Table II-2-3 Ore Deposits and Ore-showings in Nuhut-dawaa District(2)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%, Au.Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK (youngest)	DISCOVERY AND NOTES
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
BAYAN-UUL	Be (Beryl)	pegma-tite	—	beryl max.70%				1	12～15×6～8 m	○	○	—	—	—			
TSAGAAN-CHULUUT	W	Qz-V	—	W<1 %				7 veins	15～20×60	○	○	—	—	—			
MUNGUT	W, Mo	Qz-V	—	W <0.04 %, Mo < 1 %				10 veins	1.5 ～3 ×300	○	○	—	—	—			
NUHUTIIN	W	Qz-V		WO_3 0.04 ～ 0.13 %				10 veins	0.1 ～2.5 (width)	○	○	—	—	—			abandened
ULT-GROUP	W	Greiz	—	WO_3 0.01 ～ 0.06 %				4 zones	ϕ <100m	○	○	○	○	—			1970 abandoned
SAIHHAN-ULA	W	Qz-V	—	WO_3 0.18 ～ 0.5 %				42 veins	0.25～0.3 ×25～50	○	○	—	—	—			1954 abandoned
TARVAGA-TAI	Mo, W	Greiz	—	WO_3 < 0.08 Mo < 1				2 zones	120 × 5 170 ×10	○	○	○	○	—			
UVR-BAYAN	Mo, W	Greiz	—	WO_3 0.04 ～ 0.1, Mo 0.1～0.3				2 zones	300 ×30 220 ×210	○	○	○	○ 200～250m	—			
DZURH-OVOO	Mo, Sn	Garnet-Skarn	—	Mo 0.003 Sn 0.008				1	300 ×200								

Table Ⅱ-2-3 Ore Deposits and Ore-showings in Nuhut-dawaa District(3)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%, Au.Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK (youngest)	DISCOVERY AND NOTES
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
BAYAN-UUL	Be (Beryl)	pegma-tite	—	beryl max. 70%				1	12～15× 6～8 m	○	○	—	—	—			
TSAGAAN-CHULUUT	W	Qz-V	—	W<1 %				7 veins	15～20× 60	○	○	—	—	—			
MUNGUT	W, Mo	Qz-V	—	W <0.04 %, Mo < 1 %				10 veins	1.5 ～3 ×300	○	○	—	—	—			
NUHUTIIN	W	Qz-V		WO_3 0.04 ～ 0.13 %				10 veins	0.1 ～2.5 (width)	○	○	—	—	—			abandened
ULT-GROUP	W	Greiz	—	WO_3 0.01 ～ 0.06 %				4 zones	ϕ <100m	○	○	○	○	—			1970 abandoned
SAIHHAN-ULA	W	Qz-V	—	WO_3 0.18 ～ 0.5 %				42 veins	0.25～0.3 ×25～50	○	○	—	—	—			1954 abandoned
TARVAGA-TAI	Mo, W	Greiz	—	WO_3 < 0.08 Mo < 1				2 zones	120 × 5 170 ×10	○	○	○	○	—			
UVR-BAYAN	Mo, W	Greiz	—	WO_3 0.04 ～ 0.1. Mo 0.1～0.3				2 zones	300 ×30 220 ×210	○	○	○	○ 200～250m	—			
DZURH-OVOO	Mo, Sn	Garnet-Skarn	—	Mo 0.003 Sn 0.008				1	300 ×200								

2-3-5 Ore deposits

Major ore deposits in Nuhut-dawaa District are exhibited in Table II-2-3.

2-3-6 Observation

The greisen-type deposit in this district have been explored intensively and repeatedly with every method. Consequently, some of the deposits have exhausted while major mineral indications including those of low grades have been clarified almost completely by drilling and tunneling surveys. As these greisen deposits have mineralized portions partially cropping out, it is presumed that major deposits have already been known, leaving little chances for new discovery.

2-4 Har-airag District

2-4-1 Location and access

Har-airag District, approx. 200km east to west and 100km north to south, spreads over the three Aimags: Dundgoivi, Dornogovi and Hentii.

A railroad connecting the Trans-Siberian Railroads and Tianjin, China, which crosses Mongolia(Trans-Russia • Mongolia • China Rail-road) runs through the southwestern part of the district. This rail-road links the district with Ulaan Baatar. Har-airag and Bor-undur Mines, some 45km away, are linked by a branch line of the mentioned railroad. Surface transportation from Ulaan Baatar to this district is an eight to ten hour's journey by a car running on wheel tracks in the steppe.

2-4-2 Topogrphy and drainage system

The district lies on Eastern Mongolian Highlands, the highest peak of which is Mt. Sumber, 1,715m alt. and about 45km north of Bor Undur. Topographically, the altitude decreases towards southwest and northeast to form gentle hilly zones with elevation of 1,000 to 1,200m.

The drainage system of this district is divided by a watershed north of Bor-undur into two groups, ie., a group flowing south-wards into Govi Lowlands and the other flowing northwards into the Kherlen River. Owing to little precipitation, the district has no perennial river. Valley patterns are often dendritic, reflecting the fact that igneous rock is dominant in the district.

2-4-3 Climate and vegetation

The average annual temperature is -0.5 ~1 ℃; number of frost-less days is 105-115 in a year; and the annual maximum and minimum temperatures are 35.6 ℃ and -38.3℃, respectivery. Annual precipitation is 170-210mm. The Precipitation is higher in summer and lower in winter. During the two months of April and May, it is especially windy; number of sandstorm days is about 24 days in a year.

The district is covered by semi-arid steppe or semi-desert.

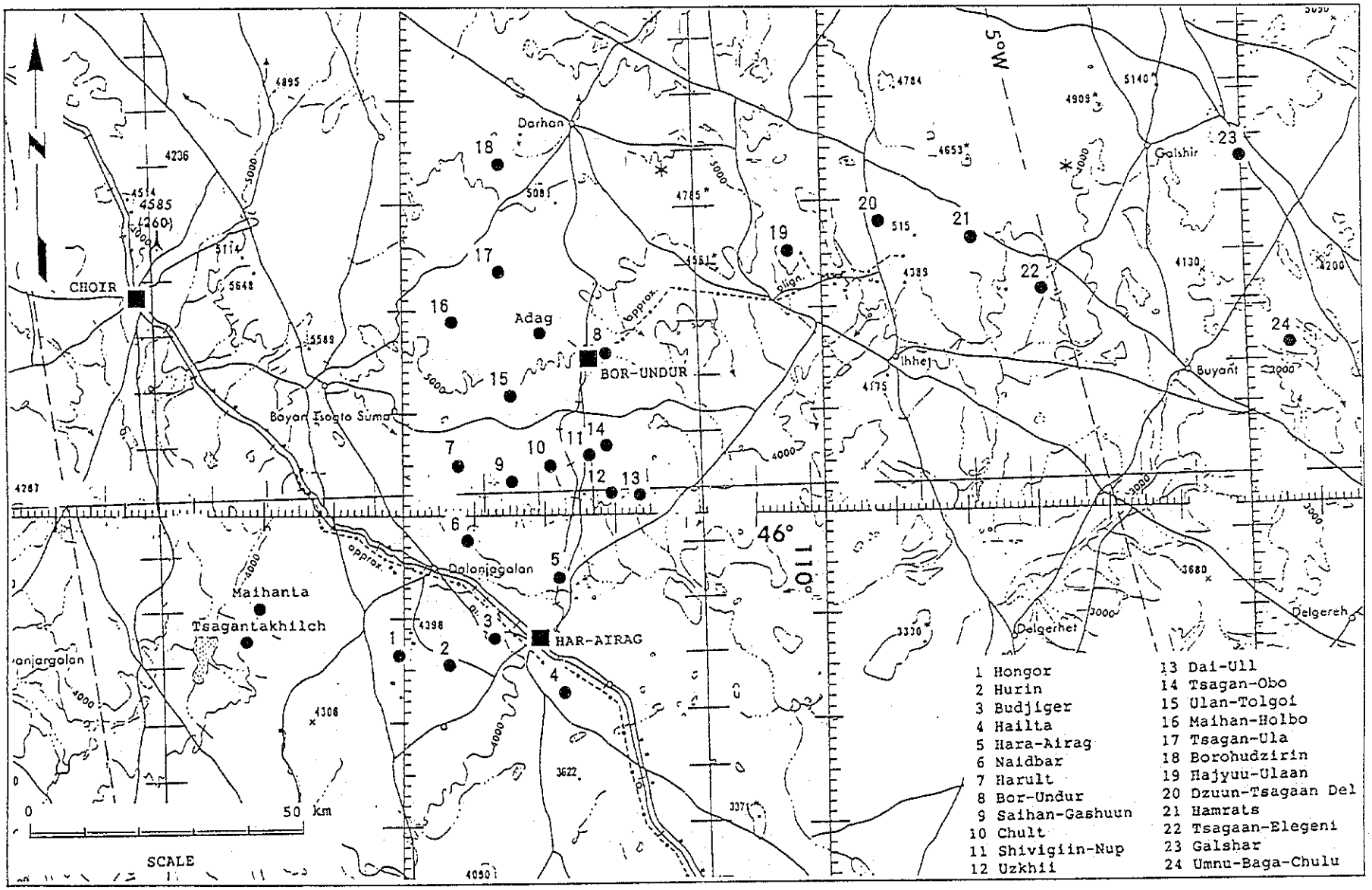


Fig. Ⅱ-2-4-1 Location Map of Fluorite Deposits in Har-airag District (phase Ⅰ)

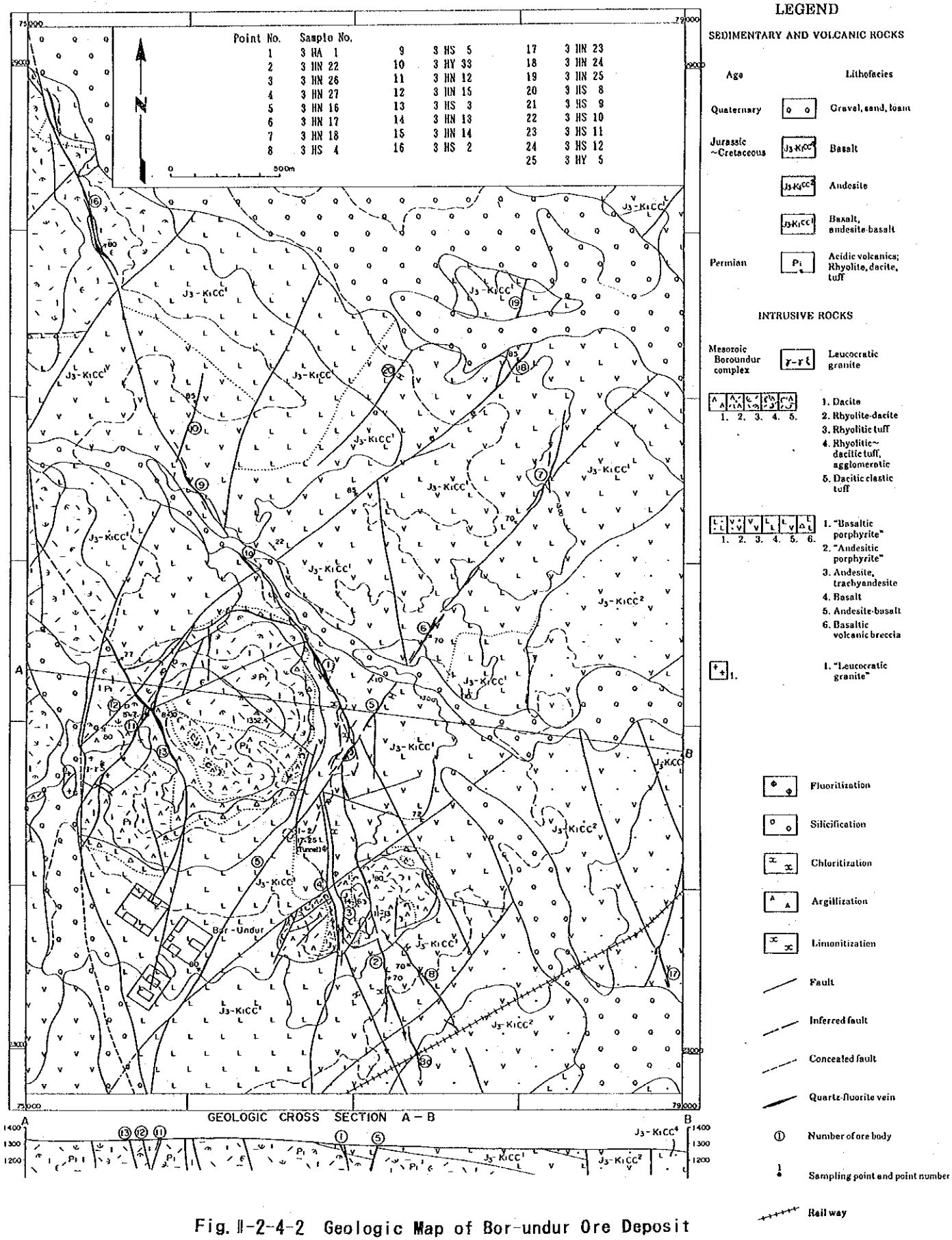


Fig. Ⅱ-2-4-2 Geologic Map of Bor-undur Ore Deposit

Table Ⅱ-2-4 Ore Deposits and Ore-showings in Har-airag District(1)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%. Au.Ag:g/t)	LOCATION LONGITUDE	LATITUDE	ALT	NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE SUR	TRC	DRL	ADT	EPT	AGE OF DEPOSIT (Ma)	HOST ROCK (youngest)	DISCOVERY AND NOTES
* BOR-UNDUR	CaF_2	Vein Qz-Fl	20.9	CaF_2 39.1 %	109°25′18″ 109°26′16″	46°15′21″ 46°16′19″	1,250 1,333	33	W: 1～18 L: 200～500 H: 100～400	○	○	○	○	○	Cretaceous	Basalt, Qp. Granite	1956 USSR production 210,000t/y CaF_2 32%
* ADAG	CaF_2	Vein Qz-Fl	4.0 (B+C_1) + 6.0 (C_2)	CaF_2 40 %	109°19′32″	46°17′44″	1,500	3	4 ×2,800 ×250 Max width 13～18m	○	○	○	○	○	Cretaceous	Granite, Qp	? production 60,000t/y CaF_2 27% ～29 %
* CHOL-TSAGAAN-DEL	CaF_2	Vein Qz-Fl	1.4	CaF_2 40～53 %	107°14′21″	46°55′48″	1,440	8	width: 3～4m length: 100 ～200 ?	○	○	○	○	○	Cretaceous	Phyl, Sch, Dol, Ls	1978 USSR production 60,000t/y CaF_2 40% ～53 %
* HONGOR I II III TOTAL	CaF_2	Vein Qz-Fl	0.24 0.66 0.47 1.37	CaF_2 34.0 % CaF_2 29.3 % CaF_2 33.0 % CaF_2 31.4 %	109°44′51″ 109°46′01″ 108°53′58″ 109°15′00″	45°48′17″ 45°48′20″ 45°47′58″ 45°47′35″	1,250 1,220 1,240	1 22 3 2	680x4x65 100x31max 680x6.9 240x5.6	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	Jurassic	Sch, Ls. Protero Carbon	1978 USSR closed, 1977-1979 Product 259,729t crude ore
* MAIHANTA I	CaF_2	Vein Qz-Fl	2.89	CaF_2 36.5 %	108°38′20″	45°49′50″	1,190	3	920x0.6～9.5x320	○	○	○ 36 holes	–	–	?	Gns. Ls. Protero.	1971 USSR Abandoned difficulty in ore-dressing
II		Cal-Fl	0.20	CaF_2 33.1 %	108°39′54″	45°51′22″	1,180	1	350x1.2～4.4x130	○	○	○ 6 holes	–	–	?	Grdp, Dio, Grpo, Late Palaeozoic	
* TSAGAAN-TAKHILCH	CaF_2	Vein Qz-Fl	1.82	CaF_2 40.5 %	108°37′36″	45°47′46″	1,215	2	2,000x1.5 x 200	○	○	○	–	–	Jurassic	Gns. Gr. Ls	1971 USSR Abandoned 55 holes 6,800m

Table Ⅱ-2-4 Ore Deposits and Ore-showings in Har-airag District(2)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%, Au,Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK	DISCOVRRY
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
HAMAR-US	CaF_2	Vein Qz-Fl	1.05	CaF_2 47.1 %	110° 10′ 28′	46° 25′ 13′				○	○	○	○	○			Working
DZOON-TSAGAAN-DEL	CaF_2	Vein	1.05	CaF_2 32.1 %	110° 02′ 18′	46° 22′ 12′				○	○	○	○	○			Working
TSAGAAN-ELEGENI	CaF_2	Vein	1.10	CaF_2 46.0 %	30km southeast from Dzoon-Tsagaan-del					○	○	○					
HAJUU-ULAAN	CaF_2	Vein	0.58	CaF_2 39.0 %	109° 52′ 05′	46° 19′ 24′				○	○	○					
BUDJIGER	CaF_2	Vein	0.38	CaF_2 37.9 %	109° 10′ 30′	46° 48′ 25′				○	○	○					
HAILTA	CaF_2	Vein	0.03	CaF_2 47.1 %	109° 21′ 50′	45° 45′ 07′				○	○	○					

2-4-4 Geology

The geology is composed of Proterozoic gneiss-crystalline schist, crystalline limestone, Carboniferous rhyolite, Permian granite, granite porphyry, granodiorite porphyry, Jurassic biotite-granite, Cretaceous basalt, quartz porphyry, aplite, aplitic granite, etc. Accompanying the igneous activity, a number of fluorite deposits were formed, which include Bor-undur, Adag, Har-airag, Hongor,etc. The largest of all is Bor-undur with ore reserves exceeding 20 million tons whilst the total fluorite ore reserves of Har-airag district are reported to reach 50 million tons.

2-4-5 Ore deposits

Major ore deposits in the district are listed in Table II-2-4.

2-4-6 Observation

Thanks to the best developed transportation facilities in Uudam Tal Area, Har-airag is the district where geological surveys including exploration of ore deposits have been most advanced in the survey area. In the district, many of Mongolia's major fiuorite deposits including Bor-undur concentrate, to form an enormous metallogenetic province of fluorite. However, as long as the current low prices of fluorite prevails in the western markets, and considering the geographical conditions of Mongolia, it would be extremely difficut for fluorite to be positively taken up as an exploration target. It appears also difficult to take up this district for future survey, in view of the fact that the past intensive surveys repeated in this district using every exploration means have resulted in discovery of fluorite deposits only.

2-5 Lugiin-gol District

2-5-1 Location and access

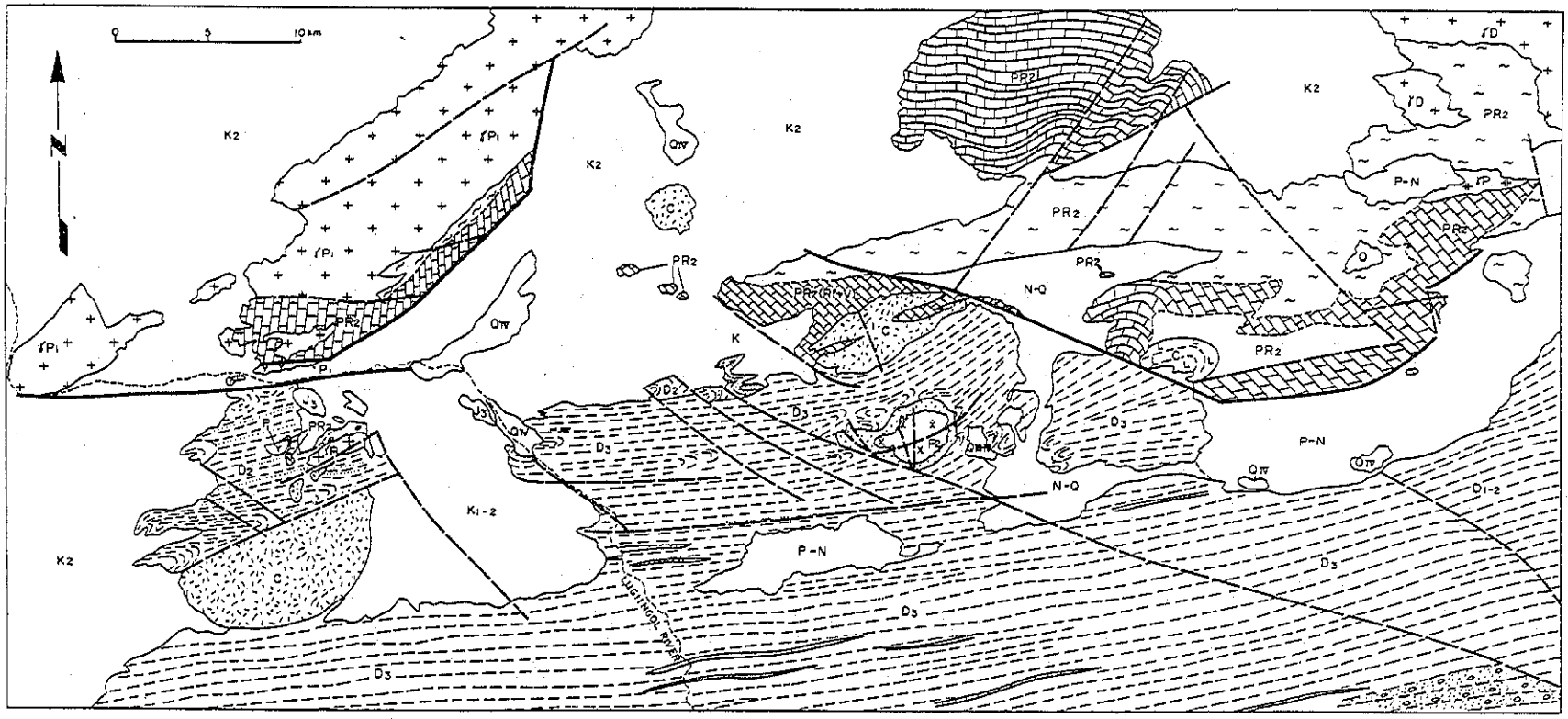
Lugiin-gol District occupies an area of approx. 70km east to west and 50km north to south, located at the southeastern end of the Mongolian Govi Desert. In terms of administrative division, it belongs to Khatanbulag, located some 240km southwest of Sainshand, the capital city of Aimag.

Ulaan Baatar and Sainshand are linked by railroad and a main road, and it takes about 10 hours by car. From Sainshand to Lugiin-gol District, some 300km away, it is a seven and half hours' jouney by car through desert.

2-5-2 Topography and drainage system

The district represents a hilly zone with elevation of 1,040-1,140m, extending in the south side of Govi Lowlands.

