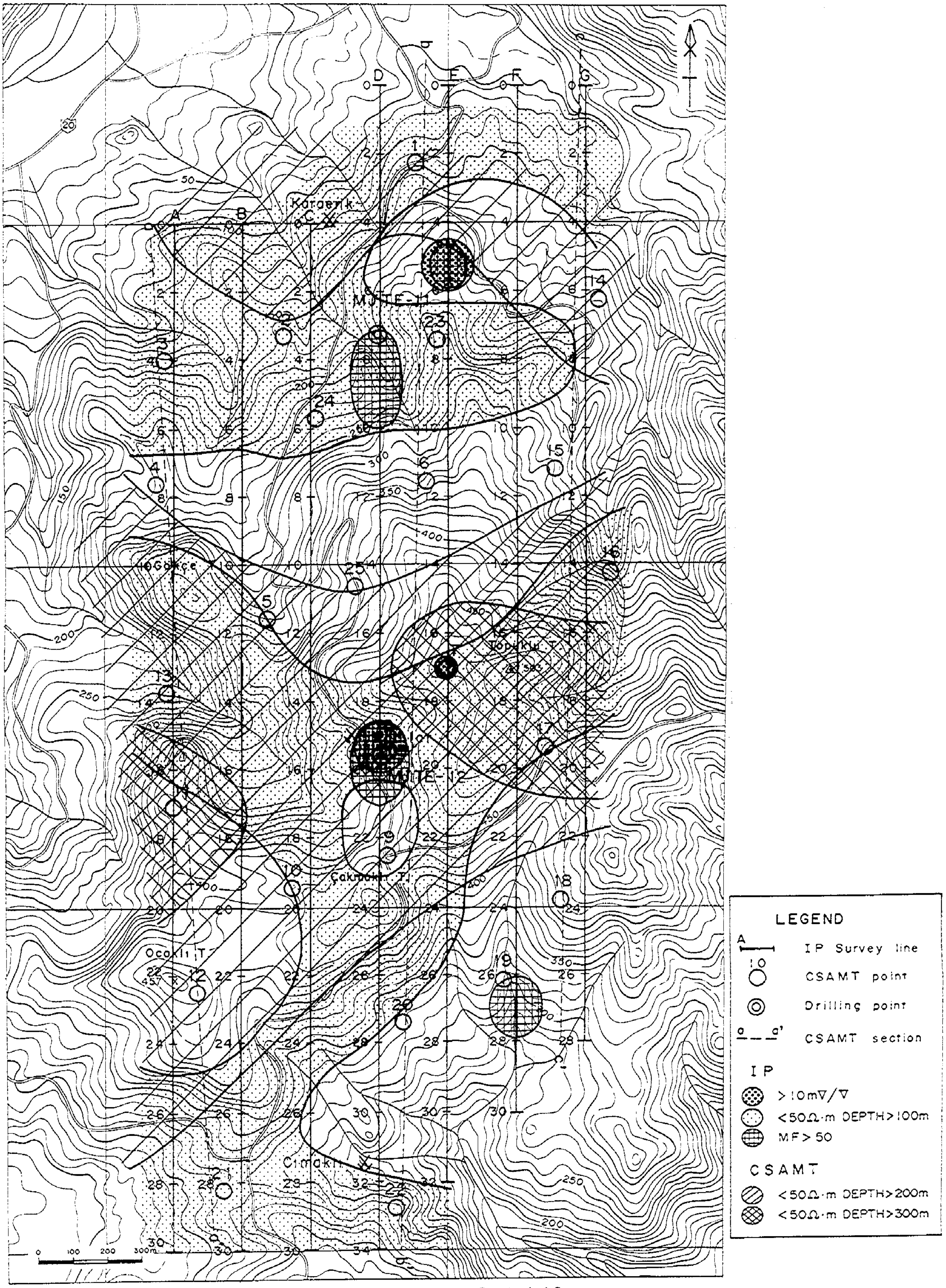

Fig.II-1-31 Summarized Map Geophysical Survey

Chapter 2 Drilling Survey

2-1 Survey Method

1. Outline

Fig.II-2-1 shows the location of this year's drilling survey.

MTA was in charge of drilling operation which was the main work of survey and MTA's equipment and materials except for consumption goods including bits and reaming shells were used.

Collected cores were summarized in a 1/200 scale geological columnar section. All cores were photographed and mineralization parts were macro-photographed.

While observing cores, geological survey around the drilling area was also conducted to utilize it for comparison with drill hole geology and a general analysis. The mineralization parts of the collected cores were chemically analyzed and thin and polished sections of representative parts also collected for the microscopic observation. In addition, X-ray diffraction tests were conducted to clarify alteration. Samples for measurment of IP and resistivity were collected.

2. Drilling Method and Equipment

Drilling was conducted by a wire line method. Casings were inserted according to the geological condition. The survey was proceeded to that concentration of drilling mud was adjusted to protect the hole wall.

Table II-2-1 and Table II-2-2 are lists of equipment and consumption goods which were mainly used for the survey. Table II-2-3 shows how a diamond bit and reaming shell used. As drilling equipment, two sets of Acker owned by MTA were used all the time. Major consumption goods except for bentonite were provided by the Japanese survey team.

3. Working Conditions

Access road construction, arrangement and removal were carried out on one shift/day and drilling work was in three shifts of eight hours/day as a principle. Personnel for one drilling shift consisted of one to two Turkish engineers and five workers. Japanese engineer worked mainly as technical instructors. The base of survey was laid in Espiye, and commuted to the drilling site by car.

4. Transportation of Equipment/Materials and Construction of Access Roads

Equipment and materials used for the drilling survey were delivered from Ankara and partly from Trabzon by several trucks to the drilling bases. Bulldozers for the access road construction were also delivered from Ankara.

Within the survey area, there were unpaved roads which connected Espiye with each village respectively, however when it rained hard, car could not pass ;consequently, the roads had to be mended frequently by bulldozer. When existing roads were far from the drilling site, new roads were constructed.

5. Demobillization

After the survey, MTA's equipment were transported to Ankara, partly to Trabzon. Drilling cores were stored in a dome tent in a stockyard of MTA Black Sea Branch Office.

6. Drilling Process Water

Usually, the water from stream was used for drilling process water, which was pumped up to collect in a tank pit at the drilling site. When the water from stream was difficult to obtain, water for living (natural spring water) was sent by pipes or it was transported by two tank lorries.

7. Progress of Drilling

Fig.II-1-2 and Fig.II-2-2 show the drilling sites. The drilling summary and itinerary are shown in Table II-2-4 through Table II-2-8.

(1) MJTE-9

The drilling period was June 29 through July 20.

From the surface to the depth of stable ground, drilling by HW casing shoe was conducted. After recovering machine and pump troubles, the HW casing was set up to the depth of 15.00m. then, drilling was carried out up to the depth of 252.1m by the NQ wire line method. NW casing was set up to the depth of 51.40m to protect weathered and fractured hole.

(2) MJTE-10

Drilling period was June 29 through July 18.

From the surface to the depth of 12.20m, drilling by HW casing shoe was conducted. Then, drilling was carried out up to the depth of 252.1m by the NQ wire line method. NW casing was inserted to the depth of 48.40m to protect the unstable hole.

(3) MJTE-11

Drilling period was August 8 through September 8.

Since the argillic alteration has been continued from surface, drilling by HW casing shoe was conducted up to the depth of 18.00m and HW casing was set up to the same depth. Then drilling was carried out up to the depth of 128.9m by the HQ wire line method and NW casing was set up to the same depth to protect the unstable part. Drilling of NQ wire line method has been conducted to the depth of 355.65m. BW casing was set up to the depth of 355.65m due to change of drilling depth (50m increase). Then, drilling was carried out up to the depth of 407.05m by the BQ wire line method. Although there were machine troubles, they were mended and drilling was completed up to the scheduled depth.

(4) **MJTE-12**

Drilling period was August 10 through September 6.

Since the argillic alteration has been continued from surface, drilling by HW casing shoe was conducted up to the depth of 30.00m and HW casing was set up to the same depth. Drilling of HQ wire line method has been conducted to the depth of 160.6m. Then drilling was carried out up to the depth of 350.30m by the NQ wire line method. NW casing was set up to the depth of 232.0m to protect the unstable part (223~232m). Although there were machine troubles, they were mended in a few days and drilling was completed up to the scheduled depth.

2-2 Results of the Survey

1. Geology, Mineralization and Alteration

Survey results will be described below by each hole. Fig.II-2-3~ II-2-6(appendix) show the geological columnar section and Fig.II-2-7 through II-2-8 show geological sections of drilling. Results of chemical analysis (of ores), X-ray diffraction test, microscopic observation of thin sections and polished ore sections are shown in Tables II-2-9 through II-2-12 respectively.

(1) **MJTE-9**

0 - 29.0m : Surface soil and talus deposit with fragments of weathered dacite and soil.

Dacite fragments show white alteration.

29.0-113.8m : Gray to reddish brown hematite dacite.

This hematite dacite contains small amount of plagioclase, and cores are mostly fractured by jointing. Thin calcite veinlets are observed at any level, and phenocrysts of plagioclase are mostly replaced by calcite. There is no mineralization. The boundary between this part and lower unit forms brecciated bed of reddish brown.

113.8-118.3m : Dacitic tuff(or lava) of Kızılkaya Formation.

It is rich in green glass (pumice) patch and coarse crystals of plagioclase. Small amount of chlorite, sericite and calcite have been detected by XD (X-Ray diffraction).

118.3-123.0m : Porphyritic dacite intrusive.

It shows reddish brown in color and contains phenocrysts of plagioclase ,small amount of quartz. Weak alteration such as calcite veinlets, calcitization of plagioclase has been observed.

123.0-138.0m : Dacite lava (tuff) of Kızılkaya Formation.

Most part shows autobrecciate lava ~ breccia (tuffaceous) accompanied by fine to coarse tuffaceous part in 124m and 150.7-151.3m depth.

138.0-158.5m : Dacitic tuff of Kızılkaya Formation.

Breccia part of this unit is rich in essential green fragments and plagioclase are commonly observed. Small amount of mineralized fragments are present. Mineralized part of pyrite films has been observed in 138-139m depth, and the results of chemical analysis of this zone are as follows,

Au 0.18ppm, Ag 0.89ppm, Fe 1.69%, S 1.61%

158.5-208.3m : Porphyritic dacite intrusive (same as above).

The contact planes in upper and lower unit show 50-70°. Base of this unit forms breccia part. Microscopically, it is composed with euhedral plagioclase, partly euhedral quartz, Fe mineral and relic of mafic mineral (pyroxene?) which is replaced by clay minerals. Penocrysts of plagioclase are mostly replaced by dusty clay minerals (sericite is detected by XD). As a whole, alteration is weak and there is no visible mineralization in this unit.

208.3-223.5m : Dacitic tuff (or lava) of Kızılkaya Formation.

It shows grayish green in color and partly laminated, containing essential elongated fragment, plagioclase and small amount of dacite and altered fragments. Porphyritic dacite intruded in 214.1-215.0m depth.

223.5-252.1m : Dacitic tuff and tuff breccia of Kızılkaya Formation.

Dacitic tuff has been observed in 228-229m, 237-239m, 245.6~247.5m depth, shows green ~ deep green in color with abundant volcanic glass, small amount of plagioclase, quartz and Fe mineral. Volcanic glass and plagioclase are mostly replaced by sericite, chlorite and calcite. Dacitic tuff breccia contains considerable amount of fragments of accessory dacite (3-5cm) amygdaloidal dacite. Most amygdals are filled with pyrite.

A few veins ~ network of Cu-Pb-Zn have been observed in 225-228m, 247-249m depth. Maximum value of analyzed elements of 4 samples from this zone are as follows,

Au 0.14ppm, Ag 8.64ppm, Cu 4.16%, Pb 2.96%, Zn 4.66%, Fe 9.57%, S 10.80%

Pyrite, chalcopyrite, sphalerite and galena are identified microscopically from veins in 227.6m and 248.8m depth. Abundant chlorite and small amount of sericite, calcite and pyrite have been detected by XD (X-Ray diffraction) in this unit.

(2) MJTE-10

0-5.0m : Surface soil and talus deposit.

It contains abundant fragments of weathered hematite dacite in yellow brown color.

5.0-51.2m : Hematite dacite (decolorization)

Upper part of this unit shows pale grayish green and brecciated by jointing. As a whole, this unit shows fine - grained appearance and partial flow structure(20-30°~60° dip) with small phenocryst of plagioclase. Montmorillonite has been detected by XD, and calcite vein · druse are scarcely found. Base of this unit forms loose argillic breccia which indicate fault breccia.

51.2-56.9m : Aphyric dacite of Çağlayan Formation.

This unit shows decolorization and weak argillization with sericite, and partially hyaloclastic.

56.9-101.7m : Dacite (intrusive?)

The upper part of this unit shows fine-grained and gray in color by decolorization, gradually change into a plagio-porphyrite facies and reddish brown in color. White spherulits are found in 66m depth. Jointing and decolorization along joint plane are common through this unit. Brecciated texture is usually observed below 95m depth. Weak mineralization of fracture filling pyrite has been found in 59m depth. The contact plane with lower unit shows 40-50° dip.

101.7-239.2m : Dacite lava of Kızılkaya Formation

Massive ~ autobrecciated lava with phenocryst of plagioclase (1-2mm) represents of this unit. Tuffaceous parts which contain green essential fragments and altered accidental fragments are found in 136-141m, 115m, 125m, 130m, 223m, depth. This unit has undergone argillization and gray in color. Sericite, chlorite, calcite and pyrite have been detected by XD. Weak mineralization of pyrite vein and network has occurred in part. In the depth of 103.65-105.9m, matrix of autobreccia filled with pyrite network. Maximum value of analyzed elements of 3 samples from this zone are as follows,

Au 0.20ppm, Ag 0.74ppm, Pb 0.01%, Zn 0.03%, Fe 6.73%, S 7.90%

Another weak mineralization parts have been observed in 133m, 108-190m depth. Colloform pyrite was found the sample in 181.5m depth. Low grade mineralization of joint filling pyrite has occurred in 205-215m depth. The base of this unit forms clay zone with disseminated pyrite. The result of chemical analysis are as follows,

Au 0.26ppm, Ag 2.94ppm, Cu 0.10%, Pb 0.20%, Zn 0.18%, Fe 5.86%, S 6.87%

239.2-252.1m : Dacitic tuff breccia of Kızılkaya Formation.

It contains abundant green glass matrix and essential fragments with small amount of gray dacite, altered rock fragments. Alteration minerals such as chlorite (abundant), calcite, pyrite , sericite (rare) have been detected by XD. There is no remarkable mineralization in this unit.

(3) MJTE-11

0-5.15m : Surface soil and talus deposit.

It contains fragments of altered rock.

5.15-180.5m : Dacitic tuff~autobrecciated lava (Çağlayan Formation?)

