

国際協力事業団
11637
図書資料室蔵書

PL. II - 2 - 16

GEOLOGICAL SURVEY

OF

HAUT ATLAS OCCIDENTAL AREA, MOROCCO

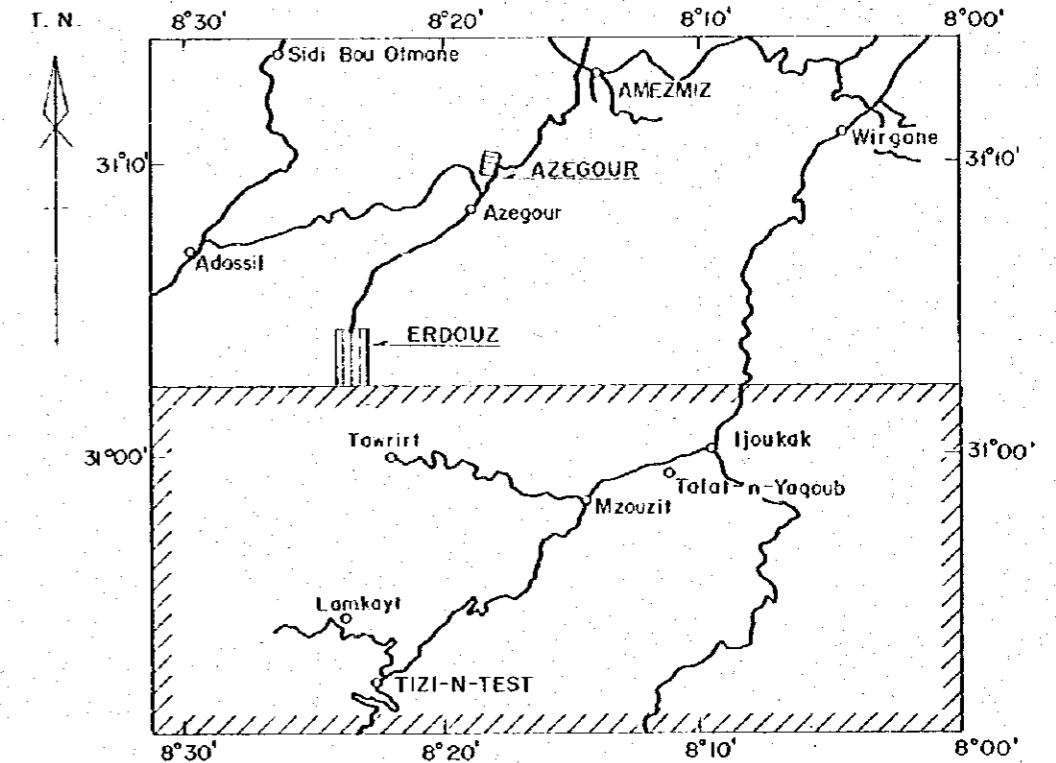
(PHASE II)

APPARENT RESISTIVITY PSEUDO SECTION

AND PFE PSEUDO SECTION WITH

INFERED RESISTIVITY STRUCTURES

(LINE D)

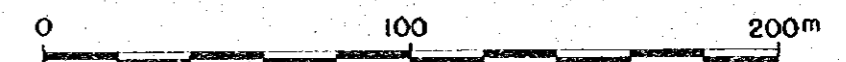


JAPAN INTERNATIONAL COOPERATION AGENCY

METAL MINING AGENCY OF JAPAN

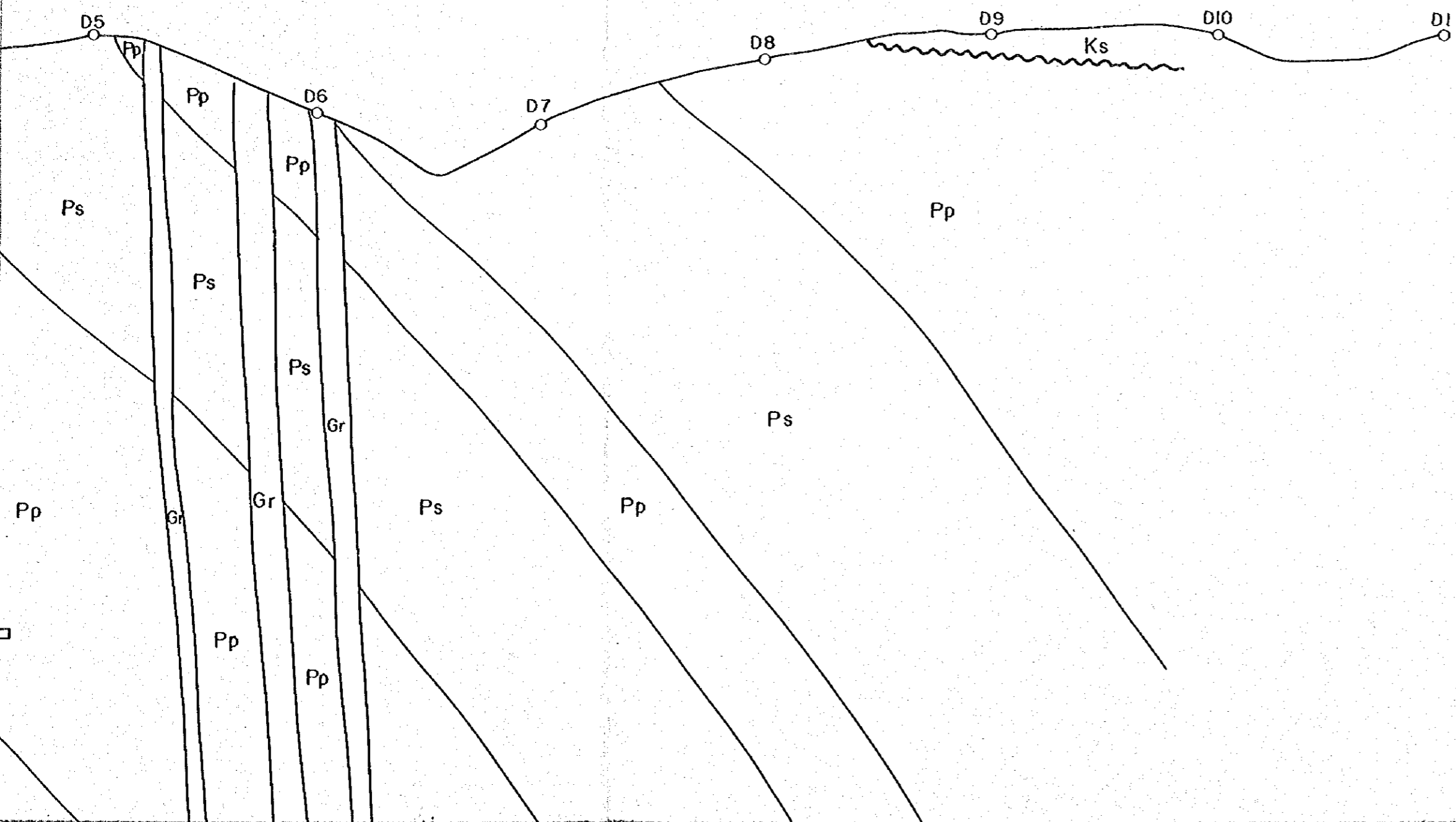
FEBRUARY 1985

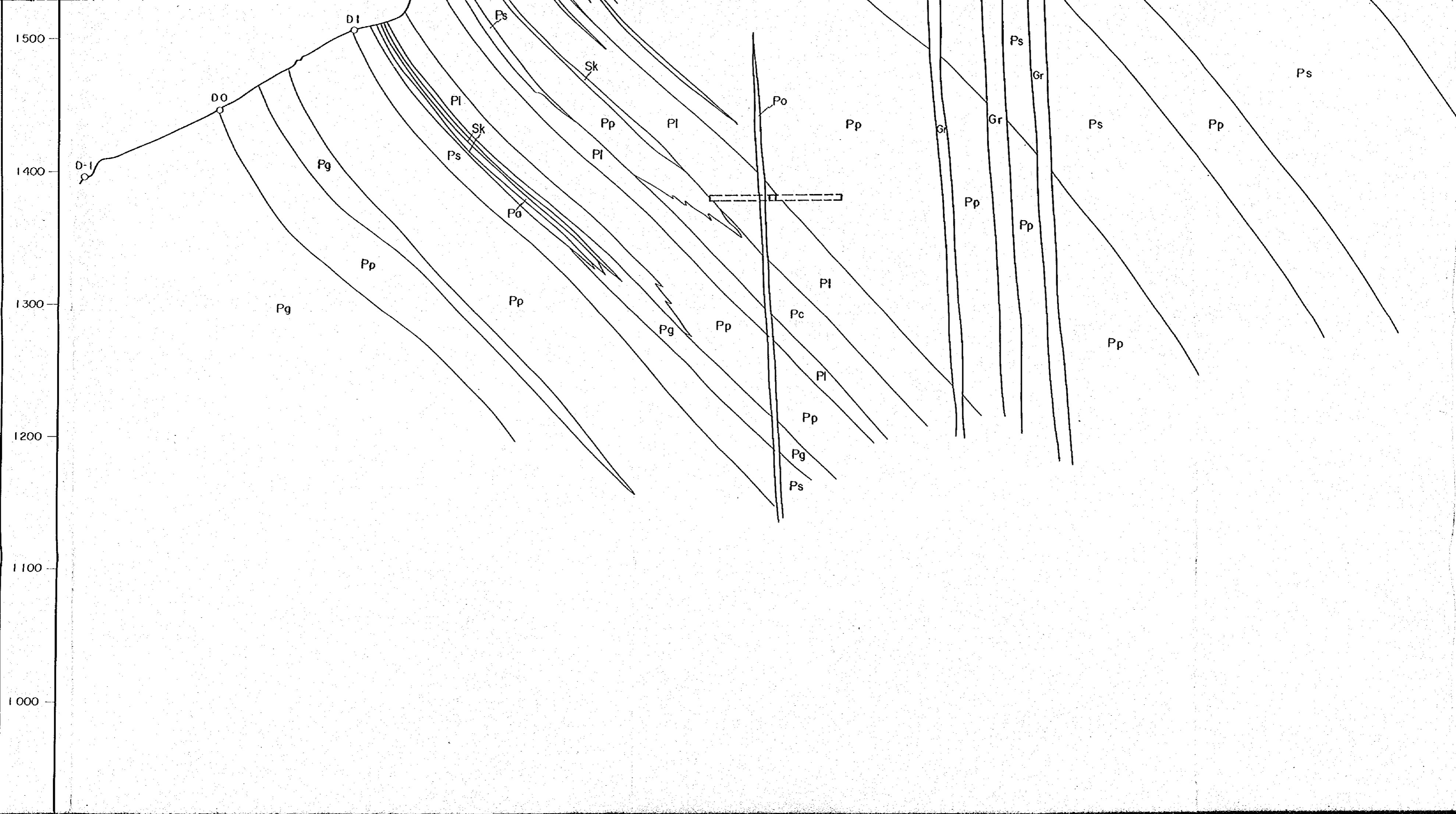
Prepared by MINDECO

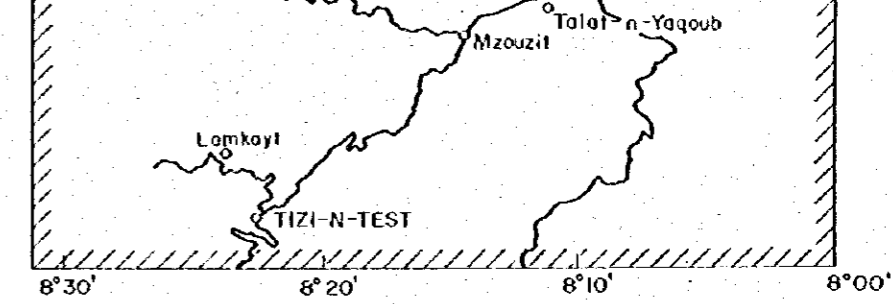
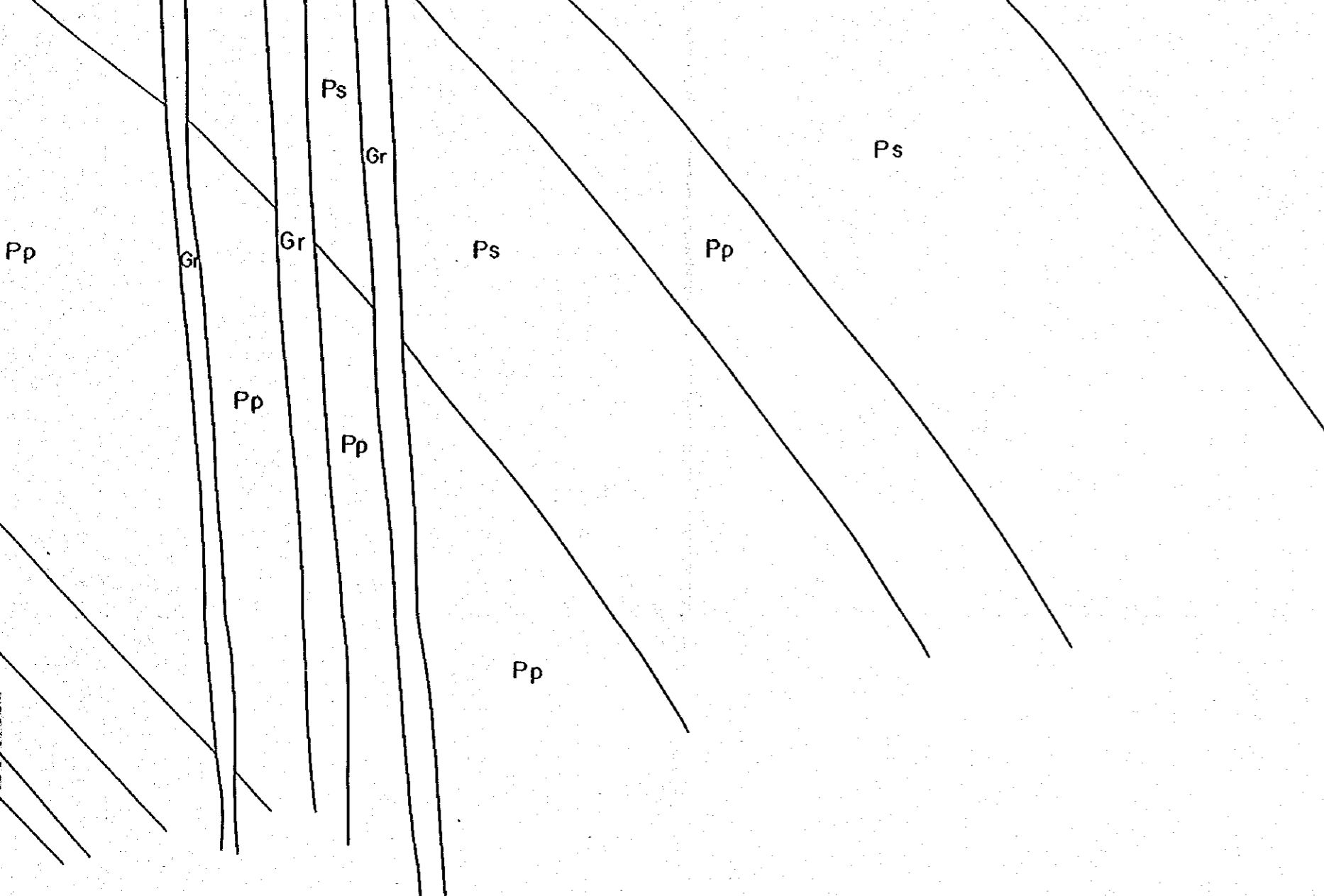


