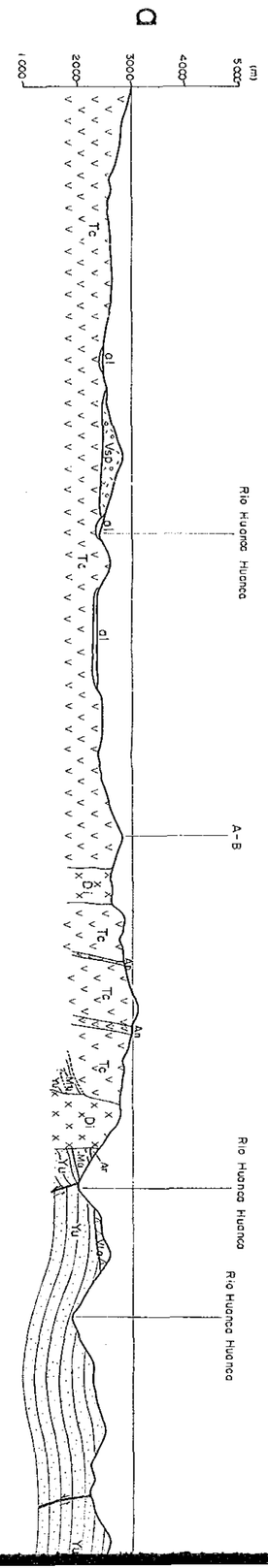
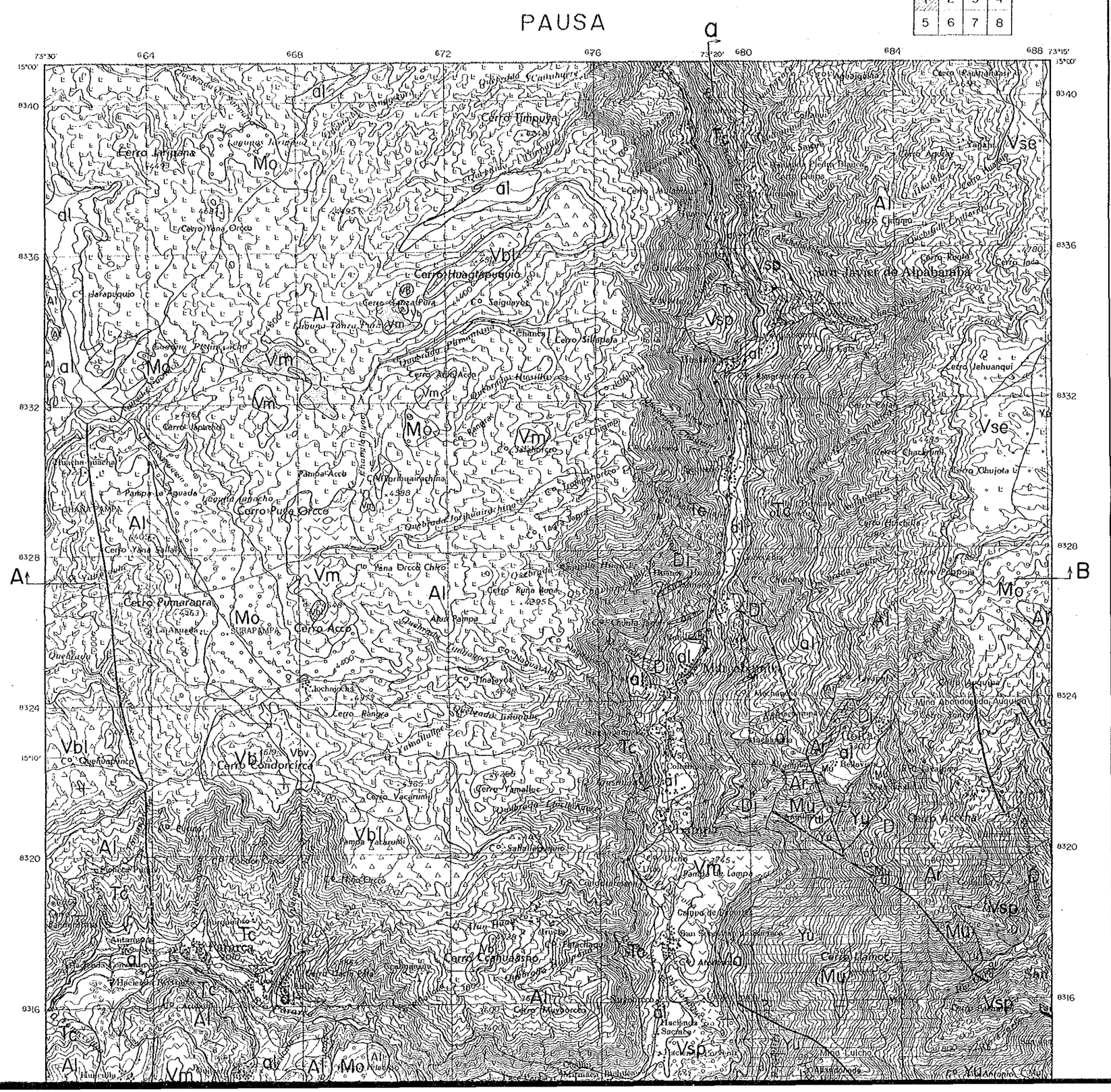




MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE 1)

GEOLOGICAL MAP
THE REGIONAL SURV
(I)

LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION A
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y META
February 1986

