REPORT
ON
THE MINERAL EXPLORATION
IN
VANUA LEVU
THE REPUBLIC OF FIJI

PHASE I

FEBRUARY 1996

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN

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PREFACE

In response to the request by the Government of the Republic of Fiji, the Japanese Government decided to conduct a mineral exploration project in Vanua Levu and entrusted the survey to the Japan International Cooperation Agency (JICA) and the Metal Mining Agency of Japan (MMAJ).

The JICA and MMAJ sent a survey team to the Republic of Fiji headed by Mr. Osamu Miyaishi from 25 September to 21 December, 1995.

The team exchanged views with the officials concerned with the Government of the Republic of Fiji and conducted a field survey in Vanua Levu. After the team returned to Japan, further studies were made and a report on Phase I of the exploration project prepared.

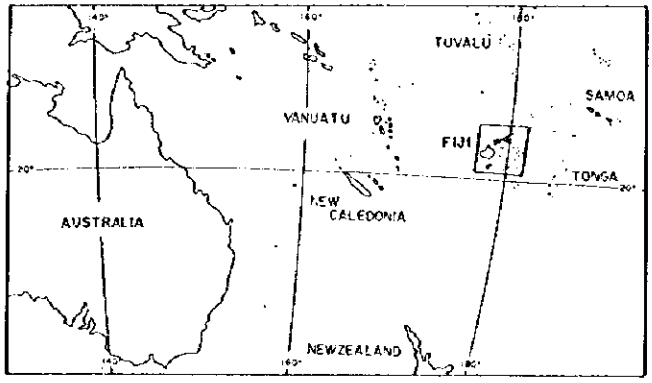
We hope that this report will serve the development of the Republic of Fiji and contribute to the promotion of friendly relations between our two countries.

We wish to express our deep appreciation to the officials concerned from the Government of the Republic of Fiji for close cooperation extended to the Japanese team.

February, 1996

Kimio FUJITA
President,
Japan International Cooperation Agency

Shozaburo KIYOTAKI
President,
Metal Mining Agency of Japan



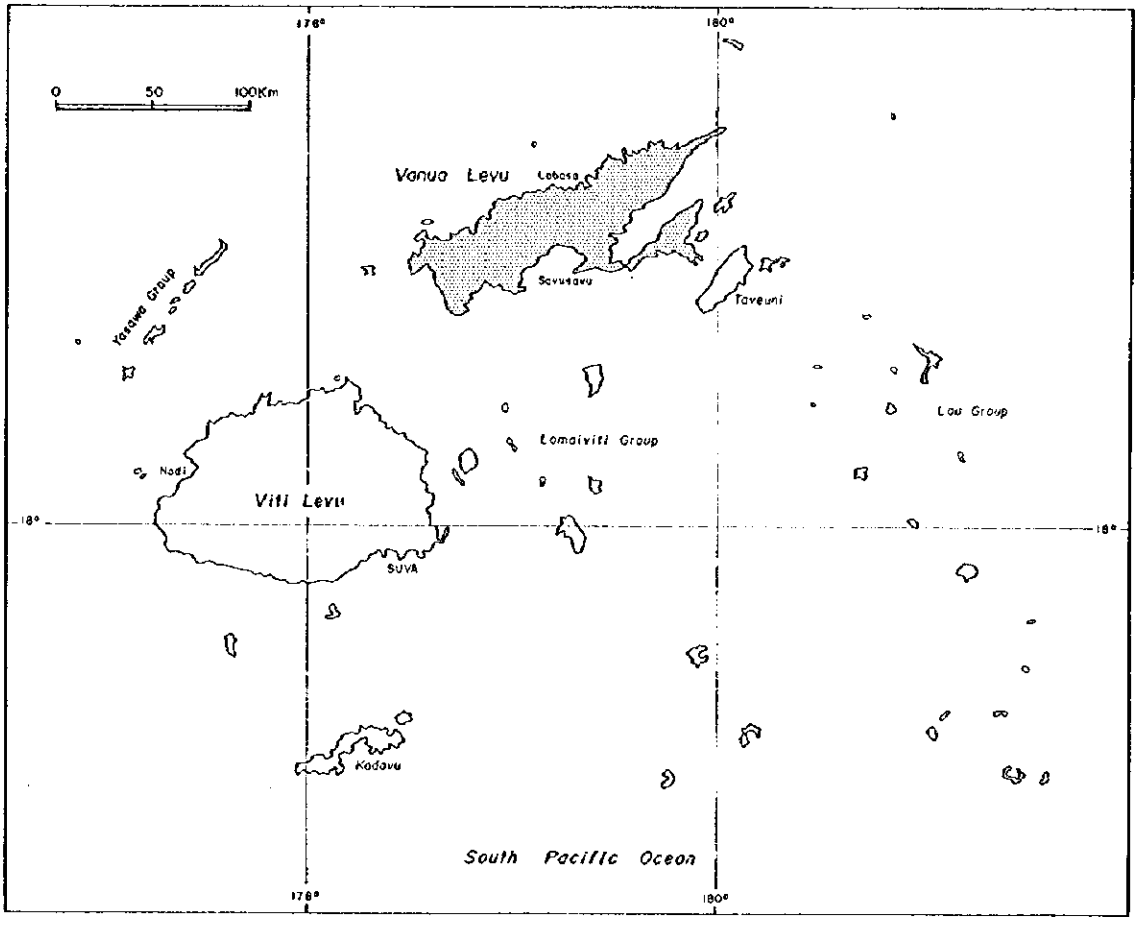


Fig. 1-1 Index Map of the Survey Area

SUMMARY

During the first-phase of the Vanua Levu mineral exploration project; three promising areas (100 km^2), namely Nakoroutari, Daguniba, and Waimotu were delineated by analysis and interpretation of existing geological and mineral resources data and information of the island (5,500 km^2). Geological and geochemical surveys were carried out in these three areas and CSAMT array and time-domain IP survey were made in the Nakoroutari. Several promising zones were extracted in these areas.

(1) Nakoroutari Area

The geology of Nakoroutari Area is composed mainly of basalt - andesite lava and volcaniclastics of the Koroutari Andesites which belong to Upper Miocene-Lower Pliocene Natewa Volcanic Group, and andesitic volcaniclastics of the Sueni Breccias. Mineralization and alteration were observed at five zones; namely Leli's Prospect, a locality to the south of the same Prospect, Navakuru, Mugsy's Prospect and a locality to the east of the Mugsy's Prospect. Leli's Prospect is the most promising of the above and also the altered zone to the south of Leli's show evidences of gold mineralization. At Leli's Prospect, two quartz veins were observed within a brecciated zone and the highest grade is 12.9 g/t Au.

In the vicinity of Leli's Prospect, CSAMT array was carried out for 12 km and time domain IP for 7.5 km. A high resistivity body was detected by CSAMT in the central part, and this is inferred to consist of two buried silicified zones elongated in the N-S direction, and the whole altered zone was found to extend in the NW-SE direction. A weak chargeability anomaly extending in the NW-SE direction was detected by IP, but anomalies over wide areal extent were not detected. Also physical characteristics of the rocks of this area were determined by laboratory measurements of 30 samples. The extent of the mineralization-alteration zone and the resistivity structure of the deeper parts of the zone were clarified by these two geophysical methods.

(2) Dakuniba Area

Mineralization of the Dakuniba Area consists of quartz veins developed in basaltic lava and basaltic volcaniclastic rocks which belong to the Dakuniba Basalt of the Natewa Volcanic Group. The major quartz veins are exposed in the upper reaches of the Nagagani Creek in the central part of the area. The veins strike in the WNW-ESE direction with steep S or N dip and the total length exceeds 2 km. Alteration associated with mineralization is observed in the northeastern part of the area; they are; quartz-clay veins extending from the upper reaches of Wailevu Creek to Nagagani Creek, argillized and pyrite dissemination from the Nubuni Creek westward, and mineralization observed in the quartz veins near a tributary of the Waikava Creek.

The continuity of individual quartz veins exposed in the upper reaches of the Nagagani Steam

has not been confirmed but the grade of the quartz veins is high with a maximum of 16g/t Au and 21 samples containing more that 1g/t Au were collected from a zone of only 1 km length. Thus this zone is considered to be a promising prospect.

(3) Waimotu Area

There are three prospects in this area; namely Waimotu Lodes, Bill's Hill Prospect, and Nuku Prospect. The orebodies and mineralization occur in weakly propylitized andesite-basalt lava and basaltic volcaniclastics rocks.

The Waimotu Lodes are comprised of; Main Lode, East Lode, and West Lode. These are chalcedony and quartz veins extending in the N-S direction and the maximum gold grades obtained during the present survey are; Main Lode 24 g/t Au (1.0m wide), East Lode 43 g/t Au (0.8m wide), West Lode 0.92 g/t (boulder). The northern and southern extensions of the Waimotu Lodes are not exposed well and the mineralization and alteration have not been confirmed .

At Bill's Hill, silicified, argillized, and pyrite-disseminated layers are developed. Quartz and chalcedony stockwork are developed cutting through the altered zone with mostly N-S strike and steep dip. Assay of all samples collected showed gold content of less than 1 g/t Au.

At Nuku, the extension of a silicified zone associated with chalcedony and quartz veins was confirmed for 150 m. It is believed that this zone strikes in the N-S direction with steep westward dip. The maximum assay result of the collected samples is 4.3 g/t Au (sampled width 2.5 m) and the average value was 1.3 g/t Au (average vein width 7 m). The grade of the cores of previous drilling at shallow zones is 0.6 g/t Au (ore width 7 m).

The lower parts of the three prospects in the Waimotu Area have been drilled and the results are encouraging.

With the above consideration, we recommend that; drilling be carried out in the Nakoroutari and Dakuniba Areas, and that geophysical survey be carried out in the Waimotu Lodes in order to clarify the continuity of the lower part of the veins.

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PART I OVERVIEW

Chapter 1. Introduction

1-1 Background and Objectives

In response to the request by the Government of the Republic of Fiji to conduct mineral exploration in Vanua Levu, the Japanese Government dispatched a mission to discuss the details of the project. As a result of the consultation between the Mineral Resources Department (MRD) of the Ministry of Lands, Mineral Resources & Energy and Metal Mining Agency of Japan, an agreement was reached for cooperative exploration in Vanua Levu. The "Scope of Work" (SW) was signed by the representatives of both governments in August, 1995. The objective of this project is to explore and assess the mineral potential of the survey area through geological survey, geochemical exploration, geophysical exploration and drilling during a three year period from 1995 to 1997.

1-2 Objectives and Outline of Operations of the First Phase Survey

During the first phase of the project, compilation of the existing data was conducted over the whole Vanua Levu island(5,500 km²) with the purpose of reviewing previous work and assess known mineral showings. A geological survey was conducted to reveal the geology and any geological structures related to mineralization in the Nakoroutari, Dakuniba and Waimotu areas, and to select promising areas through geological traversing and geochemical analysis. A geophysical survey was conducted around the Leli's Prospect in the Nakoroutari area. The scope of work during this phase was as follows:

Survey		Particulars		Details
Compilation of Existing Data		Areal Extent	5,500 km²	Whole Vanua Levu
		Duration	14 days	
Geological Survey		Areal Extent	100 km²	Nalorputari Area Dakuniba Area Waimotu Area
		Traverse Length	200 km	
	Laboratory Work	Thin section	31 pcs	
		Polished section	31 pcs	
		X-ray diffraction	108 pcs	
		Chemical analysis	507 pcs	Element:Au,Ag,As,Sb,Hg
Geophysical Survey	Array CSAMT	Survey length	12 km	Nakoroutari Area
	TDIP	Survey length	7.5 km	
	Laboratory Work	Resistivity	30 pcs	
		Chargeability	30 pcs	

1-3 Participants of the First Phase Survey

(1) Mission for project finding and scope of work consultation

(30 July, 1995 ~ 2 August 1995)

[Fijian Members]

Bhuwan DUTT	Ministry of Lands, Mineral Resources & Energy
Abdul RAHIMAN	Department of Mineral Development
Vijendra PRASAD	Mineral Resources Department
Devika REDDY	Mineral Resources Department

[Japanese Members]

Masaaki NOGUCHI	Metal Mining Agency of Japan
Masahiro KINE	Ministry of International Trade and Industry
Tsuneyuki UTAMARU	Ministry of Foreign Affairs
Yuichi SASAKI	Metal Mining Agency of Japan
Shigeki SAKURAI	Canberra Office, Metal Mining Agency of Japan

(2) The survey team

The survey of the first phase was carried out during the period from 26 September, 1995 to 21 December, 1995. Duration of the field survey and the organization of the survey team were as follows:

Duration of existing data of compilation

28 September, 1995 ~ 11 October, 1995

Duration of the geological survey

12 October, 1995 ~ 12 December, 1995

Duration of the geophysical survey

29 October, 1995 ~ 17 December, 1995

[Fijian Members]

Devika REDDY	Coordinator, Senior Mapping Geologist, MRD
Subashni DEO	Geologist, MRD
Isireli NAGATA	Geologist, MRD
Mohammed FEROZ	Assistant, MRD
Moape NAVIA	Assistant, MRD

[Japanese Members]

Osamu MIYAISHI	Team Leader, Geologist, NED
Ken OBARA	Geologist, NED
Kenji SATO	Geologist, NED
Kazuyasu SUGAWARA	Geologist, NED
Masao YOSHIZAWA	Geophysicist, NED
Toshiaki FUJIMOTO	Geophysicist, NED
Tadanori IWASAKI	Geophysicist, NED

Note MRD : Mineral Resources Development

NED : Nikko Exploration and Development Co., Ltd.

Chapter 2 Geography of the Survey Area

2-1 Location and Access

The island of Vanua Levu is approximately 180 km east-west, 35 km north-south and approximately 5,500 km² in areal extent. It is located at latitude 16°07′ S-17°01′ S and longitude 178°29′ E- 179°57′ W, and is approximately 2,800 km east of the eastern coast of Australia, approximately 2,000 km north of New Zealand and approximately 2,000 km south of the equator.

The major population centers are developed along the coast, namely Labasa, Savusavu and Nabouwalu. Entrance to Fiji is via air and usually through the international airport at Nadi on Viti Levu. Flight from Viti Levu to Vanua Levu by commercial airplane takes 25 minutes via either Nadi or Nausori near Suva. Existing roads circle the island except for the northeastern part. The majority of the main roads between Labasa and Savusavu, and Labasa and Nabouwalu is paved.

2-2 Topography and Drainage

The island shows generally gentle undulation in the northern part and steep mountainous topographic feature. Dominant rivers such as the Dreketi and Labasa Rivers have developed in the northern part of the island and carry silt to the sea, resulting in the development of lowlands with mangrove plants in some areas. The mountains are around 600m to 900m in elevation, with the highest peak Mountain Nasorolevu, reaching 1,032m. The top of the mountain range is gentle in topography, characterized by flat peaks around which a narrow drainage system has developed with numerous waterfalls. The cone shaped volcanoes vary in size such as large Bua Volcano, and in contrast, the smaller one east of Viani Bay.

2-3 Climate and Vegetation

As Vanua Levu belongs to the tropical rain forest climatic zone, it has two seasons, dry (April - November) and wet(December - March). Also, it is located in the monsoon zone and there is a southeasterly trade wind throughout the year. Precipitation on the northern side of the island is relatively low, and high on the southern side. The monthly temperature and precipitation observed at Labasa and Nabouwalu is listed below.

(Data in 1994)

			Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct	Nov.	Dec.	Annual
Labasa	Temp. (℃)	high	31.3	32.0	31.9	30.9	29.6	28.7	29.3	29.3	29.3	30.7	31.4	32.4	30.6
		low	22.5	22.6	22.8	21.9	20.0	17.3	18.3	17.5	18.8	18.6	21.5	21.5	20.3
	Precipitation (mm)		250	531	522	69	21	76	1	3	85	13	120	94	1,785
Nabouwalu	Temp. (℃)	high	30.6	30.7	30.1	28.8	27.3	26.1	25.6	26.2	25.6	26.8	28.9	29.6	28.0
		low	24.9	24.8	24.9	24.5	23.1	22.0	21.1	22.1	21.4	22.3	23.7	24.3	23.3
	Precipitation (mm)		348	417	569	103	123	163	53	12	76	6	116	191	2,177

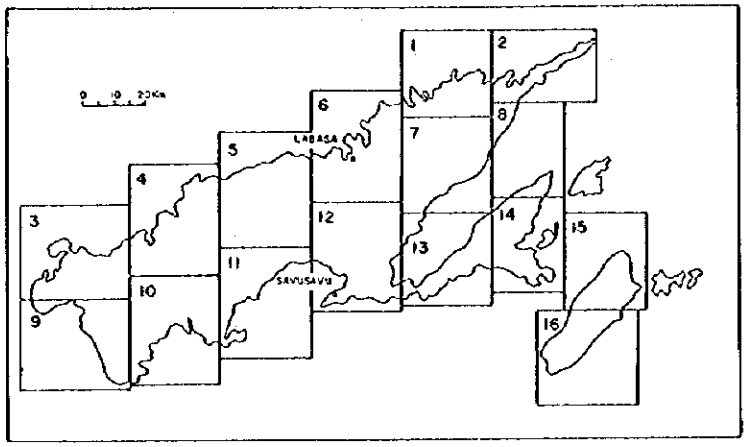
The greater part of Vanua Levu is covered by dense forest, while some areas are covered with planted pine trees. There are many palms along the coast.

Chapter 3 Available Geological Information

3-1 Outline of Past Geological Surveys

An outline of the geology of Fiji was reviewed and summarized by Rodda (1989), Okuda (1989) and others. Geological maps of Vanua Levu at 1:50,000 have been published covering the whole island by the Geological Survey of Fiji (now the MRD). The sheet number, area and the index map are shown below.

Author, published year and title of the publication	Sheet No.
Bartholomew,R.B.(1959):Geology of Savusavu Bay West,Vanua Levu	11
Richard,M.J.(1970):Geology of north-eastern Vanua Levu	1,2
Ibbotson,P.(1969):The Geology of east-central Vanua Levu	6,7,8
Coulson, F.I.E(1971):The Geology of Western Vanua Levu	3,9
Hindle,W.H.(1976):The Geology of west-central Vanua Levu	4,5,10
Woodrow,P.J.(1976):The Geology of south-eastern Vanua Levu	12,13,14



A reconnaissance map at 1:250,000 has been compiled by Richard (1966). The gold mineralization of the western Pacific region including Fiji has been summarized by Ishihara and Urabe (1989). The metallic mineral deposits of Fiji was reviewed by Colley (1976,1980) and Colley and Flint (1995) of the MRD. Reports concerning most individual prospects are available at the library of the MRD.

3-2 General Geology of the Survey Area

(1) Plate tectonics

Tectonically, the Fijian islands are located at the eastern margin of the Indo-Australian Plate and form an island arc on an ocean ridge (Lau Ridge) at a point where it bends from ENE-WSW to N-S a direction. At the Tonga trench on the eastern side of the Tonga Arc, which is located to the east of the Lau Ridge, the Pacific Plate is being subducted westward at the Vanuatu Trench on the western side of the Vanuatu Arc located to the west of the Fijian islands.

The Lau basin is located between the Tonga Arc and the Lau Ridge, and the North Fiji Basin between Vanuatu and Viti Levu. Both these basins have spreading axis. The northern side of Vanua Levu is bounded by the left lateral Fiji Transform Fault and the southern side by the Hunter Fracture Zone, a left lateral transform fault. The northern part of the Fijian Islands are considered to be rotating anticlockwise due to the eastward movement of the Indo-Australian Plate south of the Hunter Fracture Zone and the spreading of the North Fiji Basin. This rotation is believed to have begun during Miocene and Early Pliocene time. Before the advent of the spreading of the North Fiji Basin, Eocene - Miocene chain of island arcs (Vanuatu Arc - Fiji Islands- Tonga - Lau Arc), continuous in the NW-SE to N-S direction, are believed to have existed due to the subduction of the Pacific Plate at the Tonga Trench and its northward extension.

The geology of the Fijian Islands consists totally of Cenozoic units. The oldest unit is Eocene (limestone and volcanic rocks) in age while the youngest is represented by the volcanic ejecta of historic times originating Taveuni Island. In Vanua Levu, the geologic units are characterized by Late Miocene to Late Pliocene strata and consists mainly of volcanic rock (basalt, andesite, dacite) accompanied by sandstone, mudstone and marl. At the Udu Peninsula in the northeast, felsic volcanic rocks are dominant. Taveuni Island is underlain by post Pliocene basalts with volcanic activity continuing to recent times. The islands of the Koro Sea consist of Pliocene to Pleistocene basalts. The Lau Islands are underlain by Middle Miocene to Quaternary strata which are mainly composed of volcanics (basalt, andesite, dacite, rhyolite) and accompanied by limestones. Kadavu Islands consist of Middle Pliocene to Pleistocene volcanic rocks. The Mamanuca and Yasawa islands are underlain by volcanic rocks and intercalated pelagic limestone.

3-3 Geologic Setting of the Survey Area

Stratigraphically, Vanua Levu is underlain in most areas by Late Miocene to Pliocene strata that consist of basalt, andesite and dacite with intercalated sandstone, mudstone, and marl. The volcanic rocks are classified largely into the Natewa Volcanic Group, the Monkey Face Volcanic Group, the Udu Volcanic Group, the Nararo Volcanic Group and the Bua Volcanic Group.

Geologic Unit Name	Main Lithology	Thickness	Age determination
Bua Volcanic Group	Basalt	more than 900 m	(3.3-2.8 Ma)
Udu Volcanic Group	Dacite Rhyolite	more than 300 m	(7.0-6.8 Ma)
Nararo Volcanic Group	Acidic andesite		
Natewa Volcanic Group	Andesite	more than 1,500 m	(7.5-3.5 Ma)

3-4 Brief History of Mining in the Survey Area

Various types of mineralization are known in Vanua Levu and there are many prospects and some mines.

The major types of mineralization are Kuroko, epithermal, disseminated. Bauxite ore deposits also occur on the western part of the islands.

(1) Kuroko type deposits

Kuroko type deposits occur on the Udu Peninsula in the northeastern part of Vanua Levu. They are called the Udu deposits (Nukudamu deposits) and discovered in 1957, followed by the drilling 381 holes during 1957 to 1968. In 1968, Thirty two thousand tons of ore at a grade of 5.9% Cu and 6.7% Zn was mined before ceasing operations.

The Udu deposits occur in the intensely altered pumice bearing Udu Volcanic Breccia. The deposits are distributed within an approximately 450m × 200 m area. The main ore body has a pipe-like shape in plan view covering 300 m × 120 m in plan and plunges 20--30° to the ESE. The ore occurring the center of the pipe is mainly composed of massive sulfide and has undergone argillization, silicification and pyrite dissemination. Disseminated ore is dominant in the surrounding area. The massive ore displays a zonation composed of black ore, yellow ore and sulfide ore in descending order. The main ore minerals are mainly: pyrite, sphalerite, tennantite and barite, while chalcopyrite is scarce compared to the Japanese equivalents. The Mouta and Wainikoro prospects are also well known.

(2) Epithermal gold deposits

The main epithermal type prospect is at Mount Kasi in the southwestern part of the island. The deposit was mined by the open cut method during 1932 to 1946 with an estimated production of around 60,000 ounces of gold. An estimated 265 thousands tonnes of ore grading 7g/t Au was treated. The mineralization encompasses an area of 10 km^2

Gold mineralization occurs in quartz barite veins along faults hosted by calc-alkaline andesite. The main ore deposit strikes NW-SE and dips steeply westward. The mined ore zone extends 300 m in length, 12m in width, and 30 m vertically. The hanging wall of the fault which hosts the ore is brecciated, with the width of the mineralized zone becoming wider at shallower depths. The brecciated zone is 25 m in maximum width, gold-bearing and silicified. The deposits are classified as epithermal, high sulfidation type. Constituent minerals are native gold, pyrite, chalcopyrite, tetrahedrite and arsenopyrite.

The average grade is in the order of 7 g/t Au and 0.6 g/t Ag. The upper part of the brecciated zone tends to show higher grades which reach 92 g/t Au. The lower part of the deposit tends to increase in base metal grades with a maximum of 7.2 % Cu, 37 % Zn and 3.6 % Pb. Host rocks have

undergone silicification and alteration to alunite and barite in the zone immediately adjacent to the ore deposits, and propylitization including chlorite, calcite, pyrite, sericite and epidote on a regional scale.

As a result of compilation and review of existing data, the Nakoroutari, Dakuniba and Waimotu areas were selected for further geological survey and are thought to contain epithermal type mineralization.

(3) Disseminated type mineralization

A wide alteration zone is located around the Koroinasolo village. The area is underlain by basaltic-andesitic volcanic rocks and marine sediments of the Miocene-Pliocene Koroma formation. Silicification, opalization and brecciation has developed.

The areal extent of propylitic alteration is about 25 km^2. Geochemical anomalies of Au and As in soil are extracted. Disseminated ore deposits of porphyry type are expected.

