

- L : 鉱体の長さ(m)  
 H : 鉱体の斜長(m)  
 TT : 鉱体の真厚(m)  
 SG : 比重(2.9)

#### 4-6-2 計算結果

埋蔵鉱量試算の結果、鉱量275千t、Au品位13.1g/t、金量3.6tを得た(Table II-4-4)。

Table II-4-4 Ore Reserves Calculation of Bulutkan Ore Deposits

Ore body	Ore block	Area (m <sup>2</sup> )	True Thickness (m)	Volume (m <sup>3</sup> )	Tonage <sup>*</sup> (t)	Grade		Metal content	
						Au (g/t)	Ag (g/t)	Au (kg)	Ag (kg)
Bulutkan	1(1)	910	29.7	26,989	78,268	5.9	1.5	461.8	117.4
	1(2)	1,155	9.0	10,402	30,166	12.9	3.4	389.1	102.6
	Sub total	2,065	18.1	37,391	108,434	7.8	2.0	850.9	220.0
The others	2	756	0.5	378	1,096	8.5	7.8	9.3	8.5
	3	338	4.9	1,656	4,802	4.4	4.6	21.1	22.1
	4	1,400	1.8	2,520	7,308	74.7	tr	545.9	0
	5	7,820	1.3	10,166	29,481	2.5	10.8	73.7	318.4
	6	5,166	3.9	20,147	58,426	29.0	2.4	1,689.9	140.2
	7	6,375	1.6	10,200	29,580	2.3	36.1	68.0	1,067.8
	8	12,320	1.0	12,320	35,728	9.2	tr	328.7	0
	Sub total	34,175	1.7	57,387	166,421	16.4	9.4	2,736.6	1,557.0
Total		36,240	2.6	94,778	274,855	13.1	6.5	3,587.5	1,777.0

\*Specific gravity : 2.9

#### 4-7 ブルトカン地区の開発計画

ブルトカン地区の鉱床の鉱量計算(試算)の結果及び現地調査に基づき開発計画を検討した。検討内容の詳細をAppendix 2に示す。

本計画ではブルトカン鉱床を含む2つの鉱画を選択して露天採掘することとした。採掘対象は埋蔵鉱量で115千t、Au品位11.1g/tであり、可採粗鉱量は115千t、Au品位10.0g/tである。

可採粗鉱量が少なく、独立した鉱山として開発することは難しいと考えられる。近隣には粗鉱生産量10,000t/日のコクパクス金山が稼働しており、その支山として開発し、鉱石はコクパクス金山の鉱石を処理しているウチクドクNo.3選鉱場へ委託処理することを前提とした(Fig II-4-25)。

115千の鉱石を数年にわたって採掘すると維持管理コストが増加し、採算を悪化させるので短期間で採掘を終了させることが望ましい。従って、年間操業日数260日(コクパタス金山と同じ)、生産量450t/日として1年で採掘を終了させることとした。鉱石は45tダンプトラックでコクパタスまで運搬し、コクパタスからは既設の鉄道でNo.3選鉱場まで鉄道運搬する。

収入の条件として、浮選採取率95%、精鉱青化製錬採取率85%、電解採取率を99%とした。金建値を360\$/TOZとすれば、粗鉱トン当たりの収入は4,630ソム/(92.6\$/t)となる。副産物としてのAgからの収入は見込んでいない。

粗鉱トン当たりの開発費(インフラストラクチャー+採鉱機械)は2,944ソム/(58.9\$/t)、採掘費は719ソム/(14.4\$/t)、委託選鉱費は842ソム/(16.8\$/t)で、粗鉱トン当たりの支出の合計は4,505ソム/(90.1\$/t)となる。従って、粗鉱トン当たりの収益は125ソム/(2.5\$/t)となる。

以上の様に採掘対象鉱量115千tを採掘すれば、概算では約15,000千ソム/(300千\$)の利益が得られる。点在する鉱床については部分的な開発は可能と考えられる。



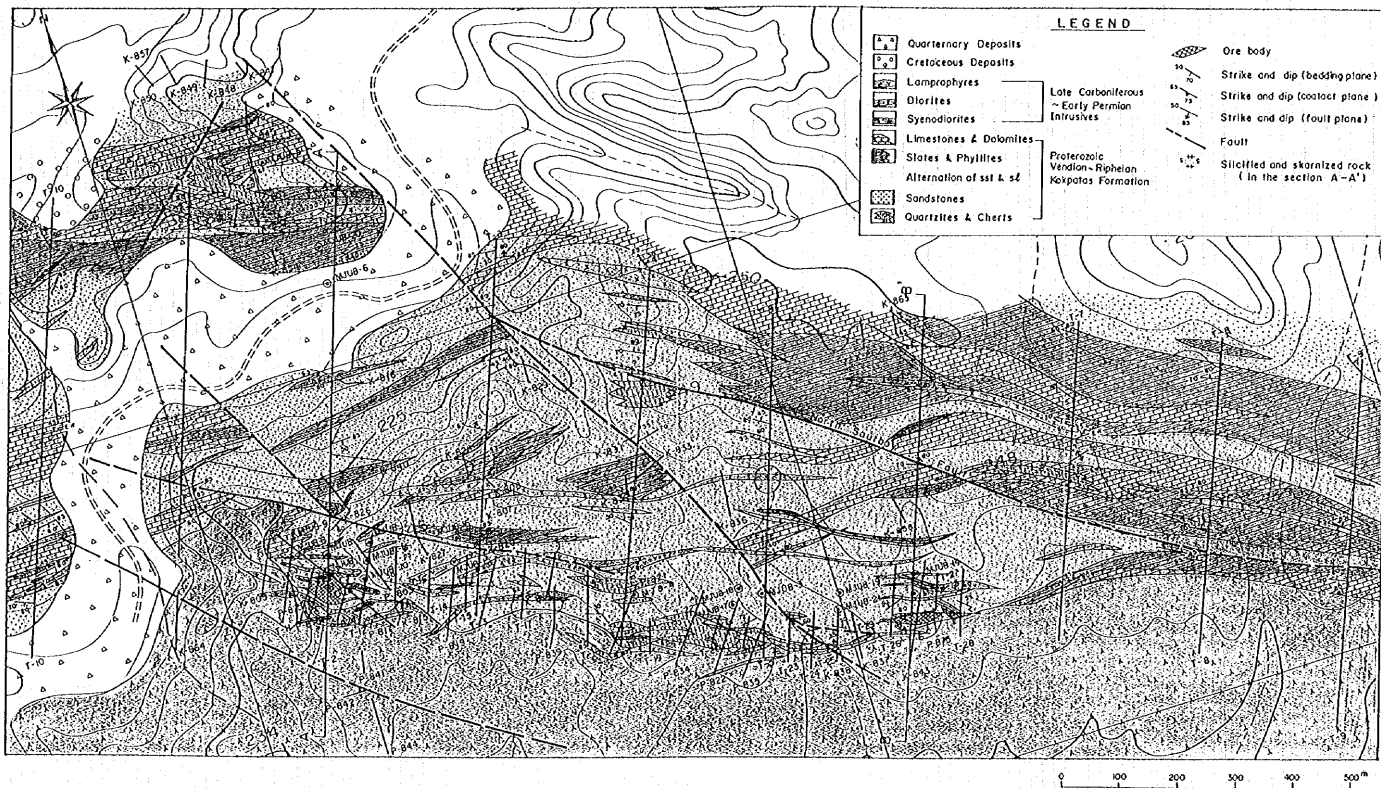


Fig. II-4-1 Geological Map of the Bulutkan District

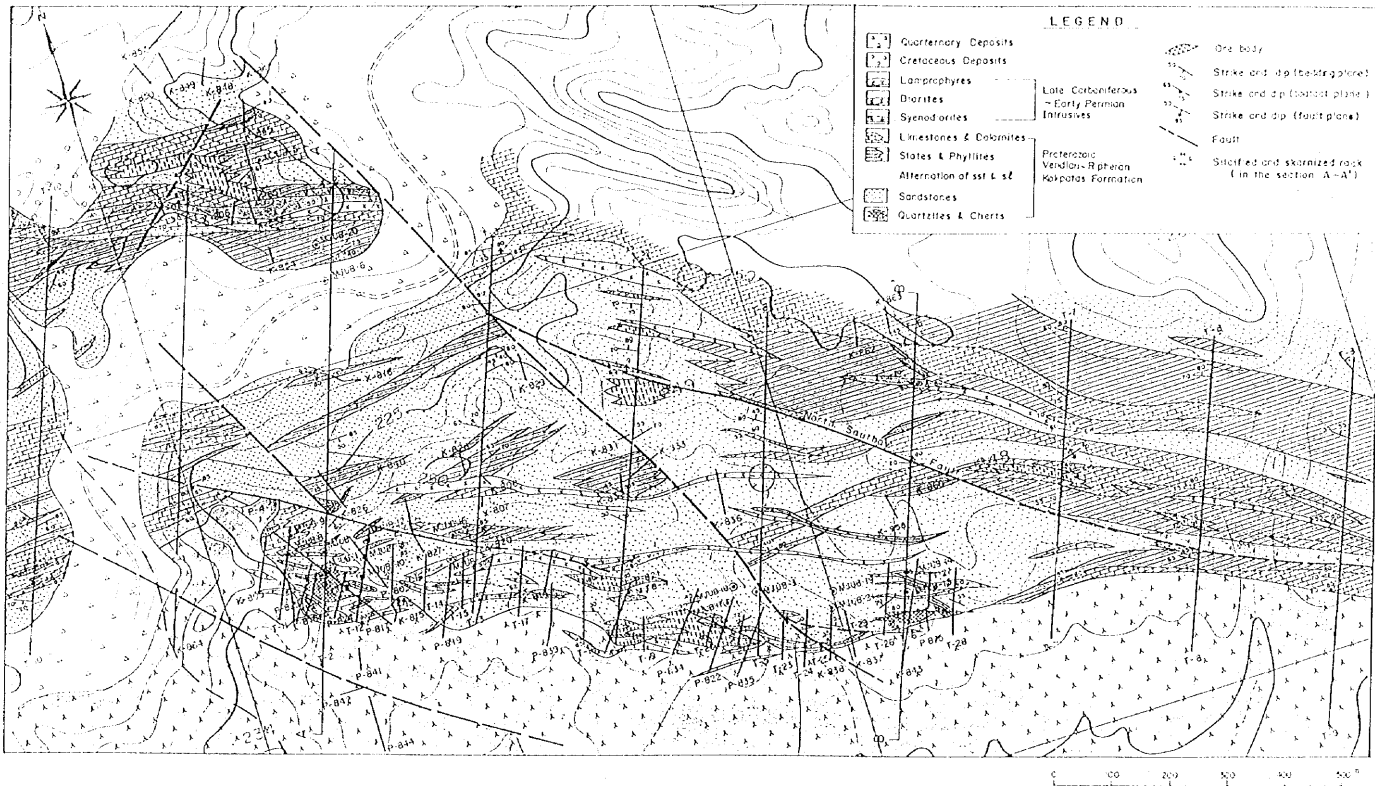


Fig II-1-1 Geological Map of the Bulunkan District



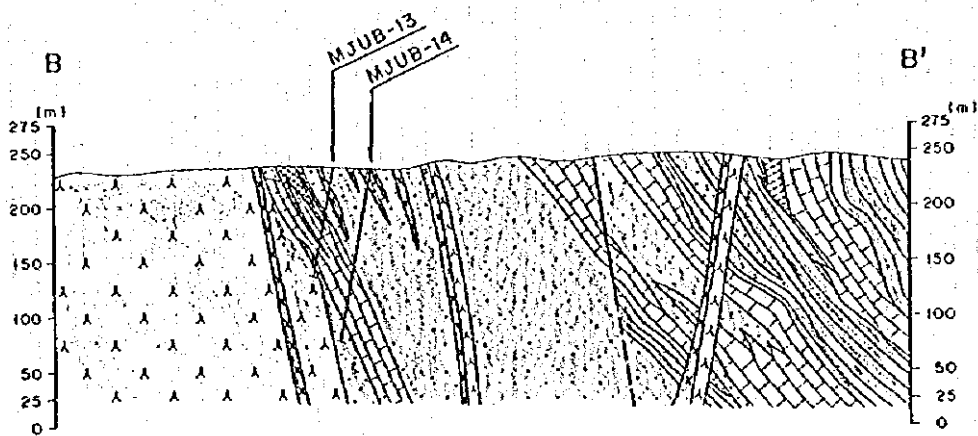
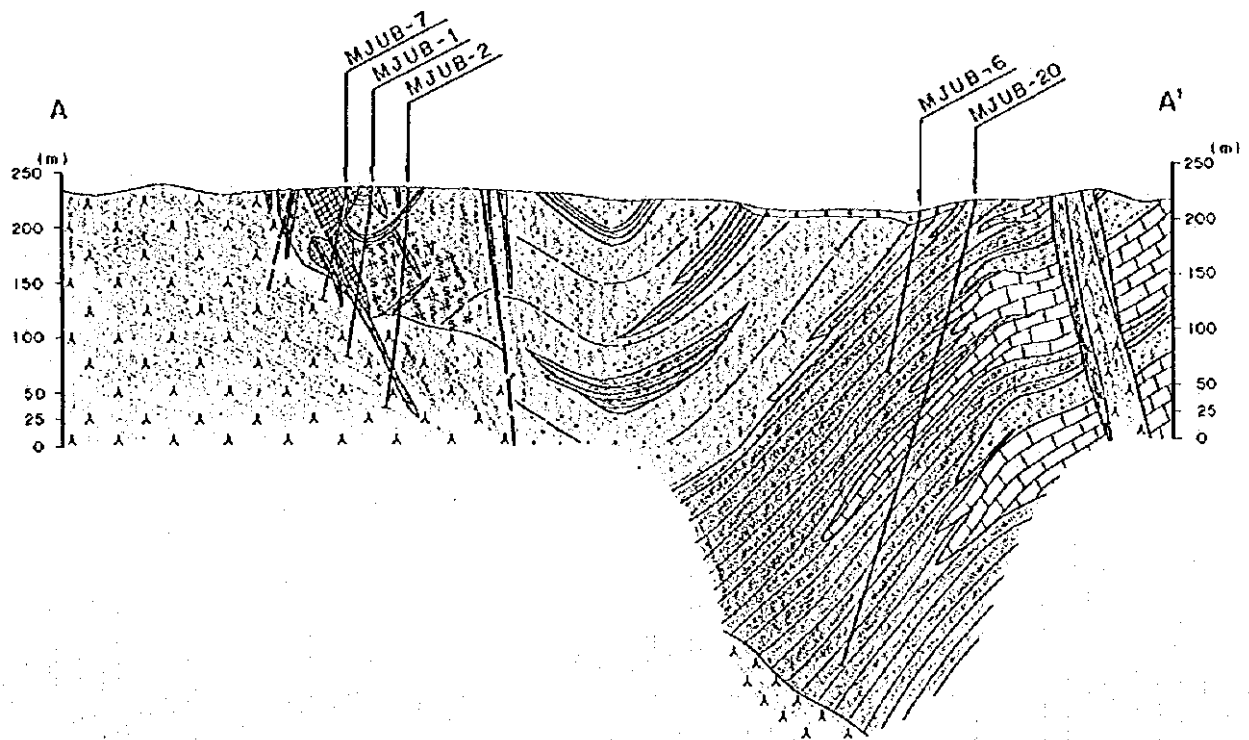
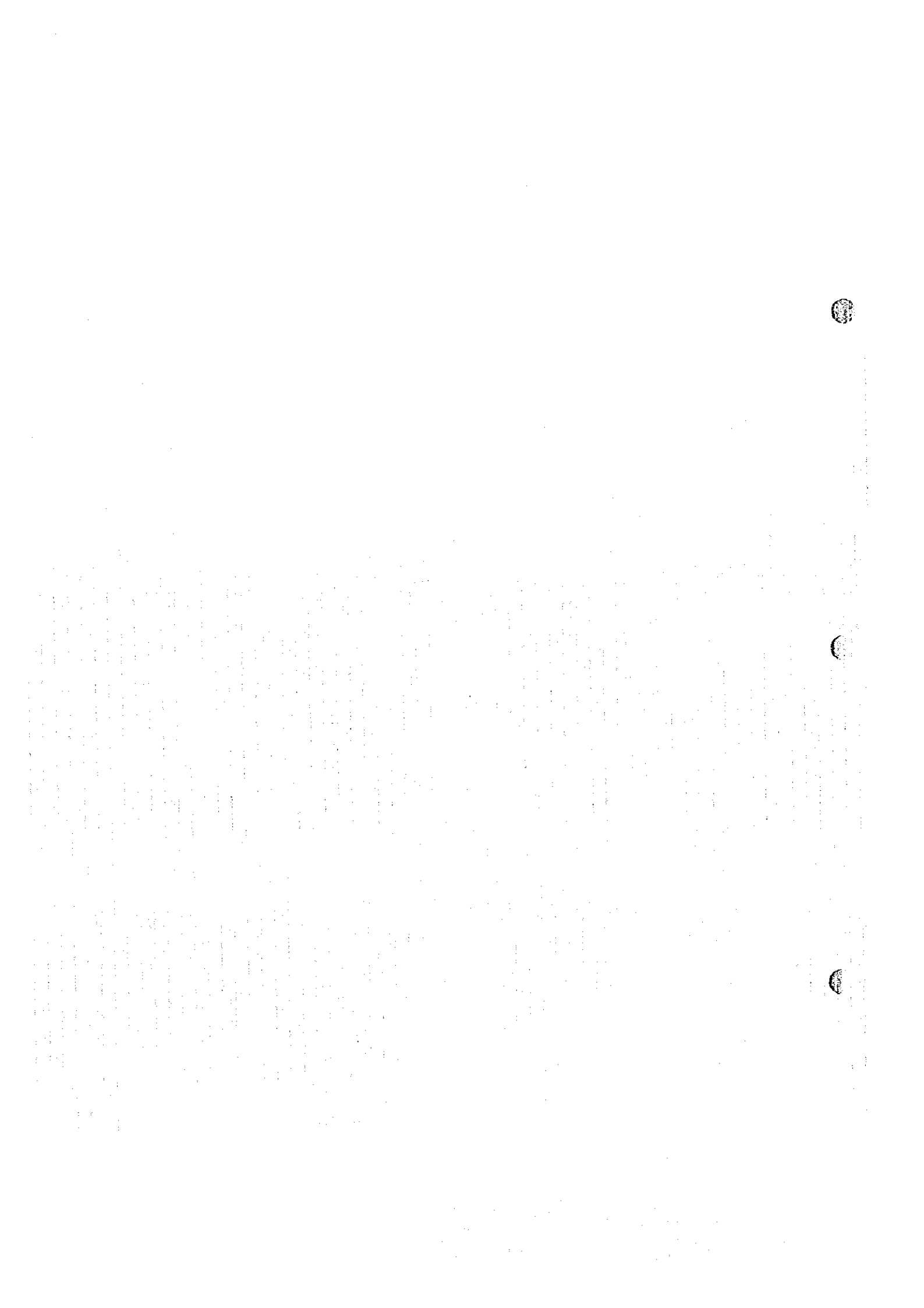


