

CHAPTER 4. SURVEY IN THE PHILIPPINES

—DATA COLLECTION AND COMPILATION—

Chapter 4. Survey in the Philippines — Data collection and compilation —

Major work in Philippines are

- (i) collect existing survey data by various survey methods on the project area,
- (ii) compile and analyze data
- (iii) collect published geographic maps, geologic maps, statistics of mining activities, etc.

Actual work was mainly carried out in the "PETROLAB" (Petrological, Mineralogical and Geochemical Services Laboratory) founded in 1983 through the Japanese governmental economic aid and in the "RP-Japan Mineral Exploration Project office" arranged specially in the Quezon branch office of BMG being adjacent to the PETROLAB. Further, visits to regional offices of BMG in Baguio, Cebu and Daet and main metallic mines such as copper, chrome and gold were done to collect data.

4-1 Data Targeted for Survey

Compilation and analysis were carried out on those data collected from the central and regional offices of BMG. On the other hand, data collection on private companies were confined to the data of mines to be visited for the reason that the data of companies were considered to be not effective to regional data compilation, owing to small area coverage.

4-2 Contents of Survey Work

The following work were carried out:

- (i) Duplication of various survey data keeping in the central and regional offices of BMG and then concentration of those duplicated data to the "RP-Japan mineral exploration project office" were — carried out by BMG counterparts.
- (ii) Visit to regional offices to duplicate and to collect necessary data, including mineral inventory maps, unpublished geological maps, pending arrangement data etc.
- (iii) Arrangement and analysis of all collected data — preparation of data sheet.
- (iv) Preparation of index maps of survey area covered by various survey methods based on all collected data — (1:250,000)
- (v) Compilation of geological map based on collected various geological maps.
- (vi) Collection of geological map quadrangles published by BMG (1:50,000).
- (vii) Collection of published geographic map quadrangles (mainly 1:50,000 and 1:250,000)
- (viii) Collection of published survey reports and literatures.

- (ix) Collection of mining statistics, climatological data, etc.
- (x) Lineament maps from Landsat imageries analyzed by Philippine side.

4-3 Items of Survey Reports, Maps and Literatures, etc. Collected in the Philippines

- (i) Duplicated and filed data from BMG offices

Mainly geological and including geochemical survey	596 reports
Mainly geophysical survey	52 reports
Total	648 reports

Notes: Besides the above-mentioned reports, about 110 reports are known. But it was not possible to duplicate them owing to missing originals.

Distribution of report by province (geological-geochemical : 596)

Quezon	68	Samar	40	Iloilo	11
Camarines Norte	37	Bohol	14	Romblon	13
Camarines Sur	39	Cebu	63	Sorsogon	13
Isabela	20	Masbate	20	Rizal	15
Cagayan	15	Negros Oriental	12	Bulacan	24
Nueva Vizcaya	18	Negros Occidental	41	Albay	4
Nueva Ecija	17	Antique	9	Catanduanes	2
Leyte	24	Capiz	7	Palawan	70

Geophysical survey reports:

Geophysical prospect	: 12 reports
Aeromagnetic survey	: 19 reports
Gravity survey	: 21 reports
Total	: 52 reports

All titles of 648 reports are listed in Appendix 8-3.

- (ii) Data Sheet

Data sheets completed were as follows:

Geological and geochemical surveys, etc.	1,138 sheets
Geophysical survey	52 sheets
Total	1,190 sheets

Notes: As there are 7 categories in the data sheet, a) geological survey, b) geochemical prospecting, c) three dimensional physical sampling, d) gravity survey, e) air-borne magnetic survey, f) geophysical prospecting and g) mining activity, more than 2 categories of data sheets are obtained from 1 report in some cases. Accordingly the total number of data sheets exceed the number of reports.

- (iii) Geological maps and mineral inventory maps -- obtained from regional offices of BMG (mainly unpublished): 26 sheets

Table-10 List of Unpublished Mineral Inventory Maps and Geological Maps

- (1) Geologic Map of Cebu
- (2) Geologic Map of Negros
- (3) Geologic Map Iloilo
- (4) Geologic Map of Capiz and Aklan
- (5) Geologic Map of Antique
- (6) Geologic Map of Southwest Panay
- (7) Geologic Map of Bohol
- (8) Geologic Map of Polillo
- (9) Geologic Map of Bicol Region
- (10) Geologic Map of Masbate
- (11) Geologic Map of Samar
- (12) Geologic Map of Leyte
- (13) Geologic Map of Nueva Ecija - 1369
- (14) Geologic Map of Quezon 1126
- (15) Mineral location map of Bicol Area
- (16) Geologic Map of Isabela
- (17) Geologic Map of Cagayan
- (18) Geologic Map of Nueva Viscaya
- (19) Geologic Map of Kalinga-Apayao
- (20) Geologic Map of Ifugao
- (21) Mineral Distribution Map of Isabela
- (22) Mineral Distribution Map of Cagayan
- (23) Mineral Distribution Map of Nueva Viscaya
- (24) Mineral Distribution Map of Kalinga
- (25) Mineral Distribution Map of Ifugao
- (26) Geologic Map of Palawan

(iv) Geological Map Quadrangles (1:50,000) : 77 sheets

Table-11 List of geologic map quadrangles 1:50,000 (see Fig.-32)

2965	I				3549		III
2966	I, II				3560	I, II,	IV
2967	I, II				3561	I, II, III,	IV
3064		III, IV			3562	I, II, III,	IV
3065	I,	III, IV			3563	II	
3066		IV			3648	I	
3067	II, III, IV				3649	I, II	
3068	I, II, III				3650	I, II	
3069	I				3662		III
3070	I				3750		III, IV
3263		III			3751	I, II, III	
3268			IV		3851		III, IV
3361	I				3852		III, IV
3367		III			3860	I,	IV
3448	I, II				3861	I, II, III, IV	
3449	I, II				3862		III
3460	I, II				4049	II	
3461	II,		IV		4149	I, II, III	
3462	I, II				4249		III, IV
3548		III, IV			4250		III
					Total	77 sheets	

(v) Geographic Map Quadrangles (1:50,000 and 1:250,000)

36 sheets of scale 1:250,000 -- covering all of project area

487 sheets of scale 50,000 -- covering 487 of 516 sheets for all project area

Table-12 List of Topographic Map Quadrangles

I. Scale

1:250,000 (see Fig.-33)

2503	2521
2504	2522
2505	2523
2506	2524
2507	2525
2508	2526
2509	2527
2510	2528
2511	2529
2512	2530
2513	2531
2514	2532
2515	2533
2516	2534
2517	2535
2518	2536
2519	2541
2520	2542

Total 36 sheets

II. Scale

1:50,000 (see Fig.-34)

2343	I			3363		III, IV	3659	I, II		
2344		II		3364	I, II, III, IV		3660	I, II, III, IV		
2443			IV	3365		II	3661	I, II, III, IV		
2444	I,		III, IV	3366			3662		II, III	
2445		II, III, IV		3367		III	3747			III, IV
2446	I			3368	I, II, IV		3748	I,		IV
2545			IV	3369	I, II, III, IV		3749	I, II, III, IV		
2546	I, II			3370	I, II, III, IV		3750	I, II, III, IV		
2547	I, II			3371	I, II, III, IV		3751	I, II, III		
2646			IV	3372	I, II, III, IV		3752	I, II		
2647	I,		III, IV	3373	I, II, III, IV		3753	I, II		
2648	I, II, III			3373	I, II, III, IV		3755	I, II,		IV
2649		II		3374	I, II, III, IV		3756	I, II, III, IV		
2748			III, IV	3375		III	3757	I,		III, IV
2749	I,		III, IV	3448		II	3758	I, II, III		
2750	I, II, III			3449	I, II		3759	I, II, III, IV		
2751		II		3451	I,	III, IV	3760		II, III, IV	
2850	I,		III, IV	3452	I, II, III, IV		3761	I, II, III, IV		
2851	I, II, III, IV			3453	I, II, III, IV		3848			IV
2852	I, II,		IV	3454	I, II, III, IV		3849	I, II, III, IV		
2853	I, II			3455		III	3850	I, II, III		
2854		II		3457	I, II, III, IV		3851	I,		III, IV
2951	I, II, III, IV			3458		III, IV	3852	I, II, III, IV		
2952			III, IV	3459		IV	3853	I, II, III, IV		
2953			III, IV	3460	I, II, III, IV		3854	I, II, III		
2954	I, II, III			3461	I, II, III, IV		3855	I, II,		IV
2955	I, II			3462	I, II, III, IV		3856	I, II, III		
2956	I, II			3464		II, III, IV	3857	I, II, III, IV		
2957		II		3468		III, IV	3858		II	
3052		II		3469	I,	III, IV	3859			III, IV
3054			III, IV	3470	I, II, III, IV		3860	I,		IV
3055	I,		III, IV	3471	I, II, III, IV		3861	I, II, III, IV		
3056	I, II, III, IV			3472		II, III, IV	3862			III
3152	I, II			3473		III, IV	3950	I, II		
3153	I, II,		IV	3474	I,	IV	3951	I, II, III		
3154		II		3475		II, III, IV	3952	I, II, III, IV		
3166	I, II			3547	I, II		3953	I,		III
3167	I, II			3548	I, II, III, IV		3954	I, II, III, IV		
3168		II		3549	I, II, III, IV		3955	I, II, III, IV		
3169	I, II			3550	I, II, III		3956	I, II, III, IV		
3252			III, IV	3551	I, II, III, IV		3957	I, II, III, IV		
3255	I			3552	I, II, III, IV		4049		II,	IV
3256	I, II			3553	I, II, III, IV		4050			III, IV
3262	I, II			3554	I, II, III, IV		4051			III
3263		II		3556		IV	4052			III
3264	I,		IV	3557		III	4053	I, II, III, IV		
3265	I, II, III, IV			3559		II, IV	4054	I, II, III, IV		
3266	I, II, III, IV			3560	I,	III, IV	4055	I, II, III, IV		
3267	I, II, III, IV			3561	I, II, III, IV		4056	I, II, III, IV		
3268	I, II, III, IV			3562	I, II, III, IV		4057		II, III, IV	
3269	I, II, III, IV			3563		II, III	4148		II	
3270	I, II, III, IV			3647	I,	III, IV	4149	I, II, III, IV		
3271	I, II, III, IV			3648	I,	III, IV	4150			III, IV
3272	I, II			3649	I, II,	IV	4151			III

3273 I, II		3650 I, II		4152	III, IV
3355 I, II,	IV	3651 II, III, IV		4153	III, IV
3356 I, II		3652 I, III, IV		4154	III
3357	IV	3653 III, IV		4156	III
3358	III, IV	3654 I, III, IV		4249	III, IV
3359 I,	III	3655	IV	4250	III
3360 I, II		3656 I, II, III			
3361 I,	IV	3657 I, II			
3362 I, II, III, IV		3658 II, IV		Total	487sheets

(vi) Published Survey Reports and Literatures: 58

Table-13 List of Reports, Literatures and Maps Collected

- (1) Geology of the Dizon porphyry copper gold orebody San Marcelino Zambales - Tomas D. Malihan.
- (2) The Geology of Coto district and vicinities - S.D. Dela Cruz
- (3) Concept in the preparation of a metallogenic map of the Philippines - F.C. Gervasio & H.E. Fernandez
- (4) Cu-Pb-Zn-Fe-Mn Interrelationship in some copper and base metal prospects in Central Cebu. - Normal C. Flores
- (5) Geology and mineral resources of Bohol - Rolando I. Calomarde, Eligio Z. Ariate
- (6) Same aspects in the geology Mineralization and geotectonics of Southwestern Panay - Wilfredo G. Diegor
- (7) Estimate of Philippine mineral wealth - Natural Resources Management Center
- (8) Philippine porphyry copper deposits: Geologic setting and characteristics - R.H. Sillitoe, I.M. Gappe, Jr.
- (9) Geology of Southern Baguio mineral district - V.S. Serafica, R.H. Enriquez, P.H. Dunuan
- (10) Geology of the Philex Sto. Tomas II ore body - Victor S. Serafica, Redempta P. Baluda
- (11) The Role of computerized data base management system and resources for exploration geochemical survey - Bureau of Mines and Geo-sciences
- (12) Metallogenesis in the Philippines: Explanatory Text for the CGMW Metallogenic map of the Philippines - G.R. Balce, O.A. Crispin, C.M. Samaniego and C.R. Miranda.
- (13) Field and laboratory equipment requirements for the RP-Japan Big Project - Bureau of Mines and Geo-sciences, 1985.
- (14) Clays in the Philippines, (IC-25) - A.J. Cruz 1977.
- (15) Feldspar in the Philippines (IC-27) - A.J. Cruz 1976.
- (16) Gypsum in the Philippines (IC-28) - A.J. Cruz 1981.
- (17) Semi-Precious gemstone and exotic minerals which may serve as indigenous raw materials for the Philippine jewelry (IC-29) - A.J. Cruz 1981.
- (18) Geology and mineral resources of Nueva Vizcaya Province, 1974 (RI-74).
- (19) The Geology and mineral resources of Pangasinan, 1974 (RI-75).
- (20) Geology and mineral resources of Sorsogon Province, 1974 (RI-76).
- (21) Geology and mineral resources of Isabels Province 1974 (RI-79).
- (22) Geology and mineral resources of Nueva Ecija, 1976 (RI-80).
- (23) Guano and phosphate rock deposits in the Philippines, (RI-83), R. Jagolino.
- (24) Geology and mineral resources of Laguna Province, 1976 (RI-84).
- (25) Geologic-geochemical survey of Caramoan Peninsula, Camarines Sur, 1976 (RI-86) - F.E. Miranda.

- (26) Bauxite deposits of Samar, 1977 (RI-89) - R.B. Jagolino.
- (27) Geology and mineral resources of Negros Island, 1978 (RI-93).
- (28) Geology and mineral resources of Camarines Norte and part of Quezon Province, 1979 (RI-94) - F.E. Miranda and P.C. Caleon.
- (29) Geology and mineral resources of Iloilo Province, 1980 (RI-96).
- (30) Geology and mineral resources of Aklan-Capiz Province, 1980 (RI-100).
- (31) Silica resources of the Philippines, 1980 (RI-101) - A.J. Cruz and E.N. Bautista.
- (32) Geology and mineral resources of Surigao del Norte, (RI-102).
- (33) Mineral resources of Rizal Province, 1980 (RI-104).
- (34) Geology and mineral resources of Camarines Sur, 1981, (RI-105).
- (35) Geology of Sta. Ines Iron deposits, Antipolo, Rizal, 1981 (RI-106) - L.R. Antonio, et al.
- (36) Geology and mineral resources of Camarines Province, 1982 (RI-108).
- (37) Geology and mineral resources of the Pangasinan region Catanduanes, 1955 (SPS No.2) - J.M. Weller, U.S.G.S., O. Crispin and C. Ibañes.
- (38) Geology and mineral resources of Bata Island, Albay, 1955 (SPS No.3) - O. Crispin.
- (39) Geology and coal resources of the Hitoma Manambrag, Region, Catanduanes, 1955 (SPS No.4) - V.D. Santos and J.M. Weller.
- (40) Geology and mineral resources of the Gatbo Peninsula Bacon-Prieto Diaz-Gubat region, Sorsogon, 1955 (SPS No.5) - C.B. Ibañes.
- (41) Geology and Coal resources of the Semirara Island, Antique, 1956 (SPS No.6) - J.F. Vergara.
- (42) Geology and mineral resources of the Argao Dalaqueta region, Cebu, 1956 (SPS No.7) - H. Bañes, U.S.G.S., C.L. Jongco, C.C. Lazaga, J.E. Pilac and H.E. Jokes, U.S.G.S.
- (43) Geology of the copper deposits of the Hixbar Gold Mines, Inc., Rapu-Rapu Island, Albay, 1956 (SPS No.9) - A. Kinkel Jr., U.S.G.S., and S.L. Samaniego.
- (44) Manganese deposits of the Anda Peninsula, Bohol, 1956 (SPS No.11) - N.W. Fernandez, D. Palacio and R.K. Sorem, U.S.G.S.
- (45) Geology and coal resources of the Calatrava-Roboso region, Occidental Negros, 1957 (SPS No.12) - M. Melendres Jr. and H. Bañes, U.S.G.S.
- (46) Geology and coal resources of Polilio, Quezon, 1968 (SPS No.15) - V. de los Santos and F.D. Spencer, U.S.G.S.
- (47) Iron-Nickel-Cobalt resources of Nonoc, Awasan and Dinagat Islands in Parcel II of the Suriga, 1958 (SPS No. 17) - W. Wright, R.B. Quicho, L. Santos-Yñigo, A. Salazar and M. Marique.
- (48) Marble in the Philippines, 1969 (TB-21) - A. Shademon.
- (49) Geology and Southwestern Negros Island (Geology 4) - P.R. Castillo and P.P. Escalada.
- (50) Interpretation of Aeromagnetic data on Negros Island, (Geology 20) - George O. Raymundo.
- (51) Report on Pinut-an Gold prospect Bgy. Pinut-an, San Ricardo, outhern Leyte (Geology 24) - Carlo D. Dayanghirang.
- (52) Geology and coal resources of Barangay Giporlos, Eastern Samar (Geology 25) - Ricarte S. Javelosa.
- (53) Notes on the periods of igneous activity in Luzon as indicated by available K-Ar Age Data (Geology 26) - Lilian R. Agawin and Others.
- (54) Geology of massive copper sulfide deposits in the Philippines (Geology 30) - Guillermo R. Balce.
- (55) Stratigraphy of a portion of the Sierra Madre Range in the Norzagaray Quadrangle, Bulacan (Geology 41) - Aristeo Pelayo.
- (56) Comprehensive report on the Samar Leyte mineral resources development Project, 1982 (Geology 45) - Mariano G. Pacis.
- (57) Geology and Mineral resources of the Philippines Vol. 1, 1982 - Bureau of Mines and Geo-sciences.
- (58) First-order leveling in the Provinces of Cagayan, Isabela, Nueva Viscaya and Nueva Ecija, Region II - B.C.G.S.

(vii) Data of Mining Statistics etc.: 8

Table-14 List of Mining Statistic Data etc.

- (1) Compilation of Data for the 1984 Producing and Operating Mines in the Philippines
- (2) Philippine Metallic Ore Reserves, 1981
- (3) Summary, Philippine Non-Metallic Ore Reserves, 1981
- (4) Philippine, Statistical Yearbook, 1984
- (5) Statistical Handbook of the Philippines, 1984
- (6) Updated Philippine Development Plan, 1984 - 1987
- (7) 1,000 Top Corporations in the Philippines
- (8) Corporate Profiles

(viii) Landsat-Lineament Maps (Natural Resources Management Center = NRMC 1985, 1:250,000) : 1 set, 7 sheets

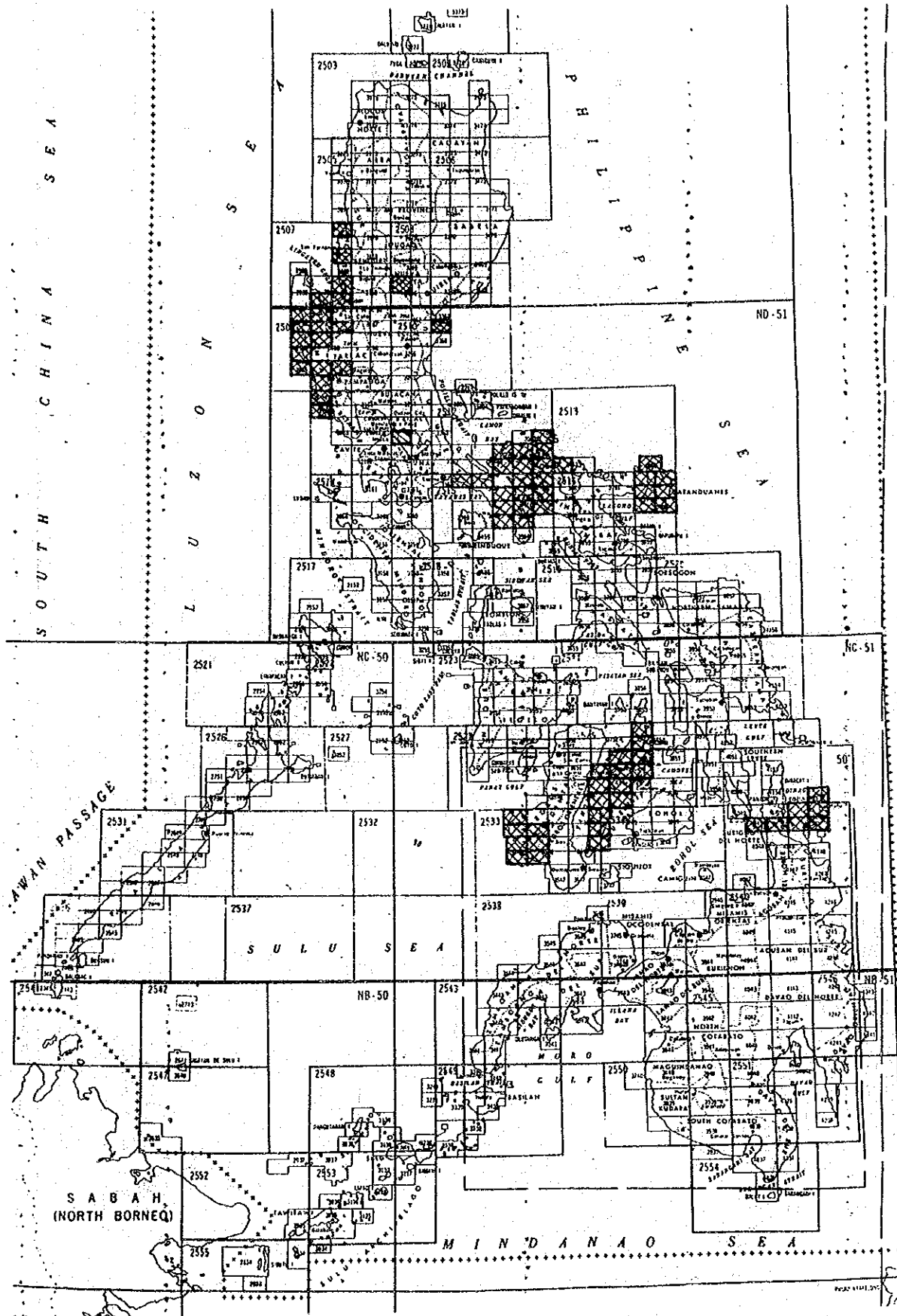


Fig-32 Index of Geologic map (1/50,000)

