

Oceanic Waves



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START is the acronym for Global Change SysTEM for Analysis Research and Training. It was launched by international scientists to build indigenous capacity world-wide to cope with scientific and policy aspects of environment change and development. The International START Secretariat was established in Washington DC, in 1992. START website address is: www.start.org



START-Oceania is one of six START regional networks. START is sponsored by the International Geosphere-Biosphere Programme (IGBP), International Human Dimensions Programme on Global Environmental Change (IHDP) and World Climate Change Research Programme (WCRP). The START programme assistant is also the Liaison Officer for the Asia-Pacific Network for Global Change Research (APN). START-Oceania website is at: www.usp.ac.fj/start

SIDS Uni Consortium launched at Mauritius for implementing BPOA



The Prime Minister of Mauritius Hon. Paul Raymond Berenger (fourth from left) oversees the launching of the SIDS University Consortium. USP's Acting Deputy Vice-Chancellor Prof Konai Thaman is seated second from the right.

The SIDS University Consortium was officially launched at the International Meeting (IM) to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States (SIDS), held from 10-14 January 2005, at the Swami Vivekananda International Convention Center in Port Louis, Mauritius.

Capacity building workshops, side events and partnership activities addressing a wide range of SIDS-related issues were held during the IM, which also saw the launching of the SIDS University Consortium.

A University of the South Pacific (USP) team to the IM witnessed the launching

of the Memorandum of Understanding (MOU) for the SIDS University Consortium on 14 January 2005.

The USP team consisted of Acting Deputy Vice-Chancellor and well-known Pacific educationist Prof Konai Thaman, Prof of Pacific Islands Biogeography Prof Randy Thaman, and Director of the Pacific Centre for Environment and Sustainable Development (PACE-SD) Prof Kanayathu Koshy. Director of the International Ocean Institute (IOI) - Pacific islands and senior lecturer at USP, Dr Joeli Veitayaki, also attended through IOI sponsorship.

An MOU was also signed between USP and the United Nations University

(UNU) on Wednesday, 12 January 2005, during the meeting of the Pacific Islands Forum group.

On behalf of USP, the MOU's were signed by Prof K. Thaman.

PACE-SD has been actively involved in negotiations for the SIDS University Consortium and the USP-UNU MOU, through the involvement of its Director Prof Koshy as a member of the team negotiating the agreements.

"The SIDS University Consortium is officially seen as one of the implementation mechanisms for the Barbados Plan of Action (BPOA) capacity building and it features well in the final Strategy

>> continued on page 8

Pacific community-based conservation course

The Pacific Islands Community-Based Conservation Course will be conducted at the University of the South Pacific (USP), Laucala Campus, Suva, Fiji, in two phases from 17 April-12 May 2005 and 10-21 October 2005.

Applications are invited from conservation practitioners and conservation organizations in the Pacific region to attend or to sponsor a participant. Application form and detailed course information is available at the website: www.usp.ac.fj/start

The Community-based Conservation Management Course is conducted in

collaboration with the South Pacific Regional Environment Programme (SPREP), USP and the International Centre for Protected Landscape (ICPL). The course is being offered for the third time.

The course aims to improve the capacity of conservation practitioners, community representatives, technical officers from government and non-governmental organisations, and training personnel in the management of community-based conservation projects and sites for the sustainable conservation and management of natural resources.

Participants will gain practical knowledge and skills for the sustainable management of conservation and protected areas.

The course will involve four weeks training at USP from 17 April to 12 May 2005. Upon return to their countries, participants will work on a four-month in-country project. They return to USP for two weeks in October to complete the course.

For further information, contact Mr Frank Wickham at the SPREP Secretariat on email: FrankW@sprep.org.ws

From the Secretariat desk

Greetings from the START-Oceania Secretariat and from the Programme Assistant, Mosmi Bhim.

Since the last issue of *Oceanic Waves*, published in November last year, two important meetings have taken place which will guide the activities of the Oceania Secretariat.

These are the START-Oceania Regional Committee meeting, which was hosted by the Institute of Research and Development (IRD) in Noumea, New Caledonia from 1-2 December. Major outcomes of this meeting have been highlighted on page 3.

The second is the START Scientific Steering Committee (SSC) meeting, held from 7-9 February 2005 in Netherlands. At this meeting, major areas in global change activities were discussed and areas were also identified which would best serve the Pacific region through the Oceania Secretariat. These are highlighted on page 7.

The Director of the START-Oceania Secretariat, Prof Kanayathu Koshy, participated as a member of the SSC. As Director of Pacific Centre for

Environment and Sustainable Development (PACE-SD), Prof Koshy also attended the International Meeting in Mauritius. Major outcomes of this have been highlighted on page 1 and page 4.

The coming into force of the Kyoto Protocol on February 16 brings a major turning point to global change activities, as the signatory developed countries are now putting a more concerted effort in activities to reduce greenhouse gas emissions and to utilise sustainable and renewable energy practices.

The COP-10 meeting last December has laid the groundwork on how this can be achieved by developed and developing countries. Some key outcomes of the COP-10 meeting are highlighted on page 6.

The Oceania Secretariat's host institute, PACE-SD, has been involved in a number of key environmental and climate change projects. Some of these have been highlighted in this issue of *Oceanic Waves*.

The 10th APN meeting, to be held in Kobe in April, will also see the launch of its new strategic plan.



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Fiji conducts second national forum to develop a waste strategy

Fiji's Department of Environment conducted a National Waste Forum in Lautoka, Fiji, in November last year, to develop a National Solid Waste Strategy (NSWS).

This follows on from the first National Waste Forum conducted earlier in Suva, Fiji, in August, 2004.

The Suva meeting saw the approval of the first draft framework of the National Solid Waste Management Strategy for Fiji, which was developed by Fiji's Department of Environment and the University of the South Pacific's (USP) Pacific Centre for Environment and Sustainable Development (PACE-SD). PACE-SD is providing technical support to Fiji's Department of Environment to develop the National Solid Waste Strategy (NSWS). The two

national waste forums held in Suva and Lautoka, will enable broad consultations with relevant stakeholders in the country.

"It is important that countries within the region deal with solid waste in an integrated fashion, and Fiji has taken such an approach which aims at moving away from fragmented and uncoordinated solid waste management to integrated waste management," Programme Manager at PACE-SD, Mr Melchior Matakai said.

"Integrated solid waste management represents a paradigm shift in Fiji's approach to waste management, where waste prevention and waste minimisation are promoted," Mr Matakai said.

