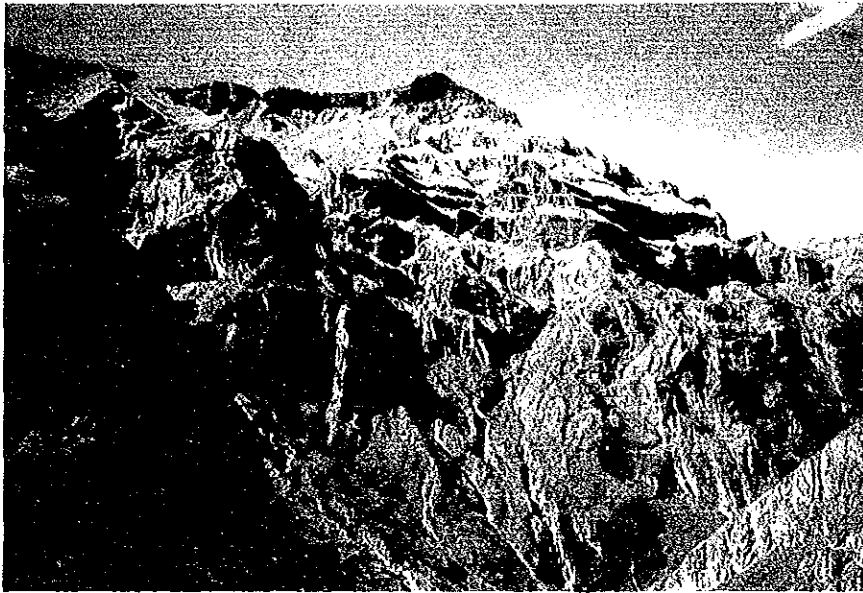




The view of the mountainous district to the northeast of the Cotahuasi Village



Camping in the plateau, "Altiplano"
(about 4,500m from the sea level)



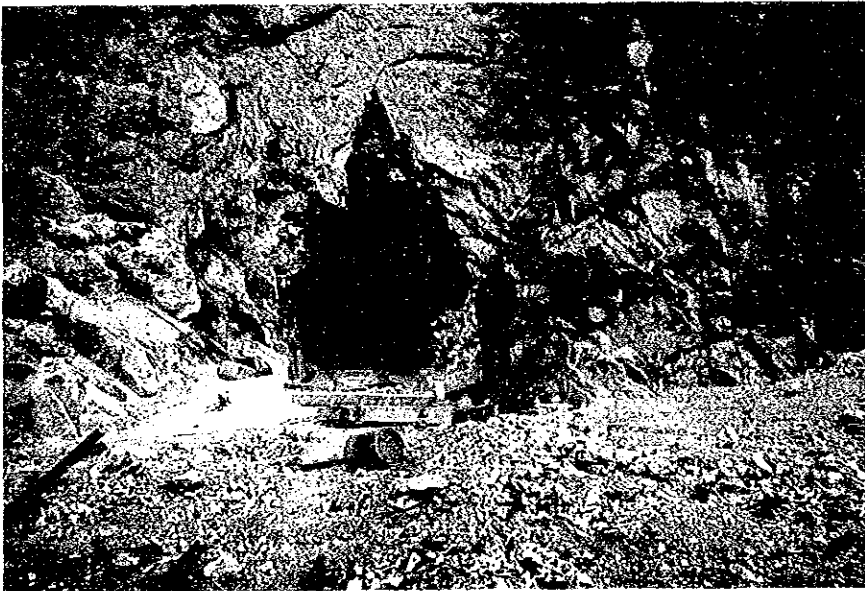
Removal along the Cotahuasi River



Collecting of stream sediment samples
(Geochemical Prospecting)



