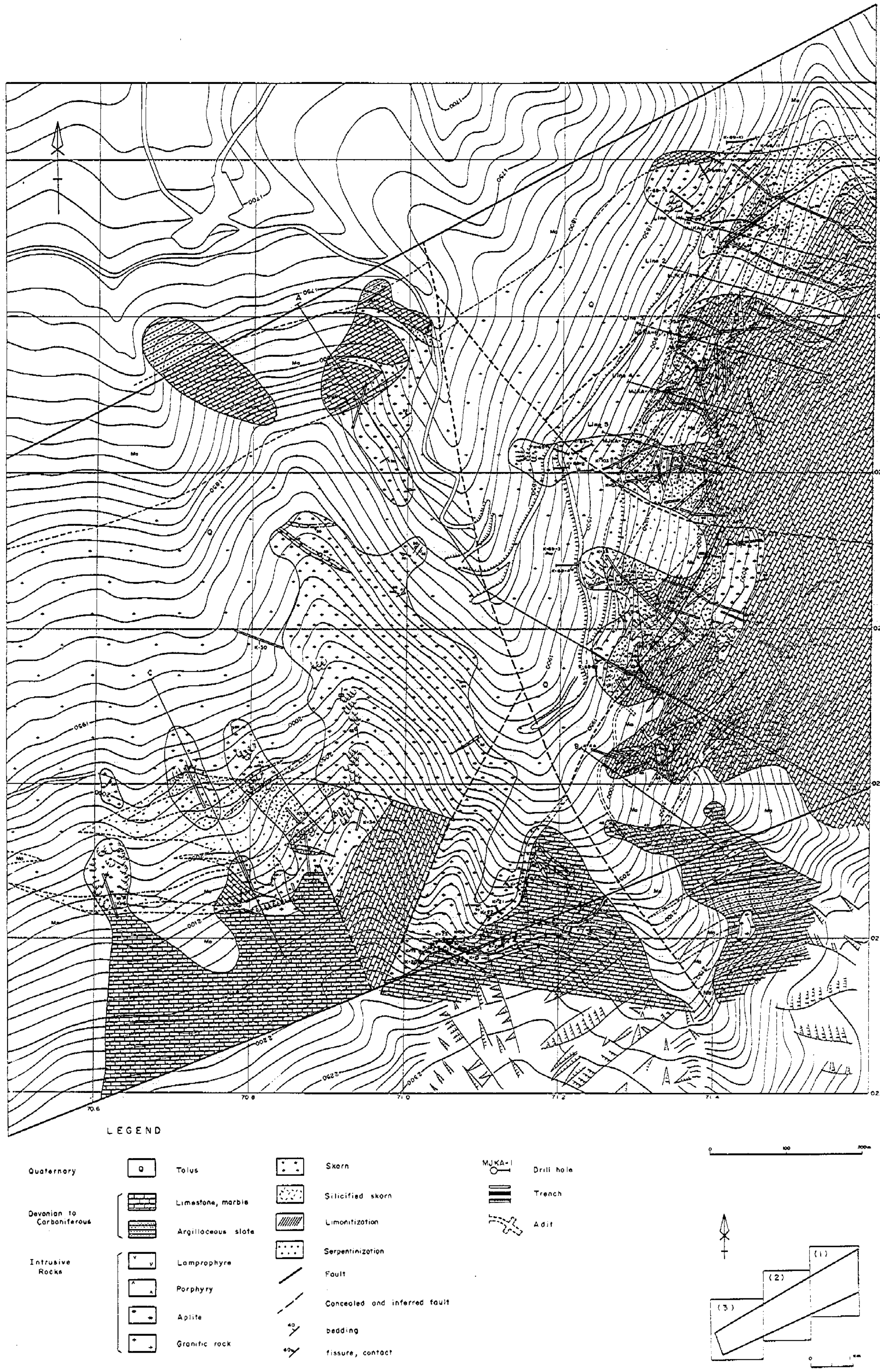


Fig. II-2-3 Geological Map of the Altyn-Jylga District (1)

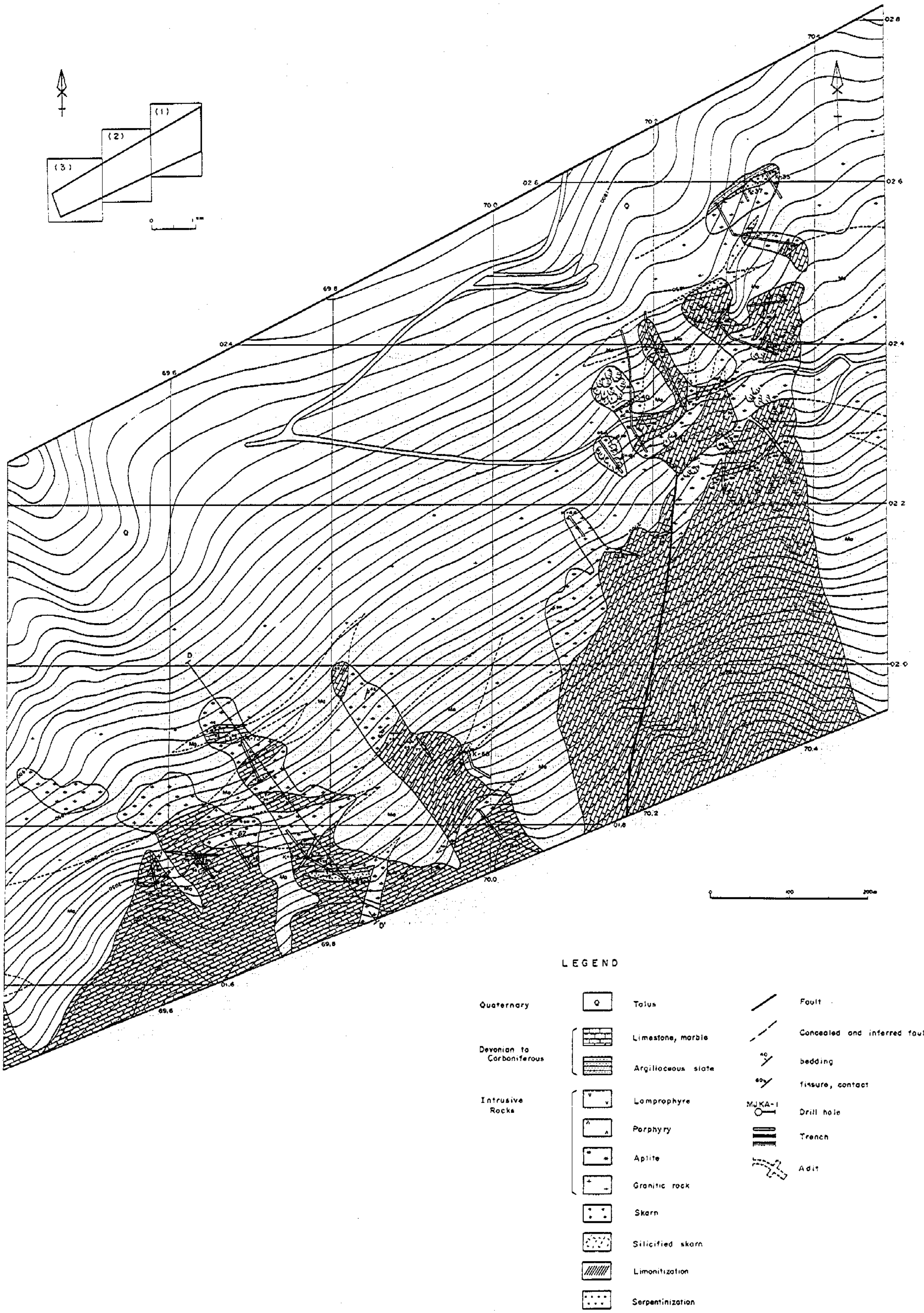


Fig. II-2-3 Geological Map of the Altyn-Jylga District (2)

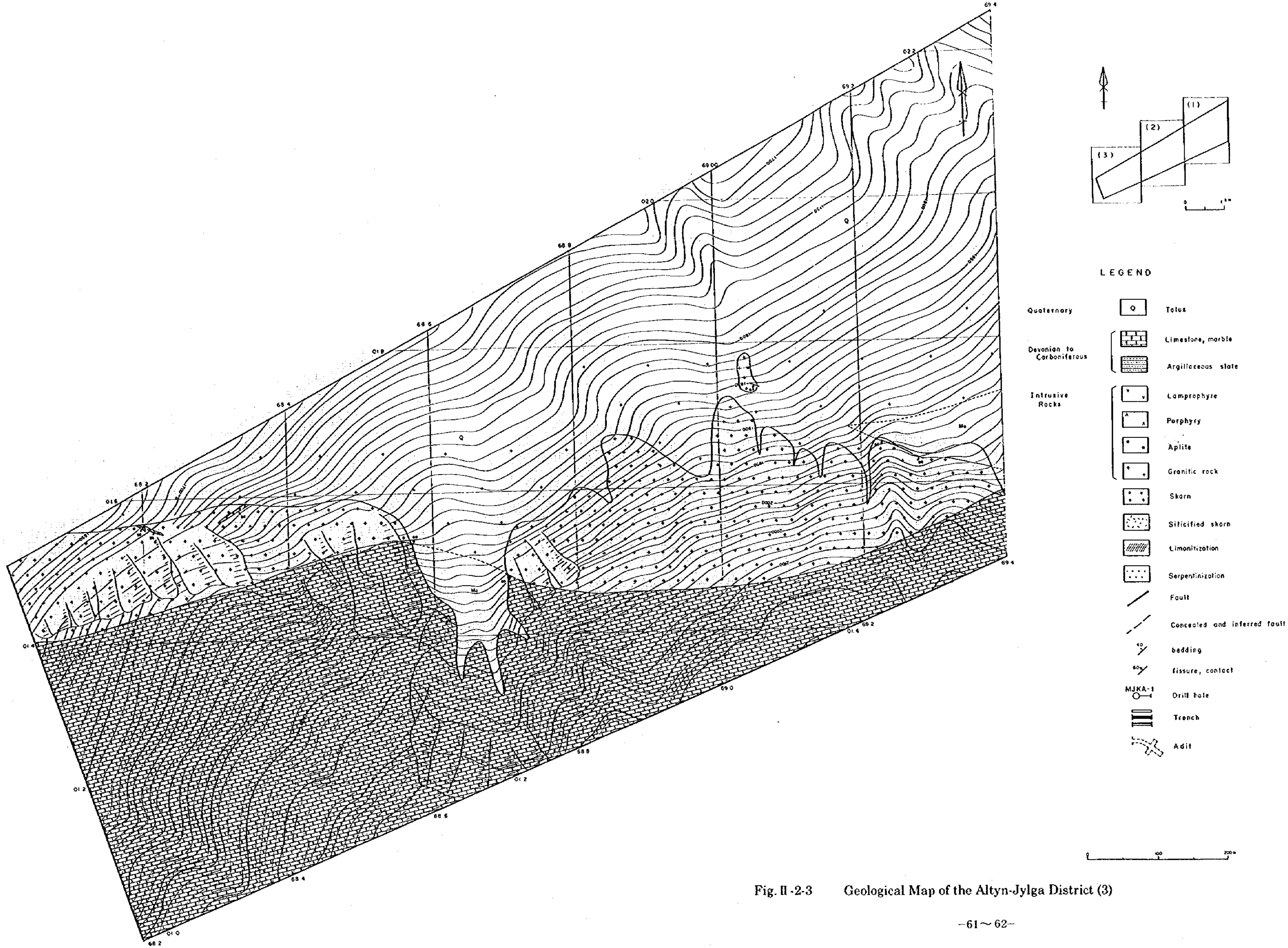


Fig. II-2-3   Geological Map of the Altyn-Jylga District (3)

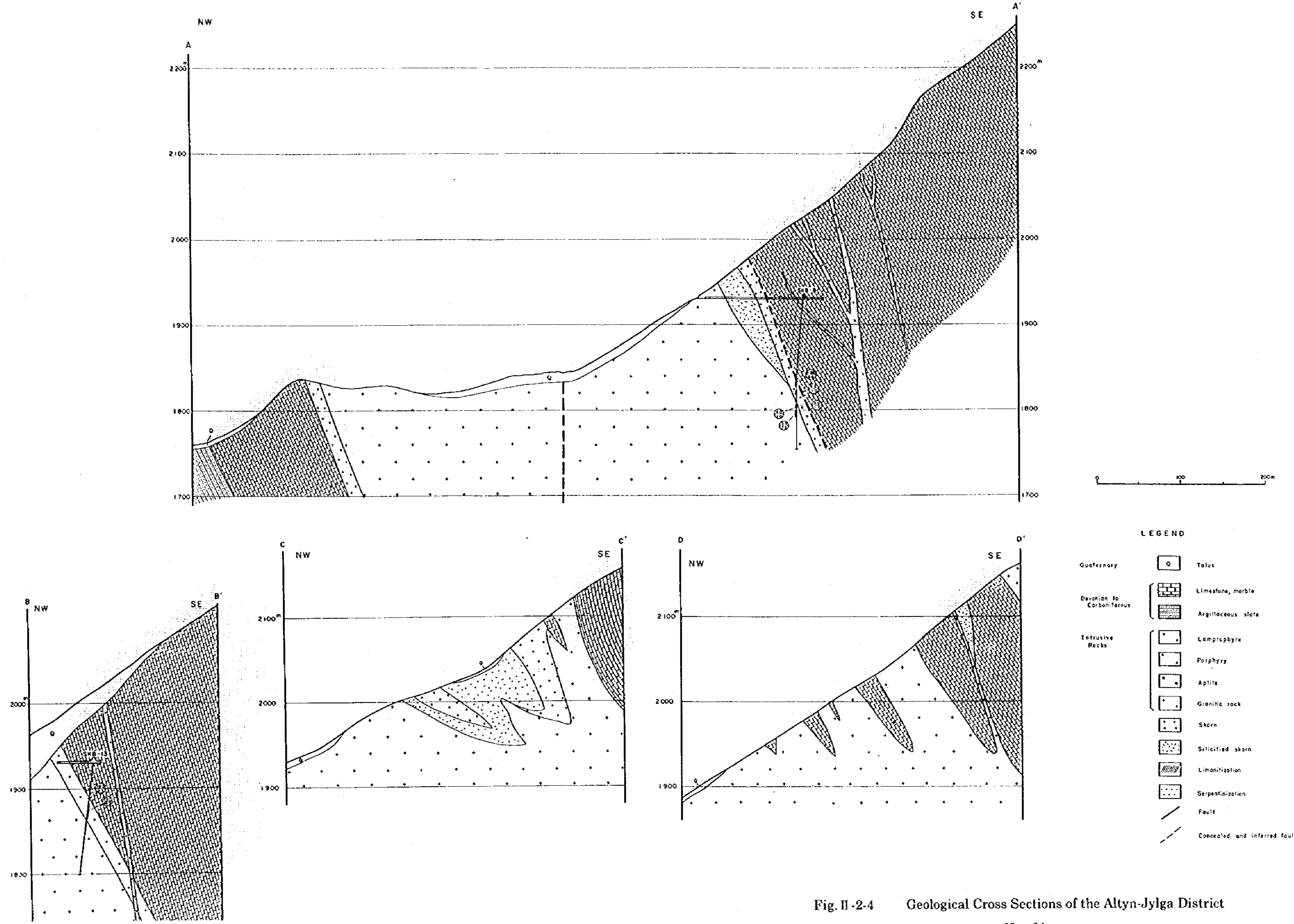


Fig. II-2-4 Geological Cross Sections of the Altyn-Jylga District

nepheline, it is classified into calc-alkaline lamprophyre. Phenocryst of quartz and plagioclase are dominant in lamprophyre (Apx. 1-3, 'N0072, 7T0002). Though these lamprophyres are petrographically classified into andesite or porphyrite, their textures are same as typical lamprophyre (7N0040), because quartz and plagioclase are xenolith. As these facies are products of a series of volcanic activity, these rocks are lump lamprophyre. Lamprophyre is intruded into skarn. Around the Altyn-Jylga gully in the southern part, surrounding rocks of lamprophyre are subjected to skarnization. Under the microscope, biotite and hornblende are replaced by clinopyroxene, and lamprophyre is also affected by skarnization (Apx. 1-3, 7T0002, 7T0005).

Dykes of gabbro and olivine amphibolite crop out. These dykes distribute in a small scale less than several meters in width.

Hornblende in granodiorite (Apx. 1-3, 7T0008) which crops out on the mouth of the 1930mL adit, is dated as 282± 14 Ma by K-Ar method (Apx. 1-11). Hornblende in lamprophyre (Apx. 1-3, 7N0040) which is intruded into marble of the hanging wall at the 1930mL adit, is dated as 299±15 Ma (Apx. 1-11). Both isotopic ages correspond to be latest Carboniferous to earliest Permian.

3) Skarn

Around the northeast body, skarn is formed in the contact zone between the granodiorite and the marble and limestone of the Kumbel formation. The skarn zone in the northern and central parts of the district extends trending NNE-SSW in length of 800m and in width of 100m. The skarn zone in the southern part elongates in length of 200m ranging in width from several meters to several ten meters. The skarn zone in the western part stretches trending ENE-WSW in length of 300m and in width of 200m. At the northwestern side of the northeast body, a small scale of skarn distributes in maximum width of several meters.

Around the southwest body, skarn is slightly produced. At the connect zone with the northeast body (the western mountainside), a small-scaled skarn occurs in width of several meters in the contact zone between marble and granodiorite dyke, accompanied with serpentine.

Skarn is composed of clinopyroxene skarn, pyroxene-garnet skarn, wollastonite skarn and silicified skarn.

Clinopyroxene skarn is widespread in the survey area, and is fine and massive facies made dominantly of clinopyroxene. Under the microscope (Apx. 1-3, 7M0002, 7N0001, 7T0010), it is composed of clinopyroxene, quartz, biotite, actinolite, hornblende and sphene. Calcite is commonly formed as stringer. Size of clinopyroxene is variable, but is generally fine in less than 0.5mm.

Pyroxene-garnet skarn and garnet-pyroxene skarn are predominant in the central part, especially at the south of the 1930mL adit. Under the microscope (Apx. 1-3, 7M0008, 7M0009, 7M0011, 7N0076), they are composed chiefly of clinopyroxene and garnet, with minor amount of quartz, plagioclase, sericite, chlorite, epidote, actinolite, hornblende and wollastonite. Calcite is formed commonly.

Wollastonite skarn is produced in the central and northern parts. Under the microscope of typical wollastonite skarn (7M0012), wollastonite forming remarkable prismatic crystal coexists with clinopyroxene.

Silicified skarn is widely observed in the survey area, especially in the northern part. Under the microscope (Apx. 1-3, 7M0006, 7T0011), silicified skarn shows fine-grained granoblastic texture, and is composed mostly of quartz and clinopyroxene, with minor amount of potassium feldspar, plagioclase, sericite, chlorite and wollastonite. Silicified skarn reveals banded structure. Size of quartz is heterogeneous. Quartz and clinopyroxene coexist commonly, but sample of 7T0011 is made of aggregates of clinopyroxene, leaving out quartz. Clinopyroxene in these aggregates trends larger in size than clinopyroxene coexisting with quartz.

4) Alteration

Shear zone is associated with yellowish brown alteration zone. The most of alteration zone trends NE-SW with clay and limonite ranging from several centimeters to several meters in width. Assemblages of quartz-sericite-(calcite), quartz(-sericite)-kaolinite-calcite, quartz(-sericite)(-kaolinite)-halloysite, quartz-sericite(-kaolinite)(-halloysite)-chlorite are detected according to X-ray diffraction analysis (Apx. 1-9).

5) Geological structure

Geological structure of sedimentary rocks is almost uncertain, because most of the Kumbel formation has been subjected to marble, skarnization and silicification, and the original texture as bedding plane has disappeared. Strikes and dips measured at several outcrops are revealed irregular and the folding structure is suggested to be complicated. According to previous researches by the Kyrghyz side, general geological structure is harmonized with a shape of the Altyn-Jylga body.

In the survey district, faults trending NE-SW and NW-SE are detected. The

Kumbel formation and the Altyn-Jylga body are cut by those faults.