However, in recent years the area is being explored for epithermal type gold deposits. Mineralization occurs along faults and in shear zones. Especially attractive gold grades have been identified along two major faults which have undergone intense silicification.

Other disseminated type mineralization occurs at the Savudrodro prospect.

The area is underlain by the Savudrodro Volcanics (basalt lavas and volcaniclastic rocks)and gabbroic dykes. Propylitic alteration and pyrite dissemination occur extensively, especially near the dykes. Geochemical survey and drilling indicate small scale porphyry copper type mineralization and associated alteration.

Chapter 4 Results of the Survey

4-1 Geologic structure, Characteristics of Mineralization and Mineralization Controls

(1) Nakoroutari Area

As a result of the Phase 1 Survey, gold mineralization has been confirmed to occur in quartz veins and breccia zones in the Nakoroutari area. Mineralization is hosted by basaltic-andesitic lavas and volcaniclastic rocks of the Koroutari Andesite of the Natewa Volcanic Group of Upper Miocene to Lower Pliocene age. The Koroutari Andesite is overlain by Sueni Breccia which have not undergone alteration or mineralization.

In the Nakoroutari area, mineralization occurs in four areas: Leli's Prospect, south of Leli's' Prospect, Mugsy's Prospect and Navakuru. Rocks occurring between these areas are not altered.

Mineralization and alteration is most intense at Leli's prospect. Gold occurs in association with quartz veins and breccia zones trending NNW-SSE. The geophysical survey results indicate that

two high resistivity zones exist near the Korobua fault which can be attributed to a subsurface silicified zone trending N-S, however, if interpreted together the general trend is NW-SE. Precursor examination of the existing drill core revealed many shear zones occurring in the propylitic altered rocks at Leli's Prospect.

Mineralization of Leli's Prospect is limited to a narrow exposed area on the surface. However, a sample of silicified lapilli tuff returned a grade of 12.9 g/t Au. Fluid inclusions identified in chalcedonic quartz indicate homogenization temperatures of between 184~208℃. Quartz vein material exhibits crustification texture, accompanied by minor amounts of chalcopyrite and sphalerite. The distribution of minor elements, such as Hg, indicate that the mineralization is epithermal and the scarcity of sulfides in the quartz veins and the alteration zone may indicate it is a low sulfidation type system.

The Nakoroutari area is located inside the southern edge of the Labasa caldera which has a diameter of 25 km~30 km (Cox,1980) and where mineralization and several hot springs occur. The caldera structure was interpreted to occur in the southern part of the Nakoroutari area by air-photo interpretation. The presence of this feature indicates the area was a center of major volcanic activity with the mineralization at Leli's Prospect possibly being part of a bigger system, controlled by a regional geologic structure. It turned out center of mineralization. Further exploration may be conducted over a wider area in an attempt to identify those structures which may potentially host mineralization.

(2) Dakuniba Area

The mineralization and alteration of the Dakuniba Area is characterized by its narrow, but long, quartz vein zone at the Dakuniba Prospect where mineralization is most intense among the area. Many narrow veins that contain higher than 1 g/t Au occur within the silicified zone which extends for 1 km. Quartz veins with more than 1 g/t Au tend to concentrate at Nagagani Creek. On the other hand, faults and argillic alteration are less developed in the area compared to those at Wailevu Creek and Nubuni Creek in eastern part of the Dakuniba Prospect. Here, the structural control on mineralization is less evident. However, the WNW-ESE trend of many basaltic dykes is similar to the E-W and N-S trending folding axes indicating that the ore solution may have moved through E-W trending tensional fractures, the same E-W trending maximum compressional stress filed as at the time of the Dakuniba basalt intrusion. This is reflected in the distribution of minor elements where gold values are high at Nagagani Creek and low at the east and west extensions where As and Sb are high. The conduit of the solution may be subsurface WNW-ESE trending faults

(3) Waimotu Area

[Waimotu Lodes]

The Waimotu Lodes consist of a Main Lode, an East Lode and a West Lode and these lodes are comprised of chalcedony-quartz veins trending north-south. The maximum grade is 24.2 g/t Au for the Main Lode and 42.5 g/t Au for the East Lode. The Waimotu Lode returned the highest gold assay results. It outcrops for 70 meters, however the north and south extension can not be traced because of poor exposure. The lode may extend downward since it may have been deposited at low temperatures as suggested by the presence of chalcedony quartz veins. On the other hand, the alteration adjacent to the vein is not wide and correlations with Sb, As and Hg are weak. This may indicate that the present exposed level represents the lower part of the system. The Waimotu Lodes contain minor sulfides.

[Bill's Hill Prospect]

Silicified and argillized (kaolinized) zones are developed at the Bill's Hill Prospect. Quartz and chalcedony stockwork is developed cutting through these zones, striking N-S and dipping steeply. Gold values from the silicified rocks and quartz veins are less than 1 g/t.

Oxidation reached 15 to 20 m from the surface by weathering as is shown by presence of iron oxides after sulfides. Quartz-chalcedony veins are similar to those at the Waimotu Lodes in texture(crustification) and low sulfide content. Shallow silicification and pyrite dissemination zone appears to have replaced highly permeable tuff breccia.

[Nuku Prospect]

At Nuku, a silicified zone comprising chalcedony-quartz veins extends in a direction for approximately 150m, dipping west. The highest grade is 4.3 /t Au (sampled width 2.5m) with the average for the total 150m being 1.3 g/t Au (average sampled width 7m). Samples from the past two drill cores returned grades of 0.6 g/t Au at an average 7m width.

The dip of the Nuku silicified zone appears to be to the east, however, the past four drillings have revealed dips to the west. This may be explained by a directional change of the dip or existence of shallow angle faults as suspected and documented in a past report. However, the dips that can be seen in outcrop may reflect minor changes such as tension fractures in a set of parallel shear zones.

In the three prospects above, quartz veins and stockwork trend N-S. Also dykes display a dominant trend N-S. The strike length of the quartz veins and stockwork is short in length and may have been emplaced in tensional fractures. Fold axes display a dominant N-S direction .

Fractures may have developed near the top of the anticlinal structure under a regional tensional stress field.

4-2 Mineral Potential of the Geological Survey Area

(1) Nakoroutari Area

Four zones were selected from the study of existing geological and resources data and information. They are; Leli's Prospect, a zone to the south of the same Prospect, Navakuru and Mugsy's Prospect. Mineralization and alteration were found to occur in all five zones, and Leli's Prospect was concluded to be the most promising. It is noted that the altered zone to the south of Leli's Prospect shows evidence of gold mineralization.

The Leli's Prospect occurs within the quartz vein-breccia zone developed in the Koroutari Andesite lava-volcaniclastics which belong to the Natewa Volcanic Group. There are two quartz vein-breccia zones, the eastern and western zones, part of the NNW-SSE system.

The alteration area on the surface is restricted to a narrow zone. However, exposure at the area is poor and high resistivity zones that reflect subsurface silicification is predicted based on the results of the geophysical survey. Therefore, there is high potential for gold ore deposits. Further, mineral potential in the surrounding Nakoroutari Area is high judging from the fact that to the south of the Leli's Prospect there is gold mineralization, and that the Nakoroutari Area is located within the Labasa Caldera in which the Tabia Prospect and hot spring area are located.

(2) Dakuniba Area

The major veins are developed over 2 km in length and the grade of the quartz veins is high with a maximum of 16 g/t Au and 21 samples containing more than 1 g/t Au were collected from a 1 km long outcrop. In addition to quartz and clay veins upstream in the Wailevu Creek and Naqaiqai Creek in the northeast, argillization and pyrite dissemination occur in the Nubuni Creek to the east and a quartz vein at a branch of Waikava Creek, together indicating the Dakuniba Area has high potential for gold mineralization. It is noteworthy that no significant drilling has been conducted, and it is therefore concluded that this zone remains a promising area.

(3) Waimotu Area

The downward extensions of three veins of the Waimotu Lode have not yet been properly tested. The southern ore shoot in the direction of the Main Lode and East Lode are attractive. The northern extension of the vein could not be traced, and to the south, swampy land prevents exposure.

At Bill's Hill two types of mineralization occur and may be the result of two stages. Silica and pyrite dissemination are cut by quartz stockworks. Such multi-stages mineralization may increase the possibility that gold has precipitated in high content.

At Nuku the silicified zone was tested to the depth about 50 m from the surface. The assay results show that Au grades at the surface is better than those of drill cores. It may be low potential of the Nuku area. However, the only two intercepts may not be sufficient for the evaluation of the prospect.

The three prospects in the Waimotu area occur in narrow zone with the same strike and may suggest this area has good mineral potential as a whole. The zone extending from the lower part of the Waimotu Lode to the subsurface part of eastern Bill's Hill is concluded to be an interesting target for further exploration because the high Au value zone may extend to downward.

Chapter 5 Conclusions and Recommendations

5-1 Conclusions

(1) Nakoroutari Area

a. This area comprises an areal extent of 36 km^2 and is located approximately 15 km south of Labasa. Geochemical, surface magnetic, and IP surveys have been conducted since 1988 in the Leli's Prospect. Also six holes with a total depth of 1,053 m have been drilled in this prospect. The hole was aimed at a quartz breccia zone associated with the NNW-SSE fault system and encountered ores with a core thickness of 0.6 m and 11.6 g/t Au.

b. The geology of this area is composed mainly of basalt-andesite lava and volcaniclastics of the Koroutari Andesites, and andesitic volcaniclastics of the Sueni Breccia. These units belong to Upper Miocene-Lower Pliocene Natewa Volcanics Group.

c. Four zones were selected from the study of existing geological and resources data and information. They are; Leli's Prospect, a zone to the south of the same Prospect, Navakuru, and Mugsy's Prospect. Mineralization and alteration were found to occur in all five zones. The Leli's Prospect was concluded to be the most promising. It is noted that the altered zone to the south of Leli's Prospect show evidence of gold mineralization.

d. The Leli's Prospect occurs within the quartz vein-breccia zone developed in the Koroutari Andesite lava-volcaniclastics which belong to the Natewa Volcanic Group. There are two quartz vein-breccia zones, the eastern and western zones, part of the NNW-SSE system. A silicified tuff breccia sample with a grade of 12.9 g/t Au has been collected in the vicinity of the Leli's Prospect, and although in a limited area, high-grade zones have been confirmed.

e. Geophysical survey by CSAMT array was carried out for 12 km and time domain IP for 7.5 km at the Leli's Prospect.

f. The CSAMT array method identified intrusive-shaped high resistivity zones in the

central parts of Line B-C and Line D-F. One-dimensional resistivity structure analysis showed the existence of two buried high-resistivity bodies which extend in the N-S direction between Lines A-C and D-F. These two bodies as a whole extend in the NW-SE direction and are interpreted to be areas of silicification.

g. The apparent resistivity measured by the time domain IP method resulted in a distribution pattern harmonious with the results of the CSAMT array. The chargeability background is dominantly low. Chargeability anomalies exceeding 10 mV·S/V were detected at three localities, but they are independent anomalies and their reliability is very low. Weak anomalies of over 5 mV·S/V occurred continuously in the central-western part of all traverse lines. These are inferred to be the anomalies detected by Geoterrex (1988). A two-dimensional model simulation was made and it is inferred from the results that these IP anomalies are caused by bodies 100 m below the surface. Also the simulation results indicate that these bodies have chargeability in the general range of 5-7 mV·S/V and most probably formed by pyrite mineralization. These bodies and the two high-resistivity bodies detected by the CSAMT array between Lines B and F are located in approximately the same locality. Thus it is believed that pyritization and silicification are closely related in this area.

h. Resistivity and chargeability of 30 rock samples (including core samples) were measured in the laboratory. The resistivity of silicified rocks was the highest at 2,884 ohm-m, followed by basalt > andesite > volcaniclastic rocks. The chargeability of volcaniclastic rocks was the highest at 11.7 mV·S/V, followed by silicified rocks > andesite > basalt. It was shown from this work that identification of rock types from physical characteristics was difficult.

(2) Dakuniba Area

a. This area is located approximately 65 km east of Savusavu with an areal extent of 36 k^{m2}. A zone comprising WNW-ESE striking quartz veins occurs 1 km north of the Dakuniba Village in the upper reaches of the Nagagani Creek. The zone was previously explored and is called the Dakunba Prospect. In the past, two holes with a total length of 176 m have been drilled, soil and rock geochemical survey, CSAMT geophysical survey, and trenching were carried out.

b. The geology of this area consists of basaltic lava and volcaniclastics of the Dakuniba Basalt belonging to the Upper Miocene - Lower Pliocene Natewa Volcanic Group.

c. Mineralization occurs in the quartz veins developed in the basaltic lava and volcaniclastics. The major veins are developed over 2 km in length and strike WNW-ESE and dip steeply. Alteration associated with mineralization is observed in the northeastern part of the area and they are; quartz-clay veins extending from the upper reaches of the

Wailevu Creek to the Nagagani Creek, argillized and pyrite dissemination from the Nubuni Creek westward, and mineralization observed in the quartz veins of a tributary of the Waikava Creek.

d. The continuity of individual quartz veins exposed in the upper reaches of the Nagagani Creek has not been confirmed, but the grade of the quartz veins is high with a maximum of 16 g/t Au and 21 samples containing more than 1 g/t Au were collected from 1 km long outcrop. Thus, this zone is concluded to be promising.

(3) Waimotu Area

a. The Bill's Hill Prospect is located approximately 45 km northeast of Savusavu, and the Waimotu Lode and Nuku Prospect are 0.5 km and 2.5 km east-northeast from there.

b. A total of 18 holes have been drilled in the three prospects of this area. A total of 551 m adits was dug and seven holes with a total of 609 m length were drilled into the Waimotu Lodes, seven and four holes were drilled in the Bill's Hill Prospect and Nuku Prospect, respectively.

c. The geology of this area consists mainly of weakly propyritized andesite and basaltic lava and volcaniclastics of the Koroutari Andesite and Korotini Breccias. These units belong to the Natewa Volcanic Group.

d. The Waimotu Lodes are comprised of; Main Lode, East Lode, and West Lode. A length of about 70 m was confirmed for the Main Lode in outcrop, but both mineralization of the East and West Lodes were confirmed only at one outcrop and the entrance of the adit. All three veins have a N-S strike and with a dip of 75° - 90° east for the Main and East Lodes. The widths of the veins are, 1.2 m maximum for the Main Lode and 0.8 m was confirmed at an outcrop for the East Lode. The maximum grade is 24.2 g/t Au for the Main and 42.5 g/t Au for the East Lodes. The gold content of 42.5 g/t was obtained in a sample collected from the East Lode (0.8 m wide), but a sample collected only 1 m south of this sample contained only 2.4 g/t Au, thus the fluctuation in the grade is strong. On the other hand, the average grade of four samples collected along the 70 m length of the Main Lode is 7.2 g/t Au and the gold content is constant. The grade of the West Lode is the lowest of the three at 0.92 g/t Au.

e. Silicified and argillized (kaolinized) zones are well developed in the Bill's Hill Prospect. Quartz and chalcedony stockwork is developed cutting through these zones, and its strike is N-S and the eastward dip is generally steep. Surface observation of the stockwork shows the occurrence of geothite as an opaque with very minor amount of chalcopyrite. The cores drilled in the past show strong dissemination of pyrite in the silicified zone. The maximum grade of individual veinlets of the stockwork is 0.21 g/t Au.

f. At Nuku, a silicified zone comprising chalcedony-quartz veins extends in a N-S direction

for approximately 150 m and the average width of this zone is approximately 7 m. The direction of dip was seemingly east, but it is difficult to determine the dip on the surface and from the results of the past drilling, it is inferred to be westward dipping. The highest grade of the stockwork is 4.3 g/t Au (sampled width 2.5 m) and the average of the total 150 m is 1.3 g/t Au (average sampled width 7 m). The past two holes encountered ores at approximately 50 m below the surface and the average grade over a 7 m width is 0.6 g/t Au.

g. The lower parts of the three prospects in this area have been drilled. All three have significant mineral potential and the zone extending from the lower part of the Waimotu Lode to the subsurface part of eastern Bill's Hill is concluded to be an interesting target for further exploration.

(4) Koroinasolo Area

The vicinity of the Koroinasolo Area in the western part of Vanua Levu was excluded from the present survey because private mining licenses had been issued when this survey began. At the time of preparing this report, however, these licenses have expired. In this area, caldera structures and a large number of NNW-SSE to NW-SE faults occur and altered zones are widely developed. It is known that there are many prospects and it is said that outcrops with gold content of over 1 g/t Au occur. Records of the details of the past surveys and exploration, however, could not be obtained and the nature of mineralization of this area is not clear.

5-2 Recommendations for the Second Year

(1) Nakoroutari Area

In the Nakoroutari Area, the Leli's Prospect is the most promising for future work including drilling. The target for drilling should be the lower part of the high-grade veins of the quartz-breccia zone. This zone is accompanied by gold mineralization and was confirmed by the present survey. This location is near stations 7 and 8 of the electric survey Line C. Also, confirmation of the CSAMT and IP high-resistivity zones is strongly recommended and this target will be the lower part of the vicinity of stations 6 and 7 of Lines B and E.

(2) Dakuniba Area

The present survey confirmed the existence of gold-bearing quartz veins at the Dakuniba Prospect. The lower parts of the quartz veins of the Dakuniba Prospect are practically unexplored, and it is recommended that drilling be carried out during the 2nd Phase if this

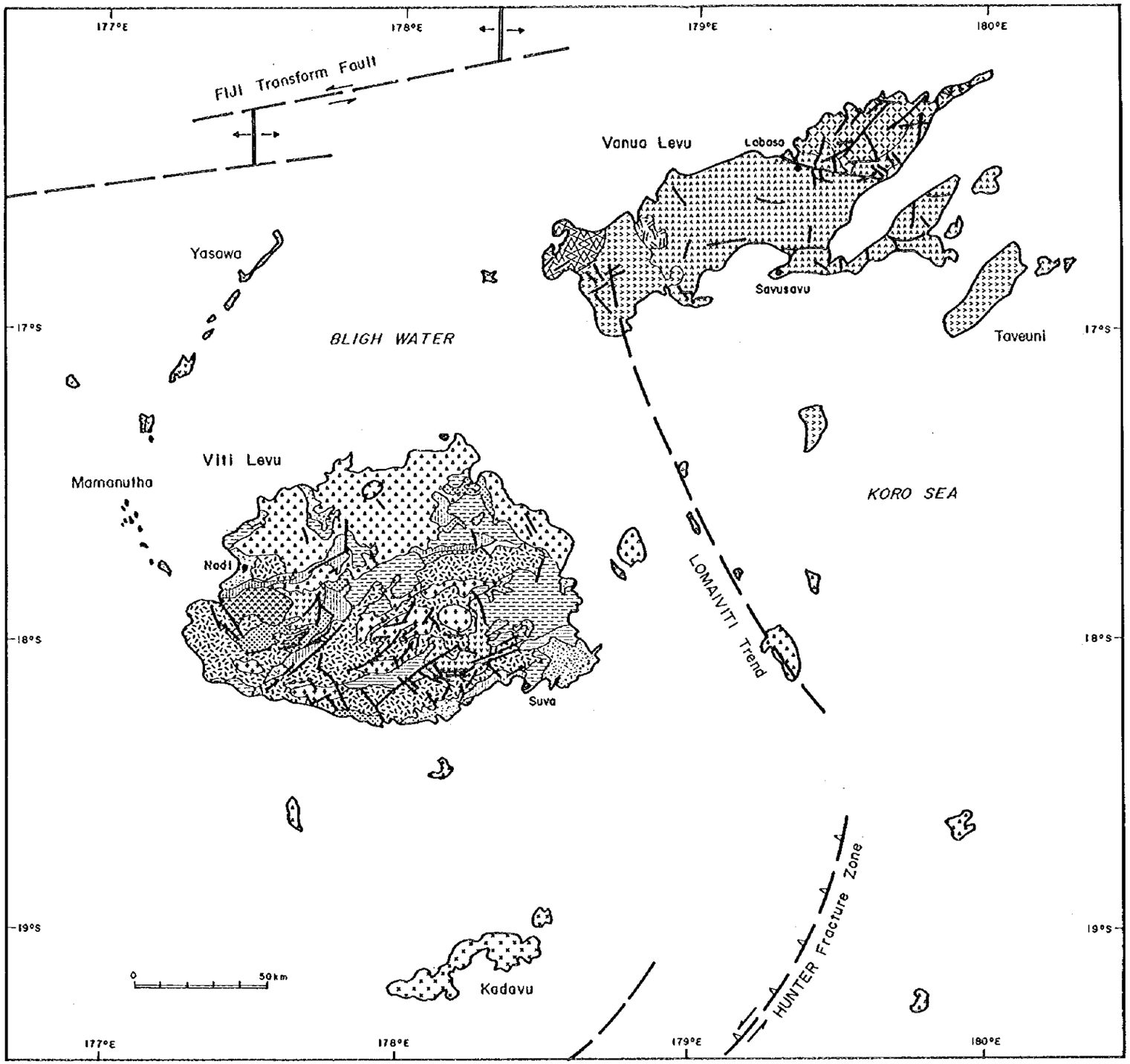
project. The high-grade zone in the upper reaches of the Nagagani Creek is considered to be a particularly promising target.

(3) Waimotu Area

In the past, geological survey and exploration were carried out covering limited parts of the Waimotu Lodes, Bill's Hill, and Nuku Prospects. This work, however, is not sufficient for assessment of the resources in the area. Of these three zones, the Waimotu Lode has the highest assay results from outcrop and is therefore most interesting. Therefore, it is recommended that we first confirm the downward continuity and the distribution of the veins by electric survey, namely CSAMT and IP, then follow it up by drilling.

(4) Koroinasolo Area

It is recommended that as this area will be open for exploration next year, all available geological data regarding this area be studied and interpreted, and then if deemed warranted, implement geological and/or geophysical survey in the areas delineated as promising.



