

# APPENDIX 7

## SUMMARY REPORT OF STAR

The STAR Meeting held in conjunction with the 26<sup>th</sup> Annual Session of the SOPAC Governing Council was convened on September 29 and 30, prior to the official opening of the Session. This reflected new arrangements that included an oral report to Governing Council by the Chair of STAR, Keith Crook (see attachment), and provision for the STAR Working Groups to report in writing, with recommendations, to the TAG Session later in the week.

During the STAR meeting, 41 scientific papers were presented orally, by poster, or by abstract (SOPAC Miscellaneous Report 263). The six sessions of oral presentations were chaired by Keith Crook, Saimone Helu (STAR Vice Chair), Jim Colwell, Robin Moaina, Dick Pickrill and Bhaskar Rao. Two themes new to STAR were represented among the papers presented: Water Resources (which included papers by SOPAC Secretariat scientists); and Time-Series Data and Interpretation, covering oceanographic, meteorological and other data collected systematically, on a high-frequency recurrent basis at specific sites over periods of several years at least. Other themes represented were: Coastal and Nearshore Processes and Resources; Mineral Deposits; Tectonics; and Geohazards, which included a paper by SOPAC Secretariat scientists.

Unprioritised highlights drawn from these scientific presentations are noted below:

- The work by John Collen and colleagues on sediment budgets in coral islands and its potential for establishing replenishment rates and indicators of the environmental health of carbonate sediment-producing ecosystems.
- Mark Sinclair's demonstration of the utility of LADS-II (Laser Airborne Depth Sounder) for bathymetric mapping of large areas of shallow water (0.5 – 70 m) rapidly, cost-effectively, and at an acceptable level of precision.
- Ahser Edward's description of the physical effects of unregulated shoreline dredging in Pohnpei, Federated States of Micronesia, and the protracted and complex response of marine and land ecosystems to the disturbance.
- Demonstration by Andy Butcher of ways in which SOPAC's National Capacity Development Program uses multimedia techniques in distance education, based on a CD ROM or SOPAC's web site, and a digitised version of SOPAC's popular publication "Coasts of Pacific Islands".
- The cluster of papers on water resources – the first at a STAR Meeting - by Giovanni Ricci, David Scott and Ed Burke of SOPAC and Ian White and Tony Falkland, that clearly demonstrates the complexities that arise in the assessment, modelling, monitoring and management of water in low and high Pacific Islands.
- Presentations by Yoshifumi Kuroda and Tim Wright describing the capabilities of the existing TAO and the about-to-be-deployed TRITON networks of deep ocean anchored buoys that record and transmit by satellite a substantial set of real time meteorological and physical oceanographic data; their very substantial socio-economic significance; the crucial importance of unimpeded access to maintain these buoys; the inevitable but unwelcome function of the buoys as fish attractors; and the consequent urgent need to educate fishermen and regulate fishing so as to prevent damage to the buoys and consequent data-loss.
- The review by Mark Merrifield and Shaun Johnston of sea-level rise, emphasising the difference between assessments based on short time series which give large and variable values, and those based on data collected over several decades. The latter provide a well-attested average rise of 1.8 cm/decade globally, much smaller and better constrained than were the estimates made in the 1980's. Local vertical movements due to tectonic uplift or settling of islands must also be taken into account. This highlights the importance of acquiring long-term (>20 years) tide-gauge data to verify satellite data.
- Bill Erb's overviews stressing the importance and relevance to the SOPAC region of the IOC-WMO-UNEP coordinated Global Ocean Observing System (GOOS); and the unique opportunities arising from the declaration

by the UN of 1998 as the Year of the Ocean.

- Papers describing classical geological approaches to volcanic hazard assessment by Vince Neall & Shane Cronin (for Taveuni, Fiji) and by Mike Petterson & colleagues (for Savo, Solomon Islands) that clearly demonstrate this essential component in hazard management.
- The associated cluster of papers by Ken Grainger (AGSO), Graham Shorten & Robert Smith (SOPAC), and Atu Kaloumaira (SPDRP) demonstrating that, to be effective, responses to geohazards must go beyond the scientific assessment stage so as to involve the communities likely to be impacted and their managers and planners, so that response planning and risk mitigation are implemented before a disaster occurs. The AGSO Cities Project, SOPAC's Pacific Cities project and the South Pacific Disaster Reduction Program exemplify, in diverse ways, this new holistic approach to geohazards and its applicability to the SOPAC region.
- John Barrie's demonstration, using geological and geochemical data from Niue, of a new model for ore genesis in limestone-capped volcanic seamounts. This model, if verified by surveys elsewhere in the SOPAC region, would substantially change the mineral resource potential of the coral island PICs.
- The outline description by Keith Crook and colleagues of newly discovered hydrothermal activity and volcanic massive sulfide deposits at Susu Knolls in the eastern Manus Basin, Papua New Guinea. This basin can now be considered as the modern analog of a mineral field or mining district.
- Papers on tectonics by Mike Petterson & colleagues on the exposure and deformation of the Ontong Java Plateau margin on Malaita, Solomon Islands; Patrick Coleman, on terraces, vertical uplift and jostling of fault blocks and their origins; and Paul Wessel and Loren Kroenke, on a new method for locating active and extinct hot spots. These contributions exemplify the continuing enhancement of the fundamental science base of concepts, data and techniques applicable to the SOPAC region.
- Several posters were displayed that presented valuable information. Particular attention was directed to those summarising the non-living and living marine resources of the New Caledonia EEZ, including summary bathymetric maps; and the mapping of surficial deposits in urban Noumea for

landslide and erosion hazard assessment.

During the 26th Annual Session, the following STAR Working Groups met. Their reports are included below:

- Coastal and Nearshore Resources and Processes (co-Chairs: John Collen, Tevita Vuibau)
- Geohazards (co-Chairs: Paul Taylor, Gajendra Prasad)
- Tectonics (co-Chairs: Loren Kroenke, Robin Moaina)
- Water (co-Chairs: Tony Falkland, Ausetalia Titimaea) – NEW working group
- Habitats (co-Chairs: Gary Green, Jean-Marie Auzende)
- Ocean Basin Mineral Resources & Technology (which subsumed the Seafloor Mapping working group) co-Chairs: Tevita Vuibau, Gary Greene (for Mike Cruickshank who could not attend)
- Information Exchange (co-Chairs Les Allinson, Gary Denton)
- Time Series Ad-Hoc Working Group – NEW working group

In addition the following working groups, with co-Chairs as indicated, did not meet. If warranted, they may resume work together with other working groups, not later than three months before the next Annual Session, or earlier should circumstances require:

- Law of the Sea (Lindsay Parson, Grant Boyes)
- Ocean Drilling (Gary Green, Rowena Duckworth)
- Hydrocarbons (Neville Exon, Donn Tolia)
- Geodesy and Precise Navigation (Mike Bevis, Barma Nand)