The structure of the northeast body of the Altyn-Jylga granite has been clarified by the drillings and adit survey at the eastern side of the body in the northern and central parts. In the northern part, the structure of the body is totally clarified to dip E gently by drilling survey implemented in this study. In the central part, the structure of the body has been interpreted to dip 60° to 70° E by previous adit and drillings (SKB-8, SKB-13). At the outcrop in the southern part, the intrusive plane dips 64° SE. At the outcrop in the western part (Fig. II-2-4, C-C'), the intrusive plane dips 30° to 60° SE. At the northwestern side of the northeast body, the intrusive plane bordered on the Sarychashma formation dips 70° SE.

At the eastern side of the southwest body (Fig.II-2-4, D-D'), the intrusive plane dips 50° to60° SE. At the western side of the body (at the western margin), the intrusive plane dips 80° N or 80° S.

Intrusive planes of lamprophyre trend N-S and NE-SW ,and dip E in the northern and central parts. The most intrusive planes of lamprophyre in the southern part trend E-W and dip S. On the basis of the swarmed dyke zone and the directions of intrusive planes, the intrusive center of lamprophyre is presumed to be situated to southeast in the central and southern parts of the Altyn-Jylga deposit.

(2) Ore deposit

1) Skarn orebody

Orebody is composed of No.1 and No.2 in the southern part of the district, No.3 in the central part, No.4 in the northern part, No.5 in the southeastern part and No.8 and No.9 in the western part.

Before investigating trench, the trenches on the No.3 and No.4 orebodies were made clean and cropped out. The location of investigated trenches is indicated in Fig. II-2-6. Geological sketches are given in Fig. II-2-7 and PL. 6.

No.3 skarn orebody crops out around 1,930m to 2,000m in altitude on the right bank of the Altyn-Jylga gully. The orebody trends NNE-SSW and dips 60° to 70° E. It extends 150m along strike and ranges from 50m to 150m in width. Zonal arrangement of skarn is noticed in order of silicified skarn, silicified garnet-pyroxene skarn, pyroxene skarn and wollastonite skarn from the west of granodiorite to the east of marble near the trench K-1A above the adit. Wollastonite-pyroxene skarn impregnated malachite and chalcopyrite, is 19.2 g/t Au in grade.

No. 4 skarn orebody is situated in 200m to 600m to the north of No.3 orebody. It trends NNE-SSW and dips 40° to 50° E. It extends 400m along the strike and ranges from 50m to 100m in width. It consists of pyroxene skarn, silicified pyroxene-wollastonite skarn and silicified wollastonite skarn at the surface. Faults trending NE-SW and dipping 70° to 80° E or W, are observed at the trench K-5A. The highest grade at the surface is 34.3 g/t Au in skarn ore accompanied with secondary copper oxide minerals at the trench K-23A.

No.1 and No.2 orebodies in the southern part, crop out around 2,000m to 2,170m on the left bank of the Altyn-Jylga gully. No.1 orebody generally trends NE-SW and dips 65° SE. It extends 150m along the strike and widens 10m. The foot wall of the orebody is granodiorite and the hanging wall is marble. According to previous data of the Kyrghyz side, six ancient workings have been described in the skarn orebody. Those workings is assumed to be excavated copper. An outcrop of pyroxene skarn is located near the trench K-27. The skarn strikes N20° E and dips 85° E with 8.3m in width. Old working is detected along the hanging wall of this skarn. The dimensions of the old working are 0.8m in width by 1.8m in height by 3.5m in length. Chalcopyrite and secondary copper oxides vein of 0.6m in width had been mined in a small-scale. This pyroxene skarn shows 2.8 g/t Au in grade.

No.2 skarn orebody is located in 30m to south of No.1 orebody. It extends 60m and ranges from 1m to 5m in width. Assay of pyroxene skarn presents 2.8 g/t Au.

Pyroxene skarn orebody is found at 100m southeast of No.1 orebody and in the left-bank of the Altyn-Jylga gully. This skarn has been produced by replacement of lamprophyre. Four trenches have been located on this orebody. The orebody trends northeast and dips 40°-50° southeast. It ranges from 1m to 2m. Chalcopyrite and secondary copper oxides are disseminated in the skarn. Assay of skarn ranges from 3.0 to 5.0 g/t Au.

No.8 and No.9 skarn orebodies in the western part are located in 150m to the west of No.1 orebody and around 2,000m to 2,100m in altitude. The orebodies stretch out 300m along the ENE-WSW direction and widen 200m. The contact zone between granodiorite and skarn orebody is presumed to dip SE gently on base of distribution of rock facies on the surface. The skarn is made mainly of pyroxene skarn and partially observed silicified skarn. In pyroxene skarn in the trench K-23, secondary copper oxide as malachite forms with minor amounts of chalcopyrite and pyrite. Skarn ranges 5.3 to 10.0 g/t Au in grade. Two winzes which widen about 1.5m in diameter and range from 6m to 8m in depth, are located around the trench. The winzes is presumed to be driven to investigate the lower extension of the skarn orebody.

Small skarn being dimension of 10m by 50m, occurs around 400m to 600m to

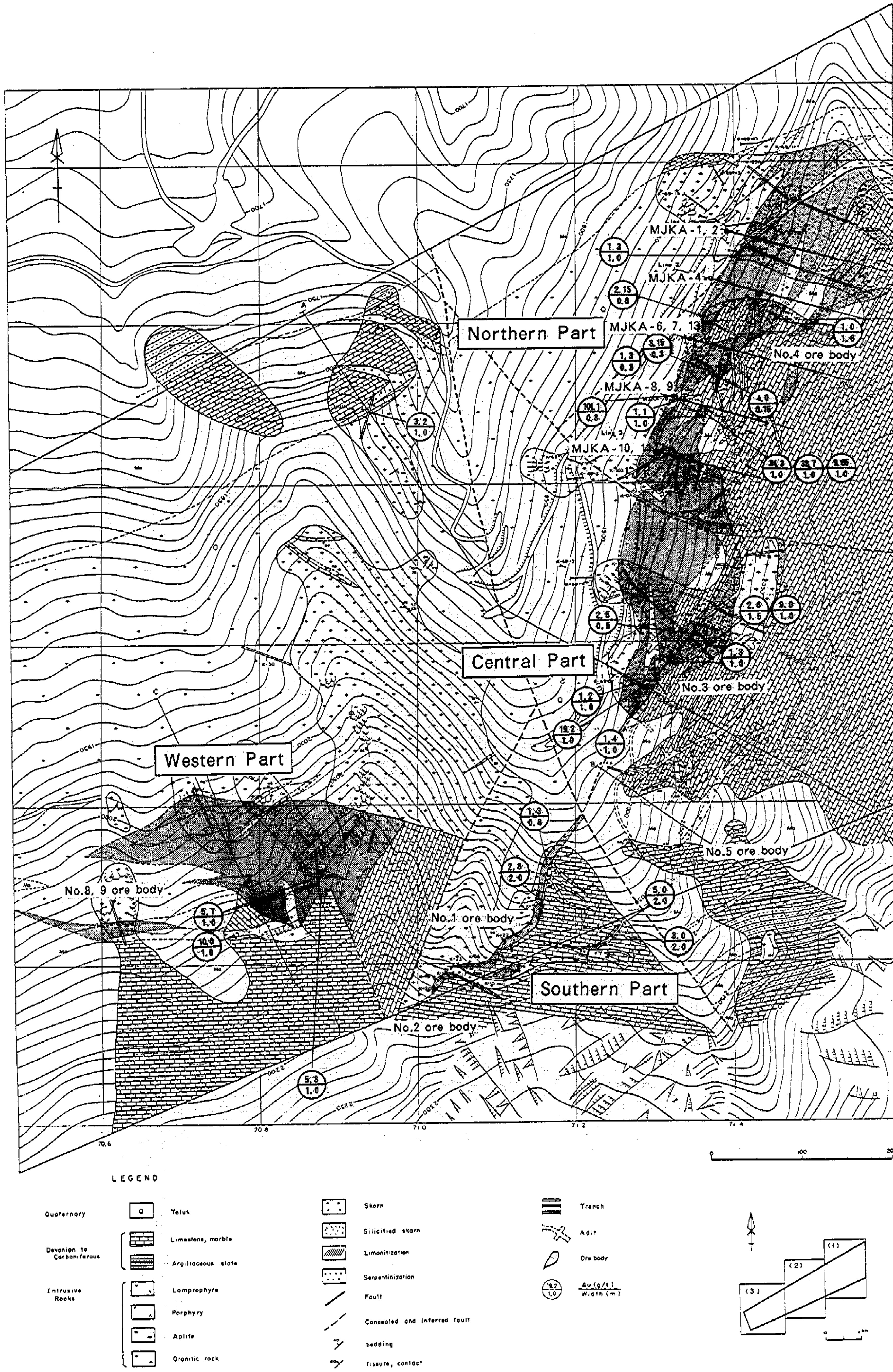


Fig. II-2-5 Distribution of Ore Deposit and Mineral Manifestations in the Altyn-Jylga District (1)

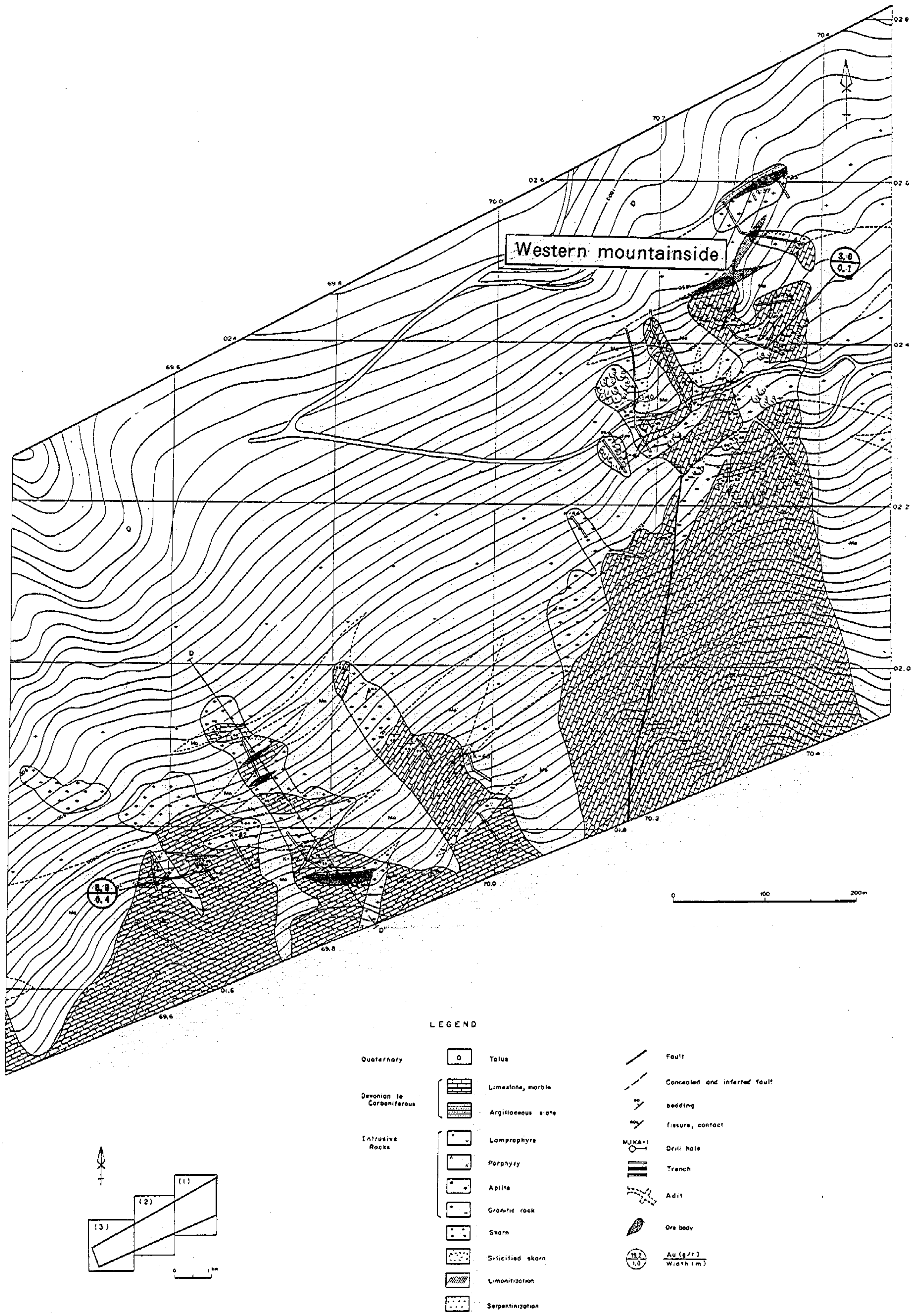


Fig. II-2-5 Distribution of Ore Deposit and Mineral Manifestations in the Altyn-Jylga District (2)

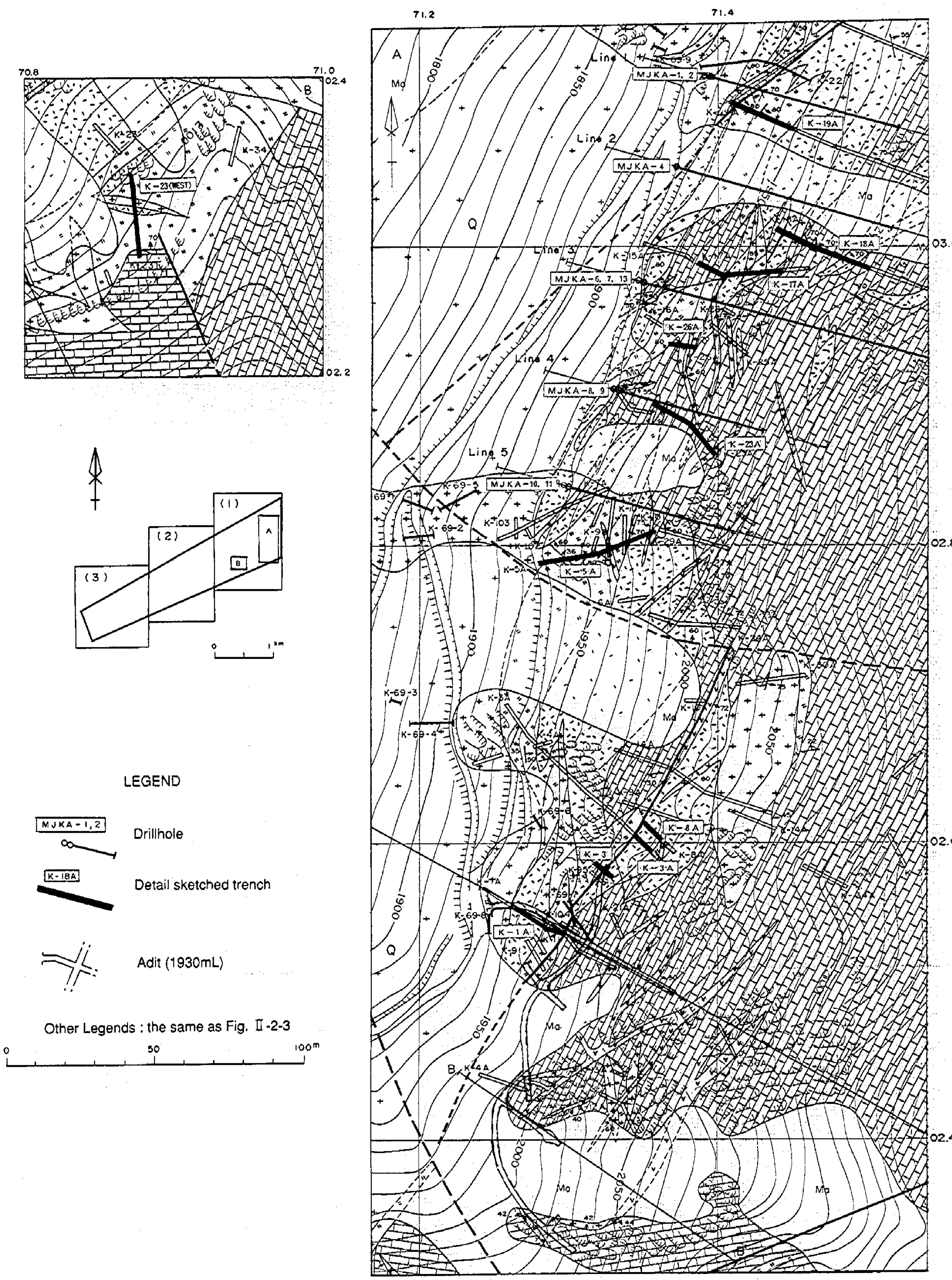


Fig. Ⅱ-2-6 Location Map of Trenches, Adit and Drillholes

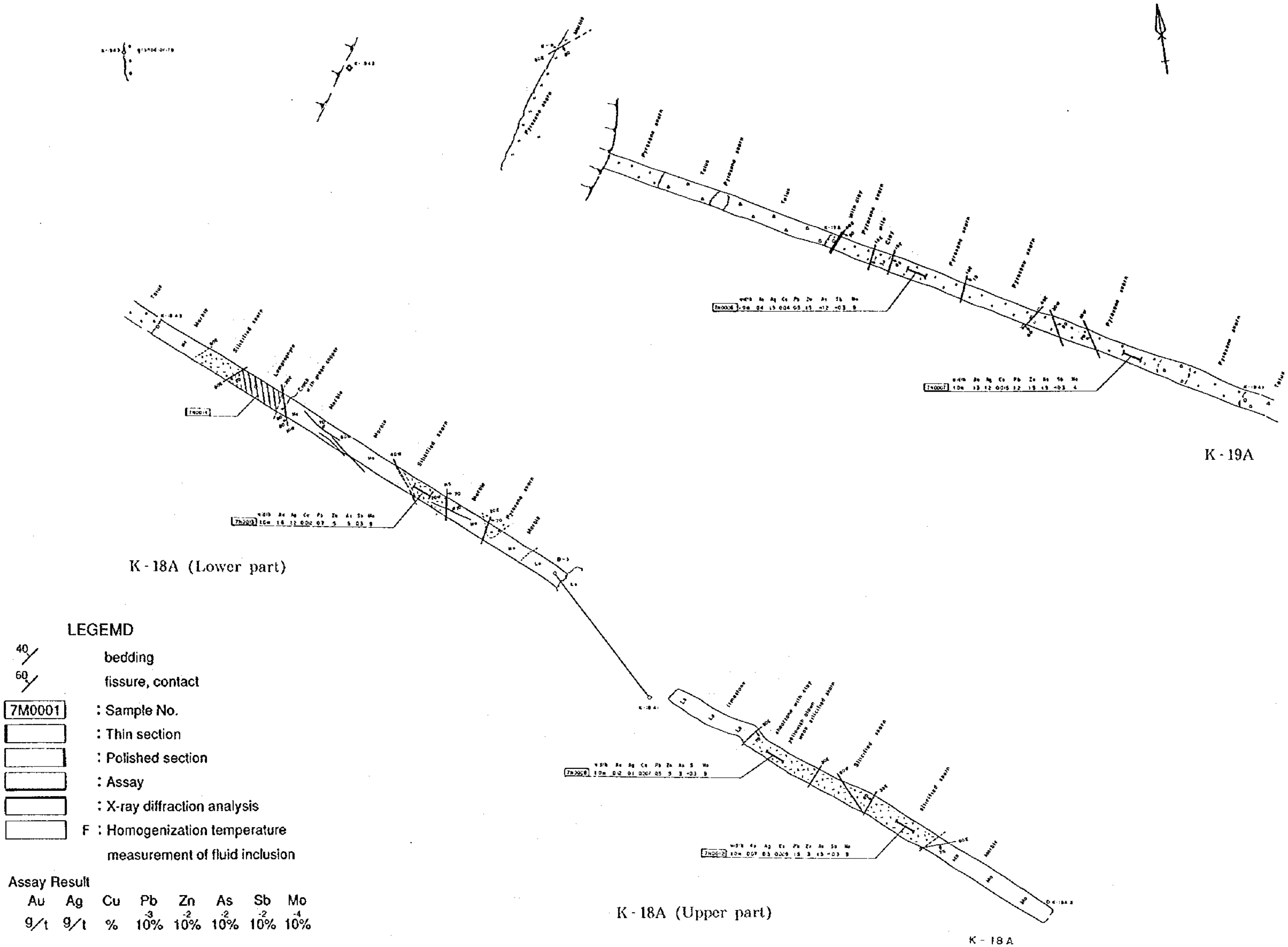


Fig. II-2-7 Geological Sketches of Trenches in the Altyn-Jylga Deposit (1)

