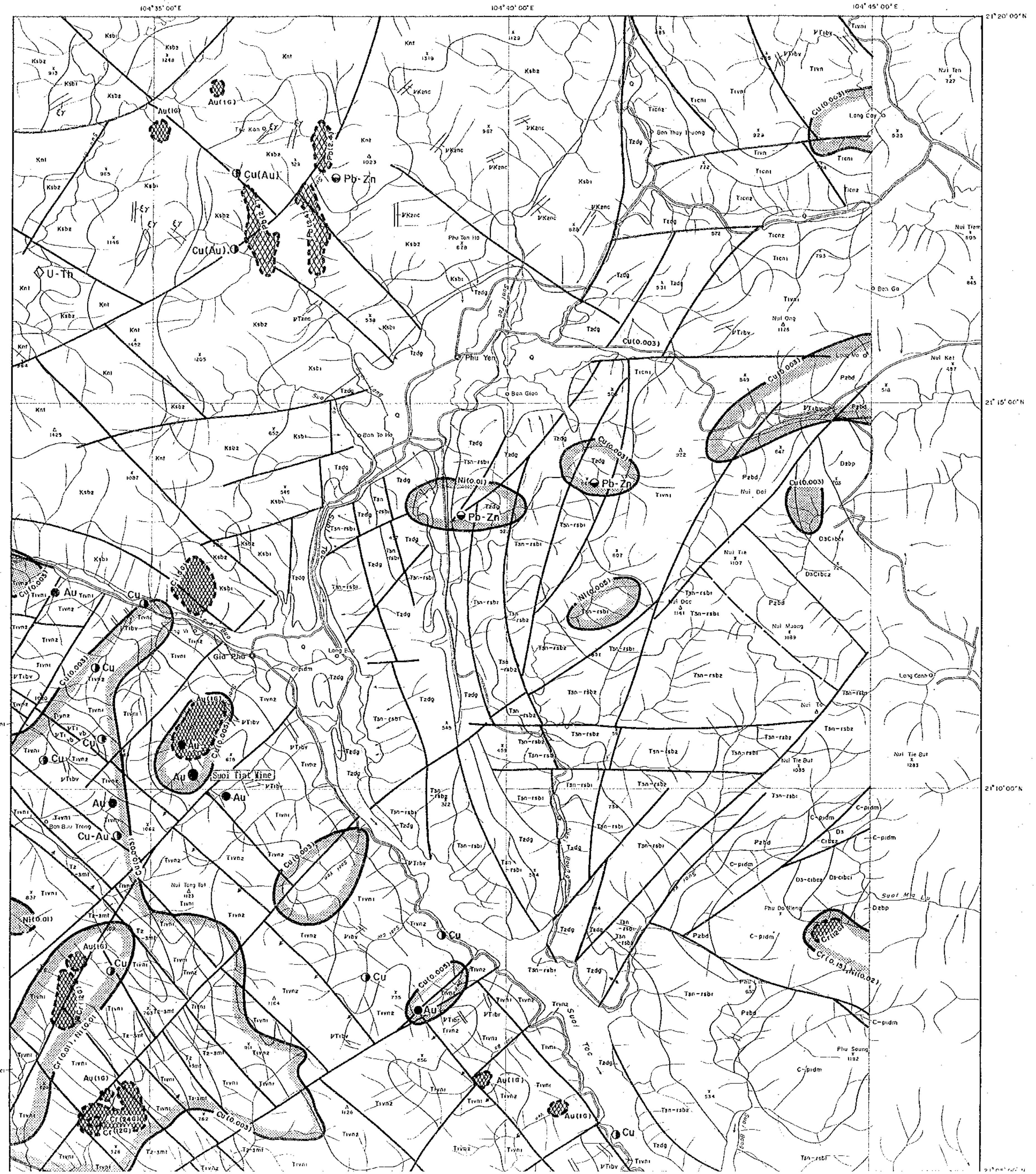
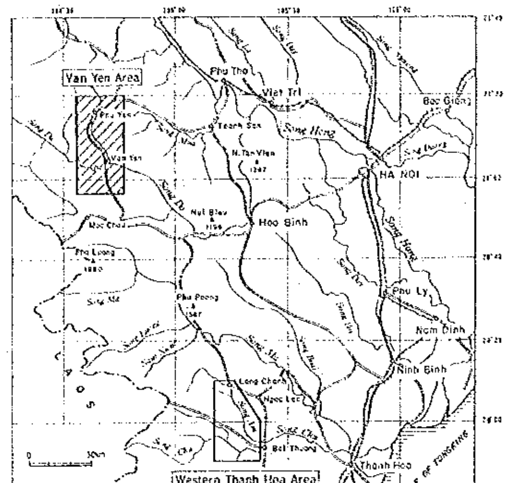


PL. 1

REPORT ON THE COOPERATIVE MINERAL EXPLORATION IN THE VAN YEN AND WESTERN THANH HOA AREAS, THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

COMPREHENSIVE INTERPRETATION MAP OF THE AVAILABLE RELEVANT DATA IN THE VAN YEN AREA



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1: 50,000

0 1 2 3 4 5km

LEGEND

Quaternary		Q	Gravel, sand and clay
Cretaceous	Yen Chau F.	K_2yc	Conglomerate and sandstone
	Ngoi Thia F.	Knt	Trachyte and tuff
	Suoi Bo F.	Ksb_2	Porphyrite, felsite, porphyry and tuff
		Ksb_1	Tuffaceous conglomerate, tuffaceous sandstone, shale and locally basalt
Triassic	Suoi Bang F.	$T_3n\text{-}rsb_2$	Shale, sandstone, siltstone and coal
		$T_3n\text{-}rsb_1$	Sandstone, siltstone and fossiliferous limestone
	Muong Trai F.	$T_2\text{-}smt$	Sandstone, siltstone, conglomerate and fossiliferous
	Dong Giao F.	T_2dg	Fossiliferous limestone
	Co Noi F.	T_1cn_2	Sandstone siltstone and locally limestone
		T_1cn_1	Tuffaceous sandstone and shale
	Vien Nam F.	T_1vn_2	Intermediate to felsic volcanic rocks
		T_1vn_1	Basalt, basaltic tuff, agglomerates and dacite
Permian	Ban Diet F.	P_2bd	Shale, sandstone and fossiliferous limestone
Carboniferous to Permian	Da Mai F.	$C\text{-}P_1dm$	Limestone
	Ban Cai F.	$D_3C_1bc_2$	Chert, sandstone and cherty fossiliferous limestone
		$D_3\text{-}C_1bc_1$	Shale, cherty shale, manganese limestone and locally fossiliferous limestone
Devonian	Ban Pap F.	D_2bp	Fossiliferous limestone

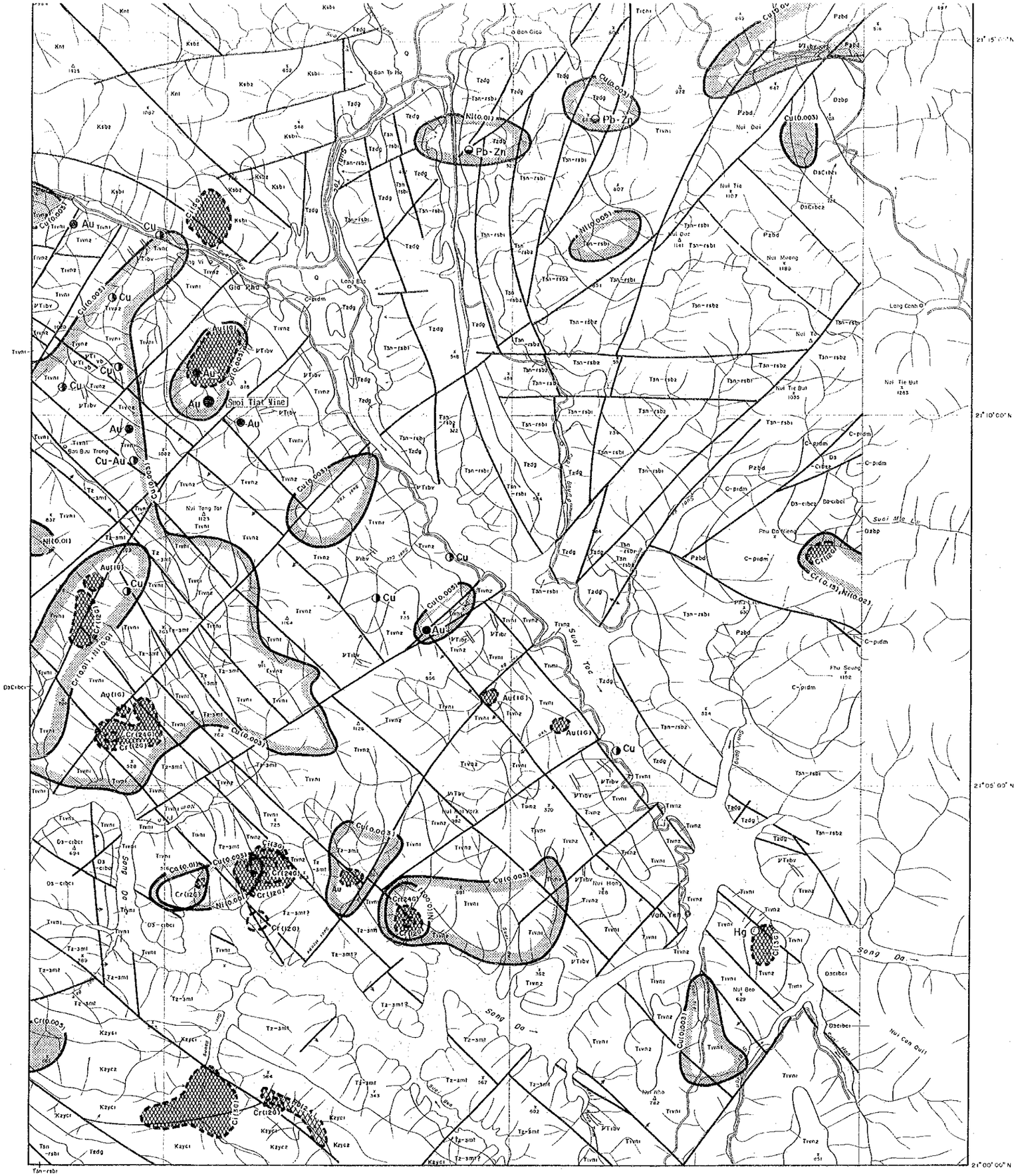
Intrusive rocks

$\xi\gamma$	Granite
νK_2nc	Nam Chien Complex: gabbro, diabase and diorite
νT_1bv	Ba Vi Complex: gabbro, diabase and diorite
(line)	Fault

Geochemical anomalous zone

Rock of soil anomalies(%) Cu(0.003)

Cu(0.003) [illegible]



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1: 50,000

0 1 2 3 4 5km

LEGEND

Quaternary — Q — Gravel, sand and clay

Cretaceous
- Yen Chau F. — Kyc — Conglomerate and sandstone
- Suoi Thia F. — Kst — Trachyte and tuff
- Suoi Bo F. — Ksb2 — Porphyrite, felsite, porphyry and tuff
- Suoi Bo F. — Ksb1 — Tuffaceous conglomerate, tuffaceous sandstone, shale and locally basalt

Triassic
- Suoi Bang F. — Tsn-rsb2 — Shale, sandstone, siltstone and coal
- Suoi Bang F. — Tsn-rsb1 — Sandstone, siltstone and fossiliferous limestone
- Khoang Tranl F. — Tz-sml — Sandstone, siltstone, conglomerate and fossiliferous
- Dong Giao F. — Tzdz — Fossiliferous limestone
- Co Soi F. — Tz2nt1 — Sandstone siltstone and locally limestone
- Co Soi F. — Tz2nt2 — Tuffaceous sandstone and shale
- Tieu Asa F. — Tz1nt2 — Intermediate to felsic volcanic rocks
- Tieu Asa F. — Tz1nt1 — Basalt, basaltic tuff, agglomerates and dacite.

Permian — Ben Piet F. — Pzbd — Shale, sandstone and fossiliferous limestone

Carboniferous to Permian
- Da Bai F. — C-Pidm — Limestone
- Bon Cai F. — Dz-C2bc — Chert, sandstone and cherty fossiliferous limestone
- Bon Cai F. — Dz-C1bc — Shale, cherty shale, sangweise limestone and locally fossiliferous limestone.

Devonian — Ban Fap F. — D2bb — Fossiliferous limestone.