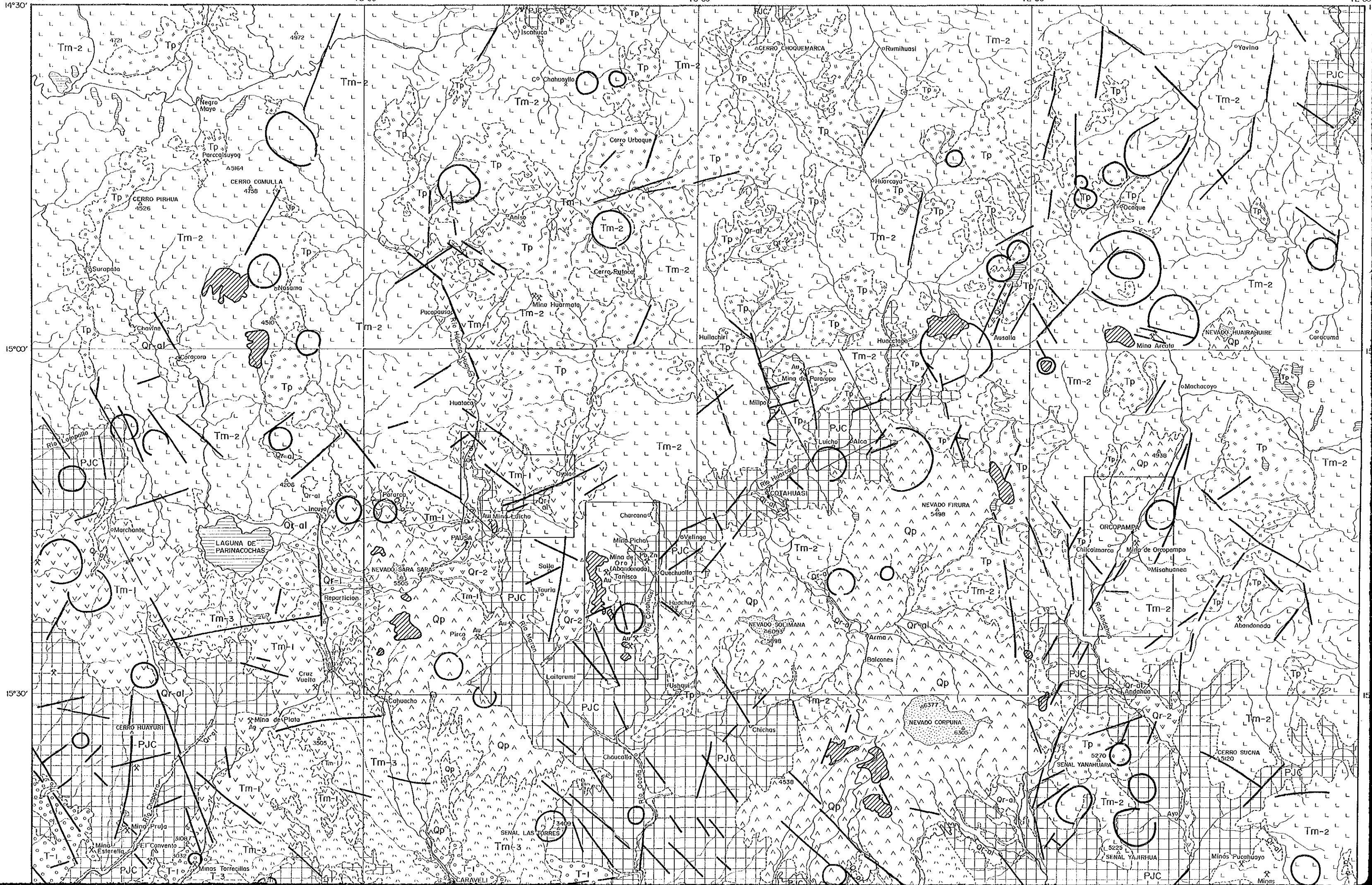
The Pirca alteration zone
(Distant view)

