Table 2-23 Summary of the Drilling Operation of MJTC-14

	Survey Period				Total Men	
	Period	Days	Work day	Off day	Engineer	Worker
Operation			Days	Days	Men	Men
Preparation	3 ～ 4 August	2	2	-	6	18
Drilling	5 ～ 18 August	14	Drilling 14	-	42	126
			Recovery -		-	-
Removal	19 ～ 20 August	2	2	-	6	18
Total	3 ～ 20 August	18	18	-	54	162

Drilling Length			
Length Planned	150.00m	Over-burden	47.00m
Increase or Decrease in Length	151.00m	Core Length	121.95m
Length Drilled	151.00m	Core Recovery	% 80.8

Core Recovery of 50 m hole		
Depth of Hole (m)	Core Recovery (%)	Core Recovery Cumulated (%)
0～ 50	38.2	38.2
50～100	100.0	73.3
100～151	100.0	80.8

Working Hours	h	%	%
Drilling	134	43	39
Other Work	178	57	51
Recovery	-	-	-
Total	312	100	
Reassembly	16		5
Dismantling	16		5
Water Transportation			
Road Construction and Others			
G.Total	344		100

Efficiency of Drilling	
Total m/work Period(m/day)	151.00m/14 days (10.79 m/day)
Total m/total Shift (m/shift)	151.00m/38 shifts (3.97 m/shift)

Drilling Length/Bit(each size bit)			
Bit Size	HW	NQ	BQ
Drilled Length(m)	-	151.00	
Core Length(m)	-	121.95	

Casing Pipe Inserted			
Size	Meterage (m)	Drillingx100 Length (%)	Meterage Recovery (%)
HW	3.05	2.03	100
NW	36.70	24.47	100

