

REFERENCES

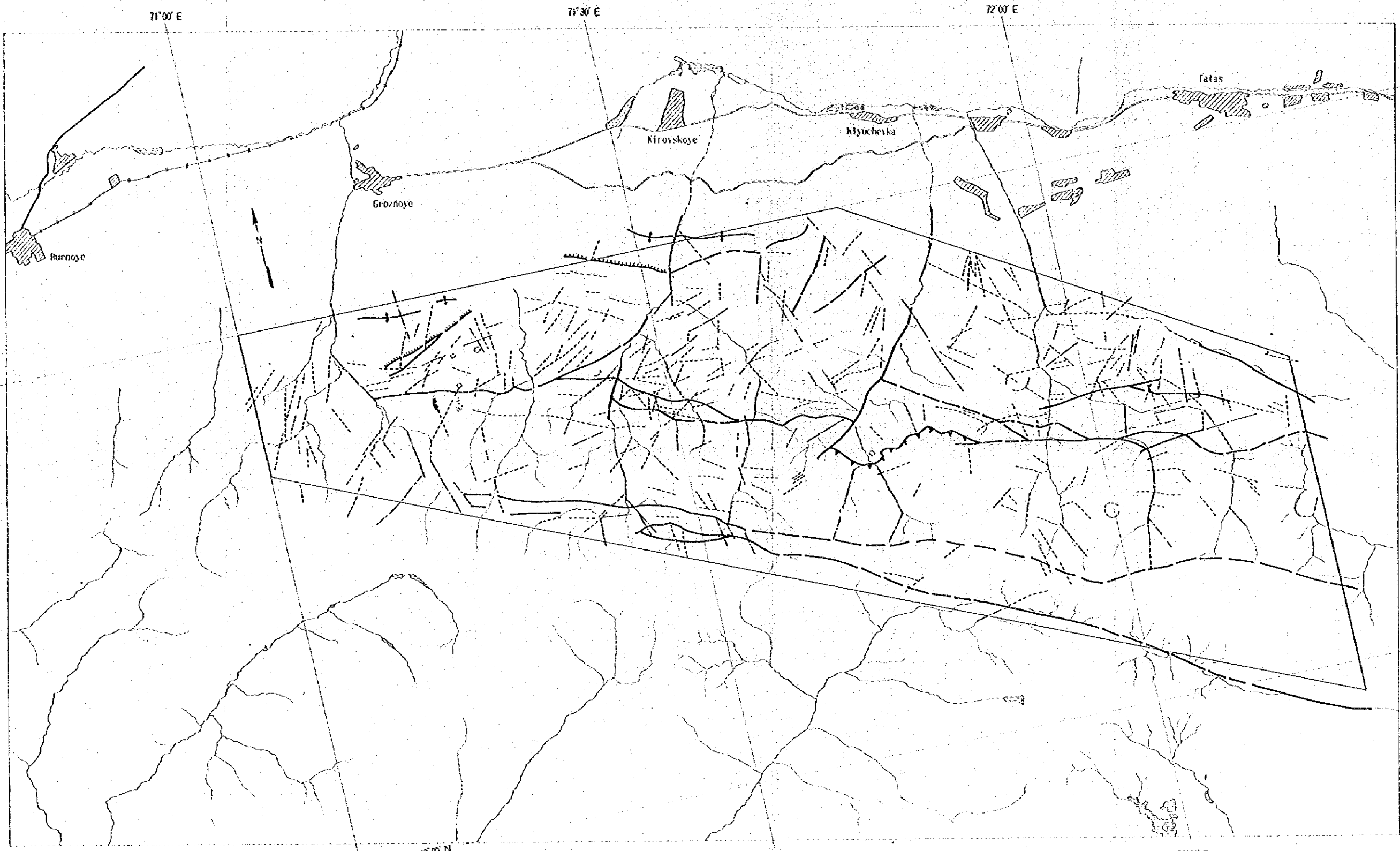
1. Academy of Kyrgyz SSR (1987) : Atlas of Kyrgyz SSR. 157p. (in Russian)
2. Bakirov A. B. and Kiselev V. V. eds (1988) : Precambrian and Lower Paleozoic of Tien-Shan. Ilm press. Furunze. 155p. (in Russian)
3. Bakirov A. B. and Kotov V. V. (1988) : Eclogite-bearing metamorphic formation - Indicators of joining zones of ancient continents. In "Precambrian and Lower Paleozoic of Tien Shan." p.4-24 (in Russian)
4. Bekker A. U., Makarov B. A. and Rázboynikov A. G. (1988) : New data on the stratigraphy of Káragainskaya formation in Talas Ala-Too (Northern Tien-Shan). In "Precambrian and Lower Paleozoic of Tien Shan." p.100-126 (in Russian)
5. Kiselev V. V., Bekker A. U. and Apayarov F. H. (1988) : Epibaikalsky Precambrian of Tien-Shan. in "Precambrian and Lower Paleozoic of Tien Shan." p.127-144 (in Russian)
6. Magakyan I. G. (1979) : Metallogeny. Nedra. (in Russian).
The Japanese edition. Gendaikougakusha Press 394p.(in Japanese)
7. MMAJ (1994) : Circumstance on mineral exploration in the Kyrgyz Republic. 80p. (in Japanese)
8. Ryabko I. I. (1992) : Brief summary of mineral resources in Talas ore area of the Republic of Kyrgyzstan. Northern-Kyrgyzskaya geological expedition. (in Russian)
9. Sokolov B. S. (1979) : Vend. Principle of isolation, boundary and time-scale. "Stratigraphy of upper Proterozoic in USSR": Nauka, p.43-61. (in Russian)
10. Sokolov B. S. (1984) : Vendian system, position on stratigraphic scale. "27th Stratigraphy". Nauka, p.111-127. (in Russian)

THE MIN
IN T
THE F

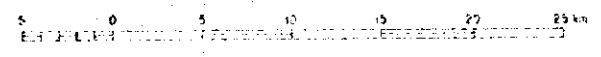
LINEAMENT MA



JAPANITE
META

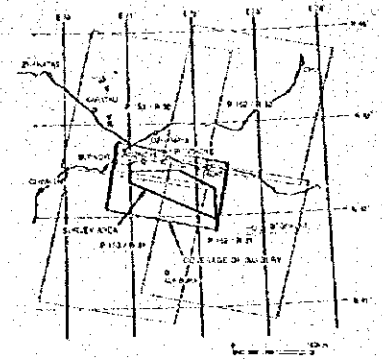


	Fault (barbs on down)
	Inferred Fault (barbs on up)
	Thrust Fault
	Major Lineament
	Minor Lineament
	Circular Structure
	Anticline
	Drainage
	Lake, Pond
	Urban Area
	Major Road
	Rail Way

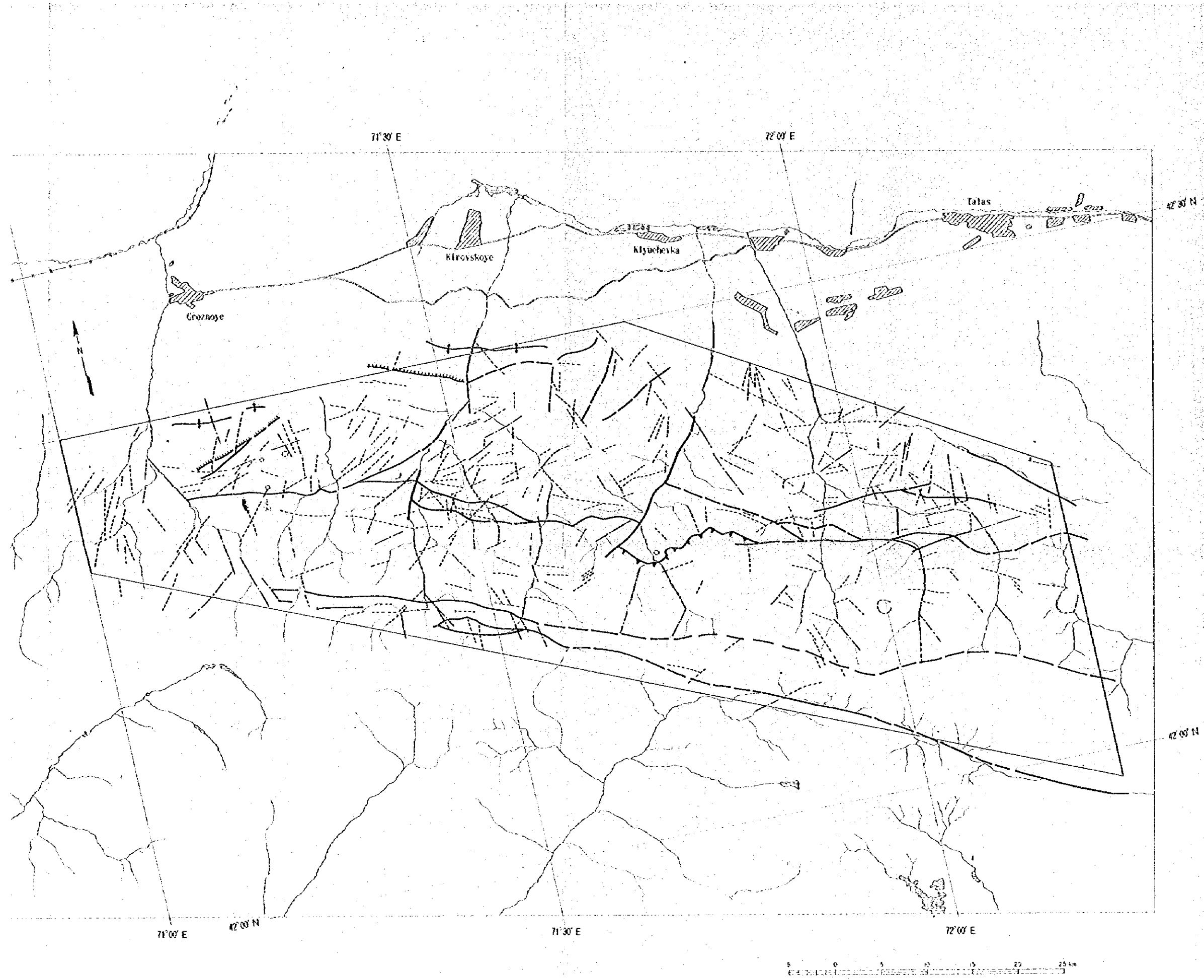


THE MINERAL EXPLORATION
IN THE TALAS AREA,
THE KYRGYZ REPUBLIC
(PHASE I)

LINEAMENT MAP OF LANDSAT TM IMAGE



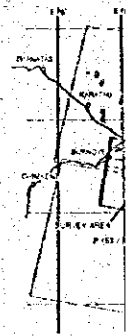
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY, 1995



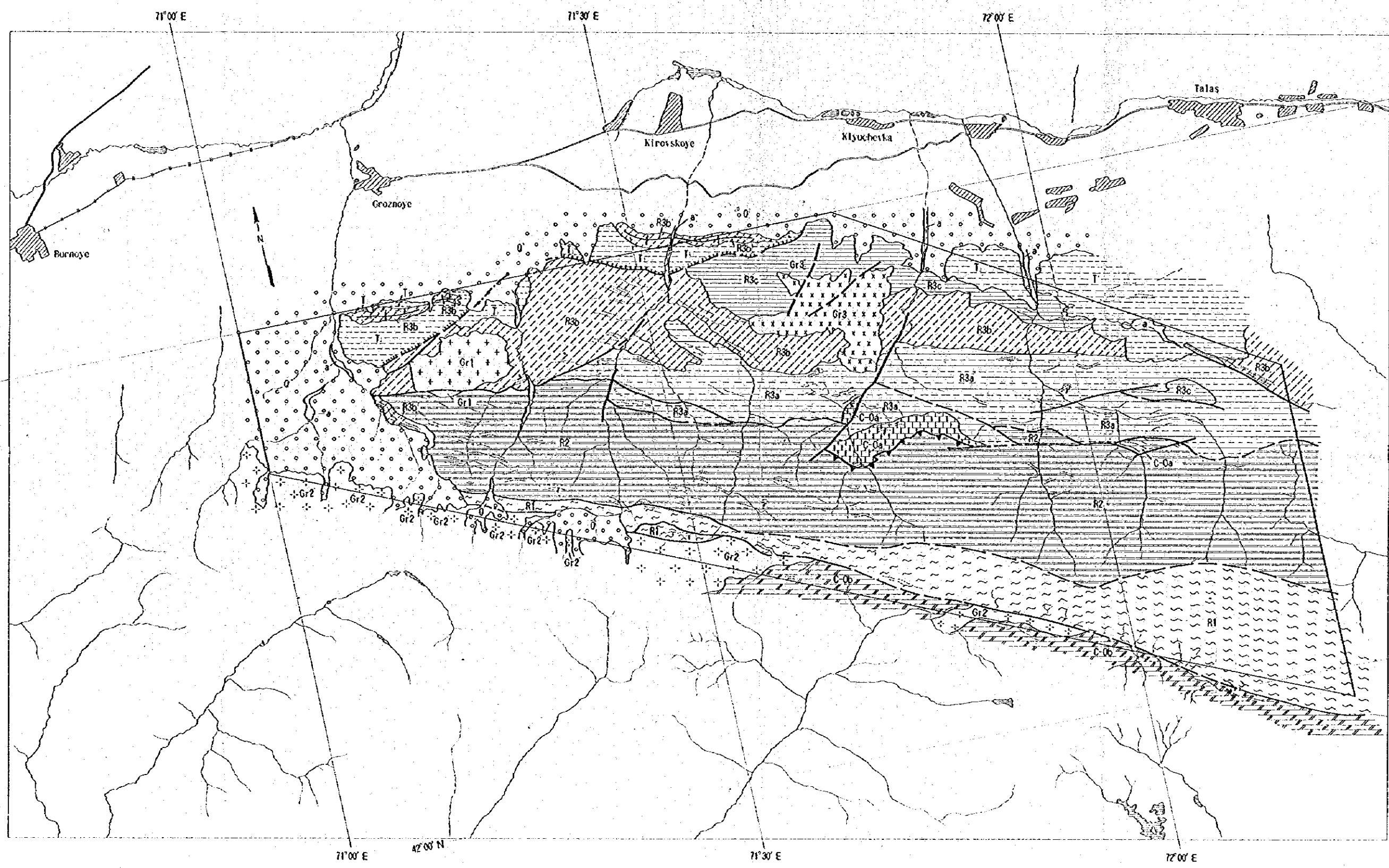
LEGEND

	Fault (bars on downhill side)
	Inferred Fault (bars on downhill side)
	thrust Fault
	Major Lineament
	Minor Lineament
	Circular Structure
	Anticline
	Drainage
	Lake, Pond
	Urban Area
	Major Road
	Rail Way