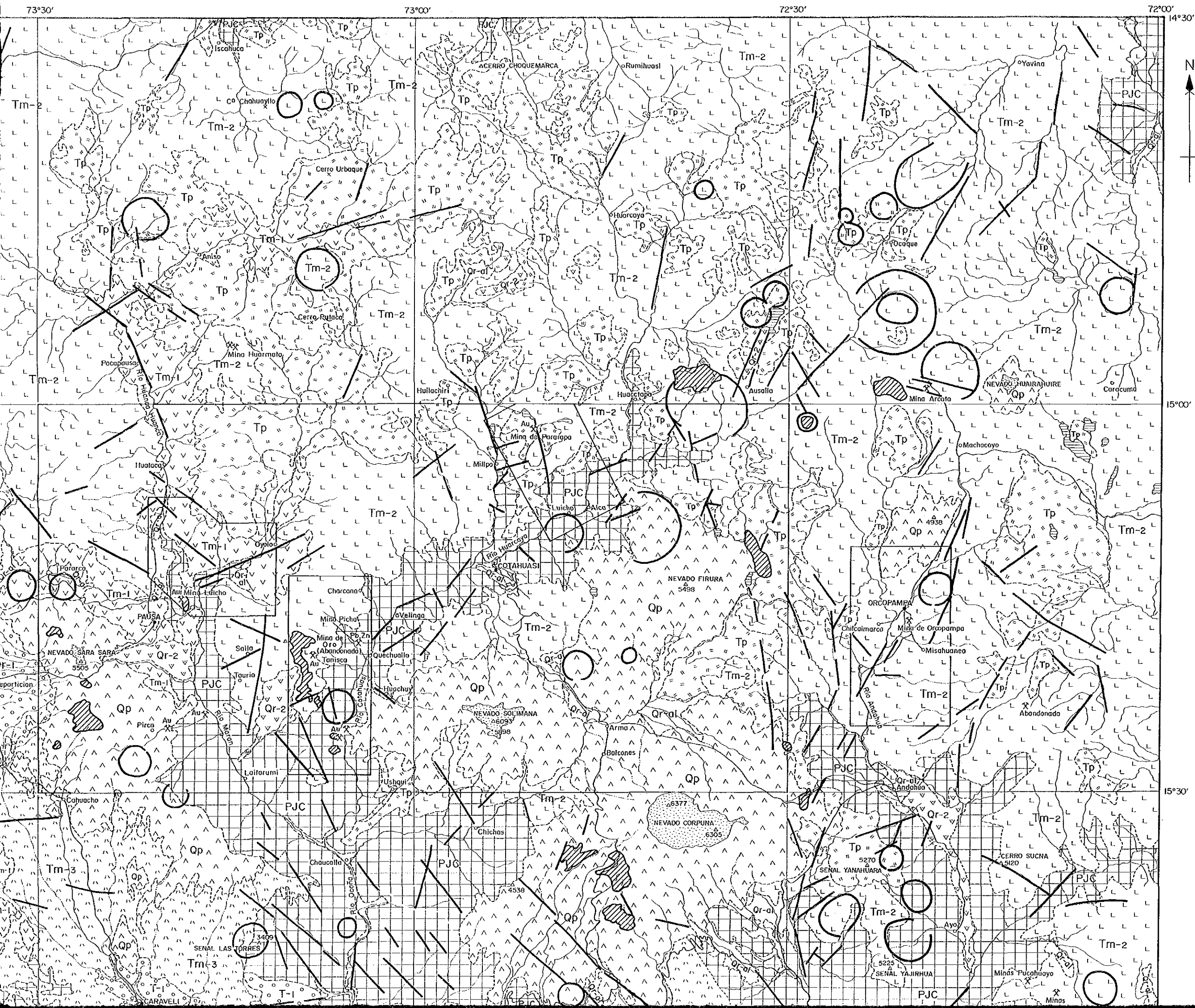


Prospecting adit of the Pararapa mine

1111

1111






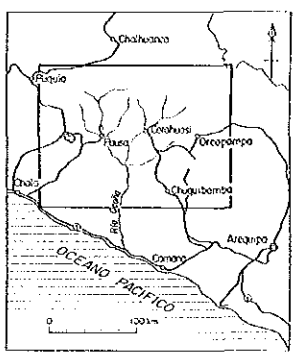
PL. I

MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

15151

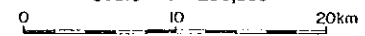
INTERPRETATION MAP OF LANDSAT FALSE COLOR IMAGES

