The Pacific Tradewinds Quarterly
Volume 7, Number 4
October/November/December 1999

Welcome to the newsletter of the Schools of the Pacific Rainfall Climate Experiment (SPaRCE). SPaRCE is a cooperative field project involving local meteorological services, elementary, middle, and high school, college, and trade school students from various Pacific island nations and the U.S. Additional information about the SPaRCE program can be found on the World Wide Web at:
http://www.evac.ou.edu/sparce/

EARTHQUAKES!

The earth is a dynamic place as many people in Vanuatu recently found out. (See Thousands Short of Water After Vanuatu Earthquake following the cover story for more about the quake.) Unlike volcanic eruptions, there are no warning signs that an earthquake is about to happen. Although scientists have learned quite a bit about earthquakes during the past century, they still have a long way to go. Until they are able to predict when and where an earthquake will occur, people must arm themselves with the only thing they can – knowledge. It is important to not only understand what an earthquake is, but what earthquakes can do and how to be earthquake prepared.

The earth is covered by plates of crust that "floats" on the liquid below it, which is known as the mantle. As these plates float around, they often bump into, slide next to, or collide with one another causing faults, or fractures in the crust. Over time, deformation of the rocks around and within the fault causes a great pressure to build. When the pressure is great enough, the rocks will move past one another causing a sudden release of stress that has been built up. This release is known as an earthquake. The area deep within the fault where movement occurred is called the hypocenter; the corresponding location at the surface of the earth is known as the epicenter.

The movement of the crust as a result of an earthquake is referred to as seismic waves. There are three types of seismic waves: l, p, and s. Each of these waves has a unique movement as well as unique effect on the earth's crust. The l-wave (or surface wave) travels along the surface of the earth causing a ripple effect of the crust. L-waves generally cause the most structural damage because they occur on the surface. The s-wave (or shake wave) moves within the interior of the earth's crust and has an up-and-down motion. S-waves moves at right angles to their direction of motion, and cannot travel through the liquid material within the earth. The p-wave (or push wave) also moves within the interior of the earth; however, it moves with a compressional movement, or side-to-side motion and is able to move through liquid material within the earth.

Prior preparation could mean life or death in the face of a natural disaster. According to the United States Geological Survey, there are several important questions to ask yourself when preparing for disaster. (For more information, visit the USGS web site: http://quake.usgs.gov)

What emergency supplies do you need?

(1) Fire extinguisher;
(2) Adequate supplies of medications that you or family members are taking;
(3) Crescent and pipe wrenches to turn off gas and water supplies;
(4) First-aid kit and handbook;
(5) Flashlights with extra bulbs and batteries;
(6) Portable radio with extra batteries;
(7) Water for each family member for at least 3 days (allow at least 1 gallon per person per day) and purification tablets or chlorine bleach to purify drinking water from other sources;
(8) Canned and package foods, enough for several days and MECHANICAL can opener. Extra food for pets if necessary;
(9) Camp stove or barbecue to cook on outdoors (store fuel out of the reach of children);
(10) Waterproof, heavy-duty plastic bags for waste disposal.

How can you plan ahead for an earthquake?
(1) Make sure each member of your family knows what to do no matter where they are when earthquakes occur.
(a) Establish a meeting place where you can all reunite afterward
(b) Find out about earthquake plans developed by children's school or day care
(c) Remember transportation may be disrupted, keep some emergency supplies--food, liquids, and comfortable shoes, for example--at work
(2) KNOW where your gas, electric and water main shutoffs are and how to turn them off if there is a leak or electrical short. Make sure older members of the family can shut off utilities.
(3) LOCATE your nearest fire and police stations and emergency medical facility.
(4) TALK to your neighbors--how could they help you, or you them after an earthquake
(5) TAKE Red Cross First Aid and CPR Training Course.

What should you do during an earthquake?
(1) If you are INDOORS--STAY THERE! (Get under a desk or table and hang on to it, or move into a hallway or get against an inside wall. STAY CLEAR of windows, fireplaces, and heavy furniture or appliances. GET OUT of the kitchen, which is a dangerous place (things can fall on you). DON'T run downstairs or rush outside while the building is shaking or while there is danger of falling and hurting yourself or being hit by falling glass or debris.
(2) If you are OUTSIDE-- get into the OPEN, away from buildings, power lines, chimneys, and anything else that might fall on you.
(3) If you are DRIVING--stop, but carefully. Move your car as far out of traffic as possible. DO NOT stop on or under a bridge or overpass or under trees, light posts, power lines, or signs. STAY INSIDE your car until the shaking stops. When you RESUME driving watch for breaks in the pavement, fallen rocks, and bumps in the road at bridge approaches.
(4) If you are in a MOUNTAINOUS AREA--watch out for falling rock, landslides, trees, and other debris that could be loosened by quakes.
(5) If you are near the ocean, move inland to high ground. Earthquakes could cause a local tsunami (tidal wave – see next *Tradewind Quarterly*, vol. 8 no.1).

