Chapter 4 Overall Review of Survey Findings

4-1 Relationship of Geology and Geologic Structure with Mineralization

The Paleozoic formations in the subejct area are folded along axes in the WNW-ESE direction, same as that of the extension of the Aktau Range in the north and of the Karatau Mountains in the south, and cut by fractures in almost the same directions, forming structural blocks which extend in the same direction as that of the fold structure. These blocks are further divided by fractures in the NE-SW and NW-SE direction into sub-blocks. The mentioned structure is considered to have been formed by the late Paleozoic Hercynian orogeny and perhaps by the early Paleozoic Caledonian orogeny.

Ore deposits and manifestations mainly of gold in the area spreading along the fracture zones in the WNW-ESE direction constitute the Karatau ore zone (70km E-W and 2km to 4km north to south) along the northern side of the Karatau granite body (270-274 Ma) and the Aktau ore zone (70km E-W; 2km to 5km N-S) which extends along the southern side of the Aktau granite body (293-322 Ma, 260-286 Ma and 265-268 Ma).

These ore zones occur chiefly in fracture zones which cut Paleozoic sandstone and slate. Fracture zones in the ore zones are intruded by Silurian intrusive rocks (diorite and porphyrite), early Pre-Permian intrusive rocks (granite porphyry) and late Permian to early Triassic intrusive rocks (lamprophyre and porphyrite). Inside fracture zones, fractures develop in various directions, of which those in the WNW-ESE direction are predominant, followed by those in the E-W, NE-SW and NW-SE directions. Fractures in the NE-SW direction are of later ages and cut fracture zones in the WNW-ESE direction to form blocks.

Along respective fracture zones, intensive hydrothermal activity is recognized, where quartz veins, quartz veinlet zones and vein-like silicification zones are observed. Accompanying the hydrothermal activity, occurs mineralization, mainly of gold, accompanied by silver, arsenic, bismuth, lead and copper. Occurrence of major mineralization is controlled by geologic structure; bonanzas are formed at intersections of fractures in different directions, especially where fractures in the WNW-ESE direction intersect those in the NE-SW and NW-SE directions.

The Karatau ore zone embraces ore deposits and manifestations of gold-silver bearing quartz vein type, such as Subashi-Sarmich deposit, Biran deposit (these are out of the survey area), Karamechet-Kurai manifestations and Altynsai deposit.

Those pertaining to the Aktau ore zone are gold-silver bearing quartz vein-type manifestations such as -- from the west -- Bitab, Bashtut, Maulyan and Taulyan, as well as the Akmulla iron-manganese manifestation.

Besides, there are pneumatolytic deposits formed in granite stocks such as the Sartakchi niobium-tantalum manifestation and the Lyangar skarn-type tungsten-molybdenum deposit which is related with the Aktau granites.

Out of these ore deposits and manifestations located in the subject area, those which are considered to need further exploration are the Altynsai deposit (Au) and the Maulyan manifestation (Au).

1) Altynsai Deposit

The Deposit is underlain by slate, siltstone, sandstone, phyllite of Ordovician to Silurian System and slate, siltstone and sandstone of Lower Silurian System. There is no dikes except for those of lamprophyre which intruded near the No.10 vein, or Berkut Vein, in the west from late Permian to early Triassic age. Sedimentary rocks and metamorphic rocks in the District are folded in anticline and syncline trending in the WNW-ESE direction, where many fracture zones with the WNW-ESE and NW-SE trends and joints with the N-S trend develop. Ore deposits in the District are vein-type deposits, characteristically consisting of quartz veins controlled by the fracture zones with the WNW-ESE and NW-SE trends, and tourmaline-quartz veins accompanying joints with the N-S trend. More than 20 ore zones of quartz veins have been confirmed in the District, which include the veins Nos. 1, 2, 5, 8 ("Northwest Vein"), 9 ("Kazanbulak Vein") and 10 ("Berkut Vein").

The major veins No.1 and No.2 of the northern ore zone occur in fracture zones in the WNW-ESE direction, dipping 45°-70° south, whilst veins Nos.5, 6, 7, 10, 11, 12, etc. of the southern ore zone occur in fracture zones in the same direction but dipping north. Only the No.9 vein occurs in fractures in the NW-SE direction, dipping northeast. Bonanzas in the veins Nos.1, 2, and 8 trending in WNW-ESE direction occurs at the intersections of a fracture of the same trend with a number of fractures in the NW-SE direction.

In an area, 2.5km long and 500m to 800 m wide, which embraces the veins Nos, 1, 2, 5, 8 and 10, inumerable joints trending in the N-S direction and dipping 45° to 80° westward develop, in which tourmaline-quartz veinlets, 0.1cm to 25cm wide, occur (Fig.II-1-3-1 and -2). The veinlet zone almost coincides with the biotite-muscovite hornfels zone. From the anomalies (20-60 gamma) detected by the Uzbek airborne magnetic survey, it has been inferred that granitic stocks are aligned in the WNW-ESE direction under the veinlet zone. The veinlet zone is considered to be tourmaline greisen formed by pneumatolysis along cross joints formed by upward intrusion of the granitic stocks.

These quartz veins and tourmaline-quartz veins tend to increase in their number, vein width and gold grade, in sandstone rather than in slate.

2) Maulyan Manifestation

The Manifestation is underlain mainly by siltstone, sandstone, slate and schist of Lower Silurian System and slate, siltstone, sandstone and schist of Ordovician System. No igneous rocks occur in the District. The schistosity strikes WNW-ESE and dips 70° to 85° north or is perpendicular. About ten of fracture-silicification zones, 1m to 20-30m wide, in the WNW-ESE direction, which cut the both formations, have been confirmed by the Uzbek trenching. Along the fracture zone, occur quartz veins, 0.5m to 2m wide and 5m to 250m long. Gold is related mainly with quartz veins but is accompanied also by silicified sandstone, slate and schist. In the manifestation, no fracture in the NW-SW or NW-SE direction which intersect fractures with the WNW-ESE trend has been confirmed.

So far confirmed are the three ore bodies, 1m to 4m wide: No.1 ore body (No.1 ore zone), 900m long; No.2 ore body (No.2 ore zone), 300m long; and No.3 ore body (No.1 ore zone), 200m long, where gold and silver grades vary substantially from 1 g/t to 33.4 g/t Au and from 1 g/t to 47.2 g/t Ag.

4-2 Characteristics of Mineralization

1) Altynsai Deposit

Component minerals of the quartz veins that occur in fractures zones with the WNW-ESE and NW-SE trends are mainly quartz, pyrite, marcasite, arsenopyrite, chalcopyrite, sphalerite, goethite and lepidocrocite, accompanied by galena, native bismuth, aikinite, wittichenite, scheelite, rutile and electrum. Electrum, 5-10 μm in grain size, observed in polished sections in Phase I occurs in quartz, associated with chalcopyrite, native bismuth and wittichenite in a vein-like alignment but exists independently, which is determined to be primary electrum.

The tourmaline-quartz veins with the N-S trend are composed mainly of quartz, tourmaline, pyrite, arsenopyrite, goethite, lepidocrocite, accompanied by marcasite and rutile. The Uzbek study indicates inclusion of wolframite, cassiterite, topaz, beryl and electrum. The veins are interpretated as tourmaline greisen.

Analysis of ore samples in Phase II indicates no correlation between gold, silver and arsenic (Figs.I-4-1 thru -3 and Table I-4-1).

Alteration of the host rocks includes silicification, pyritization, tourmalinization, hornfelsization. The alteration zones are mainly quartz-sericite zones or sericite-chlorite zones, accompanied by kaolinite and calcite.

Homogenization temperatures of fluid inclusions of the quartz samples collected by the geological survey (52 samples) and drilling survey (27 samples) of Phases I and II were min.102°C and max. 428°C. The frequency distribution diagram (Appendix 2-8) indicates

the peak around 330°C and, generally, a concentration in the 270°C-370°C range, while some samples show low temperatures of 110°C-250°C. Homogenization temperatures of tourmaline-quartz veins with the N-S trend were 260°C to 340°C, showing a tendency similar to those of veins in the WNW-ESE and NW-SE directions. Under the microscope, no difference is observed between the low-temperature fluid inclusions and the high-temperature ones, in terms of occurrence and shape. These fluid inclusions are considered to have been generated by the same hydrothermal process. No significant correlation was observed between homogenization temperature and gold grade (Fig.I-4-4), nor between homogenization temperature and depth at which drilling samples were taken (Fig.I-4-5).

2) Maulyan District

Main component minerals of the gold-bearing quartz veins are quartz, pyrite and iron oxide, accompanied by minor quantities of arsenopyrite, chalcopyrite, sphalerite, graphite and electrum. Electrum is determined to be primary, as a gold grain of approx. 2mm in diameter is independently observable in quartz.

Analysis of ore samples in Phase II shows no correlation between gold, silver and arsenic. Samples collected near the Shur manifestation characteristically indicated relatively high content of silver, unaccompanied by gold.

Alteration of the host rocks includes silicification and pyritization. The alteration zones are mainly quartz-sericite or sericite-chlorite zones, accompanied by calcite and epidote.

Homogenization temperatures of fluid inclusions of the quartz samples collected by the geological survey (37 samples) and drilling survey (6 samples) in the District ranged between min. 108°C and max. 423°C. The frequency distribution (Appendix 2-8) indicates the 130°C -370°C range, which can be divided into a low temperature group of 130°C-200°C and a high temperature group of 250°C-350°C. Comparison of respective sample indicates the three types: quartz with low temperatures only, quartz with high temperatures only and quartz with the both temperatures coexisting. Under the microscope, no difference is observed bewteen low-temperature fluid inclusions and high-temperature ones, in terms of occurrence and shape. The fluid inclusions are considered to have been generated by the same hydrothermal process. Quartz of the Aktau manifestation showed only low temperatures. The mentioned three types of quartz was verified in samples from the Maulyan manifestation, however, no clear tendency in their occurrence is recognizable due to the small number of sample. The average homogenization temperature of a sample grading Au 1.2 g/t obtained by the geological survey is 267°C, whereas those of drilling samples grading 2.0 g/t and 1.6 g/t are 221°C and 281°C, respectively, which are relatively low in the high-temperature group (Fig.I-4-4). As the gold grades of samples whose homogenization temperatures exceed 350°C were lower than

the detection limit, correlation between quartz homogenization temperature and grade was not made clear. Correlation between homogenization temperature and depth at which a drilling sample was taken is neither clear (Fig.I-4-6).

4-3 Relationship of Geochemical Anomaly with Mineralization

Microanalysis of 23 elements was conducted of 200 rock samples collected at the Maulyan District for the geochemical survey.

Combinations of elements whose correlation coefficients are no less than 0.5 nor more than 0.7 are Cd-Sb, V-Ag, V-Cd, Cr-Ni, Mo-Ag, Mo-Cd, Mo-V, Li-Co, Li-Cr, Li-Be, Ta-Be and P-Ta. Combinations of elements whose correlation coefficients are 0.7 or more were Co-Ni, Cr-Co and Mo-Sb. Au, As and Hg showed no significant correlation nor significant negative correlation with any other elements.

Anomalous points of Au are scattered in the southern part of the Maulyan manifestation, in the vicinity of the Taulyan manifestation and in the southern part of the Shur manifestation, but they are poor in continuity. Distribution of anomalous values of Au and As are relatively concordant in the vicinity of the Taulyan manifestation, which presumably suggests a high correlation between the two elements in that area. Anomalous points of Nb and Ta are spotted, though small in number, in the Aktau manifestation and in areas where granite occurs, correlation of the two elements is high. The subject geochemical survey did not result in extraction of clear continuation of anomalous points of Au, however, all the anomalous values of Au have been located in the vicinity of the known manifestation areas; therefore, geochemical survey with higher density of sample collection around the anomalous points and the known manifestation areas is expected to reveal more details of behavior of microelements.

4-4 Potentialities of Existence of Ore Deposits

1) Altynsai District

Ore deposits in the District are vein-type deposits, consisting of quartz veins controlled by the fracture zones with the WNW-ESE and NW-SE trends, and of tourmaline-quartz veins which accompanies joints with the N-S trend. More than 20 ore zones have been confirmed in the District, which include the veins Nos. 1, 2, 5, 8 ("Northwest Vein"), 9 ("Kazanbulak Vein") and 10 ("Berkut Vein"). The ore zones extend over 4km east to west and 2km north to south.

The Phase II drilling revealed that the No.5 vein of the southern ore zone, which had been anticipated to bear bonanzas in the light of the Phase I drilling survey results, is a fracture zone including low-grade quartz veins and veinlets and that gold grade is rather higher in the

surrounding tourmaline-quartz veinlet zones, thereby indicating that the No.5 vein is not worthy of further exploration.

As the result of the Phase I and II drilling survey for verification of tourmaline-quartz veins, including the MJSN-13 aimed to examine mineralization of tourmaline-quartz veinlet zones in an area, 2.5 km long and 500m to 800m wide, which embraces the veins Nos.1, 2, 5, 8 and 10, and also to examine feasibility of open pit mining, low-grade gold mineralization (Au trace to 23.6 g/t) was encountered at various locations, however the average Au grade of continuous sampling did not exceed 0.2 g/t, which is considered to indicate slim feasibility of bulk mining by open pitting.

The drillhole MJSN-11, aimed at the eastern extension (120m) of the dominant mineralization (true width 1.6 m; Au 15.3 g/t) caught by the Phase I drilling MJSN-8 in the portion under the footwall of No.2 vein, 250m below the surface, merely confirmed weak mineralization (true width 1.27m; Au 3.0 g/t). The high grade portion caught by the MJSN-8 is presumed to be a local bonanza.

The Phase I drilling at the MJSN-4, -5, 9 and -10, aimed at portions beneath the bonanzas confirmed by the Adit No.4 at No. 1 vein (extension 135m; average width 2.29m; Au 15.7 g/t) and the adit at No. 2 vein (extension 55m, average width 4.28m; Au 4.5 g/t), only encountered low-grade mineralization (Au 4 g/t or less). Either at the four new drillholes C-47, C-50[a], C-53 and C-54 by the Uzbek side, no dominant mineralization was caught after the depth of 100m under the adit. From the facts that the host rock is hornfelsized at the Altynsay ore deposit while the quartz in veins, accompanied by tourmaline, shows high homogenization temperatures of fluid inclusions (250°C-370°C), it is inferred that granitoids are concealed at a shallow level. It may be attributable to denudation of the ore body by erosion that ore bodies are not continuing into the deep (below 600m above sea level).

The ore body in the Northwest Vein, or No.8 vein, as confirmed by the Uzbek trench No.40 along the vein (confirmed extension 32m; vein width 1.35m; Au 8.1 g/t) is a massive quartz vein similar to the bonanza of No.1 vein in the Adit No.4 addit. A 230m portion between the trench along the vein and the ancient stopes in the east remains unexplored. As the altitude of the outcrop, 860m above sea level, is higher than that of the veins Nos.1 and 2, denudation of the ore body might not have advanced and its continuation into the deep may be expected.

2) Maulyan District

In the District, numerous quartz veins occur along the fracture zones and silicification zones with the WNW-ESE trend and there are gold manifestations such as Maulyan, Beshbulak, Taulyan and Shur, as well as the Aktau niobium-tantalum manifestation. In the

light of the findings of the Uzbek trenching survey and the Phase II geological survey, the gold manifestations at Beshbulak (vein width 1.7-2.5m; Au max. 4 g/t), Taulyan (1m; 4 g/t) and Shur (1.2m; 1.4 g/t) are not considered worthy of further exploration, due to the low grades of gold. The Aktau niobium-tantalum manifestation (Nb-Ta max. 0.035%) is also too low in the grade to justify further exploration.

It is in the Maulyan manifestation, of all the gold manifestations in the subject District, that mineralization spreads over relatively extensive areas, where some ten of fracture-silicification zones, 1m to 20-30m wide, extending in theWNW-ESE direction, have been found by the Uzbek trenching survey. The quartz veins and silicification zones along these fracture zones are accompanied by gold mineralization. So far, three ore bodies, 1m to 4m in vein width, ie., the No.1 ore body, 900m long, as well as the No.2 ore body, 300m long, and the No.3 ore body, 200m long, have been confirmed.