Direction: S10°W Incline:-50°

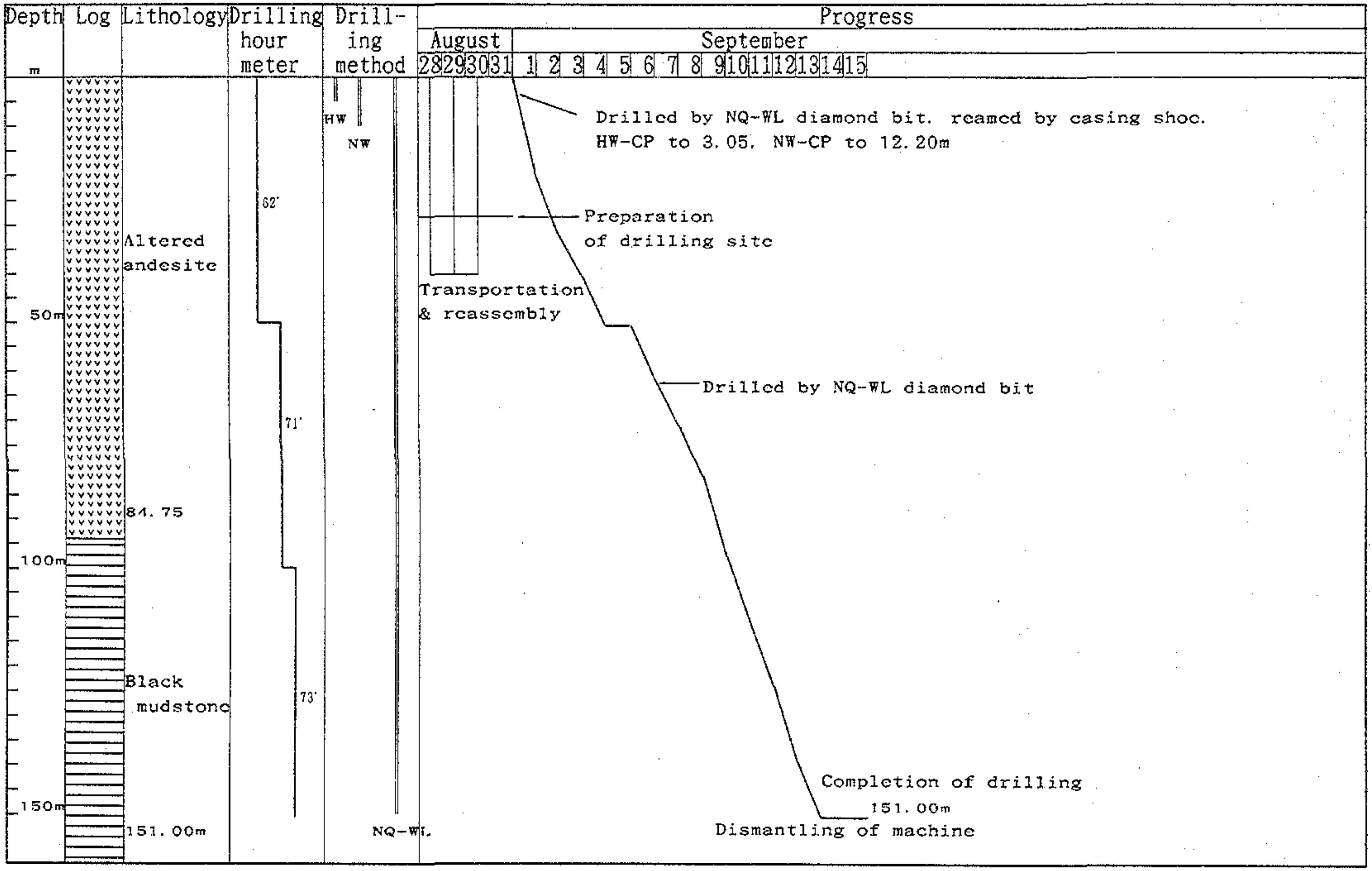


Figure 2-3 Drilling Progress of MJTC-7

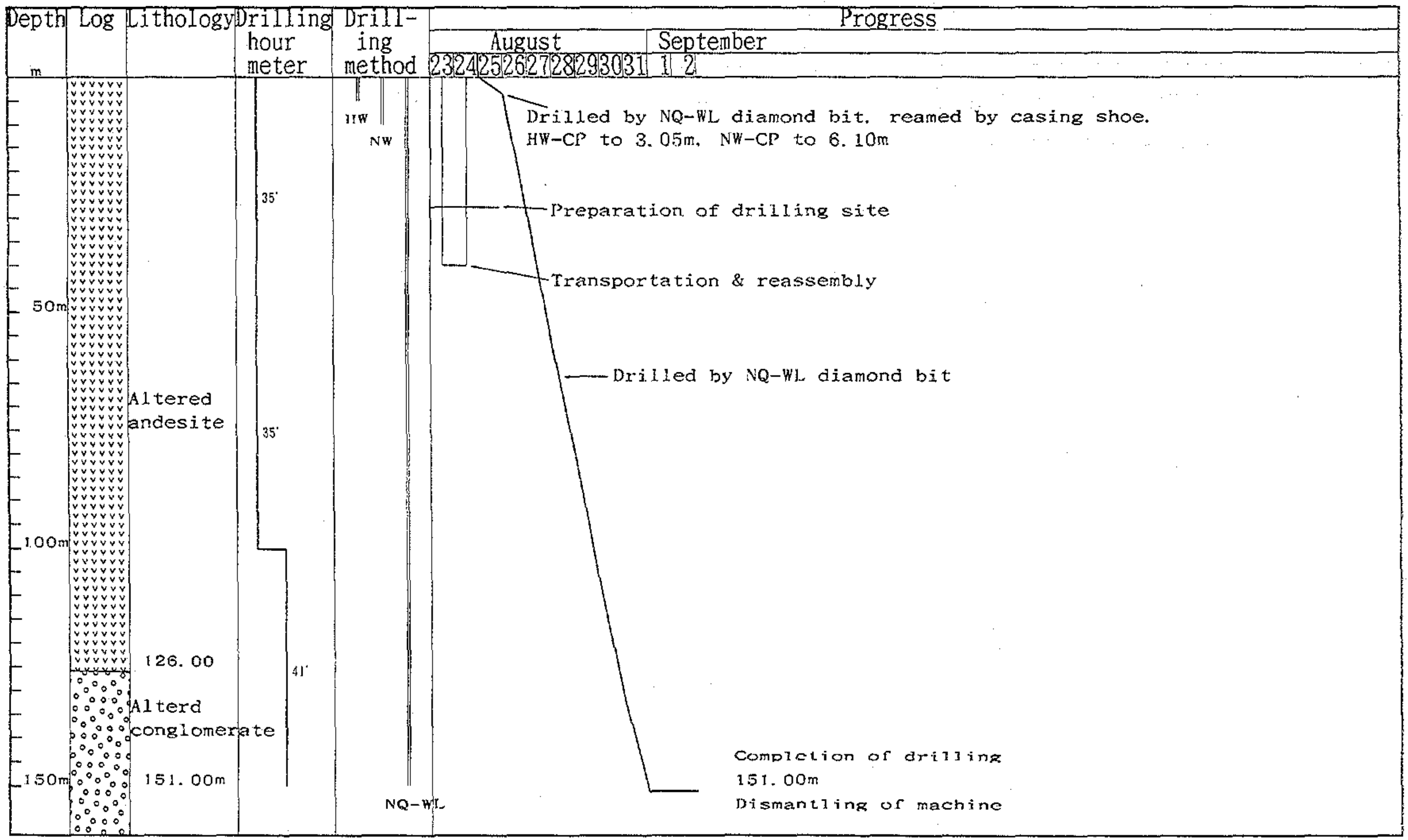


Figure 2-4 Drilling Progress of MJTC-8

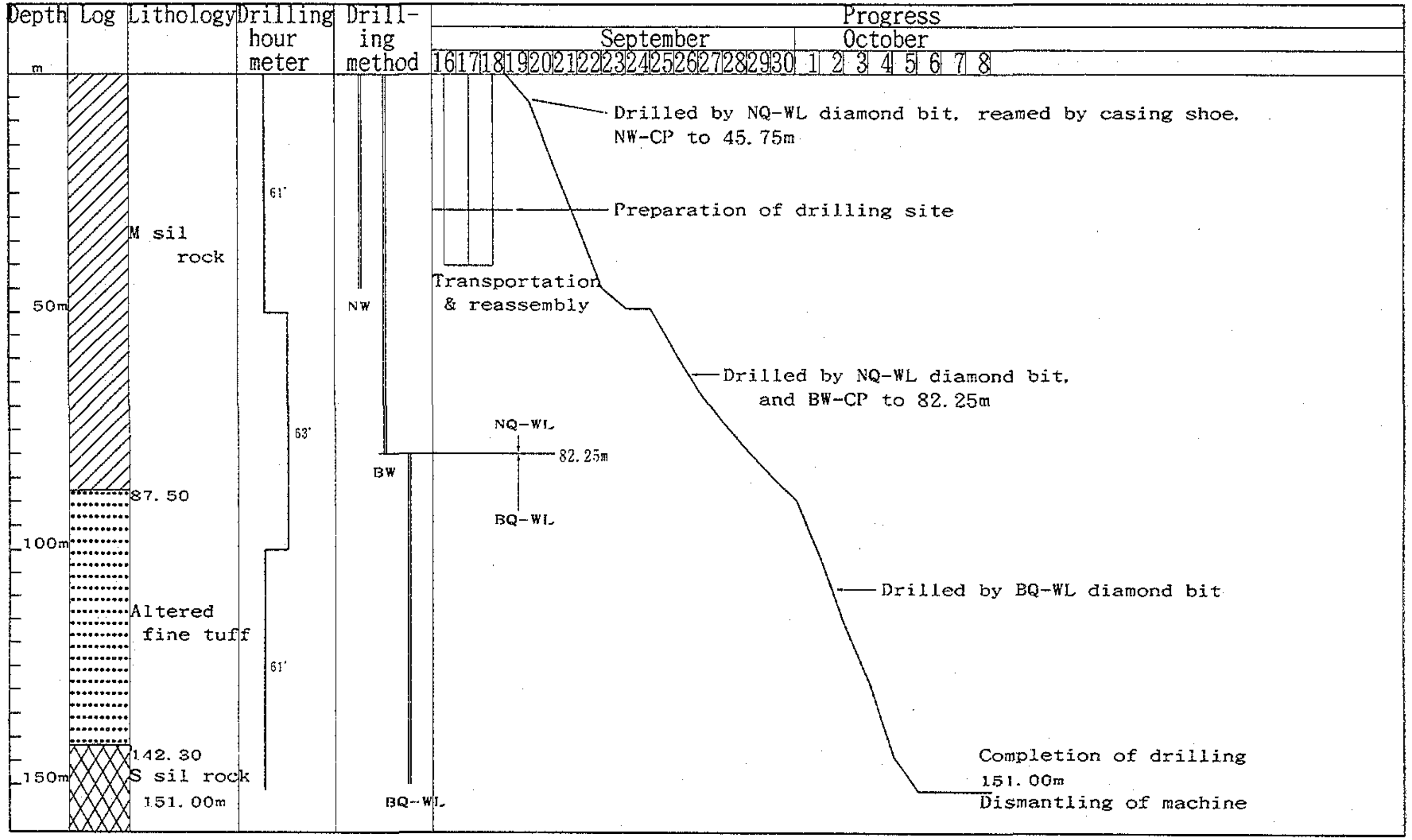


Figure 2-5 Drilling Progress of MJTC-9

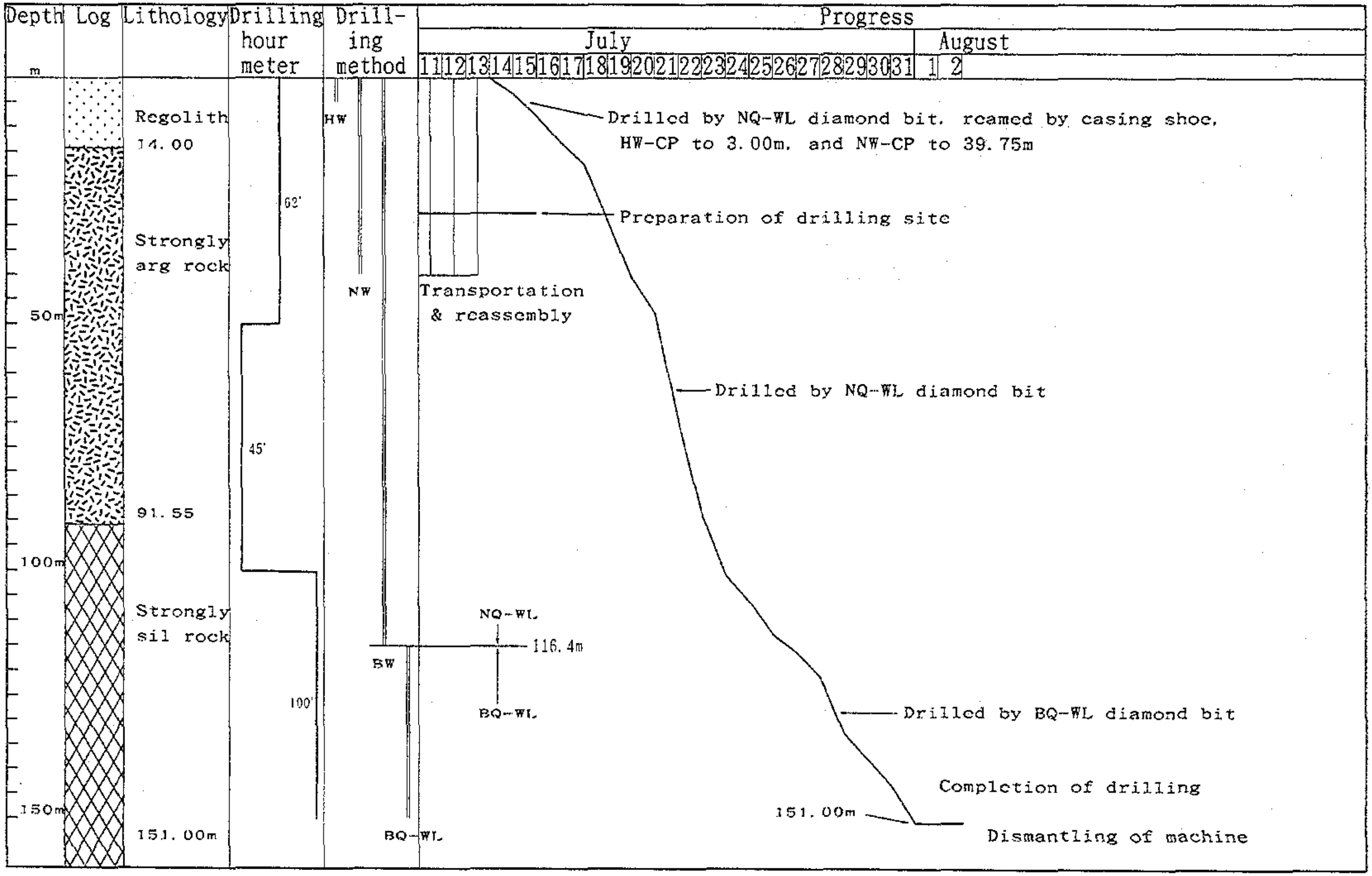


Figure 2-6 Drilling Progress of MJTC-10

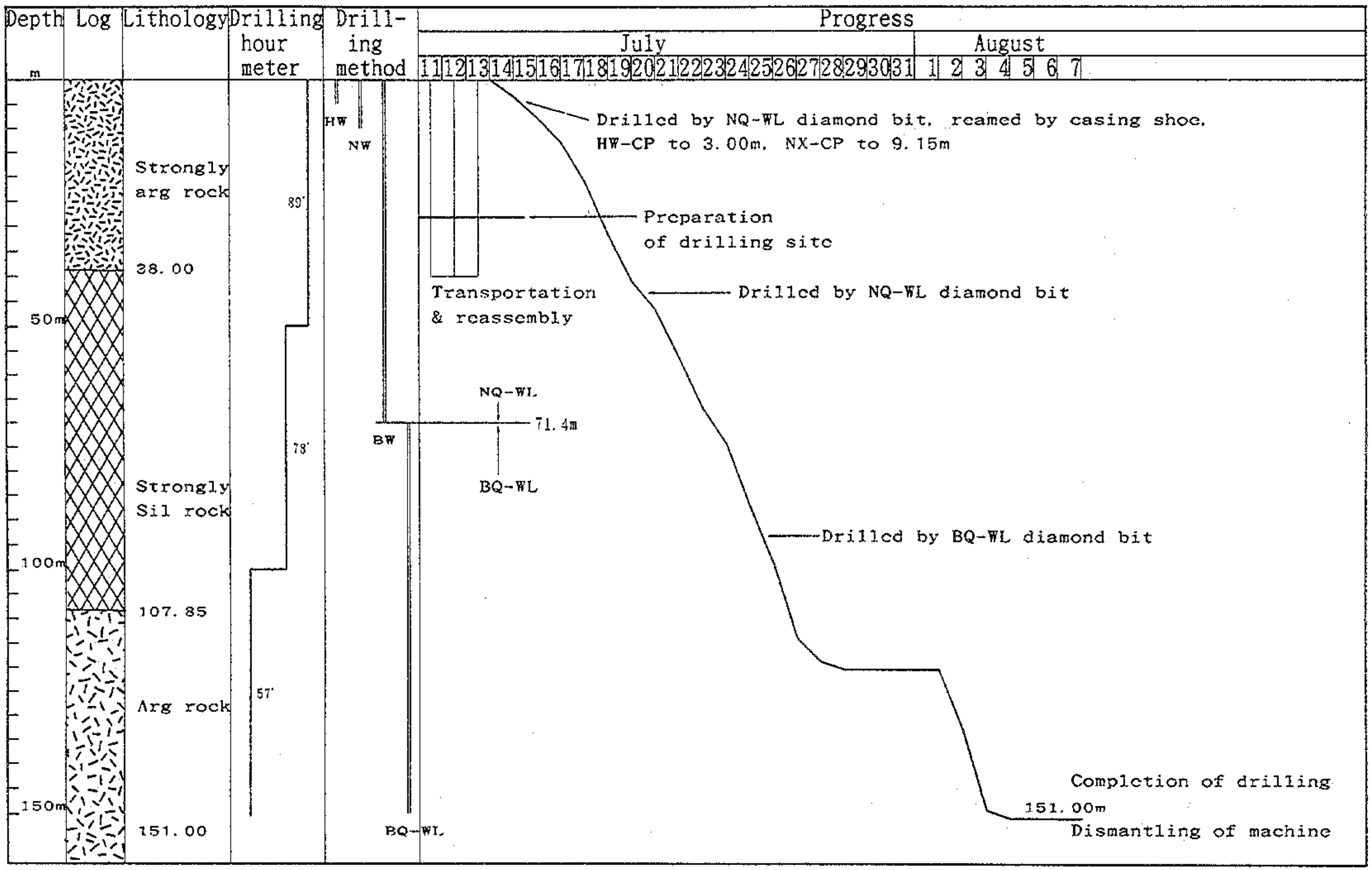


Figure 2-7 Drilling Progress of MJTC-11

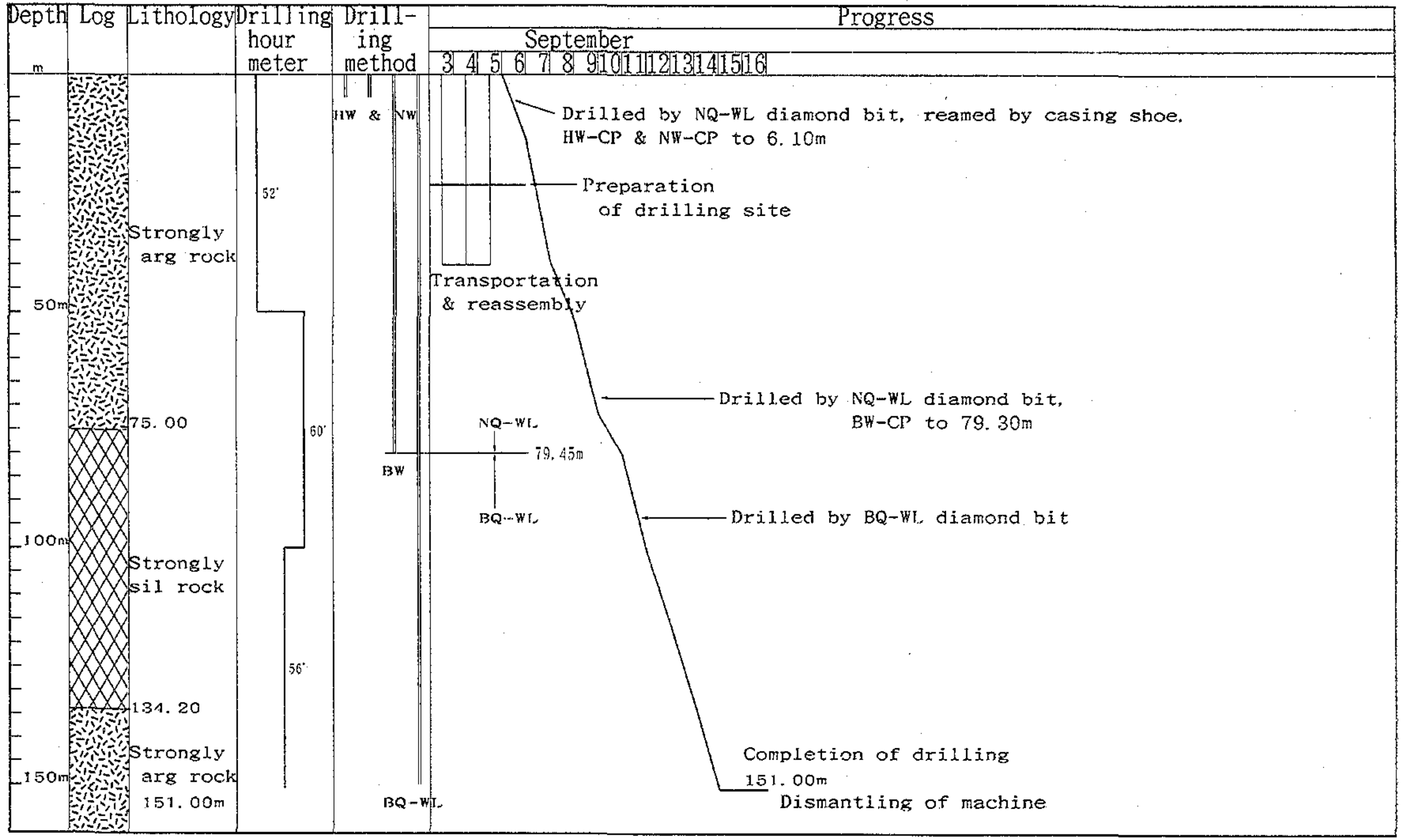


Figure 2-8 Drilling Progress of MJTC-12

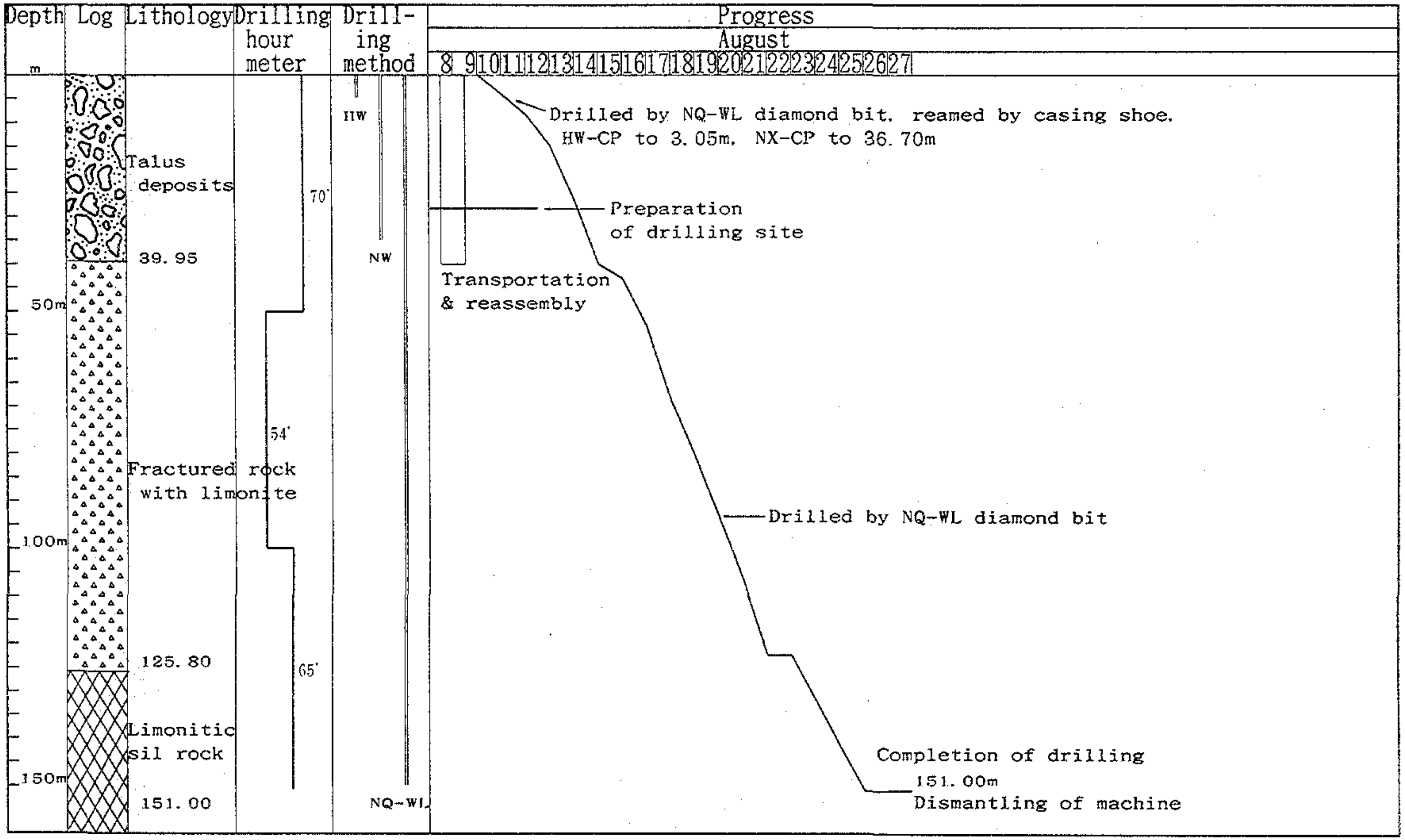


Figure 2-9 Drilling Progress of MJTC-13

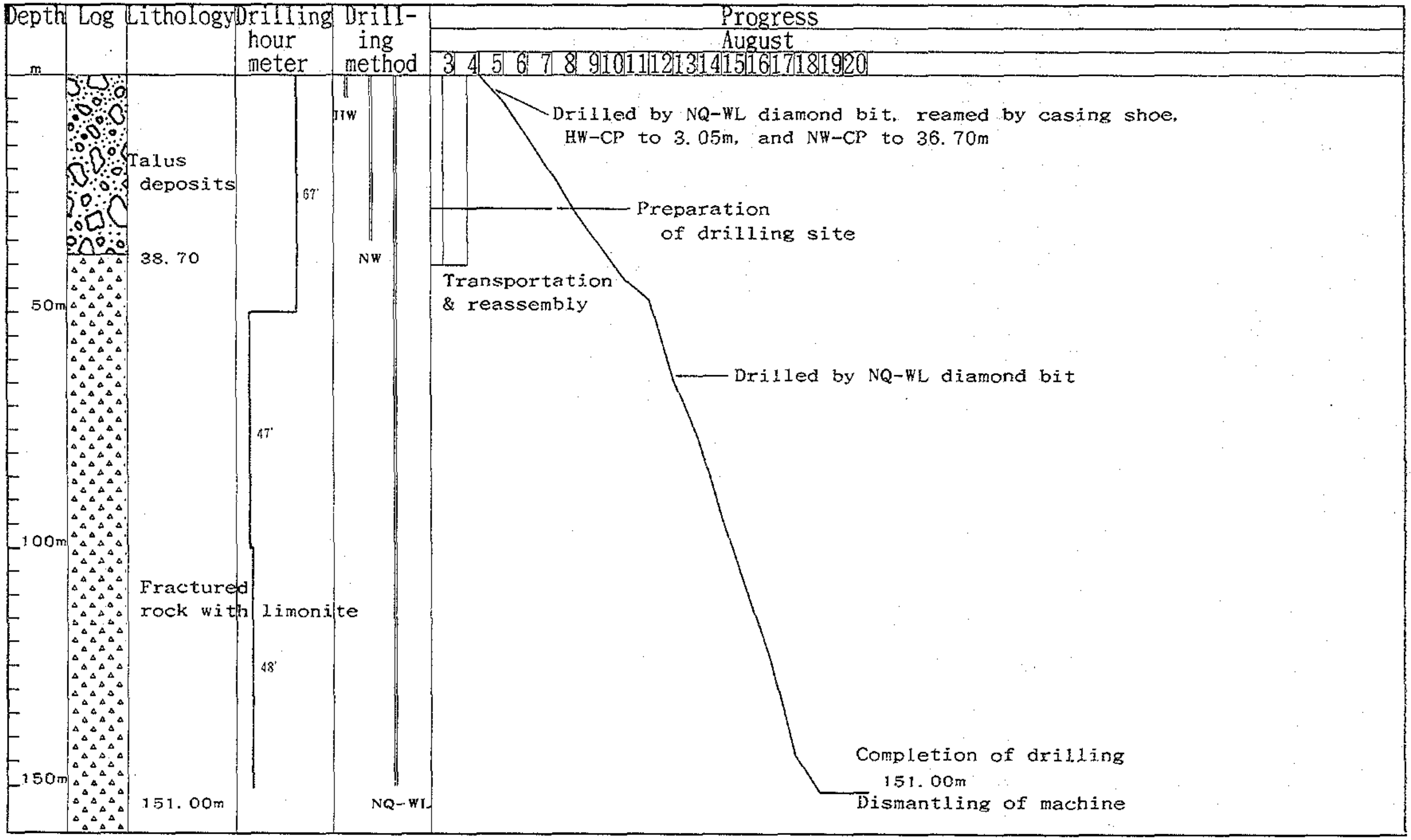


Figure 2-10 Drilling Progress of MJTC-14

4-4-3 MJTC-9

An inclined hole (-50°) was drilled through altered andesite and fine tuff of Şapçı Volcanics until 151m, in which altered zones from surface to 123m, strongly silicified zones accompanied with limonite from 123m to 150m, and pyrite dissemination zone from 150m to 151m were identified. Altered andesite and fine tuff are distributed in the neighbourhood of the drill site. The altered minerals consist of mainly alunite and a small amount of kaoline in the Şapçı Volcanics.

4-4-4 MJTC-10

An inclined hole (-50°) was drilled through argillized and silicified zones of Şapçı Volcanics until 151m, in which strongly argillized zones accompanied with disseminations of fine-grained pyrite until 75m were identified. There were strongly silicified zones consisting of massive and porous parts accompanied by disseminated pyrite and limonite from 75m to 151m.

The altered minerals consist of mainly kaoline in the argillized zones and alunite in the silicified zones.

4-4-5 MJTC-11

Silicified zones are distributed in the neighbourhood of the drill sites; an inclined hole (-50°) was drilled through argillized and silicified zones of Şapçı Volcanics until 151m, in which strongly argillized zones from surface to 38m and from 108m to 151m, and strongly silicified zones consisting of limonitic massive and porous parts from 38m to 108m were identified.

The altered minerals consist of pyrophyllite in the argillized zones and alunite in the silicified zones.

4-4-6 MJTC-12

An inclined hole (-50°) was drilled through fractured argillized-silicified zones of Şapçı Volcanics until 151m. These zones are accompanied with a large amount of limonite and hematite.

The altered minerals consist of alunite, kaoline and pyrophyllite in the silicified parts, and kaoline and a small amount of sericite in the argillized parts.

4-4-7 MJTC-13

Talus deposits are distributed in the neighbourhood of the drill sites, an inclined hole (-50°) was drilled through talus deposits and fractured argillized-silicified zones of Şapçı Volcanics until 151m. The core recovery is low in the talus deposits in the range of surface to 40m because of unconsolidated material. These zones are accompanied with a large amount of limonite and hematite.

The altered minerals consist of mainly pyrophyllite, and a small amount of kaoline and alunite in the silicified-argillized zones.

4-4-8 MJTC-14

Talus deposits are distributed in the neighbourhood of the drill sites; an inclined hole (-50°) was drilled through talus deposits and fractured argillized-silicified zones of Şapçı Volcanics until 151m. The core recovery is low in the talus deposits in the range of surface to 47m because of unconsolidated material. These zones are accompanied with a large amount of limonite and hematite.

The altered minerals consist of mainly pyrophyllite and alunite, and a small amount of kaoline in the silicified-argillized zones.

4-5 Assay Results of Cores

4-5-1 MJTC-7

Gold mineralization was not detected by this drill hole.

4-5-2 MJTC-8

Gold mineralization was not detected by this drill hole.

4-5-3 MJTC-9

The expected gold mineralization was not detected by any drill hole, but a zone containing mercury and copper was found in the silicified body in the range from 138m to 150m. It is significant that the components related to gold mineralization were detected in the lower section.

4-5-4 MJTC-10

Mineralization containing gold in excess of 100 ppb was detected in the silicified and argillized zones from 95m to 138m. These zones corresponded to the descending silicified body seen at the surface, and the content of mercury and antimony is high. Also, below 120m, the content of copper is very high.

4-5-5 MJTC-11

Mineralization containing gold in excess of 100 ppb was detected in the silicified zone from 138m to 147m. This zone corresponds to the descending gold-bearing silicified part detected by drill hole MJTC-4 of the second phase.

4-5-6 MJTC-12

Mineralization containing gold in excess of 100 ppb was detected in the silicified-argillized zones from 105.8m to 130.25m. The content of molybdenum is high in the range from 90m to 123m.

4-5-7 MJTC-13

Low-grade mineralization continued from surface to 151m at the bottom of the hole; average grade of gold is 77 ppb. It is significant that the content of gold, lead and molybdenum in the talus deposits and fractured silicified-argillized zones is higher than that in the other zones, but the content of mercury is low.

4-5-8 MJTC-14

Low-grade mineralization continued from surface to 151m at the bottom of the hole; average grade of gold is 121 ppb. It is significant that the content of gold, lead and molybdenum in the talus deposits and fractured silicified-argillized zones is higher than that in the other zones, but the content of mercury is low.

CHAPTER 5 DISCUSSION

5-1 Kocataş Alteration Zones

The silicified zones on Kocataş Hill and north-northeast of it form great masses and lenses. The scale of silicification is 1,000m x 500m. The silicification observed around Kocataş Hill gives the impression that their formation was tectonic and structurally controlled. The massive silicified zones at the highest point of Kocataş Hill and towards its northeast corner formed with the associated tectonic directions N15°-30°E and N60°-70°E, where the slightly limonitized, brecciated and silicified zones might have followed the bedding. The silicification observed in the rocks, although exhibiting different setting and distribution, has a close relationship with the tectonic directions. The silicified rocks are generally grey or greyish-white; porous, brecciated and fractured parts are reddish or brownish-white in colour. There are thin secondary limonite and hematite veins in the rocks appearing as veinlets and stains. Disseminated and gelatinous pyrites are common in unoxidized silicified rocks although no pyrite was detected within the oxidized silicified zones. Gold has been found as small grains in soil samples which were collected from the southern corner of silicification at Kocataş Hill, on top of the hill and its northeastern ridge. There are slags of a disused mine on the hill and in the Kocataş Stream.

As a result of drill survey, no drill hole (MJTC-5, 6, 7 or 8) intercepted zones corresponding to the descending silicified body seen at the surface. Hence the expected gold mineralization was not detected in the altered zones. It is considered that the lower portion of silicified-argillized zones is distributed in the Kocataş Hill.

5-2 Sartaş Alteration Zones

These zones are distributed in the upstream section of Arlık Stream and locate along the southern part of the national road between Çanakkale and Çan. The scale of the silicified zone is 500m x 500m. The gold grains were detected by heavy mineral study. The silicified zone is observed at the top of Sartaş Hill (MJTC-9), but the pale-grey to brownish-grey porous and massive silicified bodies accompanied with limonite occur on the south slope of the hill and are surrounded by silicified and argillized zones, which occur in massive and banded silicified forms, and these zones which correspond to the descending silicified body seen at the surface were intersected by drill hole MJTC-10. Further apart from Sartaş Hill, the zones have suffered weak alteration, and relict plagioclase (MJTC-3). They are white in colour. Silicified veins in the NE-SW and NEN-SWS directions occur in the weakly altered zones. Those directions are considered to be mainly those of fractures in the silicified zones.

5-3 Güvemalanı Alteration Zones

These zones are distributed in the upstream section of Arlık Stream and locate along the southern part of the national road between Çanakkale and Çan. The scale of silicified zones is 1,000m x 800m. Their fractures are, in some localities, limonitized and hematitized. Extensive silicified debris was also located towards the north of the hill. The silicified bodies in Güvemalanı Hill are massive and extend throughout a large area as big masses. They are brecciated and porous. Limonitization is observed, especially in the porous and some brecciated parts. Gold mineralization was detected by drill holes MJTC-4, 11 and 12 in these parts.

Silicified bodies are located on the İnkaya Hill as small caps, and they are mostly brecciated and limonitized. As found by the drill survey, the area is covered by talus deposits which were clarified as containing a small amount of gold by trench survey and drill holes MJTC-13 and 14.

The silicified bodies are sometimes seen as large masses and blocks towards the south of İnkaya Hill. The blocks are partially brecciated with porous structure and also commonly limonitized. The gold-bearing zone is considered to extend in these areas.

The gold-bearing rocks, which were detected in silicified zones in the range of Güvemalanı, Sartaş to İnkaya Hills, consist of massive and brecciated types. The former is utilized as flux for copper smelting, and the latter is utilized as heap leaching material.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6-1 Conclusions

Silicified and argillized zones occur in Şapçı Volcanics and part of Kirazlı Conglomerate. The Kocataş silicified zones occurring in Şapçı Volcanics were evident to 100m in MJTC-5, 6, 7 and 8, after which Kirazlı Conglomerate was intersected, but the Sartaş and Güvemalanı silicified zones continued for at least 150m in MJTC-3, 4, 9, 10, 11, 12, 13 and 14. Altered zones with limonite are predominant on the outcrops, but pyrites are not observed. Of the results of the drill survey, the following are significant: fine-grained pyrites are developed in the section underneath the surface; limonitic silicified zones with open spaces (caves) were found by drill hole MJTC-4 and 10; and the low-grade auriferous zones continued from near surface to bottom in holes MJTC-4, 13 and 14. Therefore, it is considered that the potential for gold deposits is high. Generally, auriferous mineralization in the silicified body did not extend further downward, and silicified veins were observed in the periphery of the silicified zones. Thus it is considered that their shapes are "jellyfish-like" in geologic section.

6-2 Recommendations for Future Exploration

The auriferous zones have been detected in Sartaş, Güvemalanı and İnkaya Hills; these localities belong to the concession of MTA. The drilling survey should be continued in these localities since auriferous zones were intersected by drill holes MJTC-4, 10, 13 and 14.

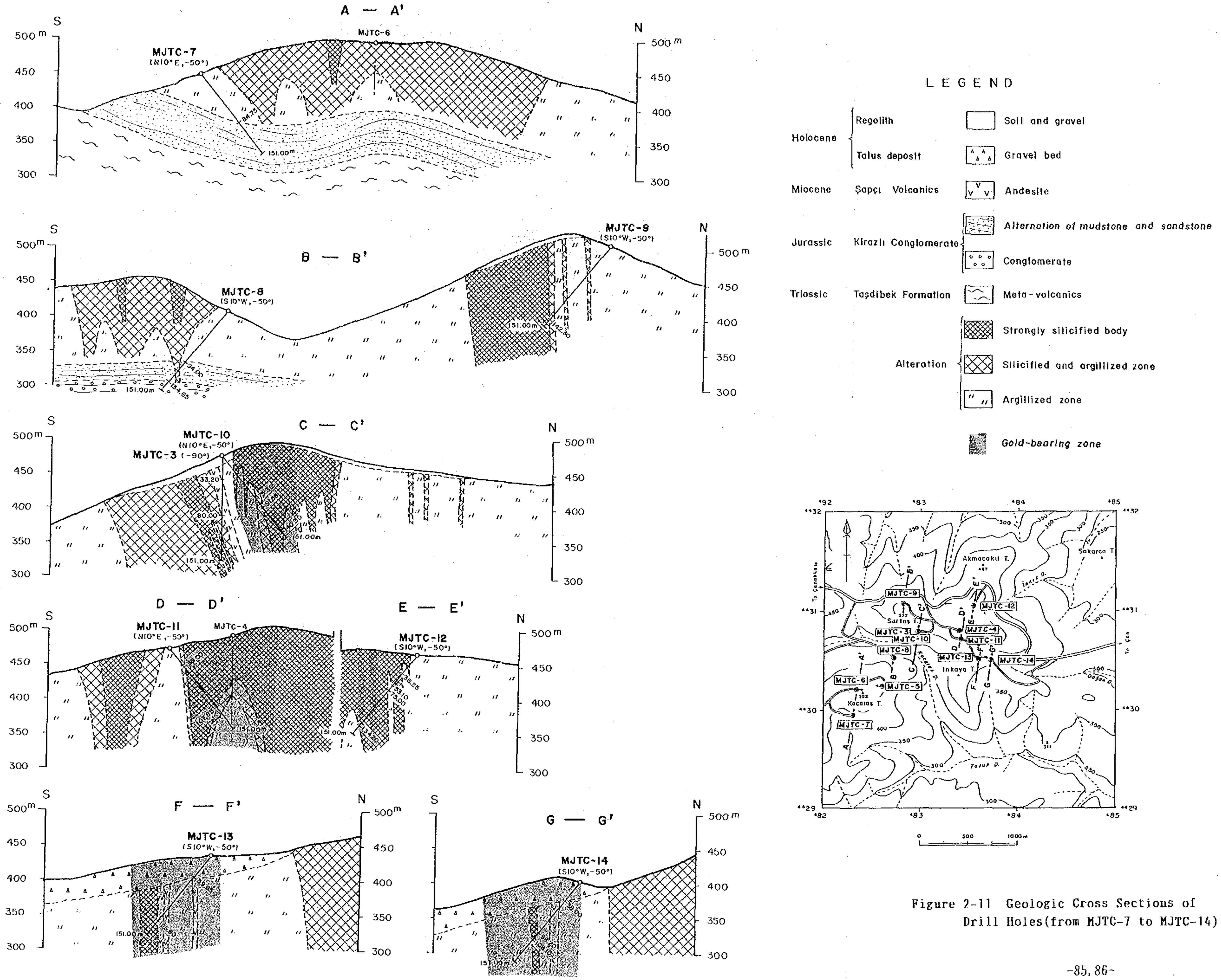


Figure 2-11 Geologic Cross Sections of Drill Holes(from MJTC-7 to MJTC-14)

PART Ⅲ PIREN HILL AREA

PART III PİREN HILL AREA

CHAPTER 1 SURVEY OF THE PIREN HILL AREA

1-1 Outline

The Piren Hill area locates in the southern part of Zone B. The basement rocks of Zone B are not distributed in this area. The geology of the area consists only of Şapçı Volcanics. The silicified zones form the protrudent topography of Büyükçukur Mountain, Geldiren Hill and Piren Hill extending east to west. Argillized zones occur on the slopes of hills and gradually change into unaltered volcanics far from the alteration zones. Gold mineralization was detected in the alteration zones of Şapçı Volcanics.

1-2 Objective of the Survey

The significant result of the first-phase survey is that the auriferous rocks were found from the rock samples collected on the western slope of Davulgılı Hill and western part of Muratlar Village. An auriferous limonitic argillized zone, which contains Au 0.7g/T, with a width of 36m, was intersected by drill hole MJTC-2. It locates on Davulgılı Hill. On the basis of the this finding, a trench survey was carried out to clarify the distribution and extent of gold mineralization on the Davulgılı Hill.

1-3 Contents of the Survey

The contents of the survey are shown in the following table.

Contents of Survey		Quantity	Components for Analysis
Trench S.	334m	104pcs	Au, Cu, Mo, Pb, Zn, Ag, As, Se, Hg, F, Ba, Tl

CHAPTER 2 GEOLOGY OF THE PIREN HILL AREA

The intermediate volcanic activity began in the Eocene, and the units progress from Çamyayla Volcanics, Şapçı Volcanics to Osmanlar Volcanics. Only Şapçı Volcanics is distributed in the area. The stratigraphic column, geologic map, geologic cross sections, and the gold occurrence and alteration map are shown in report of the second phase (1990).

CHAPTER 3 TRENCH SURVEY OF THE DAVULGILI ALTERATION ZONES

3-1 Trench Survey

The trench survey was carried out on the Davulgılı Hills, where a limonitic argillized zone was intersected by the drill survey of the second phase. The locations of trenches are shown in Figure 3-1. The intervals of channel sampling collected from the bottom of trenches are three and six meters.

3-2 Sampling

After stripping the overburden using a bulldozer, trench samples were collected from the B-C layer of soil. The depth of the trench was one meter. Sampling density was 104 samples in the length of 334m. The location of most samples vertically corresponds to strongly argillized zones.

3-3 Analytical Methods

All the samples were analyzed by Chemex Labs Ltd., of Canada. Gold was analyzed by the wet method and atomic absorption, fluorine by the SPECIFIC ION method, arsenic, selenium, mercury barium and thallium by atomic absorption spectrometry, and other elements by the ICP-AES method. The limits of detection of the elements are shown in Table 2-1. The results of analyses are shown in Table 6 of the Appendix.

3-4 Interpretation of the Chemical Results

(1) Outline of Method

The basic statistical values and correlation matrices of the chemical values of the trench samples were calculated, and the principal component analysis was carried out in the same manner as in the first and second phases. Only the basic statistical values are shown in Table 3-1.

(2) Basic Statistical Values

Basic statistical values for 12 analyzed components with a population of 104 samples were calculated. Of the 12 components, gold content was, sometimes, below the detection limit, and thus less than 2.5ppb was used for samples below 5ppb. The amounts of molybdenum, lead, arsenic, selenium, mercury and barium were high, while these of gold, silver, copper, zinc and thallium were low. The basic statistical values are shown in Table 3-1.

Table 3-1 Basic Statistical Values of Piren Hill Trenches

(Number of Samples:104)

Element	Mean	Dispersion	S.D.	Min.	Max.
Au(ppb)	5.085	0.256	0.506	2.50	280.0
Cu(ppm)	12.073	0.133	0.364	1.00	44.0
Mo(ppm)	4.724	0.088	0.297	0.50	19.0
Pb(ppm)	38.379	0.211	0.459	1.00	578.0
Zn(ppm)	10.132	0.039	0.197	2.00	32.0
Ag(ppm)	0.272	0.032	0.179	0.25	3.0
As(ppm)	139.786	0.134	0.366	22.00	1200.0
Se(ppm)	0.599	0.337	0.581	0.10	6.6
Hg(ppb)	59.749	0.123	0.350	20.00	410.0
F (ppm)	197.916	0.057	0.240	60.00	980.0
Ba(ppm)	193.772	0.130	0.361	50.00	3440.0
Tl(ppm)	0.253	0.212	0.461	0.05	2.6

(3) Interpretation

As a result of trench survey, characteristics of mineralization are considered to be as follows.

An auriferous limonitic argillized zone which contains Au 0.7g/T, with a width of 36m, was intersected by drill hole MJTC-2. It locates on the Davulgılı Hill. However, an auriferous zone on the surface was not detected by the trench survey.

CHAPTER 5 DISCUSSION

The alteration zones of the Piren Hill area distribute at Piren Hill, Büyükçukur Mountain, and Davulgılı Hill. Piren alteration zones are of the largest scale in the vicinity; it is 2km long east-west and 1km wide north-south. Gold was detected from rock samples collected during two years. The auriferous samples were significant at Davulgılı Hill and southeast of Piren Hill.

The silicified zones consist of massive, brecciated and porous parts with gradual transitions. Generally, the massive part is in the center of the silicified zones, and the porous and brecciated parts occur in the margin. The silicified zones often result in protruding topography and they can be identified in air photographs. In silicified zones accompanied by limonite and hematite due to oxidation, the quantity of limonite is low in the massive part but high in the porous part.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5-1 Conclusions

The geology consists of Şapçı Volcanics in this vicinity. The original rocks cannot be distinguished in the altered zones. The volcanic rocks become thicker with distance from the geologic basement. Altered zones with limonite and hematite are predominant on the outcrops, and pyrites are not observed because of oxidation.

Gold anomalies were detected in the silicified zones located in the southern part of the large alteration zone. The zones extend in an E-W direction in the vicinity of Piren Hill.

The auriferous zones, which occur in limonitic clay such as those in fault zones, were detected by drill hole MJTC-2. As a result of the trench survey, gold-bearing zones on the surface were small-scale and the content of gold was low.

5-2 Recommendations for Future Exploration

Gold anomalies were detected in the silicified zones located in the southern part of the large alteration zone. Also, the zone extends in an E-W direction in the vicinity of the Piren Tepe. The auriferous zone was detected by drill hole MJTC-2 in the Davulgılı silicified zones belonging to the concession of MTA. This zone was small and the content of gold was low on the surface. Therefore, further drilling survey should be carried out in the southeastern part of the Piren silicified zones, which corresponds to west of Muratlar Village.

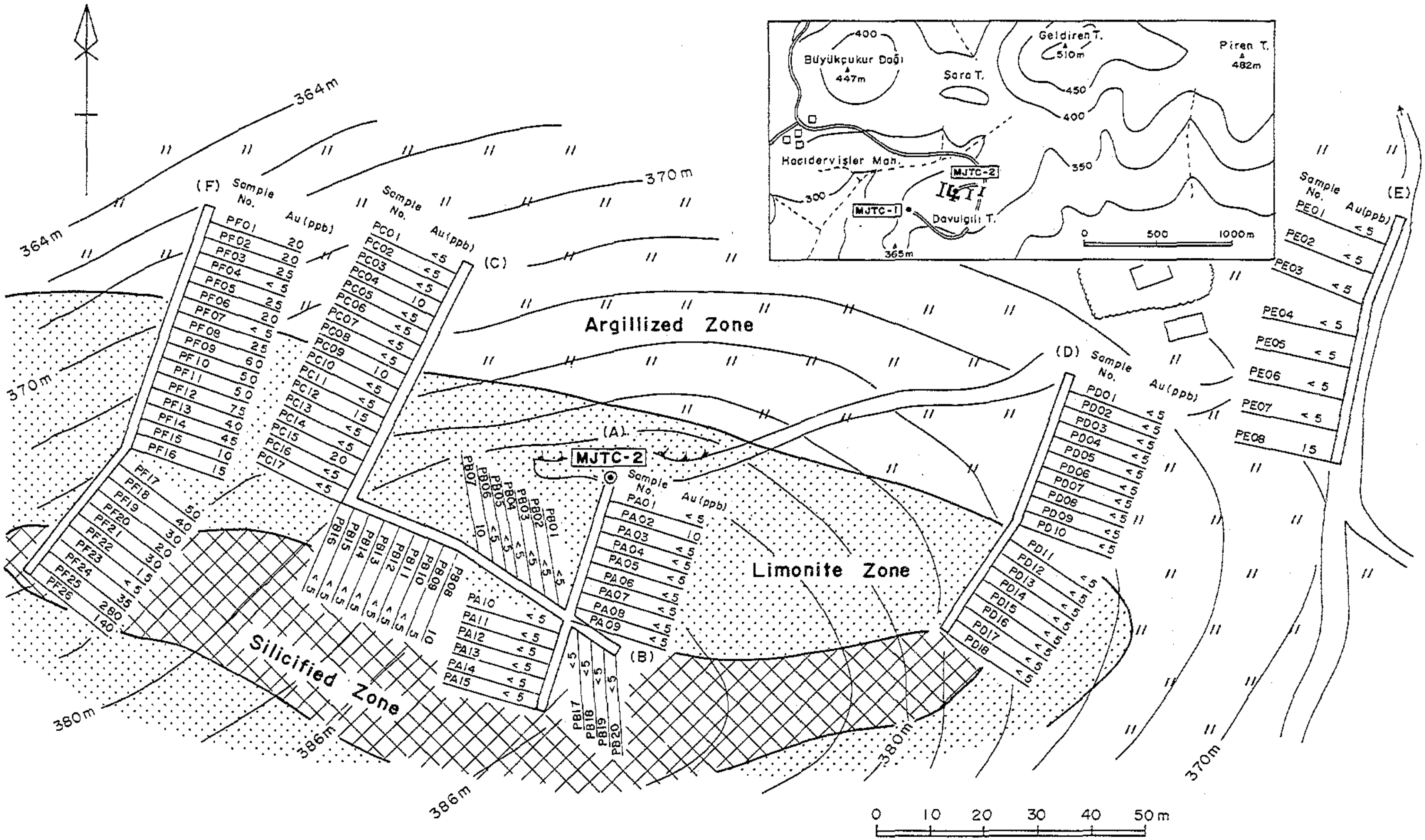


Figure 3- 1 Location Map of Trenches of Piren Hill Area

PART IV ETILI AREA

PART IV ETILI AREA

CHAPTER 1 GEOLOGICAL SURVEY OF THE ETILI AREA

1-1 Outline

The Etili Area locates eastsouthward of Zone B. The basement rocks of this area are the Sakar Dağı Formation consisting of weakly metamorphosed pelitic schist and crystalline limestone, and the Cretaceous Çavus Granite which intrudes into the Sakar Dağı Formation. The basement is correlated to the Triassic Karakaya Group because of the weakly metamorphosed lithology. The granite is not associated with mineralization, but the crystalline limestone in the vicinity has undergone contact metasomatism and has been skarnitized.