THE MI
IN THE
GEOLOGIC II
LANDSAT I

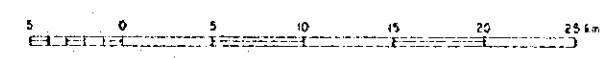


JAPAN INT
MET



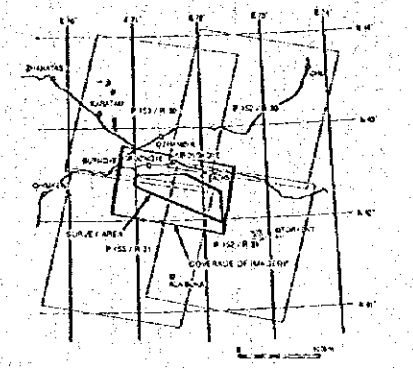
Symbol	Unit	Correlation with Geologic Map
(Dotted pattern)	a	O
(Dotted pattern)	O	N-2, P1, N1
(Horizontal lines)	T ¹	
(Checkered pattern)	C-Oa	C-Oa/b
(Vertical lines)	C-Cb	
(Horizontal lines)	R3c	R3c
(Diagonal lines)	R3b	
(Dotted pattern)	R3a	R3a, R3c
(Horizontal lines)	R2	R2d, R1, 2d
(Vertical lines)	R1	R1-2b
(Checkered pattern)	Gr3	γSd
(Dotted pattern)	Gr2	
(Dotted pattern)	Gr1	γOv?

(Dashed line)	Bedding Trace or Sci
(Line with barbs on down)	Fault (barbs on down)
(Line with barbs on up)	Inferred Fault (barbs on up)
(Line with barbs on both sides)	Thrust Fault
(Line with 'X' marks)	Anticline
(Line with arrows pointing away)	Drainage
(Oval shape)	Lake, Pond
(Hatched area)	Urban Area
(Double line)	Major Road
(Single line)	Rail Way

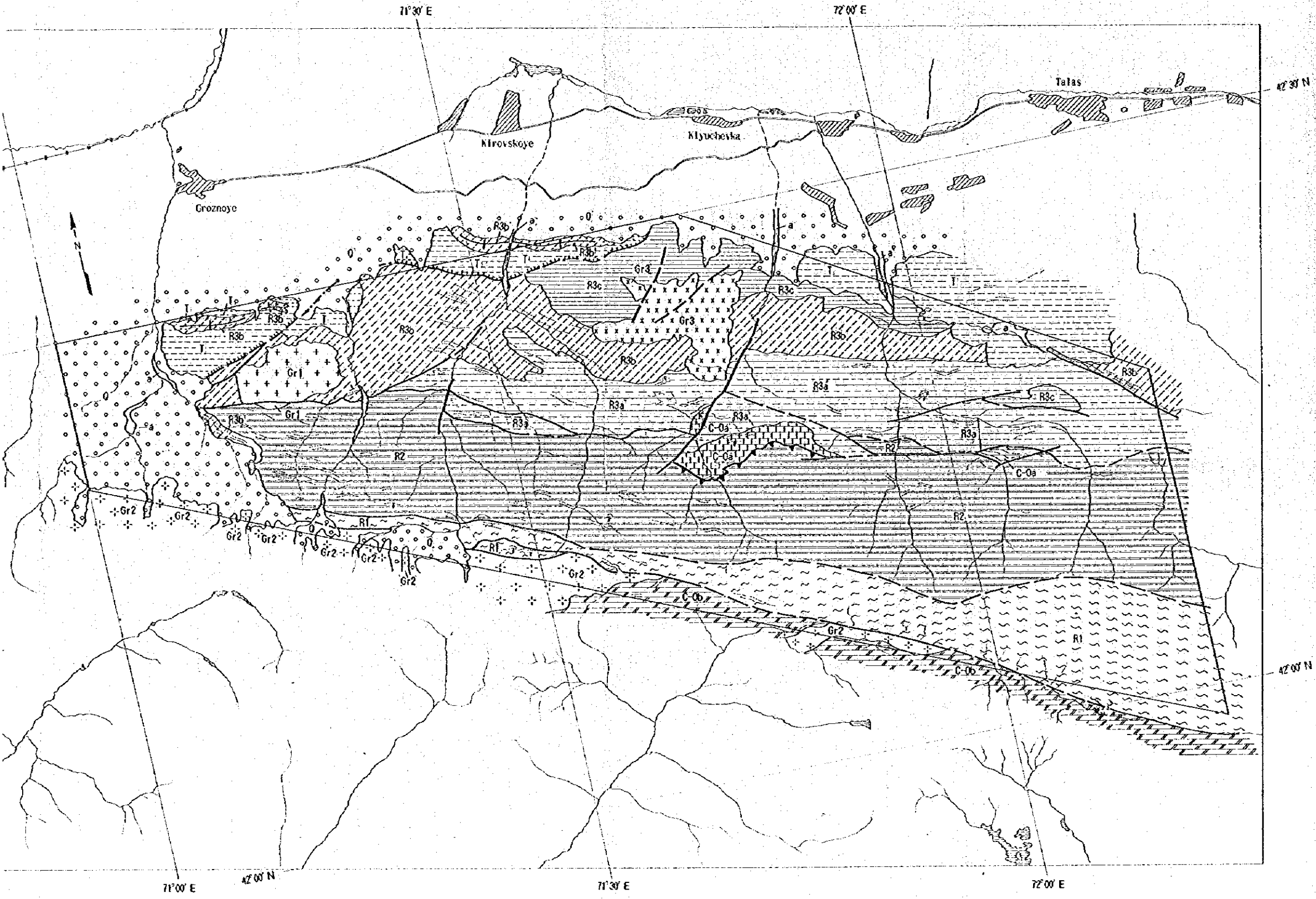


THE MINERAL EXPLORATION
IN THE TALAS AREA,
THE KYRGYZ REPUBLIC
(PHASE I)

GEOLOGIC INTERPRETATION MAP OF
LANDSAT TM FALSE COLOR IMAGE



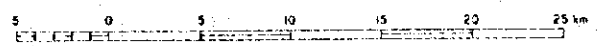
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY, 1995



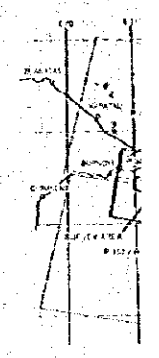
LEGEND

Symbol	Unit	Correlation with Geologic Map	Probable Rock Types
□	a	Q	gravel, loam
□	Q	N-2, Pa-Ni	clay, sandstone
□	C-Oa	C-O2b	limestone
□	C-Ob		
□	R3c	R3c	shale, siltstone, sandstone
□	R3b	R3b	shale, siltstone, sandstone
□	R3a	R3a, R3d	shale, siltstone, sandstone
□	R2	R2c, R1-2b	sandstone, shale, phyllite, limestone
□	R1	R1-2b	phyllite, limestone
□	Gr3	γSd	granitic rock
□	Gr2		granitic rock ?
□	Gr1	γOv?	granitic rock

↗ ↘	Bedding trace or Schistosity (arrows show dip direction)
— —	Fault (barbs on downfall side)
— — —	Inferred Fault (barbs on downfall side)
— — — —	Thrust Fault
∩	Anticline
↘ ↗	Drainage
○	Lake, Pond
■	Urban Area
—+—	Major Road
—+—+—	Rail Way

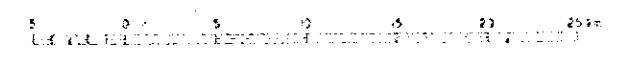
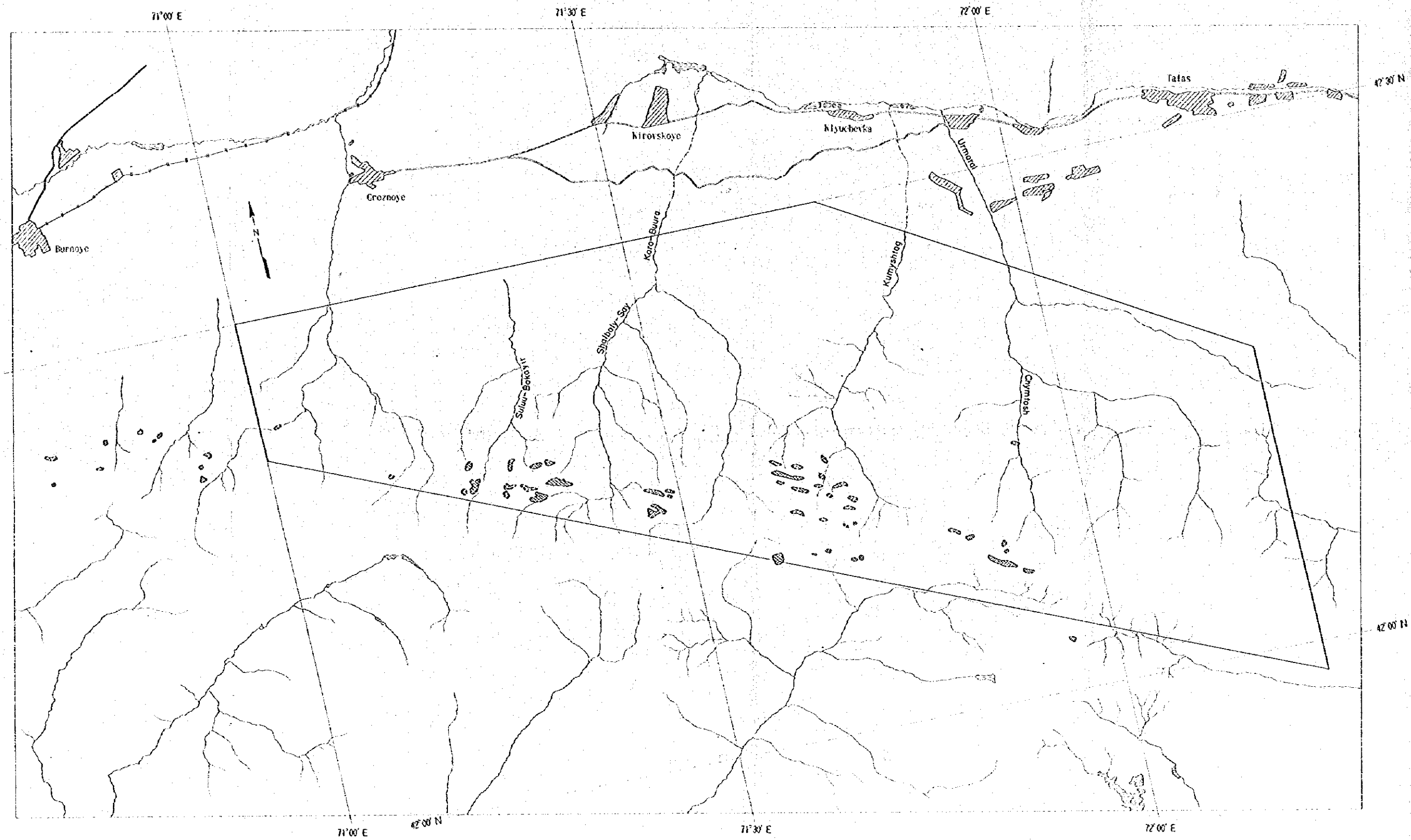


THE MIN
IN T
THE F
DISTRIBUTION
ON LAN



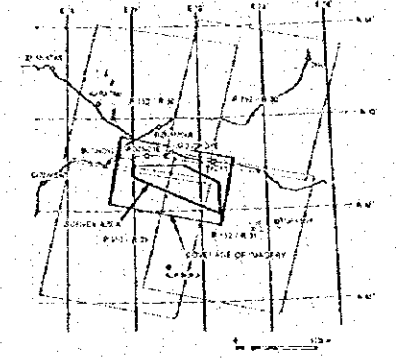
JAPANESE
SIEFA

	Spectral Anomalies
	Oceanage
	Lake, Pond
	Urban Area
	Major Road
	Rail Way



THE MINERAL EXPLORATION
IN THE TALAS AREA,
THE KYRGYZ REPUBLIC
(PHASE I)