Intrusive rocks
- gr — Granite,
- ΣDa2bc — Nui Chien Complex: gabbro, diabase and diorite
- ΣDa1bv — Ba Vi Complex: gabbro, diabase and diorite

Fault

Geochemical anomalous zone

Rank of soil anomalies(%)
Cu(0.003)

Cu(0.003) : <0.003
Cu(0.05) : 0.003-0.005
Ni(0.005) : <0.005
Ni(0.01) : 0.005-0.01
Ni(0.02) : 0.01-0.02
Cr(0.005) : <0.005
Cr(0.01) : 0.005-0.01
Cr(0.15) : 0.01-0.15
Co(0.01) : <0.01

Cr(240)Ni(0.01) — Au(1G) — Location of panned concentrate

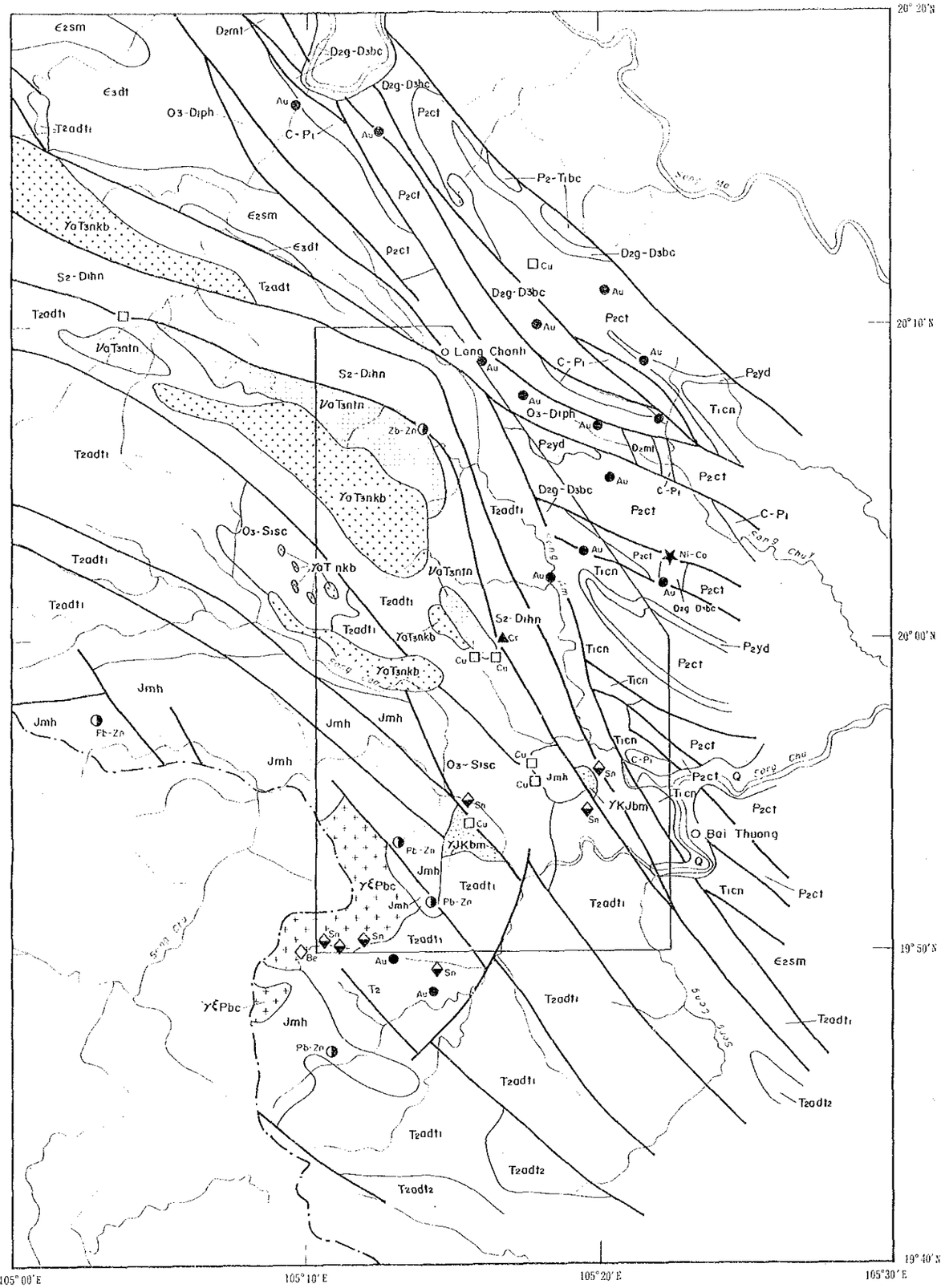
Pb(21.5)-Pb(21.5 g/m³)
Cu(2.6) -Cu(2 grains)

Mineralization

- Au
- Cu
- Pb-Zn
- Fe
- U Th

Abbreviations

Au: Gold
Cu: Copper
Pb: Lead
Zn: Zinc
Ni: Nickel
Co: Cobalt
Cr: Chromium
Cn: Cinnober
U : Uranium
Th: Thorium



L E G E N D

Quaternary	Q	Gravel, sand and soil
Jurassic	Jab	Acidic volcanic rock, acdic tuff and conglocerate
Triassic	T_2adt_3	Shale, marl and limestone with intercalation of shale
	T_2adt_2	Sandstone and tuffaceous sandstone with conglocerate, acidic volcanic rocks, chert and lenticular limestone
	T_1cn	Conglocerate, sandstone, siltstone and shale with fine bedded chert
Permian to Triassic	P_2-T_1bc	Sericitic shale with beds of iron ore, sandstone, siltstone and shale
Carboniferous to Permian	P_2yd	Limestone and coal
	P_2ct	Basic volcanic rocks with lenticular limestone at the upper part and volcanic breccia
	$C-P_1$	White and greyish black limestone with black chert(at the lower part)
Devonian	D_2g-D_3bc	Limestone with blocks of fine bedded chert and lenticular manganese ore
	D_2mt	Grey limestone
Silurian	S_2-D_1bi	Clayish shale ansd extrusive rocks
Ordovician to Devonian	O_3-D_1ph	Limestone, volcanic rocks and shale
Cambrian	$Є_3dt$	Mainly sandstone with shale
	$Є_2sm$	Sandstone, siltston, shale, limestone and shale with coal and basic volcanic rocks

Intrusive rocks

$γЄPbc$	Ban Chieng Complex: Biotite granite, porphyritic granite
$γJKbb$	Ban Muong Complex: Biotite granite, porphyritic granite
$γaT_3nkt$	Xin Boi Complex: Two mica granite and biotite granite
$γaT_3ntr$	Tri Nang Complex: Gabbro, diabase

Fault

Mineralization

Au	Gold
Sn	Tin
Be	Beryllium
Pb-Zn	Lead-Zinc
Ni-Co	Nickel-Cobalt
Cr	Chromium
Cu	Copper

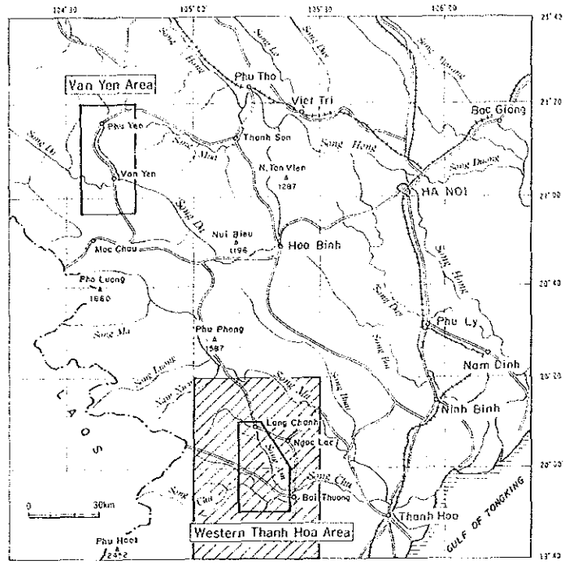
Survey Area

PL. 2

REPORT ON THE COOPERATIVE MINERAL EXPLORATION IN THE VAN YEN AND WESTERN THANH HOA AREAS, THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

COMPREHENSIVE INTERPRETATION MAP OF THE AVAILABLE RELEVANT DATA IN THE WESTERN THANH HOA AREA (GEOLOGY AND MINERALIZATION)



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

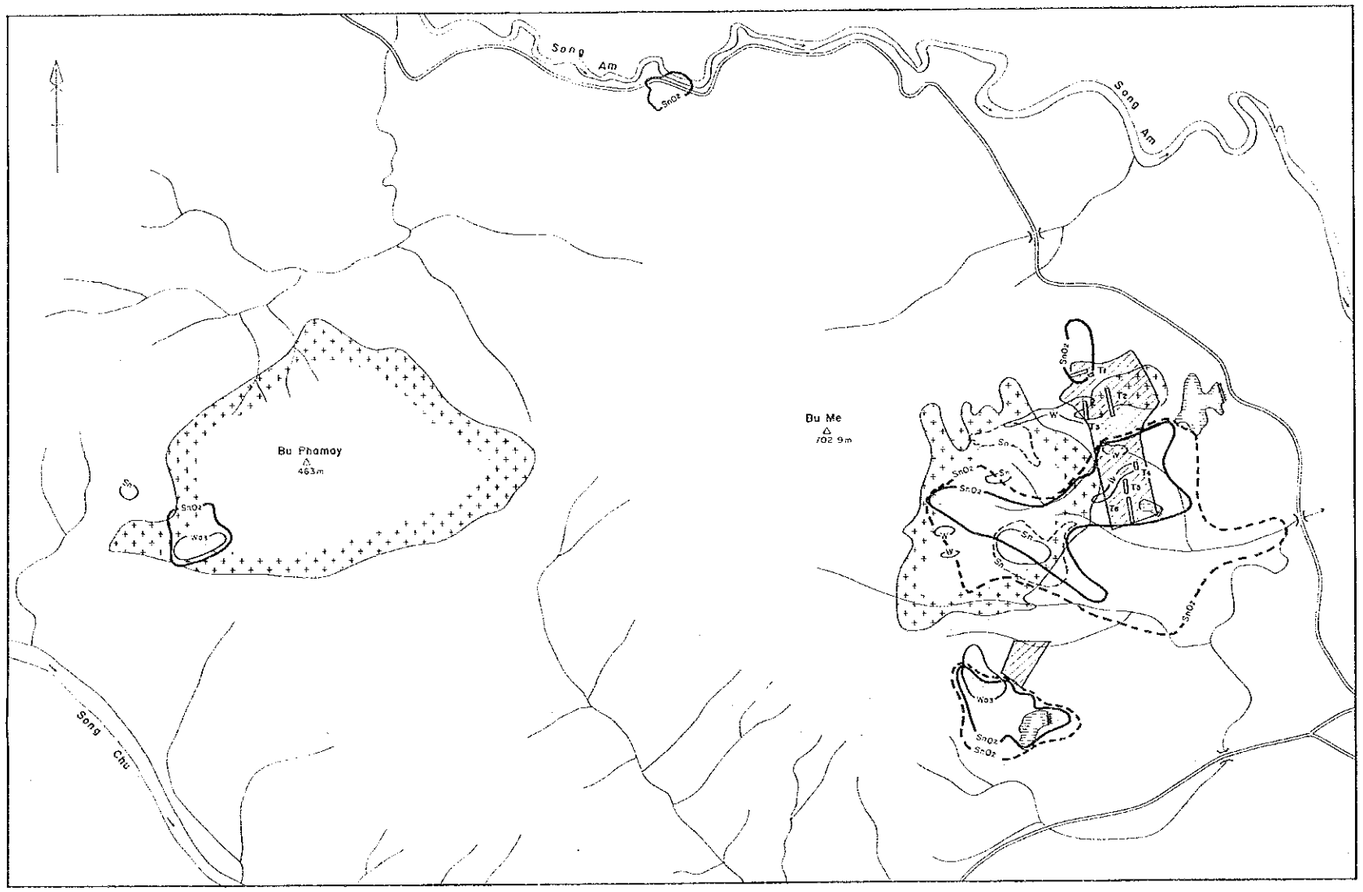
Scale 1 : 200,000

0 4 8 12 16 20km

REPORT ON THE COOPERATIVE MINERAL EXPLORATION IN THE VAN YEN AND WESTERN THANH HOA AREAS, THE SOCIALIST REPUBLIC OF VIETNAM

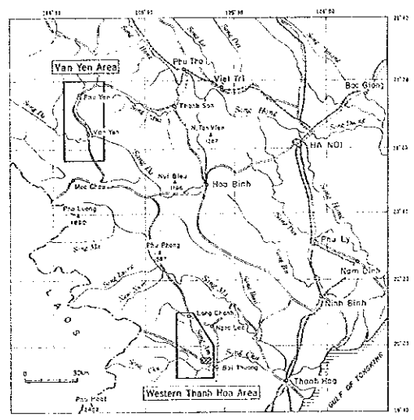
PHASE I

COMPREHENSIVE INTERPRETATION MAP OF THE AVAILABLE RELEVANT DATA IN THE WESTERN THANH HOA AREA (ANOMALOUS ZONES OF Sn-W-Au PANNED CONCENTRATE GEOCHEMISTRY)