What should you NOT to do during an earthquake?
(1) DO NOT turn on the gas again if you turned it off; let the gas company do it;
(2) DO NOT use matches, lighters, camp stoves or barbecues, electrical equipment, appliances

UNTIL you are sure there are no gas leaks. They may create a spark that could ignite leaking gas and cause an explosion and fire;
(3) DO NOT use your telephone, EXCEPT for a medical or fire emergency. You could tie up the lines needed for emergency response. If the phone doesn't work send someone for help;
(4) DO NOT expect firefighters, police or paramedics to help you. They may not be available.

THOUSANDS SHORT OF WATER AFTER VANUATU QUAKE
Reuters Press, November 28, 1999

PORT VILA (Reuters) - Thousands of people on the Vanuatan island of Pentecost faced food and water shortages on Sunday after a powerful earthquake followed by a tsunami struck the South Pacific nation early on Saturday, killing eight people.

Aside from the confirmed dead, two people are still missing and thousands are feared injured and homeless.

``A lot of damage has been done and there are reports of landslides, damaged houses, damaged water tanks and roads around the central part of the island and to the south," Vanuatu police chief inspector Eric Pakoa told Reuters.

``There are probably a lot of people homeless," Pakoa said, estimating up to 500 people would be without shelter or water. "Most water sources have been cut so we're looking at ways to provide water."

``We don't have water," a Pentecost island resident told Australian Broadcasting radio. ``All our pipes, tanks...were broken. We have a river but we have to go down to the river where the water is dirty and we have to boil the water and carry it back." Vanuatu's Prime Minister Barak Sope said his government would do all it could to rebuild the earthquake-struck island.

``Me and my government will do all we can to restore life on South Pentecost," Sope told Vanuatan radio.

Pentecost island -- which has a population of about 12,000 and is about 22 miles long and 7 miles wide -- was the worst hit area.

Five youths were crushed when a church in which they were holding a choir practice collapsed around them, and several were believed washed out to sea after the tsunami, a swift-travelling sea wave caused by the quake, hit island's the southern coast.
Earlier reports had put the death toll at 12 people.

The earthquake -- believed to be one of the most severe recorded in the Vanuatu region -- measured 7.1 on the Richter scale according to the National Earthquake Information Center in Golden Colorado, and 7.3 according to the French Earth Sciences Observatory.

The quake's epicenter was 54 miles north of the Vanuatu capital of Port Vila. It was also felt strongly on the islands of Ambrym and Epi.

The earthquake was followed within half an hour by a Tsunami that swept ashore at Baie Martelie in the island's south.

``Our first priority is to get people who are seriously injured to hospital," Pakoa said. Five seriously injured people, some suffering broken limbs after being hit by fallen trees, had been flown to Port Vila hospital.

Vanuatu Catholic Church administrator Father Celestine Tari told Reuters on Saturday the quake had damaged the largest Catholic church in Vanuatu at Melsisi mission station on Pentecost island's west coast.

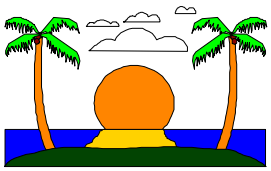
``I believe it is one of the strongest buildings. It seems that many buildings have been

broken down," he about. ``In the area where the Catholic mission is, the damage is extensive."

Further information on the deaths and the extent of the damage was expected after an assessment team returned from the island later on Sunday. The helicopter was loaned by the French army from a base in nearby New Caledonia.

Vanuatu comprises about 80 islands, located northeast of New Caledonia and northwest of Fiji. The tsunami was the region's worst since one that killed more than 2,000 people on the north coast of Papua New Guinea last year.

Pacific Weather Update



The following information was obtained from the Pacific Islands Report. The web site can be visited at:
http://pidp.ewc.hawaii.edu/pireport/graphics.htm

SOUTH PACIFIC APPLIED GEOSCIENCE COMMISSION (SOPAC)
Suva, Fiji Islands
Press Release September 15, 1999

METEOROLOGY: VARIABILITY AND CHANGE

By Dr Russell Howorth, Program Manager, SOPAC Secretariat

Variability and change are two words in the English language with overlapping meanings. So often in recent times I have seen and heard them misused, confused and mean different things to different people in the context of climate. Principally it appears that the confusion arises over the time period being considered.

Recently, at the Sixth Regional Meeting of Directors of Meteorology organized by the South Pacific Regional Environment Program (SPREP), the World Meteorological Organization (WMO) and METEO France in Tahiti, French Polynesia I heard the most simple and clear distinction being made. In the Weather Service of the United States "climate variability" means seasonal to inter-annual (year to year) changes, whilst "climate change" means changes taking place over periods of a decade or longer.