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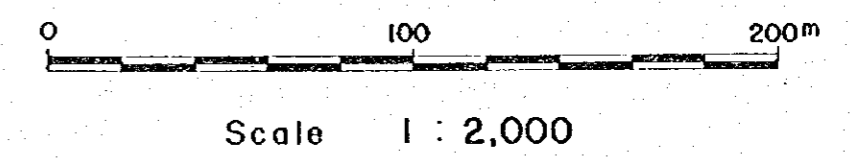
SECTION







JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN
 FEBRUARY 1985
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LEGEND

Cambrian	}	Pp	pelitic schist
		Pm	psammitic schist
		Po	calcareous schist
		Pl	limestone
Intrusive rock	}	Gr	granite
		Po	porphyrite

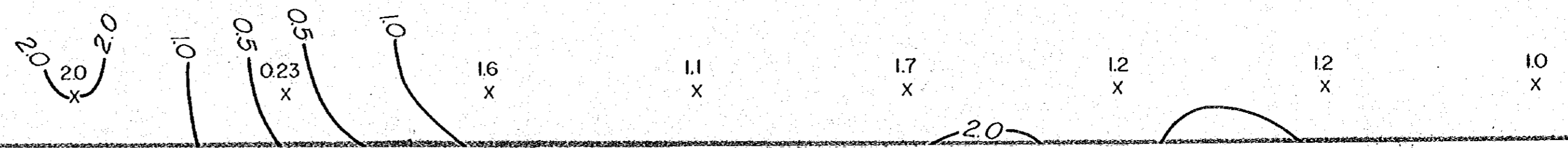
1000

900

800

APPARENT RESISTIVITY (kΩ m)

-1 0 1 2 3 4 5 6 7 8 9



RESISTIVITY (kΩ m)

5

6

7

8

9

10

11

1.7
X

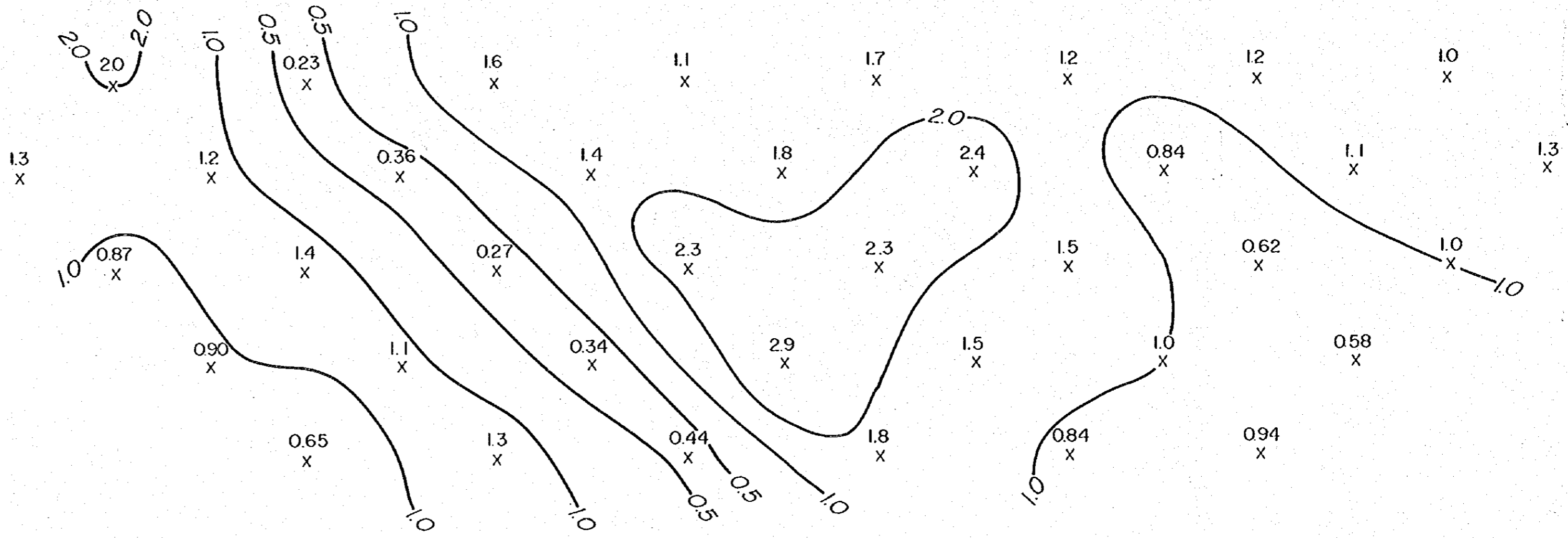
1.2
X

1.2
X

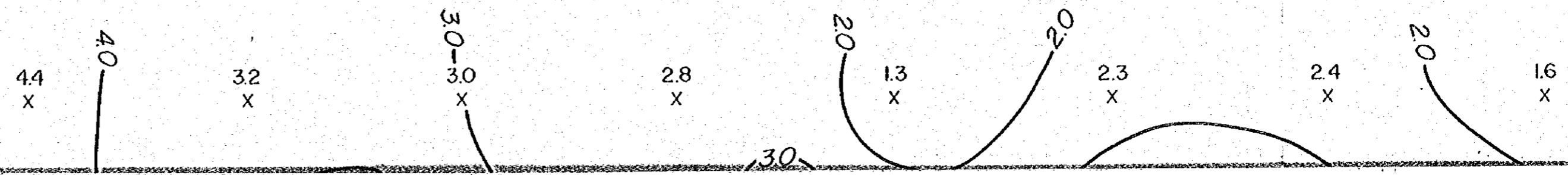
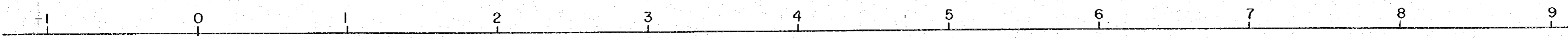
1.0
X

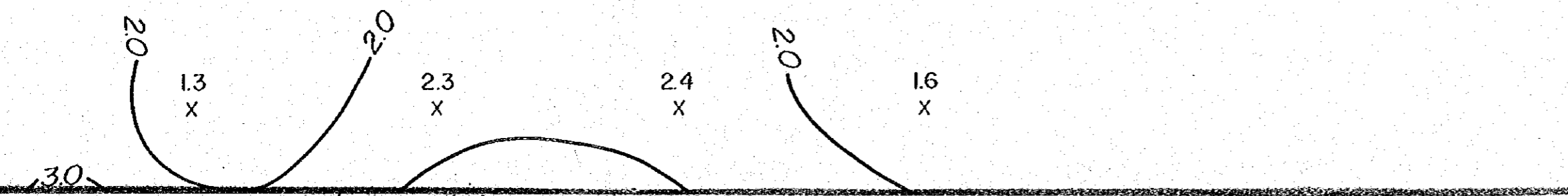
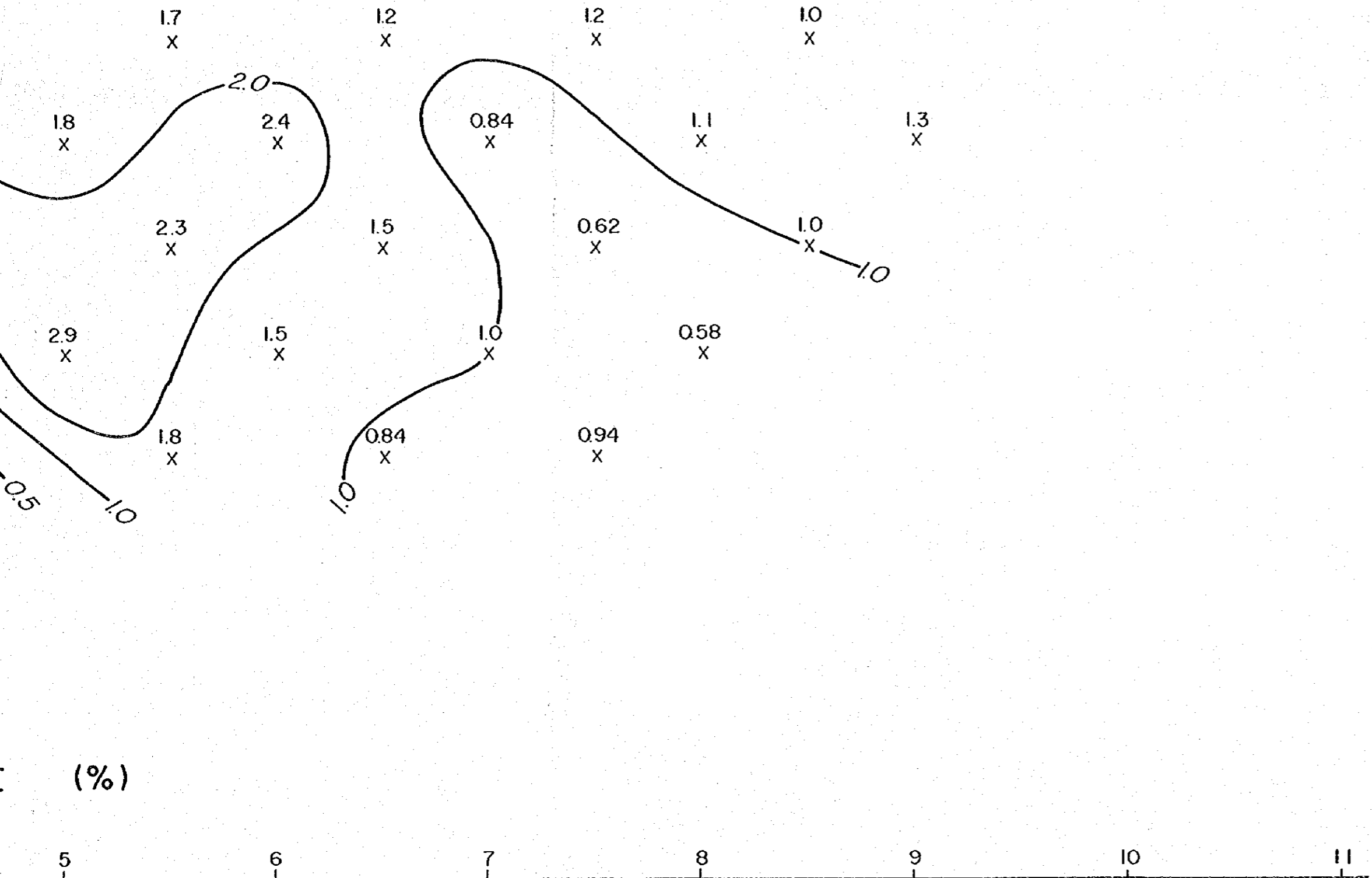
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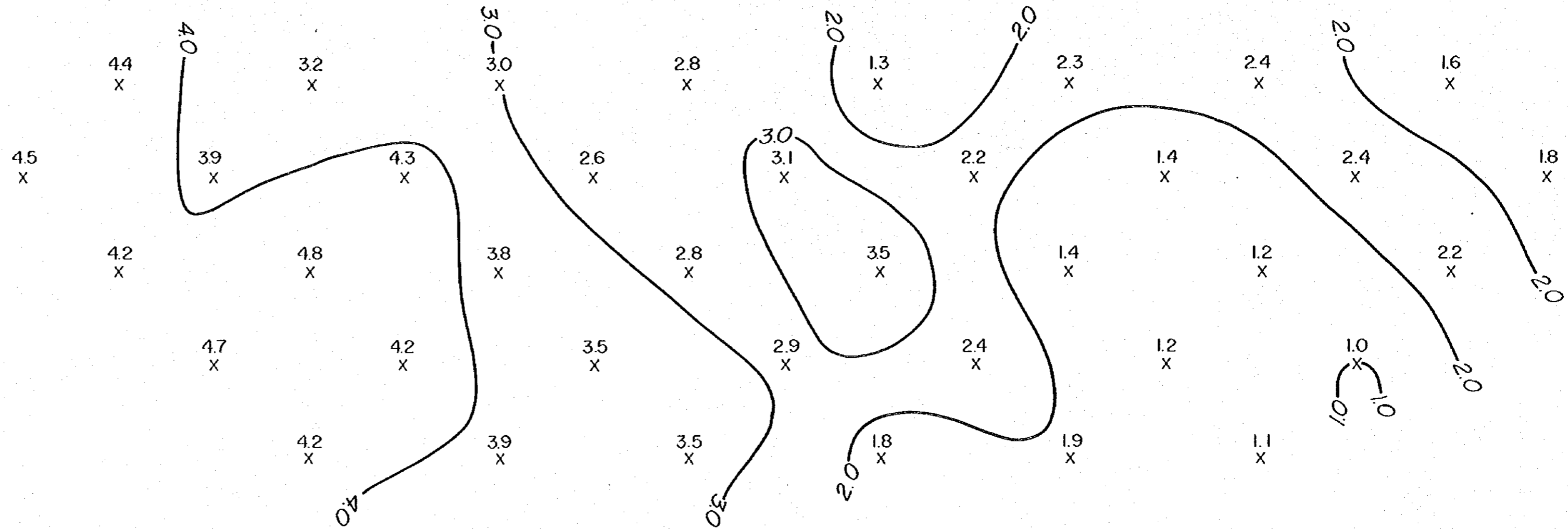




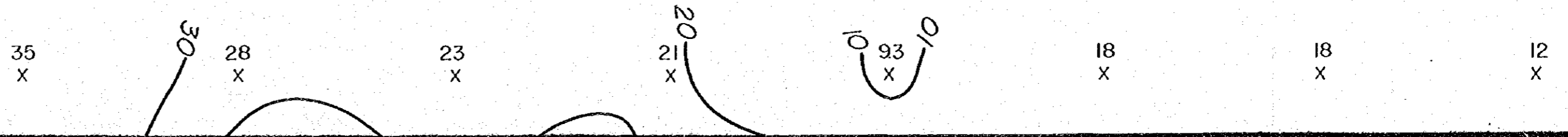
PFE (%)

