# REPORT ON THE WORK PROGRAMME OF THE TECHNICAL SECRETARIAT 1 October 1990 - 30 September 1991

SOPAC Technical Secretariat

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**APPENDICES**

# INTRODUCTION TO SOPAC

## OBJECTIVES

The South Pacific Applied Geoscience Commission (SOPAC) is an inter-governmental, regional organisation established by several South Pacific nations to:

* provide information on the physical environment of coastal and nearshore areas to assist with resource and environmental management; hazard evaluation and coastal protection works; and planning and implementation of coastal development projects.

* investigate the resource potential of coastal, nearshore and offshore minerals including construction materials, phosphates, cobalt-rich crusts, manganese nodules, polymetallic sulphides, precious corals and detrital minerals such as gold.

* assess and promote the hydrocarbon and wave energy potential of the region.

* coordinate marine geological and geophysical research being carried out in the region.

* curate and distribute marine geological and geophysical data from the South Pacific.

* train nationals in the implementation and management of their work programmes.

## MEMBER COUNTRIES

Member countries are currently Australia, Cook Islands, Federated States of Micronesia, Fiji, Guam, Kiribati, Marshall Islands, New Zealand, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa.

## BACKGROUND

SOPAC was established in 1972 as CCOP/SOPAC (the Committee for Coordination of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas) under the sponsorship of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). In 1984, CCOP/SOPAC changed its legal status to become an independent, regional, inter-governmental body. At their Annual Session in Tarawa, Kiribati in October 1990, the member countries adopted an Inter-governmental Agreement as SOPAC's new Constitution. The organisation's name was changed to SOPAC (South Pacific Applied Geoscience Commission) in 1989.

The Commission comprises the Governing Council, composed of representatives of the member countries, the Technical Secretariat and the Technical Advisory Group (TAG). The Commission meets annually to review work completed, and to discuss and plan future work required by member countries.

During the Annual Session, the Commission draws up its Work Programme consisting of Country Projects and Regional Projects. Country Projects define applied work requested by individual members to assist with their countries' development. Regional Projects have more general objectives, either to provide the background information needed for applied work or to synthesise results for widespread use.

The Commission's Work Programme is carried out by its Technical Secretariat (Techsec) in close liason and consultation with the member countries. Techsec is based in Suva, Fiji and currently has a staff about 50 of which half are professionals.

## FUNDING

SOPAC is funded by a combination of statutory and voluntary contributions by its member countries and grants from donor governments and international agencies. An annual budget of nearly F$6 million supports the implementation of the technical Work Programme and the overall operation of the Technical Secretariat, provided by donor governments and international agencies, and by the member countries themselves. Substantial additional support is also provided in the form of services to SOPAC by donor governments and other agencies mainly through major joint activities such as deep-sea cruises. Supporting countries include Australia, Canada, the European Communities as a group, Germany, Fiji, France, Japan, Netherlands, New Zealand, Norway, Peoples Republic of China, United Kingdom, the Soviet Union and USA. They provide assistance in areas such as funding, training, shiptime, non-reimbursable consultants, gifts and loans of equipment, editorial services, and publishing and printing costs. UNDP/ESCAP, UNESCO/IOC, and CFTC are the principle multilateral agencies supporting SOPAC. Member countries also provide considerable support in kind, especially during survey work, by providing personnel, facilities (including ships), equipment, and supplies.

# WORK PROGRAMME STRUCTURE

## ORGANISATION

The SOPAC Work Programme is divided into Programmes, Sub-programmes, Projects and Tasks. Projects and Tasks are work specific to each member country. A Project is essentially the work of a Programme or Sub-programme in a country, so that Project titles, in many instances, closely match the list of Programmes and Sub-programmes. Tasks are jobs required by member governments to help meet Project objectives and as such are under regular review. A full list of projects is given in Appendix 1. The SOPAC Work Programme is grouped into five Programmes, subdivided into 13 Sub-programmes:

Coastal and Nearshore Programme

- Nearshore minerals
- Coastal development
- Coastal and nearshore mapping
- Ocean energy

Hydrocarbon Programme

Offshore Programme

- Deepsea minerals
- Seabed mapping

Technical Support Programme

- Data management
- Technical information
- Technical services

Training Programme

- Courses
- On-the-job assignments
- Workshops and seminars
- Training assistance

## FORMULATION

At each Annual Session, a Work List of Tasks is compiled comprising all the work that member countries require SOPAC Techsec to implement the following year. According to instructions received at the Annual Session, and considering the resources available and the priorities of the individual member countries, Techsec constructs a Work Plan for it to carry out the following year. The Work List for 1990-91, with notes on progress made on each Task, is given in Appendix 2.

## REPORTING

Reporting to member countries is at two levels: reports by Techsec professional staff on individual Tasks completed, and reports by management on the status of implementation of the Work

Programme as a whole. As soon as practicable after any field study, a Preliminary or Cruise report is sent to the member country. When the data collected are interpreted and fully, written up, a more formal Technical Report is produced, usually marking the completion of a Task. A list of reports completed in 1990-91 is given in Appendix 3.

# WORK PROGRAMME SUMMARY 1990/91

The SOPAC Work Programme consists of three main areas of technical assistance:
the Coastal and Nearshore Programme;
the Hydrocarbon Programme;
the Off shore Programme.

Other activities in the Work Programme which assist member governments directly and support the scientific programmes are:
the Training Programme;
the Technical Support Programme.

The SOPAC Work Programme is driven by member government needs expressed as requests for assistance with particular tasks. At the Annual Session, the member countries, with the assistance of the Technical Advisory Group, review the SOPAC Work Programme and formulates Work Lists for each country for the coming year. Based on resources available to it to implement these Work Lists, the Technical Secretariat then develops in close consultation with the member countries an agreed Work Plan.

The emphasis of the Work Programme changes as these needs change. During the last 12 months - October 1990 to September 1991 - the biggest changes continue to take place in the Coastal and Nearshore Programme with Training also being maintained at a high level. During this period, field work has been carried out in nine of the 12 island member countries. Assistance provided to the two new members, the Federated States of Micronesia and the Marshall Islands, should lead to programme activities in those countries starting in 1992 (except Training which commenced late in 1990 immediately following their acceptance as SOPAC members). Management assistance with programme review and development was provided by Techsec to Federated States of Micronesia, Fiji, Guam, Kiribati, Marshall Islands, Papua New Guinea, Solomon Islands, Tuvalu, and Vanuatu with both country visits and meetings at Techsec.

## COASTAL AND NEARSHORE PROGRAMME

**Nearshore Minerals:** The greatest requirements for assistance with nearshore mineral resources remains with sand and gravel aggregates. Work on the identification, assessment, and management of sand and gravel aggregates has continued in Cook Islands, Kiribati, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Field studies have been completed to identify and assess new deposits, monitor the effects of mining activity, and provide information to assist in the development of management plans in areas where mining may take place. A major review of the availability and potential of sand resources off Nuku'alofa, Tonga has been completed. The pilot project on Funafuti, Tuvalu to test the feasibility of mining lagoon sand to infill the borrow pits on Fongafale is continuing. Techsec expects to have the dredging equipment in Tuvalu to start dredging and infill operations before the end of 1991.

Recognising the interest from the private sector in gold in the region Techsec has begun a detailed review of the potential for placer minerals in coastal and nearshore areas. The aim of this study is to identify areas where existing information is insufficient to make an evaluation capable of enticing industry to explore and exploit. When completed, the review will provide information to member governments recommending areas where detailed field surveys are warranted.

**Coastal Development:** Coastal erosion is an on-going problem most member states have to deal with, and work has been carried out in Cook Islands, Kiribati, Solomon Islands, Tuvalu, and Vanuatu. Work has included study of areas where erosion is a natural on-going process and where human activities appear to be the cause. Information is being collected to monitor coastal changes associated with beach mining, causeway construction, and other coastal developments.

As well as erosion studies, other coastal studies have been made in Cook Islands, Fiji, Kiribati, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa to assist member governments with development planning and coastal management. Coastal developments benefiting from these studies include harbour and small wharf development, land reclamation, tourist development, coastal protection, and waste disposal. To assist these studies Techsec developed the capability to collect low-level colour aerial photographs and is building up a collection of existing aerial photos.

**Coastal and Nearshore Mapping:** Coastal and nearshore mapping continues, and coastal morphology maps of Cook Islands and Western Samoa are being published. A set of preliminary bathymetric maps has been completed for Western Samoa to assist in the assessment and development of deepsea fisheries. Bathymetric information suplied to Fiji and Tuvalu fisheries has assisted in the identification of new deepsea fishing grounds. Other preliminary bathymetric maps have been completed for Cook Islands and Tuvalu.

**Wave Energy:** The collection of wave data to assess wave energy potential has been completed in Cook Islands and is continuing in Fiji, Tonga, Tuvalu, Vanuatu, and Western Samoa. Preparations are being made to set up a wave database at Techsec.

**Staffing:** During the last 12 months professional staff consisted of two Marine Geologists, two Coastal Geologists, a Coastal Engineer, and a Wave Engineer.

## HYDROCARBON PROGRAMME

On-going work has included interpretation of marine magnetic data from Tonga, investigation of a reported oil seep in Vanuatu, and a re-evaluation of reef structures identified on seismic profiles from the Solomon Islands. Assistance with on-going work has been provided to Fiji. Preparations have been made for a variety of future activities including reprocessing of selected data, re-interpretation and re-evaluation of existing data, and courses and workshops.

Data archiving at the Bureau of Mineral Resources continues and brochures to promote data available have been produced and circulated. The regions hydrocarbon potential has continued to be promoted with considerable assistance from BMR. Of note was the 1991 Australian Petroleum Explorers Association annual conference in Melbourne, where a new SOPAC display covering 5 island nations was on view for the first time.

**Staffing:** Following a twelve month period with no professional staff, a new Petroleum Geophysicist began work in March 1991. A Petroleum Coordinator has been recruited and will begin work late in 1991.

## OFFSHORE PROGRAMME

Major activities of the Offshore Programme have been a review of manganese nodule deposits in the region, the management and development of SOPAC swath mapping, and coordination of research cruises in member governments EEZ's.

**Deepsea Minerals:** The SOPAC database on manganese nodules and cobalt-rich crusts has been updated and regional maps showing manganese nodule distribution, abundance and mineral content have been prepared. These will be published in 1992 when data from the 1991 Hakurei Maru No.2 cruise in Kiribati waters have been received. A detailed review of Cook Island nodule deposits and comparison with North Pacific nodule fields has started. Funding is being sought to complete this work.

**Seabed Mapping:** Work continues on the preparation of final reports on the 1989 SOPAC GLORIA swath mapping survey carried out in Fiji, Solomon Islands, Tonga, Vanuatu, and Western Samoa. A workshop for participating scientists was held in November 1990. Three reports have been completed and two are under-going editorial processing at Techsec. Planning for a second major swath mapping

programme is proceeding and it is hoped to have the tendering well advanced before the end of the year. Swath mapping atlases of SeaMARC II data, largely collected by the SOPAC Tripartite Programme (prepared by HIG), and SSI systems data from recent cable route surveys have been compiled and expected to be available towards the end of 1991.

**Cruise Coordination:** Techsec coordinated the planning and implementation of 9 cruises in the EEZ's of Cook Islands, Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tonga, Vanuatu, and Western Samoa. The second phase of joint SOPAC/Japan deepsea mineral investigations by Hakurei Maru No.2, began with the first cruise in Cook Islands and Western Samoa during the second half of 1990. The second cruise, currently at sea in Kiribati waters, will complete the work in this programme on nodules and crusts. The remaining three cruises will focus on back-arc deepsea mineralisation. The international Ocean Drilling Program conducted two cruises on the Joides Resolution in island member goverment's waters, drilling in Fiji, Tonga, and Vanuatu.

**Staffing:** The work of the Offshore Programme is carried out by two professionals; the Offshore Coordinator and the Offshore Geologist.

## TRAINING PROGRAMME

Training activities are many and varied and continue to be maintained at a level where expenditure on training activities is ten percent of the total SOPAC budget. As a result of a decision made by the Governing Council at the 19th Annual Session in 1990, a comprehensive independent review of the Training Programme was made during 1991 and the results will be presented to the Governing Council at the 20th Annual Session.

**Courses:** The focus of training courses offered continues to be the Certificate in Earth Science and Marine Geology. This year the second 3 month part of a three year programme was attended by 14 participants. During the last 12 months seven students have benefited from SOPAC Scholarships for first degree training.

**On-the-job Assignments:** During the last 12 months eighteen island nationals have travelled within the region on SOPAC Fellowships for practical training in the field and at Techsec. Management training was held in conjunction with the SOPAC Annual Session and the Deputy Director, Department of Geology Mines and Rural Water Supply was attached to Techsec for seven months. Six island nationals have participated in cruises on foreign research vessels in their country's waters. Support was provided for 15 island nationals to attend five international conferences.

**Workshops and Seminars:** SOPAC organised, as in the past, two regional workshops during the past 12 months. The Coastal Mapping Workshop attended by 14 participants was held on the Coral Coast, Fiji. Twenty five participants are expected to attend the workshop on minerals policy in Vanuatu scheduled for the week immediately prior to the 1991 Annual Session. National in-country workshops were held in Kiribati for 13 students (Introduction to Geology), and in Solomon Islands for 25 students (Coastal Mapping).

**Training Assistance:** SOPAC continues to assist with a variety of activities at USP in Suva. These include teaching assistance for the Ocean Resources Management Programme, assistance with the development of the USP Marine Studies Programmme and extension courses, and membership on the USP Marine Studies Coordinating Committee.

**Techsec Staffing:** The Training Coordinator will be joined by an Assistant Training Coordinator in November 1991 bringing the number of full-time professional staff to two.

## TECHNICAL SUPPORT PROGRAMME

Technical support is provided by data management, drafting, publishing, library services, computing services and field operations. A major review of Techsec computing requirements has been completed

in an attempt to rationalise the use of computers in the implementation of the SOPAC Work Programme. As a result a Computer Services Manager is being recruited and other recommendations concerning hardware and software purchasing and use are being followed up.

**Data Management:** Reports have been completed summarising multichannel seismic data available in Fiji and Tonga waters, and swath mapping data available for the Lau Basin. Databases holding navigation, bathymetry, magnetic, gravity, and deepsea mineral data from offshore cruises, and indexes to offshore cruises and data stored at Techsec, have been maintained. Techsec is currently in the process of replacing its MicroVAX system with SUN workstations. It is intended to replace outdated and inefficient software, and database software packages are currently under review.

**Drafting:** A major part of the work by drafting services is the compilation and production of bathymetric and coastal morphology maps, both in conjunction with work of the Coastal and Nearshore Programme and in response to direct requests from member governments. During the last 12 months work has continued on a number of maps, and 17 bathymetric and six coastal morphology maps are now available in draft form. The four Western Samoa (Upolu) coastal morphology maps are being printed and printing of the two Cook Islands (Rarotonga) will follow. Preparations are being made to print selected bathymetric maps in 1992. Work on the SOPAC Geophysical Atlas continues with the tectonic map almost completed and with major progress being made on the sediment map. Training in bathymetric drafting and coastal morphology mapping has continued.

**Publications:** On-going technical editing and desktop publishing continues to maintain a high standard of presentation of all reports prepared from work programme activities. In order to promote the organisation and make the results of its work more readily accessible, the first Annual Report, the second issue of SOPAC Projects, and three issues of SOPAC News have been published during the last 12 months. The first Technical Bulletin, containing papers presented at the 1988 Lae Coastal Processes Workshop, has been published in a new format. Technical editing assistance has been provided to Fiji to prepare a thesis for publication.

**Library:** The SOPAC library at Techsec is now fully operational and the bibliographic database established. As well as the book and serials collection, the Techsec library also maintains collections of maps and charts, aerial photographs, hand-held camera photographs, and news articles. Current awareness and reference services, and interlibrary loans are being provided to Techsec staff and member governments direct, and to others through PIMRIS. During the last 12 months direct assistance to member governments has been provided to Fiji, Kiribati, and Tonga, with assistance to be provided to Solomon Islands and Vanuatu later in 1991.

**Technical Services:** The successful implementation of much of the SOPAC Work Programme, especially in the Coastal and Nearshore Programme, is dependent on the services provided by Technical Services. Electronic and mechanical eqipment and operational support was provided to more than 12 major field surveys during the last 12 months. Equipment maintenance, including Techsec computers, and arrangements for the shipping of equipment around the region are a major consumer of workshop staff time. Technical Services have also developed a digital recording, nearshore mapping system for coastal and nearshore work. Training in the implementation of field work, including the operation and maintenance of equipment, has been carried out on all surveys.

**Staffing:** Professional staff consists of Data Manager and Computer Mapping Geologist (Data Management); Chief Draftsman (Drafting); Technical Editor and Assistant Editor (Publications); Librarian and Assistant Librarian (Library); and Electronics Engineer (Technical Services). With training of the Assistant Librarian nearing completion, the present Assistant Librarian will be promoted to Librarian early in 1992 when funding for the present Librarian ceases.

## GENERAL

The overall aim of Techsec management, within the constraints of available resources, has been to implement the tasks in the agreed SOPAC Work List as presented in the order of priority by member countries and expressed in the SOPAC Work Plan. The efficient and effective implementation of the

SOPAC Work Programme will continue to be Techsec's primary function, with the emphasis and direction changing as needed to meet member countries' requirements. Close contact has been maintained with FFA, SPREP, the USP, Forum Secretariat, and other organisations involved in similar work in the region, to improve the effectiveness of work being carried out. Techsec management has continued to remain at its members disposal for advice and assistance, especially in the management and development of its work programmes.

Jim Eade
Deputy Director

# COASTAL AND NEARSHORE PROGRAMME

## Introduction

The majority of SOPAC's field studies are currently in this programme, which provides information on the physical aspects of coastal and nearshore areas to assist member countries with resource and environmental management. The work includes investigations of nearshore mineral resources; evaluation of the causes of and solutions for coastal erosion; and mapping the marine geological processes responsible for the morphology of coastlines. An important application of the work is to provide data against which any future changes can be measured.

The programme addresses the problems associated with engineering projects in the coastal zone, and geologic hazards related to coastal erosion and protection. Published maps of coastal and nearshore areas are an important result of the work. Member country personnel are trained in the mapping of coastal environments and the engineering aspects of coastal development so that the countries will be less dependent on outside expertise in the future.

The programme is divided into four sub-programmmes: Nearshore Minerals; Coastal Development; Coastal and Nearshore Mapping; and Ocean Energy. Each has a defined set of objectives, but the study methods, information gained, and applications are closely interwoven.

## NEARSHORE MINERALS

### Objectives

The broad objective of nearshore minerals investigations is to locate nearshore mineral prospects that are economically viable for either local or export markets and to promote those prospects to encourage their exploitation. The main prospecting activities are resource evaluation for construction materials and detrital minerals. From time to time, work is also carried out on insular phosphates and precious corals. Reconnaissance geological and geophysical surveys are first conducted to evaluate resource potential, followed by detailed surveys to define economic potential and finally by reporting to member country governments on findings with recommendations for further work.

### Summary of work

*FIJI*

**Task 91.FJ.18a: Detrital minerals, Ba river delta.**

Project work to date has been on survey planning and research on suitable equipment and costings. Project deferred to early 1992.

**Task 91.FJ.19e: Bedrock Miocene structure around Yasawa Island and the top end of Nacula Island in the Yasawas.**

Single channel seismic and magnetic data have been collected off the Yasawa Islands to assist in the integration of on-land mapping and the evaluation of marine mineral resources, including hydrocarbons *(Preliminary Report 29)*. Work completed includes processing of seismic data in New Zealand and track plot and bathymetric maps drawn. Magnetic data have been interpreted and a draft report by Dr Graham Taylor submitted to Techsec. Seismic interpretation is continuing.

*SOLOMON ISLANDS*

**Task 91.SI.16b: Placer gold at the mouth of the Matapono River, Guadalcanal, Solomon Islands.**

In July and August the field portion was completed of a study to further investigate the gold-bearing sands of the Matapono River area of Guadalcanal. Two weeks were spent in the field collecting samples of sand along a 3 kilometre section of beach *(Preliminary Report 36)*.

*TONGA*

**Task 91.TG.6a: Sampling and assessment of sand deposits off Fafa, Nuku'alofa.**

Initial estimates of sand quantities were based on the results of a drilling programme *(Technical Report 123)*. Survey work was recently completed to gather additional subsurface information to more accurately delineate the volume of the resource *(Preliminary Report 32, Technical Report 133)*. A review of sand resources in Tonga has been completed in draft.

*VANUATU*

**Task 91.VA.14a: Study of Forari Bay manganese deposits.**

Project at planning stage only and deferred until 1992.

*OTHER WORK*

**Placer potential of the South Pacific**

In early January, in conjunction with outside consultant J. V. Barrie, an outline of a program to assess the potential for the marine placer deposits in the South Pacific was prepared. An information database on the exploration for placers in the region has been established. The information is housed in a desktop GIS.

In May a paper titled "Marine Placer Potential of the South Pacific" was presented at a special session on marine minerals at the annual meeting of the Geological Association of Canada. The paper focused on the prospects of finding a marine placer deposit in Fiji, Vanuatu, Solomon Islands, or Papua New Guinea.

## COASTAL DEVELOPMENT

### Objectives

A wide range of work in this area is aimed at assessing geologic and oceanographic hazards and processes in coastal and nearshore environments. Geological hazards in island countries include shoreline erosion, earthquakes and volcanic events, and the coastal effects of storms, tsunamis, sea level change and human development. Member country requests commonly result from the interaction of natural processes with changes bought about by coastal development, requiring evaluation of the causes, extent and severity of coastal erosion. General and site-specific engineering information is also collected for use in coastal development planning, and for evaluation of specific sites for coastal engineering projects. This work applies coastal mapping and assessment of the natural hazards in the nearshore and coastal environment to engineering projects for these areas so that they may be designed to minimise adverse affects to the coastal zone.

