Table 7 Results of Factor Analysis in the Northeastern Palawan Area Factor Loadings (Foot note 1)

	1st Factor (F1)	2nd Factor (F2)
Cu	0.891	0.211
Pb	0.430	0.167
Zn	0.885	0.157
Ag	0.002	0.030
Sb	0.045	0.520
As	0.282	0.830
Hg	0.330	-0.029

(Foot note 1)

The table is shown the intension on relations of each element for factor.

ii) Calculation of factor score

Factor score of each sample is obtained by totalling each element value multiplied by factor weight. Factor score is classified by a class. (Table 8)

Table 8 Statistical Values of Factor Score in the Northeastern Palawan Area

	1st Factor (F1)	2nd Factor (F2)
$\bar{x}$	0	0
1 σ value	1.0	1.0
1.5 σ value	1.5	1.5
2 σ value	2.0	2.0
Maximum	2.388	3.413
Minimum	-3.397	-2.645

4-2-2 Analysis for Heavy Mineral Samples

1) Analytical Method

A total of 120 heavy mineral samples were collected in the Northeastern Palawan Area. Statistical analysis was carried out on the microchemical analysis results. These samples were taken from down side of the junction of streams. They were reduced from 3 kg to 20 grams by panning in each places. On these samples, microchemical analysis for Au, Ag and Ga were carried out by atomic absorption method similar to the stream sediment samples analysis. The results of this are shown in Appendix 10.1.2.

Logarithmic normal dispersion, mean value and standard deviation were calculated. A threshold value of 1.5 σ has been classified from the data.

The statistical values are shown in Table 9.

Table 9 Statistical Values on Geochemical Analysis of Heavy Mineral Samples in the Northeastern Palawan Area

	$\bar{x}$ value	1σ value	1.5σ value	2σ value	Maximum	Minimum
Au (ppb)	213	1,305	3,228	7,011	9,600	10
Ag (ppb)	63	138	205	303	720	50
Ga (ppm)	1.243	1.783	2.135	2.587	3.60	1

2) Identification of constituent minerals of heavy mineral samples

Constituent minerals are classified by binocular microscope on random 10 specimens (Taytay area 5 and Roxas area 5). Quartz is recognized as main constituent mineral and other constituent minerals are in the order of chromite, plagioclase and hematite.

Details are shown in Table 10.

Table 10 Constituent Minerals of Heavy Mineral Samples in the Northeastern Palawan Area

(Unit ; %)

Order	1	2	3	4	5	6	7	8	9	10	11	12
Mineral Name	Quartz	Chromite	Plagioclase	Hematite	Rock fragment	Zircon	Potassium feldspar	Pyroxene	Mica	Iron Oxide	Magnetite	Others
Range	65 - 1	85 - 2	20 - 2	25 - 1	12 - 2	20 - 1	7 - 3	5 - 1	8 - 1	2 - 1	2 - 1	
Mean	43.7	20.0	10.7	5.0	4.4	3.7	3.7	2.5	2.1	1.3	0.6	2.3

4-2-3 Local Distribution of Anomalous Values

1) Univariate analysis for stream sediment samples

Anomalous values in each lithological code are classified in following limit.

These classified anomalous values were plotted in 1 : 250,000 scale sample locality map with symbol ●, ▲ and ■.

Local features of anomalous value in each elements are shown in the map on distribution of anomalous value. (attached map 5-1·5-2)

Analytical Value (Z)	Symbol
1 σ value $\leq$ Z < 1.5 σ value	●
1.5 σ value $\leq$ Z < 2 σ value	▲
2 σ value $\leq$ Z	■

Cu; Accumulation zones of high and middle anomalous values are observed in Tumarbong semi schist at east side of Babuyan, east-northeast side of Roxas and north side of Taradungan. Other small scale accumulation zones of anomalous values are observed in the same rock at south side of Barton, south side of Imuruan Bay.

Pb; Small scale accumulation zones of high and middle anomalous values are observed in granodiorite at south side of Darocotan Bay in the most northern part of Palawan Island, at 10 kms northwest side of Pancol. Other accumulation zones of anomalous values are observed in the same rocks around Jaradungan in 20 kms east-northeast side of Roxas, around Bay Peak of eastern Imuruan Bay, east side of Babuyan and south side of Barton.

Zn; Accumulation zones of high and middle values are observed in Tumarbong semi schist at north side of Taradungan at 20 kms east-northeast side of Roxas, south side of Barton and east side of Babuyan.

Sb; Large scale accumulation zones of high and middle anomalous values are observed in Tumarbong semi schist at east side of Danleg and Dumaran Island located on the opposite shore of Danleg. Other small scale accumulation zones of high and middle anomalous values are observed in the same rocks at south and east sides of Barton in north coast and in turbidite at north side of Babuyan in south coast.

As; Large scale accumulation zones of high and middle anomalous values are observed in Danleg semi schist at west side of Danleg in east coast of northern part, southern and eastern parts of Barton in north coast of central part, in Caruray crysalline schist around Tinitan at 33 kms east side of Babuyan in south coast and in turbidite at north side of Babuyan. Other middle scale accumulation zone is observed in Bacuit formation at east side of El Nido in west coast of northern part.

Hg; Accumulation zones of high and middle anomalous values are observed in Caruray crystalline schist around Tinitan at 33 kms east side of Babuyan, in Tumarbong semi schist at south side of Barton and east side of Babuyan and in turbidite at north side of Babuyan. Other accumulation zones of anomalous values are observed in Bacuit formation at northern part, in Liminangcong formation at Batas, Maytiguid, Calabugdong, Maobanen Islands.

Sn; Accumulation zones of high anomalous values are observed in Tumarbong semi schist from northern part to northeastern part of Roxas, at east side of granodiorite body in western Mt. Copoas of northern Imuruan Bay. Other accumulattion zones of high and middle anomalous values are observed in Liminangcong formation and Bacuit formation at its north side.

W; Accumulation zones of high anomalous values are observed in Tumarbong semi schist at east and south sides of Roxas, in Ginlo formation at east side of Mabini in east coast of northern part. Other accumulation zones of high and middle anomalous values are observed in Liminangcong formation and Bacuit formation in northern part.

2) Factor analysis (Multivariate analysis) for stream sediment samples

Factor scores are classified within following limit. These calssified anomalous values are plotted in 1 : 250,000 scale sample locality map with symbol ●, ▲ and ■.

Local features of anomalous values in each factor are shown in the map on distribution of anomalous value. (attached map 5-1·2)

Factor Score	Symbol
1σ value ≦ S < 1.5σ value	●
1.5σ value ≦ S < 2σ value	▲
2σ value ≦ S	■

First factor (F1) ; This factor has a strong relation to Cu, Pb, Zn, Hg elements. Accumulation of high, middle and low anomalous values are observed in turbidite at north side of Babuyan. Other middle and low anomalous zones are observed in Tumarbong semi schist at south side of Barton at 20 kms east-northeast side of Roxas and Liminangcong formation at north side of Pancol.

Second factor (F2) ; This factor concerns As, Sb elements. Accumulation of high and middle anomalous values are observed in Tumarbong semi schist at north side of Danleg in east coast of northern part, south side of Barton in north coast. Other accumulation of many anomalous values are observed in the same rocks at north side of Roxas. Middle and low anomalous values are distributed in Bacuit formation, Ginlo formation at east side of El Nido in west coast. In Liminangcong formation, many anomalous values are observed at west side of Malampaya Strait. Accumulation of many anomalous values are observed in Babuyan River turbidite formation around Babuyan, around Mt St. Paul of its north side and northeast side of Barton in north coast.

3) Univariate Analysis for Heavy Mineral Samples

Extracted anomalous values from statistical procedure are classified below. These classified anomalous values are plotted with symbol ● , ▲ and ■ on 1 : 250,000 scale sample location map distributed. Features of anomalous value in each elements are shown in the map on distribution of anomalous value. (attached map 7)

Au; High anomalous value is observed in Tumarbong semi schist at 22 kms west side of Danleg in east coast and middle anomalous value is seen in the same rocks at 19 kms west side of Danleg.

Ag; High anomalous value is observed in Tumarbong semi schist at 22 kms west side of Danleg and middle anomalous value is seen in the same rocks at 19 kms west side of Danleg.

Ga; High anomalous values are observed in Bacuit formation near Sibaltan of east coast in the most northern part, in Liminangcong formation at south side of Port Catoaba and 7 kms south side of Port Catoaba in west coast, and in Tumarbong semi schist at central coast of Imuruan Bay in west coast. Middle anomalous values are seen in Bacuit formation near Sibaltan, in Liminangcong formation at central part of Maytiguid Island in east shore.

4-3 Geochemical Survey in the Southwestern Palawan Area

4-3-1 Basic Statistical Data

1) Statistical value in each lithological code

Stream sediments in the Southwestern Palawan Area are divided into following 9 populations (lithological code) according to the geochemical feature of country rocks.

Lithological Code	Contents	Sample Number
QA	Alluvium	295
N2S	Upper Miocene calcareous sandstone, mudstone	150
N2L	Lower Miocene limestone, calcareous mudstone	16
KPG	Cretaceous metasedimentary rocks	357
BC	Palaeozoic metamorphic rocks	13
KB1	Basaltic rocks (upper volcanic rocks)	29
KB2	Basaltic rocks (lower volcanic rocks)	174
KGA	Gabbroic rocks	315
UC	Ultrabasic rocks	783
MMS	Mylonitic rocks	15
	Total	2,147
	Duplicate samples	33

The statistical values in each lithological code are shown in the following table. (These values are calculated by logarithmic base and transferred to natural base.) All analytical values of Ag are sHown as -1 ppm. Ag is excepted from statistical analysis.