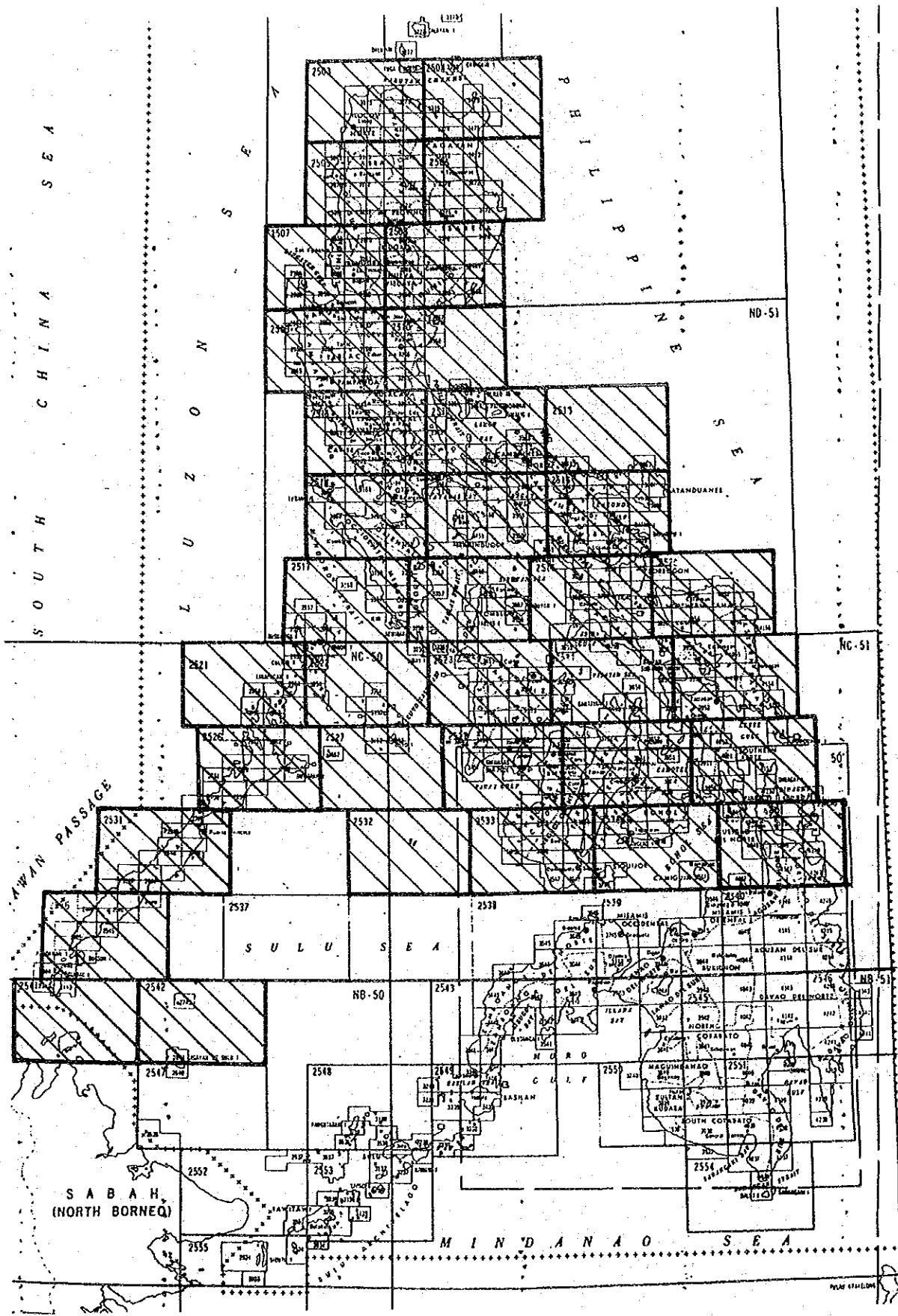


Fig-33 Index of Topographic map (1/250,000)

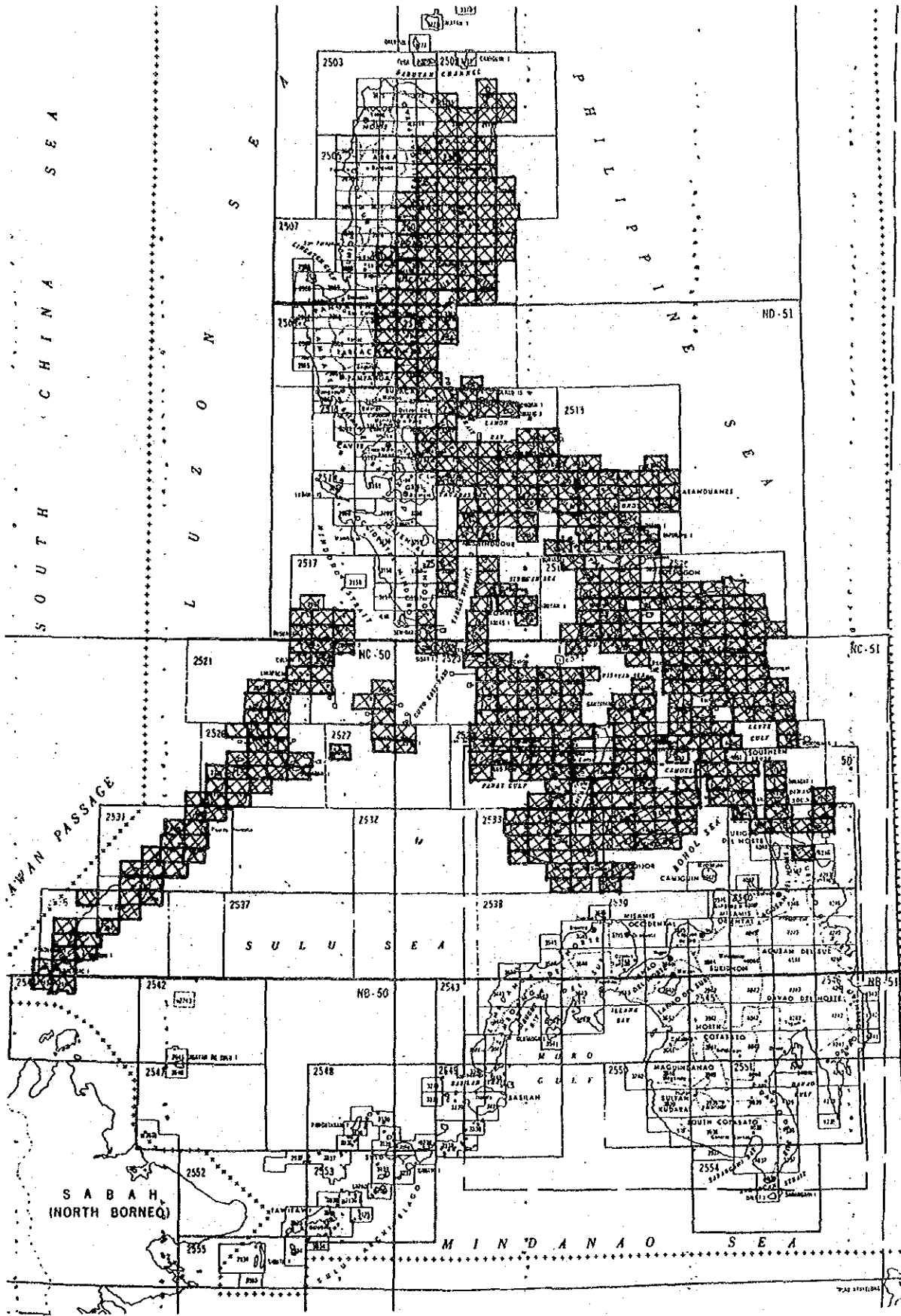


Fig-34 Index of Topographic map (1/50,000)

CHAPTER 5. SURVEY IN JAPAN

Chapter 5. Survey in Japan

5-1 Survey Reports and Literatures Collected in Japan

Effort was made to seek and collect the data on geological, geochemical and geophysical surveys accomplished in the Philippines in the Geological Survey of Japan mainly and other some private organizations in Japan. However, it was difficult to gather more detailed survey reports and maps concerned with geological survey and geochemical survey than those obtained in the Philippines except some reports connected with regional geology and geologic structure, and geophysical survey.

Reports gathered in Japan were very useful to supplement for regional data compilation work done previously in the Philippines.

The list of reports collected in Japan are as follows:

Table-15 List of Reports to be collected in Japan

- (1) Age and Nature of Orogenesis of the Philippines; F.C. Gervasio, 1967, reprinted from *Tectonophysics*, 4 (4-6).
- (2) A contribution to the study of Geologic Structure of the Philippines; W. Hashimoto and T. Sato, reprinted and compiled from *Journal of Geography*, Vol. 77, No. 2 (1968), Vol. 78, No. 4 (1969) and Vol. 79, No. 1 (1970)
- (3) On the Palawan Trend; M. Motegi, 1971, reprinted from *Mineral Engineering Magazine* XX111, No. 1
- (4) Aeromagnetic Survey in Region II of the Philippines; S. Sano and K. Ogawa, 1971, reprinted from UN. ECAFE-CCOP Technical Bulletin.
- (5) Aeromagnetic Survey of the Palawan-Sulu offshore area of the Philippines; W. Bosum et al., 1972, reprinted UN. ECAFE-CCOP Technical Bulletin Vol. 6
- (6) Setting of Porphyry Copper Deposits in the Philippines; John A. Wolfe, 1972, *MMIJ-AIME*
- (7) Mineralization of the Philippines—A Geohistorical Review—; M. Motegi, 1975, reprinted from *Geology and Palaeontology of Southeast Asia*, Vol. XV
- (8) Accreted Terranes in the Northern part of the Philippine Archipelago; D.A. Karig, 1983, reprinted from *Tectonics*, Vol. 2, No. 2
- (9) Regional Aeromagnetic Survey of some parts of the Philippines; O.C. Daclison et al., 1983, reprinted from UN. ESCAP-CCOP Technical Bulletin, Vol. 16
- (10) Geologic Evolution, Resources and Geologic Hazards—International Centennial Symposium of the Geological Survey of Japan, 1984, Report No. 263

Containing; a Geology and Tectonic Setting of Copper and Chromite Deposits in the Philippines; A.S. Zanoria et al.

b Philippine Geothermal Resources: An Alternative Indigenous Energy; R.T. Datuin et al.

- (11) Aeromagnetic Survey of the Philippines, BMG, 1980, Document of CCOP XVII Session.
- (12) Regional Gravity Survey of the Philippines, BMG, 1980, Document of CCOP XVII Session.

5-2 Summary of Landsat Data Analysis

5-2-1 Contents of the Study

To clarify the regional geological structures in the Philippines, the lineament analyses were made using Landsat MSS (Multispectral Scanner) data.

The 34 scenes with a high quality covering almost the whole country were chosen and GEOPIC images were prepared from CCT (Computer Compatible Tape). The interpretation was carried out on the false color (and black/white partly) images for the extraction of lineaments. Based on the results, rose diagrams and lineament density maps were drawn up, and structural features and the relationship between density pattern and ore deposits were studied.

Flow chart of the study is shown in Fig-36.

5-2-2 Coverage

The study area is 297,000 km² covering almost the whole area of the Philippines. It is covered by the 34 scenes of the Landsat MSS data. The coverage of each scene is shown in Fig-35.

Path on the figure is the orbit number of the satellite (Landsat) and Row is the line number of the data obtained in each orbit.

5-2-3 Abstract of Results

- (i) The Philippine Island can be divided into 3 regions by the prominent direction of the lineaments. In the region extending from Luzon to the eastern Mindanao via the eastern Visayas, a N-S system is most dominant, followed by a NE-SW system and partly a NNW-SSE system. In the region of the western Visayas and Palawan, a NE-SW system is prominent and a N-S system is locally observed. In the region of Mindanao excluding its western part, a NNE-SSW system is most dominant, which is partly followed by a NW-SE and a N-S systems.
- (ii) The areas of high lineament densities are Cordillera Central Range of Luzon, central Mindoro, Catanduanes Island, central Palawan, central Cebu and the mountainous area of Mindanao.
- (iii) The clear lineaments of a first order have been extracted on Bangui Fault, Digdig Fault, Philippine Fault, Ulugan Fault and Mindoro fault and an abundant lineaments have been marked in the thrust zone of southern Panay and Zamboanga.
- (iv) The regional features indicated by the prominent directions seem to reflect the differences of structural elements of the Philippine mobile belt and of the stable region.
- (v) In almost all areas of high lineament densities, ore deposits or mineral showings are reported, which strongly suggest the close relationship between dense lineaments and mineralization. Therefore, new mineralizations can be presumed even in the areas where any showing has not been known.

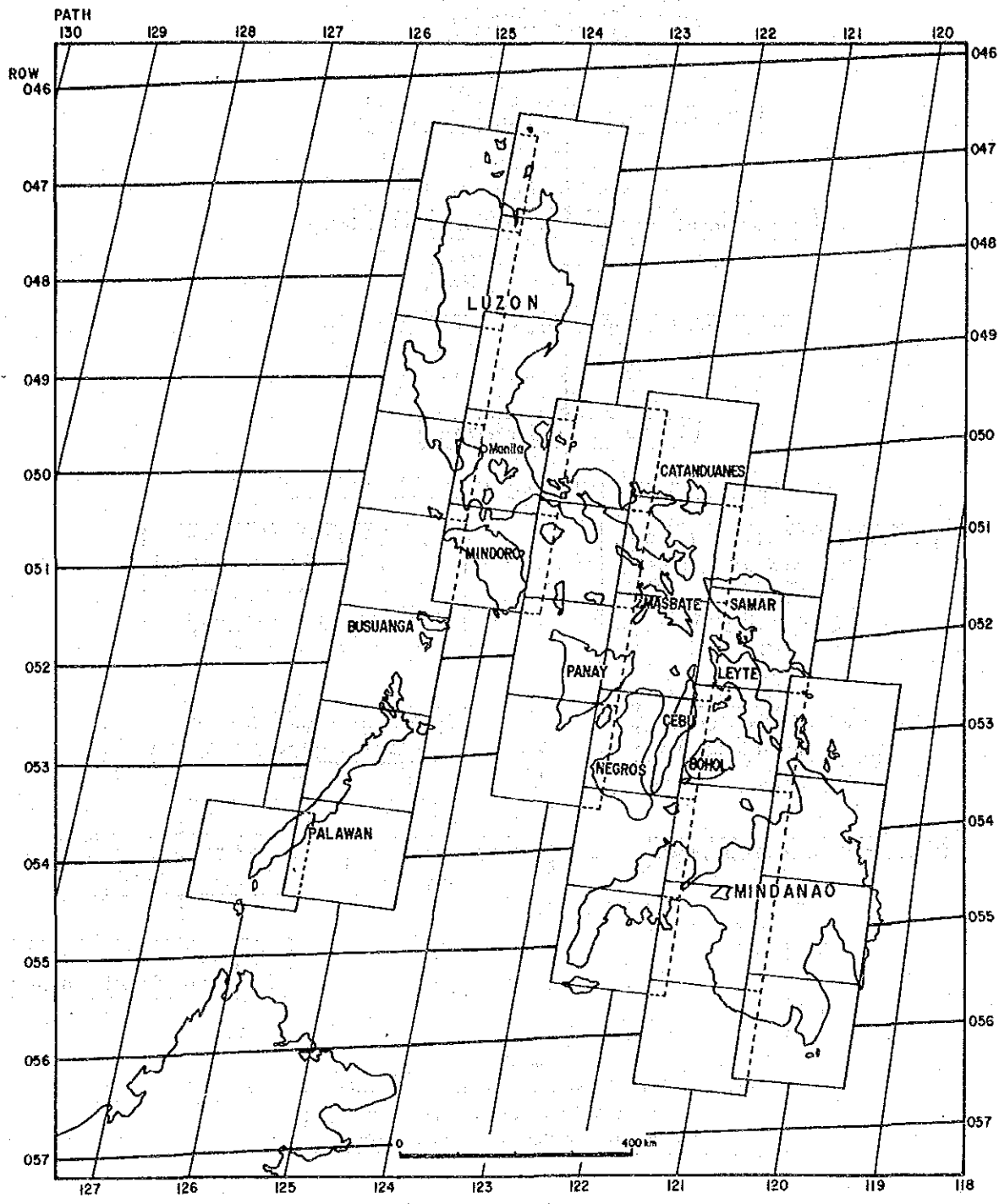
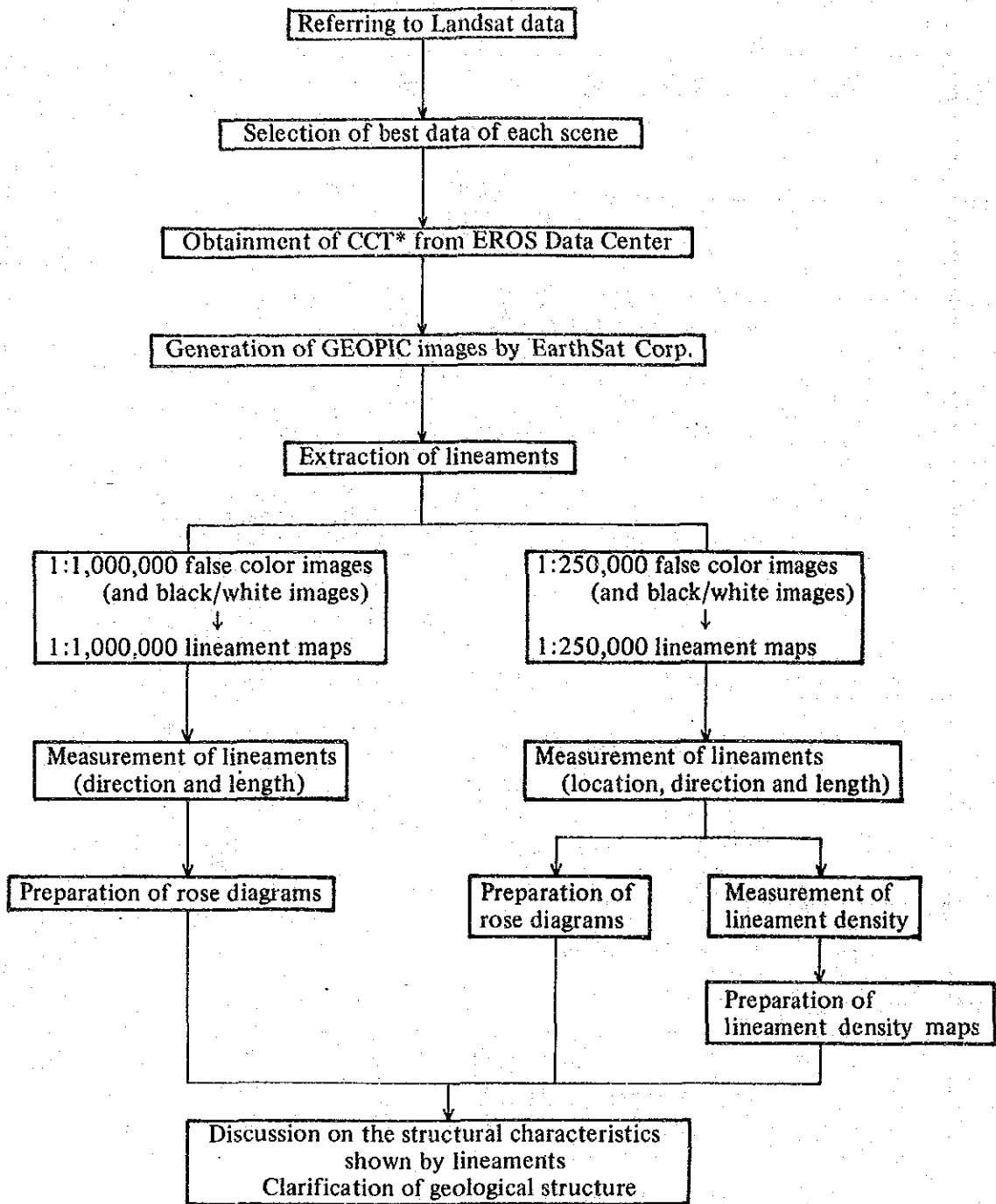


