dolomite and serpentine are identified as the component minerals of skarn samples. Dikes which underwent silicification and skarnization comprize quartz, smectite, or combinations of sericite and chlorite.

For the measurement of homogenization temperature of fluid inclusions, samples collected from silicified rocks, quartz veins and skarns were used. Minerals measured were vein-like or network-like quartz and calcite. The measurements of homogenized temperature ranged approximately between 100℃ and 360℃. In case of samples measured by calcite, the temperature ranged from 102℃ to 167℃ while samples measured by quarts ranged from 101℃ to 362℃. The homogenization temperatures of the samples collected from spots where Au grade of 0.2 g/t or higher was confirmed(T-11L1, T-18L6 and P-875L1) fell within a range of 162℃ - 238℃. These were the samples taken from silicified rocks or quartz veins.

2-2-4 Conclusive summary and consideration

In the Bulutkan district, the syenodiorite body showing the border in the WNW-ESE direction intrudes into the Kokpatas Formation. Generally, in the district, fractures and faults develop in the NW-SE ~ E-W directions, along which dikes of lamprophyre, diorite and syenodiorite intrude abundantly. These dikes, also observable in the syenodiorite body, are presumed to have been formed mainly after the intrusion of the syenodiorite body. The fractures and dikes are accompanied by silicification and skarnization.

Gold mineralization are observed in skarns or near fracture zones in the NW-SE ~ E-W directions.

From these facts, the mineralization at the Bulutkan district is considered to have been accompanied by intrusion of the syenodiorite body and controlled by faults and fractures chiefly in the NW-SE ~ E-W directions. The strongest mineralization is seen in the Kokpatas Formation along the syenodiorite body whilst, at zones away from syenodiorite bodies, mineralization presumably extends all over the Bulutkan district along faults and fractures.

The homogenization temperatures of fluid inclusions of samples in which gold mineralization was observed are more or less 200℃. This is concordant with the Phase II interpretation that high-temperature skarnization(h-temp: 250℃-350℃) was followed by lower-temperature(150℃-250℃) gold mineralization.

From these observations, the gold mineralization in the Bulutkan district is considered to have advanced accompanying the hydrothermal process controlled by faults and fractures mainly in the NW-SE ~ E-W directions, subsequent to the skarnization process accompanying activities of the syenodiorite stock.

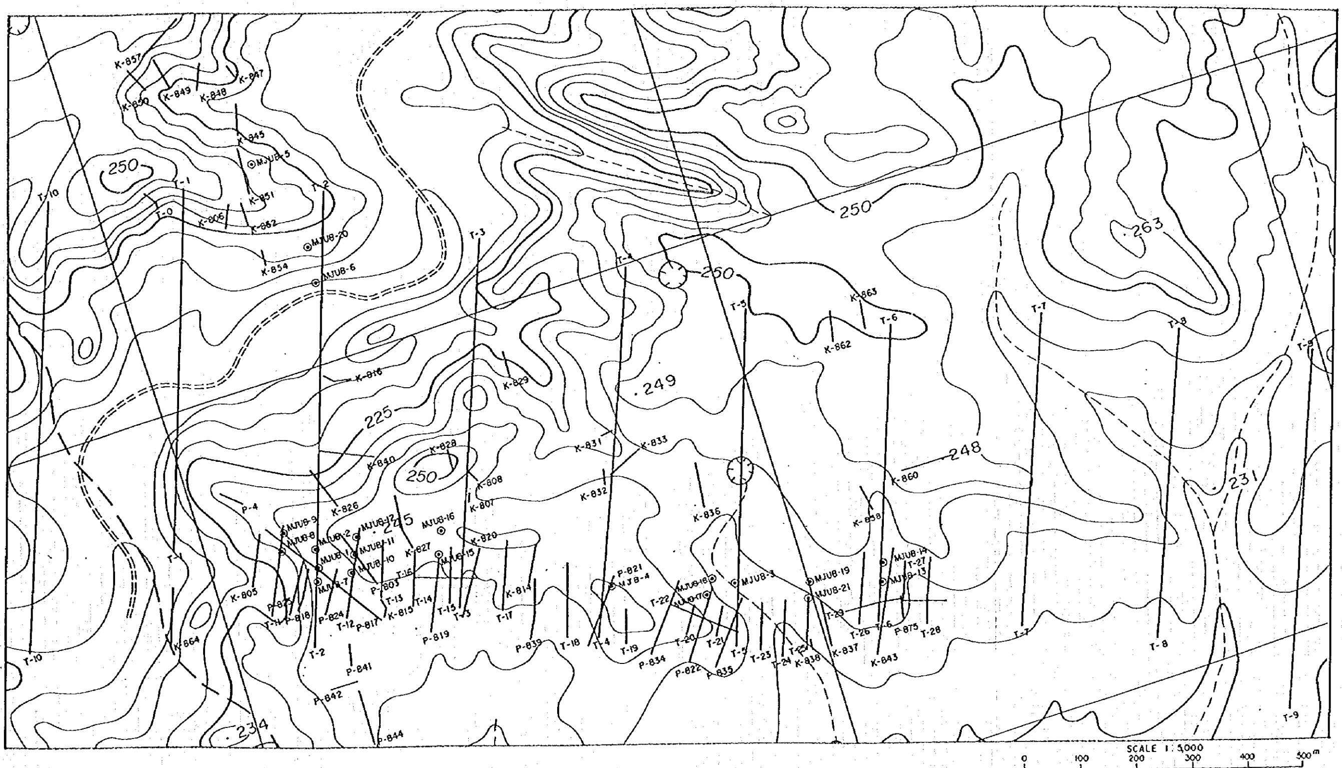

Fig. II-2-2-1　　Location Map of the Trenches and Drillholes

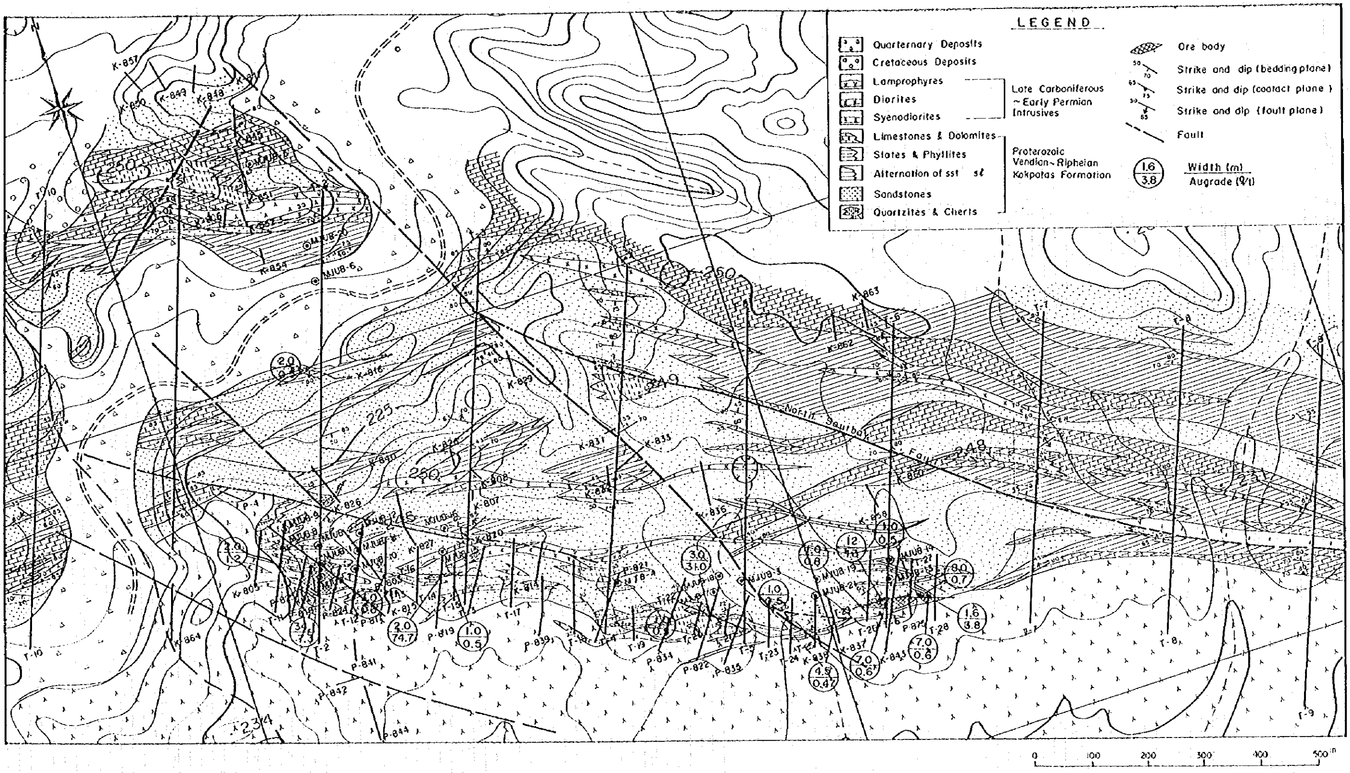

Fig. II-2-2-2 Major Mineralized Zones Caught by Trenches

Table II-2-2-1 Major Mineralized Zones Caught by Trenches (1)

Trench No.	Position (m)~(m)	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
T−11	80.0~ 82.0	2.0	1.2	tr	0.01	0.02	tr	0.04	Skarnized limestone and fracture zone.
T−13	22.0~ 23.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified and skarnized sandstone with iron oxide.
	29.0~ 32.0	3.0	0.6	tr	tr	tr	tr	tr	Silicified and skarnized metasomatite with iron oxide.
	96.0~ 97.0	1.0	0.2	1.6	tr	tr	tr	0.01	Brecciated quartzite with silicification.
T−14	19.0~ 20.0	1.0	0.2	tr	0.05	tr	tr	tr	Silicified sandstone.
	40.0~ 41.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified sandstone with iron oxide.
T−15	1.0~ 2.0	1.0	0.4	tr	tr	tr	tr	0.01	Sandstone.
	23.0~ 24.0	1.0	0.5	tr	tr	tr	0.01	tr	Silicified sandstone.
	49.0~ 50.0	1.0	0.2	tr	tr	tr	0.01	0.01	Silicified sandstone.
T−16	22.0~ 23.0	1.0	0.2	tr	tr	tr	tr	tr	Silicified alternation (ss >> sl) with iron oxide.
	31.0~ 32.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified alternation (ss >> sl) with iron oxide.
	37.0~ 38.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified sandstone with iron oxide.
T−17	101.0~102.0	1.0	0.3	tr	tr	tr	tr	tr	Diorite.

Table II-2-2-1 Major Mineralized Zones Caught by Trenches (2)

Trench No.	Position (m)~(m)	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
T-18	48.0~ 49.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified hornfels with iron oxide.
	84.0~ 86.0	2.0	0.2	tr	tr	tr	tr	tr	Silicified and skarnized alternation (ss >> sl).
	93.4~ 95.3	1.9	0.2	tr	tr	tr	tr	0.04	Silicified quartzite and sandstone.
	98.0~102.0	4.0	0.3	tr	tr	tr	tr	tr	Silicified quartzite, sandstone and fracture zone.
	104.0~106.0	2.0	0.2	tr	tr	tr	tr	tr	Quartzite
	108.0~110.0	2.0	0.4	19.6	0.06	tr	tr	tr	Silicified quartzite with quartz and iron oxide.
T-19	25.0~ 27.0	2.0	0.2	tr	0.01	tr	tr	tr	Silicified slate with iron oxide.
T-20	36.0~ 37.0	1.0	0.5	1.8	tr	tr	tr	tr	Silicified quartzite with iron oxide in fracture zone.
T-21	13.0~ 14.0	1.0	0.3	2.2	tr	tr	tr	0.06	Quartzite with iron oxide.
	34.0~ 36.0	2.0	0.3	1.8	tr	tr	tr	tr	Sandstone with iron oxide.
T-22	119.0~120.0	1.0	0.3	tr	0.09	0.02	tr	tr	Silicified rock.
T-23	22.0~ 23.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified and skarnized limestone with iron oxide.
	26.0~ 27.0	1.0	0.3	tr	tr	tr	tr	tr	Silicified and skarnized limestone with iron oxide.
	30.0~ 31.0	1.0	0.2	tr	tr	tr	tr	tr	Silicified and skarnized limestone with iron oxide.

Table II-2-2-1 Major Mineralized Zones Caught by Trenches (3)

Trench No.	Position (m)~(m)	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
T−24	55.0~56.0	1.0	0.2	2.6	tr	0.02	tr	tr	Silicified sandstone with iron oxide.
	62.0~63.0	1.0	0.5	tr	tr	tr	tr	tr	Silicified sandstone with iron oxide.
T−25	29.0~30.0	1.0	0.3	1.8	tr	tr	tr	tr	Silicified alternation (ss >> sl) with iron oxide.
	45.0~46.0	1.0	0.3	tr	tr	0.01	tr	tr	Quartz vein.
	53.0~54.0	1.0	0.2	tr	tr	tr	tr	tr	Quartzite with iron oxide.
T−26	-30.0~-29.0	1.0	0.8	tr	tr	tr	tr	tr	Quartzite
	-19.0~-18.0	1.0	0.4	tr	tr	tr	tr	tr	Brecciated quartzite with iron oxide.
T−27	23.0~24.0	1.0	0.5	tr	tr	tr	tr	tr	Lamprophyre.
	28.0~29.0	1.0	0.2	tr	tr	tr	tr	tr	Silicified alternation (ss >> sl) in fracture zone with iron oxide.
P 875	26.0~28.0	2.0	0.3	tr	0.01	tr	tr	tr	Silicified slate.
	34.0~38.0	4.0	0.3	tr	0.01	tr	tr	tr	Lamprophyre.
T−28	22.0~23.0	1.0	0.4	tr	tr	tr	tr	tr	Syenodiorite.
	32.0~33.0	1.0	0.2	tr	0.02	tr	tr	0.02	Silicified quartzite with iron oxide.
	36.0~37.0	1.0	3.8	tr	0.01	tr	tr	tr	Fractured quartzite with iron oxide and quartz veins.

Table II-2-2-1 Major Mineralized Zones Caught by Trenches (4)

Trench No.	Position (m)~(m)	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
T-29	46.0~ 48.0	2.0	0.3	tr	0.02	tr	tr	0.01	Silicified and skarnized sandstone with iron oxide.
	52.0~ 64.0	12.0	1.3	tr	0.02	0.02	tr	tr	Brecciated quartzite with chalcedony and iron oxide.
	66.0~ 67.0	1.0	0.2	1.8	tr	tr	tr	tr	Brecciated quartzite with druesy quartz and iron oxide.
	77.0~ 84.0	7.0	0.4	tr	0.02	tr	tr	tr	Silicified hornfels with iron oxide.
	104.0~110.0	6.0	0.4	5.9	0.02	tr	tr	0.01	Sandstone with iron oxide.
	125.0~133.0	8.0	0.6	1.3	0.03	tr	tr	tr	Silicified sandstone with iron oxide.
	136.0~143.0	7.0	0.6	2.2	0.02	0.02	tr	tr	Silicified sandstone with iron oxide.
	144.0~147.0	3.0	0.3	tr	0.02	tr	tr	tr	Silicified and limestone with iron oxide.

2-3 Geophysical Survey

2-3-1 Purpose of survey

The transient electromagnetic (TEM) survey was carried out to (1) to grasp the extensions of the gold mineralization zone confirmed in the phase II survey, (2) to clarify the relationship between the alteration zone and the geological structures, and (3) to pick up prospects in the survey area , by means of electrical resistivity.

2-3-2 Methods of survey

1) Principles

The transient, time-domain electromagnetic method, often referred to as TEM, is a method in which the ground is energized by man-made magnetic field and its response is measured as a function of time to determine the resistivity of the earth beneath observation point as a function of depth.

In this method, a steady current is passed through a loop of wire usually situated on the surface of the earth which is inductively linked to the earth. The fact that loop sources, which have no direct contact with the earth, can be used makes this method suitable in areas where high surface resistivities prohibit the use of conventional direct current methods. This would include regions covered by desert, sand dunes or extrusive volcanics.

When the loop current is abruptly interrupted, the secondary magnetic field arises due to eddy currents induced in the earth. The eddy currents migrate from the transmitter loop into the earth as shown in Fig. II-2-3-1. Since the pattern of migration of the eddy current resembles the propagation of a cigarette smoke, the pattern is called as 'smoke ring'. The receiver coil output voltage depends upon the underground resistivity structure. Given a resistive medium, the receiver coil output voltage, which is proportional to the time rate of change of the secondary magnetic field, is initially large but decays rapidly. The response of a good conductors is initially lower but the voltage decays slower.

Thus the receiver coil output voltage measured at surface can be converted into apparent resistivity as a function of time and analyzed to determine the resistivity of the earth at depth.

The TEM method was selected for this survey for the following reasons; (1) stability of the transmitter signal, (2) lack of distortion due to near surface heterogeneity, such as static shift in magnetotelluric method, (3) no near field phenomena as in frequency

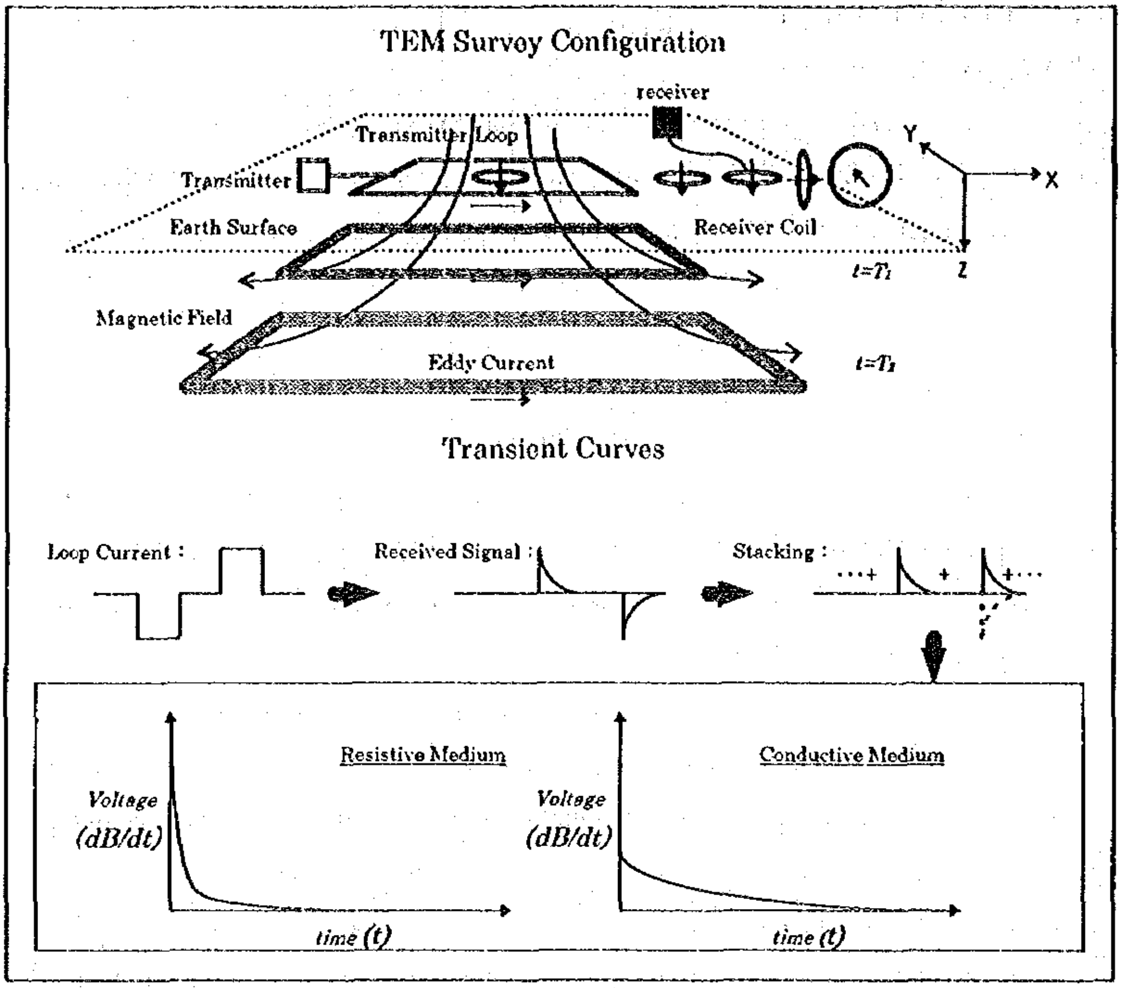

Fig.II-2-3-1 TEM Survey Configuration and Transient Curves

domain electromagnetic methods using artificial source, (4) uniqueness of the results, and (5) high production rate by using ungrounded source and receiver in rock desert.