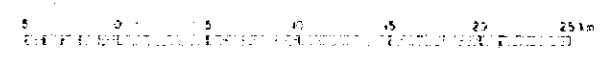
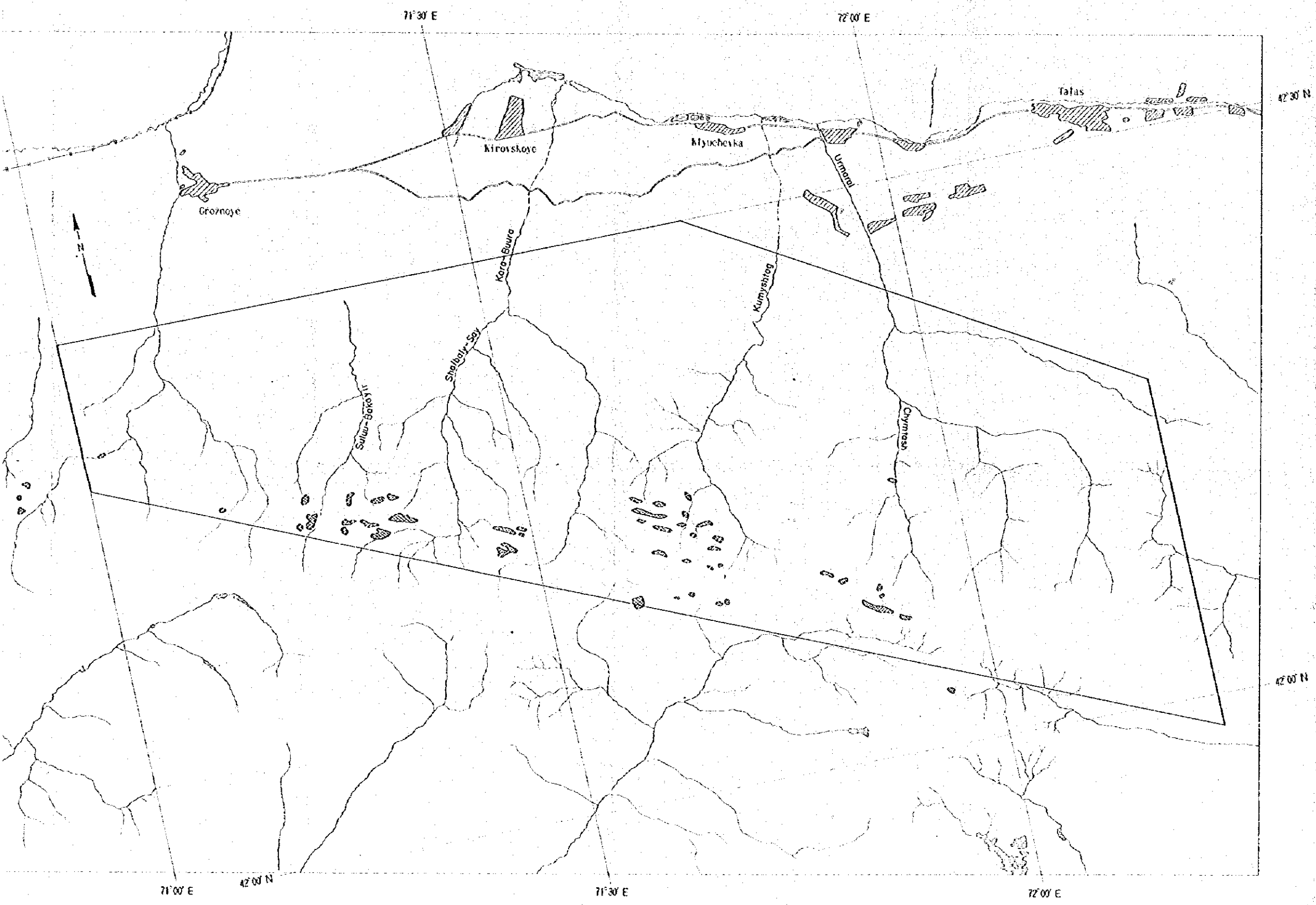
DISTRIBUTION OF SPECTRAL ANOMALIES
ON LANDSAT TM IMAGE

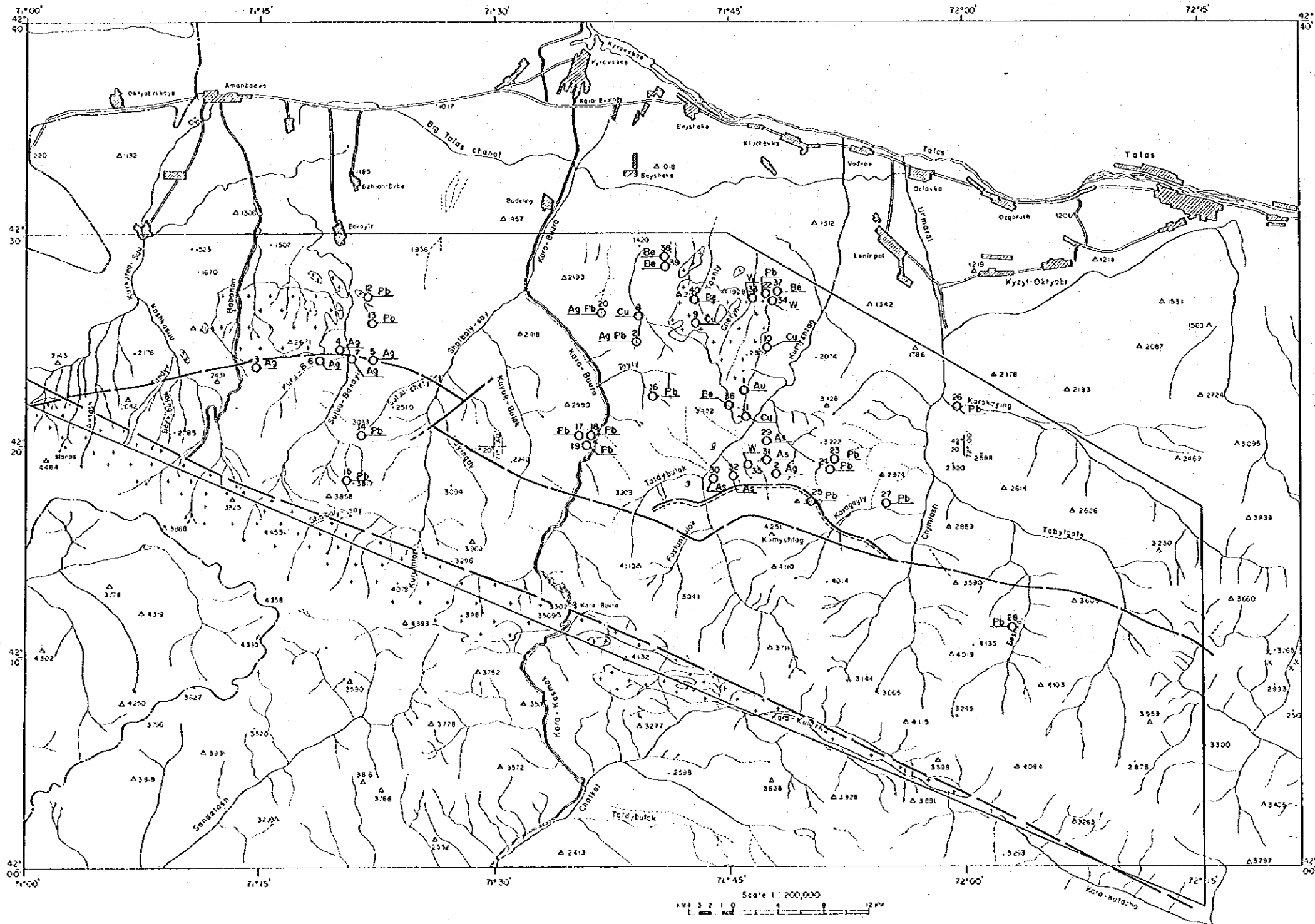


JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY, 1995

LEGEND

	Spectral Anomalies on Band3/Band1 Ratio and DECA Usage
	Drainage
	Lake, Pond
	Urban Area
	Major Road
	Path Way





PL-4

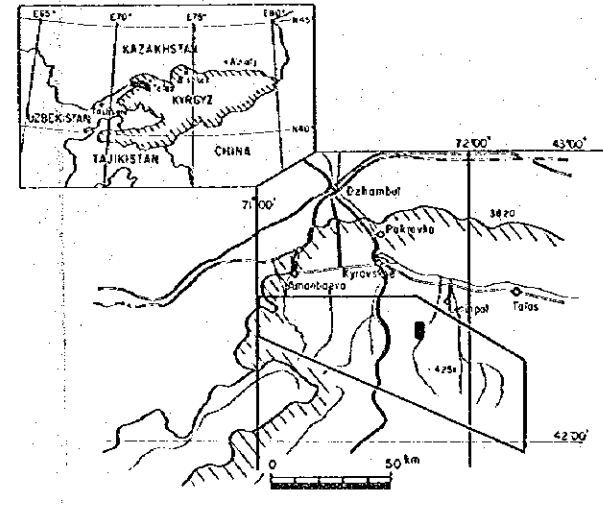
THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)
Distribution of Ore Deposit and Mineral
Occurrences

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINCECO

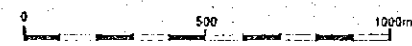
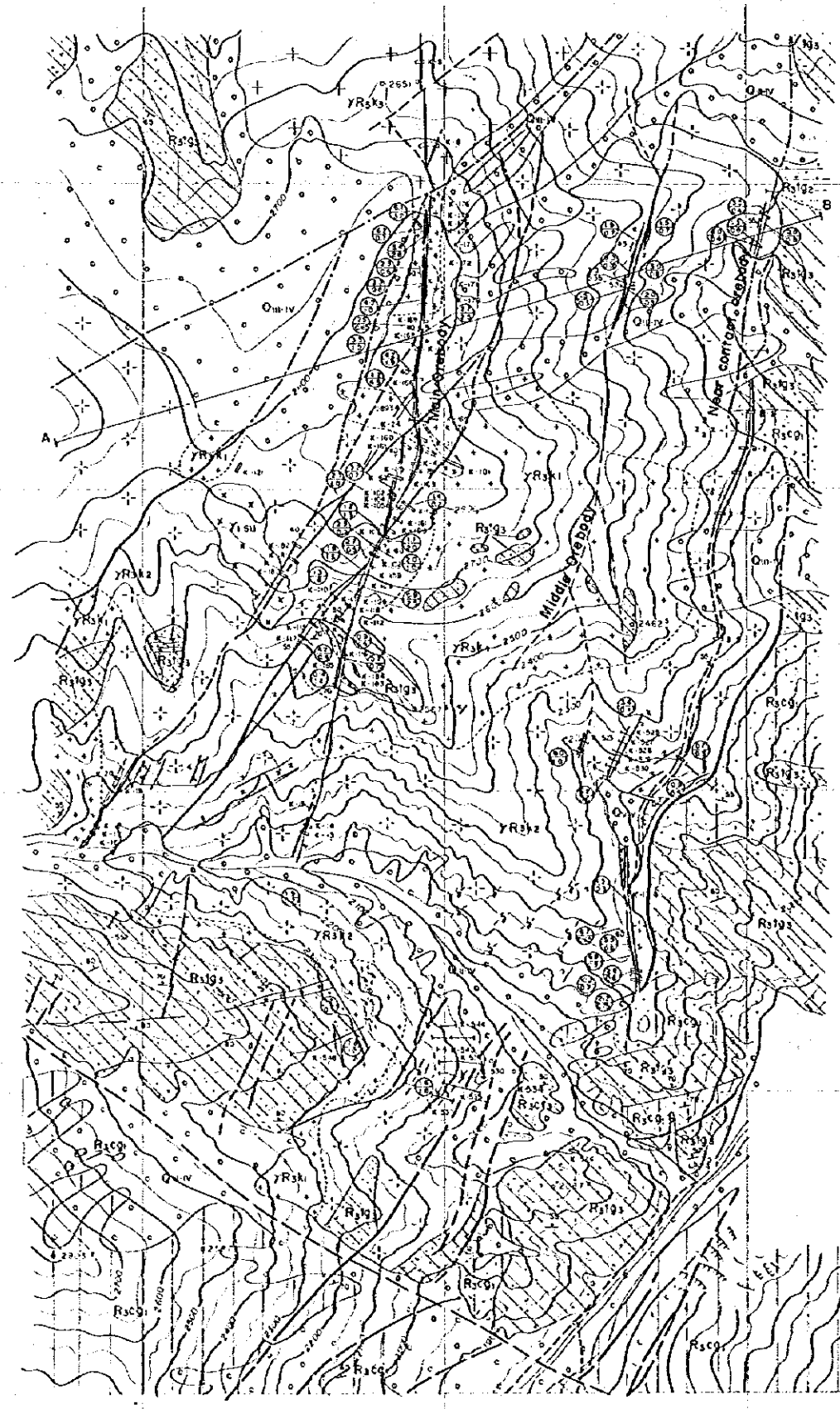
- LEGEND**
- Site of deposit, number and kind of element
 - Granitic batholith
 - Fault

THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)