LOCATION INDEX

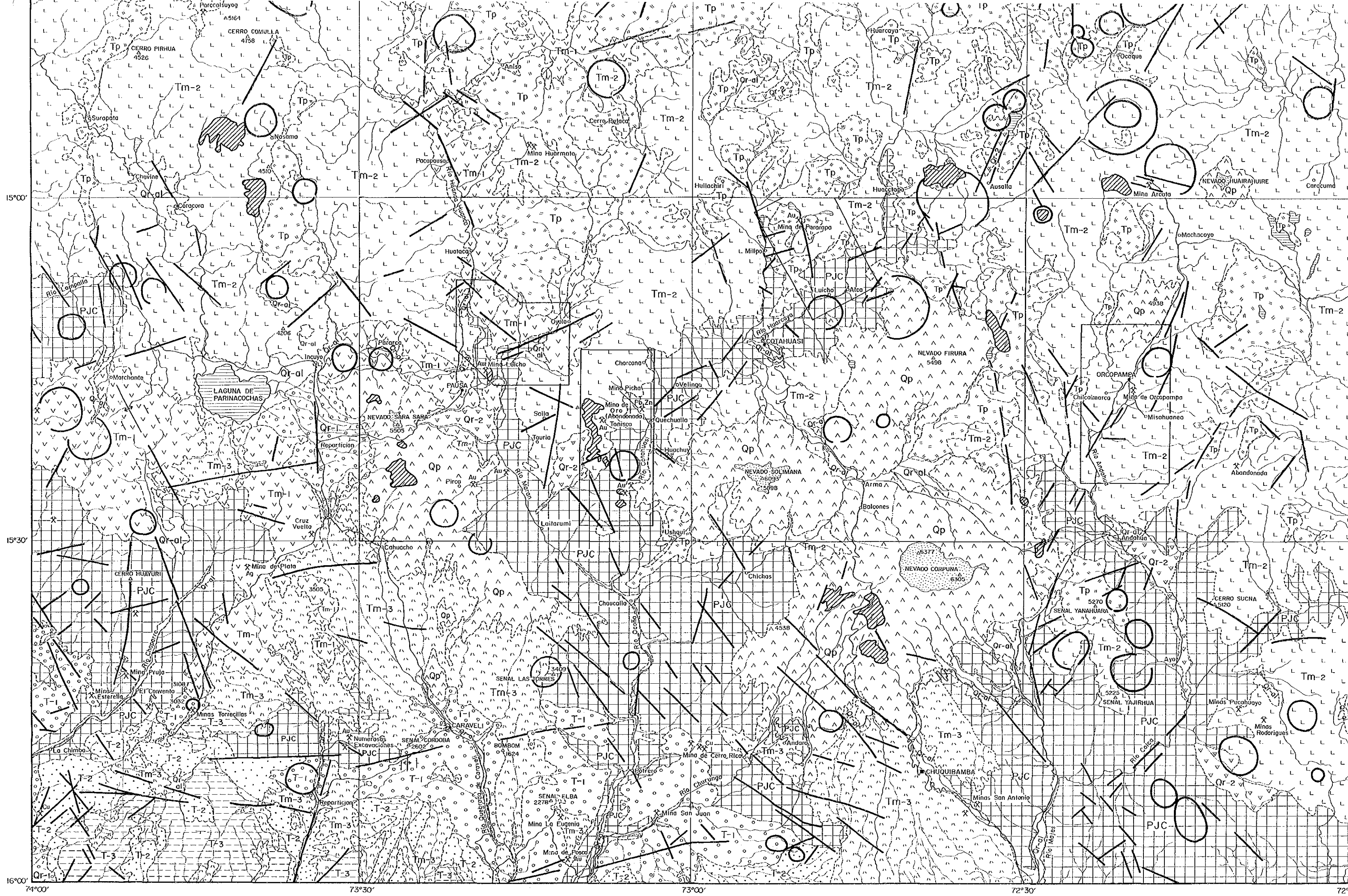
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