During Phase II, drilling performed at two boreholes, aimed at the 60m-long western extension of the bonanza (No.3 ore body, 2.4m wide, grading Au 17.8 g/t) of the No.1 ore zone found at the Uzbek trench K-3 and also aimed at the lower portion of a bonanza (No.2 ore body, 4.2m wide, grading 11.0 g/t) of the No.2 ore zone found at the trench K-7, only discovered weak mineralization not more than Au 2.0 g/t in the lower portions of the respective ore bodies. However, the drilling of six boreholes undertaken by the Uzbek side on its own during the subject fiscal year encountered mineralization, 1.2m to 1.8m wide, grading Au 4 g/t to 8 g/t, between 16m and 90m under the surface at these boreholes excepting C-10, of which analysis has not yet been obtained. From these findings, it was confirmed that low-grade mineralization is continuous at the ore zones Nos.1 and 2 of the Maulyan manifstation though gold grade varies. Especially the ore zone No.1 has been proved by trenching to continue over 1,700m and its further continuation into the Beshbulak manifestation, situated 3km east, is inferable, which indicates that potentials exist in the eastern extension of No.1 ore zone.

Table Ⅰ-4-1 Correlation among 3 Elements in Ore Samples

Drilling Survey(Altynsai Area)

(441samples)

	Au	Ag	As
Au	1.00	0.00	0.31
Ag		1.00	-0.01
As			1.00

Drilling Survey(Maulyan Area)

(142samples)

	Au	Ag	As
Au	1.00	0.01	0.03
Ag		1.00	-0.04
As			1.00

Detailed Survey(Maulyan Area)

(94samples)

	Au	Ag	As
Au	1.00	-0.10	0.07
Ag		1.00	0.15
As			1.00

Total samples

(677samples)

	Au	Ag	As
Au	1.00	0.04	0.33
Ag		1.00	0.03
As			1.00

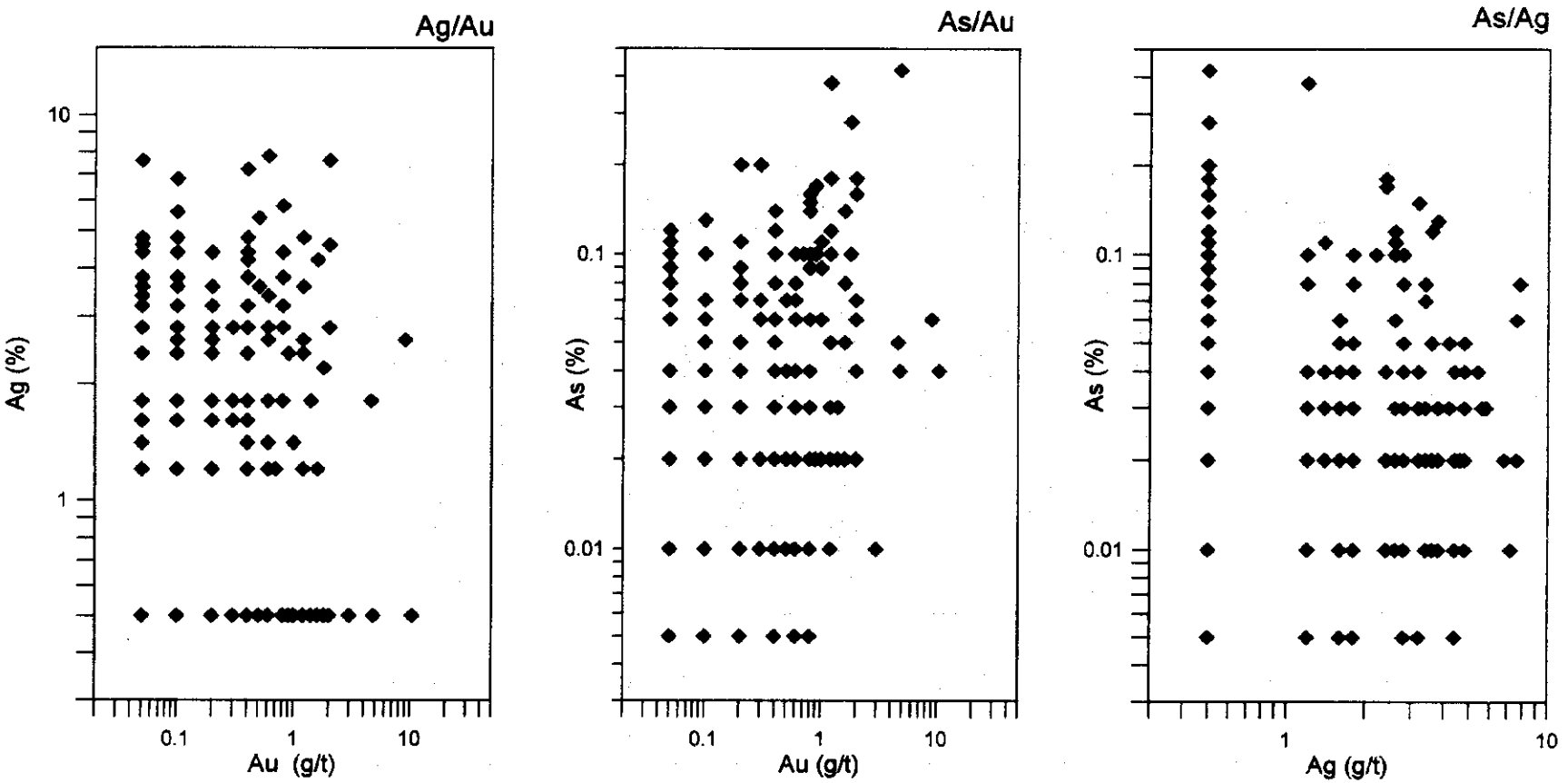


Fig. I-4-1 Scatter Plots (logarithmic) for Ore Samples in the Altynsai District

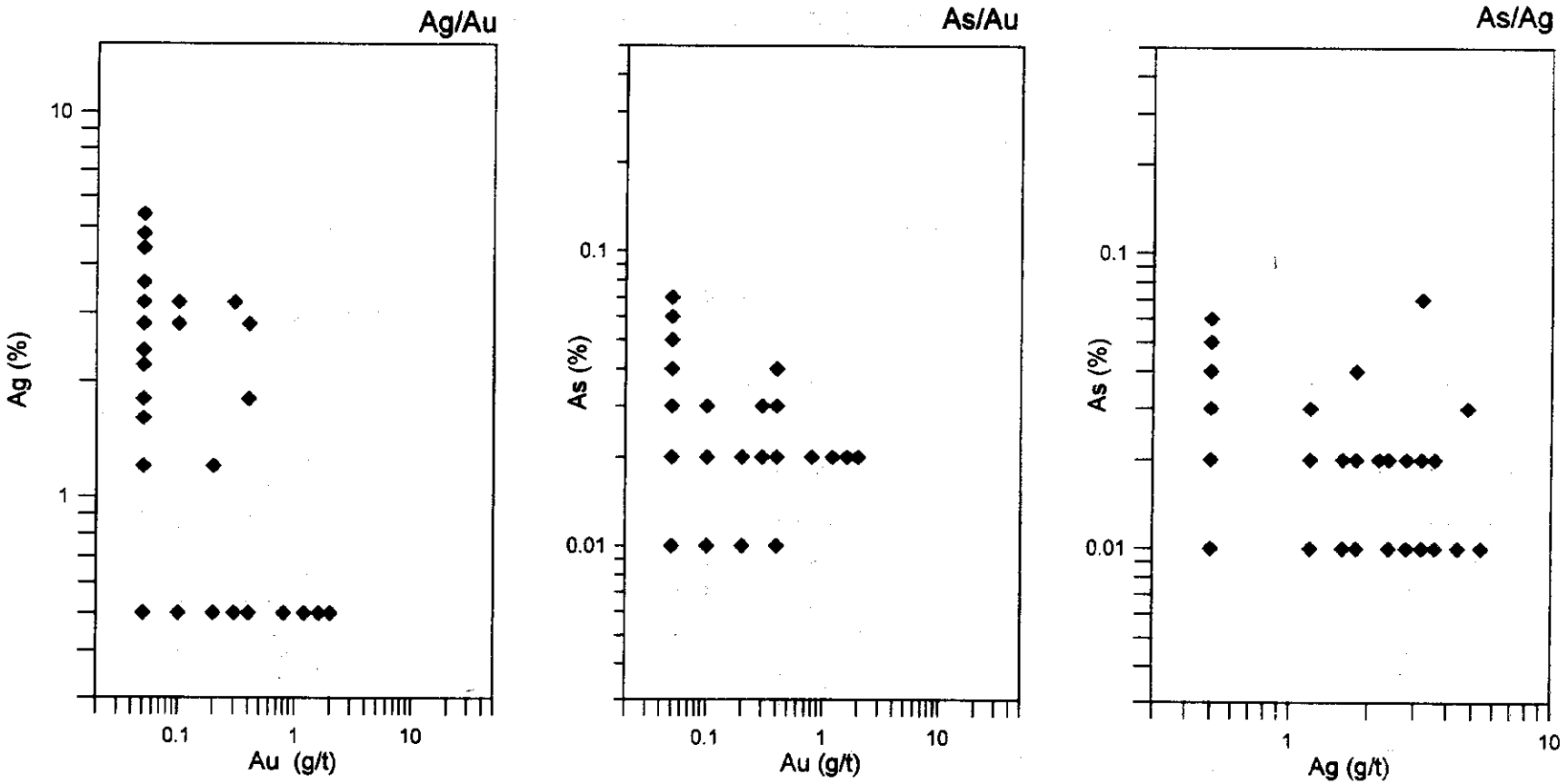


Fig. I-4-2 Scatter Plots (logarithmic) for Ore Samples in the Maulyan District

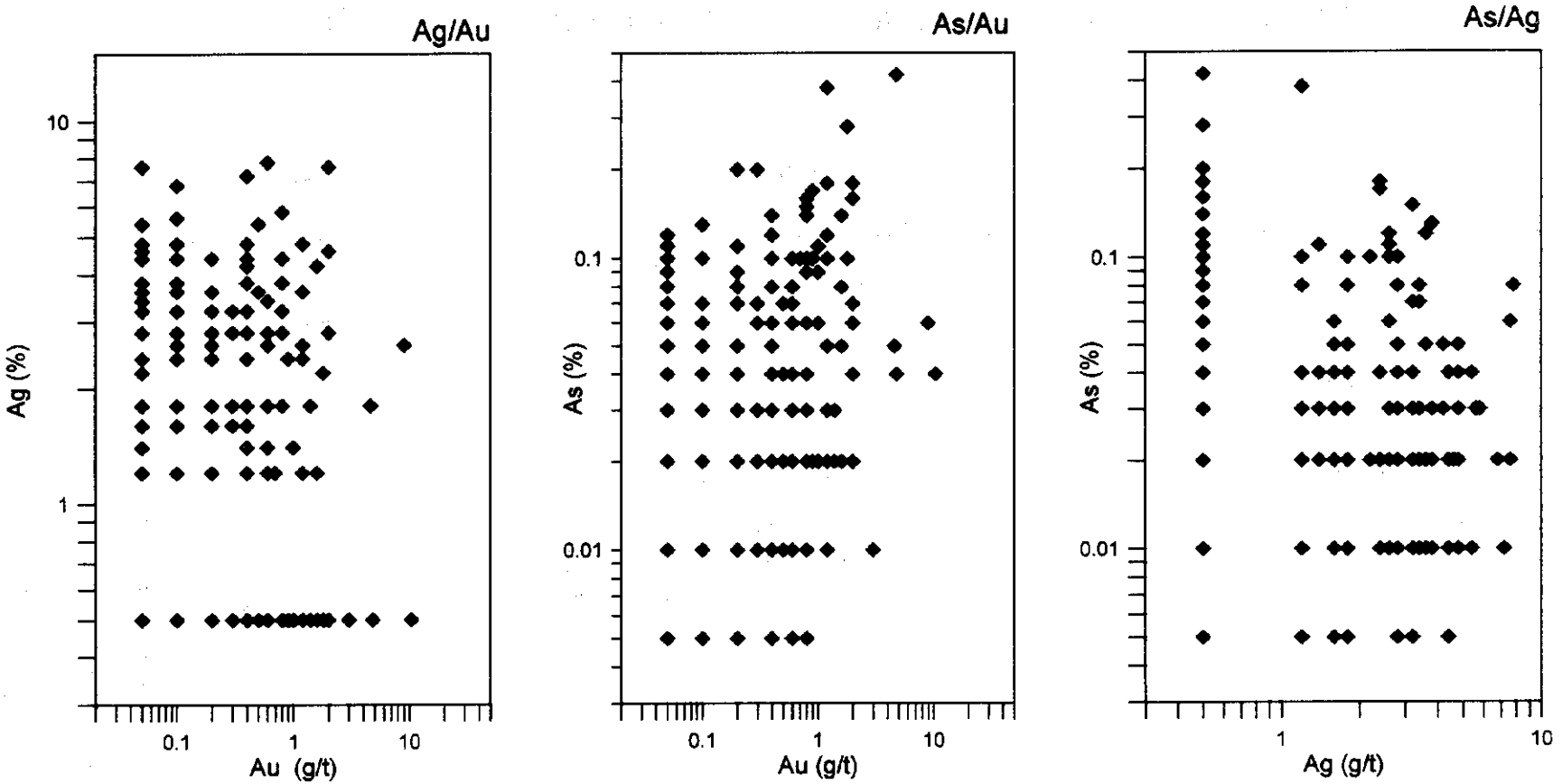
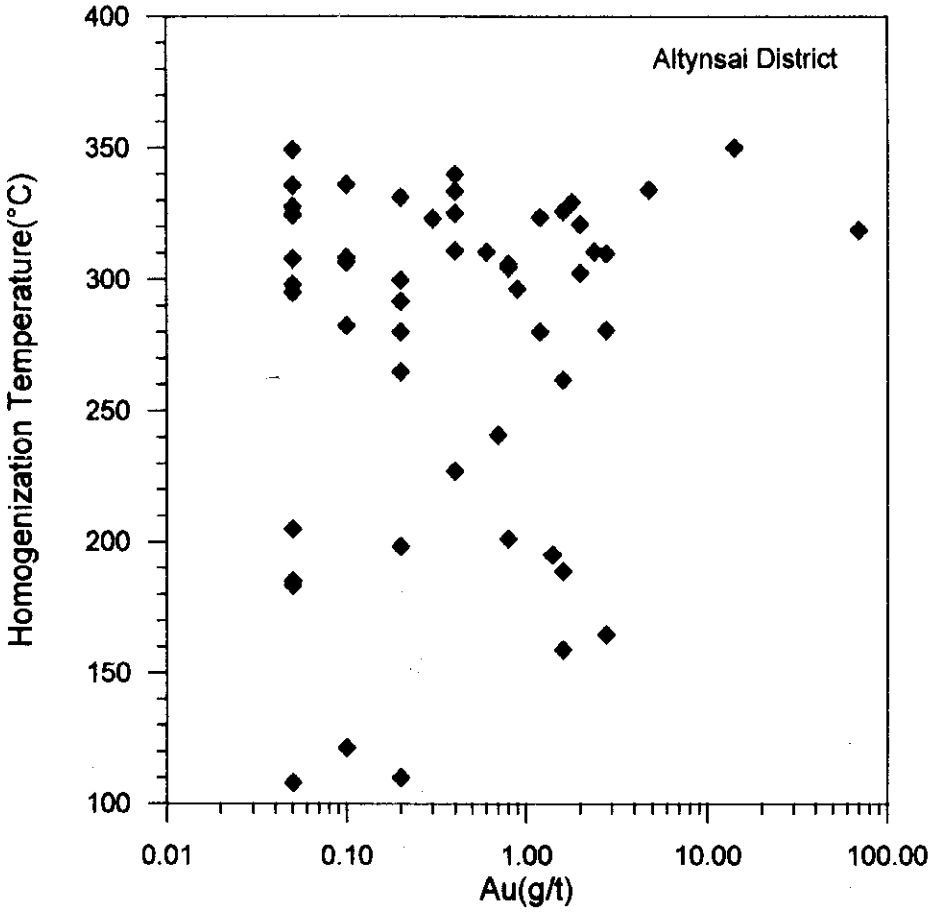


