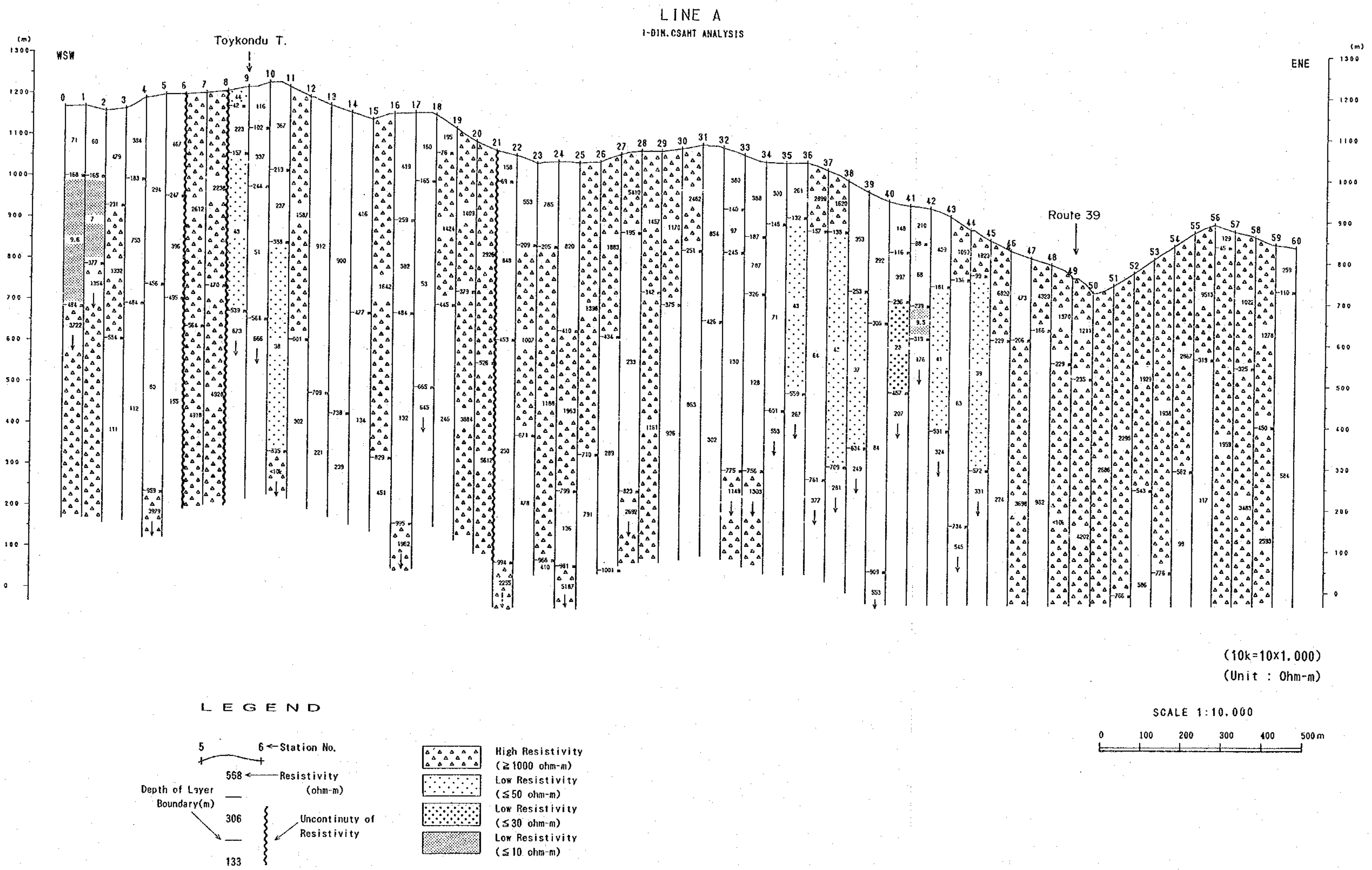


Figure 3-18 Cross Section of Resistivity Structure (1)
[Line A]

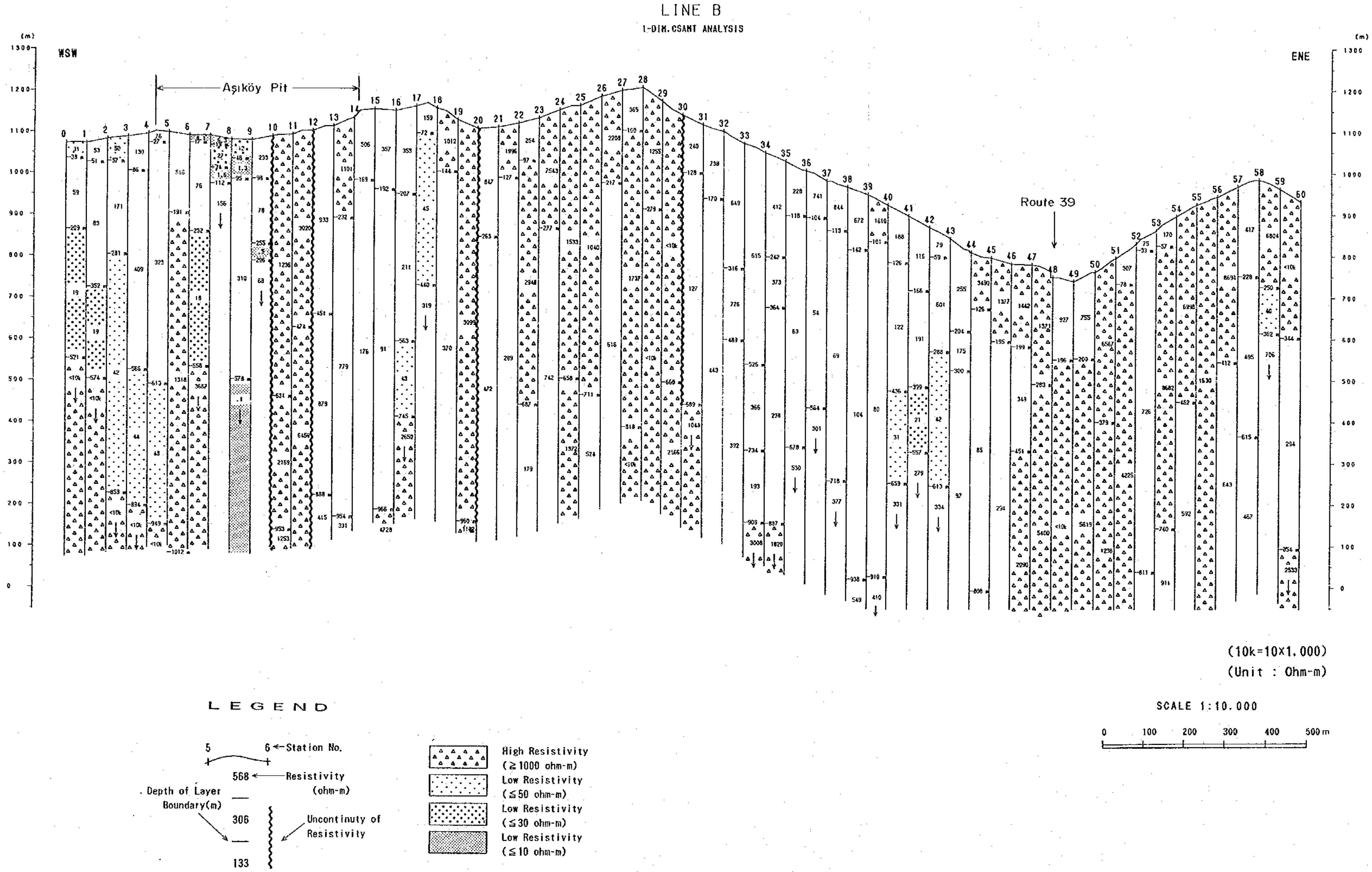


Figure 3-18 Cross Section of Resistivity Structure (2)
[Line B]

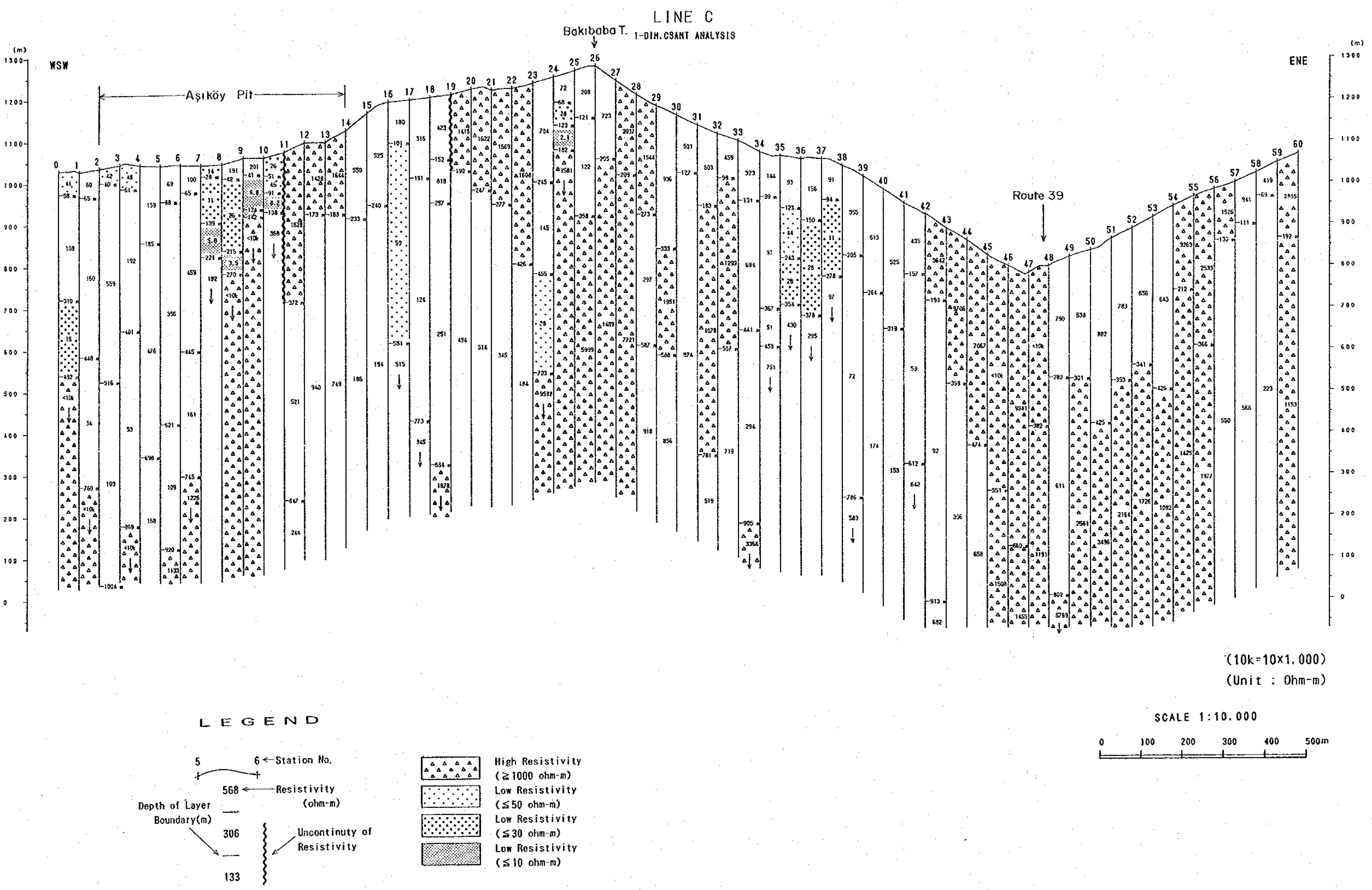


Figure 3-18 Cross Section of Resistivity Structure (3) [Line C]

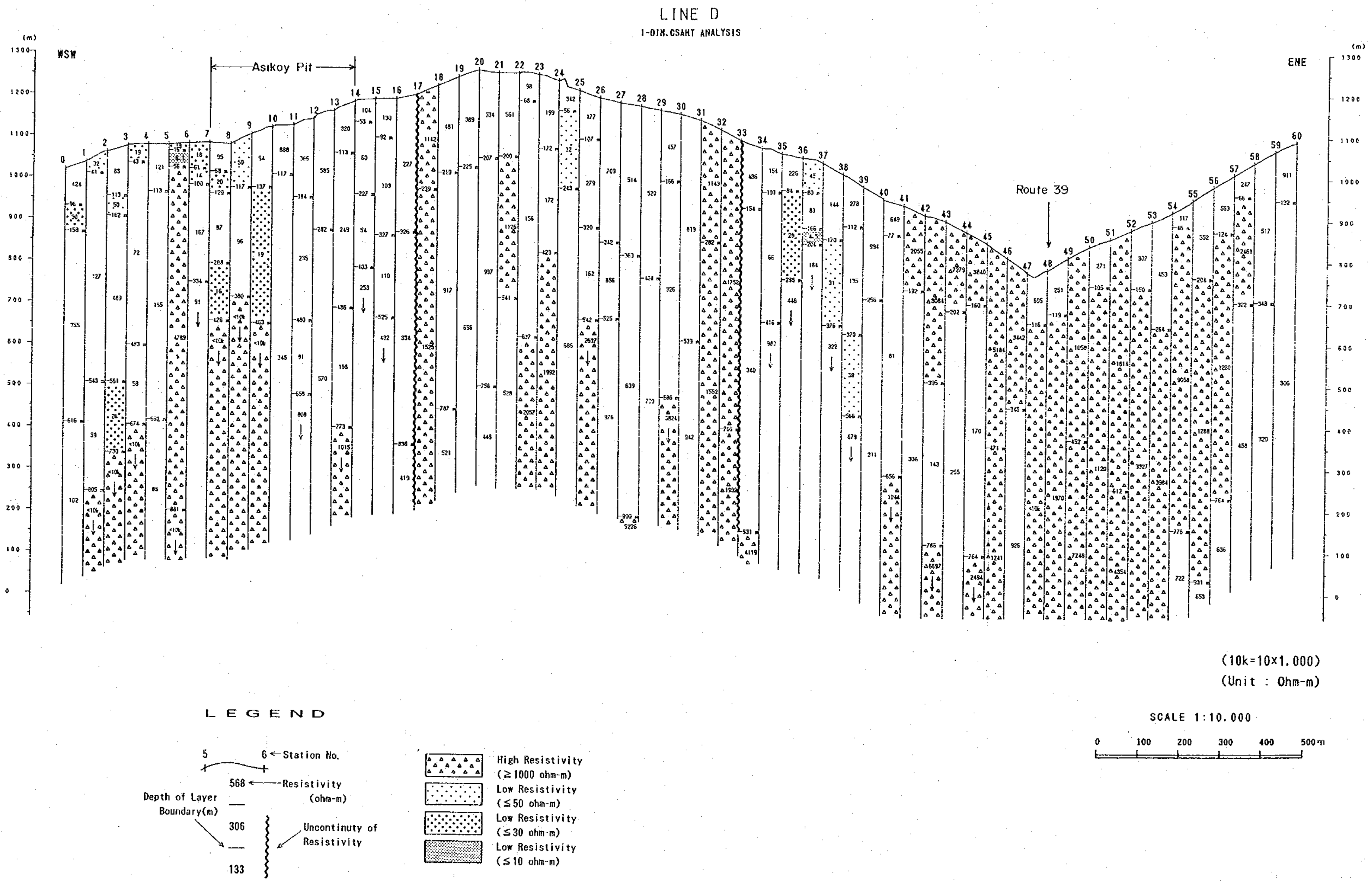


Figure 3-18 Cross Section of Resistivity Structure (4) [Line D]

