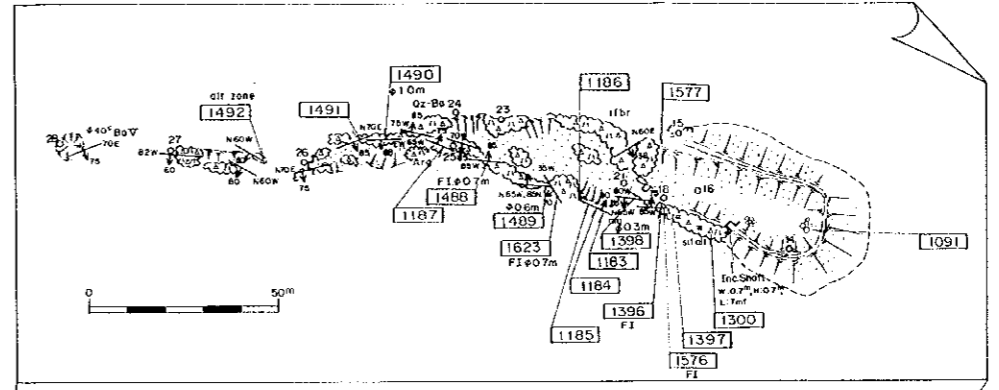
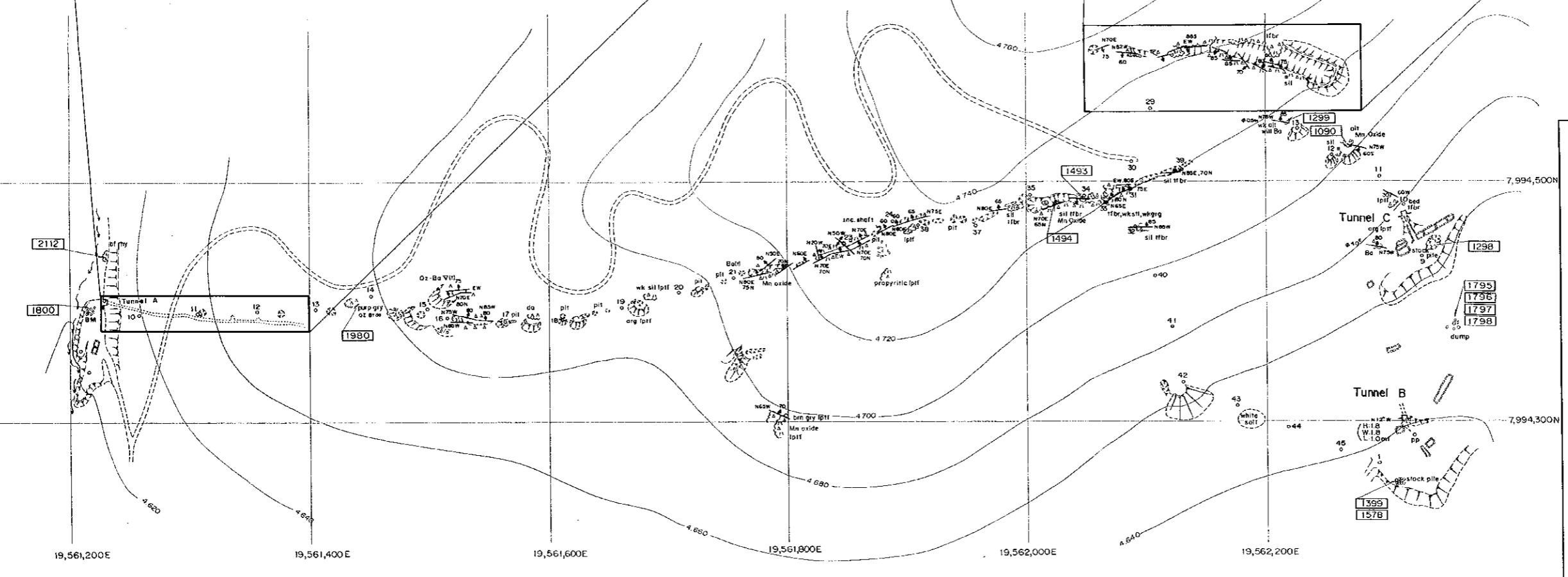


Sample No.	Au	Ag	Cu	Pb	Zn	As	Sb	Hg	Mo	Ba	Sn	
	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
1972	0.9m	<2	12	10	2,135	1,115	47	<5	410	2	334	<5
1973	0.8m	2	3	75	5,591	1,306	7	<5	400	<1	113	<5
1974	0.8m	<2	1	34	2,519	1,848	79	<5	150	<1	224	<5
1975	1.4m	<2	56	148	8,035	4,538	30	<5	490	3	134	<5
1976	1.5m	<2	7	174	11,300	2,825	44	<5	800	1	138	<5
1963	2.0m	2	13	21	9,500	4,383	191	<5	490	3	39	<5
1964	2.0m	5	25	43	2,456	3,825	115	<5	400	<1	472	<5
1977	1.0m	<2	9	12	3,134	1,047	59	<5	530	4	86	<5
1978	2.0m	<2	<0.5	4	140	1,852	<5	<5	100	<1	412	<5
1979	2.0m	<2	1	4	101	1,317	<5	<5	270	2	251	<5
1965	1.7m	31	140	287	15,200	15,639	288	13	1,240	3	23	<5
1966	1.2m	21	24	55	2,904	7,801	859	11	1,670	<1	72	<5
1967	1.8m	2	45	128	1,325	2,243	121	<5	690	2	28	<5
1968	2.2m	8	39	65	2,281	4,528	259	8	560	2	21	<5
1969	2.1m	2	82	249	3,150	4,373	61	<5	1,100	1	30	<5
1970	1.6m	2	8	31	590	3,021	61	<5	290	<1	97	<5
1971	1.0m	<2	2	11	228	637	38	<5	170	2	357	<5



Sample No.	Au	Ag	Cu	Pb	Zn	As	Sb	Hg	Mo	Ba	Sn	
	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
1090	13	119	16	7,515	2,249	<5	<5	490	3	1,276	<5	
1091	46	48	5	4,798	1,118	365	<5	80	3	1,777	<5	
1183	2	437	73	7,412	208	9	<5	400	9	2,394	<5	
1184	3	18	13	3,375	572	82	<5	130	1	4,008	<5	
1185	2	124	29	1,958	518	24	<5	130	7	3,956	<5	
1188	2	285	29	5,437	829	68	<5	270	2	4,768	<5	
1187	4	153	240	2,740	1,149	21	<5	740	7	5,260	<5	
1298	136	890	213	66,600	1,916	71	<5	320	6	55	<5	
1299	10	315	535	2,395	5,757	241	15	2,420	2	5,350	<5	
1300	<2	17	10	2,193	926	23	<5	70	8	3,225	<5	
1396	3	577	125	4,400	2,834	22	<5	360	2	6,565	<5	
1397	<2	4	4	213	1,097	51	<5	260	<1	4,046	<5	
1398	<2	240	39	92	5,198	611	33	<5	160	2	1,466	<5
1399	76	646	2,863	13,400	2,828	100	<5	270	5	78	<5	
1488	8	191	94	853	464	8	<5	50	8	3,787	<5	
1489	<2	251	159	2,585	898	12	<5	70	2	5,169	<5	
1490	7	389	75	9,195	1,058	13	<5	110	6	4,721	<5	
1491	20	229	24	1,363	1,453	88	<5	90	4	3,715	<5	
1492	24	287	61	25,000	4,503	91	<5	80	4	5,968	<5	
1493	<2	7	6	82	3,551	<5	<5	20	1	3,349	<5	
1494	<2	6	4	118	2,215	6	<5	110	2	922	<5	
1578	<2	583	14	850	331	6	<5	510	8	3,481	<5	
1577	<2	13	44	925	3,400	49	<5	160	<1	4,988	<5	
1578	3	17	90	975	951	289	<5	110	7	99	<5	



PL-1

**THE MINERAL EXPLORATION
IN THE ORURO-UYUNI AREA
REPUBLIC OF BOLIVIA**

**Geological Sketch
And
Sample Location Map
(Turaquiri District)**

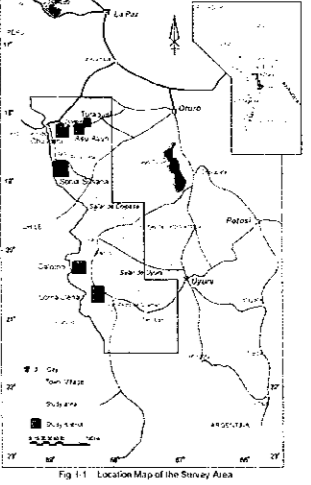


Fig. 1.1 Location Map of the Survey Area

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH 2000

THE MINERAL EXPLORATION
IN THE ORURO-UYUNI AREA
REPUBLIC OF BOLIVIA

Geological Sketch
And
Sample Location Map
(Calorno District)