#### **COASTAL AND NEARSHORE RESOURCES AND PROCESSES**

John Collen (co-Chair)  
Tevita Vuibau (co-Chair)  
James Aston  
Gabriel Ayin  
Viliame Baleivanualala  
Isabel Calvert  
Tom Cocke  
Jim Colwell  
Ahser Edward  
William Erb

Marie Ferland  
Bill Garstang  
Kriton Glenn  
Gary Greene  
Shaun Johnston  
Savae Latu  
Jackson Lum  
Takeshi Ogitsu  
Gajendra Prasad  
Dick Pickrill  
Graham Shorten  
Alf Simpson  
Mark Sinclair  
Robert Smith  
Dave Tappin  
Tu Upoko  
Chunting Xue  
Yuki Yoshida

The Coastal and Nearshore Resources and Processes Working Group considered a range of issues, from basic science through monitoring and data acquisition to the development of resources. Delegates commented very favourably on SOPAC's past coastal studies and particularly on the value of the accumulated databases. Delegates noted that pressure on the environments and resources of the coastal and nearshore zone are likely to continue to increase and were generally concerned that measures be put in place to deal with these.

The Coastal Working Group recognised that, despite much excellent baseline research on coastal and nearshore problems which in some cases extended back many years, many fundamental scientific questions pertaining to coastal processes and resources remain to be answered. For example, details of sediment budgets are poorly known and need to be quantified, as these are basic to understanding sediment dynamics, assessing sustainable resource yields and monitoring variations due to the effects of environmental change and the impacts of resource utilisation. Particular subjects identified for study include the ecology, distribution and carbonate productivity of various groups of organisms and the effects of environmental change on all of these, the formation of sediment, the directions and processes of sediment transport, and the modifications of different materials after accumulation. Fundamental to much of this is the protection and monitoring of coral reefs.

The Working Group recognised that much of this research can be undertaken within specialised research institutions. The Working Group therefore **recommended** that SOPAC actively encourage such research in interested research institutions and work to develop networks of researchers and research programs.

As part of this, the Working Group **recommended** that SOPAC seek funding to support programs aiming to quantify sediment budgets. It **further recommended** that SOPAC establish a fund of seeding money to help researchers set up programs to be primarily supported elsewhere.

The ocean water masses are very important to processes and productivity in the coastal and nearshore zone, and physical oceanographic studies are thus significant. The Working Group considered that SOPAC should continue to be involved with oceanographic research programs in the region and to maintain access to the data acquired by these.

The Coastal Working Group recognised that the continuing need for aggregate supplies in many islands has often led to the depletion of resources and hence to coastal erosion. Some alternative offshore sources have been identified, and some of these are now being utilised. In this context, the Working Group **recommended** that SOPAC urgently continue exploration for new offshore aggregate resources, especially in areas where the demand is likely to be high. The Working Group **also recommended** that SOPAC, as a matter of priority, facilitate a program of study to understand more fully how these resources were formed and have evolved, and any impact that may result from their exploitation.

The Working Group discussed the widespread concern over coastal erosion, much arising from human activities. It commended SOPAC on its past monitoring activities, existing database and network of coastal monitoring sites, and recognised the need to continue to monitor changes in the coastal and nearshore environment, particularly shoreline change, that result both from local development and from global environmental change. The ideal situation, integrated coastal zone management, requires that the physical position, composition and dynamics of the zone are known, and the Working Group therefore **recommended** that SOPAC expand the resources put into acquiring this information. Beach surveys and coastal monitoring studies should be continued as training exercises and expanded, given their long-term value, cost-efficiency and role in training in-country personnel. Wherever possible in conjunction with other studies, the beach profile studies should be extended offshore in order to help quantify total sediment budgets.

The Working Group was concerned that continuity of the records be maintained and in this context **strongly recommended** that the base sites for past surveys be surveyed into position

globally so that they are not lost. The coastal monitoring network should be expanded to atolls where there is no record as yet and monitoring programs should be pro-active, so that any resulting decisions are based on good, long-term records.

To maximise the use of human resources and to prepare for analysis of problems that will arise in the future, SOPAC should make as much use as possible of remote sensing data. The Working Group noted that new remote sensing technologies suitable for evaluating shallow water areas are continually emerging, such as the Laser Airborne Depth Sounder (LADS), video mapping and new techniques of satellite imagery, and these should be evaluated where possible. The Working Group **recommended** that each member country should aim to acquire imagery of their coastlines and suggests that SOPAC should guide member countries in this.

Although studies by SOPAC and other organisations have identified many resources in the coastal and nearshore zone, the utilisation of these in an appropriate manner may be hindered by lack of expertise. The Working Group **recommended** that SOPAC investigate what additional assistance is required by member nations, with a view to providing advice on appropriate resource development.

The Working Group recognised that many of the programs already in place or anticipated for implementation by SOPAC fall within the scope of the Global Ocean Observing System (GOOS) program. These include beach profile monitoring, coral reef monitoring, lagoon circulation modelling, ground water surveys, biological productivity and sand aggregate measurements. SOPAC capability and expertise in data management, instrumentation, monitoring and related capacity building activities suggest that SOPAC should accelerate its involvement in GOOS. The Working Group **recommended** that SOPAC should consider its role on an urgent bases, specifically its participation in the coastal module of GOOS and in the preparation of a proposal to potential donors to support this activity. The Working Group **recommended** that SOPAC co-ordinate its participation in GOOS with sister SPOCC organisations in the region, particularly SPREP, FFA and USP.

Finally, if the next Annual Session is held in FSM, the Working Group suggests that an appropriate theme for technical sessions, workshops and field trips would be "Coastal Problems in FSM".

## GEOHAZARDS

Paul Taylor - Australia (co-Chair)  
Gajendra Prasad - Fiji (co-Chair)  
Vince Neall - New Zealand (Rapporteur)  
Joe Buleka - Papua New Guinea  
Dave Tappin - United Kingdom  
Mike Petterson - United Kingdom  
Robert Smith - SOPAC  
Ken Granger - Australia  
Graham Shorten - SOPAC  
Christopher Ioan - Vanuatu  
Saimone Helu - Tonga  
Uilou Samani - Tonga  
Kent Anderson - United States  
Arvin Singh - Fiji  
Shane Cronin - New Zealand

Details of the Australian/Pacific Cities Projects were provided to the group. A good cooperative spirit has been developed between the two projects, but concrete progress in cooperative ventures has been limited due to the absence of adequate resources. Notwithstanding, the Pacific Cities Project has been proceeding through a variety of sub-projects in a number of Pacific Island Countries (PIC) utilising opportunistic funding from a number of sources. The PIC cities involved include Honiara, Suva, Nuku'alofa and Port Vila. It was also indicated that Papua New Guinea and Fiji may also be included in the project. Details of an IDNDR project, RADIUS, relating to seismic hazards in cities including Lae, Papua New Guinea and two Australian cities (possibly Cairns and Adelaide) were put forward.