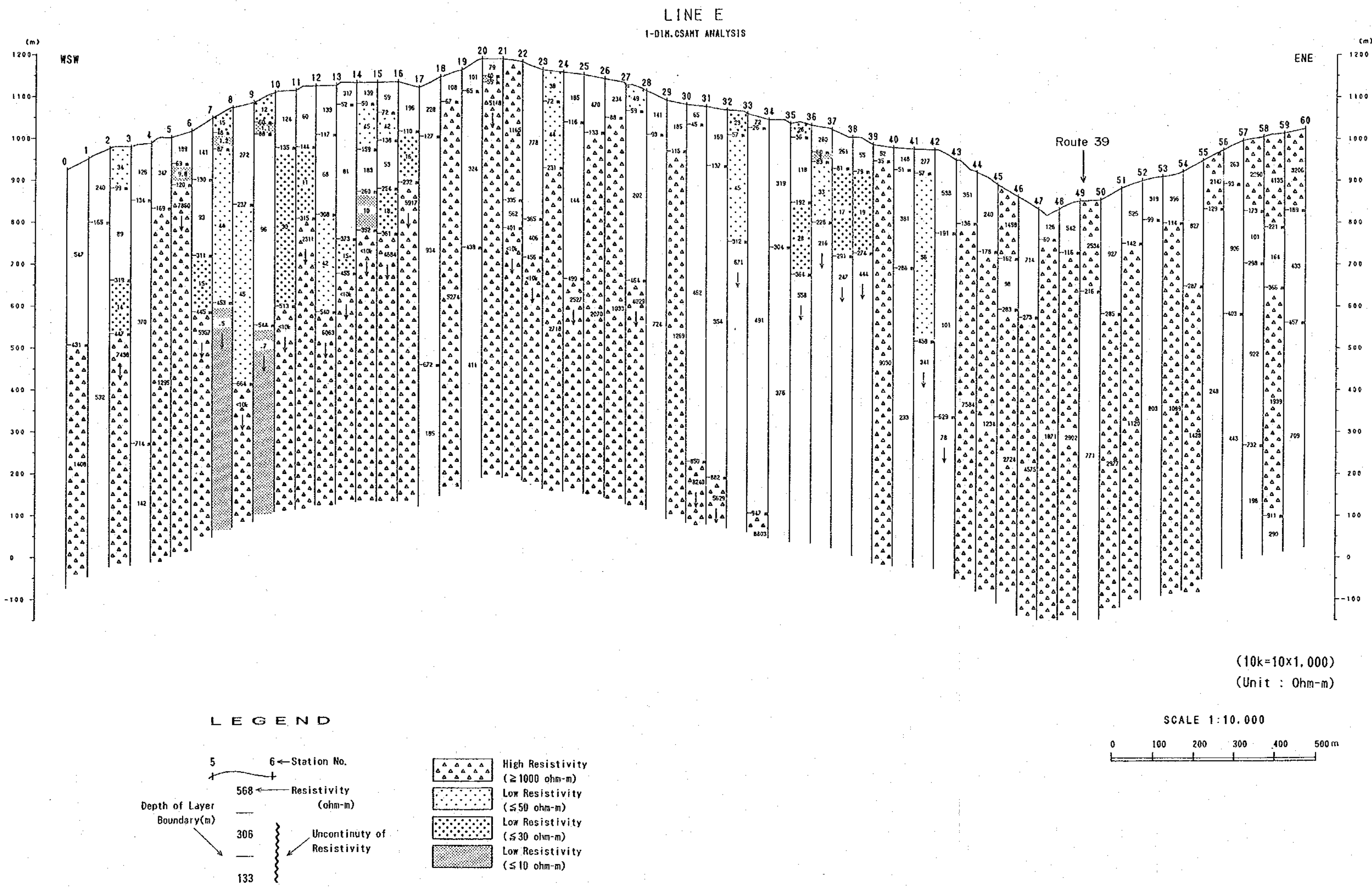


Figure 3-18 Cross Section of Resistivity Structure (5) [Line E]

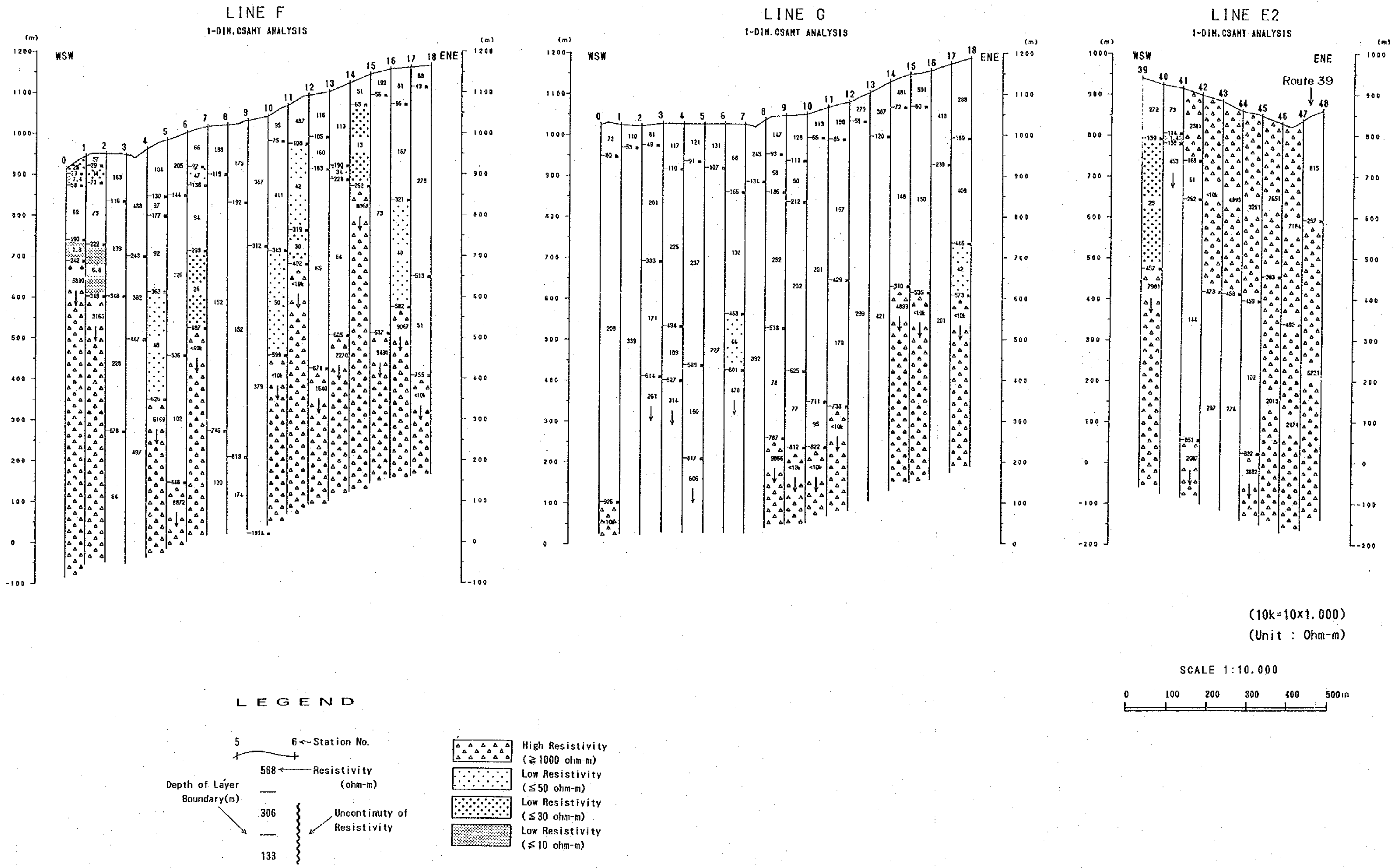
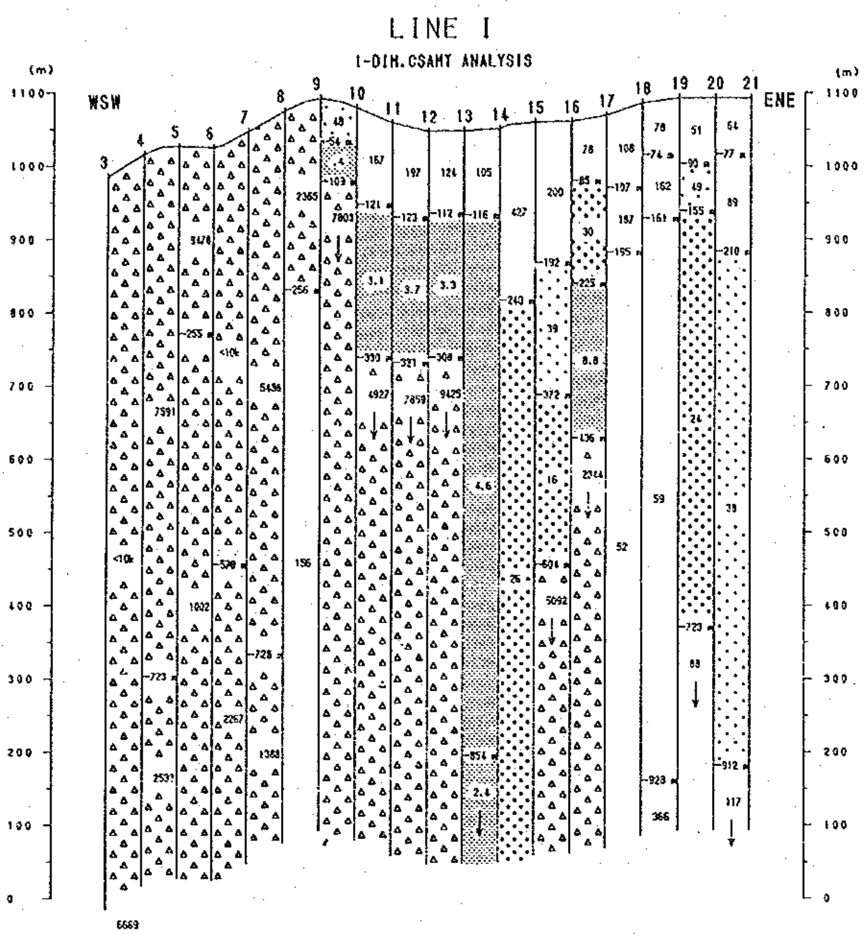
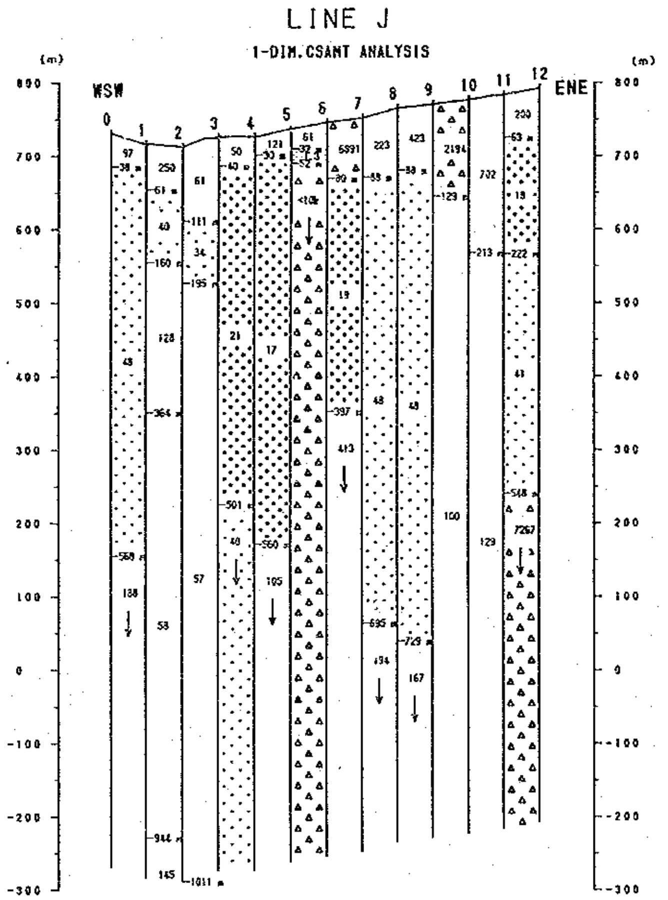


Figure 3-18 Cross Section of Resistivity Structure (6)
[Line F, G, E2]





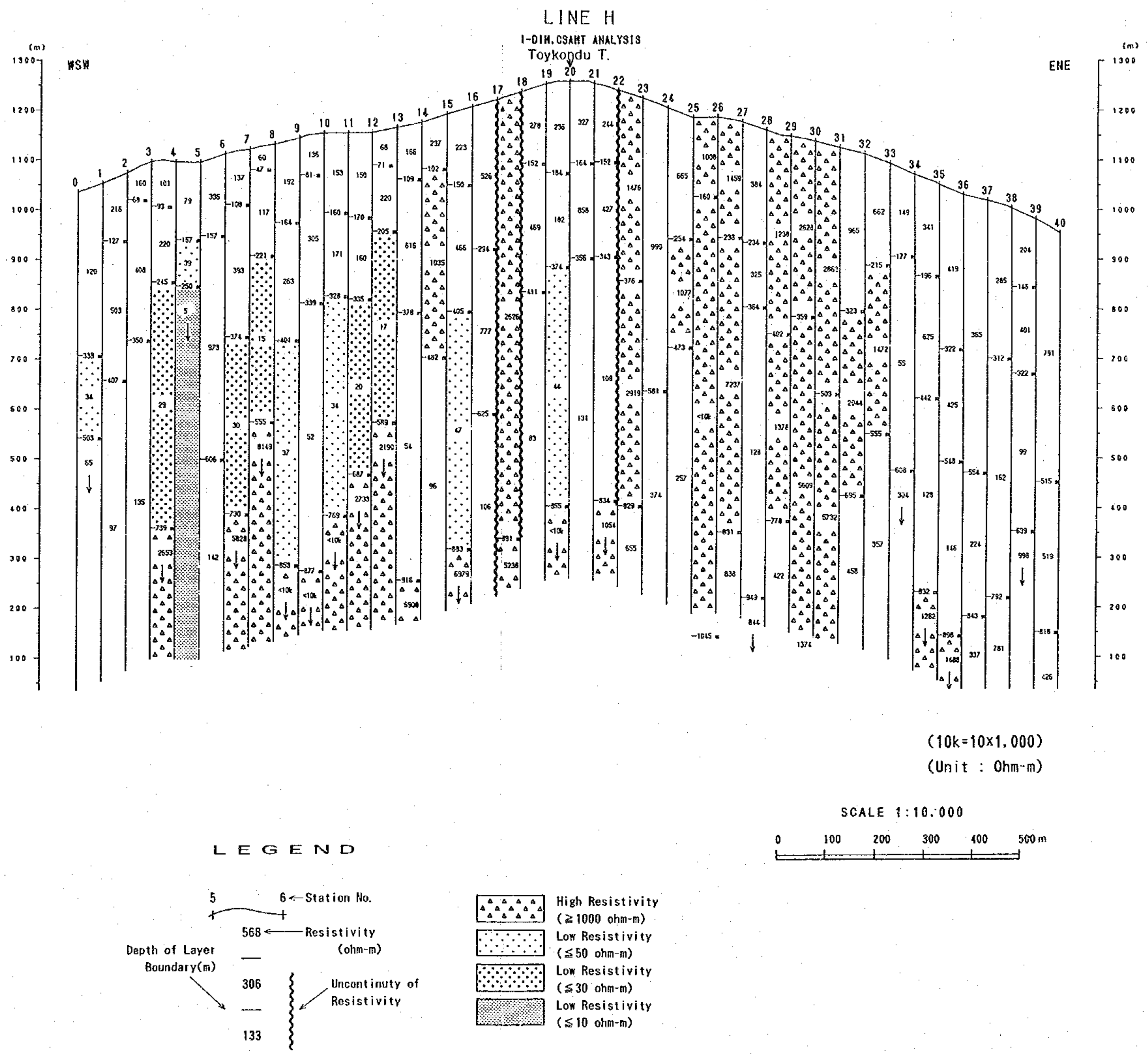


Figure 3-18 Cross Section of Resistivity Structure (7)
[Line H, I, J]

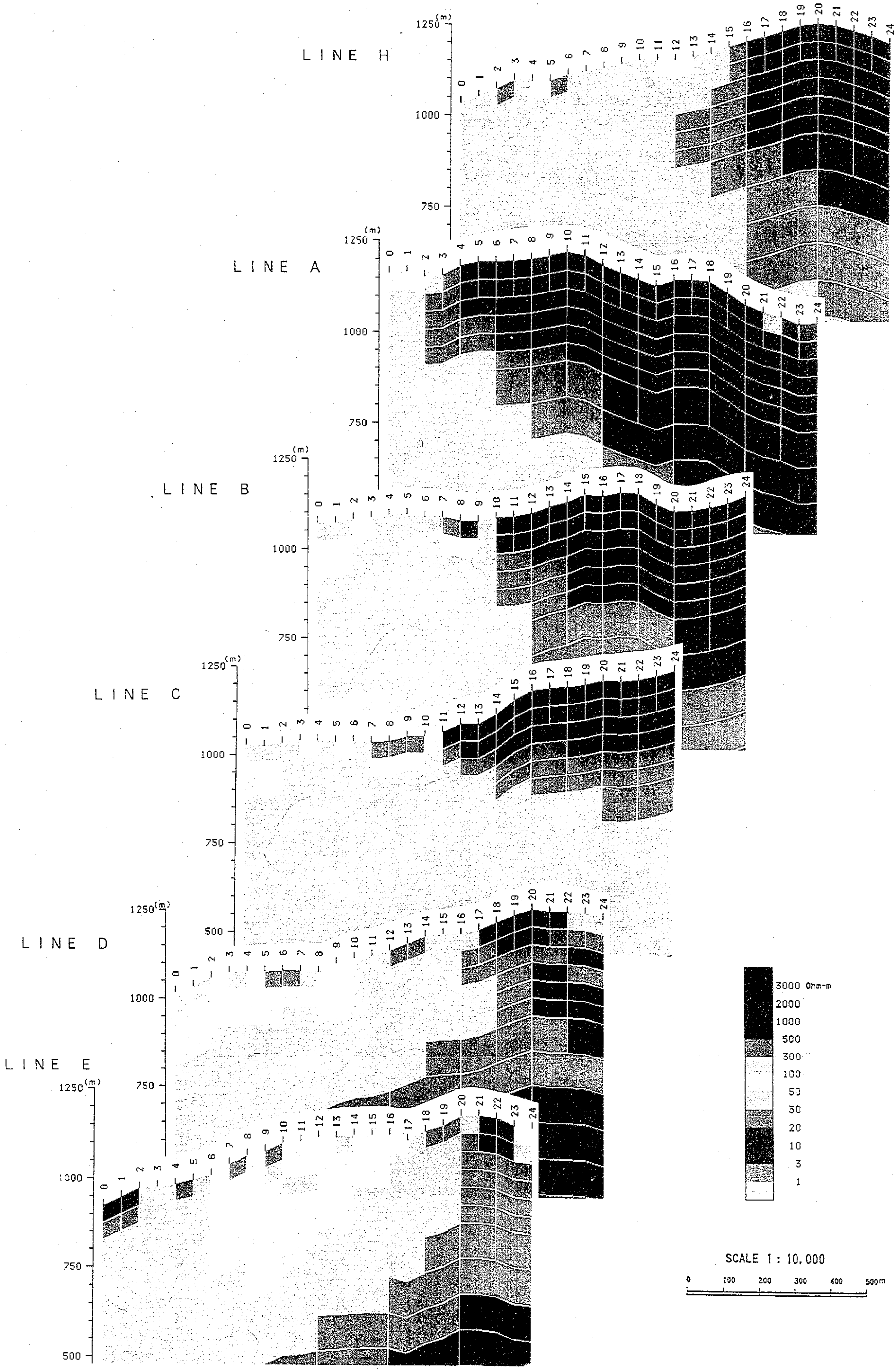


Figure 3-19 CSAMT 2-d. Simulation Analysis (1)
[Line A-H Western Part]