Fig. II-4-2 Geological Cross Section of the Bulutkan District







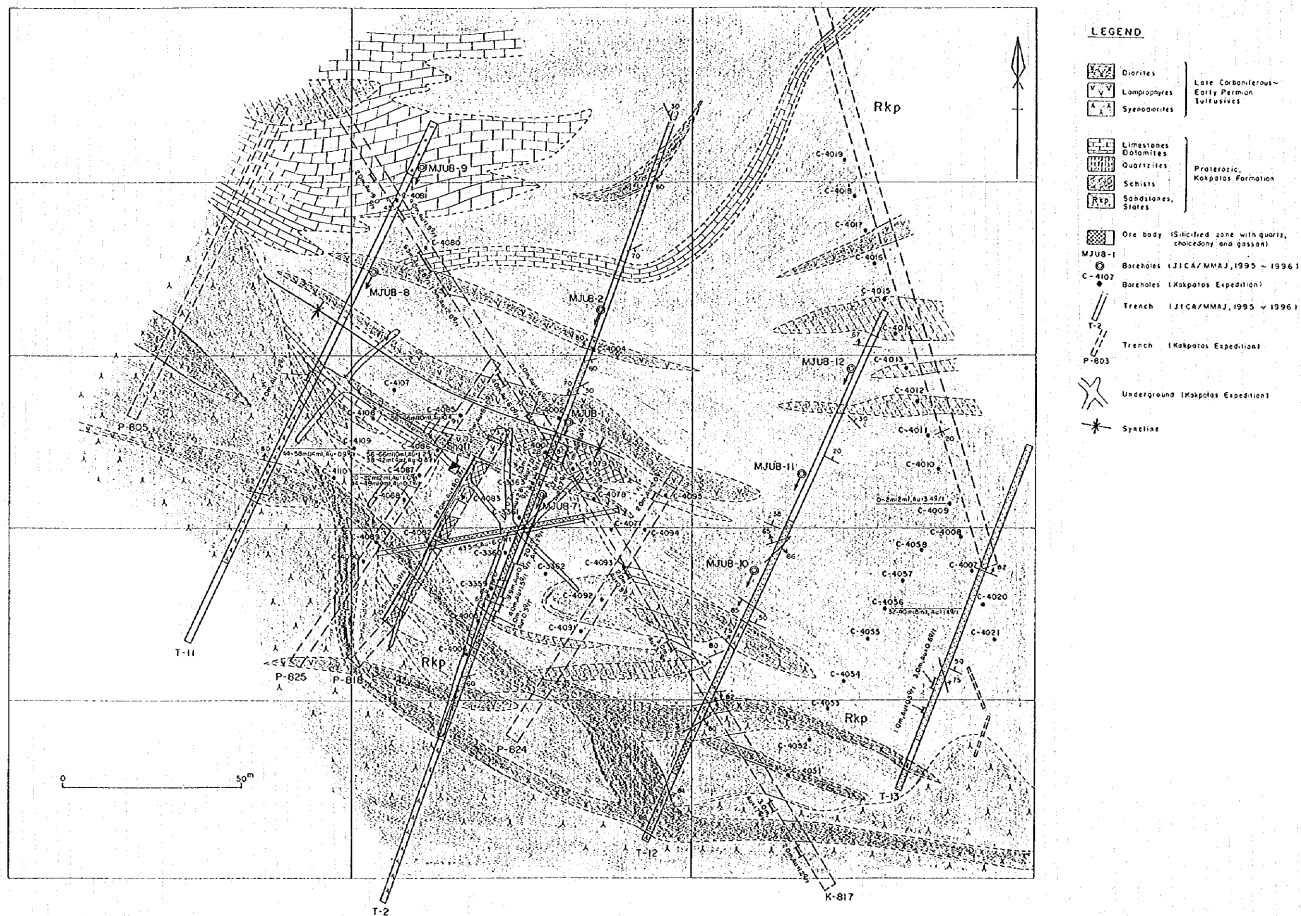
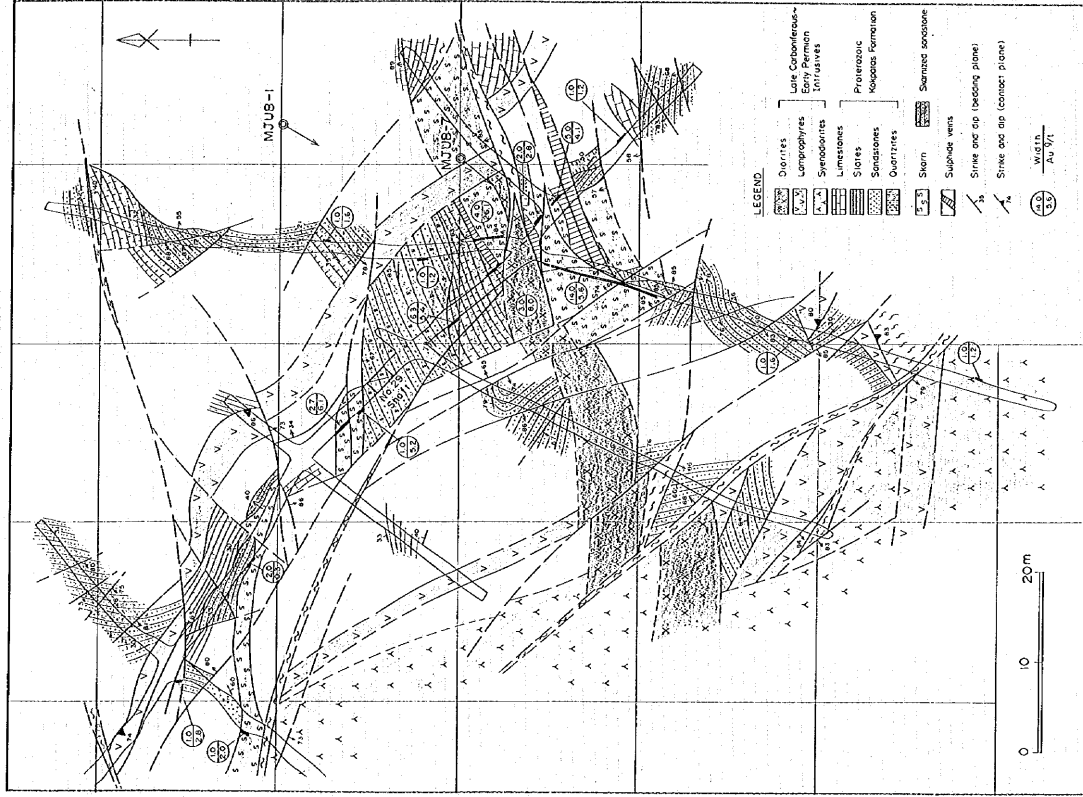


Fig. II-4-3 Geological Map of the Bulutkan Ore Deposit



Kokpotos Expedition (1956)

Fig. II-4-4 Underground Geological Map of the Buluitan Ore Deposit(+210m Level)