Topographically, the district is made up of clastics-filled valleys and monad-nocks with relative height of 100m or so, forming



LEGEND

- Andesite ~ basalt
- Basalt
- Rhyolite, rhyolitic tuff
- Flysch; siltstone, mudstone, sandstone (Lugiingol Formation)
- Sandstone, mudstone
- Sandstone
- Limestone
- Conglomerate
- Basal conglomerate
- Hornfels
- Limestone ~ marble
- "Gneissose granite", gneiss, amphibolite, "greenstone"
- Granite
- Alkali granite (Olon-Ovoot body)
- "Plagio granite" (Ulaan-Zeeg body)
- Nepheline syenite (Lugiingol body)
- Nepheline syenite with sericitization (Lugiingol body)
- Fault
- Inferred fault

Fig. Ⅱ-2-5-1 Geologic Map of Lugiingol District (phase Ⅰ)

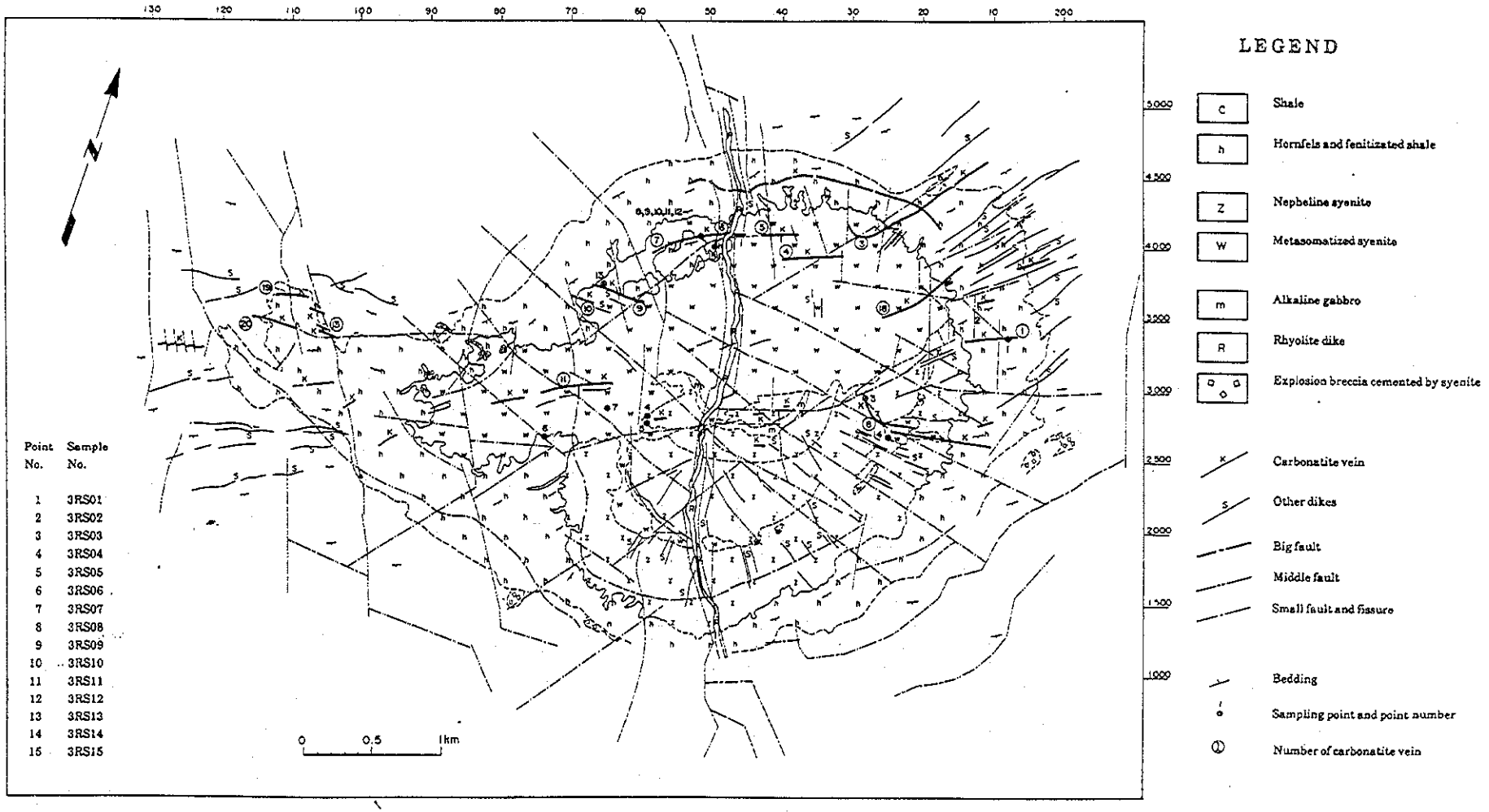


Fig. Ⅱ-2-5-2 Geologic Map of Lugiingol Ore Deposit

Table Ⅱ-2-5 Ore Deposit in Lugiin-gol District

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%, Au.Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK	DISCOVERY
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
LUGIIN-GOL	REE (Carbonatite)	Vein	0.43	TREO 2.86 %	108° 35' 04'	42° 58' 38'		60 carbonatite dikes	27~850× 0.3×250 max.	○	○	○	−	−	Triassic 237±12 229±11 234±12 239±12 242±12	Alkaline rock complex	left

gentle hilly zones.

2-5-3 Climate and vegetation

Climatic conditions are very harsh in this district. As precipitation is minimal throughout a year and strong wind blows in spring, the district represents rocky desert with poor vegetation. Temperature fluctuates from 45℃ to -40℃ in a year. From April to July, it is especially windy; number of sandstorm days in a year is around 30.

2-5-4 Geology

The geology consists of Upper Permian shale-sandstone and intrusives of Lugiin-gol Alkaline Rock Complex of the Jurassic period. The Lugiin-gol Ore Deposit is a vein-type carbonatite deposit containing mainly light rare earths such as lanthanum and cerium, accompanied by the alkali rock complex (nepheline syenite).

2-5-5 Ore deposits

Major ore deposit in this district is listed in Table II-2-5.

2-5-6 Observation

Lugiin-gol Deposit consists of 60 small carbonatite dikes with the average width of 0.3m. The total ore reserves, $C_1 + C_2$ = 436,000t(TREO=2.86%), are too small in size and too low in grade to be considered as economically valuable mineral resources under the current circumstances.

The K-Ar dating of the nepheline syenite in Lugiin-gol Alkali Rock Complex is 228±11-234±12Ma, which is presumed to be Early to Middle Triassic.

2-6 Tsagaan-suvraga District

2-6-1 Location and access

Tsagaan-suvraga District is an area, approx. 200km east to west and 100km north to south, spreading over the three Aimags: Dorno-govi, Dundgovi and Umnugovi.

The Tsagaan-suvrage Deposit, the leading deposit of the district, is located amid the unfrequented Govi Desert, some 180 linear km away from the Trans-Russia • Mongolia • China Railroad and 320 linear km from Dalanzadgad.

The district can be reached from Ulaan Baatar either via Dalanzadgad(Umnugovi) or via Sainshand(Dornogovi). From Ulaan Baatar to Dalanzadgad, air flight takes about one hour and twenty-five minutes, and from there to the district, it is a five to thirteen-hour car ride through semi-desert or desert terrain.

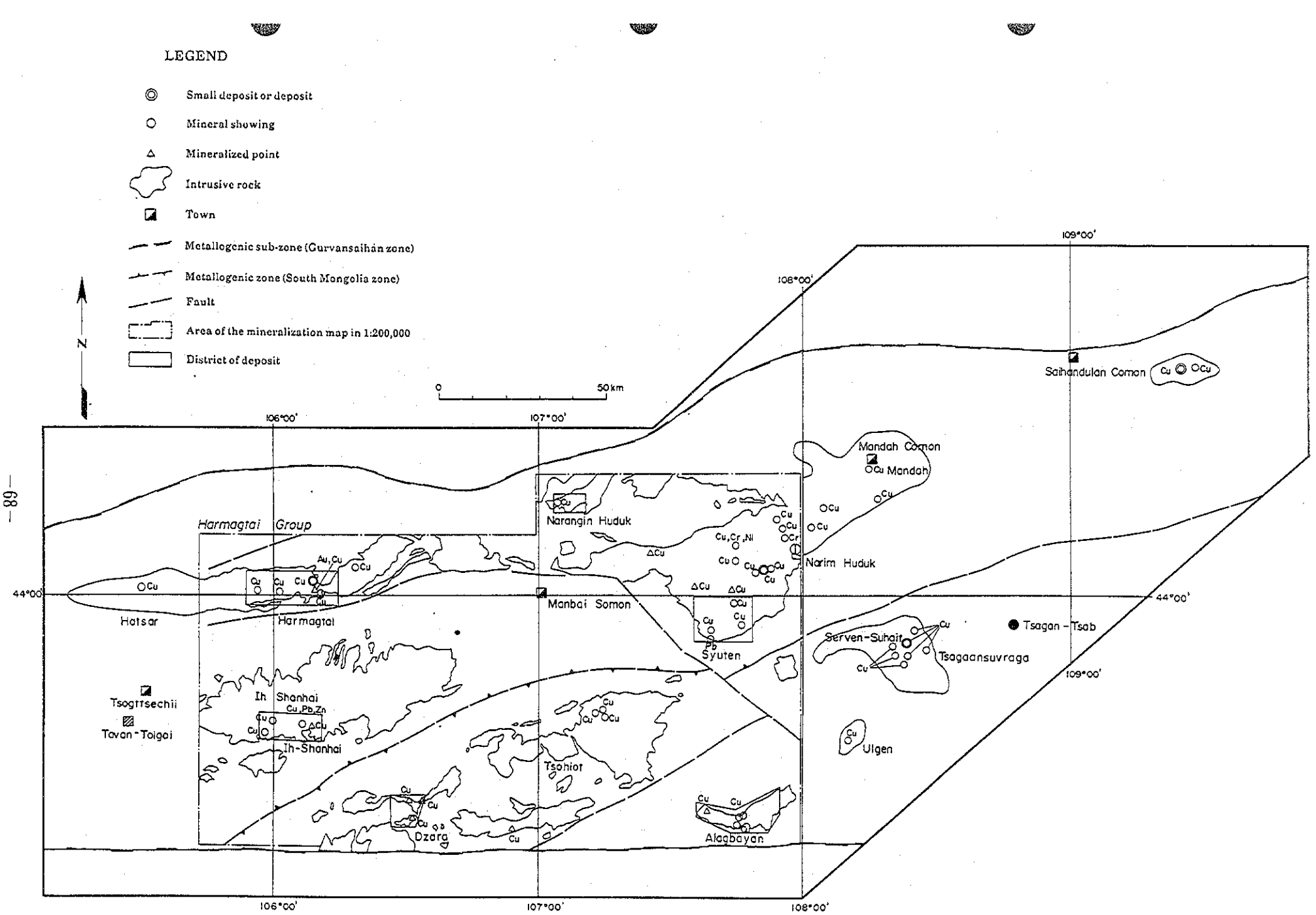
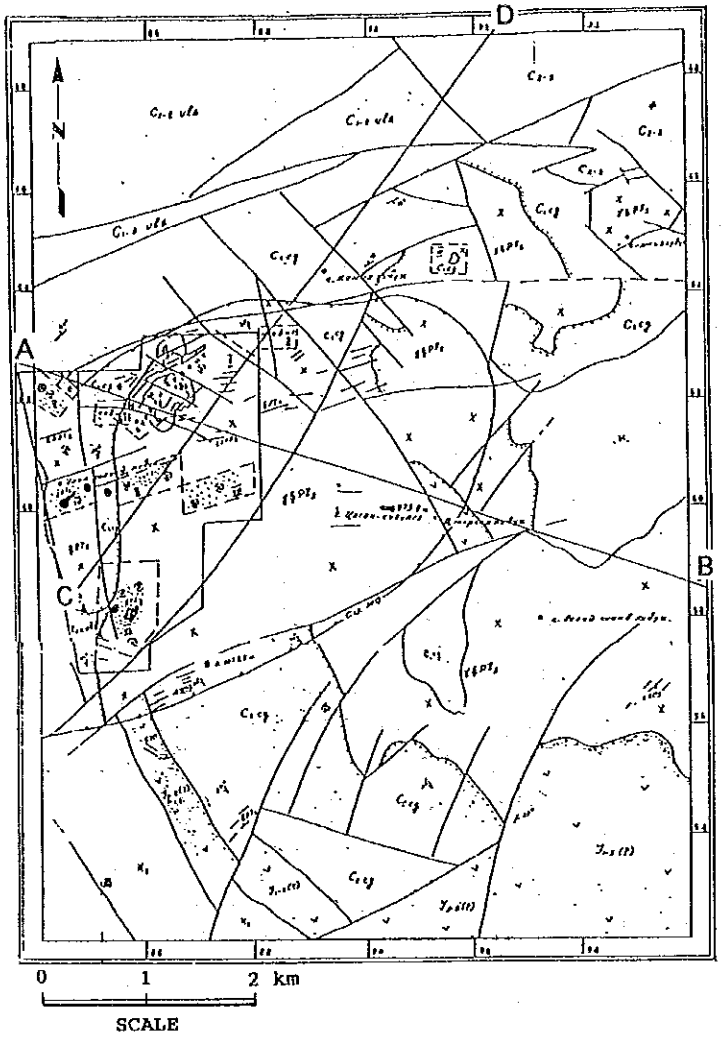
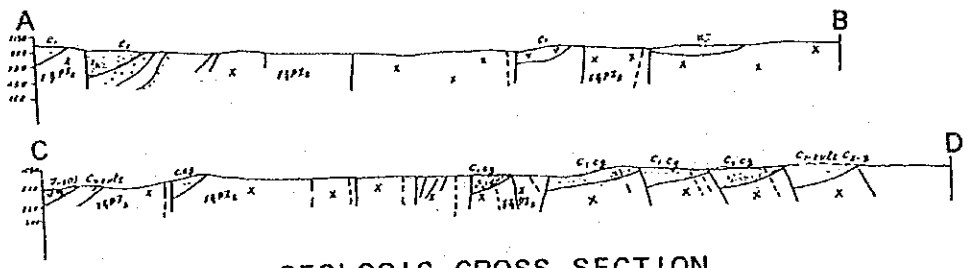


Fig. Ⅱ-2-6-1 Location of Ore Deposits in Tsagaan-suvraga District (phase Ⅰ)



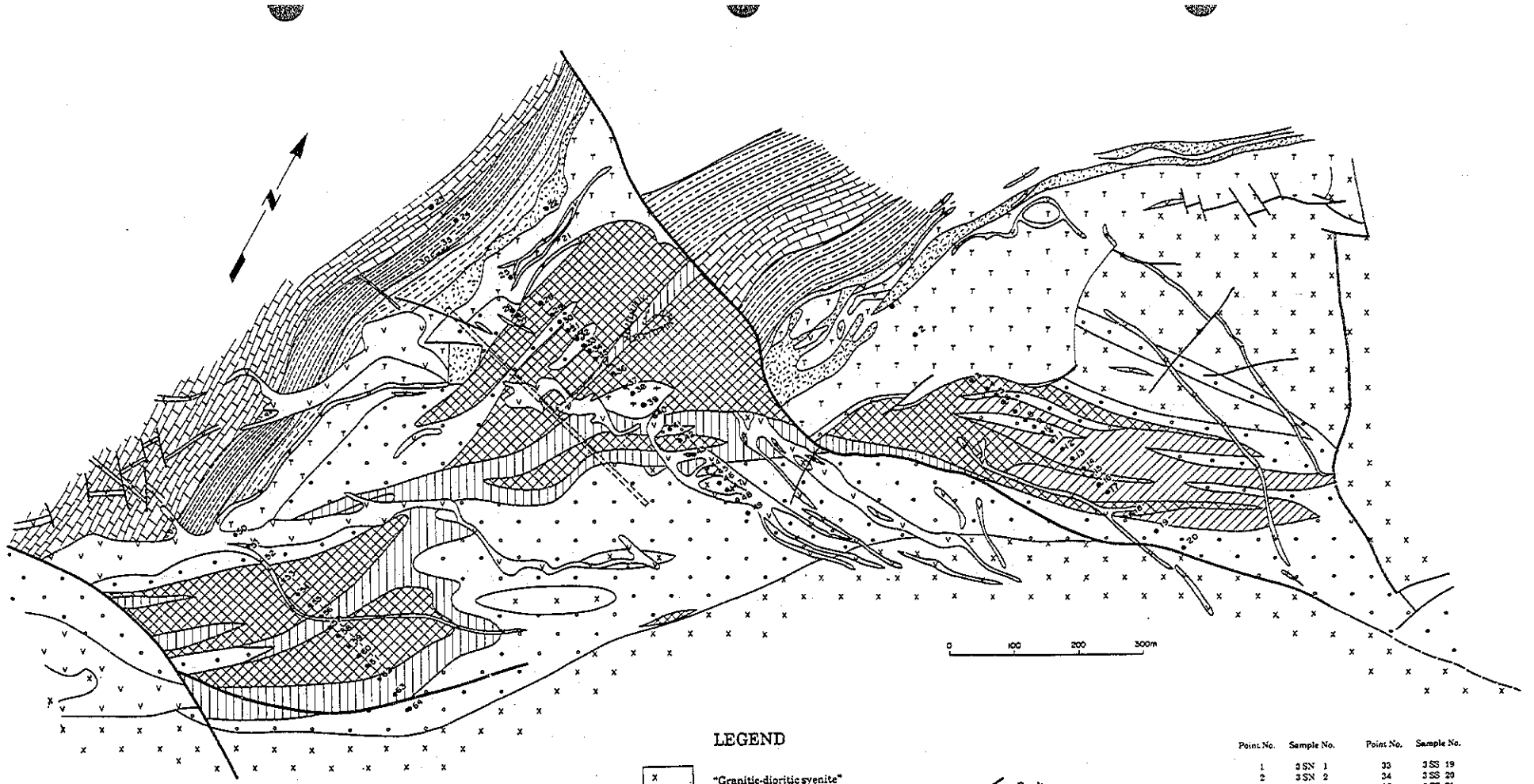
LEGEND

- Quaternary
- **CRETACEOUS**
  - Conglomerate, sandstone, mudstone, siltstone
- **JURASSIC**
  - Intermediate effusive rocks and tuff
- **CARBONIFEROUS**
  - Middle - Upper: Conglomerate, arkose, andesitic porphyrite
  - Lower - Middle: Ulidzei Formation; Conglomerate, sandstone
  - Lower: Tsagaan-Suvraga Formation; Sandstone, siltstone, syenite, diorite, limestone
- **JURASSIC(?)**
  - Andesitic porphyry dike
- **UPPER PALEOZOIC**
  - Keratophyre, syenite - porphyry
  - Aprite
- **UPPER PALEOZOIC**
  - Leucocratic granite
- **MIDDLE PALEOZOIC**
  - Dioritic porphyrite, andesitic porphyrite
  - Syenite - diorite, "grano-syenite", Syenite
  - "Quartzose" stock
  - Hydrothermal alteration (silicified, sericitized, K-feldspathization)
  - 1.Fault, 2.Inferred fault
  - Fossil
  - Tsagaan-Suvraga mineralized zone
  - Mineralization district



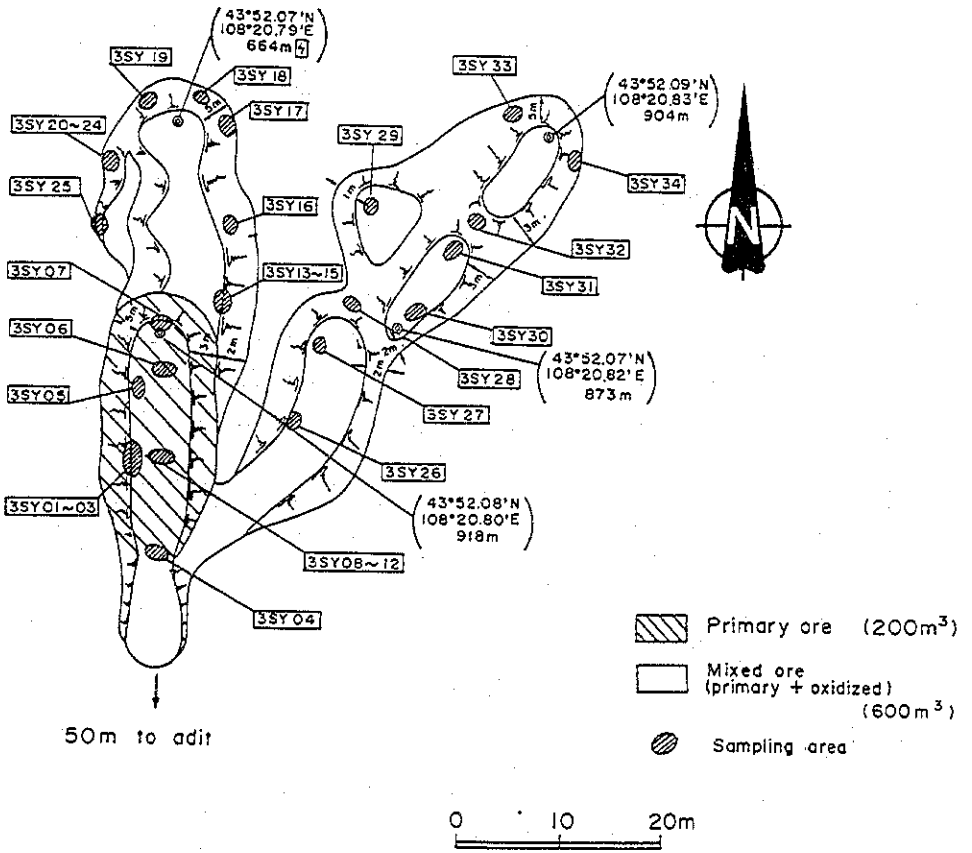
GEOLOGIC CROSS SECTION

Fig. Ⅱ-2-6-2 Geologic Map of Tsagaan-suvraga Ore Deposit



Point No.	Sample No.	Point No.	Sample No.
1	3SN 1	33	3SS 19
2	3SN 2	34	3SS 20
3	3SN 3	35	3SS 21
4	3SN 4	36	3SS 22
5	3SN 5	37	3SS 23
6	3SN 6	38	3SS 24
7	3SN 7	39	3SS 25
8	3SN 8	40	3SS 26
9	3SN 9	41	3SS 27
10	3SN 10	42	3SS 28
11	3SN 11	43	3SS 29
12	3SN 12	44	3SS 30
13	3SN 13	45	3SS 31
14	3SN 14	46	3SS 32
15	3SN 15	47	3SS 33
16	3SN 16	48	3SS 34
17	3SN 17	49	3SS 35
18	3SN 18	50	3SS 36
19	3SN 19	51	3SS 37
20	3SN 20	52	3SS 38
21	3SS 7	53	3SS 39
22	3SS 8	54	3SS 40
23	3SS 9	55	3SS 41
24	3SS 10	56	3SS 42
25	3SS 11	57	3SS 43
26	3SS 12	58	3SS 44
27	3SS 13	59	3SS 45
28	3SS 14	60	3SS 46
29	3SS 15	61	3SS 47
30	3SS 16	62	3SS 48
31	3SS 17	63	3SS 49
32	3SS 18	64	3SS 50

Fig. II-2-6-3 Geologic Map of Serven-suhait Ore Body



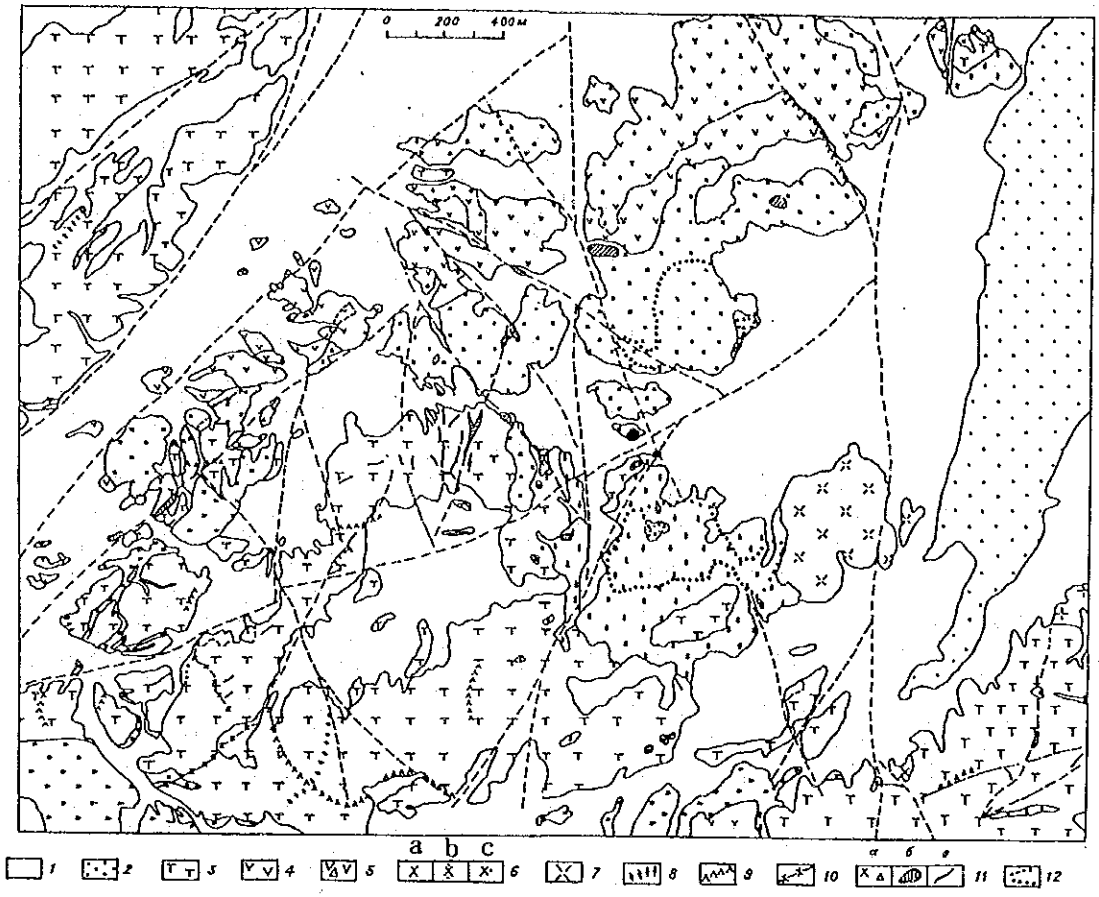
ASSAY OF CHIP SAMPLES FOR MICROSCOPIC OBSERVATION

SAMPLE NO.	Cu %	Mo %	Au ppm	Ag ppm
3 SY 1	3.210	0.079	0.040	16
3 SY 3	0.323	0.001	0.020	<2
3 SY 12	0.980	0.009	0.075	4
3 SY 14	3.250	0.040	0.185	12
3 SY 15	1.005	0.005	0.040	4
3 SY 21	1.090	0.006	0.045	2
3 SY 22	1.125	0.003	0.070	2
3 SY 24	5.040	0.042	0.230	22