Lithological code ; QA
Number of Samples 295 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
$\bar{x}$	16	5.3	32	39	365	530	0.6	24	12,232	
1 σ value	33	6.8	48	101	1,667	1,074	1.7	50	74,249	
1.5 σ value	47	7.7	60	163	3,565	1,528	3.0	82	182,928	This value estimate as threshold
2 σ value	68	8.7	73	266	7,621	2,173	5.1	102	450,680	
Maximum	108	21.0	84	320	3,100	2,380	45	101,000	270,000	
Minimum	2	5.0	11	4	11	89	0.25	20	150	

Lithological code ; N2S
Number of Samples 150 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
$\bar{x}$	20	6.3	38	26	146	596	1.1	23	3,634	
1 σ value	35	9.8	58	44	368	1,269	3.7	32	13,066	
1.5 σ value	47	13.3	73	59	586	1,851	6.7	38	24,758	This value estimate as threshold
2 σ value	62	15.4	90	78	930	2,699	12.0	45	46,935	
Maximum	87	32.0	94	220	2,300	4,000	15.0	65	50,000	
Minimum	4	5.0	14	8	37	110	0.25	20	400	

Lithological code ; N2L
Number of Samples 16 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
$\bar{x}$	34	5.0	54	27	68	928	0.6	20	2,378	
1 σ value	54	-	81	35	99	1,485	1.4	-	7,056	
1.5 σ value	67	-	100	42	121	1,877	2.2	-	12,154	This value estimate as threshold
2 σ value	84	-	122	48	147	2,374	3.3	-	20,936	
Maximum	89	5.0	89	45	136	2,230	1.9	20	22,000	
Minimum	15	5.0	24	16	40	320	0.25	20	470	

Lithological code ; KPG

Number of Samples 357 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	20	8.8	53	11	169	474	2.2	138	640	
1 σ value	31	14.9	71	28	520	752	3.3	698	5,196	
1.5 σ value	38	19.2	84	46	911	946	4.0	1,567	14,806	This value estimate as threshold
2 σ value	47	25.1	98	72	1,597	1,191	4.8	3,518	42,194	
Maximum	72	30	138	480	4,100	3,000	5.1	99,999	78,000	
Minimum	3	5	14	1.5	1.5	90	0.25	20	50	

Lithological code ; BC

Number of Samples 13 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	25	5.8	45	31	311	564	0.5	20	7,310	
1 σ value	34	8.3	65	53	905	712	1.1	-	24,373	
1.5 σ value	40	10.0	73	70	1,546	799	1.7	-	44,507	This value estimate as threshold
2 σ value	47	12.0	90	91	2,640	898	2.6	-	81,272	
Maximum	47	15.0	80	65	961	950	2.4	20	32,000	
Minimum	17	5.0	27	9	31	390	0.25	20	340	

Lithological code ; KB1

Number of Samples 29 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	25	5.0	46	56	689	785	0.9	171	19,196	
1 σ value	59	-	75	83	1,671	1,219	3.9	3,033	64,756	
1.5 σ value	92	-	96	102	2,591	1,518	7.9	12,730	119,210	This value estimate as threshold
2 σ value	141	-	123	124	4,050	1,892	16.0	53,559	219,117	
Maximum	130	5.0	112	101	1,800	3,100	23.0	80,000	121,000	
Minimum	6	5.0	21	18	21	320	0.25	20	300	

Lithological code ; KB2
Number of Samples 174 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	43	5.3	87	44	457	1,051	0.8	63	3,794	
1 σ value	65	6.8	86	81	1,086	1,481	1.9	185	26,643	
1.5 σ value	79	7.7	103	111	1,674	1,771	2.9	317	70,604	This value estimate as threshold
2 σ value	97	8.9	121	151	2,579	2,107	4.5	543	187,101	
Maximum	164	23	200	400	4,200	3,800	22.0	22,300	150,000	
Minimum	8	5	22	22	32	420	0.25	20	120	

Lithological code ; KGA
Number of Samples 315 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	40	5.0	41	42	417	713	0.4	34	3,453	
1 σ value	61	-	59	80	946	1,096	0.8	91	23,220	
1.5 σ value	74	-	73	112	1,425	1,358	1.0	148	60,208	This value estimate as threshold
2 σ value	90	-	88	154	2,146	1,682	1.4	242	156,118	
Maximum	163	5.0	138	360	9,500	2,700	5.8	45,000	158,000	
Minimum	5	5.0	14	15	21	240	0.25	20	230	

Lithological code ; UC
Number of Samples 783 (Unit; ppm except Hg)

	Cu	Pb	Zn	Co	Ni	Mn	As	Hg (ppb)	Cr	Remarks
x̄	22	5.1	53	111	2,476	1,200	0.6	58	27,753	
1 σ value	35	5.8	78	210	4,191	1,828	1.1	116	80,050	
1.5 σ value	44	6.3	143	290	4,668	2,256	1.5	164	135,950	This value estimate as threshold
2 σ value	55	6.8	174	400	5,767	2,785	2.0	231	230,899	
Maximum	630	22	270	590	63,000	6,600	9	510,000	300,000	
Minimum	1	5	13	16	16	60	0.25	20	250	

Lithological code ; MMS

Number of Samples 15 (Unit; ppm except Hg)

	Cu	Pb	Zn	Ni	Mn	As	Hg (ppb)	Remarks
$\bar{x}$	15	6.0	39	522	625	1.6	71	
1 σ value	20	8.4	58	1,096	930	4.5	92	
1.5 σ value	24	10.1	62	1,588	1,134	3.1	104	This value estimate as threshold
2 σ value	28	12.0	72	2,301	1,383	3.9	119	
Maximum	57	17	79	2,600	1,290	5	156	
Minimum	6	5	23	7	130	0.5	20	

2) Histogram

Histograms for each element in each lithological code are made by logarithmic scale with 1/2 standard deviation unit as shown in Appendix 8.

Each histogram features for each element are as follows.

Cu; Histogram of copper for each lithological code show normal logarithmic dispersion. Low grade side dispersion is not enough. In code KB1, dispersion is not enough in high grade part.

Pb; Almost all samples are under detection limit of 10 ppm. Extreme accumulation of dispersion is observed at 5 ppm which is assumed grade of detection content. Histograms does not show normal logarithmic dispersion. Maximum value of 32 ppm is included in code N2S.

Zn; Except code KPG, histogram of zinc for each lithological code shows normal logarithmic dispersion. Dispersion is not enough in high grade part in code KPG.

Co; All histograms show normal logarithmic dispersion. In codes N2S, KB2, KGA, dispersions are not enough near mean value part.

Ni; Dispersion is not enough in low grade part. Excess accumulation is seen in high grade part. This tendency is strong in codes QA, N2S, KPG, KB2, KGA. In code UC, dispersion is enough in low grade part. It seems to cause secondary enrichment.

Mn; Histogram of Mn for each lithological code shows normal logarithmic dispersion. In code N2S, sufficient dispersion is seen near mean value part.

As; Almost all samples are under detection limit of 0.5 ppm. Extreme accumulation of dispersion is observed at 0.25 ppm which is assumed grade of detection content. Excess accumulation is seen in high grade part. Histograms do not show normal logarithmic dispersion. This tendency is strong in codes KPG, UC.

Hg; Almost all samples are under detection limit of 10 ppb. Excess accumulation is seen over threshold value of 103 ppb while extreme accumulation of dispersion is observed at 5 ppb which is assumed grade of detection content. This tendency is strong in codes KPG, KB1, UC. It seems to cause mineralization anomaly.

Cr; Dispersion is not enough in low grade part. Excess accumulation is seen near mean value part and in high grade part. This tendency is strong in codes QA, KGA, KPG.

3) Cumulative frequency

Cumulative frequency curves concerning above histograms are shown in Appendix 8. In each element these curves show transition point between mean value (M) + 0.5 σ and M + 2 σ. This justifies on estimate of M + 1.5 σ value as threshold.

Cu; On codes N2S, KGA, UC, transition points are observed at M + 2 σ value. On codes QA, KPG, BC, KB1, KB2, transition points are observed at M + 1.5 σ value. Its point on code N2L is observed at M + 1 σ value.

Pb; Histograms do not show normal logarithmic dispersion. Transition points are not clear. All samples are observed such transition points at M + 1.5 σ value on codes KPG, KB2.

Zn; Transition points are observed at M + 2 σ value on codes KPG, UC. On codes QA, N2S, BC, KB2, KGA, transition points are observed at M + 1.5 σ value. Its point on code KB1 is observed at M + 1 σ value.

Co; Transition points are observed at M + 2 σ value on codes QA, N2S. On codes KPG, KB2, KGA, UC, transition points are observed at M + 1.5 σ value. Its points on codes N2L, KB1 are observed at M + 1 σ value.

Ni; On code KGA, transition point are observed at M + 2 σ value. On codes KPG, KB2, UC, transition points are observed at M + 1.5 σ value. Transition points are observed at M + 1 σ value and M + 0.5 σ value on codes KB1 and N2S each.

Mn; Transition points are observed at M + 1.5 σ value on codes QA, KB2, UC. On codes N2S, KPG, BC, KB1, KGA, transition points are observed at M + 1 σ value. Its point is observed at M + 0.5 σ value on code N2L.

As; Transition points are observed at M + 1.5 σ value on codes KB2, KGA, UC. On codes QA, N2S, KPG, KB1, transition points are observed at M + 1 σ value. Its point is observed at M + 0.5 σ value on code BC.

Hg; Transition point is observed at M + 2 σ value on code QA. On codes N2S, KPG, KB1, KB2, transition points are observed at M + 1.5 σ value. Transition points are observed at M + 1 σ value and M + 0.5 σ value on COdes UC and KGA each.

Cr; Transition point is observed at M + 2 σ value on code KPG. On codes QA, N2S, N2L, KB2, KGA, UC, transition points are observed at M + 1.5 σ value. Its point is observed at M + 1 σ value on code KB1.

4) Correlation coefficient

Correlation coefficient betweeen elements for all samples is shown in Table 11. High correlation is observed between Pb and As, Zn and Mn, Co and Ni·Mn·Cr, Ni and Mn, Cr.

The correlation coefficient tables between elements in each lithological code are shown in Appendix.

Table 11 Correlation Coefficient between each Element in the Southwestern Palawan Area
Sample; 2,147

	Cu	Pb	Zn	Ag	Co	Ni	Mn	As	Hg	Cr
Cu	1.0000									
Pb	-0.0158	1.0000								
Zn	0.4207	0.3111	1.0000							
Ag	-0.0059	-0.0074	-0.0017	1.0000						
Co	0.2383	-0.4408	0.2081	-0.0037	1.0000					
Ni	0.0619	-0.4272	0.0883	-0.0035	0.9189	1.0000				
Mn	0.4536	-0.0738	0.5094	-0.0068	0.7791	0.6287	1.0000			
As	-0.2488	0.6308	0.1817	-0.0001	-0.5356	-0.4349	-0.2413	1.0000		
Hg	-0.0911	0.1411	0.1180	-0.0180	-0.2070	-0.1726	-0.1269	0.2877	1.0000	
Cr	-0.0945	-0.4757	-0.0556	-0.0042	0.7718	0.8718	0.4429	-0.4047	-0.1371	1.0000

4-3-2 Analysis for Heavy Mineral Samples

1) Analytical Method

A total of 139 heavy mineral samples were collected in the Southwestern Palawan Area, including 39 samples collected around mineral showings.

Statistical analysis was carried out on microchemical analysis results. These samples were taken from down side of junction of streams. They were reduced from 3 kg to 20 grams by panning in each places. On these samples microchemical analysis for Au, Ag and Ga were carried out by atomic absorption method similar to the stream sediment samples analysis. The results of this are shown in Appendix 10-2.

Logarithmic normal dispersion, mean value and standard deviation were calculated. A threshold value of 1.5 has been classified from the data.

The statistical values are shown in Table 12. The distribution of anomalous value is shown in attached map-9.

Table 12 Statistical Value of Geochemical Analysis of Heavy Mineral Samples in the Southwestern Palawan Area

	$\bar{x}$ value	1σ value	1.5σ value	2σ value	Maximum value	Minimum value
Au (ppb)	12.84	38.49	66.63	115.38	300	10
Ag (ppb)	51.56	60.26	65.14	70.42	100	50
Ga (ppm)	2.87	5.95	8.56	11.90	16.80	1

2) Identification of constituent minerals of heavy mineral samples

Constituent minerals are classified by binocular microscope on random 20 specimens. Chromite is recognized as main constituent minerals and other constituent minerals are in the order of magnetite, pyroxene and hematite. Details are shown in Table 13.