Climate's impact on health needs to be recognised in the Pacific

Climate has significant impacts on the vital sectors of agriculture, disaster management, water resources and health and a project on 'Climate Variability and Change and Health in Small Island States' recommends meteorological/ weather services and health ministries to work together to reduce the risk of serious health problems.

The project, funded by the Asia Pacific Network for Global Change Research (APN) was conducted by Dr Nancy Lewis of the East-West Center, Mr Navi Litidamu of the Fiji School of Medicine and Prof Michael Hamnett of the University of Hawaii. Prof Hamnett is also a member of the START-Oceania Regional Committee.

The project involved a scoping meet-

pared to flu, but one or more cases of leptospirosis are almost twice as likely to occur when rainfall levels are equal to or above the mean monthly rainfall levels compared to rainfall below the monthly average.

The number of ciguatera cases was lowest during the months with highest rainfall (January, February and March) and highest during months with the lowest rainfall (June to September).

"While the statistical relationships for some health problems were not as strong as they were for dengue fever, researchers and health and meteorological service officials were able to identify 'best practices' and 'no regrets strategies' for the application of forecast information in the health sector," Dr Hamnett said.



Participants from the Pacific region at the workshop on 'Climate Variability and Change and Health in Small Island States' held in Nadi last year.

ing, a collaborative research effort, a national workshop, and a regional workshop to disseminate the results.

Health data was compiled by Fiji School of Medicine students and climate data was provided by the Fiji Meteorological Service.

Researchers analysed the relationship between temperature, rainfall, ENSO and extreme events, and the risks of outbreaks of dengue fever, diarrheal disease, leptospirosis, acute respiratory infections, influenza, and ciguatera.

According to Dr Hamnett, the research phase of the project found that dengue fever outbreaks with 200 or more cases occurred in January through March when two dry months (< 33% of normal rainfall) were followed by a wet month.

The 1998 dengue outbreak in Fiji occurred during an El Niño-related drought following a near miss by Cyclone Susan in January of that year.

The analysis also found an average of 421 cases of flu per month over the period 1980-2000 and higher frequency of influenza cases from April to October with a peak of more than 500 cases per month from June to September.

The number of leptospirosis cases during the same period was very small com-

"Perhaps as importantly, at both the national Fiji meeting and the regional dissemination meeting, meteorological officers and health officials had the opportunity of working together in teams to address these issues."

The national meeting was held in Suva, Fiji in September 2003 and the regional workshop on 'Climate Variability and Change and Health in Small Island States' was held from 14-15 September 2004 in Nadi, Fiji.

The results of the regional workshop include recommendations to national governments and regional and international organisations on the use of climate forecasts for more effective public health programs in the Pacific islands region. Participants also recommended the compilation of better epidemiological data which has been long overdue for the region.

The project aimed to refine a set of tools to allow meteorological service officials in the Pacific to conduct similar analysis and to develop analytical methods for assessing the impact of seasonal to inter-annual climate variability on important diseases in the region. It aimed to demonstrate how these tools and techniques can be used with climate forecasts, for risk reduction from diseases.

APN and WHO convene public forum on climate's impact on human health at the World Conference on Disaster Reduction

At the recent World Conference on Disaster Reduction (WCDR) in Kobe, Japan, the Asia-Pacific Network for Global Change Research (APN) and the WHO Centre for Health Development (WKC), convened a joint public forum on 'Climate Calamities and Human Health' on 22 January, 2005.

The public forum was held to increase the public's awareness of climate change as an actual and potential root cause of disasters affecting human health by the APN and WKC, who are both members of a Kobe-based Disaster Reduction Alliance (DRA).

"This APN/WKC partnership is essential given that climate has always had a powerful impact on human health and well-being and that some of the change and variability in climate is being driven

by human activities," an APN statement said. "The global climate is changing with more frequent extreme weather events occurring, increasing the incidence of natural disasters such as heat waves, droughts and floods. These events directly impact the health and well being of the affected communities and climate change is a new challenge to ongoing efforts to protect human health," the statement said.

The public forum was described as a resounding success with the attendance of 125 members of the local community from the Hyogo area, WCDR delegates, climate and health experts, policy-makers and the media.

Keynote presentations were made by Dr Carlos Corvalan from WHO on 'Climate change and human health' and Dr

Michael H. Glantz from the National Center for Atmospheric Research on 'Putting "natural" disaster early warning into context'.

A panel session was held on 'smart' solutions to help communities deal with future climate extremes which was chaired by Dr Andrew Mathews from NIWA who is also the co-chair of the APN Scientific Planning Group. Introductory remarks were made by Dr Shingo Nagamatsu of the Disaster Reduction Institute and Mrs Madeleen Helmer of the Red Cross/Red Crescent Centre on Climate Change and Disaster Preparedness.

The APN and WHO-Kobe Centre are grateful for the strong support and commitment to the public forum from the Hyogo Prefectural Government and the

Ministry of Environment, Japan.

The Vice-Governor of the Hyogo Prefectural Government Mr Tomio Saito and the Vice-Minister for Global Environmental Affairs, Japan, Mr Seizo Matsumoto presented opening remarks. Mr Shuichi Katoh, member of the House of Councillors and former Senior Vice Minister of the Environment, Japan, also participated in the forum and convened a lunch meeting with forum participants and APN and WHO-Kobe Centre Directors, Mr Sombu Yamamura and Dr Wilfried Kreisel.

The APN and the WHO-Kobe Centre are now preparing a publication highlighting key aspects and outcomes of this public forum and are exploring opportunities for further collaboration and follow-up activities.

START scientific meeting discusses research areas

The 18th START Scientific Steering Committee (SSC) meeting was held from 7-9 February 2005, at the Royal Netherlands Academy of Arts and Sciences in Amsterdam, Netherlands.

The meeting was attended by members of the START SSC from the International START Secretariat office and its Regional Networks in Southeast Asia, Temperate East Asia, South Asia, Pan-Africa, Mediterranean, Central Asia, Central and Eastern Europe, and the Oceania region. Also in attendance were members of global change organisations supporting START initiatives.

An update was provided by START sponsors: the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP) and the World Climate Change Research Programme (WCRP) through the Earth System Science Partnership (ESSP) initiative.

The START Annual Report was presented by the Director of the International START Secretariat, Prof Roland Fuchs. Regional Reports were presented

by SSC representatives from the START regional networks.

Director of START-Oceania Secretariat, Professor Kanayathu Koshy attended as a member of the SSC and presented the Annual Report of the START-Oceania Secretariat for 2003-2004.