LEGEND

- Granitoid
- Placer zone of cassiterite (SnO_2:101-273g/m³) by Panned concentrate
- Placer zone of cassiterite (SnO_2:51-100g/m³)
- Geochemical anomaly of Sn from soil sample (>3σ)
- Sn content in soil (Sn:0.01~0.029%)
- Placer zone of wolfrasite (WO_3:101-273g/m³)
- Geochemical anomaly of W from soil sample (>3σ)
- Trench
- Extraction area of ore reservoir
- Drainage
- Dus
- Car-Road



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

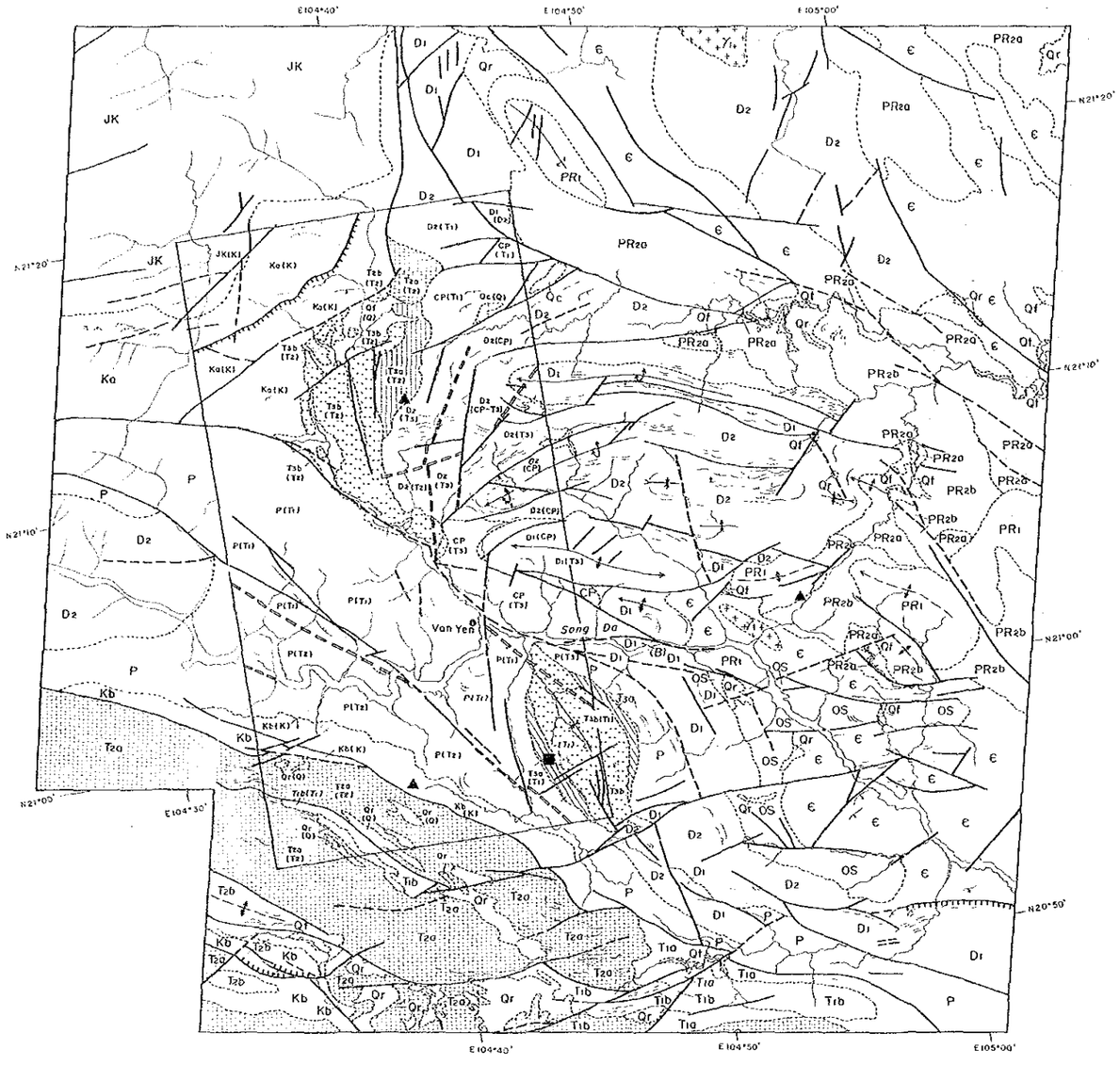
Scale 1: 20,000

0 1000 2000m

REPORT ON THE COOPERATIVE MINERAL EXPLORATION IN THE VAN YEN AND WESTERN THANH HOA AREAS, THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

PHOTOGEOLOGICAL INTERPRETATION MAP USING SPOT HRV AND LANDSAT TM IMAGES OF THE VAN YEN AREA



LEGEND

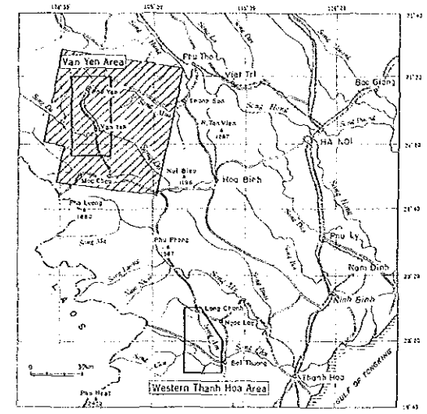
- Boundary of photogeologic unit
- P — Photogeologic unit
- (T₂) — Geologic unit of the geologic map (present survey)
- Lineament (normal fault/reverse fault)
- Fault on the geologic map
- *Bedding trace (crest; gentle, moderate, steep)*
- Dip slope (back slope of cuesta or hogback; gentle, moderate, steep)
- *Anticlinal axis with direction of plunge*
- Synclinal axis with direction of plunge
- Overturned anticline axis with direction of plunge
- Overturned synclinal axis with direction of plunge (Double arrow indicates a moderate to steep flank)
- Major drainage
- Principal city

Mineral Showing
- ■ Cu, Ni-Cu
- ▲ Pb-Zn

Survey Area

Characteristics of Photogeological Units

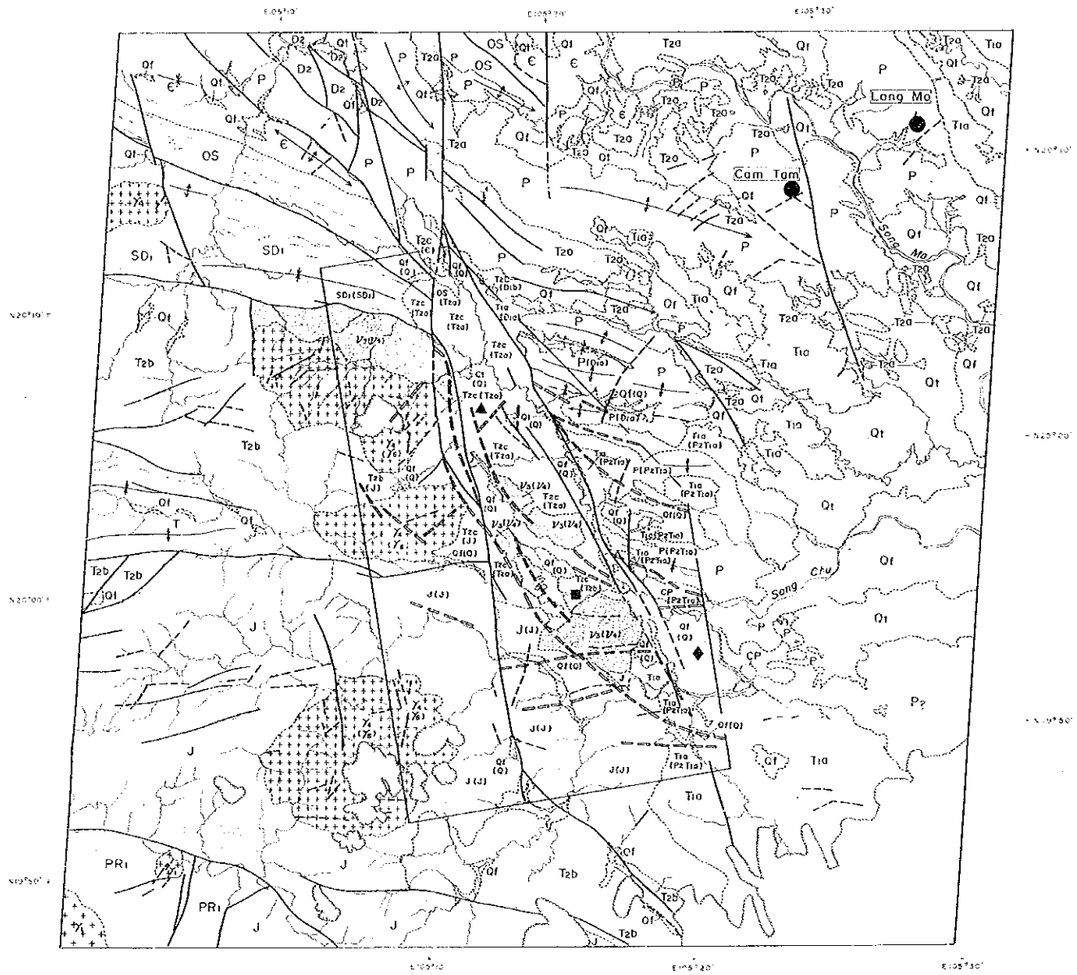
Photogeologic Units	Image characteristics		Geomorphological features					Superficial Cover		Correlation with the Published Map
			Drainage			Cross section	Bedding			
	Tone	Texture	Pattern	Density	Rock Resistance			Vegetation	Cultivation	
PR₁	black to dark grey	coarse	parallel, subdendritic	medium to low	high		very rare	dense	rare	Proterozoic; metamorphic rock-gneiss, schist etc.
PR₂b	grey to light grey	medium	Planate	very high	low		none	sparse	frequent	Proterozoic; metamorphic rocks-schist, marble etc.
PR₂a	black to dark grey	medium	trellis	very high	moderate to low		very rare	dense	rare	Proterozoic; metamorphic rocks-schist, marble etc.
∈	light to grey, dark grey	coarse	parallel, dendritic	medium	high to moderate		parallel bedding	moderate	common	Cambrian; partly metamorphic, sedimentary rocks-schist etc.
OS	dark grey to grey	medium	parallel, sub dendritic	medium	high		parallel bedding	moderate	common	Ordovician to Silurian; sedimentary rocks-conglomerate, sandstone etc.
D₂	black	coarse	parallel, rectilinear	medium to low	high		very well bedded	dense	rare	Upper Devonian; sedimentary rocks-mainly limestone
D₁	black to grey	coarse	parallel, dendritic	medium to high	high to moderate		very well bedded	dense	rare	Middle to Lower Devonian; sedimentary rocks-mainly limestone, chert
CP	grey	fine	dendritic	medium to high	moderate		rare	sparse	rare	Carboniferous and Permian; sedimentary rocks mainly limestone
P	dark grey to grey	fine	trellis	medium to high	moderate		parallel bedded	sparse	common	Upper Permian; volcanic rocks-andesite, rhyolite etc.
T₂a	dark grey to grey	medium	parallel	high	moderate		very rare	moderate	rare	Upper Triassic; andesite, basalt, and their pyroclastic rocks, marl
T₂b	grey	fine	trellis	very high	moderate		none	sparse	rare	Upper Triassic; Andesite, basalt, and their pyroclastic rocks, marl
T₁a	black	coarse	trellis, multi-lineal	very high	moderate to high		parallel bedded	dense	rare	Middle Triassic; sedimentary rock-mainly limestone
T₁b	grey	medium	dendritic	medium to high	moderate		parallel bedded	dense	common	Middle Triassic; sedimentary rocks-conglomerate, limestone etc.
T₂a	grey to dark grey	coarse	trellis	high	moderate		none	moderate	rare	Upper Triassic; sedimentary rocks-sandstone, siltstone etc.
T₂b	light to light grey	fine	trellis, parallel	medium to high	moderate to low		parallel bedded	sparse	common	Upper Triassic; sedimentary rocks-sandstone, siltstone etc.
Kb	grey, light grey	fine	parallel	high	low		none	sparse	common	Upper Cretaceous; sedimentary rocks-sandstone, siltstone etc.
Qf	light grey	fine	meandering	low	very low		none	sparse	frequent	Quaternary; gravel, sand, silt, clay
Qr	light to dark grey, white	fine	trellis	low	very low		none	sparse	frequent	Quaternary; gravel, sand, silt, clay
Qc	grey	fine	parallel	low	very low		none	sparse	common	Quaternary; gravel, sand, silt, clay
γ₅	black	coarse	parallel, trellis	high	high		massive	dense	rare	Intrusive rocks; granitic complex
JK	dark green to green	medium to coarse	trellis	high	moderate		parallel bedded	dense	common	Jurassic to Cretaceous; volcanic rocks