This distinction allows me at least to clearly put in perspective: (i) natural, ongoing climate variability on the one hand, and (ii) longer term climate change which may result from carbon dioxide and other "greenhouse-gas" build-up in the atmosphere as a result of human activity. The likely impact in the Pacific small island developing states of these latter changes, should they occur, can then
be considered.

In the Pacific island states of crucial and immediate importance and relevance is coping with natural climate variability in the course of development on individual islands. Unfortunately, the political and international agenda is focused on climate change. Therein lies a teaser.

Equally important is to recognize and the fact that whether climate changes or not in the coming decades, the impacts of natural climate variability are certain to increase.

In recent years development, and increased rates of development, in the region has stressed the natural environment. Sheer increase in population in certain areas is manifest in the inability of water resources systems to cope. Natural climate variability, including El Nino and La Nina events, also demonstrate that stress build-up. The somewhat extreme El Nino of 1997-98 is witness to that, but who
remembers the impacts of the equally severe 1982-83 El Nino??

In concluding, readers will be aware that at no stage have I mentioned sea-level rise, which is so often a focus of discussion in the context of climate issues in the region. I hope that I have made the point that in my mind there are immediate issues that need addressing irrespective of whether sea level rises or falls in the next few decades.

Finally let us not forget that droughts, cyclones, intense rain periods and other climate events with severe impact in the short term do occur as part of what we accept as "normal weather" periods.... Disasters do happen, are we prepared?

PACIFIC LEADERS RELUCTANTLY YIELD TO GLOBAL FORCES AT PALAU PACIFIC ISLANDS FORUM SUMMIT
By Michael Field

KOROR, Palau (October 4, 1999 – Agence France-Presse)---A 16-nation Pacific summit was due Tuesday to issue its communiqué, which marks a return to consensus and a reluctant agreement that, like a marriage, they cannot get everything they want.

Following a daylong retreat, Kiribati President Teburoro Tito acted as spokesman for the Pacific Islands Forum --renamed from the South Pacific Forum. He said they had made decisions on their approach over the transshipment of nuclear wastes, the program for setting up a free trade zone, climate change issues and a statement on East Timor.

Climate change two years ago caused a crisis within the summit when Australian Prime Minister John Howard would not allow the Forum to adopt a stronger stance on the issue. Breaking with a tradition of consensus, he insisted on his approach.

However, Tito made it clear that the Forum was back in a consensus mode – and this meant it would not review the climate stance decision.

Pacific leaders are disappointed at what they see as slowness by nations to adopt the Kyoto Protocols, which specify carbon emissions. But they would not be making a stronger statement as to do so "would go back to open the wounds" of the Forum session two years ago. Consensus was reached to make a softer statement. "That is the way life works. We can't have everything. Its like husband and wife;
you cannot have everything." But Tito agreed that, like the other Pacific nations, Kiribati now would go along with it. "I must admit we now see this as a necessity to meet the global forces. "I don't know who has the button on the global forces but our responsibility is to respond to them before the global waves hit our shores. "We just have to prepare ourselves for the global waves."

The Forum changed its name to recognize the central and north Pacific countries in its ranks and had resisted some calls to hold its annual summits every two years instead. It will remain an annual event, with next year's Forum meeting to take place in Kiribati. He said leaders agreed to take more control of the process, which had seen officials do most of the work before leaders even showed up. "The leaders feel that they are making the decisions.... The leaders feel they should be chewing more meat rather than just swallowing the meat."

LITTLE EVIDENCE TO SHOW PACIFIC OCEAN RISING DUE TO GLOBAL WARMING: SCIENTIST
By Michael Field

KOROR, Palau (October 4, 1999 – Agence France-Presse)---Pacific countries claiming to be losing islands and land to the rising ocean may be doing it to themselves rather than as a consequence of any man-made global warming effect, South Pacific Forum officials were told here Monday. The director of Australia's National Tidal Facility of Flinders University, Wolfgang Scherer, told a briefing that it was possible that the Pacific might be rising by up to two millimeters a year, but the effect was wildly variable across
the region.

In some places, such as Rabaul in Papua New Guinea, rising land levels are occurring due to volcanoes, while part of Australia is rising, causing a lowering of sea level. The 30th South Pacific Forum summit is under way here Monday with climate change a major agenda issue. Leaders have tended to portray the issue in terms of the industrial world creating a global environment which is leading to rising sea levels and the flooding of low-lying atoll states.

Earlier this year, Kiribati claimed two of its islets in Tarawa had "disappeared" due to rising sea levels while Tuvalu, to the south, claims its coastline is sinking due to what it says is the rising sea level caused by global warming.