It was suggested that SOPAC-coordinated work should be restricted to hazards assessment and that individual countries should take responsibility for mitigation measures. It was also suggested that risk analysis as well as geohazard assessments were needed. The group emphasised that an all-encompassing approach including hazard assessment, risk analysis, disaster management and education and awareness was necessary to achieve the goals, ie the dissemination of scientific information through local authorities to the general public. The role of the disaster management group within SOPAC should be clarified later in the session.

It was also noted that a regional database of all geohazards needed to be established and maintained in a format which could be easily accessed by disaster managers and planners within the individual PICs. The database would need to include information on the hazards and their effects as well as an indication or the capability to assess the vulnerability of the target

populations. Examples that were already included in the Australian Cities Project database included Cairns, Australia with a population of 110,000, and 30,000 buildings; and Newcastle where an earthquake caused an estimated loss of \$AUS4billion. Other examples were also highlighted including 10,000 deaths per year occurring from storm surge world-wide.

The Workshop on Volcanic Hazards and Emergency Management in the South Pacific, held in Port Vila in February 1997 was reviewed. It was noted that some 20 recommendations concerning volcano surveillance, volcanic hazard and risk management, emergency management procedures and education and awareness were put forward by the workshop. These recommendations were to go before TAG as document TAG/26/2.2 Paper 1. It was noted that action following the workshop included:

- the completion of SOPAC Miscellaneous Report 245 (record of proceedings),
- the preparation of a SOPAC Technical Bulletin which will include the papers presented at the workshop,
- completed work on the hazards at Savo volcano, Solomon Islands (STAR papers),
- work in progress on Taveuni, Fiji (STAR paper) and in Tonga, and
- work planned for Savai'i, Western Samoa (SOPAC 1998 draft Work Program)

The Working Group:

1. **endorsed** the cooperation initiated between the Australian Cities and Pacific Cities Projects and recommends that SOPAC give priority to the Pacific Cities Project.
2. **recommended** that a regional database to include all geohazards research and activities be established and maintained which is easily accessible by disaster managers and urban planners within the region.
3. **endorsed** the recommendations put forward by the Volcanic Hazards Workshop, particularly those relating to future work needed at the "high risk" volcanoes of the region and that a second workshop be convened to look at the Savo volcano.
4. **strongly urged** that the SOPAC National Representatives communicate and coordinate with the National Disaster Management Offices in their respective countries concerning both the Pacific Cities Project and the recommendations of the Workshop on Volcanic Hazards and Emergency Management.

5. recommended that a concerted effort be undertaken to target sources for funding further sub-projects of the Pacific Cities Project and for a future field-based workshop on Savo volcano.

## TECTONICS

Loren Kroenke (co-Chair),  
 Robin Moaina (co-Chair)  
 Jean-Marie Auzende  
 Patrick J Coleman  
 Gary Green  
 Benjamin Hautefeuille  
 Yves Lafoy  
 Mike Petterson  
 Uilou Samani  
 Paul Taylor

The Tectonics Working Group was convened during the 1997 SOPAC Meeting in Nadi, Fiji. Robin Moaina was elected co-Chairman. The Group reviewed progress on previous recommendations and work in progress and made recommendations regarding new geological/geophysical investigations that were believed relevant to resource assessment, geohazards, territorial claims, and resource management.

The Working Group was informed that a basement drilling transect of the Ontong Java Plateau (OJP) has been proposed with the primary objectives of determining: 1) the age and duration of emplacement of the plateau; 2) range and diversity of magmatism; 3) environment of eruption and post-emplacement vertical tectonic history of the plateau; 4) Effects of rift-related tectonism; and 5) paleogeography of the Plateau (paleolatitude of the OJP at the time(s) of emplacement). Nine sites (including a possible reference site off the plateau) are planned for a two-leg transect to address these objectives. Although it is proposed to focus on basement objectives at all of these sites, considerable information would also be accrued bearing on the tectonism associated with plateau formation and subsequent deformation, the relationship of plateau emplacement to major paleoclimatic and biospheric changes, and also on Late Mesozoic-Cenozoic paleoceanography.

The Working Group noted that the importance of basement drilling of the Ontong Java Plateau (OJP) has been widely recognised by the international earth science community. The proposed 2-leg basement drilling program on the OJP was ranked No. 1 in the 1996 global ranking of active proposals by the JOIDES Lithosphere Panel (LITHP), was put into the highest-priority category by the new Interiors

Science Steering and Evaluation Panel (I-SSEP), ranked among the top eleven proposals by SCICOM in August 1997, and forwarded to OPCOM for scheduling. As OPCOM noted however, drilling cannot proceed unless sufficient site survey information is obtained.

The Group was advised of a planned geophysical survey of the OJP, Hakuho-Maru cruise KH98-1 being led by A. Taira (Ocean Research Institute [ORI], U. of Tokyo) provides an excellent opportunity to collect requisite site survey data. This is a 3-leg field program, fully funded by the Japanese government, which is scheduled to take place between January 16 and March 16 1998. Legs 1 and 2 of the cruise will obtain swath bathymetry, gravity data, high-resolution seismic reflection, multi-channel reflection (MCS), using a 96-channel streamer, and ocean bottom seismometer (OBS) refraction data across the OJP. A. Taira's primary objectives are to study the crustal structure, sedimentary and igneous stratigraphy, and deformation structures of the OJP. These objectives both complement drilling and fulfill site survey objectives. The OJP drilling proponents have been collaborating with A. Taira in designing Legs 1 and 2 of the ORI program such that sufficient site survey data can be obtained at 5-7 of the proposed drill sites.

The group was also advised that an OJP site-survey proposal was submitted to the US NSF to (1) conduct a geophysical survey, including the first systematic survey of the poorly known eastern portion of the plateau, the "eastern salient" to investigate its relationship to the main or "high" plateau and rifting that appears to have split the salient in mid-Cretaceous time, soon after the second major documented period of volcanism on the plateau; (2) complement basement drilling with dredging of the large seamounts atop the OJP, as specifically recommended by LITHP (the seamounts will not be drilled); and (3) carry out the requisite site-surveys of the proposed drill sites that will not be surveyed during the ORI cruise, in order that drilling can proceed. This additional survey support will not only fulfill site survey requirements but will also obtain geophysical and geochemical data necessary to address fundamental aspects of the origin and evolution of the OJP that drilling will not address. The components of the field program are geophysical (magnetic, high-resolution seismic reflection, multibeam bathymetry, and gravity) surveying and dredging.