Texture and rock facies is unclear from surface to 90m due to intense argillization. Hard plagio-porphyritic dacite in the depth of 31.5-34.2m, 52.5-54m and 88.8-90.9m etc, are presumed to be block? Dense dissemination of pyrite has occurred in intensely argillized part. 6 samples have been analyzed in this zone. Relatively high analytical results are obtained in the depth of 78-80m. that is,

Au 0.38ppm, Ag 1.82ppm, Cu 0.17%, Pb 0.01%, Zn 0.02%, Fe 8.35%, S 10.33%

Alteration minerals such as sericite, kaolinite, dolomite, calcite and pyrite have been detected by XD, but chlorite was not detected. Thin veins of pyrite and chalcopyrite have occurred in hard dacite part. Original textures such as flowband and brecciation can be recognized from the depth of 90m to below level, reflecting the decrease of alteration. Alteration minerals of sericite, chlorite and calcite ware detected. Weak mineralization of pyrite vein and dissemination has occurred in this part. The bottom of this unit forms dark gray clay with disseminated fine pyrite. Results of chemical analysis of this part are as follows,

Au 0.44ppm, Ag 5.23ppm, Cu 0.06%, Pb 0.04%, Zn 0.21%, Fe 3.14%, S 3.89%

180.5-222.1m : Quartz, plagioclase porphyritic dacite.

It shows gray in color and massive, consists of phenocrysts of abundant plagioclase (1-2mm) and minor quartz (1-3mm). The upper part of this unite has undergone intense argillization accompaning pyrite. But the alteration gradually decrease to the depth. Network of chalcopyrite and sphalerite has occurred in 200m depth. Results of chemical analysis of this part are as follows,

Au 0.24ppm, Ag 2.20ppm, Cu 0.20%, Zn 1.46%, Fe 1.48%, S 2.23%

Sericite/montmorillonite interstratified mineral is detected in clay zone of 190m depth.

222.1-260.0m : Perlitic rhyolite.

It shows dark green to yellow green in color, consists of coarse crystal of quartz, plagioclase and fresh hornblende. It's physical property is loose and brittle. Mordenite was detected by XD.

260.0-322.7m : Quartz, plagioclase porphyritic dacite intrusive.

Then upper contact plane has 65° dip, and fine-grained chilled margin. This unit shows massive and hard property with weak magnetism, has undergone little alteration. Small amount of calcite vein has been observed. Alteration mineral has not detected by XD, and there is no mineralization.

322.7-366.0m : Perlitic rhyolite (same as above)

It contains small amount of essential ~ accessory fragments and has undergone weak argillization. Sericite/montmorillonite interstratified mineral and mordenite are detected by XD. There is no mineralization. The boundary between this unit and lower unit is not clear due to fractured core.

366.0-407.05m : Quartz, plagioclase porphyritic dacite intrusive.

It shows the same facies of above one. Fine grained pyrite and Mn oxide? Veins have been observed along decolored zone in 396.4-399.0m depth.

(4) MJTE-12

0-3.0m : Surface soil.

3.0-210.3m : Dacitic breccia ~ lava and plagio-porphyritic dacite.

However, it is hardly to identify the original texture of Dacitic breccia ~ lava due to intense argillic alteration, fragments of porphyritic dacite and siliceous rock have been rarely observed. The dominant alteration minerals in this unit are sericite, kaolinite, dolomite and pyrite.

In case of plagio-porphyritic dacite, reddish colored and porphyritic texture have been recognized reflecting it's hard property, even it was affected by intense alteration. This seems to suggest that plagio-porphyritic dacite belongs a hematite dacite group. Phenocryst of plagioclase (max 3-5mm) has been entirely replaced by sericite and kaolinite, and fine aggregates of quartz, sericite carbonate mineral and kaolinite have occurred in groundmass.

Strong mineralization of pyrite vein~network is dominant in this unit. Most of the pyrite crystals are coarse and concentrated in the depth of 24.3-25.0m. In the plagio-porphyritic dacite, joint-filling or matrix-filling pyritization are common. Grade of the elements from 6 samples of mineralized zone showed low value except Fe and S.

210.3-223.4m : Porphyritic dacite of Çağlayan Formation?

It shows intense argillization and the original texture of rock is not clear. Judging from presence of white relic of plagioclase and small amount of quartz phenocryst, it was identified porphyritic dacite. Dissemination and network of pyrite were found in this unit, accompanied by a few amount of sphalerite and chalcopyrite around 218m depth. Results of the chemical analysis of sample from 211-212m depth show relatively high value of Au(1.63ppm) and Ag(9.77ppm). Sample from 218-218.5m depth shows relatively high Zn(1.39%) value.

223.4-232.1m : Quartz porphyry intrusive.

It consists of purplish gray colored part and green glassy part. Chilled margin was formed in upper contact plane of this unit. Phenocrysts(1-2mm) of plagioclase and quartz are commonly observed and purplish part has weak magnetism. No mineralization has observed.

232.1-241.8m : Dacitic tuff (coarse~lapilli tuff).

It shows pale greenish gray in color and consists of fine volcanic glass, accidental fragments of tuff, silicified rock. Quartz and plagioclase are observed in a matrix which is replaced by clay mineral. Most plagioclase are replaced by calcite. No mineralization has observed.

241.8-257.25m : Quartz porphyry intrusive.

It shows grayish purple in color and the same rock facies as above one, accompanied by a few calcite veins. No mineralization has observed.

257.25-260.4m : Rhyolite.

Abundant phenocrysts of plagioclase and large phenocrysts of quartz lie in a glassy perlitic ground mass. This unit has a brittle property and may be belong with the same group of quartz porphyry. No mineralization has observed.

260.4-263.0m : Alternation of tuff and basaltic andesite.

Taffaceous part, coarse and sandy, consists of plagioclase, quartz and green glass. Basaltic andesite consists of phenocrysts of plagioclase and pyroxene and abundant amygdals. Fragments of ferruginous chert have been observed in 261.3-262m depth. It has undergone weak alteration of calcite (max=4mm).

263.0-275.7m : Basaltic andesite lava (sheet)

It shows dark reddish brown ~ green in color and massive texture. Strong magnetism and abundant amygdals have been observed usually. Beside the euhedral pyroxene and plagioclase, It contains a xenocryst of quartz. No mineralization has observed. This unit gradually changes into the upper and the lower parts.

275.7-338.5m : Dacitic hyaloclastic rock (lava) of Çağlayan Formation?

The upper part of this unit shows greenish gray in color and uniform facies with small green spot, containing plagioclase and a few quartz. The lower part has a lot of accidental fragments which shape is unclear. As a whole, glassy matrix ~ ground mass is dominant in this unit. Sericite/montmorillonite interstratified mineral was detected by XD. No mineralization has observed

338.5-344.4m : Dacitic tuff of Çağlayan Formation?

This unit consists of abundant small balls of green volcanic glass and a few accidental silicified fragments, and poor in crystal. It has undergone weak argillization (chlorite, sericite?).

344.4-350.3m : Dacite lava of Kızılkaya Formation.

It shows light gray in color reflecting weak alteration of sericite and chlorite and contains of common amount of plagioclase and a few corroded quartz. It has a similar rock facies to the footwall dacite of Çımaklı. Weak dissemination and network of pyrite have been observed through this unit. Results of chemical analysis show low value in every elements.

2-3 Consideration

Evaluation of each area is described below.

1. Taflancık area

An IP anomaly zone considered to reflect the mineralization was defined by phase I and II survey. The drilling survey conducted in the eastern half of this anomaly zone revealed a strong pyritic stockwork in footwall dacite. In addition, judging from an existence of a part containing high-grade yellow ore fragments, it was assumed that the back ground area might have been in the western half of the anomaly zone. In order to confirm this, the drilling survey was carried out this year.

Since a relatively thick layer of porphyritic dacite intruded near the ore horizon in the beneath of hematite dacite at MJTE-9, the mineralization condition is not so clear. As shown on the geological section, it can be geologically correlated to MJTE-6 located in the northeast and shows flat structural from east to west. Vein type mineralization mainly composed of Cu-Zn has been observed in the Kızılkaya Formation in the deep part and it is considered that this is related to the massive sulfide type mineralization. Judging from the alteration of mother rock, there is a strong possibility that the location of MJTE-9 is away from the center of massive sulfide mineralization.

The alteration is strong in the relatively shallow part at MJTE-10 and the argillization is strong like MJTE-8. Geologically, the Kızılkaya Formation consists of mainly lava and the horizon tuff was not observed. A strong pyritic stockwork partly develops. It is considered that the IP anomaly reflects this stockwork.

Judging from the above-mentioned, the investigation results of this area can be summarized as follows:

* The mineralization and alteration of footwall dacite is stronger in the southern part (MJTE-7), but horizon tuff has not been observed. It is possible that the ore bodies might have been already eroded out.

* Since the stratum has a gentle dip to north-northwestwards and the hanging wall tuff tends to be distributed more widely in the northern part. Therefore, there is a little room for exploration in the northern part of MJTE-6, but it is difficult to expect a large-scale ore body because the altered footwall is already exposed in the northern valley.

2. Karılar area

There are some old ore deposits and ore showings in this area and they ware all regarded as the massive sulfide type mineralization before this investigation. The results of Phase I survey suggested a possibility of a stockwork type mineralization for them. Therefore, the drilling survey in this area was carried out to discover new ore deposits expected in the depths and to clarify the type of mineralization.

MJTE-11 was drilled at an alteration zone in the south of the Karaerik deposit. In the shallow part strong alteration which continues from the Karaerik deposit has occurred. The argillization and pyritic dissemination are too strong to distinguish the rock type. With an increase in depth, the alteration and mineralization become weak. That is, although the alteration and mineralization have been observed in the shallow part of quartz-plagioclase porphyritic intrusive rock distributed at the depths of 180.5 to 222.1m, the alteration became weak in the lower part. In the depths reappears the intrusive rock with the same lithofacies. It has undergone weak alteration but no mineralization. Judging from these facts, the alteration and mineralization occurred after the activity of the intrusive rock and the degree of alteration shows low in the intrusive rock distant from the mineralization. Therefore, there is no possibility that this zone has been influenced by the massive type alteration and mineralization. Also, the stratum in the depths among the intrusive rocks is of rhyolite which has contained fresh hornblende phenocryst. There is a strong possibility that the activity of this rhyolite is newer than the massive sulfide ore deposit. In the mineralization found down to a shallow part of 200m partly exist veins of Cu and Zn. It is considered that the predominant part of Cu and Zn was a target of mining in the Karaerik deposit.

MJTE-12 was drilled in the alteration zone which continues from the Karılar deposit. The mineralization and alteration continues until a intrusive rock appears at a depth of 223m. The alteration becomes very weak in a part deeper than that. The alteration in the shallow part is remarkable and a rock type is unknown except a hard porphyritic rock. The hard porphyritic rock is rich in plagioclase phenocrysts and a reddish part is like hematite dacite. The mineralization of dissemination and stockwork with coarse pyrite, and it is similar to that of pyrite ore found in the Karılar deposit. The stratum lower than the intrusive rock consists of andesite~basaltic lava, dacitic hyaloclastite, tuff, etc. and can be correlated to the Çağlayan Formation. Therefore, there is a strong possibility that the Karılar deposit is also a relatively new network type hydrothermal ore deposit.

Judging from these facts and the layered tuff (coveres immediately above the Lahanos deposit) was not distributed in this area, it is considered that there is little possibility to find a massive sulfide ore deposit in the depth from surface to 300~400m level.