2) Equipment

The specifications of TEM measurement system which was used in this survey are listed in Table II-2-3-1. These system are manufactured by Geonics Ltd., of Canada. The primary component of the system are a receiver, a sensor coil, and a transmitter.

The receiver, a PROTEM (D) unit, samples the coil response at a series of time gate that are delayed by a prescribed amount from each turn-off of the loop current. There are 20 geometrically spaced time gates for each repetition rate as listed in the Table II-2-3-1. Decay voltages were recorded at three EM-47 transmitter repetition rates (285Hz(high),

Table II-2-3-1 Specifications of TEM Survey Equipments

Equipment	Specifications
PROTEM (D) Receiver	Measured Quantity: Time rate of decay of induced magnetic field Repetition Rate: 0.3, 0.75, 3, 7.5, 30, 75 and 285 Hz Time Gates: 20 geometrically spaced time gates for each repetition rate gives range from 6 μs to 800 ms Dynamic Range: 23 bits(132dB) Synchronization: (1) Reference cable (2) High stability quartz crystal
Receiver Coil	Air-cored Coil Effective Area: 31. 4 m^2
EM-47 Transmitter	Current Wave Form: Bipolar rectangular current with 50 % duty cycle Repetition Rate: 30, 75, 285 Hz Maximum Current: 3 A Output Voltage: 0 to 9 V, continuously variable (at 1A load) Turn-Off Time: 2.5 μ sec at 2 ampares into 40 x 40 m loop

Table II-2-3-2 Sampling Time Gates

Gate No.	Repetition Rate			Gate No.	Repetition Rate		
	285 Hz (high)	75 Hz (medium)	30 Hz (low)		285 Hz (high)	75 Hz (medium)	30 Hz (low)
1	6.813	35.25	88.13	11	77.94	319.8	799.4
2	8.688	42.75	106.9	12	99.38	405.5	1014
3	11.13	52.50	131.3	13	126.7	514.8	1287
4	14.19	64.75	161.9	14	166.4	654.3	1636
5	18.07	80.25	200.6	15	206.0	832.3	2081
6	23.06	100.3	250.6	16	262.8	1059	2648
7	29.44	125.8	314.4	17	335.2	1349	3373
8	37.56	158.3	395.6	18	427.7	1719	4297
9	47.94	199.8	499.4	19	545.6	2190	5475
10	61.13	252.5	631.3	20	695.9	2792	6978

unit: μsec

75Hz(medium), and 30Hz(low)) during the course of this survey. The EM-47 is a battery powered transmitter that can supplies 3 amperes of maximum current. A reference cable was used to establish precise timing between transmitter and receiver.

3) Measurement

In this survey, a small, square transmitter loop 40 m on a side was energized with current of 2.5 A. At each site, a receiver coil was located at the center of the square transmitter loop. The transmitter and the receiver were connected by a reference cable to be synchronized. Measurements were done at high repetition rate for all the site, and additional measurement were done at medium repetition rate and/or low repetition rate at each site. Records were stacked mostly 256 times and maximum 1,024 times for windy condition.

4) Data processing

In the first stage of the data processing, after the editing of data, the decay voltages at each time gates are transformed into late-time apparent resistivity values, by normalization with respect to field data measurement parameters such as loop dimensions, receiver gain, current and sounding geometry.

The voltages, V_0 (in unit of mV), which are measured by the PROTEM receiver are converted to magnetic field decay rate, dB/dt (nV/m^2) by following formula (Geonics, 1992).

$$\frac{dB}{dt} = \frac{V_0 \cdot 19200}{E \cdot 2^n}$$

where E is the receiver coil moment (m^2), and n is amplifier gain setting. Apparent resistivities ρ_a (ohm-m) as a function of time (t) by,

$$\rho_a(t) \cong \frac{\mu}{4\pi t_c}\left(\frac{2\mu M}{5t_c\, dB/dt}\right)^{2/3}$$

in which, μ is magnetic permeability ($4\pi * 10^{-7}$ in unit of H/m), t_c is measurement time or the time gate in seconds, and *M* is transmitter moment which is the product of the loop area (m^2) and current (A).

An automatic one dimensional inversion technique was used to generate resistivity models composed up to 15 layers. In this process, the resistivities of the layers of a initial model (half space model) , which is chosen by the inversion program, are iteratively changed and response curves are computed to determine the model whose response fits the observed data. The models are restricted by the condition in which resistivities of each layer change smoothly. Imaging sections obtained by this technique can visualize underground structures without artificial parameterization.

On the other hand, Occam's inversion tends to give fictitious layer above and below true boundary which has high resistivity contrast. A conventional inversion technique using unconstrained non-linear least square method were also used to examine the results in some sites.

The program which we have used in this survey is "TEMIX-XL" developed by Interpex Ltd of United States of America.

2-3-3 Results of survey

The location of survey lines and sites are shown in Fig. II-2-3-3. In the Phase II survey, TEM and TDIP measurements conducted along 10 survey lines (from L-1 to L-10) confirmed five zones showing high resistivity and high IP values (chargeability), similar to the Bulutkan deposit, in the Kokpatas Formation, north of the syenodiorite stock. In the Phase III survey, TEM measurement were conducted at 10 m interval along 13 survey lines from L-11 to L-23 through the area where these five anomalous zone were found. On L-13 and L-16, the measurement were conducted at 20m interval in the northern part of the lines (No.50-No.60). The measurement were also conducted at 20m interval on L-23. The steel materials and equipment around the shaft in west of L-14, prevents measurement at No.22 and No.24 of L-14, and these material seems to distort electromagnetic signal at some sites (No.19, No.20, No.23, No.25, No.26, and No.27). For this reason, the results from those sites was not reliable.

Data measured in the Phase II survey were re-interpreted and examined with data collected at 631 sites in the Phase III survey.

In explanation of the results, resistivity shall be classified as follows:

Resistivity Range					Description
less than			10	ohm-m	Very Conductive (Very low resistivity)
from	10	to	100	ohm-m	Conductive (Low resistivity)
from	100	to	1,000	ohm-m	Medium resistivity
from	1,000	to	10,000	ohm-m	Resistive (High resistivity)
more than			10,000	ohm-m	Very resistive (Very high resistivity)

1) Resistivity Structure Section

Fig. II-2-3-4 (1)-(6) show resistivity structure sections derived from TEM data in the Phase III survey and the results of re-interpretation of the Phase II data.

The features of resistivity distribution found in each section and its geological interpretations are described in Table II-2-3-3.

The features of resistivity distribution found in the sections are summarized as follows;

① The area underlain by syenodiorite is correlated with medium - high resistivity zone near the surface. Near the contact of the syenodiorite and the sedimentary rocks, resistivity is lower than in the southern edge of survey area.

② In the central part of the survey area, resistive - very resistive zones extend along northern boundary of syenodiorite. The shallower zones are located closer to the boundary. The area contains these zones seems to dip northward apparently. In some sections, the shallower resistive - very resistive zone and deeper zone are divided by relatively conductive zone.

Near-surface resistive - very resistive zones are scattered in the northern part of survey area. These resistive-very resistive zones are less continuous than those along the northern boundary of syenodiorites stock.

③ The northern part of the survey area is underlain by conductive zone, which appears to be layered structure. This zone tend to become thick northward. This zone is correlated with the area underlain by slate and limestone. Near the cross points of survey lines and the Northern Sautbay Fault, lateral discontinuities in the layered resistivity structure.

1) Resistivity Structure Map

Resistivity structure maps at the level of 200m A.S.L., 150m A.S.L., and 100m A.S.L in Fig.II-2-3-5(1)-(3), respectively.

① 200m A.S.L.

The resistive - very resistive zones extends in the WNW-ESE direction thorough the southern edge of the survey area and Bulutkan Ore deposit. The southern half of the survey area shows medium - very high resistivity and the rest of the area is conductive - very conductive. The resistivity distribution is controlled by the WNW-ESE trend and the NNE-SSW trend.

② 150m A.S.L.

The WNW-ESE trend is dominate in the resistivity distribution. Resistive - very resistive zones extend in the WNW-ESE direction thorough the southern edge of the survey area and Brutkan Ore deposit. The southern half of the survey area shows medium - very high resistivity and the rest of the area is conductive - very conductive. The very conductive zone in the northern part of the survey area bounds by Northern Sautbay Fault.

③ 100m A.S.L.

The WNW-ESE trend is dominate in resistivity distribution. Resistive - very resistive zones extend in the WNW-ESE direction thorough the southern edge of the survey area and Bulutkan Ore deposit. These zone is more continuous than those at the level of 150m A.S.L. Between the survey line L-1 and L-18, the location of the resistive zone shifts to the north from the location of these zone at the level of 200m A.S.L.

2-3-4 Discussion and Summary

1) Relationship between the survey results and the mineralization zone

Fig.II-2-3-6 shows the relationship between the geophysical survey results and the location of the ore manifestations. The boundary of the low IP value area in the Phase II survey is shown in the figure. The resistive - very resistive zone located north of the IP boundary are also shown in the figure. The shallow zones (shallower than 50 meters from the surface) are indicated by solid red colored pattern and the deep zones (deeper than 50 meters from the surface) are indicated by hatched pattern. Most of the ore manifestations caught in the trenching survey are located within the shallower resistive - very resistive zones adjacent to the IP boundary. From the comparison of results among the trenching survey, the drilling survey and the geophysical survey, IP boundary is correlated with the northern contact of syenodiorite stock and sedimentary rocks and the adjacent shallow resistive - very resistive zone correlate with diorite dikes, quartzite, silicified zone and the area where many quartz veins are developed.

Most of the ore manifestations caught by drilling survey at the level of 100-150m A.S.L. are located within the deeper resistive - very resistive zones. From the comparison of the results among the drilling survey and the geophysical survey, these zones are correlated with dikes of syenodiorite and diorite, quartzite, silicified zone, skarnized metasomatite and the area where many quartz veins are developed .

In the Phase III survey, detailed distribution of these resistive - very resistive zone has been confirmed. These zones extend in the WNW-ESE direction, but the discontinuities of these zones are found on the survey lines L-14, L-19 and L-5. The distribution of the resistive zones in the syenodiorite stock is also controlled by these discontinuities. The top of the deeper resistive zone is deepening in west of L-14. The shallow resistive zones are joined with the deep resistive zones in L-2, L-15, L-7, L-3 and L-4.

The prominent directions of faults in the survey area are the WNW-ESE and the NNE-SSW directions. The resistivity distribution of the survey area is also controlled by this directions. If the density of the fractures filled with ground water is also dominated for these directions in the syenodiorite stock, it becomes more conductive than massive part of the stock.

2) Summary of the geophysical survey results

The results of the geophysical survey in Bulutkan District is summarized as follows:

① The area underlain by syenodiorite is correlated with medium - high resistivity zone near the surface. Near the contact of the syenodiorite and the sedimentary rocks, resistivity is lower than in the southern edge of survey area.

② In the central part of the survey area, resistive - very resistive zones extend along northern boundary of syenodiorite. The shallower zones are located closer to the boundary. The area contains these zones seems to dip northward apparently.

③ The northern part of the survey area is underlain by conductive zone, which appears to be layered structure. This zone tend to become thick northward. This zone is correlated with the area underlain by slate and limestone.

④ The horizontal distribution of resistivity is controlled by major fault directions, WNW-ESE and NNE-SSW.

⑤ Most of the ore manifestations caught in the trenching survey are located within the shallower resistive - very resistive zones adjacent to the IP boundary. From the comparison of results among the trenching survey, the drilling survey and the geophysical survey, IP boundary is correlated with the northern contact of syenodiorite stock and sedimentary rocks and the adjacent shallow resistive - very resistive zone correlate with diorite dikes, quartzite, silicified zone and the area where many quartz veins are developed.

⑥ Most of the ore manifestations caught by drilling survey at the level of 100-150m A.S.L. are located within the deeper resistive - very resistive zones. From the comparison of the results among the drilling survey and the geophysical survey, these zones are correlated with dikes of syenodiorite and diorite, quartzite, silicified zone, skarnized metasomatite and the area where many quartz veins are developed .

⑦ In this survey, detailed distribution of resistive - very resistive zone related with gold mineralization has been confirmed.