Fig-35 Study Area and Landsat Coverage



* Computer Compatible Tape

Fig-36 Flow Chart of the Study

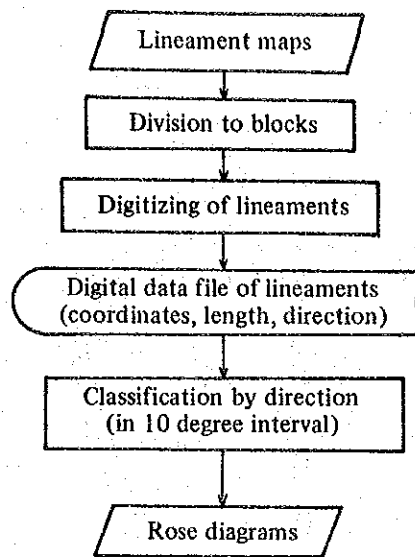


Fig-37 Flow Chart of Rose Diagram Preparation

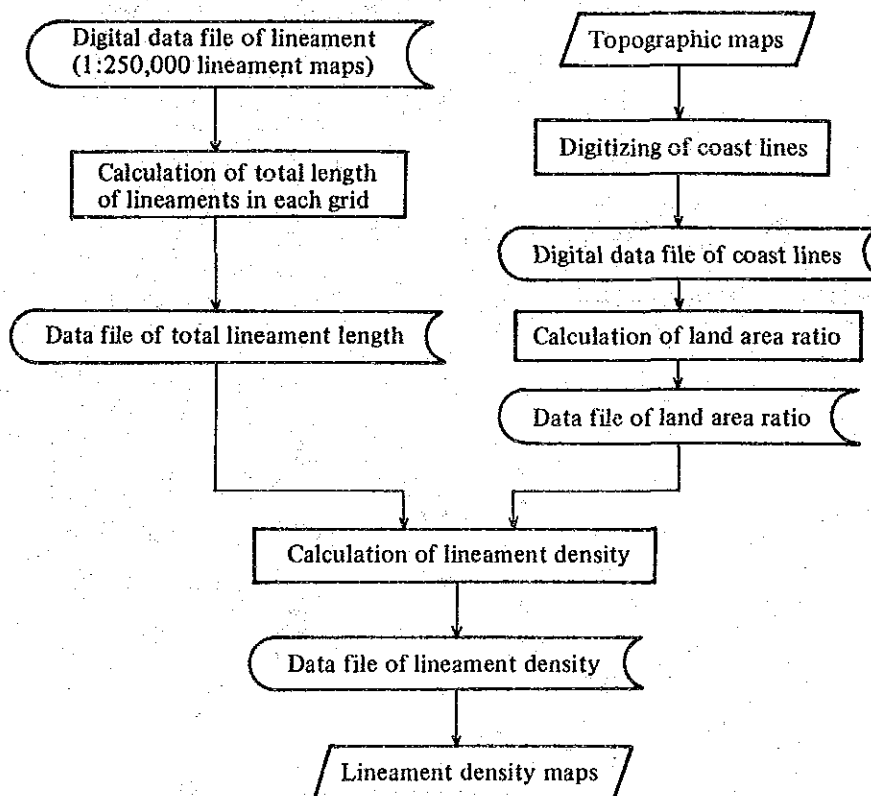


Fig-38 Flow Chart of Preparation of Lineament Density Maps

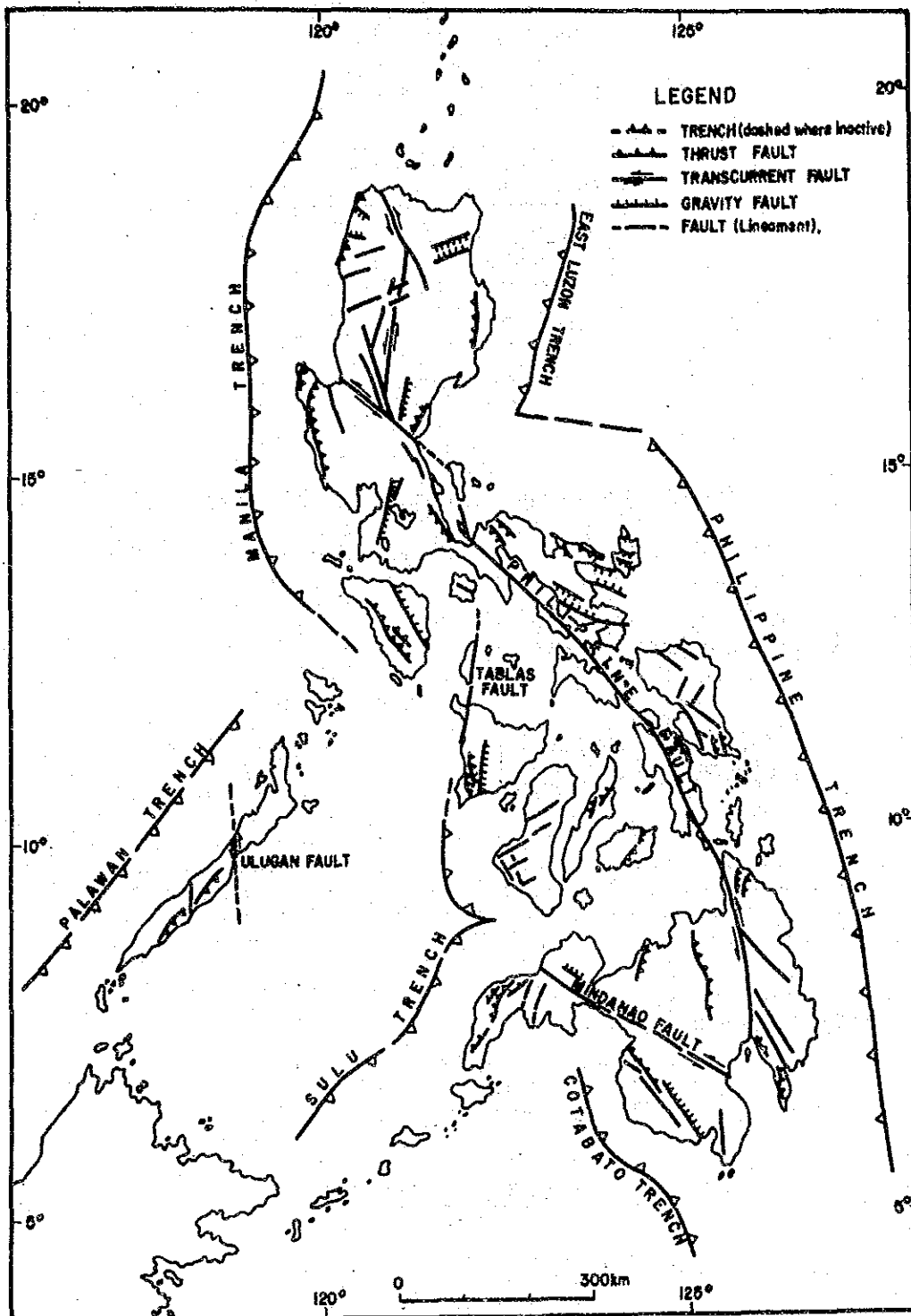


Fig-39 Major Fault in the Philippines

5-3 Contents of Final Compiled Maps

- (i) Compiled Geological Map (PL 4-1 to -14)
Scale : 1/250,000 14 sheets
Covered about 95 % of project area.
Compiled mainly from geologic maps (1/50,000) published by BMG, and supplemented with other geological maps. Therefore accuracy of each region are different variously.
- (ii) Mineral Inventory Map (PL 5-1 to -14)
Scale : 1/250,000 14 sheets
Covered all project area.
Compiled mainly based on mineral inventory maps collected in BMG regional offices. Minerals are divided into 19 kinds of metallics and 27 kinds of non-metallics.
- (iii) Index Map of Ground Survey (PL 1-1 to -14, omitting -5 and -10)
Scale : 1/250,000 12 sheets
Compiled each survey method-geological, geochemical and geophysical-, based on various survey data done by BMG.
- (iv) Index Map of Aeromagnetic Survey (PL 2-1 to -14 omitting -4, -9 and -10)
Scale : 1/250,000 11 sheets
Covered about 70 % of surveyed area.
Compiled preferentially by IGRF maps and by TMI maps in lacking area of IGRF, from survey results belonged to BMG.
- (v) Index Map of Gravity Survey (PL 3-1 to -14 omitting -5, -6, -8, -9, -10, -11, and -13)
Scale : 1/250,000 7 sheets
Covered about 85 % of surveyed area.
Compiled by Bouguer Gravity maps from survey results belonged to BMG.
- (vi) Lineament and Major Metallic Mineral Distribution Map (PL 6-1 to -2)
Scale : 1/1,000,000 2 sheets
Covered all project area.
Compiled the correlated maps between lineament and mineral distribution, which major metallic mineral deposits (Cu, Au, Ag, Cr, Ni, and Co, but grouped into 3 categories namely Cu, Au-Ag and Cr-Ni-Co) were plotted into lineament maps analyzed from Landsat imageris by other organization in Japan.
- (vii) Rose Diagram Map (PL 7-1 to -2)
Scale : 1/1,000,000 2 sheets
Covered all project area.
Compiled from Rose Diagram maps of lineament analyzed from Landsat Imageries by other organizationin in Japan

CHAPTER 6. SYNTHETIC ANALYSES

Chapter 6. Synthetic Analyses

6-1 Geology, Tectonics and Distribution of Ore Deposits

Philippine ore deposits can be further classified into genetic types, considering form, mode of formation, lithologic environment, occurrence, special chemical and mineralogical characteristics and, more particularly, established genetic types considered of significance in relation to geology and tectonics. Depending on whether or not they occur in the place where they were originally formed, these genetic types fall under two general classes: (i) in situ and (ii) residual and transported.

(i) "In situ" deposits

The genetic types of in situ deposits in the Philippines are classified into three groups as shown in Table-16.

Table-16 Genetic types of in situ deposits in the Philippines

GENETIC TYPES OF IN SITU DEPOSITS IN THE PHILIPPINES	
COPPER-GOLD (Ag,Pb,Zn,Mo,Fe) GROUP	
PORPHYRY COPPER	CHROMITE-NICKEL (Cu,Co,Pt,Fe,Al) GROUP
MASSIVE SULFIDES	CHROMITE
CYPRUS-TYPE	METALLURGICAL
KUROKO-TYPE	REFRACTORY
LUZONITE-ENARGITE BEARING VEINS	NICKEL
CONTACT METASOMATIC Cu-Zn-Pb-Au-Ag	
LEAD-ZINC VEINS	
BESSHI-TYPE	
OTHERS	
NATIVE COPPER IN BASALT	MANGANESE GROUP
CONTACT METASOMATIC Fe-Cu/Fe	BEDDED-TYPE
MIXED OXIDE-SULFIDE	BOG-TYPE
OXIDE ONLY	VEIN-TYPE
GOLD	
VEIN-TYPE	
DISSEMINATED	

(After G.R. Balce et al., 1981)

In situ deposits in Philippine ophiolite belts are chromite, nickel sulfide, Cyprus-type massive copper-zinc-lead, mercury, bedded manganese and Besshi-type deposits (Figs-17 and -19). Copper and platinum group metals are minor components of nickel sulfide deposits.

Where the ophiolite belts are overlapped or superimposed by magmatic belts, porphyry copper, kuroko-type massive sulfide, contact metasomatic Fe-Cu/Fe, and even gold deposits occur together with the diagnostically ophiolitic ore deposits. This is the case with the eastern part of Zambales Range, Mindoro, Zamboanga Peninsula, Misamis Oriental, Mindanao Central Cordillera and the belt from Camarines Norte to Davao in the eastern physiographic province.

In magmatic belts, the ore deposits are extensive porphyry copper, kuroko-type, contact metasomatic Cu-Zn-Pb-Au-Ag, contact metasomatic Fe-Cu/Fe, luzonite-enargite bearing massive sulfide veins, and gold. These deposits are largely found in

the central physiographic province and central-southern part of eastern physiographic province because this region is largely covered by magmatic belts from Cretaceous to Recent (Figs-15, -16, -17 and -18).

In addition, to date no large ore deposits or showings have been discovered in Sierra Madre Range of eastern physiographic province, however, many experts suggest that there are high potentials of porphyry copper deposit in the area (Refer: 3-3-(i)).

Most of the Philippine gold deposits are along the zone of the Philippine Fault.

(ii) Residual and transported deposits

Residual and transported deposits in the Philippines include the following types (G.R. Balce et al., 1981): (1) Ni-Fe-Co laterite; (2) aluminous laterite and bauxite; (3) residual chromite; (4) chromite beach sand; (5) residual iron; (6) magnetite beach sand; (7) placer gold and (8) residual manganese. The first four deposit types are limited to the ophiolite belts (Fig-19). In contrast, types (5), (6) and (7) are limited to the magmatic belts (Figs-15, -16, and -18). Type (8), residual manganese, is not restricted in occurrence, but they are generally of negligible quantities. They form by concentration of manganese oxide in weathering zones, particularly over exposed manganese sediments and volcanic rocks.

6-2 Geology, Tectonics and Regional Geophysical Survey Data

6-2-1 Summary of aeromagnetic survey of the Philippines

(i) Brief contents of survey.

The regional aeromagnetic survey of the Philippines was initiated in 1975 by the Bureau of Mines and Geo-Sciences jointly with the National Committee on Mineral Exploration and Survey Operation (NACOMESO).

Other airborne magnetic surveys were carried out in specific areas as part of collaborative survey programme of the Philippines with foreign institutions--JICA (by Geological Survey of Japan) and ITIT (Institute for Transfer of Industrial Technology Program) of Japan etc.

The combined effort of the above-mentioned agencies surveyed about 80% of the land areas covering approximately 117,143 line kilometers from 1975 to 1982 (Fig-40).

The regional survey of BMG used a Varian air-borne proton magnetometer system mounted in Cessna 402 for data gathering and flight operations involved coverage of N-S traverse lines spaced at 2.5 km and E-W tie lines at 10 km spacing at an altitude of 6000 feet barometric.

From 1975 to 1979 the areas where flight operations had been completed were (1) Northern Luzon, covering Ilocos Norte, Ilocos Sur, Abra, La Union, Pangasinan, and Mountain Provinces; (2) the islands of Panay, Negros, Cebu, Bohol, and Leyte, and portions of Samar in Central Philippines; and (3) the Bicol region. Flight operations over Samar, Bicol region, and Palawan Island were completed in June and August 1980 respectively.

From 1980 to 1982, the airborne magnetic survey were: resumption of the survey over the Samar area and Bicol region including the islands of Masbate; in-situ magnetic susceptibility measurement for palaeomagnetic study; and air-borne magnetic survey of Palawan Island, Zamboanga Provinces and eastern part of Mindanao.

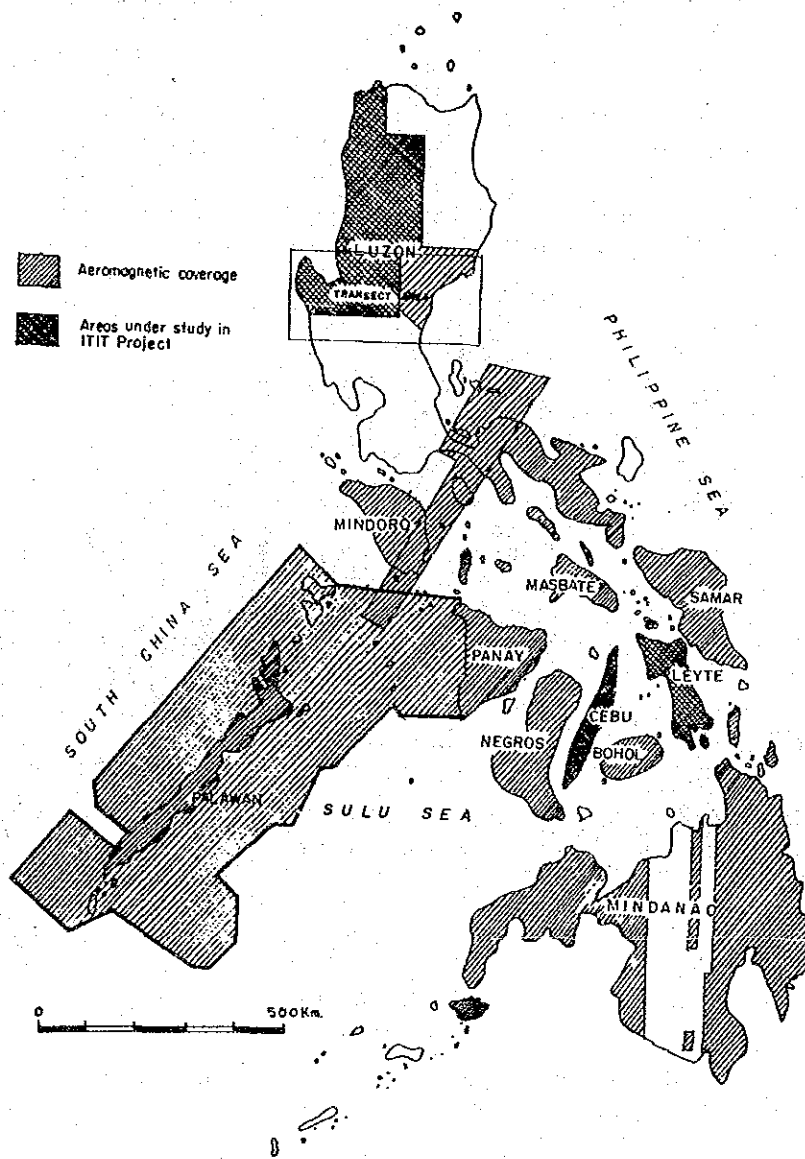


Fig-40-1 Aeromagnetic Map Coverage of the Philippines
 (After D.C. Daclison et al., 1983)

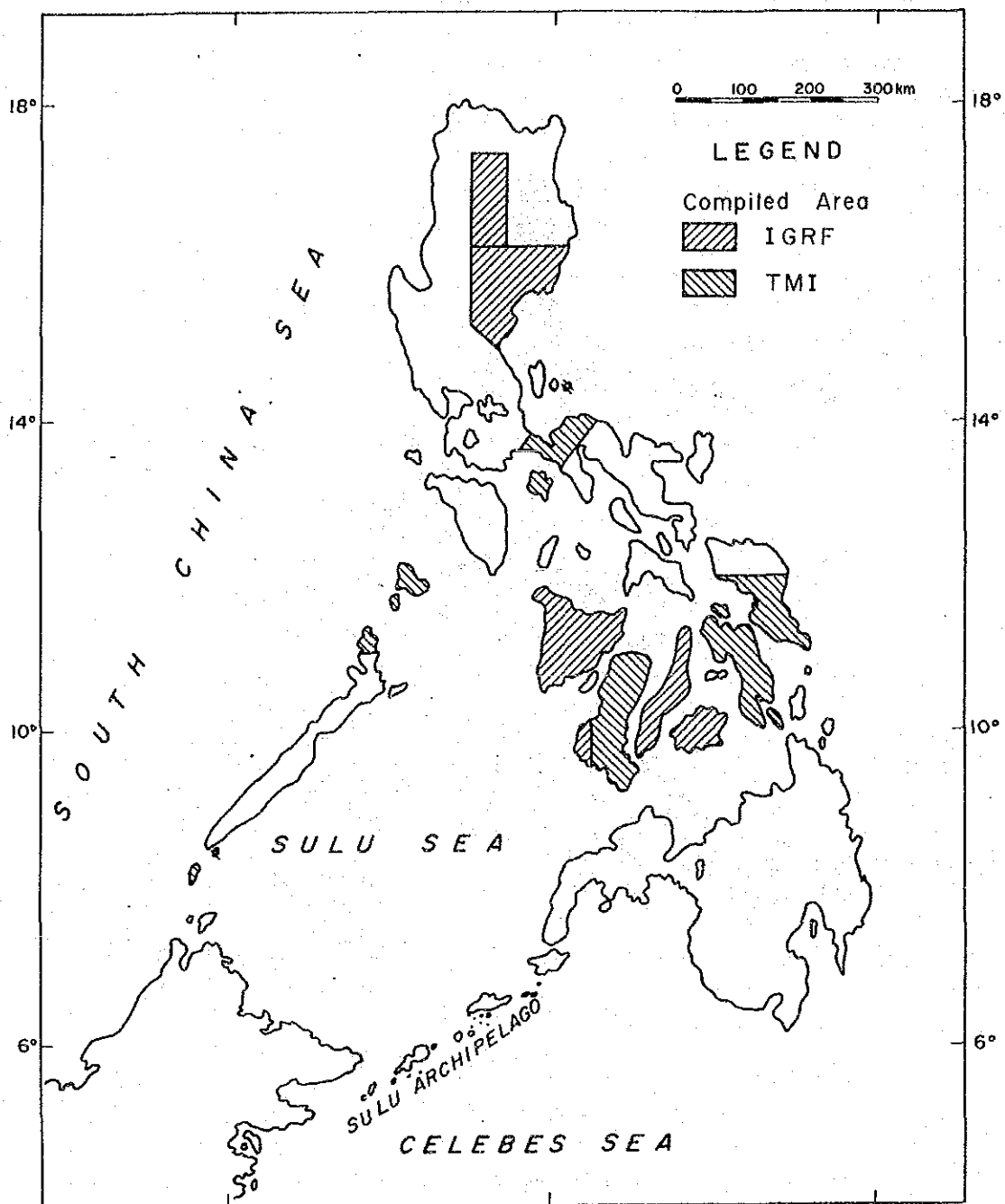


Fig-40-2 Limits of Available Aermagnetic Map

The primary objectives of the survey were to delineate magnetic bodies and structures and to provide basic information regarding the structures and geological development of particular regions relevant to the occurrences of mineral resources and petroleum potentials. It was expected that these surveys would provide basic geoscientific information pertinent for evaluating areas with potential of mineral and hydrocarbon resources.

(ii) Abstract of survey results

- (1) The aeromagnetic survey over Northwest Luzon revealed the presence of about 25 magnetic anomalies each possibly associated with mineralization. Relationship between magnetic anomalies and mineralization is evident in the Lamin area where iron deposits occur. Another magnetic anomaly, which apparently is much longer than the anomaly in the Lamin area, was delineated in Nueva Era. Previous geological investigations in Nueva Era suggest the presence of iron, copper, and gold mineralization.
- (2) The sharp and isolated anomalies in the southern part of Cordillera Central appear to be reflected and/or influenced by the Agno batholith which is associated with some porphyry copper deposits and other types of mineralization. The copper deposits of Philex Mine and Black Mountain Mine located in the southern section of the area is correlated to the negative anomalies.
- (3) Anomalies recognized in Central Luzon area are characterized by a long wavelength and low amplitude which are generally generated by the relatively deeper magnetic basement and usually reflect thick accumulation of sediments over flat topography. In the Zambales Range magnetic province, the negative pattern recognized and characterized by short wavelength and high amplitude trending NE-SW. The anomaly is reflected over an ophiolite complex consisting of peridotite, gabbro, dolerite and pillow lavas and the interpreted depth of the magnetic basement in this particular area is almost zero.
- (4) The magnetic anomalies delineated in the island of Cebu could be classified into two groups. The first group is located near the central part of the island characterized by almost E-W trending anomalies bounded by a pair of positive anomalies. The regional trend of the anomalies follows the trend of the major faults in the area and main part are influenced by the Neogene intrusive which is the loci of the porphyry copper deposits of the Atlas Mine. The second group located in the north and south of the island is related to the sedimentary rocks in the area.
- (5) The magnetic anomalies in north-central Leyte are mostly related to structural features, whereas magnetic anomalies delineated in southwestern and south-central Leyte may be located over mineralized zones. Massive sulphide deposits (Cu-Pb-Zn) have been observed in the locality.
- (6) The general trend of the magnetic anomalies in southwest Negros are parallel to the Neogene intrusive which host the mineralization in the area. Fault systems in the region sometimes border different types of magnetic anomalies. The structural zone controlled the copper mineralization.
- (7) Aeromagnetic data from the islands of Panay and Bohol are being analyzed and interpreted, while those from Samar, Bicol region, and Palawan and Mindanao are being processed and compiled for evaluation and interpretation.
- (8) In general, igneous rocks exhibit higher magnetic susceptibility of palaeomagnetism than sedimentary rocks.