The training of member country nationals in hazard evaluation and erosion surveying techniques is an important aspect of the work which includes regular Coastal Engineering Workshops and the participation of member country nationals in SOPAC coastal and nearshore surveys.

**Work Programme activities**

*COOK ISLANDS*

**Task 91.CK.4b: Beach processes and coastal stability, Avarua - Avatiu coastline.**

The primary purpose of the task is to establish sediment movement patterns during severe storms and cyclones, neither of which have occured to date during the study. Initial field work was carried out in December 1990 and April 1991 when beach profile data, shoreline measurements, air photos and historical background data were obtained. A preliminary report on the work to date is in preparation.

**Task 91.CK.4c: Nearshore and harbour bathymetry and sediments of Avarua and Avaitu, Rarotonga, Cook Islands**

Navigation, bathymetric, high resolution seismic data and sediment samples were collected off Avatiu and Avarua Harbours in April. A preliminary report is in preparation.

**Task 91.CK.4d: Avarua-Avatiu Physical Oceanography**

A field trip was made to Rarotonga in late January to retrieve the current meters from Muri Lagoon-Ngatangiia Harbour & moor them off Avarua. A second field trip in mid-March retrieved the current meters off Avarua and moored new current meters off the airport at the site of a proposed sewer outfall where drogue tracking and a rhodamine dye release study were also conducted. A water level recorder was installed in the tide gauge facility at Avarua to record tide levels corresponding to the current meter data. The instruments were recovered by Cook Islands personnel in April and returned to Fiji *(Preliminary Report 31).*

**Task 91.CK.4g: Circulation and flushing of Muri Lagoon and Ngatangiia Harbour**

In December 1990 the circulation patterns in Muri Lagoon were evaluated as part of a complete physical environmental assessment of the Ngatangiia Harbour and Muri Lagoon area. At the same time, information on offshore waves was being collected by a wave rider buoy situated just offshore Ngatangiia. In January, salinity, temperature, dissolved oxygen, drogue tracks, and X-section profiles were measured in Muri Lagoon. Current meter and water level data are being processed. *Preliminary Reports 26 and 30.*

**Task 91.CK.4h: Sediments and bathymetry of Muri Lagoon and Ngatangiia Harbour**

In March and April the final stage of field work in Ngatangiia Harbour and Muri Lagoon was completed. This involved detailed coastal mapping including local bedrock control, sampling surficial sediment and recent carbonate rock, and the collection of high resolution seismic data from the Ngatangiia Harbour area. To assist with this, Timote Tangiruaine, of the survey department in the Cooks, visited Suva to compile existing bathymetric data from the area.

*FIJI*

**Task 91.FJ.19a: Rewa river pipe line**

This task is to profile a section of Rewa river to estimate the sediment thickness over a buried pipe line. The survey was attempted but extreme weather conditions forced abandonment of field work. Project deferred to late 1991.

**Task 91.FJ.19f: Storm surge and wave set-up survey for Suva, Lautoka and Levuka.**

In October 1990, the land reclamation project at Levuka, Ovalau was visited to inspect the landfill and pile driving operation and to do a preliminary inspection of Levuka harbour for an assessment of the

storm surge potential *(Preliminary Report 27)*. A report was completed on design water level for storm surge protection in Suva, Lautoka and Levuka *(Technical Report 115)*.

**Task 91.FJ.19g: Monasavu reservoir siltation monitoring survey control.**

A sub-bottom seismic survey of Monasavu hydro lake has bben made to assist the Fiji Energy Department monitor siltation *(Technical Report 129)*. As a result of this study, further work including calculation of approximate volumes and cross-sectional areas of the profiles for varying water and siltation levels has been requested for implementation in 1992.

*KIRIBATI*

**Task 91.KI.4a: Coastal dynamics along the Nippon Causeway and other areas on South Tarawa.**

Fieldwork was conducted in January 1991 when surveys of the Betio/Bairiki shoreline, Nippon causeway, fishing channel and dredged borrow pits were conducted. The survey data have been entered in the beach profile database and comparisons made of beach profile changes. *(Preliminary Report 37)*.

**Task 91.KI.4e: Tebunginako coastal protection.**

A detailed site inspection was made of the shoreline erosion problem at Tebunginako Village on Abaiang atoll. This field trip also involved discussions regarding locally available construction materials and equipment with Norman Watts of the Kiribati Public Works *(Preliminary Report 35)*.

**Task 91.KI.9b: Collaboration with aid projects on Tarawa**

Contact has been maintained with USP, USAID, and Kinhill, Reidel and Byrne over ongoing or proposed marine-related projects on Tarawa Atoll.

*PAPUA NEW GUINEA*

**Task 91.PN.16a: Assessment of usefulness of Fisheries vessel for geoscience training.**

Field investigation and assessment carried out by Deputy Director during a visit to PNG in August 1991.

*SOLOMON ISLANDS*

**Task 91.SI.17d: Management of sand extraction at Ranadi Beach, Honiara.**

Beach profile data have been received for Nov/90, Feb/91, May/91 and is anticipated for Aug/91 and Nov/91. All data to date have been entered into the beach profile database. A field visit was made in the May, 1991 to level in the absolute elevations of all benchmarks *(Preliminary Report 25)*. A report for the first year of profile surveys is in preparation.

**Task 91.SI.17e: Baseline coastal study of Eastern Lungga Delta, Guadalcanal.**

Field work was carried out in May, 1991 during which the shoreline was walked and an assessment made of coastal dynamics. A preliminary report is in preparation which will include all previous unreported work (including beach profile surveys) in the area.

**Task 90.SI.17e: Reconnaissance coastal stability survey of Kwai and Ngongosila, north Malaita.**

The objectives of the study were to determine the nature of the coastal environment, assess the stability of the coastline, and to establish a set of beach profiles from which to collect baseline data. Preliminary results indicate that coastal erosion is occurring on the eastern sides of both islands and that the erosion and subsequent shoreline change are a consequence of the natural occurrence of high tides coupled with low intensity waves. Overcrowded living conditions on the small sand islands have meant that the erosion has an adverse impact on the population and island resources *(Technical Report 121, see also SOPAC Projects No 2).*

*TUVALU*

**Task 91.TU.2b:Assessment of Funafuti lagoon sediments to be used in borrow pit infilling**

Sediments of the eastern side of Fongafale Lagoon have been mapped and sampled *(Preliminary Report 33).* Interpretation of the seismic data is continuing. Isopach and structure maps of sand deposits are being prepared and will incorporate other available data.

**Task 91.TU.3a: Monitoring the effects of lagoon dredging on beach and nearshore regime.**

The objective of this task is to monitor any effects that the lagoon dredging project may have on the coastal environment. Data from beach profiles established in 1984 have been collected from the Public Works Department and will be analysed to determine the pre-dredging environment of the coastline. New data collected during and after the dredging project will be compared to the pre-dredging data.

**Task 91.TU.11a: Monitoring of coastal erosion on Nukufetau and Nukulaelae.**

The objectives of this task are to continue collecting data from beach profiles established in 1989 and to determine changes to the coastline. Data was collected from the Public Works Department on surveys of the beach profiles performed subsequent to the initial survey of 1989. The data will be analysed and areas of erosion and deposition determined. This information will be used to determined which areas are in need of coastal protection and the type of protection best suited to the area.

**Task 91.TU.11b: Study the causes and effects of coastal erosion on Nanumea.**

The objectives of this task are to determine areas undergoing coastal erosion and to establish beach profiles in order to assess the rate of coastal retreat. Nanumea was visited and a reconnaissance survey of the coastline performed. A reconnaissance survey to map the coastal environment using air photo interpretations was completed and the data will be analysed to determine which areas of the coastline will best benefit from the establishment of beach profiles. A future survey will establish these.

**Task 91.TU.11d: Reconnaissance monitoring of coastal erosion on the islands of Tuvalu.**

The objectives of this project are to perform a reconnaissance survey of the coastal environment of the islands of Tuvalu and to determine areas that are at risk from coastal erosion. A reconnaissance survey was conducted of six of the islands of Tuvalu previously not visited by SOPAC geologists *(Preliminary Report 38).* Interpretations of 1984 air photos were performed and ground truthing of the results was completed while on the islands. The data collected will be analysed to determine what action is required to manage the coastal environments of the islands.

*VANUATU*

**Task 90.VA.6a:Physical oceanographic and sediment baseline study of Havanah Harbour.**

Bathymetric and seabed morphology surveys of Port Havannah and Mele Bay have been completed *(Technical Reports 122 and 126).*

Planning of the physical oceanographic study of Havannah Harbour, and preparation of equipment lists is complete. Because of shipping schedules, it is not possible to begin field work on this task until September 1991. Four current meters will be moored in Havannah Harbour and salinity, temperature, and depth profiles will be measured throughout the harbour. Drogues and possibly dye tracing will also be carried out.

**Task 90.VA.6b:Mele Bay stability and sediment budget study.**

The objectives of the study are to site a series of beach profiles along the coast of Mele Bay and to collect a set of baseline data from which to measure future coastline changes. Initial results indicate that there has been accelerated erosion in the vicinity of two areas of beach-sand mining which is shown by shorter and steeper beaches containing a lower volume of sand in these areas *(Technical Report 116; see also SOPAC Projects No 2).*

*WESTERN SAMOA*

**Task 91.WS.5b: Baseline study of Mulinu'u Peninsula for management of coastal erosion.**

A technical report reviews coastal erosion, protection structures and makes recommendations on coastal management and further investigations *(Technical Report 118; see also SOPAC Projects No 2).*

**Task 91.WS.5e: Baseline surveys to assist with development and design of slipways at Saleolonga and Mulifanua.**

Western Samoa was visited in November 1990 to deliver and the ferry terminal at the western end of Upolu, severely damaged by Cyclone Ofa, was inspected. Recommendations made on a bathymetric survey data *(Preliminary Report 28).*

## COASTAL AND NEARSHORE MAPPING

### Objectives

Geological, bathymetric, and morphological surveys are conducted to build up an inventory of data on the coastal and nearshore environment. From this, maps are produced of coastal and nearshore zones for use in the planning of coastal development, erosion protection, resource exploration and other coastal management activities. There is extensive interaction and overlap with other components of the Coastal and Nearshore Programme. Training of member country nationals in mapping techniques includes the annual Coastal Mapping Workshop, interpretation of the data collected during workshops and field studies, and participation of member country nationals during SOPAC project surveys.

### Summary of work

*TUVALU*

**Task 91.TU.3e: Baseline mapping of the Northern Fongafale - Amatuku area.**

The objective of this project is to map the coastal and nearshore environment of the islands prior to the construction of a proposed causeway and new airstrip in the area. An interpretation of 1984 air photos was completed and ground truthing of the interpretation performed. Current measurements were also obtained on the reef flat between the two islands.

### Other Mapping

The following maps have been prepared and their status is reported later in this report under Technical Information: Drafting.

*COOK ISLANDS*

**Task 91.CK.5a: Lagoon and nearshore bathymetric maps**

Aitutaki bathymetry 1:200,000
Mangaia bathymetry 1:15,000
Rakahanga lagoon bathymetry 1:10,000
Pukapuka Lagoon bathymetry 1:10,000

**Task 91.CK11a: Rarotonga coastal morphology 1:10,000 (2 sheets)**

*TUVALU*

**Task 91.TU.8a: Funafuti Lagoon bathymetry 1:50,000**
**Task 91.TU.8c: Bathymetric maps**

Nukulaelae lagoon bathymetry 1:12,000
Nukufetau lagoon bathymetry 1:25,000

*WESTERN SAMOA*

**Task 91.WS.11a: Coastal bathymetry 1:20,000**

Apolima Strait area (4 sheets)

**Task 91.WS.11b: Bathymetry of offshore banks 1:125,000 (approx)**

Pasco Bank and 5 other unnamed banks (5 sheets)

**Other maps**

Offshore bathymetry 1:500,000
Coastal morphology, Upolu (4 sheets)

## OCEAN ENERGY

### Objectives

Ocean energy projects evaluate the potential for deriving electrical power from the ocean, including the harnessing of wave energy. Initially, this requires the collection of extensive oceanographic data from selected sites in coastal waters. Waverider buoys are in place in Fiji, Tonga, Tuvalu, Western Samoa and Vanuatu. These bouys provide data on the wave climate of these sites, and are demonstrating the consistency of the wave energy regime of the islands of the tropical South Pacific. Wave data are also essential for understanding coastal processes and design of coastal structures.

The tasks for 1991 were mainly to maintain waverider bouy operations and wave data collection.

### Summary of work

**Task 91.CK.8a: Assessment of the wave energy potential for Rarotonga.**

Data recording was completed in January 1991 and the buoy withdrawn at that time. Preliminary data reports for 1987, 1988, and 1989 have been forwarded to the Cook Islands.

**Task 91.FJ.6a: Installation of waverider buoy.**

Data collection began in June 1991 when a waverider buoy was installed off Kadavu *(see SOPAC Projects No 2)*.

**Task 91.TG.7a: Continued collection of wave data.**

Data collection has continued uninterrupted since December 1989. Preliminary data reports for 1987, 1988, and 1989 have been forwarded to Tonga. Tongan nationals have been trained in project management, buoy deployment and maintenance, data retrieval, buoy position monitoring, and data interpretation.

**Task 91.TU.6a: Collection of wave data to assess potential of wave energy.**

A waverider buoy has been installed off Fongafale, Funafuti. Data monitoring and buoy maintenance are required to ensure continuous buoy operation and data collection. Data collection has continued uninterrupted since September 1990. A Tuvalu national has been trained in buoy deployment and maintenance, and project management.

**Task 91.VA.13a: Wave energy data collection.**

A waverider buoy was deployed in November 1990. It has drifted off-station and been recovered three times. Vanuatu nationals have been trained in project management, buoy deployment and maintenance, and buoy rescue operations.

**Task 91.WS.8a: Wave data collection.**

Data collection has been interrupted once since September 1990. Western Samoa nationals have been trained in project management, buoy deployment and maintenance, and buoy rescue operations.

## OTHER WORK

### Air Photo Library

An airphoto library has been established at Techsec, containing duplicate sets of photographs of strategic coastal areas of SOPAC member countries. Air photo interpretation is the first step taken in order to map coastal zones after which ground truthing of the maps and further study is performed. Air photos were purchased of coastlines in the Cook Islands, Kiribati and Solomon Islands.

### SOPAC Aerial Camera Project

An evaluation of the aerial photography survey capability at Fiji Pine Limited and Sunflower Airlines was conducted in January 1991. A demonstration survey was conducted in May, 1991 on the western side of Viti Levu *(Preliminary Report 34)*. The Hasselblad camera system has been purchased and the acquisition of the aerial camera frame is pending.

**Shallow Seismic Trials**

In February high resolution shallow seismic profiles of Suva Harbour and Laucala Bay were collected. The IKB Seistec was used to collect the data and test the usefulness of such a system in the region. The same system was also tested during survey work in Rarotonga, Cook Islands.

**Cyclone Sina**

After Cyclone Sina, a visit was make to the coral coast, Viti Levu, Fiji to re-photograph sites which were photographed during the Workshop prior to the hurricane in September 1990. A short report of comparative photographs is in preparation.

**Working Group Meeting on Regional Co-operation in Applications for Remote Sensing and Geographic Information Systems Technology for the South Pacific. Suva, 18-22 March, 1991.**

SOPAC was represented at the meeting and a paper was presented reviewing SOPAC's experience with remote sensing and GIS *(Miscellaneous Report 109).*

**Advice to CAAF, Fiji**

Advice has been provided to Civil Aviation Authority Fiji (CAAF) to assist them develop and implement a feasibility study of extending the short runway at Nadi Airport into Nadi Bay.

**COASTAL AND NEARSHORE PROGRAMME REPORTS**

Collins, W.; Holden, B. 1991: Circulation and flushing of Ngatangiia Harbour and Muri Lagoon, Rarotonga, Cook Islands. *SOPAC Preliminary Report 26*: 8 pages.

Holden, B. 1991: Physical oceanography of Ngatangiia Harbour-Muri Lagoon and Avarua Harbour, Rarotonga, Cook Islands. *SOPAC Preliminary Report 30*: 20 pages.

Holden, B. 1991: Physical oceanography of Avarua-Avatiu-Motutoa, Rarotonga, Cook Islands. *SOPAC Preliminary Report 31*: 14 pages.

Carter, R. 1990: Predicted storm surge and wave setup for Suva and Laucala Bay Harbours on Viti Levu in Fiji. *SOPAC Technical Report 115*: 31 pages.

Smith, R. 1991: Monasavu siltation control. *SOPAC Technical Report 129*: 27 pages.

Holden, B. 1991: Levuka land reclamation and storm surge site investigation, 18 October 1990. *SOPAC Preliminary Report 27*: 6 pages.

Smith, R.; Numan, W.; Mouauri, M. 1990: Yasawa marine geophysical cruise, 29 October - 23 November 1990. *SOPAC Preliminary Report 29*: 51 pages.

Holden, B. 1991: Coastal protection Tebunginako Village, Abaiang, Kiribati. *SOPAC Preliminary Report 35*: 14 pages.

Gillie, R.D. 1991: Beach profile surveys on Betio and Bairiki and along the Nippon Causeway, South Tarawa, Republic of Kiribati, January 1991. *SOPAC Preliminary Report 37*: 23 pages.

Rearic, D.M. 1991: Baseline study of coastal erosion Gizo Township, Western Province, Solomon Islands. 28 November to 4 December 1990. *SOPAC Technical Report 120*: 41 pages.

Rearic, D.M. 1991: Coastal environment of Kwai and Ngongosila Islands, Malaita Province, Solomon Islands, 10 December to 12 December 1990. *SOPAC Technical Report 121*: 37 pages.

Gillie, R. 1990: Initial survey for beach erosion monitoring at Ranadi Beach, Honiara, Solomon Islands, 7-17 August 1990. *SOPAC Preliminary Report 25*: 22 pages.

Collins, W.T. 1991: Gold potential at the Matepono River mouth and adjacent areas, Northern Guadalcanal, Solomon Islands. *SOPAC Preliminary Report 36*: 15 pages.

Smith, R.B. 1991: Assessment of sand resources, north Tongatapu, Nuku'alofa, Tonga. *SOPAC Technical Report 123*: 59 pages.

Smith, R. 1991: Volume of sand in Basin A, northwest of Fafa Island, Nuku'alofa Lagoon, Tonga: results of high-resolution seismic survey. *SOPAC Technical Report 133*: 17 pages.

Smith, R.; Saphore, E. 1991: Detailed high resolution survey, Basin A, Fafa Island, Nuku'alofa Lagoon, Tonga. *SOPAC Preliminary Report 32*: 11 pages.

Smith, R.; Saphore, E.; Senaka, F. 1991: Geophysical survey of lagoon sediments, Funafuti Atoll, Tuvalu. *SOPAC Preliminary Report 33*: 15 pages.

Rearic, D.M. 1991: Mapping survey and baseline study of coastal erosion on the ialnds of Tuvalu, 22 August to 9 September 1991. *SOPAC Preliminary Report 38*.

Rearic, D.M. 1990: Baseline data of coastal erosion at Mele Bay, Efate, Vanuatu, 5 May to 19 May 1990. *SOPAC Technical Report 116*: 46 pages.

Carter, R. 1990: Hydraulic characteristics of the channel linking Erakor lagoons and environmental implications. (Water quality monitoring of the Erakor Lagoons and Port Vila Harbour). *SOPAC Technical Report 117*: 29 pages, 2 appendices.

Smith, R.B. 1991: Bathymetry and seabed morphology, Port Havannah, Vanuatu. *SOPAC Technical Report 122*: 20 pages.

Smith, R.B. 1991: Nearshore bathymetry and seabed morphology Mele Bay, Efate, Vanuatu. *SOPAC Technical Report 126*: 25 pages.

Carter, R. 1991: Shoreline erosion on Mulinu'u Point and related considerations in Western Samoa. *SOPAC Technical Report 118*: 22 pages.

Holden, B. 1991: Shoreline erosion and related problems, Western Samoa. *SOPAC Preliminary Report 28*: 8 pages.

Gillie, R. 1991: Field demonstration of vertical aerial photography capability, western Viti Levu, Fiji Islands, 30 May 1991. *SOPAC Preliminary Report 34*: 23 pages

Eade, J.; Gillie, R. 1991: SOPAC experience with remote sensing and GIS. *SOPAC Miscellaneous Report 109*: 4 pages.

# HYDROCARBON PROGRAMME

## Objectives

The general objective of the Hydrocarbon Programme is to promote oil and gas exploration and development in SOPAC member countries. The first stage in evaluating their hydrocarbon potential is to identify those sedimentary basins having favourable petroleum prospects. These are so far known in Papua New Guinea, Solomon Islands, Vanuatu and Fiji. Investigations include source and reservoir-rock analyses, stratigraphic studies, and interpretation of existing or reprocessed seismic data. New geophysical surveys are carries out where possible.

The next stage is to attract industry interest in further exploration by promoting the hydrocarbon prospects of individual member countries by publishing technical papers and promotional brochures, and displaying highlights of results at international oil industry exhibitions. Training is given to member country nationals in hydrocarbon exploration techniques, and assistance is given to their governments with legislative aspects of the petroleum industry.