Geological Map of Shyraldzhyn Deposit

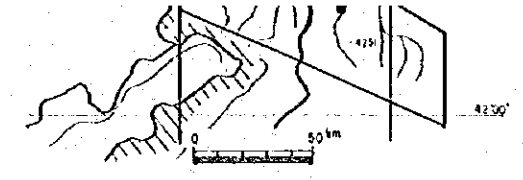
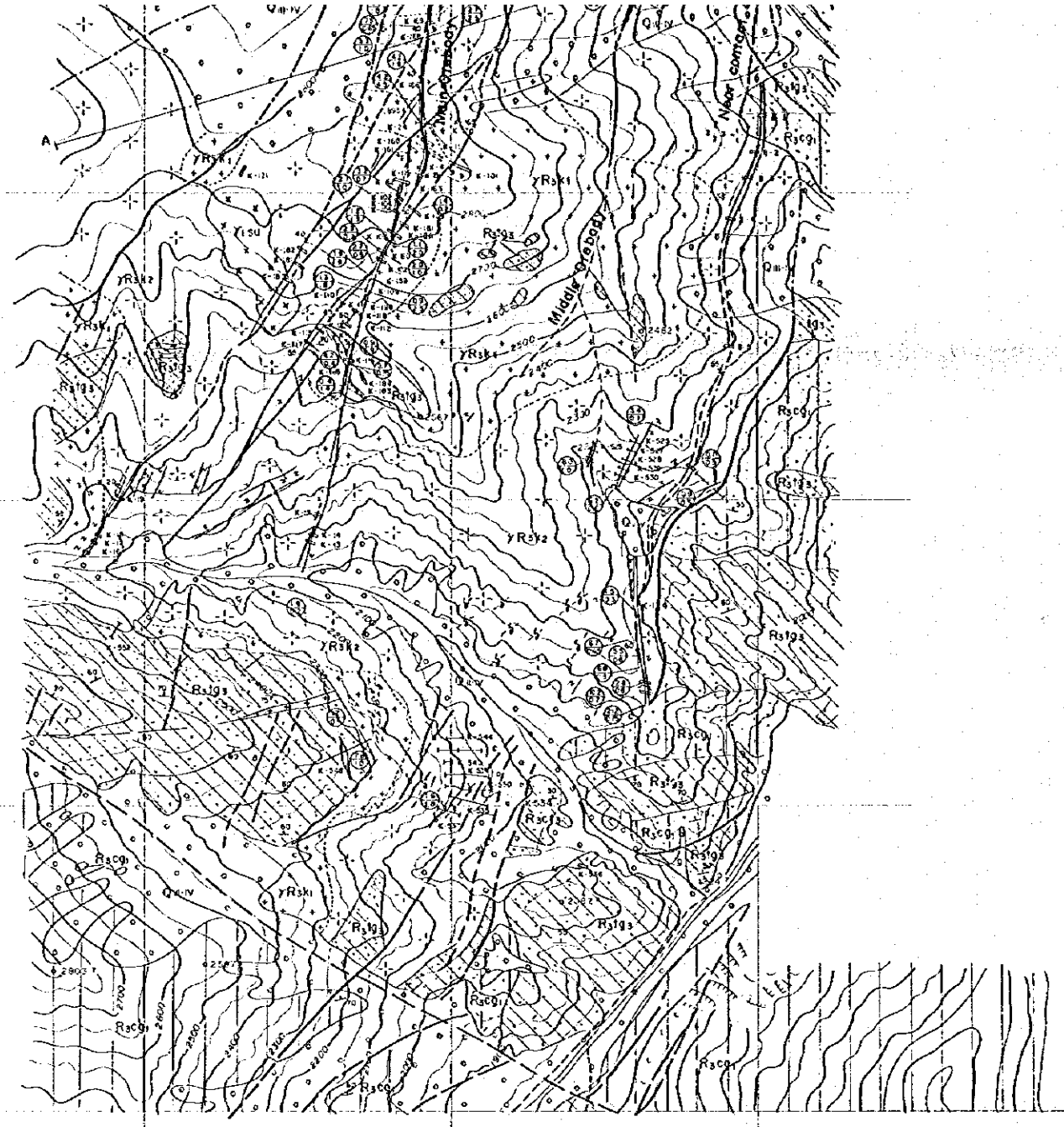


JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

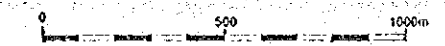


LEGEND

- Upper Quaternary - recent sediments : undivided diluvial- proluvial, loams, detritus
- Chydygoloyskaya formation : Lower Chydygoloysa sub-formation : limestone, thin layers of conglomerate, sandstone, calciferous siltstone
- Layer 3. Alternation of greyish-green conglomerate, variable grained sandstone
- Layer 2. Medium grained sandstone, thin layers of conglomerate
- Fine-grained grey, pinkish-grey granite
- Leucocratic fine-grained grey, pinkish-grey granite
- Leucocratic medium-grained grey, pinkish grey, pinkish-red granite
- Coarse-grained lilac-coloured porphyritic granite
- Dykes of aplittic granite
- Dykes of quartz diorite porphyry
- Quartz-hornblende-pyroxene hornfels, hornblende-pyroxene hornfels
- a) Greisenization zone b) Hydrothermal altered zone
- Quartz-manganoisiderite veins, quartz veins
a) already known b) presumed
- gold grade (g/t)
width (m)
- Trenches
- Strikes and dips (bedding, faults)

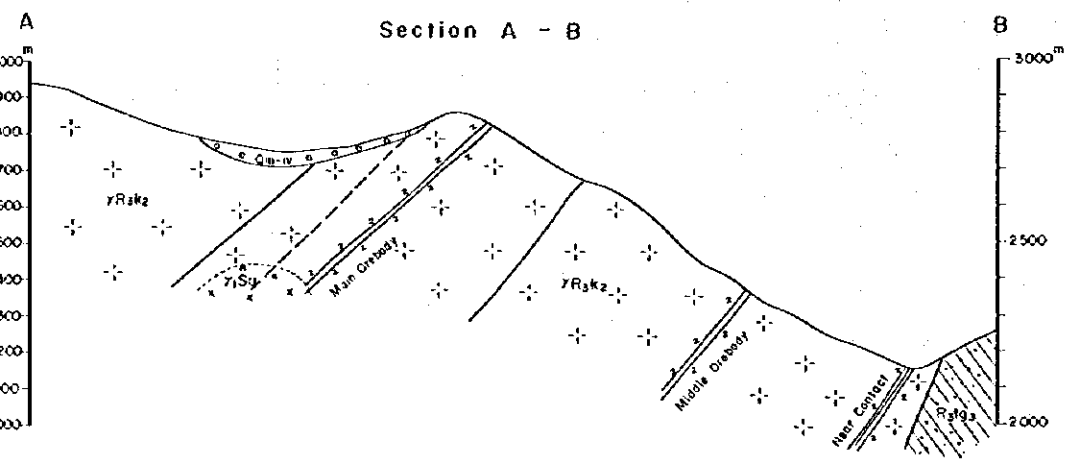


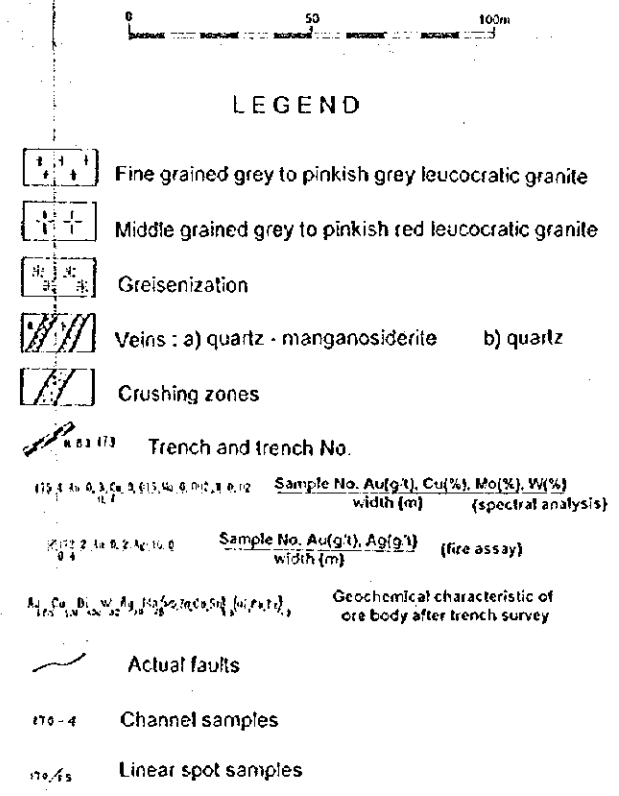
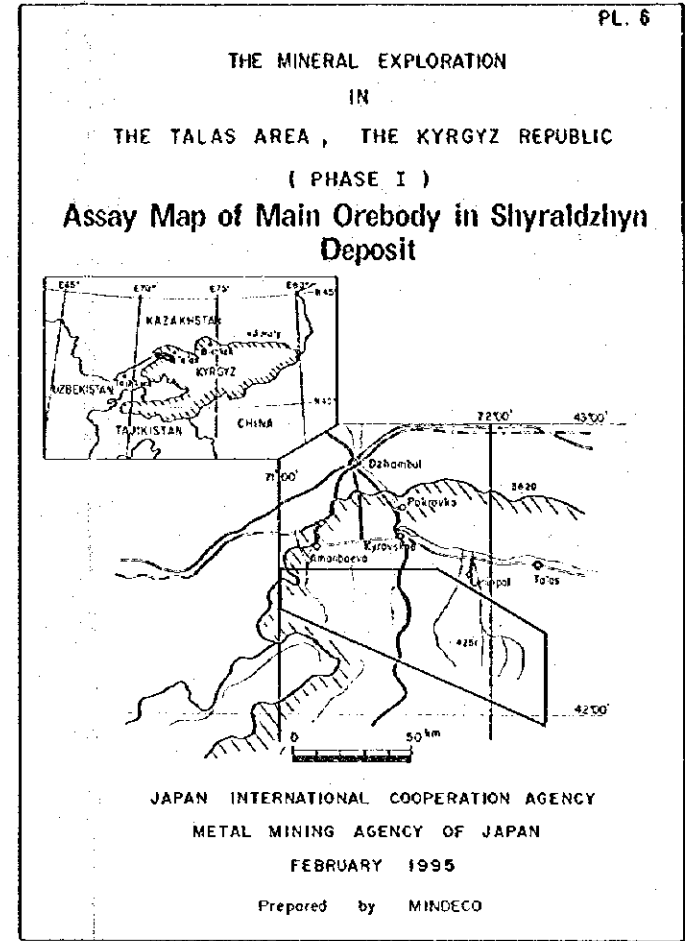
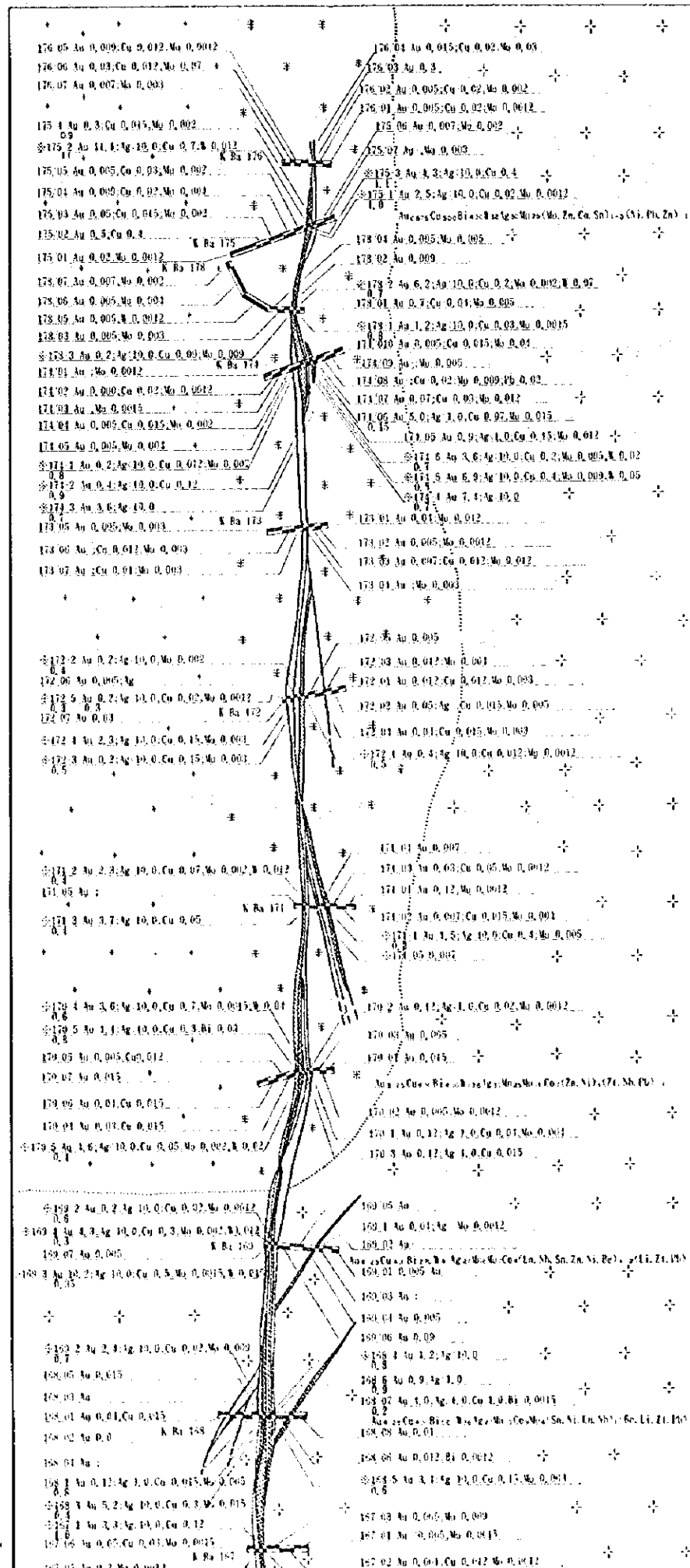
JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN
 FEBRUARY 1995
 Prepared by MINDECO