Scherer, who is part of a Pacific-wide sea level monitoring program, said it was virtually impossible to identify any manmade effects on sea level change. "You are playing a millimeter game with millimeter effects," he said, and added he would not want to speculate at this point on whether anything long term was happening to the sea level. The data, he said, are too little and too recent. However, he said it was clear that relative sea level rises in places like Kiribati may have nothing to do with the global situation but rather with the way in which the local

freshwater aquifers under each atoll are used.
If they are over used by the local population, atolls themselves can rise and fall, letting in more seawater to the fresh ground water and flooding garden pits, giving the effect of sea level rises. "The land itself is not stable. It is moving and often it is moving because of local issues." He said the early data suggested that the Pacific sea level might be rising by an average of two millimeters a year, but this is not uniform across the region and findings often are based on data less than 10 years old.

In Kiribati, the data show the sea level fell by 21 millimeters while, just to the north, the Marshalls show it rose 2.9 millimeters. "We are not finding places where the sea level rise is very strong," Scherer said. Scientists have little idea of what is happening to the land itself, whether it is rising or falling, and have no solid information on what the seabed floor is doing.

"The question is, what is happening to the volume of the oceans? That is the real critical question.... and we are a long way from being able to (solve) that problem." While scientists cannot demonstrate any sea-level rise or any relationship to manmade activities, Scherer said there was the possibility of global warming still leading to an acceleration in the rise. This could occur through a speeding up of El Niño events, which tended to increase the sea level in the Pacific.

"We cannot preclude the very definite possibility that the ocean may respond with an acceleration of sea level rise, even in the shorter term."

CONTROLLING GREENHOUSE GAS EMISSIONS - THE PNG EFFORT
By Neville Choi

PORT MORESBY, Papua New Guinea (September 30, 1999 – The Independent)---In recent years, the importance of protecting the earth's atmosphere has taken a more significant role in many countries all over the world. Through their governments, nations have recognized the gravity of protecting the earth's atmosphere and begun environmental programs designed to reduce levels of gases harmful to the atmosphere. These harmful gases are known as greenhouse gases.

Papua New Guinea, though a member of countries working toward controlling harmful gas emissions into the atmosphere, has still to realize the importance of being even more involved in the battle to save the earth's atmosphere from further damage and the potential of utilizing its natural resources to commercially benefit from the exercise.

To understand how PNG can benefit from helping to save the earth's atmosphere, more people have to be made aware of the country's biodiversity potential and how the government can use this to help the country's own socio-economical stance. One of PNG's leading environmentalists, Dr. Simon Saulei, realizes the potential of the country's biodiversity and what harnessing the commercial options of our
natural resources can do. One activity, which he says can be beneficial to the country's economy, is to establish a carbon offset industry in PNG to control greenhouse gas emissions.

Causes of Greenhouse Gases

The term 'greenhouse' is the result of gases in the atmosphere trapping the sun's warmth and raising the temperature on earth by about 33 degrees Celsius. It is a natural process and is what provides life to plants and animals, including humans. However, over hundreds of years man's activities have substantially increased atmospheric concentrations of greenhouse gases such as carbon dioxide. This human-induced warming is known as the enhanced greenhouse effect. Scientists studying greenhouse effects have concluded that the continually growing emissions of greenhouse gases will accentuate the natural greenhouse effects, thus resulting in wide ranging potential impacts on the natural environment and national and global socio-economic systems. These include climate changes on global, regional and local weather patterns and rising sea levels.

Projections In Global Warming

Global emissions of the main greenhouse gas, carbon dioxide, have grown from about 2Gt (or billion tons) of carbon a year in the first half of this century to the current estimate of over 7 billion tons a year due to human activities. It is anticipated that in the short term, further increases are inevitable. In analyzing global warming projections, the Intergovernmental Panel on Climate Change (IPCC) looked at six scenarios for future carbon dioxide emissions based on a wide range of assumptions about population and economic growth, land use and technological changes and energy use. Its lower estimate has emissions rising
slightly until 2025 and then falling to 5 Gt a year by 2100. At the other extreme, emissions keep rising at a fairly steady rate, reaching 35 Gt a year by 2100. Based on the scenarios, the IPCC concludes that global mean surface

air temperature is likely to rise between 1 degree Celsius and 3.5 degrees Celsius by 2100. With all the scenarios put together producing an average rate of warming greater than any seen in the past 10,000 years.

What this means is that the effects of global warming will vary around the globe. Temperature increases are expected to be greater towards the poles than nearer the equator, and over land than at sea. While rainfall is expected to increase in some areas and decline in others, predictions for particular regions are still highly uncertain. In addition, it is expected that there will be a number of impacts of the climate changes, which include:

· A reduction in biodiversity as plants and animal species not adapted to the changed conditions in a region may die out;

· Changes in the intensity of droughts and floods, and the availability of water for domestic, industrial and other uses;

· Changes in agricultural productivity, which is expected to increase in some areas and decrease in others;

· Threats to human health due to an increase in geographical range of insects that carry diseases such as malaria; and

· Increases in the intensity and duration of heat waves.