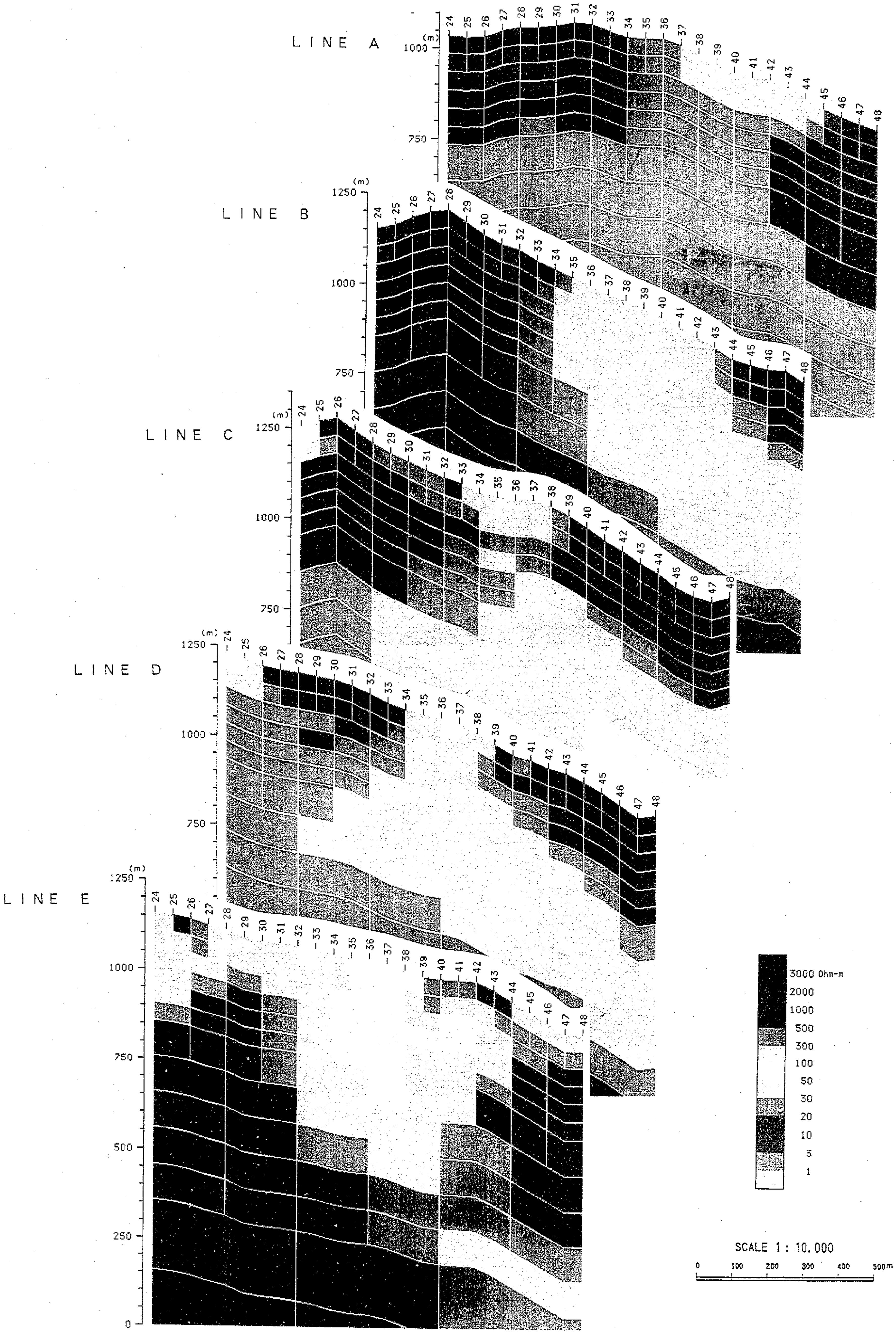


Figure 3-19 CSAMT 2-d. Simulation Analysis (2)
[Line A-E Central Part]

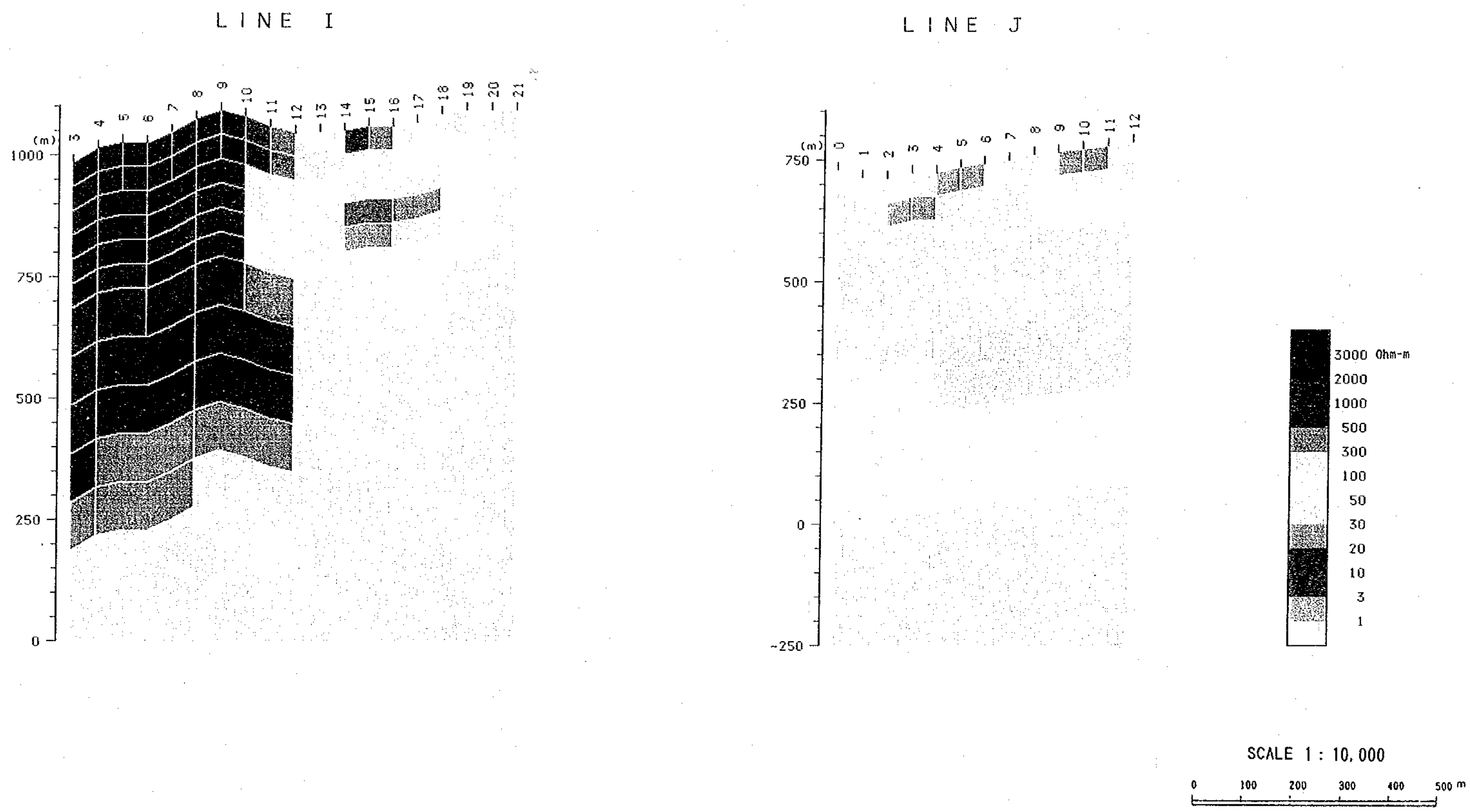
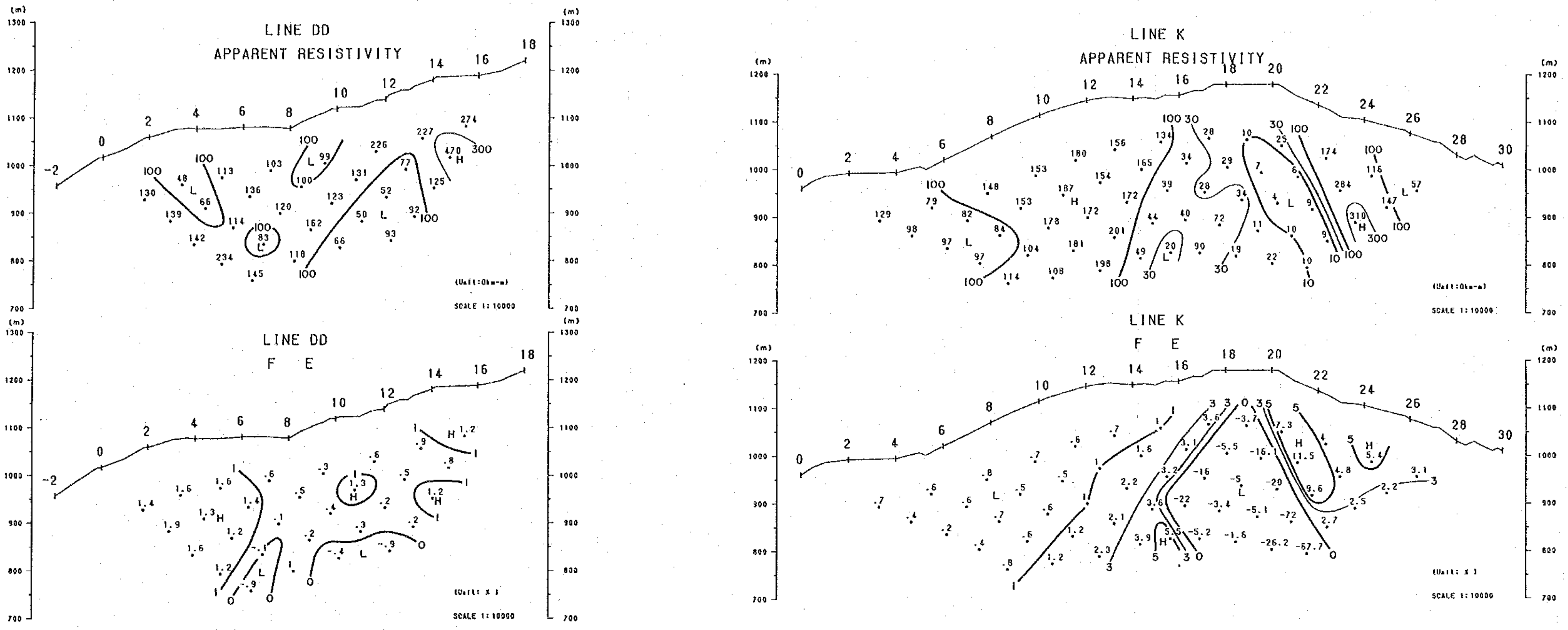


Figure 3-19 CSAMT 2-d. Simulation Analysis (3)
[Line I, J]

267, 268



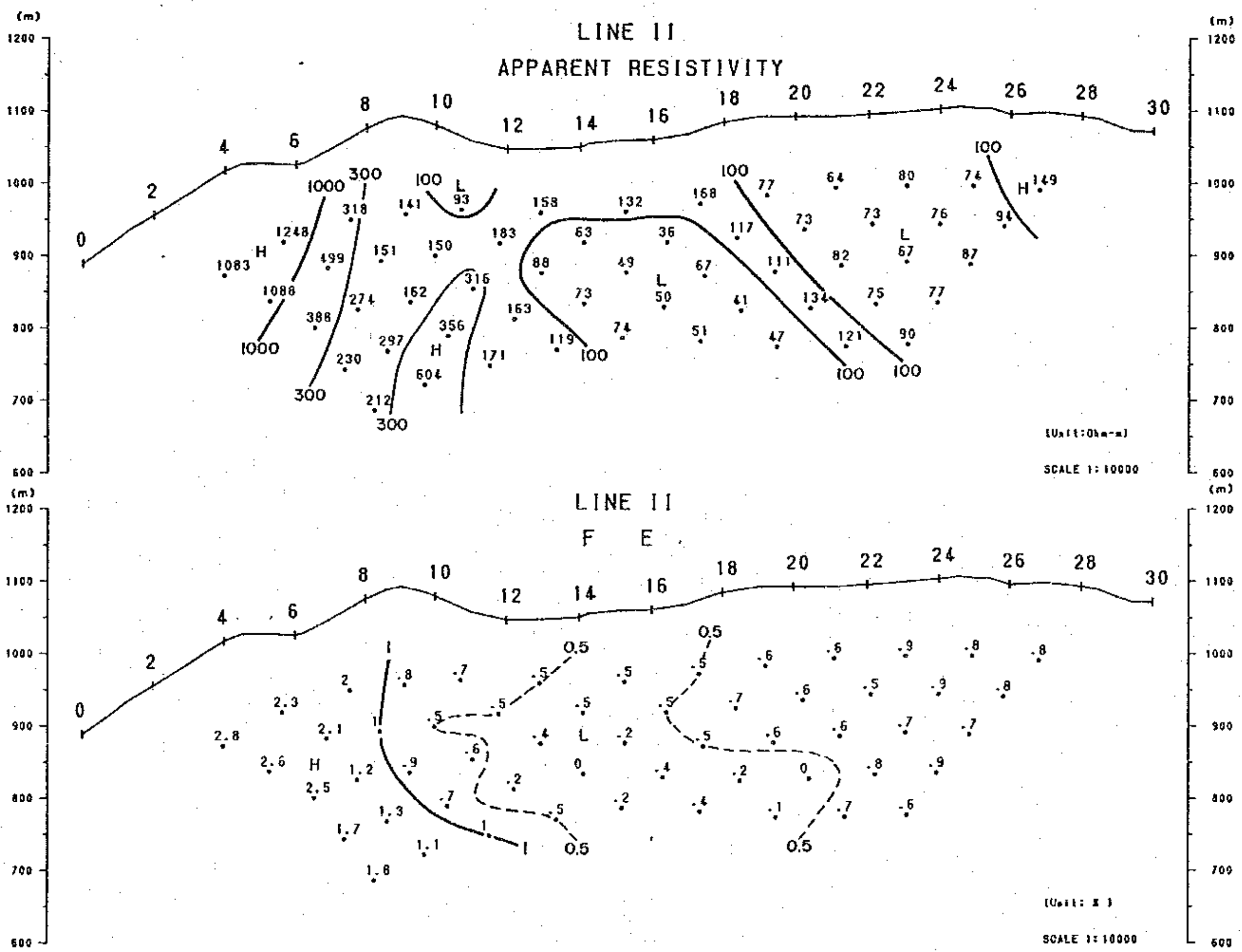


Figure 3-20 IP Pseudosection of Resistivity and FE
[Line DD, II, K]