LEGEND

- Pleistocene~Holocene sediments
- Middle Pliocene ~Pleistocene volcanic rocks
- Early ~ Late Pliocene volcanic rocks (Bua Volcanic Group)
- Early ~ Late Pliocene volcanic rocks (Nararo Volcanic Group)
- Latest Miocene ~ Earliest Pleistocene sedimentary rocks
- Latest Miocene ~ Earliest Pleistocene volcanic-plutonic rocks
- Late Miocene sedimentary rocks
- Late Miocene volcanic-(plutonic) rocks
- Late Miocene ~ Early Pliocene sedimentary rocks
- Late Miocene ~ Early Pliocene volcanic rocks (Monkey Face Volcanic Group)
- Late Miocene ~ Early Pliocene volcanic rocks(Natewa Volcanic Group)
- Late Miocene ~ Early Pliocene volcanic rocks(Udu Volcanic Group)
- Middle ~ Late Miocene sedimentary rocks
- Middle ~ Late Miocene plutonic rocks
- Late Oligocene ~ Middle Miocene volcanic-sedimentary rocks
- Late Eocene ~ Early Oligocene volcanic-plutonic rocks
- Fault
- Caldera

Fig. 1-2 Simplified Geologic Map around the Survey Area

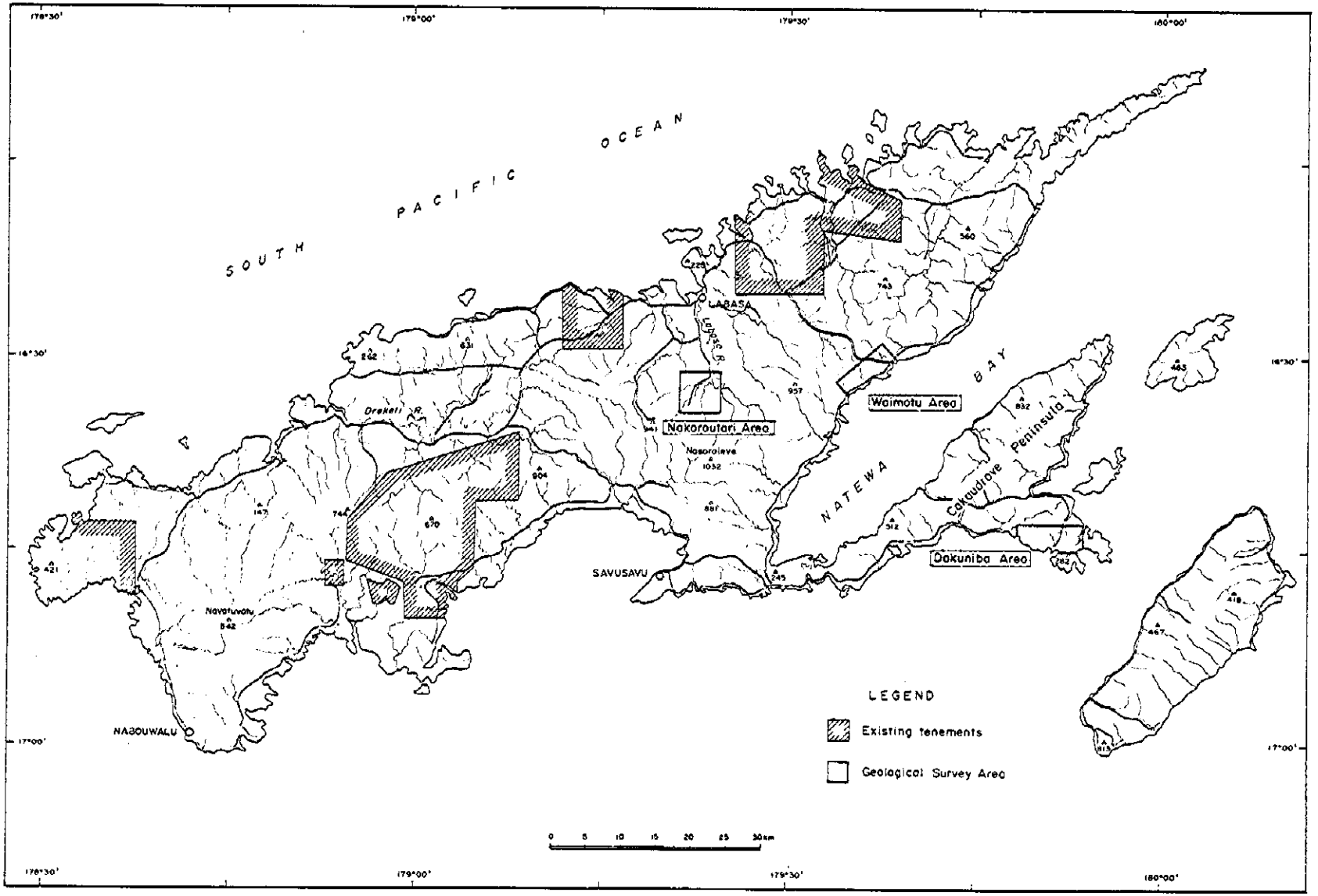


Fig. 1-3 Location Map of the Survey Area

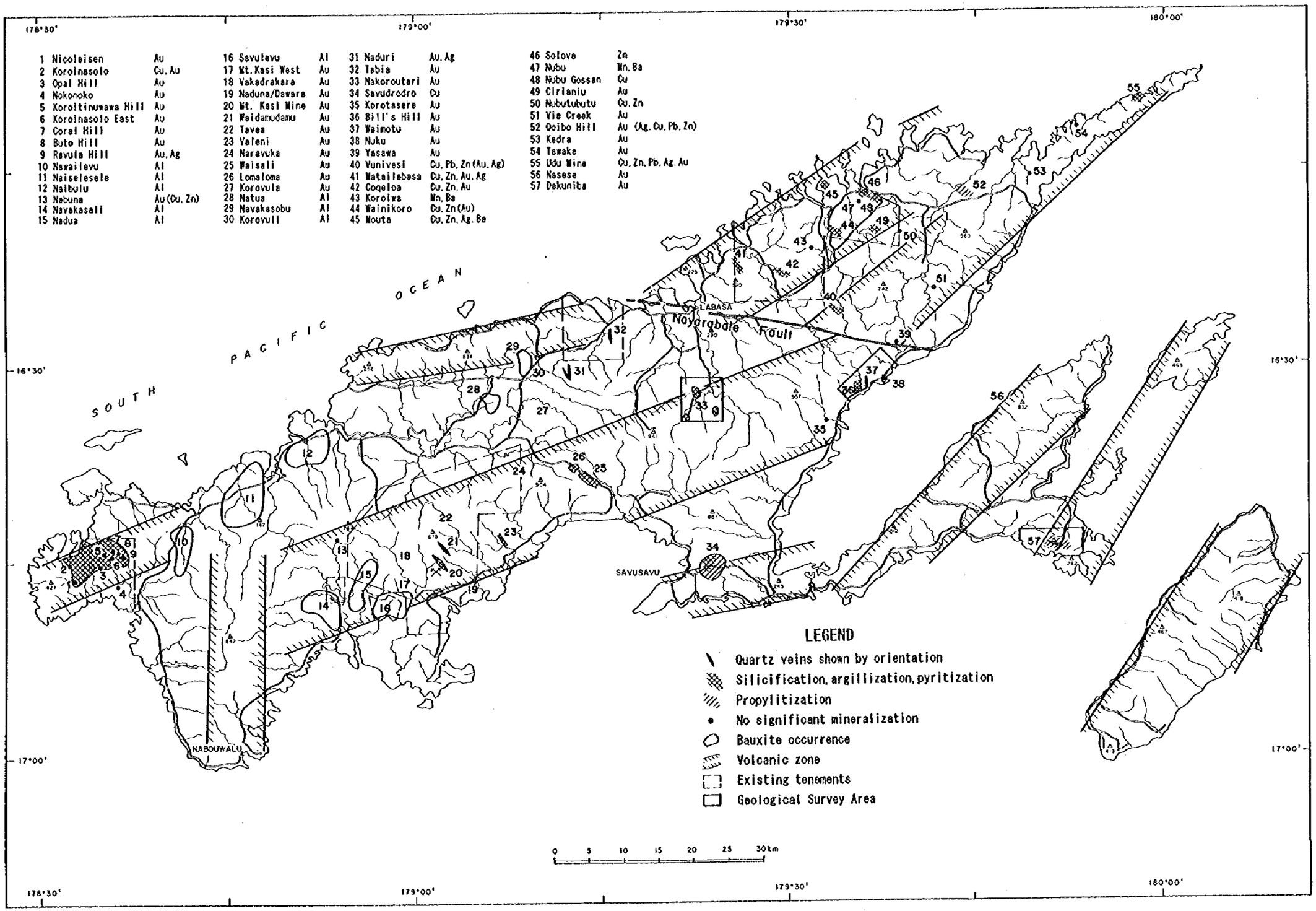


Fig. 1-4 Integrated Interpretation Map of Data Compilation Area

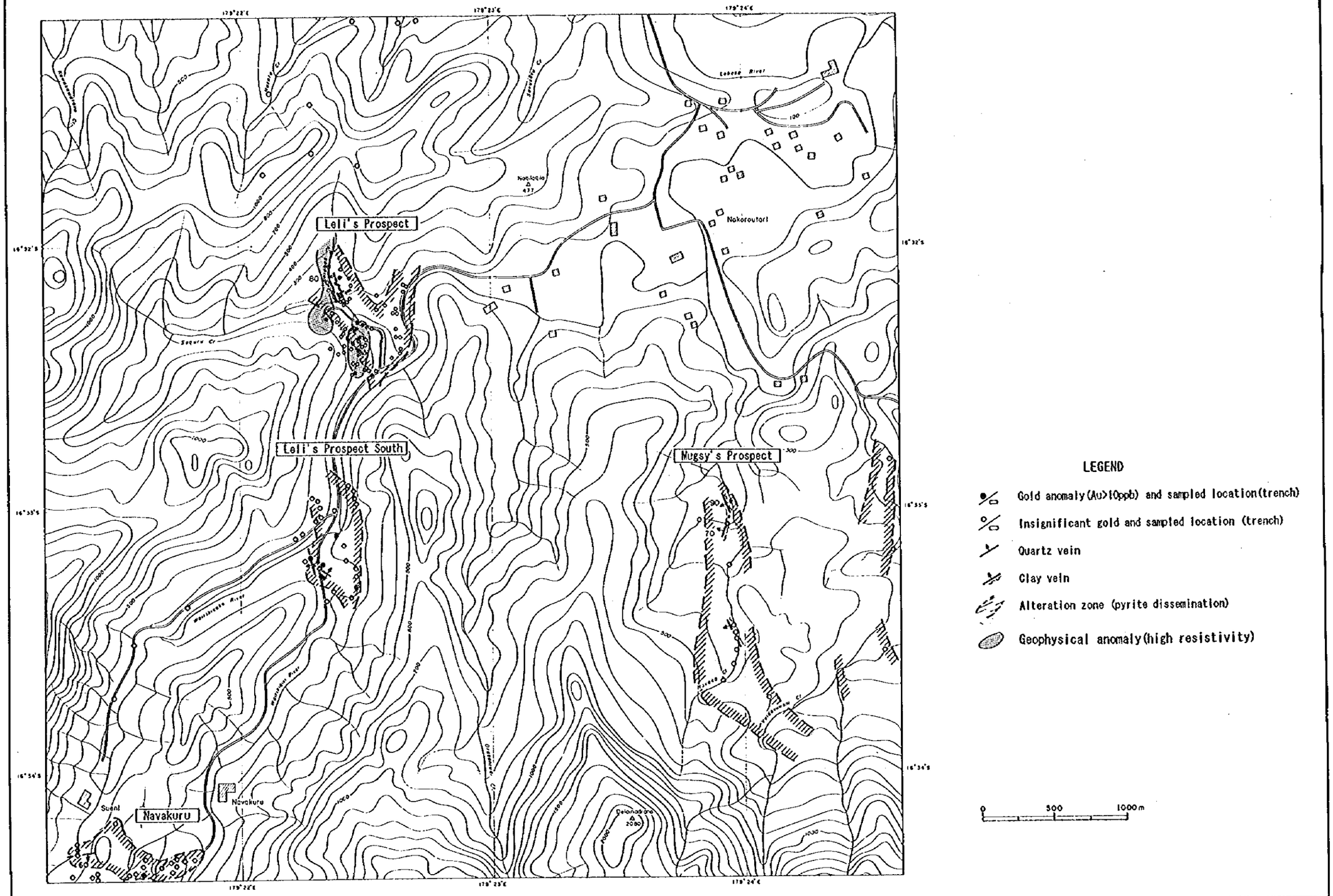


Fig. 1-5 Integrated Map of the Nakoroutari Area

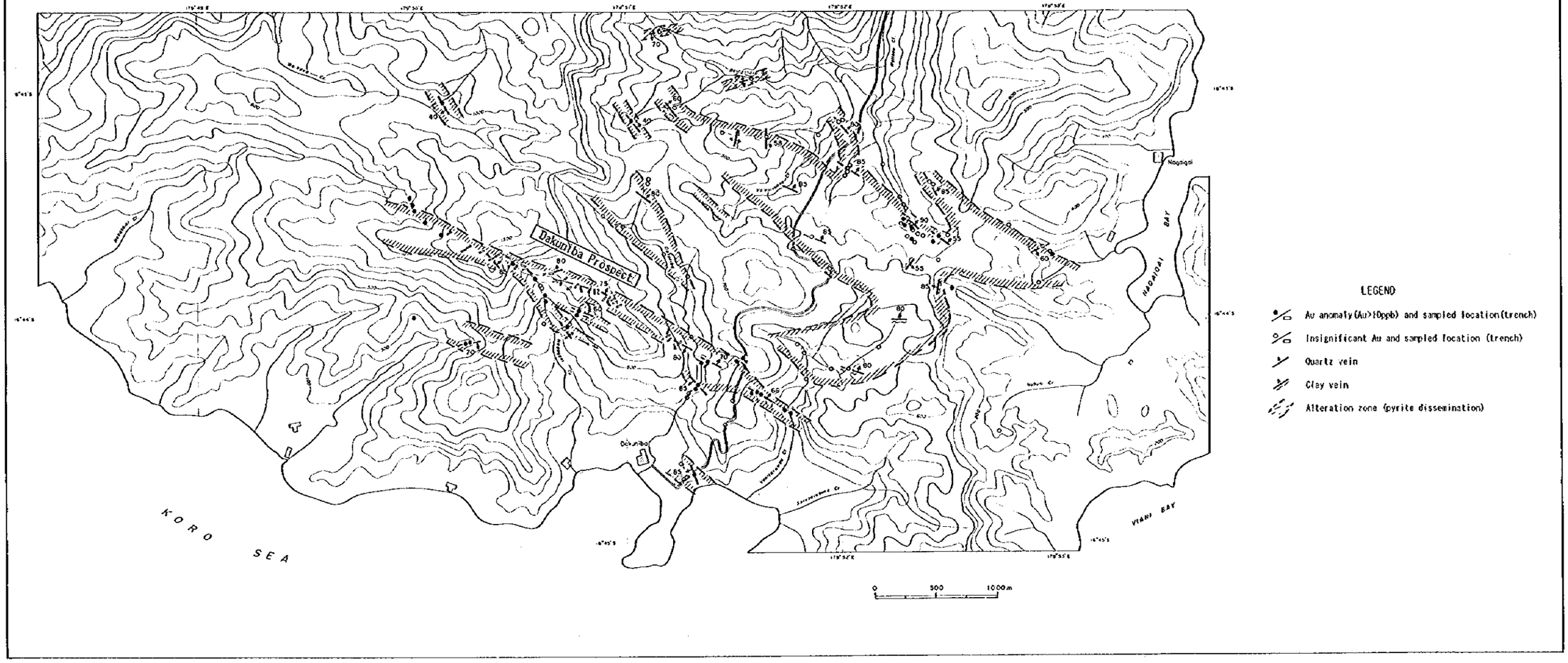


Fig. 1-6 Integrated Map of the Dakuniba Area

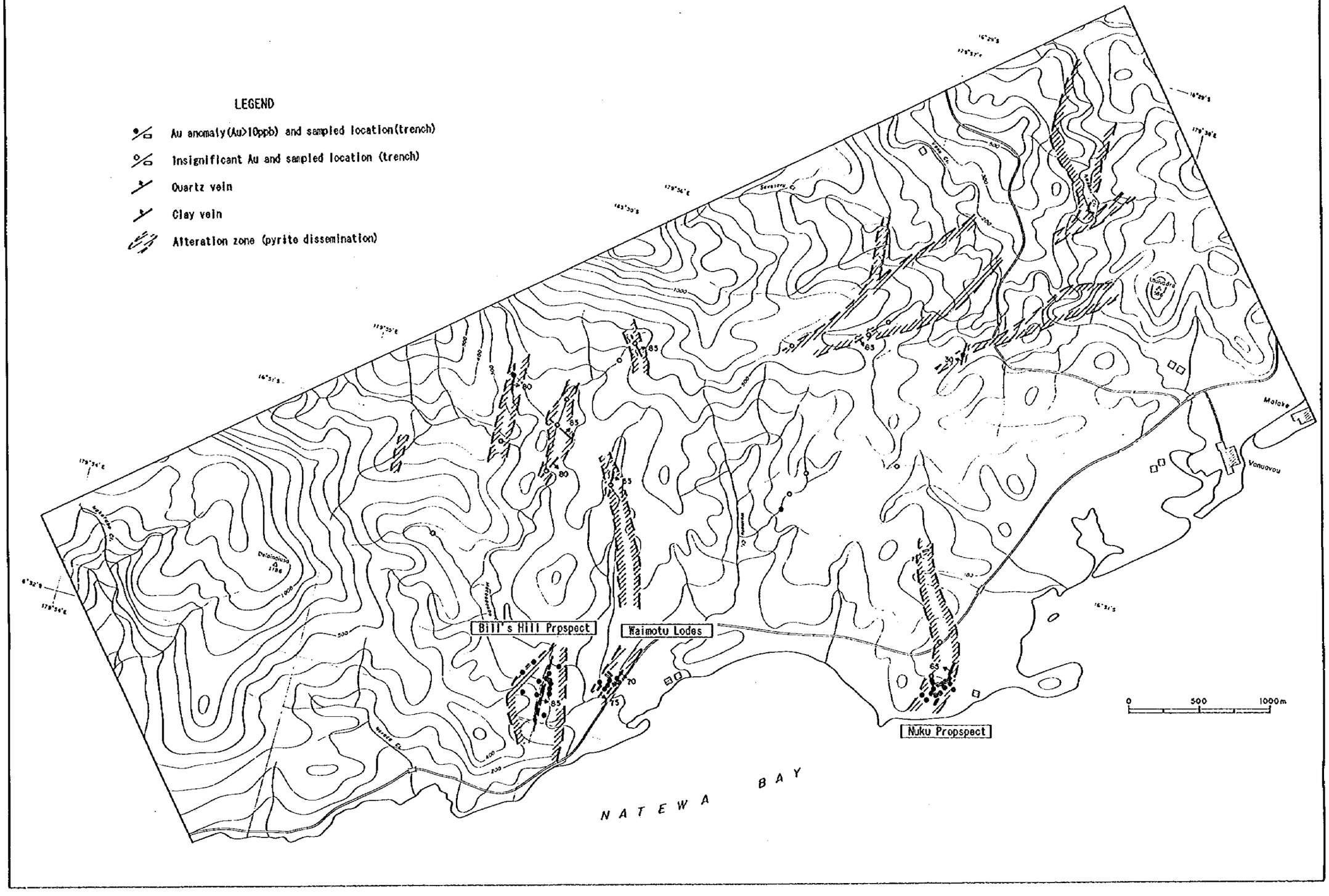


Fig. 1-7 Integrated Map of the Waimotu Area

PART II DETAILED DISCUSSION

Chapter 1

Compilation of the Existing Data

PART II DETAILED DISCUSSION

Chapter 1 Compilation of Existing Data

1-1 Survey Method

Existing data consists of published scientific papers, geological maps by the Geological Survey and MRD, and reports from various companies. Most of them were available at the library of the MRD in Suva.

The main areas are the 57 prospects which are shown by Colley and Flint (1985). Firstly, twenty two prospects from the 57 prospects were selected by excluding existing tenements and bauxite deposits. Then reports on the 22 prospects were reviewed.

Criteria for screening the prospects.

Firstly, results of past exploration work and secondly, room for exploration.

The criteria is what kind of exploration methods were conducted and what were the results, and whether the interpretation of the results was reasonable or not. The second is whether there exists the possibility that mineralization and alteration extend outside the prospect area, or not. It is difficult to evaluate the possibilities only from the report only, SLAR interpretation was applied for this purpose.

1-2 SLAR Imagery Interpretation

1-2-1 Outline

(1) Objectives

SLAR imagery interpretation was carried out in order to understand the regional geological structure and relationship with known prospects. This was used to help in the selection of geological survey areas.

(2) Area

The whole Vanua Levu island was selected for interpretation.

(3) SLAR Imagery Used

The imagery that are comprising of two different azimuths were provided by the MRD for interpretation as shown in Fig. 2-1-1. The characteristics of the imagery is as follows:

a. Wave length 1.2 cm

b. Looking directions northwestward : 11 strips

southward : 9 strips

c. Scale of imagery 1:250,000

d. Mosaic prepared October 1984

(4) Method of interpretation

Regional photogeological interpretation was carried out. As a general geological interpretation had been conducted by Mallic and Hobggod (1987), interpretation of the geological structures was emphasized during this work. The southeastward looked imagery is used for this work.

(5) Criteria for interpretation

The standards used for interpreting geologic structures are as follows.

a. Folds

Folds are identified by considering the distribution of geologic units, bends in the drainage pattern, trace of cuesta topography, extraction of strike ridges of the geologic units and other factors.

b. Lineaments

Lineaments indicate the existence of fractures on the surface or at shallow subsurface regions. Only those features considered to be geologically significant were extracted as lineaments. Those which are not clear are shown as broken lines on the map.

The major morphological features used for identifying lineaments are as follow.

① Existence of fault scarps
② Existence of linear fault valleys
③ Notably linear flow of rivers
④ Existence of kerncols and kernbuts
⑤ Linear continuation of break points of slopes

The above features vary in accordance with the geology, geologic structure and other factors of the area.

(3) Annular and dome structures

The morphological features for identifying annular structures ;

① inward radial or semi-inward radial drainage patterns

② circular or arc shaped depressions with similar shaped marginal ridges.

In the structural feature mentioned in ②, it strongly suggests the existence of eroding calderas where there are sharp continuous scarps along the inner sides of the marginal

ridges. These are called caldera structures (in the interpretation map, Fig. 2-1-1). Therefore, structures showing only first feature are called annular structure, in this work.

1-2-2 Interpretation of Geological Structure

(1) Folds.

a. Anticline: Existence of an east-west trending anticline is inferred near Mt. Bulebulewa in the northern part of the survey area. The length of the axis is about 15 km. This was based on the interpretation of morphology of ridges and the bedding trace on the eastern part of the south wing, although no bedding was traced in the northeastern part.

b. Syncline: Synclines are inferred at Dreketi River and Labasa River in the two areas near the center of the survey area. The syncline at Dreketi River is extending east-west and bedding traces are observed on both wings. The syncline around the Labasa River is also trending east-west, and its existence is shown by the interpretation of relatively lower topography though no bedding planes could be traced. These two synclinal structures are thought to represent a sedimentary basin of volcaniclastic rocks of the Natewa Volcanic Group.

(2) Lineament

A total of 171 lineaments were extracted from this area (Fig.2-1-2). The lineaments are most dense in the Udu Volcanic Area. Then, north of Savusavu, around Mt. Kasi and north of Dakuniba. The most prominent lineament runs from Labasa to Yasawa trending WNW-ESE with a total of about 450 km. It corresponds to the Nayarabale Fault (Colley and Greenbaum, 1980). The lineaments to the northeast of Nabouwalu where the Bua Volcanic Group is underlain are characteristic for their trends of N-S.

In the Area, 15 annular structures, 25 caldera structures and 8 dome structures are identified. These structures occur singly or form compound structures.

Structures	Number
Annular structure single	4
Caldera structures single	11
Dome structures single	4
Caldera & annular composed	10
Caldera & dome composed	3
Caldera, annular & dome composed	3

(3) Annular structures, caldera structures and dome structures

The largest caldera structure is located 15 km north of Labasa and has a 10 km diameter.

The northern and the eastern of slopes of this structure are characteristic of a stratiform volcano. On the other hand, the southwest part is largely eroded and the volcanic structure is unclear. Within the caldera the Matailabasa and Coqeloa prospects are located.

The caldera structure surrounding the Mt. Kasi mine has a diameter of about 10 km. The Vakadrakara and Waidamudamu gold deposits are located here.

South of Koroinasolo in the western part of the island, a composite of annular and caldera structures are located. Within these structures the Nikoleisen prospect exits. East of the structure, there are three more caldera structures and within those hydrothermal alteration zones have been identified.

1-2-3 Interpretation of the Geological Structure

The Survey area is mainly underlain by volcanic rocks and the volcanic structures have not yet been identified and described except some of them. In this study, annular, caldera and dome structures are interpreted, and most of them may indicate centers of volcanic activities aligned on ENE-WSW, NE-SW and N-S directions. The alignment suggests fractures underneath the volcanoes.

On the other hand, geologic units are developed in zones around Naduri near Labasa and Cakaudrove Peninsula on the southeastern part of the island where neither annular, caldera nor dome structures are interpreted.. Table 2-1-1 including those zones showing volcanic and associated characteristics are tentatively named as volcanic zones.

The directional change of the volcanic groups may be attributed to a difference in the time of volcanic activity and faulting after eruption of the volcano.

The Seatura volcanic zone (2 in Fig. 2-1-4) corresponds to the Lomaiviti Trends (Colley, 1976) and is younger than the Nabua volcanic zone as suspected based on the well stratiformed morphology. The sense of the Lomaiviti Trend is right lateral. Therefore, Koroinasolo volcanic zone (1) and Nabua volcanic zone, now separated by the Seatura volcanic zone may have been a single volcanic zone. Leciaceva volcanic zone (5) trends oblique to the Dakuniba volcanic zone (7) and their time relations and formation are not clear. The Busaisau volcanic zone (8) and the Udu Trend (9) correspond to the Nayarabale Fault and are oblique to the Nabua volcanic zone in the south and parallel to the Dakuniba volcanic zone.

The major prospects and hydrothermal alteration zones and gold deposits are located within the volcanic zones.

