

APPENDICES

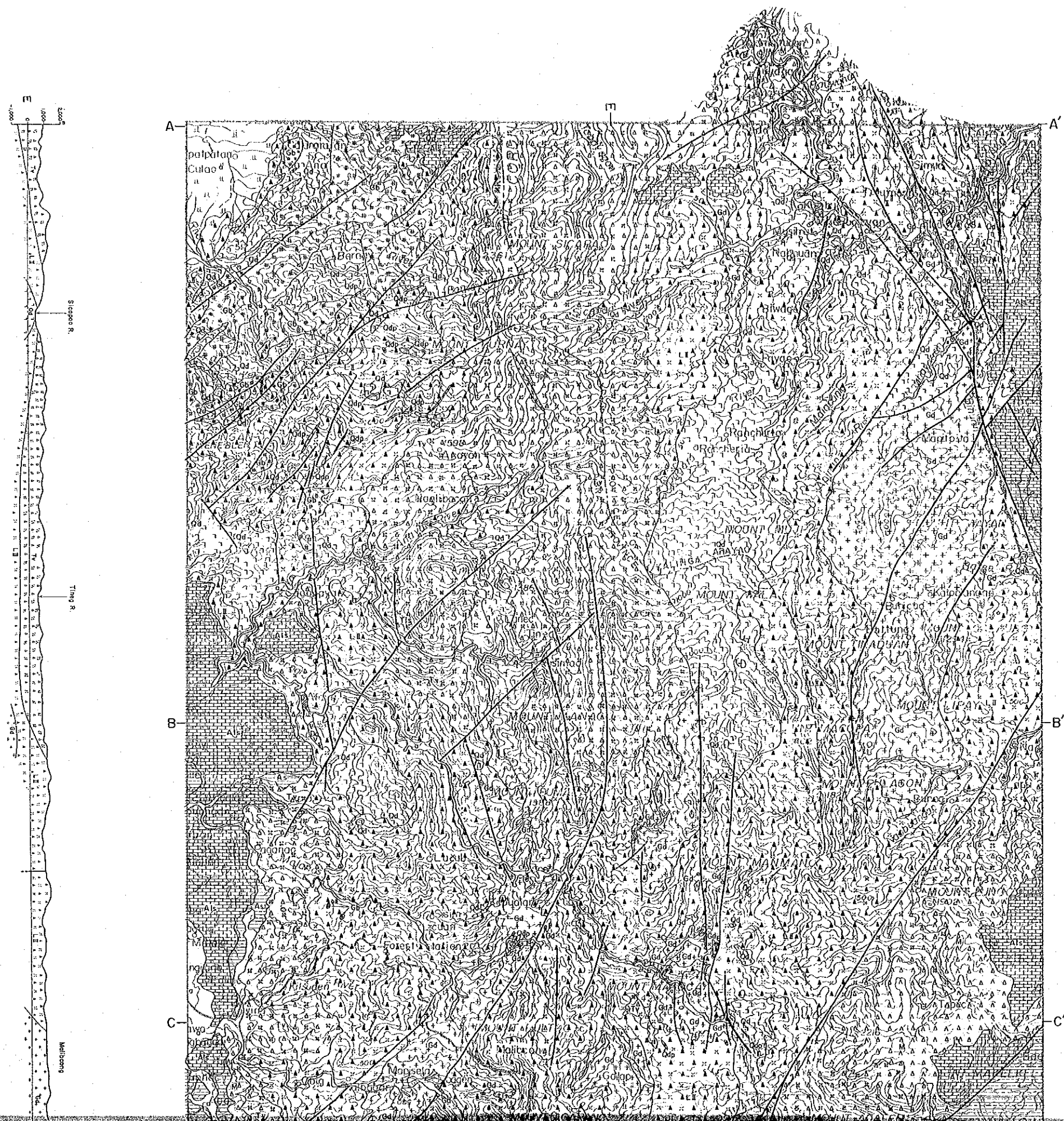
(2) Smaller Foraminifera

Species of Foraminifera	Phase		Phase I						Phase II
	Name of Formation	Tupig F.	Alava F.						Alava F.
	Sample No. Location Co-ordinate	b-129 Malitep Cr. 120° 54' 25" 17° 02' 37"	b-527 Malanas R. 120° 47' 16" 17° 40' 42"	f-302 Mabaca R. 121° 14' 57" 17° 34' 45"	f-561a Baay R. 120° 46' 45" 17° 34' 40"	f-592 Manikbel R. 120° 45' 23" 17° 27' 08"	g-523 San Juan 120° 44' 55" 17° 42' 43"	g-524 San Juan 120° 44' 20" 17° 42' 33"	b-2165 Malanas R. 120° 47' 12" 17° 40' 18"
<i>Anomalina glabrata</i> Cushman				15					6
<i>Anomalina</i> sp.									6
<i>Astronomion italicum</i> Cushman and Edwards									9
<i>A.</i> sp.	10	2		15	7				6
<i>Cibicides atezcatus</i> (d'Orbigny)									6
<i>C. lobanulus</i> (Walker and Jacob)									9
<i>C. malleryi</i> Matsunaga									6
<i>C.</i> sp.									6
<i>Cybroelphidium</i> sp.			2						9
<i>Discorbis</i> sp.									15
<i>Elphidium craticulatum</i> (Fichtel and Moll)									15
<i>Elphidium</i> highest Cushman and Grant									18
<i>E. rugosum</i> (d'Orbigny)			2						24
<i>E.</i> sp.			32	12			6		36
<i>Gyroidina orbicularis</i> d'Orbigny			4	3			2		
<i>G.</i> sp.							4		
<i>Lagenodosia</i> sp.			1						
<i>Lenticulina</i> cf. <i>nikobarensis</i> (Schwager)									
<i>L.</i> cf. <i>pseudorotulatus</i> Asano									
<i>L.</i> sp.									
<i>Lagena</i> sp.									
<i>Nonion grataloupi</i> (d'Orbigny)			15						36
<i>N. labradoricum</i> (Dawson)			3						18
<i>N. incisum</i> (Cushman)			4						6
<i>N. micrum</i> Cole			6						
<i>N. pacificum</i> (Cushman)									
<i>N.</i> sp.			25						42
<i>Nonionella</i> sp.									
<i>Planulina</i> sp.	2								
<i>Pseudonion</i> sp.									
<i>Quinqueloculina</i> sp.									
<i>Saracenaria</i> Selencki Cushman and Holson									
<i>Uvigerina nitidula</i> Schwager									
<i>U.</i> sp.									
<i>Virgulina</i> sp.									
Cal. Foram. gen. and sp. indet.	30	15	7	10.					30
<i>Globigeninoides triboea</i> (Reuss)			30						
<i>G.</i> immaturus LeRoy			27						
<i>G.</i> ruber subquadratus Bronnmann			35						
<i>G.</i> obliquus Bolli			5						
<i>Globigenina fabonensis</i> Blow			25						
<i>G.</i> bulloides d'Orbigny			40						
<i>G.</i> praebulloides Blow			25	1					
<i>G.</i> foliata Bolli			15						
<i>G.</i> inflata d'Orbigny			14						
<i>G.</i> sp.			10						
<i>Globorotalia tumida</i> (Brady)			1						3
<i>G.</i> cf. <i>tumida</i> (Brady)			4						
<i>G.</i> sp.			11						
<i>Orbulina univversa</i> d'Orbigny			4						
<i>O.</i> saturalis Bronnmann			2						
<i>O.</i> bilobata (d'Orbigny)			2						
<i>O.</i> sp.			3						
Pla. Foram. gen. and sp. indet.			5						

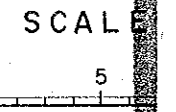
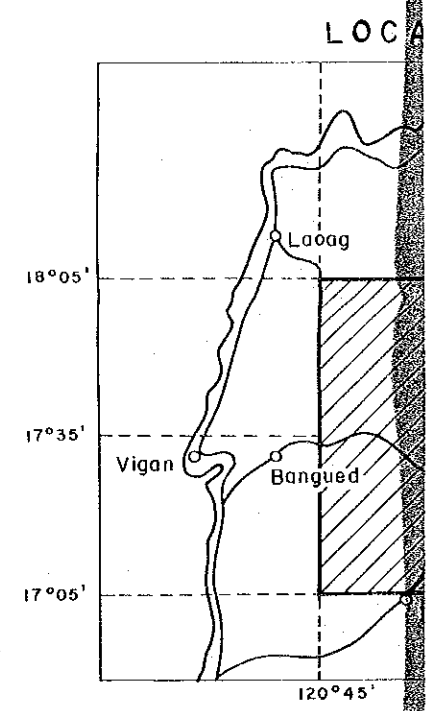
Table A-2 Results of Chemical Analysis and K-Ar Dating