Situation In PNG

PNG is highly vulnerable to the impacts of climate change as it encompasses more than 17,000 kilometers (10,200 miles) of coastline, and has almost 2,000 coastal villages and a rural coastal population of about 500,000 making it vulnerable to sea level rise and other weather-related manifestations of climate change. The IPCC projects average sea level rise from 15-19 cm by 2100, due to global warming, with sea levels continuing to rise beyond this timeframe. The extent of the rise will vary around the world. In some areas, problems caused by rising seas may be intensified by an increased risk of storm surges. The populations of some delta areas and low-lying islands will face increased danger from flooding and being submerged under water. Other likely impacts include erosion of shores and associated habitats, and increased salt levels in estuaries and freshwater aquifers in coastal margins.

PNG Estimated Greenhouse Gas (GHG) Emissions

PNG is a relatively small source of GHG emissions, and its primary source is currently coming from the change in land-use patterns. According to the World Resource Report for the period 1994-95, land-use change in 1991 accounted for 29 million tons of carbon dioxide emissions, while energy and industrial-related emissions accounted for only 2.2 million tons. Methane emissions in PNG are estimated at around 10,000 tons per annum from a combination of solid waste disposal and livestock. Hydropower provides the mainstay of PNG's electricity requirements, and the potential for expansion is quite enormous. However, there are also other potential energy sources which could be tapped and which will further contribute to GHG emissions, such as wind, solar thermal and biomass.

Already, alternative sources of fossil fuel have been investigated, such as coconut fuel and methane and alcohol from various biomasses, but these need to be further researched. It is the view of many experts that increased export-oriented exploitation of the country's oil and gas reserves could increase the country's energy-related emissions over time. As PNG is a signatory to the United Nations Framework Convention on Climate Change, it is obligated to prepare annual GHG inventories of its emissions of greenhouse gases according to international guidelines. Some of the things required in these inventories include:

· Establishing emissions patterns and trends;

· Providing a starting point for the compilation of emission projections (this was done in 1994);

· Providing essential information for the development of sectorial GHG mitigation measures and highlighting sectors requiring particular attention. So far, PNG has identified six areas: agriculture, land-use changes and forestry, energy, industrial products, solvents and other products use and wastes;

· Identifying potential sinks (natural resource rich sections of the country) whose enhancement could provide offsets for emissions from other sectors;

· Providing information/data to assist in assessing the effectiveness of mitigation measures; and

· Providing for comparison of PNG's GHG emissions against other parties to the Framework Convention on Climate Change (FCCC).

ASIAN LOGGERS IN PNG AND SOLOMONS DAMNED IN GREENPEACE REPORT

PORT MORESBY, Papua New Guinea (October 7, 1999 – The Independent)---A report released this week by the non-governmental environment group Greenpeace has revealed massive dominance of unsustainable logging by a few Asian transnationals in Papua New Guinea and the Solomon Islands. The report, "Buying Destruction: A Greenpeace Report for Corporate Consumers of Forest Products," profiles 150 logging and wood-trading companies active in the forests of PNG, the Solomon Islands, Brazil, Guyana, Chile, Suriname, Cameroon, Gabon, Indonesia, Canada and Russia.

"These top companies together log half of the total round wood produced annually by these nations. They have access to a forest area of well over 80,000,000 hectares - an area nearly three times the size of new Zealand," a statement from Greenpeace reads. According to Greenpeace, in PNG, Malaysian logger Rimbunan Hijau is estimated to control around half of the country's total timber production.

Rimbunan Hijau is also present in Vanuatu and the Solomon Islands, Brazil, Gabon and New Zealand. Malaysian interests own 96 percent of the concessions in PNG. Another Malaysian company, WTK, has a presence in PNG, Brazil and Gabon. Greenpeace says the report estimates that there are 17 million hectares of ancient forest in PNG and the Solomon Islands remaining. Of this, over 60 percent is under major threat. It says industrial logging and the expansion of shifting cultivation pose particular threats to Oceania's forests.

"This information is alarming, particularly in light of recent developments in the South Pacific," says Greenpeace Pacific's Grant Rosoman.

Mr. Rosoman said that through the report, "Buying Destruction," Greenpeace is calling on all the companies using wood and paper products to find out where their wood comes from and to end their role in forest destruction.

"'Buying Destruction' urges corporate consumers of forest products to stop buying from suppliers whose practices contribute to ancient forest destruction, inform suppliers that their company will give preference to sustainable harvested products, and more towards adapting demand for wood to fit with the natural supply," he said.