Table 2-1-1 Major Volcanic Trends in Vanua Levu

Trend	Major Trend (Volcanic zone)	Direction	Length of Zone (km)	Width of Zone (km)	Number of Annular, Caldera, Dome structure	Main Prospect	No. in Fig. 2-1-4
ENE-WSW	Koroinasolo	N70° E	25	7.5	6	Nikoleisen Koroinasolo	①
	Naduri	N75° E	30	7.5	1		③
	Nabua	N70° E	88	15	10	Mt.Kasi Lomaloma Waisali Waimotu/Nuku	④
	Lesiaceva	N80° E	25	5	-	Savudrodro	⑤
NE-SW	Cakaudrove	N50° E	5 1 0	7.5	2	-	⑥
	Dakuniba	N45° E	5+	10	2	Dakuniba	⑦
	Bucaisau	N55° E	45	10	2	Matailabasa Coqeloa Wainikoro Mouta Nubu	⑧
	Udu	N55° E	55	15	1	Udu	⑨
N-S	Seatura	N	30	10	5		②

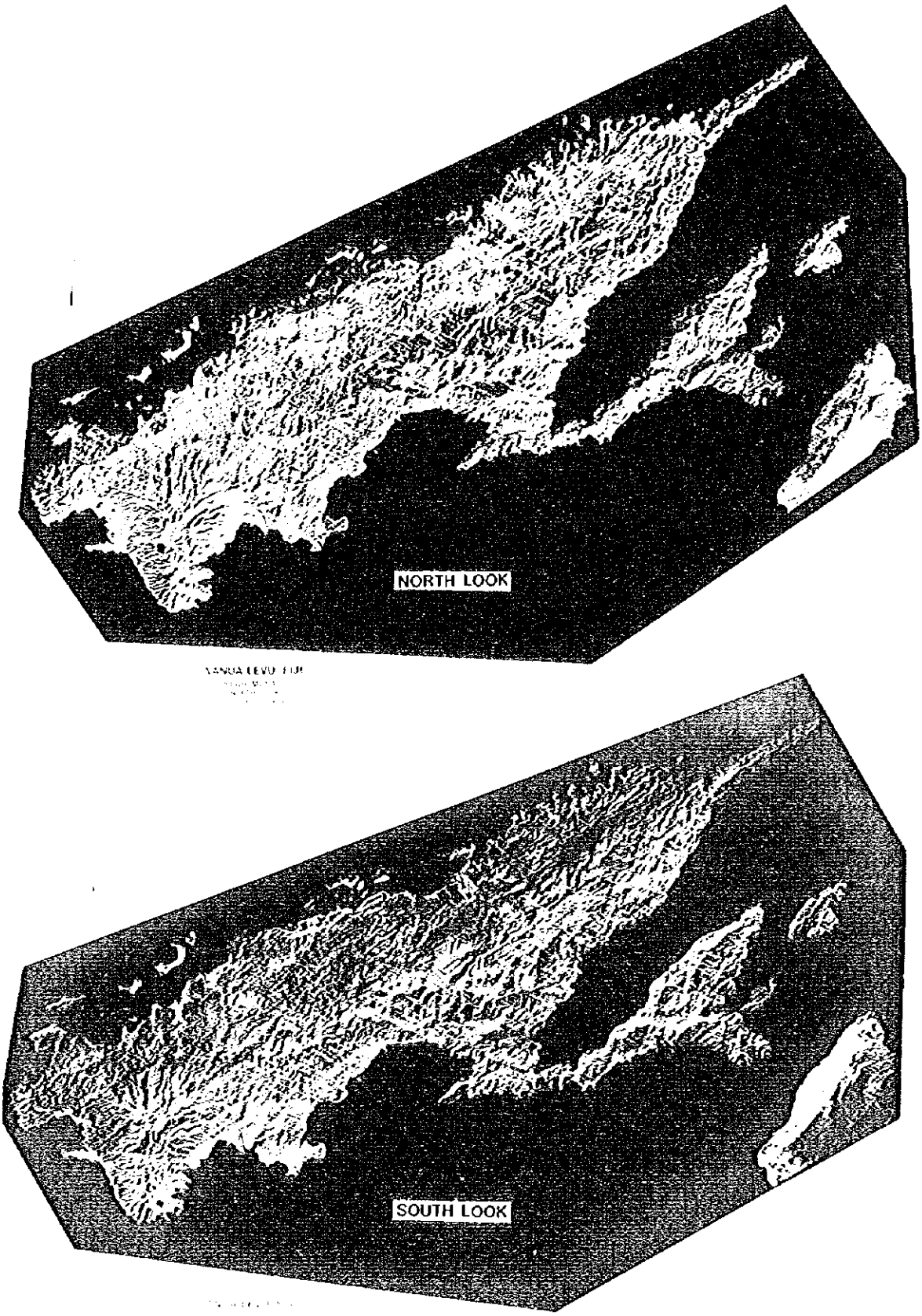


Fig. 2-1-1 SLAR Imagery Mosaic of Vanua Levu

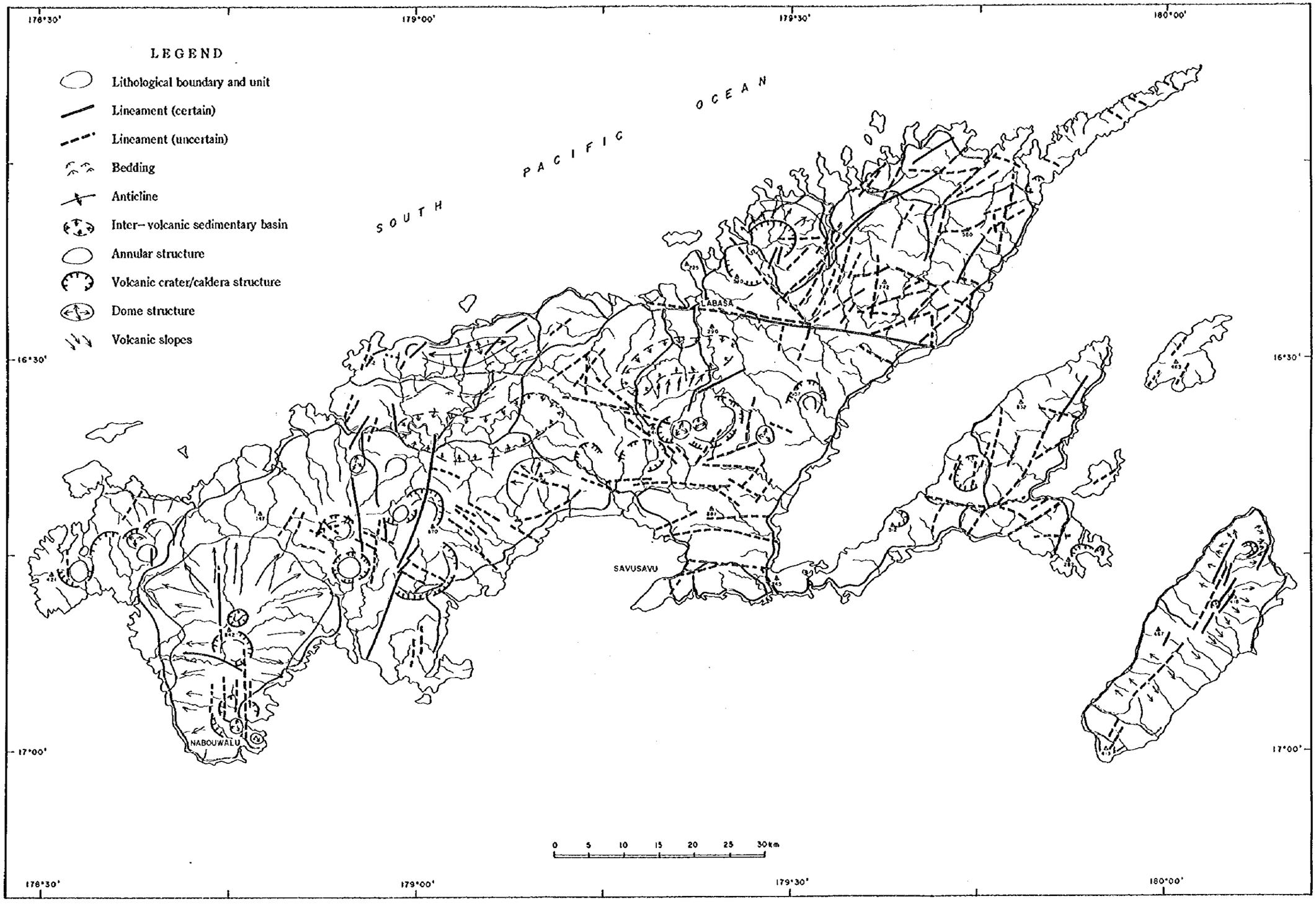
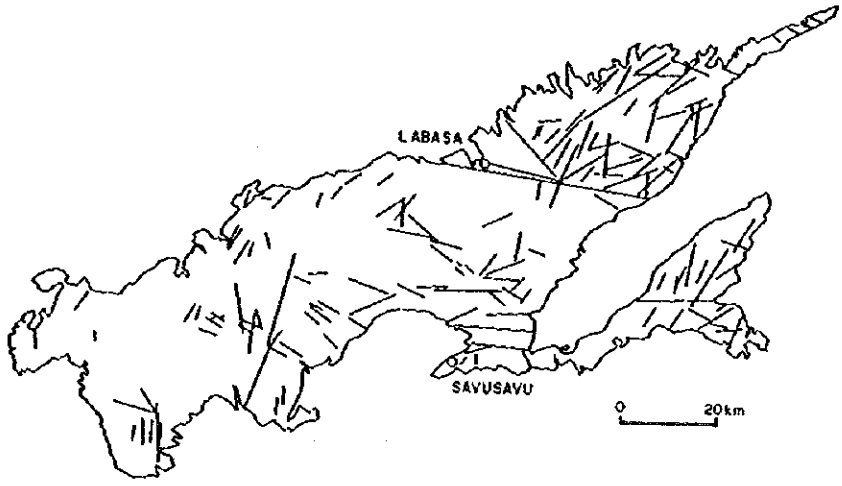
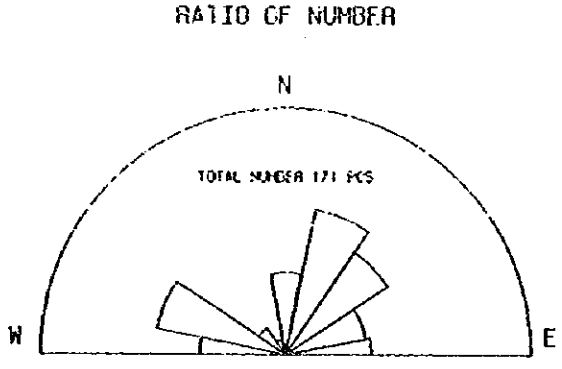
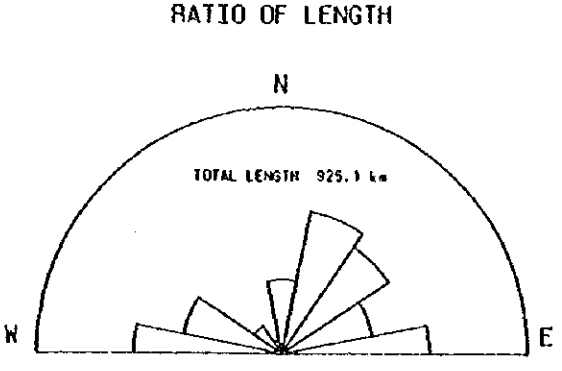


Fig. 2-1-2 Photogeological Interpretation Map Using SLAR Imagery of Vanua Levu







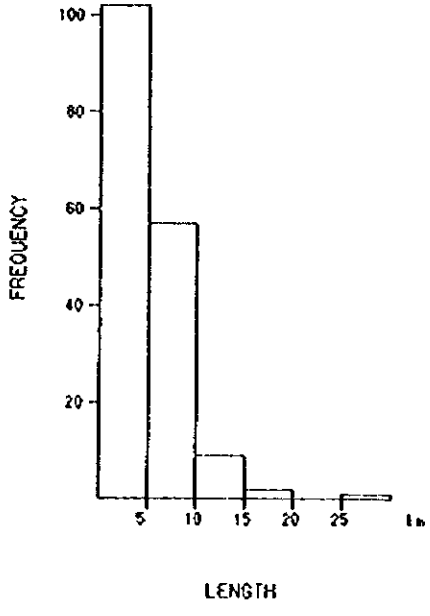


Fig. 2-1-3 Rose Diagrams of Number and Length, and Histogram of Length of Lineaments Interpreted from SLAR Imagery of Vanua Levu

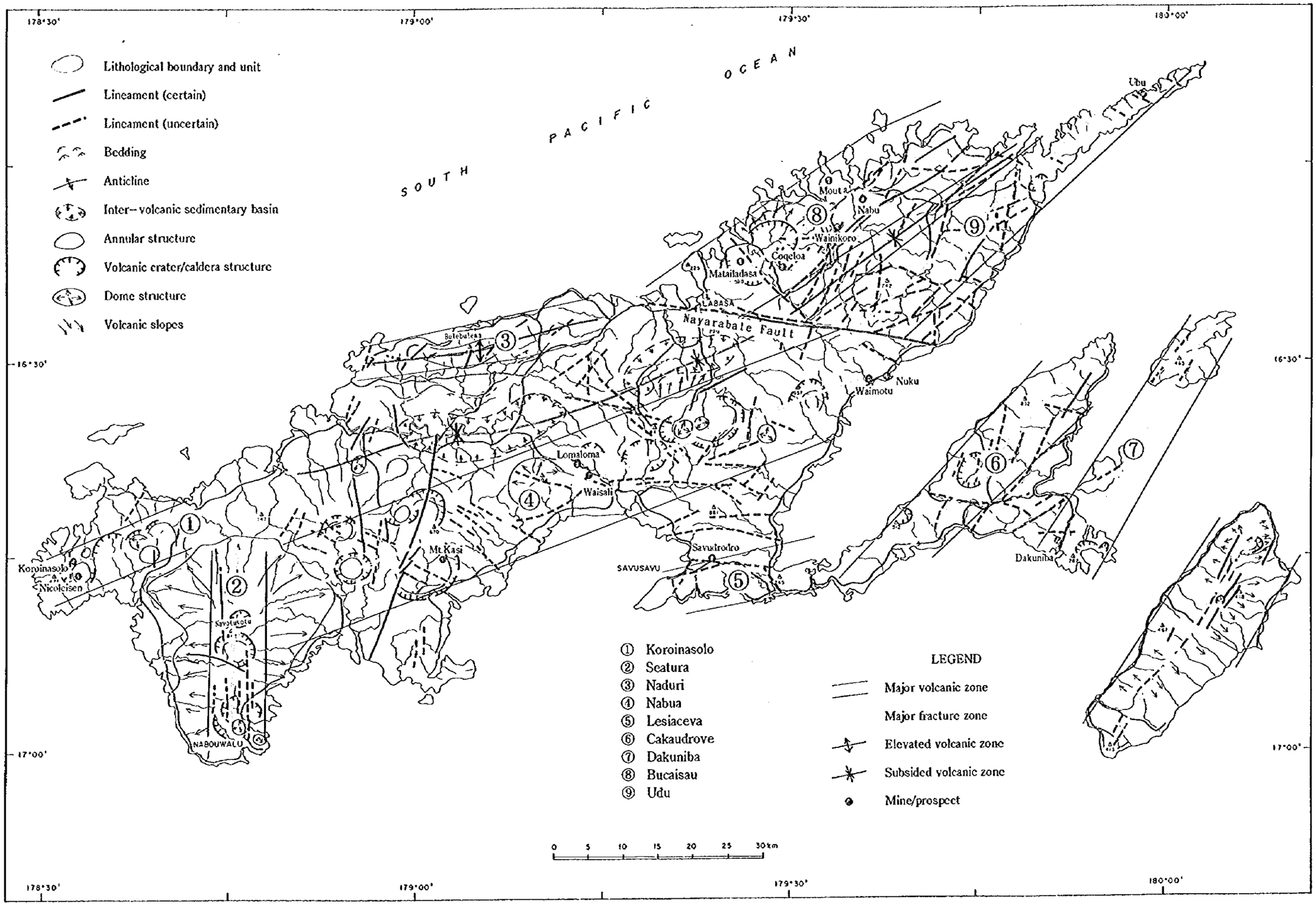


Fig. 2-1-4 Tectonic Interpretation Map of SLAR Imagery

1-3 Compilation of Existing Data

1-3-1 General Geology around the Survey Area

(1) Plate tectonics

Tectonically, the Fijian islands are located at the eastern margin of the Indo-Australian Plate and form an island arc on an ocean ridge (Lau Ridge) at a point where it bends from ENE-WSW to N-S direction. At the Tonga Trench on the eastern side of the Tonga Arc, which is located to the east of the Lau Ridge, the Pacific Plate is being subducted westward at the Vanuatu Trench on the western side of the Vanuatu Arc located to the west of the Fijian islands.

The Lau basin is located between the Tonga Arc and the Lau Ridge, and the North Fiji Basin between Vanuatu and Viti Levu. Both these basins have spreading axis. The northern side of Vanua Levu is bounded by the left lateral Fiji Transform Fault and the southern side by the Hunter Fracture Zone, a left lateral transform fault. The northern part of the Fijian Islands are considered to be rotating anticlockwise due to the eastward movement of the Indo-Australian Plate south of the Hunter Fracture Zone and the spreading of the North Fiji Basin. This rotation is believed to have begun during Miocene and Early Pliocene time. Before the advent of the spreading of the North Fiji Basin, Eocene - Miocene chain of island arcs (Vanuatu Arc - Fiji Islands- Tonga - Lau Arc), continuous in the NW-SE to N-S direction, are believed to have existed due to the subduction of the Pacific Plate at the Tonga Trench and its northward extension.

The geology of the Fijian Islands consists totally of Cenozoic units. The oldest unit is Eocene (limestone and volcanic rocks) in age while the youngest is represented by the volcanic ejecta of historic times originating Taveuni Island. In Vanua Levu, the geologic units are characterized by Late Miocene to Late Pliocene strata and consists mainly of volcanic rock (basalt, andesite, dacite) accompanied by sandstone, mudstone and marl. At the Udu Peninsula in the northeast, felsic volcanic rocks are dominant. Taveuni Island is underlain by post Pliocene basalts with volcanic activity continuing to recent times. The islands of the Koro Sea consist of Pliocene to Pleistocene basalts. The Lau Islands are underlain by Middle Miocene to Quaternary strata which are mainly composed of volcanics (basalt, andesite, dacite, rhyolite) and accompanied by limestones. Kadavu Islands consist of Middle Pliocene to Pleistocene volcanic rocks. The Mamanuca and Yasawa islands are underlain by volcanic rocks and intercalated pelagic limestone.

1-3-2 General Geology of the Survey Area

Stratigraphically, Vanua Levu is underlain in most areas by Late Miocene to Pliocene strata that consist of basalt, andesite and dacite with intercalated sandstone, mudstone, and marl. The volcanic rocks are classified largely into the Natewa Volcanic Group, the Monkey Face Volcanic

Group, the Udu Volcanic Group, the Nararo Volcanic Group and the Bua Volcanic Group.

Geologic Unit Name	Main Lithology	Thickness (m)	Age determination (Ma)
Bua Volcanic Group	Basalt	> 900 m	3.3-2.8
Udu Volcanic Group	Dacite Rhyolite	> 300 m	7.0-6.8
Nararo Volcanic Group	Acidic andesite		
Natewa Volcanic Group	Andesite	>1,500 m	7.5-3.5

1-3-3 Overview of the Prospects in the Survey Area

In Vanua Levu, Kuroko ore, epithermal gold and porphyry type deposits are known and many places have been explored by various companies. The following is an outline for each prospect in the order of the key map 1 of Colley and Flint (1985).

(1) Koroinasolo alteration zone (No. 1 to No. 9 prospects in Fig. 1-4)

This zone is located around the village Koroinasolo and underlain by Miocene to Pliocene basaltic to andesitic lavas and marine sedimentary rocks. Silicification, opalization and brecciation are developed in the area. The areal extent of the zone is about 25 km^2. Geochemical Survey by Creek sediments was conducted to define anomalous zones of Au and As. Mineralization occurs along faults and shear zones. Especially significant gold indications occur along a silicified zone near two major faults.

At Ravula Hill, Coral Hill and other prospects intense alteration and significant gold mineralization occurs. An outcrop and float returned 0.69 g/t and 1.30 g/t Au, respectively at Ravula Hill.

(2) Nabuna (No.13 prospects in Fig. 1-4)

Propylitic alteration and pyrite dissemination occurs near Nabuna in the western part of the island. Two holes were drilled by the Geological Survey of Fiji. Barringer Fiji Ltd. conducted a follow-up survey and concluded little potential exists for porphyry copper ore deposits. Placer Exploration Ltd. (Placer) then followed and concluded gold mineralization in the silicified or argillic zone was weak. The highest gold and copper values from rock chip samples are 0.55 g/t and 0.14%, respectively.

(3) Mt. Kasi West (No. 17 Prospect in Fig. 1-4)

Placer conducted a BLEG geochemical survey 1.5 km south of Vakadrakara. The area is underlain by basaltic andesite and lapilli tuff. Silicification, brecciation, and argillic-pyrite

alteration occur at a maximum width of 80 m. In addition to gold mineralization accompanied by quartz veins and silicified a zone, base metal mineralization is also found with samples of having a maximum grade of 16 g/t Au, 7 g/t Ag, 1.32% Pb, 4.82% Zn and 0.37% Cu.

(4) Vakadrakara (No.18 in Fig. 1-4)

Vakadrakara prospect is located 4 km northwest of Mt. Kasi. Gold mineralization occurs in quartz and manganese veins. In 1922 trial excavation recovered about 70g of gold from 30t of ore.

In 1975-76, Emperor Gold Mining Co., Ltd. (hereafter, Emperor) conducted a Creek sediment geochemical survey to delineate any gold anomalous zones. Newmont Pty Ltd. (hereafter, Newmont) conducted a follow-up survey to identify propylitization and argillization in a narrow zone of lapilli tuff,, and a soil geochemical survey in a narrow area to outline a 120 m x 135 m anomaly.

(5) Naduna/ Dawara (No. 19 Prospect in Fig. 1-4)

Nadura prospect is located in the lower reach of the Yanswai River in the southern part of the island. The prospect was worked from adits and ore was treated at Mt. Kasi in the 1930s. The ore deposits are hosted in basalt, andesite and volcaniclastics that underwent argillization, pyrite dissemination and silicification. They are emplaced along a fault zone. A major fault strikes E-W and dips 40°N. Four holes totaling 262 m in length were drilled at the fault. The gold grade of the deposits is between 0.46 g/t and 2.38 g/t over a width of 11 m to 18 m. On the other hand, nearby N-S trending faults were prospected by trenching and the best grades returned 1.56 g/t over 22 m. Within this prospect small alluvium deposits are located with grade of 2.97 g/t Au over a width of 16m, and 2.05 g/t Au over 28 m.

(6) Mt. Kasi (No. 20 in Fig. 1-4)

The Mt. Kasi mine is located near the top of Mt. Kasi. Laterite has developed over the southwestern part of the island in dense forest. The mine is located in the Yanawai goldfield district and mineralization of the district extends over 10 km^2. A total of 262 thousand tons of ore at 7.6 g/t Au was mined during 1932 to 1946. The ore contained 63,770 of gold and 4,830 oz of silver. Pacific Islands Gold has reported to start mining in 1996.

Gold mineralization occurs in quartz barite veins along faults hosted by calc-alkaline andesite. The main ore deposit strikes NW-SE and dips steeply westward. The mined zone is 300m in length and 12 m in width and 30 m in vertical extent. The hanging wall of the fault which hosts the ore is brecciated and the width of the mineralized zone increases vertically. The brecciated zone is 25 m in maximum width and is gold bearing and silicified. The deposits is classified as epithermal, high sulfidation type. Constituent minerals are native gold, pyrite, chalcopyrite,

tetrahedrite and arsenopyrite.

The average grade is in the order of 7g/t Au and 0.6 g/t Ag. The upper part of the brecciated zone tends to have higher grades and reaches 92 g/t Au. The lower part of the deposit tends to increase in base metal grades with a maximum of 7.2% Cu, 37% Zn and 3.6% Pb. Host rocks have undergone silicification and alteration to alunite and barite in the zone immediately adjacent to the ore deposits, and propylitization including chlorite, calcite, pyrite, sericite and epidote on a regional scale.

Ore reserve is estimated as follow:

Measured hard rock resources	382,000 t	3.21 g/t Au	(cut-off : 1.0g/tAu)
Measured eluvial resources	443,000t	2.34 g/t Au	(cut-off : 0.6 g/t Au)

(7) Waidamudamu(No. 21 in Fig 2-1-5)

Waidamudamu is located 1.4 km south of Mt. Kasi. In the 1930's survey and mining were conducted including drifting of 9 adits. The area is underlain by basaltic and andesitic lavas and volcaniclastic rocks that underwent propylitic alteration. Mineralization occurs in veins trending N20°E and N40°W and dipping 50°-90°W. The veins are comprised of quartz, carbonate, anhydrite and iron-manganese oxides. Newmont identified two veins, of which the main vein is 1.5 m in width and extends 200 m, while the eastern vein extends about 500 m. Anglo and Newmont took samples from veins at nine adits. They averaged 4.67 g/t -18.9 g/t Au over 20 to 80 meters. A total of 13 holes were drilled, although the core recovery was low and often could not reach main vein. The best three intercepts averaged about 7 g/t Au over 3 m.

(8) Tavea (No. 22 in Fig. 1-4)

The Tavea prospect was discovered north of the Valeni village in the southern part of Vanua Levu. The prospect is underlain and surrounded by the Tavea volcanic plug and circular plateau.

The host rocks are andesitic lavas and volcaniclastics of the Nararo Volcanic Group. An alteration zone of 1 km diameter coincides with the ring structure. Assay results of selected rock-float samples reached 74 g/t Au, although the assay results of outcrops are around 0.1-2.6 g/t Au.

(9) Valeni (No. 23 in Fig. 1-4)

The Valeni prospect is located north of Valeni village in the southern part of Vanua Levu. Ore deposits are hosted by volcanic rocks of the Natewa Volcanic Group. Ore deposits consist of quartz, barite veins containing sphalerite, galena and chalcopyrite. The quartz veins were drifted by 5 adits in the 1930s. In recent times Barringer conducted geological,

airborne and ground magnetic surveys. No sample returned higher than 1.5 g/t Au from exploration adits or quartz float.