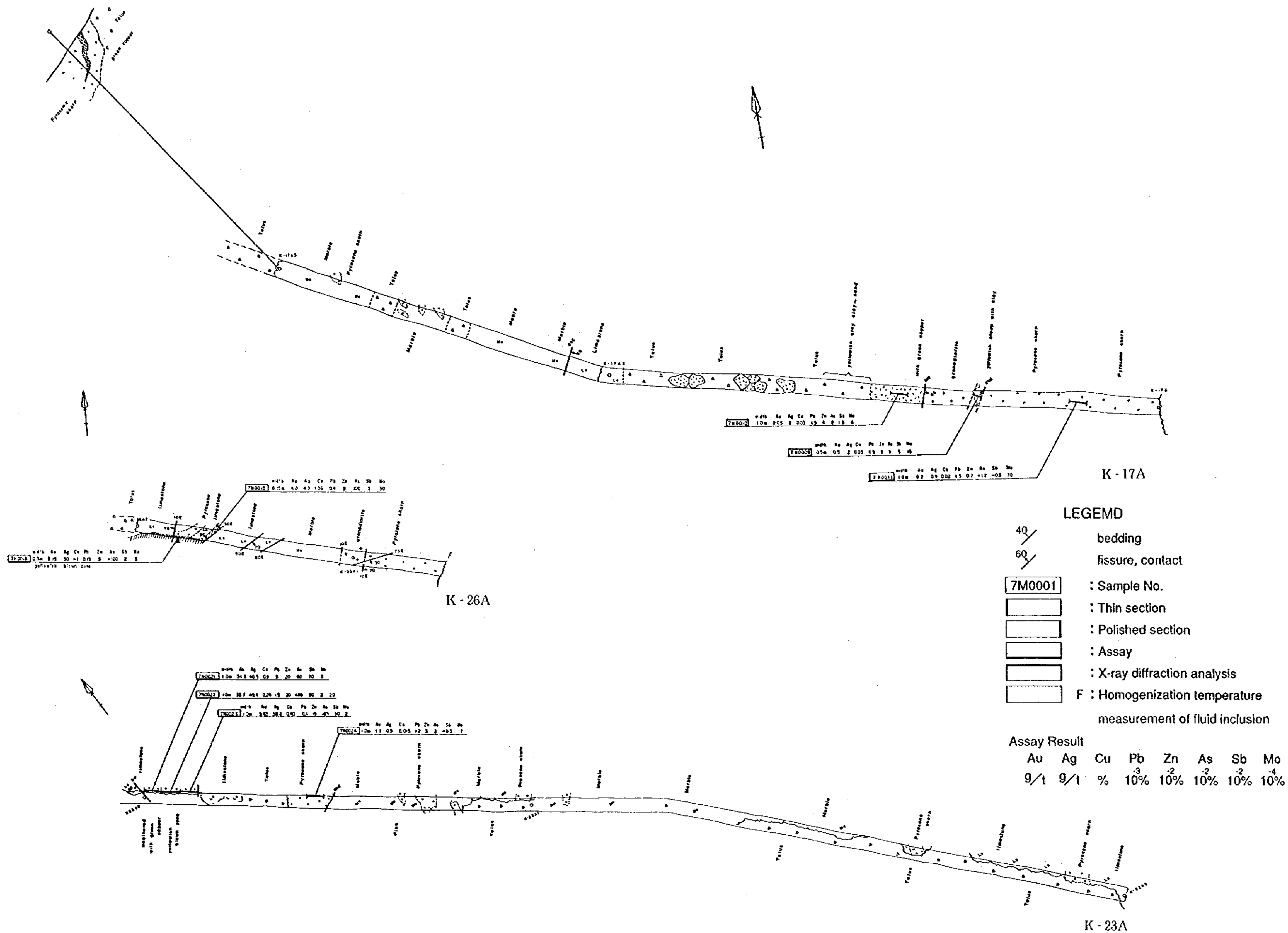


Fig. II-2-7 Geological Sketches of Trenches in the Altyn-Jylga Deposit (2)

LEGEMD

40 bedding

60 fissure, contact

7M0001 : Sample No.

: Thin section

: Polished section

: Assay

: X-ray diffraction analysis

F : Homogenization temperature measurement of fluid inclusion

Assay Result

Au	Ag	Cu	Pb	Zn	As	Sb	Mo
g/t	g/t	%	10^{-3}%	10^{-2}%	10^{-2}%	10^{-2}%	10^{-4}%

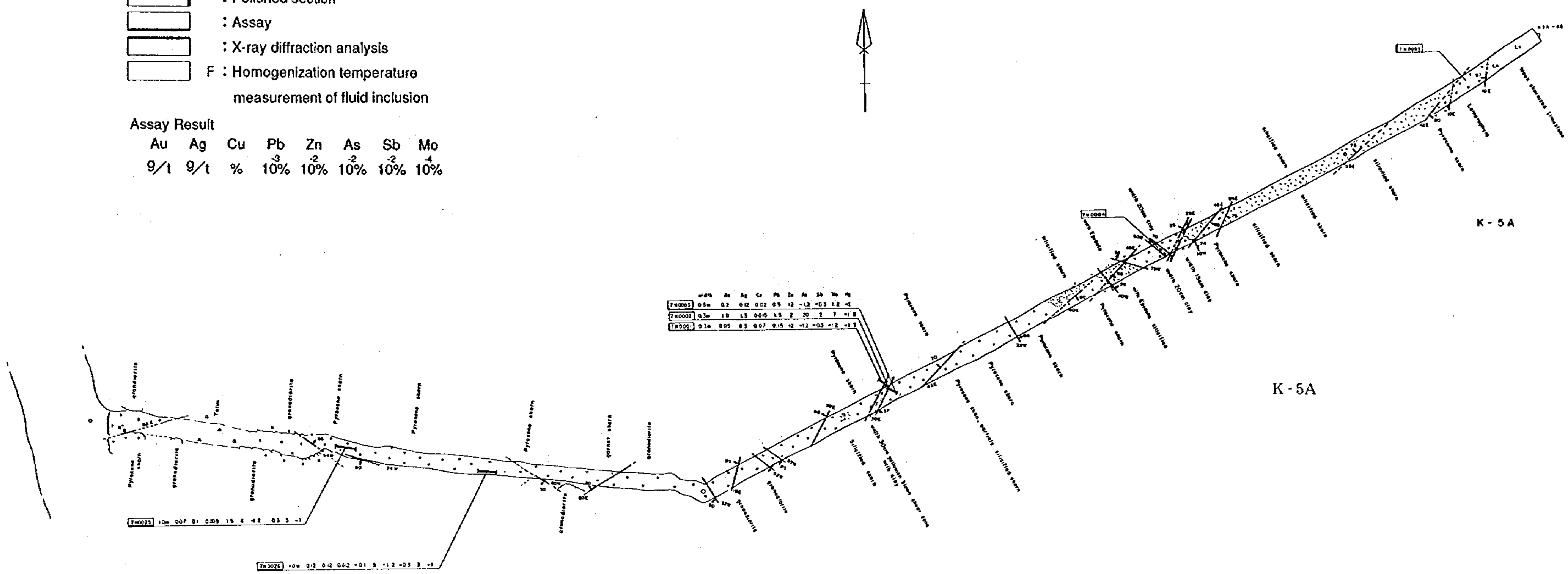
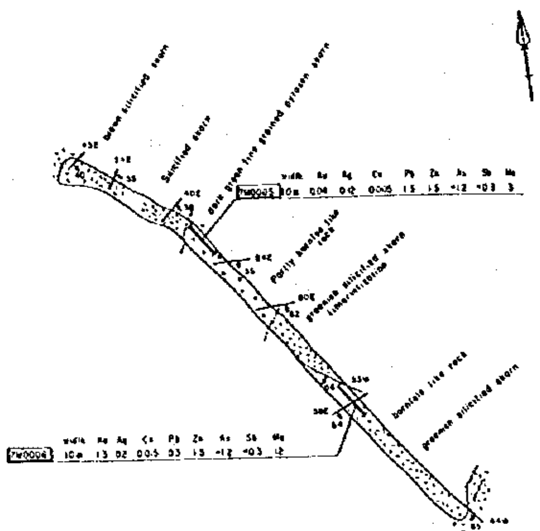
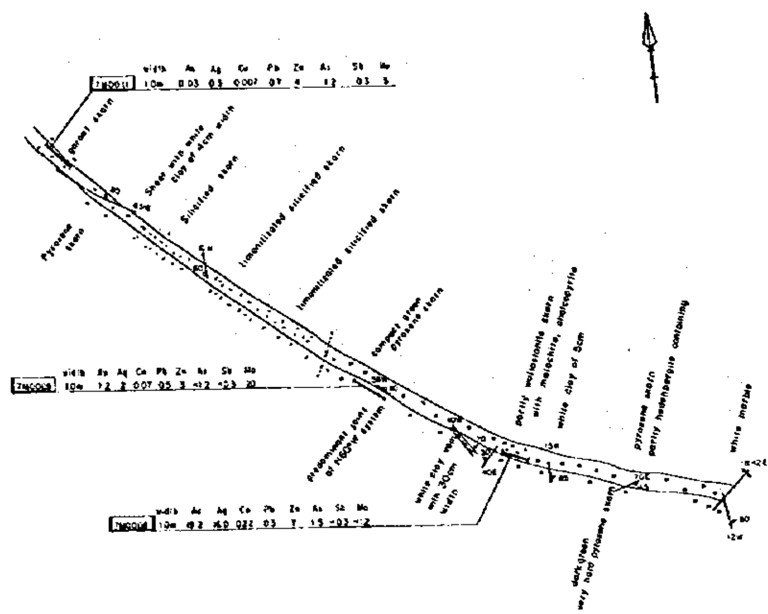


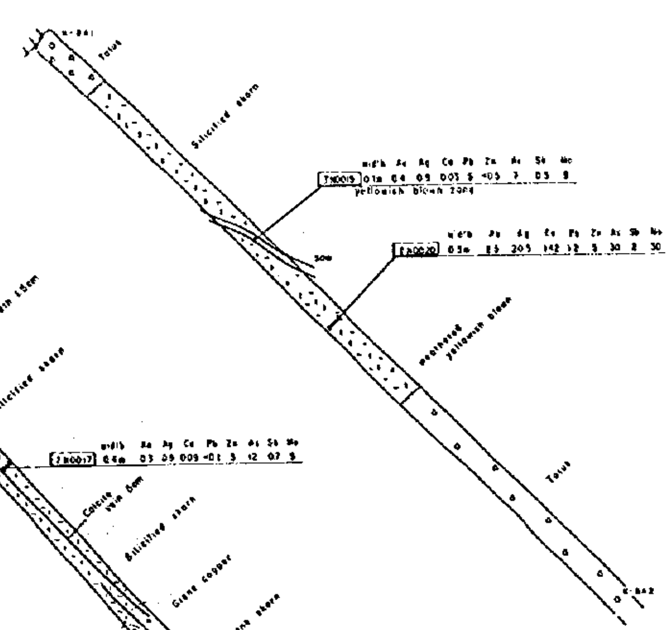
Fig. II-2-7 Geological Sketches of Trenches in the Altyn-Jylga Deposit (3)



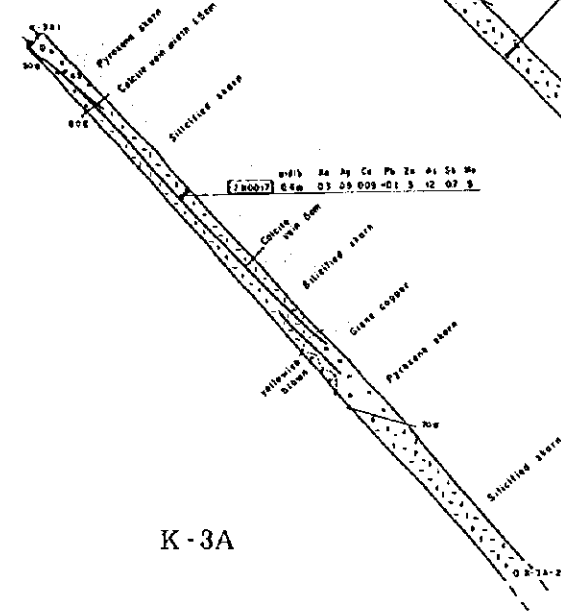
K - 3



K - 1A



K - 8A



K - 3A

LEGEMD

40/ bedding

60/ fissure, contact

7M0001 : Sample No.

: Thin section

: Polished section

: Assay

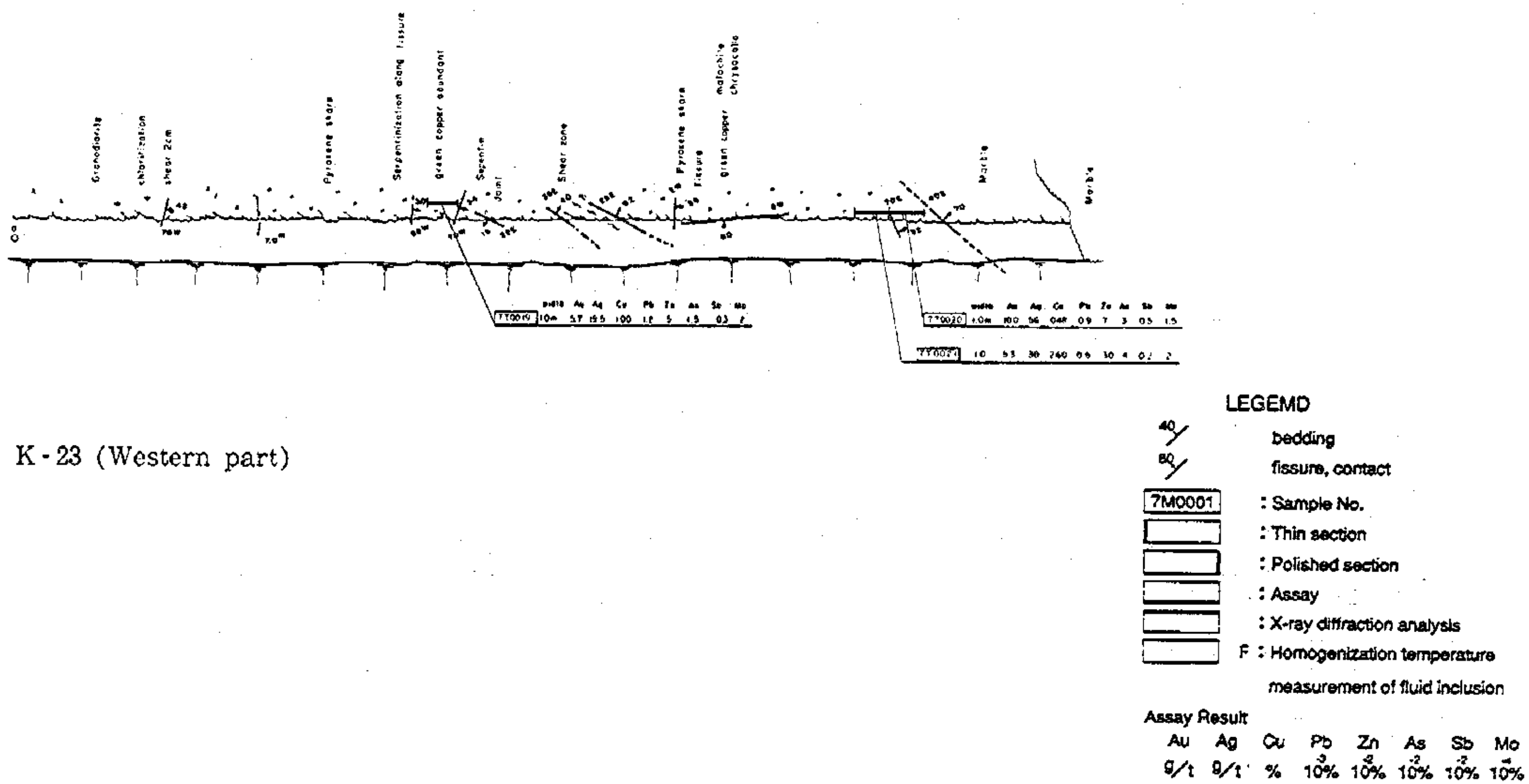
: X-ray diffraction analysis

F : Homogenization temperature measurement of fluid inclusion

Assay Result

Au	Ag	Cu	Pb	Zn	As	Sb	Mo
g/t	g/t	%	10^{-3}%	10^{-2}%	10^{-2}%	10^{-2}%	10^{-4}%

Fig. II-2-7 Geological Sketches of Trenches in the Altyn-Jylga Deposit (4)



K - 23 (Western part)

Fig. II-2-7 Geological Sketches of Trenches in the Altyn-Jylga Deposit (5)

the northwest of No.8 and No.9 orebodies in the western mountainside. Pyroxene skarn in this sector is characterized to be replaced by serpentine. Serpentinized skarn is less than 0.1 g/t Au in grade. SKGE has conducted to drill the prospective contact zone between granodiorite and shale or siltstone. Drillhole SKB-18 was drilled at 417m in depth from 1,804m in altitude, directing 140° and inclining -78°. It is composed of siltstone ranging from 0m to 220m in depth, shear zone ranging 220m to 317m and pyroxene skarn ranging from 317m to 417m. Sulfide minerals of pyrite, chalcopyrite and arsenopyrite are impregnated in the skarn with 2m to 3m in width. Especially, arsenopyrite vein of 2m in width was confirmed at the depth of 318m. Silver is predominant in the skarn.

The contact zone between granodiorite and marble stretch out 2km southwestward of the western mountainside. Skarnization is hardly observed in the contact zone, except partially limonitized alteration in granodiorite.

During 1995 to 1996, SKGE had performed a tunnel exploration at No.3 skarn orebody at 1930mL. A total of length was about 550m. A drift and crosscut had been driven and underground horizontal and inclined holes had been drilled. Samples for assay were collected from roof, both walls and cores by one meter in principal.

Table II-2-1 reveals statistic assay results of 67 samples collected from the surface of the Altyn-Jylga district in this study. Correlation coefficients among analyzed elements are also given in Table II-2-1. In this table, 67 samples are divided into two sectors, that is 23 samples from the central and southern parts, and 44 samples from the northern and western parts. Correlation coefficient showing more than 0.8, is only a relationship between lead and zinc. The fact points out that element related to gold is hardly found.

Homogenization temperatures of fluid inclusions in calcite and quartz which formed as stringer in skarn collected from trench K-25A and K-23A in the northern part and from the trench K-11 in the southern part, were measured. Fluid inclusion was liquid inclusion. Gaseous inclusion and polyphase inclusion containing halite were not observed. Size ranges from 4 to 8 μ m. It takes too many times to measure the temperature because of very fine inclusion in size. Most inclusions occurs in mother crystals and occur in prismatic form and rectangle.

The results of homogenization temperatures are given in Apx. 1-10-(1). Average homogenization temperature from the surface ranges from 118° to 200℃. Homogenization temperature in calcite from the trench K-25A ranges from 146° to 241℃. The high temperature more than 200 ℃ suggests that the inclusion would be measured after leakage of liquid phase.