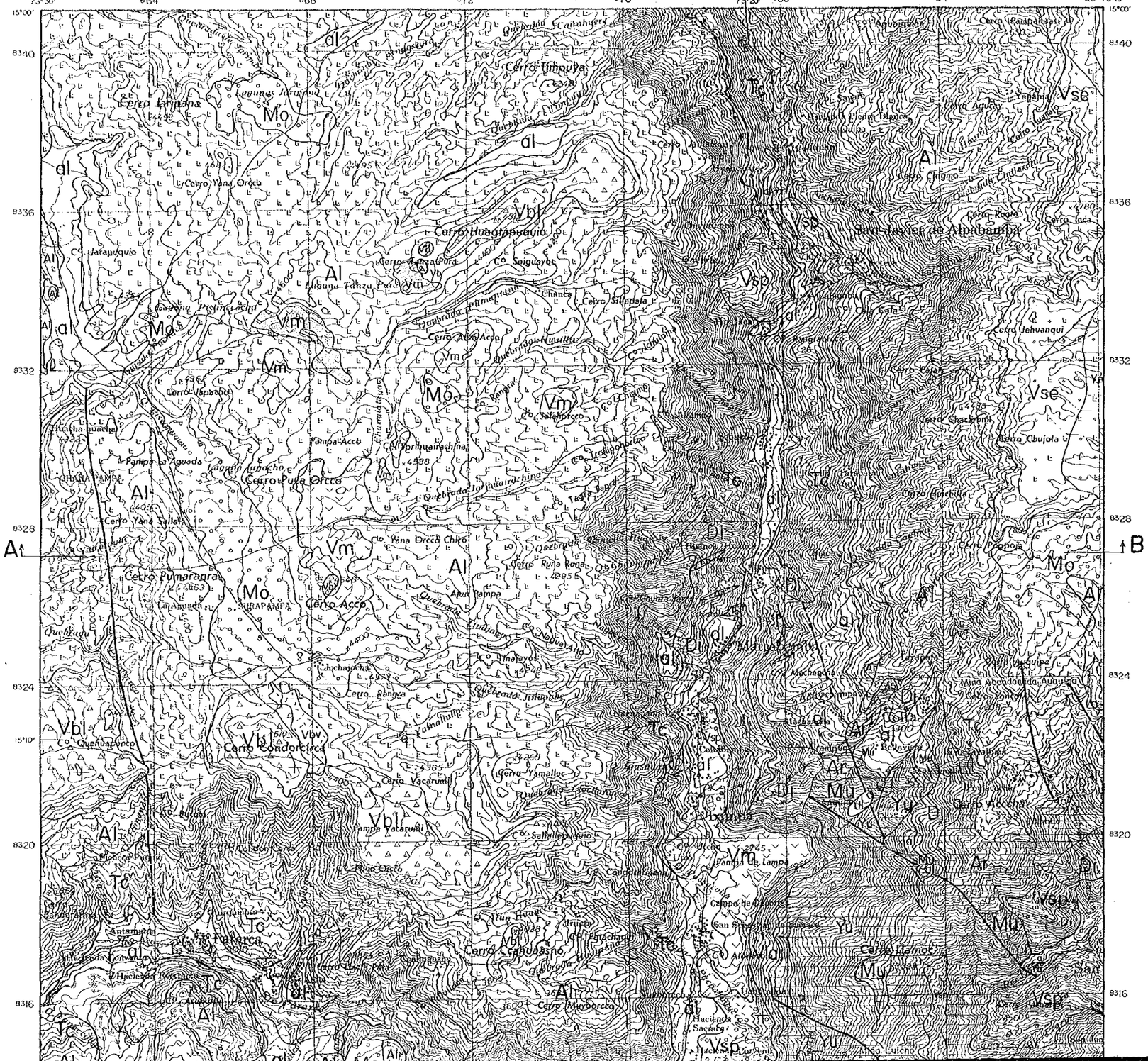
Scale 1 : 50,000
0 1 2 3 4

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and g
			Mollebamba Volcanic Rocks	Vm	Andesite lava and
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, san
			Lampa Volcanic Rocks	Vla	Andesite (basaltic
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava an
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite welded tuff and
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (part
			Alpabamba Formation	Al	Dacitic tuff, lapil and welded tuff (partly with dacite
			Tacaza Formation	Tc	Andesitic tuff bre and dacitic tuff b
		Paleocene ~Oligocene	Huanca Formation	Hc	Andesitic volcanic and tuffaceous sa
Mesozoic	Cretaceous		Arcurquina Formation	Arc	Limestone and ma and chert nodul
			Murco Formation	Mu	Red shale and sa bearing conglomera
	Cretaceous / Jurasic		Yura Group	Yu	Quartzite, siliceous and alternation of
	Jurasic		Socosani Formation	So	Black shale, limes
			Chocolate volcanic rocks	Cho	Andesitic tuff brec tuffaceous sandst
Precambrian				Gn	Gneiss, gneissose

Intrusive Rocks

Tertiary	Stock and Dyke	An	Hornblende andes
	Accha Stock	Di	Diorite and quart



PL. 3-(1)

MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE 1)

GEOLOGICAL MAP OF THE REGIONAL SURVEY AREA

(1)

LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

Scale 1 : 50,000

0 1 2 3 4 5km

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volcanic ash
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and gravel
			Lampa Volcanic Rocks	Vla	Andesite (basaltic), volcanic breccia
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava and pyroclastic rocks
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
		Miocene	Huaytillas Formation	Hy	Dacitic tuff (partly pumice bearing)
			Alpabamba Formation	Al	Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
			Tacaza Formation	Tc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Paleocene ~Oligocene	Huanca Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic	Cretaceous		Arcurquina Formation	Arc	Limestone and marl with sandstone and chert nodule
			Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate
	Cretaceous / Jurasic		Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
	Jurasic		Socosani Formation	So	Black shale, limestone with sandstone and tuff
			Chocolate volcanic rocks	Cho	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone
Precambrian				Gn	Gneiss, gneissose granite and diorite
Intrusive Rocks			Stock and Dyke	An	Hornblende andesite, andesite