(10) Naravuka (No. 24 in Fig. 1-4)

This area is underlain by dacitic volcanic rocks, limestone and sandstone. Propylitic alteration is widespread and argillic alteration also occurs. Silicification affects an area of 2m maximum width. Sinter textures also occur within the zone. Grab samples returned 1 g/t to 378 g/t Au, while the best channel sample result was 1.78 g/t over 3 m. The total length of trenches is 3 m. Placer drilled 7 holes of 496 m in total. The result was generally poor.

(11) Waisali (No. 25 in Fig. 1-4)

The Waisali prospect is located near Waisali village in the southern part of the central island. The area is underlain by andesitic lavas. They exhibit alteration consisting sericite, kaolinite, mixed layered clay minerals chlorite and pyrite with widespread quartz veining. Gold values are low.

Western Mining Corp. (Fiji) Ltd. and Anka Minerals Exploration Ltd. drilled four holes with a total length of 676 m. One of them intercepted 3.78 g/t Au over 1 m, but the remaining holes recorded grades less than 1 g/t Au. Airborne (helicopter) and ground geomagnetic surveys were conducted during 1984 to 1986.

(12) Lomaloma (No. 26 in Fig. 1-4)

This prospect is located southeast of Lomaloma village in central Vanua Levu. The area is underlain by andesitic to basaltic lavas and volcaniclastic rocks. A alteration zone is located trending in a NW-SE direction and extends over a 800m x 200m area. The alteration zone consists of silicification, pyrite dissemination and argillization. Assay results returned at best 2.78 g/t Au and 30 g/t Ag. No holes have been previously drilled.

(13) Korovula (No. 27 of Fig. 1-4)

This prospect is located 25 km southwest of Labasa. The surface is covered with clay alteration zone related to hot spring activity. Copper Resources (Fiji) Ltd. drilled one hole to reveal that alteration was limited to the near surface.

(14) Naduri (No. 31 in Fig. 1-4)

This prospect is located at Naduri in northern Vanua Levu. The area is underlain by basaltic to andesitic lavas and sandstones which have been intruded by an andesitic plug. Propylitization and silicification occurs. Ore deposits are comprised of two quartz veins, which are named Cowboy vein and Waiwaqa vein. The highest gold values of the Cowboy

vein and Waiwaqa vein are 0.37 g/t Au and 97.6 g/t Au, respectively. The Cowboy vein strikes NW-SE with a 2-12m width over 275m. The Waiwaqa vein runs N-S and dips steeply W over a 100m length. Some samples show relatively high base metal contents (for example 1.09% Cu, 1.85% Pb and 1.53% Zn).

Seven holes were drilled into extension of the Waiwaqa vein over a 100 m interval with the best assay returning 6.47 g/t Au over 6.2 m.

(15) Tabia (No. 32 in Fig. 1-4)

This area is known for its hot spring activity. In 1994, Copper Resources drilled one hole with poor results.

(16) Nakoroutari (No. 33 in Fig. 1-4)

This has been selected as the Geological Survey Area and is described in Section 1-4-2 of this report.

(17) Savudrodro (No. 34 in Fig. 1-4)

This prospect area is underlain by the Savudrodro Volcanics (basalt lavas and volcaniclastic rocks of the same composition) and gabbroic to dioritic dyke swarms. Propylitization and pyrite dissemination is widespread near the dyke. The results of geochemical and geophysical surveys and drilling indicate small scale porphyry copper mineralization exists.

(18) Korotasere (No. 35 of Fig. 1-4)

This prospect is located 8 km southeast of the Waimotu. City Resources discovered quartz veins and silicification in andesite lavas. The highest value of silicified float was 1.7 g/t Au and 125 g/t Ag. Geochemically anomalous zones for As, Hg, Cu, Pb and Zn were located by rock and Creek sediment sampling, while no follow-up survey was conducted.

(19) Prospects in the Waimotu Area (Nos. 36, 37 and 38 in Fig. 1-4)

Here the Waimotu Area is defined as the area including the Waimotu Lode, Bill's Hill prospect and the Nuku prospect. Bill's Hill is 65 km from Savusavu. The Nuku and Waimotu Lodes are located 0.5 km and 2.5 km east-northeast of Bill's Hill, respectively.

This area has been selected as a Geological Survey Area and is described in Section 2-1-4 of this report.

(20) Yasawa (No. 39 in Fig. 1-4)

This prospect is located around the Yasawa village near the northern area of Natewa Bay.

Placer conducted 8 trenching and got the 1.28 g/t a Au over 4 m interval. A ground magnetic survey was conducted but only revealed high susceptibility rocks. No useful data was obtained in the survey.

(21) Vunivesi (No. 40 in Fig. 1-4)

In 1981, GeoPacific Services Pty Ltd. and Consolidated Goldfield discovered the prospect. In 1988 Pacific Island conducted small scale work.

Small pods of massive sulfides occur in dacite lavas and volcaniclastic rocks of the Udu Volcanic Group. Ore minerals consist mainly of chalcopyrite, sphalerite and galena, covelline, chalcocite and barite. Geopacific reported an average grade of 4.1 g/t Au, 645 g/t Ag, 1.05% Cu, 0.81% Pb and 4% Zn.

(22) Matailabasa (No. 41 in Fig. 1-4)

Jennings and Solomon Pacific NL conducted a follow-up survey on Barringer's geochemical anomalies. Ore is emplaced near the contact of the pumiceous breccia and andesite to dacite dyke. Near the contact silicification occurs with pyrite and chalcopyrite. The vein zone is considered as a feeder zone of Kuroko type deposits or marginal part of a porphyry copper deposit. The assay values are around 1.5% to 2% Cu and the highest gold and silver values are 10 g/t and 600 g/t, respectively. Assay results of float consisting of limonite and jarosite with chalcopyrite and chalcocite ranges between 3-19% Cu and 12-13% Zn. The highest gold value is 9 g/t.

(23) Coqueloa(No. 42 in Fig. 2-1-5)

Jennings conducted a IP survey and drilled 6 holes with poor results. Later in 1978-79, Aquitaine identified a gold anomaly in silicified samples and then Solomon did some survey for gold.

(24) Koroiwa (No. 43 in Fig. 1-4)

Float that contains manganese oxide and barite are found south of the Wainikoro prospect.

(25) Wainikoro (No. 44 in Fig. 1-4)

This area is located 25 km east of Labasa. Kuroko type mineralization occurs in dacite lavas and volcaniclastic rocks. Silicified carbonate occurs trending NW-SE.

In 1956 to 1960 a local prospector named R. L. Giving did some work. Later, in 1967 to 1969, Banno Mining Co., Ltd. drilled 42 holes totaling 4,630 m. In 1976, Melven Copper Ltd. and United States Steel (NY) Inc. conducted a geophysical survey. In 1987 Placer conducted

geochemical, magnetic and IP surveys but failed in finding a significant anomaly.

(26) Mouta (No. 45 in Fig. 1-4)

This prospect is located 25 km northeast of Labasa. In 1957, the area was discovered by R.L.Govind. The Geological Survey conducted a follow-up survey which resulted in the identification of several small ore deposits. In 1967, Melven conducted a detailed survey including 7 drill holes.

Kuroko type mineralization occurs in pumiceous breccia and dacite lavas in the upper part of the Udu Volcanic Group. Host rocks dip gently westward at 15°-25°. The mode of ore occurrence is both massive sulfide and disseminated ore. Ore is comprised of sphalerite, pyrite and minor amounts of chalcopyrite, chalcocite and barite.

(27) Solove (No. 46 in Fig. 1-4)

This prospect is described as a manganese ore deposit. Melven drilled three holes and revealed that pyrite dissemination and sphalerite occurs in chloritized dacite breccia. Grab samples returned 1.4 g/t Au and 82 g/t Ag.

(28) Nubu (No. 48 in Fig. 1-4)

In this area, manganese oxide coats the surfaces of weathered dacitic rocks. Manganese oxide accompanies barite. Drilling revealed a silicified zone with pyrite and chalcopyrite.

(29) Nubu Gossan (No. 48 in Fig. 1-4)

Gossanous boulders are distributed over a 4,00 k^{m2} area. The distribution of the gossan is thought to be fault controlled. Host rocks underwent silicification and brecciation so that the original volcanic textures and hydrothermally altered textures are difficult to distinguish. The gossan contains a small amount of pyrite and bornite. The highest grade of gossan is 0.25% Cu.

(30) Qirianiu (No. 49 in Fig. 1-4)

This area includes Quiriyaqa Hill, Quiriyaqa East, Vuinubu Ridge and Drudrusava prospects. In 1986-92, Placer drilled 43 holes totaling 5,449 m. The area is underlain by sandstone, conglomerate, andesite, basalt and limestone.

Qiriyaqa Hill: Soil sampling was conducted and a geochemical anomalous area of 200m × 300 m was outlined. Extensive trenching revealed low grade gold mineralization with a maximum grade of 2.24 g/t over a 54 m interval. Magnetic and IP geophysical surveys and the drilling of 28 holes were conducted. As a result, a wide low grade zone was outlined.

Vuinubu Ridge: This prospect is located 750m southeast of the Qiriyaqa Hill. Host rocks

consist of andesitic and dacitic lavas and underlying volcaniclastic rocks. Silicification and argillic alteration and gold mineralization were identified along a NE-SW trending fault. Quartz veining occurs over an area of 1000 m x 900 m. The geochemical survey revealed a maximum grade of 2.6 g/t Au coinciding with an IP anomaly. A maximum grade of 1.92 g/t Au over 16 m was found by channel sampling. In 1992, 4 holes totaling 597.5 m returned 1.17 g/t Au over 58 m.

(31) Nubutubutu (No. 50 in Fig. 1-4)

This prospect is located about 2 km south of the Nubu Gossan. Copper and zinc anomalies in soil samples was identified and a pyrite dissemination and clay zone surrounding intrusive rocks. Placer conducted a follow-up survey but did not identify mineralization.

(32) Via Creek (No. 51 in Fig. 1-4)

United Resources (Fiji) Ltd. obtained a maximum grade of 10.5 g/t Au from a sample of chalcedonic quartz in silicified volcanic rocks.

(33) Qoibo Hill (No. 52 in Fig. 1-4)

In 1969-1970 the Geological Survey identified Ag, Cu and Zn geochemical anomalies in this area. In 1978, Melven took a sample with a grade of 5.6 g/t Au from the geochemical grid area. The area is underlain by basaltic to andesitic lavas. Placer conducted a follow-up survey to reveal no gold anomaly, however a base metal anomaly was outlined. A quartz-barite-pyrite vein and massive pyrite are emplaced in propylite and with bleaching fractures. The highest value is 0.54 g/t Au from a sample of quartz vein. Ground magnetic, IP and resistivity surveys were conducted and identified two anomalous zones with respect to chargeability and resistivity.

(34) Kedra (No. 53 in Fig. 1-4)

There is no report on this prospect.

(35) Tawake (No. 54 in Fig. 1-4)

A gold prospect is reported near Tawake village on the Udu Peninsula.

(36) Udu Ore Deposits (Nukudamu deposits: No. 54 in Fig. 1-4)

Kuroko type deposits occur on the Udu Peninsula in the northeastern part of Vanua Levu. They are called the Udu deposits (Nukudamu deposits). They were discovered in 1957, and 381 holes were drilled during 1957 to 1968. In 1968, thirty two thousand tons of ore at a grade of 5.9% Cu and 6.7% Zn was mined before ceasing operations.

The Udu deposits occur in the intensely altered pumiceous breccia of the Udu Volcanic Breccia. The deposits are distributed over an area of approximately 450m × 200 m. The main ore body displays a pipe-like shape in plan view and encompass 300m X 120m in plan and plunges 20-30° to the east-southeast. The ore in the center of the pipe is mainly composed of massive sulfide and surrounding rocks has undergone argillization, silicification and pyrite dissemination. Disseminated ore is dominant in the surrounding area. The massive ore shows a zonation composed of black ore, yellow ore and sulfide ore in descending order. The main ore minerals are pyrite, sphalerite, tennantite and barite. Chalcopyrite is scarce compared to the Japanese equivalents.

(37) Nasese (No. 56 in Fig. 1-4)

Near the Nasese village in the northeast of Cakaudrove Peninsula, Beta Ltd. discovered an anomalous gold zone in a panned sample. The area is underlain by basaltic andesite that underwent chloritization and epidotization and locally, silicification and quartz veining occur. Gold mineralization has not been confirmed at outcrops.

(38) Dakuniba (No. 57 in Fig. 1-4)

This area has been selected as a Geological Survey Area, and is described in section 1-4 and Chapter 4 of this report.

(39) Bauxite deposits (Nos. 10-12, 14-16, 28-30 in Fig. 1-4)

Bauxite deposits are developed western Vanua Levu where basaltic rocks of the Bua Volcanic Group are distributed. The deposits consist of gibbsite in lateritic clay. The maximum thickness of the deposits are 9 m and lack continuity. In 1958, current Alcan International Ltd. started development and kept the tenements until early 1970s. Since 1976, no exploration work has been conducted.

1-4 Selection of Geological Survey Areas

1-4-1 Outline

The existing data on the prospects outlined above were reviewed based on the following criteria.

a. Areas where alteration is known will be selected if:

-the size of the alteration area is large,

-mineralization is not sporadic

-structures (faults) with known mineralization exist ,

-geochemical anomaly is large, and

-high gold values are found.

b. Areas among the above where past exploration work has not been sufficient compared to the size of mineralization and alteration zone or geochemical anomaly, and where drilling should prove the potential of gold mineralization.

From the results, prospects near Mt. Kasi, porphyry type-epithermal type prospects near Koroinasolo, Kuroko type prospects near Wainikoro, gold prospects near Nakoroutari, prospects near the Waimotu Lodes, and the Dakuniba Prospect were thought most promising. The former three areas were within existing tenements at the time this study. The latter three are left for the Geological Survey.

1-4-2 Nakoroutari Area

(1) Location

15 km south of Labasa

(2) Commodities

Au, Ag

(3) Geology and Mineralization

Mineralization occurs in andesitic lavas and volcaniclastic rocks and conglomerate, sandstone, and mudstone. Quartz veins and breccia zones are controlled by faults. The geochemical survey area is called Leli's Prospect. In a 700 m x 200 m area, float with quartz veins and/or pyrite dissemination is widespread and the highest value was 7.9 g/t Au. Native gold, chalcopyrite and sphalerite occur in the breccia zone along the faults. The homogenization temperatures of fluid inclusions range from 184°C to 204°C.

(4) Previous Work Conducted

Since 1988, PacAu (Fiji) Ltd. and Paget Gold Mining (Fiji) Ltd. conducted the following survey within SPL1301.

- Geochemical Survey
  Creek sediment samples : 60 pcs
  rock chip samples : 161 pcs
  soil samples : grid sampling, 400 m x 500 m
- Diamond drill holes
  6 holes, 1,053m total length

(5) Previous Work Results

The highest value from the fault breccia zone is 17.9 g/t Au. Samples taken over 600 m averages 4.7 g/t Au and 33 g/t Ag. The highest value from core samples was 11.6 g/t Au over 0.6 m intervals.

(6) Room for Exploration

The survey was conducted over a narrow area of 700 m N-S by 600 m E-W. The mineralization zone crops out along Korobua fault zone intermittently over 600m.

The maximum length of individual exposures is about 80m. The area of north of the Leli's prospect is gently undulating and sugar cane fields are developed, so that exposure of rocks is poor. As the area increases in elevation toward the south, exposure tends to be better but existing data does not show details of alteration and mineralization. An interesting feature is a half caldera structure interpreted from the SLAR imagery.

In conclusion, it is certain that gold mineralization occurs around Leli's Prospect and geologic structures that may control the gold mineralization are developed. The mineralization with significant gold values and the geologic structure presumably preferable for circulation of ore solution indicate this has a potential for gold emplacement good enough to conduct Geological Survey.

1-4-3 Dakuniba Area

(1) Location

The area is located 65 km east of Savusavu.

(2) Commodities

Au, Ag

(3) Geology and Mineralization

Mineralization occurs in andesitic rocks of the Natewa Volcanic Group, and is emplaced in quartz veins and breccia zones that are controlled by the faults. Major alteration extends in a WNW-ESE direction over 4 km. Ore minerals are chalcopyrite, marcasite, galena, sphalerite, arsenopyrite and barite.

(4) Previous Exploration Work Conducted

This area has been explored since 1930. In 1957 the Geological Survey drilled two holes totaling 176m in length after rock chip samples returned 13 g/t Au. In 1969-1971, Barringer took 378 Creek sediment samples and outlined a weak Cu anomaly (cold extractable). Since 1986 Pacific Islands conducted geochemical surveys by soil and rock chip samples, trenching and CSAMT survey. No drilling was conducted.

(5) Results of Previous Work

As a result of a geochemical survey, a weak soil anomaly (more than 10 ppb) was outlined over 1km north of Dakuniba village. Trenching was done extensively on and around the area. The highest value from the trenches was 12.8 g/t Au over 1.5m width. The low grade gold zone less than 1 g/t Au extends over 3.2 km.

(6) Room for Survey

Geochemical anomalies are widespread. This area is thought to be a prospect that had not been properly drilled before. Therefore this area has a high potential for gold deposit emplacement and is selected as a Geological Survey Area.

1-4-4 Waimotu Area

(1) Location

Here, the Waimotu Area is defined as the area including the Waimotu Lodes, the Bill's Hill prospect and the Nuku prospect. Bill's Hill is 65km from Savusavu. The Nuku prospect and Waimotu Lodes are located 0.5 km and 2.5 km east-northeast of Bill's Hill, respectively.

(2) Commodities

Au, Ag

(3) Geology and Mineralization

This area is underlain mainly by basaltic andesite rocks with locally intercalated volcanic breccia. Waimotu veins show echelon-like alignment consisting of N-S trending chalcedony-quartz. The grades range between 7-22 g/t Au and 5 g/t Ag. Seven diamond drill holes were aimed at lower extensions of the veins. The 40 m strike lengths does not seem to improve. At Bill's Hill silicified and argillic (kaolinized) zones grade 0.2-0.5 g/t Au. A lower stockwork zone grades 0.4 g/t Au. At the Nuku Prospect, a breccia zone containing chalcedony-quartz veins has developed. Outcrop grades 5.6 g/t Au over 4.5m.

(4) Previous Exploration

1938 Waimotu Lode was discovered.

1940~42 Emperor drifted tunnels for 551 m and drilled 7 holes totaling 609 m.

1974~ Jennings conducted soil geochemical survey. Other companies, Aquitaine, BHP, Consolidated Goldfields, J/V of Moninex, Goldfields and Canyon Resources, J/V of GeoPacific and Delta Gold NL conducted exploration work including soil sampling, pitting and trenching.

(5) Results of Exploration Work

At the Waimotu Lode three holes intercepted a mineralization zone out of seven holes. The best intercepts were 17.9 g/t Au over a 0.6 m interval. At Bill's Hill, 8 holes totaling 846 m were drilled. Three holes intercepted mineralization with the best assay of 4.3 g/t Au over 0.6 m. At Nuku, 4 holes totaling 310 m were drilled with a best result of 0.46 g/t Au over 9 m intervals.

Hole No.	Azimuth	Inclination	Length	Intercept		
				Depth	Interval	Assay Results
BH85-1	82	-45	150.3	36.0	14	1.2
BH85-2	85	-70	192.1	12.0	6	1.2
BH87-3	-	-90	51.1	25.9	1.2	1.5
BH87-4	-	-90	64.6	37.0	12.2	0.27
BH87-5	-	-90	50.2	4.8	21.8	0.77
BH87-6	-	-90	35.7	25.3	2.1	0.86
BH87-7	-	-90	40.3	29.1	7.1	0.17
BH87-8	85	-54	261.75	101.1	0.6	4.3

Assay results from the quartz stockwork zone near the collar of DDH-1 was 7.2 g/t Au over a 1 m interval. The grade of the stratiform silicified brecca zone ranges from 0.2 to 0.5 g/t Au.

The Waimotu Lodes were explored and developed during 1940-41. In 1949, prospectors sampled from costeans and the results were as follows:

Lode	Strike length (m)	Average width (m)	Average grade (g/tAu)
East Lode	33	0.8	11
Main Lode	34	0.7	17
West Lode	18	0.2	17

In 1941, the best result from the Emperor's drilling was 2m @ 9.9 g/t Au within 14m @ 1.2

g/t Au. Two other interceptions were only less than 1.5 g/t Au. The total proven reserves was 5,480 t of ore with a grade of 9.9 g/t Au with an average of 0.43 m.

At Nuku, the average grade of chalcedonic quartz veins was 1.3 g/t Au at trenches. The best assay was 13.5 g/t Au over 1.5 m interval. The results of drilling were disappointing because of the low grade.

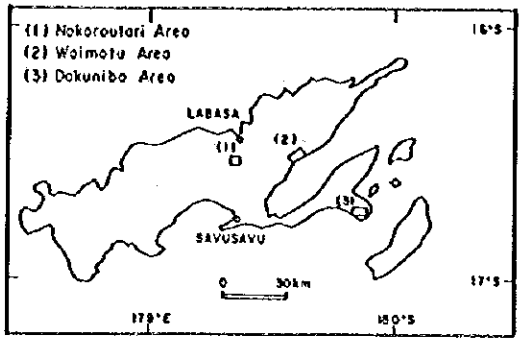
(6) Room for Exploration

The previous work conducted was limited to three prospects and the surrounding area was not surveyed extensively. Existing data does not show the mineralization and alteration in the surrounding zone. On the other hand, a lineaments that correspond to the Nayarabale Fault and a caldera structure were interpreted by SLAR Imagery north of the three prospects. It is noteworthy that the Yasawa prospect is located near the intersection of the two geologic structures. In this area gold prospects are relatively densely distributed and the downward extension of these areas was not sufficiently explored. Therefore, the area including the three prospects are selected for the Geological Survey Area.