Table II-2-1 Summary of Assay Result of Surface Samples in the Altyn-Jylga District

1) All Data

	Au (g/t)	Ag (g/t)	Cu (%)	Pb $(10^{-3}\%)$	Zn $(10^{-2}\%)$	As $(10^{-2}\%)$	Sb $(10^{-2}\%)$	Mo $(10^{-4}\%)$
Sample Number	67	67	67	67	67	67	67	67
Maximum	101.0	100	2.9	90	100	489	90	400
Minimum	0.02	<0.1	0.005	<0.1	<0.3	<1.2	<0.3	<1.2
Average	4.4	14	0.4	3.8	8.2	26.6	5.3	16.3

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.55	1.00						
Cu	0.08	0.43	1.00					
Pb	0.03	0.29	-0.10	1.00				
Zn	0.09	0.32	0.07	0.81	1.00			
As	0.51	0.39	0.11	-0.03	0.10	1.00		
Sb	0.32	0.45	0.28	0.10	0.20	0.78	1.00	
Mo	0.04	0.00	0.48	-0.07	-0.08	0.02	-0.03	1.00

2) Central and Southern parts

	Au (g/t)	Ag (g/t)	Cu (%)	Pb $(10^{-3}\%)$	Zn $(10^{-2}\%)$	As $(10^{-2}\%)$	Sb $(10^{-2}\%)$	Mo $(10^{-4}\%)$
Sample Number	23	23	23	23	23	23	23	23
Maximum	19.2	100	2.9	5	20	90	70	40
Minimum	0.03	<0.1	0.005	<0.1	<0.3	<1.2	<0.3	<1.2
Average	2.3	12	0.4	1.3	4.4	13	4.7	10.3

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.15	1.00						
Cu	0.21	0.68	1.00					
Pb	-0.27	0.16	0.11	1.00				
Zn	0.20	0.02	0.11	-0.26	1.00			
As	0.03	0.44	0.67	0.02	-0.03	1.00		
Sb	0.00	0.57	0.71	0.15	-0.01	0.78	1.00	
Mo	-0.08	0.23	0.60	0.26	-0.11	0.39	0.40	1.00

3) Nothern and Western parts

	Au (g/t)	Ag (g/t)	Cu (%)	Pb $(10^{-3}\%)$	Zn $(10^{-2}\%)$	As $(10^{-2}\%)$	Sb $(10^{-2}\%)$	Mo $(10^{-4}\%)$
Sample Number	44	44	44	44	44	44	44	44
Maximum	101.0	90	2.9	90	100	489	90	400
Minimum	0.02	<0.1	0.007	<0.1	<0.3	<1.2	<0.3	<1.2
Average	5.5	15.1	0.3	5.1	10.2	33.7	5.6	19.5

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.69	1.00						
Cu	0.08	0.27	1.00					
Pb	0.02	0.35	-0.13	1.00				
Zn	0.07	0.40	0.09	0.82	1.00			
As	0.52	0.43	0.04	-0.06	0.07	1.00		
Sb	0.38	0.39	0.06	0.11	0.24	0.85	1.00	
Mo	0.03	-0.04	0.58	-0.08	-0.09	0.00	-0.08	1.00

A favorable temperature that gold precipitates from hydrothermal solution, is different from individual deposit. In general, homogenization temperature ranges from 300° to 200°C. The average temperature on the surface reveals lower temperature compared with the above-mentioned favorable temperature for gold deposition.

2) Underground geological survey

The entrance of tunnel is located on 1,930m in altitude. Crosscut of 140m in length had been driven to the east-southeastward. At the 79m in the crosscut, skarn orebody which dipped 70° SE, had been confirmed in width of 6m. The northward and southward drifts had been driven along skarn orebody.

As the result of underground geological survey, zonal arrangement of granodiorite, silicified skarn, pyroxene skarn, pyroxene-garnet skarn and marble, was observed from foot wall at the west to the hanging wall at the east (Fig. II-2-8, PL. 7). Silicified skarn extends 150m directing N-S and ranges in width from 20m to 40m. Pyroxene skarn extends 160m trending N-S and ranges in width from 5m to 25m. Pyroxene skarn grades into pyroxene-garnet skarn at 130m from the beginning point of the southern drift. Pyroxene-garnet skarn continues to the southern end of the drift (Fig. II-2-9).

Sulfide minerals of chalcopyrite and pyrite are impregnated in pyroxene skarn and pyroxene-garnet skarn rather than in silicified skarn.

Crosscut had been driven in 50m length to the hanging wall at the 130m from the beginning point of the southern drift. Chalcopyrite is disseminated in coarse-grained garnet skarn with 1mm to2mm in grain size around the junction of the crosscut. Highest grade of skarn ore around there is 58 g/t Au. Average grade of the southern wall is 19.0 g/t Au with 11.7m in width. Average grade of the northern wall is 22.7 g/t Au with 5.9m in width.

As the result of X-ray diffraction analysis, garnet collected from the southern wall has following characteristics. Typical face of andradite (400) is represented as strongest peak. Size of unit cell calculated on the basis of nine peaks is estimated to be 12.03 Å (andradite: 12.048 Å, grossularite: 11.851 Å). Therefore, the fact concludes that garnet is assumed to be closely the end member of andradite.

Ore minerals are impregnated in garnet. Pyrite and chalcopyrite are observed by naked eyes. Under the microscope (Apx. 1-5, 7N0074), pyrite and chalcopyrite, magnetite, pyrrhotite, sphalerite, electrum and wittichenite are observed. Chalcopyrite occurs in irregular form among grains of garnet and skarn minerals

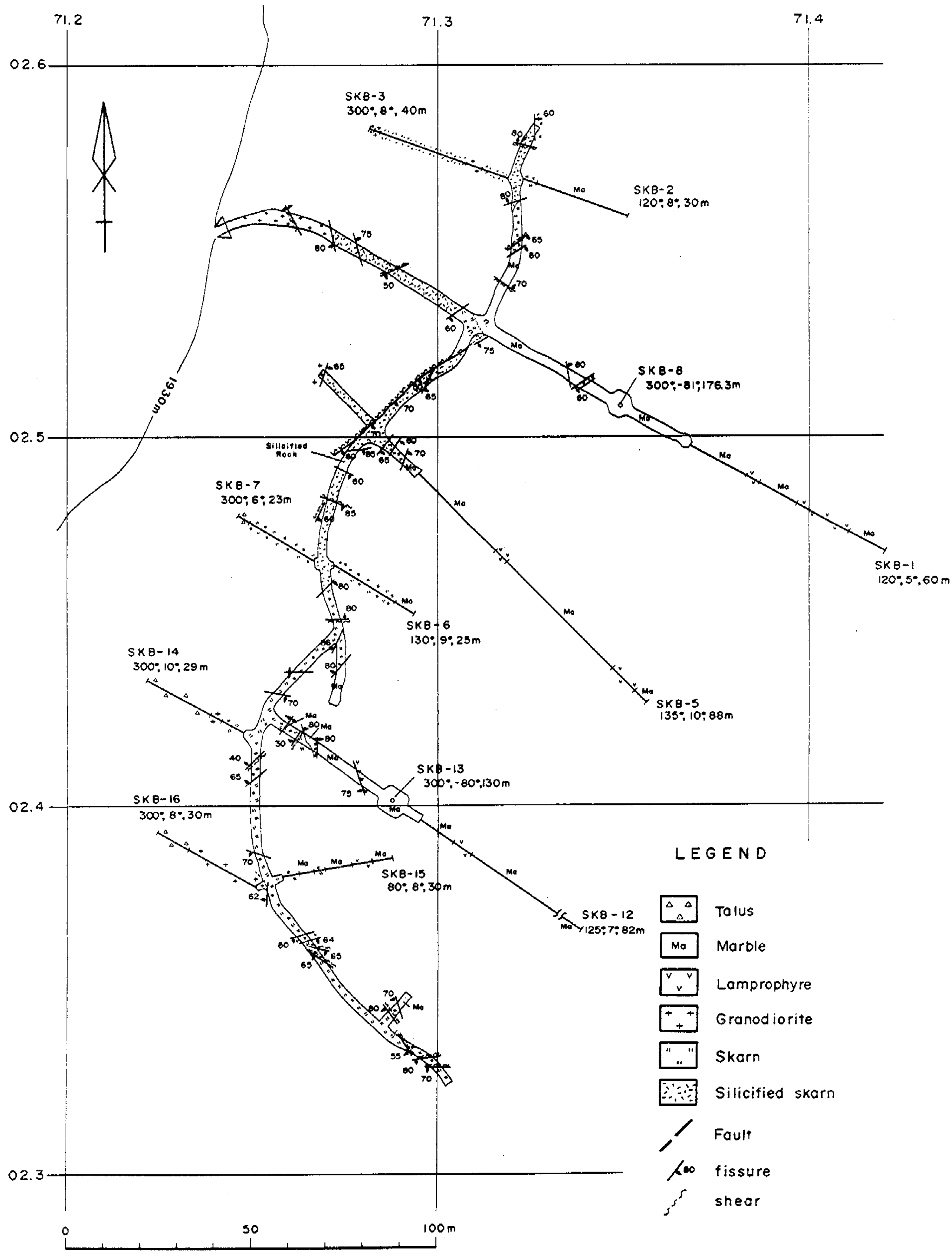


Fig. II-2-8 Geological Sketch of 1930mL Adit in the Altyn-Jylga Deposit

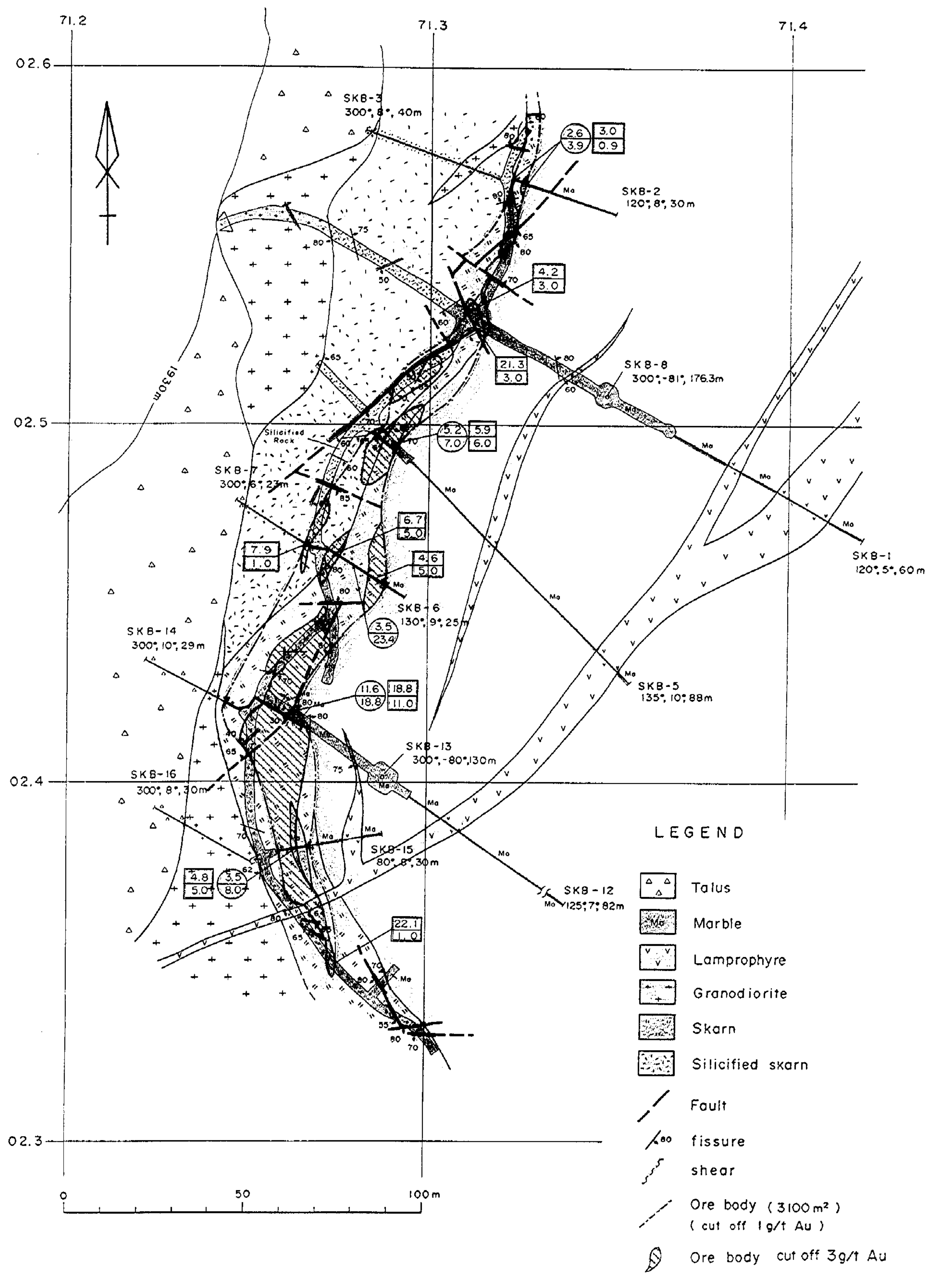


Fig. II-2-9 Underground Geological Map of 1930mL Adit in the Altyn-Jylga Deposit

and occurs along fissure. It is less than 0.2mm in size. It includes magnetite, wittichenite, electrum and sphalerite showing star exsolution texture. Pyrite coexists with chalcopyrite and forms in euhedral and subhedral. Pyrite replaced from marcasite revealing lamella texture.

Two inclined drillings from the crosscut in 1930mL had been carried out to clarify mineralization in the lower extension of No.3 skarn orebody by the Kyrghyz side. The northern hole SKB-8 had been implemented in azimuth of 300°, inclination of -81°, depth of 176m (Fig. II-2-4, A-A'). Between 97m and 140m, four mineralization zones had been confirmed in width ranging from 1m to 7.2m with average grade of 3 to 5 g/t Au. The southern hole SKB-13 had been conducted in azimuth of 300°, inclination of -80°, depth of 130m (Fig. II-2-4, B-B'). Between 46.4m and 64.9m, mineralization zone had been confirmed in width 18.5m with average grade of 25.7 g/t Au. The latter high grade ore is located at the 1870mL and its inclined length converts to be 13m in horizontal width. High grade ore is pyroxene-garnet skarn associated with chalcopyrite and bornite. Garnet is characterized by coarse grain ranging from 1mm to 2mm. Under the microscope, it is composed of chalcopyrite, bornite, sphalerite, chalcocite, electrum, wittichenite, pyrite and marcasite. Electrum ranges from 5 to 100 μ m in size. It occurs along fissures and grain boundaries of garnet. Electrum coexists closely with bornite and bismuthinite.

Average homogenization temperature of fluid inclusion in garnet and calcite at the depth of 101m (1830mL) in SKB-8 hole represents around 169°C and around 151°C, respectively (Apx. 1-10, 7M0903). Average homogenization temperature in quartz stringer at the depth of 61m (1860mL) in SKB-13 hole represents around 140°C (Apx. 1-10, SK202). These homogenization temperatures have been rather low than a common homogenization temperature of gold bonanza.

At the underground, fracture as fissure and shear formed in skarn have been observed. At the underground geological survey strikes and dips of fractures were measured. As the result of this study, π-diagrams of fractures were drawn and axes of structure were investigated in detail statistically (Fig. I-2-10, Fig. II-2-11). According to the investigation, shear plane was swarmed at striking N42° E and dipping 64° SE and at striking N30° W and dipping 88° E. On the other hand, joint was swarmed at striking N56° E and dipping 41° NW and at striking N27° W and dipping 81° NE. The fact concludes that the fracture directing NE-SW and dipping E or W and the fracture directing NW-SE and dipping E are developed in No.3 skarn orebody.

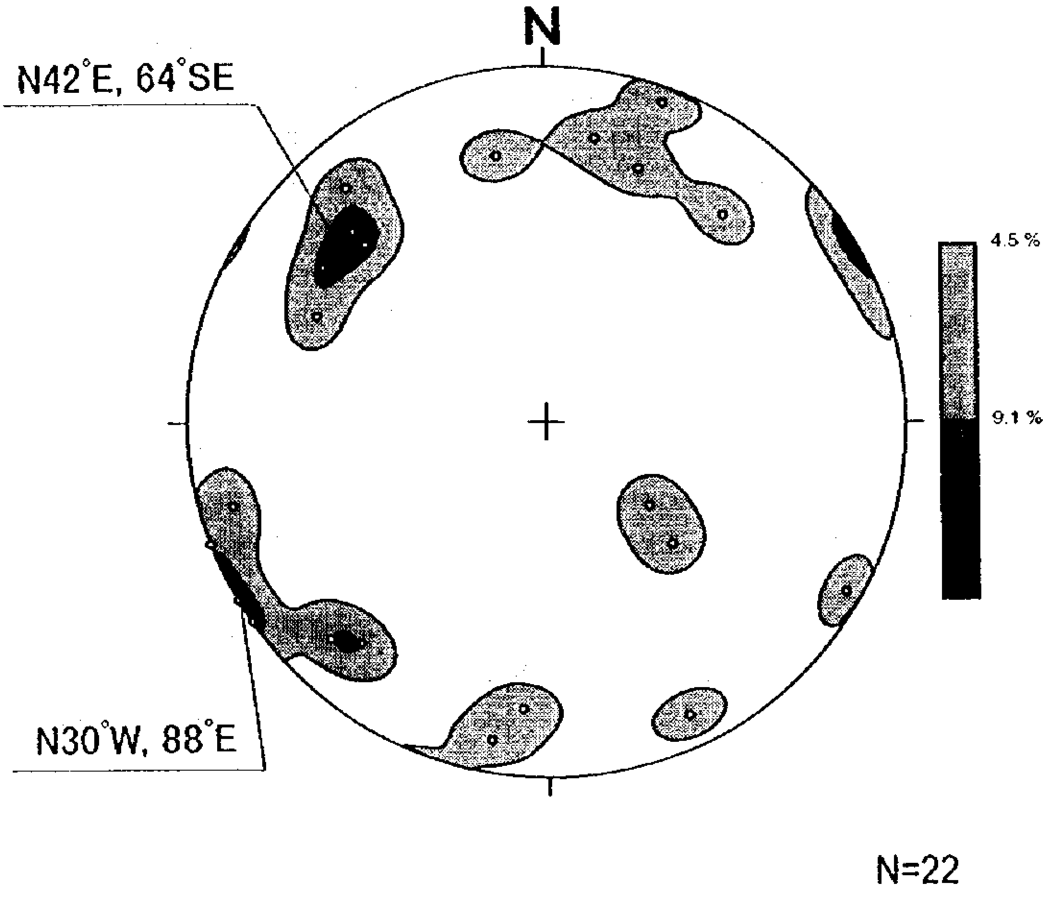


Fig. II-2-10 π-diagram of Shear Plane System at the 1930mL Adit
(Low-hemisphere projection)

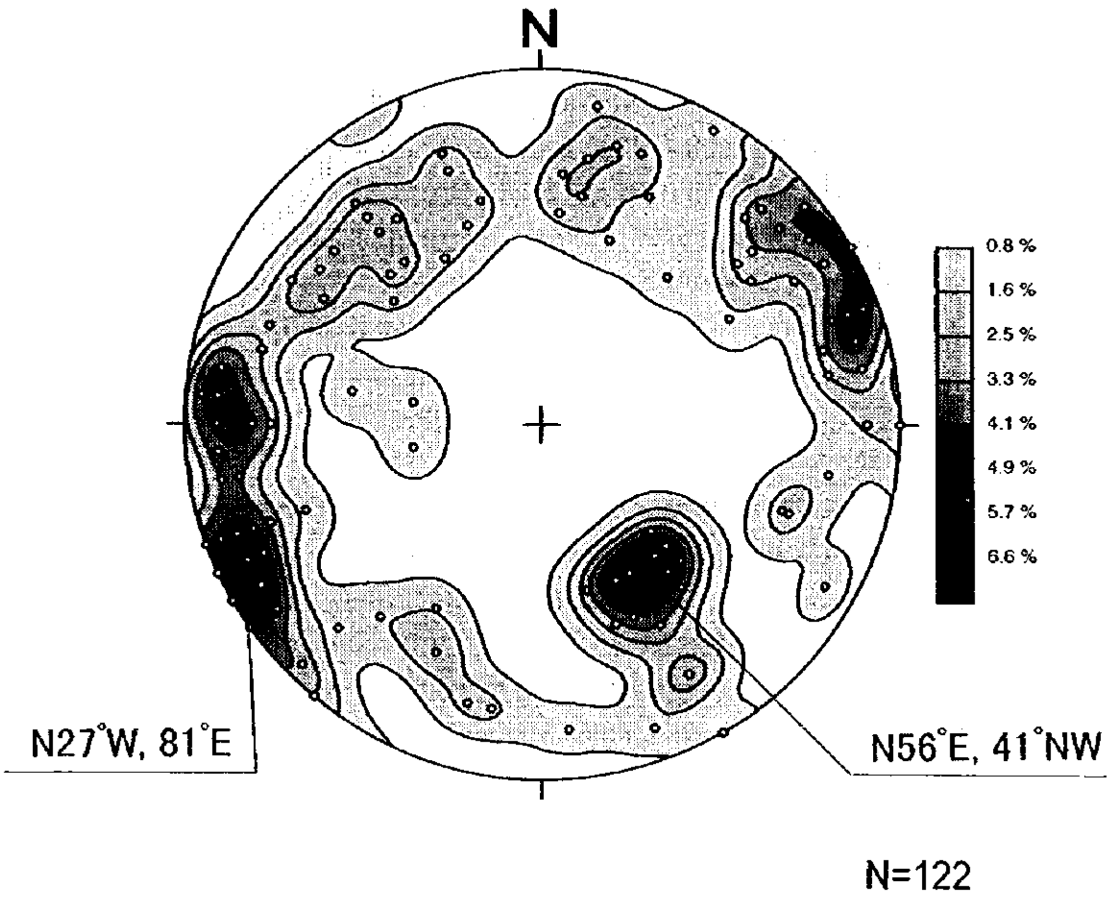


Fig. II-2-11 π-diagram of Joint System at the 1930mL Adit
(Low-hemisphere projection)

A relationship between fracture system and gold grade was investigated. As peviously described, high grade gold ore occurs near the beginning of the southern drift (18.1-23.4 g/t Au), and near the junction of the crosscut on the SKB-13 hole (average grade 19.0 g/t Au with 11.7m in width). This position is located near the intersection between the fracture directing NE-SW and the fracture directing NW-SE. Gold mineralization is assumed to be gathered at the intersection between the fracture directing NE-SW and the fracture directing NW-SE, though it is not conclusive because of only a few places identified.