No.	Sample No.	Rock Name	Location	Co-ordinate		Chemical Composition (%)														Age (m.y.) by K-Ar dating	
				E Longl.	N Latl.	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	CO ₂	H ₂ O(+)	H ₂ O(-)		Total
		Phase I																			
1	a-502	Granophyre	Middle stream of Ikmin R., 1Km E of Boriney	120° 49' 35"	17° 22' 49"	76.36	0.13	12.07	0.48	0.93	0.02	0.09	0.70	3.22	4.82	0.05	-	0.25	0.10	99.22	12.6
2	a-512	Granodiorite	2.5Km West of Boriney	120° 47' 38"	17° 22' 52"	59.01	0.49	17.55	2.83	3.56	0.10	2.31	5.64	3.77	2.94	0.24	-	0.93	0.08	99.45	18.4
3	b-522	Granodiorite	National Road No.6, 3.5Km SW of Licuan	120° 53' 33"	17° 35' 19"	57.39	0.73	17.10	2.83	4.92	0.13	2.73	6.52	3.09	3.04	0.35	0.18	0.80	0.08	99.87	18.3
4	e-308	Quartz monzonite	Upper stream of Nabbugan River	121° 09' 39"	17° 43' 45"	62.73	0.53	17.03	0.32	4.24	0.10	1.39	3.62	3.96	4.65	0.23	-	0.39	0.22	99.41	16.2
5	f-515	Quartz diorite	Middle stream of Utep River	120° 49' 09"	17° 15' 37"	61.22	0.51	16.74	2.08	3.95	0.14	2.77	6.12	3.33	1.90	0.16	-	0.50	0.12	99.54	9.8
6	g-106	Diorite porphyry	Lower stream of Layacan River	120° 49' 18"	17° 08' 45"	56.67	0.48	18.17	4.19	2.84	0.14	3.31	6.81	4.07	0.88	0.26	0.40	1.41	0.22	99.85	* -
7	g-307	Granodiorite	Lower stream of Baren R., 5Km W of Tawini	121° 12' 02"	17° 50' 06"	65.43	0.51	15.74	1.52	2.87	0.10	1.39	3.77	3.70	3.77	0.21	-	0.08	0.14	99.23	13.7
8	g-512	Gabbro	Middle stream of Madongan River	120° 51' 39"	18° 00' 32"	48.01	0.81	20.21	3.94	7.19	0.17	4.46	12.07	2.43	0.24	0.07	-	0.10	0.16	99.86	* -
9	g-533	Quartz diorite	Lower stream of Tineg R., 3Km W of Agsinao	120° 55' 08"	17° 47' 43"	56.08	0.71	17.22	3.59	5.07	0.17	3.61	7.19	3.68	1.53	0.23	-	0.52	0.12	99.72	18.5
10	m-317	Quartz diorite	Middle stream of Dagara R., 1Km NW of Dagara	121° 05' 30"	17° 55' 36"	62.95	0.51	15.60	2.28	4.20	0.14	2.92	5.55	3.10	1.80	0.13	-	0.38	0.06	99.62	19.9
		Phase II																			
11	a-2306	Gabbro	Middle stream of Burnay River	120° 46' 53"	17° 58' 52"	41.62	1.21	18.78	6.38	8.70	0.18	5.41	12.02	1.62	0.16	0.02	-	3.54	0.24	99.88	* -
12	b-2338	Quartz diorite	Middle stream of Burnay River	120° 48' 56"	17° 59' 04"	67.23	0.39	15.65	1.16	3.81	0.11	1.48	3.59	3.99	0.92	0.08	-	1.08	0.32	99.81	23.0 ± 1.1
13	c-2161	Quartz diorite porphyry	Upper stream of Manikbel R., Near Ud-Udiao	120° 52' 05"	17° 28' 35"	58.38	0.45	17.50	3.08	2.59	0.13	2.56	7.29	2.51	0.48	0.15	-	4.42	0.24	99.78	15.4 ± 1.5
14	c-2162	Granodiorite	2Km West of Ud-Udiao	120° 50' 53"	17° 28' 24"	52.95	0.70	18.67	3.34	6.11	0.18	3.79	8.12	2.92	1.65	0.27	-	0.81	0.04	99.55	20.0 ± 1.0
15	e-2203	Quartz diorite	Upper stream of Binongan R., 8Km E of Malibcong	121° 05' 00"	17° 35' 19"	69.66	0.42	14.65	1.28	3.02	0.07	1.00	2.47	4.70	0.72	0.13	-	1.10	0.04	99.26	26.3 ± 1.8
16	e-2207	Dacite dyke	6Km Northwest of Malibcong	121° 02' 27"	17° 36' 10"	52.20	0.53	20.65	3.79	3.81	0.16	2.96	9.42	2.41	0.41	0.16	-	2.91	0.36	99.77	18.3 ± 2.0
17	e-2704	Granodiorite	3.5Km South of Kabugao	121° 11' 13"	17° 59' 36"	59.54	0.68	17.72	2.35	4.35	0.12	2.76	5.77	3.12	2.12	0.19	-	0.88	0.18	99.78	19.4 ± 1.0
18	g-2250	Quartz diorite porphyry	Middle stream of Bucloc R., 3Km SE of Bucloc	120° 52' 26"	17° 25' 21"	63.50	0.39	17.21	1.95	3.56	0.10	2.07	5.66	3.35	1.23	0.12	-	0.24	0.20	99.58	12.6 ± 0.6
19	h-2121	Quartz diorite	Upper stream of Bucloc R., 0.3Km NE of Ableg	120° 56' 00"	17° 27' 56"	63.03	0.42	17.19	2.20	3.23	0.13	2.31	6.05	3.22	0.73	0.13	-	0.86	0.16	99.66	12.0 ± 0.8
20	r-2120	Quartz diorite	Middle stream of Bucloc R., 1.5Km E of Bucloc	120° 52' 14"	17° 26' 30"	52.92	0.87	20.67	2.07	5.39	0.13	4.27	9.17	2.56	0.65	0.17	-	0.88	0.12	99.87	16.1 ± 1.1
		Phase III																			
21	b-3143	Quartz diorite	1.1Km North of Ud-Udiao	120° 29' 50"	17° 29' 15"	57.77	0.71	17.55	2.64	4.81	0.18	3.35	6.53	2.54	2.33	0.25	-	0.95	0.08	99.69	15.9 ± 0.8
22	b-3144	Dacite dyke	0.8Km North of Ud-Udiao	120° 29' 50"	17° 29' 09"	62.52	0.37	16.24	1.64	4.28	0.16	2.13	5.56	2.15	1.30	0.12	-	2.65	0.36	99.48	10.5 ± 1.1
23	b-3350	Dacite dyke	Lower stream of Balasian R., 1.2Km E of Babasig	120° 45' 57"	17° 07' 01"	60.08	0.50	17.64	2.76	3.81	0.17	2.75	7.02	3.35	0.58	0.21	-	0.71	0.36	99.94	9.8 ± 2.0

* K-content was not sufficient to date



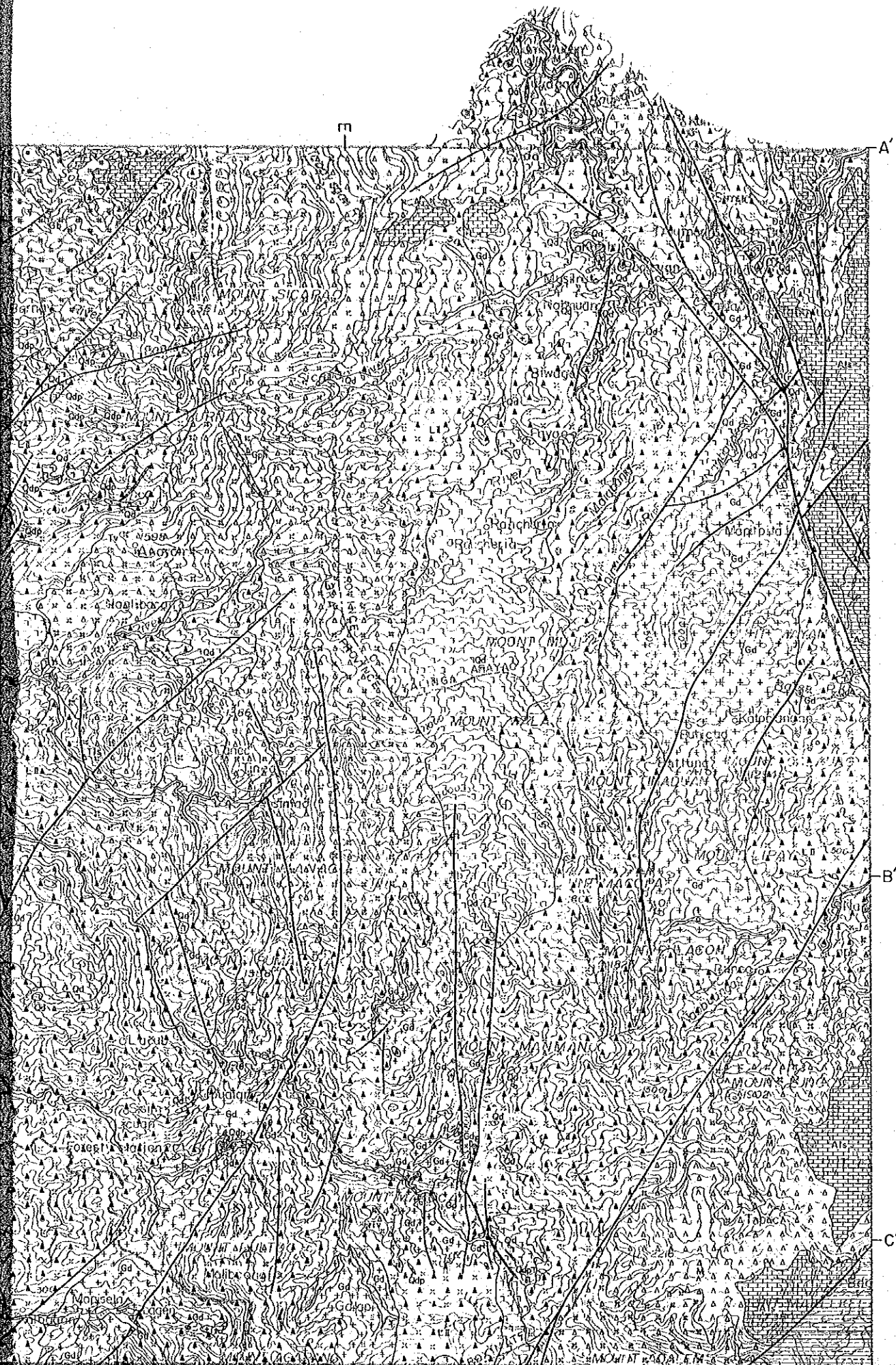
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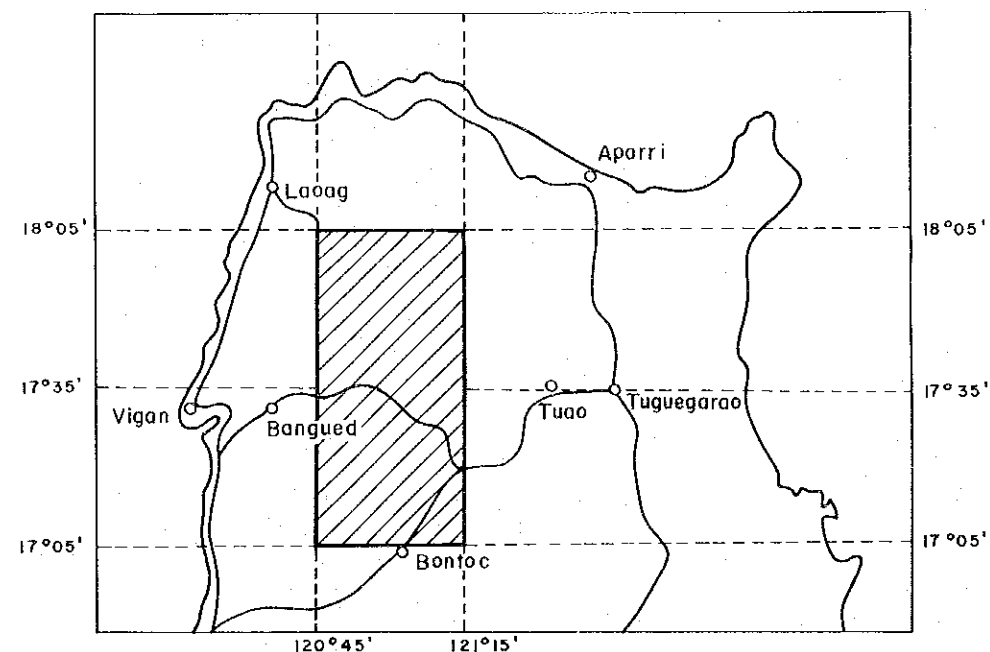
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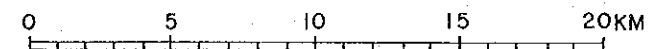
Geological Map
and
Geological Profile