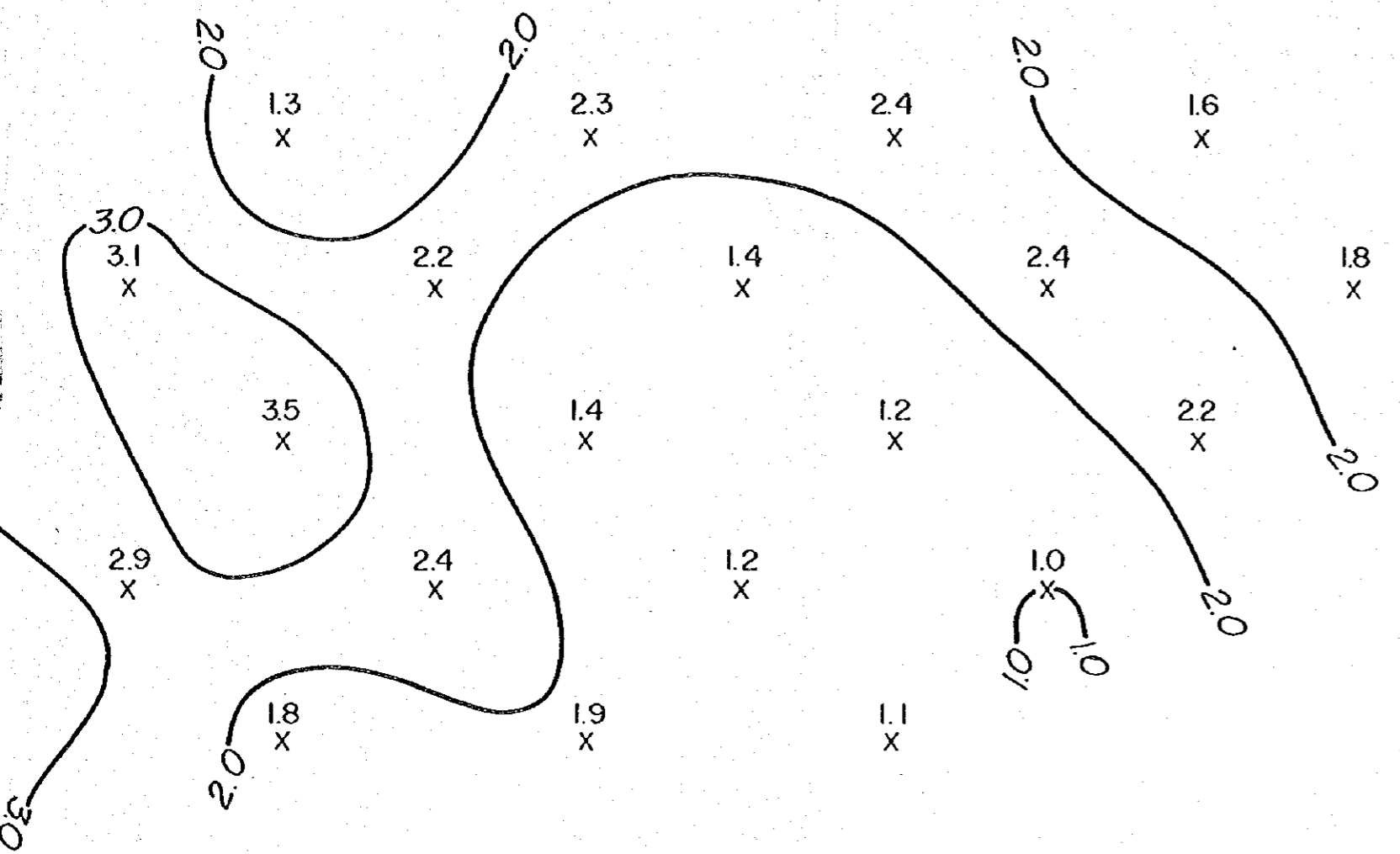




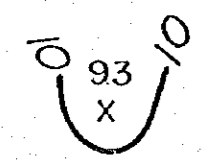
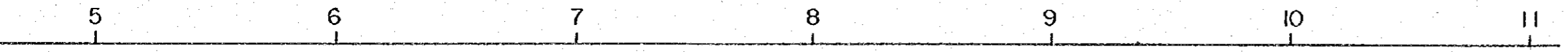


RAW PHASE (0.125 Hz) (m rad)





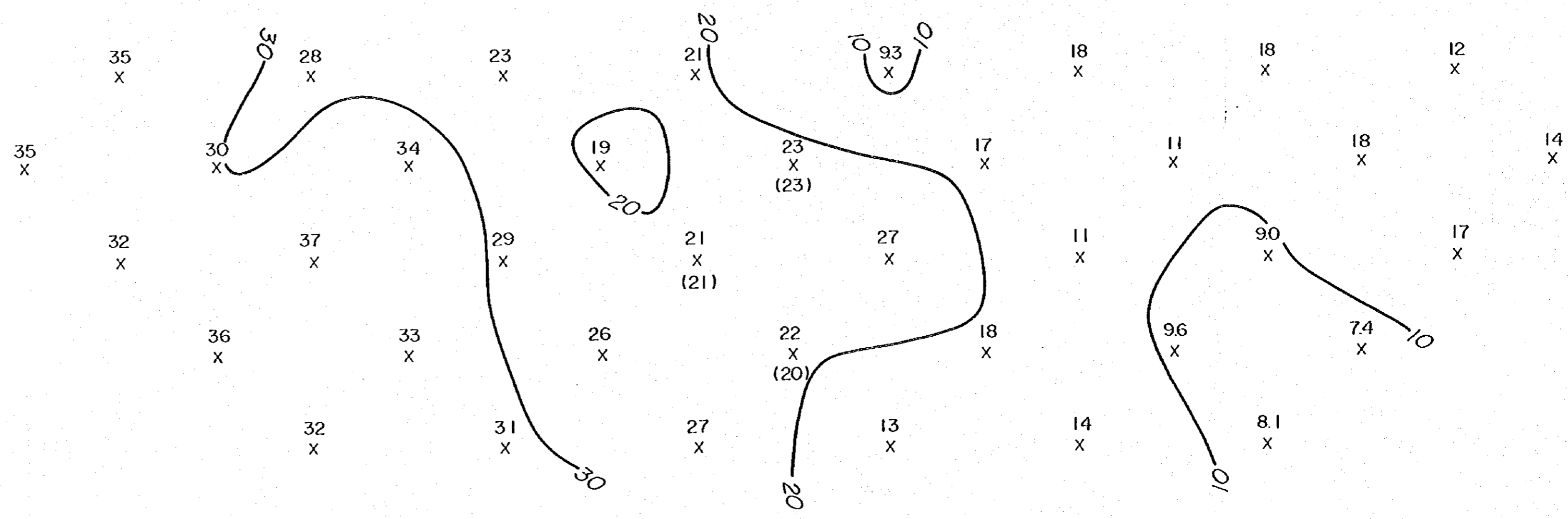
(0.125 Hz) (m rad)



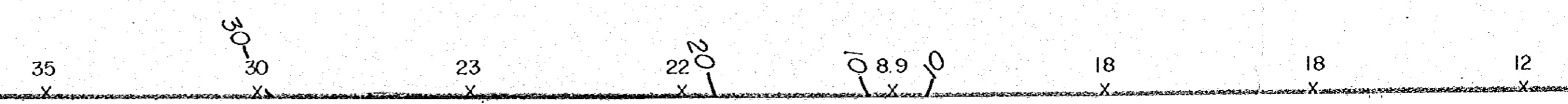
18
X

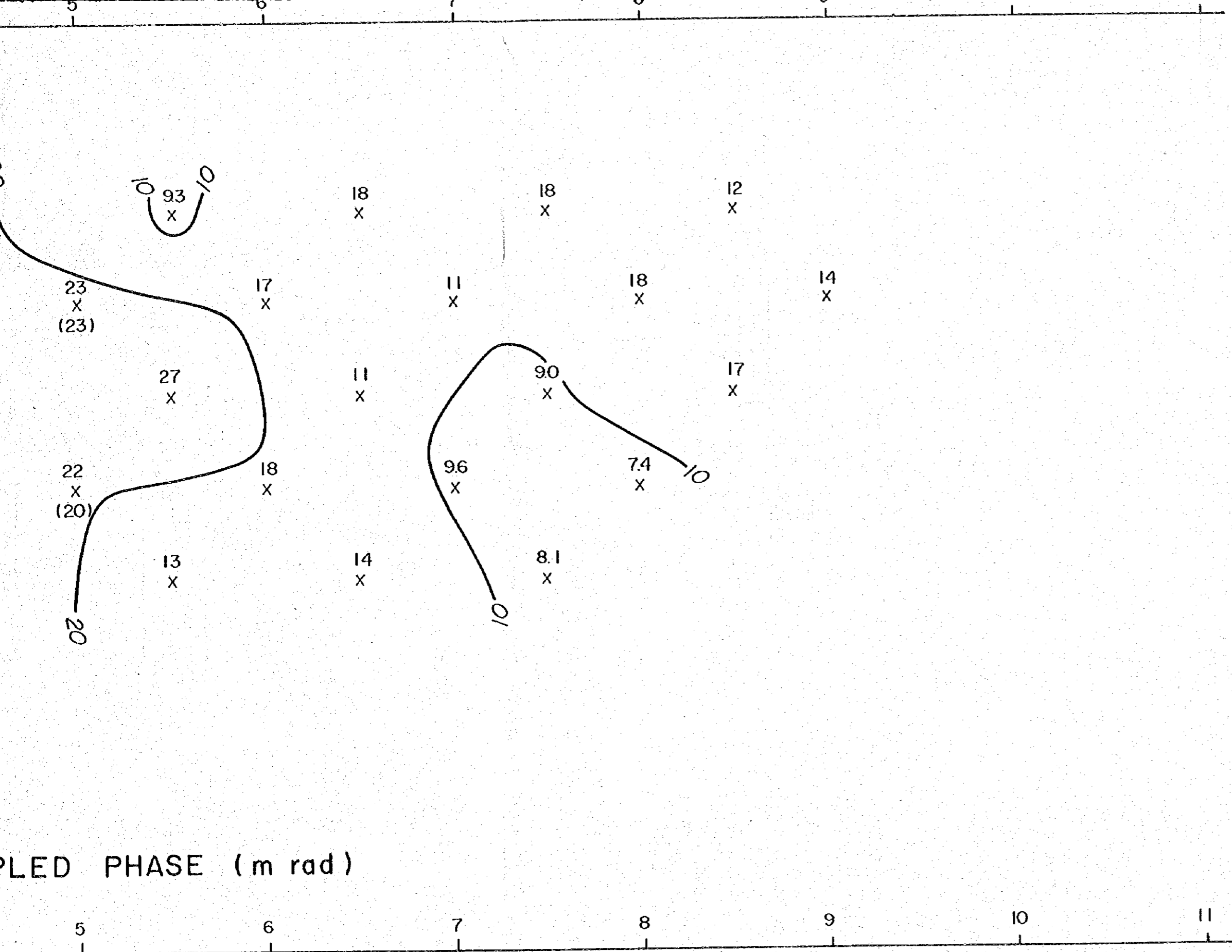
18
X

12
X



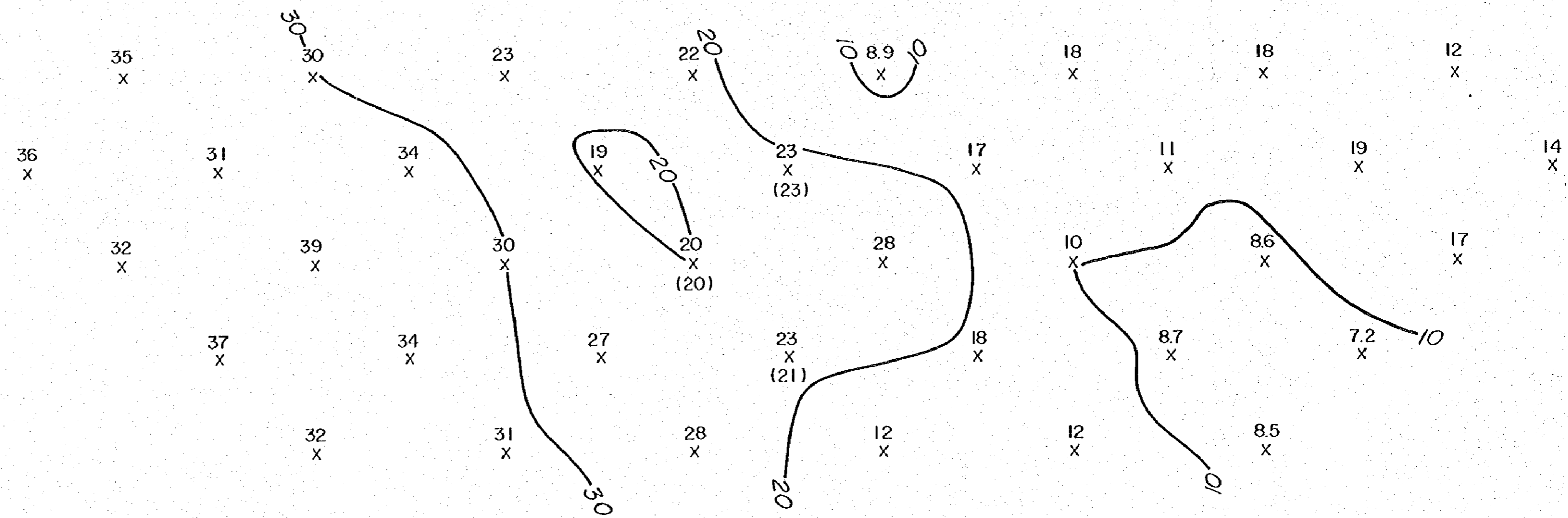
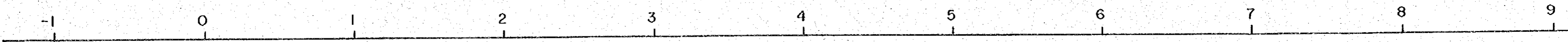
3 - Pt. DECOUPLED PHASE (m rad)



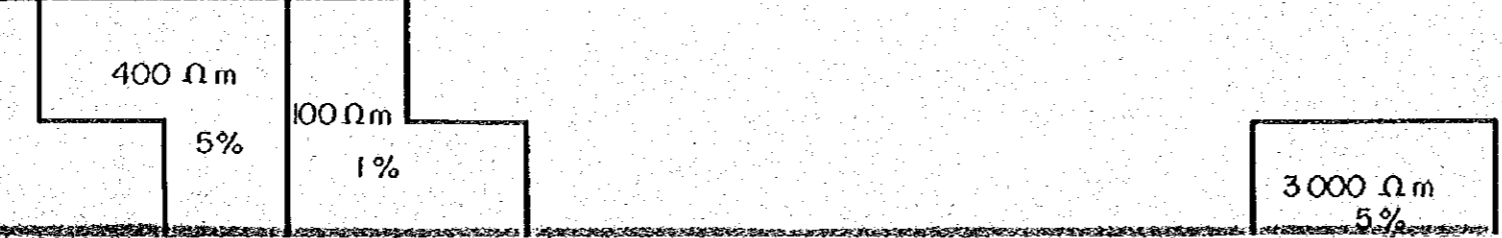
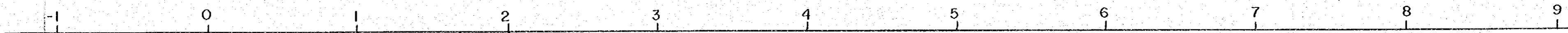


SAMPLED PHASE (m rad)