Table 13 Constituent Minerals of Heavy Mineral Samples in the Southwestern Palawan Area

(Unit ; %)

Order	1	2	3	4	5	6	7	8	9	10	11	12	13
Mineral Name	Chromite	Magnetite	Pyroxene	Hematite	Olivine	Amphibole	Plagioclase	Ilmenite	Quartz	Iron Oxide	Mica	Potassium feldspar	Zircon
Range	80 - 15	55 - 10	46 - 1	15 - 2	15 - 2	57 - 1	12 - 1	6 - 1	8 - 1	5 - 1	5 - 2	5 - 1	3 - 1
Mean	34	19	11	8	7	6	5	3	3	2	1	0.6	0.4

4-3-3 Local Distribution of Anomalous Values

1) Univariate analysis for stream sediment samples

Anomalous values in each lithological code are classified in following limit.

These classified anomalous values were plotted in 1 : 250,000 scale sample locality map with symbol ●, ▲ and ■.

Local features of anomalous value in each elements are shown in the map on distribution of anomalous value. (attached map 8-1·8-2)

Analytical Value (Z)	Symbol
1σ value $\leq Z <$ 1.5σ value	●
1.5σ value $\leq Z <$ 2σ value	▲
2σ value $\leq Z$	■

Cu; Accumulation zones of anomalous values are observed at north side of Puerto Princesa underlain by Palaeogene (Kgb, KpgS, Kba) where exposed in harzbergite as a window, and in harzbergite (Khz) of its north side. Other anomalous values are observed at north and west sides of Inaguan in south side of Puerto Princesa underlain by Kgb, Khz, and north side of the road to Aboabo from Panacan at the most southern part of survey are where exposed in Khz, Kgb, Kba.

Pb; Accumulation zones of anomalous values are observed in Kpgb at west side of Inaguan in central region, N2S at east side of Quezon located in the most southern part of survey area. Other anomalous values are observed in MMS at east and west sides of Ulugan Bay at the most northern part of survey area. These anomalous values show over 2 .

Zn; Distribution of anomalous values is recognized in all rock facies.

Accumulation of high and middle anomalous values are observed in Khz at north bank of Bacungan River, Isable River and in Kdb at south side of survey area.

Co; Accumulation of high and middle anomalous values are observed around harzbergite body from west side of Panacan to Long Point of northwest coast.

Ni; Accumulation of high and middle anomalous values are observed in harzbergite at north bank of Bacungan, south foot of Mt. Baheli and south foot of Mt. Airy in north side of Puerto Princesa, along Binansarian Bay at south side of Puerto Princesa, around harzbergite from west side of Panacan to Long Point of northwest coast and in N2S near Birong in south side of west coast.

Mn; Accumulation of high and middle anomalous values are observed at north side of Puerto Princesa underlain by palaeogene where exposed in harzbergite as a window, its north side underlain by harzbergite, around harzbergite in south side of Puerto Princesa, south limit of survey area underlain by upper ophiolite (Kba, Kgb) and south side of Quezon.

As; Accumulation of high and middle anomalous values are observed at north side of Puerto Princesa underlain by Palaeogene where exposed in harzbergite as a window and its north side underlain by harzbergite. Accumulation of anomalous values are observed in Kpgb of north side of Aborlan, around harzbergite at west and north sides of survey area, Kba around Quezon and its north side in south limit of survey area.

Hg; Accumulation of high and middle anomalous values are observed at north side of Puerto Princesa underlain by Palaeogene where exposed in harzbergite as a window and its north side underlain by harzbergite. Other accumulation of high and middle anomalous values are observed at belt range from north side of Aborlan to south side of Long Point and around Quezon.

Cr; Accumulation of middle and low anomalous values are observed around harzbergite in south side of survey area, south limit underlain by Kdb, Kba. Accumulation of high anomalous values are observed at 15 kms ENE side of

Birong at west coast underlain by Kba. Microchemical analysis for Cr collected by UNDP survey has not been carried out. Cr distribution in north side of Puerto Princesa is unknown.

2) Univariate Analysis for Heavy Mineral Samples

Extracted anomalous values from statistical procedure are classified below. These classified anomalous values are plotted with symbol ●, ▲ and ■ on 1 : 250,000 scale sample location map distributed. Features of anomalous value in each elements are shown in the map on distribution of anomalous value. (attached map 9)

Au; Almost all samples are under detection limit of 20 ppb. The sample collected in Malasgao mineral showing of nickel laterite at 18 kms NWN side of southern Panacan shows maximum value of 300 ppb.

Ag; Almost all samples are under detection limit of 100 ppb. The sample shown maximum value of 100 ppb is recognized near harzburgite small body surrounded by reverse fault passed through 13 kms north side of Aborlan of east coast.

Ga; 17 anomalous values are distributed along the gabbro body at west side of Puerto Princes, including 3 high and 6 middle anomalous values. Especially 2 high anomalous values of 16.8 ppm and 12.2 ppm are recognized near Penascosa Point of west coast.

5. SYNTHESIS

5. Synthesis

5-1 Summary

5-1-1 Geology and Structure

The northern and central parts of Palawan, which is located in the westernmost part of the Philippine Archipelago, were the area surveyed. Two lithological provinces corresponding to the northeastern and southwestern portion of the island had been recognized with the Ulugan Bay Fault being considered as the divided line. Northern parts are underlain by Pre-permian basement rocks which consist of schist, phyllite and semi-schist. Permian, Triassic and Jurassic units had also been encountered. Tertiary turbidites unconformably overlie these lithological units in the southern portion of this lithological province. On the otherhand, the southwestern part is assumed to be underlain by Cretaceous rocks which consist of green schist and quartz schist. These rocks are overlain by ophiolite suite which consist of harzburgite, dunite, gabbro, diabase and basalt. Post-Miocene limestone and sand stone were noted to cover the above mentions lithologies too. The ophiolite has been intensely deformed by stresses that are assumed to have originated from a NW-SE direction. Thrust faultings had juxtaposed hartzburgite and gabbro together.

North of Puerto Princesa, gabbros and basal crystalline schists were encountered as window outcrops in the harzburgite. The Kapoas Granite, the intrusion of which is assumed to occurred in the latter part of Jurassic and the Stripe Peak Granite, the intrusion of which is tentatively dated end of Paleogene are noted in the northeastern part. They have intruded Paleozoic and Mesozoic rock units. Paly Island off the coast of Calanag is basically made up of Cretaceous serpentinite. No intrusive has been noted especially in the southwestern part. However, mylonites have been observed along the tectonic line near the Ulugan Bay Fault.

5-1-2 Mineralization

The known metallic deposits in this survey area are mainly Ni and Cr (including Fe Partly) deposits accompanied the ophiolite at western part and Hg deposits near Tagburos north of Puerto Pricesa. In addition to these deposits Sb, Cu and Mn mineralization are also known. Non-metalic deposits are phosphate of the guano type found east of Quezon, limestone around Ulugan Bay at the central part and silica sand around Roxas at the northeastern part. Generally Ni and Cr deposits are seen around harzburgite body. Hg, Sb, Cu and other mineralizations are observed at the distribution area of the upper formation and its surroundings at windows north of Puerto Princesa.

5-1-3 Relationship between of the Geochemical Survey and Mineralization

1) Univariate analysis for stream sediment samples

In this survey, a total of 1,690 stream sediment samples at the Northeastern Palawan Area were collected and analysed by atomic absorption method for Cu, Pb, Zn, Ag, As, Hg, Sn, W, Sb and Mo. The results of this analysis and additional analysis of 1,679 stream sediment samples collected by UNDP survey in 1981 (analyzed elements; Cu, Pb, Zn, Ag, As, Hg, Ni, Bi, Sb and Mn) were treated by statistical univariate and multivariate analytical procedures. At the southwestern Palawan Area, a total of 1,560 stream sediment samples were collected and analysed by AAS for Cu, Pb, Zn, Ag, As, Hg, Ni, Cr, Co and Mo. The results of this analysis and additional analysis of 587 stream sediment samples collected by the UNDP survey on 1981 (analyzed elements; Cu, Ag, Zn, Ni, Mn, As, Sb and Hg) were treated by statistical univariate analytical procedure. The salient points with regard to the mineralization of the survey are:

1 Ni, Cr mineralization accumulate around harzbergite body.

2 Hg, Cr, Mn and Sb mineralizations accumulate at the distribution area of upper formation and its surroundings area as windows (UNDP/area) north of Puerto Princesa.

3 The unknown anomalous zone observed in Tumarbong semi-schist north of Taradungan, 20 kms ENE of Roxas turned to be a Cu anomalous zone with a showing of more than 20 high anomalous values. Other accumulations of high anomalous values of Zn, Sb, Hg, Sn and W are observed immediate surroundings of the Cu anomaly which are worthing of notice since they may be considered as polymetallic anomalous zone.

4 Similar polymetallic anomalous zone is observed in Babuyan River turbidite at east of Ulugan Bay of Stripe Peak (UNDP). Accumulation of Cu, Pb, Zn, Sb, As and Hg anomalous values are noted.

5 A small scale polymetallic anomalous zone is observed in the Tumarbong semi-schist south of Barton in middle north coast.
Accumulation of Pb, Zn, Sb, As and Hg anomalous values are noted.

The anomalous zones of 3, 4 and 5 show also accumulation of high and middle anomalous values at the results of multivariate analysis (factor analysis).

These anomalous zones (except 1) are located near normal and reverse faults. These faults are thought to have acted as passages of later polymetallic mineralizing fluids.

2) Univariate analysis for heavy mineral samples

The Au and Ag anomalous values of heavy mineral samples at the northeastern part are observed around above mentioned 3 anomalous zone. Accumulation of Ga anomalous value are noted in Bacuit formation at the northernmost part and at the Liminangcong formation at its southern side. No relation between the above mentioned anomalous zones and Ga anomalous zone had been noted.
As for the southwestern part, Au and Ag anomalous values are observed in and around the above mentioned 1 anomalous zone. Accumulation of Ga anomalous values is seen in the gabbro body west of Puerto Princesa. Anomalous values of Ga have no relationship with above mentioned anomalous zones.

5-1-4 Conclusion of Summary

Palawan I - IV Area is divided in two part, northeastern Palawan which is consists of mainly normal sediments and southwestern Palawan which is conformed mainly ophiolitic rocks. The mineralization of northeastern part is generally weak on the contraly, southwestern part has visible mineralization and actual operating chromite mine as Atlas, Richman and Boyo and suspended mercury mine are known.

The extracted anomalous zones which strongly corresponds to the known mineralization, geologic and tectonic setting of the area are as follows.

1) Ni, Cr and Co anomalous zone around harzburgite body in southwestern Palawan, many other anomalous values locate in Pliocene series, but these are neglected as the results of external material influence.

2) Hg, Cu, Mn and Sb anomalous zone in the tectonic window of upper ophiolite north of Puerto Princesa.

3) Cu, Zn, Sb, Hg, Sn and Hg poly-metallic anomalous zone at north of Taradungan 20 kms ENE of Roxas. Stratabound type deposit is expected.

4) Cu, Pb, Zn and Hg anomalous zone in Babuyan River turbidites at east side Ulugan Bay fault. In south side of this anomalous zone Stripe Peak diorite has intruded, therefor hydrothermal mineralization is expected.

5) Pb, Zn, Sb, As and Hg anomalous zone in Tumar Bong semi-schist at south of Barton in middlenorth coast. Stratabound type deposit is expected.

References

(1) Bureau of Mines and Geo-Sciences (1982); Geology and Mineral Resources of the Philippines. Volume One.