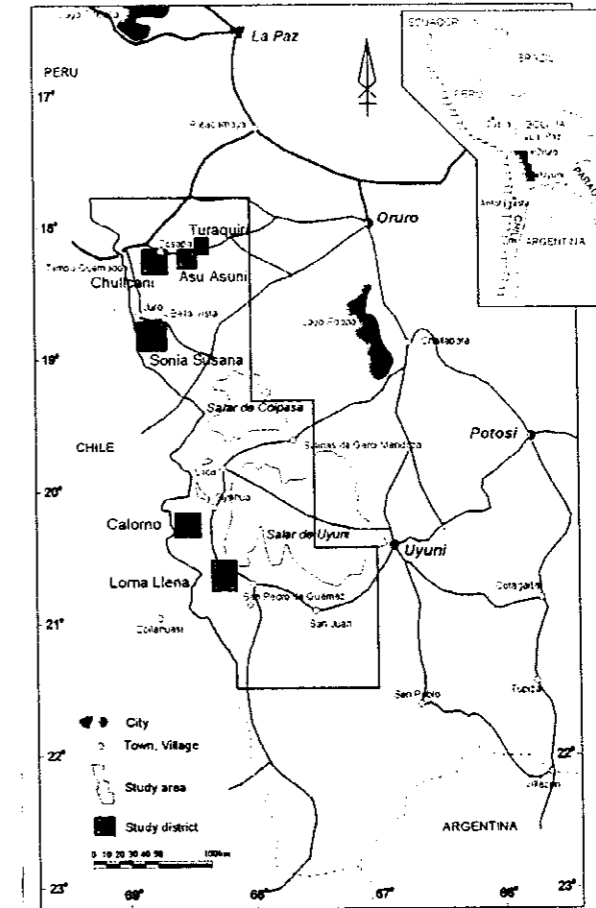
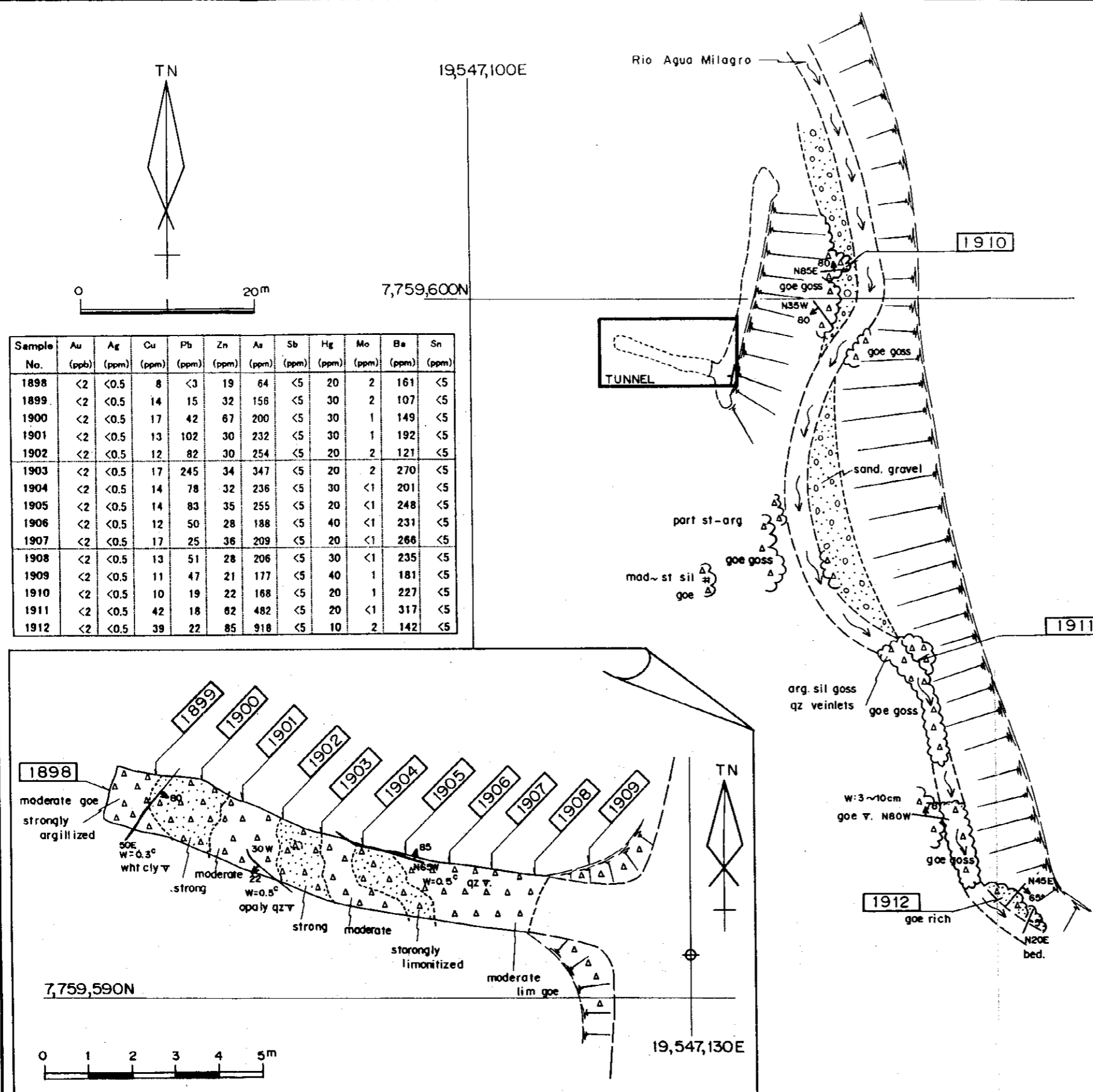
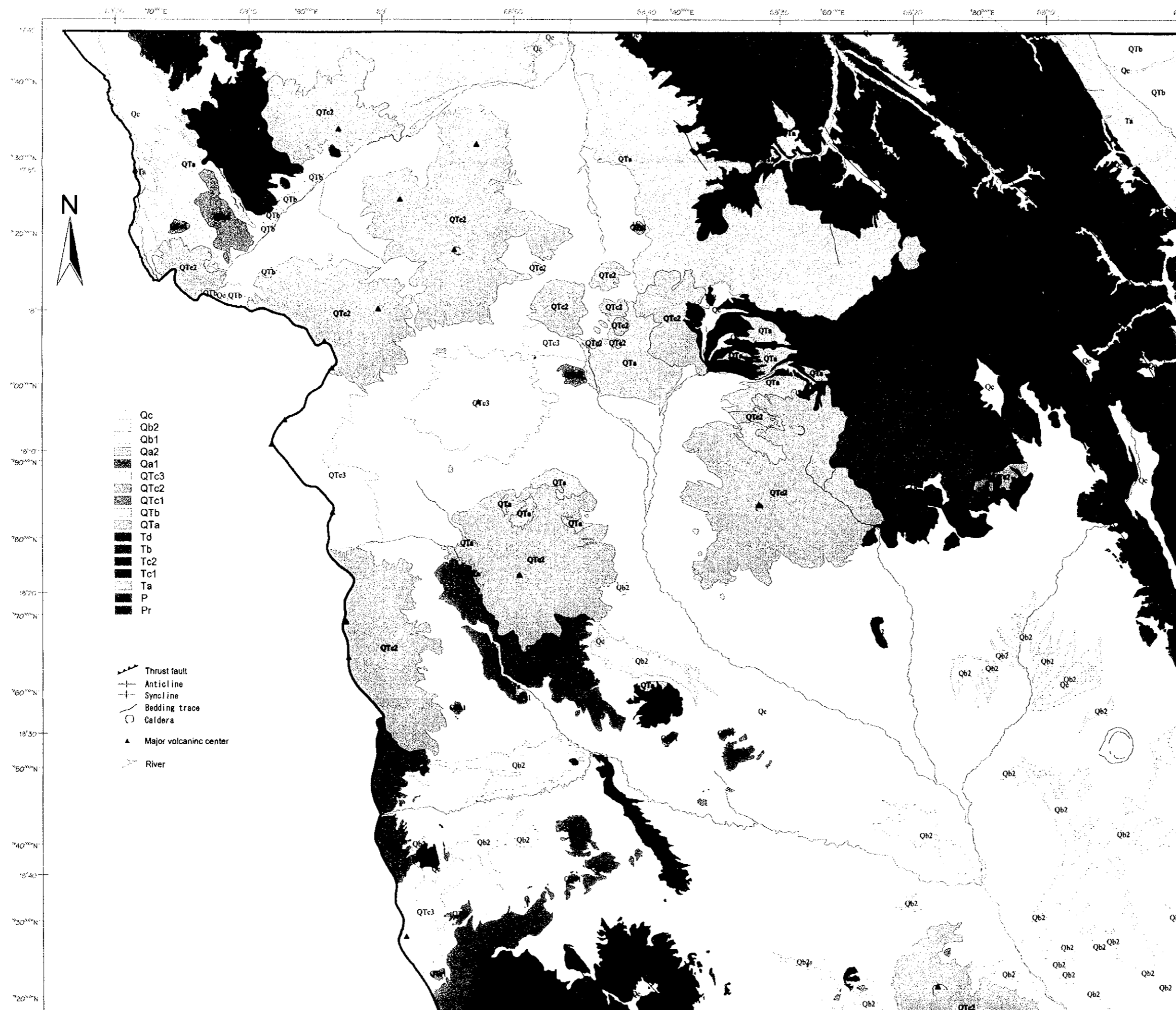