Table II-2-2 reveals statistic assay results of 35 samples collected from the tunnel in this study. Correlation coefficients among analyzed elements are also given in Table II-2-2. As correlation coefficient between silver and copper was 0.82, a scattered map was drawn to investigate distribution of both elements. It was made clear that correlation coefficient is estimated to be large digital because silver of two samples of 7N0037 and 7N0038 has extremely higher assay than other samples. By re-calculating except above two sample, correlation coefficient is estimated to be 0.68. The fact points out that element related to gold is hardly found.

Table II-2-3 exhibits assay of 35 samples collected in this study, and also gives previous assay of 28 samples which are compared with 35 samples in their situation and geological point of view. Comparing both assay, they have a good agreement. Mean values are calculated to be 5.1 g/t Au in this study, 5.0 g/t Au in previous study. Weighted mean values are 7.5 g/t Au and 6.8 g/t Au, respectively.

Gold mineralization at No.3 skarn orebody was examined using all the gold assay of 691 samples on the previous underground assay map. A cumulative frequency distribution of gold assay was plotted on normal probability graph. The relevant threshold values were extracted as the bending points of the cumulative frequency distribution curve, which would discriminate between the background and anomaly values of gold mineralization (Fig. II-2-12). When an analyzed value was less than an lower limited value, a half value of the lower limited value was substituted. According to the bending points of the cumulative frequency distribution curve, minimum value representing gold mineralization in this orebody was determined to be 0.5 g/t Au in grade, and its anomaly value was 30 g/t Au in grade.

Area of orebody at 1930mL was investigated as 1 g/t Au in cut-off grade. Area of orebody more than 1 g/t Au was embedded in pyroxene skarn chiefly, and was estimated to be 3,100km^2 (Fig. II-2-9). Average grade of this area was calculated to

Table II-2-2 Summary of Assay Result of Ore from 1930mL Adit in the Altyn-Jylga District

1) All Data

	Au (g/t)	Ag (g/t)	Cu (%)	Pb (10-3%)	Zn (10-2%)	As (10-2%)	Sb (10-2%)	Mo (10-4%)
Sample Number	35	35	35	35	35	35	35	35
Maximum	35.8	139.3	0.3	90	70	195	40	90
Minimum	0.12	<0.1	0.005	0.12	0.3	<1.2	<0.3	<1.2
Average	5.6	5.9	0.05	4.4	8.6	20.7	4.0	16

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	-0.08	1.00						
Cu	0.00	0.82	1.00					
Pb	-0.11	0.21	0.08	1.00				
Zn	-0.09	0.65	0.51	0.74	1.00			
As	0.10	-0.10	-0.20	-0.01	-0.11	1.00		
Sb	-0.09	-0.08	-0.09	0.07	0.02	0.14	1.00	
Mo	-0.18	-0.11	-0.22	-0.03	-0.20	-0.02	0.14	1.00

2) Except 2 Samples of 7N0037 (Ag:139.3g/t) and 7N0038 (Ag:30g/t)

	Au (g/t)	Ag (g/t)	Cu (%)	Pb (10-3%)	Zn (10-2%)	As (10-2%)	Sb (10-2%)	Mo (10-4%)
Sample Number	33	33	33	33	33	33	33	33
Maximum	35.8	7.0	0.12	20	30	195	40	90
Minimum	0.3	<0.1	0.005	0.12	0.3	<1.2	<0.3	<1.2
Average	5.9	1	0.04	1.8	5.4	21.4	4.0	16.6

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.48	1.00						
Cu	0.14	0.68	1.00					
Pb	-0.05	0.17	-0.14	1.00				
Zn	0.07	0.29	0.15	0.02	1.00			
As	0.10	-0.07	-0.21	-0.01	-0.14	1.00		
Sb	-0.10	-0.14	-0.04	0.00	0.04	0.13	1.00	
Mo	-0.19	-0.14	-0.24	0.20	-0.24	-0.03	0.13	1.00

Table II-2-3 Comparison of Assay Results between this Study and Previous Study from 1930mL Adit in the Altyn-Jylga Deposit

Location No. (in order from north to south)	This study			Previous study			Remarks
	length (m)	Number of Samples	Grade of Au (g/t)	length (m)	Number of Samples	Grade of Au (g/t)	
1	1.2	3	0.6	2.3	3	0.5	frc-slsk
2	0.4	1	12.0	1.5	2	1.9	frc-slsk
3	2.4	3	10.0	2.5	3	8	frc
4	2.1	3	26.7	3.0	3	21.3	hgsk
5	0.2	1	0.1	1.0	1	—	frc
6	1.0	3	0.5	1.5	1	0.8	dk
7	0.2	1	1.8	1.5	2	2	frc
8	0.7	2	0.6	0.7	1	0.5	frc
9	3.0	7	5.2	3.0	3	1.9	hgsk
10	0.6	1	0.3	0.5	1	0.5	frc
11	0.2	1	0.4	1.6	2	0.4	frc-grsk
12	1.5	3	3.1	0.6	1	0.7	drs-frc
13	0.8	2	5.7	2.0	2	23.4	frc
14	1.3	3	9.3	2.0	2	3.6	frc
15	1.0	1	0.3	1.0	1	—	frc
Mean			5.1			5.0	
Weighted mean			7.5			6.8	

Notes:
frc: fracture
slsk: siliceous skarn
grsk: pyroxene-garnet skarn
hgsk: high grade skarn
dk: dyke
drs: druse

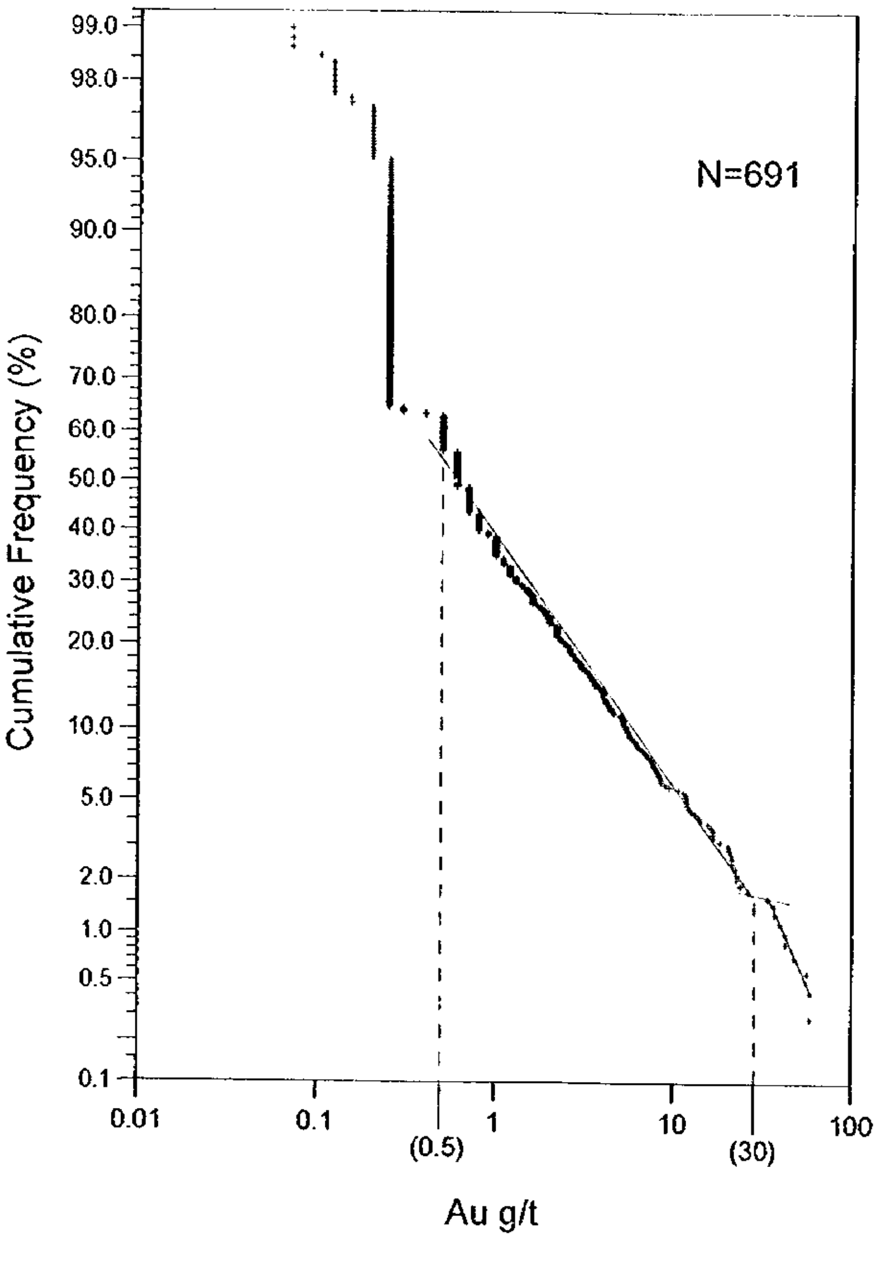


Fig. II-2-12 Cumulative Frequency Diagram of Gold Assay at the 1930mL Adit be 5.5 g/t Au, excepting anomaly value being more than 30 g/t Au.

The results of homogenization temperatures from the 1930mL adit are given in Apx. 1-10-(1). Homogenization temperature ranges from 136° to 230°C. Average homogenization temperatures reveal around 152°C and around 192°C in calcite, and around 148°C in quartz.

2-3 Drilling survey

2-3-1 Purpose of survey

A drilling survey was carried out in the northern part of the Altyn-Jylga deposit. The purpose of the survey was to directly clarify mineralization such as scale and grade of the gold-bearing skarn orebody ranging from 1,940m to 1,750m in altitude.

2-3-2 Method of survey

1) Outline of drilling work

Drilling of ten drillholes totaling 1,811.2m was conducted. The locations of the respective drillholes are shown in Fig. II-2-6. Altitude, abscissa and ordinate of each hole were determined by using a simple survey with compass and measuring tape. The base point of the survey is an entrance of adit with an altitude of 1,930m.

Three drilling machines were used in the work; two machines of Longyear L-38-98 model, another was former USSR SKB-5 model. Main equipment and materials were transferred by ship and air cargoes from Japan to Kyrghyz. Bulldozers, trucks and a crane truck were used for road construction, drilling site leveling and preparation, and transportation and setting up of drilling machines and supplies. The drilling operation was performed in two 12-hour shifts, in principle.

A wire-line drilling method was applied for two Longyear machines, and a normal drilling method was used for SKB-5 machine, in the operation in an effort to improve core recovery and work progress. For the surface soil drilling, metal bits of ϕ 101mm or diamond bits of ϕ 101mm, 112mm and 116mm were used. After reaching the bedrock, the drilling continued with diamond bits of HQ, NQ and BQ as the final diameter.

Water for drilling work was conveyed by some 4 m^3 tank trucks from the nearest stream of the Sokh valley, which was about 2 km away, and pumped up from water reserved tanks to drilling sites with a level difference of 130m.

2) Drilling work

The drilling work lasted for 117 days, from August 23 to December 17, 1997. The drilling length, core recovery and drilling efficiency are given by each hole in Table II-2-4. Main equipment used, results of the work and progress record, consumption of drilling articles and diamond bits are listed in Appendix 3-1 to 3-5.

2-3-3 Results of survey

The drilling survey has been performed in the northern part. As the result of the drilling survey, it is confirmed that granodiorite body is more widespread in the deep than near surface and skarn zone becomes scaled down in the deep. Although gold mineralization is recognized in skarn everywhere, grade is low ranging from 0.1 to 0.5 g/t Au. Except a small-scale high gold concentration, large-scale high gold orebodies has not been confirmed.

The respective results of the drillhole are described in order from the north to the south. Geologic core logs of the holes with 1:200 of scale are presented in Apx. 2. Schematic core log is given in Fig. II-2-13. Geological cross sections along the programmed direction of the holes are shown in Fig. II-2-14 to Fig. II-2-18.

Core samples for assay were collected one meter length in principle. The samples were cut into pairs of half-core. Chemical analysis was performed by the Laboratory of the South Kyrghyz Geological Expedition. Eight elements of gold, silver, copper, lead, zinc, arsenic, antimony and molybdenum were analyzed there.

(1) Geology and mineralization of each drillhole

1) MJKA-1 (Direction 105°, inclination 0°, drilled length 160.1m)

This hole has been intended to clarify mineralization at 1,910m in altitude and to 160m east of the trench K-19A (Fig. II-2-14).

(a) Geology

Granodiorite continued from the mouth of hole to the depth of 69.1m. Silicified skarn is confirmed at the depth ranging from 69.1m to 131.1m. Granodiorite is slightly chloritized generally. Lots of veins were found along fractures and joints with some millimeters in width. Under the microscope (Apx. 1-3, 7A0387) of granodiorite around the depth of 44m, polycrystal of quartz by fracture, cataclasite of plagioclase and dominant calcite networks are observed, with small amount of sericite and chlorite as altered minerals. Granodiorite occupying from 131.2m in the depth to 160.1m of the bottomhole, is chloritized and limonitized.

Concerning silicified skarn at the depth ranging from 69.1m to 92.0m,

Table II-2-4 General Results of Drilling Works (1)

Item		MJKA-1	MJKA-2	MJKA-4	MJKA-6	MJKA-7	Subtotal
Period of drilling							
Starting date		8 Oct. '97	19 Oct. '97	23 Nov. '97	5 Oct. '97	28 Oct. '97	
Finishing date		18 Oct. '97	21 Nov. '97	14 Dec. '97	27 Oct. '97	24 Nov. '97	
Total days		10.5	33.5	21.5	22.0	27.5	
Drilling machine		L-38	L-38	L-38	L-38	L-38	
Direction		105°	105°	105°	105°	105°	
Inclination		0°	-40°	0°	0°	-45°	
Length of drilling (m)		160.1	244.5	162.3	160.1	281.0	1,008.0
Length of core (m)		146.6	224.7	142.1	146.8	248.1	908.3
Core recovery (%)		91.6	91.9	87.6	91.7	88.3	90.1
Bit	φ116mm	5.0m	4.0m	3.0m	3.0m	3.0m	
	φ101mm	—	—	—	16.5m	—	
	HQ	29.2m	57.5m	29.4m	51.4m	30.3m	
	NQ	56.5m	183.0m	30.1m	89.2m	61.4m	
	BQ	69.4m	—	99.8m	—	186.3m	
	φ112mm	—	—	—	—	—	
	φ 93mm	—	—	—	—	—	
	φ 76mm	—	—	—	—	—	
Casing	HW	5.0m	4.0m	3.0m	3.0m	6.0m	
	NW	34.5m	127.0m	45.0m	20.5m	31.5m	
	BW	91.0m	—	63.0m	96.0m	100.0m	
	φ108mm	—	—	—	—	—	
	φ 89mm	—	—	—	—	—	
Drilling (day)*		10.5	33.5	21.5	22.0	27.5	115.0
Drilling (day)**		10.5	33.5	21.5	22.0	27.5	115.0
Efficiency (m/day)*		15.2	7.3	7.5	7.3	10.2	8.8
Efficiency (m/day)**		15.2	7.3	7.5	7.3	10.2	8.8

* working days

** including no-working days for regain of accident and others

Table II-2-4 General Results of Drilling Works (2)

Item		MJKA-8	MJKA-9	MJKA-10	MJKA-11	MJKA-13	Subtotal	Grand total
Period of drilling								
Starting date		29 Aug. '97	12 Sep. '97	30 Aug. '97	17 Sep. '97	27 Nov. '97		
Finishing date		9 Sep. '97	3 Oct. '97	16 Sep. '97	8 Dec. '97	14 Dec. '97		
Total days		11.5	21.5	17.5	82.5	17.5		
Drilling machine		L-38	L-38	L-38	L-38, SKB-4	L-38		
Direction		105°	105°	105°	105°	105°		
Inclination		0°	-55°	0°	-45°	-20°		
Length of drilling (m)		101.1	210.2	111.9	204.9	175.1	803.2	1,811.2
Length of core (m)		84.6	206.2	96.2	181.5	163.9	732.4	1,640.7
Core recovery (%)		83.7	98.1	86.0	88.6	93.6	91.2	90.6
Bit	φ116mm	—	0.8m	—	—	3.0m		
	φ101mm	1.1m	3.6m	1.1m	—	—		
	HQ	—	—	—	—	20.0m		
	NQ	68.0m	99.4m	73.9m	—	43.7m		
	BQ	32.0m	106.4m	36.9m	—	108.4m		
	φ112mm	—	—	—	4.5 m	—		
	φ93mm	—	—	—	69.5m	—		
	φ76mm	—	—	—	130.9 m	—		
Casing	HW	—	—	—	—	3.0m		
	NW	18.0m	15.0m	22.0m	127.0m	24.5m		
	BW	69.0m	94.5m	75.0m	—	64.5m		
	φ108mm	—	—	—	4.5m	—		
	φ89mm	—	—	—	74.0m	—		
Drilling (day)*		11.5	20.5	17.5	69.5	17.5	136.5	251.5
Drilling (day)**		11.5	21.5	17.5	82.5	17.5	150.5	265.5
Efficiency (m/day)*		8.8	10.3	6.4	2.9	10.0	5.9	7.2
Efficiency (m/day)**		8.8	9.8	6.4	2.5	10.0	5.3	6.8

* working days

** including no-working days for regain of accident and others wollastonite-pyroxene skarn is brecciated and silicified, and partially limonitized. Silicified skarn from 92.0m to 131.1m is limonitized with occasionally manganese oxides.

(b) Mineralization

Portion presenting more than 1 g/t Au in grade was given in a place of silicified skarn at the depth between 72.1m and 74.1m. It contains chalcopyrite-pyrrhotite-calcite veinlet with 10 cm in width, and its average grade is 4.3 g/t Au in 2.0m wide. Under the microscope (Apx. 1-5, 7A0403), lots of chalcopyrite with minor amounts of magnetite, pyrite, galena, wittichenite, electrum and bismuthinite. Chalcopyrite fills among grains of skarn minerals in irregular anhedral form in less than 0.5 mm in size. Chalcopyrite includes magnetite, galena and electrum in irregular form with 50, 50 and 5 μ m, respectively. Pyrite occurs as foliated crystal of 2×30 μ m in chalcopyrite and is observed as euhedral crystal of 0.01mm. Wittichenite and bismuthinite coexist as forming intergrowth in chalcopyrite.

Though calcite veinlets are observed between 97m and 99m deep, their grade is low less than 0.01 g/t Au.

2) MJKA-2 (Direction 105°, inclination -40°, drilled length 244.5m)

At this hole, it has been aimed to clarify mineralization around the depth of 150m beneath the MJKA-1 (Fig. II-2-14).