Fig. I-4-3 Scatter Plots (logarithmic) for All Ore Samples



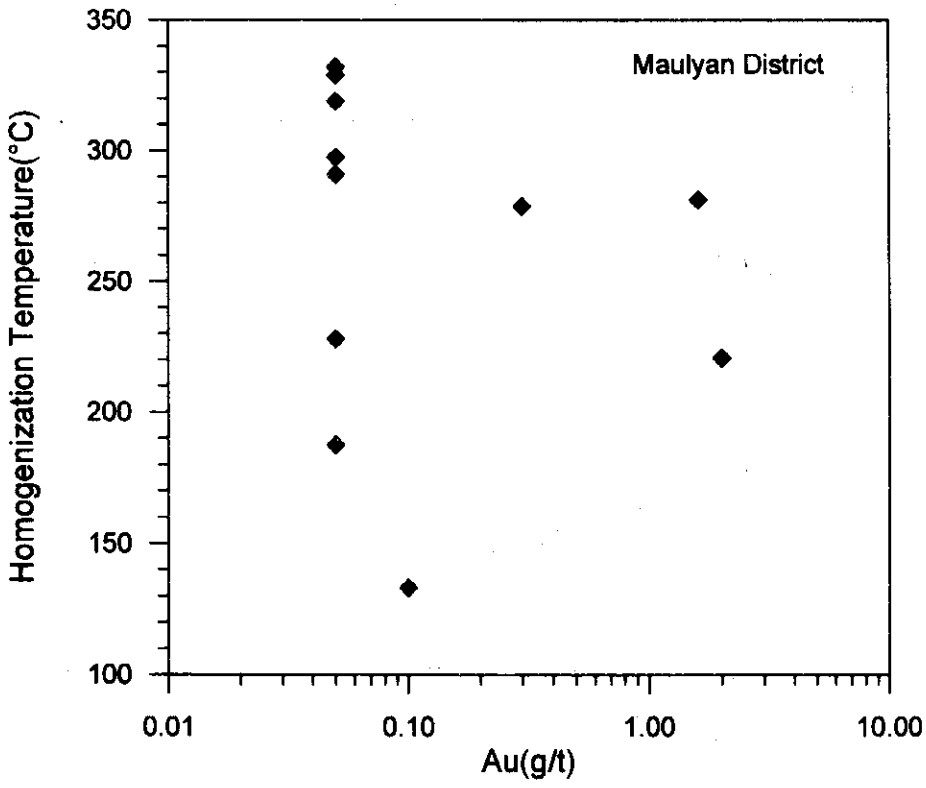


Fig.I-4-4 Correlation Diagram between Au Grade and Homogenization Temperature of Fluid Inclusions

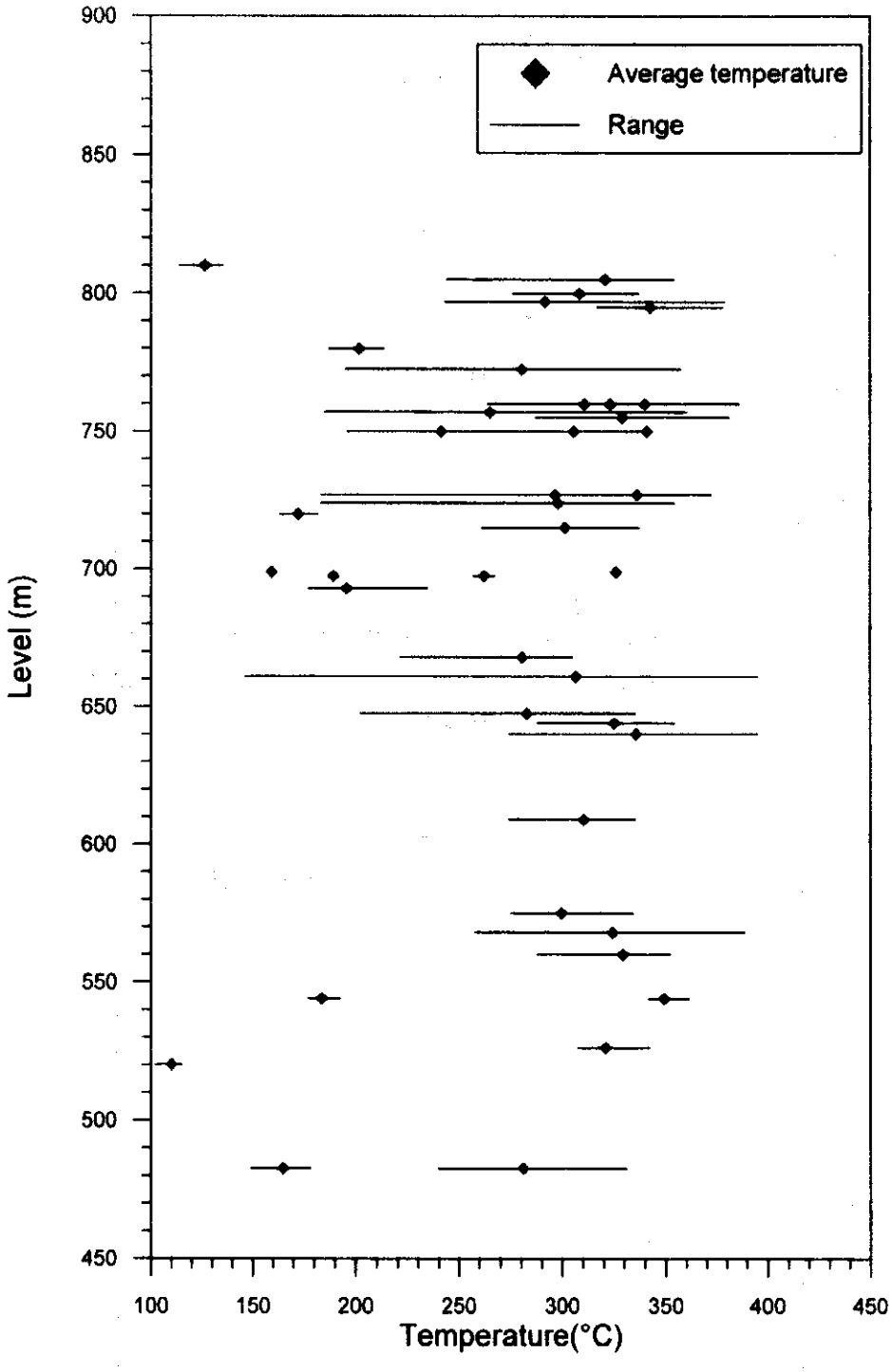


Fig. I-4-5 Correlation Diagram between the Elevation and Homogenization Temperature of Fluid Inclusions(Altynsai District)

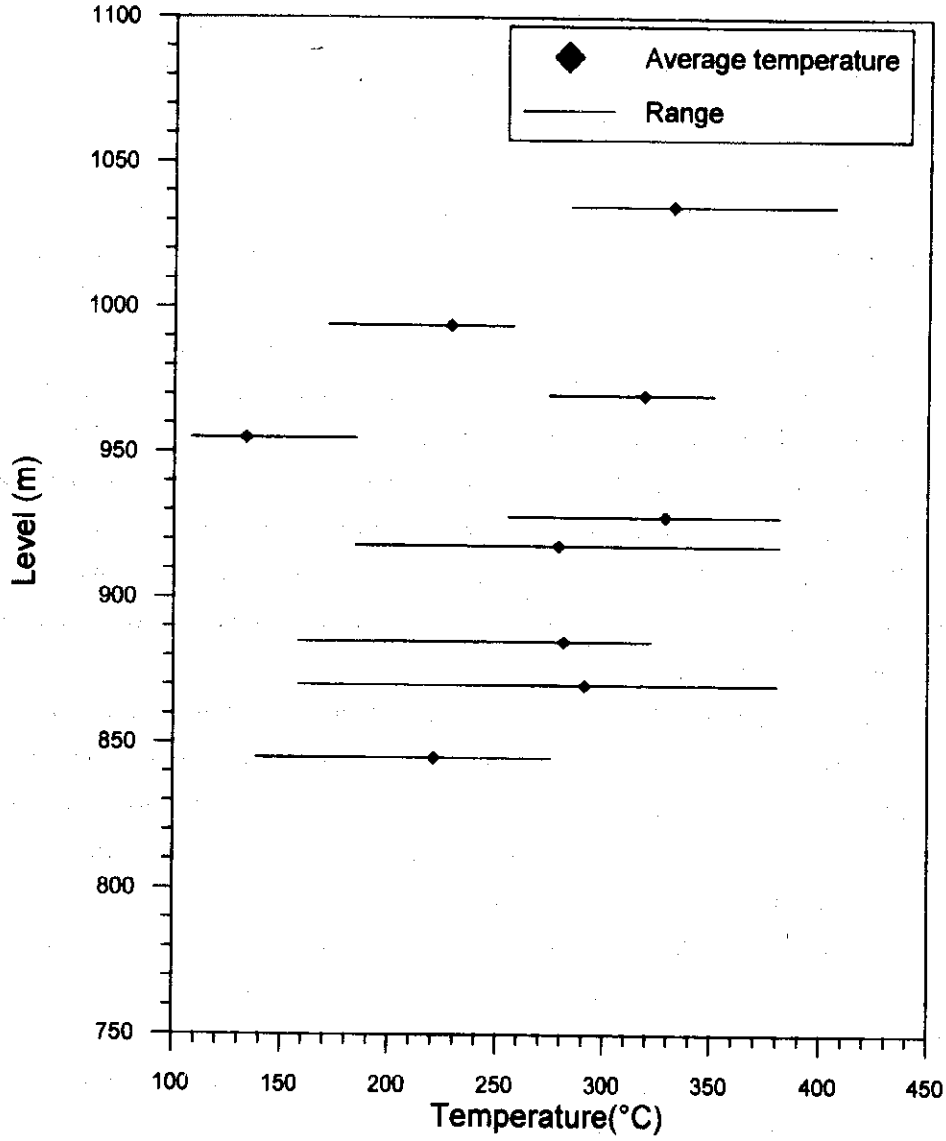


Fig. I-4-6 Correlation between the Elevation and Homogenization Temperature of Fluid Inclusions(Maulyan District)

Chapter 5 Conclusions and Recommendations

5-1 Conclusions

1) Altynsai District

(1) The District is underlain by slate, siltstone, sandstone and phyllite of Ordovician to Silurian System and slate, as well as, siltstone and sandstone of Lower Silurian System, intruded by late Permian to early Triassic lamprophyre dikes. Ore deposits in the District are vein-type gold deposits, consisting of quartz veins controlled by fracture zones with the WNW-ESE and NW-SE trends, and of tourmaline-quartz veins which accompany joints with the N-S trend.

(2) Bonanzas in the veins trending in WNW-ESE direction (the veins Nos. 1, 2and 8) occurs at the intersections of a fracture of the same trend with a number of fractures in the NW-SE direction. The tourmaline-quartz veins in the N-S direction tend to increase in their number, vein width and gold grade, in sandstone rather than in slate.

(3) The homogenization temperatures of fluid inclusions of quartz generally range between 270°C and 370°C, while some samples shows low temperatures of 110°C to 250°C. The homogenization temperatures of the tourmaline-quartz veins with the N-S trend range between 260°C and 340°C, showing no significant difference from those of the veins with the WNW-ESE and NW-SE trends. No significant correlation was found between homogenization temperature and gold grade, nor between homogenization temperature and depth at which a drilling sample was taken.

(4) The relatively strong mineralization (true width 0.2 m to 1 m; Au 2-20 g/t), on the hanging side of No.1 vein and in No.5 vein caught by the Phase I drilling survey and the Uzbek trenching, drilling and tunneling surveys, is inferred to correspond mostly to the tourmaline-quartz veinlet zones with the N-S trend. The No.5 vein is a fracture zone including low-grade quartz veins and veinlets.

(5) The Phase I and II drilling survey, including the MJSN-13 aimed to examine mineralization of tourmaline-quartz veinlet zones with the N-S trend and also to examine feasibility of open pit mining, discovered low-grade gold mineralization (Au trace to 23.6 g/t) at various locations; however, the overall average of Au grade did not exceed 0.2 g/t, which is insufficient for justifying the open pit mining.

(6) The drillhole MJSN-11, aimed at the eastern extension(120m) of the dominant mineralization (true width 1.6m; Au 15.3 g/t) caught by the Phase I drilling MJSN-8 in the lower portion of No.2 vein (footwall), confirmed weak mineralization, 1.27m in true width, grading Au 3.0 g/t.

(7) The Phase I drilling at the MJSN-4, -5, 9 and -10, aimed at portions beneath the bonanzas confirmed by the Adit No.4 at No. 1 vein (extension 135m; average width 2.29m; Au 15.7 g/t) and the adit at No. 2 vein (extension 55m, average width 4.28m; Au 4.5 g/t), and the new Uzbek drilling at the four new drillholes C-47, C-50[a], C-53 and C-54 failed to discover mineralization exceeding Au 5 g/t after the depth of 100m under the adit.

(8) In view of the facts that, at the Altynsai ore deposit, the host rock is hornfelsed and the quartz in veins, accompanied by tourmaline, shows high homogenization temperatures of fluid inclusions (250°C-370°C), it is inferred that granites are concealed at shallow levels. The poor continuity of ore bodies in the deep (below 600m above sea level) may be attributable to denudation of ore bodies by erosion.

(9) The ore body in the Northwest Vein(No.8 vein) as confirmed by the Uzbek trench No.40 along the vein, 32m in confirmed extension, 1.35m in width, grading Au 8.1 g/t. A 230m portion between the trench and the ancient stopes in the east remains unexplored. As the altitude of the outcrop, 860m above sea level, is higher than that of the veins Nos.1 and 2, denudation of the ore body might not have advanced; and, its continuation into the deep may be expected.

2) Maulyan District

(1) The sedimentary rocks which constitute the basement of the Disrict are Cambrian System (mainly limestone), Ordovician System (mainly slate), Lower Silurian System(mainly siltstone and sandstone) and Upper Silurian to Middle Carboniferous System (mainly crystalline limestone). These strata are markedly folded along an axis in the WNW-ESE direction and cut by fractures in the similar direction, forming an elongated tectonic zones extending in the WNW-ESE direction. Intersecting the tectonic zone, fractures also develop in the NE-SW and NW-SE directions. Middle Carboniferous to early Permian Aktau granites intrude into the northern part of the District, while there occur dikes of late Carboniferous to Triassic diabase and lamprophyre.

(2) In the District, ore manifestations mainly of gold occur along the fracture zones in the WNW-ESE direction, forming a part of the Aktau ore zone (70km E-W and 2km to 5km N-S) along the southern side of the Aktau granitic complex. The ore zone, aligned in parallel with the Aktau granitic complex, is inferred to have been formed by mineralization accompanying igneous activity of granites. There are gold manifestations such as Maulyan, Beshbulak, Taulyan and Shur, as well as the Aktau manifestation of niobium-tantalum.

(3) In the light of the findings of the Uzbek trenching survey and the Phase II geological survey, the gold manifestations at Beshbulak (vein width 1.7-2.5m; Au max. 4 g/t), Taulyan (1m; max. 4 g/t) and Shur (1.2m; max. 1.4 g/t) are not considered worthy of further exploration, due to the low grades of gold. The Aktau niobium-tantalum manifestation (Nb-Ta max. 0.035%) is also too low in grade to justify further exploration.

(4) Main component minerals of the gold-bearing quartz veins are quartz, pyrite, goethite and lepidocrocite, accompanied by minor quantities of arsenopyrite, chalcopyrite, sphalerite, graphite and electrum.

(5) The geochemical survey indicated that combinations of elements whose correlation coefficients are no less than 0.5 nor more than 0.7 are Cd-Sb, V-Ag, V-Cd, Cr-Ni, Mo-Ag, Mo-Cd, Mo-V, Li-Co, Li-Cr, Li-Be, Ta-Be and P-Ta. Combinations of elements whose correlation coefficients are 0.7 or more were Co-Ni, Cr-Co and Mo-Sb. Au, As and Hg showed no significant correlation nor significant negative correlation with any other elements.

(6) Anomalous points of Au are scattered in the southern part of the Maulyan manifestation, near the Taulyan manifestation, and in the southern part of the Shur manifestation, but they are poor in continuity. Distribution of anomalous values of Au and As in the vicinity of the Taulyan manifestation are relatively concordant. Anomalous points of Nb and Ta are spotted, though small in number, in the Aktau manifestation and in areas where granite occurs, correlation of anomalous points of the two elements is high. The subject geochemical survey did not result in extraction of clear continuation of anomalous points of Au, however, all the anomalous values of Au were located in the vicinity of the known manifestations.

(7) Homogenization temperatures of fluid inclusions of quartz samples collected by the geological survey and drilling survey in the District were min.108°C and max. 423°C. While the temperatures range between 130°C-370°C, the quartz samples may be devided into a relatively low temperature group of 130°C-200°C and a high temperature group of 250°C-370°C. Three types of quartz samples -- those which have low homogenization temperatures only, those which have high temperature only and those which have both low and high temperatures -- were confirmed. While quartz of the three types has been confirmed at the Maulyan manifestation, the homogenization temperatures of quartz samples grading Au 1.2 - 2.0 g/t were 221°C-281°C, which are higher than the general temperature range of gold occurrence, 100 °C -250 °C . Correlation between homogenization temperature and depth at which a drilling sample was taken is also unclear.