6-2-2 Summary of regional gravity survey of the Philippines

(i) Brief contents of survey

Regional gravity survey of the Philippines was started in 1966 with the use of a Worden Prospector Model gravity meter. To date, the survey has covered about 45 percent of the land area of the Philippines (Fig-41). The surveyed areas include the whole island of Luzon, Catanduanes, Masbate, Marinduque, Mindoro, Cebu, Leyte, northeastern and southern tip of Negros and Balbac. Significant gravity anomalies have been delineated and each anomaly may be associated with the occurrence of high-density rock units, geological structures, and/or mineralization.

Gravity observations were taken every 5 to 10 km along roads and at 2-km to 3-km spacing in poorly accessible areas. Preliminary analysis and interpretation of data indicate the presence of gravity anomalies, which reflect structural features and rock type distribution in the island.

(ii) Abstract of survey results

- (1) A northwest-trending gravity high along the length of the island coincides with the Philippine Rift.
- (2) A broad northwest gravity high in the northeastern part is probably associated with the occurrence of basement complex composed of gabbro, schist, and peridotite.
- (3) Gravity lows at the northwestern portion cover limestone areas.
- (4) The Bouguer gravity anomaly of northern Luzon (Teodoro, 1970) features a gravity high near the Philex Mine and an overlapped negative anomaly might be related to the porphyry copper mine in addition to the large positive anomaly. A case of a similar combination of the gravity anomalies was pointed out around the Marcopper Mine in Marinduque (Sano, 1981).
- (5) Bouguer anomaly of Leyte Island suggests that most of the gravity high conform with the magnetic low.

6-2-3 Interrelation of geology, tectonics and results of regional geophysical surveys

The interrelation of geology, tectonics and the results of regional geophysical surveys--aeromagnetic survey and regional gravity survey--, had been done in the Philippines are approximately summarized as follows;

- (i) The magnetic anomalies are mainly delineated, being related to structural features (Leyte and central-northern Negros etc.), associated with mineralization (northwestern-central Luzon, central Cebu and Negros etc.) and reflected over lithologic character (Zambales Range in Luzon--ophiolite complex etc.)
- (ii) The positive magnetic anomalies are delineated near the porphyry copper deposit (The Atlas Mine in central Cebu)--mineralized intrusive bodies.
- (iii) The magnetic anomalies characterized by short wavelength and high amplitude are interpreted shallow depth of the magnetic basement (Zambales Range in Luzon), while long wavelength and low amplitude are generally generated by the relatively deeper magnetic basement (central Luzon).
- (iv) The gravity highs are mainly occurred being coincided with structural features (Philippine Rift) and probably associated with the occurrence of basic-ultramafic basements.

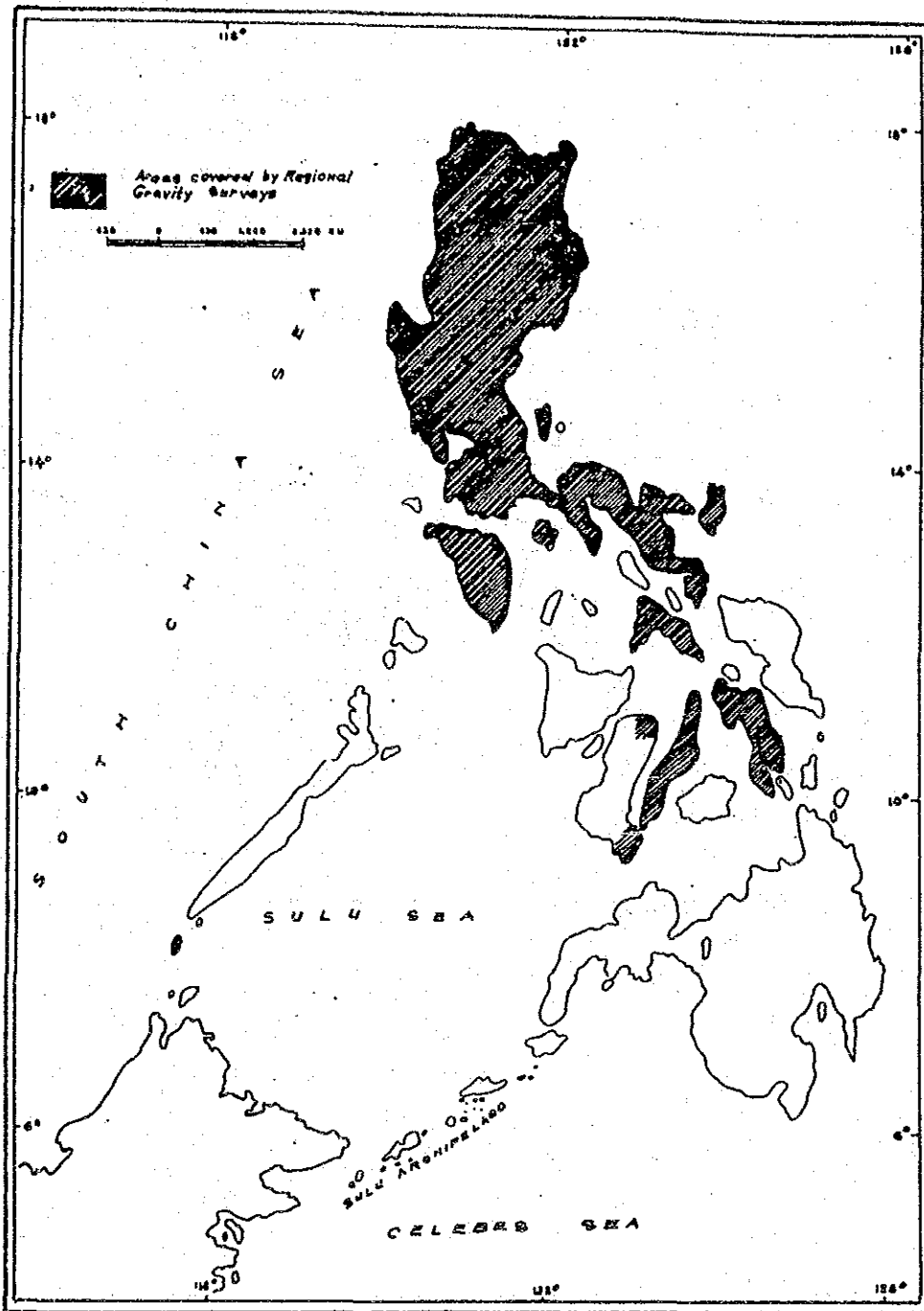


Fig-41-1 Map Showing Areas Covered by Regional Gravity Surveys in the Philippines
 (After Bureau of Mines and Geo-sciences, revised Document CCOP XVII (1980))

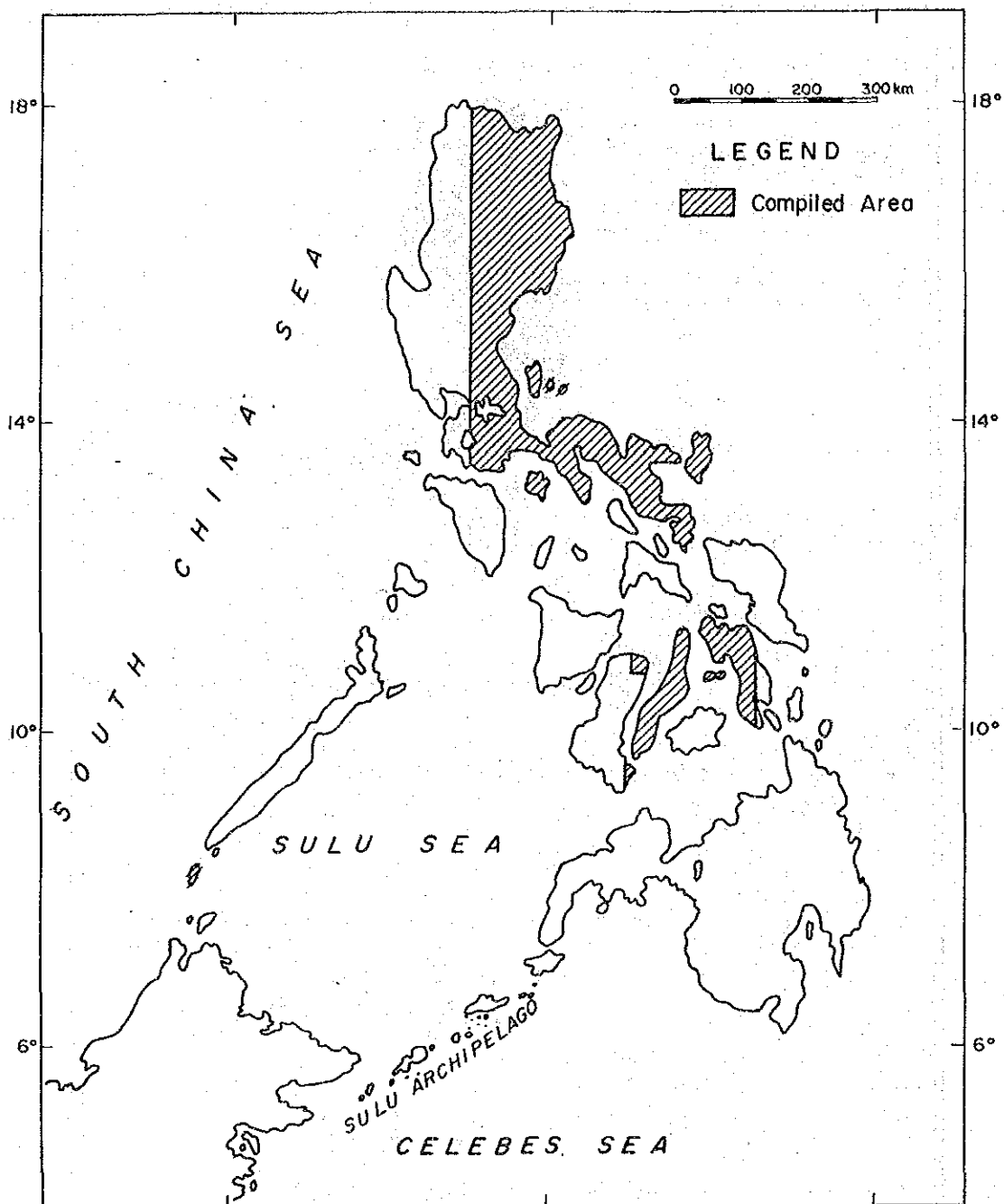


Fig-41-2 Limits of Available Gravity Map

- (v) The gravity lows cover limestone areas.
- (vi) The porphyry copper zone is located relating to overlapped negative Bouguer gravity anomaly in addition to the large positive anomaly in a gravity high (The Philex Mine in north-central Luzon), and a case of a similar combination of the gravity anomalies is pointed out around the Marcopper Mine in Marinduque.

6-3 Interpretation of the relationship between Geology, Ore Deposits and Landsat Analyses Results

The Philippine Island can be divided into 3 regions by the prominent direction of the lineaments from analyses of Landsat imageries. Their localities seem to reflect the differences of structural elements between of the mobile belt and of the stable region.

The areas of high lineament densities are Cordillera Central Range in northern Luzon, southern Sierra Madre Range of Luzon, central Mindoro, Catanduanes Island, central Palawan, central Cebu and the mountainous area of Mindanao.

Comparing the known faults, the major lineaments lie on Bangui Fault, Digdig Fault, Philippine Fault, Ulugan Fault and Mindoro fault and an abundant lineaments have been marked in the thrust zone of southern Panay and Zamboanga. However, the faults running through the plain are recognized only as local lineaments.

The relationship between Landsat analyses results and the localities of ore deposits has been studied based on Chapter 3 in this report. The results are summarized as below.

- (1) The high lineament densities tend to occur in the areas where copper and gold mineralizations of porphyry copper or other types (accompanied by acidic igneous activities) are distributed, while the low densities in the areas where chrome and nickel mineralizations (accompanied by ultramafic rock bodies) are distributed.
- (2) The areas of high lineament densities and their features are as follows.

(Northern Luzon)

The high lineament densities occur in the west and the northeast areas. In the former area, they are distributed at two places, namely the west and the southeast of Laoagu, around which some copper showings have been reported. In the latter area, high densities are marked at three places lining in an E-W direction, but no showings have been recognized.

(Northern part of Central Luzon)

In the area extending from the east to the north of Baguio, some high densities are arranged in a N-S direction. Many ore deposits of a porphyry copper type (such as Batong Buhay in the north, Sto. Nino and Sto. Thomas II near Baguio), a gold-copper vein type and a contact metasomatic type are known in this area.

(Western part of Central Luzon)

High densities are marked in the north of Zambales Range, where many chromite deposits represented by Acoje Mine are distributed.

(Eastern part of Central Luzon)

High densities are marked in the north of Zambales Range, where many chromite deposits widely developed in its surroundings, where Collosal porphyry copper deposit and Sta. Ines contact metasomatic deposit are known.

(Catanduanes Island)

High densities are distributed in the area from the north to the west, where some copper showings have been reported.

(Mindoro Island)

High densities occur in the southerly central part but no showings are found.

(Panay Island)

Two places of high densities are marked in the west part, around which a gold-copper vein type and a copper-sulfide Cyprus type ore deposits are distributed.

(Cebu Island)

High densities are marked on the northwest and the north of Cebu City, whereas the former contains Atlas Mine.

(Negros Island)

Small-scale high densities are observed in the southwest part and in the west of which Sipalay Mine is located. Besides, many porphyry copper deposits are distributed in the south.

(Palawan Island)

A relatively wide zone of high densities is found on the southeast of Puerto Princesa while two small-scaled zones on the south. In this island, some chrome and nickel deposits are known but no showings have been reported in the above-mentioned zones.

(Northern Mindanao)

High densities are marked on the east of Lake Mainit and the southwest of Surigao. Some gold-copper showings are distributed around these places.

(Western Mindanao)

In the southern Zamboanga Peninsula, there is a small-scaled high density zone around which lead-Zinc-Silver showings are recorded.

(Central Mindanao)

In the south of Mt. Kinabalin, there occurs a high density zone where gold-copper showings are reported.

(Southern Mindanao)

Three high density zones are observed in the south of Cotabato. In their surroundings, a considerably large number of showings have been reported.

- (3) It appears from the above that ore deposits or mineral showings are reported in the almost all areas of high lineament densities, which strongly suggest the close relationship between dense lineaments and mineralization. Therefore, new mineralizations can be presumed even in the rest areas where any showing has not been known.

6-4 Evaluation of Mineral Potentials in the "RP-Japan Mineral Exploration Project Area"

6-4-1 Procedure of evaluation

The procedure to evaluate potentials of minerals and ore deposits not dependent on numerals processed statistically but guided by judgement based on geological and mineralogical data collected in this survey in the "RP-Japan Mineral Exploration Project Area" are as follows:

- (i) Project area were sub-divided into seven (7) zones as below to estimate comparatively (Fig-42).

Zone I : central northern Sierra Madre Ranges
Zone II : Quezon Province (southern Sierra Madre), Polillo
Zone III : Bicol area, Catanduanes
Zone IV : eastern Visayas--Samar, Leyte, Dinagat etc.
Zone V : central Visayas--Bohol, Cebu, Negros, Siquijor etc.
Zone VI : western Visayas--Panay, Guimaras, Tablas etc.
Zone VII : Palawan area--Palawan, Busuanga etc.

- (ii) Extract ore deposits or ore showings per zone concerning mainly Cu, Au, Ag, Cr, Ni, and Co; and prioritize these ore deposits according to potential in each zone (Table-17, ex. Commodity Priorities per Zone -- ①, ②, ④, in the order of decreasing priority).
- (iii) Consequently prioritize for each zone in accordance with the main minerals to clarify notional superiorities of zones in the whole project area (Table-17, ex. (1), (2),(7), in the order of decreasing priority).

6-4-2 Evaluation

The potentials of mineral deposits have some local characteristics related to geology and tectonic features.

Based on Table-17, evaluation of potentials of minerals and ore deposits for the whole project area are as follows:

- (i) For chrome, nickel and cobalt, Zone-VII (Palawan), Zone-I (central - northern Sierra Madre) and Zone-IV (eastern Visayas) where ophiolite complexes are predominant, are ranked high.
- (ii) For copper, considering porphyry copper and kuroko-type deposits which are generated in magmatic arc terranes, and cyprus-type massive sulfide deposit which are associated with ophiolite terranes, Zone-I (central -northern Sierra Madre), Zone-II (Quezon) and Zone-IV (eastern Visayas) are ranked high. Especially Zone-I and Zone-II where any important ore deposit or showing had not been known, are ranked high because of high potential in the future.
- (iii) For gold and silver, Zone-II (Quezon), Zone-III (Bicol), Zone-V (central Visayas) and Zone-IV (eastern Visayas) are ranked high, considering association with porphyry copper and kuroko-type deposits and the fact that most gold lode deposits are located near and along the Philippine Fault.

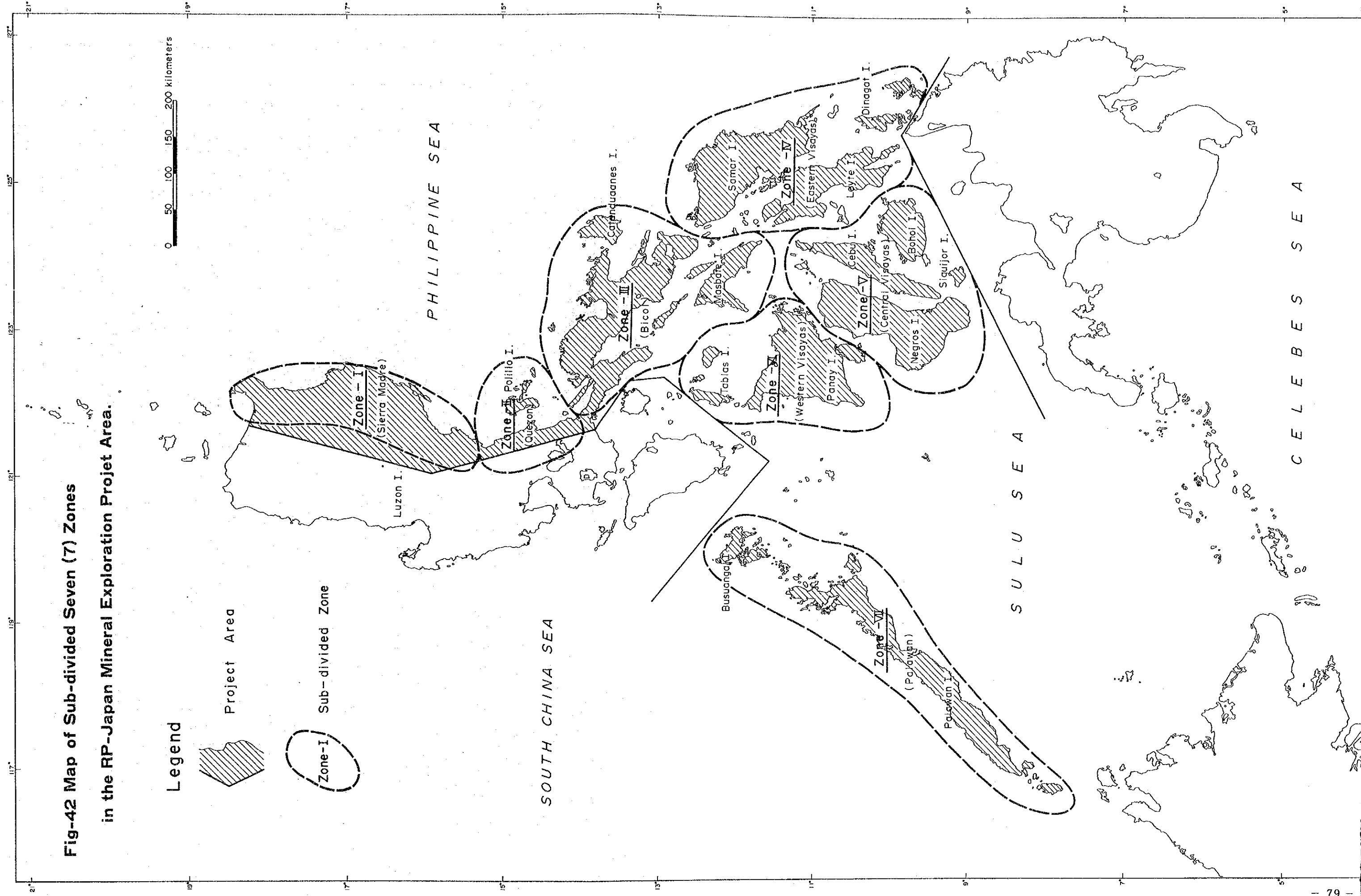


Fig-42 Map of Sub-divided Seven (7) Zones

in the RP-Japan Mineral Exploration Project Area.