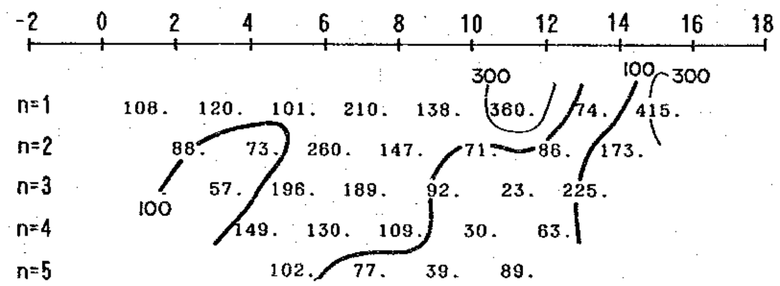
269, 270

Simulation Model Line D D

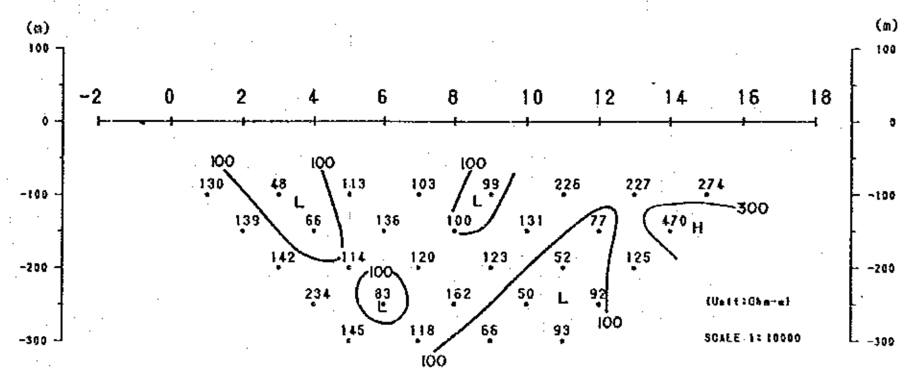
	-2	0	2	4	6	8	10	12	14	16
1	444	455	544	444	777	774	774	444	777	777
2	333	555	533	333	444	444	444	444	777	777
100m 3	555	555	555	544	444	444	333	444	444	444
4	555	555	555	554	444	444	333	444	444	444
5	555	555	555	554	444	444	333	444	444	444
200m 6	555	555	555	554	444	444	333	333	444	444
7	555	555	555	333	444	444	333	333	444	444
8	555	555	555	333	444	333	333	333	444	444
300m 9	555	555	555	333	444	333	333	333	444	444
10	555	555	555	333	444	333	333	333	444	444
11	555	555	555	333	444	333	333	333	444	444
12	555	555	555	333	444	333	333	333	444	444
13	555	555	555	555	533	333	333	333	444	444
14	555	555	555	555	533	333	333	333	444	444
15	555	555	555	555	566	666	666	666	666	666
16	555	555	555	555	566	666	666	666	666	666

CODE	RESISTIVITY ohm-m	F.E. %
1	10.	3.0
2	30.	1.5
3	50.	2.0
4	200.	.5
5	150.	1.0
6	1000.	1.0
7	2000.	2.0
8	8888.	888.0
9	9999.	999.0

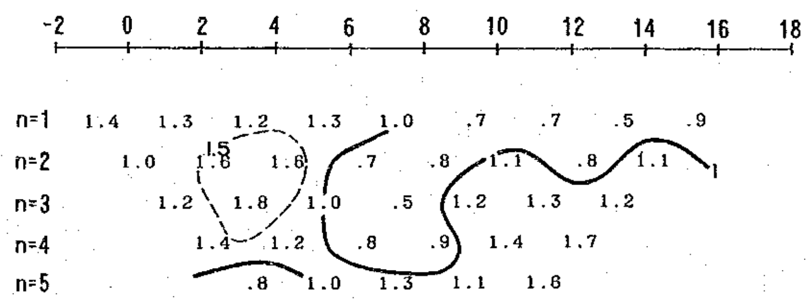
Apparent Resistivity



Observed Apparent Resistivity



F E



Observed F E

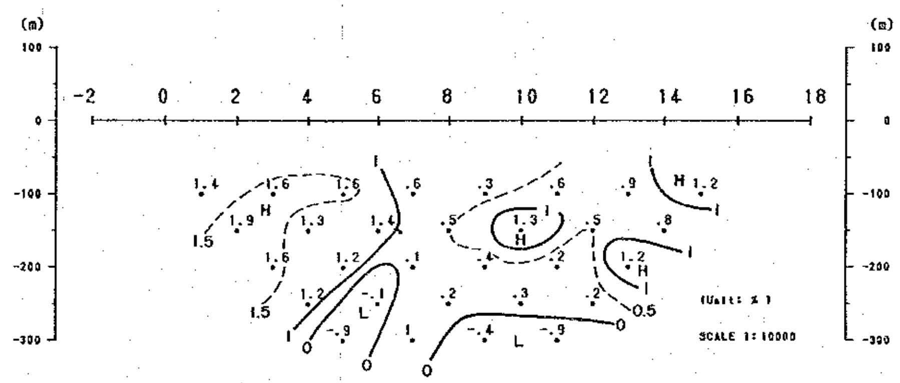


Figure 3-21 IP 2-d. Model Simulation Analysis (1) [Line DD]

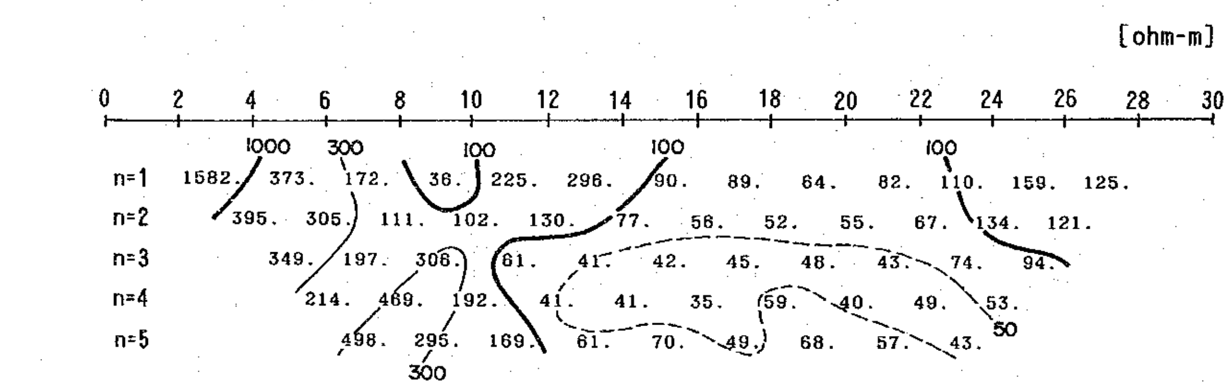
271, 272

Simulation Model Line I I

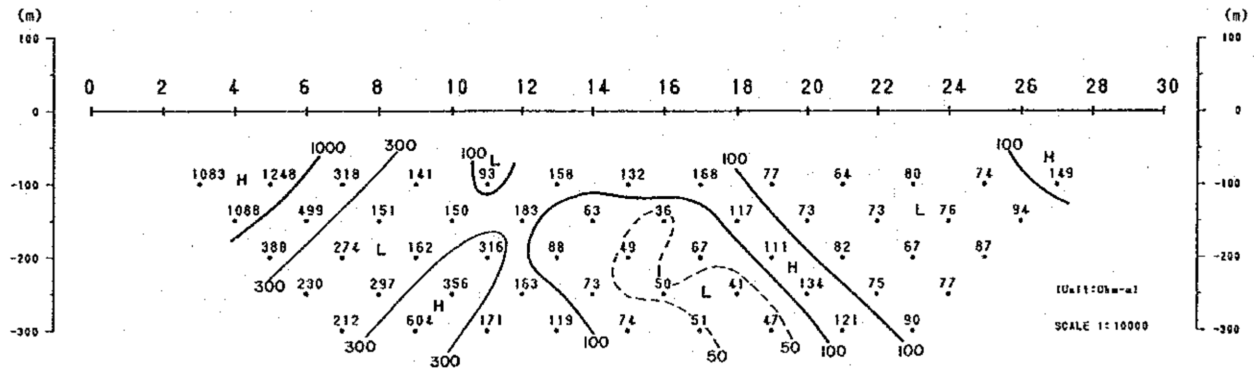
Depth	Row	0–2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	18–20	20–22	22–24	24–26	26–28	28–30
	1	666	666	665	555	544	444	555	555	444	444	444	444	444	555	555
	2	666	666	665	555	522	777	777	444	444	333	335	555	555	555	555
	3	666	666	666	555	577	224	444	444	443	333	355	555	555	555	555
100m	4	666	666	666	555	777	222	222	222	233	333	355	555	555	555	555
	5	666	666	666	665	777	222	222	222	233	333	335	555	555	555	555
200m	6	666	666	666	665	777	222	222	222	233	333	335	555	555	555	555
	7	666	666	666	667	777	772	222	222	222	333	333	555	555	555	555
	8	666	666	666	677	777	772	222	222	222	333	333	555	555	555	555
300m	9	666	666	666	777	777	778	888	888	888	888	888	855	555	555	555
	10	666	666	666	666	688	888	888	888	888	888	888	855	555	555	555
	11	666	666	666	666	688	888	888	888	888	888	888	888	888	888	888
	12	666	666	666	666	688	888	888	888	888	888	888	888	888	888	888
	13	666	888	888	888	888	888	888	888	888	888	888	888	888	888	888
	14	666	888	888	888	888	888	888	888	888	888	888	888	888	888	888
	15	666	888	888	888	888	888	888	888	888	888	888	888	888	888	888
	16	666	888	888	888	888	888	888	888	888	888	868	888	888	888	888

CODE	RESISTIVITY ohm-m	F.E. %
1	5.	.1
2	50.	.5
3	80.	1.0
4	100.	.5
5	200.	1.0
6	1500.	2.0
7	5000.	1.5
8	9000.	.1
9	9999.	999.0