(8) It is in the Maulyan manifestation, of all the gold manifestations in the District, that mineralization spreads over relatively extensive areas, where some ten of fracture-silicification zones extending in the WNW-ESE direction are accompanied by mineralization. So far, three ore bodies, 1m to 4m in vein width, ie., the No.1 ore body, 900m long, as well the No.2 ore body, 300m long, and the No.3 ore body, 200m long, have been confirmed. The gold grade varies from 1 g/t to 33.4 g/t. Bonanzas tend to have been formed at converging parts of a number of fractures paralleling in the WNW-ESE direction.

(9) During Phase II, drilling was performed at two boreholes, aimed at the 60m-long western extension of the No.3 ore body (2.4m wide, grading Au 17.8 g/t) found at the Uzbek trench K-3 and also at the lower portion of the No.2 ore body (4.2m wide, grading 11.0 g/t) found at the trench K-7. Although the drilling caught pyryte-bearing quartz veins and veinlets in various parts, gold mineralization exceeding Au 1.0 g/t was found only in the lower portion of the No.3 ore body (0.2m in true width, Au 2.0 g/t) and in the lower portion of the No.2 ore body (0.34m, Au 1.6 g/t).

(10) In the subject fiscal year, drilling was carried out by the Uzbek side on its own at six boreholes (C-3, 6, 7, 8, 9, 10), which caught mineralization, 1.2m to 1.8m wide, grading Au 4 to 8 g/t, between 16m and 90m from the surface at these boreholes excepting C-10, of which analysis has not yet been obtained.

(11) From these findings, it has been confirmed that low-grade mineralization is continuous at the ore zones Nos. 1 and 2 of the Maulyan manifestation, though gold grade considerably varies.

5-2 Recommendations for Phase III Survey

1) Altynsai District

(1) The ore body in the Northwest Vein, or No.8 vein, as confirmed by the Uzbek trench No.40 along the vein, 32m in confirmed extension, 1.35m in vein width, grading Au 8.1 g/t, is a massive quartz vein similar to the bonanza of No.1 vein in the Adit No.4. As the altitude of the outcrop, 860m above sea level, is higher than that of the veins Nos.1 and 2, denudation of the ore body might not have advanced and its continuation into the deep may be expected. It is advisable to implement drilling survey to verify mineralization in the 230-m portion between the trench and the ancient stopes in the east and in its western extention.

2) Maulyan District

(1) It has been confirmed by the Uzbek drilling survey that the mineralization continues

from 16m to 90m below the surface at the ore zones Nos. 1 and 2. Especially at the No.1 ore zone, the trenching survey revealed that the mineralization continues over 1,700m in extension, which is inferred to continue further into the Beshbulak manifestation, situated 3 km east of the subject manifestation. It is advisable to implement drilling survey to verify mineralization, mainly up to 100m under the surface, in the eastern extension of the ore bodies confirmed by the Uzbek trenching and drilling surveys.

(2) The lower portion of the No.3 ore zone remains unexplored. It is advisable to implement drilling survey to verify mineralization in the portion beneath the vein, 1m wide, grading Au 6.8 g/t, as confirmed by the Uzbek trench K-45.

PART II PARTICULARS

Chapter 1 Altynsai District

1-1 Outline of Geology and Ore Deposits of Altynsai District

The Altynsai District is located in a hilly zone, alt. 650m to 850m, in the extreme east of the Karatau Mountains, some 105km west-northwest of Samarkand. The District is accessible from Samarkand by car in about 2 hours (road distance 155 km). Geologically, the Altynsai District pertains to the Karatau ore zone, together with the Sarmich deposit and the Kurai and Karamechet manifestations, to the west (Fig. I-3-1).

The area is underlain by slate, siltstone, sandstone and phyllite of Ordovician to Silurian System and slate, siltstone and sandstone of Lower Silurian System, intruded by lamprophyre dikes from late Permian to early Triassic time in the vicinity of the No.10 vein, or "Berkut Vein" in the west (Fig. II-1-1-1, 2, PL. II-1-1-1, 2).

Sedimentary rocks and metamorphic rocks in the District are folded in anticline and syncline with the WNW-ESE trend. There are many fracture zones with the WNW-ESE and NW-SE trends and numerous joints with the N-S trend. Ore deposits in the District are gold-bearing quartz veins controlled by fracture zones with the WNE-ESE and NW-SE trends, and tourmaline-quartz veins accompanying joints with the N-S trend. Among ore deposits in the District, the best known is the Altynsai deposit.

Discovered in 1938, the Altynsai deposit was investigated between 1952 and 76 by geological survey, electric survey, magnetic survey, two prospecting adits, drilling survey (8 boreholes) and extensive trenching survey. The prospecting was later suspended to reinforce exploration of the Sarmich deposit to the west but was resumed in 1995. Currently, trenching, drilling and tunneling surveys are ongoing. More than 20 ore zones have so far been ascertained, which include the veins Nos. 1, 2, 8 ("Northwest Vein"), 9 ("Kazanbulak Vein") and 10 ("Berkut Vein").

1) Northern ore zone

Major veins such as Nos. 1, 2 and 8 are located in this ore zone. The structure that controls mineralization is fracture zones with the WNW-ESE trend, dipping 45° to 70° southward, 15m to 40m wide and 500m to 1,000m long. Inside the fracture zones, host rocks are intensively crushed, limonitized, silicified, and accompanied by quartz veins. Extension of the Nos. 1 and 2 echelon veins reaches 1,300m, along which ancient stopes excavated up to an approximate depth of 30m remain over 470m. Although gold grades of the surface level of the No.1 and No.2 veins are unclear because of the ancient mining of bonanzas, the following grades have been obtained at the Adit No.4 (+698.89m level), 25m to 35m under the surface (PL.II-1-1-3):

No.1 vein: Extension 135m; average width 2.29m; Au 15.7 g/t, Ag 5.7 g/t

No.2 vein: Extension 55m; average width 4.28m; Au 4.5 g/t, Ag 2.1 g/t

Ancient stopes remain in a surfacial portion of the No. 8 vein, as well. The vein is 0.5m to 3.5m wide, grading 0.1 g/t to 10 g/t, while a sample taken from a bonanza indicates Au 17.7 g/t (2.7m wide). The vein has been prospected by the Uzbek side up to some 100m under the surface with drilling at four boreholes, a 25m exploration shaft and a 35m prospecting drift (Fig. II-1-2-8). So far, no dominant mineralization has been found, except at the drillhole C-25 where Au 6.2 g/t (true thickness 1.31m) was confirmed. The ore body of the No.8 vein, which was confirmed by the Uzbek trench No.40 along the vein, 230m west of the ancient stopes, is a dominant massive quartz vein similar to the bonanza of No.1 vein in the Adit No.4. Its size and grade are 32m in the confirmed extension, 1.35m in average width and an average Au grade of 8.1 g/t. (Fig.II-1-1-3)

2) Southern ore zone

In parallel with the southern side of the No. 1 and No. 2 veins, veins with the WNW-ESE trend including Nos. 5, 7, 11 and 12 have been found. These veins occur in anticlinorium. The fracture-silicification zones including these veins are up to 40m wide and 300m to 700m long, dipping 35° to 70° - 80° northward. Mineralization accompanies a quartz vein, 0.5m to 3m wide, which is accompanied by oxidized sulfide minerals. Gold concentrates in intersections of fracture zones trending in different directions. In trenches, gold grades are mostly 0.1g/t to 0,9 g/t, rarely 1 g/t to10 g/t or more, but continuity of high grade portions is poor. In Phase I, drilling was conducted at MJSN-2 aimed at the No.11 vein and, in Phase II, at MJSN-12 and 14 aimed at the No.5 vein, none of which encountered a bonanza.

3) No. 9 vein ("Kazanbulak Vein")

The vein is located 1km west of the No.2 vein of Altynsai deposits. Gold mineralization occurs in a fracture zone trending in the NW-SE direction which cuts sandy slate. The ore zone is 5m wide, 300m long and dips northeast. The gold mineralization accompanies a lenticular quartz vein, up to 1.5m wide and 15m long, existing in a fracture zone. Its gold grade varies markedly between 0.1 g/t and 217.8 g/t (usually 2-7 g/t). The Uzbek drilling C-43 aimed at the level 50m beneath a dominant vein (Au 217.8 g/t, 1.0m wide) only caught low-grade mineralization, 2.7m wide, grading 0.6 g/t. The ore body is presumed to be small in size and largely variable in grade.

4) No.10 vein ("Berkut Vein")

This vein is located 1km west of the Kazanbulak Vein. Ore zones in echelon trending in the WNW-ESE direction spreads over an area, 200m wide and 1km long. Between 1956 and 58, prospecting which included 44 trenches, two prospecting shafts, a prospecting tunnel and drilling was carried out. The initial objective of prospecting was tungsten, of which two types of ore body exist.

The first type occurs in two lamprophyre dikes with the NW-SE trend, 270 m long and 6 m wide. WO_3 grade of the dikes varies from 0.01% to 0.95% (0.25% in average). The ore body is too low in grade and too small in size to be mined. Gold grade is 0.1- 2.6 g/t (0.6 g/t in average), while a sample collected from the fracture zone indicated 19.6 g/t.

The second type ore bodies are stockwork quartz veins and tourmaline-quartz veins with the N-S trend, disseminated with sulfide minerals. About 400 of quartz veins, 0.01m to 0.2m thick, have been confirmed. Gold grade ranges bewteen 0.1 g/t and 27.8 g/t, but usually is 0.3-1.5 g/t. The highest grade of silver is 10.6 g/t while WO_3 grades 0.02% to 0.15% (max. 2.25%). None of gold, silver and WO_3 can be an objective of exploration due to the low grade. The vein is not prospected at present.

5) Tourmaline-quartz veins with the N-S trend

Numerous joints trending in the N-S direction and dipping 45° to 80° westward develop in an area, 500m to 800m wide, which embraces the Nos, 1, 2, 5, 8 and 10 veins. Tourmaline-quartz veinlets, 0.1cm to 25cm wide, occur in the joints (Figs. II-1-3-1 and -2). The veinlet zone almost coincides with the biotite-muscovite hornfels zone. From the anomalies (20-60 gamma) of the Uzbek airborne magnetic survey, it has been inferred that granitic stocks are aligned in the WNW-ESE direction under the veinlet zone. The veinlet zone is considered to be tourmaline greisen formed by pneumatolysis of granites concealed at relatively shallow levels. Gold grade of the veinlets is generally 1 g/t or lower, rarely reaching 20 g/t.

Component minerals in quartz veins occurring in fracture zone with the WNW-ESE and NW-SE trends are mainly quartz, pyrite, marcasite, arsenopyrite, chalcopyrite, sphalerite, goethite and lepidocrocite, accompanied by galena, native bismuth, aikinite, wittichenite, scheelite, tourmaline, rutile and electrum. Electrum identified in the polished sections is 5-10μm in grain size and occurs in quartz, associated with chalcopyrite and native bismuth in vein-like alignment but is independently existing without contact with these minerals.

In the tourmaline-quartz veins accompanying the joints with the N-S trend, main component minerals are quartz, tourmaline, pyrite and arsenopyrite. The Uzbek studies indicate that wolframite, cassiterite, topaz, beryl and native gold are included, which has not

been verified by the subject survey.

1-2 Drilling Survey

1-2-1 Purpose of the survey

Drilling survey aimed to collect samples and to confirm ore reserves was carried out, in order to examine and describe stratigraphy and occurrence of ore deposits in the Altynsai District.

1-2-2 Methods of the survey

1) Survey work

With the personnel and equipment arranged by the Samarkandgeology, drilling work at 4 boreholes totalling 790.4m was performed.

Locations of the respective drillholes are indicated in Figs. II-1-2-1.

The drilling machines used were two units of the Russian-made SKB-41, capable of drilling 300 m in case of 76 mm dia. and 500 m in case of 59 mm dia., respectively.

The drilling operation was performed in two 12-hour shifts, with one foreman and one operator per unit, in principle.

A buldozer and a trailer were used for the transportation of drilling rigs and supplies to respective drill sites, road construction, drill site leveling and for preparations.

The wireline methods were employed for the drilling operation in an effort to improve core recovery and work progress.

For the surface soil drilling, single diamond bits and metallic bits of 76 mm dia. were used. After drilling reaches the rock, casing pipes of 73 mm dia. were inserted and installed, and drilling operation was continued with the diamond bits of 59 mm dia. as the final diameter. Mud water was not prepared at the drilling site but at the mud water plant of the Altynkazgan Expedition's base and transported to the drilling site by $2m^3$ and $4m^3$ tank trucks.

The drilling work lasted for 75 days from July 29 to October 11, 1998. The drilling lengths and core recovery by borehole are tabulated in Table II-1-2-1. The drilling efficiency, working time, consumption of drilling articles and bits are respectively shown in Table II-1-2-2 thru II-1-2-5. The main equipment used, results of work and progress record by drillhole are respectively shown in Appendices 3-1 thru 3-3.

2) Drilling operation

The drilling operation is outlined in Table II-1-2-6.

1-2-3 Results of the drilling survey

The survey findings are shown in the geological cross sections (Fig. II-1-2-2 thru 5).

1) MJSN-11 (Direction N 10°E; inclination -75°; drilling length 280.1m) (Exploration Line L-54)

The drilling was aimed to examine the mineralization (true width 1.6m; Au 15.3 g/t) in the eastern extension (120m), which was caught under the No.2 vein (footwall) by the MJSN-8 drilled in Phase I.

(1) Geology : The drillhole is composed, from the mouth to the end, of a sandstone bed of the lower formation of Ordovician to Silurian System, accompanied by slate.

(2) Mineralization : As seen in Fig. II-1-2-2, a network-type quartz vein zone (true width 1.25m; Au 3.0 g/t), presumed to be the footwall of No.2 vein, was confirmed between the depths of 237.30m and 250.50m, as well as low-grade mineralization in numerous tourmaline-quartz veins and veinlets accompanied by pyrite and arsenopyrite.

The major mineralization showings are indicated in Table II-1-2-7.

2) MJSN-12 (Direction S 10°W; inclination -75°; drilling length 220.0 m) (Exploration line L-57)

The drilling was aimed to explore a portion under the No.5 vein about 100m below the surface, where relatively good gold mineralization (true width 0.2m - 1m; Au 2 -8.2 g/t) was caught by the MJSN-5 drilled in Phase I.

(1) Geology : From the mouth to the end, the drillhole consists of sandstone of the lower formation of Ordovician to Silurian System, accompanied by phyllite and slate.

(2) Mineralization : As seen in Fig. II-1-2-3, low-grade gold mineralization was caught in tourmaline-quartz veins and veinlets accompanied by pyrite and arsenopyrite, in various locations. However, the No.5 vein is a fracture zone that includes low-grade quartz veins and veinlets.

The major mineralization showings are indicated in Table II-1-2-7.

3) MJSN-13 (Direction S 80°E; inclination -75°; drilling length 128.0m) (Exploration line L-012)

The drilling was aimed to examine mineralization in the tourmaline-quartz veins with the N-S trend and the feasibility of open pit mining.

(1) Geology : The drillhole consists, from the mouth to the end, of sandstone bed of the lower formation of Ordovician to Silurian System, accompanied by slate.

(2) Mineralization : As seen in Fig. II-1-2-4, low-grade gold mineralization (Au trace - 2.0 g/t) was caught in various locations in tourmaline-quartz veins and veinlets accompanied by pyrite and arsenopyrite. However, these tourmaline-quartz veinlet zones were found by continuous sampling to be low in Au grade (0.2 g/t or less); therefore, the zone around the drillhole could not be an objective of open pit mining.

The mineralization showings are indicated in Table II-1-2-7.

4) MJSN-14 (Direction S 10° E; inclination -75°; drilling length 162.3m) (Exploration line L-65)

The drilling was intended to examine mineralization of the No.5 vein some 100m below the surface.

(1) Geology : From the mouth to the end, the drillhole is composed of sandstone bed of the lower formation of Ordovician to Silurian System, accompanied by phyllite and slate.

(2) Mineralization : As seen in Fig. II-1-2-5, the drilling caught in various locations low-grade mineralization (Au trace - 9.0 g/t) in tourmaline-quartz veins and veinlets accompanied by pyrite and arsenopyrite. However, the No.5 vein is a fracuture zone that includes low-grade quartz veins and veinlets.

Major mineralization showings are indicated in Table II-1-2-7.

1-3 Summary and Considerations

The District is underlain by slate, siltstone, sandstone, phyllite of Ordovician to Silurian System and slate, siltstone and sandstone of Lower Silurian System, which are intruded by lamprophyre dikes in the vicinity of the No.10 vein. Sedimentary rocks and metamorphic rocks in the District are folded in anticline and syncline trending in the WNW-ESE direction, where many fracture zones with the WNW-ESE and NW-SE trends and joints with the N-S trend develop.

