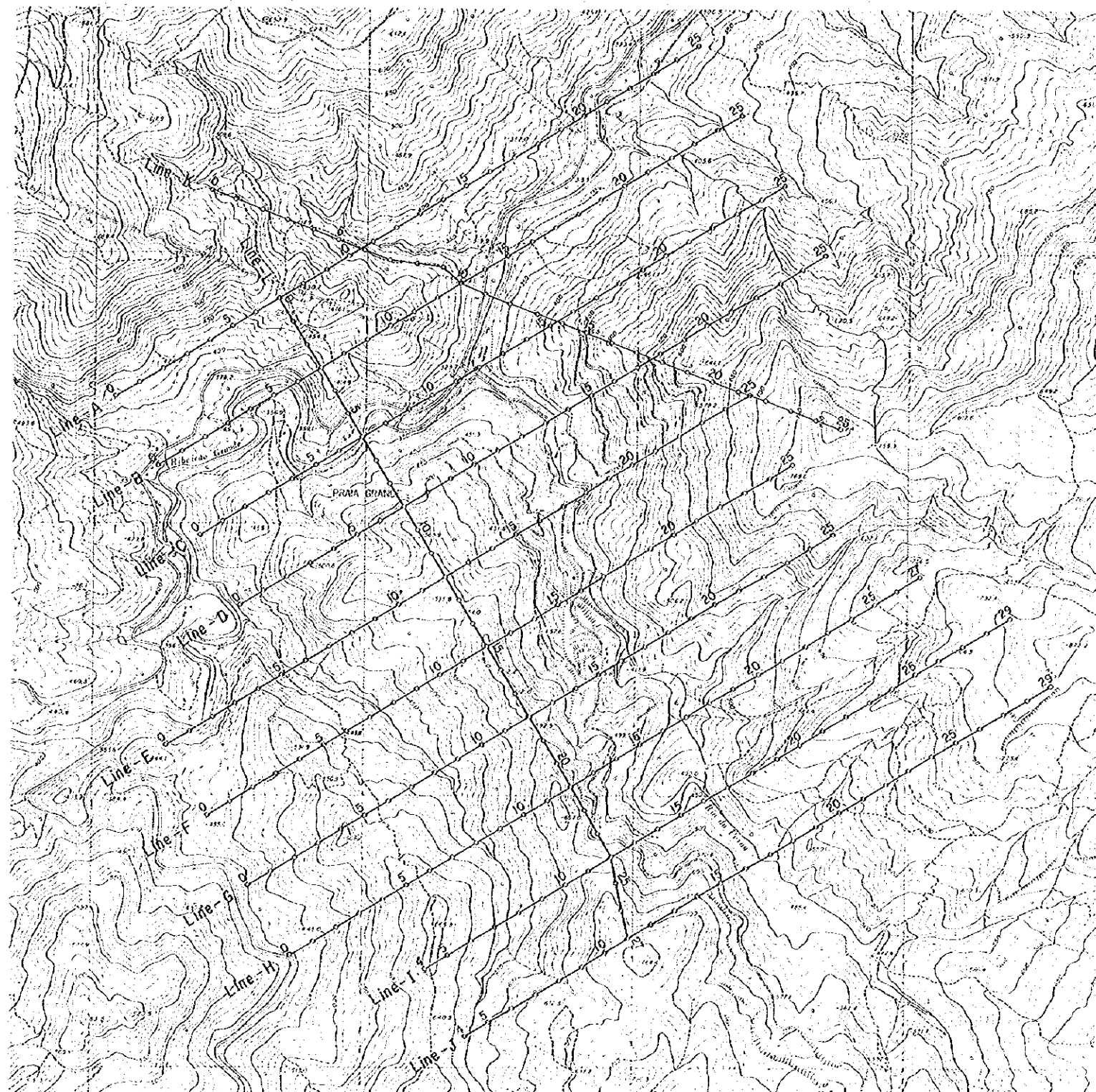
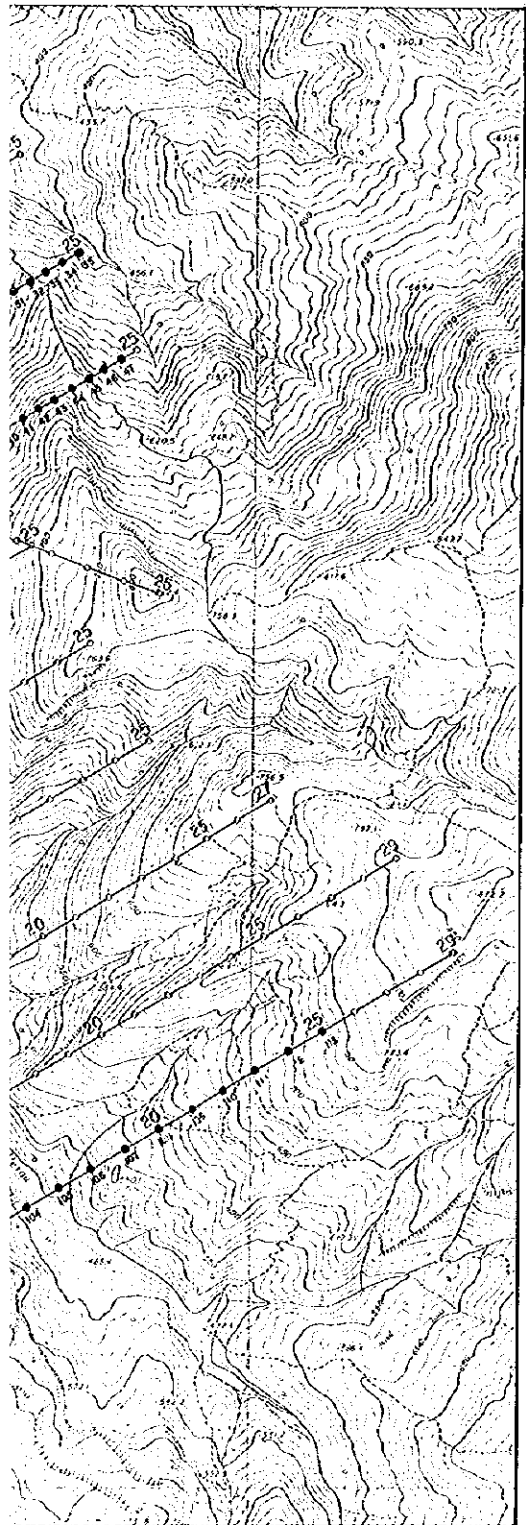