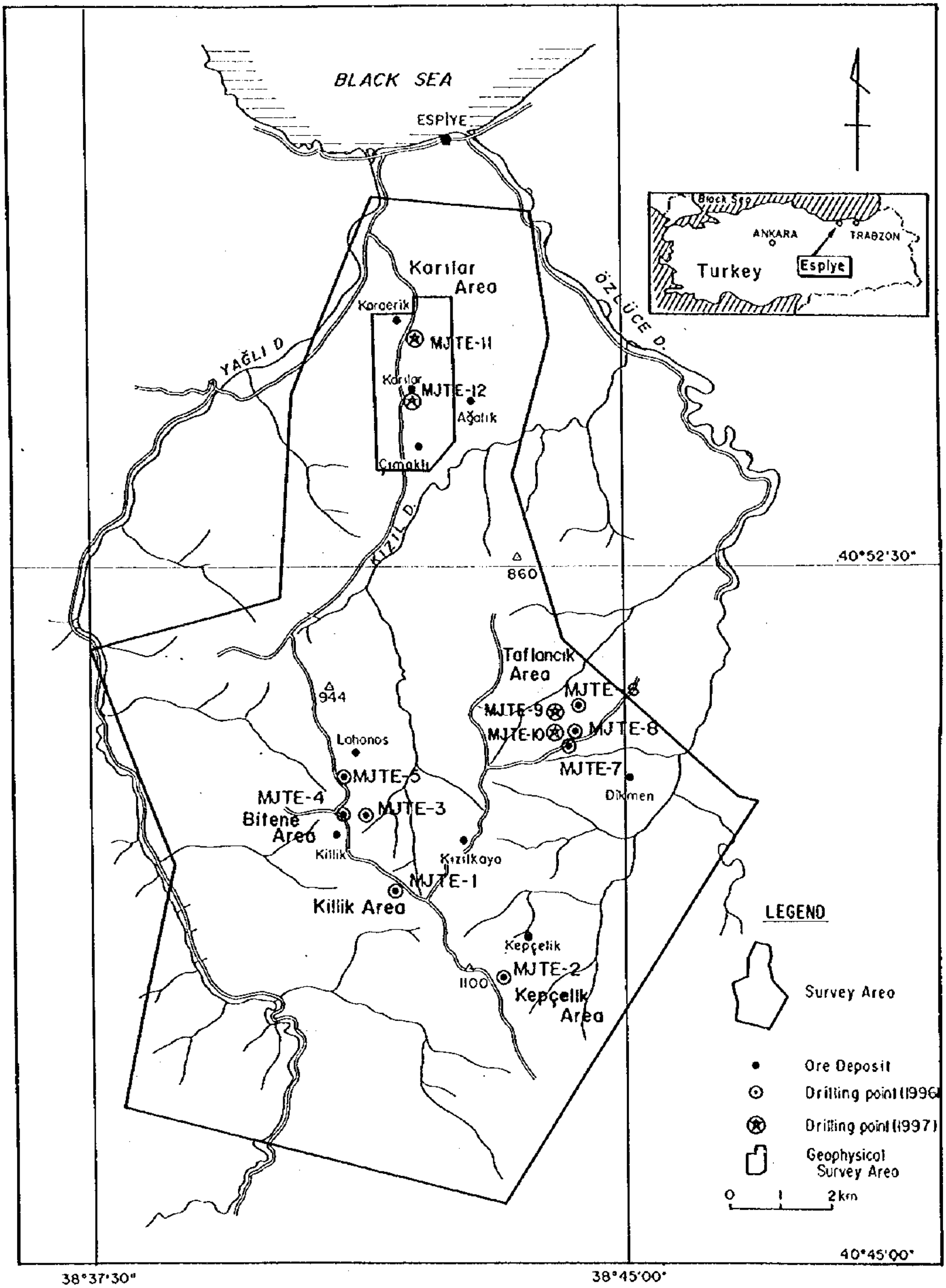

Fig.II-2-1 Location of the Drilling Survey Area

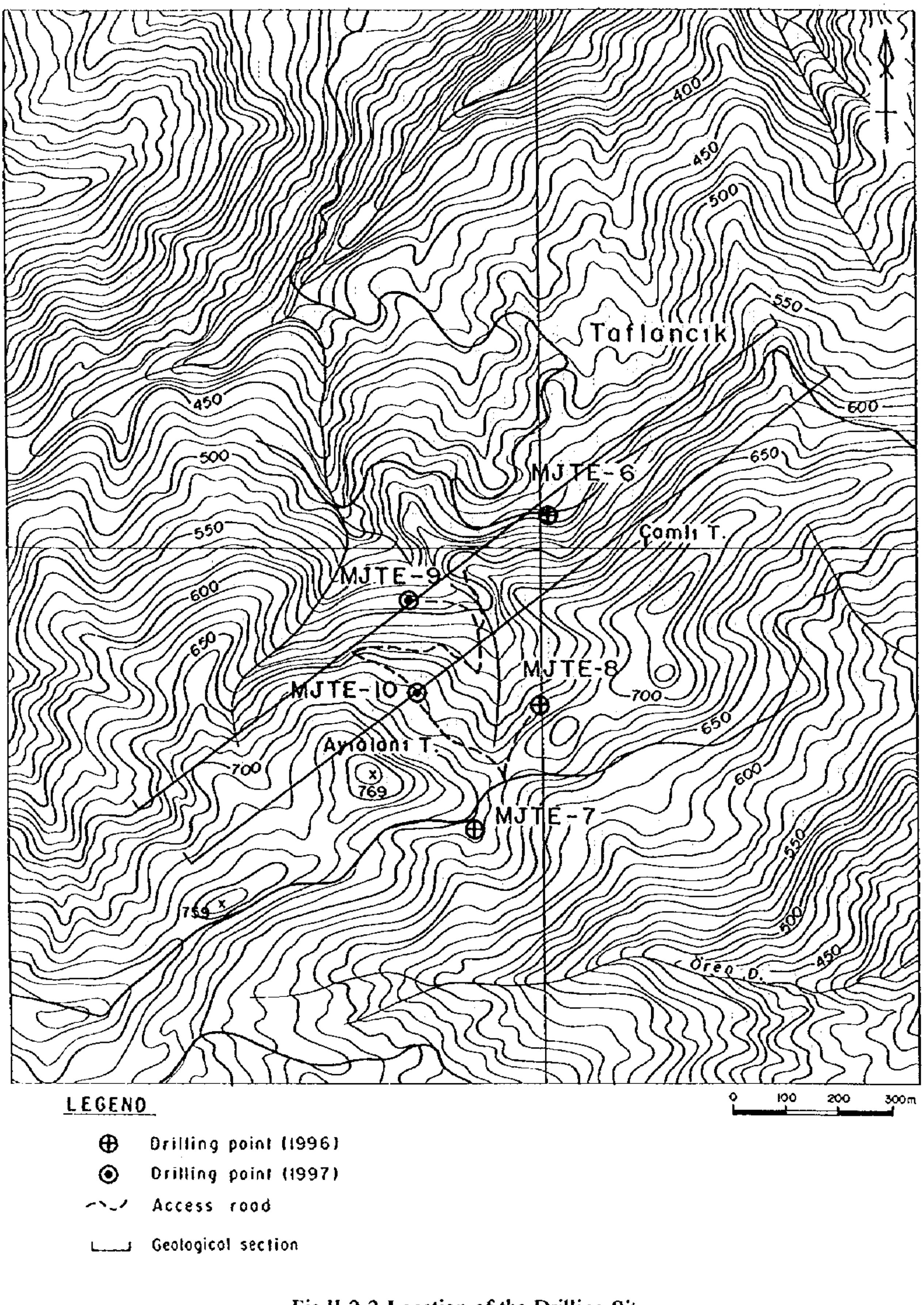

Fig.II-2-2 Location of the Drilling Sites

Table II-2-1 List of Main Drilling Equipment

Drilling Machine Model "ACKER"	2 Sets
Specifications	
Capacity	640m(NQ), 762m(BQ)
Dimension L×W×H	2,310×1,070×1,850mm
Histing Capacity	8727Kg
Spindle Speed	Fw:234rpm,485rpm,887rpm, 1500rpm Rw:192rpm
Engine	58hp, 2300rpm
Model "Deutz F4L912"	
Drilling Pump Model "BR-535"	2 Sets
Specifications	
Piston Diameter	70mm
Stroke	70mm
Capacity	37.5liter/min,50.7liter/min 81.4liter/min,132.5liter/min
Engine Model "Deutz Diesel"	17.8hp, 3000rpm
Generators	2 Sets
Specifications	
Capacity	3KW, 5KW 380,220Volt, 50Hz
Derrick for ACKER	1 Set
Specification	
Hight	6.10m

Table II-2-2 List of Drilling Equipment and Consumption Goods

Description	Specification	Unit	Quantity			
			MJTE-9	MJTE-10	MJTE-11	MJTE-12
Drilling rod HQ	3.05m	pc			42	53
Drilling rod NQ	3.05m	pc	82	82	117	115
Drilling rod BQ	3.05m	pc	82		113	
Outer tube	HQ	pc			1	1
Outer tube	NQ	pc	1	1	1	1
Outer tube	BQ	pc			1	
Inner tube	HQ	pc			2	2
Inner tube	NQ	pc	2	2	2	2
Inner tube	BQ	pc			2	
Inner tube head	HQ	pc			2	2
Inner tube head	NQ	pc	2	2	2	2
Inner tube head	BQ	pc			2	
Overshot	HQ	pc			1	1
Overshot	NQ	pc	1	1	1	1
Overshot	BQ	pc			1	
Wireline rope	6mm	m	300	300	450	400
Casing pipe(HW)	3.05m	pc	5	4	6	10
Casing pipe(NW)	3.05m	pc	17	16	61	76
Casing pipe(BW)	3.05m	pc			116	
Core lifter	HQ	pc			4	4
Core lifter	NQ	pc	5	4	5	5
Core lifter	BQ	pc			5	
Core lifter case	HQ	pc			4	4
Core lifter case	NQ	pc	5	4	5	5
Core lifter case	BQ	pc			5	
Bentonite		kg	3600	4000	6500	5600
Cement		kg	1250	1250	1250	1250
Light oil		l	3500	3100	5800	4200
Engine oil		l	60	80	80	80
Gear oil		l	40	40	40	40
Hydraulic oil		l	40	40	40	40
Core box	5-7m	pc	42	44	75	66
Pipe for water	1"	pc	300	300	200	400

Table II-2-3 List of Used Diamond Bits and Reaming Shells

Description	Specification	Unit	Quantity			
			MJTE-9	MJTE-10	MJTE-11	MJTE-12
HQ-WL BITT	E35 40CTS	pc			2	2
NQ-WL BITT	E35 30CTS	pc	4	4	5	4
BQ-WL BITT	E35 25CTS	pc	1		1	
HQ-REAMING SHELL	E35 16CTS	pc			2	2
NQ-REAMING SHELL	E35 9CTS	pc	3	3	5	4
BQ-REAMING SHELL	E35 7CTS	pc			1	
CASING SHOE BITT(HW)		pc	1	1	1	1
CASING SHOE BITT(NW)		pc	2	1	1	2
CASING SHOE BITT(BW)		pc			1	

Table II-2-4 Drilling Summary (MJTE-9)

WORKING PERIOD

CLASS	WORKING PERIOD: PERIOD	TOTAL DAYS	DAY BREAK DOWN: ACTUAL WORKING	DAY BREAK DOWN: DAY OFF	WORKERS
RIG UP	97/06/25 ~ 97/06/28	4 days	4 days	0 days	64 workers
DRILLING	97/06/29 ~ 97/07/20	22	DRILLING 19	0	304
			REPAIR 3	0	48
TEAR DOWN	97/07/21 ~ 97/07/25	5		0	80
TOTAL	97/06/25 ~ 97/07/25	31	31	0	496

DRILLING DEPTH etc.

PROPOSED DEPTH	250.00 m	OVERBURDEN	m
ADDILIONAL DEPTH	2.10 m	CORE LENGTH	231.25 m
INSPECTED DEPTH	252.10 m	RECOVERY	91.7 %

CORE RECOVERY PER EACH 100m

5 DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%) SECTION	CORE RECOVERY(%) CUMULATIVE
0.00 ~ 100.45	80.80	80.4	80.4
100.45 ~ 200.45	98.80	98.8	89.6
200.45 ~ 252.10	51.65	100.0	91.7

TIME ANALYSYS

CATEGORY	(hr.)	(%)	(%)
DRILLNG	213	43.6	39.2
TRIP, CORE RECOVER CASING, etc.	219	44.9	40.3
REPAIR, FISHING	56	11.5	10.3
WATER SUPPLY	0	0.0	0.0
SUB-TOTAL	488	100.0	89.7
RIG UP	16		2.9
TEAR DOWN	40		7.4
TOTAL	544		100.0

TOTAL DEPTH/TOTAL WORKING DAYS	11.46 m/day
TOTAL DEPTH/ACTUL WORKING DAYS	11.46 m/day
TOATL DEPTH/ACTUL DRILLING DAYS	13.27 m/day
ACTUAL DRLLING WORKERS/TOTAL DEPTH	1.21 worker/dav

CASING

SIZE	SET DEPTH (m)	B/A×100 (%)	RECOVERY (%)
HW	15.00	5.95	100
NW	51.40	20.38	100
BW			

REMARKS
A: TOTAL DEPTH
B: SET DEPTH

Table II-2-5 Drilling Summary (MJTE-10)

WORKING PERIOD

CLASS	WORKING PERIOD	DAY BREAK DOWN			WORKERS
	PERIOD	TOTAL DAYS	ACTUAL WORKING	DAY OFF	
RIG UP	97/06/25 ~ 97/06/28	4 days	4 days	0 days	64 workers
DRILLING	97/06/29 ~ 97/07/18	20	DRILLING 18	0	288
			REPAIR 2	0	32
TEAR DOWN	97/07/19 ~ 97/07/23	5	5	0	80
TOTAL	97/06/25 ~ 97/07/23	29	29	0	464

DRILLING DEPTH etc.

PROPOSED DEPTH	250.00 m	OVERBURDEN	m
ADDILIONAL DEPTH	2.10 m	CORE LENGTH	239.10 m
INSPECTED DEPTH	252.10 m	RECOVERY	94.8 %

TIME ANALYSYS

CATEGORY	(hr.)	(%)	(%)
DRILLNG	209	44.3	37.3
TRIP,CORE RECOVER CASING, etc.	215	45.6	38.4
REPAIR,FISHING	48	10.2	8.6
WATER SUPPLY	0	0.0	0.0
SUB-TOTAL	472	100.0	84.3
RIG UP	24		4.3
TEAR DOWN	64		11.4
TOTAL	560		100.0

CASING

SIZE	SET DEPTH (m)	B/A×100 (%)	RECOVERY (%)
HW	12.20	4.84	100
NW	48.40	19.19	100
BW			

CORE RECOVERY PER EACH 100m

DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%) SECTION	CUMULATIVE
0.00 ~ 102.65	89.80	87.5	87.5
102.65 ~ 200.25	97.45	99.8	93.5
200.25 ~ 252.10	51.85	100.0	94.8

TOTAL DEPTH/TOTAL WORKING DAYS	12.61 m/day
TOTAL DEPTH/ACTUL WORKING DAYS	12.61 m/day
TOATL DEPTH/ACTUL DRILLING DAYS	14.01 m/day
ACTUAL DRLLING WORKERS/TOTAL DEPTH	1.14 worker/day

REMARKS
A: TOTAL DEPTH
B: SET DEPTH

Table II-2-6 Drilling Summary (MJTE-11)

WORKING PERIOD

CLASS	WORKING PERIOD PERIOD	TOTAL DAYS	ACTUAL WORKING	DAY OFF	WORKERS
RIG UP	97/07/31 ~ 97/08/07	8 days	8 days	0 days	128 workers
DRILLING	97/08/08 ~ 97/09/08	32	DRILLING 31	0	496
			REPAIR 1	0	16
TEAR DOWN	97/09/09 ~ 97/09/16	8	8	0	128
TOTAL	97/07/31 ~ 97/09/16	48	48	0	768

(ACTUAL WORKING and DAY OFF are under DAY BREAK DOWN.)

DRILLING DEPTH etc.

PROPOSED DEPTH	350.00 m	OVERBURDEN	m
ADDILIONAL DEPTH	57.05 m	CORE LENGTH	398.55 m
INSPECTED DEPTH	407.05 m	RECOVERY	97.9 %

CORE RECOVERY PER EACH 100m

DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%) SECTION	CORE RECOVERY(%) CUMULATIVE
0.00 ~ 100.25	94.20	93.9	93.9
100.25 ~ 202.95	102.70	100.0	97.0
202.95 ~ 300.20	97.05	99.8	97.9
300.20 ~ 401.45	99.00	97.8	97.9
401.45 ~ 407.05	5.60	100.0	97.9

TIME ANALYSYS

CATEGORY	(hr.)	(%)	(%)
DRILLNG	362	48.1	42.3
TRIP,CORE RECOVER CASING, etc.	358	47.6	41.8
REPAIR,FISHING	32	4.3	3.7
WATER SUPPLY	0	0.0	0.0
SUB-TOTAL	752	100.0	87.9
RIG UP	40		4.7
TEAR DOWN	64		7.5
TOTAL	856		100.0

TOTAL DEPTH/TOTAL WORKING DAYS	12.72 m/day
TOTAL DEPTH/ACTUL WORKING DAYS	12.72 m/day
TOATL DEPTH/ACTUL DRILLING DAYS	13.13 m/day
ACTUAL DRLLING WORKERS/TOTAL DEPTH	1.22 worker/day

CASING

SIZE	SET DEPTH (m)	B/A×100 (%)	RECOVERY (%)
HW	18.00	4.42	100
NW	185.70	45.62	100
BW	355.65	87.37	100

REMARKS
A: TOTAL DEPTH
B: SET DEPTH

Table II-2-7 Drilling Summary (MJTE-12)

WORKING PERIOD

CLASS	WORKING PERIOD PERIOD	DAY BREAK DOWN TOTAL DAYS	ACTUAL WORKING	DAY OFF	WORKERS
RIG UP	97/07/31 ~ 97/08/09	10 days	10 days	0 days	160 workers
DRILLING	97/08/10 ~ 97/09/06	28	DRILLING 24	0	384
			REPAIR 4	0	64
TEAR DOWN	97/09/07 ~ 97/09/13	7	7	0	112
TOTAL	97/07/31 ~ 97/09/13	45	45	0	720

DRILLING DEPTH etc.