ASSAY OF ORE-STOCK PILE

SAMPLE NO.	Cu %	Mo %	Au ppm	Ag ppm
3 SY 4	0.630	0.020	0.130	16
3 SY 5	0.383	0.005	0.025	2
3 SY 6	0.275	0.003	0.035	2
3 SY 7	0.475	0.006	0.035	2
3 SY 8	0.632	0.018	0.065	8
3 SY 13	0.374	0.068	0.025	2
3 SY 16	0.457	0.023	0.025	2
3 SY 17	0.375	0.017	0.040	<2
3 SY 20	0.350	0.025	0.030	<2
3 SY 25	0.400	0.006	0.020	2
3 SY 26	0.483	0.015	0.030	2
3 SY 27	0.376	0.024	0.025	<2
3 SY 28	0.718	0.020	0.050	2
3 SY 29	0.562	0.014	0.020	<2
3 SY 30	0.570	0.012	0.055	<2
3 SY 31	0.480	0.031	0.030	<2
3 SY 32	0.515	0.028	0.020	<2
3 SY 33	0.308	0.047	0.015	<2
3 SY 34	0.475	0.004	0.025	<2
AVERAGE	0.465	0.020	0.037	2.6

Fig. II-2-6-4 Assay of Ore Pile by Grab Samples at Serven-suhait Ore Body



L E G E N D

1 Quaternary sediments

2 Barungoiot formation(K_2), red clay, calcareous sandstone

3 Ugomur formation(D_{1-2}), tuff, tuffaceous sandstone, tuff breccia

4 Andesite

5 Brecciated lava of andesite

6 Diorite porphyry (a, b, c, fine-, medium-, coarse-grained)

7 Granodiorite porphyry

8 Andesite dyke

9 Diorite porphyry dyke

10 Granodiorite porphyry dyke

11 Breccia

- a explosion
- b quartz-hematite-tourmaline stockwork
- c quartz-hematite-tourmaline vein

12 Hydrothermal alteration zone

Fig. Ⅱ-2-6-5 Geologic Map of Harmagtai

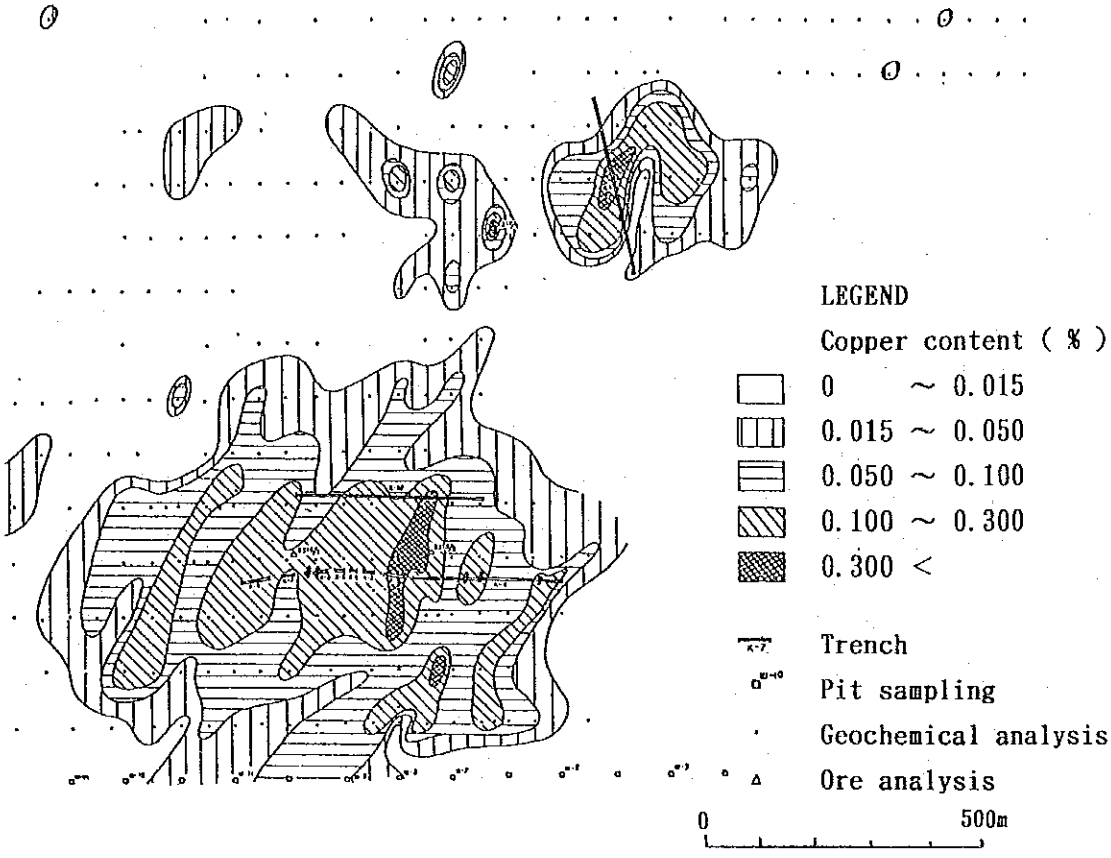
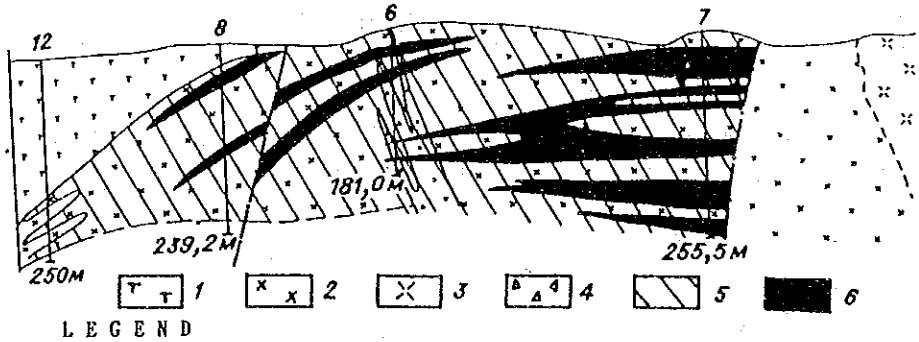


Fig. Ⅱ-1-24 Assay map of the Harmagtai ore deposit



L E G E N D

1 Ugomur formation(D ₁ ~ ₂), tuff, tuffaceous sandstone, tuff breccia

2 Diorite

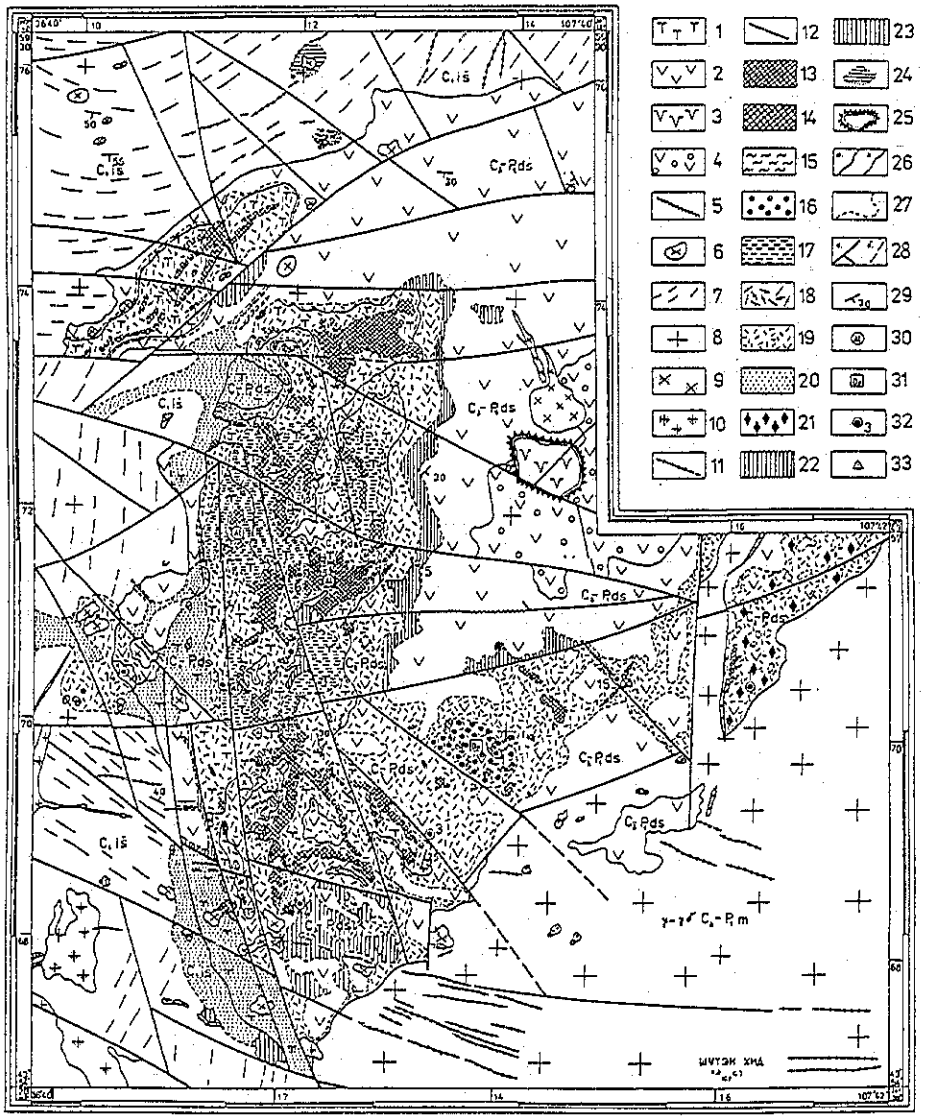
3 Granodiorite porphyry

4 Breccia dyke

5 0.1% ≦ Cu < 0.3%

6 Cu > 0.3%

Fig. Ⅱ-2-6-6 Geologic Profile of the Harmagtai Ore Deposit



L E G E N D

1～6 Dusinob Formation (C_3 ~P_1 ds) :
- 1 Pyroclastic rocks, brecciated lava
- 2 Andesite, andesitic porphyrite
- 3 Andesite (neck)
- 4 Andesitic agglomerate
- 5 Rhyolite-porphyry
- 6 Diorite, "Syeno-diorite porphyrite"

7 Iheshanhai Formation (C_1 is): Eugeosynclinal tuffaceuos sediments and sedimentary rocks

8～10 Intrusive Mantah Complex (C_3 ~P_1 m):
- 8 Granite and granitic rocks(Syuten Mass)
- 9 Diorite
- 10 Granite, syenite-porphyry
- 11 Granodiorite-porphyry
- 12 Quartz vein

13～23 Hydrothermal alteration zones
- 13 Silicified zone
- 14 Ferrous silicified rockzone
- 15 Tourmaline-bearing silicified rock zone
- 16 Quartz-diaspore zone
- 17 Quartz-alunite zone
- 18 Quartz-pyrophyrite zone
- 19 Quartz-sericite zone
- 20 Quartz-clay zone
- 21 Quartz-andalusite zone
- 22 Propyrite zone
- 23 Quartz-tourmaline zone

- 24 Silicified rocks of Ihesyanhai Formation
- 25 Center of volcanic activity
- 26 Geologic boundary
- 27 Boundary of the alteration zones
- 28 Fault: a/Assured, b/inferred
- 29 Strike and dip of bedding
- 30 Alunite zone
- 31 Diaspore zone
- 32 Drilling hole

Fig. Ⅱ-2-6-7 Geologic Map of Shuten

Table II-2-6 Ore Deposits and Ore-showings in Tsagaan-suvraga District(1)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%. Au.Ag:g/t)	LOCATION LONGITUDE	LATITUDE	ALT	NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE SUR	TRC	DRL	ADT	EPT	AGE OF DEPOSIT (Ma)	HOST ROCK (youngest)	DISCOVERY AND NOTES
* TSAGAAN-SUVRAGA	Cu, Mo	Porphy-ry						9	Area: 2km ×3.5 km						339±17 Carboni-ferous	Quartz-monzonite	1964 MPR
No.1		Qz-Ser-K-fel	240.044	Cu 0.53, Mo 0.018	108°20'47"	43°51'56"	1,188	1	1980×500 ×>470	○	○	○	○	−		Qz-monz	97 holes
No.2		K-fel	16	Cu 0.32	(Serven-Suhait)			1	510 × 20	○	○	○	−	−		Qz-monz	2 holes
No.3		K-fel	−	Cu 0.03～0.46				1	600 ×200	○	○	−	−	−		Qz-monz	
No.4		K-fel	14.000	Cu 0.39				1	1180～620 ×90×200	○	○	?	−	−		Qz-monz	
No.5		K-fel	0.737	Cu 0.40				1	180 × 45	○	○	○	−	−		Qz-monz	3 holes
No.6		K-fel	0.050	Cu 0.35				1	470 × 50	○	○	○	−	−		Qz-monz	6 holes
No.7		K-fel	−	Cu 0.08～0.4				1	300 × 12	○	○	−	−	−		Qz-monz	
New No.1		K-fel	0.048	Cu 0.42				1	450 ×300	○	○	○	−	−		Qz-monz	8 holes
New No.2		K-fel	0.160	Cu 0.33				1	400 × 90	○	○	○	−	−		Qz-monz	1 hole
This ore deposit is characterized by the poor 2ndary enrichment of copper.																	
DUCHIN-HURAL	Cu dissem+	Porphy-ry stock w.	2.60	Cu 0.31	106°18'00" 106°20'25"	44°04'30" 44°05'50"	about 1.000	1	200 ～400 ×5 ～20	○	○	○	−	−	C_3 ～ P_1	An, Grd(C_3 ～ P_1).	1971 MPR 12 holes
HARWAG-TAI	Cu dissem+	Porphy stock w.	139.60	Cu 0.25	106°08'40"	44°01'30"	about 1.000	3	550 ×250 ×>200, 400 ×300 ×>200	○	○	○	−	−	C_3 ～ P_1	Diorite-porohyry	1971 MPR 17 holes
IH-SHANHAI	Cu	Porphy	−	Cu 0.01～2.5 Au 0.03～3g/t	106°00'00"	43°40'20"	about 1.000	>3	1500×10. 100 ×30.	○	○	−	−	−	C_3 ～ P_1	An, Tf. silt (D_3 ～C_1), Gr, Grd, Grdp(C_3 ～ P_1)	1971 MPR air-borne magne and IP 10km
NARIN-HUDAG	Cu	Porphy	8.60	Cu 0.58	107°11'00"	44°14'10"	1.000	8		○	○	○	−	−	C_3 ～ P_1	An, Gd, Dio C_3 ～ P_1	1971 MPR 1/50.000 geol. surv. IP.
• Central				Cu 0.3 ～1.17				6	6 ～23× 100 ～400								
• North				Cu 0.36				1	20×300								
• South				Cu 0.01～0.41				1	50×300								

Table Ⅱ-2-6 Ore Deposits and Ore-showings in Tsagaan-suvraga District(2)

NAME	MINERALS	TYPE	RESERVE (M. t)	ORE GRADE (%. Au. Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK	DISCOVRRY
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
OVOOTU-HIRA	Cu	Porphy Qz-stock-work	—	Cu 0.05～0.3 Ag 0.2 ～0.6 Au ≦5g/t	105° 02′ 10′	44° 01′ 05′	about 1,000	2	200 ×300	○	○	○	—	—	C_3 ～ P1 Grdp	D_3 ～ C_1	1971 MPR 14 holes, chem, Mag Trench
SYUTEN	Cu, Au	Sil. zone	12.6	Cu 0.31 Cu 0.33 Cu 0.1 Cu 0.8, Ag 6g/t Cu 0.05～0.15 Cu 0.3 Cu 0.01～2.0	107° 40′ 00′	43° 50′ 00′	1.000	12	200 ×300 200 ×100 30×0.3 60×2 20×5 10×3 300 ×5	○	○	○	—	—	C_3 ～ P1	ss, sh: C_1 And, Rhy: C_3 ～ P_1 Gr. Dio, Grd Por	1971 MPR
UHAA-HUDAG	Cu	Porphy -ry dissem stock	— type type	Cu 0.05～3 Ag 0.1 ～12.3	106° 12′ 30′	44° 01′ 45′	1.000	12	200 ×300 2000×600 450 ×350	○	○	○	—	—	C_3 ～ P1	And , Tuff, Grd(C_3 ～ P_1)	1971 MPR 3 holes

2-6-2 Topography and drainage system

The district spreads over the extreme south of Mongolian Highlands and Govi Lowlands. Altitude diminishes towards the south. Govi Lowlands are a basin with approximate elevation of 1,000m extending over southern Mongolia from northeast to southwest, in which upheaved block of basement rocks up to 1,500m above sea level are scattered.

Due to minimal precipitation, the district has no perennial river. The drainage system consists of two groups: those flowing southwards from Mongolian Higlands to Govi Lowlands and the others distributed in the upheaved blocks of basment rocks within Govi Lowlands. The former represents a parallel pattern while the latter has a radial pattern, reflecting the general topography. Valleys often form a dendritic pattern in igneous rock zones, a grid pattern in Paleozoic sedimentary rock zones, and a feather-veined pattern in Jurassic to Cretaceous rock zones. These valleys become rivers only temporarily during rainfall in summer and their downstreams extinguish either by evaporation or seeping down into the earth, or flow into salt lakes.

2-6-3 Climate and vegetation

The average annual temperature is 3.4℃; number of frostless days in a year is in excess of 150; and the annual maximum and mimum teperatures are 40.8℃ and -41.4℃, respectively. Annual precipitation ranges from 70 to 120mm, with higher precipitation in summer and lower in winter. During the three months from March to May, strong wind rages in the district.

Owing to the extremely dry weather, the district is covered by semi-desert or desert with poor vegetation.

2-6-4 Geology

The geology of district consists of Middle to Upper Devonian or lower Carboniferous group, with intrusion of Carboniferous to Early Permian granite and syenite. Accompanying Carboniferous to Early Permian acidic igneous rocks, many porphyry-type copper deposits and indications, including Tsagaan-suvraga, Harmagtai, Ih-shanhai and Shuten, are distributed within an approximate area of 300km east to west and 60km north to south, which forms the country's second largest porphyry copper deposit zone.

2-6-5 Ore deposits

Major ore deposits in this district are listed in Table II-2-6.

2-6-6 Observation

Since the late-1960's, surveys were energetically repeated using a variety of exploration techniques, at major deposits in Tsagaan-suvraga District.

With regard to Serven-suhait Orebody, the largest of the Tsagaan-

suvraga Deposit(reseves 240 million t; Cu 0.53% - Mo 0.018%), substantial drilling and tunneling surveys were carried out, which revealed, among others, that the orebody is poor with pyrite and has slightly developed secondary enrichment zones. Therefore, this deposit has little room for further exploration. Concernig other deposits in the area, especially of copper, exploration has been conducted relatively well. As all these deposits have certain problems either with ore reserves, grade, characteristics or with infrastructure, it appears difficult for these deposits to come into development for the time being.

On the other hand, it has been known thanks to the past exploration that the mineral indications at Shuten, Harmagtai, In-shanhai, Ovoot-hira, etc. have gold occurrences. Above all, Shuten's alteration zones resemble those of epithermal or hydrothermal gold deposits; accordingly, further survey and re-evaluation of the Shuten indications as a potential gold deposit rather than a copper deposit seem to be necessary.

2-7 Ulziit District

2-7-1 Location and access

Ulziit District of the first year's survey was an area of about 250km east to west and 80km north to south, spreading over the three Aimag: Dornogovi, Dundgovi and Umnugovi.

Ulziit District of the second year's survey was an area of approx. 250km east to west and 250km north to south, which comprized a part of the Tsagaan-suvraga District of the first year's survey. (Fig.I-1-1)

Olon-ovoot, which is the base point in the district, is located in sparsely populated Govi desert,540km away from Ulaan Baatar and 120km from Dalanzadgad.

From Ulaan Baatar to this district, one can go either straight by car or fly to Dalanzadgad and from there, use a car. In case of using a car all the way, it take some sixteen hours, one way. The flight hours from Ulaan Baatar to Dalazadgad are one hour and twenty-five minutes, and from Dalanzadgad to Olon-ovoot, it is a three-hours journey by car.

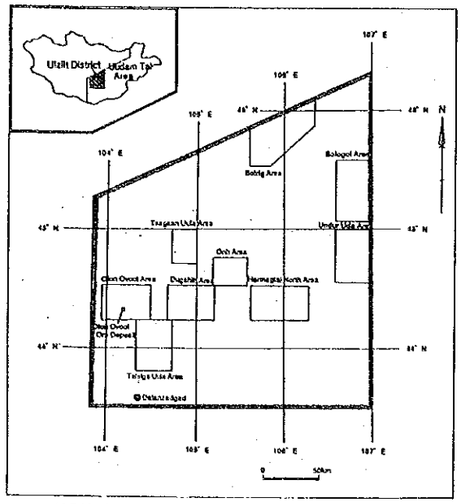
2-7-2 Topography and drainage system

The district is at the extreme west of Mongolian Highlands, and topographically, it is made up of lowlands of about 1,100m in altitude, where Cretaceous rocks are distributed,and zones of upheaved basement rocks, mainly Paleozoic. The upheaved basment rock zones generally form undulating hills 100-200m higher than the lowlands.

The district has no perennial river due to minimal precipitation. The drainage system represents in many cases a dendritic pattern in igneous rock zones, a grid pattern in paleozoic sedimentary rock zones

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE II)

Geologic Map of the Ulziit District



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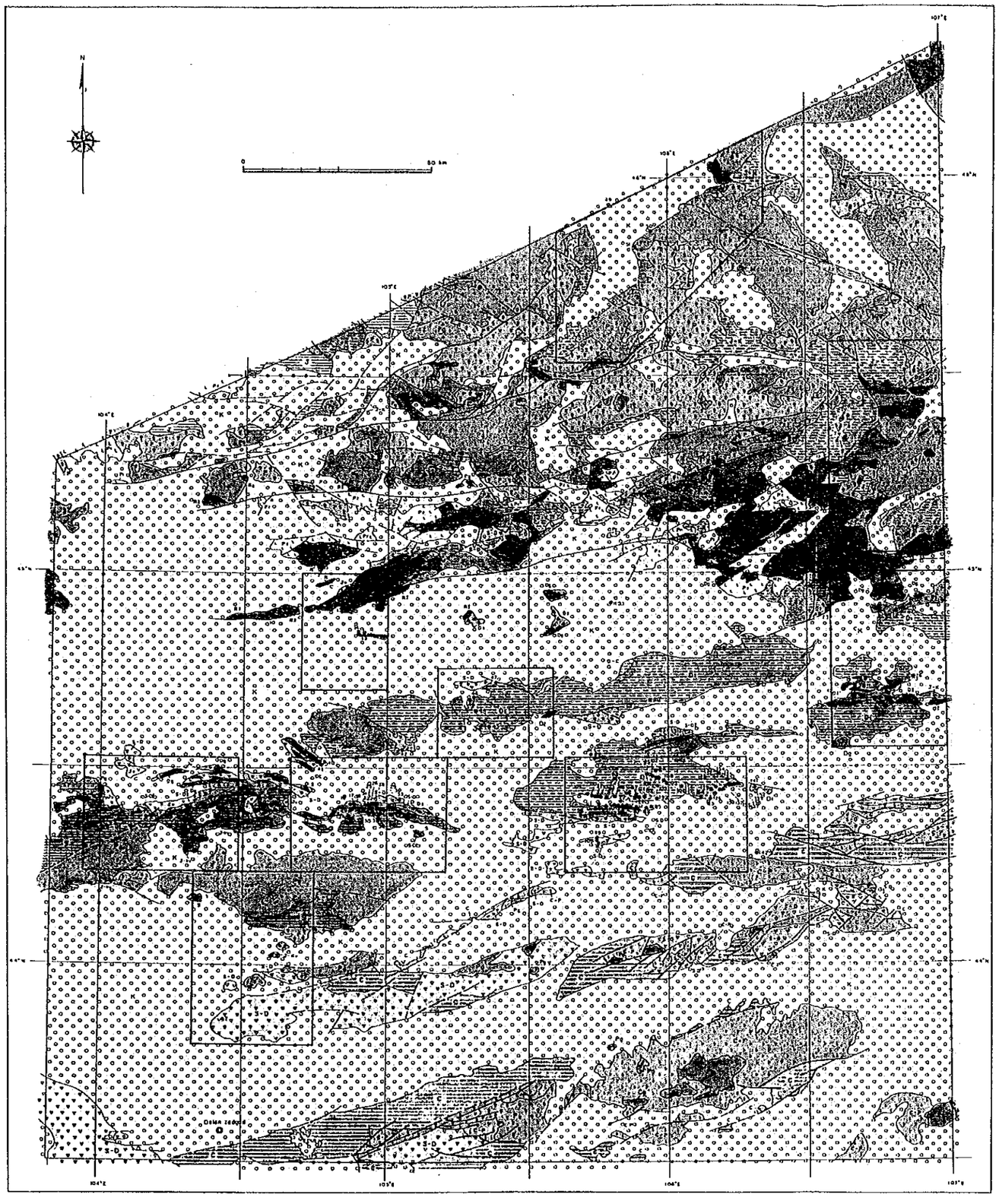