(2) Hashimoto W. (1982, 1983, 1984); Limestone deposit and its geology in Philippines (1 - 5); Sekkaiseki No. 196, No. 201, No. 203, No. 206, No. 208

(3) Hashimoto W. and Sato T. (1973); Geologic structure of North Palawan and its bearing on the geological history of the Philippines; Geology and Paleontology of Southeast Asia V. 13. P145 - 161

(4) United Nations Development Programme (1985); Technical Report No. 6, Geology of Central Palawan

(5) Celenk O., Flores R. AL., Cardiel G.C. and Hernandez F. (1984); Reconnaissance geochemical survey in Central Palawan United Nations-Bureau of Mines and Geo-Sciences, Internal Tech. Rept. GCR/84/20

(6) Metal Mining Agency of Japan; Extraction of mineral deposits from promissible area in Philippines Report of Geological Analysis Committee.

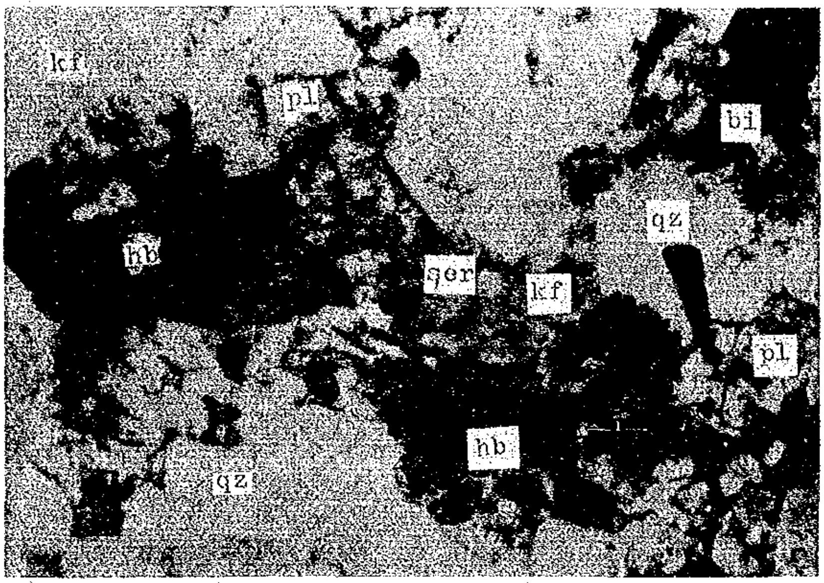
(7) Kanto Branch of the Mining and Metallurgical Institute
Society of Mining Geologist of Japan
Japan Mining Industry Association
(1982); Laterite, its nature and utility technique

(8) JICA
MMAJ
(1985); Report on the Mineral Exploration in the Republic of the Philippines. Phase One (Data Compilation)

APPENDICS

Appendix 1 Thin Section Micro-Photograph

APPENDIX 1
Microphotograph (Thin Section)
(Northern-Eastern Palawan)



kf; Potash feldspar
pl; Plagioclase
hb; Hornblende
bi; Biotite
gz; Quartz
ser; Sericite

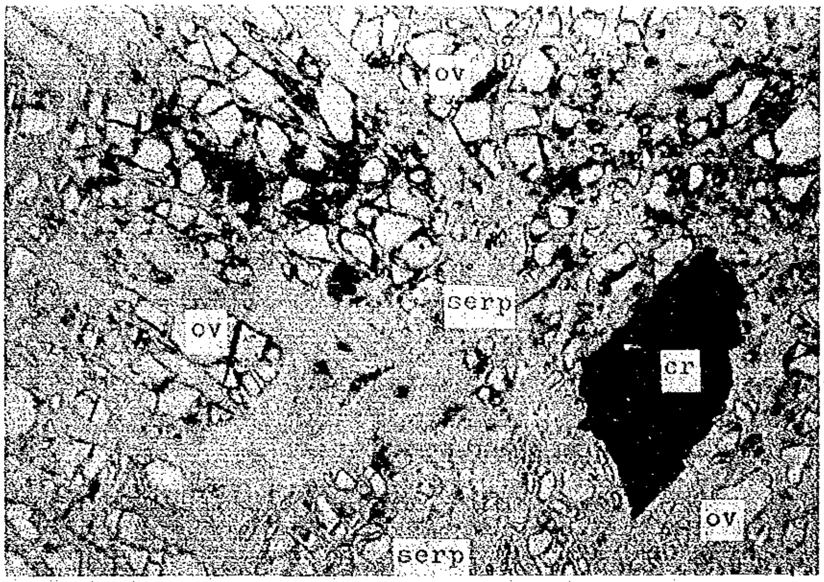
Parallel Nicol

0 0.5mm

Granodiorite (Sample No. NJR 18)
Locality; 8.5 Km NW Pancol of North Palawan
Main Mineral; Hornblende, Biotite, K-feldspar, Plagioclase, Quartz
Accessary Mineral; Opaque Mineral
Secondary Mineral; Sericite (in Feldspar), Chlorite (in Hornblende)
K-feldspare change to perthite

Crossed Nicol

0 0.5mm



ov; Olivine
serp; Serpentinite
cr; Chromite

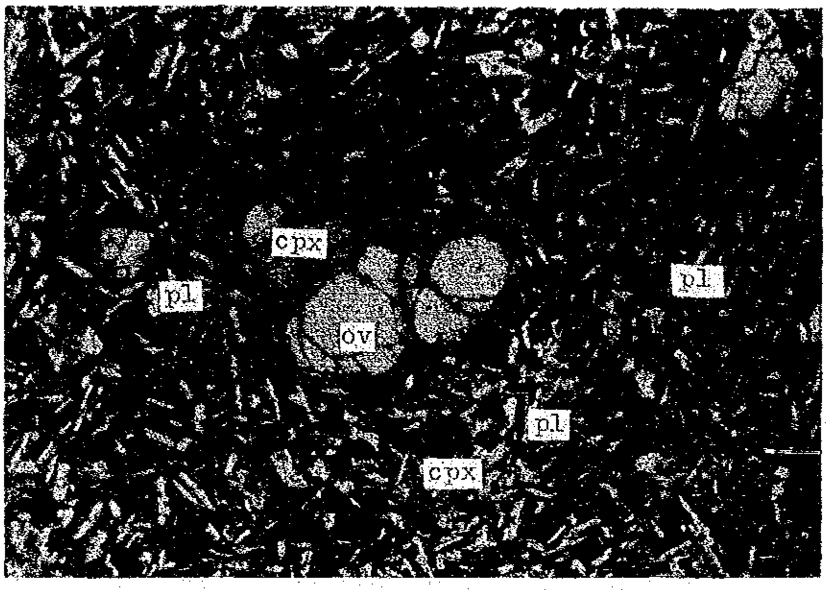
Parallel Nicol

0 0.5mm

Serpenitized Peridotite (Sample No. NE 11)
Locality; Paley Island East side of North Palawan
Main Mineral; Olivine, Orthopyroxene
Accessary Mineral; Chromite, Opaque Mineral
Secondary Mineral; Serpentine (Network in Olivine)
Carbonate, Limonite (Veinlet)

Crossed Nicol

0 0.5mm



pl; Plagioclase
cpx; Clinopyroxene
or; Olivine

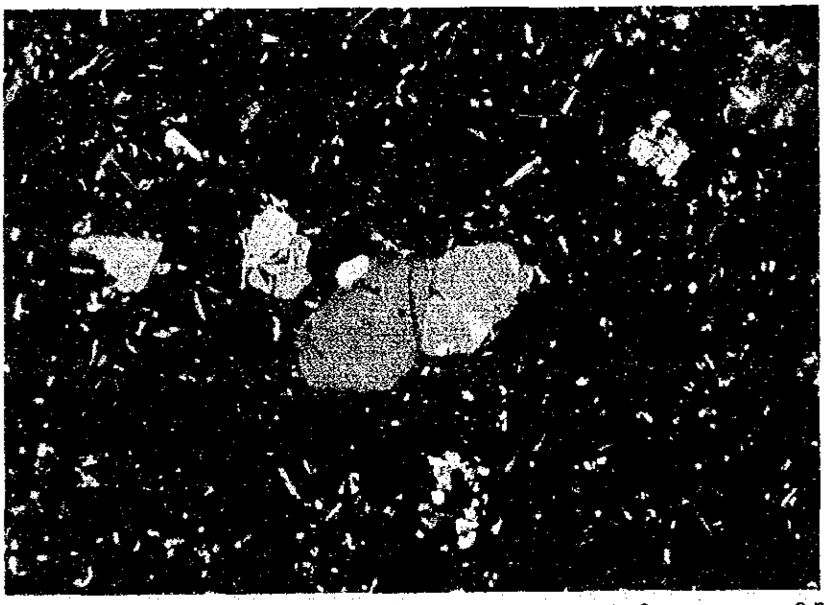
Parallel Nicol 0 0.5mm

Basalt (Sample No. NB004)

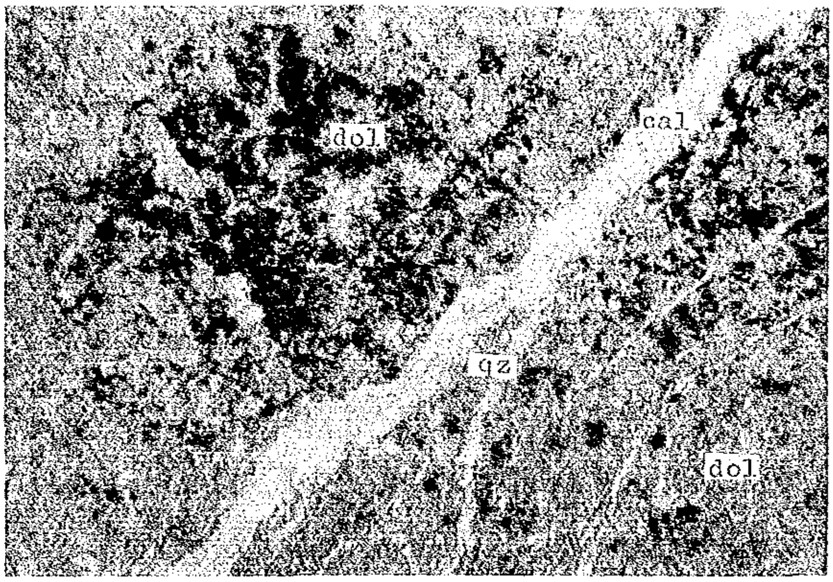
Locality; 10 Km Southeast Taytay in North Palawan

Phenocryst; Olivine (1 ~ 2 mm idiomorphic),
Orthopyroxene (-1.5 mm short columnar shape)

Groundmass; needle-like Plagioclase, small amount opaque mineral dark brown colored glass.