PROPOSED DEPTH	350.00 m	OVERBURDEN	m
ADDILIONAL DEPTH	0.30 m	CORE LENGTH	392.95 m
INSPECTED DEPTH	350.30 m	RECOVERY	96.4 %

TIME ANALYSYS

CATEGORY	(hr.)	(%)	(%)
DRILLNG	246	39.4	33.0
TRIP,CORE RECOVER CASING, etc.	330	52.9	44.4
REPAIR,FISHING	48	7.7	6.5
WATER SUPPLY	0	0.0	0.0
SUB-TOTAL	624	100.0	83.9
RIG UP	64		8.6
TEAR DOWN	56		7.5
TOTAL	744		100.0

CASING

SIZE	SET DEPTH (m)	B/A×100 (%)	RECOVERY (%)
HW	30.00	8.56	100
NW	232.00	66.23	100
BW			

CORE RECOVERY PER EACH 100m

DEPTH (m)	CORE LENGTH (m)	CORE RECOVERY(%) SECTION	CUMULATIVE
0.00 ~ 102.65	90.35	88.0	88.0
102.65 ~ 200.25	97.00	99.4	93.7
200.25 ~ 300.90	100.65	100.0	95.8
300.90 ~ 350.30	49.40	100.0	96.4

TOTAL DEPTH/TOTAL WORKING DAYS	12.51 m/day
TOTAL DEPTH/ACTUL WORKING DAYS	12.51 m/day
TOATL DEPTH/ACTUL DRILLING DAYS	14.60 m/day
ACTUAL DRLLING WORKERS/TOTAL DEPTH	1.10 worker/day

REMARKS
A: TOTAL DEPTH
B: SET DEPTH

Table II-2-8 Drilling Schedule

ITEM	JUNE	JULY	AUGUST	SEPTEMBER
Mobilization to Espiye	19 — 24			
MJTE-9 Rig up	25 — 28			
MJTE-9 Drilling	29 —	— 20		
MJTE-9 Tear down		21 — 25		
MJTE-10 Rig up	25 — 28			
MJTE-10 Drilling	29 —	— 18		
MJTE-10 Tear down		19 — 23		
MJTE-11 Rig up		31 —	— 7	
MJTE-11 Drilling			8 —	— 8
MJTE-11 Tear down				9 — 16
MJTE-12 Rig up		31 —	— 9	
MJTE-12 Drilling			10 —	— 6
MJTE-12 Tear down				7 — 13
Demobilization to Ankara				17 — 24

Table II-2-9 Results of Chemical Analysis

NO.	DRILLING NO	DEPTH (m)	SAMPLE TYPE	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	FE (%)	S (%)	REMARKS
A-1	MJTE-9	138.5(25cm)	py-film+diss dc	0.18	0.89	< 0.01	< 0.01	0.01	1.69	1.61	
A-2	MJTE-9	224.0(20cm)	arg.py-diss	0.09	0.93	0.01	0.18	0.06	2.83	2.01	
A-3	MJTE-9	227.0(30cm)	cp+sph,py breccia	0.06	1.17	0.15	0.01	1.32	6.33	5.69	
A-4	MJTE-9	227.6(10cm)	cp-sph py vein	0.06	7.10	4.16	0.21	4.66	7.99	10.80	
A-5	MJTE-9	248.8(10cm)	gn,sph,cp-vein	0.14	8.64	0.38	0.01	4.34	9.57	5.54	
A-6	MJTE-10	103.0(10cm)	py arg-zone	0.20	0.65	< 0.01	0.01	0.03	1.99	1.93	
A-7	MJTE-10	104.5(20cm)	py weak net	0.04	0.74	< 0.01	< 0.01	< 0.01	6.73	7.90	
A-8	MJTE-10	105.0-105.5	py-net/diss	0.08	0.70	< 0.01	< 0.01	0.01	3.85	4.32	
A-9	MJTE-10	124.5(30cm)	py-film dc	0.19	0.51	< 0.01	< 0.01	0.01	3.11	2.94	
A-10	MJTE-10	181.5(50cm)	py+cal net	0.05	0.48	< 0.01	< 0.01	0.01	3.65	3.18	
A-11	MJTE-10	206.0(30cm)	py-net	0.11	0.79	< 0.01	< 0.01	< 0.01	2.17	1.50	
A-12	MJTE-10	225.5(30cm)	sil,py-net	0.18	1.17	< 0.01	< 0.01	0.01	1.44	1.49	
A-13	MJTE-10	229.5(25cm)	py-net	0.10	0.89	< 0.01	< 0.01	0.01	1.32	1.11	
A-14	MJTE-10	232.3(20cm)	breccia fill py	0.15	1.17	0.01	< 0.01	0.02	4.74	5.65	
A-15	MJTE-10	238.5(50cm)	arg.py zone	0.26	2.94	0.10	0.20	0.18	5.86	6.87	
A-16	MJTE-11	20.5-22.5	arg.fine py zone	0.08	0.89	< 0.01	< 0.01	< 0.01	4.38	4.43	
A-17	MJTE-11	44.0-45.0	breccia filling py	0.15	1.07	0.01	< 0.01	< 0.01	5.20	5.43	
A-18	MJTE-11	51.0-52.0	arg-py>cp	0.18	1.17	0.04	< 0.01	0.01	3.71	3.62	
A-19	MJTE-11	78.0-79.0	py net cp bearing	0.38	0.82	0.17	0.01	0.02	8.35	10.33	
A-20	MJTE-11	79.0-80.0	py net cp bearing	0.17	1.36	0.13	< 0.01	0.01	7.60	7.82	
A-21	MJTE-11	86.0-87.0	arg.py diss	0.14	0.98	< 0.01	< 0.01	0.02	6.18	6.95	
A-22	MJTE-11	180.0-180.5	arg with py	0.44	5.23	0.06	0.04	0.20	3.41	3.89	
A-23	MJTE-11	202.0-202.5	sph+cp net	0.24	2.20	0.20	< 0.01	1.46	1.48	2.23	
A-24	MJTE-12	24.3-25.0	coarse py massive	0.03	1.59	0.01	0.01	0.03	35.69	39.08	
A-25	MJTE-12	25.0-26.5	py,sil net/arg	0.07	1.17	< 0.01	< 0.01	< 0.01	14.51	15.77	
A-26	MJTE-12	34.6-35.6	py net/diss	0.10	1.03	< 0.01	< 0.01	< 0.01	26.23	30.01	
A-27	MJTE-12	49.0-50.0	joint filling py	0.10	0.65	< 0.01	< 0.01	< 0.01	23.78	27.20	
A-28	MJTE-12	85.0-85.5	py diss/net	0.13	0.70	< 0.01	< 0.01	< 0.01	31.81	37.00	
A-29	MJTE-12	202.0-203.0	arg with py	0.34	0.98	0.01	< 0.01	< 0.01	5.65	6.34	
A-30	MJTE-12	211.0-212.0	py+clay net	1.63	9.77	0.11	0.02	0.70	7.28	8.53	
A-31	MJTE-12	218.0-218.5	py net cp bearing	0.87	5.05	0.07	0.10	1.39	10.96	6.87	
A-32	MJTE-12	222.8-223.8	arg with py	0.26	4.02	0.01	0.01	0.19	6.73	3.80	
A-33	MJTE-12	345.5(50cm)	py net	0.09	2.85	< 0.01	< 0.01	0.02	2.56	1.30	

Abbreviation

py:pyrite, cp:chalcopyrite, sph:sphalerite, hm:hematite, Dc:dacite,
diss:dissemination, net:network, arg:argillization, sil:silicification

Table II-2-10 Results of X-Ray Diffraction Analysis

NO.	SAMPLE NO.	DRILLING NO.	DEPTH m	ROCK TYPE	FORMATION	MINERALS Qz	Pl	Kf	Ab	M	MX	Ch	Se	CM	K	Md	Py	Hm	Ca	Do	Gp	Mg	Remarks
1	X-1	MJTE-9	60.0	hematite dacite	Dh	O	O												·				
2	X-2	MJTE-9	117.0	dacitic tuff	Kdc	Δ			O			·	·						·				
3	X-3	MJTE-9	136.0	argillized dacite	Kdc	O			·				·	Δ			·		·				
4	X-4	MJTE-9	190.0	dacite	Dp	O			O				·					·					
5	X-5	MJTE-9	210.0	dacitic tuff	Kt2	O			O			Δ	Δ						Δ				
6	X-6	MJTE-9	227.0	dacitic tuff brec	Kt1	O			·			Δ	Δ				·		·				
7	X-7	MJTE-9	249.2	dacitic tuff brec	Kt1	Δ			Δ			O	Δ				·		Δ				
8	X-8	MJTE-10	38.5	dacite	Dh	◎			Δ	·			·										
9	X-9	MJTE-10	85.6	dacite	Dp	O			Δ	Δ							·						
10	X-10	MJTE-10	105.5	dacite	Kdc	O			Δ		Δ						Δ						
11	X-11	MJTE-10	140.0	dacitic tuff	Kt2	O			·		·		Δ				·		Δ				
12	X-12	MJTE-10	185.0	dacite	Kdc	◎			Δ			·	·				·		Δ				
13	X-13	MJTE-10	220.5	dacitie	Kdc	◎			Δ			·	·										
14	X-14	MJTE-10	229.5	altered dacite	Kdc	O			O			·	·				·		Δ				
15	X-15	MJTE-10	250.0	dacitic tuff brec	Kt1	·			·				·				·		O				
16	X-16	MJTE-11	23.0	argillized dacite	Cdc	◎							Δ		Δ		·			Δ		·	
17	X-17	MJTE-11	80.0	argillized dacite	Cdc	O							·				O		·	·			
18	X-18	MJTE-11	140.0	dacite breccia	Cdc	◎			·			Δ	·				·		Δ				
19	X-19	MJTE-11	190.0	dacite	Dp	O	O	·			Δ												
20	X-20	MJTE-11	228.5	rhyolite	Cry	Δ	Δ									Δ							
21	X-21	MJTE-11	281.0	dacite	Dp	O	O																
22	X-22	MJTE-11	330.0	rhyolite	Cry	·	Δ				·					·						Δ	Cr·
23	X-23	MJTE-11	396.4	dacite and clay	Dp	O	◎			Δ							·				·		
24	X-24	MJTE-12	49.5	altered dacite	Dh	◎							Δ		Δ		·			Δ			
25	X-25	MJTE-12	100.0	dacite or tuff	Dh	◎							Δ		Δ		·			O			
26	X-26	MJTE-12	150.0	dacite breccia	Dh	◎							Δ		Δ					Δ			
27	X-27	MJTE-12	200.0	argillized dacite	Cdp	◎							·				O						
28	X-28	MJTE-12	240.0	dacitic tuff	Ctf	O	Δ								·				Δ				
29	X-29	MJTE-12	305	dacite	Cdc	O	Δ				Δ												
30	X-30	MJTE-12	336.0	dacite	Cdc	O	Δ				Δ												
31	X-31	MJTE-12	347.0	dacite	Kdc	◎	Δ						·				·						

Abbreviations: Qz:quartz Pl:plagioclase Ab:albite S/M:sericite/montmorillonite Kf:alkali feldspar
interstratified mineral Ch:chlorite S:sericite K:kaolinite Ca:calcite Do:dolomote Hm:hematite
Gp:gypsum Md:mordenite CM:chlorite/montmorillonite Mg:Magnesite Py:pyrite Cr: cristbalite
◎:abundant O:common Δ:rare ·:very rare

Table II-2-11 Results of Microscopic Observation of Thin Section

NO.	SAMPLE NO	DRILLING NO	DEPTH m	ROCK TYPE	TEXTURE	PHENOCRYST Qz	Pl	Hb	Au	Hy	Fe	Mf	FRAGMENT	GROUNDMASS・MATRIX Qz	Pl	Kf	Si	Fe	Gl	ALTERATION・METAMORPHIC Qz	Ch	Se	Ca	Cl	Op	REMARKS
1	T-1	MJTE-9	157.6	Dacitic tuff	Pyroclastic										△		○		◎	◎	△	△	○		△	
2	T-2	MJTE-9	190.0	Dacite	Porphyritic	△	○				△						○		◎	○				○	・	
3	T-3	MJTE-9	246.5	Fine tuff	Pyroclastic														◎	○	○	△	○		△	
4	T-4	MJTE-10	116.0	Dacite	Porphyritic		△					△					◎			◎		△	△	○	・	
5	T-5	MJTE-11	129.0	Altered dacite?			△		・											○			△	◎	△	
6	T-6	MJTE-11	330.5	Rhyolite	Pearlitic, Porphy.	◎	○	△			△								◎							
7	T-7	MJTE-11	390.0	Dacite	Porphyritic	◎	◎				△				△	△	△		◎				△	△		
8	T-8	MJTE-12	54.5	Altered dacite?	Porphyritic, Felsic		○		○		・	・							◎	◎	△	◎	△	◎	○	
9	T-9	MJTE-12	236.0	Dacitic tuff	Clastic								Ad, Dc	○	○			△	◎	△	○		○	△		coarse, rework
10	T-10	MJTE-12	272.3	Basaltic andesite	Intersertal, porphy		○		○		△				◎			△	◎		・		△	△		
11	T-11	MJTE-12	318.0	Dacite	Porphyritic	○	○	△			△						○		◎	△			△			hyaloclastic
12	T-12	MJTE-12	345.5	Dacite	Porphyritic	△	○										◎		◎	◎	△	△			○	

Abbreviations: Qz: quartz, Pl: plagioclase, Kf: potassium feldespar, Ho: hornblende, Mf: mafic minerale, Si: siliceos mineral, Gl: glass, Pu: pumice, Fe: fe-minerale
Ch: chlorite, Se: sericite, Ca: calcite, Ep: epidote, Cl: clay mineral, Op: opaque mineral
Ad: andesite, Rhy: rhyolite, SS: sandstone, Gr: granite, Dc: dacite, Tf: tuff, At: altered rock

Table II-2-12 Results of Microscopic Observation of Polished Section

NO.	SAMPLE NO.	DRILLING NO.	DEPTH m	ROCK TYPE	MINERALS Cp	Sph	Gn	Py	REMARKS
1	P-1	MJTE-9	227.6	cp, sph vein	◎	◎	・	○	
2	P-2	MJTE-9	248.8	cp, sph vein	○	◎	◎	○	emulsion texture
3	P-3	MJTE-10	105.5	network ore				◎	
4	P-4	MJTE-10	124.5	py film ore				○	
5	P-5	MJTE-10	181.5	diss. ore				◎	colloform rexture
6	P-6	MJTE-11	32.5	cp vein	◎	・		◎	
7	P-7	MJTE-11	202.1	cp sph vein	◎	◎		○	
8	P-8	MJTE-11	396.4	py clay vein				・	
9	P-9	MJTE-12	25.0	massiv py ore	・	・		◎	
10	P-10	MJTE-12	218.0	network ore		・	・	◎	