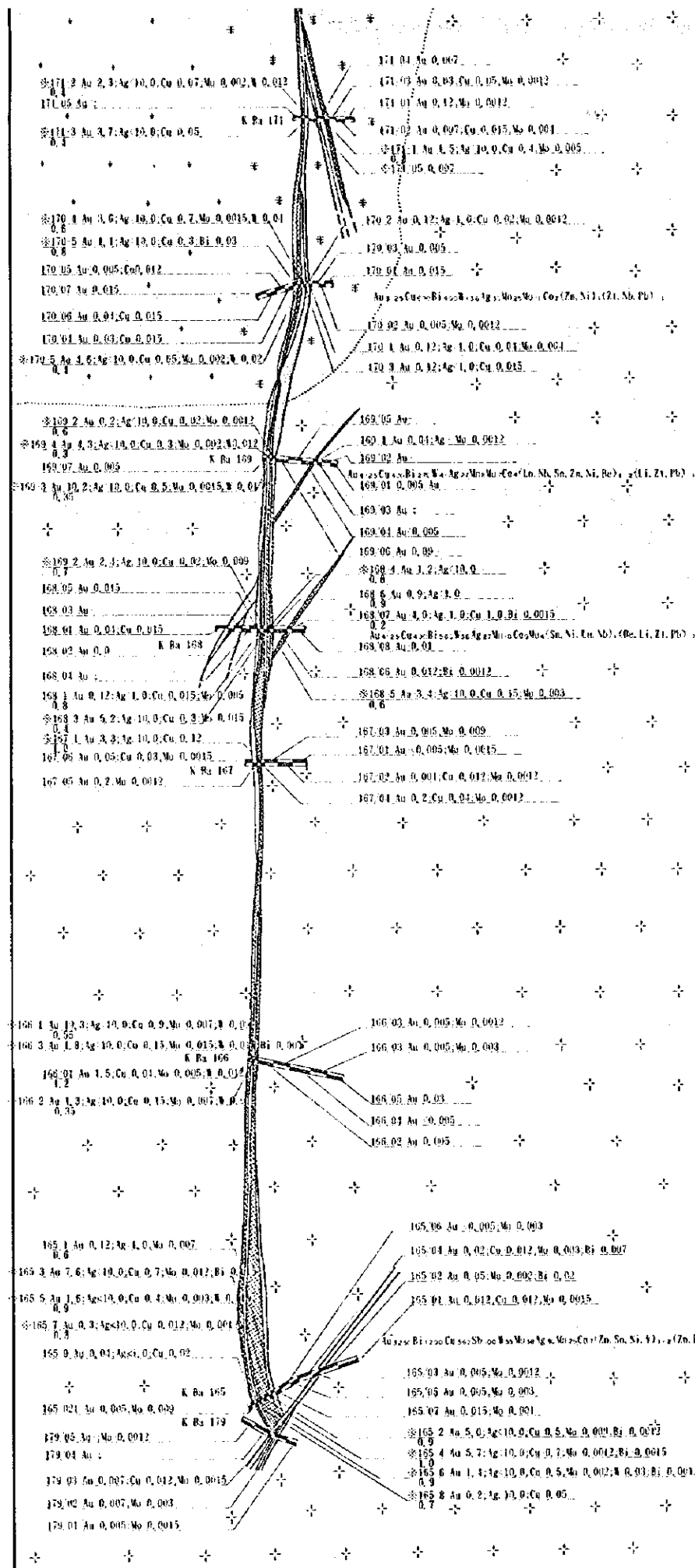


LEGEND

- Upper Quaternary - recent sediments : undivided diluvial-proluvial, loams, detritus
- Chydygolovskaya formation ; Lower Chydygolovskaya sub-formation : limestone, thin layers of conglomerate, sandstone, calciferous siltstone
- Layer 3. Alternation of greyish-green conglomerate, variable grained sandstone
- Layer 2. Medium-grained sandstone, thin layers of conglomerate
- Fine-grained grey, pinkish-grey granite
- Leucocratic fine-grained grey, pinkish-grey granite
- Leucocratic medium-grained grey, pinkish grey, pinkish-red granite
- Coarse-grained lilac-coloured porphyritic granite
- Dykes of aplitic granite
- Dykes of quartz diorite porphyry
- Quartz-hornblende-pyroxene hornfels, hornblende-pyroxene hornfels
- a) Greisenization zone b) Hydrothermal altered zone
- Quartzmanganosiderite veins, quartz veins
a) already known b) presumed
- gold grade (g/t)
width (m)
- Trenches
- Strikes and dips (bedding, faults)
- Fault a) actual b) inferred c) concealed



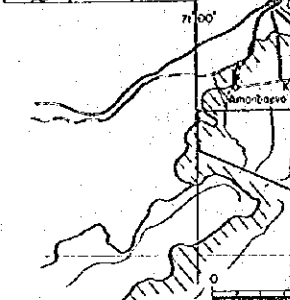
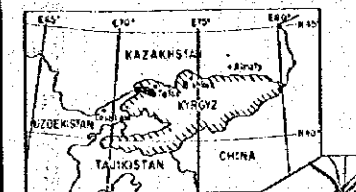




LEGEND

- Fine grained grey to pinkish grey leucocratic granite
- Middle grained grey to pinkish red leucocratic granite
- Greisenization
- Veins : a) quartz - manganosiderite b) quartz
- Crushing zones
- Trench and trench No.
- Sample No. Au(g/t), Cu(%), Mo(%), W(%)
width (m) (spectral analysis)
- Sample No. Au(g/t), Ag(g/t)
width (m) (fire assay)
- Geochemical characteristic of
ore body after trench survey
- Actual faults
- Channel samples
- Linear spot samples

THE MINERAL
IN
THE TALAS AREA, TH
(PHASE
Geological Map of K

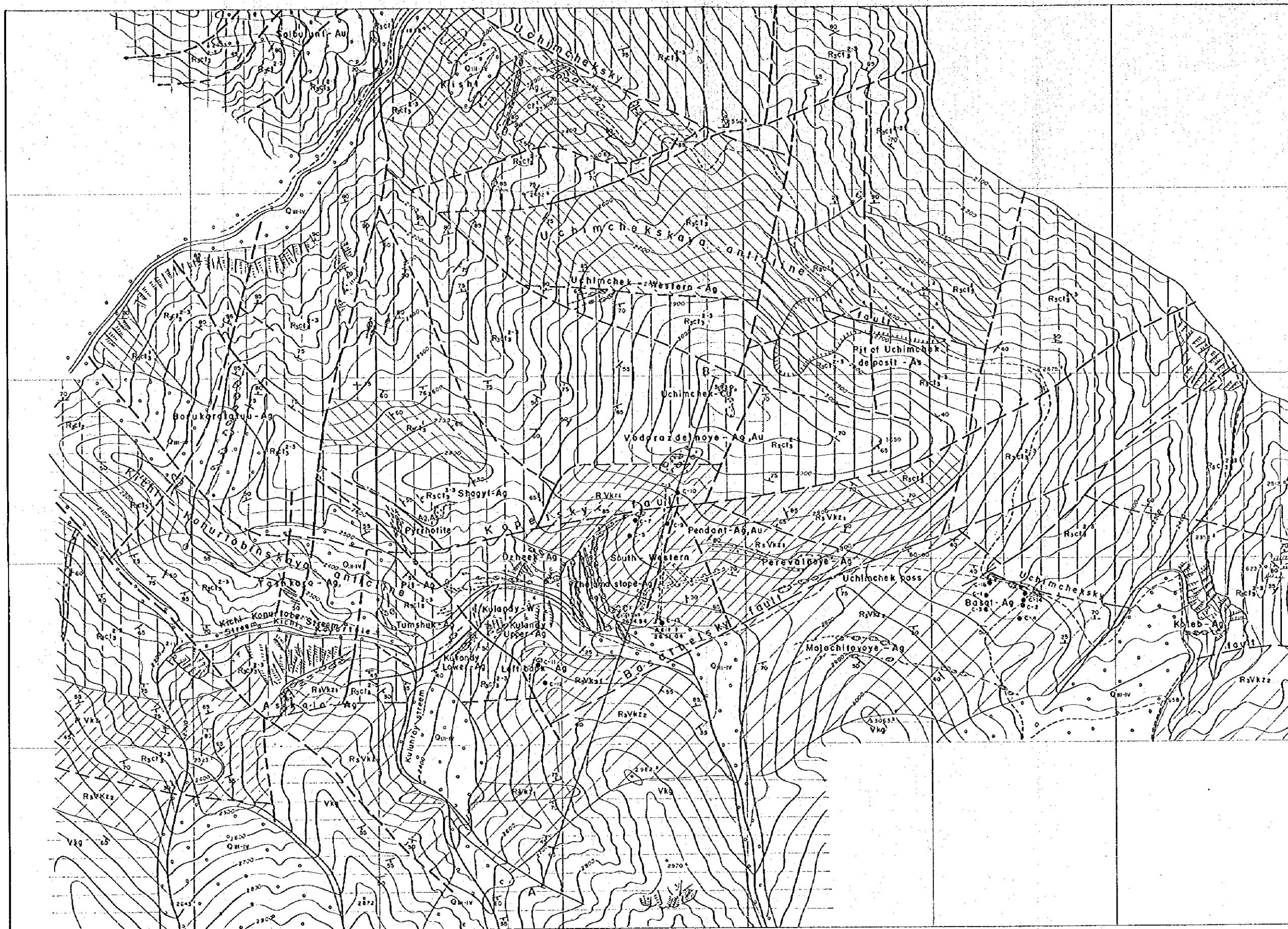


JAPAN INTERNATIONAL
METAL MINING AGI
FEBRUARY
Prepared by

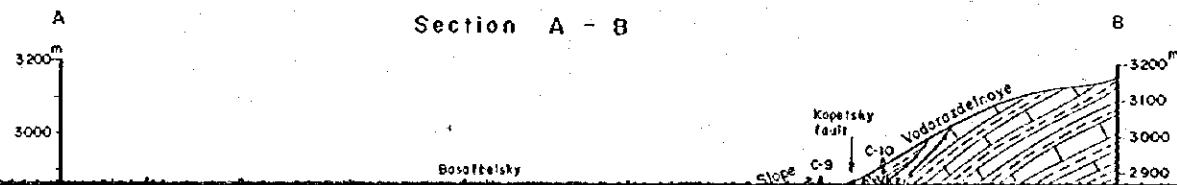


LEGEND

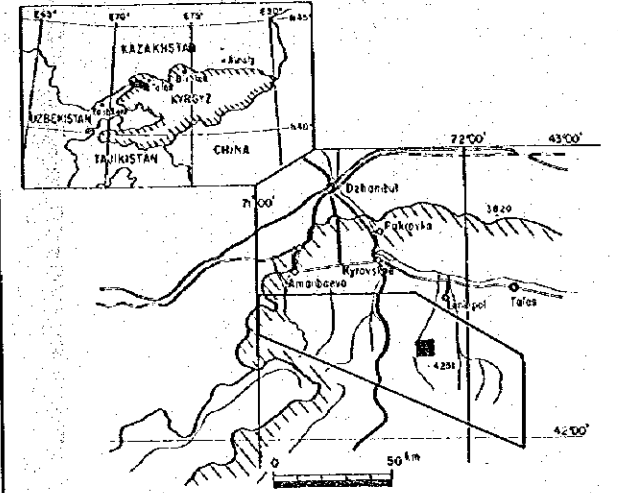
- Upper Quaternary recent sedi (diluvial, proluvial, alluvial, gl)
- Kurganskaya formation: sand limestone, conglomerate, tuff
- Upper Kyzylbelskaya sub-form (sandstone), lenses of limestone
- Lower Kyzylbelskaya sub-form siltstone, greenish siltstone, g
- Upper Chatkaragaiskaya sub-l Alternation of hornfels, siltstone
- Upper Chatkaragaiskaya sub-l hornfels, siltstone with thin fa
- Middle Chatkaragaiskaya sub-limestone with layers of carb
- a) limestone b) siltstone
- a) shale b) sandstone
- granule conglomerate
- Quartz-porphry dykes
- Manganosiderite veins
- Skarn zone
- Faults
- Strike and dip a) rock t
- Underground horizontal
- Drill holes



Section A - B



THE MINERAL EXPLORATION
 IN
 THE TALAS AREA, THE KYRGYZ REPUBLIC
 (PHASE I)
 Geological Map of Kumyshtag Area