The intermediate volcanic activity began in the Eocene, and the units progress from Gicikler Volcanics to Şapçı Volcanics. The Karaköy Formation consisting of conglomerates was then deposited during the long volcanic interval. Quaternary basaltic dykes are observed as small outcrops where the Sakar Dağı Formation is distributed.

Geochemical anomalies of gold were discovered in the silicified and argillized zones in the Miocene Şapçı Volcanics, and the distribution of gold mineralization was delineated by the third-phase survey.

1-2 Objective of the Survey

Gold grains were discovered in the soil samples collected from the vicinity of the Hamam hot spring in the south of Tepeköy Village, Geological survey and geochemical sampling of the Etili Area were conducted in the third phase. As a result of these surveys, gold anomalies were discovered in the south of Tepeköy Village and the north of Halilaga Village. These are in the Tepeköy and Halilaga Hill silicified zones. Most rock samples collected from these silicified zones contained gold in excess of 50 ppb, and hence detailed geological and geochemical surveys were conducted in the Tepeköy and Halilaga silicified zones, and a drill survey was carried out in the concession of MTA.

1-3 Contents of the Survey

The contents of the survey are shown in the following table.

Contents of Survey	Quantity	Components for Analysis
Geological Survey Detailed Geological Survey	115 km^2 20 km^2	
Geochemical Survey	458 pcs	Au,Cu,Mo,Pb,Zn,Ag,As,Se,Hg,F,Ba,Tl
Whole rock analysis Thin Section X-ray Diffractive M.	13 pcs 13 pcs 61 pcs	
Drill Survey 151mx2=302m	100 pcs	Au,Ag,Cu,Pb,Zn,Sb,Hg,Mo

CHAPTER 2 GEOLOGY OF THE ETILI AREA

2-1 General Geology

The basement rocks of this zone are the Sakar Dağı Formation consisting of weakly metamorphosed pelitic schist and crystalline limestone, and the Çavus Granite which intrude into the Sakar Dağı Formation. Although fossils have not been found from this formation, it is correlated to the Triassic Karakaya Group because of the weakly metamorphosed lithology. The granite is not associated with mineralization, but the crystalline limestone in the vicinity has undergone contact metasomatism and has been skarnitized. The intermediate volcanic activity began in Eocene and the units continue from Gicikler Volcanics to Şapçı Volcanics; then the Karaköy Formation consisting of conglomerates was deposited during the long volcanic interval. Quaternary basaltic dykes are observed as small outcrops where the Sakar Dağı Formation is distributed. The geologic map, geologic cross sections, stratigraphic columns and the mineralized alteration zones are shown in Figures 4-1, 4-2 and 4-3.

2-2 Stratigraphy

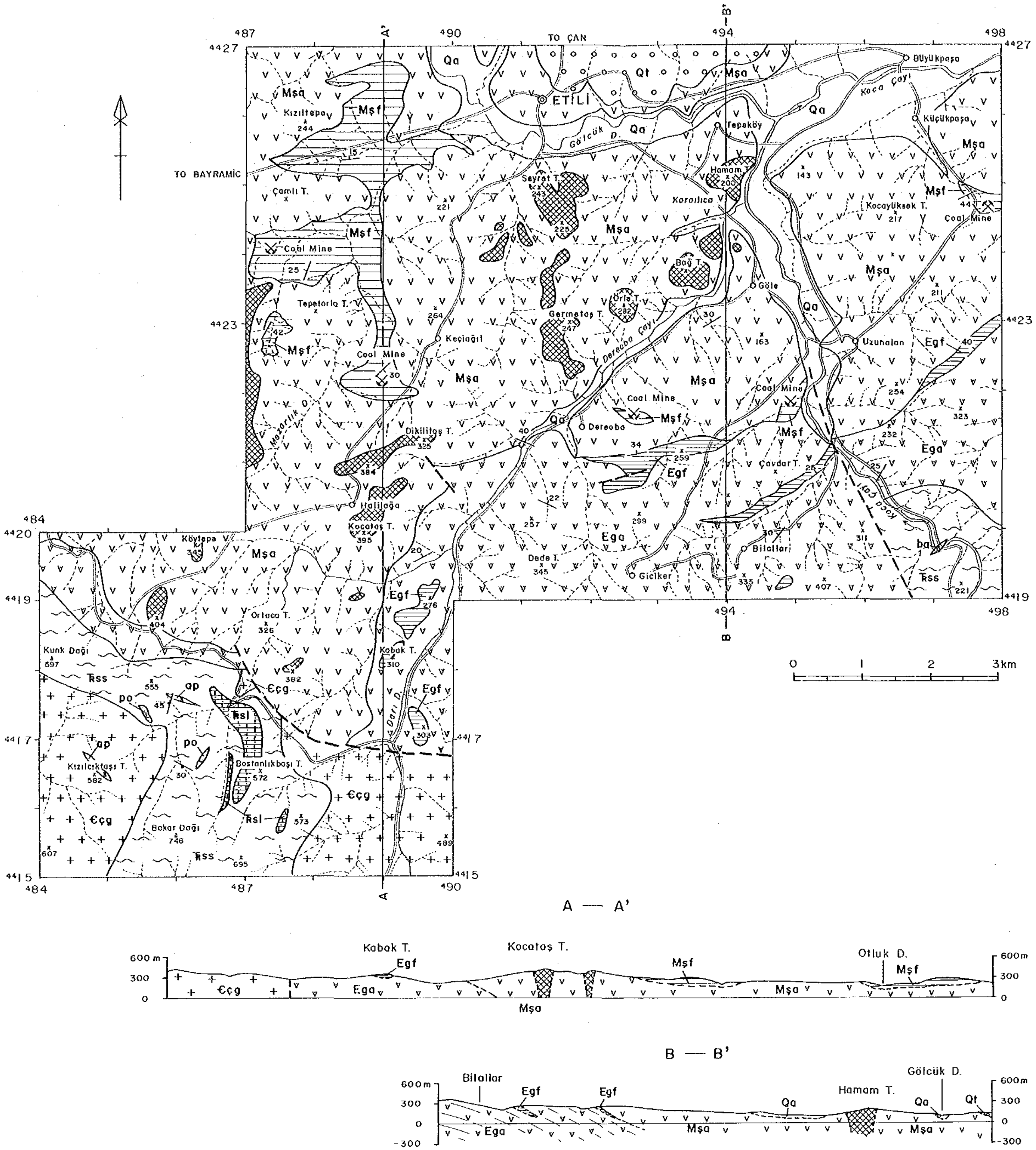
2-2-1 Sakar Dağı Formation

Type locality: Vicinity of Mt. Sakar (elevation 746m)

Thickness: +500m

Distribution: It is distributed in the southwest part of the area, extending 3km E-W and 4km N-S and, in the southeast part of the area, extending 1.5km E-W and 1.5km N-S and.

Lithology and occurrence: The formation crops out in southwestern and southeastern parts of the Etili Area and is composed mainly of pelitic schists, calcareous schists, crystallized limestones and meta-basic rocks. Schists comprised of pelitic schists, amphibole schists, sericite schists, and calcareous schists are more widespread than other rock units of the formation. They have already been converted into hornfels along granodiorite contacts.



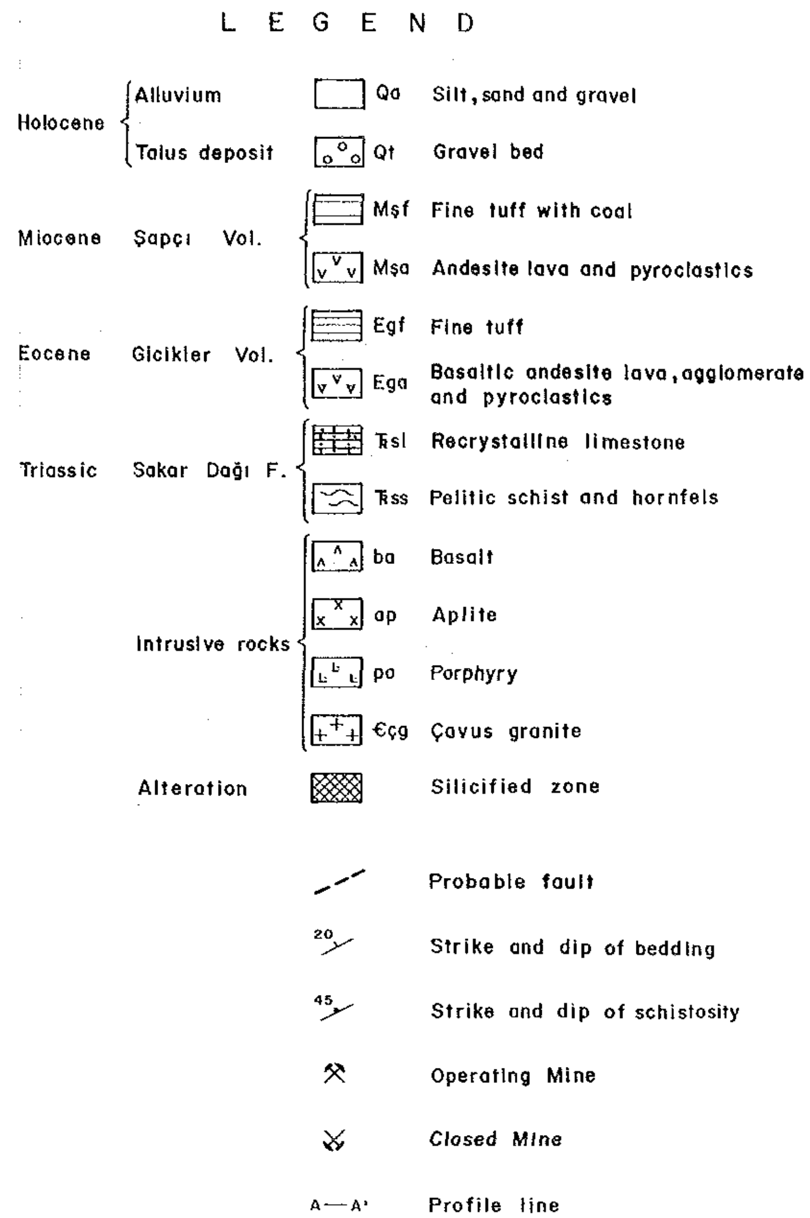


Figure 4- 1 Geologic Map and Cross Sections of the Etili Area

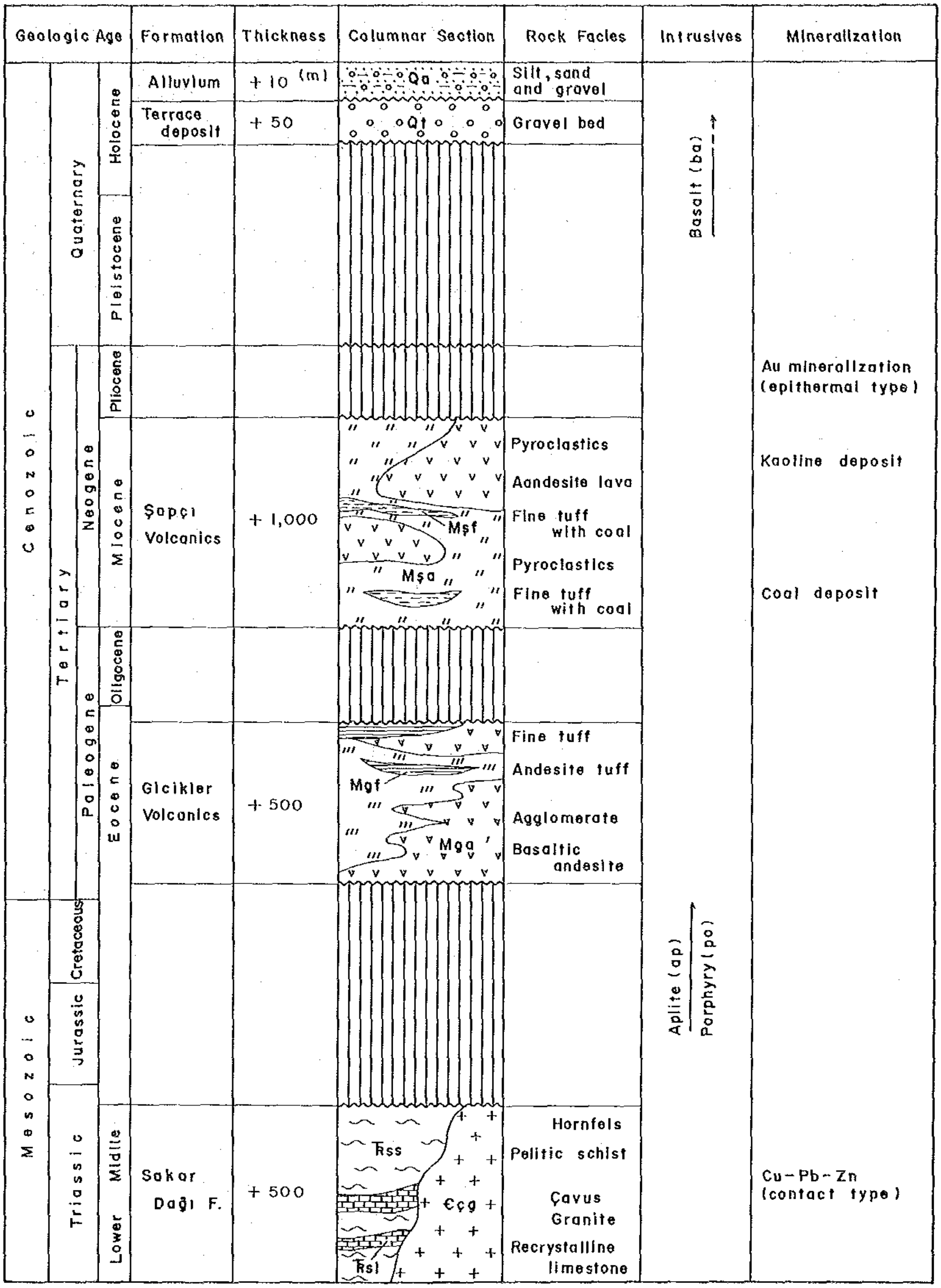


Figure 4- 2 Schematic Column of the Etili Area

Schists are generally grey, dark grey and black in colour except near the contacts where they are light coloured due to the effects of silicification and contact metamorphism. Crystallized limestones occur as lenses in schists. They are usually dark grey, greyish black and locally white in colour and consist mainly of fine-grained crystals and irregular calcite veins. The limestone becomes lighter in color and locally saccharoidal in texture near the contact. Skarns identified as garnet, garnet-actinolite and actinolite-garnet-diopside, contain a scarce amount of pyrite, hematite (specularite), magnetite, wollastonite and several secondary minerals such as limonite, malachite and azurite. Wollastonite mineralizations, locally already mined out, were, in particular, formed together with silicification during the recrystallization phase. Meta-basic rocks, exposed at upper parts of schists and locally transitional to them, are usually dark colored, except in areas near the granodiorite where they are greenish black in colour. They are silicified, pyritized and epidotized and are more compact around granodiorite contacts. Away from the contacts, their colour becomes darker and their texture is revealed to be looser.

Stratigraphic position: This formation is distributed in the southwest and southeast parts of the zone in an oval shape and is overlain unconformably by Şapçı Volcanics and intruded by Çavus Granite.

2-2-2 Gicikler Volcanics

Type locality: It is distributed widely around the Gicikler Village. The village is located in the south of Etili Village.

Thickness: ±500m

Distribution: These rocks occur in Gicikler Village, and are developed in the E-W direction in the southern part of the Etili Area, and gently dip north.

Lithology and occurrence: It is widely exposed around Gicikler and Bilaller Villages in southern and southeastern parts of the Etili Area. The unit unconformably overlies the Sakar Dağı Formation. The oldest units are generally composed of an alternation of tuffites, argillized tuffites, agglomerates and basaltic andesites. Tuffites and agglomerates are mainly dark greyish green in colour, intermediate in thickness and distinctively bedded. Tuffites are partly argillized. Volcanic pebbles in agglomerates are rounded to subrounded and also occur occasionally as blocks. The dimensions of pebbles appear to decrease towards the west and the unit completely gains the nature of tuffites and agglomeratic tuffites. In addition, in the vicinity of Bilaller, a decrease in pebble dimensions is observed. Cream-coloured tuffites observed at upper parts of the unit, reaching 5 to 10 meters in thickness, are lenticular and are mined as coating stones in the district. Basaltic andesites occur at several different levels in the unit, are purple and dark grey in colour and are massive in appearance. They show flow structures which accord with bedding. They have generally not undergone any alteration.

Stratigraphic position: The stratigraphic relation with Şapçı Volcanics is not clear, but Gicikler Volcanics is unconformably overlain by Şapçı Volcanics.

2-2-3 Şapçı Volcanics

Type locality: Vicinity of Şapçı Village (Zone B)

Thickness: +1,000m

Distribution: This is the largest unit and covers most of the zone.

Lithology and occurrence: It is the unit covering most of the Etili Area and consists chiefly of andesitic lavas, andesitic agglomerates, tuffs and tuffites. It shows a lava characteristic around Tepeköy and Hamam Hill and is basically dark grey, and dark green when fresh. Lava flow surfaces can locally be observed. When altered, they become brown, yellowish brown, yellow and yellowish white in colour. Plagioclase phenocrysts are largely argillized to various degrees. Biotite phenocrysts, except in intensely altered parts of andesitic lavas, can commonly be recognized all over the rock. The unit is characterized by agglomerates in the north of Tepeköy. It is mainly represented by andesitic tuffs and tuffites which also locally include bedded tuffitic marls and volcanic mudstones and coal occurrences in between them as large and small pockets from west to southwest of the survey area, in the south of Seyret Hill and around the Keçiagılı village. Gypsum fragments are observed in some parts of coal-bearing and argillized tuffites. In addition, silicified blocks, partly pyritized and partly barren, occur at coal-bearing levels. Towards the west to northwest, an increase in the amount of the andesitic agglomerates in the unit is a prominent feature as well as an increase in the amount of andesitic lavas at upper levels of the unit. Alterations are observed to be argillization, limonitization, hematitization and silicification. The unit when having undergone argillization usually becomes light coloured and varies from light brownish green, yellowish white to white in colour depending upon the degree of alteration. Silicification usually within the silicified and argillized zones is observed to be more advanced towards the center. Porphyritic texture formed by coarse biotite and plagioclase crystals can be observed if the rock has only been slightly altered. Nevertheless, in cases, the rock has been intensively argillized, primary texture of the rock has been completely obliterated and cannot be recognized. The limonitized and hematitized rocks show reddish brown colours. This type is mainly restricted to fractures in silicified zones and is also associated with argillized alteration.

The protruding relief is formed by silicified zones. Silicification slightly appearing at outer portions of altered zones becomes overwhelmingly dominated in their inner portions. Silicified rocks locally occur as massive bodies. In this case, their colours vary between greyish white and dark gray. In some other instances, the silicified rocks also appear to be porous and brecciated. Brecciated parts generally reported around faults and fractures are intensively limonitized. They are also intensively fractured and are coated by limonite along fracture planes. The north part of silicified rocks cropping out at Hamam Hill is light grey and grey coloured and is generally massive. However, the rocks in this region have been locally intensively disrupted by fissures and fractures trending N10°-20°W, N20°-30°E and N60°-80°W. Argillization and limonitization are traced in fracture zones. The silicified rocks south of Hamam Hill have been even more violently broken into pieces by fractures and fissures extending in the same directions as mentioned above. Therefore, the southern part is more brecciated and limonitized with respect to the northern part. Silicified zones exposed at Örle, Karaçam and Seyret Hills located in westward and southwestward extensions of Hamam Hill in south Etili are lined up over the same tectonic zone. Although they show similar features as those at Hamam Hill, but they are smaller in size. A silicified zone cropping out north of Halilağa village trends nearly in a N70°-80°E direction. It is usually reddish grey, light brown colored and is highly fractured and locally brecciated. Fissures and fractures generally extend in N70°-80°E and N10°-20°W directions. Limonitization is basically observed along its fractured and brecciated portions. The silicified zone is densely fractured, fissured and sheared at the top of the hill, north of the Halilaga village cemetery. Towards the outer portions or edges it gradually becomes porous and brecciated and grades into an argillized zone. Locally pyritized, it contains a small amount of sulfur between limonites along the Halilaga village road to the west.

It is shown microscopically that the most abundant phenocrysts are plagioclase with mostly biotite, hornblende and augite. The argillization was kaolinization, but chlorite and epidote also occur.

Stratigraphic position: This unit unconformably overlies the Sakar Dağı Formation and is covered by the Karaköy Formation.

2-2-4 Alluvium

Alluvium is observed in the vicinity of Etili Village in the north of the

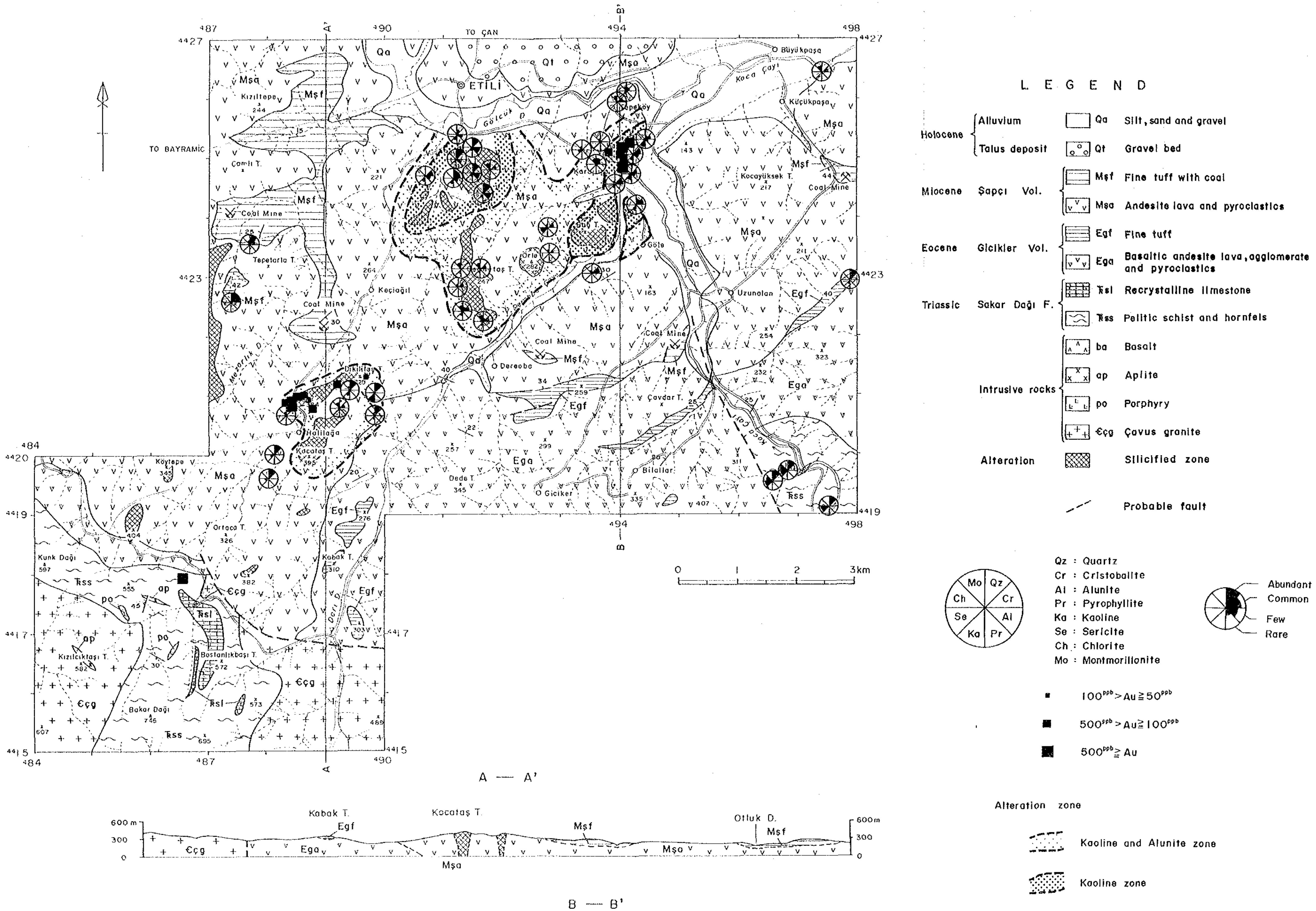


Figure 4- 3 Gold Occurrence and Alteration Map of the Etili Area

survey area. It appears to be composed of very loosely cemented pebbles of various sizes. Pebbles consist mainly of silicified rocks and some andesitic rocks.

2-3 Intrusive Bodies

(1) Çavus Granite: This crops out around Darı Stream and Kızılcık Hill in the southeastern part of the survey area. This granite mainly lies in the south Etili Area and was named Çavus pluton by previous researchers but is described hereafter as Çavus granodiorite for its part enclosed in the survey area. The granite, in fault contact with Şapçı volcanics on the north side, has brought about local metamorphic fingerprints in the Sakar Dagı Formation of Triassic age. Primary textures of the rocks, due largely to contact metamorphic overprints, have already been obliterated; schists have been converted into hornfelses, calcareous schists into skarns, limestones locally into skarns as well as being partly recrystallized. After the Triassic the granite, probably Cretaceous in age, usually is altered at the surface. Feldspars and micas are especially intensely altered. The granodiorite, white and yellowish white in colour, shows a friable fabric like sand. However, in the valleys, unaltered, rather massive, spotty, fractured greyish white coloured fresh granodiorite outcrops can also be traced. Aplitic dykes cross-cutting the granodiorite have also been observed. Although the rock appears unaltered to the unaided eye, alteration of potash feldspars to chlorites and epidotes is observed microscopically.
(2) Porphyry and aplite: In this area, porphyry occurs as NE-SW and NW-SE trending dikes in the southwestern part where the Sakar Dagı Formation is distributed.
(3) Basalt: Basalt occurs as dikes which are inferred to be correlated with the intrusive part of Kocaçakıl Basalt of Zone B in the area where the Sakar Dagı Formation is distributed.

2-4 Geologic Structure

In the southern part of the Etili Area, the basement composed of the Sakar Dagı Formation and Çavus Granite is uplifted, and Tertiary volcanic rocks overlie unconformably. The volcanic rocks are often massive and it is not easily to determine the geologic structure, but the Gicikler Volcanics in the southern part of the Etili Area dips gently northward. Although the Şapçı Volcanics does not have bedding and the structure is not clear, it is assumed that the structure is gentle and wavy.

Anticlinal and synclinal structures are not clearly observed except in the above-mentioned uplifted part. From the regional view point, it is inferred that the distribution area of Şapçı Volcanics corresponds to the south wing of the synclinal structures.

The fractures in this area occur in various directions, but the frequencies are low. Lineaments in the NE-SW direction in the central part of the area (the central part of the remote-sensing zone) are from Landsat data. Although not confirmed by surface study, faults in the NNE-SSW and NW-SE directions were inferred to be associated with these lineaments.

The NNE-SSW faults transect through the central part of the area, and they cut through the Şapçı Volcanics, but are covered by an alluvium deposit.