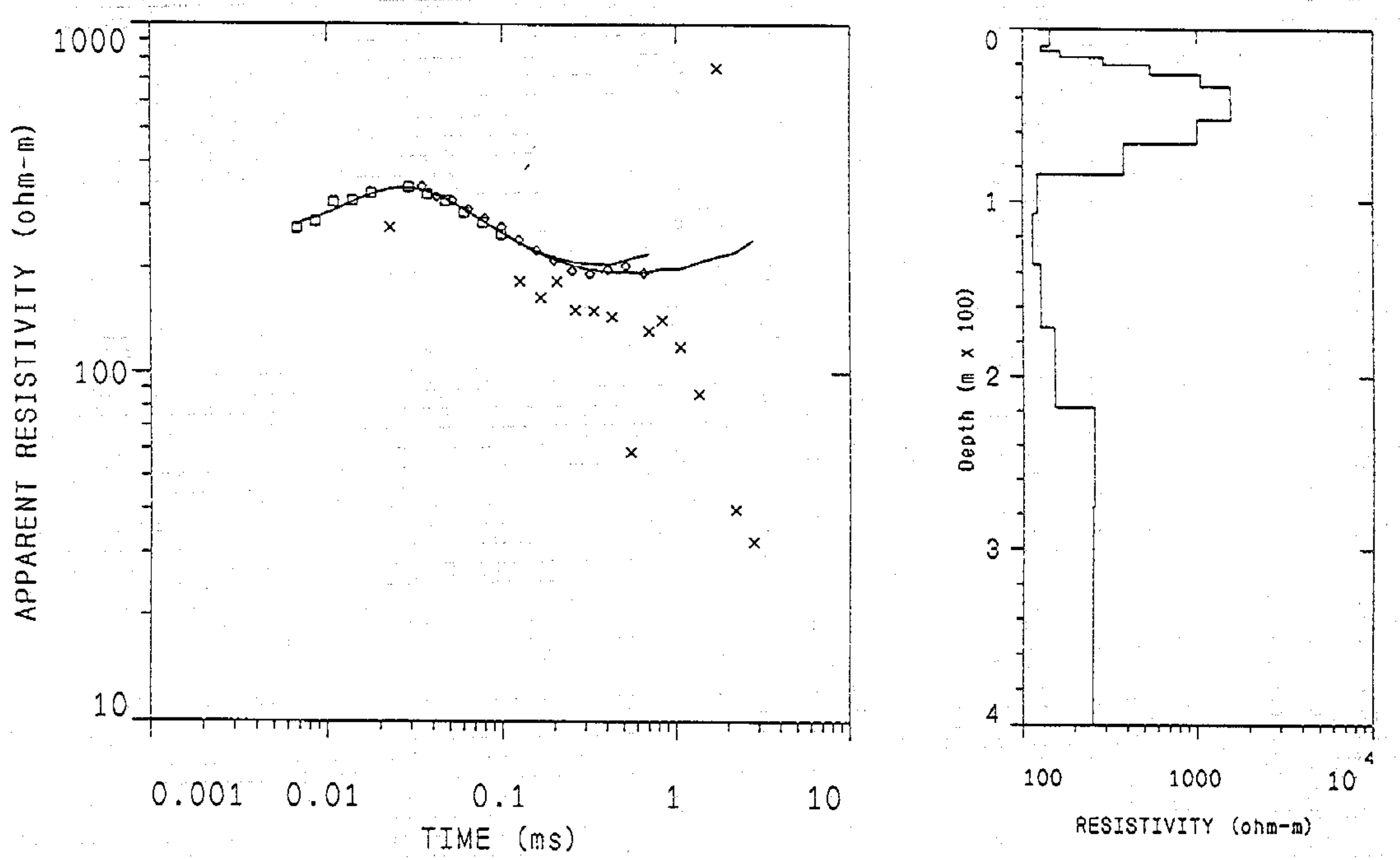

Fig. II-2-3-2 Example of Cccam's Inversion Results

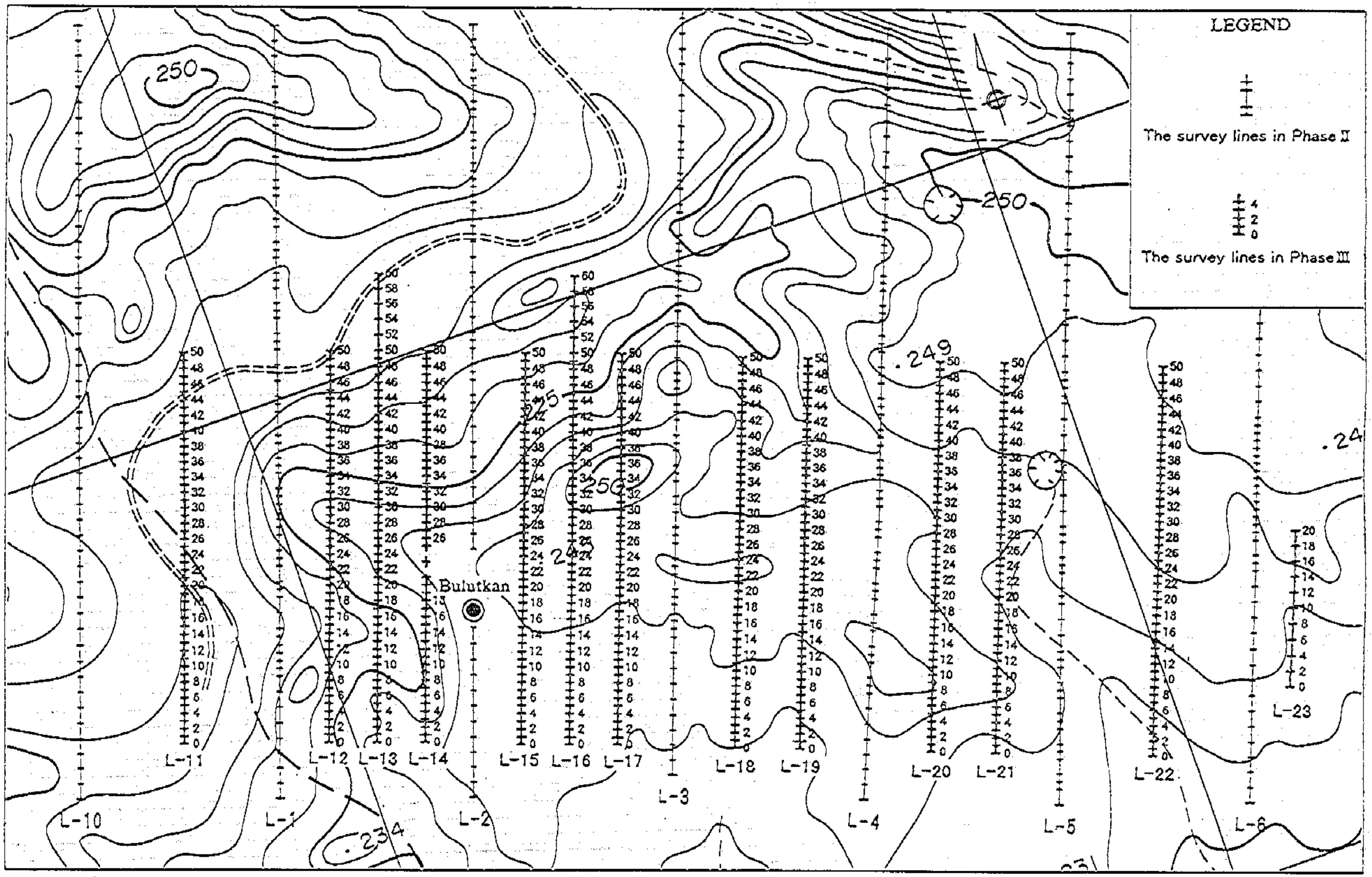

Fig. II-2-3-3 Locations of TEM Survey Lines and Sites

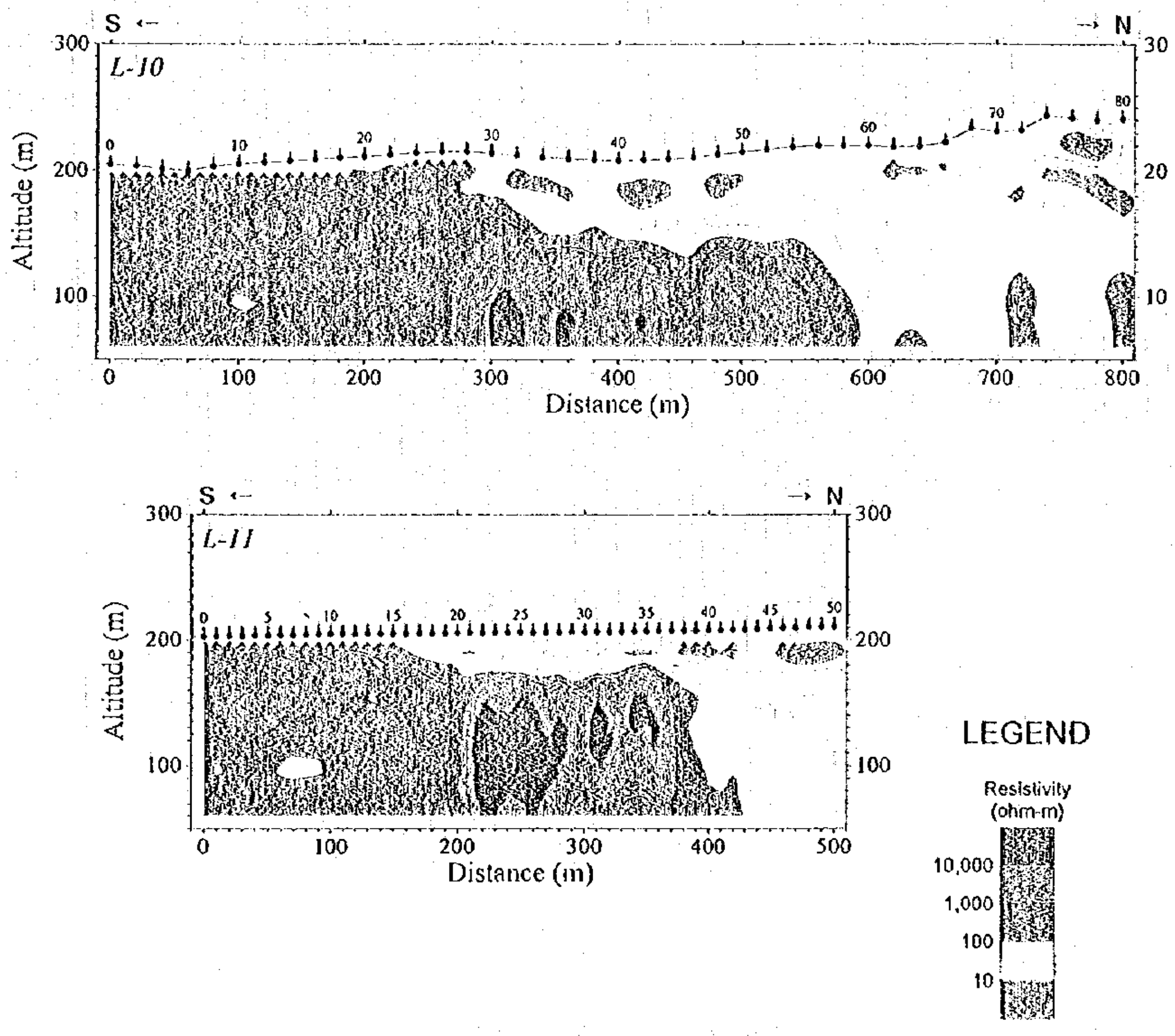

Fig. II -2-3-4(1) Resistivity Structure Sections (Line-10 and Line-11)

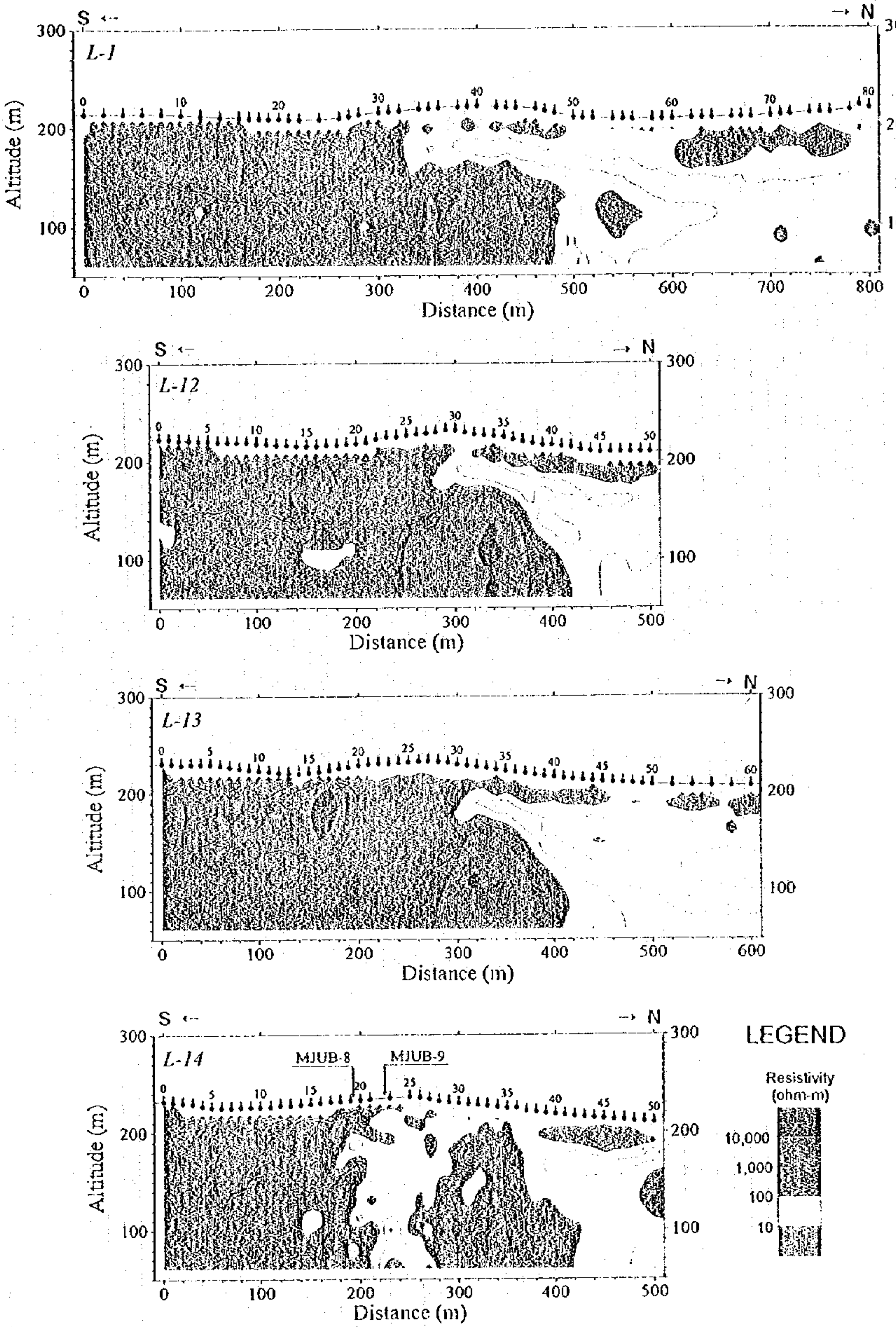

Fig. II-2-3-4(2) Resistivity Structure Sections (Line-1, Line-12, Line-13 and Line-14)

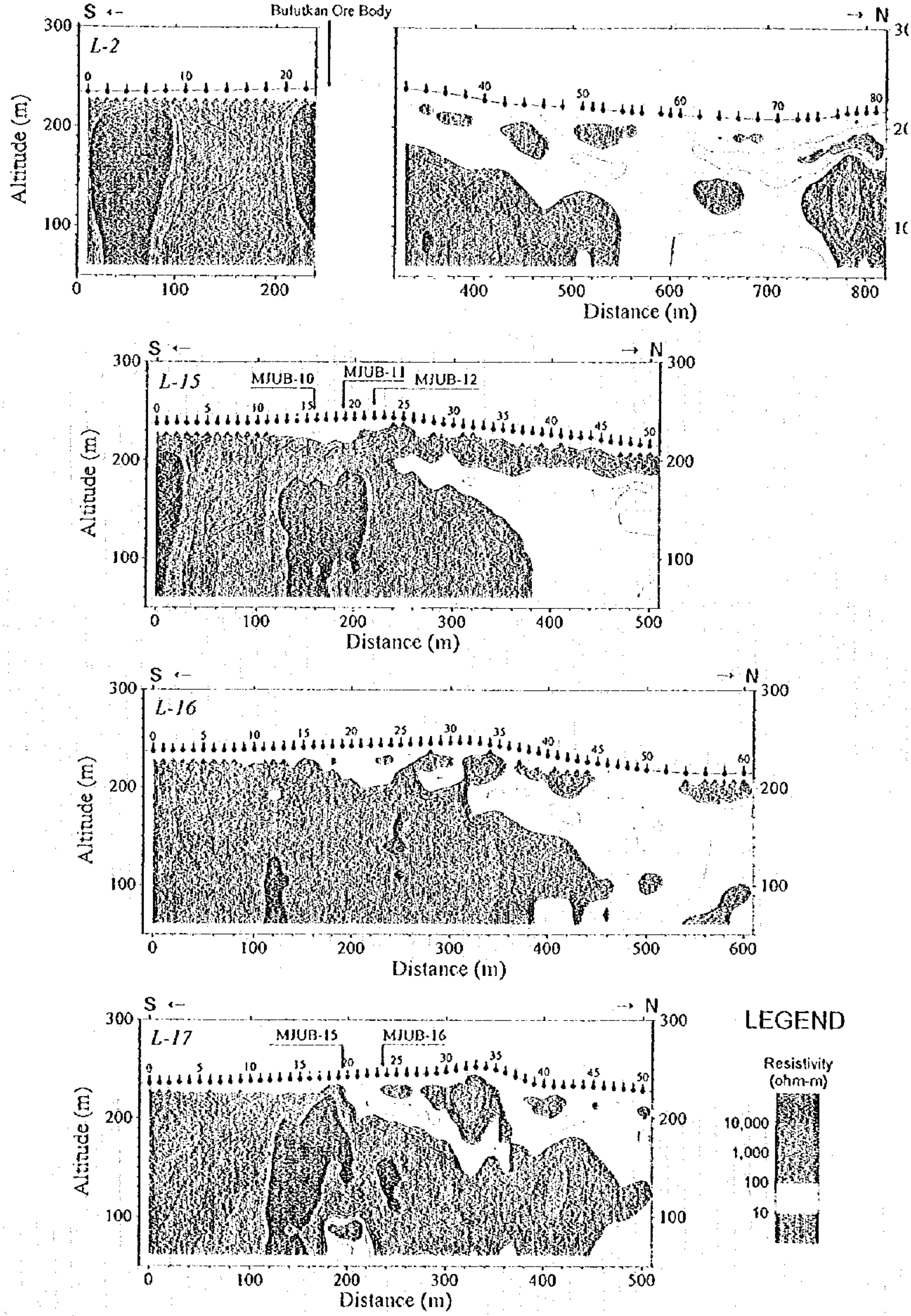

Fig. II-2-3-4(3) Resistivity Structure Sections (Line-2, Line-15, Line-16 and Line-17)

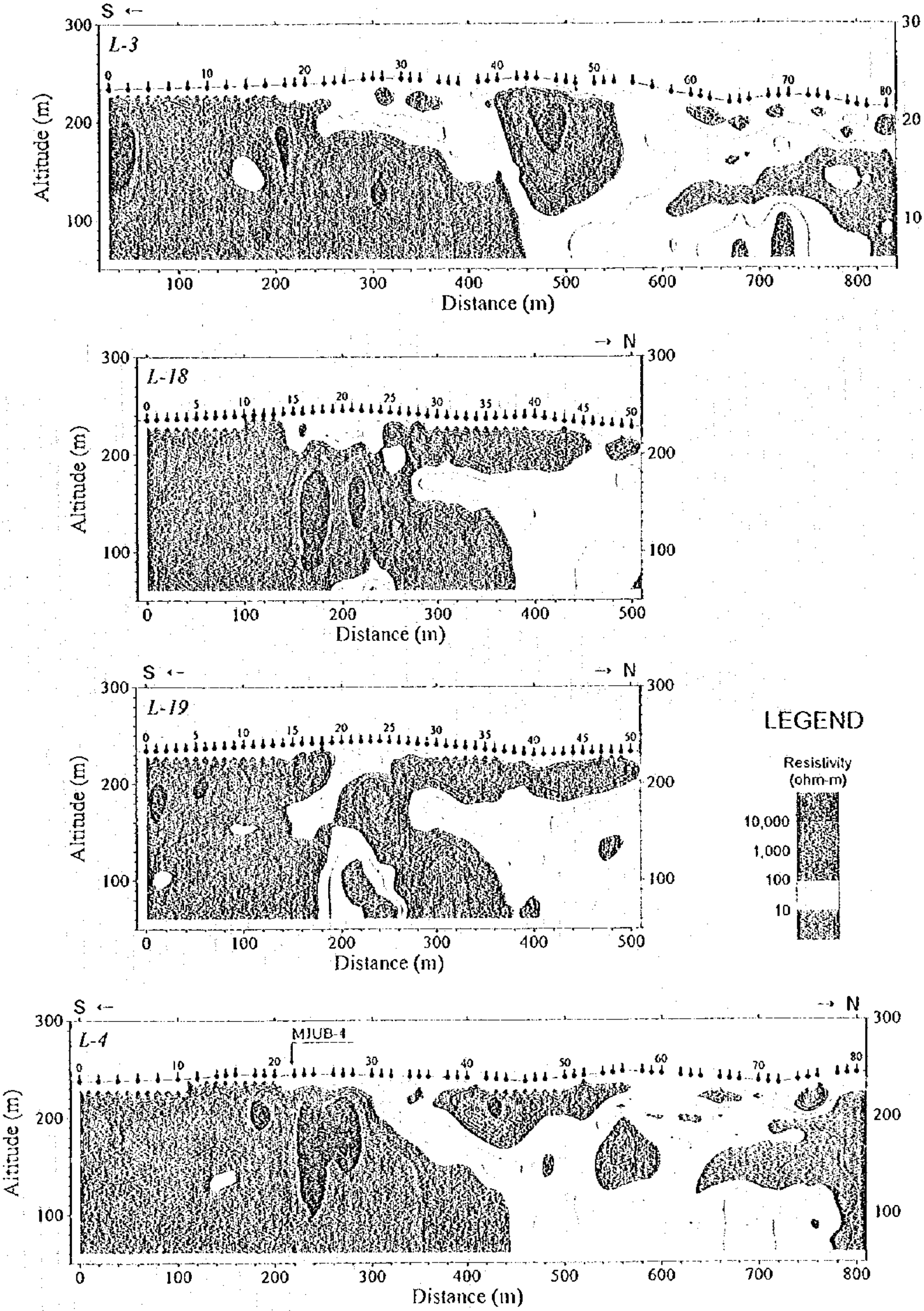

Fig. II-2-3-4(4) Resistivity Structure Sections (Line-3, Line-18, Line-19 and Line-4)