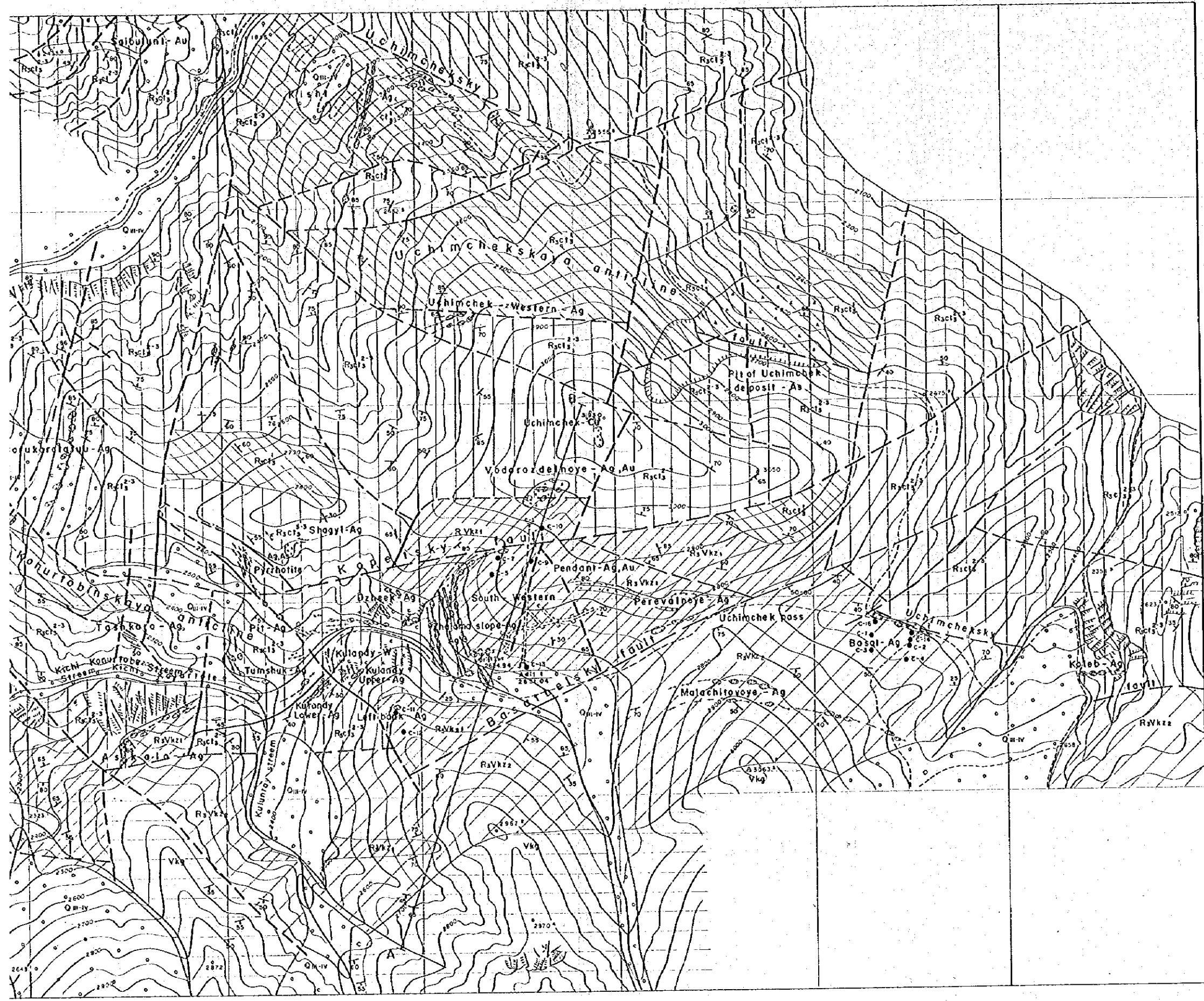


JAPAN INTERNATIONAL COOPERATION AGENCY
 METAL MINING AGENCY OF JAPAN
 FEBRUARY 1995
 Prepared by MINDECO



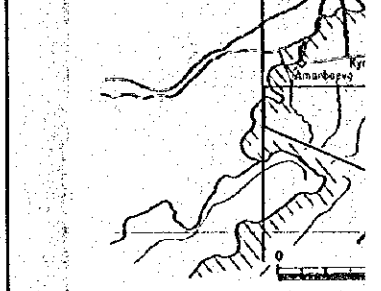
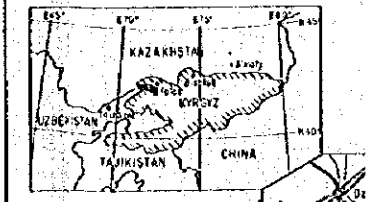
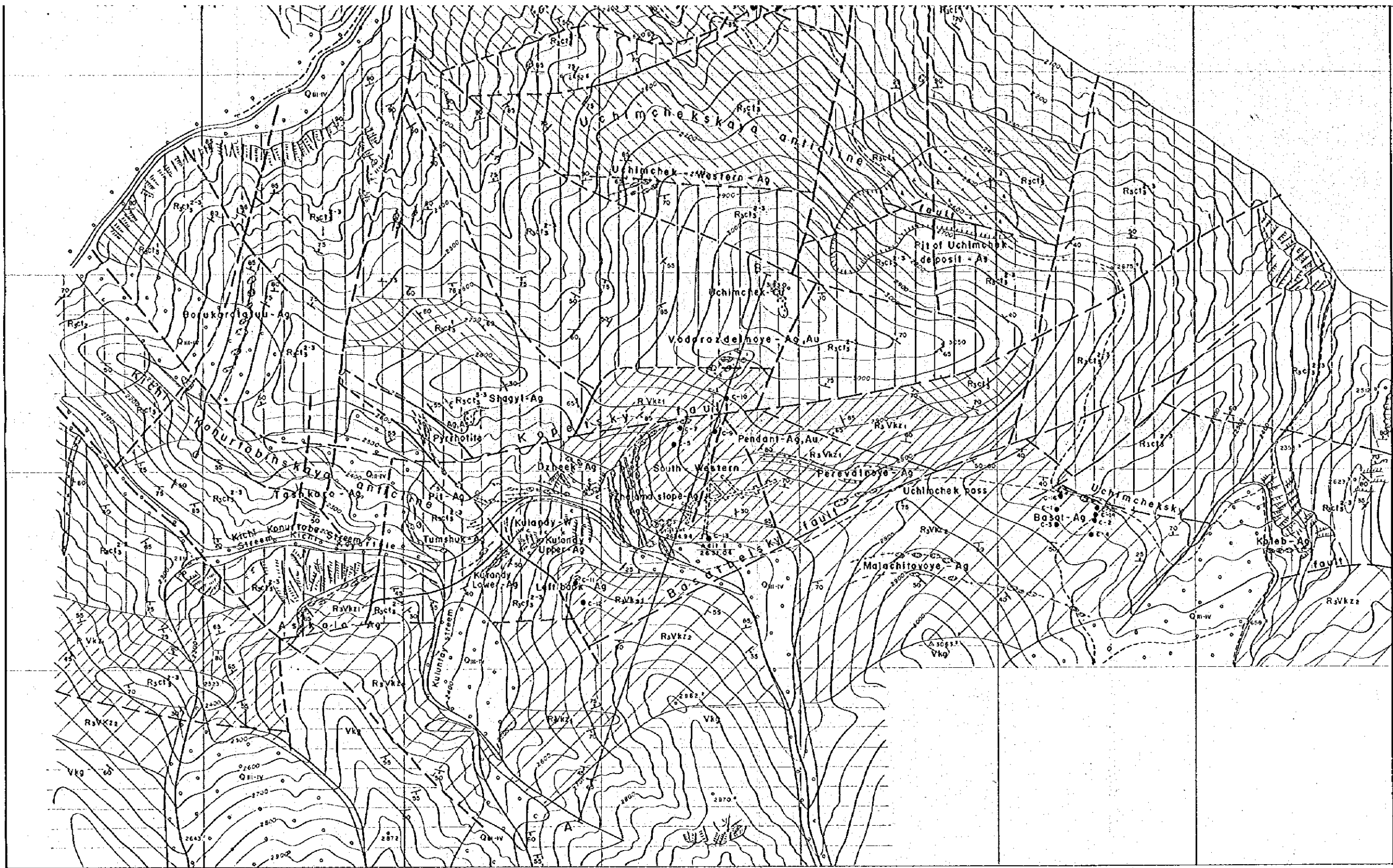
LEGEND

- Upper Quaternary recent sediments (diluvial, proluvial, alluvial, glacial)
- Kurganskaya formation : sandstone, shale, Jasper lydite, limestone, conglomerate, tuff, tuffaceous sandstone, chert
- Upper Kyzylbelskaya sub-formation : shale (mostly dark-red sandstone), lenses of limestone
- Lower Kyzylbelskaya sub-formation : sandstone dark-grey siltstone, greenish siltstone, greyish-green and wine red shale
- Upper Chatkaragaiskaya sub-formation : upper and middle layers ; Alternation of hornfels, siltstone, limestone
- Upper Chatkaragaiskaya sub-formation : lower layer ; hornfels, siltstone with thin layers of sandstone, conglomerate
- Middle Chatkaragaiskaya sub-formation : medium-grained limestone with layers of carbonate shale
- a) limestone b) siltstone
- a) shale b) sandstone
- granule conglomerate
- Quartz-porphry dykes
- Manganosiderite veins
- Skarn zone
- Faults
- Strike and dip a) rock beds
- Underground horizontal workings

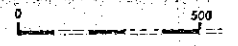


Section A - B



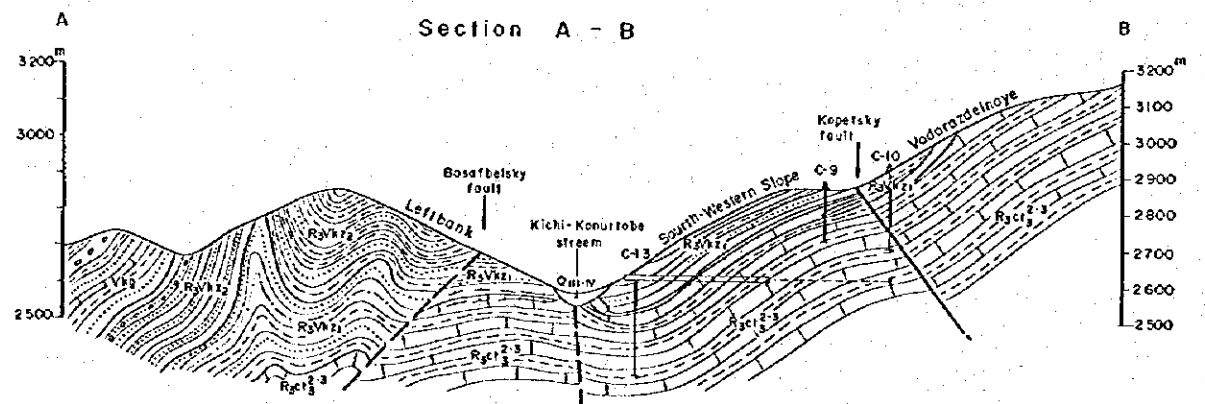


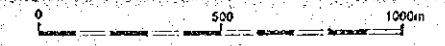
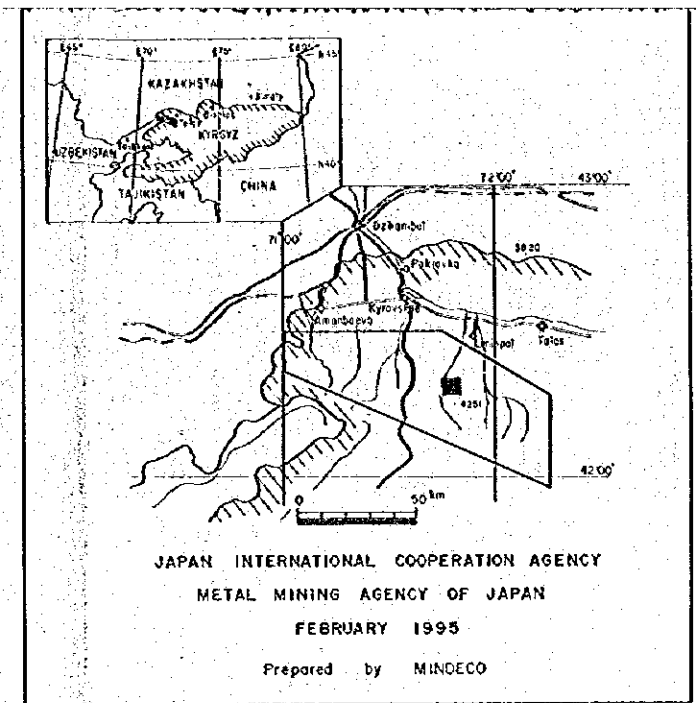
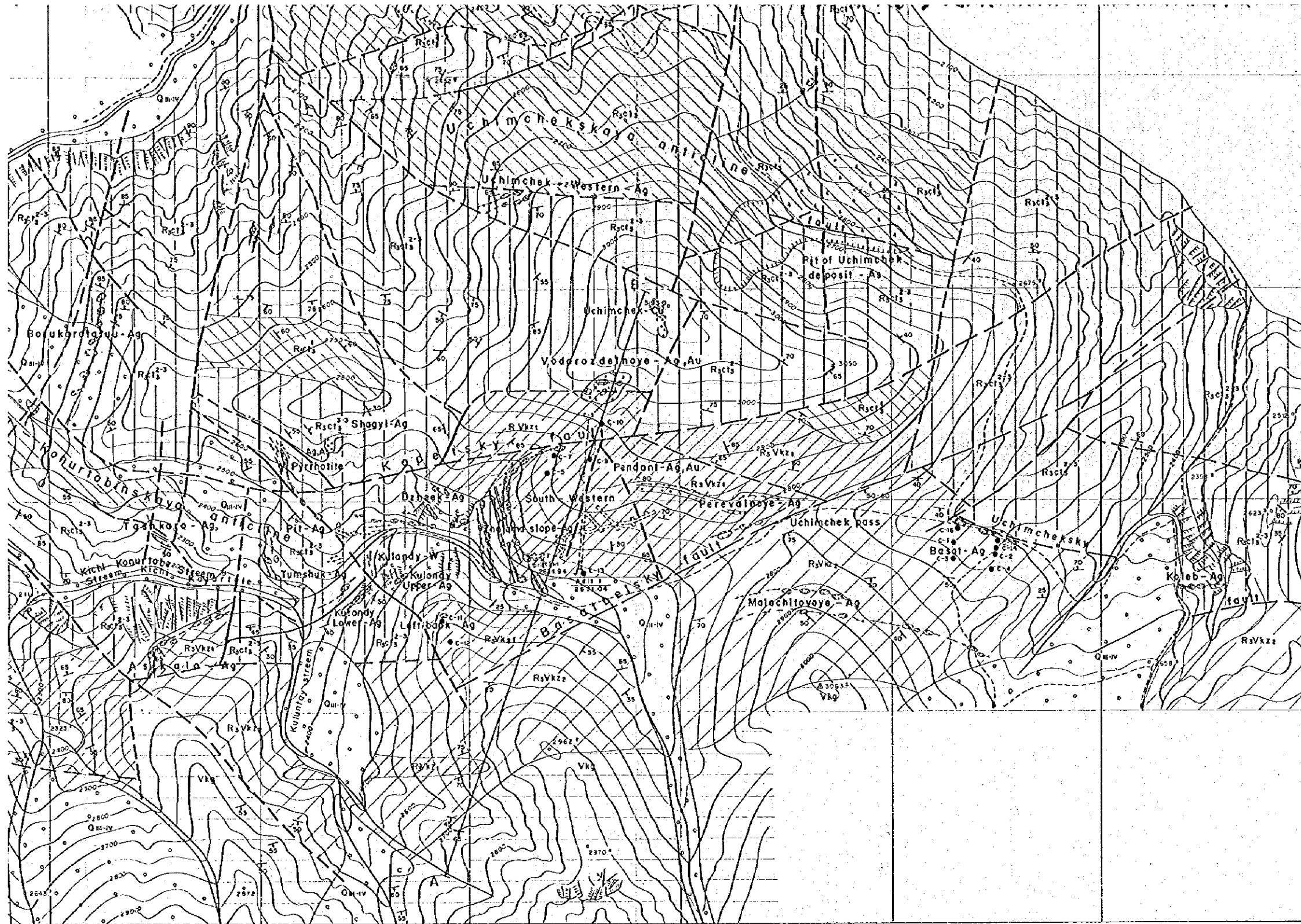
JAPAN INTERNATIONAL
METAL MINING AG
FEBRUARY
Prepared by