The Working Group was informed of continuation of IFREMER (French) work in back-arc basins. A HYFIFLUX cruise is planned to take place at the end of 1998 in the framework of

German-French cooperation. The target is the North Fiji Basin. Submersible exploration of the Manus basin will continue in 1999 in the framework of the French-Japanese New STARMER project, through organisation of a diving cruise with the French Submersible NAUTILUS onboard L'Atalante. In addition, complementary bathymetric and geophysical surveys should be planned for 1999 in the western part of Solomon Sea, and the northern part of Coral Sea in order to investigate the subduction effects along the New Britain Trench and around the Papua New Guinea mainland. The ZoNèCo 5 Cruise aboard the L'Atalante in 1999 will be devoted to the study of the structure of the southern part of the Lord Howe Rise and the Chesterfield Hot Spot.

The Working Group was also informed that two joint surveys in the New Caledonia region recently have been discussed between France, New Caledonia and Australia. Deep seismic profiles between Australia and the New Hebrides Trench and along the Lord Howe Rise which will probably be carried out in March-April 1998 in order to investigate the geological and tectonic history of the Tasman Sea and the ridges and basins between Australia and New Caledonia. Another goal will be assessment of Hydrocarbon potential.

The Working Group noted that present-day southwest Pacific appears to be a cluster of rifted continental fragments. The detachment of New Caledonia, the Norfolk Ridge, and New Zealand from the Gondwana rim may have also involved both the 'Eua Ridge, now located in Tonga, and the Vanikolo Basin, now located in northern Vanuatu. To better understand the geological framework of this region and evaluate its hydrocarbon potential, it is necessary to investigate the structural style of the ridges and basins off eastern Australia using deep, multi-channel seismic (MCS) techniques.

Australia and New Zealand have already initiated deep MCS surveys on the Norfolk Ridge between Norfolk Island and New Zealand. Onshore results from a MCS survey carried out in 1995 on the GOUARO anticline located 180 km north of Noumea, New Caledonia are very promising and a test well (1600 m deep) is planned to be drilled in January 1998 which should enable a comprehensive evaluation of the basal flysch sand and fractured Paleocene chert reservoirs. Offshore, the deep MCS (240 channel) profiles between Australia and the New Hebrides Trench and along the Lord Howe Rise, which will probably be carried out in March-April 1998, will investigate both the structural style and the hydrocarbon potential of that area.

The Working Group **strongly recommended** that the surveys planned for the French-New Caledonia-Australian project be extended into the South Fiji Basin to the Tonga-Lau ridges, in order to complete the assessment of the hydrocarbon potential of this region and determine provenance of some of the more distal terrains believed to be rifted continental fragments.

## **WATER**

Tony Falkland (co-Chair)  
 Ausetalia Titimaea (co-Chair)  
 Ed Burke (Rapporteur)  
 Fr John Bonato  
 Joe Buleka  
 Saimone Helu  
 Christopher Ioan  
 Robin Moaina  
 Uilou Samani  
 Isaia Taape  
 Sisilia Talagi  
 Filipo Taulima  
 Donn Tolia  
 Ian White  
 David Scott  
 Harald Scholzel  
 Giovanni Ricci  
 Andy Butcher

The Water Working Group is a new STAR working group. The group elected, as co-Chairs, Ausetalia Titimaea (Samoa) and Tony Falkland (Australia).

The Working Group emphasised the fundamental importance of freshwater resources and adequate sanitation to the social and environmental wellbeing of the Pacific island nations of the region. The Working Group recognised the most important and strategic role of SOPAC as a regional co-ordinator of appropriate projects and activities in the water and sanitation sector. Further, the Working Group recognised the need and supported the continuation of SOPAC's role in this important sector.

The Working Group recognised the contributions to the water and sanitation sector of other regional organisations (e.g. SPREP, SPC) and international organisations (e.g. UNESCO-IHP, WHO, WMO, UNDP, UNEP). It also recognised valuable contributions by many bi-lateral aid donors to the sector. It further recognised the need for continued and enhanced co-ordination of efforts between agencies in order to prevent duplication and to maximise the benefits of the limited resources available to support

important water and sanitation sector projects and activities.

The Working Group recognised that a number of important regional and inter-regional meetings had been held in the past 15 years which addressed the water and sanitation sector needs of the region. In particular, it reviewed the findings of a number of recent regional meetings concerning water and sanitation issues in the Pacific, including:

- Water Planning Workshop (Honiara, UNESCO/SOPAC/UNDDSMS, June 1994)
- UNESCO-IHP Working Group Meetings (Suva, April 1996 & July 1997)

The Working Group acknowledged and endorsed a number of important projects, involving research, training and community education, which had been identified at previous meetings, as follows:

- Catchment and communities
- Groundwater recharge and modelling
- Groundwater pollution
- Groundwater and surface pollution
- Appropriate groundwater extraction systems
- Rainwater catchment study
- Integrated island water resources study

## **Recommendations**

The Working Group made the following recommendations concerning strategic and Work Program issues:

1. SOPAC continue to provide adequate resources to its newly formed Water Resources Unit to enable it to implement its Work Program for the benefit of the member nations in the water and sanitation sector.
2. the Water Resources Unit of SOPAC adopt or include the following goals and strategies:

### *Goal:*

To help member countries in the South Pacific to

- assess, develop, manage and conserve their water resources

- develop appropriate sanitation programs.

*Strategies:*

- Help identify regional needs
  - Encourage regional projects
  - Develop resource and personnel databases
  - Develop appropriate information transfer strategies
  - Develop training programs for water resources assessment, development, management and conservation and sanitation planning and management
  - Facilitate research on water and sanitation directed at national and regional needs
  - Provide ready access to research results
3. SOPAC and member countries enhance their efforts to encourage and attract donor funding for the work program of the Water Resources Unit.
  4. SOPAC and member countries encourage donors to fund the proposed Water Resources Unit's project to promote, encourage and foster appropriate demand management and conservation practices in member countries, recognising that increasing pressure is being placed on freshwater resources and that currently developed water resources are often inadequately utilised due to system losses and sometimes wastage.
  5. The Water Resources Unit include in its work program a project to encourage and assist member countries in developing water resources and sanitation legislation to address and promote appropriate water resources development, management, conservation and protection.
  6. The Water Resources Unit explore, assess and report to SOPAC and the Water Working Group on the provision of temporary employment (6-12 months) for water and sanitation staff from member countries to work on appropriate projects at SOPAC, as a means of enhancing efforts for capacity building and human resource development amongst member countries.
  7. SOPAC and the Water Resources Unit maintain and enhance co-ordination with regional and international organisations, donors and member countries regarding water and sanitation sector activities to avoid duplication of limited resources.
  8. The Water Resources Unit publish and distribute a quarterly newsletter for member countries and interested agencies which co-ordinate information on water related activities within the region and relevant activities outside the region.
  9. The Water Resources Unit develop a regional database to store, retrieve and disseminate water resources and other related information for the benefit of member countries and researchers assisting the region.
  10. The Water Resources Unit assist with the development and application of national databases for the long-term storage of water resources and other related information.
  11. The Water Resources Unit co-ordinate a waterwell driller training and a pump maintenance scheduling and training project in order to strengthen the capacity of many member countries' groundwater agencies to effectively undertake their own drilling and pump maintenance so as to satisfy the need to adequately and sustainably develop their groundwater resources.
  12. The Water Resources Unit assist and, where possible, participate in water investigation projects which have been identified as regionally important, such as the following projects:
    - Catchment and communities
    - Groundwater recharge and modelling
    - Groundwater pollution
    - Groundwater and surface pollution
    - Appropriate groundwater extraction systems
    - Rainwater catchment study
    - Integrated island water resources study
  13. The Water Resources Unit distill and disseminate the results of research projects of importance to member countries in a form appropriate to their needs. A current example is the need to prepare a guideline on groundwater modelling appropriate to the needs and capacity of member countries.