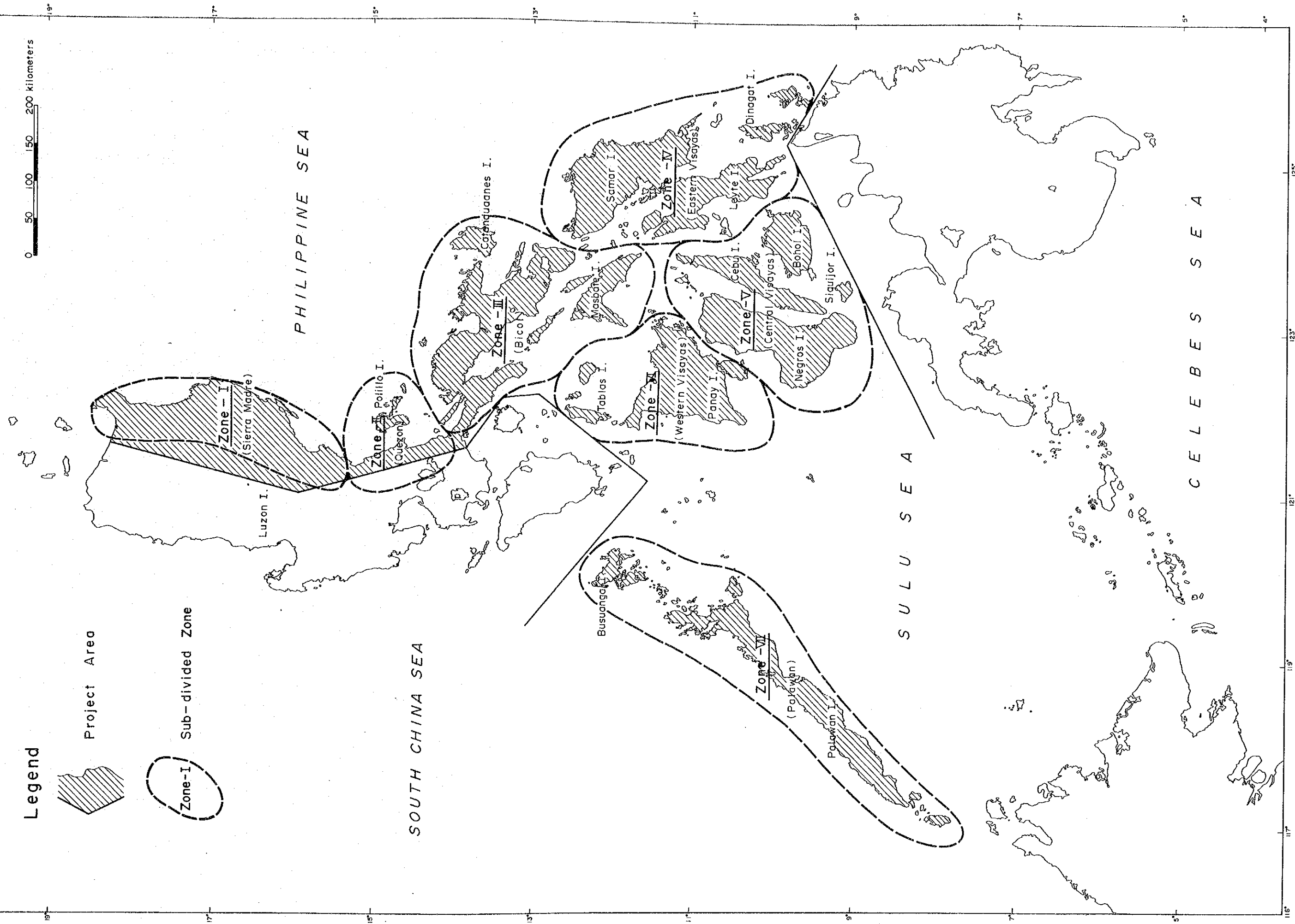


Table-17 Bases of Evaluation of Priorities in the "RP-Japan Mineral Exploration Project Area"

Zone	Commodity Priorities per Zone	Cu	Au/Ag	Cr/Ni/Co
I (Sierra Madre)	① Cu - Porphyry type Massive sulfides (Cyprus, Kuroko) ② Au - Vein type/ Placer ③ Cr - Laterite/Massive podiform	(1)	(5)	(2)
II (Quezon)	① Au - Vein type/Placer ② Cu/Mo - Porphyry/Kuroko ③ Cr/Ni - Podiform/Laterite	(2)	(1)	(5)
III (Bicol)	① Au - Vein type/Placer ② Cu - Porphyry/Kuroko/Kieslager	(6)	(2)	(6)
IV (Eastern Visayas)	① Cu - Kuroko/Porphyry ② Au - Vein type ③ Cr/Ni - Podiform/Laterite (SE-Samar)	(3)	(4)	(3)
V (Central Visayas)	① Au - Vein type ② Cu - Porphyry/Massive/Vein type/ Kuroko	(4)	(3)	(7)
VI (Western Visayas)	① Cu - Prphyry/Cyprus type ② Au - Vein type ③ Cr - Podiform/Laterite	(5)	(6)	(4)
VII (Palawan)	① Cr - Podiform/Laterite ② Ni - Laterite ③ Cu - Porphyry ④ Au - Vein type	(7)	(7)	} (1)

CHAPTER 7. CONCLUSIONS

AND RECOMMENDATIONS

Chapter 7. Conclusions and Recommendations

7-1 Conclusions of Survey

- (i) The principal objective of survey in the Philippines was collection of geological maps and mineral inventory maps in the RP-Japan mineral exploration area. This was attained sufficiently for more than ninety (90) percent of the project area. Aside from survey data, mining activity data and mining statistics were also obtained.
- (ii) The major mineral resources in the Philippines are copper, chrome, nickel and gold, which respectively rank seventh (271 thousand tons/year), eighth (356 thousand tons/ore/year), sixth (14 thousand tons/year) and fifth (25.9 tons/year) in 1982 free-world production.
- (iii) The Philippines is an amalgamation of various crustal terranes (ophiolites, metamorphics=microcontinents, and magmatic arcs) that have coalesced in response to complex and rapidly changing interaction between three converging megaplates since the Mesozoic, and it is divisible into "stable or aseismic belt" and "Philippine mobile belt" seismically or active area.
- (iv) The major ore deposits in the Philippines that have been generated in close relation to crustal tectonics are copper and chromite deposits. Copper deposits are mainly of cyprus-type massive sulfide and vein-type deposits associated with ophiolite terranes originated from oceanic crust, kuroko-type, porphyry copper, contact-metasomatic and hydrothermal vein-type deposits in belts of igneous activity forming island arcs (=magmatic arc terranes). Chromite deposits are exclusively associated with alpine-type peridotite-dunite-gabbro complexes in ophiolite terranes.
- (v) More than ninety percent of potential gold metal in the Philippines are by-product of porphyry copper deposits. However, most gold-lode deposits are near and along the zone of Philippine Fault.
- (vi) From the regional geophysical surveys accomplished to date in the Philippines, magnetic anomalies delineated are obviously related to structural features associated with mineralization and reflected by lithologic character (ophiolite complex etc). The gravity highs mainly coincide with structural features (Philippine Rift) and probably associated with the occurrence of basic-ultra-basic basements, whereas the gravity lows covers limestone areas, etc.
- (vii) From the Landsat imagery analysis, high lineament densities tend to occur in the areas where copper and gold mineralization of porphyry copper or other types accompanied by acidic igneous activities are distributed. Ore deposits or mineral showings are reported in the almost all areas of high lineament densities, which strongly suggest the close relationship between dense lineament and mineralization. Therefore, new mineralization can be presumed even in areas where any showing has not been known. Low lineament densities tend to occur in the areas of ophiolites where chrome and nickel mineralizations are distributed.

- (viii) The whole "RP-Japan mineral exploration project area" is sub-divided into seven (7) zones, and an evaluation of mineral potentials for major ore minerals - Cu, Au, Ag, Cr, Ni and Co -, based on the judgement brought from geological and mineralogical data collected in this survey, was attempted. Consequently, it was shown that mineral potentials have some local characteristics connected with geology and tectonic features. Thus: (1) potentials of Cr-Ni-Co were ranked higher in areas -- Zone-VII (Palawan), Zone-I (central - northern Sierra Madre) and Zone-IV (eastern Visayas) where ophiolite predominantly distributed, (2) potentials of Copper were ranked higher in areas -- Zone-I (central - northern Sierra Madre), Zone-II (Quezon) and Zone-IV (eastern Visayas) where magma arc belts were located and ophiolite complexes were also distributed, (3) potentials of Au-Ag were ranked higher in areas -- Zone-II (Quezon), Zone-III (Bicol), Zone-V (central Visayas) and Zone-IV (eastern Visayas) due to association with porphyry copper etc. and the relationship between gold-lode deposits and Philippine Fault.

7-2 Recommendations for following works

- (i) On the relationship between mineralizations and tectonic features in the Philippines, copper, gold, silver, chrome, nickel and cobalt were pointed out as main mineral resources holding high existing potential. So these minerals should be explored as main target in the future.
- (ii) On the above-mentioned condition, in case of regional geochemical survey, analytical elements corresponding with regional geological circumstances and target minerals have to be chosen, and many elements are not necessary to analyze.
- (iii) On the analysis of geochemical survey data, the selection of "Population", adapted to regional geological circumstances, should be done carefully to avoid the extraction of erroneous geochemical anomalies.
- (iv) Some areas where high lineament densities are recognized from Landsat imageries but any important ore deposits or showings have not been known are considered to be promising zone for copper and gold, therefore much attention has to be taken in stage of preliminary regional survey.

CHAPTER 8. APPENDICES

Chapter 8 Appendices

8-1 Climatological Data

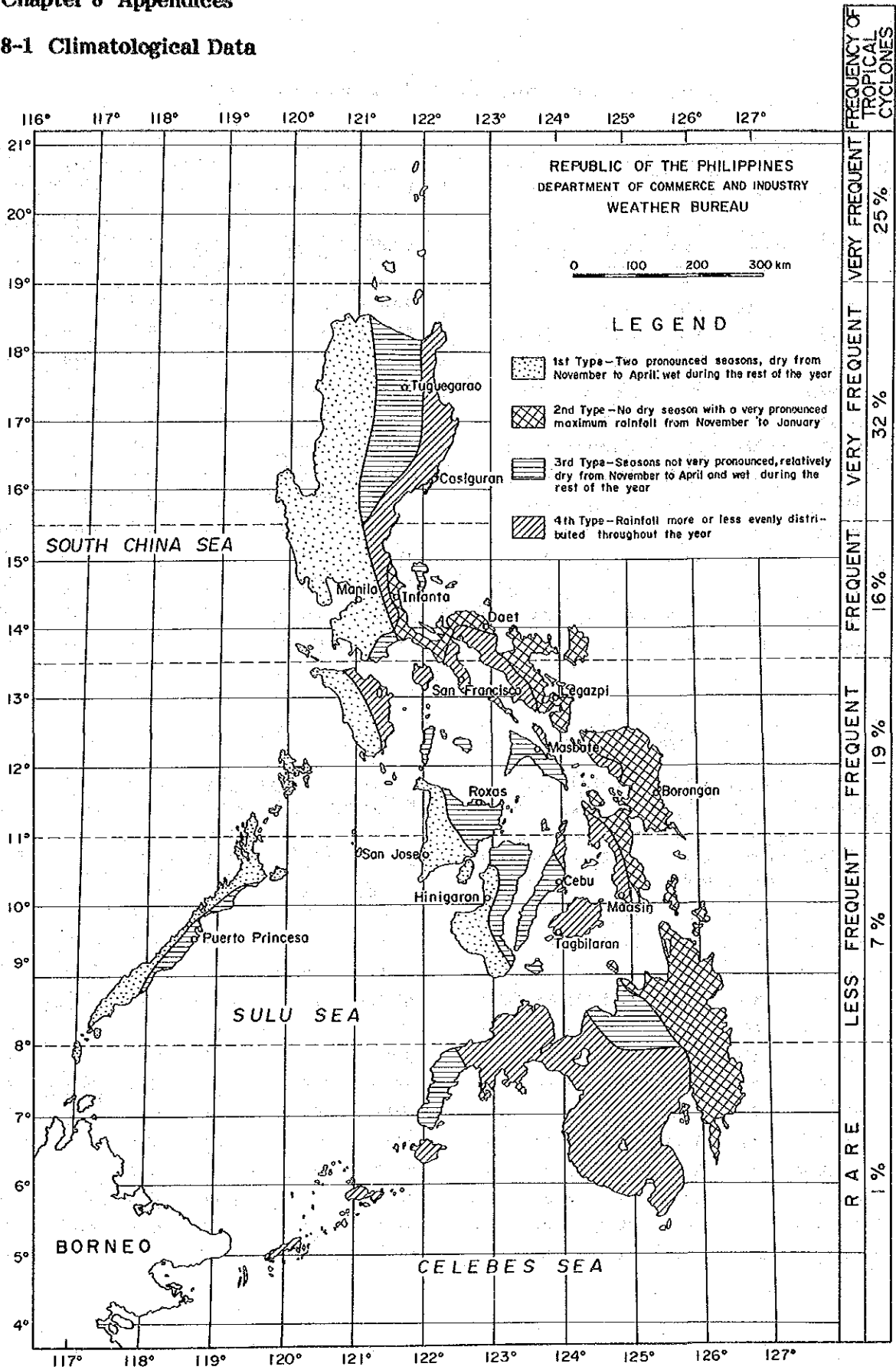


Fig.-43 Climate Map of the Philippines

Table-18 Climatological Data of major Station

Station : TUGUEGARAO, CAGAYAN
 Period of Record : 1951 - 1970 (3rd Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	20.4	6	29.6	19.5	80
FEB	18.8	4	31.5	19.5	76
MAR	37.4	5	34.1	21.2	71
APR	54.3	5	36.1	22.8	68
MAY	103.6	10	37.1	23.8	69
JUN	192.8	13	35.8	23.9	75
JUL	211.5	14	35.0	23.7	77
AUG	248.7	15	34.3	23.8	79
SEP	220.4	15	33.8	23.5	80
OCT	226.3	14	32.5	22.6	81
NOV	280.1	15	30.4	21.7	84
DEC	105.4	11	29.3	20.6	84
Annual	1,700.3	127	33.3	22.2	77

Station : CASIGURAN, AURORA
 Period of Record : 1951 - 1970 (4th Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	230.8	18	27.9	19.3	89
FEB	180.5	15	28.5	19.1	88
MAR	198.6	15	29.9	19.8	87
APR	143.3	15	31.5	21.0	85
MAY	239.3	16	32.8	22.0	84
JUN	226.5	15	33.0	22.6	84
JUL	239.3	17	32.6	22.4	86
AUG	266.8	18	32.2	22.5	87
SEP	265.0	18	32.2	22.2	87
OCT	351.7	18	31.4	21.4	86
NOV	637.5	20	29.8	21.0	87
DEC	457.3	20	28.7	20.3	88
Annual	3,436.6	203	30.9	21.1	87

Station : INFANTA, QUEZON (2nd Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	379.4	25	27.2	21.9	87
FEB	241.6	20	27.8	21.9	85
MAR	183.5	16	29.3	22.5	84
APR	192.0	17	30.8	23.6	83
MAY	199.3	16	32.1	24.2	81
JUN	216.7	17	32.5	24.4	80
JUL	236.6	18	32.1	24.2	81
AUG	227.7	19	31.8	24.3	81
SEP	297.3	19	31.5	23.9	82
OCT	503.5	25	30.2	23.5	85
NOV	572.8	24	29.2	23.5	86
DEC	537.4	27	27.8	22.8	87
Annual	3,787.8	244	30.2	23.4	84

Station : MANILA (1st Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	13.3	4	29.7	22.2	72
FEB	6.3	3	30.3	22.4	69
MAR	10.1	4	31.9	23.5	65
APR	21.3	4	33.2	24.9	64
MAY	122.9	9	33.5	25.6	69
JUN	286.9	16	32.1	25.2	76
JUL	354.3	22	31.2	24.7	79
AUG	473.9	22	30.5	24.5	82
SEP	401.0	22	30.6	24.4	82
OCT	181.9	17	31.1	24.3	77
NOV	114.2	12	30.6	23.7	76
DEC	58.1	9	29.8	22.9	75
Annual	2,044.2	142	31.2	24.0	74

Station : DAET, CAMARINES NORTE
 Period of Record : 1951 - 1970 (2nd Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	361.8	24	28.3	22.3	84
FEB	191.7	18	29.0	22.2	81
MAR	165.2	14	30.3	22.5	81
APR	131.7	14	31.6	23.3	81
MAY	137.2	13	33.0	23.9	80
JUN	163.9	15	33.2	24.0	81
JUL	206.1	17	32.5	23.8	83
AUG	275.7	19	32.1	24.0	83
SEP	270.3	19	32.0	23.6	84
OCT	494.7	24	31.1	23.9	85
NOV	614.1	24	30.1	23.5	84
DEC	537.6	27	29.0	23.1	85
Annual	3,550.0	225	31.0	23.3	82

Station : SAN FRANCISCO, QUEZON
 Period of Record : 1951 - 1970 (4th Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	52.4	11	29.4	21.3	84
FEB	18.8	7	30.1	21.3	83
MAR	29.1	7	31.2	21.9	79
APR	25.6	4	32.3	22.7	76
MAY	93.4	8	32.7	23.7	74
JUN	162.8	14	31.9	24.0	75
JUL	236.5	19	31.2	23.9	77
AUG	204.6	17	30.8	24.3	77
SEP	192.7	17	30.9	23.9	77
OCT	231.1	18	31.1	23.0	79
NOV	186.1	15	30.7	22.8	80
DEC	137.7	14	29.8	22.1	83
Annual	1,570.7	150	31.0	22.9	79

Station : LEGAZPI, ALBAY (2nd Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	301.6	21	28.7	22.3	84
FEB	176.2	17	29.1	22.3	83
MAR	207.6	17	29.9	22.8	82
APR	172.7	17	31.1	23.6	83
MAY	182.2	14	32.2	24.1	82
JUN	205.4	16	32.5	24.0	82
JUL	229.8	19	31.9	23.7	84
AUG	282.9	20	31.7	23.8	85
SEP	247.3	20	31.7	23.5	85
OCT	307.3	20	31.3	23.1	85
NOV	478.3	21	30.3	23.1	85
DEC	466.3	23	29.2	22.8	86
Annual	3,257.6	225	30.8	23.2	84

Station : MASBATE, MASBATE (3rd Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	170.9	15	29.5	23.4	83
FEB	74.9	11	30.0	23.1	82
MAR	64.3	10	31.3	23.7	80
APR	42.5	6	32.6	24.8	79
MAY	105.6	8	33.4	25.4	78
JUN	141.4	14	33.1	25.4	79
JUL	179.5	16	32.4	25.1	82
AUG	205.2	17	32.1	25.1	83
SEP	181.2	15	32.0	25.0	83
OCT	224.8	16	31.7	24.8	83
NOV	239.1	16	30.9	24.6	84
DEC	227.9	16	29.9	23.9	85
Annual	1,857.3	159	31.6	24.5	82

Station : BORONGAN, EASTERN SAMAR
 Period of Record : 1951 - 1970 (2nd Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	605.9	25	29.1	22.6	86
FEB	414.7	22	29.3	22.5	85
MAR	306.5	22	30.3	22.8	84
APR	265.2	22	31.3	23.4	84
MAY	332.5	20	32.0	23.6	84
JUN	220.3	18	32.3	23.5	84
JUL	210.9	17	32.2	23.2	84
AUG	209.2	15	32.6	23.3	82
SEP	190.7	16	32.7	23.2	82
OCT	305.3	20	31.8	23.0	84
NOV	512.7	22	30.7	22.9	86
DEC	670.5	26	29.8	22.8	86
Annual	4,244.4	246	31.2	23.1	84

Station : MAASIN, SOUTHERN LEYTE
 Period of Record : 1972 - 1979 (4th Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	207.5	13	30.0	21.2	79
FEB	142.6	11	30.3	21.5	77
MAR	91.9	7	31.0	22.0	76
APR	95.8	9	31.0	22.7	75
MAY	80.6	8	32.1	22.6	73
JUN	128.6	12	31.4	22.3	75
JUL	178.7	12	30.6	22.7	76
AUG	159.0	14	31.0	22.8	78
SEP	153.2	14	30.8	22.6	78
OCT	251.2	16	31.0	22.5	78
NOV	201.0	16	30.7	22.0	77
DEC	211.7	18	30.0	21.7	79
Annual	1,901.8	150	30.8	22.2	77

Station : CEBU, CEBU (3rd Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	100.2	13	30.2	22.7	78
FEB	70.3	11	30.5	22.7	76
MAR	53.9	11	31.6	23.1	75
APR	58.2	8	32.8	24.0	72
MAY	114.8	12	33.0	24.7	75
JUN	178.1	16	32.0	24.2	79
JUL	208.7	18	31.3	23.8	81
AUG	189.5	17	31.5	23.9	80
SEP	178.1	16	31.4	23.8	81
OCT	191.1	20	31.4	23.6	82
NOV	161.9	15	31.0	23.5	81
DEC	133.3	16	30.5	23.0	80
Annual	1,638.1	173	31.4	23.6	78

Station : TAGBILARAN, BOHOL
 Period of Record : 1961 - 1970 (4th Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	104.2	14	30.6	21.5	83
FEB	90.5	11	30.7	21.4	81
MAR	87.5	10	31.8	21.5	80
APR	63.5	9	33.0	22.5	77
MAY	72.0	9	33.5	23.5	78
JUN	149.5	15	32.9	23.5	80
JUL	130.1	15	32.5	23.4	81
AUG	110.1	14	32.8	23.6	79
SEP	104.6	12	33.1	23.7	79
OCT	167.5	18	32.6	22.8	83
NOV	204.2	16	32.1	22.4	83
DEC	110.9	19	31.6	22.1	84
Annual	1,394.6	162	32.3	22.7	81

Station : ROXAS, CAPIZ (3rd Type)
 Period of Record : 1951 - 1970

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	107.4	15	29.7	23.7	79
FEB	52.7	10	30.1	23.7	78
MAR	54.7	9	31.1	24.3	76
APR	43.5	6	32.5	25.4	73
MAY	167.1	12	33.4	25.4	75
JUN	277.6	17	33.4	24.5	78
JUL	280.6	18	32.8	24.1	80
AUG	249.3	18	32.8	24.1	80
SEP	234.6	17	32.8	24.0	81
OCT	354.1	20	32.1	24.2	81
NOV	239.4	18	31.3	24.5	80
DEC	176.8	17	30.2	24.3	80
Annual	2,237.8	175	31.9	24.3	78