## Summary of work

*FIJI*

**Task 91.FJ.1a: Seismic interpretation and hydrocarbon prospectivity assessment of the Great Sea Reefs Area.**

Retrieved MRD copies of seismic data, base maps and logs of Great Sea Reefs # 1 well. Data being prepared for seismic interpretation jointly by Techsec and MRD; acoustic impedance (sonic and density log) synthetic seismogram processing will be undertaken to provide a seismic well tie.

**Task 91.FJ.1i: Interpretation of multichannel seismic data.**

Assistance has been given to MRD to prepare separate track plots of MCS data as a preliminary to identifying, assembling, and interpreting the other 90 remaining uninterpreted MCS profiles.

**Task 91.FJ.1j: Coordinate a regional hydrocarbon policy seminar for attendance by senior civil servants and senior energy/policy/legislation advisers.**

SOPAC has been informed that ESCAP have located funding for a hydrocarbon policy seminar which is planned for early 1992.

*PAPUA NEW GUINEA*

**Task 91.PN.16c: Other special training required during 1991.**

Preparations are being made for a second course on petroleum geology to be held in Mendi in November 1991.

*SOLOMON ISLANDS*

**Task 91.SI.10a: Preparation of legal framework for hydrocarbon exploration and exploitation.**

Reviewed and commented on UNCTC/SOPAC final draft of Petroleum Regulations and Model

Agreement. Discussed with Ministry and Attorney-General in Honiara: it was agreed that they would expedite legislation following review by the Ministry of Natural Resources.

**Task 91.SI.10b: Retrieval of existing geophysical data.**

Request for Iron Bottom Sound tape retrieval sent to Pacific Energy and Minerals in the US.

**Task 91.SI.10c: MCS and other data reprocessing.**

MCS composite track plots have been prepared with 400 m and 1000 m isobaths: interpretation, data retrieval, processing and acquisition programs will be selectively based on review of these maps.

**Task 91.SI.10f: Source rock, reservoir, and stratigraphic drilling.**

Published information is being reviewed to determine a suitable drilling location (probably on Guadalcanal Plains). This work will be coordinated with drilling in Vanuatu and Tonga.

*TONGA*

**Task 91.TG.5b: Magnetic survey of Ha'apai and Nomuka Groups**

A preliminary interpretation by NZ consultants Geo-Research has been reviewed, and it has been decided to do more detailed work on the data, including maps of depth to volcanic basement. Following this work, magnetic modelling will be undertaken at Techsec.

*VANUATU*

**Task 91.VA.2a: Source rock studies in association with ODP programme.**

Although preliminary ship-board results are disappointing (less than 0.5% TOC), Techsec has requested bids from ISPG (Canada), BMR, and USGS, to process the complete set of samples currently held by USGS.

**Task 91.VA.2b: Reinterpretation of existing MCS data.**

A MCS composite track plot showing ODP drill sites, and 400 m and 1000 m isobaths, has been prepared. Well logs from ODP sites have been requested.

**Task 91.VA.2c: MCS survey of the Espiritu Santo and Malekula areas.**

Information on work required to assist in the Vanuatu hydrocarbon programme, including a recommendation for a US$800,000 - 1000 km seismic programme, has been prepared to assist the Director in end-of-June discussions on "soft loans" from the World Bank for petroleum exploration and geothermal drilling in Efate. Stratigraphic drilling on Malekula and Santo could be "piggy-backed" on the geothermal programme recommended by in a NZ Consultants' report, a copy of which has recently been forwarded to SOPAC.

**Task 91.VA.2e: Promotion of Vanuatu hydrocarbon potential.**

A display was presented at the 1991 APEA Conference, held in Melbourne in April.

**Task 91.VA.2d: Investigate oil seep off northern Malekula.**

The Sarmet Bay/Crab Bay fringing reef was inspected for signs of oil seeps. No unusual

geological features were noted. No verbal verification was obtained of the underwater oil seep reported in 1966. An account of a 100 m diameter, slippery coating of the reef flat in the same area in 1985 or 1986 was discounted for lack of typical colour and smell. A follow up letter will be sent to the original source author, Dr A.H.G. Mitchell.

*OTHER WORK*

**Promotion:**

Techsec represented Fiji, PNG, Solomon Islands, Tonga (along with Saimone Helu), and Vanuatu at the APEA annual conference in Melbourne, April 7 - 9. The new SOPAC display of petroleum potential of the five island nations prepared by BMR received limited but favourable reviews.

**Data Retrieval, Storage, Processing, Acquisition**

During visits to the BMR, Digicon and Halliburton in April, substantial discussions were held and information gathered on these subjects.

**General assistance**

Techsec has prepared and transmitted to the Ministry of Geology, Mines and Rural Water Supply, Vanuatu, a set of data including:

MCS track map from Malekula and ODP sites 832 and 833.
ODP preliminary stratigraphy.
Tables of Vanuatu areas of seafloor bounded by the 400 and 100 m isobaths.
Gridded maps illustrating block size options (5' x 5', 6' x 6', 10' x 10').
Seismic sections across ODP sites and potential land drilling site on Uripiv Island.

**HYDROCARBON PROGRAMME REPORTS**

Pflueger, J. 1990: Hydrocarbon potential of the Lau Ridge: Reid Reef to Ogea Levu Island. *SOPAC Technical Report 114*: 14 pages, 3 figures, 11 seismic cross-sections, 2 plates.

# OFFSHORE PROGRAMME

## Objectives

Seabed mapping of deep-water areas by research vessels provides fundamental data on the large, geologically complex and relatively unexplored EEZs of member countries and the South Pacific region as a whole. These investigations are closely linked to assessment of offshore mineral potential which includes cobalt-rich crusts, manganese nodules, polymetallic sulphides, metalliferous sediments and seamount phosphates.

The main function of SOPAC's Offshore Programme is to coordinate the activities of foreign research vessels and ensure that member countries are kept fully informed on the activities and results of cruises in their waters. SOPAC also interprets seabed and bathymetric data, produces reconnaisance-scale maps of selected areas, evaluates areas with mineral potential and maintains databases on offshore minerals. Areas with mineral potential are promoted within the marine mining industry, and exploration is encouraged.

## DEEPSEA MINERALS

Information from recent cruises has been added to the manganese nodule database and is now fully up-to-date. All files have been converted to DBASE III files to make data recovery and plotting easier. From this up-dated database, four South Pacific regional maps have been prepared showing nodule abundance, and nickel, cobalt, and copper grades.

**Task 91.CK.1a: Evaluation of nodule potential in the Cook Islands.**

A detailed evaluation of the economic potential of Cook Islands nodule deposits and a comparison with nodule deposits in the North Pacific has begun. Funds are being sought for a consultancy to do the major part of this work.

**Task 91.CK.1b: Evaluation of results of 1990 Hakurei Maru No.2 cruise in Southern Cook Islands**

Results from the 1990 cruise were received in April 1991 and have been distributed to the Cook Islands.

**Task 91.KI.2a: Assessment of results of 1989 Hakurei Maru No2 cruise**
**Task 91.KI.5a: Review of work done on Hakurei Maru No2 cruises.**

The results of the 1989 cruise of the Hakurei Maru No2 carried out under the SOPAC-Japan manganese nodule/cobalt crust programme have been assessed *(Technical Report 125)*. The grades and abundances of nodules in the region were not high enough to be a potential resource. Thick cobalt crusts of paramarginal grade were found on seamounts in the region.

**Task 91.KI.2b: Assessment of nodule and crust potential of the Gilbert Islands Group.** Meetings have been held, plans drawn up and reviewed, and work co-ordinated with Japan for a manganese nodule and cobalt crust survey of the Gilbert Islands region of Kiribati in August-October, 1991 to assess the potential for these minerals. The Offshore Coordinator represented SOPAC on the first of three legs.

## SEABED MAPPING

*GLORIA swath mapping*

Projects: FJ.23 Offshore Seabed Mapping

SI.24 Long Range Acoustic Mapping of the Seafloor
TG.13 Reconnaissance Swath and Bathymetric Mapping of the Seafloor in Offshore Areas
VA.9 Long Range Acoustic Mapping of the Seafloor
WS.14 Offshore Seabed Mapping

(a) Completed contract with JCU for processing of GLORIA data:
(b) Coordinated the GLORIA swath mapping programme with seven consultants;
(c) Organised and held workshop with consultants at Townsville in November 1990 to coordinate draft reports;
(d) Interpreted GLORIA data and bathymetry for Samoa and other reports;
(e) Reviewed, checked interpretations, and added to draft manuscript reports;
(f) Two reports are published *(Technical Reports 127, 130)*. The other four have been prepared and are at various stages of review.
(g) Arranged for publication of abbreviated scientific reports in GeoMarine Letters.

*Future swath mapping*

**Task 91.VA.9a: Seabed mapping of Central Basin and adjoining areas**
**Task 91.SI.24a: Seabed mapping of Vanikoro Basin**
**Task 91.SI.24b: Swath mapping of Solomon Islands arc**
**Task 91.TU.8b: Bathymetric mapping of seamounts**

Specifications for the next swath mapping surveys have been drawn up, revised, and areas selected. Planning meetings have been held with EEC regarding funding.

**Task 90.TG.4a**: A bibliography of published and unpublished geological and geophysical work in the Lau Basin from 1985 to early 1991 contains 131 entries, showing the great geoscientific interest in this backarc area *(Technical Report 124)*.

*HIG Swath Atlas*

An atlas of SeaMARC swath data collected by HIG, mostly during the joint SOPAC-Tripartite programme, is being prepared at HIG. It is nearing completion and copies will be distributed to member countries.

## OTHER WORK

*Coordination*

Techsec laised with the following research vessels and their organisations which worked in the SOPAC region :

HAKUREI MARU No 2 (Japan), Aug 23 - Sept 15, 1990, Leg 1: Sampled for manganese nodules and cobalt crust in Western Samoa EEZ. Found very few nodules of poor quality and poor crusts. Leg 2: Sept 18 - Oct 25, 1990. Sampled in southern Cook Islands area for manganese nodules.

JOIDES RESOLUTION (USA), Oct 16 - Dec 17, 1990 for ODP Leg 134 in Vanuatu. Drilled five holes in D'Entrecasteaux Zone and adjacent margin, and two holes in Central Basin to evaluate ridge-arc collision and subduction timing and processes.

HAKUHO MARU (Japan), Oct 30 - Dec 14, 1990. Leg 1: chemical and physical oceanography and aerosol study along two transects of the equator at 160°E and 179°E. Leg 2: geochemical, biological and geological study of hydrothermal areas of eastern Manus Basin. Found evidence of hydrothermalisation in eastern Manus Basin.

JOIDES RESOLUTION (USA), Dec 21, 1990 - Feb 28, 1991 for ODP Leg 135 in Lau Basin and Tonga Arc. Drilled five sites: one in old backarc crust in western Lau Basin, two in young crust in central Basin, one on Tonga platform, one on outer edge of Tonga forearc to evaluate back-arc rifting and arc history.

YOKOSUKA (Japan), Jan 10 - Feb 6, 1991 Obtained geological and geophysical data on NW arm of triple junction in central NFB, and on Coriolis and Jean Charcot Troughs in Vanuatu.

MOANA WAVE (USA), 11 Feb - 2 April, 1991. Did PACRIM WEST SeaMARC II cable route surveys in Solomon Islands area, including east of San Cristobal and Malaita in areas where little data existed.

MORSKY GEOFIZIK (USSR) May 12 - mid June, 1991. Obtained geophysical data and bottom samples in waters just north of the EEZ of central Line Islands, Kiribati with HIG. Work planned in the Kiribati EEZ was not carried out.

YOKOSUKA/ SHINKAI 6500 (Japan), August 26 - Nov 7, 1991. Diving on 30 sites in N. Fiji Basin rift axis and hydrothermal areas and recovering long term hydrothermal observatory and an OBS station.

HAKUREI MARU No. 2 (Japan) 26 Aug- 27 Oct, 1991. Sampling for manganese nodules and cobalt crusts in Gilbert Islands as part of Japan/SOPAC programme.

*Research cruises*

A schedule of research cruises in the SOPAC region has been maintained to assist member countries manage foreign vessels working in their waters. A database of past cruises in the SOPAC region has been maintained and updated.

*Lectures and conferences*

The following meetings were attended:

Pacific Islands 2000 - Summarised and described the potential for mineral resources in the Southwest Pacific.

STARMER Symposium - GLORIA posters were displayed and a talk given on sediments of the North Fiji Basin.

Underwater Mining Institute and Oceans '91 meetings in Hawaii will be attended following the SOPAC 20th Annual Session.

## OFFSHORE PROGRAMME REPORTS

Tiffin, D.L. 1991: Bibliography of published and unpublished work in Lau Basin, Tonga, from 1985 to early 1991. *SOPAC Technical Report 124*: 18 pages.

Tiffin, D.L.; Kinoshita, Y. 1991: Executive Summary. Ocean Resources Investigation in the Sea Area of SOPAC. Report on the Joint Basic Study for the Development of Resources. Volume 5: Sea Area of the Republic of Kiribati. *SOPAC Technical Report 125*: 10 pages.

Clarke, J.E.H.; Jarvis, P.; Price, R.; Kroenke, L. 1991: Tectonic activity and plate boundaries along the northern flank of the Fiji Platform. *SOPAC Technical Report 127*: 45 pages.

Jarvis, P.A; Kroenke, L.W.; Price, R.; Maillet, P. 1991: Structural fabric in the northern North Fiji Basin. *SOPAC Technical Report 130*: 28 pages.

Tufar, W. 1990: SONNE 68 - OLGA II Research Cruise, April 29 to June 25, 1990 - Preliminary Cruise Report. *SOPAC Cruise Report 136*: 9 pages, 2 Appendices.

Malahoff, A.; Falloon, T. 1991: Preliminary report of the *Akademik Mstislav Keldysh/MIR* Cruise 1990, Lau Basin Leg (May 7-21). *SOPAC Cruise Report 137*: 27 pages.

Sakai, H. 1991: Expedition East Manus Basin hydrothermal field, *Hakuho-Maru* cruise KH90-3, Leg 2. A brief summary report for SOPAC. *SOPAC Cruise Report 138*: 3 pages, 2 figures, 1 table.

# TECHNICAL SUPPORT PROGRAMME

## DATA MANAGEMENT

### Objectives

The managment of a large amount of scientific data and the provision of ready access to it in the most useful form is fundamental to achieving the objectives of SOPAC Work Programmes. The objectives of Data Management are to:

* locate all data collected in the SOPAC region that is relevant to the Work Programme and to establish the type and quality of that data.
* acquire copies of data that are not readily accessible or data that are required for reassessment by Techsec.
* digitise selected data held at Techsec and store on computer.
* provide data processing facilities at Techsec.
* provide member countries with data and information on data held at Techsec on request.
* assist member countries to develop management systems for their own data.

### Work Programme activities

The following contributions were made to the Work Programme for 1991:

**Task 91 FJ.21a: Retrieval of MCS data to complete hydrocarbon database**
Multichannel seismic data (navigation and shotpoints, as well as bathymetry, magnetism and gravity) in Fiji EEZ held at SOPAC have been retrieved from SOPAC cruise database and copied to Fiji MRD.

**Task 91 FJ.21b: Trackplot index of all swath mapping data in Fiji's EEZ**
An index of all cruises in Fiji waters held in SOPAC database, particularly those which acquired swath mapping data and multichannel seismic data has been prepared. Thirteen large maps display the cruise tracks, marked with dates and time *(Technical Report 119)*.

**Task 91 TG.5d: Navigation database for MCS tracks in Tonga waters**
An database on navigation of all multichannel seismic tracks in Tonga waters, digitised from available trackplots, complete with seismic line numbers and shotpoint numbers has been prepared. A small summary map is provided for each cruise, and two examples of large displays are included *(Technical Report 131)*.

**Task 91 TG.4a: Synthesis and publication of Lau Basin bathymetric data**
All GLORIA and Seabeam cruises in the Lau Basin have been identified, indexed and small summary maps prepared to show the coverage of swath data collected by German, French, American, British and Australian vessels *(Technical Report 132)*.

### Maintenance of databases

All 49 offshore SOPAC cruises, 653 offshore foreign cruises and 154 SOPAC field surveys are indexed in a computer database named MAGEON. Where available, the navigation, bathymetric,

magnetic and gravity data of offshore cruises are stored in a computer database named MAGEONC. Data of other categories such as GLORIA or Seabeam data are stored on magnetic tape. All digital data copied to SOPAC as a result of offshore cruises in the region are catalogued using a computer database named CAREF. Access is provided to the SOPAC field survey archive box system through catalogue and a computer database called ARBOX.

**Development of databases**

Following recommendation by TAG at the 19th Annual Session, a SUN computer system is being installed at Techsec to replace the MicroVAX system. This system consists of one SUN workstation, two PCs and Ethernet network. A second workstation and a tape drive is to be added shortly. Preparations have been made to transfer of all Data Management databases onto one relational database management system on the SUN.

All cruise data from within 5° to 18° North have been obtained from World Data Center A for Marine Geophysical Data, and will be included in the database when transferred to the SUN system. This will result in a total of over 700 offshore cruises in the database.

The use of the offshore cruise data up to now has been predominantly for indexes to data and indexed trackplots, rather than for processed information such as contour line maps. The choice of the ideal database systems at Techsec for long-term needs is being reviewed.

A complete set of computer procedures has been developed to:

(a) reformat cruise files from their indigenous format to the MGD77 format;

(b) check navigation, bathymetry, magnetism and gravity data;

(c) reduce the volume of data files where the information is sometimes plethoric.

A series of multichannel seismic trackplots have been digitised and a MCS trackline database for the whole of SOPAC area will be developed.

## TECHNICAL INFORMATION : DRAFTING

**Objectives**

The objectives of the drafting section at Techsec are to:

* compile and prepare maps as requested by member countries
* provide drafting services to Techsec staff
* train nationals in drafting, especially bathymetric drafting and map preparation

**Work Programme activities**

*COOK ISLANDS*

**Task 91.CK.5a: Lagoon and nearshore bathymetric maps**

The 1:15 000 Mangaia offshore bathymetric map was compiled in 1982 by G.Gauss (CR67) and is available in draft form.

The 1:200 000 Aituktaki offshore bathymetric map is compiled and available in draft form. Will be printed in colour in 1992.
The 1:10 000 Rakahanga Lagoon bathymetric map is available in draft form. All linework has been scribed and masks for the sea and land tints have been prepared. Nomenclature started and will be printed in 1992.
The 1:10 000 Pukapuka lagoon bathymetric map is compiled and available in draft form. This map will also be printed in 1992.
More survey data are required before the Suwarrow lagoon bathymetric map can be compiled. A 1:36 000 a digitised base map shows the existing bathymetry profiles at SOPAC.

**Task 91.CK.11a: Rarotonga coastal morphology**

The two sheets at 1:10 000 have had minor additions from the Hosking/Tupa June 1990 map. The maps require new photography before final preparation of repromat for printing. The map will be proof printed in late 1991.

*TUVALU*

**Task 91.TU.8a: Funafuti Lagoon bathymetry**

A 1:50 000 map is compiled and available in draft form. Reproduction material is cut. Guide images for scribing / masking required. To be printed in 1992.

**Task 91.TU.8c: Bathymetric maps and Lagoons**

The 1:12 000 map of Nukulaelae Lagoon is compiled and available in draft form. Reproduction material is cut. Guide images for scribing / masking required. The 1:25 000 map of Nukufetau Lagoon is compiled and available in draft form. Reproduction material is cut. Guide images for scribing / masking required. Printing for both maps is planned for 1992.

*WESTERN SAMOA*

**Task 91.WS.11a: Bathymetry (Coastal)**

Sheetlines 16 and 17 of the Western Samoa 1:20 000 Topographic Series have been extended (16B and 17B) making a 4 sheet coverage of Apolima Strait. The contour overlays fit to the Topo sheets. The data are from the NZ Navy *Lachlan* surveys. The contour interval is 10m to 200m and 50m from 200m to 500m. This is an on-going project that can be incorporated under Task 91.WS.11c.

**Task 91.WS.11b: Bathymetry of offshore banks**

Contoured bathymetric maps of Pasco Bank and 5 other unnamed banks are prepared at the approximate scale of 1:125 000 from available 1985 *MV Cape Pillar* / RAN survey data. They will remain in draft form until additional and seabeam data is collected.

**Task 91.WS.11c: Development of a mapping work plan**

Plans for a drafting office along with the major part of Apia Observatory were destroyed by Cyclone Ofa. This task is deferred.

**Bathymetry (Offshore):** 500m contours have been digitised, edited and draft plots are available. Scale 1:500 000 in 5 sheets, also merged into one sheet. Copies of a version received on a stable base from Peter Hill will be sent to Apia.

**Western Samoa coastal morphology maps:** Four sheets (West, North, South and East Upolu) are proof printed and will be printed in late 1991.

### Other work

*SOPAC Region Map*

A base map to cover the SOPAC member countries is compiled, in A4 (SOPAC annual report) and A1 (printed map) versions. All the material is ready for proofing and printing except the name overlay. This task is a high priority.

*SOPAC Geophysical Atlas*

Compilation of the tectonic map has been completed and it is now being drafted. Much of the work on compiling information on the sediment thickness map has been done and this is to be completed late in 1991.

## TECHNICAL INFORMATION: PUBLICATIONS

### Objectives

The objectives of the publications section are to:

* to provide information on and promote the work of SOPAC by preparing technical summaries, newsletters, the Annual Report and other material
* edit and publish all SOPAC reports
* distribute technical reports and other material to member countries, donors and other organisations as appropriate

### Work Programme activities

**Task 91.KI.4c: Assist with public education programme on coastal erosion and coastal management.**

Public education material on coastal management was collected or sought from several sources world-wide to assist with development of public awareness of coastal processes. While being developed particularly for Kiribati, this material should have widespread application in the Pacific.