Fig. I-1 Location Map of the Survey Area

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
MARCH 2000

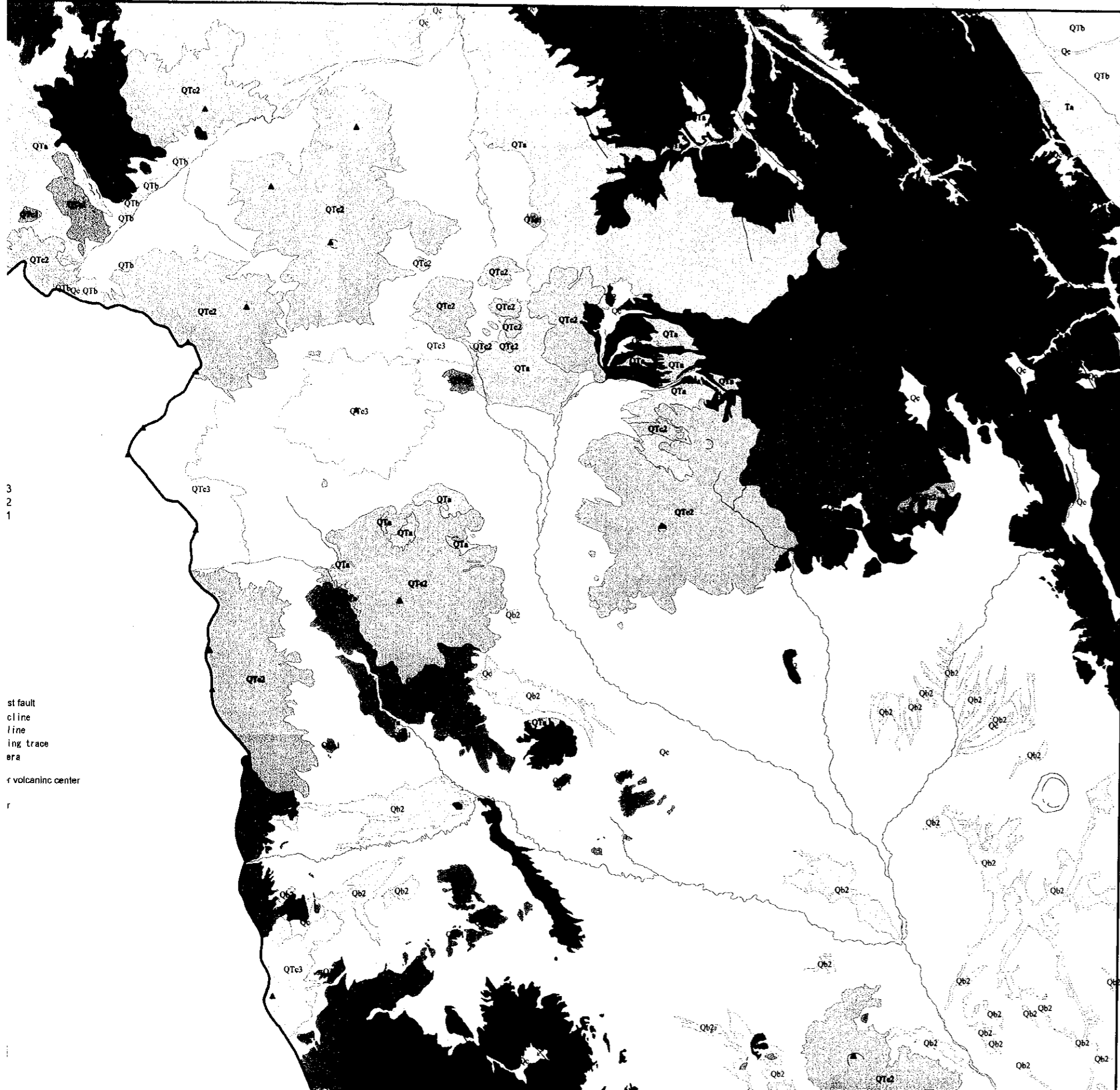




List of geologic unit

Geological Unit	Color or Landmark	Textural Pattern	Drainage Pattern	Density	Rock Resistance	Bedding	Essential Density	Lithology	Geological Correlation (U.S. Geological Survey, 1968)
Qc	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Qc4
Qb1	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Qc4
Qa1	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Qc4
QTc3	grayish brown to brown	medium	parallel	middle	high	poor bedded	-	sandstone	Q1
QTc2	yellowish gray	fine	parallel	middle	low	poor bedded	-	siltstone	Q1
QTc1	dark brown to brown	medium	parallel	middle	high	poor bedded	-	shale	Q1
QTb	dark brown to brown	medium	parallel	middle	high	poor bedded	-	shale	Q1
QTa	dark brown to brown	medium	parallel	middle	high	poor bedded	-	shale	Q1
Td	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
Tb	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
Tc2	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
Tc1	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
Ta	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
P	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1
Pr	blackish gray to gray - light gray	fine	arborescent	low	low	-	low	volcanic ash deposit	Q1

67°00' E 67°30' E 68°00' E 68°30' E 69°00' E 69°30' E 70°00' E 70°30' E 71°00' E 71°30' E 72°00' E 72°30' E 73°00' E 73°30' E 74°00' E



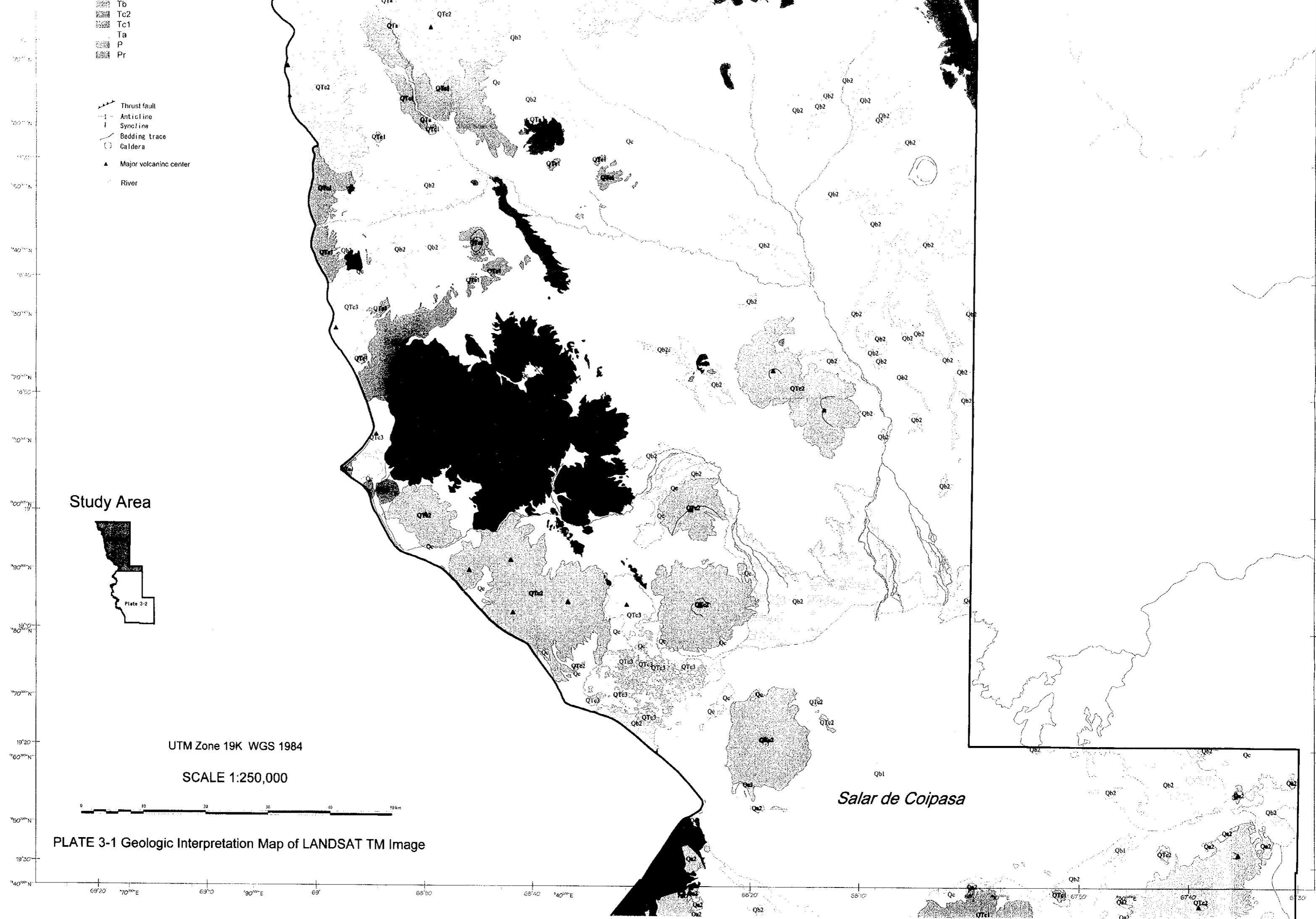
List of geologic unit

UNIT	DESCRIPTION	THICKNESS (m)	GRAIN SIZE	STRUCTURE	SEDIMENTATION RATE (mm/yr)	SEDIMENT TYPE	SEDIMENTARY FACIES	SEDIMENTARY ENVIRONMENT	SEDIMENTARY AGE	SEDIMENTARY CORRELATION
Qa	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qa
Qb	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qb
Qc	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qc
Qd	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qd
Qe	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qe
Qf	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qf
Qg	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qg
Qh	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qh
Qi	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qi
Qj	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qj
Qk	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qk
Ql	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Ql
Qm	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qm
Qn	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qn
Qo	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qo
Qp	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qp
Qq	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qq
Qr	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qr
Qs	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qs
Qt	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qt
Qu	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qu
Qv	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qv
Qw	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qw
Qx	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qx
Qy	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qy
Qz	dark grey - black clay	fine	clayey	low	low	clay	clay	low	low	Qz

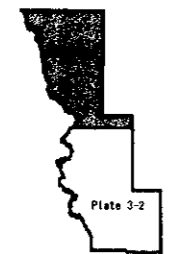
74°00' N
74°30' N
75°00' N
75°30' N
76°00' N
76°30' N
77°00' N
77°30' N
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78°30' N
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86°00' N
86°30' N
87°00' N
87°30' N
88°00' N
88°30' N
89°00' N
89°30' N
90°00' N

- Tb
- Tc2
- Tc1
- Ta
- P
- Pr

- Thrust fault
- Anticline
- Syncline
- Bedding trace
- Galdera
- Major volcanic center
- River



Study Area



UTM Zone 19K WGS 1984

SCALE 1:250,000



PLATE 3-1 Geologic Interpretation Map of LANDSAT TM Image

Salar de Coipasa

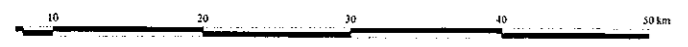
rust fault
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ldera
or volcanic center
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rea