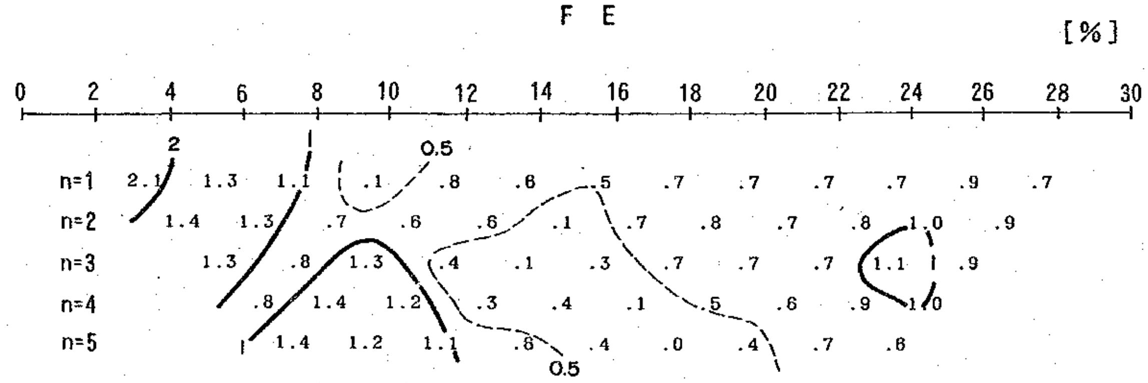
Apparent Resistivity



Observed Apparent Resistivity



F E



Observed F E

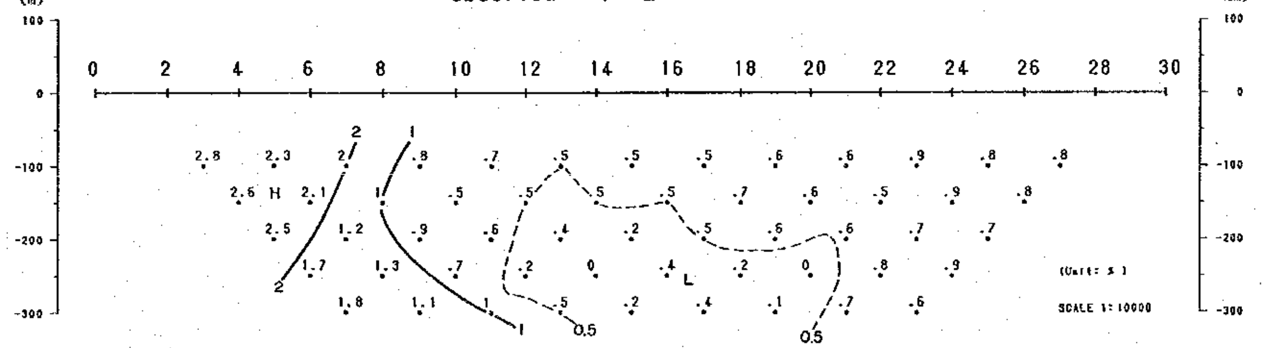


Figure 3-21 IP 2-d. Model Simulation Analysis (2)
[Line II]
273, 274

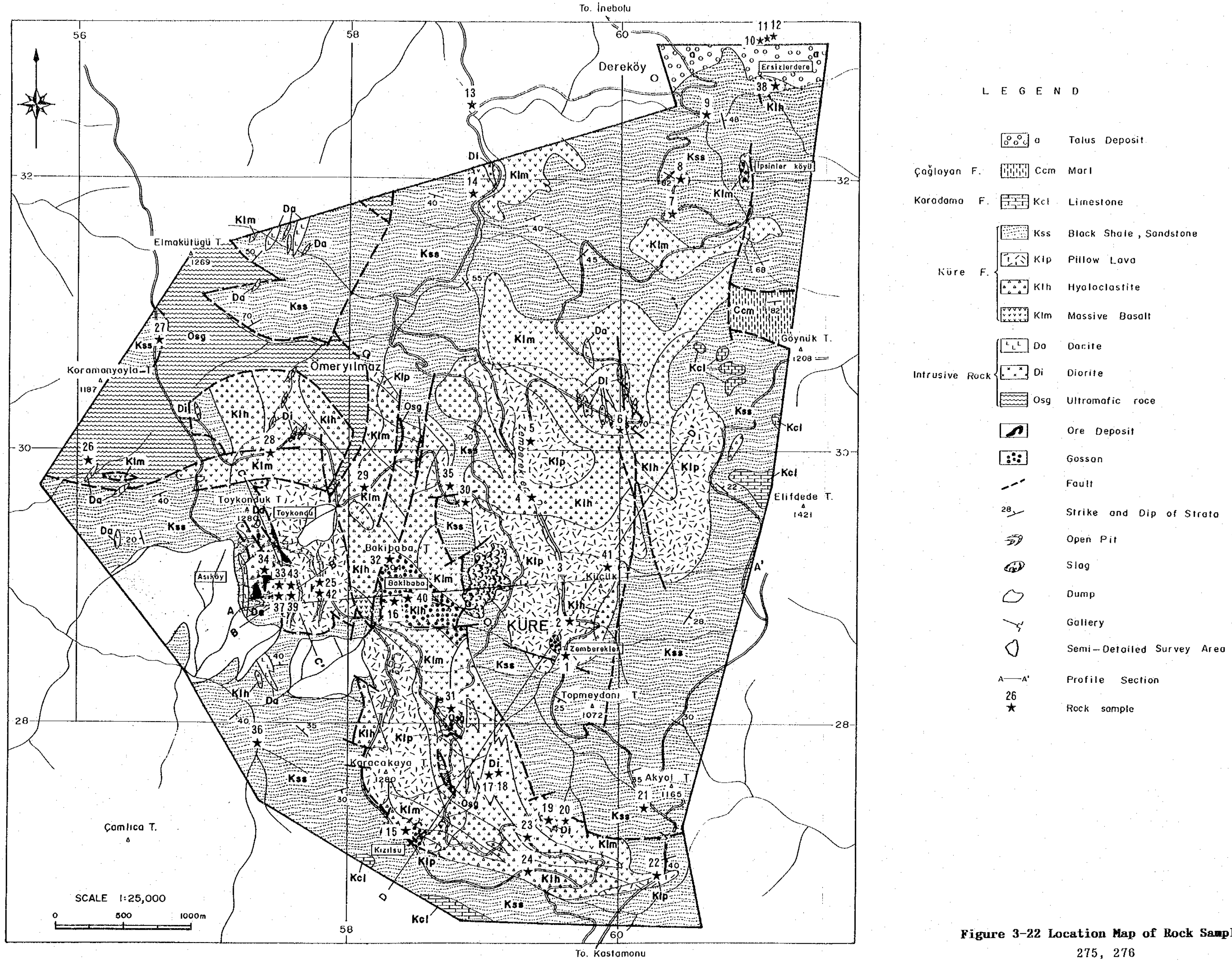


Figure 3-22 Location Map of Rock Samples

275, 276

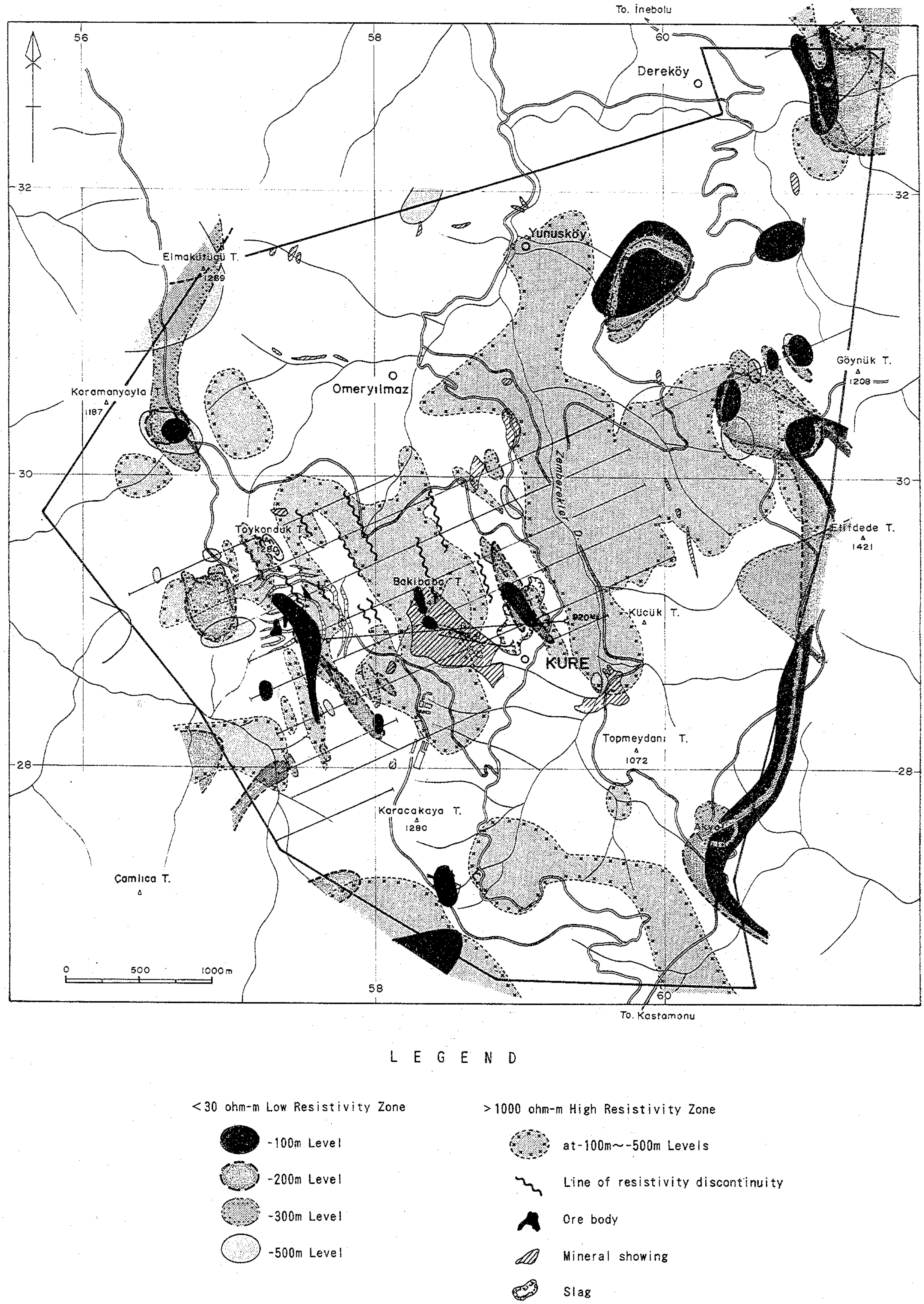


Figure 3-24 Geophysical Interpretation Map

CHAPTER 5 DISCUSSIONS

The known ore deposits in this zone are Aşıköy Toykondu, Bakibaba and Kizilsu. The geologic units constituting this zone are; ultramafic rocks, basalts and pelitic sedimentary rocks. The basalts are submarine effusive in nature and tuffs formed by steam explosion do not occur and it is considered that the basalts effused in deeper ocean. There is a very large amount of pyrite, small amounts of chalcopyrite and sphalerite, and minor amount of marcasite and pyrrhotite in the ores of the known deposits. From the above facts, the known deposits of this zone are believed to be of Cyprus-type. The characteristics of the mineralization of this zone including the mineral composition, grade and occurrence indicate that the target of the present exploratory work is Cyprus-type copper mineralization.

The ore deposits occur within hyaloclastite and at the boundary between it and black shale, also 10-20cm subrounded massive ore occur in hyaloclastite in some of the deposits surveyed. In the latter case, the amount of the boulder ores is more or less proportionate to the degree of silicification of the host rock. This indicates that the basaltic activity (hyaloclastite formation) continued after the formation of the massive ores. Thus basaltic rocks are also host to the ores in this zone.

There are mineral showings in 13 localities in the Küre Mining Zone. These are largely grouped into two types from the host rocks and the shape of the orebody.

One type of mineralization is the limonite dissemination in the basalts and sedimentary units. These extend horizontally and the examples are; Ersizlerdere, İpsinler, Northeastern Katıruçtuğu, Western Katıruçtuğu, North of Bakibaba, Zemberekler, Southwestern Bakibaba, and North of Karacakaya.

The other type extends along faults and also in dacite. These showings are; Northern Yunusköy, Western Yunusköy, East of Elmakütüğü, Western Ömeryılmaz and East of Bakibaba.

The age of the mineralization of the latter type, emplaced along faults, is different from that of the massive orebodies such as Aşıköy Toykondu (same as the basalt activity or later stage of volcanism) because it is after the deposition of the Küre Formation. Therefore, Cyprus-type mineralization cannot be expected in these occurrences.

It was clarified by the present survey that all the known massive orebodies occur at the boundary of the sedimentary rocks and hyaloclastite or within hyaloclastite. This shows that hyaloclastite and areas where it is expected to occur would be the prime target of exploration. It is noted, however, that network orebodies near the massive ores also occur in massive basalt and these rocks cannot be ignored for exploration.

The alteration accompanying mineralization is silicification with small amounts of sericite observed in hyaloclastite. It does not extend much more than the massive-type mineralization laterally and the thickness is at the most several meters. In the case of network mineralization, only part of the sulfide veinlets are silicified and the alteration is of very small scale. The black shale on the hanging wall of the orebodies, is bleached by alteration at Southwest Bakibaba and 3x10mm pyrite lenses occur in the hanging wall black shale of the Aşıköy Orebody, but other than these, manifestations of Cyprus-type mineralization such as silicic ochres do not occur. Therefore, use of the black shale in exploration in this zone is very limited.

The following areas are concluded to be promising as a result of the present survey.

a. Vicinity of Aşıköy-Toykondu Deposit

This deposit extends in the N-S direction, and the geological structure indicate the possibility of locating massive ores at the extension. Particularly in the southern zones, the black shale of the hanging wall is distributed and the possibility of the existence of ore in the lower zones is promising.

b. Vicinity of Bakibaba Deposit

Gossan is distributed over 600x500m near the Bakibaba Deposit. The scale of the gossan distribution is very large compared to the size of the massive ore in this zone considering the relation at the Aşiköy Orebody. Massive ores could be anticipated below the gossan.

c. Zone between Bakibaba and Kızılsu

There are two mineral showing near the boundary of basalts and black shale. The Kızılsu Deposit consists of network and small massive ores with the western side cut by a fault. Massive ore displace by the fault might be located.

It is believed worthwhile to explore for Cyprus-type mineralization at the mineral showings of; Ersizlerdere, İpsinler, Northeast Katıruçtuğu, Western Katıruçtuğu, North of Bakibaba, Zemberekler, Southwest of Bakibaba, and North of Karacakaya. Zemberekler is considered to be of particular interest because of the distribution of gossan over 120x50m and the existence of mine wastes in the vicinity.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6-1 Conclusions

The results of the previous geological and geophysical work carried out in the Küre Mining Zone were studied with care and were used in the planning of the semi-detailed geological survey and geophysics consisting of CSAMT array and IP. As the zone is considered promising with the existence of an operating mine, semi-detailed geological survey covering 22km^2 was carried out from the onset.

The major part of the zone is covered by Küre Formation consisting of Lias basalts and alternation of sandstone and shale. The Küre Deposit occurs in the hyaloclastite near the boundary with black shale. Other mineral showings have similar mode of occurrence and there are possibilities of locating Cyprus-type mineralization in this zone.

The geological and geophysical field work of the first year delineated the following localities for future detailed exploration.

a. Southern part of Aşıköy deposit.
b. Northern and southern parts of Bakibaba deposit.
c. Vicinity of entrance to Gallery 920ML.
d. Southern part of İpsinler mineralized zone.
e. Zemberekler and Kızılsu deposits.

The following is a brief description of the above localities.

6-1-1 Southern Part of Aşıköy Deposits

Clear CSAMT anomalies were obtained. The surface is covered by sandstone-shale alternation of the Küre Formation. It is south of the Aşıköy Deposit which is presently mined by open pit. This corresponds to the southern extension of the deposit. There are three N-S trending tectonic lines parallel to each other near the Küre Mine and this location is near the western line.

6-1-2 Vicinity of Entrance to Gallery 920ML

CSAMT anomalies were obtained with values second to southern part of Aşiköy. Pyrite dissemination was found in the 920ML gallery, but further exp;oration has not been conducted. This location corresponds to the northern extension of the Zemberekler. Basalts occur on the surface.

6-1-3 North and South of Bakibaba Deposit

CSAMT anomalies with values after 6-1-1 and 6-1-2. At the surface basalts and minor amount of sandstone-shale alternation are observed. These anomalies are located to the north and south of the Bakibaba Deposit with high copper grade and the existence of the N-S tectonic lines in the vicinity enhances the need for further exploratory work in the area.

6-1-4 South of İpsinler Mineralized Zones

Very strong CSAMT anomalies occur in this locality. The surface is covered by limestone talus deposits of Karadana Formation and manifestation of mineralization is not observed on the surface. IP anomalies were not obtained and this could be due to flow of subsurface water or to CSAMT anomalies due to targets deeper than 200m depth. Further geophysical investigation is warranted.

6-1-5 Zemberekler and Kızılsu Deposit

Küre Mine is located in a topographically steep area and there are high tension electric transmission lines in the general area. Also there are large amounts of overburden from the open pit covering the vicinity. Therefore, geophysical work can be carried out only in limited parts. This locality can only be further explored by drilling from the above reasons.

6-2 Recommendations for the Second Phase Survey

It is recommended that the following be carried out during the second phase of this project. It is anticipated that promising zones will be delineated as a result of the work listed below.

Promising Localities	Geophysical Prospecting	Drilling Survey
Southern Part of Aşıköy Orebody		Reco
Vicinity of Entrance to Gallery 920ML		Reco
North and South of Bakibaba Deposit		Reco
South of İpsinler Mineralized Zone.	Reco	
Zemberekler and Kızılsu Deposits		Reco

Reco:recommendation

PART 4 TAŞKÖPRÜ ZONE

PART 4 TAŞKÖPRÜ ZONE

CHAPTER 1 GEOLOGY OF THE TAŞKÖPRÜ ZONE

1-1 Outline of Geology

The geology of this zone is composed of, in ascending order; Devrekani Metamorphic Rocks, Çangal Meta-ophiolite, Kayadibi Formation, Muzrup Formation, Kızacık Formation, Alaçam Formation, and Çayköy Formation. Of these units, the Çangal Meta-ophiolite is dominant and occupies the major part of the zone. Metamorphic rocks mainly occur in the lower two units while the upper five are composed of sedimentary rocks. Gökırmak River flows along the southern side of the Taşköprü Zone and a very large alluvial plain is developed around Taşköprü City. Fossils were not found during the present survey, but from the descriptions of the fossils in the vicinity, the correlation is considered to be as shown in Table 1-23. A schematic stratigraphic column and a geological map and cross sections are laid out in Figures 4-1 and 4-2 respectively.

1-2 Stratigraphy

1-2-1 Devrekani Metamorphic Rocks

Type locality:Southeastern part of Yazıcı Village.

Thickness:Over 1,000m.

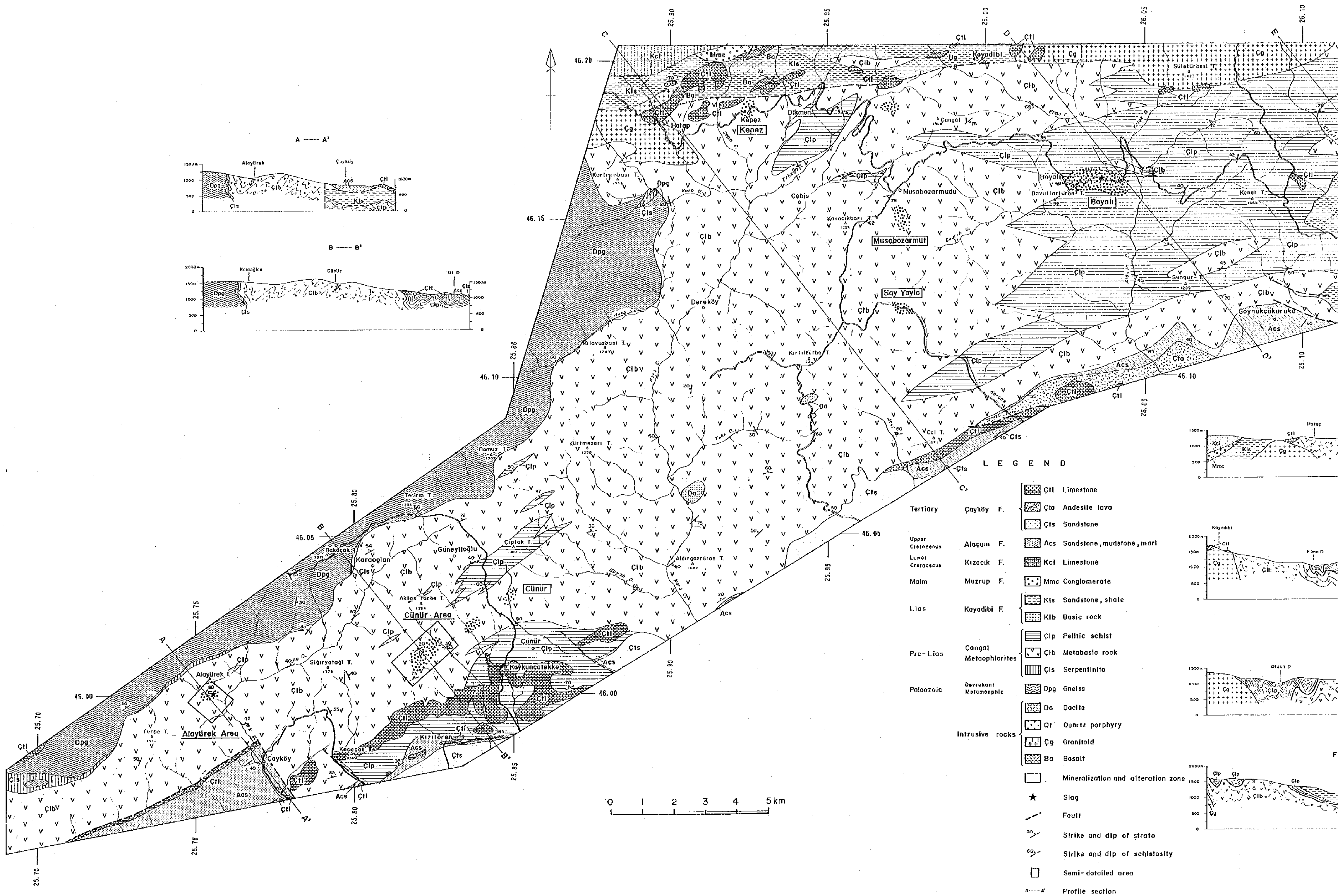
Distribution:These rocks occur in the western part of the survey zone from southeastern Yazıcı Village to the southwestern part of Mt. Alayürek.

Lithology and occurrence:The lithology of this unit is mostly biotite gneiss with some muscovite. This is distributed mostly in relatively flat area and the exposure is not good. The flat area is cultivated and vegetation is dense both in the flat and the uncultivated steeper areas. The rocks are well exposed at Musa Stream which is deeply dissected by erosion. The schist has gneissose texture and consists mainly of quartz, biotite, chlorite and sericite.

Stratigraphic relations:This is in fault contact with the overlying Çangal Meta-ophiolite. This relation is seen at the Musa Stream which flows almost linearly from southwest to northeast; the western side of the stream is the

Geologic Age			Formation	Thickness	Rock Facies	Rock Name	Mineralization & Intrusives
Quaternary			Alluvium	+50m		Sand, gravel	
Cenozoic	Tertiary		Çayköy F.	+1,000m	Çtl Çta Çts	Çtl:limestone Çta:andesite lava Çts:sanstone	↑ Da:dacite Qt:quarz porphyry
Mesozoic	Cretaceous	Upper	Alaçam F.	+500m	Acs	Acs:sandstone,marl mudstone	
		Lower	Kızacık F.	+500m	Kcl	Kcl:limestone	
	Jurassic	Malm	Muzrup F.	+300m	Mmc	Mmc:conglomerate	
		Dogger					↑ Çangal Granitoids (Çg)
		Lias	Kayadibi F.	+1,000m	Kls Klb	Kls:sandstone Klb:basic rocks	
	Pre-Jurassic		Çangal Meta-ophiolites	+5,000m	Çlb Çlp Çlb Çls	Çlp:pelitic schist Çlb:meta-basic rocks Çls:serpentinite	Mineralization (Cu,Py)
? Paleozoic			Devrekani Metamorphics	+1,000m	Dpg	Dpg:gneiss	

Figure 4-1 Schematic Column in the Taşköprü


A —— A'
B —— B'
LEGEND
Tertiary
Çayköy F.
Çtl Limestone
Çta Andesite lava
Çts Sandstone
Upper Cretaceous
Alaçam F.
Acs Sandstone, mudstone, marl
Lower Cretaceous
Kızacık F.
Kcl Limestone
Malm
Muzrup F.
Mmc Conglomerate
Lias
Kayadibi F.
Kls Sandstone, shale
Klb Basic rock
Pre-Lias
Çangal Metaophiolites
Çlp Pelitic schist
Çlb Metabasic rock
Çls Serpentinite
Paleozoic
Devrekani Metamorphic
Dpg Gneiss
Intrusive rocks
Da Dacite
Qt Quartz porphyry
Çg Granitoid
Ba Basalt
Mineralization and alteration zone
Slag
Fault
Strike and dip of strata
Strike and dip of schistosity
Semi-detailed area
Profile section
0 1 2 3 4 5 km
Kepez
Boyalı
Musabozarmut
Say Yayla
Cünür
Cünür Area
Alayürek Area
Alayürek T.
Çayköy
Karaoglan
Güneylioğlu
Koykuncatekke
Kızılören
Kayadibi
Dikmen
Hatap
Musabozarmudu
Göynükçukuru
Dereköy
Cebis
Çangal T.
Sultetürbesi T.
Kavacıkbaşı T.
Kılavuzbaşı T.
Kürtmezarı T.
Domuz T.
Tecirin T.
Çıplak T.
Aktaş Türbe T.
Sığıryatağı T.
Kocaçal T.
Aldırgaztürbe T.
Kırtıltürbe T.
Sungur T.
Konat T.
Davutlartürbe
Karlıçınbaşı T.