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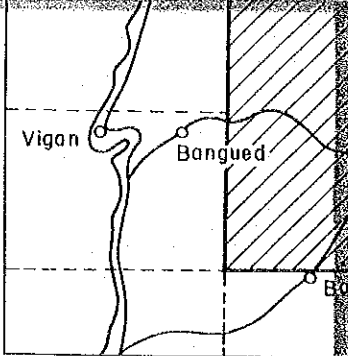
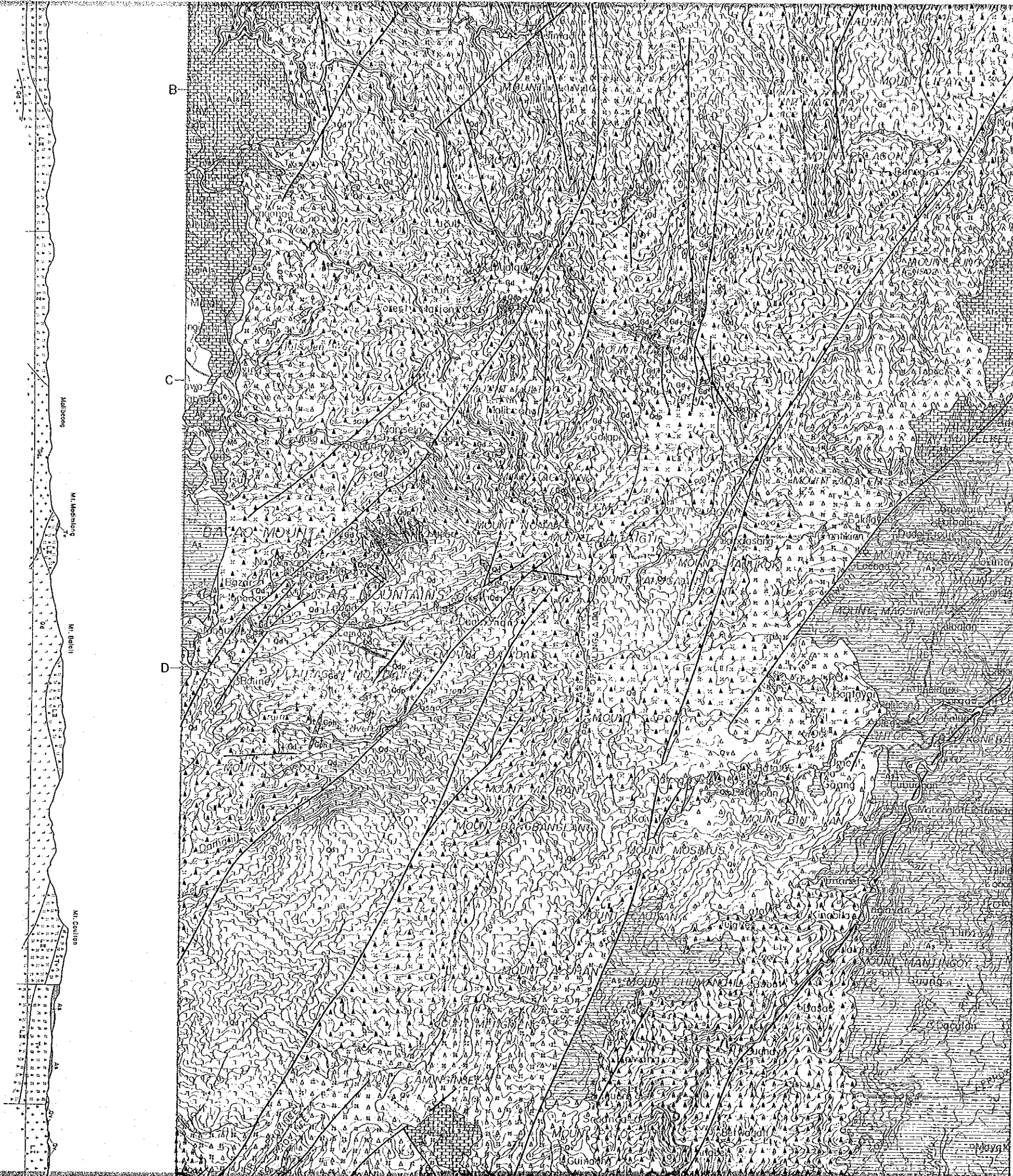
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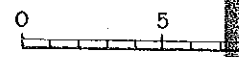
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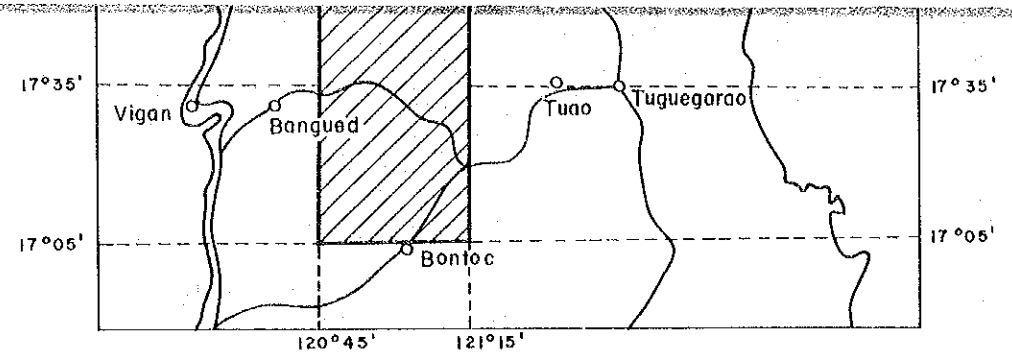
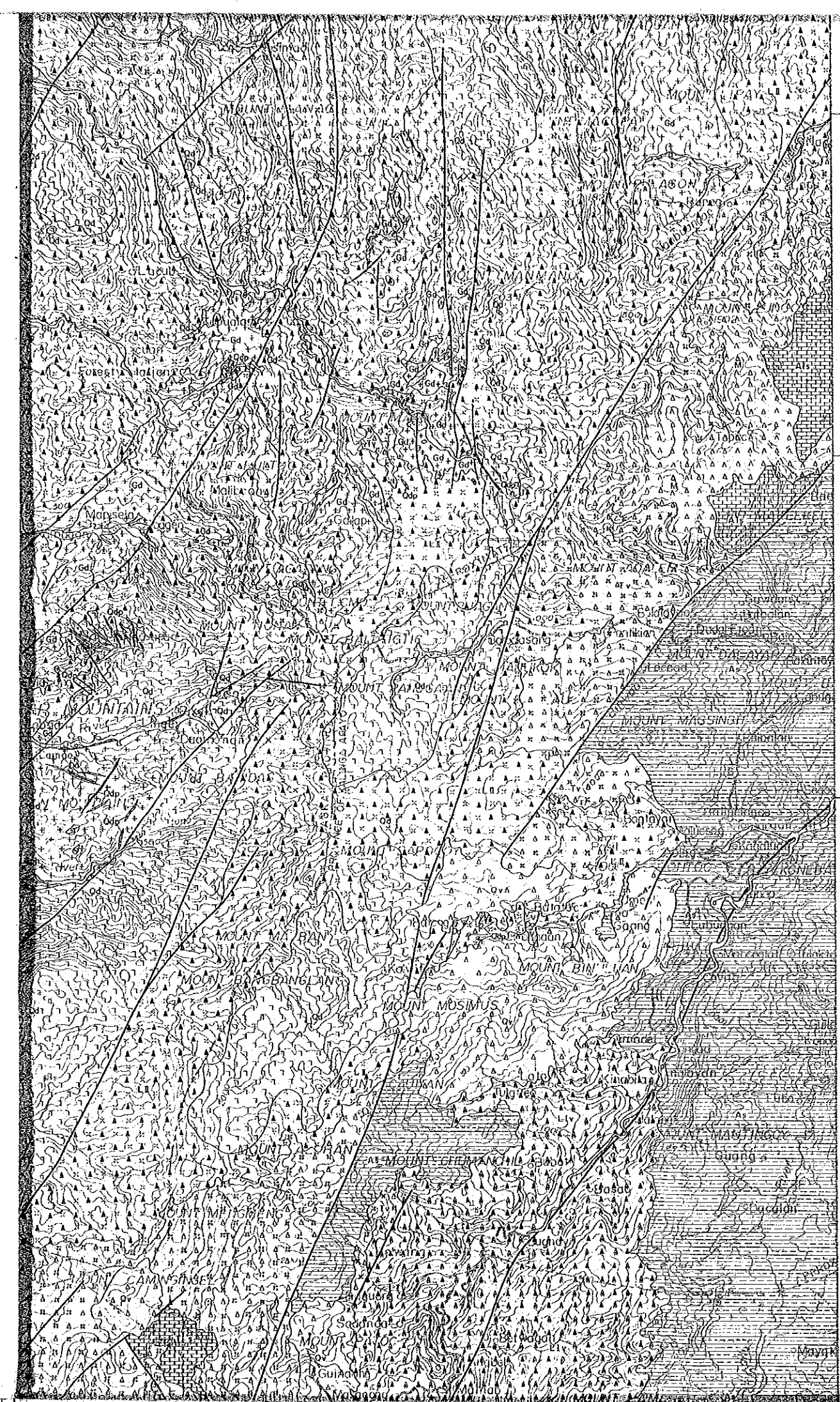