LEGEND

- Upper Quaternary recent sedi (diluvial, proluvial, alluvial, gl)
- Kurganskaya formation: sand limestone, conglomerate, tuff
- Upper Kyzylbayskaya sub-form (sandstone), lenses of limestone
- Lower Kyzylbayskaya sub-form (siltstone, greenish siltstone, s)
- Upper Chatkaragaiskaya sub-form (Alternation of hornfels, siltstone)
- Upper Chatkaragaiskaya sub-form (hornfels, siltstone with thin la)
- Middle Chatkaragaiskaya sub-form (limestone with layers of carb)
- a) limestone b) siltstone
- a) shale b) sandstone
- granule conglomerate
- Quartz-porphry dykes
- Manganosiderite veins
- Skarn zone
- Faults
- Strike and dip a) rock t
- Underground horizontal
- Drill holes
- a) Ancient mines b)

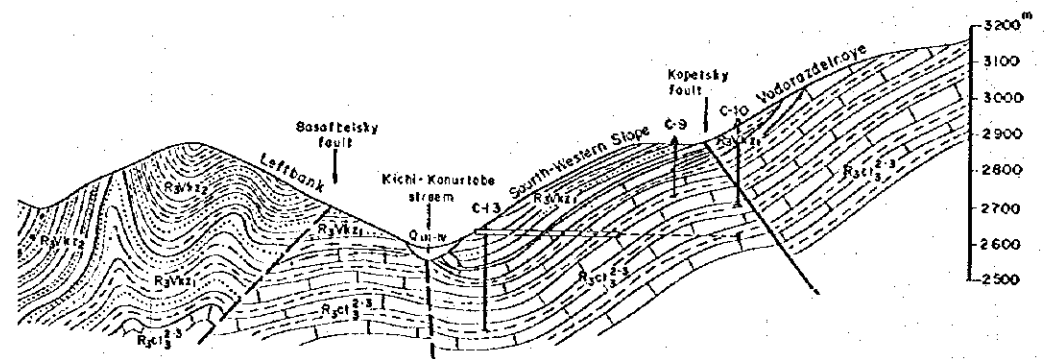


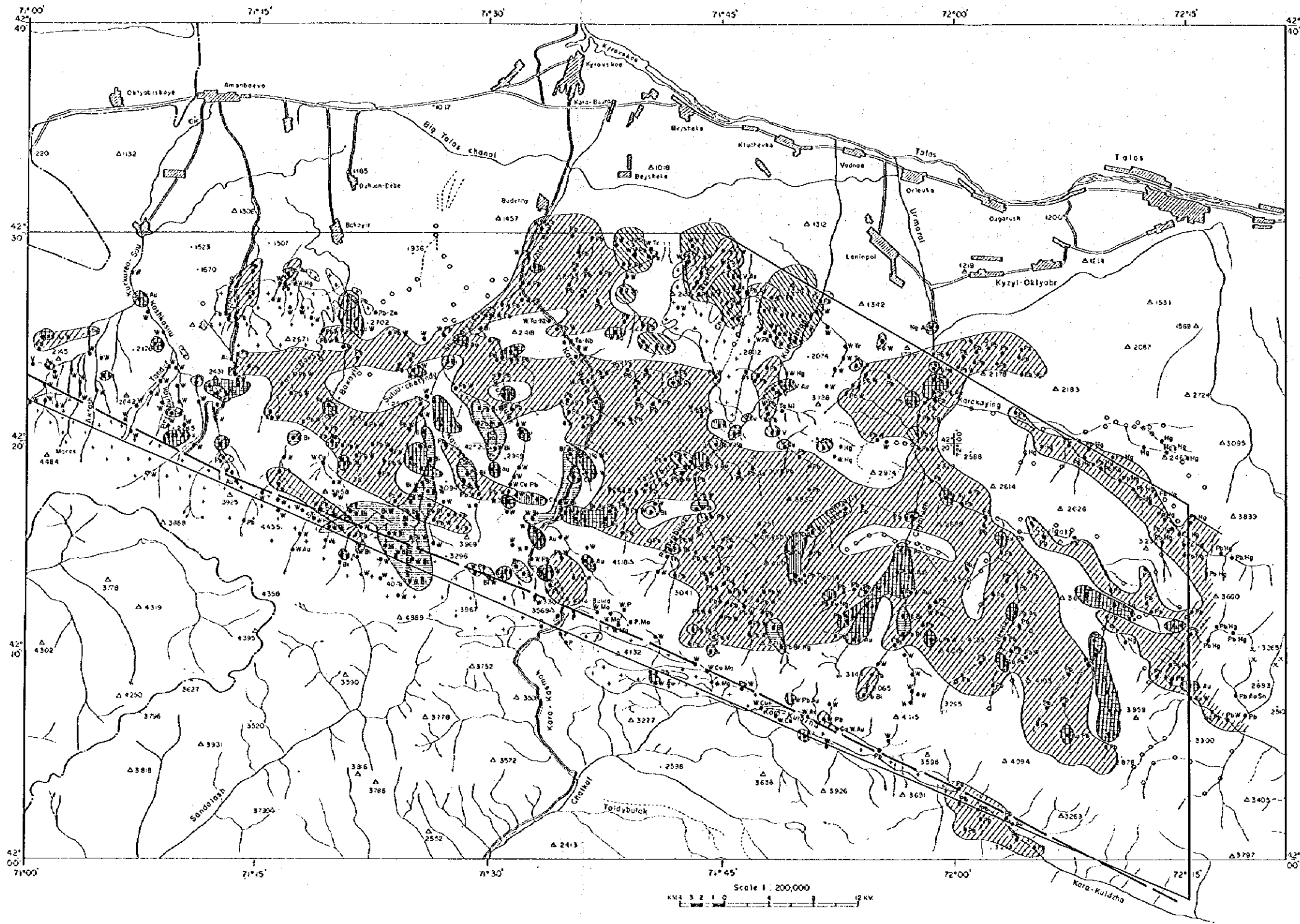


LEGEND

- Upper Quaternary recent sediments (diluvial, proluvial, alluvial, glacial)
- Kurganskaya formation : sandstone, shale, jasper lydite, limestone, conglomerate, tuff, tuffaceous sandstone, chert
- Upper Kyzylbelskaya sub-formation : shale (mostly dark-red sandstone), lenses of limestone
- Lower Kyzylbelskaya sub-formation : sandstone dark-grey siltstone, greenish siltstone, greyish-green and wine red shale
- Upper Chatkaragaiskaya sub-formation : upper and middle layers : Alternation of hornfels, siltstone, limestone
- Upper Chatkaragaiskaya sub-formation : lower layer : hornfels, siltstone with thin layers of sandstone, conglomerate
- Middle Chatkaragaiskaya sub-formation : medium-grained limestone with layers of carbonate shale
- a) limestone b) siltstone
- a) shale b) sandstone
- granule conglomerate
- Quartz-porphry dykes
- Manganosiderite veins
- Skarn zone
- Faults
- Strike and dip a) rock beds
- Underground horizontal workings
- Drill holes
- a) Ancient mines b) Ancient rock dumps

Section A - B



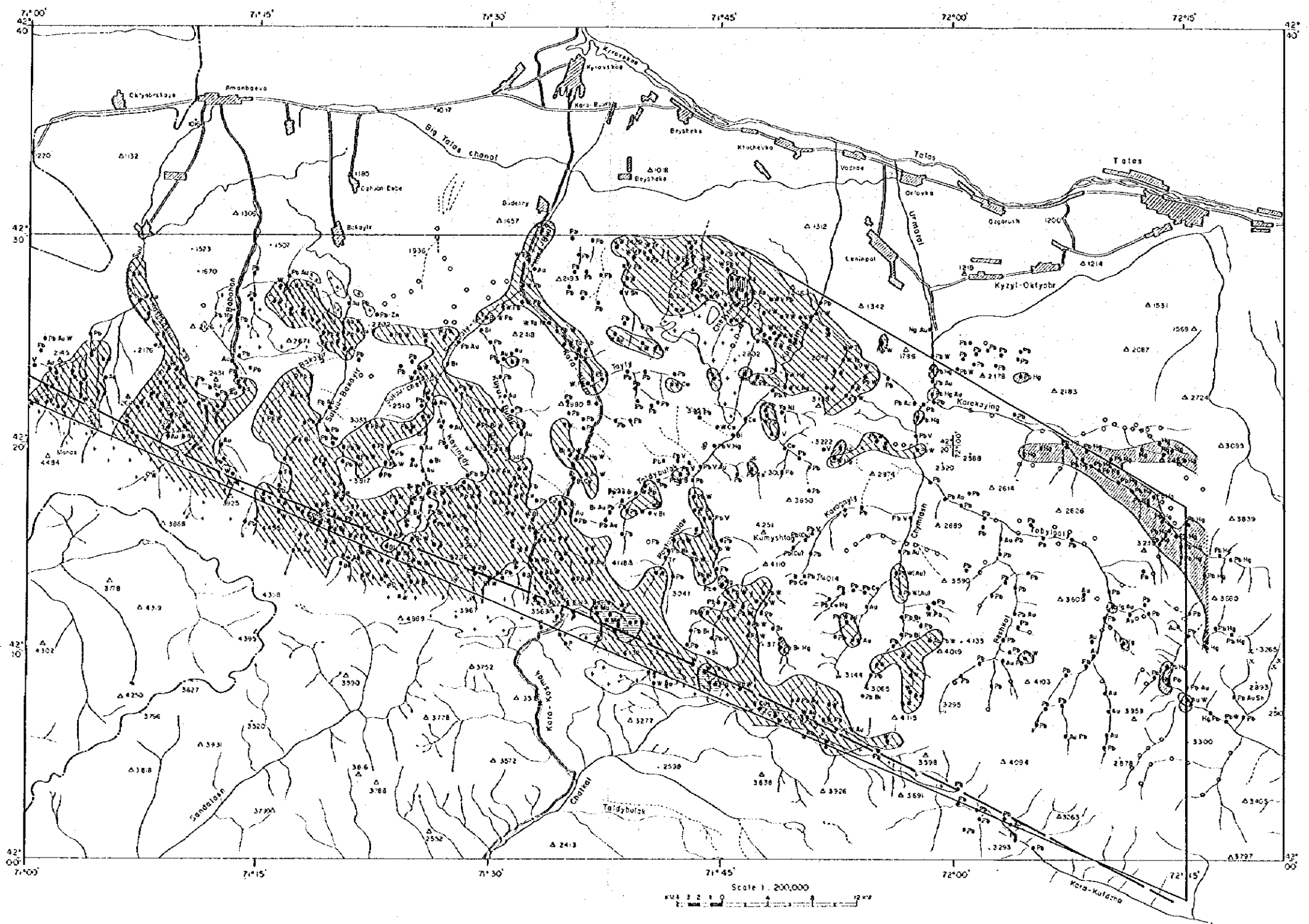


PL-8(1)

THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)
Geochemical Anomaly Map of the Survey Area
(Au, Pb, Cu, Bi, V)

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

- LEGEND**
- | | | | |
|-----|--|--|-----------|
| | Gold | | Lead-Zinc |
| | Copper | | Bismuth |
| | Vanadium | | |
| ● | Panning points containing metal minerals | | |
| ○ | Panning points without metal minerals | | |
| | Granitic batholith | | |
| --- | Fault | | |