PACIFIC WEATHER FORECASTERS CONCERNED ABOUT END TO CRUCIAL EUROPEAN FUNDED PROGRAM

SUVA, Fiji Islands (October 12, 1999 – Radio Australia)---Concerns have been raised by weather forecasters in the Pacific region about the future of a European Union funded project, which has helped them acquire equipment and provide for training needs.

As Radio Australia correspondent Ofa Kaukimoce reports, the forecasters discussed the matter during a training workshop on public weather and warning services currently under way in Fiji's western town of Nadi.

"The program includes a four-year-old Cyclone Warning Upgrade Project which ends in September next year. Headed by Australian meteorologist Neville Koop, the project provides equipment, training and consultancies to those Pacific countries that are signatories to the Lomé Convention.

"It has provided essential support for the Nadi Weather Office, which serves the region with an EMWIN computer system, which helps forecasters to see satellite images of weather patterns around the world.

"Participants were told that there is no chance of extending the project because the Lomé Convention, which the project falls under, will expire at the end of next year.

"Participants were urged to develop a proposal for a follow-up project on the upgrading of cyclone forecasting systems.

"Ofa Kaukimoce, Nadi."

RECORD OCTOBER RAINFALL IN TONGA

NUKU'ALOFA, Tonga (October 22, 199 –Radio Tonga)---One of the highest monthly rainfalls on record continues to drench Tonga.

A weather bureau spokesperson, calling the rains "unusual," reported that over 11 and a half inches of rain fell on the capital during the October 1- 19 period, and the downpours are continuing. He said the change in the amount of rain is due mainly to the warming of the earth's atmosphere.

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME (SPREP)
Apia, Samoa
MEDIA RELEASE October 27, 1999 Bonn, Germany
PACIFIC ISLAND COUNTRIES SPELL OUT CAPACITY BUILDING NEEDS AT CLIMATE SUMMIT

The international community must take an integrated approach in helping small island states boost their capacity to deal with disruptive climate change and sea-level rise, Pacific Island countries said today.

Delegates from nine Pacific Island countries attending the Climate Convention conference being held this week in Bonn, Germany, said the Climate Convention and its Kyoto Protocol contained ten separate references to the need to improve the capacity of developing and vulnerable countries to meet their Convention commitments and begin the steps they would have to take to adapt to climate change.

They said these provisions needed to be gathered under one umbrella, to provide a coherent framework within which specific projects can be designed.

Mr. John Mooteb from the Federated States of Micronesia said it was critical that capacity building projects should be driven by the needs of the country. "What the donor community thinks we need is not always appropriate," Mr. Mooteb said. "For example, one of our outer islands was given a huge walk-in refrigerator. But it uses too much electricity, and it is too big for that community's needs. So instead it is being used as a storage shed."

Vanuatu delegate Mr. Russell Nari said it was also essential that projects should be designed so their effects continued long-term. "If you introduce a new technology, you can't just walk in and walk out. The country receiving that technology needs to know how to operate and maintain that technology. And it has to be cross-checked to make sure the country can afford to maintain and operate it long-term."

Mr. Nakibae Teuatabo from Kiribati said small island states urgently needed assistance in developing the planning and decision-making tools they would need as climate change impacts became more severe.

"We need to be able to apply the tools, and we need to be able to collect necessary data and establish data systems," Mr. Teuatabo said. "Our capacity building needs cover a wide range of areas, but some of the more pressing include data gathering and analysis for vulnerability and adaptation options studies and compilation of greenhouse gas inventories. We also need a broad range of skills, research and technologies to help us deal with coastal erosion."

Mr. Teuatabo said another specific need in Kiribati was research to establish a definition of drought, so the public could receive drought warnings. "Then there is the growing need to protect our coasts. We are interested in establishing mangroves as a first line of protection, but we need assistance in investigating whether mangroves will grow in certain locations, how to carry out a pilot project, which varieties to select, how to grow young plants in nurseries and how to transplant them."

He said as well as integrating capacity building provisions in the Climate Convention, there was also a need to integrate regional initiatives. "One country may already have knowledge and skills that could be applied in another as well. We need assistance in pooling our regional knowledge."

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME (SPREP)
Apia, Samoa
Press Release November 3, 1999
PACIFIC ISLAND COUNTRIES CRITICIZE INACTION OVER CLIMATE CHANGE

Pacific Island countries today expressed severe disappointment that the rest of the world had failed to decide on immediate actions to reduce greenhouse gas emissions and help vulnerable countries adapt to climate change.

Speaking at a press conference held during the Climate Convention Conference being held in Bonn, Germany, eight Pacific Island countries described a broad range of disruptive climate and sea level changes which they were experiencing now, and said there was an urgent need for global action to stop global warming and climate change.