Table 2-1-2 Known Prospects in the Survey Area

Ref. No.	Name	Commodities	Previous Tenement			Work Conducted				Geology & Mineralization			Comment
			SPL No.	Operator	Period	Mapping	Geochemical	Geophysical	Tunneling Drilling	Geology	Mineralization & Alteration	Grade	
13	Nabuna	Au(Cu,Zn)	SPL1114 SPL1184 SPL1220 SPL1224	Geological Survey, Placer	1987-91		SS(BLEG) Rock		None		Week gold mineralization with silicification & argillic alteration	Maximum assay values in rock chips: 0.65g/tAu & 0.15%Cu	○ Caldera structure(SLAR) × Deep erosion
23	Valeni	Au	SPL1209 SPL1220 SPL1224	Newmont Placer	1930s 1984 1986-90	1:2,500	SS:53+ Soil Rock	IP, Magnetics	5 adits		NW trending quartz barite veins +silicification, Brecciation. Shear zone with Pb,Zn & low Au	Vein<1.5g/tAu, <5.0g/tAg	○ Favourable structures × Low Au values (better for base metals)
25	Waisali	Au,Ag	SPL1213 SPL1353	WMC Amka PacAu/Beta	1984-?	1:10,000	SS:176 samples Soil Rock:66 samples	Airborne Magnetics		Andesite	Clay-pyrite alternation: sericite kaolinite Quartz veins Argillization 5%S in Py.	DDH:1m@3.78g/tAu Others<1g/t	○ Widespread alteration ○ Geochem anomalies are not fully tested × Silicified zone is limited? × Extensive Geochem
26	Lomaloma (Wailevu)	Au,Ag	SPL1187 SPL1220 SPL1224	Aurelia Placer	1980-? 1985-90-?		SS:92 samples Soil:43 samples Rock:121 samples			Basic to intermediate flows,breccias	800m X 200m alteration(silicification,quartz veining)	Float: up to 30g/tAg and 2.78g/tAu	○ Broad Alteration ○ Not fully tested
27	Korovula	Au	SPL1262	Placer	-1987		SS:201 samples Rock:126 samples Soil 136 samples						
31	Naduri	Au,Ag	SPL1262	Pacific Nationwide	1987-1990		Rock:103 samples Soil:52 samples	Air magnetics	7 DDH 600m	Basic-andesite flows	2-12m X 275m	NW-SE trending Cowboy:0.37g/tAu Waiwaqa:97.6g/tAu	○ High Au values × Extensively prospected
33	Nakoroutari	Au,Ag	SPL1301	PacAu Paget	1990-		SS:60 samples Soil:400m x 500m Rock:161samples	IP,Magnetics	6 DDH:1053m	Lavas, tuffs and breccias	700m x 200m quartz veining silicification pyritization	Silicified float:7.9g/tAu	○ Structure(SLAR,Mag) ○ Geochem anaomaly? × Difficut to geologic survey (poor exposure?)
34	Savudrodro	Cu	SPL1277 SPL1300	PacAu Beta	-1987-					Basalt	Weak pyritization	SS(pan conc.): 2.1g/tAu	× Sporadic Au anomaly
35	Korostasere	Au	SPL1280?	City Resources			Rock SS				Veining, propylitization	float:1.7g/tAu, 125g/tAg	○ Room for prospecting
36	Bill's Hill	Au,Ag	SPL1091 SPL1162 SPL1185	Jennings	1974 1985-88		Soil		8 DDH	Basaltic - andesitic	Kaolin cap /quartz chalcedonic veining	5.6-21.8m @ 0.17-0.77g/tAu	○ Epithermal system ○(or ×?) Prospected collectively (the area is limited)
37	Waimotu	Au,Ag	SPL1185	Emperor CGP	1940-42				U/G:551m 7DDH:609m	Basaltic-andesitic rock	3 chalcedonic-qaurtz veins	0.2-0.7m@5-22g/tAu	same as above
38	Nuku	Au,Ag	SPL1185	GeoPacific	1984-87-				4 DHH	basaltic-andesitic rock	In breccia zone	stockwork 2.3g/t	○ Not properly tested
39	Yasawa	Au	SPL1214	Placer			3 trenches					4m@1.28g/t	
40	Vunivesi	Cu,Pb,Zn (Au,Ag)	SPL1093 SPL1185 SPL1247	Jennings CGP	-1988-?								× Small polymetalic
50	Nubutubutu	Cu,Zn	SPL1214	Placer							SS anomaly diss py		1 Along a major NE fault 2 Pyrite does not explain the strong anomaly
51	Via Creek	Au	SPL1278	United		Nasavu River					chalcedonic qtz vein: 10.5g/t(float?)		No other indication
52	Qoibo Hill	Au (Ag,Cu,Pb,Zn)	SPL1091 SPL1239	Melven Placer	1978		Soil	Surotem		Bsic to andesitic volcanics	Quartz-barite-pyrite	5.6g/tAu, qtz:0.64g/tAu	Small base metal target
53	Kedra	Au	SPL1239										
54	Tawake	Au											
55	Udu Mine	Cu,Zn,Pb, Ag,Au		Various	1957-				1969.mined 32,000t(5.9%Cu)	Pumiceous pyroclastics,Dacite	Massive sulfide(black ore)		
56	Nasese	Au	SPL1291	Beta			Panning			Widespread chl-epidote alteration in basic andesite	Anomalous gold, quartz veining, local weak silicification		
57	Dakuniba	Au	SPL1246	Pacific	1986-		Soil:4.5km X 2.5km		57 trenching 69 percussion (249m)	Basalt lavas & pyroclastics	Quartz veining	2.0m@12.8g/tAu	○ Depth is untested ○ Long strucure with anomalous Au × Weak alteration

SS: stream sediments



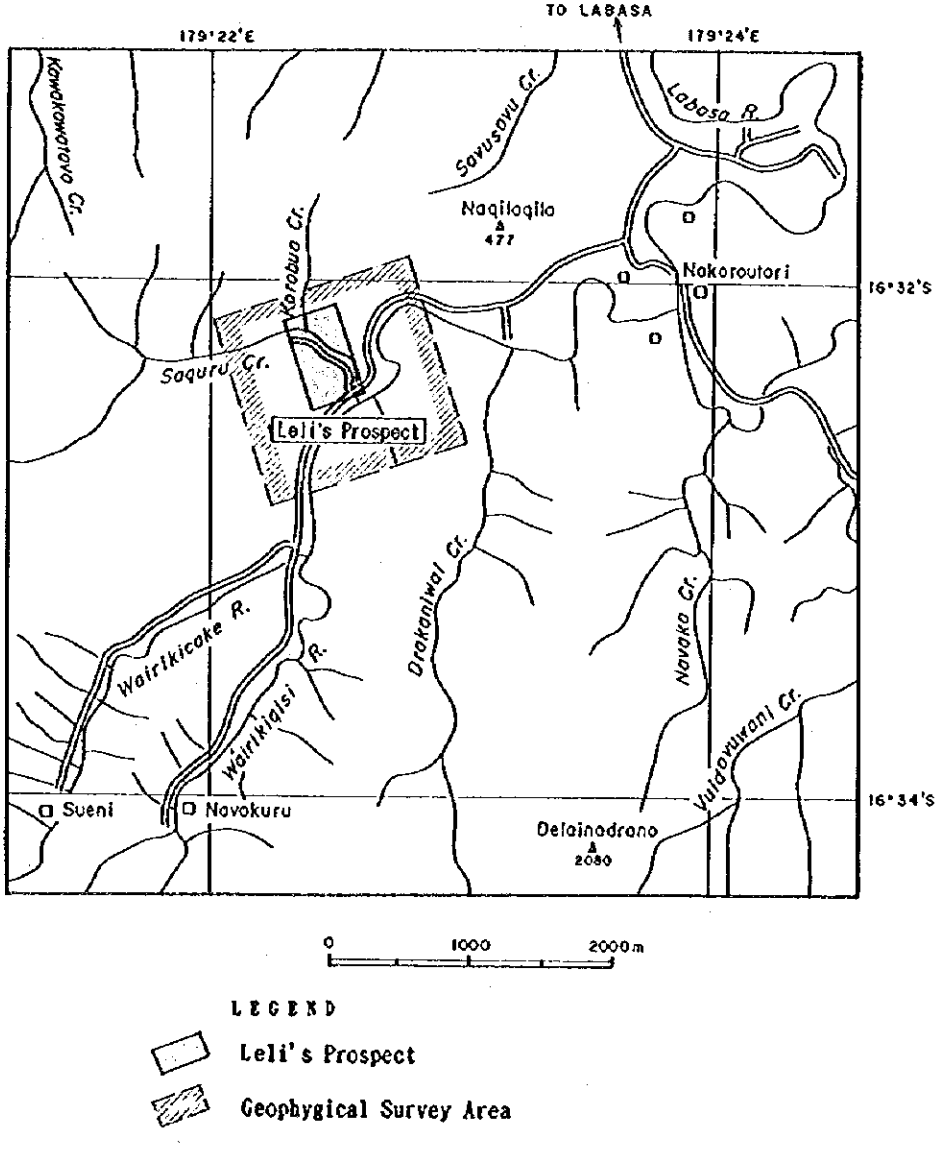


Fig. 2-1-5 Location Map of the Nakoroutari Area

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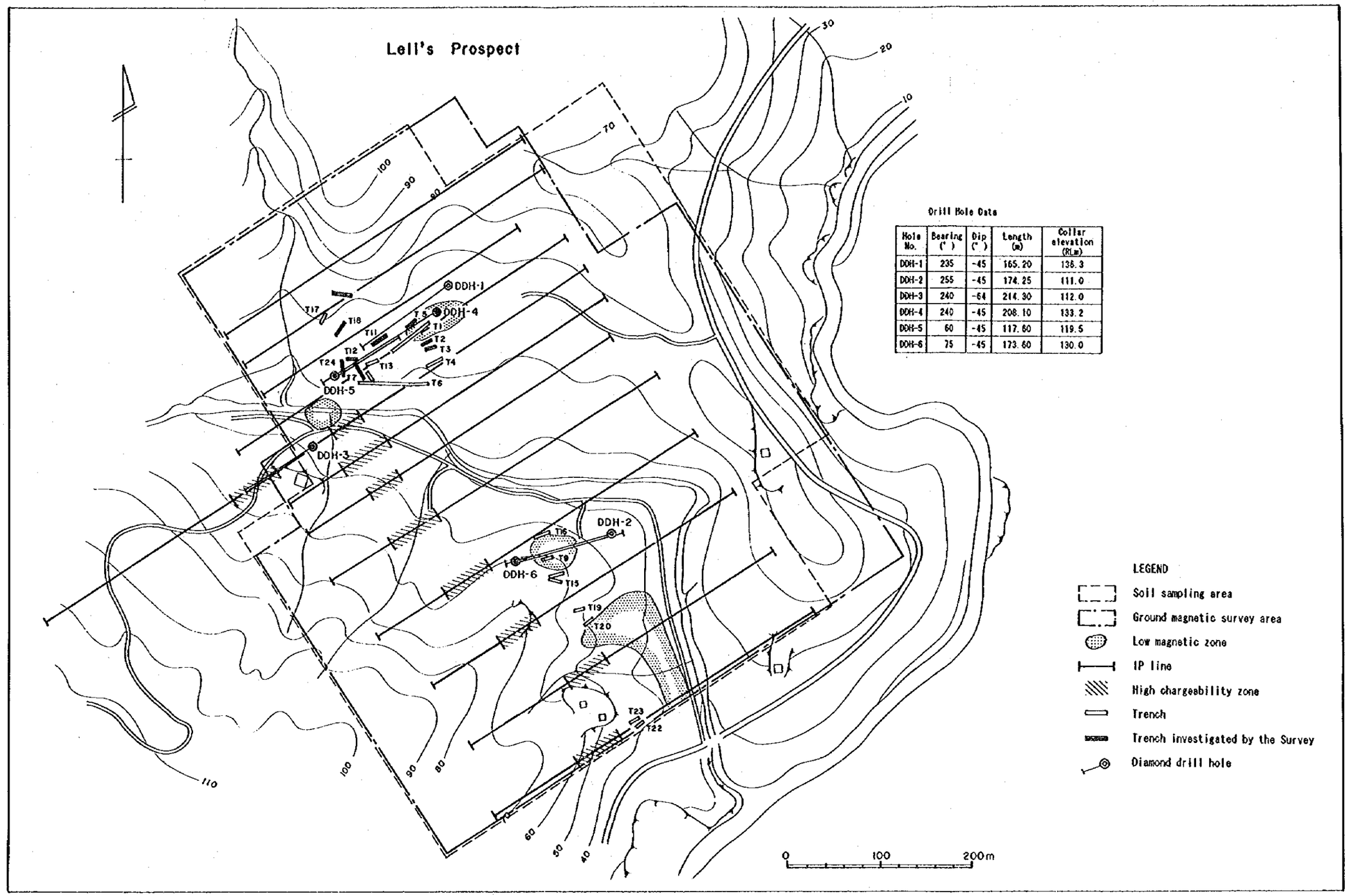

Fig. 2-1-6 Summary Map of Existing Data of the Nakoroutari Area

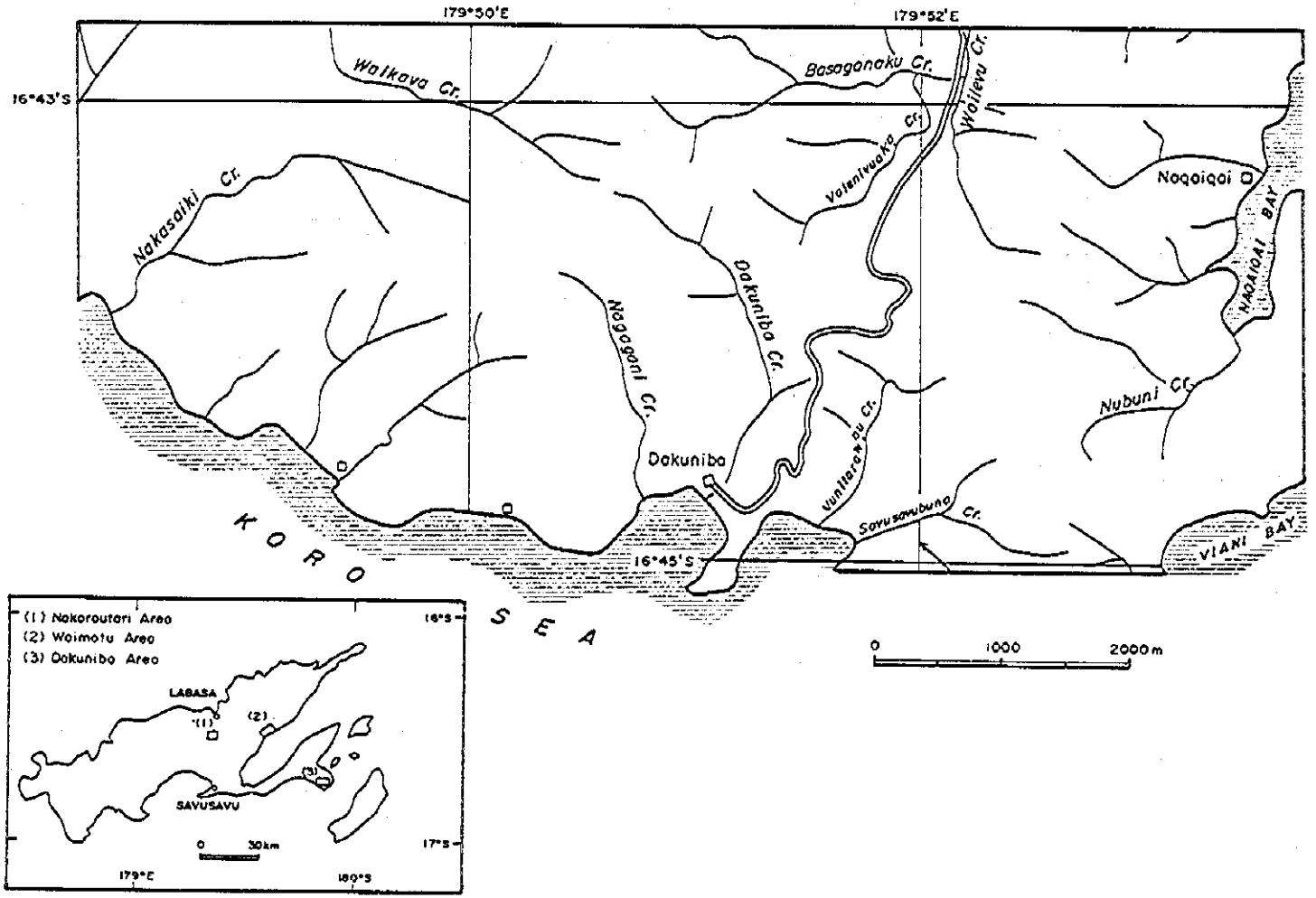

Fig. 2-1-7 Location Map of the Dakuniba Area

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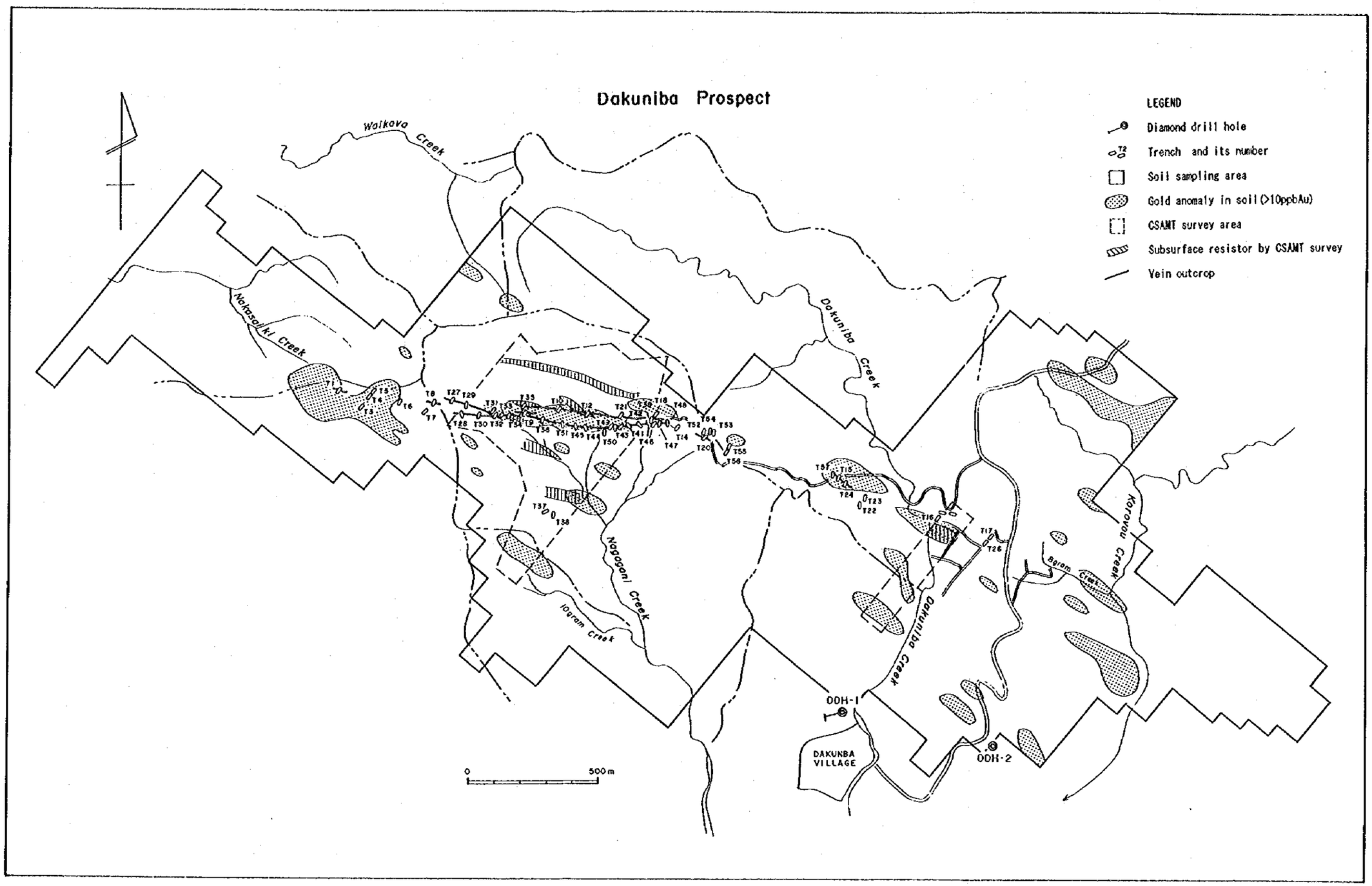


Fig. 2-1-8 Summary Map of Existing Data of the Dakuniba Area

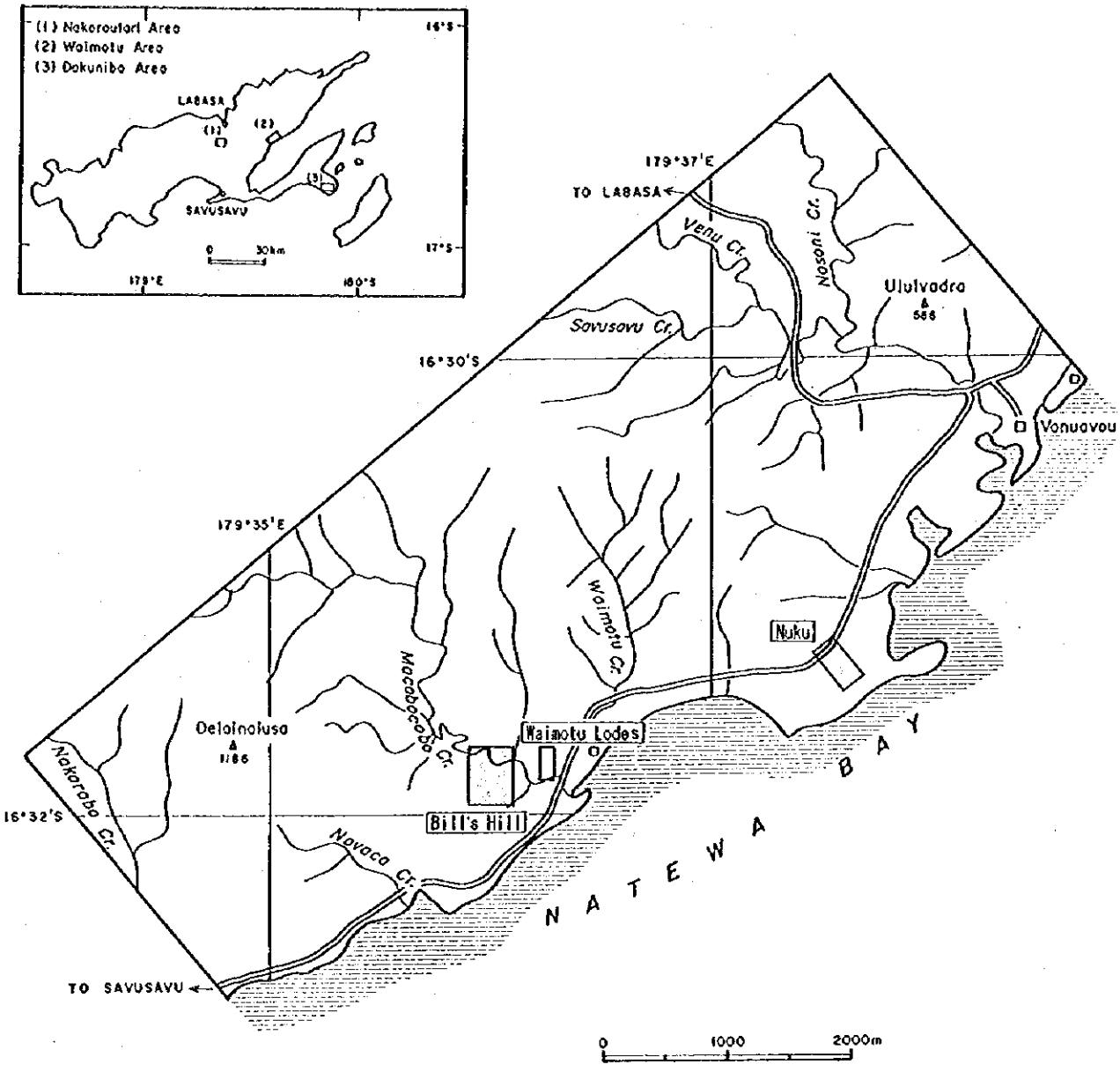


Fig. 2-1-9 Location Map of the Waimotu Area

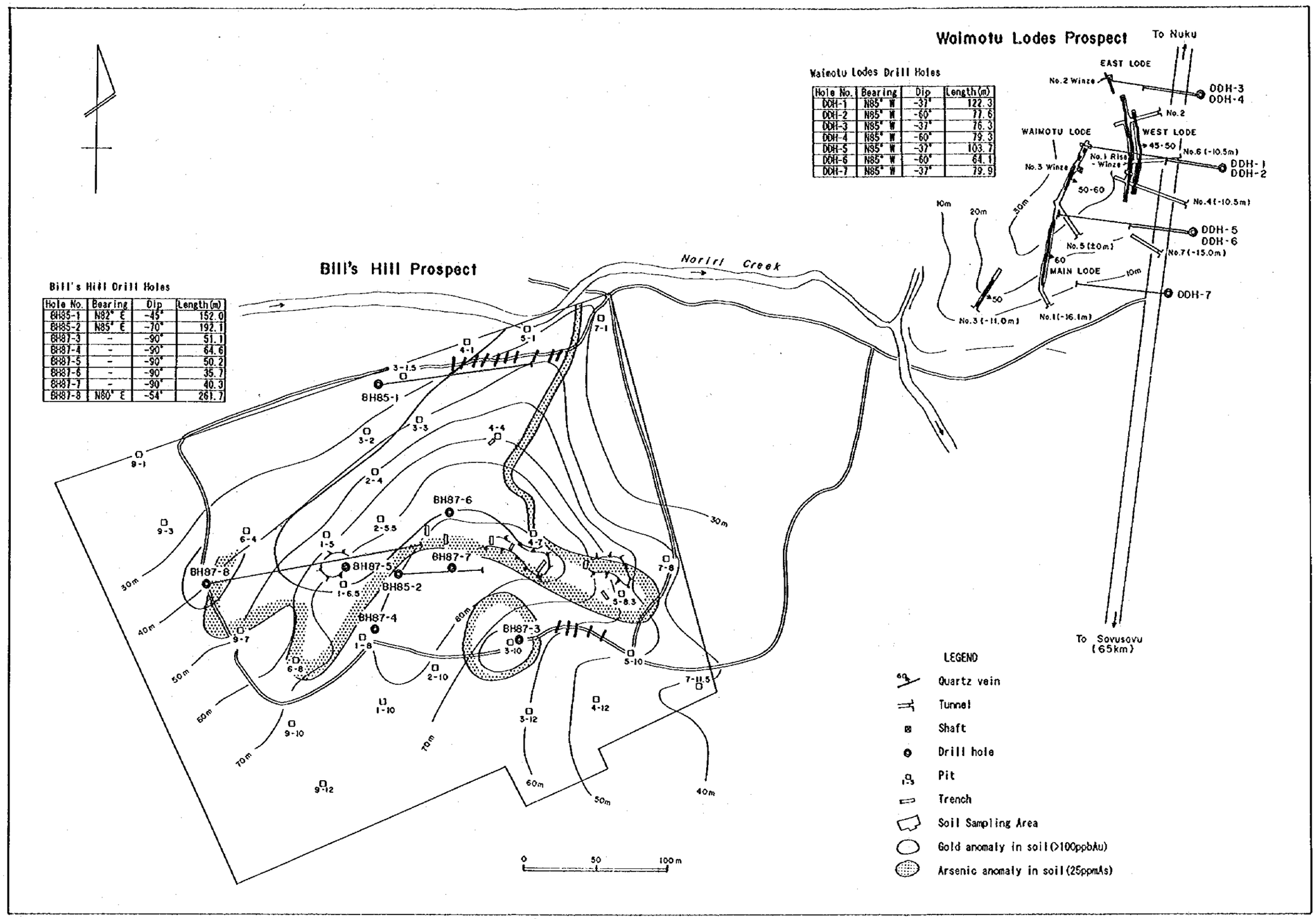


Fig. 2-1-10 Summary Map of Existing Data of the Waimotu Lodes and Bill's Hill Prospect