February 1986

Scale 1 : 50,000

0 1 2 3 4

LEGEND

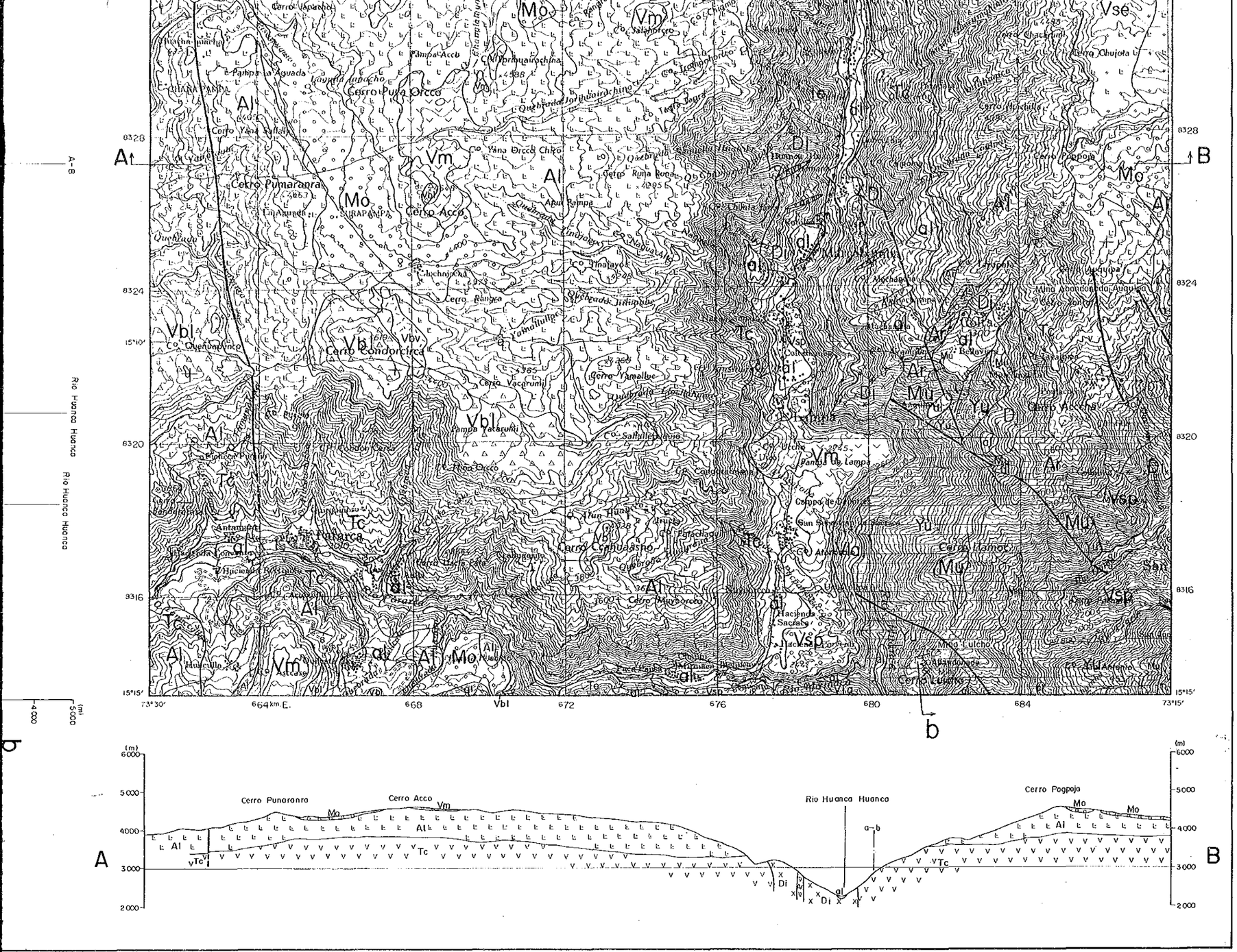
Cenozoic
- Quaternary
  - Holocene
    - Alluvium — al — Sand, mud and c
    - Mollebamba Volcanic Rocks — Vm — Andesite lava and
    - Volcanic Sediment of Pausa — Vsp — Volcanic ash, sa
    - Lampa Volcanic Rocks — Vla — Andesite basalti
  - Pleistocene
    - Moraine Sediment — Mo — Gravel, sand and
    - Barroso Group
      - Upper — Vbu — Acidic tuff
      - Lower — Vbl — Andesite lava c
- Tertiary
  - Pliocene
    - Senca Volcanic Rocks — Vse — Hornblende–bioti welded tuff and
    - Huaytillas Formation — Hy — Dacitic tuff (pa
    - Alpabamba Formation — Al — Dacitic tuff, lapi and welded tuff (partly with decit
  - Miocene
    - Tacaza Formation — Tc — Andesitic tuff br and dacitic tuff
  - Pliocene–Miocene
    - Huanca Formation — Hc — Andesitic volcani and tuffaceous s

Mesozoic
- Cretaceous
  - Arcurquina Formation — Arc — Limestone and m and chert nodu
  - Murco Formation — Mu — Red shale and s bearing conglome
- Jurassic
  - Yura Group — Yu — Quartzite, siliceou and alternation of
  - Socosani Formation — So — Black shale, lime
  - Chocolate volcanic rocks — Cho — Andesitic tuff bre tuffaceous sands

Precambrian — Gn — Gneiss, gneissose

Intrusive Rocks
- Tertiary
  - Stock and Dyke — An — Hornblende ande
  - Accha Stock — Di — Diorite and quar
- Cretaceous
  - La Costa Batholith — CB — Quartz diorite and

- Fault
- Inffered fault
- Anticline
- Syncline
- Geological bound
- Geological profil
- Strike and dip o
- Strike and dip o
- Strike and dip o
- Mine (working or
- Hot spring



INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

Scale 1 : 50,000

0 1 2 3 4 5 km

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volcanic ash
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and gravel
			Lampa Volcanic Rocks	Vla	Andesite (basaltic), volcanic breccia
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group – Upper	Vbu	Acidic tuff
			Barroso Group – Lower	Vbl	Andesite lava and pyroclastic rocks
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (partly pumice bearing)
			Alpabamba Formation	Al	Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
			Tacaza Formation	Tc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Paleocene ~Oligocene	Huanca Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic	Cretaceous		Arcurquina Formation	Ar	Limestone and marl with sandstone and chert nodule
			Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate
			Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
	Jurasic		Socosani Formation	So	Black shale, limestone with sandstone and tuff
			Chocolate volcanic rocks	Cho	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone
Precambrian				Gn	Gneiss, gneissose granite and diorite

Intrusive Rocks

Tertiary	Stock and Dyke	An	Hornblende andesite, andesite
	Accha Stock	Di	Diorite and quartz diorite
Cretaceous	La Costa Batholith	CB	Quartz diorite and granodiorite