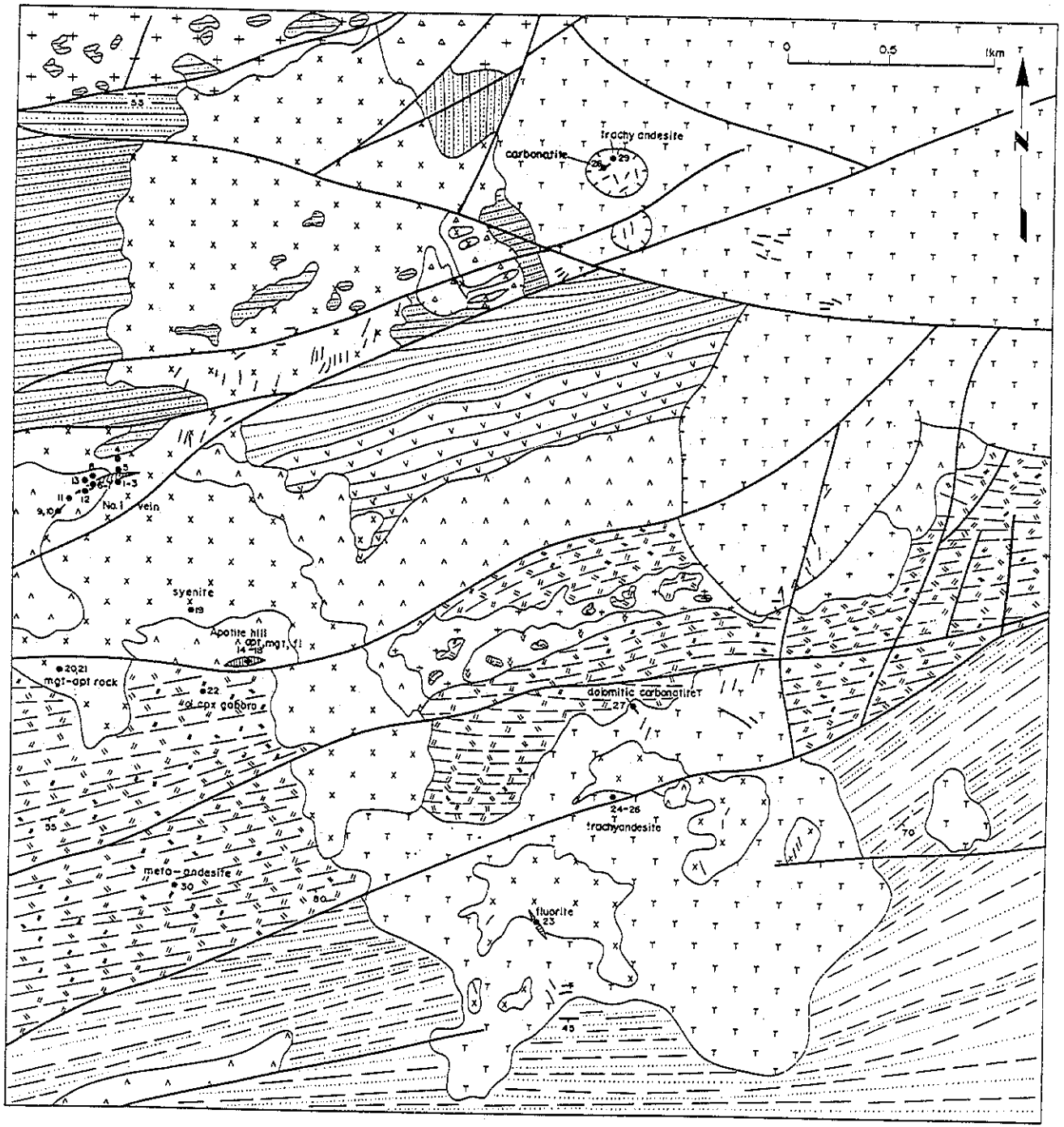
LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Tertiary	Tv		olivine basalt, tuff
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	Dl		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1		sandstone, shale, siltstone
Silurian-Devonian	S-Dl		limestone
	S-D		dacite, rhyolite, andesite, tuff
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	Rl		limestone
	R		quartzite, phyllite, sandstone, gneiss, amphibulite
Intrusive Rocks	Pγ		granite, granosyenite
	Pr		rhyolite, rhyolitic breccia, quartz porphyry
	Dγ		granite, granodiorite

● ore showing

K	unit name and boundary
	strike and dip direction
	anticline
	syncline
	fault
	inferred fault
	thrust fault

Fig. II-2-7-1 Geology and Location of the Survey Areas of the Ulziit District (phase II)



LEGEND

J3ul	Upper Jurassic (Ulgei F.)	Trachyte, leucocratic trachyte Conglomerate, volcanic breccia
D1r2	Lower Devonian (Irtinbeyanhural F.)	Sandstone, siltstone, limestone, conglomerate
D1r1		Acidic tuff, shale, sandstone, limestone
S2-D1mh	Middle Silurian ~ Lower Devonian (Manhaanl F.)	Rhyolite, dacite, acidic tuff, conglomerate, sandstone
S1-2ma	Middle ~ Lower Silurian (Mandalobiin F.)	Sandstone, siltstone, limestone, conglomerate
μpD1	Early Devonian	Dacite
ξJ3	Late Jurassic	Syenite, melano-syenite
γP1	Early Permian	Leucocratic porphyritic granite
γD2	Middle Devonian	Plagio-granite
νD2		Mdg gabbro

Carbonatite vein

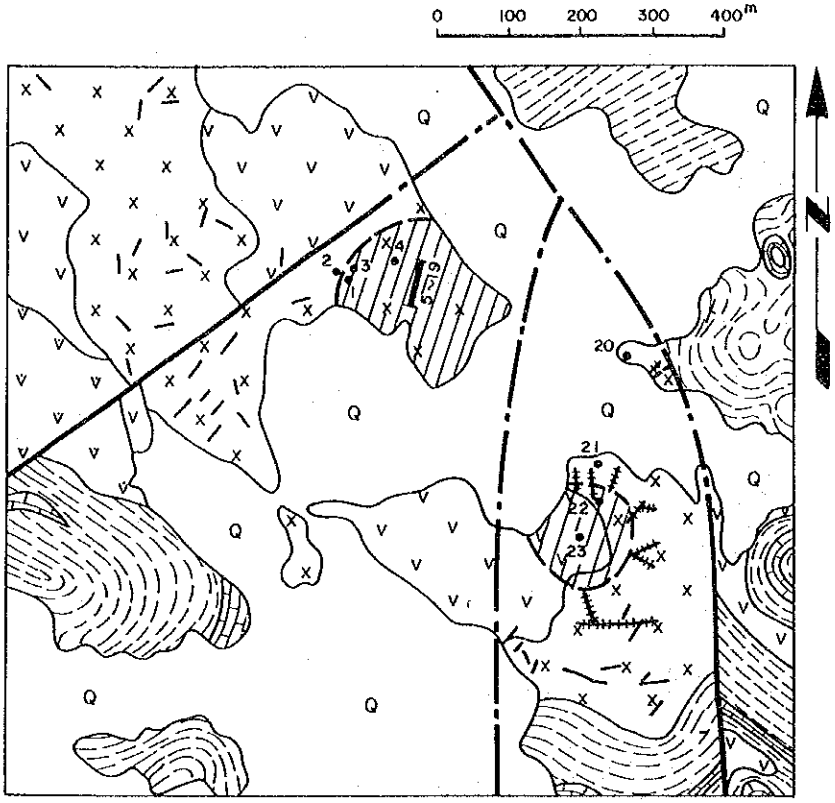
Circular structure

Fault

Sampling point and number

Point No.	Sample No.	Point No.	Sample No.
1	3US01	16	3US16
2	3US02	17	3US17
3	3US03	18	3US18
4	3US04	19	3US19
5	3US05	20	3US20
6	3US06	21	3US21
7	3US07	22	3US22
8	3US08	23	3US23
9	3US09	24	3US24
10	3US10	25	3US25
11	3US11	26	3US26
12	3US12	27	3US27
13	3US13	28	3UN18
14	3US14	29	3UN19
15	3US15	30	3UN20

Fig. Ⅱ-2-7-2 Geologic Map of Mushgia-hudag



Point No.	Sample No.
1	3US 81
2	3US 82
3	3US 83
4	3US 84
5~19	3US 85~99
20	3US 100
21	3US 101
22	3US 102
23	3US 103
24	3US 104

LEGEND

Quarternary
- Q — Alluvium and Diluvium

Late Jurassic
- Conglomerate, sandstone, siltstone
- Limestone
- Rhyolite, acidic tuff
- Trachyte, trachytic tuff
- Syenite
- Stockwork of carbonatite and celestite

- Carbonatite vein
- Quartz vein
- Fault
- Concealed fault
- Trench
- ● 1 — Sampling point and number

Fig. Ⅱ-2-7-3 Geologic Map of Bayan-khushuu

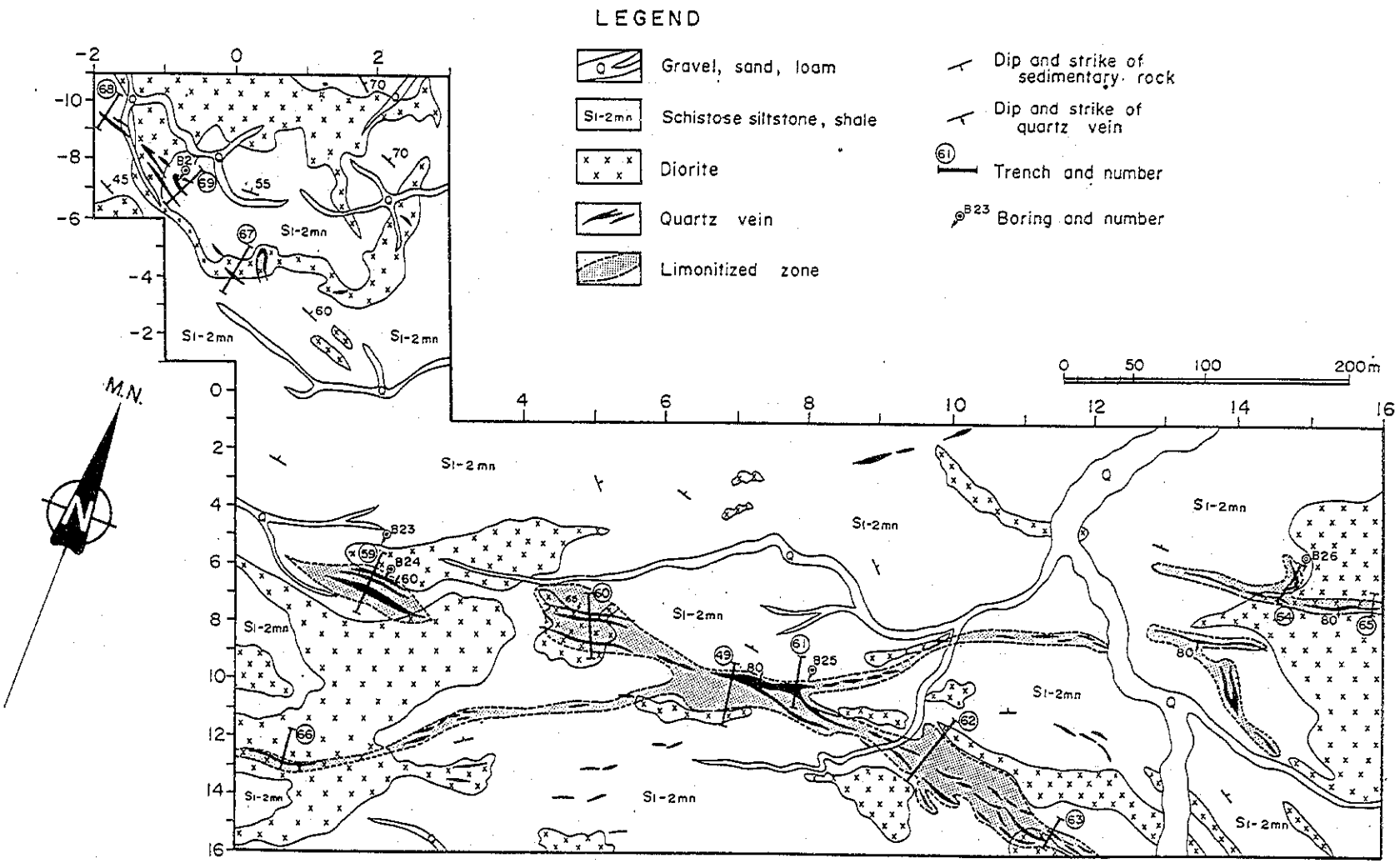


Fig. II-2-7-4 Geologic Map of the Olon-ovoot

Table Ⅱ-2-7 Major Ore Deposits and Ore-showings in Ulziit District(Phase Ⅰ)

NAME	MINERALS	TYPE	RESERVE (M.t)	ORE GRADE (%, Au, Ag:g/t)	LOCATION			NUMBER OF ORE BODY	SIZE OF ORE BODY (m)	EXPLORATION STAGE					AGE OF DEPOSIT (Ma)	HOST ROCK	DISCOVERY
					LONGITUDE	LATITUDE	ALT			SUR	TRC	DRL	ADT	EPT			
* MUSHGIA-HUDAG	REE	Carbonatite	398.000	TREO 1.53	104° 00' 16'	44° 23' 41'	1.160	>50	Area: 1700×500	○	○	○	−	−	132±7 (C.)	Syenite, Syenite-porphyry	1974-1977 USSR/MPR Ore reserve decreased now.
	Apatite type		44.500	TREO 3.37					50×300 max.								
	Carbonate type		353.500	TREO 1.30													
* BAYAN-HUSHUU	Sr celestite	Msv. Stock work	0.700	SrO 40 ～50	104° 21' 19'	44° 20' 17'	1.129	1	80×100 ×80	○	○	○	−	−		Rhy, Rhytic -tuff, Dio, Dio-por (J_3)	1976 USSR 20 bore holes
* OLON-OVOOT	Au	Qz-V + Netw	0.700 ?	Au 3.3g/t	104° 09' 44'	44° 22' 28'	1.205	6	50～100 <25× >50	○	○	○	−	−	283±14, 301±15	Ss, Sh(S-D) Dio(D)	1990 MPR under exploration
* HORIMT-HUDAG	Au	Qz-V	−	max 16.5 g/t Au	104° 06' 40'	44° 20' 58'	1.200	7	2×200 max.	○	○	○	○	−	?	Ss, Sh(S-D)	1979-1982 USSR. 2 bore-holes
* DUGSHIH	Au	Qz-V	−	0.03 g/t Au (2 pcs) = Treshinii	104° 55' 48'	44° 24' 29'	1.284	several veins	0.6 ×30 max.	○	○	−	−	−	?	Ss, Sh(S-D) Diorite	1979-1982 USSR.
* ONH	Au	Qz-V	−	≦ 0.04 g/t Au (13 pcs)	105° 22' 29'	44° 36' 12'	1.260	vein-swarm area: 2,500 × 600	1 ×50～ 200 max.	○	○	−	−	−	?	Ss, Sh, Gab, Rhy (S-D)	1979-1982 USSR. 5 trenches
* BAYAN-BOR-NURUU	Au	Qz-V	−	≦ 0.06 g/t Au	104° 53' 06'	44° 24' 25'	1.275	vein-swarm about 100 area: 360	0.1 ～1.5 ×100 max. veins × 60	○	○	−	−	−	?	Ss, Sh(S-D) Diorite	1979-1982 USSR

and a feather-veined pattern in Jurassic to Cretaceous zones. Valleys becom rivers only temporarily at the time of rainfall. Their downstreams evaporate, seep down into the ground or flow into salt lakes.

2-7-3 Climate and vegetation

The climate of district falls into the desert type, being dry all through a year. The average annual temperature is 3-4.5℃; number of frostless days is about 130 in a year; and the annual maximum and minimum temperatures are 37.5℃ and -36.5℃, respectively Annual precipitation is from 80 to 120mm; precipitation is higher in summer and lower in winter. During the two months of April and May, it is especially windy; number of sandstorm days is about 40 in a year.

The district has poor vegatation. The northern part is semi-desert while the southern part is rock desert in hilly zones and soil desert in lowlands.

2-7-4 Geology

The geology of district is constituted by Upper Proterozoic and Paleozoic such as Upper Silurian, Lower Devonian, Upper Carboniferous and Permian, which have intrusion of and ore overlain by Triassic and unconformably overlain by Jurassic and Cretaceous. There are many gold indications formed by Carboniferous to Early Permian acidic igneous activity, as well as carbonatite deposits and strontium deposits which were formed by Upper Jurassic to Lower Cretaceous acidic igneous activity.

2-7-5 Ore deposits

Besides the many gold indications including Olon-ovoot, the district has deposits of many different types such as carbonatite deposits(Mushgia-hudag),strontium deposits(Bayan-khushuu), fluorite deposits, etc. Major deposits are exhibited in Table II-2-7.

The reconnaissance geological survey of the second year revealed that there exist a number of large gold indicatins in Govi distrct. Those confirmed by the second year's survey are listed in Table II-2-7 -1 thru II-2-7-9.

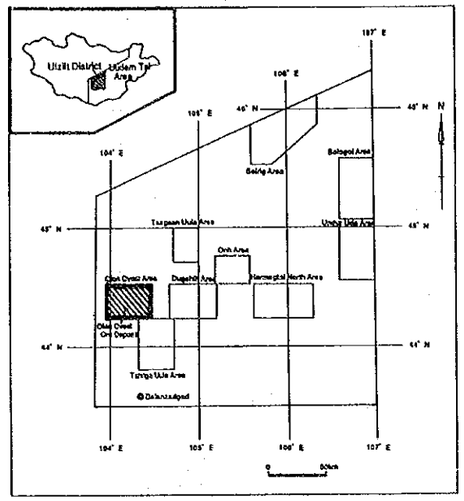
2-7-6 Observation

Mineral resources survey in Uiziit District has its inception in the discovery of Mushgia-hudag Deposit in the course of geological mapping with a 1/200,000 scale jointly conducted by Mongolia and Russuia from 1974 to 77. Since then, the areas around the deposit have been explored intensively and repeatedly with various techniques. Regarding Mushgia-hudag and Bayan-khushuu Deposits, it can be said that evaluation work has been completed. From the evaluation, these two ore deposits are considered to be unworthy of explotation in view of their ore reserves and grades.

In contrast, Olon-ovoot Deposit, at which the GEOLOGY Company

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE Ⅱ)

Geologic Map of the Olon Ovoot Area



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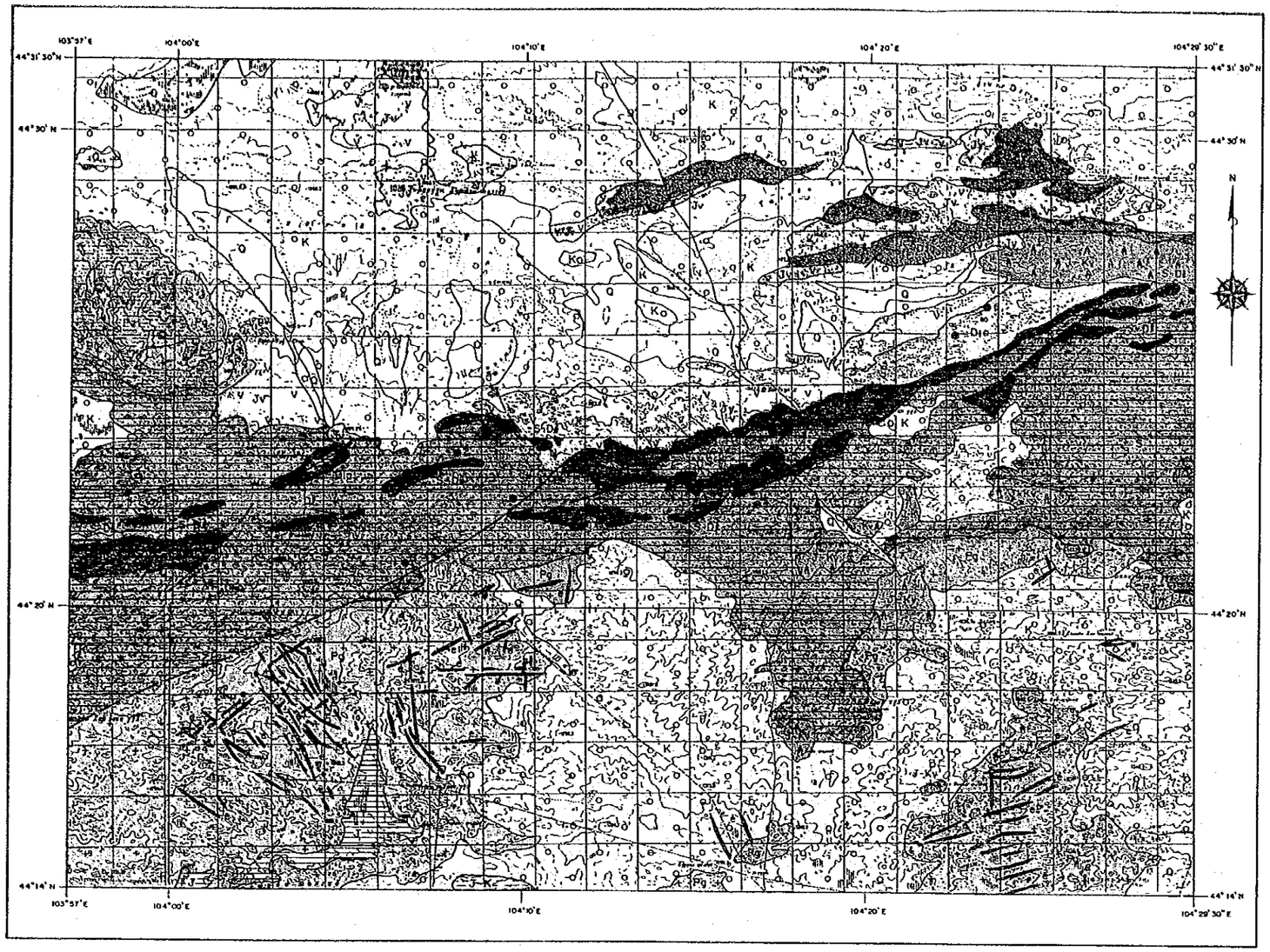


0 5 10km

LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D2l		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1l		limestone
	D1b		sandstone, shale, siltstone
	D1a		shale, siltstone, sandstone

Silurian-Devonian	S-Dl		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	Rl		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	ε		granodiorite porphyry
	d		diorite, microdiorite, diorite porphyry
	Pg		granite, granosyenite
	Pr		rhyolite, quartz porphyry
	C-Pg		granite, granodiorite, granosyenite, diorite
	D2g		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

● ore showing

K	unit name and boundary
	strike and dip direcion
	anticline
	syncline
	fault
	inferred fault
	thrust fault

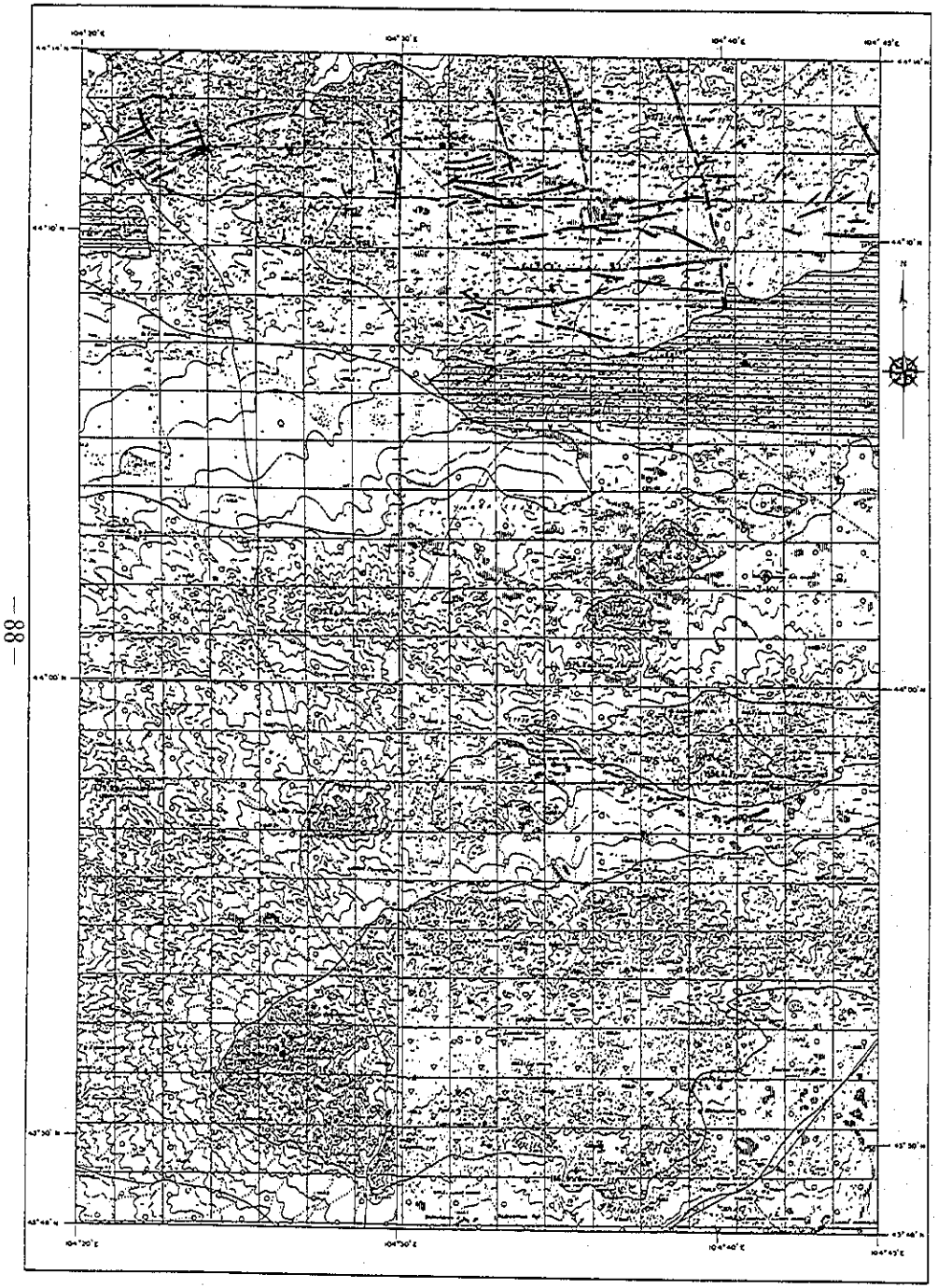
Fig. Ⅱ-2-7-5 Geologic Map of the Olon-ovoot Area (phase Ⅱ)