UTM Zone 19K WGS 1984

SCALE 1:250,000

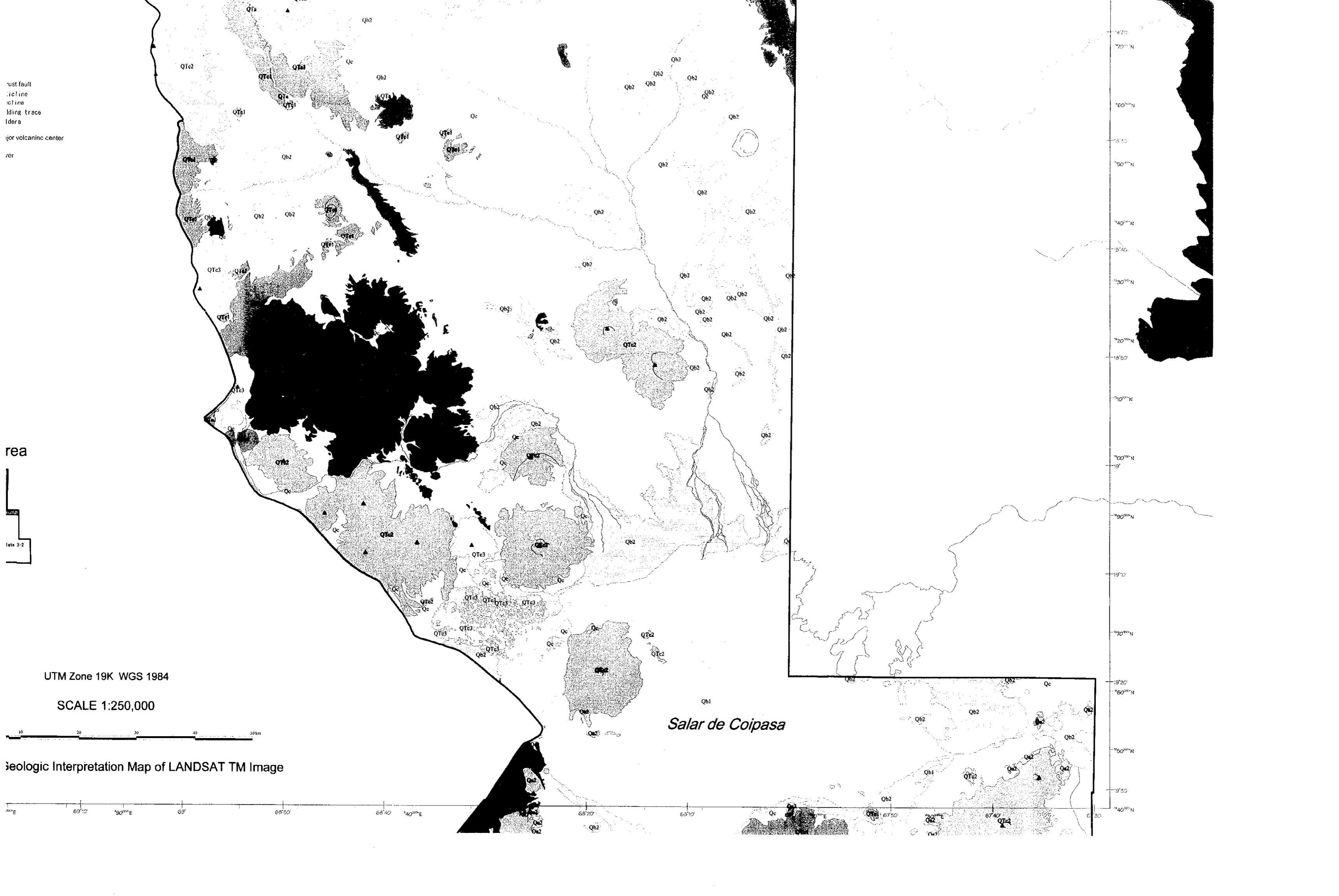


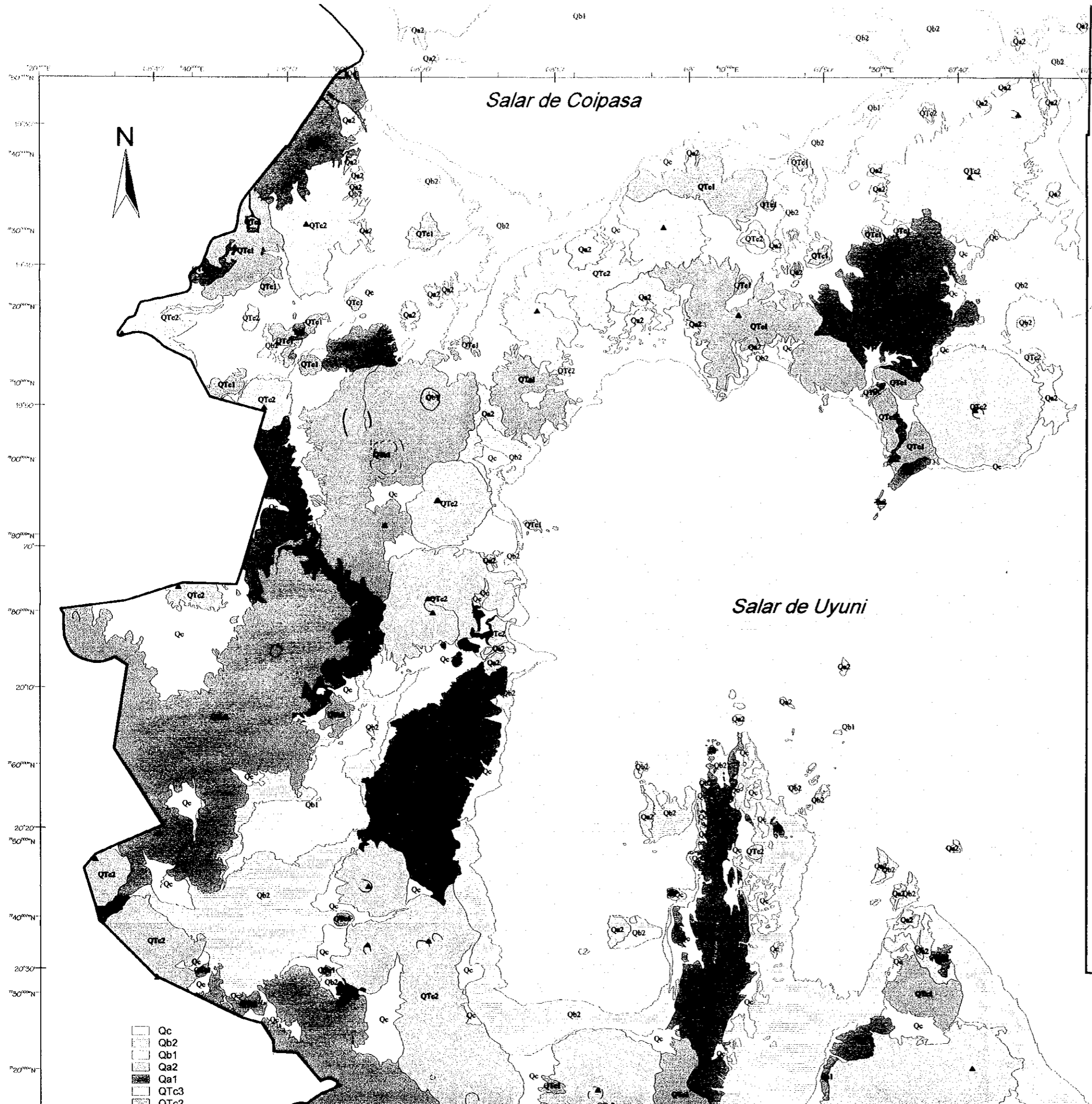
Geologic Interpretation Map of LANDSAT TM Image

69°15' E 69°10' E 69°05' E 69°00' E 68°55' E 68°50' E 68°45' E 68°40' E 68°35' E 68°30' E

9°15' N
9°10' N
9°05' N
9°00' N
8°55' N
8°50' N
8°45' N
8°40' N
8°35' N
8°30' N
8°25' N
8°20' N
8°15' N
8°10' N
8°05' N
8°00' N
7°55' N
7°50' N
7°45' N
7°40' N
7°35' N
7°30' N
7°25' N
7°20' N
7°15' N
7°10' N
7°05' N
7°00' N
6°55' N
6°50' N
6°45' N
6°40' N
6°35' N
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6°10' N
6°05' N
6°00' N