## HABITAT

Jean-Marie Auzende (co-Chair)  
H. Gary Greene (co-Chair)  
Dick Pickrill  
Bill Erb  
Yves Lafoy  
Ahser Edward  
Uilou Samani  
Marie Ferland  
John Collen  
Jim Colwell  
Tevita Vuibau  
Moses Nelson  
Sandy Colvine  
Gary Denton  
Dave Tappin  
Alf Simpson  
Phil Woodward  
Chunting Xue  
Franck Martin  
Russell Howorth

The Habitat Working Group convened a meeting Tuesday afternoon, 30 September 1997, with 20 participants in attendance. Discussion centered around the upcoming SOPAC conference on "Marine Benthic Habitats and their Living Resources: Monitoring, Management and Application to Pacific Island Countries" to be held in Noumea, New Caledonia 10-16 November 1997. It was reported that over 60 abstracts had been received and nearly 200 registrants had applied to attend the conference. This was considered to be an excellent response, particularly in light of the short time-line and showed the extreme interest in habitats. The program will be finalised within two weeks time and the formal program printed. Six sessions will be convened and consist of the following, including suggested Chairs and number of presentations to be given:

- Session 1. Shallow Techniques, 7 papers, Suggested Co-Chairs: Chauvet, Leach, Greene.
- Session 2. Shallow Lagoons, Bays and Reefs, 17 papers, Suggested Co-Chairs: Poiner, Collen, McDermitt.
- Session 3. Shelves and Slopes, 15 papers, Suggested Co-Chairs: Able, Pickrill, Cailliet.
- Session 4. Seamounts and Ridges; Trenches and Canyons, 7 papers, Suggested Co-Chairs: Grandperrin, F. Parrish, Exon, Auzende.
- Session 5. Technology, Interpretations, Analytical Techniques and Models, 10 papers, Suggested Co-Chairs: Pitcher, Burnhold, Kvittek.

Session 6. Harmful Organisms in the South Pacific, 4 papers, Suggested Chair: Enevoldsen

**Total: 60 papers**

In addition, **over 10 posters** would be on display at the conference.

It was reported that an abstract volume would be printed for handout at the conference.

A report of the proceedings of the conference and workshops would be produced under the direction of Keith Crook and possibly published as a SOPAC Technical Bulletin. In addition, about 20 papers will be solicited for publication in the French journal of Aquatic Living Resources. All sponsors will be recognised at the opening of the conference.

The Working Group placed significant emphasis on the participation of SOPAC island nationals to the conference and workshop. Concern was expressed about the importance of the interdisciplinary approach of the conference and the need to have both geologist and biologist, as well as representatives of regional biological and fisheries agencies, in attendance. Based on these discussions the Working Group made the following recommendations:

Noting the regional concern about the sustainability of living resources and the multidisciplinary need to evaluate fisheries and other living resources habitats, the Working Group **recommended** that SOPAC continue to encourage the participation of SOPAC Member Country nationals familiar with geology, physical oceanography and fisheries biology, as well as fisheries managers, to attend the Habitat Conference in November. The Working Group further **recommended** that the Member Countries' representatives and managers to the conference come to New Caledonia with specific problems that they would like to see addressed at the workshops of the conference.

Noting the ability, and desire, of geoscientists to apply geophysical and geological techniques to the characterization of fisheries and other benthic organisms' habitats, and the need to protect the sustainability of living resources of the SOPAC region, the Working Group **recommended** that SOPAC encourage Member Countries to initiate cross-fertilization of geological, biological and physical and chemical oceanographic disciplines within their countries.

Recognising the importance of informing regional fisheries and other biological organisa-

tions within the SOPAC region of the value of utilising geological and geophysical techniques in characterising living resources habitats, the Working Group **recommended** that SOPAC ask member and donor countries to encourage organisations such as SPREP, FFA, USP and other agencies to send representatives to, and to participate in, the Habitat conference in November.

Noting the desire to move rapidly ahead in formulating work plans to investigate regional living-resource habitats, the Working Group **recommended** that in cooperation with the SOPAC Secretariat a Working Group meeting be convened in Noumea, at the end of the Habitat Conference, to evaluate the results of the conference specific to SOPAC needs and recommend further action.

Recognising the diversity of the Habitat Conference sessions, the Working Group **recommended** that a committee be organised to evaluate and report upon the cross-cutting nature of the conference. The Working Group **further recommended** that in cooperation with the SOPAC Secretariat a group be formed to publicise the results of the conference.

#### **OCEAN BASIN MINERAL RESOURCES & TECHNOLOGY**

Gary Greene (co-Chair), MLML  
Tevita Vuibau (co-Chair), Fiji  
John Barrie, AVIAN Mining  
Kriton Glenn, Australia  
Tu Upoko, Cook Islands  
Viliame Baleivanualala, Fiji  
Savae Latu, Tonga  
Isabel Calvert, New Zealand  
Bue Gastang, Marshall Islands  
Marie Ferland, USP  
Bhaskar Rao, Fiji  
Sung-Rock Lee, KIGAM  
Jim Colwell, AGSO  
Robin Moaina, PNG  
Donn Tolia, Solomon Islands  
Loren Kroenke, UH-SOEST  
Keith Crook, UH-SOEST  
Takeshi Ogitsu, SOPAC  
Alf Simpson, SOPAC  
Franck Martin, SOPAC  
Phi Woodward, SOPAC

The Offshore Working Group convened a meeting Monday evening, 29 September 1997, with 21 participants in attendance. SOPAC's historical offshore involvement was reviewed and a comparison of land-based and ocean-based interests were discussed. It was pointed out that

most deep offshore minerals and energy investigations have been accomplished primarily through developed nations' assistance programs with SOPAC Secretariat acting in a coordinating capacity. Today, SOPAC's focus is primarily on onshore mineral assessment and evaluation with SOPAC responding to demands from Member Countries to do more baseline and environmental studies and provide advice on mining, petroleum potential and recent technological advances.