Crossed Nicol 0 0.5mm



dol; Dolomite
cal; Calcite
qz; Quartz

Parallel Nicol

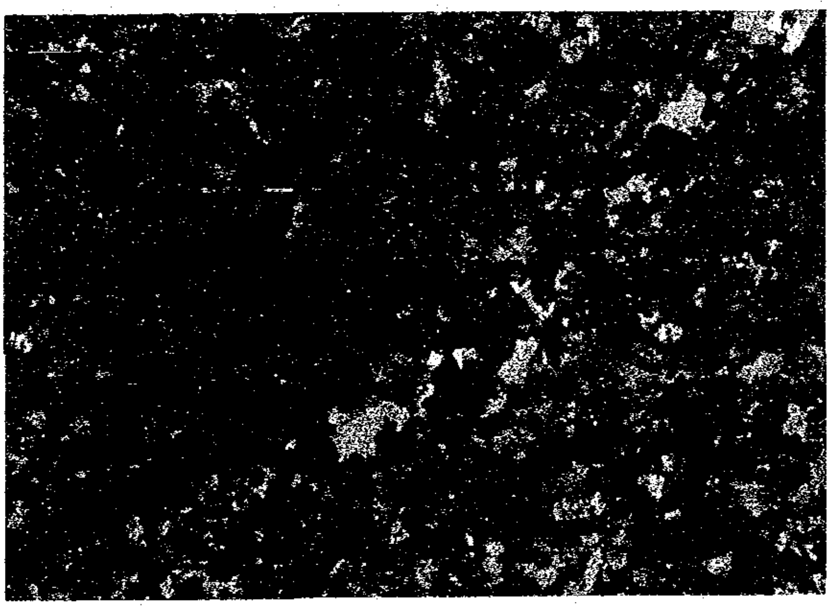
0 0.5mm

Magnesite (Sample No. NJR62)

Locality; Natinloc Is.,Western side of North Palawan

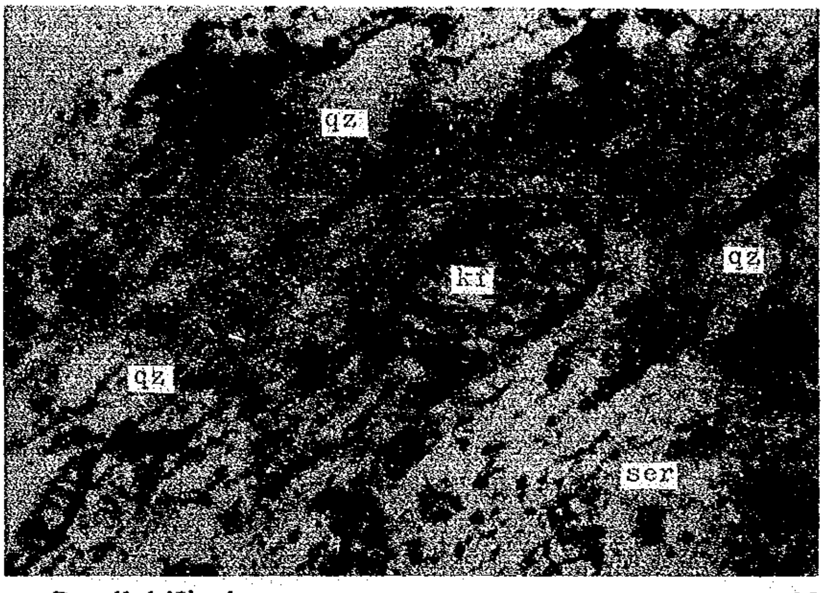
Main Mineral: Magnesite (0.1 mm pyramidal idiomorphic)
Calcite (irregular network inter grain of magnesite)
Quartz (disparse in calcite veinlet)

Some impulity small particles scatter in magnesite crystals



Crossed Nicol

0 0.5mm



qz; Quartz
kf; Potash feldspar
ser; Sericite

Parallel Nicol

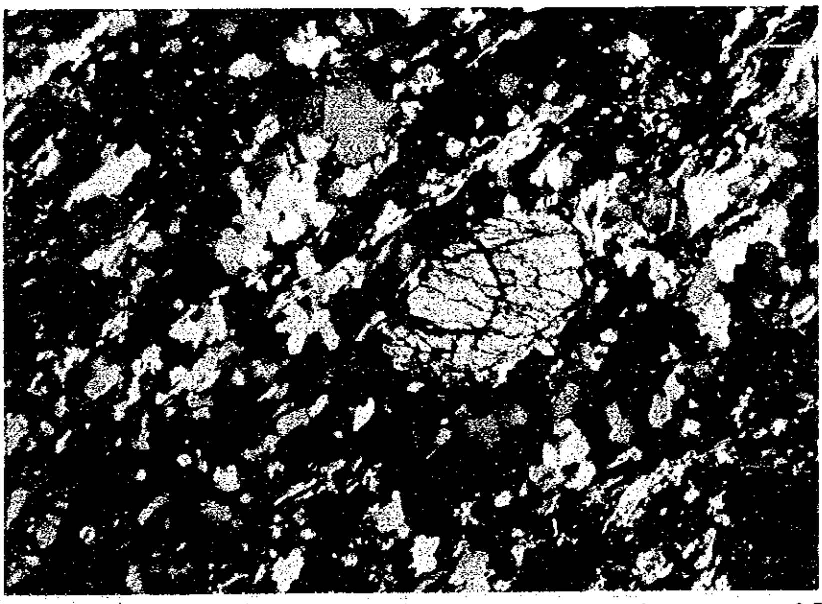
0 0.5mm

Silicious Schist (Sample No. NT075R)

Locality; 7 Km Southeast of Bokbok point West coast of North Palawan

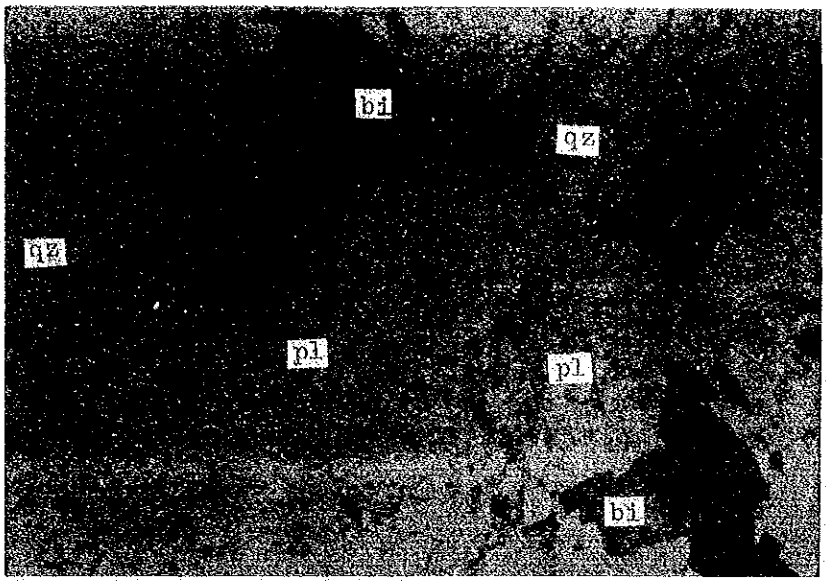
Main Mineral: Quarlz (0.05 ~ 0.1 mm size, granoblastic terxture result of recrystallization)
K-feldspar (-1 mm coast rounded crystal)

Secondary Mineral; Sericite, Clay mineral, Limonite



Crossed Nicol

0 0.5mm



qz; Quartz
pl; Plagioclase
bi; Biotite

Parallel Nicol

0 0.5mm

Quartz Diorite (Sample No. SW23R)

Locality; Southeast side of Capoas Peninsula, North Palawan

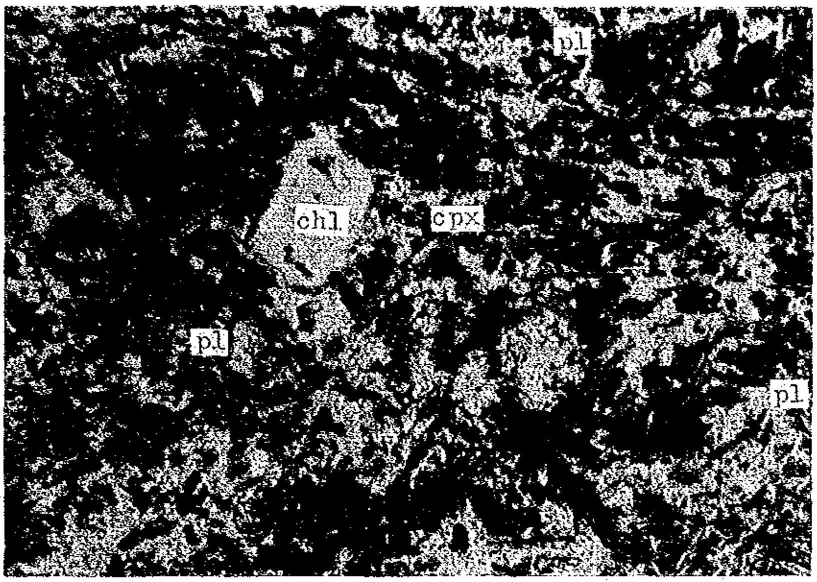
Main Mineral: Biotite (semi idiomorphic -2 mm)
Plagiochlase (semi idiomorphic -2.5 mm) zonal structure visible over 40% of crystals, component assumed as audesine quarlz (allotriomorphic -2 mm) shows 40% of all.

Accessory Mineral; Apatite, Zircon

Secondary Mineral; Chlorite, Epidote

Crossed Nicol

0 0.5mm



pl; Plagioclase
cpx; Clinopyroxene
chl; Chlorite

Parallel Nicol

0 0.5mm

Dolerite (Sample No. NX20R)

Locality; SE Side of Capoas Peninsula North Palawan

Phenocryst; Amygdaloidal shape phenocryst (-1 mm), which change complete to chlorite or chlorite fringed carbonate is visible.

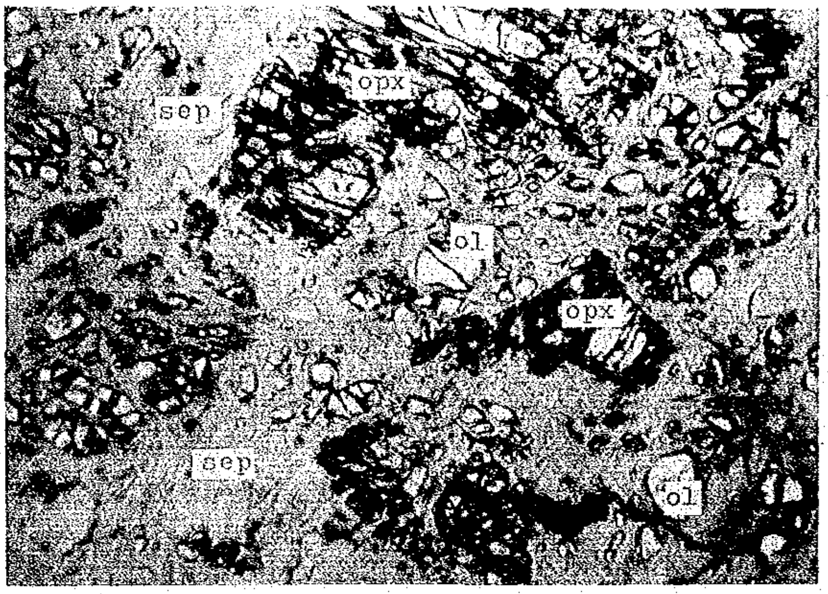
Groundmass: Shown intergranular or subophitic texture, consisted of needle-like plagioclase and columnar clino-pyroxene

Secondary Mineral; Epidote and quarlz partially occur in groundmass, prehnite veinlets are also visible