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

0 5 10 km



LEGEND

- Boundary of photogeologic unit
- Tio — Photogeologic unit
- (Dvo) — Geologic unit of the geologic map (present survey)
- Lineament
- Fault on the geologic map
- Bedding trace (crest; gentle, steep)
- Anticlinal axis with direction of plunge
- Synclinal axis
- Major drainage
- Reservoir
- Cloud cover
- Survey Area

Mineral Deposit Showing

- Au(-Ag)
- Cu, Ni Cu
- Pb-Zn
- Sn-W

Characteristics of Photogeological Units

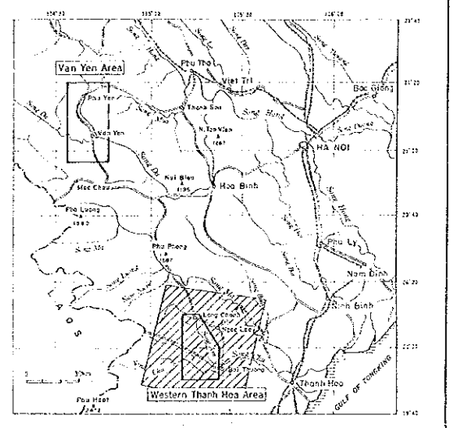
Photogeologic Units	Image characteristics		Geomorphological features					Superficial Cover		Correlation with the Published Map
			Drainage			Cross section	Bedding	Vegetation	Cultivation	
	Tone	Texture	Pattern	Density	Rock Resistance					
PR_1	red	coarse	dendritic	high	moderate		none	dense	rare	Proterozoic: metamorphic rocks gneiss, schist etc.
ϵ	red	coarse	dendritic	medium	moderate to high		rare	dense	rare	Cambrian, partly Ordovician: metamorphic rocks schist etc.
ϵS	red to reddish grey	coarse to medium	trellis	high	moderate to low		well bedded	moderate	rare	Ordovician to Silurian: sedimentary rocks conglomerate, sandstone etc.
SD_1	red	medium	sub-dendritic, pinnate	high	moderate		well bedded	dense	rare	Silurian to Lower Devonian: sedimentary rocks conglomerate, sandstone, shale etc.
D_2	red to reddish brown	coarse	dendritic	medium	high		none	dense	rare	Middle to upper Devonian: sedimentary rocks mainly shale, limestone
CP	red to reddish grey	coarse	dendritic	medium	moderate		none	dense	none	Carboniferous to Permian: sedimentary rocks conglomerate, limestone, shale etc.
P	red to reddish grey	fine, smooth	parallel	low	moderate to low		none	moderate	rare	Upper Permian: volcanic rocks andesite, rhyolite etc.
T_1a	light red to red	fine	trellis, pinnate	high	moderate		partly bedded	dense	season	Lower Triassic: sedimentary, partly volcanic rocks sandstone, shale etc.
T_2a	red to reddish brown	coarse	trellis, rectangular	very high	high to moderate		none	dense	rare	Middle Triassic: sedimentary rocks mainly limestone
T_2b	red	medium	dendritic	high	moderate to high		partly bedded	dense	rare	Middle Triassic: siltstone, sandstone tuffs etc. porphyritic rhyolite, dacite etc.
T_2c	red	fine	pinnate trellis	very high	low to moderate		rare	dense	rare	Middle Triassic: sedimentary rocks shale, siltstone, sandstone etc.
J	red to reddish brown	coarse	dendritic	high	very high		very rare	dense	rare	Jurassic(?): rhyolite, dacite, and their pyroclastic rocks
Qt	grey to greenish grey	medium	meandering	low	very low		none	sparse	frequent	Quaternary: gravel, sand, silt, clay (terrace deposits?)
Qf	grey to light grey	fine	meandering	low	very low		none	sparse	frequent	Quaternary: gravel, sand, silt, clay
γ_1	reddish brown	medium	dendritic	medium	high		massive	dense	none	Intrusive rocks: granitic complex
γ_2	reddish brown to dark brown	medium	sub-parallel, radial	medium	very high		massive	dense	none	Intrusive rocks: granitic leucocratic complex
ν_3	red to reddish brown	fine	sub-parallel radial	low	moderate		massive	dense	rare	Intrusive rocks: gabbroic complex

PL. 5

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

PHOTOGEOLOGICAL INTERPRETATION MAP USING SPOT HRV
AND LANDSAT TM IMAGES OF WESTERN THANH HOA AREA



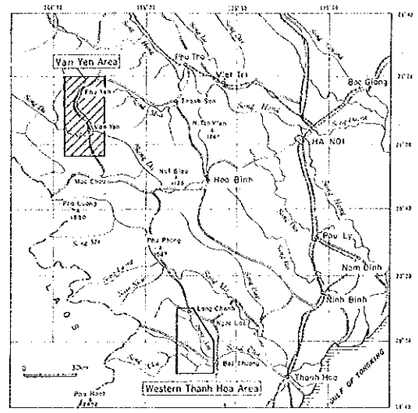
FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

0 5 10 km

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE 1

GEOLOGIC MAP OF THE VAN YEN AREA

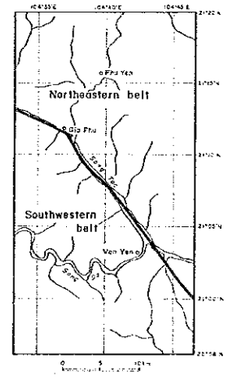


FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1:50,000
0 1 2 3 4 5km

Division of the Belts

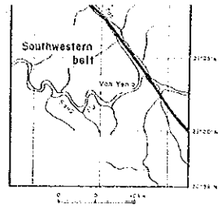


LEGEND

STRATIGRAPHY

- Quaternary (Q)
- Cretaceous (K)
- Upper Triassic (T3)
- Middle Triassic (T2)
- Lower Triassic (T1)
- Lower Permian (P1)
- Carboniferous to Permian (CP)
- Middle to Upper Devonian (D23)
- Middle Devonian (D2)

INTRUSIVE ROCKS



LEGEND

STRATIGRAPHY

- Quaternary
- Cretaceous
- Upper Triassic
- Middle Triassic
- Lower Triassic
- Lower Permian
- Carboniferous to Permian
- Middle to Upper Devonian
- Middle Devonian

INTRUSIVE ROCKS

Cretaceous

Syenite · Granite · Gabbro

Early Triassic

Gabbro, dolerite · Trachyte

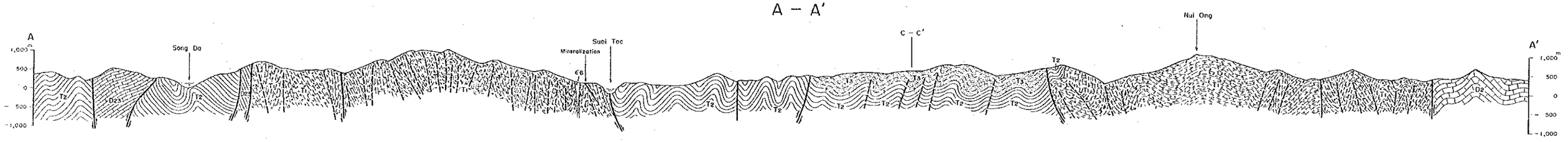
Permian

Ultramafic rocks

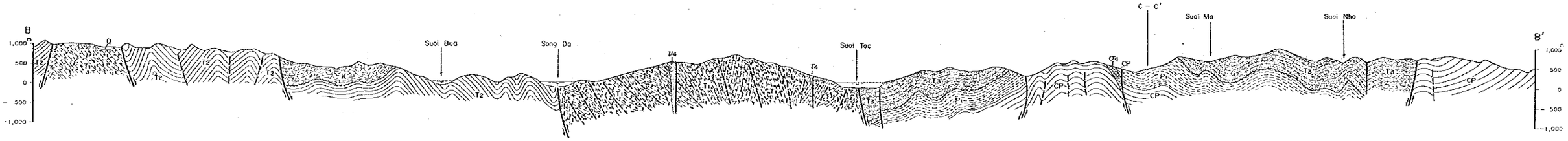
OTHERS

- Fault (certain / inferred or covered by the Quaternary)
- Dip and strike of bed
- Dip and strike of schistosity
- Mineralization
- Operating Mine
- A — A' Geologic section line

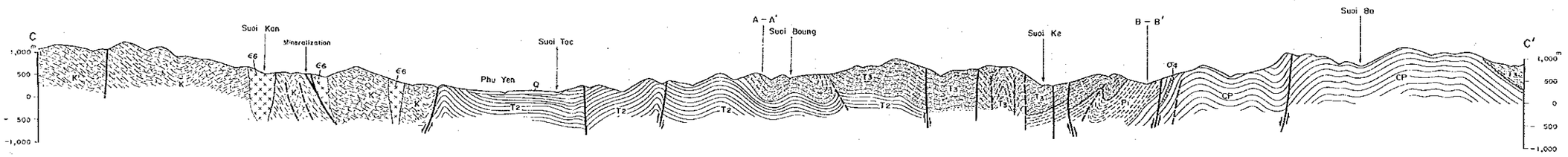
A – A′


A
A′
Song Da
Suoi Tac
Mineralization
C – C′
Nui Ong
1,000 m
500
0
– 500
–1,000
T2
T3
D2
D3
P1
CP
O
σ4
γ4
τ4
€6

B – B′


B
B′
C – C′
Suoi Ma
Suoi Nho
Suoi Bua
Song Da
Suoi Tac
1,000 m
500
0
– 500
–1,000
T2
T3
CP
O
σ4
γ4
τ4

C – C′

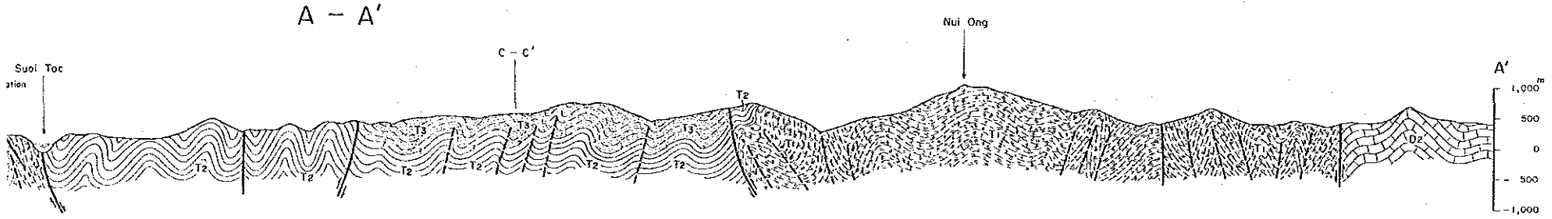

C
C′
Suoi Kan
Mineralization
Suoi Tac
A – A′
Suoi Boung
Suoi Ke
B – B′
Suoi Ba
Phu Yen
1,000 m
500
0
– 500
–1,000
K
T2
T3
CP
O
σ4
€6

PL 7

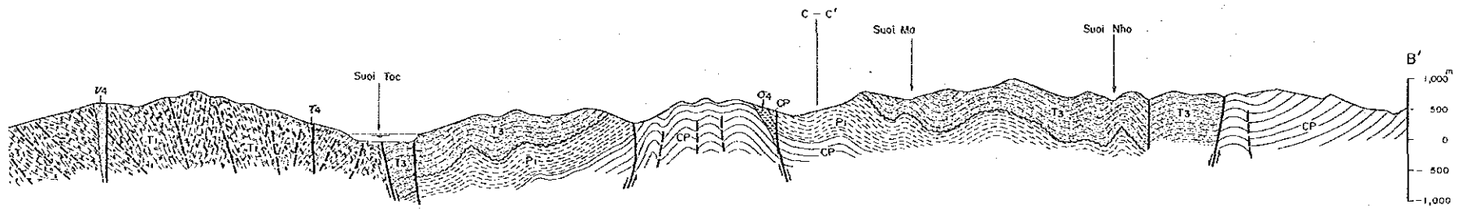
REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE I

GEOLOGIC SECTIONS OF THE VAN YEN AREA

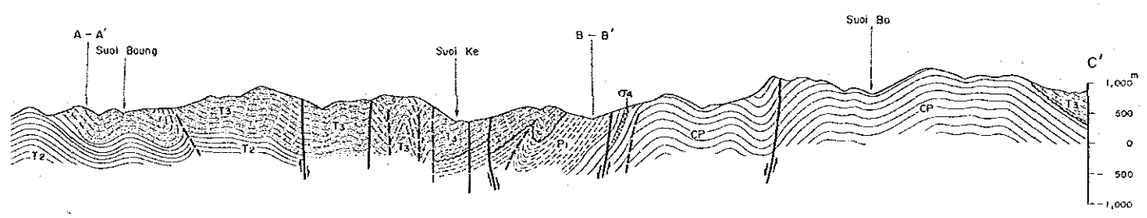
A – A′



B – B′



C – C′



LEGEND

STRATIGRAPHY

- Q — Quaternary
- K — Cretaceous
- T3 — Upper Triassic
- T2 — Middle Triassic
- T1 — Lower Triassic
- P1 — Lower Permian
- CP — Carboniferous to Permian
- D2-3 — Middle to Upper Devonian
- D2 — Middle Devonian

INTRUSIVE ROCKS

Cretaceous

- γ5 — Syenite
- γ4 — Granite
- γ5 — Gabbro

Early Triassic

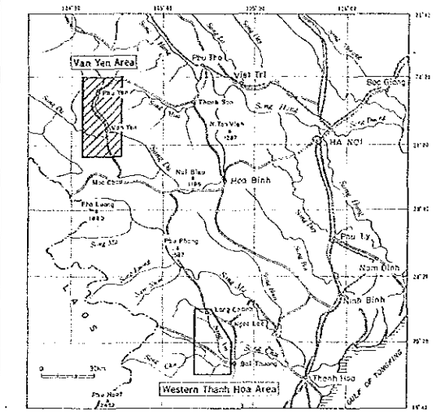
- γ4 — Gabbro, doterite
- τ4 — Trachyte

Permian

- σP1 — Ultramafic rocks

OTHERS

Fault (certain / inferred or covered by the Quaternary).