**Task 91 FJ.21c: Technical editing assistance.**

A consultancy was used to carry out the major editing work on a Mineral Resoures Department Memoir on ground failure hazards around and in Suva Harbour.

### Technical publications

About 50 Technical, Cruise, Preliminary and Miscellaneous reports were edited and distributed. A Technical Bulletin was published, in a new format, on the Coastal Processes Workshop in Lae, PNG.

### Promotional material

SOPAC's first Annual Report was published, providing an overview of the organisation, Work Programme activities and finances. A new-look Proceedings was published, solely as a report on the Annual Session. Three issues of SOPAC News were produced, providing information on the Technical Secretariat, progress on the Work Programme, and lists of recent SOPAC publications. The newsletter is distributed to about 600 contacts world-wide. The second issue of SOPAC Projects was published, providing easily-read summaries of key SOPAC technical reports to ensure that their content is acessible to as wide an audience as possible. A brochure explaining the Work Programme and a video promoting SOPAC are in preparation.

## TECHNICAL INFORMATION : LIBRARY

### Objectives

The general objective is to establish a fully organised special library at the Technical Secretariat. This includes the provision of information services to improve the effectiveness of marine geological researchers and other users of geological information in the South Pacific region.

Specific objectives include:

* implementing computerised cataloguing and classification systems for the Techsec library and map collections

* establishing a bibliographic database on non-living marine region resources materials relevant to the SOPAC work programme, in close association with the Pacific Islands Marine Resources Information Service (PIMRIS) at the University of the South Pacific

* training an island national to operate and manage both the library services and database

### Status of work

The SOPAC library is now fully operational, the bibliographic database is established with records uploaded regularly to PIMRIS, and the training component will be finished in January 1992. Improvements to library services continue to be made.

### Databases

The library collection has now been completely catalogued, classified and indexed, as have the map and aerial photograph collections. The map and aerial photograph catalogue will be published annually *(Miscellaneous Report 115)*. Subject and geographic indexes for all SOPAC publications are prepared annually, and published as part of SOPAC Miscellaneous Report 15. An index to news articles on SOPAC and regional non-living marine resources is produced annually *(Miscellaneous Report 116)*. A list of journals held at Techsec is also available on request. Subject bibliographies are prepared from the library databases on request, and for occasional publication in SOPAC News. A "Contacts" database has also been established principally as a mailing list for distribution of publicity materials and SOPAC reports. From this database, the South Pacific Geoscience Directory will be compiled in response to TAG 1990 Recommendation 18.

| Database holdings: number of records | 1990 | 1991 |
|---|---|---|
| Library catalogue, confidential reports | 2500 | 5000 |
| Maps, charts | 750 | 900 |
| Aerial photographs | --- | 150 |
| Journals | 230 | 300 |
| News articles | 450 | 600 |

**Bibliography**

SOPAC compiled its first bibliography on regional geology and geophysics in 1975, with a second edition published in 1983. In 1989 SOPAC established a bibliographic database to update this information and to improve access to published reports, documents, charts and other materials: this database has been designed to be fully compatible with PIMRIS in order to facilitate sharing of records among the PIMRIS cooperating organizations. In effect the SOPAC database is the non-living resources component of PIMRIS.

At present the SOPAC bibliography on non-living marine resources consists of 2300 records in the library catalogue. The librarian has utilised this database and the NEWS articles database to assist PIMRIS with reference enquiries and in compiling marine science information packages for distribution in the region. The scope of the bibliography is being expanded to include materials not currently held at Techsec, but which are located in the region. The database will include references to publications of Pacific Island country geological surveys, and to consultants' reports and other emphemeral materials held in the region. Work has commenced on entering the publications of the Solomon Islands Geology Division, Tonga Department of Lands, Surveys and Natural Resources Geology Section, and the Vanuatu Geological Survey.

**Training**

The Assistant Librarian, Ms. Dillie George, successfully completed her Master of Library and Information Studies degree, and additional course work at Dalhousie University, Halifax, Canada. She returned to Techsec in December 1990 for further training, and will assume the position of SOPAC Librarian in January 1992.

**Work Programme Activities**

Three SOPAC Member Countries (Solomon Islands, Fiji and Western Samoa) formally requested assistance with their geology libraries as part of the Work Programme for 1990. Kiribati, Tonga and Vanuatu added similar requests for 1991. Work on the Western Samoa request continues to be deferred due to extensive damage to the Apia Observatory from Cyclone Ofa, although a replacement set of SOPAC reports was compiled and forwarded last year. The SOPAC librarian visited the Kiribati Ministry of Natural Resource Development in October of 1990 (Task KI.91.7a) and undertook a major sorting, weeding and rearranging of materials. Lack of computer facilities prevented the establishment of a library database. The librarian visited Tonga in June 1991 (Task TG.91.11a). Geology section documents were sorted and weeded, and a library database installed. Data entry of titles held in the section has been completed. The librarian and assistant librarian will undertake Task VA.91.7b in Vanuatu in October 1991; a follow-up visit to the Solomon Islands (Task SI.90.22a) will also take place in October.

## TECHNICAL SERVICES

### Objectives

The primary objectives of the Technical Services section are to:

* purchase, operate, maintain and repair all equipment required to implement the SOPAC Work Programme

* provide a skilled field operations capability to assist Techsec professional staff implement their field work

* train island nationals in all aspects of field operations and equipment repair and maintainance

### Equipment

SOPAC owns a wide range of equipment to allow Techsec to carry out field operations undertaken for the Work Programme in member countries. These activities include navigation, bathymetric surveys, sub-bottom profiling, underway magnetics, sidescan sonar, underwater photogrphy (still and video), scuba diving, measurement of currents, temperature, salinity, conductivity, water quality and clarity, and bottom and sub-bottom sediment sampling. SOPAC also owns a number of small boats and outboards,compressors, water pumps, power generators, and other equipment to gives Techsec independent capability to carry out its field operations.

Of special note is improved navigational capability. A computerised mapping system allows real-time logging of trisponder positioning (accurate to +/- 3 m) and bathymetric data. Techsec also now has a hand held GPS receiver.

For sand resources surveys, an airlift sampling system can bulk sample coarse sediments in up to 20 m water depth. SOPAC is purchasing a used, lightweight, portable, Hirez system bubble pulser which gives good results in shallow water and in coarse sediments. A Seascat profiler records data digitally up to a depth limit of 300 m. In addition, Techsec now has five current meters to carry out more current surveys.

Of the six waverider buoys that SOPAC owns, five are deployed in member countries.

The barge and pusher tug for the Tuvalu borrow pit filling pilot project are under construction at Suva and are due to have trials in Fiji in October.

### Work activities

In order to maintain this assortment of electronic and mechanical systems in an operational state of readiness as well as provide assistance during field surveys, a service facility with qualified personnel has been established at Techsec staffed by a Geological Technician, Marine Technician, Electronics Technician and a Marine Mechanic, all working under the guidance of the Electronics Engineer. Survey coordination includes scheduling the appropriate mode of shipping to and from the member country, organising, testing, and sometimes customising the appropriate systems and support items prior to the actual survey, mobilising the equipment at the survey site and assisting with the operation of the survey, preparing the equipment for shipment back to Techsec, and finally intercepting the equipment to commence the maintenance, repair and calibration cycle once again.

This support includes maintaining the software and hardware of the personal computer systems installed at Techsec. A list of major equipment items at Techsec is given in Appendix 7.

An increasing amount of the electronic engineer's time is spent training member country nationals in the operation, maintainance and repair of a wide variety of field equipment.

## TECHNICAL SUPPORT PROGRAMME REPORTS

Morel, Y. 1991: Index of offshore cruises in the sea area of Fiji. *SOPAC Technical Report 119*: 47 pages. (Report has 13 large plots. These can be viewed at the Techsec library and the Fiji Mineral Resources Department).

Creech, H. 1991: Organisation of Library materials at the Ministry of Lands, Survey and Natural Resources, Kingdom of Tonga, Geology Section. *SOPAC Technical Report 128*:

Morel, Y.; Medina, B. 1991: SOPAC database on multichannel seismic tracks in Tonga waters. *SOPAC Technical Report 131*: 23 pages.

Morel, Y.; Medina, B. 1991: Compilation of swath mapping tracklines in the Lau Basin. *SOPAC Technical Report 132*: 20 pages.

Sherwood, A.; Eade, J.; Bukarau, L.; Wong, F. 1990: Style manual for SOPAC publications. *SOPAC Miscellaneous Report 98.*

SOPAC Technical Secretariat 1990: Report on the Work Programme of the SOPAC Technical Secretariat, 1 October 1989 - 30 September 1990. *SOPAC Miscellaneous Report 99.*

Bukarau, L.; Sherwood, A. 1990: Report summaries prepared for SOPAC 19th Annual Session. *SOPAC Miscellaneous Report 100.*

Morel, Y.; Motuiwaca, S. 1990: Catalogue of the data archive box system at Techsec. *SOPAC Miscellaneous Report 101.*

Morel, Y.; Bakoso, B. 1990: Catalogues of SOPAC Work Programme field surveys and foreign offshore cruises in the SOPAC region. *SOPAC Miscellaneous Report 102.*

Proceedings of the Nineteenth Annual SOPAC Session

SOPAC Annual Report, 1990

SOPAC News

SOPAC Projects

# TRAINING PROGRAMME

## Objectives

The Training Programme is an important part of SOPAC's work and has the broad goal of developing the professional and technical skills required by member countries to explore for and promote their non-living resources and to develop their coastal, nearshore and offshore area. On-the-job assignments provide direct experience in technical and scientific investigations. Formal certificate courses and scholarship schemes for tertiary degrees are complemented by workshops, seminars and other activities.

## Introduction

The training activities being carried out by Techsec continue to develop and expand in scope. The accompanying graphs show (i) the growth of training, and (ii) the total amount of training (by country) carried out to the end of 1990 compared with previous years. Already the total for 1991 is equal to just over 60 percent of the total for the whole of 1990.

From the beginning of 1991 the Training Co-ordinator assumed responsibility of Officer-In-Charge of the UN Project at SOPAC.

An Assistant Training Coordinator has been appointed, Mr Fuka Kitekei'aho, from Tonga. He has participated in, as well as assisted, with SOPAC training activities in the past. He is expected to be in post by early November.

## Independent Review of SOPAC Training Programme

At the 19th Annual Session of SOPAC in Kiribati last year, the Governing Council resolved that an independent review and evaluation of the SOPAC Training Programme be carried out. This took place between April 9-27 this year by David Kear and Greg Anderson and the report is presently in the hands of the Governing Council.

## Present Training Activities

At present training activities are grouped as follows, but these may change as a result of the adoption of recommendations contained in the report of the Training Review.

Courses:

- Certificate in Earth Science and Marine Geology programme;
- First degree training (SOPAC Scholarship Scheme).

On-the-job assignments:

- SOPAC Fellowship Scheme
- SOPAC Management Training Scheme
- Training during cruises;
- Training at places other than Techsec;

SOPAC Workshops and Seminars:

- Coastal mapping
- Annual session workshop
- Other workshops
- Seminars

Training assistance:

High school curriculum development;
Ocean Resource Management Programme
Other training assistance

During early 1989 a 5-year Training Plan for 1989-1993 was prepared. The 5-year planning document has been widely circulated to member countries and donors, and has proved a very useful document. Reference should be made to this document for details on the nature of each training activity.

The following comments on each training activity are intended to provide information on their status at the time of the 20th Annual Session, September 1991.

**Courses**

*Certificate in Earth Science and Marine Geology Programme*

This is a three-year programme held for three months each year. It started a new cycle in early 1990 with the Basic Course. Advanced Course 1: Earth Materials, and Advanced Course 2: Marine Geology and Earth History. Two six week courses were held earlier this year from 8 April to 28 June.

As part of this course a 5-day special course on use of air photos was held, which followed on from the 10-day special course on Introduction to Remote Sensing held during last year's course.

The Advanced Courses 1 and 2 were attended by 14 participants from the following countries; Cooks (2), Fiji (5), Papua New Guinea (2), Solomon Islands (3), Tonga (2). Two Western Samoa participants were unable to attend.

CFTC and New Zealand continue to provide funds for this training programme.

*First degree training (SOPAC Scholarship Scheme)*

Mr Augustin Tabi (Vanuatu) and Samisoni Sauni (Tuvalu), in December completed their Foundation Science year of study at the University of the South Pacific. Neither performed well and the scholarships were terminated. Neither Vanuatu or Tuvalu were able to identify suitably qualified new students and requested that scholarships be held over to 1992. Vanuatu has identified two likely students presently at Malapoa College who could commence Foundation Science at USP next year. Tuvalu has requested that their Scholarships Officer and SOPAC Training Co-ordinator later this year, visit the schools in Australia/New Zealand which Tuvalu students attend, in an attempt to identify suitable student(s).

Mr Alan Utanga (Cook Islands), in December completed his third year of study at the University of Canterbury. He did not perform well and the scholarship was terminated. In the event Cook Islands was able to identify a replacement, Ms Mauriamai Rakoia. In June she completed her First Semester, Degree 1 study at USP, and transferred to University of British Columbia in August.

In December, Mr Mawendra Nandan (Fiji), and Lameko Talia (Western Samoa) completed their first year of study at the University of Canterbury, and returned in February to commence their second year of study. Fiji had requested that Nandan be transferred to Queensland University of Technology, Brisbane. This was not possible due to lack of funds to cover the Overseas Student Fee. Western Samoa has also indicated a wish to have a second scholarship commencing in 1992.

In May, Mr Renell Magu (Solomon Islands) completed his first year of study at the University of Hawaii, and returned in August to commence his second year.

Kiribati asked for a scholarship for an I-Kiribati to be deferred. A candidate was selected following the holding of a three-day Introductory Geology Course in October last year at King George VI School in Tarawa. Unfortunately it was later found out that the candidate did not fulfil USP Foundation Science entry requirements.

A scholarship for a Tongan national was also held over for 1992.

Funding for the Scholarship Scheme continued to be by the Canadian SPOD Programme and the UN Project attached to SOPAC. In addition New Zealand awarded Fees Only scholarships to students in New Zealand, also the University of Hawaii gave Mr Magu a Tuition Fees Waiver.

**On-the-job assignments**

*SOPAC Fellowship Scheme*

The number of fellowships awarded in the twelve month period since the last Annual Session is 18, compared with 12 during the preceding twelve months. Of particular note this past year was the training of individuals at places in the region other than Techsec, either as part of Techsec field survey teams, or at other regional Geological Surveys. In one case, a Fiji driller attached to a commercial drilling company in Papua New Guinea (the company concerned paid all costs whilst the driller was at Ok Tedi). The attachments were for periods of one day up to six weeks.

Funding continued to be supplied by the ICOD and the UN Project attached to SOPAC.

| | | | | |
|---|---|---|---|---|
| Cooks | Michael Mouauri | Nearshore,FJ | 16 days | 05Nov-21Nov |
| FSM | Moses Nelson | Administration | 5 days | 08Dec-14Dec |
| Fiji | Ana Romanu | Administration | 25 days | |
| Vanuatu | Willie Newman | Nearshore,FJ | 16 days | 05Nov-21Nov |
| Vanuatu | Siri Seule | Coastal,SI | 18 days | 27Nov-14Dec |
| Fiji | Varani Raiyawa | Licensing,PNG | 24 days | 19Jan-11Feb |
| Solomons | Peter Auga | Licensing,PNG | 24 days | 19Jan-11Feb |
| Solomons | John Taisia | Planning, FJ | 31 days | 13Jan-12Feb |
| Vanuatu | Siri Seule | Nearshore, CK | 14 days | 21Jan-03Feb |
| Tuvalu | Semu Taafaki | Management | 1 day | 04Jan |
| Fiji | Livai Bulisolevu | Drilling, PNG | 38 days | 09Feb-18Mar |
| Tonga | Solomone Fifita | Wave-rider, WS | 10 days | 05Mar-14Mar |
| Solomons | Donn Tolia | Management | 5 days | 19Apr-22Apr |
| Tuvalu | Melton Tauetia | Waverider, TG | 13 days | 26Apr-08May |
| Vanuatu | Stanley Temakon (SPREP Conf Noumea) | Management | 13 days | 29Jun/11Jul |
| Marshalls | John Bungitak | Management | 13 days | 19Jul/31Jul |
| Cooks | Tim Tangiruaine | Nearshore | 14 days | 07Aug/21Aug |
| Cooks | Bobby Bishop | Coastal, TV | 23 days | 17Aug/11Sep |

*SOPAC Management Training Scheme*

(i) At the Annual Session

A Junior Professional Management Training Project funded by ICOD enabled a junior professional staff member to attend the 19th Annual Session in Kiribati together with the national representatives. Eight (8) junior professional staff received management training at the Annual Session (11 days each), one from each of the following countries; Cooks, Fiji, Kiribati Papua New Guinea, Solomons, Tuvalu, Vanuatu and Western Samoa. At least five are anticipated at the 20th Annual Session.

It should be noted that several of the national representatives are not readily familiar with the scientific and technical nature of the work programme and need time regularly to discuss the work programme at length with Techsec staff, other technical advisers, and their fellow national representatives. A Senior Management Training Project funded by the EC, has been established to cover the travel costs for the national representatives to attend the Annual Session. Five (5) senior professional staff received management training at the 19th Annual Session in Kiribati (two days each), one from each of the following countries; Fiji, Papua New Guinea, Solomons, Tuvalu, and Vanuatu. At least five are anticipated at the 20th Session.

(ii) At Techsec

Stanley Temakon, Deputy Director, Dept Geology Mines and Rural Water Supplies, Vanuatu, had a seven month management attachment to Techsec from February to August. It is anticipated that a similar attachment will take place again next year for a second person. Funds for this activity were provided by AIDAB.

Short term management training attachments to the Techsec are already covered under the Fellowship Scheme.

*Training during cruises*

This activity continues on an opportunity arises basis. During the past twelve months 6 island nationals from the Cook Islands, Fiji, Tonga, and Papua New Guinea, participated onboard the vessels Hakurei Maru No2, Joides Resolution, Franklin and Yokosuka. Funds were provided by ICOD, the Japanese Government and the UN Project at SOPAC.

| | | | | |
|---|---|---|---|---|
| Cooks | Aturangi Hosking | Hakurei Maru | 40 days | 17Sep-26Oct |
| PNG | Russell Perembo | ODP Leg 134 | 67 days | 20Oct-17Dec |
| Fiji | Crystelle Pratt | ODP Leg 135 | 70 days | 22Dec-02Mar |
| Tonga | Sione Soakai | ODP Leg 135 | 70 days | 22Dec-02Mar |
| Fiji | Eroni Jako | Yokosuka | 29 days | 09Jan-06Feb |
| PNG | UPNG Student | Franklin | 23 days | 23Sep-15Oct |

*Training at places other than Techsec*

During the past twelve months the following activities took place;

(i) 3 individuals attended the Coastal Engineering Workshop, Townsville for 4 days in November; Ata Herman (Cook Islands), Galt Siegrist (Guam) and Paul Phillips (Western Samoa). Funds were provided by the Sasakawa Peace Foundation in Japan,

(ii) 5 individuals attended the Remote Sensing Workshop, Noumea/Tahiti for 6 days in November; Alf Simpson and Kemueli Masikerei (Fiji), Stevie Nion, and Kathy Munagan (Papua New Guinea), Imo Malo (Tuvalu). Funds were provided by the Sasakawa Peace Foundation in Japan,

(iii) 4 individuals attended the STARMER Workshop, Noumea for 7 days in February. Stanley Temakon (Vanuatu), Saimone Helu (Tonga), Alf Simpson and Eroni Jako (Fiji). Funds were provided by the STARMER programme,

(iv) Saimone Helu (Tonga) attended the APEA Conference, Melbourne (5-13Apr; 9days),

(v) Stuart Kingan (Cook Islands) attended the Pacific Science Congress, Honolulu (27May-3June; 7 days),

(vi) Alf Simpson (Fiji) attended the South Pacific Environments Conference, Auckland (2-7 September; 5 days).

**SOPAC Workshops and Seminars**

*SOPAC Coastal Mapping Workshop*

The 1991 SOPAC Coastal Mapping Workshop was held on the Coral Coast, Fiji, from 22 July to 2 August (12 days) and was attended by 14 participants from 10 member counries as follows; Cook Islands (2), Fiji (3), Guam (1), Marshall Islands (1), Papua New Guinea (1), Solomon Islands (1), Tonga (1), Tuvalu (1), Vanuatu (1) and Western Samoa (2). Funds were provided by the New Zealand Government and USAID.

The objectives of the Coastal Mapping Workshop are to train member country participants in the techniques of mapping the geology and morphology of the coastline, performing bathymetry surveys of nearshore areas, and producing maps from the results. Participants in the 1991 workshop mapped the coastline of Cuvu Harbour on Viti Levu and performed a bathymetry survey of the harbour. The participants produced maps of the coastal geology and bathymetry and a report on the results with recommendations for future study.

*Annual Session Workshop*

At the time of writing the SOPAC/CIDA Minerals Policy Workshop is planned to be held in Luganville, Vanuatu from 16-20th September 1991. The following representation is expected; Cooks Islands (2), Federated States of Micronesia (2), Fiji (5), Kiribati (2), Marshalls (2), Papua New Guinea (2), Solomon Islands (2), Tonga (3), Tuvalu (1), Vanuatu (2) and Western Samoa (2). Funds are provided by the CIDA Management for Change Programme.