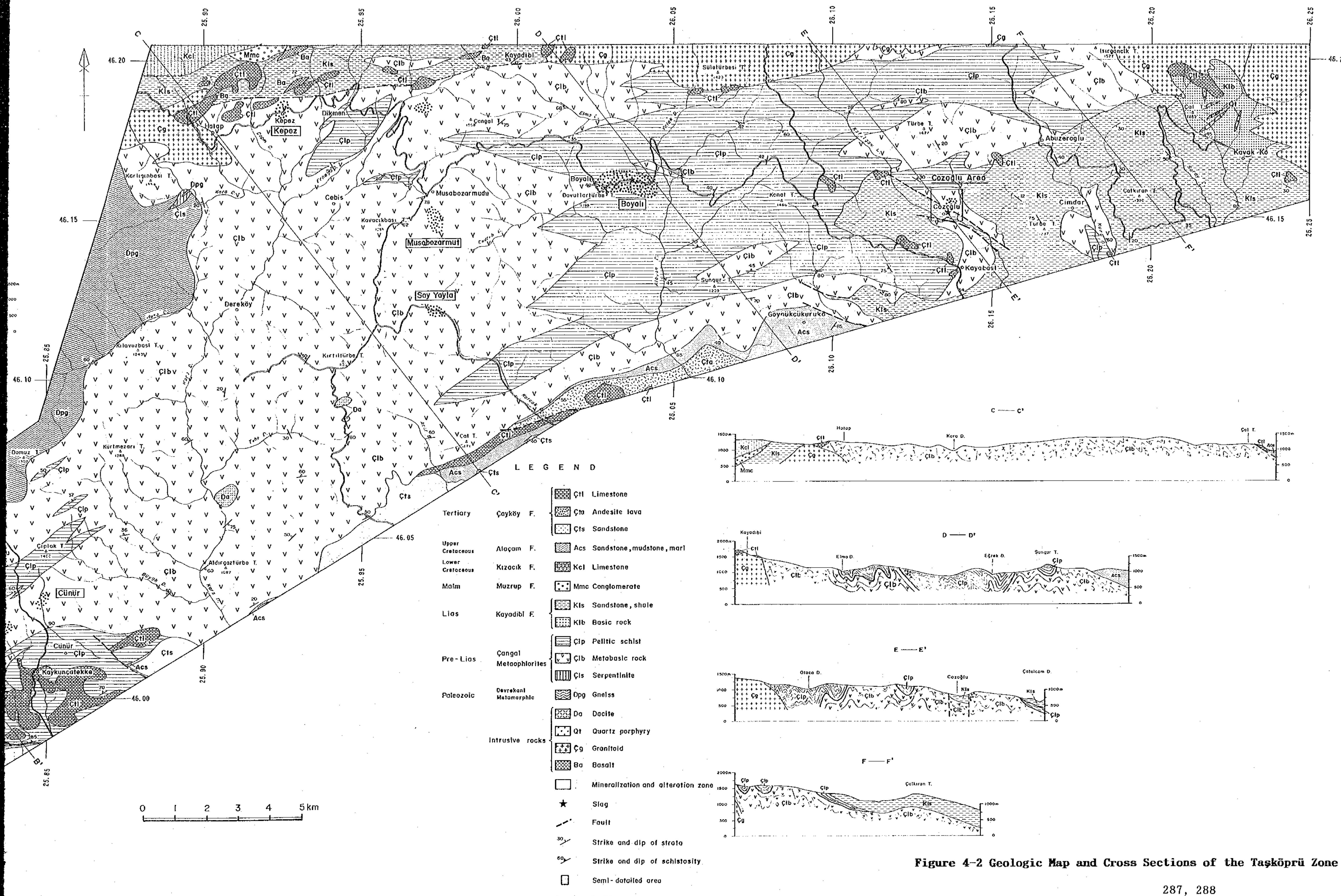


Figure 4-2 Geologic Map and Cross Sections of the Taşköprü Zone

gneiss while the east consists of metabasalts of the upper unit. The general trend of the contact of the two units in this zone is NNE-SSW, and serpentine has intruded into the boundary in the SW direction from Mt. Alayürek. This metamorphic unit is considered to have been derived from Paleozoic sedimentary rocks and was metamorphosed by orogenesis of the Dogger time.

1-2-2 Çangal Meta-ophiolites

Type locality: Southern part of Mt. Çangal.

Thickness: Over 5,000m.

Distribution: The meta-ophiolite extends 100km in the east-west direction and 30km in the north-south direction. It occupies approximately 70% of the survey zone.

Lithology and occurrence: This body is composed of serpentine, green rocks constituting the major part, and pelitic rocks. The serpentine intruded in the early stages followed by mafic volcanic rocks, the green rocks. The latter occupies the major part of this body. In the later stages volcanism declined and pelitic rocks became dominant. Subsequently, orogenesis of the Dogger Epoch strongly affected these rocks and the green rocks were metamorphosed to metabasalt and green schist, and the pelitic rocks to pelitic schist.

Serpentine occurs at the boundary with the underlying Devrekani Metamorphics and is partly intruded into the lower unit. The occurrence is limited to the western part of the zone and it is narrow with several to several tens of kilometer in length.

The green rock, the major constituent of this unit, consists of metabasalts and green schist. The metabasalt is believed to have derived from basalt, it is massive and weakly metamorphosed. The green schist is believed to have derived from pyroclastics. Remnants of brecciated structure is not observed and thus the original rock was most probably tuff. Pelitic schist gradually becomes dominant eastward. Metabasalt is dominant to the west and green schist to the east.

The pelitic schist becomes dominant to the east of Boyali, but there are also small occurrences around Cünür in the west. It is dominant in the parts delineated as pelitic schist on the geological map. But it also forms alternations with green schist or mixtures which are difficult to distinguish the two schists. The original rocks of the pelitic schist is believed to have been shale, sandstone, mudstone and other sediments.

The metabasalt has intersertal, porphyritic, and ophitic textures characteristic of basalt. Chlorite, epidote, calcite, carbonates increase with the metamorphic degree and also granoblastic and nemotoblastic textures appear.

Stratigraphic relations:
The underlying unit is the Devrekani Metamorphic Rocks. The relation with the upper Kayadibi Formation is fault contact at; the northern side of Taşköprü and the west of Kayadibi Village to the north of Mt. Çangal. It is intruded by Çangal Granites to the east of Kayadibi Village. The east-west boundary between this meta-ophiolite and the Kayadibi Formation is almost linear and a large tectonic line is inferred. In the southern side, the stratigraphically higher Kayadibi, Muzrup, and Kızacık Formations are lacking to the west and is unconformably overlain by Alaçam and Çayköy Formations, and in the east it is overlain unconformably by sandstone of the Kayadibi Formation.

1-2-3 Kayadibi Formation

Type locality:Vicinity of Kayadibi Village.

Thickness:Over 1,000m.

Distribution:West of Kayadibi Village and east of Cozoğlu Village.

Lithology and occurrence:This formation comprises sedimentary rocks and basalts. The sediments are black shale, silt and fine-grained sandstone. Fossils and dendrites are not observed in the sedimentary rocks. The attitude of these rocks vary considerably. The dip is generally steep, 60°-70°. Intercalation of thin limestone has been reported and occurrence of calcareous mudstone was observed in this zone. It has been reported that the basalt is composed of spilite, diabase, gabbro, serpentine and others, but the body consists of massive basalt near Mt. Cal and basalt dykes in western Kayadibi Village.

Stratigraphic relations:
This unit overlies the Çangal Meta-ophiolite unconformably and is overlain unconformably by Muzrup and Kızacık Formations at western Kızacık Village, and by limestone of the Çayköy Formation in the depression at eastern Cozoğlu Village. It is correlated regionally to the Akgöl Formation.

1-2-4 Muzrup Formation

Type locality:Muzrup Village (outside of the survey zone) to the northwest of Kayadibi Village.

Thickness:Over 300m.

Distribution:This formation is distributed widely from 4km north of Kepez Village to the Muzrup Village outside of the survey zone.

Lithology and occurrence:This formation has characteristics similar to alluvial fans in the mountainous areas, namely it comprises red conglomerate, sandstone, siltstone and psammitic limestone. Fragments of shale, sandstone, diabase, gabbro, granite, granodiorite of the underlying formations are included in the conglomerates and also metamorphosed dolomite and marble occur as pebbles.

Stratigraphic relations:This formation unconformably overlies the Kayadibi Formation and is overlain by Kızacık Formation. It is correlated to the Bürnük Formation of latest Dogger to early Malm from the relations to the higher and lower units.

1-2-5 Kızacık Formation

Type locality:Kızacık Village (7km north of Kepez Village, outside of the survey zone).

Thickness:Over 500m

Distribution:This formation is widely distributed from the northwest corner of the Taşköprü Zone to the Kızacık Village.

Lithology and occurrence:This formation is composed of shallow marine grey to bluish grey calcareous rocks extending northward from the south. This was formed by the regional transgression during early Malm Epoch.

Stratigraphic relations:This formation overlies the Kayadibi and Muzrup Formations unconformably. The overlying formation is not clear within the survey zone, but is overlain unconformably by Cretaceous sedimentary rocks outside of the present area. Index fossils occur in the type locality and is correlated to İnaltı Formation.

1-2-6 Alaçam Formation

Type locality:Lower reaches of the Alaçam River.

Thickness:Over 500m.

Distribution:This formation is distributed from southwestern Cozoğlu to the southern side of Mt. Alayürek. This is the southern side of the Taşköprü Zone extending into outside of the survey zone.

Lithology and occurrence:This formation comprises grey turbiditic sandstone, conglomerate, and dark grey calcareous shale and bedding with east-west strike and southward dip is developed.

Stratigraphic relations:This formation overlies the Çangal Meta-ophiolite unconformably and underlies the Çayköy Formation unconformably. Fossils indicating Upper Cretaceous Epoch occur outside of the survey zone and is correlated to the Çağlayan Formation.

1-2-7 Çayköy Formation

Type locality:Vicinity of Çayköy Village.

Thickness:Over 1,000m.

Distribution:This formation occurs on the southern side of the Taşköprü Zone and extends to the outside of the survey zone.

Lithology and occurrence:This formation comprises grey well bedded grey sandstone, greyish purple to reddish brown andesite lava and andesitic pyroclastics, and psammitic limestone in the ascending order. All the constituents have narrow distribution and they occur separately.

The lowermost sandstone occurs on a small scale covering the Çangal Meta-ophiolite and Alaçam Formation in the survey zone, but outside it has wide distribution. The andesite occurs only in the south-central part of the Taşköprü Zone. Although not studied microscopically, it is believed to be two-pyroxene andesite from hand specimen studies. Psammitic limestone is the uppermost bed and occurs on topographically high localities.

Stratigraphic relations:This formation overlies the Çangal Meta-ophiolite and the Alaçam Formation. Fossils are not found, but its relations with strata in the vicinity indicate Tertiary age.

1-2-8 Alluvium

Sand and gravel beds occur in the major streams of the zone. These are not shown in the geological map prepared. Terrace deposits were not found.

CHAPTER 2 INTRUSIVE ROCKS

2-1 Çangal Granite

This granite occurs around Mt. Şuletürbesi in the central-north, vicinity of Hatap Village in the northwest, and northeastern Mt. Çal in the westernmost part of the zone. These are topographically high localities with thick vegetation and deep weathering.
The granite intrudes the Çangal Meta-ophiolite and Kayadibi Formation. The contact of these rocks with the granite is very clear without evidences of thermal metamorphism. There are xenoliths more or less aligned in the east-west direction. The total chemical analysis (samples M286, Y075) and microscopic studies (samples A101, A112, H040, H044, Y086, Y091) indicate coarse-grained diorite.

2-2 Dacite

This intrusive body considered to be dacite and quartz porphyry occurs with NE-SW trend near Mt. Cal in the eastern part of the survey zone. Here, it is quartz porphyry and has intruded into the basalts of the Kayadibi Formation.

Small bodies of dacite occur along the road between Mt. Kırtiltürbe and Taşköprü and in the middle reaches of Kara Stream. These bodies occur as lava domes and are intruded into the Çangal Meta-ophiolite. These are all silicified and argillized and the alteration mineral is sericite (samples; A102, K248, S091, Y102).

CHAPTER 3 GEOLOGIC STRUCTURE

The Çangal Meta-ophiolite occurs widely in the survey zone and the attitude of the lamina cannot be determined because of the effect of metamorphism. Thus the geologic structure is very difficult to determine. Lithologically, it changes from ophiolitic lava in the west to pelitic rocks in the east. It is in contact with the underlying basement, Devrekani Metamorphics, through NE-SW trending tectonic line. Also it is bordered by the E-W trending lineation with the Çangal Granite and Kayadibi Formation on the northern side.

In the southern side, Cretaceous to Tertiary sediments overlie the Çangal Meta-ophiolite unconformably. These sediments generally are E-W trending. This direction appear to represent the regional trend of this zone. There are faults of N-S and NE-SW systems which transect the above and they displace and cut into blocks the massif which extends in the E-W direction. These faults are considered, from the geologic units they transect, to have formed during Tertiary time. The tectonic lines which are inferred to exist at the boundary of the Devrekani Metamorphics and Çangal Meta-ophiolite, and also at the Çangal Granite contact are believed to be of older ages.

CHAPTER 4 MINERALIZATION AND ALTERATION

4-1 Cozoğlu Mineralized Zone

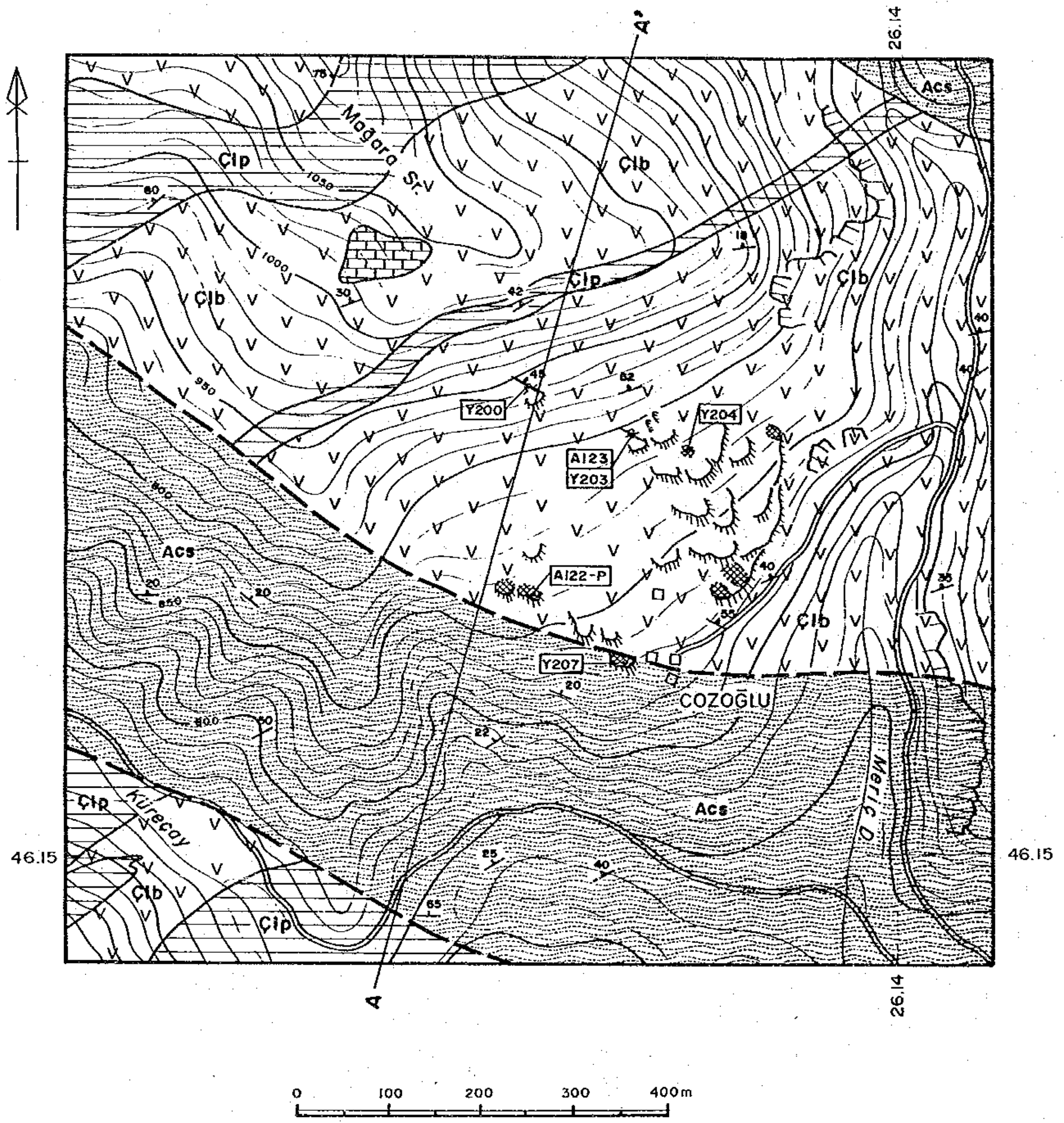
This zone is located on the northern side of the Cozoğlu Village in the eastern part of the Taşköprü Zone. Semi-detailed survey was conducted over an area of $1km^2$. A geological map and cross sections are shown in Figure 4-3 and sketches of the mineralized zone in Figure 4-4.