FEBRUARY 1994

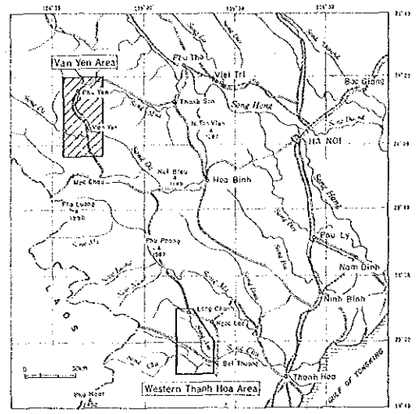
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 : 50,000

0 1 2 3 4 5km

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE I

LOCALITY MAP OF SAMPLES FOR LABORATORY STUDIES IN THE VAN YEN AREA



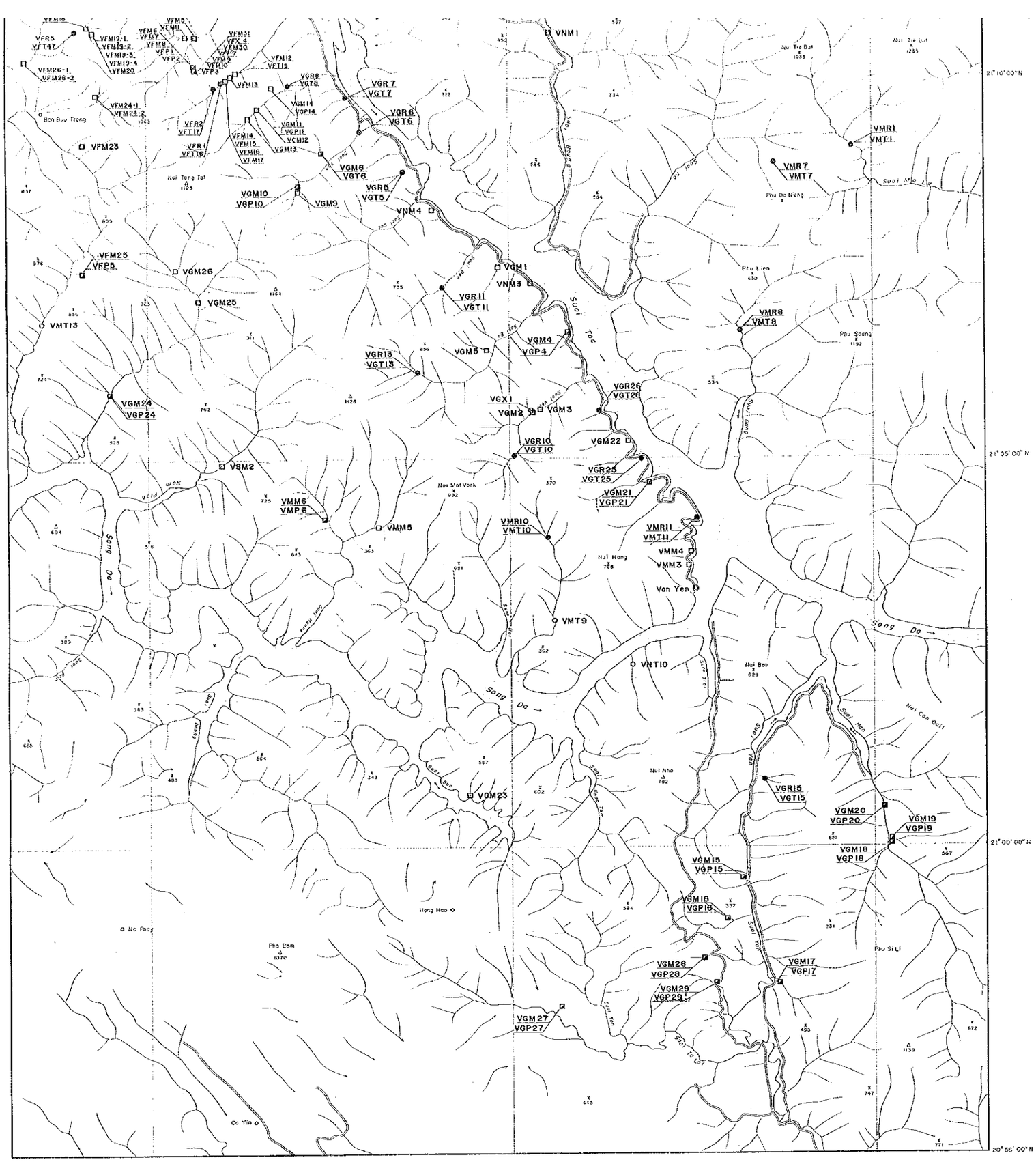
FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1:50,000
0 1 2 3 4 5km

LEGEND

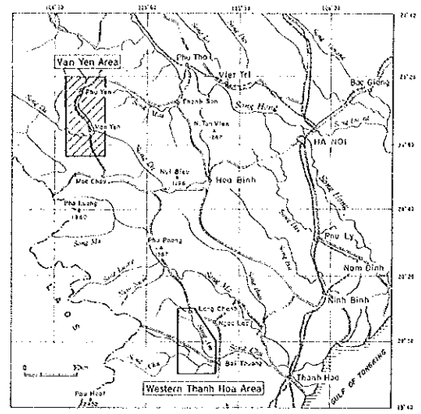
- ○ VFT3 — Location and number of rock samples for thin section
- ● VFR3 / VFT3 — Location and number of rock samples for whole rock analysis and thin section; upper : whole rock analysis sample; lower : thin section sample
- □ VFM3 — Location and number of ore samples for chemical analysis
- ◪ VFM7 / VFP7 — Location and number of ore samples for chemical analysis and polished section; upper : chemical analysis sample; lower : polished section sample
- ⊗ VFX5 — Location and number of rock samples for X-ray diffraction analysis


VFM19
VFR5
VFT47
VFM19-1
VFM19-2
VFM19-3
VFM19-4
VFM20
VFM26-1
VFM26-2
VFM24-1
VFM24-2
Bon Bau Trang
VFM23
VFM6
VFM11
VFM7
VFM8
VFP1
VFP2
VFM9
VFM10
VFP3
VFM31
VFX 4
VFM30
VFM12
VFT19
VFM13
VGR8
VGT8
VGM14
VGP14
VGM11
VGP11
VCM12
VGM13
VFR2
VFT17
VFR1
VFT16
VFM14
VFM15
VFM16
VFM17
VGR7
VGT7
VGR6
VGT6
VGM6
VGT6
VGR5
VGT5
VGM10
VGP10
VGM9
Nui Tong Tat
VNM1
VNM4
VGM1
VNM3
VGR11
VGT11
VGM4
VGP4
VGM5
VGR13
VGT13
VGX1
VGM2
VGM3
VGR26
VGT26
VGM22
VGR10
VGT10
VGR25
VGT25
VGM21
VGP21
Nui Mat Voi
VMR10
VMT10
VMR11
VMT11
VMM4
VMM3
Van Yen
VMT9
VNT10
Nui Beo
Nui Nho
VGR15
VGT15
VGM20
VGP20
VGM19
VGP19
VGM18
VGP18
VGM15
VGP15
VGM16
VGP16
VGM17
VGP17
VGM28
VGP28
VGM29
VGP29
VGM27
VGP27
Nui Hang
Nui Tre Bat
Nui Con Quit
Phu Lien
Phu Soung
Phu SiLi
Pha Bem
Co Yin O
Hang Hao O
No Phay
VMR1
VMT1
VMR7
VMT7
Phu Da Nhang
VMR8
VMT8
VFM25
VFP5
VGM26
VGM25
VMT13
VGM24
VGP24
VSM2
VMM6
VMP6
VMM5
VGM23
Song Da
Suoi Tac
Suoi Hao
Suoi Tien
Suoi Nhan
Suoi Ngoi
Suoi Tac Lot
21°10'00"N
21°05'00"N
21°00'00"N
20°56'00"N

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM

PHASE 1

LOCALITY MAP OF STREAM SEDIMENT AND PANNED CONCENTRATE SAMPLES IN THE VAN YAN AREA



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

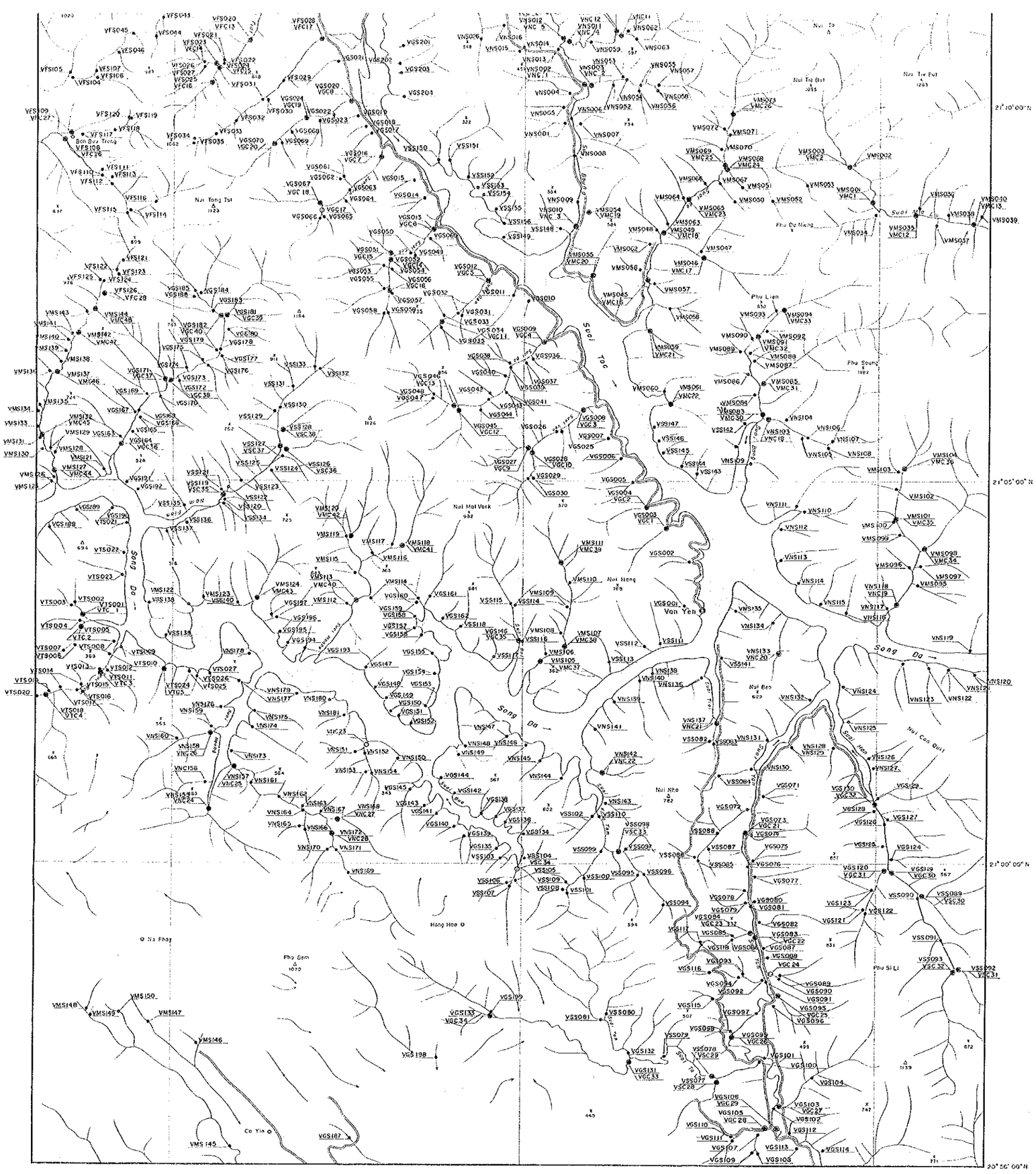
Scale 1:50,000

0 1 2 3 4 5km

LEGEND

- ◉ VFS001 Location and number of both stream sediment and panned concentrate samples
  - upper : stream sediment sample
  - lower : panned concentrate sample
- ● VFS002 Location and number of stream sediment samples
- ○ VFC 2 Location and number of panned concentrate samples