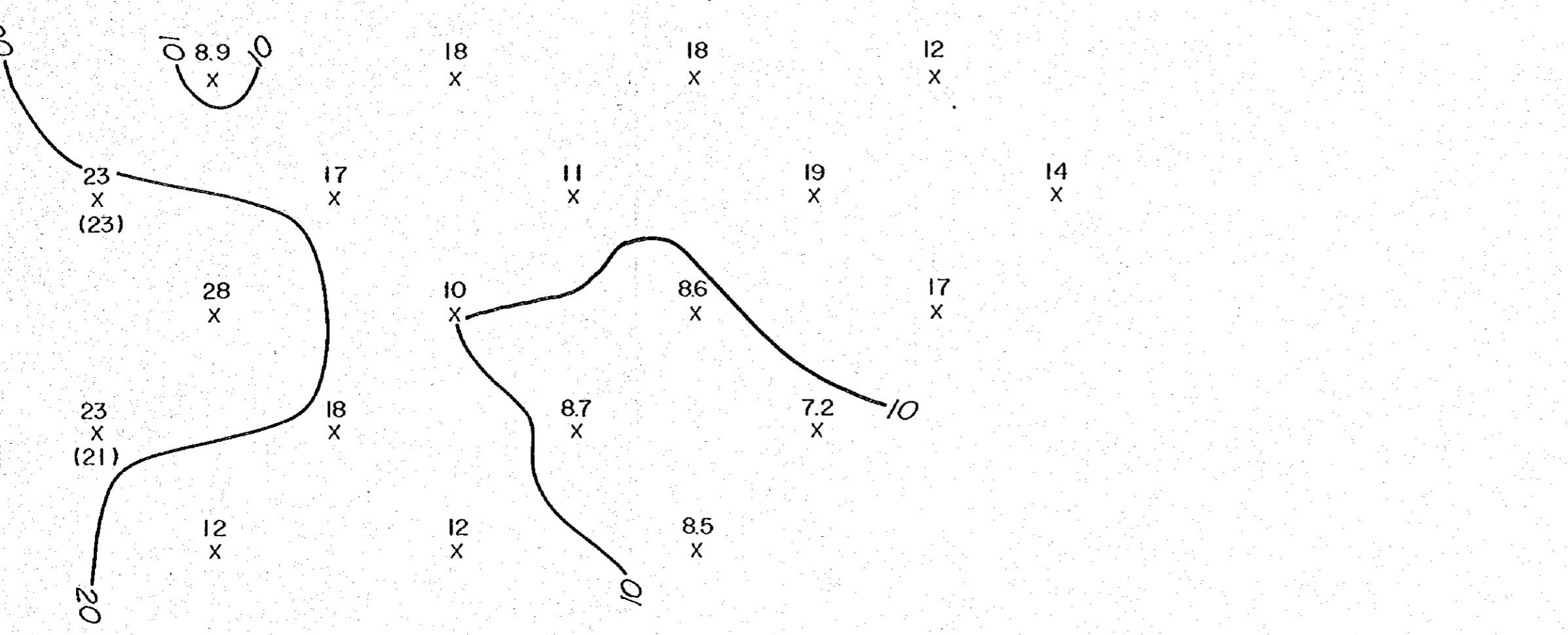
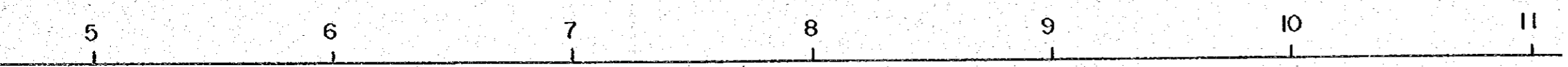
$10 \begin{matrix} 8.9 \\ X \end{matrix} 10$
 $18 \begin{matrix} X \end{matrix}$
 $18 \begin{matrix} X \end{matrix}$
 $12 \begin{matrix} X \end{matrix}$



INFERED RESISTIVITY STRUCTURE



LED PHASE (m rad)

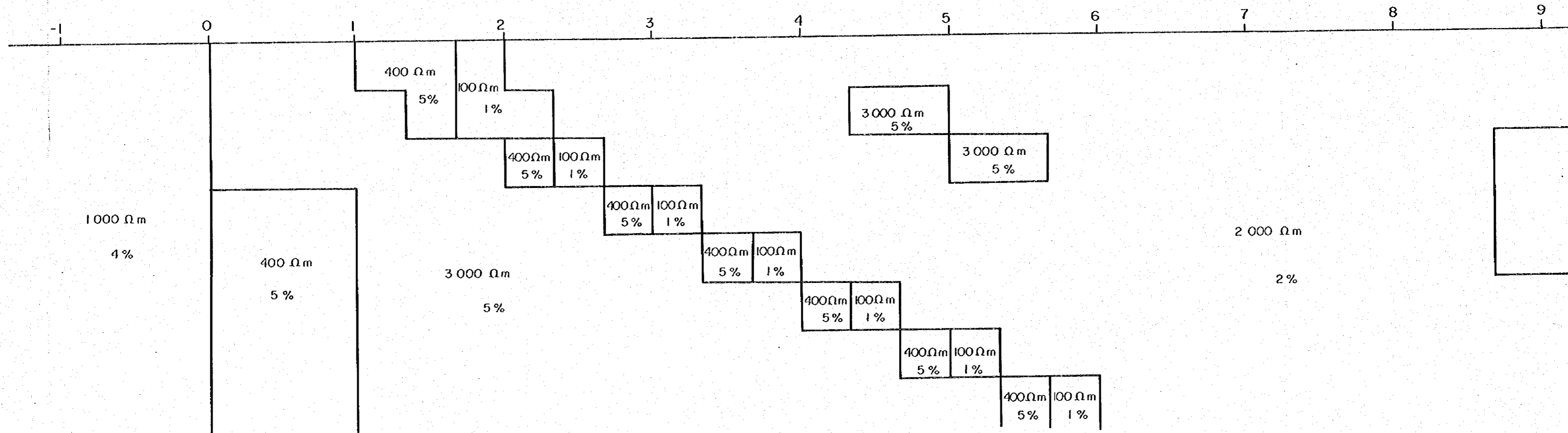


TIVITY STRUCTURE

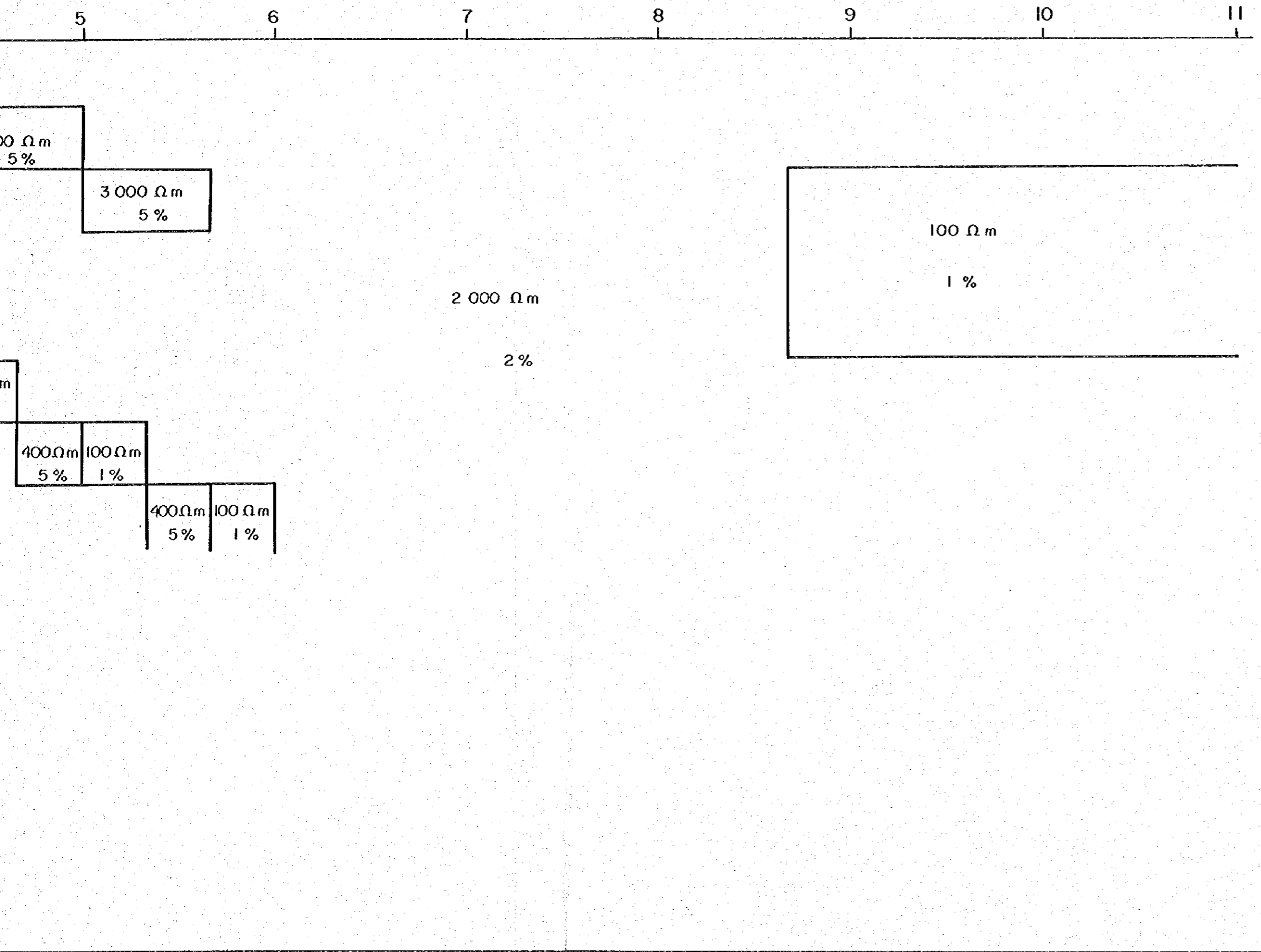


0 Ω m
5.0

INFERED RESISTIVITY STRUCTURE



ACTIVITY STRUCTURE



ATE - I

Coordinate X = 1643m
Y = 3443m

Direction 285°
Inclination -60°

Elevation 1407 m

Total Depth 203.30m

Depth (m)	Column	Depth (m)	Observations	Depth (m)	Assay (ppm)		
					Cu	Mo	W
0			non core				
		2.00	black, biotite spotted schist compact, metamorphosed				
		8.70 8.75	quartz 5cm, silicified zone				
10		11.60	black spotted schist				
		14.40	quartz vein 2cm				
			black, biotite spotted schist				
20		22.20 22.30	skarn zone (10cm)				
		24.80 25.30	altered zone (calcite)				
30		31.50	sheared zone (chloritized)				
		33.00	black spotted schist				
		38.10	pyrite, pyrrhotite imp				
40		40.00	pyrite imp				
		43.50 44.00 44.90 45.00	skarn (pyrite, pyrrhotite imp) skarn (10cm) compact, spotted schil				
		48.00 48.10	green skarn				
			black spotted schist				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
100		101.00	skarnized schist	101.50	25	40	70
		104.70	skarnised schist	104.50	1800	50	170
		105.20	green skarn				
		106.50	molybdenite imp	107.50	240	725	50
		108.80	silicified schist				
110		110.20	silicified schist	110.50	40	80	60
		113.00	chalcopyrite, molybdenite imp	113.00	220	300	≤ 20
		113.60	epidotized schist				
		115.00	gneissose schist	115.00	4300	300	140
120		121.20	molybdenite imp	121.30	140	400	≤ 20
		123.50	molybdenite imp	123.50	30	1525	30
		125.60	skarnized schist (epidote, spessartite, hematite)	125.50	50	975	30
		127.40	gneissose schist (microcline, pinkish diopside)	127.50			
130		136.10	silicified, black-violet banded schist				
140		139.00	gneissose schist (microcline, pinkish diopside)				
		143.60	skarnised schist (pinkish epidote)	143.60			
		145.00	spessartite skarn	146.00	160	530	≤ 2
			molybdenite imp	148.00	15	130	≤ 2

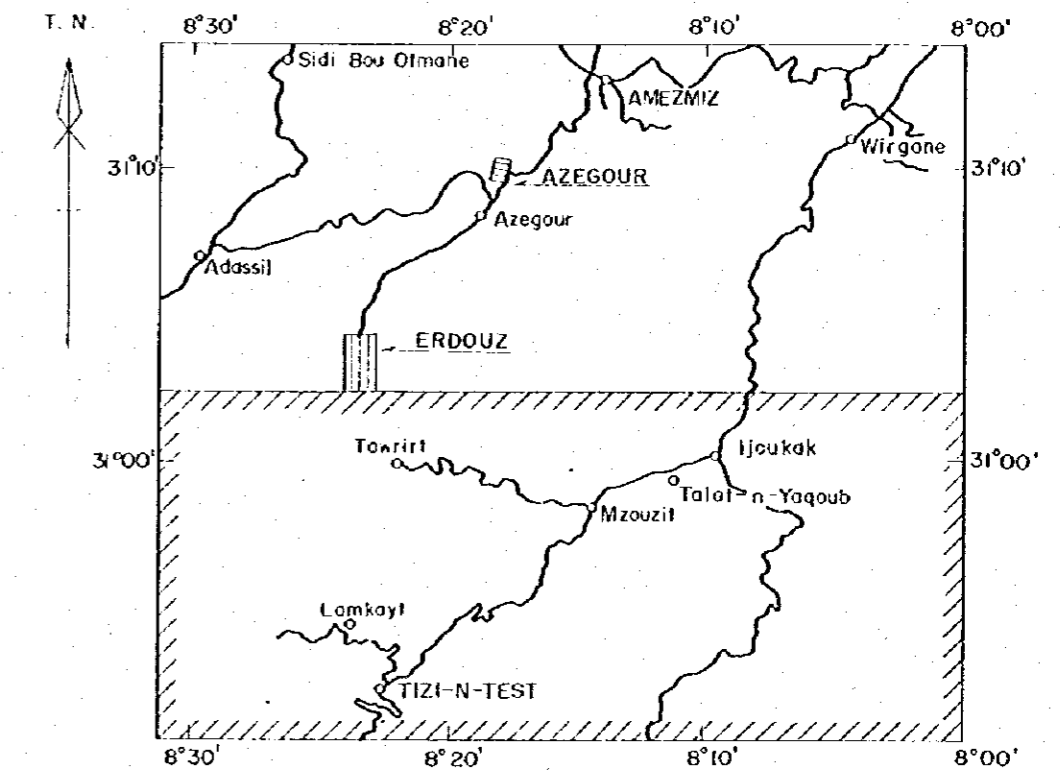
Depth (m)	Column	Depth (m)	Observation
200	~ ~ ~ ~ ~	203.30	gneissose schist (biotite) silicified

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GEOLOGICAL SURVEY

OF
HAUT ATLAS OCCIDENTAL AREA, MOROCCO
(PHASE II)