Salar de Coipasa

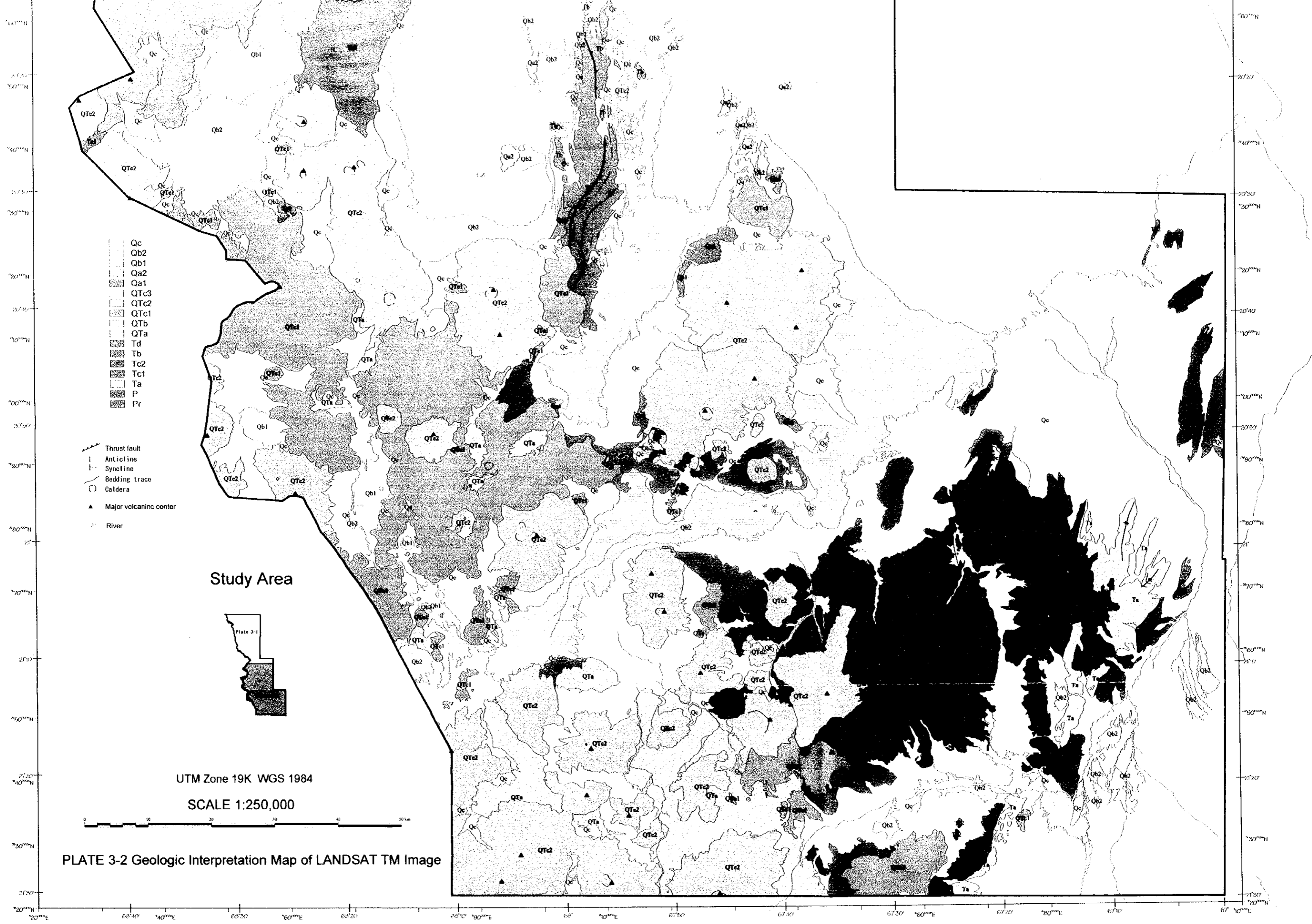




List of geologic unit

Geologic Unit	Color	Pattern	Thickness (m)	Rock	Stratigraphy	Age	Remarks
Qc	Light gray	Horizontal lines	1-2	Quartzite	Pre-Cambrian	Qc	Quartzite (Precambrian)
Qb1	Dark gray	Vertical lines	1-2	Quartzite	Pre-Cambrian	Qb1	Quartzite (Precambrian)
Qb2	Light gray	Horizontal lines	1-2	Quartzite	Pre-Cambrian	Qb2	Quartzite (Precambrian)
Qa1	Dark gray	Vertical lines	1-2	Quartzite	Pre-Cambrian	Qa1	Quartzite (Precambrian)
QTc1	Dark gray	Vertical lines	1-2	Quartzite	Pre-Cambrian	QTc1	Quartzite (Precambrian)
QTc2	Dark gray	Vertical lines	1-2	Quartzite	Pre-Cambrian	QTc2	Quartzite (Precambrian)
QTc3	Dark gray	Vertical lines	1-2	Quartzite	Pre-Cambrian	QTc3	Quartzite (Precambrian)

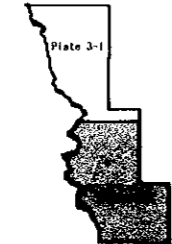
- Qc
- Qb2
- Qb1
- Qa1
- QTc3
- QTc2
- QTc1



- Qc
- Qb2
- Qb1
- Qa2
- Qa1
- QTc3
- QTc2
- QTc1
- QTb
- QTa
- Td
- Tb
- Tc2
- Tc1
- Ta
- P
- Pr

- Thrust fault
- Anticline
- Syncline
- Bedding trace
- Caldera
- Major volcanic center
- River

Study Area



UTM Zone 19K WGS 1984

SCALE 1:250,000

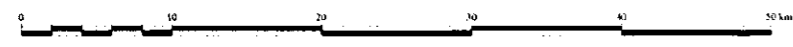
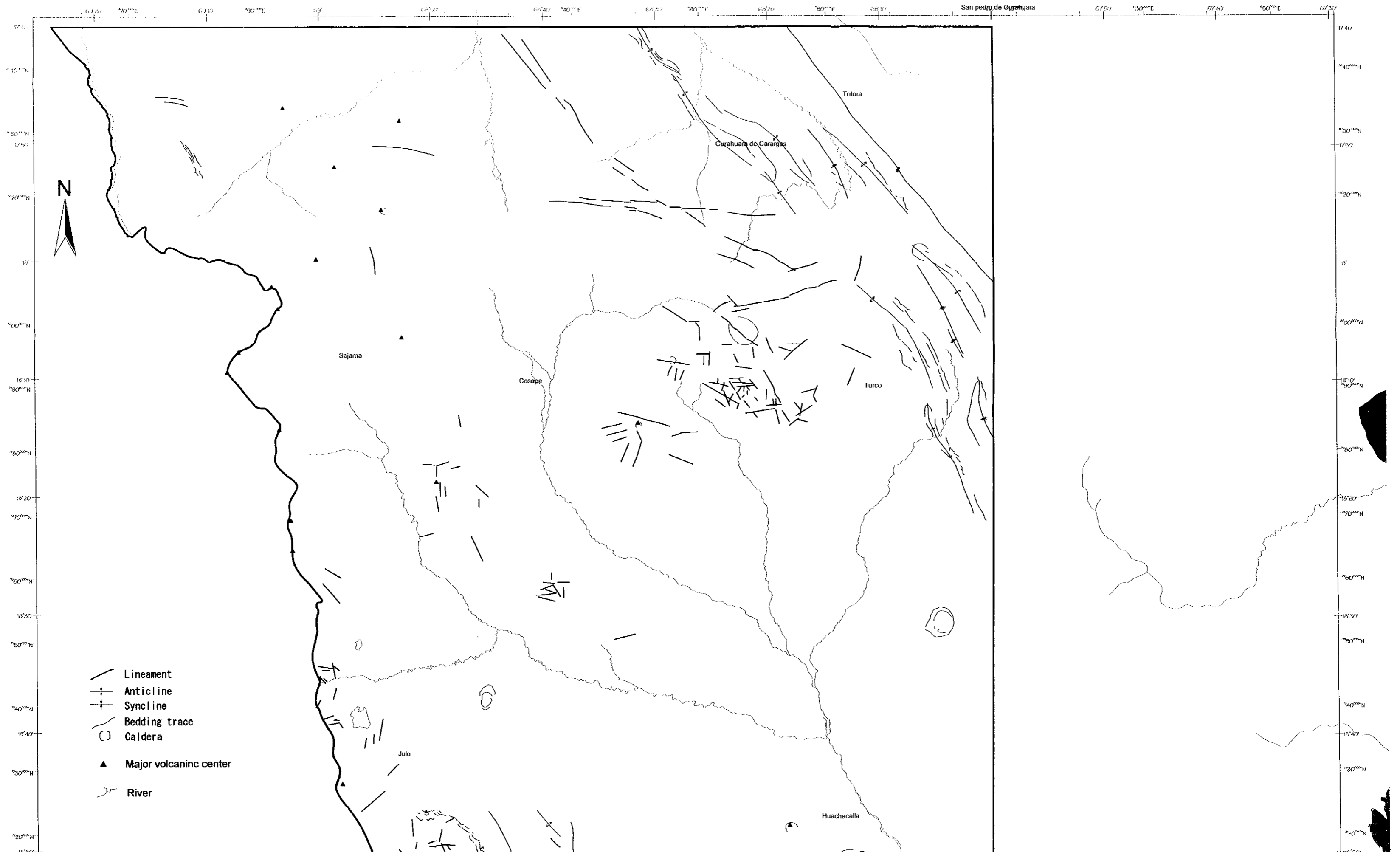
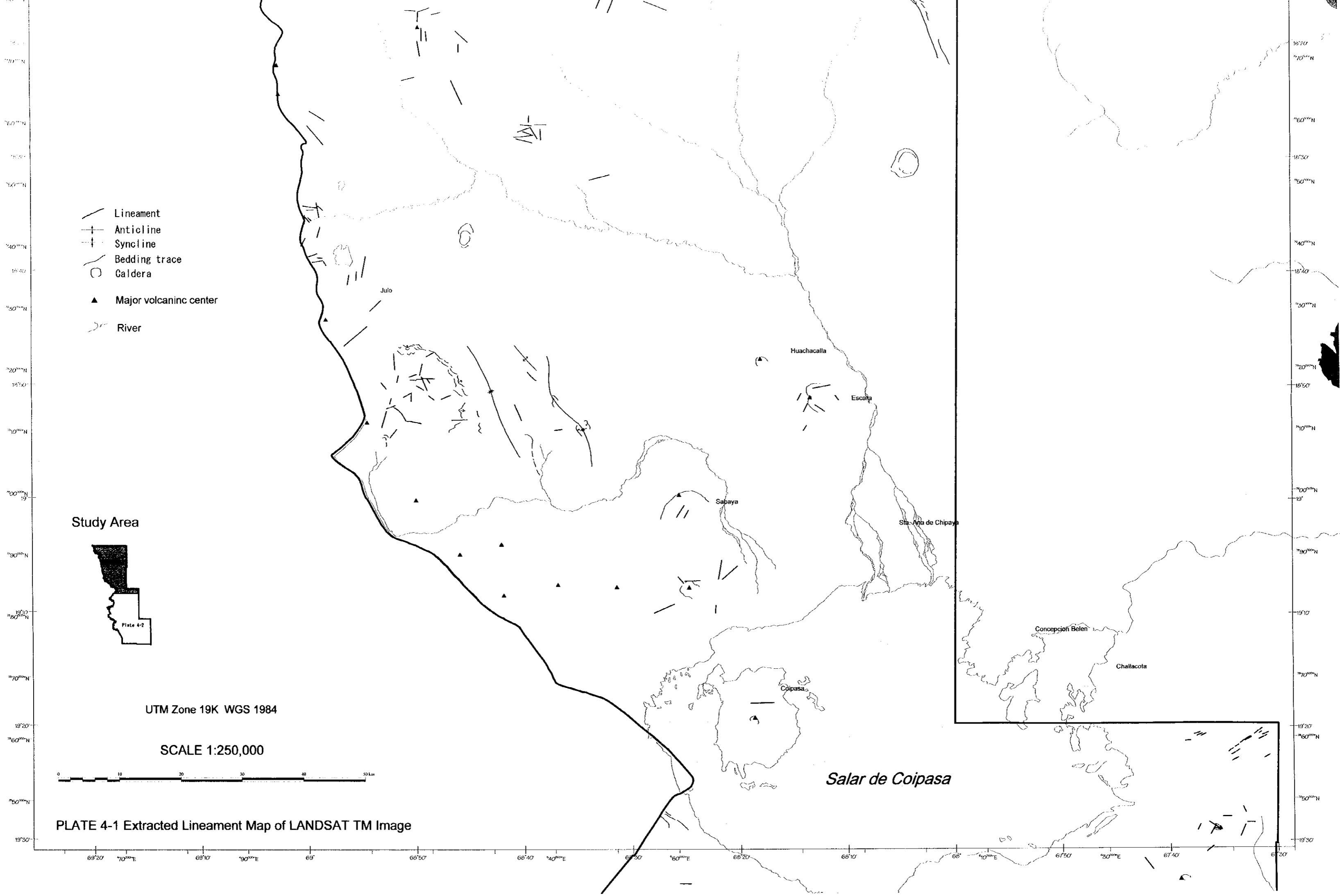