The Working Group noted that the Japanese 5-year SOPAC offshore regional minerals investigation was in its third year and that perhaps a review of this program should be done to ensure a comprehensive response to regional concerns. Also noted was the growing interest in offshore sulfides in PNG, potential mining of sulfides by the Japanese in Okinawa Trench, the possibility of sulfide mining in the Eastern Manus Basin and interest in mining manganese nodules in the Cook Islands. It was reported that in 1998 IFREMER (French) in cooperation with Germany will undertake the HYFIFLUX cruise in the North Fiji Basin to investigate back arc basin processes and mineralisation. In addition, a submersible exploration of the Manus Basin will continue in 1999 using the French submersible NAUTILE as part of the joint French-Japanese STARMER project. In regard to deep seafloor mapping, the French will continue mapping in the PNG EEZ, in the Coral Sea and in the Solomon Sea, as well as in the region between Australia and New Caledonia. Based on these discussions the Working Group made the following recommendations:

Noting the world wide interest in deep sea minerals, such as manganese nodules and cobalt-rich crusts, and noting the considerable amount of offshore data recently collected in the SOPAC region, the Working Group **recommended** that, with the concurrence of Member Countries, a synthesis of offshore mineral data in the hands of SOPAC and an analysis of regional mineral potential be undertaken. Further noting that MMTTC has volunteered to coordinate a review of minerals and technology in the SOPAC region, the Working Group **recommended** that SOPAC take advantage of this offer and with SOPAC staff involvement proceed to synthesize and assess SOPAC regional mineral potential. The Working Group **recommended** that the synthesis and assessment be done in the context of regional geology so that mineral forming processes can be better understood.

Noting the recent Japanese project to evaluate benthic biological impacts associated with sea

bed mining, the Working Group **recommended** that SOPAC encourage continuation of environmental impact studies associated with sea bed minerals extraction.

Recognising that for sea bed mineral exploitation to occur in the SOPAC region SOPAC Member Countries need to have in place mineral mining policies, the Working Group **recommended** that SOPAC encourage, and where possible assist, Member Countries to establish sea bed mining legislation.

Noting the need for technical assistance of SOPAC Member Countries to make decisions about applications for the granting of Authority to Prospect (ATP), the Working Group **recommended** that SOPAC organise a list of appropriate technical advisors with considerable diverse experience in minerals exploration that could respond to the call for technical assistance of the Member Countries.

## **INFORMATION EXCHANGE**

Gary R W Denton (co-Chair)  
Leslie Allinson (co-Chair)  
Tu Tanianau  
Gabriel Ayin  
Asher Edward  
Tinian Reiher  
Tebao T Awerika  
Bue Gastang  
Sisilia G Talagi  
Ausetalia Titimaea  
Fanoanoaga Patolo  
Chris Ioane  
Franck Martin  
Benjamin Hautefeuille

### **Problem**

Pacific Island countries need readily available and affordable access to global information as well as developing their national information capacity.

This is critical for business development through participation in the global knowledge economy, raising skill levels through distance education and improved resource management and environmental monitoring through participation in information forums where the common transport is the Internet.

In particular, research institutions like GOOS, IOC, JAMSTEC, SOEST advise Pacific Island Countries to visit their web sites as a form of information provision and retrieval.

Many Pacific Island countries have no access to these opportunities as Internet services are unaffordable or unavailable.

### **Background**

SOPAC implemented a national Internet group (Fiji Internet/intranet Group) model which is both sustainable and transferable to other PICs and is investigating both existing and new satellite options for providing international Internet access to the national groups.

Costs will be falling and SOPAC, mindful of budget constraints throughout the region, is closely monitoring these costs and weighing price, performance, and reliability factors to ensure any project implemented has a goal of sustainability.

SOPAC has sought and received endorsement from SPOCC to continue to explore avenues for funding a project to provide Internet access to PICs where these services are unavailable or not affordable.

As a final point, it should be noted that telecommunications industries, in particular international, have unduly influenced government policy makers where it is those same policy makers who should have directed the telcos into providing affordable services, as in the power generation and distribution industry.

### **Solution**

Transfer the Fiji Internet/Intranet Group Technology to PICs using existing international telecommunications or independent satellite options.

### **Related Documents**

TAG/26/3.2 Paper 1: Knowledge-based Industries and Information Technology

Internet Services for PIC Regional Implementation Initiatives

SOPAC Miscellaneous Reports

242 Pacific Sustainable Development Network Program Phase 2.

### Recommendations

1. Internet e-mail should be available immediately.
2. Full Internet should be implemented in the medium term.
3. Internet services provided should be reliable and affordable where lack of reliability excludes PEACESAT as a service provider.
4. Individual countries should decide the selection of services.
5. SOPAC should identify a donor for implementing Internet connectivity for member countries where services are unavailable or not affordable and should continue negotiations with UNDP as a possible donor and, should investigate using existing telecommunications carriers or alternative satellite services.
6. SOPAC should investigate options for upgrading existing Internet services in member countries where those services are inadequate or not affordable.

### TIME SERIES AD-HOC WORKING GROUP

Dr Yoshifumi Kuroda – JAMSTEC  
Mr Timothy B. Wright – Pacific Marine Environmental Laboratory (PMEL)  
Mr William Erb – IOC/UNESCO

### TAO/TRITON Array

The Tropical Atmosphere Ocean (TAO) Array is a system of deep sea oceanographic buoys deployed in the Equatorial Pacific between 8°N and 8°S stretching from the Galapagos Islands to Papua New Guinea. There are 70 buoys (though 3 sites have been temporarily abandoned due to damage and subsequent data loss) Twenty-five of the buoys from 180°, 165°E, 156°E, 147°E, 137°E are in the SOPAC member countries EEZ. We must request clearance every year to service these buoys though the system has now been declared operational and is expected to be maintained for at least the next ten years and longer. JAMSTEC is developing a surface moored buoy network named TRITON (TRIangle Trans-Ocean buoy Network).

Deployment of TRITON buoys will commence in March 1998. The TRITON buoys will be located at 8N 156E, 5N 156E, 2N 156E and 0, 156E next to the ATLAS buoys at these locations. After intercomparison of the data, the TRITON buoys will replace the ATLAS buoys in the Western Pacific. In addition to the surface buoys, subsurface ADCP current meter buoys will be continually deployed along the Equator.

The buoys measure salinity, atmospheric pressure, wind direction and speed, air temperature and humidity, and temperature of the ocean from the sea surface to 10 depths down to 750 meters. Some of the buoys also measure currents, conductivity, rainfall, solar radiation and dissolved CO<sub>2</sub>. Data and position are relayed in near real-time by ARGOS satellite to scientists around the world via the GTS and the Internet every day. The buoys are anchored to the bottom with a four-ton anchor. A steel cable connects the buoys to a mooring line to the bottom.