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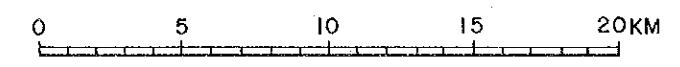


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Quaternary	Alluvium	Q
	Quaternary volcanics	Qv
Tertiary	Nogona	
	Alava Formation	Als
	Mobaca Formation	M
	Tineg Formation	Tv
Paleogene	Licuan Group	
	Licuan Formation	Lls
Dikes	Dike	Da
	Gph	Gph
	Qdp	Qdp
	Dp	Dp
Plutonic rocks	Gd	Gd
	Qd	Qd
	Gb	Gb



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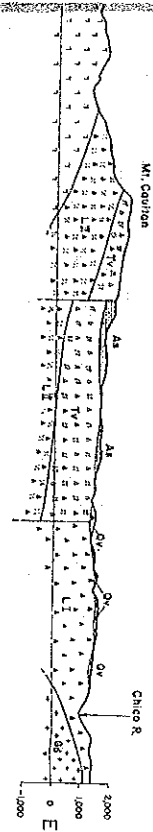
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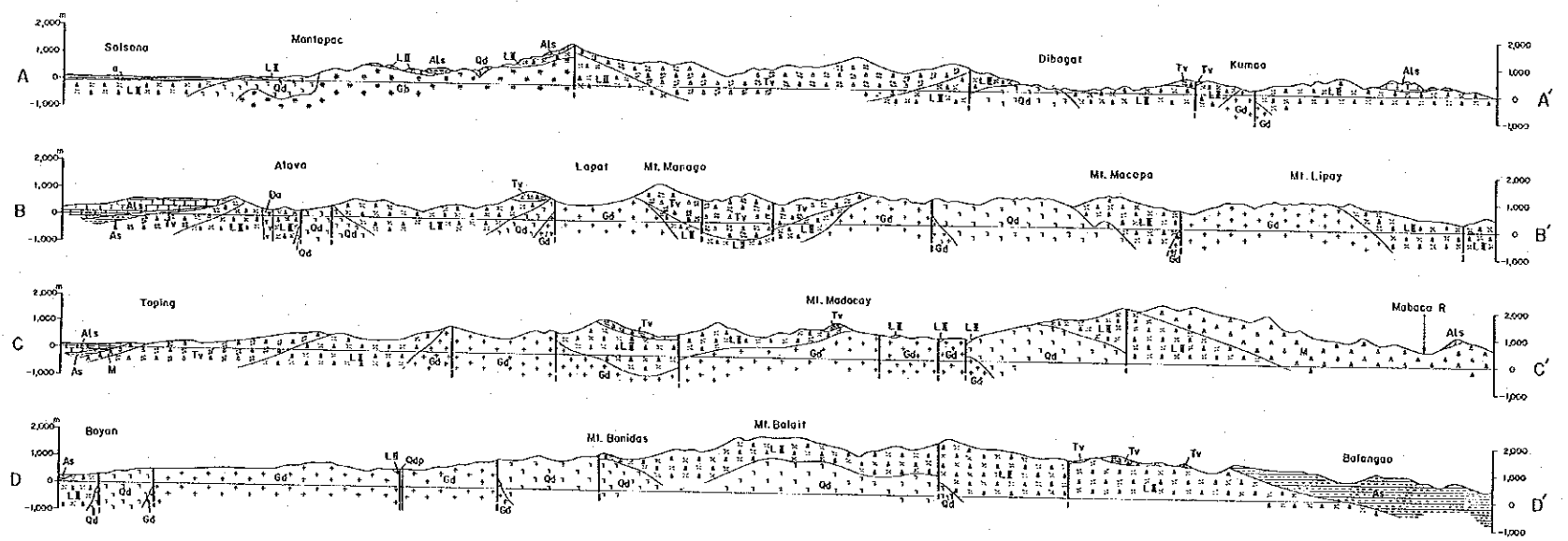
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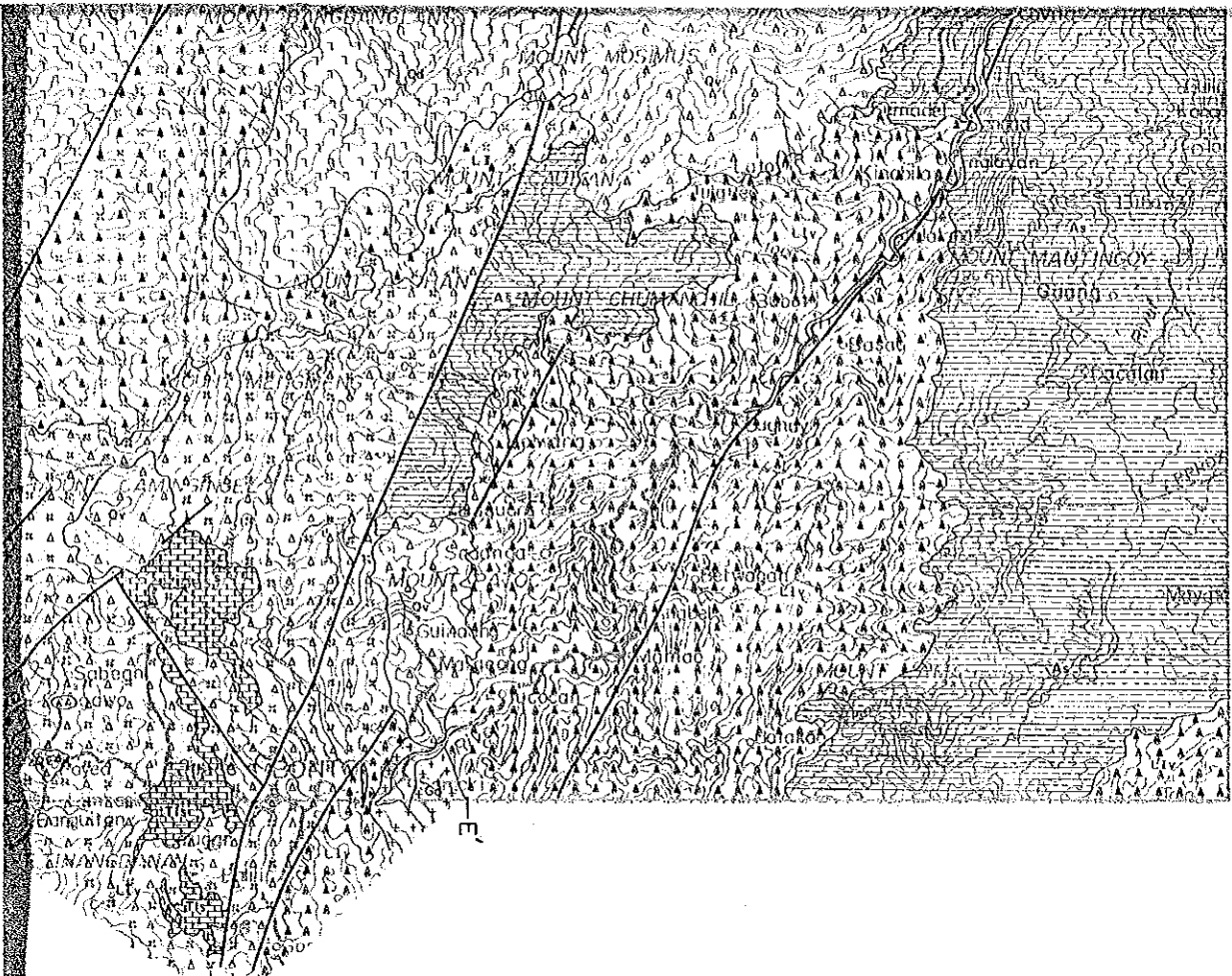
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Quaternary	Alluvium		gravel & sand
	Quaternary volcanics		dacitic to andesitic pyroclastics & lava
Neogene	Alava Formation		sandstone & mudstone with conglomerate
			limestone
	Mabaco Formation		andesitic pyroclastics with andesite lava, volcanic congl & tuffaceous sand
Tertiary			dacitic pyroclastics & dacite lava
	Tineg Formation		limestone
			andesite lava & its pyroclastics
	Luzon Group		basalt lava and pyroclastics
			thin bedded limestone
Dikes			dacite
			granophyre
			quartz diorite porphyry
			diorite porphyry
Plutonic rocks			granodiorite
			quartz diorite
			gabbro