*Other Workshops and Seminars*

No other regional workshops were held during the reporting period, though the following were planned; a Workshop on Collection and Processing of Wave Data, a Workshop on Minerals Databases, and a Workshop on Equipment Maintenance and Operation.

However, in the past twelve months, two national workshops (seminars) were held, for which normal staff travel funds covered the cost of the instructors from Techsec. The useage of "workshop" or "seminar" serves simply to highlight a cost difference (national seminars are relatively cheap to hold compared with regional workshops). Also the need to get a group of people with a large variety of backgrounds at national level together to discuss a topic is becoming increasingly recognised.

In Kiribati on Introduction to Geology for 13 students at the King George VI School, 8-10 October.

A similar activity planned for Western Samoa was postponed.

In the Solomon Islands on Coastal Mapping for 25 physical planning students at the College of Higher Education, 20-24 May. This was a follow-on activity from last year.

A second workshop for Papua New Guinea related to Petroleum Geology was planned for June but will now be held in November. New Zealand funds will cover the cost of one instructor, and normal Techsec staff travel funds for a second.

## Training assistance

*High school curriculum development*

In recent years Cook Islands, Fiji, Kiribati, Tonga and Western Samoa, have expressed interest in high school curriculum development related to geology, earth sciences, ocean resources and coastal environments. In late 1988, Vanuatu expressed a wish that Techsec assist with a review of a teaching module in geology/earth science. To date nothing has been done for any of the countries.

Techsec is supporting the Marine Studies Programme at USP to launch a curriculum development programme.

*Ocean Resource Management Programme*

Techsec continues to assist with the ORMP. Six lectures were given to UU201, and six lectures to UU301. The Training Co-ordinator was unable to lecture in the ORMP Regional Workshop in Majuro at the end of January.

Techsec provided all teaching materials for Course Book Module 2: Oceanography and Introduction to Non-Living Resources for the UU201 course which from 1991 is now being offered by Extension.

*Other Training Assistance*

SOPAC has supported the USP Marine Studies Programme in an application for funding to Canada for a 3-year post of a Lecturer in Marine Geology. This has been approved and an appointment is pending.

The Training Co-ordinator is assisting USP in the development of a new course UU111 "Introduction to Marine Studies" to be offered by Extension Services.

SOPAC continues to play an active role in the Marine Studies Co-ordinating Committee at USP.

## Training Co-ordinator's Travel

A visit was made to the University of Christchurch in early March to review scholarship arrangements and talk to scholarship holders.

Member country visits were restricted to Kiribati(October), Solomon Islands (November) and Vanuatu (February), considering in the previous year all countries were visited.

The Training Co-ordinator attended the following regional meetings where training planning meetings were held - FFC (Wellington) and the Pacific Science Congress (Honolulu). Visits were made at those times to Victoria University in Wellington and the University of Hawaii in Honolulu.

As Officer-In-Charge of the UN Project, the Training Co-ordinator visited ESCAP, Bangkok in July.

## TRAINING PROGRAMME REPORTS

Howorth, R. 1990: Introduction to Earth Science and Marine Geology. A short course for Kiribati: 8-10 October 1990. *SOPAC Training Report 35.*

Harper, J.R. 1990: Proceedings of the CIDA-SOPAC Coastal Investigations and Engineering Workshop. *SOPAC Training Report 36.*

Howorth, R. 1991: First Report - ICOD Project 890319. SOPAC Fellowship Scheme (Phase 2). *SOPAC Training Report 37.*

Temakon, S. 1991: Report on ICOD Project 900362 Junior Professional Management Training at SOPAC Annual Session, Tarawa, Kiribati, 1-10 October 1990. *SOPAC Training Report 38.*

SOPAC Technical Secretariat, 1991: Report on Remote Sensing in the Pacific "PIX-ILES 90" Workshop, 19-24 November 1990. *SOPAC Training Report 39.*

SOPAC Technical Secretariat, 1991: Report on the Engineering in Coral Reef Regions Workshop, 4-7 November 1990. *SOPAC Training Report 40.*

SOPAC Technical Secretariat, 1991: First annual report in ICOD/SOPAC Scholarship Scheme. *SOPAC Training Report 41.*

Woodward, P.; Gillie, R. 1991: Coastal Mapping Workshop for Solomon Islands College of Higher Education, 20 May - 24 May 1991. *SOPAC Training Report 42.*

Temakon, S.; Rearic, D.; Woodward, P. 1991: SOPAC 1991 Coastal Mapping Workshop, Fiji, 22 July - 2 August 1991. *SOPAC Training Report 43.*

SOPAC Technical Secretariat 1990: NEARSHORE MINERALS IN THE SOUTH PACIFIC. Member Country papers from the SOPAC-ICOD Nearshore Minerals Workshop, Savusavu, Fiji, 1988. *SOPAC Miscellaneous Report 103.*

SOPAC Techsec 1990: NEARSHORE MINERALS - selected papers from the SOPAC-ICOD Nearshore Minerals Workshop, Savusavu, Fiji, 1988. *SOPAC Miscellaneous Report 104.*

SOPAC Techsec 1990: Lecture notes from CIDA-SOPAC Coastal Investigations and Engineering Workshop. *SOPAC Miscellaneous Report 105.*

Howorth, R. 1991: SOPAC Coastal mapping training and education programme. (Prepared for Environment Week Workshop, Gizo, Western Province, Solomon Islands, 5-9 November 1990. *SOPAC Miscellaneous Report 106.*107:

Temakon, S. 1991: A review of SOPAC activities in Vanuatu from 1978-1991. *SOPAC Miscellaneous Report 107.*

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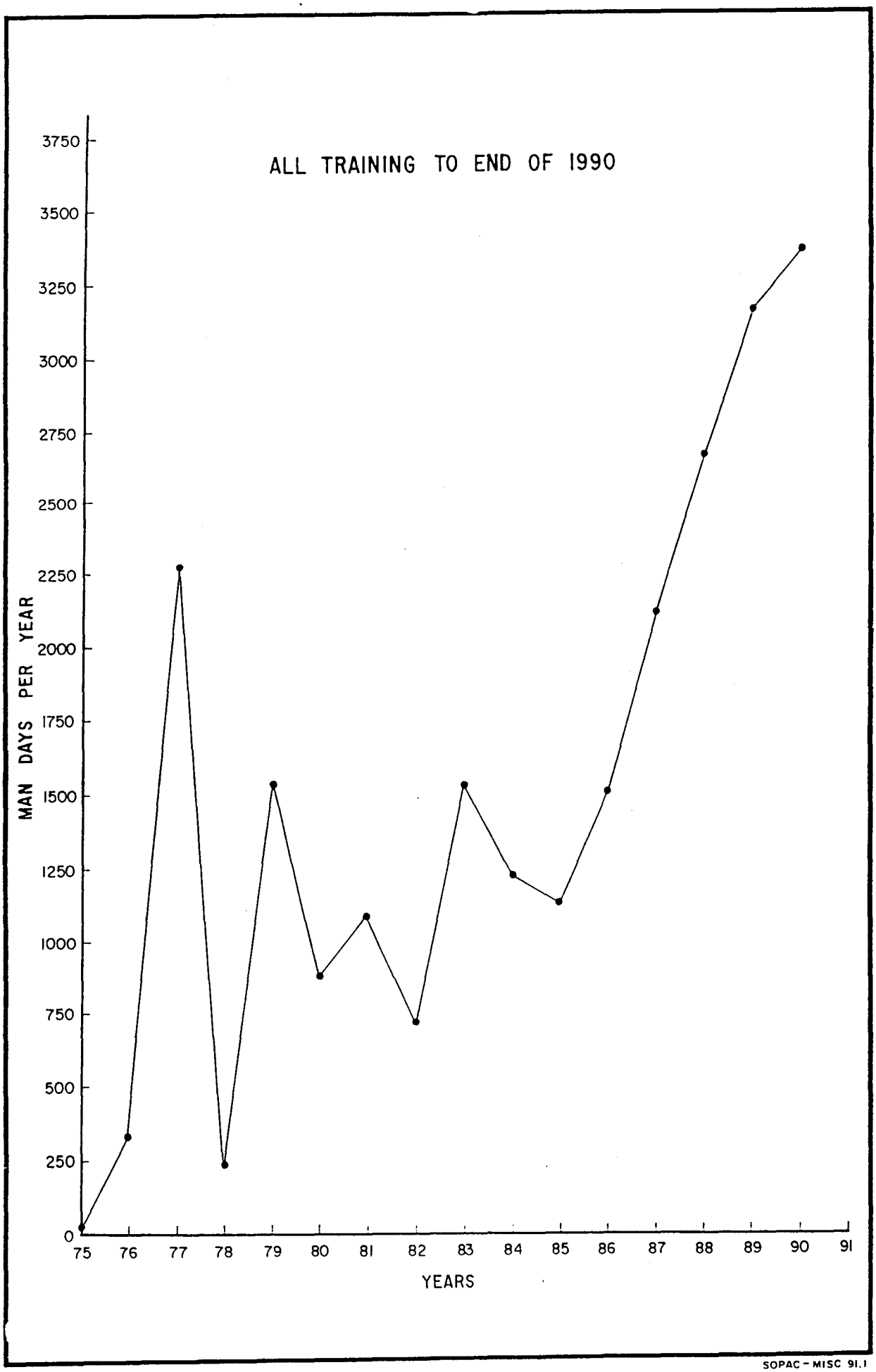
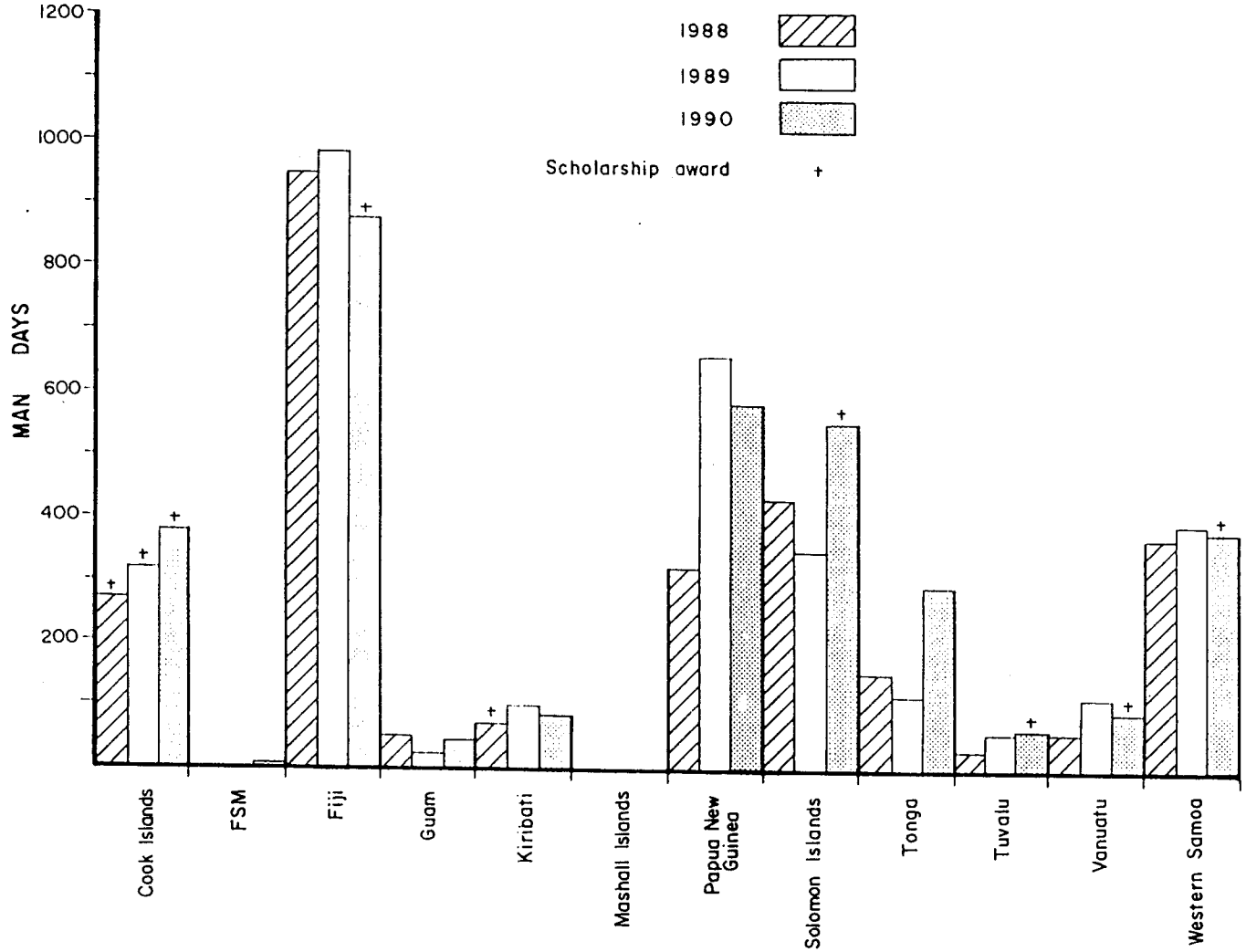



SOPAC - MISC 91.1

# TRAINING SUMMARY BY COUNTRY



# Appendix 1

# LIST OF PROJECTS

## LIST OF PROJECTS

**COOK ISLANDS**

| | | |
|---|---|---|
| CK. | 1 | Mn nodules |
| | 2 | Phosphate |
| | 3 | Precious corals |
| | 4 | Coastal engineering |
| | 5 | Bathymetry |
| | 6 | Clay (DELETED) |
| | 7 | Co-rich crusts |
| | 8 | Ocean energy |
| | 9 | Data management |
| | 10 | Construction materials |
| | 11 | Coastal & nearshore mapping |

**FIJI**

| | | |
|---|---|---|
| FJ. | 1 | Hydrocarbons |
| | 2 | Data review for relinguished mineral concessions (COMPLETED) |
| | 3 | (Hydrocarbons W of Yasawas, DELETED) |
| | 4 | Geol/geophys. shallow shelves |
| | 5 | Phosphate Lau Group |
| | 6 | Ocean energy |
| | 7 | Geophysical surveys (COMPLETED) |
| | 8 | Regional aeromagnetic data (COMPLETED) |
| | 9 | Seismic refraction Viti Levu & Vanua Levu |
| | 10 | Bathymetry and sediments Kadavu Passage (COMPLETED) |
| | 11 | Geol/geophys. N. margin, Fiji Platform |
| | 12 | Geol/geophys. Suva-Beqa, seismic zone |
| | 13 | (Geol/geophys. S Viti Levu, DELETED) |
| | 14 | Detailed aeromagnetic data |
| | 15 | Position fixing |
| | 16 | Metalliferous muds/hydrothermal deposits |
| | 17 | Mn nodules |
| | 18 | Detrital minerals |
| | 19 | Coastal engineering |
| | 20 | Precious corals |
| | 21 | Data management |
| | 22 | Island drilling |
| | 23 | Offshore seabed mapping |

**GUAM**

| | | |
|---|---|---|
| GM. | 1 | Geol/geophys. data review |
| | 2 | (OTEC, DELETED) |
| | 3 | Mn nodules/Co-rich crusts |
| | 4 | Hydrothermal deposits |
| | 5 | (Precious corals, DELETED) |
| | 6 | Hydrocarbons |
| | 7 | Coastal engineering |
| | 8 | (Deepwater hydrostation, DELETED) |
| | 9 | (Radiological survey, DELETED) |
| | 10 | Seamount ecosystems |
| | 11 | Offshore seabed mapping |
| | 12 | Geohazard studies |

**KIRIBATI**

| | | |
|---|---|---|
| KI. | 1 | Phosphate |
| | 2 | Mn nodules |
| | 3 | Precious corals |
| | 4 | Coastal engineering |
| | 5 | Co-rich crusts |
| | 6 | Construction materials |
| | 7 | Data management |

8 Offshore seabed mapping
9 Coastal & nearshore mapping
10 Geohazard studies

**PAPUA NEW GUINEA**

PN. 1 Geol/geophys. outlying islands
2 Detrital minerals
3 (Crustal study, DELETED)
4 Coastal engineering
5 Hydrocarbon data review
6 Hydrocarbons Cape Vogel Basin
7 Hydrocarbons New Ireland Basin
8 Hydrothermal deposits
9 Phosphate
10 Mn nodules N. of Manus Trench
11 Bathymetry
12 Precious corals
13 Industrial minerals
14 Geohazard studies
15 Data Management
16 Coastal & nearshore mapping

**SOLOMON ISLANDS**

SI. 1 Geol/geophys. Choiseul to Santa Isabel
2 Hydrocarbons Slot and Manning Strait
3 (Geol/geophys. Solomon Sea, DELETED)
4 Bauxite in Manning Strait to Choiseul
5 Detrital minerals (gold) N. Guadalcanal
6 Phosphate
7 Hydrothermal deposits, active volcanoes
8 Hydrothermal deposits Vella Lavella
9 Bauxite on Indispensable Reefs and Rennell
10 Hydrocarbons outer islands
11 (Geol/geophys. Manning Strait, DELETED)
12 Mn nodules Polkington Trough
13 (Hydrocarbons Rennel Arc, DELETED)
14 Precious corals
15 Bathymetry
16 Detrital minerals Santa Isabel, Choiseul, Guadalcanal, San Cristobal
17 Coastal engineering
18 Clay
19 Cement materials
20 Construction materials Honiara Bay
21 Geol/geochem. Santa Isabel, Malita, Guadalcanal, San Cristobal
22 Data management
23 Geohazard studies
24 Offshore seabed mapping
25 Coastal & nearshore mapping

**TONGA**

TG. 1 Mn nodules (COMPLETED)
2 Phosphate
3 Precious corals
4 Hydrothermal deposits
5 Hydrocarbons
6 Construction materials
7 Ocean energy
8 Coastal engineering
9 Seismicity/tsunamis
10 Co-rich crusts
11 Data management
12 Coastal & nearshore mapping
13 Offshore seabed mapping

**TUVALU**

| | | |
|---|---|---|
| TU. | 1 | Precious corals |
| | 2 | Construction materials |
| | 3 | Coastal engineering |
| | 4 | Mn nodules |
| | 5 | Co-rich crusts |
| | 6 | Ocean energy |
| | 7 | Data management |
| | 8 | Bathymetry |
| | 9 | Phosphate |
| | 10 | Training |
| | 11 | Geohazard studies |

**VANUATU**

| | | |
|---|---|---|
| VA. | 1 | Hydrothermal deposits |
| | 2 | Hydrocarbons |
| | 3 | Precious corals |
| | 4 | Bathymetry |
| | 5 | Clay |
| | 6 | Coastal development |
| | 7 | Data management |
| | 8 | Nearshore geological mapping |
| | 9 | Offshore seabed mapping |
| | 10 | Training |
| | 11 | Geohazard studies |
| | 12 | Coastal & nearshore mapping |
| | 13 | Ocean energy |
| | 14 | Detrital minerals |

**WESTERN SAMOA**

| | | |
|---|---|---|
| WS. | 1 | Phosphate (COMPLETED) |
| | 2 | Mn nodules (COMPLETED) |
| | 3 | (Mn nodules W Samoa Platform, DELETED) |
| | 4 | Precious corals |
| | 5 | Coastal engineering |
| | 6 | Hydrocarbons |
| | 7 | Co-rich crusts |
| | 8 | Ocean energy |
| | 9 | Data management |
| | 10 | Onshore clay minerals |
| | 11 | Coastal & nearshore mapping |
| | 12 | Construction materials |
| | 13 | Geohazard studies |
| | 14 | Offshore seabed mapping |

**REGIONAL PROJECTS**

| | | |
|---|---|---|
| REG | 1 | Geol/geophys. Coral Sea |
| | 2 | Geol/geophys. Manus, Solomon, Woodlark Basins |
| | 3 | Geol/geophys. Melanesian Borderland |
| | 4 | Geol/geophys. North Fiji Basin |
| | 5 | Geol/geophys. Lau Basin |
| | 6 | Deep sea drilling SW Pacific |
| | 7 | Abyssal sediments SW Pacific Basin |
| | 8 | Planktonic sediments South Fiji Basin |
| | 9 | Geol/geophys. New Caledonia to Solomon Islands |
| | 10 | Hydrothermal deposits back-arc basins |
| | 11 | Seamount phosphate |
| | 12 | Mn nodules Nauru and Ellice Basins |
| | 13 | Mn nodules Cook Islands - Tuamotu transect |
| | 14 | Chemical analysis of sediments regional compilation |
| | 15 | Mn nodules regional data compilation |
| | 16 | Seismicity SW Pacific |
| | 17 | Data compilation and management |

18 Ocean thermal data
19 (Tectonics Fiji Plateau, DELETED)
20 Lithosphere study SW Pacific
21 Line Islands evolution
22 Mn nodules Central Pacific Basin
23 Mn nodules Marquesas Fracture Zone
24 Tectonic synthesis SW Pacific
25 Geophysical Atlas, SW Pacific
26 Sedimentary basins SW Pacific
27 Carbonate sediments SW Pacific
28 Subduction effects seismic ridges and plateaus
29 Co-rich crusts SW Pacific
30 Coastal erosion regional review
31 Saline lakes and lagoons SW Pacific
32 Evolution of coral reefs SW Pacific
33 Hydrocarbon source, maturation, entrapment models
34 Evolution of geomorphic terrains Papua New Guinea
35 Pre-Pliocene evolution SW Pacific
36 Hydrothermal deposits & hazards near surface volcanoes
37 Sediment budgets in lagoons
38 Island drilling SW Pacific
39 Regional information exchange
40 Geophysics Micronesian Trench
41 Long range swath mapping S Pacific
42 Aerial Photographs
43 SOPAC Aerial Camera
44 Sea Level Changes