Crossed Nicol

0 0.5mm

Microphotograph (Thin Section)
(South-Western Palawan)



ol; Olivine
opx; Orthopyroxene
serp; Serpentinite

Parallel Nicol

0 1mm

Serpentinized Harlzburgite (Sample No. CE012)

Locality; 2 Km North of Atlas Mine, North Coast of SW Palawan

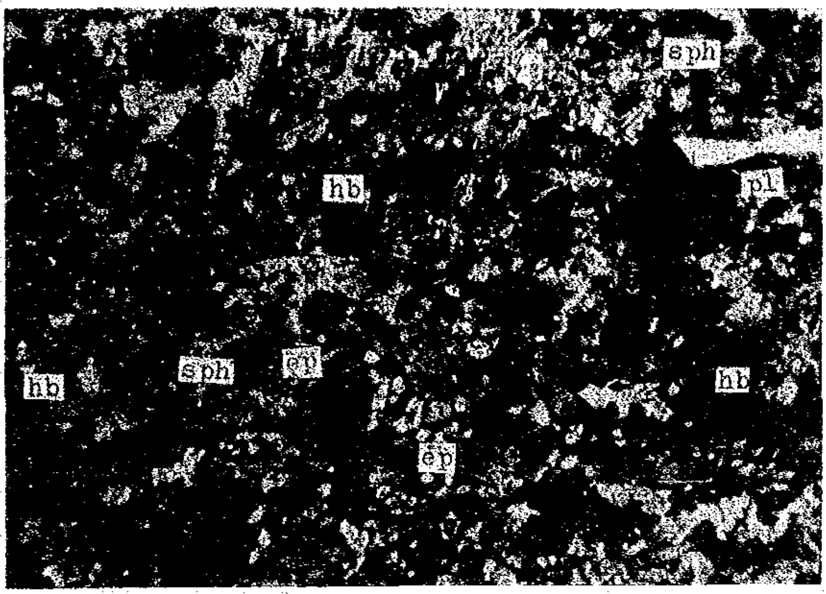
Main Mineral; Network Serpentinite
Olivine (0.05 ~ 0.2 mm size) and Orthopyroxene (0.5 ~ 4 mm) as rerict Mineral of Serpentinizaiton.

Accessary Mineral; Chromite (0.1 ~ 0.44 mm size)

Secondary Mineral; Serpentine (fibrous or platy), Opaque mineral (0.001 mm size)

Crossed Nicol

0 1mm



hb; Hornblende
sph; Sphane
pl; Plagioclase
ep; Epidote

Parallel Nicol

0 1mm

Epidote Hornblende Schist (Sample No. CJ004)

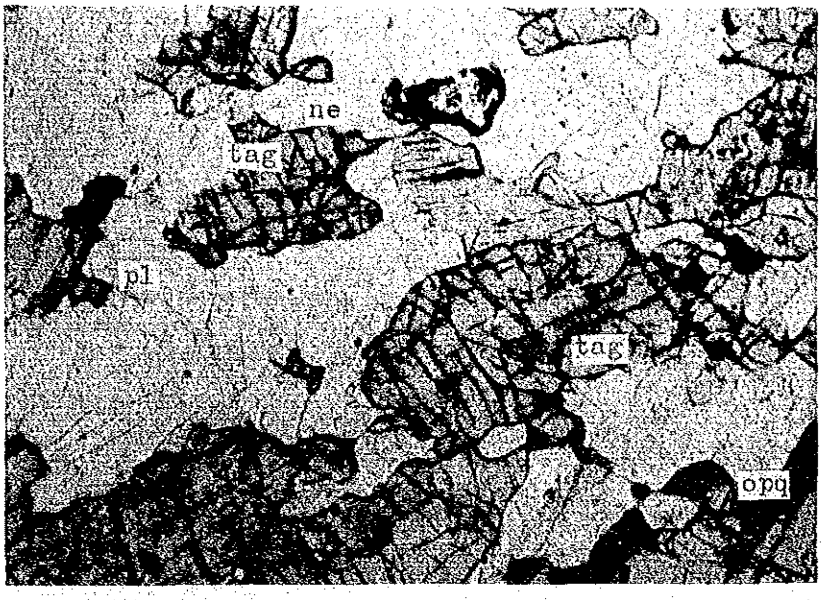
Locality; 10 Km Ingauan East side of SW Palawan

Main Mineral; Hornblende has greenish brown to bluish green color and short columnar habit (0.05 ~ 0.5 mm size), these C-axis arrange definite direciton and conform schistose structure.
Epidote has granular idiomorphic habit and aggragated clot in places.
Plagioclase make matrix of hornblende and fresh.

Accessary Mineral; Sphane and Opaque Mineral scatter as granular idiomorphic crystals

Crossed Nicol

0 1mm



tag; Titanaugite
ne; Nepheline
pl; Plagioclase
opq; Opaque mineral

Parallel Nicol

0 1mm

Alkali Gabbro (Sample No. CL063)

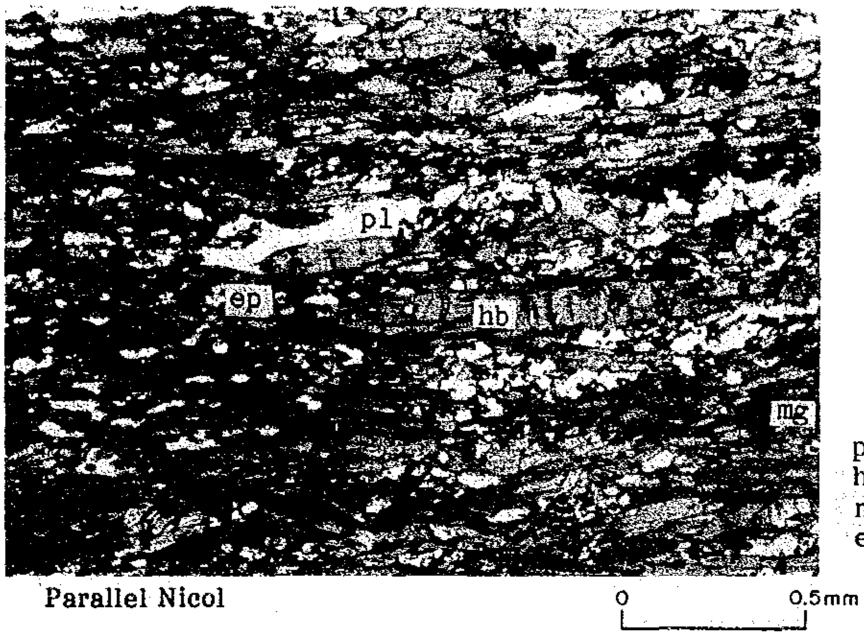
Locality; 6 Km North of Inaguan East of SW Palawan

Main Mineral; Plagioclase has abundand composit twin and semi-idiomorphic habit (0.4 ~ 2 mm)
Titanaugite has fine flake of biotite and show pale pink to pale green pleochroism and semi-idiomorphic habit
Nepheline has granular allotriomorphic habit and fill intergranular space
Opaque minerals scattered along boundary titanaugite and plagioclase and assumed as ilmenite.

Secondary Mineral; Chlorite is recognized along the cleavage of plagioclase.

Crossed Nicol

0 1mm



pl; Plagioclase
hb; Hornblende
mg; Magnetite
ep; Epidote

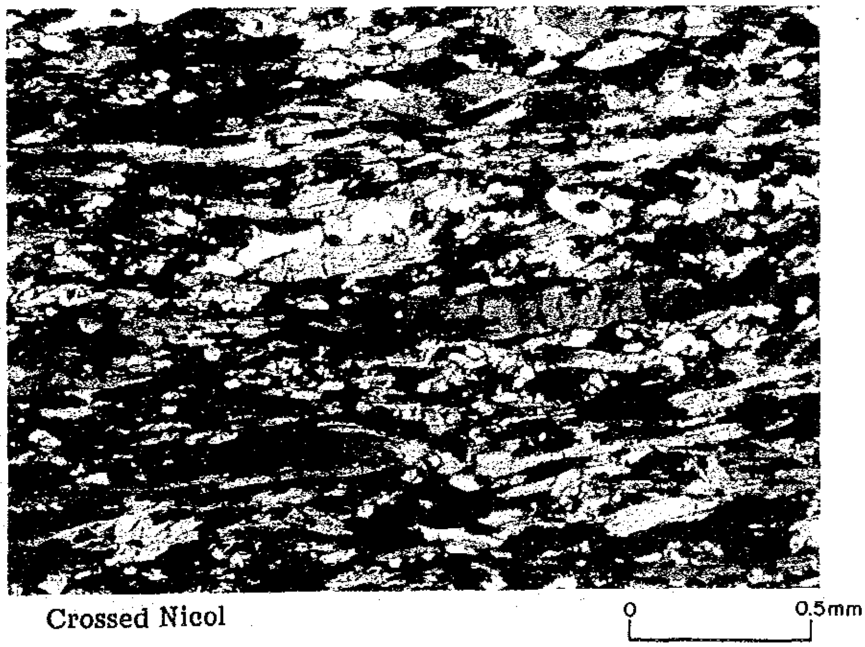
Parallel Nicol

Hornblende Schist (Sample No. CN03)

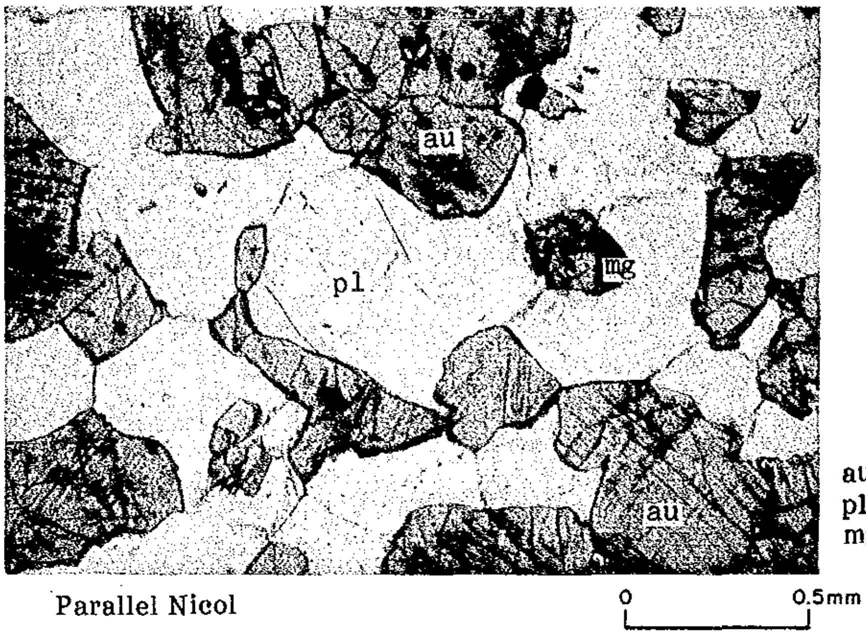
Locality; Upstream of Tigman River

Main Mineral; Hornblende has paralled intergrowth with columnar habit (0.5 ~ 1.0 mm)
Plagioclase is suffered albitization but andesine (AB 65 An 35) is also recognized.
Epidote has 0.02 ~ 0.2 mm size grain in small amount.