PLATE 3-2 Geologic Interpretation Map of LANDSAT TM Image





Study Area

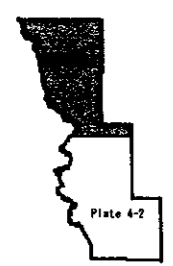
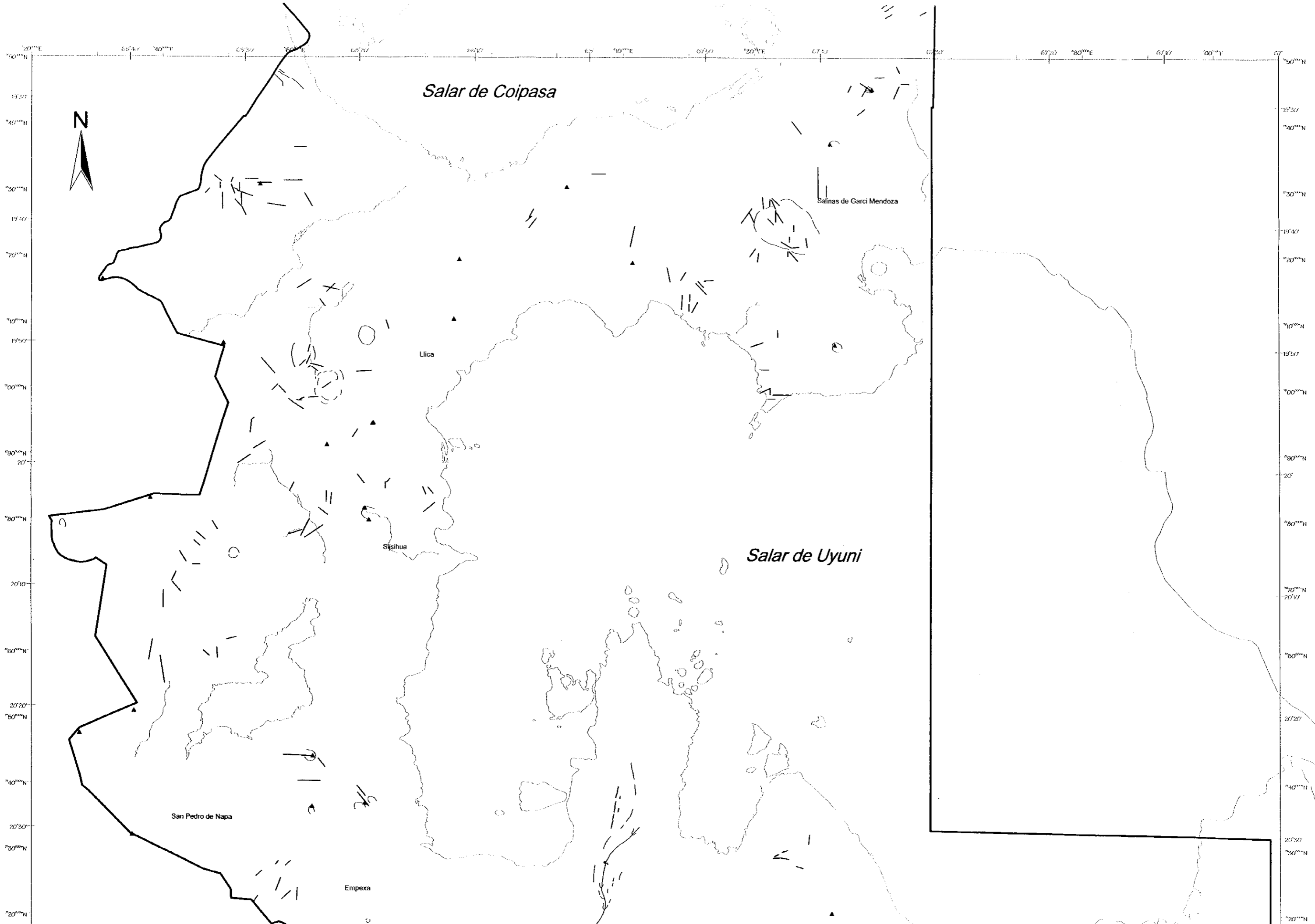


PLATE 4-1 Extracted Lineament Map of LANDSAT TM Image



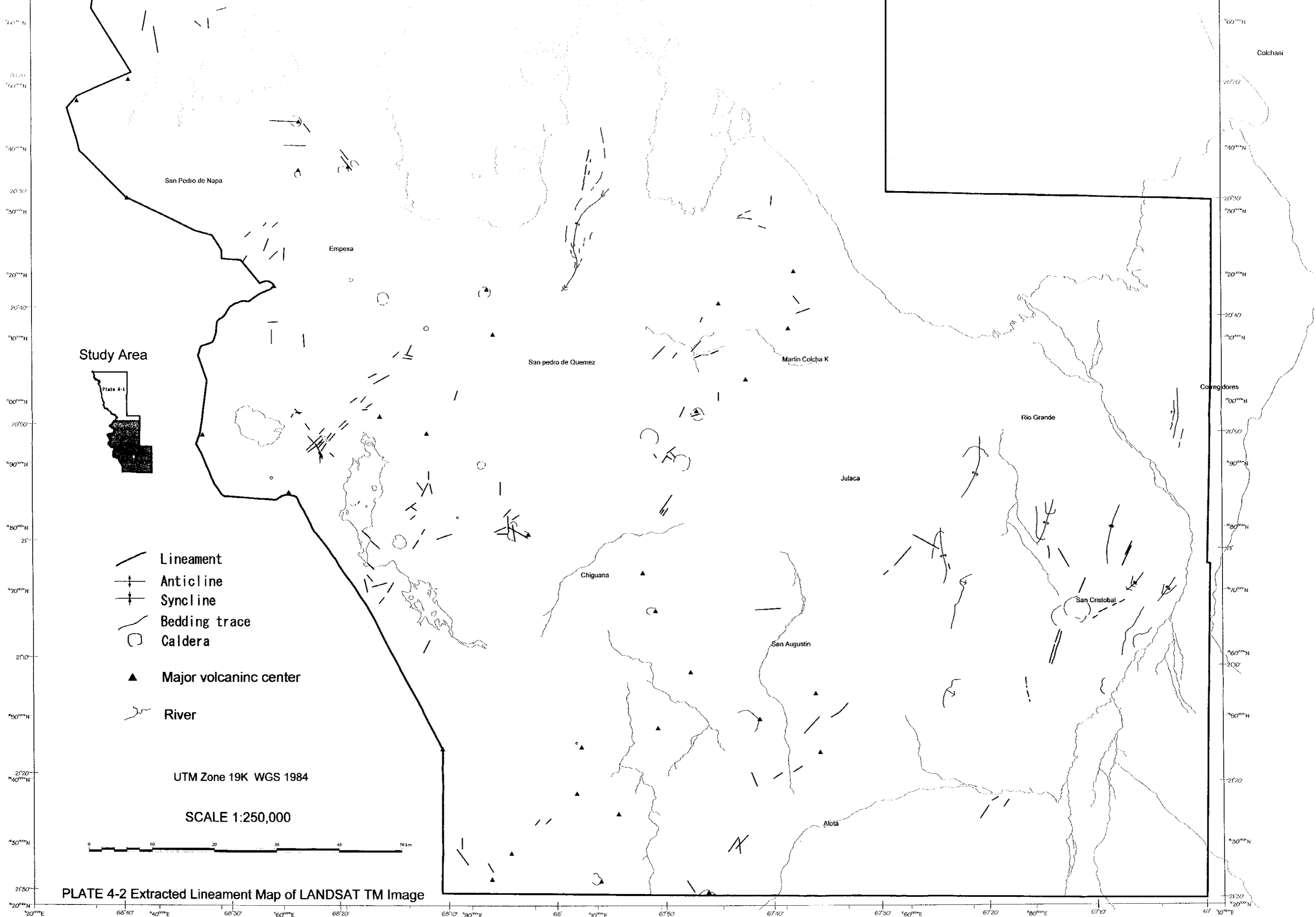
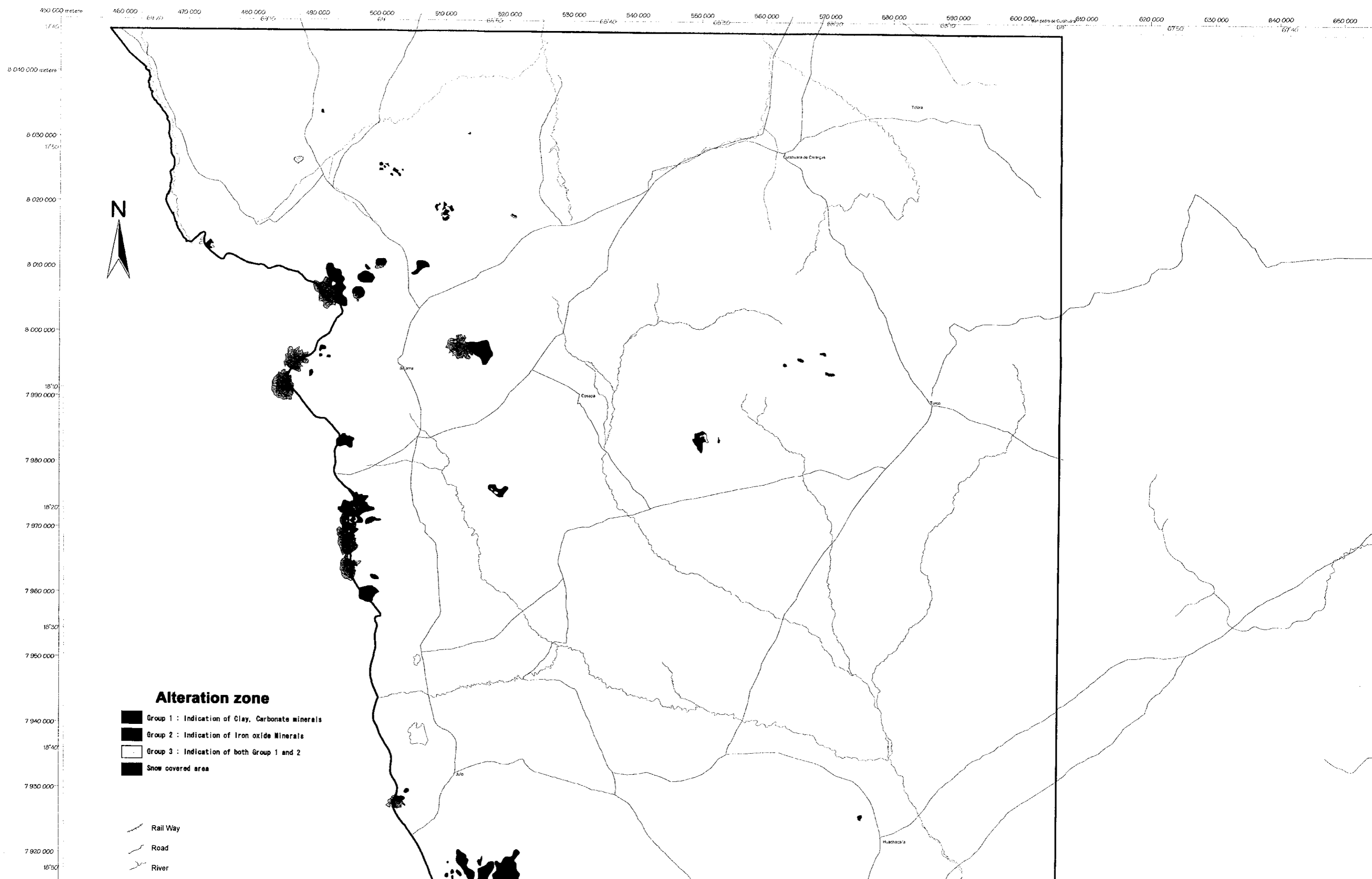