Global change issues discussed at the meeting included activities in the area of vulnerability and adaptation. In this area, discussions focussed on the Assessments of Impacts and Adaptations to Climate Change (AIACC) project, which is jointly executed by START and the Third World Academy of Sciences (TWAS) on behalf of the United Nations Environment Programme (UNEP).

Other activities discussed were: the Monsoon Asia Integrated Regional Studies (MAIRS), industrial transformation, water and the Global Water Systems project (GWSP), coastal zones and the Land-Ocean Interactions in the Coastal Zone (LOICZ) project, and Climate Prediction and Agriculture (CLIMAG) project.

Updates were provided on regional funding mechanisms and presentations were made by regional and strategic partners, including the Inter-American Institute (IAI), the Asia-Pacific Network for Global Change Research (APN), and the Netherlands Foundation for the Advancement of Tropical Research (WOTRO).

According to Prof Koshy, the areas that were highlighted as best to serve the major needs of the Oceania region were:

- climate vulnerability, adaptation, resilience and capacity building as a short-term to mid-term thematic area, which could be implemented in the second phase of the AIACC project;
- the possibility of training and research awards for Visiting and Young Scientists for the Oceania region; and
- phase II of the LOICZ project, for which the Oceania region has been identified as a target area for further activities and interaction.

These areas will be followed-up by the START-Oceania Secretariat for further activities during the year, in the Oceania region.

APN meeting in Kobe will mark decade of service to Asia-Pacific

The Asia-Pacific Network for Global Change Research (APN) will hold the 10th APN Inter-governmental Meeting (IGM) and Scientific Planning Group (SPG) Meeting from 12-14 April 2005, at the International Conference Center in Kobe, Japan.

The IGM and the SPG meetings are organised by the APN Secretariat, located in Kobe, Japan, in collaboration with the Ministry of Environment, Japan, and Hyogo Prefectural Government which is the host of the APN Secretariat Office in Kobe.

The upcoming APN meetings will present the 'Report of Institutional and Scientific Evaluation of Phase 1 (1996-2004)' and the Second Strategic Plan (Second Phase, 2005-2009) for IGM endorsement. Additionally, the APN will also launch its global change coastal zone management synthesis report.

To mark the APN's tenth anniversary, in conjunction with the IGM, the Hyogo Prefectural Government will convene, with the APN, a public forum on 'capacity building and environmental education: APN's expected roles.'

The Ministry of Environment, Japan, and the APN will co-host a scientific symposium on the 'Contribution of APN - Evaluation of Vulnerability and Adaptation Measures in the Asia-Pacific region - Focusing on Coastal Zones'. This symposium will convene on 13 April at the Kobe International Conference Centre.

A detailed report of the above activities will feature in the April edition of the APN newsletter (www.apn.gr.jp).

Students prefer multi-modal methods of learning

>> continued from page 3
which methods were most effective.

Distance and Flexible Learning (DFL) teaching methodologies, currently in use at USP, were assessed. These are: face-to-face, print-based, summer schools, multi-modal, video broadcast and video-based teaching methods.

PACE-SD was assisted by USP's Distance and Flexible Learning Support Centre (DFLSC), in the assessment.

A region-wide analysis of students perspective on learning methodologies was made through a pre-set questionnaire sent to the USP centres in the 12 South

Pacific member countries. Former DFL students were also interviewed.

"Students responses reveal that the majority prefer face-to-face mode of learning, as they are already familiar with it, from their primary and secondary schooling years." Programme Manager from PACE-SD Mr Melchior Matakai said. "However, where constraints prevent teaching of courses in the face-to-face mode, the multi-modal (mixture of modes) approach, on average, was considered an effective way of learning." The research also revealed that gender equity in accessing tertiary and higher

education in USP member countries has been achieved over the past eight years, mainly through the offering of distance and flexible learning courses.

The learning methodologies research has revealed that in 2003, 54 per cent of total enrolments in distance and flexible learning courses were by women. When DFL and on-campus course enrolments are combined, female enrolments in 2003 amounted to 51 per cent. The project will identify alternative and sustainable approaches to learning that are in use, in order to reduce learning and knowledge gaps in SIDS.

Mauritius meeting decides on sustainable development for SIDS

The International Meeting (IM) to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States (SIDS) convened from 10-14 January 2005, at the Swami Vivekananda International Convention Center in Port Louis, Mauritius. Almost 2000 participants were in attendance, including 18 presidents, vice-presidents and prime ministers, some 60 ministers, and representatives of UN agencies and intergovernmental and non-governmental organisations.

Below is a summary of the IM as published in the International Institute for Sustainable Development's (IISD) Earth Negotiations Bulletin, Vol. 8 No. 47, Monday 17 January 2005.

The IM was preceded by two days of informal consultations on Saturday and Sunday, 8-9 January to facilitate preparations for the IM, in particular to advance negotiations on the Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of SIDS.

From Monday to Wednesday, 10-12 January, the IM held five plenary panels on the themes of: environmental vulnerabilities of SIDS; special challenges of SIDS in trade and economic development; role of culture in the sustainable development of SIDS; addressing emerging trends and social challenges for the sustainable development of SIDS; and building resilience in SIDS. The Main Committee met from Monday to Thursday, 10-13 January, to complete negotiations on the Strategy document.

The high-level segment of the IM took place on Thursday and Friday, comprising a general debate and two round tables. The general debate addressed the "Comprehensive review of the implementation of the Programme of Action for the Sustainable Development of SIDS", while the round tables considered the overall theme of "The Way Forward", with the first discussing mobilisation of resources, and the second addressing capacity building.

Capacity building workshops, side events and partnership activities addressing a wide range of SIDS-related issues were held during the IM, which also saw the launching of the SIDS University Consortium. At the conclusion of the meeting, delegates adopted the Mauritius Declaration and the Mauritius Strategy for the Further Imple-

mentation of the Programme of Action on the Sustainable Development of SIDS.

The Main Committee, established on Monday, 10 January, concluded its work on the Strategy document on Thursday, 13 January, after having meetings, informal consultations and contact groups to discuss controversial issues such as climate change, trade, governance, and transport of radioactive material.

There was no agreement reached on Climate change and sea-level rise and trade: globalisation and trade liberalisation.

Below is the summary on the discussion on Climate change and sea-level rise, as published in the Earth Negotiations Bulletin.