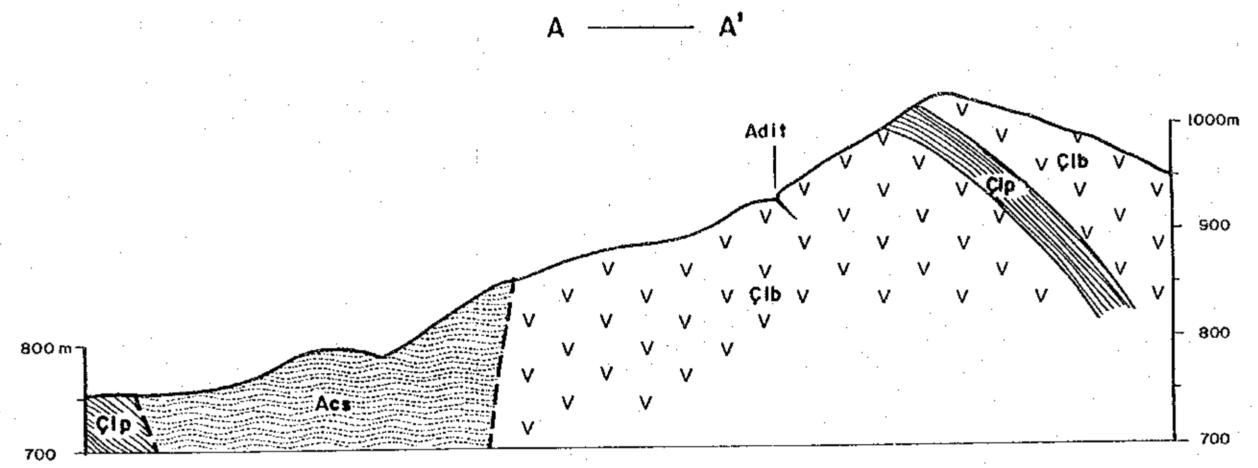
4-1-1 Geology

The geology around this zone is composed mainly of Çangal Meta-ophiolite, Kizacik Formation, and Alaçam Formation. The meta-ophiolite comprises psammitic schist, massive metabasalt and green schist. The Kizacık Formation consists of greyish white limestone and the Alaçam Formation of quartz arenite and black mudstone. Kızacık Formation overlies the meta-ophiolite unconformably while the Alaçam Formation is in fault contact.

4-1-2 Mineralization and Alteration

There are two openings of old adits on the surface. A large amount of mine wastes is found in the vicinity. These are all in the Çangal Meta-ophiolite.





L E G E N D

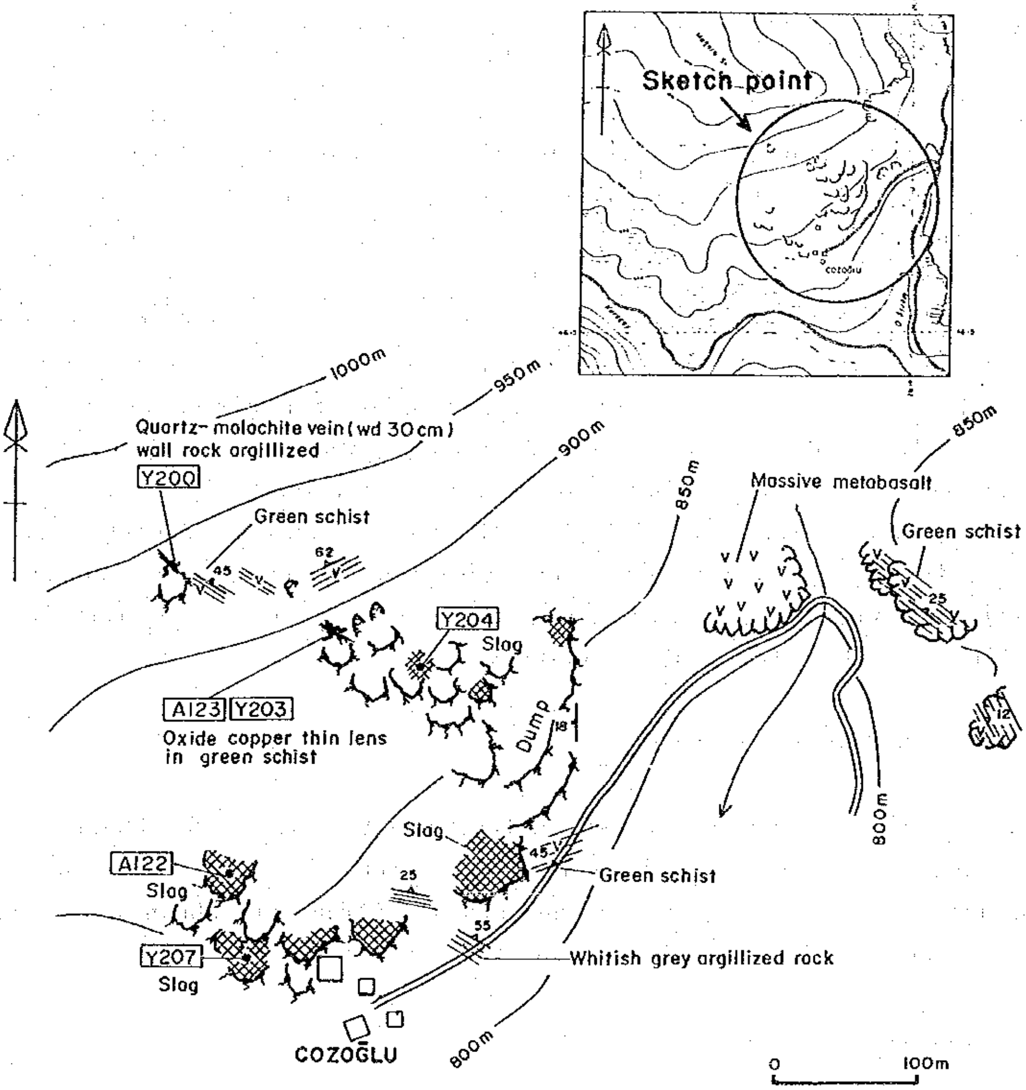
Alaçam Formation	Acs	Sandstone and shale	
Kızacık Formation	Kcl	Limestone	
Çangal Metaophiolite	Çlb	Metabasalt and green schist	
	Çlp	Pelitic schist	
Mineralization and alteration		Gossan with quartz vein	
		Slag	
		Adit	
		Dump	

- Fault
- Strike and dip of strata
- Strike and dip of schistosity
- Y200: Location and number of sample for ore assay
- A122-P: Chemical assay of ore mineral and polished section sample
- A——A': Profile section

Sample No.	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	Co (%)	S(%)
A122 (Slag)	<0.1	<5	1.19	0.07	0.19	0.17	0.35
A123	<0.1	<5	0.78	0.01	0.04	<0.006	1.81
Y200	<0.1	5	2.50	<0.01	0.75	0.01	0.18
Y203	<0.1	5	0.91	<0.01	0.16	0.01	1.22
Y204 (Slag)	<0.1	5	4.81	<0.01	0.01	<0.006	0.49
Y207 (Slag)	<0.1	5	1.05	<0.01	0.18	0.11	0.83

Figure 4-3 Geologic Map and Cross Sections of Cozoğlu Locality

One of the two old adits has a cross cut at 7m from the entrance and pyrite dissemination occurs in parts of the green schist with some oxidized copper minerals. Assay of these samples indicate Cu 0.7-0.9% and S 1.8% .



Sample No.	Au Gr/T	Ag Gr/T	Cu %	Pb %	Zn %	Co %	S %
A122	<0.1	< 5	1.19	0.07	0.19	0.17	0.35
A123	<0.1	< 5	0.78	0.01	0.04	<0.006	1.81
Y200	<0.1	5	2.50	<0.01	0.75	0.01	0.18
Y203	<0.1	5	0.91	<0.01	0.16	0.01	1.22
Y204	<0.1	5	4.81	<0.01	0.01	<0.006	0.49
Y207	<0.1	5	1.05	<0.01	0.18	0.11	0.83

Figure 4-4 Sketch of Cozoğlu Mineralized Zones

The other opening could be a collapsed incline or a shaft. Near the opening, there is a 30cm thick quartz vein in the green schist with malachite flecks in the cracks. The quartz vein sample show Cu 2.5%, Zn 0.7% and there could be zinc oxide minerals. There are, however, many segregation quartz veins in the green schist near the mineralized zone and it is believed that the above quartz vein near the adit opening and the copper oxide is not related. Parts of the green schist in the vicinity is altered to grey clay.

There are same mine waste dumps within 400x150m range. Samples from two of these dumps show Cu 1.0-4.8% and chalcopyrite and bornite are observed microscopically.

It is difficult to determine the type of mineralization from the surface showings, but the possibility of Küre-type mineralization is considered to be high from; the lack of strong alteration of the green schist on the surface, and the existence of secondary copper and zinc oxide minerals in the cracks of the quartz veins. The mode of occurrence of the minerals is similar to that of the Aşiköy Toykondu Deposit of the Küre Mining Zone. The origin of the large amount of mine waste must be determined, but surface survey cannot provide the solution as the exposure in the vicinity is very poor. Geophysical method must be applied.

4-2 Cünür Mineralizes Zones

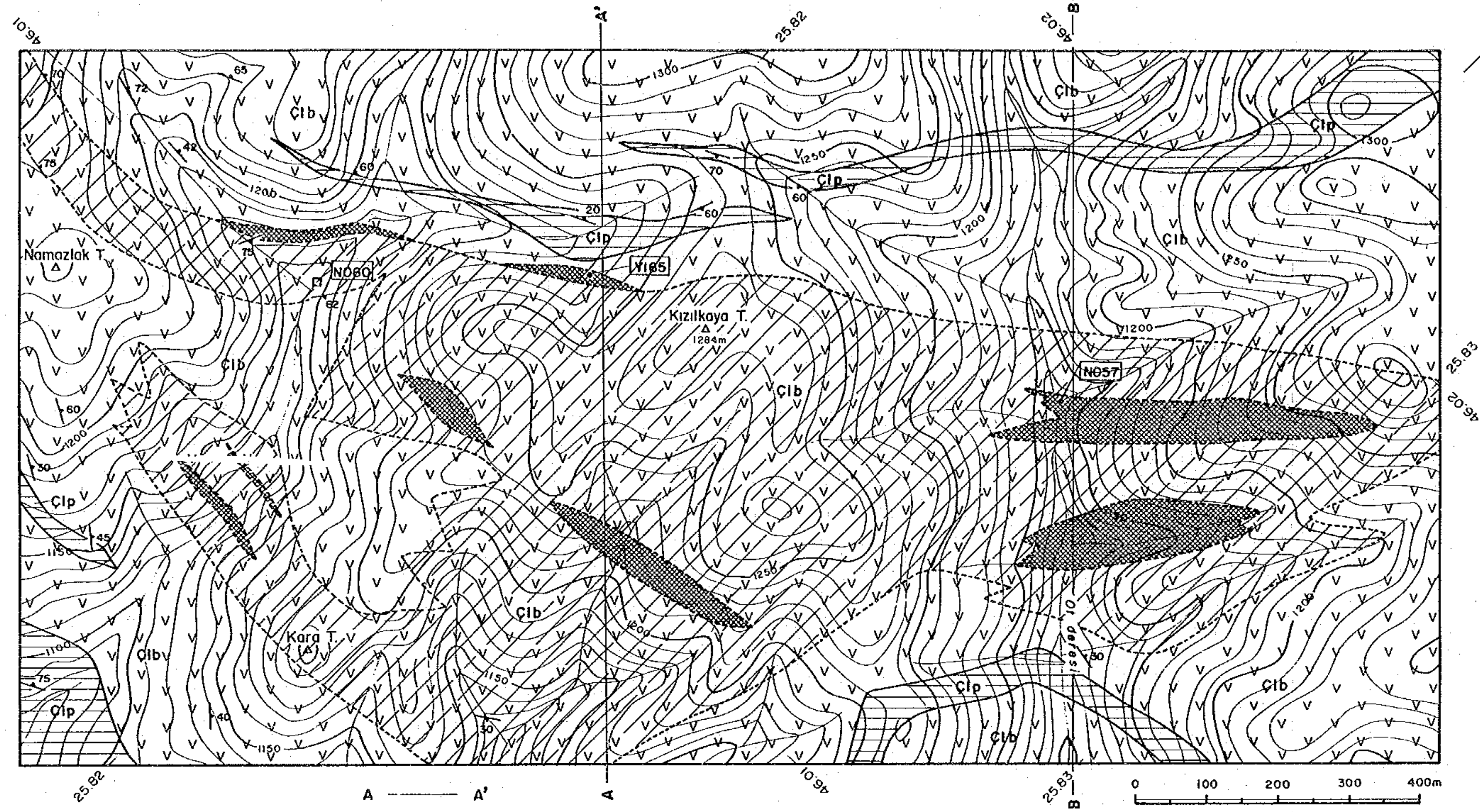
This mineralized zone is located on the western side of the Cünür Village in the southwestern part of the survey area. Semi-detailed survey was conducted over 2km^2. A geological map and cross sections are shown in Figure 4-5 and sketches of the mineralized zone in Figure 4-6.

4-2-1 Geology

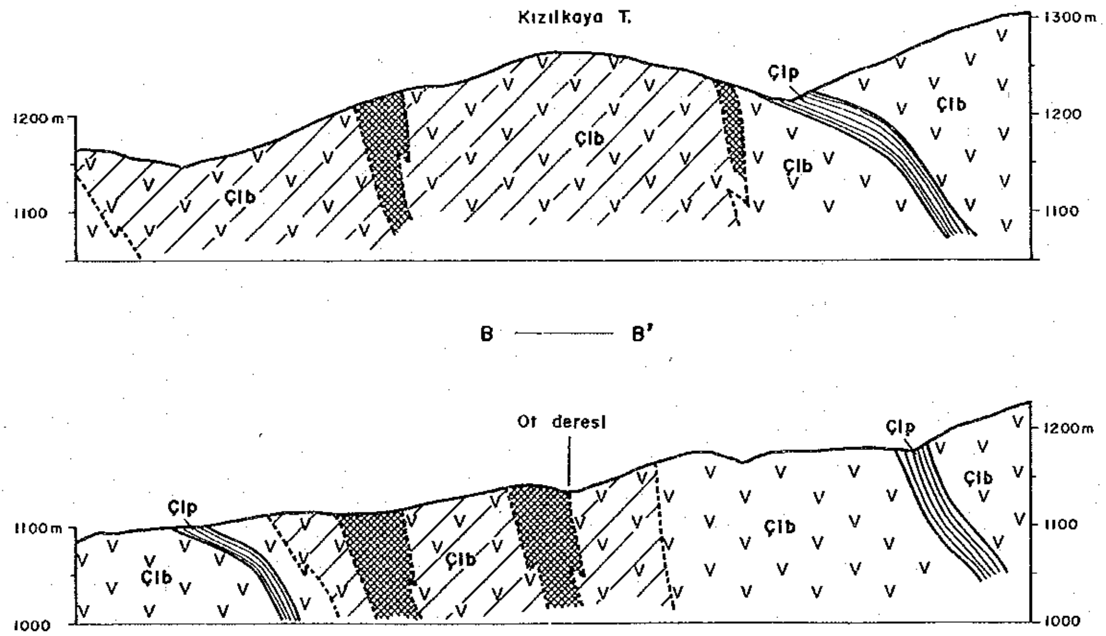
The geology around the zones is Çangal Meta-ophiolite consisting of pelitic schist, massive basalt, and green schist. The pelitic schist strikes NE-SW and the dip is mostly within the range of 20°-70° N.