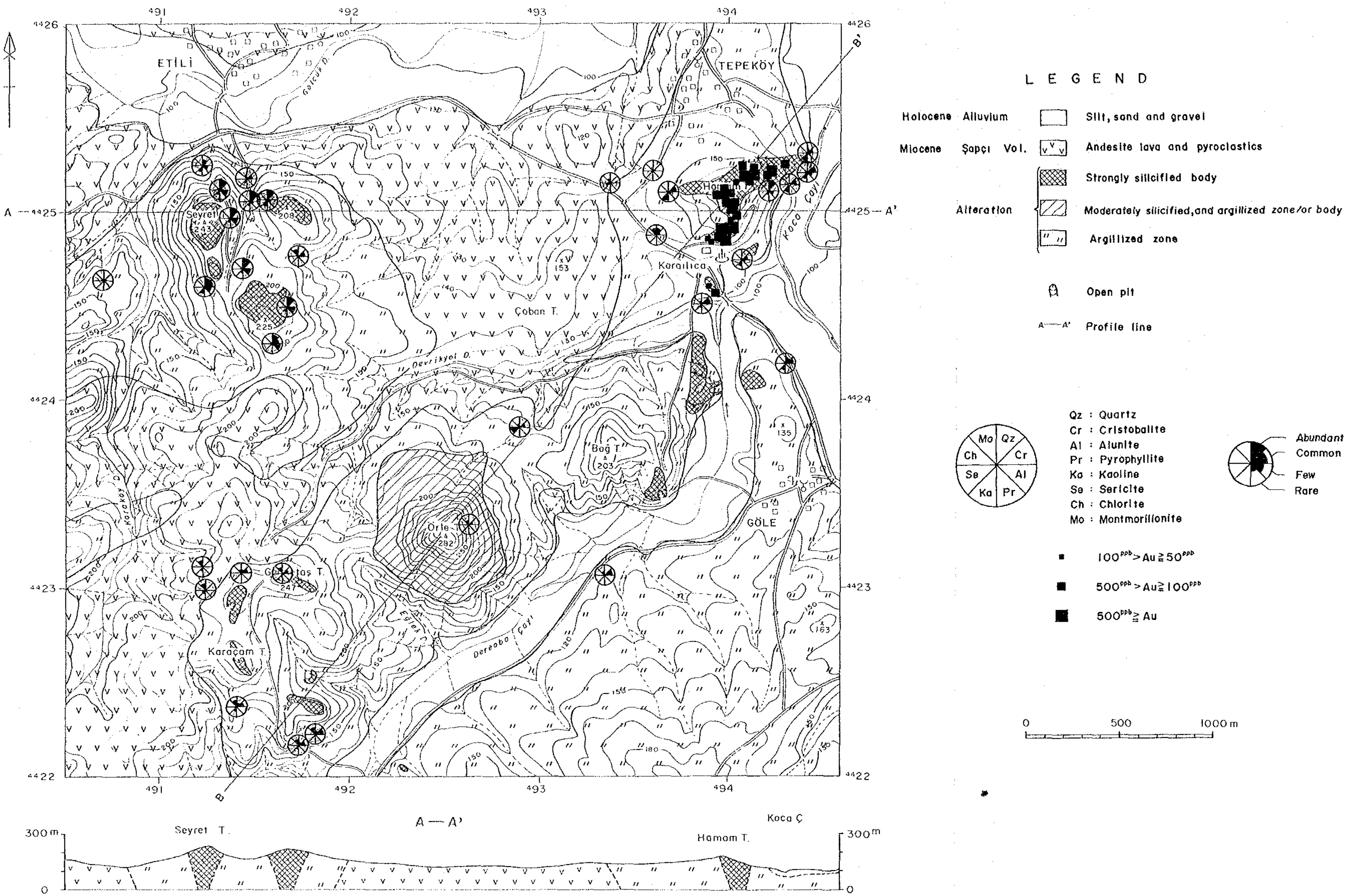
The NW-SE faults are inferred to run through the Koca River to the east of Etili Village.

CHAPTER 3 ALTERATION ZONES

3-1 Outline

The Şapçı Volcanics has been silicified and argillized virtually throughout the entire area. The strongly altered parts are shown in Figure 4-1. The silicified zones often result in protruding topography, and they can be identified by Landsat images. The silicified zones which occur on slopes with thick vegetation and the relatively flat parts were newly identified during the geological survey. They are shown in Figure 4-3; the strongly silicified parts are shown separately. The strongly silicified zones are surrounded by silicified and argillized zones. The strongly silicified rocks are massive and stratified, but there are also brecciated parts which do not show the structure of the original rocks. They are all aggregates of fine-grained quartz with over 95% SiO_2, hard, compact and porous. The colour is mostly white, but becomes dark grey when containing pyrite, reddish brown with hematite and yellow to brown with limonite. Clay minerals (mainly kaoline) are sometimes contained in small amounts in the noncompact parts. Native sulfur, pyrite and other minerals occur in some druses.

Argillized zones occur surrounding the silicified zone. The clay zones consist of white parts and yellow-brown parts. The former consists mainly of quartz and clay minerals (kaoline, alunite, etc.), while the latter parts contain limonite and hematite in addition to the clay minerals (montmorillonite). These are probably products of the oxidation of pyrite and other sulfides.



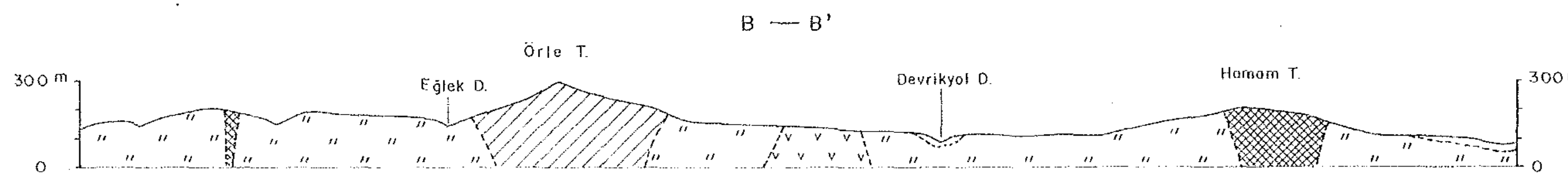


Figure 4- 4 Geologic Map and Cross Section of Tepeköy Area

3-2 Tepeköy Alteration Zones

These zones are widely distributed in the south of Tepeköy Village, Seyret Hill, and from Örle to Karaçam Hills. The strongly silicified zones are Hamam and Seyret Hills. The scale of Hamam Hill forming outcrops of the silicified zones is 700m x 500m. Also, the strongly silicified zone is observed at the top of and around Seyret Hill, the scale of the altered zone is 800m x 700m. These zones consist of the pale-grey to brownish grey porous and massive silicified bodies accompanied with limonite and are surrounded by silicified and argillized zones, which occur in massive and banded silicified forms. Further apart from Hamam and Seyret Hills, the zones have suffered weak alteration, and relict plagioclase. They are white in colour.

The samples of gold grains detected by heavy mineral study were collected from Hamam hot spring area. Although the top of Hamam Hill consists of grey massive silicified rock, the northeast and south slopes consist of grey-brown limonitic massive and porous silicified rocks, and gold-bearing zones occur in the limonitic part along cracks or fractures trending N10°-20°W, N20°-30°E and N60°-80°W.

The altered minerals in the silicified zones consist of kaoline and alunite. and apart from these zones, alteration zones are changed from kaoline-montmorillonite to montmorillonite. The massive part of strongly silicified zones on Hamam Hill are mined by open pit for the brick-size stones which pave the road

3-3 Halilaga Alteration Zones

These zones are located in the southwest of Etili Village and distributed on Taşkesilen-Kocataş Hill (southeast of Halilaga) and Şaguluk Hill (northeast of Halilaga). The former trends NNE-SSW, and the scale of the silicification zone is 1000m x 300m. The latter trends NEE-SWW, and the scale of the silicification zone is 700m x 150m.

The silicification observed around Halilaga Village suggests that their formation was tectonic and structurally controlled. The massive silicified zones at a higher point on Taşkesilen-Kocataş Hill formed with the associated tectonic directions of N30°-40°E, where the slightly limonitized, brecciated, and silicified zones might have followed the bedding.

The silicified rocks are generally grey or greyish-white; porous, brecciated and fractured parts are reddish or brownish-white in colour. There are thin secondary limonite and hematite veins in the rocks appearing as veinlets and stains. Disseminated and gelatinous pyrites are common in unoxidized

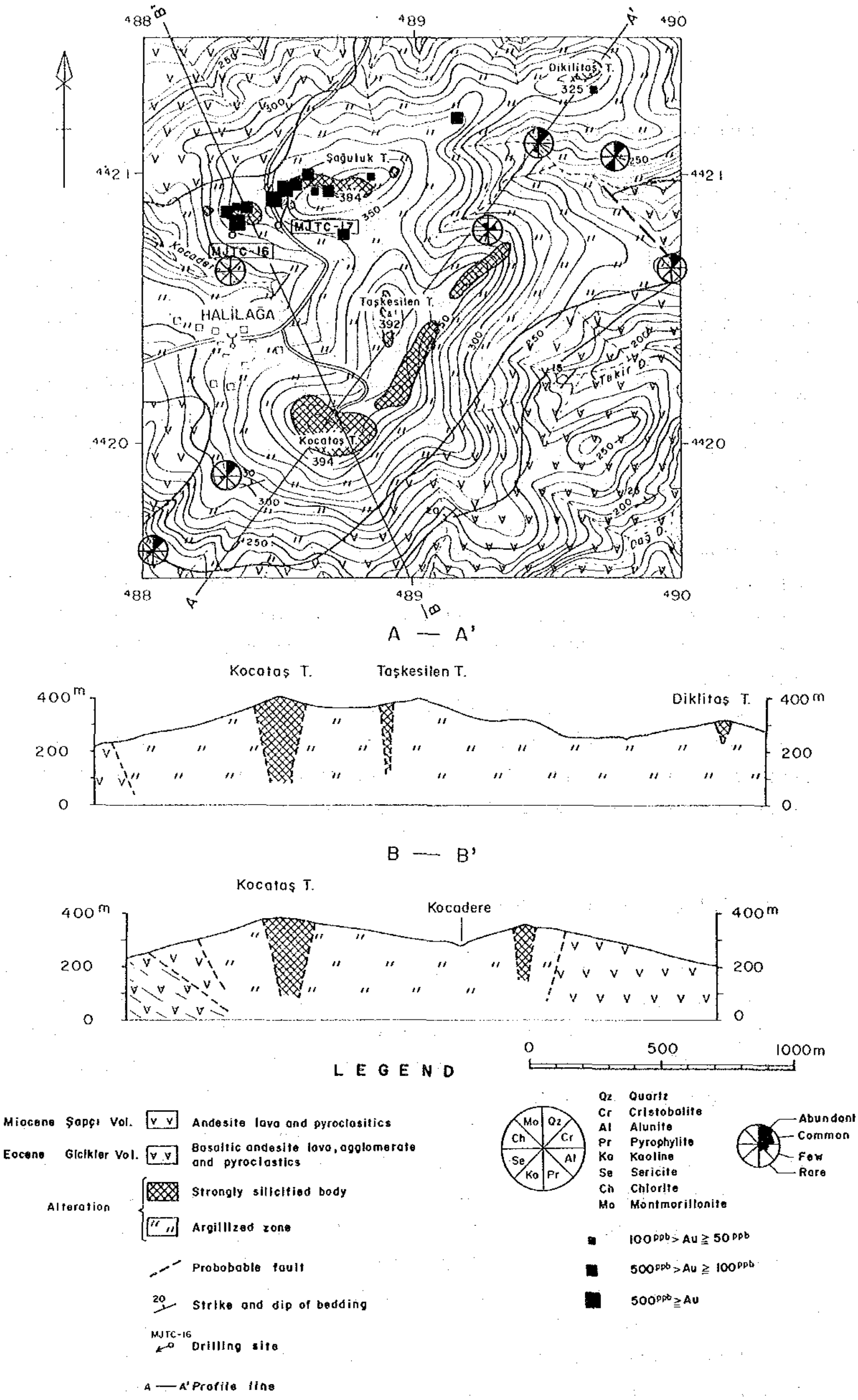


Figure 4- 5 Geologic Map and Cross Section of Halilaga Area

silicified rocks from the drill hole although no pyrite was detected within the oxidized silicified zones.

Gold-bearing zones were found at Şağuluk Hill. The samples were collected from the western part of silicified-argillized zones at Şağuluk Hill.

CHAPTER 4 GEOCHEMICAL PROSPECTING OF ROCK SAMPLES

4-1 Sampling

Rock samples were collected from the 115km^2 geological survey area, and the vicinity of the MTA concession in the southern and eastern parts of Zone B. Sampling density was four samples per square kilometer. Silicified and argillized zones were mostly sampled because of the expected epithermal gold mineralization.

4-2 Analytical Methods

All the samples were analyzed by Chemex Labs Ltd., of Canada. Gold was analyzed by the wet method and atomic absorption, fluorine by the Ion-Specific-Electrode method, arsenic by Aqua-Regia Hydride-AA, selenium by $HCl/KClO_3$-Extraction-AA, mercury by HNO_3/HCl-Cold-Vapour AA, barium and thallium by atomic absorption spectrometry, and other elements by the ICP-AES method. The limits of detection of the elements and results of chemical analyses are shown in Table 2-1 and Table 4 of the Appendix.

4-3 Statistical Analysis of the Chemical Results

(1) Outline of Method

Basic statistical values and correlation matrices of the chemical values of the rock samples were calculated, and the principal component analysis was carried out in the same manner as in the first and second phases.

(2) Basic Statistical Values

Basic statistical values for 12 components using the population of all 458 samples were calculated. Of the 12 components, the gold content was at times below the detection limit and thus less than 2.5ppb was used for samples below 5ppb. Arsenic, lead, selenium, mercury and barium contents were high while those of copper, molybdenum, zinc, fluorine and thallium were low. The basic statistical values are shown in Table 4-1.

Table 4-1 Basic Statistical Values of Etili Rock Samples

(Number of Samples:458)

Element	Mean	Dispersion	S.D.	Min.	Max.
Au(ppb)	7.750	0.613	0.783	2.50	2790.0
Cu(ppm)	12.583	0.281	0.530	0.50	10000.0
Mo(ppm)	3.164	0.217	0.466	0.50	547.0
Pb(ppm)	17.204	0.780	0.883	1.00	5040.0
Zn(ppm)	4.774	0.288	0.536	1.00	696.0
Ag(ppm)	0.324	0.109	0.330	0.25	60.0
As(ppm)	109.625	0.489	0.699	1.00	9200.0
Se(ppm)	0.424	0.455	0.674	0.10	35.0
Hg(ppb)	328.927	0.908	0.953	10.00	78000.0
F (ppm)	87.042	0.142	0.377	20.00	1080.0
Ba(ppm)	560.792	0.209	0.458	30.00	10000.0
Tl(ppm)	0.184	0.381	0.617	0.05	34.0

(3) Principal Component Analysis

The values for gold, many of which were below the detection limit, were processed by the same method as for the basic statistical values. Also as in the first and second phases, the principal component analysis was carried out with all samples as the population. The correlation matrix is shown in Table 4-2. It can be seen that when the elements up to an accumulated proportion of 70% are taken, the eigenvalue is generally 0.94 and the proportion 7.8%. Thus, those up to the fifth principal component express the major variations of this area.

First principal components: The components with large absolute eigenvector are copper, molybdenum, lead, zinc, arsenic, mercury and thallium.

Second principal components: Fluorine shows positive while silver shows negative values.

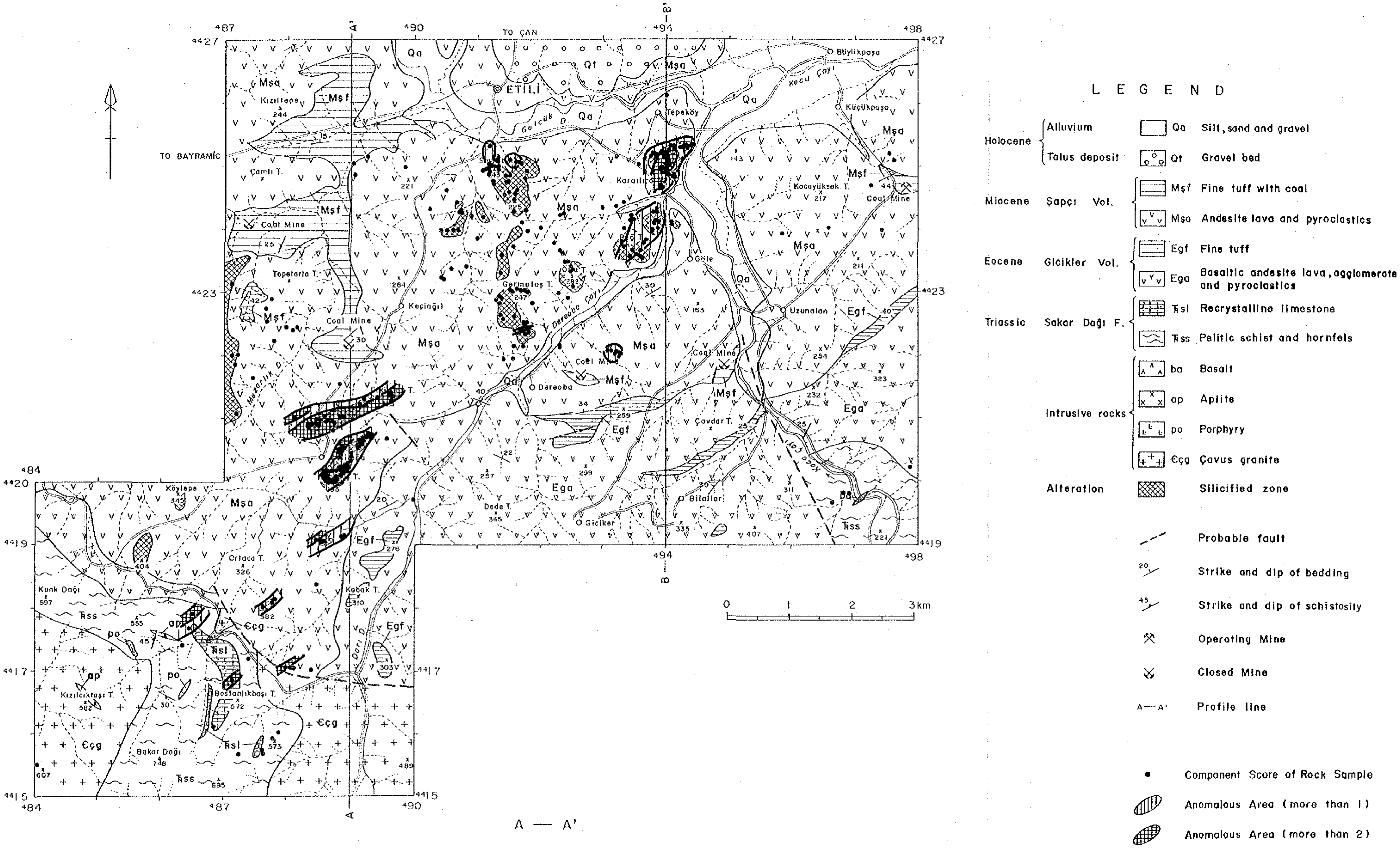
Third principal components: Gold and silver show positive while zinc and thallium show negative values.

Fourth principal components: Barium shows positive while zinc and silver show negative values.

Fifth principal components: Molybdenum, arsenic and selenium show positive while thallium shows negative values.

The above are the components with high absolute eigenvectors. The first principal components are metallic elements, and they express the variation caused by epithermal mineralization. They are the elements with high content in the mineral showings in all areas. The proportion is somewhat low but the eigenvalues are high. The second and third principal components are mostly metallic with high scores in alteration zones. Thus these are considered to show the variations of the silicified and argillized zones.

The fourth and fifth principal components are believed to indicate a portion



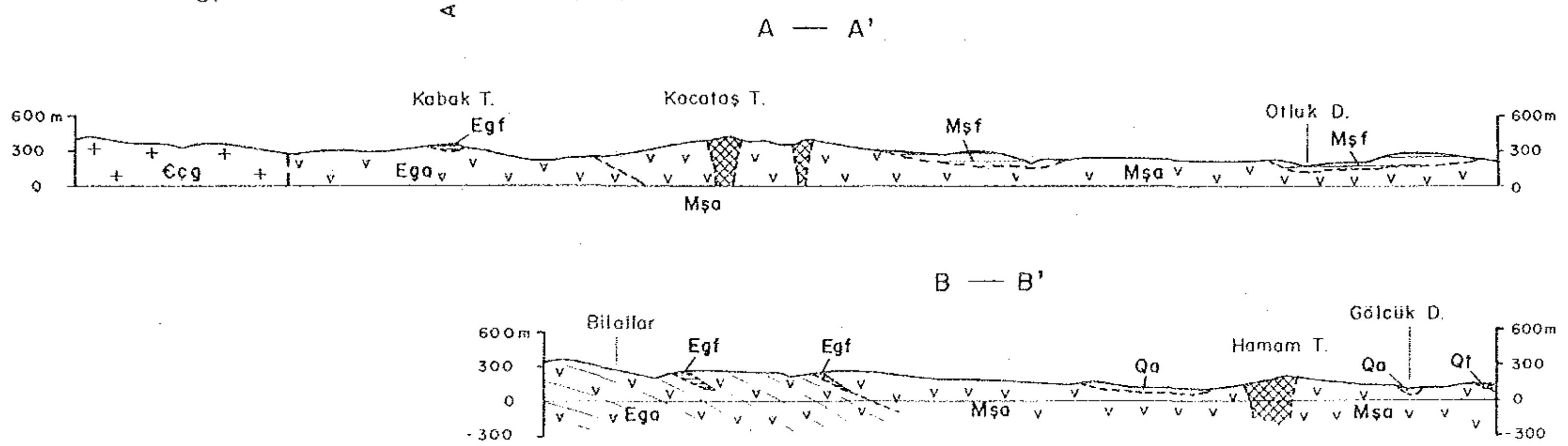


Figure 4- 6 Map of Component Score of Rock Samples in the Etili Area

of the mineralization because they contain metals although the proportion and the eigenvalues are low. By showing the localities with the first principal component exceeding 1 on the map (Figure 4-6), they are seen as covering most of the localities where gold was detected.

Table 4-2 Correlation(upper) and Covariance(lower) Matrix of Rock Samples (Etili)

	Au	Cu	Mo	Pb	Zn	Ag	As	Se	Hg	F	Ba	Tl
Au	0.613	0.19468	-0.04462	0.16106	0.02537	0.27676	0.22177	0.16739	0.01511	0.08731	0.28724	-0.14030
Cu	0.081	0.281	0.31947	0.38359	0.61326	0.25617	0.42238	0.32224	0.23222	0.16984	0.25290	0.25869
Mo	-0.016	0.079	0.217	0.44207	0.30917	0.27834	0.39140	0.34763	0.40605	-0.09055	0.02951	0.32302
Pb	0.111	0.180	0.182	0.780	0.42025	0.41836	0.40261	0.26242	0.65731	-0.09066	0.25172	0.57990
Zn	0.011	0.174	0.077	0.199	0.288	0.22531	0.34744	0.30038	0.12321	0.35245	0.13611	0.34860
Ag	0.072	0.045	0.043	0.122	0.040	0.109	0.07398	0.17273	0.36654	-0.11948	0.04181	0.13866
As	0.121	0.157	0.128	0.249	0.130	0.017	0.489	0.43509	0.27924	0.07433	0.30947	0.29377
Se	0.088	0.115	0.109	0.156	0.109	0.038	0.205	0.455	0.28154	0.20285	0.25963	0.16388
Hg	0.011	0.117	0.180	0.553	0.063	0.115	0.186	0.181	0.908	-0.35547	0.22657	0.40612
F	0.026	0.034	-0.016	-0.030	0.071	-0.015	0.020	0.052	-0.128	0.142	0.21949	0.02310
Ba	0.103	0.061	0.006	0.102	0.033	0.006	0.099	0.080	0.099	0.038	0.209	0.22473
Tl	-0.068	0.085	0.093	0.316	0.115	0.028	0.127	0.068	0.239	0.005	0.063	0.381

Table 4-3 Eigenvalues and Eigenvectors of Rock Samples (Etili)

	1	2	3	4	5	6	7	8	9	10	11	12
Au	0.11834	0.23123	0.70082	-0.10766	-0.05839	-0.18705	-0.38108	0.08802	-0.35055	0.23686	0.08326	-0.22911
Cu	0.34233	0.23013	-0.06183	-0.26503	-0.05014	-0.42044	0.49064	-0.04565	-0.06368	0.33632	-0.43973	0.15222
Mo	0.31702	-0.18687	-0.18197	-0.14315	0.43351	0.06720	-0.24544	-0.69587	-0.23489	0.11927	0.05883	-0.03460
Pb	0.40781	-0.21813	0.01554	0.03878	-0.26010	-0.00882	-0.21015	0.16513	-0.30639	-0.29060	0.02273	0.68291
Zn	0.32146	0.27312	-0.32434	-0.33735	-0.17762	-0.11406	0.11444	0.11902	-0.07323	-0.22359	0.62607	-0.28971
Ag	0.23979	-0.19671	0.33556	-0.53175	-0.20843	0.35087	-0.01078	-0.11350	0.56772	-0.04317	-0.06861	0.00443
As	0.33379	0.15047	0.02922	0.23050	0.38638	-0.42885	-0.29209	0.12641	0.49623	-0.33451	-0.12574	-0.05938
Se	0.28926	0.19625	0.06780	0.08383	0.52841	0.52013	0.19240	0.41210	-0.02189	0.26166	0.13675	0.14815
Hg	0.32528	-0.42114	0.11315	0.18780	-0.02020	0.11859	0.29507	0.12979	-0.27766	-0.31941	-0.28257	-0.53983
F	0.03780	0.61001	-0.19234	-0.03069	-0.16964	0.40740	-0.25105	-0.10353	-0.13567	-0.27287	-0.46714	-0.09461
Ba	0.21314	0.25430	0.28167	0.56793	-0.25911	0.09509	0.32036	-0.46372	0.15169	-0.01778	0.25366	0.08058
Tl	0.30564	-0.14999	-0.34538	0.28408	-0.37239	0.06325	-0.34840	0.15238	0.17639	0.56842	-0.04623	-0.20120
Eigenvalue	3.88739	1.76848	1.30726	1.05668	0.93730	0.70218	0.57120	0.49699	0.39191	0.37447	0.29892	0.20724
Proportion	0.32395	0.14737	0.10894	0.08806	0.07811	0.05852	0.04760	0.04142	0.03266	0.03121	0.02491	0.01727
Accum. Prop	0.32395	0.47132	0.58026	0.66832	0.74643	0.80494	0.85254	0.89396	0.92662	0.95782	0.98273	1.00000

Table 4-4 Significant Analytical Results of Rock Samples (1)