Climate Change and Sea-Level Rise: This issue was raised on Monday (10 January) in the Main Committee where the US, G-77/China and EU presented alternative texts. It was discussed in a contact group, which met frequently from Tuesday (11 January) until early Thursday (13 January) morning.

In the contact group, deliberations focused on whether to include text on:

- the likelihood of climate change to threaten the existence of SIDS;



The signatories to the SIDS University Consortium, from left: Vice-Chancellor (VC) of the University of West Indies (UWI) Prof E. Nigel Harris, President of the University of Virgin Islands (UVI) Dr La Verne Ragster, Acting Deputy VC of USP Prof K. Thaman, VC of the University of Malta (UM) Prof Lino Briguglio, and VC of the University of Mauritius Prof G. T. G. Mohamedbhai.

- the evolving nature of climate change science;
- the call for ratification of the Kyoto Protocol;
- a need to mitigate greenhouse gas (GHG) emissions;
- prioritisation of the use of renewable energy;
- the use of advanced and cleaner fuel technologies;
- the use of nuclear technologies;
- development and implementation of national adaptation strategies and their integration into national sustainable de-



Prof Konai Thaman speaks during the launch of the SIDS University Consortium.

velopment strategies (NSSDs); and

- the promotion of financial and technological support, through, inter alia, the GEF.

On Thursday (13 January), the Main Committee agreed to text stating that, inter alia:

- the long-term effects of climate change may threaten the very existence of some SIDS;
- parties that have ratified the Kyoto Protocol strongly urge all States that have not done so to ratify it in a timely manner;

- increased energy efficiency and development and use of renewable energy is promoted as a matter of priority, as well as advanced and cleaner fossil fuel technologies;
- the development and implementation of national adaptation strategies and their integration into NSSDs is needed; and
- SIDS should, with assistance from regional development banks and other financial institutions, where appropriate, establish and strengthen national and regional climate change coordination mechanisms.

Below is a summary of the component on Climate Change and Sea Level Rise, of the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of SIDS. This summary was published in the *Earth Negotiations Bulletin*.

The Strategy recognises that the adverse effects of climate change and sea-level rise present significant risks to the sustainable development of SIDS, and that the long-term effects of climate change

may threaten the very existence of some SIDS.

The Strategy states that SIDS, with the necessary support of the international community, will, as an integral component of their national sustainable development strategies, develop and implement national adaptation strategies and facilitate regional and inter-regional cooperation, including within the framework of the UNFCCC. It also states that SIDS, with assistance from regional development banks, should coordinate further to establish or strengthen national and regional climate change coordination mechanisms.

Regarding the role of the international community, the Strategy states that they should, inter alia:

- fully implement the UNFCCC and further promote international cooperation on climate change;
- continue to take steps, in accordance with the UNFCCC and Kyoto Protocol, to address climate change, including through adaptation and mitigation, in accordance with the CBDR principle;
- promote increased energy efficiency and development and use of renewable energy, as a matter of priority, as well as advanced and cleaner fossil fuel technologies;
- implement the Buenos Aires Programme of Action on Adaptation and Response measures;
- work to facilitate and promote the development, transfer and dissemination to SIDS of appropriate technologies and practices to address climate change;
- build and enhance scientific and technological capacities, including in SIDS; and
- enhance the implementation of national, regional and international strategies to monitor the earth's atmosphere, and work with SIDS to strengthen their involvement in monitoring and observing systems, and enhance their access to, and use of, information.

Other areas covered in the Mauritius Strategy are: natural and environmental disasters, management of wastes, coastal and marine resources, freshwater resources, land resources, energy resources, tourism resources, biodiversity resources, transport and communication, science and technology, graduation from LDC States, Trade: globalisation and trade liberalisation, sustainable capacity development and education for sustainable development, sustainable production and consumption, national and regional enabling environments, health, knowledge management and information for decision-making, culture, and implementation.

Copies of the IM documents and other details of the IM meeting are available at the website: www.iisd.ca/sids/IM

South Pacific Sea Level and Climate Monitoring Project

The South Pacific Sea Level & Climate Monitoring Project aims to provide increased certainty and understanding about climate change, climate variability and sea level changes in Pacific Island countries.

The Australian Government funded project began in 1991 to address the concerns of Pacific Island Governments and countries about the potential implications of changing sea levels from global warming (enhanced greenhouse effect). To date, its array of monitoring stations has been widely acknowledged as one of the most accurate sources available for information on sea level and climate change.

Sea levels and associated meteorological variables are measured using state-of-the-art Sea Level Fine Resolution Acoustic Measurement Equipment (SEAFRAME- Tide Gauge) monitoring stations in 12 Pacific Island countries, including Cook Islands, Tonga, Fiji, Vanuatu, Samoa, Tuvalu, Kirabati, Nauru, Solomon Islands, Papua New Guinea, Federated States of Micronesia and Marshall Islands. These SEAFRAME stations are also linked to a network of 10 Continuous Global Positioning Systems (CGPS) that measure vertical land movement and help to determine absolute sea level. Within the next 20-40 years the project's data has

the potential to detect a greenhouse signal in sea level records, a task requiring very accurate monitoring and quality control of data over a long time period due to the natural variability in sea level caused by atmospheric, oceanographic and geological processes.

Pacific Island nations also derive more immediate benefits from the South Pacific Sea Level and Climate Monitoring Project. Some of the benefits include:

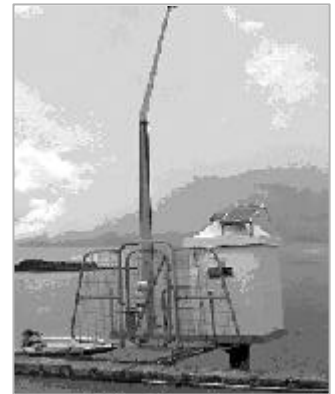
- Increased capacity in natural disaster management, with the project's monitoring equipment helping to provide tsunami warnings, storm surge predictions, improved weather predictions and information on El Nino.

- The use of project information for in-country management and planning in sectors such as fisheries, water resources, land management and coastal development.

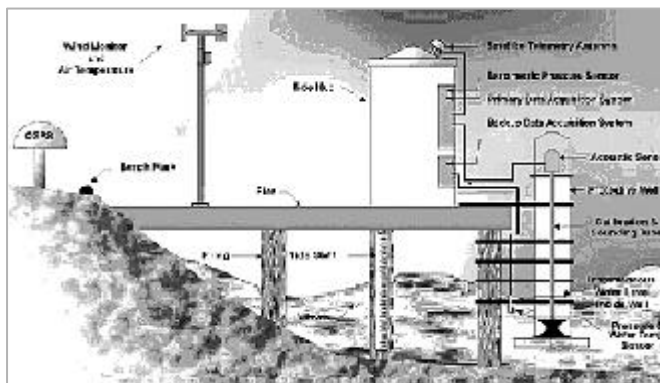
- The use of project data for vulnerability and adaptation assessments and to enhance regional and national climate change communications.