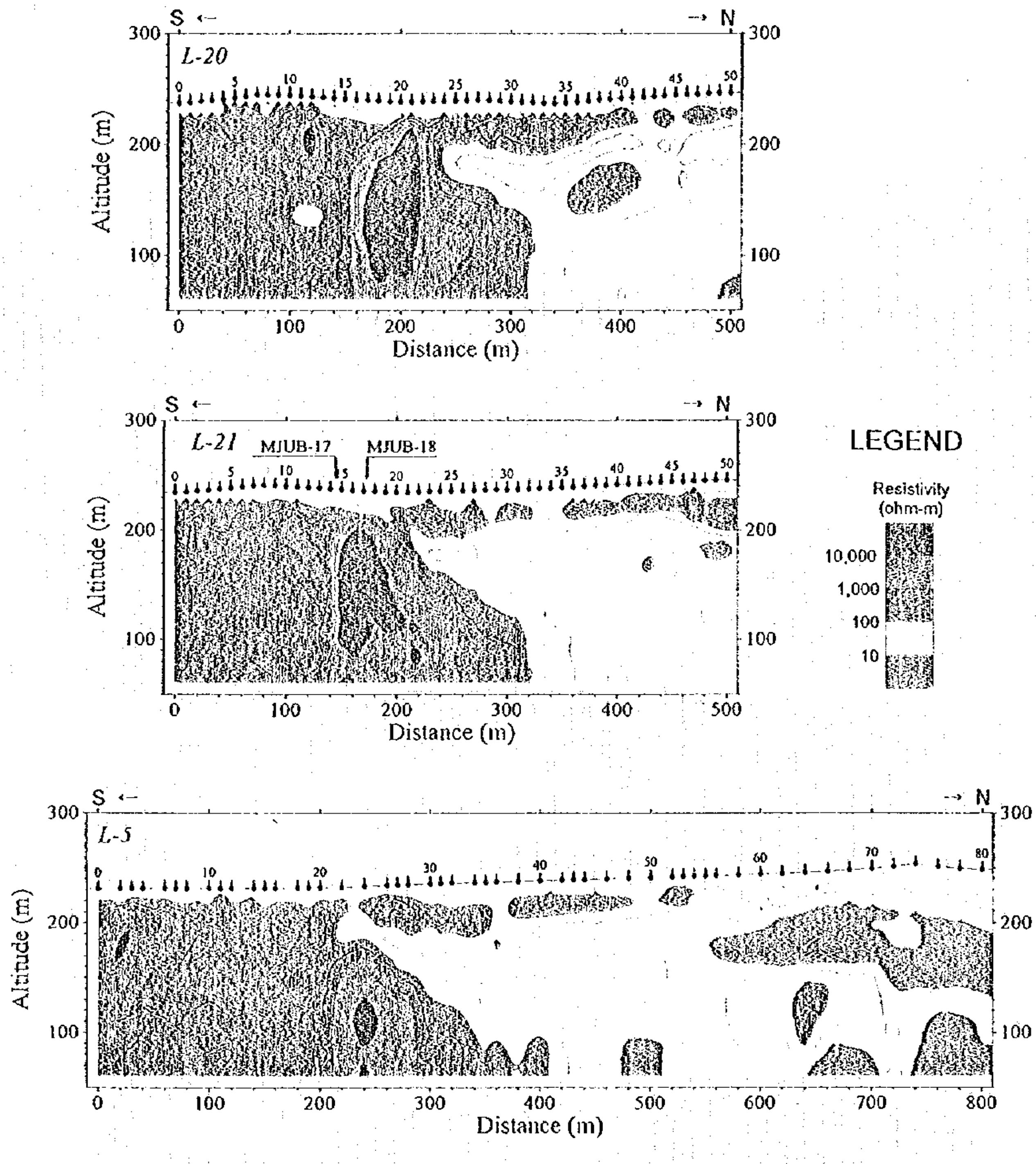

Fig. II-2-3-4(5) Resistivity Structure Sections (Line-20, Line-21 and Line-5)

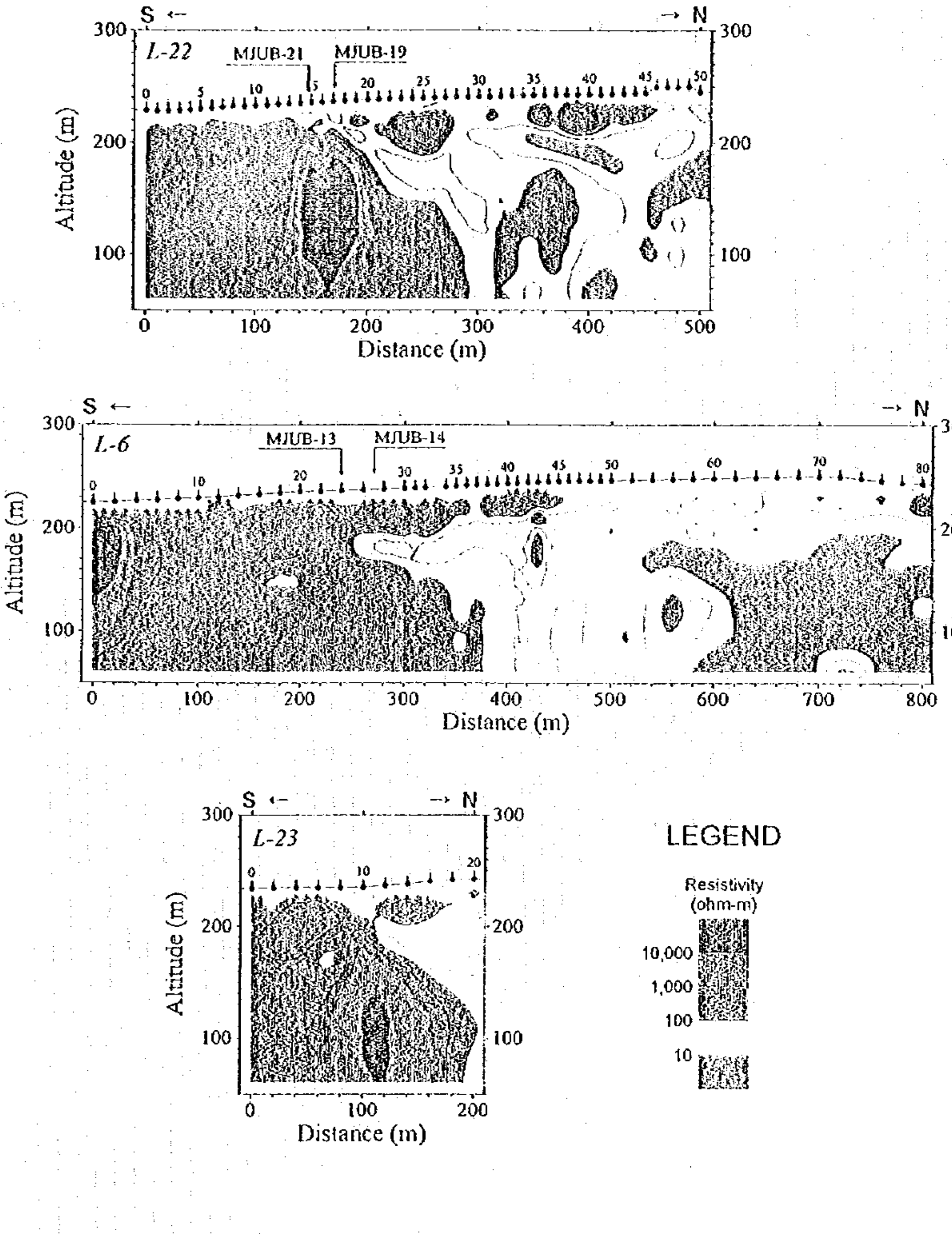

Fig. II -2-3-4(6) Resistivity Structure Sections (Line-22, Line-6, and Line-23)

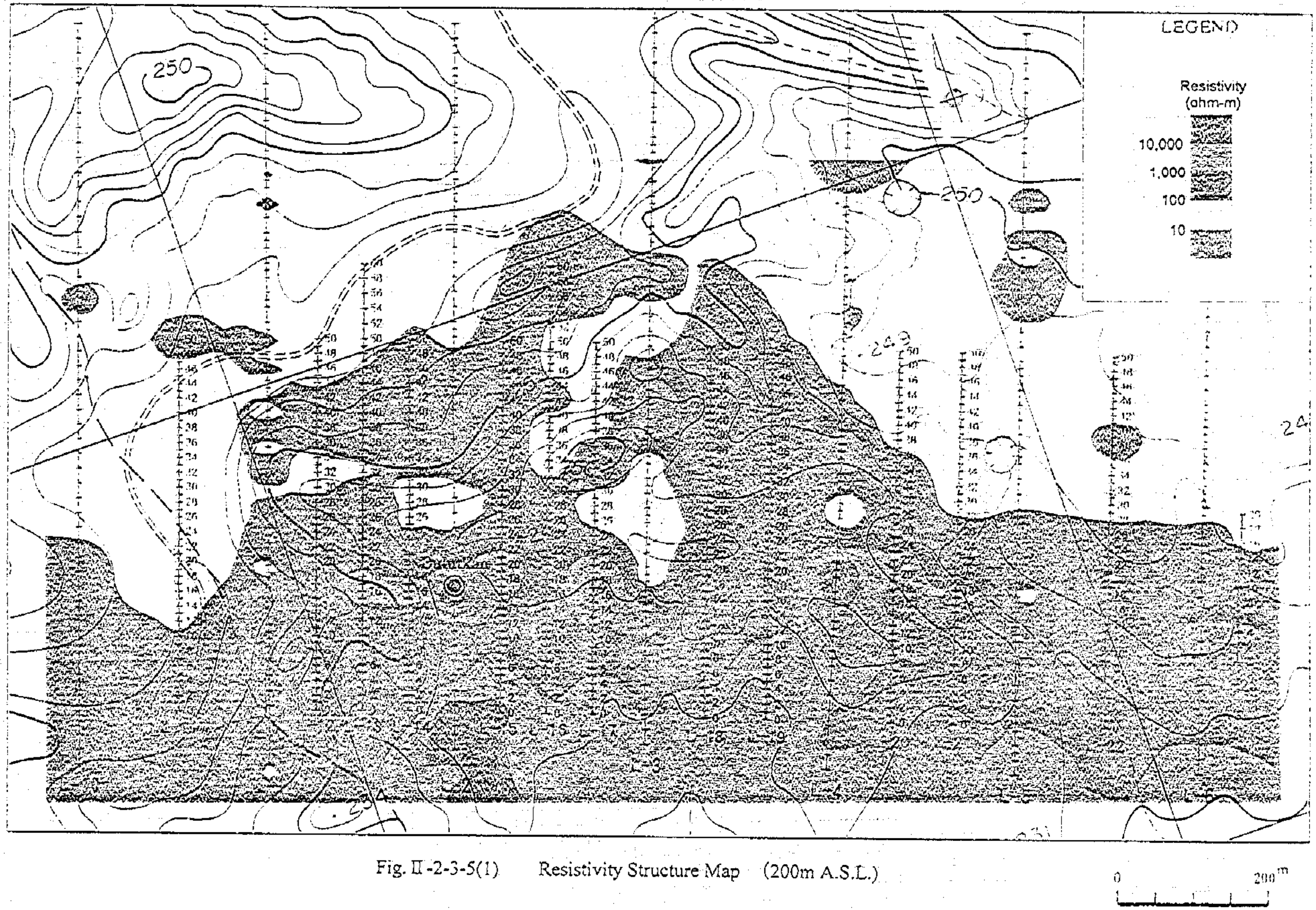

Fig. II-2-3-5(1) Resistivity Structure Map (200m A.S.L.)

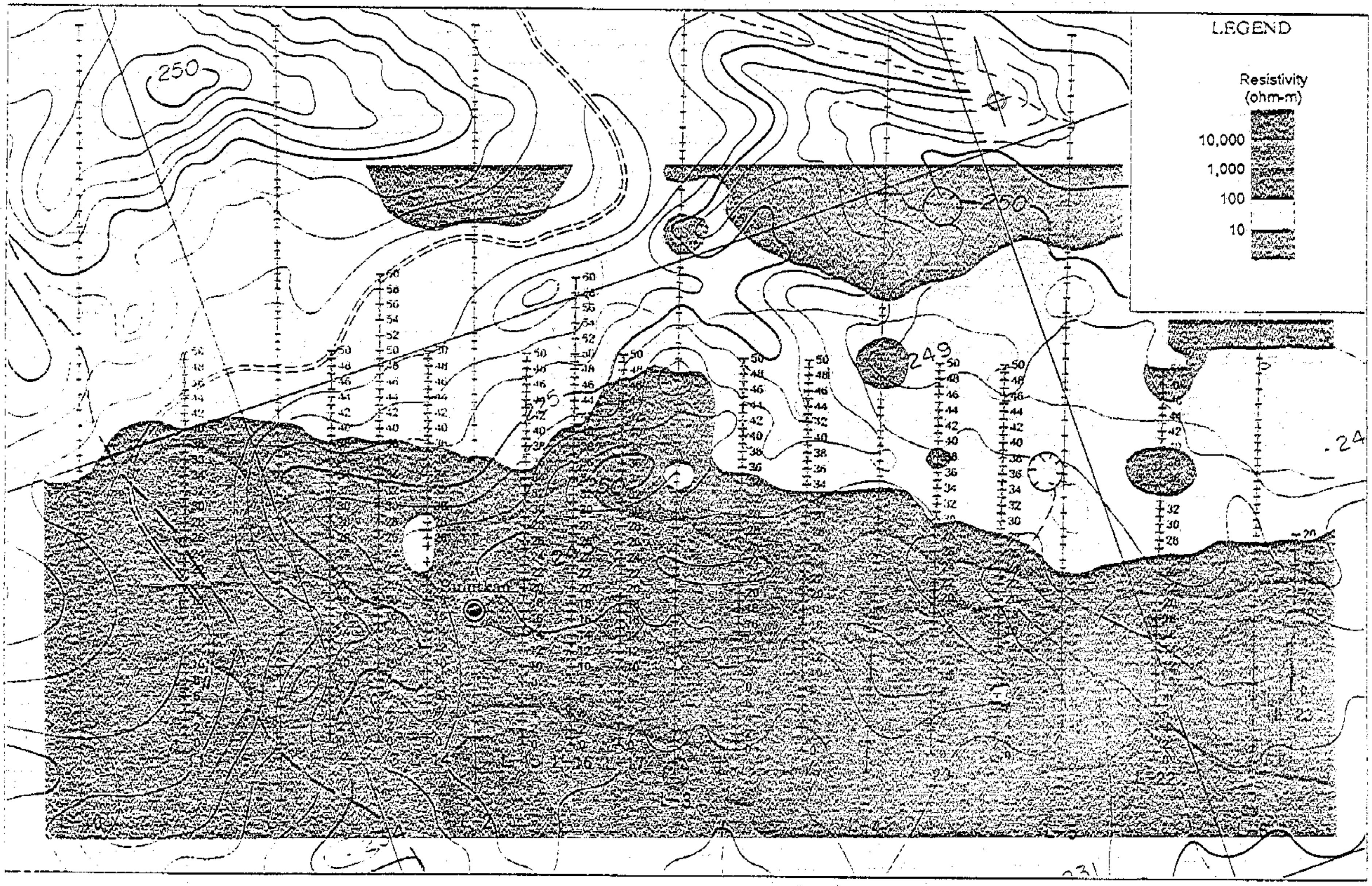

Fig. II-2-3-5(2) Resistivity Structure Map (150m A.S.L.)

0 200m

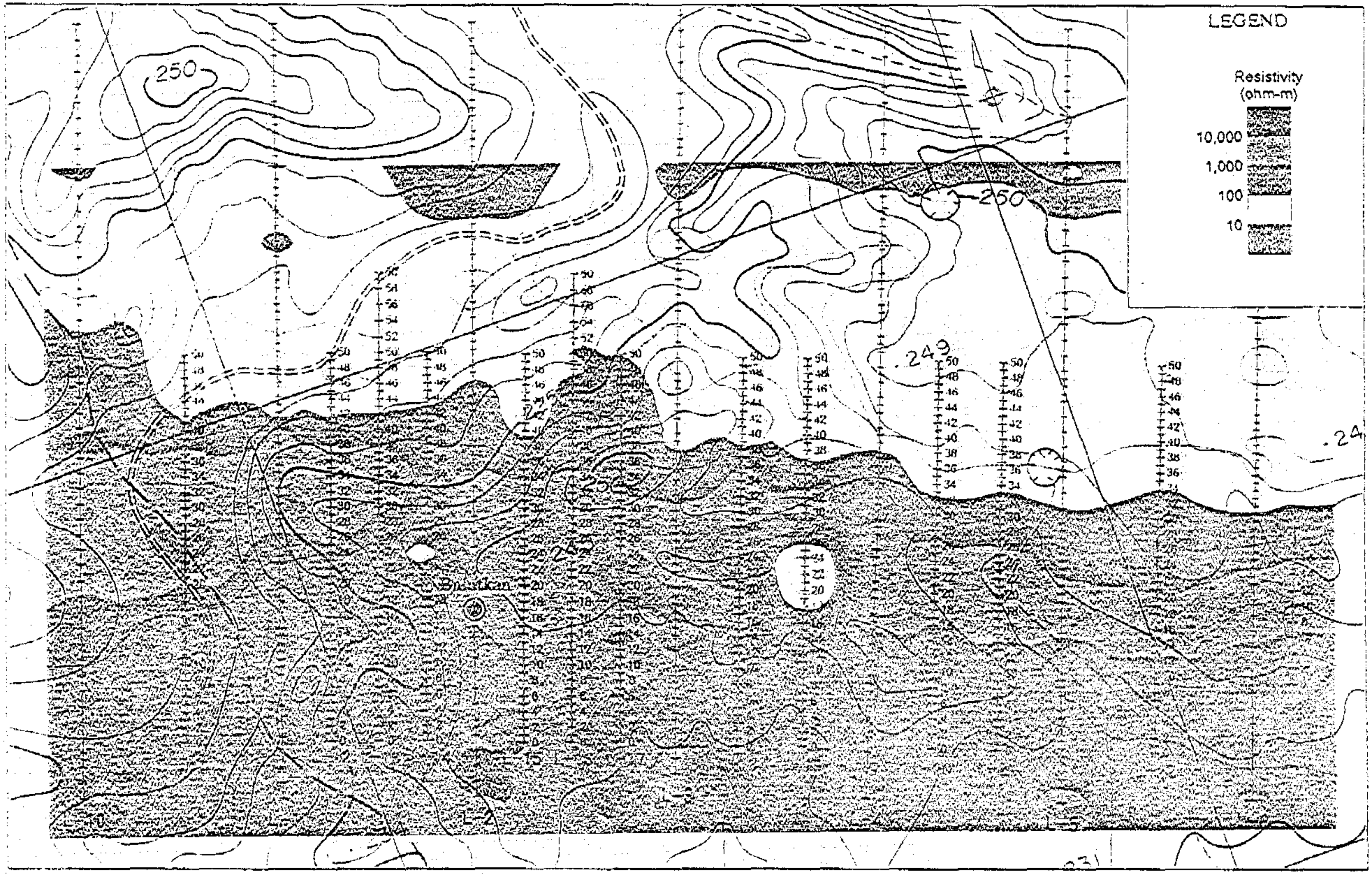

Fig. II -2-3-5(3)　Resistivity Structure Map　(100m A.S.L.)