Abbreviations: Cp: chalcopyrite, Sph: Sphalerite, Gn: galena, Py: pyrite

◎: abudant ○: common △: few ・: rare

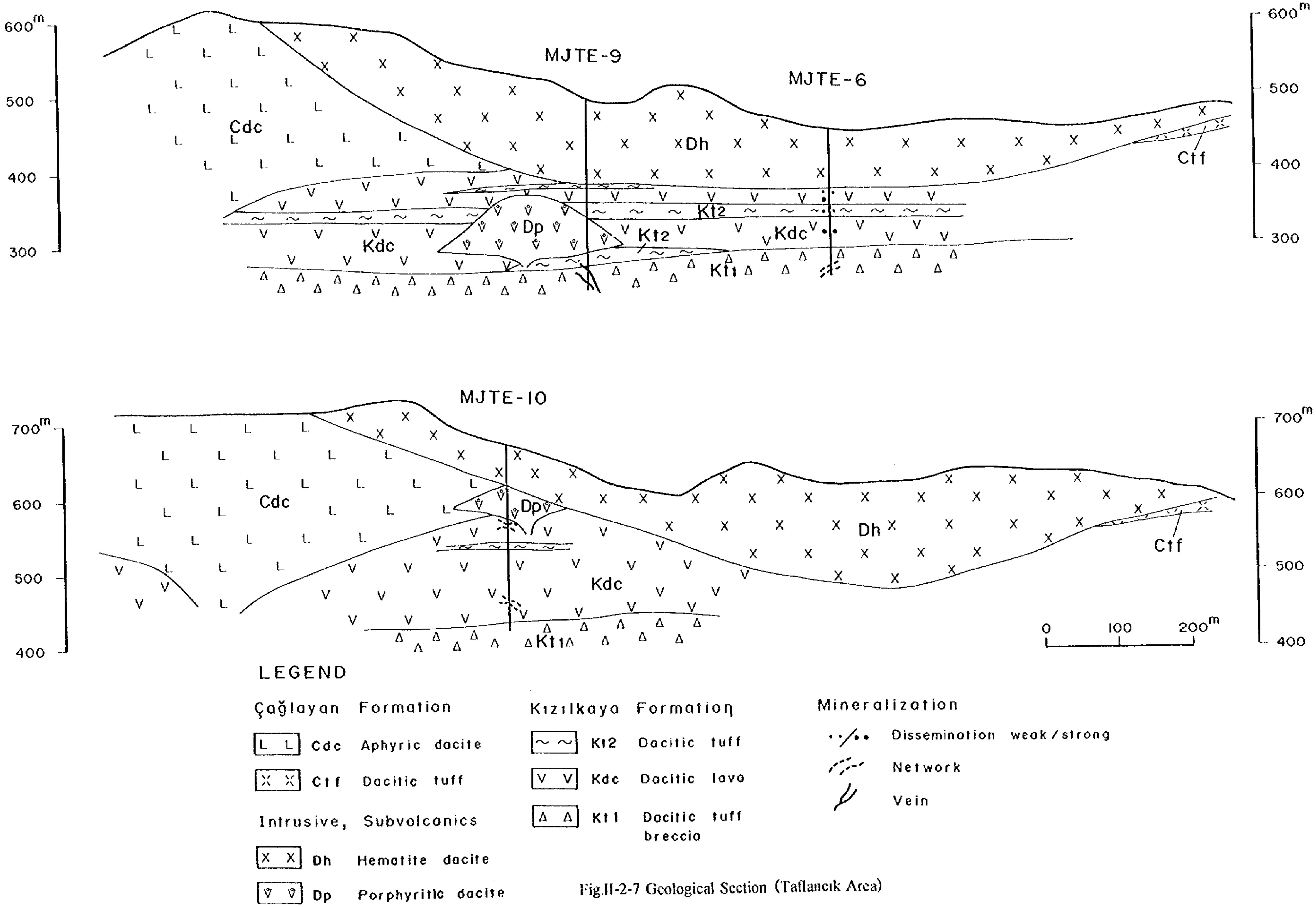

Fig.II-2-7 Geological Section (Taflancık Area)

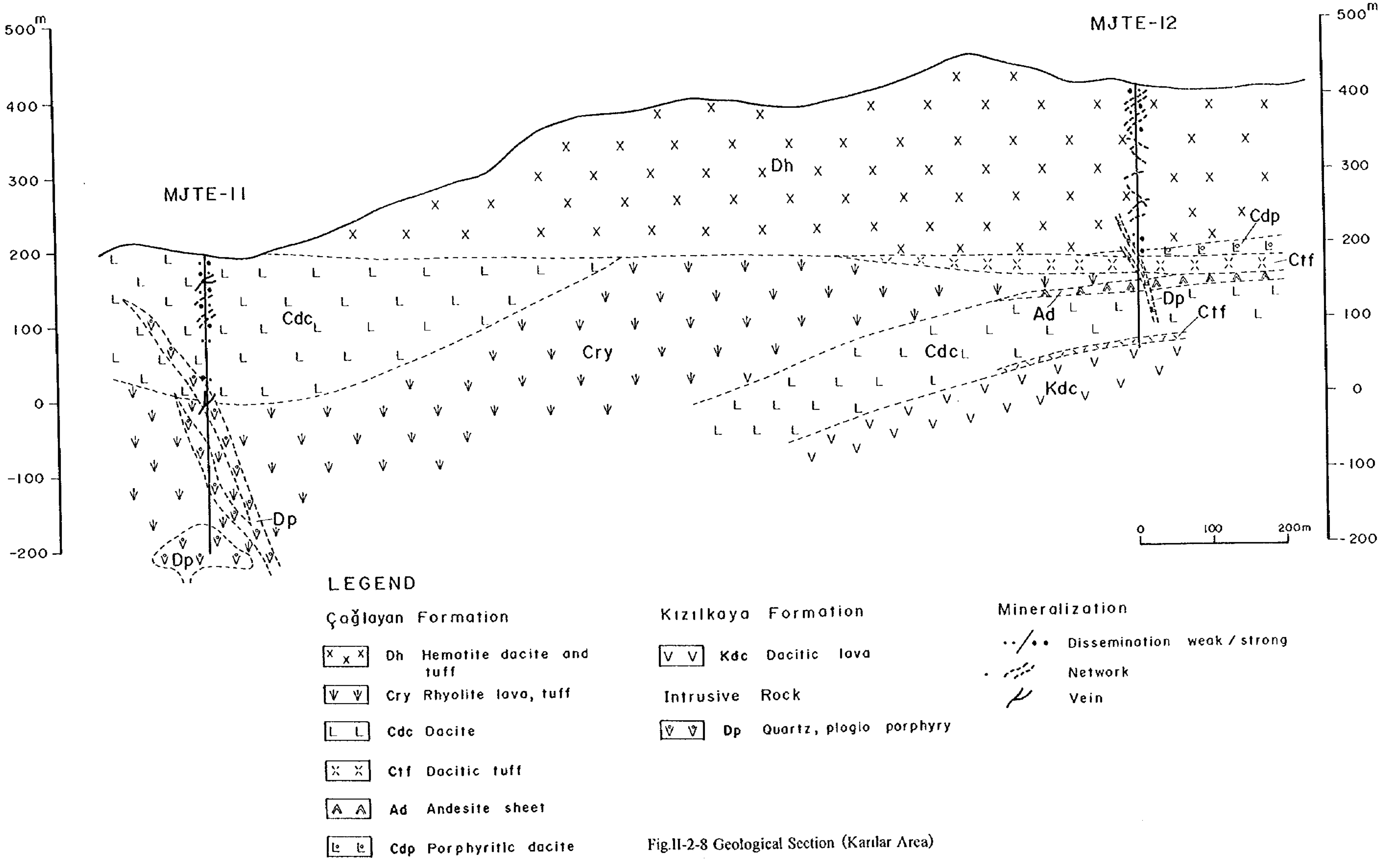

Fig.II-2-8 Geological Section (Karılar Area)

PART III Conclusion and Recommendation

PART III Conclusion and Recommendation

Chapter 1 Conclusion

The drilling survey of two boreholes (total 500m) in the Taflancık area and the geophysical survey (IP and CSAMT methods) and the drilling survey of two boreholes (total 750m) in the Karılar area were conducted in this year. The survey results in each area were summarized as shown below.

1. Taflancık area

Last year the drilling of three boreholes was carried out in the eastern part of the anomaly zone defined by IP survey, where yellow ore fragments, a network zone in a footwall, and an alteration zone were confirmed. The exploration of MJTE-9 and MJTE-10 was carried out in this year for the purpose of prospecting the northwestern area of this anomaly zone.

MJTE-9 is located in the northern part of the anomaly zone, at a point 300m away from MJTE-6 to the southwest. Its geology can be correlated to MJTE-6 and the dip of strata is almost horizontal between these two points. MJTE-9 is accompanied by veinlets of Cu-Pb-Zn in the depths but the mineralization is weak on the whole. The alteration is also weak compare to other holes and there are not so many fragments of mineralized and altered rocks which are found in a large quantity at MJTE-6. Judging from these survey results, it is concluded that MJTE-9 is located far from the back ground zone of altered fragments etc, compared to MJTE-6.

MJTE-10 is located in the middle western part of the anomaly zone. It indicates almost the same geology and mineralization as MJTE-8. That is, the mineralization mainly containing pyrites was found on the whole Kızılkaya Formation, but the chemical analysis revealed that each element showed low value and no development of horizon tuff was found. Judging from these survey results, it is highly possible that the ore body might have been eroded out in this area although it would had formed before.

2. Karılar area

Some old mines such as Karaerik, Karılar, and Çımaklı are known in this area. Those were generally believed to be the strata-bound type massive sulfide deposits. But, the survey in Phase I suggested a possibility of network-vein type mineralization for those mines. The survey in this area was carried out for the purpose of clarifying these problems and the exploration for deep level.

As the results of geophysical survey (IP method), since the anomaly pattern indicated a steeply dipping form in Karılar deposit, it was thought to be a new hydrothermal deposit. A lenticular anomaly zone which might have reflected an ore body in a relatively shallow part was observed in the Karaerik deposit. According to the results of MJTE-11 drilled in this neighborhood, it was assumed that a stockwork of sulfides developed in dacite. The mined part of the Karaeric ore deposit was considered to be a part of ore shoot.

In the depths of these ore deposits, IP anomalies different from that in shallow parts were observed. As the results of drilling survey, it is thought that the anomalies of deep level reflected mostly montmorillonite in rhyolite in Karaerik and a pyrite stockwork in dacite of Kızılkaya Formation in Karılar. Geologically speaking, considering that a new thick stratum accumulates toward the north and no remarkable IP anomaly has been observed, it is thought that there is little possibility of Lahanos type massive sulfide ore deposit exists at least shallow than 300 to 400m below the surface of the earth.

Chapter 2 Recommendation in the Future Projects

According to the results obtained through the survey in phase I to III, the following was clarified.

* Tow types of mineralization have been recognized in this area. Those are a massive sulfide type and a stockwork-vein type mineralization (late stage).
* The mineralization and alteration zones in footwall dacite are widely distributed in the NE-SW direction.
* The distribution and continuity of the ore horizon of massive sulfide were clarified.
* The existence of a relatively thick layer of hanging wall tuff is desired in order that an ore body exists.
* The IP method is effective to explore the area covered with a hanging wall.

Based on the above, the following program will be proposed in the future projects.

The exploration for promising areas is almost completed, but an economical ore deposit was not discovered. The drilling survey was not conducted only in the Çalkaya area among the promising areas. Since the hanging wall is thick in the Çalkaya area and the exploration depth was not sufficient for the IP survey (a=100m) conducted in phase II survey, it is advisable to carry out an exploration of a=200m executed in the Karılar area and then make a confirmation by the drilling survey.

There are various types of dacite composing footwall (Kızılkaya Formation). The present survey could not clarify the characteristics of dacite related to the ore deposit. Therefore, it is desirable to make a detailed survey on this dacite, classify lithofacies, and clarify their mineralogical and geochemical characteristics, form, structure, etc.. Thus, it is expected that an approach to the massive ore body will be easily.

It is possible that some ore showings of the massive sulfide type ore deposits along the coast of the Eastern Black Sea may contain stockwork type mineralization which became clear through the survey of this area. Therefore, taking into consideration the continuity of the ore horizon, characteristics of footwall dacite, etc., we suggest a re-investigation of the promising areas in the Eastern Black Sea Region.

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Appendix (1)
Geological Columnar Section of Exploration Wells
(Fig.II-2-2~6)

0m−100m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Soil, sand	0-4.0m brown surface soil												
5			4.0-29.0m yellow brown weathered fragments of decolored hematite dacite												
10															
15			fragment with quartz veinlet												
20		Talus breccia?	white altered fragments rich												
25			28m reddish brown soil												
30		Dacite (Dh)	29-113.8m reddish brown hematite dacite fine grain plagio phenocryst												
35															
40															
45			48.3-49.25m brecciated texture												
50															
55			gray reddish brown hard hematite dacite, silicified, oxidized; plagio phenocryst 5-10%												
60					K-1	60.00									
65			67.2m calcite druse												
70			net-breccia partly calcite filling												
75			grayish purple hematite dacite plagio → calcite												
80			78.5m calcite druse; breceiate matrix brown in color												
85			85.2m calcite vein 70° width=3mm												
90			purplish in color grassy dacite plagio=0.5-1mm, 2-4%		IP-1	90.00									
95			95.8m calcite vein 20mm												
100															

abbreviations qz:quartz, pl or plagio:plagioclase, cal:calcite, ch:chlorite, s or ser:sericite, k:kaolinite, hem:hematite, py:pyrite, sph:sphalerite cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-3 Geological Columnar Section of MJTE-9 (Appendices) (1)

100m--200m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
105 110	X X	Dacite (Dh)	102.4-102.8m calcite net and veinlets fractured jointed hematite dacite reddish brown in color 113.6-113.8m reddish brown laminated soft fine breccia of hematite dacite base												
115	~ ~	Dacitic tuff (Kt2)	113.8-118.3m green soft altered dacite lava-tuff, plagio rich		X-2	117.60									
120	▽ ▽	Dacite (Dp)	118.3-123.0m reddish brown plagio porphyritic dacite, int, plagio=2-4mm/15%												
125 130 135	V V	Dacite (Kdc)	123-138.0m greenish gray altered brecciated dacite, essential fragments dominant dark fine pyrite ball (diss.) 2-3% bearing		X-3	136.00									
			soft clay altered zone	py	A-1	138.50		25.00	0.13	0.83	<0.01	<0.01	0.01	1.69	[illegible]
			138-139m pyrite film - sel weak												
140 145 150 155	~ ~	Dacitic tuff (Kt2)	138.0-158.5m dacitic lava or hyalo breccia with a few fragments of sil-rock and pyrite diss. balls 142m base of flow unit? essential large fragment rich		1P-2	148.90									
			150.7-151.3m green coarse tuff? boundary= 50° - 30°		T-1	157.60									
160 165 170 175 180 185	▽ ▽	Dacite (Dp)	158.5-208.3m dark purplish gray compact plagio porphyritic dacite int. pl=2mm, 7-10%(replaced by calcite?) black or dark mineral 1-2% magnetic +-calcite veinlets jointed fractured quartz bearing												
190 195 200	▽ ▽		199.0-199.8m fragmented core		T-2, X-4, 1P-3										

abbreviations qz:quartz, pl or plagio:plagioclase, cal:calcite, ch:chlorite, s or ser:sericite, k:kaolinite, hem:hematite, py:pyrite, sph:sphalerite cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-3 Geological Columnar Section of MJTE-9 (Appendices) (2)

MJTE−9 (3)

200m−300m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Dacite (Dp)													
205			base of unit/berecciated												
210		Dacitic tuff (Kt2)	208.3-223.5m? pale greenish laminated dacite tuff or lava, green glass rich accidental dc, sil rock fragments plagio rich		X-5	210.00									
215			214.1-215.0m reddish brown porphyritic dacite												
220					IP-4	220.00									
			←clay with pyrite net.	Vein	A-2	224.00		20.00	0.09	0.93	<0.01	0.18	0.06	2.83	2.01
225		Dacitic tuff breccia (Kt1)	223.5 − bottom deep green tuff breccia and tuff	cp	A-3	227.00		30.00	0.06	1.17	0.15	0.01	1.32	6.33	5.69
				sph	X-6	227.30									
				py	A-4, P-1		227.60	10.00	0.06	7.10	4.16	0.21	4.66	7.99	10.80
230			225-228m cp+sph+py+cal thin vein − net												
235			porous gray fragment/essential? dia=2-15cm, replaced or filled with cal, py, hem												
240			237-239.1m fine hyaloclastic part												
			244.7-245.6m amygdaloidal dc fragment?												
245			245.6-247.45m deep green fine part		T-3	246.50									
				Vein	A-5, P-2		248.80	10.00	0.14	8.61	0.38	0.01	4.34	9.57	5.54
250			247.45m, 248.6m sph+gn+cp+py net		X-7	249.20									
			252.10m bottom of hole												
255															