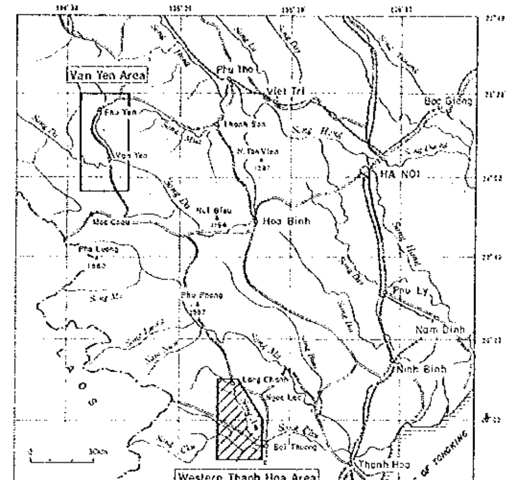
104°35'00"E 104°40'00"E 104°45'00"E 21°20'00"N 21°15'00"N 21°10'00"N 21°05'00"N


Song Da
Nui Tre But
Nui Tong Tat
Nui Mat Voi
Nui Nho
Nui Hang
Nui Con Quit
Phu Lien
Phu Song
Phu Si Li
Phu Gem
Hang Hoa O
O Na Phat
Co Yin O
Van Yen
21°10'00"N
21°05'00"N
21°00'00"N
20°56'00"N

PL. 10

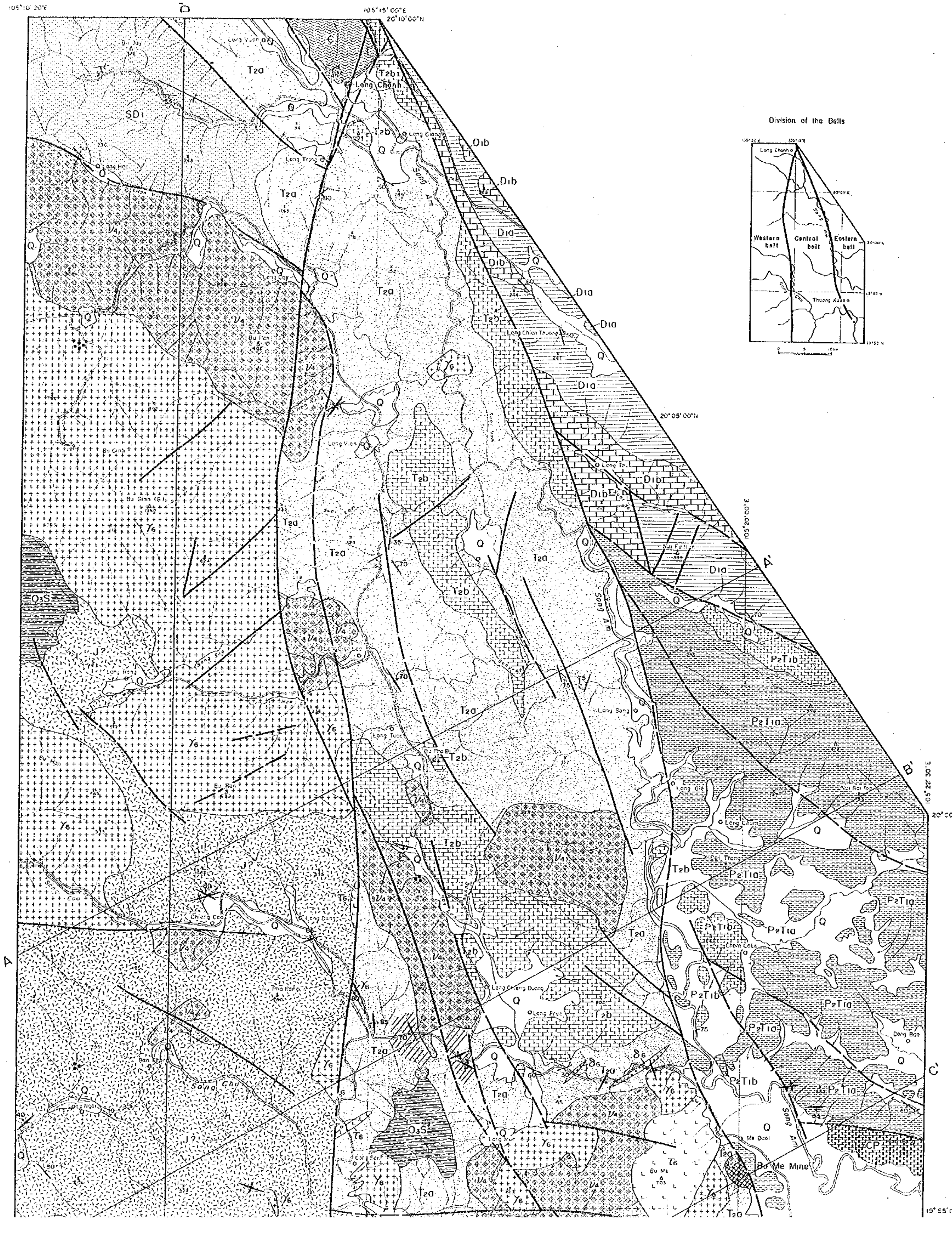
REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE I

GEOLOGIC MAP OF THE WESTERN THANH HOA AREA



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN



Scale 1:50,000

0 1 2 3 4 5 km

LEGEND

STRATIGRAPHY

- Q — Quaternary
- J? — Undiscriminated Jurassic (mainly dacitic tuff)
- T2a / T2b — Middle Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- P2T1a / P2T1b — Upper Permian to Lower Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- CP — Carboniferous to Permian
- D1a / D1b — Lower Devonian
  - a : sedimentary rocks excluding limestone
  - b : limestone
- SD1 — Silurian to Lower Devonian
- O3S — Upper Ordovician to Silurian
- Є — Cambrian

INTRUSIVE ROCKS

Late Cretaceous to Paleogene

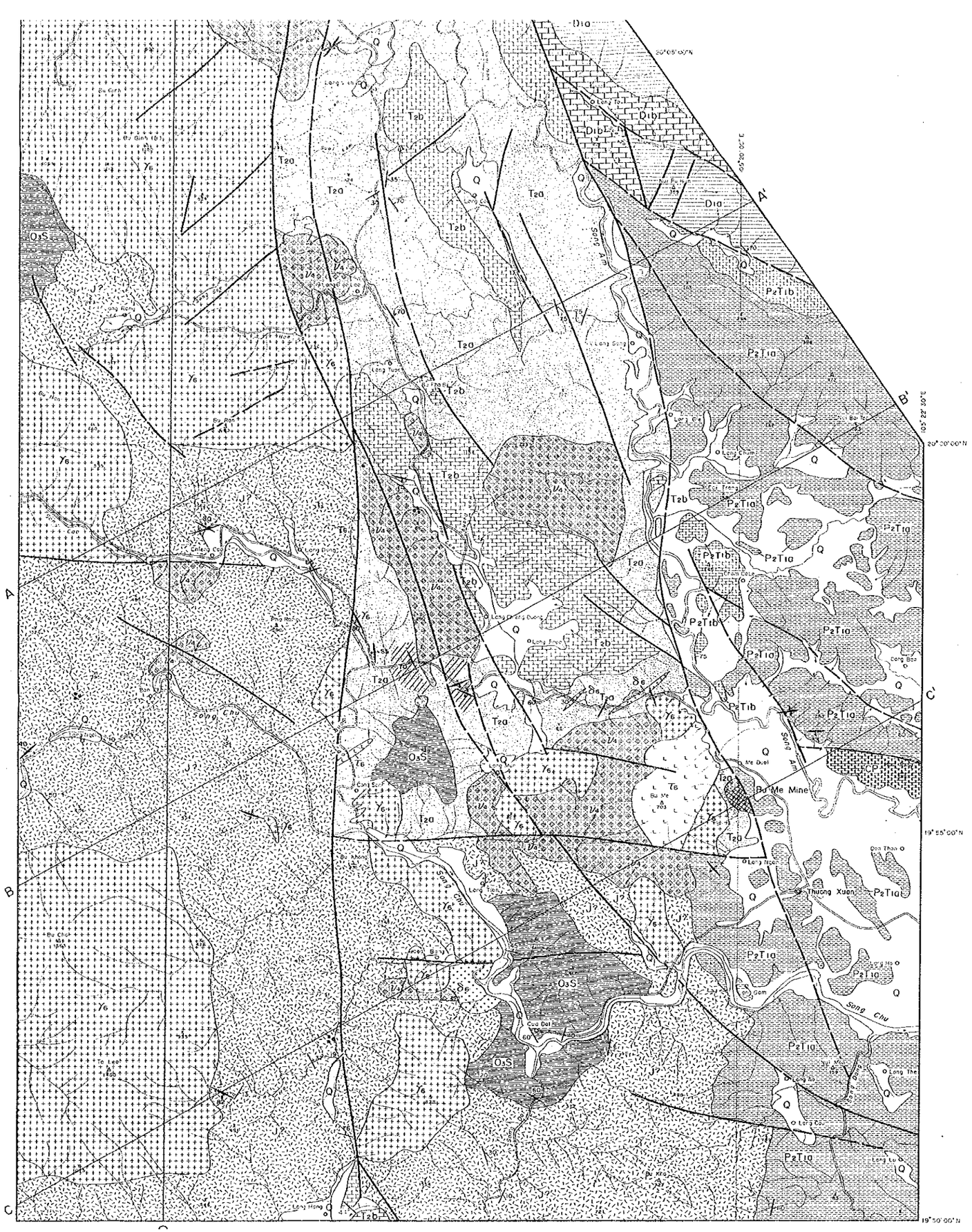
- γ_6 — Granitic rock
- δ_6 — Diorite
- τ_6 — Felsic rock

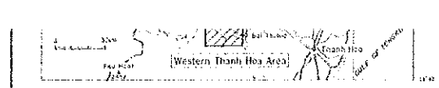
Late Triassic

- ν_4 — Gabbro

OTHERS

- Fault (certain / inferred or covered by the Quaternary)
- Dip and strike of bed
- Anticlinal axis





FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1: 50,000

0 1 2 3 4 5km

LEGEND

STRATIGRAPHY

- Quaternary
- Undiscriminated Jurassic (mainly dacitic tuff)
- Middle Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- Upper Permian to Lower Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- Carboniferous to Permian
- Lower Devonian
  - a : sedimentary rocks excluding limestone
  - b : limestone
- Silurian to Lower Devonian
- Upper Ordovician to Silurian
- Cambrian