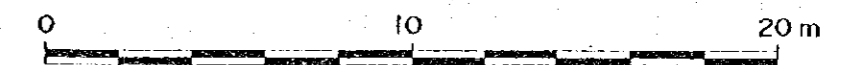
GEOLOGICAL DRILL LOG IN AZEGOUR SECTOR
ATE - 1



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

FEBRUARY 1985

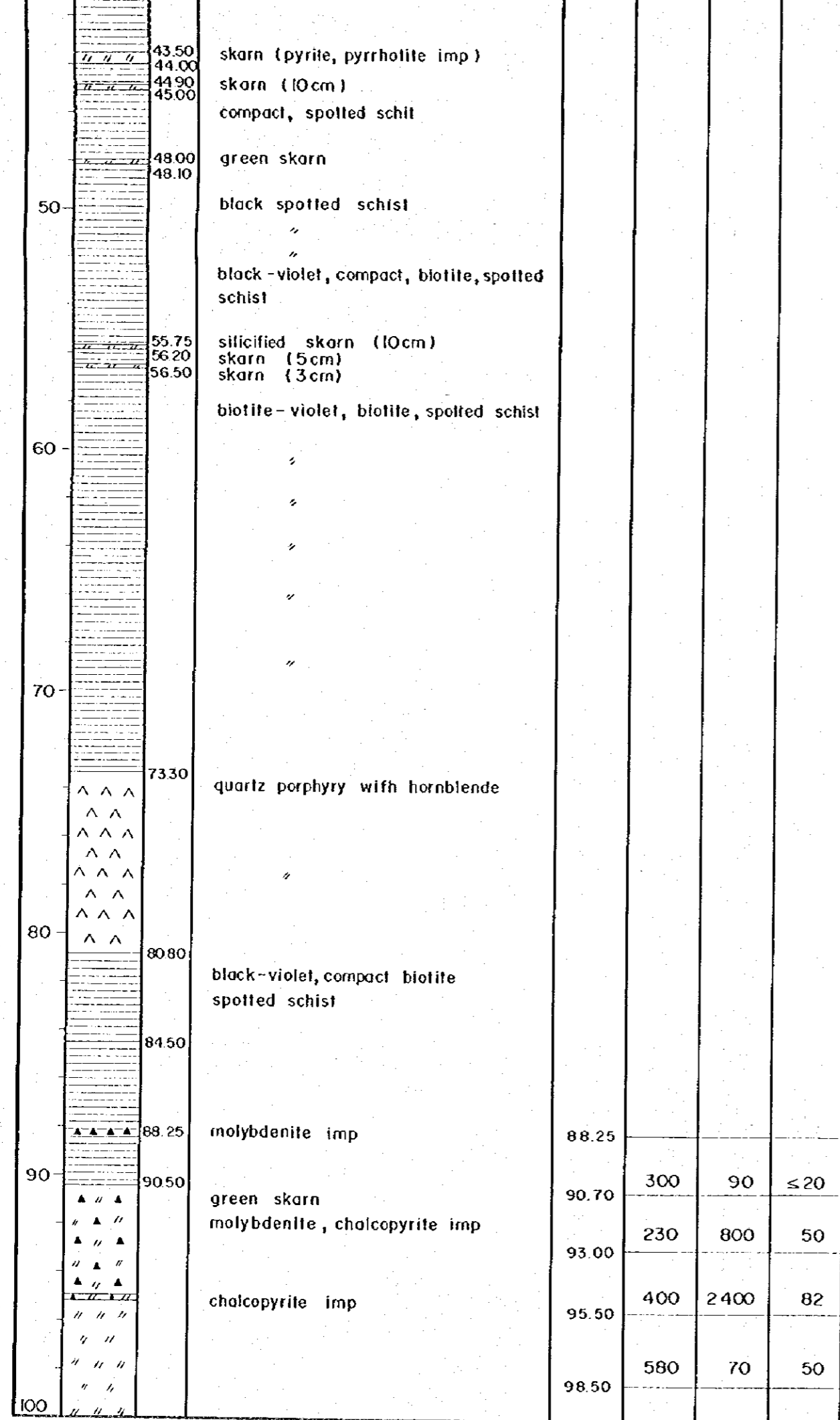
Prepared by MINDECO



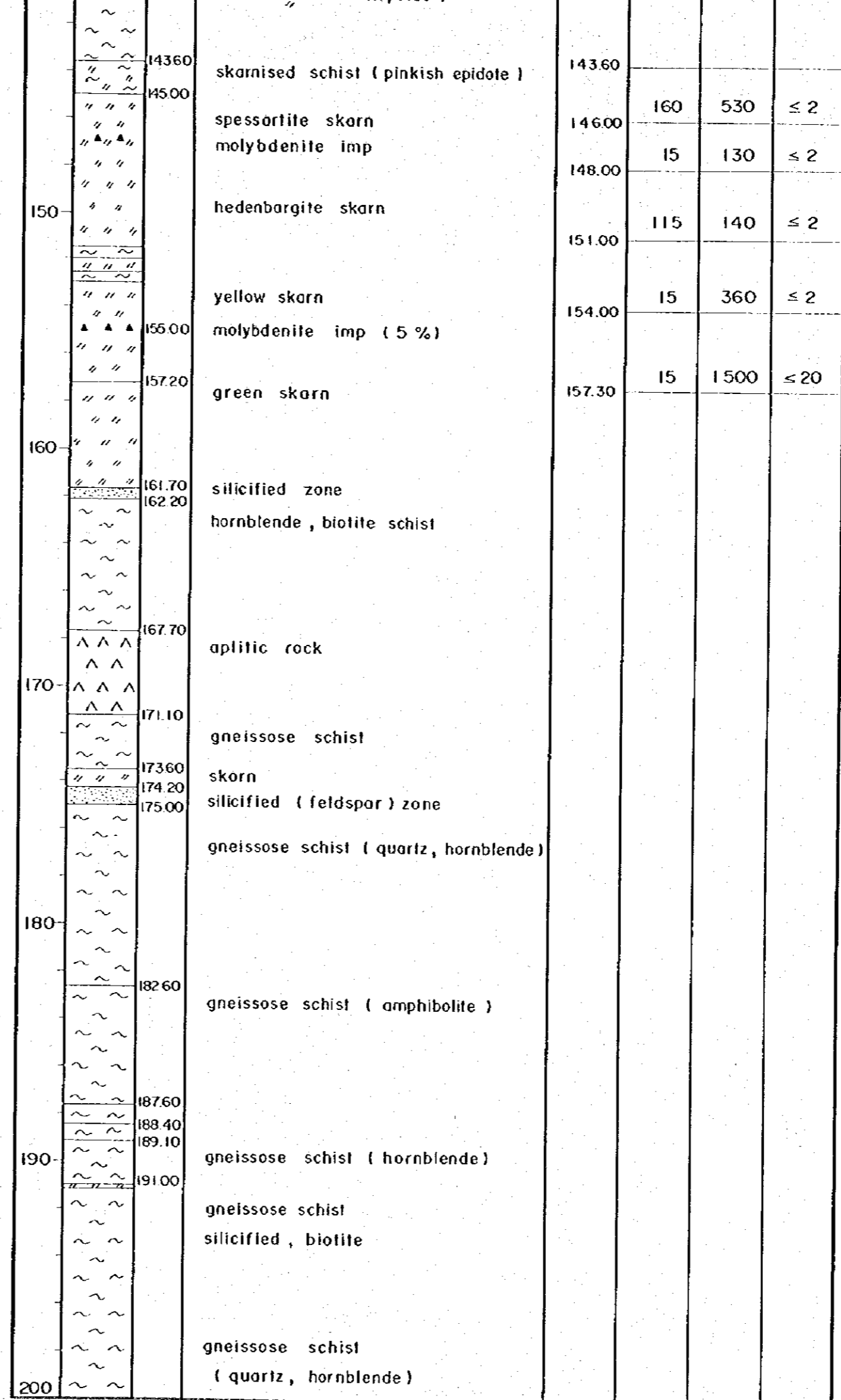
Scale 1 : 200

Observation	Depth (m)	Assay (ppm)		
		Cu	Mo	W
gneissose schist	101.50	25	40	70
gneissose schist with skarn, molybdenite imp	104.50	1800	50	170
gneissose schist	107.50	240	725	50
gneissose schist	110.50	40	80	60
pyrite, molybdenite imp	113.00	220	300	≤ 20
gneissose schist	115.00	4300	300	140
molybdenite imp	121.30			
molybdenite imp	123.50	140	400	≤ 20
molybdenite imp	125.50	30	1525	30
gneissose schist (epidote, spessartite, hematite)	127.50	50	975	30
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (microcline, pinkish diopside)				
gneissose schist (pinkish epidote)	143.60			
epidote skarn	146.00	160	530	≤ 2
molybdenite imp	148.00	15	130	≤ 2

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
200	~		gneissose schist (biotite) silicified				
	~						
	~						
	~	203.30					



88.25			
90.70	300	90	≤ 20
93.00	230	800	50
95.50	400	2400	82
98.50	580	70	50

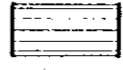
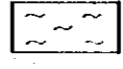
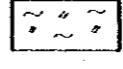
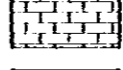
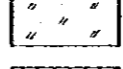
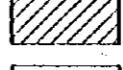
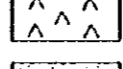
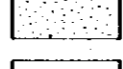
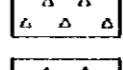
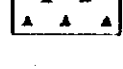


143.60			
146.00	160	530	≤ 2
148.00	15	130	≤ 2
151.00	115	140	≤ 2
154.00	15	360	≤ 2
157.30	15	1500	≤ 20

ed schist (pinkish epidote)	143.60			
lite skarn enite imp	146.00	160	530	≤ 2
	148.00	15	130	≤ 2
argite skarn	151.00	115	140	≤ 2
skarn enite imp (5 %)	154.00	15	360	≤ 2
skarn	157.30	15	1500	≤ 20
d zone nde , biotite schist				
rock				
se schist				
d (feldspar) zone				
se schist (quartz , hornblende)				
se schist (amphibolite)				
se schist (hornblende)				
se schist d , biotite				
se schist z , hornblende)				

Scale 1 : 200

LEGEND

-  spotted schist
-  gneissose schist
-  skarnized schist
-  limestone
-  skarn
-  amphibolite
-  quartz porphyry, aplite, porphyrite
-  quartz, calcite, silicified zone
-  crushed zone, sheared zone
-  ore mineral

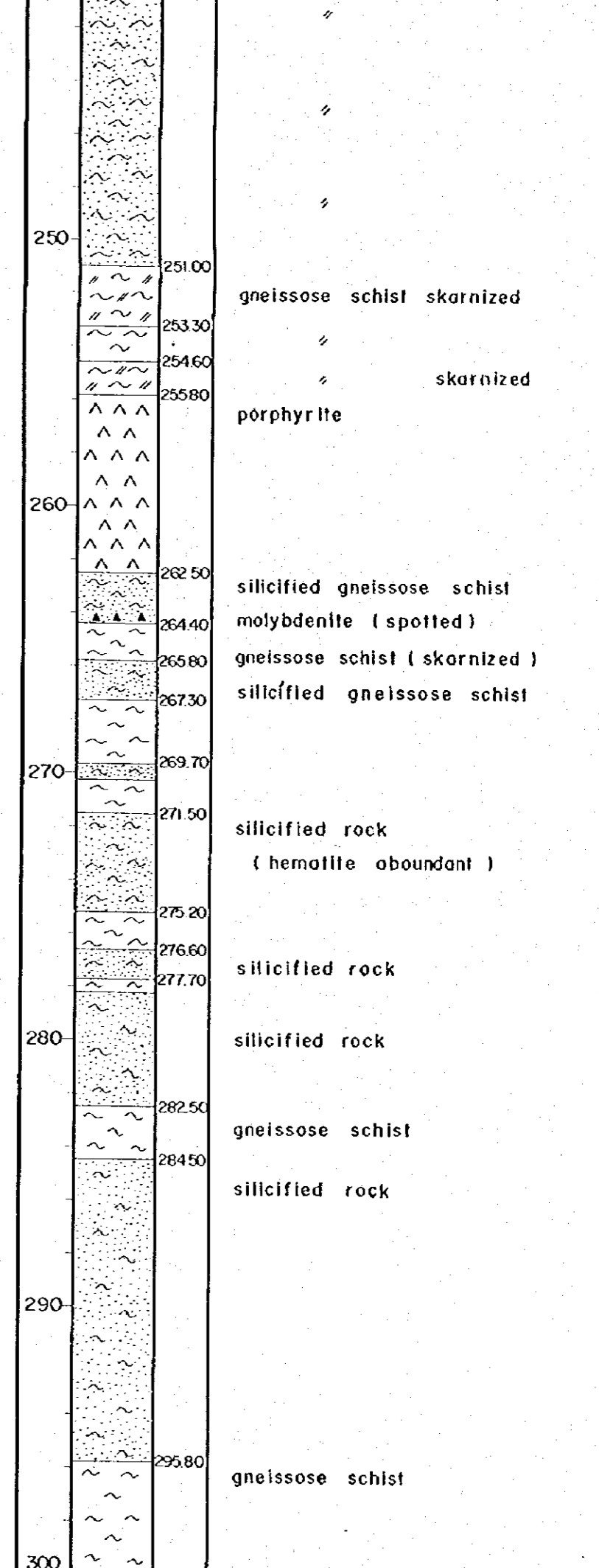
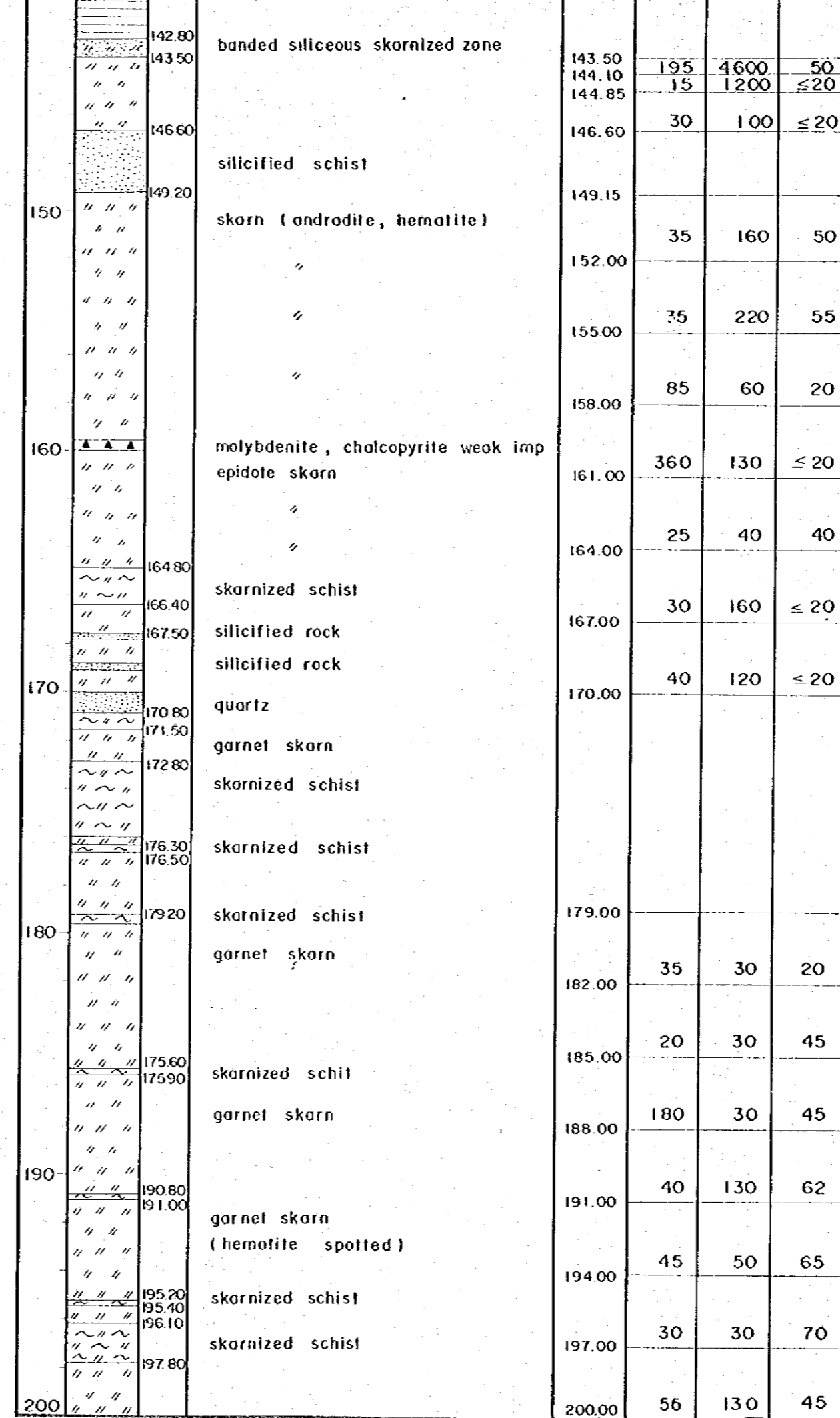
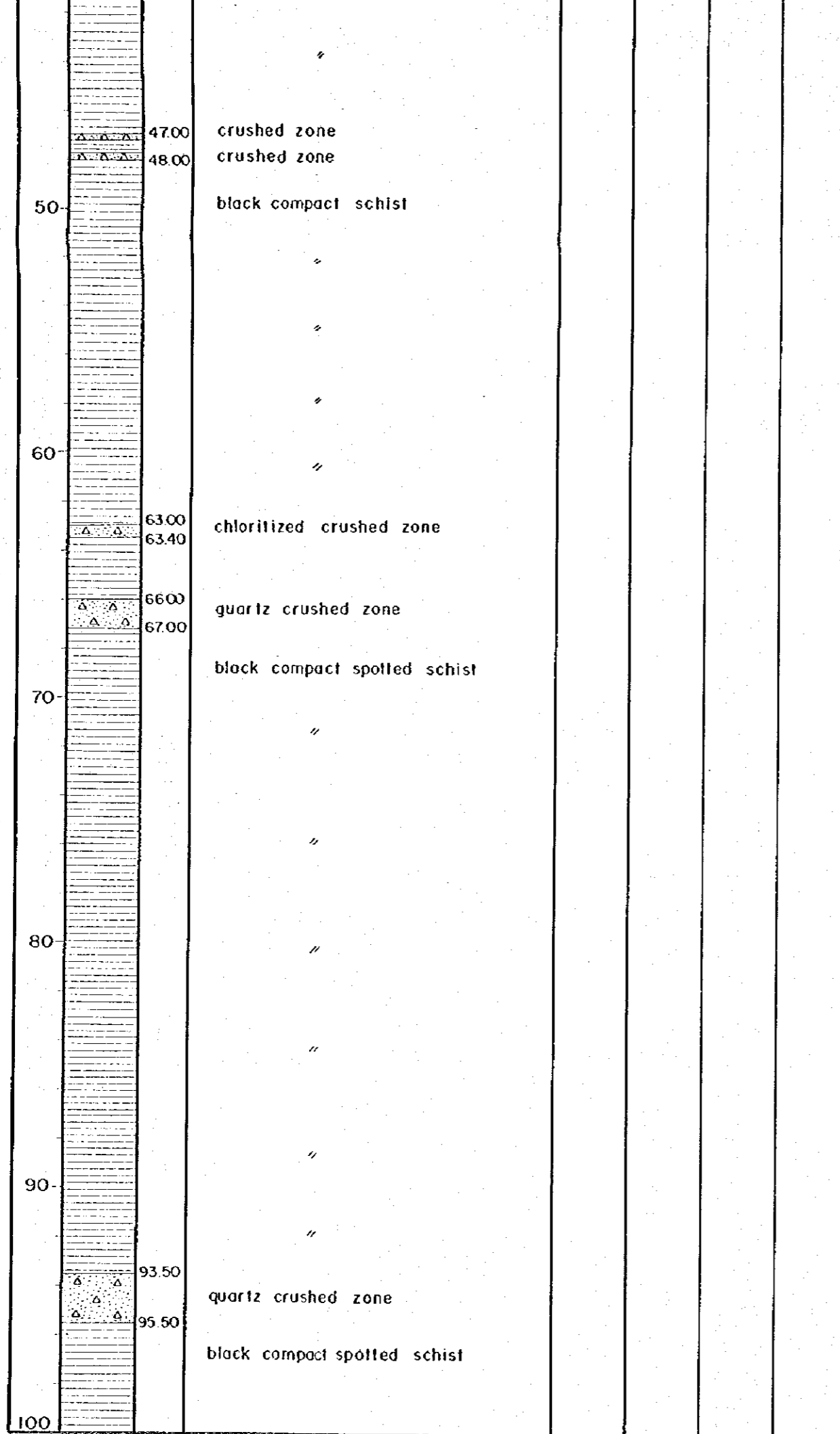
ATE - 2