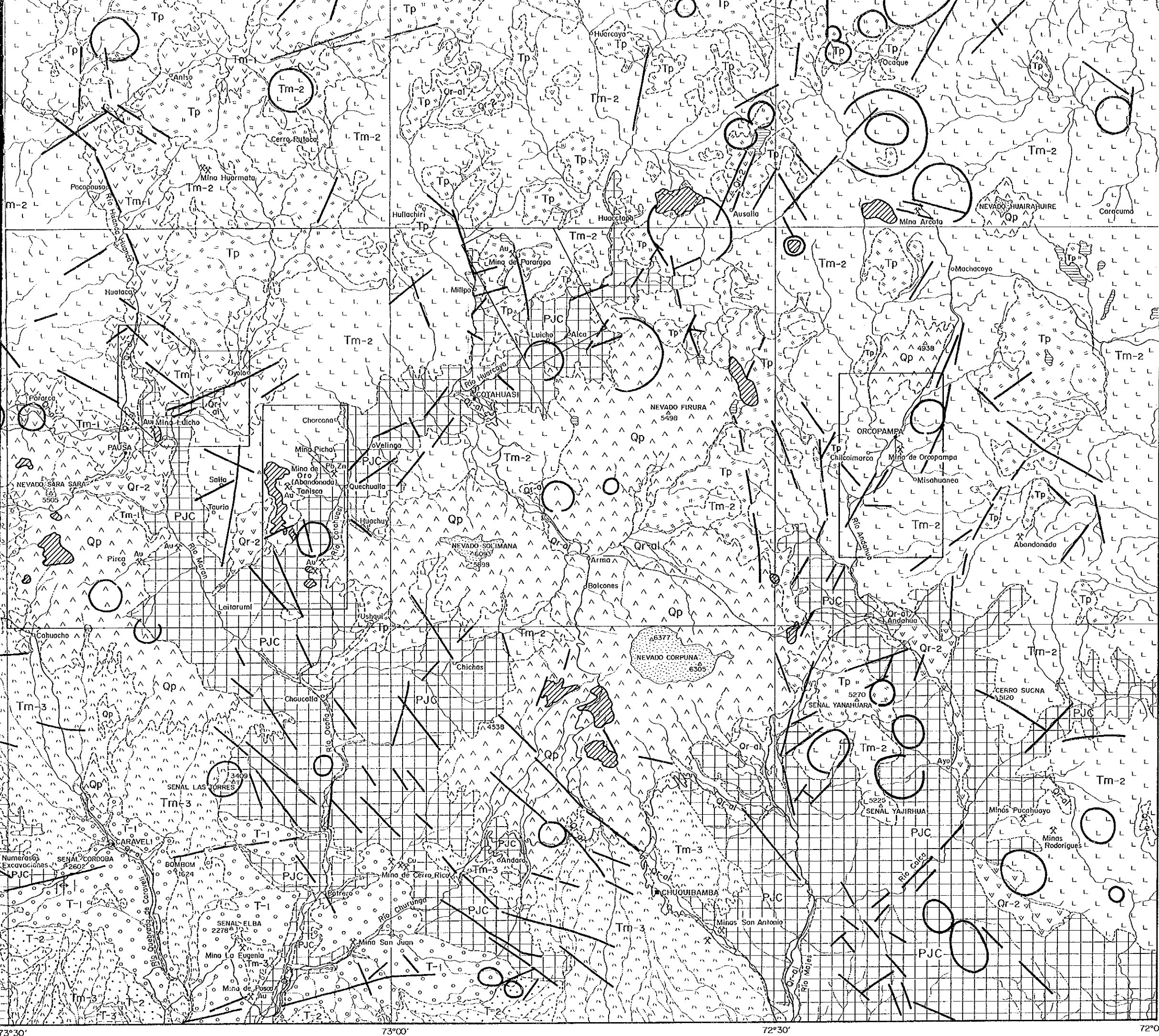
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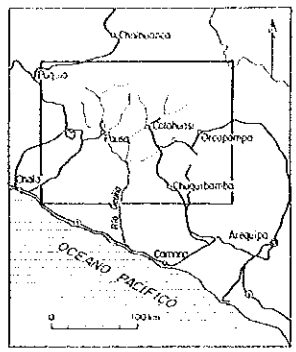
LEGEND