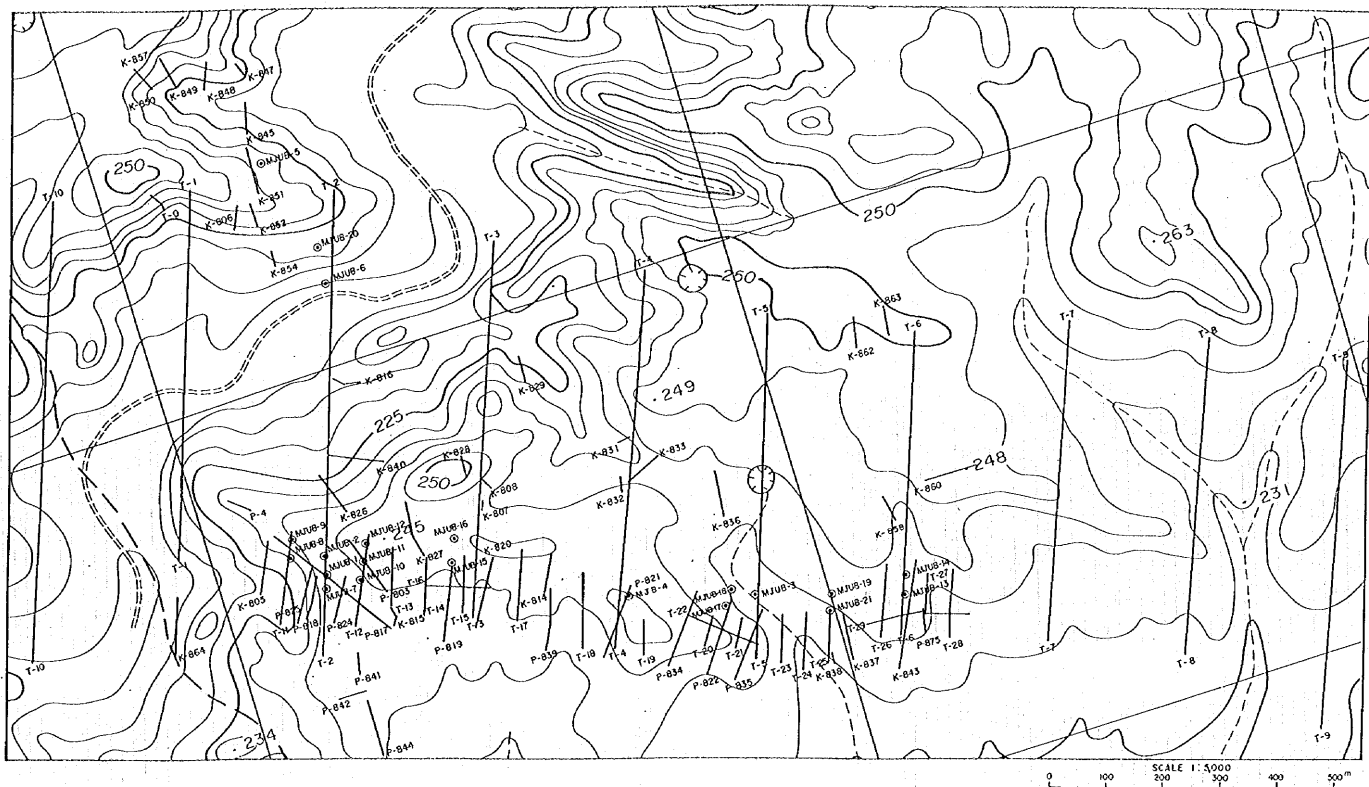


Fig. 11-4-5 Location Map of the Trenches and Drillholes

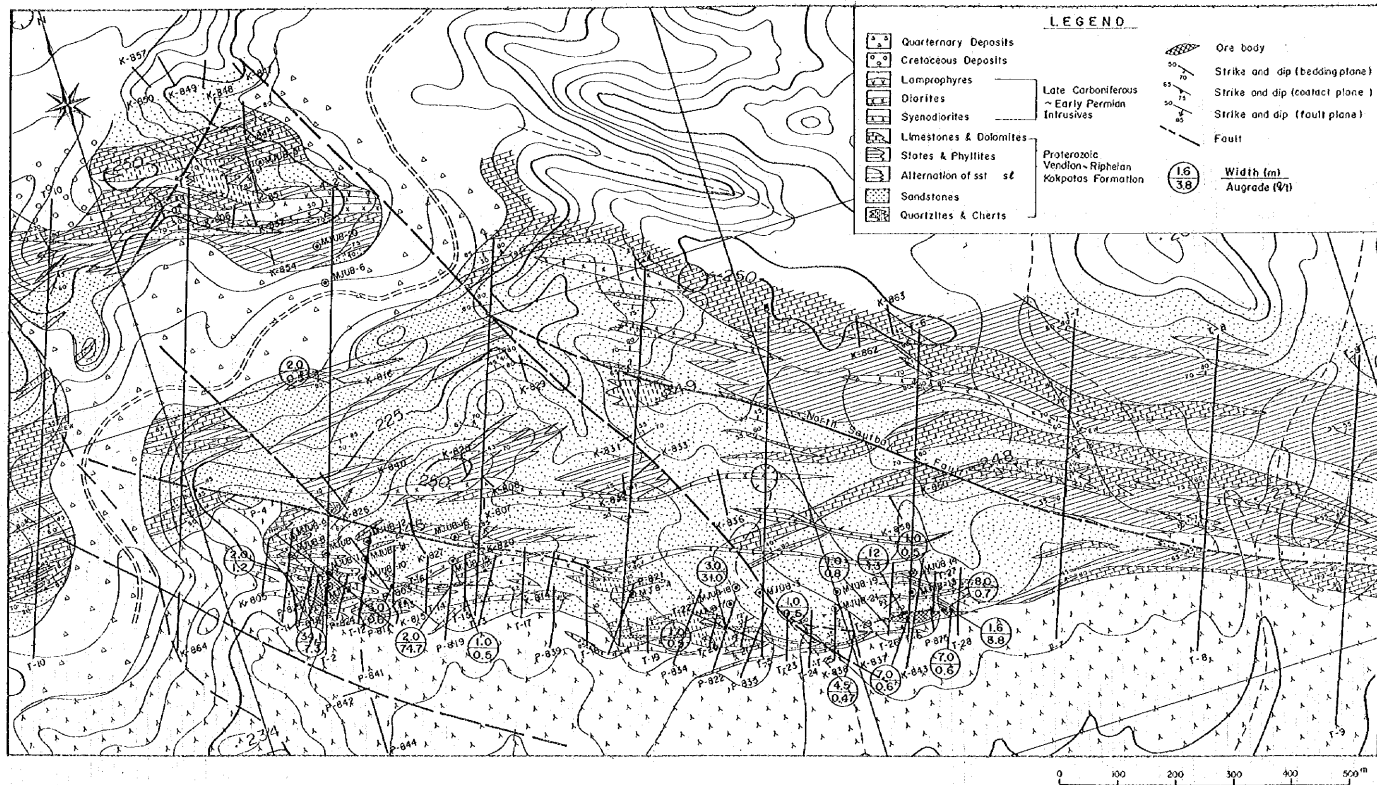


Fig. II -4-6 Major Mineralized Zones Caught by Trenches



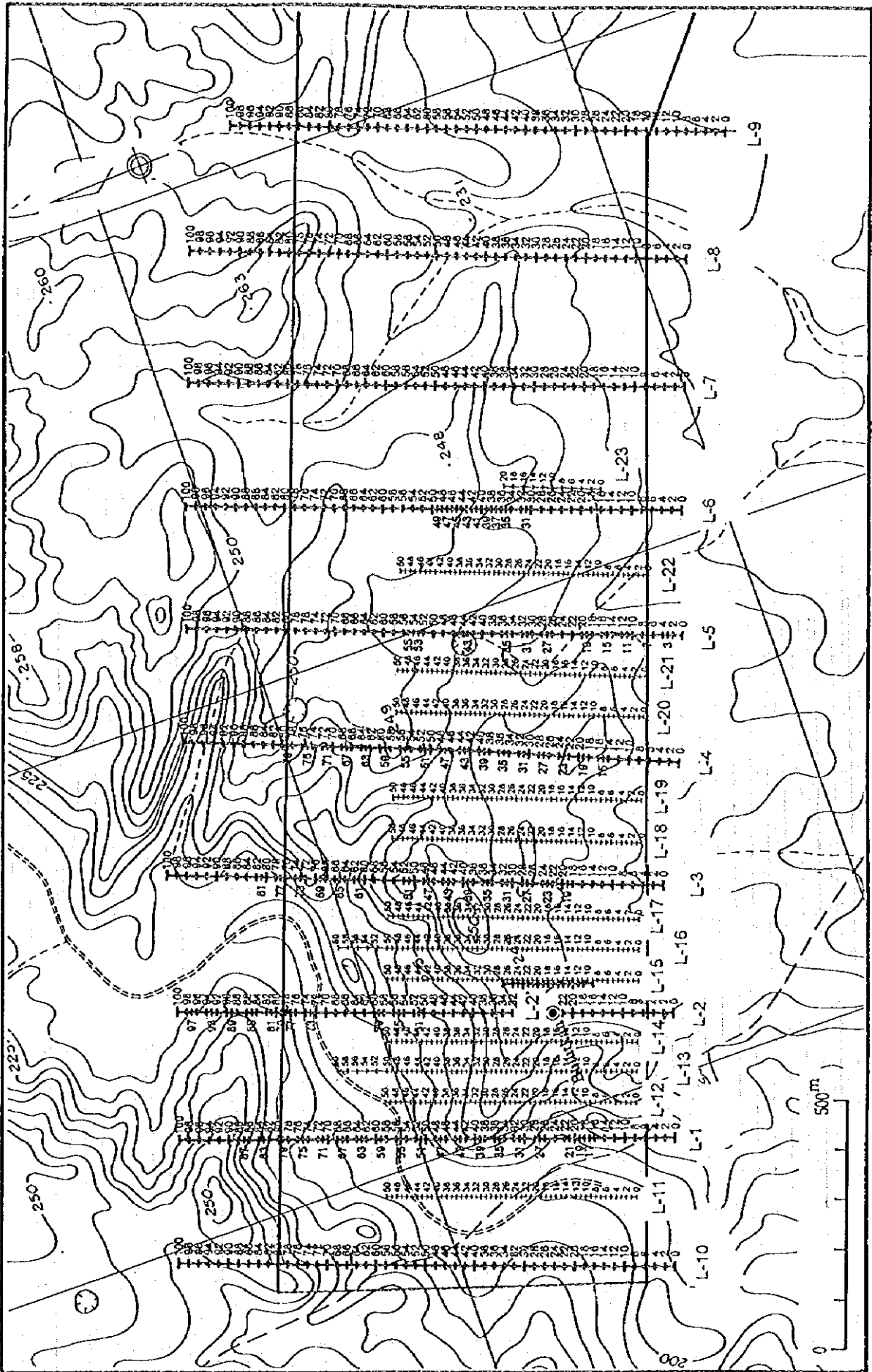


Fig. II-4-7 Locations of TEM Survey Lines and Sites

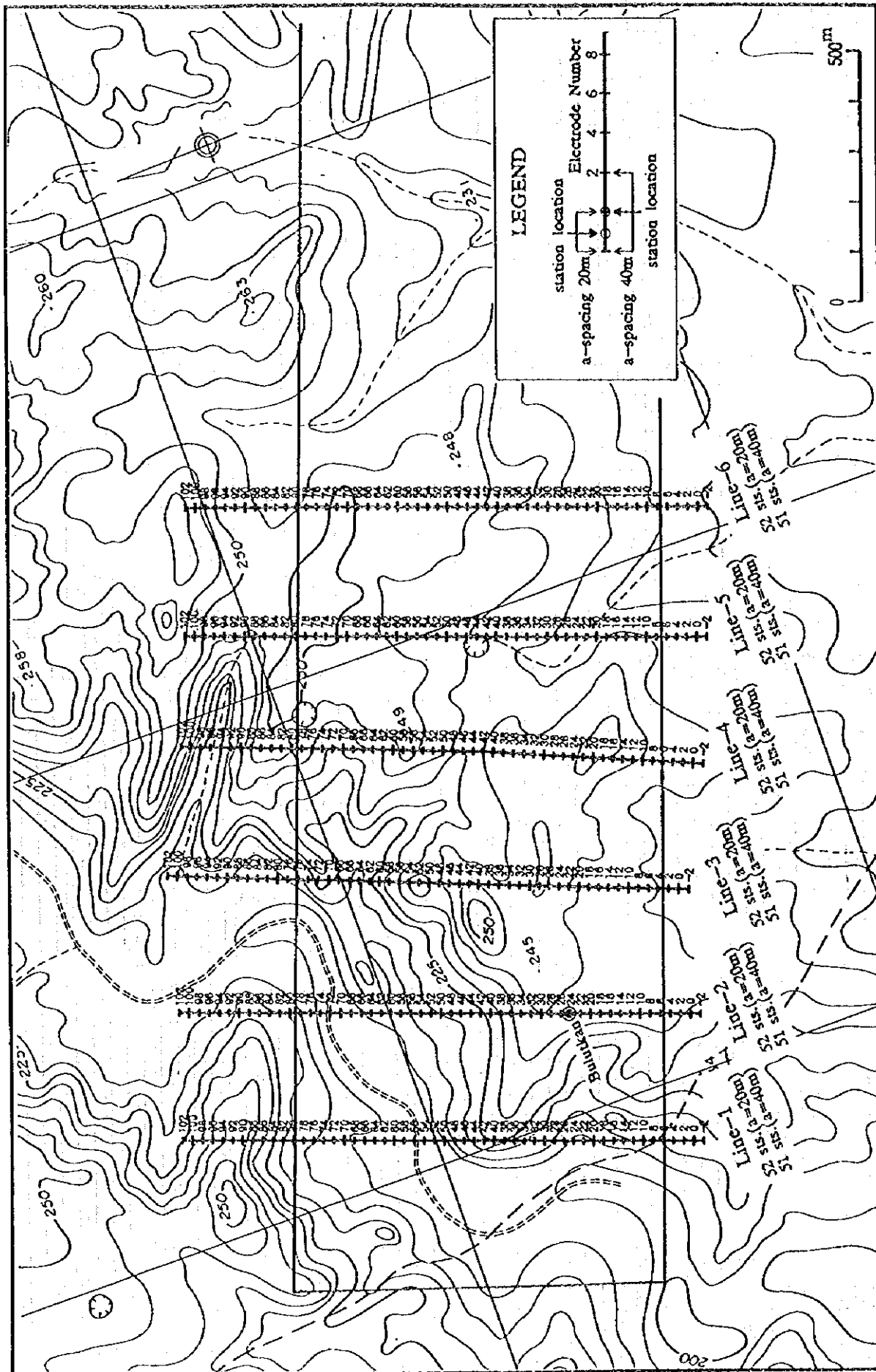
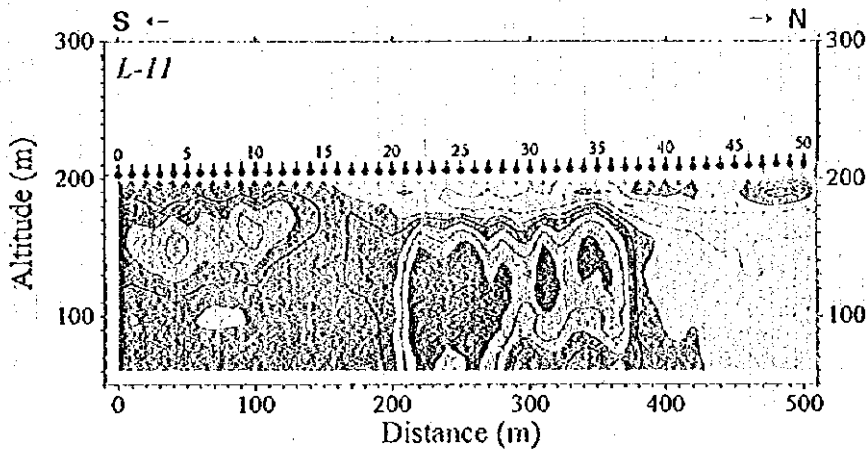
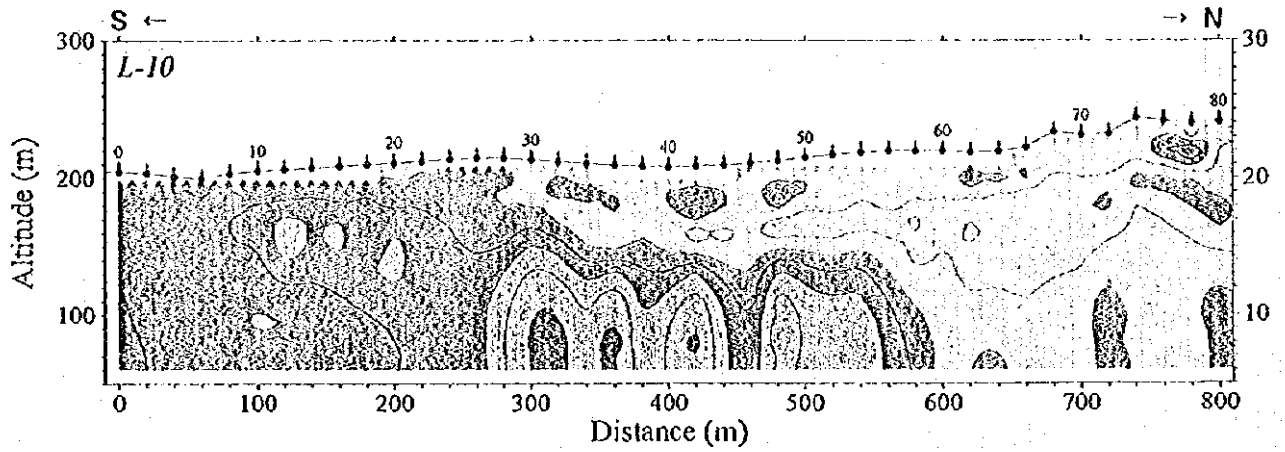


Fig. II-4-8 Locations of TDIP Survey Lines and Sites





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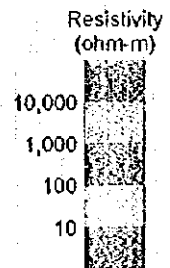


Fig. II-4-9(1) Resistivity Structure Sections (Line-10 and Line-11)

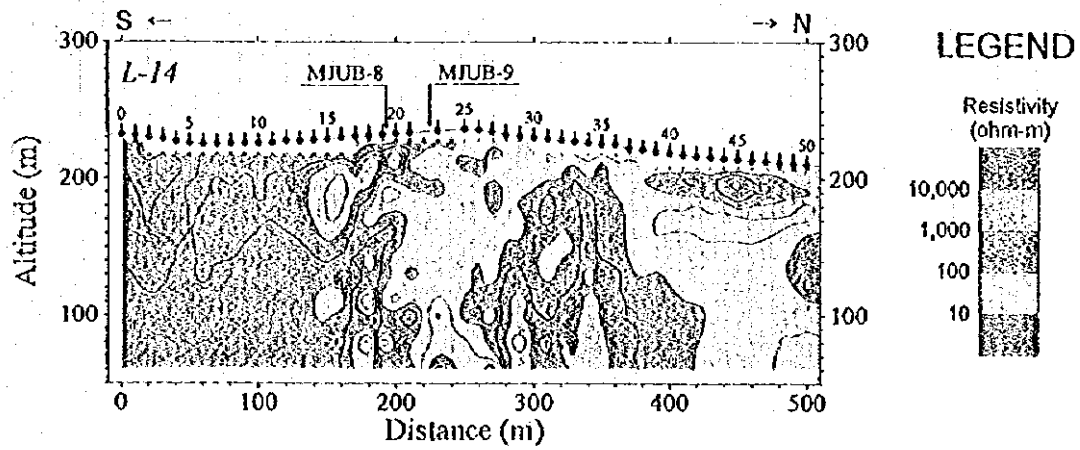
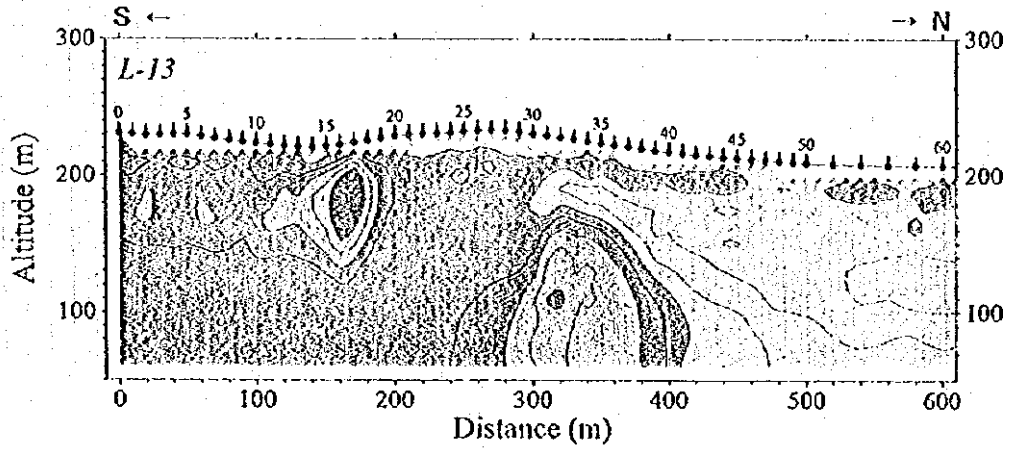
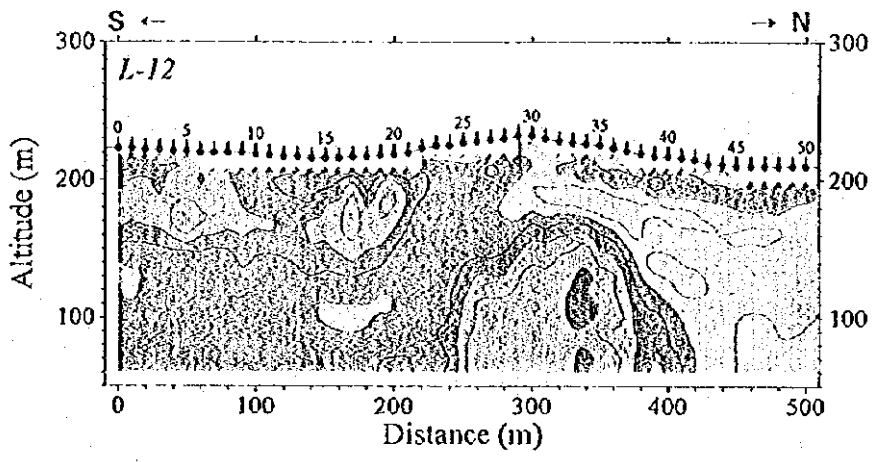
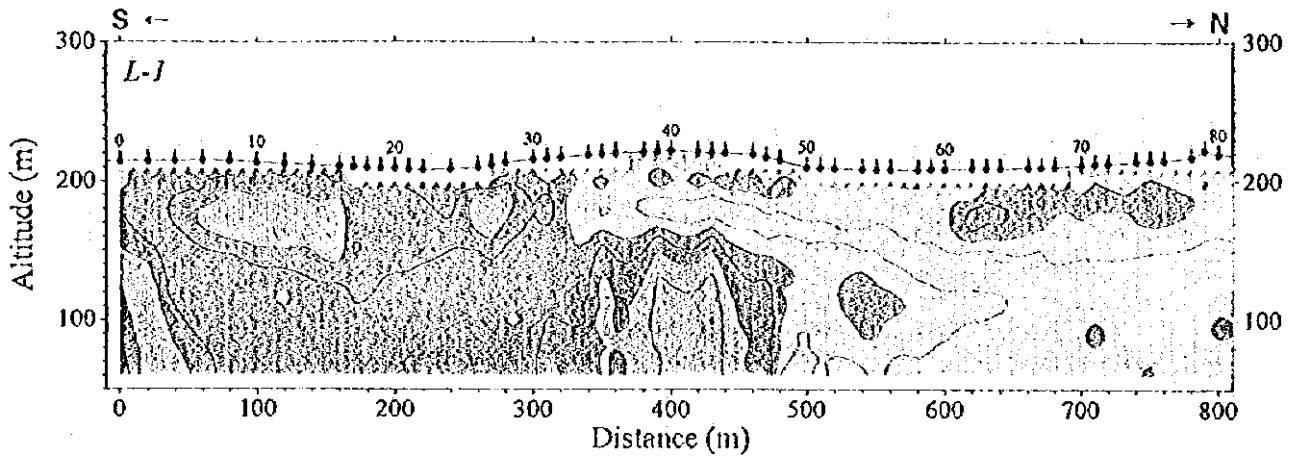


Fig. II-4-9(2) Resistivity Structure Sections (Line-1, Line-12, Line-13 and Line-14)

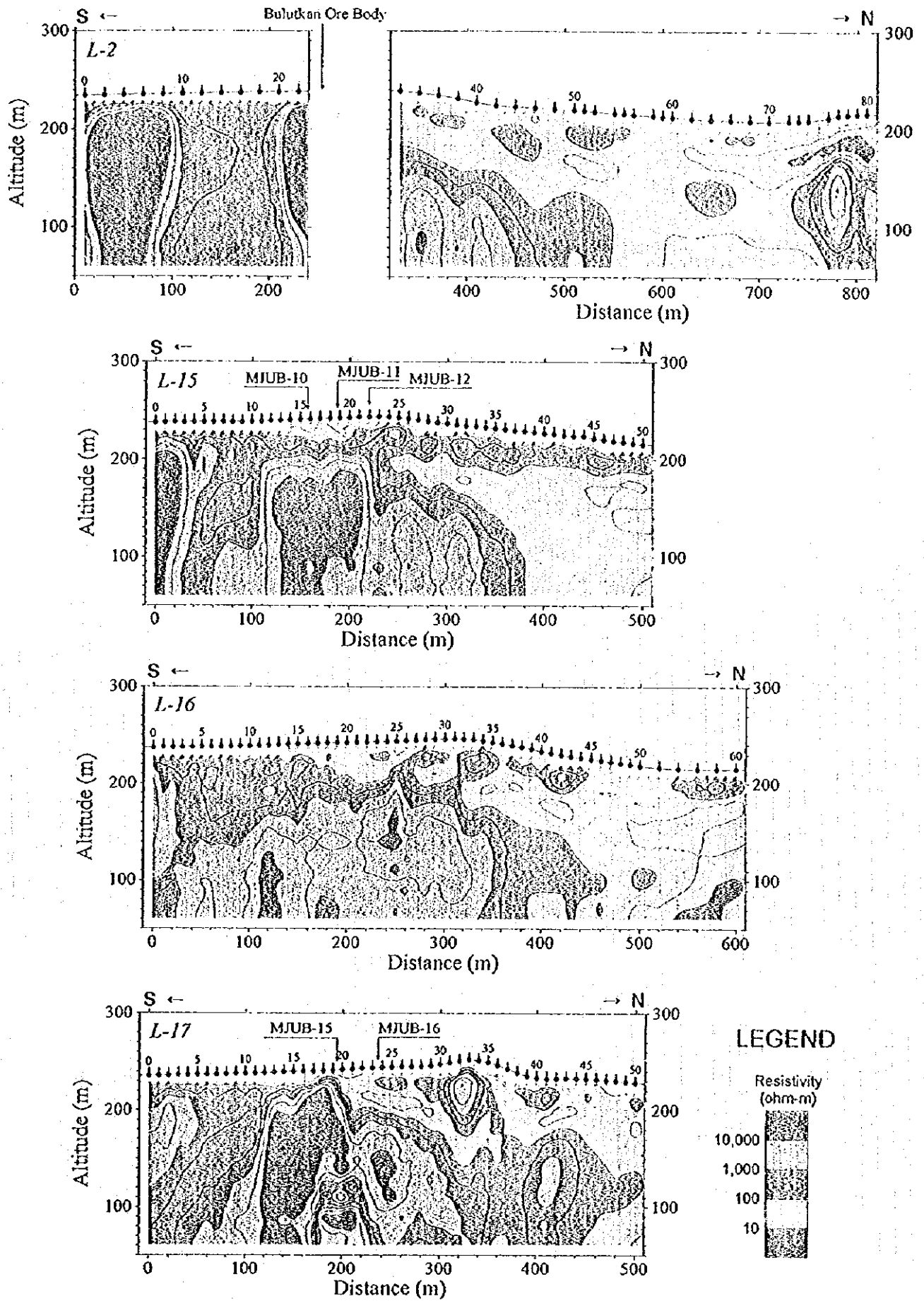


Fig. II-4-9(3) Resistivity Structure Sections (Line-2, Line-15, Line-16 and Line-17)