Ore deposits in the District are vein-type deposits consisting of quartz veins controlled by the fracture zones with the WNW-ESE and NW-SE trends, and of tourmaline-quartz veins accompanying joints with the N-S trend. More than 20 ore zones have been confirmed in the District, which include the veins Nos. 1, 2, 8 ("Northwest Vein"), 9 ("Kazanbulak Vein") and 10 ("Berkut Vein").

In an area, 2.5km long and 500 m to 800 m wide, which embraces the veins Nos, 1, 2, 8 and 10, inumerable joints trending in the N-S direction and dipping 45° to 80° westward develop, forming a tourmaline-quartz veinlet zone (Fig.II-1-3-1 and -2). The veinlet zone almost coincides with the biotite-muscovite hornfels zone. From the anomalies (20-60 gamma) detected by the Uzbek airborne magnetic survey, it has been inferred that granitic

stocks are aligned in the WNW-ESE direction under the veinlet zone. The veinlet zone is considered to be tourmaline greisen formed by pneumatolysis along cross joints formed by upward intrusion of the granitic stocks.

Bonanzas in veins trending in WNW-ESE direction (the veins Nos. 1, 2and 8) occurs at the intersections of a fracture of the same trend with a number of fractures in the NW-SE direction. The tourmaline-quartz veins in the N-S direction tend to increase in their number, vein width and gold grade, in sandstone rather than in slate.

Homogenization temperatures of fluid inclusions of the samples collected by thhe geological survey (52 samples) and drilling survey (27 samples) of Phases I and II were min.102°C and max. 428°C. The frequency distribution (Appendix 2-8) indicates the peak around 330°C and, generally, a concentration in the range of 270°C-370°C, while some samples show low temperatures of 110 °C -250 °C. Homogenization temperatures of tourmaline-quartz veins with the N-S trend were 260°C to 340°C, showing a tendency similar to those of veins in the WNW-ESE and NW-SE directions. Under the microscope, no difference is observed between the low-temperature fluid inclusions and the high-temperature ones, in terms of occurrence and shape. These fluid inclusions are considered to have been generated by the same hydrothermal process. No significant correlation was observed between homogenization temperature and gold grade, nor between homogenization temperature and depth at which a drilling sample was taken.

The relatively strong mineralization (true width 0.2 m to 1 m; Au 2-20 g/t) on the hanging side of No.1 vein and in No.5 vein discovered by the Phase I drilling survey is inferred to be mostly the tourmaline-quartz veinlet zones with the N-S trend, in view of the findings of the Phase II drilling survey and of the Uzbek trenching, drilling and tunneling surveys. Especially, the Phase II drilling revealed that the No.5 vein, which had been anticipated to bear bonanzas, is a fracture zone including low-grade quartz veins and veinlets, indicating that gold grade is rather higher in the surrounding tourmaline-quartz veinlet zones.

The Phase I and II drilling survey, including the MJSN-13 aimed to examine mineralization of tourmaline-quartz veinlet zones with the N-S trend and also to examine feasibility of open pit mining, encountered low-grade gold mineralization (Au trace to 23.6 g/t) at various locations, however the average Au grade of continuous sampling did not exceed 0.2 g/t, which is insufficient for justifying open pit mining.

The drillhole MJSN-11, aimed at the eastern extension(120m) of the dominant mineralization (true width 1.6 m; Au 15.3 g/t) caught by the Phase I drilling MJSN-8 in the portion beneath the footwall of No.2 vein, merely confirmed weak mineralization, 1.27m in true width, grading Au 3.0 g/t.

The Phase I drilling at the MJSN-4, -5, 9 and -10, aimed at portions beneath the bonanzas confirmed by the Adit No.4 at No. 1 vein (extension 135 m; average width 2.29 m; Au 15.7 g/t) and at No. 2 vein (extension 55 m, average width 4.28 m; Au 4.5 g/t), only encountered low-grade mineralization (Au 4 g/t or less). Either at the four new drillholes C-47, C-50', C-53 and C-54 of the Uzbek side, no dominant mineralization (exceeding Au 5 g/t) was confirmed after the depth of 100m under the adit (Fig. II-1-2-6, 7).

In view of the facts that the host rock is hornfelsed at the Altynsay ore deposit and that the quartz in veins, accompanied by tourmaline, shows high homogenization temperatures of fluid inclusions (250°C-370°C), it is inferable that granites are concealed at shallow levels. The poor continuity of ore bodies in the deep (below 600m above sea level) may be attributable to denudation of the ore body advancing by erosion.

The ore body in the Northwest Vein, or No.8 vein, as confirmed by the Uzbek trench No.40 along the vein, 32m in confirmed extension, 1.35m wide, grading Au 8.1 g/t, is a massive quartz vein similar to the bonanza of No.1 vein in the Adit No.4. A 230m portion between the trench and the ancient stopes remains unexplored. As the altitude of the outcrop, 860m above sea level, is higher than that of the veins Nos.1 and 2, denudation of the ore body might not have advanced; and, its continuation into the deep may be expected.

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

Hole No.	Programmed Length(m)	Drilled length (m)	Length of core (m)	Core recovery (%)
MJSN-11	280.00	280.10	229.00	81.8
MJSN-12	220.00	220.00	178.50	81.1
MJSN-13	120.00	128.00	105.10	82.1
MJSN-14	160.00	162.30	131.60	81.1
Total	780.00	790.40	644.20	81.5

Table II-1-2-2 Efficiency of Each Drillhole in the Altynsai District

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
MJSN-11	SKB-41	Aug. 9,'98 ↓ Oct.10,'98	280.10	229.00	81.8	37.6	15.3	52.9	7.45	5.29	4.45
MJSN-12	SKB-41	July 27,'98 ↓ Sept.25,'98	220.00	178.50	81.1	36.0	18.3	54.3	6.11	4.05	3.61
MJSN-13	SKB-41	Sept.20,'98 ↓ Oct.11,'98	128.00	105.10	82.1	9.4	8.8	18.2	13.62	7.03	5.82
MJSN-14	SKB-41	July 20,'98 ↓ Aug.22,'98	162.30	131.60	81.1	17.8	9.6	27.4	9.12	5.92	4.77
Total			790.40	644.20	81.5	100.8	52.0	152.8	7.84	5.17	4.39

* includes drilling and out drilling

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

Table II-1-2-3 Working Time of Diamond Drilling in the Altynsai District

Hole No.	Working Period		Number of Works		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)
MJSN-11	Aug. 9,'98 ↓ Oct.10,'98	63	144	113	384.0	518.0	190.0	25.0	44.0	108.0	1,269.0
MJSN-12	July 27,'98 ↓ Sept.25,'98	61	161	119	319.0	546.0	347.0	27.0	30.0	36.0	1,305.0
MJSN-13	Sept.20,'98 ↓ Oct.11,'98	22	48	42	147.0	79.0	101.0	24.0	42.0	45.0	438.0
MJSN-14	July 20,'98 ↓ Aug.22,'98	34	84	64	228.0	199.0	137.0	27.0	39.0	27.0	657.0
Total	—	180	437	338	1,078.0	1,342.0	775.0	103.0	155.0	216.0	3,669.0

Table II-1-2-4 Consumable Drilling Articles in the Altynsai District

Item	Specifi-cation	Unit	Quantity				
			MJSN-11	MJSN-12	MJSN-13	MJSN-14	Total
Bentonite		kg					0
Clear mud		kg					0
Nl mud water		m^3	123	143	45	115	426
C. M. C.		kg					0
UNIFLOK		kg					0
Clay		kg	10	10	10	20	50
Diamond bit	93mm	pc					0
Diamond bit	76mm	pc				1	1
Diamond bit	59mm	pc	31	42	17	16	106
Diamond single bit	59mm	pc					0
Diamond reamer	76mm	pc					0
Diamond reamer	59mm	pc	1	2	1	1	5
Metal crown	112mm	pc					0
Metal crown	93mm	pc					0
Metal crown	76mm	pc	1	1	1		3
Metal shue	89mm	pc					0
Metal shue	73mm	pc	1	1	1	1	4
core box			21	25	10	18	74

Table II-1-2-5 Drilling Meterage of Bits in the Altynsai District

Size	Number of bits (pcs)	Drilling Meterage by Drillhole (m)				Total	Efficiency
		MJSN-11	MJSN-12	MJSN-13	MJSN-14		M/bit
Metal bits (ϕ 76mm)	1	15.00				15.00	15.00
	1		5.00			5.00	5.00
	1			10.00		10.00	10.00
Sub total	3	15.00	5.00	10.00		30.00	10.00
Diamond bits (ϕ 76mm)	1				6.00	6.00	6.00
Sub total	1				6.00	6.00	6.00
Diamond bits (ϕ 59mm)	31	265.10				265.10	8.55
	42		215.00			215.00	5.12
	17			118.00		118.00	6.94
	16				156.30	156.30	9.77
Sub total	106	265.10	215.00	118.00	156.30	754.40	7.12
Grand total	110	280.10	220.00	128.00	162.30	790.40	7.19

Table II-1-2-6 Results of Drilling Works in the Altynsai District

Hole No.		MJSN-11	MJSN-12	MJSN-13	MJSN-14
Direction Dip		N10° E -75°	S10° W -75°	S80° E -75°	S10° W -75°
Bit (m)	φ 76mm	15.00	5.00	10.00	6.00
	φ 59mm	265.10	215.00	118.00	156.30
Casing (m)	φ 89mm				
	φ 73mm	15.00	5.00	10.00	6.00

Table II-1-2-7 Major Mineralization Zones Revealed by Drillings in the Altynsai District

Hole No.	Depth (m)	True width (m)	Au (g/t)	Ag (g/t)	As (%)	Remarkas
MJSN-11	124.70 ~ 125.80(1.10)	0.17	1.6	4.2	0.05	N-S Veinlets
	245.60 ~ 247(1.40)	1.27	3.0	<1.0	0.01	No.2 V.(L)
MJSN-12	27.00 ~ 28.00(1.00)	0.16	2.0	<1.0	0.02	N-S Veinlets
	66.10 ~ 66.70(0.60)	0.09	4.6	1.8	0.05	N-S Veinlets
	99.50 ~ 100.60(1.10)	0.17	1.6	<1.0	0.02	N-S Veinlets
	123.30 ~ 125.40(2.10)	0.33	3.3	<1.0	0.09	N-S Veinlets
MJSN-13	112.80 ~ 113.15(0.35)	0.25	2.0	<1.0	0.16	N-S Veinlets
MJSN-14	45.00 ~ 47.00(2.00)	0.31	1.7	1.2	0.05	N-S Veinlets
	57.00 ~ 58.00(1.00)	0.16	2.0	<1.0	0.18	N-S Veinlets
	69.60 ~ 71.50(1.90)	0.30	6.0	2.7	0.03	N-S Veinlets
	123.50 ~ 124.80(1.30)	0.20	2.0	2.8	0.04	N-S Veinlets
	127.90 ~ 129.30(1.40)	0.22	9.0	2.6	0.06	N-S Veinlets
	129.30 ~ 130.50(1.20)	0.19	0.5	<1.0	0.02	N-S Veinlets
	137.30 ~ 137.80(0.50)	0.08	1.8	2.2	0.10	N-S Veinlets
	148.10 ~ 148.30(0.20)	0.03	1.8	<1.0	0.28	N-S Veinlets
	150.80 ~ 152.00(1.20)	0.19	1.6	1.2	0.08	N-S Veinlets
	155.80 ~ 158.20(2.40)	0.38	2.2	3.1	0.14	N-S Veinlets