(a) Geology

This hole is composed mostly of granodiorite, accompanied by dykes such as granodiorite porphyry, lamprophyre and aplite. Skarn is not recognized and granodiorite confirmed by MJKA-1 spreads in the deep.

Granodiorite is chloritized as a whole. Granodiorite between depths ranging from 170m to 180m, is limonitized. Lamprophyre is dark green in color and intrudes granodiorite around the depth of 39m and 43m with 0.6m to 0.9m wide. Aplite is pale green and intrudes about the depth of 144m and 241m with 3m to 5m in width.

Between 48.6m and 57.1m in depth, strong chloritized rock is observed with calcite network.

(b) Mineralization

Portion presenting more than 1 g/t Au in grade was given in a place of aplite at the depth between 243.0m and 244.5m. Average grade of width 1.5m is 1.4 g/t Au. Aplite is associated with arsenopyrite-pyrite vein of 30 cm in width.

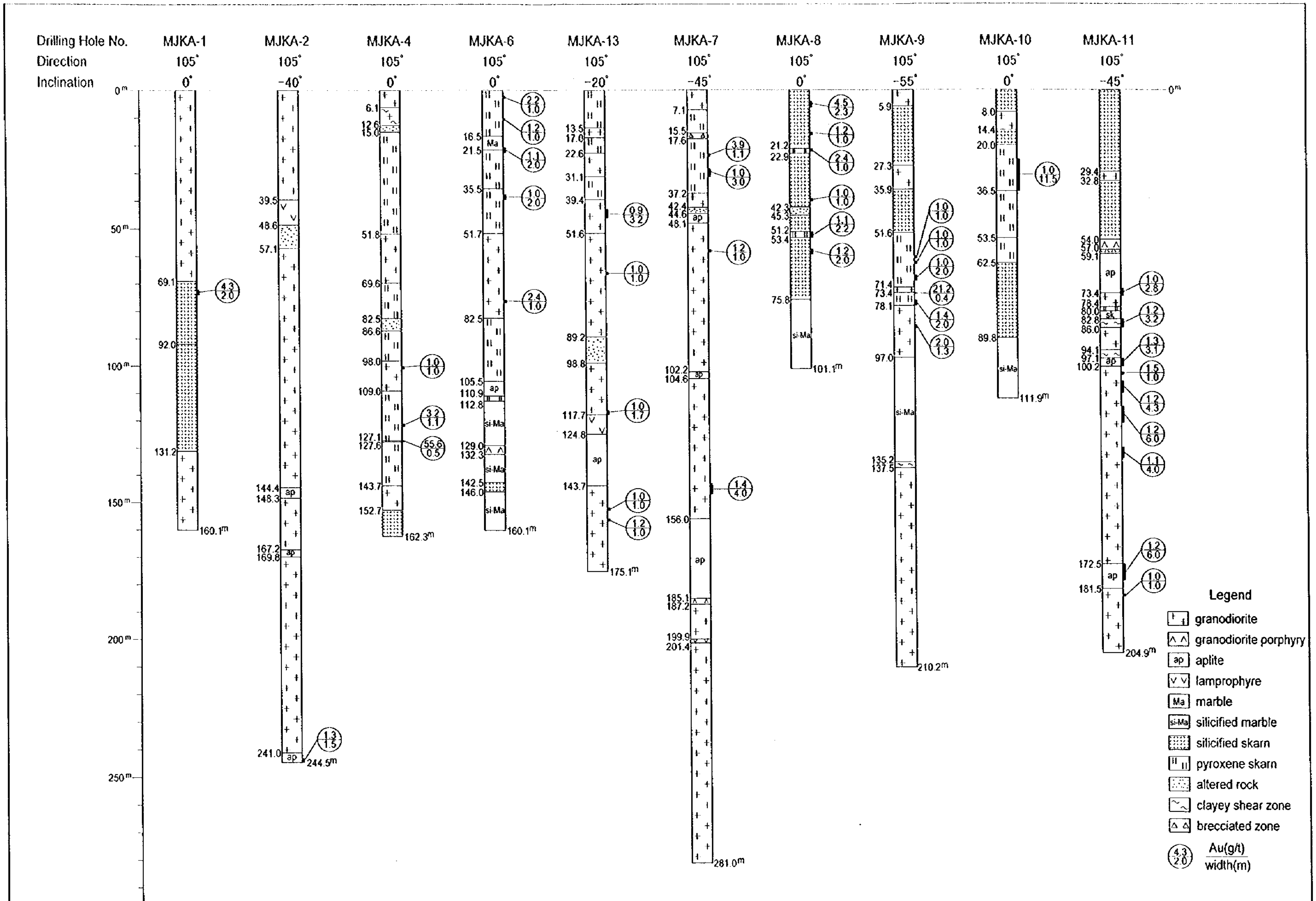


Fig. II-2-13 Summary of Core Log in the Altyn-Jylga Deposit

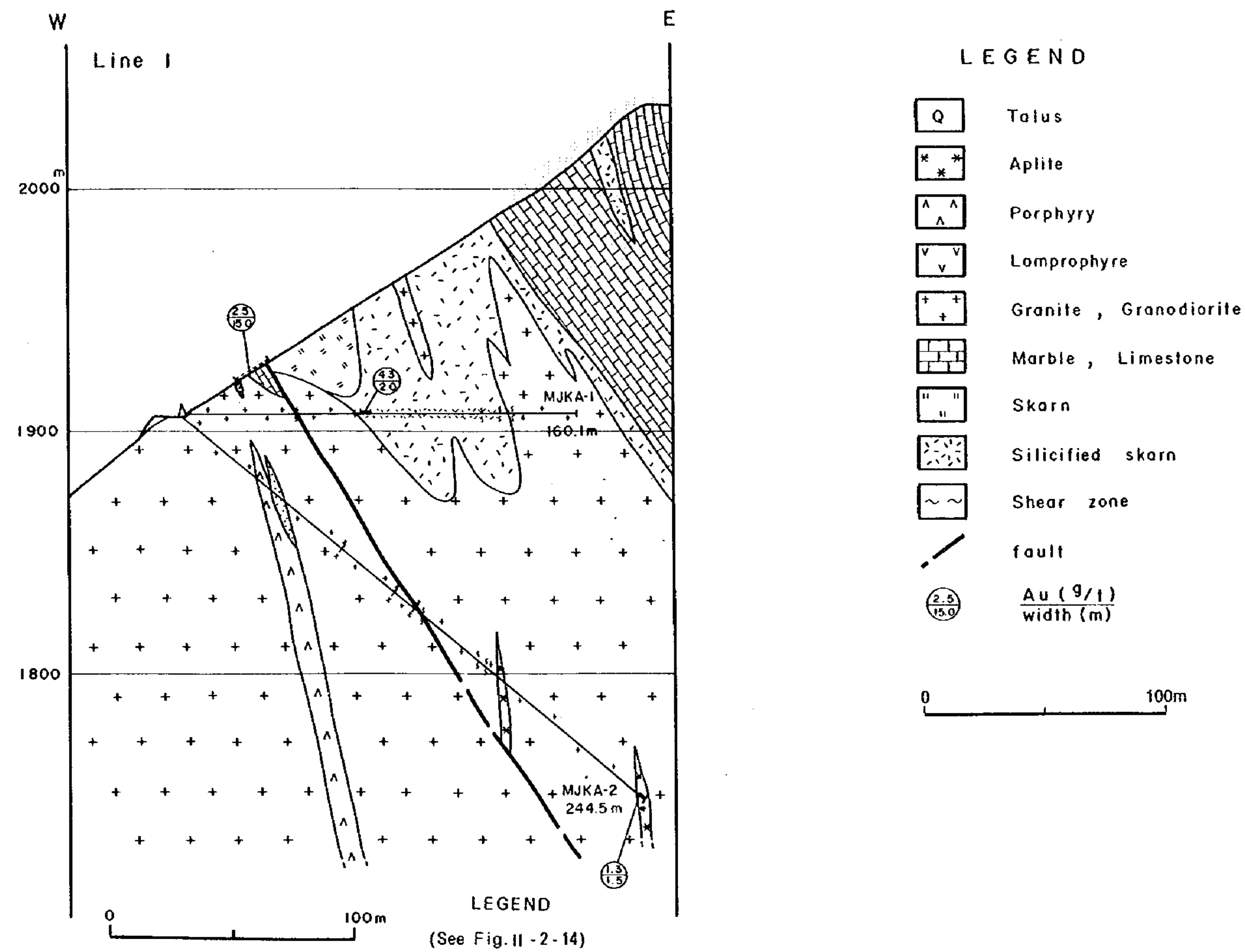


Fig. II -2-14 Geological Cross Section along MJKA-1 and 2

Around the depth of 165m and 170m, quartz veinlets with 0.5cm to 1cm wide were observed. Their grade were less than 0.3 g/t Au. Around the depth between 183m and 195m, pyrite-quartz veinlets with 0.5cm to 1cm in width were observed and their grade were less than 0.5 g/t Au.

3) MJKA-4 (Direction 105°, inclination 0°, drilled length 162.3m)

This hole has been designed to examine mineralization at 1,910m in altitude and to 160m east between the trench K-19A and K-17A (Fig. II-2-15).

(a) Geology

This hole is made chiefly of clinopyroxene skarn, with quartz-pyroxene skarn, pyroxene-wollastonite skarn and silicified pyroxene-wollastonite skarn. Granodiorite occurs in those skarn in a narrow length.

Limonite quartz altered rock is observed with disseminated pyrite and hematite at the depths ranging 12.6m - 15.0m, 79.2m - 81.1m, and 82.5m - 86.65m.

In 6.5m of the depth between 6.1m 12.6m, granodiorite is crushed with greenish clay. This fracture zone has been presumed to correspond to a NE trending fault confirmed on the surface about 40m northeast of this hole.

At two depths of 16m and 49m in quartz-pyroxene skarn, breccia zones are noticed in width ranging from 0.4m to 0.8m, accompanied by limonite, pyrite and quartz.

(b) Mineralization

Portions detected more than 1 g/t Au in grade were presented in three places at the depth 100.0m - 101.0m, 120.9m - 122.0m and 127.1m - 127.6m.

At the depth between 127.1m and 127.6m, quartz vein concentrated arsenopyrite with 0.5m wide is recognized and grade of vein is represented 55.6 g/t Au, 278 g/t Ag, 0.46% Cu and 26.25% As.

4) MJKA-6 (Direction 105°, inclination 0°, drilled length 160.1m)

This hole has been intended to clarify mineralization at 1,920m in altitude and to 160m east of the trench K-17A (Fig. II-2-16).

(a) Geology

It has been made clear that pyroxene skarn widespread underground, though its skarn is not recognized on the surface. Wollastonite-pyroxene skarn and quartz-pyroxene-wollastonite skarn occupy up to a depth of 105.5m. From the depth of 112.8m to the bottomhole, silicified marble is appeared. Chloritized granodiorite is

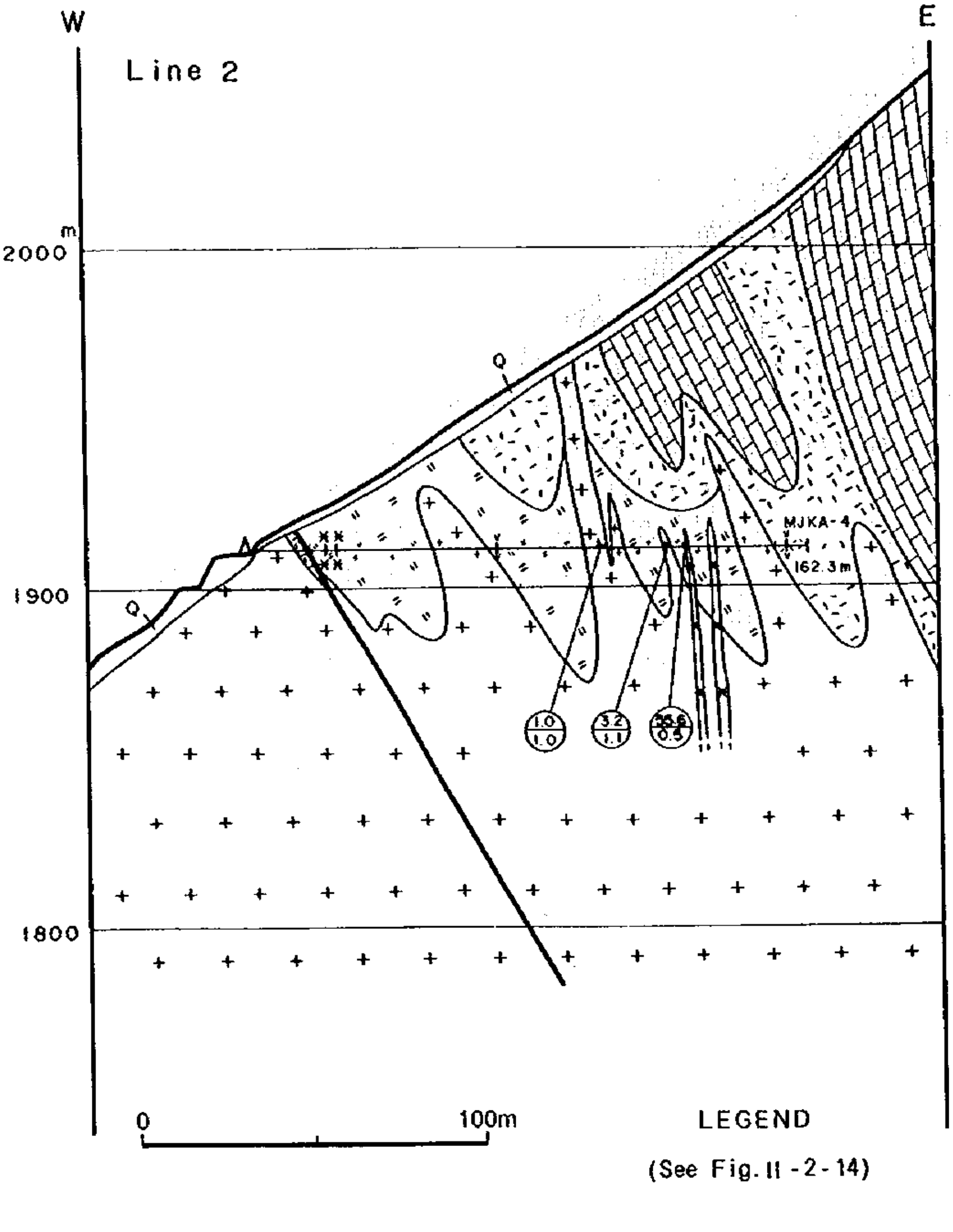
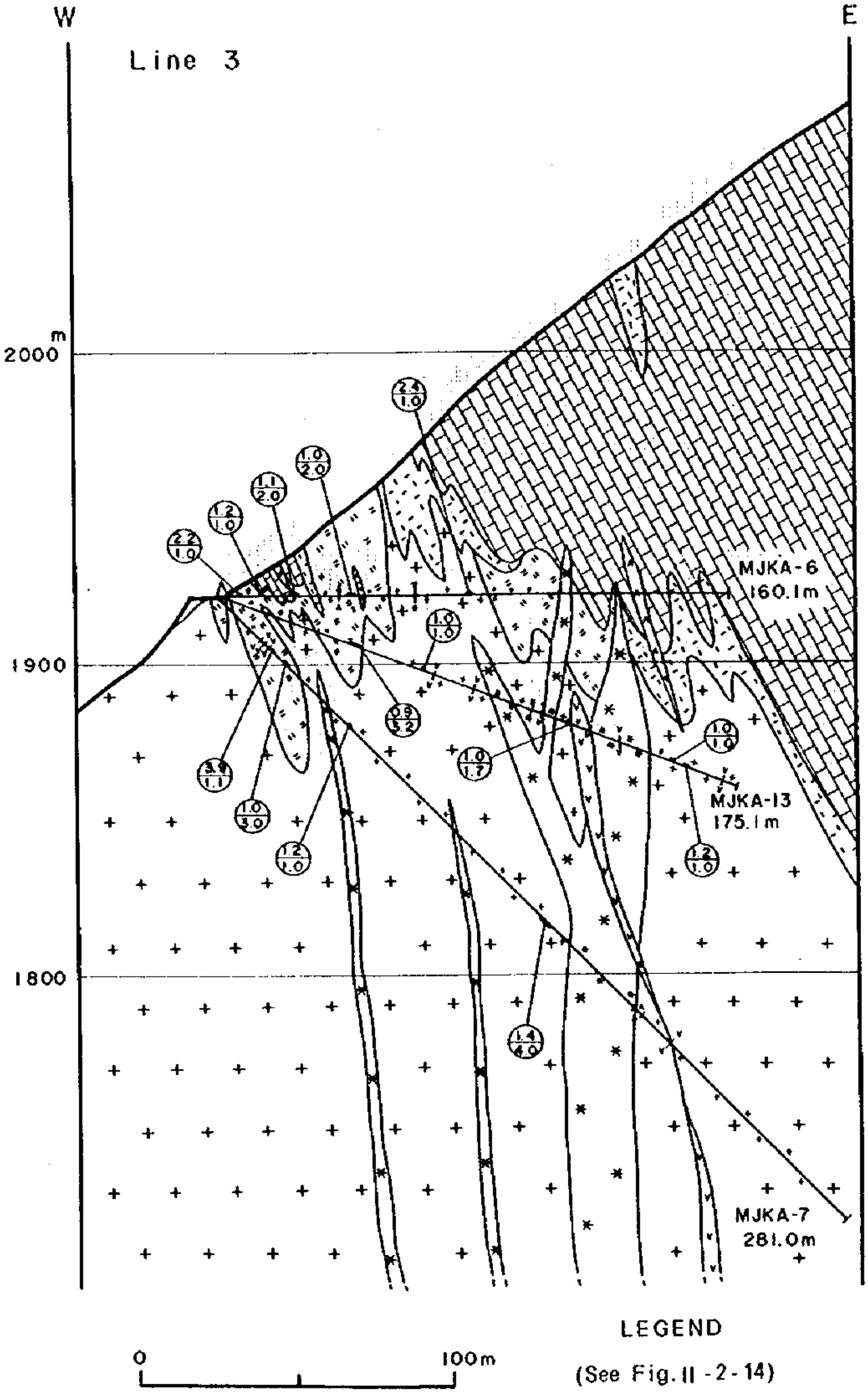


Fig. II-2-15 Geological Cross Section along MJKA-4



LEGEND
(See Fig. II-2-14)

Fig. II-2-16 Geological Cross Section along MJKA-6, 7 and 13 observed a depth ranging from 51.5m to 82.5m in pyroxene skarn.

Skarn at the depth of 37.8m, wollastonite is cut by pyroxene vein in network by naked eyes. Under the microscope (Apx. 1-3, 7A0493), it is composed chiefly of clinopyroxene, wollastonite, with quartz, potassium feldspar and plagioclase. Generally, each mineral is not homogeneous in size and texture. Clinopyroxene vein is associated with quartz.

Under the microscope (Apx. 1-3, 7A0493), skarn at the depth of 95.6m is composed mostly of clinopyroxene and wollastonite, with sphene and minor amount of quartz and prehnite. Their size is not homogeneous.

Silicified skarn is often skarnized by pyroxene, garnet and wollastonite.

(b) Mineralization

Five portions were detected more than 1 g/t Au in grade. Each place is 1m to 2m in width and it grade is ranging from 1.0 to 2.4 g/t Au. Mineralized parts showing more than 1 g/t Au, are observed fine pyrite dissemination.

In pyroxene skarn and aplite from 94m to 112m in depth, pyrite, chalcopyrite and arsenopyrite are impregnated. Under the microscope (Apx. 1-3, 7A0491, 7A0501, 7A0508, 7A0509), it contains chalcopyrite, tetrahedrite, pyrrhotite, marcasite and pyrite, with minor amount of sphalerite, galena, wittichenite, electrum, chalcocite and covelline.

5) MJKA-13 (Direction 105°, inclination -20°, drilled length 175.1m)

This hole has been aimed to examine mineralization around the depth of 50m beneath MJKA-6 (Fig. II-2-16).