Tertiary	Paleogene	Teng Formation	Tls	
		L-lean Group	Formations	L.II
				L.IV
	Formation	L.II		
Oligocene			Da	
			Gph	
			Oop	
			Dp	
			Gd	
Plutonic rocks			Gd	
			Gd	
			Gb	

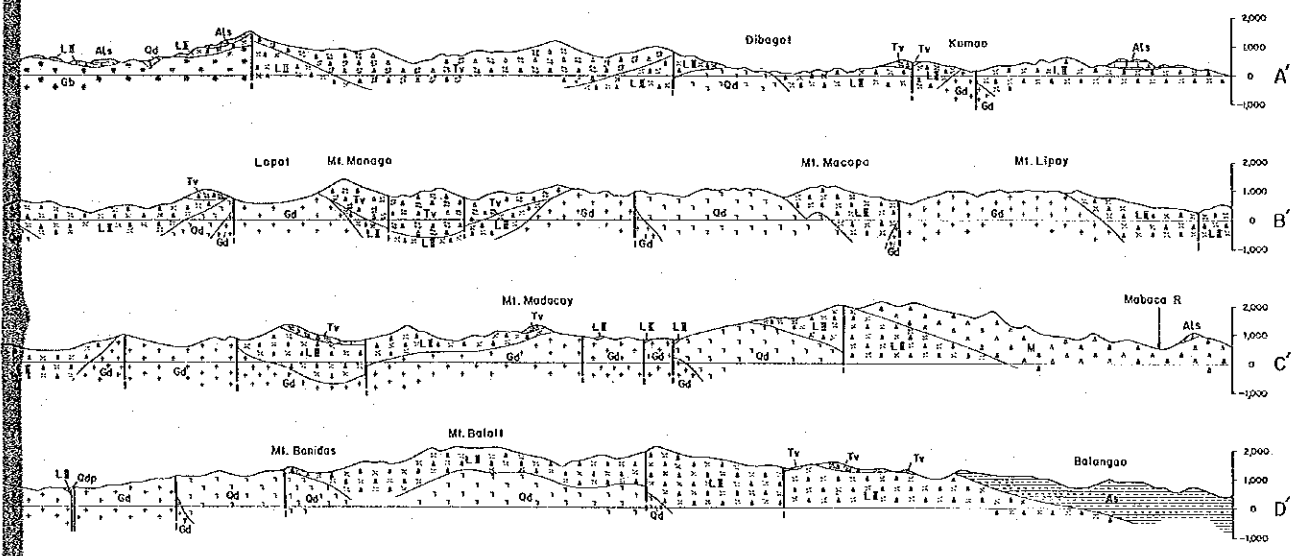




Palisades Group	Formation	Lls	limestone
		Llv	andesite lava & its pyroclastics
	Formation	Llv	basalt lava and pyroclastics
		Lls	thin bedded limestone

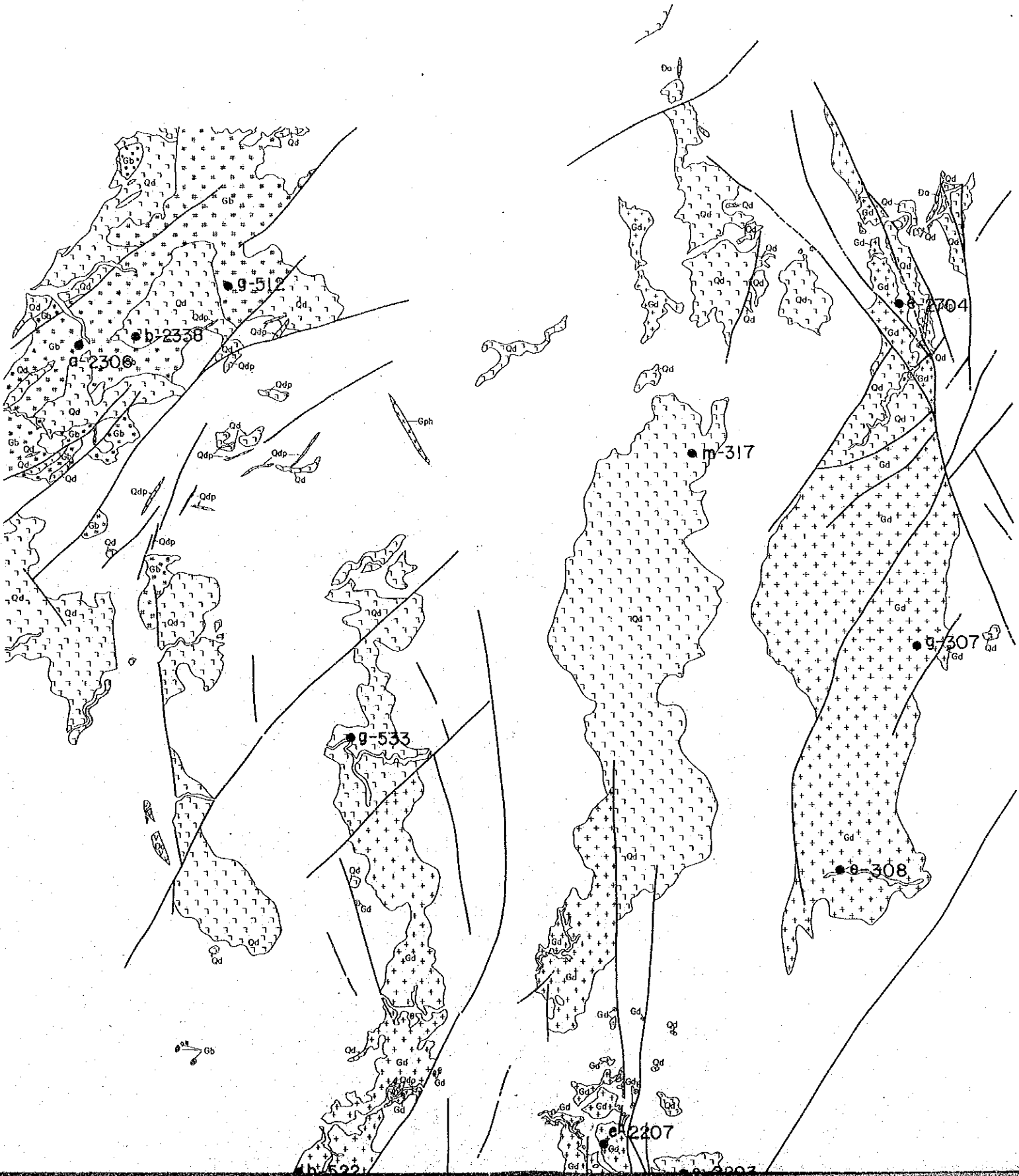
Dikes	Da	dacite
	Gph	granophyre
	Qdp	quartz diorite porphyry
	Dp	diorite porphyry