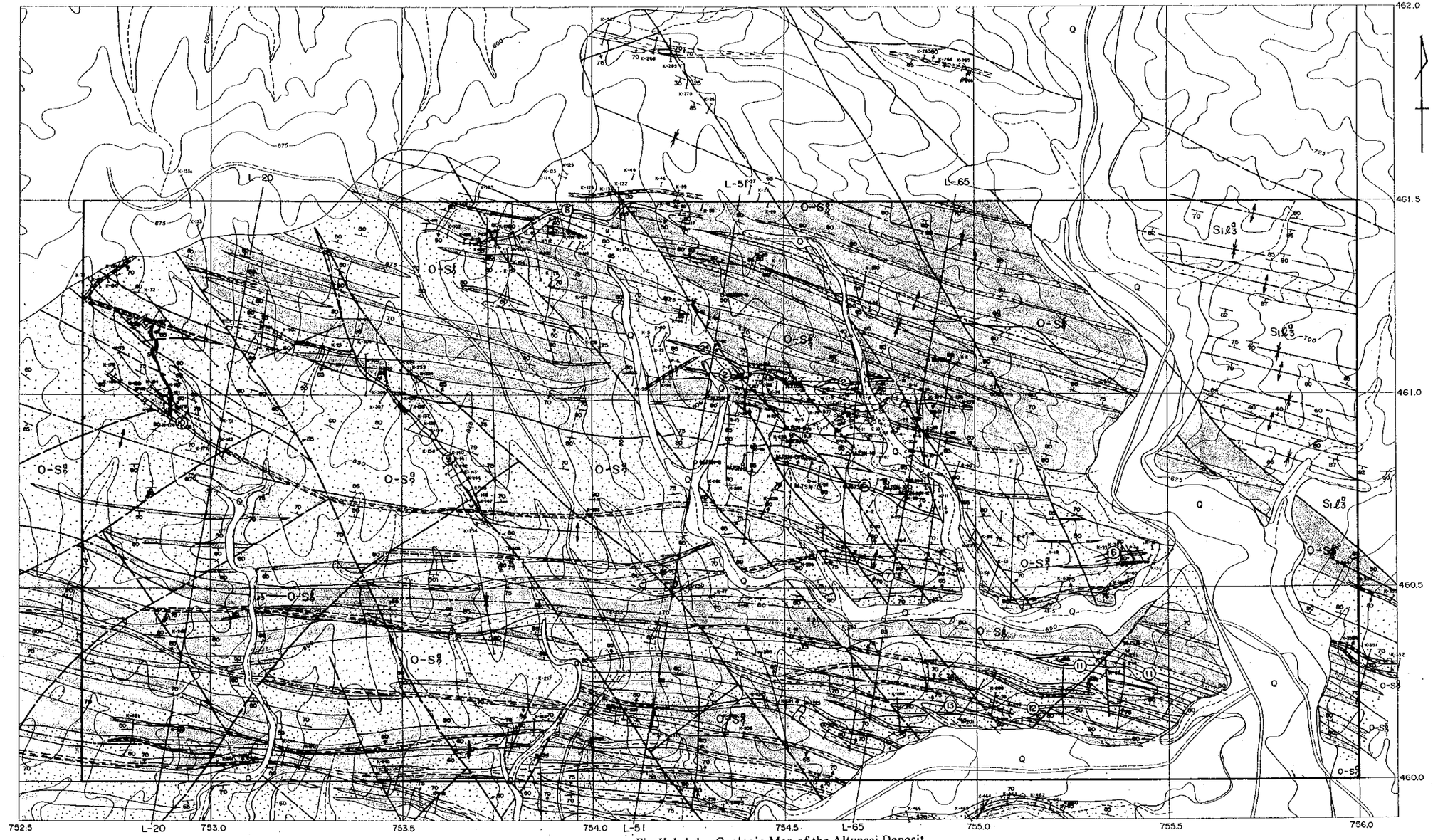


Fig.II-1-1-1 Geologic Map of the Altynsai Deposit

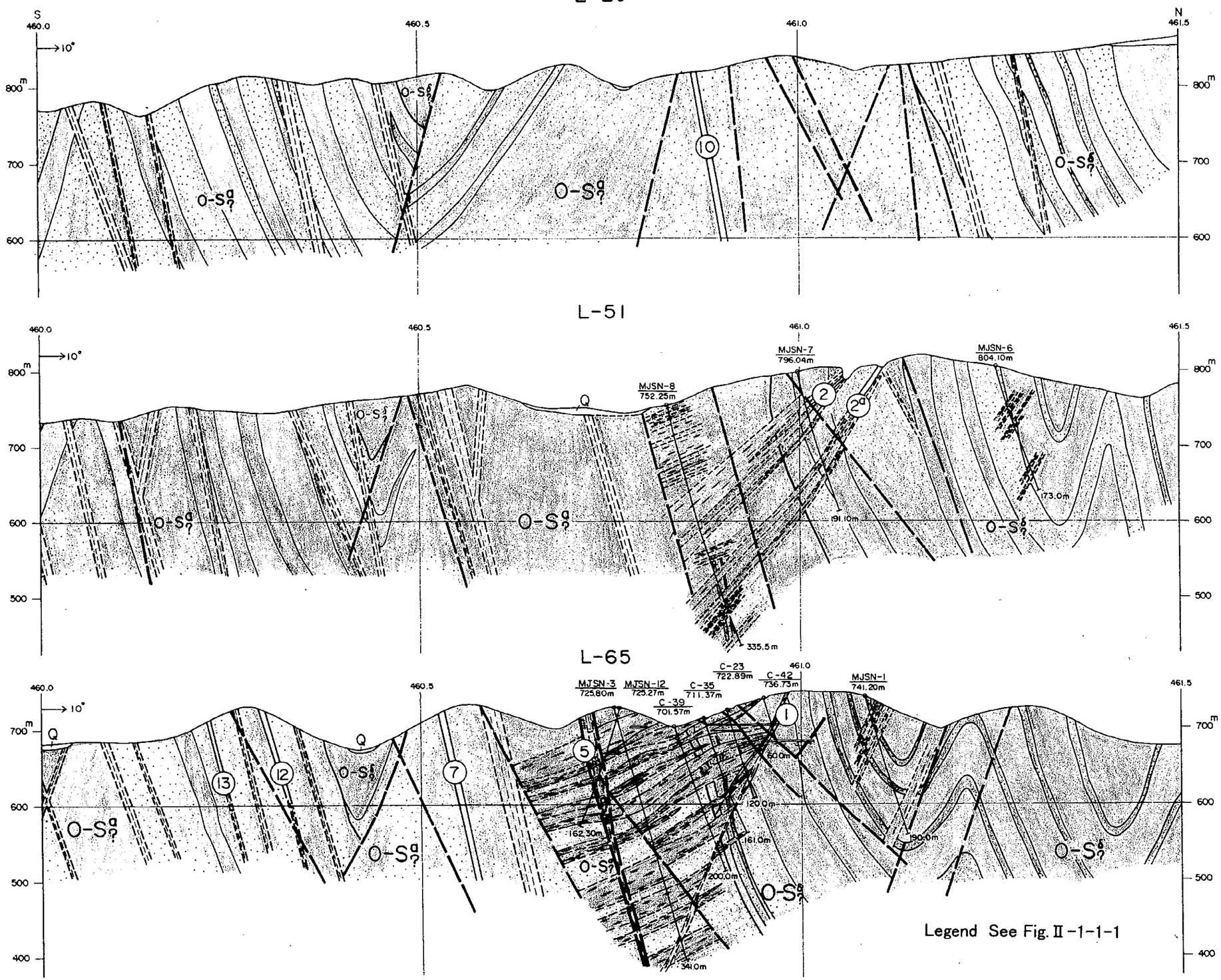


Fig.II-1-1-2 Geologic Cross Sections of the Altynsai Deposit

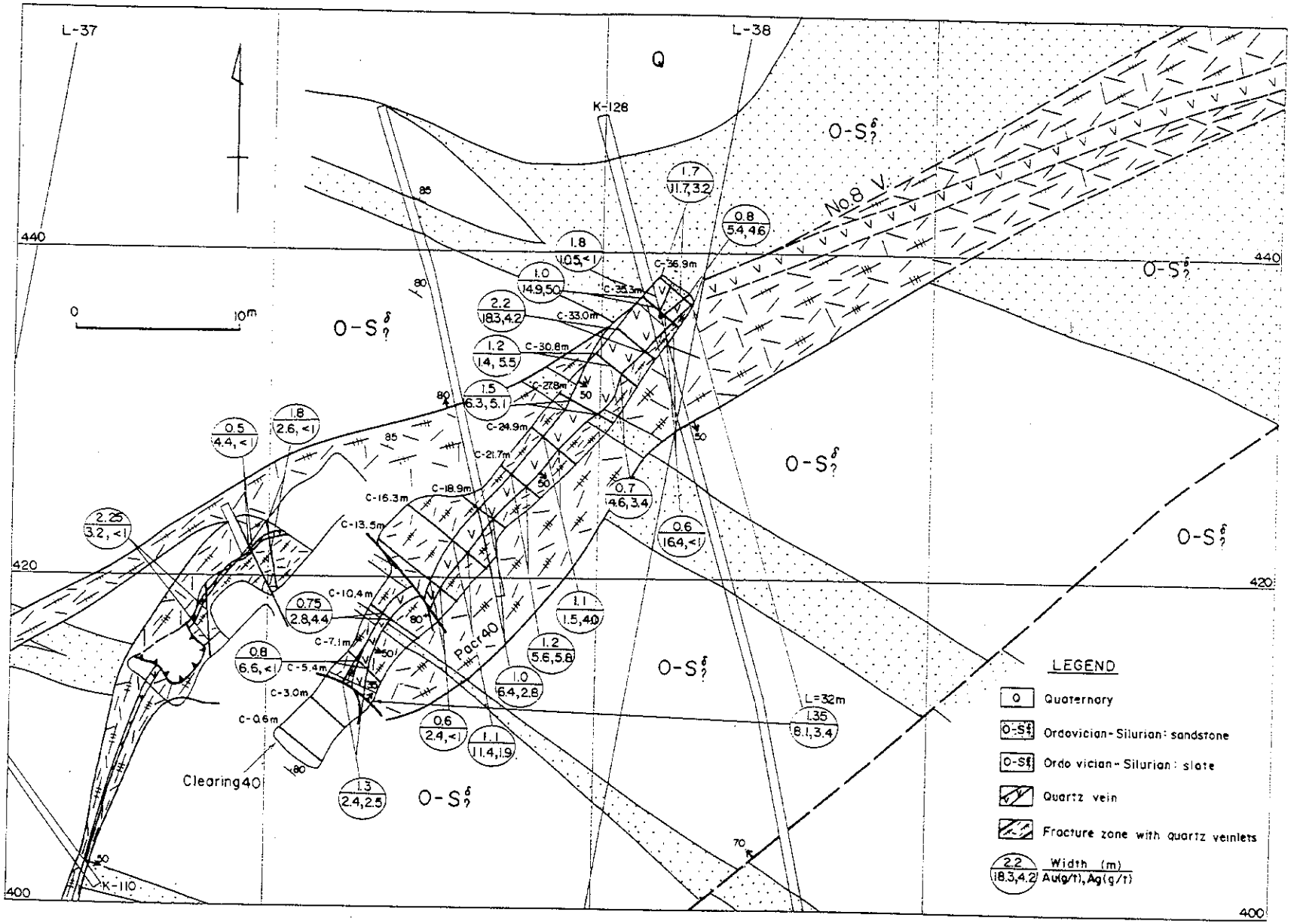


Fig.II-1-1-3 Geologic Map of Northwestern Vein (No.8 Vein)

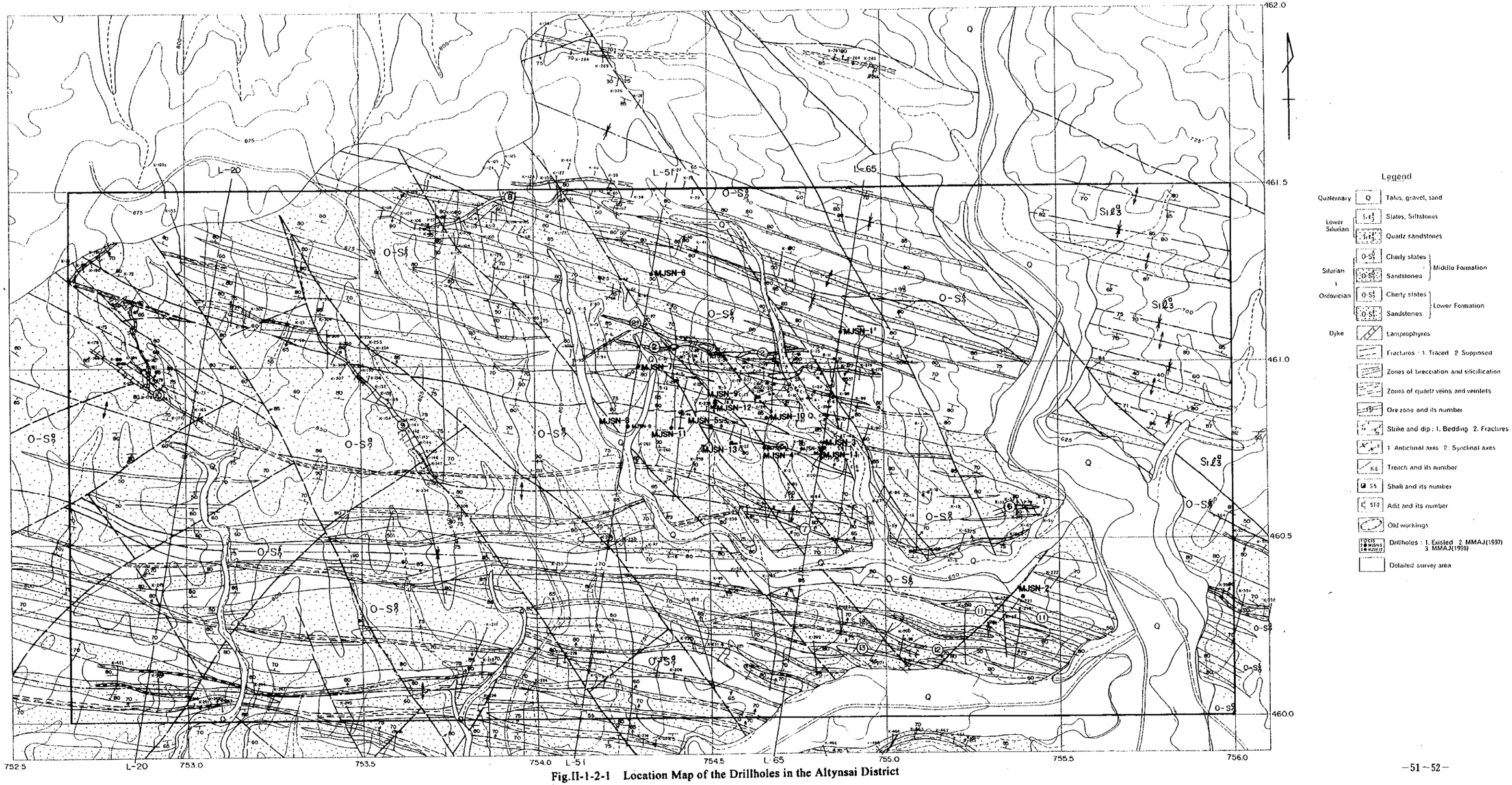


Fig.II-1-2-1 Location Map of the Drillholes in the Altynsai District

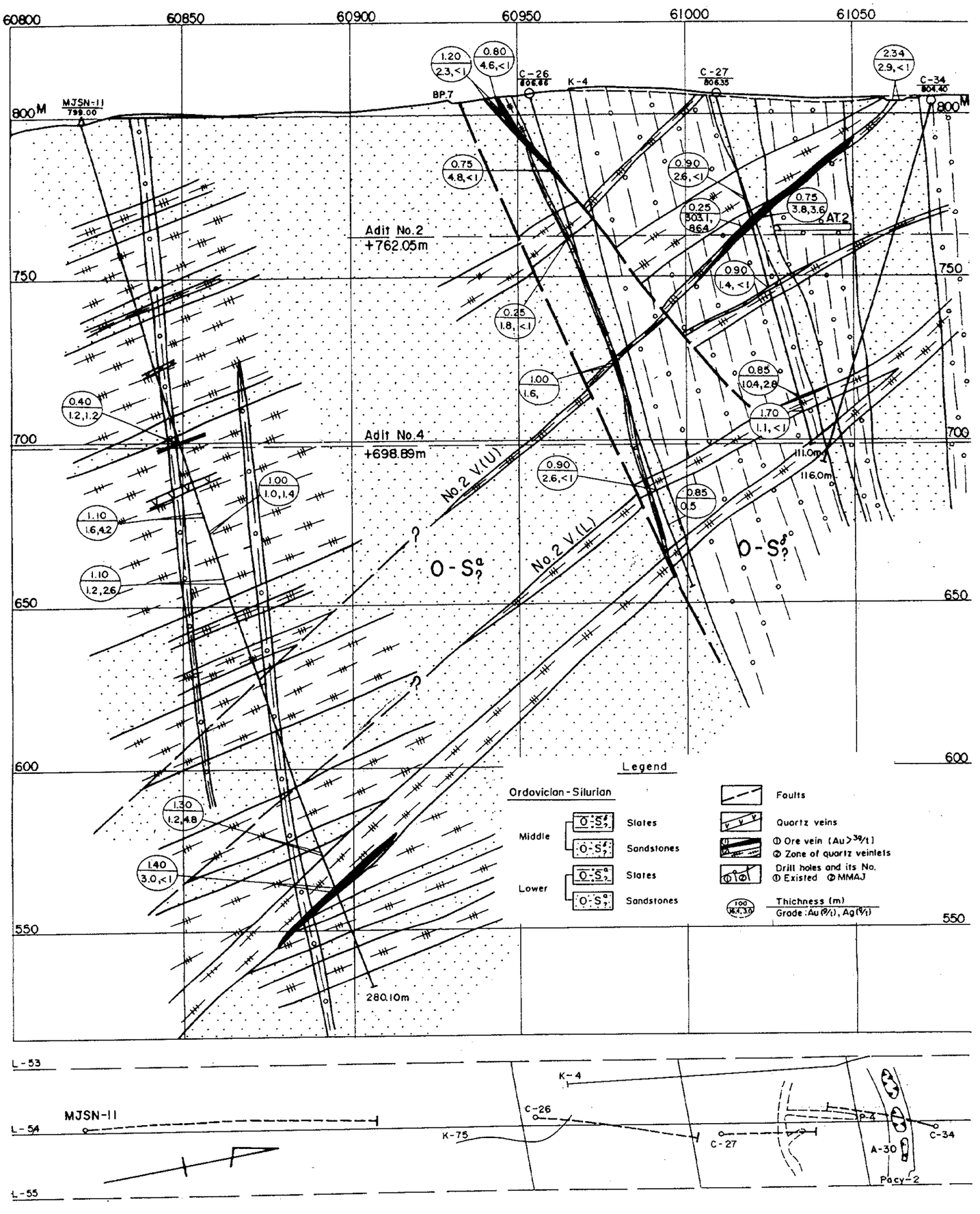


Fig.II-1-2-2 Geologic Cross Section along MJSN-11 (L-54)

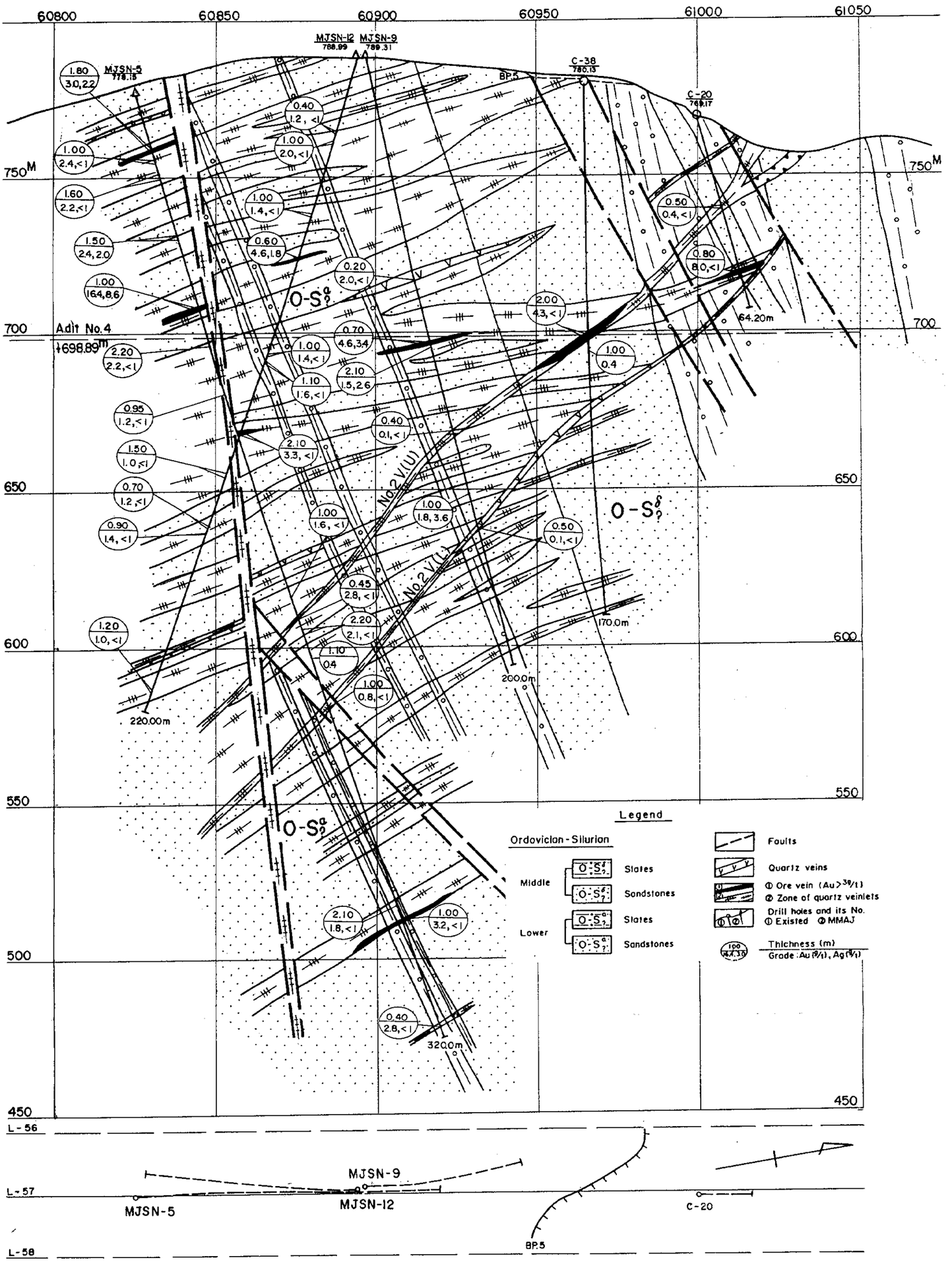


Fig.II-1-2-3 Geologic Cross Section along MJSN-5, 9 and 12 (L-57)