- More accurate tidal predictions for shipping, search and rescue and marine research activities.

- Capacity building and skills transfer through climate modelling and policy workshops and extensive on-the-job training of regional staff.



A seaframe station in Federated States of Micronesia.



A seaframe monitoring station with a Continual Global Positioning System.

- Support national and regional policies on climate change and sea level rise.

The South Pacific Sea Level & Climate Monitoring Project is providing a major contribution to the science of climate change, both regionally and globally, as well as providing valuable data for a variety of other purposes.

For more information, please contact: Dr Chalapan Kaluwin, Regional Coordinator, Australian Marine Science & Technology, PO Box 17955, Suva, Fiji, phone/fax: (679) 330 4003, email: amsatck@connect.com.fj

Dhaka workshop focuses on community adaptation to climate change

The International Workshop on Community Level Adaptation to Climate Change was held from 16-18 January 2005 at the Pan Pacific Sonargaon Hotel in Dhaka, Bangladesh.

The workshop aimed to share the latest state of knowledge and developments in adaptation programmes, priorities and solutions through dissemination and interaction between participants.

Adaptation to climate change has risen up the political and scientific agenda in recent years.

The issue has received increasing attention within the United Nations Framework Convention on Climate Change (UNFCCC), and programme activities are expanding through international and national level initiatives such as the creation of the Global Environmental Facility (GEF) Adaptation Fund, UNDP's Adaptation Policy Framework and the National Adaptation Programme of Action for Least Developing Countries and the emphasis on adaptation in the fourth Assessment of the Intergovernmental Panel on Climate Change (IPCC).

Community-based adaptation activities are working to link climate change into sustainable development and the workshop aimed at raising the professional capacity for developing and implement-

ing strategies, programmes and projects for adaptation to climate change.

53 international participants including practitioners, researchers, policy makers, donors and community representatives, attended the meeting and discussed how climate change links to sustainable development and exchanged experiences of community-level adaptation practices.

Five representatives from the South Pacific participated in the workshop.

Visiting Professor at USP's Pacific Centre for Environment and Sustainable Development (PACE-SD) Dr Murari Lal, chaired a session on Adaptation in Practice on Sunday 16 January.

On the same day, Climate Change Adaptation Officer with the South Pacific Regional Environment Programme (SPREP) Mr Taito Nakalevu, made a presentation on 'Improving the Resilience of Pacific Island Communities: Lessons learned based on a Canadian



Pacific participants at the Dhaka meeting (from right) Dr Murari Lal, Dr Penehuro Lefale, Mr Peiniamina Leavai, Mr Taito Nakalevu and a representative from Vanuatu.

International Development Assistance (CIDA)/SPREP adaptation Project'.

On Monday 17 January, Dr Penehuro Lefale from the National Institute of Water and Atmospheric Research (NIWA) in New Zealand, presented a paper on 'Weather and Climate Knowledge: Samoan and Mauritanian Experiences', and Senior Climate Change Officer at the Ministry of Resources in Samoa, Mr Peiniamina Doug Ali Leavai, presented findings of their Pi-

lot Community Adaptation project.

Ms Leilani Duffy, from the United Nations Development Programme (UNDP) in Samoa, was a panelist on the session on Responding to Climate Change, held on Tuesday 18 January.

The workshop themes covered emerging issues in community adaptation including international institutions and funding mechanisms, effects of climate change on different sectors, linking climate change adaptation

to other development priorities, mainstreaming adaptation, methodological issues such as stakeholder engagement and vulnerability assessment and identifying and evaluating adaptation options. Particular attention was given to lessons relevant to improving the capacity of the most vulnerable groups of people, improving livelihoods in developing countries and integrating these lessons into international programmes and negotiation processes.

UN's Kyoto treaty against global warming is in force

The Kyoto treaty against global warming came into force on February 16 2005, with United Nations Secretary-General Kofi Annan urging the world to save the planet by adding to the limits on greenhouse gases and the UN environment chief stressing that many in the United States, the world's top polluter, support the protocol despite the US Government's opposition, a United Nations Press Release states.

Under the Kyoto Protocol to the 1992 UN Framework Convention on Climate Change (UNFCCC), industrialised countries are to reduce their combined emissions of six major greenhouse gases during the five-year period from 2008 to 2012 to below 1990 levels. So far 128 Member States have ratified the accord. For many countries, achieving the Kyoto targets will be a major change that will require new policies and new approaches, the Press Release said.

"By itself, the Protocol will not save humanity from the dangers of climate change," Mr Annan said in a video message to a celebratory ceremony in the ancient Japanese capital of Kyoto, where it was negotiated in 1997. "So let us celebrate today, but let us not be complacent.

"I call on the world community to be bold, to adhere to the Kyoto Protocol, and to act quickly in taking the next steps. There is no time to lose," he added.

After President George W. Bush withdrew US support for the Protocol in 2001, Russian ratification became vital for it to enter into force since 55 Parties to the UNFCCC must ratify it, including the developed countries whose combined 1990 emissions of carbon dioxide exceed 55 per cent of that group's total. Russia, with 17 per cent, took the official step in November.

The Intergovernmental Panel on Climate Change (IPCC), the scientific body which advises governments and which was established by UNEP and the UN World Meteorological Organization (WMO), concluded a few years ago that global temperatures may rise by as much as 5.8 degrees centigrade by 2100 without action, the Press Release said.

Another report, launched a few weeks ago by the International Climate Change Task Force, an alliance of three think-tanks in the US, Australia and Britain, argues that even a two degree rise could take the planet past a point of "no return".

The UN High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, Anwarul K. Chowdhury, pointed out in the Press Release, the adverse effects that climate change and sea level rise present to the sustainable development of small island developing states.

"Never before has the negative impact of climate change been more evident than the recent devastating weather conditions resulting in widespread hurricanes, cyclones, tropical storms, tidal waves, tsunamis in various parts of the world, particularly affecting small island developing states. These small countries are the most vulnerable to global climate change," he stressed.

The ratification of the Kyoto Protocol by the Russian Federation last year, ensured the continuity of mitigation efforts into the next decade.