Fault

Inffered fault

Anticline

Syncline

Geological boundary

A B Geological profile line

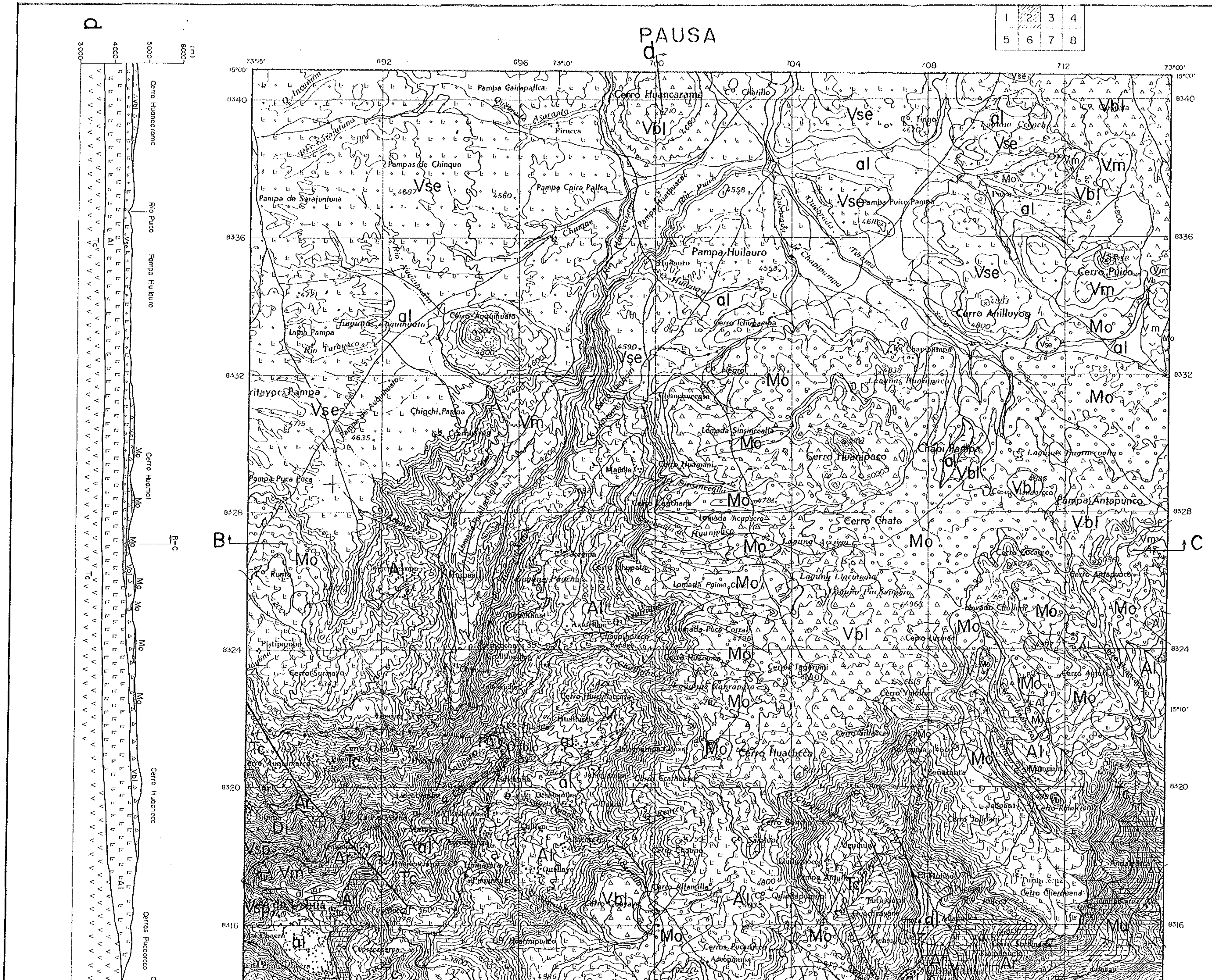
30 Strike and dip of bedding

50 Strike and dip of foliation

Strike and dip of flow structure

X Mine (working or closed)

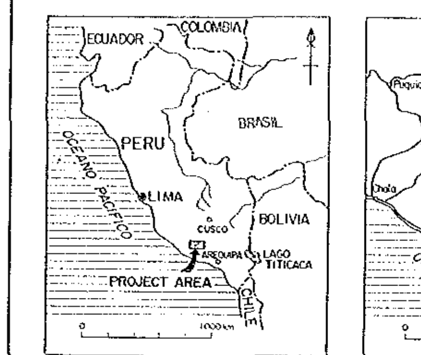
Hot spring



MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

GEOLOGICAL MA
THE REGIONAL SUR
(2)

LOCATION INDEX



JAPAN INTERNATIONAL COOPERATION
METAL MINING AGENCY OF JAP
INSTITUTO GEOLOGICO MINERO Y MET
February 1986

Scale 1 : 50,000

LEGEND

Cenozoic — Quaternary — Holocene
- Alluvium — al — Sand, mud and
- Mollebamba Volcanic Rocks — Vm — Andesite lava an
- Volcanic Sediment of Pausa — Vsp — Volcanic ash, s
- Lampa Volcanic Rocks — Vlo — Andesite (basalti

Cenozoic — Quaternary — Pleistocene
- Moraine Sediment — Mo — Gravel, sand an
- Barroso Group, Upper — Vbo — Acidic tuff
- Barroso Group, Lower — Vbl — Andesite lava

Cenozoic — Tertiary
- Pliocene: Sencca Volcanic Rocks — Vse — Hornblende-bioti welded tuff and
- Miocene: Huaylillas Formation — Hy — Dacitic tuff (par
- Miocene: Alpabamba Formation — Al — Dacitic tuff, lapi and welded tuff (partly with dacit
- Paleocene–Oligocene: Tacaza Formation — Tc — Andesitic tuff br and dacitic tuff
- Paleocene–Oligocene: Huanca Formation — Hc — Andesitic volcan and tuffaceous s

Mesozoic — Cretaceous
- Arcurquina Formation — Arc — Limestone and m and chert nodu
- Murco Formation — Mu — Red shale and s bearing conglomer
- Yura Group — Yu — Quartzite, siliceou and alternation of

Mesozoic — Jurasic
- Socosani Formation — So — Black shale, limes
- Chocolate volcanic rocks — Cho — Andesitic tuff bre tuffaceous sandst

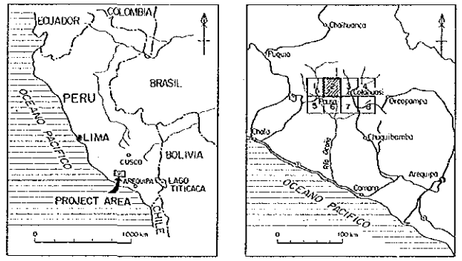
Precambrian
- Gn — Gneiss, gneissose

Intrusive Rocks
- Stock and Dyke — Ad — Hornblende ande

MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

GEOLOGICAL MAP OF THE REGIONAL SURVEY AREA (2)