Etili Au > 50ppb

Sample No.	Description	Au ppb	Cu ppm	Mo ppm	Pb ppm	Zn ppm	Ag ppm	As ppm	Se ppm	Hg ppb	F ppm	Ba ppm	Tl ppm
Y640	94100 25190	2790	41	1	12	6	<0.5	1320	3.4	170	410	2750	<0.1
P665	88510 20890	2380	37	40	5040	30	3.0	1600	14.6	43000	80	3450	3.2
Y734	94015 24910	1810	22	4	148	8	<0.5	400	1.6	120	70	720	<0.1
Y611	93980 24910	1680	43	17	90	14	<0.5	3900	8.2	260	220	3200	0.5
Y639	94100 25190	1230	14	<1	2	2	<0.5	340	2.4	50	300	680	<0.1
Y653	94125 25195	1060	29	2	4	4	<0.5	310	2.2	120	300	1300	<0.1
S705	86530 17890	1060	>10000	6	16	118	25.5	72	<0.2	10	110	200	<0.1
Y647	94085 25185	1050	12	1	6	<2	<0.5	76	0.4	240	60	1520	<0.1
Y638	94100 25190	1000	12	<1	6	<2	<0.5	260	1.6	40	160	700	<0.1
Y738	93960 24910	990	49	7	140	6	<0.5	3850	0.8	220	70	>10000	0.7
P660	88530 20950	960	9	3	334	6	3.0	234	2.2	19000	50	3800	0.4
P666	88505 20900	930	71	14	2870	122	<0.5	1000	6.6	14000	320	880	6.2
Y607	93965 24845	800	110	1	150	48	<0.5	3200	0.2	90	210	6900	0.3
Y733	94020 24925	790	26	7	260	8	<0.5	1450	1.6	600	70	2300	0.3
Y648	94085 25185	740	22	1	8	<2	<0.5	216	1.8	90	220	1000	<0.1
Y606	93970 24845	725	52	1	54	18	<0.5	940	1.6	150	120	2800	0.8
Y621	94035 25050	690	64	3	6	2	<0.5	1250	<0.2	260	170	400	0.3
Y732	94020 24930	655	21	13	162	22	<0.5	2700	2.8	220	200	2500	0.3
P668	88365 20825	620	59	12	204	16	60.0	300	6.6	61000	50	2250	0.2
Y652	94125 25195	590	50	2	8	2	<0.5	340	1.0	130	130	1080	<0.1
Y645	94085 25185	575	20	1	2	<2	<0.5	610	4.6	100	170	2000	<0.1
Y613	94030 24780	570	135	13	1300	38	<0.5	2920	1.2	150	150	5400	0.3
Y605	93985 24850	500	39	1	30	4	<0.5	340	1.0	490	120	2900	0.1
P653	88700 20930	440	23	7	140	2	17.5	52	1.2	42000	30	1560	0.1
Y737	93990 24915	430	6	1	148	2	<0.5	160	<0.2	510	50	8600	<0.1
Y651	94125 25195	400	18	3	2	2	<0.5	76	<0.2	50	60	4300	<0.1
P664	88515 20885	390	27	17	962	12	1.0	370	6.6	21000	110	960	1.0
Y634	94110 25175	385	9	1	2	<2	<0.5	60	<0.2	60	110	580	<0.1
Y666	94300 25230	380	15	1	24	18	<0.5	2510	0.6	710	560	3200	<0.1
Y642	94085 25185	375	5	1	<2	<2	<0.5	100	<0.2	90	60	700	<0.1
Y735	93990 24920	370	10	2	60	2	<0.5	176	<0.2	270	70	1700	0.4
Y646	94085 25185	340	8	1	2	<2	<0.5	44	0.2	150	160	1370	<0.1
Y643	94085 25185	340	12	1	2	<2	<0.5	300	0.8	50	160	1550	<0.1
Y635	94110 25175	340	2	<1	<2	<2	<0.5	23	<0.2	40	40	440	<0.1
Y636	94110 25175	335	5	1	2	<2	<0.5	50	<0.2	40	50	720	<0.1
P667	88310 20865	330	34	5	128	12	8.5	90	1.8	14000	40	2800	0.2
C626	88755 20795	320	7	9	296	12	1.5	880	2.4	4500	80	1700	<0.1
Y622	94035 25055	310	33	5	2	4	<0.5	1130	<0.2	320	70	170	0.1
Y637	94100 25190	305	6	1	4	<2	<0.5	90	0.6	50	200	2450	<0.1

Table 4-4 Significant Analytical Results of Rock Samples (2)

Etili Au > 50ppb

Sample Description No.	Au ppb	Cu ppm	Mo ppm	Pb ppm	Zn ppm	Ag ppm	As ppm	Se ppm	Hg ppb	F ppm	Ba ppm	Tl ppm
P670 88395 20880	295	37	21	2870	34	8.5	610	5.0	8200	100	1200	0.9
Y608 93945 24845	280	23	1	60	12	<0.5	1000	11.2	170	120	2950	0.1
Y644 94085 25185	265	6	1	2	<2	<0.5	156	<0.2	160	160	1680	<0.1
P656 88120 20990	265	8	20	440	4	0.5	100	2.8	4800	50	1100	1.3
Y630 94110 25175	240	6	1	4	<2	<0.5	60	<0.2	30	100	390	<0.1
Y650 94125 25195	210	12	1	2	<2	<0.5	36	<0.2	40	70	440	<0.1
P659 88520 20965	205	14	13	542	8	<0.5	232	2.0	22000	40	2120	0.4
P663 88520 20885	200	30	11	776	12	3.0	270	2.6	6100	60	1920	0.9
Y632 94110 25175	185	23	2	26	<2	<0.5	100	<0.2	90	150	550	<0.1
P658 88580 20960	180	22	6	176	6	4.0	110	7.0	28000	70	430	<0.1
Y682 93980 25090	175	74	6	14	12	<0.5	1100	6.4	100	50	660	<0.1
Y686 94000 25050	175	2	<1	6	<2	<0.5	44	<0.2	50	60	500	<0.1
Y610 93945 24865	175	73	9	62	32	<0.5	3200	<0.2	90	400	870	0.2
P655 88610 21000	175	9	15	342	8	0.5	156	2.4	5700	60	1360	0.6
Y680 93940 25095	130	3	1	6	2	<0.5	14	<0.2	50	40	600	<0.1
T665 87850 18120	125	75	2	92	10	<0.5	200	17.6	1300	320	940	<0.1
Y678 93995 25110	110	3	1	2	<2	<0.5	18	<0.2	30	50	540	<0.1
Y631 94110 25175	110	5	<1	14	<2	<0.5	44	<0.2	50	80	450	<0.1
Y691 93925 24890	110	4	2	8	<2	<0.5	240	<0.2	20	50	260	<0.1
C631 89175 21200	105	24	12	632	18	1.5	500	4.2	5200	90	820	5.6
Y677 93980 25125	100	4	1	2	<2	<0.5	11	<0.2	60	50	300	<0.1
Y620 94045 24980	100	90	10	66	8	<0.5	4000	16.8	420	160	1900	1.9
C628 88850 20980	95	29	10	100	4	3.5	68	1.2	8200	40	550	<0.1
Y649 94125 25195	90	4	1	<2	<2	<0.5	17	<0.2	40	170	560	<0.1
Y627 94125 25180	90	11	1	8	<2	<0.5	110	<0.2	30	150	240	<0.1
Y655 94080 25245	85	93	1	8	86	<0.5	630	<0.2	80	100	300	0.2
M679 88880 22500	85	17	6	216	12	3.5	56	2.6	14000	40	1220	0.1
Y690 93915 24845	80	26	51	94	118	<0.5	44	<0.2	80	200	380	0.1
Y612 94025 24960	75	37	3	58	20	<0.5	4650	6.0	220	220	2100	0.1
Y674 94030 25135	75	5	1	4	<2	<0.5	46	<0.2	700	40	740	<0.1
P657 88640 20935	75	22	8	272	8	2.0	104	1.0	5300	40	750	0.5
Y626 94125 25180	65	7	1	16	<2	<0.5	84	<0.2	30	90	680	<0.1
P669 88355 20885	65	15	3	100	6	2.5	48	<0.2	4600	40	550	0.2
C633 89680 21310	65	20	37	1150	38	6.0	440	35.0	25000	110	950	1.6
Y673 94040 25160	55	14	3	8	4	<0.5	830	3.8	80	60	1380	<0.1
Y641 94100 25190	50	7	1	2	<2	<0.5	80	<0.2	60	60	1400	<0.1
Y628 94125 25180	50	7	1	16	<2	<0.5	64	<0.2	30	240	1500	<0.1
P661 88475 20970	50	16	12	428	14	<0.5	470	4.2	30000	80	850	0.2

CHAPTER 5 DRILLING SURVEY

5-1 Outline of Diamond Drilling

5-1-1 Objective of Diamond Drilling

As a result of geological and geochemical surveys carried out in the third phase of the project, an epithermal-gold-type ore deposit was expected as a promising target at Tepeköy and Halilaga in the Etili Area. At Halilaga, a drilling survey consisting of two holes (total hole length 302m) was planned and subsequently carried out in order to explore underground emplacement of the epithermal-gold-type ore deposit, and to investigate and unravel the relationship between the emplacement conditions of the ore deposit and the results of geological and geochemical surveys. The purpose of each hole is as follows.

MJTC-16 : exploration of gold anomalous area (Halilaga) found by geochemical survey.

MJTC-17 : exploration of gold anomalous area (Halilaga) found by geochemical survey.

5-1-2 Outline of Drilling Operation

(1) Location of drill holes

No.	X	Y	Z [m sea level]	Direction	Dip
MJTC-16	88338	20785	316	N20°E	-50°
MJTC-17	88500	20805	332	N20°W	-50°

(2) Drilling operation method

The wire line drilling method using an NQ- and BQ-type diamond bit was applied. Drill inclinations -50°.

(3) Core survey

A geological columnar section *1/200* in scale was complied, and colour photographs of all collected drill cores were taken.

(4) Chemical assay of drilling cores

Whole collected cores were split along the core extension, and half-pieces of the split core were chemically assayed to detect gold and silver contents for the enter section, while selected samples were analyzed for gold, silver, copper, lead, zinc, antimony, mercury and molybdenum contents.

(5) Laboratory studies of the core

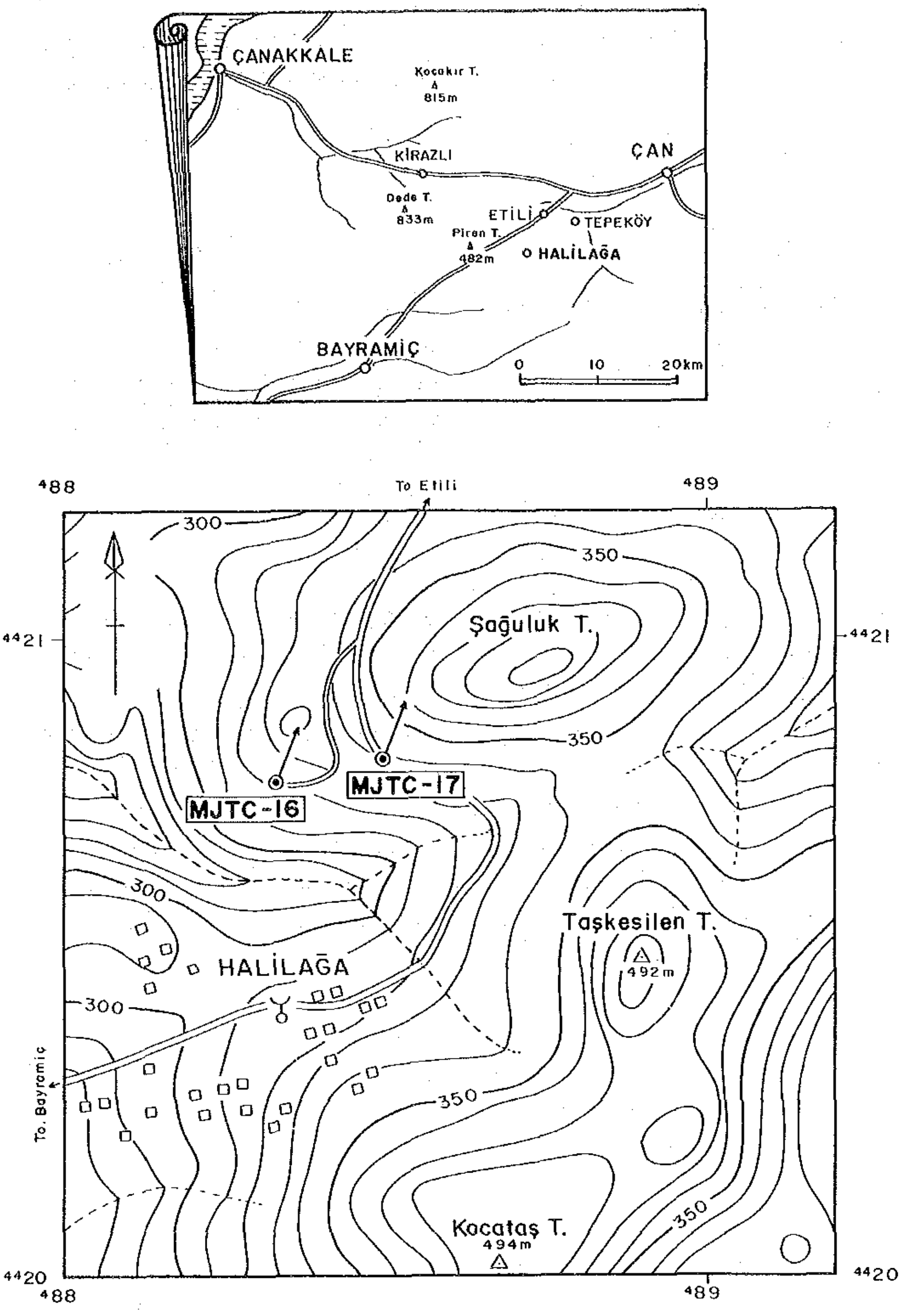


Figure 4- 7 Location Map of Drill Holes of the Etili Area

Microscope observations of rock thin sections, and total rock analysis, and detection of altered minerals by X-ray diffractometer were performed.

5-1-3 Holes Drilled

Drill Holes Performed

No.	Length Drilled	Surface Soil	Core Length	Core Recovery	Period
MJTC-16	151.00m	2.80m	136.45m	92.1%	17 Sep- 2 Oct
MJTC-17	151.00m	1.80m	135.90m	90.6%	3 Oct-16 Oct

5-2 Drilling Operation

5-2-1 Drilling Method

The drilling operation was performed by means of the wire line method using a diamond drilling bit of NQ and BQ sizes at the MJTC-16 and MJTC-17 sites which had exposed bedrock at the surface.

Bentonite mud water was circulated during drilling in order to reduce torque resistance caused by collapse in the hole.

Geology of the Etili Area consists of silicified and argillized andesite. At the predominantly alterated sections of rocks in the hole, the rocks are soft and brittle and have many well-developed cracks and fissures which often cause loss of circulating mud water and much flash water. On the other hand, strongly silicified rock is very hard to drill.

5-2-2 Drilling Machines, Equipment and Consumables

Two sets of Longyear L-38 were used for the drilling operation. Types and specifications of the machines, engines, pumps and equipment, and amount of consumables are shown in Tables 2-4, 2-5 and 2-6.

5-2-3 Operation Members and Shifts

The operation of move-in and move-out from site to site, and preparation work in the site were performed by a shift-per-day system, while the actual drilling operation was carried out by three shifts per day with eight working hours per shift. One drilling shift consisted of five members, a Japanese driller, a Turkish assistant driller of MTA and three Turkish workers.

5-2-4 Transportation and Road Construction

The drilling machines, equipment and consumables were transported from the

Northwest Anadol Regional Office of MTA located in Balıkesir to a place near these drilling sites by a large truck, and then to the drilling sites by a small truck. As there was no access road, a new road 100m long for MJTC-16 and MJTC-17 was constructed by bulldozer.

5-2-5 Water Supply

The water necessary for the drilling operation was transported by a tractor from a nearby well.

5-2-6 Withdrawal

After completion of the third-phase drilling survey, drilling machines and equipment were stored in the storehouse of the MTA Office in Balıkesir.

5-3 Results of Diamond Drilling

5-3-1 MJTC-16

The hole reached massive bedrock at 2.8m after cutting through the surface with an NQ-size diamond bit with circulating dense bentonite mud water. After reaming with the NW casing shoe bit, NW casing pipes were inserted at 15.25m. Below 15.25m, an NQ wire line method and bentonite mud water were used for the drilling operation. The loss of mud water commenced at 107.45m, and BW casing pipes were inserted at 111.95m because of severe collapse of the hole. Below 111.95m, a BQ wire line method and bentonite mud water were used for the drilling operation. The drilling was completed at 151.00m. The lithology of this drill hole consists of strongly silicified and argillized rocks (2.80-16.65m), and weakly argillized andesite (16.65-151.00m).

Depth (m)	0-111.95	111.95-151.00
Mud Water	BMW	BMW
Bit Exchange(pcs)	NQWL bit(4)	NQWL bit(1)
Pump Pres. (kg/cm^2)	0-5	5-10
Pump Feed (ℓ/min)	40	30
Pump Deli. (ℓ/min)	40	30
Bit Pres. (kg/cm^2)	1,000-1,500	1,000-1,500
Bit Rot. (rpm)	200	200
Core Recovery (%)	90	91

BMW:Bentonite Mud Water, Pres.:Pressures, Deli.:Delivery
Rot.:Rotation

5-3-2 MJTC-17

Table 4-5 Record of the Drilling Operation at MJTC-16

	Drilling Length			Total		Shift		Working Men	
	Shift 1	Shift 2	Shift 3	Drilling Length	Core Length	Drilling Shift	Total Shift	Engi-neer	Worker
	m	m	m	m	m			men	men
17 Sept	PRDS						1	3	9
18 Sept	PRDS						2	3	9
19 Sept	PRDS						3	3	9
20 Sept	5.50	1.95	3.30	10.75	6.00	3	6	3	9
21 Sept	3.05	2.85	6.30	22.95	14.85	3	9	3	9
22 Sept	4.90	2.65	5.85	36.35	25.90	3	12	3	9
23 Sept	7.95	8.35	8.00	60.65	49.75	3	15	3	9
24 Sept	8.05	7.55	5.40	81.65	70.75	3	18	3	9
25 Sept	5.80	3.45	7.55	98.45	87.55	3	21	3	9
26 Sept	8.20	5.30	INCP	111.95	101.05	3	24	3	9
27 Sept	INCP	7.15	5.05	124.15	112.20	3	27	3	9
28 Sept	5.35	5.80	2.75	138.05	126.05	3	30	3	9
29 Sept	5.90	1.80	2.10	147.85	133.30	3	33	3	9
30 Sept	3.15	OUCP		151.00	136.45	2	35	3	9
1 Oct	DISM						36	3	9
2 Oct	DISM						37	3	9
Total	57.85	46.85	46.30	151.00	136.45	32	37	48	144

Abbreviations

ROCO;Road construction

PRDS;Preparation of drilling site

TRAN;Transportation

TRRE;Transportation and Reassembly

DISM;Dismantling

RECO;Recovery work

INCP;Inserting casing pipe

OUCP;Retrieving casing pipe

Table 4-6 Record of the Drilling Operation at MJTC-17

	Drilling Length			Total		Shift		Working Men	
	Shift 1	Shift 2	Shift 3	Drilling Length	Core Length	Drilling Shift	Total Shift	Engi-neer	Worker
	m	m	m	m	m			men	men
3 Oct	PRDS						1	3	9
4 Oct	PRDS						2	3	9
5 Oct	6.00	5.90	4.95	16.85	15.05	3	5	3	9
6 Oct	7.55	4.25	4.40	33.05	30.30	3	8	3	9
7 Oct	8.20	6.10	6.10	53.45	50.70	3	11	3	9
8 Oct	7.85	7.25	1.85	70.40	67.55	3	14	3	9
9 Oct	6.05	6.95	2.00	85.40	82.55	3	17	3	9
10 Oct	6.00	4.55	5.95	101.90	94.65	3	20	3	9
11 Oct	4.45	5.00	4.10	115.45	105.95	3	23	3	9
12 Oct	5.00	4.00	5.35	129.80	119.65	3	26	3	9
13 Oct	7.45	6.15	5.10	148.50	133.40	3	29	3	9
14 Oct	2.50	OUCP		151.00	135.40	2	31	3	9
15 Oct	DISM						32	3	9
16 Oct	DISM						33	3	9
17 Oct	DISM						34	3	9
Total	61.05	50.15	39.80	151.00	135.40	29	34	45	135

Abbreviations

ROCO;Road construction
PRDS;Preparation of drilling site
TRAN;Transportation
TRRE;Transportation and Reassembly
CIMW;Circulation of mud water
DISM;Dismantling
RECO;Recovery work
INCP;Inserting casing pipe
OUCP;Retrieving casing pipe

Table 4-7 Summary of the Drilling Operation of MJTC-16

Operation	Survey Period: Period	Days	Work day (Days)	Off day (Days)	Total Men: Engineer (Men)	Total Men: Worker (Men)
Preparation	17 ～ 19 Sept	3	3	-	9	27
Drilling	20 ～ 30 Sept	11	Drilling 11	-	33	99
			Recovery -		-	-
Removal	1 ～ 2 Oct	2	2	-	6	18
Total	17 Sept～ 2 Oct	16	16	-	48	144

Drilling Length			
Length Planned	150.00m	Over-burden	2.80m
Increase or Decrease in Length	151.00m	Core Length	136.45m
Length Drilled	151.00m	Core Recovery	% 92.1

Core Recovery of 50 m hole

Depth of hole (m)	Core Recovery (%)	Core Recovery Cumulated (%)
0～ 50	86.0	86.0
50～100	100.0	88.9
100～151	93.1	92.1

Working Hours	h	%	%
Drilling	154	60	52
Other Work	101	40	34
Recovery	-	-	-
Total	255	100	
Reassembly	24		8
Dismantling	16		6
Water Transportation			
Road Construction and Others			
G.Total	295		100

Efficiency of Drilling

Total m/work Period(m/day)	151.00m/11 days (13.72 m/day)
Total m/total Shift (m/shift)	151.00m/32 shifts (4.72 m/shift)

Drilling Length/Bit(each size bit)

Bit Size	HW	NQ	BQ
Drilled Length(m)	-	111.95	39.05
Core Length(m)	-	101.05	35.40

Casing Pipe Inserted

Size	Meterage (m)	Meterage / Drilling Length x100 (%)	Recovery (%)
NW	15.25	10.19	100
BW	111.95	74.14	100

Direction: N20°E Incline:-50°

Table 4-8 Summary of the Drilling Operation of MJTC-17

Operation	Survey Period: Period	Survey Period: Days	Survey Period: Work day (Days)	Survey Period: Off day (Days)	Total Men: Engineer (Men)	Total Men: Worker (Men)
Preparation	3 ~ 4 October	2	2	–	6	18
Drilling	5 ~ 14 October	10	Drilling 10	–	30	90
			Recovery		–	–
Removal	15 ~ 17 October	3	3	–	9	27
Total	3 ~ 17 October	15	15	–	45	135

Drilling Length			
Length Planned	150.00m	Over-burden Cave	1.80m
Increase or Decrease in Length	151.00m	Core Length	135.40m
Length Drilled	151.00m	Core Recovery	% 89.7%

Core Recovery of 50 m hole

Depth of Hole (m)	Core Recovery (%)	Core Recovery Cumulated (%)
0~ 50	95	95
50~ 100	91	93
100~ 151	83	90

Working Hours	h	%	%
Drilling	138	59	51
Other Work	94	41	34
Recovery			
Total	232	100	85
Reassembly	16		6
Dismantling	24		9
Water Transportation			
Road Construction and Others			
G.Total	272		100

Efficiency of Drilling

Total m/work Period(m/day)	151.00m/10 days (15.10m/day)
Total m/total Shift (m/shift)	151.00m/29 shifts (5.21m/shift)

Drilling Length/Bit(each size bit)

Bit Size	NQ	BQ	
Drilled Length(m)	85.40	65.60	
Core Length(m)	82.55	53.35	

Casing Pipe Inserted

Size	Meterage (m)	Meterage/Drilling Length x100 (%)	Recovery (%)
HW	3.05	2	100
NW	21.35	14	100
BW	85.40	57	100

Direction: N20°E   Incline:-50°

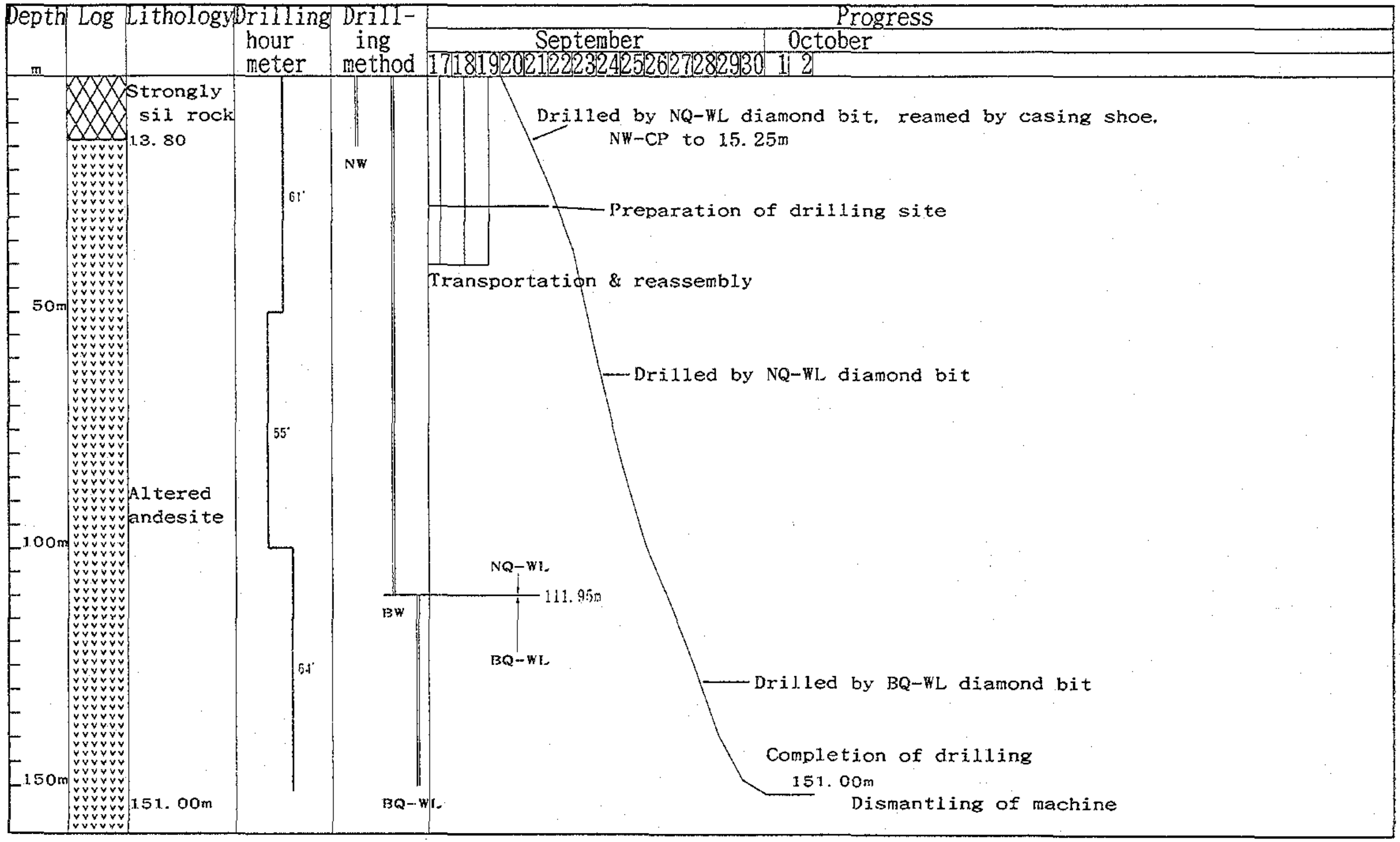


Figure 4-8 Drilling Progress of MJTC-16

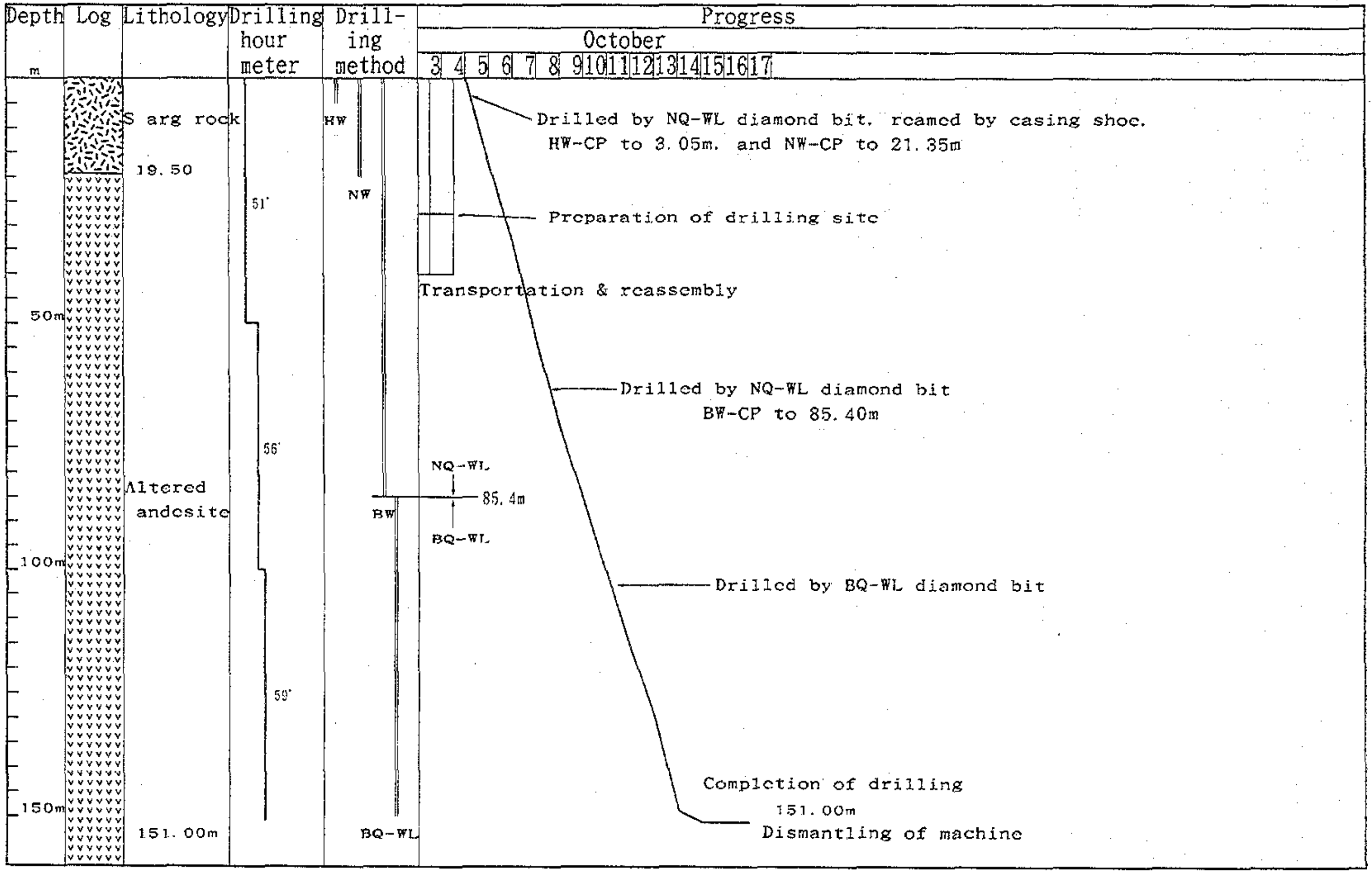


Figure 4-9 Drilling Progress of MJTC-17

The hole reached massive bedrock at 1.8m after cutting through the surface with an NQ-size diamond bit with circulating dense bentonite mud water. After reaming with the HW and NW casing shoe bit, HW and NW casing pipes were inserted at 3.05m and 21.35m. Below 21.35m, an NQ wire line method and bentonite mud water were used for the drilling operation. The loss of mud water commenced at 107.45m, and BW casing pipes were inserted at 85.40m because of severe collapse of the hole. Below 85.40m, a BQ wire line method and bentonite mud water were used for the drilling operation. The drilling was completed at 151.00m.