0　200m

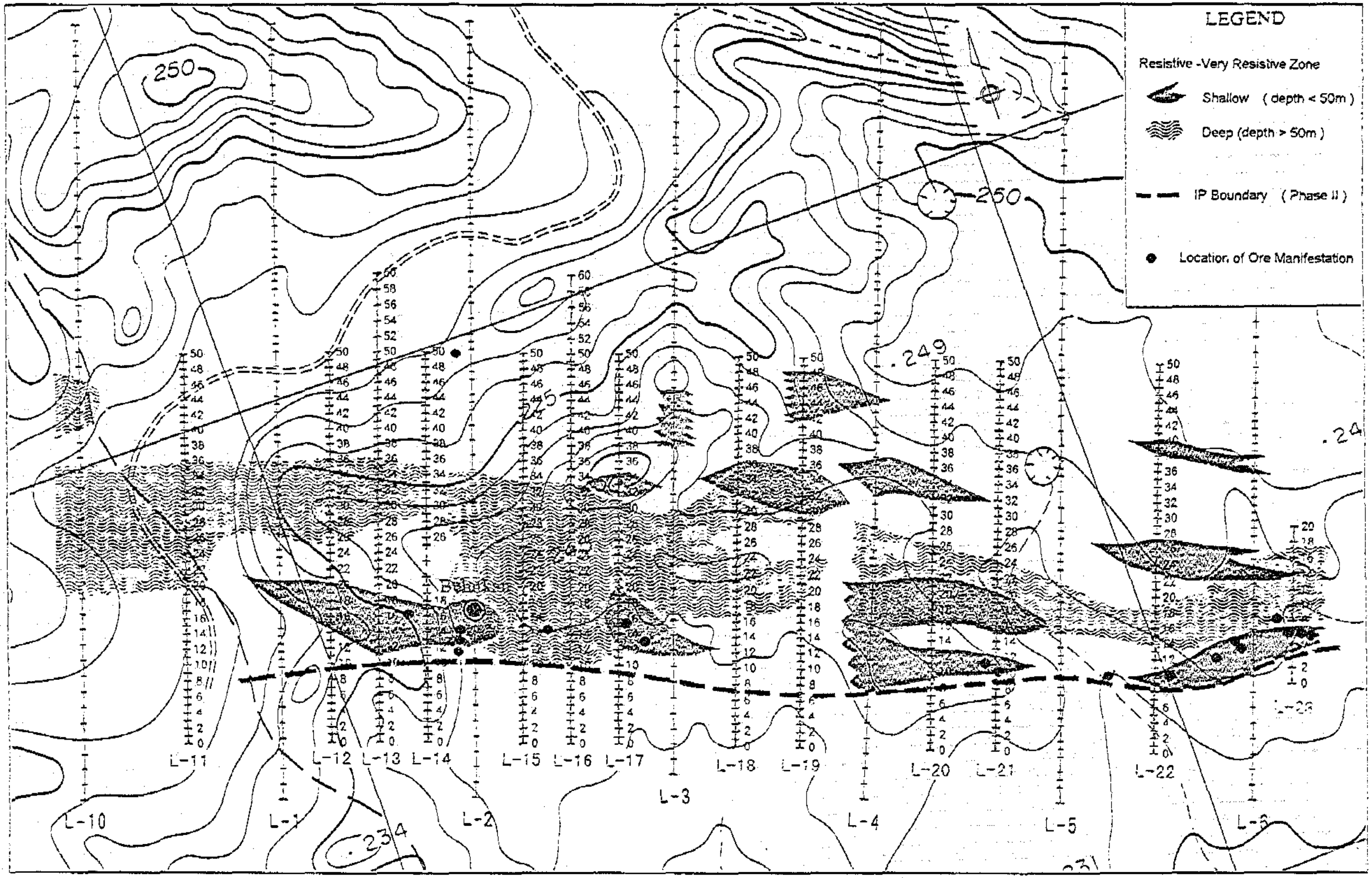

Fig. II -2-3-6 Geophysical Inerpretation Map

Table II-2-3-3 Summary of Resistivity Distribution

Line Name	Resistivity Distribution	Correlation with Geology
L-11	A medium - high resistivity zone lies beneath No.0 - No.15. In the central part of the section, medium - very high resistivity basement is overlain by the conductive layer. The basement dip steeply northward from No.35. In the northern part of the section appears to be conductive layered structure. A shallow resistive - very resistive zone lies beneath No.1 - No.12, and a deep resistive - very resistive zones lies beneath No.21 - No.37.	Quarternary deposit covers valley along the survey line. The resistivity distribution cannot be correlated with geology because no trenching survey has been conducted along this line.
L-12	A medium - high resistivity zone lies beneath No.0 - No.28. In the central part of the section, conductive layer is overlain by the medium resistivity layer and underlain by resistive basement. The basement dip steeply northward from No.35. In the northern part of the section appears to be conductive layered structure. Shallow resistive zones lie beneath No.1 - No.12 and No.14 - No 20, and a deep resistive - very resistive zone lies beneath No.25 - No.37.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.27. The area underlain by syenodiorite is correlated with medium - high resistivity zone near the surface.
L-13	A medium - very high resistivity zone lies beneath No.0 - No.30. In the central part of the section, conductive layer is overlain by the medium resistivity layer and underlain by resistive basement. The basement dip steeply northward from No.35. In the northern part of the section appears to be conductive layered structure. A shallow resistive - very resistive zone lies beneath No.13 - No.18, and a deep resistive - very resistive zone lies beneath No.29 - No.37.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.29. The area underlain by syenodiorite is correlated with medium - high resistivity zone near the surface. The diorite dikes penetrate sedimentary rocks near No.16 and No.17 in the shallow resistive-very resistive zone. The ore manifestation was caught in the trench P-825. The ore manifestation is located about 30 meters away from No.16 along the dike.
L-14	A medium - high resistivity zone lies beneath No.0 - No.18. In the central part of the section, a conductive surface layer is more than 30 m thick. Data recorded at No.19 - No.21 could not be analyzed due to severe distortion by the steel material piled around these stations. Depth to the medium resistivity basement become shallower beneath No.29 - No.36, and it turns to dip steeply northward from No.36. A shallow resistive zone lies beneath No.14 - No.18.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.14. The silicified zone accompanied by dikes of diorite and lamprophyre lies between No.14 and No.20. The area underlain by syenodiorite exhibits medium resistivity. The shallow resistive-very resistive zone is correlated with the silicified zone and the dikes. The conductive zone is analyzed more than 100 m beneath No.21 - No.27 whereas the syenodiorite was caught in the level of 190m A.S.L. in the drillhole MJUB-8 and MJUB-9. These results are not reliable because signal might be distorted by the steel material piled near the stations.
L-15	A medium - very high resistivity zone lies beneath No.0 - No.25. In the central part of the section, conductive layer is overlain by the medium resistivity layer and underlain by resistive basement. The basement dip northward and the dip steepen from No.35. In the northern part the section, medium resistivity layer is underlain by conductive layer. A very resistive zone lies beneath No.0 - No.6, and a deep resistive - very resistive zones lie beneath No.12 - No.37.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.9. The silicified zone accompanied by diorite dikes lies between No.9 and No.15. The area underlain by syenodiorite exhibits medium resistivity. The shallow resistive-very resistive zone is correlated with the silicified zone and the dikes. Within the resistive zone between No.12 and No.21, diorite dikes, quartzite, skarn and limestone were caught in the drillholes MJUB-10, MJUB-11 and MJUB-12. A weak ore manifestation was caught in this resistive zone.
L-16	A medium - high resistivity zone lies beneath No.0 - No.15. In the central part of the section, medium - high resistivity basement is overlain by the conductive layer. The basement dip northward. In the northern part of the section appears to be conductive layered structure. A deep resistive - very resistive zone lies beneath No.0 - No.35.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.10. The silicified zone accompanied by diorite dikes lies between No.10 and No.15. The area underlain by syenodiorite exhibits medium resistivity to high resistivity. The rise of medium resistivity zone beneath No.25-30 can be correlated with slate and diorite dikes.
L-17	A medium - very high resistivity zone lies beneath No.0 - No.19. In the central part of the section, medium - very high resistivity basement is overlain by the conductive layer. Shallow resistive - very resistive zones lie beneath No.0 - No.4, No.12 - No.20 and No.28 - No.35, and a deep resistive - very resistive zone lies beneath No 21 - No.31.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.7. The silicified zone accompanied by diorite dikes lies between No.7 and No.18. The area underlain by syenodiorite exhibits medium resistivity to high resistivity. The shallow resistive - very resistive zone is correlated with the silicified zone and the dikes. Within the very resistive zone, many quartz veins were caught in the drillholes MJUB-15 and MJUB-16. The shallow medium - high resistivity zone beneath No.28-35 can be correlated with slate and diorite dikes.
L-18	A medium - very high resistivity zone lies beneath No.0 - No.13. In the central part of the section, medium - very high resistivity basement is overlain by the conductive layer. The basement dip northward and the dip steepen near No.35. Shallow resistive - very resistive zones lie beneath No.0 - No.4, No.16 - No.23 and No.28 - No.37, and a deep resistive - very resistive zone lies beneath No.29 - No.35.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.10. The area underlain by syenodiorite exhibits medium resistivity to high resistivity. The shallow medium - high resistivity zone beneath No.25-37 can be correlated with slate and diorite dikes.
L-19	A medium - very high resistivity zone lies beneath No.0 - No.15. In the central part of the section, medium - high resistivity zone is overlain by the conductive layer. The resistivity - resistive zone dip northward. Shallow resistive - very resistive zones lie beneath No.0 - No.10, No.16 - No.18, No.31 - No.36, and No.42-No.49. Deep resistive zone lie beneath No 23 - No.25 and No.30 - No.32.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.12 and quartzite lies north of the contact. The area underlain by syenodiorite exhibits medium resistivity to very high resistivity. The shallow resistive zone beneath No.16 - No.18 is correlated with quartzite. The shallow medium - high resistivity zone beneath No.28-36 can be correlated with slate and diorite dikes.
L-20	A medium - very high resistivity zone lies beneath No.0 - No.24. In the central part of the section, the conductive layer is overlain by medium resistivity layer, and underlain by medium - high resistivity basement. The basement dip northward and the dip steepen near No.31. In the northern part of the section appears to be conductive layered structure. A resistive - very resistive zone lies beneath No.16 - No.25. Shallow resistive - very resistive zones lie beneath No.9 - No.12 and No.32 - No.34.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.8. Ore body and quartzite lies north of the contact. The area underlain by syenodiorite exhibits medium resistivity. The shallow resistive zone beneath No.9 - No.12 is correlated with ore body and quartzite. The shallow medium - high resistivity zone beneath No.32 - No.34 can be correlated with diorite dikes.
L-21	A medium - very high resistivity zone lies beneath No.0 - No.21. In the central part of the section, the conductive layer is overlain by medium resistivity layer, and underlain by medium - high resistivity basement. The basement dip steeply northward. A resistive - very resistive zone lies beneath No.15 - No.24. A shallow resistive zones lies beneath No.10 - No.13.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.9. Ore body and quartzite lies north of the contact. The area underlain by syenodiorite exhibits medium resistivity. The shallow resistive zone beneath No.9 - No.12 is correlated with ore body and quartzite. Near No.10, ore manifestations were caught in the trenches (T-6 and T-29).Within this resistive zone and the adjacent shallow very resistive zone, ore manifestations were also caught in the drillholes MJUB-17 and MJUB-18.
L-22	A medium - very high resistivity zone lies beneath No.0 - No.17. In the central part of the section, the conductive layer is overlain by medium resistivity layer, and underlain by medium resistivity basement. The basement dip steeply northward. A resistive - very resistive zone lies beneath No.11 - No.19. Shallow resistive zones lies beneath No.0 - No.4, No.23 - No.26 and No.38 - No.40. In the northern part of the section appears to be conductive layered structure. A lateral discontinuity in resistivity structure is recognized near No.44.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.9. Ore body and quartzite lies north of the contact. The area underlain by syenodiorite exhibits medium resistivity to high resistivity. The drillhole MJUB-19 penetrates quartzite, silicified and skarnized metasomatite, syenodiorite dikes, diorite dikes and lamprophyre dikes. The very resistive zone in this section is correlated with these rocks and dikes. Lateral discontinuities in the resistivity structure was found near No.44 where the survey line crosses Northern Sautbay fault.
L-23	A medium - very high resistivity zone lies beneath No.0 - No.10. In the northern half of the section, the conductive layer is overlain by medium resistivity layer, and underlain by medium - very high resistivity basement. The basement dip sharp northward. A resistive - very resistive zone lies beneath No.8 - No.16. A shallow resistive - very resistive zone lies beneath No.4 - No.6.	Contact of the syenodiorite and the sedimentary rocks on the surface is near No.2. Ore body and quartzite lies north of the contact. The area underlain by syenodiorite exhibits medium resistivity to high resistivity. The shallow resistive zone beneath No.4 - No.6 is correlated with ore body and quartzite. Near No.6, weak ore manifestations were caught in the trenches (T-28 and T-29).Within this resistive zone, ore manifestations accompanied by many quartz veins were also caught in the drillholes MJUB-13 and MJUB-14.

2-4 Drilling Survey

2-4-1 Purpose of survey

Aimed at the Bulutkan gold deposit, drilling survey was carried out to clarify mineralization at depth. It was also aimed to clarify mineralization in the depth of the ore showings caught by the trenching and geophysical survey in Phases II and III and of the portions where occurrence of gold mineralization is anticipated in the light of the resistivity structure and the IP anomalies

2-4-2 Method of survey

1) Survey work

With the personnel and equipment arranged by the Samarkandgeology, drilling work of 14 holes totaling 2,119.0m was performed.

The locations of the drillholes are shown in Figs. II-2-1-1 and II-2-2-1.

Two Russian-made drilling machines, SKTO-65(drilling cap. o76mm: 650m; o59m: 1,000m) were used.

The drilling operation was performed, in principle, in two 12-hour shifts, with one foreman and one operator per machine. Two buldozer and a trailer were used for the transportation of drilling machines and supplies, road construction, drilling site leveling and preparations.

The wireline method was applied to the drilling operation in an effort to improve core recovery and work progress.

For the surface soil drilling, single diamond bits and metal bits of o112mm or o93mm were used. After reaching the rock, o108mm and o89mm casing pipes were inserted and installed. The drilling was continued with diamond bits of o76mm or o59mm as the final diameter. Mud water was not arranged at the drilling site but at the Kokpatas Expedition's mud water plant, and was conveyed to the site by an 8m3 tank truck.

The drilling work lasted for 113 days from June 23 to October 13, 1996. The drilling length and core recovery by drillhole are tabulated in Table II-2-4-1.

The drilling efficiency, working time, consumable drilling articles and diamond bits are shown in Tables II-2-4-2 thru II-2-4-5, respectively. The main machinery and equipment used, results of the work and progress record by drillhole are respectively shown in Appendices 3-1 thru 3-3 at the end of this volume.

2) Drilling operation

An outline of the drilling operation performed is shown in Table II-2-4-6.

2-4-3 Results of survey

The drilling survey aimed at the west extension of the Bulutkan orebody resulted in discovery of gold mineralization accompanied by silicified-skarnized metasomatite, skarns and quartz-sulfide veins, at the drillholes MJUB-8 and MJUB-9.

Also at the MJUB-11 and MJUB-12 among the three drillholes aimed at the east extension of the same orebody, low-grade gold mineralization(Au 1 g/t or less) accompanied by silicified-skarnized metasomatite and skarns.

The drillholes outside of the Bulutkan deposit, at which gold mineralization of Au 1 g/t or more was confirmed, were MJUB-13, MJUB-17 and MJUB-18, all of which occur in the Proterozoic close to the north of the syenodiorite stock. No other drilling came to find mineralization of Au 1 g/t or more.

The survey results are shown in Figs. II-2-4-1 ~ 7: the geological cross sections along the drillholes.

1) MJUB-8(Direction S25° W; inclination -80° ; drill length 100.0m)

The drilling was aimed to ascertain mineralization from the surface at the 70m point on the west extension of the Bulutkan deposit to an approximate depth of 70m.

(1) Geology

Except for near-surface portion, the drillhole is composed of sandstone, silicified rocks, and silicified-skarnized metasomatite accompanied by sulfide veins and skarns, of the Kokpatas Formation. At the depth of 37.4m, the drilling entered a syenodiorite body at the footwall of the ore deposit. Lamprophyre and diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-1, gold mineralization accompanied by silicified-skarnized metasomatite and skarn was found. Indications of the mineralization are shown in Table II-2-4-7.

2) MJUB-9(Direction S25° W; inclination -80° ; drilling length 100.0m)

The drilling is aimed to ascertain mineralization from the surface at the 70m point on the west extension of the Bulutkan deposit to an approximate depth of 100m.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone, limestone and silicified-skarnized metasomatite including quartz veins, skarns and sulfide veins (pyrite, arsenopyrite and chalcopyrite), of the Kokpatas Formation. At the depth of 48.3m, the drilling entered the syenodiorite body at the footwall of the deposit. Diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-1, skarnized diorite and gold mineralization accompanied by quartz and sulfide veins and skarns were found. Indications of the mineralization are shown in Table II-2-4-7.

3) MJUB-10(Direction S25° W; inclination -80° ; drilling length110.0m)

The drilling is aimed to ascertain mineralization from the surface at the 70m point on the east extension of the Bulutkan deposit to an approximate depth of 100m.

(1) Geology

Except for near-surface portion, the drillhole is composed of sandstone, slate, limestone, dolomite, as well as hornfels, silicified-skarnized metasomatite and skarns metamorphosed from these rocks, of the Kokpatas Formation. At an approximate depth of 84.6m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-2, no indication of mineralization of Au 0.4g/t or more was found.

4) MJUB-11(Direction S25° W; inclination -80° ; drilling length152.0m)

The drilling was aimed to ascertain mineralization from the surface at the 70m point on the east extension of the Bulutkan deposit to an approximate depth of 100m.

(1) Geology .

Except for near-surface portion, the drillhole is composed mainly of sandstone, slate, limestone, as well as hornfels, silicified rocks, silicified-skarnized metasomatite and skarns metamorphosed from these rocks, of the Kokpatas Formation. At the depth of 129.0m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-2, low-grade gold mineralization accompanied by silicified sandstone was found. Indications of the mineralization are shown in Table II-2-4-7.

5) MJUB-12(Direction S25° W; inclination -80° ; drilling length 194.0m)

The drilling was aimed to ascertain mineralization from the surface at the 70m point on the east extension of the Bulutkan deposit to an approximate depth of 150m.

(1) Geology

Except for near-surface portion, the drillhole is composed of sandstone, slate, limestone, as well as hornfels, silicified rocks, silicified-skarnized metasomatite and skarns metamorphosed from these rocks, of the Kokpatas Formation. At the depth of 152.8m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Diorite dikes intrude into these rocks.

(2) Minealization

As seen in Fig. II-2-4-2, low-grade gold mineralization accompanied by silicified-skarnized metasomatite and skarns was found. Indications of the mineralization are shown in Table II-2-4-7.

6) MJUB-13(Direction S20° W; inclination -80° ; drilling length 100.0m)

The drilling was aimed to prospect the silicified zone accompanied by brecciated quartz confirmed by the trenches T-6 and T-29, and also to examine the high resistivity structure and the IP anomalies caught by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone, slate, limestone, as well as silicified-skarnized metasomatite metamorphosed from these rocks and skarns, of the Kokpatas Formation. At the depth of 91.7m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Lamprophyre dikes intrude into these rocks. Between the depths of 39.5m and 42.5m, brecciated quartz-calcite veins accompanied by sulfide minerals are found while quartz-calcite veins are found in various parts up to the depth of 91.7m.