LOCATION INDEX

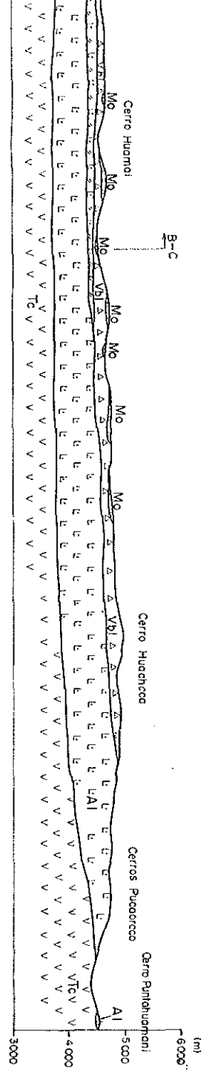


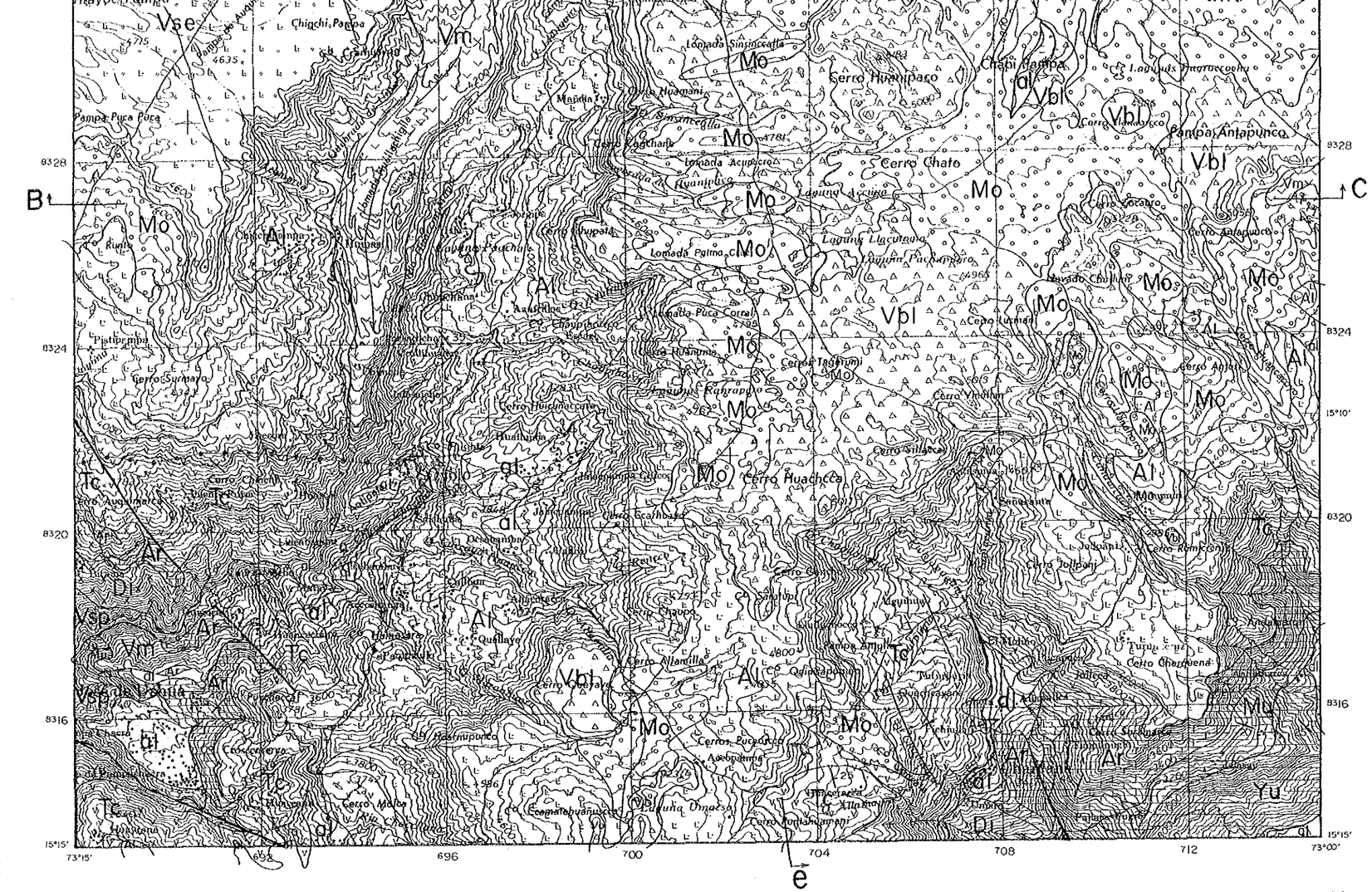
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

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

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volcanic ash
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and gravel
			Lampa Volcanic Rocks	Vla	Andesite (basaltic), volcanic breccia
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava and pyroclastic rocks
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
			Huaylillas Formation	Hy	Dacitic tuff (partly pumice bearing)
		Miocene	Alpabamba Formation	Al	Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
			Tacaza Formation	Tc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Paleocene Oligocene	Huanca Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic	Cretaceous		Arcurquina Formation	Ar	Limestone and marl with sandstone and chert nodule
			Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate
	Jurassic		Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
			Socosani Formation	So	Black shale, limestone with sandstone and tuff
			Chocolate volcanic rocks	Cho	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone
Precambrian				Gn	Gneiss, gneissose granite and diorite
Intrusive Rocks					
			Stock and Dyke	An	Hornblende andesite, andesite
			Tertiary		





February 1986
Scale 1 : 50,000
0 1 2 3
LEGEND
Cenozoic
Quaternary
Holocene
Alluvium
al
Sand, mud a
Moltebamba Volcanic Rocks
Vm
Andesite lava
Volcanic Sediment of Pausa
Vsp
Volcanic ash
Lampa Volcanic Rocks
Vla
Andesite (bas
Pleistocene
Moraine Sediment
Mo
Gravel, sand
Barroso Group
Upper
Vbu
Acidic tuff
Lower
Vbl
Andesite lav
Tertiary
Pliocene
Sencca Volcanic Rocks
Vse
Hornblende-b welded tuff a
Miocene
Huaylillas Formation
Hy
Dacitic tuff
Alpabamba Formation
Al
Dacitic tuff, and welded tu (partly with d
Tacaza Formation
Tc
Andesitic tuff and dacitic tu
Paleocene -Oligocene
Huanca Formation
Hc
Andesitic vol and tuffaceou
Mesozoic
Cretaceous
Arcurquina Formation
Arc
Limestone an and chert n
Murco Formation
Mu
Red shale an bearing conglo
Yura Group
Yu
Quartzite, silic and alternatio
Jurasic
Socosani Formation
So
Black shale,
Chocolate volcanic rocks
Cho
Andesitic tuff tuffaceous sa
Precambrian
Gn
Gneiss, gneiss
Intrusive Rocks
Tertiary
Stock and Dyke
An
Hornblende
Accha Stock
Dl
Diorite and
Cretaceous
La Costa Batholith
CB
Quartz diorite
Fault
Inffered fault
Anticline
Syncline
Geological bo
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30 Strike and d
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Strike and d
X Mine (workin
Hot spring
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8328
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15°10'
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696
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708
712
Vse Vm Mo Vbl Al Tc Ar Dl Vsp Vm al Mu Yu
Chigchi Pampa
Pampa Puca Puca
Cerro Huamani
Cerro Huanipaco
Cerro Chato
Pampa Antapunco
Laguna Acchicha
Lomada Palma
Nevado Chullua
Cerro Puca Corral
Cerro Sumayo
Cerro Huacchca
Cerro Chinchi
Cerro Ccolhuay
Cerro Umasi
Cerro Allamilla
Laguna Umasa
Cerros Pucaorcco
Cerro Chenquena
Cerro Pantahuamani
Quebrada de Umasi
Lomada Tuallachiello
Jorgipa
Cerro Cocouro
Cerro Antapunco
(m)
6000
5000
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Tc
Al
Mo
Vse
Vbl
Ar(?)
Cerro Huamai
Cerro Huachcca
Cerros Pucaorcco
Cerro Pantahuamani
e