- | | |
|---------------------------------------|--|
| Quaternary | <ul style="list-style-type: none"> Qr-1 Sediment Lavo flow Pyroclastic rocks, Sedimentary rocks Pyroclastic rocks and lava (basic) Pyroclastic rocks Pyroclastic rocks |
| Tertiary | <ul style="list-style-type: none"> Tm-3 Pyroclastic rocks and lava Tm-2 Pyroclastic rocks and lava Tm-1 Pyroclastic rocks and lava T-3 Sedimentary rocks T-2 Sedimentary rocks T-1 Sedimentary rocks |
| Cretaceous
Jurassic
Precambrian | <ul style="list-style-type: none"> PJC Sedimentary rocks, Intrusive rocks |
-
- Alteration zone
 - Lineament
 - Curvicular structure
 - Known mine site
 - Strike and dip
 - Anticline
 - Pond
 - Remaining snow





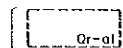
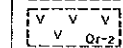
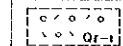
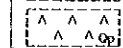
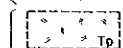
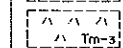
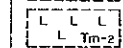
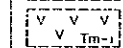
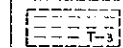
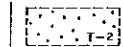
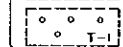
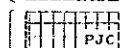



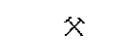

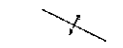


LOCATION INDEX

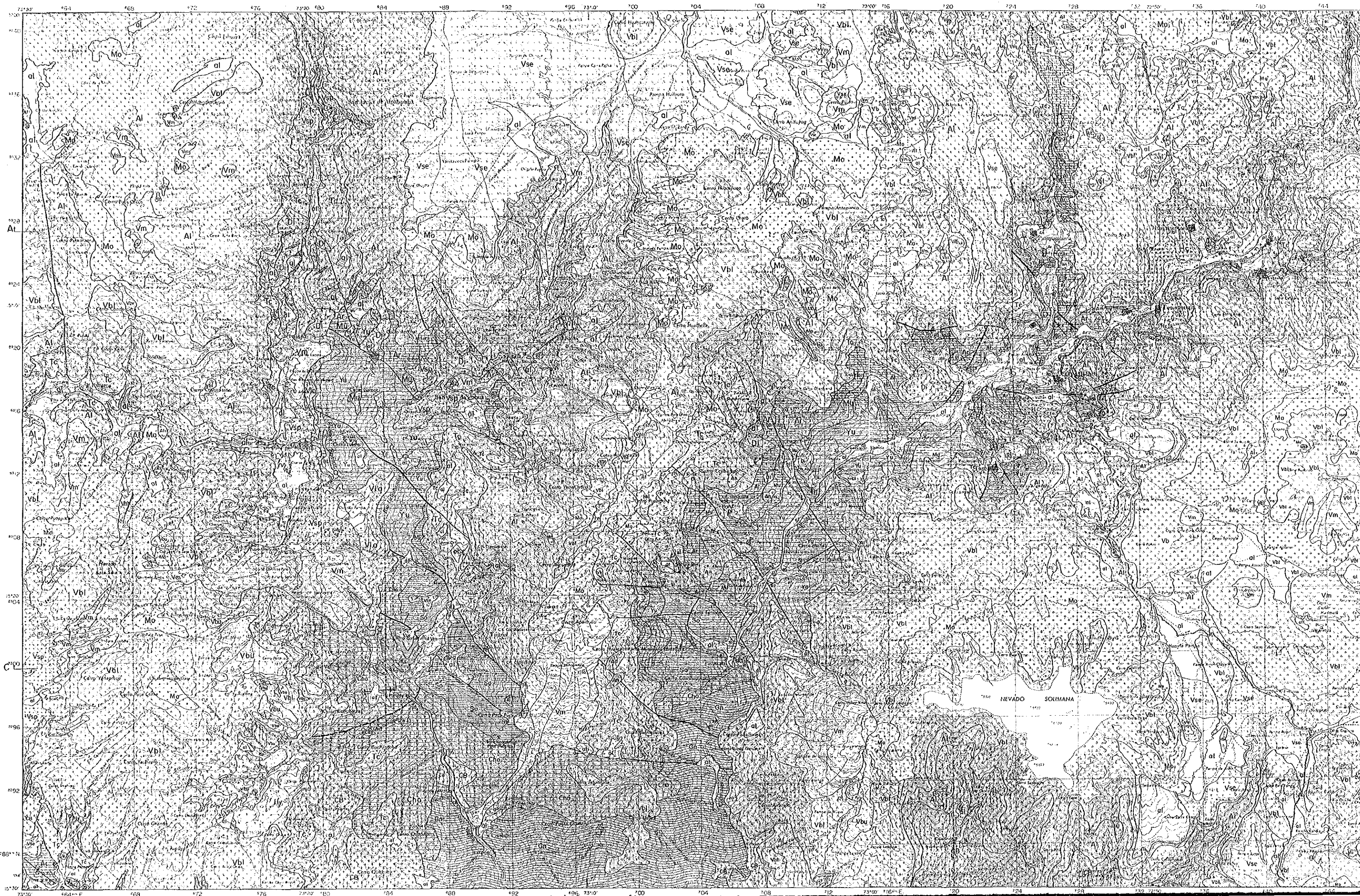
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
INSTITUTO GEOLOGICO MINERO Y METALURGICO
February 1986

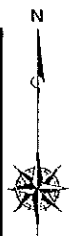
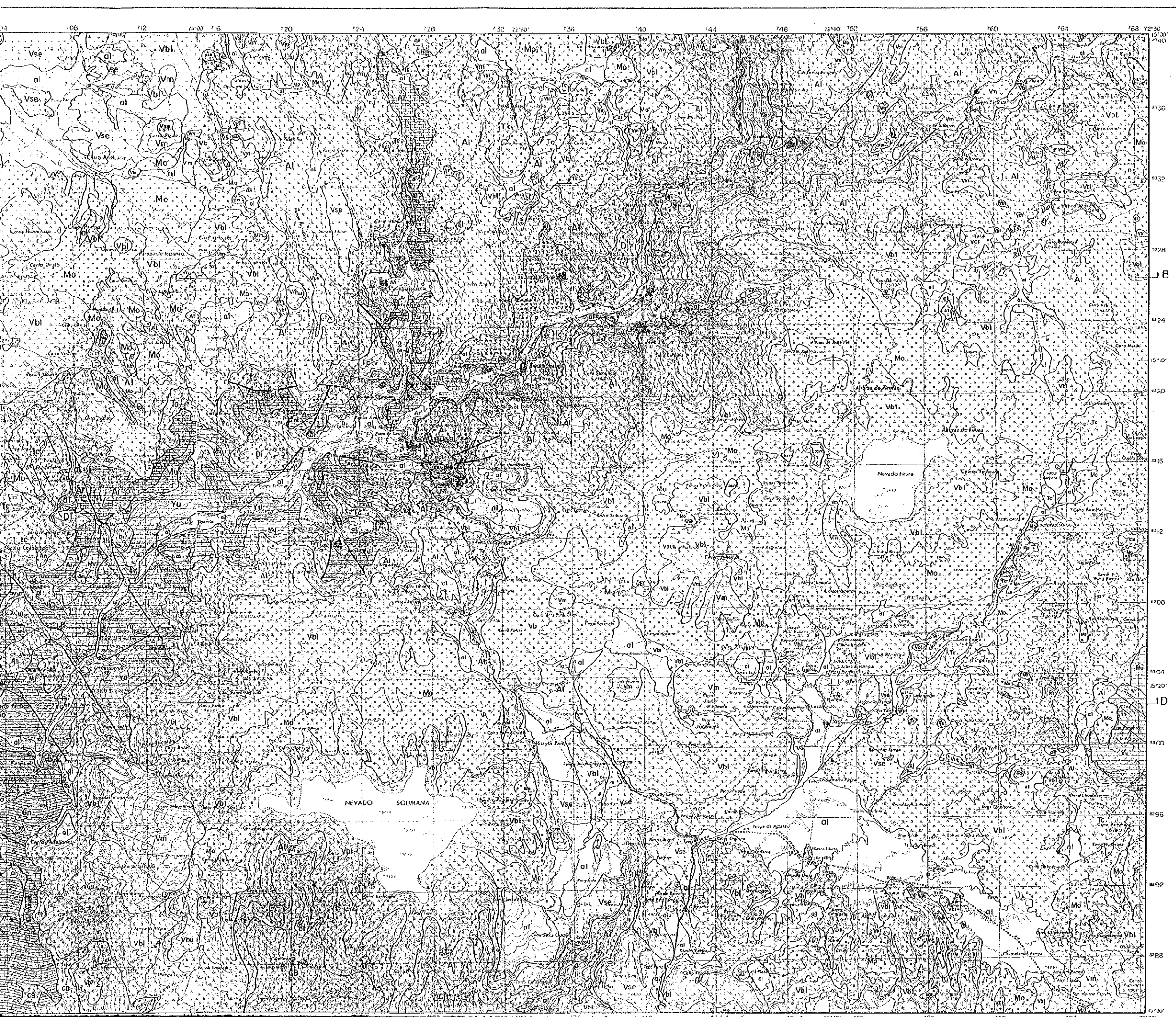
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LEGEND