An important first step to understanding of the ENSO mechanism is to undertake a study of the process of the growth and dissipation of the warm pool in the western Pacific, an area where the water temperature is the world's highest, acting as an engine driving the atmosphere. It is also necessary to study the variability in low-latitude western boundary currents such as the New Guinea Coastal and the Mindanao Currents. The water circulation in the western Pacific may be influenced by salinity change induced by subsurface currents associated with seasonal and ENSO cycles. Surface heat and water fluxes are also very important to study the maintenance mechanism of the warm pool.

Researchers use the data to learn how to predict future changes in the world's climate. The buoys were first deployed to learn how to predict the El Niño (ENSO) phenomenon. The data is also useful to detect ocean fronts and changes in fish migration patterns in the tropics. In addition, the data is made available to weather forecasters around the world. In the tropics, there are very few locations or ships that regularly report the weather. Measurements of the observed weather conditions are an essential ingredient in weather predictions. Several nations (Nauru and Kiribati) have used wind and ocean current data from the buoys to help locate missing or overdue boats.

The buoys act as Fish Attraction Devices (FADS) and consequently there is evidence of fishing activity around the buoys. Mooring lines and the remainder of nets fouled on the cable are

frequently found. Often, the anemometers are removed and the buoys towers have been completely removed from the mooring. There have been instances where we have recovered moorings that have been set adrift and found that the cable was severed, probably to recover fishing equipment. Since the buoys are only serviced twice a year, the data loss and subsequent break in the time series data, not to mention the loss of equipment is serious. The TAO project has had to abandon 3 sites in the Western Pacific temporarily until a solution is found. Most of the data loss and mooring damage occurred on the Eastern and Western edges of the Array. It is of the highest importance to maintain the time series by resolving the conflict between fishing activities and maintenance of the buoy array in this region.

### Recommendations

1. Participants of the SOPAC annual meeting recognised that the TAO/TRITON Array will give fundamentally important oceanographic and atmospheric data for daily weather forecasts, coastal management, tourism, marine safety and fishery resource management. The real time data is of great benefit to South Pacific countries.
2. SOPAC should encourage member countries to grant blanket clearances to the TAO/TRITON project for scientific cruises to service the buoys, and conduct oceanographic and meteorological measurements in their EEZ. A blanket clearance is required to service and repair the buoys on short notice in case of damage to the sensors. The buoys are located in the EEZ of Kiribati, Tokelau, Tuvalu, Nauru, Federated States of Micronesia, Solomon Islands, Papua, New Guinea and Palau. In particular, since deployment of TRITON buoys will commence in the EEZ of the Federated States of Micronesia in March 1998, cooperation from the Federated States of Micronesia is urgent and vital for the successful maintenance of the TRITON buoys.
3. Education of fishing fleets operating in SOPAC countries is strongly encouraged. The TAO/TRITON Project has developed a brochure in 5 languages, (Japanese, Chinese, Korean, English and Spanish) to inform fisherman about the Array. Also, participation of fishing observers and oceanography or fisheries students in TAO cruises aboard the NOAA Ship KA'IMIMOANA and JAMSTEC R/V KAIYO and R/V MIRAI is encouraged, especially during 1998, the International Year of the Oceans.
4. SOPAC should assist the TAO/TRITON project in developing legislation or regulations to discourage fishing vessels from damaging or interfering with the operation of the buoys and to protect this valuable regional information resource.

### ATTACHMENT

Report by the STAR Chairman (Prof. Keith Crook) to Governing Council

Mr Chairman, Ladies and Gentlemen – In his opening speech the Minister referred to SOPAC as one of the “tools we sharpen, oil and keep in good condition”. In fact, SOPAC is a set of tools, one of which is STAR; and over the past year STAR has been sharpened, as evidenced by the new arrangements, of which I am particularly appreciative:

- The opportunity afforded to me, as STAR Chair, pro term, to address the SOPAC Governing Council; and
- The provision for the STAR Working Groups to report their recommendations to TAG later in this Annual Session.

I want, first, to say something about STAR – what it is and why it exists. I do so because I detected some puzzlement about this at the last Annual Session among non-technical members of national and donor agency delegations. What on earth is a mob of scientists doing, giving and listening to scientific papers and having scientific discussions, at the SOPAC Annual Session, which is, after all, the annual meeting of the governing body of a regional inter-governmental organisation attended by national delegations and the SOPAC Secretariat.

STAR was founded 12 years ago as a group to provide continuity of scientific advice to SOPAC between the international workshops that were, in those days, held every few years and were very important for determining the scope and directions of SOPAC's Work Program – which was not nearly as broad as it is now.

In the years since then SOPAC has evolved; and so has STAR. It is now the Science Technology and Resources network of SOPAC, interfacing the organisation with the international research community, through extensive use of the Internet. There is a very large number of scientists scattered world-wide who have re-

search interests in the SOPAC region; interests that are relevant to SOPAC's Work Program and to SOPAC's Pacific Island member countries. It is that scientific community that STAR seeks to reach, and to engage in meeting the needs of SOPAC and the region. STAR does this by calling each year for scientific and technical papers on topics relevant to SOPAC's Work Program to be given at a STAR Meeting held in conjunction with the SOPAC Annual Session. For each meeting, a few topics, selected in conjunction with the SOPAC Secretariat, are particularly highlighted. Papers on time-series data was one of the new topics highlighted for this year's STAR meeting.

Why do scientists come to the STAR meetings?

- To give and listen to technical papers – a traditional activity of scientists;
- To discuss science with colleagues informally;
- To establish and extend contacts in the region so as to assist their research projects; and
- To contribute their expertise to SOPAC – for the invitations to STAR meeting explicitly lays this responsibility on intending participants.

Who pays for the scientists to attend? I mention this because that, too, seemed to be a source of some confusion at the last Annual Session. Let me be quite explicit. It's not SOPAC that pays. The scientists pay for themselves, or the organisations that they work for pay for them to attend, because of the benefits that their attendance confers on their scientific work and the work of their organisations.

Let me give you a personal example of how this works, in practice. For more than 30 years I and my students have been working in Morobe Province, PNG of which Lae is the capital. I have published papers on the geology of Lae, and have a new one 75% completed. I'd heard last year of SOPAC's Pacific Cities project but I had no idea until I arrived here this week that Lae was scheduled for inclusion on that project. Furthermore I have an application pending, with colleagues from James Cook University to use the Australian "R/V Franklin" in 1999 for an in-shore marine geoscience survey of the Huon Peninsular coast from Lae and eastwards to Bukaua. And I've learned since arriving here in Nadi that PNG is seeking funding from a donor agency for a related study around Lae, and that one of the scientific assessors for that agency is at this meeting.