# Appendix 2

# STATUS OF 1990 - 1991 WORK LIST

## STATUS OF 1991 WORK LIST

COOK ISLANDS

Project CK.1: **ASSESSMENT OF MANGANESE NODULE POTENTIAL**

| | |
|---|---|
| **Task 91.CK.1a: Evaluation of nodule potential in the Cook Islands.** | Funds being sought for consultancy. |
| **Task 91.CK.1b: Evaluation of results of 1990 Hakurei Maru No.2 cruise in Southern Islands.** | Results received and distributed. |

Project CK.2: **ASSESSMENT OF PHOSPHATE POTENTIAL**

| | |
|---|---|
| **Task 91.CK.2a: Phoshate potential of Penrhyn, and Suwarrow Lagoons.** | Not in 1991 Work Plan. |

Project CK.3: **ASSESSMENT OF PRECIOUS CORAL POTENTIAL**

| | |
|---|---|
| **Task 91.CK.3a: Corallium potential of selected sites in the Southern Cook Islands.** | Not in 1991 Work Plan. |

Project CK.4: **SURVEYS TO ASSIST WITH COASTAL DEVELOPMENT**

| | |
|---|---|
| **Task 91.CK.4a: Advisory assistance for harbour development in Rarotonga and the outer islands of the Southern Group.** | Planned for late 1991. |
| **Task 91.CK.4b: Beach processes and coastal stability, Avarua-Avatiu coastline.** | Field work carried out in December 1990 and April 1991. Data being processed. |
| **Task 91.CK.4c: Nearshore and harbour bathymetry and sediments, Avarua and Avatiu Harbours.** | Field work carried out in December 1990 and April 1991. Data being processed. |
| **Task 91.CK.4d: Physical oceanography of the Avaru-Avatui harbours and nearshore areas.** | SOPAC Preliminary Report 31. Data being processed. |
| **Task 91.CK.4e: Bathymetry and sediments of the area off Arutanga, Aitutaki.** | Not in 1991 Work Plan. |
| **Task 91.CK.4f: Physical oceanography of Arutanga, Aitutaki.** | Not in 1991 Work Plan. |
| **Task 91.CK.4g: Circulation and flushing of Muri Lagoon - Ngatangiia Harbour.** | SOPAC Preliminary Report 26. Data being processed. |

| | |
|---|---|
| **Task 91.CK.4h: Sedimentation in Muri Lagoon and Ngatangiia Harbour.** | SOPAC Preliminary Reports 23 and 26. Data being processed. |
| Project CK.5: **BATHYMETRIC MAPPING** | |
| **Task 91.CK.5a: Continued production of lagoon and nearshore bathymetric maps.** | Available in draft: Mangaia 1:15,000; Pukapuka 1:10,000; Rakahanga 1:10,000. |
| **Task 91.CK.5b: Preparation of new bathymetric maps of islands in the Southern Cooks.** | Available in draft: Aitutaki 1:200,000. |
| Project CK.8: **ASSESSMENT OF WAVE ENERGY POTENTIAL** | |
| **Task 91.CK.8a: Assessment of the wave energy potential for Rarotonga.** | Completed January 1991. Data reports for 1987, 1988, and 1989 completed. |
| Project CK.11: **COASTAL AND NEARSHORE MAPPING** | |
| **Task 91.CK.11a: Rarotonga Coastal Map.** | Two maps are currently being printed. |
| **Task 91.CK.11b: Aitutaki colour satellite image maps.** | Not in 1991 Work List. |

FIJI

| | |
|---|---|
| Project FJ.1: **ASSESSMENT OF HYDROCARBON POTENTIAL OF FIJI** | |
| **Task 91.FJ.1a: Seismic interpretation and hydrocarbon prospectivity assessment of the Great Sea Reefs Area.** | Data prepared for processing and interpretation. |
| **Task 91.FJ.1b: Assist with preparation of a brochure to promote the hydrocarbon potential of Fiji.** | No progress. |
| **Task 91.FJ.1c: Promote the hydrocarbon potential of Fiji at major international conferences.** | Display presented at APEA Conference, Australia April 1991. |
| **Task 91.FJ.1d: Review and interpret gravity and magnetic data from licence areas in the Fiji EEZ.** | No progress. |

| | |
|---|---|
| **Tasks 91.FJ.1e: Geophysical mapping (using single channel and multichannel seismic reflection) of sedimentary basins where little seismic reflection data exists.** | No progress. |
| **Task 91.FJ.1f: Review and interpret gravity and magnetic data from licence areas in Fiji.** | Deleted. |
| **Task 91.FJ.1g: Advise on and assist in the retrieval of digital seismic tapes and other basic data pertinent to petroleum exploration.** | Continuing with BMR assistance. |
| **Task 91.FJ.1h: Coordinate assessment of seabed samples for geochemical analysis of hydrocarbon gases.** | No progress. |
| **Task 91.FJ.1i: Interpretation of multichannel seismic data.** | Track plots prepared. |
| **Task 91.FJ.1j: Coordinate a regional hydrocarbon policy seminar for attendance by senior civil servants and senior energy/policy/legislation advisers.** | Funding identified. Planned for early 1992. |
| Project FJ.6: **ASSESSMENT OF ENERGY POTENTIAL FROM MARINE RENEWABLE SOURCES.** | |
| **Task 91.FJ.6a: Installation of waverider buoy.** | Buoy deployed June 1991. |
| Project FJ.18: **NEARSHORE SURVEYS OF COASTAL AREAS, BEACH TO REEF, FOR METALLIFEROUS DETRITAL MINERALS** | |
| **Task 91.FJ.18a: Detrital minerals, Ba river delta.** | Deffered to early 1992. |
| Project FJ.19: **BASELINE STUDIES OF INSHORE AND NEARSHORE AREAS IN FIJI FOR COASTAL DEVELOPMENT PROGRAMMES.** | |
| **Task 91.FJ.19a: Development of geotechnical and environmental maps of the inshore and nearshore areas of Suva from SPOT image data.** | Not in 1991 Work Plan. |
| **Task 91.FJ.19b: Assistance with acquisition of SPOT imagery over Fiji.** | Not in 1991 Work Plan. |
| **Task 91.FJ.19c: Coordinate and assist coastal studies by research institutions.** | Two proposals prepared for work in Suva lagoon area. |

| | |
|---|---|
| **Task 91.FJ.19d: Lagoon bed and subbottom survey in Suva Harbour.** | Not in 1991 Work Plan. |
| **Task 91.FJ.19e: Bedrock Miocene structure around Yasawa Islands and the top end of Nacula Island in the Yasawas.** | SOPAC Preliminary Report 29. Data processed, report in preparation. |
| **Task 91.FJ.19f: Storm surge and wave set up survey for Lautoka and Levuka.** | SOPAC Preliminary Report 27. |
| Project 91.FJ.21: **DATA MANAGEMENT** | |
| **Task 91.FJ.21a: Retrieval of MCS data to complete hydrocarbon database.** | Not in 1991 Work Plan. |
| **Task 91.FJ.21b: Trackplot index of all swath mapping data in Fiji's EEZ.** | SOPAC Technical Report 119. |
| **Task 91.FJ.21c: Technical editing assistance.** | Bulletin on the Geology of Suva Harbour has been edited. |
| **Task 91.FJ.21d: Geophysical mapping using data from MRD seismic database.** | Not in 1991 Work Plan. |
| **Task 91.FJ.21e: Coordinate assessment of completion of hydrocarbon database.** | Not in 1991 Work Plan. |
| Project FJ.23: **SEABED MAPPING** | Not in 1991 Work Plan. |
| **Task 91.FJ.23a: Seafloor imagery east of Vanua Levu and southwest of Viti Levu.** | |
| Project FJ.T: **TRAINING** | |
| **Task 91.FJ.Ta: Training of MRD electronic support staff on the maintenance and operation of geophysical equipment.** | Training provided at Techsec. |
| **Task 91.FJ.Tb: Training in technical report writing.** | No progress. |
| **Task 91.FJ.Tc: Remote sensing processing.** | Not in 1991 Work Plan. |
| **Task 91.FJ.Td. Training on outboard operations and preventative maintenance.** | Training provided at Techsec. |
| **Task 91.FJ.Te: Ocean Drilling Programme Leg 135 post-cruise meetings and data interpretation.** | Waiting request from MRD. |

| | |
|---|---|
| **Task 91.FJ.Tf: Training of Fiji Government drillers on the operation and maintenance of drill rigs.** | One driiler has had six week attachment in PNG. |

## GUAM

Project GM.7: **BASELINE SURVEYS FOR COASTAL MANAGEMENT**

| | |
|---|---|
| **Task 91.GM.7a: Coastal mapping of southern Guam.** | Further mapping by USGS completed. |

Project GM.11: **BATHYMETRIC AND SEABED MAPPING**

| | |
|---|---|
| **Task 91.GM.11a: Swath mapping of Guam's EEZ.** | Not in 1991 Work Plan. |

## KIRIBATI

Project KI.2: **ASSESSMENT OF MANGANESE NODULE AND COBALT-RICH CRUST POTENTIAL**

| | |
|---|---|
| **Task 91.KI.2a: Assessment of results of 1989 RV Hakurei Maru No.2 cruise.** | SOPAC Technical Report 125. |
| **Task 91.KI.2b: Assessment of nodule and crust potential of the Gilbert Islands Group.** | Hakurei Maru No.2 cruise at sea August-October 1991. |

Project KI.3: **ASSESSMENT OF PRECIOUS AND SEMI-PRECIOUS CORAL POTENTIAL**

| | |
|---|---|
| **Task 91.KI.3a: Reconnaissance survey of black coral in the Line and Phoenix Islands.** | Not in 1991 Work Plan. |
| **Task 91.KI.3b: Development of semi-precious coral industry in the Gilbert islands group.** | Not in 1991 Work Plan. |

Project KI.4: **BASELINE STUDIES FOR COASTAL DEVELOPMENT PROJECTS**

| | |
|---|---|
| **Task 91.KI.4a: Coastal dynamics along the Nippon Causeway and other areas on South Tarawa.** | SOPAC Preliminary Report 37. Continuing. |
| **Task 91.KI.4b: Coastal dynamics of areas in the Line Islands where development is planned or taking place.** | No progress. |

| | |
|---|---|
| **Task 91.KI.4c: Assist with public education programme on coastal erosion and coastal management.** | Material for pamplet compiled. |
| **Task 91.KI.4d: Sediment budget studies of lagoon areas off the islands of North Tarawa.** | Not in 1991 Work Plan. |
| **Task 91.KI.4e: Development of a coastal protection plan for lagoon shore at Tebunginako Village, Abaiang Atoll. and other islands in Kiribati requiring assistance.** | SOPAC Preliminary Report 35. |
| **Task 91.KI.4f: Coastal morphology mapping on Fanning and Washington Islands.** | Not in 1991 Work Plan. |
| **Task 91.KI.4g: Bathymetry and sediments of the approach channel and harbour at London, Christmas Island.** | Not in 1991 Work Plan. |
| Project KI.5: **ASSESSMENT OF COBALT-RICH CRUST POTENTIAL** | |
| **Task 91.KI.5a: Review of work done on RV Hakurei Maru No.2 cruises.** | Not in 1991 Work Plan. |
| Project KI.6: **IDENTIFICATION OF MINEABLE DEPOSITS OF CONSTRUCTION MATERIALS** | |
| **Task 91.KI.6a: Assist with management of sand and gravel mining on reef flats in South Tarawa.** | SOPAC Technical Report 91. |
| Project KI.7: **DATA MANAGEMENT** | |
| **Task 91.KI.7a: Set up library system for MNRD, Tarawa.** | Initial work carried out in October 1991. |
| Project KI.9: **COASTAL AND NEARSHORE MAPPING** | |
| **Task 91.KI.9a: Mapping of bathymetry and sediments in Tarawa lagoon.** | No progress. |

PAPUA NEW GUINEA

| | |
|---|---|
| Project PN.4: **COASTAL DEVELOPMENT** | |
| **Task 91.PN.4a: Site surveys for small wharves in Morobe Province.** | Not in 1991 Work Plan. |

Project PN.5: **HYDROCARBON POTENTIAL**

| | |
|---|---|
| **Task 91.PN.5a: Training in management of hydrocarbon data.** | No progress. |
| **Task 91.PN.5b: In-house specialist training in petroleum geophysics.** | Petroleum Geophysicist to visit PNG Geological Survey in November 1991. |

Project PN.8: **HYDROTHERMAL MINERALS**

| | |
|---|---|
| **Task 91.PN.8a: Study of Hydrothermal vents in the Western Woodlark Basin.** | PACLARK cruise during September-October 1991. |

Project PN.16: **TRAINING**

| | |
|---|---|
| **Task 91.PN.16a: Assessment of usefulness of Fisheries vessel for geoscience training.** | Assessment carried out in August 1991. |
| **Task 91.PN.Ta: Training in equipment maintenance and operation.** | Attachment to Techsec planned for November 1991. |
| **Task 91.PN.Tb: Second course in Marine Geology.** | Planned for November 1991. |

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SOLOMON ISLANDS

Project SI.10 : **ASSESSMENT OF HYDROCARBON POTENTIAL**

| | |
|---|---|
| **Task 91.SI.10a: Preparation of legal framework for hydrocarbon exploration and exploitation.** | Review completed. |
| **Task 91.SI.10b: Retrieval of existing geophysical data.** | Continuing with BMR assistance. |
| **Task 91.SI.10c: MCS and other data reprocessing.** | Selection and preparation of MCS data continuing. |
| **Task 91.SI.10d: MCS survey of Iron Bottom Basin.** | No progress. |
| **Task 91.SI.10e: MCS survey of Vanikoro Basin.** | No progress. |
| **Task 91.SI.10f: Source-rock, reservoir, and stratigraphic drilling.** | ODP drilling complete. Onland drill-site selection continuing. |
| **Task 91.SI.10g: Promotion of hydrocarbon prospects.** | Display presented at APEA Conference, Australia April 1991. |

Project SI.16: **ASSESSMENT OF MINERAL POTENTIAL IN BEACH AND NEARSHORE AREAS**

| | |
|---|---|
| **Task 91.SI.16a: Review of geochemical data.** | Not in 1991 Work Plan. |
| **Task 91.SI.16b: Gold potential at Matepono River mouth.** | SOPAC Preliminary Report 36. Data being processed. |
| **Task 91.SI.16c: Gold potential of Fauro submerged crater, Shortland Islands.** | Not in 1991 Work Plan. |
| **Task 91.SI.16d: Gold potential of Kele River mouth.** | Not in 1991 Work Plan. |

Project SI.17: **COASTAL DEVELOPMENT**

| | |
|---|---|
| **Task 91.SI.17a: Baseline hydraulic and water quality studies of Marovo lagoon.** | Not in 1991 Work Plan. |
| **Task 91.SI.17b: Baseline hydraulic and water quality studies off North Guadalcanal.** | Not in 1991 Work Plan. |
| **Task 91.SI.17c: Reconnaissance coastal survey, Auki, Malaita.** | No progress. |
| **Task 91.SI.17d: Management of sand extraction at Ranadi Beach, Honiara.** | SOPAC Preliminary Report 25. Beach profiling continuing. |
| **Task 91.SI.17e: Baseline coastal study of Eastern Lungga Delta, Guadalcanal.** | Field work carried in May. |

Project SI.22: **DATA MANAGEMENT**

| | |
|---|---|
| **Task 91.SI.22a: Provision of in-country computing facilities.** | Not in 1991 Work Plan. |

Project SI.23: **COASTAL MAPPING**

| | |
|---|---|
| **Task 91.SI.23a: Satellite mapping of coastal and nearshore areas.** | Not in 1991 Work Plan. |
| **Task 91.SI.23b: Production of coastal maps from results of the 1989 Coastal Mapping Workshop.** | Additional data collection continuing. |

Project SI.24: **SEABED MAPPING**

| | |
|---|---|
| **Task 91.SI.24a: Seabed mapping of Vanikoro Basin.** | Not in 1991 Work Plan. |

| | |
|---|---|
| **Task 91.SI.24b: Swath mapping of Solomon Islands Arc.** | Not in 1991 Work Plan. |
| **Task 91.SI.24c: Island slope stability mapping in Solomon Islands.** | Not in 1991 Work Plan. |

**TRAINING**

| | |
|---|---|
| **Task 91.SI.Ta: Course on Coastal Processes and Coastal Management.** | Carried out in May. SOPAC Training Report 42. |

TONGA

Project TG.3: **PRECIOUS CORALS**

| | |
|---|---|
| **Task 91.TG.3a: Review of Corallium potential in Lau Basin.** | Not in 1991 Work Plan. |

Project TG.4: **HYDROTHERMAL MINERALS**

| | |
|---|---|
| **Task 91.TG.4a: Synthesis and publication of Lau Basin bathymetric data.** | SOPAC Technical Reports 124 and 132. |

Project TG.5: **HYDROCARBON POTENTIAL**

| | |
|---|---|
| **Task 91.TG.5a: Promotion of Tonga hydrocarbon potential.** | Display presented at APEA Conference, Australia, April 1991. |
| **Task 91.TG.5b: Magnetic survey of Ha'apai and Nomuka Groups.** | SOPAC Joint Contribution 77. |
| **Task 91.TG.5c: Shallow stratigraphic and source-rock drilling.** | |
| **Task 91.TG.5d: Navigation data base for MCS tracks in Tonga waters.** | SOPAC Technical Report 131. |
| **Task 91.TG.5e: Develop and promote a proposal to drill a deep holes on Eua and Vavau.** | No progress. |

Project TG.6: **NEARSHORE MINERALS**

| | |
|---|---|
| **Task 91.TG.6a: Sampling and assessment of sand deposits off Fafa, Nuku'alofa.** | SOPAC Preliminary Report 32. SOPAC Technical Reports 124 and 133. Review completed and report in draft. |
| **Task 91.TG.6b: Sampling and assessment of sand deposits in Vava'u.** | Not in 1991 Work Plan. |

| | |
|---|---|
| Project TG.7: **RENEWABLE ENERGY** | |
| **Task 91.TG.7a: Continued collection of wave data.** | Continuing. Data reports for 1987, 1988, and 1989 completed. |
| **Task 91.TG.7b: Feasibility of hydroelectric power from tides at Fanga'uta Lagoon entrance.** | Not in 1991 Work Plan. |
| Project TG.8: **BASELINE STUDY OF INSHORE AREAS FOR COASTAL DEVELOPMENT PROGRAMMES** | |
| **Task 91.TG.8a: Nearshore water circulation system off Nuku'alofa, Northern Tongatapu.** | Not in 1991 Work Plan. |
| Project TG.9: **GEOLOGICAL HAZARDS** | |
| **Task 91.TG.9a: Establish sealevel measurement programme.** | Not in 1991 Work Plan. |
| Project TG.11: **DATA MANAGEMENT** | |
| **Task 91.TG.11a: Assist Geology Section in the organisation of library materials.** | SOPAC Technical Report 128. |
| Project TG.12: **COASTAL AND NEARSHORE MAPPING** | |
| **Task 91.TG.12a: Image analyses for Vava'u and Haapai** | Not in 1991 Work Plan. |

TUVALU

| | |
|---|---|
| Project TU.1: **ASSESSMENT OF PRECIOUS CORAL POTENTIAL** | |
| **Task 91.TU.1a: Assess potential of black coral resources** | Not in 1991 Work Plan. |
| Project TU.2: **AGGREGATE MATERIALS FOR CONSTRUCTION AND LANDFILL** | |
| **Task 91.TU.2a: Lagoon dredging and borrow pit infilling pilot project.** | Construction of barge and pusher boat almost complete. Other components being purchased. |
| **Task 91.TU.2b: Assessment of Funafuti lagoon sediments to be used in borrow pit filling.** | SOPAC Preliminary Report 33. Data being interpreted. |

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|---|---|
| Project TU.3: **NEARSHORE BASELINE STUDIES TO ASSIST WITH COASTAL MANAGEMENT** | |
| **Task 91.TU.3a: Monitoring the effects of lagoon dredging on beach and nearshore sediment regime.** | Beach profiling on-going. |
| **Task 91.TU.3b: Study of the biology of Funafuti lagoon and ecology of the lagoon reef.** | SPREP to do this work. First baseline survey planned for November. |
| **Task 91.TU.3c: Detailed coastal mapping of Funafuti Atoll.** | Further field work carried out September 1991. |
| **Task 91.TU.3d: Monitoring the effects of dredging on lagoon waters.** | First baseline survey planned for November 1991. |
| **Task 91.TU.3e: Baseline mapping of the northern Fongafale - Amatuku area.** | Field work carried out September 1991. |
| Project TU.6: **POTENTIAL OF OCEAN ENERGY** | |
| **Task 91.TU.6a: Collection of wave data to assess potential of wave energy.** | Continuing. |
| Project TU.8: **BATHYMETRIC MAPPING** | |
| **Task 91.TU.8a: Mapping of Funafuti Lagoon.** | Funafuti lagoon bathymetry, draft. |
| **Task 91.TU.8b: Bathymetric mapping of seamounts in Tuvaluan area of Northern Melanesian Borderland.** | Not in 1991 Work List. |
| Project TU.11: **GEOLOGICAL HAZARD STUDIES** | |
| **Task 91.TU.11a: Monitoring of coastal erosion on Nukufetau and Nukulaelae.** | Report in preparation. |
| **Task 91.TU.11b: Study the causes and effects of coastal erosion on Nanumea.** | Field work carried out September 1991. |
| **Task 91.TU.11c: Oceanographic study of interaction of currents between Nanumea lagoon and the ocean.** | Field work carried out September 1991. |
| **Task 91.TU.11d: Reconnaissance monitoring of coastal erosion on the islands of Tuvalu.** | Field work carried out September 1991. |