INTRUSIVE ROCKS

Late Cretaceous to Paleogene

- Granitic rock
- Diorite
- Felsic rock

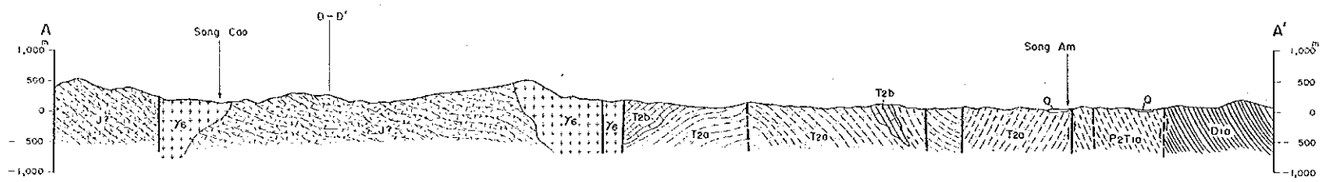
Late Triassic

- Gabbro

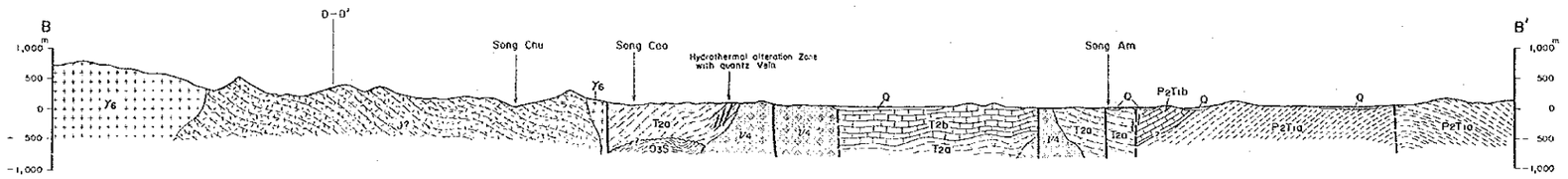
OTHERS

- Fault (certain / inferred or covered by the Quaternary)
- Dip and strike of bed
- Anticlinal axis
- Quartz (-Sulfide) Vein
- Mineralization
- Greisenization Zone
- Hydrothermal alteration
- Operating Mine
- A — A' Geologic Section line

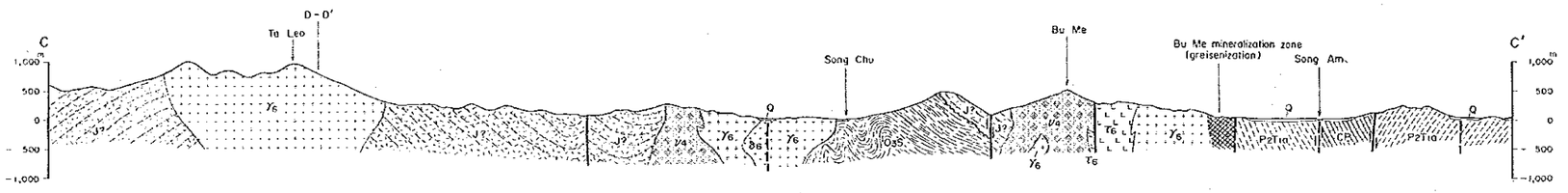
A – A′



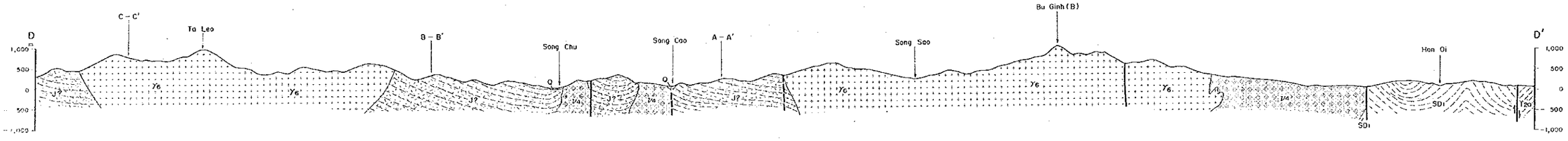
B – B′



C – C′



D – D′



LEGEND

STRATIGRAPHY

- Q — Quaternary
- J3 — Undiscriminated Jurassic (mainly clastic tuff)
- T2o — Middle Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- P2Tlo — Upper Permian to Lower Triassic
  - a : sedimentary rocks excluding limestone
  - b : limestone
- C2P1 — Carboniferous to Permian
- D1o — Lower Devonian
  - a : sedimentary rocks excluding limestone
  - b : limestone
- SD1 — Silurian to Lower Devonian
- O3S — Upper Ordovician to Silurian
- € — Cambrian

INTRUSIVE ROCKS

Late Cretaceous to Paleogene

- γ4 — Granitic rock
- δ4 — Diorite
- T6 — Felsic rock

Late Triassic

- γ6 — Gabbro

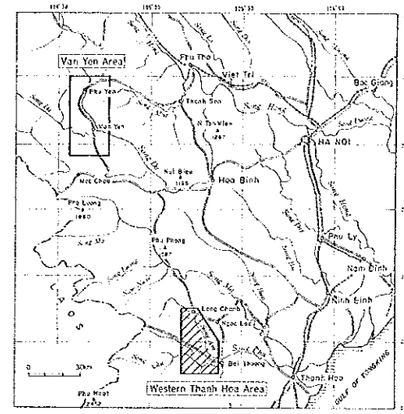
OTHERS

- Fault (certain / inferred or covered by the Quaternary)

REPORT ON THE COOPERATIVE MINERAL EXPLORATION IN THE VAN YEN AND WESTERN THANH HOA AREAS, THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

GEOLOGIC SECTIONS OF THE WESTERN THANH HOA AREA



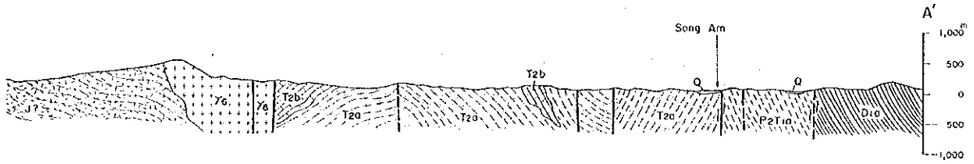
FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

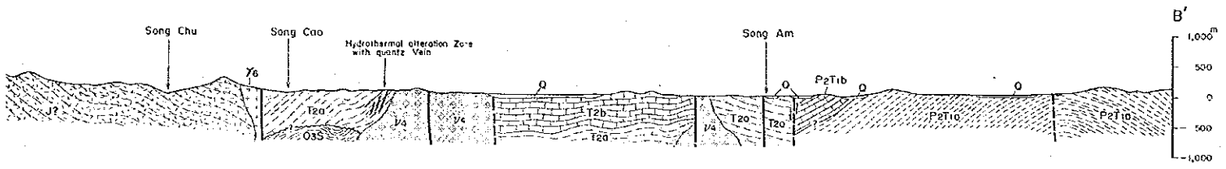
Scale 1: 50,000

0 1 2 3 4 5km

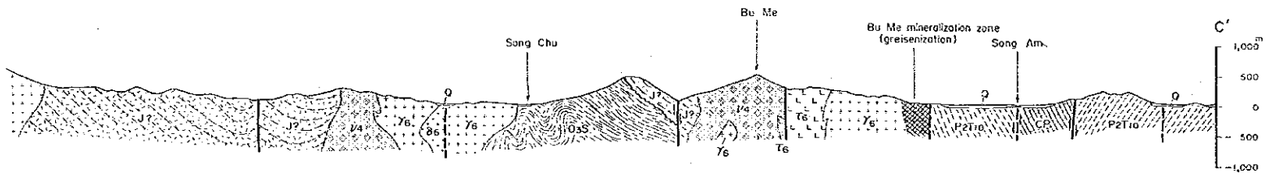
A – A′



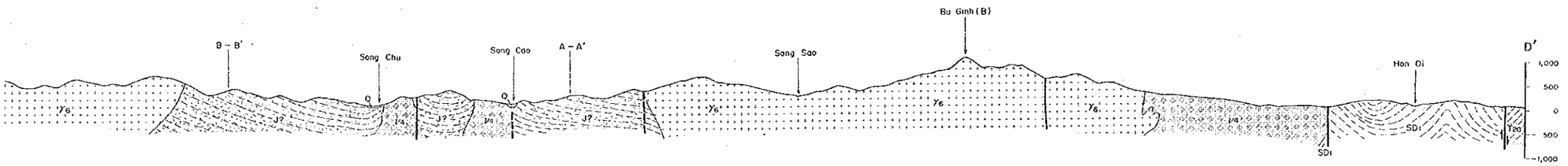
B – B′



C – C′



D – D′



LEGEND

STRATIGRAPHY

- Q — Quaternary
- J? — undiscriminated Jurassic (mainly dacitic tuff)
- T2a / T2b — Middle Triassic: a : sedimentary rocks excluding limestone; b : limestone
- P2Tla / P2Tlb — Upper Permian to Lower Triassic: a : sedimentary rocks excluding limestone; b : limestone
- C-P — Carboniferous to Permian
- D1a / D1b — Lower Devonian: a : sedimentary rocks excluding limestone; b : limestone
- S2-1 — Silurian to Lower Devonian
- O3S — Upper Ordovician to Silurian
- € — Cambrian

INTRUSIVE ROCKS

Late Cretaceous to Paleogene

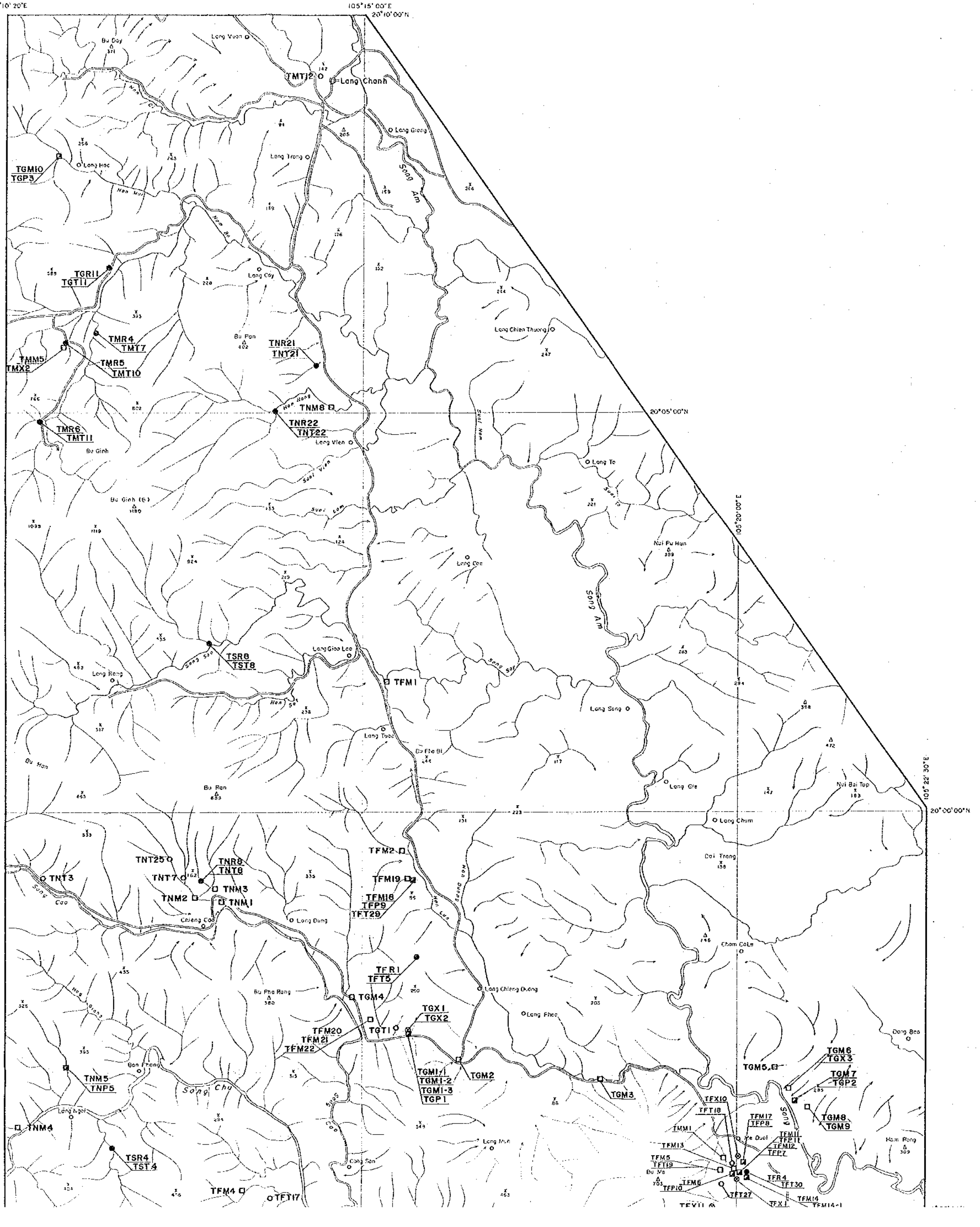
- γ6 — Granitic rock
- δ6 — Diorite
- τ6 — Felsic rock