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-3 Geological Columnar Section of MJTE-9 (Appendices) (3)

MJTE-10 (1)

0m – 100m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
0–5		Soil Talus	0-5.0m orange yellow muddy, weathered hematite dacite fragment rich												
5–51.2		Dacite (Dh)	5.0-51.2m pale yellow gray-purplish gray weathered hematite dacite mostly brecciated to fragmented												
17			←flow structur=20-30°												
27			calcite druse												
30			pale purplish in color plagio. bearing												
37					X-8	38.50									
44			pale green altered aphyric dacite												
46			48.8-51.2m muddy matrix breccia hematite dacite angular fragment=fault?												
51.2–56.9		Dacite (Cdc)	51.2-56.9m gray-pale gray brecciated aphyric dacite or hematite dacite												
56.9–101.7		Dacite (Dp)	56.9-101.7m gray-light gray dacite plagio porphyritic, dark gray fracture filling pyrite+clay ↓ gradually change purplish in color with spherulitic texture												
76			light gray and reddish brown patched dacite (hematite dacite?) partly brecciated and calcite net												
85					IP-5 X-9		85.60								
96			gray-purplish gray brecciated to 101.7m												

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Fig.II-2-4 Geological Columnar Section of MJTE-10 (Appendices) (1)

MJTE−10 (2)

100m−200m

DEPTH (m)	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
	Dacite(Dp)													
		101.7-102.4m pale green soft fine dacite?	arg, py	A-6	103.00		10.00	0.20	0.65	<0.01	0.01	0.03	1.99	1.93
				A-7	104.50		20.00	0.04	0.74	<0.01	<0.01	<0.01	6.73	7.90
105		102.4-103.65m dark gray clay alt. dc		A 8	105.00	105.50	50.00	0.06	0.70	<0.01	<0.01	0.01	3.85	4.32
				P-3, X-10		105.50								
		103.65-105.9m dark gray autobrecciated dacite pyrite net rich		IP-6	108.50									
110														
115		←essential elongated fragment rich	py	X-4	115.00									
120	Dacite (Kdc)	gray-dark gray plagio. porphyritic dacite, pyrite ball dots=2-3% pl=2-3mm												
		124-125m fine pyrite film - net	py	P-4 A-9		124.50	30.00	0.19	0.51	<0.01	<0.01	0.01	3.11	2.94
125														
130														
135														
	Dacitic tuff (Kt2)	136.3-141.0m greyish green essential fragmented dacite lava or tuff with accidental sil-dc, aphyric dc fragment		IP-7	138.00									
140				X-11	140.00									
145		dark gray porhyritic dacite pyrite-sulfide=2-4%												
150		fracture filling pyrite+clay												
155														
160														
165	Dacite (Kdc)	←black brecciated matrix filled with sil+pyrite												
170														
175														
180		intensely argillized dacite	py	P-5 A-10		181.50	50.00	0.05	0.48	<0.01	<0.01	0.01	3.65	3.18
			s, arg											
185				X-12	185.50									
		fracture filling pyrite+clay+calcite												
190		green essential fragment pl=1-2mm												
195				IP-8	195.50									
		196.7m pyrite dissemination zone 2cm												
200														

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-4 Geological Columnar Section of MJTE-10 (Appendices) (2)

200m-300m

DEPTH (m)	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
205		205-210m fine crysrtal pyrite filled with fracture, 10-15cm interval	py	A-11	206.00		30.00	0.11	0.79	<0.01	<0.01	<0.01	2.17	1.50
210														
215	Dacite (Kdc)	215-223.6m grayish green compact dacite pl=1-2mm, grandmass:glassy →ch (pyrite <1%)												
220				IP-9	219.50									
				X-13	220.50									
		222.3-222.6m pyrite filling matrix												
225		gray altered dacite/breccia in black sil. matrix		A-12	225.50		30.00	0.19	1.17	<0.01	<0.01	0.01	1.44	1.49
				X-14 A-13		229.50	25.00	0.10	0.89	<0.01	<0.01	0.01	1.32	1.11
230		← pyrite net		A-14	232.30		20.00	0.15	1.17	0.01	<0.01	0.02	4.74	5.65
235		237-239m grey argillic zone(clay) with fine pyrite	arg	A-15	238.50		50.00	0.26	2.94	0.10	0.20	0.16	5.86	6.87
240	Dacitic tuff breccia (Ktl)	239.2-252.1(bottom) deep green tuff breccia and fine tuff fragments of reddish brown dc. amygdal dc. alt. rock, gray dacite												
245				IP-10	245.00									
250		elongated flat essential fragment		X-15	250.00									
255														

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-4 Geological Columnar Section of MJTE-10 (Appendices) (3)

MJTE-11 (1)

0m－100m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
5	o - o / - o - / o - o	Soil Talus	0-5.15m soil and altered rock, hematite dacite fragment												
	L L		5.15-180.5m												
10	L L		dark gray-gray intensely argillized dacite? or tuff? with siliceous ball - fragment pyrite dissemination = 2-5%												
15	L L	Dacite (Cdc?)													
20	L L		←breccia texture	py	A-16	20.50	22.50	200	0.06	0.89	<0.01	<0.01	<0.01	4.38	4.43
	L L		20.5-22.5m dark gray clay zone/with fine pyrite max=15%?		X-16	23.00									
25	L L		milky gray siliceous ball (hyalo-breccia?)												
30	L L		31.5-34.4m dark gray compact/silicified plagio porphyritic dacite? with cp+sph+py veinlets ↓ gradually change	(cp) (sph)	P-6	32.50									
35	L L														
40	L L		argillic altered dacite? pyrite dissemination - net=2-5%	arg	IP-11	40.00									
45	L L		←dark gray siliceous matrix/breccia with fine matrix	s ± k, py	A-17	44.00	45.00	100	0.15	1.07	0.01	<0.01	<0.01	5.20	5.43
50	L L				A-18	51.00	52.00	100	0.16	1.17	0.04	<0.01	0.01	3.71	3.62
55	L L		50.5-50.9m and 52.5-54m gray hard porphyritic dacite sil+ser altered/py-net, cp dot	(cp)											
60	L L	Dacite (Cdc)	pale greenish gray dacite breccia or tuff.												
65	L L														
70	L L		light gray essential fragment?	py											
75	L L		71.9-72.6m black clay with very fine pyrite												
80	L L		78-88.8m dark gray soft clay with pyrite zone pyrite>>cp. dot		A-19	78.00	79.00	100	0.38	0.82	0.17	0.01	0.02	8.35	10.33
				(cp)	A-20	79.00	80.00	100	0.17	1.36	0.13	<0.01	0.01	7.60	7.82
					X-17	80.00									
85	L L		green glass or breccia bearing		A-21	86.00	87.00	100	0.14	0.98	<0.01	<0.01	0.02	6.19	6.95
90	L L		88.8-90.9m hard dark gray dacite	py											
95	L L		pale greenish gray dacite breccia partly quartz druse, lens												
100	L L		←green glass rich zone												

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Fig.II-2-5 Geological Columnar Section of MJTE-11 (Appendices) (1)

MJTE-11 (2)

100m−200m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	SAMPLE FROM (m)	SAMPLE TO (m)	SAMPLE WIDTH (cm)	CHEMICAL ANALYSIS Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			partly flow banded dc? with light gray breccia												
105			←cp dot?		IP-12	105.00									
110			←gray porphyritic elongated lens (essential?)												
115			glassy flow structure, pale green dc-rhy?												
120			118.1-118.2m, 119.0m pyrite+cp vein, dot-diss.												
125			123.8-124.3m clay+pyrite net-diss zone hem+qz rock fragment												
130			127.8-128.2m clay zone/fault?		I-5	129.00									
135		Dacite (Cdc)	pale greenish dacite-rhyodacite, hyalo breccia? pl→cal, py-weak												
140			138.6m, 139.9m py-diss band		X-18	140.00									
145			greenish chlorite, calcite altered brecciated or hyaloclastic												
150															
155															
160			160.1-165m soft clay rich zone, essential fregment? or breccia=pl porphyritic	arg											
165			166-168m pyrite and clay net												
170			←flow band∠40°		IP-13	171.00									
175			reddish brown hem+sil fragment												
180			180.0-180.5m, 181.95-182.4m clay with py zone, fault?		A-22	180.00	180.50	50.00	0.44	5.23	0.06	0.04	0.20	3.41	3.89
185			182.4-222.1m gray-dark gray altered porphyritic dacite-rhyolite intrusive, pl>qz dissemination pyrite=3-5%	arg (S) py											
190		Dacite (Dp)			X-19	190.00									
195			porous alteration with cp, sph dot	(cp) (sph)											
200			197.2m 20cm, clay+py zone												

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Fig.II-2-5 Geological Columnar Section of MJTE-11 (Appendices) (2)

200m-300m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			200.25m sph+cp+py vein	cp sph	A-23	202.00	202.50	50.00	0.24	2.20	0.20	<0.01	1.46	1.43	2.23
					P-7	202.10									
205			gray qz<pl porphyritic dacite		IP-14	202.90									
210		Dacite (Dp)	greenish gray chloritic altered 212m weak py-clay												
215			215-222.1m reddish brown/greenish gray mixed												
220			oxidized(fracture filling)												
225			boundary weavy(30-45°) 222.1-260.0m olive green-grayish green glassy perlitic, rhyolite lava or tuff coarse pl, qz, hornblende(fresh)		X-20	228.50									
230			no visible mineralization weak argillization												
235		Rhyolite (Cry)	massive and lose												
240			fracture filling hematite												
245					IP-15	247.00									
250															
255															
260			calcite veinlets												
			260.0-322.7m sharp boundary(65°) chilled-fine grained												
265			purplish gray - grayish green compact hard dc-qz intrusive												
270		Dacite (Dp)	phenocryst/pl+qz 2-3mm crystal rich weak magnetic												
275			no visible mineralization weak chloritic alteration												
280					X-21	281.00									
285															
290			292.0m shear fracture												
295			brecciated texture with calcite net-vein												
300															

abbreviations qz:quartz, pl or plagio:plagioclase, cal:calcite, ch:chlorite, s or ser:sericite, k:kaolinite, hem:hematite, py:pyrite, sph:sphalerite
cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-5 Geological Columnar Section of MJTE-11 (Appendices) (3)

300m-407.5m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			partly brecciated hard compact dc-qz												
305															
310		Dacite (Dp)	no visible mineralization weak chloritic alteration												
315															
320															
325			322.7-366m pale greenish gray coarse rhyolite weak alt(montmorillonite?)												
330			329-343m olive yellow green bentonitic coarse crystal rich tuff or lava essential fragment in amoeba form		IP-16 X-22 T-6	329.00 330.00 330.50									
335		Rhyolite (Cry)													
340			black glassy aphyric fragment												
345															
350			grayish green altered glassy matrix rich(pearlitic) rhyolite or tuff												
355			reddish hematite banded vein zone												
360			←dark gray glassy porphyritic band-lens												
365															
370			366-366.8m soft brecciated core boundary unclear												
375			366-407.05m greenish gray hard pl>qz porphyritic intrusive bluish green chloritic alt.												
380															
385		Dacite (Dp)	←bluish chlorite on fracture												
390			hematite+chlorite net		T-7 IP-7	390.00 391.50									
395					P 8 X-23		396.40								
400			396-399m decolorization?(sericitization) fracture filling fine pyrite or manganese oxide												
405			407.05m bottom												

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cp:chalcopyrite,gn:galena,dc:dacite,rhy:rhyolite,int:intrusive,alt:alteration,arg:argillization,sil:silicification,diss:dissemination,net:network

Fig.II-2-5 Geological Columnar Section of MJTE-11 (Appendices) (4)

MJTE-12 (1)

0m-100m

Depth (m)	Geological column	Rock name	Description	Alteration and mineralization	Sample No.	From (m)	To (m)	Width (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
		Soil	0-3m surface soil												
5			3-210.3m fragmented core strong argillic pyritic alteration												
10			dark gray-gray altered tuff breccia or brecciated dacite lava												
15			16.4m 20cm coarse pyrite ore												
20															
25			24.3-25.0m coarse pyrite ore		A-24	24.30	25.00	70	0.08	1.50	0.01	0.01	0.03	35.96	39.08
					P-9	25.00									
			pyrite net-dissemination zone		A-25	25.00	26.50	150	0.07	1.17	<0.01	<0.01	<0.01	14.51	15.77
30			27.4-31.4m gray hard porphyritic dacite pl=2x5mm, py+sil alt. ↓ gradually change to brecciated soft part/or tuff?	arg											
35					IP-18	34.70									
			34-36m dark gray sil+clay+pyrite zone	S + K	A-26	34.60	35.60	100	0.10	1.03	<0.01	<0.01	<0.01	26.23	30.01
40		Dacite (Dh?)	←pyrite net rich												
45			←1-2cm aphyric ball rich gradually change ↓												
			45.1-63.6m gray-pale brownish hard dacite jointed/fractured	py	X-24	49.50									
50			47.5-50.7m joint filling coarse pyrite zone	diss	A-27	49.00	50.00	100	0.10	0.65	<0.01	<0.01	<0.01	23.78	27.20
				≀ net	T-8	54.50									
55			plagio porphyritic dacite pl=2-4mm, →altered to white clay												
60					IP-19	61.00									
65			boundary/clay pyrite 63.6-70.0m light gray sericitic altered tuff or dacite breccia? pyrite dissemination and net.												
70			70.0-74.0m pale gray porphyritic dacite with fracture filling pyrite												
75			74-77.4m argillized breccia/tuff?												
80			77.4-80.0m jointed porphyritic dacite 80.0-82.0m argillized hyalo breccia?												
85			82.0-97.0m brecciated jointed porphyritic dc. altered pl=2-5mm		A-28	85.00	85.50	50.00	0.13	0.70	<0.01	<0.01	<0.01	31.81	37.00
90			joint filling pyrite/clay												
95			boundary/porphyritic fragment rich												
100			texture unclear		X-25	100.00									

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-6 Geological Columnar Section of MJTE-12 (Appendices) (1)

MJTE-12 (2)

100m-200m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
			97.3-124.4m gray-light gray argillic altered dacite/tuff?												
105			pyrite dissemination or dot 5-10%												
110			breccia/fracture filling pyrite												
115															
120			dark gray fragment band												
125			124.4-139.5m gray jointed porphyritic dacite partly hard sil,ser,cal altered free from qz phenocryst	arg S + K											
130															
135			←pyrite net rich												
140		Dacite (Dh?)	139.5-159m? brecciated dc/tuff breccia? ←joint filling pyrite	py diss / net											
145			147-148.5m hard porphyry block?												
150			149m~156m argillic zone, soft		X-26	150.00									
155															
160			159-172m pale gray plagio-porphyritic dacite pl→ser/cal pyrite dissemination decrease(2-3%)												
165															
170			←fracture filling fine py+clay ←dark gray coarse - porouse fragment												
175			172-200.5m argillized dacitic breccia/ tuff breccia		IP-20	175.00									
180			pyrite dissemination and net. 180.0m dark gray essential fragment?												
185			187.35-5m clay with pyrite diss.zone												
190			187.5-190.7m light gray siliceous/ser alt zone 193.0m 20cm/medium grain pyrite zone												
195															
200					X-27	200.00									