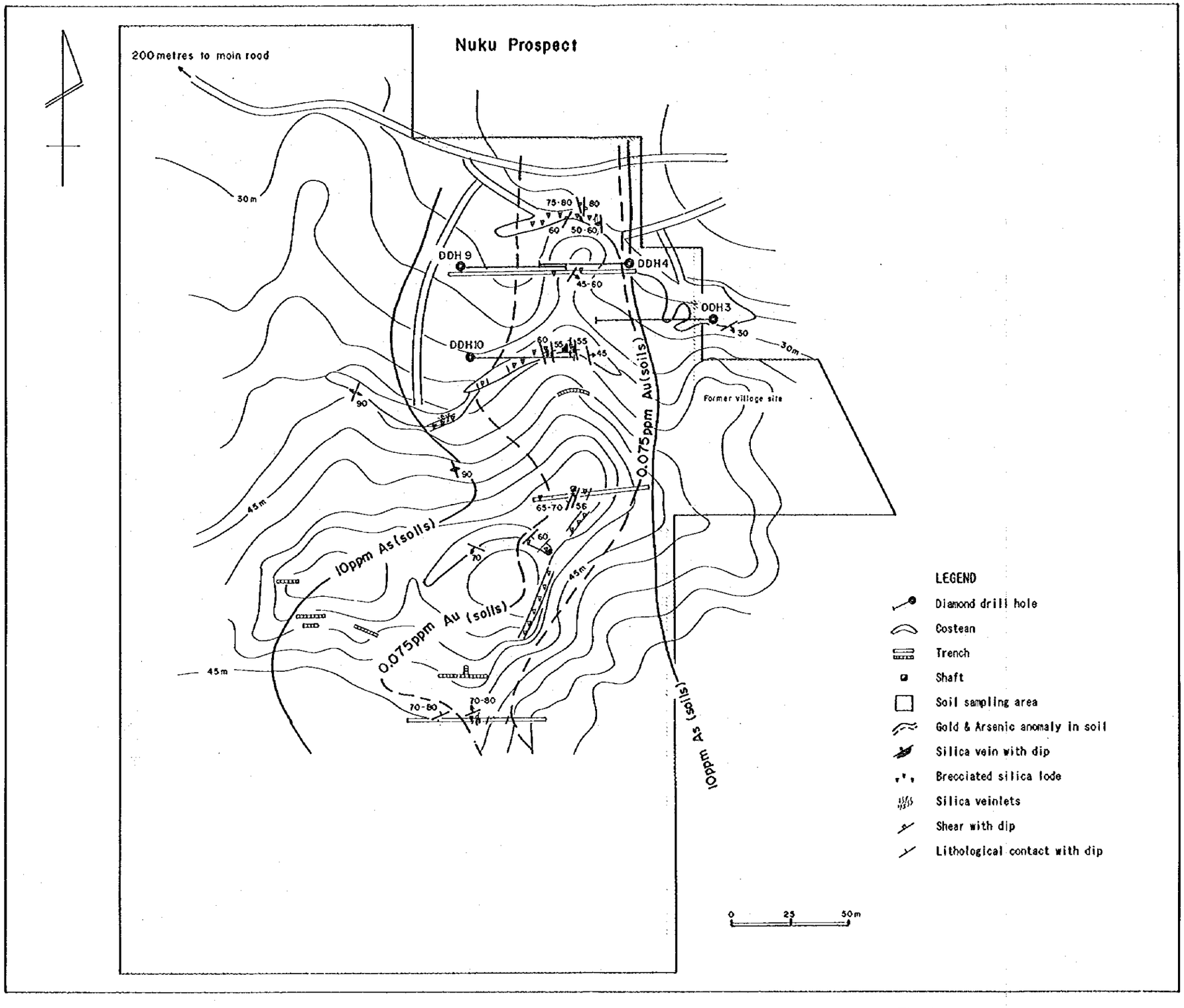


Fig. 2-1-11 Summary Map of Existing Data of the Nuku Prospect

Chapter 2~4

Geological Survey

Chapter 2 Geological Survey of the Nakoroutari Area

2-1 Outline of Geology and Mineralization

Mineralization occurs as quartz veins and breccia zones (fault breccia) in the Koroutari Andesites of the Natewa Volcanic Group. Four mineralization and alteration zones are distributed in this area. However, High gold values are limited to the Leli's prospect.

2-2 Stratigraphy

The Natewa Volcanic Group in this area is divided into three formations: the Koroutari Andesites, the Sueni Breccias and the Wailevu Formation.

(1) Koroutari Andesites

The Koroutari Andesites are distributed widely under this area and consist of andesite lava, basalt lava and coarse volcaniclastic breccia. The lavas do not display a clear pillow texture, presumably they were erupted on land and flew into the shallow sea. Ibbotson (1969) estimated 70% of the constituents are volcaniclastic. On the geological map this formation is divided into three mappable units: a basaltic lava dominant member, andesite-basaltic andesite lava dominant member and a volcaniclastic facies dominant member.

Basalt lava is distributed in the northern and southwestern part of the area. The unit in the northern part is blackish in color and consists of auto-brecciated and weakly compact lavas.

The andesite to basaltic andesite lava unit is widely distributed in the area. It is blackish to dark green. Sometimes it is difficult to distinguish it from the above andsite lava unit, but it has less mafic phenocrysts, paler in color and sometimes porphyritic. The unit is massive, and it sometimes may be autobrecciated to hyaloclastite facies.

The volcaniclastic unit consists mainly of lapilli tuff but fine tuff is dominant in the north and east. Mud flow facies in the unit is distributed in the north.

These units are considered to be correlated to the relatively lower part of the Natewa Volcanic Group. The Wailevu Formation of Ibbotson (1969) is distributed in the northwestern part of the area. In this study the Wailevu formation is unseparated in the area and is included in the volcaniclastic unit of Koroutari Andesites in this survey. Ibbotson (1969) indicates the Wailevu Formation consists of epiclastic sediments: grit, sandstone, sandstone and minor amounts of graywacke and breccia.

The Maximum thickness of the Koroutari Andesites is estimated at 300 m. Ibbotson (1969) estimates the maximum thickness of the Koroutari Andesites is at 450 m.

(2) Sueni Breccia

This formation is mainly distributed in the southwestern part of the high lands in the area. It consists mainly of hyaloclastic volcanic breccia and of finer grained volcaniclastic breccia deposited in a shallow marine environment. It is grayish to blackish in color and generally lacks bedding, except along the fine tuffs.

Ibbotson (1969) indicates the Sueni Breccias and Koroutari Andesites are the same age. However, in this survey they are mapped as the Sueni Breccias overlying the Koroutari Andesites unconformably, while the true relationship between both formations is not observed. This formation tends to be distributed at higher elevation, and has not undergone significant alteration.

The Maximum thickness of the Sueni Breccias is estimated at 400 m.

2-3 Intrusive Rocks

Basaltic rocks are intruded in many places within the area. The width of dykes are generally 1 m to 5 m. The dominant trend is N-S and NW-SE. Phenocrysts include olivine, clinopyroxene and plagioclase, in a groundmass consisting of fine grained clinopyroxene and plagioclase. They have undergone weak alteration with olivine being replaced by smectite.

2-4 Geologic Structure

The most prominent geologic features are N-E to NNE-SSW trending faults and NW-SE faults. The western block in Leli's prospect in the central part of the area is downthrown in the east. The Korobua fault zone is a series of faults running N-S around the Korobua Creek and Saquru Creek area.

The volcaniclastic layers that are distributed in the northwest show ENE-WSW strikes and dip 15 °N. The volcaniclastic rocks in the northeast strike E-W and dip 15°N.

The intercalation of volcaniclastic layers in the Drakaniwai Creek area in the south strike E-W to NW-SE and dip 30°N. Between the two areas, a small anticline and syncline exist.

2-5 Mineralization and Alteration

(1) Leli's Prospect

At this prospect, silicification occurs along the Korobua fault. In trenches, silicified breccias are distributed in the matrix of the volaniclastic rocks. The silicified zone along the Korobua fault contain quartz veins emplaced within a shear zone in andesitic lapilli tuff. Quartz veins carry a small amount of sulfides: pyrite, chalcopyrite, and galena. Quartz veins consists of fine grained zones and medium grained zones showing crustification texture. Quartz is chalcedonic and original chalcedony recrystallizing quartz. Early fine grained chalcedony is cut later by a quartz vein. Quartz precipitation and brecciation preceded repeatedly.

Microscopic observation indicates that quartz fragments and matrix are replaced by quartz and sericite (or sericite-smectite mixed layer mineral). Barite is observed in three samples that are from the east breccia zone. They accompany quartz and iron oxide (goethite and hematite).

(2) South of Leli's Prospect

About 1 km south of the junction of the Wairikicake and Wairikiqisi Rivers, small areas of alteration and silicification have developed and quartz veinlets occur in weathered porphyritic andesite at two localities. They trend NNW-SSE to NW-SE with a vertical dip. The assay results are 0.30 g/t Au (width 5 cm) and 0.55 g/t Au (width 0.10m). The andesite that has undergone propylitic alteration with pyrite dissemination over 400 m trends in a N-S direction.

(3) Mugsy's Prospect

An argillic alteration zone is developed at the Navaka Creek. Exposure around this area is very poor and a N-S trending fault is suspected from the aerial photographs. Gold values are 0.01 g/t or less, while As (maximum 90 ppm) and Hg (0.388 ppm) are anomalous. It appears hydrothermal alteration has taken place with accompanying mineralization.

(4) Nuvakuru Prospect

Silicified float with pyritization are distributed from the Sueni village to the Navakuru village. A quartz vein bearing pyrite of 20 cm width strikes N78°E and dips 65°S. However, assay results of Au, Ag and Sb were below the detection limits, and As and Hg are as low as 6 ppm and 112 ppb, respectively. The highest value in this area is 0.02 g/t Au from a limonitic vein.

2-6 Results of the Geochemical Survey

A total of 189 samples were submitted for chemical analysis. The basic statistics are as follows (also see Fig. 2-A-1~3, Table 2-A-3). The statistical analysis was done after logarithmic conversion was made.

Element(unit)	Au(g/t)	Ag(g/t)	As(ppm)	Sb(ppm)	Hg(ppm)
Detection Limit	0.01	0.4	1.0	0.5	0.005
Average	0.014	0.4	2.6	0.36	0.037
Minimum	<0.01	<0.4	<1.0	0.25	0.007
Maximum	12.9	14.9	210	14.3	92
Average+σ	0.08	1.1	15	0.77	0.094
Average+2 × σ	0.45	3.1	90	1.6	0.24

Au: 60% of samples are below detection limit (<0.01g/t). The samples that grade more than the detection limit indicate the sample has undergone some kind of mineralization. The cumulative frequency curve indicates the samples above detection limit consist of two groups. The numbers of samples that are higher than (average+σ) and (average+2 × σ) are 15% and 7% of the total. Judging that the samples were taken from quartz veins and altered rocks, the values may be too high for thresholds. Therefore, 0.01 g/t Au and 0.08 g/t Au are used for the thresholds to delineate anomalous zones (Fig. 2-2-5,6).

Ag: 0.04 g/t(detection limit) and 3.1 g/t (average+2 × σ) are selected for threshold.

As: 15 ppm(average+ σ) and 90 ppm (average+2 × σ) are selected for thresholds.

Sb: 0.5 ppm(detection limit) and 1.6 ppm(average+2 × σ) are selected for threshold.

Hg: 0.09 ppm(average+ σ) and 0.24 ppm (average+2 × σ) are selected for thresholds.

The corrections between two elements are shown in the table below and correlation graphs at the end of Chapter Four. Au does not appear to be correlated with Ag, As, Sb or Hg. On the other hand, Ag has clear correlation with As and Sb.

	Ag	As	Sb	Hg
Au	0.28	0.31	0.09	0.01
Ag		0.57	0.64	0.28
As			0.68	0.36
Sb				0.38

2-7 Considerations

In this area, mineralization in the quartz and breccia zone at Leli's Prospect is the most promising. The geophysical survey was conducted because the exposure of the mineralization zone is poor (see Chapter 5). The results of the CSAMT method show a high resistivity zones that indicate N-S trending silicified zones near the Korobua Fault Zone. The IP method indicated a weak chargeability zone trending NW-SE, but an extensive anomaly was not outlined.

The mineralization of the area is considered to be of epithermal origin based on the 184~208°C homogenization temperature of fluid inclusions in chalcedonic quartz at Leli's Prospect, crustification texture of chalcedonic quartz veins with small amounts of chalcopyrite and sphalerite and minor element contents in the veins. The minerlization may be classified into low sulfidation type judging from the alteration zone that may be related to mineralization in narrow quartz veins containing minor amounts of sulfide. Previous drilling revealed abundant shear zones developed underneath this area.

On the other hand, the Nakoroutari area is located within the Labasa caldera near its inner slope. Within the caldera hot springs and mineralization zones occur although the volcanic center has not identified because extensive erosion has destroyed the topography. Therefore, it may be effective to evaluate the potential of the area and Leli's Prospect since it may be not the center of mineralization and a more attractive area may be outlined.

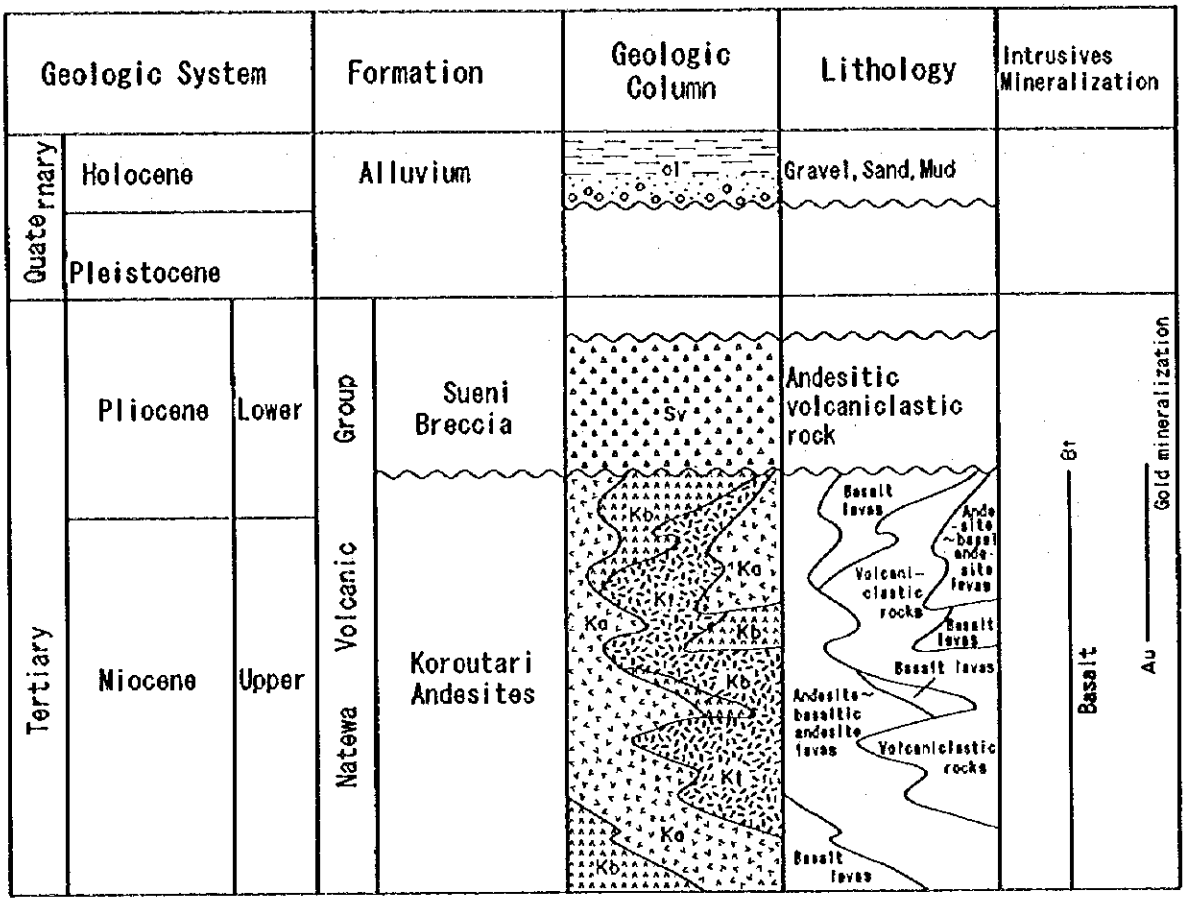


Fig. 2-2-1 Schematic Stratigraphic Columns of the Nakoroutari Area

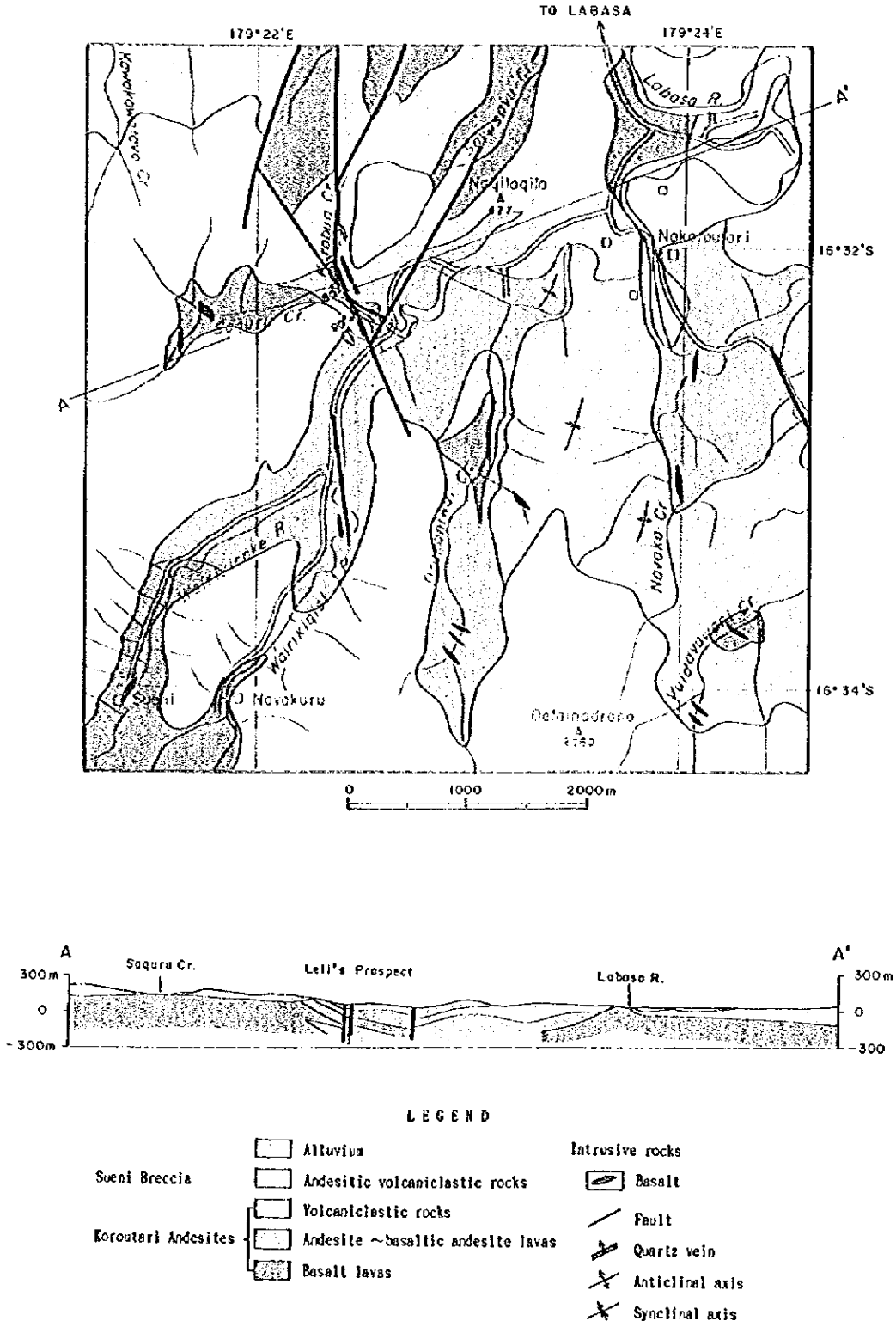


Fig. 2-2-2 Geologic Map of the Nakoroutari Area

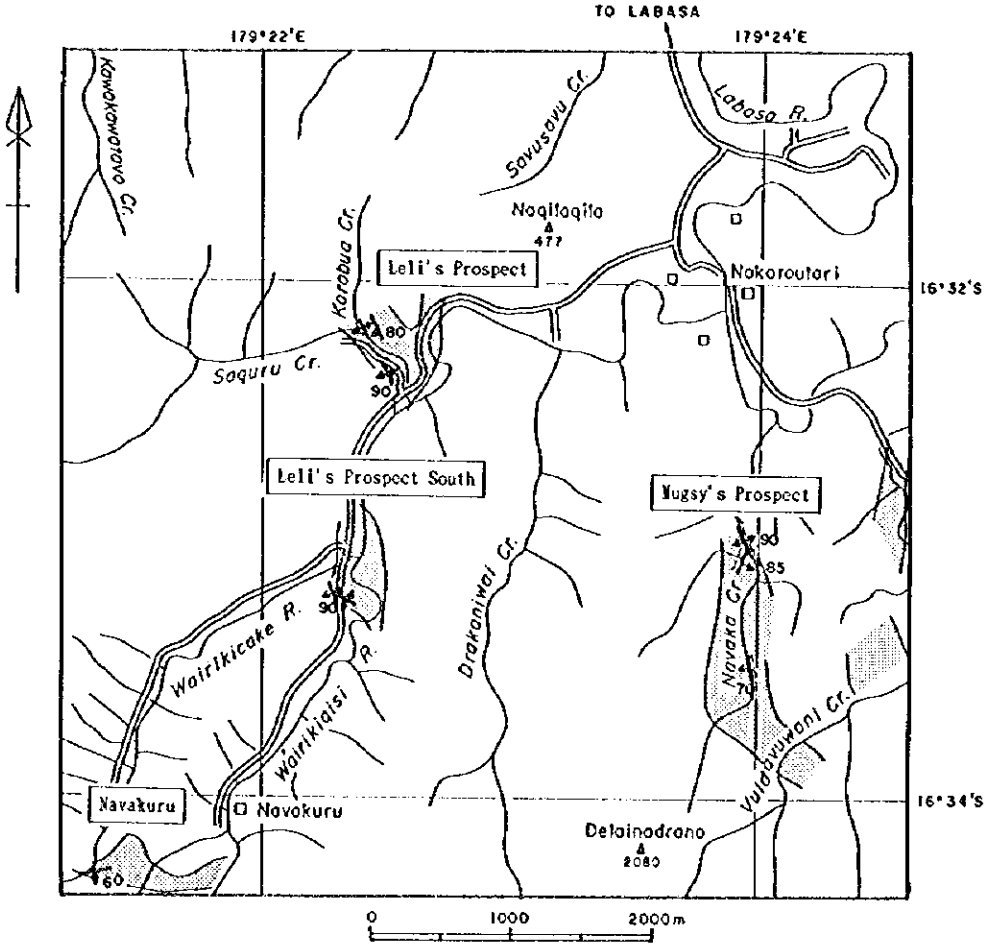
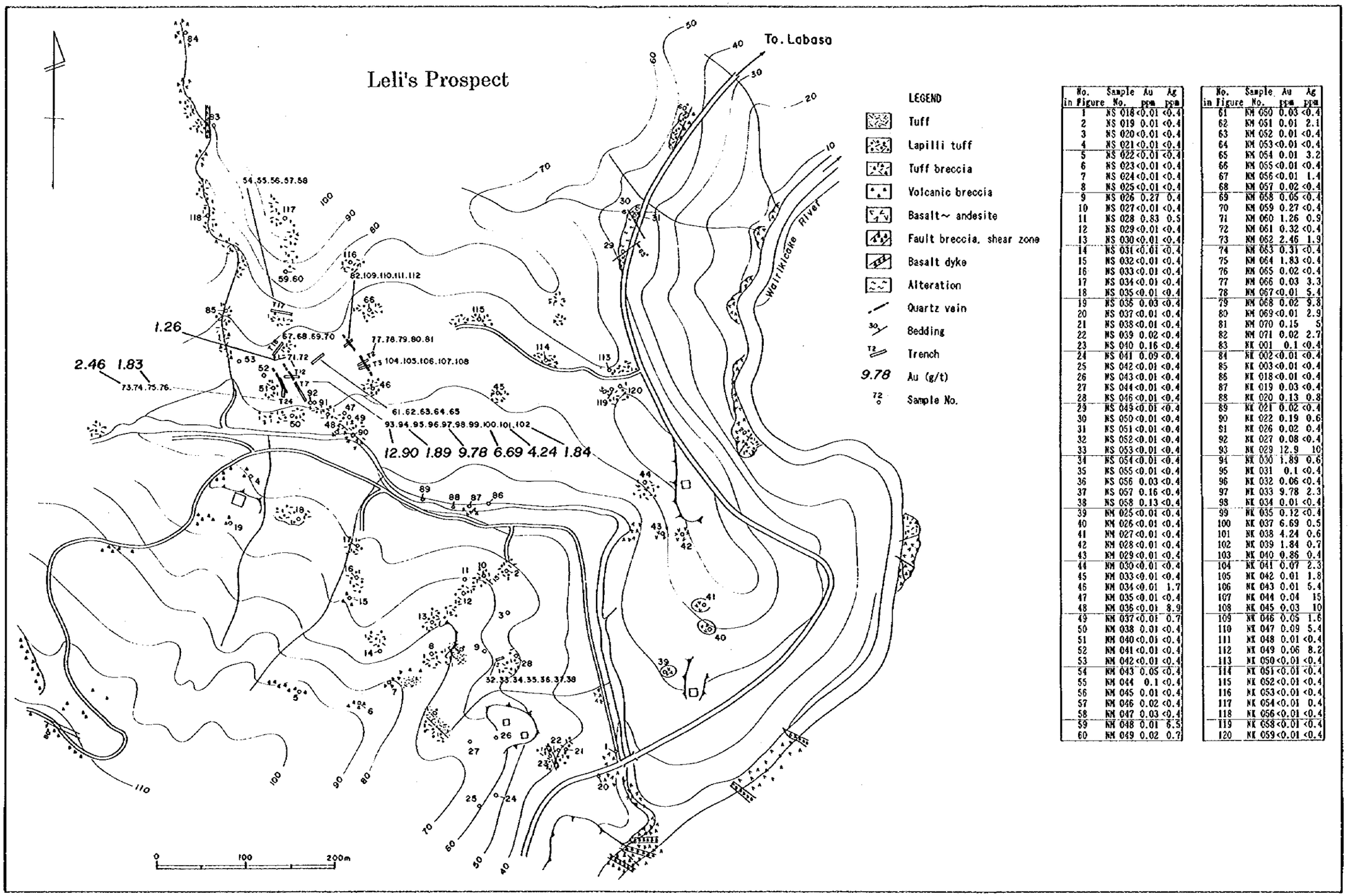