VANUATU

| | |
|---|---|
| Project VA.1: **METALLIFEROUS MUD POTENTIAL IN THE ACTIVE VOLCANIC ARC BACK-ARC BASINS OF VANUATU** | |
| **Task 91.VA.1a: Search for metalliferous muds in active arc areas.** | Not in 1991 Work Plan. |
| Project VA.2: **HYDROCARBON POTENTIAL OF VANUATU.** | |
| **Task 91.VA.2a: Source-rock studies in association with ODP programme.** | Shipboard results completed. Further analyses planned. |
| **Task 91.VA.2b: Reinterpretation of existing MCS data.** | Composite track plots prepared. |
| **Task 91.VA.2c: MCS survey of the Espiritu Santo and Malekula areas.** | No progress. |
| **Task 91.VA.2d: Investigate oil seep off northern Malekula.** | Field visit made June 1991. |
| **Task 91.VA.2e: Promotion of Vanuatu hydrocarbon potential.** | Display presented at APEA Conference, Australia April 1991. |
| Project VA.4: **BATHYMETRIC MAPPING OF THE VANUATU ISLAND ARC AND ADJACENT DEEP SEAFLOOR** | |
| **Task 91.VA.4a: Bathymetric map of Vanuatu.** | Not in 1991 Work Plan. |
| Project VA.6 : **BASELINE STUDIES FOR COASTAL DEVELOPMENT PROGRAMMES** | |
| **Task 91.VA.6a: Physical oceanographic and sediment baseline study of Havanah Harbour.** | SOPAC Technical Report 122. Further carried out September 1991. |
| **Task 91.VA.6b: Assist with the preparation of a management plan for Mele Bay.** | SOPAC Technical Reports 116 and 124. |
| PROJECT VA.7: **DATA MANAGEMENT** | |
| **Task 91.VA.7a: Computer support.** | Not in 1991 Work Plan. |
| PROJECT VA.8: **EXTENSION OF GEOLOGICAL MAP OF VANUATU INTO OFFSHORE AREAS** | |
| **Task 91.VA.8a: Publication of geological map of Vanuatu region.** | |

PROJECT VA.9: **LONG RANGE ACOUSTIC MAPPING**

| | |
|---|---|
| **Task 91.VA.9a: Seabed mapping of Central Basin and adjoining areas.** | Not in 1991 Work Plan. |

PROJECT VA.12: **COASTAL AND NEARSHORE MAPPING**

| | |
|---|---|
| **Task 91.VA.12a: Coastal maps of parts of Efate.** | Maps available in draft. |

PROJECT VA.13: **OCEAN ENERGY**

| | |
|---|---|
| **Task 91.VA.13a: Wave energy data collection.** | Continuing. |

Project VA.14: **ASSESSMENT OF DETRITAL MINERAL POTENTIAL**

| | |
|---|---|
| **Task 91.VA.14a: Study of Forari Bay manganese.** | Deferred. |
| **Task 91.VA.14b: Assessment of auriferous terraces, Big Bay area, Espiritu Santo.** | No progress. |

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WESTERN SAMOA

Project WS.4: **ASSESSMENT OF PRECIOUS CORAL POTENTIAL**

| | |
|---|---|
| **Task 91.WS.4a: Review of black coral potential.** | Not in 1991 Work Plan. |
| **Task 91.WS.4b: Review of Corallium potential.** | Not in 1991 Work Plan. |

Project WS.5: **COASTAL DEVELOPMENT STUDIES**

| | |
|---|---|
| **Task 91.WS.5a: Dredging work plan for lagoon areas to be dredged.** | Not in 1991 Work Plan. |
| **Task 91.WS.5b: Baseline study of Mulinu'u Peninsula for management of coastal erosion.** | SOPAC Preliminary Report 28. SOPAC Technical Report 118. |
| **Task 91.WS.5c: Study the effects of dredging in Vaiusu Bay.** | Not in 1991 Work Plan. |
| **Task 91.WS.5d: Coastal stability and cyclone risk, north Upolu.** | SOPAC Technical Report 90. Coastal Morphology maps. |

| | |
|---|---|
| **Task 91.WS.5e: Baseline surveys to assist with development and design of slipways at Salelolonga and Mulifanua.** | Not in 1991 Work List. |
| Project WS.7: **ASSESSMENT OF COBALT-RICH CRUST POTENTIAL.** | |
| **Task 91.WS.7a: Review of cobalt-rich crust potential.** | 1990 Hakurei Maru No.2 cruise report received April 1991. |
| Project WS.8: **OCEAN ENERGY POTENTIAL** | |
| **Task 91.WS.8a: Wave data collection.** | Continuing. |
| Project WS.9: **DATA MANAGEMENT** | |
| **Task 91.WS.9a: Assistance in the use of GIS** | Not in 1991 Work Plan. |
| **Task 91.WS.9b: Improvement of library facilities at Apia Observatory.** | Waiting for new offices. |
| Project WS.11: **COASTAL AND NEARSHORE MAPPING** | |
| **Task 91.WS.11a: Nearshore detailed bathymetric mapping.** | Apolima Strait 1:20,000 (4 sheets). |
| **Task 91.WS.11b: Detailed bathymetric mapping of offshore banks.** | Pasco and other unnamed banks, 1:125,000 (5 sheets) |
| **Task 91.WS.11c: Development of a mapping work plan.** | Waiting for new offices. |
| **Task 91.WS.11d: Purchase of a SPOT image of Western Samoa.** | Not in 1991 Work Plan. |
| Project WS.16: **TRAINING** | |
| **Task 91.WS.16a: Promotion of career opportunities in earth science.** | Deferred to late 1991. |

# Appendix 3

# LIST OF REPORTS COMPLETED

# SOPAC PUBLICATIONS LIST FOR 1990-91 BY COUNTRY

## COOK ISLANDS

Collins, W.; Holden, B. 1991: Circulation and flushing of Ngatangiia Harbour and Muri Lagoon, Rarotonga, Cook Islands. *SOPAC Preliminary Report 26*: 8 pages.

Holden, B. 1991: Physical oceanography of Ngatangiia Harbour-Muri Lagoon and Avarua Harbour, Rarotonga, Cook Islands. *SOPAC Preliminary Report 30*: 20 pages.

Holden, B. 1991: Physical oceanography of Avarua-Avatiu-Motutoa, Rarotonga, Cook Islands. *SOPAC Preliminary Report 31*: 14 pages.

## FIJI

Pflueger, J. 1990: Hydrocarbon potential of the Lau Ridge: Reid Reef to Ogea Levu Island. *SOPAC Technical Report 114*: 14 pages, 3 figures, 11 seismic cross-sections, 2 plates.

Carter, R. 1990: Predicted storm surge and wave setup for Suva and Laucala Bay Harbours on Viti Levu in Fiji. *SOPAC Technical Report 115*: 31 pages.

Morel, Y. 1991: Index of offshore cruises in the sea area of Fiji. *SOPAC Technical Report 119*: 47 pages. (Report has 13 large plots. These can be viewed at the Techsec library and the Fiji Mineral Resources Department).

Tiffin, D.L. 1991: Bibliography of published and unpublished work in Lau Basin, Tonga, from 1985 to early 1991. *SOPAC Technical Report 124*: 18 pages.

Clarke, J.E.H.; Jarvis, P.; Price, R.; Kroenke, L. 1991: Tectonic activity and plate boundaries along the northern flank of the Fiji Platform. *SOPAC Technical Report 127*: 45 pages.

Smith, R. 1991: Monasavu siltation control. *SOPAC Technical Report 129*: 27 pages.

Jarvis, P.A; Kroenke, L.W.; Price, R.; Maillet, P. 1991: Structural fabric in the northern North Fiji Basin. *SOPAC Technical Report 130*: 28 pages.

Malahoff, A.; Falloon, T. 1991: Preliminary report of the *Akademik Mstislav Keldysh/MIR* Cruise 1990, Lau Basin Leg (May 7-21). *SOPAC Cruise Report 137*: 27 pages.

Holden, B. 1991: Levuka land reclamation and storm surge site investigation, 18 October 1990. *SOPAC Preliminary Report 27*: 6 pages.

Smith, R.; Numan, W.; Mouauri, M. 1990: Yasawa marine geophysical cruise, 29 October - 23 November 1990. *SOPAC Preliminary Report 29*: 51 pages.

## KIRIBATI

Tiffin, D.L; Kinoshita, Y. 1991: Executive Summary. Ocean Resources Investigation in the Sea Area of SOPAC. Report on the Joint Basic Study for the Development of Resources. Volume 5: Sea Area of the Republic of Kiribati. *SOPAC Technical Report 125*: 10 pages.

Holden, B. 1991: Coastal protection Tebunginako Village, Abaiang, Kiribati. *SOPAC Preliminary Report 35*: 14 pages.

Gillie, R.D. 1991: Beach profile surveys on Betio and Bairiki and along the Nippon Causeway, South Tarawa, Republic of Kiribati, January 1991. *SOPAC Preliminary Report 37*: 23 pages.

## PAPUA NEW GUINEA

Tufar, W. 1990: SONNE 68 - OLGA II Research Cruise, April 29 to June 25, 1990 - Preliminary Cruise Report. *SOPAC Cruise Report 136*: 9 pages, 2 Appendices.

Sakai, H. 1991: Expedition East Manus Basin hydrothermal field, *Hakuho-Maru* cruise KH90-3, Leg 2. A brief summary report for SOPAC. *SOPAC Cruise Report 138*: 3 pages, 2 figures, 1 table.

## SOLOMON ISLANDS

Rearic, D.M. 1991: Baseline study of coastal erosion Gizo Township, Western Province, Solomon Islands. 28 November to 4 December 1990. *SOPAC Technical Report 120*: 41 pages.

Rearic, D.M. 1991: Coastal environment of Kwai and Ngongosila Islands, Malaita Province, Solomon Islands, 10 December to 12 December 1990. *SOPAC Technical Report 121*: 37 pages.

Gillie, R. 1990: Initial survey for beach erosion monitoring at Ranadi Beach, Honiara, Solomon Islands, 7-17 August 1990. *SOPAC Preliminary Report 25*: 22 pages.

Collins, W.T. 1991: Gold potential at the Matepono River mouth and adjacent areas, Northern Guadalcanal, Solomon Islands. *SOPAC Preliminary Report 36*: 15 pages.

Woodward, P.; Gillie, R. 1991: Coastal Mapping Workshop for Solomon Islands College of Higher Education, 20 May - 24 May 1991. *SOPAC Training Report 42*: 3 pages.

## TONGA

Smith, R.B. 1991: Assessment of sand resources, north Tongatapu, Nuku'alofa, Tonga. *SOPAC Technical Report 123*: 59 pages.

Tiffin, D.L. 1991: Bibliography of published and unpublished work in Lau Basin, Tonga, from 1985 to early 1991. *SOPAC Technical Report 124*: 18 pages.

Creech, H. 1991: Organisation of Library materials at the Ministry of Lands, Survey and Natural Resources, Kingdom of Tonga, Geology Section. *SOPAC Technical Report 128*.

Jarvis, P.A; Kroenke, L.W.; Price, R.; Maillet, P. 1991: Structural fabric in the northern North Fiji Basin. *SOPAC Technical Report 130*: 28 pages.

Morel, Y.; Medina, B. 1991: SOPAC database on multichannel seismic tracks in Tonga waters. *SOPAC Technical Report 131*: 23 pages.

Morel, Y.; Medina, B. 1991: Compilation of swath mapping tracklines in the Lau Basin. *SOPAC Technical Report 132*: 20 pages.

Smith, R. 1991: Volume of sand in Basin A, northwest of Fafa Island, Nuku'alofa Lagoon, Tonga: results of high-resolution seismic survey. *SOPAC Technical Report 133*: 17 pages.

Malahoff, A.; Falloon, T. 1991: Preliminary report of the *Akademik Mstislav Keldysh/MIR* Cruise 1990, Lau Basin Leg (May 7-21). *SOPAC Cruise Report 137*: 27 pages.

Smith, R.; Saphore, E. 1991: Detailed high resolution survey, Basin A, Fafa Island, Nuku'alofa Lagoon, Tonga. *SOPAC Preliminary Report 32*: 11 pages.

## TUVALU

Smith, R.; Saphore, E.; Senaka, F. 1991: Geophysical survey of lagoon sediments, Funafuti Atoll, Tuvalu. *SOPAC Preliminary Report 33*: 15 pages.

Rearic, D.M. 1991: Mapping survey and baseline study of coastal erosion on the islands of Tuvalu, 22 August to 9 September 1991. *SOPAC Preliminary Report 38*: 13 pages.

## VANUATU

Rearic, D.M. 1990: Baseline data of coastal erosion at Mele Bay, Efate, Vanuatu, 5 May to 19 May 1990. *SOPAC Technical Report 116*: 46 pages.

Carter, R. 1990: Hydraulic characteristics of the channel linking Erakor lagoons and environmental implications. (Water quality monitoring of the Erakor Lagoons and Port Vila Harbour). *SOPAC Technical Report 117*: 29 pages, 2 appendices.

Smith, R.B. 1991: Bathymetry and seabed morphology, Port Havannah, Vanuatu. *SOPAC Technical Report 122*: 20 pages.

Smith, R.B. 1991: Nearshore bathymetry and seabed morphology Mele Bay, Efate, Vanuatu. *SOPAC Technical Report 126*: 25 pages.

Jarvis, P.A; Kroenke, L.W.; Price, R.; Maillet, P. 1991: Structural fabric in the northern North Fiji Basin. *SOPAC Technical Report 130*: 28 pages.

## WESTERN SAMOA

Carter, R. 1991: Shoreline erosion on Mulinu'u Point and related considerations in Western Samoa. *SOPAC Technical Report 118*: 22 pages.

Holden, B. 1991: Shoreline erosion and related problems, Western Samoa. *SOPAC Preliminary Report 28*: 8 pages.

## REGIONAL

Gillie, R. 1991: Field demonstration of vertical aerial photography capability, western Viti Levu, Fiji Islands, 30 May 1991. *SOPAC Preliminary Report 34*: 23 pages.

## JOINT CONTRIBUTION REPORTS

Davy, B. 1991. Seismic reflection processing. DSIR Geology and Geophysics Contract Report 1991/63 (SOPAC Joint Contribution 79).

Eissen, J.P. (ed.) 1991. Geology and biology of the rift system in the north Fiji and Lau basins: abstracts. ORSTOM, Noumea (SOPAC Joint Contribution 67) Conference: STARMER symposium (1991 : Noumea).

Falconer, R.K.H., Handley, L.J. 1991. Presentation and interpretation of SOPAC 1989 Nomuka and Ha'apai group, Kingdom of Tonga, magnetic data. GeoResearch Associates, Waikanae, N.Z. GeoResearch Associates Report 91.031: 19 p.; 5 fig. (SOPAC Joint Contribution 77).

Harper, J. 1990. Trip report: visit to Christmas Island, 11 to 25 July 1990. Harper Environmental Services Project: 13 p., figs., tables, 4 app. (SOPAC Joint Contribution 80).

Japan International Cooperation Agency, Metal Mining Agency of Japan 1991. Report on the joint basic study for the development of resources: sea area of Western Samoa. JICA, [np]. Ocean resources investigation in the sea area of CCOP/SOPAC 1-1: 121 p.; 4 app.; 6 fig. (SOPAC Joint Contribution 75) [with data volumes].

Japan International Cooperation Agency, Metal Mining Agency of Japan 1991. Report on the joint basic study for the development of resources, sea area of Cook Islands. JICA, [np]. Ocean resources investigation in the sea area of CCOP/SOPAC 1-2: 102 p.; 3 app.; 14 fig. (SOPAC Joint Contribution 76) [with data volumes].

Kroenke, L.W., Eade, J.V. (eds.) 1990. Basin formation, ridge crest processes, and metallogenesis in the North Fiji Basin. Circum-Pacific Council, Houston. Circum-Pacific Council for Energy and Mineral Resources Earth Science Series (SOPAC Joint Contribution 68). Note: Draft.

Oceanor [1990]. Wave measurements in the Pacific Ocean 1987 - 1990. Oceanor, [Trondheim]: 1 vol. data sheets (SOPAC Joint Contribution 78). Note: Title on data sheets: SOPAC/NECOR wave measurements.

Stackelberg, U. von (and shipboard scientific party) Bundesanstalt fur Geowissenschaften und Rohstoffe 1990. Geoscientific investigations in the Lau Basin (southwest Pacific Ocean): research cruise SO67-2 with R/V Sonne March 17 to April 28, 1990. BGR, Hannover (SOPAC Joint Contribution 63).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Tongatapu/Tonga Islands summary report 1987. NHL, Trondheim (SOPAC Joint Contribution 69).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Tongatapu/Tonga Islands summary report 1988. NHL, Trondheim (SOPAC Joint Contribution 70).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Tongatapu/Tonga Islands summary report 1989. NHL, Trondheim (SOPAC Joint Contribution 71).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Rarotonga/Cook Islands summary report 1987. NHL, Trondheim (SOPAC Joint Contribution 72).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Rarotonga/Cook Islands summary report 1988. NHL, Trondheim (SOPAC Joint Contribution 73).

Torsethaugen, K. Norwegian Hydrotechnical Laboratory 1991. Wave data collection at Rarotonga/Cook Islands summary report 1989. NHL, Trondheim (SOPAC Joint Contribution 74).

# Appendix 4

# TECHSEC STAFF LIST

# SOPAC TECHNICAL SECRETARIAT STAFF LIST

(as at 1 September 1991

| Position | | Incumbent | Funding |
|---|---|---|---|
| **MANAGEMENT** | | | |
| 1. | Director | J. Kotobalavu | SOPAC |
| 2. | Deputy Director | J. Eade | Australia |
| 3. | Finance & Admin. Controller | U. Farook | SOPAC |
| 4. | Programme Co-ordinator | T. Toatu | EEC |
| 5. | Executive Secretary | J. Brown | SOPAC |
| 6. | Senior Technical Secretary | L. Baravilala | SOPAC |
| **TECHNICAL PROGRAMMES** | | | |
| **Coastal and Nearshore Programme** | | | |
| 7. | Coastal Geologist | D. Rearic | USGS |
| 8. | Coastal Geologist | R. Gillie | ICOD |
| 9. | Coastal Engineer | B. Holden | CIDA |
| 10. | Marine Geologist | R. Smith | CFTC |
| 11. | Marine Geologist | W. Collins | ICOD |
| 12. | Remote Sensing Geologist | Recruiting | France |
| 13. | Wave Engineer | E. Olsen | Norway |
| 14. | Dredging Engineer | S. Pow | CFTC (6 months) |
| **Hydrocarbon Programme** | | | |
| 15. | Petroleum Geologist | Recruiting | CFTC |
| 16. | Petroleum Geophysicist | W. Barclay | CIDA |
| **Offshore Programme** | | | |
| 17. | Offshore Co-ordinator | D. Tiffin | CIDA |
| 18. | Marine Geologist | Y. Kinoshita | Japan |
| **Training Programme** | | | |
| 19. | Training Co-ordinator | R. Howorth | ESCAP/UNDP |
| 20. | Asst. Training Co-ordinator | Recruiting | EEC |
| **Technical Support Programme** | | | |
| *Data Management* | | | |
| 21. | Data Manager | Y. Morel | France |
| 22. | Computer Geologist | B. Medina | France |
| 23. | Computer Operator | B. Bakoso | France |
| *Technical Information* | | | |
| 24. | Technical Editor | A. Sherwood | NZ |
| 25. | Assistant Editor | L. Bukarau | EEC |
| 26. | Librarian | H. Creech | ICOD |
| 27. | Assistant Librarian | D. George | ICOD/SOPAC |
| 28. | Chief Draftsman | P. Woodward | Australia |
| 29. | Draftsman | N. Naibitakele | ESCAP/UNDP |
| *Technical Services* | | | |
| 30. | Electronics Engineer | E. Saphore | ESCAP/UNDP |
| 31. | Computer Systems Manager | Recruiting | CFTC |
| 32. | Snr Electronics Technician | Recruiting | EEC |
| 33. | Electronics Technician | P. Musunamasi | ESCAP/UNDP |
| 34. | Marine Mechanic | J. Mausio | EEC |
| 35. | Snr Geology Technician | S. Motuiwaca | ESCAP/UNDP |
| 36. | Technl Support Assistant | Recruiting | EEC |
| 37. | Workshops Assistant | S. Ratu | SOPAC |
| *Technical Secretaries* | | | |

| | | | |
|---|---|---|---|
| 38. | Technical Secretary | L. Waradi | EEC |
| 39. | Technical Secretary | L. Kamali | EEC |
| 40. | Technical Secretary | A. Nata | EEC |
| 41. | Technical Secretary | S. Prasad | EEC |

**FINANCE AND ADMINISTRATION SUPPORT**

| | | | |
|---|---|---|---|
| 42. | Accountant | A. Pal | SOPAC |
| 43. | Administrative Assistant | N. Whippy | SOPAC |
| 44. | Accounts Clerk | M. Salusalu | SOPAC |
| 45. | Secretary/Registry Clerk | A. Olsen | SOPAC |
| 46. | Receptionist/Clerk | U. Bainiloga | SOPAC |
| 47. | Driver/Clerk | E. Gaunavou | SOPAC |
| 49. | Cleaner/Office Assistant | N. Daurewa | SOPAC |
| 50. | Watchman/Security | T. Cama | SOPAC |
| | (on roster basis) | B. Tukana | SOPAC |
| | | I. Sogo | SOPAC |

# Appendix 5

# CRUISES COMPLETED 1990-91

## LIST OF CRUISES COMPLETED OR UNDERWAY WITHIN SOPAC AREA

**from 1 September 1990 to 1 September 1991**

Prepared by Don Tiffin, Techsec

The following foreign research vessel cruises have operated within SOPAC Member Country EEZ's (exclusive of Australia and NZ) since 1 September 1990:

JOIDES RESOLUTION (USA), 10 August - 11 October 1990 from Guam to Townsville for ODP Leg 133. Ocean Drilling Programme in northeast Australia to define sedimentary response to sea level changes in the Late Cenozoic, esp. Quaternary; to define effect of paleo- chemistry, -climate, and -oceanography on carbonate reefs. Drilled 12 sites along two transects. Largest drill core recovery to date. Found Great Barrier Reef was much younger than thought (abouat 0.5 million years). Co-Chief Scientists: Peter Davies (BMR), Judith McKenzie (ETH, Switzerland).