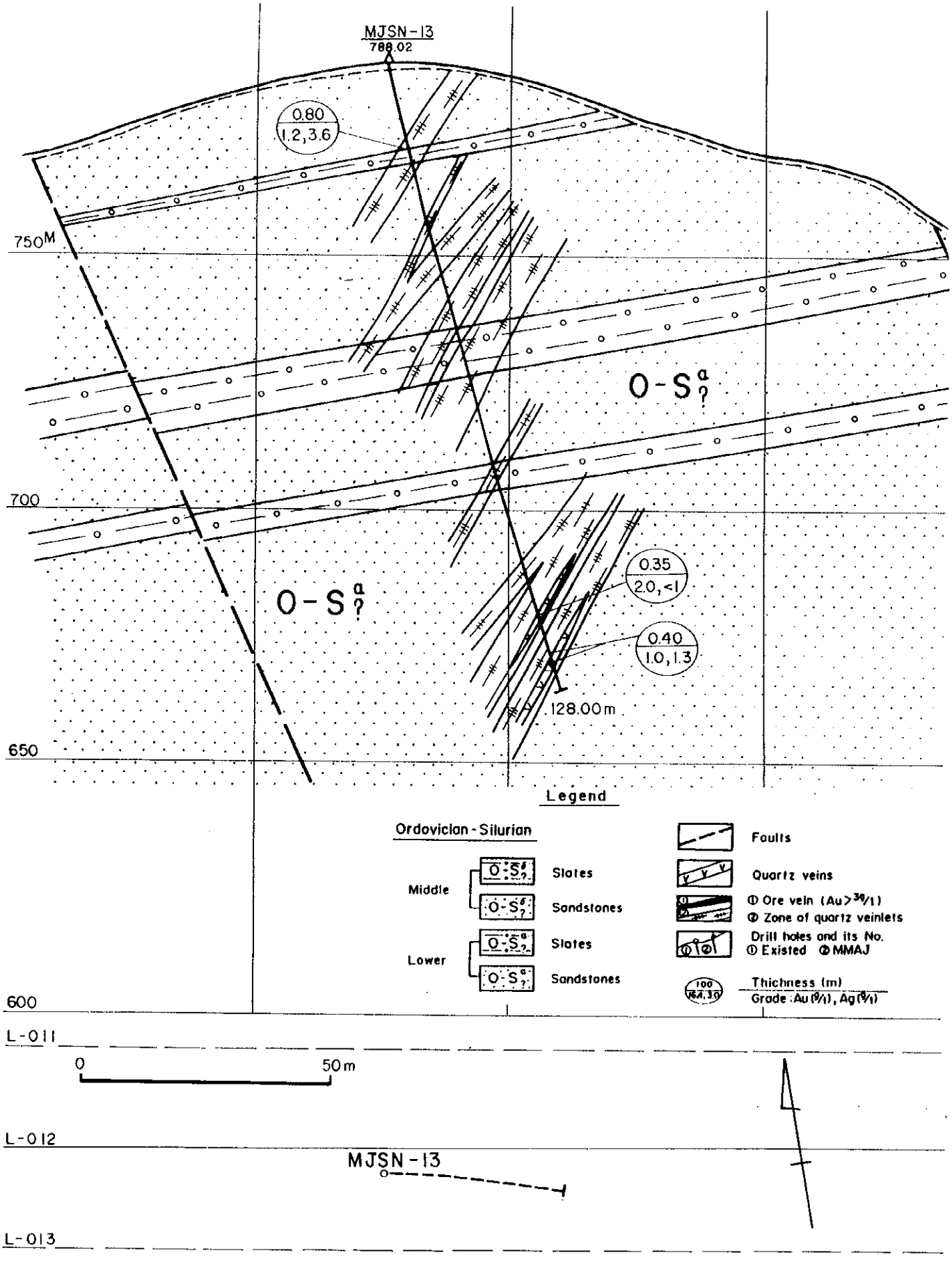


Fig.II-1-2-4 Geologic Cross Section along MJSN-13 (L-012)

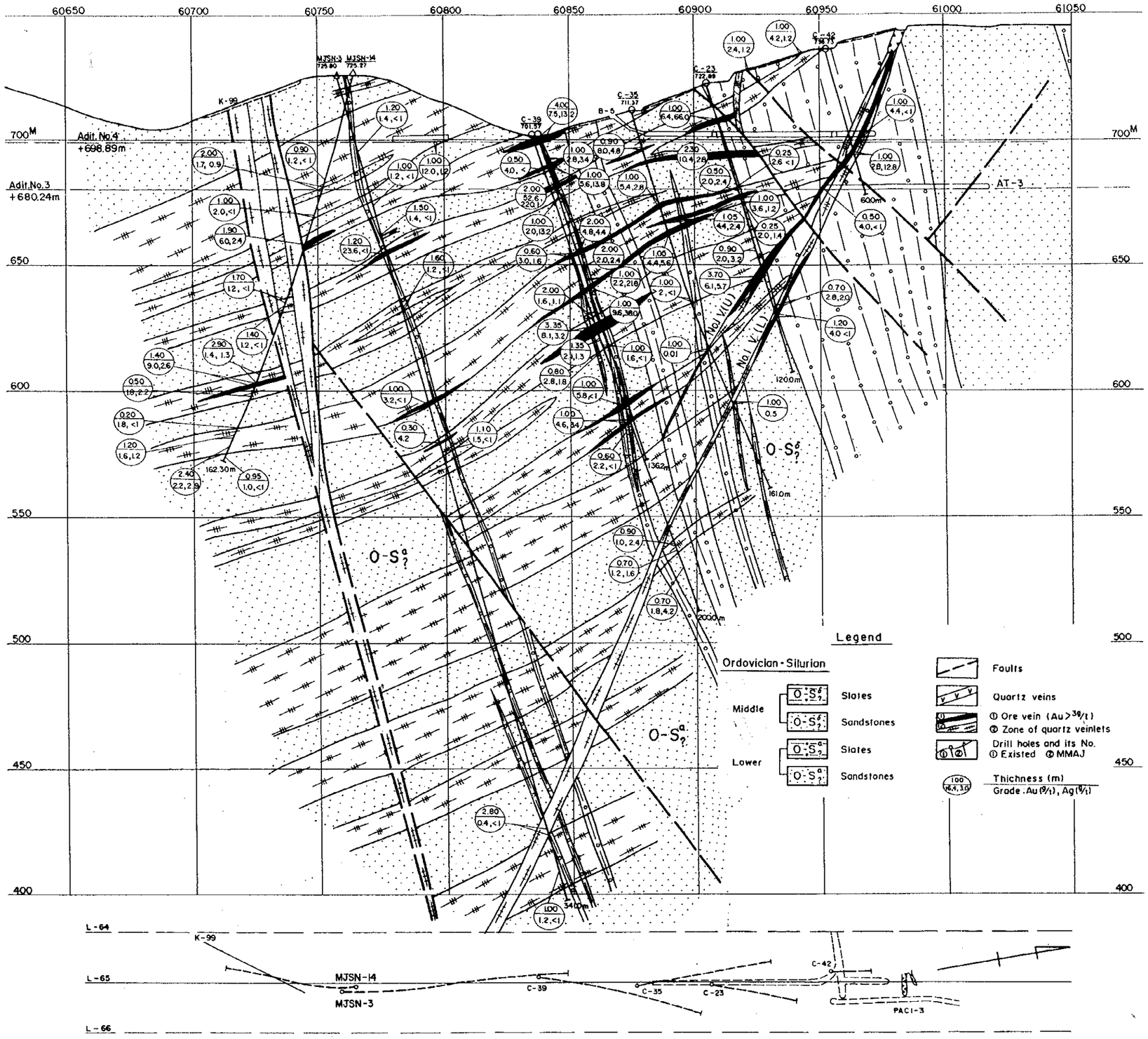


Fig.II-1-2-5 Geologic Cross Section along MJSN-3 and 14 (L-65)