Fig. 2-2-3 Distribution Map of Prospects and Alteration Zones in the Nakoroutari Area



No. in Figure	Sample No.	Au ppm	Ag ppm
1	NS 018	<0.01	<0.4
2	NS 019	0.01	<0.4
3	NS 020	<0.01	<0.4
4	NS 021	<0.01	<0.4
5	NS 022	<0.01	<0.4
6	NS 023	<0.01	<0.4
7	NS 024	<0.01	<0.4
8	NS 025	<0.01	<0.4
9	NS 026	0.27	0.4
10	NS 027	<0.01	<0.4
11	NS 028	0.83	0.5
12	NS 029	<0.01	<0.4
13	NS 030	<0.01	<0.4
14	NS 031	<0.01	<0.4
15	NS 032	<0.01	<0.4
16	NS 033	<0.01	<0.4
17	NS 034	<0.01	<0.4
18	NS 035	<0.01	<0.4
19	NS 036	0.03	<0.4
20	NS 037	<0.01	<0.4
21	NS 038	<0.01	<0.4
22	NS 039	0.02	<0.4
23	NS 040	0.16	<0.4
24	NS 041	0.09	<0.4
25	NS 042	<0.01	<0.4
26	NS 043	<0.01	<0.4
27	NS 044	<0.01	<0.4
28	NS 046	<0.01	<0.4
29	NS 049	<0.01	<0.4
30	NS 050	<0.01	<0.4
31	NS 051	<0.01	<0.4
32	NS 052	<0.01	<0.4
33	NS 053	<0.01	<0.4
34	NS 054	<0.01	<0.4
35	NS 055	<0.01	<0.4
36	NS 056	0.03	<0.4
37	NS 057	0.16	<0.4
38	NS 058	0.13	<0.4
39	NM 025	<0.01	<0.4
40	NM 026	<0.01	<0.4
41	NM 027	<0.01	<0.4
42	NM 028	<0.01	<0.4
43	NM 029	<0.01	<0.4
44	NM 030	<0.01	<0.4
45	NM 033	<0.01	<0.4
46	NM 034	<0.01	1.7
47	NM 035	<0.01	<0.4
48	NM 036	<0.01	8.9
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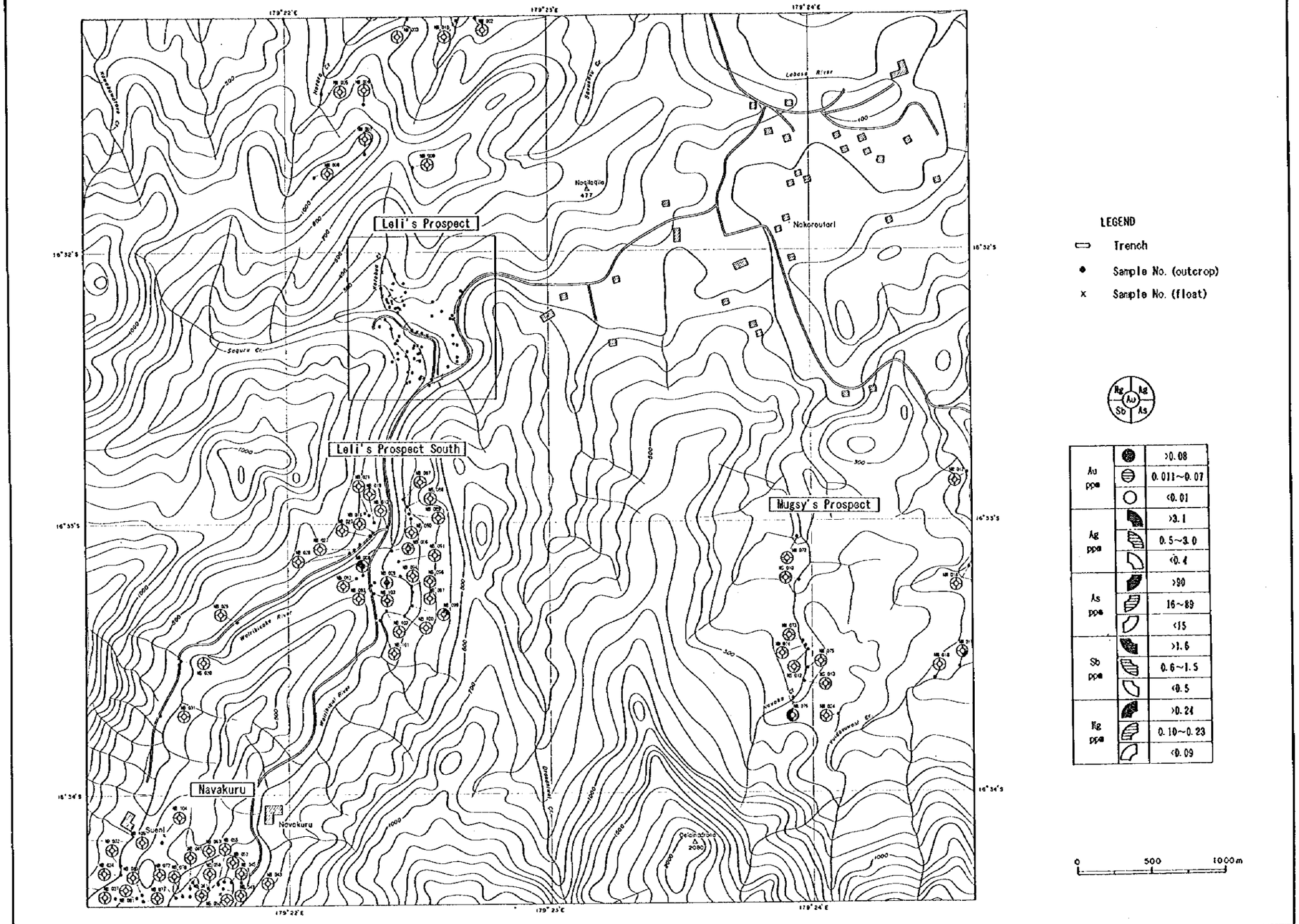
50	NM 038	0.01	<0.4
51	NM 040	<0.01	<0.4
52	NM 041	<0.01	<0.4
53	NM 042	<0.01	<0.4
54	NM 043	0.05	<0.4
55	NM 044	0.1	<0.4
56	NM 045	0.01	<0.4
57	NM 046	0.02	<0.4
58	NM 047	0.03	<0.4
59	NM 048	0.01	6.5
60	NM 049	0.02	0.7

No. in Figure	Sample No.	Au ppm	Ag ppm
61	NM 050	0.03	<0.4
62	NM 051	0.01	2.1
63	NM 052	0.01	<0.4
64	NM 053	<0.01	<0.4
65	NM 054	0.01	3.2
66	NM 055	<0.01	<0.4
67	NM 056	<0.01	1.4
68	NM 057	0.02	<0.4
69	NM 058	0.05	<0.4
70	NM 059	0.27	<0.4
71	NM 060	1.26	0.9
72	NM 061	0.32	<0.4
73	NM 062	2.46	1.9
74	NM 063	0.31	<0.4
75	NM 064	1.83	<0.4
76	NM 065	0.02	<0.4
77	NM 066	0.03	3.3
78	NM 067	<0.01	5.4
79	NM 068	0.02	9.8
80	NM 069	<0.01	2.9
81	NM 070	0.15	5
82	NM 071	0.02	2.7
83	NK 001	0.1	<0.4
84	NK 002	<0.01	<0.4
85	NK 003	<0.01	<0.4
86	NK 018	<0.01	<0.4
87	NK 019	0.03	<0.4
88	NK 020	0.13	0.8
89	NK 021	0.02	<0.4
90	NK 022	0.19	0.6
91	NK 026	0.02	0.4
92	NK 027	0.08	<0.4
93	NK 029	12.9	10
94	NK 030	1.89	0.6
95	NK 031	0.1	<0.4
96	NK 032	0.06	<0.4
97	NK 033	9.78	2.3
98	NK 034	0.01	<0.4
99	NK 035	0.12	<0.4
100	NK 037	6.69	0.5
101	NK 038	4.24	0.6
102	NK 039	1.84	0.7
103	NK 040	0.86	0.4
104	NK 041	0.07	2.3
105	NK 042	0.01	1.8
106	NK 043	0.01	5.4
107	NK 044	0.04	15
108	NK 045	0.03	10
109	NK 046	0.05	1.6
110	NK 047	0.09	5.4
111	NK 048	0.01	<0.4
112	NK 049	0.06	8.2
113	NK 050	<0.01	<0.4
114	NK 051	<0.01	<0.4
115	NK 052	<0.01	<0.4
116	NK 053	<0.01	<0.4
117	NK 054	<0.01	0.4
118	NK 056	<0.01	<0.4
119	NK 058	<0.01	<0.4
120	NK 059	<0.01	<0.4

Fig. 2-2-4 Detailed Survey Results of the Leli's Prospect



LEGEND

- Trench
- Sample No. (outcrop)
- × Sample No. (float)

Au ppm	●	>0.08
	◍	0.011~0.07
	○	<0.01
Ag ppm	◥	>3.1
	▨	0.5~3.0
	◺	<0.4
As ppm	◥	>90
	▨	16~89
	◺	<15
Sb ppm	◥	>1.6
	▨	0.6~1.5
	◺	<0.5
Hg ppm	◥	>0.24
	▨	0.10~0.23
	◺	<0.09

Fig. 2-2-5 Geochemical Survey Results of the Nakoroutari Area

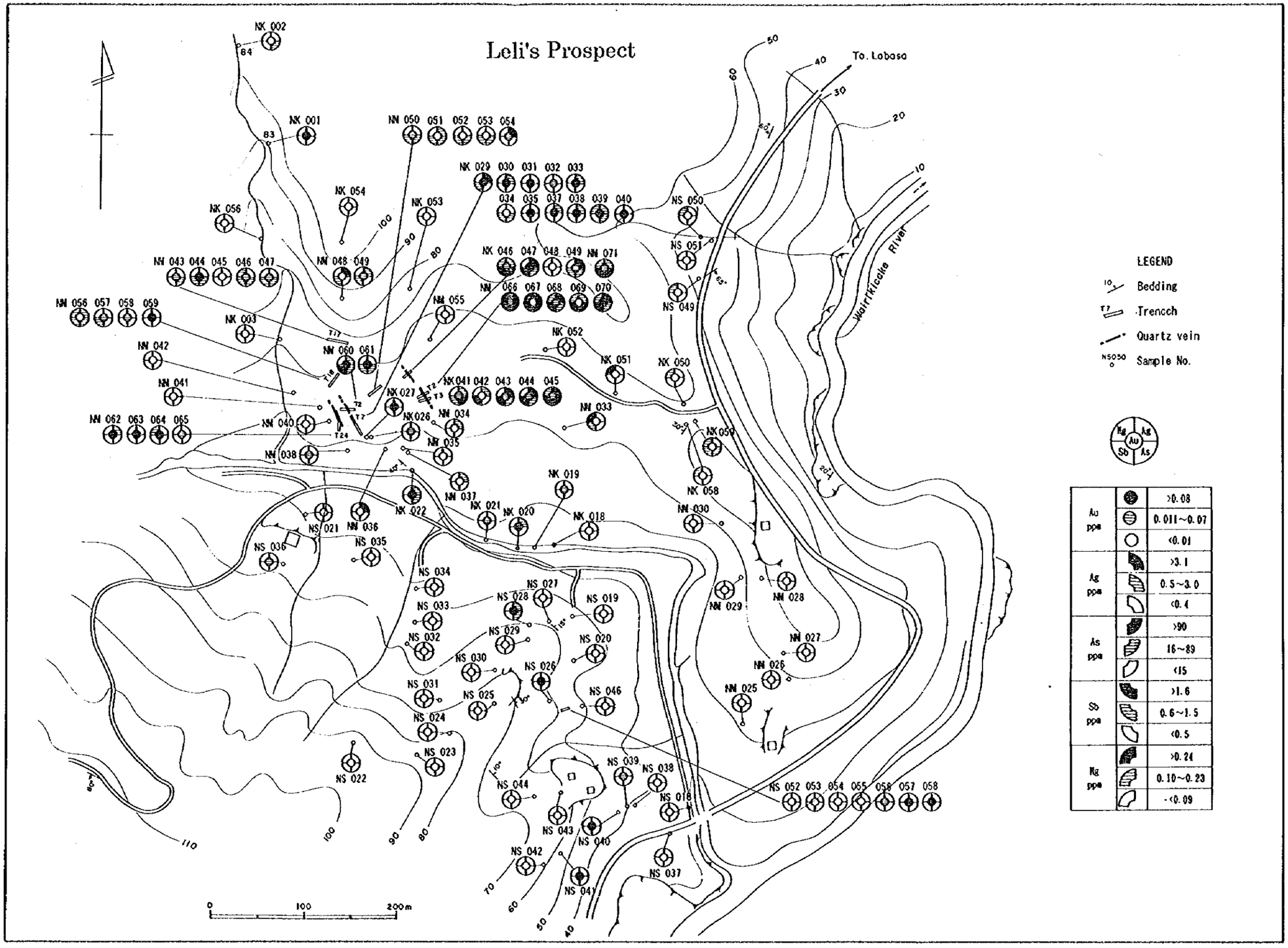
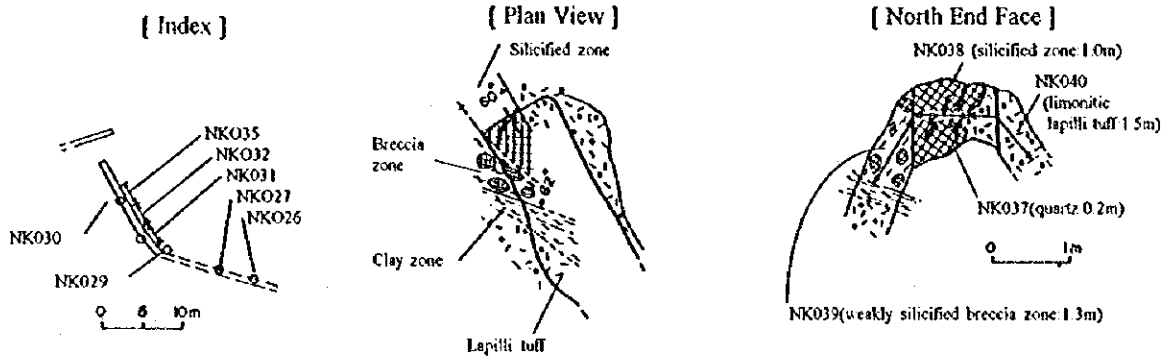


Fig. 2-2-6 Geochemical Survey Results of the Leli's Prospect Area

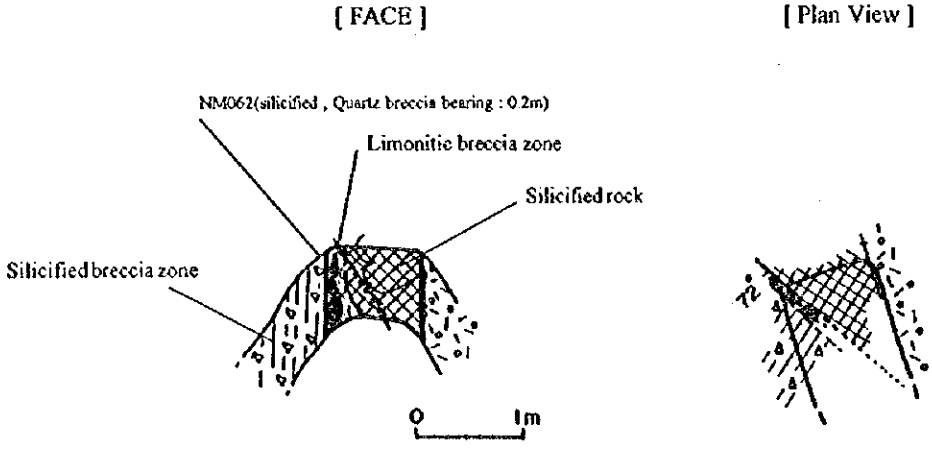
Leli's Prospect

Trench No.7



Sample	width (m)	Au (g/t)	Ag (g/t)
NK026	-	0.022	0.4
NK027	-	0.08	<0.4
NK029	-	12.9	10.4
NK030	-	1.89	0.6
NK031	5.0	0.096	<0.4
NK032	5.0	0.064	<0.4
NK035	5.0	0.115	<0.4
NK037	0.2	6.69	0.5
NK038	1.0	4.24	0.6
NK039	1.3	1.84	0.7
NK040	1.5	0.86	0.4

Trench No.24



Sample	width (m)	Au (g/t)	Ag (g/t)
NM062	0.2	2.46	1.9

Fig. 2-2-7 Sketch of Trenches at the Leli's Prospect

Chapter 3 Geology of the Dakuniba Area

3-1 Outline of Geology

Minerlization occurs as quartz veins in the Dakuniba Basalt of the Natewa Volcanic Group. Major veins strike WNW-ESE and dip steeply. The veins extend for more than 2 km. Maximum Au grade is 16 g/t and many samples assay 1 g/t.

3-2 Stratigraphy

The area is underlain by basalt lava and volcaniclastic rocks of the same composition that are correlated to the Dakuniba Basalt. The Formation is divided into three units on the geologic map (Fig. 2-3-2) based on rock facies: compact lava (unbrecciated) facies, autobrecciated to coarser volcaniclastic facies, and finer volcaniclastic facies. These units are defined tentatively for mapping purposes and should not be regarded as officially defined members.

The compact lava is distributed mainly in the center of the area, and is dark green in color and hard. Extensive alteration has resulted in smectite replacing olivine and pyroxene. The rock often contains coarse grained pyroxene phenocrysts and altered olivine.

Brecciated basalt is distributed widely, especially in the western and eastern part of the area. Main constituents appear to be autobrecciated lava and volcaniclastic rocks which are mostly classified as volcanic breccia in terms of their fragment size. The composition appears to be the same as the compact lava. The rocks of this unit may be more strongly altered as smectite has replaced phenocrysts and matrix. It tends to be softer and sometimes dark reddish in color as a result of oxidation.

Volcaniclastic facies are distributed in the narrow area intercalated with the basalt lavas. They consists mainly of lapilli tuff and tuff, including epiclastic fine tuff as in the east of Dakuniba village. The fine tuffs are often bedded. Volcaniclastic rocks are soft and green to grayish green in color. The rocks are mainly composed of lithic fragments and rarely contain scoria.

The lavas appear to have been erupted on land and in the shallow sea based on the lack of pillow lavas and of absence of clear hyaloclastic textures in addition to the oxidation. Only a minor amount of epiclastic facies are present.

The total thickness of this formation is more than 900m.

3-3 Intrusive Rocks

Many basalt dykes and a small number of gabbroic bodies have intruded into the formation. The dominant direction of the basalt dykes is NW-SE in the east part of the area and E-W in the western part. The widths of the dykes generally range between 0.3m and 3 m.

3-4 Geologic Structure

The faults in the area have a dominant strike of NNE-SSW and NW-SE, which is oblique to the ENE-WSW trend in the Cakaudrove Peninsula. The folds are not clear, but a N-S trending synclinal and anticlinal axis with a 1 km length and wing width of 1 km is estimated.

The dykes in the west display a WNW-ESE strike that are orthogonal to the fold axes, The compressional direction was E-W.

3-5 Mineralization and Alteration

Mineralization occurs as gold bearing quartz veins. Most of the quartz veins occur intermittently in the upper reaches of the Nagagani Creek to the north of the Dakuniba village, over more than 3 km length. More than 50 trenches have been excavated in this area called the Dakuniba Prospect. The width of the quartz veins ranges from less than 1 cm up to 1 m, mostly being less than 10 cm. Quartz veins strike N65°W and dip 60°N~60°S, while some display a E-W~NE-SW strike.

Other zones of quartz veining include the area from Wailevu Creek to near Naqaiqai Creek, in a NW-SE direction over 2 km in length. This zone is adjacent to Nibuni Creek where an argillic alteration zone has developed. In addition, another outcrop of quartz veins occurs at the branch of the Waikava Creek to the northwest.

Under the microscope, the quartz vein samples are mainly comprised of quartz and adularia and goethite with pyrite, chalcopyrite, sphalerite and galena, and trace amounts of acanthite. A sample from a quartz vein at trench No.29 contains abundant pyrite, sphalerite, galena, arsenopyrite and acanthite. Chemical analysis indicate 12.4 g/t Au and 1,420 g/t Ag. (The acanthite may have been generated through exsolution when the sulfide was oxidized to goethite).

The dominant silicified zones surrounding the quartz veins reach 3m. The two samples that were taken from the east and west ends of the Nagagani zone contain barite but Au values are as low as 0.2 g/t and less than 0.01 g/t, respectively.

3-6 Geochmical Survey

A total of 241 samples were taken for chemical analysis. The results are summarized as frequency distribution and cumulative frequency curves. The threshold values are established based on basic statistics.

Element(unit)	Au(g/t)	Ag(g/t)	As(ppm)	Sb(ppm)	Hg(ppm)
Detection Limit	0.01	0.4	1.0	0.5	0.005
Average	0.036	0.70	26	0.75	0.037
Minimum	<0.01	<0.4	<1.0	<0.5	0.006
Maximum	16.1	151	1,590	28	3.2
Average+σ	0.31	3.5	165	2.4	0.11
Average+2 x σ	2.6	18	1,059	7.5	0.33

Au: Threshold values are established at 0.01 g/t and 0.31 g/t. At the Dakuniba Pprospect, the highest gold value is 16.1 g/t Au and many samples grade higher than 1 g/t Au, in addition to the wide geochemical zone established by using the thresholds . At Wailevu Creek and Basaganaku Creek in the northern part, weak Au anomaly (0.01 g/t~ 0.31 g/t) was located. At the branch of Waikava Creek, Au mineralization was identified with a grade of 0.45 g/t Au.

Ag: Thresholds of 0.7 g/t and 3.5 g/t were selected. Ag values cover wide range. The Ag/Au ratios are in the order of 1 while the ratio range between 0.2 ~ 10.

As: Thresholds of 26 ppm and 165 ppm were selected. Values higher than 1,000 ppm are from the samples that range between 0.1~1 g/t Au with the exception of one sample. Samples with more than 1 g/t Au have between 26~529 ppm As. Samples with higher than 165 ppm As extend further west and east over the Au anomaly zone.

Sb: Threshold values are 0.75 ppm and 2.4 ppm. The highest value is 28 ppm from a sample of float (0.1 g/t Au) taken from the Nakasaiki Creek in the far northeast of the Dakuniba Prospect. The second highest value is 25 ppm from a quartz vein from the Eight-gram Creek in the southeastern area of the Dakuniba Prospect. Sb is apparent over a wider anomaly zone than As.

Hg: Thresholds are 0.037 ppm and 0.33 ppm.

The correlation between Au and the other four elements is obvious. The correlations among the other four elements are admitted.