(a) Geology

From the mouth of hole to the depth of 39.4m, pyroxene-wollastonite skarn and garnet-pyroxene skarn including granodiorite are continued. From the depth of 39.4m to the bottomhole, granodiorite, lamprophyre dykes and aplite dykes are appeared. Granodiorite is chloritized and limonitized.

Completely limonite altered rock are recognized ranging from 89.2m to 98.8m in depth.

(b) Mineralization

Malachite is often impregnated in aplite ranging from 108.4m to 112m in depth and from 124.8m to 143.7m.

Five portions were detected more than 1 g/t Au in grade. Each place is 1m to

3.2m in width and it grade is ranging from 1.0 to 1.2 g/t Au.

6) MJKA-7 (Direction 105°, inclination -45°, drilled length 281.0m)

This hole has been aimed to examine mineralization around the depth of 100m below MJKA-13 (Fig. II-2-16).

(a) Geology

This hole is composed mostly of granodiorite associated with dykes of aplite, granodiorite porphyry and lamprophyre. Pyroxene skarn is recognized at the depth ranging from 7.0m to 37.2m. It has been clear that granodiorite appeared in MJKA-6 and MJKA-13 was widespread at the underground. This granodiorite is undergone by hydrothermal alteration. Veinlets of calcite and chlorite are formed in granodiorite. Altered rock into chlorite-pyroxene skarn is occurred in the depth from 42.4m to 44.6m.

Under the microscope (Apx. 1-3, 7A0562) of granodiorite porphyry at the depth of 18.6m, quartz, potassium feldspar, plagioclase, biotite and pseudomorph of hornblende and clinopyroxene are observed. Sericite, calcite and minor amount of chlorite, sphene and apatite are formed as altered mineral. They are products of hydrothermal alteration.

Under the microscope (Apx. 1-3, 7A0787) of lamprophyre at the depth of 200.6m, plagioclase, biotite and hornblende compose, occurring sericite and chlorite by hydrothermal alteration and forming network of calcite. Xenocrystal of quartz is occurred.

(b) Mineralization

Disseminated pyrite and malachite-quartz veinlet with 1cm to 2 cm in width are formed in pyroxene skarn. Brecciated pyroxene skarn with pyrite impregnated are formed with 1m wide in pyroxene skarn at the depth from 15m to 18m. Around the depth of 18.6m, 20m and 22m, lamprophyre dyke with 5cm to 20cm wide intrude pyroxene skarn.

Portions detected more than 1 g/t Au in grade were occurred at the depth of 20m, 23m, and 30m. At the depth from 23.0m to 24.1m, average grade is 3.9 g/t Au. Dissemination and vein of pyrite and arsenopyrite are formed in granodiorite. Around the depth of 58m and 145m, gold assay represent from 1.2 to 2.5 g/t.

Under the microscope of impregnated pyrite in pyroxene skarn at the depth of 16m and 23m (Apx. 1-5, 7A0558, 7A0565), it consists of pyrite, goethite and lepidocrocite.

Under the microscope of arsenopyrite-pyrite-quartz veinlet at the depth of 125m and 176m (Apx. 1-5, 7A0644, 7A0683), it is compose of arsenopyrite marcasite and pyrite, accompanied by chalcopyrite, tetrahedrite, sphalerite and graphite.

7) MJKA-8 (Direction 105°, inclination 0°, drilled length 101.1m)

This hole has been aimed to clarify mineralization at the altitude of 1,930m and to the east of 100m of the trench K-23 (Fig. II-2-17).

(a) Geology

Silicified skarn continued from a mouth of the hole to the depth of 75.8m, and it changed into silicified marble from 75.8m to the bottomhole. It has been clear that silicified skarn is widespread in the underground than the surface.

Silicified skarn is presumed to be formed after pyroxene-wollastonite skarn and pyroxene skarn have been affected by remarkable silicification. Banded structure ranging from 50° to 60° at the direction of drilling, is often observed in silicified skarn. Banded structure is ranging from 2cm to 10cm wide, composed of microcrystalline quartz.

Dykes of lamprophyre and porphyrite were intruded at a width of 0.3m to 2m in silicified skarn.

Banded structure of limonite veinlets is observed in silicified skarn.

Under the microscope of pyroxene skarn at the depth of 21.8m (Apx. 1-3, 7A0057), it is composed chiefly of clinopyroxene and is shown idiomorphic texture of about 0.1mm in diameter, with subordinate amount of plagioclase, potassium feldspar and veinlets of tourmaline.

Under the microscope of skarnized lamprophyre at the depth of 19.8m (Apx. 1-3, 7A0055), phenocryst presumed to be pseudomorph of hornblende is noticed. Both phenocryst and groundmass have been replaced clinopyroxene completely. Veinlets of prehnite were formed.

(b) Mineralization

In silicified skarn and pyroxene skarn, arsenopyrite veinlets and malachite-chrysocolla veinlets in a width about 1 cm are formed. Malachite is formed along fractures of silicified marble.

Portions detected more than 1 g/t Au in grade were formed around the depth of 4m, 15m, 22m, 39m, 51m and 57m, with width from 1m to 2.3m. Highest grade is 4.5 g/t Au at a depth ranging from 4.0m to 6.3m.

Under the microscope of chalcopyrite veinlet at a depth of 5.8m (Apx. 1-5,

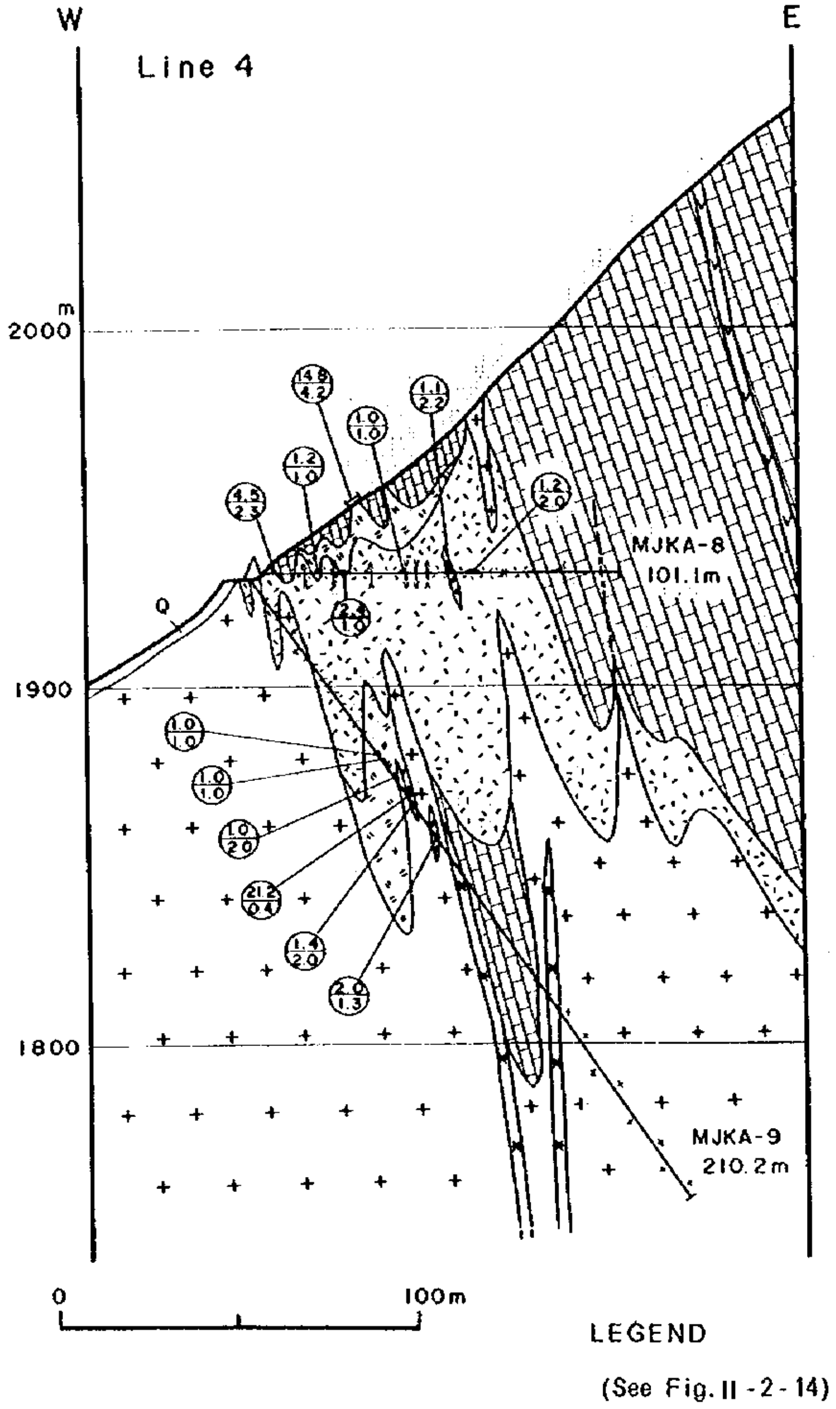


Fig. II-2-17 Geological Cross Section along MJKA-8 and 9

7A0041), sphalerite, galena, pyrite, wittichenite, electrum, chalcocite and covellite are observed.

Under the microscope of malachite-chrysocolla veinlet at a depth of 52m (Apx. 1-5, 7A0088), chalcopyrite, goethite and lepidocrocite are formed.

8) MJKA-9 (Direction 105°, inclination -55°, drilled length 210.2m)

This hole has been aimed to examine mineralization around the depth of 150m beneath MJKA-8 (Fig. II-2-17).

(a) Geology

Silicified skarn occupies at the depth from 5.9m to 27.3m and from 35.9m to 51.6m. Pyroxene skarn is recognized at the depth from 51.6m to 78.1m. It has been clear that pyroxene skarn confirmed by MJKA-8 extend to the lower part widely.

Silicified marble is occupies at the depth from 97.0m to 135.2m, and border granodiorite with shear zone of 2m wide accompanied by clay.

Under the microscope of silicified skarn at the depth of 21m (Apx. 1-3, 7A02228), it is composed chiefly of quartz, potassium feldspar, plagioclase and clinopyroxene, with subordinate amount of sericite and calcite. Showing pale brown banded structure of some centimeters in width by naked eyes, this structure is presumed to cause by the differences of volume and grain size between quartz and potassium feldspar. Clinopyroxene coexists with quartz showing equigranular texture in a case, and aggregates of clinopyroxene without quartz in another case. In former case, aggregates of clinopyroxene are often surrounded by banded structure.

(b) Mineralization

Malachite-pyrite veinlets occur in both silicified and pyroxene skarn occasionally.

Portions detected more than 1 g/t Au in grade were formed around the depth of 60m, 62m, 67m, 73m, 76m and 85m, with width from 0.4m to 2m. Highest grade is 21.2 g/t Au at a depth ranging from 73.4m to 73.8m.

Under the microscope of chalcopyrite-pyrite impregnation at a depth of 85.3m (Apx. 1-5, 7A0280), it consists mostly of pyrite and chalcopyrite, with pyrrhotite arsenopyrite and tetrahedrite.

Under the microscope of arsenopyrite veinlet at a depth of 140.7m (Apx. 1-5, 7A0384), goethite is formed as minor amount.

9) MJKA-10 (Direction 105°, inclination 0°, drilled length 111.9m)

This hole has been aimed to examine mineralization at the altitude of 1,930m and to 110 east of the trench K-7A (Fig. II-2-18).

(a) Geology

Pyroxene skarn is observed on the surface and extends to the deep. Pyroxene skarn is confirmed at the depth from 20 to 62.5m.

Under the microscope of pyroxene skarn at a depth of 23.3m and 41.4m (Apx. 1-3, 7A0020, 7A0142), it is made mostly of clinopyroxene with grain size of 0.5mm, associated with quartz, calcite and actinolite.

(b) Mineralization

Dissemination of chalcopyrite and pyrite are formed in pyroxene skarn ranging from 21m to 30m.

Portion detected more than 1 g/t Au in grade was formed ranging from 25.0m to 36.5m, with width 11.5m and its average grade represents 1.0 g/t Au.

Under the microscope of pyrite impregnation in pyroxene skarn at depths of 20.8m and 25.6m (Apx. 1-5, 7A0280), most amount of pyrite and chalcopyrite, and minor of sphalerite chalcocite and covelline are formed.

10) MJKA-11 (Direction 105°, inclination -45°, drilled length 204.90m)

This hole has been aimed to examine mineralization around the depth of 150m beneath MJKA-10 (Fig. II-2-18).

(a) Geology

Though silicified skarn continues up to the depth 54.0m, it is indicated that granodiorite distribute at the underground.

Clay zone ranging in thickness from 1.5m to 4m, were formed in the following three depths of from 27.9m to 29.4m, from 82.8m to 86.0m and from 94.1m to 97.1m. Those clay zone suggest an existence of fault zone.

(b) Mineralization

Sulfide minerals hardly observed in silicified skarn, small grains of pyrite are formed in granodiorite and aplite.

Portions detected more than 1 g/t Au were formed at the depths of from 73m to 133m in granodiorite and from 172m to 178m in aplite. Highest grade represents 2.8.0 g/t Au at the depth from 115.8m to 116.8m.

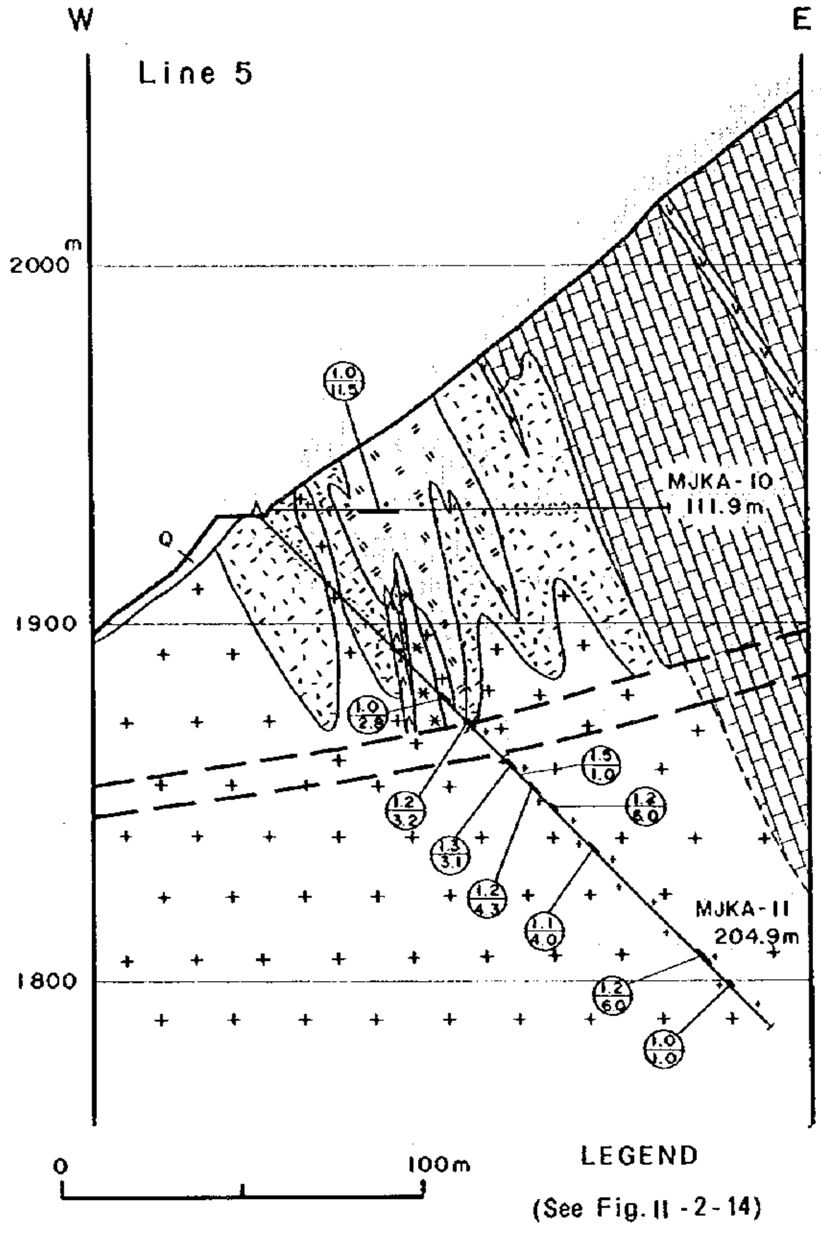


Fig. II-2-18 Geological Cross Section along MJKA-10 and 11

(2) Assay result

Major mineralized zones confirmed by the drillings are listed in Table II-2-5. Though highest gold grade in mineralization zone is 55.6 g/t, ore was commonly low grade ore up to 4 g/t Au. Looking at kinds of ore, portions detected more than 1 g/t Au were formed in pyroxene skarn, and were hardly occurred in silicified skarn. On the other hand, portions detected more than 1 g/t Au were found in granodiorite and aplite.

As the result of this drilling survey, it is concluded that gold mineralization is poor in the northern part of the Altyn-Jylga deposit because of indicating a low grade of 0.1 to 0.5 g/t Au commonly.

Statistic values of eight analyzed elements of drill core samples and correlation coefficients among elements are given in Table II-2-6. Using all the 1170 samples, correlation coefficient between gold and silver has been calculated to be 0.90. Drawing the scatted map between gold and silver, distribution of both elements had been investigated. As the results of the map, correlation coefficient between them indicated to be high because analyzed both values of arsenopyrite vein which was confirmed at the depth of ranging from 127.1m to 127.6m in MJKA-4, showed extremely high values as Au 5.6 g/t and Ag 278 g/t.

As the result of recalculation except above-mentioned sample, the correlation coefficient between gold and silver was calculated to be 0.41. The recalculating result of samples being only more than 0.5 g/t Au in grade, is given in third part of Table II-2-5. It is presumed that there is a few relationship between arsenic and antimony .

(3) Alteration

Kind of clay mineral was studied because clay were formed in fractures and shear at the drill holes. Results of X-ray diffraction analysis of core samples were given in Apx. 1-9-(2). As clay and related minerals, most of quartz were formed with minor amounts of sericite and kaolinite, commonly. Sericite is considered to be a typical mineral in a neutral alteration zone, and kaolinite is thought about to be a typical minerals in a acidic alteration zone. Halloysite was formed in the depth of 113m at MJKA-7 and 96m at MJKA-11. Minor amount of pyrophyllite were observed in the depths of 62m and 125m at MJKA-7. In generally, halloysite and pyrophyllite are characteristic minerals of acidic alteration zone as well as kaolinite. Stable minerals are halloysite, kaolinite and pyrophyllite, in order from high to low temperature.