PLATE 4-2 Extracted Lineament Map of LANDSAT TM Image



Alteration zone

- Group 1 : Indication of Clay, Carbonate minerals
- Group 2 : Indication of Iron oxide Minerals
- Group 3 : Indication of both Group 1 and 2
- Snow covered area

- Rail Way
- Road
- River

480 000 490 000 500 000 510 000 520 000 530 000 540 000 550 000 560 000 570 000 580 000 590 000 600 000 610 000 620 000 630 000 640 000 650 000 660 000 meters

7940
8 040 000 meters
8 030 000
7950
8 020 000
8 010 000
8 000 000
7990
7980
7970 000
7960 000
7950
7950 000
7940
7940 000
7930
7930 000



tion zone

- ation of Clay, Carbonate minerals
- ation of Iron oxide Minerals
- ation of both Group 1 and 2

7 970 000
7 960 000
7 950 000
7 940 000
7 930 000
7 920 000
7 910 000
7 900 000
7 890 000
7 880 000
7 870 000
7 860 000
7 850 000
7 840 000 meters

- Alteration zone**
- Group 1 : Indication of Clay, Carbonate minerals
 - Group 2 : Indication of Iron oxide Minerals
 - Group 3 : Indication of both Group 1 and 2
 - Snow covered area
- Rail Way
Road
River

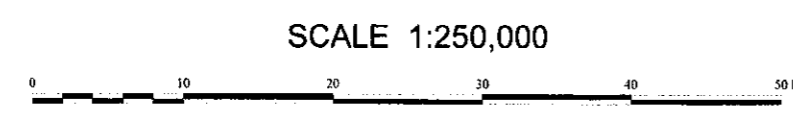


PLATE 5-1 Extracted Alteration Map of LANDSAT TM Image

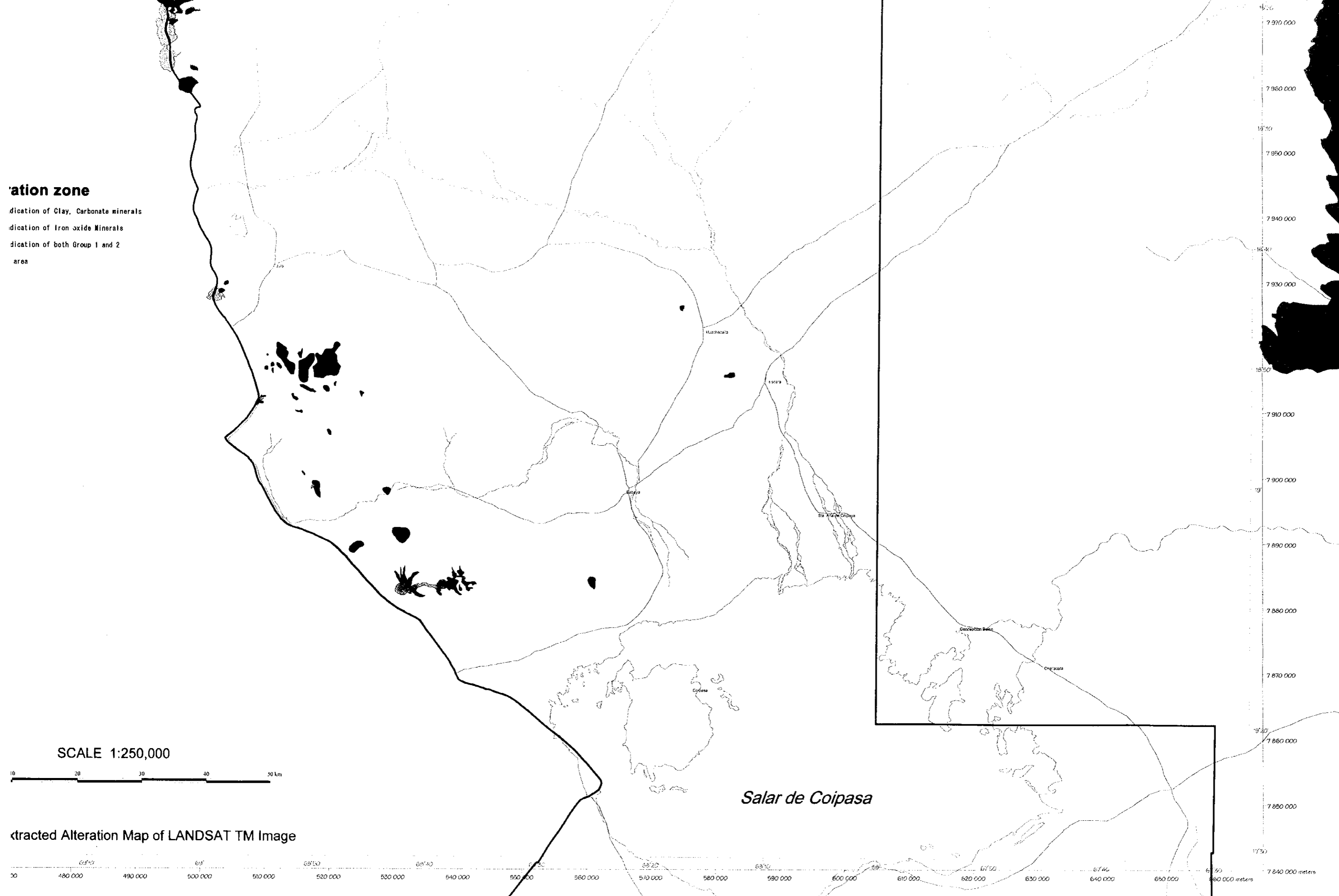
69°20' 69°10' 69° 68°50' 68°40' 68°30' 68°20' 68°10' 68° 67°50' 67°40' 67°30' 67°20' 67°10' 67°

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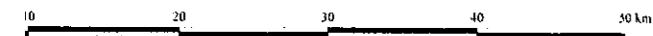


Alteration zone

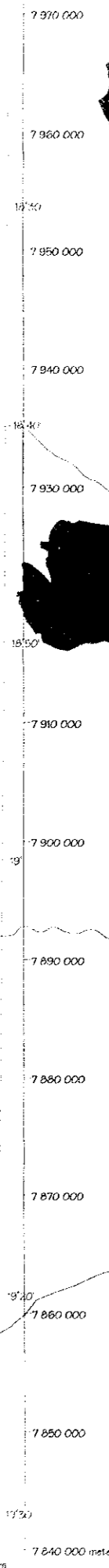
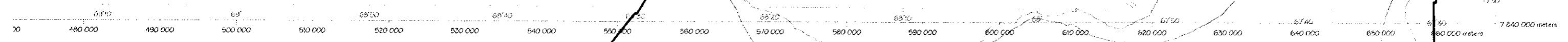
- Indication of Clay, Carbonate minerals
- Indication of Iron oxide Minerals
- Indication of both Group 1 and 2 area