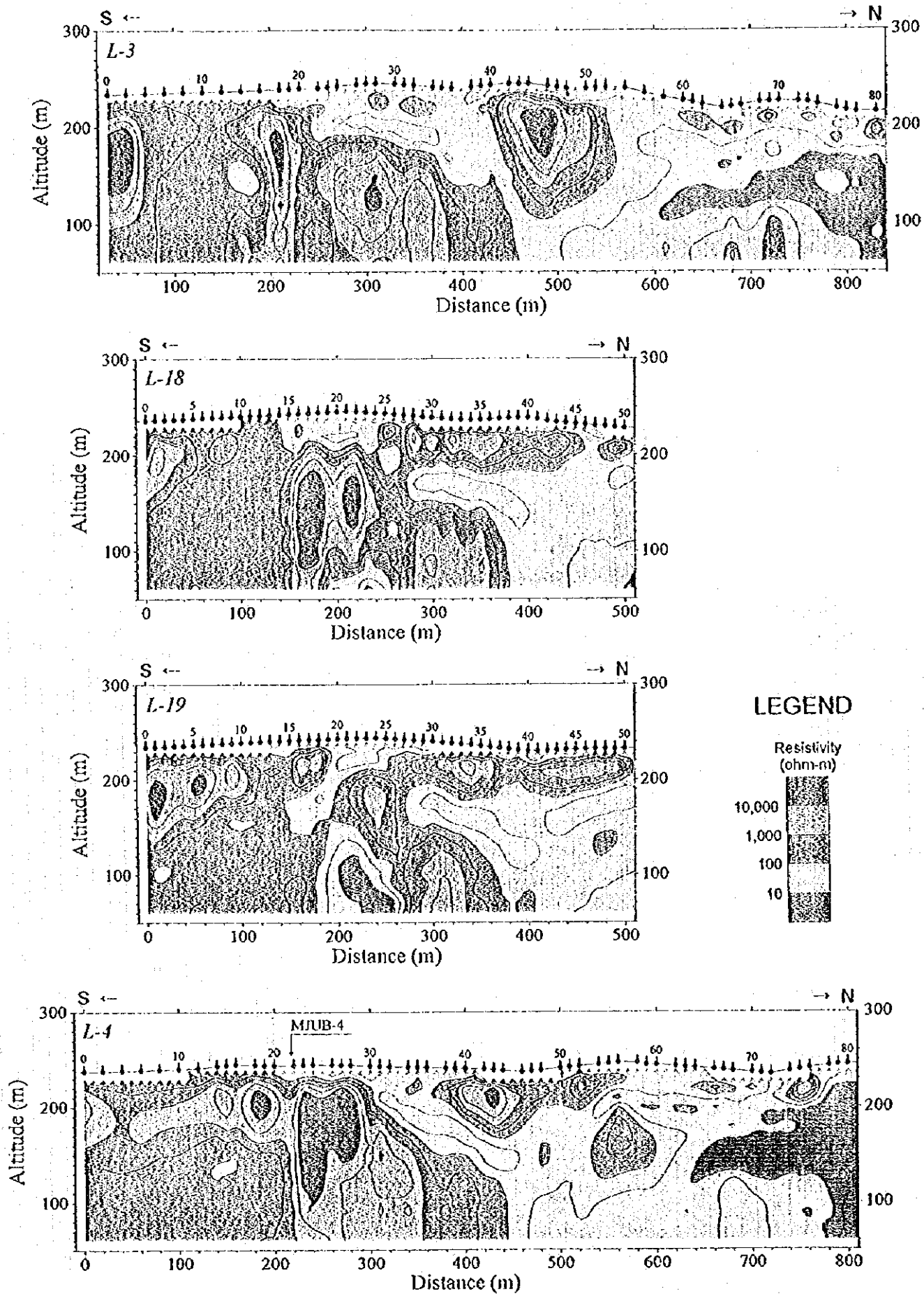


Fig. II-4-9(4) Resistivity Structure Sections (Line-3, Line-18, Line-19 and Line-4)

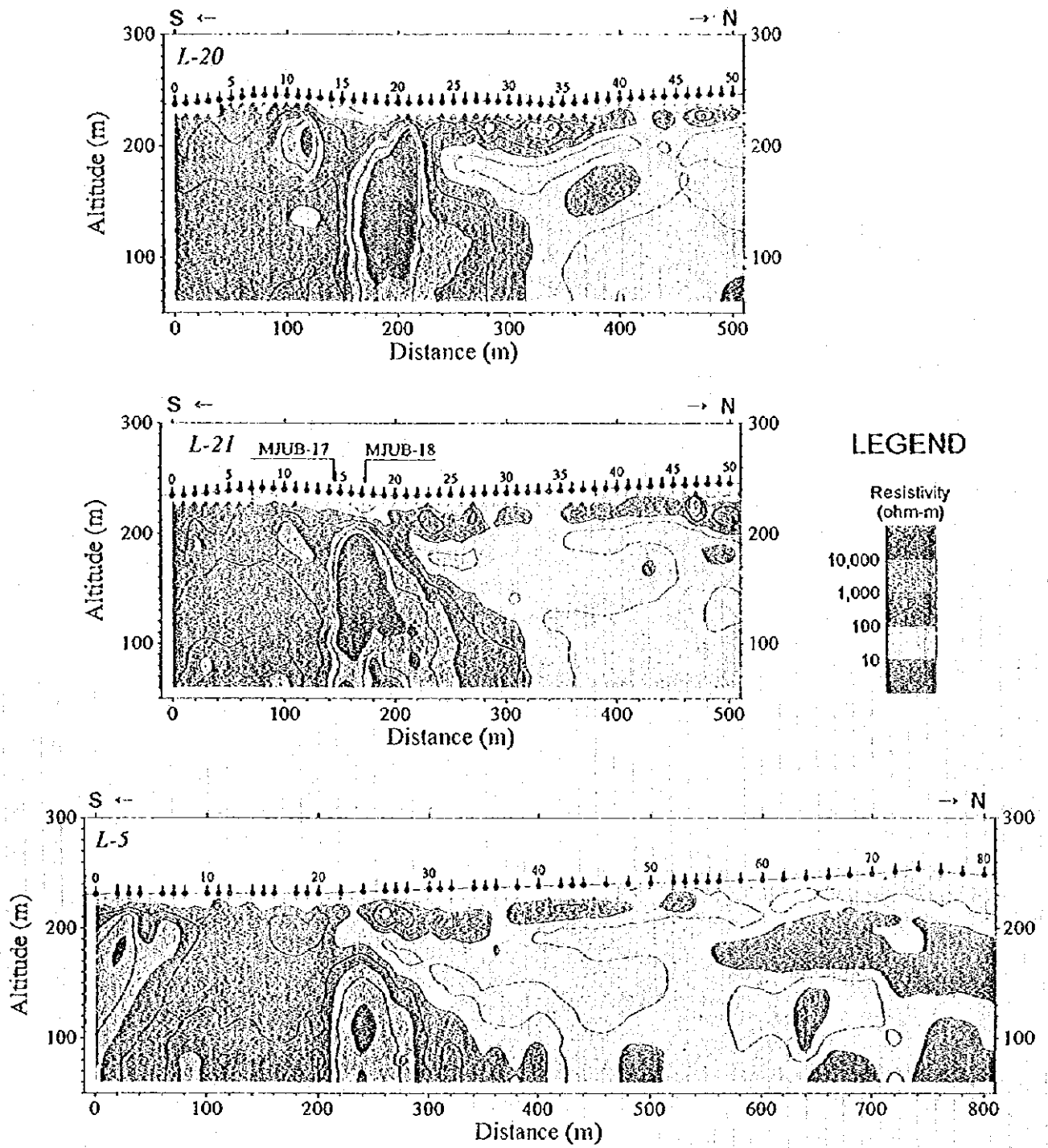
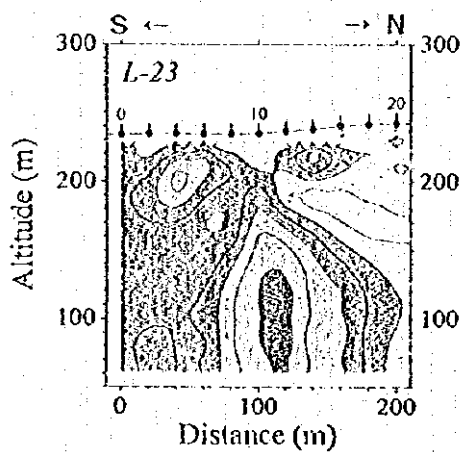
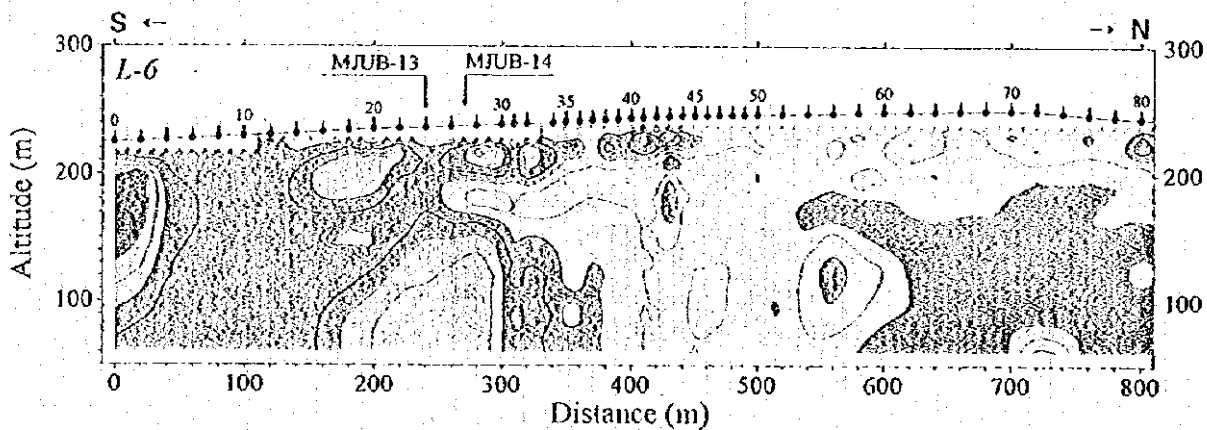
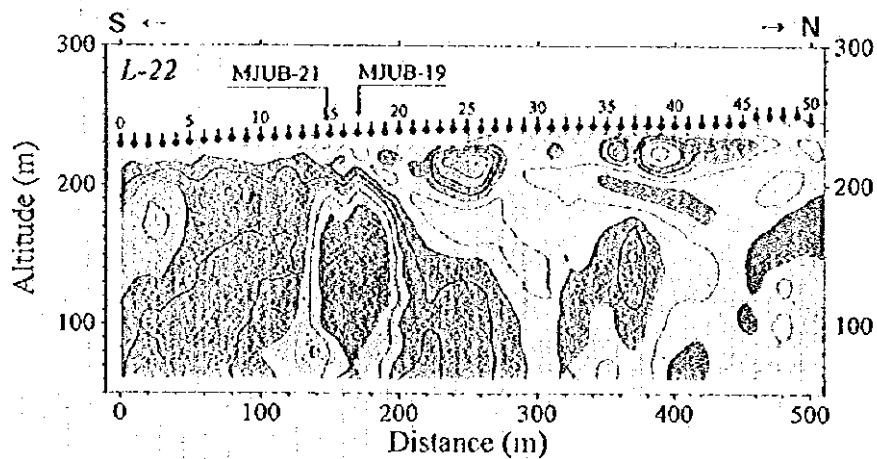


Fig. II-4-9(5) Resistivity Structure Sections (Line-20, Line-21 and Line-5)



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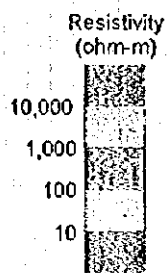


Fig. II-4-9(6) Resistivity Structure Sections (Line-22, Line-6, and Line-23)

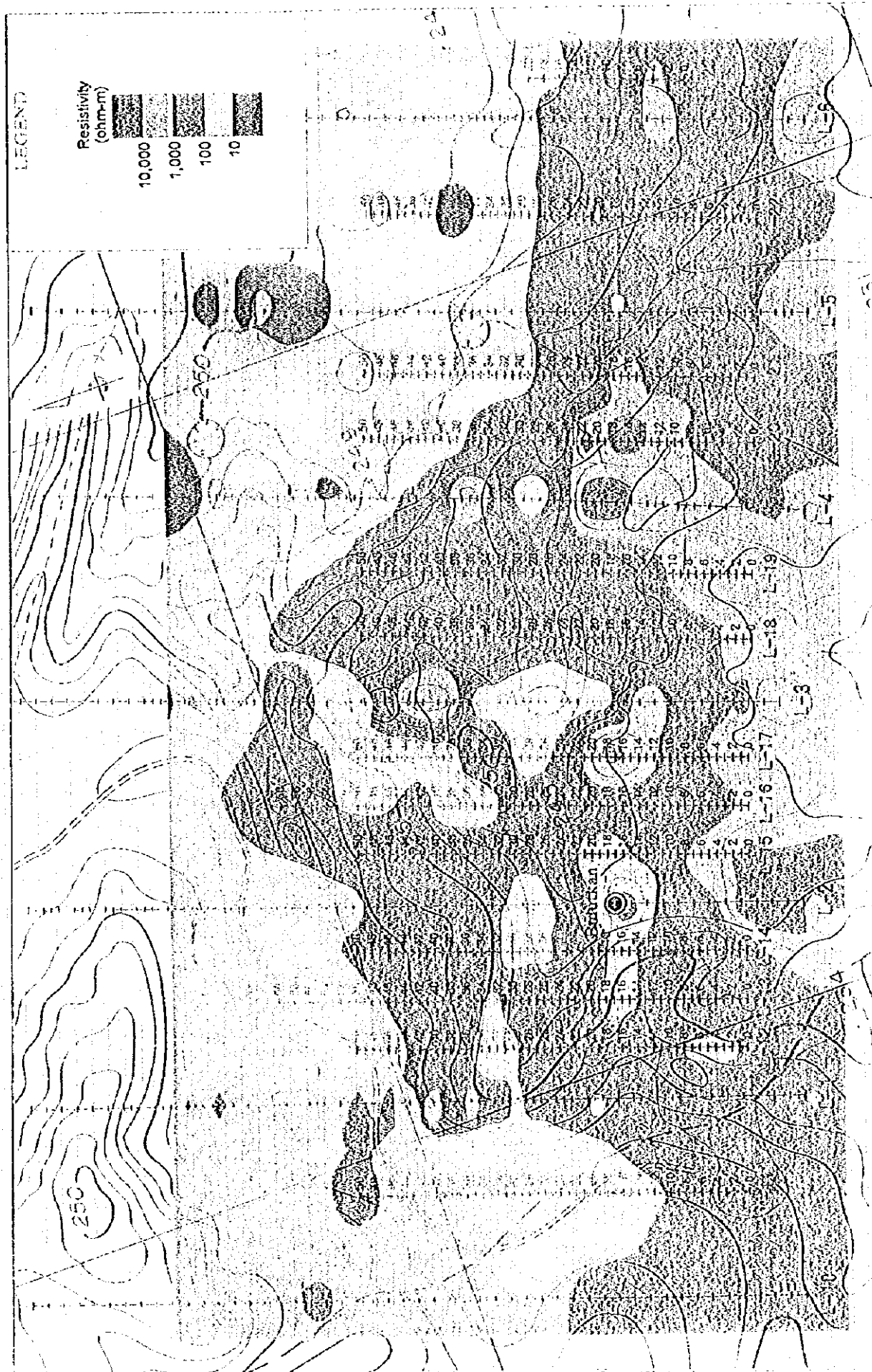


Fig. II-4-10(1) Resistivity Structure Map (200m A.S.L.)



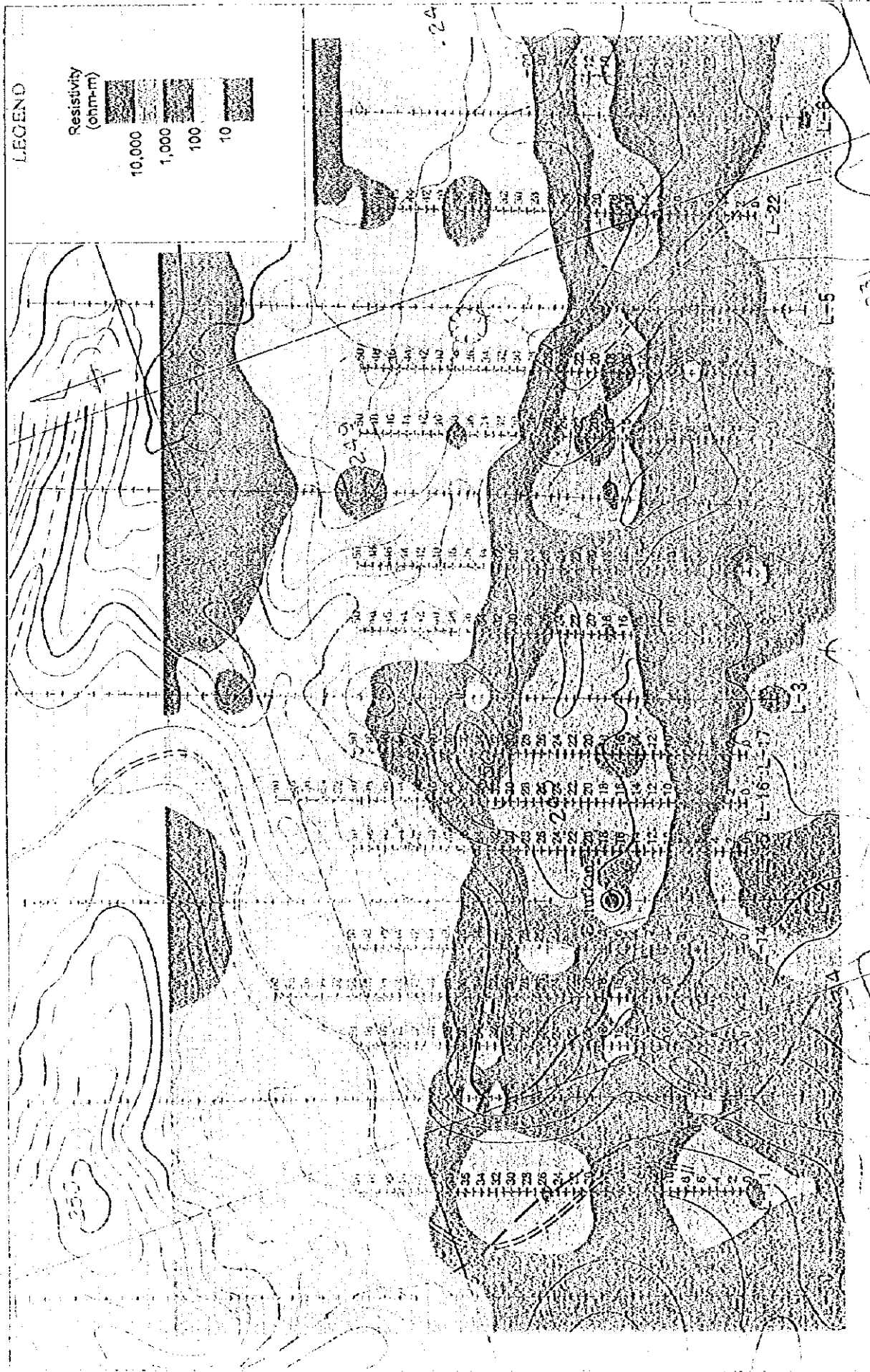


Fig. II-4-10(2) Resistivity Structure Map (150m A.S.L.)