Coordinate X = 1643 m Direction
 Y = 3443 m Inclination - 90°
 Elevation 1407 m Total Depth 300.00m

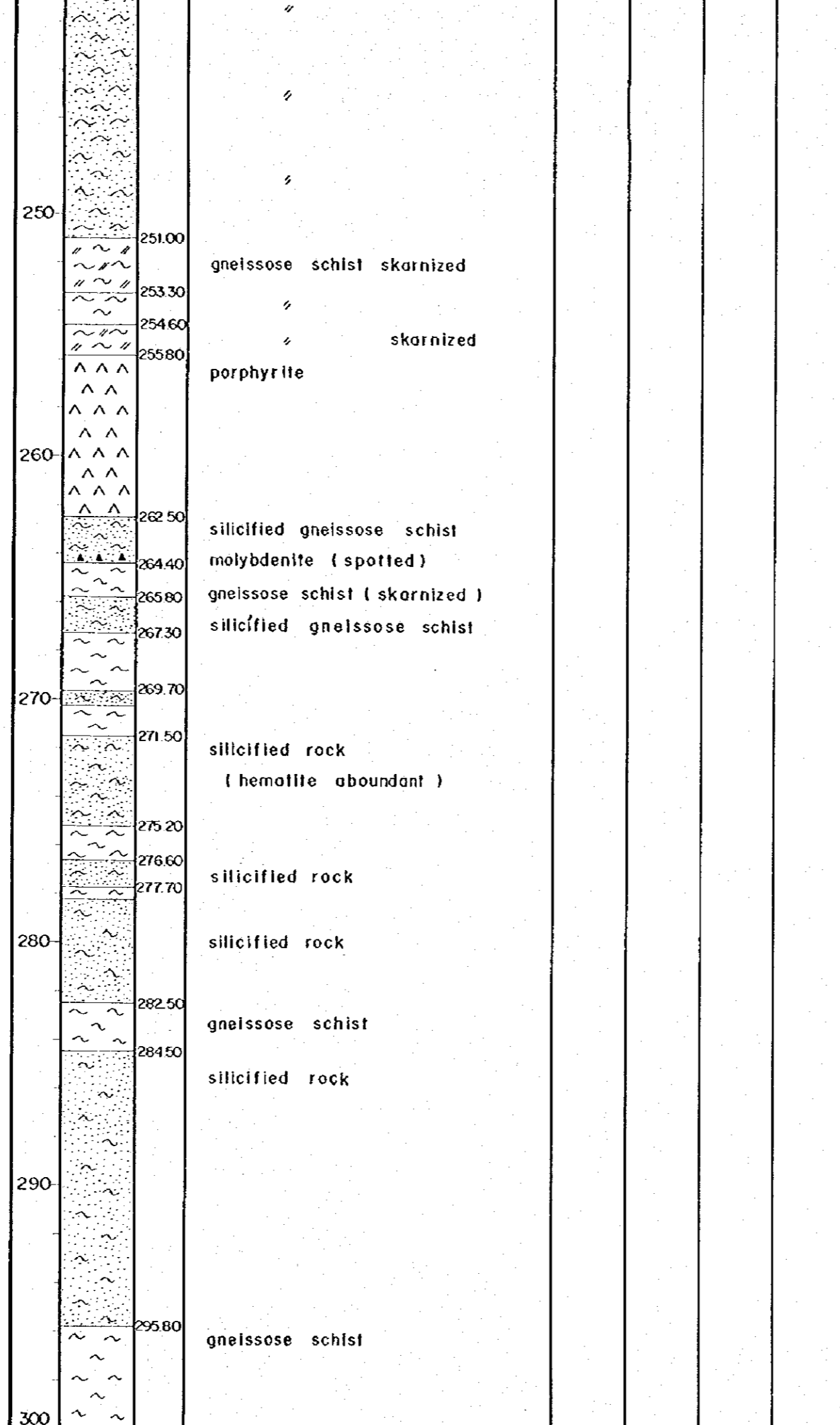
Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
0			black biotite spotted schist				
			“				
			“				
10		930 950	chloritized zone				
			black biotite spotted schist				
			“				
			“				
20			“				
			“				
			“				
30			“				
			“				
			“				
40			“				
			“				
		47.00	crushed zone				
		48.00	crushed zone				
50			black compact schist				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
100			black compact spotted schist				
			“				
			“				
110		109.60	quartz crushed zone				
			black compact spotted schist				
			“				
			“				
			“				
120		119.40 120.50	silicified zone				
			“				
			“				
			“				
			“				
		125.00	banded silicified skarnized black schist				
		127.30	black compact spotted schist				
130			“				
			“				
			“				
			“				
		135.70	quartz crushed zone				
		136.80	“				
140			“				
			“				
		142.80	banded siliceous skarnized zone	143.50			
			“	143.50	195	4600	50
			“	144.10	15	1200	≤20
			“	144.85			
			“	146.60	30	100	≤20
			silicified schist				
		149.20	“				
150			“				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
200			garnet skarn				
			“				
			“				
		203.70	silicified rock, chalcopyrite imp				
			skarnized schist with hematite				
			“				
210		209.80	garnet skarn				
			“				
		212.40	skarnized schist				
			“				
			“				
		217.00	quartz vein, chalcopyrite				
		218.00	andradite skarn,				
220		219.85	chalcopyrite imp				
			chalcopyrite imp				
		221.50	quartz				
		223.35	gneissose schist				
			“				
			“				
230			“				
			“				
			“				
		232.50	silicified rock (diopside ?)				
			“				
			“				
			“				
			“				
240			“				
			“				
			“				
			“				
			“				
250			“				

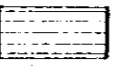
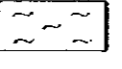
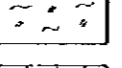
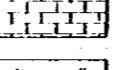
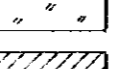
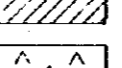
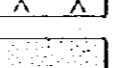
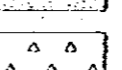
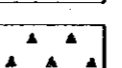



siliceous skarnized zone	143.50	195	4600	50
	144.10	15	1200	≤20
	144.85			
	146.60	30	100	≤20
ed schist	149.15			
(andradite, hematite)	152.00	35	160	50
"	155.00	35	220	55
"	158.00	85	60	20
enite, chalcopyrite weak imp skarn	161.00	360	130	≤20
"	164.00	25	40	40
ed schist	167.00	30	160	≤20
ed rock	170.00	40	120	≤20
ed rock				
skarn				
ed schist				
ed schist				
ed schist	179.00			
skarn	182.00	35	30	20
	185.00	20	30	45
ed schist	188.00	180	30	45
skarn	191.00	40	130	62
(ite spotted)	194.00	45	50	65
ed schist	197.00	30	30	70
ed schist	200.00	56	130	45



Scale 1 : 200

LEGEND

-  spotted schist
-  gneissose schist
-  skarnized schist
-  limestone
-  skarn
-  amphibolite
-  quartz porphyry, aplite, porphyrite
-  quartz, calcite, silicified zone
-  crushed zone, sheared zone
-  ore mineral

ATE - 3

Coordinate X = 1895 m Direction 285°
 Y = 3480 m Inclination -55°
 Elevation 1354 m Total Depth 170.00m

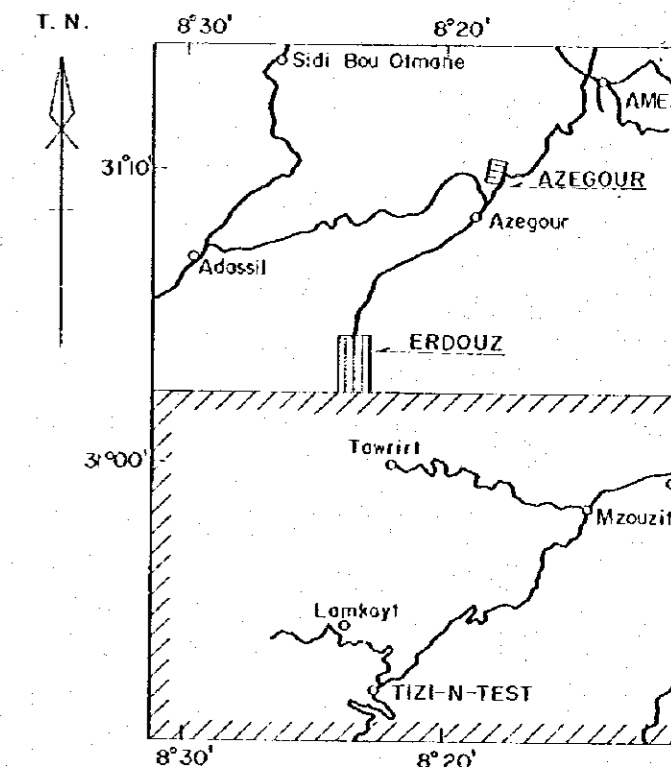
Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
0			Non Core				
		3.00	gneissose schist				
		3.50					
		4.20					
			biotite spotted schist compact, silicified				
10			“				
			“				
		14.80	quartz vein 0.20m (sheet-like)				
		15.00					
		16.20	quartz veinlet				
		16.80					
20			biotite spotted schist				
		22.20	pyrite imp decolored				
		22.25					
		25.40	strong silicification				
		25.85					
		27.70	strong silicification				
		28.60					
30							
		34.30	pyrite imp, quartz vein decolored green				
		34.38					
			biotite spotted schist				
40			“				
			“				
		46.70	silicified crushed zone				
		48.70					
50			quartz veinlet pyrrhotite - Cu - Py imp. (width 1cm)				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
100			white limestone				
		105.55	garnet skarn, pyrrhotite imp				
		106.55					
		106.80	epidote, chlorite garnet skarn				
110			spotted garnet skarn				
		110.00	“				
		112.80					
		116.75	quartz porphyry orang-yellow				
		117.90					
120			diopside - chlorite garnet skarn				
		120.10	“				
		125.70	white silicified zone				
		126.95					
130			silicified porphyroblastic gneissose schist				
		134.40	dark green dolerite dyke				
		135.20					
			black biotite porphyroblastic gneissose schist				
140			“				
			“				
			pale green silicified zone pyrite imp				
150							