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-6 Geological Columnar Section of MJTE-12 (Appendices) (2)

MJTE－12 (3)

200m－300m

DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
205			200.5-210.3m intensely argillized tuff? matrix=pumiceous? fine pyrite dissemination 5-10%	arg	A-29	202.00	203.00	100	0.34	0.98	0.01	<0.01	<0.01	5.65	6.34
210					A-30	211.00	212.00	100	1.63	9.77	0.11	0.02	0.70	7.29	8.53
215		Dacite (Cdp)	210.3-223.4m dark gray-gray alt porouse dacite? argillic/pyrite dissemination partly cp, sph, gn? bearing	cp, sph	A-31	218.00	218.50	50.00	0.87	5.05	0.07	0.10	1.39	10.96	6.87
220			←219.4m sph bearing veinlet		P-10	218.00									
			222.6-223.4m dark gray-black clay(fault?) with fine py+cp?		A-32	222.80	223.30	50.00	0.26	4.02	0.01	0.01	0.19	6.73	3.80
225, 230		Dacite (Dp)	223.4-232.1m quartz porphyry intrusive purplish gray hard part/green soft part(sheared) intercalate boundary=80° wavy												
235		Dacitic tuff (Ctf)	232.1-241.8m pale pinkish gray-grayish green dacitic tuff(lapilli bearing) qz, pl, green glass fragment accidental sil rock, red rock		T-9	236.00									
					IP-21	237.50									
240			241.2-241.8m/shear contact		T-28	240.00									
245, 250, 255		Dacite (Dp)	241.8-257.25m pale pinkish gray hard quartz porphyry. magnetic, fresh pl, qz phenocryst=2mm/15-20% hematite in contact												
260		Rhyolite (Rhy)	257.25-260.4m grayish green perlitic rhyolite weak magnetic												
		Andesite/tuff	260.4-263.0m andesite, coarse tuff ferruginous chert mix. zone												
265, 270, 275		Andesite (Do)	263-275.7m dark reddish brown hard massive basaltic andesite sheet? strong magnetic, fresh pl, pyroxene amygdal→chlorite, calcite veinlet boundary hyalobreccia and gradually change		T-10	272.30									
280, 285		Dacite (Cdc)	275.7-338.5m pale greenish gray dacitic~rhy lava(partly autobrecciated) pl, qz phenocryst green spot, accidental fragment		IP-22	286.00									
290, 295, 300			pale brown essential ball?												

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cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-6 Geological Columnar Section of MJTE-12 (Appendices) (3)

300-350. 3m

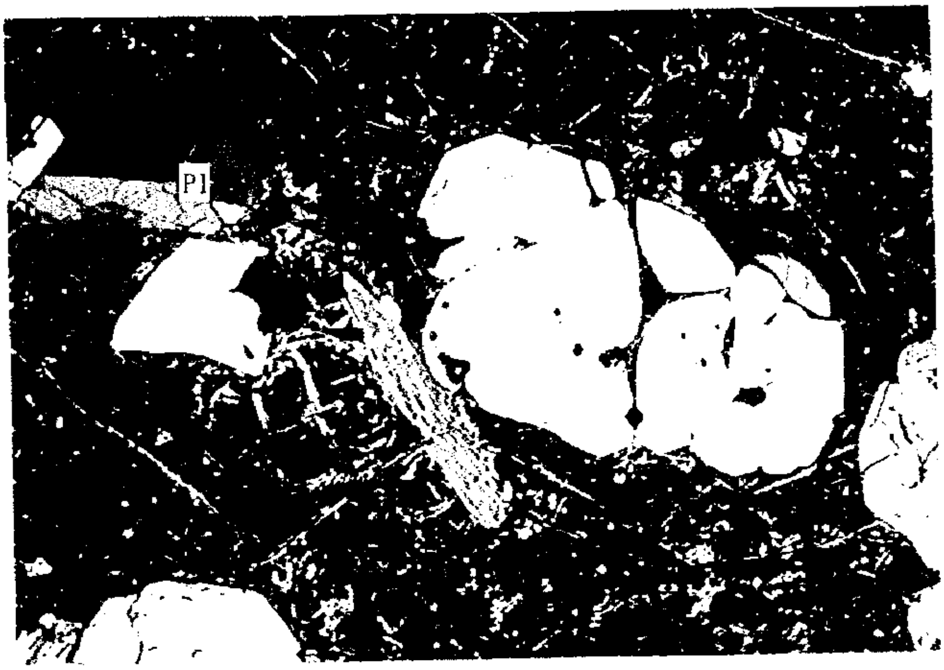
DEPTH (m)	GEOLOGICAL COLUMN	ROCK NAME	DESCRIPTION	ALTERATION and MINERALIZATION	SAMPLE No.	FROM (m)	TO (m)	WIDTH (cm)	Au (ppm)	Ag (ppm)	Cu (%)	Pb (%)	Zn (%)	Fe (%)	S (%)
305					X-29	305.00									
310			←boded green hyalo breccia ball ∠40°												
315			315.5-8 ∠80° qz>>hem vein 5cm width												
					T-11	318.00									
320			arg.altered essential ball dacitic lava?												
325		Dacite (Cdc)													
330			330.4-332.0m silicified very hard porhyritic dacite, pl=2-3mm boundary gradually change												
335					X-30	336.00									
			boundary gradually change												
340		Dacitic tuff (Ctf)	338.5-344.4m dacitic tuff? with green glass ball												
345		Dacite (Kdc)	344.4-350.3m gray hard silicified and pyritized dacite, quartz bearing	py net	T-12 A-33		345.50	50.00	0.09	2.85	<0.01	<0.01	0.02	2.56	1.30
					X-31	347.00									
350					IP-23	350.00									
355															
360															
365															
370															
375															
380															
385															
390															
395															
400															

abbreviations qz:quartz, pl or plagio:plagioclase, cal:calcite, ch:chlorite, s or ser:sericite, k:kaolinite, hem:hematite, py:pyrite, sph:sphalerite
cp:chalcopyrite, gn:galena, dc:dacite, rhy:rhyolite, int:intrusive, alt:alteration, arg:argillization, sil:silicification, diss:dissemination, net:network

Fig.II-2-6 Geological Columnar Section of MJTE-12 (Appendices) (4)

Appendix (2)
Photomicrograph

Lower nicol



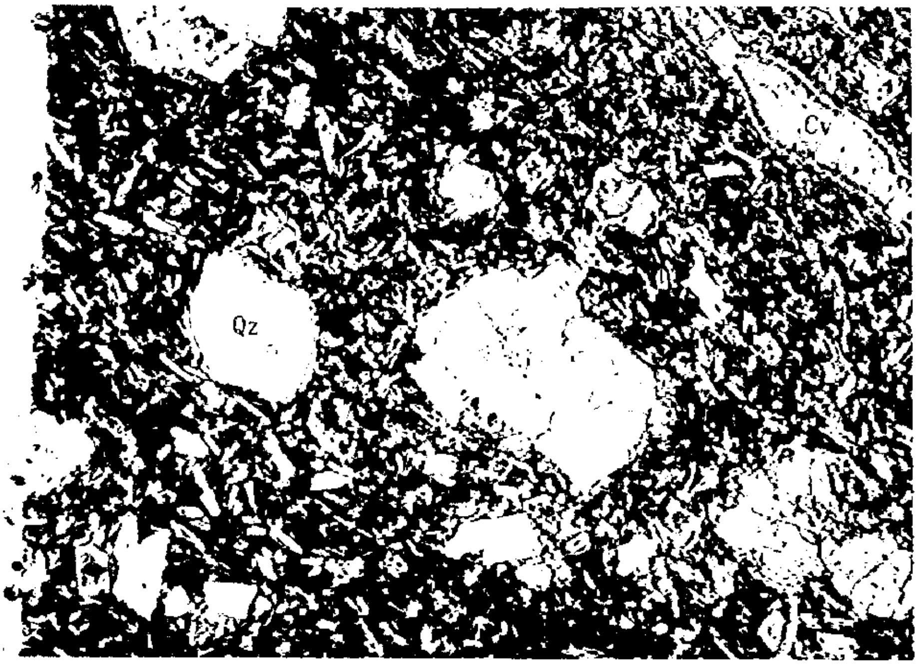
crossed nicols

0__________1mm

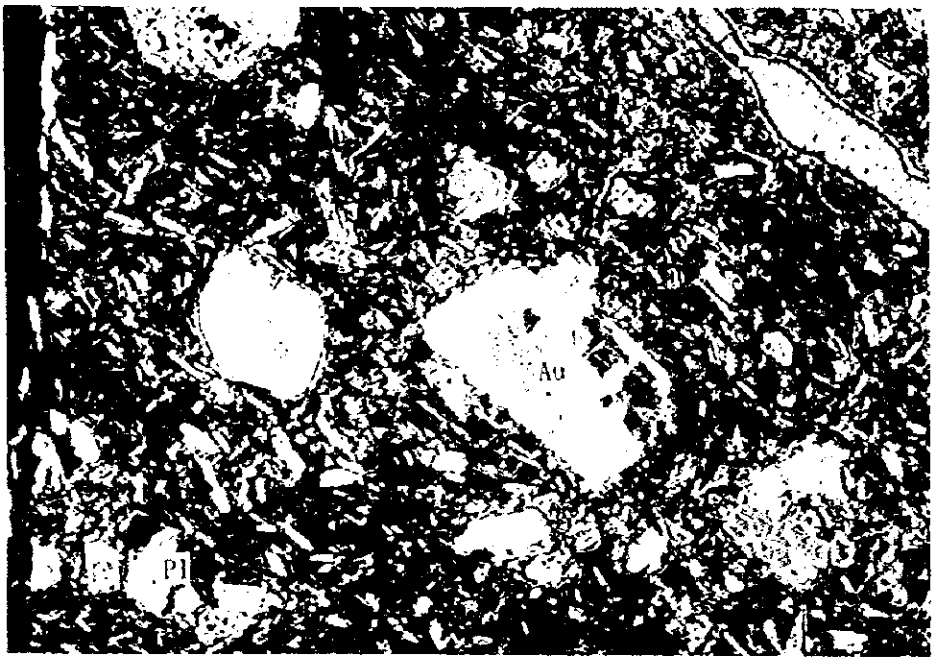
Location: MJTE-11, 330.5m

Sample type: Rhyolite(Cry)

Note:Qz=quartz, Ho=hornblende, Pl=plagioclase, Gl=glass



Lower nicol



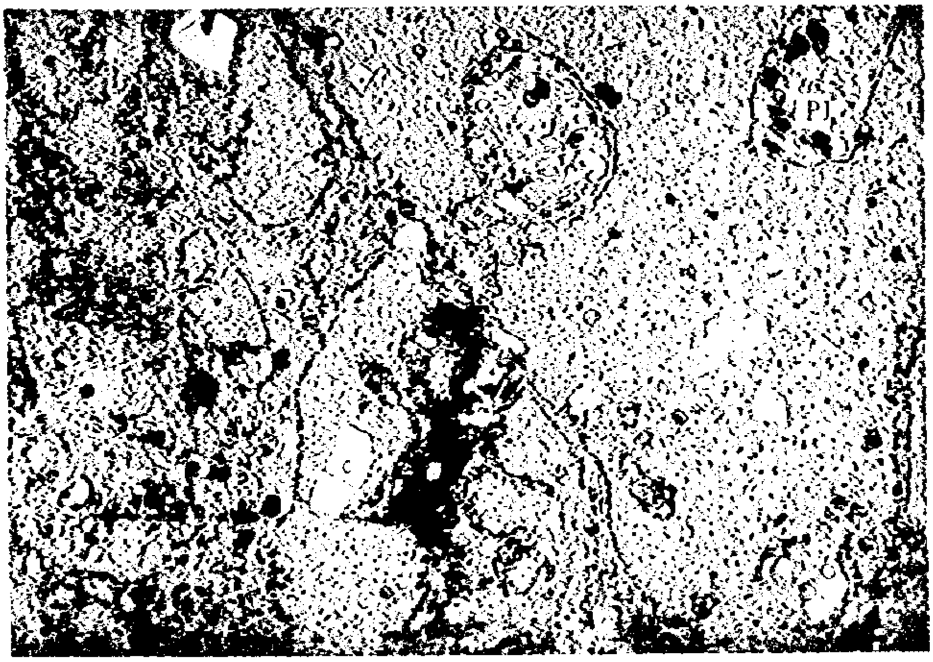
crossed nicols

0__________1mm

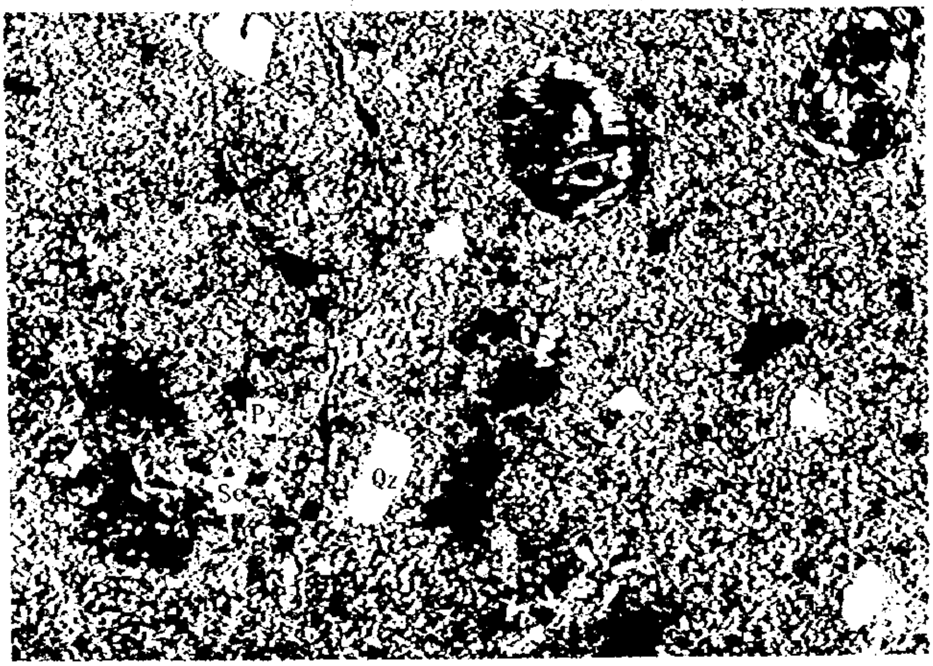
Location:　MJTE-12, 272.3m

Sample type: Basaltic andesite(Do)