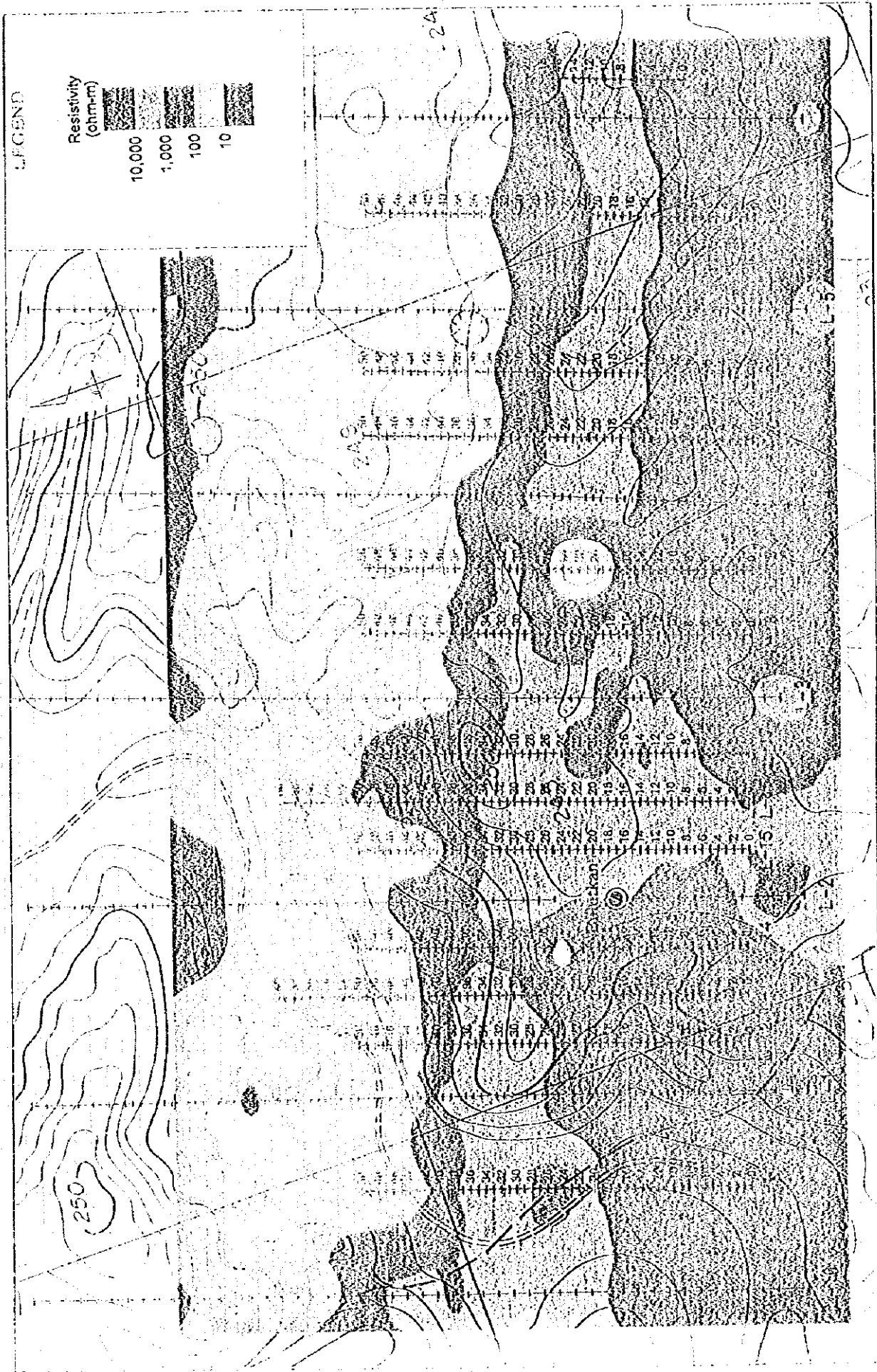


Fig. II-4-10(3) Resistivity Structure Map (100m A.S.L.)

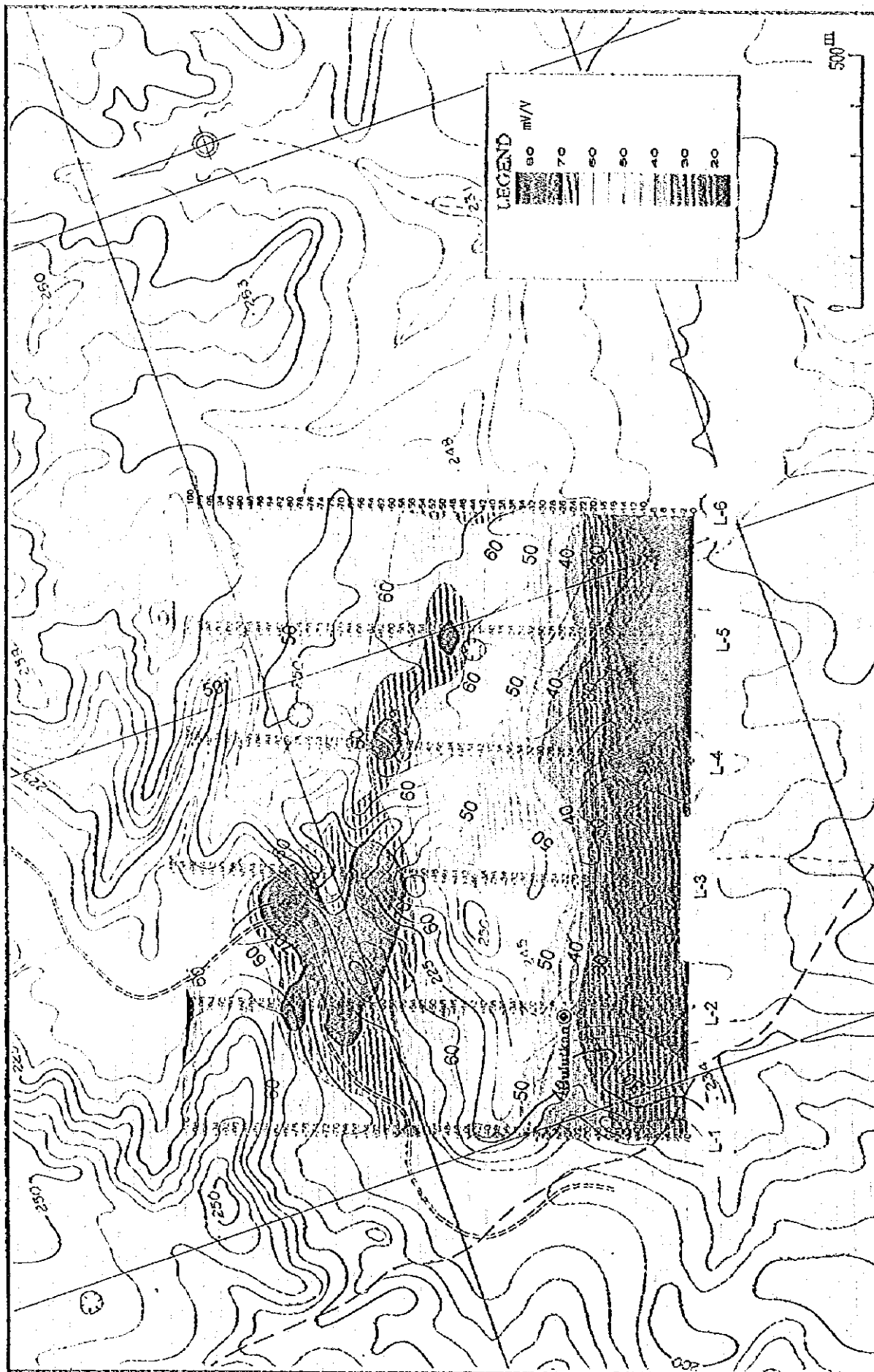


Fig. II-4-11 IP value (Chargeability) Distribution Map

Table II-4-1 Resistivity and IP value(Chargeability) of Rock Samples

Sample No.	Locality	Rock name	Py	Resistivity (ohm-m)	I P (mV/V)
B-1B1	MJUB-1 37.5 m	Metasomatite	○	357	380.7
B-1B2	MJUB-1 44.4 m	Metasomatite	○	17,073	20.8
B-1B3	MJUB-1 59.5 m	Metasomatite		22,920	5.1
B-1B4	MJUB-1 77.5 m	Metasomatite		74,964	8.2
B-1B5	MJUB-1 85.5 m	Skarn	○	1,245	20.1
B-1B6	MJUB-1 149.6 m	Syenodiorite		802	1.6
B-2B1	MJUB-2 11.4 m	Limy sandstone		123,271	19.1
B-2B2	MJUB-2 17.6 m	Limestone		35,569	7.2
B-2B3	MJUB-2 35.8 m	Metasomatite	○	757	26.5
B-2B4	MJUB-2 95.1 m	Sulphide vein	○	0.9	181.6
B-2B5	MJUB-2 99.8 m	Alt. (ss>sl)	○	2,149	143.3
B-2B6	MJUB-2 109.2 m	Metasomatite	○	278	344.1
B-2B7	MJUB-2 189.5 m	Syenodiorite		9,248	3.1
B-3B1	MJUB-3 24.3 m	Skarnized sandstone	○	21	32.3
B-3B2	MJUB-3 45.3 m	Hornfels(ss)	○	17	119.0
B-3B3	MJUB-3 50.0 m	Alt. (sl>ss)	○	24	230.2
B-3B4	MJUB-3 64.0 m	Limestone		18,392	7.8
B-3B5	MJUB-3 81.5 m	Sulphide vein	○	0.4	288.4
B-3B6	MJUB-3 96.0 m	Marble with wollastonite		2,836	4.3
B-3B7	MJUB-4 130.6 m	Syenodiorite		302	3.2
B-4B1	MJUB-4 20.8 m	Granite		74	13.2
B-4B2	MJUB-4 22.4 m	Limestone		5,566	5.0
B-4B3	MJUB-4 45.9 m	Metasomatite	○	1,372	118.4
B-4B4	MJUB-4 64.0 m	Sandstone		45,393	22.2
B-4B5	MJUB-4 85.5 m	Lamprophyre	○	742	134.3
B-4B6	MJUB-4 103.8 m	Syenodiorite		46,400	8.5
B-6B1	MJUB-6 35.4 m	Alt. (sl>ss)	○	2,491	31.0
B-6B2	MJUB-6 48.0 m	Metasomatite	○	43	128.5
B-6B3	MJUB-6 78.5 m	Porphyrite		6,766	17.3
B-6B4	MJUB-6 82.7 m	Alt. (sl>ss)	○	44,041	187.7
B-6B5	MJUB-6 133.7 m	Alt. (sl>ss)	○	96,593	5.2
B-7B1	MJUB-7 9.4 m	Chalcedony		166	1.3
B-7B2	MJUB-7 24.3 m	Lamprophyre		13	8.1
B-7B3	MJUB-7 49.4 m	Skarn	○	6.7	133.0
B-7B4	MJUB-7 59.4 m	Metasomatite		4,101	22.4
B-7B5	MJUB-7 71.8 m	Diorite		2,739	23.1
B-5B1	MJUB-5 6.8 m	Dolomite		29	2.0
B-5B2	MJUB-5 36.0 m	Lamprophyre		580	6.7
B-5B3	MJUB-5 100.2 m	Limestone		5,989	3.7
B-5B4	MJUB-5 106.6 m	Diorite		65,087	6.4

Rock type	Resistivity (ohm-m)	I P (mV/V)
Syenodiorite	14,200	4
Sulphide vein	1	240
Altered rock	9,000	89
No altered rock	29,200	60
Others	10,900	30
average	16,000	68

remark: Alt. = Alternation of strata, sl = slate, ss = sandstone

Table II-4-3 Major Mineralized Zones Caught by Drillings in the Bulutukan District(1)

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	As (%)	Bi (%)	Mo (%)	WO <sub>3</sub> (%)	Remarks
MJUB-1	80.3-81.0 (0.7)	0.4	1.4	tr	tr	tr	tr	0.62	tr	tr	tr	Silicified and skarnized metasomate
	83.4-86.0 (2.6)	1.5	0.8	0.9	0.12	tr	tr	0.30	tr	tr	tr	Skarn and pyrite vein
	86.0-88.0 (2.0)	1.1	2.8	tr	0.06	tr	tr	0.01	0.01	tr	tr	Skarn
	92.0-95.0 (3.0)	1.7	0.5	1.1	0.05	tr	tr	0.13	tr	tr	tr	Skarn
MJUB-3	80.0-82.0 (2.0)	1.6	0.4	tr	tr	tr	tr	tr	tr	tr	0.02	Skarnized limestone and pyrite vein
	82.0-84.0 (2.0)	1.6	2.3	36.1	0.09	tr	tr	tr	tr	tr	0.02	Skarnized limestone
MJUB-7	0 -10.4(10.4)	5.5	4.3	1.1	0.05	tr	tr	0.03	tr	tr	tr	Silicified rock with drusey quartz, gossan and chaledony
	10.4-15.6 (5.2)	2.8	0.4		0.05	tr	0.01	0.01	tr	tr	tr	Silicified rock with gossan
	15.6-16.6 (1.0)	0.5	0.6	2.8	0.08	tr	tr	0.04	tr	tr	tr	Silicified rock
	26.0-27.0 (1.0)	0.5	0.8	tr	0.10	tr	tr	tr	tr	tr	tr	Lamprophyre
	36.1-51.0(14.9)	7.9	21.2	4.3	0.07	tr	tr	0.09	tr	tr	tr	Skarn and skarnized sandstone
52.1-66.5(14.4)	7.6	0.3		0.01	tr	tr	tr	tr	tr	tr	Silicified and skarnized metasomate	

Table II-4-3 Major Mineralized Zones Caught by Drillings in the Bulutkan District(2)

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO <sub>3</sub> (%)	Remarks
MJUB-8	18.1-19.3(1.2)	0.5	1.1	1.8	0.03	tr	tr	tr	Silicified and skarnized metasomatite
	27.7-30.0(2.3)	1.1	8.5	7.8	0.12	0.01	tr	0.03	Silicified and skarnized metasomatite
	30.0-34.6(4.6)	2.2	0.4	1.3	0.06	tr	tr	tr	Silicified and skarnized metasomatite
	34.6-37.4(2.8)	1.6	3.4	3.2	0.09	tr	tr	tr	Skarn and diorite with sulfide (pyrite, marcasite)
MJUB-9	41.2-42.2(1.0)	0.6	0.5	tr	0.01	0.02	tr	0.01	Skarnized diorite
	47.0-48.0(1.0)	0.5	8.5	7.8	0.38	1.70	tr	0.01	Quartz, sulfide (pyrite, marcasite, chalcopyrite) vein
MJUB-11	81.0-82.2(1.2)	0.9	0.5	1.8	0.03	tr	tr	tr	Silicified sandstone with pyrite, calcite veinlets
	123.3-125.9(2.6)	2.4	0.5	48.6	0.01	tr	tr	tr	Diorite with pyrite, calcite veinlets
MJUB-12	11.0-12.8(1.8)	1.6	0.8	10.4	0.07	0.02	tr	tr	Silicified and skarnized metasomatite
	135.0-137.0(2.0)	1.8	0.4	tr	0.03	0.04	tr	tr	Skarn with pyrite, chalcopyrite, marcasite
MJUB-13	19.8-21.0(1.2)	0.7	0.5	tr	0.02	tr	tr	tr	Silicified lamprophyre
	39.5-41.5(2.0)	1.1	11.9	1.0	tr	tr	tr	tr	Quartz, calcite vein

Table II-4-3 Major Mineralized Zones Caught by Drillings in the Bulutkan District(3)

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO <sub>3</sub> (%)	Remarks
MJUB-14	93.4-95.0(1.6)	0.9	0.4	tr	0.05	tr	0.04	tr	Silicified alternation (sandstone > slate) with pyrite, quartz veinlets
	116.0-117.5(1.5)	1.0	0.4	tr	tr	tr	tr	tr	Skarnized and fractured limestone
MJUB-17	23.4-26.4(3.0)	2.0	1.3	tr	0.02	0.02	tr	tr	Fracture zone with lamprophyre and calcite
	30.5-31.5(1.0)	0.6	0.4	8.4	0.05	0.20	tr	tr	Silicified and fractured sandstone with quartz, calcite, pyrite
	74.8-75.5(0.7)	0.5	6.0	23.8	0.33	0.75	tr	tr	Silicified and skarnized metasomatite with sulfide (pyrite, pyrrhotite, chalcopyrite) vein
MJUB-18	69.0-69.5(0.5)	0.5	9.8	72.8	3.5	0.45	tr	0.02	Quartz. sulfide (pyrite, chalcopyrite) vein