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GEOLOGICAL OF HAUT ATLAS OCCIDENTAL (PHASE II

GEOLOGICAL DRILL LOG IN ATE-3



JAPAN INTERNATIONAL COOP
 METAL MINING AGENCY

FEBRUARY 19

Prepared by MIN

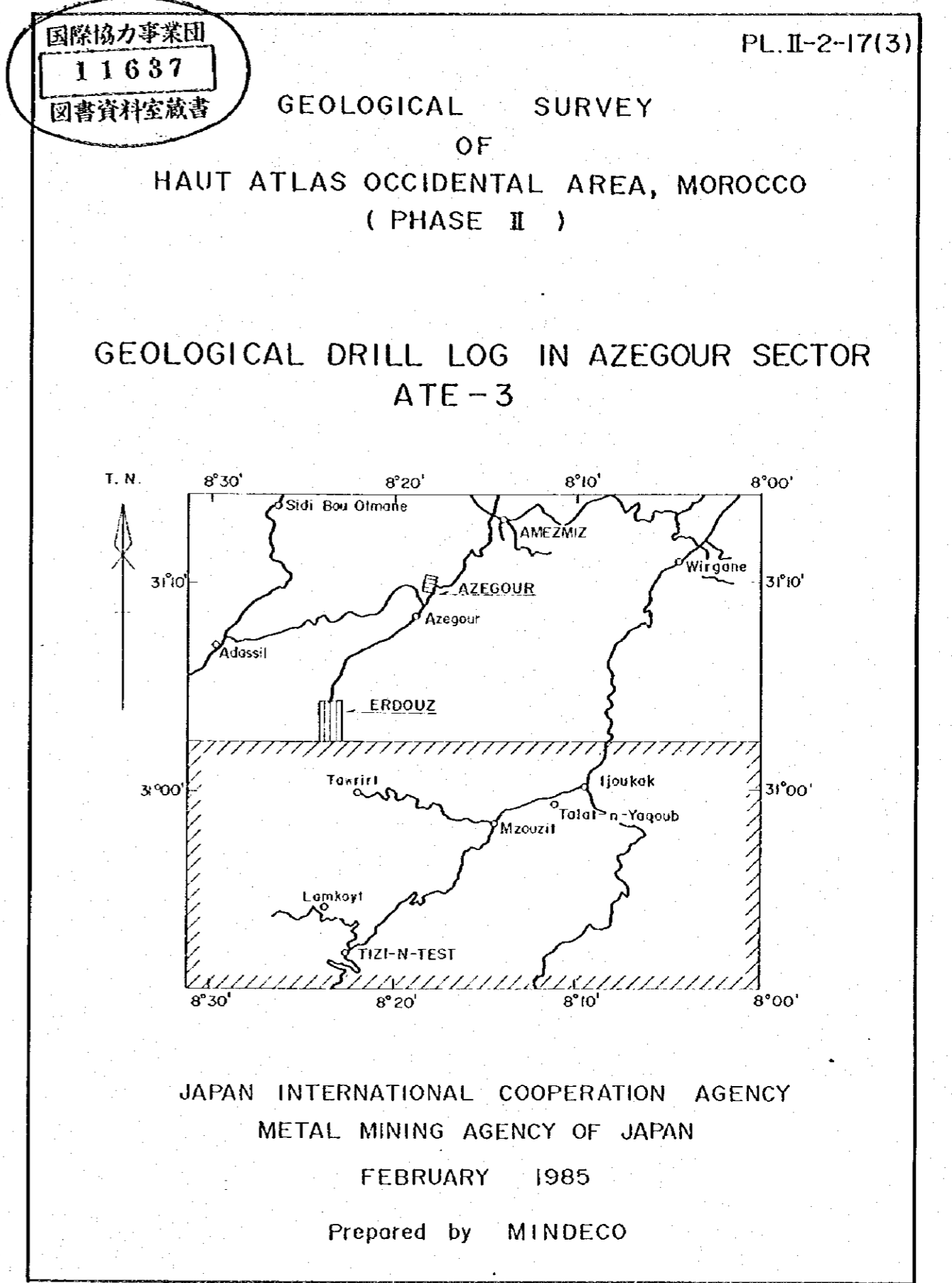


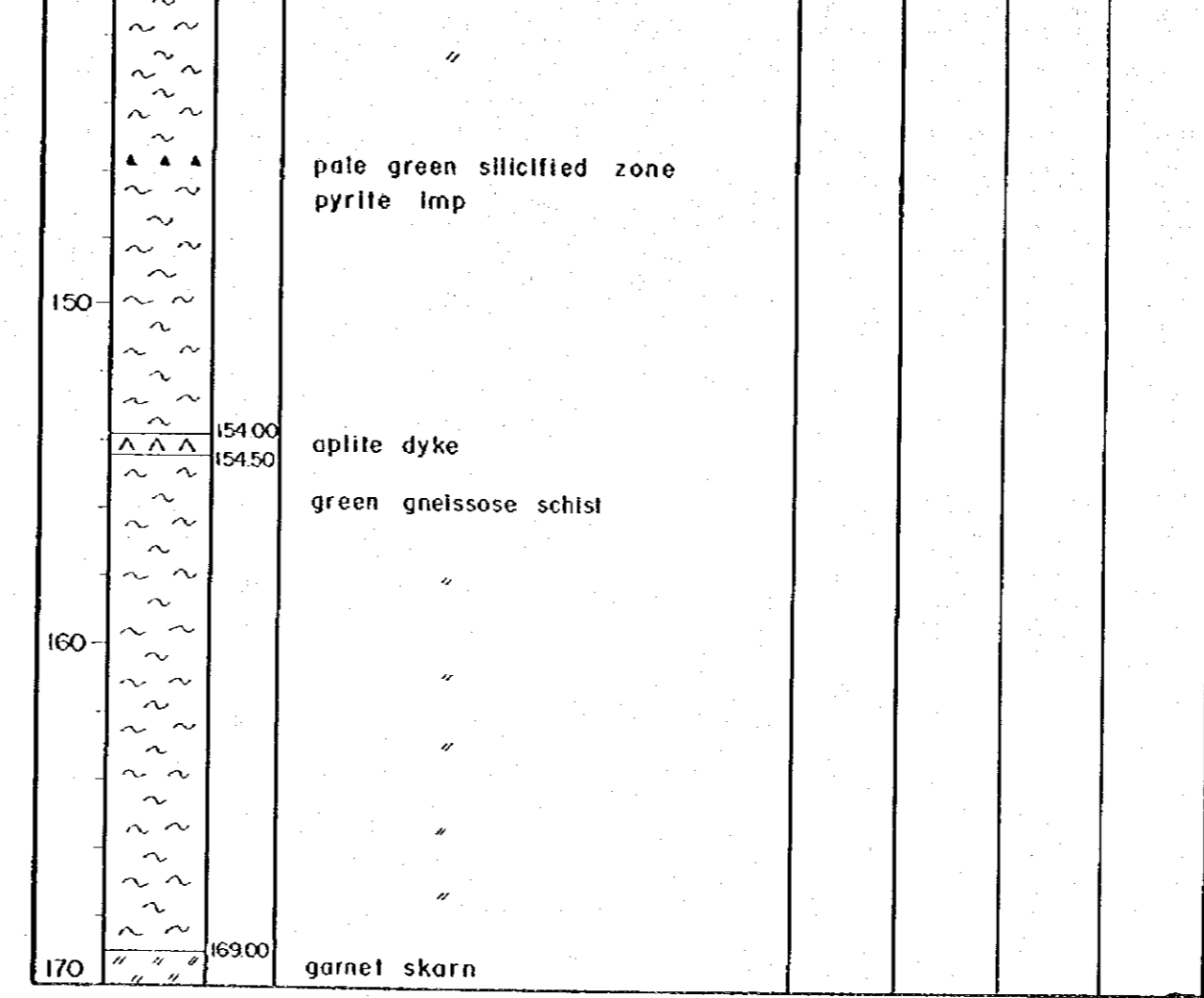
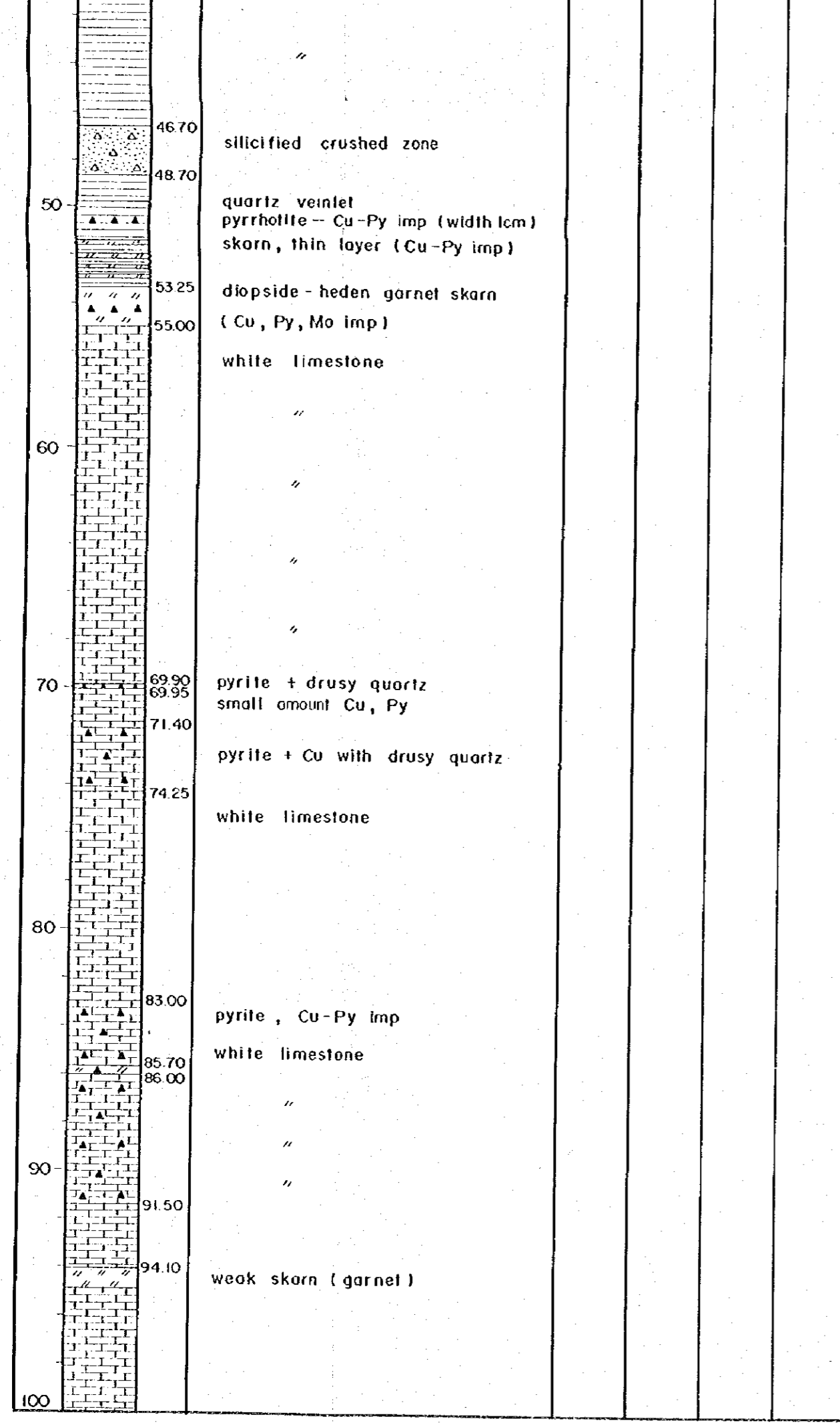
Scale 1 : 200

X = 1895 m Direction 285°
 Y = 3480 m Inclination -55°
 1354 m Total Depth 170.00m

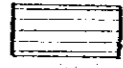
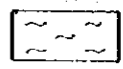
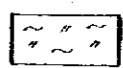
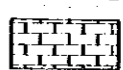
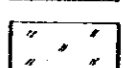
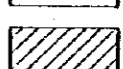
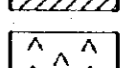
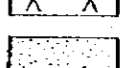
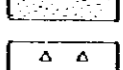
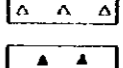
Observation	Depth (m)	Assay (ppm)		
		Cu	Mo	W
Core				
gneissose schist				
white spotted schist				
compact, silicified				
"				
"				
"				
quartz vein 0.20m (sheet-like)				
quartz veinlet				
white spotted schist				
white imp decolored				
silicification				
silicification				
white imp, quartz vein decolored green				
white spotted schist				
"				
"				
silicified crushed zone				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
100			white limestone				
		105.55	garnet skarn, pyrrholite imp				
		106.55	epidote, chlorite garnet skarn				
		106.80					
110		110.00	spotted garnet skarn				
		112.80					
		116.75	quartz porphyry orang-yellow				
		117.90					
120		120.10	diopside-chlorite garnet skarn				
		125.70	white silicified zone				
		126.95	silicified porphyroblastic gneissose schist				
130		134.40	dark green dolerite dyke				
		135.20	black biotite porphyroblastic gneissose schist				
140			"				
			"				
			pale green silicified zone				
			pyrite imp				



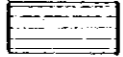
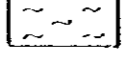
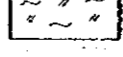
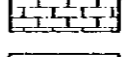
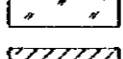
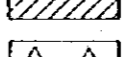
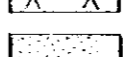
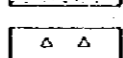
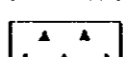



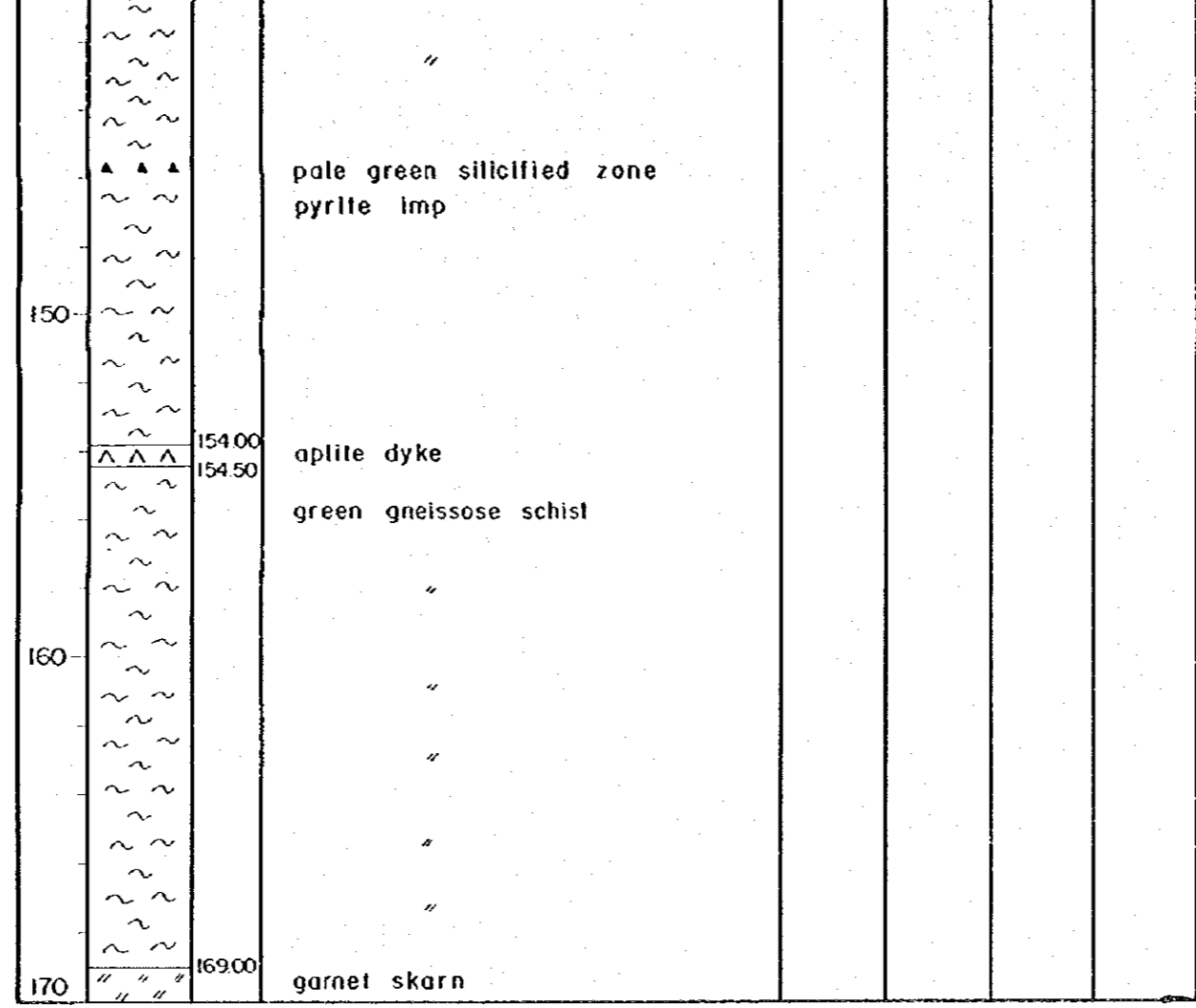
LEGEND

-  spotted schist
-  gneissose schist
-  skarnized schist
-  limestone
-  skarn
-  amphibolite
-  quartz porphyry, aplite, porphyry
-  quartz, calcite, silicified zone
-  crushed zone, sheared zone
-  ore mineral