- | | |
|---------------------------------------|---|
| Quaternary | <ul style="list-style-type: none">  Sediment  Lava flow  Pyroclastic rocks, Sedimentary rocks  Pyroclastic rocks and lava (basic)  Pyroclastic rocks  Pyroclastic rocks  Pyroclastic rocks and lava  Pyroclastic rocks and lava |
| Tertiary | <ul style="list-style-type: none">  Sedimentary rocks  Sedimentary rocks  Sedimentary rocks |
| Cretaceous
Jurassic
Precambrian | <ul style="list-style-type: none">  Sedimentary rocks, Intrusive rocks |
| | <ul style="list-style-type: none">  Alteration zone  Lineament  Curvicular structure  Known mine site  Strike and dip  Anticline  Pond  Remaining snow |

73°30' 73°00' 72°30' 72°00' 15°00' 15°30' 16°00'





PL. 2

MINERAL EXPLORATION
IN
COTAHUASI AREA
(PHASE I)

GEOLOGICAL MAP OF
THE COTAHUASI AREA

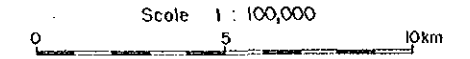
LOCATION INDEX

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

Scale 1 : 100,000

LEGEND

Cenozoic	Quaternary	<table border="0"> <tr> <td>Alluvium</td> <td>al</td> <td>Sand, mud and gravel</td> </tr> <tr> <td>Mollebamba Volcanic Rocks</td> <td>Vm</td> <td>Andesite lava and volcanic ash</td> </tr> <tr> <td>Volcanic Sediment of Pausa</td> <td>Vsp</td> <td>Volcanic ash, sand and gravel</td> </tr> </table>	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			
		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											
	Pleistocene	<table border="0"> <tr> <td>Lampa Volcanic Rocks</td> <td>Ala</td> <td>Andesite (basaltic), volcanic breccia</td> </tr> <tr> <td>Moraine Sediment</td> <td>Mo</td> <td>Gravel, sand and mud</td> </tr> </table>	Lampa Volcanic Rocks	Ala	Andesite (basaltic), volcanic breccia	Moraine Sediment	Mo	Gravel, sand and mud						
		Lampa Volcanic Rocks	Ala	Andesite (basaltic), volcanic breccia										
	Moraine Sediment	Mo	Gravel, sand and mud											
	Tertiary	Pliocene	<table border="0"> <tr> <td>Barrero Group (Upper)</td> <td>Vbu</td> <td>Acidic tuff</td> </tr> <tr> <td>Barrero Group (Lower)</td> <td>Vbl</td> <td>Andesite lava and pyroclastic rocks</td> </tr> </table>	Barrero Group (Upper)	Vbu	Acidic tuff	Barrero Group (Lower)	Vbl	Andesite lava and pyroclastic rocks					
			Barrero Group (Upper)	Vbu	Acidic tuff									
		Barrero Group (Lower)	Vbl	Andesite lava and pyroclastic rocks										
Miocene		<table border="0"> <tr> <td>Sencca Volcanic Rocks</td> <td>Vsc</td> <td>Hornblende-biotite dacite lava, welded tuff and tuff</td> </tr> <tr> <td>Huayllillas Formation</td> <td>Hy</td> <td>Dacitic tuff (partly pumice bearing)</td> </tr> <tr> <td>Alpabamba Formation</td> <td>Alp</td> <td>Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)</td> </tr> <tr> <td>Tacaza Formation</td> <td>Vtc</td> <td>Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)</td> </tr> </table>	Sencca Volcanic Rocks	Vsc	Hornblende-biotite dacite lava, welded tuff and tuff	Huayllillas Formation	Hy	Dacitic tuff (partly pumice bearing)	Alpabamba Formation	Alp	Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)	Tacaza Formation	Vtc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)
		Sencca Volcanic Rocks	Vsc	Hornblende-biotite dacite lava, welded tuff and tuff										
		Huayllillas Formation	Hy	Dacitic tuff (partly pumice bearing)										
	Alpabamba Formation	Alp	Dacitic tuff, lapilli tuff, tuff breccia and welded tuff (partly with dacite lava or andesite lava)											
Tacaza Formation	Vtc	Andesitic tuff breccia, Andesite, tuff and dacitic tuff breccia (greenish grey)												
Oligocene	<table border="0"> <tr> <td>Huanca Formation</td> <td>Vhc</td> <td>Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)</td> </tr> <tr> <td>Arcuquina Formation</td> <td>Arq</td> <td>Limestone and marl with sandstone and chert nodule</td> </tr> <tr> <td>Murco Formation</td> <td>Mu</td> <td>Red shale and sandstone with gypsum bearing conglomerate</td> </tr> </table>	Huanca Formation	Vhc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)	Arcuquina Formation	Arq	Limestone and marl with sandstone and chert nodule	Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate				
	Huanca Formation	Vhc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)											
	Arcuquina Formation	Arq	Limestone and marl with sandstone and chert nodule											
Murco Formation	Mu	Red shale and sandstone with gypsum bearing conglomerate												
Jurassic	<table border="0"> <tr> <td>Yura Group</td> <td>Yu</td> <td>Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale</td> </tr> <tr> <td>Socosaní Formation</td> <td>So</td> <td>Black shale, limestone with sandstone and tuff</td> </tr> <tr> <td>Chocolate volcanic rocks</td> <td>Chc</td> <td>Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone</td> </tr> </table>	Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale	Socosaní Formation	So	Black shale, limestone with sandstone and tuff	Chocolate volcanic rocks	Chc	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone				
	Yura Group	Yu	Quartzite, siliceous sandstone, black shale and alternation of quartzite and shale											
	Socosaní Formation	So	Black shale, limestone with sandstone and tuff											
Chocolate volcanic rocks	Chc	Andesitic tuff breccia, tuff, andesite and tuffaceous sandstone												
Precambrian	<table border="0"> <tr> <td>Gneiss, gneissose granite and diorite</td> <td>Gn</td> <td></td> </tr> </table>	Gneiss, gneissose granite and diorite	Gn											
Gneiss, gneissose granite and diorite	Gn													
Intrusive Rocks	<table border="0"> <tr> <td>Stock and Dyke</td> <td>VvAn</td> <td>Hornblende andesite, andesite</td> </tr> <tr> <td>Archo Stock</td> <td>VvAr</td> <td>Diorite and quartz diorite</td> </tr> </table>	Stock and Dyke	VvAn	Hornblende andesite, andesite	Archo Stock	VvAr	Diorite and quartz diorite							
	Stock and Dyke	VvAn	Hornblende andesite, andesite											
Archo Stock	VvAr	Diorite and quartz diorite												



LEGEND

Cenozoic	Quaternary	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	Vta	Andesite (basaltic), volcanic breccia	
	Tertiary	Pliocene	Moraine Sediment	Mo	Gravel, sand and mud
			Barraso Group	Vbu	Acidic tuff
		Miocene	Sencca Volcanic Rocks	Vse	Hornblende-biotite dacite lava, welded tuff and tuff
			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)
Mesozoic	Cretaceous	Huancá Formation	Hc	Andesitic volcanic conglomerate, tuff breccia and tuffaceous sandstone (greenish grey)	
		Arcurquina Formation	Ar	Limestone and marl with sandstone and chert nodule	
	Jurassic	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	
		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
	Tertiary	Intrusive Rocks	Stock and Dyke	An	Hornblende andesite, andesite
			Accho Stock	Di	Diorite and quartz diorite
Cretaceous		La Costa Batholith	Cb	Quartz diorite and granodiorite	
				— — — — — Fault	
				— — — — — Inferred 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	