Table Ⅱ-2-7-1 Ore Deposits and Ore-showings in the Olon-ovoot Area (1)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Note
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
1	Horimt Hudag	Au	Qz-v	104° 06′ 40″	44° 20′ 58″	parallel quartz veins unit vein size Max. 2m×200 m Seven major veins are known within four mineralized zones. vein zone: 200m×1,200 m Vein quartz is characterized by coarse grained comb quartz and semi-transparent quartz.	siltstone, sandstone of S_{1-2} Mandal Ovoo F.	1.44 ～ 16.58	0.6 ～ 1.7	3	138 ～232	Qz-ka-Serpy	Strike: E-W ～N80° E. dip : 60°～80° N discocery: 1979-1982 Three trenches and two drillings were done. Small diorite rock bodies are seen around the veins. Visible gold occurs.
2	North Olon Ovoot	Au	Qz-v	104° 08′ 09″	44° 23′ 18″	nine quartz veins scattered in the area of 2km ×0.5km unit vein size Max. 12 m×30m. Vein quartz is characterized by chalcedonic～tourmaline-bearing milky quartz.	siltstone, sandstone of S_{1-2} Mandal Ovoo F.	0.30 ～ 1.75	0.4 ～ 1.9	7	102 ～323	Qz-chl	Strike: E-W ～N80° E. dip : 60°～80° N reen copper occurs
3	Olon Ovoot	Au	Qz-v	104° 09′ 42″	44° 22′ 21″	consists of six major quartz vein zones scattered in the area of 1 km×0.4km Vein quartz is characterized by semi-transparent ～milky quartz. Pyritization is commonly seen in the wall rocks. Many dicrite～granodiorite rock bodies are seen around.	siltstone, sandstone of S_{1-2} Mandal Ovoo F.	up to 223g/t	up to 7.2g/t M<0.2	2,500	148 ～356 Av=256℃	Qz-chl, Qz-ser-chl	Strike: N60° W～E-W ～N80° E dip : steeply dipping to north or south discovery: 1990 twenty eight trenches and several drillings were done by Geology company, visible gold occures K-Ar age of sericite: 283 ±14 Ma, 301±15 Ma

Table Ⅱ-2-7-1 Ore Deposits and Ore-showings in the Olon-ovoot Area (2)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
4	Boroodon	Au	Qz-v	104° 16′ 49″	44° 22′ 16″	single quartz vein vein size Max. 1.5 m×40 m Vein quartz is characterized by chalcedonic milky quartz.	siltstone, sandstone of S_{1-2} Mandal Ovoo F.	—	—	—	—	(Qz-chl)	Strike: N55° E. dip : 55° S discovery: 1979-1982
5	Unegt Uul West	Au	Qz-v	104° 22′ 31″	44° 25′ 51″	single quartz vein vein size Max. 4 m×100 m unit vein size Max. 12 m×30m milky white mono quartz, no sulfide(segregation vein?)	dark gray phyllite S_{1-2} Mandal Ovoo F.	—	—	—	—	(Qz-ser)	Strike: N70° E. dip: 75° N
6	Unegt Uul	Au	Qz-v	104° 23′ 25″	44° 26′ 26″	more than eight parallel quartz veins are distributed in the area of 1.2km×0.2km . Vein quartz is characterized by milky white compact mono-quartz very poor in sulfide.	carbonaceous pelitic schst S_{1-2} Mandal Ovoo F.	—	—	—	228 ～368 Av=285	Qz-ser	Strike: N75°~80° E. dip: 75° N~90°



LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tr		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-K$_V$		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D3l		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1l		limestone
	D1b		sandstone, shale, siltstone
	D1s		shale, siltstone, sandstone
Silurian-Devonian	S-Dl		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	Rl		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	ε		granodiorite porphyry
	d		diorite, microdiorite, diorite porpeyry
	Pβ		granite, granoeyenite
	Pr		rhyolite, quartz porphyry
	C-Pβ		granite, granodiorite, granoeyenite, diorite
	D2β		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

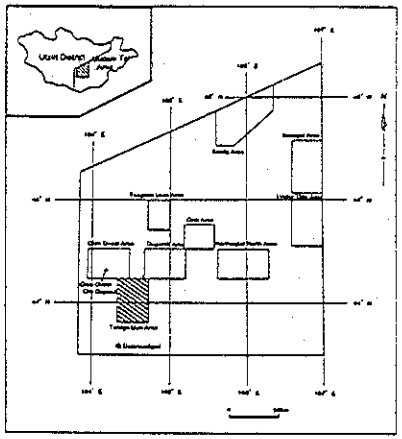
● ore showing

	unit name and boundary
	strike and dip direction
	anticline
	syncline
	fault
	inferred fault
	thrust fault

PL.Ⅱ－1－3

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE Ⅱ)

Geologic Map of the Tahilga Uula Area



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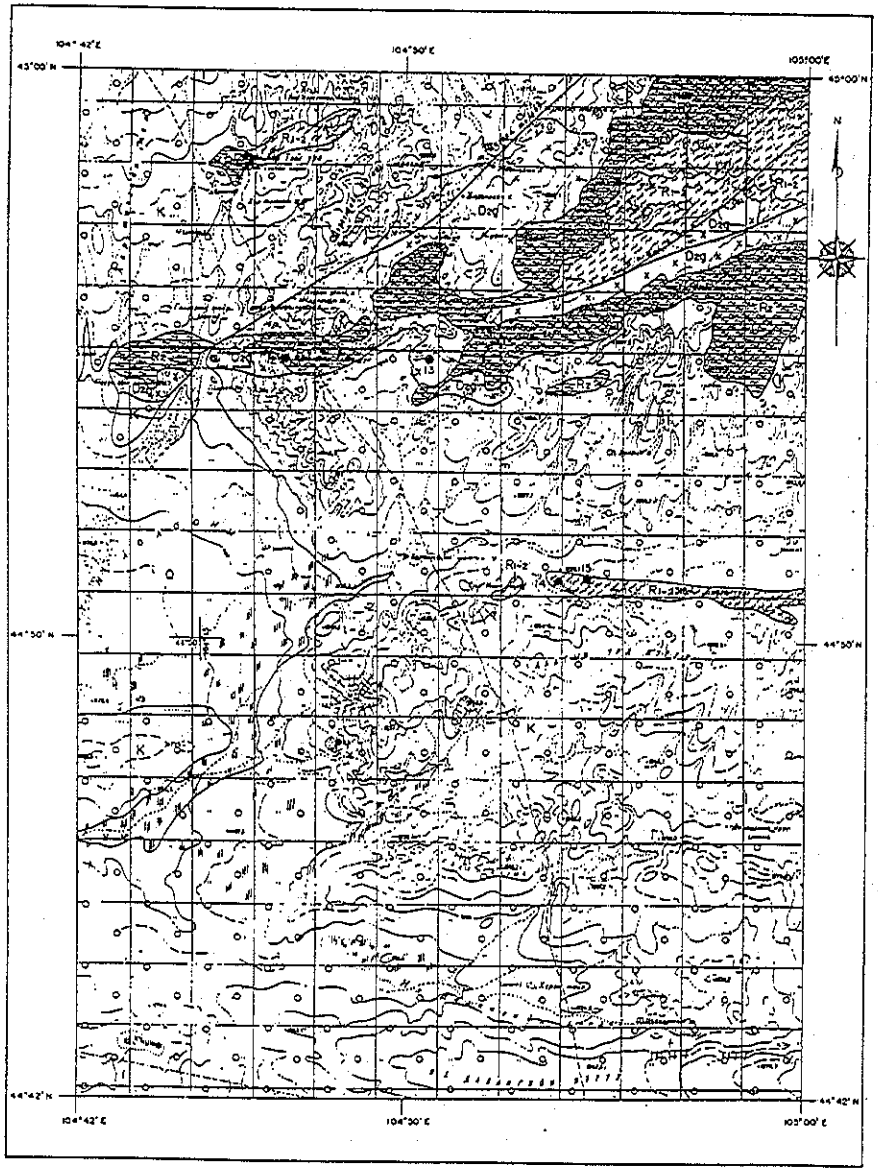
JANUARY 1993

Fig. Ⅱ-2-7-6 Geologic Map of the Takhilga-uula Area (phase Ⅱ)

Table Ⅱ-2-7-2 Ore-showings in the Takhilga-uula Area

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Note
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
7		Au	Qz-v	104° 26′ 23″	43° 51′ 43″	small quartz veins vein size Max. 0.15m×15m Some veinlets are sporadically seen in the area of 30m×300 m. Vein quartz is characterized by chalcedonic milky quartz very poor in sulfide.	siltstone, sandstone (C_3-P_1)	0.04 ～ 3.29	0.4 ～ 1.1	2	—	(Qz-ser-chl)	strike: N5°E, dip : 40°E Very poor in quartz vein and wall rock alteration.
8		—	Qz-v pegmatite	104° 31′ 21″	44° 11′ 58″	aplite dike cut by the veinlets of pegmatitic quartz. size of dike Max. 20 m×100 m	granite (C_{2-3})	—	—	—	—	(K-fel)	strike: N-S dip : vertical? No value for exploration
9		Au	Qz-v	104° 40′ 52″	44° 07′ 14″	single mono quartz vein size of the vein: 0.4 m×40m silicified zone:Max. 2 m×40m wall rock alteration is very small and weak.	dark gray schist(D_1)	—	—	—	—	Silicification	strike: N30°E, dip: 65°W No value for exploration



LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loess
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D2l		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1l		limestone
	D1b		sandstone, shale, siltstone
	D1a		shale, siltstone, sandstone
Silurian-Devonian	S-D1		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	R3		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	α		granodiorite porphyry
	d		diorite, microdiorite, diorite porphyry
	Pγ		granite, granorystite
	Pr		rhyolite, quartz porphyry
	C-Pγ		granite, granodiorite, granosyenite, diorite
	D2γ		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

● ore showing

	unit name and boundary
	strike and dip direction
	anticline
	syncline
	fault
	inferred fault
	thrust fault

PL.Ⅱ－1－4

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE Ⅱ)

Geologic Map of the Tsagaan Uula Area

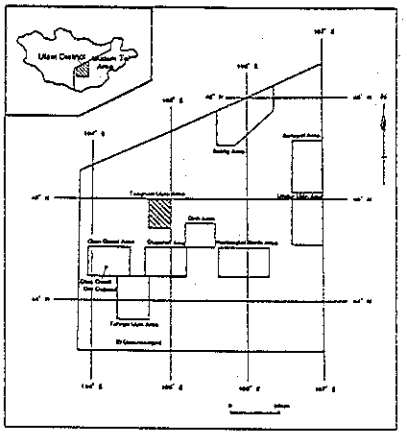


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Fig. Ⅱ-2-7-7 Geologic Map of the Tsagaan-uula Area (phase Ⅱ)

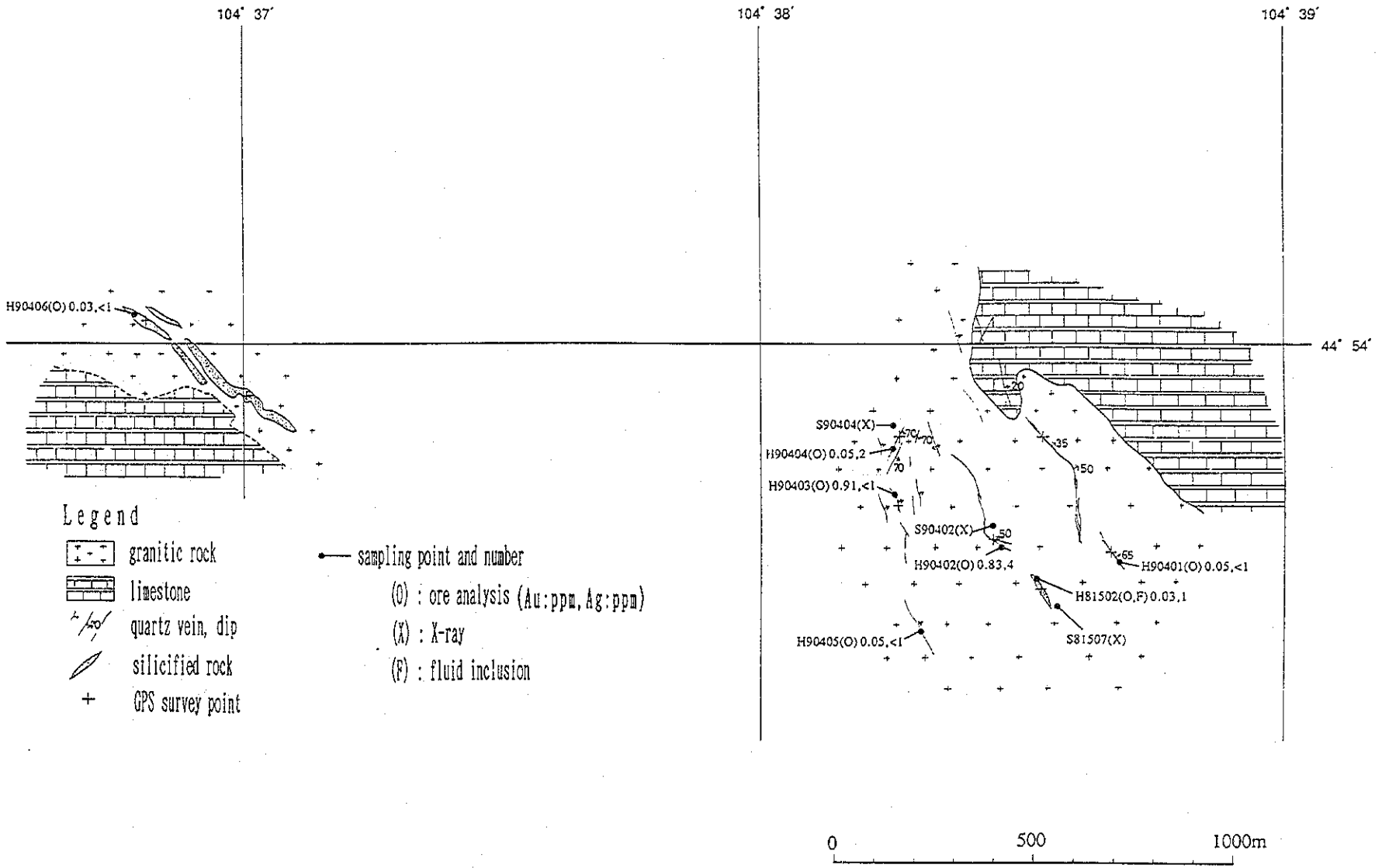


Fig. II-2-7-8 Geologic Map of Ore-showing No. 11

Table Ⅱ-2-7-3 Ore-showings in the Tsagaan-uula Area (1)

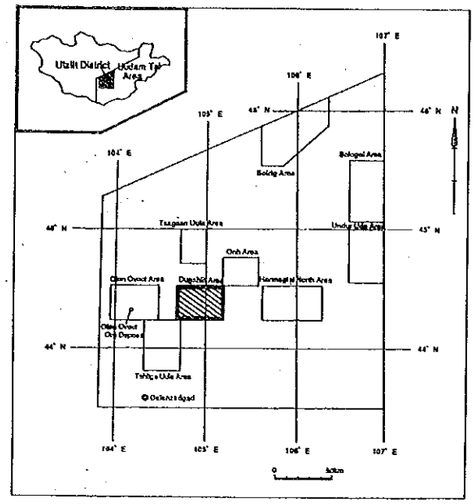
No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
10	Zuun hailhan Uul	Au	Qz-v	104° 35′ 44″	44° 53′ 18″	single quartz vein vein size Max. 4.5 m×1500m Vein quartz is characterized by chalcedonic milky quartz.	limestone, siltstone of Vendian-Cambrian	0.04	0.8	1	98 ～150 Av. 118	Qz-cal	Strike: N60° W, dip: 45° N enplaced in the fault
11	Huturiin Tol-goi	Au	Qz-v	104° 38′ 32″ ～ 104° 36′ 49″	44° 53′ 40″ ～ 44° 54′ 02″	quartz vein swarm vein size Max. 20 m×450 m vein zone 500 m×2,600 m milky white mono quartz	phyllite, lime limestone, granite (V-C)	0.03 ～ 0.91	0.4 ～ 3.8	7	259～298 Av. 276	Qz-ser	Strike: N30° ~45° W, dip: 50° ~70° NE
12	Makangiin Hur-en Uul	Au	Qz-v	104° 47′ 08″	44° 55′ 00″	Four milky mono quartz veins are aligned along the boundary between limestone and granite. vein size Max. 6m×60 m length of vein zone 350 m	granite and limestone	0.03	3.2	1	—	Qz-pl-K-fel-ser	Strike: N35° W, dip: 50° NE
13	Daaga Uul	Au	Qz-v	104° 50′ 41″	44° 55′ 00″	About twelve quartz veins are distributed in the area of 200 m× 300m. Milky white vein quartz is disseminated by small amount of galena.	limestone and schist	0.06	0.9	1	—	Qz-chl-cal	Strike: NS~N60° E, dip: 30° NW~50° SE
14		Au	Qz-v	104° 53′ 50″	44° 51′ 07″	stockwork of milky white quartz veinlets vein size Max. 2m× 40 m stock work: 30m×70m	pelitic schist	0.04	0.6	1	—	Qz-pl-ser-cal	Strike: N80° E, dip: 9 0° (champion vein)

Table Ⅱ-2-7-3 Ore-showings in the Tsagaan-uula Area (2)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
15		Au	Qz-v	104° 54′ 32″	44° 51′ 10″	four parallel quartz veins are seen in the area of 100 m× 100 m vein size Max. 6 m×30m Veins are characterized by milky white mono quartz and development of hydro-fracturing.	limestone.	0.03	0.6	1	—	Qz-Ser-chl	Strike: N80° E, dip: 90° ? This area is mostly covered by aluvial deposit.

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE II)

Geologic Map of the Dugshih Area



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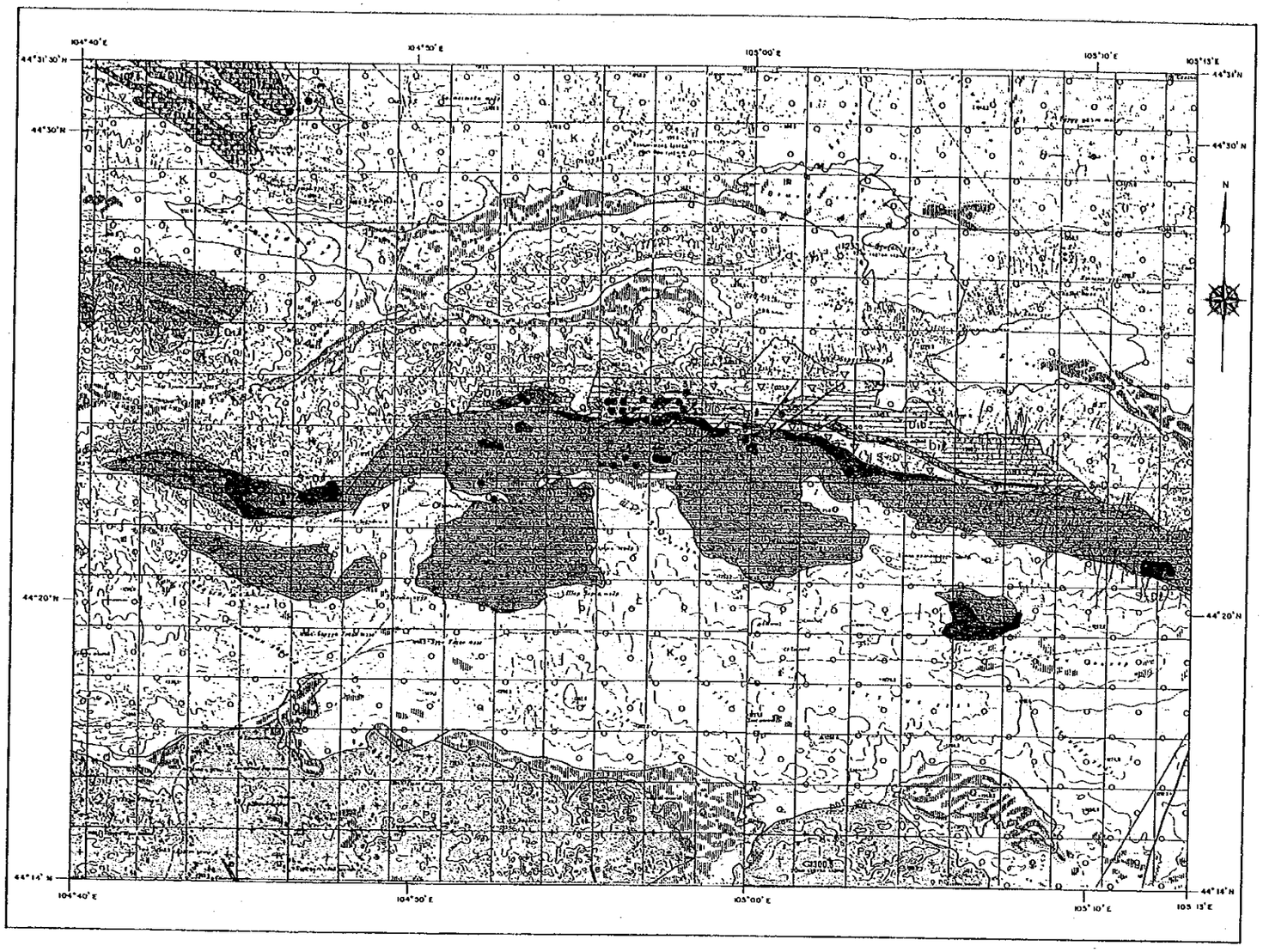


LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D3l		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1l		limestone
	D1b		sandstone, shale, siltstone
	D1s		shale, siltstone, sandstone

Silurian-Devonian	S-Dl		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	Rl		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	ε		granodiorite porphyry
	d		diorite, microdiorite, diorite porphyry
	Pγ		granite, granosyenite
	Pr		rhyolite, quartz porphyry
	C-Pγ		granite, granodiorite, granosyenite, diorite
	D2γ		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

● ore showing

K	unit name and boundary
	strike and dip direction
	anticline
	syncline
	fault
	inferred fault
	thrust fault

Fig. II-2-7-9 Geologic Map of the Dugshih Area (phase II)