Scale 1 : 200

LEGEND

-  spotted schist
-  gneissose schist
-  skarnized schist
-  limestone
-  skarn
-  amphibolite
-  quartz porphyry, aplite, porphyrite
-  quartz, calcite, silicified zone
-  crushed zone, sheared zone
-  ore mineral



ified crushed zone

tz veinlet
hotite - Cu-Py imp (width 1cm)
n, thin layer (Cu-Py imp)

side - heden garnet skarn
, Py, Mo imp)

e limestone

"

"

"

"

te + drusy quartz
l amount Cu, Py

te + Cu with drusy quartz

e limestone

le, Cu-Py imp

e limestone

"

"

"

k skarn (garnet)

ATE - 4

Coordinate X = 1895 m
 Y = 3480 m
 Elevation 1354 m

Direction
 Inclination - 90°
 Total Depth 236.50 m

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
0			non core				
		2.60	black silicified schist				
		4.40	crushed brack schit				
		8.50	black silicified schist				
10		11.70	spotted schist				
		18.70	silicified schist				
20		19.20	spotted schist				
		24.80	crushed zone				
30		31.70	amphibolite				
		33.00	silicified spotted schist				
40		39.40	silicified schist				
		40.20					
		44.60	quariz crushed zone				
		45.80	black spotted schist				
50							

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
100		101.70	calcite vein				
		102.30	porous silicified limestone				
		109.20	grey limestone				
110							
		125.50	crushed grey limestone				
120							
		131.60	grey limestone				
130							
		135.20	crushed limestone				
		136.50	grey massive limestone				
140							
		150.00	pyrite, pyrrolite imp				
150			pyrite, imp crushed zone				

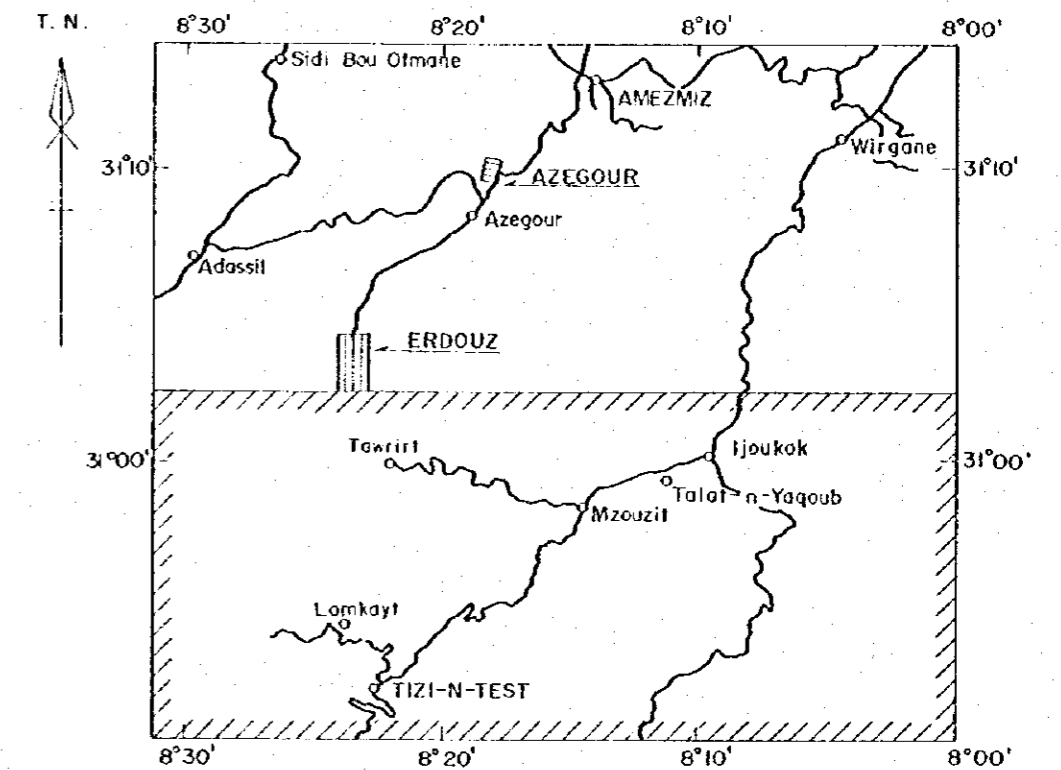
Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
200		200.40	greenish marron skarn				
		202.00	chalcocite				
		203.90					
		204.50	silicified schist				
		206.50					
		208.50	gneissose schist				
210							
		214.70	biotite gneissose schist				
			gneissose schist (porphyroblastic)				
220							
		226.20	silicified rock				
		227.10	gneissose schist (porphyroblastic)				
230							
		230.50	silicified rock				
		231.00					
		234.20	silicified rock				
		236.50	gneissose schist				

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PL.II-2-17(4)

GEOLOGICAL SURVEY
OF
HAUT ATLAS OCCIDENTAL AREA, MOROCCO
(PHASE II)

GEOLOGICAL DRILL LOG IN AZEGOUR SECTOR
ATE-4



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

FEBRUARY 1985

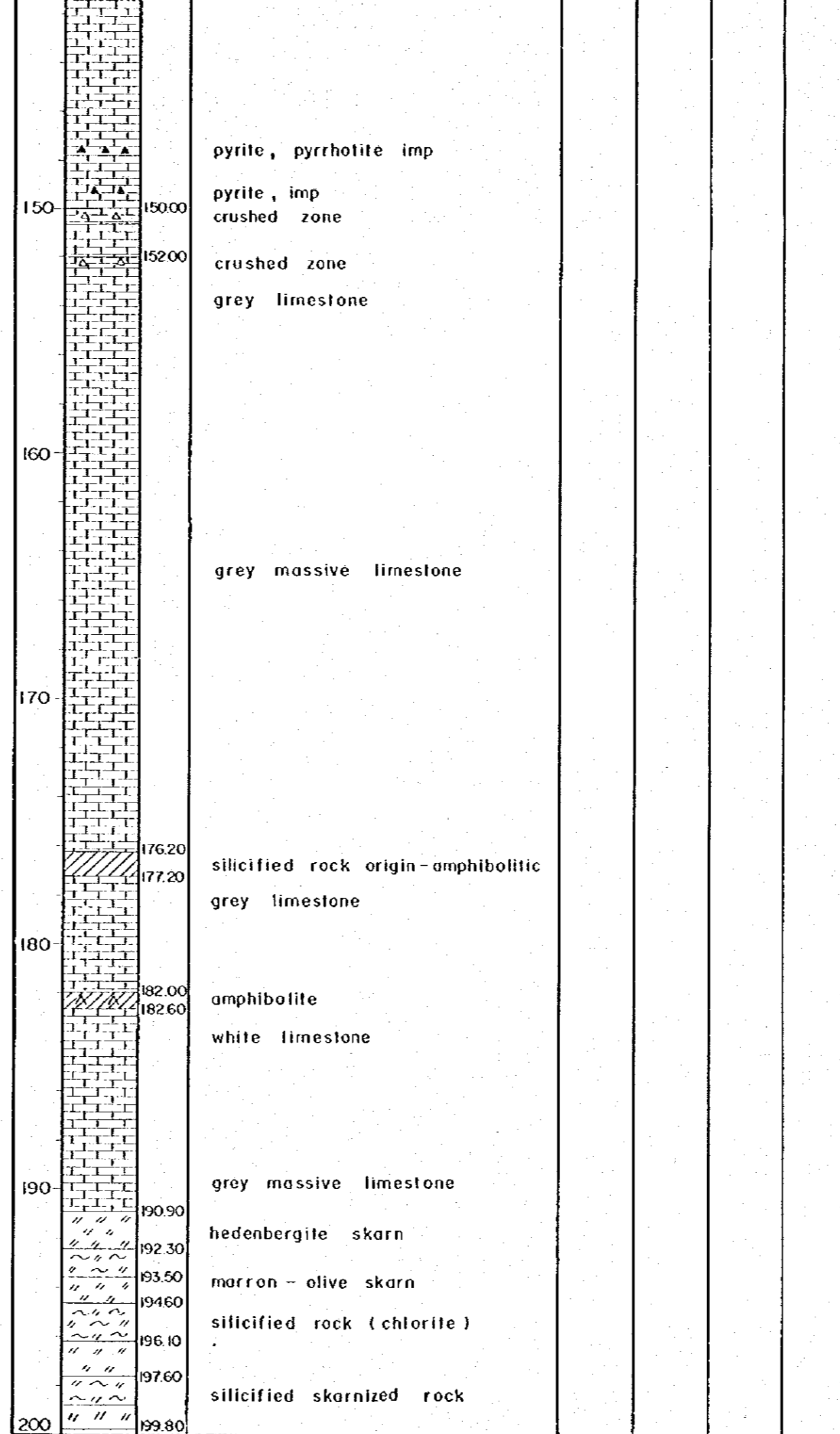
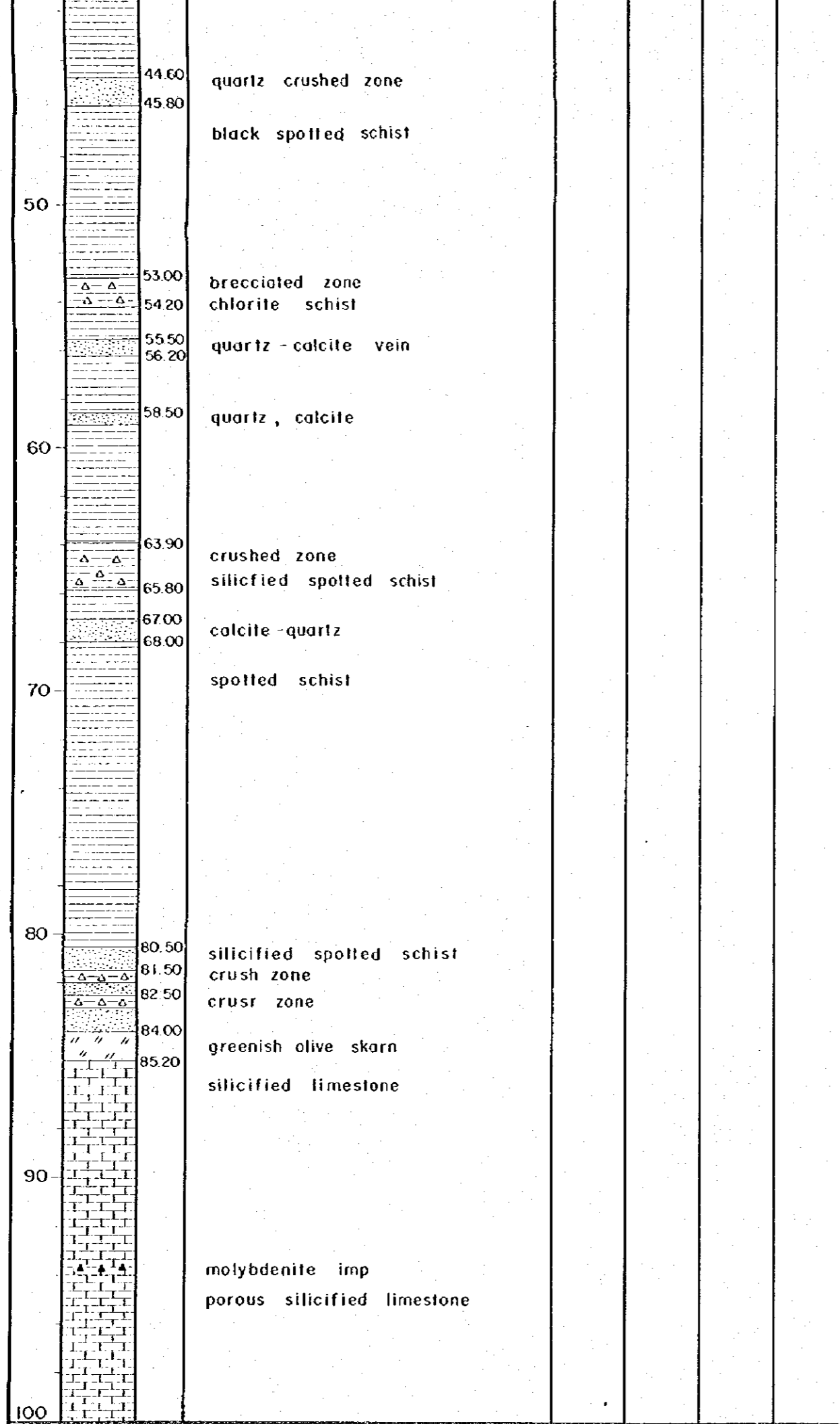
Prepared by MINDECO



Scale 1 : 200

Observation	Depth (m)	Assay (ppm)		
		Cu	Mo	W
ite vein				
ous silicified limestone				
limestone				
hed grey limestone				
limestone				
hed limestone				
massive limestone				
e, pyrrhotite imp				
e imp				

Depth (m)	Column	Depth (m)	Observation	Depth (m)	Assay (ppm)		
					Cu	Mo	W
200		200.40	greenish marron skarn				
		202.00	chalcocite				
		203.90					
		204.50	silicified schist				
		206.50					
		208.50	gneissose schist				
210							
		214.70	biotite gneissose schist				
			gneissose schist (porphyroblastic)				
220							
		226.20	silicified rock				
		227.10					
			gneissose schist (porphyroblastic)				
230							
		230.50	silicified rock				
		231.00					
		234.20	silicified rock				
		236.50	gneissose schist				



e, pyrrhotite imp
 e, imp
 ed zone
 hed zone
 limestone

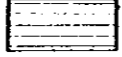
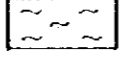
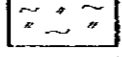
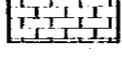

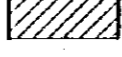
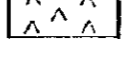

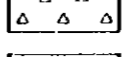
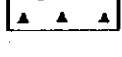
 massive limestone

 fied rock origin-amphibolitic
 limestone

 ibolite
 e limestone

 massive limestone
 nbergite skorn
 on - olive skarn
 fied rock (chlorite)
 fied skarnized rock

LEGEND

-  spotted schist
-  gneissose schist
-  skarnized schist
-  limestone
-  skarn
-  amphibolite
-  quartz porphyry, aplite, porphyrite
-  quartz, calcite, silicified zone
-  crushed zone, sheared zone
-  ore mineral