So, I've just this morning participated in an informal discussion with scientists from PNG, SOPAC, Australia and Canada. The SOPAC scientist will serve as a clearing house as we swap information and go on to discuss how to coordinate our plans so as to maximise the scientific return from the resources available to each of us. That kind of synergy is why scientists keep coming back to STAR and SOPAC meetings; and it's by no means the first time that I've experienced it. It also justifies the expenditure to attend STAR meetings.

I want to say a bit more about "who pays". Lately we have heard a lot about 'cost/benefit', 'leverage', 'bottom lines' and all the other terms beloved to those who determine institutional budgets. The cash value of everything is assessed. Well, I've never heard anyone assess the equivalent cash value of the technical advice made available to SOPAC at each Annual Session. So I did a rough back-of-the-envelope calculation of what it would cost, at commercial rates, to assemble and transport to Nadi, the outside expertise that is assembled here today. It came out to somewhere between \$150,000 to \$0.25 million each year; and remember that a panel of experts contracted in at commercial rates would likely take a week to do what STAR and TAG scientists do in three days, because they would lack familiarity with the way SOPAC works. So, when the costs of SOPAC are next being discussed, remember to mention those very substantial in-kind benefits that SOPAC attracts to the region each year.

Well, what does STAR do at its meetings? First the scientific papers: 41 have been presented this year. I want to highlight here just a very few of them. Others are covered in the Summary Report of STAR.

- First the work by John Collen's group on sediment production on reef flats, and its potential for telling us whether aggregate mined from lagoons is a renewable resource or not and, if it is, whether the extraction rate is sustainable; and further, the emerging evidence that such studies can provide indicators of the environmental health of the ecosystems that produce the sediment.
- Mark Sinclair's demonstration of the utility of LADS-II (Laser Airborne Depth Sounder) for bathymetric mapping of large areas of shallow water (0.5 – 70m) rapidly, cost-effectively, and at an acceptable level of precision.
- The papers on time-series data – a new field for STAR – that clearly demonstrate the vital importance of such data for predicting

the onset of El Niños, as well as for routine forecasting.

- A review of global data on sea-level rise, estimated at 1.8 cm/decade. That's not so large, when you think of it as 1.8 m per 1000 years. Reef growth can keep pace, and the sediment generated by reef flats can feed the beaches so they keep up. But if the reef flats are polluted, the beaches are being mined and seawalls are causing shoreline erosion, trouble could lie ahead. Also, you need to know what is happening to base level on your island – both sides of it, if it's a big one – because most islands are sinking or rising because of tectonic forces, independently of sealevel rise.
- The cluster of papers on water resources – the first at a STAR Meeting - by Giovanni Ricci, David Scott and Ed Burke of SOPAC and Ian White and Tony Falkland, that clearly demonstrates the complexities that arise in the assessment, modelling, monitoring and management of water in low and high Pacific Islands.
- A classic volcano hazard assessment of Savo, Solomon Islands, showing that it is capable of generating Montserrat-style nuée ardent glowing ash flows.
- The associated cluster of papers by Kim Granger (AGSO), Graham Shorten & Bob Smith (SOPAC), and Atu Kaloumaira (SPDRP) demonstrating that, to be effective, responses to geohazards must go beyond the scientific assessment stage so as to involve the communities likely to be impacted and their managers and planners, so that response planning and risk mitigation are implemented before a disaster occurs. The AGSO Cities Project, SOPAC's Pacific Cities project and the South Pacific Disaster Reduction Program exemplify, in diverse ways, this new holistic approach to geohazards and its applicability to the SOPAC region.

The second thing that STAR does is conduct Working Groups which now make recommendations to TAG, on topics relevant to SOPAC's Work Program. If you'd asked me at breakfast, I would have told you that STAR has 11 working groups. But I discovered today that it now has 12! We'd forgotten about time-series data, so some of the scientists involved got together as an ad hoc Working Group and prepared a report with recommendations to TAG. That's a good example of how STAR Works – we'll formally establish that Working Group next year. So, effectively STAR has 12 Working Groups, of which 8 have met during this meeting.

Because of limited time, I'm only going to mention two of the Working Groups here, and they're not the one that held the longest meetings. I've chosen them for other reasons, as you'll soon see. The reports of all the Working Groups form part of the STAR Summary Report.

I want first to mention the Habitats Working Group established two years ago, which did most of its work before and at the last Annual Session, and since then. As a result, a "Conference on Marine Benthic Habitats and their Living Resources: Monitoring, Management and Application to Pacific Island Countries" will be held in Noumea, New Caledonia from November 10-16, six weeks hence. The conference is sponsored by SOPAC and IOC, and co-sponsored by France, New Caledonia, IFREMER, ORSTOM, the South Pacific Commission and the European Union.

I've highlighted this conference for two reasons. First, because I want to say this to all island nation representatives: Please make sure that your country sends a geologist and a marine biologist to the conference, as well as someone from your fisheries agency which, I trust, is already well aware of the meeting. Why? Because this conference is about the intersection of marine geology and geophysics – which defines the physical aspects of a marine habitat – and marine biology, which defines its assemblage of organisms; and on this dual basis the location, and health of a fishery is determined.

My second reason for mentioning the Habitats Conference relates back to my earlier comments about the value to SOPAC and the region of the in-kind commitments channeled through STAR. The study of marine habitats is an entirely new field for SOPAC, arising from the intersection between marine geology and geophysics and marine biology. The Habitats Conference is, in effect, a large innovations workshop which is being run for the benefit of SOPAC and the region. Here, as in earlier years, SOPAC is getting its cutting-edge innovations workshops arranged and conducted for it at minimal cost to SOPAC and its island member countries. And that is a 'significant' in-kind contribution that must be factored into any cost-benefit analysis of SOPAC's role and functions.

The second Working Group that I want to highlight is the ad-hoc Working Group on Time-Series data that I mentioned earlier. I do so because I want SOPAC's Island Country member delegations to take very careful note of this working group's recommendations. They are of the utmost importance to the region and they will require urgent administrative and legisla-

tive or regulatory responses from your governments.

I want to point to a general implication that arises from what I have been saying. SOPAC is the South Pacific Applied Geoscience Commission, but 'Geoscience' doesn't contribute to its acronym. Now that is appropriate, given SOPAC's origin as a marine geological and geophysical prospecting agency. When SOPAC was reconstituted as a regional inter-governmental organisation, it acquired its present name, including the rather more general term 'Geoscience'.

What we're now seeing, from this year's STAR meeting is that 'geoscience' is not just about

geology (e.g. minerals) and geophysics (e.g. earthquakes). Rather it is about the broad sweep of sciences that study the earth. It includes, as well, physical oceanography, meteorology, marine biology and ecology, and aspects of earth-related social sciences such as urban geography.

So, Mr Chairman, in summary I can report that STAR, one of the tools available to SOPAC and the Pacific Island Countries, is sharpened, well oiled and in good condition; and stands willing and ready to serve the needs of SOPAC, its members, and the region.

Thank You.