INSTITUTO GEOLOGICO MINERO Y METALURGICO

February 1986

Scale 1 : 50,000

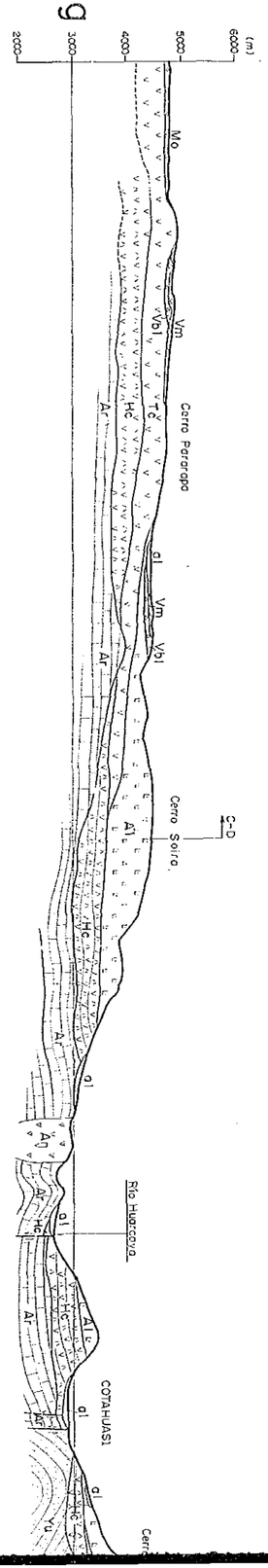
0 1 2 3 4 5 km

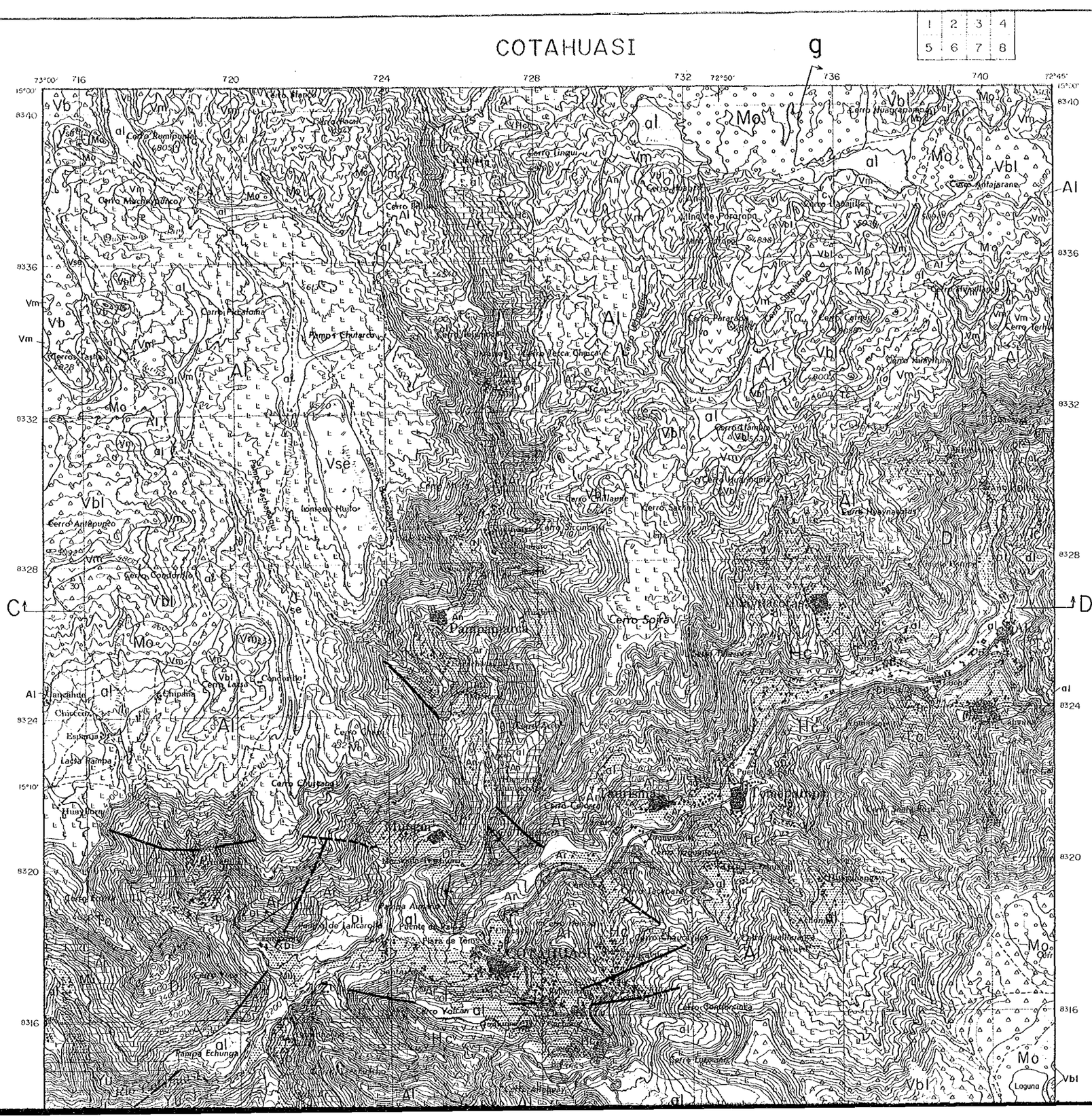
LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volcanic ash
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and gravel
			Lampa Volcanic Rocks	Vlo	Andesite (basaltic), volcanic breccia
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group — Upper	Vbu	Acidic tuff
			Barroso Group — Lower	Vbl	Andesite lava and pyroclastic rocks
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (partly pumice bearing)
			Alpabamba Formation	Al	Dacitic tuff, tapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
			Tacaza Formation	Tc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Paleocene Oligocene	Huanca Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic	Cretaceous		Arcurquina Formation	Ar	Limestone and marl with sandstone and chert nodule
			Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate
	Jurassic		Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
			Socosani Formation	So	Black shale, limestone with sandstone and tuff
			Chocolate volcanic rocks	Cho	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstore
Precambrian				Gn	Gneiss, gneissose granite and diorite

Intrusive Rocks			
Tertiary	Stock and Dyke	An	Hornblende andesite, andesite
	Accha Stock	Di	Diorite and quartz diorite
Cretaceous	La Costa Batholith	Cgd	Quartz diorite and granodiorite

- Fault
- Inffered fault
- Anticline
- Syncline
- Geological boundary
- A–B Geological profile line
- 30 Strike and dip of bedding
- 50 Strike and dip of foliation
- Strike and dip of flow structure
- Mine (working or closed)
- Hot spring





MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

GEOLOGICAL MAP O
THE REGIONAL SURVEY
(3)

LOCATION INDEX

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURG
February 1986

Scale 1 : 50,000
0 1 2 3 4

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volca
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and
			Lampa Volcanic Rocks	Vla	Andesite(basaltic), vol
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava and py
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dac welded tuff and tuff
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (partly pu
			Alpabamba Formation	Al	Dacitic tuff, lapilli tuf and welded tuff (partly with dacite lava
			Tacaza Formation	Tc	Andesitic tuff breccia, and dacitic tuff breccia
		Paleocene Oligocene	Huanca Formation	Hc	Andesitic volcanic cong and tuffaceous sandstor
Mesozoic	Cretaceous		Arcurquina Formation	Arc	Limestone and marl wi and chert nodule
			Murco Formation	Mu	Red shale and sandsto bearing conglomerate
	Cretaceous / Jurasic		Yura Group	Yu	Quartzite, siliceous sand and alternation of quar
	Jurasic		Socosani Formation	So	Black shale, limestone
			Chocolate volcanic rocks	Cho	Andesitic tuff breccia, tuffaceous sandstore
Precambrian				Gn	Gneiss, gneissose granite