The lithology of this drill hole consists of strongly argillized rocks (1.80-10.00m), and weakly argillized andesite locally accompanied with pyrite dissemination (16.65-151.00m).

Depth (m)	0-85.40	85.40-151.00
Mud Water	BMW	BMW
Bit Exchange(pcs)	NQWL bit(3)	BQWL bit(2)
Pump Pres. (kg/cm^2)	1-5	5-10
Pump Feed (ℓ/min)	40	30
Pump Deli. (ℓ/min)	40	30
Bit Pres. (kg/cm^2)	1,000-1,500	1,000-1,500
Bit Rot. (rpm)	200	200
Core Recovery (%)	97	81

5-4 Alteration of Drill Holes

5-4-1 MJTC-16

An inclined hole (-50°) was drilled through the strongly silicified-argillized zones and weakly argillized zones of Şapçı Volcanics. Altered minerals of the former consist of montmorillonite and a small amount of kaoline; the latter consists of mainly montmorillonite and a small amount of sericite. Fine-grained pyrite was observed from 24.80m to 30.10m. Below 130.00m, unaltered fractured andesites have undergone propylitization and are accompanied by chlorite and calcite.

5-4-2 MJTC-17

An inclined hole (-50°) was drilled through the strongly argillized zones and weakly argillized zones of Şapçı Volcanics. Altered minerals of the former consist of montmorillonite and a small amount of kaoline; the latter consists of mainly a small amount of kaoline. Fine-grained pyrite was observed from 50.00m to 99.60m. Below 38.90m, weakly altered fractured andesites have

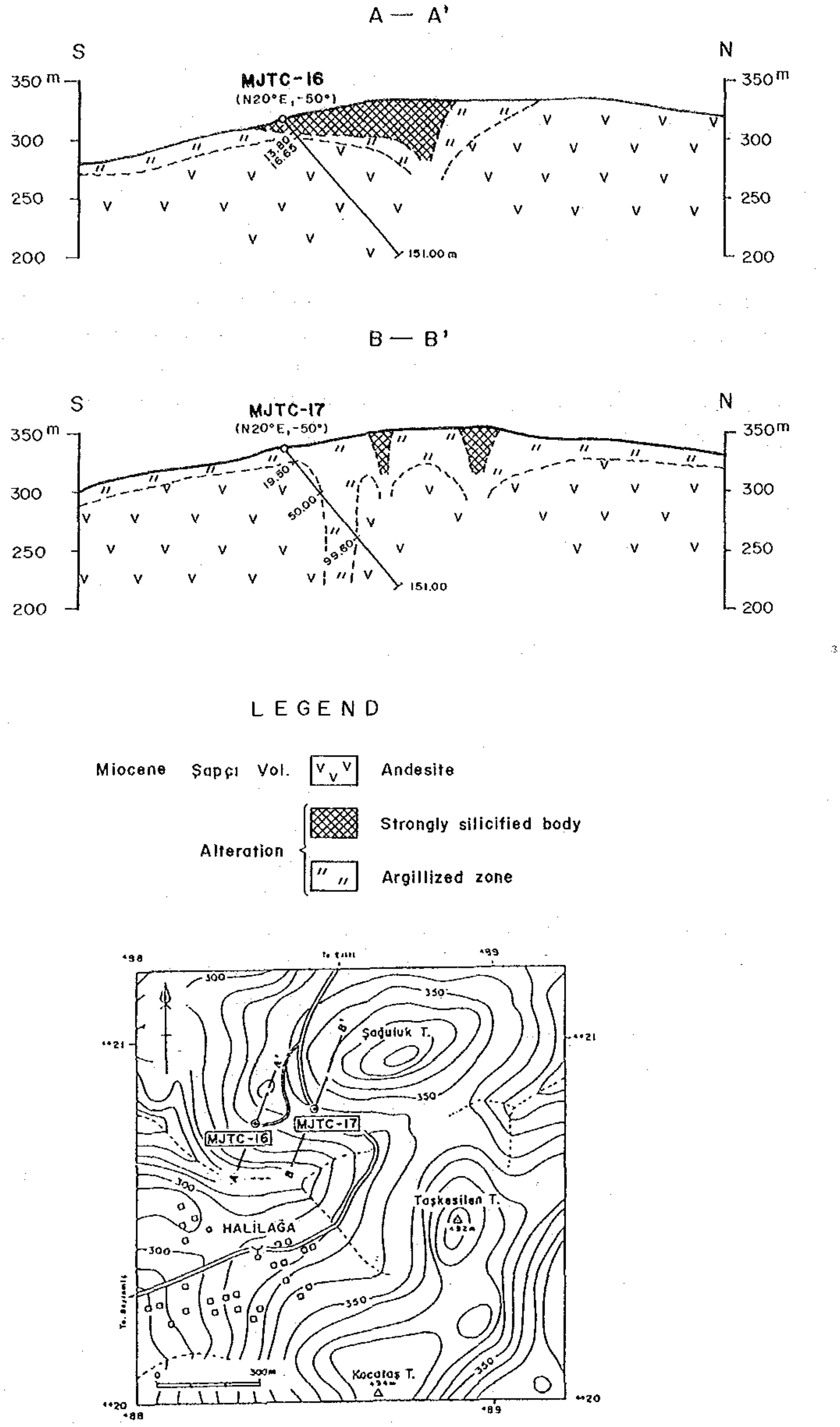


Figure 4-10 Geologic Cross Section of Drill Holes (MJTC-16 and 17)

undergone propylitization and are accompanied by chlorite and calcite.

5-5 Assay Results of Core

5-5-1 MJTC-16

Mineralization containing gold in excess of 100 ppb was detected in the limonitic argillized zones accompanying silicified blocks from 2.80m to 16.65m. The average grade of 13.85m width is Au 581ppb, Ag 1.3ppm, Pb 294ppm, Sb 80.6ppm and Hg 7104ppb. The content of these zones is higher than in other mineralization zones.

5-5-2 MJTC-17

Gold mineralization was not detected by drill hole MJTC-17.

CHAPTER 6 DISCUSSION

6-1 Alteration Zones

The silicified and argillized zones of the Etili Area are distributed in the Seyret, Hamam, Örle, Kocataş-Taşkesilen and Şaguluk Hills. Tepeköy alteration zones are the biggest in the vicinity, the dimensions being 4km long east-west and 3km wide north-south. The gold content was detected from rock samples collected during 1990. The auriferous samples were significant in the Hamam Hill of Tepeköy and Şaguluk Hill of Halilaga alteration zones. The silicified bodies consist of massive, brecciated and porous parts with gradual transitions. Generally, the massive part is centered in the silicified body; the porous and brecciated parts occur at the margin. The silicified zones often result in protruding topography and they can be identified on air photographs. The silicified zones are accompanied by limonite and hematite due to oxidation. The quantity of limonite and hematite is low in the massive part, and high in the porous and brecciated parts.

6-2 Alteration of the Deeper Zone

The two drill holes in the Halilaga alteration zones, MJTC-16 and 17 were inclined -50°. The lithology of these two drill holes consists mainly of weakly argillized andesite accompanied with pyrite dissemination, and the silicified zones became thin at subsurface. The auriferous limonitic silicified-argillized zones continued from 2.80m to 16.65m in MJTC-16. Altered andesites accompanied by pyrite disseminations occur surrounding the silicified-argillized zones.

6-3 Gold and Silicified Zone

It is significant that gold was detected in the rock samples collected from the Tepeköy and Halilaga alteration zones, in soil for heavy mineral study and in drill hole MJTC-16. The results of the third-phase survey indicate the possibility of medium-scale low-grade gold deposits in Tepeköy alteration zones. However, gold-bearing zones detected on the surface remain thin due to advanced erosion in the Halilaga.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

7-1 Conclusions

Silicified and argillized zones occur in Şapçı Volcanics. The Halilaga silicified zones occurring in Şapçı Volcanics were evident as thin near the surface in MJTC-16 and 17, after which weakly altered andesites were intersected, but the Tepeköy silicified zones are inferred to continue for at least 150m because of large-scale silicified bodies. Altered zones with limonite are predominant on the outcrops, but pyrites are not observed.

Of the results of the drill survey, the following are significant: fine-grained pyrites are developed in the section underneath the surface, limonitic silicified-argillized zones were found by drill hole MJTC-16 and the low-grade auriferous zones continued from 2.80m to 16.65m in hole MJTC-16. Therefore, it is considered that the potential for gold deposits is low.

In Tepeköy alteration zones, auriferous mineralization in the silicified body extend further downward, and silicified veins are expected to be found in the central portion of the silicified zones. Thus it is considered that their shapes are "mushroom-like" in geologic section as in the Kestane Dagı Area.

7-2 Recommendations for Future Exploration

Auriferous zones have been detected in Hamam Hill of southern Tepeköy Village. Although this locality does not belong to the concession of MTA, the drilling survey should be continued here because the auriferous zones were found through study of many rock samples.

PART V DIKMEN AREA

PART V DİKMEN AREA

CHAPTER 1 SURVEY OF THE DIKMEN AREA

1-1 Outline

The Dikmen area locates in the southwestern part of Zone C. The basement rocks of this zone are the Emeşe Formation composed of green schist, pelitic schist and crystalline limestone and Ovacık Granite (Triassic). The Emeşe Formation occurs widely in the southern part of the zone, and it is overlain unconformably by the Sarısuvat Formation in the northern part. The Sarısuvat Formation comprises sandy limestone, and the age is Late Jurassic.

Cretaceous sediments are lacking here, and the Karanlık Formation was deposited in the Tertiary. The lower part of this formation is the Kızılcık Member, which is believed to be the basal conglomerate, and the upper part consists of the Kirazlıgeçit Member composed of alternating siltstone and sandstone. These are considered to be flysch-type sediments.

Eocene and Miocene volcanics are lacking, and Akkayrak Volcanics consisting of post-Late Tertiary dacite overlie the Karanlık Formation unconformably.

As for intrusive rocks, Late Cretaceous to Eocene granodiorite (Dikmen granite) and porphyry are distributed in the area. A porphyry molybdenum (copper) deposit associated with these intrusive rocks was discovered, and it is considered that epithermal mineralization occurred after the porphyry molybdenum mineralization.

1-2 Objective of the Survey

A significant result of the survey during the first phase is that the auriferous rocks were found through rock samples collected in the upstream section of Sığırirek Stream, and that the mineralization zones bearing molybdenum were detected downstream of Sığırirek Stream. During the second phase, geological and geochemical surveys, and geophysical surveys of IP and SIP methods were conducted in the Dikmen Area. On the basis of these results, a drill survey (MJTC-15) was carried out to clarify the downward extension of mineralization zones.

1-3 Contents of the Survey

The contents of the survey are shown in the following table:

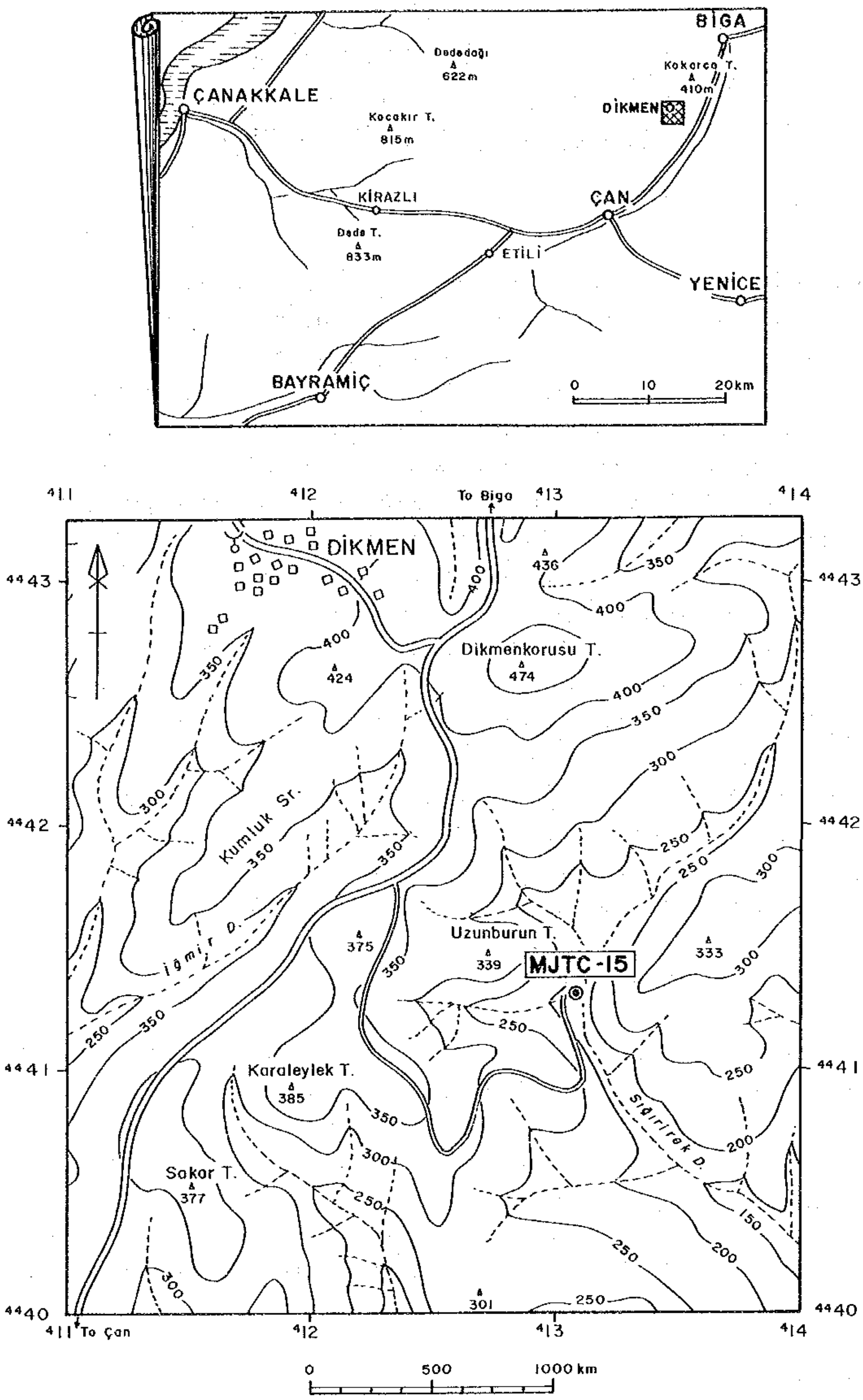


Figure 5- 1 Location Map of Drill Hole of the Dikmen Area

Contents of Survey	Quantity	Components for Analysis
Drill Survey(1 hole, 150m)	50pcs	Au,Ag,Cu,Pb,Zn,Sb,Hg,Mo
Whole rock analysis	5pcs	
Thin Section	5pcs	
X-ray Diffractive Method	6pcs	

CHAPTER 2 GEOLOGY OF THE DIKMEN AREA

The Dikmen area locates in the southwestern part of Zone C. The geology of this area consists mainly of the Late Triassic Emeşe Formation, Eocene Karanlık Formation, and Pleistocene Akkayrak Volcanics. The stratigraphic column, geologic map, cross sections, and mineralization and alteration map are shown in the report of the second phase (1990).

CHAPTER 3 MINERALIZATION AND ALTERATION

Molybdenite and pyrite are traced in the Sığırirek Stream in eastern Dikmenkorsu Hill, within the granodiorite as disseminations, as strains along fractures and cracks, and in quartz veins as grains or groups of grains and veinlets. Quartz veins of various directions generally bear pyrite, and sometimes molybdenite is also observed in this area. The porphyries, aplites and in particular, granodiorites in Domuzdamı Stream are cut by quartz veinlets (with thicknesses between 2mm and 30cm) bearing pyrite, molybdenite and chalcopyrite as disseminations and/or veinlets. Malachite, azurite, limonite and hematite are additionally traced as fracture fillings in silicified zones of the Emeşe Formation.

The silicified zones trending NEN-SWS are partially observed in the northern part of Sığırirek Stream within the Emeşe Formation. Silicification especially is traced within metamorphosed volcanics and sedimentary rocks of the Emeşe Formation around Dikmenkorsu Hill and northwest of the survey area as blocks of different sizes. They are highly limonitized and hematitized. Copper hydroxides are also associated with these silicified blocks around Uzunburun Hill. Advanced argillization is also always associated with the silicified blocks. Silicifications are abundant within the metamorphosed volcanic and sedimentary rocks at the southeastern part of the survey area, although advanced argillization is mainly limited to the porphyries. The altered minerals consist mainly of kaoline and sericite.

CHAPTER 4 DRILLING SURVEY

4-1 Outline

As a result of geological, geochemical and geophysical surveys carried out in the first and second phase, the porphyry molybdenum-type and epithermal-gold-type ore deposits were expected as promising targets in the Dikmen area. In the third phase, a drilling survey consisting of one hole (total hole length 150m) was planned and susequently carried out in order to explore the subsurface extent of mineralization from the outcrop downward.

The drilling machines, equipment and consumables were transported from the MTA Office located in Balıkesir. As there was no access road, a new 2km road for MJTC-15 was constructed by a bulldozer. The drilling operation was commenced on August 29, 1990, and was ended on September 15, 1990, and performed by means of the wire line method using NQ-size diamond bits. The core recovery was 93.5%.

(1) Location of drill holes

No.	X	Y	Z [m sea level]	Direction	Dip
MJTC-15	79150	20760	364	-	-90°

(2) Core survey

A geological columnar section 1/200 in scale was complied, and colour photographs of all collected drill cores were taken.

(4) Chemical assay of drilling cores

Whole collected cores were split along the core extension, and half-pieces of the split core were chemically assayed to detect gold and silver content for the enter section, while selected samples were analyzed for gold, silver, copper, lead, zinc, antimony, mercury and molybdenum contents.

(5) Laboratory studies of the core

Microscope observations of thin sections, whole rock analysis, and detection of altered minerals by the X-ray diffraction method were performed.

4-2 Alteration of Drill Holes (MJTC-15)

Although the geology of the drill site was given as altered porphyries, the vertical hole drilled through the silicified-argillized zones of Emeşe Formation. These zones accompanied with quartz veinlets of various directions, continued downward, and the frequency of quartz veinlets increased in the subsurface. Limonitic altered zones due to oxidization were continued to 66.00m. Advanced argillization locally took place along fractures. The altered rocks of the hole microscopically have granular texture, and consist mainly of fine-grained quartz, mafic minerals and opaque minerals (pyrite); almost all mafic minerals have been altered into chlorite and epidote. Altered minerals distinguished by the X-ray diffraction method consist of kaoline and sericite.

4-3 Assay Results of Core

Mineralization containing molybdenum in excess of 100 ppm was detected in the silicified-argillized zones. In these zones, contents of copper, zinc, antimony and mercury are higher than in other mineralization zones, while contents of gold, silver and lead are low. Significant analytical results are as follows.

Sample No.	Au ppb	Ag ppm	Cu ppm	Pb ppm	Zn ppm	Sb ppm	Hg ppb	Mo ppm
1504	30	0.5	2400	40	720	57.0	6700	136
1506	<5	<0.2	170	19	230	27.0	1500	105
1510	<5	<0.2	160	25	260	22.0	1200	116
1515	<5	<0.2	32	2	38	3.6	1700	100
1535	<5	<0.2	36	8	38	5.6	4400	320
1536	<5	<0.2	54	9	36	13.0	5800	105
1538	<5	<0.2	675	18	230	100.0	3400	235
1539	<5	<0.2	62	5	48	14.8	8200	100
1545	<5	<0.2	44	59	620	7.6	6800	110
1546	<5	<0.2	36	52	500	7.6	3500	130

CHAPTER 5 DISCUSSION

A porphyry molybdenum-copper deposit associated with the intrusion of the Dikmen Granite and porphyries was discovered. The mineralization extends from the eastern side of the Dikmen Granite in a NE-SW direction to the Emeşe Formation in the Sığırirek Stream. The Dikmen Granite and porphyries which are distributed along the Sığırirek Stream and the upstream section of Domuzdamı occur in the same direction as the Dikmen Fault. Sericitization is intense in Dikmen Granite and porphyries near porphyry molybdenite mineralization zones.

The gold mineralization found in the silicified zones of NEN-SWS direction is partially observed in the northern part of Sığırirek Stream within the Emeşe Formation, and the silicified rocks are accompanied by quartz veinlets within the Dikmen Granite and porphyries. Auriferous localities are gradually increasing with progress in geochemical prospecting. Generally, kaoline is detected where gold mineralization is found.

The rocks are decoloured white at Sığırirek, and minor amounts of sulfide minerals such as molybdenite, chalcopyrite, sphalerite and pyrite occur associated with the quartz veinlets. Although invisible under the microscope, analysis of cores shows the existence of arsenic, antimony and mercury. Sericite and kaoline were identified by X-ray diffraction, indicating epithermal activity after the porphyry mineralization. The two mineralizations might be overlapping.

The porphyry mineralization extends to the lower horizons and this is expected to be a low-grade large-scale deposit. This deposit locally contains gold, silver and antimony.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6-1 Conclusions

Geophysical prospecting was carried out together with a detailed geological survey and geochemical prospecting. The detailed geological survey has clarified the distribution and conditions of gold occurrence, argillized zones and skarnization. The geochemical work has revealed two types of mineralization. By geophysical methods, the subsurface extent of mineralization from the outcrop downward was shown by delineating the low-resistivity zone and FE anomalies by IP.

A porphyry molybdenum-copper deposit associated with the intrusion of the Dikmen Granite and porphyry was discovered. The mineralization extends from the eastern side of the Dikmen Granite in a NW-SE direction to the Emeşe Formation in the Sığırirek Stream. The Emeşe Formation is altered, and minor amounts of sulfides such as molybdenite, chalcopyrite, wolframite, sphalerite and pyrite occur in the quartz veinlets. The analytical results show the existence of gold, arsenic, mercury and antimony. This shows that epithermal mineralization occurred after the porphyry molybdenum mineralization, and they now overlap spatially.

The porphyry molybdenum deposit mentioned above is expected to be a large-scale low-grade deposit as this type of mineralization is extensive at depth. It contains gold and antimony locally and may turn out to be a very important target.

6-2 Recommendations for Future Exploration

Geophysical prospecting was carried out along with detailed geological survey and geochemical prospecting. By geophysical methods, the subsurface extent of mineralization from the outcrop downward was shown by delineating the low-resistivity zone and FE anomalies by IP. In the third-phase survey, the mineralization zones corresponding to geophysical anomalies, was intersected by drill hole MJTC-15. Further drill survey should be conducted in the mineralized zone of the localities distributed in the Dikmen Granite and porphyry.

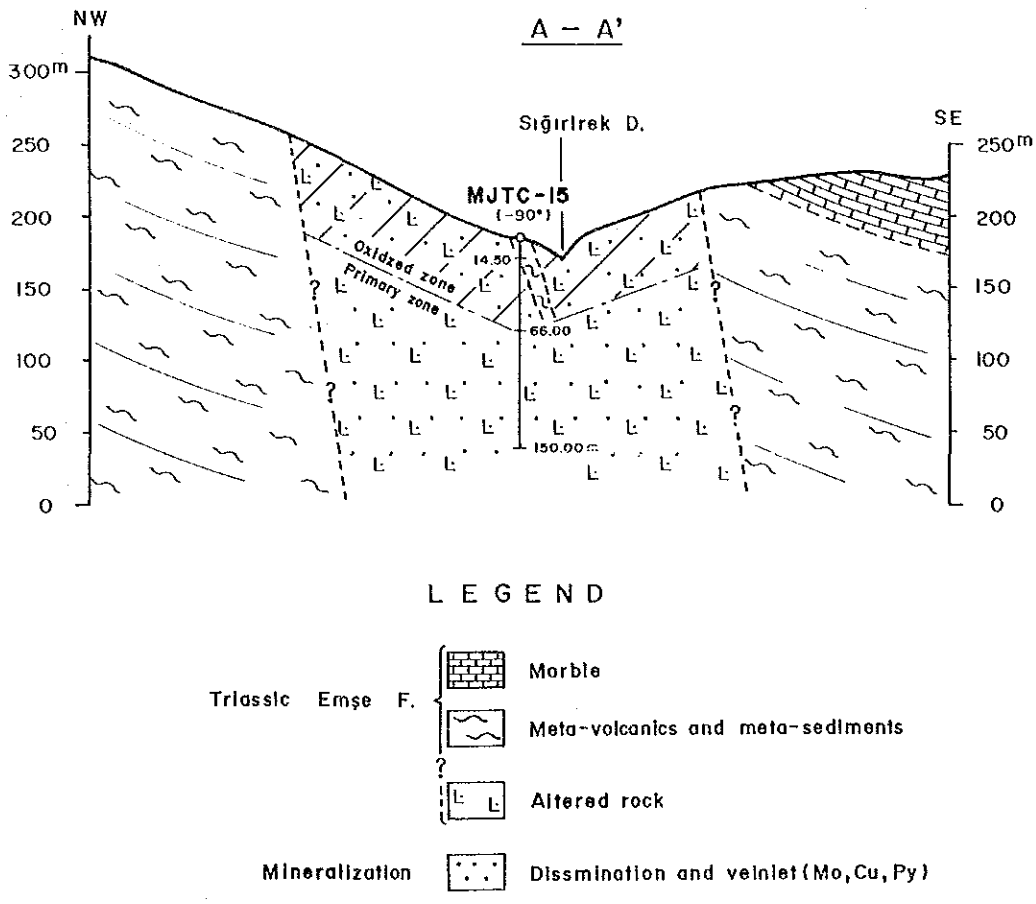


Figure 5- 2 Geologic Cross Section of Drill Hole (MJTC-15)

PART VI

CONCLUSIONS AND RECOMMENDATIONS

PART VI CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 1 CONCLUSIONS

During the third phase, geological and geochemical surveys were conducted in the Etili Area. Further trench survey was carried out in the Arlık Stream and Piren Hill Area, and drill survey in the Arlık Stream and Etili. Compiled maps of those areas are shown in Figures 1-12, 1-13 and 1-14, a list of geological and geochemical characteristics in Table 1-10. A summary of the four areas is as follows:

(1) Arlık Stream Area

Silicified and argillized zones occur in Şapçı Volcanics and part of Kirazlı Conglomerate. The Kocataş silicified zones occurring in Şapçı Volcanics were evident to 100m in MJTC-5, 6, 7 and 8, after which Kirazlı Conglomerate was intersected, but the Sartaş and Güvemalanı silicified zones continued for at least 150m in MJTC-3, 4, 9, 10, 11, 12, 13 and 14. Altered zones with limonite are predominant on the outcrops, but pyrites are not observed. Of the results of the drill survey, the following are significant: fine-grained pyrites are developed in the section underneath the surface; limonitic silicified zones with open spaces (caves) were found by drill hole MJTC-4 and 10; and the low-grade auriferous zones continued from near surface to bottom in holes MJTC-4, 13 and 14. Therefore, it is considered that the potential for gold deposits is high. Generally, auriferous mineralization in the silicified body did not extend further downward, and silicified veins were observed in the periphery of the silicified zones. Thus it is considered that their shapes are "jellyfish-like" in geologic section.