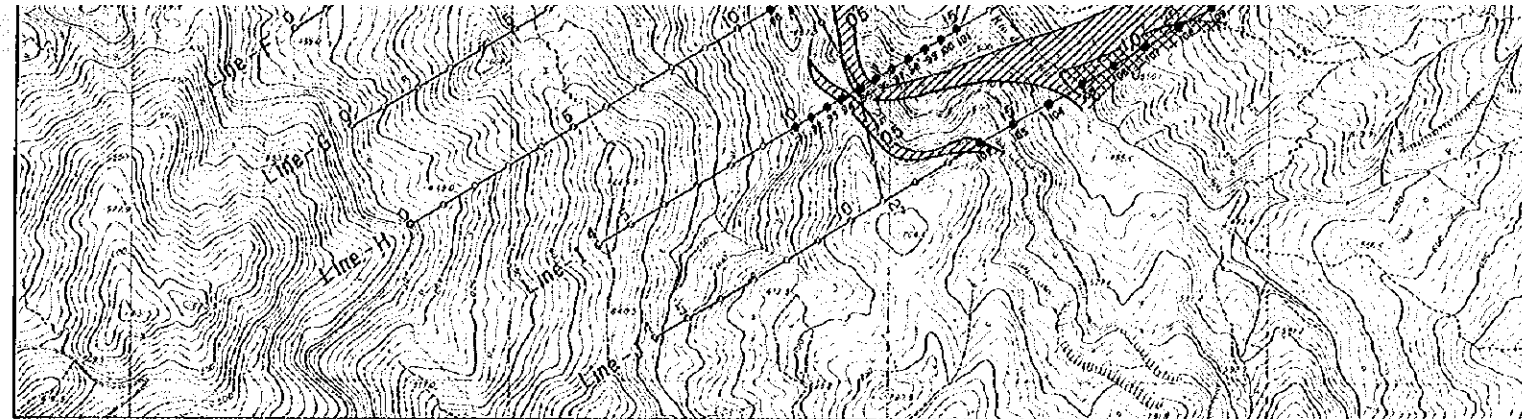
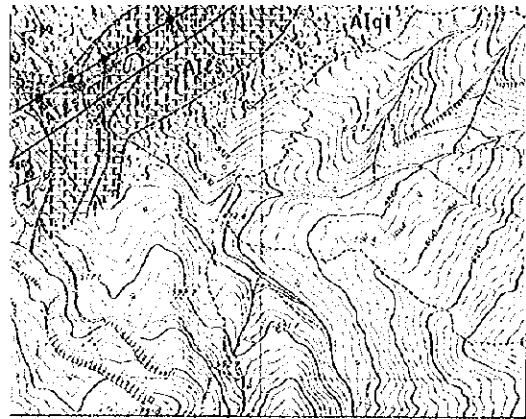