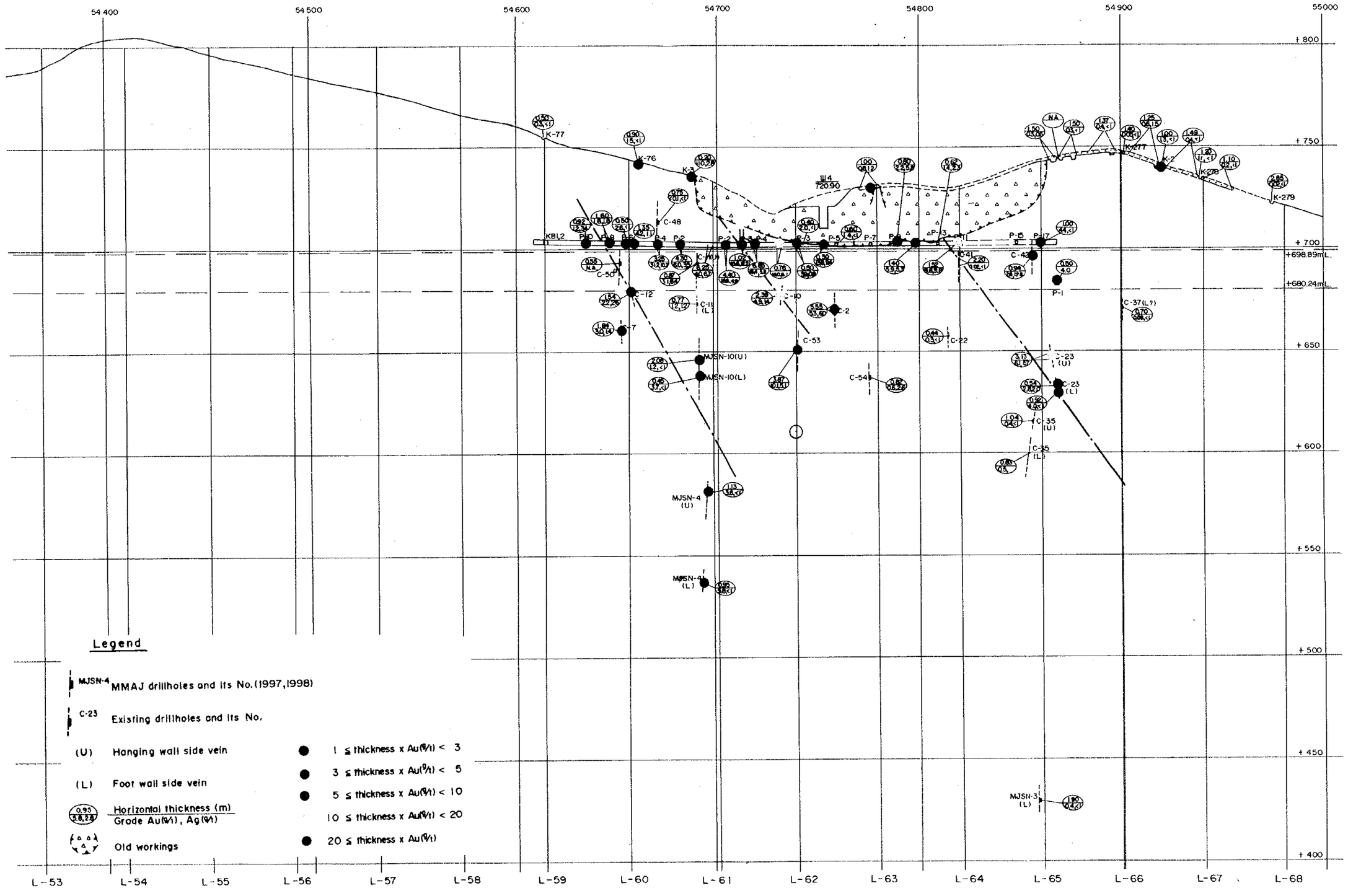


Fig II-1-2-6 Perspective Section for Altynsai No.1 Vein

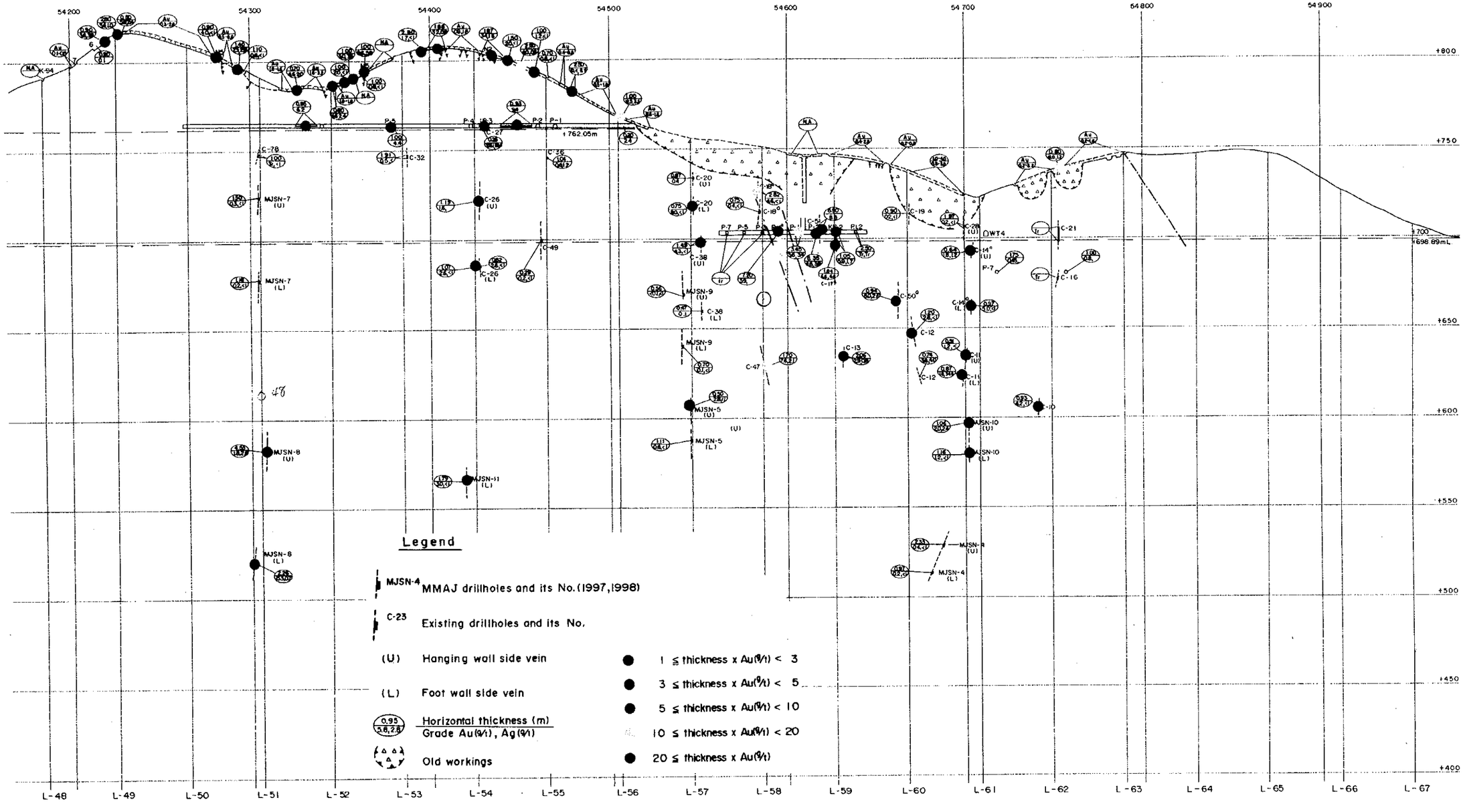


Fig II-1-2-7 Perspective Section for Altynsai No.2 Vein

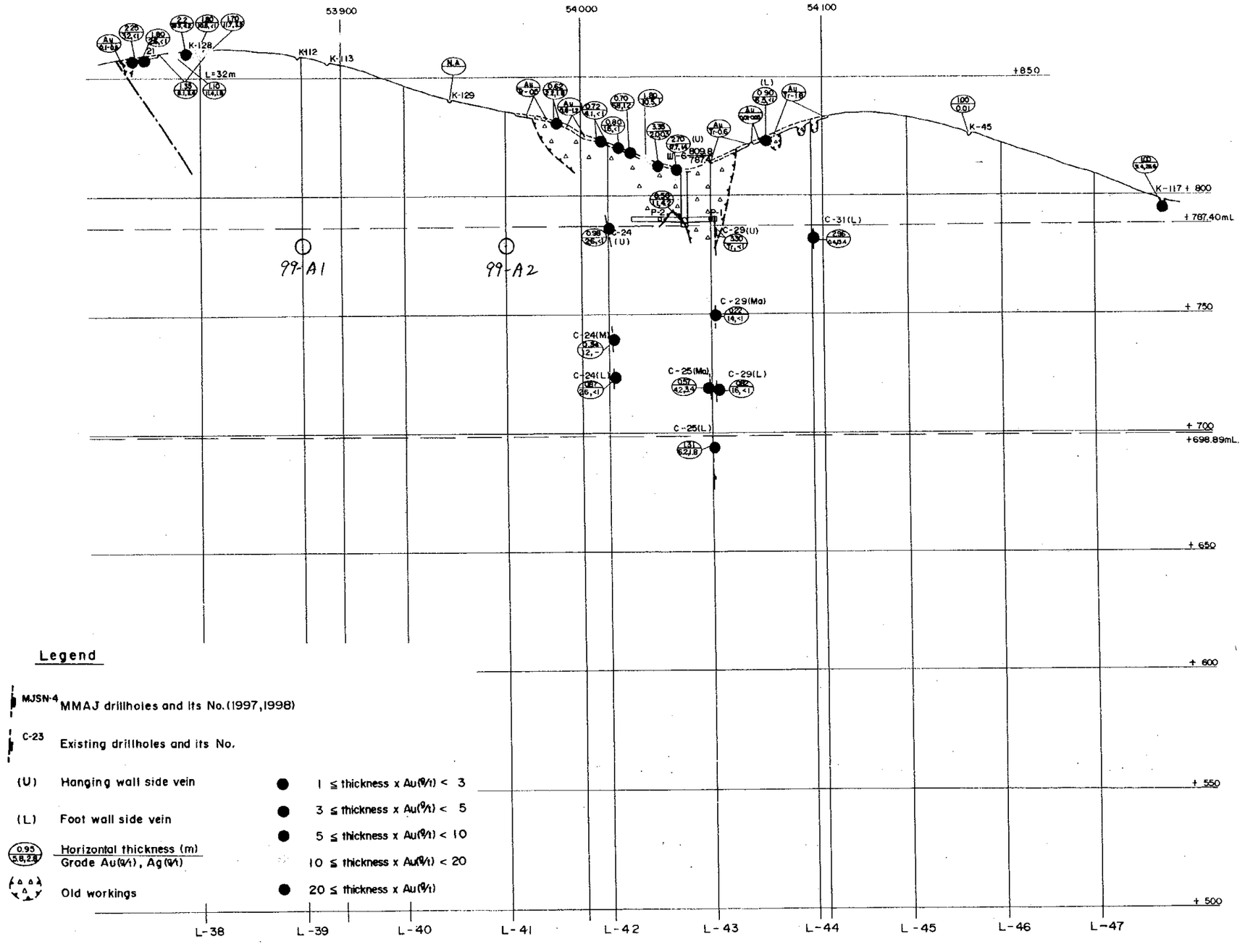
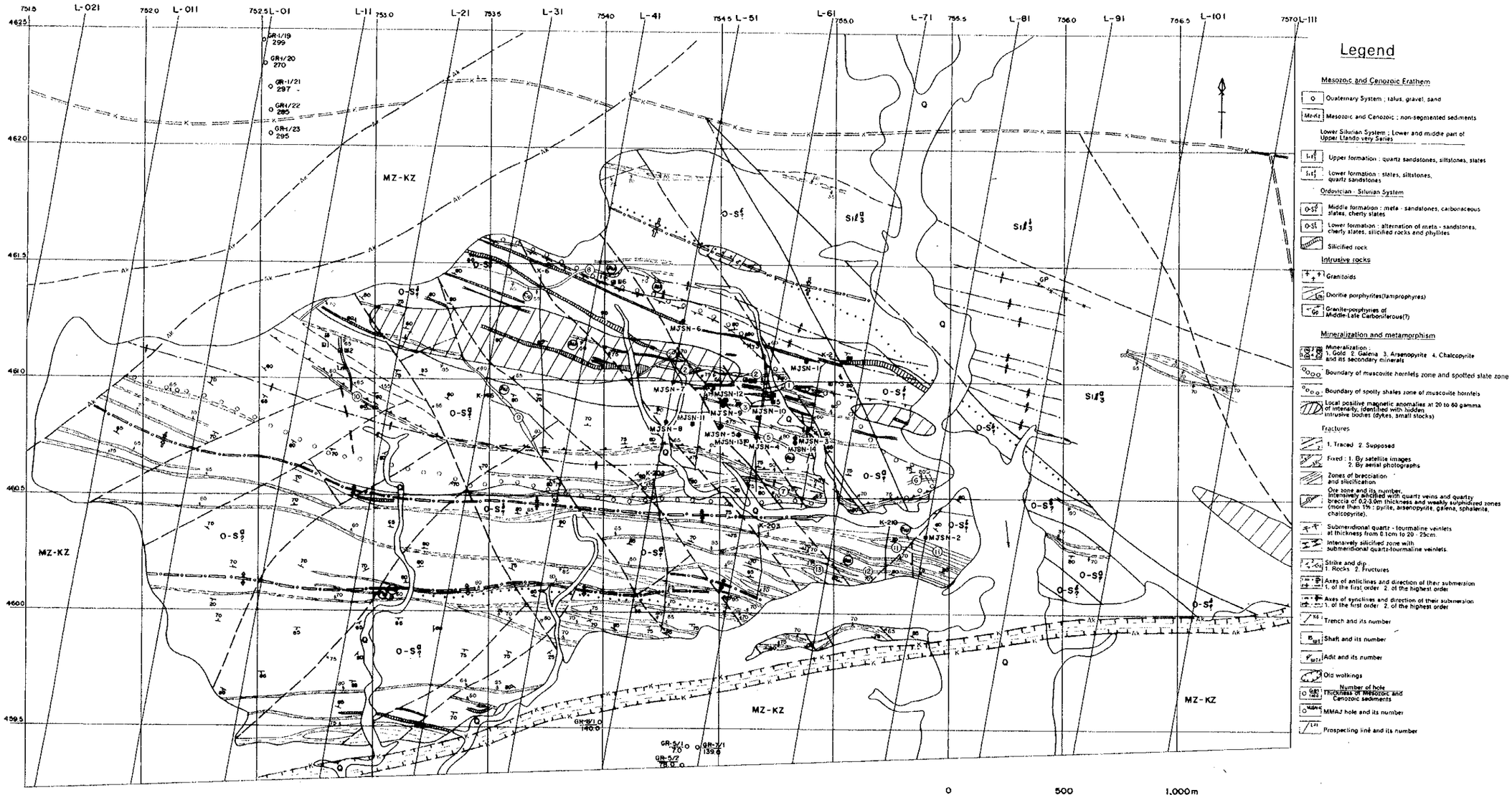


Fig II-1-2-8 Perspective Section for Altynsai No.8 Vein



Legend

Mesozoic and Cenozoic Erathem

- Q — Quaternary System ; talus, gravel, sand
- MZ-KZ — Mesozoic and Cenozoic ; non-segmented sediments

Lower Silurian System ; Lower and middle part of Upper Llando very Series

- S_2^2 — Upper formation : quartz sandstones, siltstones, slates
- S_2^1 — Lower formation : slates, siltstones, quartz sandstones

Ordovician - Silurian System

- $O\text{-}S_1^3$ — Middle formation : meta - sandstones, carbonaceous slates, cherty slates
- $O\text{-}S_1^2$ — Lower formation : alternation of meta - sandstones, cherty slates, silicified rocks and phyllites
- Silicified rock

Intrusive rocks

- Granitoids
- Dp — Dioritic porphyrites(lamprophyres)
- GP — Granite-porphyries of Middle-Late Carboniferous(?)

Mineralization and metamorphism

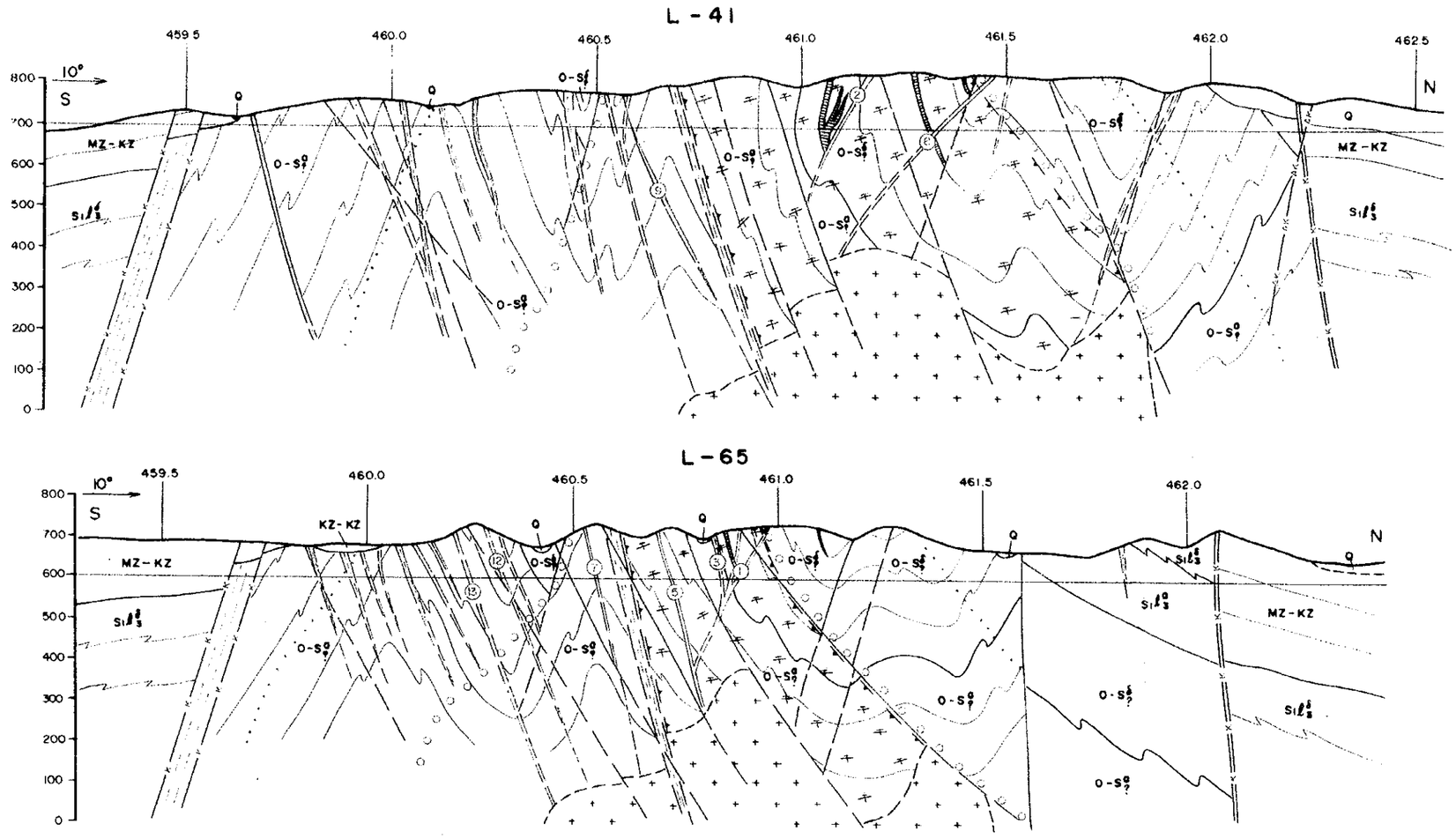
- Mineralization : 1. Gold 2. Galena 3. Arsenopyrite 4. Chalcopyrite and its secondary minerals
- Boundary of muscovite hornfels zone and spotted slate zone
- Boundary of spotty shales zone of muscovite hornfels
- Local positive magnetic anomalies at 20 to 60 gamma of intensity, identified with hidden intrusive bodies (dykes, small stocks)

Fractures

- 1. Traced 2. Supposed
- Fixed : 1. By satellite images 2. By aerial photographs
- Zones of brecciation and silicification
- Ore zone and its number, intensively silicified with quartz veins and quartzy breccia of 0.2-3.0m thickness and weakly sulphidized zones (more than 1% : pyrite, arsenopyrite, galena, sphalerite, chalcopyrite).
- Submeridional quartz - tourmaline veinlets at thickness from 0.1cm to 20 - 25cm.
- Intensively silicified zone with submeridional quartz-tourmaline veinlets.
- Strike and dip 1. Rocks 2. Fractures
- Axes of anticlines and direction of their submersion 1. of the first order 2. of the highest order
- Axes of synclines and direction of their submersion 1. of the first order 2. of the highest order
- Trench and its number
- Shaft and its number
- Adit and its number
- Old workings
- Number of hole / Thickness of Mesozoic and Cenozoic sediments
- MMAJ hole and its number
- Prospecting line and its number

Fig.II-1-3-1 Integrated Interpretation Map of the Altynsai Deposit

(modified after V.A. Shebchenko; 1997)



Legend

Mesozoic and Cenozoic Erathem

- Q — Quaternary System: talus, gravel, sand
- Mz Kz — Mesozoic and Cenozoic: non-segmented sediments
- Lower Silurian System: Lower and middle part of Upper Llando very Series
  - Upper formation: quartz sandstones, siltstones, slates
  - Lower formation: slates, siltstones, quartz sandstones
- Ordovician - Silurian System
  - Middle formation: meta - sandstones, carbonaceous slates, cherty slates
  - Lower formation: alternation of meta - sandstones, cherty slates, silicified rocks and phyllites
- Silicified rock

Intrusive rocks

- Granitoids
- Dr — Diorite porphyrites(lamprophyres)
- Gr — Granite-porphyries of Middle-Late Carboniferous(?)

Mineralization and metamorphism

- Mineralization: 1 Gold 2 Galena 3 Arsenopyrite 4 Chalcopyrite and its secondary minerals
- Boundary of muscovite hornfels zone and spotted slate zone
- Boundary of spotty shales zone of muscovite hornfels
- Local positive magnetic anomalies at 20 to 60 gamma of intensity, identified with hidden intrusive bodies (dykes, small stocks)

Fractures

- 1 Traced 2 Supposed
- Fixed: 1 By satellite images 2 By aerial photographs
- Zones of brecciation and silicification
- Ore zone and its number: intensively silicified with quartz veins and quartz breccia of 0.2-3.0m thickness and weakly sulphidized zones (more than 1% pyrite, arsenopyrite, galena, sphalerite, chalcopyrite)
- Submeridional quartz - tourmaline veinlets at thickness from 0.1cm to 20 - 25cm
- Intensively silicified zone with submeridional quartz-tourmaline veinlets

- Strike and dip: 1 Rocks 2 Fractures
- Axes of anticlines and direction of their submersion: 1 of the first order 2 of the highest order
- Axes of synclines and direction of their submersion: 1 of the first order 2 of the highest order
- Trench and its number
- Shaft and its number
- Adit and its number
- Old workings
- Number of hole / Thickness of Mesozoic and Cenozoic sediments
- MM4 - hole and its number
- Prospecting line and its number

(modified after V.A. Shebchenko; 1997)

Fig.II-1-3-2 Integrated Interpretation Cross Sections of the Altynsai Deposit