(2) Piren Hill Area

The geology consists of Şapçı Volcanics in this vicinity. The original rocks cannot be distinguished in the altered zones. The volcanic rocks become thicker with distance from the geologic basement. Altered zones with limonite and hematite are predominant on the outcrops, and pyrites are not observed because of oxidation.

Gold anomalies were detected in the silicified zones located in the southern part of the large alteration zone. The zones extend in an E-W direction in the vicinity of Piren Hill. The auriferous zones, which occur in limonitic clay such as those in fault zones, were detected by drill hole MJTC-2. As a result of the trench survey, gold-bearing zones on the surface were small-scale and the content of gold was low.

(3) Etili Area

Silicified and argillized zones occur in Şapçı Volcanics. The Halilağa silicified zones occurring in Şapçı Volcanics were evident as thin near the surface in MJTC-16 and 17, after which weakly altered andesites were intersected, but the Tepeköy silicified zones are inferred to continue for at least 150m because of large-scale silicified bodies. Altered zones with limonite are predominant on the outcrops, but pyrites are not observed.

Of the results of the drill survey, the following are significant: fine-grained pyrites are developed in the section underneath the surface, limonitic silicified-argillized zones were found by drill hole MJTC-16 and the low-grade auriferous zones continued from 2.80m to 16.65m in hole MJTC-16. Therefore, it is considered that the potential for gold deposits is low.

In Tepeköy alteration zones, auriferous mineralization in the silicified body extend further downward, and silicified veins are expected to be found in the central portion of the silicified zones. Thus it is considered that their shapes are "mushroom-like" in geologic section, as in the Kestane Mt. Area.

(4) Dikmen Area

Geophysical prospecting was carried out together with a detailed geological survey and geochemical prospecting. The detailed geological survey has clarified the distribution and conditions of gold occurrence, argillized zones and skarnization. The geochemical work has revealed two types of mineralization. By geophysical methods, the subsurface extent of mineralization from the outcrop downward was shown by delineating the low-resistivity zone and FE anomalies by IP.

A porphyry molybdenum-copper deposit associated with the intrusion of the Dikmen Granite and porphyry was discovered. The mineralization extends from the eastern side of the Dikmen Granite in a NW-SE direction to the Emeşe Formation in the Sığırirek Stream. The Emeşe Formation is altered, and minor amounts of sulfides such as molybdenite, chalcopyrite, wolframite, sphalerite and pyrite occur in the quartz veinlets. The analytical results show the existence of gold, arsenic, mercury and antimony. This shows that epithermal mineralization occurred after the porphyry molybdenum mineralization, and they now overlap spatially.

The porphyry molybdenum deposit mentioned above is expected to be a large-scale low-grade deposit as this type of mineralization is extensive at depth. It contains gold and antimony locally and may turn out to be a very important target.

The results of the third phase work summarized in (1)-(3) above, indicate the possibility of large-scale low-grade gold deposits in the alteration zone near the basement rocks. The porphyry molybdenum deposit mentioned in (4) also is expected to be a large-scale low-grade deposit as this type of mineralization is extensive at depth. It locally contains gold and antimony, and significant gold is expected to be found in the overlapping portion.

CHAPTER 2 RECOMMENDATIONS FOR FUTURE EXPLORATION

It is recommended that the following work be conducted in the promising areas delineated above (Figure 1-15). In the three localities of Zone B, epithermal gold mineralization is anticipated because of the gold showings of the alteration zones which were identified by geological and geochemical surveys. The hydrothermal gold mineralization is expected to extend both horizontally and vertically. Here, detailed geological survey clarified the distribution and extent of the alteration zone, and heavy mineral investigation in the vicinity located the position of the gold mineralization. On the basis of these findings, inclined drilling should be carried out in order to clarify the state of subsurface mineralization.

(1) Arlık Stream Area

The auriferous zones have been detected in Sartaş, Güvemalanı and İnkaya Hills; these localities belong to the concession of MTA. The drilling survey should be continued in these localities since auriferous zones were intersected by drill holes MJTC-4, 10, 13 and 14.

(2) Piren Hill Area

Gold anomalies were detected in the silicified zones located in the southern part of the large alteration zone which extends in an E-W direction in the vicinity of the Piren Tepe. The auriferous zone was detected by drill hole MJTC-2 in the Davulgılı silicified zones belonging to the concession of MTA. This zone was small and the content of gold was low on the surface. Further drilling survey should then be carried out in the southeastern part of the Piren silicified zones, which corresponds to west of Muratlar Village.

(3) Etili Area

The auriferous zones have been detected in Hamam Hill of southern Tepeköy Village. Although this locality does not belong to the concession of MTA, the drilling survey should be continued here because the auriferous zones were found through study of many rock samples.

(4) Dikmen Area

Geophysical prospecting was carried out along with detailed geological survey and geochemical prospecting. By geophysical methods, the subsurface extent of mineralization from the outcrop downward was shown by delineating the mineralization zones corresponding to geophysical anomalies, and was intersected by drill hole MJTC-15. Further drill survey should be conducted in the mineralized zone of the localities distributed in the Dikmen Granite and porphyry.

REFERENCES

Abe,I., Suzuki,H., Isogami,A. and Goto,T.(1986):Geology and Development of the Hishikari Mine, Mining Geology, Vol.36, pp.117-130 (in Japanese with English abstract).

Behçet Akyürex and Yılmaz Soysal(1980):Biga Yarımadası ve Güneyinin -1/100,000 Ölçekli Kompilasyonu, Report of MTA(unpublished).

Dey,A.and Morison,H.F.(1973) : Electromagnetic coupling in frequency and time domain induced polarization surveys over multilayered earth, Geophysics, Vol. 38, pp.380-405.

Ercan,T. and Türkecan,A.(1984) : Batı Anadolu-Ege Adaları-Yunanistan ve Bulgaristan'daki Plütonların Gözden Geçirilişi, Ketin Simpozyumu, pp.189-208.

ERSDAC(1988):ERSDAC-In Search of Mineral Wealth of the Mother Earth from Space-Earth Resources Satellite Analysis Center(ERSDAC), p.16.

Fujii,N., Tsukumura,K. and Julio,J.M.(1989):Mode of occurrence and genetic processes of the Iriki kaoline deposit, southern Kyushu. Bulletin of the Geological Survey of Japan, Vol.40(6), pp.299-322. (in Japanese)

Hayba,D.O., Bethke,P.M., Heald,P. and Foley,N.K.(1985):Geologic, Mineralogic, and Geochemical Characteristics of Volcanic-Hosted Epithermal Precious-Metal Deposits, Geology and Geochemistry of Epithermal Systems, Vol.2, pp.129-167.

Hallof,P.G.and Pelton,W.H.(1980):The removal of inductive coupling effects from spectral IP data,.SEG.50th Annual International Meeting in Houston

Hallof P.G. and Klein,J.D.(1982) : Electrical parameters of volcanogenic mineral deposits,.S.E.G.52nd Annual International Meeting.

Hedenquist,J.W.(1987) : Mineralization associated with volcanic-related hydrothermal systems in the Circum-Pacific Basin. In Transactions of the Fourth Circum-Pacific Conference on Energy and Mineral Resources.

Higgs,R.(1962):Kartaldag Gold Prospect, Çanakkale(memorandum).

Henley,R.W.(1985):The Geothermal Framework of Epithermal Deposits, Geology and Geochemistry of Epithermal Systems, Vol.2, pp.1-24.

Hohmann,G.W.(1973): Electromagnetic coupling between grounded wires at the surface of a two layered earth, Geophysics, Vol.38, pp.854-863.

Ishihara,S.(1977):The magnetite-series and ilmenite-series granitic rocks, Mining Geology,27, pp.293-305.

Ishihara,S.(1986):Gold Deposits of Philippines, Type and Model of Ore Genesis, Chishitsu News, No.384, pp.6-21 (in Japanese).

Izawa,E., Urashima,Y. and Okubo,Y.(1984):Age of mineralization of the Nansatsu type gold deposits, Kagoshima, Japan-K-Ar dating of alunite from Kasuga, Iwato and Akeshi-, Mining Geology, Vol.34, No.187, pp.343-351 (in Japanese)

Izawa,E.(1985) : Alteration Zone and Clay Mineral of Epithermal Gold-Silver Deposits, Discussion on Geothermal System, Special Issue, Gold-silver Ore of Japan, No.3, The Mining and Metallugical Institute of Japan, pp.133-154 (in Japanese).

Izawa,E.(1986) : Symposium on Mineral Deposit Modeling(Manila)-with special reference to models for hydrothermal gold deposits., Mining Geology, Vol.36, pp.237-241 (in Japanese).

Mason,B.(1966):Principle of Geochemistry(third edition), John Wiley & Sons, Inc. New York.

Matsushita,Y.(1987):Gold Deposit of Hot Spring Type and Geothermal System, Chishitsu News, No.390, pp.20-43 (in Japanese).

Maucher,A.(1960):Report on Gold Occurrence in Çanakkale(memorandum).

MMAJ(1986) : Gold Deposits of the World, Information Center of Metal Mining Agency of Japan, pp.65-109 (in Japanese).

MMAJ・ERSDAC(1986) : Report on Research and Development of Remote Sensing Technology for Natural Resources Satellite Data Analysis, Metal Mining Agency of Japan(MMAJ) and Earth Resources Satellite Analysis Center (ERSDAC), pp.76-94 (in Japanese).

Molly,E.W.(1958):Türkiye batısı altın mineralizasyonu(memorumdum).

MTA(1964):Iron Ore Deposits of Turkey, No.118.

MTA(1965):Barite and Fluorite Deposits of Turkey, No.126.

MTA(1965):Tungsten and Molybdenum Deposits of Turkey, No.128

MTA(1970):Arsenic, Mercury, Antimony and Gold Deposits of Turkey, No.129.

MTA(1970):TÜRKIYE METALOJENİSİ, 1:2,500,000 Ölçekli Türkiye Metalolenik Haritasının İzahı, No.144.

MTA(1972):Lead, Copper and Zinc Deposits of Turkey, No.133.

Nagasawa,K.(1981):Characteristic Clay Minerals occurring in Gold-silver Deposits, Mining Geology, Special Issue, No.10, pp.227-233(in Japanese).

Pelton,W.H.,Ward,.S.H., Hallof, P.G., Sill,W.R., and Nelson,P.H.(1978) : Mineral discrimination and removal of inductive coupling with Multifrequency IP, Geophysics, Vol.43, pp.598-609.

Shikazono,N.(1981) : The Chemical Compositions and These Factor of Control of Electrum occurring in Black Ore Deposits and Epithermal-type Vein Deposits, Mining Geology, Special Issue, No.10, pp.259-267 (in Japanese with English abstract).

Shoji,T(1986) : Relation with Gold-silver Vein Deposits and Adularia, Special Issue, Gold-silver Ore of Japan, No.3, The Mining and Metallugical Institute of Japan, pp.113-132.

Takeda,H. and Imamura,R.(1979) : Photogeological Interpretation for Construction Engineer, Kyouritsu Shuppan, p.72

Togashi,Y. and Nakamura,K.(1990):Gold deposits in the western United Ststes(4)-Mesquite and Picacho deposits, southeastern California. Chishitsu News, No.430, pp.49-59 (in Japanease).

Turhan,A.(1968):Çanakkale H17-C_1 nolu paftanın, Koru-Balcılar Köyleri civarının jeoloji etüdü(unpublished).

Urabe,T(1985):Gold Deposits in the state of Nevada, their type and model, Chishitsu News, No.373, pp.25-37 (in Japanese).

Urashima,Y., Saito, M. and Sato,H.(1981) : Iwato Gold Deposits, Special Issue of Mining Geology, No.10, pp.1-14 (in Japanese with English abstract).

Wakimoto,K., Tarumizu,K. and Tanaka,Y(1984) : Statistic Interpretation using Personal Computer, Kyouritsu Shuppan, pp.160-175 (in Japanese).

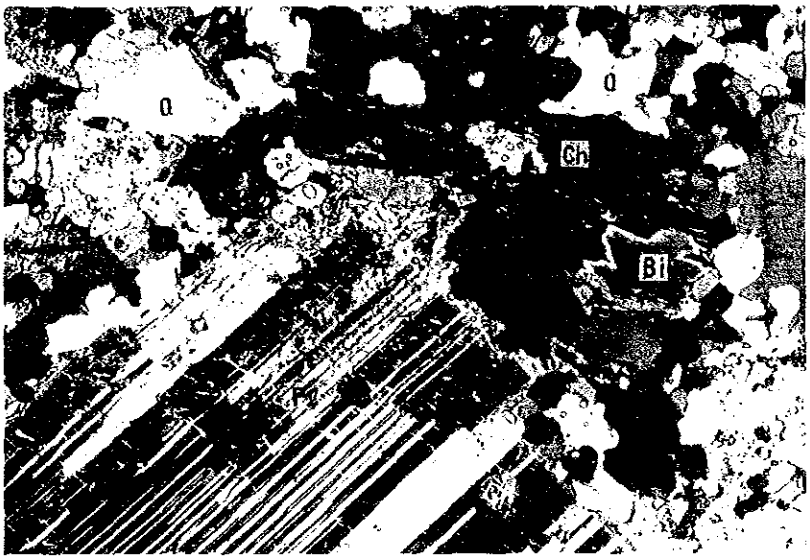
Sample No. S663

Locality:Ardıç Stream

Rock Name:Basaltic andesite
(Şapçı Volcanics)

Pℓ:plagioclase

0 0.1mm



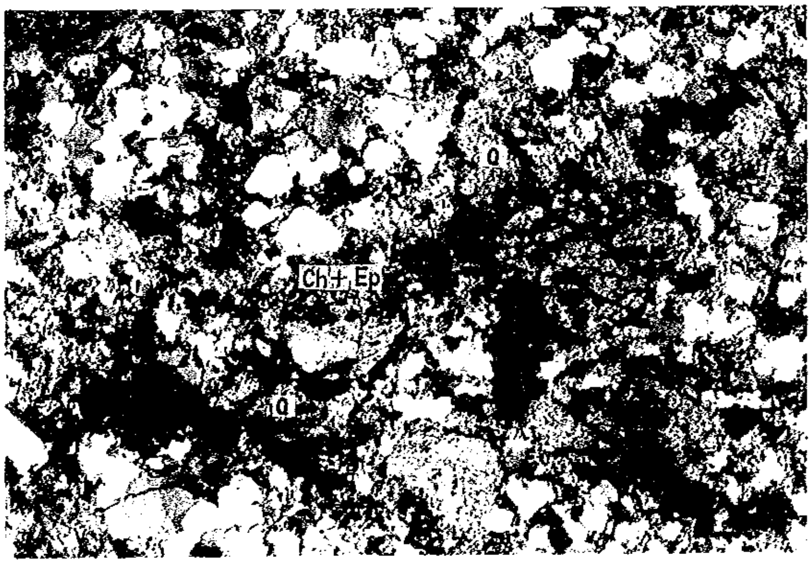
Sample No. S699

Locality:Darı Stream

Rock Name:Granodiorite
(Çavus Granite)

Pℓ:plagioclase
Q :quartz
Ch:chlorite
Bi:biotite

0 0.1mm



Sample No. D154

Locality:MJTC-15, 135.0m

Rock Name:Altered Rock
(Emeşe Formation)

Q :quartz
Ch+Ep :chlorite, epidote

0 0.1mm

Microscopic Photograph of Thin Section (Cross Nicols)

APPENDIX

Abbreviations of Appendix

v:very, s:strong, m:moderate, w:weak, arg:argillized, sil:silicified
limo:limonite, hem:hematite, r:rock, l:light, (f):float,
qz:qurtz, py:pyrite, diss:dissemination
N:north, S:south, E:east, W:west, T:Tepe(hill), D:Dere(stream)

◎:Abundant ○:Common △:Few ・:Rare

Name of Mineral

Mo:montmorillonite, Ch:chlorite, Se:sericite, Mu:muscovite, Ka:kaoline, Pr:pyrophyllite, Da:diaspore, Al:alunite, Gy:gypsum, An:anhydrite, Ca:calcite, Do:dolomite, Si:siderite, Cr:α-cristobalite, Qz:quartz, Pl:Plagioclase, Kf:potassium feldspar, Py:pyrite, Ma:magnetite, He:hematite, Ep:epidote, Ho:hornblende, Ha:halloysite, Ja:jarosite

Name of Formation

Tss:Sakar Dağı Formation
Mga:Gicikler Volcanics
Mşa:Şapçı Volcanics

Table 1 Description of X-ray Diffractive Samples

No.	Rock Name	Alteration	Formation	Location
C678	White-grey altered andesite	m arg, w sil	Gicikler V.	Bozcaören T.
C681	ditto	m arg	Şapçı V.	SW.Dikilitaş T.
C683	White altered tuff	s arg		SE.Dikilitaş T.
M673	White altered andesite	s arg		Tepetarla T.
M677	ditto	s arg		Mezarlık D.
M685	ditto	w arg		E.Küçükpaşa
M690	ditto	m arg		SW.Göle
M696	ditto	s arg		S.Hamam T.
M700	Grey altered andesite	m arg		NW.Halilaga
M701	White altered andesite	s arg		↓
M703	L.brown altered tuff	m arg		NE.Halilaga
P604	White altered andesite	s arg		SE.Seyret T.
P690	L.brown-white altered andesite	s arg		S.Seyret T.
P691	Purplish white altered tuff	m arg, w sil		SE.Seyret T.
P692	White altered andesite	m arg, s sil		↓
P693	ditto	s arg		E.Seyret T.
P694	Brown altered andesite	m arg, m sil		SE.Seyret T.
P695	White altered andesite	s arg, m sil		E.Seyret T.
P696	ditto	s arg, w sil		N.Seyret T.
P697	ditto	s arg, s sil		↓
P698	Yellow altered andesite	s arg		E.Seyret T.
P699	L.brown altered andesite	s arg, w sil		↓
P700	White altered andesite	s arg, m sil		↓
P701	L.brown altered andesite	m arg		↓
P702	White altered andesite	s arg		NW.Seyret T.
S611	White altered andesite	w arg		NE.Örle T.
S612	ditto	w arg		E.Örle T.
S665	White altered fine tuff	s arg	Gicikler V.	Coal mine
S677	White altered rock	s arg	Sakar D.F.	E.Kabak T.
S680	Yellow altered rock	w arg, m sil		N.Kabak T.
S681	Pink-grey altered rock	s arg		↓
T678	Yellow-white altered andesite	m arg	Şapçı V.	Germetaş T.
T679	L.brown-white altered andesite	m arg		↓
T680	L.green-white alterd andesite	m arg, w sil		W.Germetaş T.
T681	Yellow-white altered tuff	s arg		↓
T682	White altered tuff	s arg		N.Karaçam T.
T683	Yellow-white altered tuff	s arg		S.Karaçam T.
T684	White altered andesite	s arg		NE.Dışlık T.
T685	White altered tuff	s arg		↓
T686	White altered tuff	s arg		SW.Kocataş T.
T687	White altered tuff	s arg		↓
Y702	White altered andesite	s arg		S.Hamam T.
Y740	White-yellow altered andesite	s arg		S.Tepeköy
Y741	ditto	s arg		↓
Y742	ditto	s arg		W.Hamam T.
Y743	White altered andesite	m arg		Tepeköy
Y744	White-L.brown altered andesite	m arg		S.Tepeköy
Y745	White altered andesite	s arg		E.Hamam T.
Y746	White-yellow altered andesite	s arg		↓
Y747	L.red-white altered andesite	m arg		↓
Y748	L.grey altered andesite	m arg, s sil		Hamam T.
Y750	White altered andesite	s sil		↓
Y751	L.brown-white altered andesite	m arg		S.Hamam T.
Y752	Yellow-white altered tuff	m arg		SW.Hamam T.

Table 2 Results of X-ray Diffractive Analysis (1)

Sample No.	Altered Rock	Rock unit	Location	Clay Mineral Mo	Ch	Se	Mu	Ka	Pr	Ha	Sulfate m. Al	Gy	Ja	Carbonate Ca	Do	Si	Silicate Cr	Tr	Qz	Feld. Pl	Kf	Miscellaneous m. Py	Ma	He	Bi	Ho
C678	White altered andesite	Mga	Bozcaören Tepe	•?				•											◎		•					
C681	ditto	Mşa	Dikilitaş Tepe	•				△											◎	•	•					
C683	White altered tuff	Mşa	ditto					◎											◎		•					
M673	white altered andesite	Mşa	Tepetarla Tepe	•						•?							△	•	◎	○	•					
M677	ditto	Mşa	Mezarlık Dere														◎	△	◎							
M685	ditto	Mşa	Küçükpaşa	△													△	•		△	•	•				
M690	ditto	Mşa	Göle	•													○			◎	•					
M696	ditto	Mşa	Hamam Tepe					△									○		△	•						
M700	Grey altered andesite	Mşa	Halilaga							•							△	△		•	•			•	•	
M701	White altered andesite	Mşa	ditto	•						•								△			•					
M703	L. brown altered tuff	Mşa	ditto	△				•		△			•				△			•	•					
P604	White altered andesite	Mşa	Seyret Tepe					△			△						○									
P690	L. brown altered andesite	Mşa	ditto					△			△						○		○							
P691	Purplish altered tuff	Mşa	ditto								○						△		○							
P692	White altered andesite	Mşa	ditto					•			○								◎							
P693	ditto	Mşa	ditto	△													△			•	•					
P694	Brown altered andesite	Mşa	ditto					•			○								◎					•		
P695	White altered andesite	Mşa	ditto					•			○								◎							
P696	ditto	Mşa	ditto					•			○					•?			◎							
P697	ditto	Mşa	ditto					•			△								◎							
P698	Yellow altered andesite	Mşa	ditto	•							•		•						○							
P699	L. brown altered andesite	Mşa	ditto					△			•								◎							
P700	White altered andesite	Mşa	ditto					•			•								◎							
P701	L. brown altered andesite	Mşa	ditto	•				•?		•	•						△	△								
P702	White altered andesite	Mşa	ditto					△			△								△							

Abbreviations: ◎:Abundant ○:Common △:Few •:Rare, Mo:Montmorillonite, Ch:Chlorite, Se:Sericite, Mu:Muscovite, Ka:Kaoline, Pr:Pyrophyllite, Ha:Halloysite, Al:Alunite, Gy:Gypsum, Ja:Jarosite, Ca:Calcite, Do:dolomite, Si:Siderite, Cr:α-Cristobalite, Tr:Toridymite, Qz:Quartz, Pl:Plagioclase, Kf:Potassium feldspar, Py:Pyrite, Ma:Magnetite, He:Hematite, Bi;Biotite, Ho:Hornblende,

Mga:Gicikler Volcanics, Mşa:Şapçı Volcanics

Table 2 Results of X-ray Diffractive Analysis (2)

Sample No.	Altered Rock	Rock unit	Location	Clay Mineral							Sulfate m.			Carbonate			Silicate			Feld.		Miscellaneous m.				
				Mo	Ch	Se	Mu	Ka	Pr	Ha	Al	Gy	Ja	Ca	Do	Si	Cr	Tr	Qz	Pl	Kf	Py	Mo	He	Bi	Ho
S611	White altered andesite	Mşa	Örle Tepe	·		○											△			◎	·					
S612	ditto	Mşa	ditto	·									·				·	·		·	·					
S665	White altered fine tuff	Mga	Coal mine					·											◎	·	·					
S677	White altered rock	Tss	Kabak Tepe			○													◎	·	·					
S680	Yellow altered rock	Tss	ditto		○	○													◎	·						
S681	Pink-grey altered rock	Tss	ditto		△	○													◎	·						
T678	Yellow altered andesite	Mşa	Germetaş Tepe	·						·							△		·	·	·					
T679	L. brown altered andesite	Mşa	ditto	△				·									△			·	·					
T680	Yellow altered rock	Mşa	ditto	△				·												·	·					
T681	Pink-grey altered rock	Mşa	ditto	△	·	·														·	·					
T682	White altered tuff	Mşa	Karaçam Tepe	·													△			·	·					
T683	Yellow-white altered tuff	Mşa	ditto	△				·									△		·	·	△				·	
T684	White altered andesite	Mşa	Dısılık Tepe	△													○		·	·	·					
T685	White altered tuff	Mşa	ditto	△				·									△		·	·	·					
T686	ditto	Mşa	Kocataş Tepe			·													◎		·					
T687	ditto	Mşa	ditto			·													◎		·					
Y702	White altered andesite	Mşa	Hamam Tepe	·				·									○			·	·					
Y740	ditto	Mşa	Tepeköy	·		·														·						
Y741	ditto	Mşa	ditto	·																·						
Y742	ditto	Mşa	Hamam Tepe					○			·						○				·					
Y743	ditto	Mşa	Tepeköy	△													△				·					
Y744	ditto	Mşa	ditto	·				·?					△				·		·							
Y745	ditto	Mşa	Hamam Tepe					○			·						△		·							
Y746	ditto	Mşa	ditto					△			△						○									
Y747	Pink-grey altered andesite	Mşa	ditto					△									○									
Y748	L. grey altered andesite	Mşa	ditto					·			△								◎							
Y750	White altered andesite	Mşa	ditto					△			·						○									
Y751	L. brown altered andesite	Mşa	ditto					△			·						△							·		
Y752	Yellow altered tuff	Mşa	ditto	△								△					·		△	·	·					

Abbreviations: ◎:Abundant ○:Common △:Few ·:Rare, Mo:Montmorillonite, Ch:Chlorite, Mu:Muscovite, Se:Sericite, Ka:Kaoline, Pr:Pyrophyllite, Ha:Halloysite, Al:Alunite, Gy:Gypsum, Ja:Jarosite, Ca:Calcite, Do:Dolomite, Si:Siderite, Cr:α-Cristobalite, Tr:Toridymite, Qz:Quartz, Pl:Plagioclase, Kf:Potassium feldspar, Py:Pyrite, Ma:Magnetite, He:Hematite, Bi:Biotite, Ho:Hornblende.