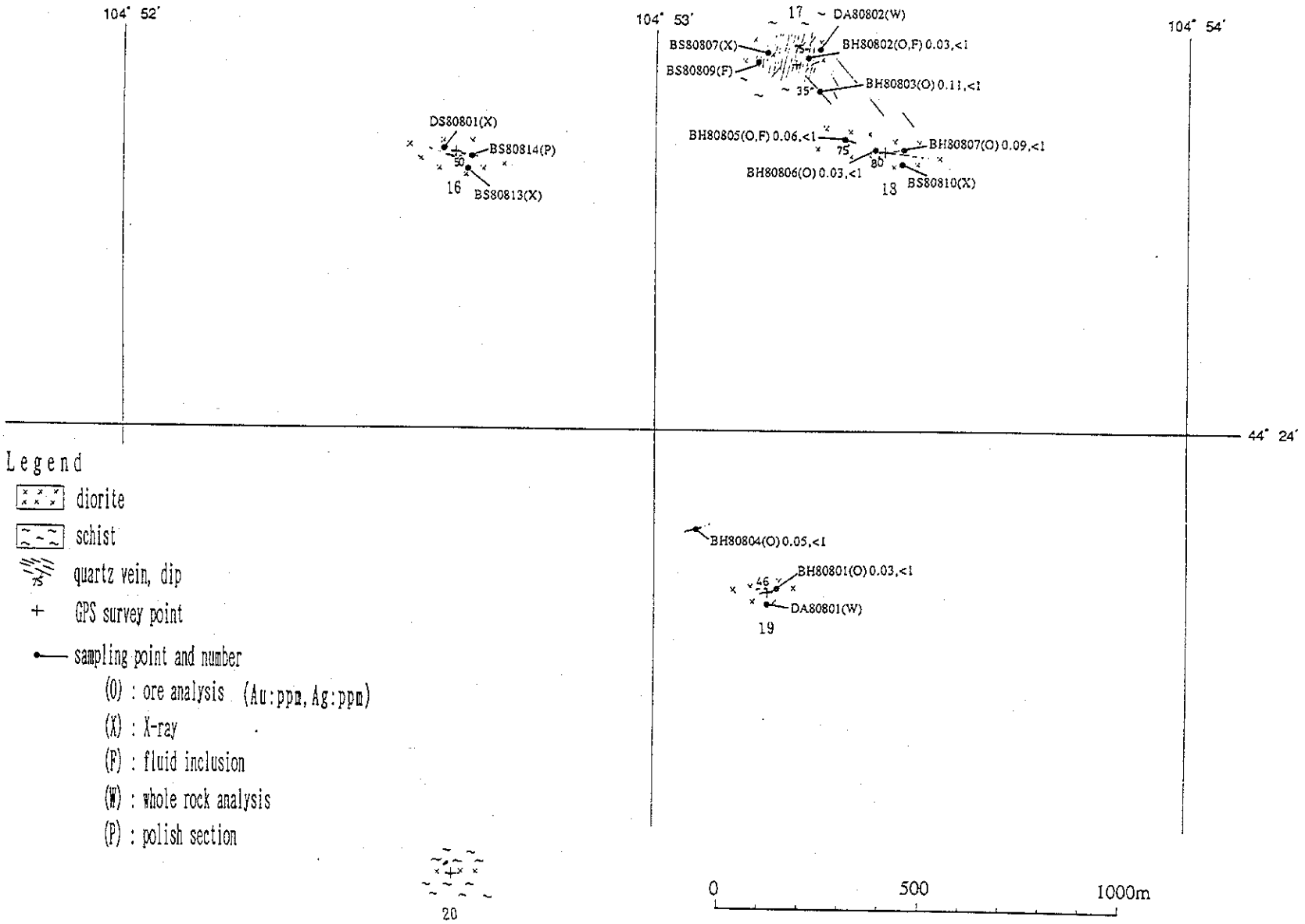


Fig. Ⅱ-2-7-10 Geologic Map of Ore-showings No. 16～20 (Bayan-bor-nuruu)

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (1)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
16		Au	Qz-v	104° 52′ 38″	44° 24′ 22″	Five quartz veins are seen in the area of 30m×80m. vein size Max. 0.6 m×25m Milky white quartz contains small amount of pyrite, pyrrohtite and chalcopyrite.	micro diorite	0.03 ~ 0.09	0.4	2	—	(Qz-chl)	Strike: N50° W~N80° W. dip: 50° ~75° S
17	Bayan Bor Nuruu	Au	Qz-v	104° 53′ 16″	44° 24′ 29″	quartz vein swarm vein size Max. 0.4 m×120 m vein zone: EW 120 m×NS 140m milky white mono quartz 23~25 veins / section average width: 0.15 m	diorite	0.03	0.4	2	120~320	Qz-ser-chl-pl	Strike: N30° ~50° E. dip: 50° ~80° W
18	Bayan Bor Nuruu (eastern extension)	Au	Qz-v	104° 53′ 26″	44° 24′ 23″	More than ten milky monoquartz veins are seen in the area of EW 500m×NS 200m. Maximum size of a vein is 0.7 m wide × 80 m long.	diorite. schist	0.06	0.6	1	—	Qz-chl-cal-pl	Strike: N50° ~80° W. dip: 75° ~80° SW
19		Au	Qz-v	104° 53′ 13″	44° 23′ 47″	Three quartz veins are distributed in the area of 30m×40m. Milky white vein quartz is disseminated by small amount of pyrite.	diorite	0.03	0.6	1	—	(Qz-chl)	Strike: N80° E. dip: 46° N

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (2)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
20		Au	Qz-v	104° 52′ 40″	44° 23′ 24″	quartz vein swarm formed at the contact of diorite and psammitic schist vein size: Max. 0.7 m×15 m vein zone: EW 60m×NS 30 m	diorite and schist	0.03	0.4	1	—	(Qz-chl)	Strike: N80° W, dip: 90°? Three vein zones are recognized.
21		Au	Qz-v	104° 52′ 04″	44° 22′ 36″	milky white chalcedonic quartz vein at the contact of diorite and schist vein size: Max. 0.3 m×4.5 m	diorite and schist	—	—	—	—	(Qz-chl)	Strike: N75° W, dip: 30° S
22	Umnu Nuur (eastern extension)	Au	Qz-v	104° 52′ 12″ ～ 104° 52′ 46″	44° 22′ 12″ ～ 44° 22′ 21″	More than ten milky white quartz veins are seen in the area of EW 800m×NS 100m. Maximum size of a vein is 1.5 m wide × 100m long.	micro diorite andesite	0.03 ～ 0.04	0.4 ～ 0.6	2	—	Qz-chl-pl	Strike: N70°~80° E. dip: 10°~75° S epi-chl alt. no sulfide
23	Sultin Hudag (eastern extension)	Au	Qz-v	104° 56′ 23″	44° 23′ 11″	More than five milky white quartz veins are seen in the area of EW 200m×NS 200m. Maximum size of a vein is 2 m wide × 30 m long. This area is completely covered by alluvial deposits.	not obvious	0.03	0.4	2	129～289	?	Strike: N70° E, EW. dip: steep pyrite and goethite are visible

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (3)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
24		Au	Qz-v	104° 56′ 23″	44° 23′ 11″	milky white chalcedonic quartz veins in the diorite rock body. vein size: Max. 0.3 m×10m vein zone: Max. 10m×30m	diorite	—	—	—	—	Qz-chl	Strike: N70° W, dip: 45° N
25	Repelnii	Au	Qz-v	104° 55′ 50″	44° 24′ 23″	quartz vein swarm formed at the contact of diorite and psammitic schist vein size: Max. 4.2 m×88m vein zone: EW 140 m×NS 100m	diorite and schist	0.03	0.4	3	139~354	Qz-ser-cal pl	Strike: N85° W, dip: 35°~60° N There are two vein zones and four trenches applied to them.
26		Au	Qz-v	104° 56′ 01″	44° 24′ 23″	milky white chalcedonic quartz veins scattered in the diorite rock body vein size: Max. 1.8 m×15m vein zone: Max. 50m×150 m More than twelve small veins are seen in two vein zones.	diorite					Qz-Ser	Strike: N70°~85E, dip: 75°~80° N
27		Au	Qz-v	104° 56′ 16″	44° 24′ 12″	Six semi-transparent mono-quartz veins are sporadically seen in pelitic mica schist. vein size: Max. 0.5 m×3 m vein zone: Max. 30m×40m	diorite	—	—	—	—	(Qz-Ser)	Strike: N10° W, dip: ?

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (4)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
28		Au	Qz-v	104° 56′ 17″	44° 24′ 24″	milky white chalcedonic quartz vein zone in sericite schist vein size: Max. 0.3 m×5 m vein zone: Max. 3 m×65m about ten small quartz veins	sericite schist	—	—	—	—	(Qz-Ser)	Strike: N70° W, dip: ?
29		Au	Qz-v	104° 56′ 52″	44° 24′ 26″	quartz vein swarm formed in the pelitic schist vein size: Max. 0.3 m×5 m vein zone: Max. 25m×150 m	pelitic schist	—	—	—	—	Qz-chl-pl	Strike: N77° W, dip: 85 ° N
30		Au	Qz-v	104° 57′ 13″	44° 24′ 19″	milky white chalcedonic mono-quartz vein in the diorite rock body vein size: Max. 1.8 m×80m	diorite	0.02 ～ 0.04	0.4 ～ 0.6	2	142～204 Av. 174	Qz-ser-cal	combination of two veins N55° E, 75~90° N ×N70° E, 75° S
31		Au	Qz-v	104° 58′ 05″	44° 24′ 34″	parallel quartz veins in psammitic schist vein size: Max. 0.5 m×80m vein zone: Max. 50m×200 m Wesern end of the zone is covered by colluvial deposit. average vein ratio≦ 10 %	diorite	0.07	0.4	1	162～343 Av. 252	Qz-ser-chl-pl	Strike: N80° W, dip: 75° ~90° S

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (5)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
32		Au	Qz-v	104° 57′ 54″	44° 24′ 22″	milky white chalcedonic quartz vein zone in sericite schist vein size: Max. 0.1 m×10m vein zone: Max. 3 m×60m	sericite schist, diorite	0.03	0.6	1	101～301 Av. 182	Qz-chl-pl	Strike: N80° E, dip: 45S. Strike: N55° E, dip: 55S
33		Au	Qz-v	104° 58′ 03″	44° 24′ 14″	four parallel quartz veins in diorite rock body vein size: Max. 3 m×80 m vein zone: Max. 50m×80 m milky white mono quartz	diorite	0.03	0.4	1	130～292 Av. 196	Qz-Ser-chl-cal-pl	Strike: N45° E, dip: 75° NW
34	Treshinii	Au	Qz-v	104° 55′ 59″	44° 24′ 12″	ten to eleven parallel quartz veins in the diorite rock body milky white mono-quartz vein size: Max. 0.6 m×30m vein zone: Max. 50m×30m	diorite	0.03	0.6 ～ 1.3	2	151～329 Av. 238	Qz-pl	Strike: N20° E, dip: 60°～80° W
35		Au	Qz-v	104° 56′ 41″	44° 23′ 01″	three quartz veins along the boundary between diorite and psammitic schist vein size: Max. 0.3 m×10m vein zone: Max. 40m	diorite	—	—	—	—	(Qz-ser)	Strike: N63° E, dip: 35° N

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (6)

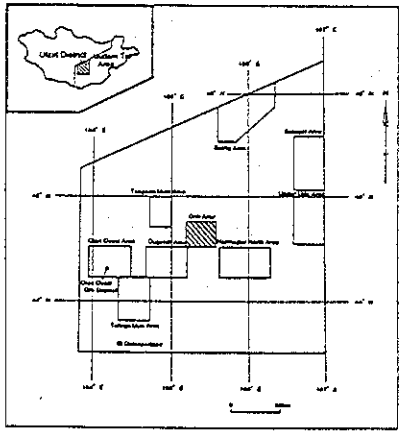
No.	Name of deposit	Mineral	Type of Deposit	Coodinate Longitude	Coodinate Latitude	Characteristics and Size	Host Rock	Assay Au(g/t)	Assay Ag(g/t)	Assay pcs	Filling Temp ℃	Alteration type	Remarks
36		Au	Qz-v	104° 57′ 14″	44° 23′ 10″	Three quartz veins are seen in the area of 20m×70m. vein size Max. 0.6 m×20m Milky white mono quartz	micro diorite	—	—	—		(epi-chl)	strike: N75° E. dip: 90°
37	Haraat Shand	Au	Qz-v	105° 00′ 02″	44° 23′ 24″	quartz vein swarm vein size Max. 0.5m×30m vein zone: EW 20m×NS 30 m milky white mono quartz 10 veins / section average width: 0.2 m	diorite	0.04	1.5	1	—	(Qz-ser)	strike: N25° W. dip: 75° SW
38		Au	Qz-v	104° 59′ 55″	44° 23′ 35″	Five parallel milky mono-quartz veins are seen in the area of EW 100m× NS 20m. Maximum size of a vein is 3 m wide × 40 m long.	diorite (schistose)	0.03	0.4	1	154～325 Av. 243	(Qz-ser)	strike: N70°～85° E. dip: 45°～85° NW
39		Au	Qz-v	104° 00′ 59″	44° 24′ 08″	milky white mono quartz vein zone vein size Max. 1m×35m vein zone:NS 100m× EW 1000m	diorite (schistose)	0.03	0.4	1	149～392 Av. 251	Qz-cal	strike: N80° w. dip: 80° N
40	Dersen Us Hudag	Au	Qz-v	104° 46′ 51″	44° 30′ 46″	milky white mono quartz veins vein size Max. 5m×150 m vein zone:NS 100m× EW 1000m	schist (pelitic)	0.03	< 0.3 ～ 2.5	2	110～262 Av. 199	ser-chl	strike: N60° w. dip: 60° NE~90° Mn Oxide bering

Table Ⅱ-2-7-4 Ore-showings in the Dugshih Area (7)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Scale	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
41		Au	Qz-v, sil-r, alt clay	104° 46′ 16″	44° 30′ 30″	white clay zone with pyrite-rich silicified rock and fragments of milky white chalcedonic vein quartz size of alteration zone: EW ≧100 m× NS ≧300 m	schist	0.03 ～ 0.04	< 0.3 ～ 2.7	4	—	Qz-ka-ser	Strike: N15° W, dip: 90° ? Hot spring type
42	Ayagch	Au	Qz-v	105° 03′ 23″	44° 32′ 50″	milky white chalcedonic quartz vein with silicified rock single vein, mono-quartz vein size: Max. 8 m×300 m average width 1 ～2 m	syenite	0.03	0.4	1	139～319	—	Strike: N70° W, dip: 90° ?

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE II)

Geologic Map of the Onh Area



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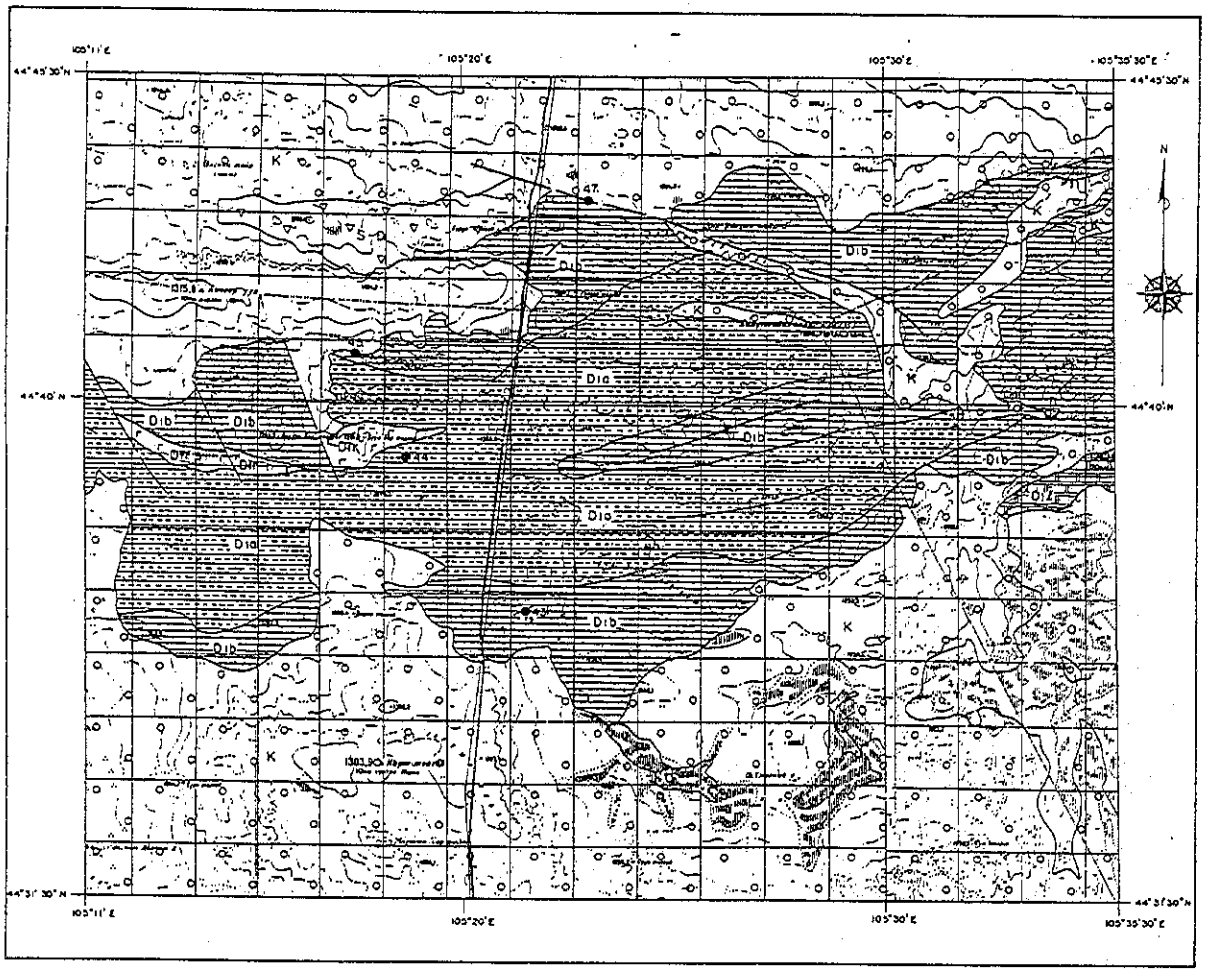
METAL MINING AGENCY OF JAPAN
JANUARY 1993



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LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D3f		limestone
	D3		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1f		limestone
	D1b		sandstone, shale, siltstone
	D1a		shale, siltstone, sandstone

Silurian-Devonian	S-Df		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	R3		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	ε		granodiorite porphyry
	δ		diorite, microdiorite, diorite porphyry
	P3		granite, granosyenite
	Pr		rhyolite, quartz porphyry
	C-P3		granite, granodiorite, granosyenite, diorite
	D2i		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

● ore showing

	unit name and boundary
	strike and dip direction
	anticline
	synecline
	fault
	inferred fault
	thrust fault

Fig. II-2-7-11 Geologic Map of the Onh Area (phase II)

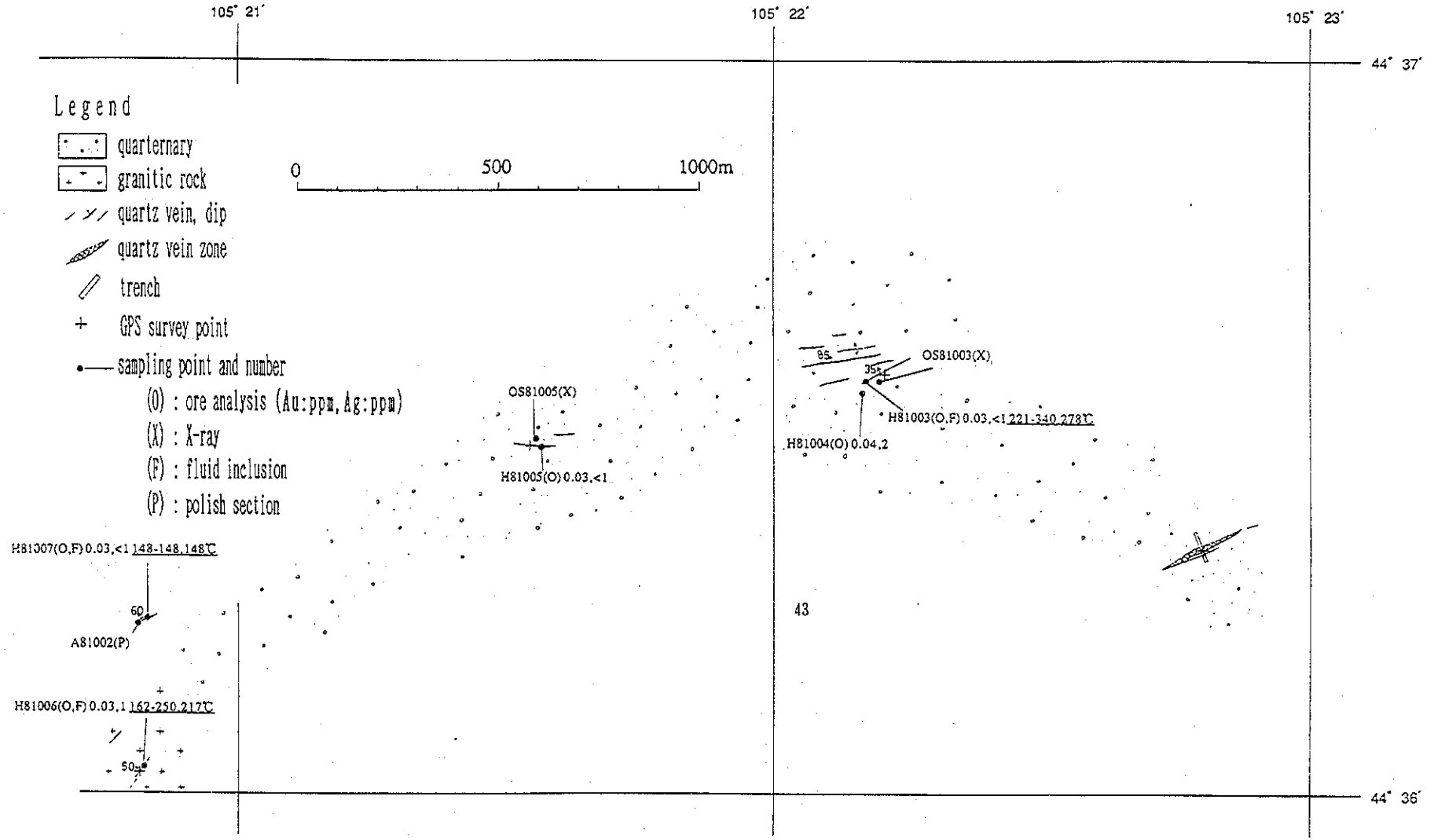


Fig. Ⅱ-2-7-12 Geologic Map of Ore-showing No. 43 (Onh)

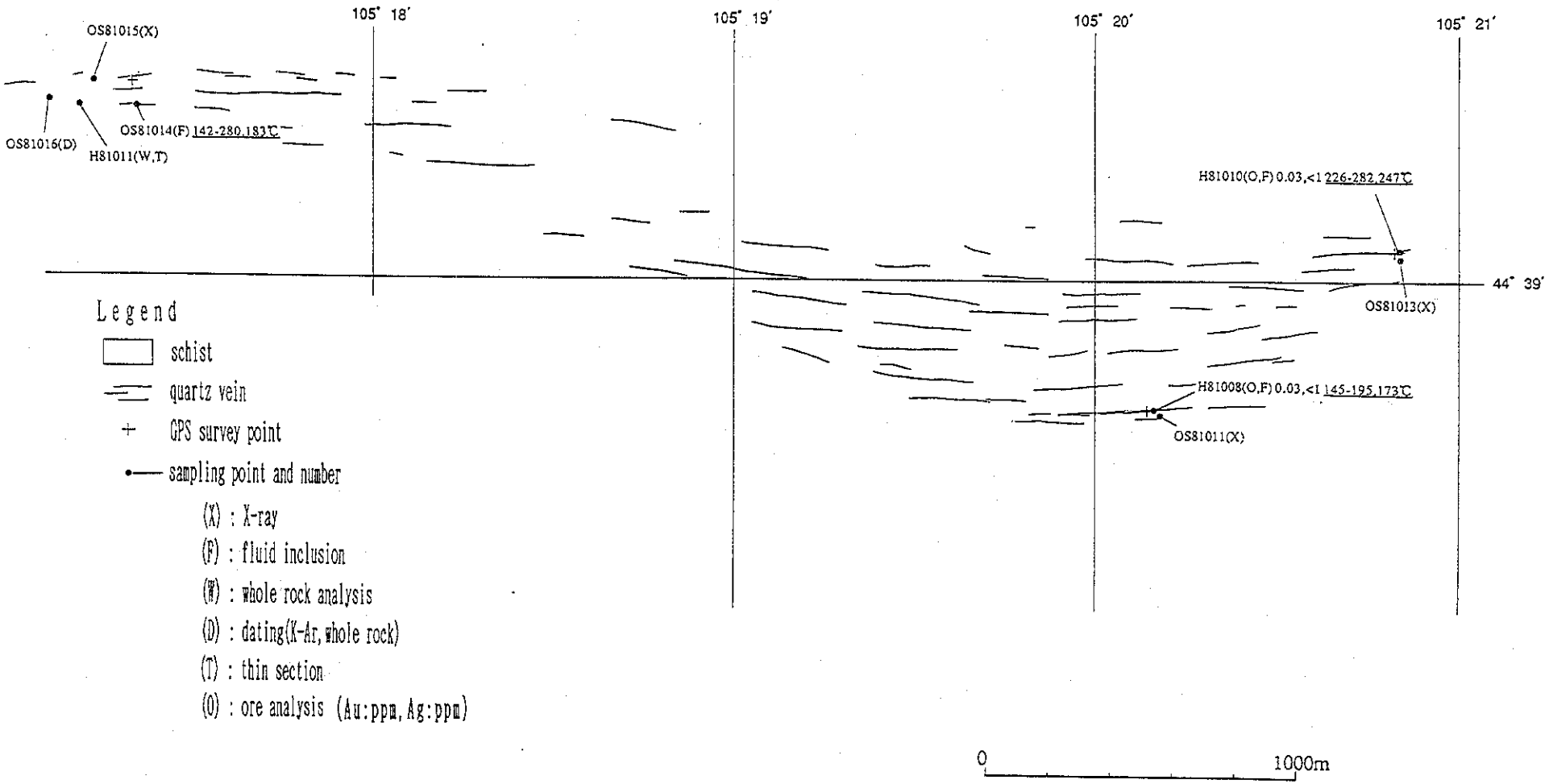


Fig. Ⅱ-2-7-13 Geologic Map of Ore-showing No. 44 (North-onh)