Station : SAN JOSE, ANTIQUE (1st Type)
 Period of Record : 1902 - 1932

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	33.0	4	30.3	21.3	79
FEB	22.9	3	30.9	21.4	81
MAR	19.0	3	31.6	21.9	80
APR	45.7	4	32.8	23.2	77
MAY	222.5	14	31.7	24.0	83
JUN	370.3	20	30.5	23.8	85
JUL	615.7	23	29.8	23.5	86
AUG	530.6	21	30.0	23.7	86
SEP	490.5	20	30.1	23.4	86
OCT	351.8	16	30.0	23.2	86
NOV	183.4	10	30.3	22.7	84
DEC	53.6	7	30.3	22.0	82
Annual	2,933.0	145	30.7	22.8	83

Station : HINIGARAN, NEGROS OCCIDENTAL (1st Type)
 Period of Record : 1919 - 1933

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	72.6	8	30.4	21.9	NA
FEB	47.0	5	31.5	22.0	NA
MAR	38.1	5	32.2	22.2	NA
APR	55.1	4	33.2	23.1	NA
MAY	221.1	12	32.1	23.5	NA
JUN	211.6	15	30.8	23.1	NA
JUL	467.1	20	30.0	22.9	NA
AUG	336.6	18	30.2	22.8	NA
SEP	330.7	16	30.5	22.9	NA
OCT	279.4	15	30.9	21.7	NA
NOV	214.1	13	31.0	22.5	NA
DEC	94.0	9	30.9	22.0	NA
Annual	2,367.5	140	31.1	22.5	NA

Station : PUERTO PRINCESA, PALAWAN
 Period of Record : 1951 - 1970 (3rd Type)

Month	Rainfall (mm.)	No. of Rainy Days	Temp. (°C)		Relative Humidity (%)
			Maximum	Minimum	
JAN	34.7	4	30.8	22.8	84
FEB	20.9	3	31.3	22.7	82
MAR	47.2	4	32.1	23.4	81
APR	42.1	6	33.0	24.2	80
MAY	151.8	12	32.5	24.7	83
JUN	168.6	15	31.2	24.0	86
JUL	185.2	16	30.8	23.6	87
AUG	205.5	17	30.8	23.5	87
SEP	187.9	16	31.0	23.5	86
OCT	182.2	15	31.2	23.9	87
NOV	215.1	13	31.1	23.5	86
DEC	125.7	8	30.9	23.3	85
Annual	1,566.9	127	31.4	23.6	84

8-2 NAME OF MINES AND MINERAL SHOWINGS

Table-19 List of Mine/Explored/Developed/Prospect/Indication (Metallics and Nonmetallics) in the Project Area

1. Northern Sierra Madre
 - 1) Cagayan
 - 2) Isabela
 - 3) Quirino
 - 4) Ifugao
 - 5) Nueva Vizcaya
2. Southern Sierra Madre and Polillo
 - Quezon
 - Nueva Ecija
 - Bulacan
 - Rizal
3. Bicol Region
 - Camarines Norte
 - Camarines Sur
 - Albay
 - Sorsogon
4. Catanduanes
5. Masbate Island
6. Samar Island
7. Leyte Island
8. Panay Island
9. Negros Island
10. Cebu Island
11. Bohol Island
12. Siquijor Island
13. Dinagat and Siargao Islands
14. Palawan
15. Romblon

Notes: Heading number of each mine etc. is corresponding to the number of Mineral Inventory Map. (PL 5-1 to 14),

Abbreviation

Metallics

Au : Gold
Ag : Silver
Al : Aluminum
As : Arsenic
Bax : Bauxite
Cu : Copper
Co : Cobalt
Cr : Chromite
Fe : Iron
Hg : Mercury
Mn : Manganese
Mo : Molybdenum
Ni : Nickel
Pb : Lead
Sb : Antimony
Sn : Tin
U : Uranium
W : Tungsten
Zn : Zinc

Nonmetallics

Asb : Asbestos
Asp : Asphalt
Bar : Barite
Bn : Bentonite
Cly : Clay
Coal : Coal
Dia : Diatomaceous Earth
Dol : Dolomite
Fd : Feldspar
Fl : Flourite
Gn : Guano
GnP : Guano-Phosphate
Gr : Granite
Gyp : Gypsum
Ls : Limestone
Mbl : Marble
P : Phosphate
Peb : Pebble
Peat : Peat
Per : Perlite
Py : Pyrite
S : Sulfur
Sh : Shale
Si : Silica
Sis : Silica Sand
Ss : Sandstone
Tlc : Talc

1. Northern Sierra Madre

1) Cagayan

Metallics

2. Broderth & Magdangal	Fe
3. Lal-lo	Mn
4. APEX	Fe
5. Marina Mines	Fe
6. Mayonga Mining Co., Ltd.	Fe
7. Camalaniugan	Fe
10. Sanchez Mira	Fe
11. Calaveria	Fe
13. FE VA Mining Co.	Fe

Nonmetallics

1. San Vicente, Santa Ana	Ls
8. Angang	Cly
9. Liwan	Cly
12. Makatay	Gyp

2) Isabela

Metallics

1. Cordon, Marian Copper deposits	Cu
3. Diwed	Cu
4. Agar	Cu
5. Calabasa	Cu
6. Menuma	Cu
7. Saigot	Cu
8. Ilagan	Cu
9. Disawat No. 1	Cu
10. Disawat No. 2	Cu
11. Isabela	Cu
12. J-Group of Claims	Cu
13. Marian Group of Claims	Cu
14. Ilut	Cu
15. Kimmaldero	Cu
16. Diadi	Cu
17. Didadongan	Cu
18. Black Rock Mining Corp.	Cu
19. Diwakawal, Dinapigue	Cu
20. Dicavatuel	Mn
21. Black Rock Mining Corp.	Mn
22. San Luis	Cu
26. Kinaipang	Cu
27. Black Rock Ming Corp.	Cu
28. Bicobian, Ilagan	Cu, Mn
29. Cordon	Cu
30. Marian	Cu
31. Caguilingan	Cu
32. Olympus Mineral & Explora- tion Co.	Cu
33. Emmy & M Claim of Vulcan Ind'l & Mining Corp.	Cu

Nonmetallics

2. Santa Maria Coal Mines	Coal
23. Cagayan Valley	Ls
24. Basian Mining Association	Ls
25. Dindenan No. 1	Py

3) Quirino

Metallics

- | | |
|-------------------------------------|----|
| 1. Mr. Jose de Leon | Cu |
| 3. Pugot-Mining & Exploration Corp. | Cu |

Nonmetallics

- | | |
|-------------------|----|
| 2. Cecilio Mining | Ls |
|-------------------|----|

4) Ifugao

Metallics

- | | |
|---|----|
| 2. Potia, Lepanto Exploration (Asia) Inc. | Cu |
|---|----|

Nonmetallics

- | | |
|--|-----|
| 1. Jurisdictions of Aritao and Bambang | Cly |
|--|-----|

5) Nueva Vizcaya

Metallics

- | | |
|-----------------|--------------------|
| 1. Bray | Cu |
| 2. Inaban | Cu |
| 3. Cawayan | Cu, Au |
| 4. Taduan | Cu, Zn, Pb, Au, Ag |
| 5. Dupax | Cu, Zn |
| 6. Tuggle-Gibbs | Mo |
| 7. Niponga | Cu, Au, Ag |
| 8. Sta. Cecilia | Fe |

Nonmetallics

- | | |
|-----------------------------|-----|
| 9. Malacbit | Cly |
| 11. Dupax de Sur; Norte | Py |
| 12. I-iyoy | Cly |
| 13. Tulalang-Banila | Cly |
| 14. Ambognio | Gyp |
| 15. Aritao, Dupax del Norte | Cly |

2. Southern Sierra Madre and Polillo

Metallics

- | | |
|---------------------|--------|
| 1. Delasag | Cu |
| 2. Casigukan | Cu |
| 4. San Idefonso | Cu |
| 5. Dilalongan | Cu |
| 6. Dinalungan | Cu |
| 7. Diarabasin | Cu, Mn |
| 8. Ditec | Cu |
| 9. San Luis | Mn |
| 11. Nasudijan | Cu |
| 13. Besog | Cu |
| 14. Madulag, Baler | Mn |
| 15. Libok, Gaddidon | Mn |
| 16. Papaya | Au |
| 17. Sumacbao, Gapan | Cu |
| 18. Ibonga | Cu |
| 23. Norsagaray | Fe |

Nonmetallics

- | | |
|----------------------|------|
| 3. Dilalongan Reach | Si |
| 10. Ulebete | Mbl |
| 12. Bateria, Bagting | Fd |
| 19. Cogonan, Sibul | Mbl |
| 20. Suklay | Gyp |
| 21. Dingalan | Ls |
| 22. Akle, San Rafael | Cly |
| 25. Suga, Norzagaray | Ls |
| 33. Anibawan | Coal |
| 34. Burdeos | Ls |
| 35. West Burdeos | Coal |
| 40. Mauban | Ls |
| 41. Paglubog | Mbl |
| 43. Sampaloc | Mbl |
| 44. Piis, Lucban | Cly |
| 45. Lawique, Tayabas | Ls |

2. Southern Sierra Madre and Polillo (Continued)

<u>Metallics</u>		<u>Nonmetallics</u>	
24. Angat	Cu	46. Sta. Catalina, Atimon	Ls
26. Angelo Mountains	Au, Ag, Zn	47. Lipata	Ls
27. Luzon Mining	Au	48. Sapaan	Mbl
28. Puray	Cu	50. Sta. Cecilia, Tagkawayan	Si
29. Bosoboso River, Rizal	Au	51. Abi	Si
30. Lumbay, Collosal	Cu	56. Lipata, Padre Burgos	Ls
31. Sta. Ines	Fe	57. Lawigue, Tayabas	Ls
32. Tigman River, Real	Au	59. Burdeos	Coal
36. Mt. Malolod	Fe	60. Cabungalunan, Burdeos	Ls
37. May-Ilaw	Fe	61. Anibauan, Burdeos	Coal
38. Marcopper Prospect	Cu	62. Tanay	Mbl
39. Kalubakis	Fe	63. Tanay	Ls
42. Lagingbayan	Cu	64. Pantay, Antipolo	Ls
49. San Vicente	Cu	65. Antipolo	Cly
58. San Rafael, Burdeos	Fe	66. Teresa	Ls
67. Limutan, Gen. Nakar	Cu	68. Norzagaray, Bulacan	Si
74. Bulacan Iron Deposit	Fe	69. Norzagaray, Bulacan	Ls
78. Bilintongan, Gen. Tinio	Cu	70. Pingalan	Ls
79. Gapan Mining Ass.	Cu	71. Dingalan	Ls
80. NE1369	Mn	72. Camachino, San Ildefonso	Cly
81. Madulag, Baler	Mn	73. Tungku, Alagao	Ls
82. Ortegon, Liggayu	Cu	75. Camachino, San Miguel	Cly
84. Artavi Mining Co.	Cu, Mn	76. Pulong Bato, Alagao	Mbl
86. Carranglan	Cu	77. Camachille, Angat	Ls
87. Puncan	Mn	83. Sumpawo, Pantabangan	Coal
		85. Pantabangan	Cly
		88. Maringalo	Si
		89. Burgos, Carranglan	Si

3. Bicol Region

<u>Metallics</u>		<u>Nonmetallics</u>	
2. Villa, Aurura	Fe	41. Libobo, Ragay	Cly
12. Larap, Philippine Mine	Fe	44. Sigamot, Libmanan	GnP
13. Larap, Macalineo Mine	Fe	46. Pay-gay, Libmanan	GmP
17. Barbara Mine	Au	47. Bical, Libmanan	Ls
18. Paracale-Gumaus Mine	Au	55. San Vicente, Tinambac	Cly
21. Capacuan	Fe	58. Siruma	Cly
26. Malaguit	Au	64. Sibobo	Cly
27. Labnig, Golden Rock Mine	Au	78. Lagnoy	Mbl
30. Agusan Mine	Au	94. San Sebastian-Bulalacao	Mbl
34. Potot Mine	Fe	95. Limang, Paniman	Ls
36. Talisay-Vinson	Fe	97. Paniman	GnP
51. Tinalmud, Pasacao	Cu	106. Cararan	Gyp
57. Bani	Mn	107. Bula & Balatan	Gyp
60. Mapid	Fe	107. Siramag	Gyp
61. Pantat	Fe	116. Nagas, Oas	GnP
63. Tinambac	Fe	135. Legaspi	Per

3. Bicol Region (Continued)

<u>Metallics</u>		<u>Nonmetallics</u>	
65. Habikihon	Cr	136. Baao	Per
66. Mt. Putianay	Ni	137. Pilar-Dansol	Ls
67. Lagunoy	Ni	141. Rizal	S
68. Mayon Mine	Cr	142. Dalipay	Cly
71. Cagisean	Mn	143. Osiao	S
74. Malaiba	Cu	144. Guinlajon	S
76. Del Pilar	Mn	145. Bacon	Cly
77. Magna Rosa	Pb	146. NW. Gatbo	Ls
79. Maagnas	Cu	147. Gatbo	Coal
79. Pili-Pagsangahan	Cu	152. Calpi & Dulos, Bulan	Si
83. San Vicente, Maslog	Cu	153. Casiguran	Per
86. Lahuy Is.	Au	154. Gatbo, Bacon	Coal
89. Potag-Belen	Cu	155. Pilar, Sorsogon	Ls
91. Pili-Pagsangahan, Parubcan	Cu	156. Basod	Dia
91. Malaiba	Cu	168. Daguit, Labo	Ls
92. Pandanan	Fe	170. Anayan-Agdagnan, Bula	Ls
93. Paniman	Mn	171. Mt. Isarog, Goa	S
100. Malatigao	Mn	173. Bogtog	Py
109. Nabua	Cu	174. Matan	Py
129. Dupont-Champion	Cu	175. Caramoan	Mbl
130. Hixbar	Au		
131. Piedmont	Cu		
138. Dansol	Fe		
150. Sorita Fe Prospect	Fe		
157. Mabilo, Labo	Fe		
158. Aguit-it-Sabang Indan	Fe		
159. Dalas, Labo	Fe		
160. Napalgasan-Pinagbirayan	Fe		
161. Calaborman, Paracale	Fe		
162. Malacbang, Paracale	Au		
167. Calburnay, Tabas	Fe		
169. Exiban, Labo	Au		
172. Salvacion, Caramoan	Mn		
176. Himagtukan, Lagunoy	Cr		
177. Guiloon, Siroma	Mn		
178. Culasi, Mercedes	Hg		

4. Catanduanes

<u>Metallics</u>		<u>Nonmetallics</u>	
1. Hilacan	Cu	3. Camp Eritano	Coal
2. Bagamanoc	Fe	4. Pancayanan	Cly
5. Cororongan	Au	6. Hitoma	Coal
7. Agban, Baras	Cu	11. Catagbaian	Mbl
8. Vinticayan	Cu	13. Calolbon	Mbl
9. Libjo, Bato	Cu	14. Marilima	GnP
10. Carawat	Mn	15. Cacao	GnP
12. Dukaway	Mn	16. Lictin	GnP
18. Danicop	Cu	17. Talisoy	GnP
19. Marinawa	Mn	20. San Vicente	Mbl
21. Eli	Mn		

5. Masbate Island

<u>Metallics</u>		<u>Nonmetallics</u>	
2. Aroroy, ACMDC	Au	1. West of Port Barrera	GnP
3. Capsay, Aroroy	Au		
4. Baleno	Cu		
5. Gussan, Capsay	Mn		
6. Capsay Aroroy	Au		
7. Baleno	Au		
8. Napuangan Concepcion	Au		
10. Maslate	Au, Cu		
17. Ayat Mandaon	Mn		
20. Tugbo	Fe		
21. Umabay, Mobo	Cu		
24. Umabay, Mobo	Cu		
25. Umabay, Mobo	Cu		
29. Fabella, Dagosongon	Cu		
30. Nabangig, Palanas	Mn		
34. Luya, Aroroy	Au, Ag		

6. Samar Island

<u>Metallics</u>	<u>Nonmetallics</u>
1. Cataydogan and Tanauan, San Jose de Buan	25. Carbon River, McArther
2. San Jose de Buan	28. Carbon Creek, Hucnan, Giporlos
3. Alabat and Kalaydugan, San Jose de Buan	Coal
4. Lawaan and Casandig, Wright	Coal
5. Bato Creek, Lawaan, Wright	
6. Paco, Rono and Concepcion, Wright	
7. Lawaan, Wright	
8. Tula, Wright	
9. Tula, Wright	
10. Tula, Wright	
11. Borak and Honop, Llorente	
12. Concord, Hinabangan	
13. Bagacay, Hinabangan	
14. Bagacay, Hinabangan	
15. Bagacay, Hinabangan	
16. Lonoy-Midway Area, San Julian	
17. Antipolo, Llorente	
18. Antipolo, Llorente	
19. Borak and Honop, Llorente	
20. Antipolo, Llorente	
21. Borak, Llorente	
22. Antipolo, Llorente	
23. Hernani, Llorente and McArther	
24. Magsaysay, McArther	
26. Catmon Creek, McArther	
27. Giporlos	
29. Camanga, Salcedo	
30. Opong, Salcedo	
31. Opong, Salcedo	
32. Carapdapan, Siguinon and Abigao, Salcedo	
33. Layong Orang, Balangiga	
34. Pahagong, Kahiyam, Giporlos	
35. Mercedes and Guiuan	
36. Gasindig and Lawaan, Wright	
37. Lawaan, Wright	

7. Leyte Island

<u>Metallics</u>		<u>Nonmetallics</u>	
6. Pas-ay	Au	9. Mapula	S
8. Bitun	Au, Cu	26. Liberty, Ormoc City	Peat
10. Hiunangan	Fe	31. Balite, Villaba	Asp
11. Tolosa	Fe	32. Balite, Villaba	Asp
12. Hiunangan	Fe	32. Bilian	S
14. MacArther	Fe	33. Olisihan	S
15. Abuyog	Fe		
16. Lambonao	Au		
17. St. Rafael	Ni		
18. Tigbawan	Ni		
19. Hinambangan	Ni		
21. Balagawan	Au		
22. Sumuhi	Au, Cu, Mn		
23. Sogod	Au, Cu		
24. Pulta, Hilongos	Cu		
25. Bagacay, Tacroban	Cu		
29. Silago	Fe		
40. Pulta, Hilongos	Cu		
41. Cura-jo, Caiba-an, Tacroban	Cu		
43. Bay Bantawan, St. Bernard	Au		
46. Antipolo, Jaro	Ni		
47. San Jose, Tanauan	Fe		

8. Panay Island

<u>Metallics</u>		<u>Nonmetallics</u>	
3. Sumagawsaw, Unidos, Nabas	Mn	1. Boracay Island Beach	Peb
4. Tanaktakan, Rizal, Nabas	Mn	2. Unidos, Nabas	Si
5. Panaktakan, Rizal, Nabas	Mn	10. Cumalaseas and Giron, Nabas	Mbl
6. Tagaroroc, Unidos, Nabas	Mn	11. Mt. Upao, Buruanga	Cly
7. Aklan, Habana, Nabas	Mn	12. Tigum, Buruanga	Coal
8. Unidos, Nabas	Mn	13. Hayhay, Buruanga	Coal
9. Laserna, Botong and Malindog, Nabas	Cu	16. San Roque, Libertad	Garnet
14. Libertad	Fe	17. Bulanao and San Roque, Libertad	Gr
15. Mt. Panapoan, Libertad	Cu	19. Tudor, San Roque and Bulanao, Libertad	Mbl
18. Balangay Creek, Libertad	Cu	20. Buntawan, Unico	Cly
21. Libertad	Fe	22. Paho, Libsertad	Mbl
24. San Isidro, 1 km S.E of Ibajay	Mn	23. Libertad-Pandan	SiS
25. Regador, Ibajay	Mn	34. Sinalman Creek, Paningayan River	Coal
26. Dangcalan, Tangalan	Mn	35. Maralison Island	Cly
27. Bebo, Tangalan	Mn	37. Igsoro and Pangalcagan, Bugasong	Cly
28. Sumalay, Tangalan	Mn		
29. Maslog Creek, Calimbahan River, Tangalan	Cu		

8. Panay Island (Continued)

<u>Metallics</u>		<u>Nonmetallics</u>		
30.	Tasoy, 6 km S.W. of Perfecta, Pandan	Mn	38. Larioja, Patnongon	Cly
31.	Lezo	Mn	41. Igtoog	Py
32.	Nimbongan Creek, Borabod River, Pandan	Mn	42. Nagdurog, 6 km N.E. of Cuyapiao	Py
33.	Manomong Creek, Malinao River	Cu	43. Bionan, 8 km E. of Patnongon	Py
36.	Lombuyan, Barbaza	Cu	44. Lunocan, Cuyapiao, Patnongon	Py
39.	Buyapiao, Patnongon	Cu	45. Bancal	Py
40.	Igtalang, Cuyapiao, Patnongon	Cu	48. Carmelo and Carawisan, San Remegio	Py
46.	Bitas, Patnongon	Cu	50. Bongbongan	Py
47.	Kalmar, Tumangad Brook, Sibalom	Cr	51. Igdamay	Py
49.	Carawisan, san Remegio	Cu	52. Batocueva, San Remegio	Cly
53.	Paniciuan, San Remegio	Cu	54. Villafont, Sibalom	Cly
57.	Nagdayao creek, Sibalom	Cu	55. Lupa Villar, Sibalom	Cly
59.	Basiao, Ivisan	Fe	56. San Juan, Sibalom	Cly
60.	Cudian, Ivisan	Mn	58. Dao, Atiotis	Cly
61.	Sta. Cruz, Ivisan	Mn	67. Penian, Balasan	Cly
62.	yabton, 2.5 km E. of Ivisan	Mn	68. Calagnaan	Cly
63.	Marubrub, 4 km S.W. of Ivisan	Mn	69. Sicogon Island	Cly
64.	Pari, Pilar	Cu	70. Sicogon Island	Cly
65.	Olalo, Pilar	Cu	71. Bayas Island	Cly
66.	Loay, Pilar	Cu	72. Binon-an, Batad	Cly
74.	Mandoawak, 10 km N.E. of Sara	Mn	73. Batad, Near Km Post 123, Iloilo-Estancia road	Cly
78.	Masonson Hill	Cu	75. Bandolan, San Dionisio	Cly
81. & 82.	Pan de Azucar Island	Fe	76. Alawihao, Masonson, Sara	Fd
85.	Dawis, Ajuy	Cu	77. Masonson, Sara	Gr
89.	Nipa, Concepcion	Cu	79. Bandolan, San Dionisio	Cly
91.	Sto. Tomas, Barotac Viejo	Cu	80. Sicogon, Calagnaan, Bayas and Gigantes	Cly
93.	Anilao	Mn	83. Paralian	Cly
106.	Salvacion, Nueva Valencia, Guimaras	Cu	84. Paralian	Cly
			86. Panalicdan, Ajuy	Fd
			87. Gaas, Ajuy	Cly
			88. Mt. Apitong	Cly
			90. Ajuy, Silagon Peminsula	Cly
			92. Mt. San Nicolas	Cly
			94. Tigbauan, Cabatuan	Cly
			95. Binalod	Cly
			96. Talacuan, Leon	Cly
			97. Anonang	Cly
			98. Sinamay, San Miguel	Cly
			99. Maliano-Malauag, Sta. Barbara	Cly
			100. Sta. Teresa, Sta. Barbara	Cly
			101 & 102. Sta. Barbara, Pavia and San Miguel	Cly
			103. Hibaoan, Pavia-Mandurriao	Cly
			104. Oton	Cly
			105. Cabano, Jordan, Guimaras Island	Sis