HAKUREI MARU No 2 (Japan), 1990, for new Japan-SOPAC 5 yr programme. **Leg 1**: 23 August - 15 September from Majuro to Apia. In Western Samoa work area from 28 August for manganese nodules and cobalt crust surveys. Chief Scientist: Yoshihisa Okuda (GSJ). **Leg 2**: 18 September - 25 October, from Apia to Honolulu. In southern Cook Islands work area 20 September - 16 October for manganese nodule survey. Chief Scientist: Jiro Date, (DORD).

JOIDES RESOLUTION (USA), 16 October - 17 December 1990 from Townsville to Suva for ODP Leg 134 in Vanuatu. Ocean Drilling Programme to evaluate ridge-arc collision and subduction. Drilled five holes in D'Entrecasteaux Zone and adjacent margin, and two holes in Central Basin. Co-Chief Scientists: Gary Greene (USGS), Jean-Yves Collot (ORSTOM-France).

HAKUHO MARU (Japan), 30 October - 14 December 1990 from Honolulu to Tokyo via Rabaul and Guam, cruise KH90-3 for Ocean Research Institute, University of Tokyo, with Seabeam.
**Leg 1**: chemical and physical oceanography and aerosol study along two transects of the equator at 160°E and 179°E. Port stop in Rabaul, 21-24 November. **Leg 2**: geochemical, biological and geological study of hydrothermal areas of eastern Manus Basin. Port stop in Guam, 7-10 December, then transit to Tokyo. Chief Scientist: Prof. Hitoshi Sakai.

FARNELLA (UK-USGS) 4 December 1990 - 29 March 1991, used USGS GLORIA system to map EEZ's of US territories: **1.** Necker Ridge in EEZ of Hawaii; **2.** Johnson Island; **3.** Kingman and Palmyra Islands, Sector 1. Also made a nodule cruise in Clarion-Clipperton Nodule area, and installed bathymetric mapping capability to GLORIA in California. Project Manager: David Clague, USGS.

JOIDES RESOLUTION (USA), 21 December 1990 - 28 February 1991 from Suva to PagoPago and Honolulu for ODP Leg 135. Drilling in Lau Basin and Tonga Arc evaluated back-arc rifting and arc history. Five drill holes were made: one in old backarc crust in western Lau Basin, two in young crust in central Basin, one on Tonga platform, one on outer edge of Tonga forearc. Co-Chief Scientists: Lindsay Parson (IOSDL), Jim Hawkins (SCRIPPS).

YOKOSUKA (Japan), 10 January - 6 February 1991 Noumea-Suva-Noumea for YOKOSUKA 90 under the Japan/France STARMER programme. In Noumea, 7-10 January, in Suva, 22-25 January, in Noumea 6-9 February. Targets were in central NFB and NW arm of triple junction, and Coriolis Troughs in Vanuatu. Single and multi-channel seismic, sonobuoy and OBS refraction, magnetics, sampling with corer and dredge, wide swath bathymetry, deeptow TV and sidescan sonar, and deep hydrocast data was obtained. Chief Scientists: **Leg 1** - Jean Phillip Eissen, Yoshi Okuda; **Leg 2** - Jean-Marie Auzende, Yoshi Okuda.

MOANA WAVE (USA), 11 February - 2 April 1991, Honolulu-Port Vila-Guam for SSI, Inc. PACRIM WEST Cable route surveys with SeaMARC II in eastern Solomon Islands area. Project Manager: Don Hussong, SSI. Loren Kroenke, on board adviser.

MORSKY GEOFIZIK (USSR) 12 May - mid June 1991. Single channel seismic, gravity and magnetics and shallow water dredging in northern Line Islands just north of Kiribati. Joint cruise by HIG and Marine Geology/Geophysics, Sakhalin. Chief Scientist: Vyacheslav Patrikev. Barbara Keating and one student from HIG.

# Appendix 6

# CRUISE SCHEDULE

# DRAFT RESEARCH SHIP SCHEDULE FOR SOPAC AREA

**as at 26 August 1991**

Prepared by Don Tiffin, Techsec

YOKOSUKA/ SHINKAI 6500 (Japan), 24 August - 7 November 1991. Diving for the STARMER programme in North Fiji Basin. Arrive Suva 24 August from Japan; **Leg 1** - Lv Suva 29 August: 15 dives on sites on NFB rift axis and hydrothermal areas. Arrive Noumea 25 September. Co-Chief Scientists: Tetsuro Urabe (GSJ), Etienne Ruellan, (University of Nice). **Leg 2** - Lv Noumea 9 October: 15 dives on sites on NFB rift axis and hydrothermal areas. Arrive Suva, 4 November. Leave Suva, 7 November. Co-Chief Scientists: Manabu Tanahashi (GSJ), J-M Auzende (IFREMER).

HAKUREI MARU No. 2 (Japan) 26 August - 27 October 1991 in Gilbert Islands for manganese nodules and cobalt crusts. Japan/SOPAC programme, cruise leader Jiro Date, DORD.

FRANKLIN (Australia), 24 September - 14 October 1991 from Cairns to Townsville: PACLARK V programme, sampling and photograpy in Western Woodlark Basin in hydrothermal areas and in eastern Manus Basin to define submersible dive targets there. Chief Scientists: Ray Binns, CSIRO; Steve Scott, University of Tasmania.

NOROIT (France), Noumea to Noumea, 1 November - 13 December 1991 by ORSTOM for SANTA CRUZ programme in northwestern North Fiji Basin, eastern Solomon Islands. Bathymetry, magnetic and structural data to determine nature of northern backarc troughs and history and tectonics of northern basin in relation to Vitiaz paleo-subduction. Port stop in Honiara. Chief Scientist: Bernard Pelletier.

NOROIT/CYANA (France) end 1991 (?)for SAVANES programme of ORSTOM. Noumea to Port Vila. Diving at up to 18 sites in the Jean Charcot Troughs and Hazel Holme Fracture Zone, northern Vanuatu, to date volcanism, analyse hydrothermal fluids and deposits, study stratigraphy, structure, tectonics and evolution. Part of STARMER Programme. Chief Scientists: Patrick Maillet, Tetsuro Urabe.

JOIDES RESOLUTION (USA) 24 March - 20 July 1992: ODP Drilling for Atolls and Guyots programme, some sites in Marshall Islands. **Leg 143**: 24 March -20 May, from Honolulu to Majuro. Drilling at 3 sites. **Leg 144**: 25 May -20 July, from Majuro to Yokohama. Drilling at 5 sites.

MAURICE EWING (ex-Bernier)(USA), April(?), 1992: Deep seismic studies of extensional processes in Western Woodlark Basin and Trobriand Islands area, in collaboration with Monash University. The ship has a Hydrosweep and 240 channel MCS system. Chief Scientist: John Mutter, Lamont-Doherty Geophysical Observatory.

MOANA WAVE (USA) proposed for 1992. SeaMARC II in Woodlark Basin east of PACLARK area. Chief Scientist: Brian Taylor (SOEST).

MOANA WAVE (USA), 1992, for University of California programme in Huon Gulf. Study of arc-continent collision using SeaMARC II. Chief Scientist: Eli Silver (UCSC).

CHARLES DARWIN (UK), proposed for late 1992 for joint IOSDL/BRIDGE programme in Lau Basin. Plan to use GLORIA/TOBI swath mapping equipment and do bottom sampling.

ATALANTE (FRANCE), proposed for 1993, possibly also 1994, for swath mapping and geophysical surveys in New Caledonia and South Pacific region.

# Appendix 7

# LIST OF MAJOR EQUIPMENT AT SOPAC

# LIST OF MAJOR EQUIPMENT AT SOPAC TECHSEC

**Position Fixing Systems**

Delnorte Trisponder :
- DDMU 520
- DDMU 562
- Transponder 217E

Delnorte Trisponder :
- DMU RO3C
- Transponder 217C
- Decca Data printer 10284

Magellan PRO 1000 gps Navigator
Magnavox satellite navigator 4102 with azimuth flux-gate compass 314
Sokkiska C3E Automatic level
Tamaya Sextant

Computerised Mapping and Plotting System (CMAPS):
- Delnorte Trisponder
- Raytheon DE719-C with Odem digitizer
- Toshiba T1000 computers
- CCOP/SOPAC software and hardware

**Sub Bottom Profilers and depth Sounders**

Raytheon RTT1000A :
- Raytheon De-719 Echosounder
- Raytheon PTR 106-C transceiver
- Raytheon TC 3.5/7 transducer
- EPC 1650 line scan recorder

EG & G Boomer :
- EG & G 232-A Power Supply
- EG & G 231 Triggered Cap Bank
- EG & G 265 Hydrophone Array
- EG & G 262-J Hydrophone Array
- EPC 4603 Line Scan Recorder
- Khron Hite 3700 banad pass filter
- Hewlett Packard 465 A amplifier
- Hydro-spark array Mod 3
- Schliedegg Mag 3OV Monopulse generator

Data Sonics Bubble Pulser System SPR 1200

**Towed Sensing Equipment**

Barringer M123 magnetometer with marine probe.

Klein Side Scan Sonar:
- Klein SA 350-A transceiver
- Klein 4225-001A towfish
- Klein 4225-001E towfish
- EPC 3200 line scan recorder
- EPC 4800 line scan recorder

**Underwater Observation/Photography**

Benthos Underwater Camera System :
- Benthos 371 camera
- Benthos 381 utility flash

Benthos 2216 pinzer
Deployment frame

RT Labs Underwater Monitor: Dolphin TM 10 (TV lens F=8.5mm)
Panasonic portable VCR NV180
Panasonic monitor
RT labs camera controller

Nikonus IV-A underwater hand held camera and Toshiba TM-IIunderwater electronic flash unit.

Scuba for 6 divers
Bauer Purus-G (330 BAR) diving-air compressor

**Physical Oceanographic Equipment**

| | |
|---|---|
| Aanderra water level recorder | WLR-5 (2) |
| Aanderra current meter | RCM-7 (2) |
| Aanderra current meter | RCM-4 (3) |
| Aanderra temperature string | TS-2 (2) |

Data storing unit reader
Aanderra tape reader 2650
Aanderra hydrophone receiver 2247

Hatch DR-EL/4 portable water quality lab
NBA DNC-3 water monitorPartech multi-parameter water quality monitor

SBE STD Profiler: YSI STC (model 33) meter/probe
YSI DO (model ST) meter/probe

**Bottom Sampling Equipment**
Vanveen grabs: 55 cm, 50 cm, 30 cm, 15 cm
Benthos "Boomerang" free fal grabs (4)
Geomarex vibrocorer system
Acker N5-W wire line drill system
CCOP/SOPAC Vibro air-lift system

**Computers, printers, periphals**
MicroVAX II
VAX Station 3100
8088 XT Clone
80286 AT Clone
80386 AT Clone
Compaq PC
Sharp portable
Toshiba T1000 laptop
Zenith Supersport 286
Zenith Supersport 386
Hewlett Packard laser jet II printer
Hewlett Packard laser jet III printer
Panasonic KXP 4420 Laser printer
Texas Instrument TI855 Dot matrix printer
Star NX1000 Dot matrix printer
Tetronix 4696 Dot matrix printer
Epson FX 1050 Dot matrix printer
Epson FX 100 Dot matrix printer

Diconix 150P ink jet portable printer
Hewlett Packard Scanjet scanner
Huston Instruments Hi Pad digitizer
GTCO 3648A digitizer
JCAD digitizing tamlet
Benson 1650 plotter
Schlumberger 1835 plotter
SUN SPARC IPC Workstation
SUN SPARC printer
SUN CD ROM Drive

**Support Equipment**
Aluminium dinghy 15 ft with 2 x 15 hp outboard engine
Zodiac MKIV dinghy with mariner 25 hp outboard engine
Zodiac C130 Dinghy with seagull ESC4 outboard engine
Hydrowinch HR-40 winch
Ingersoll-Rand compressor SCD 2030
Ingersoll-Rand compressor P100 A
Yanmar water pump YDP 3E
Honda water pump WA 20
Yamaha diesel generator EDY 3000
Honda petrol generator EF 1500
Yamaha petrol generator EF 600
Geomarex vibro-motors BUP-4
Power-chief diesel generator 12KVA
Portable aluminium (7m) 'A' frame

**SOPAC Major Equipment to be Acquired**

| | | |
|---|---|---|
| Position fixing systems | : | GPS receivers |
| | | Rhotheta option for Trisponder system |
| | | Electronic total station |
| Depth Sounder | : | ODEM DF3200 Echo-TRAC survey sounder |

# Appendix 8

# STATUS OF 19TH SESSION TAG RECOMMENDATIONS

## SUMMARY OF RECOMMENDATIONS OF THE TECHNICAL ADVISORY GROUP

1. Noting that grade and abundance data on South Pacific nodules and crusts is not widely available or known, TAG strongly RECOMMENDED that the data be compiled and publicised and made available through the major data base systems (Agenda Item 8.1).

**SOPAC nodule database updated; draft regional maps showing nodule abundance and metal grades completed.**

2. TAG, noting that OTC had recently conducted a major cable route survey and had collected detailed swath mapping data, RECOMMENDED that Techsec visit OTC Australia to review the data applicable to member countries and to obtain relevant copies of the data (Agenda Item 8.3).

**Contact with OTC established through SSI, data to be presented at SOPAC 20th Annual Session.**

3. TAG RECOMMENDED that document CR 19/8.3/1 (Swath mapping areas in the EEZs of Tonga, Fiji, Tuvalu, Solomon Islands, and Papua New Guinea) be revised by Techsec, taking into consideration changes and additions suggested by TAG, and that the revised document be distributed to all TAG advisors and other appropriate persons concerned with possible future swath-mapping cruises in the SOPAC region, as soon as possible after the Nineteenth Session (Agenda Item 8.3).

4. TAG strongly RECOMMENDED that ships transiting member countries waters collect as much data as possible, especially swath-mapping data, for use by that member country (Agenda Item 8.3).

5. TAG, assigning a high priority to the hydrocarbon programme, RECOMMENDED that Techsec seek the services of a hydrocarbon expert from the UK ODA to develop a detailed proposal for a multi-national programme to evaluate the petroleum potential of SOPAC member countries, RECOMMENDED that funds be sought from the EEC and other sources such as Australia, the UK, Norway, France, and the USA, and AGREED that work done under the multi-national hydrocarbon programme and the major swath-mapping survey be apportioned to reflect the needs of all island member countries (Agenda Item 9).

**UK expert not available.**

6. TAG, in considering the Proceedings of the CIDA-SOPAC Coastal Investigations and Engineering Workshop, endorsed the following RECOMMENDATIONS (Agenda Item 10.3):

a) Member governments are encouraged to develop coastal zone management plans that would place governments in a more pro-active position (as opposed to reactive position) and alert developers to potential coastal zone hazards. SOPAC should consider making the expertise in Techsec available to assist in developing such plans in identifying potential coastal zone hazards with strong emphasis on coastal stability and marine pollution implications.

b) SOPAC should consider the development of guidelines or a check list that could be used by island member countries and/or developers in the initial evaluation stages of coastal development relative to non-living resources.

c) SOPAC should further promote the collecting, collating and use of historical weather data, aerial photography, "local knowledge" and geological data for the initial evaluation of coastal development proposals.

d) Systematic on-going monitoring of coastal stability and processes should be encouraged as one of the conditions in the development permit issued to developers.

e) Member countries are encouraged to advise SOPAC of locations of potential coastal developments.

14. TAG RECOMMENDED Techsec prepare a draft list of regional concerns in coastal and nearshore disciplines that could be reviewed by TAG and SOPAC at the Annual Session, and that can be used as a guide to potential researchers and funding agencies (Agenda Item 10.6).

**The annual SOPAC Work List, consisting of a list of work required by member countries and prioritised by them, reflects regional concerns in coastal and nearshore disciplines.**

15. TAG, noting the need for a formal link between SOPAC and IOC, RECOMMENDED that an IOC representative should be co-located at IOC headquarters and at Techsec to coordinate IOC activities in the SOPAC region and to represent the region at IOC meetings, and further RECOMMENDED that the generous offer of the United States that if so requested by the member countries, the United States will assist in identifying funding for this position and facilitate a formal agreement between SOPAC and IOC (Agenda Item 10.6).

**Preparations for possible IOC representative position at Techsec begun. Instigation deferred until office space requirements for professional programme staff sorted out.**

16. TAG RECOMMENDED that Techsec uptrade its Data Management computer facility by the addition of at least two Sun work stations to provide backup, one of which should be a large work station, and noting that both data base management programmes, GMT and GEOMER can operate simultaneously further RECOMMENDED that both programmes be installed and used, and that the present PCs be linked into the Sun work stations, if necessary through the Micro Vax II (Agenda Item 11.1).

**One SUN station being installed; second being accorded; other hardware and software requirements reviewed by consultant and consultant's recommendations being followed up.**

17. TAG RECOMMENDED that the generous offer of the East-West Center to assist with the creation of a mineral resources information system for Solomon Islands, Fiji, and Vanuatu be supported (Agenda Item 11.1).

18. TAG RECOMMENDED that Techsec prepare an appropriate list of experts working in the SOPAC region, including addresses, electronic addresses, and a brief outline of expertise, and provide this to member countries (Agenda Item 11.2).

**Consultants register at Techsec established.**

19. TAG RECOMMENDED that the 1991 STAR meeting be conducted over two days during the 1991 SOPAC Annual Session, that the general theme be geology, geophysics and minerals of the Southwest Pacific, and include a review of the results of recent ODP legs, swath-mapping, and topics organised by various working groups (Agenda Item 12).

**STAR meeting set for September 20 and 21, immediately prior to SOPAC 20th Annual Session.**

20. TAG noted that specific member country requests regarding training had arisen from discussion of the 1990 Work List and RECOMMENDED that (Agenda Item 13):

a) confidential reports be prepared on participants in all training activities and not just the Earth Science and Marine Geology Course;

b) consideration be given to holding a workshop on drilling, possibly in conjunction with the UNDP Regional Water Resources Project;

c) public education and awareness training, including the preparation of publicity material especially focused on schools, receive more attention;

d) that a regional workshop on equipment maintenance be preceded by the preparation of a list of equipment available in member countries.

f) A follow-on workshop should be considered that would allow suitably qualified island nationals to work with a wave tank or flume to examine specific design and failure mechanisms for foreshore protection schemes of potential interest to island countries.

g) SOPAC should investigate the implementation and use of short-term training attachments for engineers and geologists to provide a broad range of practical experience.

h) SOPAC should consider organising a Seminar/Workshop on the use of aggregate bitumen and cement for marine application in small island countries.

7. Recognising the need for technical advisors in the fields of nearshore minerals, coastal development, geohazards and other aspects of the coastal and nearshore programme, to assist in deliberations at the annual session, TAG RECOMMENDED that technical advisors present at the nineteenth annual session identify and encourage experts in these areas from their countries to attend Annual Sessions of SOPAC (Agenda Item 10.3).

8. TAG noted that thee was a continuing need for technical advice in the offshore programme, but also specifically RECOMMENDED that Techsec make special efforts to invite advisors in the following technical fields: coral reef ecology; sea level change; geological engineering; and coastal engineering (Agenda Item 10.3).

**Additional advisors with above technical expertise invited to 20th Annual Session.**

9. Noting that there is a funding problem in bringing experts to the annual session, TAG RECOMMENDED that Techsec approach donor agencies to obtain funding for experts to attend the annual session (Agenda Item 10.3).

**AIDAB and UNDP/ESCAP have continued to support attendance of special technical advisors.**

10. Noting the great value of the wave buoy measurement both in terms of potential electricity generation and of helping coastal protection design, TAG RECOMMENDED that Techsec approach Norway to increase the number of operating buoys from four to six so that data could be collected in more countries (Agenda Item 10.4).

**Operational buoys increased from four to five.**

11. Noting the high commercial charges involved in the transmission of wave data, TAG RECOMMENDED that Techsec find ways to reduce costs of operating of the wave measurement programme by getting data handling at non-commercial rates (Agenda Item 10.4).

**Data now accessed from computer in Australia with subsequent savings in operational costs.**

12. TAG, in discussing the Lagoon Wave Study proposal (Document CR 19/10.4), agreed that wave data was valuable for many reasons other than the wave power potential and RECOMMENDED that links with university doctoral programmes be established to undertake the lagoon study (Agenda Item 10.4).

13. TAG RECOMMENDED that Techsec in conjunction with member countries prepare a list of research projects in coastal and nearshore disciplines and publish this both as a conference room document for review by TAG and within the Annual Report, to provide other interested parties with a regional perspective of nearshore and coatal research in the region (Agenda item 10.6).