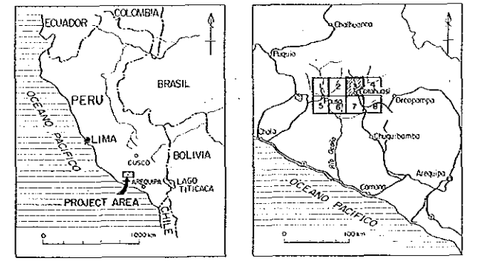
Intrusive Rocks

Tertiary	Stock and Dyke	An	Hornblende andesite,
		X X X	

MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

GEOLOGICAL MAP OF THE REGIONAL SURVEY AREA (3)

LOCATION INDEX



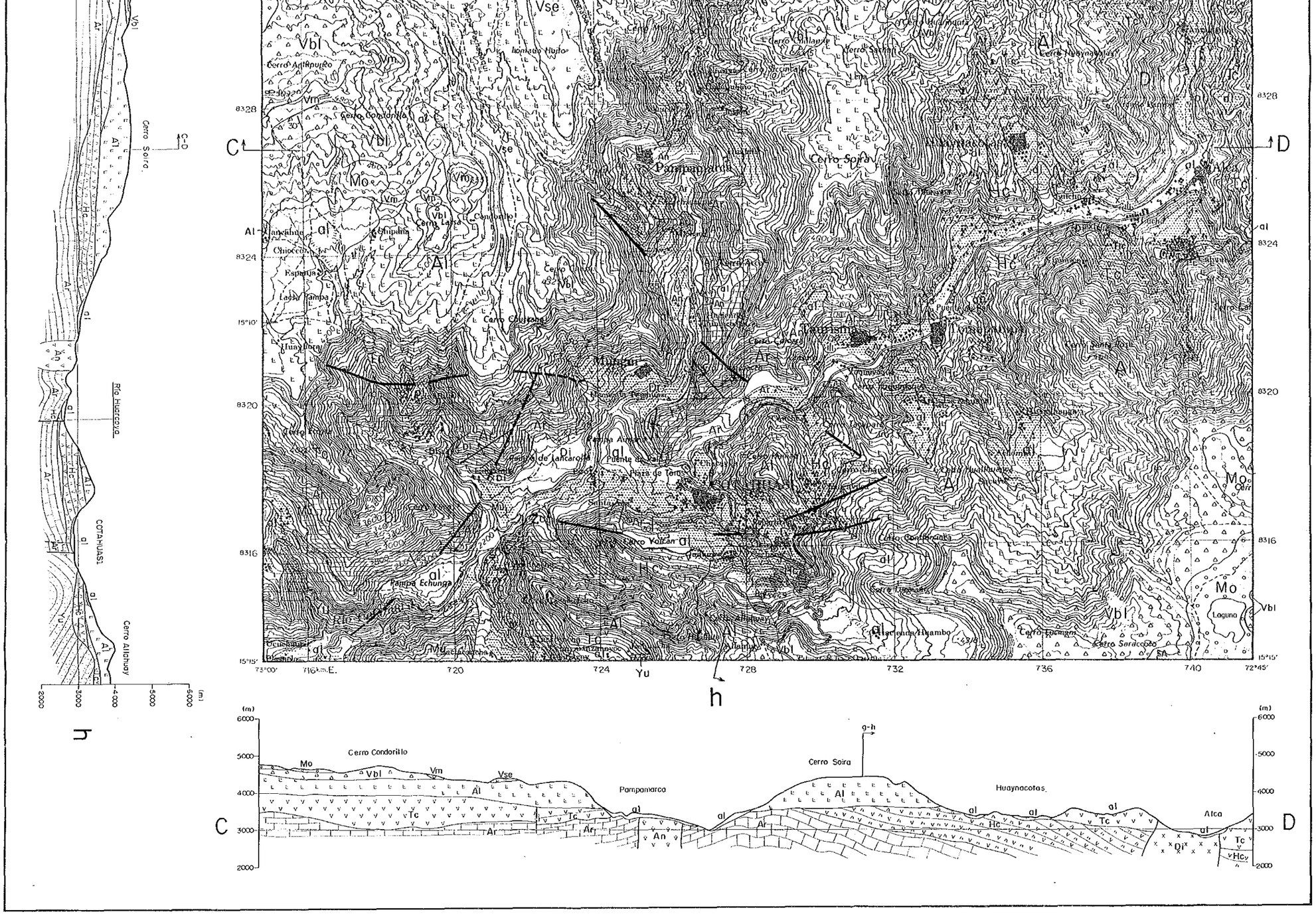
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

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

LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and gravel
			Mollebamba Volcanic Rocks	Vm	Andesite lava and volcanic ash
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sand and gravel
			Lampa Volcanic Rocks	Vla	Andesite (basaltic), volcanic breccia
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava and pyroclastic rocks
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (partly pumice bearing)
			Alpabamba Formation	Al	Dacitic tuff, tapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
			Tacaza Formation	Tc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Paleocene Oligocene	Huanca Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic	Cretaceous		Arcurquina Formation	Arc	Limestone and marl with sandstone and chert nodule
			Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate
	Jurassic		Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
			Socosani Formation	So	Black shale, limestone with sandstone and tuff
			Chocolate volcanic rocks	Cla	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone
Precambrian				Gn	Gneiss, gneissose granite and diorite
Intrusive Rocks					
Tertiary			Stock and Dyke	An	Hornblende andesite, andesite