9. Negros Island

<u>Metallics</u>	
12. Malalag, Binadlan, Binalbagan	Fe
18. Andos and Maaslom, Ayungon	Cu, Au, Ag
19. Inayawan, Cauayan	Cu
20. Baclao, Catagona, Cauayan	Cu
21. Inayawan, Cauayan	Cu
22. Nagdo, Baclao, Cauayan	Cu
23. San Jose, Sipalay	Cu
24. Umas and Mambuyang, Binulig, Sipalay	Cu
25. Bindoy	Cu
26. Mabinay	U
27. Nauhang and Binusay, Manlucahoc, Sipalay	Cu
28. Binusay, Manlucahoc, Sipalay	Cu
29. Colet and Catwanan, Manlucahoc	Cu
33. Bagatban, Ilog	Cu
34. Asia, Hinoba-an	Cu
35. Maoyasoyas and Panocondocon, Damutan, Hinoba-an	Cu
36. New Manila, Pinggot, Ilog	Fe
37. New Manila, Pinggot, Ilog	Cu, Fe
38. Asia, Hinoba-an	Cu
39. Bulwagan, Asia, Hinoba-an	Cu
40. Maatop, Hinoba-an	Cu
41. 8 km S. of New Manila, Magbello, Kabankalan	Cu
42. Lungon, Basay	Ag, Au, Mo
43. Muhong, Maglinao, Basay	Cu
44. Aya-aya, Basay, Bayauan	Cu
45. Sta. Catalina	Fe
52. Manons, Paloypay	Cu
53. Tabiogon, Kangatid, San Jose	Cu
59. Bago & Escalante	Fe

<u>Nonmetallics</u>	
1. Lopez Jaena, Sagay	Ls
2. Bolanon, New Sagay	SiS
3. Bato, Sagay	Si
4. Cawa, Toboso	Dol
5. Crua, Macasilao, Calatrava	Coal
6. Ilaya, Calatrava	P
7. Magbubuong, Tigbon, Calatrava	P
8. Tigbao, Calatrava	Dol
9. Maa, Bago	Cly
10. East Budlagan, Canlaon City	S
11. Binakayan, Guihukgan	P
13. Buenavista, Guihulngan	Dol
14. Dancalan, Ilog	Ls, SS, Sh
15. Dancalan, Ilog	GnP
16. Tapul and Salong, Kabankalan	Coal
17. Dalaopan, Tayasan	Gyp
30. Maricalum, Sipalay	Ls
31. Bindoy	Dol
32. Manjuyod	Dol
46. Canlabo, Campoyo, Manjuyod	Cly
47. Campaclan, Sibulan	Cly
48. Pancil, Lo-oc, Sibulan	Cly
49. Cangmating, Sibulan	Cly
50. Basak, Zamboanguita	Cly
51. Cabcab, Lutoban	Cly
54. Amlan-Pamplona	S
55. Casoloning, Tayasan	S
56. Calatrava	Ls
57. Bahulay	S
58. Lemery	Ls
60. Cansimbog, Escalante	Ls
61. Sherman Hill	Si

10. Cebu Island

<u>Metallics</u>	
17. Matugan, Balamban	Cu
33. Panoypoy and Garing, Binaliw	Cu
37. Panganilan, Toledo City	Cu
38. Sinsin and Sudlon, Cebu City	Cu
39. Ningka-on and Sinsin, Cebu City	Cu
40. Sinsin, Pardo, Cebu City	Cu
41. Biga, Toledo City	Cu

<u>Nonmetallics</u>	
1. Mabuli, Tabogon	GnP
2. Bagacay, Tabogon	GnP
3. Nonoc, Liki and Sagay, Borbom	GnP
4. Tabubuelan Area	Dol
5. S.W. Pansoy, Sogod Area	Dol
6. Tiguib and Apalan, Tuburan	GnP
7. Catmonda-an	Dol

10. Cebu Island (Continued)

<u>Metallics</u>		<u>Nonmetallics</u>	
42. Biga, Toledo City	Cu	8. Libo, Lagba-o and Colonia, Tuburan	GnP
43. Biga, Toledo City	Cu	9. Macaas, Catmon	GnP
44. Biga, Kanapnapan, Toledo City	Cu	10. Km 31 Macaas, Catmon	Dol
45. Lantay, Biga, Toledo City	Cu	11. Panalipan Bridge, Catmon	Dol
47. Kanapnapan, Toledo City	Cu, Zn	12. 1 Km S.W. of Panalipan Bridge	Dol
51. Minglanilla, Toledo City	Cu, Zn	13. Puente Area	Dol
89. San Miguel	Cu	14. Carmen and Catbog	Py
94. Carmen & Cotmon	Cu	15. Baring, Corte, Puente, Boyo and Siotes, Carmen	GnP
		16. Carmen Area	Dol
		18. Km 81-82 Asturias	Dol
		19. Tubigag, Manok, Sta. Rita and Bago, Asturias	GnP
		20. Agtugop, Asturias	Gn
		21. Guinsay, Danao City	Cly
		22. Mayama, Biasong, Balamban	Gn
		23. Danao Town	Dol
		24. Looe, Danao City	Dol
		25. Baliang, Danao City	GnP
		26. Danao City	Coal
		27. Libong-Tubig, Kambuhawi, Sam-ang, Mayama and Biagong, Balamban	GnP
		28. Maslong, Danao city	Dol
		29. Bongaluga, Compostela	Dol
		30. Tag-angilan, Mulao, Compostela	Fd
		31. Tuburan and Tiltilan, Liloan	Ls
		32. Carmen and Catbog	Py
		34. Lataban, Liloan	Ls
		35. Kotkot, Compostela	Cly
		36. Malubog, Toledo City	Coal
		46. Latawan, Tuburan, Cebu City	GnP
		48. Danao, Compostela, Toledo-Naga, Argao, Dalaguete	Coal
		49. Contabaco and Masaba, Nega, Toledo City	Coal
		50. Bunga and Cuya, Toledo City	GnP
		52. Pook, Talisay, Cebu City	Cly
		53. Pangdan, Naga, Cebu City	Si
		54. Poblacion, Naga	Si
		55. Pangdan, 4 km W. of Naga	Si
		56. Naga and Fernando	Ls
		57. Mangoto, Pinamungahan	Si
		58. 5 km S.W. of Aloguinsan	Dol
		59. Tuyon, Valladolid, Carcar	Cly
		60. Sibongan Area	Dol

10. Cebu Island (Continued)

Nonmetallics

61. Dumanjug Coast	Dol
62. Rondan Area	Dol
63. Badlan Area	Dol
64. Lambog, Badian	Dol
65. Mantalongon, Ablayan, Dalaguete	Coal
66. Ablayan Area	Coal
67. Grandchina, Kabagol and Maangtud, Mantankngon, Dalaguete	Coal
68. 1.5 km from Dalaguete Town	Dol
69. Macopa Creek, Alcoy	Dol
70. Boljoon Area	Dol
71. Oslob Area	Dol
79. Sibonga	Coal
82. Lot-ud-Guinbawian	Ls
83. Samboan, Ginatican	Si
84. Alpaco, Naga	Coal
85. Barang	Coal
86. Lutak	Coal
87. Sibago, Pinamangahan	Coal
88. Uling, Naga	Coal
90. Loca & Lamesa, Balamba	Mbl
91. San Vicente, Liloan	Ls
92. Mabini	Coal
93. Danao, Compostela & Liloan	GnP

11. Bohol Island

Metallics

2. Salog, Jetafe	Cu
3. Banakan, Salog, Jetafe	Au, Cu
6. Bagacay, Talibon	Cu
7. Buli, Salog, Jetafe	Cu
8. Camparot	Cu
9. Balisong, Bagacay, Talibon	Cu
10. Baas, Bagacay, Talibon	Cu
15. Nagasnas Hill, Alica	Ni
17. Buenavista, Carmen	Mn
24. Salamanca, Colonia, Carmen	Cu, Ag, Au
28. Bactol, Jagna	Ni
29. Banglawag, Buero	Cr
41. Cangmundo, Jetap	Cu, Au
42. Laka	Cu, Au
43. Kauswagan	Au

Nonmetallics

1. Jau Island	Si
4. Kauswagan, San Isidro	GnP
5. Balintawak, Talibon	Si
11. Catigbian, Buenavista	Cly
12. Cave, Nabaud, Inabanga	GnP
13. Balintawak and Baungon, Clarin	GnP
14. Dagnawan and San Roque, Sagbayan	GnP
16. Cabidian, Mabini	GnP
18. Poblacion, Bongbong, Ambuan and Rizal, Catigbian	GnP
19. Tiwi and Tan-awon, Loon	GnP
20. Montehermoso, La Victoria and Monte Suerte, Carmen	GnP
21. Sinibaon Cave, Nan-od, Sierra Bullones	GnP

11. Bohol Island (Continued)

<u>Metallics</u>		<u>Nonmetallics</u>	
44. Mahayag	Cu	22. Marcelo, Batuan and Tambo,	
45. Anda	Mn	Mabini	GnP
46. Guindulman-Anda	Cu	23. Cabiawan Cave and Katiniong Cave,	GnP
		Guindulman	
		25. Bikahan and Taguta-as,	GnP
		Antequera	
		26. Kalaguban Cave, Bood,	GnP
		Maribojoc	
		27. Sta. Cruz and Upper Cabacnitan,	GnP
		Batuan	
		30. Magaiga, Baucan Sur, Buyog,	
		Datog, Saling and San Roque,	GnP
		Balilihan	
		31. La Paz, Lourdas and Fatima,	GnP
		Cortes	
		32. Libjo, Cambuac Norte and	GnP
		Bahay-bahay, Sikatuna	
		33. Licolico, Lagtangan, Caubagin	GnP
		and Magsaysay, Sevilla	
		34. Villa Suerte and Cambigao,	GnP
		Bilar	
		35. Nanangkaan, Corella	GnP
		36. Ka Melchor and Kaiyo Cave,	
		Payahan, Cayawa and Tonday,	GnP
		Badayon	
		37. Jimilian and Buenavista, Loboc	GnP
		38. Hophopan Cave, Omijon,	
		Valencia	GnP
		39. Jau Island	Si
		40. Garcia Hernandez (Philippine	
		Sinter Corp.)	Ls
		53. Ubay	Si

12. Siquijor Island

<u>Metallics</u>		<u>Nonmetallics</u>	
Larena	Mn	Capalasanan Lazi	P
Conmasque & Lotlotan	Mn	8. Pisong Maria	P
Red Hill Area	Mn		
Nangka-Maria Clara	Mn		
Samba Mine	Mn		
Pisong	Mn		

13. Dinagat and Siargao Islands

Metallics

1. Bel	Cr
2. Mt. Redondo	Cr
3. Cliff-Kalanungan	Fe, Ni
4. Tubajon	Fe, Ni
5. Libjo	Cr
6. Northern Maliano-Mabini	Fe, Ni
7. Gaas-Southern Maliano	Fe, Ni
8. Boa-Valencia	Fe, Ni
9. Tagabaga-Paniog	Fe, Ni
10. Lutawon Basin	Al
11. Nonoc	Ni, Co
12. Siargao Is.	Mn

14. Palawan

Metallics

2. Coron, San Nicolas	Mn
18. Bacungan	Cr
19. Perpertual, Bacungan	Hg
20. Sta. Lourdes	Hg
21. Tagbuross	Hg
22. Irahuan	Cr
26. Bobosawen-Apurauan	Ni
27. Birong	Ni
29. Takuenangon, Inogbong	Cr
30. Pandacan, Narra	Ni
31. Princesa Urduja, Narra	Ni
32. Tronto, calategas	Ni
33. Calategas	Ni
34. Narra	Ni
39. Labog	Ni
40. Dulag, Brookes Point	Fe
41. Calumpang, Quezon	Cu
42. Tarampita, Eran	Ni
43. Winchester Exploration Corp. Labog	Ni
45. Linao, Ipilan	Ni
46. Ipilan, Brookers Point	Ni
47. Tirongan, Linao	Cu
48. Gantung, Linao	Cu, Zn
50. Rio Tuba Batarasa	Ni
54. Rio Tuba	Ni
56. Balalac	Cu
62. Morson Point Mines, Berong	Ni, Fe, Co
63. Aborlan	Ni, Co, Fe

Nonmetallics

6. Taytay	Sis
10. Roxas del Pilar	Sis
23. Tagbuross-Montible	Cly
24. Inagauan	Cly
28. Maliano & Princesa Urduja	Cly
35. But Also	GnP
37. Balintoc	GnP
38. Alfonso	GnP
49. Inagaan, Maringas	Tlc
52. Iwahig	GnP
53. Tagbita, Latud	Sis
61. Malanut	Ls

15. Romblon

<u>Metallics</u>		<u>Nonmetallics</u>	
2. Cooc & Odiongan	Cu	1. Nomblon	Mbl
13. Olango, España	Ni	3. Cobrador Is.	Mbl
		4. Alad Is.	Mbl
		5. Mercedes Assn.	Mbl
		6,7 Uranco & Gonzales	Mbl
		8,9 Ave & Nickel Mining	Mbl
		10. Juliet	Mbl
		11. Ilauran	Mbl
		12. Sabalayan	Mbl
		14. Gutivan, Cajidioean	Si

8-3 SURVEY REPORTS REPRODUCED

Table-20 List of Reproduced Survey Reports in the Projected Area

I. Geological Survey and Geochemical Survey etc.: 596

QUEZON: 68

<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*133 (1939)	H. Aberding	Report on the coal resources of Polillo district
*129 RA	A. Magpantay P. Velez J. Filler	Reconnaissance geology of Sisin area, Atimonan, Quezon
*130 RA	F. Francisco R. Jagolino	Report on the copper prospects in Bo. Dilalongan, Casiguran, Quezon
*187	V. de los Santos D. Abiog	Report on the geological investigation of coal claims in Anibauan, Burdeos (Polillo Island) Quezon for the Commonwealth Ceramics Corp.
*195	V. delos Santos	Report on the conference with mayor Corona Auste of Burdeos and Mr. M. Basconcillo of the Bu. of Forestry regarding the release of mineralized land from the Polillo Forest reserve for agricultural purposes as authorized under Presidential Proc. No. 241
*207	I. Antonio	Report on the survey of the Polillo Forest reserve
*225	F. Francisco	Report on the geological investigation of the proposed damsites of the Gumaca waterworks project, Gumaca, Quezon
*299	C. Ibañez L. Antonio	Report on the geologic investigation of the Mn deposit in Madulag, Baler, Quezon
*514 306	O. Crispin M. Pacis	Memo report on the preliminary geologic investigation of copper prospects in Ibunagosis area, Dingalan, Quezon Province
*396	A. Cruz P. Liñgat	Report on the geologic investigation of mineral claims in Pagbilao and Tayabas, Quezon for Portland cement materials
*444	A. Gorriceta C. Velasquez	Reconnaissance studies of beach and sand in Northern Quezon Province

QUEZON:

<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*455	O. Crispin A. Buangan	Memo report on the geological investigation of the Malolod iron prospect, Mt. Malolod, Polillo, Quezon province
*467	C. Velasquez A. Gorriceta	Reconnaissance survey of the beach sand deposit in Southern Quezon province
*475	D. Abiog J. Mantaring	Geologic investigation of gold-zinc prospect in Angelo Mountains, Infanta, Quezon
553 (1001)	J. Fernandez O. Abarquez B. Vera Cruz P. Estupugan	Geology of Polillo Iron prospects, Quezon
*614	D. Encina	Report on the geological investigation of the Dilalongan beach sand in Quezon province
*682	J. Fernandez B. Vera Cruz P. Estupigan O. Abarquez	Preliminary report on the regional geology of Polillo Island group, Quezon
*738 (1075)	A. Cruz D. Abiog	Geologic investigation of the Placer claims of Umiray Mng. Co., in Dingalan, Quezon for cement raw materials location of plant site
*761 (1107)	C. Llave R. de Luna	Report on the geological investigation of limestone deposit in sitios Pangasinan and Tingtingon, Bo. Cabungalan, Burdeos, Quezon
*769	V. delos Santos F.D. Spencer	Geology and coal resources of central Polillo Island, Quezon
*790 (1160)	D. Abiog	Memo report on a geological investigation of copper prospects in Bo. San Vicente, Tagcawayan, Quezon
*816	GSD	Mineral deposits of Infanta and Polillo Island, Quezon
*829 (1193)	D. Abiog	Geologic investigation of cement raw materials deposits in Dingalan, Quezon
*923 (1326)	R. Valentin D. Abiog	Geological investigation of copper-Mn prospects in Diarabasin, Sub-province Aurora, Quezon

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*925 (1330)	J. Santiago D. Almogela	Geologic investigation for copper mineralization of National Mining Association, Dinalungan, Quezon
*934 (1344)	P. Dumapit	Hydrogeological investigation of Palola Spring, Lucban, Quezon
*956 (1367)	F. Reyes	Memo report on the geological investigation of the Manganese deposits in Madulag, Baler, Quezon
*963 (1375)	D. Abiog	Report on the geological investigation of pyritic and manganese deposits in San Luis, Aurora sub-province, Quezon
*965 (1379)	D. Almogela	Report on the geological investigation and verification of copper and manganese mineralization in "Sierra" and "Madre" group of claims in Bo. Dibet, Casiguran, Quezon
*973 (1387)	P. Caleon O. Abarquez	Geoelectrical investigation of Mount Cadig laterite deposits, Quezon-Camarines Norte Provinces
*964 (1376)	J. Ronan	Memo report on the geological verification of four placer claims of limestone for marble and lime in Bo. Sta. Catalina, Atimonan, Quezon
*977 (1392)	C.V. Ramos	Memo report on geological investigation of copper claims of Baler Consolidated Mining, Inc. Besog, Lisanin, Diteki, San Luis, Quezon
*1017 (1447)	J. Fernandez	Geological investigation of the Amihan Mining Corp. properties at Casiguran and Delasag, Quezon
*1030 (1466)	A. Cruz	Memo report on the geological investigation of placer claim "Valdeavella Limestone" in Lawigae, Tayabas, Quezon
*1043 (1488)	A. Cruz	Memo report on the geologic investigation of mineral claims of Phil. Mineral Industries Chemical Pioneer Corp. in sitio Pandayan, Umiray, General Nakar, Quezon

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1086 (1537)	A. Cruz	Geologic investigation and raw material appraisal of the limestone claims of Guanzon Lime Development Co., Inc. in Bo. Lawigue, Tayabas, Quezon
*1106 (1556)	J. Santiago	Geologic investigation of outcrops for copper mineralization in the Sierra Madre Range, San Luis, Quezon
*1103 (1546)	A. Cruz	Geologic survey for marble in sitio Paglubog, Lagingbayan, Mauban, Quezon
*1115 (1901)	Z. Zepeda	Memo report on the Geological verification of copper mineralization within the "Nelson" group of claims in sitio Dupinga, Barrio Ligaya, Municipality of Baler Sub-Province of Maria Aurora, Quezon
1126 (1621)	P. Dumapit	Preliminary report on the groundwater geology of Southern Quezon Province
*1138 (1649)	A. Cruz	Geologic Investigation and verification of limestone claims of Banahaw Mining Partnership in Sampaloc, Quezon
*1148 (1652)	P. Liñgat	Memorandum report on the geological verification of a limestone deposit within palcer claim Pla 645-D in Barrio Lawigue, Tayabas, Quezon
*1166 (1651)	F. Miranda	Geological investigation of the Ben Boss Mining claims situated at Barrio Lagingbayan (Cagsiay III) Mauban, Quezon
*1216 (1761)	Z. Zepeda	Geological verification of copper claims in sitio Nasudijan, Barrio Ditike, San Luis, Quezon
*1212 (1704)	A. Cruz	Marble in Southern Dingalan, Quezon
*1251 (1846)	P. Liñgat	Geological investigation and mineral verification of Vimel Rockline 1,11,111 in Barrio Malinao Ibaba and Tinandog, Atimonan, Quezon
*1330 (1979)	N. Bautista	Report on the investigation of 900 lode claims in Mauban, Quezon province for International Hardwood and Veneer Company of the Philippines