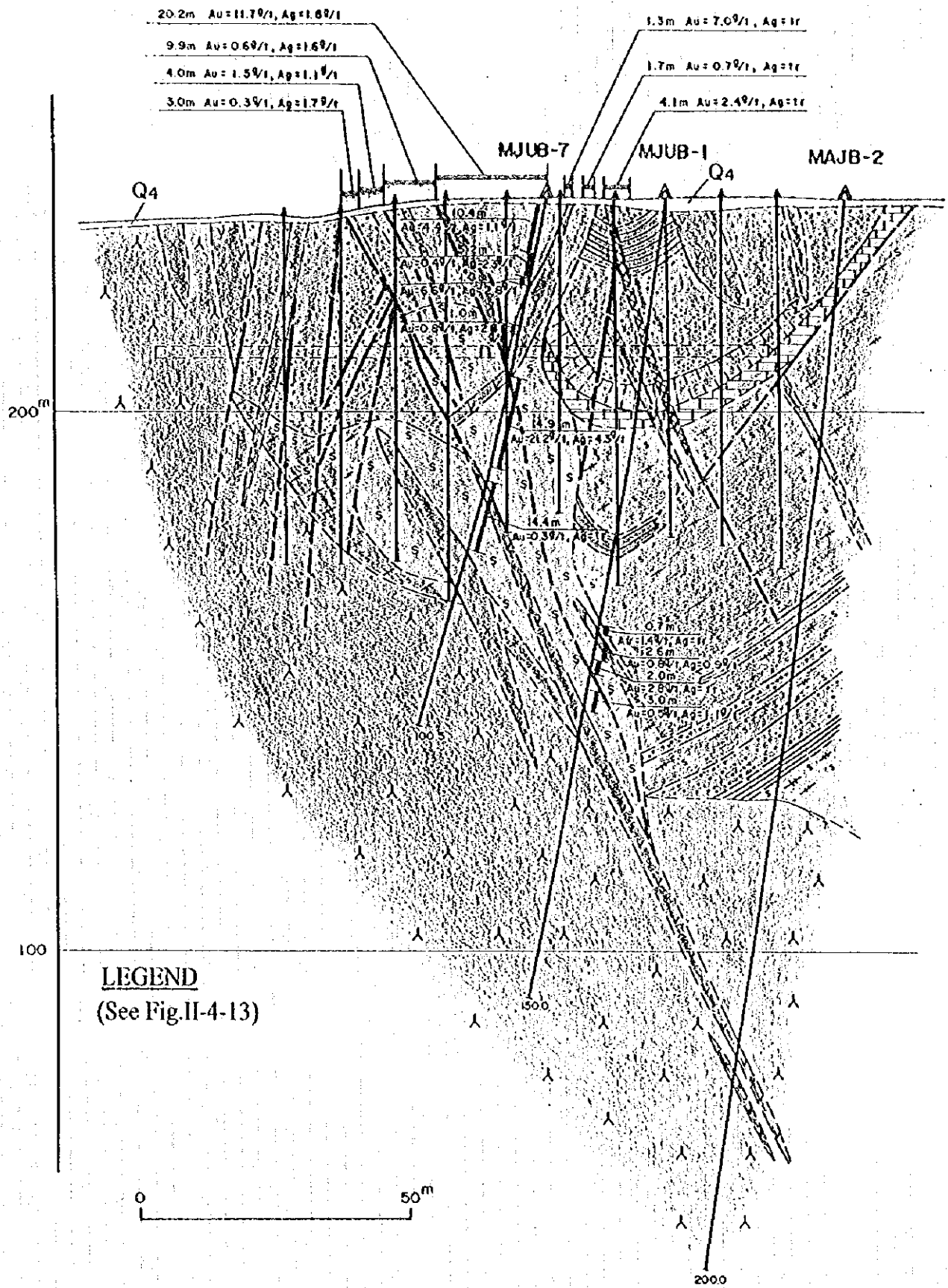















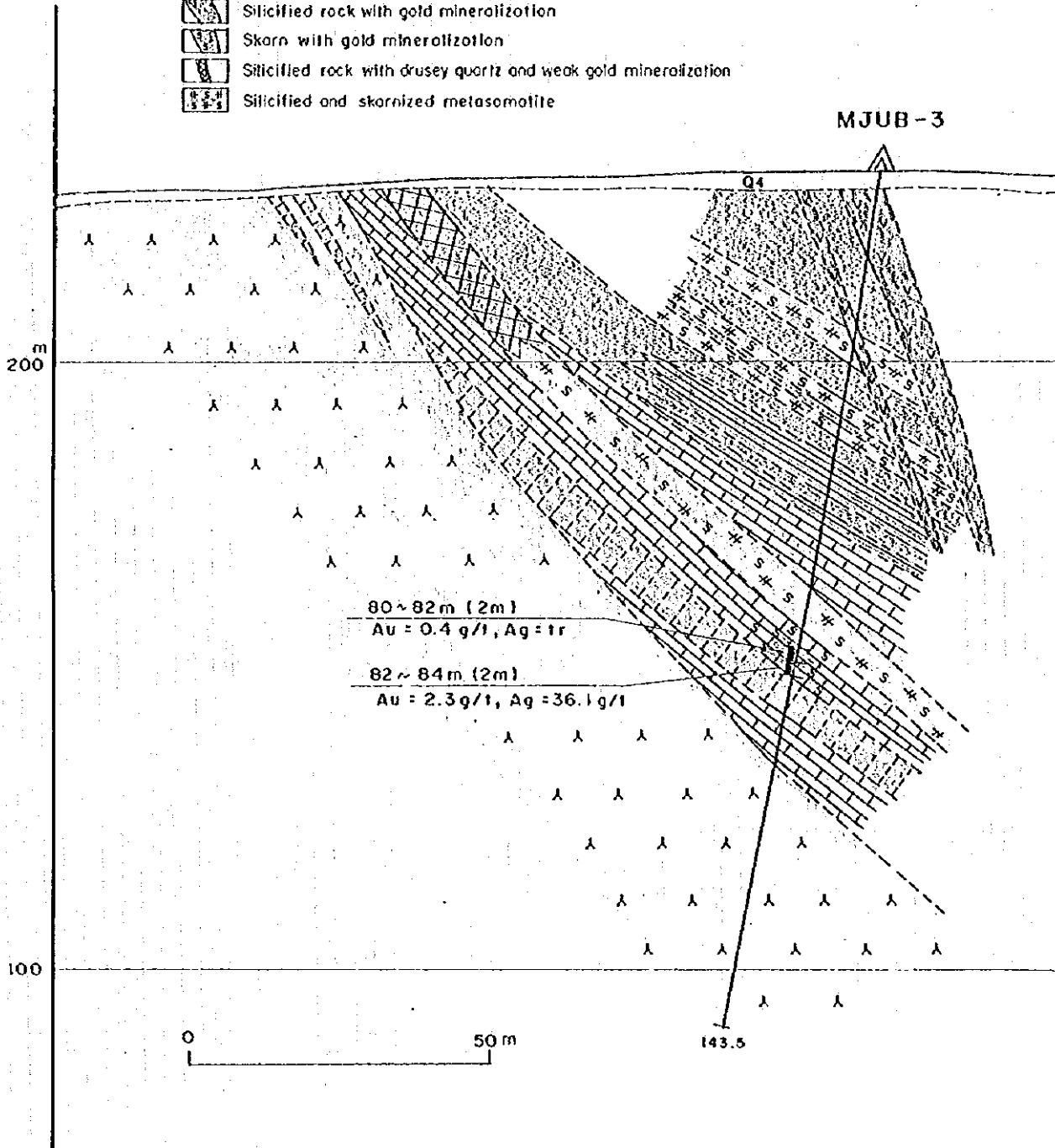


Fig. II-4-12 Geological Cross Section along MJUB-1,2 and 7

**LEGEND**

-  Quaternary Deposits
  -  Diorites
  -  Porphyrites
  -  Granites
  -  Lamprophyres
  -  Syenodiorites
  -  Limestones
  -  Dolomites
  -  Slates
  -  Sandstones
  -  Quartzites
- } Late Carboniferous ~  
Early Permian Intrusives
- } Proterozoic  
Kokpatas Formation
-  Silicified rock with gold mineralization
  -  Skarn with gold mineralization
  -  Silicified rock with drusey quartz and weak gold mineralization
  -  Silicified and skarnized metasomilite