Plutonic rocks	Gd	granodiorite
	Qd	quartz diorite
	Gb	gabbro

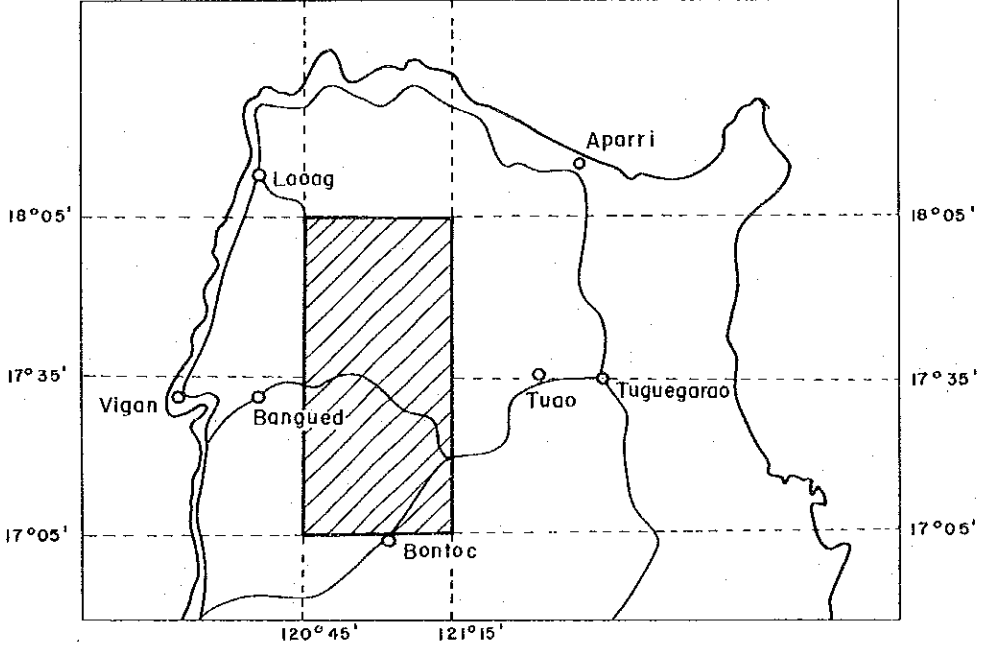


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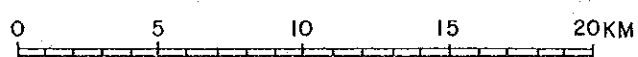
Location Map of Rock
Samples for Chemical Analysis,
K-Ar Dating



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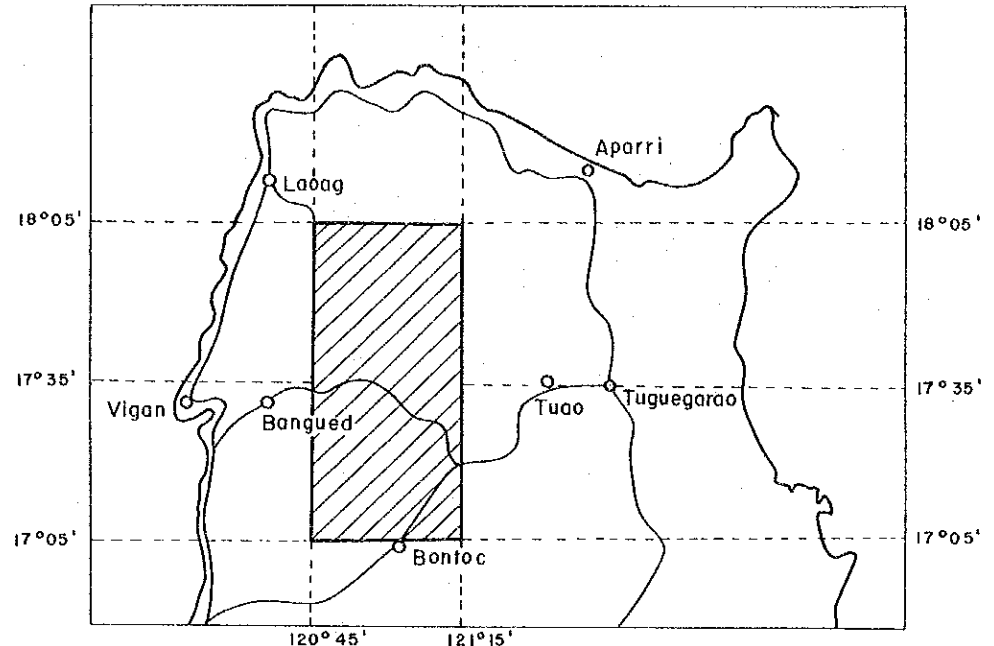


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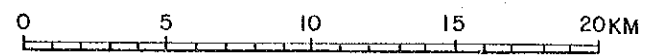


Samples for Chemical Analysis, K-Ar Dating

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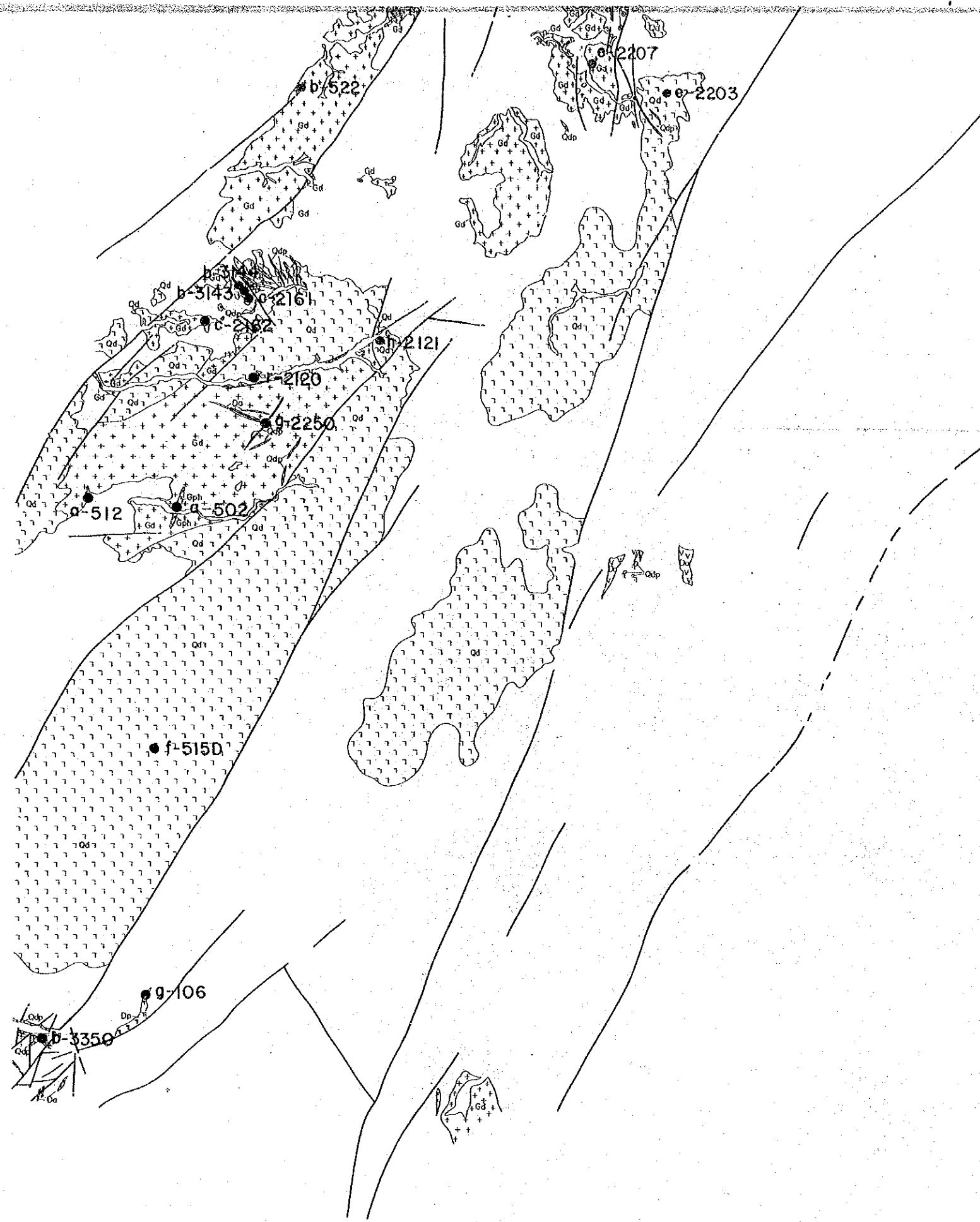
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● Rock Samples for K-Ar Dating and Chemical Analysis

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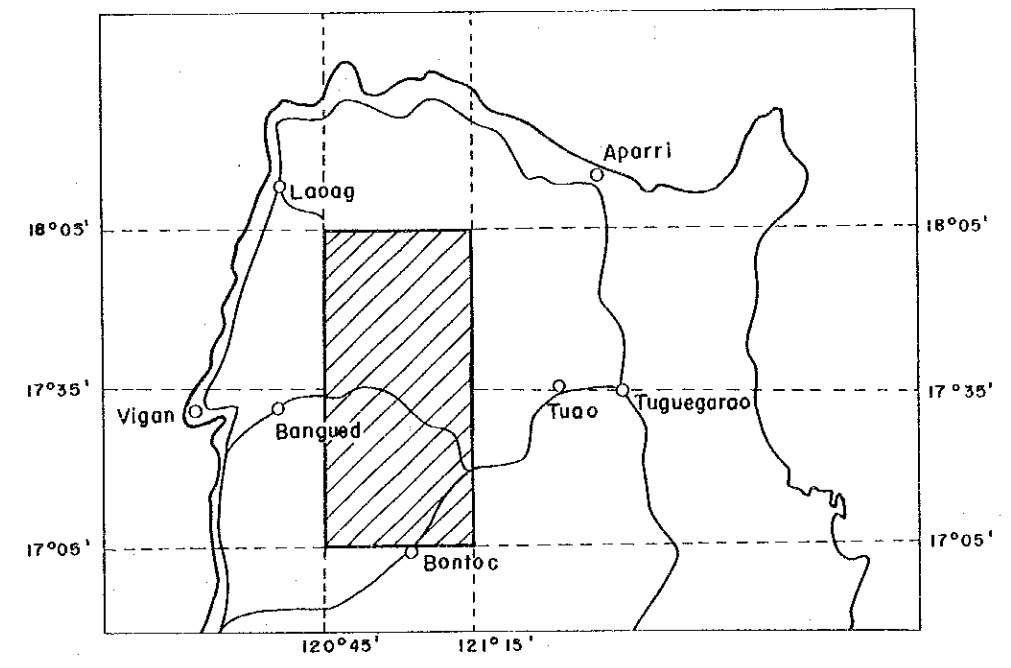
● Rock Samples for K-Ar Dating and Chemical Analysis