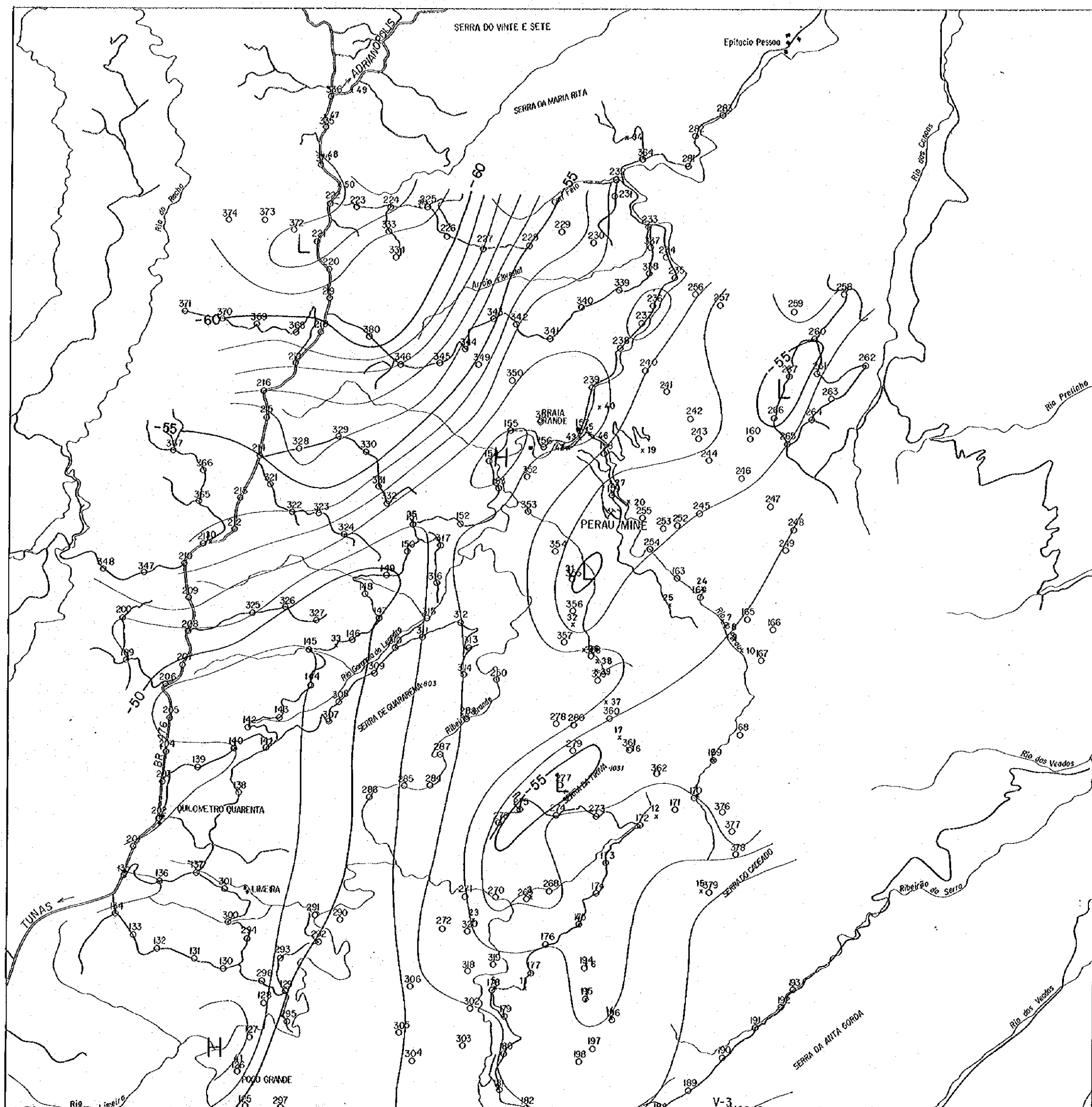
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PL.II-1

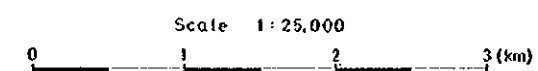
BRAZIL GEOLOGICAL SURVEY OF ANTA GORDA AREA PHASE II BOUGUER ANOMALY MAP ($\rho=2.7$)



LOCATION INDEX		
SERRA 4-3	ANTA GORDA 4-4	ANTA GORDA 4-5
TUNAS 4-1	PERAU 4-2	PERAU 4-3
TUNAS 4-3	PERAU 4-4	PERAU 4-5

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LEGEND

- 1 mgal
- 5 mgal
- 192 Gravity Observation Point and its Number
- × 1 Sampling Location and No. of Rock Sample