**Fig. II-4-13 Geological Cross Section along MJUB-3**



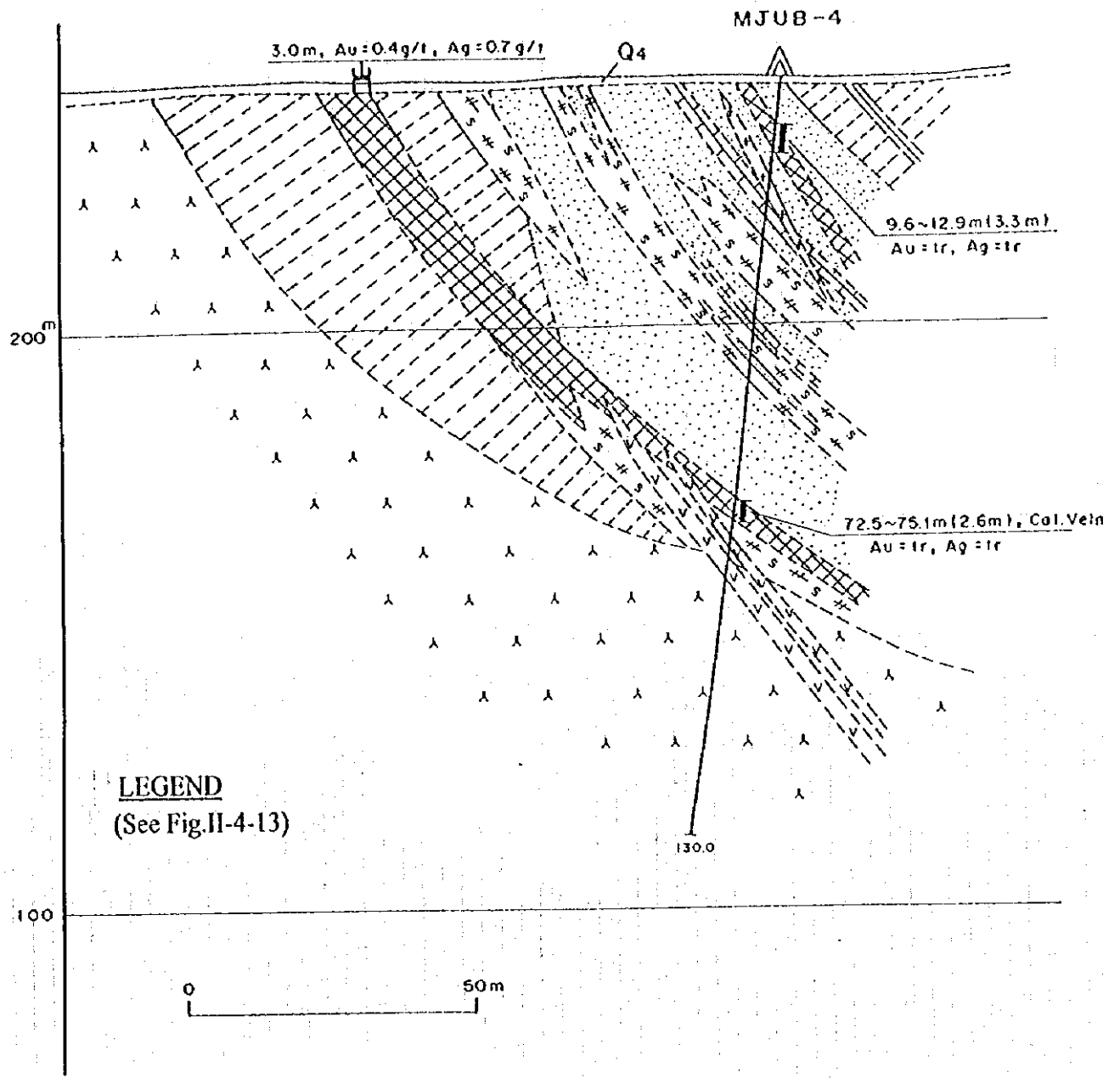


Fig. II-4-14      Geological Cross Section along MJUB-4

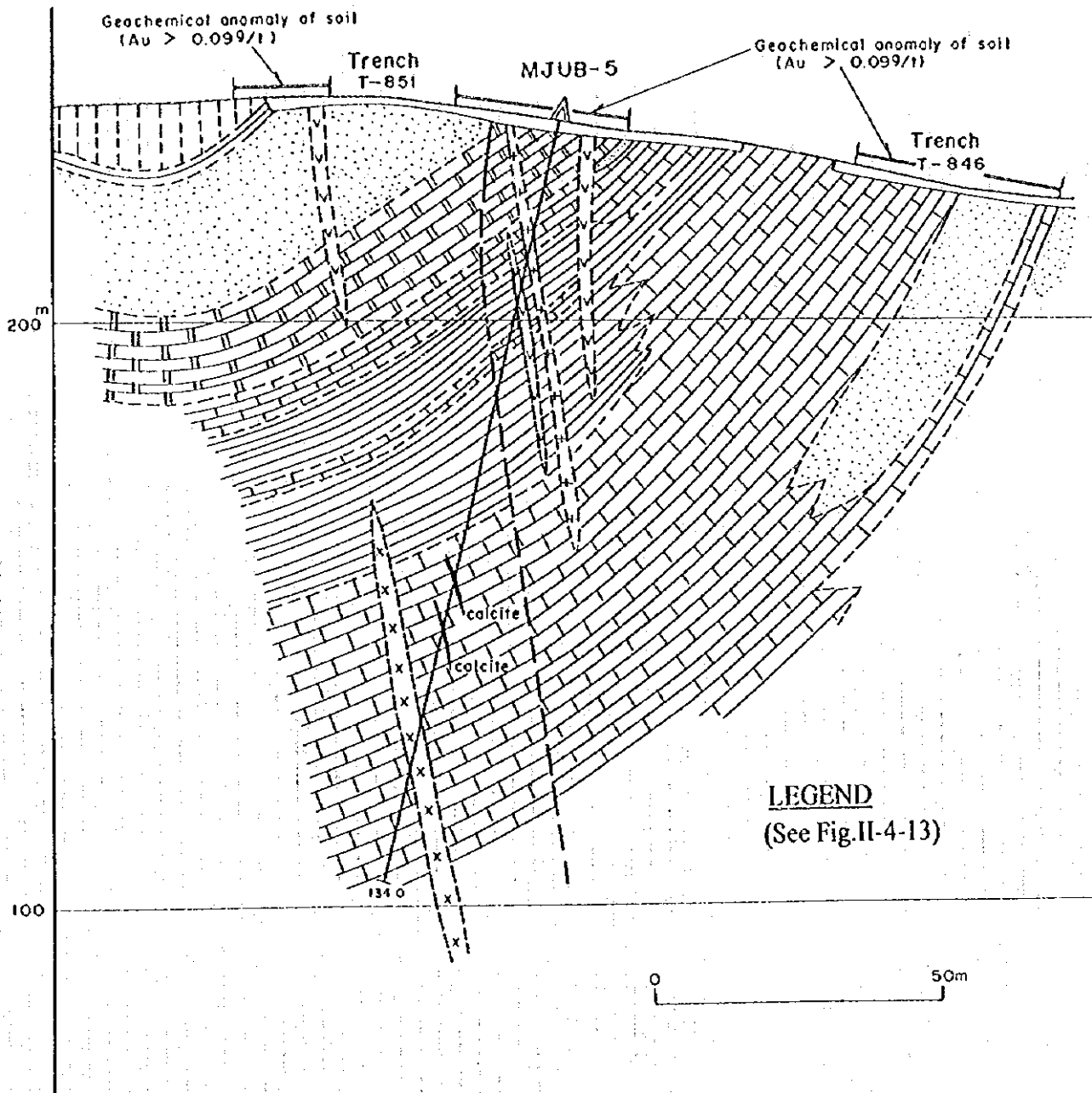


Fig. II-4-15 Geological Cross Section along MJUB-5

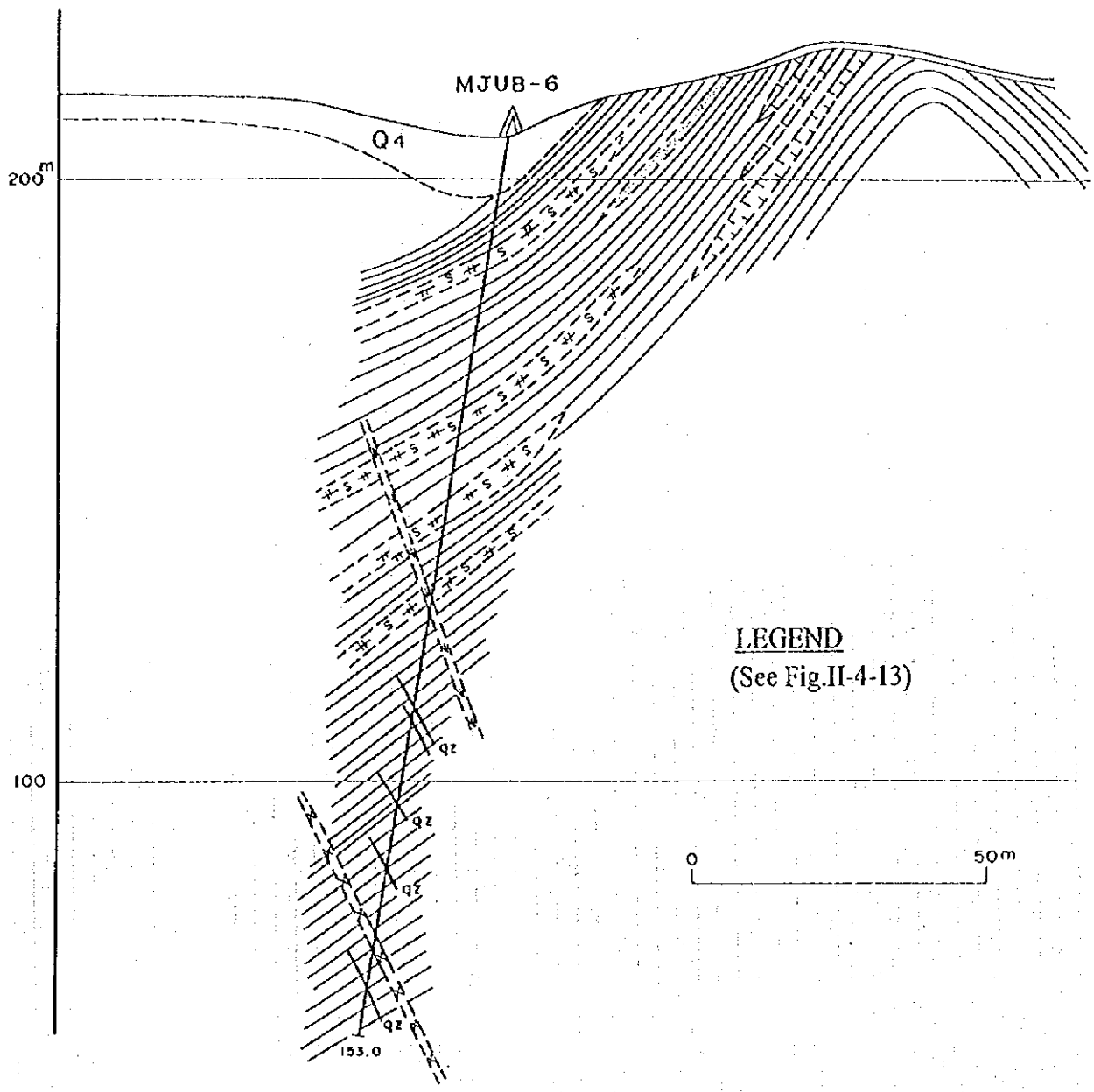


Fig. II-4-16 Geological Cross Section along MJUB-6

**LEGEND**

- Quaternary Deposits
  - Diorites
  - Porphyrites
  - Aplites
  - Granites
  - Lamprophyres
  - Syenodiorites
  - Limestones
  - Dolomites
  - Slates
  - Sandstones
  - Quartzites
- ] Late Carboniferous --  
Early Permian Intrusives
- ] Proterozoic  
Kokpatas Formation
- Silicified rock with gold mineralization
  - Skarn
  - Brecciated silicified rock with drusy quartz
  - Silicified and skarnized metasomate
- Fault      Fractured zone
- Vein (qz; quartz, col; calcite, su; sulfide)