Note　　　: Au=augite, Pl=plagioclase, Qz=quartz, Cv=cavity



Lower nicol



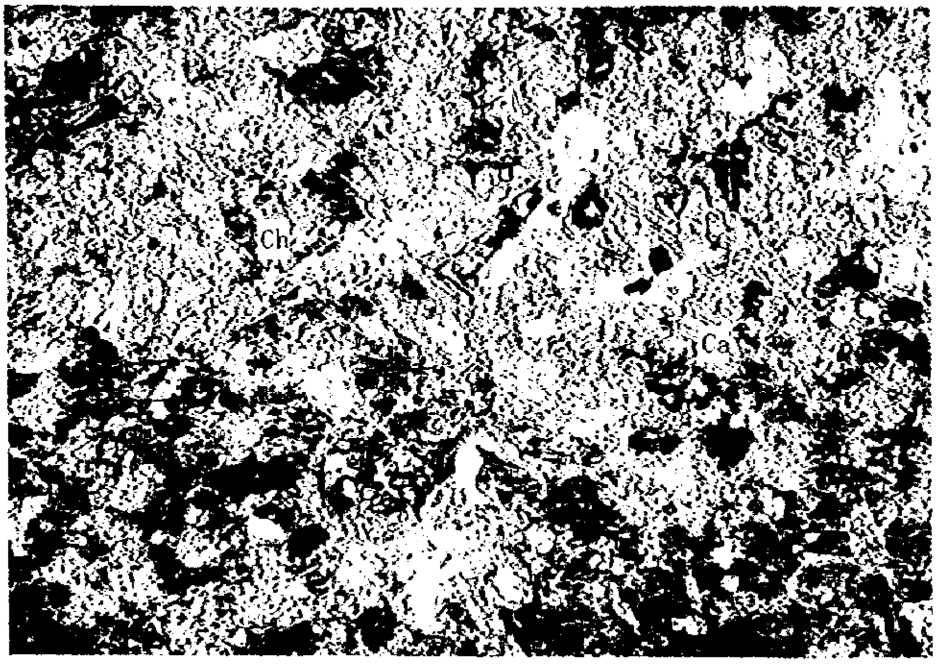
crossed nicols

0 1mm

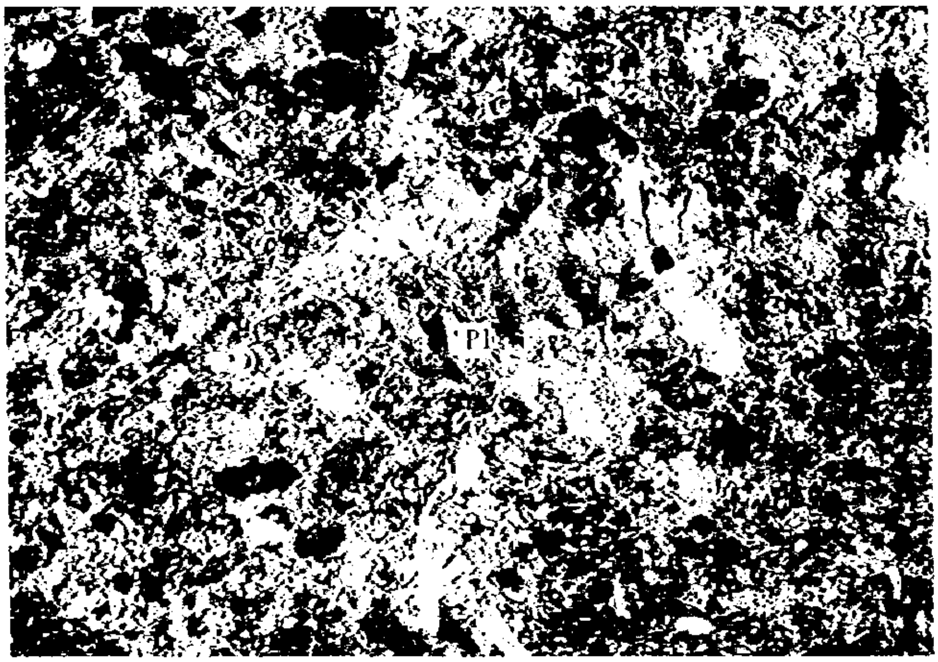
Location: MJTE-12, 345.5m

Sample type: Dacite (Kdc)

Note : Pl=plagioclase, Qz=quartz, Py=pyrite, Se=sericite



Lower nicol



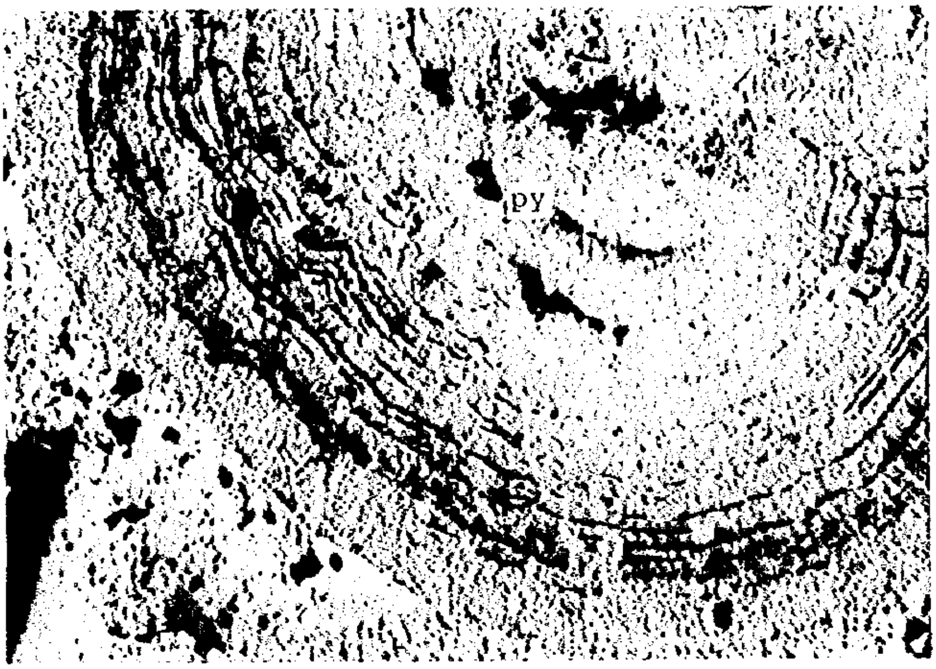
crossed nicols

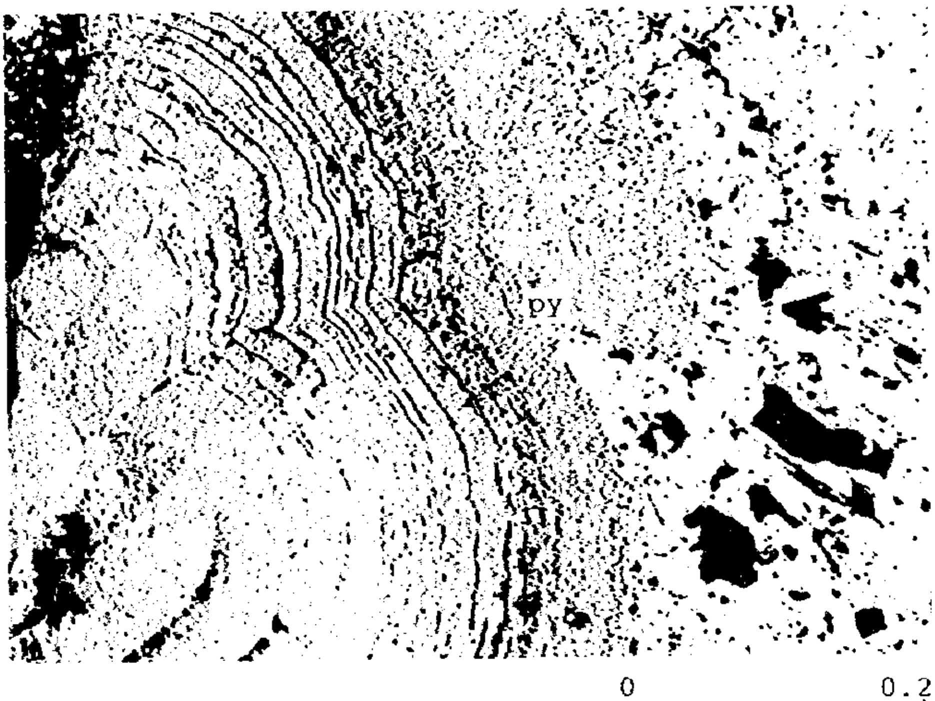
0______1mm

Location: MJTE-9, 246.5m

Sample type: Dacitic tuff(Kt1)

Note : Pl=plagioclase, Ca=calcite, Se=sericite, Ch=chlorite



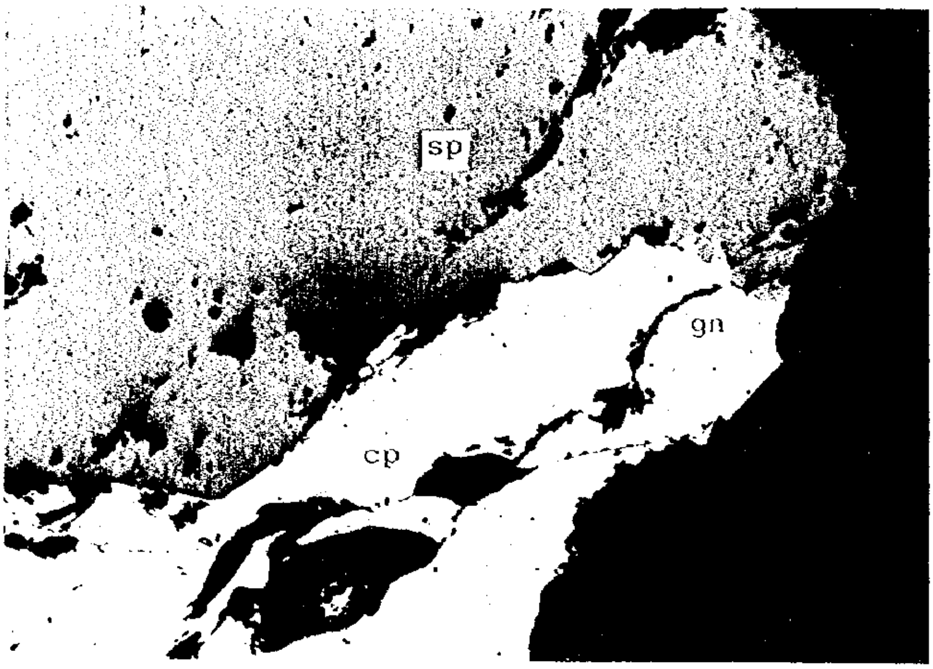


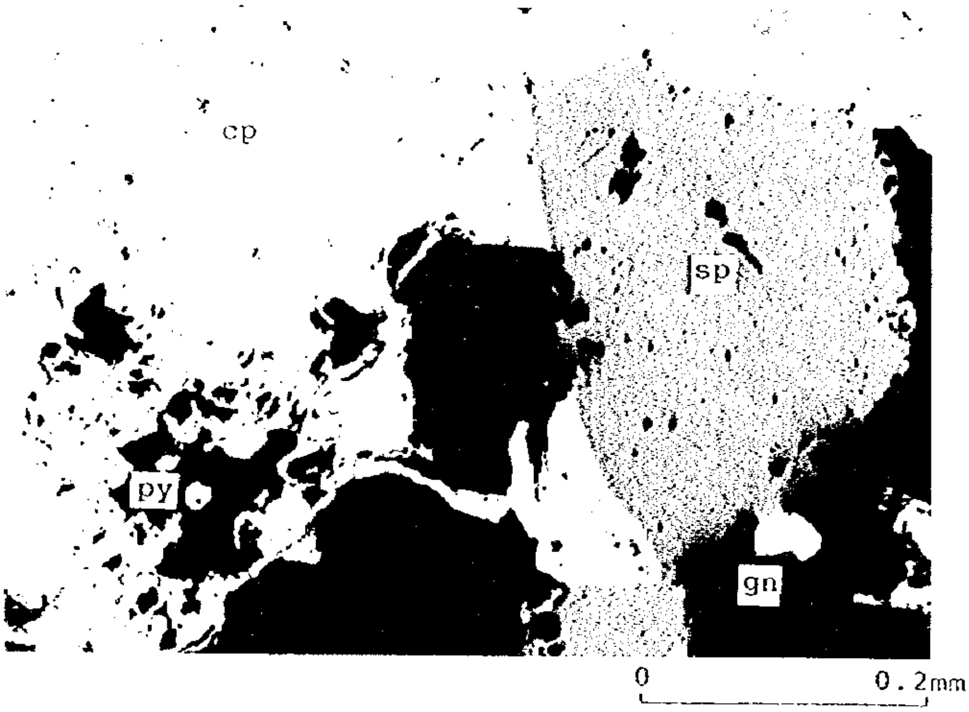
0 0.2mm

Location : MJTE-10, 181.5m

Sample type : Dissemination ore.

Note : py:pyrite(colloform)

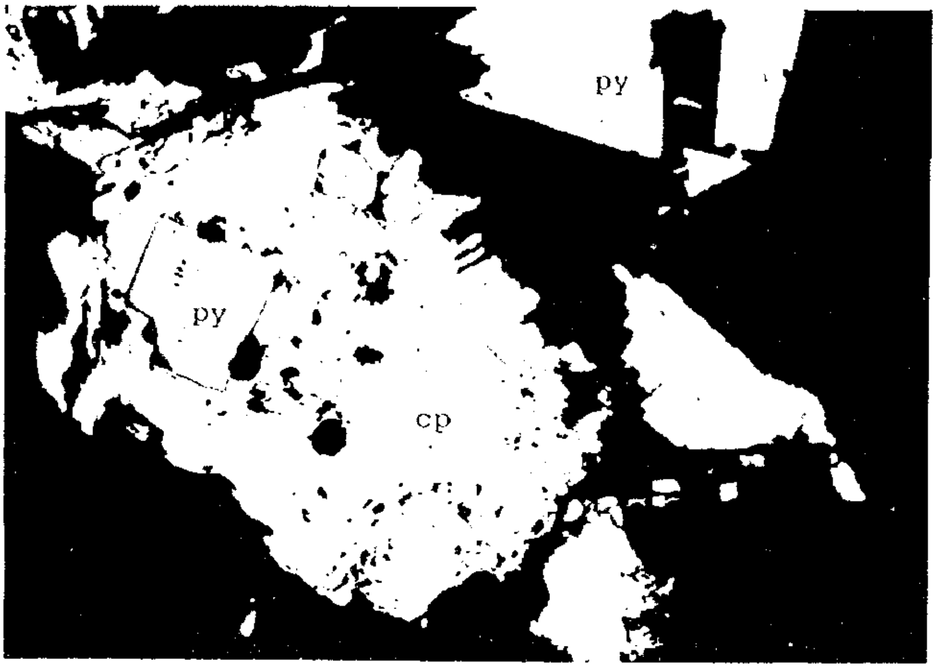




Location : MJTE-9, 227.6m

Sample type : Chalcopyrite - sphalerite vein

Note : cp:chalcopyrite, sp:sphalerite, gn:galena, py:pyrite



Location : MJTE-11, 32.5m

Sample type : Chalcopyrite vein.

Note : cp:chalcopyrite, py:pyrite

Location : MJTE-12, 25.0m

Sample type : Massive pyrite ore.

Note : py:pyrite

JICA