Tss:Sakar Dağı Formation, Mga:Gicikler Volcanics, Mşa:Şapçı Volcanics

Table 2 Results of X-ray Diffractive Analysis (3)

Sample	Altered Rock	Drill Hole		Clay Mineral							Sulfate m.			Carbonate			Silicate		Feld.		Miscellaneous m.						
No.		No.	Depth	Mo	Ch	Se	Ha	Ka	Pr	Da	Al	Gy	Ja	Ca	Do	Si	Cr	Qz	Pl	Kf	Py	Mo	He	Gn	Mg	Bi	Ho
071	Limonitic s arg rock	MJTC-7	9.50			•		•										◎	•	•							
072	Grey s arg rock with py diss		47.00	△				•										△	•		•						
073	ditto		70.00	•				•										△	•	•	•						
074	Grey m arg fine tuff		96.50	△				•						△				△	•	•							
081	L. reddish-brown m arg andesite	MJTC-8	7.00			•												◎		•							
082	L. grey s arg rock		33.00			•												○	•	△	△						
083	L. grey m arg andesite with py diss		87.00			•		•										○	△	•	•						
084	ditto		113.00	•		•												○	△	•	•						
091	White-l. brown s~m sil rock	MJTC-9	10.00								△							◎									
092	L. grey m sil rock		32.00								○							◎					•				
093	L. grey sil fine tuff		76.00								△							◎									
094	L. grey m sil rock with py diss		151.00					•			△							◎			•						
101	L. grey s sil rock	MJTC-10	40.00					△										◎	•	•	•						
102	White brecciated sil rock		83.80					•										◎	•	•							
103	Grey vs massive sil rock with clay		125.00					△										△	•	•				•			
104	L. grey brecciated sil rock		147.00					•			○							◎			•						
111	Grey vs sil rock with alunite	MJTC-11	56.00						△	•						•?	•	△	•	•							
112	ditto		71.40						△		◎	•		•		•	•	○									
113	Grey m~s arg rock with py diss		114.00						○		△	•		•			•	△							•		
114	L. grey s arg rock with py diss		149.00						△										•	•	•						
121	Limonitic s arg rock	MJTC-12	16.00			•		•			△							◎									
122	Reddish grey s arg rock		59.50				•		•		△							○									
123	Grey-red massive vs sil rock		94.60				•		△		•							◎									
124	Grey s arg rock with py diss		148.00			•		△			•							○			•						
131	White clay	MJTC-13	40.80					•	△		•							◎									
132	L. grey fine-grained rock		44.70					•	△		•							◎									
133	Fractured s sil rock		90.30															◎									
134	L. grey fractured s arg rock		117.80					•	△					•?													
141	White grey s arg rock	MJTC-14	38.80					•	•		△							◎									
142	White s arg rock		57.30					•			△							◎									
143	L. green m arg andesite		61.20					•	△		△							○									
144	Fractured rock with limonite		119.80						○		•						△	○		•			•				

Abbreviations: ◎:Abundant ○:Common △:Few •:Rare, Mo:Montmorillonite, Ch:Chlorite, Se:Sericite, Ha:Halloysite, Ka:Kaoline, Pr:Pyrophyllite, Da:Diaspore, Al:Alunite, Gy:Gypsum, Ja:Jarosite, Ca:Calcite, Do:dolomite, Si:Siderite, Cr:α-Cristobalite, Qz:Quartz, Pl:Plagioclase, Kf:Potassium feldspar, Py:Pyrite, Mo:Molybdenite, He:Hematite, Gn:Galena, Mg:Magnesite, Bi:Biotite, Ho:Hornblende.

Table 2 Results of X-ray Diffractive Analysis(4)

Sample No.	Altered Rock	Drill Hole No.	Depth	Clay Mineral Mo	Ch	Se	Ha	Ka	Pr	Da	Sulfate m. Al	Gy	Ja	Carbonate Ca	Do	Si	Silicate Cr	Qz	Feld. Pl	Kf	Miscellaneous m. Py	Mo	He	Gn	Mg	Bi	Ho
151	Altered porphyry	MJTC-15	44.20			•		△						•				◎		•	•	•					
152	Grey fault clay		52.70			•		•										◎		•							
153	Silicified rock		68.50			•		•						△				◎	○	•							
154	L.grey m arg porphyry		119.80			•		△										◎	△	•							
155	ditto		131.80			•		△										◎	•	•	•						
156	ditto		149.00			•		•										◎	△	•							
161	Grey m arg andesite	MJTC-16	17.10	△				•						△			△		•	•	•					•	
162	L.grey-green w alt andesite		64.00	○		•											△		•	•	•					•	
163	ditto		83.50	△				△									△	•	•	•			•				
164	Dark green auto-brecciated andesite		150.00	△		•											•	•	△	•	•						
171	Grey m arg andesite	MJTC-17	13.80	△				•											○	•	•						
172	ditto		70.00					△									△		•	•	•					•?	
173	L.grey w arg andesite		96.50					•			•						◎	△			•						
174	Cream yellow s arg rock		142.50	•				•											○	•	•					△	

Abbreviations: ◎:Abundant ○:Common △:Few •:Rare. Mo:Montmorillonite, Ch:Chlorite, Se:Sericite, Ha:Halloysite, Ka:Kaoline, Pr:Pyrophyllite, Da:Diaspore, Al:Alunite, Gy:Gypsum, Ja:Jarosite, Ca:Calcite, Do:dolomite, Si:Siderite, Cr:α-Cristobalite, Qz:Quartz, Pl:Plagioclase, Kf:Potassium feldspar, Py:Pyrite, Mo:Molybdenite, He:Hematite, Gn:Galena, Mg:Magnesite, Bi:Biotite, Ho:Hornblende.

Table 3 Description of Rock Samples

Etili　　　　　　　　　　　　　　　　　　　　　　　　No.1

No.	Rock Name	Alteration	Formation	Location
C601	Massive rock with limonite	m sil	Şapçı V.	N.Germetaş T.
C602	ditto	vs sil		
C604	Altered rock with limonite	s arg, w sil		↓
C605	Massive rock with limonite	vs sil		NW.Germetaş T.
C606	Porous rock	s sil		↓
C608	Traverten			Germetaş T.
C609	Brecciated rock with limonite	s sil		
C610	Limonitic rock	s sil		
C611	Massive rock	vs sil		↓
C612	Massive rock (opal)	vs sil		SE.Germetaş T.
C613	Brecciated rock with limonite	s sil		E.Keçiağıl
C614	Porous rock	s sil		
C615	Massive rock	m sil		
C616	Brecciated rock with limonite	s sil		↓
C617	Brecciated rock	s sil		E.Davulga T.
C618	Massive rock (opal)	vs sil		
C619	ditto	vs sil		
C620	ditto	vs sil		
C621	Altered rock with limonite	s arg		
C622	Altered rock	s arg		↓
C623	Limonitic rock			NE.Davulga T.
C624	Massive rock (opal)	vs sil		↓
C625	Brecciated rock	s sil		NE.Halilağa
C626	Brecciated rock with limonite	s sil		
C627	ditto	s sil		
C628	ditto	s sil		
C629	ditto	s sil		
C630	ditto	s sil		
C631	ditto	s sil		↓
C632	Porous rock with limonite	s sil		Dikilitaş T.
C633	ditto	s sil		
C634	ditto	s sil		
C635	ditto	s sil		
C636	ditto	s sil		
C637	ditto	s sil		
C638	Altered rock with limonite	w arg, w sil		↓
C639	Massive rock	vs sil		NE.Halilağa
C641	Altered rock with qz veinlet	w arg		Dağ D.
C645	Porous rock with limonite	s sil		E.Taşkesilen T.
C647	Massive rock with limonite	s sil		NE.B.başı T.
C648	ditto	s sil		
C649	Massive rock	s sil		↓
C650	ditto	s sil		Oğlaktaşı T.
C651	Massive rock with limonite	s sil		S.Halilağa
C652	ditto	s sil		
C653	Massive rock	s sil		↓
C667	Massive rock with limonite	m sil		ENE.Dereoba
C668	ditto	s sil		
C669	Brecciated rock with limonite	s sil		
C670	ditto	s sil		↓

Table 3 Description of Rock Samples

No.2

No.	Rock Name	Alteration	Formation	Location
C671	Porous rock with limonite	s sil	Şapçı V.	ENE.Dereoba
C672	Brecciated rock with limonite	s sil		
C673	ditto	s sil		
C674	ditto	m sil		↓
M601	Grey rock with limomite	vs sil		NE.Bag T.
M602	ditto	vs sil		(Open pit 3m)
M603	ditto	vs sil		
M604	ditto	vs sil		
M605	ditto	vs sil		
M606	ditto	vs sil		
M607	ditto	vs sil		↓
M608	ditto	vs sil		Lower bench
M609	ditto	vs sil		
M610	ditto	vs sil		
M611	ditto	vs sil		
M612	ditto	vs sil		
M613	ditto	vs sil		
M614	ditto	vs sil		
M615	ditto	vs sil		↓
M616	ditto	vs sil		Upper bench
M617	Brecciated rock with limonite	vs sil		E.Bag T.
M618	ditto	vs sil		(drill road)
M619	Porous rock with limonite	vs sil		
M620	Limo-sil part in the arg zone	w arg, s sil		
M621	ditto	w arg, s sil		↓
M622	Fractured rock with limonite	w arg, s sil		Bag T.
M623	ditto	w arg, s sil		(pipe line)
M624	Limonitic rock (float)	w arg, s sil		
M625	Massive rock with limonite	w arg, s sil		
M626	ditto(float)	w arg, s sil		↓
M627	Porous limo part in the sil r	w arg, s sil		S.Bag T.
M628	ditto	w arg, s sil		(Open pit)
M629	ditto	w arg, s sil		
M630	ditto	w arg, s sil		↓
M631	Limonitic massive rock	vs sil		S.Bag T.
M632	ditto	vs sil		
M633	Grey massive rock with limo	vs sil		
M634	Limonitic rock	w arg, s sil		↓
M635	Massive rock with limonite	vs sil		NE.Bag T.
M636	ditto	vs sil		
M637	ditto	vs sil		
M638	ditto	vs sil		
M639	ditto	vs sil		
M640	ditto	vs sil		
M641	ditto	vs sil		
M642	ditto	vs sil		
M643	ditto	vs sil		
M644	Porous rock with limonite	w arg, s sil		
M645	ditto	w arg, s sil		↓
M646	Massive part in the arg rock	w arg, s sil		E.Bag T.

Table 3 Description of Rock Samples

No.3

No.	Rock Name	Alteration	Formation	Location
M647	Massive part in the arg rock	w arg, s sil	Şapçı V.	E.Bag T.
M648	Porous, brecciated rock	w arg, s sil		
M649	ditto	w arg, s sil		
M650	ditto	w arg, s sil		↓
M651	Brecciated rock with limo	w arg, s sil		NE.Bag T.
M652	ditto	w arg, s sil		
M653	ditto	w arg, s sil		
M654	ditto	w arg, s sil		
M655	Massive rock with limonite	w arg, s sil		↓
M659	Massive rock with limonite(f)	vs sil		S.Küçükpaşa
M660	Limonitic rock(f)	vs sil		↓
M665	Massive rock with limonite(f)	vs sil		NW.Halilaga
M666	ditto	vs sil		
M667	ditto	vs sil		
M668	Brecciated rock with limo(f)	s sil		
M669	Reddish soil	m arg		
M670	Massive rock with limonite(f)	vs sil		
M671	ditto	s sil		
M672	Brecciated rock with limonite	s sil		
M674	Massive rock with limonite(f)	vs sil		
M675	Brecciated rock with limo(f)	vs sil		
M676	Reddish limonitic rock(f)	w arg, s sil		
M678	Brecciated rock with limo(f)	vs sil		↓
M679	ditto	vs sil		NW.Halilaga
M680	Brecciated rock with limo(f)	w arg, m sil		W.Sakar Dagı
M687	Reddish limonitic rock	w arg, m sil		SW.Küçükpaşa
M688	Massive rock with limonite(f)	vs sil		N.Çardak T.
M689	Limonitic porous rock(f)	vs sil		Kocasık T.
P601	Grey massive～porous rock	s sil		S.Seyret T.
P602	L.grey porous rock with limo	s sil		
P603	ditto	s sil		
P605	L.grey massive～porous rock	s sil		
P606	Massive brecciated rock	s sil		↓
P607	Porous rock with limonite	m sil		Seyret T.
P608	ditto	s sil		
P609	ditto	s sil		
P610	Porous～massive rock	s sil		
P611	Massive～porous rock	s sil		
P612	ditto	s sil		
P613	ditto	s sil		
P614	Altered rock with limonite	s arg, w sil		
P615	Grey massive～porous rock	s sil		
P616	Massive and crushed rock	s sil		
P617	Porous rock	w arg, s sil		
P618	Altered rock with limonite	s arg		
P619	ditto	s arg, w sil		
P620	ditto	s arg, w sil		
P621	Grey massive rock with limonit	s sil		
P622	Grey massive rock	s sil		
P623	Altered rock with limonite	s arg	↓	↓

Table 3 Description of Rock Samples

No.4

No.	Rock Name	Alteration	Formation	Location
P624	Altered rock with limonite	s arg,	Şapçı V.	Seyret T.
P625	Brecciated rock with limonite	s sil		
P626	Grey massive rock	w arg, s sil		
P627	Massive~porous rock	s sil		↓
P628	Brecciated rock with limonite	s sil		E.Seyret T.
P629	Brecciated massive rock	s sil		
P630	ditto	s sil		
P631	Porous limonitic rock	m sil		
P632	Massive/brecciated rock	s sil		
P633	Massive rock with limonite	s sil		↓
P634	Massive~porous rock	s sil		Seyret T.
P635	ditto	ditto		
P636	ditto	s arg, w sil		↓
P637	Altered rock	s arg		E.Seyret T.
P638	ditto	s arg		
P639	Altered rock with limonite	s arg		
P640	ditto	s arg		
P641	Yellow altered rock	s arg		
P642	Massive~porous rock	s sil		
P643	ditto	s sil		
P644	Grey massive rock	s sil		
P645	L.grey massive rock	s sil		↓
P646	Altered rock	s arg		Seyret T.
P647	Limonitic brecciated rock	s arg, m sil		
P648	Limonitic altered rock	s arg, w sil		
P649	ditto	s arg, w sil		↓
P650	ditto	s arg, m sil		E.Seyret T.
P651	Limonitic massive~porous rock	s sil		Halilaga
P652	ditto	s sil		
P653	Massive~porous rock	s sil		
P654	Brecciated porous rock	s sil		
P655	Limonitic porous rock	s sil		
P656	ditto	s sil		
P657	ditto	s sil		
P658	Limonitic massive~porous rock	s sil		
P659	Limonitic porous rock	s sil		
P660	L.grey brecciated rock	s sil		
P661	Limonitic brecciated rock	s sil		
P662	Massive~porous rock	s sil		
P663	Limonitic porous rock	s sil		
P664	Argillized rock	s arg, w sil		
P665	Limonitic porous rock	s sil		
P666	Altered rock	s sil		
P667	Limonitic brecciated rock	s sil		
P668	ditto	s sil		
P669	ditto	s sil		
P670	ditto	s sil		
P671	Altered rock	s arg, w sil		↓
P673	Altered rock with limo (opal)	s arg, w sil		Keçiağılı
P674	L.grey massive rock	s sil		↓

Table 3 Description of Rock Samples

No.5

No.	Rock Name	Alteration	Formation	Location
P675	L.grey massive rock	s sil	Şapçı V.	Keçiagılı
P676	ditto	s sil		
P677	L.brown rock with limonite	s sil		↓
P679	Altered rock with limonite	s arg, w sil		Halilaga
P680	ditto	s arg, w sil		
P681	ditto	s arg, w sil		↓
P682	Massive~porous rock with limo	s sil		Seyret T.
P683	Massive/brecciated rock	s sil		
P684	Altered rock with limonite	s arg, m sil		
P685	Massive~porous rock	s sil		
P686	Massive/brecciated rock,limo	s sil		
P687	ditto	s sil		↓
S601	Silicified rock with limonite	m sil, w arg		Örle T.
S602	ditto	w sil, w arg		
S603	ditto	w sil, w arg		
S605	ditto	w sil, w arg		
S606	ditto(soil)	w sil, w arg		
S607	Massive rock with limonite	vs sil		
S608	ditto	s sil		
S609	ditto	s sil		
S610	ditto	s sil		
S614	Brecciated rock with limonite	s sil		
S615	ditto	s sil		
S616	ditto	s sil		
S620	Brecciated rock with limonite	vs sil		Dereoba Çayı
S621	ditto	vs sil		↓
S622	Brecciated rock with limonite	m sil		Kocataş T.
S623	ditto	m sil		
S624	ditto	s sil		
S625	ditto	m sil		
S626	ditto	s sil		
S627	ditto	s sil		
S628	ditto	s sil		
S629	ditto	vs sil		
S630	ditto	vs sil		
S631	ditto	vs sil		
S632	ditto	vs sil		
S633	ditto	vs sil		
S634	Mass/Porous rock with limonite	vs sil		
S635	ditto	vs sil		
S636	ditto	vs sil		
S637	ditto	vs sil		
S638	Fractured rock with limonite	vs sil		
S639	Massive~porous rock with limo	vs sil		
S640	Brecciated rock with limonite	vs sil		
S641	Massive~porous rock with limo	vs sil		
S642	Brecciated rock with limonite	vs sil		↓
S643	ditto	vs sil		Taşkesilen T.
S644	ditto	vs sil		
S645	ditto	vs sil		↓

Table 3 Description of Rock Samples

No.6

No.	Rock Name	Alteration	Formation	Location
S646	Brecciated rock with limonite	m sil	Şapçı V.	Taşkesilen T.
S647	Massive～porous rock with limo	vs sil	↓	↓
S648	ditto	vs sil		
S649	ditto	vs sil		
S650	ditto	vs sil		↓
S651	Massive～porous rock with limo	vs sil		Taşkesilen T.
S652	ditto	vs sil		
S653	ditto	vs sil		
S654	ditto	vs sil		
S655	ditto	vs sil		
S656	ditto	vs sil		
S657	ditto	vs sil		
S658	ditto	vs sil		
S659	dittO	vs sil		
S660	ditto	vs sil		
S661	ditto	vs sil		
S662	ditto	vs sil		
S667	Limonitic rock	s sil	Giciker V.	
S679	Silicified rock with epidote	vs sil, w arg	Sakar Dağı	
S680	ditto, py diss (sulfur)	vs sil		
S681	ditto, py diss (alunite)	vs sil		
S691	Sedimentary rock with py diss	vs sil epi		
S705	Malachaite with garnet	skarn		
S707	Gossan with magnetite, quartz	skarn		
S708	Mass～porous rock with limo	vs sil	Şapçı V.	
S709	ditto	vs sil		
S710	ditto	vs sil		
S711	ditto	vs sil		
S712	ditto	vs sil		
S713	ditto	vs sil		
S714	ditto	vs sil		
S715	ditto	vs sil		
S716	ditto	vs sil		
S717	ditto	vs sil		
S718	Silicified andesite(breccia)	w sil		
S719	Silicified rock	s sil		↓
T601	Argilic rock with hematite	s arg, m sil		SW.Tepeköy
T602	Brec andesite with limo & hem	w arg, m sil		SW.Çoban T.
T603	ditto	w arg, m sil		↓
T604	Fractured, brecciated rock	s arg		Çoban T.
T605	Limonitic rock	s arg, w sil		E.Çoban T.
T606	Limonitic rock	s arg		↓
T607	Brecciated rock with limonite	vs sil		Germetaş T.
T608	Limonitic massive rock	vs sil		
T609	Massive rock with limonite	vs sil		
T610	ditto	vs sil		
T611	Limonitic massive rock	vs sil		
T612	Limonitic arg rock	s arg, w sil		↓
T613	Brec andesite with limo & hem	w arg, w sil		E.Karaçam T.
T614	Massive rock with limonite	vs sil	↓	N.Karaçam T.

Table 3 Description of Rock Samples

No.7

No.	Rock Name	Alteration	Formation	Location
T615	Massive rock	vs sil	Şapçı V.	Karaçam T.
T616	Massive rock with limonite	vs sil	│	N.Dışlık T.
T617	Arg rock	vs arg	│	↓
T618	Massive rock with limonite	vs sil	│	N.Karaçam T.
T619	Limonitic rock	s arg	│	↓
T620	Arg rock with limonite	s arg, w sil	│	Dışlık T.
T621	Opal		│	↓
T622	ditto		│	SE.Karaçam T.
T623	Massive rock	vs sil	│	│
T624	ditto	vs sil	│	│
T625	ditto	vs sil	│	↓
T626	ditto	vs sil	│	E.Karaçam T.
T627	Arg rock	vs arg	│	│
T628	Massive rock	vs sil	│	↓
T629	ditto	vs sil	│	Kocataş T.
T630	ditto	vs sil	│	│
T631	Banded massive rock with limo	vs sil	│	│
T632	Massive rock with qz veinlets	vs sil	│	│
T633	Massive rock	vs sil	│	│
T634	Brecciated rock with limonite	s sil	│	│
T635	Limonitic brecciated rock	s sil	│	│
T636	Limonitic rock	vs sil	│	│
T637	ditto	vs sil	│	│
T638	Massive rock	vs sil	│	│
T639	ditto	vs sil	│	│
T640	Grey limonitic massive rock	vs sil	│	│
T641	Massive rock	vs sil	│	│
T642	Limonitic rock	vs sil	│	│
T643	Massive rock	vs sil	│	│
T644	Fractured & brecciated rock	vs sil	│	│
T645	Massive rock	vs sil	│	│
T646	Limonitic brecciated rock	vs sil	│	│
T647	Massive rock	vs sil	│	│
T648	Limonitic silicified rock	vs sil	│	│
T649	Limonitic brecciated rock	vs sil	│	│
T650	Limonitic silicified rock	vs sil	│	│
T651	Limonitic massive rock	vs sil	│	│
T652	Fractured, silicified rock	vs sil	│	│
T653	Massive silicified rock	vs sil	│	│
T654	Brecciated silicified rock	vs sil	│	│
T655	Brecciated limonitic rock	vs sil	│	↓
T656	Altered rock	s arg	Sakar Dagı	SW B.başı T.
T657	Hornfels with py-limo	s sil	│	Kurtalanı
T658	Hornfels	m arg, m sil	│	│
T659	Hornfels	s arg, m sil	│	↓
T660	Hornfels	s sil	│	Sivri T.
T661	Skarn with py-limo		│	↓
T662	Skarn with malachite-azraite		│	B.başı T.
T663	Silicified rock with qz vein	vs sil	Şapçı V.	Örenpiren T.
T664	Silicified rock	w arg,vs sil	│	↓

Table 3 Description of Rock Samples

No.8

No.	Rock Name	Alteration	Formation	Location
T665	Silicified andesite with limo	m arg,m sil	Şapçı V.	Örenpiren T.
T666	Altered rock	vs arg		B.başı T.
T667	Massive rock with limo	vs sil		Germetaş T.
T668	ditto	vs sil		↓
T669	ditto	vs sil		N.Karaçam T
T670	ditto	vs sil		
T671	ditto	vs sil		↓
T672	ditto	w arg, s sil		Karaçam T.
Y601	Fractured, brecciated rock	vs sil		Hamam T.
Y602	Limonitic brecciated rock	vs sil		
Y603	ditto	vs sil		
Y604	ditto	vs sil		
Y605	Brecciated silicified rock	vs sil		
Y606	Brecciated silicified rock	vs sil		
Y607	Limonitic brecciated rock	vs sil		
Y608	Limonitic brecciated rock	vs sil		
Y609	Limonitic porous rock	vs sil		
Y610	Limonitic brecciated rock	vs sil		
Y611	ditto	vs sil		
Y612	ditto	vs sil		
Y613	ditto	vs sil		↓
Y614	ditto	vs sil		Karaılıca
Y615	ditto	vs sil		
Y616	Brecciated rock with pyrite	vs sil		
Y617	Altered andesite	m arg		
Y618	ditto	m arg, w sil		
Y619	Grey sil rock with pyrite	vs sil		↓
Y620	Limonitic brecciated rock	vs sil		Hamam T.
Y621	ditto	vs sil		
Y622	Brecciated rock with pyrite	vs sil		
Y623	Altered andesite	m arg, w sil		
Y624	Limonitic brecciated rock	vs sil		
Y625	Brecciated rock	w arg, s sil		
Y626	ditto	w arg, s sil		
Y627	ditto	w arg, s sil		
Y628	ditto	w arg, s sil		
Y629	ditto	w arg, s sil		
Y630	Grey massive rock	vs sil		
Y631	ditto	vs sil		
Y632	ditto	vs sil		
Y633	ditto	vs sil		
Y634	ditto	vs sil		
Y635	ditto	vs sil		
Y636	ditto	vs sil		
Y637	Grey fractured sil rock	vs sil		
Y638	ditto	vs sil		
Y639	ditto	vs sil		
Y640	ditto	vs sil		
Y641	ditto	vs sil		
Y642	Grey～blue massive rock	vs sil		↓

Table 3 Description of Rock Samples

No.9

No.	Rock Name	Alteration	Formation	Location
Y643	Limonitic arg rock	s arg, m sil	Şapçı V.	Hamam T.
Y644	Grey～blue massive rock	vs sil		
Y645	Massive rock	vs sil		
Y646	ditto	vs si		
Y647	ditto	vs sil		
Y648	ditto	vs sil		
Y649	Grey massive rock	vs sil		
Y650	ditto	vs sil		↓
Y651	Grey massive rock	vs sil		Hamam T.
Y652	ditto	vs sil		
Y653	ditto	vs sil		
Y654	Altered andesite	s arg		
Y655	Porous rock with limonite	s sil		
Y656	Altered rock with limonite	s arg		↓
Y657	L.grey massive rock	vs sil		S.Karaılıca
Y658	Brecciated massive rock	vs sil		
Y659	ditto	vs sil		
Y660	Massive rock	vs sil		
Y661	Fractured,massive rock with py	vs sil		
Y662	ditto	vs sil		↓
Y663	Porous rock with limonite	vs sil		Hamam T.
Y664	ditto	vs sil		
Y665	Fractured rock with limonite	vs sil		
Y666	Brecciated rock with limonite	vs sil		
Y667	Brecciated rock with pyrite	vs sil		
Y668	Brec./porous rock with limo	vs sil		
Y669	Altered rock with limonite	m arg		
Y670	Brecciated rock	vs sil		
Y671	Brecciated rock with limonite	vs sil		
Y672	Porous rock with limonite	vs sil		
Y673	ditto	vs sil		
Y674	L.grey massive rock	vs sil		
Y675	ditto	vs sil		
Y676	Brecciated rock with pyrite	vs sil		
Y677	ditto	vs sil		
Y678	L.grey massive rock	vs sil		
Y679	ditto	vs sil		
Y680	Porous rock with limonite	vs sil		
Y681	L.grey massive rock	vs sil		
Y682	Brecciated rock with limonite	vs sil		
Y683	L.grey massive rock	vs sil		
Y684	L.grey brecciated rock	vs sil		
Y685	L.grey massive rock	vs sil		
Y686	Brecciated rock with limonite	vs sil		
Y687	Porous rock with limonite	vs sil		
Y688	L.grey massive rock	vs sil		
Y689	Grey massive rock with pyrite	vs sil		
Y690	L.grey massive rock	vs sil		
Y691	Porous rock with limonite	vs sil		
Y692	Altered rock	m arg		↓

Table 3 Description of Rock Samples

No.10

No.	Rock Name	Alteration	Formation	Location
Y696	Altered rock with limonite	s arg, m sil	Şapçı V.	Hamam T.
Y732	Brecciated rock with limonite	vs sil	‖	↓
Y733	ditto	vs sil	‖	↓
Y734	Brec./porous rock with limo	vs sil	‖	↓
Y735	Brecciated rock with limonite	vs sil	‖	↓
Y736	L.grey massive/brecciated rock	vs sil	‖	↓
Y737	Banded rock with limonite	vs sil	‖	↓
Y738	Grey brecciated rock	vs sil	‖	↓