(2) Mineralization

As seen in Fig. II-2-4-3, gold mineralization accompanied by silicified lamprophyre and quartz-calcite veins was caught. Indications of the mineralization are shown in Table II-2-4-7.

7) MJUB-14(Direction S20° W; inclination -80° ; drilling length 161.0m)

The drilling was aimed to prospect the portion from the surface to the depth of 120m of the silicified zone accompanied by brecciated quartz, which was confirmed by the Trenches T-6 and T-29, and also to examine the high resistivity structure and the IP anomalies confirmed by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone, slate, limestone, as well as silicified-skarnized and skarn metasomatite metamorphosed from these rocks, of the Kokpatas Formation. Lamprophyre and syenodiorite dikes intrude into these rocks. In various parts between the depths of 90.8m and 137.8m, quartz-calcite veins are found.

(2) Mineralization

As seen in Fig. II-2-4-3, low-grade gold mineralization accompanied by alternation of silicified sandstone and slate and also by skarnized limestone was found. Indications of the mineralization are shown in Table II-2-4-7.

8) MJUB-15(Direction S20° W; inclination -80° ; drilling length 102.0m)

The drilling was aimed to prospect the portion from the surface to an approximate depth of 70m of the showings(2m wide, Au 74.7g/t) confirmed by the Kokpatas Expedition's trench P-819 near the west of the south end of the trench T-3, and also to examine the high resistivity structure caught by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone and slate of the Kokpatas Formation, which are cut by lamprophyre and aplite dikes. Weak silicification and skarnization are observed in the rocks of Kokpatas Formation.

(2) Mineralization

As seen in Fig.II-2-4-4, no indication of mineralization of Au 0.4g/t or more was found.

9) MJUB-16(Direction S20° W; inclination -80° ; drilling length 151.0m)

The drilling was aimed to prospect the portion from the surface to an approximate depth of 120m of the showings(2m wide, Au 74.7g/t) confirmed by the Kokpatas Expedition's trench P-819 near the west of the south end of the trench T-3, and also to examine the high resistivity structure confirmed by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone, slate, limstone, as well as silicified-skarnized metasomatite metamorphosed from these rocks, of the Kokpatas Formation. Lamprophyre, aplite and syenodiorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-4, no indication of mineralization of Au 0.4g/t or more was found.

10) MJUB-17(Direction S35° W; inclination -80° ; drilling length 100.0m)

The drilling is aimed to prospect the portion from the surface to an approximate depth of 70m of the showings(8m wide, Au 31.0g/t) confirmed by the Kokpatas Expedition's trench P-822 near the west of the south end of the trench T-5, and also to examine the high resistivity structure confirmed by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone, slate and limestone, as well as silicified rocks and silicified-skarnized metasomatite metamorphosed from these rocks, of the kokpatas Formation. At the depth of 78.7m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Lamprophyre and diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-5, the drilling caught gold mineralization accompanied by a fracture zone including lamprophyre and calcite and by silicified-skarnized metasomatite including sulfide veins(pyrite, arsenopyrite and chalcopyrite). Indications of the mineralization are shown in Table II-2-4-7.

11) MJUB-18(Direction S35° W; inclination -80° ; drilling length 154.0m)

The drilling was aimed to prospect the portion from the surface to an approximate depth of 120m of the showings(8m wide, Au 31.0g/t) confirmed by the Kokpatas Expedition's trench P-822 close to the west of the south end of the trench T-5, and also to examine the high resistivity structure confirmed by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sandstone and limestone, as well as silicified rocks and silicified-skarnized metasomatite metamorphosed from these rocks, of the Kokpatas Formation. At the depth of 110.5m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Lamprophyre and diorite dikes intrude into these rocks. At various parts between 24.0m and 110.5m, quartz-calcite veins are observed.

(2) Mineralization

As seen in Fig. II-2-4-5, gold mineralization accompanied by quartz-sulfide veins(pyrite and chalcopyrite) was found. Indications of the mineralization are shown in Table II-2-4-7.

12) MJUB-19(Direction S20° W; inclination -80° ; drilling length 150.0m)

The drilling is aimed to prospect the portion from the surface to an approximate depth of the silicified fracture zone confirmed by the trench T-25, and also to examine the high resistivity structure caught by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

Except for near-surface portion, the drillhole is composed mainly of sanstone, slate, quartzite and limestone, as well as silicified-skarnized metasomatite metamorphosed from these rocks, of the Kokpatas Formation. Lamprophyre, diorite and syenodiorite dikes intrude into these rocks. In various parts between 81.0m and 138.0m, quartz-calcite veins are observed.

(2) Mineralization

As seen in Fig. II-2-4-6, no indication of mineralization of Au 0.4g/t or more was found.

13) MJUB-20(Direction S20° W; inclination -80° ; drilling length 440.0m)

The drilling was aimed to prospect the deep portion around 870m of the L-2, which was extracted as a high potentiality area of occurrence of ore deposits, as the result of the geological structure analysis conducted by the Uzbek side. The Phase II geophysical suvey also confirmed distribution of high resistivity and high IP in the area.

(1) Geology

Except for near-surface portion, the drillhole is composed of altered beds of sandstone and slate, quartzite, limestone and dolomite of the Kokpatas Formation, in some parts of which weak silicification and skarnization are observed. Lamprophyre, porphyrite and diorite dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-7, many quartz veinlets of several centimeters wide, accompanied by sulfide minerals(pyrite and arsenopyrite) are observed in portions deeper than 389.3m, but no indication of gold mineralization was found. Pyrite dissemination is observed in the alternation of sandstone and slate.

14) MJUB-21(Direction S20° W; inclination -80° ; drilling length 105.0m)

The drilling was aimed to prospect the portion from the surface to an approximate depth of the silicified-fracture zone confirmed by the trench T-25, and also to examine the high resistivity structure confirmed by the geophysical survey at the hanging side of the syenodiorite body.

(1) Geology

The drill hole is composed mainly of sandstone, slate, quartzite and limestone, as well as silicified-skarnized metasomatite metamorphosed from these rocks, of the Kokpatas Formation. At the depth of 76.8m, the drilling entered the syenodiorite body at the footwall of the ore deposit. Lamprophyre dikes intrude into these rocks.

(2) Mineralization

As seen in Fig. II-2-4-6, no indication of mineralization of Au 0.4g/t or more was found.

2-4-4 Conclusive summary and consideration

The drilling survey aimed at the western extension of the Bulutkan ore body caught gold mineralization in the two drillholes, MJUB-8 and MJUB-9, at the respective portions referred to in the preceding paragraphs. The gold mineralization is accompanied by silicified-skarnized metasomatite, skarns and quartz-sulfide veins (pyrite, arsenopyrite and chalcopyrite).

By the drilling (of three drillholes) aimed at the east extension of the Bulutkan orebody, low-grade gold mineralization(Au 1 g/t or less) accompanied by silicified-skarnized metasomatite and skarns was ascertained in the two drillholes, MJUB-11 and MJUB-12.

The findings of the 210m-level tunnel, 28m below the surface, developed from within the vertical shaft No.29 which was opened in the central part of the Bulutkan deposit by the Uzbek side as a part of its own exploration, indicate that the bonanza of the ore deposit occur at intersections of the faults with the WNW-ESE, NW-SE and ENE-WSW trends and the horizon including carbonate rocks. The ore body is presumed to be in a shape of a polygonal pyramid or pipe with the wide top area(the surface portion), either upright or sharply inclined northeastward. Therefore, the mineralization confirmed by the Phase III drilling survey on the west and east extensions of the Bulutkan deposit presumably is not directly connected with the Bulutkan orebody.

The localities where Phase III drilling survey confirmed not less than 1 g/t of gold are: the west extension of the Bulutkan orebody, MJUB-13 between the depths of 39.5m and 41.5m(true width 1.1m, Au 11.9 g/t, Ag 1.0 g/t), MJUB-17 between 23.4m and 26.4m(true width 2.0m, Au 1.3 g/t, Ag trace) and between 74.8m and 75.5m(true width 0.5m, Au 6.0 g/t, Ag 23.8 g/t), and MJUB-18 between 69.0m and 69.5m(true width 0.5m, Au 9.8 g/t, Ag 72.8 g/t), all of which occur in the Proterozoic close to the north of the syenodiorite stock.

The gold mineralization occurs at intersections of the faults with the WNW-ESE trends, group of fissures intersecting the faults and also the horizon of carbonate rocks. In the light of the findings from the trenching survey and the drilling survey aimed at the upper and lower parts, however, these ore bodies are presumed to be poor in continuity and small in size (extension 50 ~150m; depth 100m or less).