Describing the extent of coastal erosion in some parts of the Kingdom of Tonga, Tongan spokesman Mr. Taniela Tukia said four years ago officials from the Ministry of Lands, Survey and Natural Resources spent a week

in one particular area searching for survey pegs from the 1927 survey of Tonga. "Eventually they found them under water," he said.

Palau Congressman Surangel Whipps described how coral bleaching had devastated parts of Palau's coral reefs, declared by the Smithsonian Institute to be one of the seven wonders of the underwater world. He said in all his sixty years he had never seen such destruction.

Hon. Pokotoa Sipeli, the Minister of Meteorology, Climate Change and Environment for the Government of Niue, said breadfruit trees, which supply a staple food, used to fruit for three months of the year. Now, however, they were developing fruit all year, but the immature fruit was dropping off before it ripened.

In Kiribati, Ms. Karibaiti Taoaba said some villages were being forced to move inland because of worsening coastal erosion.

Ms. Myra Moekaá from the Cook Islands said as well as increased coastal erosion, her country had suffered a recent increase in the frequency and severity of cyclones. "Time is running out for us," she said. "We call on the handful of parties stalling negotiations to allow matters to move forward."

Mr. Russell Nari from Vanuatu also noted an increase in the frequency and severity of cyclones, and said rising seas were covering some low-lying coconut plantations. He said all Pacific Island countries attending the Climate Convention Conference were disappointed that there were no decisions to take immediate action.

"The way we look at it now, other countries are using all the excuses in the world to get out of actually reducing their emissions. And the discussions on mechanisms to help developing countries reduce emissions worry me. Industrialized countries seem to be using these mechanisms as a cheaper way to reduce emissions overseas without doing anything about their own domestic emissions."

Mr. Dennis Bebego from Papua New Guinea agreed. "There are serious changes actually happening now in the Pacific and in other developing countries," Mr. Bebego said. "There's sufficient documentary evidence to warrant action on the Climate Convention's Articles dealing with promises to help countries particularly vulnerable to climate change. This conference should take a specific decision on that one."

He said Pacific island countries were not just sitting back asking for help.

"Eight countries have now fulfilled their Convention commitments by compiling National Communications which detail greenhouse gas emissions, vulnerability to climate change and adaptation options. They are now looking to developed countries to also fulfill their commitments."

CLIMATE EXPERT SAYS A WARMING SUN IS THE MAIN CAUSE OF RISING SEAS

MELBOURNE, Australia (November 10, 1999 – Radio Australia)---A United Nations climate expert claims that rising sea levels are mainly due to the sun heating up, and not to greenhouse gas emissions.

Dr. Robert Balling, a researcher and professor at Arizona State University, says greenhouse gas concentrations have dropped and satellite and balloon atmospheric measurements show no warming.

Dr. Balling, currently in Australia for an international conference on climate change, says while sea levels have risen, they are not due to greenhouse gas emissions.

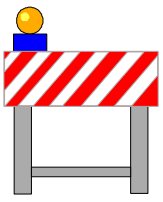
"I think if you look in the past century, there's ample evidence that sea levels have risen. There's equal evidence that the global temperature has increased.

"A point that I make over and over is that that doesn't immediately implicate the build up of greenhouse gases.

"We know that the sun has been getting brighter over the past century. So if one were to look at the scientific literature you would find that many people are discussing why the planet temperature may have risen half a degree, thereby causing sea levels to rise.

"But by no means has there been a consensus it's been caused by a buildup of greenhouse gases," Dr. Balling said.

SPaRCE Web Page Under Construction



The SPaRCE web page has moved to a different address. Unfortunately, during this relocation, many links were damaged and will have to be repaired. We

apologize for the inconvenience and hope to have the new web site operating in the near future.
The new web address is
http://www.evac.ou.edu/sparce/

La Niña Update

Note: The following information was obtained from the NASA Jet Propulsion Laboratory (JPL) web site at **http://www.jpl.nasa.gov** at the California Institute of Technology. The images associated with the article(s) can be found at this site.

Mild La Niña conditions developing
November 29, 1999

Unusually warm weather ocean temperatures off Asia and cool waters in the eastern and equatorial Pacific are signaling La Niña's mild return, according to the latest sea-surface heights observed by the joint NASA-French space agency's TOPEX/Poseidon satellite.

Lower than normal sea-surface heights in the eastern North Pacific and abnormally high sea-surface heights in the western and mid-latitude Pacific are expected to drive storms coming out of the Pacific this winter, the mission data indicate.

Unusual conditions persist in the western and mid-latitude Pacific Ocean as well, with higher than average sea-heights of between 8 and 24 centimeters (3 to 9 inches). These areas of increased sea-surface height and unusually warm water were present last year, but the increase in height has surpassed last year's measurements.