Table II-2-5 Major Mineralization Zones Confirmed by Drilling in the Altyn-Jylga Deposit

Hole No.	Depth (m)	Width(m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	As (%)	Sb (%)	Mo (%)	Mineralization
MJKA-1	72.1-74.1	2.0	4.3	7.7	0.10	0.001	0.02	0.02	0.008	0.003	Silicified wollastonite-pyroxene skarn
MJKA-2	243.0-244.5	1.5	1.3	0.6	0.007	0.004	0.005	1.6	0.014	0.002	Aplite with arsenopyrite
MJKA-4	120.9-122.0	1.1	3.2	100	0.3	0.03	0.04	7.68	0.07	0.002	Epidote skarn with malachite and arsenopyrite
MJKA-4	127.1-127.6	0.5	55.6	278.0	0.46	0.04	0.15	26.25	0.9	0.0003	Arsenopyrite-quartz vein
MJKA-6	2.0-3.0	1.0	2.2	2	0.09	0.0003	0.05	0.01	<0.003	0.0012	Wollastonite-pyroxene skarn
MJKA-6	75.8-76.8	1.0	2.4	0.4	0.003	0.003	0.007	0.05	0.009	0.002	Granodiorite
MJKA-7	23.0-24.1	1.1	3.9	6.7	0.30	0.012	0.03	0.5	0.12	0.0017	Pyroxene skarn with malachite and chrysocolla
MJKA-8	4.0-6.3	2.3	4.5	10.0	0.13	0.0005	0.05	0.3	0.058	0.0003	Silicified skarn with pyrite arsenopyrite
MJKA-8	21.2-22.2	1.0	2.4	3.0	0.03	0.0001	0.07	0.09	0.0003	0.003	Pyroxene skarn
MJKA-9	73.4-73.8	0.4	21.2	1.2	0.007	0.0007	0.07	0.01	<0.003	0.0004	Pyroxene skarn
MJKA-9	85.1-86.4	1.3	2.0	1.2	0.03	0.0012	0.04	0.003	<0.003	0.0009	Pyroxene skarn with pyrite and chalcopyrite
MJKA-11	114.8-120.8	6.0	1.2	0.2	0.007	0.0011	<0.03	0.05	<0.003	0.0027	Limonitized granodiorite
MJKA-11	172.5-178.5	6.0	1.2	0.3	0.005	0.0021	0.005	0.15	<0.003	0.0038	Aplite with arsenopyrite

Table II-2-6 Summary of Assay Result of Drilling Core in the Altyn-Jylga District

1) All Data

	Au (g/t)	Ag (g/t)	Cu (%)	Pb (10-3%)	Zn (10-2%)	As (10-2%)	Sb (10-2%)	Mo (10-4%)
Sample Number	1170	1170	1170	1170	1170	1170	1170	1170
Maximum	55.6	278	0.5	40	20	2625	90	300
Minimum	<0.0012	<0.1	<0.001	<0.1	<0.3	<1.2	<0.3	<1.2
Average	0.31	0.73	0.02	1.2	2	7.1	0.5	15.1

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.90	1.00						
Cu	0.38	0.43	1.00					
Pb	0.54	0.59	0.32	1.00				
Zn	0.17	0.27	0.27	0.03	1.00			
As	0.87	0.94	0.40	0.70	0.14	1.00		
Sb	0.70	0.73	0.41	0.67	0.13	0.86	1.00	
Mo	0.00	-0.01	0.02	0.06	-0.13	0.00	0.01	1.00

2) Except Sample No.7A0956 (Au:55.6g/t, Ag:278g/t)

	Au (g/t)	Ag (g/t)	Cu (%)	Pb (10-3%)	Zn (10-2%)	As (10-2%)	Sb (10-2%)	Mo (10-4%)
Sample Number	1169	1169	1169	1169	1169	1169	1169	1169
Maximum	21.2	30	0.50	30	20	768	70	300
Minimum	<0.0012	<0.1	<0.001	<0.1	<0.3	<1.2	<0.3	<1.2
Average	0.27	0.50	0.02	1.1	2.0	4.9	0.4	15.1

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.41	1.00						
Cu	0.20	0.56	1.00					
Pb	0.07	0.11	0.17	1.00				
Zn	0.09	0.23	0.23	-0.08	1.00			
As	0.32	0.44	0.25	0.50	0.00	1.00		
Sb	0.28	0.45	0.26	0.44	0.03	0.82	1.00	
Mo	0.02	0.02	0.02	0.09	-0.13	0.04	0.03	1.00

3) Above Au 0.5 g/t and except Sample No.7A0956

	Au (g/t)	Ag (g/t)	Cu (%)	Pb (10-3%)	Zn (10-2%)	As (10-2%)	Sb (10-2%)	Mo (10-4%)
Sample Number	208	208	208	208	208	208	208	208
Maximum	21.2	30	0.50	30	15	768	70	200
Minimum	<0.0012	<0.1	<0.001	<0.1	<0.3	<1.2	<0.3	<1.2
Average	1.15	1.18	0.03	1.4	2.2	17.2	1.1	17.3

Correlation coefficient

	Au	Ag	Cu	Pb	Zn	As	Sb	Mo
Au	1.00							
Ag	0.37	1.00						
Cu	0.13	0.59	1.00					
Pb	0.06	0.15	0.15	1.00				
Zn	0.14	0.43	0.43	-0.09	1.00			
As	0.26	0.44	0.25	0.78	0.00	1.00		
Sb	0.26	0.46	0.28	0.67	0.03	0.83	1.00	
Mo	-0.02	-0.04	-0.05	0.10	-0.17	0.03	0.05	1.00

On a basis of clay minerals, an area of the northern part almost is presumed to belong to neutral alteration zone, but acidic alteration zone distributes along some fracture and fissure. The overlapped alteration zone is presumed to exist partially.

(4) Homogenization temperature

Homogenization temperature of fluid inclusion were measured. Mother mineral were calcite and quartz. Before measuring temperature, inclusions were observed under the microscope. Fluid inclusions in calcite and quartz are made of liquid inclusions. Gaseous inclusion and polyphase inclusion with halite were not observed. Size of liquid inclusion is very small ranging from 4m to 10m. Inclusions were scattered or swarm in mother crystal. Oval and polygon forms were predominant in quartz, and rectangle and prismatic form were observed in calcite.

Homogenization temperature are listed in Apx. 1-10-(4). Homogenization temperature ranges from 115° to 265°C, and averages of the temperature show from 116° to 200°C.

2-4 Consideration

The survey district is underlain by dolomite and limestone of the Kumbel formation which corresponds to the Lower to Middle Devonian system, and shale, siltstone and sandstone of the Sarychashma formation which corresponds to the Upper Carboniferous system. The district is intruded by the Altyn-Jylga body which is mostly made of granodiorite of the late Carboniferous to early Permian. The Altyn-Jylga deposit is gold copper- bearing skarn deposit, which has been formed in the contact zone between the Altyn-Jylga body and carbonate rocks of the Kumbel formation.

As the results of satellite image analysis, the Altyn-Jylga deposit is distributed around the lineament swarm zone of an E-W trend. A close relationship between the mineralization and the E-W trending fractures is suggested.

A drilling survey has been done in No.4 skarn orebody in the northern part of the Altyn-Jylga deposit. As the result of the drilling survey, it has been confirmed that granodiorite body is more widespread in the deeper than near the surface and that skarn zone becomes scaled down in the deep. As the combined results of the underground geological survey and the previous drilling survey in No.3 skarn orebody, the orebody has dipped 70° E.

K-Ar ages of both hornblende from granodiorite and lamprophyre in the Altyn-Jylga deposit are almost identical (282-299 Ma), and they correspond to latest

Carboniferous to earliest Permian. Based on its distribution and occurrence, lamprophyre has formed in a later stage of igneous activity produced granodiorite. Skarn orebody has been intruded by lamprophyre. Therefore, skarn is presumed to be formed in latest Carboniferous to earliest Permian.

Predominant intrusive planes of lamprophyre dyke trend N-S to NE-SW and dip E in the northern and central parts, and trend E-W and dip S in the southern part. Dykes are considered to be intruded into fracture in the surrounding rock. According to the swarmed dyke zone and the axial trend of intrusive plane, the center of the intrusive activity has been presumed to be situated to southeast of the central and south parts in the Altyn-Jylga deposit.

Lamprophyre dyke around the Altyn-Jylga gully have undergone skarnization accompanied with secondary copper oxides. Gold mineralization ranging from 1.3 to 5.0 g/t Au in grade has been recognized in a part of lamprophyre dyke.

It has been confirmed that gold mineralization is predominant in No.3 skarn orebody which has been revealed average grade of 5-6 g/t Au with an area of approximately 3,000km². As the result of the underground geological survey of the 1930mL adit, fractures showing the NE-SW and NW-SE trends are predominant in No.3 skarn orebody. Considering the close relationship between gold mineralization and fracture, gold mineralization is assumed to be concentrated around the intersection of both trends.

To sum up the above description, skarnization and gold mineralization in the Altyn-Jylga district is presumed to be controlled by the intrusive mechanism of granodiorite body and lamprophyre dyke and the fracturing system trending NE-SW and NW-SE.

To compare mineralization of No.3 orebody in the central part with mineralization of No.4 orebody in the northern part, No.3 skarn orebody is dominant in gold mineralization. But the mineralization generally trends to be poor to the north direction. The mineralization in the northern part is common in silicification, and is rich in arsenopyrite and low in homogenization temperature as compared with the mineralization in the central part. The above-mentioned facts are inferred to be shown characteristics of a margin of the mineralization.

Silicified skarn is widely observed in the survey area. Under the microscopic observation, it is composed mostly of quartz and clinopyroxene with fine-grained granoblastic texture. The silicified skarn is characterized by a banded structure which have been formed by difference of the size of minerals and the volume ratio of quartz and pyroxene. At banded structure, quartz coexist with clinopyroxene, and rarely coexist with potassium feldspar in fine-grained part (Apx. 1-3, 7A0228).

Some silicified skarn is made of aggregates of only clinopyroxene, leaving out quartz. Clinopyroxene in these aggregates trends to be coarse in size than clinopyroxene surrounding aggregates. Fine-grained part of banded structure has sometimes surrounded a rim of clinopyroxene aggregate (7A0228). In the case that clinopyroxene aggregate is contact with coarse quartz, the former is replaced by the latter. Though clinopyroxene coexists with wollastonite or quartz, occurrence of quartz coexisting with wollastonite is not observed. When wollastonite forms its aggregate with clinopyroxene, wollastonite is replaced by coarse quartz at the contact with quartz.

To sum up the above description, clinopyroxene skarn and wollastonite skarn are presumed to be already produced at the time of formation of silicified skarn. Silicified skarn showing banded structure and granoblastic texture, is assumed to be formed to replace clinopyroxene skarn or wollastonite skarn.

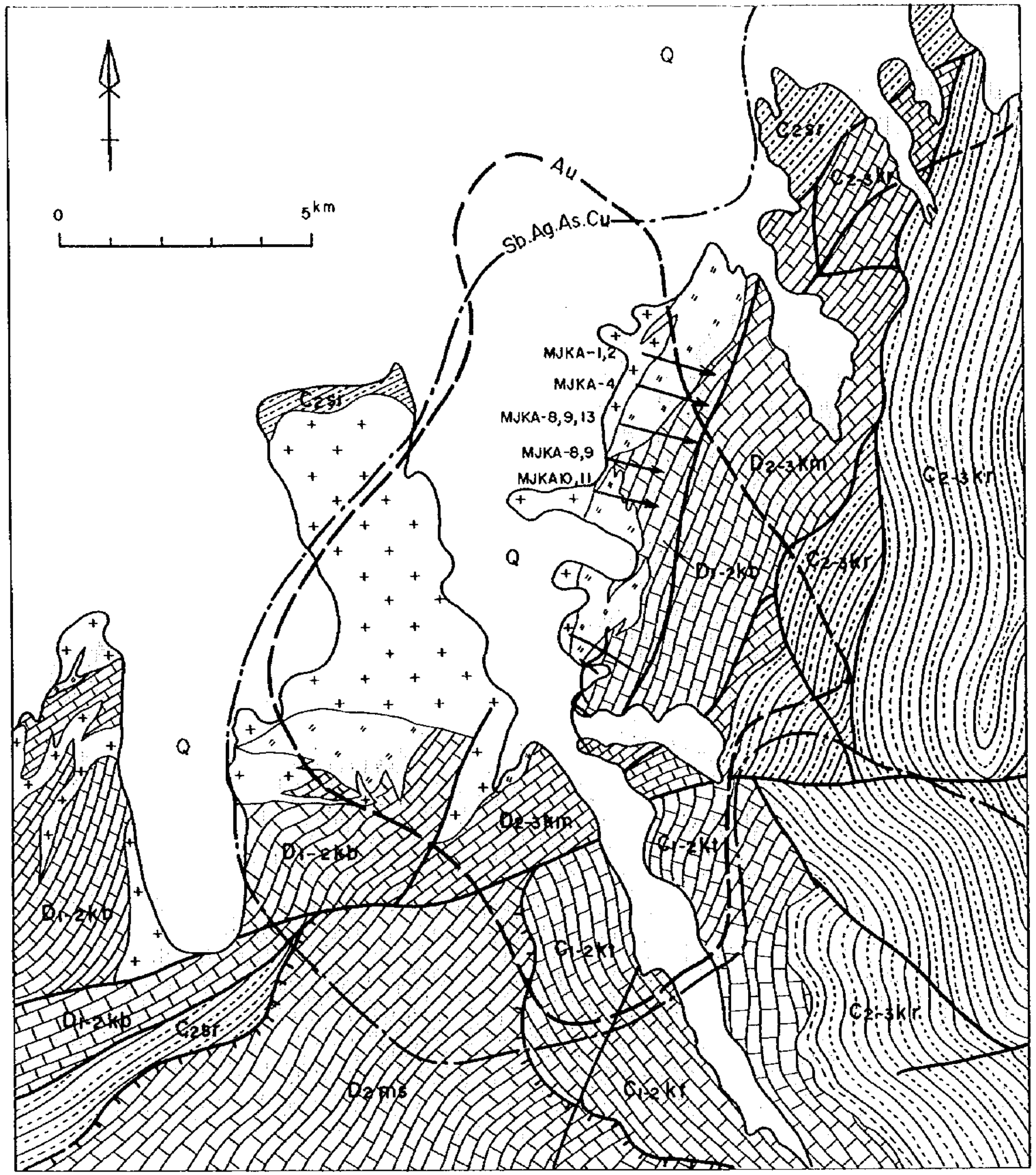
Gold mineral in the deposit is electrum which is associated with copper sulfides as chalcopyrite and bornite. High grade gold ore on surface is easily found out owing to green copper zone, because copper sulfides were replaced by malachite and chrysocolla.

Electrum ranges from 5 to 100 μ m in size. It occurs along fissures and grain boundaries of garnet, clinopyroxene, quartz and calcite. Electrum occurs coexists with chalcopyrite, bornite, bismuthinite and wittichenite.

By the original study of the Kyrghyz side, electrum also coexists with quartz and calcite (Solodkova, 1997).

Geochemical prospecting had been already performed around the Altyn-Jylga deposit (Fig. II-2-19). Geochemical anomaly more than 0.25 g/t Au in grade has distributed surrounding gold-bearing skarn zone in the central, northern and western parts. Remarkable gold anomaly is marked in marble and limestone zone along the Altyn-Jylga gully, to the south-southeast of No.3 skarn orebody, where skarn was not found in the previous survey. This geochemical anomaly is assumed to result from impregnation of very fine gold in mother rocks near surface by gold mineralization which had happened at deeper site. Therefore, the geochemical anomaly is presumed to correspond to a center of gold mineralization.

Homogenization temperature of fluid inclusion were investigated in Japan and Korea (Miyazawa, 1977). He reported that the homogenization temperature of skarnization including magnetite at the early stage ranged from 300° to 430°C, the homogenization temperature of early sulfide mineralization made chiefly of



LEGEND

Q	Quaternary
	Limestone, Marble
	Slate
	Granodiorite
	Skarn
	Fault
Au	Geochemical anamaly (Au >0.25 g/t)
Sb.Ag.As.Cu	Geochemical anomaly (Sb >25ppm, Ag >1ppm, As >50ppm, Cu >178ppm)
	Drilling
	Adit

$C_{2-3}kr$: Kuruksay Fm.

$C_{1-2}kt$: Kulduntau Fm.

$D_{2-3}ms$: Mustor Fm.

$D_{1-2}kb$: Kumbel Fm.

magnetite ranged 250° to 320°C, and the homogenization temperature of later sulfide mineralization made mainly of pyrite ranged 180° to 270°C.

The average homogenization temperatures from the 1930mL adit reveal 152°C and 192°C in calcite, and 148°C in quartz. High grad ore showing 13m in width and average grade of 25.7 g/t Au, had been caught at 1870mL from previous inclined drilling (SKB-13) from 1930mL. Average homogenization temperature in quartz stringer which has cut this high grade ore, represents 140°C. Average homogenization temperature of fluid inclusion in garnet and calcite at 1830mL of SKB-8 represents 169°C and 151°C, respectively.

On the basis of mineral assemblage from this deposit, the mineralization in the deposit correspond to the later sulfide mineralization (homogenization temperature: 180° to 270°C). Homogenization temperature of high grade ore located under the 1930mL ranges from 140° to 169°C. It reveals lower temperature than homogenization temperature of ranging from 180° to 270°C at the later sulfide mineralization.

A favorable temperature that gold precipitates from hydrothermal solution, is different from an individual deposit. In general, homogenization temperature ranges from 200° to 300°C. The average temperature on the surface reveals lower temperature compared with the above-mentioned favorable temperature for gold deposition. In general, homogenization temperature grades high in lower and inner extension of orebody. It is suggested that the high grade gold mineralization at 1870mL would continue to the most favorable orebody in the downward extension, on the basis of the distribution and structure of orebody and the homogenization temperature, although it is not conclusive because of only a few measurements.

On the basis of the above consideration, mineralization model in the Altyn-Jylga deposit is reached in Fig. II-2-20.

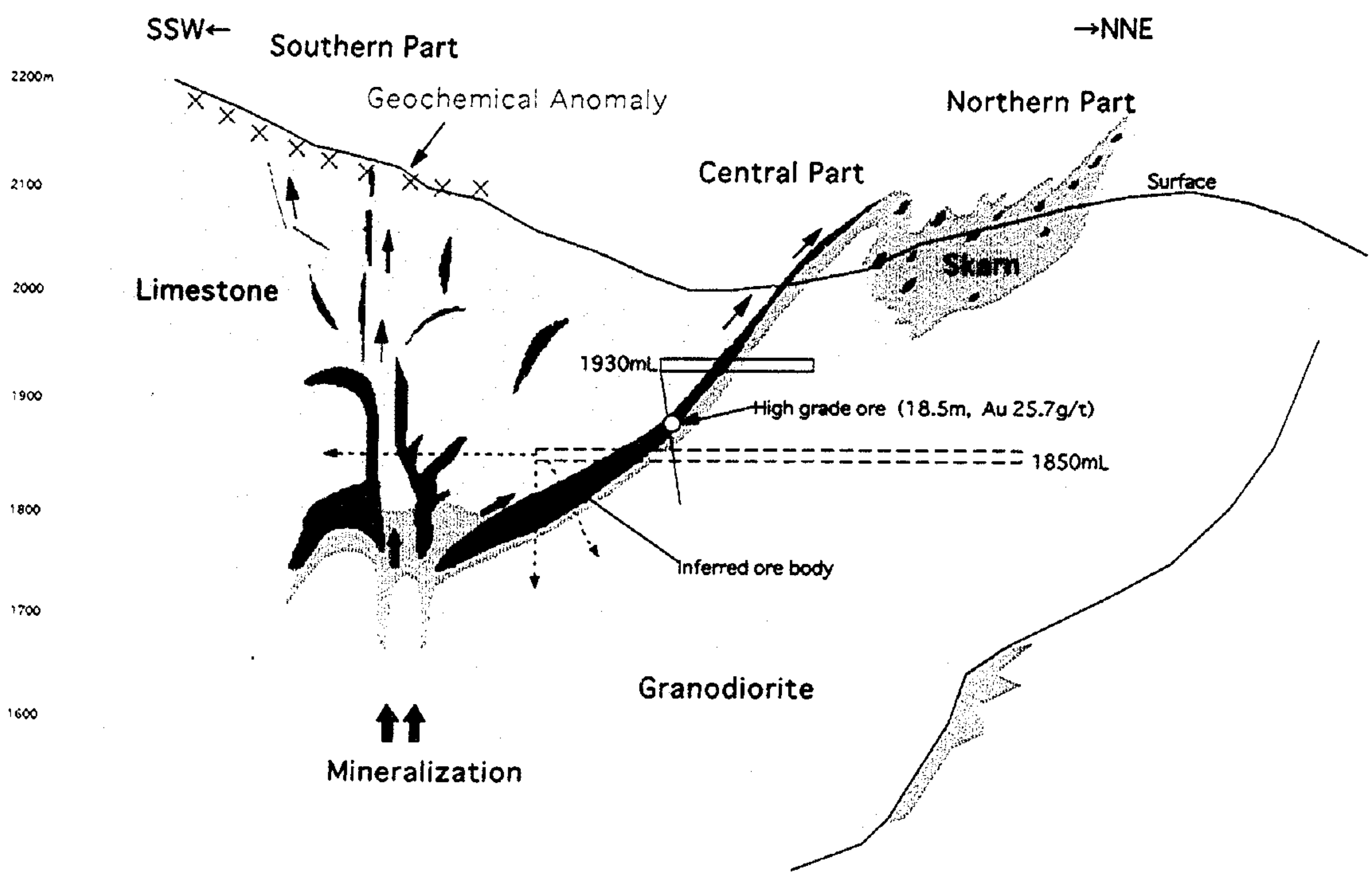


Fig. Ⅱ-2-20 Schematic Profile of the Mineralization Zone in the Altyn-Jylga District