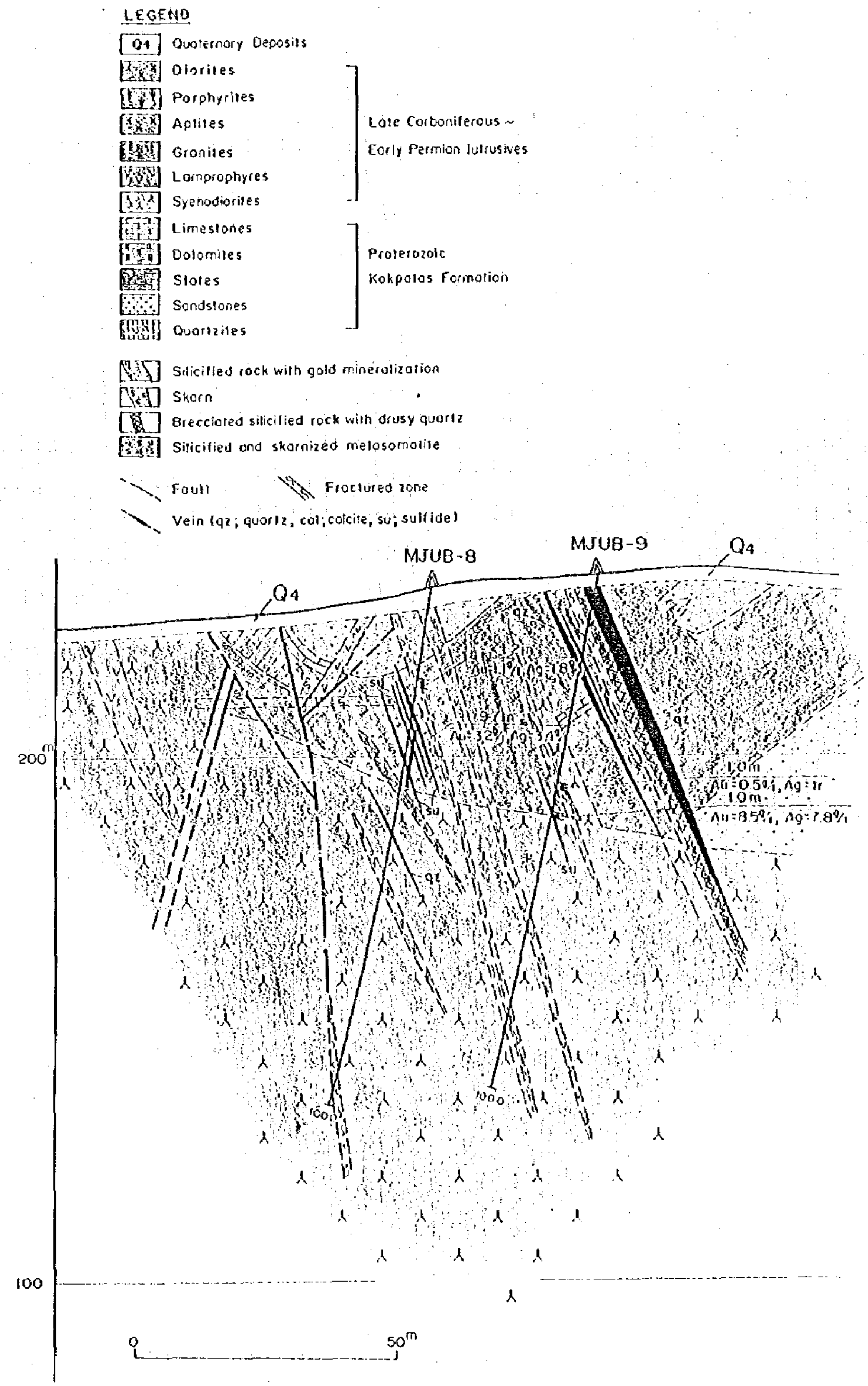

Fig. II-2-4-1 Geological Cross Section along MJUB-8,9

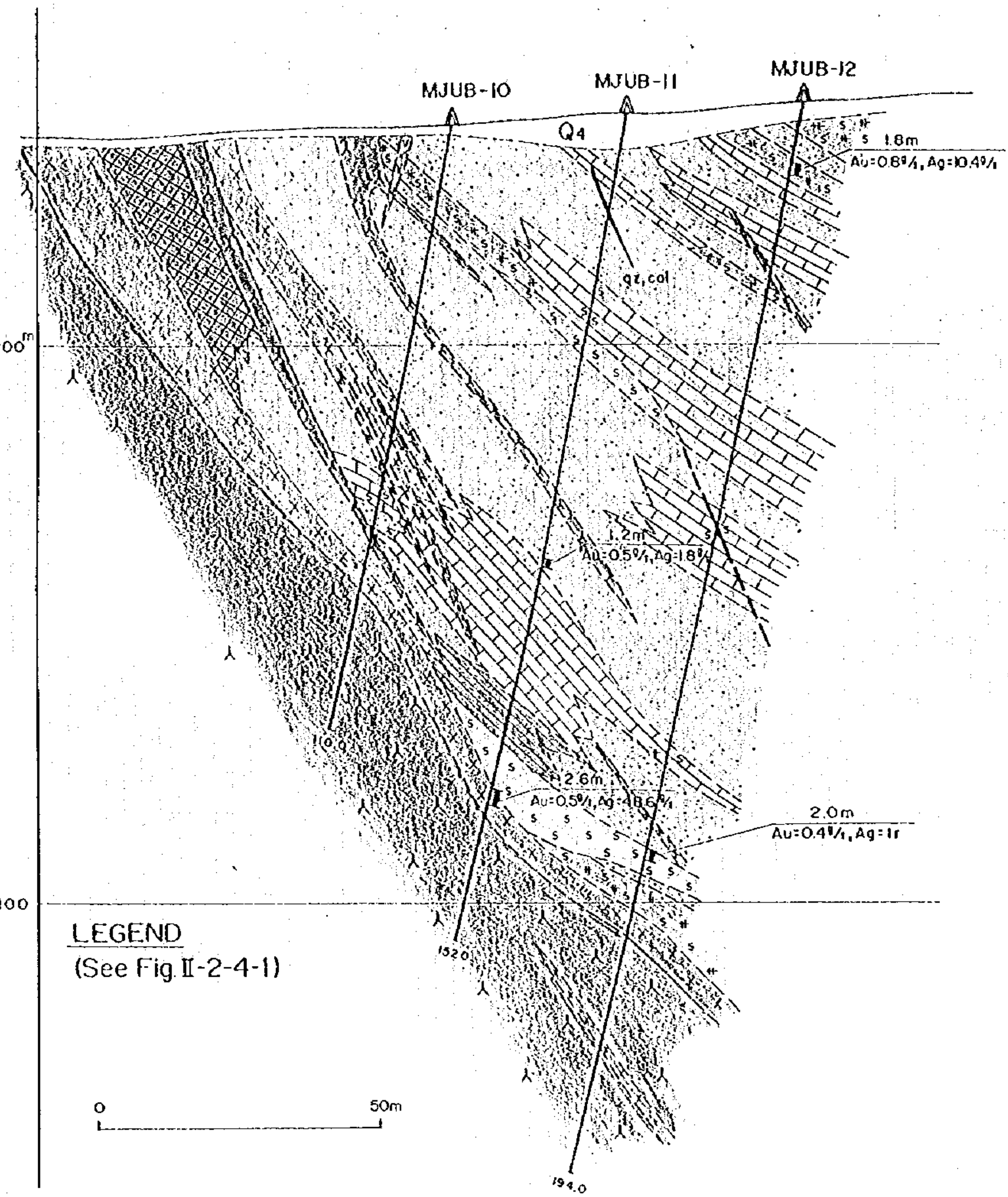

Fig. II-2-4-2 Geological Cross Section along MJUB-10,11 and 12

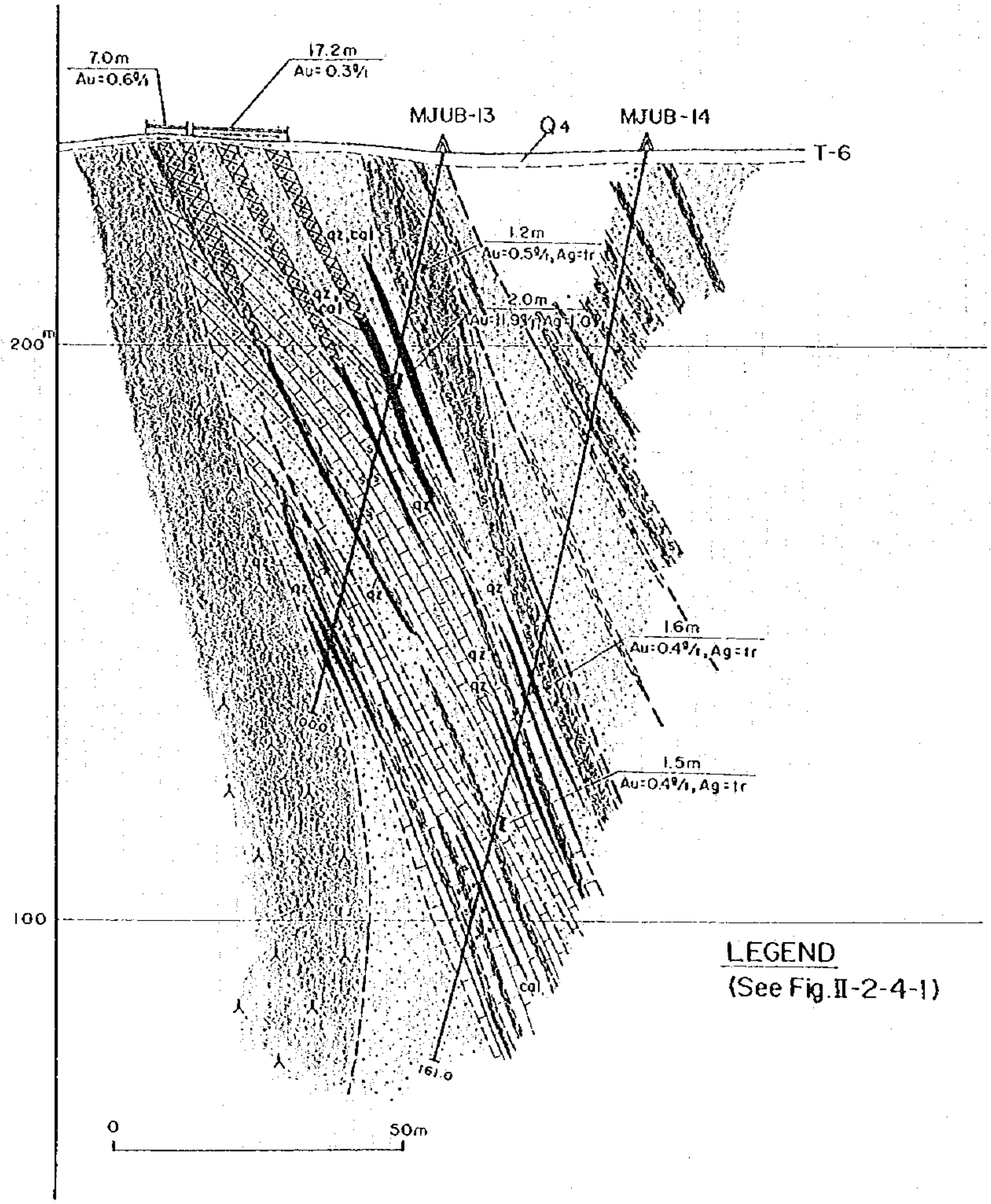

Fig. II-2-4-3 Geological Cross Section along MJUB-13,14

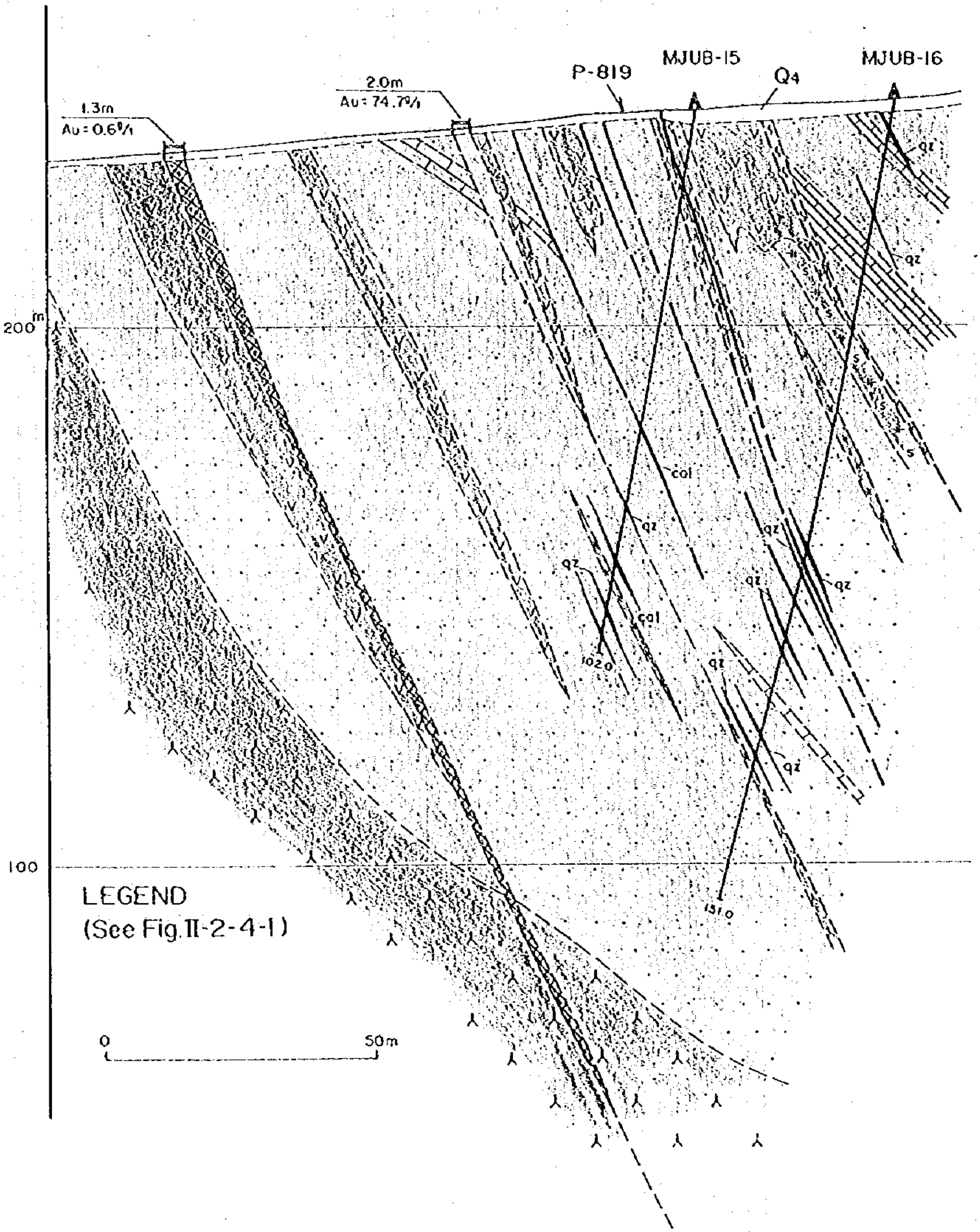

Fig. II-2-4-4 Geological Cross Section along MJUB-15,16

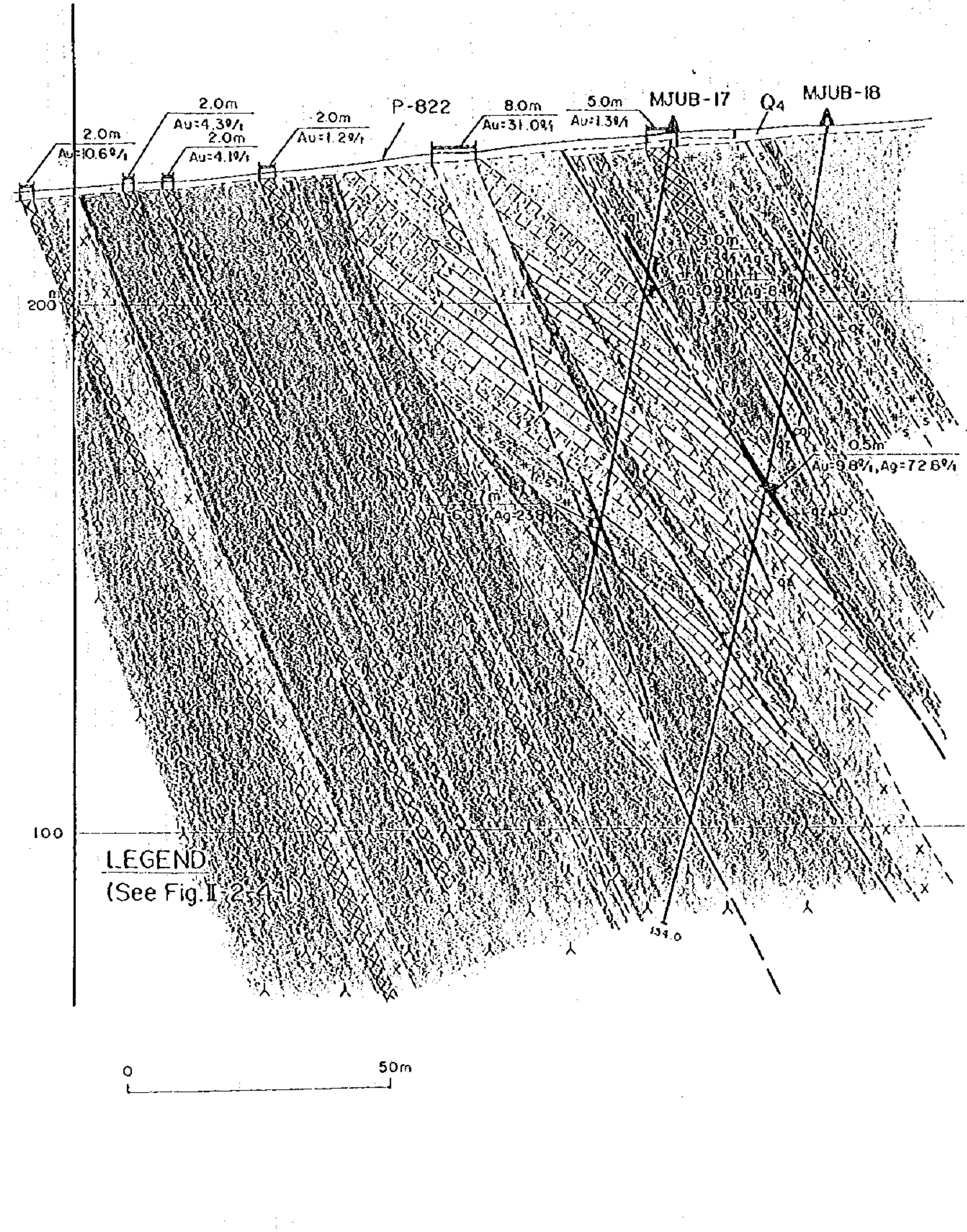

Fig. II-2-4-5 Geological Cross Section along MJUB-17,18

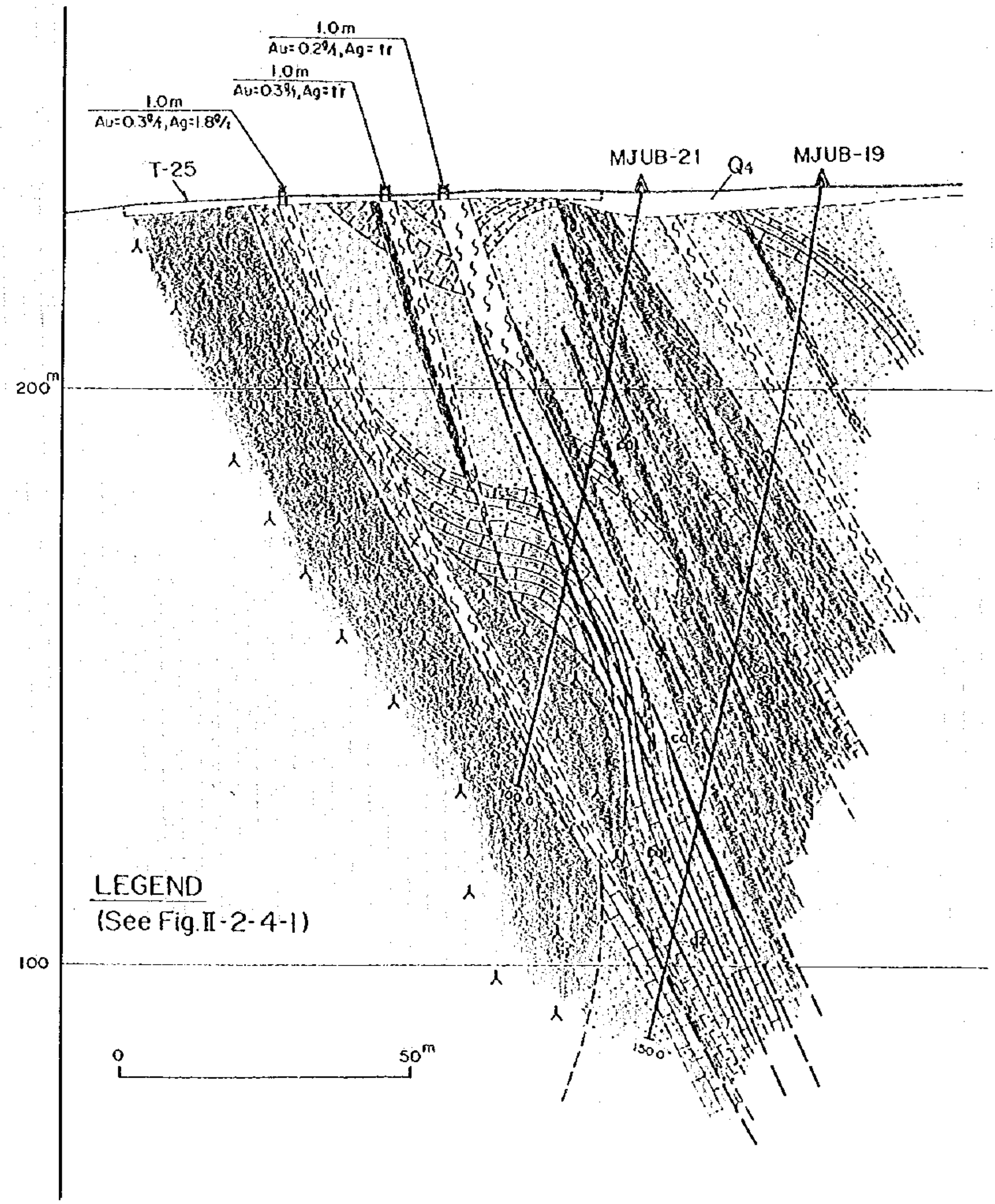

Fig. II-2-4-6 Geological Cross Section along MJUB-19,21

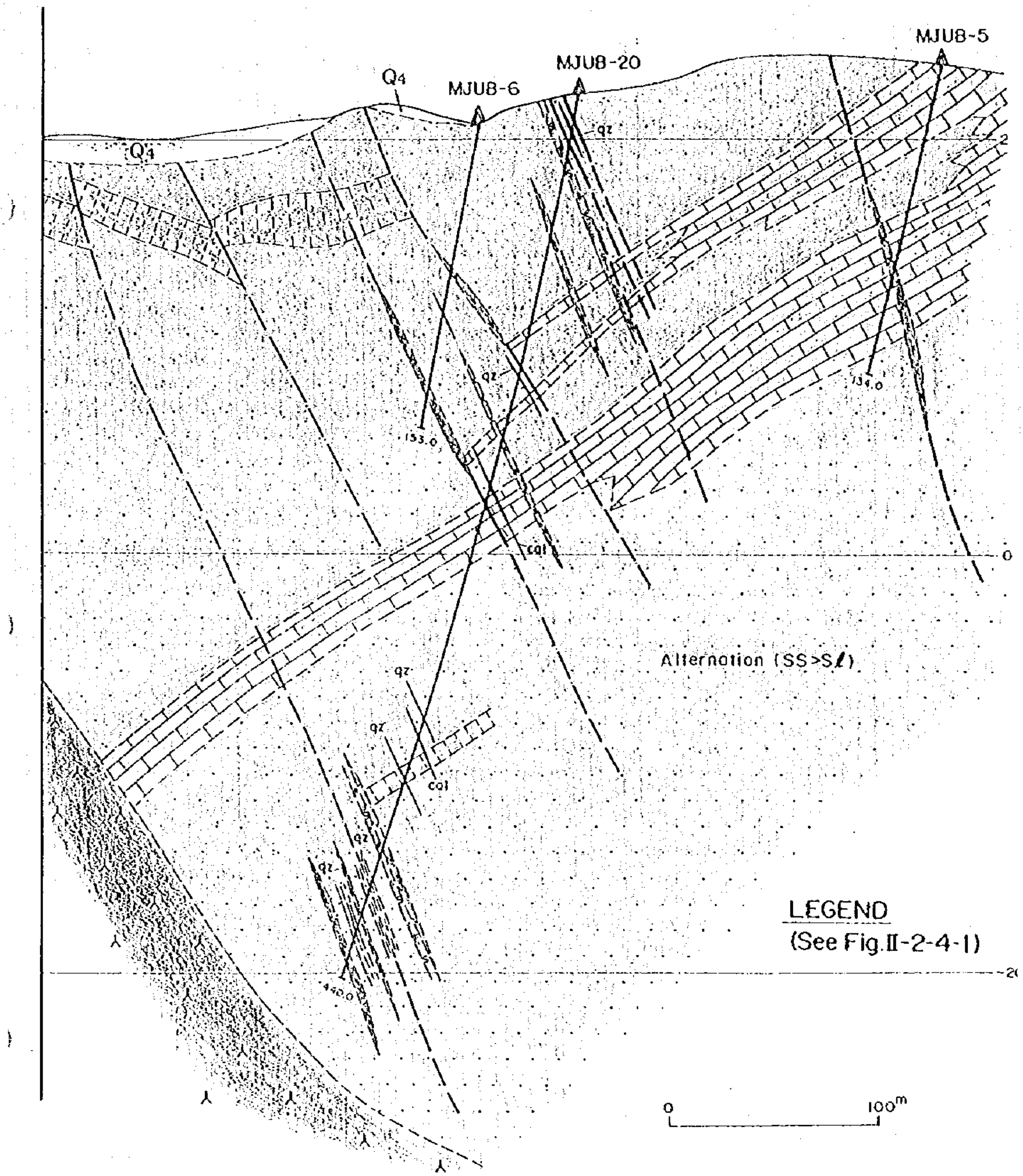

Fig. II-2-4-7 Geological Cross Section along MJUB-20

Table II-2-4-1 Quantity of Drilling Works and Core Recovery in the Bulutkan District

Hole No.	Programmed length (m)	Length (m)	Length of Core (m)	Core recovery (%)
MJUB- 8	100.0	100.0	94.5	94.5
MJUB- 9	100.0	100.0	91.1	91.1
MJUB-10	110.0	110.0	101.0	91.8
MJUB-11	150.0	152.0	141.6	93.2
MJUB-12	190.0	194.0	175.9	90.7
MJUB-13	100.0	100.0	92.2	92.2
MJUB-14	161.0	161.0	137.2	85.2
MJUB-15	100.0	102.0	98.4	96.5
MJUB-16	150.0	151.0	143.1	94.8
MJUB-17	100.0	100.0	92.8	92.8
MJUB-18	150.0	154.0	146.3	95.0
MJUB-19	150.0	150.0	145.2	96.8
MJUB-20	440.0	440.0	428.9	97.5
MJUB-21	100.0	105.0	102.3	97.4
Total	2,101.0	2,119.0	1,990.5	93.9

Table Ⅱ-2-4-2 Efficiency of Each Drillhole in the Bulutkan District (1)

Hole No.	Drilling Machine	Working Period	Drilling Length (m)	Core		Working Day			Efficiency		
				Length (m)	Recovery (%)	Drilling⁎ (day⁎)	Others (day)	Total⁎⁎ (day⁎⁎)	m/day⁎	m/day⁎⁎	m/working period
MJUB- 8	ZIF−650	June 23. '96 ↓ July 4. '96	100.0	94.5	94.5	5.5	5.2	10.7	18.18	9.35	8.33
MJUB- 9	ZIF−650	July 5. '96 ↓ July 14. '96	100.0	91.1	91.1	5.5	4.5	10.0	18.18	10.00	10.00
MJUB-10	ZIF−650	June 23. '96 ↓ July 5. '96	110.0	101.0	91.8	4.4	6.6	11.0	25.00	10.00	8.66
MJUB-11	ZIF−650	July 5. '96 ↓ July 14. '96	152.0	141.6	93.2	7.4	2.3	9.7	20.54	15.67	15.20
MJUB-12	ZIF−650	July 14. '96 ↓ Aug. 4. '96	194.0	175.9	90.7	11.0	10.3	21.3	17.64	9.11	9.11
MJUB-13	ZIF−650	July 14. '96 ↓ July 21. '96	100.0	92.2	92.2	5.2	2.5	7.7	19.23	12.99	12.99
MJUB-1[illegible]	ZIF−650	July 21. '96 ↓ Aug. 1. '96	161.0	137.2	85.2	7.5	3.8	11.3	21.47	14.25	14.25
MJUB-15	ZIF−650	Aug. 4. '96 ↓ Aug. 13. '96	102.0	98.4	96.5	6.0	2.0	8.0	17.00	12.75	10.97

⁎ includes drilling and out drilling.