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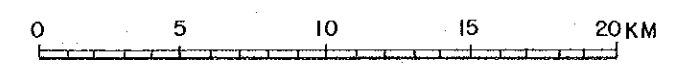
Geochemical Anomaly Map
in Phase I (Stream Sediments)



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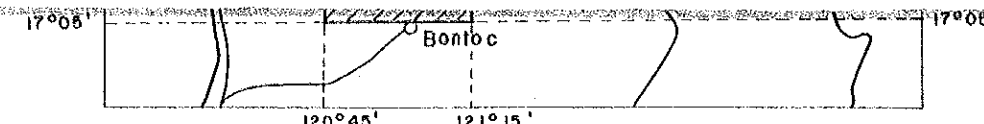
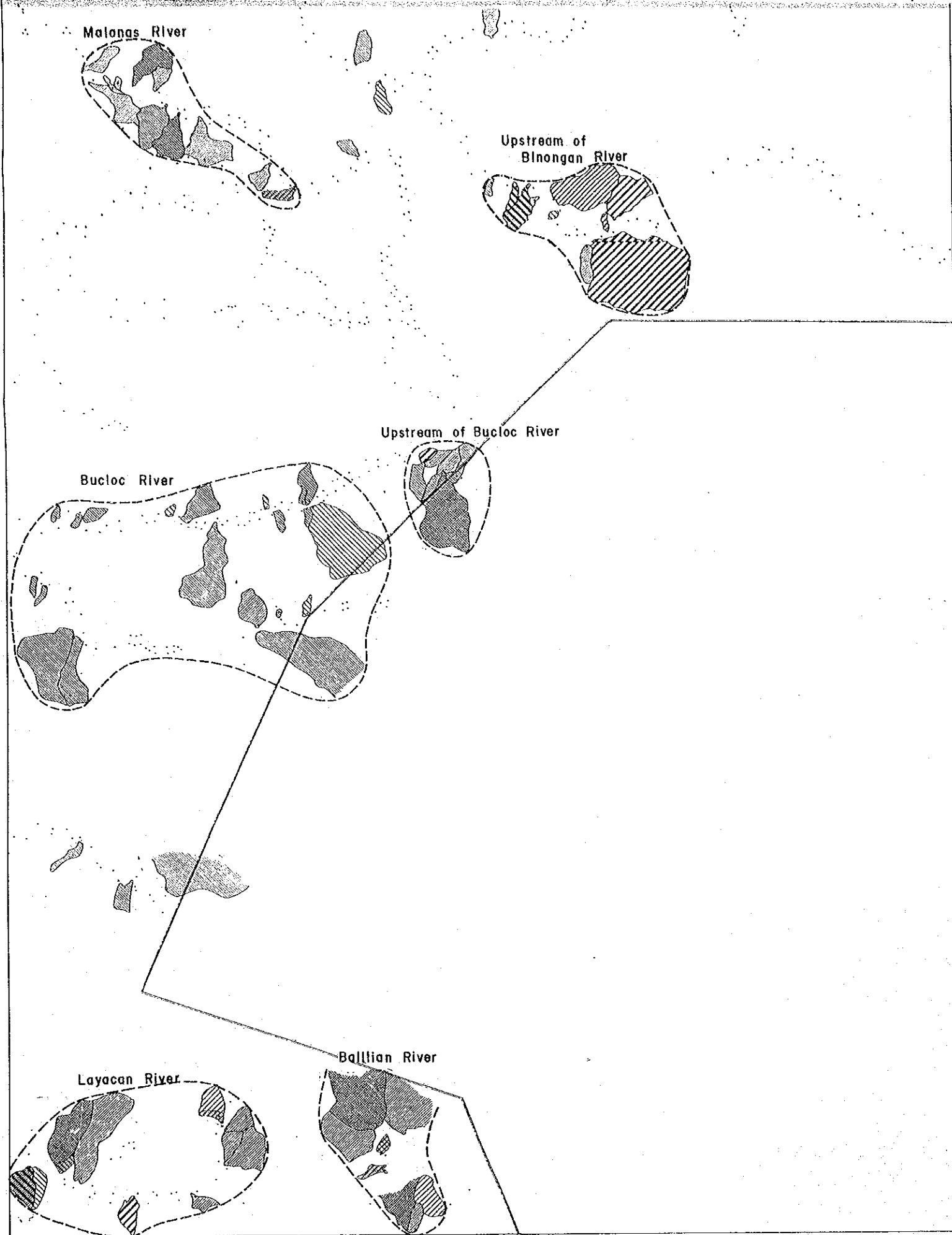


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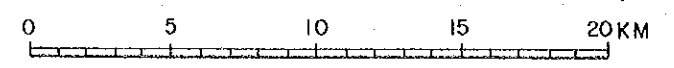


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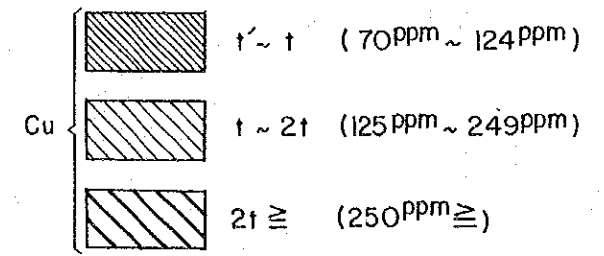
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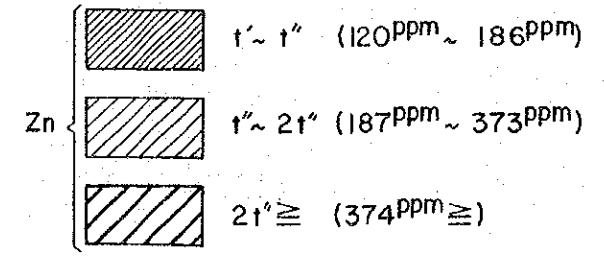
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Cu content in stream sediment sample