February



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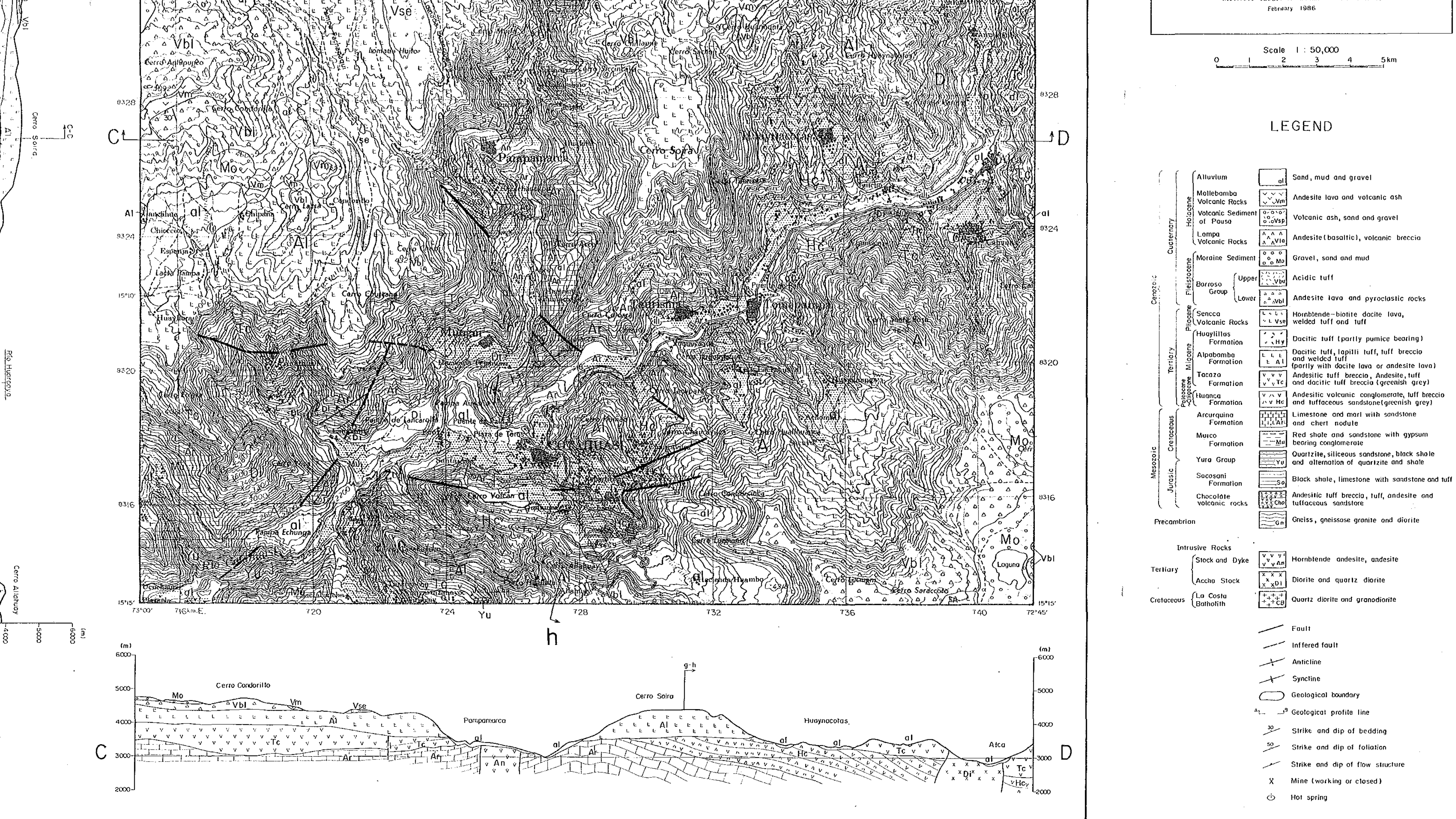
LEGEND

Cenozoic	Quaternary	Holocene	Alluvium	al	Sand, mud and
			Mollebamba Volcanic Rocks	Vm	Andesite lava an
			Volcanic Sediment of Pausa	Vsp	Volcanic ash, sa
			Lampa Volcanic Rocks	Vla	Andesite (basalti
		Pleistocene	Moraine Sediment	Mo	Gravel, sand and
			Barroso Group Upper	Vbu	Acidic tuff
			Barroso Group Lower	Vbl	Andesite lava
	Tertiary	Pliocene	Sencca Volcanic Rocks	Vse	Hornblende-bioti welded tuff and
		Miocene	Huaylillas Formation	Hy	Dacitic tuff (pa
			Alpabamba Formation	Al	Dacitic tuff, lap and welded tuff (partly with dacit
			Tacaza Formation	Tc	Andesitic tuff b and dacitic tuff
		Paleocene ~Oligocene	Huanca Formation	Hc	Andesitic volcan and tuffaceous
Mesozoic	Cretaceous		Arcurquina Formation	Arc	Limestone and m and chert nodu
			Murco Formation	Mu	Red shale and bearing conglome
	Cretaceous / Jurasic		Yura Group	Yu	Quartzite, siliceo and alternation
	Jurasic		Socosani Formation	So	Black shale, lim
			Chocolate volcanic rocks	Cho	Andesitic tuff bre tuffaceous sands
Precambrian				Gn	Gneiss, gneissose

Intrusive Rocks

Tertiary	Stock and Dyke	An	Hornblende ande
	Accha Stock	Di	Diorite and qua
Cretaceous	La Costa Batholith	CB	Quartz diorite an

―	Fault
- - -	Inffered fault
⟂	Anticline
✕	Syncline
⬭	Geological bound
A └ ┘ B	Geological profi
30	Strike and dip
50	Strike and dip
→	Strike and dip
X	Mine (working
♨	Hot spring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LEGEND
Cenozoic
Quaternary
Holocene
Alluvium — al — Sand, mud and gravel
Mollebamba Volcanic Rocks — Vm — Andesite lava and volcanic ash
Volcanic Sediment of Pausa — Vsp — Volcanic ash, sand and gravel
Lampa Volcanic Rocks — Vla — Andesite (basaltic), volcanic breccia
Pleistocene
Moraine Sediment — Mo — Gravel, sand and mud
Barroso Group Upper — Vbu — Acidic tuff
Barroso Group Lower — Vbl — Andesite lava and pyroclastic rocks
Tertiary
Pliocene
Sencca Volcanic Rocks — Vse — Hornblende-biotite dacite lava, welded tuff and tuff
Huaylillas Formation — Hy — Dacitic tuff (partly pumice bearing)
Miocene
Alpabamba Formation — Al — Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)
Tacaza Formation — Tc — Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
Paleocene Oligocene
Huanca Formation — Hc — Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)
Mesozoic
Cretaceous
Arcurquina Formation — Ar — Limestone and marl with sandstone and chert nodule
Murco Formation — Mu — Red shale and sandstone with gypsum bearing conglomerate
Yura Group — Yu — Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale
Jurassic
Socosani Formation — So — Black shale, limestone with sandstone and tuff
Chocolate volcanic rocks — Cho — Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone
Precambrian — Gn — Gneiss, gneissose granite and diorite
Intrusive Rocks
Tertiary
Stock and Dyke — An — Hornblende andesite, andesite
Accha Stock — Di — Diorite and quartz diorite
Cretaceous
La Costa Batholith — CB — Quartz diorite and granodiorite
Fault
Inferred fault
Anticline
Syncline
Geological boundary
Geological profile line
Strike and dip of bedding
Strike and dip of foliation
Strike and dip of flow structure
Mine (working or closed)
Hot spring
C D
Cerro Condorillo
Cerro Soira
Pampamarca
Huaynacotas
Alca
g-h
(m)
6000
5000
4000
3000
2000