⁎⁎ includes drilling, out drilling, regain of accident, preparation, dismount/mobilization and others.

Table II-2-4-2 Efficiency of Each Drillhole in the Bulutkan District (2)

Hole No.	Drilling Machine	Working Period	Drilling Length (m)	Core		Working Day			Efficiency		
				Length (m)	Recovery (%)	Drilling* (day*)	Others (day)	Total** (day**)	m/day*	m/day**	m/working period
MJUB-16	ZIF−650	Aug. 13, '96 ↓ Sept. 16, '96	151.0	143.1	94.8	10.9	23.8	34.7	13.85	4.35	4.35
MJUB-17	ZIF−650	Aug. 1, '96 ↓ Aug. 5, '96	100.0	92.8	92.8	3.9	0.8	4.7	25.64	21.28	21.28
MJUB-18	ZIF−650	Aug. 5, '96 ↓ Aug. 15, '96	154.0	146.3	95.0	6.7	3.3	10.0	22.99	15.40	14.95
MJUB-19	ZIF−650	Sept. 17, '96 ↓ Oct. 13, '96	150.0	145.2	96.8	10.3	16.7	27.0	14.56	5.56	5.56
MJUB-20	ZIF−650	Aug. 16, '96 ↓ Sept. 25, '96	440.0	428.9	97.5	23.9	16.1	40.0	18.41	11.00	10.81
MJUB-21	ZIF−650	Sept. 25, '96 ↓ Oct. 2, '96	105.0	102.3	97.4	4.0	3.0	7.0	26.25	15.00	15.00
Total			2,119.0	1,990.5	93.9	112.2	100.9	213.1	18.89	9.94	9.69

* includes drilling and out drilling.

** includes drilling, out drilling, regain of accident, preparation, dismount/mobilization and others.

Table II-2-4-3 Working Time of Diamond Drilling in the Bulutkan District (1)

Hole No.	Working Period		Number of Workers		Working						
	Period	(day)	Foreman (man)	Worker (man)	Drilling (hour)	Out Drilling (hour)	Regain of Accident (hour)	Preparation (hour)	Dismount/ Mobilization (hour)	Others (hour)	Total (hour)
MJUB- 8	June 23, '96 ↓ July 4, '96	12.0	32	40	99	33	52	64	8	—	256
MJUB- 9	July 5, '96 ↓ July 14, '96	10.0	30	34	85	48	87	8	12	—	240
MJUB-10	June 23, '96 ↓ July 5, '96	12.7	33	48	84	22	67	80	11	—	264
MJUB-11	July 5, '96 ↓ July 14, '96	10.0	29	35	132	45	21	18	16	—	232
MJUB-12	July 14, '96 ↓ Aug. 4, '96	21.3	64	68	192	72	216	16	16	—	512
MJUB-13	July 14, '96 ↓ July 21, '96	7.7	23	31	93	32	19	24	16	—	184
MJUB-14	July 21, '96 ↓ Aug. 1, '96	11.3	34	37	136	45	67	16	8	—	272
MJUB-15	Aug. 4, '96 ↓ Aug. 13, '96	9.3	24	27	83	62	23	16	8	—	192

Table II-2-4-3 Working Time of Diamond Drilling in the Bulutkan District (2)

Hole No.	Working Period		Number of Workers		Working						
	Period	(day)	Foreman (man)	Worker (man)	Drilling (hour)	Out Drilling (hour)	Regain of Accident (hour)	Preparation (hour)	Dismount/ Mobilization (hour)	Others (hour)	Total (hour)
MJUB-16	Aug. 13. '96 ↓ Sept. 16. '96	34.7	104	108	154	107	543	16	12	—	832
MJUB-17	Aug. 1. '96 ↓ Aug. 5. '96	4.7	13	17	69	25	—	10	8	—	112
MJUB-18	Aug. 5. '96 ↓ Aug. 15. '96	10.3	29	34	117	45	30	16	32	—	240
MJUB-19	Sept. 17. '96 ↓ Oct. 13. '96	27.0	81	84	181	65	378	12	12	—	648
MJUB-20	Aug. 16. '96 ↓ Sept. 25. '96	40.7	120	124	390	184	320	32	34	—	960
MJUB-21	Sept. 25. '96 ↓ Oct. 2. '96	7.0	21	25	66	31	32	26	13	—	168
Total	—	218.7	637	712	1.881	816	1.855	354	206	—	5.112

Table II-2-4-4 Consumable Drilling Articles in the Bulutkan District

Item	Specification	Unit	Quantity														
			MJUB- 8	MJUB- 9	MJUB-10	MJUB-11	MJUB-12	MJUB-13	MJUB-14	MJUB-15	MJUB-16	MJUB-17	MJUB-18	MJUB-19	MJUB-20	MJUB-21	Total
Cement		kg															
Bentonite		kg															
Clear mud		kg					260			100							360
Polyacrylicamide		kg															
N1 mud water		m^3	39	26	21	43	75	21	51	31	71	21	15	77	145	24	660
N4 mud water		m^3			4												4
Diamond bit	76mm	pc					1	1		2	1			1	1		7
Diamond bit	59mm	pc	3	3	3	6	10	4	4	4	10	3	4	10	14	4	82
Diamond reamer	76mm	pc				2								1			3
Diamond reamer	59mm	pc	1	1	1	1	4	1	2	1	5	1	2	3	11	1	35
Metal crown	112mm	pc	3														3
Metal crown	93mm	pc		1	2	1	1	1	1	1	2	1	2		1	1	15
Metal crown	89mm	pc		1													1
Core box	56~58mm	pc	3	1	2	2	1	3	2	1	1	2	4	1	1	4	28
〃	36~40mm	pc	9	11	11	15	17	8	14	10	14	9	13	13	44	8	196

Table II-2-4-5 Drilling Meterage of Diamond Bits in the Bulutkan District

Size	Number of	Drilling meterage by drillhole (m)														Total	Efficiency
	bits(pcs)	MJUB-8	MJUB-9	MJUB-10	MJUB-11	MJUB-12	MJUB-13	MJUB-14	MJUB-15	MJUB-16	MJUB-17	MJUB-18	MJUB-19	MJUB-20	MJUB-21		m/bit
φ 76mm	1					8.0										8.0	8.00
	1						8.0									8.0	8.00
	2								5.5							5.5	2.75
	1												7.0			7.0	7.00
Sub total	5					8.0	8.0		5.5				7.0			28.5	5.70
φ 59mm	3	85.8														85.8	28.60
	3		93.5													93.5	31.17
	3			100.0												100.0	33.33
	6				144.0											144.0	24.00
	10					182.0										182.0	18.20
	4						92.0									92.0	23.00
	4							156.0								156.0	39.00
	4								85.5							85.5	21.38
	10									145.0						145.0	14.50
	3										93.0					93.0	31.00
	4											141.0				141.0	35.25
	10												143.0			143.0	14.30
	14													424.0		424.0	30.29
	4														81.0	81.0	20.25
Sub total	82	85.8	93.5	100.0	144.0	182.0	92.0	156.0	85.5	145.0	93.0	141.0	143.0	424.0	81.0	1,965.8	23.97
Grand total	87	85.8	93.5	100.0	144.0	190.0	100.0	156.0	91.0	145.0	93.0	141.0	150.0	424.0	81.0	1,994.3	22.92

Table Ⅱ-2-4-6 Results of Drilling Works in the Bulutkan District

Hole No.		MJUB-8	MJUB-9	MJUB-10	MJUB-11	MJUB-12	MJUB-13	MJUB-14	MJUB-15	MJUB-16	MJUB-17	MJUB-18	MJUB-19	MJUB-20	MJUB-21
Direction		S 25° W	S 25° W	S 25° W	S 25° W	S 25° W	S 20° W	S 20° W	S 20° W	S 20° W	S 35° W	S 35° W	S 20° W	S 20° W	S 20° W
Dip		- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°	- 80°
	φ 112mm	14.2	—	—	—	—	—	—	—	—	—	—	—	—	—
Bit	φ 93mm	—	6.5	10.0	8.0	4.0	—	5.0	11.0	6.0	7.0	13.0	—	16.0	24.0
(m)	φ 76mm	—	—	—	—	8.0	8.0	—	5.5	—	—	—	7.0	—	—
	φ 59mm	85.8	93.5	100.0	144.0	182.0	92.0	156.0	85.5	145.0	93.0	141.0	143.0	424.0	81.0
	φ 112mm	5.0	—	—	—	—	—	—	—	—	—	—	—	—	—
Casing	φ 108mm	—	—	—	—	—	5.0	—	—	—	—	—	—	—	—
(m)	φ 89mm	30.0	10.0	8.0	10.0	11.0	—	8.0	8.0	7.0	12.0	11.0	5.0	12.0	8.0
	φ 73mm	40.0	20.0	25.0	27.0	24.0	20.0	25.0	30.0	25.0	22.0	25.0	24.0	25.0	30.0

Table II-2-4-7 Major Mineralized Zones Caught by Drillings in the Bulutkan District (1)

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
MJUB-8	18.1- 19.3(1.2)	0.5	1.1	1.8	0.03	tr	tr	tr	Silicified and skarnized metasomatite
	27.7- 30.0(2.3)	1.1	8.5	7.8	0.12	0.01	tr	0.03	Silicified and skarnized metasomatite
	30.0- 34.6(4.6)	2.2	0.4	1.3	0.06	tr	tr	tr	Silicified and skarnized metasomatite
	34.6- 37.4(2.8)	1.6	3.4	3.2	0.09	tr	tr	tr	Skarn and diorite with sulfide (pyrite, marcasite)
MJUB-9	41.2- 42.2(1.0)	0.6	0.5	tr	0.01	0.02	tr	0.01	Skarnized diorite
	47.0- 48.0(1.0)	0.5	8.5	7.8	0.38	1.70	tr	0.01	Quartz, sulfide (pyrite, marcasite, chalcopyrite) vein
MJUB-11	81.0- 82.2(1.2)	0.9	0.5	1.8	0.03	tr	tr	tr	Silicified sandstone with pyrite, calcite veinlets
	123.3-125.9(2.6)	2.4	0.5	48.6	0.01	tr	tr	tr	Diorite with pyrite, calcite veinlets
MJUB-12	11.0- 12.8(1.8)	1.6	0.8	10.4	0.07	0.02	tr	tr	Silicified and skarnized metasomatite
	135.0-137.0(2.0)	1.8	0.4	tr	0.03	0.04	tr	tr	Skarn with pyrite, chalcopyrite, marcasite
MJUB-13	19.8- 21.0(1.2)	0.7	0.5	tr	0.02	tr	tr	tr	Silicified lamprophyre
	39.5- 41.5(2.0)	1.1	11.9	1.0	tr	tr	tr	tr	Quartz, calcite vein

Table II-2-4-7 Major Mineralized Zones Caught by Drillings in the Bulutkan District (2)

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	Cu (%)	As (%)	Mo (%)	WO_3 (%)	Remarks
MJUB-14	93.4- 95.0(1.6)	0.9	0.4	tr	0.05	tr	0.04	tr	Silicified alternation (sandstone > slate) with pyrite, quartz veinlets
	116.0-117.5(1.5)	1.0	0.4	tr	tr	tr	tr	tr	Skarnized and fractured limestone
MJUB-17	23.4- 26.4(3.0)	2.0	1.3	tr	0.02	0.02	tr	tr	Fracture zone with lamprophyre and calcite
	30.5- 31.5(1.0)	0.6	0.4	8.4	0.05	0.20	tr	tr	Silicified and fractured sandstone with quartz, calcite, pyrite
	74.8- 75.5(0.7)	0.5	6.0	23.8	0.33	0.75	tr	tr	Silicified and skarnized metasomatite with sulfide (pyrite, pyrrhotite, chalcopyrite) vein
MJUB-18	69.0- 69.5(0.5)	0.5	9.8	72.8	3.5	0.45	tr	0.02	Quartz, sulfide (pyrite, chalcopyrite) vein

2-5 Estimation of Ore Reserves of the Bulutkan Deposit(Tentative)

The orebodies in the Bulutkan district, of which ore reserves estimation was made, have varied shapes, sizes and grade distribution, as the survey findings indicate. So far conducted of the orebodies are only the trenching survey, drilling survey at 70 ~ 300m spacing, and tunnel prospecting at the +210m level of the Bulutkan orebody, which are not sufficient for the ore bodies to be clarified in detail, nor for accurate calculation of ore reserves.

The trenching, drilling and tunneling surveys have caught ore zones containing not less than 1 g/t of gold at several locations. These ore zones represent close relationship with fault fracture zones and controlled by carbonate rock structures, from which certain continuity is inferrable between them. Therefore, tentative calculation was made for rough estimation of ore reserves and grade.

2-5-1 Calculation basis and procedures

(1) Area of estimation

Of the orebodies occurring in the Proterozoic close to the north side of the syenodiorite stock extending WNE-ESE, those which occur between the western limit in the vicinity of the Bulutkan orebody and the eastern limit close to the trench T-6 constitute the subject area of this estimation.

(2) Definition of ore zone

Of the orebodies confirmed by the trenching, drilling and tunneling surveys, the estimation is limited to those which have the true width not less than 1m and Au grade not less than 3 g/t.

(3) Definition of ore block

The extent of an ore block is defined by straight lines of max. 50m in strike and max. 30m perpendicularly from the center point of respective ore zones caught by the trenching, drilling and tunneling surveys.

In case no ore zone is confirmed by trenching or drilling at an extension of an ore body, the extent of ore block is limited only up to the median point.

In case an extension of an orebody cuts in strike and dip the syenodiorite body at the footwall of the ore deposit, the extent of ore block is limited only up to the intersection.

(4) Specific gravity

For specific gravity of the ore, the median(2.9) between those of the Sautbay ore(3.0) and Saghinkan ore(2.8) as determined by the Kokpatas Expedition was applied.

(5) Ore reserves by ore block

Ore reserves of respective blocks are calculated by the following formula:

① In case of the Bulutkan orebody(Block 1):

$$V = (A + B + \sqrt{A \cdot B}) \times 1/3 \times H \times SG$$

where, A: Area(m^2) of the top face
B: Area(m^2) of the bottom face
H: Height(m)
SG: Specific gravity(2.9)

② In case of the other orebodies:

$$V = L \times H' \times TT \times SG$$

where, L: Length(m) of orebody
H': Inclined length(m) of orebody
TT: True thickness(m) of orebody
SG: Specific gravity(2.9)

(6) Grade of ore block

① In case of the Bulutkan orebody(Block 1):

For the grade of a level, the length-weighted average(by the sampling length) of the ore-zone grade was applied. For the grade of an ore block, the area-weighted average of the top and bottom levels of the block was applied. In case an ore zone confirmed by drilling enters an ore block, the data were incorporated in grade calculation of the nearest level.

② In case of the other orebodies:

For the grade of an ore block, the length-weighted average(by the sampling length) of the ore-zone grade was applied.

2-5-2 Sampling and analysis

Methods of sampling and analysis applied were as follows:

(1) Sampling of drill cores

In principle, samples of an ore vein were taken at 1m spacing, while those of an altered zone at 2m spacing. Excepting samples for testing purpose, all the rest was taken as samples.

(2) Sampling at a trench

Samples were taken from a channel, 10-20cm wide and 10cm deep, dug at the bottom of a trench, in principle, at 1m spacing for an ore vein while, for an altered zone, at 2m spacing.

(3) Sampling at a tunnel

Continuous channel sampling was conducted by the Kokpatas Expedition of the State Committee of Geology and Mineral Reserves, from both sidewalls of the tunnel, in principle, at 1m spacing.

(4) Analysis

Analysis of samples were carried out by the Samarkand Geology. In priciple, gold was analyzed by the fire fire assay while the atomic absorption was applied for the other components.

2-5-3 Results of estimation

Results of the tentative calculation are exhibited in Fig. II-2-5-1, while the ore reserves estimation is tabulated in Table Ii-2-5-1.

Table II-2-5-1 Ore Reserves Calculation of Bulutkan Ore Deposits

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

*Specific gravity : 2.9

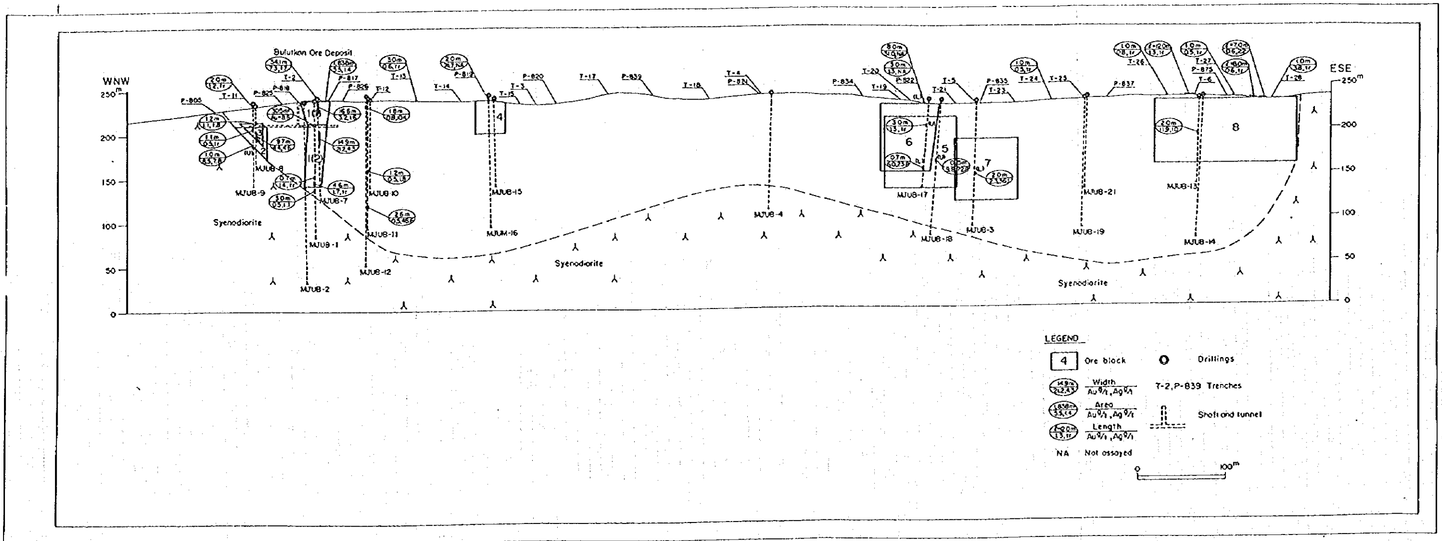

Fig. II-2-5-1 Perspective Section for Ore Reserve Calculation of Bulutkan District