To make sure that the "house" is in order for the Protocol's imminent entry into force, Parties gathered at the Tenth Conference of the Parties (COP-10) to the United Nations Framework Convention on Climate Change (UNFCCC),

"Even a two degree rise could take the planet past a point of "no return" - International Climate Change Task Force.

from 6-18 December 2004 in Buenos Aires, Argentina.

Over 6100 participants from 167 governments, two observer states, 272 intergovernmental, non-governmental and other observer organisations, and 240 media outlets were in attendance, according to a COP-10 Final summary published in the *Earth Negotiations Bulletin* (Vol. 12 No. 260, Monday 20 December 2004) published by the International Institute for Sustainable Development (IISD).

The COP-10 meeting was held simultaneously with the 21st session of the COP's Subsidiary Body for Scientific and Technological Advice (SBSTA) and Subsidiary Body for Implementation (SBI) at the La Rural Exhibition Center in Buenos Aires.

During the meeting, Parties addressed and adopted numerous decisions and conclusions on various issues, including: technology transfer; issues relating to land use, land-use change and forestry; the UNFCCC's financial mechanism; Annex 1 national communications; capacity building; adverse effects and adaptation, and UNFCCC Article 6 (education, training and public awareness).

Below are some outcomes of the COP-10 meeting, as published in the final summary by the *Earth Negotiations Bulletin*.

- In the decision on land use, land-use change and forestry (LULUCF), the COP, inter alia, encourages Annex 1 Parties that have ratified the Protocol to submit, on a voluntary basis, estimates of greenhouse gas emissions by sources and removals by sinks, using the common reporting format.

- In the decision, the COP decides, inter alia:

- to adopt simplified modalities and procedures for small-scale afforestation and reforestation (A&R) Clean Development Mechanism (CDM) project activities in the first commitment period;
- to limit small-scale afforestation and reforestation projects to net anthropogenic greenhouse gas (GHG) removals by sinks less than eight kilotonnes of carbon dioxide per year if the average projected net anthropogenic GHG removals by sinks for each verification period do not exceed eight kilotonnes of carbon dioxide equivalent per year;
- if a small-scale project results in excess removals of eight kilotonnes of carbon dioxide equivalent per year, excess removals will not be eligible for

climate change issues and increasing the involvement of national governmental organisations in capacity-building activities;

- ensuring that resources are made available for the implementation of capacity building activities; and
- improving international donor coordination in the provision of financial resources.

The COP encourages Parties to improve implementation of capacity-building activities, taking into account the above key factors, and to report on the effectiveness and sustainability of capacity-building programmes in their national communications. It also requests the GEF to take into account the above key factors when supporting capacity-building activities, and invite Annex II Parties, multilateral, bilateral and international agencies, and the private sector to continue providing financial resources to support the capacity-building framework.

The decision entitled the Buenos Aires Programme of Work on Adaptation and Response Measures, is divided into four parts: adverse effects of climate change; impact of the implementation of response measures; further multilateral work relating to activities under decision 5/CP.7; and the SBSTA programme of work on impacts, vulnerability, and adaptation to climate change.

On adverse effects of climate change, the COP decides to further implementation of actions under decision 5/CP.7 on information and methodologies, and vulnerability and adaptation. It also requests the Secretariat to organise, before COP-13, three regional workshops, reflecting regional priorities, and one expert meeting for SIDS, reflecting issues of priority identified by that group. Regarding modeling, the COP encourages the IPCC to incorporate regional-specific modeling information on adverse effects of climate change in its Fourth Assessment Report.

On the SBSTA programme of work on impacts, vulnerability and adaptation to climate change, the COP:

- requests SBSTA to develop a five-year programme of work on the impacts, vulnerability and adaptation to climate change;
- invites Parties to submit views to the Secretariat by 31 March 2005.

The COP also encourages CDM project participants to make proposals for new baseline and monitoring methodologies for types of project activities in sectors not yet covered by approved methodologies, including transportation and energy efficiency, and to intensify its work to ensure the proper functioning of the CDM, by, inter alia, developing a management plan.

the issuance of temporary or long-term certified emissions reductions; and

- to exempt small-scale project activities from the share of proceeds to be used to assist developing countries that are particularly vulnerable to adverse impacts of climate change and shall be entitled to a reduced level of the non-reimbursable fee for requesting registration and a reduced rate of the proceeds to cover administrative expenses of the CDM.

- In the decision, the COP, inter alia, encourages Parties to implement the priority elements in the regional action plans relating to the global observing systems for climate.

- The decision states that the report on the assessment of funding necessary to assist developing countries in fulfilling their commitments under the UNFCCC shall constitute an input of the COP to the fourth replenishment negotiations of the Global Environmental Facility (GEF) Trust Fund. It urges the GEF to make adequate funding available to developing countries to meet their commitments under the UNFCCC, and requests the Secretariat to compile information on future investment needs of developing countries for the purpose of fulfilling their commitments.

- In the final decision on capacity building for developing countries, the COP, inter alia, outlines key factors that could assist in further implementing capacity building, such as:

- prioritising institutional capacity building;
- integrating capacity-building activities in planning processes;
- raising awareness at various levels on

Noumea meet decides on new climate change projects

The hosting of the START-Oceania Regional Committee meeting by the Institute of Research and Development (IRD) in Noumea, New Caledonia, has provided the basis for new partnerships for research collaboration.

The annual START-Oceania Regional Committee Meeting was held from 1-2 December 2004 at the IRD, to review the activities of the Secretariat and to prepare strategies for the future. START is the acronym for the Global Change System for Analysis, Research and Training. The International START Secretariat is based in Washington, USA.

The chair of the Committee, Professor Nick Harvey said that the IRD had a lot of expertise which could be used for the benefit of research in the South Pacific region.

As the focus of START is on research relating to global change, current projects carried out in this area were reviewed.

Prior to the meeting, START-Oceania Director, Professor Kanayathu Koshy met the Director of IRD, Dr Fabrice Colin to discuss the possibility of IRD collaboration in climate-change research and ENSO impacts on climate variability.

During the meeting, the START-Oceania team met with IRD research groups from the Oceanography and Geology sectors. The team also met the French government representative Mr Jean-Francois Marini, the government of New Caledonia delegate for research

of cooperation will be best for the regional presence of France as France is also here to provide expertise and assistance in development."

Professor Koshy commented that the responses from IRD and the French government were very encouraging. "In

creases in the intensity and frequency of cyclones and increased frequency of extreme rainfall events," Prof Koshy said.