The TOPEX/Poseidon satellite's measurements over the last seven and a half years have provided scientists with a comprehensive record of the 1997 – 1999 El Niño/La Niña climate pattern by measuring changing sea-surface heights to within 4 centimeters (1.5 inches) precision.

La Niña conditions likely to prevail
October 20, 1999

TOPEX/Poseidon has detected lower than normal sea-surface heights in the eastern North Pacific and unusually high sea-surface heights in the western and mid-latitude Pacific. The height of the sea surface over a given area is an indicator of ocean temperature and other factors that influence climate.

A mirror image of previous oceanic profiles prevail in the western and mid-latitude Pacific Ocean, where higher than normal sea-surface heights are currently about 20 centimeters (8 inches). Unusually warm temperatures have persisted and topped last year's temperatures, said Dr. William Patzert, an oceanographer at NASA's Jet Propulsion Laboratory, Pasadena, California.

"These unbalanced conditions will undoubtedly exert a very strong influence on climate over North America this fall and winters," Patzert said. "Our profile of high sea-surface heights and warm temperatures in the western Pacific Ocean contrasts with low sea-surface heights and cool conditions in the eastern and equatorial Pacific. Those conditions will have a powerful impact on the weather system delivering jet streams out of the North Pacific."

"Clearly, these unusual conditions, which have persisted for 2 ½ years will not be returning to normal any time soon," Patzert said. "This climate imbalance is big and we're definitely going through a decade of wild climatic behavior. But when we look back at the climate record over the past century, we've seen behavior like this before."

SPaRCE Biography

Howdy! I am Chris Huffer. I grew up on a dairy farm outside of Marshall, Oklahoma, which is known for having the state's "widest

concrete Main Street."

Since Oklahoma has taken on the name "Tornado Alley," I have gotten to see some really fascinating weather. Some of the weather I've experienced has been strong wind, hail, thunderstorms, tornadoes and winter storms. The ever-changing weather was neat to observe.

Chris Huffer on graduation day 1998.

In 1990 I enrolled at the University of Oklahoma to pursue degrees in meteorology and journalism. I received my Bachelors Degree in Journalism in May of 1995 and my meteorology degree in May of 1998. I began part-time work with EVAC after my graduation in 1998 and began to work full-time in September of 1998. I have been working with Susan Postawko since then. It has been a good opportunity for me to apply my meteorological skills to educational outreach work and has allowed me to meet interesting people.

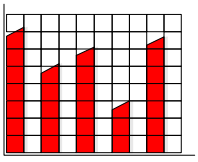
The educational outreach program I work with is called GLOBE (Global Learning and Observation to Benefit the Environment). Student participants worldwide take environmental measurements (atmosphere, hydrology, soils and land cover/biology) and enter the data collected into a computer data base for analysis and quality control by scientists.

I participate in Teacher Training Workshops for teachers who wish to become involved with the GLOBE project. I discuss with these teachers the importance of having these measurements and how they can get their students involved in understanding weather and its effects on the environment.

Through meteorology and trying to forecast weather here in Oklahoma, I get to enjoy working with and helping people. My future plans are to be in broadcast television., hopefully as a television meteorologist here in Oklahoma. The public will always need to know what weather is going to do and what to do to protect themselves from its elements.

Part of my free time is spent Ballroom dancing. I spend time socially dancing the Swing, Foxtrot, Waltz, Polka and Latin to name a few. I am very active in my community and here at the University of Oklahoma.

How does your school rank?



Beginning with this newsletter, you will be able to compare the number of observations your school has made versus how many observations other schools have made. The table of observations, located on the last few pages of this newsletter, lists the year that a school joined the program (this is generally based on the date of the first data sheet sent in), the school name, number of observations, date of the last data sheet sent in, and the number of gages at each school. Take a look and see who has the most observations!

Bon Voyage and Good Luck!

We are wishing a farewell to two more of our fellow co-workers. Brad McGavock and Barbara Gibson will be leaving SPaRCE Headquarters for new jobs in New Mexico and Hawai'i, respectively.

Brad McGavock joined the SPaRCE crew in 1997. Since receiving his Bachelor's degree in meteorology, he has been working on the Surface Reference Data Canter (SRDC). Brad will be joining the National Weather Service in Albuquerque, New Mexico at the end of December.

Barbara Gibson was instrumental in beginning the SPaRCE Program. As Project Coordinator, Barbara traveled to the South Pacific extensively, attended and lead numerous workshops, and developed much of the pH material that SPaRCE sends to you, the participant. Barbara is close to completing her Ph.D. in an interdisciplinary Geosciences program. She will be joining The Nature Conservancy (TNC) in Honolulu, Hawai'i in January.

Everyone at SPaRCE and EVAC would like to congratulate both Brad and Barbara on their achievements, thank them for their dedication and efforts, and wish them the best of luck.