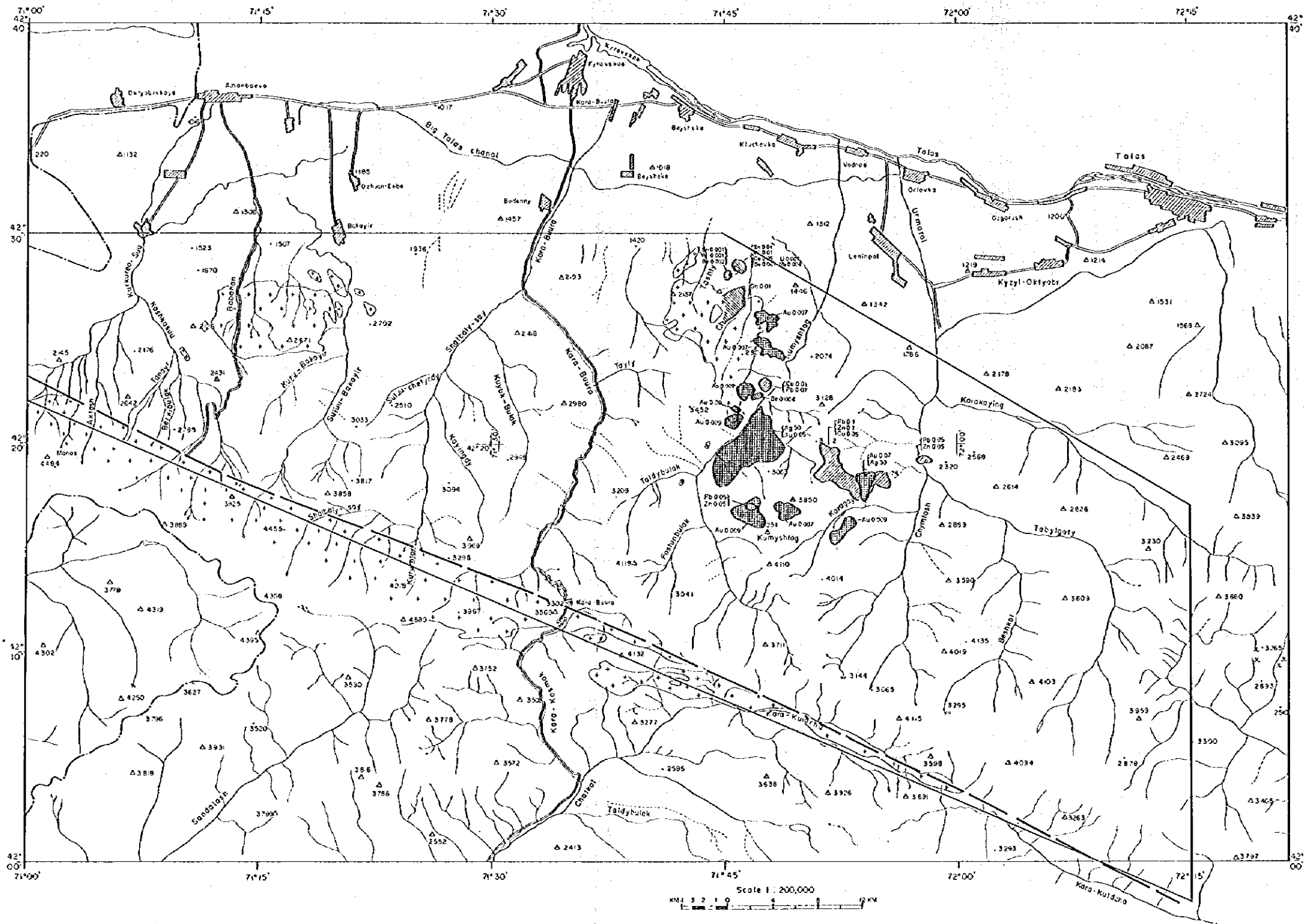


PL-8(2)

THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)
Geochemical Anomaly Map of the Survey Area
(As, Hg, W, Mo)

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

- LEGEND**
- Arsenic
 - Mercury
 - Tungsten
 - Molybdenum
 - Panning points containing metal minerals
 - Panning points without metal minerals
 - Granitic batholith
 - Fault

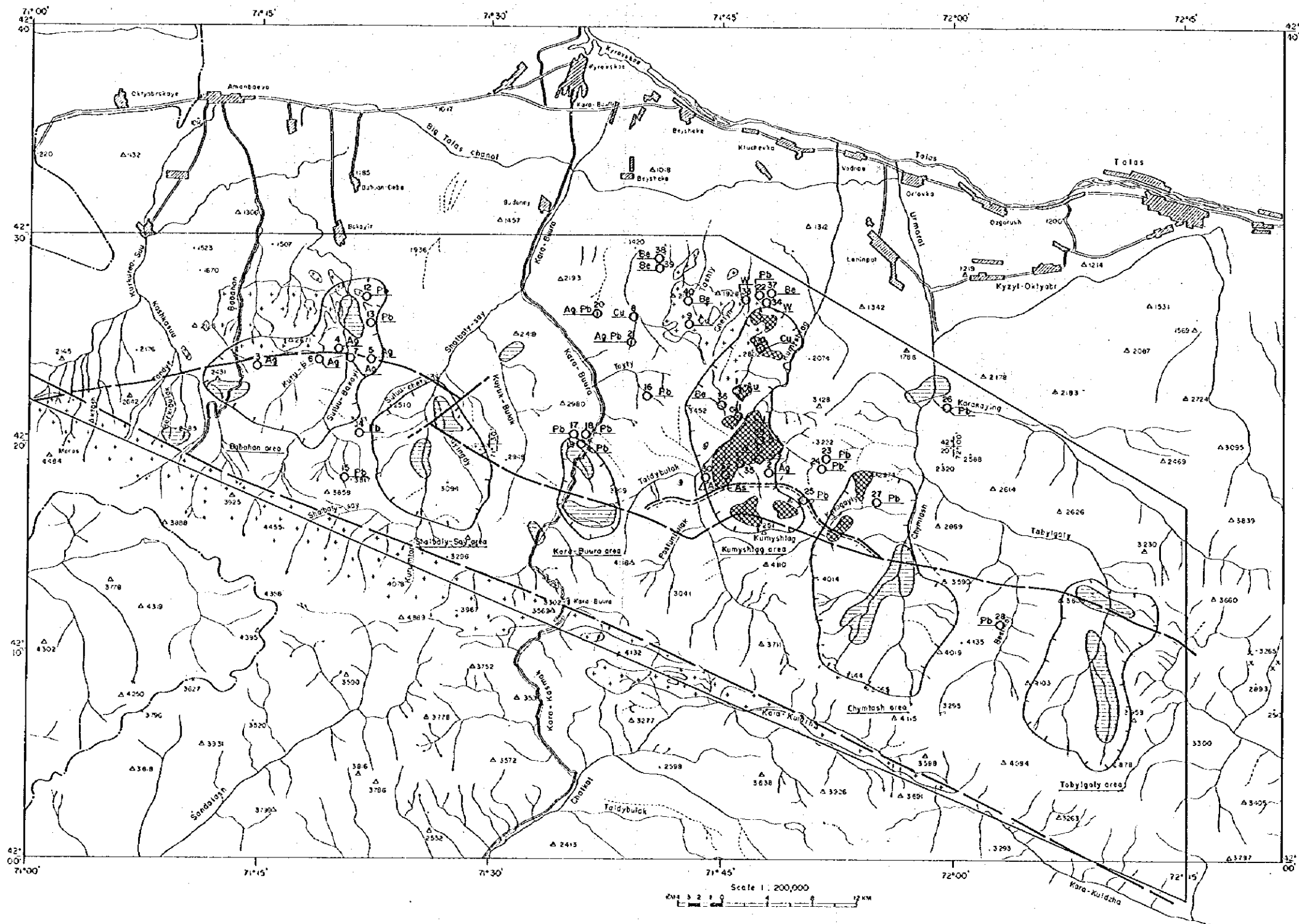


PL-9

THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)
Geochemical Anomaly Map of the Shyraldzhyn
and Kumyshtag Area

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

- LEGEND**
- Au, Ag (g/t)
 - Pb, Zn, Cu (%)
 - Sn, W, Be, Nb, Ce, Li (%)
 - Granitic batholith
 - Fault

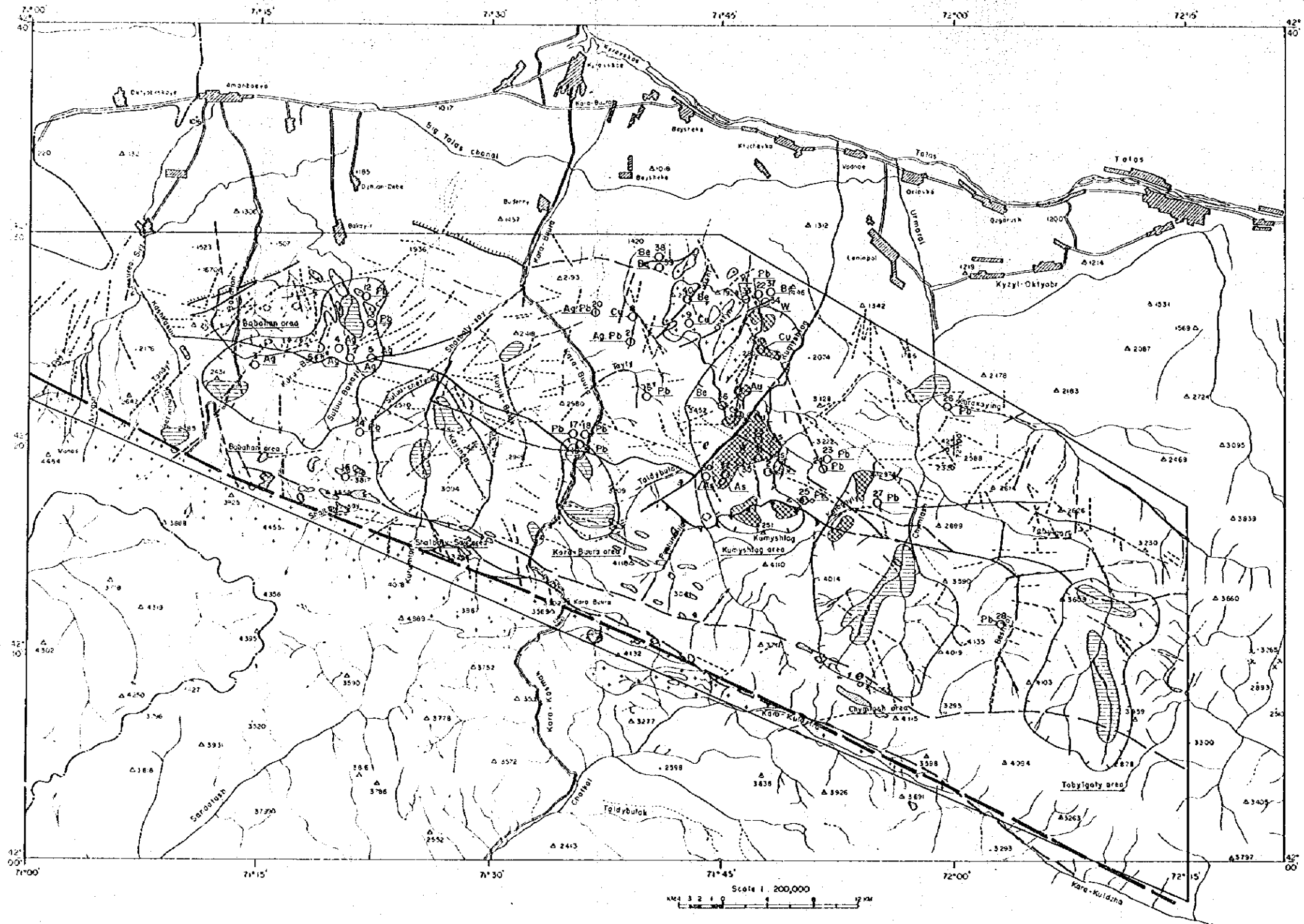


PL. - 10

THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)
Summary of the Compilation

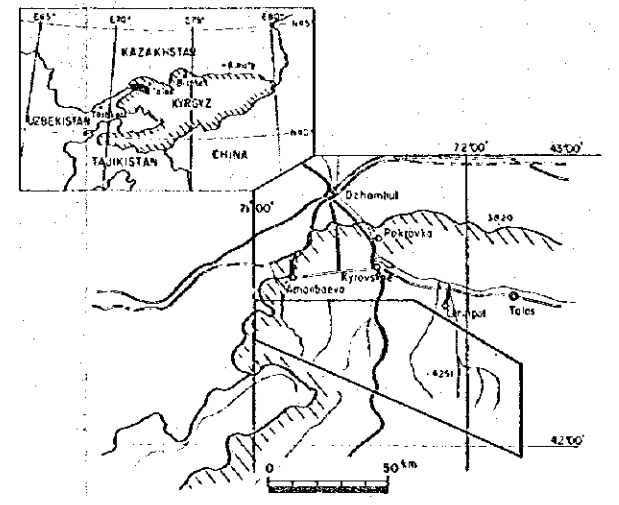
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

- LEGEND**
- The promising area for future survey
 - Site of deposit, number and kind of element
 - Geochemical gold anomaly of semi-detail survey
 - Geochemical gold anomaly of reconnaissance survey
 - Granitic batholith
 - Fault



THE MINERAL EXPLORATION
IN
THE TALAS AREA, THE KYRGYZ REPUBLIC
(PHASE I)

Generalized Results of the Survey



JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1995
Prepared by MINDECO

LEGEND

- The promising area for future survey
- Site of deposit, number and kind of element
- Geochemical gold anomaly of semi-detail survey
- Geochemical gold anomaly of reconnaissance survey
- Spectral anomaly after satellite image analysis
- Interpreted fault and major lineament
- Minor lineament
- Granitic batholith
- Fault

JICA