4-2-2 Mineralization and alteration

These mineralized zones comprise eight lenses and bedded gossan bodies in green schist. The gossans extend in the NE-SW direction harmonious to the bedding and the maximum lateral extension is 400x50m. They are silicified and argillized parts of mafic rocks with quartz-limonite-pyrite network vein



A —— A'



L E G E N D

Çangal Metaophiorite
- Çlb Metabasalt and green schist
- Çlp Pelitic schist

Mineralization and alteration
- Gossan
- Silicification

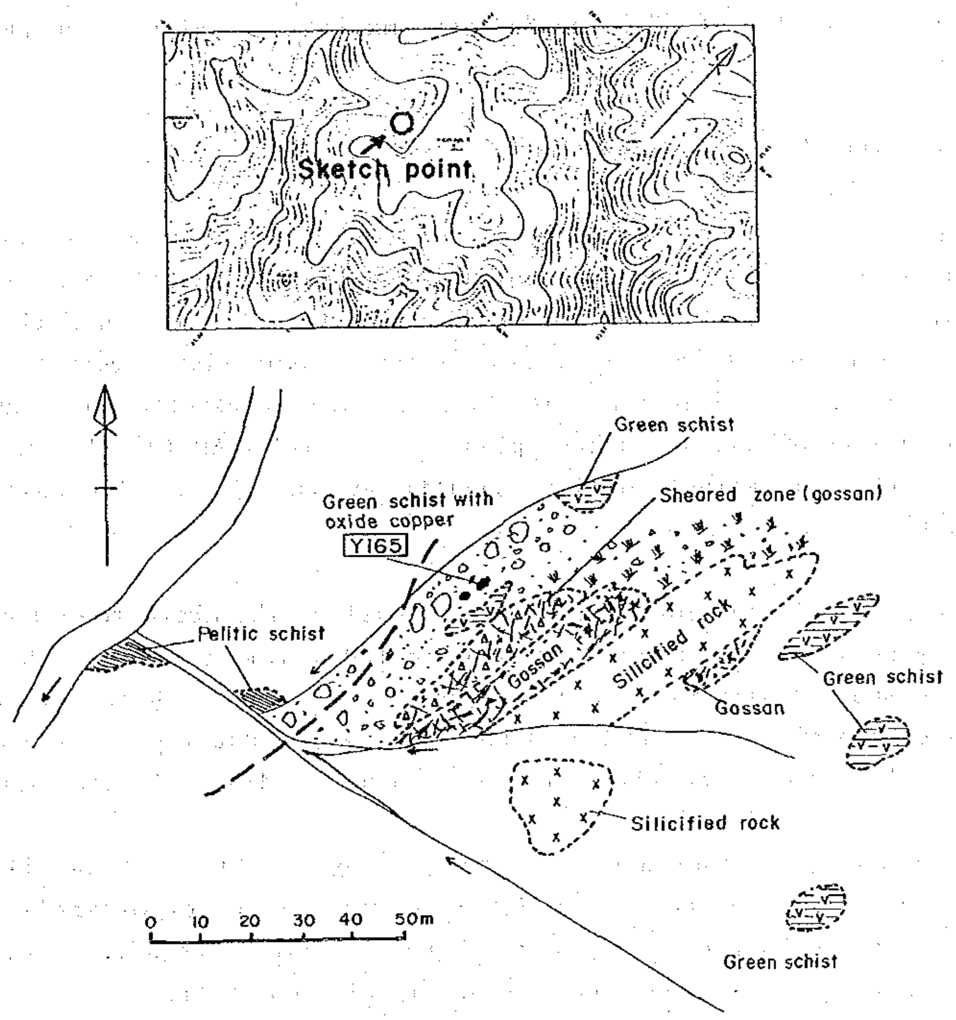
- Strike and dip of schistosity
- A—A' Profile section
- Y165 Location and number of sample for ore assay
- N060 Location and number of sample for thin section

Sample No.	Au(g/t)	Ag(g/t)	Cu(%)	Pb(%)	Zn(%)	Co(%)	S(%)
N057	1.9	115	0.30	0.10	0.15	<0.006	40.26
Y165	<0.1	5	4.31	<0.01	1.44	0.01	0.29

Figure 4-5 Geologic Map and Cross Sections of the Cünür Locality

lets and limonite dissemination. Azurite and chrysocolla occur in parts of the gossan in the central part of the zones and the assay of the sample is Cu 4.3%, Zn 1.4%. Pyrite veinlets occur in the gossan in the northeastern part of the zone with assay result of Au 1.9g/t, Ag 115g/t, S 40%. These zones are considered to be promising for copper and zinc from the chemical data with the good possibility of blind Küre-type deposit. Further geophysical prospecting would be most useful in assessing the potential of these zones.

Silicified rocks occur widely around the gossans. These silicified bodies are derived from mafic rocks and limonite do not occur.



Sample No.	Au Gr/T	Ag Gr/T	Cu %	Pb %	Zn %	Co %	S %
Y165	<0.1	5	4.31	<0.01	1.44	0.01	0.29

Figure 4-6 Sketch of Cünür Mineralized Zones

4-3 Alayürek Mineralized Zones

These mineralized zones are located at the southwestern end of the Taşköprü Zone, 7km west of the Cozoğlu Mineralized Zones. Semi-detailed survey was carried out over $1km^2$. A geological map and a cross section in Figure 4-7 and sketches of the exposure is shown in Figure 4-8.

4-3-1 Geology

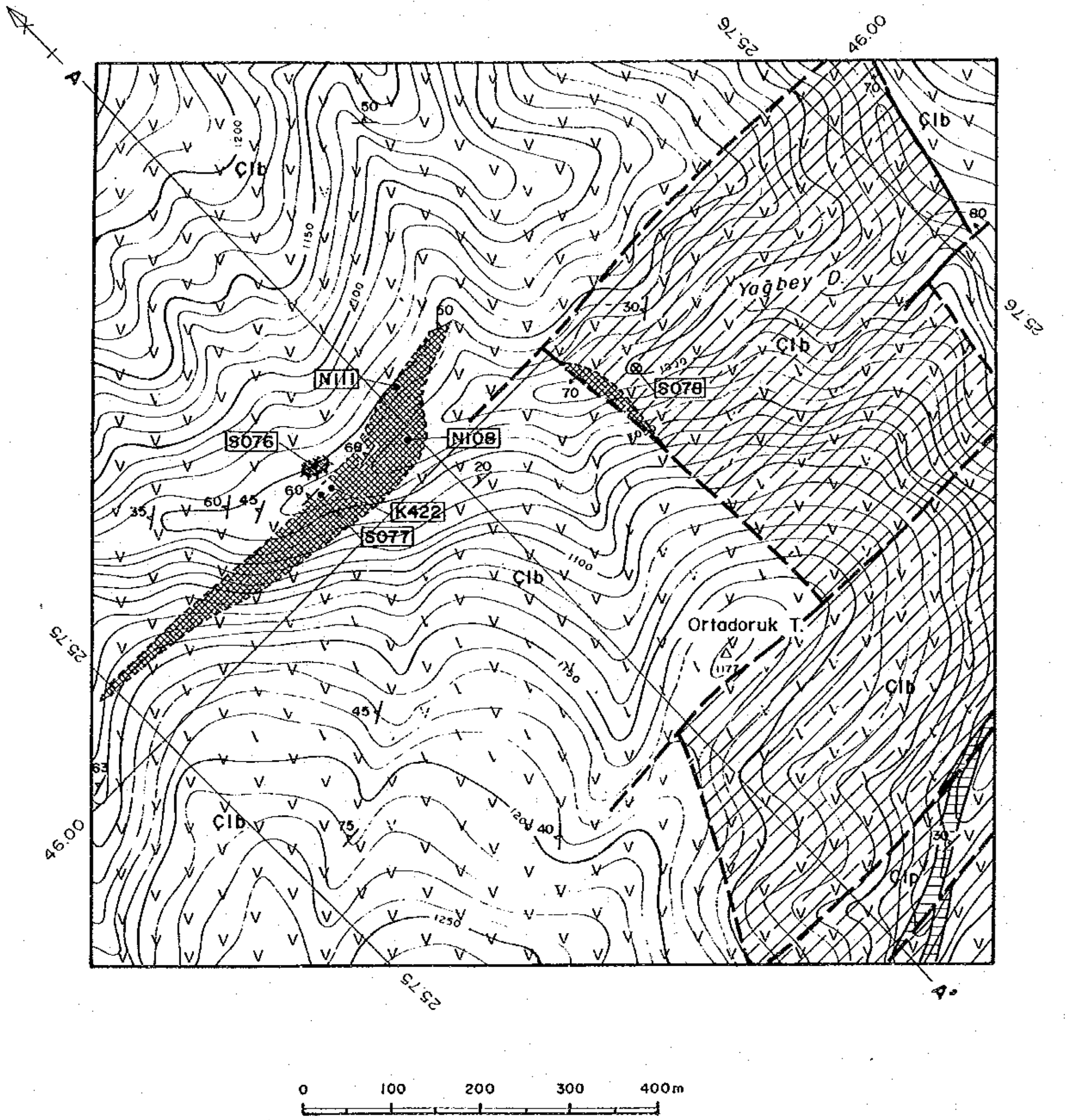
The Çangal Meta-ophiolite is the geologic unit occupying the vicinity of the zones. The lithology is pelitic schist, massive basalt, and green schist. The attitude of the pelitic schist is NE-SW strike and 30° N dip. There are many faults of N-S and E-W systems in the southeastern part of the area.

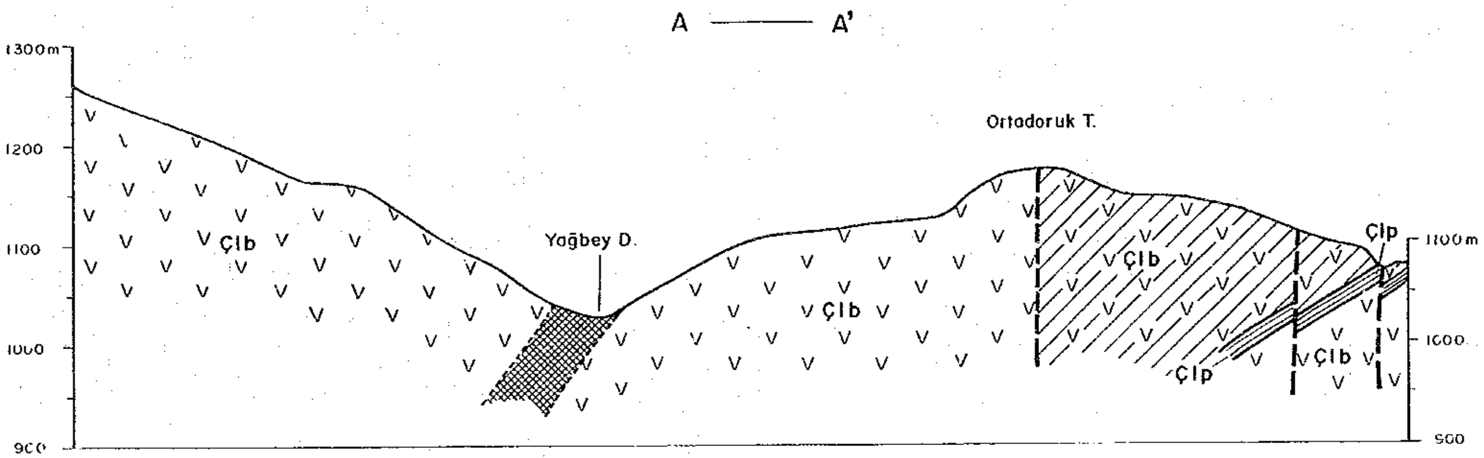
4-3-2 Mineralization and Alteration

The mineralization consists of pyrite dissemination-limonite network at two localities. One is bedded dissemination-network zone extending in the east-west direction over 600 x 70m in the western part. The mineralization differ by the nature of the host rock, strong dissemination occurs in green schist while network veinlets are developed in massive basalt. The higher of the assay values of the network samples is Au 1.5g/t, Ag 100g/t, Cu 0.9%. The green schist is almost totally non-altered, but the massive basalt is partly silicified.

The other mineralized zone occurs to the east of the above zone and is a relatively small pyrite dissemination over 100 x 10m extending N-S along faults. In the vicinity of this zone bounded by N-S and E-W faults, mafic rocks have been silicified and bleached with large amount of quartz, some sericite and chlorite. The silicified zone do not contain metallic minerals.

These mineralized zones are characterized by weak alteration with the exception of silicified parts and the occurrence of copper minerals. This indicates the possibility of blind deposits similar to the Küre type. Geophysical prospecting is necessary to confirm this possibility.





L E G E N D

Çangal Metaophiolites
- Çlb Metabasalt and green schist
- Çlp Pelitic schist

Mineralized and alteration
- Dissemination of pyrite and partly argillization / silicification
- Silicification

Slag

Fault

Strike and dip of schistosity

N108 Location and number of sample for ore assay

S078 Location and number of sample for X-ray diffraction analysis

A—A' Profile section

Sample No.	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	Co (%)	S (%)
K422	<0.1	< 5	0.02	< 0.01	<0.01	<0.006	4.22
N108	0.2	< 5	0.91	< 0.01	0.03	<0.006	12.81
N111	1.5	100	0.17	0.39	0.03	<0.006	1.75
S076 (Slag)	<0.1	15	1.02	0.04	1.56	<0.006	1.39
S077	<0.1	< 5	0.04	< 0.01	0.03	< 0.006	<0.01

Figure 4-7 Geologic Map and Cross Sections of Alayürek Locality

4-4 Other Mineralized Zones

The Taşköprü Zone is covered by thick vegetation, has steep mountainous terrain with difficult access in many places, and the exploration activities are not easy. Thus, exploration was not very active in the past. Under these circumstances, however, geological and geochemical surveys have been carried out in areas other than the above and mineral showings have been located. They are all copper-zinc mineralization in the green schist of the Çangal Meta-ophiolite.

These mineralization can be grouped into lenses, bedded, and dissemination. Boyalı and Eastern Cünür are considered noteworthy and MTA carried out detailed geochemical prospecting. In Sey Yayla, another noteworthy prospect, Etibank conducted geophysical work. The results, however, were not encouraging. In other zones, geochemical anomalies were extracted, but they were considered to be of the order not warranting semi-detailed survey during our present work.

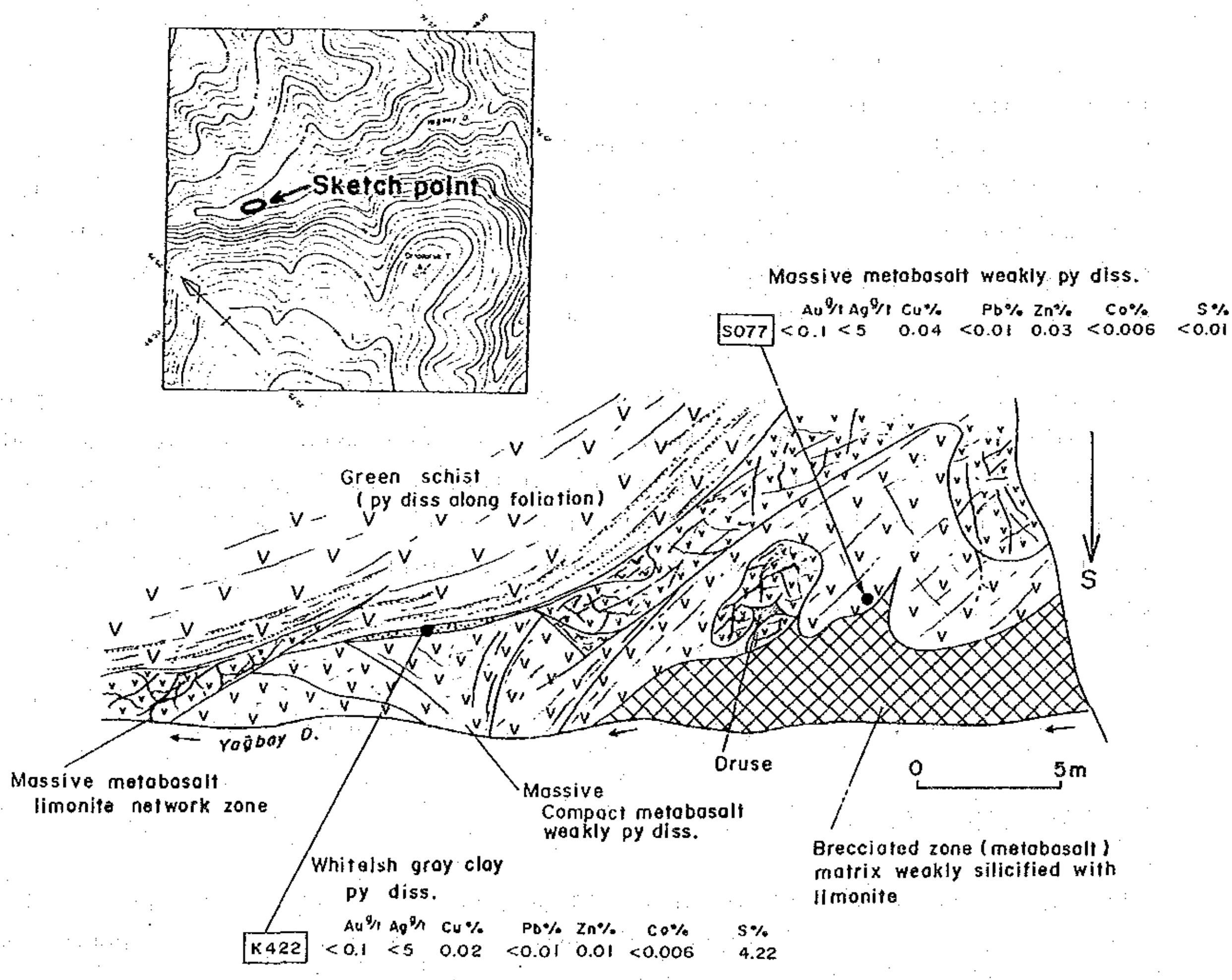


Figure 4-8 Sketch of Alayürek Mineralized Zones