Late Triassic

- γ4 — Gabbro

OTHERS

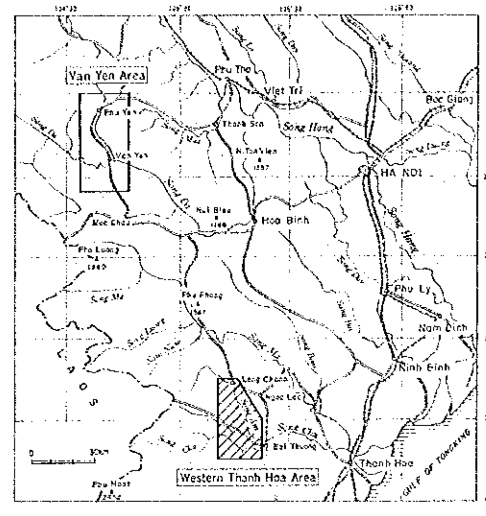
- Fault (certain / inferred or covered by the Quaternary)



PL. 12

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE 1

LOCALITY MAP OF SAMPLES FOR LABORATORY STUDIES IN THE WESTERN THANH HOA AREA



FEBRUARY 1994

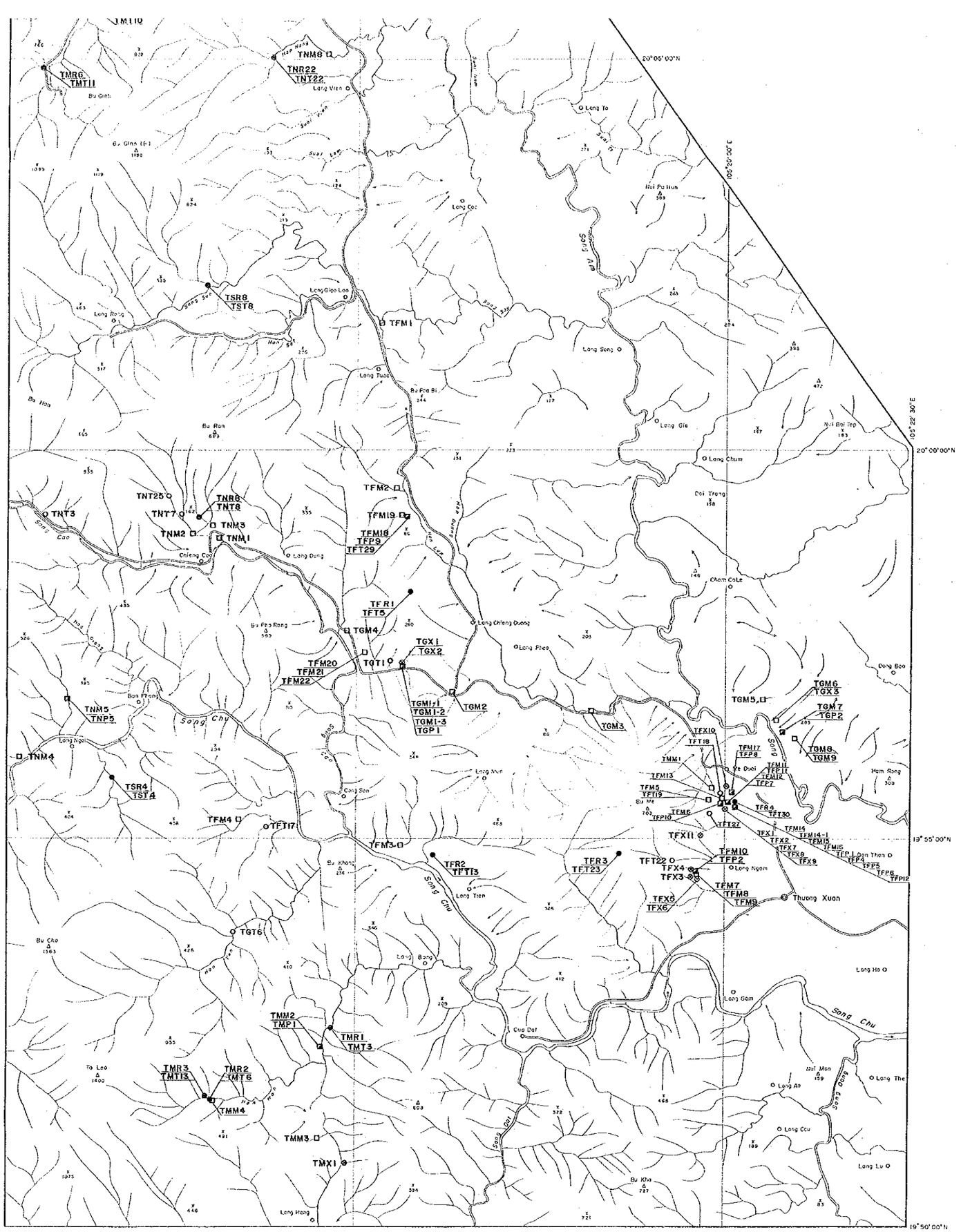
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

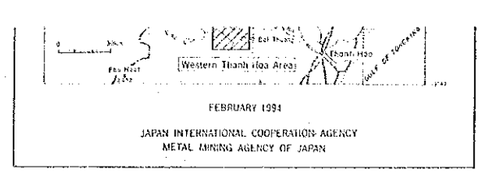
Scale 1: 50,000

0 1 2 3 4 5km

L E G E N D

O	TFT3	Location and number of rock samples for thin section
●	TFR3 / TFT3	Location and number of rock samples for whole rock analysis and thin section; upper : whole rock analysis sample; lower : thin section sample
□	TFM3	Location and number of ore samples for chemical analysis
◪	TFM7 / TFP7	Location and number of ore samples for chemical analysis and polished section; upper : chemical analysis sample; lower : polished section sample
⊗	TFX5	Location and number of rock samples for X-ray diffration analysis





FEBRUARY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1: 50,000

0 1 2 3 4 5km

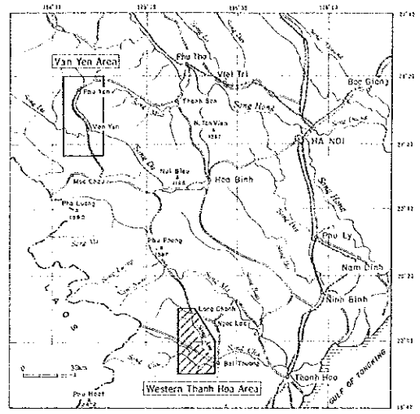
LEGEND

- ○ TFT3 — Location and number of rock samples for thin section
- ● TFR3 / TFT3 — Location and number of rock samples for whole rock analysis and thin section
  upper : whole rock analysis sample
  lower : thin section sample
- □ TFM3 — Location and number of ore samples for chemical analysis
- ◪ TFM7 / TFP7 — Location and number of ore samples for chemical analysis and polished section
  upper : chemical analysis sample
  lower : polished section sample
- ⊗ TFX5 — Location and number of rock samples for X-ray diffraction analysis

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM

PHASE I

LOCALITY MAP OF STREAM SEDIMENT AND PANNED CONCENTRATE SAMPLES IN THE WESTERN THANH HOA AREA



FEBRUARY 1991

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

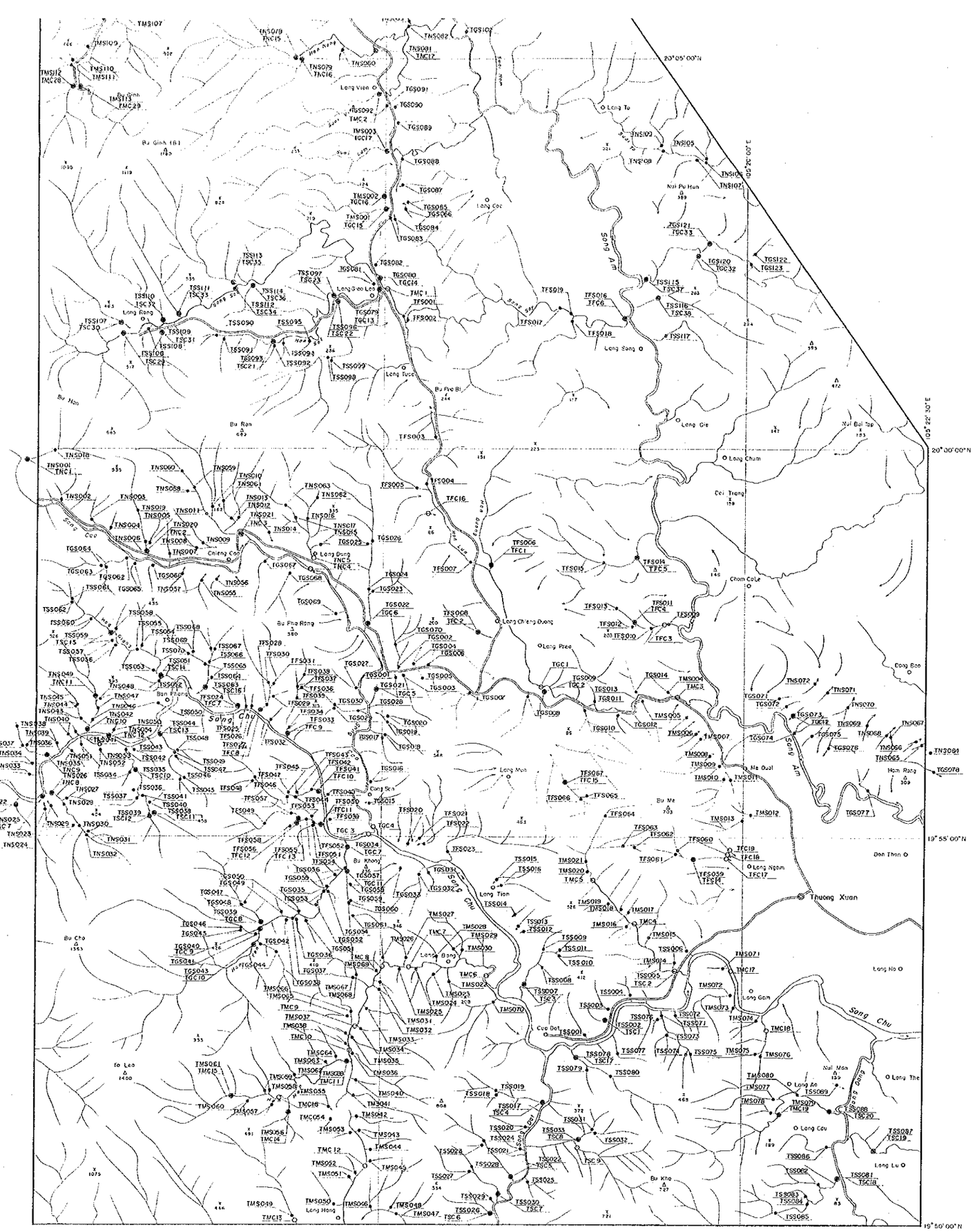
Scale 1: 50,000

0 1 2 3 4 5 km

105°10' 20"E
105°15' 00"E
20°10' 00"N
20°05' 00"N
105° 20' 00" E
105° 20' 30"E
20° 00' 00"N

LEGEND

- ⊕ TFS001 Location and number of both stream sediment and panned concentrate samples (TFC 1) — upper : stream sediment sample; lower : panned concentrate sample
- ● TFS002 Location and number of stream sediment samples
- ○ TFC 2 Location and number of panned concentrate samples

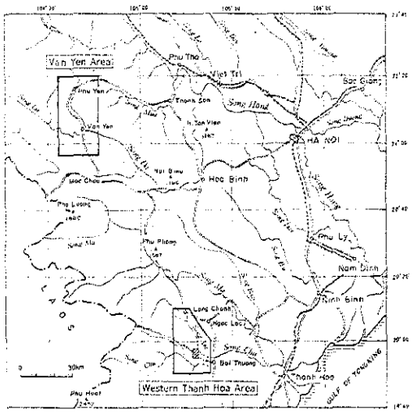


LEGEND

- ◉ TFS001 Location and number of both stream sediment and panned concentrate samples
  upper : stream sediment sample
  lower : panned concentrate sample
- ● TFS002 Location and number of stream sediment samples
- ○ TFC 2 Location and number of panned concentrate samples

REPORT ON THE COOPERATIVE MINERAL EXPLORATION
IN THE VAN YEN AND WESTERN THANH HOA AREAS,
THE SOCIALIST REPUBLIC OF VIETNAM
PHASE I

LOCALITY MAP OF SOIL SAMPLES IN THE WESTERN THANH HOA AREA



FEBRUARY 1994

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

Scale 1 5,000
0 100 200 300 400 500m

LEGEND

- A-1 : Location and number of soil samples
- TFS010 : Location and number of stream sediment samples
- TFC17 : Location and number of panned concentrate samples
- TFR6 / TFT6 : Location and number of rock samples for whole rock analysis and thin section. upper : whole rock analysis sample, lower : thin section sample
- TFM7 / TFP7 : Location and number of ore samples for chemical analysis and polished section. upper : chemical analysis sample, lower : polished section sample
- TFX5 : Location and number of rock samples for X-ray diffration analysis