Metamorphism Facies: Belonging Epidote - Amphibolite Facies



Crossed Nicol



au; Augite
pl; Plagioclase
mg; Magnetite

Parallel Nicol

Gabbro (Sample No. COP121386)

Locality; 8 Km ESE Birong West Coast SW Palawan

Main Mineral; Plagioclase has semi-idiomorphic habit (0.3 ~ 0.5 mm size) and albite twin. Component correspond Labradorite

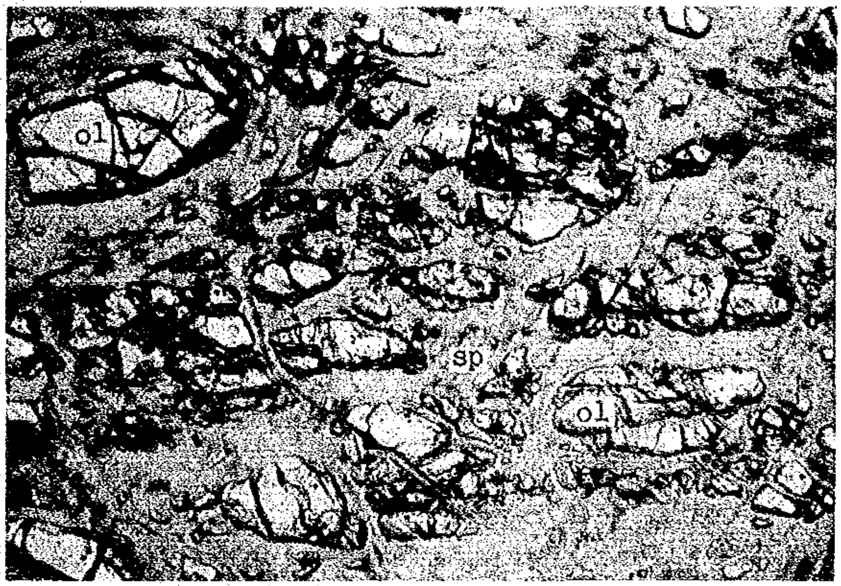
Augite has semi-idiomorphic or allotrimorphic habit (0.2 ~ 0.6 mm size) and sometimes show exsolution lamellar of Ortho-pyroxene.

Hypersthene has pale-green to yellow brown pleochroism in small amount.

Magnetite occur certain amount in or around quite crystals.

Secondary Mineral; This rock is generally fresh and sendary mineral is very small.

Crossed Nicol



ol; Olivine
sp; Serpentinite

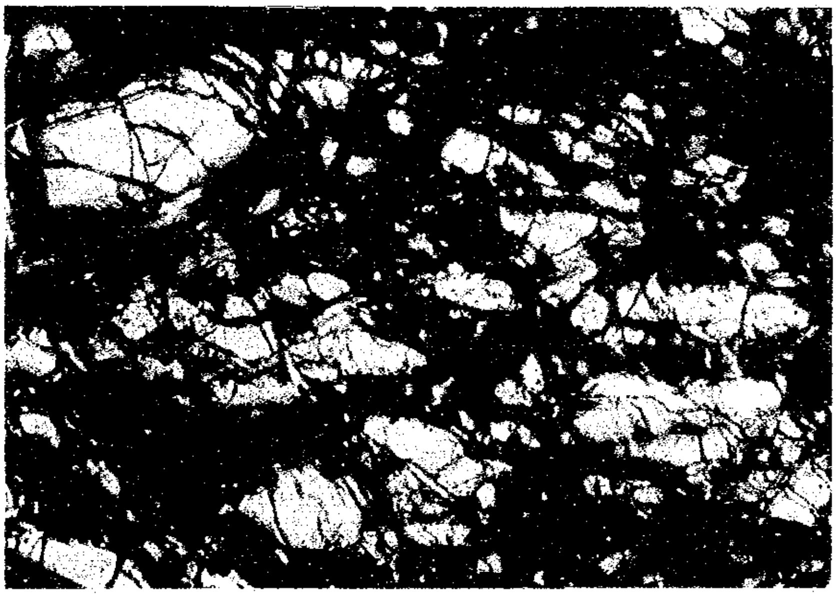
Parallel Nicol 0 0.5mm

Dunite (Sample No. CS037R)

Locality; 17 Km NE Birong of SW Palawan

Main Mineral; Olivine has short columnar habit (1 ~ 2 mm size) mesh structure develope well and serpenitize along the mesh, fine grained opaque mineral occur in good amount.
Chromite is seen is small amount (1 ~ 2 mm size)

Secondary Mineral; Calcite fill up intergranular space and Pumpellyite veinlets (0.02 ~ 0.1 mm) occure in places.



Crossed Nicol 0 0.5mm

ol; Olivine
sp; Serpentinite

Parallel Nicol

0 0.5mm

Harlzburgite (Sample No. CS002R)

Locality; 5 Km WSW of Victoria Peak SW Palawan

Main Mineral; Olivine has idiomorphic or semi idiomorphic habit and serpentinize along mesh structure
Angite has allotriomorphic or semi-idiomorphic habit and change to aggregation of Serpentinite, Chlorite and Brucite.

Opaque Mineral; Magnetite and Chromite occur in small amount.

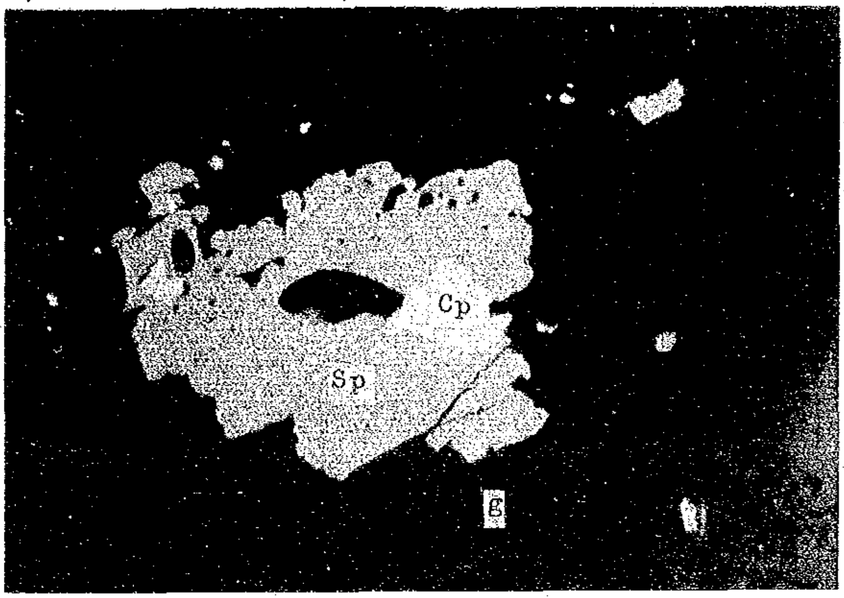
Crossed Nicol

0 0.5mm

Appendix 2 Polished Section Micro-Photograph

APPENDIX 2

Microphotograph (Polished Section)
(North-Eastern Palawan)



Sample (NB027) of 2 Km West Mabini

Disseminated Ore in Granodiorite

Consisting of Chalcopyrite Sphalerite and Pyrrhotite

Cp: Chalcopyrite
Sp: Sphalerite
g: Gangue Mineral

0 0.04 mm

Sample (NB035) of 3 Km SW Mabini

Disseminated Ore in granodiorite

Consisting of Chalcopyrite Arsenopyrite and Pyrrhotite

Cp: Chalcopyrite
ASP: Arsenopyrite
Po: Pyrrhotite

0 0.1 mm

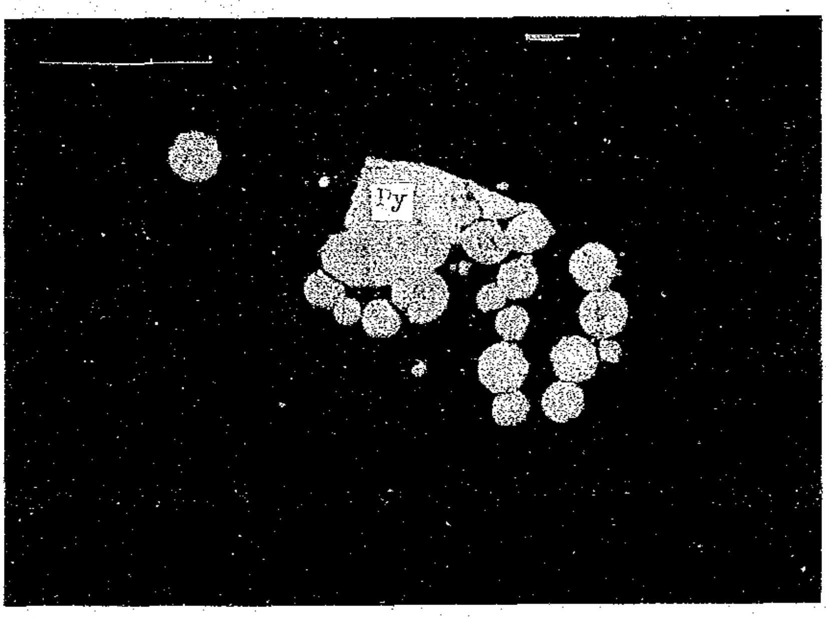
Sample (NPO13BR)
Southern Part of
Dumaran Is.

Disseminated Ore in
Tumarbong Semi-Schist

Consist of Chalcopyrite
in Ryrite.

Cp: Chalcopyrite
Py: Pyrite

0 0.04mm



Sample (NP016R)
Southern Part of
Dumaran Is.