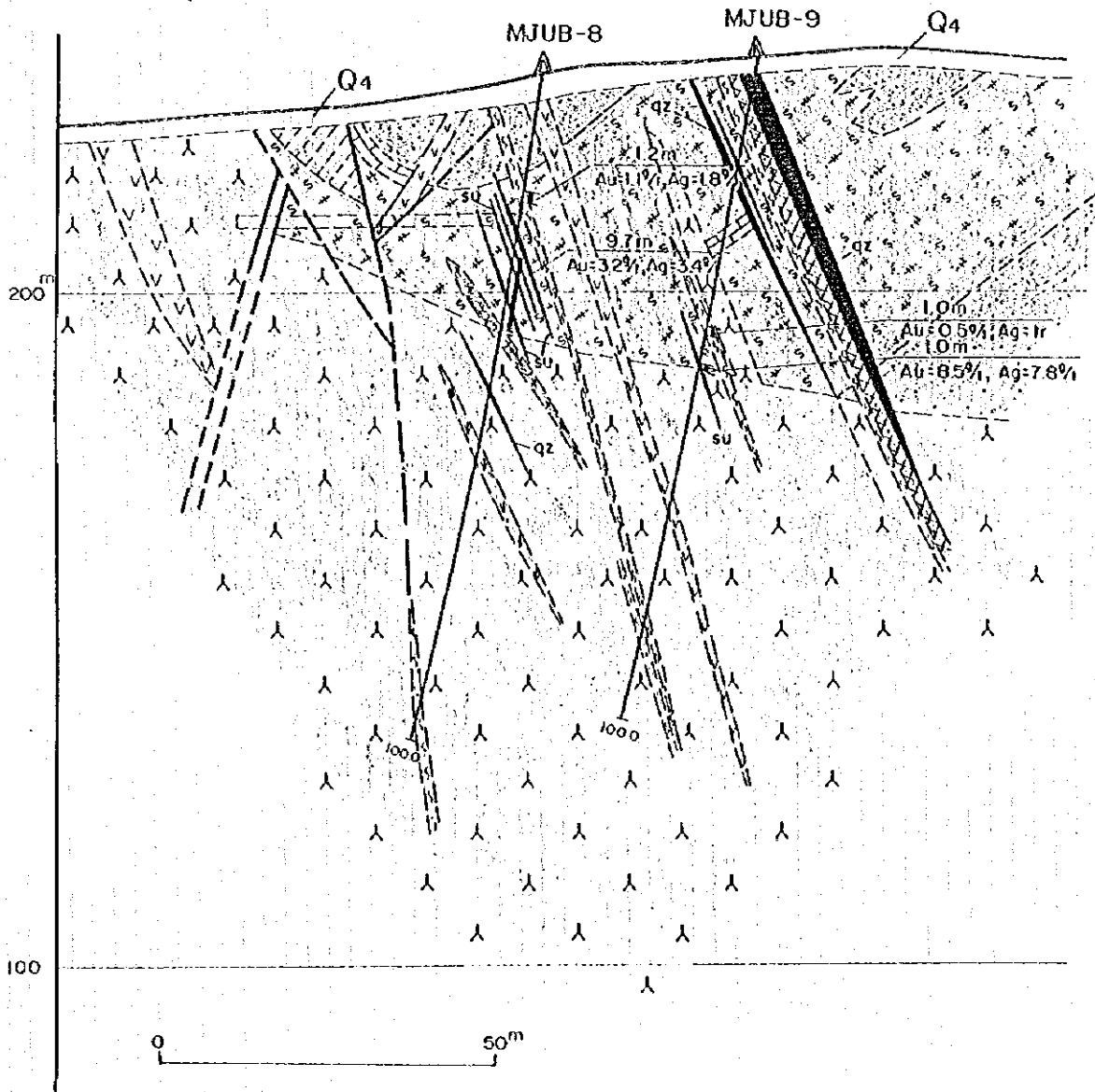


Fig. II-4-17 Geological Cross Section along MJUB-8,9

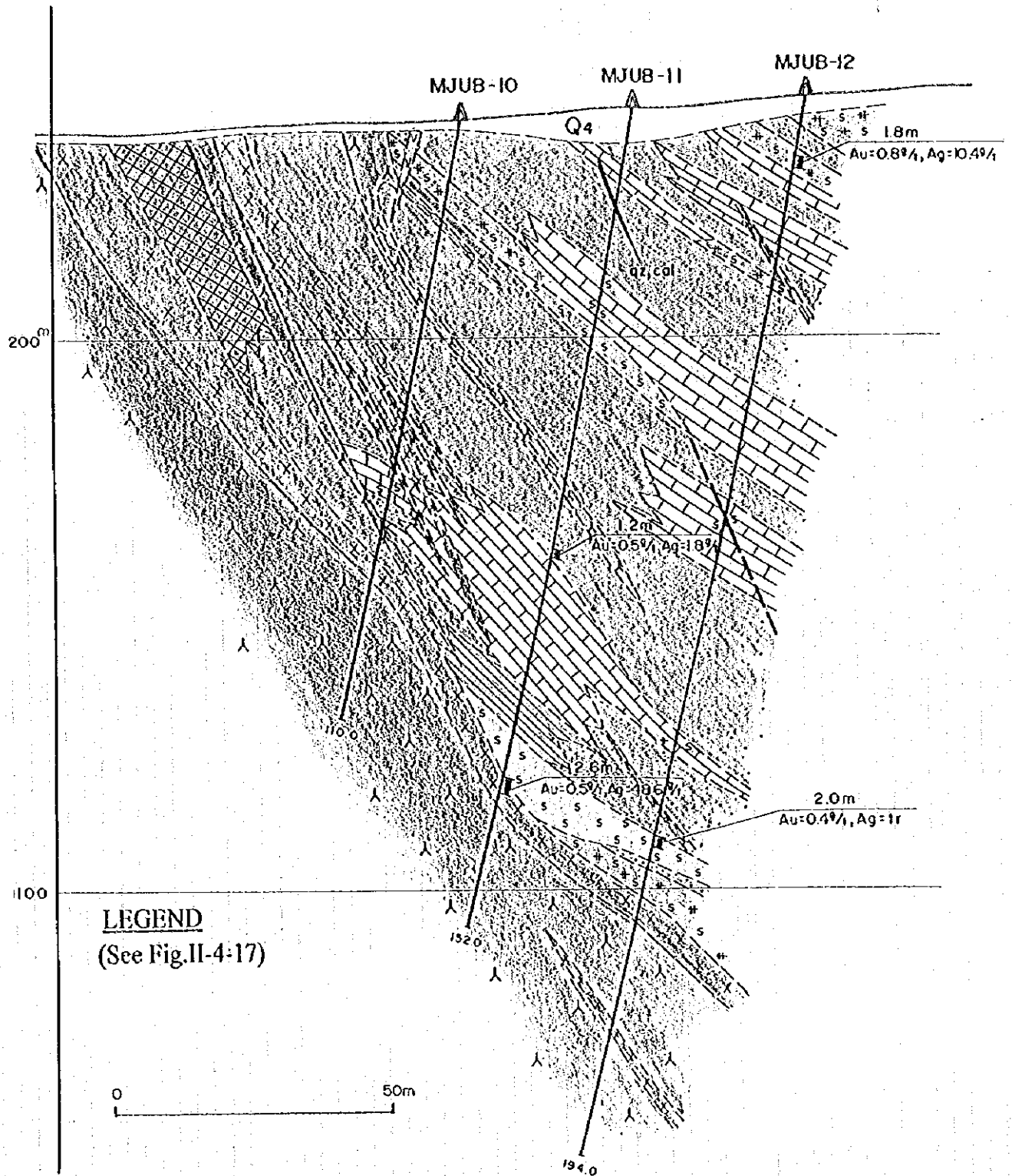


Fig. II-4-18 Geological Cross Section along MJUB-10,11 and 12

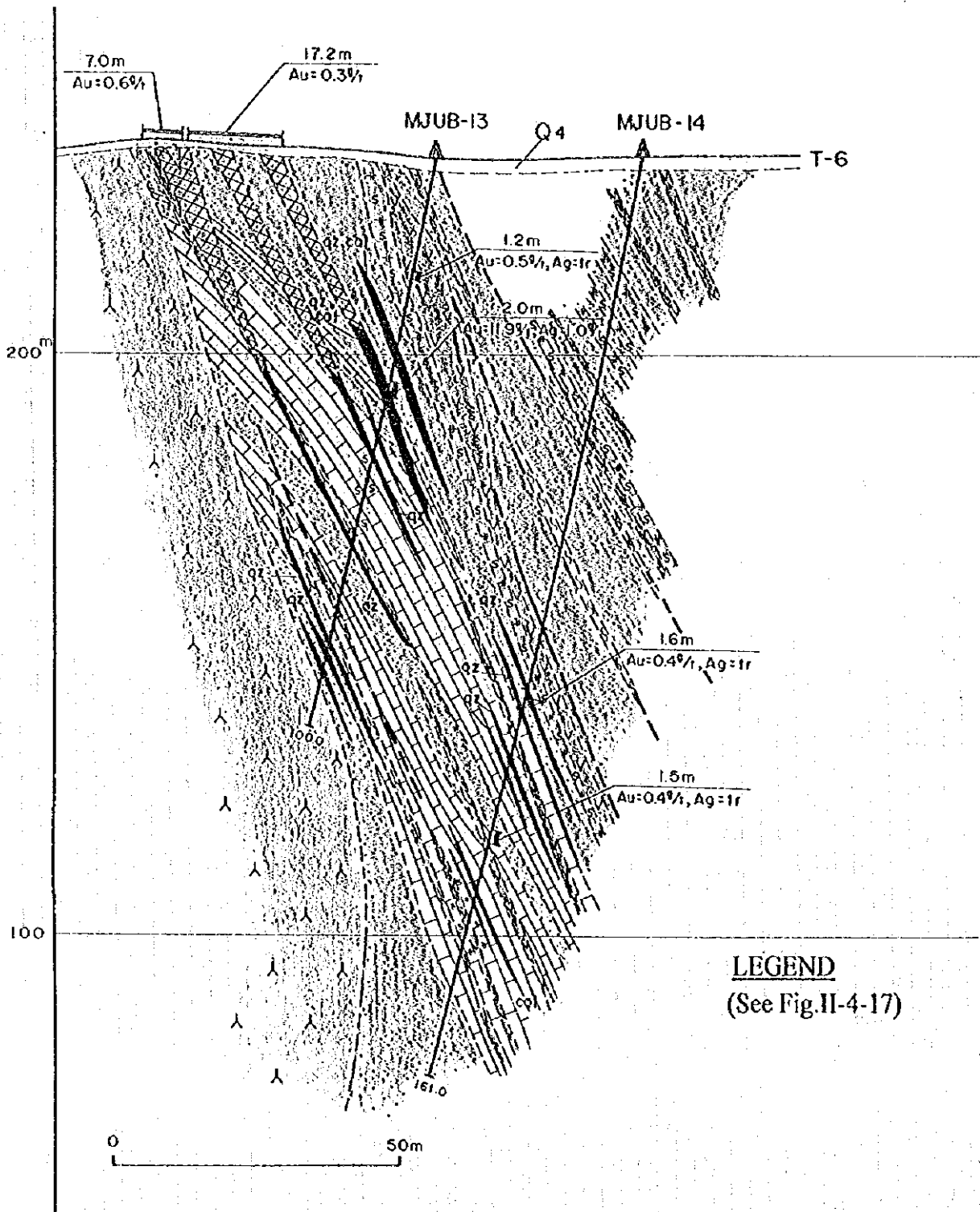


Fig. II-4-19 Geological Cross Section along MJUB-13,14

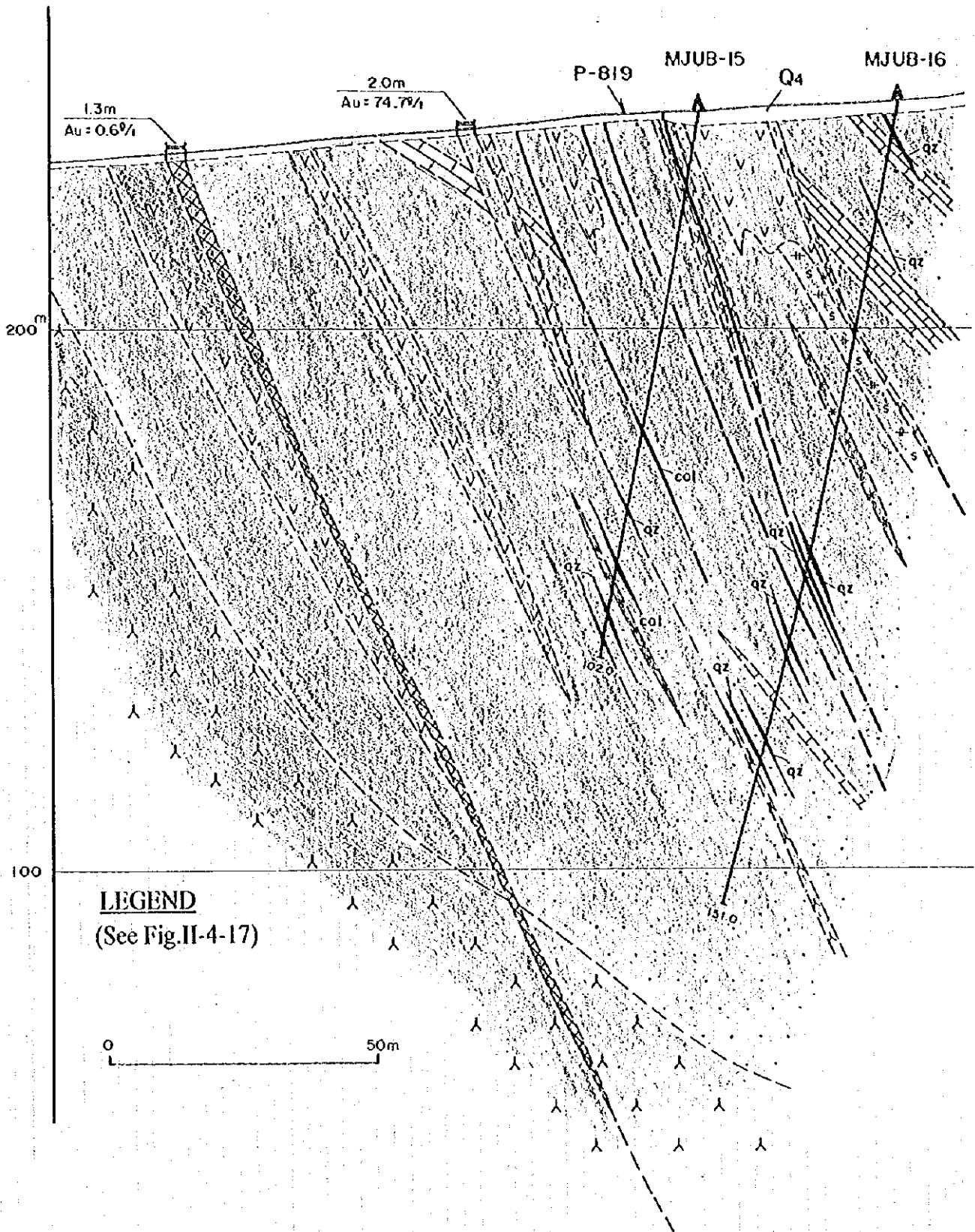


Fig. II-4-20 Geological Cross Section along MJUB-15,16

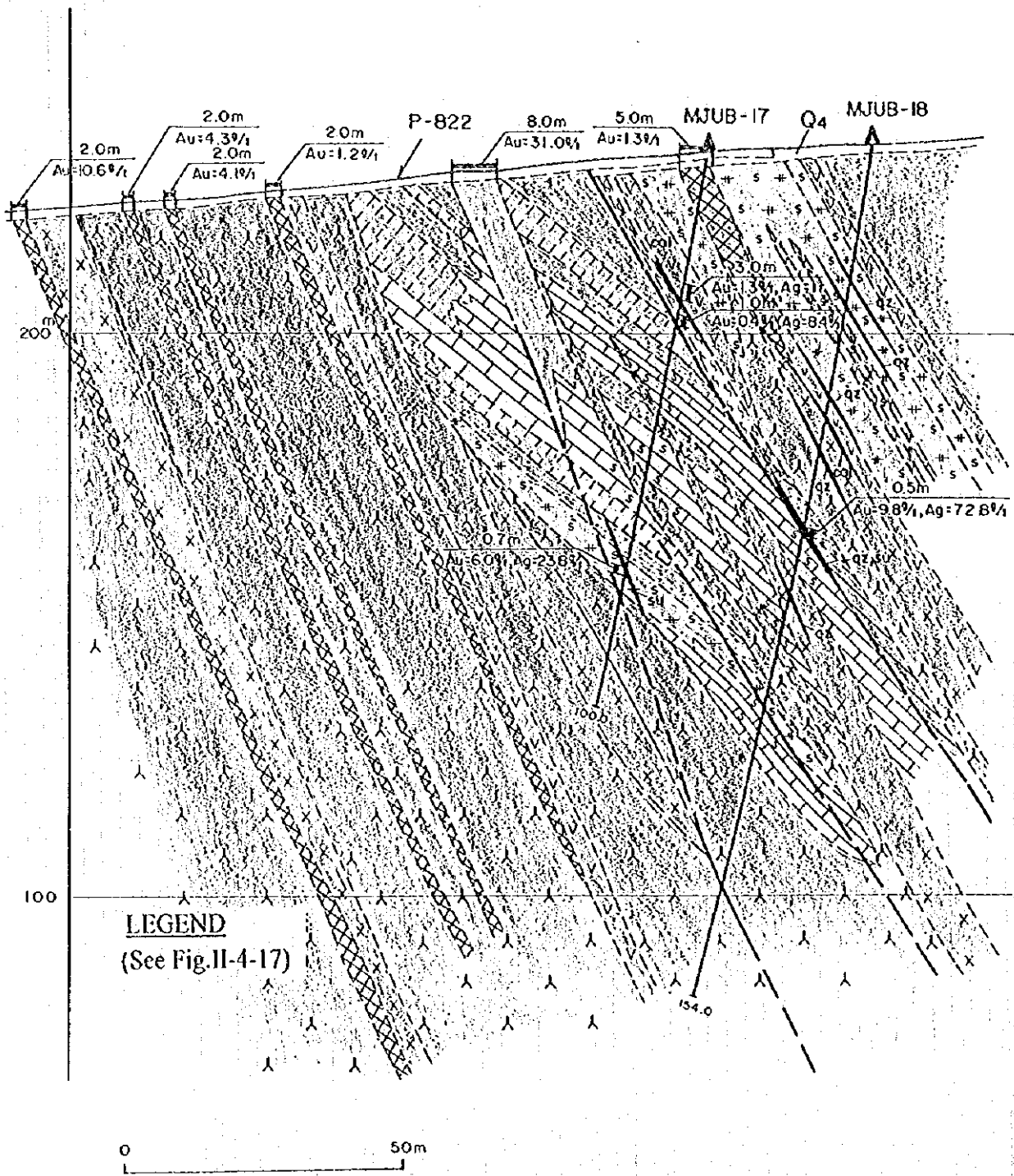


Fig. II-4-21 Geological Cross Section along MJUB-17,18



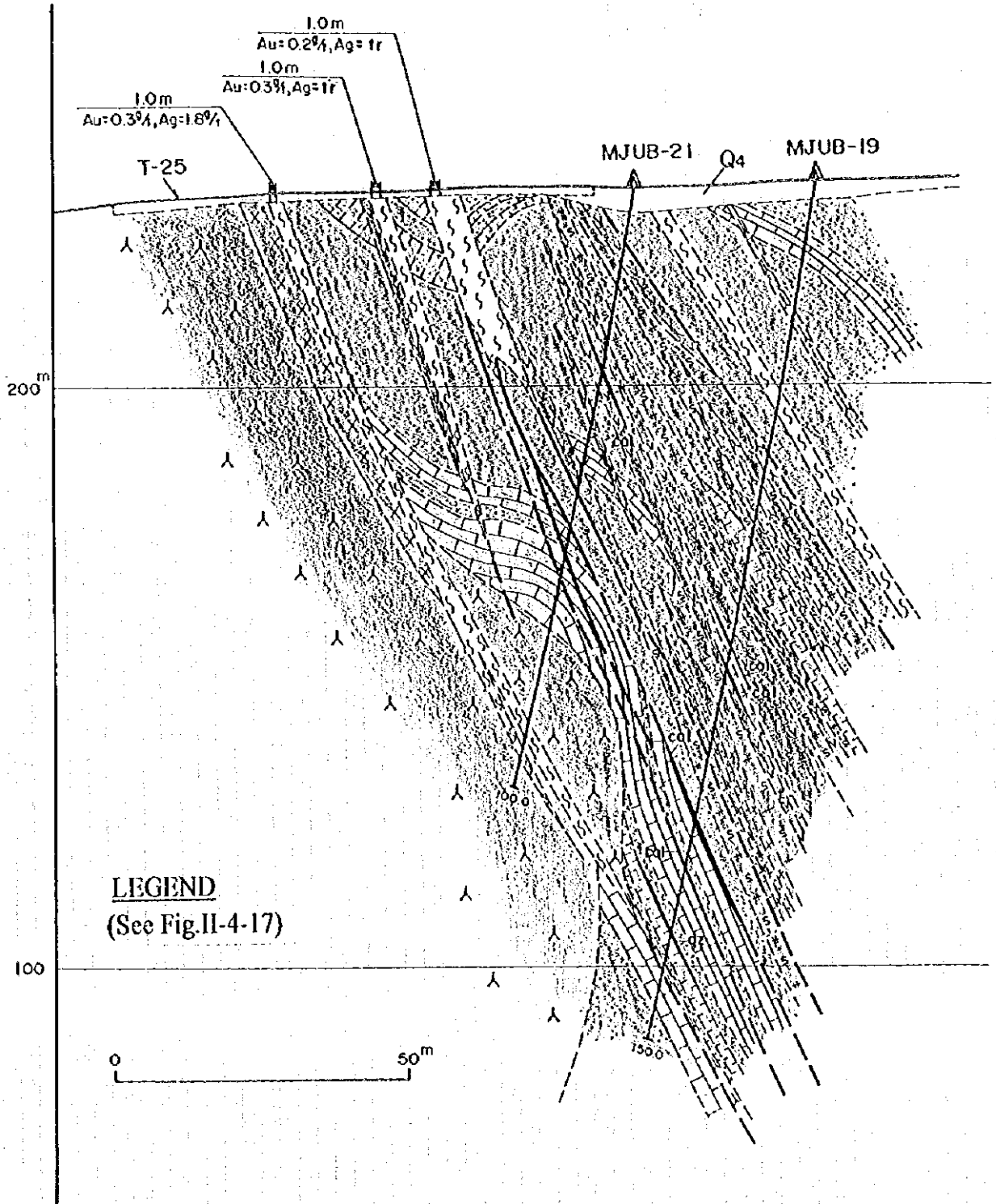


Fig. II-4-22 Geological Cross Section along MJUB-19,21

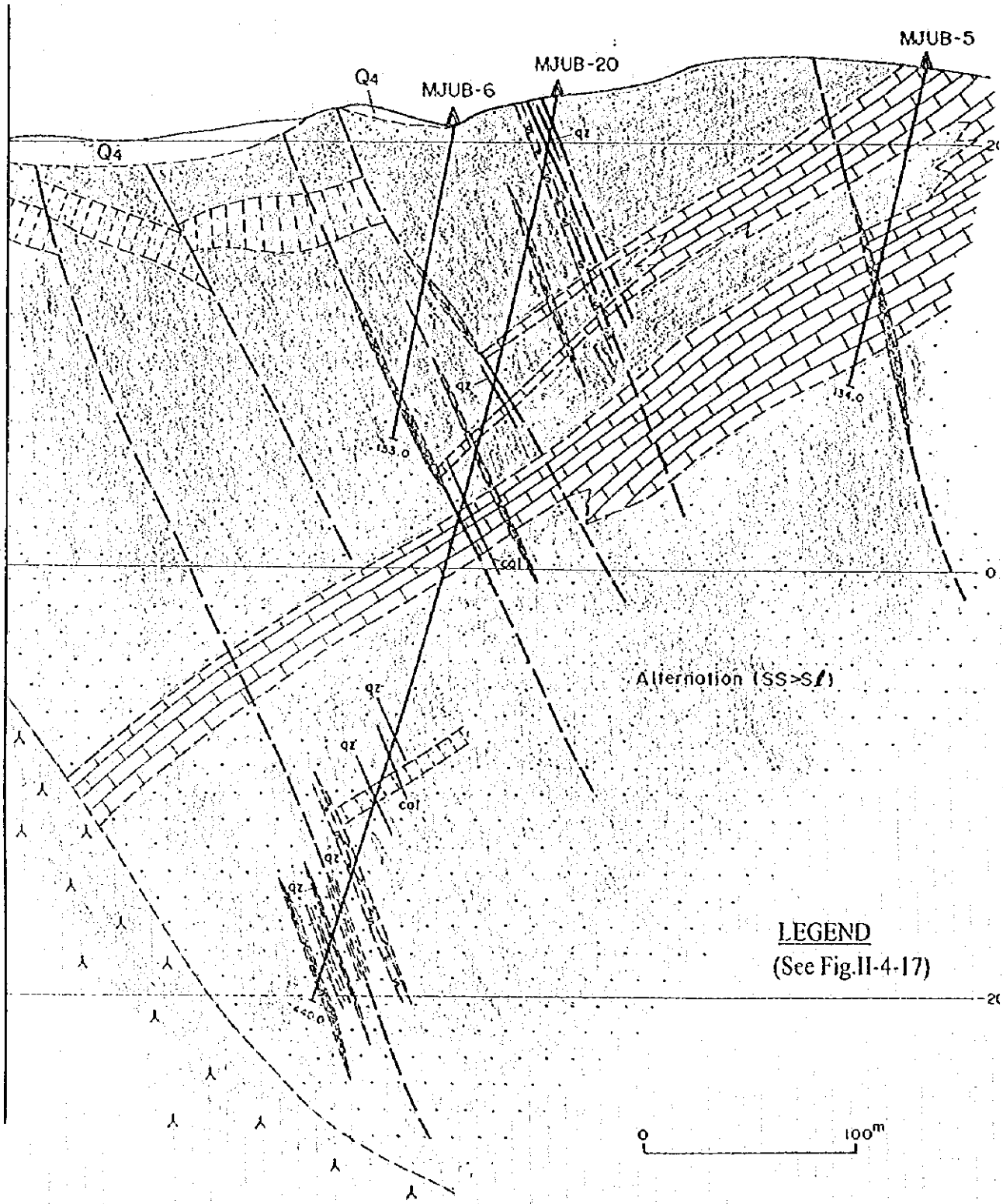


Fig. II-4-23 Geological Cross Section along MJUB-20



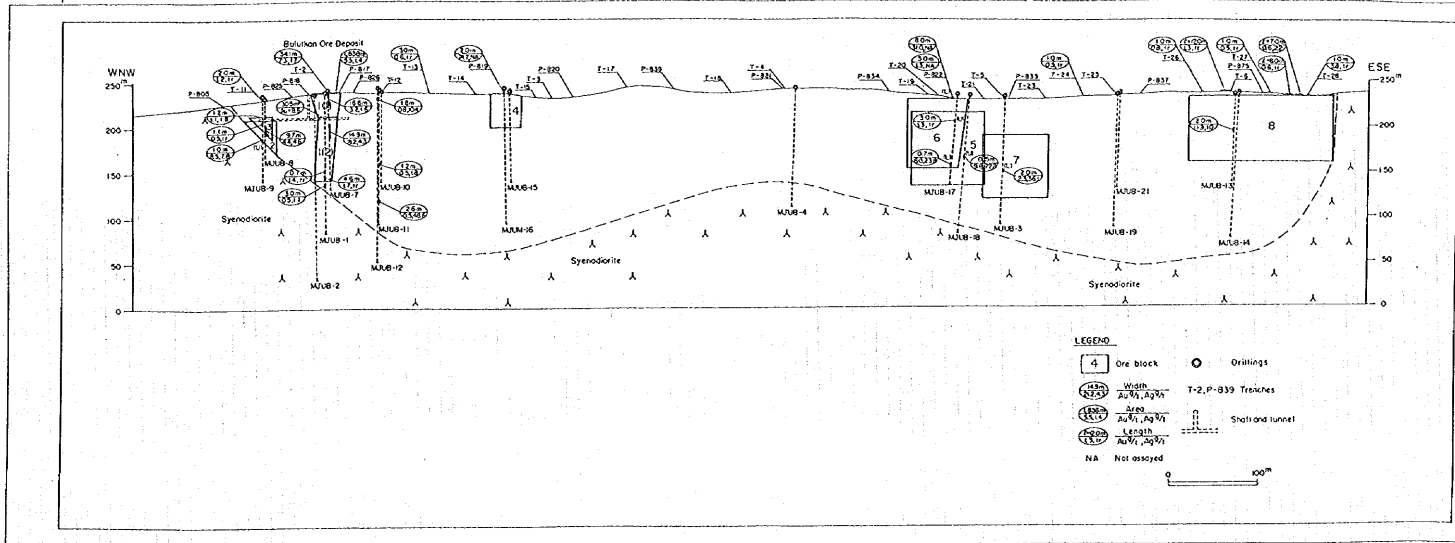


Fig. II-4-24 Perspective Section for Ore Reserve Calculation of Bulutkan District



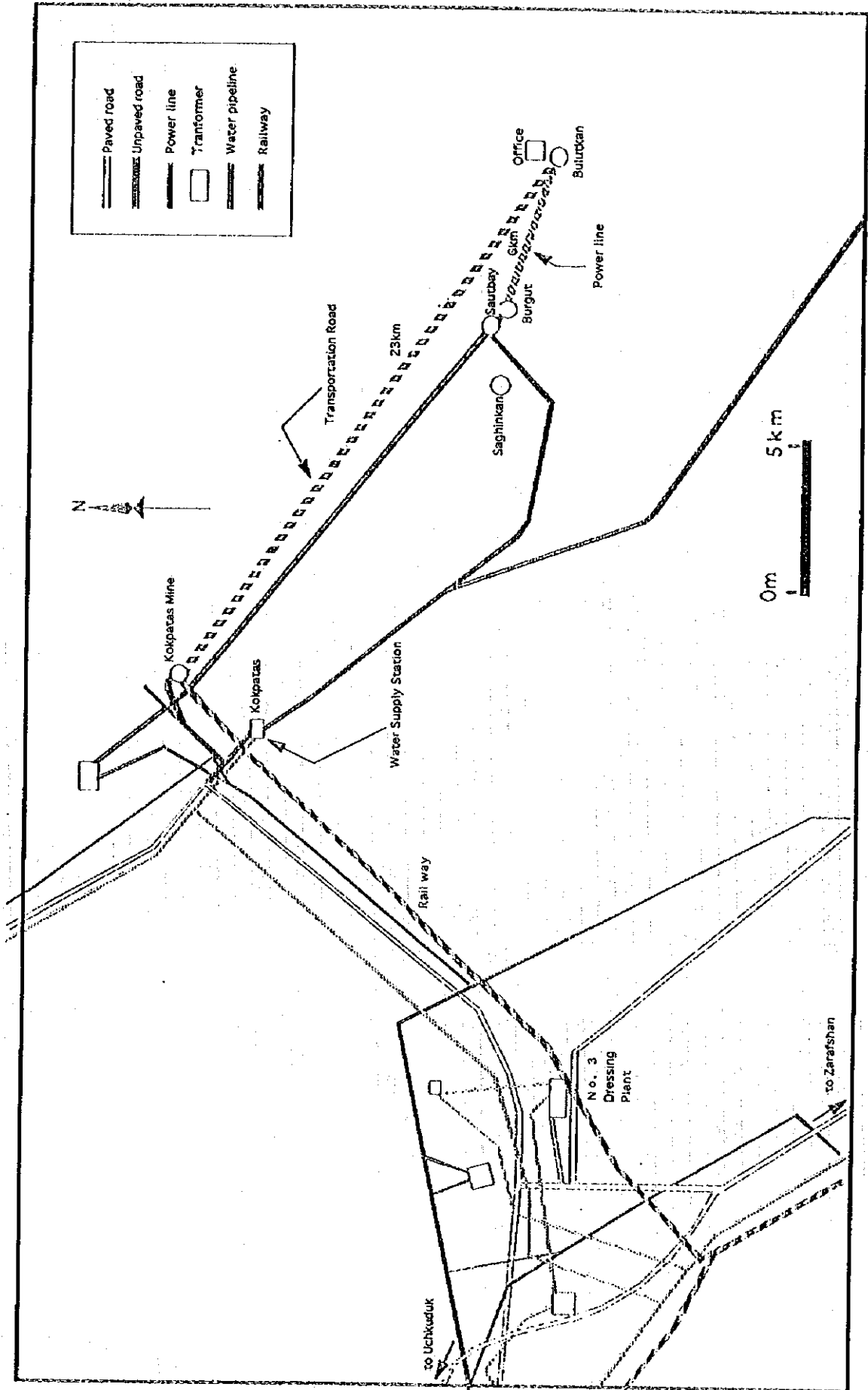


Fig. II-4-25 Location Map of Infrastructure in Bulutkan District