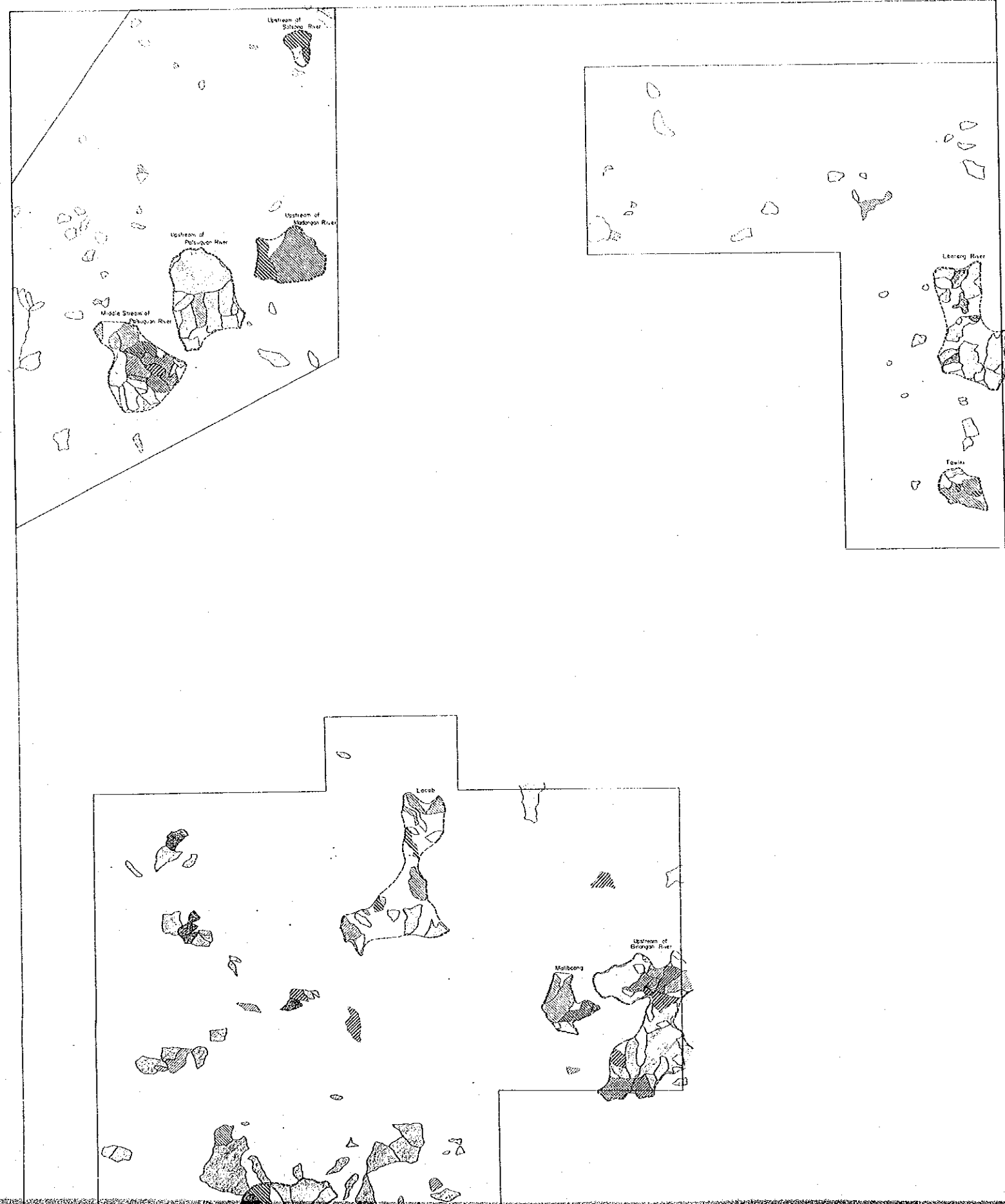
Zn content in stream sediment sample



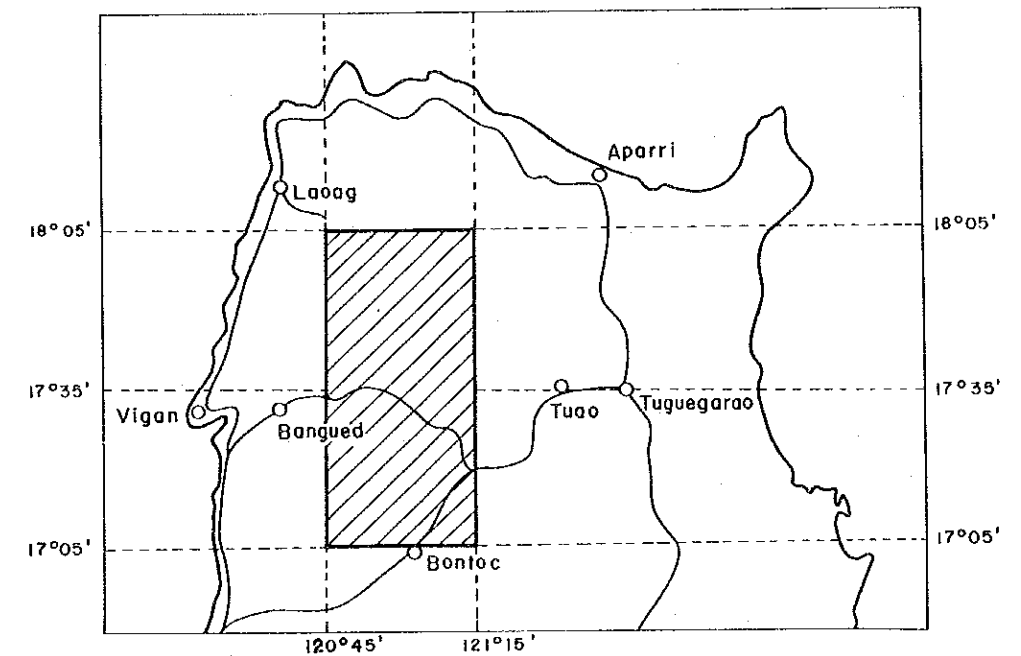
- sample location
- anomalous zone
- boundary of unfeasible area for field survey

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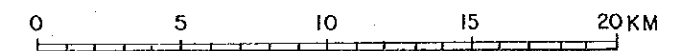
Geochemical Anomaly Map
in Phase II (Stream Sediments)



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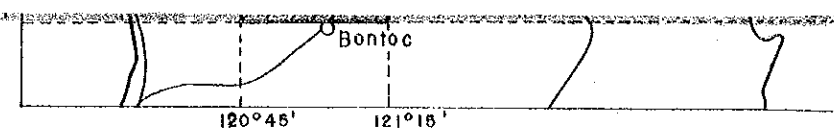
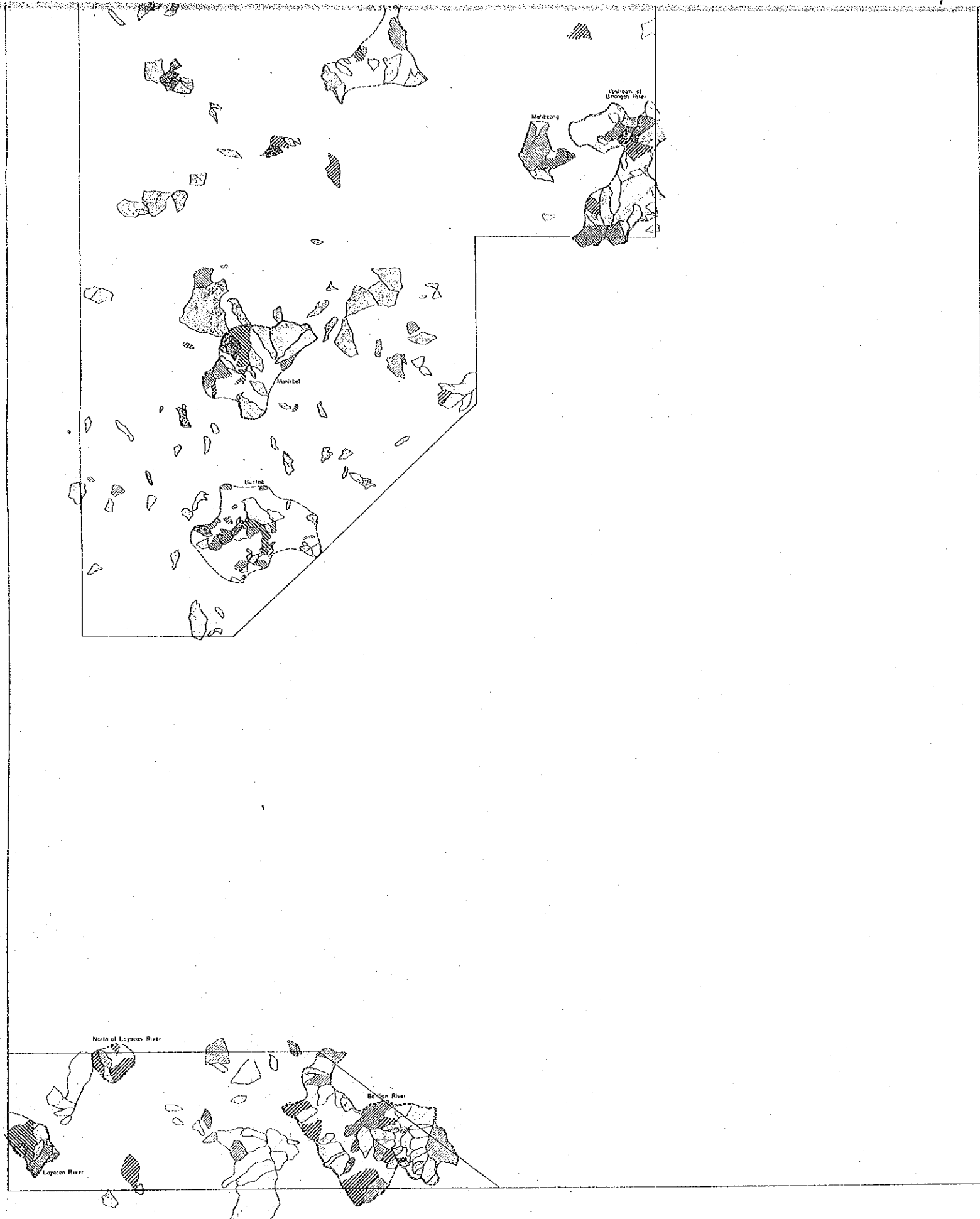


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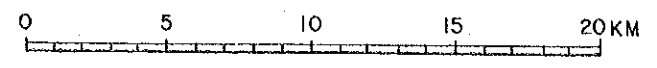


METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

September 1981



SCALE 1 : 250,000



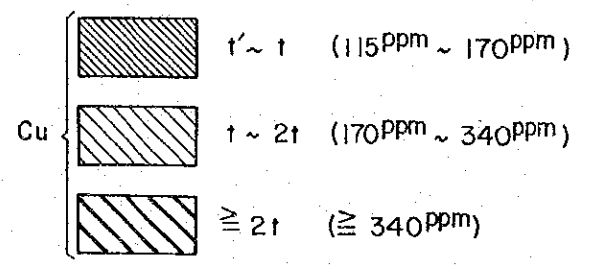
METAL MINING AGENCY OF JAPAN
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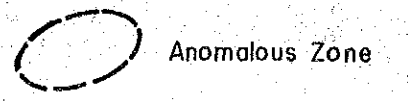
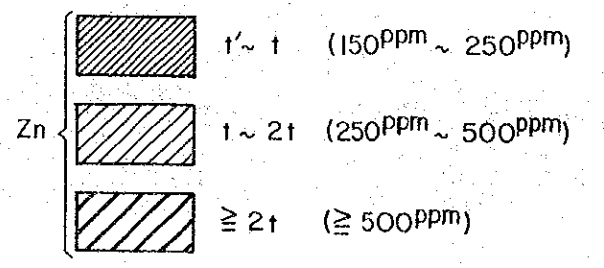
Prepared by Bishimetal Exploration Co., Ltd.

LEGEND

Cu content in stream sediment sample



Zn content in stream sediment sample



JICA