Table Ⅱ-2-7-5 Ore-showings in the Onh Area (1)

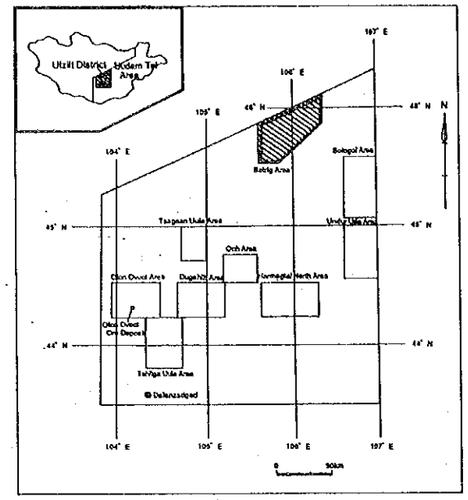
No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
43	Onh	Au	Qz-v	105° 22′ 12″ ～ 105° 20′ 50″	44° 36′ 32″ ～ 44° 36′ 14″	Many quartz veins are scattered in the area of 3.000 m × 1.000 m. vein size Max. 1m wide, 50 ～ 200 m long This area is mostly covered by colluvial deposit and dune sand	schist(S_2 - D_1), granite rhyolite and gabbro	0.03 ～ 0.04	< 0.3 ～ 1.7	7	148～340	Qz-ser-cal-pl	strike: N60°~80° E. dip: 35° NW~90°
44	North Onh	Au	Qz-v	105° 20′ 08″ ～ 105° 17′ 13″	44° 38′ 45″ ～ 44° 39′ 23″	parallel quartz vein swarm vein size Max. 2.0m×150 m vein zone: EW 3.500 m×NS 500 m milky white mono quartz veins run every 10～20m intervals	schist(S_2 - D_1)	0.03	< 0.3 ～ 0.6	3	142～282	Qz-ser-cal-pl	strike: E-W, dip: steeply dipping to the north or south
45		Au	Qz-v	105° 17′ 26″	44° 40′ 46″	parallel quartz veins quartz veins are seen in the area of EW 800m× NS 100 m. Maximum size of a vein is 4 m wide × 80 m long.	gry ser sch (S_2 -D_1)	0.03	< 0.3	1	182～305	Qz-ser-chl-pl	strike: N70° W dip: 85° S
46		Au	Qz-v	105° 18′ 12″	44° 41′ 03″	milky white mono quartz vein (amethyst bearing) vein size Max. 0.5 m×8 m	schist (S_2 - D_1)	0.03	0.4	1	—	—	strike: N70° E, dip: 9 0°

Table Ⅱ-2-7-5 Ore-showings in the Onh Area (2)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
47		Au	Qz-v.	105° 22′ 55″	44° 43′ 24″	milky white chalcedonic quartz veins aligned along the border line between tal and hilly zone vein size Max. 1m×2 m vein zone 100 m long	trachy-andesite (J_3)	0.03	< 0.3	1	—	Qz-talc	strike: N70° W, dip: vertical

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE II)

Geologic Map of the Soirig Area



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JANUARY 1993

LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D2f		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1f		limestone
	D1b		sandstone, shale, siltstone
	D1a		shale, siltstone, sandstone
Silurian-Devonian	S-Df		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Riphean	Rf		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	ε		granodiorite porphyry
	δ		diorite, microdiorite, diorite porphyry
	Pγ		granite, granosyenite
	Pr		rhyolite, quartz porphyry
	C-Pγ		granite, granodiorite, granosyenite, diorite
	D2γ		granite, granodiorite
	D2δ		diorite, gabbro
	D1r		rhyolite, dacite

ore showing

K	unit name and boundary
	strike and dip directon
	anticline
	syncline
	fault
	inferred fault
	thrust fault

Fig. II-2-7-14 Geologic Map of the Soirig Area (phase II)

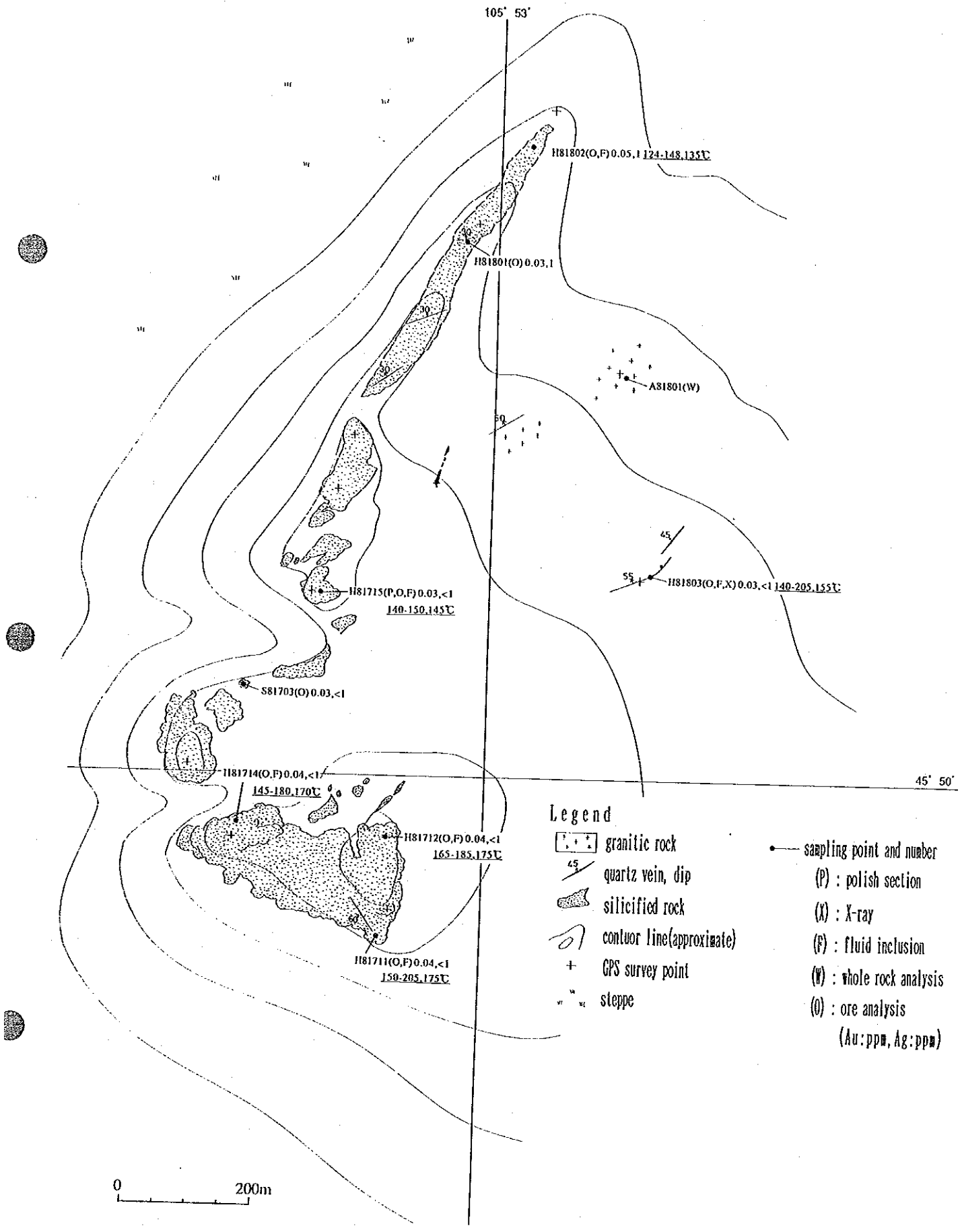
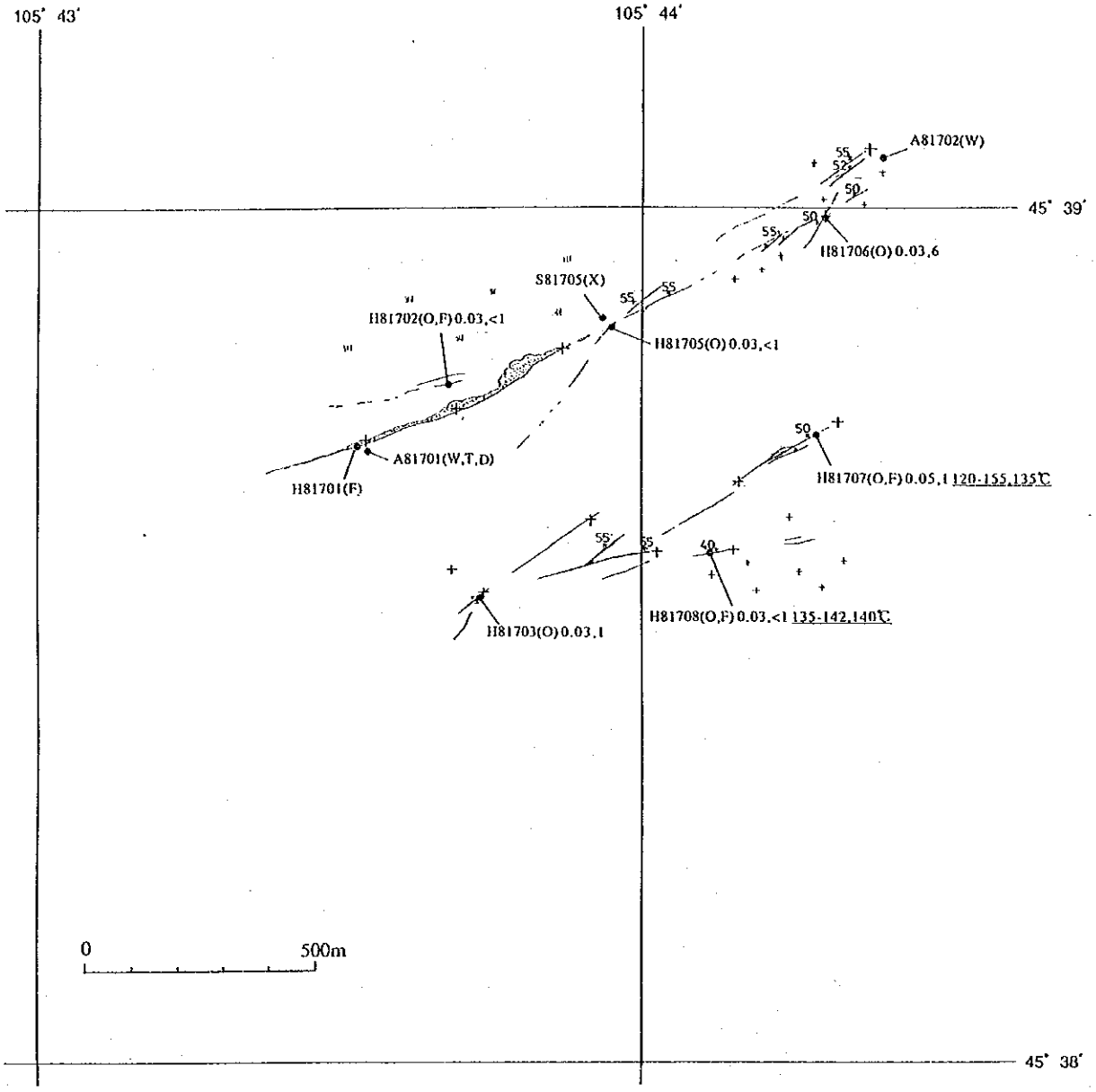


Fig. Ⅱ-2-7-15 Geologic Map of Ore-showing No. 51 (Munh-tsagaan-tolgoi)



Legend

- granitic rock
- quartz vein, dip
- silicified rock
- \+ GPS survey point
- steppe
- sampling point and number
  - (O) : ore analysis (Au:ppm, Ag:ppm)
  - (X) : X-ray
  - (F) : fluid inclusion
  - (W) : whole rock analysis
  - (T) : thin section
  - (D) : dating(K-Ar, whole rock)

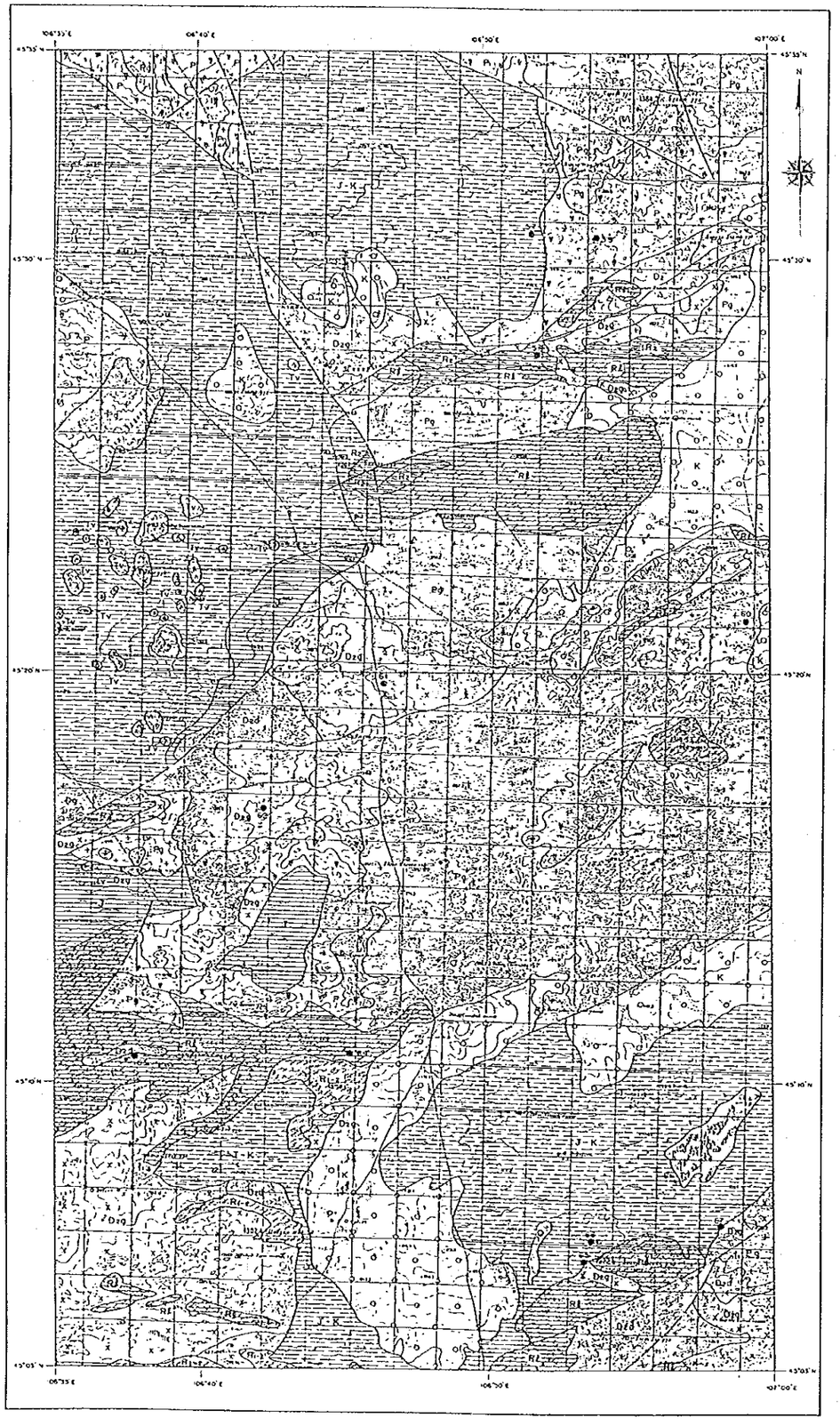
Fig. Ⅱ-2-7-16 Geologic Map of Ore-showing No. 52 (Zalaa-uul)

Table Ⅱ-2-7-6 Ore-showings in the Soirig Area(1)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate Longitude	Coodinate Latitude	Characteristics and Size	Host Rock	Assay Au(g/t)	Assay Ag(g/t)	Assay pcs	Filling Temp ℃	Alteration type	Remarks
48		Cu	Skarn	105°19′18″ ～ 105°19′29″	45°43′46″ ～ 45°44′01″	magnetite-epidote-garnet skarn green copper bearing there are two ore showings ①four ore bodies, Max. 20 m× 50m, alignes N70°E direction zone: 650 m× 80 m Cu<0.3% ②two ore bodies, Max. 20m× 20m, alignes N-S direction zone: 50m× 20 m Cu<0.3%	alkali-granite	—	—	—	—	epidote-garnet	strike: N70°E, N-S dip: ?
49		Au	Qz-v silicified zone	105°47′16″	45°56′00″	Four milky white quartz veins align N 65°W direction with silicified zone. Maximum size of a vein is 2 m wide × 15 m long. vein zone: 50 m long	gneissose-granite	—	—	—	—	(Qz-ser)	strike: N65°W dip: 85°SW
50	North Munh Tsagaan Tolgoi	Au	Qz-v	105°55′59″ ～ 105°56′25″	45°52′02″ ～ 45°52′12″	single quartz vein with silicified rock, mono-quartz Maximum size of the vein is 20m wide × 1,500m long.	granite	0.03 ～ 0.12	0.4 ～ 0.6	3	—	Qz-ser	strike: N50°E~N72°E dip: steeply to N?
51	Munh Tsagaan Tolgoi	Au	Qz-v	105°52′47″	45°49′53″	massive siliccified rock and milky white mono-quartz veins Max. size 340m×1300m	granite	0.03 ～ 0.05	0.4 ～ 1.3	9	124～205	Qz-ser-K-fel	strike: N30°E~N70°E dip: 30°~50°NW

Table Ⅱ-2-7-6 Ore-showings in the Soirig Area(2)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate		Characteristics and Size	Host Rock	Assay			Filling Temp ℃	Alteration type	Remarks
				Longitude	Latitude			Au(g/t)	Ag(g/t)	pcs			
52	Zalaa Uul	Au	Qz-v.	105° 43′ 41″ ～ 105° 44′ 22″	45° 38′ 35″ ～ 45° 39′ 04″	milky white quartz vein and massive silicified rock vein size Max. 20 m×1500m vein zone: 700m×1500m mono-quartz vein with hydro-fracturing	granite	0.03 ～ 0.05	0.6 ～ 5.7	6	119～202	Qz-ser-chl K-fel-pl	strike: N60° E~N85° E dip: 40°~55° N
53	Ongon Tsagaan Tolgoi	Au	Qz-v.	105° 41′ 57″ ～ 105° 41′ 32″	45° 34′ 49″ ～ 45° 34′ 34″	three milky white quartz veins and stockwork of quartz vein-lets, partly silicified vein size Max. 2m×120 m vein zone: 300m×700 m mono-quartz vein with small amount of pyrite	trachy-andes-ite	0.03	0.6 ～ 2.7	2	122～202	Qz-Ser	strike: N10° W, N4 5° E. E-W dip: 80° E, 40° N, 60° NW
54		SiO_2	pegmat-ite	106° 14′ 29″	46° 03′ 03″	pegmatite quartz vein(milky white monc-quartz vein size: 1.5m×20m	granite	—	—	—	—	(K-feld)	strike: N80° E, dip: 90°?
55		SiO_2	pegmat-ite	106° 39′ 41″	45° 55′ 36″	massive pegmatite quartz size: 50m ×150m, 50m ×80m	granite	—	—	—	—	(K-feld)	elliptic shape area: 200m×200m
56		china clay	china clay	106° 55′ 16″	45° 44′ 19″	china clay deposit in lithoid-itic welded tuff size: 50m ×100m class×3~4	lithoiditic welded tuff	—	—	—	—	(Qz-ser)	elliptic shape area: 400m×400m



LEGEND

Geologic Age	Geologic Unit	Symbol	Rock Types
Quaternary	Q		sand, gravel, loam
Tertiary	Tv		olivine basalt
Cretaceous	K		sandstone, siltstone, conglomerate, limestone, coal
Jurassic-Cretaceous	J-K		conglomerate, siltstone, sandstone
	J-Kv		basalt, trachybasalt-trachyandesite, trachyte
Jurassic	J		conglomerate, siltstone, sandstone
	Jv		trachyte-dacite, trachyrhyolite
Permian	P		trachyte, andesite, trachyandesite, dacite, tuff
Carboniferous-Permian	C-P		basalt, trachyandesite, andesite, tuff, conglomerate
Carboniferous	C		sandstone, siltstone, conglomerate, mudstone
Devonian-Carboniferous	D-C		tuffaceous conglomerate, sandstone, siltstone
Devonian	D2ℓ		limestone
	D2		basalt, trachybasalt, andesite, dacite, rhyolite, tuff
	D1ℓ		limestone
	D1b		sandstone, shale, siltstone
	D1a		shale, siltstone, sandstone
Silurian-Devonian	S-Dℓ		limestone
	S-D		dacite, rhyolite, andesite, tuff, phyllite, shale
Silurian	S		sandstone, siltstone, shale, phyllite
Undifferentiated Paleozoic	PZ		sandstone, siltstone, clayey shale
Ripheian	Rℓ		recrystallized limestone
	R2		quartzite, phyllite, siltstone, sandstone, amphibolite
	R1-2		shale, amphibolite, quartzite, phyllite, gneiss
Intrusive Rocks	e		granodiorite porphyry
	d		diorite, microdiorite, diorite porphyry
	Pg		granite, granosyenite
	Pr		rhyolite, quartz porphyry
	C-Pg		granite, granodiorite, granosyenite, diorite
	D2g		granite, granodiorite
	D2d		diorite, gabbro
	D1r		rhyolite, dacite

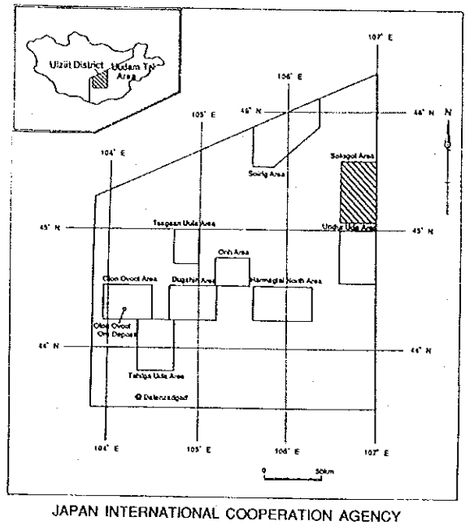
● ore showing

K	unit name and boundary
	strike and dip directon
	anticline
	syncline
	fault
	inferred fault
	thrust fault

PL. II – 1 – 9

MINERAL EXPLORATION
IN
THE UUDAM TAL AREA, MONGOLIA (PHASE II)

Geologic Map of the Sologoi Area



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
JANUARY 1993

0 5 10km

Fig. II-2-7-17 Geologic Map of the Sologoi Area (phase II)