The committee plans to develop four additional projects in the area of climate change. These include a project on adapting to climate change; a regional project linking climate change and El Nino; a project on coastal management in Oceania; and a project on the impacts of climate change on communities.

The committee has decided to develop these projects as partnership initiatives. The meeting also identified projects in other areas which will be developed during the year.

START has regional networks in six developing regions of the world. The START secretariat for the Pacific is based at the University of the South Pacific (USP) in Suva, Fiji, and is known as the START-Oceania Secretariat.

The START-Oceania Regional Committee includes members from Papua New Guinea, Fiji, Hawaii, Australia, New Zealand, New Caledonia and the South Pacific Regional Environment Programme (SPREP).



French government representative Mr Jean-Francois Marini (second from left) with START Oceania Regional Committee members (from left) Dr John Campbell from the University of Waikato, Prof Kanayathu Koshy from USP, Dr Alexandre Ganachaud from IRD and Prof Nick Harvey from the Adelaide University. Dr Christopher Maes (first on right) from the IRD was an observer at the meeting.

Mr Charles Washetine, and the Director of Meteo-France Mr Nicolas Beriot. "France is on the way of financing research that will be cooperative in the region," Mr Marini said. "This kind

the Pacific, some signs of climate change can already be seen. However, climate variability such as extreme weather events are a matter of immediate concern. Examples of these are in-

Students prefer multi-modal ways of learning

A multi-modal approach to learning has been considered the best in distance learning, according to research into different learning methods at the University of the South Pacific (USP).

The research is part of a project on Collaborative Local Capacity Building Approaches to Bridging the Learning and Knowledge Divide in Small Island Developing States (SIDS), being conducted through a research award from the International Development Research Centre, Canada, and the United Nations Development Programme (IDRC-UNDP).

It is jointly implemented by USP, University of Philippines (UP), University of West Indies (UWI), Counterpart Caribbean (CC), Ghana Institute of Management and Public Administration (GIMPA) and UNDP. The project research is led by Dr Mario Delos Reyes from UP, in partnership with researchers from UWI, CC, GIMPA and USP. At USP, the project is coordinated by the Pacific Centre for Environment and Sustainable Development (PACE-SD). Phase one of the project was recently completed and involved an assessment of the different methods of learning in use for tertiary teaching in the developing regions of the world, to find out

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CSIRO assists PACE-SD to simulate a high resolution model for Fiji's climatology

A high resolution climate model simulation has been performed for the first time for Fiji's climatology, as a result of successful research collaboration between the University of the South Pacific (USP) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The simulation involving a trial numerical experiment for a ten-year period (1975-1984), was performed jointly by Dr John McGregor of CSIRO and Dr Murari Lal, a Visiting Professor with USP's Pacific Centre for Environment and Sustainable Development (PACE-SD), during his five-week visit to CSIRO, Australia late last year.

The simulation was performed at a horizontal resolution of eight kilometres, which is currently the highest resolution at which a global climate model has been applied for regional climatological simulation internationally. CSIRO's global Cubic Conformal Atmospheric Model (C-CAM) was used to conduct the simulation.

"This scientific activity is aimed at developing in-house capacity at USP in attempting to facilitate the Pacific Island Countries and its communities to understand the interannual climate variability and related disasters in the short term through preparedness based on

predictions from the model. In the long-term, it will help regional countries meet their sustainable development goals through formulation of appropriate adaptation response strategies based on future projections of regional, national and local climate change," Dr Lal said. Preliminary analysis of model generated data has demonstrated a fairly good skill by the CSIRO model in simulating the annual cycles of maximum and minimum temperatures and rainfall at selected locations in Fiji. The model has also successfully reproduced the gradient of maximum and minimum surface air temperatures between western and central divisions of Viti Levu, Fiji.

"Model simulation of spatial and temporal distribution of monthly total rainfall (10 year mean) over Viti Levu, Fiji, shows that it is capable of reproducing the observed intraseasonal and interannual variability at Nadi and Suva. The influence of El Nino phenomena has also been captured well in the model simulated rainfall," Dr Lal explained. Extensive analysis of the model generated data and validation with observed meteorological data sets is currently underway at PACE-SD.

"Given the skill demonstrated by the model, PACE is planning to work with CSIRO to import their C-CAM model

to the region via USP and conduct several numerical experiments for Fiji and other Pacific Island Countries. These experiments will further test the model's skill in simulating the climatology of the Pacific on country basis through the involvement of national meteorological services in the region," Dr Lal said.

"Subsequently, additional simulations will be performed with enhanced greenhouse forcings to develop climate change scenarios for the islands of the Pacific at this higher resolution. These scenarios could then be effectively used for sector specific vulnerability analysis - such as for agriculture, water or health - and finally appropriate adaptation strategies could be developed on location/country basis in the years to come," he said.

Discussions with CSIRO for the above development have been described as very encouraging.

"CSIRO has been very forthcoming in assisting PACE build its capacity for this important exercise, especially if PACE is able to secure funds from donor agencies to meet costs of basic infrastructure, manpower, operation and capacity building activities," Dr Lal said.

Conferences

27-29 June 2005: LOICZ II Inaugural Open Science Meeting for its second decade of global environmental change research, will be held at Egmond aan Zee, in the Netherlands. Deadline for Early Bird Registration is 31 March 2005. Deadline for Full Registration is 30 April 2005. For more information please go to website: <http://www.loicz.org/conference> or email: loicz.conference@nioz.nl

21-23 June 2005: GECHS-sponsored workshop on Human Security and Climate Change will be held in Oslo, Norway, from 21-23 June 2005. Call for Papers has been announced. For further information, visit website: www.cicero.uio.no/humsec

9-12 November 2005: The First DIVERSITAS Open Science Conference (OSC1) will be held in Oaxaca, Mexico, on the theme 'Integrating Biodiversity Science for Human Well-Being'. Registration is open until January 2005. Abstracts are due on 31 March 2005. For more information, contact the DIVERSITAS secretariat on email: info@diversitas-osc1.org or visit the website: <http://www.diversitas-osc1.org>

27 August - 2 September 2005: 4th International NCCR Climate Summer School will be held in Grindelwald, Switzerland on the theme 'From the Holocene to the Anthropocene: Climate of the Last 1000 Years'. Young scientists (PhD students and Post-Docs) are invited to apply. Participation is limited to a maximum of 70. A small number of grants is available for students from developing countries. Deadline for applications is 15 December 2004. Details and application form can be found online at: <http://www.nccr-climate.unibe.ch>

9-13 October 2005: 6th Open Meeting of the Human Dimensions of Global Environmental Change Research Community will be held at the University of Bonn, Germany, on the theme "Global Environmental Change, Globalization and International Security: New Challenges for the 21st Century". For further information, contact coordinator, Lis Mullin, email: openmeeting.ihdp@uni-bonn.de or visit the website <http://openmeeting.homelinux.org>.