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1331 (1986)	J. Mantaring F. Miranda	Geological-Geochemical investigation of the Unisan Quadrangle, Quezon Province
*1354 (2039)	L. Antonio	Geological investigation and mineral verification of Sixty nine (69) mineral lode claims of Baler Consolidated Mining Inc. in Bo. Diteki, San Luis, Quezon
*1396	C.A. Llave	Mineral and survey verification of "Luc-1" (Pla-22766-D) placer mining claim in Bo. Piis, Lucban, Quezon
*1434	C.V Ramos	Geological verification covering 38 lode claims of the Lumbay copper deposit in Limutan, General Nakar, Quezon
*1567 (1975)	M.G. Pacis	Mineral verification of Three areas applied for exploration permit at Umiray Forest Reserve General Nakar, Quezon province
*1585 (1975)	Z.C. Zepeda	Geological investigation of the reported mineral deposit of quartz in Barrio Sta. Catalina, Atimonan, Quezon
*1648 (1976)	P. Estupigan	Mineral and geological verification inside the Umiray Forest reservation at Bo. Lumbay General Nakar, Quezon the exploration permit application.
*Q-13	G.P. Revilla	Geological field verification of the limestone deposit of AQP-880 in BGY. Lipata, Padre Buroos, Quezon
*Q-2	E.R. Malaca	Individual accomplishment report on the detailed geological mapping of Limutan-Irramang area, Gen Nakar, Quezon
*PG-Q2-1	D.G. Malicdem	Notes on the geology and exploration of Collosal-Lepanto Copper Project, Gen. Nakar, Quezon, Journal of GSP. vol. 29, No.1, March 1975
*Q-7	G.P. Revilla	Geological field verification of the limestone deposit w/in AQP-875 in Bgy. Sapaan and Tinandog, Atimonan, Quezon

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*Q-9	G.O. Relova	Geological field verification of the limestone deposit w/in AQP-634 in BGY Ibabang Palale, Tayabas, Quezon
*Q-4	G.P. Revilla E.R. Malaca	Geological verification of silica, feldspar, & quartz deposits of ABI Mines Corporation covered by MLA-NOS 526 & 568 in BGY San Vicente, Tackawayan, Quezon
*Q-1	R.J. Robles	Progress report on the detailed geological mapping and geochemical sampling of Matani area, Gen. Nakar, Quezon, for April 1980
*Q-258	B.S. Vargas	Report on the geological verification of the Nickeliferous Laterite in Cadig, Quezon-Camarines Norte Provinces
*Q-328	G.P. Revilla	Geological field verification of silica and bill quartz deposit of "Amado-1" mineral claim in Bgy Sta Cecilia, Tagkawayan, Quezon
*Q-6	R.A. Flores	Geological field verification of the limestone deposit w/in AQL-361 Bgy. San Isioro, Atimonan, Quezon
*Q-14	G.P. Revilla	Geological field verification of the limestone deposit of AQP-881 in Bgy. Lipata, Padre Buroos, Quezon
*Q-12	J. Crisologo I.A. Festisa	Geological investigation w/in the area covered by AQP-903 located at Bgy Sto. Tomas Tagkawayan, Quezon
*Q-240	A. Cruz	Memoandum report on the geological investigation of mineral claims of Philippine Mineral Industrial Chemical Pioneer Corporation in Sitio, Pandayan, Umiray, Gen. Naker, Quezon
*Q-376	R.E. Yumul	Inspection and verification of the exploration activities of Marcopper Mining Corporation, covered by Exploration permit No. 50 w/in a portion of the umiray forest reservation at BO. Lumbay, Gen. Nakar, Quezon

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*11	L. Abad	Valuation on the property of United-Paracale Mining Co. at Paracale, Camarines Norte
*43	J. Quema C. Jongeo	Report on the evaluation of the property Gabun-Paracale Mining Co. at Calaburnay, Paracale, Camarines Norte
*82	F. Kehlstedt	The Larap Iron ore deposits
*272	C. Ibañez E. Puson	Geologic Investigation of Manganese deposits in Bani, Tinambac, Camarines Sur & Tigbinan, Labo, Camarines Norte
*318	O. Crispin	Memorandum report on the preliminary investigation of Iron prospects in Lamit Bay area, Camarines Sur; Manganese prospects and Iron Titanium Deposit in Albay, and copper and iron prospects in Camarines Norte
*328	F. Gervacio	Report on Investigation of the mineral Spring in Lanot, Mercedes, Camarines Norte
*340	O. Crispin	Memorandum report on the geological investigation of iron ore prospects at Tigbinan, Labo and at Pinagbirayan, Paracale, Camarines Norte
*342	O. Crispin	Memorandum report on the geological investigation of iron prospects in Calaburnay, Tabas, Napangasan-Pinagbirayan Area and ores Inc. (San Felipe Mines) in Paracale, Camarines Norte
*449	L. Bryner	Report on the geology of the Submakin Prospects Area, Paracale, Camarines Norte
*450	L. Bryner	Report on the geology of the Paracale-Gumus Mine 350-level, Camarines Norte
*552	J. Fernandez E. Manalang	Geology of the Labo Iron Deposits, Labo, Camarines Norte
*591	P. Caleon O. Abarquez	Geophysical survey of the iron prospects in Paracale, Camarines Norte
*613	R. de Guzman P. Estupigan	Uranium mineralization in Paracale District, Camarines Norte

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
749 (1093)	N. Caagusan C. Samonte J. Fernandez	Report on the geological-Geophysical Canvassing of the iron deposits of Camarines Norte
*788 (1156)	Z. Zepeda	The geology of the flint clay deposits in Bulala Capalonga, Camarines Norte
*846 (1216)	R. Zerda	Geological investigation of Talisay-Vinson magnetite sand deposits, Camarines Norte
*970 (1384)	R. Zerda	Geologic investigation of Mataque Iron-Copper prospect Capalonga, Camarines Norte
*1014 (1445)	P. Caleon	Report on the geological investigation of the copper lead prospect at Bo. Parang, Paracale Camarines Norte
*1054 (1505)	P. Caleon	Geological investigation of Luis and Puring Fr. mining claims of Mr Pedro D. Lamadrid situated in Sitio Napangasan, Bo Pinagbirayan, Paracale, Camarines Norte
*1059 (1506)	J. Fernandez	Geological investigation of La Suerte Resources and Industrial Corporation Projects and Jose Panganiban, Camarines Norte
*1075 (1500)	P. Caleon	Geological investigation of the Mining property of Century Iron Mines Company, Inc. situated at Bo. Matique, Capalonga, Camarines Norte
*1091 (1550)	P. Caleon	Geological investigation of the mineral claim of Armstrong Mining and Industrial Corp. situated at Bo. Makati, Capalonga, Camarines Norte
*1112 (1585)	C. Llave	Geological investigation of the 13 Mining claims (PLA-4912-D to PLA-4924-D) in Bo. Bulala Capalonga, Camarines Norte for Firestone Ceramics Incorporated
*1319 (1961)	P. Caleon	Mineral investigation & Verification of the three (3) mineral claims applied for lease by Mr Vicente S. Raffeses in Sitio Namucanan Bo. Daguit, Labo, Camarines Norte
*1320 (1962)	P. Caleon	Mineral investigation and verification of Eighteen (18) placer mineral claims applied for lease by Mineral processing & Supply (Phil.) Inc., situated in Bauud, Camarines Norte

CAMARINES NORTE:

<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1412	P. Caleon	Report on the geological investigation at the mineral properties of La Suerte Resources & Industries, Inc., J. Panganiban, Camarines Norte
*1421	P. Caleon	Mineral investigation & verification of Twenty two (22) lode claims applied for lease by Mr Felix M. Antonio in Bo. Bulalacao, Jose Panganiban, Camarines Norte
*1441	P. Caleon	Geological Investigation of the mineral properties of Peninsula Natural Resources Corp. (PENARCO) situated in Jose Panganiban & Paracale, Prov. of Camarines Norte
*1494	P. Caleon	Verification of geologic reserves of the Bessemer Pit Area of Phil. Iron Mines, Inc. in Larap, Jose Panganiban, Camarines Norte
*1526	P. Caleon	Geological investigation and estimate of geologic reserves of the mineral properties of Metals Exploration Asia, Inc. situated in the Municipalities of Paracale and Jose Panganiban, Prov. of Camarines Norte
*1529	P. Caleon	Geological investigation and estimate of geologic reserves of the mineral property of Golden Rock Mines, Incorporated at Labnig, Paracale, Camarines Norte
1547 (1975)	C.S. Samonte	Geological verification of iron and copper mineralization of the Vein Venida Claim in Labo, Camarines Norte
*1550 (1975)	C.A. Llave	Mineral verification of three lode claims in Bo. Malacbang, Paracale, Camarines Norte
*1607 (1976)	G.R. Balce	Report on the investigation of the reported Mercury and Sulphur occurrence in barrio Culasi, Mercedes, Camarines Norte
*1637 (1976)	O.M. Pineda	Report on the evaluation of geologic reserves of La Suerte Gold Mining Corporation in Sta. Rosa Norte, Jose Panganiban, Camarines Norte

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1639 (1976)	E.M. Manalang C.L. Baguilat P. Rovillos, Jr.	Radiometric survey and preliminary geologic estimate of uranium tonnage at tunnel 3 in Bessemer Rescue area of Philippine Iron Mines, Larap, Jose Panganiban, Camarines Norte
*1651 (1976)	D.H. Almogela C.S. Samonte	Radiometric logging of the Diamond Drill Cores in the Bureau of Mines uranium exploration project Larap, Jose Panganiban, Camarines Norte
1307	C.V. Ramos	Geological investigation & mineral verification of twelve (12) placer claims of Golder River Mining Corp. at Malaguit, Paracale, Camarines Norte
970	R.R. Zerda	Geological investigation of Matague Iron-Copper Prospect, Capalonga, Camarines Norte
1286	B.S. Vargas	Mineral & lease survey verification of mining claims of Zen Mining Expl. at Talisayvinzon, Camarines Norte
MRO-V-1	S.V. Sendon	Geological Report of nine (9) lode claims applied for lease by Mr Jose Robles
MRO-V-4	R.A. Juan V.P. Narido	Memorandum report on the geological verification of the mining claims applied for lease by Jovito Palado
MRO-V-7	E.E. Samson	Geological verification of six (6) mining claims applied for lease by Golden Arrow Mining Co., Inc.
PHIL-8, P-22	BMG & U.S. Aec	Reconnaissance for uranium in the Philippines

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*70 & 48RA	D.P. Cruz D. Domingo	Report on the gypsum deposit of Southwestern Albay & Camarines Sur
*43 & 38RA	DIP. Cruz	Phosphate & pyrite deposit of Camarines Sur, Albay and Catanduanes
*179	J. Abadilla	Geology of the white clay deposits in piruma, Peninsula, Camarines Sur, Luzon
*190	A. Cruz	Preliminary report on the white clay deposit of Napu and Fundado, Siruma & Sugusugon, Suguitan & San Vicente, Tinambac, Camarines Sur
*192	J. de la Cruz	Preliminary report on the white clay deposits of La Purisima, Siruma and San Vicente, Tinambac, Camarines Sur
*194	Belandres Cruz & Yap	Geologic report on ceramic raw materials, Tagkawayan, Quezon and del Callego, Camarines Sur
*217	F. Francisco N. Jandumon	Report on the geological investigation of the Manila Railroad Line in Central Camarines Sur
*43 RA	D.P. Cruz L.A. Ferrera	The geology of Pambuhan Peninsula The geology of Lahug Island
*44 RA	- do -	The guano deposits in Paniman Cave, Caramoan, Camarines Sur
*45 RA	D.P. Cruz	Report on the Phosphate rock deposits of Sigamot, Libmanan, Camarines Sur
*46 RA	D.P. Cruz C. Domingo	Report on the mineral character of the land areas applied for by Vicente Tuason and Ciriaco Chiunaco, Siruma, Camarines Sur
272 (see Cam. Norte 272)	C.B. Ibañez	Geologic investigation of Mn deposits in Bani Tinambac, Camarines Sur and Tigbinan, Labo, Camarines Norte
*348	A.J. Cruz	Report on the geologic investigation of Gypsum claims in Balatan, Camarines Sur
360	F. Gervasio	Report on the S prospect in Mt. Isarog, Goa, Camarines Sur

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*440	A.J. Cruz J.P. Taboada	A geologic investigation of Balatan, Camarines sur for cement raw materials and location of plant site
*673	A. Gorriceta C. Velasquez	Report on the geological investigation of cement raw materials in Libmanan, Sipocot and Cabusao, Camarines Sur
*716	J.U. Santiago R. Peneyra	Investigation of Aurora No. 3 & Pagasa No. 5 lode claims & the Mn ore stockpiles on the beach of sitio Quiloon, Bo. Boboan, Siruma, Camarines Sur
*753 (1100)	A.J. Cruz P.H. Liñgat	Geologic investigation of the feasibility of establishing a Portland cement plant in Sipocot, Camarines Sur
*843 (see ALBAY 843)	R. Jagolino	The geology of the perlite deposit in Baao, Camarines Sur and Legaspi City, Albay
*991	M. Marcelo	Geological investigation of copper prospects Bo. Tinalmud, Pasacao, Camarines Sur
*1056 (1501)	R. Zerda	Report on the geologic investigation of chromite laterite prospects Lagunoy, Camarines Sur
*1057 (1504)	G. Balce	Geological and geochemical investigation copper prospect in the Nabua forest reserve Camarines Sur
*1140 (1646)	P. Caleon	Geological investigation of a portion of the Siruma white clay mineral reservation applied for renewal of operating contract by Pacific Manufacturing Co. in Bo. San Vicente, Tinambac, Camarines Sur
*1145 (1648)	P. Caleon	Geological investigation and verification of six (6) lode claims mining applied for leased by Mrs. Teresita D. Ong in Bo. Patag-Belen, Caramoan, Camarines Sur
*1282	J. de la Cruz	Memo report on the investigation of ceramic raw materials in Camarines Sur and Camarines Norte

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1290 (1910)	C. Velasquez	Geological investigation of the clay deposits in sitios Bamnbanon and Kuquinon, Bo. Liboro, Ragay, Camarines Sur
*1480	C. Velasquez	Mineral verification of placer claims, Pla-3309 and Pla-3310 in sitio Pag-gay, Barrio Libmanan, Camarines Sur
*1510	E.M. Manalang	Mineral verification of the chromite-nickel prospect in Lagunoy, Camarines Sur
*1593 (1976)	E.M. Manalang	Mineral verification of twelve (12) chromite - nickel lode claims in Bo. Himagtocon, Lagonoy, Camarines Sur
*1630 (1976)	F.E. Miranda	Geological-geochemical survey of Caramoan Peninsula, Camarines Sur
*309	F.C. Gervasio H.P. Lukban	Report of investigation of the lode claim in Bula, Camarines Sur
1500	D.P. Cruz H.P. Lukban	Geology of Lahuy Island, Caramuan, Camarines Sur
PG-CS-1 (CS-1630)	F.E. Miranda	The geology and mineral resources of Iaramoan peninsula, Camarines Sur, Phil, Jour of Gsp, U. 30, 1976
PG-CS-2 (CN-272)	C.B. Ibañez	Notes on the geology of the manganese deposits in Bani, Tinambac, Camarines Sur, Journal of Gsp V. 13, No. 3, Sep 1959
1167	P.C. Calleon	Mineral investigation and verification of eleven (11) mining claims applied for lease by Or & Mrs Jose Abuno in Bula & Balatan, Camarines Sur
MRO-V-2	R.A. Juan	Geological investigation of the mineral claim at Balatan, Camarines Sur
MRC-V-3	G.R. Balce F.T. Reves	Geological and geochemical investigation of copper prospects in the Nabua Forest Reserve, Camarines Sur
MRO-V-5	J.Z. Tabios B.B. Escandor	Geological investigation of chromite-nickel prospect of the three (3) mining claims in Bo. Himagtokon, Labonoy, Camrines Sur

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
MRO-V-9	E.E. Samson	Report on the geological verification of S.U. Ilarde mineral claim situated in Sitio Pulangdaga, San Juan, Balatan, Camarines Sur
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*503	J. Santiago	Memo report on the tektite occurrence in Isabela
*656	R. Peña	Memo report on geological investigation of some claims applied for lease in Bicobian, Palanan, Isabela
*792 (1163)	P. Contreras	Geological investigation of four groups of copper claims in Ilagan, Isabela
*871 (1244)	Z. Zepeda	Memo report on the geological verification of the mining claims of the Cagayan Valley Cement Corp. in Tumauni, Isabela
*995 (1415)	R. Peña	Memo report on the geological investigation of copper and manganese prospects in Palanan, Isabela
*1042 (1485)	C. Samonte	Mineral verification of thirty-lode claims applied for lease in Cordon, Isabela
*1048 (1494)	D.H. Almogela	Geology and verification of eleven (11) lode claims of San Pablo Mining Corp. in barrio Didadongon, Palayan, Isabela
*1157 (1669)	P. Manlansing	Geological investigation of the Agar copper prospect in Kasala, San Mariano, Isabela
*1227 (1781)	D. Almogela	Geological investigation and mineral verification on the group of lode claims of Olympus mineral exploration company, Inc. situated in Cordon, Isabela
*1426	A. Cabantog	Geological Field verification of copper, manganese etc. deposits of black rock Mng Corporation in Bo. Dimakawal, San Mariano, Isabela

ISABELA:

<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*1466	M.G. Pacis	Geological investigation and mineral verification of 79 placer claims applied for lease by New Frontier Mines Incorporated in the Municipalities of Dimapiqui, San Mariano and Palanan, Isabela
*1475	D.G. Custodio	Geological verification of two (2) lode claims applied for lease in San Luis, Cordon, Isabela
*1523	E.M. Manalang	Mineral verification of three lode claims applied for lease in Bo. Caguilingan, Cordon, Isabela
*1604 (1976)	O.M. Pineda	Evaluation of the copper-gold property of Vulcan Industrial and mineral exploration in Kakilingan, municipality of Cordon, Province of Isabela
LIB-IS-1	D.G. Custodio	Progress report on the reconnaissance geological survey of part of Lapigne Quad, Isabela Prov.
LIB-IS-2 (same as 656)	R. Peña	A report on the geological investigation of some claims applied for lease in Bicobian, Ilagan, Isabela
PG-IS-2	G.B. Baguiran	Notes on the geology & exploration of the marian copper deposit, Corpon, Isabela J of Gsp V. 29 N.1, Mar. 1975
PG-IS-1	R.A. de Guzman	Geology & remobilized aspects of the massive sulphide deposits of port Bicobian, Ilagan, Isabela, & other similar Phil. deposits J. of Gsp, V.22, N3, Sept. 1908
IS-3	R.B. de Los Santos	Report on the geological investigation of 23 "Emmy" & "M" claims of Vulcan Ind'l & Mining Corp., Cordon, Isabela
IS-4	E.A. Rillon N.G. Santiago	Report on the geology of Jones, Santiago, Cabatuan, Roxas & Corpon Quadangles

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<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
*233	J. de la Cruz	Preliminary Report on the White Clay Deposit and Regional Geology of Calayan Island, Cagayan
237	O. Crispin E.M. Puzon	Report on the Preliminary Geological Investigation Manganese Deposit at Lal-lo, Cagayan
247	B.C. Burgess	Perlite, Calayan Island, Cagayan
*274	P.M. Capistrano	Preliminary Report on the Geology and Ore Possibilities of the Camalaniugan Iron Prospect in Cagayan Province
*405	L.R. Antonio	Preliminary Report on the Geology of Claveria Iron Prospects Claveria, Cagayan
558	E. Durkee S. Pederson	Geology of Northern Luzon
*588	M. Liggayu	Geological Investigation of the Broaderth & Magdangal Black Sand Claims in Northern Cagayan
*530	A. Cruz	Geologic Investigation of Gypsum Prospect in Sitio Makatay, San Jose, Sanchez Mira, Cagayan
*844	J. de la Cruz	Preliminary Report on the Survey of Clay and Perlite Deposits of Calayan Island, Prov. of Cagayan
*1077 (1529)	C. Ramos	Report on the Mineral Verification of Magnetite Sand Claims of FE VA Mining Corpo. in Northern Cagayan Province
*1333 (1989)	C. Llave	Mineral and Lease Survey Verification of Teresita Mining Claims Sitios Cabatoan Ensenada, Paguitpit, Barrio Naguilian Camaguin Island, Calayan, Cagayan
*1450	M.V. Garcia	Report on the Mineral Verification of the Magnetite Sand Deposits at Sanchez Mira, Cagayan
*1678 (1976)	E.A. de Luna	Groundwater in Cagayan Basin Northeastern Luzon

CAGAYAN:

<u>REPORT NO.</u>	<u>AUTHOR/S</u>	<u>TITLE OF REPORTS</u>
LIB-CA-1	N.L. Caagusan	Stratigraphy and evolution of the Cagayan Valley Basin, Luzon, Phil.
LIB-CA-2	E.T. Avila, Jr.	Mineral verification of the magnetite sand claims of Mayorga Mng. Co., Cagayan Province

NUEVA VISCAYA: 18

*77	W. Litchner W. Wright	Tuggle-gibbs molybdenum prospects in Nueva Viscaya Province, Luzon - CCXXIX
*278	O. Crispin	Memo report on the preliminary geologic investigation of Imdgan-Alang-Malico area, sta. Fe, Nueva Viscaya
*439	R. Obial	Geological investigation of the Cu-2N Project at Dupax, Nueva Viscaya
*563	C. Liave A. Gorriceta	Memo report on the geological investigation for clay materials in Sitio Manlaabit, Bo. Loblob, Dupax, Nueva Viscaya
*997	P. Dumadit	Verification of gold mineralization in Ronrono, Quezon, Nueva Viscaya
PG-NV-1	P.C. Geruasio	Notes on the geomorphic history of southern Nueva Viscaya & the genesis of the lean iron deposit of Sta Cecilia Construction Mines, Journal of GSP, V.13, N.3 Sep. 1959
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NV-6	D. Almogela	Geological investigation and verification of fifteen (15) lode claims of Pingkian Mining Co., in Bo. San Fabian, Kayapa, Nueva Viscaya
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*174	J. Teves	Geology of Calubian and vicinity, Leyte
*196	D. Palacio	Preliminary report on the geology and rock asphalt deposits of balite, Villaba, Leyte
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*560	J. Fernandez	Magnetometer survey of the black sand in the Eastern coast of Leyte
*641	J. Fernandez	Geophysical reconnaissance of Tongonan geothermal field, Ormoc City, Leyte del Norte
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*1101 (1573)	O. Abarquez	Mineral canvassing of part of Western Leyte
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