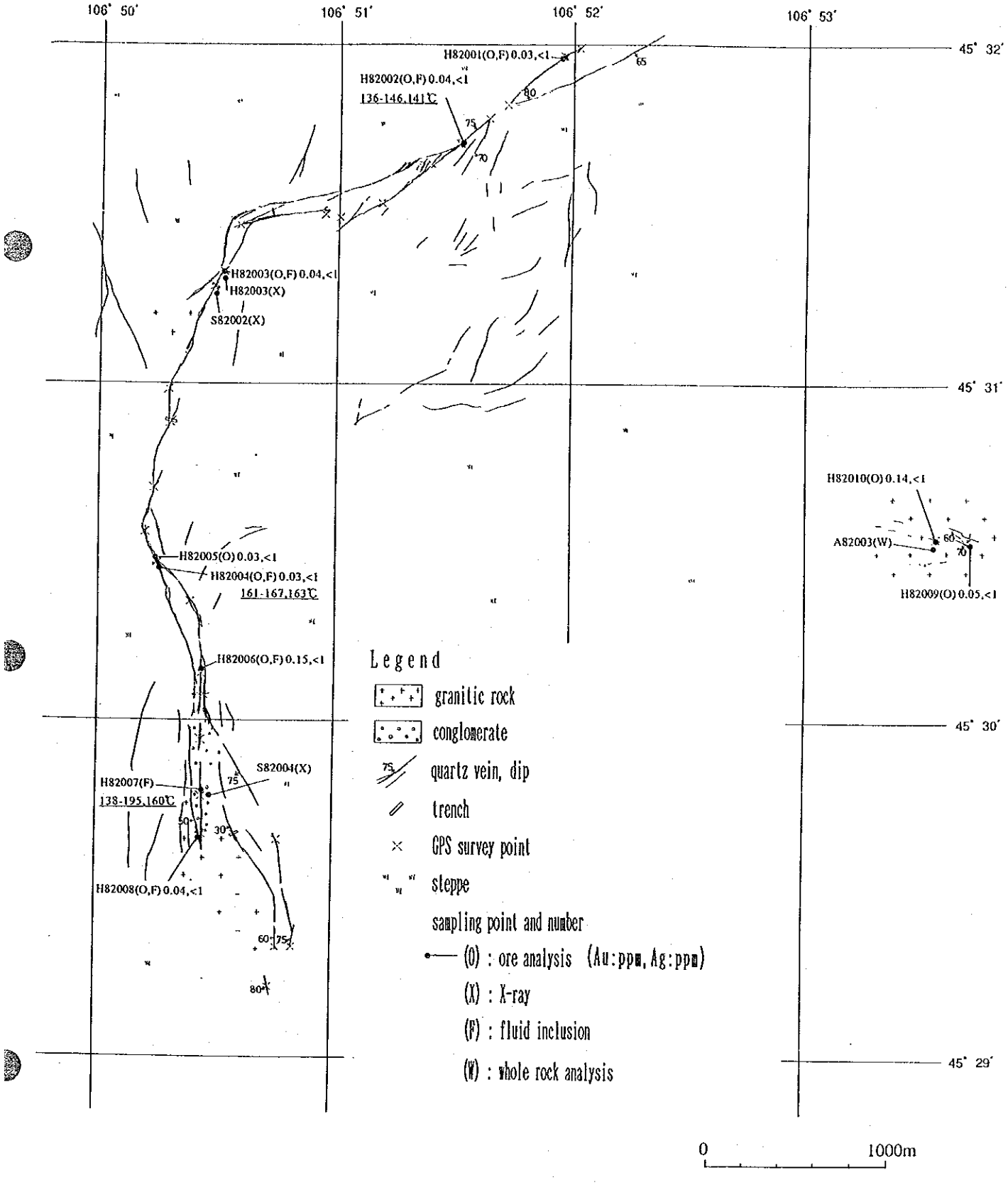
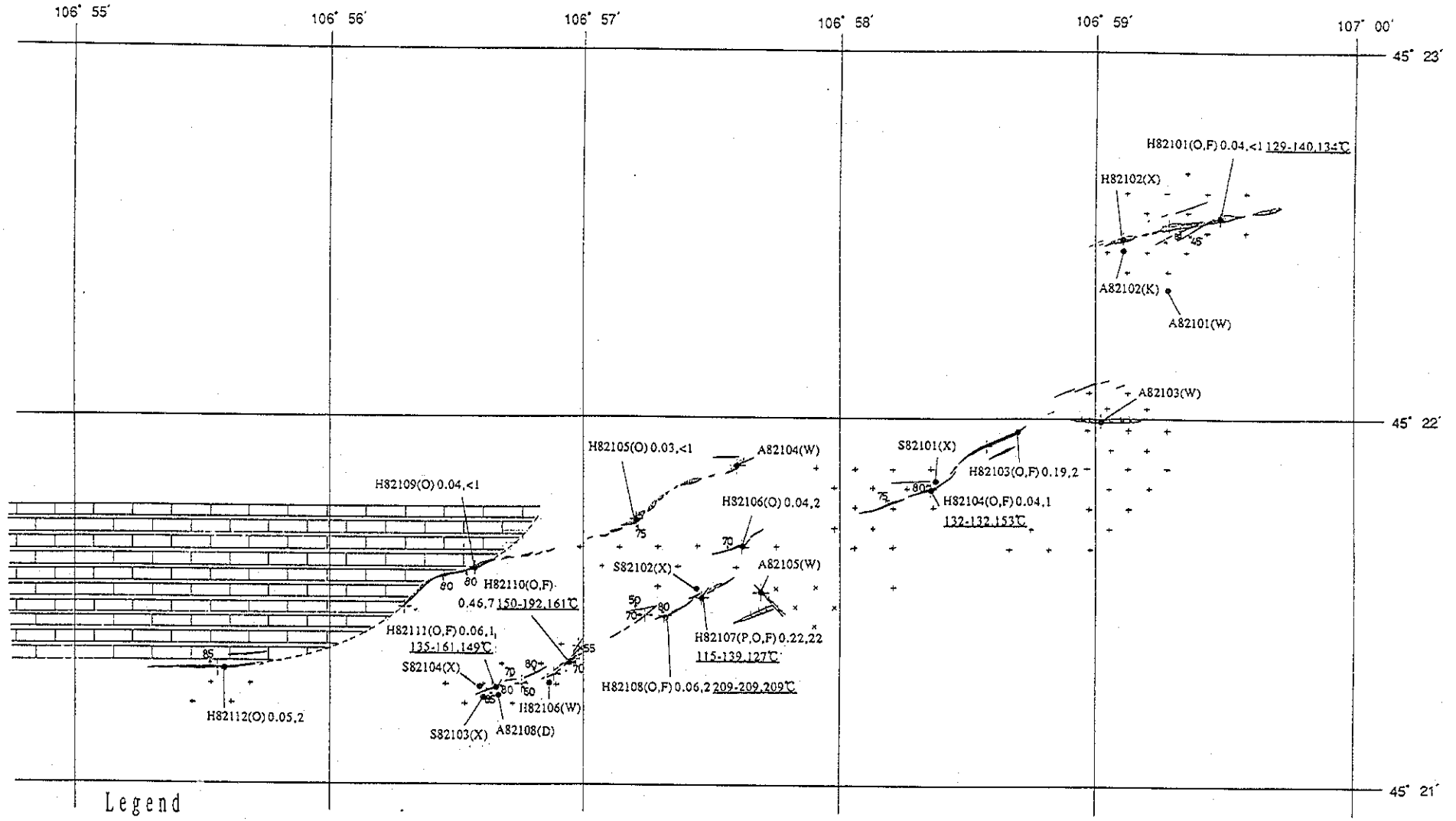


Fig. Ⅱ-2-7-18 Geologic Map of Ore-showing No. 57 (Dersen-us-hudag)



Legend

- limestone
- rhyolite
- granitic rock
- diorite
- quartz vein, dip
- silicified rock
- GPS survey point
- sampling point and number
- (O) : ore analysis (Au:ppm, Ag:ppm) (W) : whole rock analysis
- (X) : X-ray (P) : polish section
- (F) : fluid inclusion
- (D) : dating (K-Ar, whole rock)

Fig. Ⅱ-2-7-19 Geologic Map of Ore-showing No. 60 (Morit)

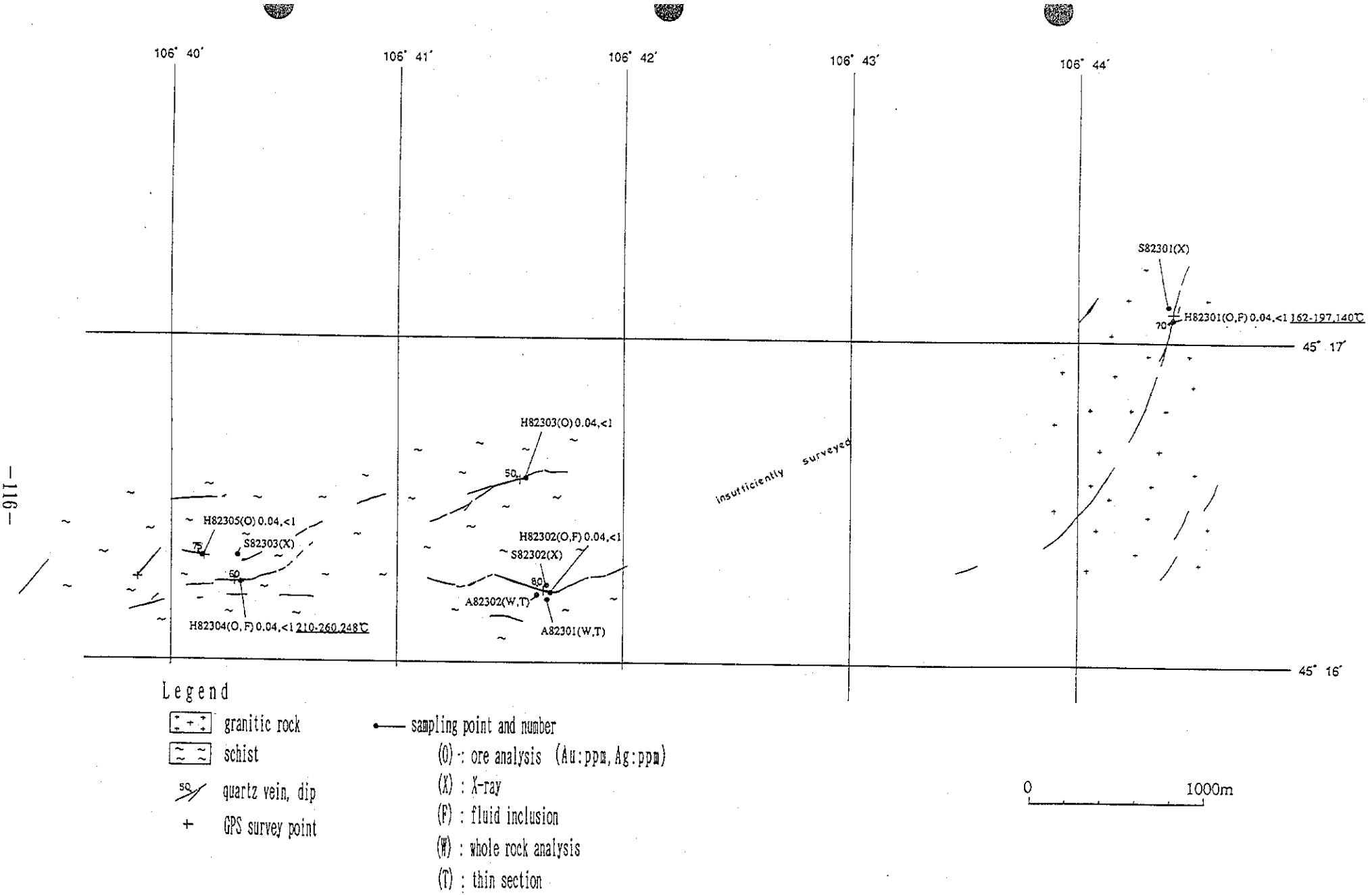


Fig. II-2-7-20 Geologic Map of Ore-showing No. 62 (Futui-us)

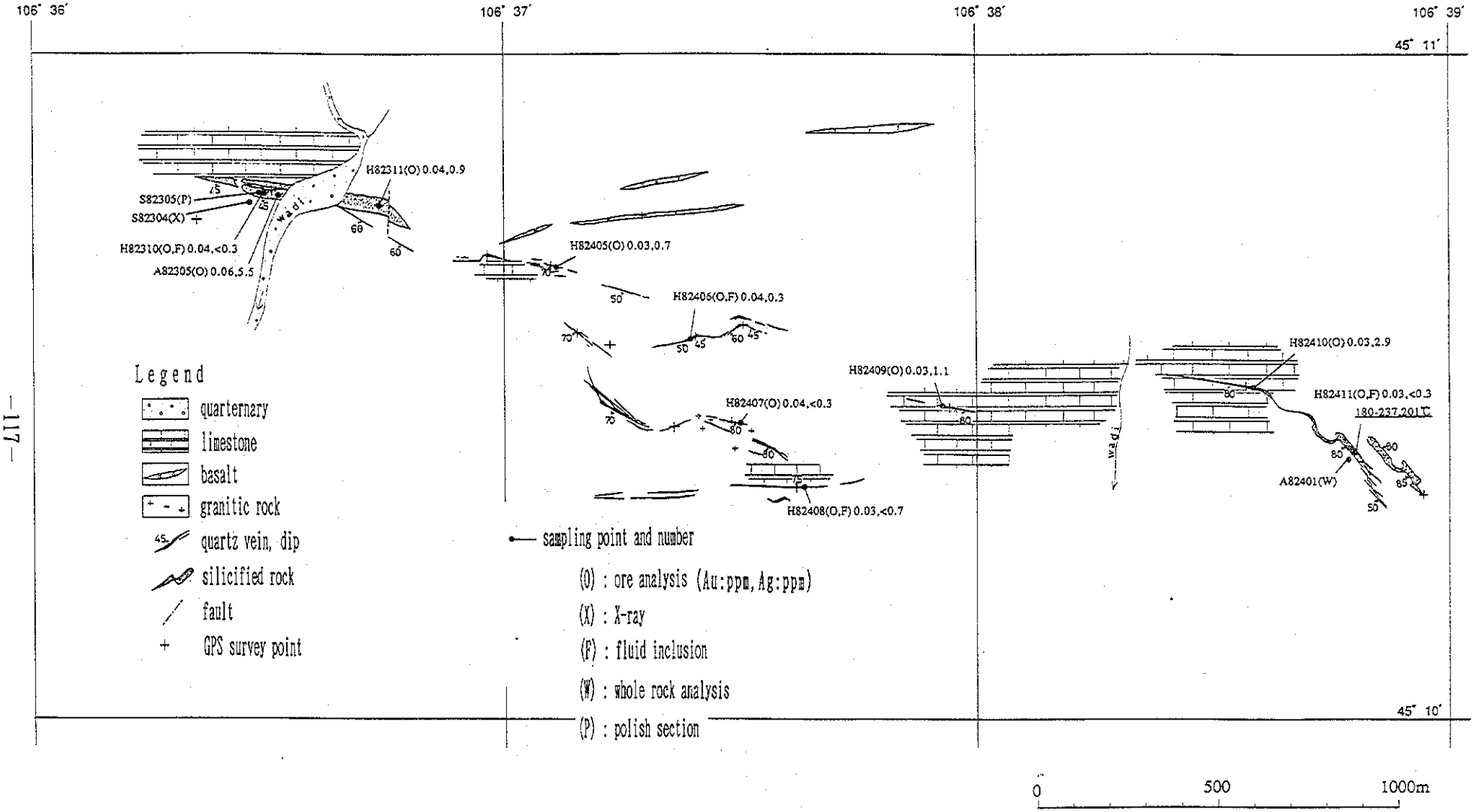


Fig. Ⅱ-2-7-21 Geologic Map of Ore-showing No. 63 (Ulziit-ovoo)

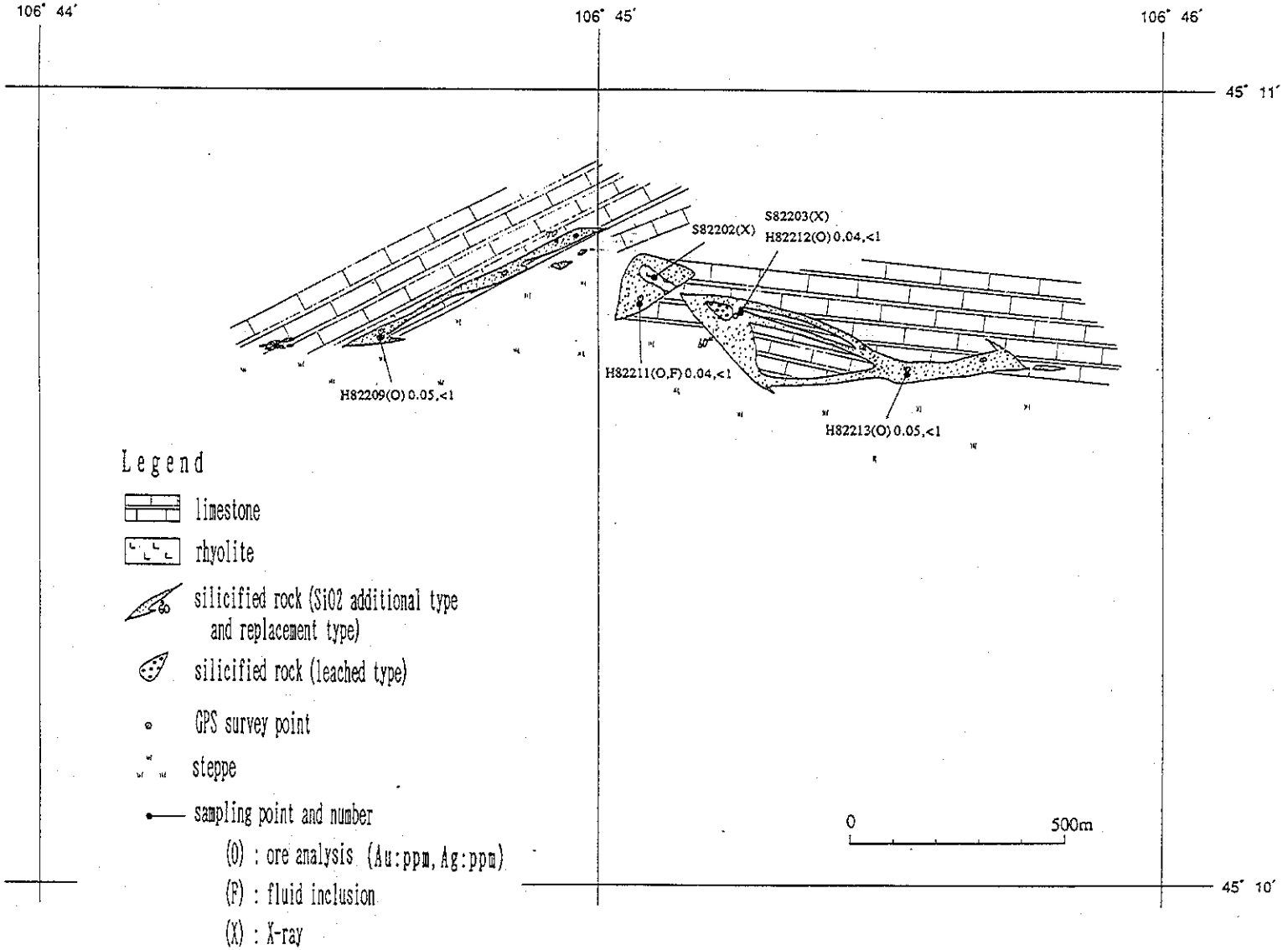


Fig. Ⅱ-2-7-22 Geologic Map of Ore-showing No. 64 (Sologoi-bayan)

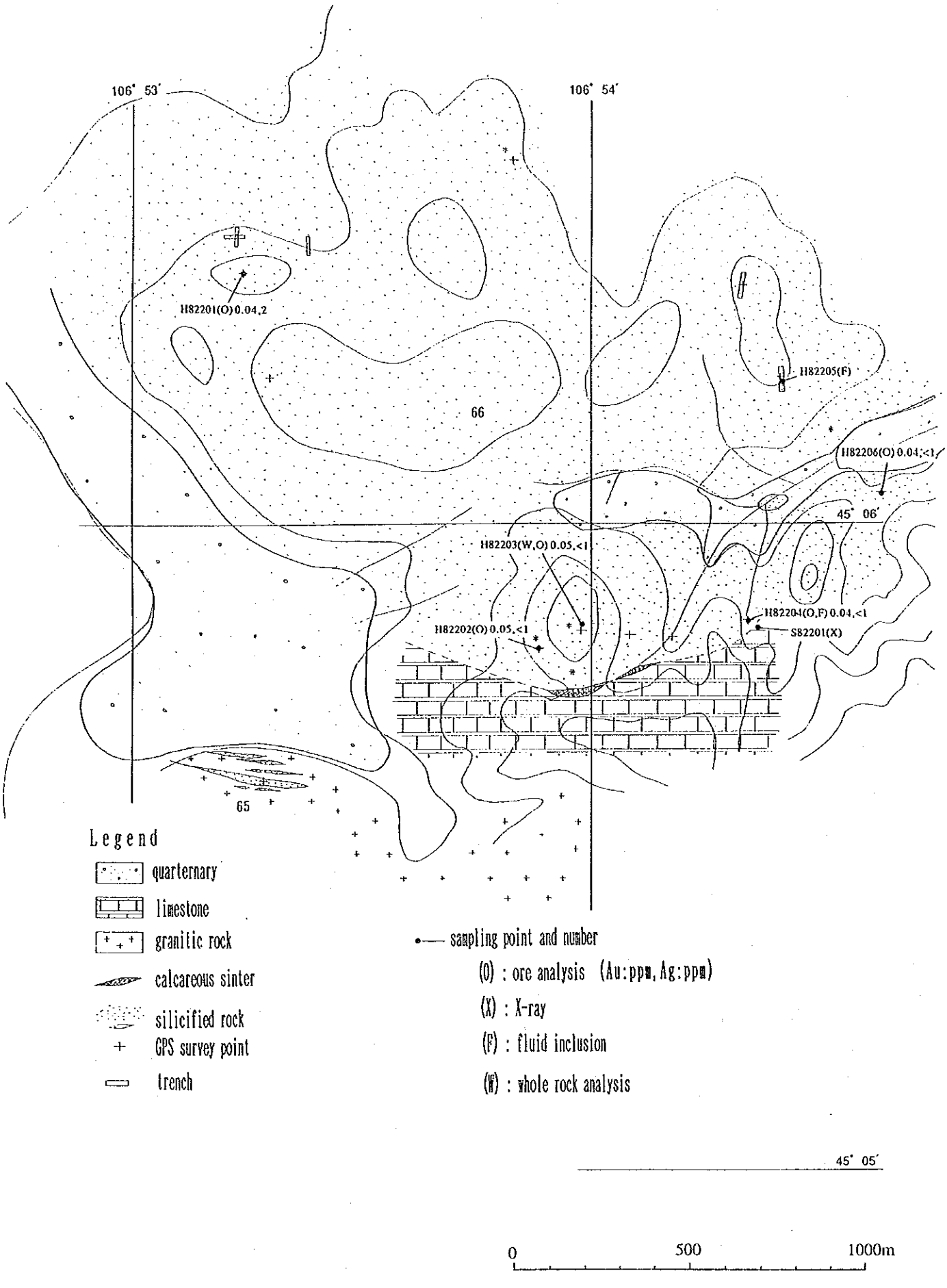


Fig. Ⅱ-2-7-23 Geologic Map of Ore-showing No. 65, No. 66 (Hetsuu-tsagaan-tolgoi)

Table Ⅱ-2-7-7 Ore-showings in the Sologoi Area (1)

No.	Name of deposit	Mineral	Type of Deposit	Coodinate Longitude	Coodinate Latitude	Characteristics and Size	Host Rock	Assay Au(g/t)	Assay Ag(g/t)	Assay pcs	Filling Temp ℃	Alteration type	Remarks
57	Dersen Us HUdak	Au	Qz-v	106° 52′ 00′ ～ 106° 50′ 51′	45° 31′ 59′ ～ 45° 29′ 20′	many quartz veins, silicified rocks and stock works are seen in the area of 3 km ×6 km. vein size Max. 15m×6.5 km chalcedonic quartz vein has banded structure.	granite(PZ1), tuff, tuff-breccia, conglomerate sandstone (P_{1-2})	0.03 ～ 0.15	< 0.3 ～ 0.4	7	136～195	Qz-pl-K-fel	Strike: N80° E~N60° E~N20° E~N-S~N45° W~N80° W dip: 50° ~90° to both side hydro-fracturing and geyserite are seen. fluorite occures
58		Au	Qz-v	106° 51′ 39′	45° 27′ 45′	milky white chalcedonic mono-quartz veins (parallel veins) vein size Max. 10m×120 m vein zone 300 m×300 m Southeastern end of Dersen Us Hudag	granite(PZ1),	—	—	—	—	—	Strike: N45° ~70° E, N50° W dip: 90° ? hematite-bearing hydro-fracturing, csg mono qz
59		Au	Qz-v	106° 53′ 41′	45° 30′ 33′	milky white chalcedonic mono-quartz veins(parallel veins) vein size Max. 0.6m×50m vein zone 100 m×300 m Eastern end of Dersen Us Hudag	diorite, schist	0.05 ～	< 0.3 ～	2	—	Qz-pl-K-fel	Strike: N45° ~70° W, dip: 60° ~90° SW banded
60	Morit	Au	Qz-v	106° 59′ 29′ ～ 106° 58′ 28′	45° 22′ 32′ ～ 45° 19′ 58′	Six major quartz veins and silicified rocks are distrib-uted in a couple of vein zones vein size Max. 5m×1,000 m vein zone 1 km×6.5 km pyrite, pyrrhotite, chalcopyrite	granite(PZ_1) limestone(V-C_1)	0.03 ～ 0.46	<0.3 ～ 21.6	11	115 ～209	Qz-ser-K-fel-pl	Strike: N65° ~80° E, dip: 50° ~80° N, 75° ~80° S