26 March - 2 April 2006: Dissertations Initiative for the Advancement of Climate Change Research Symposium (DISCCRS). The symposium will take place at the Asilomar Conference Center in Pacific Grove, CA. The conference will cover an interdisciplinary training for recent PhD graduates (1 December 2002-30 September 2005) addressing climate-change impacts. Application deadline is 2 October 2005. Further information on websites: <http://aslo.org/phd.html> or <http://aslo.org/phd/discrsposter.pdf>

Tsunami impacts and warning networks for Pacific

A tsunami is a wave, or a series of waves, that may result from a variety of disturbances: undersea earthquakes, landslides or volcanic eruptions. A tsunami only has impact in coastal areas, as the wave generated by the submarine geological action runs up towards shallower water. This is what the word tsunami implies. It is a Japanese word meaning "harbour wave". Destructive tsunamis are infrequent, but are most common in the Pacific Ocean. The Pacific is the most tsunami-prone area because the Pacific basin is surrounded by the so-called "Ring of Fire", a series of plate boundaries along which tectonic activity is very high. Tsunamis can travel at speeds over 700 kilometres an hour in the deep ocean. During major tsunamis fatalities and damage result from both the wave(s) and accompanying debris churned up as the wave surges across the shoreline.

Recent Tsunamis in the Region

In the past decade, two tsunamis have brought tragic loss of life to the Oceania region.

In November 1999, a strong undersea earthquake occurred 140 kilometres north-west of Port Vila. The earthquake itself caused a house to collapse, resulting in five fatalities, as well as crop damage from landslides. It also generated a tsunami which struck the southern tip of the nearby island of Pentecost, with the loss of five lives.

The most devastating tsunami in recent memory in the region occurred near Aitape, on the northern coast of Papua New Guinea, in July 1998. Three tsunami waves, up to ten metres high, struck a 25km length of coast shortly before dark, at about 7.30pm. About 9,000 people are thought to have lived in the affected villages. Of these, over 2,000 were killed and many more injured.

The Science of Tsunamis

Tsunamis are unlike normal surface waves ("wind waves") of the ocean. To begin with, tsunamis are usually cre-

ated by a sudden vertical displacement of the sea floor, while wind waves are a result of wind blowing across the water surface. To a person in a boat far out at sea, wind waves can be a serious inconvenience, or even dangerous, while the passage of a tsunami would probably go unnoticed. The height of the tsunami wave in the open ocean is generally less than one-half metre, the wavelength (distance between succes-



Debris of a house, in the aftermath of the tsunami that struck Aitape, Papua New Guinea in July 1998.

sive crests) may be one hundred kilometers or more, and the period (time interval between passage of successive crests) is often more than one hour. As the tsunami nears a shoreline, the front of the wave is slowed by the shallower water. The wave starts crowding together and building up in height. If there is a bay or harbour, the waves may become focused and reach even greater heights (this is what gave rise to the term tsunami, or harbour wave).

Tsunamis move at a speed that is equal to the square root of the product of the acceleration of gravity (9.8m/s/s) and the water depth. In the Pacific Ocean, where the typical water depth is about 4000m, a tsunami travels at about 200m/s, or 720km/hr. Tsunamis not only propagate at high speeds, they can also travel across entire ocean basins and still cause damage. It is not uncommon for a tsunami caused by an earthquake near South America to be recorded on the tide gauges of the South Pacific Sea Level and Climate Monitoring Project. A tsunami can be generated by any disturbance that displaces a large water

mass from its equilibrium position. Aside from the direct effects of earthquakes in moving the sea floor, there are several other ways this can happen. Submarine landslides, which often accompany large earthquakes, can also disturb the overlying water column as sediment and rock slump downslope (as occurred in the case of the Aitape, PNG tsunami). Similarly, a violent submarine volcanic eruption can create an

impulsive force that lifts the water column and generates a tsunami. Normal landslides, from hillsides next to the ocean and large meteor impacts have also been known to cause tsunamis. Tsunamis generated from these mechanisms, dissipate quickly and rarely affect coastlines distant from the source area.

Small isolated islands with steeply sloping fringing or barrier reefs are only moderately at risk from tsunamis. The steeply sloping sea floor does not tend to build up the height of the wave, and the reef helps as a barrier to the wave. Similarly, any gap in a reef puts the adjacent shoreline at risk. With the aid of computers, scientists can now map tsunamis across the ocean, and predict travel times, magnitudes, and which areas are most vulnerable.

Tsunami Warning Network

The Tsunami Warning System in the Pacific (ITSU) provides detection and early warning of potentially damaging tsunamis in the Pacific basin. ITSU provides warnings through the Pacific Tsunami Warning Center (PTWC) located at Ewa Beach in Hawaii, for its 25 member countries. The Seafloor Stations (water level recorders) of the Pacific Project are key components of the Pacific tide gauge network, which includes gauges located on islands and around the Pacific coasts, on which the PTWC relies.

Information for this article was provided by Dr Chalapan Kaluwin, Regional Coordinator, South Pacific Sea Level and Climate Monitoring Project, email: amsatck@connect.com.fj

SIDS Uni Consortium launched at Mauritius to implement BPOA

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Document," Prof Koshy said. "The USP-UNU link up promises improved collaboration in the area of environment and sustainable development."

At the conclusion of the meeting, delegates adopted the Mauritius Declaration and the Mauritius Strategy for the Further Implementation of the Programme of Action on the Sustainable

Development of SIDS.

However, there was no agreement reached on climate change and sea-level rise, and on globalisation and trade liberalisation, during the meeting.

The USP component of the work on the BPOA, in the lead-up to the IM has been coordinated by PACE-SD. An extended brochure on Pacific Island Countries and Multi-lateral Environment Agreements

and a book on Sustainable Development and the Pacific Island Countries, were produced by PACE-SD for the IM.

"USP has a lot to look forward to in terms of action for the commitments we made at the IM and at the World Summit on Sustainable Development (WSSD) in Johannesburg," Prof Koshy said. "It is now for us and SIDS to work out an implementation strategy."