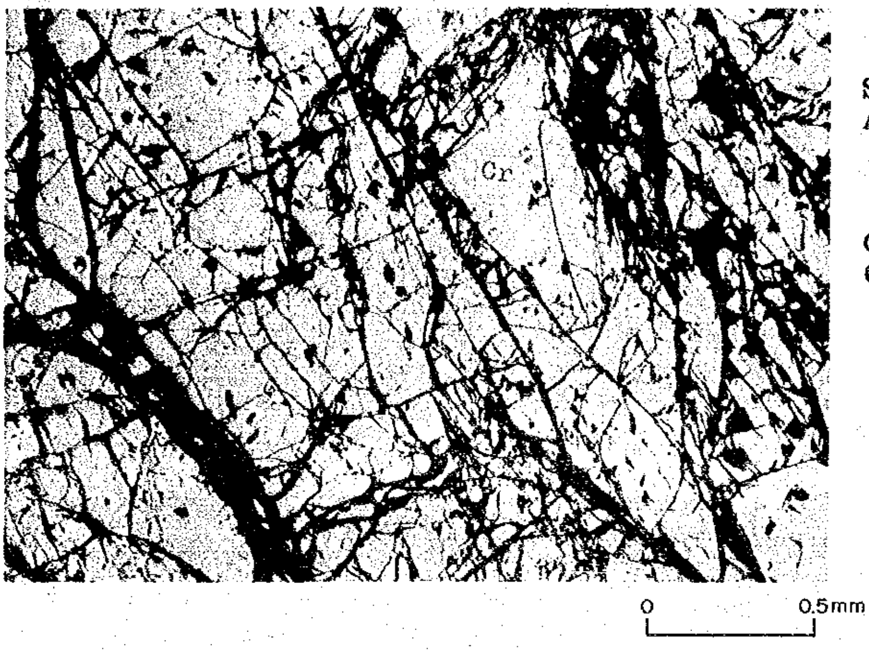
Disseminated Ore in
Granodiorite

Consisting of Framboidal
texture Pyrite

Py: Pyrite

0 0.04mm

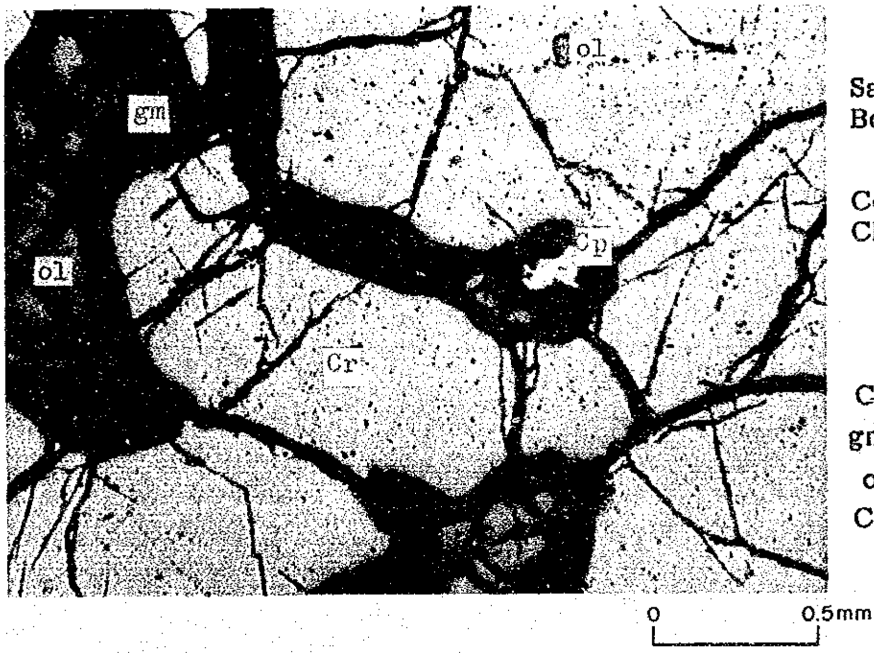
Microphotograph (Polished Section)
(South-Western Palawan)



Sample (CA009B) of Atlas Mine

Consisting of Massive Chromite Ore

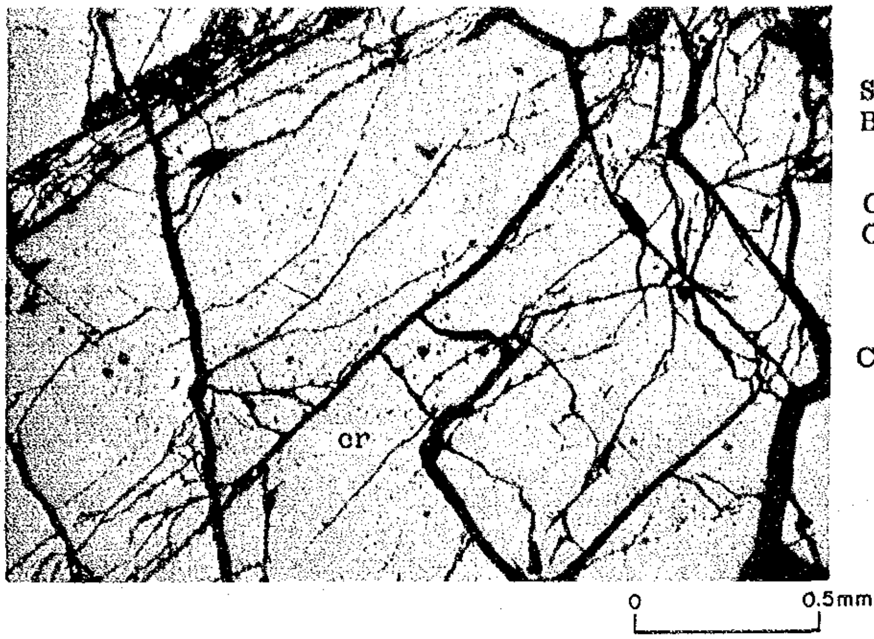
Cr: Chromite



Sample (CA031B) of Boyo Mine

Consisting of Massive Chromite Ore

Cr: Chromite
gm: Gangue mineral
ol: Olivine
Cp: Chalcopyrite



Sample (CX21486) of Berong Ore Showing

Consisting of Massive Chromite Ore

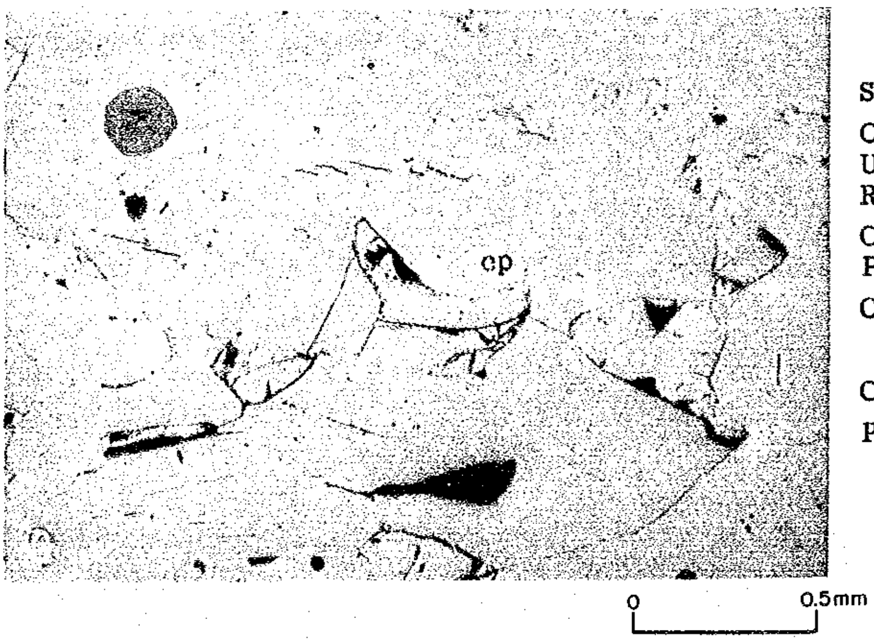
CR: Chromite

Sample (CX217B86) of Romarao Ore Showing

Consisting of Magnetite in Massive Chromite

Cr: Chromite

mg: Magnetite



Sample (CP230186)

Ore Showing of Upstream Maglasagao River

Chalcopyrite and Pyrrhotite

Ore in Peridotite

Cp: Chalcopyrite

Po: Pyrrhotite

Appendix 3 Micro Fossil Correlation Table

Appendix 3 Micro Fossil Correlation Table

Radiolarian and foraminiferal dating for the samples from Palawan Islands, Philippine

Sample number	Rock facies	Radiolarians (R, Rare P, Poor)	Forminifera	Remarks
NB23	Limestone	Barren	Barren	Acritarcs
NZ07RF	Gray LS.	Barren	Barren	Slaty LS. Acritarcs
NB50	Limestone	Barren	Barren	
NAR21	Limestone	Barren	Barren	Acritarcs Nummulites
NC61	Mudstone	Barren	Barren	Siltstone
NB42	Sandstone	Barren	Barren	
MF1	Limestone	Barren	Barren	Pelitic LS.
NMR028	Limestone	Barren	Barren	
FIM1	Limestone	Barren	Barren	Nummulites (?)
NLR065	Shale	Barren	Barren	
NH014	Chert	Barren	Barren	Siliceous sh.
NB40	Chert	Barren	Barren	Siliceous sh. Acritarcs Slate
NW44R	Black shale	Barren	Barren	
NAR19	Limestone	Barren	Barren	
CH069PL	Mudstone	Barren	Barren	Acritarcs
CN06	Red chert	R/P	Barren	Red sh. rich
CS049R	Red chert	Barren	Barren	
CO0521086	Red chert	Barren	Barren	
CN11	Limestone	R/P	Barren	
CN08	Limestone	Barren	Barren	Sandstone
CJ021PL	Limestone	Barren	Barren	Green. sh.
CG039PL	Mudstone	Barren	Barren	Slate
CG044-05(A)PL	Mudstone	Barren	Barren	Weathering
NW24R	Black shale	Barren	Barren	Slate
NW36R	White chert	Barren	Barren	Thin Mn vein
NW46R	Shale	Barren	Barren	Black slate
NX05R	Carb. sh.	Barren	Barren	
NX07R-2	Shale	Barren	Barren	Silty sadst.
NZ38R	Gray shale	Barren	Barren	Slate
NZ32R	Shale	Barren	Barren	Slate
NW43R	Shale	Barren	Barren	

NANNOFOSSILS OBSERVED IN THE PUERTO DISTRICT SAMPLE

Sample Number	CJ021PL
Abundance - Preservation	AP
Atching/Overgrowth	0/3
Coccolithus eopelagicus	F
C. pelagicus	C
Cyclicargolithus abisectus	C
C. floridanus	A
Distyococcites bisectus	F
D. scrippsae	C
Reticulofenestra spp. (small)	C
Sphenolithus ciperoensis	R
S. distentus	F
S. moriformis	A
NANNOZONE	CP-19a

Appendix 4 Time Determination Data of K-Ar Method

Appendix 4 Time Determination Data of K-Ar Method

T. I. Sample #	Your Sample #	Material Analyzed	Isotopic Age (Ma)	^{40}AR * (scc/gm × 10^{-5})	% ^{40}AR *	% K	Notes
KA-86-1248	CO052286-2	Whole Rock	37.2 ± 1.9	.55 .56	56.2 69.6	.38 .38	
KA86-1249	CO0121386	Whole Rock	-- ± --	-- --		<.02 <.02	1
KA86-1250	CA034MA.PT.AD	Whole Rock	26.5 ± 3.1	.008(7) .007(9)	20.8 29.4	.08 .08	2
KA86-1251	CJ056AD	Whole Rock	40.3 ± 4.0	.018 .020	26.6 23.8	.12 .12	
KA86-1252	NF492386	Whole Rock	36.0 ± 1.8	.428 .396	77.9 81.6	2.92 2.91	
KA86-1253	NB004	Whole Rock	.5 ± .3	.001(8) .001(3)	7.5 4.2	.79 .79	2, 3
KA86-1254	NW23R	Whole Rock	12.6 ± .6	.194 .189	89.7 91.0	3.85 3.92	
KA86-1255	NX10R	Whole Rock	12.4 ± .6	.140 .137	84.9 75.3	2.86 2.85	

Notes

1. This sample contained less than 0.02% potassium our minimum detection limit. Accordingly, we cancelled the argon analysis and did not calculate an isotopic age.
2. For this sample, we have shown the ^{40}Ar* concentration to four places past the decimal. Although we maintain that the 40Ar* concentraiton measurement is significant to only 1 × 10^{-8} scc/gm, we have included the fourth digit in brackets for two reasons. First, at these low values, the rounding off error can be a significant fraction of the total ^{40}Ar* concentration, and second, for ^{40}Ar* values of less than 1 × 10^{-7} scc/gm we use four digits in the age calculation.
3. The extremely large analytical uncertainty is due to the very low percentage of radiogenic argon.