SCALE 1:250,000



Extracted Alteration Map of LANDSAT TM Image





Salares de Coipasa

Salares de Uyuni



520 000 meters

7 850 000 meters

7 840 000

7 830 000

7 820 000

7 810 000

7 800 000

7 790 000

7 780 000

7 770 000

7 760 000

7 750 000

7 740 000

7 730 000

710 000 meters

7 840 000

7 830 000

7 820 000

7 810 000

7 800 000

7 790 000

7 780 000

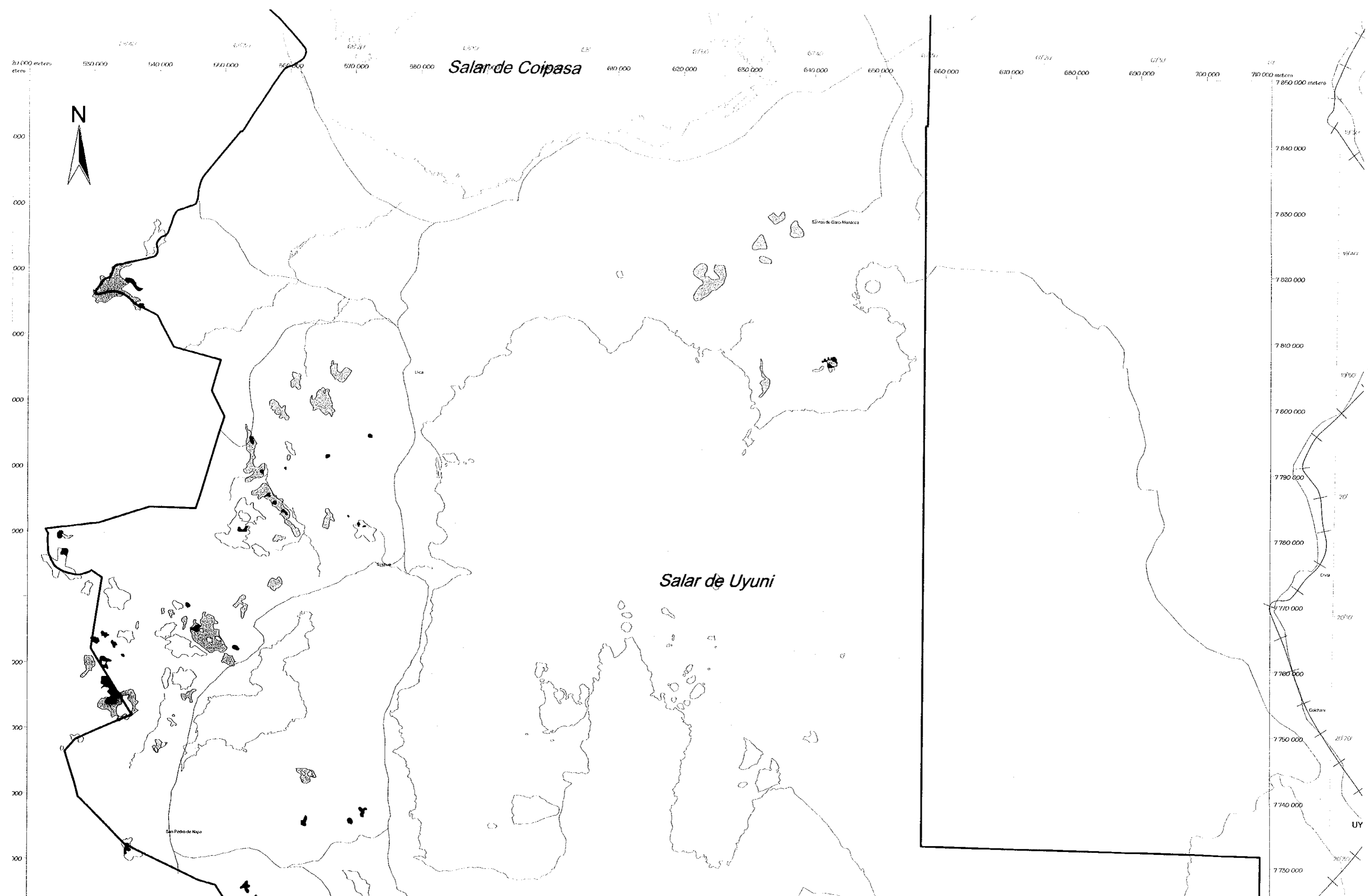
7 770 000

7 760 000

7 750 000

7 740 000

7 730 000



Salar de Coipasa

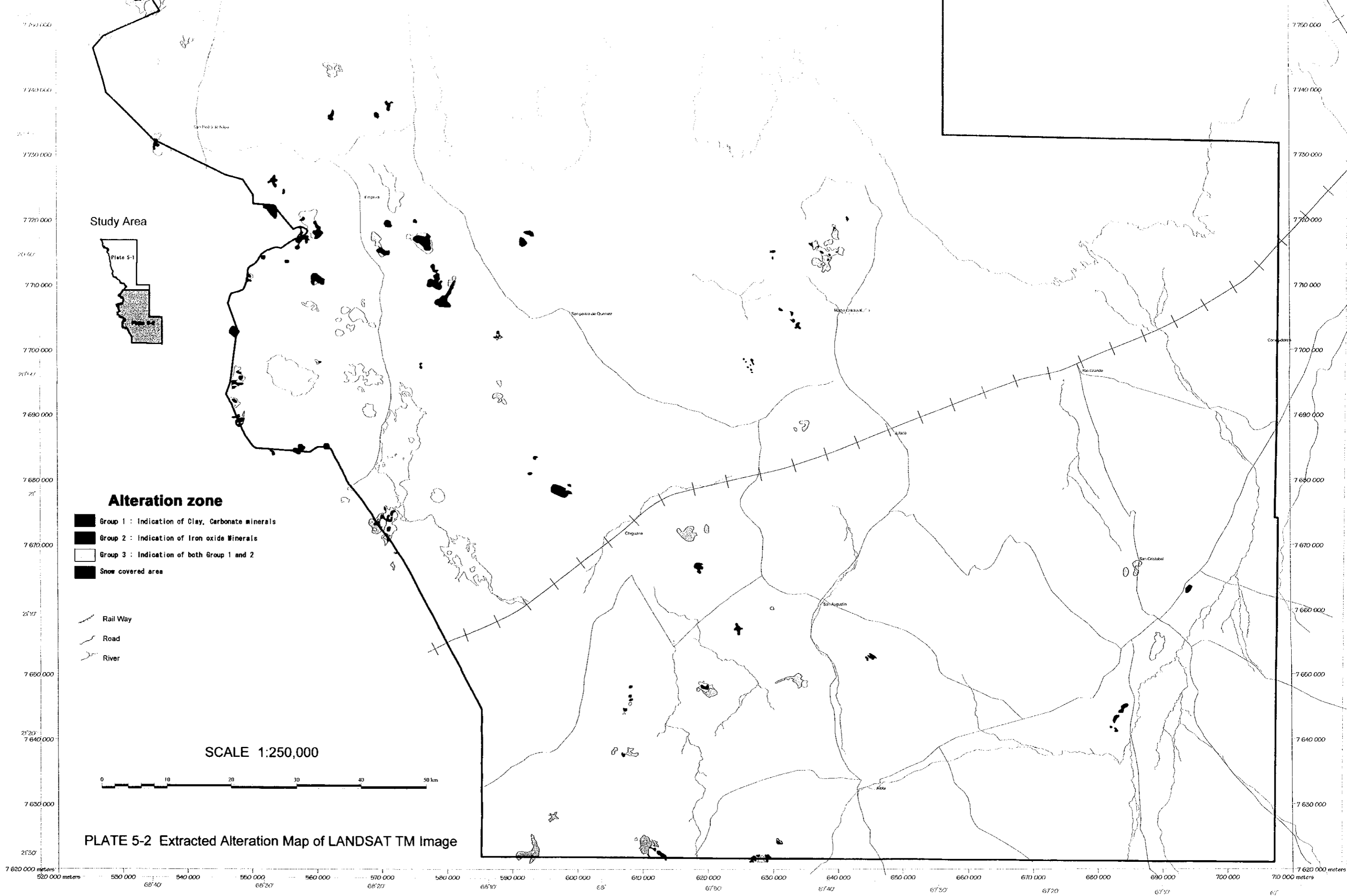
Salar de Garo Malaca

Lica

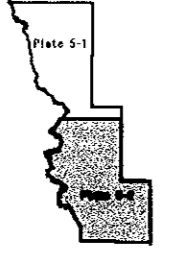
Salar de Uyuni

San Pedro de Niza

UY



Study Area



Alteration zone

- Group 1 : Indication of Clay, Carbonate minerals
- Group 2 : Indication of Iron oxide Minerals
- Group 3 : Indication of both Group 1 and 2
- Snow covered area

- Rail Way
- Road
- River

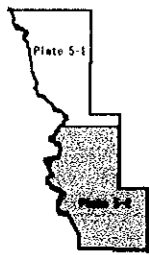
SCALE 1:250,000







PLATE 5-2 Extracted Alteration Map of LANDSAT TM Image

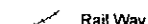




Study Area



Alteration zone

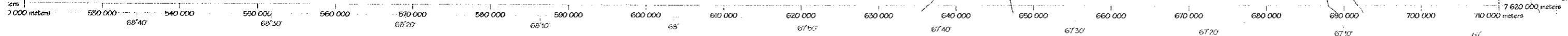
-  Group 1 : Indication of Clay, Carbonate minerals
-  Group 2 : Indication of Iron oxide Minerals
-  Group 3 : Indication of both Group 1 and 2
-  Snow covered area

-  Rail Way
-  Road
-  River

SCALE 1:250,000



PLATE 5-2 Extracted Alteration Map of LANDSAT TM Image



UY

